

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
- UNINCORPORATED PLACE



PLANS OF PROPOSED IMPROVEMENTS ON THE
PRIMARY ROAD SYSTEM
LINN COUNTY
BRIDGE REPLACEMENT - PPCB
US 151 IN FAIRFAX OVER PRAIRIE CREEK

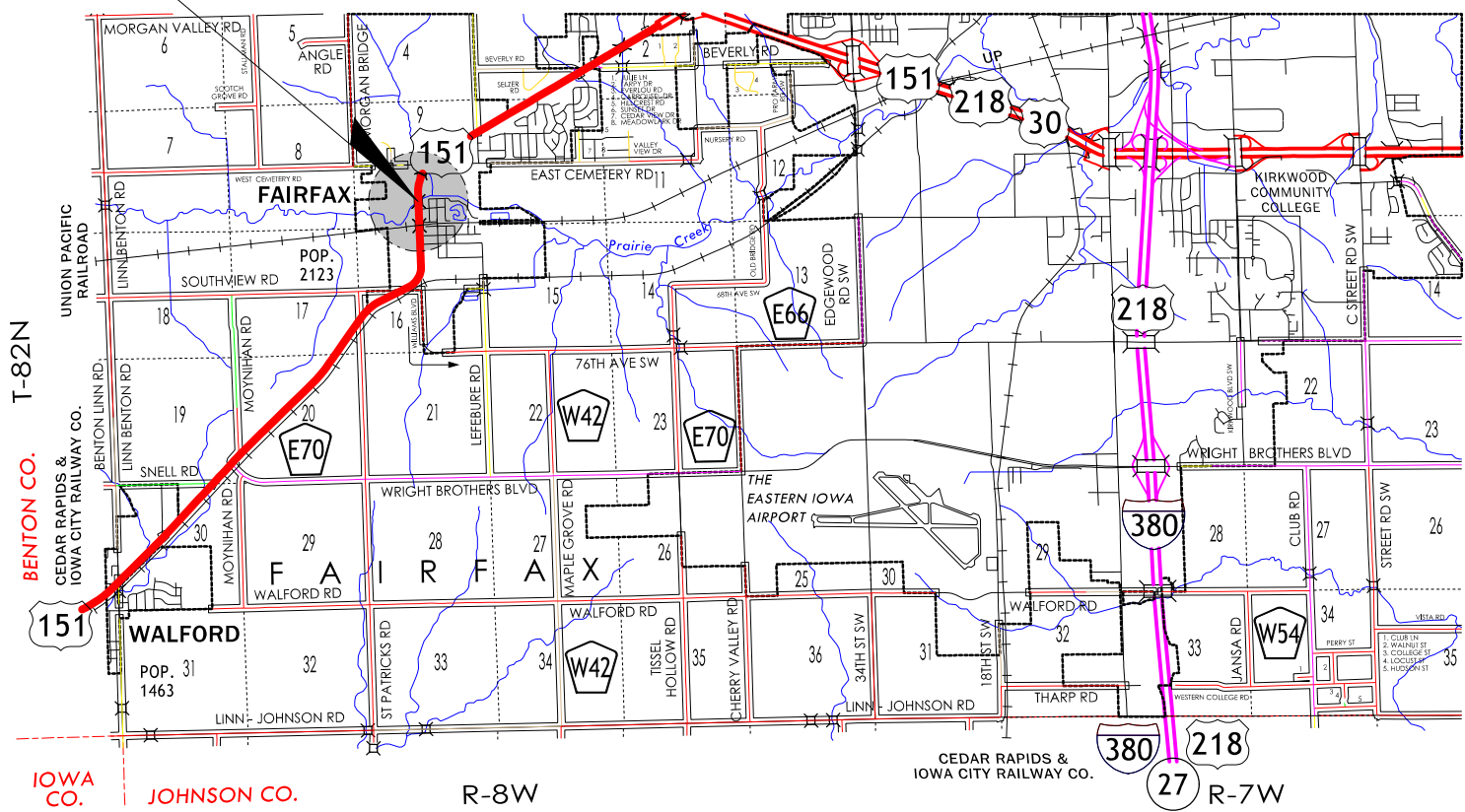
THE IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.

REVISIONS

	TOTAL SHEETS
	63
PROJECT NUMBER	
BRF-151-3(142)--38-57	
R.O.W. PROJECT NUMBER	
NHSN-151-3(147)--2R-57	
PROJECT IDENTIFICATION NUMBER	
08-57-151-020-03	

INDEX OF SHEETS	
NO.	DESCRIPTION
1	TITLE SHEET
2	ESTIMATE SHEET - DESIGN 518
2-60	DESIGN 518
SPS.1-SPS.3	SOIL PROFILE SHEETS

DESIGN 518



LOCATION MAP

IOWA ONE CALL
1-800-292-8989
www.iowaonecall.com
811
Know what's below. Call before you dig.

DESIGN DATA URBAN				
2013	AADT	8,100	V.P.D.	
2040	AADT	12,010	V.P.D.	
2040	DHV	1,255	V.P.H.	
TRUCKS		6	%	
Total Design ESALs		---		

INDEX OF SEALS		
SHEET NO.	NAME	TYPE
1	LILI YANG	STRUCTURAL DESIGN
6	ADAM R. BULLERMAN	HYDRAULIC DESIGN
SPS.1	ANNA M. SMITH	GEOTECHNICAL DESIGN

STRUCTURAL 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.

Signature: *Lili Yang* Date: 9-4-2018
Printed or Typed Name: Lili Yang

My license renewal date is December 31, 2018

Pages or sheets covered by this seal: SHEETS 1 THRU 60 OF 63

PROJECT DIRECTORY NAME: 5715102008

ESTIMATE REFERENCE INFORMATION			ESTIMATE REFERENCE INFORMATION		
ITEM NO.	ITEM CODE	DESCRIPTION	ITEM NO.	ITEM CODE	DESCRIPTION
9	2404-7775000	REINFORCING STEEL - -	18	2501-0201057	PILES, STEEL, HP 10 X 57 PILING SHALL BE GRADE 50. INCLUDES FURNISHING AND INSTALLING STEEL PILE POINTS.
10	2404-7775005	REINFORCING STEEL, EPOXY COATED - -	19	2501-6335010	PREBORED HOLES 10'-0 PREBORE REQUIRED AT EACH ABUTMENT PILE LOCATION.
11	2404-7775009	REINFORCING STEEL, STAINLESS STEEL - -	20	2501-8400172	TEMPORARY SHORING INCLUDES ALL COST FOR DESIGNING, FURNISHING AND INSTALLING THE SHEET PILE SHORING. SHORING TO REMAIN UNTIL BEGINNING OF STAGE 2 ABUTMENT CONSTRUCTION.
12	2407-0562865	BEAMS, PRETENSIONED PRESTRESSED CONCRETE, BTB65 INCLUDES PIER AND ABUTMENT BEARING MATERIAL. NONSTANDARD STIRRUP LENGTHS ARE USED FOR THIS BEAM. INCLUDES CONTRACTOR FILLING OUT BEAM NUMBERS BY LOCATION AND BEAM SEAT ELEVATIONS IN "PPC BEAM DATA SPREADSHEET" AND FILLING OUT TOP OF BEAM SHOTS IN "BRIDGE DECK GRADE ADJUSTMENT SPREADSHEET" AND FORWARDING ELECTRONIC SPREADSHEET TO THE ENGINEER.	21	2507-2638650	BRIDGE WING ARMORING - EROSION STONE INCLUDES FURNISHING AND PLACING ENGINEERING FABRIC, EROSION STONE, AND ALL REQUIRED EXCAVATING, SHAPING AND COMPACTING FOR WING ARMORING.
13	2407-0562875	BEAMS, PRETENSIONED PRESTRESSED CONCRETE, BTB75 INCLUDES PIER AND ABUTMENT BEARING MATERIAL. NONSTANDARD STIRRUP LENGTHS ARE USED FOR THIS BEAM. INCLUDES CONTRACTOR FILLING OUT BEAM NUMBERS BY LOCATION AND BEAM SEAT ELEVATIONS IN "PPC BEAM DATA SPREADSHEET" AND FILLING OUT TOP OF BEAM SHOTS IN "BRIDGE DECK GRADE ADJUSTMENT SPREADSHEET"AND FORWARDING ELECTRONIC SPREADSHEET TO THE ENGINEER.	22	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01,B,3, OF THE STANDARD SPECIFICATIONS.
14	2408-7800000	STRUCTURAL STEEL INCLUDES ALL COSTS FOR FUNISHING AND INSTALLING STEEL INTERMEDIATE DIAPHRAGMS.	23	2507-6800061	REVETMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
15	2414-6424110	CONCRETE BARRIER RAILING INCLUDES CONCRETE BARRIERS ALONG EAST EDGE OF BRIDGE DECK. INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING THE RIGID STEEL CONDUITS, JUNCTION BOXES AND FITTINGS. INCLUDES 230 LF OF ONE 2" DIAMETER RIGID STEEL CONDUIT IN EAST BARRIER. 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.	24	2533-4980005	MOBILIZATION - -
16	2414-6425410	CONCRETE BARRIER, REINFORCED, SEPARATION INCLUDES CONCRETE SEPARATION RAIL ON DECK AND APPROACH SLABS. 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. INLCUDES DRILLING AND GROUTING BICYCLE RAILING ANCHOR RODS AND THE DOWELS OF THE SEPARATION END SECTION AT SOUTH APPROACH SLAB.	25	2599-9999009	(‘LINEAR FEET’ ITEM) ALUMINUM PEDESTRIAN RAILING INCLUDES ALL NECESSARY HARDWARE AND MATERIALS REQUIRED TO FABRICATE AND INSTALL PEDESTRIAN ALUMINUM RAILING ALONG WEST EDGE OF DECK, INCLUDING DRILL AND GROUT ANCHOR BOLTS ON TOP OF CURB. PAYMENT SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, EQUIPMENT AND LABOR AND FOR PERFORMANCE OF ALL WORK NECESSARY FOR FABRICATING AND INSTALLING ALUMINUM PEDESTRIAN RAILING AS PER PLAN.
17	2499-2300001	DECK DRAINS INCLUDES 10 EACH OF 8"X4" TUBE DECK DRAINS AT 92 LB EACH AND 5 EACH OF TRAIL AESTHETIC DECK DRAINS. REFER TO THESE PLANS FOR LOCATIONS, MATERIALS AND THE DETAILS OF THE CONSTRUCTION. INCLUDES ALL NECESSARY HARDWARE AND MATERIALS REQUIRED TO FABRICATE AND INSTALL DECK DRAINS, INCLUDING STRUCTURAL STEEL AND TRENCH GRATE CASTINGS. THE PAYMENT SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, EQUIPMENT AND LABOR AND FOR PERFORMANCE OF ALL WORK NECESSARY FOR FABRICATING AND INSTALLING THE DECK DRAINS AS PER PLAN.	26	2599-9999009	(‘LINEAR FEET’ ITEM) ALUMNUM BICYCLE RAILING, SEPARATOR INCLUDES ALL NECESSARY HARDWARE AND MATERIALS REQUIRED TO FABRICATE AND INSTALL BICYCLE ALUMINUM RAILING ALONG WEST FACE OF SEPARATION BARRIER, INCLUDING DRILL AND GROUT ANCHOR RODS ON SEPARATION BARRIER. PAYMENT SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, EQUIPMENT AND LABOR AND FOR PERFORMANCE OF ALL WORK NECESSARY FOR FABRICATING AND INSTALLING ALUMINUM BICYCLE RAILING AS PER PLAN.
			<div>DESIGN FOR 30° SKEW (R.A.) 209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL 66'-0 END SPANS77'-0 INTERIOR SPAN ESTIMATE REFERENCE INFORMATION STA. 867+41.69 (℄ US 151)SEPTEMBER 2018 LINN COUNTY IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION DESIGN SHEET NO. 2 OF 59 FILE NO. 31286 DESIGN NO. 518</div>		
DESIGN TEAM : LLY / TWE /  400 EAST COURT AVE, SUITE 140 DES MOINES, IOWA 50309 515-243-4477			LINN COUNTYPROJECT NUMBER BRF-151-3(142)--38-57SHEET NUMBER 3		

SUMMARY OF CONCRETE QUANTITIES

LOCATION	STRUCTURAL CONCRETE	HPC STRUCT. CONCRETE
SOUTH ABUTMENT FOOTING	33.0	———
NORTH ABUTMENT FOOTING	33.0	———
BRIDGE DECK** + ABUT. & PIER DIAPHRAGMS + WING EXT.	———	468.2
ABUTMENT WEST WINGS (2 @ 2.6)	———	5.2
ABUTMENT EAST WINGS (2 @ 1.9)		3.8
BOLLARDS (2 @ 0.5)	———	1.0
MONUMENTS (2 @ 2.6)	———	5.2
POLE BASES (2 @ 0.4)	———	0.8
PIER 1	323.2	———
PIER 2	287.8	———
** INCLUDES TRAIL CURB		
TOTAL (CU. YDS.)	677.0	484.2

SUMMARY OF REINFORCING STEEL

LOCATION	NON-COATED REINFORCING STEEL	EPOXY COATED REINFORCING STEEL	STAINLESS STEEL REINFORCING STEEL
BRIDGE DECK** + ABUTMENT FOOTING + ABUT. & PIER DIAPH.	271	111,509	5,638
ABUTMENT WEST WINGS	————	396	————
ABUTMENT EAST WINGS	————	396	————
BARRIER RAIL - WEST SEPARATION RAIL	————	4,979	1,370
BARRIER RAIL - WEST SEPARATION RAIL ON S. APPROACH	————	504	182
BARRIER RAIL - WEST SEPARATION RAIL ON N. APPROACH	————	976	359
BARRIER RAIL - EAST RAIL	————	3,409	1,333
BARRIER RAIL - EAST RAIL END SECTION	————	532	384
BOLLARDS	————	88	120
MONUMENTS	————	538	616
POLE BASES	————	390	————
CONDUIT SUPPORT	————	88	————
PIER 1	38,551	————	1,238
PIER 2	35,125	————	1,134
** INCLUDES TRAIL CURB			
TOTAL (LBS.)	73,947	123,805	12,374

SUMMARY OF EXCAVATION

LOCATION	CLASS 20 EXCAVATION	CLASS 21 EXCAVATION	CLASS 22 EXCAVATION
SOUTH ABUTMENT	133	_____	_____
NORTH ABUTMENT	133	_____	_____
PIER 1	_____	462	34
PIER 2	_____	298	_____
TOTAL (CU. YDS.)	266	760	34

SUMMARY OF FOUNDATIONS

[illegible]

SUMMARY OF STRUCTURAL STEEL

LOCATION	TOTAL (LBS.)
INTERMEDIATE DIAPHRAGMS	7,770
TOTAL (LBS.)	7,770

SUMMARY OF BEARINGS

[illegible]

DESIGN FOR 30° SKEW (R.A.)

209'-0x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN

SUMMARY QUANTITIES

STA. 867+41.69 (C US 151) SEPTEMBER 2018

LINN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 59 FILE NO. 31286 DESIGN NO. 518

GENERAL NOTES:

THIS DESIGN IS FOR THE REPLACEMENT OF THE EXISTING 160'-0 x 30' STEEL I-BEAM BRIDGE (DESIGN NO. 1060, BUILT IN 1961), WITH A NEW 209'-0 x 46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL ON US 151 OVER PRAIRIE CREEK IN LINN COUNTY. ELECTRONIC COPIES OF ORIGINAL DESIGN PLANS ARE AVAILABLE TO THE CONTRACTOR AS PART OF THE E-FILES SUPPLIED WITH THE CONTRACT DOCUMENTS.

THIS BRIDGE IS DESIGNED FOR HL-93 LOADING, PLUS 20 LBS. PER SQUARE FOOT OF ROADWAY FOR FUTURE WEARING SURFACE.

"REMOVAL OF EXISTING BRIDGE" INCLUDES ALL COSTS ASSOCIATED WITH REMOVING THE EXISTING BRIDGE (DESIGN NO. 1060, BUILT IN 1961) BY STAGES. REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS. ANY DAMAGE TO OTHER EXISTING STRUCTURES NOT NOTED FOR REMOVAL SHALL BE THE RESPONSIBILITY OF THE BRIDGE CONTRACTOR AND SHALL BE REPAIRED AT NO EXTRA COST TO THE STATE.

ALL PLAN DIMENSIONS ARE HORIZONTAL UNLESS NOTED OTHERWISE.

FAINT LINES ON PLANS INDICATE THE EXISTING STRUCTURE.

DURING CONSTRUCTION OF THIS PROJECT THE BRIDGE CONTRACTOR WILL BE REQUIRED TO COORDINATE OPERATIONS WITH THOSE OF OTHER CONTRACTORS WORKING WITHIN THE SAME AREA. SEE SHEET J.1 FOR THE LIST OF OTHER WORK IN THE AREA IN PROJECT NHSX-151-3(158)--3H-57.

THE CITY AND UTILITY COMPANIES WHOSE FACILITIES ARE SHOWN ON THE PLANS OR KNOWN TO BE WITHIN THE COMSTRUCTION LIMITS SHALL BE NOTIFIED BY THE BRIDGE CONTRACTOR OF THE CONSTRUCTION STARTING DATE.

THE BRIDGE CONTRACTOR SHALL PREBORE HOLES FOR ABUTMENT PILES. HOLES SHALL BE BORED TO THE ELEVATIONS SHOWN ON THE "LONGITUDINAL SECTION ALONG CENTERLINE APPROACH ROADWAY" ON DESIGN SHEETS 5, 7 & 9. PILES SHALL BE DRIVEN THROUGH THE HOLES TO AT LEAST THE SPECIFIED DESIGN BEARING.

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.

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.

CONCRETE BARRIER RAILS PLACED USING THE SLIP FORM 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 SLIP FORMED METHOD).

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.

ALL REINFORCING BARS AND BARS NOTED AS DOWELS SUPPLIED FOR THIS STRUCTURE SHALL BE DEFORMED REINFORCEMENT UNLESS OTHERWISE NOTED OR SHOWN.

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5d1 IS 5/8" 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

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.

GUARD RAIL IS TO BE PLACED AS A PART OF THE TIED PROJECT NHSX-151-3(158)--3H-57.

LONGITUDINAL GROOVING OF THE BRIDGE DECK WILL BE REQUIRED IN ACCORDANCE WITH ARTICLE 2412.03, D OF THE STANDARD SPECIFICATIONS. LONGITUDINAL GROOVING QUANTITIES FOR THIS PROJECT ARE INCLUDED IN THE ROADWAY PLANS IN PROJECT NHSX-151-3(158)--3H-57.

A SCRAPE SAMPLE WAS TAKEN FROM AN AREA 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 <50 PARTS PER MILLION (PPM). ANALYSIS OF TOTAL CHROMIUM ON THIS SAMPLE WAS <50 PPM. THESE ANALYSES 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.

RESEARCHERS FROM IOWA STATE UNIVERSITY WILL BE OBSERVING PLACEMENT OF DECK CONCRETE FOR THIS PROJECT. CONTRACTOR IS REQUIRED TO CONTACT BRENT PHARES AT (515)294-5879 THREE (3) DAYS PRIOR TO DECK CONCRETE PLACEMENT AND WHENEVER A CHANGE IN DECK PLACEMENT SCHEDULE IS MADE. ACTIVITIES BY IOWA STATE UNIVERSITY WILL BE TO OBSERVE ONLY AND WILL NOT IMPACT CONSTRUCTION ACTIVITIES.

ALL CONCRETE CURING COMPOUNDS USED ON SURFACES TO BE COATED WITH STRUCTURAL CONCRETE COATING SHALL BE IN ACCORDANCE WITH THE "DEVELOPMENTAL SPECIFICATIONS FOR CONCRETE SURFACE PREPARATION AND TESTING PRIOR TO COATING APPLICATION".

GENERAL NOTES (CONT.):

STAINLESS STEEL SPLICE REINFORCING BARS SHALL BE PLACED AT STAGE CONSTRUCTION JOINTS TO FACILITATE CONNECTION OF STAGE 1 CONSTRUCTION WITH STAGE 2 CONSTRUCTION. THE STAINLESS STEEL SPLICE BAR SHALL MATCH THE SIZE OF BAR TO BE SPLICED.

PROJECTED STAINLESS STEEL SPLICE BAR ENDS SHALL BE MAINTAINED IN A CLEAR, STRAIGHT AND UNDAMAGED CONDITION.

MECHANICAL SPLICE SHOULD BE USED FOR ABUTMENT FOOTING LONGITUDINAL 8#I BARS AT STAGE CONSTRUCTION JOINTS. SEE MECHANICAL SPLICE DETAILS ON DESIGN SHEET 22.

TEMPORARY SHORING NOTES:

TEMPORARY SHORING (SHEET PILE OR OTHER) SHALL BE REQUIRED AS NECESSARY TO PREVENT THE EARTH UNDER THE EXISTING TRAFFIC LANE FROM SLOUGHING IN DURING CONSTRUCTION.

THE CONTRACTOR SHALL SUBMIT A TEMPORARY SHORING PLAN TO THE ENGINEER FOR APPROVAL. THE TEMPORARY SHORING PLAN SHALL BE DESIGNED AND CERTIFIED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF IOWA. THE CONTRACTOR SHALL SUBMIT THE TEMPORARY SHORING PLAN ELECTRONICALLY IN ACCORDANCE WITH SECTION 1105.03 OF THE STANDARD SPECIFICATIONS. THE ENGINEER WILL BE ALLOWED 30 CALENDAR DAYS TO REVIEW THE TEMPORARY SHORING PLAN. THE CONTRACTOR SHALL NOT PROCEED WITH INSTALLATION OF THE TEMPORARY SHORING WITHOUT NOTICE TO PROCEED FROM THE ENGINEER.

THE TEMPORARY 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

TEMPORARY SHORING SHALL BE PAID FOR AS A LUMP SUM INCLUDING ALL COST FOR DESIGNING, FURNISHING AND INSTALLING. SHORING SHOULD REMAIN IN PLACE UNTIL BEGINNING OF STAGE 2 ABUTMENT CONSTRUCTION. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, ARTICLE 1107.07 OF THE STANDARD SPECIFICATIONS STILL APPLIES.

SPECIFICATIONS:

DESIGN:

AASHTO LRFD 7TH EDITION, SERIES OF 2014, EXCEPT AS NOTED IN THE CURRENT IOWA BRIDGE DESIGN MANUAL.

CONSTRUCTION:

IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.

DEVELOPMENTAL SPECIFICATIONS FOR HIGH PERFORMANCE CONCRETE FOR STRUCTURES SHALL APPLY TO APPLICABLE WORK ON THIS PROJECT.

DEVELOPMENTAL SPECIFICATIONS FOR CONCRETE SURFACE PREPARATION AND TESTING PRIOR TO COATING APPLICATION.

DEVELOPMENTAL SPECIFICATIONS FOR STRUCTURAL CONCRETE COATING.

DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION, SERIES OF 2014, EXCEPT AS NOTED IN THE CURRENT IOWA BRIDGE DESIGN MANUAL:

REINFORCING STEEL IN ACCORDANCE WITH LRFD AASHTO SECTION 5, GRADE 60.

CONCRETE IN ACCORDANCE WITH LRFD AASHTO SECTION 5, f'c = 4,000 PSI, EXCEPT PRESTRESSED BEAM CONCRETE AS NOTED.

PRESTRESSED CONCRETE BEAMS, SEE DESIGN SHEET 39.

STRUCTURAL STEEL IN ACCORDANCE WITH LRFD AASHTO SECTION 6. ASTM A709 GRADE 36 AND GRADE 50 (AASHTO M270 GRADE 36 AND GRADE 50).

BRIDGE DECK DIMENSIONS TABLE			
	ITEM	UNIT	QUANTITY
1	DECK LENGTH	L.F.	212.5
2	MINIMUM DECK WIDTH	L.F.	64.0
3	MAXIMUM DECK WIDTH	L.F.	64.0
4	DECK AREA	S.F.	13,600

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 ROADWAY.
4. DECK AREA IS TO BE BASED ON THE FACE-TO-FACE PAVING NOTCH DISTANCE AND OUT-TO-OUT DECK DIMENSIONS.

SHOP DRAWING SUBMITTAL'S

SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)

SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH 1105.03 OF THE STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.

SHOP DRAWINGS SHALL BE SUBMITTED WITH THE FOLLOWING NAMING CONVENTION:
(Paren).County_DesignNumber_SubmittalDescription.pdf
Example: (090).Blackhawk_Design915_DeckDrains.pdf

1	INTERMEDIATE STEEL DIAPHRAGMS
2	TEMPORARY SHORING
3	TRAIL AESTHETIC DECK DRAINS
4	ALUMINUM PEDESTRIAN RAILING
5	ALUMINUM BICYCLE RAILING

NOTE: THESE PLANS DO NOT CONTAIN ROADWAY SHEETS. ROADWAY QUANTITIES ARE INCLUDED WITH THE TIED PROJECT NHSX-151-3(1058)--3H-57.

NOTE: POLLUTION PREVENTION PLAN IS INCLUDED WITH THE TIED PROJECT NHSX-151-3(158)--3H-57.

TRAFFIC CONTROL PLAN

NOTE: THE ROADWAY WILL BE CLOSED TO THRU TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTION. HOWEVER, THE ROADWAY WILL REMAIN OPEN TO LOCAL TRAFFIC THROUGHOUT CONSTRUCTION. REFER TO THE TRAFFIC CONTROL PLAN INCLUDED WITH THE TIED PROJECT NHSX-151-3(158)--3H-57.

DESIGN FOR 30° SKEW (R.A.)

209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL

66'-0 END SPANS77'-0 INTERIOR SPAN

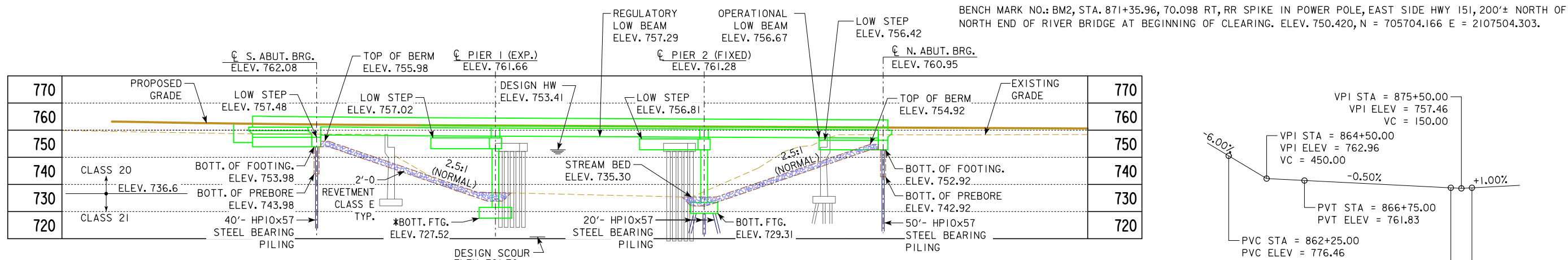
GENERAL NOTES

STA. 867+41.69 (☒ US 151)SEPTEMBER 2018

LINN COUNTY

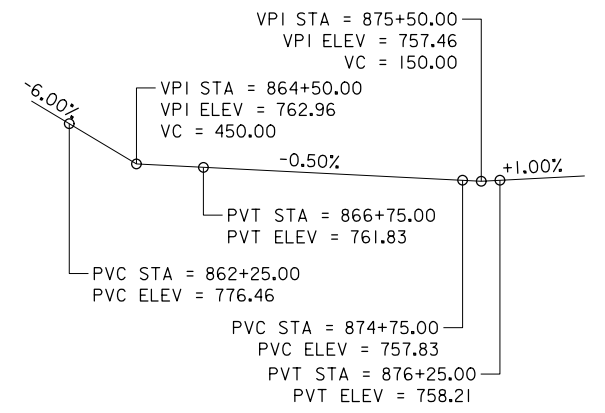
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 59FILE NO. 31286DESIGN NO. 518



LONGITUDINAL SECTION ALONG CL APPROACH ROADWAY

TOP OF BRIDGE DECK CROWN 0.03' BELOW PROFILE GRADE



PROPOSED PROFILE GRADE

HYDRAULIC DATA

DRAINAGE AREA = 178.0 SQ. MI.
STREAM SLOPE = 6.11 FT./MI.
AVG. LOW WATER STAGE = 736.6

Q₅₀ = 13,480 CFS
STAGE = 752.66
BACKWATER = 0.41 FT.

Q₁₀₀ = 16,060 CFS
STAGE = 753.41
BACKWATER = 0.48 FT.
AVG. BRIDGE VELOCITY = 6.19 FPS

Q₂₀₀ = 18,991 CFS
STAGE = 753.99
CALCULATED DESIGN SCOUR = 721.07

Q₅₀₀ = 22,750 CFS
STAGE = 754.91
CALCULATED CHECK SCOUR = 717.56

ALL ELEVATIONS NAVD88
50, 100 & 500 YR. STAGES AND
DISCHARGES FROM LINN COUNTY F.I.S.,
APRIL 5, 2010

UTILITIES LEGEND:

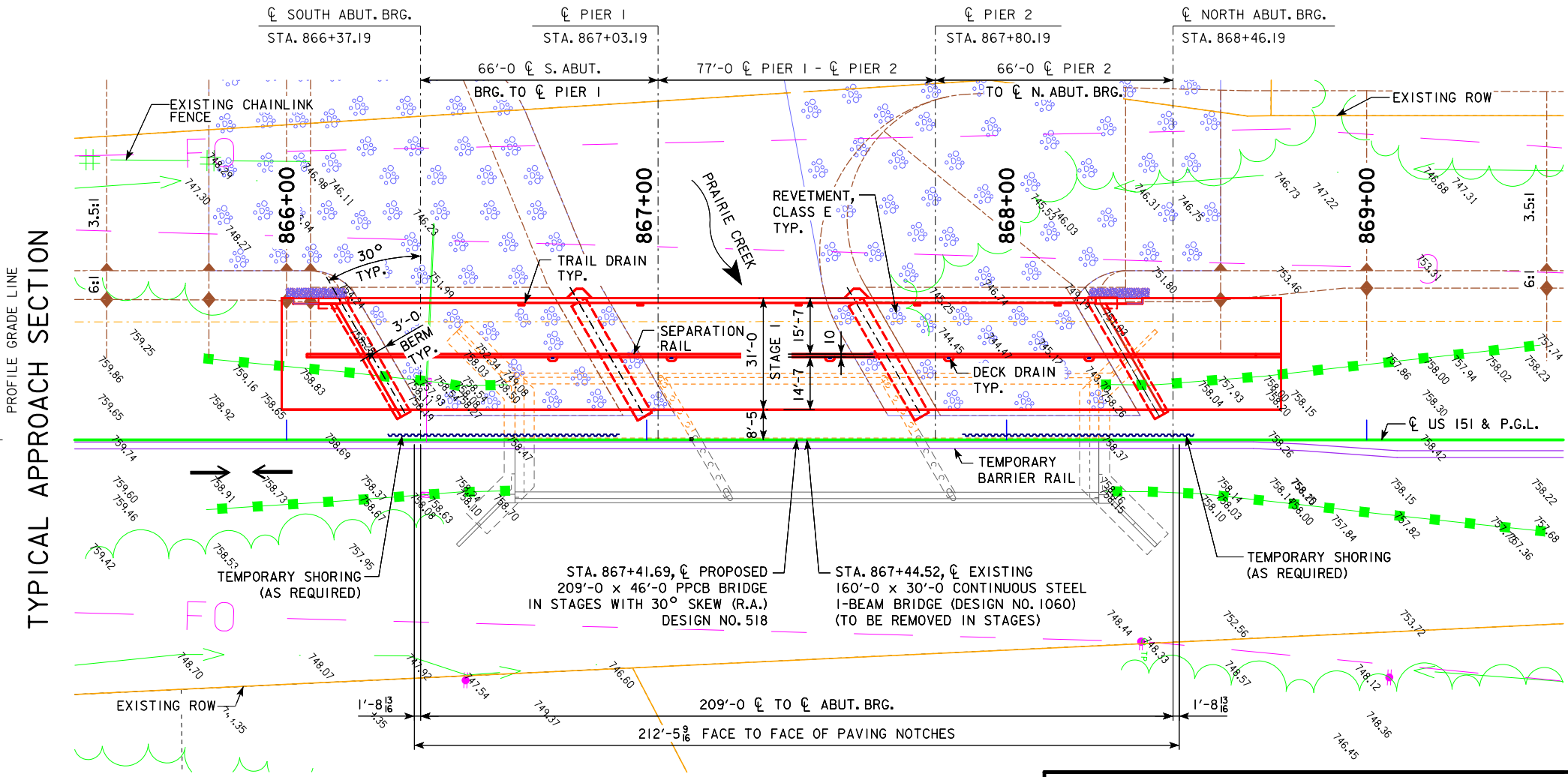
FO - FIBER OPTIC - SOUTH SLOPE
G - GAS - MIDAMERICAN ENERGY

LOCATION

US 151
OVER PRAIRIE CREEK
T-82N R-8W
SECTION 9
FAIRFAX TOWNSHIP
LINN COUNTY
FHWA NO. 33781
BRIDGE MAINT. NO. 5722.0S151
LATITUDE 41.923186°
LONGITUDE -91.783847°

TRAFFIC ESTIMATE

2013 AADT	8,100	V.P.D.
2040 AADT	12,010	V.P.D.
2040 DHV	1,255	V.P.H.
TRUCKS	6	%
TOTAL		
DESIGN ESALS	---	



SITUATION PLAN
STAGE I

NOTE:
FOR TRAIL AND DECK DRAIN SPACING,
SEE DESIGN SHEET 9.

FOR APPROACH SLAB DETAILS, REFER
TO ROADWAY PLANS.

HYDRAULIC 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.

Signature *Adam R. Bullerman* Date 12/14/18

Printed or Typed Name Adam R. Bullerman

My license renewal date is December 31, 2018

Pages or sheets covered by this seal: SHEETS 6 THRU 11 - HYDRAULIC DATA

DESIGN FOR 30° SKEW (R.A.)

209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL

66'-0 END SPANS 77'-0 INTERIOR SPAN

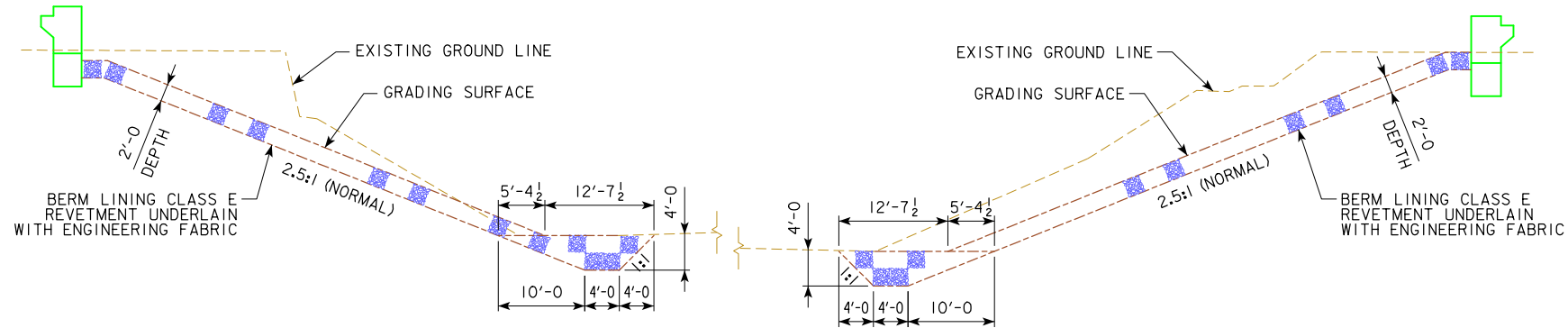
SITUATION PLAN - STAGE I

STA. 867+41.69 (CL US 151) SEPTEMBER 2018

LINN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 5 OF 59 FILE NO. 31286 DESIGN NO. 518



SECTION THRU EMBEDDED REVETMENT BERM

BENCH MARK NO.: BM2, STA. 871+35.96, 70.098 RT, RR SPIKE IN POWER POLE, EAST SIDE HWY 151, 200'± NORTH OF NORTH END OF RIVER BRIDGE AT BEGINNING OF CLEARING. ELEV. 750.420, N = 705704.166 E = 2107504.303.

BERM SLOPE LOCATION TABLE (STAGE I)						
	SOUTH ABUTMENT			NORTH ABUTMENT		
	STATION	OFFSET	ELEV	STATION	OFFSET	ELEV
A1	866+72.83	42.42 LT	737.00	867+61.05	42.42 LT	735.66
A2	866+93.42	6.75 LT	737.00	867+81.64	6.75 LT	735.66
B1	866+17.90	42.42 LT	755.98	868+16.50	42.42 LT	754.92
B2	866+38.49	6.75 LT	755.98	868+37.10	6.75 LT	754.92
W1	866+06.61	42.42 LT	761.64	868+33.08	42.42 LT	760.23

BERM SLOPE ELEVATIONS REFLECT THE GRADING SURFACE

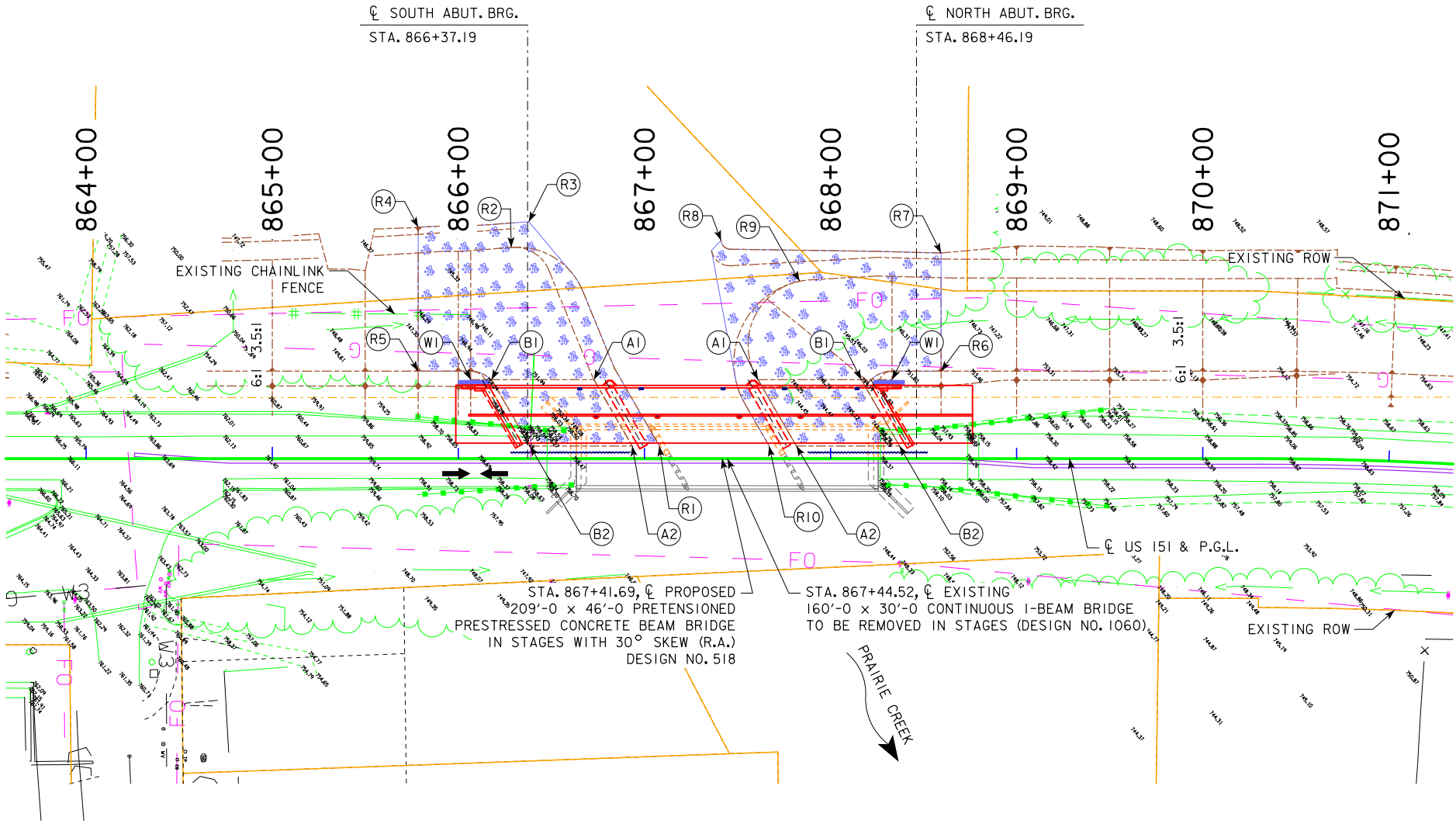
ESTIMATED BERM ARMORING QUANTITIES (STAGE I)				
LOCATION	REVETMENT CL. E (TON)	EROSION STONE (TON)	ENGINEERING FABRIC (SY)	CLASS 10 CHANNEL EXCAVATION (CY)
BERM LINING - SOUTH ABUTMENT	1072	-	1005	670
BERM LINING - NORTH ABUTMENT	1251	-	1173	782
STONE TOE - SOUTH ABUTMENT	302	-	296	189
STONE TOE - NORTH ABUTMENT	196	-	192	122
TOTALS	2821	-	2666	1763

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

REVETMENT LAYOUT:

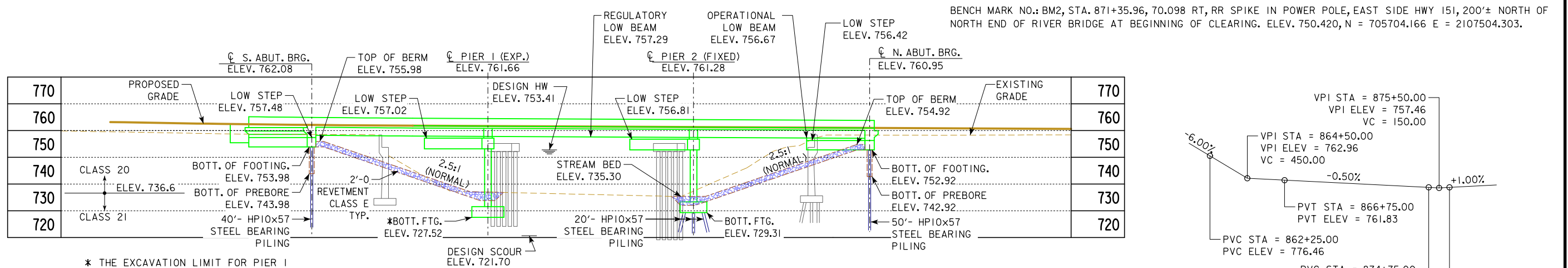
- (R1) STA. 867+08.00, 6.75' LT; END STONE TOE
- (R2) STA. 866+28.46, 113.50' LT; END STONE TOE
- (R3) STA. 866+37.88, 127.29' LT; END BERM LINING
- (R4) STA. 865+78.43, 124.37' LT; END BERM LINING
- (R5) STA. 865+78.43, 47.00' LT; END BERM LINING
- (R6) STA. 868+59.43, 47.00' LT; END BERM LINING
- (R7) STA. 868+59.43, 110.43' LT; END BERM LINING
- (R8) STA. 867+41.15, 117.24' LT; END BERM LINING
- (R9) STA. 867+83.37, 95.31' LT; END STONE TOE
- (R10) STA. 867+67.06, 6.75' LT; END STONE TOE

UTILITIES LEGEND:
FO - FIBER OPTIC - SOUTH SLOPE
G - GAS - MIDAMERICAN ENERGY



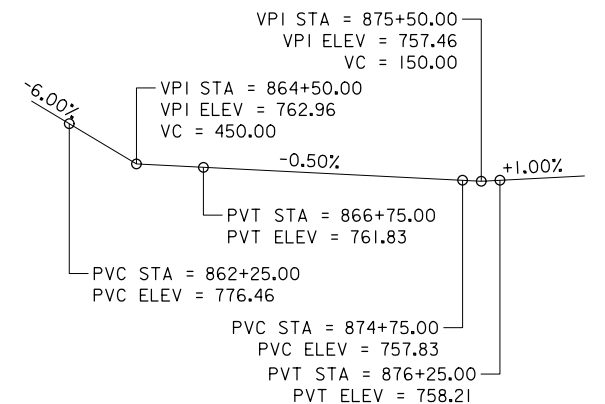
SITE PLAN
STAGE I

DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
SITE PLAN - STAGE I
STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 6 OF 59 FILE NO. 31286 DESIGN NO. 518



LONGITUDINAL SECTION ALONG CL APPROACH ROADWAY

TOP OF BRIDGE DECK CROWN 0.03' BELOW PROFILE GRADE



PROPOSED PROFILE GRADE

HYDRAULIC DATA

DRAINAGE AREA = 178.0 SQ. MI.
STREAM SLOPE = 6.11 FT./MI.
AVG. LOW WATER STAGE = 736.6

Q_{50} = 13,480 CFS
STAGE = 752.66
BACKWATER = 0.41 FT.

Q_{100} = 16,060 CFS
STAGE = 753.41
BACKWATER = 0.48 FT.
AVG. BRIDGE VELOCITY = 6.19 FPS

Q_{200} = 18,991 CFS
STAGE = 753.99
CALCULATED DESIGN SCOUR = 721.07

Q_{500} = 22,750 CFS
STAGE = 754.91
CALCULATED CHECK SCOUR = 717.56

ALL ELEVATIONS NAVD88
50, 100 & 500 YR. STAGES AND
DISCHARGES FROM LINN COUNTY F.I.S.,
APRIL 5, 2010

UTILITIES LEGEND:

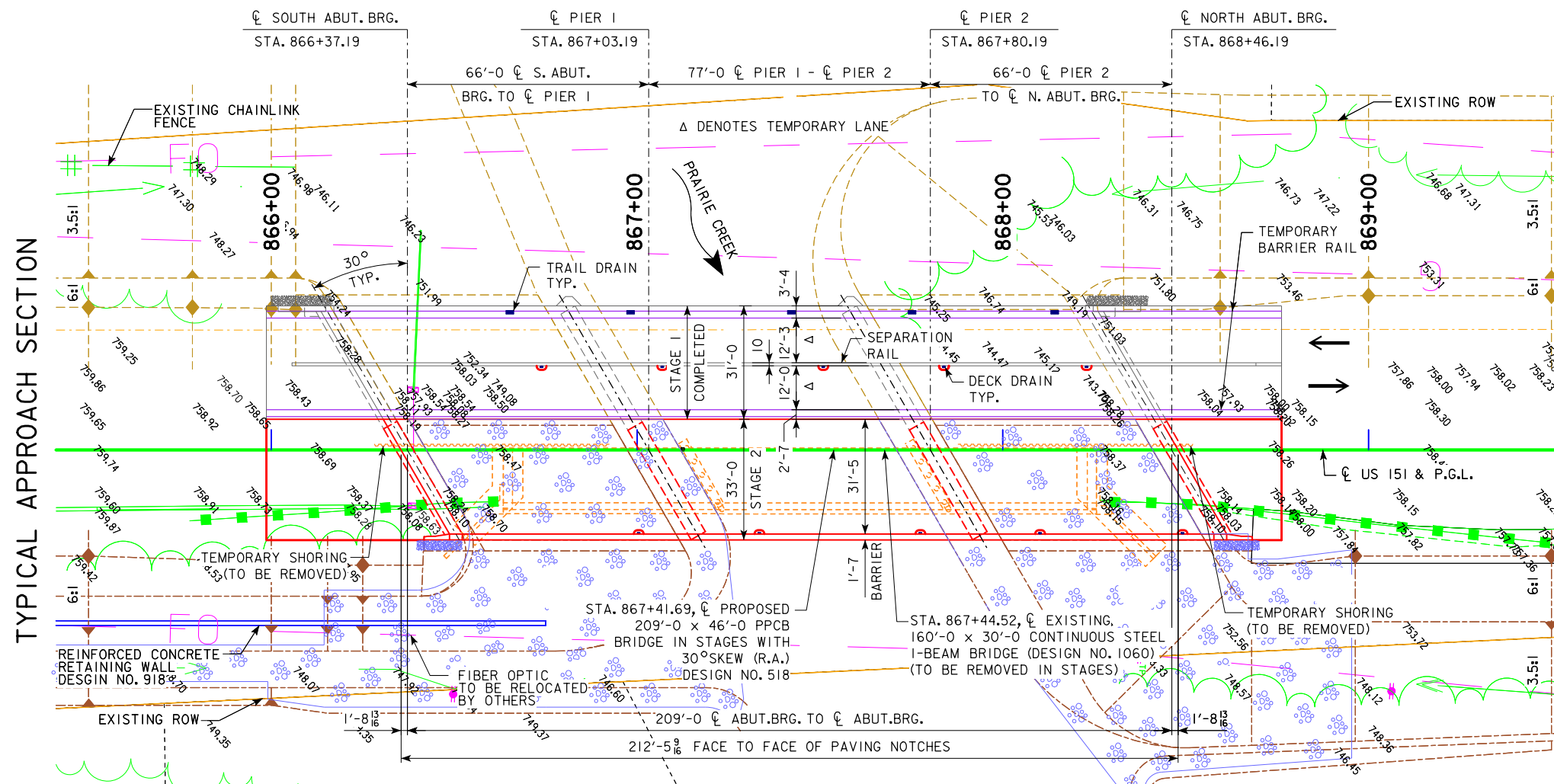
FO - FIBER OPTIC - SOUTH SLOPE
G - GAS - MIDAMERICAN ENERGY

LOCATION

US 151
OVER PRAIRIE CREEK
T-82N R-8W
SECTION 9
FAIRFAX TOWNSHIP
LINN COUNTY
FHWA NO. 33781
BRIDGE MAINT. NO. 5722.0S151
LATITUDE 41.923186°
LONGITUDE -91.783847°

TRAFFIC ESTIMATE

2013 AADT	8,100	V.P.D.
2040 AADT	12,010	V.P.D.
2040 DHV	1,255	V.P.H.
TRUCKS	6	%
TOTAL		
DESIGN ESALS		

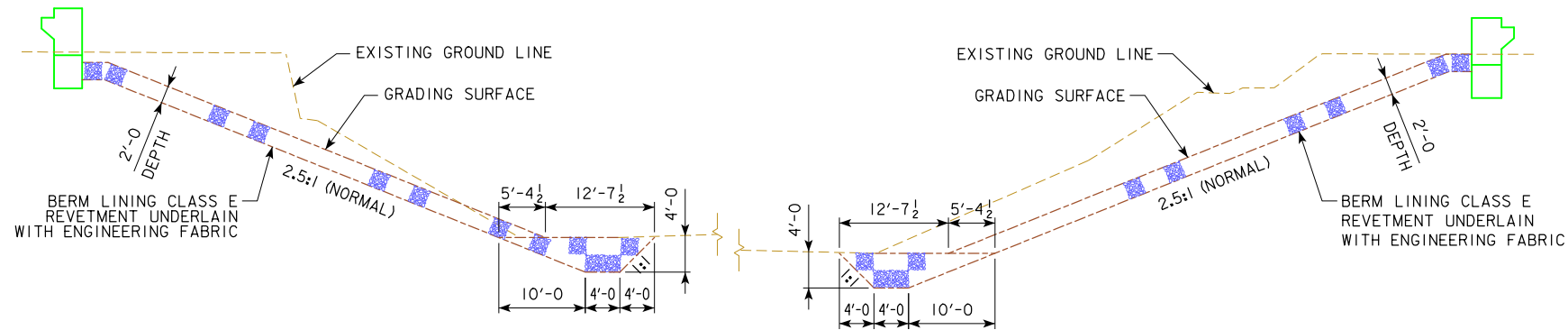


SITUATION PLAN STAGE 2

NOTE:
FOR TRAIL AND DECK DRAIN SPACING,
SEE DESIGN SHEET 9.

FOR APPROACH SLAB DETAILS, REFER
TO ROADWAY PLANS.

DESIGN FOR 30° SKEW (R.A.)
**209'-0" X 46'-0" PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0" TRAIL**
66'-0" END SPANS 77'-0" INTERIOR SPAN
SITUATION PLAN - STAGE 2
STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 7 OF 59 FILE NO. 31286 DESIGN NO. 518



SECTION THRU EMBEDDED REVETMENT BERM

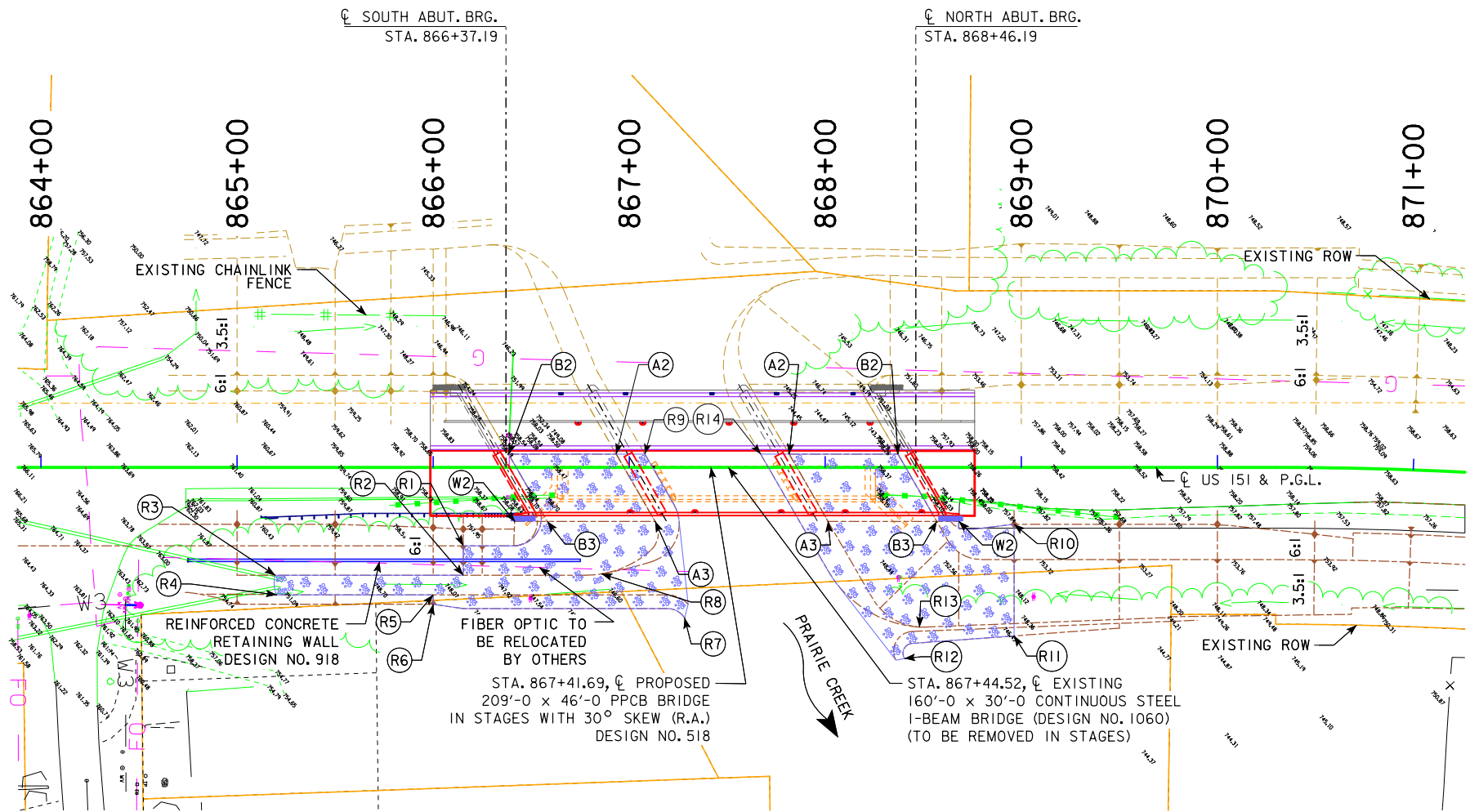
BENCH MARK NO.: BM2, STA. 871+35.96, 70.098 RT, RR SPIKE IN POWER POLE, EAST SIDE HWY 151, 200'± NORTH OF NORTH END OF RIVER BRIDGE AT BEGINNING OF CLEARING. ELEV. 750.420, N = 705704.166 E = 2107504.303.

BERM SLOPE LOCATION TABLE (STAGE 2)						
	SOUTH ABUTMENT			NORTH ABUTMENT		
	STATION	OFFSET	ELEV	STATION	OFFSET	ELEV
A2	866+93.42	6.75 LT	737.00	867+81.64	6.75 LT	735.66
A3	867+13.25	27.58 RT	737.00	868+01.46	27.58 RT	735.66
B2	866+38.49	6.75 LT	755.98	868+37.10	6.75 LT	754.92
B3	866+58.31	27.58 RT	755.98	868+56.92	27.58 RT	754.92
W2	866+41.74	27.58 RT	761.49	868+68.20	27.58 RT	760.29

BERM SLOPE ELEVATIONS REFLECT THE GRADING SURFACE

ESTIMATED BERM ARMORING QUANTITIES (STAGE 2)				
LOCATION	REVTMENT CL. E (TON)	EROSION STONE (TON)	ENGINEERING FABRIC (SY)	CLASS 10 CHANNEL EXCAVATION (CY)
BERM LINING - SOUTH ABUTMENT	946	-	887	591
BERM LINING - NORTH ABUTMENT	875	-	821	547
STONE TOE - SOUTH ABUTMENT	162	-	158	101
STONE TOE - NORTH ABUTMENT	243	-	238	152
TOTALS	2226	-	2104	1391

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.



REVTMENT LAYOUT:

- R1 STA. 866+15.38, 40.00' RT; END BERM LINING
- R2 STA. 866+15.38, 55.00' RT; END BERM LINING
- R3 STA. 865+19.46, 55.00' RT; END BERM LINING
- R4 STA. 865+20.22, 65.00' RT; END BERM LINING
- R5 STA. 866+00.00, 65.00' RT; END BERM LINING
- R6 STA. 866+00.00, 69.83' RT; END BERM LINING
- R7 STA. 867+28.24, 76.85' RT; END BERM LINING
- R8 STA. 866+85.96, 54.31' RT; END STONE TOE
- R9 STA. 867+08.00, 6.75' LT; END STONE TOE
- R10 STA. 868+96.38, 28.98' RT; END BERM LINING
- R11 STA. 868+96.38, 85.97' RT; END BERM LINING
- R12 STA. 868+40.45, 97.53' RT; END BERM LINING
- R13 STA. 868+48.09, 81.43' RT; END STONE TOE
- R14 STA. 867+67.06, 6.75' LT; END STONE TOE

UTILITIES LEGEND:
FO - FIBER OPTIC - SOUTH SLOPE
G - GAS - MIDAMERICAN ENERGY

DESIGN FOR 30° SKEW (R.A.)

209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL

66'-0 END SPANS 77'-0 INTERIOR SPAN

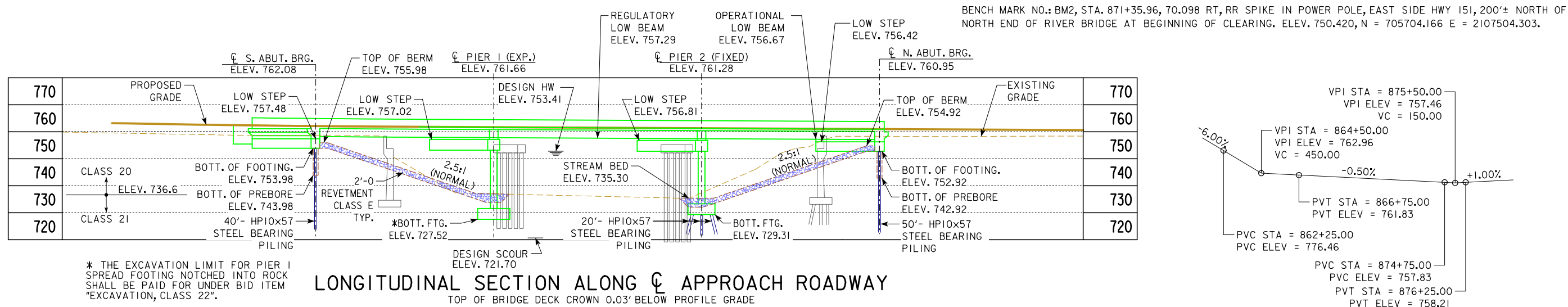
SITE PLAN - STAGE 2

STA. 867+41.69 (CL US 151) SEPTEMBER 2018

LINN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 8 OF 59 FILE NO. 31286 DESIGN NO. 518



PROPOSED PROFILE GRADE

HYDRAULIC DATA

DRAINAGE AREA = 178.0 SQ. MI.
STREAM SLOPE = 6.11 FT./MI.
AVG. LOW WATER STAGE = 736.6
Q₅₀ = 13,480 CFS
STAGE = 752.66
BACKWATER = 0.41 FT.
Q₁₀₀ = 16,060 CFS
STAGE = 753.41
BACKWATER = 0.48 FT.
AVG. BRIDGE VELOCITY = 6.19 FPS
Q₂₀₀ = 18,991 CFS
STAGE = 753.99
CALCULATED DESIGN SCOUR = 721.07
Q₅₀₀ = 22,750 CFS
STAGE = 754.91
CALCULATED CHECK SCOUR = 717.56
ALL ELEVATIONS NAVD88
50, 100 & 500 YR. STAGES AND
DISCHARGES FROM LINN COUNTY F.I.S.,
APRIL 5, 2010

UTILITIES LEGEND:

FO - FIBER OPTIC - SOUTH SLOPE
G - GAS - MIDAMERICAN ENERGY

LOCATION

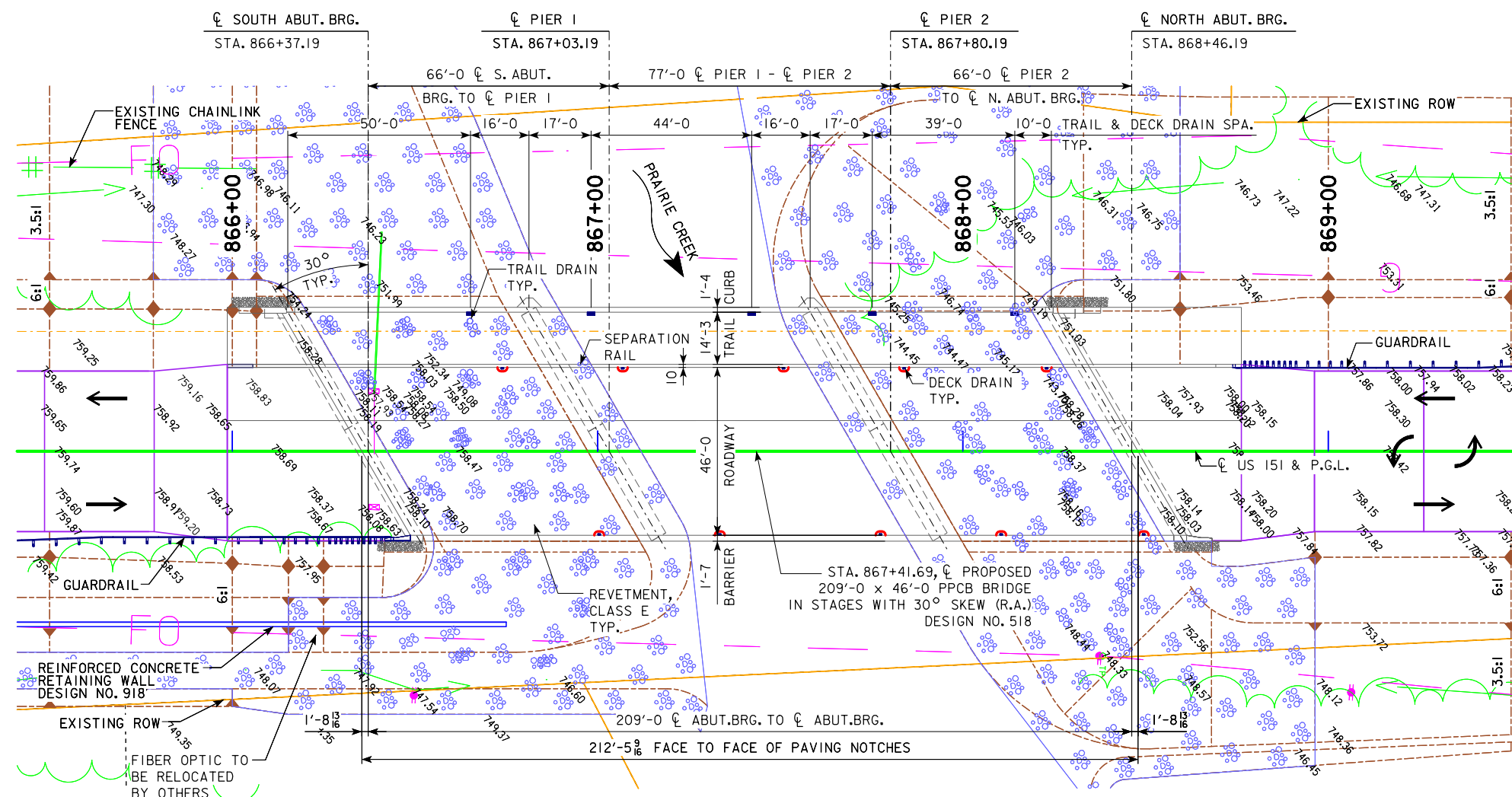
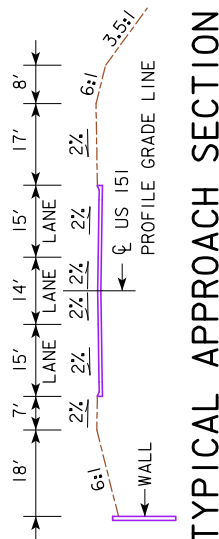
US 151
OVER PRAIRIE CREEK
T-82N R-8W
SECTION 9
FAIRFAX TOWNSHIP
LINN COUNTY
FHWA NO. 33781
BRIDGE MAINT. NO. 5722.0S151
LATITUDE 41.923186°
LONGITUDE -91.783847°

TRAFFIC ESTIMATE

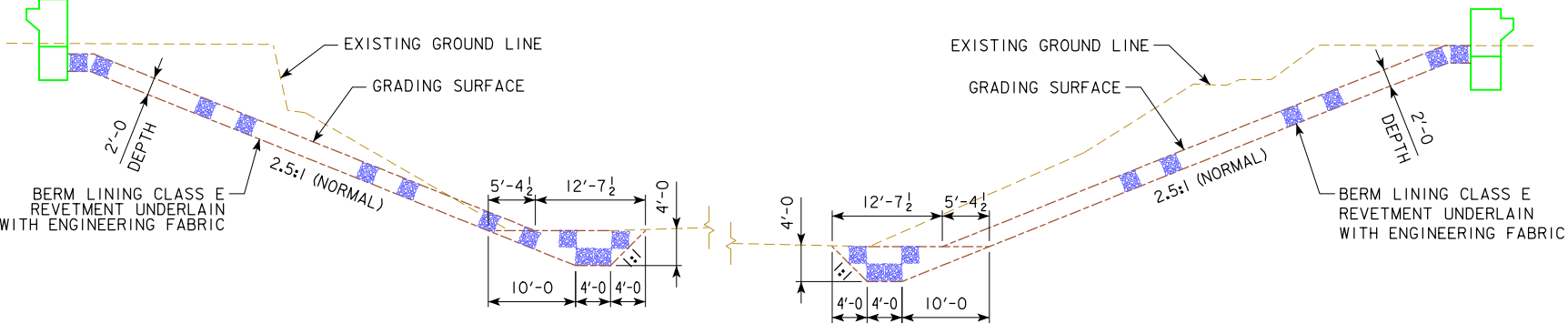
2013 AADT	8,100	V.P.D.
2040 AADT	12,010	V.P.D.
2040 DHV	1,255	V.P.H.
TRUCKS	6	%
TOTAL		
DESIGN ESALS	---	

SITUATION PLAN FINAL

DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
SITUATION PLAN - FINAL
STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 9 OF 59 FILE NO. 31286 DESIGN NO. 518

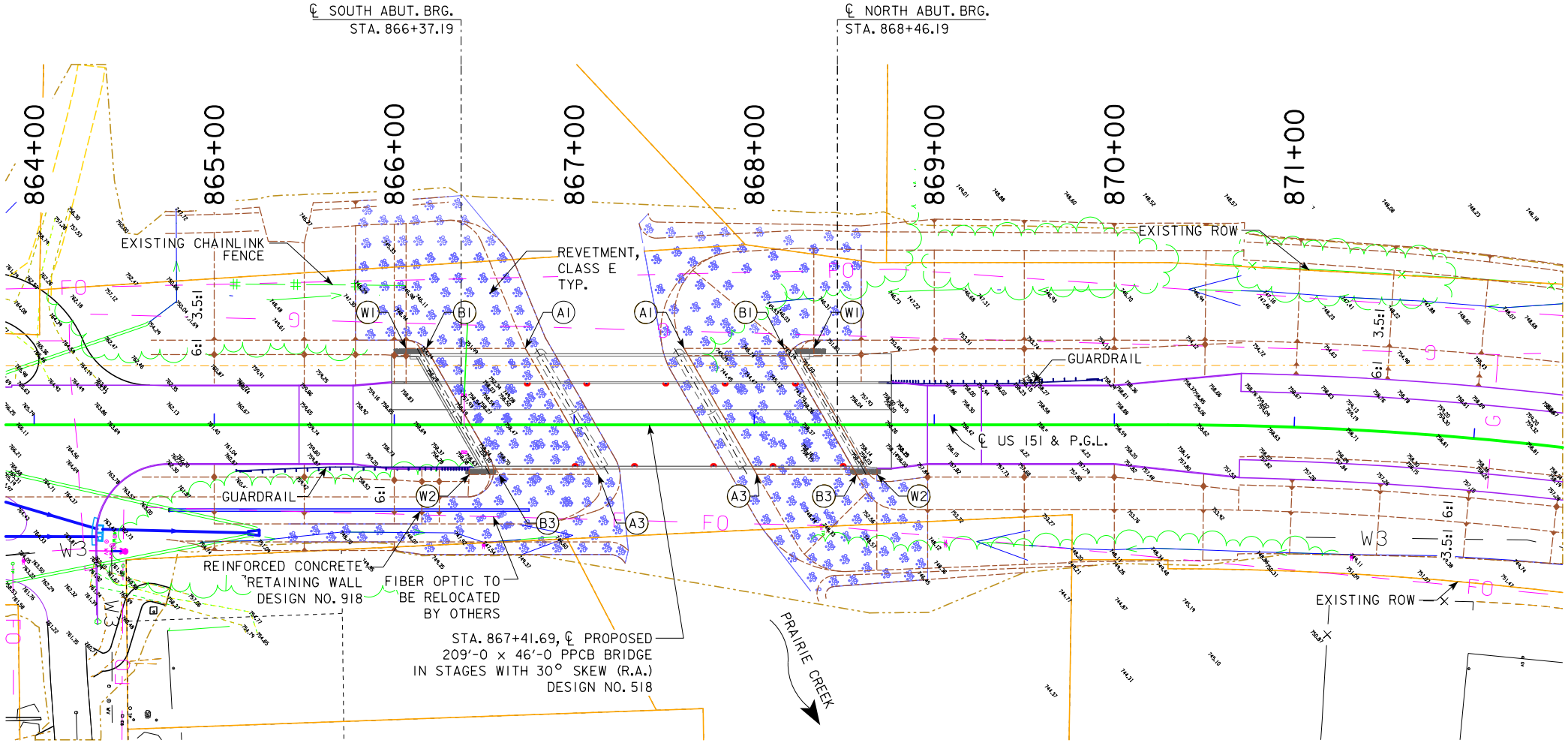


BENCH MARK NO.: BM2, STA. 871+35.96, 70.098 RT, RR SPIKE IN POWER POLE, EAST SIDE HWY 151, 200'± NORTH OF NORTH END OF RIVER BRIDGE AT BEGINNING OF CLEARING. ELEV. 750.420, N = 705704.166 E = 2107504.303.



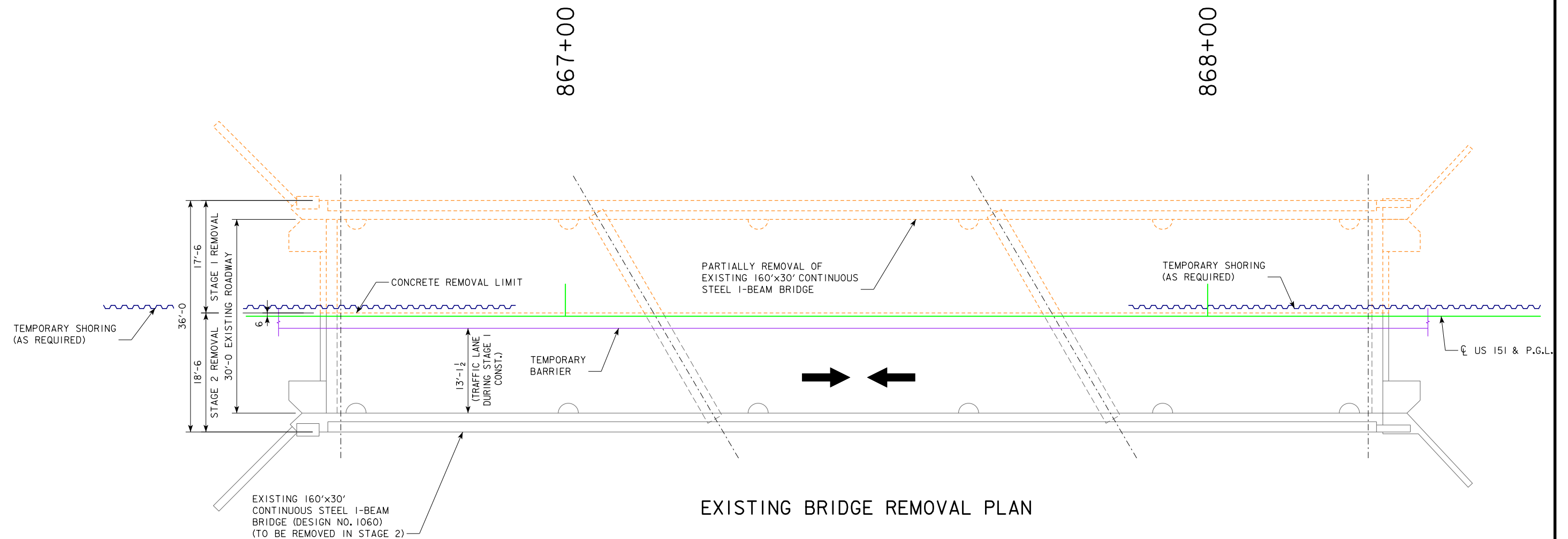
SECTION THRU EMBEDDED REVETMENT BERM

NOTE:
SEE DESIGN SHEETS 6 & 8 FOR BERM SLOPE LOCATION TABLE
AND BERM ARMORING QUANTITIES.



UTILITIES LEGEND:
FO - FIBER OPTIC - SOUTH SLOPE
G - GAS - MIDAMERICAN ENERGY

DESIGN FOR 30° SKEW (R.A.)
**209'-0x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL**
66'-0 END SPANS 77'-0 INTERIOR SPAN
SITE PLAN - FINAL
STA. 867+41.69 (C US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 10 OF 59 FILE NO. 31286 DESIGN NO. 518



NOTE:
FOR STAGING AND REMOVAL NOTES, SEE DESIGN SHEET 12.

DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
 66'-0 END SPANS 77'-0 INTERIOR SPAN
REMOVAL PLAN
 STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 11 OF 59 FILE NO. 31286 DESIGN NO. 518

THE US 151 BRIDGE OVER PRAIRIE CREEK, DESIGN NO.518, BRIDGE PROJECT BRF-151-3(142)--38-57, IS CONSTRUCTED WITH THE TIED PROJECT NHSX-151-3(158)--3H-57. BRIDGE CONSTRUCTION STAGE NUMBERS 1 AND 2 DO NOT NECESSARILY COINCIDE WITH ROAD CONSTRUCTION STAGE NUMBERS, AS DESIGNATED IN ROADWAY PLANS.

STAGE 2 CONSTRUCTION OF US 151 BRIDGE OVER PRAIRIE CREEK IS SCHEDULED TO BEGIN DURING STAGE 3A AS DEFINED IN THE TIED PROJECT NHSX-151-3(158)--3H-57.

STAGE 2A CONSTRUCTION OF US 151 BRIDGE OVER PRAIRIE CREEK IS SCHEDULED TO BEGIN DURING STAGE 4 AS DEFINED IN THE TIED PROJECT NHSX-151-3(158)--3H-57.

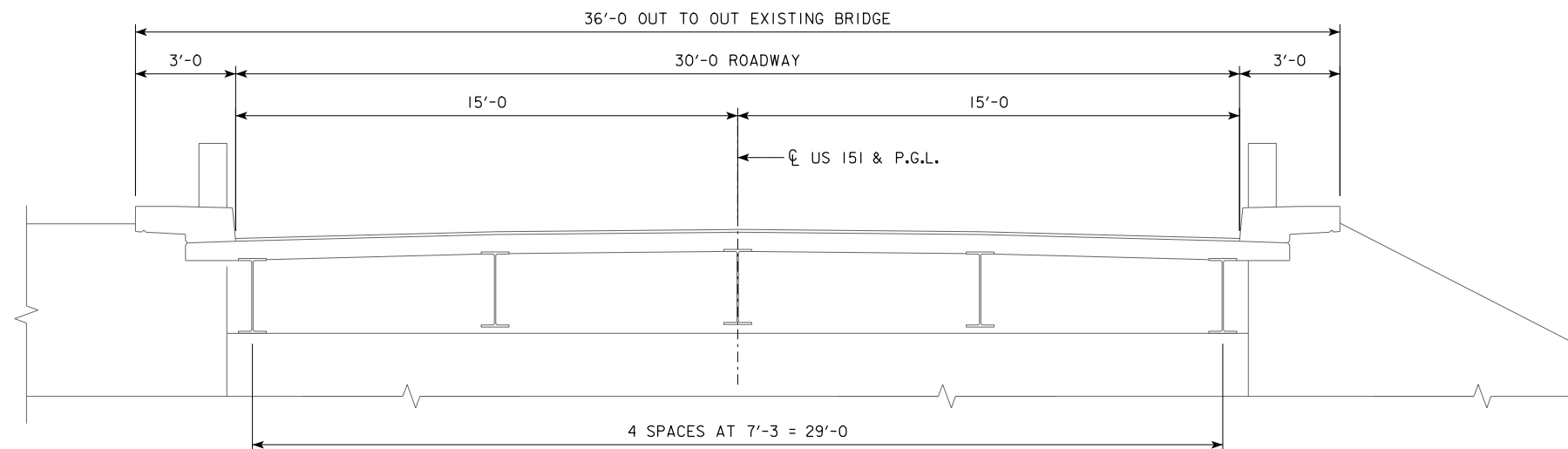
SEE ROADWAY STAGING PLANS AND NOTES LOCATED IN THE J SHEETS OF THE TIED PROJECT NHSX-151-3(158)--3H-57 PLANS FOR ADDITIONAL INFORMATION RELATED TO LANE CLOSURES, CONSTRUCTION ACCESS AND OTHER CONSTRUCTION STAGING COORDINATION ITEMS.

REMOVALS OF THE EXISTING BRIDGE SUPER- AND SUB- STRUCTURE SHALL BE COMPLETED IN STAGES TO THE LIMITS SHOWN.

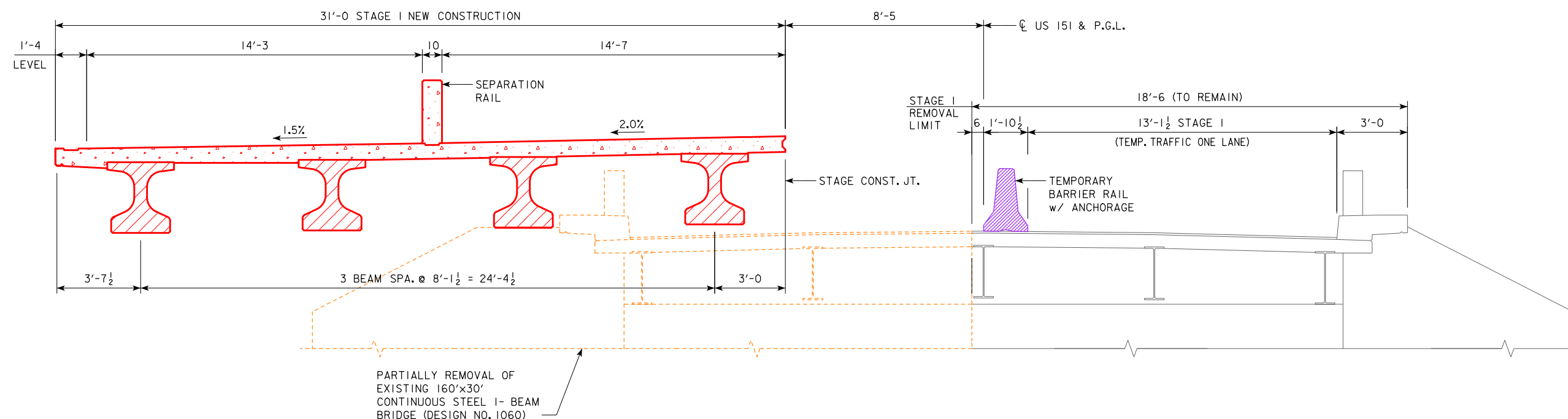
AFTER BRIDGE STAGE 1 CONSTRUCTION IS COMPLETED, ALL REMAINING PORTIONS OF THE EXISTING BRIDGE SHALL BE REMOVED IN STAGE 2 OF BRIDGE CONSTRUCTION IN ACCORDANCE WITH SECTION 240I OF THE STANDARD SPECIFICATIONS.

REMOVE EXISTING SUB-STRUCTURE 2'-0 BELOW THE FINISHED BERM LINE EXCEPT AS NOTED.

FIELD VERIFY THE EXISTING NORTH ABUTMENT FOOTING PILE AND CONCRETE BLOCK LOCATIONS. REMOVE CONCRETE BLOCK UNDERNEATH THE EXISTING NORTH ABUTMENT FOOTING WHERE IT CONFLICTS TO NEW ABUTMENT CONSTRUCTION.



CROSS SECTION THRU EXISTING BRIDGE
(LOOKING NORTH)



CROSS SECTION THRU STAGE I
(LOOKING NORTH)

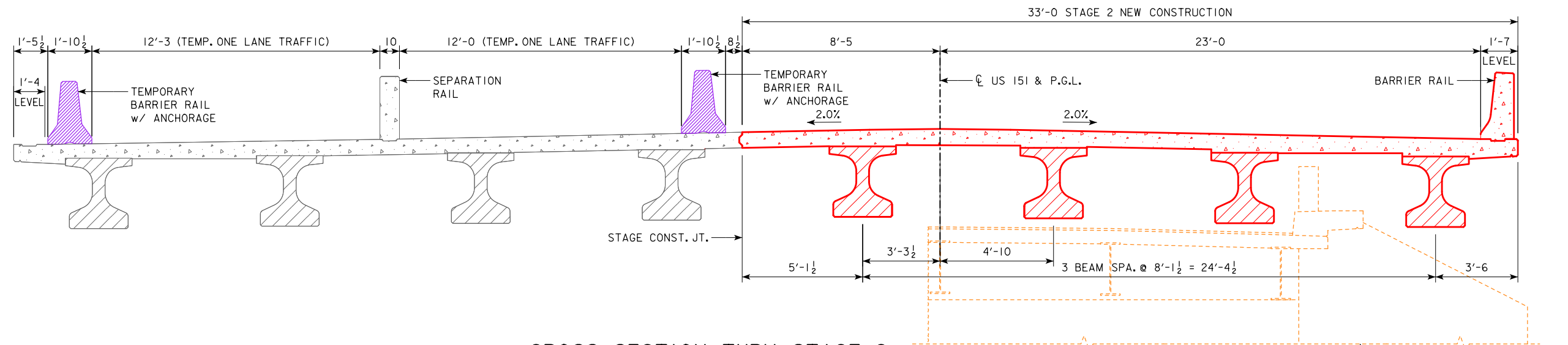
SHIFT TRAFFIC TO ONE LANE TRAFFIC ON
EAST SIDE OF EXISTING BRIDGE.
REMOVE WEST HALF OF EXISTING BRIDGE
AND CONSTRUCT WEST PORTION OF THE
PROPOSED BRIDGE.

NOTE:
TEMPORARY BARRIER SHALL BE ANCHORED INTO BRIDGE DECK, REFER
TO IOWA D.O.T. ROAD PLAN STANDARD BA-401 FOR REQUIREMENT.

DESIGN FOR 30° SKEW (R.A.)

209'-0"x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN

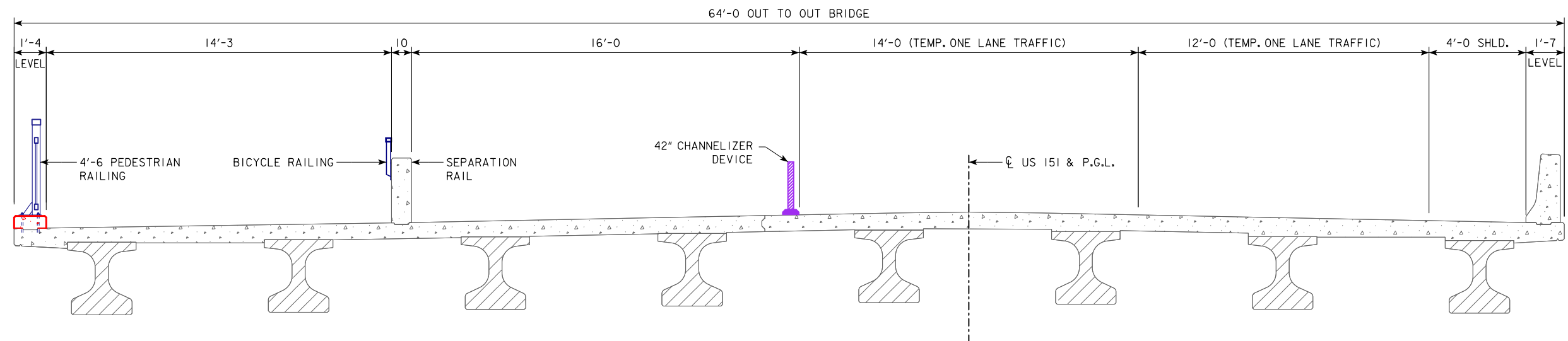
STAGING DETAILS
STA. 867+41.69 (℄ US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 12 OF 59 FILE NO. 31286 DESIGN NO. 518



CROSS SECTION THRU STAGE 2

(LOOKING NORTH)

SHIFT TRAFFIC TO TWO LANE TRAFFIC ON THE NEWLY CONSTRUCTED WEST PORTION OF BRIDGE.
REMOVE TBR. INSTALL CHANNELIZER DEVICE.
REMOVE REMAINING PORTION OF THE EXISTING BRIDGE, AND CONSTRUCTION EAST PORTION OF THE PROPOSED BRIDGE.



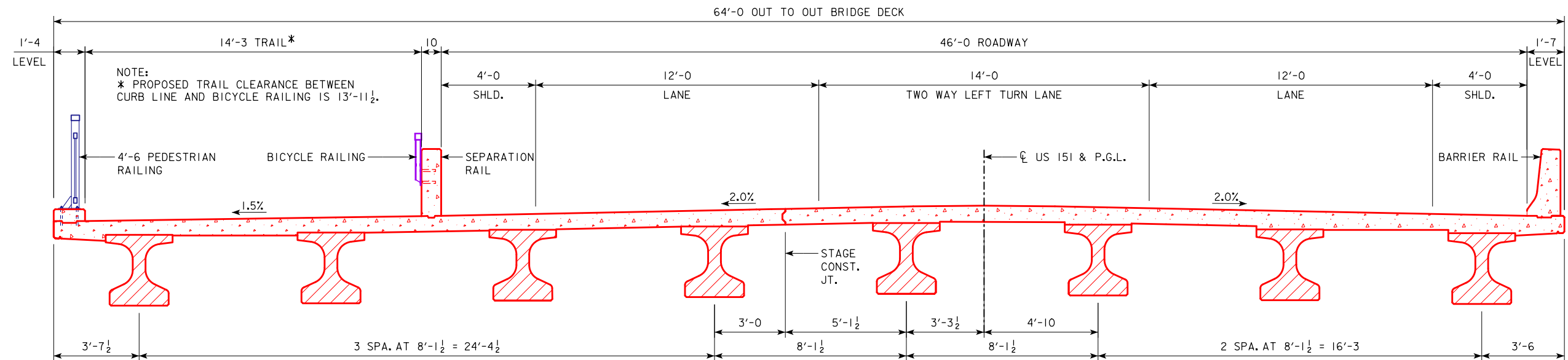
CROSS SECTION THRU STAGE 2A

(LOOKING NORTH)

SHIFT TRAFFIC TO TWO LANE TRAFFIC ON THE NEWLY CONSTRUCTED EAST PORTION OF BRIDGE.
REMOVE TBR. INSTALL 42" CHANNELIZER DEVICE.
CONSTRUCT TRAIL CURB, CONCRETE MONUMENT, BOLLARDS, PEDESTRIAN AND BICYCLE RAILINGS AT THE WEST PORTION OF THE PROPOSED BRIDGE.

NOTE:
FOR STAGING AND REMOVAL NOTES, SEE DESIGN SHEET 12.
TEMPORARY BARRIER SHALL BE ANCHORED INTO BRIDGE DECK, REFER TO IOWA D.O.T. ROAD PLAN STANDARD BA-401 FOR REQUIREMENT.

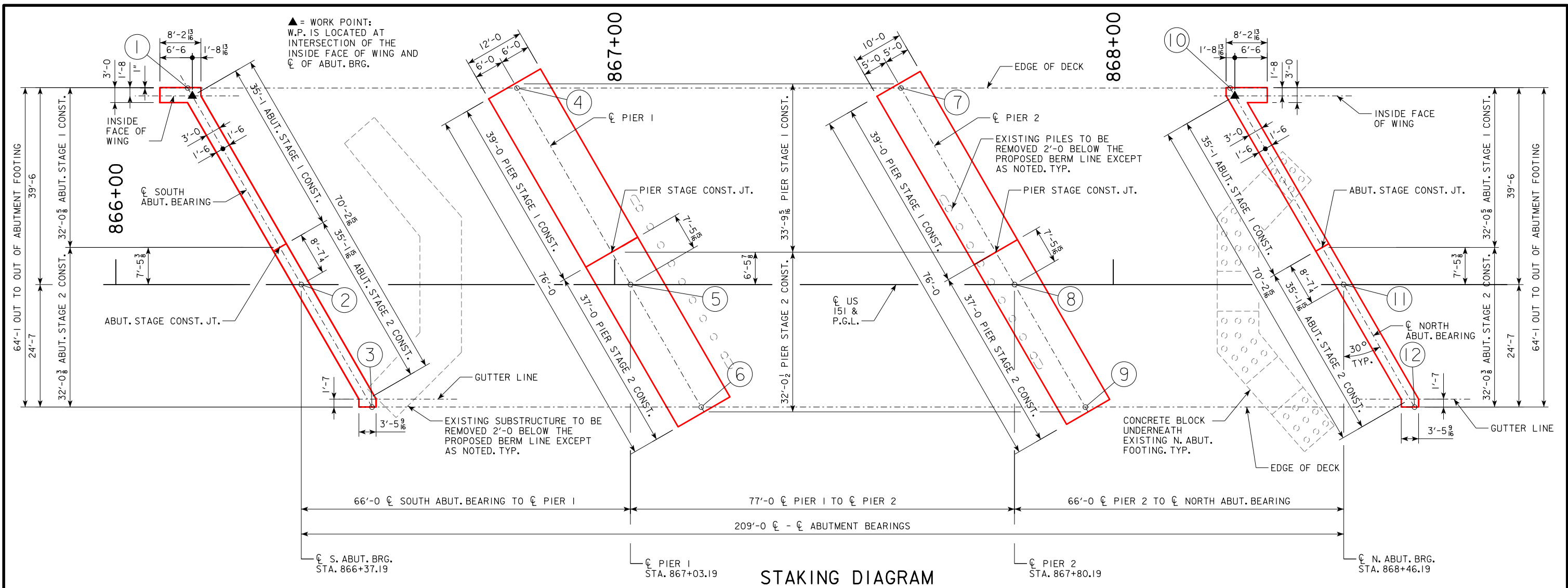
DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
STAGING DETAILS
STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 13 OF 59 FILE NO. 31286 DESIGN NO. 518



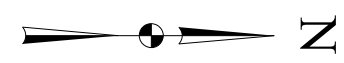
CROSS SECTION THRU FINAL
(LOOKING NORTH)
SHIFT TRAFFIC TO FINAL TRAFFIC LANES ON THE PROPOSED BRIDGE.

NOTE:
FOR STAGING AND REMOVAL NOTES, SEE DESIGN SHEET 12.

DESIGN FOR 30° SKEW (R.A.)
**209'-0x46'-0 PRETENSIONED PRESTRESSED
 CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL**
 66'-0 END SPANS 77'-0 INTERIOR SPAN
STAGING DETAILS
 STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 14 OF 59 FILE NO. 31286 DESIGN NO. 518



STAKING DIAGRAM



NOTE:
FIELD VERIFY EXISTING NORTH ABUTMENT FOOTING PILE
AND CONCRETE BLOCK LOCATIONS. REMOVE CONCRETE
BLOCK UNDERNEATH THE EXISTING NORTH ABUTMENT
FOOTING WHERE IT CONFLICTS TO THE NEW ABUTMENT
CONSTRUCTION.

BRIDGE COORDINATES								
LOCATION	POINT	℄ S. ABUT. BRG.	POINT	℄ PIER 1	POINT	℄ PIER 2	POINT	℄ N. ABUT. BRG.
LEFT EDGE OF DECK	①	E=2107413.326 N=705182.401	④	E=2107410.613 N=705248.345	⑦	E=2107407.447 N=705325.280	⑩	E=2107404.733 N=705391.224
℄ US 151 & P.G.L.	②	E=2107451.774 N=705206.759	⑤	E=2107449.061 N=705272.704	⑧	E=2107445.895 N=705349.639	⑪	E=2107443.181 N=705415.583
RIGHT EDGE OF DECK	③	E=2107475.753 N=705221.951	⑥	E=2107473.040 N=705287.896	⑨	E=2107469.874 N=705364.830	⑫	E=2107467.160 N=705430.775

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 30° SKEW (R.A.)

209'-0x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL

66'-0 END SPANS 77'-0 INTERIOR SPAN

STAKING DIAGRAM

STA. 867+41.69 (CL US 151) SEPTEMBER 2018

LINN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 15 OF 59 FILE NO. 31286 DESIGN NO. 518

BENCH MARK NO.: BM2, STA. 871+35.96, 70.098 RT, RR SPIKE IN POWER POLE, EAST SIDE HWY 151, 200'± NORTH OF NORTH END OF RIVER BRIDGE AT BEGINNING OF CLEARING. ELEV. 750.420, N = 705704.166 E = 2107504.303.

PIER I NOTES:

ALL REINFORCING STEEL IS TO BE SECURELY WIRED IN PLACE BEFORE CONCRETE IS PLACED.

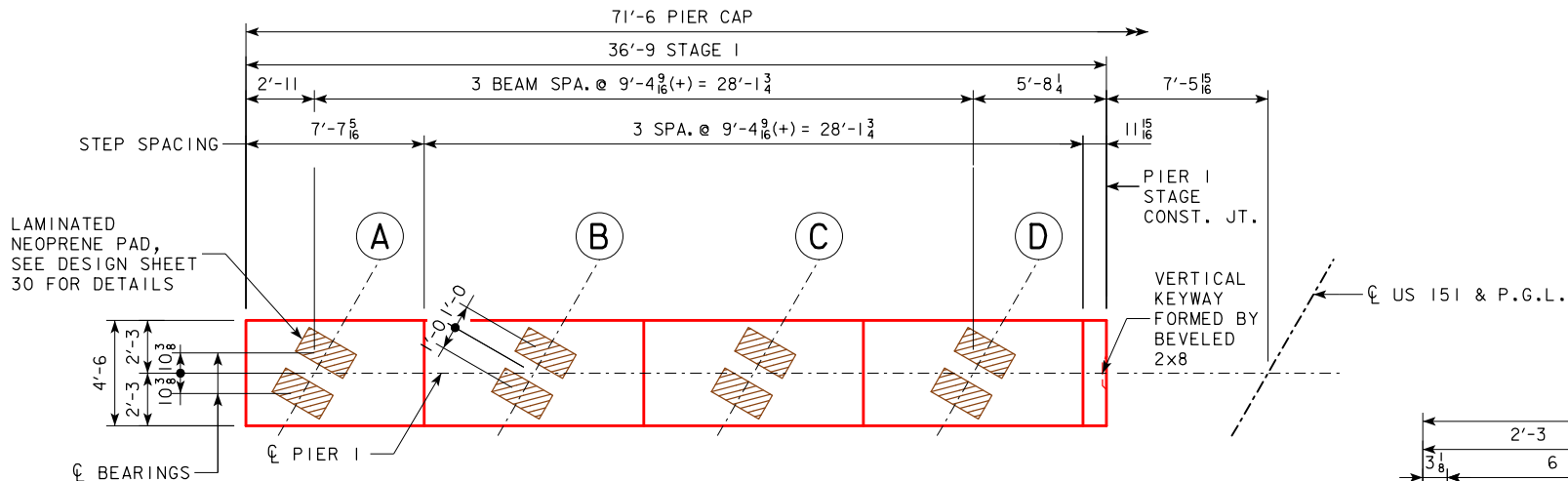
ALL EXPOSED CORNERS 90° OR SHARPER ARE TO BE FILLETED WITH A 3/4" DRESSED AND BEVELED STRIP.

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.

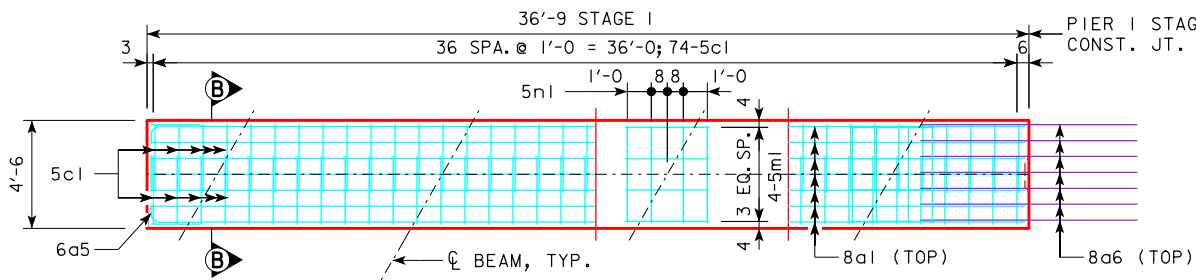
THE 9d2 FOOTING TO COLUMN DOWELS ARE TO BE IN PLACE BEFORE FOOTING CONCRETE IS PLACED.

8a1, 6a3, AND 8b1 IN THE PIER CAP, 5e2 BARS IN THE PIER COLUMN, AND 6f1 AND 8g1 IN THE FOOTING, SHALL LAP WITH STAINLESS STEEL SPLICE REINFORCING BARS PROJECTED BEYOND THE STAGE CONSTRUCTION JOINT (i.e. 8a6, 6a7, AND 8b3 IN THE PIER CAP, 5e3 BARS IN THE PIER COLUMN, AND 6f4 AND 8g4 IN THE FOOTING).

FOR STAINLESS STEEL SPLICE REINFORCING NOTES, SEE GENERAL NOTES IN DESIGN SHEET 4.

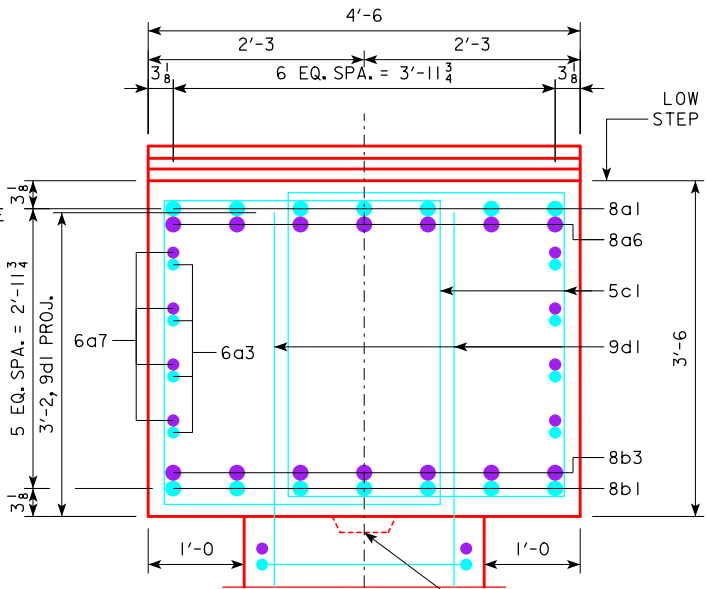


PIER I CAP PLAN (STAGE I)



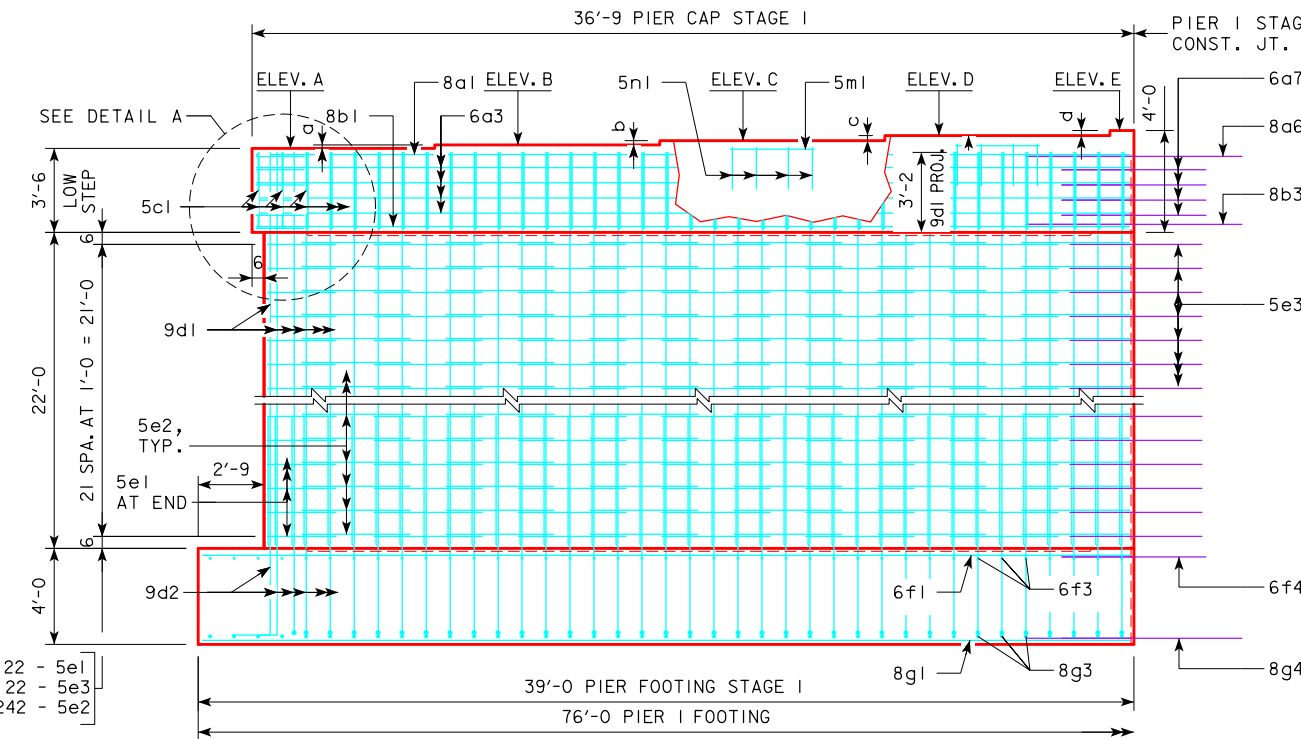
PIER I CAP PLAN (STAGE I)

NOTE: PLACE MAT OF 5m1 & 5n1 BARS UNDER BEAMS C & D.

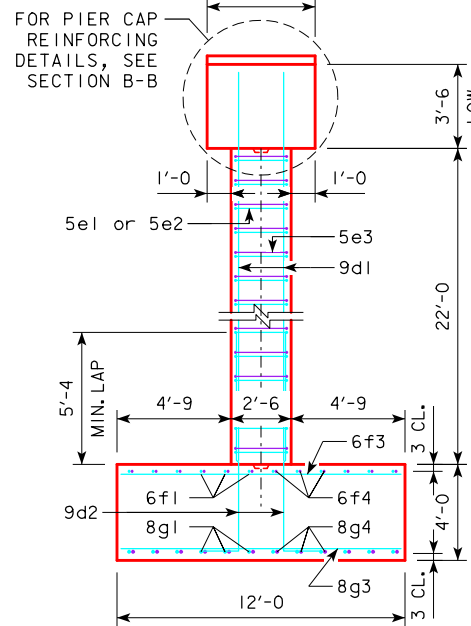


SECTION B-B

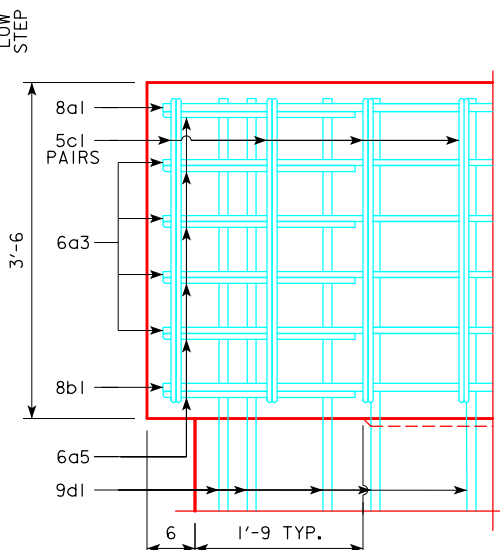
(5m1 & 5n1 BAR NOT SHOWN) BEVELED KEYWAY (TOP & BOTT. OF PIER COLUMN)



PIER I ELEVATION (STAGE I)



END ELEVATION



DETAIL A

TABLE OF PIER I ELEVATIONS	
POINT	PIER
ELEV. A	757.02
ELEV. B	757.11
ELEV. C	757.23
ELEV. D	757.37
ELEV. E	757.51
BOTT. FTG. ELEV.	727.52

TABLE OF PIER I STEPS	
STEP	PIER
a	1 3/16
b	1 7/16
c	1 11/16
d	1 11/16

STAINLESS SPLICE BAR		
BAR	LOCATION	MIN. LAP LENGTH
8a6	CAP, LONGITUDINAL, TOP, SPLICE	4'-9
6a7	CAP, LONGITUDINAL, SIDE, SPLICE	2'-10
8b3	CAP, LONGITUDINAL, BOTT., SPLICE	4'-9
6f4	FOOTING, LONGITUDINAL, TOP, SPLICE	2'-10
8g4	FOOTING, LONGITUDINAL, BOTT., SPLICE	4'-9
5e3	COLUMN, HOOPS	2'-6

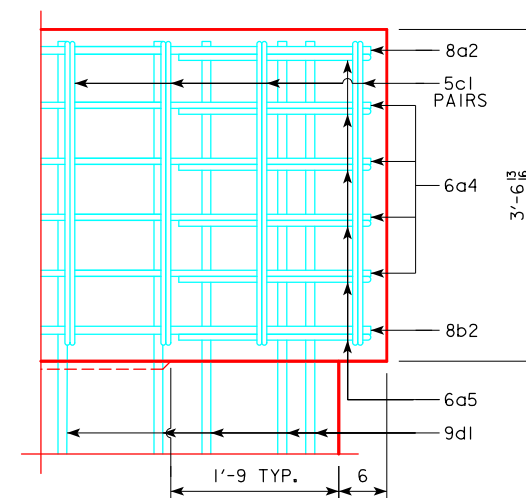
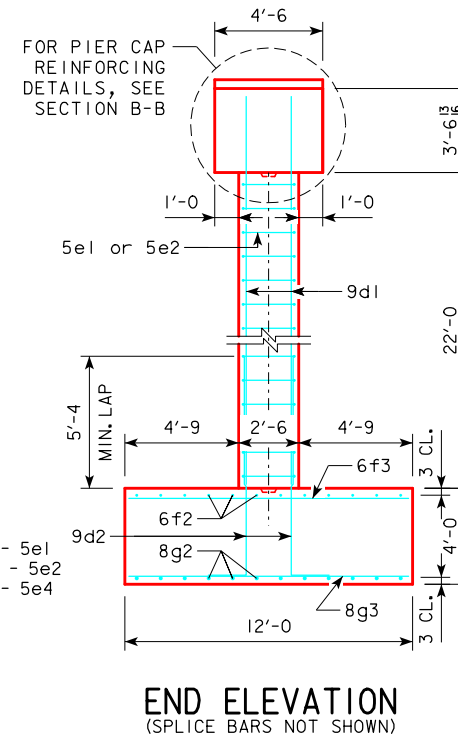
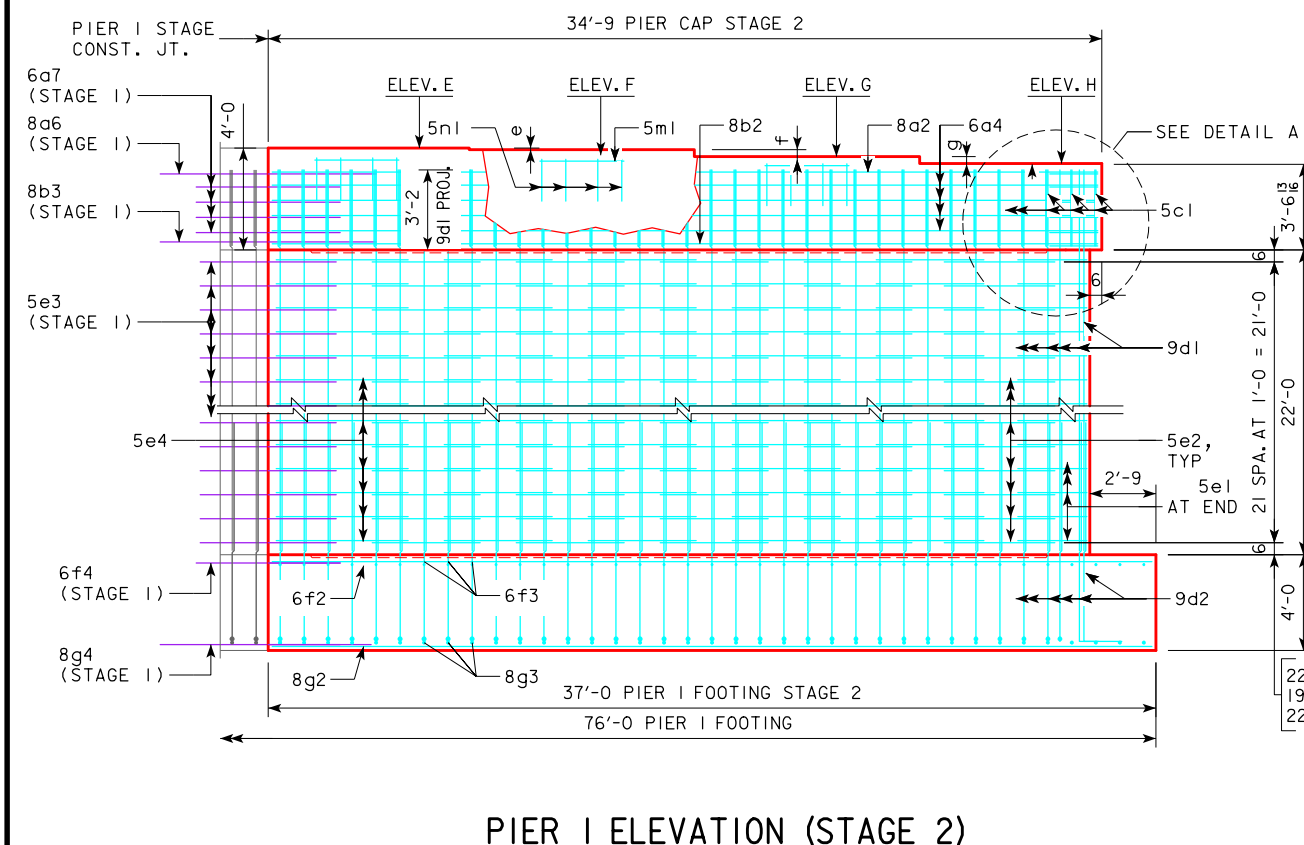
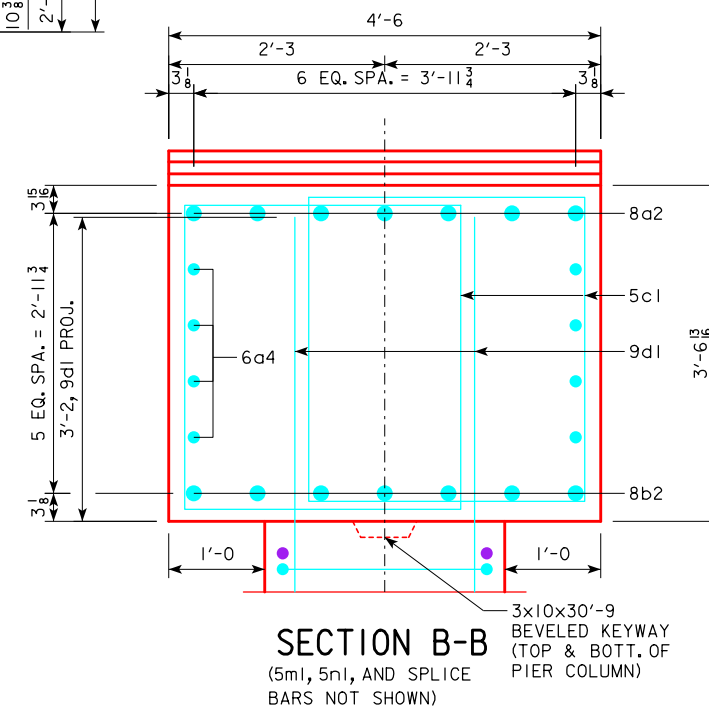
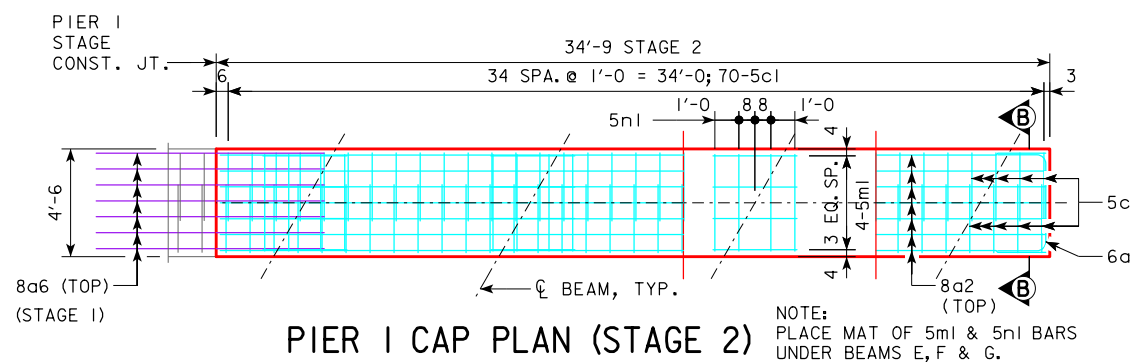
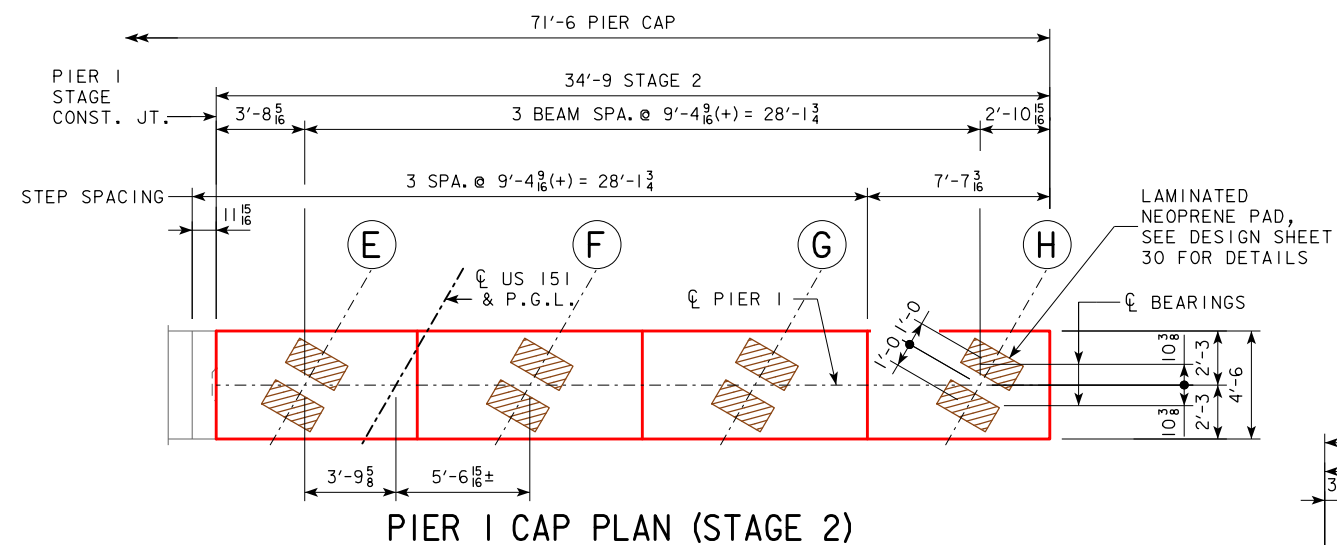
NOTE: FOR TYPICAL SECTION THRU FOOTING AND PIER I FOOTING REINFORCEMENT, SEE DESIGN SHEET 18.

DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
PIER I DETAILS - STAGE I
STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 16 OF 59 FILE NO. 31286 DESIGN NO. 518

BENCH MARK NO.: BM2, STA. 871+35.96, 70.098 RT, RR SPIKE IN POWER POLE, EAST SIDE HWY 151, 200'± NORTH OF NORTH END OF RIVER BRIDGE AT BEGINNING OF CLEARING. ELEV. 750.420, N = 705704.166 E = 2107504.303.

POINT	PIER
ELEV. E	757.51
ELEV. F	757.46
ELEV. G	757.27
ELEV. H	757.09
BOTT. FTG. ELEV.	727.52

TABLE OF PIER 1 STEPS	
STEP	PIER
e	$\frac{5}{8}$
f	$2\frac{1}{4}$
g	$2\frac{1}{4}$



NOTE:
FOR PIER 1 NOTES, SEE DESIGN SHEET 16.

FOR TYPICAL SECTION THRU FOOTING AND PIER 1 FOOTING
REINFORCEMENT, SEE DESIGN SHEET 18.

FOR MINIMUM REINFORCING SPLICE LENGTH AT STAGE
CONSTRUCTION JOINT, SEE DESIGN SHEET 16.

DESIGN FOR 30° SKEW (R.A.)

209'-0"x46'-0" PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0" TRAIL
66'-0" END SPANS 77'-0" INTERIOR SPAN

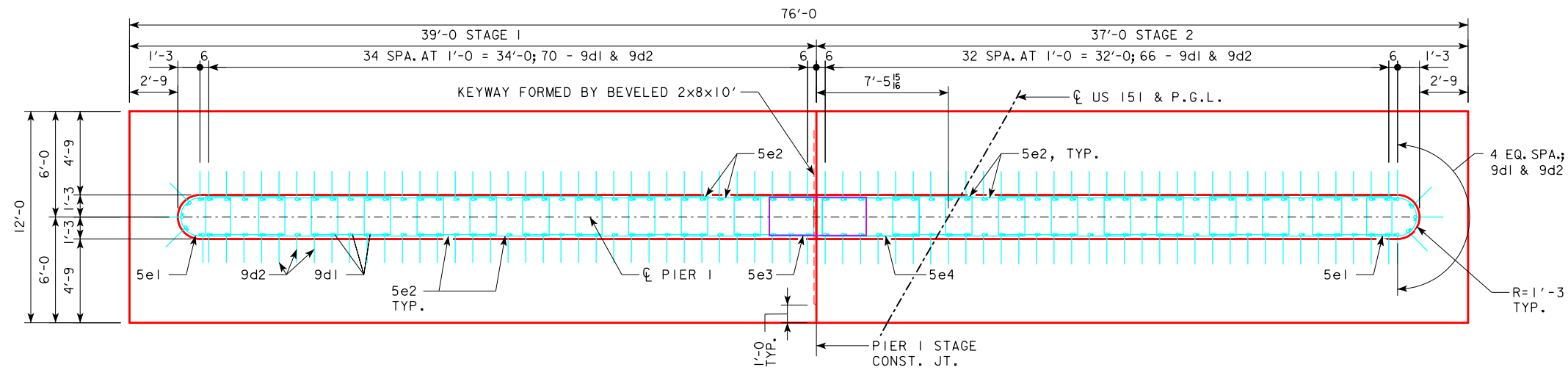
PIER 1 DETAILS - STAGE 2

STA. 867+41.69 (☺ US 151) SEPTEMBER 2018

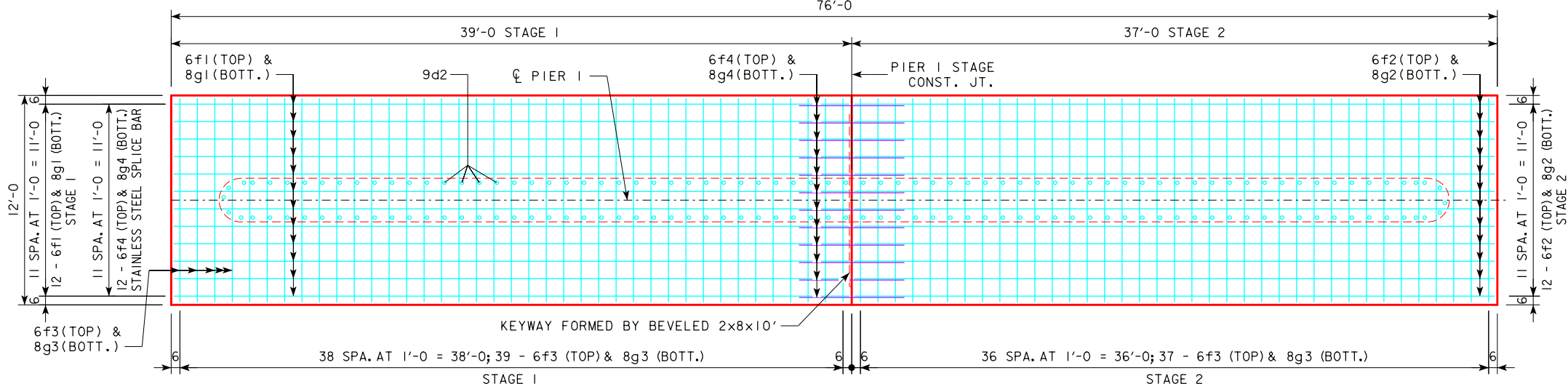
LINN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 17 OF 59 FILE NO. 31286 DESIGN NO. 518

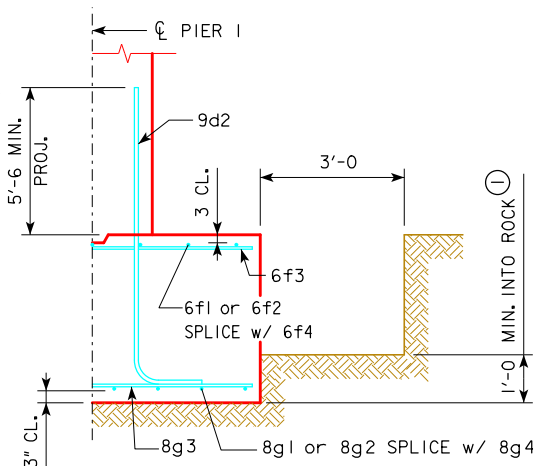


PIER I BOTTOM OF COLUMN PLAN



PIER I FOOTING PLAN

NOTE:
THE EXCAVATION LIMIT FOR
PIER I SPREAD FOOTING
NOTCHED INTO ROCK SHALL BE
PAID FOR UNDER BID ITEM,
"EXCAVATION, CLASS 22."



TYPICAL SECTION THRU FOOTING

CONCRETE PLACEMENT QTY'S - PIER I				
LOCATION	QUANTITY	LOCATION	QUANTITY	
CAP STAGE I	23.0 CU. YD	CAP STAGE 2	22.5 CU. YD	
COLUMN STAGE I	73.3 CU. YD	COLUMN STAGE 2	69.3 CU. YD	
FOOTING STAGE I	69.3 CU. YD	FOOTING STAGE 2	65.8 CU. YD	TOTAL
	165.6 CU. YD		157.6 CU. YD	323.2 CU. YD

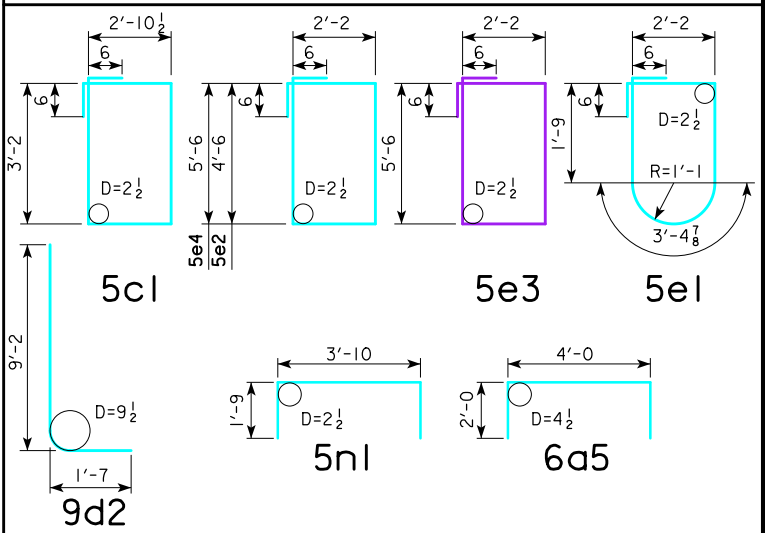
NON-COATED REINFORCING STEEL - PIER I

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
8a1	CAP, LONGITUDINAL, TOP, STAGE 1		7	36'-5	681
8a2	CAP, LONGITUDINAL, TOP, STAGE 2		7	34'-5	643
6a3	CAP, LONGITUDINAL, SIDE, STAGE 1		8	36'-5	438
6a4	CAP, LONGITUDINAL, SIDE, STAGE 2		8	34'-5	414
6a5	CAP, END		12	8'-0	144
8b1	CAP, LONGITUDINAL, BOT., STAGE 1		7	36'-5	681
8b2	CAP, LONGITUDINAL, BOT., STAGE 2		7	34'-5	643
5c1	CAP, STIRRUPS		144	13'-1	1,965
9d1	COLUMN, VERTICAL		146	25'-2	12,493
9d2	COLUMN, VERTICAL, DOWELS		146	10'-9	5,336
5e1	COLUMN HOOPS, END		44	10'-1	463
5e2	COLUMN HOOPS		440	14'-4	6,578
5e4	COLUMN HOOPS		22	16'-4	375
6f1	FOOTING, LONGITUDINAL, TOP, STAGE 1		12	38'-8	697
6f2	FOOTING, LONGITUDINAL, TOP, STAGE 2		12	36'-8	661
6f3	FOOTING, TRANSVERSE, TOP		76	11'-8	1,332
8g1	FOOTING, LONGITUDINAL, BOT., STAGE 1		12	38'-8	1,239
8g2	FOOTING, LONGITUDINAL, BOT., STAGE 2		12	36'-8	1,175
8g3	FOOTING, TRANSVERSE, BOTTOM		76	11'-8	2,367
5m1	CAP, STEP, TRANSVERSE		20	3'-6	73
5n1	CAP, STEP, LONGITUDINAL		20	7'-4	153
REINFORCING STEEL TOTAL (LBS.)					38,551

STAINLESS REINFORCING STEEL - PIER I

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
8a6	CAP, LONGITUDINAL, TOP, SPLICE		7	9'-10	184
6a7	CAP, LONGITUDINAL, SIDE, SPLICE		8	6'-0	72
8b3	CAP, LONGITUDINAL, BOT., SPLICE		7	9'-10	184
5e3	COLUMN HOOPS, SPLICE		22	16'-4	375
6f4	FOOTING, LONGITUDINAL, TOP, SPLICE		12	6'-0	108
8g4	FOOTING, LONGITUDINAL, BOT., SPLICE		12	9'-10	315
STAINLESS REINFORCING STEEL TOTAL (LBS.)					1,238

BENT BAR DETAILS



DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
PIER I FOOTING & QUANTITIES
STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 18 OF 59 FILE NO. 31286 DESIGN NO. 518

NOTE:
CONCRETE AND REINFORCING STEEL QUANTITIES ARE INCLUDED ON THE SUMMARY
QUANTITIES SHEET.

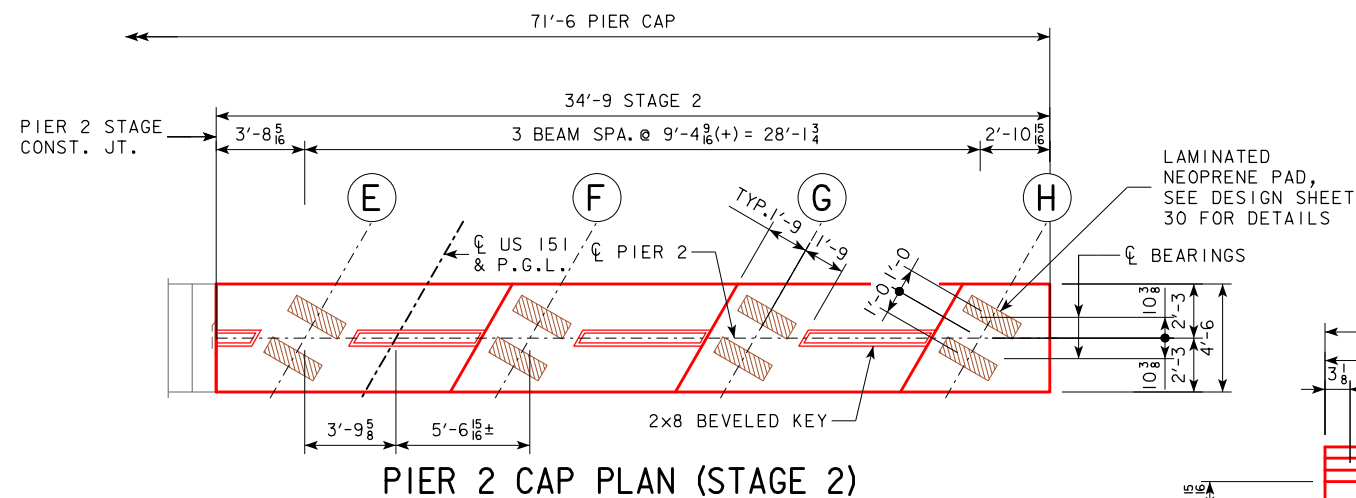
PIER I SPREAD FOOTING SHALL EXTEND AT LEAST 12 INCHES INTO SUITABLE
FOUNDATION ROCK AND THE LAST 12 INCHES OF ROCK EXCAVATION SHALL BE TO
NEAT LINES OF MASONRY. THE FOUNDATION ROCK SHALL HAVE A MINIMUM LRFD
NOMINAL BEARING RESISTANCE OF 55 KIPS PER SQUARE FOOT AT STRENGTH
LIMIT STATE AND 18 KIPS PER SQUARE FOOT AT SERVICE LIMIT STATE.

SHEET NUMBER 20

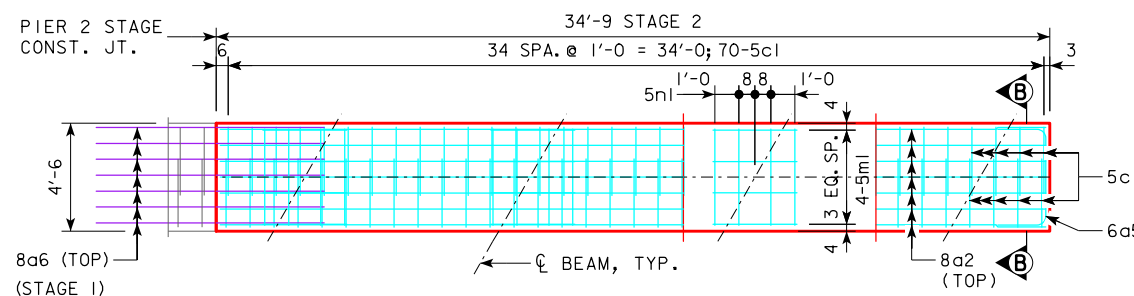
BENCH MARK NO.: BM2, STA. 871+35.96, 70.098 RT, RR SPIKE IN POWER POLE, EAST SIDE HWY 151, 200'± NORTH OF NORTH END OF RIVER BRIDGE AT BEGINNING OF CLEARING. ELEV. 750.420, N = 705704.166 E = 2107504.303.

POINT	PIER
ELEV. E	757.30
ELEV. F	757.25
ELEV. G	757.06
ELEV. H	756.88
BOTT. FTG. ELEV.	729.31

TABLE OF PIER 2 STEPS	
STEP	PIER
e	$\frac{5}{8}$
f	$2\frac{1}{4}$
g	$2\frac{1}{4}$

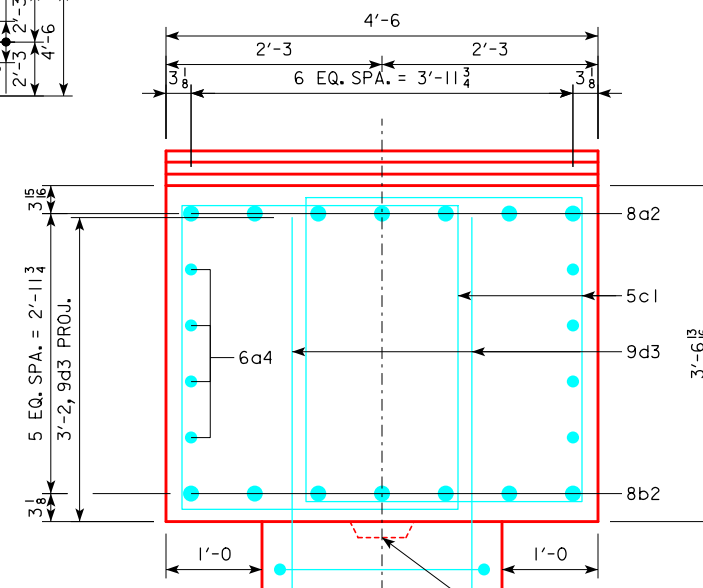


PIER 2 CAP PLAN (STAGE 2)



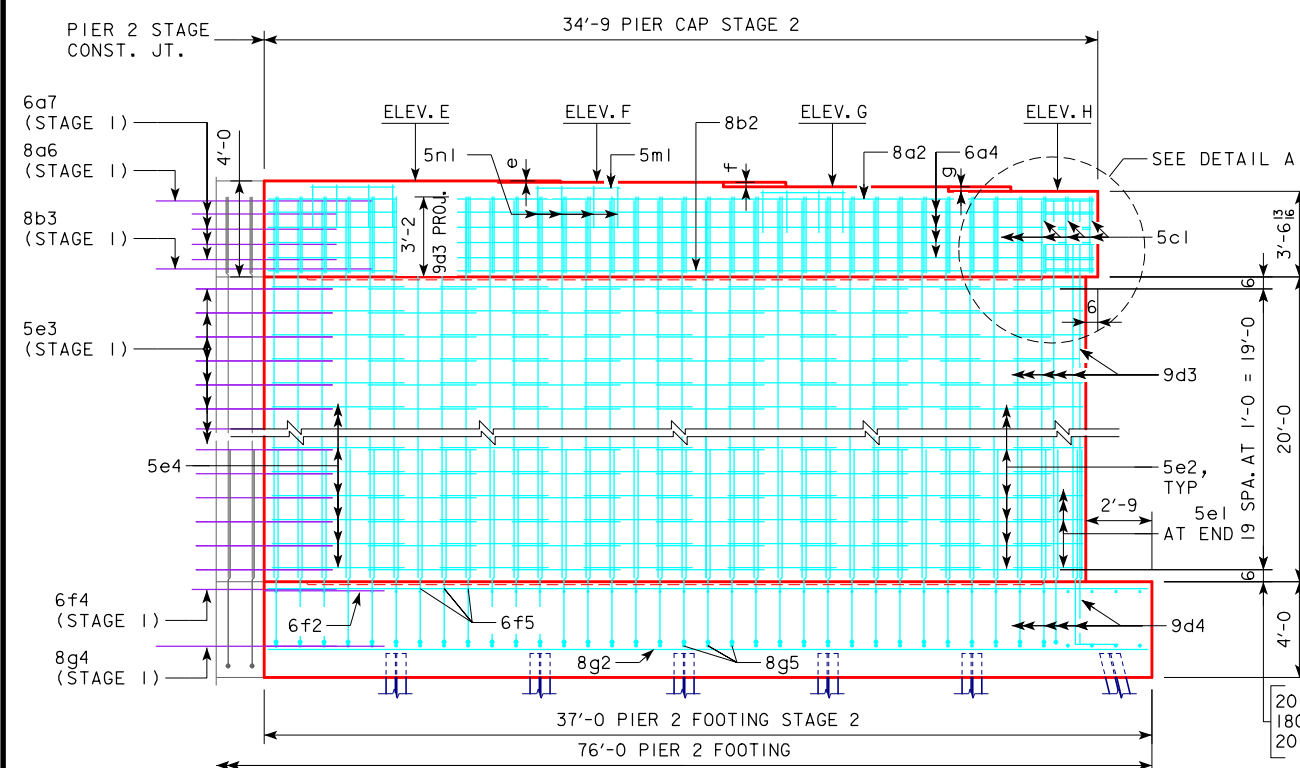
PIER 2 CAP (STAGE 2)

NOTE:
PLACE MAT OF 5ml & 5nl BARS
UNDER BEAMS E, F & G.

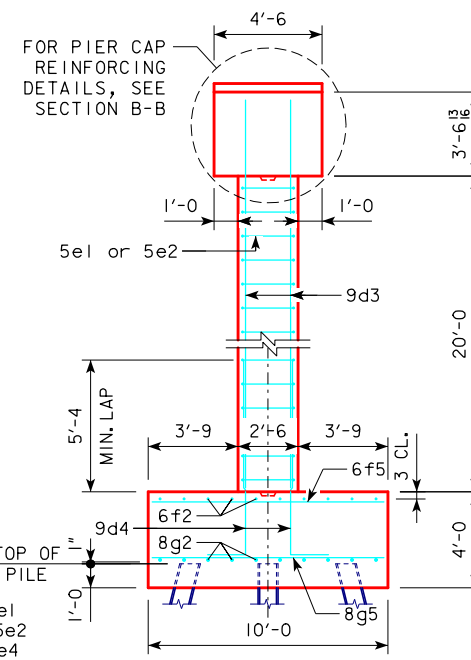


SECTION B-B

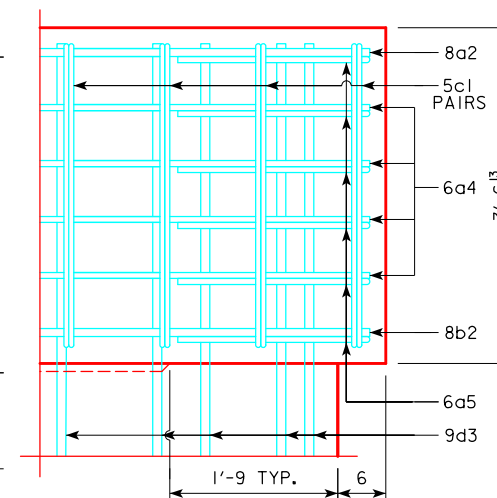
(5ml, 5nl, AND SPLICE BARS NOT SHOWN)	(TOP & BOTT. OF PIER COLUMN)
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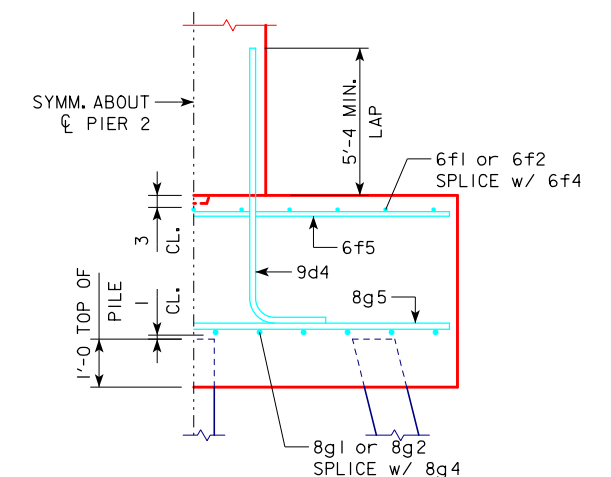
PIER 2 ELEVATION (STAGE 2)



END ELEVATION
(SPLICE BARS NOT SHOWN)



DETAIL A



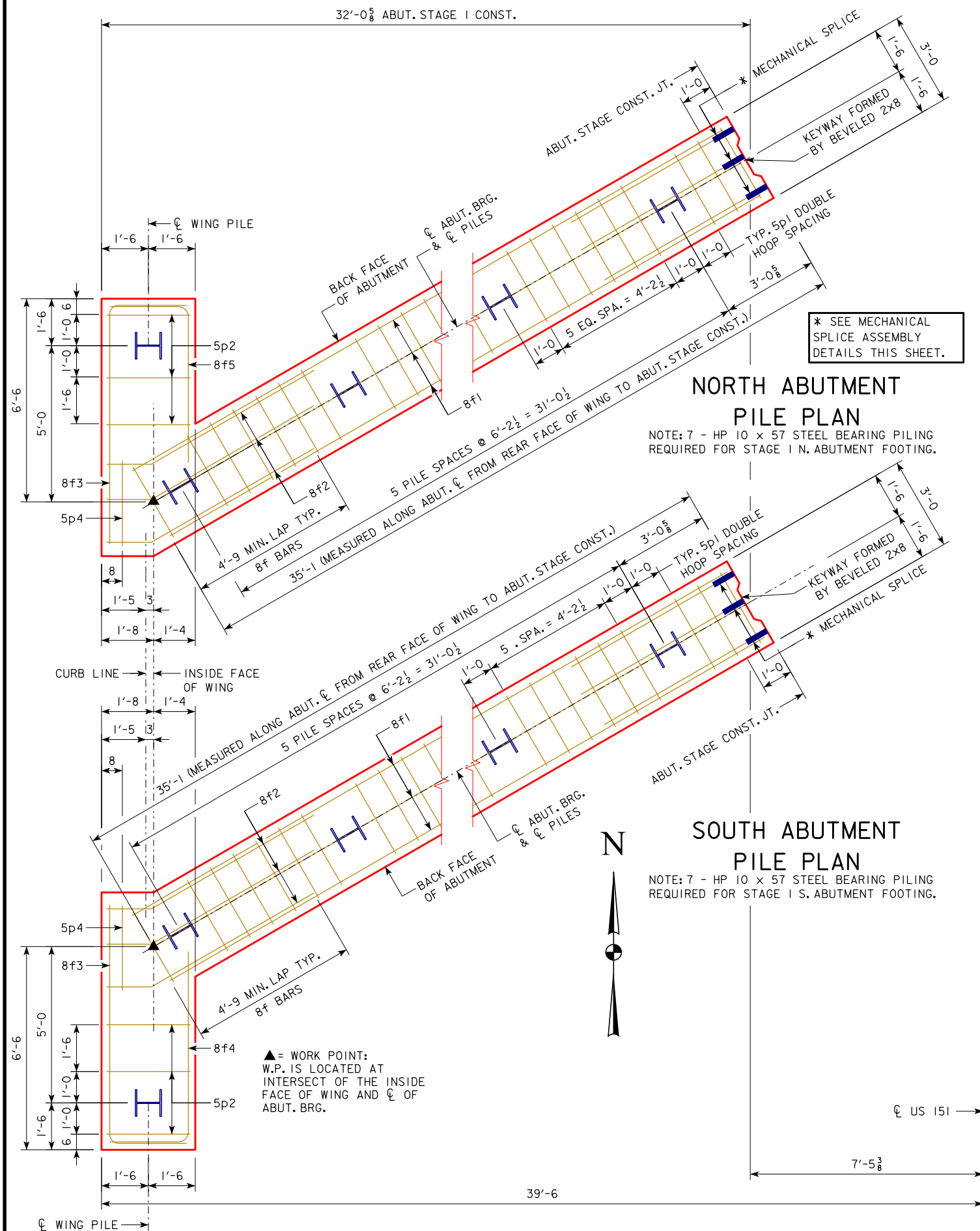
TYPICAL SECTION
THRU FOOTING

NOTE:
FOR PIER 2 NOTE, SEE DESIGN SHEET 19.

FOR PIER 2 FOOTING REINFORCEMENT DETAILS, SEE DESIGN SHEET 21.

FOR MINIMUM REINFORCING SPLICE LENGTH AT STAGE CONSTRUCTION JOINT, SEE DESIGN SHEET 19.

DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
PIER 2 DETAILS - STAGE 2
STA. 867+41.69 (C) US 151 SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 20 OF 59 FILE NO. 31286 DESIGN NO. 518



NORTH ABUT. PILE DESIGN NOTES:

THE CONTRACT LENGTH OF 50 FEET FOR THE NORTH ABUTMENT PILES IS BASED ON A NON-COHESIVE SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 152 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.55 FOR SOIL AND 0.7 FOR ROCK END BEARING. TO ACCOUNT FOR SOIL CONSOLIDATION UNDER THE NEW FILL, THE FACTORED AXIAL LOAD INCLUDES A FACTORED DOWN DRAG LOAD OF 4 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.

NORTH ABUT. PILE DRIVING NOTES:

THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR NORTH ABUTMENT PILES IS 114 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.

CAST-IN-ONE-PIECE STEEL PILE POINTS ARE REQUIRED FOR ALL PILES IN ACCORDANCE WITH ARTICLE 4167.02 OF THE CURRENT STANDARD SPECIFICATION AND MATERIALS I.M. 468.

NOTE:

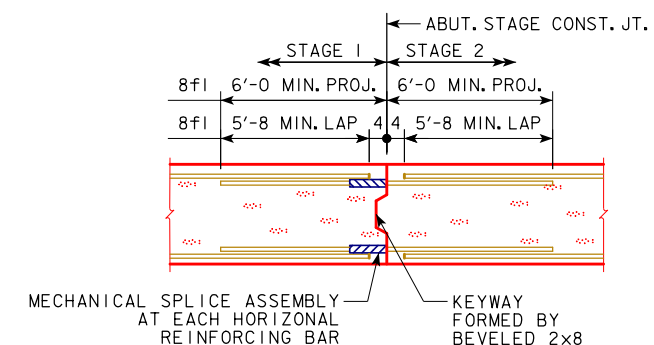
FIELD VERIFY THE EXISTING NORTH ABUTMENT FOOTING PILE AND CONCRETE BLOCK LOCATIONS. REMOVE CONCRETE BLOCK UNDERNEATH THE EXISTING NORTH ABUTMENT FOOTING WHERE IT CONFLICTS TO NEW ABUTMENT CONSTRUCTION.

MECHANICAL SPLICE DETAIL

THE 8f1 BARS SHALL BE SPLICED AT THE LOCATIONS SHOWN USING MECHANICAL SPLICE ASSEMBLIES. 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 BE A MINIMUM OF EQUAL TO THE DIAMETER OF THE CORRESPONDING BAR WHICH THE SPLICE BAR IS LAPPED WITH.

ALL MECHANICAL SPLICE ASSEMBLIES TO BE USED IN SPLICING 8f1 BARS 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 18 EPOXY COATED SPLICE ASSEMBLIES WILL BE REQUIRED.



ABUTMENT CONCRETE QUANTITY

LOCATION	QUANTITY
NORTH ABUTMENT FOOTING (STAGE 1)	17.5
SOUTH ABUTMENT FOOTING (STAGE 1)	17.5
TOTAL (CU. YDS.)	35.0

NOTES:

CONCRETE QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.

SOUTH ABUT. PILE DESIGN NOTES:

THE CONTRACT LENGTH OF 40 FEET FOR THE SOUTH ABUTMENT PILES IS BASED ON A NON-COHESIVE SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 154 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.55 FOR SOIL AND 0.7 FOR ROCK END BEARING. TO ACCOUNT FOR SOIL CONSOLIDATION UNDER THE NEW FILL, THE FACTORED AXIAL LOAD INCLUDES A FACTORED DOWN DRAG LOAD OF 6 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.

SOUTH ABUT. PILE DRIVING NOTES:

THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR SOUTH ABUTMENT PILES IS 114 TONS AT END OF DRIVE OR RETAP. THE PILE CONTRACT LENGTH SHALL BE DRIVEN AS PER PLAN UNLESS PILES REACH REFUSAL. IN NO CASE SHALL A PILE BE EMBEDDED LESS THAN 20 FEET. CONSTRUCTION CONTROL REQUIRES A WEAP ANALYSIS WITH BEARING GRAPH.

CAST-IN-ONE-PIECE STEEL PILE POINTS ARE REQUIRED FOR ALL PILES IN ACCORDANCE WITH ARTICLE 4167.02 OF THE CURRENT STANDARD SPECIFICATION AND MATERIALS I.M. 468.

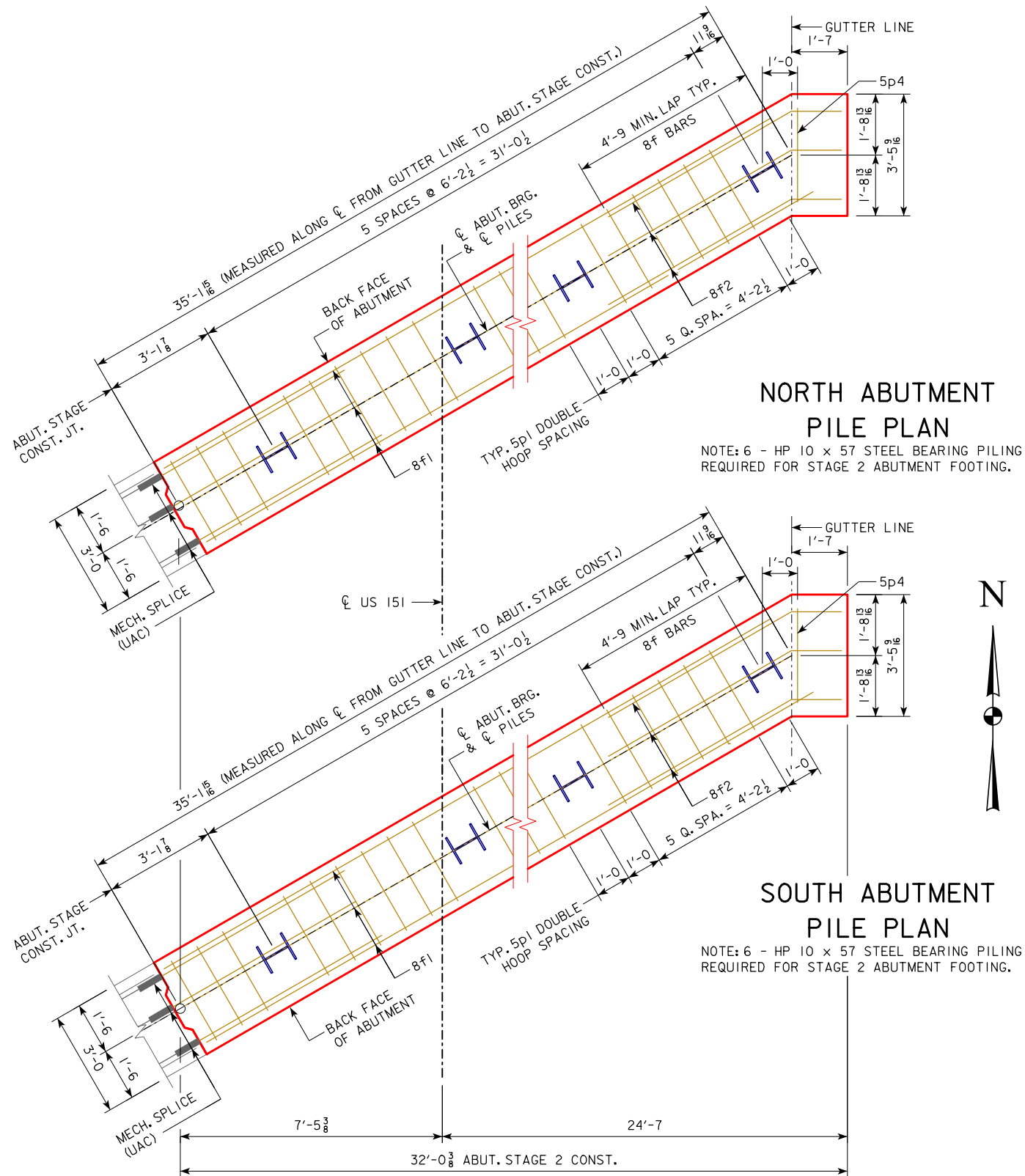
DESIGN FOR 30° SKEW (R.A.)

209'-0x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN

ABUTMENT FOOTING DETAILS - STAGE 1
STA. 867+41.69 (CL US 151) SEPTEMBER 2018

LINN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 22 OF 59 FILE NO. 31286 DESIGN NO. 518

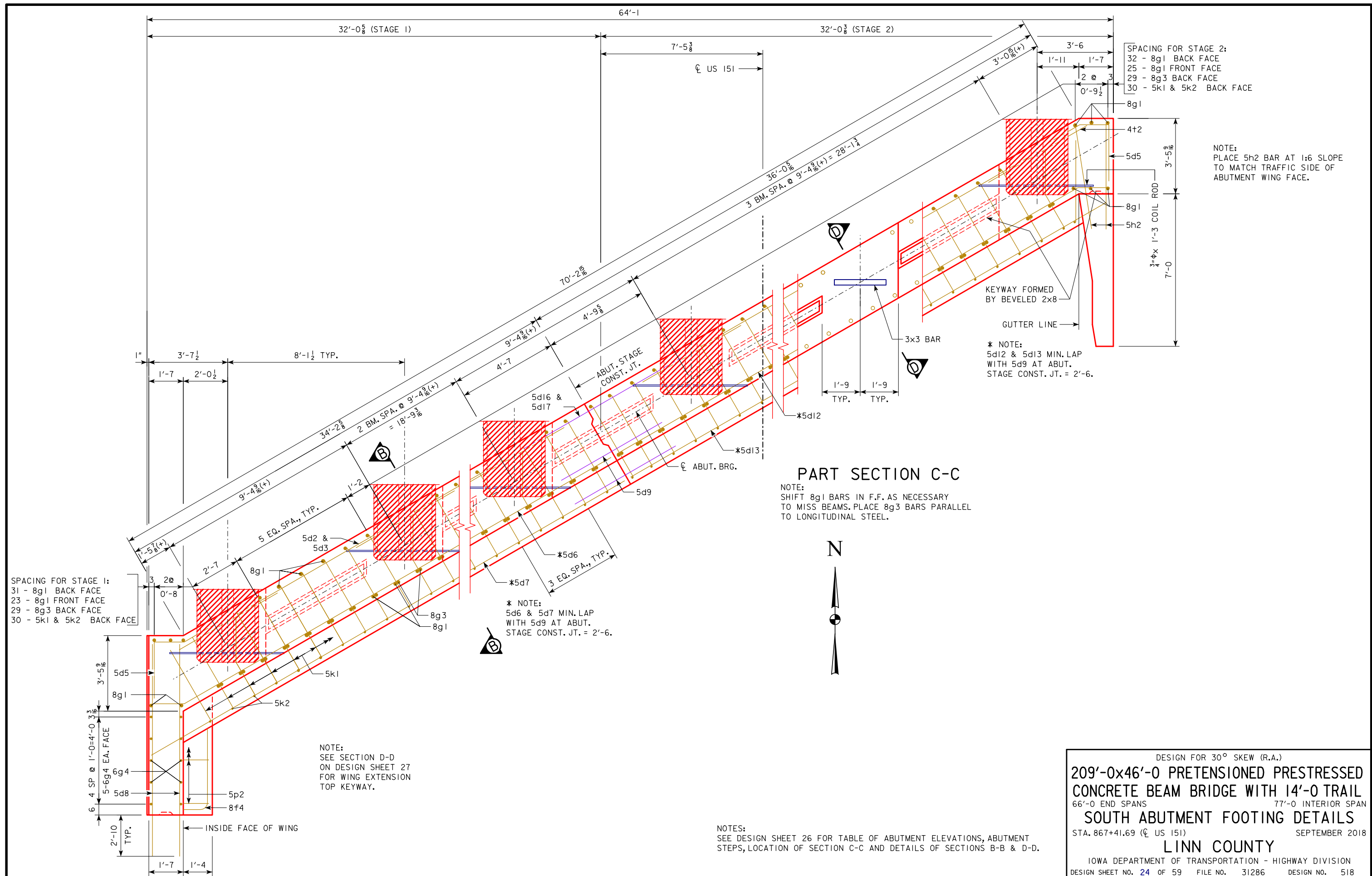


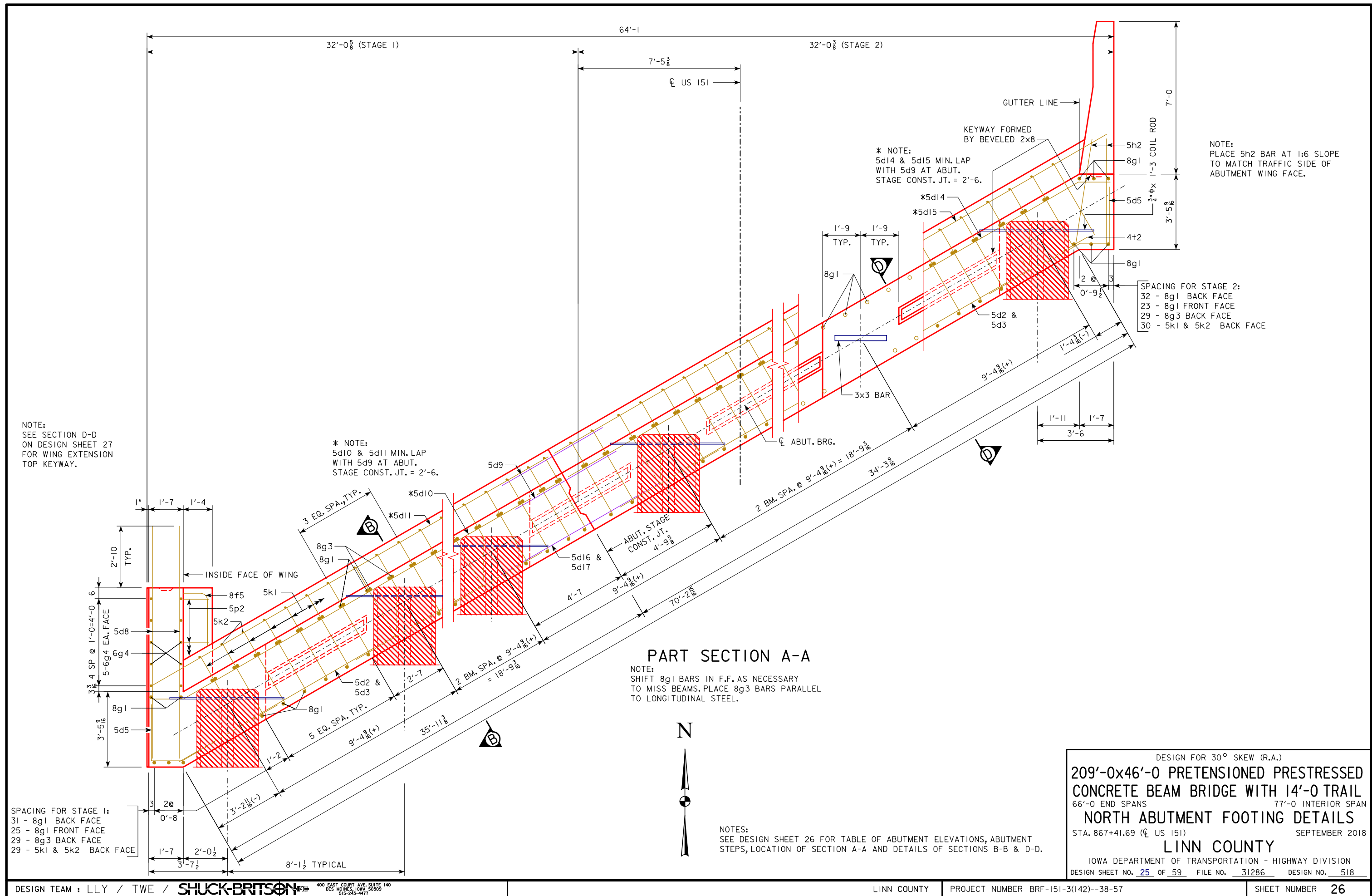
ABUTMENT CONCRETE QUANTITY	
LOCATION	QUANTITY
NORTH ABUTMENT FOOTING (STAGE 2)	15.5
SOUTH ABUTMENT FOOTING (STAGE 2)	15.5
TOTAL (CU. YDS.)	31.0

NOTES:
CONCRETE QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.

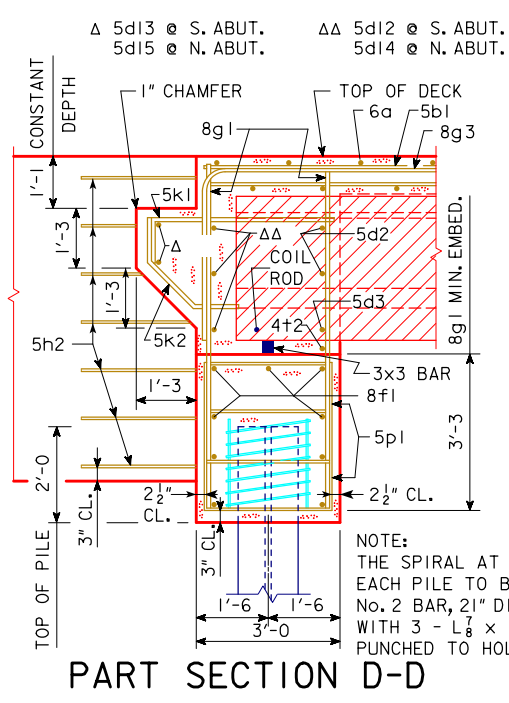
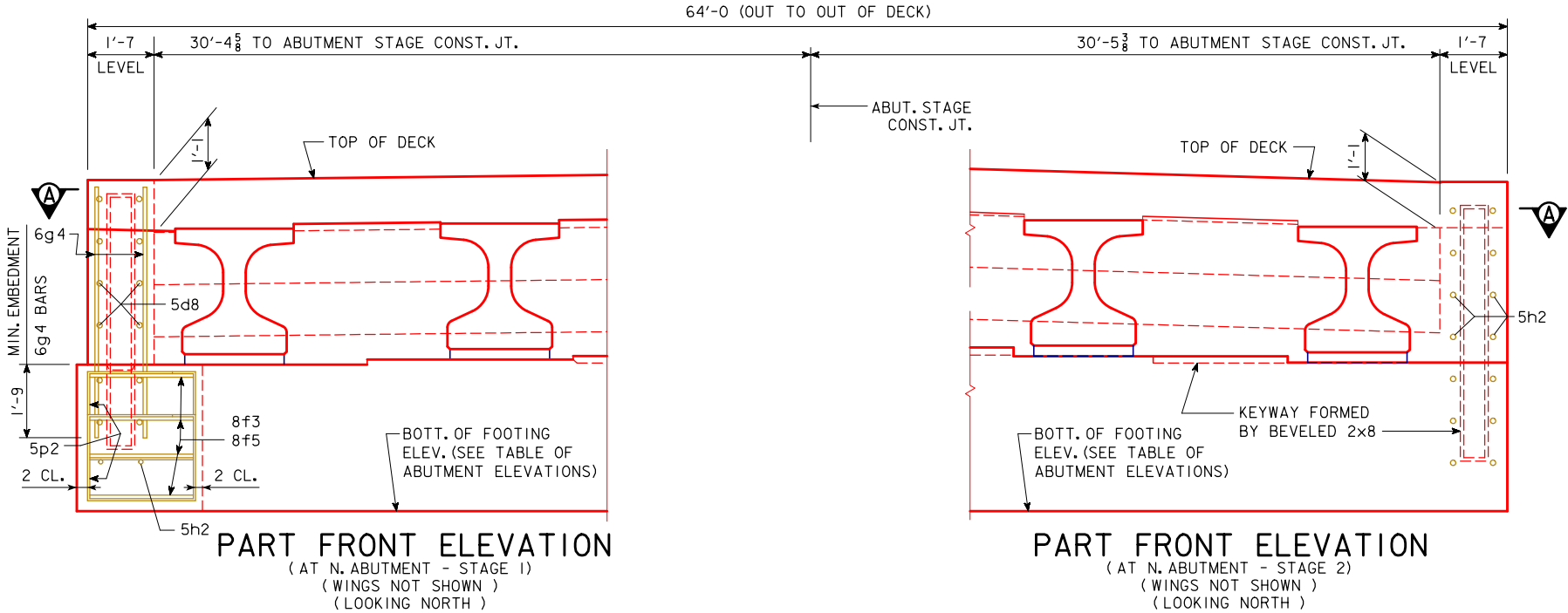
NOTE:
FOR ABUTMENT PILE NOTES AND MECHANICAL SPLICE DETAILS,
SEE DESIGN SHEET 22.

DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
 66'-0 END SPANS 77'-0 INTERIOR SPAN
ABUTMENT FOOTING DETAILS - STAGE 2
 STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 23 OF 59 FILE NO. 31286 DESIGN NO. 518





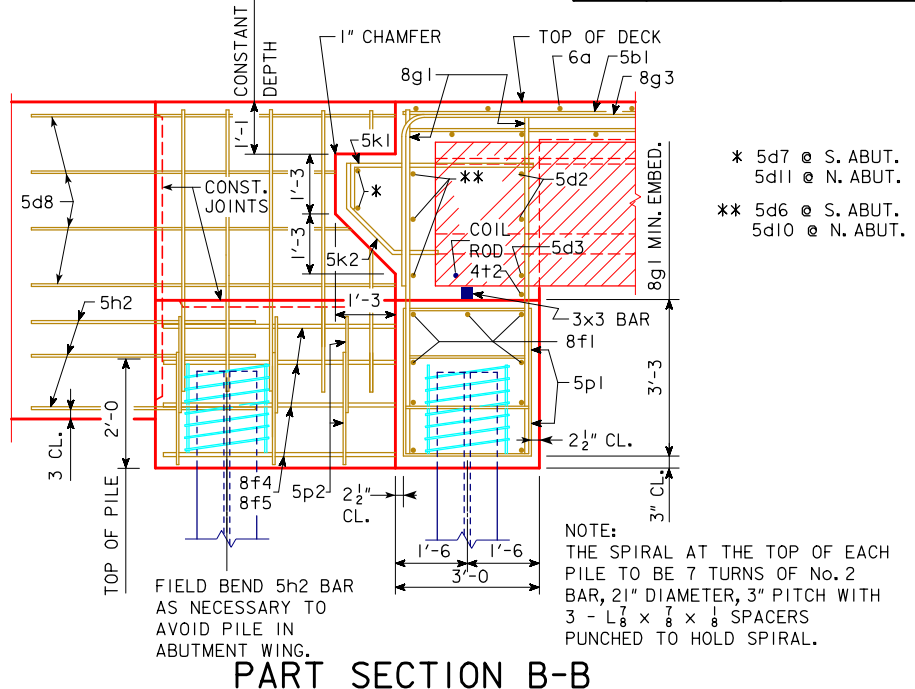
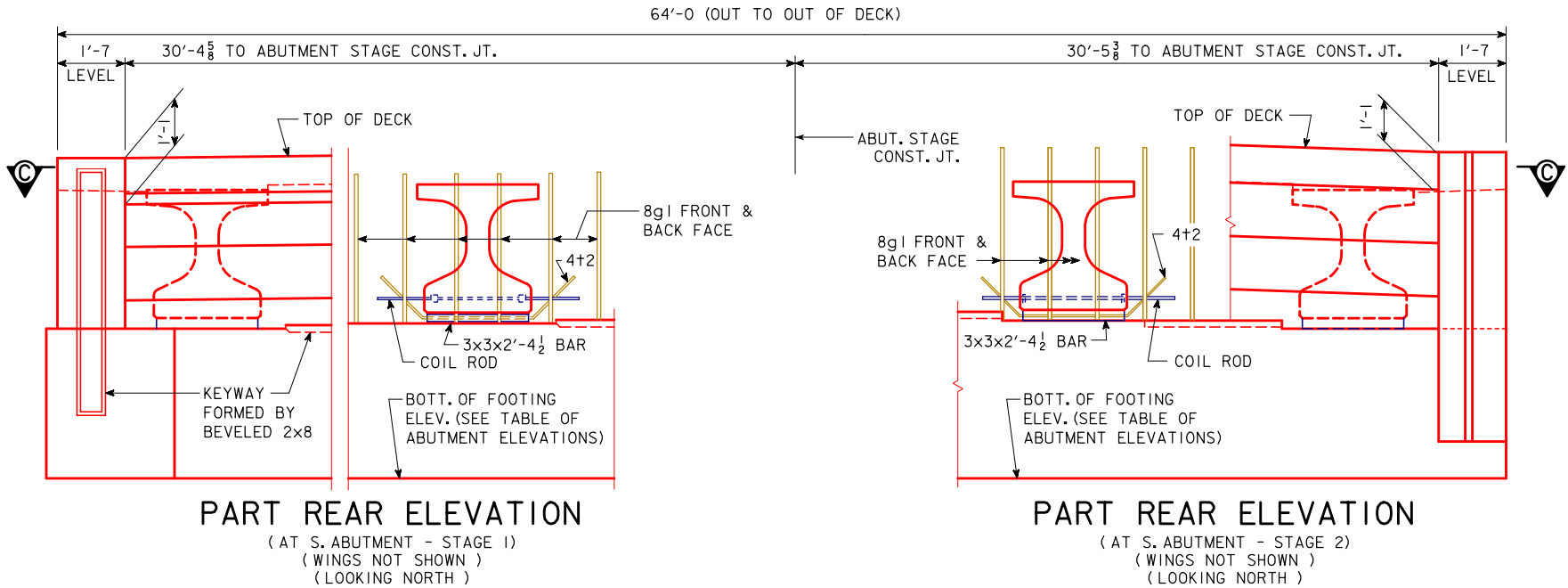
BENCH MARK NO.: BM2, STA. 871+35.96, 70.098 RT, RR SPIKE IN POWER POLE, EAST SIDE HWY 151, 200'± NORTH OF NORTH END OF RIVER BRIDGE AT BEGINNING OF CLEARING. ELEV. 750.420, N = 705704.166 E = 2107504.303.



NOTE: PLACE 5h2 BAR AT 1:6 SLOPE TO MATCH TRAFFIC SIDE OF ABUTMENT WING FACE.

TABLE OF ABUTMENT ELEVATIONS		
POINT	S. ABUT.	N. ABUT.
ELEV. A	757.58	756.42
ELEV. B	757.64	756.51
ELEV. C	757.73	756.63
ELEV. D	757.84	756.77
ELEV. E	757.96	756.91
ELEV. F	757.88	756.86
ELEV. G	757.68	756.67
ELEV. H	757.48	756.49
BOTT. FTG. ELEV.	753.98	752.92

TABLE OF ABUTMENT STEPS		
STEP	S. ABUT.	N. ABUT.
a	1 $\frac{3}{16}$	1 $\frac{3}{16}$
b	1 $\frac{1}{16}$	1 $\frac{7}{16}$
c	1 $\frac{3}{8}$	1 $\frac{11}{16}$
d	1 $\frac{3}{8}$	1 $\frac{11}{16}$
e	1 $\frac{5}{16}$	1 $\frac{5}{8}$
f	2 $\frac{7}{16}$	2 $\frac{1}{4}$
g	2 $\frac{7}{16}$	2 $\frac{1}{4}$



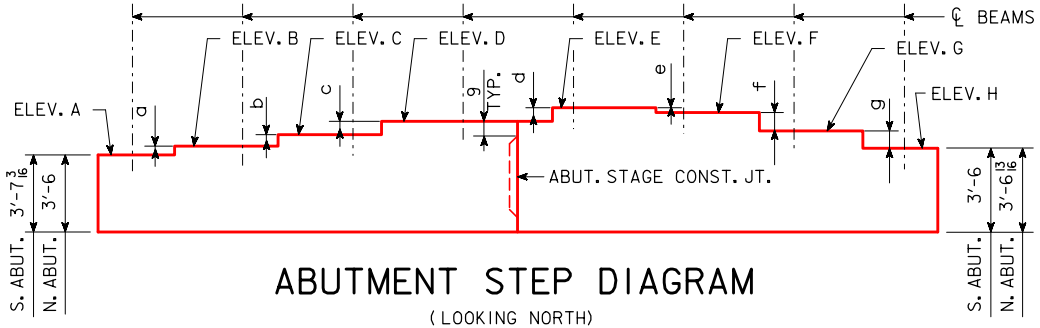
* 5d7 @ S. ABUT.
5d11 @ N. ABUT.
** 5d6 @ S. ABUT.
5d10 @ N. ABUT.

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 OR BACK WALL 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.

7 - HP 10 x 57 STEEL BEARING PILING REQUIRED FOR STAGE 1 EACH ABUTMENT FOOTING.

6 - HP 10 x 57 STEEL BEARING PILING REQUIRED FOR STAGE 2 EACH ABUTMENT FOOTING.



NOTE:
FOR LOCATIONS OF SECTIONS B-B & D-D, SEE DESIGN SHEETS 24 & 25.
FOR SECTION A-A, SEE DESIGN SHEET 25.
FOR SECTION C-C, SEE DESIGN SHEET 24.

DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
ABUTMENT FOOTING DETAILS
STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 26 OF 59 FILE NO. 31286 DESIGN NO. 518

REINFORCING BAR LIST - ONE W. ABUT. WING

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5h1	HORIZONTAL, BOTH FACES		14	6'-8	98
5s1	VERTICAL, BOTH FACES		16	6'-0	100
REINFORCING STEEL EPOXY COATED - TOTAL (LBS.)					198

CONCRETE PLACEMENT SUMMARY

CONCRETE	TOTAL
ONE WEST ABUTMENT WING	2.6
TOTAL (CU. YDS.)	2.6

LEGEND

AREA TO BE FINISHED SMOOTH ON TOP WING

PART PLAN VIEW

VIEW A-A

(APPROACH SLAB NOT SHOWN)

NOTE:
PLUG 3"Ø PVC PIPE WITH
EXPANDING FOAM PRIOR
TO BACK FILLING BEHIND
ABUTMENTS.

FOR CONCRETE
MONUMENT DETAILS
SEE DESIGN SHEET 53

▲ = WORK POINT;
SEE DESIGN SHEET 15.

ABUTMENT WING - ELEVATION VIEW

SECTION B-B

SECTION C-C

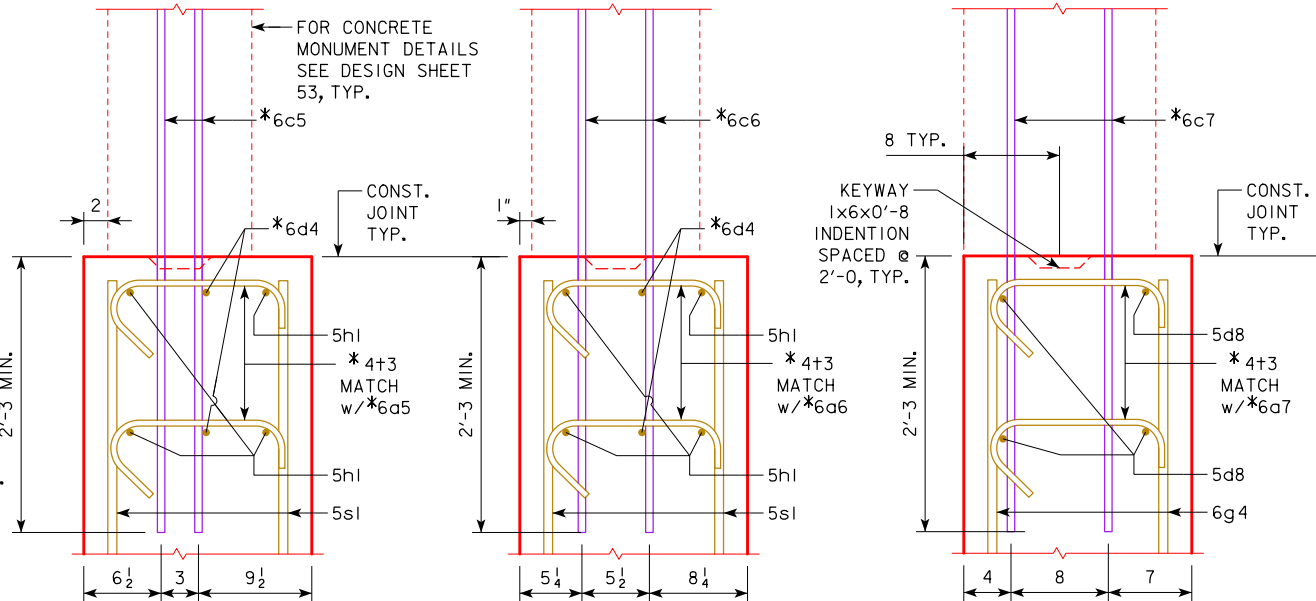
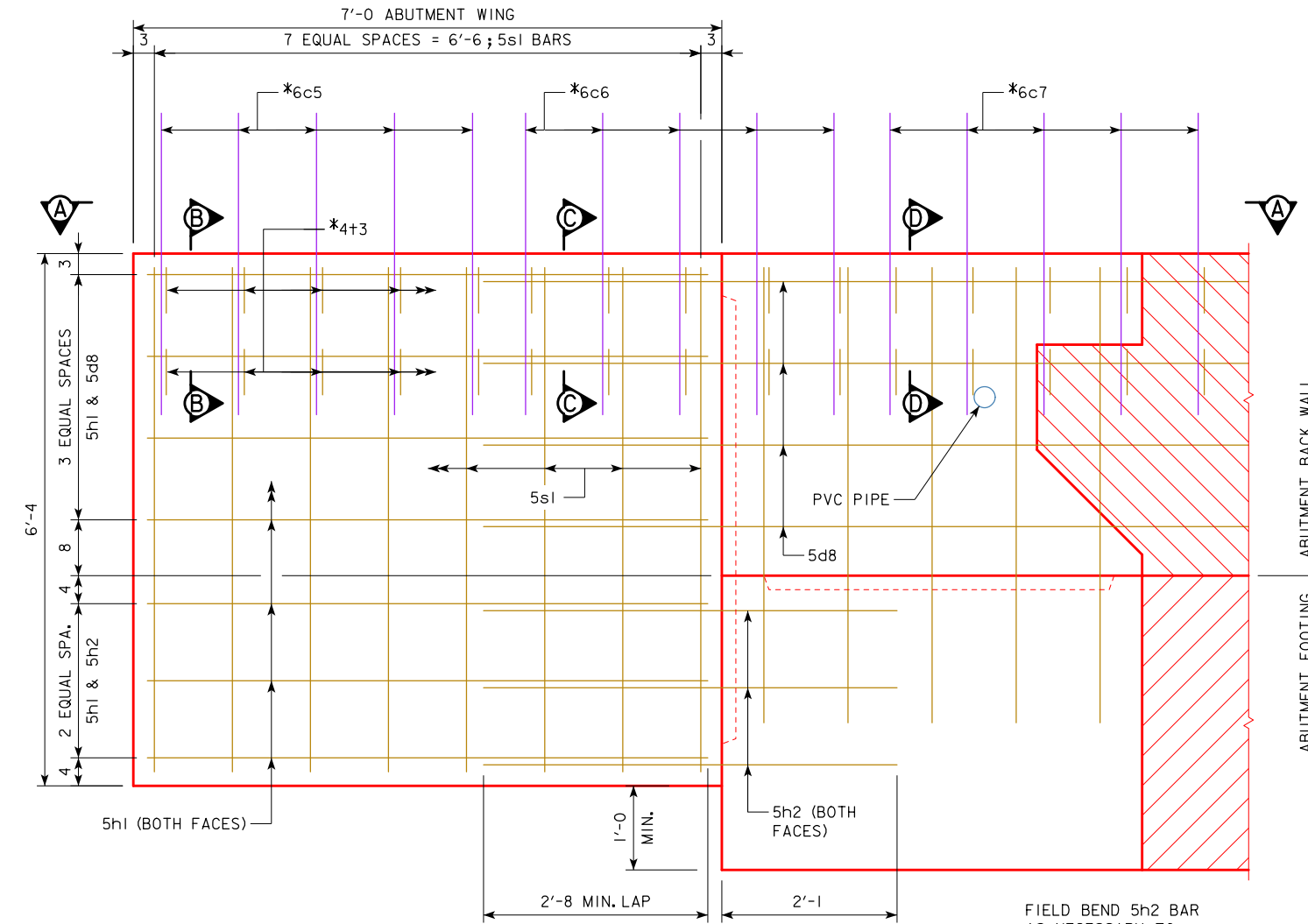
SECTION D-D

NOTE:
CONCRETE AND REINFORCING STEEL QUANTITIES ARE INCLUDED ON THE
SUMMARY QUANTITIES SHEET.

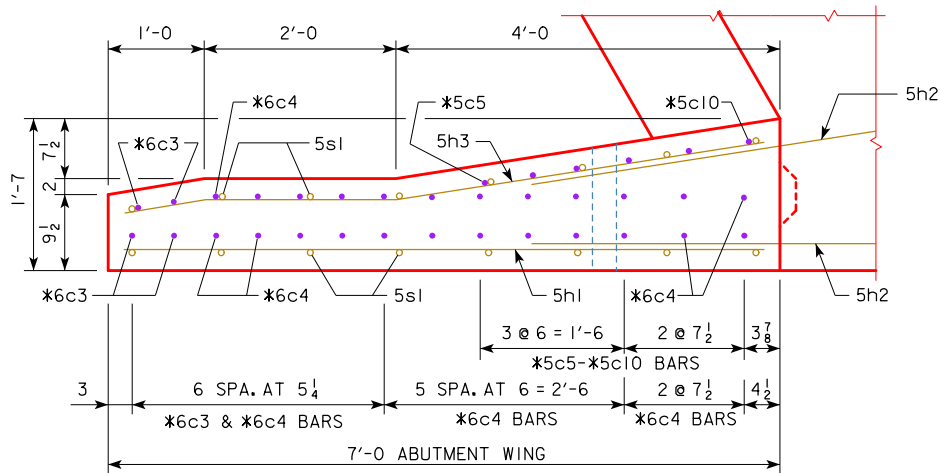
DESIGN FOR 30° SKEW (R.A.)
**209'-0x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL**
66'-0 END SPANS 77'-0 INTERIOR SPAN
WEST ABUTMENT WING DETAILS
STA. 867+41.69 (C US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 27 OF 59 FILE NO. 31286 DESIGN NO. 518

* CONCRETE MONUMENT BARS TO BE PLACED
WITH ABUTMENT WING EXTENSION AND WING.
SEE CONCRETE MONUMENT SHEET IN THESE
PLANS FOR QUANTITIES OF REINFORCING
BARS 6c5, 6c6, 6c7, 6d4 & 4t3.

FIELD BEND 5h2 BAR
AS NECESSARY TO
AVOID PILE IN
ABUTMENT WING.

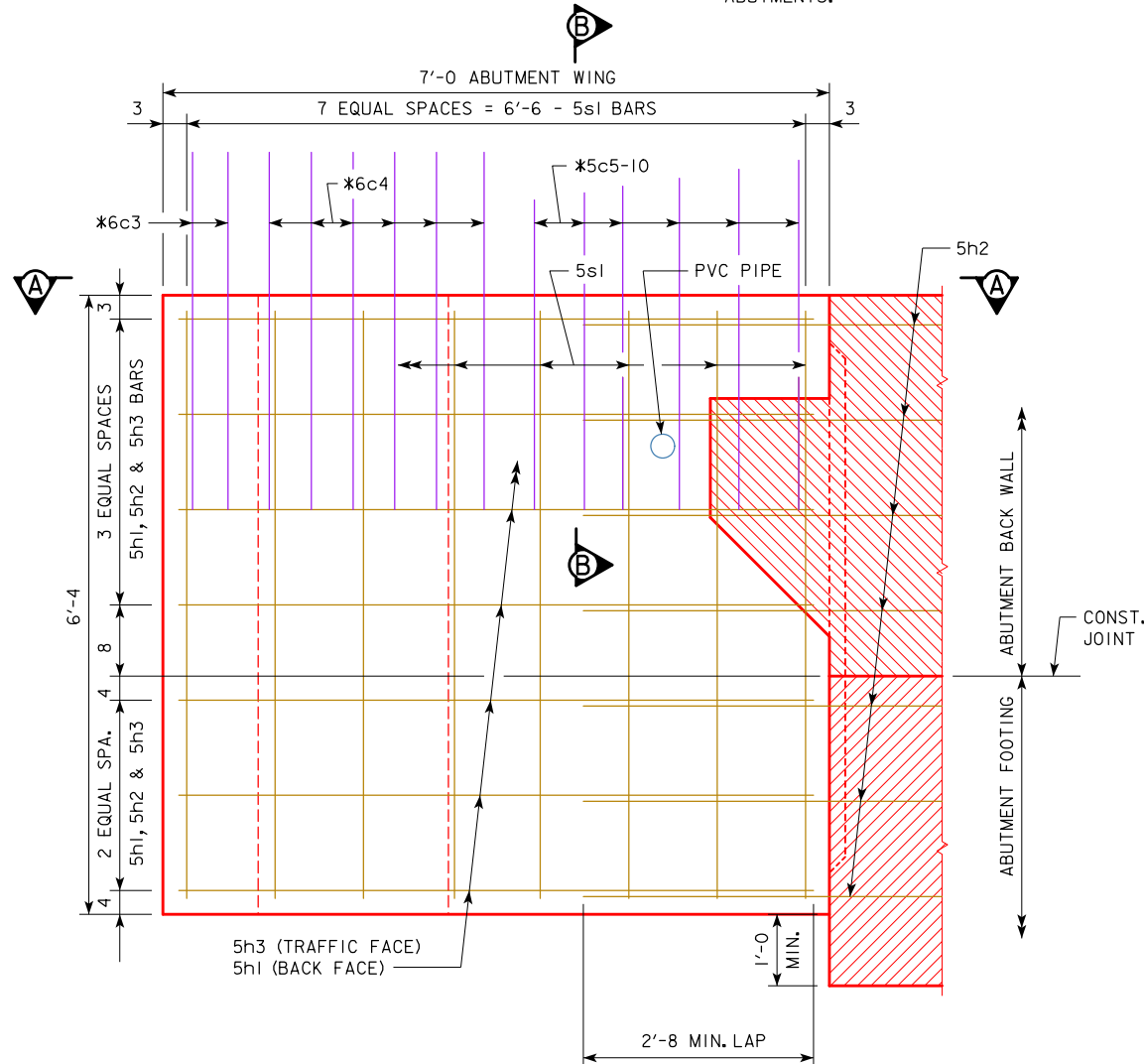


CORRECTION 04-14 - ADDED REFERRAL NOTE TO SUMMARY QUANTITIES SHEET.
ENGLISHMISCELLANEOUSBRIDGES.DGN - 2111 - THIS SHEET ISSUED 02-08.

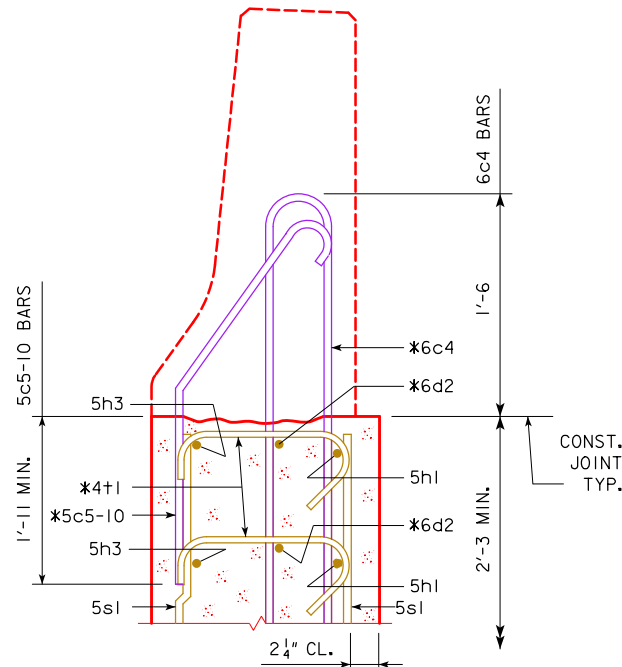


VIEW A-A

NOTE:
PLUG 3"Ø PVC PIPE WITH
EXPANDING FOAM PRIOR
TO BACK FILLING BEHIND
ABUTMENTS.



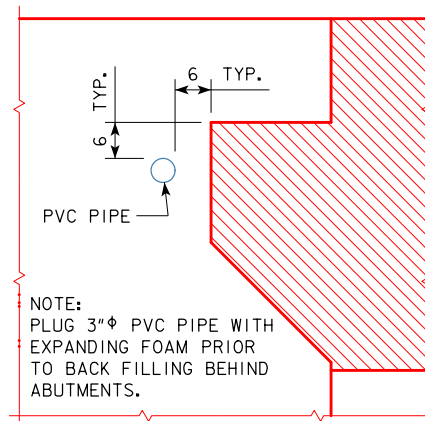
EAST ABUTMENT WING - ELEVATION VIEW



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.



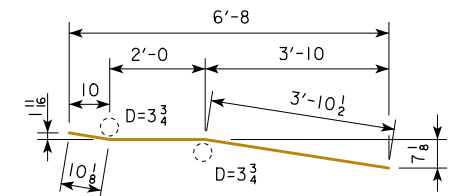
PVC PIPE LOCATION

NOTE:
PLUG 3"Ø PVC PIPE WITH
EXPANDING FOAM PRIOR
TO BACK FILLING BEHIND
ABUTMENTS.

REINFORCING BAR LIST - ONE EAST 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.

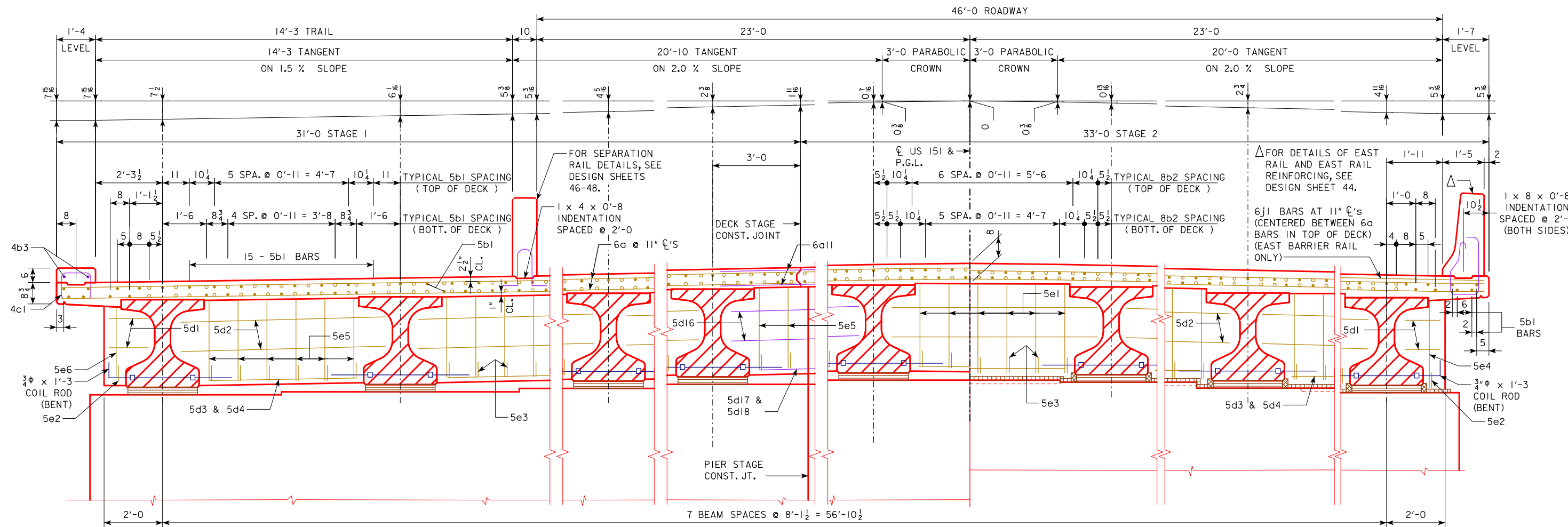
BENT BAR DETAILS

CONCRETE PLACEMENT SUMMARY

CONCRETE	TOTAL
ONE EAST ABUTMENT WING	1.9
TOTAL (CU. YDS.)	1.9

NOTE:
CONCRETE AND REINFORCING STEEL QUANTITIES ARE INCLUDED ON THE
SUMMARY QUANTITIES SHEET.

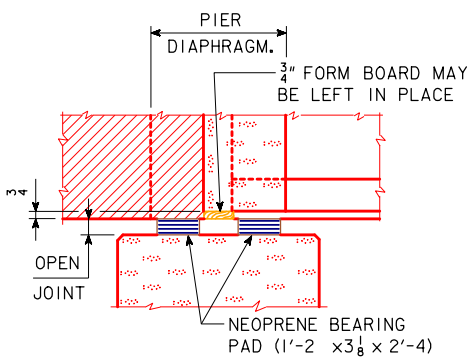
DESIGN FOR 30° SKEW (R.A.)
**209'-0x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL**
66'-0 END SPANS 77'-0 INTERIOR SPAN
EAST ABUTMENT WING DETAILS
STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 28 OF 59 FILE NO. 31286 DESIGN NO. 518



PART SECTION NEAR PIER 1
(LOOKING NORTH)
(EXPANSION PIER)

DECK AREA (STAGE 1) = 21.04 SQ. FT.
DECK AREA (STAGE 2) = 22.35 SQ. FT.
DECK AREA DOES NOT INCLUDE THE HAUNCH.

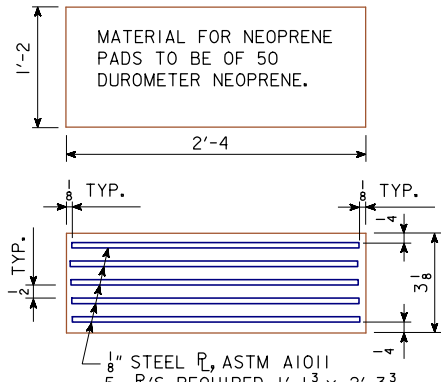
PART SECTION NEAR PIER 2
(LOOKING NORTH)
(FIXED PIER)



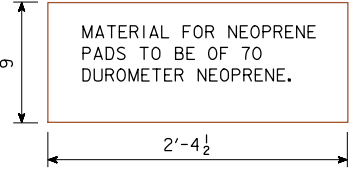
PART SECTION THROUGH EXPANSION PIER DIAPHRAGM

NOTE:
COST OF LAMINATED NEOPRENE PADS SHALL BE INCLUDED IN THE PRICE BID FOR "PRETENSIONED PRESTRESSED CONCRETE BEAMS".

EXPANSION PIER (PIER 1)



LAMINATED NEOPRENE PAD



PLAIN NEOPRENE PAD

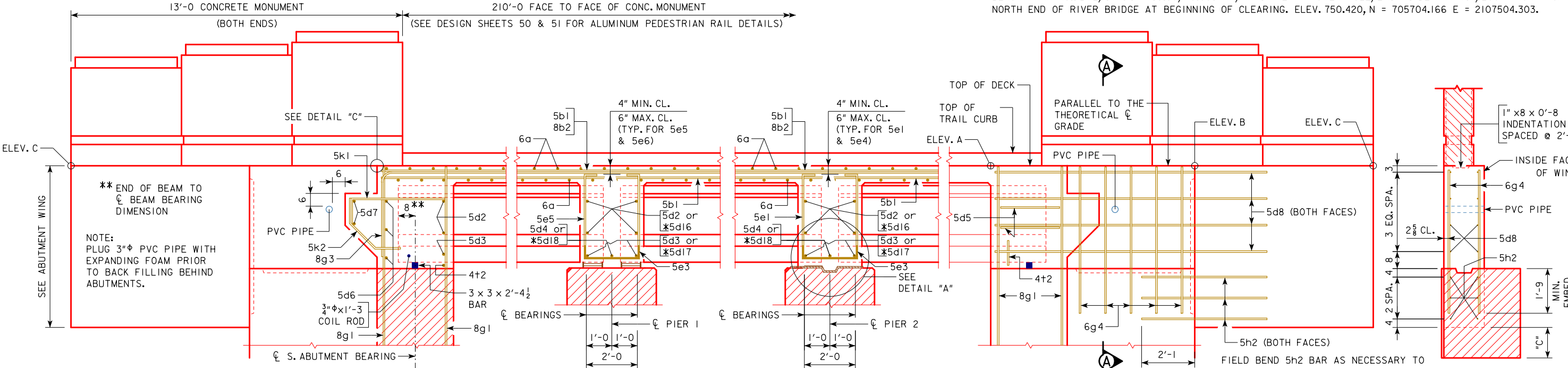
NOTE:
COST OF PLAIN NEOPRENE PADS SHALL BE INCLUDED IN THE PRICE BID FOR "PRETENSIONED PRESTRESSED CONCRETE BEAMS".

FIXED PIER (PIER 2)

NOTE:
FOR SUPERSTRUCTURE NOTES, SEE DESIGN SHEET 29.
FOR DECK DRAIN LOCATIONS, SEE DESIGN SHEET 9.
FOR TRAIL AESTHETIC DECK DRAINS, SEE DESIGN SHEET 36.
FOR DETAILS OF INTERMEDIATE DIAPHRAGMS, SEE DESIGN SHEETS 42 & 43.

DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
SUPERSTRUCTURE DETAILS
STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 30 OF 59 FILE NO. 31286 DESIGN NO. 518

BENCH MARK NO.: BM2, STA. 871+35.96, 70.098 RT, RR SPIKE IN POWER POLE, EAST SIDE HWY 151, 200'± NORTH OF NORTH END OF RIVER BRIDGE AT BEGINNING OF CLEARING. ELEV. 750.420, N = 705704.166 E = 2107504.303.



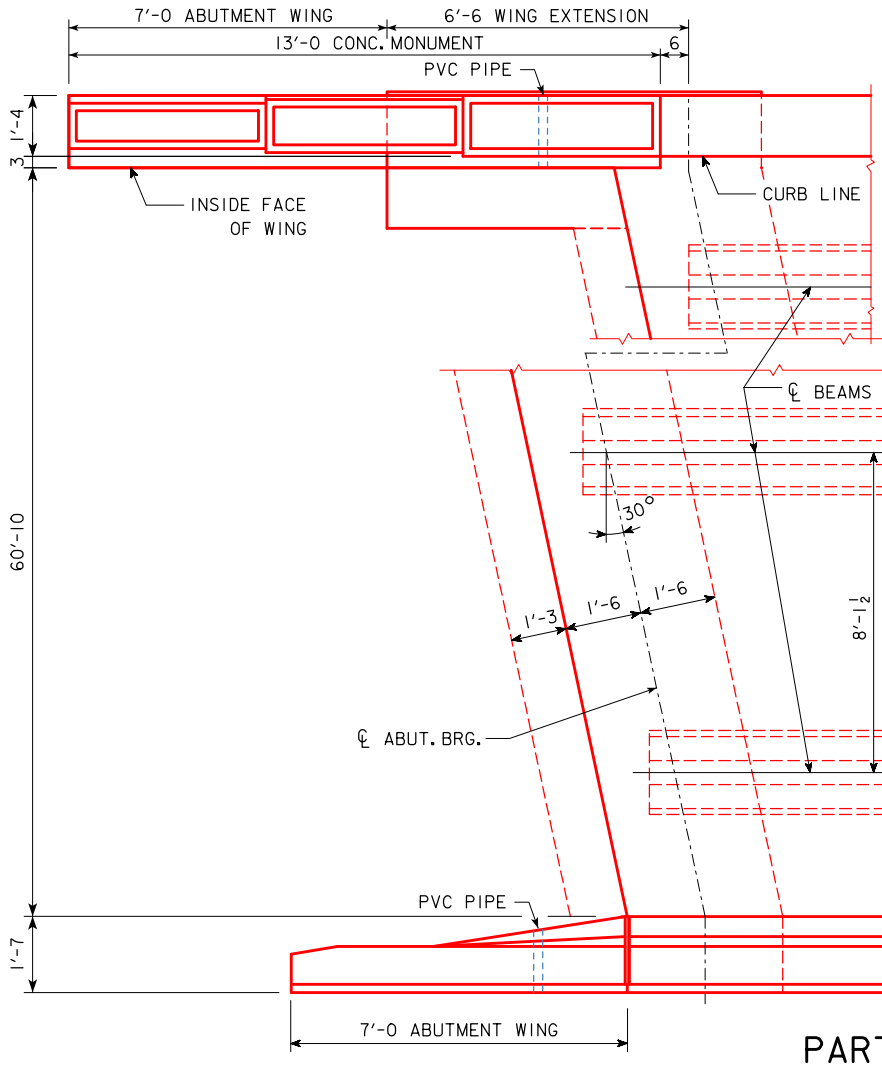
PART LONGITUDINAL SECTION NEAR TRAIL
(LOOKING WEST)
(FOR DETAILS OF INTERMEDIATE DIAPHRAGM SEE DESIGN SHEETS 42 & 43)

EXP. PIER 1
FIXED PIER 2

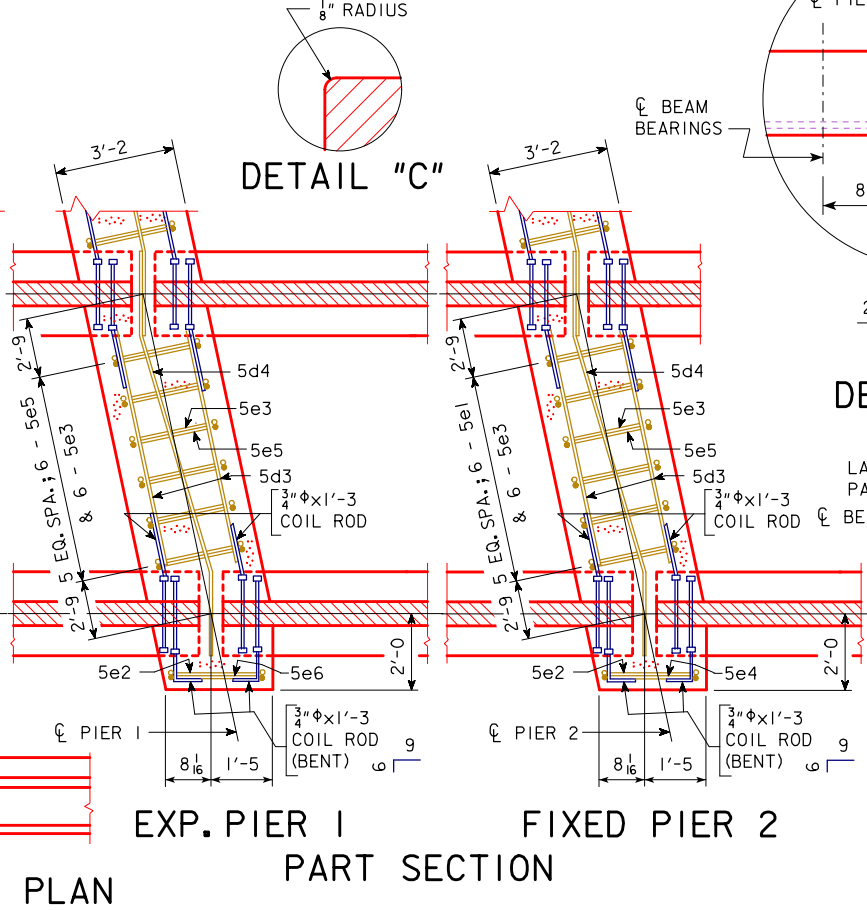
* 5d16, 5d17 & 5d18 STAINLESS STEEL BARS SHALL BE PLACED AT STAGE CONSTRUCTION JOINT LOCATIONS.

PART END VIEW AT ABUTMENT
SECTION A-A

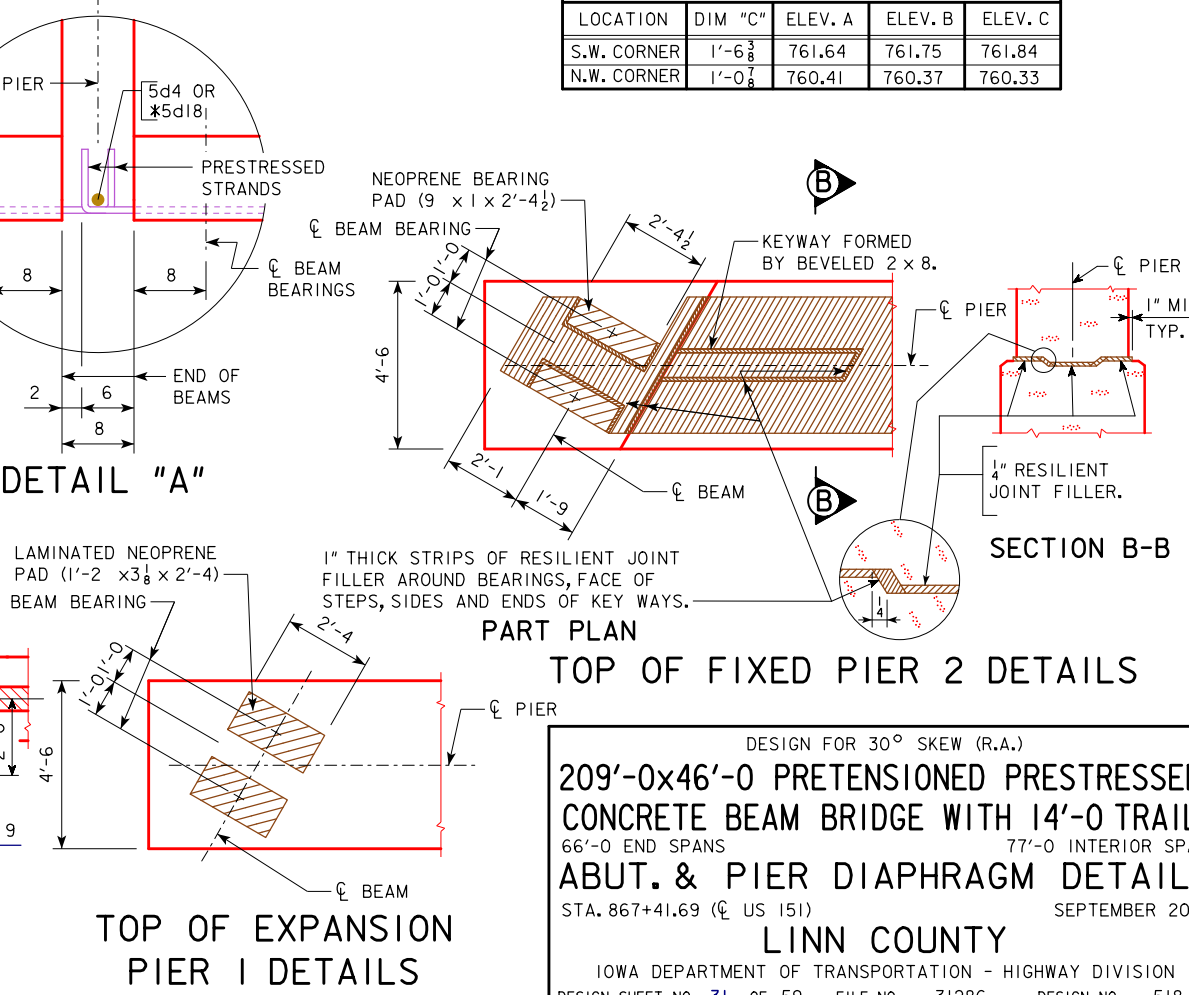
TABLE OF WING ELEVATIONS				
LOCATION	DIM "C"	ELEV. A	ELEV. B	ELEV. C
S.W. CORNER	1'-6 3/8	761.64	761.75	761.84
N.W. CORNER	1'-0 3/8	760.41	760.37	760.33



PART PLAN



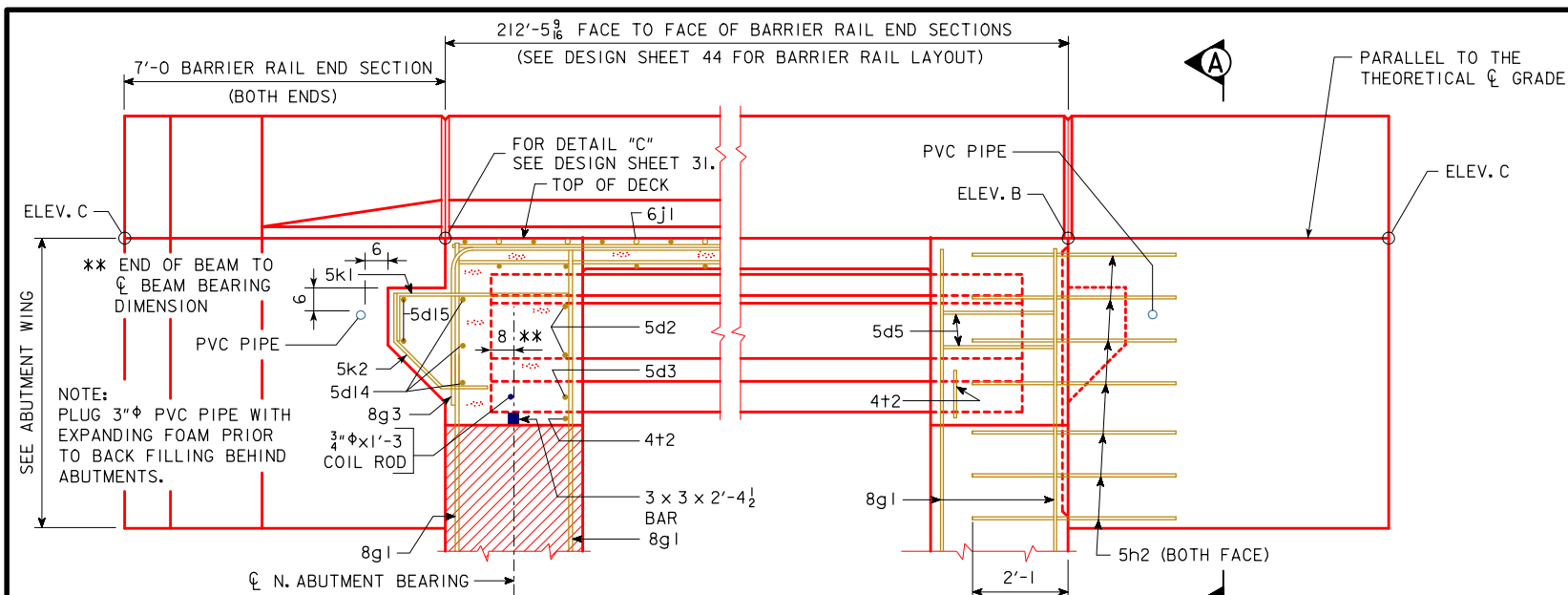
PART SECTION



TOP OF FIXED PIER 2 DETAILS

TOP OF EXPANSION PIER 1 DETAILS

DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
ABUT. & PIER DIAPHRAGM DETAILS
STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 31 OF 59 FILE NO. 31286 DESIGN NO. 518



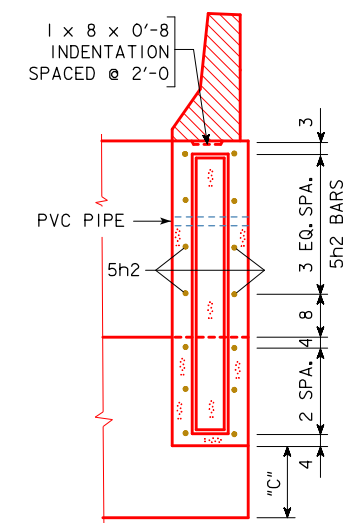
**PART LONGITUDINAL SECTION
NEAR EAST GUTTER**

(LOOKING EAST)

(FOR DETAILS OF INTERMEDIATE DIAPHRAGM SEE DESIGN SHEETS 42 & 43)

**PART END VIEW AT ABUTMENT
EAST WINGS**

BENCH MARK NO.: BM2, STA. 871+35.96, 70.098 RT, RR SPIKE IN POWER POLE, EAST SIDE HWY 151, 200'± NORTH OF NORTH END OF RIVER BRIDGE AT BEGINNING OF CLEARING. ELEV. 750.420, N = 705704.166 E = 2107504.303.



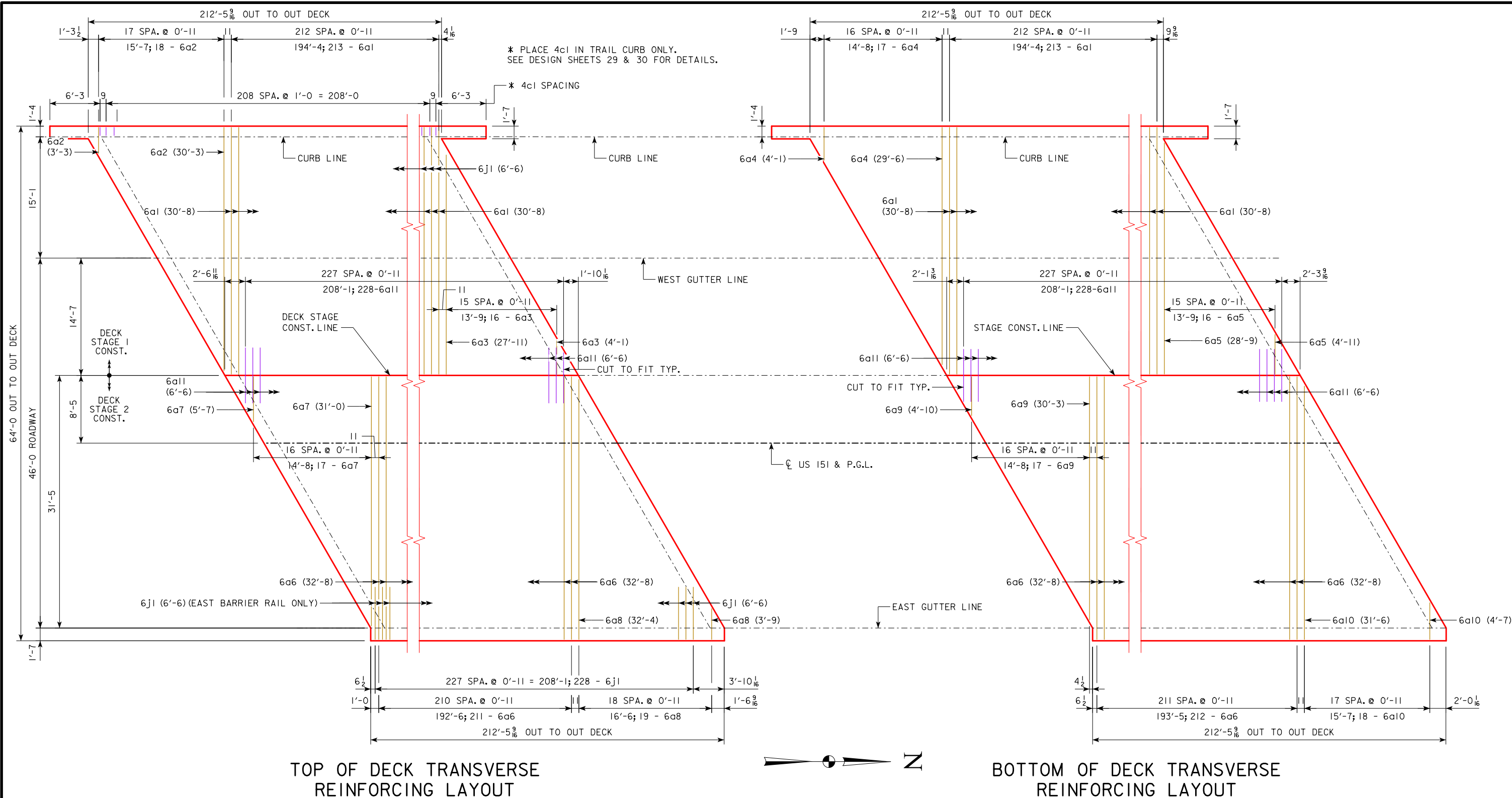
SECTION A-A

**TABLE OF WING
ELEVATIONS**

LOCATION	DIM "C"	ELEV. B	ELEV. C
S.E. CORNER	1'-3 ⁵ / ₈	761.55	761.61
N.E. CORNER	1'-1 ⁷ / ₈	760.44	760.41

NOTE:
FOR PIER DIAPHRAGM DETAILS, SEE DESIGN SHEET 31.

DESIGN FOR 30° SKEW (R.A.)
**209'-0x46'-0 PRETENSIONED PRESTRESSED
 CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL**
 66'-0 END SPANS 77'-0 INTERIOR SPAN
ABUT. DIAPHRAGM DETAILS
 STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 32 OF 59 FILE NO. 31286 DESIGN NO. 518

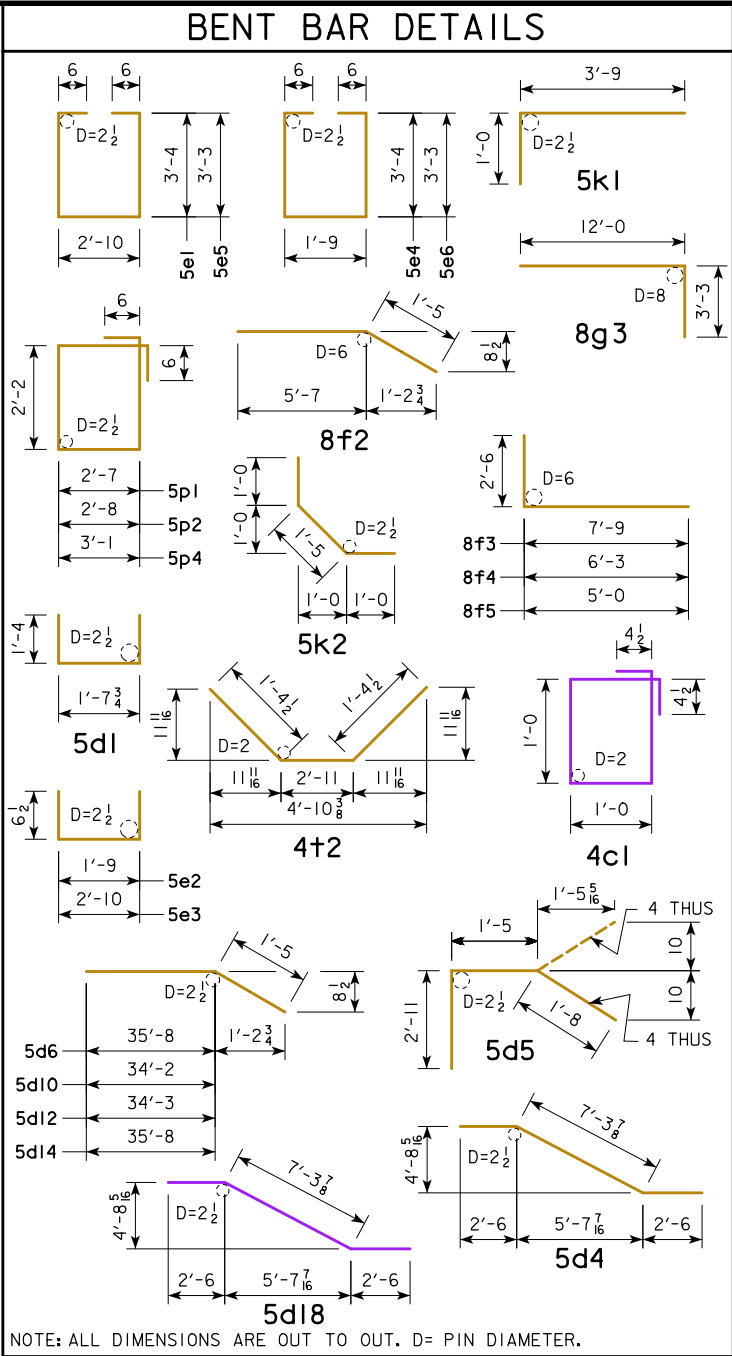


THE CONTRACTOR SHALL TAKE APPROPRIATE CARE TO COORDINATE CURB REINFORCING (4b3 & 4c1 BARS) AND DECK REINFORCING (5b1, 6a1 & 6a2 BARS) WITH PLACEMENT OF PEDESTRIAN RAILING ANCHOR ROD LOCATIONS AS SHOWN ON DESIGN SHEETS 50 & 51. SHIFT REINFORCING STEEL AS NECESSARY TO PREVENT INTERFERENCE WITH DRILLING THE PEDESTRIAN RAILING ANCHOR RODS.

NOTE:
FOR BOLLARDS DETAILS, SEE DESIGN SHEET 52.
FOR CONCRETE MONUMENT DETAILS, SEE DESIGN SHEET 53.
FOR LIGHTING POLE CONCRETE BASE DETAILS, SEE DESIGN SHEET 55.

DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
DECK TRANSVERSE REINFORCING
STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 34 OF 59 FILE NO. 31286 DESIGN NO. 518

REINFORCING BAR LIST						
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT	
6a1	DECK TRANSVERSE TOP & BOTT., STAGE 1		426	30'-8"	19,622	
6a2	DECK TRANSVERSE TOP END, STAGE 1		18	VARIES	453	
6a3	DECK TRANSVERSE TOP END, STAGE 1		16	VARIES	385	
6a4	DECK TRANSVERSE BOTT. END, STAGE 1		17	VARIES	429	
6a5	DECK TRANSVERSE BOTT. END, STAGE 1		16	VARIES	403	
6a6	DECK TRANSVERSE TOP & BOTT., STAGE 2		423	32'-8"	20,755	
6a7	DECK TRANSVERSE TOP END, STAGE 2		17	VARIES	467	
6a8	DECK TRANSVERSE TOP END, STAGE 2		19	VARIES	515	
6a9	DECK TRANSVERSE BOTT. END, STAGE 2		17	VARIES	448	
6a10	DECK TRANSVERSE BOTT. END, STAGE 2		18	VARIES	487	
5a12	DECK TRANSVERSE AT TRAIL DECK DRAINS		20	3'-0"	63	
5b1	DECK LONGITUDINAL TOP & BOTT.		774	37'-1"	29,937	
8b2	DECK LONGITUDINAL TOP AT PIERS		274	19'-0"	13,900	
5d1	PIER DIAPHRAGM ENDS		8	4'-4"	36	
5d2	PIER & ABUT. DIAPHRAGM LONGITUDINAL		84	8'-2"	715	
5d3	PIER & ABUT. DIAPHRAGM LONGITUDINAL		42	6'-1"	266	
5d4	PIER DIAPHRAGM LONGITUDINAL		12	12'-4"	154	
5d5	ABUT. DIAPHRAGM ENDS		8	6'-0"	50	
5d6	S. ABUT. DIAPHRAGM LONGIT. B.F., STAGE 1		3	37'-1"	116	
5d7	S. PAVING NOTCH LONGITUDINAL, STAGE 1		2	38'-0"	79	
5d8	ABUT. DIAPH. WING EXT. LONGIT. BOTH FACE		16	10'-9"	179	
5d10	N. ABUT. DIAPHRAGM LONGIT. B.F., STAGE 1		3	35'-7"	111	
5d11	N. PAVING NOTCH LONGITUDINAL, STAGE 1		2	35'-0"	73	
5d12	S. ABUT. DIAPHRAGM LONGIT. B.F., STAGE 2		3	35'-8"	112	
5d13	S. PAVING NOTCH LONGITUDINAL, STAGE 2		2	35'-2"	73	
5d14	N. ABUT. DIAPHRAGM LONGIT. B.F., STAGE 2		3	37'-1"	116	
5d15	N. PAVING NOTCH LONGITUDINAL, STAGE 2		2	38'-0"	79	
5e1	PIER DIAPHRAGM HOOPS, FIXED PIER		42	10'-6"	460	
5e2	PIER DIAPHRAGM TIED ENDS		4	2'-10"	12	
5e3	PIER DIAPHRAGM TIED		84	3'-11"	343	
5e4	PIER DIAPHRAGM HOOPS, FIXED PIER ENDS		2	9'-5"	20	
5e5	PIER DIAPHRAGM HOOPS, EXPANSION PIER		42	10'-4"	453	
5e6	PIER DIAPH. HOOPS, EXPANSION PIER ENDS		2	9'-3"	19	
8f1	ABUT. FOOTING LONGITUDINAL, BOTH FACE		36	34'-10"	3,348	
8f2	ABUT. FOOTING LONGIT., ENDS, BOTH FACE		36	7'-0"	673	
8f3	ABUT. EXTENSION LONGITUDINAL		8	10'-3"	219	
8f4	ABUT. EXTENSION LONGITUDINAL		4	8'-9"	93	
8f5	ABUT. EXTENSION LONGITUDINAL		4	7'-6"	80	
8g1	ABUT. VERT., BOTH FACE		222	7'-1"	4,199	
8g3	ABUT. DIAPHRAGM VERT., B.F.		116	15'-3"	4,723	
6g4	ABUT. DIAPHRAGM WING EXT. VERT.		20	5'-9"	173	
5h2	ABUT. TO WING ANCHOR		40	4'-11"	205	
6j1	TOP OF DECK TRANSVERSE (AT RAIL)		228	6'-6"	2,226	
5k1	PAVING NOTCH		119	4'-9"	590	
5k2	PAVING NOTCH		119	3'-5"	424	
5p1	ABUT. HOOPS		268	10'-6"	2,935	
5p2	ABUT. EXTENSION HOOPS		12	10'-8"	134	
5p4	ABUT. HOOPS AT ENDS		8	11'-6"	96	
4+2	UNDER BEAMS AT ABUTMENTS		16	5'-8"	61	
REINFORCING STEEL EPOXY COATED - TOTAL (LBS.)					111,509	
NON-COAT						
#2	PILE SPIRAL		26	38'-6"	171	
	SPIRAL SPACERS, $L \frac{7}{8} \times \frac{7}{8} \times \frac{1}{8} \times 0.70$		78	1'-10"	100	
NON-COATED REINFORCING STEEL - TOTAL (LBS.)					271	
6a11	DECK TRANSVERSE TOP & BOTT., SPLICE		456	6'-6"	4,452	
4b3	TRAIL CURB LONGITUDINAL		12	36'-8"	294	
4c1	TRAIL CURB HOOPS		21	4'-9"	670	
5d9	ABUT. DIAPH. & PAV. NOTCH LONGIT. SPLICE		10	5'-4"	56	
5d16	PIER & ABUT. DIAPHRAGM LONGITUDINAL		12	8'-2"	102	
5d17	PIER & ABUT. DIAPHRAGM LONGITUDINAL		6	6'-1"	38	
5d18	PIER DIAPHRAGM LONGITUDINAL		2	12'-4"	26	
REINFORCING STEEL STAINLESS STEEL- TOTAL (LBS.)					5,638	
EPOXY COATED REINFORCING						



CONCRETE PLACEMENT QUANTITIES	
LOCATION	QUANTITY
SECTION 1, DECK & ABUT. DIAPHRAGM., STAGE 1	63.9
SECTION 2, DECK, STAGE 1	46.4
SECTION 3, DECK & ABUT. DIAPHRAGM., STAGE 1	62.4
SECTION 4, DECK & PIER DIAPHRAGM., STAGE 1	27.4
SECTION 5, DECK & PIER DIAPHRAGM., STAGE 1	28.0
SECTION 6, DECK & ABUT. DIAPHRAGM., STAGE 2	65.4
SECTION 7, DECK, STAGE 2	49.2
SECTION 8, DECK & ABUT. DIAPHRAGM., STAGE 2	64.5
SECTION 9, DECK & PIER DIAPHRAGM., STAGE 2	27.6
SECTION 10, DECK & PIER DIAPHRAGM., STAGE 2	28.2
TRAIL CURB	5.2
TOTAL (CU. YDS.)	468.2

NOTE:
CONCRETE AND REINFORCING STEEL QUANTITIES ARE INCLUDED
ON THE SUMMARY QUANTITIES SHEET.

FOR BOLLARDS DETAILS, SEE DESIGN SHEET 52.

FOR CONCRETE MONUMENT DETAILS, SEE DESIGN SHEET 53.

FOR LIGHTING POLE CONCRETE BASE DETAILS, SEE DESIGN SHEET 55.

DESIGN FOR 30° SKEW (R.A.)

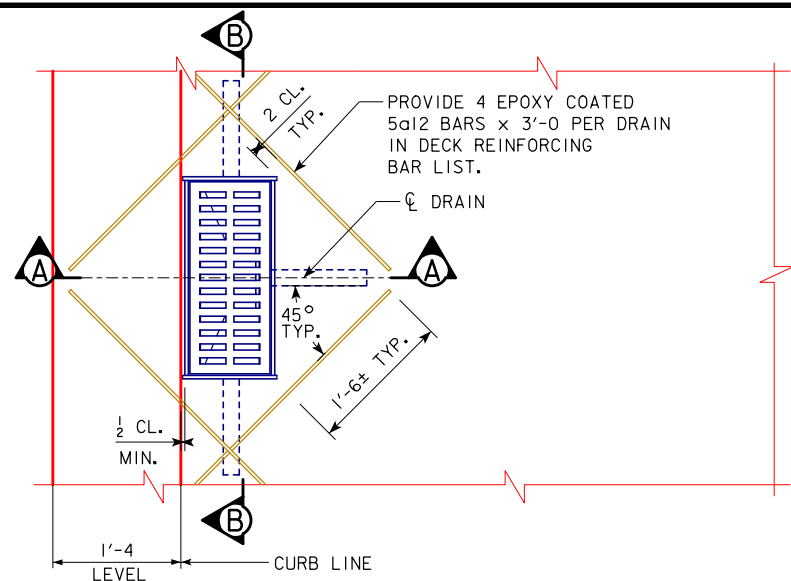
209'-0x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN

SUPERSTRUCTURE QUANTITIES

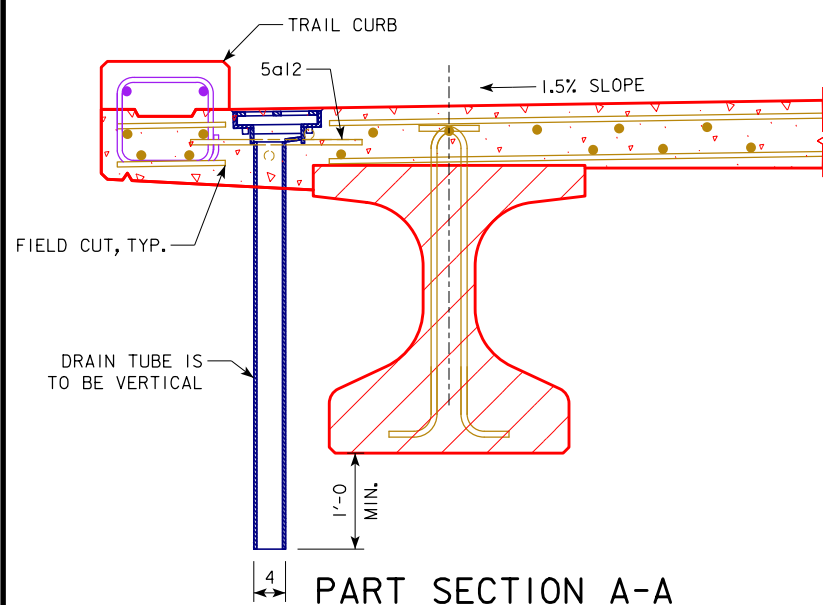
STA. 867+41.69 (℄ US 151) SEPTEMBER 2018

LINN COUNTY

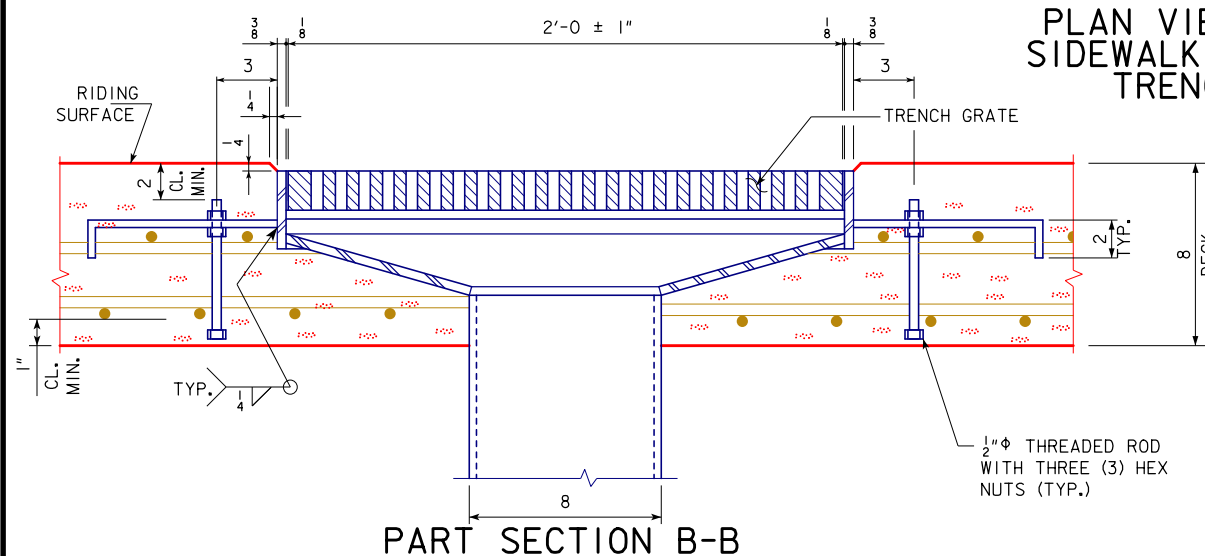
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 35 OF 59 FILE NO. 31286 DESIGN NO. 518



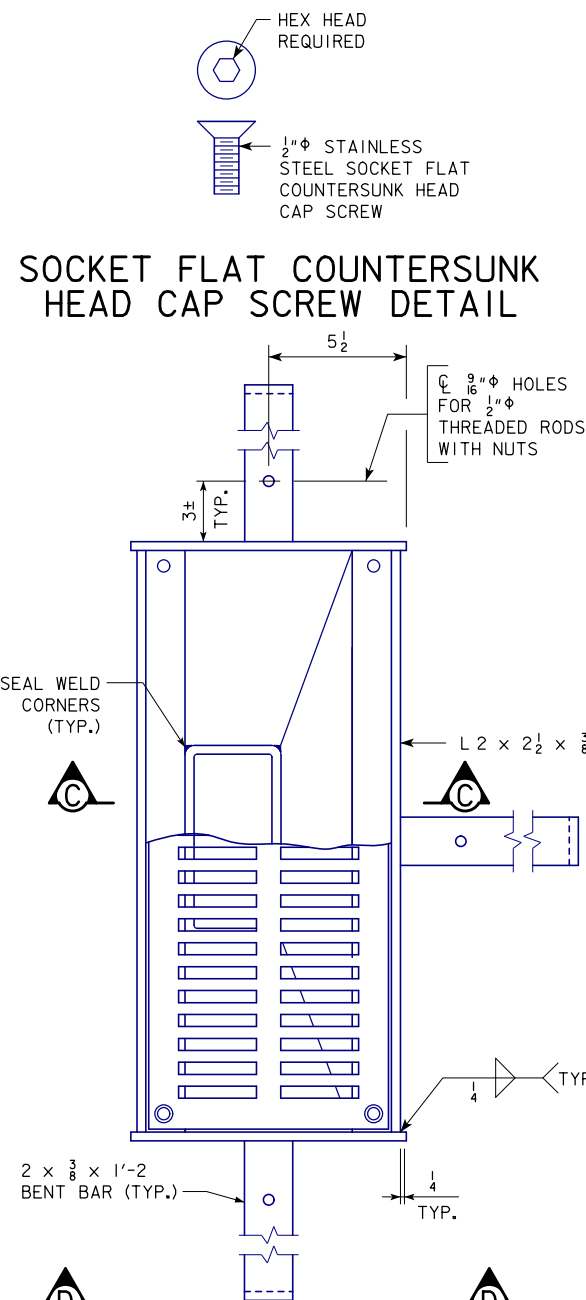
PART PLAN AT DRAIN AT TRAIL CURB



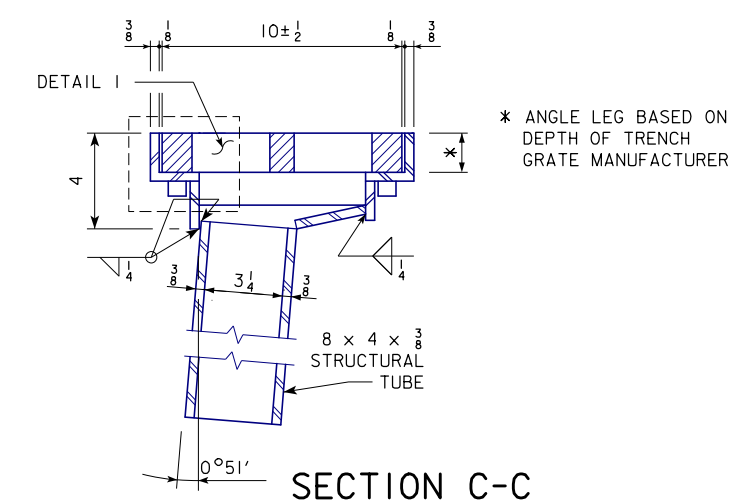
PART SECTION A-A



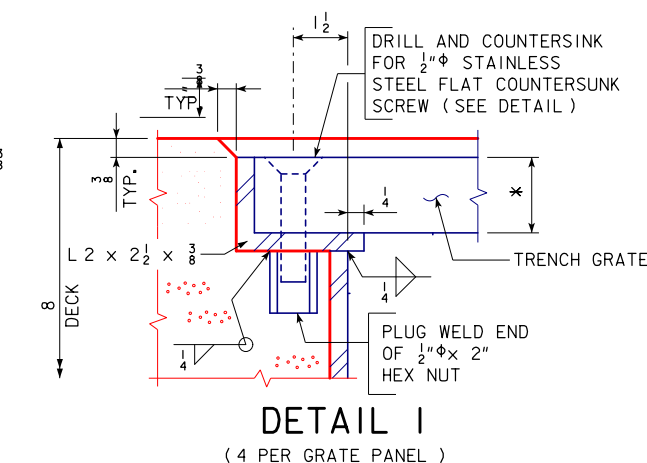
PART SECTION B-B



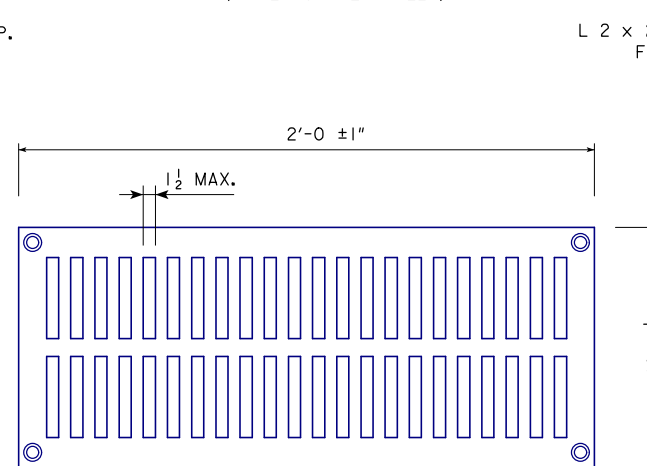
PLAN VIEW OF SIDEWALK DRAIN TRENCH



SECTION C-C



DETAIL I
(4 PER GRATE PANEL)



TRAIL DRAIN TRENCH GRATE PLAN
(1 GRATE REQUIRED PER DRAIN)

TRAIL DRAIN TRENCH GRATE ELEVATION

NOTE: PATTERN AND DIRECTION OF GRATE OPENINGS SHALL BE SIMILAR TO THE PATTERN SHOWN.

DRAIN NOTES

THE DRAINS SHALL BE 3/8 INCH THICK STEEL. THE DRAIN ASSEMBLIES SHALL BE GALVANIZED AFTER FABRICATION. THE BID ITEM "DECK DRAIN" SHALL INCLUDE ALL COSTS ASSOCIATED WITH FABRICATING AND INSTALLING THE DECK DRAINS AS PER PLAN.

THE DRAIN TRENCH GRATES SHALL BE FERROUS CASTINGS. METAL USED IN THE MANUFACTURE OF CASTINGS SHALL CONFORM TO ASTM A48-83 CLASS 35B OR BETTER GRAY IRON CASTINGS IN ACCORDANCE WITH CURRENT IOWA D.O.T. STANDARD SPECIFICATIONS. FINISH OF CASTINGS SHALL BE SMOOTH AND FREE OF DEFECTS. TRENCH GRATES SHALL BE CAPABLE OF CARRYING AASHTO HL-93 LOADING. GALVANIZING OF THE TRENCH GRATES IS NOT REQUIRED.

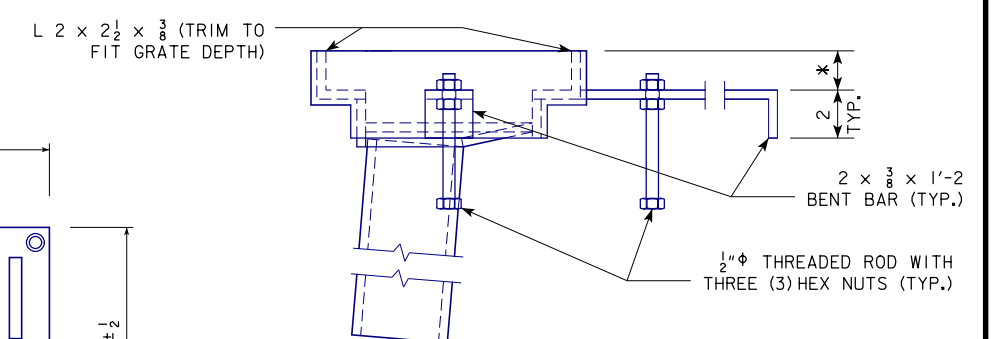
DRAINS SHALL BE CENTERED OVER THE NEAREST BOTTOM TRANSVERSE SLAB REINFORCING BAR FROM THE LOCATION DESIGNATED ON THE SITUATION PLAN. THE BOTTOM TRANSVERSE SLAB REINFORCING BAR SHALL BE CUT OFF TO PROVIDE 1 INCH CLEARANCE FROM THE DRAIN. THE TOP TRANSVERSE SLAB REINFORCING BARS ON EACH SIDE OF THE DRAIN, SHALL BE SPACED AS NECESSARY TO PROVIDE 1 INCH CLEARANCE FROM THE DRAIN. LONGITUDINAL SLAB REINFORCING BARS THAT CONFLICT WITH THE DRAIN SHALL BE CUT OFF TO PROVIDE 2 INCH CLEARANCE FROM THE DRAIN. ALL CUT ENDS OF BARS SHALL BE COATED WITH EPOXY PATCHING MATERIAL SUPPLIED BY THE MANUFACTURER OF THE EPOXY COATING. LONGITUDINAL SLAB REINFORCING BARS SHALL BE SHIFTED AS NECESSARY TO ACCOMMODATE ANCHOR BARS.

MATERIALS

PLATES, BARS, THREADED RODS AND ANGLES SHALL MEET THE REQUIREMENTS ASTM A709 GRADE 36. THE TUBE STEEL SHALL MEET THE REQUIREMENTS ASTM A500 GRADE B.

3/8" MECHANICALLY GALVANIZED STEEL FLAT HEAD SCREW SHALL MEET THE REQUIREMENTS OF ASTM B695-04 (2009) AND ASTM F835-12.

3/8" MECHANICALLY GALVANIZED STEEL HEX HEAD BOLT AND HEX NUT SHALL MEET THE REQUIREMENTS OF ASTM B695-04 (2009) AND ASTM A307-12 GRADE A.



VIEW D-D

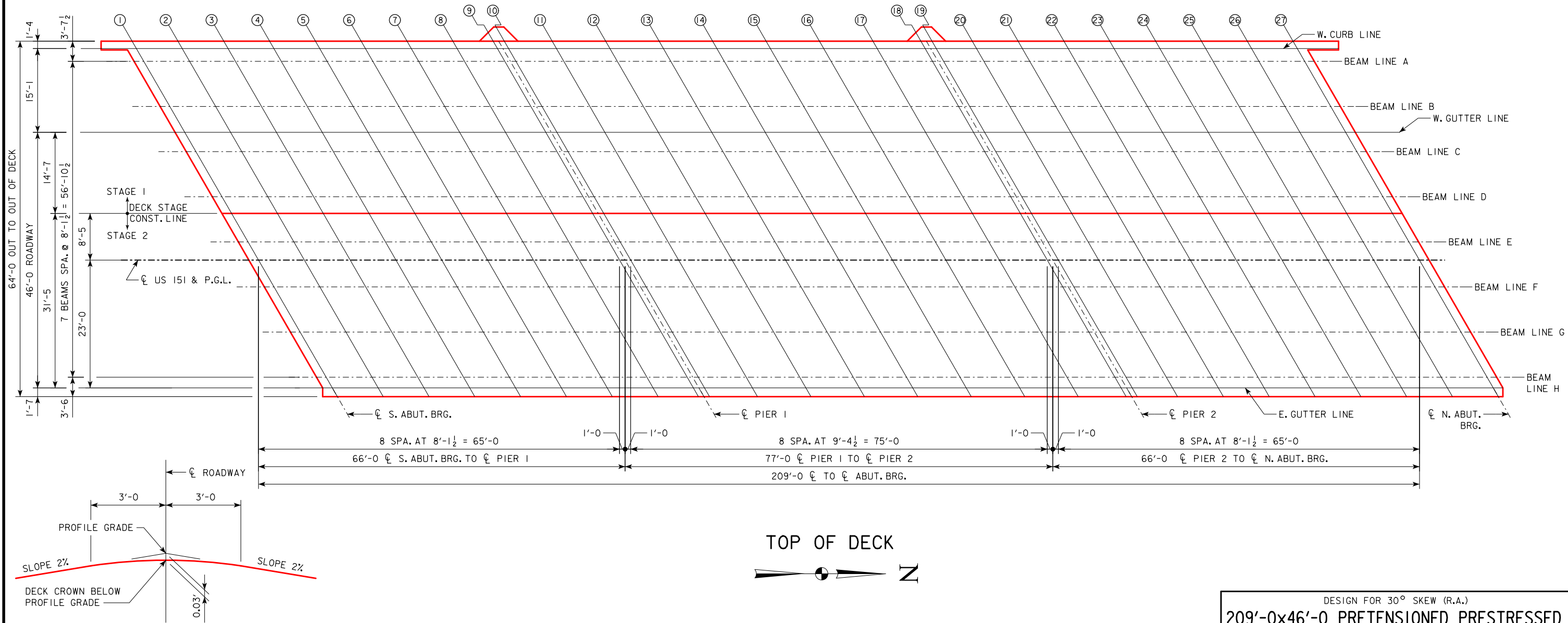
NOTE:

FOR DECK DRAIN LOCATIONS, SEE DESIGN SHEET 9.

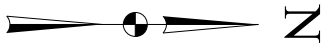
FOR ROADWAY DECK DRAIN DETAILS, SEE DESIGN SHEET 29.

DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
 66'-0 END SPANS 77'-0 INTERIOR SPAN
TRAIL AESTHETIC DECK DRAIN DTLS.
 STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 36 OF 59 FILE NO. 31286 DESIGN NO. 518

		TOP OF DECK ELEVATIONS																											
LOCATION	℄ S. ABUT. BRG.									℄ PIER 1 BEARINGS									℄ PIER 2 BEARINGS										℄ N. ABUT. BRG.
	LINE 1	LINE 2	LINE 3	LINE 4	LINE 5	LINE 6	LINE 7	LINE 8	LINE 9	LINE 10	LINE 11	LINE 12	LINE 13	LINE 14	LINE 15	LINE 16	LINE 17	LINE 18	LINE 19	LINE 20	LINE 21	LINE 22	LINE 23	LINE 24	LINE 25	LINE 26	LINE 27		
WEST CURB LINE	761.66	761.57	761.48	761.40	761.33	761.26	761.21	761.16	761.12	761.11	761.06	761.01	760.97	760.92	760.87	760.83	760.78	760.73	760.72	760.68	760.64	760.60	760.56	760.52	760.48	760.44	760.40		
BEAM LINE A	761.68	761.59	761.50	761.42	761.35	761.29	761.23	761.19	761.15	761.14	761.09	761.04	761.00	760.95	760.90	760.86	760.81	760.76	760.75	760.71	760.67	760.63	760.59	760.55	760.51	760.47	760.43		
BEAM LINE B	761.75	761.66	761.57	761.50	761.43	761.38	761.33	761.29	761.24	761.23	761.19	761.14	761.09	761.05	761.00	760.95	760.91	760.86	760.85	760.81	760.77	760.73	760.69	760.65	760.61	760.57	760.52		
WEST GUTTER LINE	761.79	761.70	761.62	761.55	761.49	761.43	761.39	761.35	761.31	761.30	761.25	761.20	761.15	761.11	761.06	761.01	760.97	760.92	760.91	760.87	760.83	760.79	760.75	760.71	760.67	760.63	760.59		
BEAM LINE C	761.84	761.75	761.67	761.61	761.54	761.49	761.45	761.41	761.36	761.35	761.31	761.26	761.21	761.17	761.12	761.07	761.03	760.98	760.97	760.93	760.89	760.85	760.81	760.77	760.73	760.69	760.64		
BEAM LINE D	761.95	761.87	761.80	761.73	761.67	761.63	761.58	761.54	761.50	761.49	761.45	761.40	761.35	761.31	761.26	761.21	761.17	761.12	761.11	761.07	761.03	760.99	760.95	760.91	760.86	760.82	760.78		
STAGE CONST. JT.	761.99	761.91	761.84	761.78	761.72	761.68	761.64	761.60	761.56	761.55	761.50	761.45	761.40	761.36	761.31	761.26	761.22	761.17	761.16	761.12	761.08	761.04	761.00	760.96	760.92	760.88	760.84		
BEAM LINE E	762.06	761.99	761.92	761.86	761.81	761.76	761.72	761.68	761.64	761.63	761.59	761.54	761.49	761.45	761.40	761.35	761.30	761.26	761.25	761.21	761.17	761.13	761.09	761.04	761.00	760.96	760.92		
CL US 151	762.08	762.01	761.94	761.88	761.83	761.79	761.75	761.71	761.67	761.66	761.61	761.57	761.52	761.47	761.42	761.38	761.33	761.28	761.27	761.23	761.19	761.15	761.11	761.07	761.03	760.99	760.95		
BEAM LINE F	761.99	761.92	761.85	761.80	761.75	761.71	761.67	761.63	761.59	761.58	761.53	761.48	761.44	761.39	761.34	761.30	761.25	761.20	761.19	761.15	761.11	761.07	761.03	760.99	760.95	760.91	760.87		
BEAM LINE G	761.78	761.72	761.66	761.61	761.56	761.52	761.48	761.44	761.40	761.39	761.35	761.30	761.25	761.20	761.16	761.11	761.06	761.02	761.01	760.97	760.93	760.89	760.84	760.80	760.76	760.72	760.68		
BEAM LINE H	761.58	761.52	761.47	761.42	761.38	761.34	761.30	761.26	761.22	761.21	761.16	761.11	761.07	761.02	760.97	760.93	760.88	760.83	760.82	760.78	760.74	760.70	760.66	760.62	760.58	760.54	760.50		
EAST GUTTER LINE	761.53	761.47	761.42	761.38	761.34	761.29	761.25	761.21	761.17	761.16	761.12	761.07	761.02	760.98	760.93	760.88	760.83	760.79	760.78	760.74	760.70	760.66	760.62	760.57	760.53	760.49	760.45		



TOP OF DECK

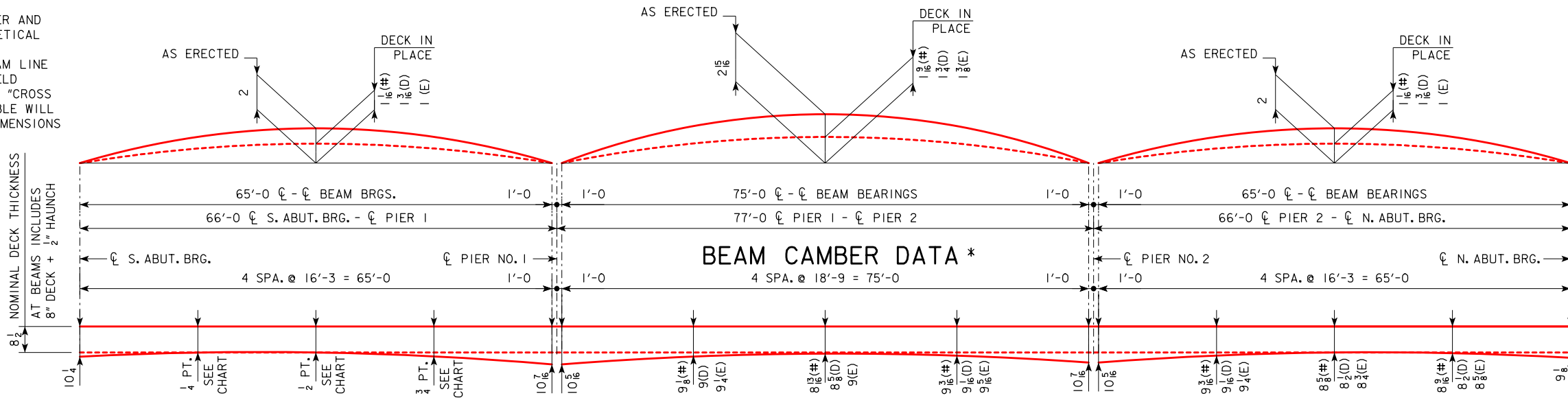
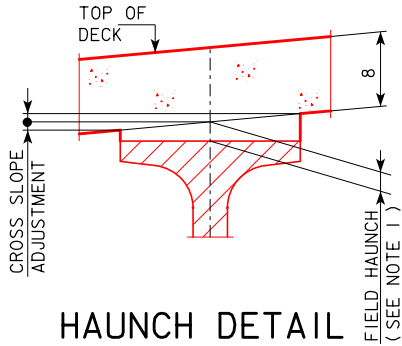


DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
TOP OF DECK ELEVATIONS
STA. 867+41.69 (℄ US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 37 OF 59 FILE NO. 31286 DESIGN NO. 518

BEAM LINE HAUNCH ELEVATIONS																														
LOCATION	℄ S. ABUT. BRG.									℄ PIER 1 BEARINGS										℄ PIER 2 BEARINGS										℄ N. ABUT. BRG.
	LINE 1	LINE 2	LINE 3	LINE 4	LINE 5	LINE 6	LINE 7	LINE 8	LINE 9	LINE 10	LINE 11	LINE 12	LINE 13	LINE 14	LINE 15	LINE 16	LINE 17	LINE 18	LINE 19	LINE 20	LINE 21	LINE 22	LINE 23	LINE 24	LINE 25	LINE 26	LINE 27			
BEAM LINE A	761.01	760.95	760.89	760.82	760.76	760.69	760.62	760.55	760.48	760.47	760.47	760.46	760.43	760.39	760.34	760.27	760.19	760.09	760.08	760.07	760.06	760.03	760.00	759.95	759.90	759.83	759.76			
BEAM LINE B	761.08	761.02	760.96	760.90	760.84	760.78	760.72	760.65	760.58	760.57	760.56	760.55	760.53	760.49	760.44	760.37	760.28	760.19	760.18	760.17	760.16	760.13	760.10	760.05	759.99	759.93	759.86			
BEAM LINE C	761.17	761.11	761.06	761.01	760.95	760.90	760.83	760.77	760.70	760.69	760.68	760.67	760.65	760.61	760.56	760.49	760.40	760.31	760.30	760.29	760.28	760.25	760.22	760.17	760.11	760.05	759.98			
BEAM LINE D	761.28	761.23	761.18	761.13	761.07	761.02	760.97	760.90	760.84	760.83	760.82	760.80	760.78	760.74	760.68	760.62	760.54	760.45	760.44	760.43	760.41	760.38	760.35	760.30	760.25	760.18	760.12			
BEAM LINE E	761.40	761.35	761.32	761.27	761.23	761.18	761.12	761.05	760.98	760.97	760.97	760.96	760.94	760.91	760.85	760.78	760.69	760.59	760.58	760.57	760.56	760.54	760.51	760.46	760.40	760.33	760.26			
BEAM LINE F	761.32	761.28	761.24	761.20	761.16	761.11	761.06	760.99	760.92	760.91	760.91	760.90	760.87	760.84	760.78	760.71	760.63	760.54	760.53	760.52	760.50	760.48	760.44	760.39	760.34	760.27	760.20			
BEAM LINE G	761.12	761.08	761.05	761.01	760.97	760.93	760.87	760.81	760.74	760.73	760.72	760.71	760.69	760.65	760.60	760.52	760.44	760.35	760.34	760.33	760.31	760.29	760.25	760.21	760.15	760.09	760.02			
BEAM LINE H	760.92	760.88	760.85	760.82	760.79	760.74	760.69	760.62	760.55	760.54	760.54	760.53	760.50	760.46	760.41	760.34	760.26	760.16	760.15	760.14	760.13	760.10	760.07	760.02	759.97	759.90	759.83			

MISCELLANEOUS DATA TABLE																													
	BEAM LINE		S. ABUT. BRGS.							℄ PIER NO. 1 BEAM BRGS.								℄ PIER NO. 2 BEAM BRGS.								N. ABUT. BRGS.			
ANTICIPATED DEFLECTION DUE TO DECK (IN.)	A-C, F-H		0	$\frac{3}{8}$	$\frac{5}{8}$	$\frac{7}{8}$	$\frac{15}{16}$	$\frac{7}{8}$	$\frac{5}{8}$	$\frac{3}{8}$	0	0	$\frac{1}{2}$	$\frac{15}{16}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{15}{16}$	$\frac{1}{2}$	0	0	$\frac{3}{8}$	$\frac{5}{8}$	$\frac{7}{8}$	$\frac{15}{16}$	$\frac{7}{8}$	$\frac{5}{8}$	$\frac{3}{8}$	0
	D		0	$\frac{5}{16}$	$\frac{9}{16}$	$\frac{3}{4}$	$\frac{13}{16}$	$\frac{3}{4}$	$\frac{9}{16}$	$\frac{5}{16}$	0	0	$\frac{7}{16}$	$\frac{13}{16}$	$\frac{1}{16}$	$\frac{1}{3}$	$\frac{1}{16}$	$\frac{13}{16}$	$\frac{7}{16}$	0	0	$\frac{5}{16}$	$\frac{9}{16}$	$\frac{3}{4}$	$\frac{13}{16}$	$\frac{3}{4}$	$\frac{9}{16}$	$\frac{5}{16}$	0
	E		0	$\frac{3}{8}$	$\frac{3}{4}$	$\frac{15}{16}$	$\frac{1}{16}$	$\frac{15}{16}$	$\frac{3}{4}$	$\frac{3}{8}$	0	0	$\frac{9}{16}$	$\frac{1}{16}$	$\frac{1}{7}$	$\frac{1}{2}$	$\frac{1}{7}$	$\frac{1}{16}$	$\frac{9}{16}$	0	0	$\frac{3}{8}$	$\frac{3}{4}$	$\frac{15}{16}$	$\frac{1}{16}$	$\frac{15}{16}$	$\frac{3}{4}$	$\frac{3}{8}$	0
CROSS SLOPE ADJUSTMENTS in.	A,B		$\pm \frac{1}{4}$																										
	C THRU H		$\pm \frac{5}{16}$																										
ALLOWABLE FIELD HAUNCH in. (ft.) AT ℄ BEAM	MAX	ALL	3 (0.250)	$2\frac{1}{2}$ (0.208)						3 (0.250)		$2\frac{1}{2}$ (0.208)						3 (0.250)		$2\frac{1}{2}$ (0.208)						3 (0.250)			
	MIN	ALL	0 (0)	(A, B) - $\frac{1}{4}$ (-0.021); (C THRU H) - $\frac{3}{16}$ (-0.016)						0 (0)		(A, B) - $\frac{1}{4}$ (-0.021); (C THRU H) - $\frac{3}{16}$ (-0.016)						0 (0)		(A, B) - $\frac{1}{4}$ (-0.021); (C THRU H) - $\frac{3}{16}$ (-0.016)						0 (0)			

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 THE "MISCELLANEOUS DATA" TABLE. "CROSS SLOPE ADJUSTMENT" VALUES FROM THE "MISCELLANEOUS DATA" TABLE WILL AID THE CONTRACTOR IN DETERMINING ACTUAL FORMED HAUNCH DIMENSIONS AT THE EDGES OF THE TOP FLANGE.



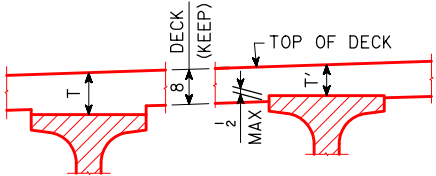
SPAN 1 DECK THICKNESS CHART

BEAM LINE	$\frac{1}{4}$ PT.	$\frac{1}{2}$ PT.	$\frac{3}{4}$ PT.
BEAM LINE A	$8\frac{7}{8}$	$8\frac{1}{2}$	9
BEAM LINE B	$8\frac{7}{8}$	$8\frac{1}{2}$	9
BEAM LINE C	$8\frac{15}{16}$	$8\frac{9}{16}$	$9\frac{1}{16}$
BEAM LINE D	$8\frac{7}{8}$	$8\frac{1}{2}$	$9\frac{1}{16}$
BEAM LINE E	$9\frac{1}{16}$	$8\frac{13}{16}$	$9\frac{5}{16}$
BEAM LINE F	9	$8\frac{13}{16}$	$9\frac{5}{16}$
BEAM LINE G	$9\frac{1}{16}$	$8\frac{15}{16}$	$9\frac{3}{8}$
BEAM LINE H	$9\frac{1}{8}$	9	$9\frac{7}{16}$

NOTE 1 :
TO CALCULATE FIELD HAUNCH REQUIRED AT EACH LOCATION, SURVEY THE BEAM TOPS CONSISTENT WITH THE SPACING'S SHOWN ON THE "TOP OF DECK ELEVATIONS LAYOUT" ON DESIGN SHEET 37. 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 ELEVATIONS" INCLUDES ADJUSTMENT FOR DECK THICKNESS AND ANTICIPATED DEFLECTIONS. NO ADDITIONAL CALCULATIONS ARE REQUIRED. IF THE FIELD HAUNCH EXCEEDS THE MAXIMUMS AND MINIMUMS INDICATED IN THE MISCELLANEOUS DATA TABLE, ADJUSTMENTS TO THE GRADE OR ADDITIONAL HAUNCH REINFORCEMENT WILL BE REQUIRED.

DECK THICKNESS AT ℄ BEAM (T) *

NOTE:
*. DIMENSIONS WITH (#) ARE FOR BEAM LINES A-C & F-H. DIMENSIONS FOR 'DECK IN PLACE' AND DECK THICKNESS FOR BEAM LINES D & E ARE AS SHOWN. DIMENSIONS FOR 'AS ERECTED' AND DECK THICKNESS AT BEARING LOCATIONS ARE FOR ALL BEAMS.

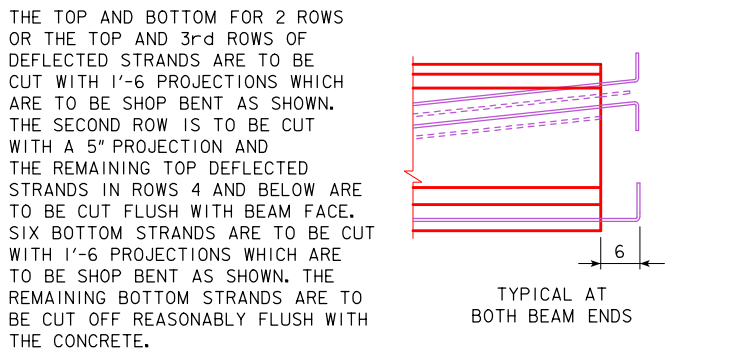


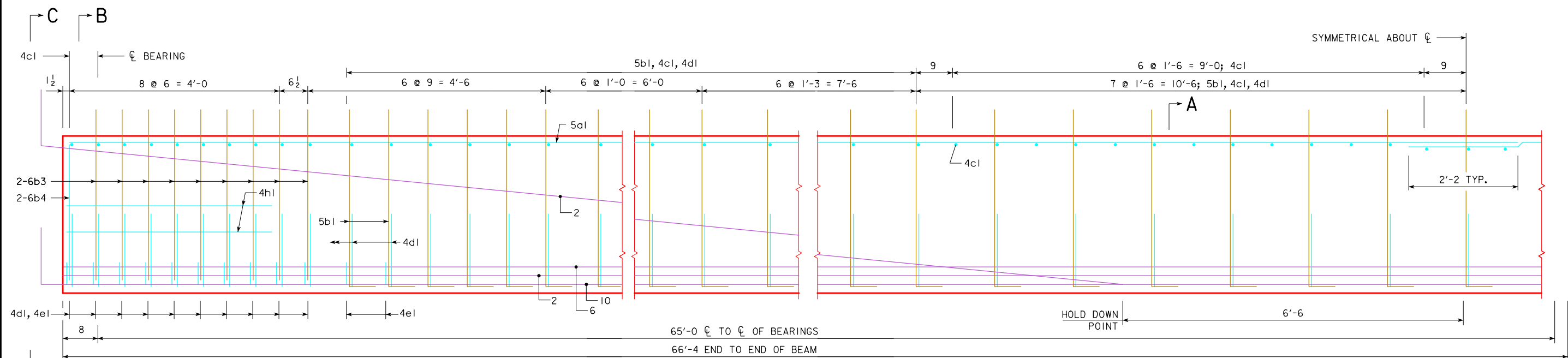
DECK THICKNESS DETAILS

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 ON THIS SHEET FOR ADDITIONAL INFORMATION TO AID THE CONTRACTOR IN SETTING THE FIELD HAUNCHES REQUIRED FOR CONSTRUCTION.

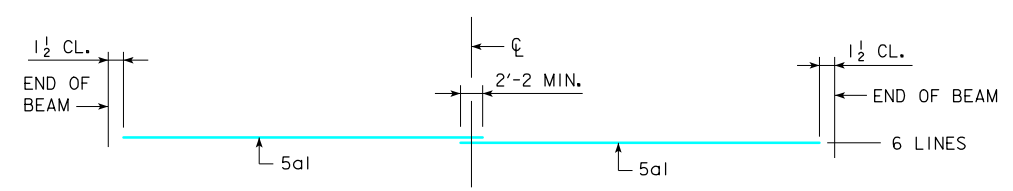
NOTE:
HAUNCH LOCATIONS ARE AT THE SAME LOCATIONS AS THE BEAM LINES AND ENCIRCLED NUMBERS SHOWN ON DESIGN SHEET 37.

DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
DECK THICK. & HAUNCH DATA DETAILS
STA. 867+41.69 (℄ US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 38 OF 59 FILE NO. 31286 DESIGN NO. 518



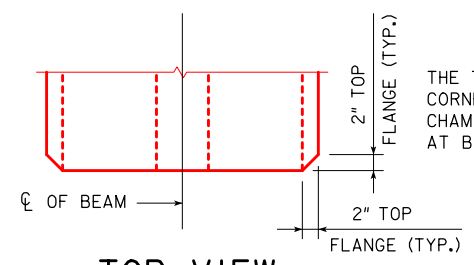


BTB65

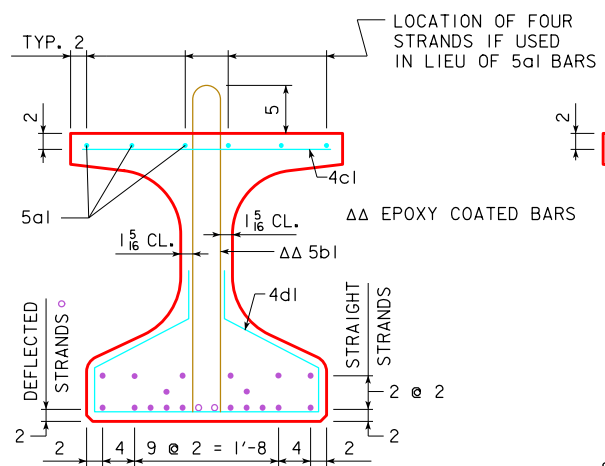


TOP FLANGE LONGITUDINAL BAR LAYOUT

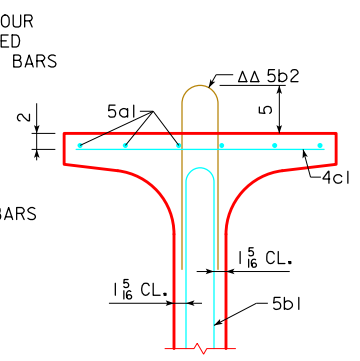
▲ NOTE: BEAM STIRRUP EXTENSIONS ARE NON-STANDARD.



TOP VIEW

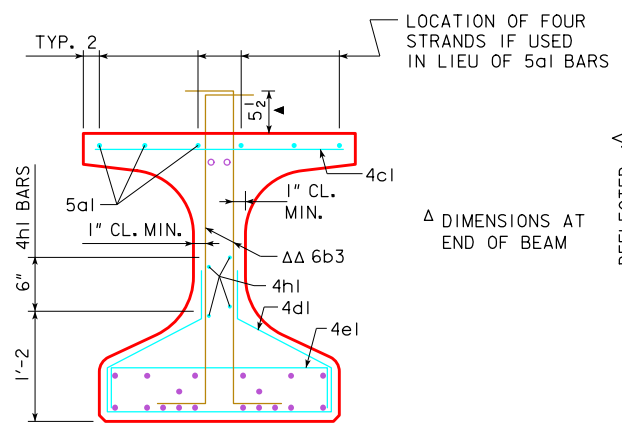


SECTION A-A



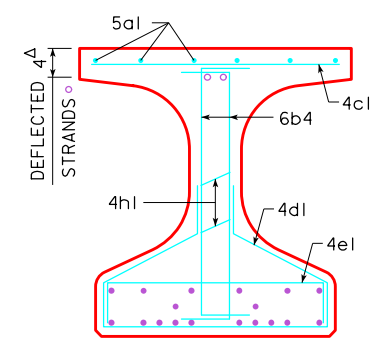
SECTION A-A (ALTERNATE)

SEE ALTERNATE BAR NOTE ON STANDARD SHEET 4750.



SECTION B-B

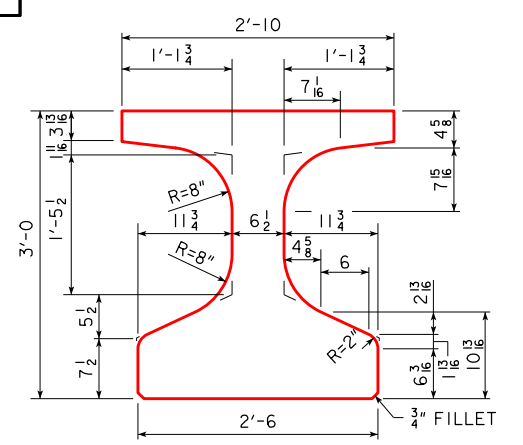
▲ DIMENSIONS AT END OF BEAM



SECTION C-C

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

BEAM SECTION PROPERTIES

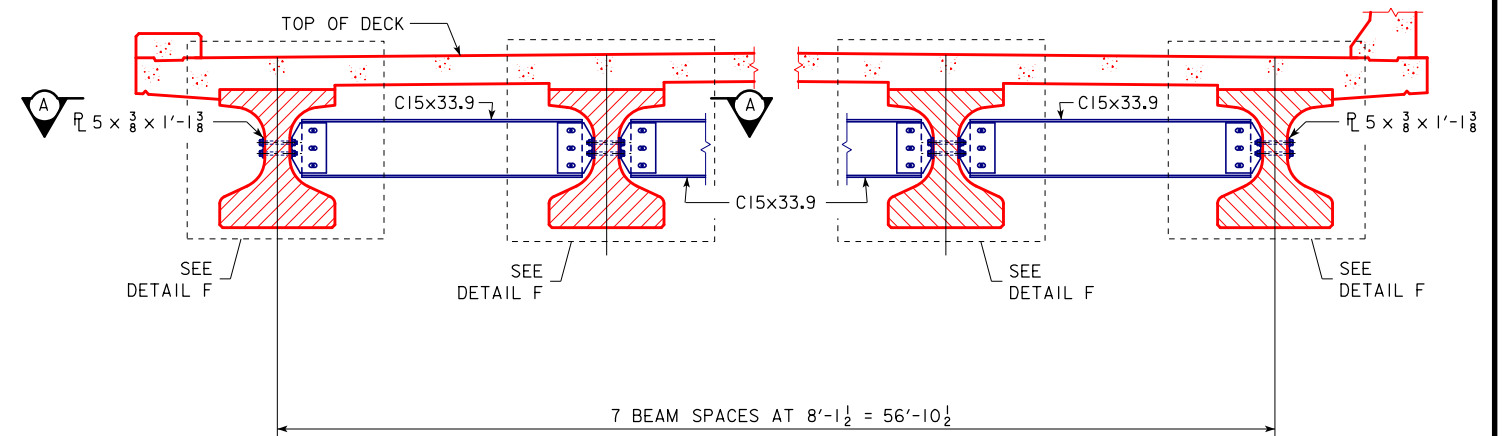


BTB BEAM CROSS SECTION

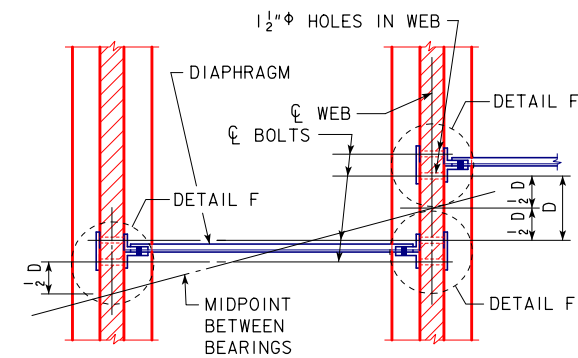
DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
 66'-0 END SPANS 77'-0 INTERIOR SPAN
BTB65 BEAM DETAILS
 STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 40 OF 59 FILE NO. 31286 DESIGN NO. 518



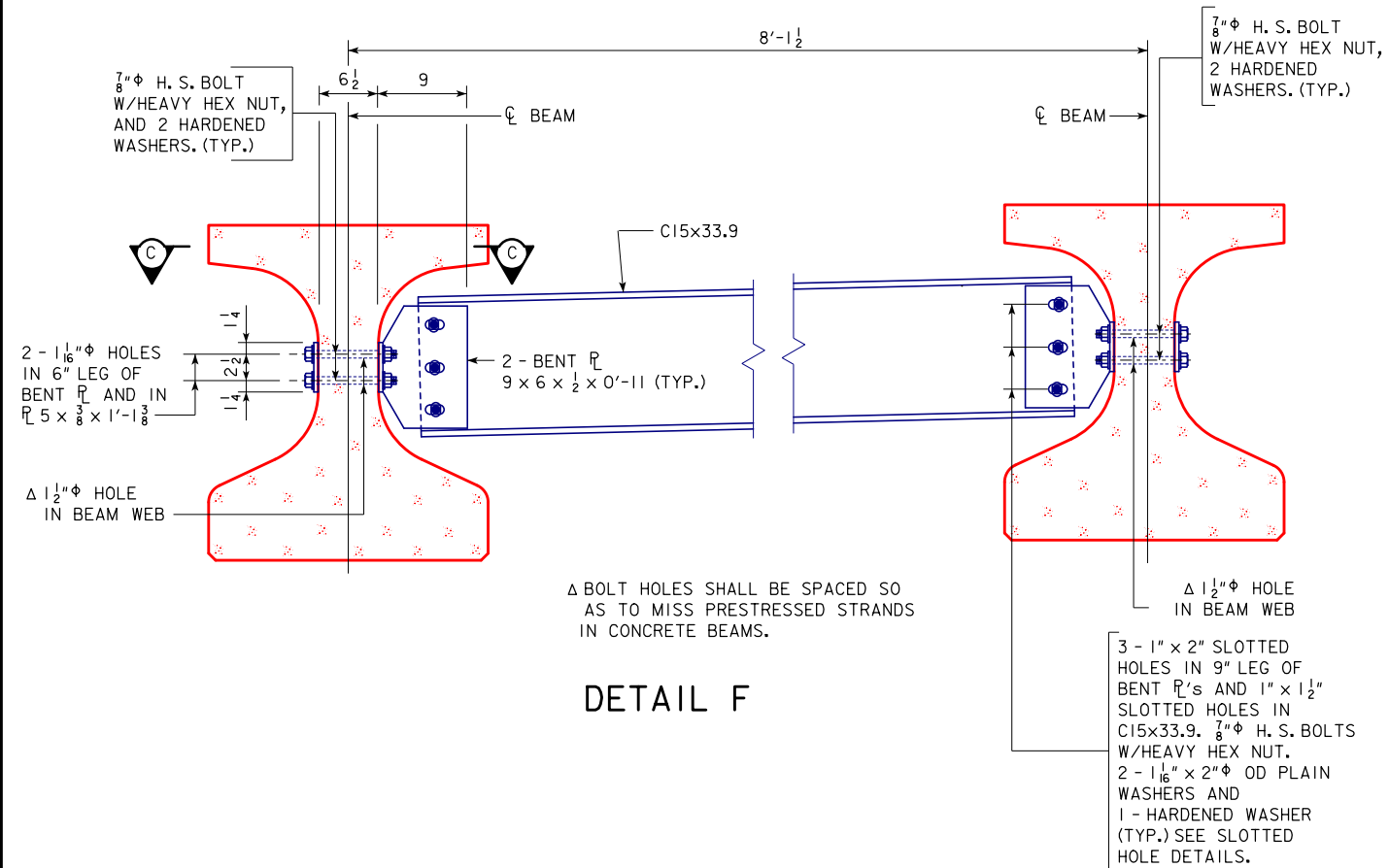
DESIGN TEAM : LLY / TWE / **SHUCK-BRITSON** INC. 400 EAST COURT AVE. SUITE 140
DES MOINES, IOWA 50309
515-263-4477



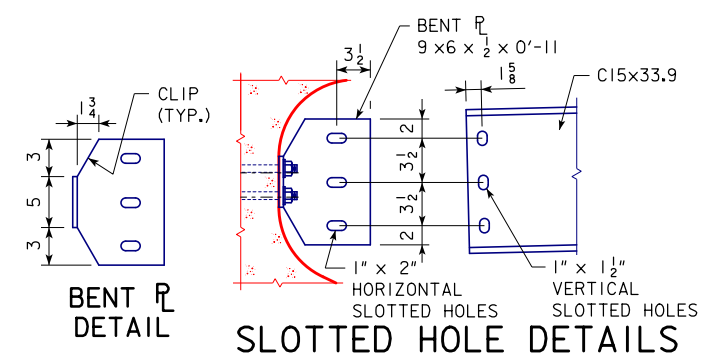
SECTION SHOWING INTERMEDIATE DIAPHRAGMS



PART SECTION A-A
(D = 4'-0 ⁵/₁₆')



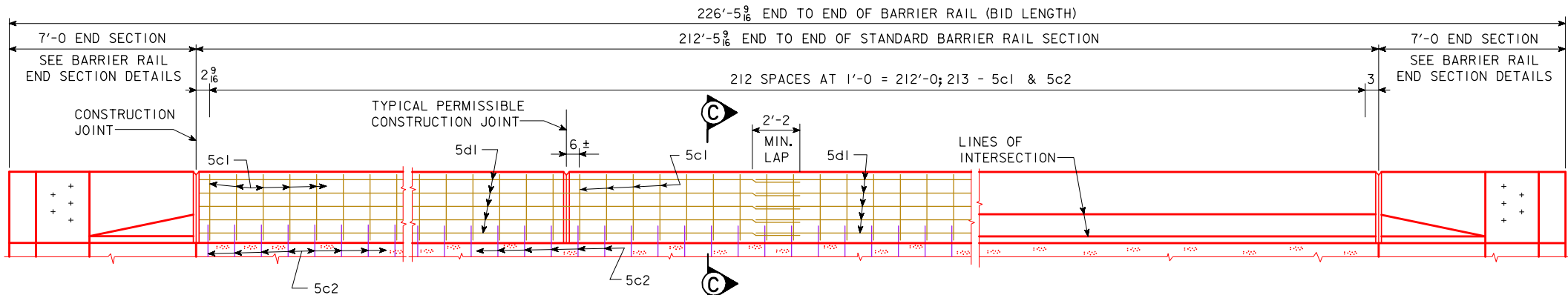
DETAIL F



DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
 66'-0 END SPANS 77'-0 INTERIOR SPAN
INTERMEDIATE DIAPHRAGM DETAILS
 STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 43 OF 59 FILE NO. 31286 DESIGN NO. 518

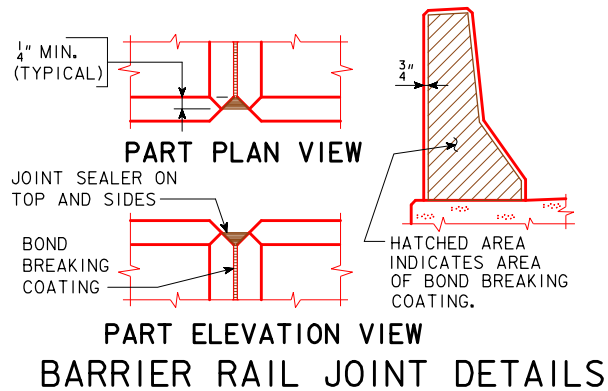
STEEL INTERM. DIAPHS. FOR "BTB" BEAM BRIDGES - SHT. 2 OF 2

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



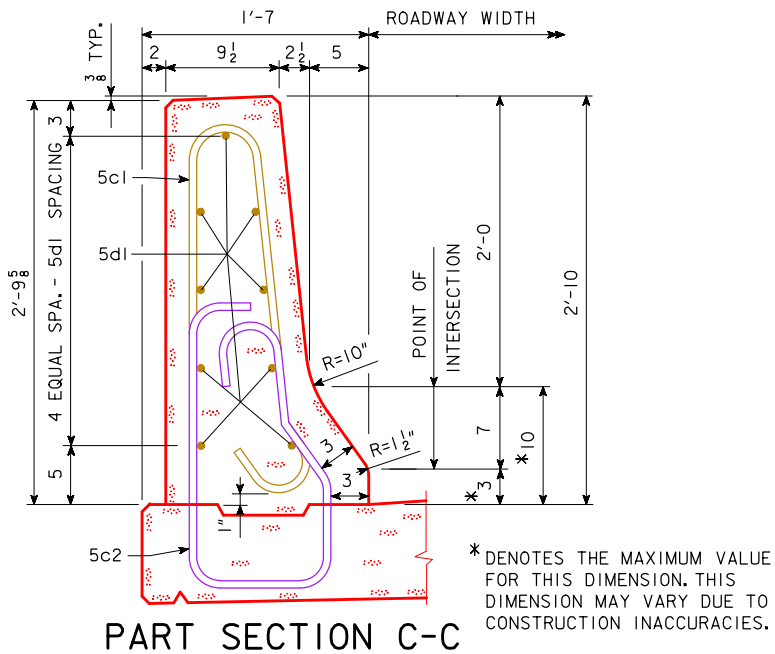
ELEVATION OF EAST BARRIER RAIL LAYOUT
(LOOKING EAST)

NOTE:
CONDUIT NOT SHOWN FOR CLARITY.
SEE DESIGN SHEETS 55 & 56 FOR
CONDUIT 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 SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, EXCLUDING REINFORCING STEEL, AND ALL OF THE EQUIPMENT AND LABOR REQUIRED TO ERECT THE RAIL IN ACCORDANCE WITH THESE PLANS AND CURRENT SPECIFICATIONS. IF CONDUIT IS REQUIRED IN THIS PLAN THE RIGID STEEL CONDUIT, JUNCTION BOXES AND FITTINGS INCLUDING LABOR AND ANY ADDITIONAL WORK TO DO THE INSTALLATION IS CONSIDERED INCIDENTAL TO THE COST OF THE RAILING.
THE JOINT SEALER SHALL BE LIGHT GRAY NONSAG LATEX CAULKING SEALER MARKETED FOR OUTDOOR USE. NO TESTING OR CERTIFICATION IS REQUIRED.
TOP OF THE BARRIER RAIL IS TO BE PARALLEL TO THE THEORETICAL CL GRADE.
CROSS SECTIONAL AREA OF THE STANDARD SECTION OF THE BARRIER RAIL = 2.84 SQUARE FEET.



EPOXY COATED REINF. STEEL - EAST RAIL

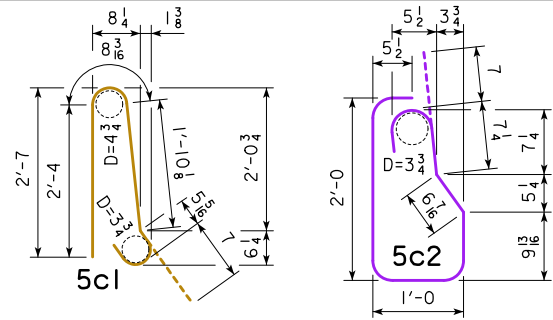
SECTION	BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
STANDARD SECTIONS	5c1	RAIL, VERTICAL		213	5'-11	1,315
	5d1	RAIL, LONGITUDINAL		54	37'-2	2,094
EPOXY STEEL TOTAL (LBS.)						3,409

STAINLESS STEEL REINF. STEEL - EAST RAIL

SECTION	BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
STANDARD SECTIONS	5c2	RAIL, VERTICAL		213	6'-0	1,333
STAINLESS STEEL TOTAL (LBS.)						1,333

NOTE: REINFORCING STEEL QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.

BENT BAR DETAILS



NOTE:
ALL DIMENSIONS ARE OUT TO OUT.
D = PIN DIAMETER.

CONCRETE PLACEMENT SUMMARY

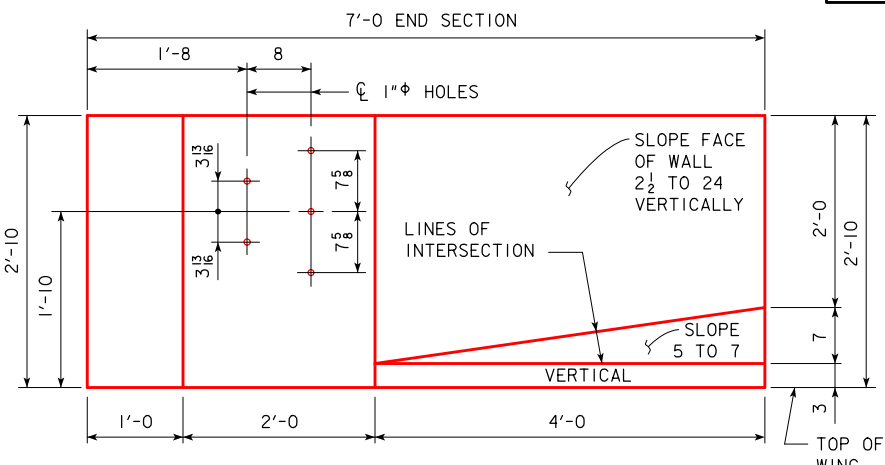
SECTION	TOTAL
STANDARD SECTION 212'-5 9/16 @ 0.1052 CU .YD. PER FT.	22.4
TOTAL (CU. YD.)	22.4

CONCRETE BARRIER RAIL QUANTITIES

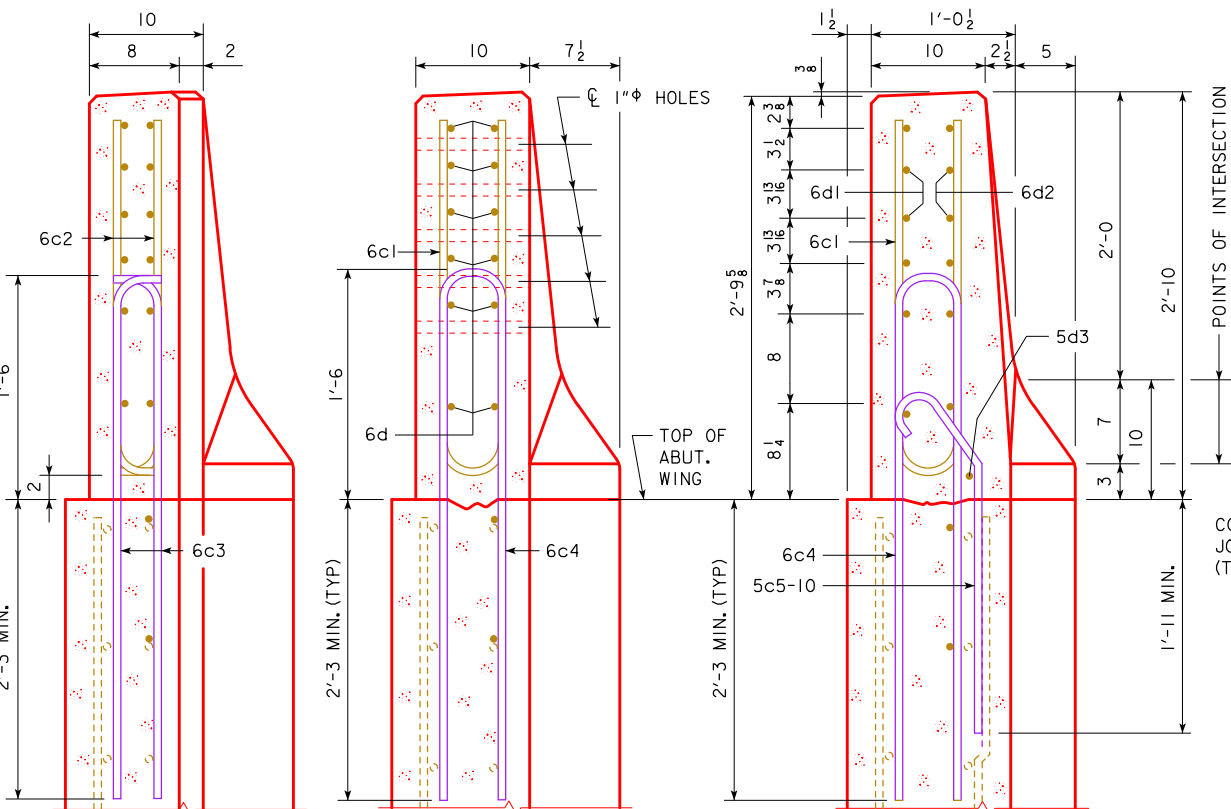
ITEM	UNIT	QUANTITY
CONCRETE BARRIER RAILING	L.F.	226.5

DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
EAST BARRIER RAIL DETAILS
STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 44 OF 59 FILE NO. 31286 DESIGN NO. 518

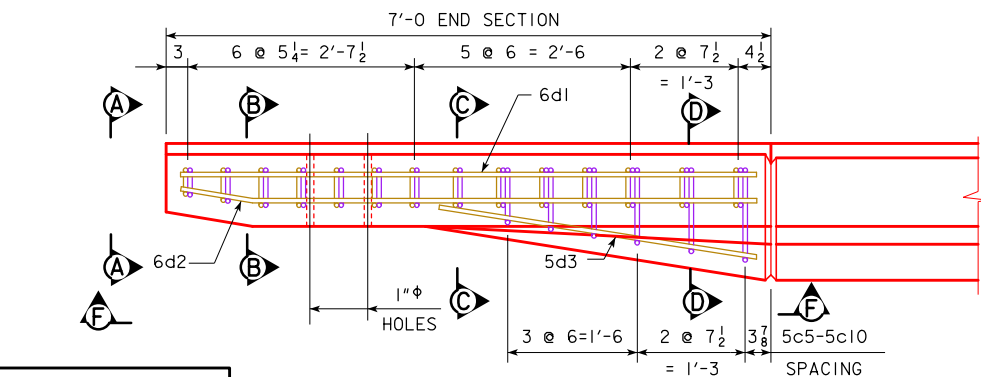
NOTE:
CONDUIT NOT SHOWN FOR CLARITY.
SEE DESIGN SHEETS 55 & 56 FOR
CONDUIT DETAILS



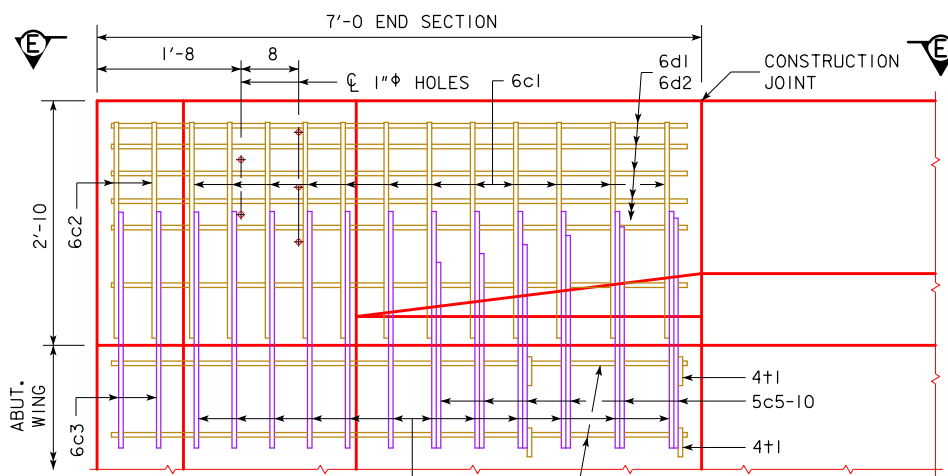
PROVIDE 5 HOLES FORMED WITH 1"Ø PLASTIC CONDUIT. COST TO BE INCLUDED IN PRICE BID FOR CONCRETE BARRIER RAILING.



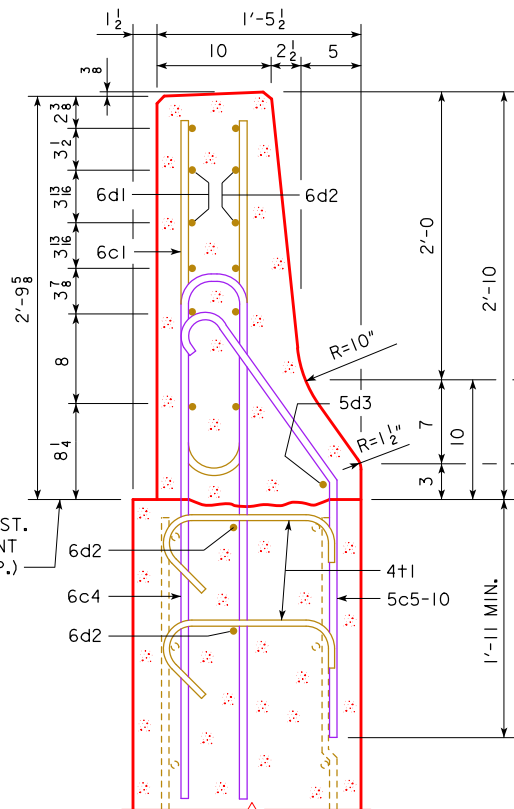
SECTION C-C



PART VIEW E-E



PART VIEW F-F



SECTION D-D

NOTE:
DASHED LINES BELOW THE TOP OF
WING ARE THE ABUTMENT WING
REINFORCING STEEL. SEE WING
ABUTMENT SHEET FOR PLACEMENT.

NOTE: REINFORCING STEEL QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.

SECTION	TOTAL
BARRIER RAIL ONE END SECTION	0.65 CU. YD.

Technical drawings of 10 different reinforcement bar (rebar) shapes, labeled 4+1, 6c1, 6c2, 6c3, 6c4, 6d2, and 5c5-5c10. Each drawing shows the bar's profile with dimensions in feet and inches. A table in the top right corner lists the bar types and their corresponding dimensions. A note at the bottom states: "NOTE: ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER."

BAR	"X"
5c5	0'-6 $\frac{1}{2}$ "
5c6	0'-8 $\frac{1}{2}$ "
5c7	0'-10 $\frac{1}{4}$ "
5c8	1'-0 $\frac{1}{4}$ "
5c9	1'-2"
5c10	1'-4"

NOTE: ALL DIMENSIONS ARE OUT TO OUT.
D = PIN DIAMETER.

NOTE: ALL DIMENSIONS ARE OUT TO OUT.
D = PIN DIAMETER.

DESIGN FOR 30° SKEW (R.A.)

209'-0x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN

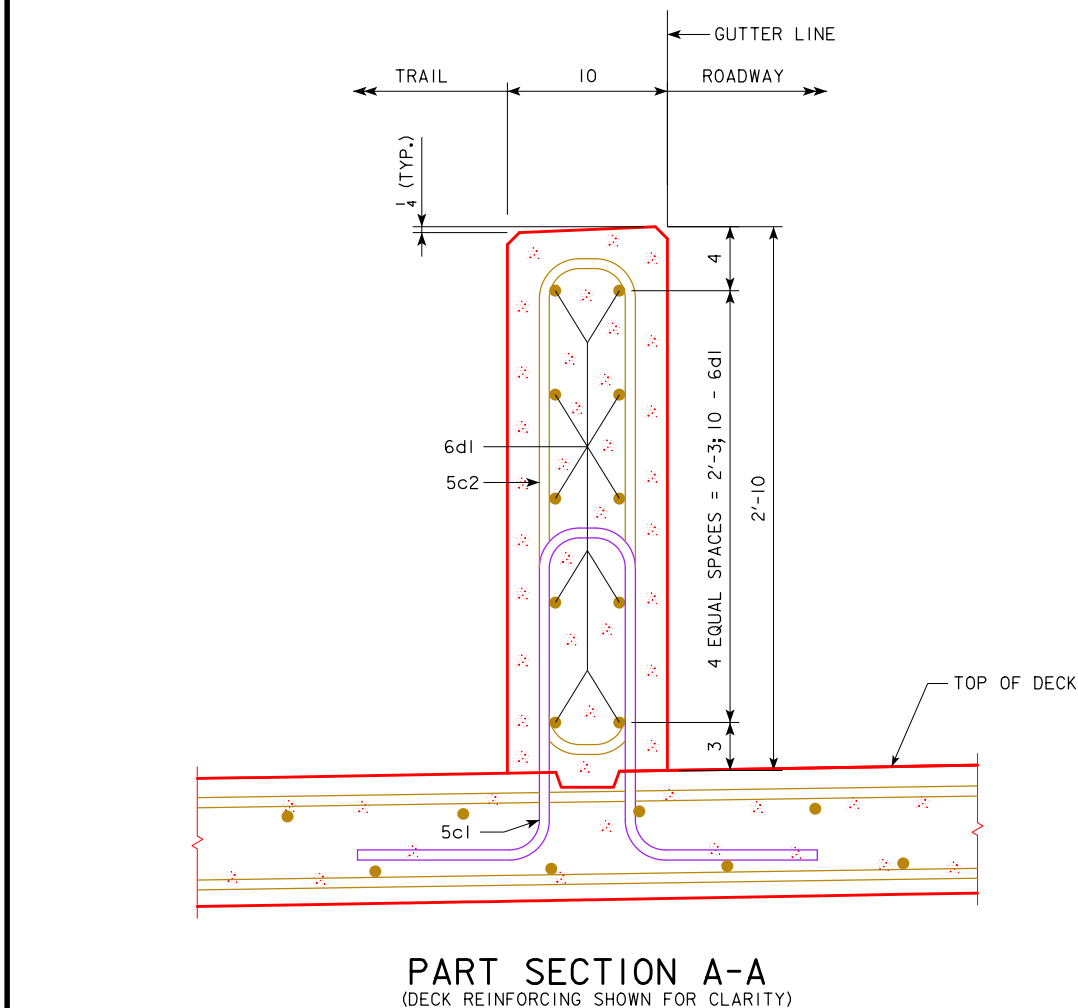
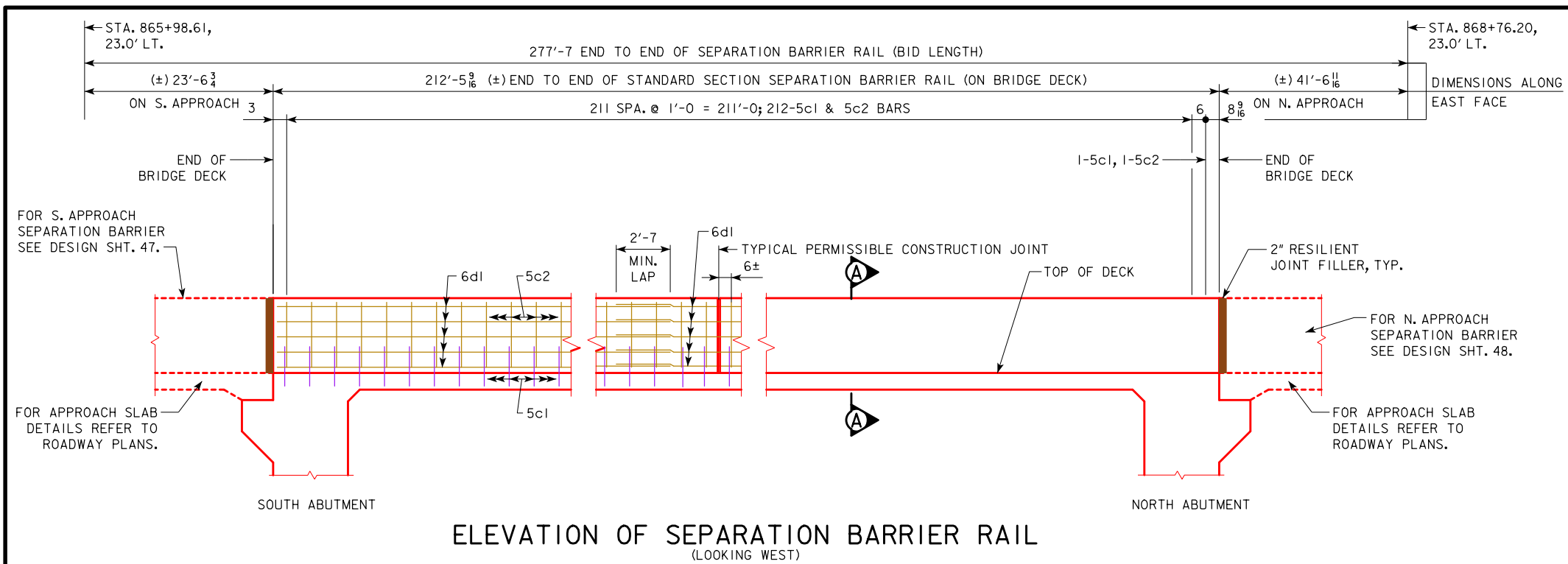
EAST BARRIER RAIL END SECTIONS

STA. 867+41.69 (☺ US 151) SEPTEMBER 2018

LINN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

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SEPARATION BARRIER RAIL NOTES

TOP OF THE BARRIER RAIL IS TO BE PARALLEL TO THE THEORETICAL \bar{C} GRADE. MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.

ALL EXPOSED CORNERS 90° OR SHARPER ARE TO BE FILLETED WITH A $\frac{3}{4}$ " DRESSED AND BEVELED STRIP.

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 JOINT SEALER SHALL BE LIGHT GRAY NONSAG LATEX CAULKING SEALER MARKETING FOR OUTDOOR USE. NO TESTING OR CERTIFICATION IS REQUIRED.

COST OF THE JOINT SEALER AND BOND BREAKER SHALL BE CONSIDERED INCIDENTAL TO OTHER CONSTRUCTION.


THE PERMISSIBLE CONSTRUCTION JOINTS ARE TO BE PLACED BETWEEN VERTICAL BARS AT A MINIMUM SPACING OF 20'-0 FEET AND SHALL BE SPACED A MINIMUM OF 1 FOOT FROM \bar{C} OF ANY HANDRAIL POST. CONSTRUCTION JOINT SURFACES ARE TO BE COATED WITH AN APPROVED BOND BREAKER.

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. THE PRICE BID FOR "CONCRETE BARRIER, REINFORCED, SEPARATION" SHALL BE FULL COMPENSATION FOR FURNISHING ALL EQUIPMENT, LABOR AND MATERIAL, EXCEPT REINFORCING STEEL, REQUIRED TO ERCT THE RAIL IN ACCORDANCE WITH THESE PLANS AND CURRENT STANDARD SPECIFICATIONS.

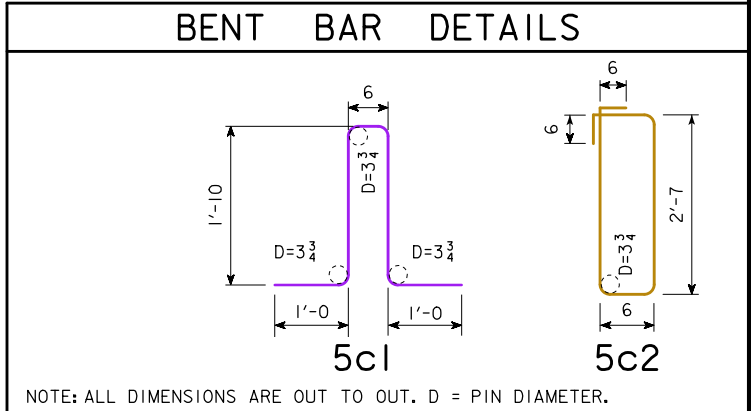
CROSS SECTIONAL AREA OF THE SEPARATION BARRIER RAIL = 2.36 SQUARE FEET.

NOTE:
ALUMINUM BICYCLE RAIL ON WEST FACE
OF SEPARATION BARRIER NOT SHOWN FOR
CLARITY. REFER TO DESIGN SHEET 49 FOR
ALUMINUM BICYCLE RAIL DETAILS.

EPOXY COATED REINF. STEEL						
STANDARD SECTION	BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
	5c2	RAIL, VERTICAL		213	7'-2	1,592
	6dl	RAIL, LONGITUDINAL		60	37'-7	3,387
REINFORCING STEEL EPOXY COATED - TOTAL (LBS.)						4,979

STAINLESS STEEL						
BAR	LOCATION		SHAPE	NO.	LENGTH	WEIGHT
5c1	RAIL TO DECK - STANDARD SECTION			213	6'-2	1,370
	REINFORCING STEEL STAINLESS STEEL - TOTAL (LBS.)					1,370

NOTE: REINFORCING STEEL QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.

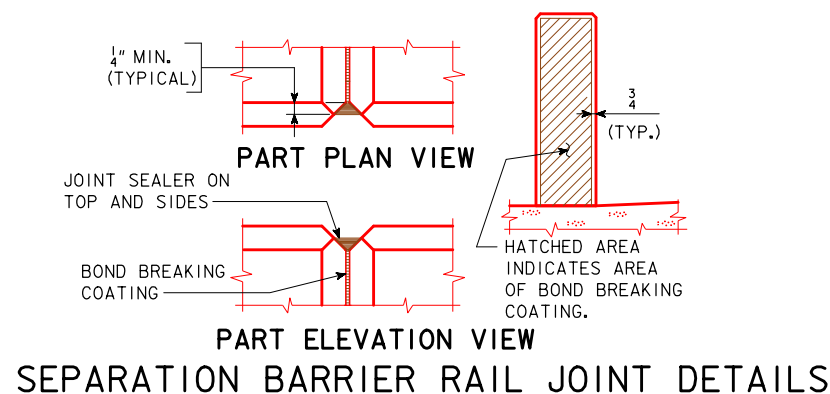


CONCRETE PLACEMENT SUMMARY

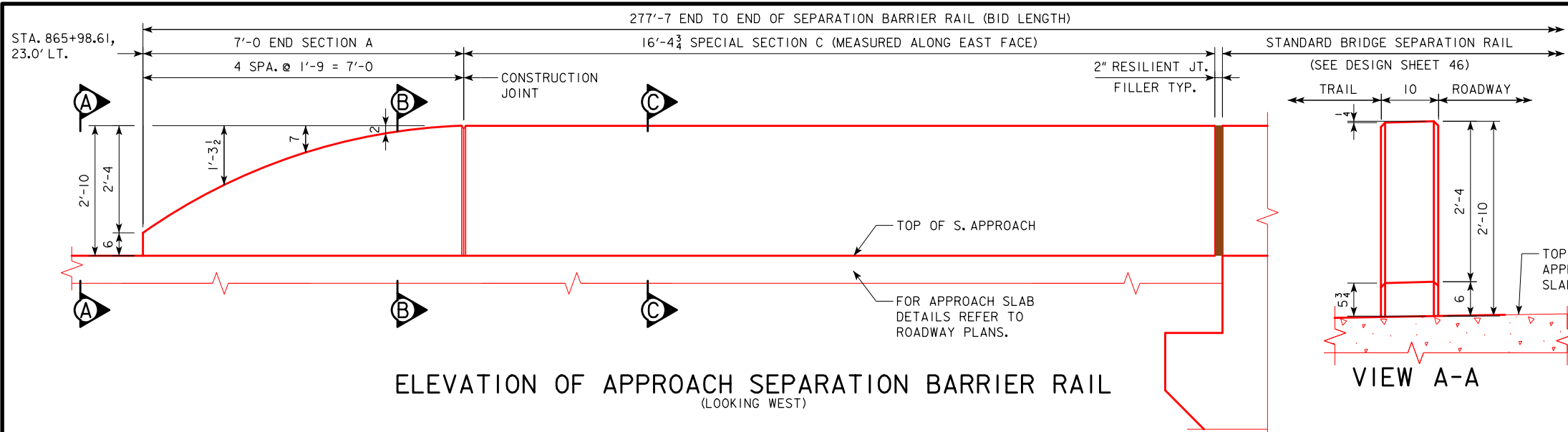
SECTION	TOTAL
STANDARD SECTION 212.5' @ 0.087 CU. YD. PER FT.	18.5

SEPARATION BARRIER RAIL QUANTITY		
ITEM	UNIT	QUANTITY
CONCRETE BARRIER, REINFORCED, SEPARATION	L.F.	277.6

Δ SEPARATION BARRIER RAIL QUANTITY INCLUDES SEPARATION BARRIER RAIL ON BRIDE DECK AND APPROACH SLABS.



DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
SEPARATION BARRIER RAIL DETAILS
STA. 867+41.69 (\bar{C} US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 46 OF 59 FILE NO. 31286 DESIGN NO. 518



EPOXY COATED REINF. STEEL						
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT	
5c4-9	RAIL, VERTICAL		12	VARIES	44	
5d2	RAIL, LONGITUDINAL, TOP		1	7'-0"	8	
5d3	RAIL, LONGITUDINAL		8	VARIES	43	
TOTAL (LBS.)					95	
5c2	RAIL, VERTICAL		23	7'-2"	172	
6d3	RAIL, LONGITUDINAL		5	15'-7"	117	
6d4	RAIL, LONGITUDINAL		5	16'-0"	120	
TOTAL (LBS.)					409	
REINFORCING STEEL EPOXY COATED - TOTAL (LBS.)					504	

STAINLESS STEEL						
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT	
5c3	RAIL TO APPROACH - END SECTION A		7	3'-6"	26	
5c11	RAIL TO APPROACH - SPECIAL SECTION C		23	6'-6"	156	
REINFORCING STEEL STAINLESS STEEL - TOTAL (LBS.)					182	

NOTE: REINFORCING STEEL QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.

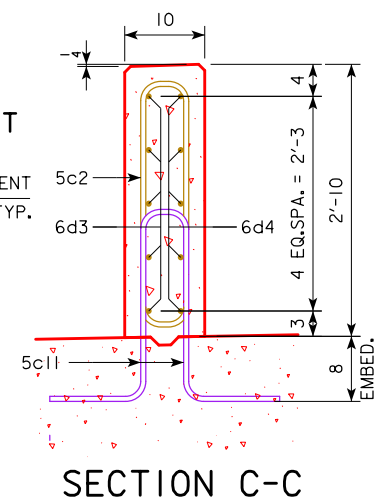
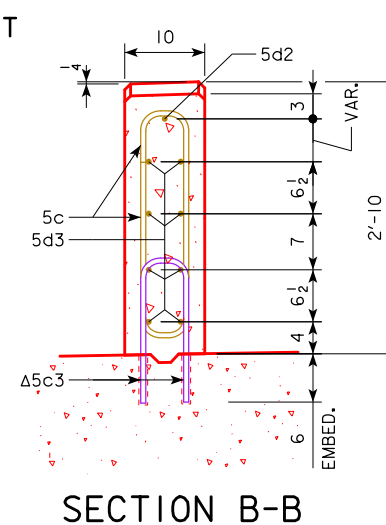
BENT BAR DETAILS			
MARK	"X"	LENGTH	
5c4	1'-6"	2'-10"	
5c5	1'-10 1/2"	3'-2"	
5c6	2'-2 1/2"	3'-5 1/2"	
5c7	2'-4"	3'-8"	
5c8	2'-6"	3'-9 1/2"	
5c9	2'-6 1/2"	3'-10 1/4"	

NOTE: ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

CONCRETE PLACEMENT SUMMARY		
SECTION	TOTAL	
END SECTION A	7' @ 0.444 CU. YD	0.4
SPECIAL SECTION C	16.3 @ 0.0874 CU. YD PER FT.	1.4
TOTAL (CU. YD)		1.8

NOTE:
SEE DESIGN SHEET 46 FOR SEPARATION BARRIER RAIL NOTES AND CONSTRUCTION JOINT DETAILS.

DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
S. APPROACH SEPAR. RAIL DETAILS
STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 47 OF 59 FILE NO. 31286 DESIGN NO. 518

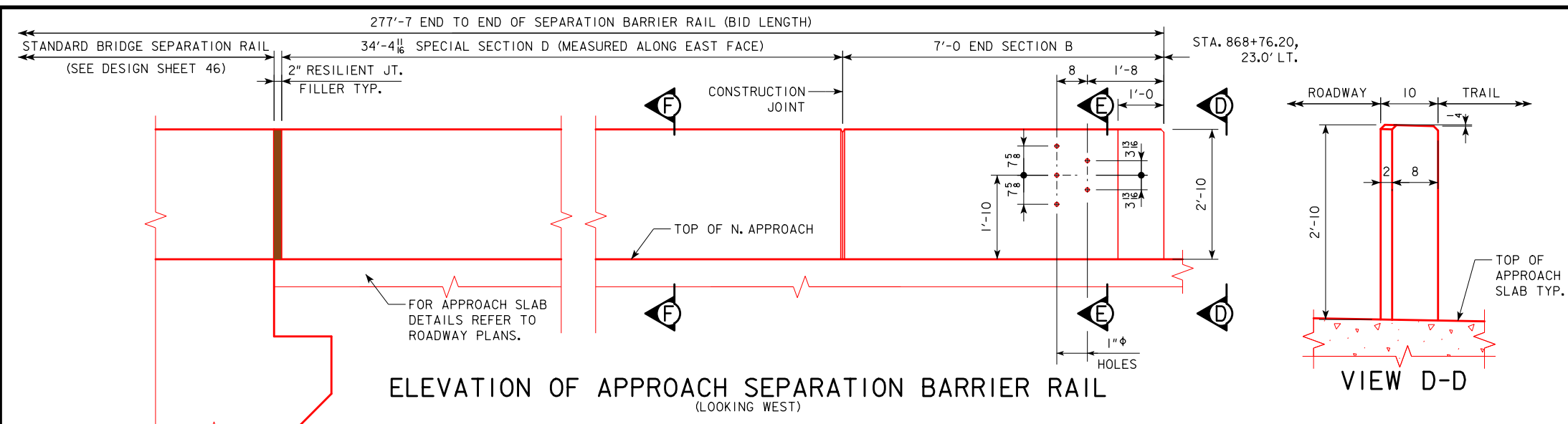







ELEVATION OF APPROACH SEPARATION BARRIER RAIL (LOOKING WEST)

PLAN VIEW OF S. APPROACH SEPARATION BARRIER RAIL (S. APPROACH SLAB NOT SHOWN)

SEPARATION BARRIER RAIL END SECTION A SHOULD BE CONSTRUCTED DURING BRIDGE CONSTRUCTION STAGE 2A.

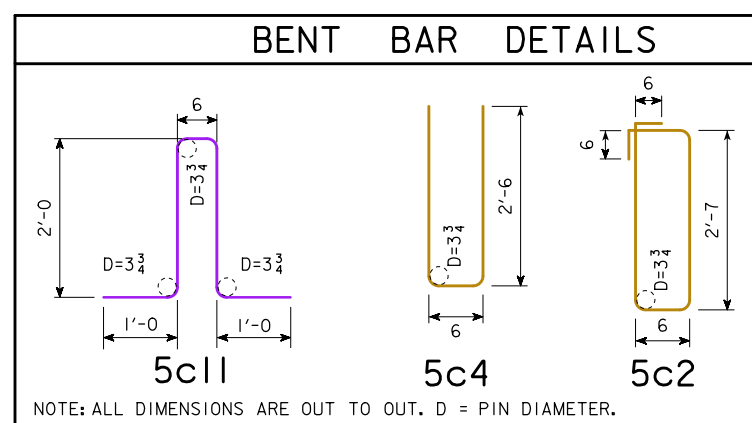
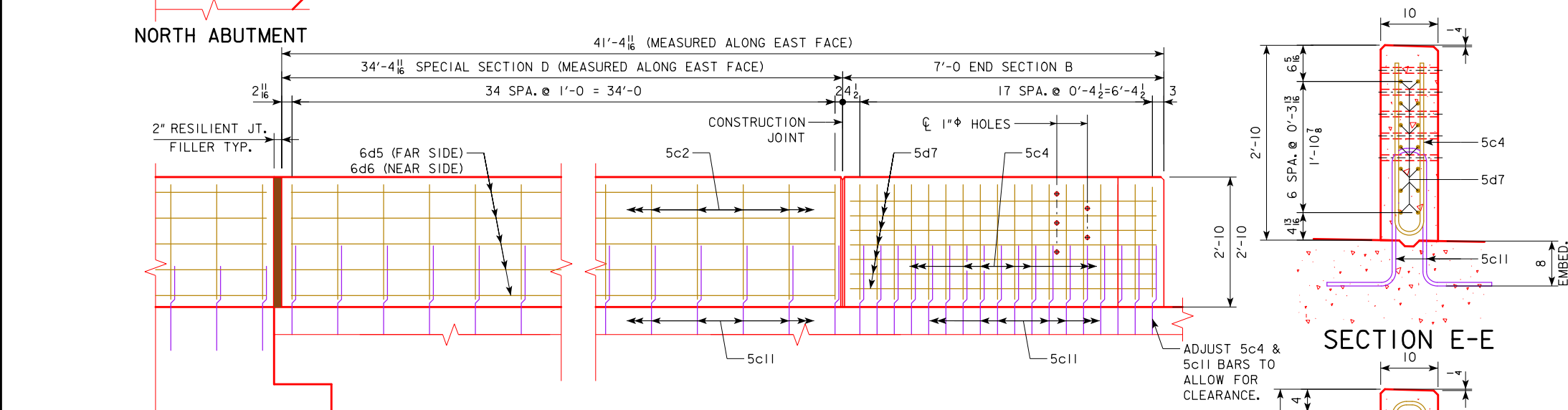
SEPARATION BARRIER RAIL SPECIAL SECTION C SHOULD BE CONSTRUCTED DURING BRIDGE CONSTRUCTION STAGE 1.



EPOXY COATED REINF. STEEL						
END SECTION B	BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
	5c4	RAIL, VERTICAL		18	5'-6	103
	5d7	RAIL, LONGITUDINAL		14	6'-8	97
	TOTAL (LBS.)					200
SPECIAL SECTION D	5c2	RAIL, VERTICAL		35	7'-2	262
	6d5	RAIL, LONGITUDINAL		5	34'-6	259
	6d6	RAIL, LONGITUDINAL		5	34'-0	255
	TOTAL (LBS.)					776
REINFORCING STEEL EPOXY COATED - TOTAL (LBS.)						976

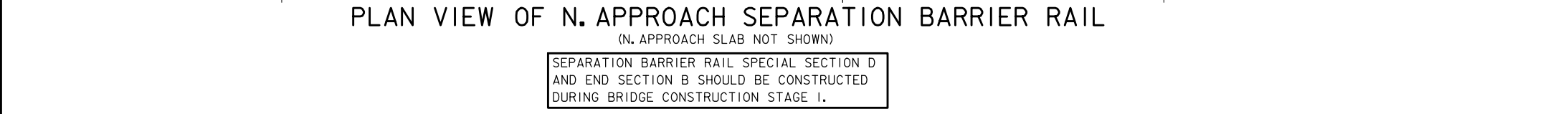
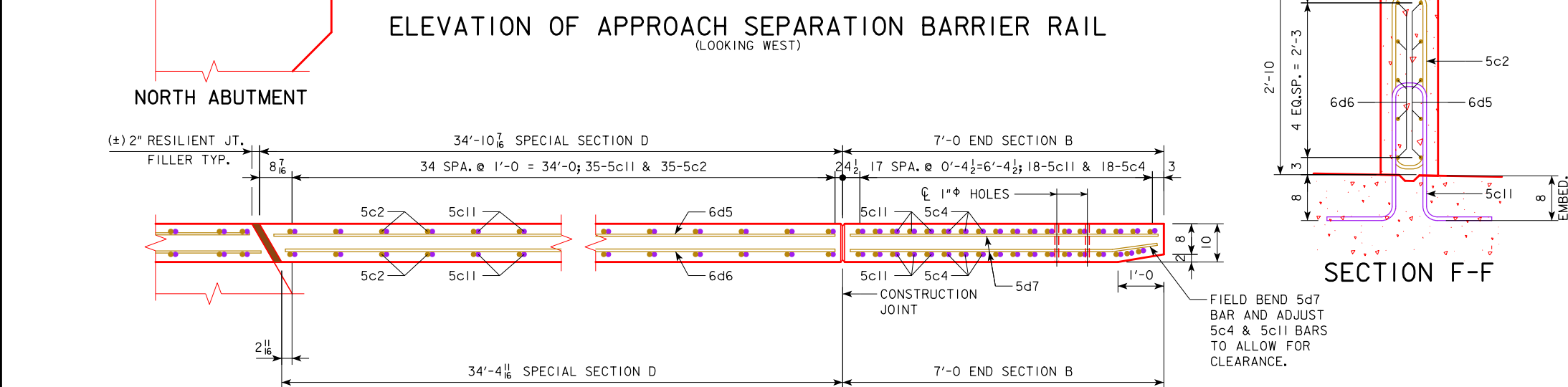
STAINLESS STEEL						
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT	
5c11	RAIL TO APPROACH - END SECTION B		18	6'-6"	122	
5c11	RAIL TO APPROACH - SPECIAL SECTION D		35	6'-6"	237	
REINFORCING STEEL STAINLESS STEEL - TOTAL (LBS.)						359

NOTE: REINFORCING STEEL QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.

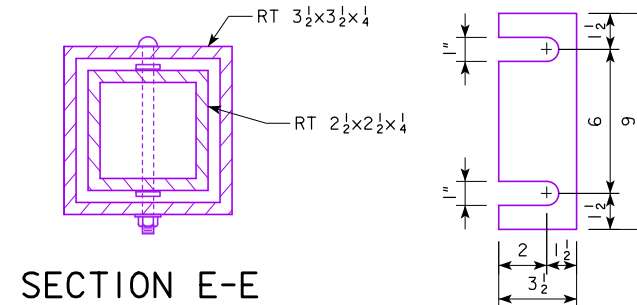
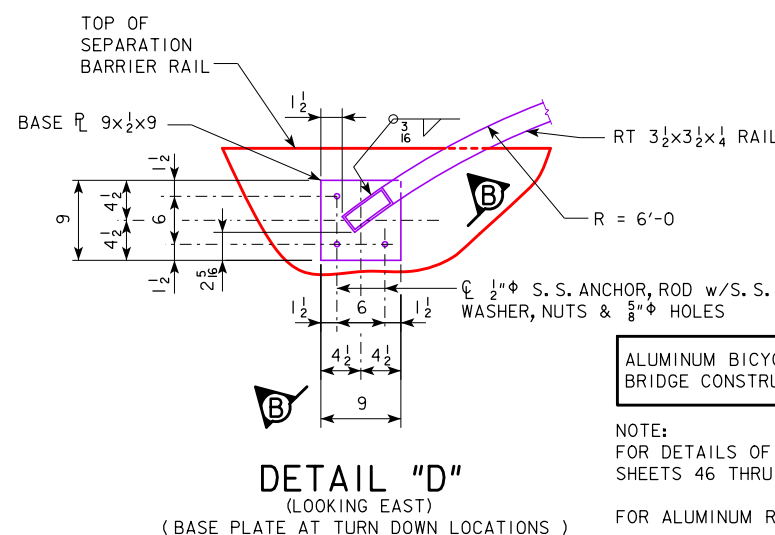
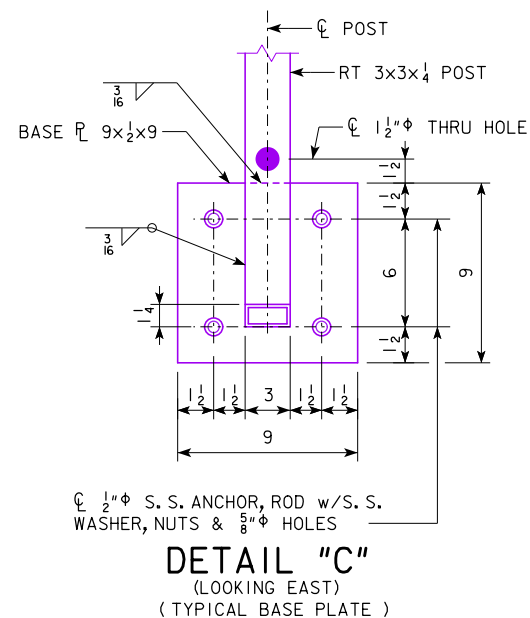
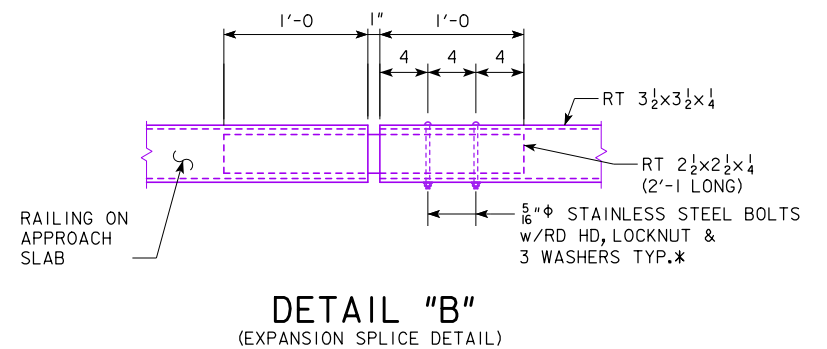
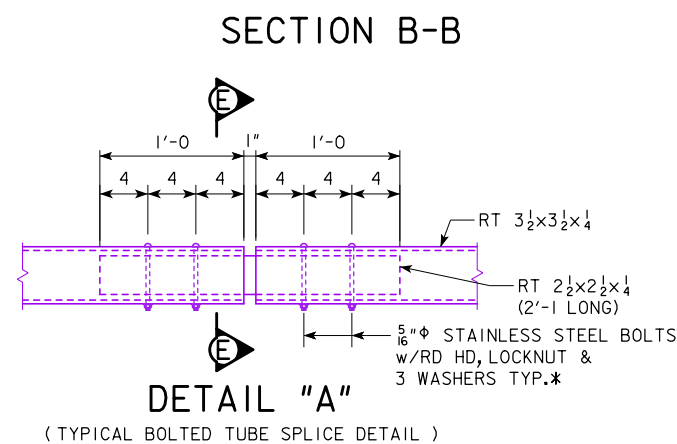
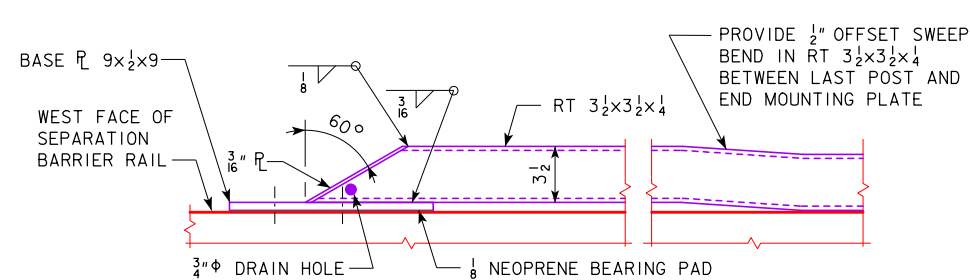
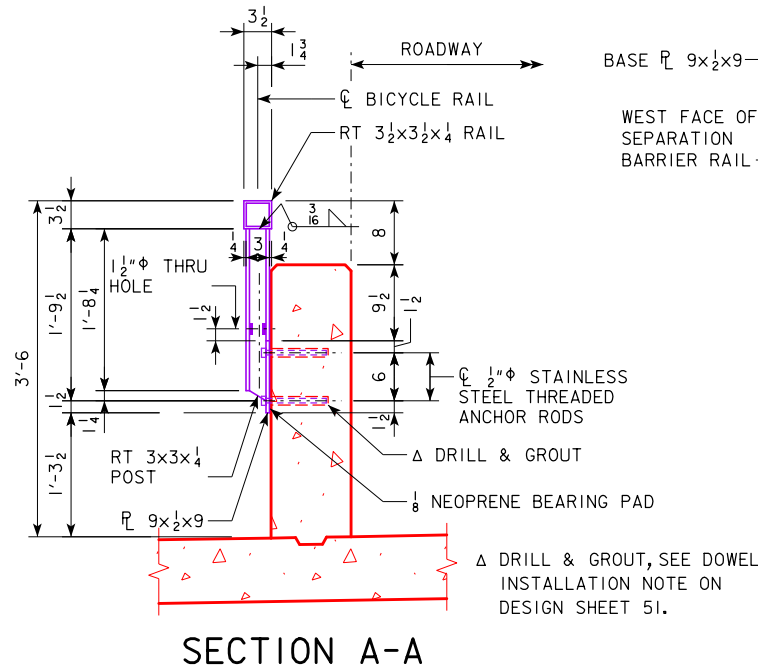
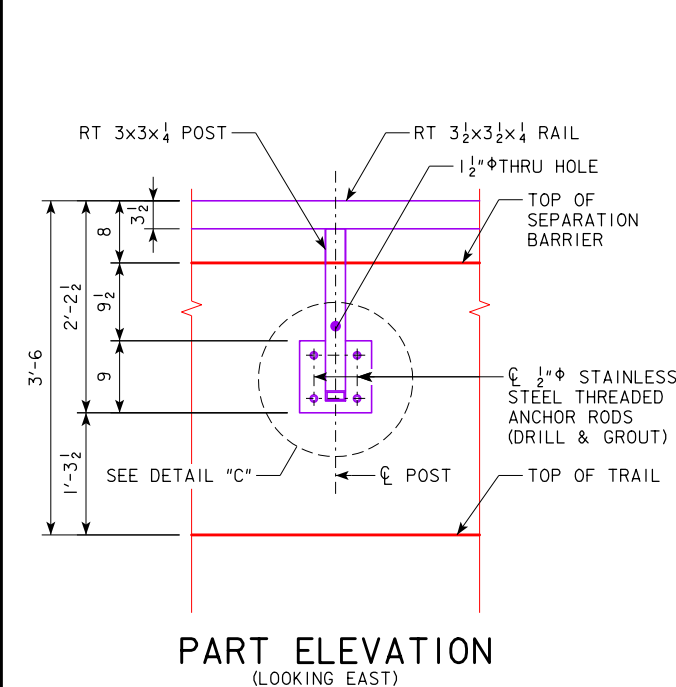
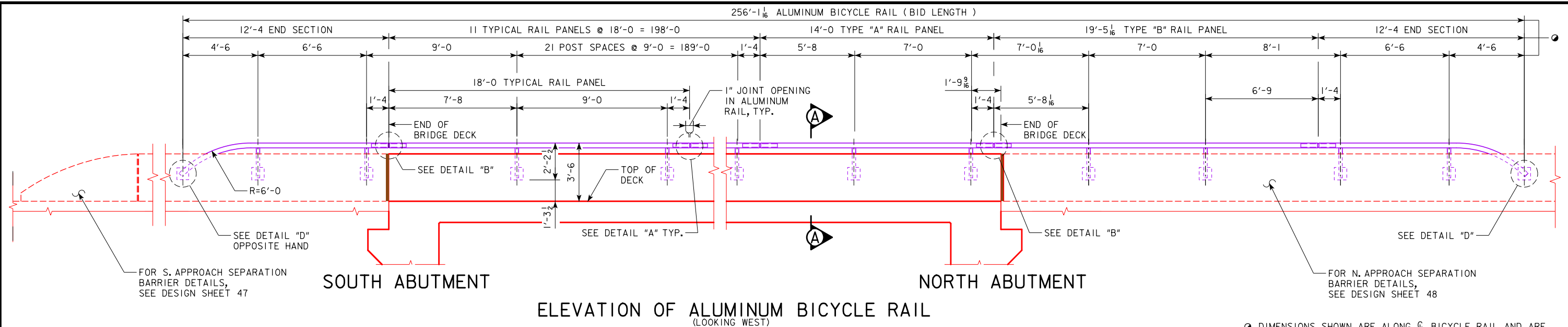


CONCRETE PLACEMENT SUMMARY		
SECTION		TOTAL
END SECTION B	7.0' @ 0.0874 CU. YD PER FT.	0.6
SPECIAL SECTION D	34.4' @ 0.0874 CU. YD PER FT.	3.0
TOTAL (CU. YD.)		3.6

NOTE: SEE DESIGN SHEET 46 FOR SEPARATION BARRIER RAIL NOTES AND CONSTRUCTION JOINT DETAILS.



DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
 66'-0 END SPANS 77'-0 INTERIOR SPAN
N. APPROACH SEPAR. RAIL DETAILS
 STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
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NOTE:
PROVIDE 2 SETS - $\frac{1}{16}$ " STAINLESS
STEEL SHIMS FOR EACH BASE PLATE.
USE AS REQUIRED.

● DIMENSIONS SHOWN ARE ALONG C BICYCLE RAIL AND ARE IN HORIZONTAL PLANE ONLY. CONTRACTOR SHALL ADJUST FOR SLOPE AND VERTICAL CURVE TO CONFORM TO THE HORIZONTAL AND VERTICAL ALIGNMENT OF THE BRIDGE. POSTS SHALL BE SET PLUMB.

NOTE:
*SPACE INNER SLEEVE FROM OUTER TUBE WITH STAINLESS STEEL
STANDARD WASHERS ABOVE AND BELOW SLEEVE AT EACH BOLT.
HOLES IN INNER SLEEVE TO BE OVERSIZED ($\frac{1}{16}$ " ϕ).

QUANTITIES		
ITEM	UNITS	AMOUNT
ALUMINUM BICYCLE RAIL	LIN. FT.	256.1

DESIGN FOR 30° SKEW (R.A.)

209'-0x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN

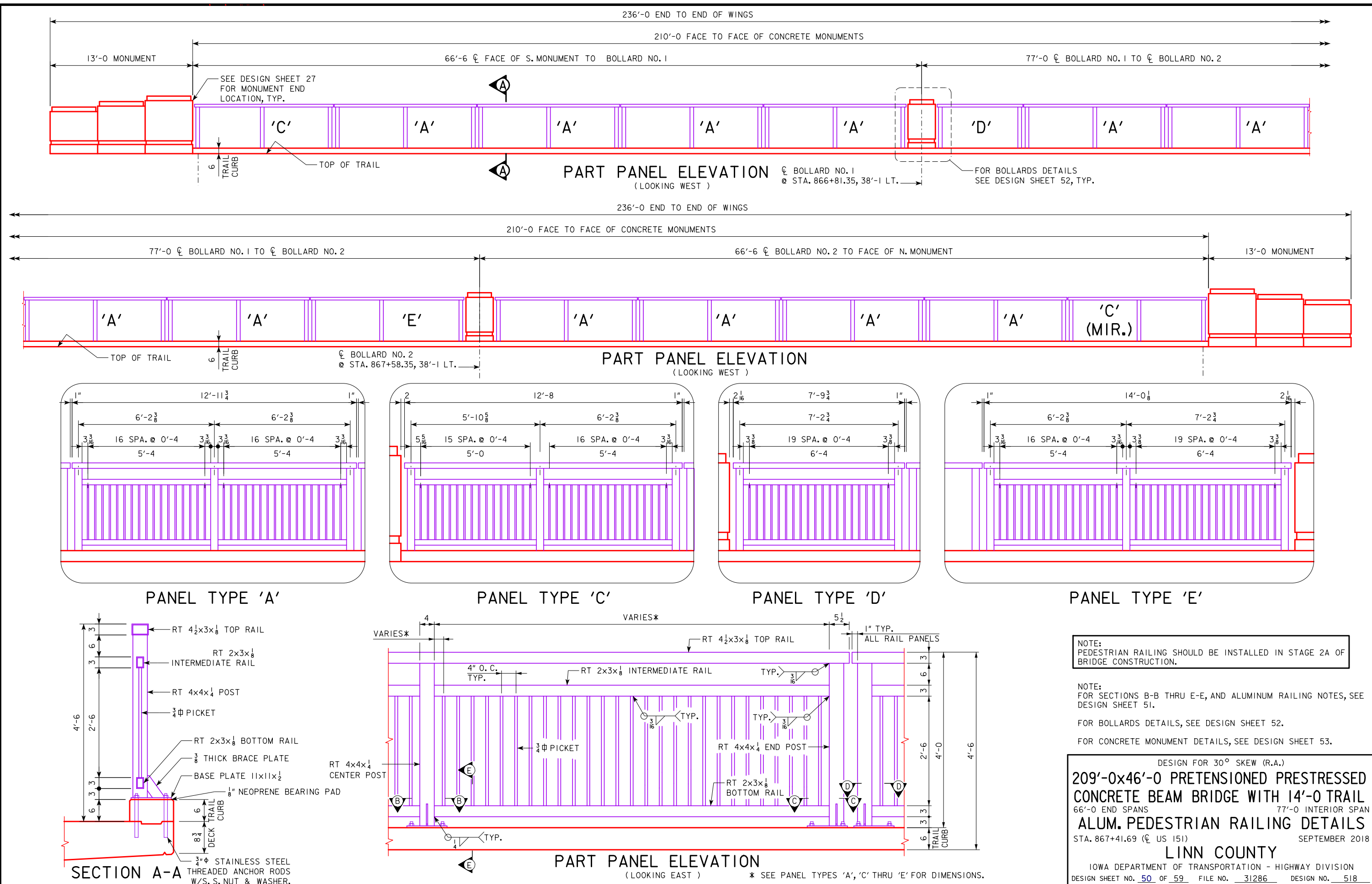
ALUMINUM BICYCLE RAILING DETAILS

E. STA. 867+41.69 (C US 151) SEPTEMBER 2018

LINN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 49 OF 59 FILE NO. 31286 DESIGN NO. 518



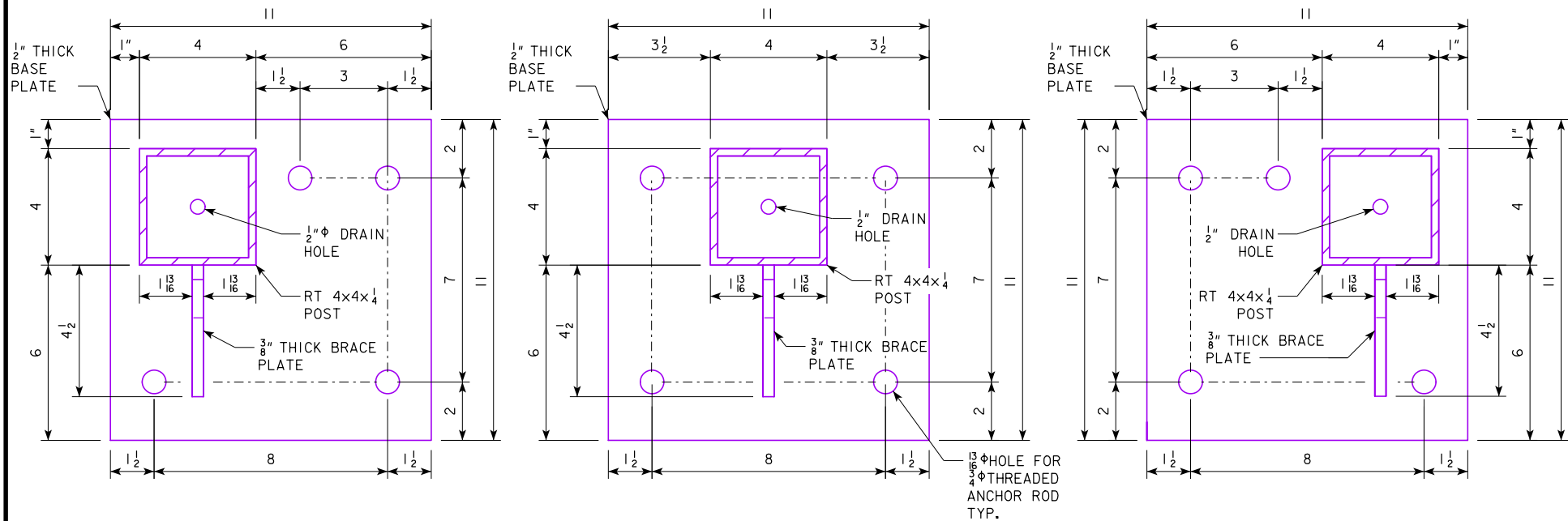
NOTE:
PEDESTRIAN RAILING SHOULD BE INSTALLED IN STAGE 2A OF
BRIDGE CONSTRUCTION.

NOTE:
FOR SECTIONS B-B THRU E-E, AND ALUMINUM RAILING NOTES, SEE
DESIGN SHEET 51.

FOR BOLLARDS DETAILS, SEE DESIGN SHEET 52.

FOR CONCRETE MONUMENT DETAILS, SEE DESIGN SHEET 53.

DESIGN FOR 30° SKEW (R.A.)
**209'-0x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL**
66'-0 END SPANS 77'-0 INTERIOR SPAN
ALUM. PEDESTRIAN RAILING DETAILS
STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 50 OF 59 FILE NO. 31286 DESIGN NO. 518



SECTION D-D
(NORTH END POST)

SECTION B-B
(CENTER POST)

SECTION C-C
(SOUTH END POST)

ALUMINUM RAILING NOTES:
HORIZONTAL RAILS, POSTS, PICKETS, BASE PLATES, POST BACKING PLATES AND SHIM PLATES (IF REQUIRED) SHALL COMPLY WITH THE REQUIREMENTS OF ASTM B221-12 AND ASTM B429-10 AND BE OF GRADE 6061-T6 AND MEET AMERICAN NATIONAL STANDARD DIMENSIONAL TOLERANCES FOR ALUMINUM MILL PRODUCTS.

ENDS OF RAIL SECTIONS ARE TO BE SAWED OR MILLED. ALL CUT ENDS ARE TO BE TRUE, SMOOTH, AND FREE OF BURRS OR RAGGED EDGES.

ANY WELDS WITH BURRS ON THE FRAMING MEMBER SHALL BE GROUND FLUSH. WELDING SHALL COMPLY WITH THE REQUIREMENTS OF AWS D1.2, STRUCTURAL WELDING CODE - ALUMINUM.

ALUMINUM FILLER ALLOY ER5356 OR ER5556 SHALL BE USED [IOWA DOT STANDARD SPECIFICATIONS 4187.01, A, 7]. ONLY MICROSCOPICALLY CLEAN WELDING WIRE (THOSE WHICH HAVE BEEN SHAVED AFTER DRAWING) SHALL BE USED, AND SPOOLS OF WIRE REMAINING AT THE END OF THE DAY'S PRODUCTION SHALL BE SEALED IN POLYETHYLENE BAGS. WELDING WIRE IN DRIVE ROLLS AND GUN NOT SO PROTECTED SHALL BE DISCARDED.

ALL AREAS TO BE WELDED SHALL BE BRUSHED WITH STAINLESS STEEL BRUSHES IMMEDIATELY PRIOR TO WELDING. ALL ALUMINUM WELDING SHALL BE PERFORMED BY THE GAS METAL ARC WELDING (GMAW) PROCESS. ONLY THE STRINGER BEAD TECHNIQUE SHALL BE USED. INTERPASS TEMPERATURE SHALL NOT EXCEED 200 DEGREES FAHRENHEIT. ALL INITIAL ROOT PASSES SHALL NOT EXCEED 5/16 INCH AND MUST PENETRATE THE ROOT. THE CONVEXITY OF A FILLET WELD SHALL NOT EXCEED 1/16 INCH.

ALL ALUMINUM RAILING COMPONENTS SHALL BE ANODIZED TO A LIGHT BRONZE COLOR (CHAMPAGNE, #311) IN ACCORDANCE WITH AAMA 611-98, "VOLUNTARY SPECIFICATION FOR ANODIZED ARCHITECTURAL ALUMINUM". USE A CLASS 1 INTEGRAL COLOR FINISH (REQUIRES MINIMUM COATING THICKNESS OF 0.7 MIL). SURFACE PREPARATION SHALL BE IN ACCORDANCE WITH ASTM D 3933-10. VENT HOLES FOR ANODIZING SHALL BE PLACED IN THE RAIL PANELS AT LOCATIONS THAT WILL BE THE LEAST VISIBLE IN THE FINAL ERECTED POSITION OF THE RAIL.

STAINLESS STEEL ANCHOR RODS SHALL COMPLY WITH ASTM A320/A320M, CLASS 1, GRADE B8, CLASS 1A, GRADE B8A, OR CLASS 2 GRADE B8, OR ASTM F593 GROUP 1, ALLOY 304 OR 304L, GROUP 2, ALLOY 316 OR 316L, OR GROUP 3, ALLOY 321 OR 347 MEETING CONDITION A, CWI OR CW2. HEX NUTS SHALL COMPLY WITH ASTM A194/A194M, GRADE 8, 8A, 8C, 8CA, 8M, 8MA, 8T OR 8TA, OR ASTM F594, GROUP 1, ALLOY 304 OR 304L, GROUP 2, ALLOY 316 OR 316L, OR GROUP 3, ALLOY 321 OR 347 MEETING CONDITION A, CWI OR CW2. STAINLESS STEEL WASHERS SHALL BE PLAIN FLAT, TYPE 304 OR 304L, ACCORDING TO FEDERAL SPECIFICATION FF-W-92.

ALL RAILING SHALL BE CONSTRUCTED PLUMB IN THE TRANSVERSE DIRECTION OF THE BRIDGE AND BE NORMAL TO THE BRIDGE PROFILE GRADE IN THE LONGITUDINAL DIRECTION OF THE BRIDGE.

STAINLESS STEEL ANCHOR RODS SHALL BE ACCURATELY DRILLED AND GROUTED INTO THE CONCRETE TO PROVIDE CORRECT ALIGNMENT OF RAILING NORMAL TO GRADE.

STAINLESS STEEL ANCHOR RODS SHALL BE 3/4" DIA. FOR PEDESTRIAN RAILING AND 1/2" DIA. FOR BICYCLE RAILING, A193-12B GR. B7, BE FULLY THREADED WITH HEAVY HEX NUTS AND ONE HARDENED WASHER EACH. EMBED THREADED RODS 10" MIN. AT CONCRETE CURB AND 6" MIN. AT CONCRETE SEPARATION BARRIER. ANCHOR RODS, NUTS, AND WASHERS SHALL BE STAINLESS STEEL. POLYMER BONDING MATERIAL SYSTEM SHALL BE IN ACCORDANCE WITH MATERIALS I.M. 491.11, APPENDIX C. INSTALLED ANCHORS SHALL BE CAPABLE OF OBTAINING AN ULTIMATE LOAD PER THREADED ROD OF 8 KIPS IN TENSION FOR THE SPACING AND EDGE DISTANCE SHOWN IN THE PLANS.

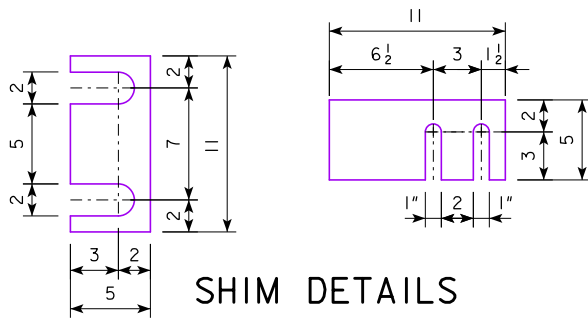
PROVIDE TWO SETS OF 1/16 INCH ALUMINUM SHIMS FOR EACH RAILING POST, TO BE USED AS REQUIRED. PROVIDE A 1/8 INCH THICK NEOPRENE SHEET BETWEEN CONCRETE AND SHIMS UNDER EACH RAIL POST BASE PLATE.

THE NEOPRENE SHEET SHALL MATCH THE LENGTH AND WIDTH OF THE POST BASE PLATE. THE NEOPRENE SHEETS ARE TO BE 50, 60, OR 70 DUROMETER HARDNESS AND SHALL MEET THE REQUIREMENTS OF IOWA DOT STANDARD SPECIFICATIONS SECTION 4195.02.

IMMEDIATELY FOLLOWING FABRICATION, PROTECT ALL ALUMINUM RAILING AND PANEL SURFACES FROM DAMAGE DURING SHIPPING, HANDLING, STORAGE AND INSTALLATION. PROTECTIVE MEASURES SHALL REMAIN IN PLACE UNTIL FINAL ASSEMBLY AND INSTALLATION. REPAIR OR REPLACEMENT OF DAMAGED COMPONENTS SHALL BE AT THE CONTRACTOR'S COST AND TO THE SATISFACTION OF THE ENGINEER AT NO ADDITIONAL COST TO THE PROJECT.

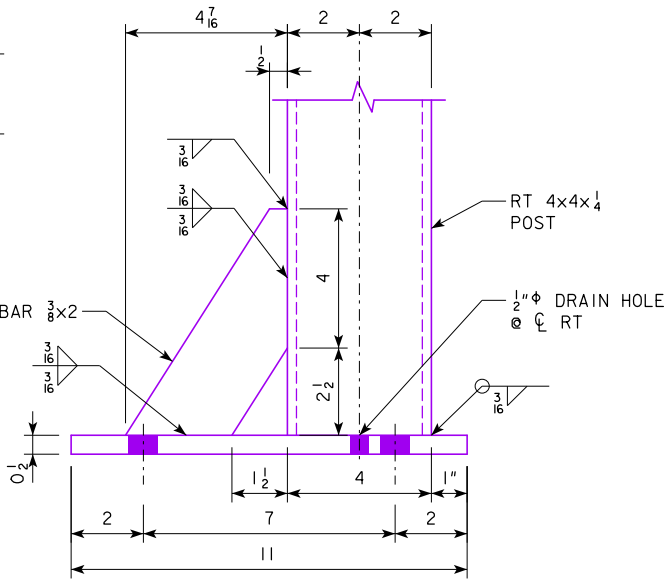
PROVIDE A RAILING MOCKUP FOR REVIEW AND APPROVAL PRIOR TO COMMENCING RAILING PRODUCTION. FOR THE PURPOSES OF THE MOCKUP, ONE "TYPE A" PEDESTRIAN RAILING PANEL ASSEMBLY WITH 3 POSTS, 2 INFILL PANELS, AND A TOP RAIL WILL BE REQUIRED.

ALUMINUM RAILING IS TO BE BID ON A LINEAL FOOT BASIS MEASURED FROM END TO END OF RAIL. PRICE BID FOR EACH RAILING TYPE SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL INCLUDING ANCHOR RODS AND SHIMS, AND ALL OF THE EQUIPMENT AND LABOR REQUIRED TO ERECT THE RAIL, POSTS, BASE PLATES, ANCHOR RODS, POST BACKING PLATES, SHIMS, AND NEOPRENE PADS IN ACCORDANCE WITH THESE PLANS AND CURRENT SPECIFICATIONS.



SHIM DETAILS

NOTE:
PROVIDE 2 SETS - 1/16" STAINLESS STEEL SHIMS FOR EACH BASE PLATE. USE AS REQUIRED.

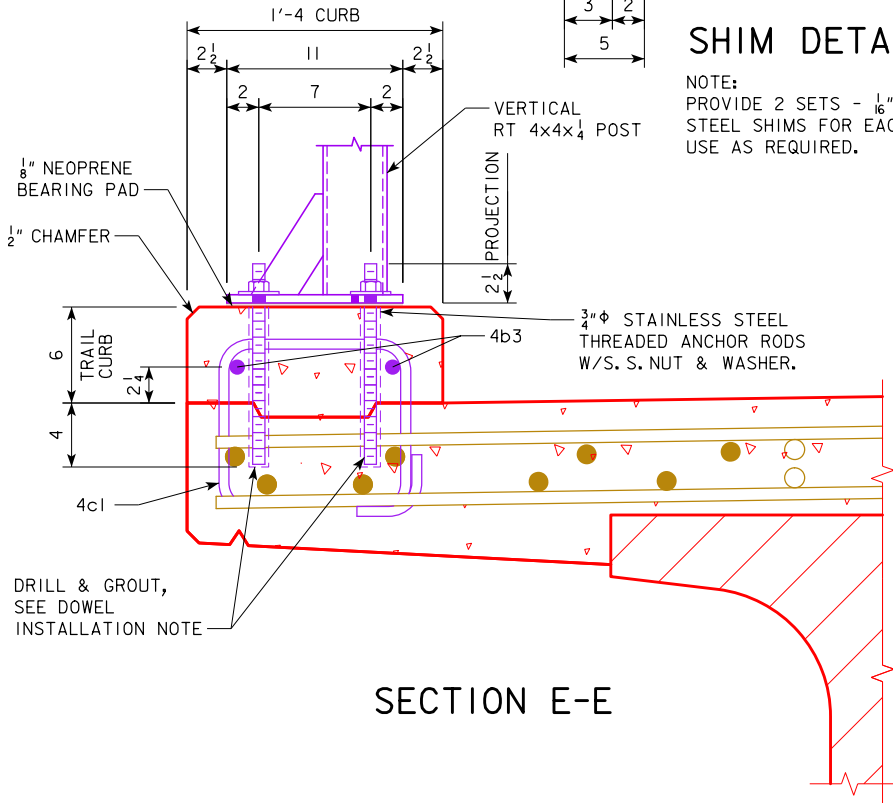


TYPICAL SIDE VIEW

DOWEL INSTALLATION NOTE:

THE ANCHOR RODS SHALL BE SET AS DOWELS IN DRILLED HOLES. HOLES ARE TO BE 10" DEEP AT PEDESTRIAN RAILING AND 6" DEEP AT BICYCLE RAILING. THE DOWELS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. THE FOLLOWING SYSTEM SHALL BE USED AS A BONDING AGENT FOR BOTH VERTICAL AND HORIZONTAL DOWELS:

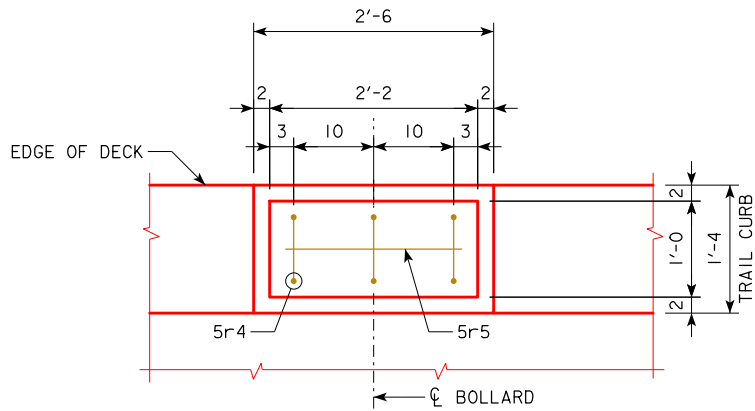
POLYMER GROUT SYSTEM SHALL BE IN ACCORDANCE WITH ARTICLE 2301.03, E, OF THE STANDARD SPECIFICATIONS.



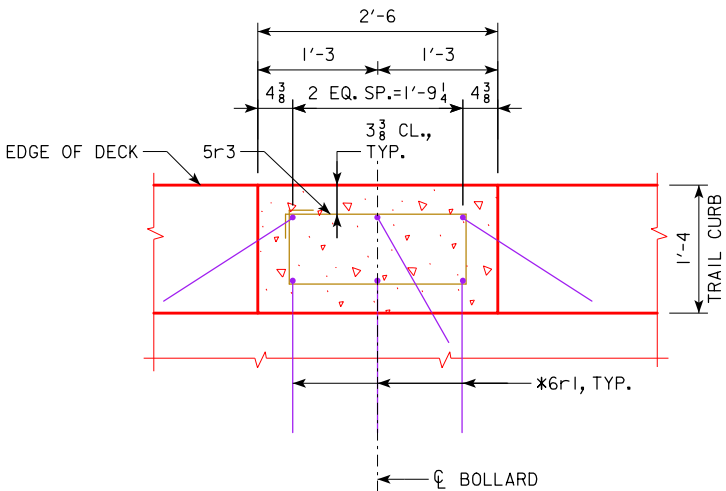
SECTION E-E

DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
ALUM. PEDESTRIAN RAILING DETAILS
STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 51 OF 59 FILE NO. 31286 DESIGN NO. 518

NOTE:
FOR LOCATIONS OF SECTIONS B-B THRU E-E, SEE DESIGN SHEET 50.

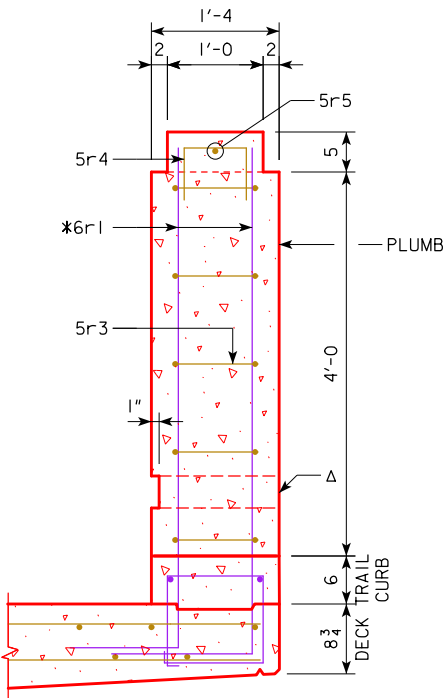


VIEW A-A



SECTION B-B
(LIGHT POLE BASE NOT SHOWN FOR CLARITY)

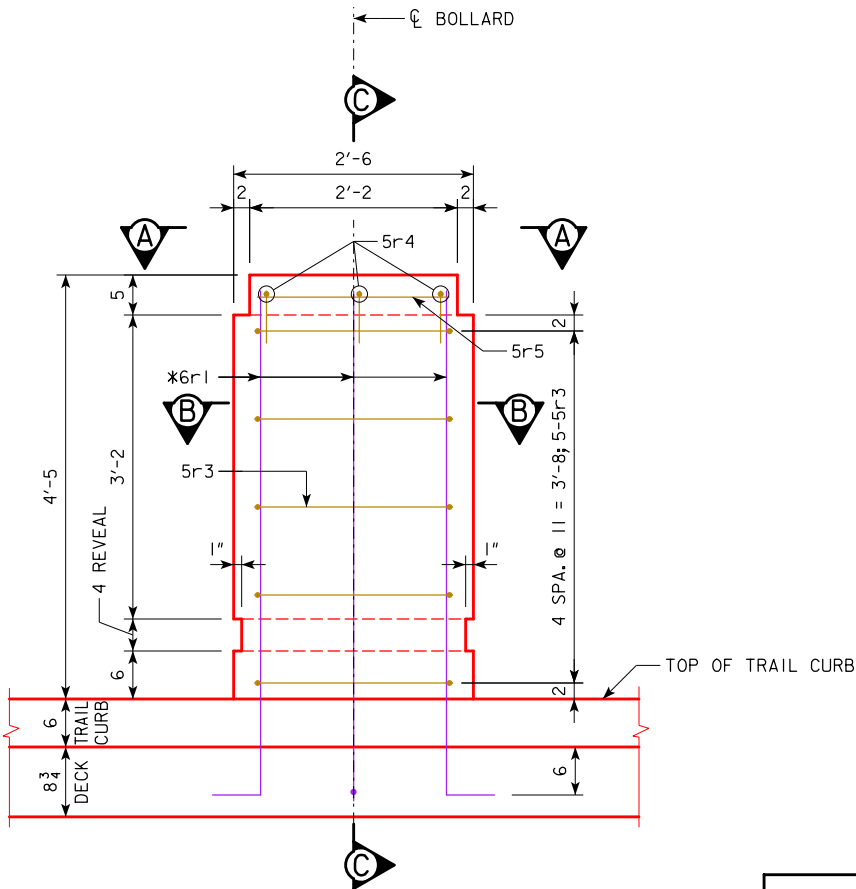
NOTE:
SEE DESIGN SHEET 50 FOR
LOCATIONS OF BOLLARDS.



Δ OMIT BOLLARD REVEAL AT WEST FACE
FOR LIGHT POLE BASE CONSTRUCTION

SECTION C-C

(LIGHT POLE BASE NOT SHOWN FOR CLARITY)



BOLLARD DETAIL

(LOOKING WEST)
(2 TOTAL)

NOTE:
*6r1 BOLLARD BARS TO BE
PLACED WITH BRIDGE DECK.

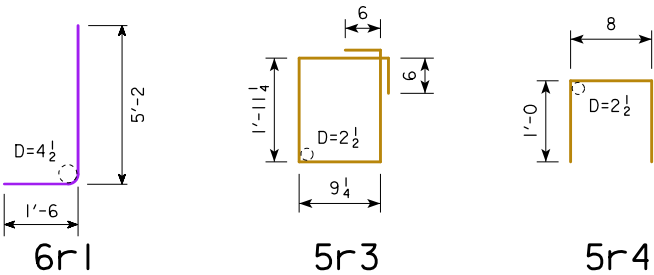
EPOXY REINF. STEEL - ONE BOLLARD

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5r3	BOLLARD HOOPS		5	6'-5	34
5r4	BOLLARD VERTICAL		3	2'-8	8
5r5	BOLLARD HORIZONTAL		1	1'-10	2
TOTAL (LBS.)					44

STAINLESS STEEL - ONE BOLLARD

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6r1	BOLLARD VERTICAL		6	6'-8	60
TOTAL (LBS.)					60

BENT BAR DETAILS



NOTE: ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

CONCRETE PLACEMENT SUMMARY - ONE BOLLARD

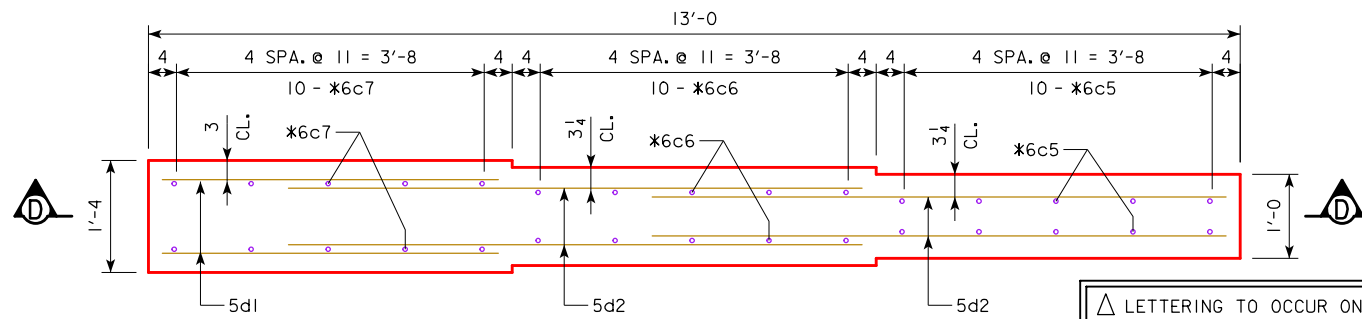
SECTION	TOTAL
ONE BOLLARD	0.5 CU .YD.

NOTE:
CONCRETE AND REINFORCING STEEL QUANTITIES ARE INCLUDED
ON THE SUMMARY QUANTITIES SHEET.

BOLLARD SHOULD BE CONSTRUCTED IN STAGE 2A OF BRIDGE
CONSTRUCTION.

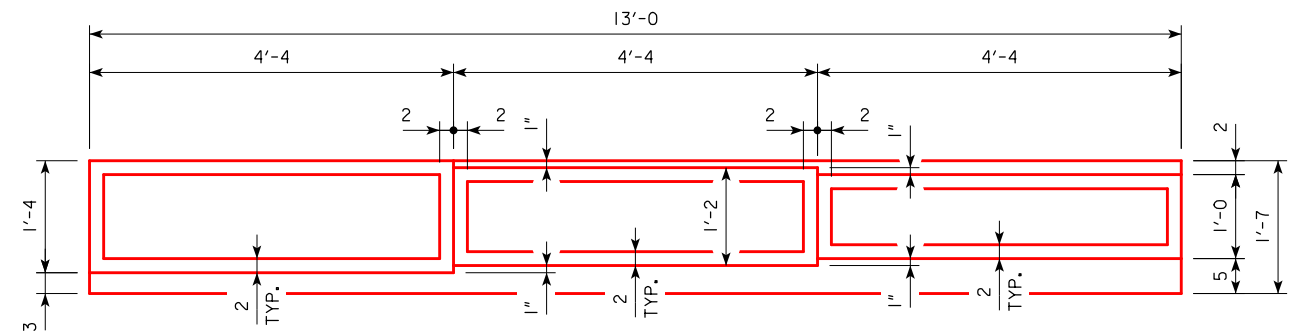
NOTE:
FOR LIGHT POLE BASE DETAILS, SEE DESIGN SHEET 55.

DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
CONCRETE BOLLARD DETAILS
STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 52 OF 59 FILE NO. 31286 DESIGN NO. 518

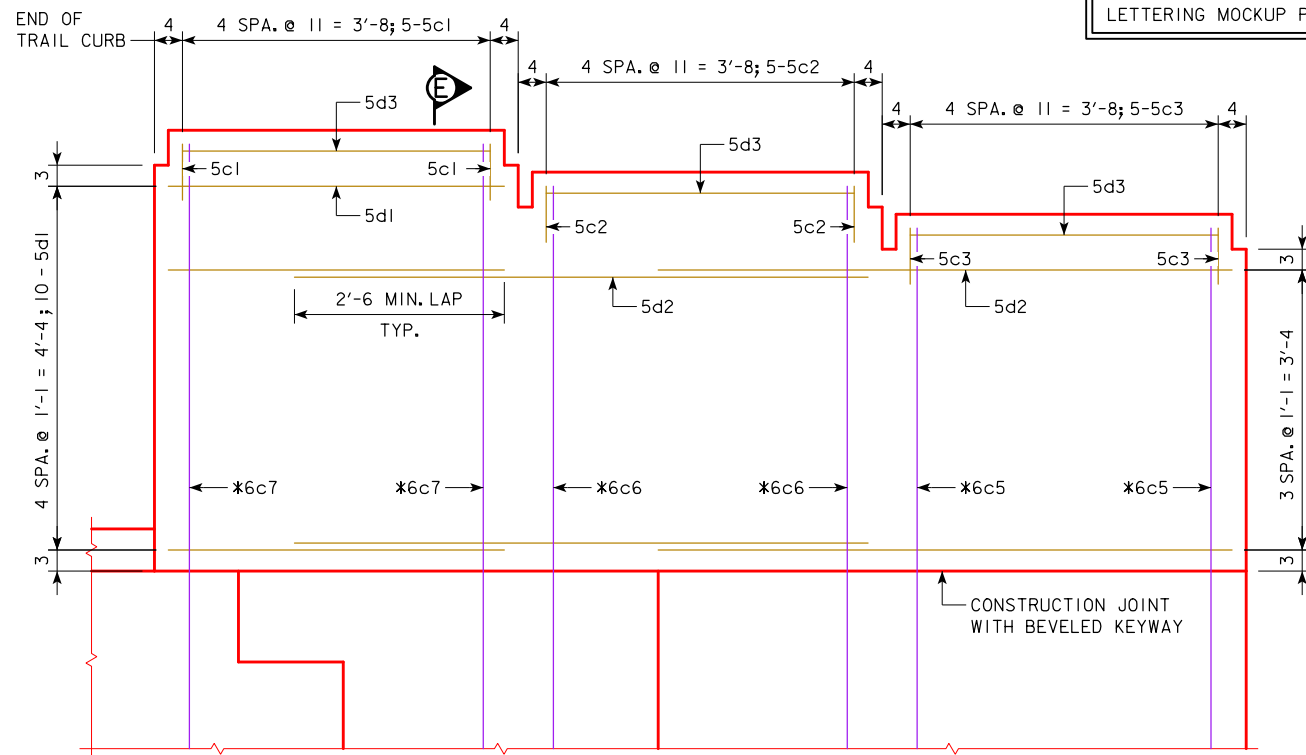


SECTION C-C

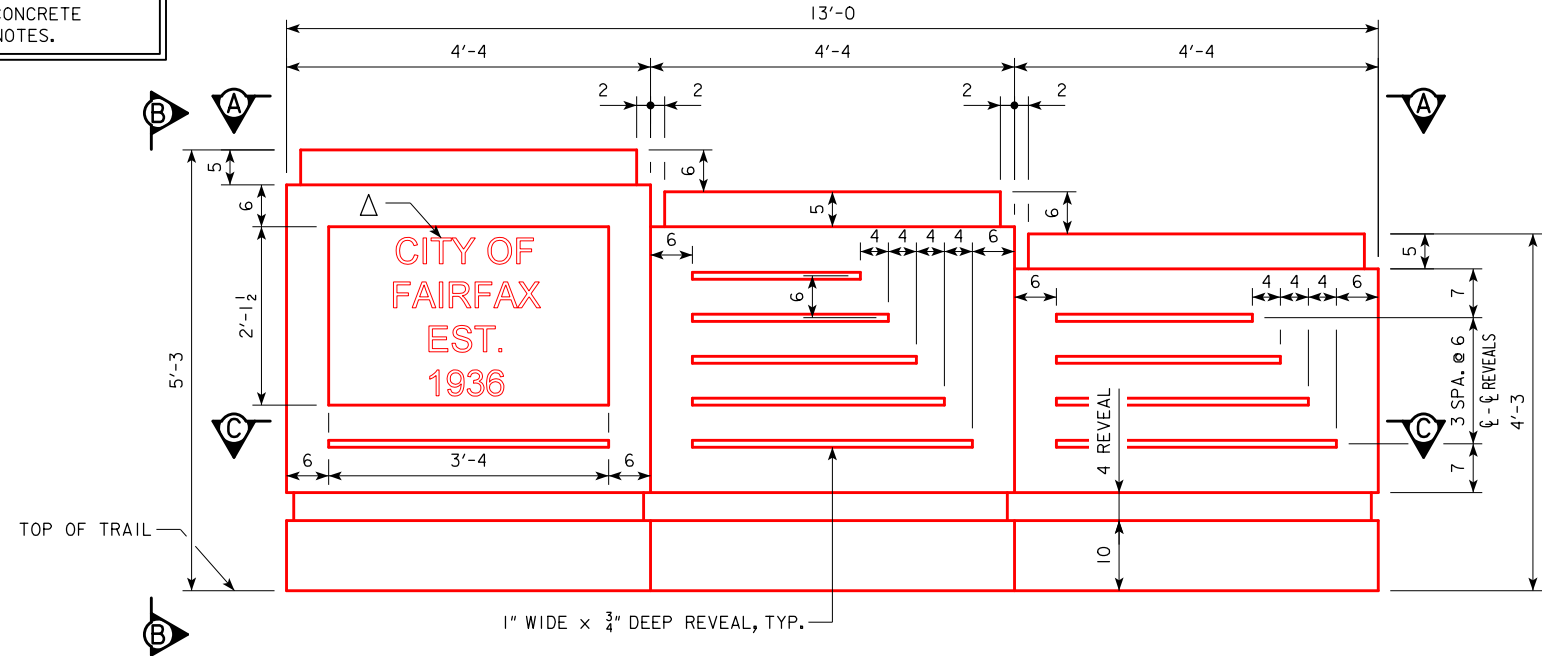
△ LETTERING TO OCCUR ONLY AT NORTH MONUMENT. 1" RECESS AT SOUTH MONUMENT. FONT TO BE ARIAL BOLD, 4" HIGH WITH 2⁵/₈" LINE SPACES, CENTERED WITHIN 1" RECESS; LETTERS TO PROJECT 1/2" FROM RECESS SURFACE. MOCKUP PANELS REQUIRED. REFER TO DESIGN SHEET 54 FOR CONCRETE LETTERING MOCKUP PANEL NOTES.



VIEW A-A

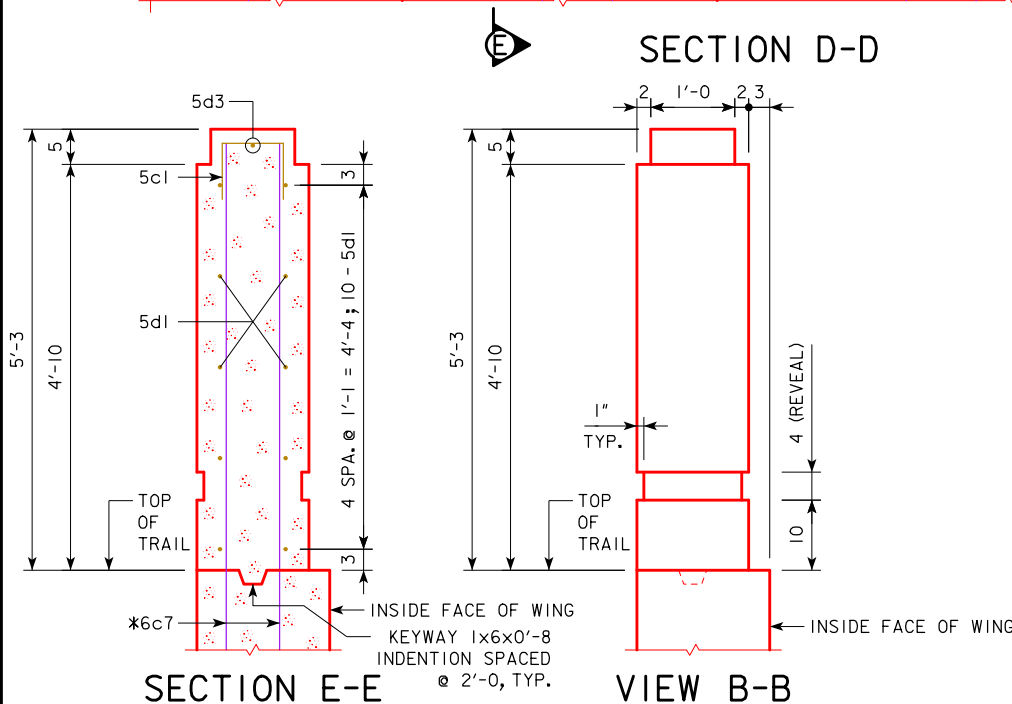


SECTION D-D



INTERIOR ELEVATION - CONCRETE MONUMENT

(NORTH MONUMENT SHOWN, SOUTH MONUMENT SIMILAR, NO LETTERING)
(LOOKING WEST)



SECTION E-E

VIEW B-B

EPOXY COATED REINF. STEEL - ONE MONUMENT

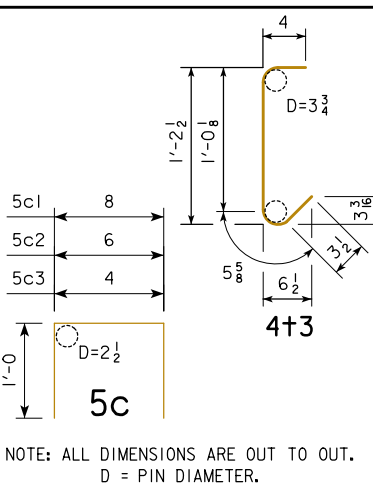
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5c1	VERTICAL	□	5	2'-8	14
5c2	VERTICAL	□	5	2'-6	13
5c3	VERTICAL	□	5	2'-4	12
5d1	HORIZONTAL	—	10	4'-0	42
5d2	HORIZONTAL	—	16	6'-10	114
5d3	HORIZONTAL	—	3	3'-8	11
6d4	HORIZONTAL	—	2	6'-8	20
4+3	RAIL, ABUT. WING BARS	—	30	2'-2	43
EPOXY REINF. TOTAL WEIGHT (LBS.)					269

STAINLESS STEEL REINF. STEEL - ONE MONUMENT

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6c5	VERTICAL, WING DOWELS	—	10	6'-4	95
6c6	VERTICAL, WING DOWELS	—	10	6'-10	103
6c7	VERTICAL, WING DOWELS	—	10	7'-4	110
STAINLESS STEEL TOTAL WEIGHT (LBS.)					308

NOTE: CONCRETE AND REINFORCING STEEL QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.

BENT BAR DETAILS



NOTE: ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

CONCRETE PLACEMENT SUMMARY

LOCATION	TOTAL
ONE CONCRETE MONUMENT	2.6 CU. YD.

MONUMENT SHOULD BE CONSTRUCTED IN STAGE 2A OF BRIDGE CONSTRUCTION.

NOTE: FOR NOTES OF CONCRETE RUSTICATION, CONCRETE COATING, AND MONUMENT CONCRETE, SEE DESIGN SHEET 54.

DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
CONCRETE MONUMENT DETAILS
STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 53 OF 59 FILE NO. 31286 DESIGN NO. 518

STRUCTURAL CONCRETE COATING NOTES:

THE SURFACES OF THE CONCRETE RAILING MONUMENTS AND RAILING BOLLARDS AS NOTED AND SHOWN IN THE PLANS SHALL BE FINISHED WITH MINERAL SILICATE PAINT.THE COATING USED SHALL BE CERTIFIED TO ALLOW WATER VAPOR TRANSMISSION IN ACCORDANCE WITH ASTM E96 OR ASTM D1653.

THE MINERAL SILICATE PAINT SHALL BE ONE OF THE FOLLOWING LISTED PRODUCTS:

- 1. KEIM MINERAL COATINGS OF AMERICA: CONCRETAL MINERAL COATING
- 2. EDISON COATINGS, INC.: EVERKOTE 300 MINERAL COATING
- 3. CATHEDRAL STONE PRODUCTS: MASONRE MINERAL COATING
- 4. APPROVED EQUAL; SUBMIT PRODUCT INFORMATION TO THE IOWA DOT, OFFICE OF BRIDGES AND STRUCTURES, AMES, IA 50010. DO NOT ORDER MATERIALS PRIOR TO RECEIVING APPROVAL FOR USE ON THE PROJECT.

PRIOR TO BEGINNING PRODUCTION PAINTING, DEMONSTRATE SURFACE PREPARATION METHODS AND PAINT APPLICATION ON THE CONCRETE LETTERING MOCKUP PANEL LOCATED AT THE BRIDGE SITE. NO PRODUCTION CONCRETE PAINTING MAY BEGIN UNTIL FINAL APPROVAL OF PAINTING RESULTS ON THE MOCKUP. APPROVED MOCKUP SHALL REMAIN IN PLACE NEAR THE BRIDGE FOR COMPARISON TO PRODUCTION PAINTING UNTIL WORK IS COMPLETED.

PRIOR TO CONCRETE COATING APPLICATION, PREPARE SURFACES IN ACCORDANCE WITH THE "DEVELOPMENTAL SPECIFICATIONS FOR CONCRETE SURFACE PREPARATION AND TESTING PRIOR TO COATING APPLICATION". APPLY MINERAL SILICATE PAINT IN ACCORDANCE WITH THE "DEVELOPMENTAL SPECIFICATIONS FOR STRUCTURAL CONCRETE COATING".

THERE ARE TWO DIFFERENT COLORS OF CONCRETE COATING TO BE USED ON THE BRIDGE. SEE DETAILS ON THIS DESIGN SHEET FOR SPECIFIC COLOR LOCATIONS AND LIMITS. "COLOR NO. 1" SHALL BE A LIGHT CREAM COLOR MATCHING SAE-AMS-STD-595 COLOR NUMBER 36642. "COLOR NO. 2" SHALL BE A DARK RED-BROWN COLOR MATCHING SAE-AMS-STD-595 COLOR NUMBER 30160. SUBMIT COATING PRODUCT DOCUMENTATION AND COLOR SAMPLES IN ACCORDANCE WITH THE "DEVELOPMENTAL SPECIFICATIONS FOR STRUCTURAL CONCRETE COATING".

AFTER ALL CONCRETE COATING WORK IS COMPLETED, DELIVER THE MOCKUP PANEL TO A SITE WITHIN THE CITY LIMITS OF FAIRFAX (480 FRONT STREET, OR AS DIRECTED BY THE ENGINEER).

COATED SURFACE AREA TABULATION (SY):

COLOR NO. 1:
MONUMENTS 32.1 SY
BOLLARDS 7.5 SY

COLOR NO. 2:
MONUMENTS 3.5 SY
BOLLARDS 0.5 SY

TOTAL 43.6 SY

ALL COSTS ASSOCIATED WITH SURFACE PREPARATION AND APPLICATION OF MINERAL SILICATE PAINT ARE TO BE INCLUDED IN THE BID ITEM "STRUCTURAL CONCRETE COATING".

RAILING MONUMENT CONCRETE NOTES:

SELF-CONSOLIDATING CONCRETE (SCC) WILL BE ALLOWED FOR USE AT THE RAILING MONUMENTS AT NO ADDITIONAL COST TO THE PROJECT. THE CONTRACTOR SHALL SUBMIT A PROPOSAL TO USE SCC TO THE ENGINEER FOR APPROVAL. PROPOSAL SHALL BE IN ACCORDANCE WITH MATERIALS I.M. 528 AND I.M. 529. THE SCC MIX DESIGN SHALL BE SUBMITTED TO AND APPROVED BY THE IOWA DOT PRIOR TO THE USE OF SCC.

CONCRETE LETTERING MOCKUP PANEL NOTES:

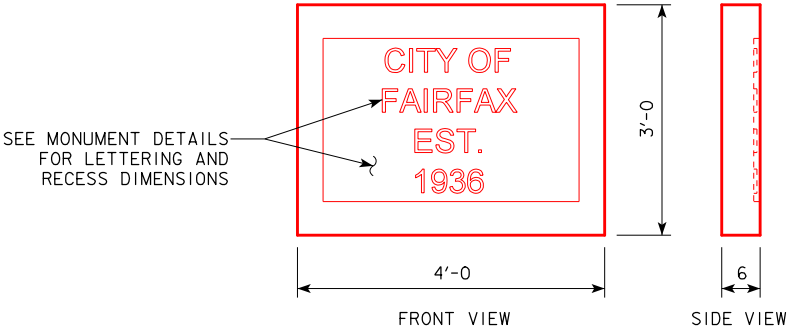
PRIOR TO BEGINNING ANY PRODUCTION CONCRETE WORK ON THE RAILING MONUMENT THAT INCLUDES RAISED LETTERING, A CONCRETE MOCKUP PANEL MUST BE REVIEWED AND APPROVED BY THE ENGINEER.

CONSTRUCT A 3-FOOT HIGH, BY 4-FOOT WIDE, BY 6-INCH DEEP MOCKUP PANEL IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND THESE PLANS. INCLUDE THE 2'-1 1/2" TALL BY 3'-4" WIDE BY 1" DEEP RECESS WITH THE RAISED LETTERING AS DETAILED IN THESE PLANS. CENTER THE RECESS AND LETTERING IN THE FACE OF THE MOCKUP PANEL.

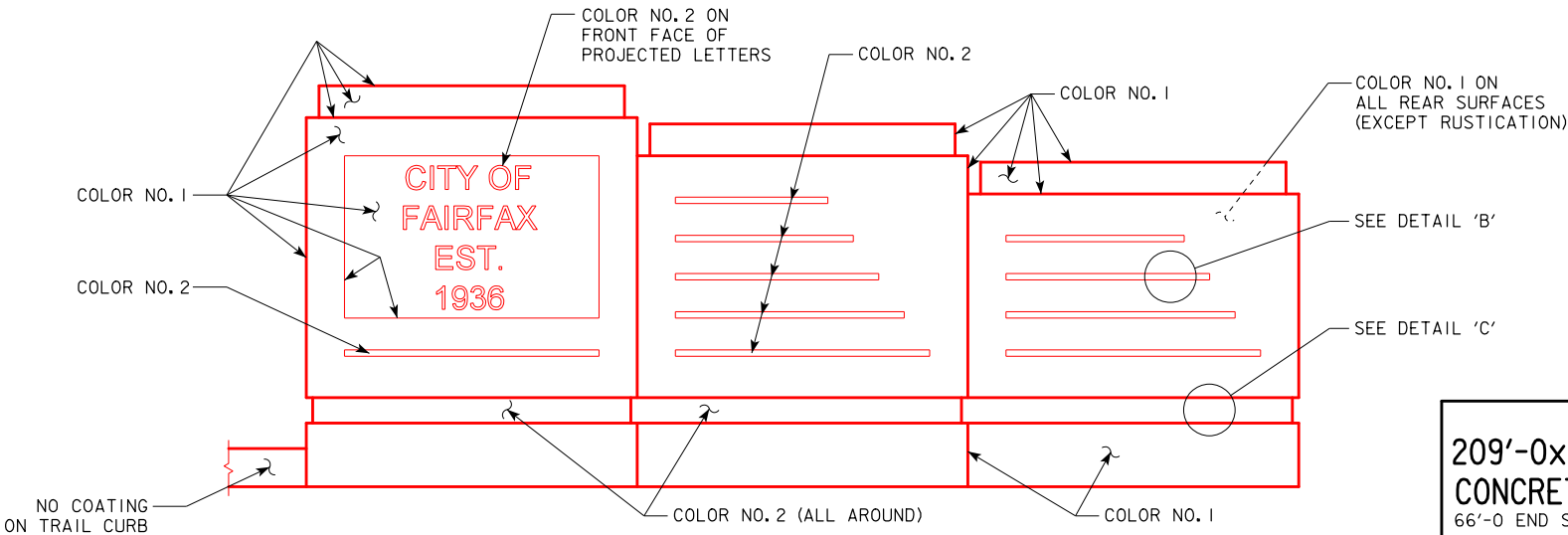
CAST THE MOCKUP PANEL ON SITE USING THE SAME FORMING METHODS, PROCEDURES, FORM INSERTS, AND CONCRETE MIXTURE AS ARE PROPOSED FOR THE PRODUCTION WORK. RECESSED AND LETTERED FACES SHALL BE VERTICAL DURING THE CASTING PROCESS. A SINGLE MAT OF NO. 5 REINFORCING BARS IN TWO DIRECTIONS SHALL BE SET 2 INCHES CLEAR TO THE RECESSED SURFACE. IF THE MOCKUP PANEL IS REJECTED, CONSTRUCT A NEW MOCKUP PANEL AS DIRECTED BY THE ENGINEER. BEGIN ASSOCIATED CONCRETE PRODUCTION WORK ONLY AFTER THE MOCKUP HAS BEEN APPROVED BY THE ENGINEER.

AFTER CURING FOR A MINIMUM OF 28 DAYS, THE MOCKUP PANEL SHALL ALSO BE USED TO DEMONSTRATE THE STRUCTURAL CONCRETE COATING APPLICATION. SEE DETAILS AND NOTES ELSEWHERE IN THESE PLANS FOR FURTHER INFORMATION.

ALL COSTS ASSOCIATED WITH THE CONCRETE LETTERING MOCKUP PANEL(S) SHALL BE INCLUDED IN THE PRICE BID FOR "HIGH PERFORMANCE STRUCTURAL CONCRETE".



MOCKUP PANEL DETAILS



INTERIOR ELEVATION - CONCRETE MONUMENT

(NORTH MONUMENT SHOWN - SOUTH MONUMENT SIMILAR, NO LETTERING)

CONCRETE RUSTICATION NOTES:

STRIPS AND PANELS USED AS INSERTS WITHIN CONCRETE FORMS TO CREATE THE RUSTICATION FEATURES MAY BE MADE OF WOOD, STEEL, NYLON, 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.

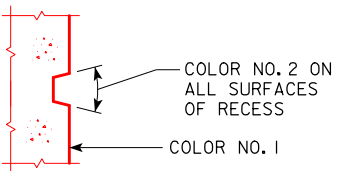
RUSTICATION INSERTS SHALL EASILY ATTACH TO FORMS AND SHALL NOT ALLOW LEAKAGE OF CONCRETE BETWEEN THE FORM AND THE INSERT. WHEN STEEL FORMS ARE USED, RUSTICATION STRIPS MAY BE RIGIDLY ATTACHED TO THE INSIDE SURFACES OF THE FORMS. WHEN STEEL FORMS ARE NOT USED, RUSTICATION STRIPS AND OTHER INSERTS FOR 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 RUSTICATION'S.

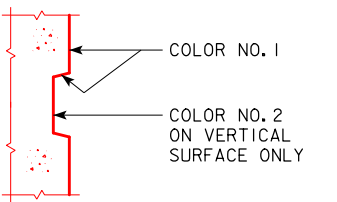
FOR RUSTICATION FEATURES FOLLOWING THE PERIMETER OF ROUNDED SURFACES, IT MAY BE NECESSARY TO USE MULTIPLE LAYERS OF INSERT MATERIAL IN ORDER TO ACHIEVE THE RADIUS CURVE. THIS IS ACCEPTABLE, PROVIDED THAT THE FINAL SHAPE, LINE, DEPTH, AND DIMENSION OF THE FEATURES ARE MAINTAINED IN THE FINAL RESULT.

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 STANDARD SPECIFICATIONS. IF SURFACES WILL NOT RECEIVE A 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.

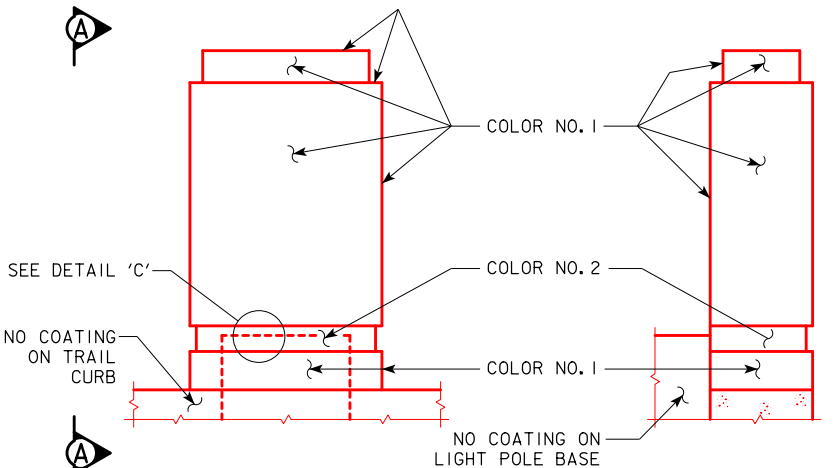
ALL COSTS ASSOCIATED WITH CONCRETE RUSTICATION ARE TO BE INCLUDED IN THE BID ITEM "HIGH PERFORMANCE STRUCTURAL CONCRETE".



DETAIL 'B'



DETAIL 'C'



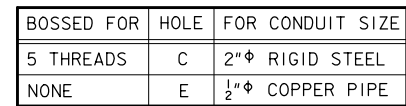
BOLLARD ELEVATION

VIEW A-A

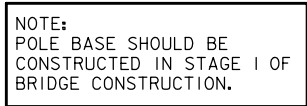
STRUCTURAL CONCRETE COATING DETAILS

DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
AESTHETIC MISC. DETAILS
STA. 867+41.69 (C US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 54 OF 59 FILE NO. 31286 DESIGN NO. 518

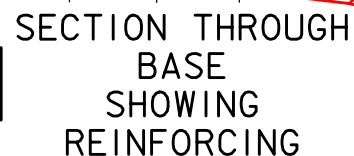
REVISED 09-14 - ADD STAINLESS STEEL NOTE TO THE LIGHTING NOTES.
REVISED 09-2016 - ADDED STANDARD SPECIFICATIONS 4185.02B₂ IN LIGHTING NOTES.
ENGLISHCHECKRAILBRIDGES.DGN 1030ASI - THIS SHEET REDRAWN 9-8-88



LI-104 JUNCTION BOX
WATERTIGHT, CAST IRON - FLUSH MOUNT



NOTE:
*POLE BASE BARS TO BE PLACED
WITH BRIDGE DECK.



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 $\frac{1}{4}$ ". 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 BID ITEM "CONCRETE BARRIER RAILING".

COST OF FURNISHING AND INSTALLING POLES, LIGHTS, AND LIGHTING CONDUCTOR IS NOT A PART OF THIS CONTRACT.

ALL ANCHOR BOLT MATERIAL SHALL COMPLY WITH THE REQUIREMENTS OF IOWA DOT MATERIALS I.M. 453.08 AND STANDARD SPECIFICATIONS 4185.02,B,2.

WELDING OF ANCHOR BOLTS SHALL NOT BE ALLOWED. THE CONTRACTOR SHALL HAVE A TEMPLATE FROM THE MANUFACTURER / FABRICATOR FOR PROPER PLACEMENT OF THE ANCHOR BOLTS.

ALL REINFORCING STEEL IS TO BE EPOXY COATED AND GRADE 60.

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.

NOTE: ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

NOTE: FOR LOCATION OF CONDUITS SEE LIGHTING LAYOUT DETAILS IN THESE PLANS. LIGHTING QUANTITIES FOR CONCRETE AND REINFORCING STEEL FOR POLE BASES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.

209'-0"x46'-0 PRETENSIONED PRESTRESSED
 CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
 66'-0 END SPANS 77'-0 INTERIOR SPAN

CONDUIT DETAILS

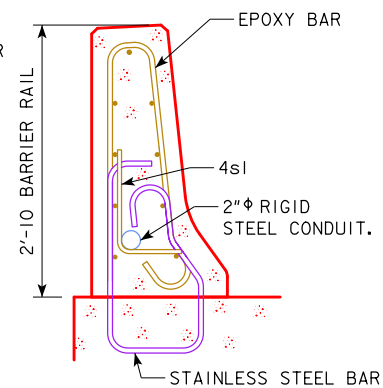
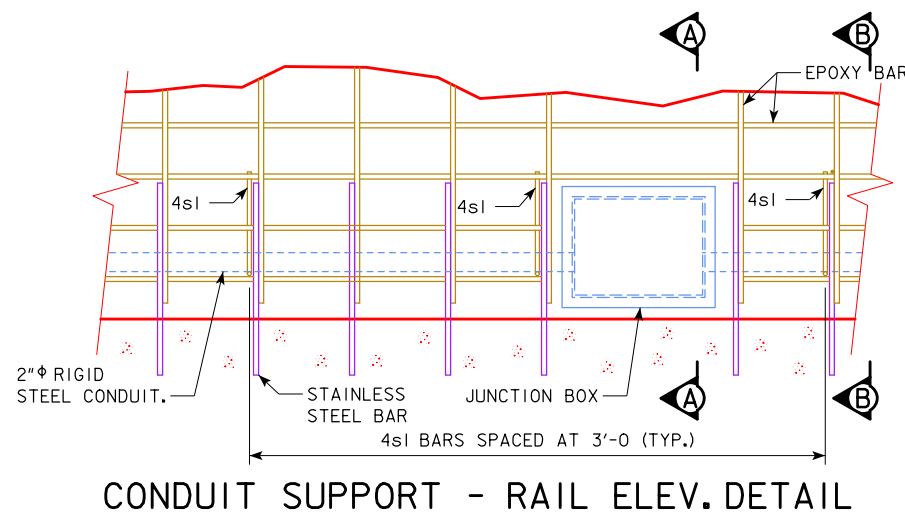
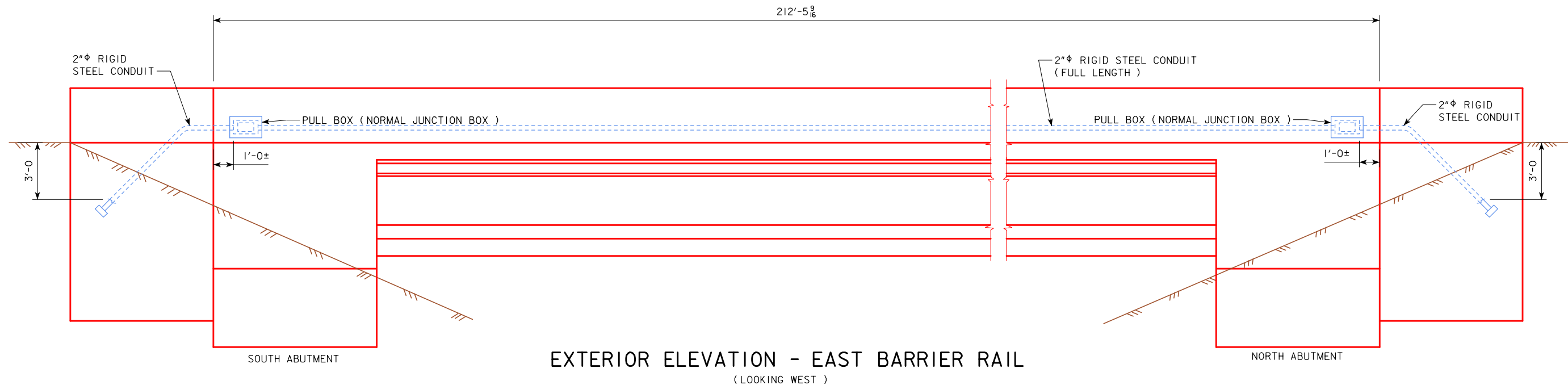
STA. 867+41.69 (C US 151) SEPTEMBER 2018

LINN COUNTY

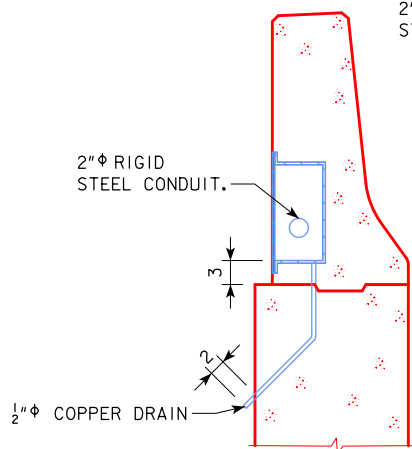
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 55 OF 59 FILE NO. 31286 DESIGN NO. 518

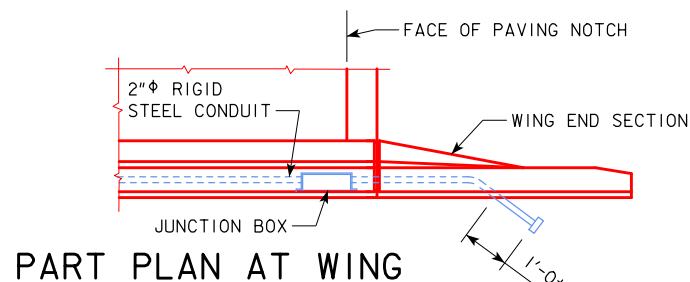
REVISION 05-11 - ADDED THE WORD 'MINIMUM' TO THE 3 1/2 INCH DIMENSION FOR THE LOCATION OF THE 2 INCH CONDUIT IN THE BARRIER RAIL.
REVISED 09-2016 - ADDED CONDUIT SUPPORT RAIL DETAIL TO KEEP CONDUIT ISOLATED FROM THE STAINLESS STEEL REINFORCING.
ENGLISHDECKRAILBRIDGES.DGN 1030AS2 - THIS SHEET ISSUED 09-03.



SECTION B-B - CONDUIT SUPPORT
4s1 BARS USE 3'-0 SPACING. GALVANIZED CONDUIT
SHALL NOT COME INTO CONTACT WITH THE STAINLESS STEEL REINFORCING.
(75 REQUIRED)



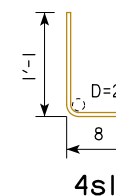
SECTION A-A
THRU JUNCTION BOX



PART PLAN AT WING

EPOXY REINFORCING STEEL - ONE RAIL

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4s1	RAIL CONDUIT-EAST BARRIER		75	1'-9	88
TOTAL WEIGHT (LBS.)					88

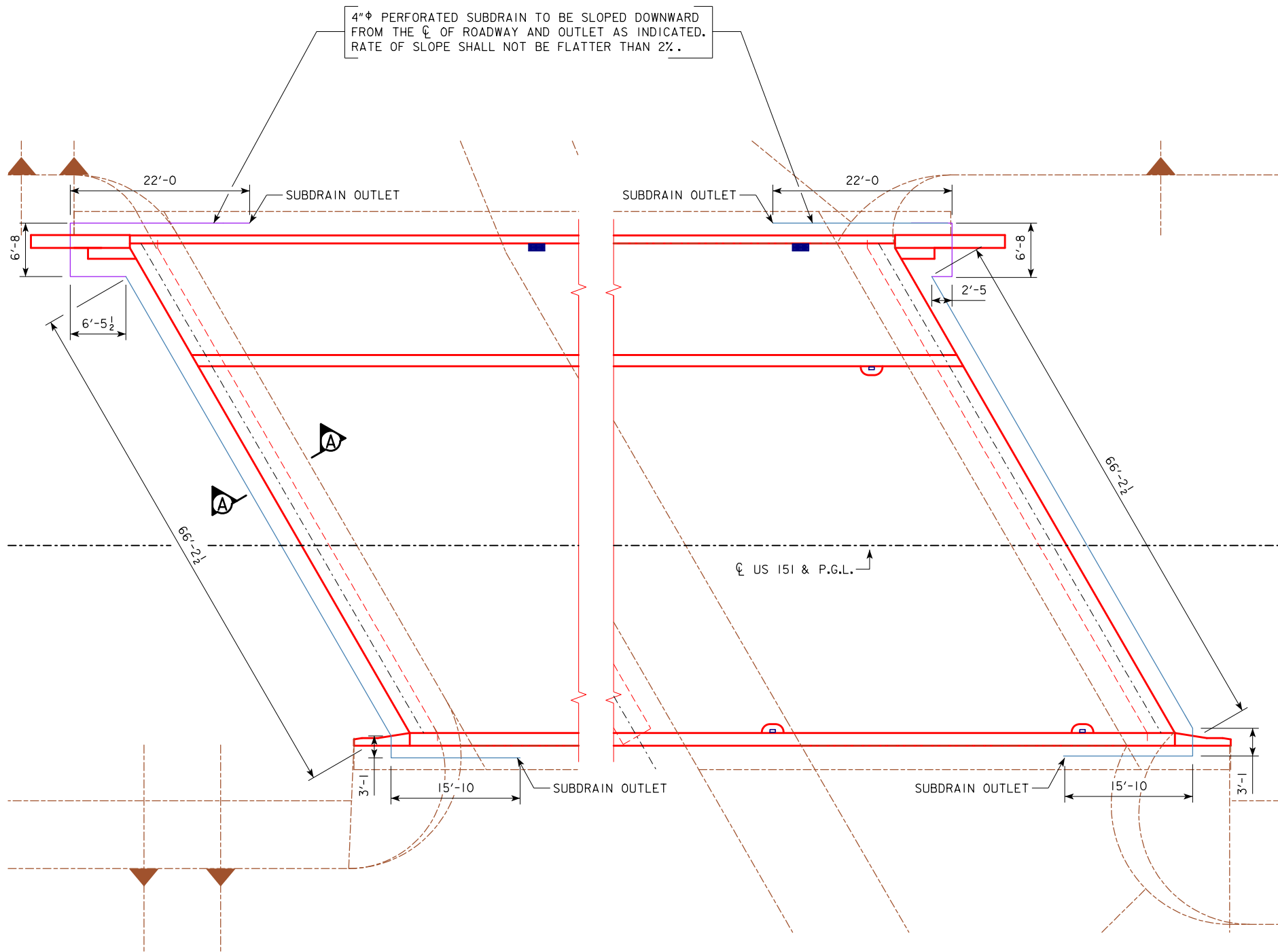


NOTE: ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

NOTE:
REINFORCING STEEL QUANTITIES ARE INCLUDED
ON THE SUMMARY QUANTITIES SHEET.

FOR LIGHTING NOTES AND JUNCTION BOX DETAILS,
SEE DESIGN SHEET 55.

DESIGN FOR 30° SKEW (R.A.)
**209'-0x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL**
66'-0 END SPANS 77'-0 INTERIOR SPAN
CONDUIT DETAILS
STA. 867+41.69 (C US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
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SITUATION PLAN
SHOWING SUBDRAIN LOCATIONS



SUBDRAIN NOTES :

THIS PLAN SHEET SHOWS DETAILS FOR PLACING ALL SUBDRAINS AND SUBDRAIN OUTLETS REQUIRED FOR THIS STRUCTURE.

THE SUBDRAINS SHALL BE 4" IN DIAMETER 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 BACK FILL FLOODING PROCESS. IF A METAL OUTLET PIPE IS USED, IT SHALL BE 6 INCHES IN DIAMETER AND COUPLED TO THE 4 INCH DIAMETER SUBDRAIN IN ONE OF THE TWO FOLLOWING WAYS.

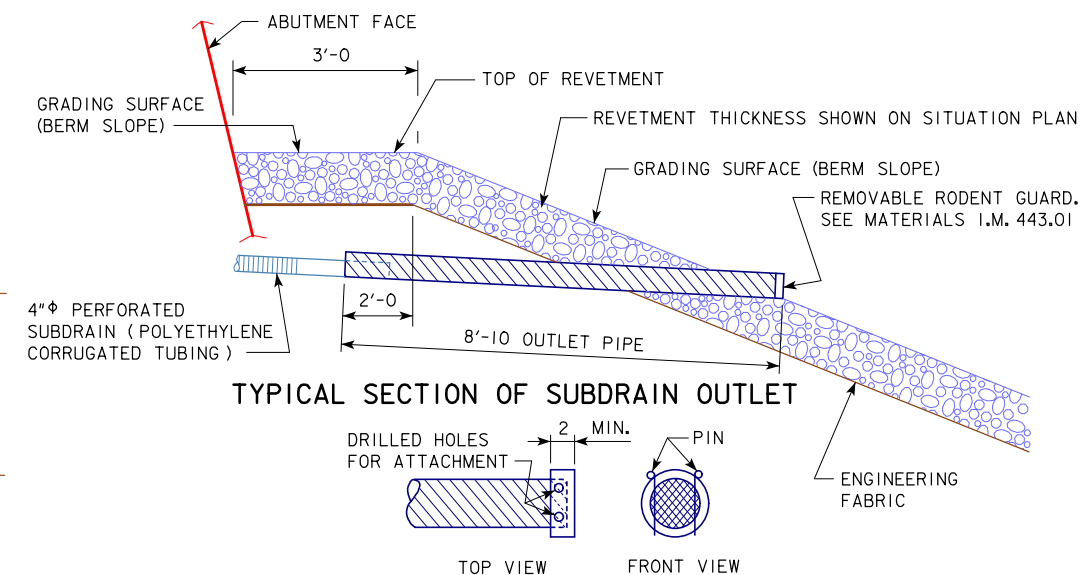
1. USE AN INSIDE FIT REDUCER COUPLER (COUPLER MUST BE INSERTED A MINIMUM OF 1'-0 INTO THE METAL OUTLET PIPE).
2. INSERT 1'-0 OF THE 4" SUBDRAIN INTO THE 6" METAL OUTLET PIPE, THEN FULLY SEAL THE ENTIRE OPENING WITH GROUT.

THE COST OF FURNISHING AND PLACING SUBDRAIN (INCLUDING EXCAVATION), GRANULAR BACK FILL, POROUS BACK FILL, AND SUBDRAIN OUTLET IS TO BE INCLUDED IN THE PRICE BID FOR "STRUCTURAL CONCRETE (BRIDGE)". NO EXTRA PAYMENT WILL BE MADE.

THE DIMENSIONS SHOWN FOR THE PROPOSED SUBDRAINS ARE BASED ON THE PROPOSED GRADING LAYOUT OF BRIDGE BERMS. THE DIMENSIONS SHOWN ARE FOR ESTIMATING ONLY. REQUIRED LENGTHS AND GENERAL LOCATIONS OF SUBDRAINS ARE SUBJECT TO CHANGE DUE TO FIELD ADJUSTMENTS OF THE GRADING LAYOUT.

SUBDRAIN OUTLET ELEVATIONS

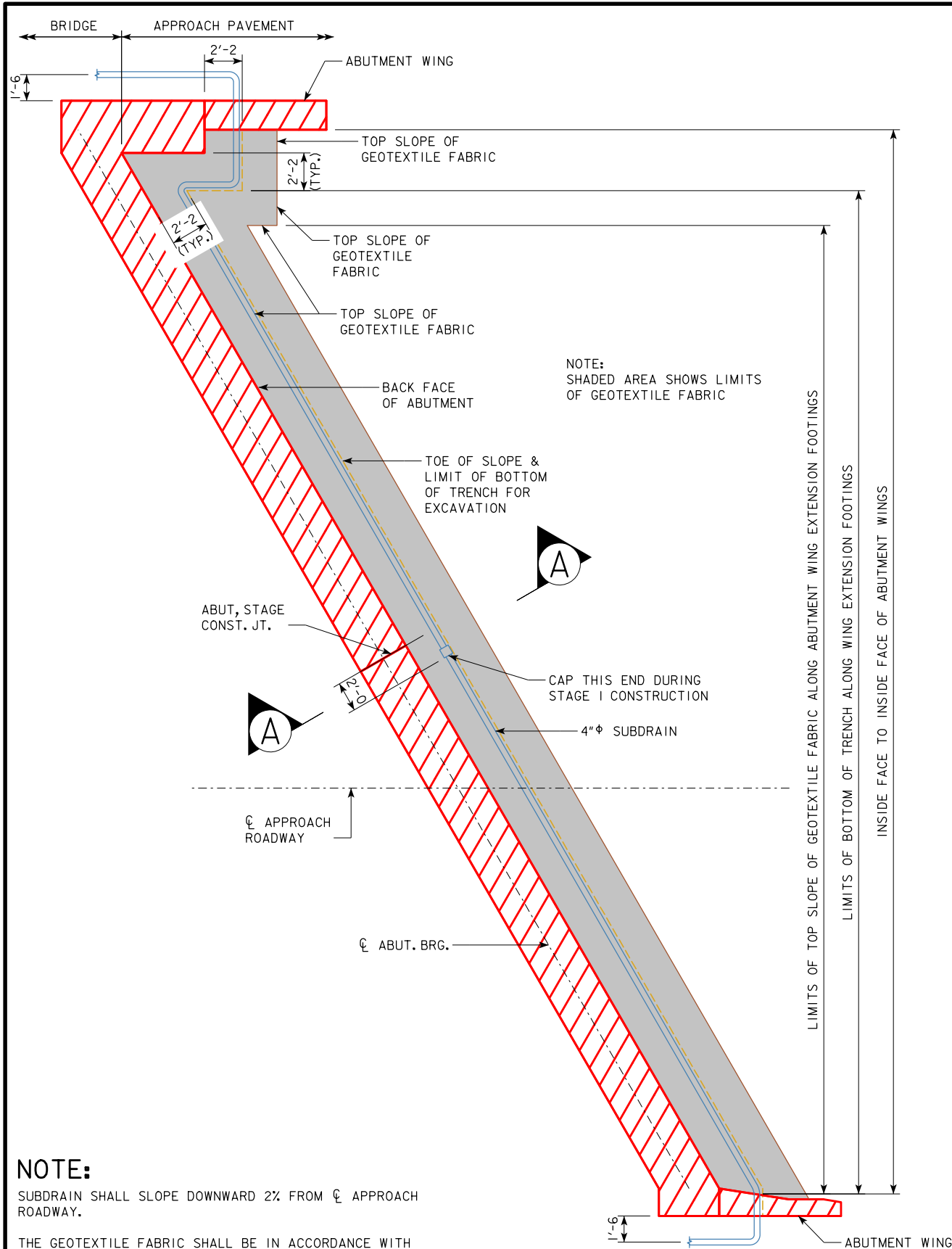
LOCATION	ELEVATION
SOUTHWEST ABUTMENT	±753.62
SOUTHEAST ABUTMENT	±753.74
NORTHWEST ABUTMENT	±752.56
NORTHEAST ABUTMENT	±752.68



TYPICAL SECTION OF SUBDRAIN OUTLET
REMOVABLE RODENT GUARD DETAILS
REVETMENT STONE (EMBEDDED) OUTLET DETAILS

NOTE:
SECTION A-A IS SHOWN ON ABUTMENT
BACK FILL DETAILS SHEET.

DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
SUBDRAIN DETAILS
STA. 867+41.69 (CL US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 57 OF 59 FILE NO. 31286 DESIGN NO. 518



NOTE:
SUBDRAIN SHALL SLOPE DOWNWARD 2% FROM ϕ APPROACH ROADWAY.

THE GEOTEXTILE FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 6 OF THE STANDARD SPECIFICATIONS. IF THE ENGINEERING FABRIC IS LAPPED THE LAPS SHALL BE A MINIMUM OF ONE FOOT IN LENGTH, SHINGLE FASHION WITH UP SLOPE LAP PIECE ON TOP AND STAPLED FOR CONTINUITY.

ABUTMENT PLAN

ABUTMENT BACK FILL 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 BACK FILL 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 BACK WALL, ABUTMENT WING WALLS, AND EXCAVATION FACE TO A HEIGHT THAT WILL BE APPROXIMATELY 1 TO 2 FEET HIGHER THAN THE HEIGHT OF THE POROUS BACK FILL PLACEMENT AS SHOWN IN THE "BACK FILL DETAILS" ON THIS SHEET. THE STRIPS OF THE FABRIC PLACED SHALL OVERLAP APPROXIMATELY 1 FOOT AND SHALL BE PINNED IN PLACE. THE FABRIC SHALL BE ATTACHED TO THE ABUTMENT BY USING LATH FOLDED IN THE FABRIC AND SECURED TO THE CONCRETE WITH SHALLOW CONCRETE NAILS. THE FABRIC PLACED AGAINST THE EXCAVATION FACE SHALL BE PINNED.

WHEN THE FABRIC IS IN PLACE, THE SUBDRAIN SHALL BE INSTALLED DIRECTLY ON THE FABRIC AT THE TOE OF THE REAR EXCAVATION SLOPE. A SLOT WILL NEED TO BE CUT IN THE FABRIC AT THE POINT WHERE THE SUBDRAIN EXITS THE FABRIC NEAR THE END OF THE ABUTMENT WING WALL.

POROUS BACK FILL IS THEN PLACED AND LEVELED, NO COMPACTION IS REQUIRED.

ABUTMENT BACK FILL PROCESS < CONT. >:

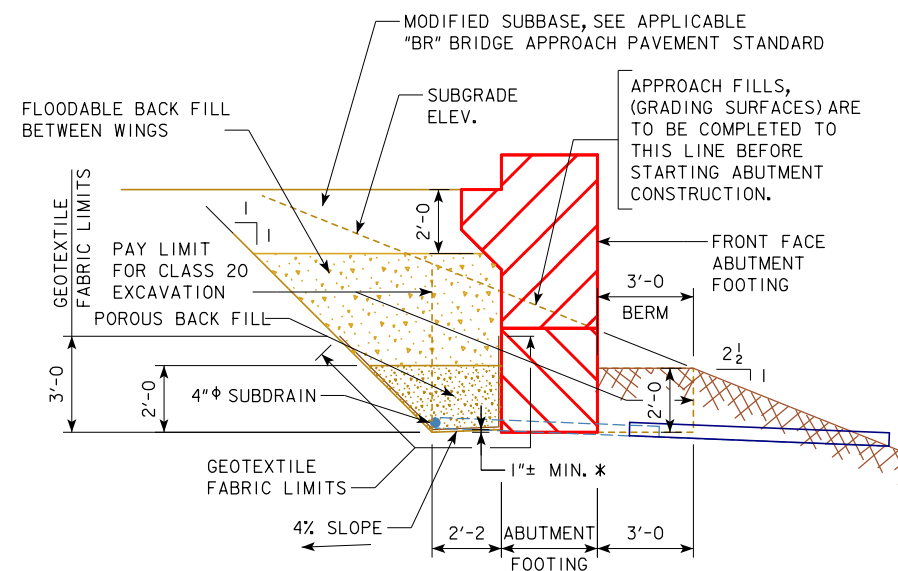
THE REMAINING WORK INVOLVES BACK FILLING WITH FLOODABLE BACK FILL, SURFACE FLOODING, AND VIBRATORY COMPACTION. THE FLOODABLE BACK FILL MATERIAL SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. THE FLOODABLE BACK FILL SHALL BE PLACED IN INDIVIDUAL LIFTS, SURFACE FLOODED, AND COMPACTED WITH VIBRATORY COMPACTION TO ENSURE FULL CONSOLIDATION. LIMIT THE LOOSE LIFTS TO NO MORE THAN 2 FEET OF THICKNESS.

START SURFACE FLOODING FOR EACH FLOODABLE BACK FILL LIFT AT THE HIGH POINT OF THE SUBDRAIN AND PROGRESS TO THE LOW POINT WHERE THE SUBDRAIN EXITS THE FABRIC. TO ENSURE UNIFORM SURFACE FLOODING, WATER RUNNING FULL IN A 2-INCH DIAMETER HOSE SHOULD BE SPRAYED IN SUCCESSIVE 6-FOOT TO 8-FOOT INCREMENTS FOR 5 MINUTES WITHIN EACH INCREMENT.

FLOODABLE BACK FILL LIFT PLACEMENT, FLOODING, AND COMPACTION SHALL PROGRESS UNTIL THE REQUIRED FULL THICKNESS OF THE ABUTMENT BACK FILL HAS BEEN COMPLETED.

WATER REQUIRED FOR FLOODING, SUBDRAINS, POROUS BACK FILL, FLOODABLE BACK FILL, AND GEOTEXTILE FABRIC FURNISHED AT THE BRIDGE ABUTMENTS WILL NOT BE MEASURED SEPARATELY FOR PAYMENT.

THE COST OF WATER REQUIRED FOR FLOODING, SUBDRAINS, POROUS BACK FILL, FLOODABLE BACK FILL, AND GEOTEXTILE FABRIC FURNISHED AT THE BRIDGE ABUTMENTS SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID FOR STRUCTURAL CONCRETE.



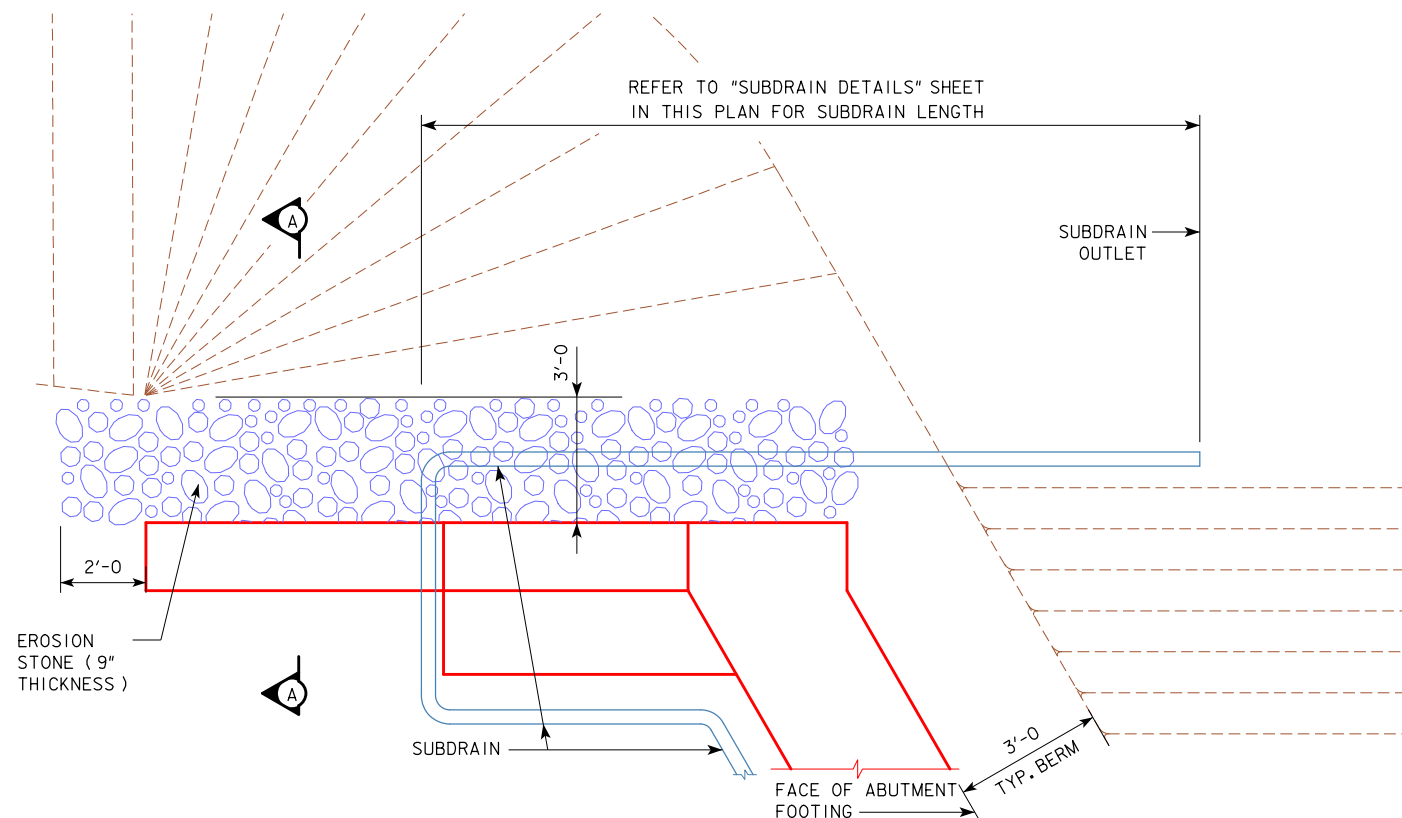
**SECTION A-A
BACK FILL DETAILS**

NOTE: GEOTEXTILE FABRIC WILL BE ATTACHED TO FACE OF ABUTMENT FOOTING AND WINGS.

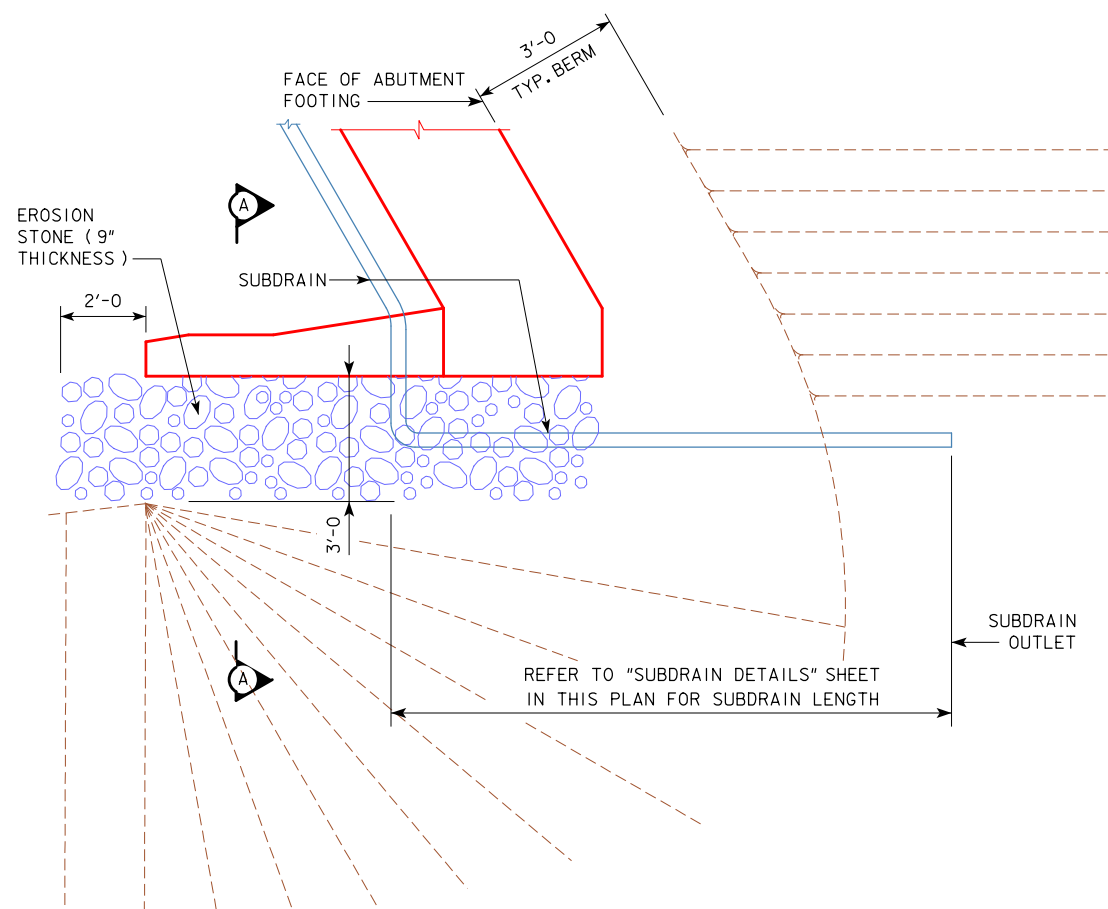
* DIMENSION VARIES DUE TO 2% SUBDRAIN SLOPE.

NOTE:
SEE SUBDRAIN DETAILS SHEET FOR DETAILS NOT SHOWN ON THIS SHEET WHICH ARE PERTINENT TO THIS STRUCTURE.

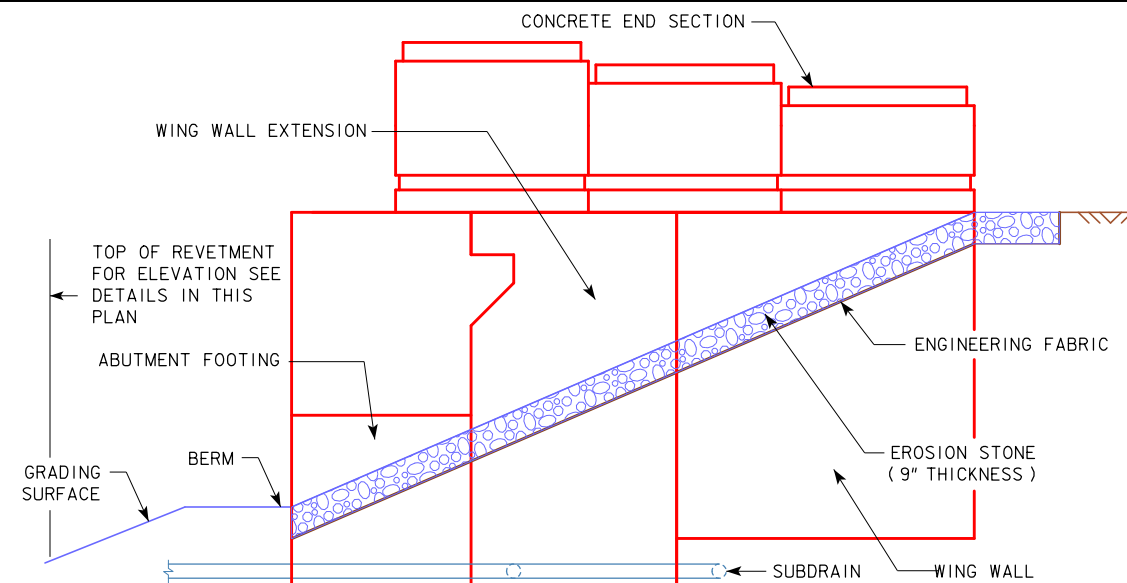
DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
ABUTMENT BACKFILL DETAILS
STA. 867+41.69 (ϕ US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
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TOP VIEW OF WING ARMORING - WEST WING



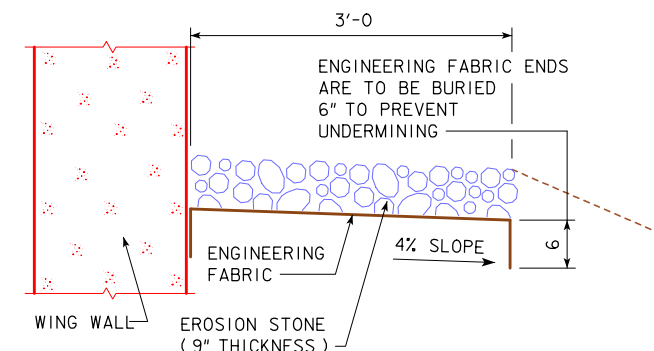
TOP VIEW OF WING ARMORING - EAST WING



PROFILE VIEW OF WING ARMORING - WEST WING

(LOOKING EAST)

A CHECK SHALL BE MADE
AT THE SUBDRAIN OUTLET
TO INSURE THAT IT IS
DRAINING PROPERLY
DURING THE BACK FILL
FLOODING PROCESS.



SECTION A-A

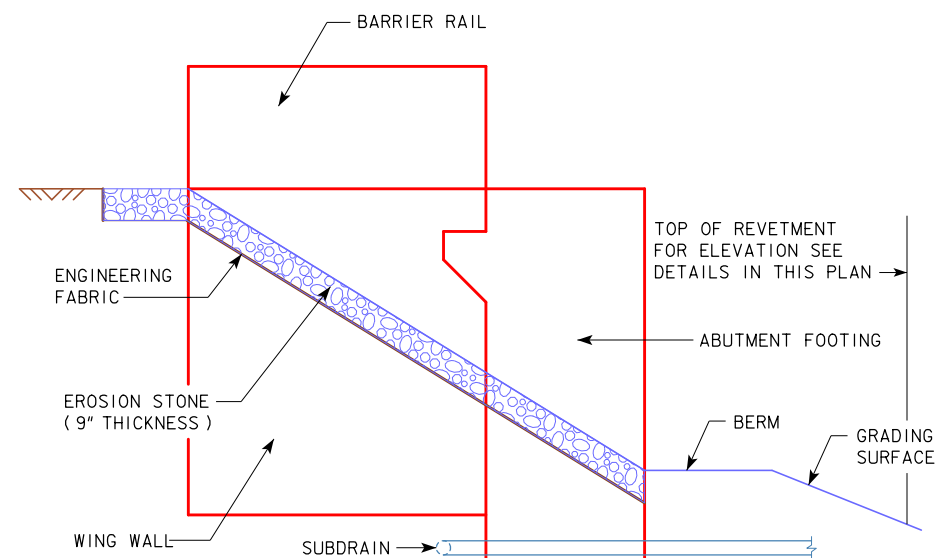
GENERAL NOTES:

EROSION STONE SHALL BE PLACED ALONG THE SIDES OF THE WINGS AND ABUTMENT FOOTING AS SHOWN IN SECTION A-A. THIS IS TYPICAL AT EACH CORNER OF THE BRIDGE UNLESS OTHERWISE NOTED IN THE PLANS. THE EROSION STONE AT THESE LOCATIONS SHALL BE UNDERLAYED WITH ENGINEERING FABRIC IN ACCORDANCE WITH ARTICLE 4196.01, B, 3, OF THE STANDARD SPECIFICATIONS.

THE EROSION STONE SHALL BE IN ACCORDANCE WITH SECTION 4130, OF THE STANDARD SPECIFICATIONS. MATERIAL PASSING THE 3 INCH SCREEN BUT 100% RETAINED ON A 1 INCH SCREEN MAY BE USED AS CHOKO STONE.

THE EROSION STONE SHALL BE DEPOSITED, SPREAD, CONSOLIDATED AND SHAPED BY MECHANICAL OR HAND METHODS THAT WILL PROVIDE UNIFORM 9" DEPTH AND DENSITY AND PROVIDE UNIFORM SURFACE APPEARANCE.

PAYMENT FOR THE BRIDGE WING ARMORING WILL BE BID PER SQUARE YARD. COST WILL INCLUDE ENGINEERING FABRIC, EROSION STONE, EXCAVATION, SHAPING, AND COMPACTION TO DIMENSIONS SHOWN IN THESE PLANS. BID ITEM SHALL BE "BRIDGE WING ARMORING - EROSION STONE".



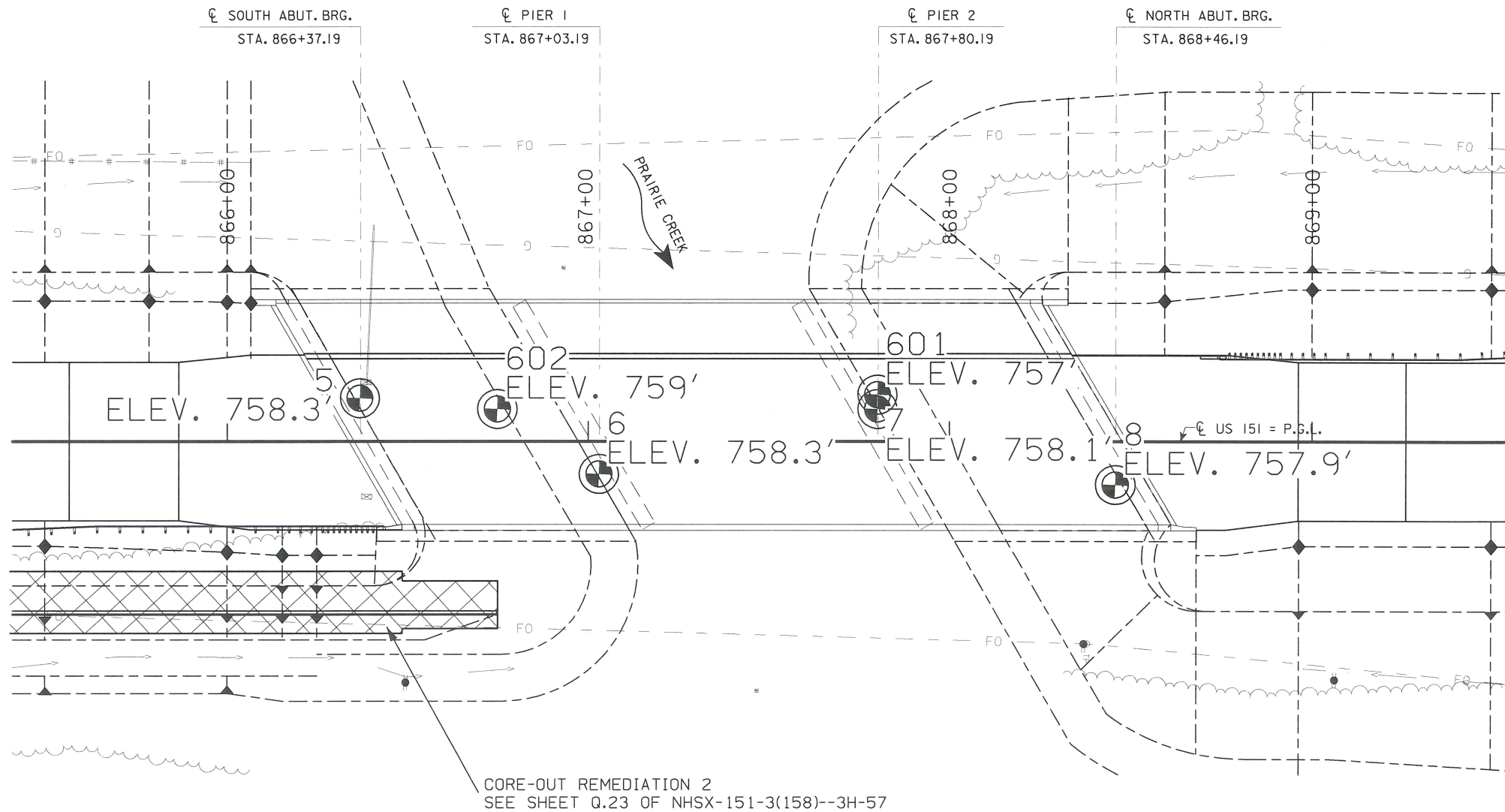
PROFILE VIEW OF WING ARMORING - EAST WING

(LOOKING WEST)

DESIGN FOR 30° SKEW (R.A.)
209'-0x46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
66'-0 END SPANS 77'-0 INTERIOR SPAN
BRIDGE WING ARMORING
STA. 867+41.69 (C US 151) SEPTEMBER 2018
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 59 OF 59 FILE NO. 31286 DESIGN NO. 518

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

NOTE: SOILS MAY VARY BETWEEN BORINGS. SEE STANDARD SPECIFICATION 1104.01



GEOTECHNICAL DESIGN



I hereby certify that this engineering document was prepared under my supervision and that engineering decisions with regard to the design were made by me or by other duly licensed Professional Engineers under the laws of the State of Iowa.

Signature: *Anna M. Smith*
ANNA M. SMITH
Printed or Typed Name

My license renewal date is December 31, 2019

Pages or sheets covered by this seal: SPS.1 - SPS.3



LOCATION

US HIGHWAY 151
OVER PRAIRIE CREEK
T-82N R-8W
SECTION 9
FAIRFAX TOWNSHIP
LINN COUNTY
FHWA NO. 33781
BRIDGE MAINT. NO. 5722.OS151
LATITUDE 41.923186°
LONGITUDE -91.783847°

DESIGN FOR 30° SKEW (R.A.)

209'-0 x 46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
(BTB BEAMS)

SPANS (66'-0, 77'-0, 66'-0)

SOIL PROFILE SHEET
STATION 867+41.69 LINN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 1 OF 3 FILE NO. 31286 DESIGN NO. 518

FILE NO. 31286

ENGLISH

DESIGN TEAM

Shuck-Britson\Terracon

LINN

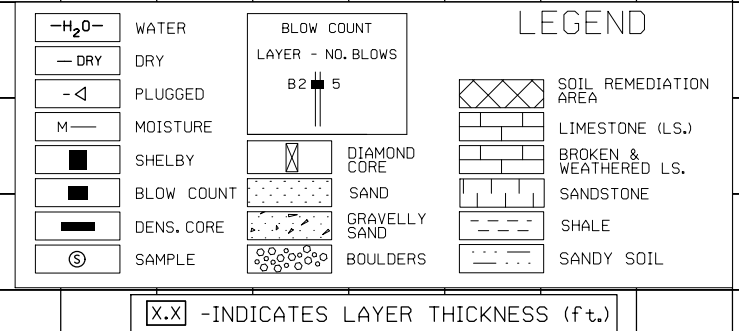
COUNTY

PROJECT NUMBER

BRF-151-3(142)--38-57

SHEET NUMBER SPS.1

NOTE: SOILS MAY VARY BETWEEN BORINGS.
SEE STANDARD SPECIFICATION 1104.01



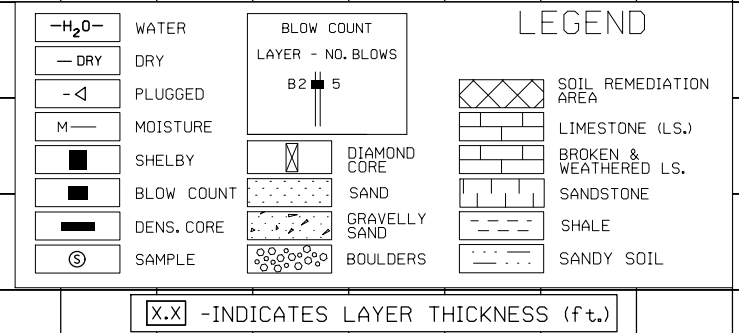
SHELBY TUBE CORE DATA			
CORE NO.	5 F1	8 D1	8 E1
DEPTH IN FEET	16.5	6.5	16.5
CLASSIFICATION (AASHTO)	A-6(2)	A-7-6(16)	A-7-6(21)
COEFF. CONSOL. (SQ. FT /DAY)	-	0.15	-
TRIAXIAL COMPRESSION	CU	CU	CU
COHESION - PSF	160	120	70
FRICTION COEFF.	-	-	-
MOISTURE CONTENT %	23	24	44
DRY DENSITY - PCF	101	93	77
CU-CONSOLIDATED UNDRAINED			
UU-UNCONSOLIDATED UNDRAINED			
UC-UNCONFINED COMPRESSION ($c=1/2 Q_u$)			

Boring No.	Date Drilled	While Drilling	End of Drilling	Delayed Water Level
5	01/13/2016	18	-	-
6	01/14/2016	19	-	-
7	01/14/2016	18	-	-
8	01/13/2016	19	19 wCI	-

ROCK CORE INFORMATION					
Boring	Approx.Surf.El.(ft)	Run No.	Interval(ft)	Recovery(%)	RQD(%)
5	758.3	1	22.5-25	40	0
5	758.3	2	25-26.5	100	0
5	758.3	3	26.5-35	24	0
5	758.3	4	35-40	100	32
8	757.9	1	38.5-39.5	64	0
8	757.9	2	39.5-45.5	91	15
8	757.9	3	45.5-48.7	100	67

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 2 OF 3 FILE NO. 31286 DESIGN NO. 518

NOTE: SOILS MAY VARY BETWEEN BORINGS.
SEE STANDARD SPECIFICATION 1104.01



DESIGN FOR 30° SKEW (R.A.)

209'-0 x 46'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE WITH 14'-0 TRAIL
(BTB BEAMS)

SPANS (66'-0, 77'-0, 66'-0)

SOIL PROFILE SHEET

STATION 867+41.69 LINN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 3 FILE NO. 31286 DESIGN NO. 518