

**BRIDGE REPLACEMENT**

Project No. L-#39--73-90



**IOWA**  
**DEPARTMENT OF TRANSPORTATION**  
 Highway Division  
 PLANS OF PROPOSED IMPROVEMENT ON THE  
**FARM-TO-MARKET ROAD SYSTEM**  
**WAPELLO COUNTY**  
**BRIDGE REPLACEMENT**  
**PROJECT NO. L-#39--73-90**

PERMITS

THIS PROJECT IS COVERED BY:

THE IOWA DEPARTMENT OF NATURAL RESOURCES NPDES GENERAL PERMIT NO. 2 ??-????-????? DATE: ?/?/?

THE CORPS OF ENGINEERS NATIONWIDE PERMIT # 33

LOCATED ON DAHLONEGA ROAD., APPROX. ¼ MILE SOUTH OF 105TH AVE. OVER LITTLE CEDAR CREEK.

THE IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2009, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO THE CONSTRUCTION WORK ON THIS PROJECT.

Scales: As Noted

**PROJECT TRAFFIC CONTROL PLAN**

THIS ROAD WILL BE CLOSED TO THROUGH TRAFFIC DURING CONSTRUCTION. LOCAL TRAFFIC TO ADJACENT PROPERTIES WILL BE MAINTAINED AS PROVIDED FOR IN ARTICLE 1107.08, 2009 STANDARD SPECIFICATION PLUS CURRENT SUPPLEMENTAL SPECIFICATIONS. "TRAFFIC CONTROL DEVICES, PROCEDURES, LAYOUTS, SIGNING, AND PAVEMENT MARKINGS INSTALLED WITHIN THE LIMITS OF THIS PROJECT SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" AS ADOPTED BY THE DEPARTMENT PER 761 OF THE IOWA ADMINISTRATIVE CODE (IAC) CHAPTER 130."

ALL ADVANCED WARNING SIGNS, TYPE III BARRICADES, AND OTHER TRAFFIC CONTROL DEVICES FOR THIS PROJECT SHALL BE LOCATED AT THE BEGINNING AND THE END OF THE PROJECT, AND WHERE THE ROAD FOR CONSTRUCTION INTERSECTS OTHER PUBLIC ROADS AND SHALL INCLUDE ALL OTHER BARRICADES AND WARNING SIGNS NECESSARY TO PROTECT THE CONTRACTOR'S WORK AND EQUIPMENT, AND FOR PROVIDING FOR THE SAFETY OF THE TRAVELING PUBLIC. ALL SIGNS, BARRICADES, AND OTHER CONTROL DEVICES SHALL BE IN ACCORDANCE WITH THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAY 2003 EDITION"

DETOUR WILL BE ESTABLISHED, SIGNED, AND MAINTAINED BY WAPELLO COUNTY.

**INDEX OF SHEETS**

No.	Description
1	TITLE SHEET
2	ESTIMATED PROJECT QUANTITIES, REFERENCE INFORMATION & SOUNDING DATA
3	PLAN & PROFILE
4	GENERAL NOTES
5-20	BRIDGE DESIGN DETAILS
21-22	TYPICAL CROSS SECTIONS, TABULATIONS, POLLUTION PREVENTION PLAN & DETAILS

**NO MILEAGE SUMMARY**

**ROAD STANDARD PLANS**

The following Standard Plans shall be considered applicable to construction work on this project.

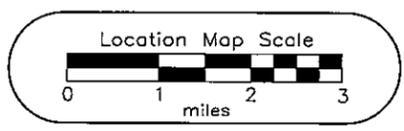
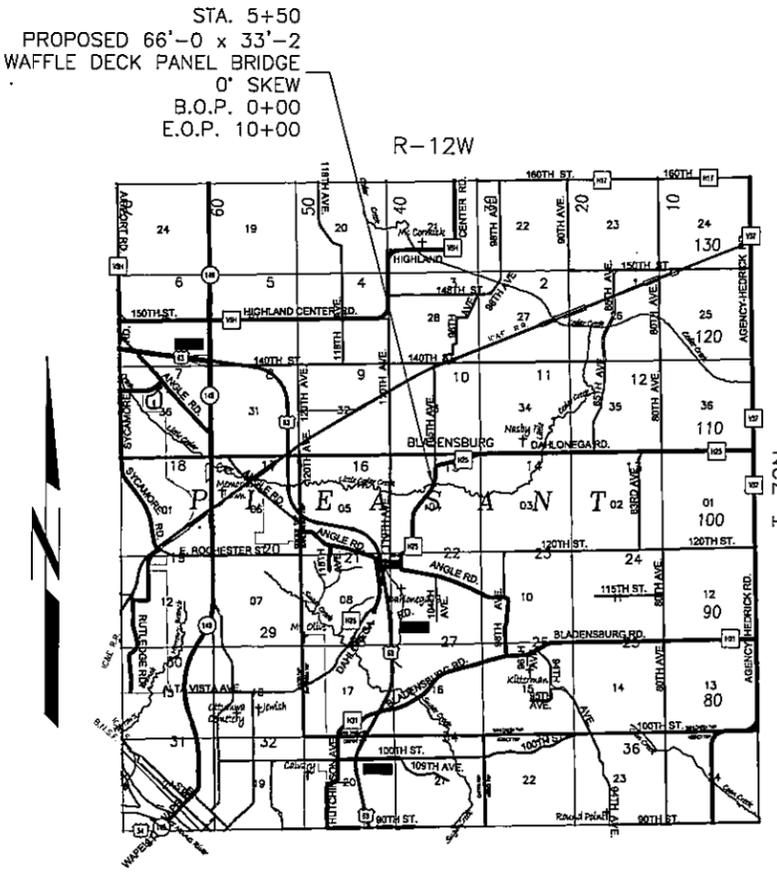
Identification	Date	Identification	Date	Identification	Date
BA-200	10-19-10	TC-252	10-20-09		
BA-201	10-19-10	SI-172	04-20-10		
BA-202	04-20-10	SI-173	04-20-10		
BA-205	04-20-10	SI-211	10-19-10		
BA-250	10-19-10				
RL-14A	10-19-10				

**INDEX OF SEALS**

SHEET NO.	NAME	TYPE
4-20	DEAN G. BIERWAGEN	STRUCTURAL DESIGN
1-3, 20-21	BRIAN P. MOORE	HYDRAULIC DESIGN

**WAPELLO COUNTY**

Letting Date **APRIL 1, 2011**



2006 AADT 280 V.P.D.

Gregory M. Kenning

Steve Siegel

Jerry Parker Chairperson

*Approved Board of Supervisors*

**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 **Dean G. Bierwagen** Date \_\_\_\_\_

Printed or Typed Name

My license renewal date is December 31, \_\_\_\_\_

Pages or sheets covered by this seal. 4 thru 20

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

**BRIAN P. MOORE** DATE \_\_\_\_\_

My license renewal date is December 31, 2010

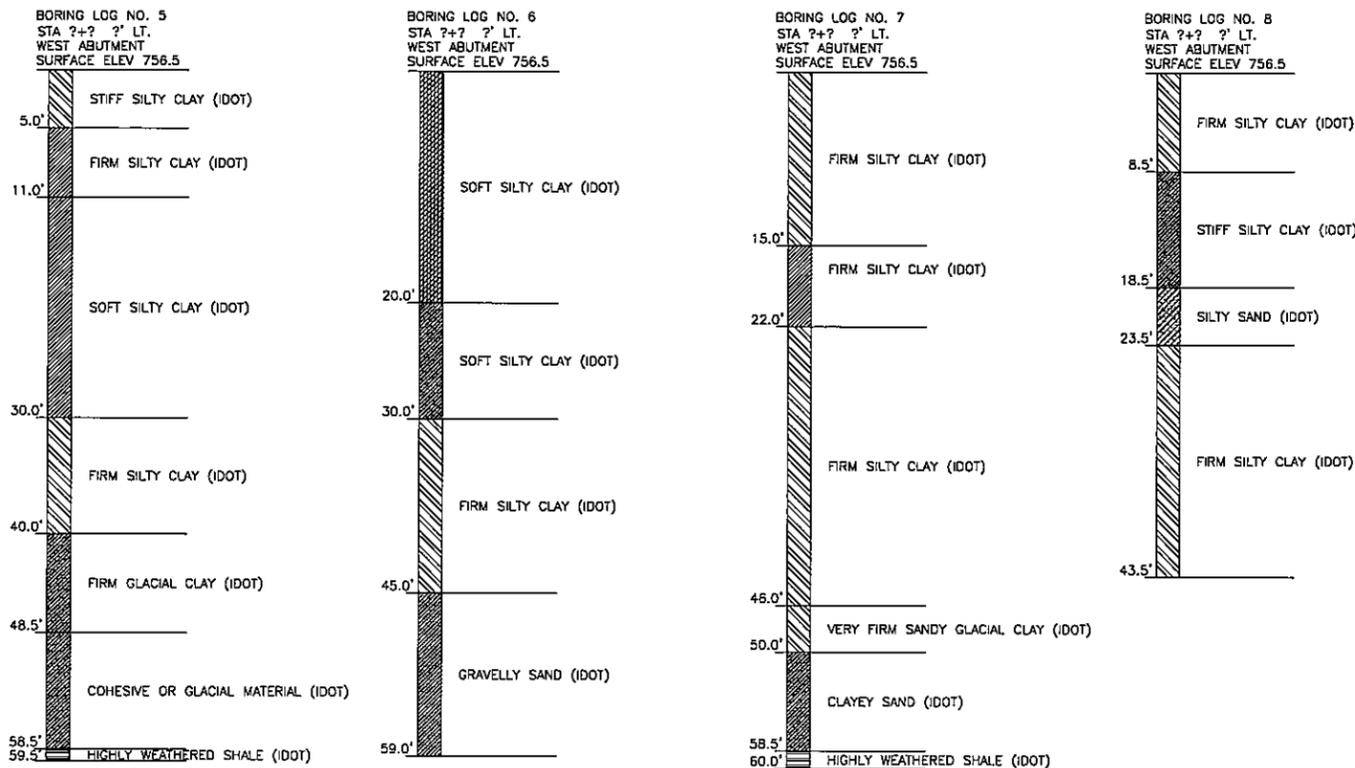
Pages or sheets covered by this seal. 1-3, 20-22

# ESTIMATED PROJECT QUANTITIES

REF. NO.	ITEM-CODE	ITEM	UNITS	TOTAL
001	2101-0850001	CLEARING AND GRUBBING	ACRE	1.0
002	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	C. Y.	222.0
003	2301-0685550	BRIDGE APPROACH PAVEMENT, AS PER PLAN	S. Y.	2,760.0
004	2401-6745625	REMOVAL OF EXISTING BRIDGE	L. S.	1.0
005	2402-2720000	EXCAVATION, CLASS 20	C. Y.	73.8
006	2403-0100010	STRUCTURAL CONCRETE (BRIDGE)	C. Y.	69.7
007	2404-7775000	REINFORCING STEEL	LBS.	275.0
008	2404-7775005	REINFORCING STEEL, EPOXY COATED	LBS.	10,620.0
009	2407-0550001	BEAMS, PRETENSIONED PRESTRESSED CONCRETE, ERECT AS PER PLAN	EACH	5.0
010	2408-7800000	STRUCTURAL STEEL	LBS.	1,096.1
011	2414-6424120	CONCRETE OPEN RAILING	L. F.	77.0
012	2501-0201042	PILES, STEEL, HP 10 x 42	L. F.	840.0
013	2505-4008200	STEEL BEAM GUARDRAIL BARRIER TRANSITION SECTION	EACH	4.0
014	2505-4021690	STEEL BEAM GUARDRAIL END ANCHOR, BOLTED	EACH	4.0
015	2505-4021762	STEEL BEAM GUARDRAIL END TERMINAL	EACH	4.0
016	2507-3250005	ENGINEERING FABRIC	S. Y.	438.0
017	2507-6800061	REVTMENT, CLASS 'E'	TON	473.0
018	2518-6910000	SAFETY CLOSURE	EACH	2.0
019	2528-8445110	TRAFFIC CONTROL	L. S.	1.0
020	2533-4980005	MOBILIZATION	L. S.	1.0
021	2599-9999003	UHPC IN-FILL PLACEMENT	C. Y.	17.8
022	2599-9999003	PANELS, PRET CONC, ERECT AS PER PLAN	EACH	14.0
023	2601-2634100	MULCHING	ACRE	1.0
024	2601-2636043	SEEDING AND FERTILIZING (RURAL)	ACRE	1.0

## SOUNDING DATA

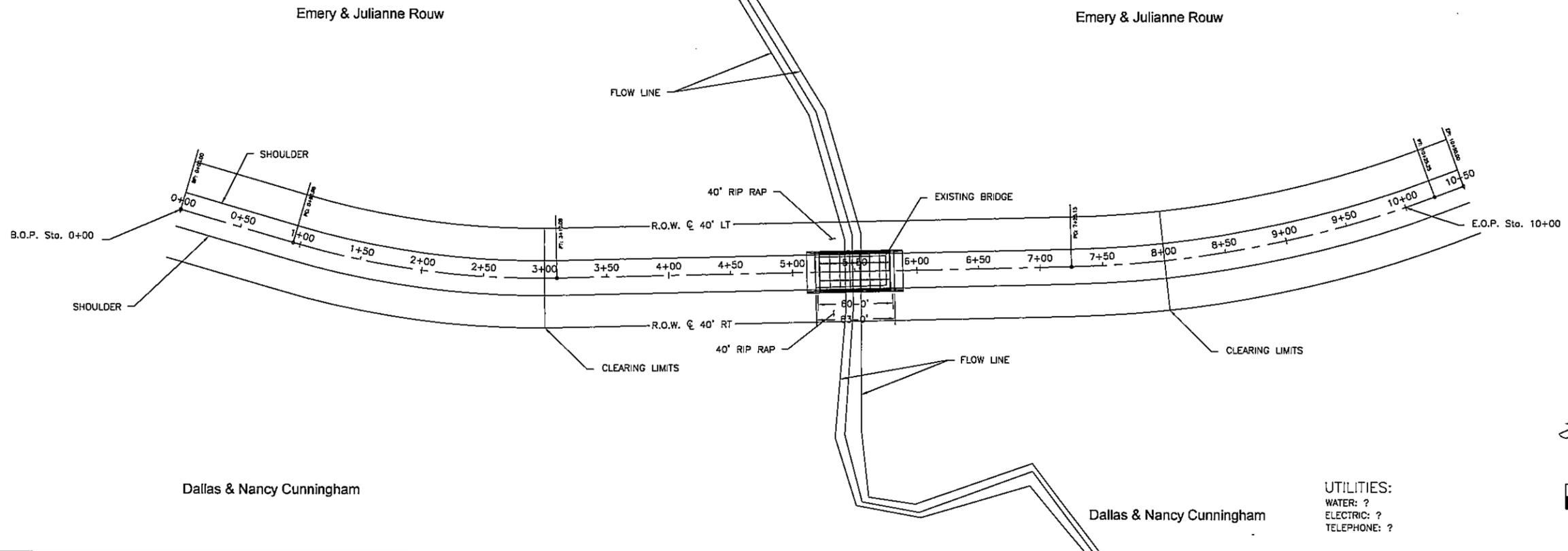
(REFER TO SHEET 3 FOR BORING LOCATIONS)



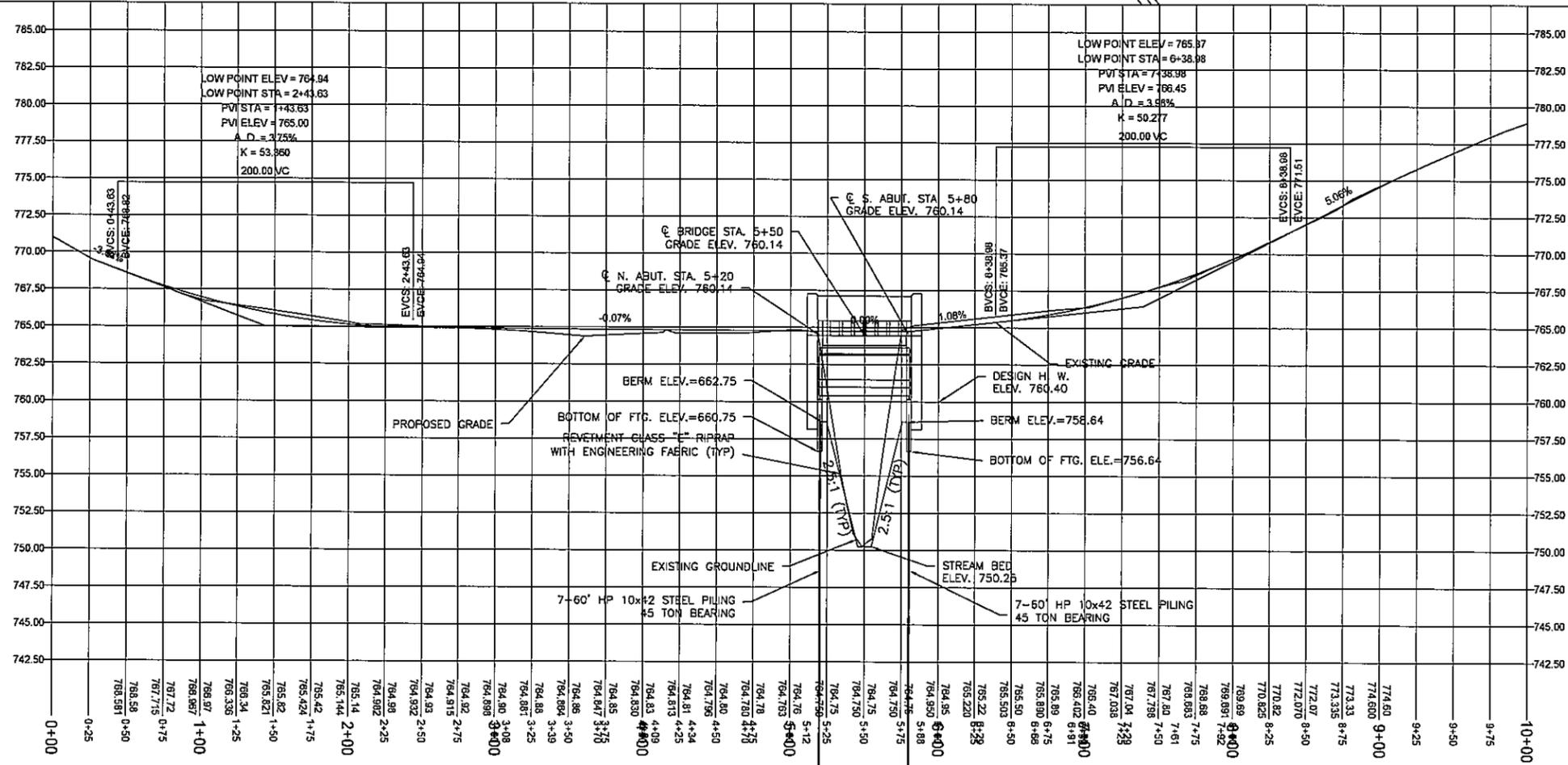
### REF. NO. ESTIMATE REFERENCE INFORMATION

- 001 REFER TO SITUATION ON SHEET 3. DURING APRIL 15 AND SEPTEMBER 15 THE CONTRACTOR SHALL NOT CUT DOWN ANY TREES THAT ARE 9" IN DIAMETER AT BREAST HEIGHT.
- 002 RESHAPING CHANNEL FOR RIP RAP AND BLENDING CHANNEL FROM RIP RAP AREA TO EXISTING CHANNEL. REFER TO PAGE 3 FOR DETAILS.
- 003 BID PRICE TO INCLUDE ALL MATERIAL AND LABOR TO CONSTRUCT BRIDGE APPROACH SECTION. H.M.A. SHALL BE PLACED AT 10IN. DEPTH WITH 1FT OF MODIFIED SUBBASE. REFER TO SHEET 22 FOR DETAIL.
- 004 THE EXISTING BRIDGE IS 60' x 24' P.P.C.B., LOCATED AT STA. 5+47.11. LUMP SUM BID FOR REMOVAL OF EXISTING STRUCTURE SHALL INCLUDE THE DISPOSAL OF ALL MATERIAL. ALL MATERIAL SHALL BECOME PROPERTY OF CONTRACTOR.  
  
"SCRAPE SAMPLES OF THIS BRIDGE WERE TAKEN TO GET AN INDICATION OF THE EXISTENCE OF AND LEVEL OF TOTAL CHROMIUM AND TOTAL LEAD. THE ANALYSIS OF TOTAL CHROMIUM IN THE SAMPLE WAS 11,400 PPM. THE TOTAL ANALYSIS OF TOTAL LEAD IN THE SAMPLE WAS 7,820 PPM. THE ANALYSIS SHOWS THE EXISTENCE OF THESE TWO TOXIC CONSTITUENTS. THE LEVELS INDICATED BY THESE TESTS COULD CREATE CONDITIONS ABOVE REGULATORY LIMITS FOR HEALTH SAFETY REQUIREMENTS. NO OTHER SUBSTANCES WERE ANALYZED. THE BIDDER SHOULD NOT RELY ON THE CONTRACTING AUTHORITY'S TESTING AND ANALYSIS FOR ANY PURPOSE OTHER THAN AN INDICATION OF THE EXISTENCE OF THESE TWO CONSTITUENTS."
- 009 REFER TO SHEETS 13&14. BEAMS TO BE FABRICATED AND PROVIDED BY CORESLAB STRUCTURE INC., AND PROVIDED TO THE SITE UNDER SEPARATE CONTRACT WITH WAPELLO COUNTY. PRICE TO INCLUDE ALL COSTS FOR PLACEMENT OF BEAMS ONLY.
- 013-015 REFER TO TABULATION ON SHEET 22. STANDARD ROAD PLAN BA-205 AND BA-202.
- 017 REFER TO DETAIL ON SHEET 22. RIP RAP SHALL BE PLACED 2' THICK.
- 021 REFER TO DETAILS ON SHEETS 4,8&9. PRICE TO INCLUDE ALL MATERIAL AND LABOR TO FINISH U.H.P.C. IN-FILL OF JOINTS.
- 022 REFER TO DETAILS ON SHEETS 17&18. PANELS TO BE FABRICATED AND PROVIDED BY CORESLAB STRUCTURE INC., AND PROVIDED TO THE SITE UNDER SEPARATE CONTRACT WITH WAPELLO COUNTY. PRICE TO INCLUDE ALL COSTS FOR PLACEMENT AND ERECTION OF PANELS ONLY.
- 023-024 MULCHING, SEEDING AND FERTILIZING SHALL BE DONE IN ALL TEMPORARY CONSTRUCTION EASEMENTS & R.O.W.

DESIGN FOR A 0' SKEW  
**60'-0 X 33'-2 PRECAST UHPC  
 WAFFLE DECK PANEL BRIDGE**  
 ONE 60'-0 SPAN  
 STA. 5+50  
 JULY, 2010  
**ESTIMATED QUANTITIES**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION



UTILITIES:  
 WATER: ?  
 ELECTRIC: ?  
 TELEPHONE: ?



**GENERAL NOTES:**

THIS DESIGN IS FOR THE REPLACEMENT OF THE EXISTING 60 FT. PRESTRESSED CONCRETE BRIDGE. THE EXISTING BRIDGE SUPERSTRUCTURE CONSISTS OF CONCRETE DECK, PRESTRESSED BEAMS AND TIMBER ABUTMENTS. THE REPLACEMENT BRIDGE SHALL BE A SINGLE SPAN PRESTRESSED WITH PRECAST ULTRA HIGH PERFORMANCE DECK PANELS.

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

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (501 IS 1/2 INCH DIAMETER BAR). ENGLISH REINFORCING STEEL RECEIVED IN THE FIELD MAY DISPLAY THE FOLLOWING "BAR DESIGNATION". THE "BAR DESIGNATION" IS THE STAMPED IMPRESSION ON THE REINFORCING BARS, AND IS EQUIVALENT TO THE BAR DIAMETER IN MILLIMETERS.

ENGLISH SIZE	BAR DESIGNATION
3	10
4	13
5	16
6	19
7	22
8	25
9	29
10	32
11	36

THE CONTRACTOR SHALL VISIT THE SITE AND BE FAMILIAR WITH THE EXISTING CONDITIONS OF THE PROJECT. UTILITY LOCATIONS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATIONS OF UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY DAMAGE, WHICH MIGHT OCCUR DUE TO HIS FAILURE TO LOCATED AND PROTECT UNDERGROUND UTILITIES.

ACCESS SHALL BE MAINTAINED TO INDIVIDUAL PROPERTIES DURING CONSTRUCTION. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT.

THE PRECAST SLAB FOR THE BRIDGE IS CAST FROM ULTRA HIGH STRENGTH CONCRETE CALLED 'DUCTAL' MANUFACTURED BY CORESLAB STRUCTURES, LAPLATTE, NEBRASKA. THE SLABS ARE BEING PURCHASED AND SUPPLIED TO THE JOB SITE UNDER A SEPARATE CONTRACT BETWEEN WAPELLO COUNTY AND CORESLAB STRUCTURES. THE CONTRACTOR SHALL CONTACT JOHN HEIMANN OF CORESLAB STRUCTURES, INC, 802 ALLIED ROAD, LAPLATTE, NE, 68123 OFFICE: (402)291-0733 EXT. 407 AND CELL PHONE: (402)960-0644 TO ARRANGE A TIME TO HAVE THE SLABS SHIPPED TO THE JOB SITE.

UPON DELIVERY TO THE JOB SITE EACH PANEL SHALL BE JOINTLY INSPECTED BY THE WAPELLO COUNTY ENGINEER, CORESLAB STRUCTURES AND THE BRIDGE CONTRACTOR FOR STRUCTURAL INTEGRITY AND ANY DAMAGE THAT MAY HAVE BEEN CAUSED BY SHIPMENT ANY DAMAGE SHALL BE REPAIRED BY CORESLAB. ONCE ACCEPTED BY THE WAPELLO COUNTY ENGINEER AND THE CONTRACTOR, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PANELS DURING CONSTRUCTION AT THE BRIDGE SITE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACEMENT OR REPAIR OF ANY PANELS DAMAGED DURING THE CONSTRUCTION AT THE BRIDGE SITE, WHICH SHALL INCLUDE THE LIFTING AND PLACEMENT ON THE BRIDGE BEAMS.

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

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

**PRECAST PANEL HANDLING**

LIFTING ANCHORS:  
LIFTING ANCHORS FOR PRECAST PANELS SHALL BE APPROVED BY THE WAPELLO COUNTY ENGINEER PRIOR TO USE.

MECHANICAL SPLICES:  
THE OPEN RAIL POSTS SHALL BE SPLICED AT THE DECK LOCATION SHOWN IN THE PLANS USING MECHANICAL SPLICE ASSEMBLIES. THE MECHANICAL SPLICE ASSEMBLY USED SHALL MEET THE REQUIREMENTS OF MATERIALS I.M.451 APPENDIX E.

LIFTING AND HANDLING:  
PANELS SHALL BE HANDLED IN SUCH A MANNER AS NOT TO DAMAGE THE PANELS DURING LIFTING OR MOVING. LIFTING ANCHORS CAST INTO THE PANELS SHALL BE USED FOR LIFTING AND MOVING THE PANELS AT THE FABRICATION PLANT AND IN THE FIELD. THE ANGLE BETWEEN THE TOP SURFACE OF THE PANEL AND THE LIFTING LINE SHALL NOT BE LESS THAN SIXTY DEGREES, WHEN MEASURED FROM THE TOP SURFACE OF THE PANEL TO THE LIFTING LINE. DAMAGE CAUSED TO ANY PANEL, SHALL BE REPAIRED AT THE EXPENSE OF THE CONTRACTOR TO THE SATISFACTION OF THE WAPELLO COUNTY ENGINEER.

**NOTES FOR UHPC FIELD CAST IN-FILLS JOINTS**

UHPC IN-FILL MATERIAL: THE UHPC MATERIAL FOR THE FIELD CAST JOINTS AND BEAM TO SLAB CONNECTIONS SHALL BE DUCTAL, SUPPLIED BY LAFARGE OF NORTH AMERICA. THE CONTACT PERSON FOR OBTAINING THE MATERIAL IS:

V.H.(VIC) PERRY, FCSCE, MASC., P.ENG.,  
VICE-PRESIDENT / GENERAL MANAGER - DUCTAL  
LAFARGE NORTH AMERICA  
(DIRECT 403-292-9423 / MOBILE 403-669-8632 / FAX 403-278-7420)  
E-MAIL VIC.PERRY@LAFARGE-NA.COM

PRE-POUR MEETING: PRIOR TO THE INITIAL PLACEMENT OF THE DUCTAL, THE CONTRACTOR SHALL ARRANGE FOR AN ONSITE MEETING WITH THE LAFARGE REPRESENTATIVE AND WAPELLO CO ENGINEER. THE CONTRACTOR'S STAFF SHALL ATTEND THE SITE MEETING. THE OBJECTIVE OF THE MEETING WILL BE TO CLEARLY OUTLINE THE PROCEDURES FOR MIXING, TRANSPORTING, FINISHING AND CURING OF THE UHPC MATERIAL. THE CONTRACTOR SHALL ARRANGE FOR A REPRESENTATIVE OF THE LAFARGE TO BE ON SITE DURING THE PLACEMENT OF THE JOINTS. THE REPRESENTATIVE SHALL BE KNOWLEDGEABLE IN THE SUPPLY, MIXING, DELIVERY, PLACEMENT, AND CURING OF THE DUCTAL MATERIAL.

STORAGE: THE CONTRACTOR SHALL ASSURE THE PROPER STORAGE OF PREMIX, FIBERS AND ADDITIVES AS REQUIRED BY THE LAFARGE SPECIFICATIONS IN ORDER TO PROTECT MATERIALS AGAINST LOSS OF PHYSICAL AND MECHANICAL PROPERTIES

BATCHING AND CURING: THE DESIGN AND FABRICATION OF FORMS SHALL FOLLOW APPROVED INSTALLATION DRAWINGS AND SHALL FOLLOW THE RECOMMENDATIONS OF THE MANUFACTURER. ALL THE FORMS FOR UHPC SHALL BE CONSTRUCTED FROM PLYWOOD.

TWO PORTABLE BATCHING UNITS WILL BE SUPPLIED BY LAFARGE TO THE CONTRACTOR FOR MIXING OF THE JOINT MATERIAL. THE CONTRACTOR SHALL FOLLOW THE BATCHING SEQUENCE AS SPECIFIED BY THE LAFARGE AND APPROVED BY THE WAPELLO CO ENGINEER. ARRANGEMENTS SHALL BE MADE BY WAPELLO COUNTY TO HAVE ALL NECESSARY ELECTRICAL POWER & EQUIPMENT ON SITE TO OPERATE MIXERS

THE SURFACE OF THE UHPC FIELD JOINTS SHALL BE FILLED FLUSH WITH THE PRECAST PANELS TO WITHIN A TOLERANCE OF PLUS OR MINUS 1/8 IN. THE CONCRETE IN THE FORM SHALL BE CURED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS FOUR DAYS AT MINIMUM TEMPERATURE OF 60°F TO ATTAIN THE DESIGN STRENGTH.

QUALITY CONTROL: THE CONTRACTOR SHALL TAKE FOUR SETS OF COMPRESSIVE STRENGTH TEST SAMPLES FOR EACH DAY OF PLACEMENT. EACH SET CONSISTS OF 3 CYLINDERS 3 IN. X 6 IN. ALL SETS SHALL BE MOIST CURED FOR 4 DAYS AND SHALL BE KEPT SHELTERED IN OPEN AIR AFTER 4 DAYS. THE FOLLOWING TESTS SHALL BE PERFORMED:

CONCRETE COMPRESSIVE STRENGTHS SHALL BE ACCORDING TO ASTM C 39. THE FIRST SET IS TO BE TESTED AT 4 DAYS. THE SECOND SET SHALL BE TESTED AT 28 DAYS. THE THIRD SET WILL BE SENT TO THE LAFARGE NORTH AMERICA BETWEEN THE 4TH DAY AND THE 14TH DAY. THE FOURTH SET SHALL BE TREATED AS A RESERVE SET. THE RESERVE SET WILL BE RETAINED BY WAPELLO COUNTY.

**PANEL INSTALLATION ON SITE:**

EQUIPMENT:  
THE CONTRACTOR SHALL HAVE ALL EQUIPMENT REQUIRED FOR PANEL INSTALLATION, AND UHPC IN-FILL ON-SITE PRIOR TO BEGINNING PANEL INSTALLATION.

PLACEMENT TECHNIQUE:

PANELS MAY BE PULLED TOGETHER DURING PLACEMENT USING APPROVED TEMPORARY DEVICES. ANY DAMAGE TO THE PANELS CAUSED BY TEMPORARY DEVICES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE WAPELLO COUNTY ENGINEER.

PLACEMENT TOLERANCES:

THE CENTERLINE OF THE PANELS SHALL BE WITHIN 1/8 INCH OF THE PRE-SURVEYED CENTERLINE MARKED ON THE SURFACE OF THE BASE. VERTICAL ALIGNMENT OF THE PANELS SHALL BE SUCH THAT THE TOP SURFACE OF AN INDIVIDUAL PANEL IS NO MORE THAN 1/8 INCH HIGHER OR LOWER THAN THE TOP SURFACE OF AN ADJOINING PANEL AT ANY POINT ALONG THE JOINT BETWEEN THE PANELS.

PATCHING AND REPAIRS:

DAMAGE CAUSED TO THE PRECAST PANELS DURING ANY PART OF THE PANEL INSTALLATION PROCESS SHALL BE REPAIRED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE WAPELLO COUNTY ENGINEER USING APPROVED REPAIR METHODS AND MATERIALS. REPAIRS OF DAMAGED AREAS WILL BE ADDRESSED ON A CASE-BY-CASE BASIS BY THE WAPELLO COUNTY ENGINEER. ANY PATCH IF REQUIRED SHALL BE FINISHED FLUSH WITH THE SURFACE OF THE SURROUNDING CONCRETE AND GIVEN A TEXTURE SIMILAR TO THE SURROUNDING CONCRETE.

**SPECIFICATIONS:**

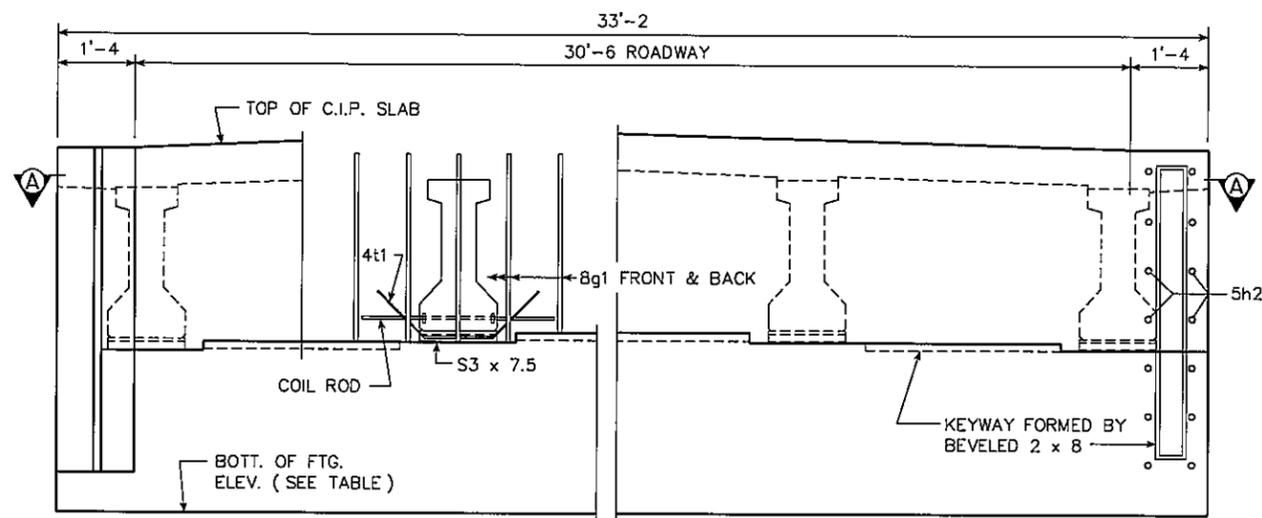
DESIGN: AASHTO LRFD SERIES OF 2007.  
CONSTRUCTION: IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2009, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.

**DESIGN STRESSES:**

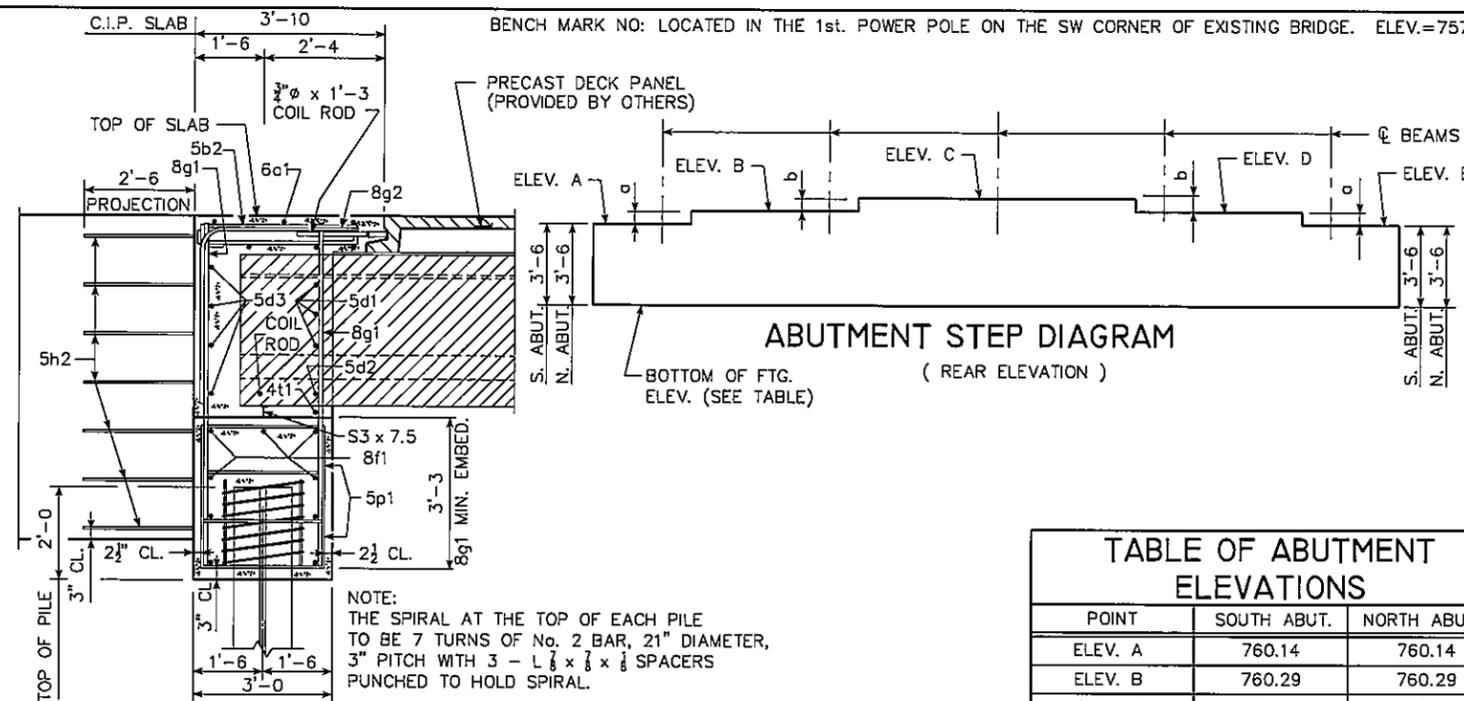
DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 2007.  
REINFORCING STEEL IN ACCORDANCE WITH SECTION 5, GRADE 60.  
CAST-IN-PLACE CONCRETE IN ACCORDANCE WITH SECTION 5, f'c = 3,500 PSI.  
PRECAST CONCRETE BEAMS IN ACCORDANCE WITH SECTION 5, f'c = 7000 PSI.

DESIGN FOR A 0' SKEW  
**60'-0 X 33'-2 PRECAST UHPC  
WAFFLE DECK PANEL BRIDGE**  
ONE 60'-0 SPAN  
STA. 5+50  
JULY, 2010  
**GENERAL NOTES**  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

BENCH MARK NO: LOCATED IN THE 1st. POWER POLE ON THE SW CORNER OF EXISTING BRIDGE. ELEV.=757.47



PART REAR ELEVATION AT ABUTMENT

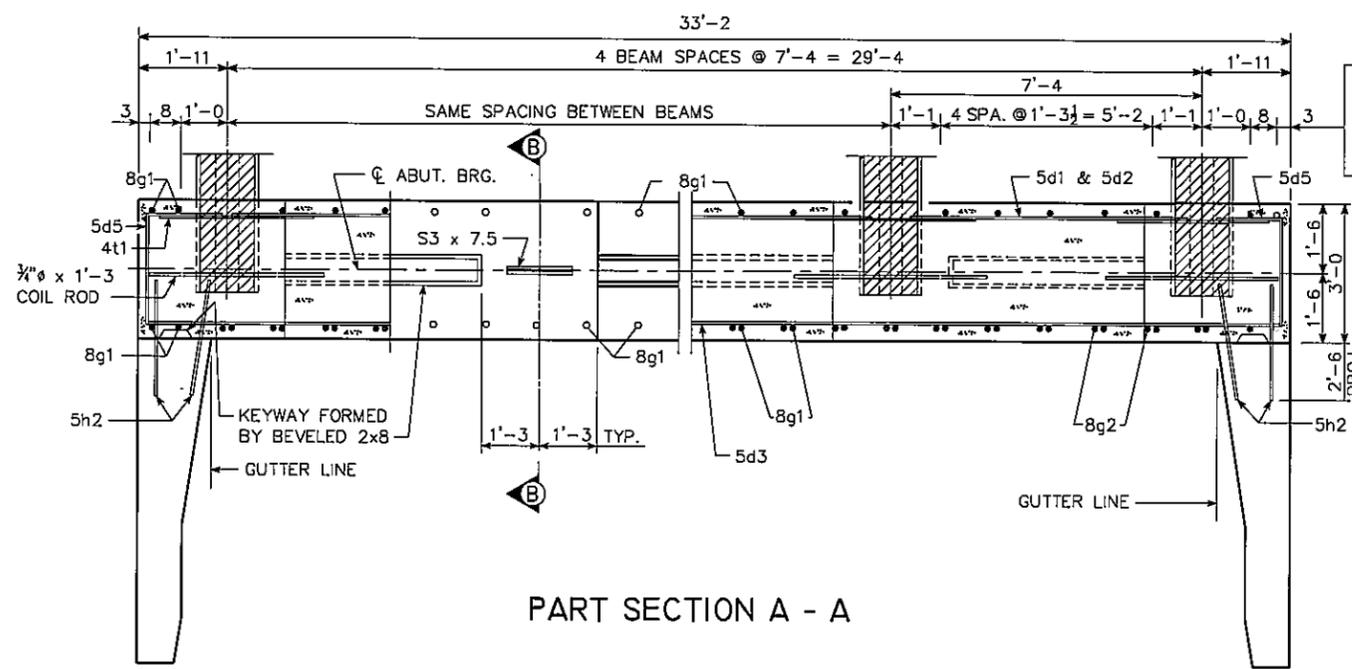


PART SECTION B-B



ABUTMENT STEP DIAGRAM (REAR ELEVATION)

POINT	SOUTH ABUT.	NORTH ABUT.
ELEV. A	760.14	760.14
ELEV. B	760.29	760.29
ELEV. C	760.44	760.44
ELEV. D	760.29	760.29
ELEV. E	760.14	760.14
BOTT. FTG. ELEV.	756.64	756.64

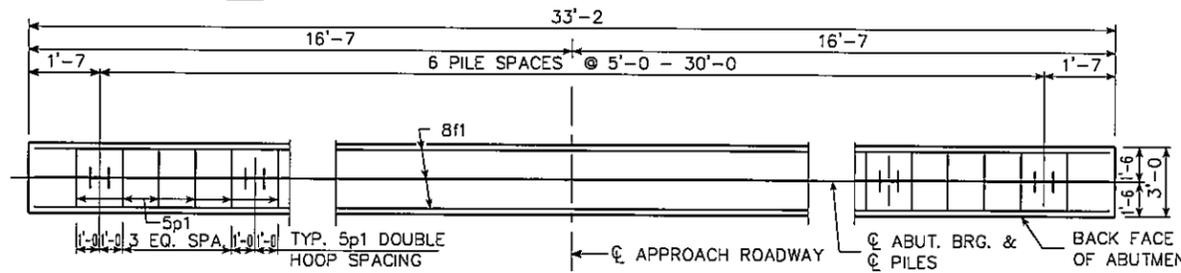


PART SECTION A - A

- SPACING FOR :
- 29 - 8g1 BACK FACE
  - 24 - 8g1 FRONT FACE
  - 25 - 8g2 BACK FACE
  - 25 - 5k1 & 5k2 BACK FACE

NOTE: PLACE 5h2 BAR AT 1:6 SLOPE TO MATCH TRAFFIC SIDE OF ABUTMENT WING FACE (BOTH SIDES TYPICAL.)

STEP	SOUTH ABUT.	NORTH ABUT.
a	1 1/2	1 1/2
b	1 1/2	1 1/2



ABUTMENT PILE PLAN

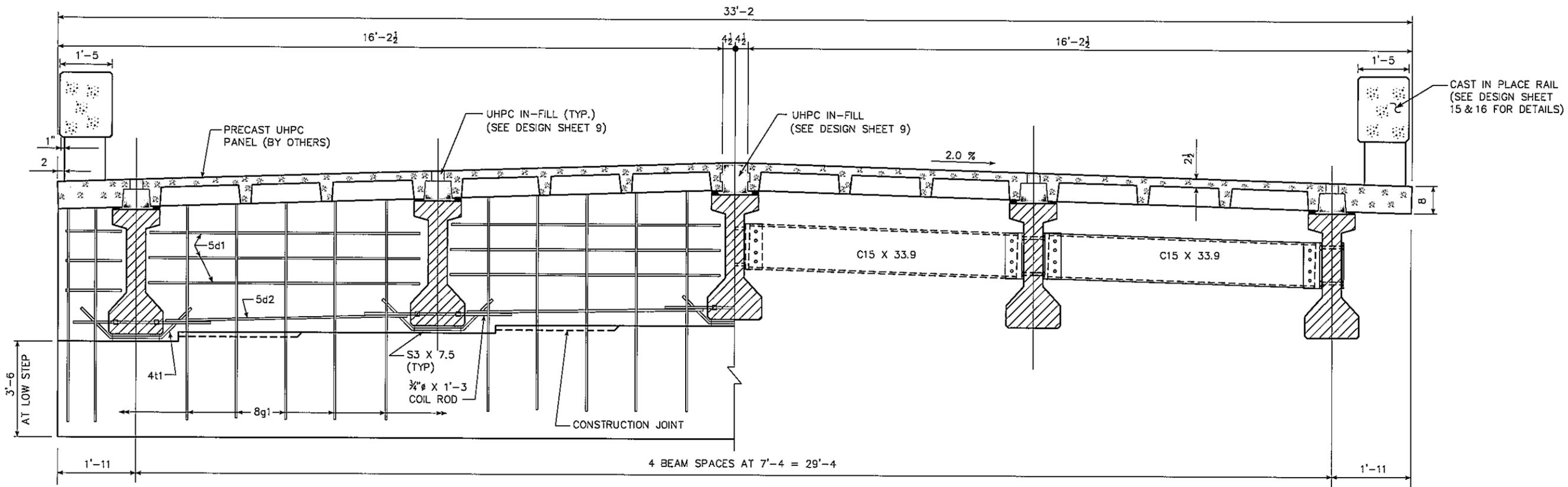
NOTE:  
7 x 60 - HP 10 x 42 STEEL BEARING PILING REQUIRED AT EACH ABUTMENT.  
45 TON BEARING ON EACH PILE.

NOTE:  
OPEN RAIL NOT SHOWN IN DETAILS.  
SEE DESIGN SHEET 15 & 16.

**ABUTMENT NOTES:**

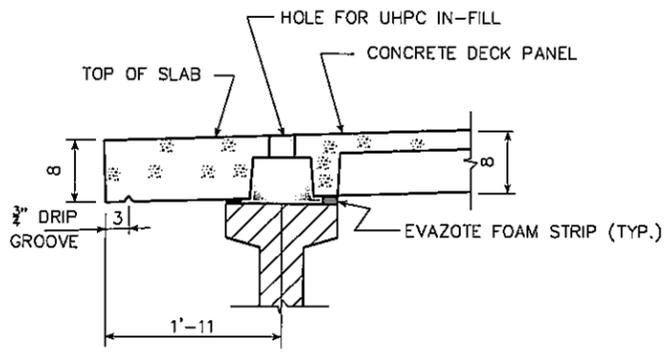
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN. THE DESIGN BEARING FOR THE ABUTMENT PILES IS 45 TONS. IF NECESSARY TO PREVENT DAMAGE TO THE END OF THE BRIDGE DECK OR BACKWALL FROM CONSTRUCTION EQUIPMENT, AN APPROPRIATE METHOD OF PROTECTION APPROVED BY THE WAPELLO COUNTY ENGINEER SHALL BE PROVIDED BY THE BRIDGE CONTRACTOR AT NO EXTRA COST TO WAPELLO COUNTY.

DESIGN FOR A 0° SKEW  
**60'-0 X 33'-2 PRECAST UHPC WAFFLE DECK PANEL BRIDGE**  
 ONE 60'-0 SPAN  
 STA. 5+50  
**ABUTMENT DETAILS**  
 JULY, 2010  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION



PART SECTION NEAR ABUTMENT

PART SECTION NEAR MID SPAN



TYPICAL SLAB AND HAUNCH DETAIL

\* FOR SLAB THICKNESS OVER BEAMS SEE "SLAB THICKNESS DETAILS" ON DESIGN SHEET NO. 10.

**SUPERSTRUCTURE NOTES:**

THE ABUTMENT DIAPHRAGM CONCRETE IS TO BE TIED MONOLITHICALLY WITH THE FLOOR SLAB AND PRECAST PANELS. COST OF ALL PREFORMED EXPANSION JOINT FILLER MATERIAL IS TO BE INCLUDED IN THE PRICE BID FOR "STRUCTURAL CONCRETE ( BRIDGE )". ALL BEAMS ARE TO BE SET VERTICAL. FORMS FOR THE OPEN RAIL ARE TO BE SUPPORTED BY THE PRESTRESSED CONCRETE BEAMS. CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN. ALL ABUTMENT DIAPHRAGM REINFORCING IS TO BE WIRED IN PLACE AND ADEQUATELY SUPPORTED BEFORE CONCRETE IS PLACED. COST OF BEARING MATERIAL IS TO BE INCLUDED IN THE PRICE BID FOR "PRETENSIONED PRESTRESSED CONCRETE BEAMS".

**PANEL LEVELING NOTES:**

THE CONTRACTOR SHALL WORK WITH THE CORESLAB CORPORATION TO DEVELOP A LEVELING SYSTEM TO BE USED WITH THE PLACEMENT OF THE PANELS TO ACHIEVE PROPER GRADE.

LEVELING DEVICES, DESIGNED BY THE CONTRACTOR, SHALL BE USED ON EACH PRECAST PANEL, AND SHALL BE APPROVED BY THE WAPELLO COUNTY ENGINEER.

PLATES SHALL MEET THE REQUIREMENTS OF ASTM A709 GRADE 36. ALL PLATES SHALL BE GALVANIZED. GALVANIZING SHALL BE IN ACCORDANCE WITH ARTICLE 4100.07 OF THE STANDARD SPECIFICATIONS.

MATERIAL, INSTALLATION AND MANUFACTURING OF ALL COMPONENTS OF THE LEVELING DEVICES WILL BE CONSIDERED INCIDENTAL TO THE COSTS OF THE PRECAST PANELS PLACEMENT.

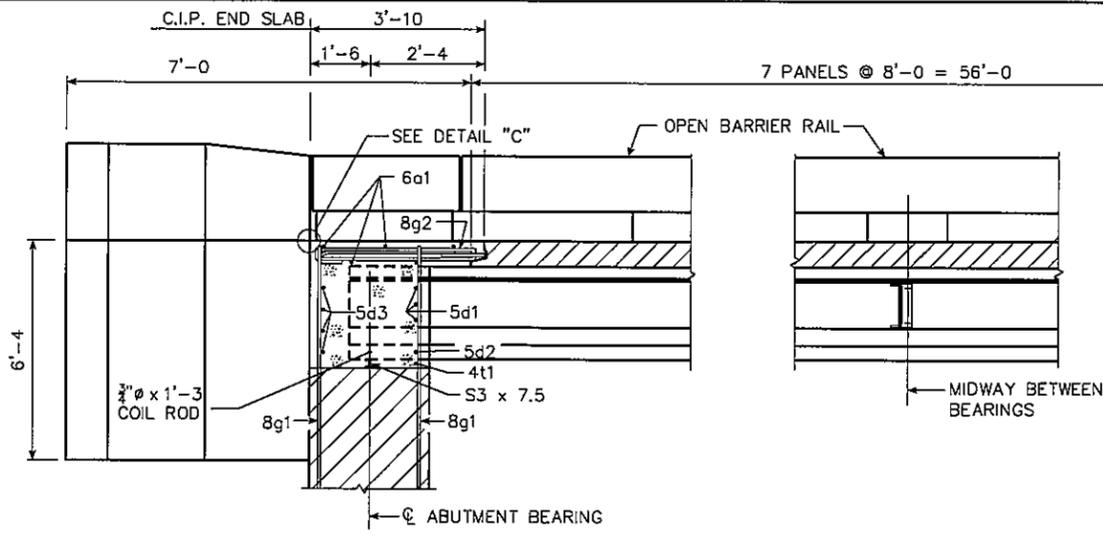
THE LEVELING DEVICES SHALL BE TESTED ON THE FIRST PANEL PRODUCED, IN THE MANUFACTURER'S SHOP, BEFORE PROCEEDING TO THE FIELD INSTALLATION. NOTE THE PANELS WILL BE ON A 2% GRADE IN THE FIELD AND THE LEVELING DEVICES SHOULD BE CHECKED FOR SLIPPAGE AT THIS ANGLE.

LEVEL DEVICES MAY BE LEFT IN PLACE AND COVERED BY UHPC IN-FILL.

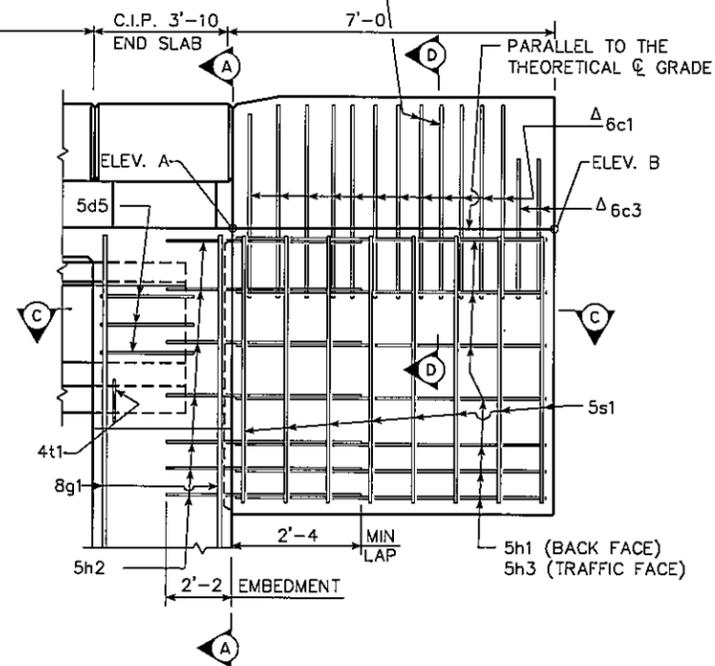
LENGTH OF S3 x 7.5 (ABUTMENT BEAM SEAT)	
BEAM BOTTOM FLANGE WIDTH	LENGTH OF S3 x 7.5
1'-8	1'-6 1/2

DESIGN FOR A 0° SKEW  
**60'-0 X 33'-2 PRECAST UHPC WAFFLE DECK PANEL BRIDGE**  
 ONE 60'-0 SPAN  
 STA. 5+50  
 JULY, 2010  
**SUPERSTRUCTURE DETAILS**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

SEE OPEN BARRIER RAIL DETAILS FOR BARS AND BAR SPACING ON DESIGN SHEET 15.

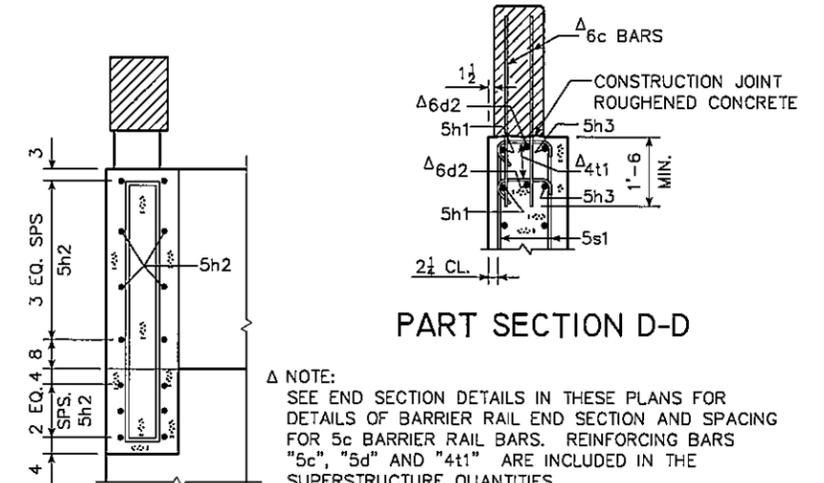


PART LONGITUDINAL SECTION NEAR GUTTER



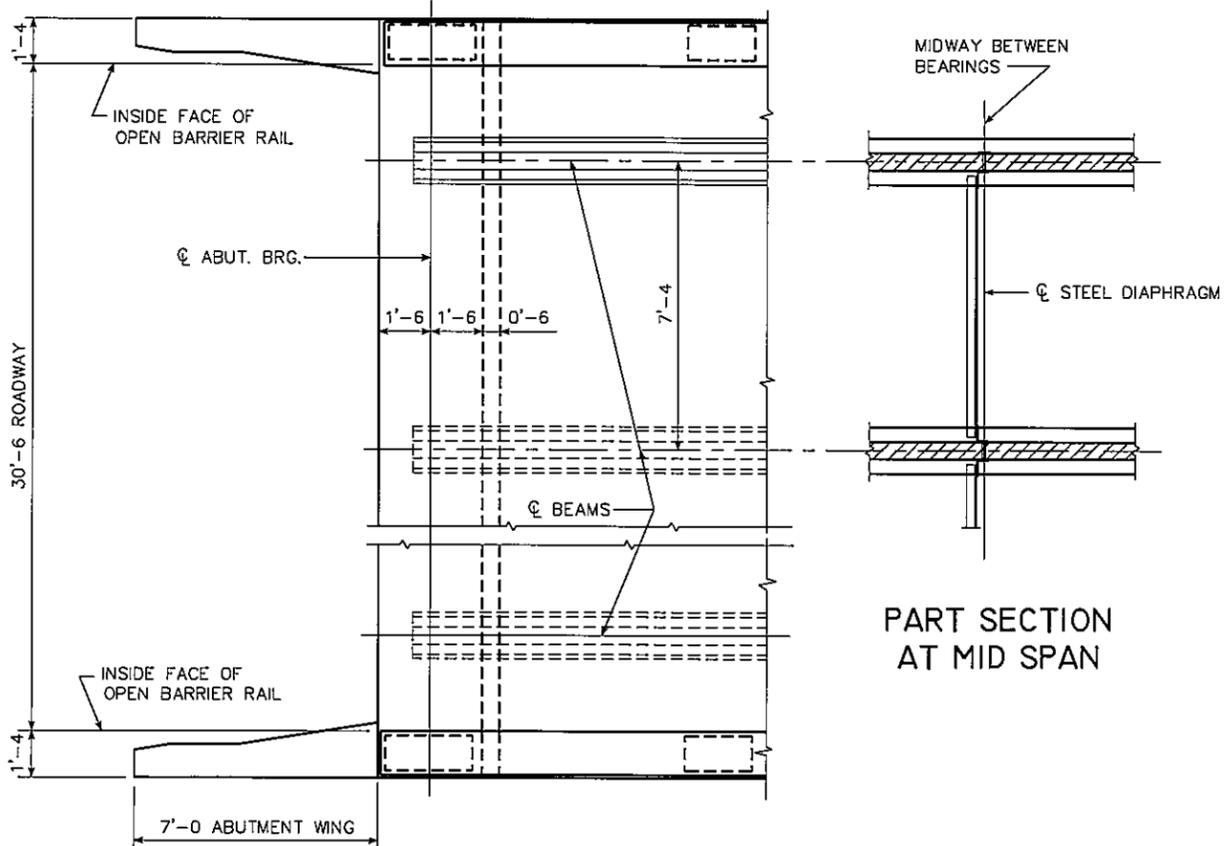
PART END VIEW AT ABUTMENT

TABLE OF WING ELEVATIONS				
LOCATION	DIM "C"	ELEV. A	ELEV. B	ELEV. C
EACH CORNER	2'-0"	764.42	764.42	764.42



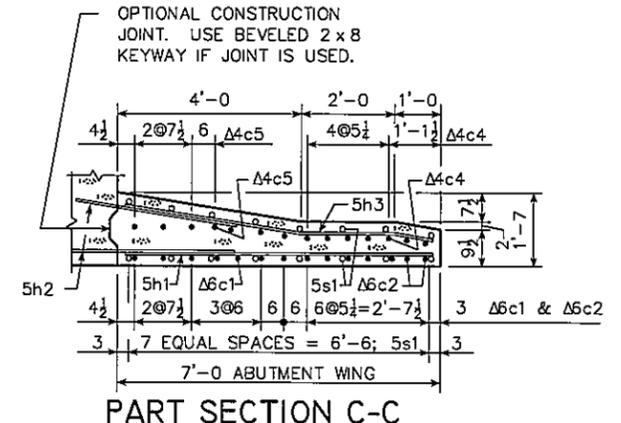
PART SECTION D-D

NOTE: SEE END SECTION DETAILS IN THESE PLANS FOR DETAILS OF BARRIER RAIL END SECTION AND SPACING FOR 5c BARRIER RAIL BARS. REINFORCING BARS "5c", "5d" AND "4t1" ARE INCLUDED IN THE SUPERSTRUCTURE QUANTITIES.



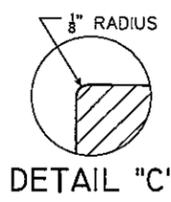
PART PLAN

PART SECTION AT MID SPAN

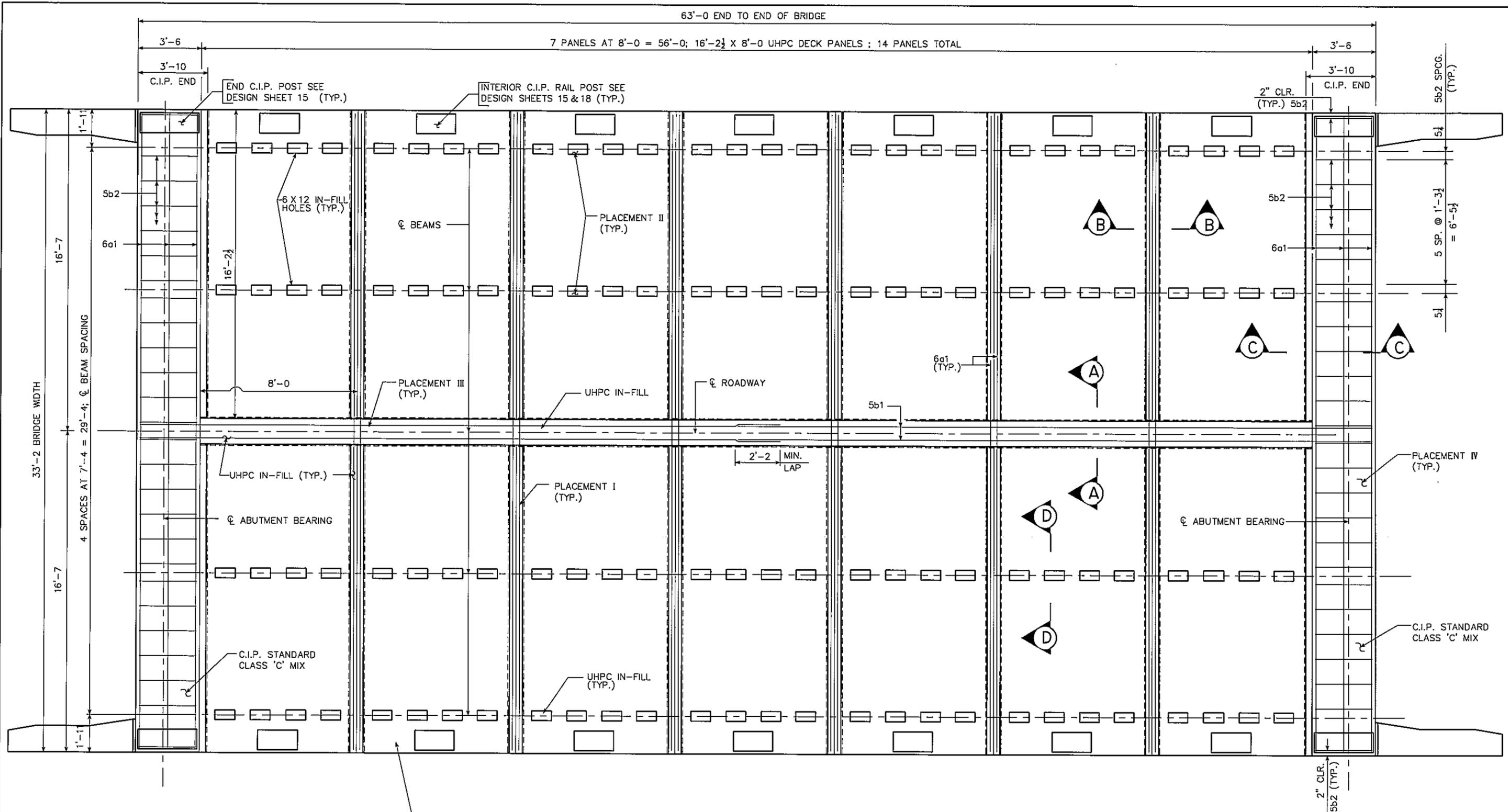


PART SECTION C-C

SECTION A-A



DESIGN FOR A 0° SKEW  
**60'-0 X 33'-2 PRECAST UHPC WAFFLE DECK PANEL BRIDGE**  
 ONE 60'-0 SPAN  
 STA. 5+50  
**SUPERSTRUCTURE DETAILS**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 JULY, 2010



**UHPC IM-FILL & C.I.P. CLASS 'C' SEQUENCE**  
 IN-FILL AND CAST-IN-PLACE CLASS 'C' PLACEMENT SHALL BE PLACED IN THE FOLLOWING SEQUENCE. ALTERNATE PLACEMENT SEQUENCE SHALL BE SUBMITTED TO THE WAPELLO COUNTY ENGINEER FOR APPROVAL.

- I. TRANSVERSE JOINTS (12 LOCATIONS)
- II. 6x12 IN-FILL HOLES (112 LOCATIONS)
- III. C. JOINT (1 LOCATION)
- IV. ABUTMENT PLACEMENT C.I.P. CLASS 'C'

PRECAST UHPC WAFFLE PANELS PROVIDED BY OTHERS (TYP.) SEE DESIGN SHEETS 17 & 18 FOR DETAILS

**PLAN VIEW PRECAST PANEL LAYOUT**  
 (BRIDGE RAILING NOT SHOWN)

NOTE:  
 FOR JOINT DETAILS A-A, B-B, C-C & D-D, SEE DESIGN SHEET 9.

NOTE:  
 FOR CONCRETE RAILING DETAILS, SEE DESIGN SHEETS 15 & 16.

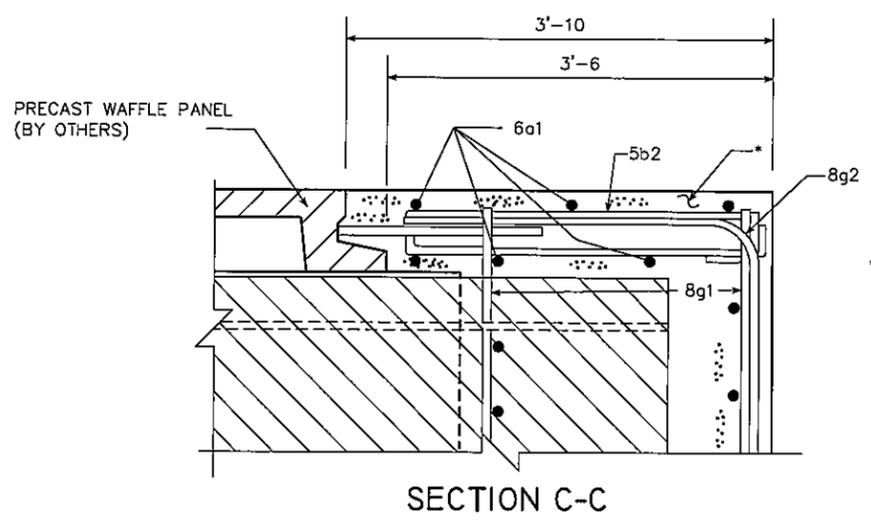
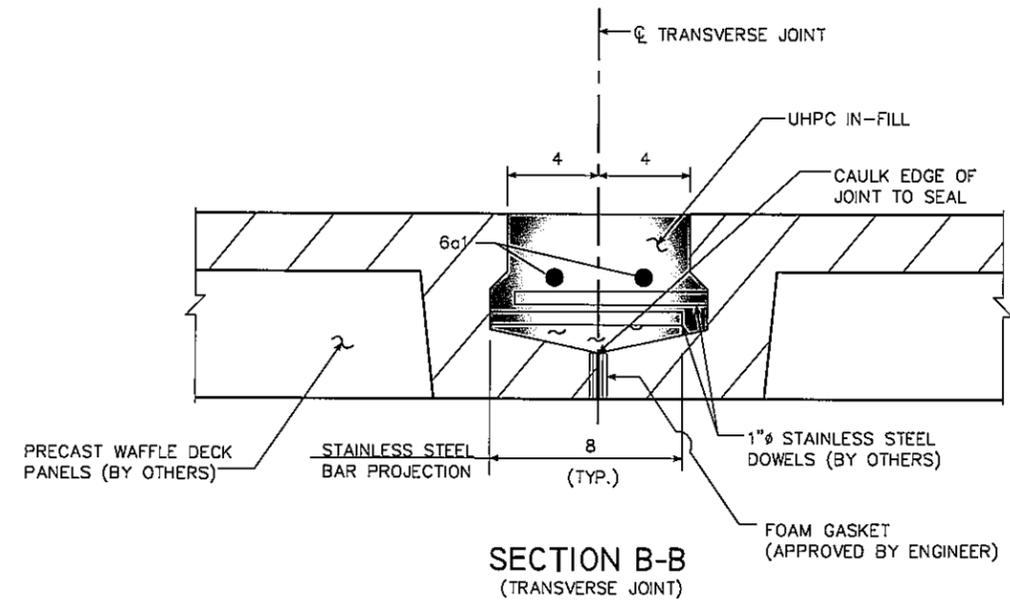
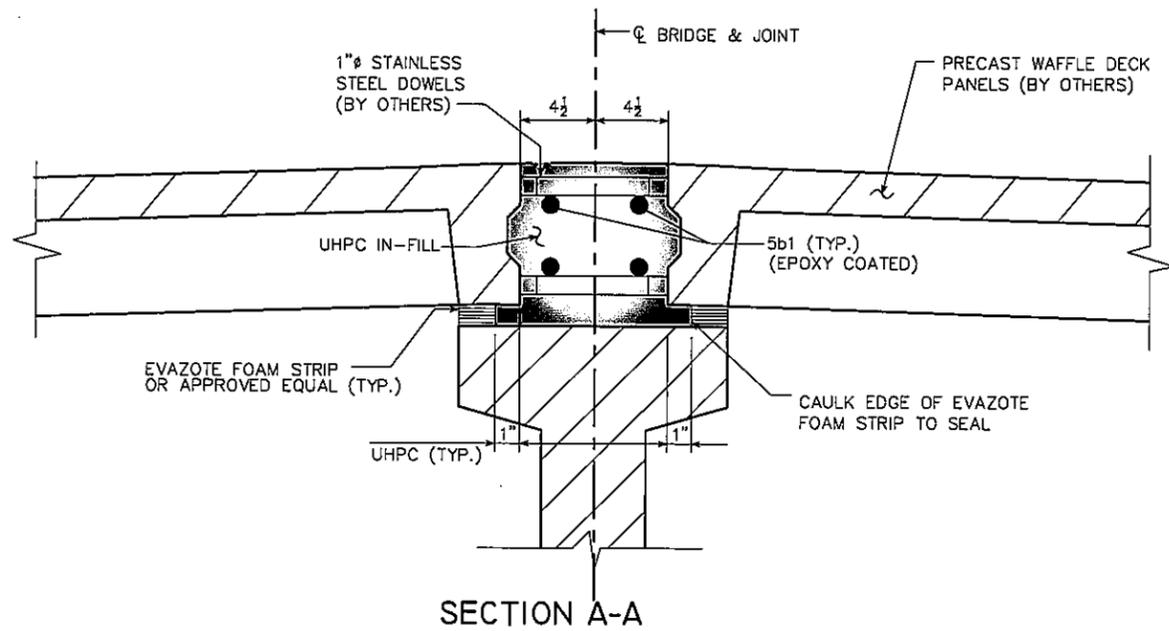
DESIGN FOR A 0° SKEW

**60'-0 X 33'-2 PRECAST UHPC WAFFLE DECK PANEL BRIDGE**

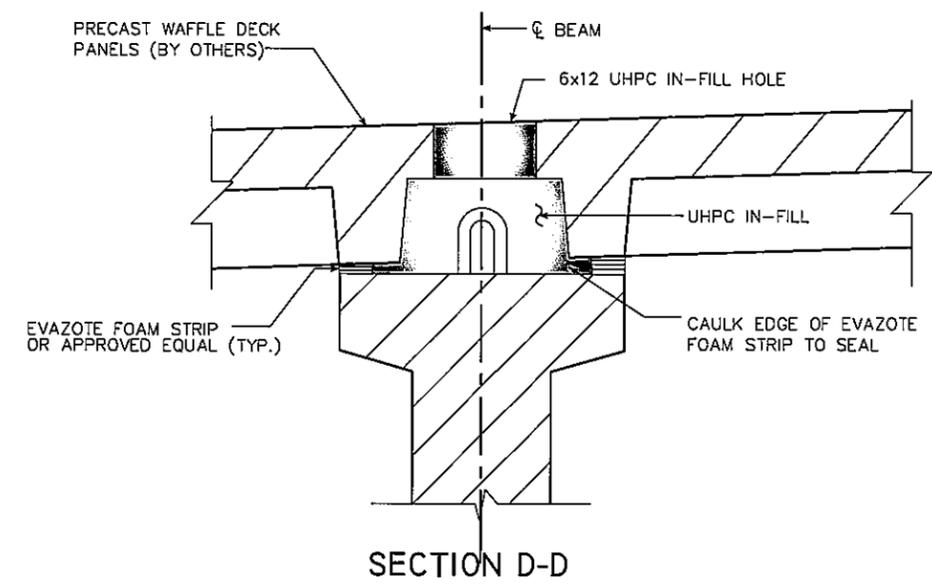
ONE 60'-0 SPAN STA. 5+50 JULY, 2010

**FULL BRIDGE PANEL LAYOUT**

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

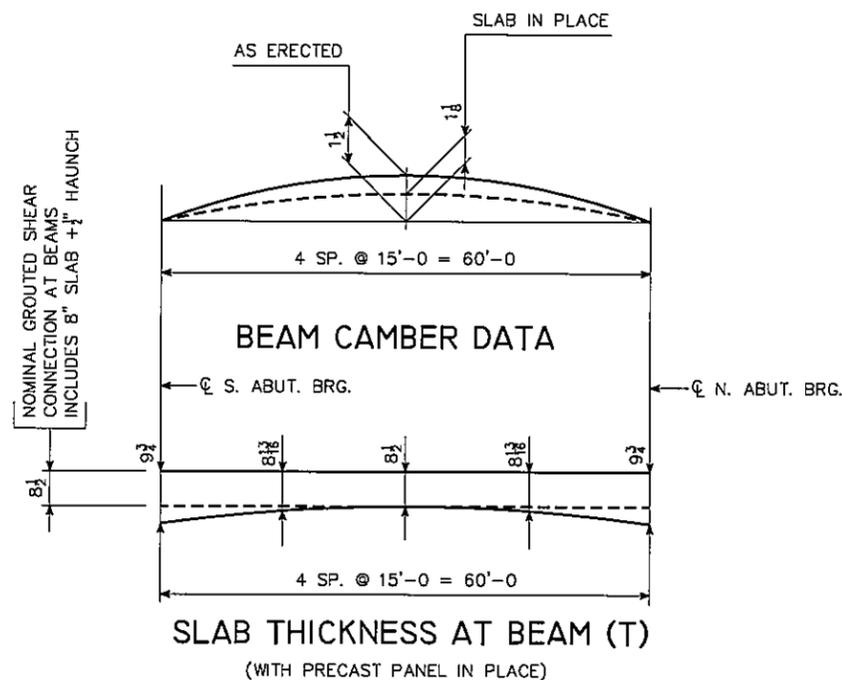


\* NOTE:  
CAST-IN-PLACE AREA OF THE ABUTMENT BACKWALL AND 3'-10 OF DECK SHALL BE STRUCTURAL CONCRETE, BRIDGE STANDARD CLASS 'C' MIX.



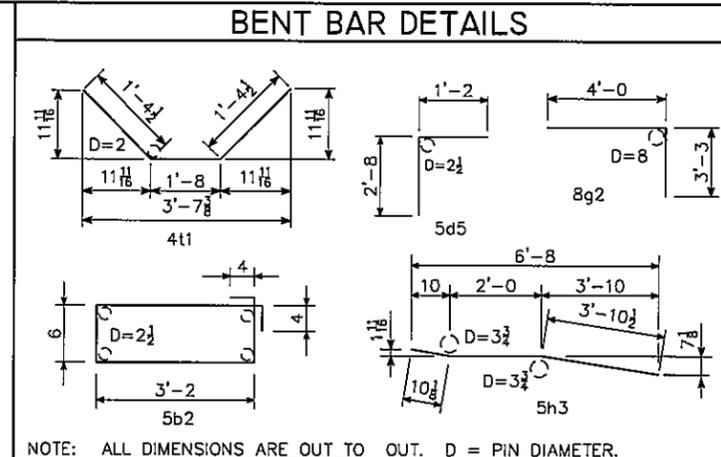
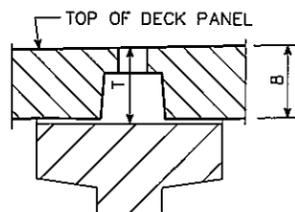
DESIGN FOR A 0° SKEW  
**60'-0 X 33'-2 PRECAST UHPC WAFFLE DECK PANEL BRIDGE**  
 ONE 60'-0 SPAN  
 STA. 5+50  
 JULY, 2010  
**CAST IN PLACE END SLAB DETAILS**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

NOTE:  
FOR DETAILS AND QUANTITIES NOT SHOWN, REFER TO DESIGN SHEET 10.



**SLAB THICKNESS DETAILS**

NOTE : THE SLAB 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 SHEET 11 FOR ADDITIONAL INFORMATION TO AID THE CONTRACTOR IN SETTING THE FIELD HAUNCHES REQUIRED FOR CONSTRUCTION.



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

**EPOXY COATED REINF. BAR LIST - TWO ABUT'S.**

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6a1	SLAB, TRANSV., TOP & BOTT.	—	22	32'-10	1085
5b1	ABUT. DIAPHR.	—	8	32'-5	270
5b2	ABUT. DIAPHR.	□	52	8'-0	434
5d1	ABUT. DIAPHR., LONGIT. F.F.	—	24	6'-3	156
5d2	ABUT. DIAPHR., LONGIT. F.F.	—	8	5'-5	45
5d3	ABUT. DIAPHR., LONGIT. F.F.	—	8	32'-10	274
5d5	ABUT. DIAPHR., END	└	12	3'-10	48
8g1	ABUT. VERTICAL	—	106	7'-7	2146
8g2	ABUT. DIAPHR., VERT., B.F.	└	50	7'-3	968
5h1	ABUT. WING, HORIZ.	—	28	6'-8	195
5h2	ABUT. TO WING, HORIZ.	—	56	5'-0	292
5h3	ABUT. WING HORIZ. TRAFFIC FACE	—	28	6'-9	197
5s1	WING, VERT.	—	64	6'-0	400
4t1	UNDER BEAMS AT ABUTS.	∩	10	4'-5	30
#2	Δ PILE SPIRAL	◻◻◻◻	14	38'-6	246
	Δ SPIRAL SPACER, L 7/8 x 7/8 x 1/8 x 0.70	—	42	1'-10	29
BARRIER RAIL REINFORCING - SEE DES. SHT. NO. 16					4080
TOTAL ( LBS. )					10,895

ΔEPOXY COATING NOT REQUIRED

**UHPC IN-FILL PLACEMENT**

SECTION	TOTAL
I TRANSVERSE JOINTS (12 @ 0.202)	2.43
II 6 x 12 IN-FILLS (112 @ 0.128)	14.34
III CENTERLINE JOINT (1 @ 1.040)	1.04
TOTAL C.Y.	17.81

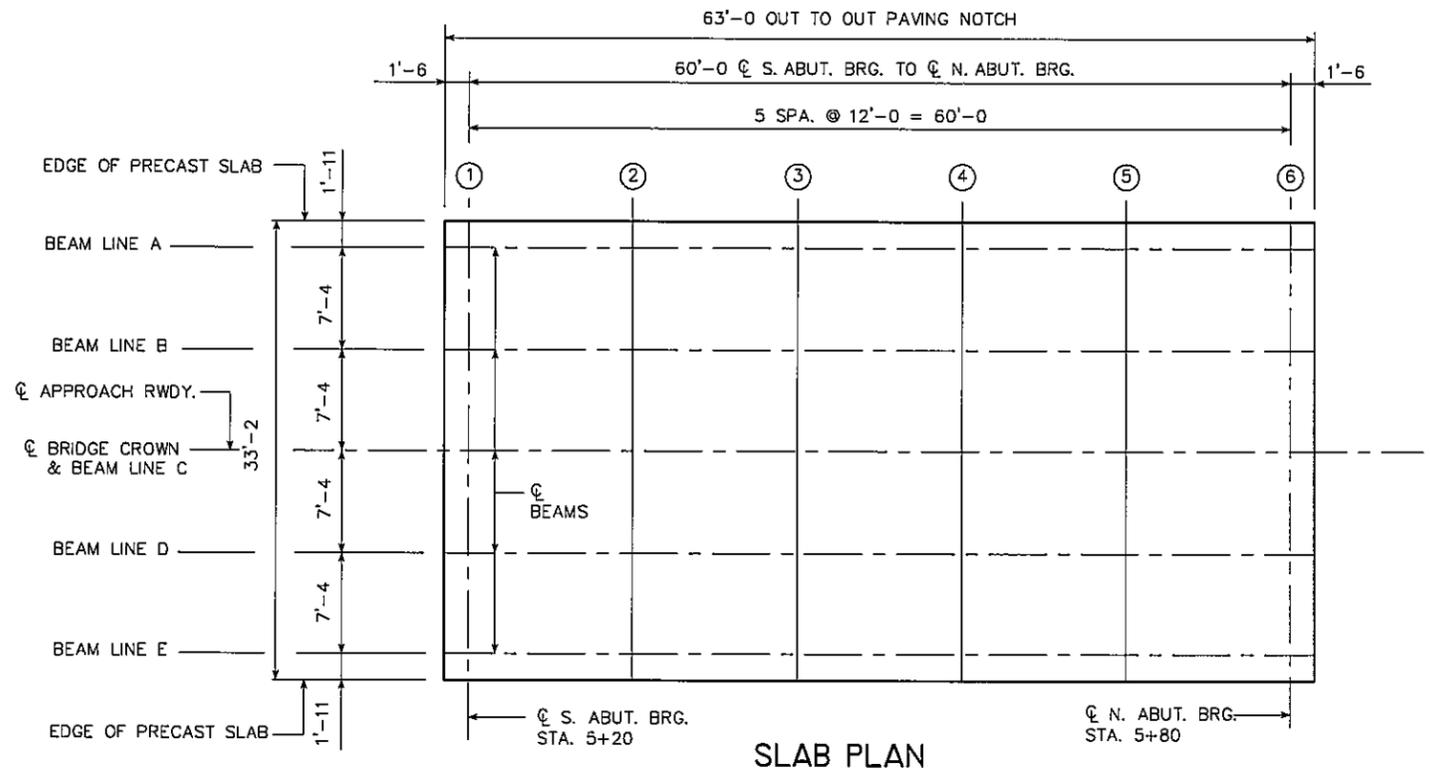
**CONCRETE PLACEMENT QUANTITIES - ONE SUPERSTR.**

SECTION	TOTAL
SLAB ENDS, ABUTMENT DIAPHRAGMS	35.2
ABUTMENT SEAT	27.1
ABUTMENT WINGS ( 4 AT 1.84 CY EA. )	7.4
TOTAL C.Y.	69.7

DESIGN FOR A 0° SKEW  
**60'-0 X 33'-2 PRECAST UHPC  
 WAFFLE DECK PANEL BRIDGE**  
 ONE 60'-0 SPAN  
 STA. 5+50  
 JULY, 2010  
**SUPERSTRUCTURE DETAILS**

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

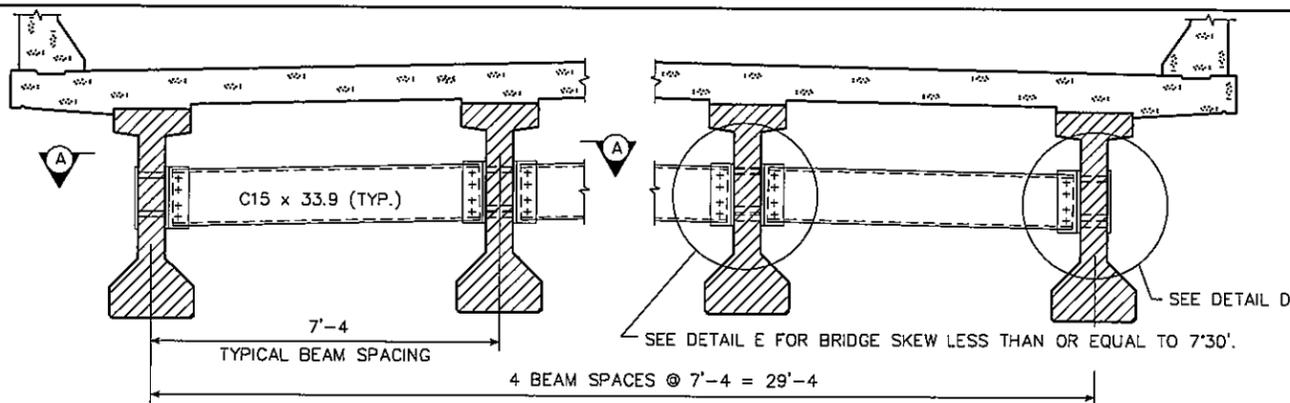
TOP OF PRECAST SLAB ELEVATIONS								
LOCATION	☉ SOUTH ABUT. BRG.	1	2	3	4	5	6	☉ NORTH ABUT. BRG.
BEAM LINE A	764.46	764.46	764.46	764.46	764.46	764.46	764.46	
BEAM LINE B	764.60	764.60	764.60	764.60	764.60	764.60	764.60	
☉ BRIDGE CROWN & BEAM LINE C	764.75	764.75	764.75	764.75	764.75	764.75	764.75	
BEAM LINE D	764.60	764.60	764.60	764.60	764.60	764.60	764.60	
BEAM LINE E	764.46	764.46	764.46	764.46	764.46	764.46	764.46	



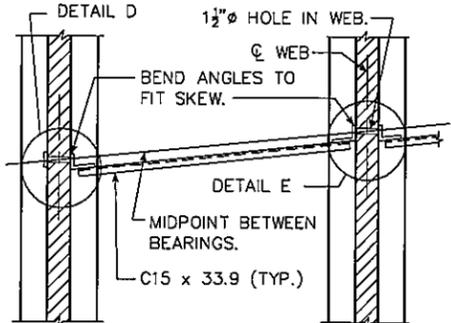
**TYPICAL SLAB AND HAUNCH DETAIL**  
 FOR SLAB THICKNESS (T) OVER BEAMS SEE SLAB THICKNESS AT EXISTING BEAM DETAILS ON SHEET 10.

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.

DESIGN FOR A 0° SKEW  
**60'-0 X 33'-2 PRECAST UHPC  
 WAFFLE DECK PANEL BRIDGE**  
 ONE 60'-0 SPAN  
 STA. 5+50  
 JULY, 2010  
**TOP OF SLAB ELEVATIONS**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

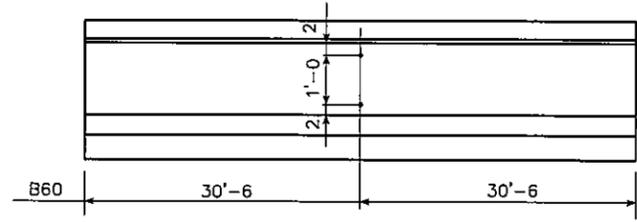


SECTION SHOWING INTERMEDIATE DIAPHRAGM

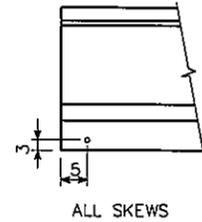


SECTION A-A

FOR BRIDGES SKEWED LESS THAN OR EQUAL TO 7'30"



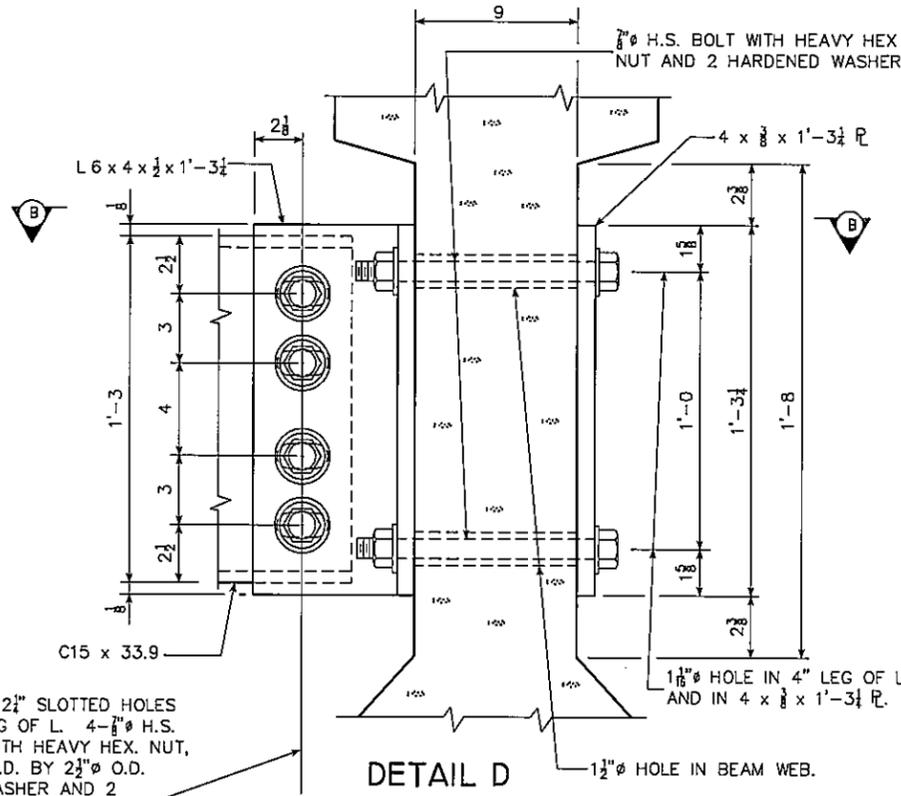
INTERMEDIATE DIAPHRAGM BOLT LOCATIONS



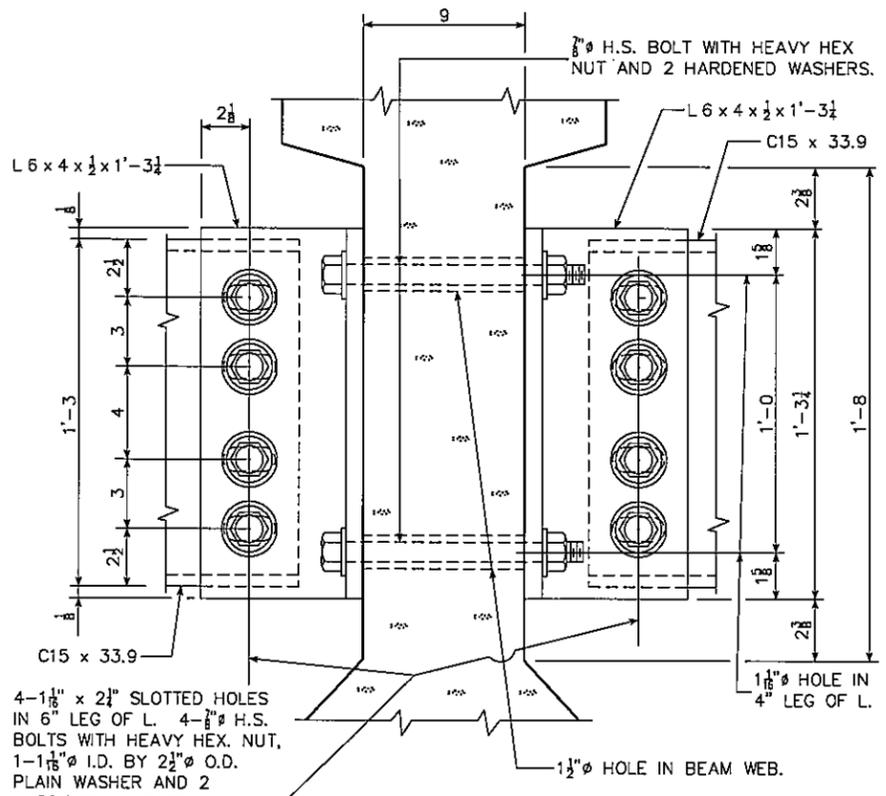
INTEGRAL ABUTMENT BEAM COIL TIE LOCATIONS

NOTES:  
 ALL DIAPHRAGM MATERIALS, INCLUDING BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED.  
 SHOP DRAWINGS OF THE STEEL DIAPHRAGMS SHOWING LAYOUT AND DETAILS OF THE DIAPHRAGMS SHALL BE SUBMITTED FOR APPROVAL.  
 ALL COSTS FOR FURNISHING AND INSTALLING STEEL INTERMEDIATE DIAPHRAGMS SHALL BE INCLUDED IN THE PRICE BID FOR STRUCTURAL STEEL.  
 THE 1 1/2" HOLES FOR THE 3/4" H.S. BOLTS SHALL BE CAST INTO THE WEB. DRILLING IS NOT ALLOWED.  
 THE 3/4" H.S. BOLTS THROUGH THE WEB SHALL HAVE A THREAD LENGTH OF 3" MIN. AND 4" MAX. AND SHALL MEET THE REQUIREMENTS OF ASTM A449.  
 ALL BOLTS ARE TO BE TIGHTENED PRIOR TO PLACING BRIDGE FLOOR CONCRETE WITH THE FOLLOWING EXCEPTION: BOLTS IN DIAPHRAGMS LOCATED UNDER LONGITUDINAL BRIDGE FLOOR CONSTRUCTION JOINTS SHALL NOT BE TIGHTENED UNTIL STAGE TWO OF THE BRIDGE FLOOR HAS BEEN PLACED.

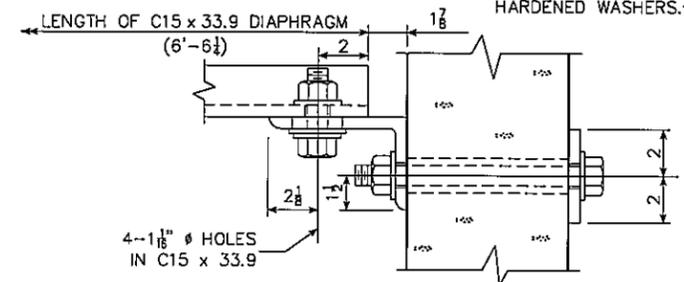
INTERMEDIATE DIAPHRAGM STRUCTURAL STEEL			
<b>ONE CONNECTION DETAIL "E"</b>			WEIGHT
2 - 3/8" x LENGTH H.S. BOLTS WITH NUTS AND WASHERS			
WEB THICKNESS	LENGTH OF H.S. BOLTS	WEIGHT PER DETAIL "E"	NUMBER OF DETAIL "E"
9"	12"	5.34 LB	3
2 - L6 x 4 x 1/2 x 1'-3 1/4" = 41.2 LB			3
123.6			
<b>ONE CONNECTION DETAIL "D"</b>			
2 - 3/8" x LENGTH H.S. BOLTS WITH NUTS AND WASHERS			
WEB THICKNESS	LENGTH OF H.S. BOLTS	WEIGHT PER DETAIL "D"	NUMBER OF DETAIL "D"
9"	12"	5.34 LB	2
1 - BACKING PLATE 4 x 3/8 x 1'-3 1/4" = 6.5 LB			2
1 - L6 x 4 x 1/2 x 1'-3 1/4" = 20.6 LB			2
13.0			
41.2			
<b>ONE C15 x 33.9 DIAPHRAGM</b>			
BEAM SPACING			7'-4"
WEB THICKNESS		* LENGTH	UNIT WEIGHT (LB)
6"		6'-3 1/4"	212.6
* THE LENGTH OF THE C15 x 33.9 SHOWN IN THE TABLE IS BASED ON A VARIABLE CLEARANCE OF 1 1/8" TO 2 1/8" BETWEEN THE FACE OF BEAM WEB AND END OF C15 x 33.9.			
<b>DIAPHRAGM WEIGHTS</b>			
UNIT WEIGHT	NUMBER OF DIAPHRAGMS		
212.6 LB	4	850.4	
<b>DIAPHRAGM CONNECTION BOLTS</b>			
8 - 3/8" x 0'-2 1/2" H.S. BOLTS WITH NUTS AND WASHERS, PER UNIT DIAPHRAGM		NUMBER OF DIAPHRAGMS	
10.3 LB		4	
		41.2	
INTERMEDIATE DIAPHRAGM STRUCTURAL STEEL (TOTAL LB) = 1096.1			



DETAIL D

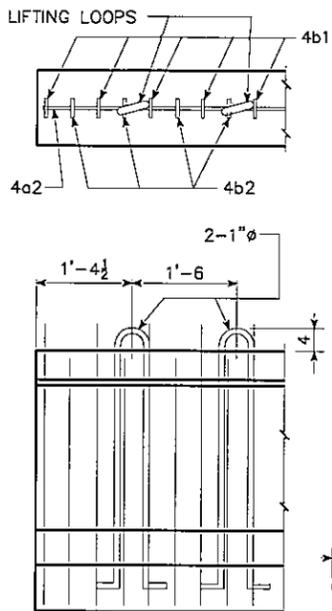


DETAIL E



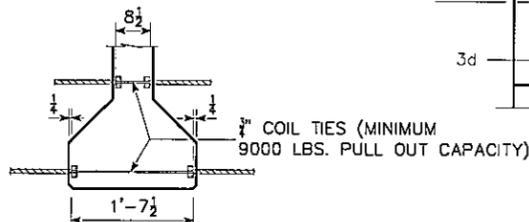
SECTION B-B

DESIGN FOR A 0' SKEW  
**60'-0" X 33'-2" PRECAST UHPC WAFFLE DECK PANEL BRIDGE**  
 ONE 60'-0" SPAN  
 STA. 5+50  
 JULY, 2010  
**INTERMEDIATE DIAPHRAGM DETAILS**  
 IOWA DEPARTMENT OF TRANSPORTATION -- HIGHWAY DIVISION



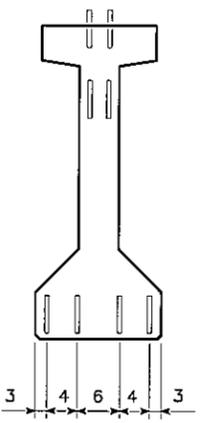
**LIFTING LOOP DETAIL**

ALTERNATE TYPES MAY BE SUBSTITUTED WITH THE APPROVAL OF THE ENGINEER. LIFTING LOOPS ARE TO BE STRUCTURAL GRADE.



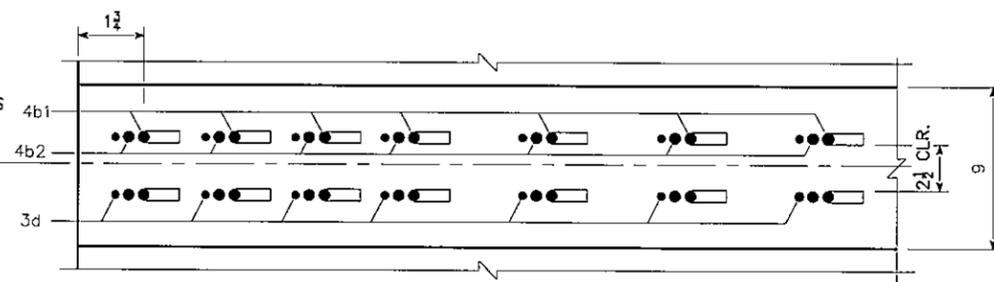
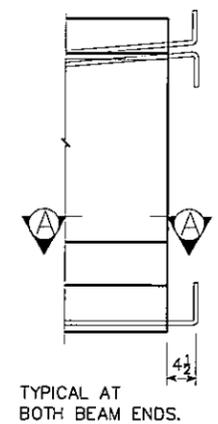
**COIL TIE DETAIL**

NUMBER AND EXACT LOCATION OF COIL TIES TO BE AS DETAILED ON SPECIFIC BRIDGE DESIGN.



**STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS**

4 TOP DEFLECTED STRANDS ARE TO BE CUT WITH 1'-0 PROJECTIONS AND SHOP BENT UP OR DOWN AS SHOWN (BEND TOP AND BOTTOM ROWS). FOUR BOTTOM STRANDS ARE TO BE CUT WITH 1'-0 PROJECTIONS AND SHOP BENT AS SHOWN. THE REMAINING BOTTOM STRANDS SHALL BE CUT OFF REASONABLY FLUSH WITH THE CONCRETE.



**SECTION A-A SHOWING PLACEMENT OF STIRRUPS NEAR END OF BEAM**

**DESIGN STRESSES:**

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE TO BE IN ACCORDANCE WITH A.A.S.H.T.O. LRFD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 2007:  
 REINFORCING STEEL IN ACCORDANCE WITH SECTION 5, GRADE 60.  
 PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 5, f's = 270,000 psi.

ΔΔ4b1 BARS TO BE EPOXY COATED.  
 \*\* WHERE DEFLECTING STRANDS INTERFERE WITH PLACEMENT, SOME IN-PLACE BENDING MAY BE NECESSARY.

**B BEAM DATA**

BEAM	SPAN LENGTH @ BEARING	OVERALL BEAM LENGTH (L)	STRAND SIZE DIA. (inches)	NO. OF STRANDS		TOTAL INITIAL PRESTRESS KIPS	HOLD DOWN FORCE-KIPS	CAMBER (in.)		DEFLECTION (in.) Δ <sub>b</sub>				PERMISSIBLE SPACING		WEIGHT (TONS)	CONCRETE (C. Y.)	REINFORCING STEEL-(lb)		
				STRAIGHT	DEFLECTED			AT RELEASE	AFTER LOSSES	IMMEDIATE <sup>①</sup> (ELASTIC) Δ <sub>t</sub>		TIME <sup>②</sup> (PLASTIC) Δ <sub>t</sub>		HL93 LOADING						
										CONC. DIAPH.	STEEL DIAPH.	CONC. DIAPH.	STEEL DIAPH.	CONC. DIAPH.	STEEL DIAPH.					
*B60	60'-0	61'-0	0.60	10	4	595	17.3	0.84	1.49			0.34		0.08			7'-4	15.9	7.84	747

- ① DEFLECTIONS AT MID-SPAN DUE TO WEIGHT OF SLAB AND DIAPHRAGM. THE DEFLECTIONS SHOWN ARE FOR A SLAB WEIGHT OF 489 #/FT.<sup>2</sup> (8" SLAB AND 7'-4 BEAM SPACING) AND ONE STEEL DIAPHRAGM (285 #) AT C OF SPAN.
- ② DEFLECTIONS DUE TO THE COMBINED EFFECT OF CREEP DUE TO WEIGHT OF SLAB AND SHRINKAGE OF SLAB.
- TOTAL BEAM DEFLECTIONS AT C OF SPAN, Δ<sub>b</sub>, DUE TO WEIGHT OF SLAB AND DIAPHRAGMS FOR DETAILING PURPOSE:  
 (A) Δ<sub>b</sub> = Δ<sub>t</sub> + Δ<sub>r</sub> FOR SIMPLE SPAN.  
 (B) Δ<sub>b</sub> = Δ<sub>t</sub> + 1/2 Δ<sub>r</sub> FOR END SPANS OF CONTINUOUS BRIDGE.  
 (C) Δ<sub>b</sub> = Δ<sub>t</sub> + 1/2 Δ<sub>r</sub> FOR INTERIOR SPANS OF CONTINUOUS BRIDGE.
- ③ TOTAL INITIAL PRESTRESS IS BASED ON 72.6% f's, f's = 270 ksi AND A<sub>s</sub> = 0.217 sq. in.

\* MINIMUM CONCRETE f'c (AT 28 DAYS) SHALL BE 7,000 psi. MINIMUM f'ci AT RELEASE SHALL BE 6,000 psi.

**NOTES:**

THESE BEAMS ARE DESIGNED FOR AASHTO LIVE LOADS AS INDICATED IN ABOVE TABLE WITH AN ALLOWANCE OF 20 lb. PER SQUARE FOOT OF ROADWAY FOR FUTURE WEARING SURFACE.

HOLD DOWN POINTS FOR DEFLECTED STRANDS MAY BE MOVED TOWARD ENDS OF BEAM A DISTANCE OF 0.05 L MAXIMUM AT PRODUCER'S OPTION.

ALL PRESTRESSING STRANDS SHALL CONFORM TO ASTM A416 GRADE 270 LOW RELAXATION STRANDS.

TOPS OF BEAMS SHALL BE STRUCK OFF LEVEL AND A 3.5 INCH STRIP SHALL BE FINISHED ALONG EACH EDGE OF THE BEAM. THE REMAINING 9 INCH WIDTH SHALL BE ROUGHENED TO A 1/4" AMPLITUDE.

BEARINGS SHALL BE AS DETAILED ON OTHER DESIGN SHEETS. BEAMS TO BE USED IN BRIDGES MADE CONTINUOUS BY THE POURED IN PLACE FLOOR, ARE TO BE AT LEAST 28 DAYS OLD BEFORE THE FLOOR IS PLACED UNLESS A SHORTER CURING TIME IS APPROVED BY THE BRIDGE ENGINEER.

THE PORTIONS OF THE PRESTRESS BEAMS THAT ARE TO BE EMBEDDED IN THE ABUTMENT SHALL BE ROUGHENED FOR A DISTANCE OF 10" FROM THE BEAM END BY SANDBLASTING OR OTHER APPROVED METHODS TO PROVIDE SUITABLE BOND BETWEEN THE BEAM AND THE DIAPHRAGM IN ACCORDANCE WITH ARTICLE 2403.03, I OF THE SPECIFICATIONS.

ALL BEAMS ARE TO BE INCREASED IN LENGTH TO COMPENSATE FOR ELASTIC SHORTENING, CREEP AND SHRINKAGE.

IF THE STEEL DIAPHRAGM OPTION IS ALLOWED AND USED, HOLES MUST BE CAST IN THE WEB TO ACCOMMODATE THE STEEL DIAPHRAGM ATTACHMENTS AS DETAILED ON THE STEEL DIAPHRAGM DETAIL SHEET.

0.6" DIAMETER STRANDS STRESSED TO NOT MORE THAN 5,000 LBS. EACH MAY BE USED IN LIEU OF THE α BARS WHICH RUN THE FULL LENGTH OF THE BEAM IN THE TOP FLANGE.

UPON DELIVERY TO THE JOB SITE EACH PANEL SHALL BE JOINTLY INSPECTED BY THE WAPELLO COUNTY ENGINEER, CORESLAB STRUCTURES AND THE BRIDGE CONTRACTOR FOR STRUCTURAL INTEGRITY AND ANY DAMAGE THAT MAY HAVE BEEN CAUSED BY SHIPMENT ANY DAMAGE SHALL BE REPAIRED BY CORESLAB. ONCE ACCEPTED BY THE WAPELLO COUNTY ENGINEER AND THE CONTRACTOR, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PANELS DURING CONSTRUCTION AT THE BRIDGE SITE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACEMENT OR REPAIR OF ANY PANELS DAMAGED DURING THE CONSTRUCTION AT THE BRIDGE SITE, WHICH SHALL INCLUDE THE LIFTING AND PLACEMENT ON THE BRIDGE BEAMS.

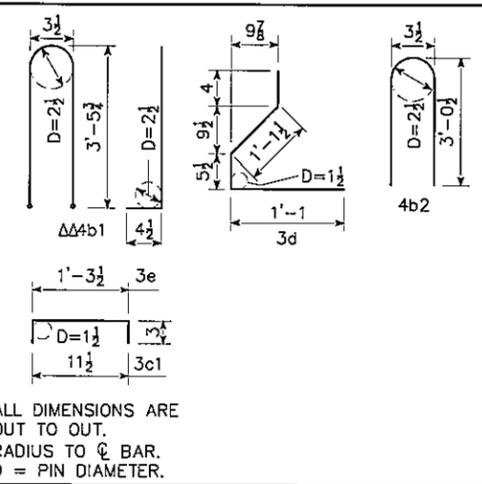
**SPECIFICATIONS:**

CONSTRUCTION: STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION, CURRENT SERIES, WITH CURRENT APPLICABLE SPECIAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS.

DESIGN: A.A.S.H.T.O. LRFD, SERIES OF 2007, WITH MINOR MODIFICATIONS.

**REINFORCING BAR LIST**

BEAM	SPAN	B60	60'-0
BAR	SHAPE	NO.	LENGTH
6a1	—	4	31'-10
4a2	—	2	4'-2
ΔΔ 4b1	U	64	7'-10
4b2	U	6	6'-2
3c1	—	64	1'-6
** 3d	∟	140	3'-0
3e	—	22	1'-10

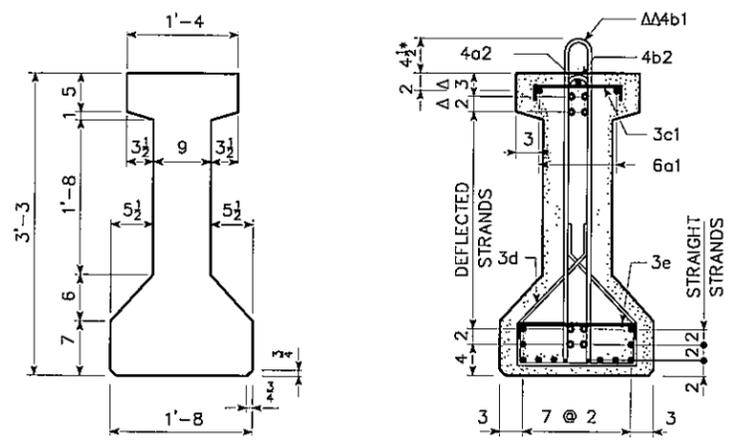
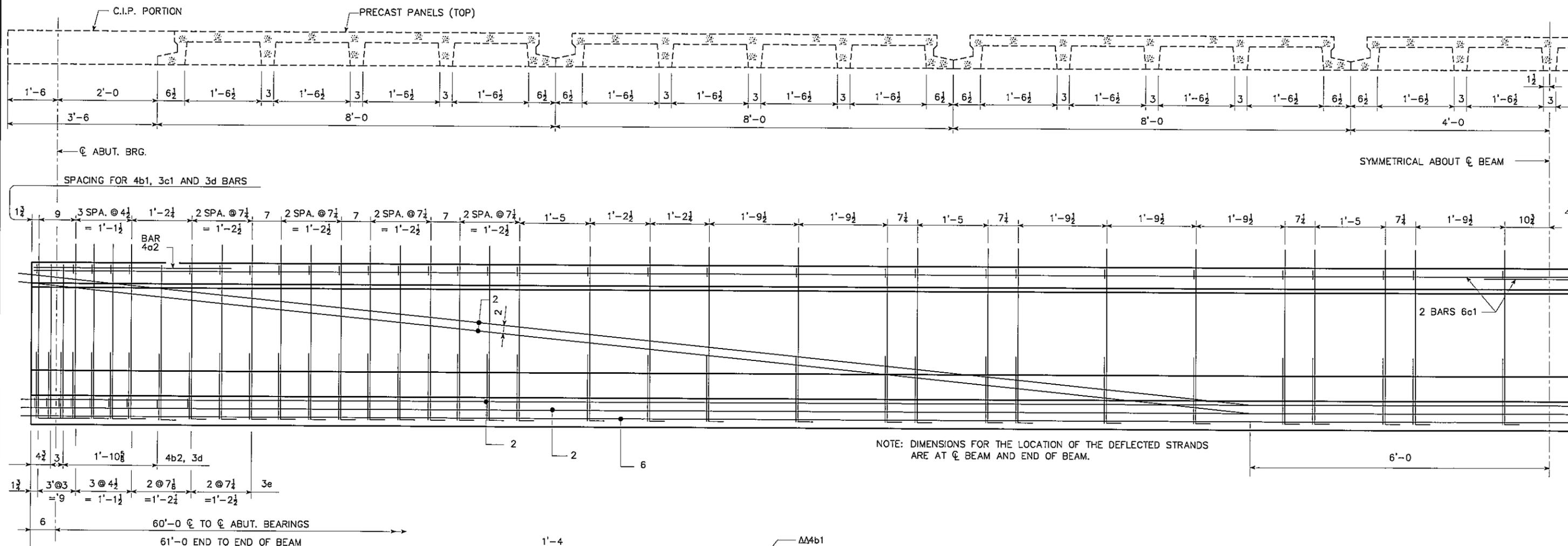


NOTE:  
 UHPC WAFFLE PANELS WILL BE SUPPLIED BY CORESLAB STRUCTURES, INC, 802 ALLIED ROAD, LAPLATTE, NE, 68123. CONTACT JOHN HEIMANN AT OFFICE: (402)291-0733 EXT. 407 AND CELL PHONE: (402)960-0644

DESIGN FOR A 0° SKEW  
**60'-0 X 33'-2 PRECAST UHPC WAFFLE DECK PANEL BRIDGE**  
 ONE 60'-0 SPAN  
 STA. 5+50  
**MODIFIED B60 BEAM DETAILS (BY OTHERS)**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

ENGLISH BEAMS.DGN - 4610 - LRFD - THIS SHEET RE-ISSUED 09-06.

NOTE:  
 PRECAST DECK PANELS WITH DIMENSIONS SHOWN  
 ONLY FOR CLARITY OF HOOP SPACING DIMENSIONS IN BEAM.



'B' BEAM CROSS SECTION

A = 499.5 in.<sup>2</sup>

Y<sub>b</sub> = 17.63 in.

I = 77,364 in.<sup>4</sup>

NOTE: BARS 3d ARE TO BE PLACED IN PAIRS.

○ DEFLECTED STRANDS

\* KEEP

Δ DIMENSIONS AT END OF BEAM

ΔΔ EPOXY COATED BARS

DESIGN FOR A 0° SKEW

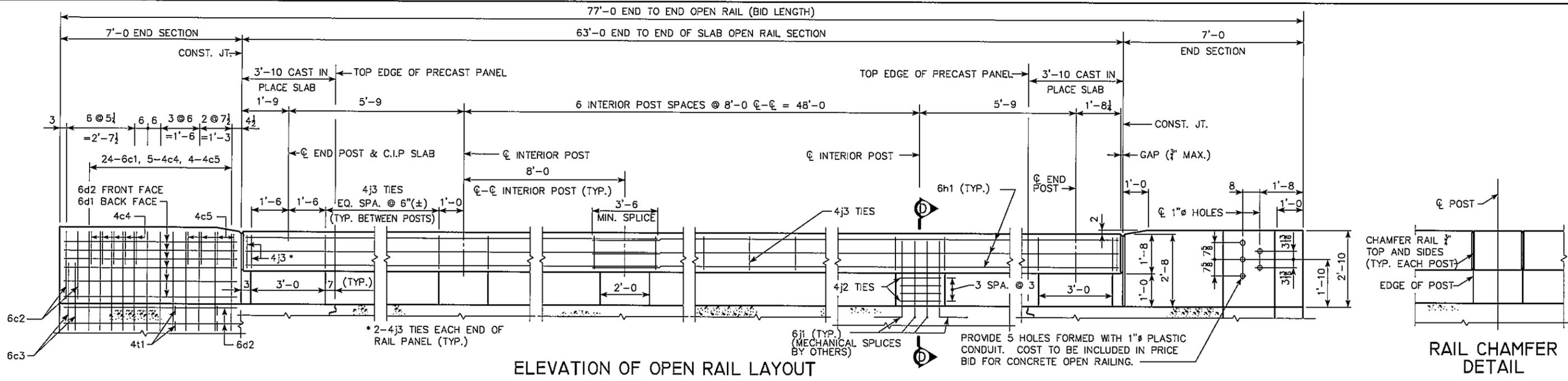
**60'-0" X 33'-2" PRECAST UHPC  
 WAFFLE DECK PANEL BRIDGE**

ONE 60'-0" SPAN  
 STA. 5+50

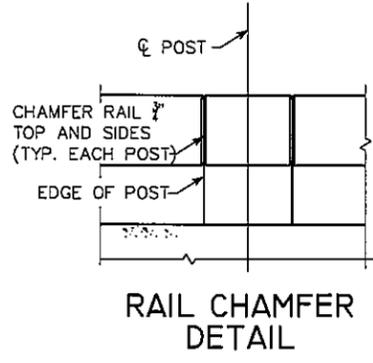
JULY, 2010

**MODIFIED B60 BEAM DETAILS  
 (BY OTHERS)**

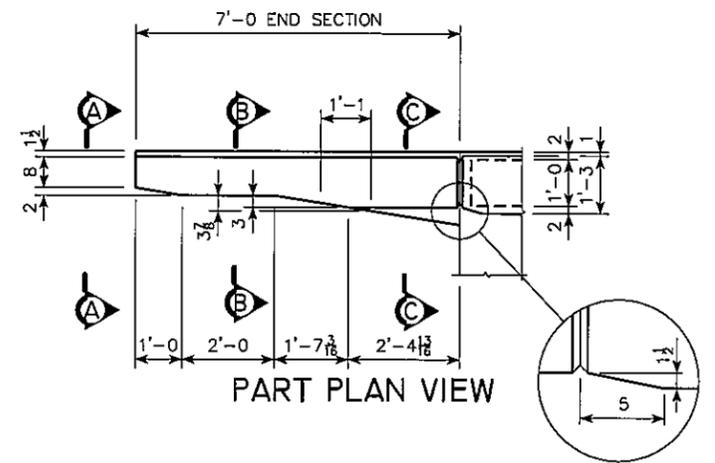
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION



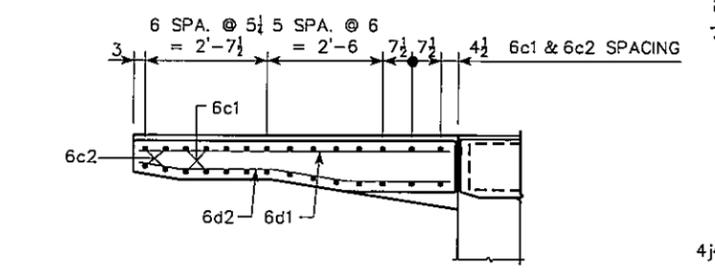
ELEVATION OF OPEN RAIL LAYOUT



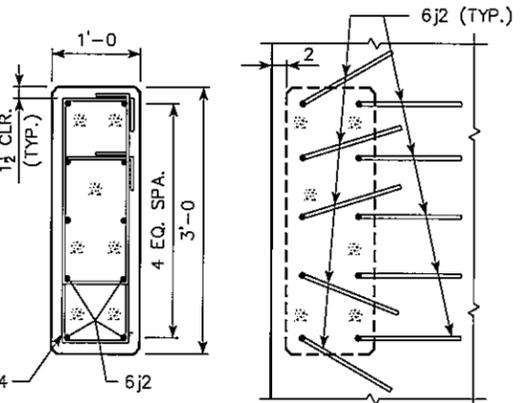
RAIL CHAMFER DETAIL



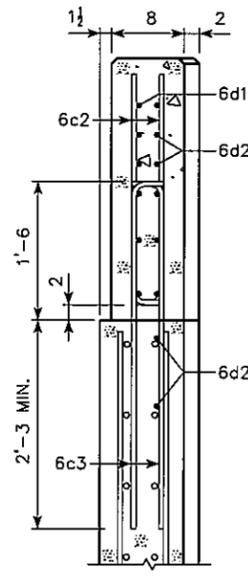
PART PLAN VIEW



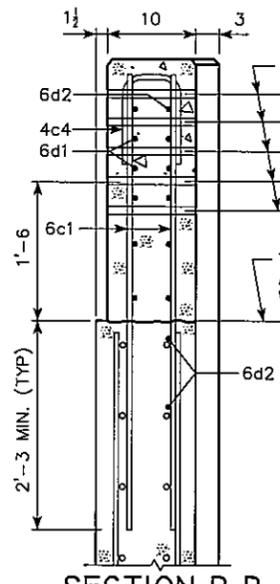
PART PLAN SECTION



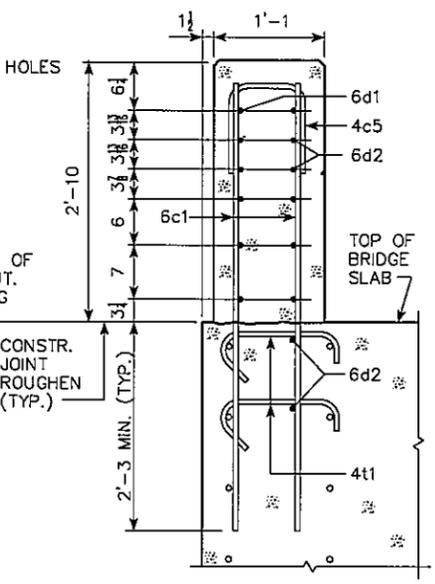
END POST DETAILS (REQUIRED AT ENDS OF OPEN RAIL)



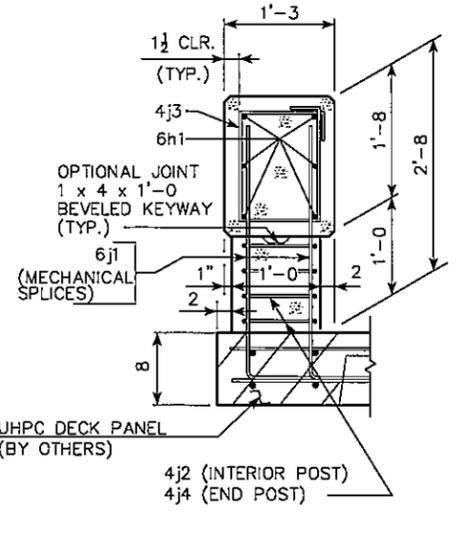
VIEW A-A



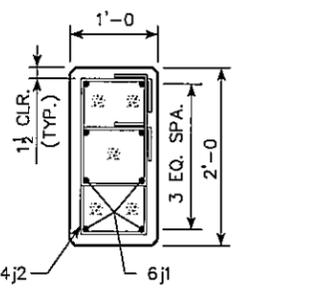
SECTION B-B



SECTION C-C



PART SECTION D-D



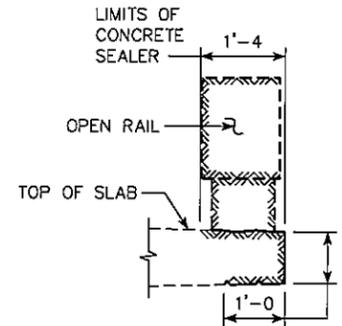
INTERIOR POST DETAILS

DESIGN FOR A 0° SKEW  
**60'-0 X 33'-2 PRECAST UHPC  
 WAFFLE DECK PANEL BRIDGE**  
 ONE 60'-0 SPAN  
 STA. 5+50  
 JULY, 2010  
**OPEN BARRIER RAIL DETAILS**  
 IOWA DEPARTMENT OF TRANSPORTATION -- HIGHWAY DIVISION

# EPOXY REINFORCING STEEL-TWO OPEN RAILS

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6c1	VERTICAL	—	96	4'-11"	709
6c2	VERTICAL	—	16	2'-10"	68
6c3	VERTICAL	—	16	4'-1"	98
4c4	VERTICAL HOOPS	—	20	2'-10"	38
4c5	VERTICAL HOOPS	—	16	3'-1"	33
6d1	HORIZONTAL	—	24	6'-8"	240
6d2	HORIZONTAL	—	32	6'-9"	324
6h1	LONGITUDINAL OPEN RAIL	—	24	33'-1"	1193
6j2	VERTICAL DOWELS OPEN RAIL	—	40	4'-2"	250
4j2	HOOPS INTERIOR POSTS	—	112	4'-8"	349
4j3	HOOPS OPEN RAIL	—	172	5'-5"	622
4j4	HOOPS END POSTS	—	32	6'-5"	137
4t1	WING FOOTING TIE BARS	—	16	VARIES	19
(INCLUDE WITH SUPERSTRUCTURE REINFORCING)				TOTAL (LBS.)	4080

REINFORCING QUANTITIES SHOWN ARE BASED ON 45° SKEW BID LENGTHS.

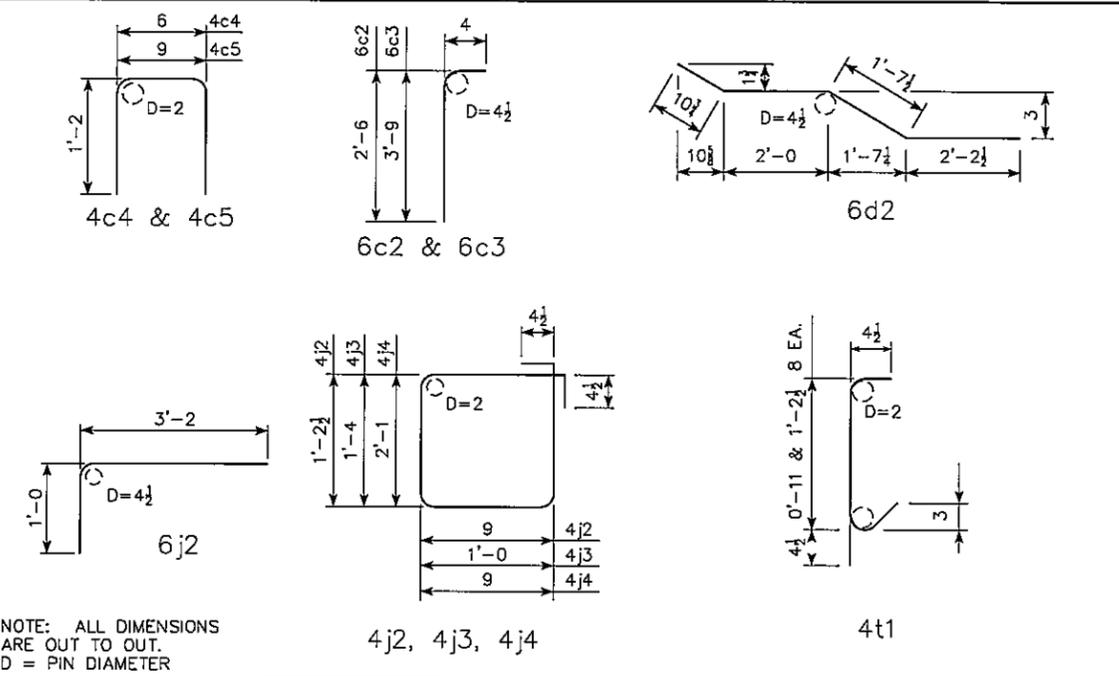


## CONCRETE SEALER LIMITS FOR OPEN RAILS

CONCRETE SEALER SHALL BE APPLIED TO BOTH SIDES OF BRIDGE SLAB ON THE TOP, EDGE OF SLAB AND UNDER THE SLAB. THE CONCRETE SEALER SHALL ALSO BE APPLIED TO THE OPEN RAIL ON THE TOP, TRAFFIC FACE SIDE, BOTTOM OF RAIL, AND ON ALL SIDES OF THE OPEN RAIL POSTS.

THE CONCRETE SEALER LIMITS ARE SHOWN IN THE DETAIL AND SHALL APPLY TO THE FULL LENGTH OF BRIDGE. CONCRETE SEALER SHALL BE APPLIED IN ACCORDANCE WITH ARTICLE 2403.03, P. 3, OF THE STANDARD SPECIFICATIONS. NO ADDITIONAL PAYMENT SHALL BE MADE AND SHALL BE CONSIDERED INCIDENTAL TO THE COST OF STRUCTURAL CONCRETE.

## BENT BAR DETAILS



## OPEN RAIL NOTES:

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

THE CONCRETE OPEN RAIL IS TO BE BID ON A LINEAL FOOT BASIS MEASURED FROM END TO END OF RAIL. THE NUMBER OF LINEAL FEET OF OPEN RAIL INSTALLED WILL BE PAID FOR AT THE CONTRACT PRICE PER LINEAL FOOT. PRICE BID FOR "CONCRETE OPEN RAILING, TL-4" SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, EXCLUDING REINFORCING STEEL, AND ALL OF THE EQUIPMENT AND LABOR REQUIRED TO CONSTRUCT THE RAIL IN ACCORDANCE WITH THESE PLANS AND CURRENT SPECIFICATIONS.

ALL OPEN RAIL REINFORCING STEEL IS TO BE INCLUDED WITH THE SUPERSTRUCTURE REINFORCING STEEL.

ALL OPEN RAIL CONCRETE IS TO BE CLASS C.

TOP OF THE OPEN RAIL IS TO BE PARALLEL TO THEORETICAL  $\phi$  GRADE.

## CONCRETE PLACEMENT QUANTITIES

STANDARD SECTION CU. YDS.	11.2
END SECTION 4 @ 0.687 CU. YDS.	2.8
TOTAL CU. YDS. - TWO RAILS	14.0

DESIGN FOR A 0° SKEW

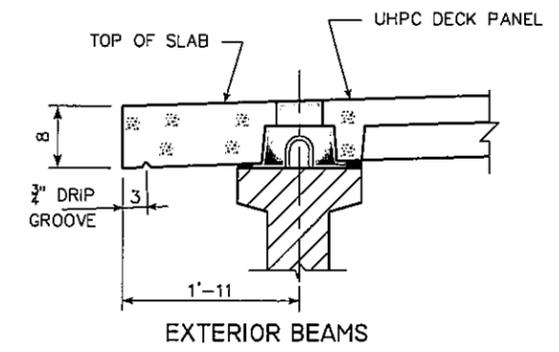
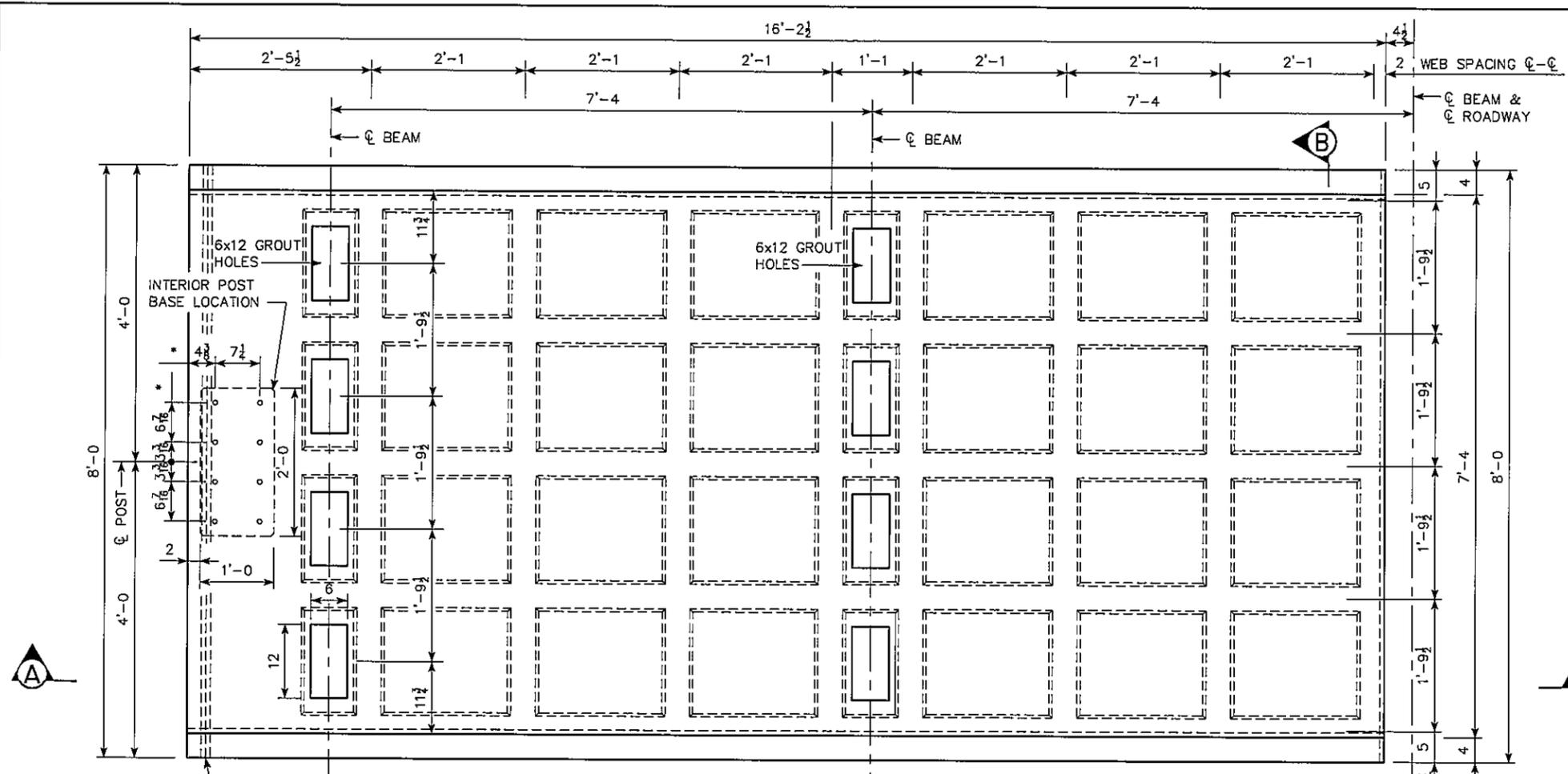
**60'-0" X 33'-2" PRECAST UHPC WAFFLE DECK PANEL BRIDGE**

ONE 60'-0" SPAN  
STA. 5+50

JULY, 2010

**OPEN BARRIER RAIL DETAILS**

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION



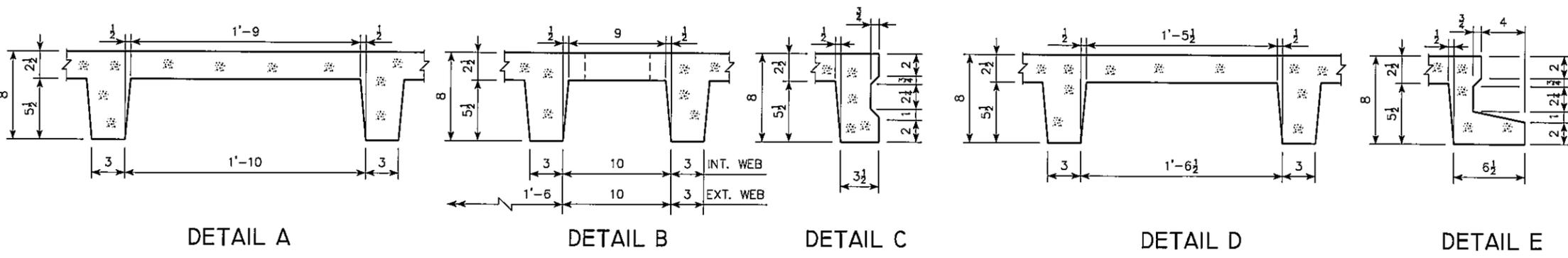
DRIP GROOVE DETAIL

NOTE:  
 UHPC WAFFLE PANELS WILL BE SUPPLIED BY  
 CORESLAB STRUCTURES, INC, 802 ALLIED ROAD,  
 LAPLATTE, NE, 68123. CONTACT JOHN HEIMANN AT  
 OFFICE: (402)291-0733 EXT. 407 AND  
 CELL PHONE: (402)960-0644

PLAN VIEW

SECTION A-A

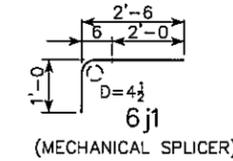
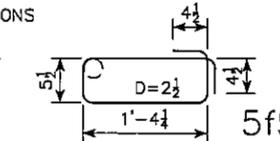
SECTION B-B



DESIGN FOR A 0° SKEW  
**60'-0 X 33'-2 PRECAST UHPC  
 WAFFLE DECK PANEL BRIDGE**  
 ONE 60'-0 SPAN  
 STA. 5+50  
 JULY, 2010  
**DECK PANEL DETAILS  
 (BY OTHERS)**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

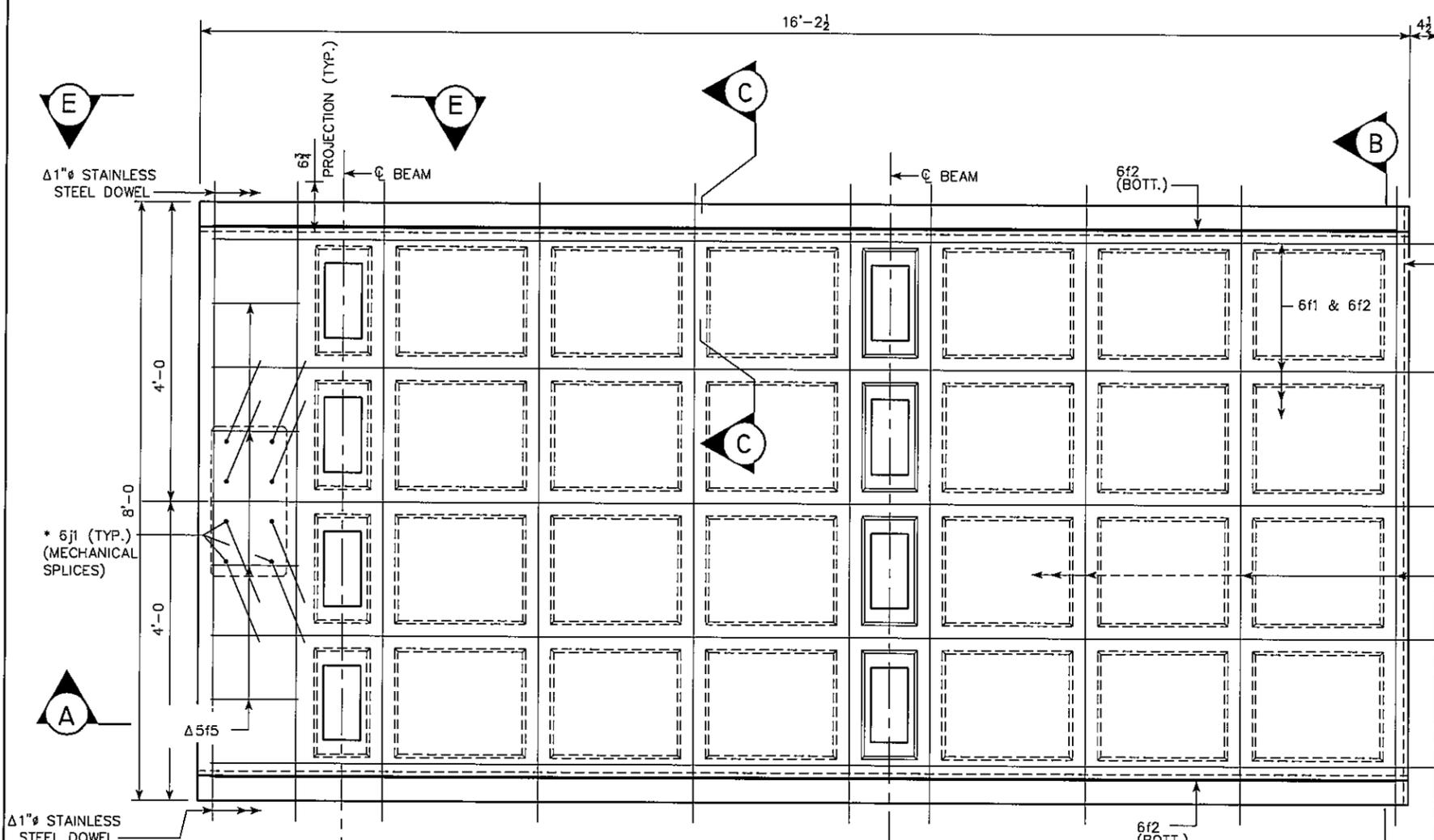
**BENT BAR DETAILS**

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

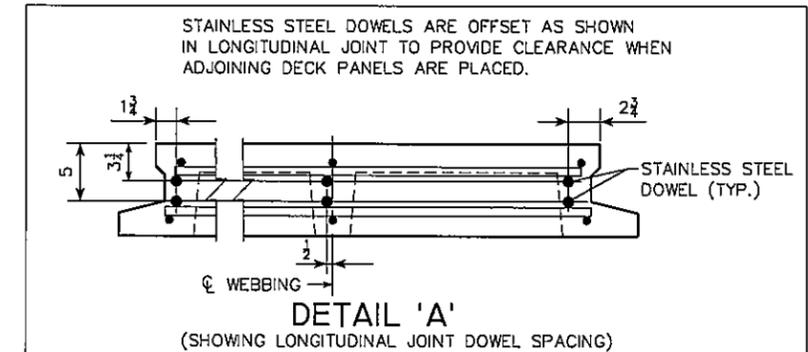


**REINF. BAR LIST-ONE DECK PANEL**

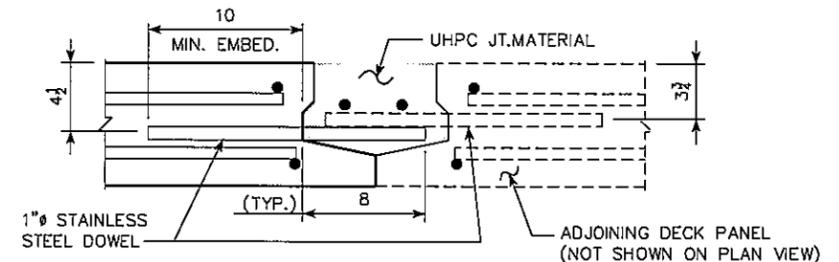
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6f1	DECK, TOP, TRANSVERSE	—	5	15'-10	119
6f2	DECK, BOTT, TRANSVERSE	—	5	15'-10	119
6f3	DECK, TOP, LONGITUDINAL	—	10	7'-0	105
6f4	DECK, BOTT, LONGITUDINAL	—	10	7'-2	108
5f5	DECK, TRANSVERSE	□	4	4'-5	18
1"Ø	STAINLESS STEEL DOWELS	—	30	1'-6	120
REINFORCING STEEL - TOTAL ( LBS. )					589



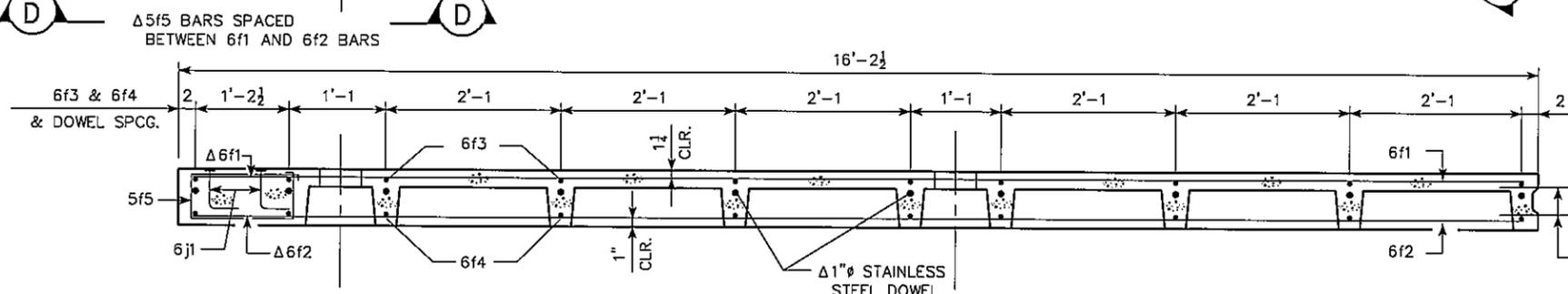
**PLAN VIEW**



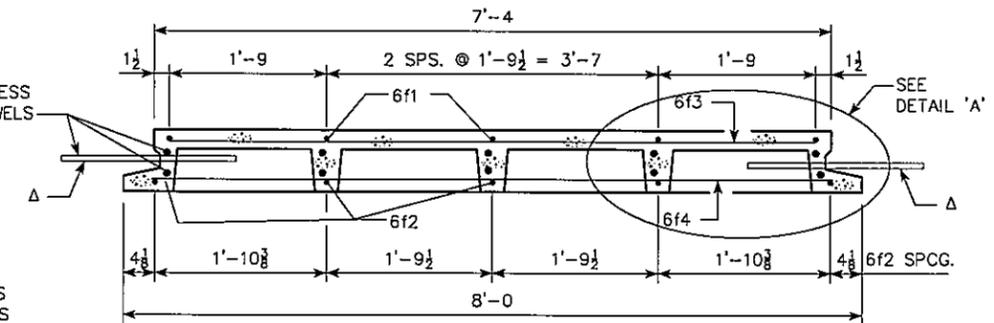
**DETAIL 'A'**  
(SHOWING LONGITUDINAL JOINT DOWEL SPACING)



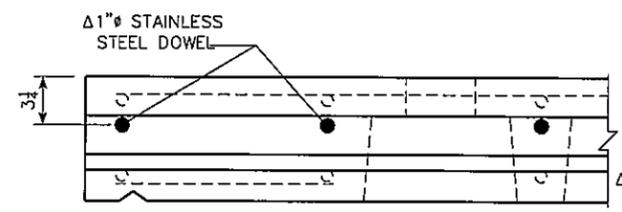
**SECTION C-C**  
(SHOWING TRANSVERSE JOINT)



**SECTION A-A**

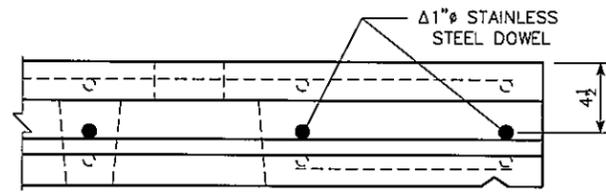


**SECTION B-B**



**PARTIAL VIEW D-D**

**DOWEL NOTES:**  
STAINLESS STEEL DOWELS SHALL BE DEFORMED BAR GRADE 60, TYPE 316 LN IN ACCORDANCE WITH ASTM A955/A955M-01.

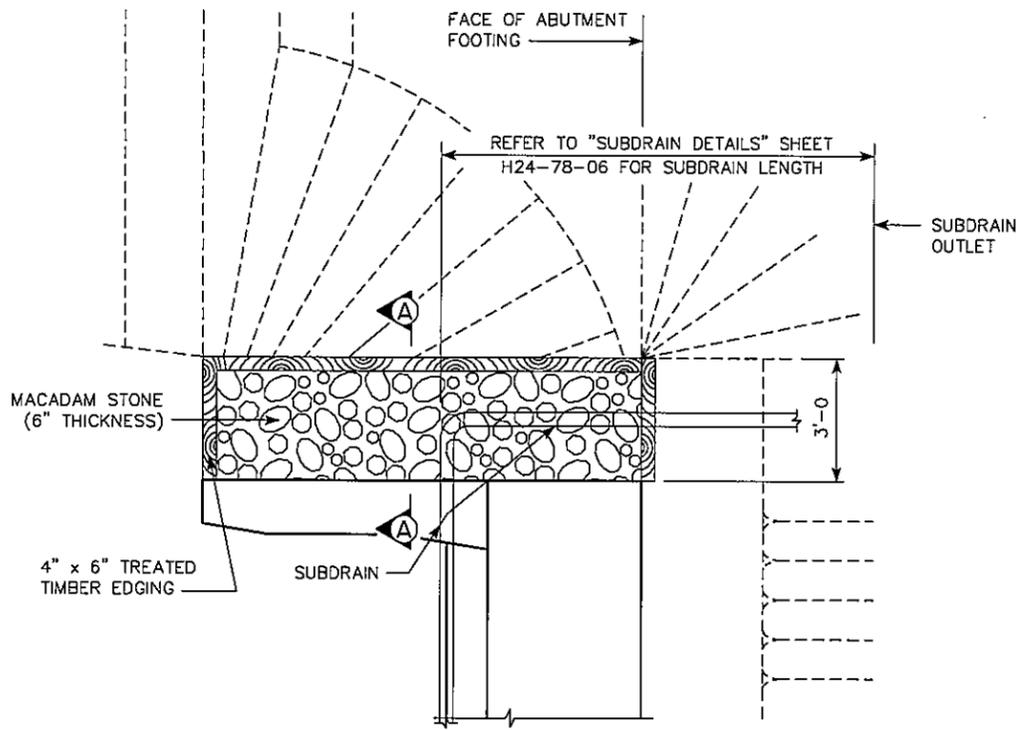


**PARTIAL VIEW E-E**

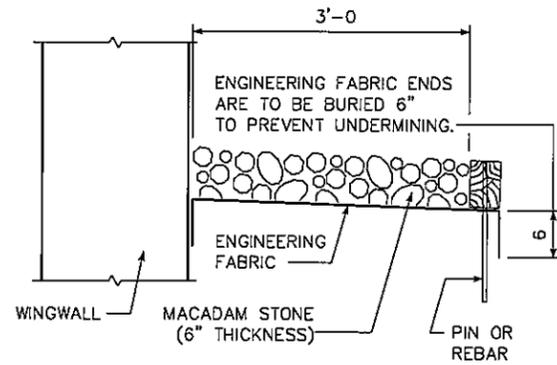
**NOTE:**  
STAINLESS STEEL DOWELS ARE TO BE PLACED AS SHOWN IN THE TRANSVERSE JOINTS FOR EACH PRECAST PANEL TO ACHIEVE AN OVER/UNDER DOWEL PLACEMENT WHEN PANELS ARE SET IN PLACE. OVER/UNDER PLACEMENT CAN BE REVERSED, BUT MUST BE MAINTAINED FOR EACH PANEL.

**\*NOTE:**  
FOR OPEN RAIL DETAILS SEE DESIGN SHEETS XX AND XX

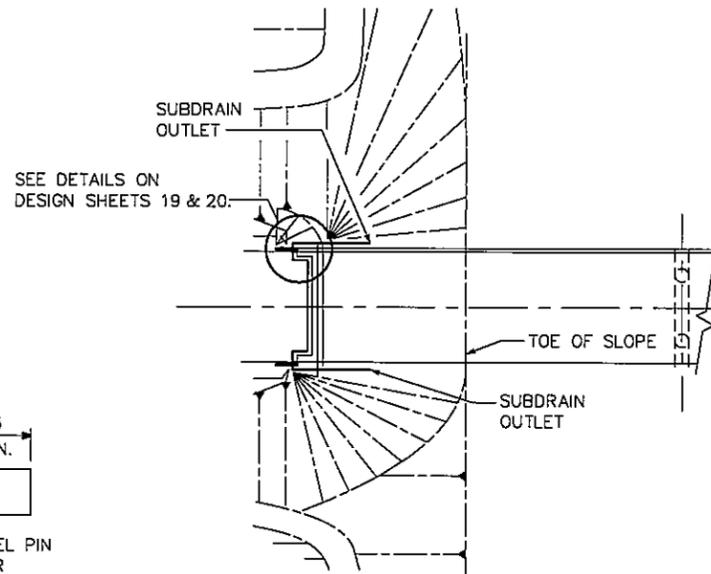
DESIGN FOR A 0° SKEW  
**60'-0 X 33'-2 PRECAST UHPC WAFFLE DECK PANEL BRIDGE**  
ONE 60'-0 SPAN  
STA. 5+50  
**DECK PANEL REINFORCING (BY OTHERS)**  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION



TOP VIEW OF WING ARMORING

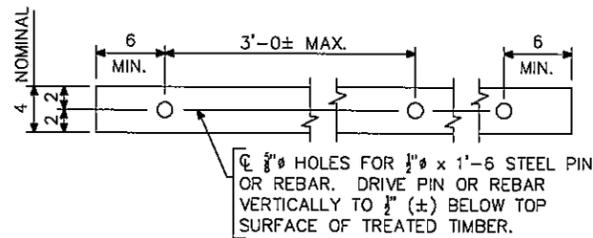


SECTION A-A

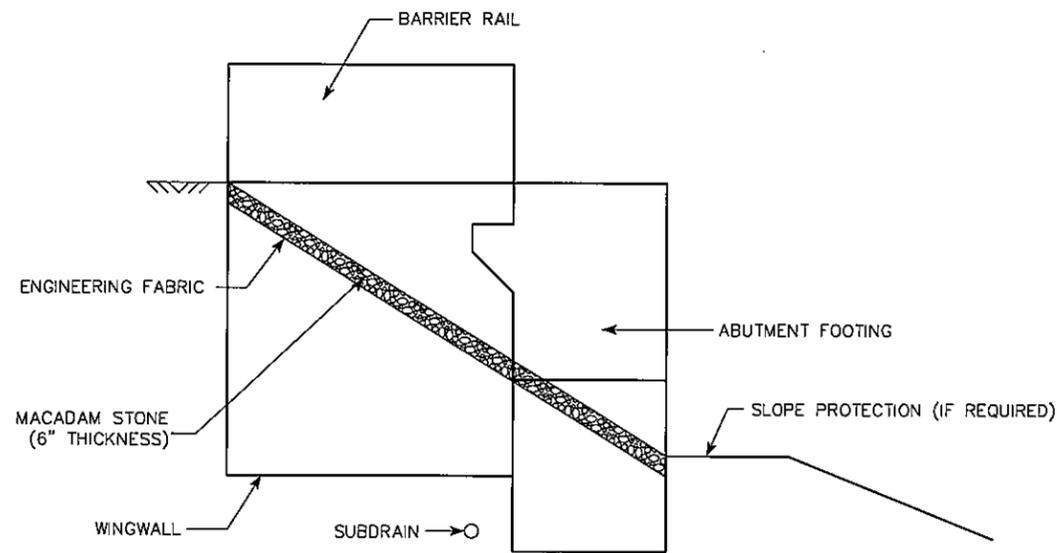


PROTECTION LAYOUT 0° SKEW SITUATION PLAN

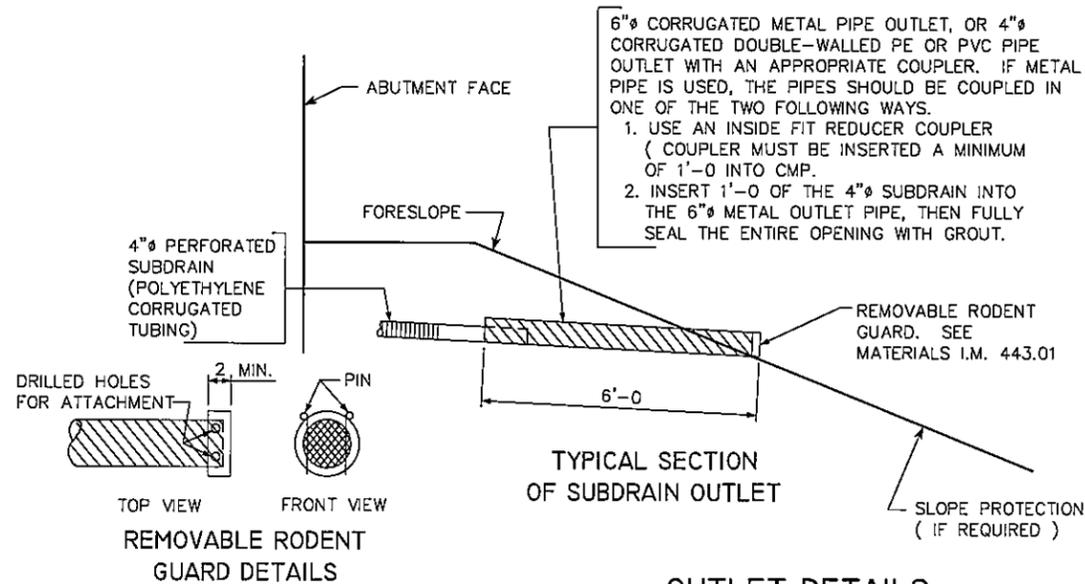
REFER TO SITUATION PLAN FOR NORTH ARROW.



4" x 6" TREATED TIMBER EDGING DETAILS



PROFILE VIEW OF WING ARMORING



OUTLET DETAILS

NOTE:  
SEE ABUTMENT BACKFILL DETAILS SHEET 20 FOR DETAILS NOT SHOWN ON THIS SHEET WHICH ARE PERTINENT TO THIS STRUCTURE.

DESIGN FOR A 0° SKEW  
**60'-0" X 33'-2" PRECAST UHPC WAFFLE DECK PANEL BRIDGE**  
ONE 60'-0" SPAN  
STA. 5+50  
JULY, 2010  
**WING ARMORING DETAILS**

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

**SUBDRAIN NOTES:**

THE BRIDGE CONTRACTOR IS TO INSTALL SUBDRAINS BEHIND THE ABUTMENT. THE SUBDRAINS SHALL BE 4" IN DIAMETER AND MEET THE REQUIREMENTS OF SECTION 4143.01 B OF THE CURRENT I.D.O.T. STANDARD SPECIFICATION. THE SUBDRAIN OUTLET SHALL CONSIST OF A 6'-0" LENGTH OF PIPE WITH A REMOVABLE RODENT GUARD.

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.

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

**MACADAM STONE WING ARMORING NOTES:**

MACADAM STONE SHALL BE PLACED ALONG THE SIDE OF THE WING AND ABUTMENT FOOTING. THIS IS TYPICAL AT EACH CORNER OF THE BRIDGE UNLESS OTHERWISE NOTED IN THE PLANS. THE MACADAM STONE AT THESE LOCATIONS SHALL BE UNDERLAYED WITH ENGINEERING FABRIC MEETING THE REQUIREMENTS OF 4196.01 C.

THE BRIDGE BERM FORESLOPE SHALL BE COMPACTED AND SHAPED AS SHOWN ON THESE PLANS, THE SITUATION PLAN AND AS DIRECTED BY THE ENGINEER. THE BERM FORESLOPE SHALL BE FIRM WHEN THE ENGINEERING FABRIC AND MACADAM STONE ARE PLACED.

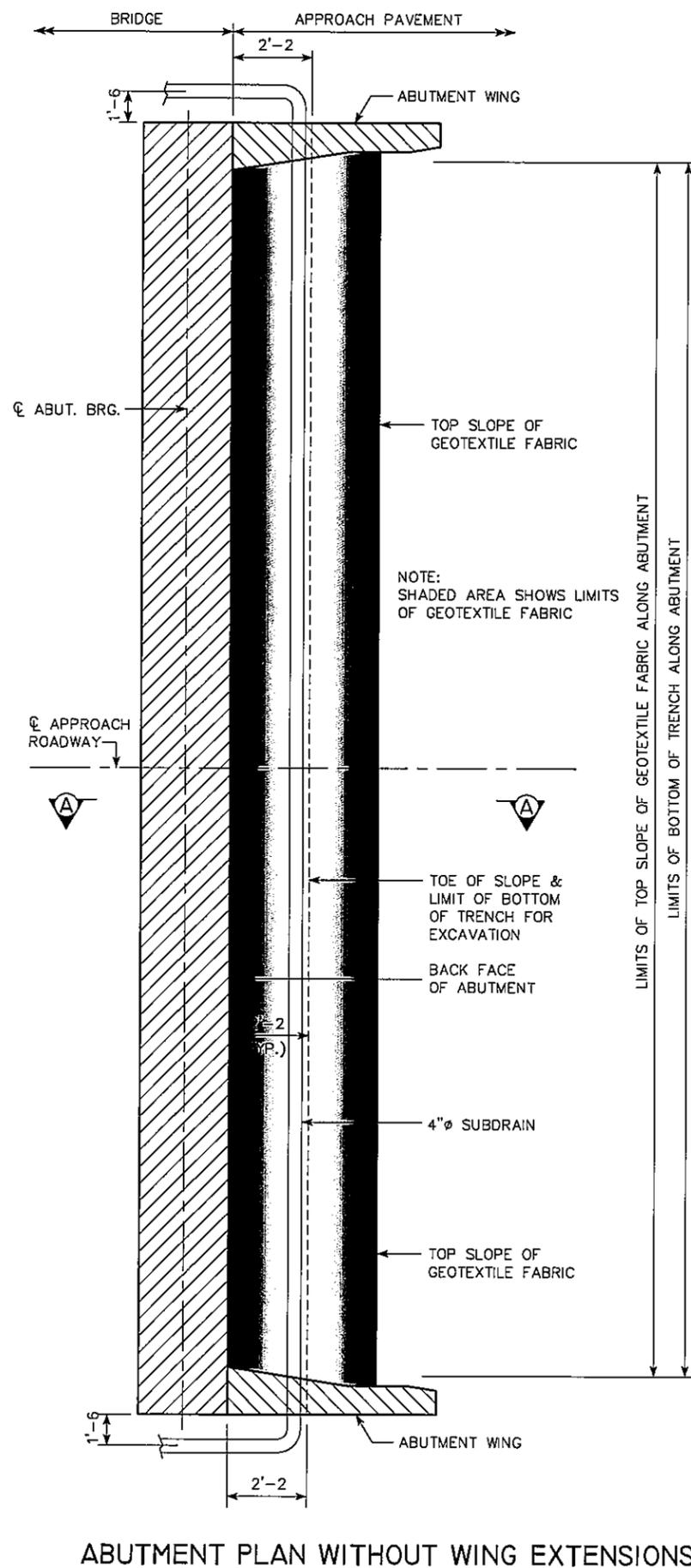
THE ENGINEERING FABRIC SHALL MEET THE REQUIREMENTS OF 4196.01 C. IF THE ENGINEERING FABRIC IS LAPPED THE LAPS SHALL BE A MINIMUM OF ONE FOOT IN LENGTH, SHINGLE FASHION WITH UP SLOPE LAP PIECE ON TOP AND STAPLED FOR CONTINUITY.

THE MACADAM STONE SHALL MEET THE REQUIREMENTS OF 4122.02, COARSE MATERIAL (NO CHOKE STONE IS ALLOWED).

WOOD PRESERVATIVE TREATMENT FOR THE TIMBER EDGING SHALL MEET THE REQUIREMENTS FOR GUARDRAIL POSTS, SAWED FOUR SIDES, AS SPECIFIED IN 4161.

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

PAYMENT FOR THE BRIDGE WING ARMORING SHALL BE INCIDENTAL TO THE BID ITEM "STRUCTURAL CONCRETE (BRIDGE)" AND SHALL INCLUDE COSTS OF ALL MATERIAL AND LABOR TO CONSTRUCT THE WING ARMORING AS SHOWN ON THESE PLANS.



ABUTMENT PLAN WITHOUT WING EXTENSIONS

TECHNICAL DATA INFORMATION - GEOTEXTILE FABRIC

MECHANICAL PROPERTIES	TEST METHOD	UNIT	MINIMUM AVERAGE ROLL VALUE	
			MD	CD
TENSILE STRENGTH (AT 5% STRAIN)	ASTM D 4595	kN/m (LBS/FT)	19.8 (1356)	19.8 (1356)
APPARENT OPENING SIZE (AOS)	ASTM D 4751	mm (U.S. SIEVE)	0.43 MAX (#40)	
FLOW RATE	ASTM D 4491	L/MIN/m <sup>2</sup> (GAL/MIN/FT <sup>2</sup> )	733 (18)	
UV RESISTANCE (AT 500 HOURS)	ASTM D 4355	% STRENGTH RETAINED	70	

ABUTMENT BACKFILL PROCESS:

THE BASE OF THE EXCAVATION SUBGRADE BEHIND THE ABUTMENT IS TO BE GRADED WITH A 4% SLOPE AWAY FROM THE ABUTMENT FOOTING AND A 2% CROSS SLOPE IN THE DIRECTION OF THE SUBDRAIN OUTLET. THIS EXCAVATION SHAPING IS TO BE DONE PRIOR TO BEGINNING INSTALLATION OF THE GEOTEXTILE AND BACKFILL MATERIAL.

AFTER THE SUBGRADE HAS BEEN SHAPED, THE GEOTEXTILE FABRIC SHALL BE INSTALLED IN ACCORDANCE WITH THE DETAILS SHOWN. THE FABRIC IS INTENDED TO BE INSTALLED IN THE BASE OF THE EXCAVATION AND EXTENDED VERTICALLY UP THE ABUTMENT BACKWALL, ABUTMENT WING WALLS, AND EXCAVATION FACE TO A HEIGHT THAT WILL BE APPROXIMATELY 1 TO 2 FOOT HIGHER THAN THE HEIGHT OF THE POROUS BACKFILL PLACEMENT AS SHOWN IN THE "BACKFILL DETAILS" ON THIS SHEET. THE STRIPS OF THE FABRIC PLACED SHALL OVERLAP APPROXIMATELY 1 FOOT AND SHALL BE PINNED IN PLACE. THE FABRIC SHALL BE ATTACHED TO THE ABUTMENT BY USING LATH FOLDED IN THE FABRIC AND SECURED TO THE CONCRETE WITH SHALLOW CONCRETE NAILS. THE FABRIC PLACED AGAINST THE EXCAVATION FACE SHALL BE PINNED.

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

POROUS BACKFILL IS THEN PLACED AND LEVELED, NO COMPACTION IS REQUIRED.

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

START SURFACE FLOODING FOR EACH FLOODABLE BACKFILL LIFT AT THE HIGH POINT OF THE SUBDRAIN AND PROGRESS TO THE LOW POINT WHERE THE SUBDRAIN EXITS THE FABRIC. TO ENSURE UNIFORM SURFACE FLOODING, WATER RUNNING FULL IN A 2-INCH DIAMETER HOSE SHOULD BE SPRAYED IN SUCCESSIVE 6-FOOT TO 8-FOOT INCREMENTS FOR 3 MINUTES WITHIN EACH INCREMENT.

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

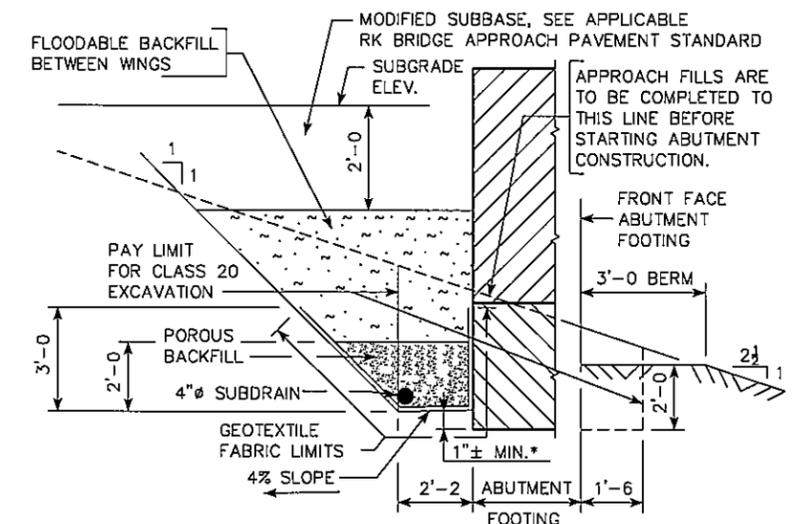
WATER REQUIRED FOR FLOODING, SUBDRAINS, POROUS BACKFILL, FLOODABLE BACKFILL, AND GEOTEXTILE FABRIC FURNISHED AT THE BRIDGE ABUTMENTS WILL NOT BE MEASURED SEPARATELY FOR PAYMENT.

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

NOTE:

SUBDRAIN SHALL SLOPE DOWNWARD 2% FROM  $\phi$  APPROACH ROADWAY WHEN OUTLETTING BOTH SIDES OF THE ABUTMENT.

SUBDRAIN SHALL SLOPE DOWNWARD 2% FROM HIGH END WHEN OUTLETTING AT ONE END OF THE ABUTMENT.



SECTION A-A  
BACKFILL DETAILS

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

\*DIMENSION VARIES DUE TO 2% SUBDRAIN SLOPE.

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

DESIGN FOR A 0' SKEW  
**60'-0 X 33'-2 PRECAST UHPC  
 WAFFLE DECK PANEL BRIDGE**  
 ONE 60'-0 SPAN  
 STA. 5+50  
 JULY, 2010  
**ABUTMENT BACKFILL DETAILS**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

# Pollution Prevention Plan

110-12A

All contractors/subcontractors shall conduct their operation in a manner that minimizes erosion and prevents sediments from leaving the highway right-of-way. The prime contractor shall be responsible for compliance and implementation of the Pollution Prevention Plan (PPP) for their entire contract. This responsibility shall be further shared with subcontractors whose work is a source of potential pollution as defined in this PPP.

## 1. SITE DESCRIPTION

This Pollution Prevention Plan (PPP) is for the Bridge Replacement on Dahloreaga Road.

This PPP covers approximately 2.0 acres with an estimated 1.1 acres being disturbed. The portion of the PPP covered by this contract has 2.0 acres disturbed.

The PPP is located in an area of 2 soil associations: Lindley-Keswick-Weler, Grundy-Halg. The estimated runoff coefficient of the project site after completion will be .76.

Refer to the plans (L-#39-73-90) for locations of typical slopes, ditch-grades, and major structural and non-structural controls. A copy of this plan will be on file at the project engineer's office. Runoff from this will flow into Little Cedar Creek, Cedar Creek, Skunk River and Mississippi River.

### POTENTIAL SOURCES OF POLLUTION:

Site sources of pollution generated as a result of this work relate to silts and sediment which may be transported as a result of a storm event. However, this PPP provides conveyance for other (non-project related) operations. These other operations have storm water runoff, the regulation of which is beyond the control of this PPP. Potentially this runoff can contain various pollutants related to site-specific land uses. Examples are:

#### Rural Agricultural Activities:

Runoff from agricultural land use can potentially contain chemicals including herbicides, pesticides, fungicides and fertilizers.

#### Commercial and Industrial Activities:

Runoff from commercial, industrial and commerce land use may contain constituents associated with the specific operation. Such operations are subject to potential leaks and spills which could be commingled with runoff from the facility. Pollutants associated with commercial and industrial activities are not readily available since they are typically proprietary.

## 2. CONTROLS

At locations where runoff can move offsite, silt fences shall be placed along the perimeter of the areas to be disturbed prior to beginning grading, excavation or clearing and grubbing operations. Vegetation in areas not needed for construction shall be preserved. As areas reach their final grade, additional silt fences, silt basins, intercepting ditches, sod flumes, letdowns, bridge end drains, and earth dikes shall be installed as specified in the plans and/or as required by the project engineer. This will include using silt fence as ditch checks and to protect intakes. Temporary stabilizing seeding shall be completed as the disturbed areas are constructed. If construction activity is not planned to occur in a disturbed area for at least 21 days, the area shall be stabilized by temporary seeding or mulching within 14 days. No more than 750,000 square feet of exposed erodible area is allowed in any one grading spread without permission of the project engineer. Other stabilizing methods shall be used outside the seeding time period.

This work shall be done in accordance with Section 2602 of the Standard Specification. If the work involved is not applicable to any contract items, the work shall be paid for according to Article 1109.03 paragraph B.

As the work progresses, additional erosion control items may be required as determined by the engineer after field investigation. These may be items such as letdown structures, soil stabilization mats, and other appropriate measures to be installed by the paving or erosion control contractor as directed by the engineer. The erosion control contractor will complete the construction with the establishment of permanent perennial vegetation of all disturbed areas.

## 3. OTHER CONTROLS

Contractor disposal of unused construction materials and construction material wastes shall comply with applicable state and local waste disposal, sanitary sewer, or septic system regulations. In the event of a conflict with other governmental laws, rules and regulations, the more restrictive laws, rules or regulations shall apply.

### APPROVED STATE OR LOCAL PLANS

During the course of this construction, it is possible that situations will arise where unknown material will be encountered. When such situations are encountered, they will be handled according to all federal, state, and local regulations in effect at the time.

## 4. MAINTENANCE

The contractor is required to maintain all temporary erosion control measured in proper working order, including cleaning, repairing, or replacing them throughout the contract period. Cleaning of silt control devices shall begin when the features have lost 50% of their capacity.

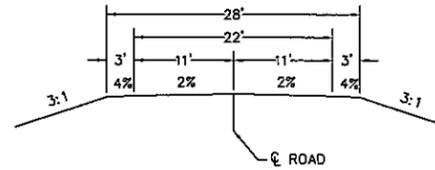
## 5. INSPECTIONS

Inspections shall be made jointly by the contractor and the contracting authority every seven calendar days and after each rain event that is 1/2" or greater. The contractor shall immediately begin corrective action on all deficiencies found. The findings of this inspection shall be recorded in the project diary. This PPP may be revised based on the findings of the inspection. The contractor shall implement all revisions. All corrective actions shall be complete within 3 calendar days of the inspection.

## 6. NON-STORM DISCHARGES

This includes subsurface drains (i.e. longitudinal and standard subdrains), slope drains and bridge end drains. The velocity of the discharge from these features may be controlled by the use of patio blocks, Class A stone or erosion stone.

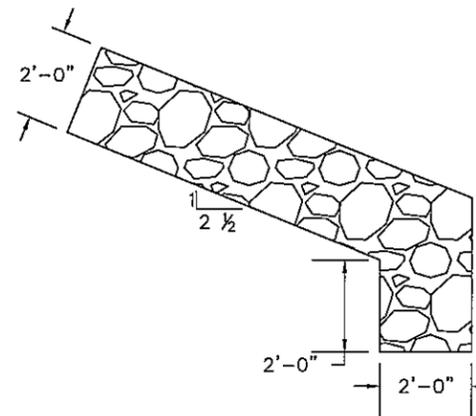
## TYPICAL APPROACH SECTION B.O.P. 0+00 TO E.O.P. 10+00



## HYDRAULIC DATA

DRAINAGE AREA = 6.4 SQ. MI.  
 DESIGN DISCHARGE = 1,894 CFS.  
 DESIGN HIGH WATER = 760.4  
 BRIDGE WATERWAY AREA = 352 SQ. FT.  
 DESIGN VELOCITY = 2.77 F.P.S.  
 Q25 = 1,541 C.F.S. STAGE ELEV. 757.85  
 Q50 = 1,894 C.F.S. STAGE ELEV. 758.30 (DESIGN)  
 Q100 = 2,276 C.F.S. STAGE ELEV. 758.71

## EMBANKMENT SECTIONAL DETAIL



DESIGN FOR A 0° SKEW  
**60'-0 X 33'-2 PRECAST UHPC  
 WAFFLE DECK PANEL BRIDGE**  
 ONE 60'-0 SPAN  
 STA. 5+50  
 JULY, 2010  
**POLLUTION PREVENTION PLAN & DETAILS**

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

STEEL BEAM GUARDRAIL AT CONCRETE BARRIER OR BRIDGE END POST

Refer to BA-200, BA-201, BA-202, BA-205, BA-250, SI-172, SI-173, SI-211.

108-8A  
10-19-10

No.	Station	Offset	Layout Lengths				Delineators and Object Markers					Bid Items ①					Remarks	
			VT1	VF	VT2	ET Terminal	Type	Object Marker			End Anchor Bolted	Barrier Transition Section	Steel Beam Guardrail	End Terminal		Adapter		
								Type 1	Type 2	Type 3				Standard	Flored for Cable Connection			
								White No.	No.	OM-3L No.				OM-3R No.	BA-202 Type			BA-201 No.
1	5+88.5	15'-4 1/8 LEFT	28.0	0.0	75.0	50.0	1	7	2	0	1	A	1	129'-1 1/2	1	0.0	0.0	STATION 5+50
2	5+11.5	15'-4 1/8 LEFT	28.0	0.0	13.0	50.0	1	0	2	1	0	A	1	66'-1 1/2	1	0.0	0.0	STATION 5+50
3	5+11.5	15'-4 1/8 RIGHT	28.0	0.0	75.0	50.0	1	7	2	0	1	A	1	129'-1 1/2	1	0.0	0.0	STATION 5+50
4	5+88.5	15'-4 1/8 RIGHT	28.0	0.0	13.0	50.0	1	0	2	1	0	A	1	66'-1 1/2	1	0.0	0.0	STATION 5+50

① Lane(s) to which the installation is adjacent.

GRADING FOR GUARDRAIL INSTALLATIONS

Refer to EW-204

107-23  
04-19-11

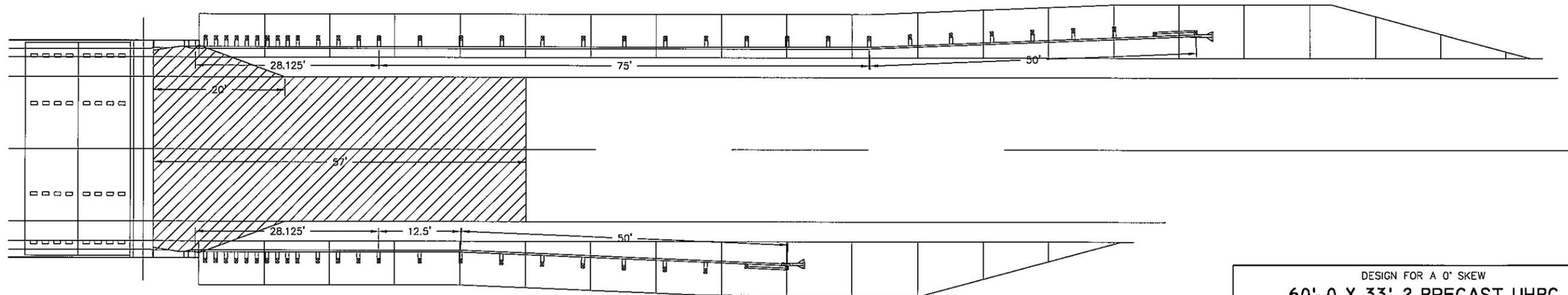
No.	Direction of Traffic	Location		Foreslope at Guardrail	Dimensions (Feet)									Earthwork		Remarks
		Station	Side		X1	Y1	X2	Y2	X3	Y3	X4	Y4	Z	Class 10 Excavation	Embankment In Place	
														Cu. Yds.	Cu. Yds.	
1	S	5+88.5	WEST	VARIES	102'-6 1/4	6'-7 1/2	N.A.	N.A.	N.A.	N.A.	152'-5 1/8	8'-1 1/8	47'	10.4		
2	S	5+11.5	WEST	VARIES	40'-3 1/8	6'-7 1/2	N.A.	N.A.	N.A.	N.A.	89'-11 1/8	8'-1 1/8	47'	16.7		
3	N	5+11.5	EAST	VARIES	102'-6 1/4	6'-7 1/2	N.A.	N.A.	N.A.	N.A.	152'-5 1/8	8'-1 1/8	47'	13.0		
4	N	5+88.5	EAST	VARIES	40'-3 1/8	6'-7 1/2	N.A.	N.A.	N.A.	N.A.	89'-11 1/8	8'-1 1/8	47'	18.2		

TABULATION OF SAFETY CLOSURES

108-13A  
10-28-97

Refer to Section 2518 of the Standard Specifications

STATION	CLOSURE TYPE		REMARKS
	Road Qty.	Hazard Qty.	
0+00	1		B.O.P.
10+00	1		E.O.P.



DESIGN FOR A 0° SKEW  
**60'-0 X 33'-2 PRECAST UHPC  
 WAFFLE DECK PANEL BRIDGE**  
 ONE 60'-0 SPAN  
 STA. 5+50  
 JULY, 2010  
**TABULATIONS & MISC. DETAILS**  
 IOWA DEPARTMENT OF TRANSPORTATION -- HIGHWAY DIVISION