IOWA DOT
Highway Division

H24–06 THREE SPAN PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE STANDARDS

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STRUCTURAL RESISTANCE LEVEL-1 (SRL-1) REPLACES THE 50 TON STEEL PILE DESIGNATION.

STRUCTURAL RESISTANCE LEVEL-2 (SRL-2) REPLACES THE 75 TON STEEL PILE DESIGNATION.

FOR MORE INFORMATION ON STRUCTURAL RESISTANCE LEVELS (SRL-1 & SRL-2), SEE THE BRIDGE DESIGN MANUAL, LOCATED ON THE IOWA DEPARTMENT OF TRANSPORTATIONS, OFFICE OF BRIDGES AND STRUCTURES, WEBSITE.

REVISED 05-13 - THE GENERAL NOTES AND SPECIFICATIONS MOVED TO STANDARD SHEET H30-01A-06. SRL NOTATION ADDED.

LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

INDEX SHEET

H24-01-06

GENERAL NOTES:

THE H24-06 BRIDGE STANDARDS, IF PROPERLY USED, PROVIDE THE STRUCTURAL PLANS NECESSARY TO CONSTRUCT THREE SPAN 24' ROADWAY PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES WITH LENGTHS OF 138'-10, 151'-4, 163'-10, 176'-4, 188'-10, 201'-4, 213'-10, 226'-4 AND 243'-0.

THESE BRIDGES MAY BE BUILT ON A 0°, 15°, 30° OR 45° SKEW. THESE PLANS SHOW THE BRIDGES SKEWED IN ONE DIRECTION, BUT ALL DIMENSIONS AND DETAILS WOULD BE THE SAME FOR THE OPPOSITE SKEW.

THESE BRIDGES ARE DESIGNED FOR HL93 LOADING PLUS 20 LBS. PER SQ. FT. OF ROADWAY FOR FUTURE WEARING SURFACE. CONTROL OF CRACKING BY DISTRIBUTION OF REINFORCEMENT FOR SLAB DESIGN BASED ON PRE LRFD 2005 INTERIMS.

NOTE THAT WHEN APPROACH PAVEMENT IS TO BE PLACED, THE TEMPORARY PAVING BLOCKS SHALL BE REMOVED AND A PROPER JOINT FOR EXPANSION SHALL BE PROVIDED BETWEEN THE BRIDGE AND THE APPROACH PAVING.

THE FLOOR SLAB AS SHOWN INCLUDES $\frac{1}{2}$" INTEGRAL WEARING SURFACE.

THE ABUTMENTS FOR THESE BRIDGES ARE BUILT INTEGRAL WITH THE SUPERSTRUCTURE. THEREFORE, IT IS IMPORTANT THAT A PROPER JOINT FOR EXPANSION BE PROVIDED BETWEEN THE BRIDGE AND APPROACH PAVING, WHEN APPROACH PAVING IS NEEDED.

THE INTEGRAL ABUTMENT DESIGN UTILIZED ON THESE BRIDGES RESTRICTS THEIR USE IN THE FOLLOWING MANNER:

(1) THE 201'-4, 213'-10, 226'-4 AND 243'-0 BRIDGES SHALL USE STEEL PILES AT THE ABUTMENTS.
(2) THESE BRIDGES ARE NOT TO BE USED WHEN POINT BEARING FOR THE ABUTMENT STEEL PILING WOULD BE OBTAINED ON ROCK AT A DISTANCE LESS THAN 15 FEET FROM THE BOTTOM OF FOOTING.
(3) THE ABUTMENT PILING ARE TO BE DRIVEN THROUGH OVERSIZED HOLES PREBORED TO A MINIMUM OF 10 FEET BELOW THE BOTTOM OF FOOTING. THE PREBORED HOLES SHALL BE IN ACCORDANCE WITH SECTION 2501.19 OF THE STANDARD SPECIFICATIONS. THE ELEVATION OF THE BOTTOM OF THE PREBORED HOLE SHALL BE SHOWN ON THE PLANS.

THESE STANDARDS GIVE MOST OF THE INFORMATION NECESSARY TO BUILD THESE BRIDGES ON EITHER A CREST VERTICAL CURVE OR A STRAIGHT GRADE. BECAUSE OF THE INFINITE NUMBER OF GRADE POSSIBILITIES IT WILL BE NECESSARY TO SHOW ON THE PLANS THE ABUTMENT AND PIER STEP DIMENSIONS. TO HELP IN OBTAINING THIS STEP INFORMATION SEE "EXAMPLES OF BRIDGE SEAT AND STEP CALCULATIONS" ON SHEET H24-02-06 .

THE ABUTMENT FOOTING AND PIER CAP CONCRETE QUANTITIES SHOWN IN THESE PLANS ARE CALCULATED BASED ON A 0.3% GRADE. FOR HIGHER GRADES, THESE CONCRETE QUANTITIES FOR BRIDGES SKEWED AT 15°, 30°, AND 45° MAY NEED TO BE INCREASED. IN ADDITION, THE LAYOUT OF THE PIER CAP STEP REINFORCING STEEL IS GRADE DEPENDENT FOR BRIDGES SKEWED AT 15°, 30°, AND 45°. SEE SHEETS H24-17-06, H24-24-06, AND H24-31-06 TO DETERMINE THE ADDITIONAL CONCRETE QUANTITIES REQUIRED AND FOR THE LAYOUT AND QUANTITY OF THE PIER CAP STEP REINFORCING STEEL.

PROVIDE TOP OF SLAB ELEVATIONS AND WING ELEVATIONS A, B AND C AS NOTED ON THE STANDARD SHEETS (LONGITUDINAL SECTION).

VARIOUS TYPES OF PIERS MAY BE USED WITH THESE STANDARDS. IT SHOULD BE NOTED THAT THE DETAILS FOR THE PIER DIAPHRAGM ON THE SUPERSTRUCTURE DEPEND ON THE TYPE OF PIER USED.

THE PIERS AND ABUTMENTS FOR THESE STANDARDS HAVE BEEN DESIGNED FOR THE USE OF BOTH FRICTION AND POINT BEARING PILES. IT IS NECESSARY THAT THE TYPE AND LENGTH FOR BOTH THE ABUTMENT AND PIER PILES BE DESIGNATED ON THE FRONT SHEET OF THE PLANS.

THE INTEGRAL ABUTMENTS, PILE BENTS, AND TEE PIERS FOR THESE H24 STANDARDS HAVE BEEN DESIGNED FOR THE USE OF VARIOUS TYPES OF PILE FOOTINGS OR SPREAD FOOTINGS AS FOLLOWS.

- INTEGRAL ABUTMENTS: TIMBER PILES (LIMITED BY BRIDGE LENGTH) OR HP10x57 PILES AT BRIDGE DESIGN MANUAL (BDM) ARTICLE 6.2.6.1 STRUCTURAL RESISTANCE LEVEL-1 (SRL-1)
- PILE BENTS: STANDARD CONCRETE-FILLED STEEL PIPE PILES (P10L), STANDARD PRESTRESSED CONCRETE PILES (P10L), OR STANDARD H-PILES (P10L AND SRL-1)
- TEE PIERS: HP10x57 PILES AT BRIDGE DESIGN MANUAL (BDM) ARTICLE 6.2.6.1 STRUCTURAL RESISTANCE LEVEL-1 OR 2 (SRL-1 OR SRL-2) OR SPREAD FOOTINGS

STRUCTURAL RESISTANCE LEVEL-1 (SRL-1) REPLACES THE 50 TON STEEL PILE DESIGNATION.

STRUCTURAL RESISTANCE LEVEL 2 (SRL-2) REPLACES THE 75 TON STEEL PILE DESIGNATION.

FOR MORE INFORMATION ON SRL-1 AND SRL-2, SEE THE BRIDGE DESIGN MANUAL, LOCATED ON THE IOWA DEPARTMENT OF TRANSPORTATION, OFFICE OF BRIDGES AND STRUCTURES WEB SITE.

3" WING PVC PIPE IS INCIDENTAL TO STRUCTURAL CONCRETE.

BECAUSE THESE BRIDGE STANDARDS HAVE BEEN REVISED FOR LRFD BASED ON 2012-COMPLETED IOWA STATE UNIVERSITY RESEARCH, FOR PILE FOUNDATIONS THE DESIGNER WILL NEED TO DETERMINE THE CONSTRUCTION CONTROL METHOD, CONTRACT LENGTH, AND DRIVING TARGET AND GIVE THAT INFORMATION ON THE FRONT SHEET OF THE PLANS. BRIDGE DESIGN MANUAL CADD NOTES E17.7, E17.8, E17.9, E18.8, AND E18.9 ARE APPROPRIATE FOR THAT PURPOSE. THE NOTES, AS WELL AS THE BRIDGE DESIGN MANUAL AND DESIGN EXAMPLES, ARE AVAILABLE ON THE OFFICE OF BRIDGES AND STRUCTURES WEB SITE: HTTP://WWW.IOWADOT.GOV/BRIDGE/INDEX.HTM.

THESE STANDARDS ARE FOR USE FOR BRIDGES WITH NON-EPOXY COATED REINFORCING. REINFORCING BAR LAP LENGTHS ARE BASED ON THE USE OF NON-EPOXY COATED REINFORCING.

FOR PIERS SUBJECT TO SCOUR THE DESIGN BEARING SHALL BE OBTAINED BELOW SCOUR ELEVATION. SCOUR ELEVATION SHALL BE SHOWN ON THE FRONT SHEET.

CONCRETE INTERMEDIATE DIAPHRAGMS SHALL BE USED FOR OVERPASS BRIDGES. THE DESIGNER SHALL ADJUST THE CONCRETE AND REINFORCING QUANTITIES ACCORDINGLY.

KEYWAY DIMENSIONS SHOWN ON THE PLANS ARE BASED ON NOMINAL DIMENSIONS UNLESS STATED OTHERWISE. IN ADDITION, THE BEVEL USED ON THE KEYWAY SHALL BE LIMITED TO A MAXIMUM OF 10 DEGREES FROM VERTICAL.

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5a1 IS $\frac{5}{8}$ INCH DIAMETER BAR). ENGLISH REINFORCING STEEL RECEIVED IN THE FIELD MAY DISPLAY THE FOLLOWING "BAR DESIGNATION". THE "BAR DESIGNATION" IS THE STAMPED IMPRESSION ON THE REINFORCING BARS, AND IS EQUIVALENT TO THE BAR DIAMETER IN MILLIMETERS.

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

DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 4th Ed, SERIES OF 2007.
REINFORCING STEEL IN ACCORDANCE WITH LRFD AASHTO SECTION 5, GRADE 60.
CONCRETE IN ACCORDANCE WITH LRFD AASHTO SECTION 5, f'c = 3,500 PSI.
FOR STANDARD PRESTRESSED CONCRETE BEAMS, SEE SHEETS H24-32-06 THRU H24-37-06

SPECIFICATIONS:

DESIGN:
AASHTO LRFD 4th Ed, SERIES OF 2007.

CONSTRUCTION:
IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2012, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.

05-13
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWADOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
DECEMBER, 2006

GENERAL NOTES | H24-01A-06

REVISED 05-13 - THIS STANDARD RENAMED TO H30-01A-06. INDEX SHEET INFORMATION ON STANDARD H30-01-06.

EXAMPLES OF BRIDGE SEAT AND STEP CALCULATIONS:

THE DESIGNER SHALL SHOW ON THE PLANS THE 4 ELEVATIONS AND THE 3 STEP DIMENSIONS REQUIRED FOR EACH OF THE PIER TOP AND ABUTMENT BRIDGE SEATS.

THE BOXED IN DETAILS IN THE FOLLOWING EXAMPLES SHOW HOW THE INFORMATION SHOULD BE INDICATED ON THE PLANS.

EXAMPLE NO. 1

A STRAIGHT GRADE OF -3.25% WITH THE P.I. STATION OF 103+75.00 AND ELEVATION OF 653.29. THE BRIDGE LENGTH IS 213'-10 ℄ TO ℄ OF ABUTMENT BEARINGS WITH 30° SKEW RIGHT AHEAD.

STATIONS

℄ BRIDGE STA.	=	105+85.00	
± $\frac{1}{2}$ OF L2	±	38.67	
℄ PIER BRGS.	=	105+46.33	106+23.67
± LI		- 68.25	+ 68.25
℄ ABUTMENT BRGS.	=	104+78.08	106+91.92

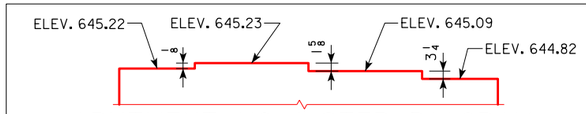
ELEVATIONS ALONG PROFILE GRADE LINE (P.G.L. ELEV.)

℄ ABUT. BRG. = 653.29-[(104+78.08)-(103+75.00)](0.0325) = 649.94
℄ PIER BRG. = 653.29-[(105+46.33)-(103+75.00)](0.0325) = 647.72
℄ PIER BRG. = 653.29-[(106+23.67)-(103+75.00)](0.0325) = 645.21
℄ ABUT. BRG. = 653.29-[(106+91.92)-(103+75.00)](0.0325) = 642.99

ELEVATIONS TOP OF SLAB FACING ALONG THE STATIONING
(BEAM SPACING)(TAN. SK.△)(GRADE) = (7.00)TAN 30°(0.0325) = 0.13'

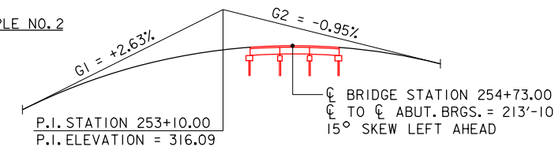
ABUTMENT NO. 1

BEAMS	EXTERIOR	INTERIOR	INTERIOR	EXTERIOR
PGL ELEV.	649.94	649.94	649.94	649.94
SK. △CORRECT	+0.20	+0.07	-0.07	-0.20
SLAB CROWN	-0.18	-0.04	-0.04	-0.18
TOP SLAB ELEV.	649.96	649.97	649.83	649.56
-"U" (4'-8$\frac{7}{8}$)	-4.74	-4.74	-4.74	-4.74
BR. SEAT ELEV.	645.22	645.23	645.09	644.82



ABUTMENT NO. 1 STEP DIAGRAM
LOOKING UP STATIONING

EXAMPLE NO. 2



FROM SHEET H24-03-06 { LENGTH OF VERTICAL CURVE = (20000)(0.0358) = 716 FEET
M.O. = (0.0358)(716)($\frac{1}{8}$) = 3.204 FEET

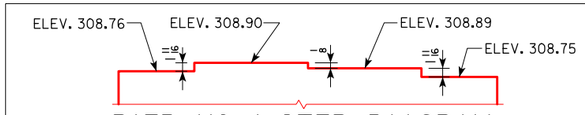
STATIONS

℄ BRIDGE STA.	=	254+73.00	
± $\frac{1}{2}$ OF L2	±	38.67	
℄ PIER BRGS.	=	254+34.33	255+11.67
± LI		- 68.25	+ 68.25
℄ ABUTMENT BRGS.	=	253+66.08	255+79.92

ELEVATIONS TOP OF SLAB FACING ALONG THE STATIONING
(BEAM SPACING)(TAN. SK.△) = (7.00')TAN 15° = 1.88'

PIER NO. 1

BEAMS	EXTERIOR	INTERIOR	INTERIOR	EXTERIOR
STATION	254+37.15	254+35.27	254+33.39	254+31.51
PGL ELEV.	+313.55	+313.55	313.54	313.54
SLAB CROWN	-0.18	-0.04	-0.04	-0.18
TOP SLAB ELEV.	313.37	313.51	313.50	313.36
-"U" (4'-7$\frac{5}{16}$)	-4.61	-4.61	-4.61	-4.61
BR. SEAT ELEV.	308.76	308.90	308.89	308.75



PIER NO. 1 STEP DIAGRAM
LOOKING UP STATIONING

TEE PIER NOTES:

THE TEE PIERS SHOWN IN THESE PLANS ARE DESIGNED FOR USE WITH THE H24-06 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE STANDARDS. THE PIER MAY BE USED FOR EITHER GRADE SEPARATION OR STREAM CROSSING STRUCTURES. THE PIERS WERE DESIGNED FOR THE FOLLOWING STREAM FORCE AND ICE LOADING CONDITIONS, AND SHOULD NOT BE USED WHERE THESE LOADING CONDITIONS ARE EXCEEDED.

ICE FORCE:
ICE FORCES WERE APPLIED AT A HEIGHT OF H/2 + 1'-6 ABOVE THE BOTTOM OF THE PIER FOOTING, WHERE H IS THE OVERALL HEIGHT OF PIER. THE EFFECTIVE ICE STRENGTH WAS 24 KSF FOR 1'-7 OF ICE DEPTH. A PRIMARY ICE FORCE (F) WAS CALCULATED ACCORDING TO THE LRFD SPECIFICATIONS AND APPLIED TO THE PIER STEM AS FOLLOWS:

CASE 1: 100% OF F APPLIED PARALLEL TO THE PIER'S LONG AXIS AND 15% OF F APPLIED PERPENDICULAR TO THE PIER'S LONG AXIS.
CASE 2: 50% OF F APPLIED PARALLEL TO THE PIER'S LONG AXIS AND 34% OF F APPLIED PERPENDICULAR TO THE PIER'S LONG AXIS.

STREAM FLOW:
THE STREAM VELOCITY USED WAS 5 FT/SEC WITH THE C_D COEFFICIENT EQUAL TO 1.4. THE RESULTING STREAM FORCE WAS ASSUMED TO ACT PARALLEL TO THE PIER'S LONG AXIS. IT WAS ASSUMED THAT SUPERSTRUCTURE ELEMENTS WILL CLEAR HIGH WATER BY APPROXIMATELY 3'-0.

FOOTING GEOMETRY:
IT WAS ASSUMED THAT THE PIER FOOTING WILL BE SET APPROXIMATELY 6'-0 BELOW THE ADJACENT STREAMBED OR GROUND SURFACE. IT WAS ALSO ASSUMED THAT THERE ARE NO SIGNIFICANT UNBALANCED EARTH PRESSURES APPLIED TO THE PIER.

ALL BRIDGES WITH TEE PIERS DETAILED ON THESE STANDARDS ARE INTENDED TO HAVE ONE FIXED PIER AND ONE EXPANSION PIER. THE PILE LAYOUT AND REINFORCEMENT SHOWN ARE THE SAME FOR EITHER FIXED OR EXPANSION PIER. THE ONLY DISTINCTION BETWEEN FIXED PIER AND EXPANSION PIER LIES IN THE SELECTION OF BEARINGS AND PRESENCE OF THE KEYWAY IN THE TOP OF THE CAP. EACH BRIDGE SHALL HAVE ONE SET OF FIXED BEARINGS AND ONE SET OF EXPANSION BEARINGS, WHICH MAY BE USED ON EITHER PIER 1 OR PIER 2. THE KEYWAY IN THE TOP OF THE CAP SHOULD BE ELIMINATED FROM THE EXPANSION PIER.

HP10x57 STEEL PILE SHALL BE USED IN THE PILE FOOTINGS OF THE PIERS FOR EITHER FRICTION OR POINT BEARING PILE CONDITIONS. FRICTION BEARING INCLUDES SIDE FRICTION AND END BEARING IN SOIL. POINT BEARING INCLUDES SIDE FRICTION AND POINT BEARING IN ROCK. NOMINAL STRUCTURAL RESISTANCE WAS TAKEN AS 243 KIPS FOR HP10x57 SLR-1 FRICTION BEARING PILES AND 365 KIPS FOR HP10x57 SLR-2 POINT BEARING PILES. A NOMINAL UPLIFT RESISTANCE OF 42 KIPS PER PILE WAS USED IN THE DESIGN OF THE PIER FOOTINGS. THE PIER SHALL NOT BE USED AT SITES WHERE THIS UPLIFT FORCE CANNOT BE ACHIEVED DUE TO SPECIFIC CONDITIONS SUCH AS NEAR SURFACE ROCK LAYERS.

WHEN PIERS ARE USED IN GRADE SEPARATION STRUCTURES, EPOXY COATED REINFORCEMENT MAY BE REQUIRED FOR PIER COLUMNS. CONSULT CURRENT POLICY FOR GUIDANCE ON THE USE OF EPOXY COATED REINFORCEMENT IN SUCH CASES. ADJUST THE dl COLUMN BAR PROJECTION INTO THE CAP AND dl/d2 LAP DISTANCE ACCORDINGLY.

05-13
LATEST REVISION DATE

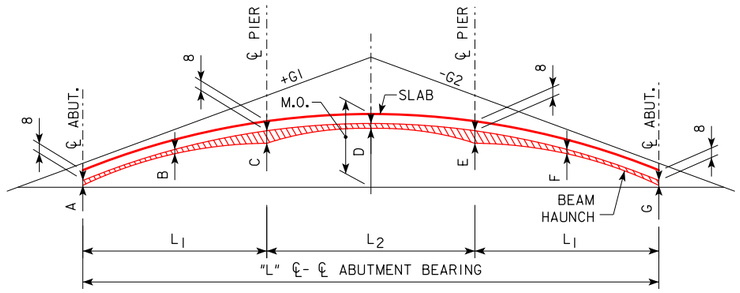
APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
DECEMBER, 2006

GENERAL INFORMATION | H24-02-06

REVISED 05-13 - TEE PIER NOTES WERE CHANGED TO LRFD SPECS.



℄-℄ ABUT. BRG. "L"	A ℄ ABUT.	B	C ℄ PIER	D	E ℄ PIER	F	G ℄ ABUT.
138'-10	1	9/16	1 7/16	1/2	1 7/16	9/16	1
151'-4	7/8	5/8	1 11/16	9/16	1 11/16	5/8	7/8
163'-10	7/8	9/16	1 7/16	9/16	1 7/16	9/16	7/8
176'-4	7/8	5/8	1 5/8	1/2	1 5/8	5/8	7/8
188'-10	7/8	5/8	2	9/16	2	5/8	7/8
201'-4	1/2	11/16	1 3/8	1/2	1 3/8	11/16	1/2
213'-10	11/16	5/8	1 3/8	9/16	1 3/8	5/8	11/16
226'-4	1 1/8	9/16	1 5/8	9/16	1 5/8	9/16	1 1/8
243'-0	1 1/2	9/16	1 5/8	9/16	1 5/8	9/16	1 1/2

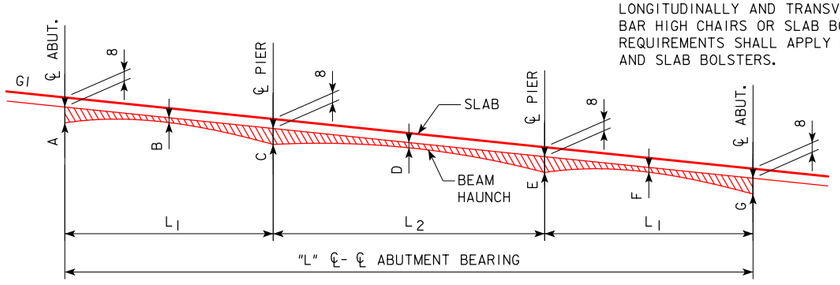
LENGTH OF VERTICAL CURVE REQUIRED = (20,000)(G1-G2)

M.O. = $\frac{(G1-G2)(\text{LENGTH OF V.C.})}{8}$

(G1-G2) IS THE ALGEBRAIC DIFFERENCE OF THE APPROACH GRADES EXPRESSED IN DECIMAL FORM. G1 NEED NOT HAVE THE SAME VALUE AS G2. MAXIMUM VALUE OF G1 OR G2 IS 5%. LENGTH OF CURVE AND M.O. ARE IN FEET.

SLAB AND HAUNCH THICKNESS AT BEAMS FOR VERTICAL CURVE

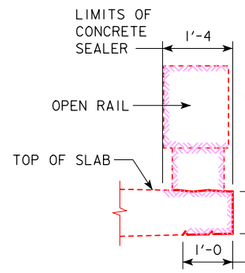
TOP TRANSVERSE REINFORCING STEEL IS TO BE PARALLEL TO AND 2½" CLEAR BELOW TOP OF SLAB. BOTTOM TRANSVERSE REINFORCING STEEL IS TO BE PARALLEL TO AND 1" CLEAR ABOVE BOTTOM OF SLAB. TOP AND BOTTOM REINFORCING STEEL IS TO BE SUPPORTED BY INDIVIDUAL BAR CHAIRS SPACED AT NOT MORE THAN 3'-0 CENTERS LONGITUDINALLY AND TRANSVERSELY, OR BY CONTINUOUS ROWS OF BAR HIGH CHAIRS OR SLAB BOLSTERS SPACED 4'-0 APART. I.M. 451.01 REQUIREMENTS SHALL APPLY FOR BAR CHAIRS, BAR HIGH CHAIRS, AND SLAB BOLSTERS.



℄-℄ ABUT. BRG. "L"	A ℄ ABUT.	B	C ℄ PIER	D	E ℄ PIER	F	G ℄ ABUT.
138'-10	1 1/16	1/2	1 11/16	9/16	1 11/16	1/2	1 1/16
151'-4	7/8	9/16	1 7/8	1/2	1 7/8	9/16	7/8
163'-10	15/16	1/2	1 11/16	1/2	1 11/16	1/2	15/16
176'-4	15/16	1/2	1 15/16	1/2	1 15/16	1/2	15/16
188'-10	1 1/16	9/16	2 3/8	9/16	2 3/8	9/16	1 1/16
201'-4	3/4	5/8	1 13/16	9/16	1 13/16	5/8	3/4
213'-10	7/8	1/2	1 13/16	9/16	1 13/16	1/2	7/8
226'-4	1 3/8	1/2	2 1/8	9/16	2 1/8	1/2	1 3/8
243'-0	1 15/16	1/2	2 1/8	9/16	2 1/8	1/2	1 15/16

G1 MAY HAVE A + OR - SIGN. THE MINIMUM NUMERICAL VALUE OF THE GRADE IS 0.3% AND THE MAXIMUM VALUE IS 5%.

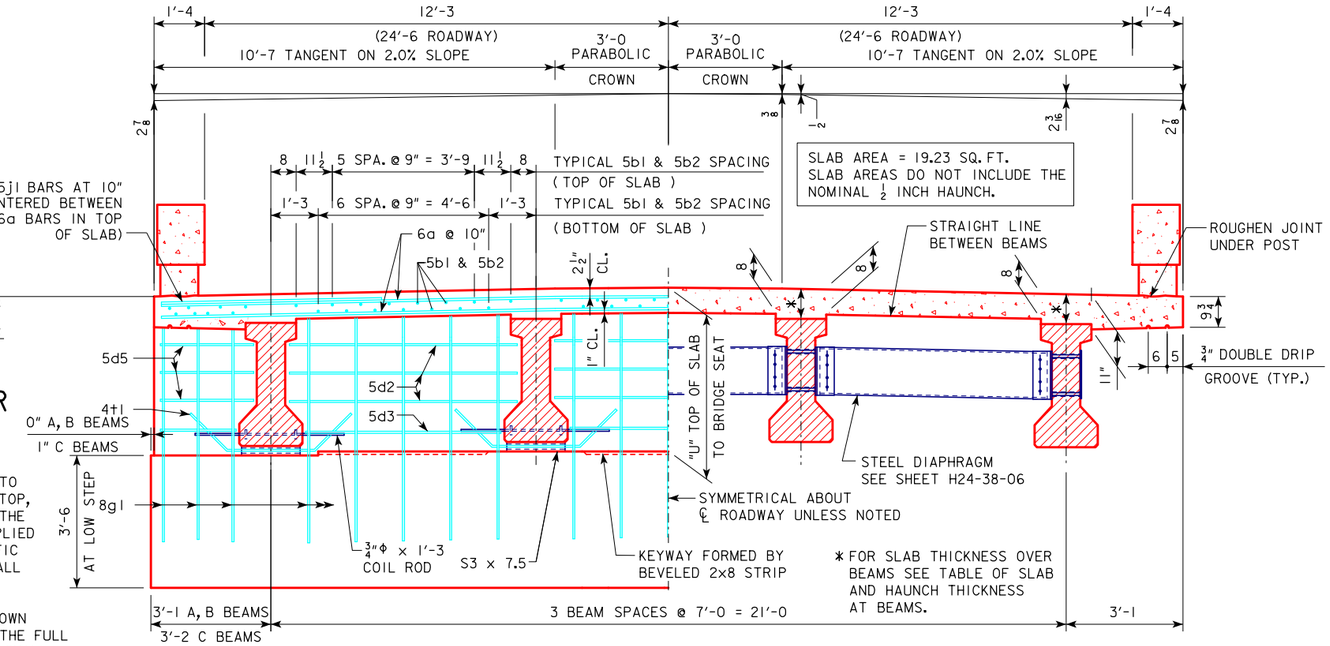
SLAB AND HAUNCH THICKNESS AT BEAMS FOR STRAIGHT GRADE



CONCRETE SEALER LIMITS FOR OPEN RAILS

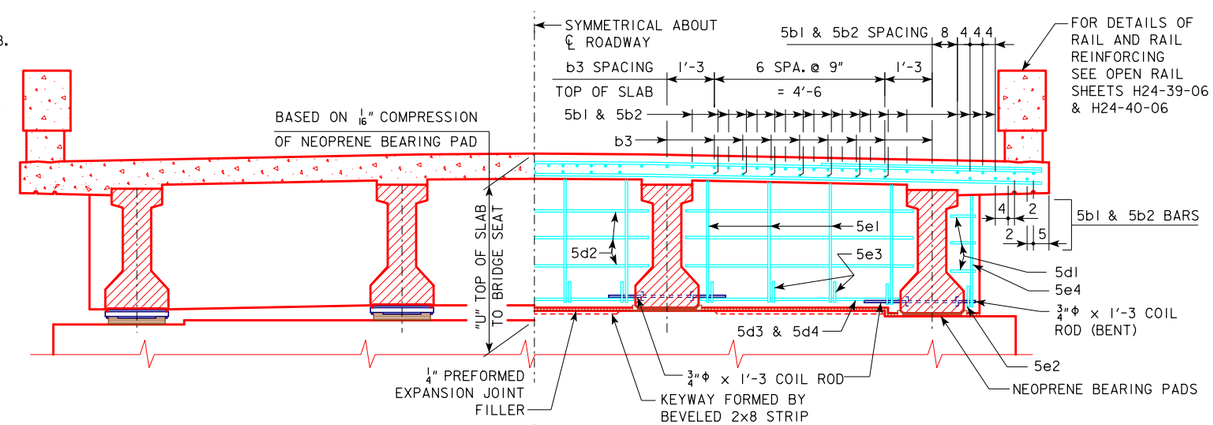
CONCRETE SEALER SHALL BE APPLIED TO BOTH SIDES OF BRIDGE SLAB ON THE TOP, EDGE OF SLAB AND UNDER THE SLAB. THE CONCRETE SEALER SHALL ALSO BE APPLIED TO THE OPEN RAIL ON THE TOP, TRAFFIC FACE SIDE, BOTTOM OF RAIL, AND ON ALL SIDES OF THE OPEN RAIL POSTS.

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 SPECIFICATONS.

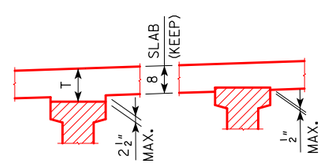


HALF SECTION NEAR ABUTMENT

HALF SECTION NEAR MID SPAN



SECTION NEAR PIER



SLAB THICKNESS DETAILS

NOTE: THE SLAB THICKNESS (T) AT THE BEAMS, (8" SLAB PLUS HAUNCH) IS BASED ON THE ANTICIPATED BEAM CAMBER REMAINING AFTER PLACING THE SLAB, BUT IS NOT GUARANTEED FOR CONSTRUCTION. IF BEAM IS UNDER CAMBERED INCREASE THE HAUNCH THICKNESS OVER THE BEAM AT THE MIDPOINT OF THE SPANS (POINTS B, D AND F). IF THE BEAM IS OVER CAMBERED DECREASE THE HAUNCH THICKNESS OVER THE BEAM AT THE MIDPOINT OF THE SPANS (POINTS B, D AND F) TO A MAXIMUM OF ½" EMBEDMENT IN THE SLAB. IF MORE THAN ½" EMBEDMENT IS REQUIRED OR IF THE HAUNCH EXCEEDS 2½" THE GRADE LINE IS TO BE REVISED.

LENGTH OF S3 x 7.5

(ABUTMENT BEAM SEAT)

BEAM BOTTOM FLANGE WIDTH	LENGTH OF S3 x 7.5
1'-5	1'-3½
1'-8	1'-6½

06-12
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

SUPERSTRUCTURE DETAILS | H24-03-06

REVISED 06-12 - I.M. REQUIREMENT ADDED TO BAR CHAIR NOTE.

GENERAL NOTES:

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

ALL REINFORCING BARS ARE TO BE SECURELY WIRED IN PLACE AND ADEQUATELY SUPPORTED ON BAR CHAIRS BEFORE CONCRETE IS PLACED. I.M. 451.01 REQUIREMENTS SHALL APPLY FOR BAR CHAIRS.

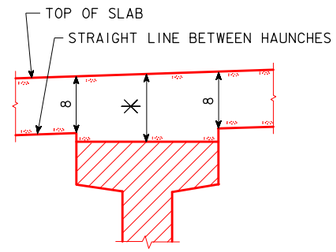
ALL PRESTRESSED CONCRETE BEAMS ARE TO BE SET VERTICAL.

FORMS FOR THE SLAB AND RAILS ARE TO BE SUPPORTED BY THE PRESTRESSED CONCRETE BEAMS.

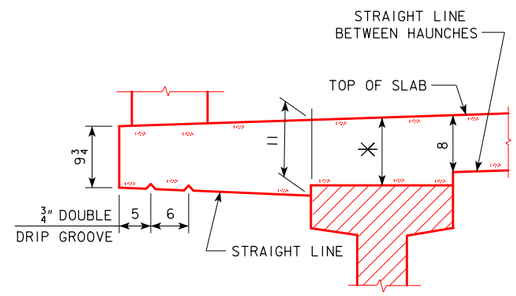
THE PIER AND ABUTMENT DIAPHRAGM CONCRETE IS TO BE PLACED MONOLITHICALLY WITH THE FLOOR SLAB.

ALL REINFORCING STEEL IS TO BE GRADE 60.

COST OF ALL PREFORMED EXPANSION JOINT FILLER MATERIAL IS TO BE INCLUDED IN THE PRICE BID FOR "STRUCTURAL CONCRETE (BRIDGE)".



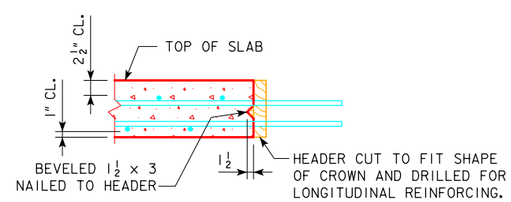
INTERIOR BEAMS



EXTERIOR BEAMS @ OPEN RAIL

TYPICAL SLAB AND HAUNCH DETAIL

* FOR SLAB THICKNESS OVER BEAMS SEE "SLAB THICKNESS DETAILS" ON SHEET H24-03-06



TRANSVERSE SLAB CONSTRUCTION JOINT

06-12
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

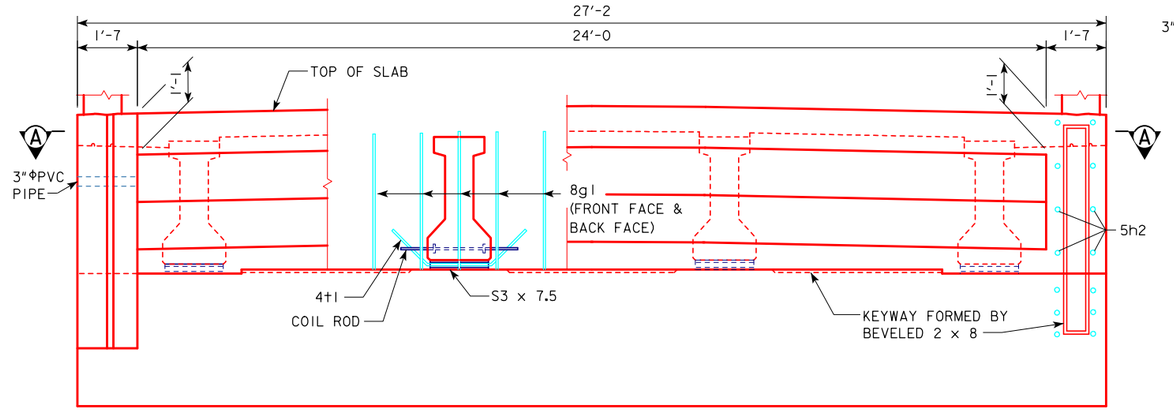
STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

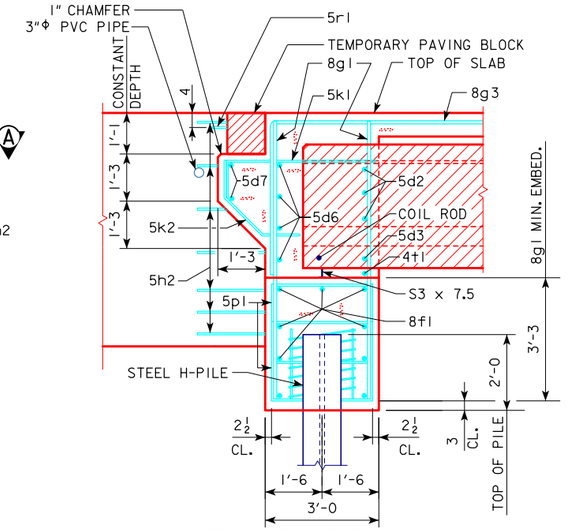
DECEMBER, 2006

SUPERSTRUCTURE DETAILS | H24-04-06

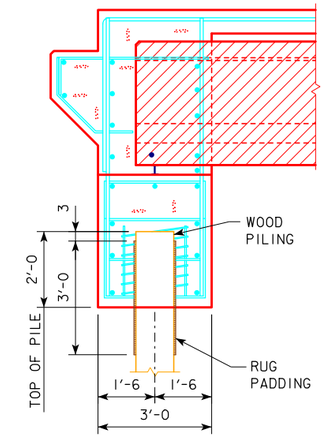
REVISED 06-12 - I.M. REQUIREMENT ADDED TO BAR CHAIR NOTE.



PART REAR ELEVATION AT ABUTMENT



PART SECTION B-B
(FOR STEEL H-PILING)



PART SECTION B-B
(FOR WOOD PILING)

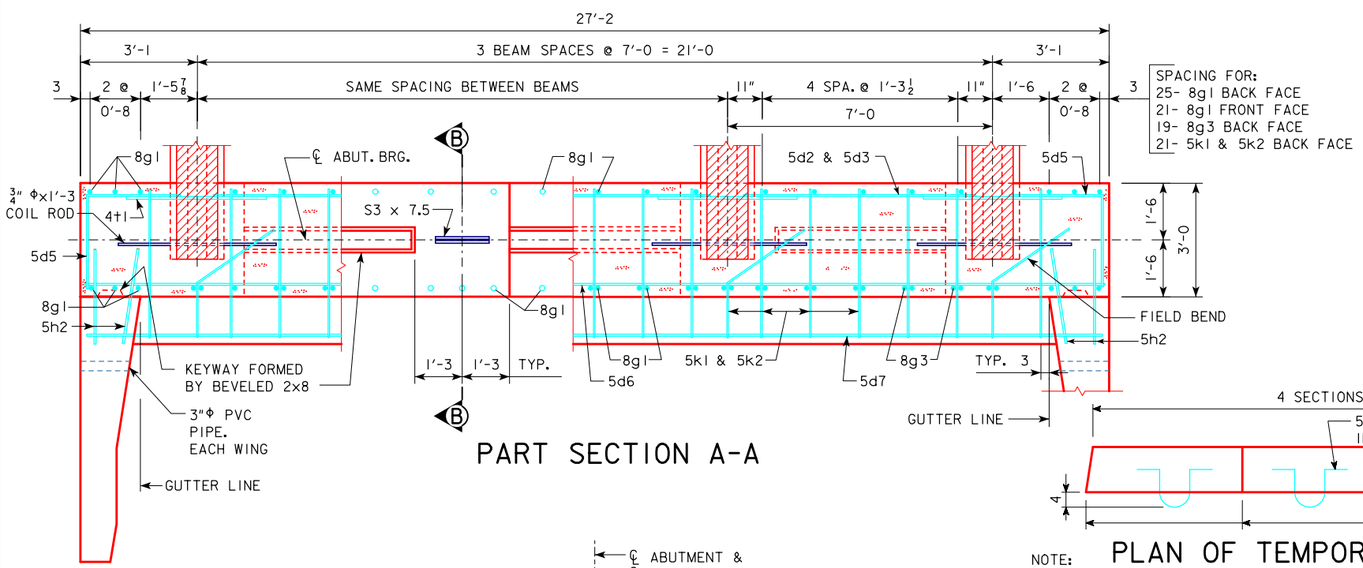
WOOD PILING NOTE:

AFTER PILES ARE CUT OFF, THE UPPER 3', EXCEPT AS SHOWN, IS TO BE WRAPPED WITH A DOUBLE THICKNESS OF RUG PADDING HELD IN PLACE BY TACKING WITH GALVANIZED ROOFING NAILS AND WRAPPED WITH #14 GAUGE GALVANIZED WIRE AT A 4" PITCH, CARE IS TO BE TAKEN NOT TO DAMAGE PADDING WHEN PLACING CONCRETE. RUG PADDING MAY BE EITHER OF THE FOLLOWING:

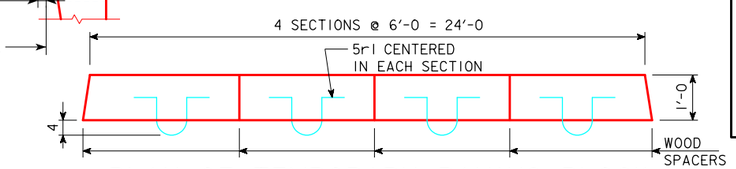
(1) HAIR AND JUTE RUG PADDING, RUBBERIZED ON BOTH SIDES, AND WEIGHING NOT LESS THAN 47 OZ. PER SQ. YD.

(2) BONDED URETHANE OR BONDED POLYFOAM WITH A MINIMUM DENSITY OF 5 LBS. PER CU. FT. AND SHALL BE AT LEAST $\frac{1}{2}$ IN. THICK, (MATERIAL LESS THAN $\frac{1}{2}$ IN. IN THICKNESS MAY BE USED, BUT WILL REQUIRE ADDITIONAL WRAPS FOR A TOTAL OF AT LEAST ONE INCH).

NOTE:
THE SPIRAL AT THE TOP OF EACH PILE TO BE 7 TURNS OF NO. 2 BAR, 21" DIAMETER, 3" PITCH WITH 3 - $L\frac{7}{8} \times \frac{7}{8} \times \frac{1}{8}$ SPACERS PUNCHED TO HOLD SPIRAL.



PART SECTION A-A

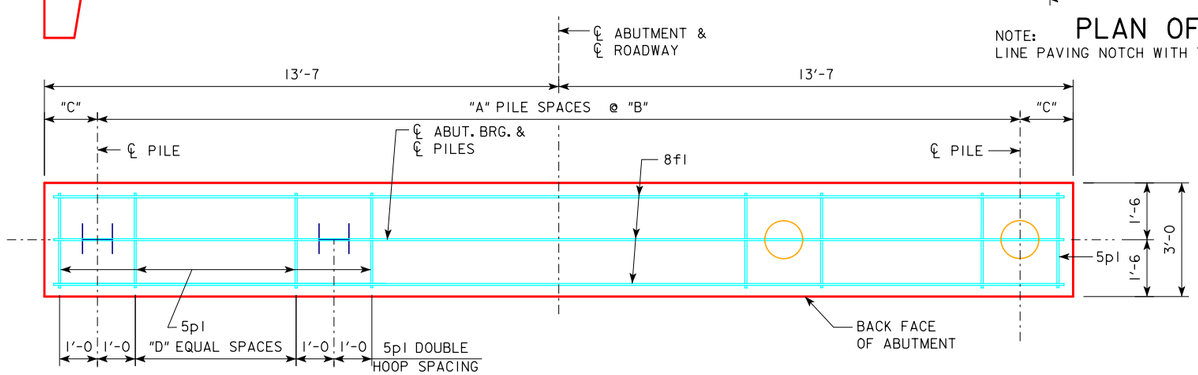


PLAN OF TEMPORARY PAVING BLOCK

NOTE:
LINE PAVING NOTCH WITH TAR PAPER BEFORE PLACING THE TEMPORARY PAVING BLOCK.

ABUTMENT PILE SPACING		℄-℄ ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10
WITH WOOD PILES	"A" PILE SPACES		9	9	10	10	10
	"B" (FT. - IN.)		2'-8	2'-8	2'-5	2'-5	2'-5
	"C" (FT. - IN.)		1'-7	1'-7	1'-6	1'-6	1'-6
	"D" EQUAL SPACES		1	1	1	1	1
	NO. OF PILES PER ABUT.		10	10	11	11	11
	PU, STRENGTH I DESIGN LOAD (KIPS)		56	58	57	59	61
WITH STEEL H-PILES	"A" PILE SPACES		4	4	4	4	5
	"B" (FT. - IN.)		5'-8	5'-8	5'-8	5'-8	4'-6
	"C" (FT. - IN.)		2'-3	2'-3	2'-3	2'-3	2'-4
	"D" EQUAL SPACES		3	3	3	3	2
	NO. OF PILES PER ABUT.		5	5	5	5	6
	PU, STRENGTH I DESIGN LOAD (KIPS)		124	129	137	142	122

NOTE: Pu, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



ABUTMENT PILE PLAN

ABUTMENT NOTES:

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

ABUTMENT PILES ARE TO BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

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

BARRIER RAIL NOT SHOWN IN DETAILS.

IF ROCK IS CLOSER THAN 15' BELOW ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.

05-13
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

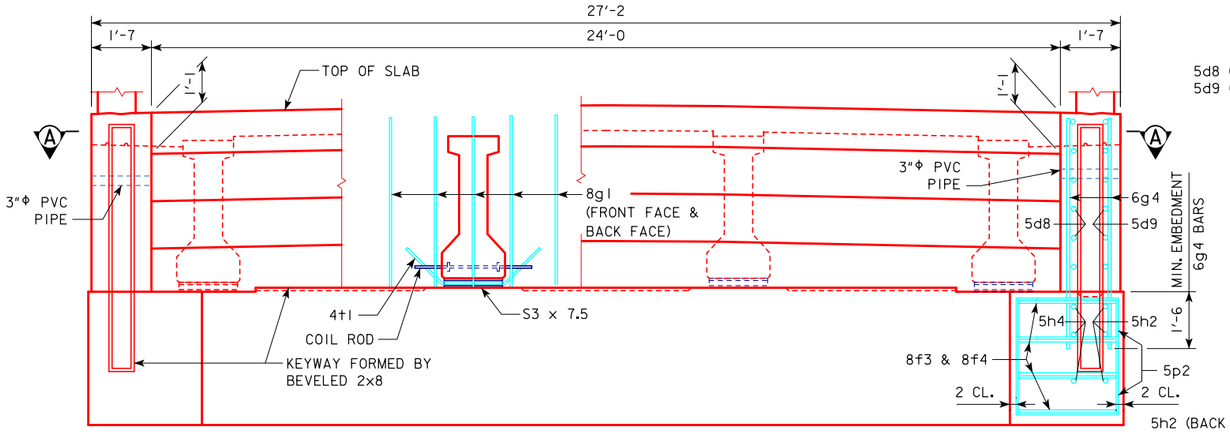
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

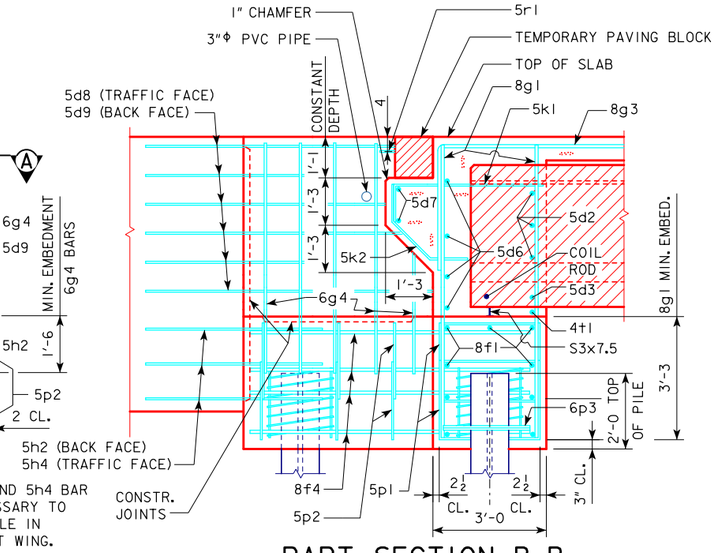
ABUTMENT DETAILS
0° SKEW A & B BEAMS

H24-05-06

REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.



PART REAR ELEVATION AT ABUTMENT



FIELD BEND 5h4 BAR AS NECESSARY TO AVOID PILE IN ABUTMENT WING.

PART SECTION B-B

ABUTMENT NOTES:

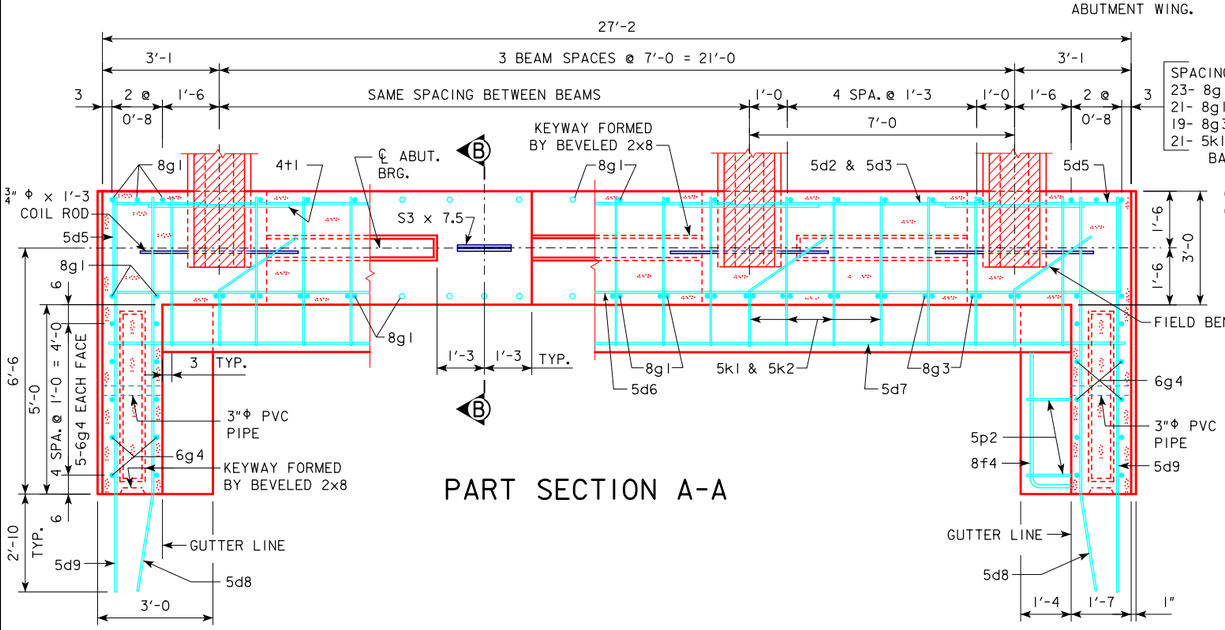
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.

ABUTMENT PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

BARRIER RAIL NOT SHOWN IN DETAILS.

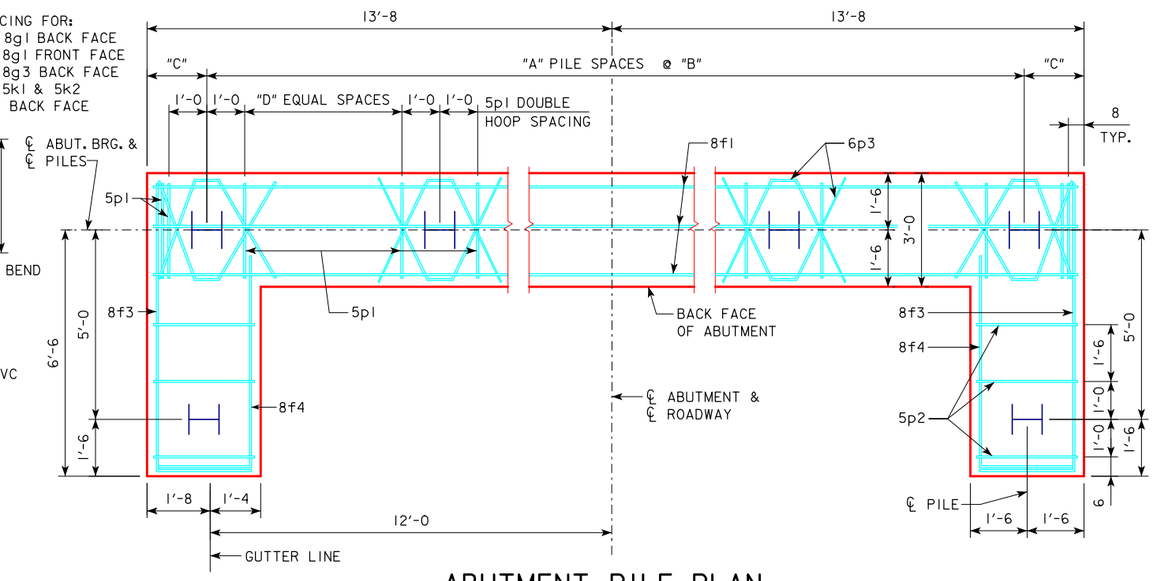
IF ROCK IS CLOSER THAN 15' BELOW ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.

NOTE:
THE SPIRAL AT THE TOP OF EACH PILE TO BE 7 TURNS OF NO. 2 BAR, 21" DIAMETER, 3" PITCH WITH 3 - L $\frac{7}{8}$ x $\frac{7}{8}$ x $\frac{1}{8}$ SPACERS PUNCHED TO HOLD SPIRAL.

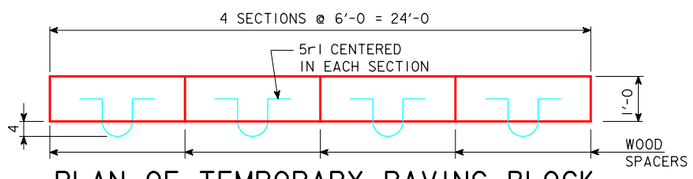


SPACING FOR:
23- 8g1 BACK FACE
21- 8g1 FRONT FACE
19- 8g3 BACK FACE
21- 5k1 & 5k2 BACK FACE

PART SECTION A-A



ABUTMENT PILE PLAN



PLAN OF TEMPORARY PAVING BLOCK

NOTE :
LINE PAVING NOTCH WITH TAR PAPER BEFORE PLACING THE TEMPORARY PAVING BLOCK.

ABUTMENT PILE SPACING	℄-℄ ABUT. BRG.	201'-4	213'-10	226'-4	243'-0
WITH STEEL H-PILES	"A" PILE SPACES	5	5	5	5
	"B" (FT. - IN.)	4'-6	4'-6	4'-6	4'-6
	"C" (FT. - IN.)	2'-5	2'-5	2'-5	2'-5
	"D" EQUAL SPACES	2	2	2	2
	NO. OF PILES PER ABUT.	8	8	8	8
	PU, STRENGTH I DESIGN LOAD (KIPS)	128	132	136	144

NOTE: Pu, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

10-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

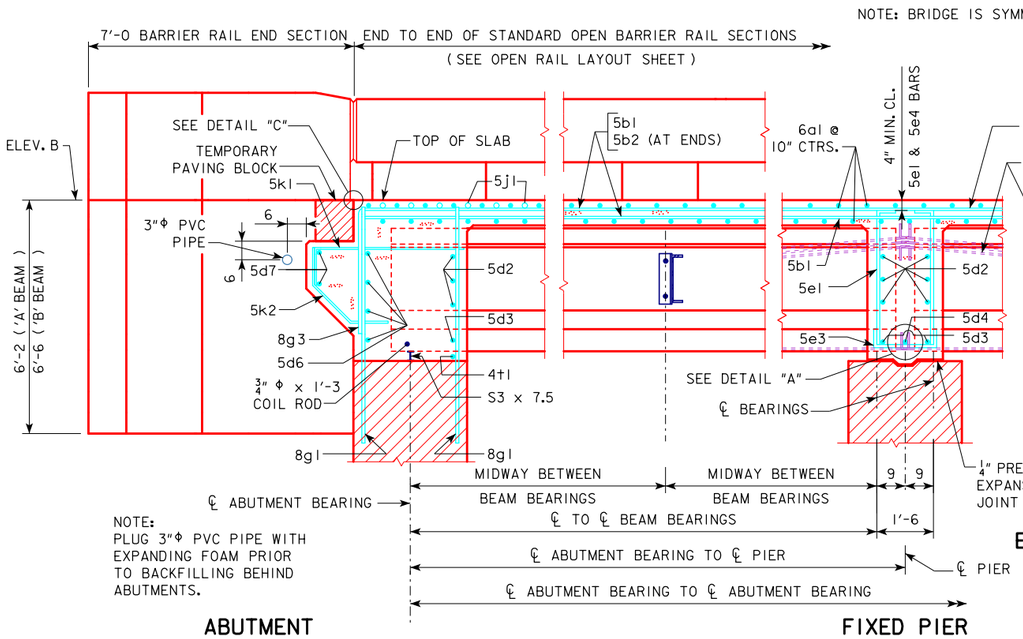
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

ABUTMENT DETAILS
0° SKEW C BEAMS

H24-06-06

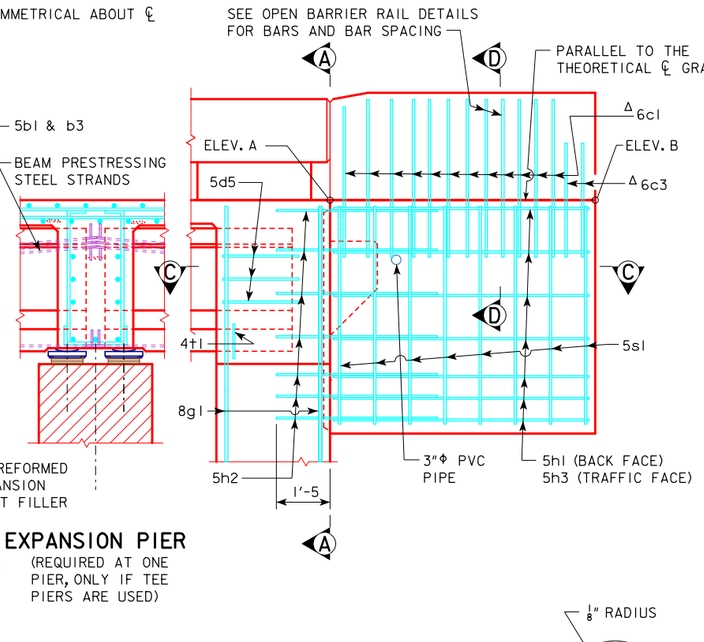
REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 10-2016 - REMOVED SECTION DIRECTORS "C-C" FROM PART SECTION B-B, THEY WERE VOID BECAUSE THERE WAS NO SECTION C-C DETAIL.



NOTE:
PLUG 3"Φ PVC PIPE WITH EXPANDING FOAM PRIOR TO BACKFILLING BEHIND ABUTMENTS.

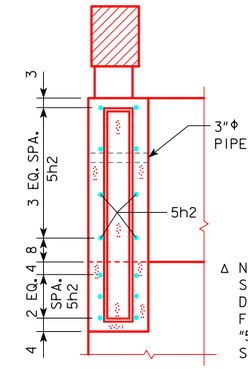
PART LONGITUDINAL SECTION NEAR GUTTER

(FOR DETAILS OF INTERMEDIATE DIAPHRAGM SEE SHEET H24-38-06)

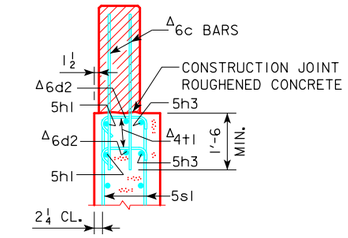


EXPANSION PIER

(REQUIRED AT ONE PIER, ONLY IF TEE PIERS ARE USED)



SECTION A-A

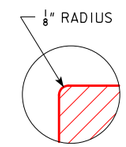


PART SECTION D-D

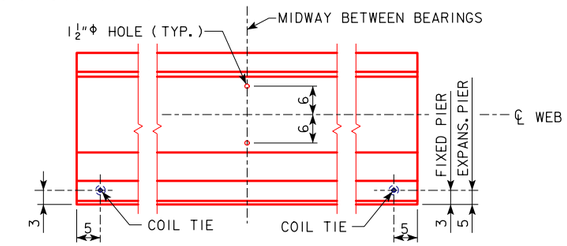
Δ NOTE:
SEE END SECTION DETAILS IN THESE PLANS FOR DETAILS OF BARRIER RAIL END SECTION AND SPACING FOR 5c BARRIER RAIL BARS. REINFORCING BARS "5c", "5d" AND "4t1" ARE INCLUDED IN THE SUPERSTRUCTURE QUANTITIES.

PART END VIEW AT ABUTMENT

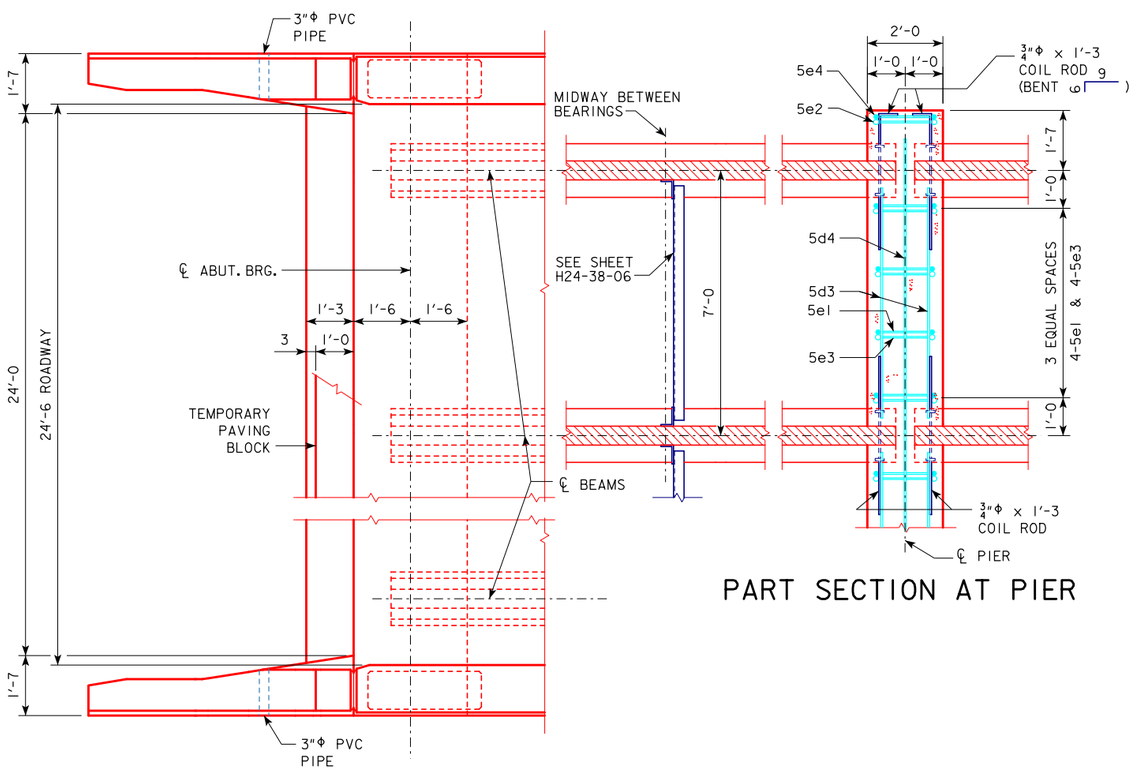
PROVIDE ELEVATIONS A AND B IN THE BRIDGE PLAN SHEETS.



DETAIL "C"

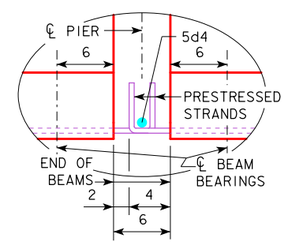


LOCATION OF BEAM COIL TIES AND STEEL DIAPHRAGM BOLT HOLES

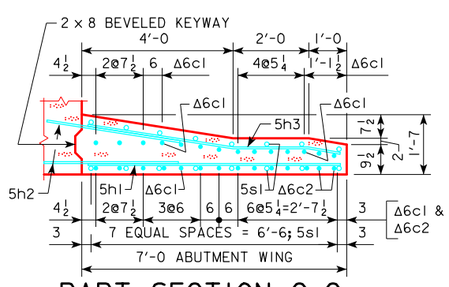


PART PLAN

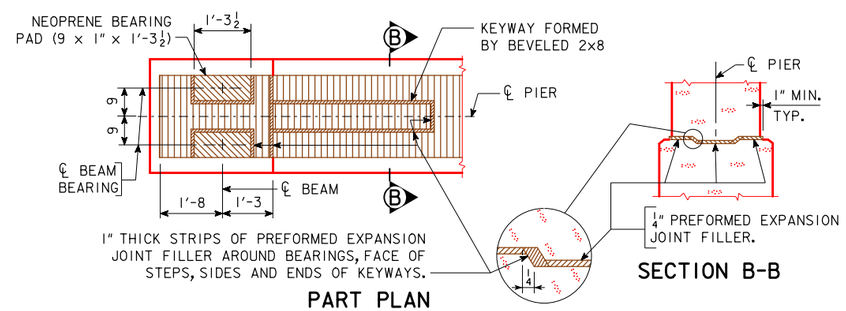
PART SECTION AT PIER



DETAIL "A"



PART SECTION C-C



PART PLAN

SECTION B-B

TOP OF FIXED PIER DETAILS

(SEE SHEET H24-41-06 FOR EXPANSION PIER BEARING DETAILS)

01-10
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

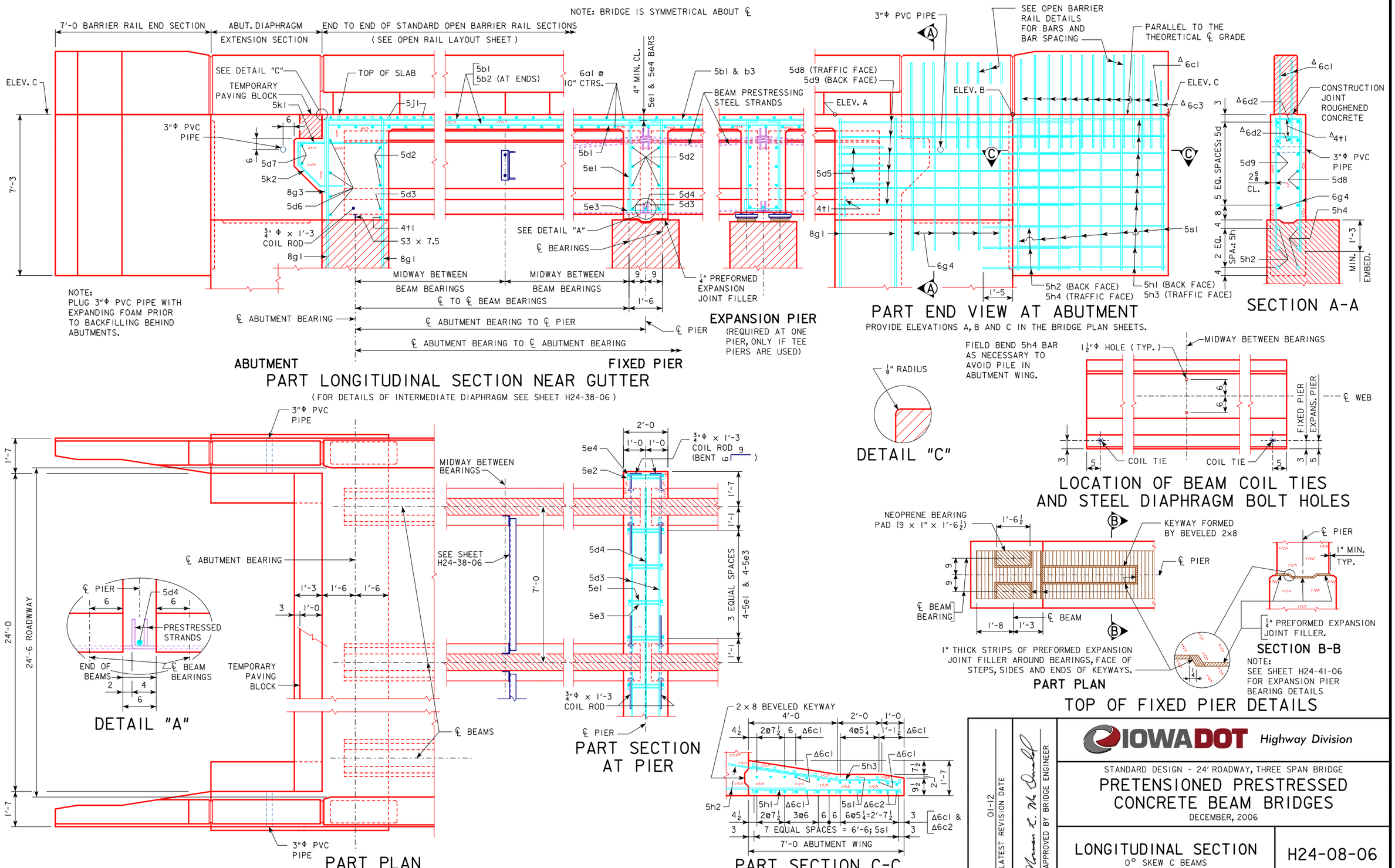
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

LONGITUDINAL SECTION
0° SKEW A & B BEAMS

H24-07-06

CORRECTION 09-10 - MINOR MODIFICATIONS TO PART SECTION C-C.
REVISED 01-10 - ABUT. WINGS SHAPE CHANGED.



01-12
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

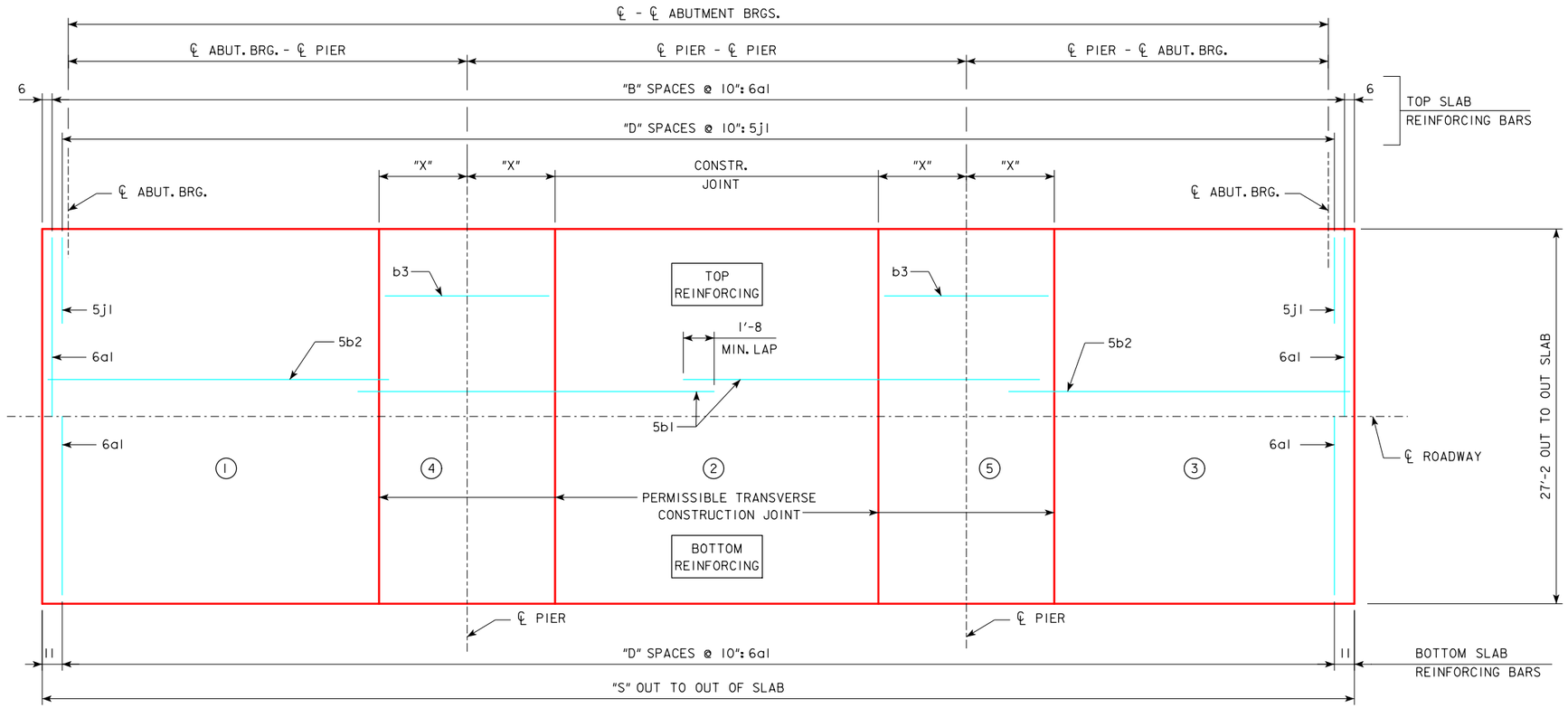
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

LONGITUDINAL SECTION
0° SKEW C BEAMS

H24-08-06

REVISED 01-12 - ADDED FIELD BEND 5h4 BAR TO AVOID PILE IN ABUTMENT WING NOTE.



SLAB LAYOUT

GENERAL DATA		℄-℄ ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
VERTICAL CURVE	TOP OF SLAB TO ABUT. CONSTR. JT. AT C.L. ABUT. BRG.	"U"	3'-8	3'-7 7/8	4'-2 7/8	4'-2 7/8	4'-2 7/8	4'-8 1/2	4'-8 11/16	4'-9 1/8	4'-9 1/2
	TOP OF SLAB TO PIER TOP AT C.L. PIER*	"U"	3'-6 3/8	3'-6 5/8	4'-1 3/8	4'-1 9/16	4'-1 15/16	4'-7 5/16	4'-7 5/16	4'-7 9/16	4'-7 9/16
STRAIGHT GRADE	TOP OF SLAB TO ABUT. CONSTR. JT. AT C.L. ABUT. BRG.	"U"	3'-8 1/16	3'-7 7/8	4'-2 15/16	4'-2 15/16	4'-3 1/16	4'-8 3/4	4'-8 7/8	4'-9 3/8	4'-9 15/16
	TOP OF SLAB TO PIER TOP AT C.L. PIER*	"U"	3'-6 5/8	3'-6 13/16	4'-1 5/8	4'-1 7/8	4'-2 5/16	4'-7 3/4	4'-7 3/4	4'-8 1/16	4'-8 1/16
D.L. PIER REACTION (D.L. + F.W.S.) SERVICE LOADS		KIPS	290.2	313.8	357.4	382.2	407.2	486.5	514.4	542.4	569.7
L.L. PIER REACTION (HL93) NO IMPACT SERVICE LOADS		KIPS	207.6	215.3	222.7	229.9	237.0	244.0	253.2	268.2	284.4
NO. OF SPACES FOR 6a1 BARS (TOP)		"B"	169	184	199	214	229	244	259	274	294
NO. OF SPACES FOR 6a1 BARS (BOTTOM) AND 5j1 BARS (TOP)		"D"	168	183	198	213	228	243	258	273	293
OUT TO OUT OF SLAB		"S"	141'-10	154'-4	166'-10	179'-4	191'-10	204'-4	216'-10	229'-4	246'-0
SLAB TRANSVERSE CONSTR. JT. DISTANCE FROM C.L. PIER		"X"	6'-7	7'-1	7'-7	8'-1	8'-8	9'-2	9'-8	10'-2	10'-2

ESTIMATED QUANTITIES (SUPERSTRUCTURE PLUS INTEGRAL ABUTMENTS)	℄-℄ ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
STRUCTURAL CONCRETE SUPERSTRUCTURE (INCLUDES ABUT. WINGS)	C.Y.	142.2	151.0	165.8	175.0	184.2	202.8	212.0	221.6	234.0
STRUCTURAL CONCRETE ABUTMENTS (w/ WOOD PILES)	C.Y.	20.4	20.4	20.3	20.3	20.3	-----	-----	-----	-----
STRUCTURAL CONCRETE ABUTMENTS (w/ STEEL H PILES)	C.Y.	21.6	21.6	21.6	21.6	21.6	29.4	29.4	29.4	29.4
PRETENSIONED PRESTRESSED CONCRETE BEAM, CENTER SPAN	NO.	4-A50	4-A55	4-B59	4-B63	4-B67	4-C71	4-C75	4-C80	4-C80
PRETENSIONED PRESTRESSED CONCRETE BEAM, END SPAN	NO.	8-A42	8-A46	8-B50	8-B55	8-B59	8-C63	8-C67	8-C71	8-C80
CONCRETE RAIL	L.F.	311.7	336.7	361.7	386.7	411.7	456.7	481.7	506.7	540.0
STRUCTURAL STEEL (w/ PILE BENT PIERS)	LB.	2451	2451	2451	2451	2451	2388	2388	2388	2388
STRUCTURAL STEEL (w/ TEE PIERS)	LB.	3168	3168	3168	3168	3168	3234	3234	3234	3234
REINFORCING STEEL (w/ WOOD PILES)	LB.	43,047	45,845	49,244	52,656	55,495	-----	-----	-----	-----
REINFORCING STEEL (w/ STEEL H PILES)	LB.	42,857	45,655	48,946	52,358	55,173	61,750	65,116	68,217	72,059
NO. OF WOOD PILES, TREATED FOR TWO ABUTMENTS	NO.	20	20	22	22	22	-----	-----	-----	-----
NO. OF STEEL H-PILES (HP 10 x 57) FOR TWO ABUTMENTS	NO.	10	10	10	10	12	16	16	16	16
PREBORED HOLES (w/ WOOD PILES)	L.F.	200	200	220	220	220	-----	-----	-----	-----
PREBORED HOLES (w/ STEEL H-PILES)	L.F.	100	100	100	100	120	160	160	160	160

CONCRETE PLACEMENT QUANT. (SUPERSTRUCTURE PLUS INTEGRAL ABUTMENTS)	℄-℄ ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
SLAB INCL. HAUNCH, ABUT. DIAPHR., & WINGWALLS** , SECT. 1 & 3	C.Y.	76.1	81.2	90.0	95.3	100.5	113.5	119.0	124.6	137.0
SLAB INCLUDING HAUNCH, SECTION 2	C.Y.	28.4	30.7	33.0	35.3	37.5	39.9	42.1	44.5	44.5
SLAB INCLUDING HAUNCH & PIER DIAPHRAGM, SECTIONS 4 & 5	C.Y.	28.5	29.9	33.2	34.8	36.6	39.0	40.5	42.1	42.1
PAVING BLOCKS	C.Y.	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ABUTMENT WINGS	C.Y.	7.2	7.2	7.6	7.6	7.6	8.4	8.4	8.4	8.4
ABUTMENT FOOTINGS (w/ WOOD PILES)	C.Y.	20.4	20.4	20.3	20.3	20.3	-----	-----	-----	-----
ABUTMENT FOOTINGS (w/ STEEL H PILES)	C.Y.	21.6	21.6	21.6	21.6	21.6	29.4	29.4	29.4	29.4

NOTE: CONCRETE DECK SHALL BE PLACED IN SECTIONS AND SEQUENCES INDICATED. ALTERNATE PROCEDURES FOR PLACING DECK CONCRETE MAY BE SUBMITTED FOR APPROVAL TOGETHER WITH A STATEMENT OF THE PROPOSED METHOD AND EVIDENCE THAT THE CONTRACTOR POSSESSES THE NECESSARY EQUIPMENT AND FACILITIES TO ACCOMPLISH THE REQUIRED RESULTS. FOR APPROVED ALTERNATE PROCEDURES THE ENGINEER SHALL DETERMINE IF A RETARDING ADMIXTURE IS REQUIRED TO MAINTAIN PLASTICITY OF THE CONCRETE DECK DURING PLACEMENT.

* VALUES SHOWN ARE FOR FIXED PIERS ONLY AND ALLOW FOR 1/16 INCH DEFLECTION OF THE 1 INCH NEOPRENE BEARING PAD. AT EXPANSION PIER LOCATIONS ADD 3/16 INCHES TO "U" VALUES SHOWN.

** WINGWALLS APPLY ONLY TO BRIDGES USING "C" BEAMS.

07-15
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

SUPERSTRUCTURE DETAILS
0° SKEW

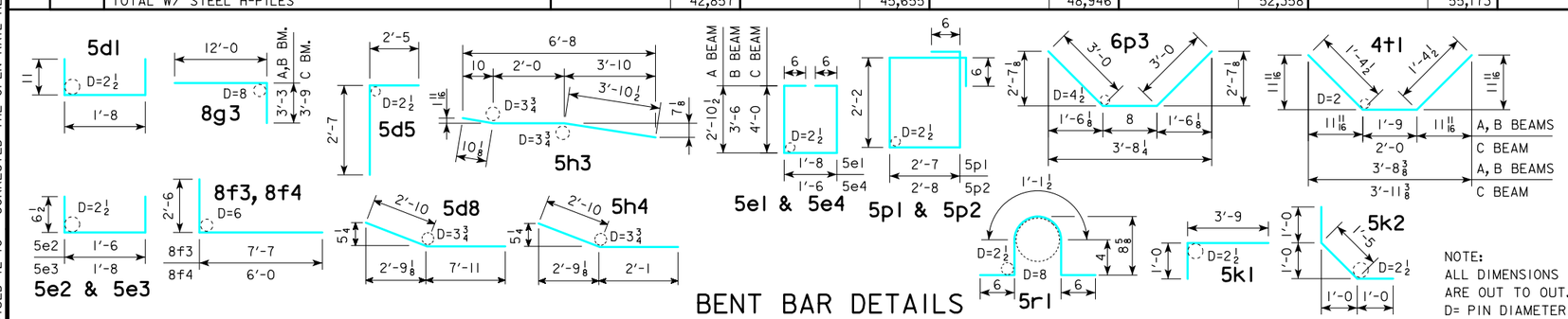
H24-09-06

REVISED 07-2015 - CHANGED CONCRETE PLACEMENT NOTE TO ACCOUNT FOR THE POSSIBLE ADDITION OF A RETARDING ADMIXTURE TO THE CONCRETE.

REINFORCING BAR LIST

ONE SUPERSTRUCTURE AND TWO ABUTMENTS

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT
	℄-℄ ABUT. BRG.		138'-10			151'-4			163'-10			176'-4			188'-10			201'-4			213'-10			226'-4			243'-0		
	℄-℄ BEAM BRG.		42'-6	50'-10	42'-6	46'-8	55'-0	46'-8	50'-10	59'-2	50'-10	55'-0	63'-4	55'-0	59'-2	67'-6	59'-2	63'-4	71'-8	63'-4	67'-6	75'-10	67'-6	71'-8	80'-0	71'-8	80'-0	80'-0	80'-0
	BEAM SERIES		A BEAM			A BEAM			B BEAM			B BEAM			B BEAM			C BEAM			C BEAM			C BEAM			C BEAM		
6a1	SLAB TRANSV. TOP & BOTT.		339	26'-10	13,663	369	26'-10	14,872	399	26'-10	16,081	429	26'-10	17,290	459	26'-10	18,499	489	26'-10	19,708	519	26'-10	20,918	549	26'-10	22,127	589	26'-10	23,739
5b1	SLAB LONGITUDINAL, TOP & BOTT.		122	40'-0	5,090	122	40'-0	5,090	183	40'-0	7,635	183	40'-0	7,635	183	40'-0	7,635	244	40'-0	10,180	244	40'-0	10,180	244	40'-0	10,180	305	40'-0	12,725
5b2	SLAB LONGITUDINAL, TOP & BOTT., ENDS		122	33'-3	4,231	122	39'-6	5,026	122	26'-7	3,383	122	32'-10	4,178	122	39'-1	4,973	122	26'-2	3,330	122	32'-5	4,125	122	38'-8	4,920	122	27'-10	3,542
6b3	SLAB LONGITUDINAL, TOP @ PIERS		50	12'-10	964	50	13'-10	1,039	50	14'-10	1,114	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7b3	SLAB LONGITUDINAL, TOP @ PIERS		—	—	—	—	—	—	—	—	—	50	15'-10	1,618	50	17'-0	1,737	50	18'-0	1,840	—	—	—	—	—	—	—	—	—
8b3	SLAB LONGITUDINAL, TOP @ PIERS		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	19'-0	2,537	50	20'-0	2,670	50	20'-0	2,670
5d1	PIER DIAPH. ENDS		12	3'-6	44	12	3'-6	44	12	3'-6	44	12	3'-6	44	12	3'-6	44	12	3'-6	44	12	3'-6	44	12	3'-6	44	12	3'-6	44
5d2	PIER & ABUT. DIAPH. LONGIT.		54	6'-4	357	54	6'-4	357	54	6'-4	357	54	6'-4	357	54	6'-4	357	54	6'-1	343	54	6'-1	343	54	6'-1	343	54	6'-1	343
5d3	PIER & ABUT. DIAPH. LONGIT.		18	5'-5	102	18	5'-5	102	18	5'-5	102	18	5'-5	102	18	5'-5	102	18	5'-2	97	18	5'-2	97	18	5'-2	97	18	5'-2	97
5d4	PIER DIAPH. LONGIT.		2	23'-9	50	2	23'-9	50	2	23'-9	50	2	23'-9	50	2	23'-9	50	2	23'-9	50	2	23'-9	50	2	23'-9	50	2	23'-9	50
5d5	ABUT. DIAPH. ENDS		12	5'-0	63	12	5'-0	63	12	5'-0	63	12	5'-0	63	12	5'-0	63	12	5'-0	63	12	5'-0	63	12	5'-0	63	12	5'-0	63
5d6	ABUT. DIAPH. LONGIT. B.F.		8	26'-9	223	8	26'-9	223	8	26'-9	223	8	26'-9	223	8	26'-9	223	8	26'-9	223	8	26'-9	223	8	26'-9	223	8	26'-9	223
5d7	PAVING NOTCH LONGIT.		4	26'-9	112	4	26'-9	112	4	26'-9	112	4	26'-9	112	4	26'-9	112	4	26'-9	112	4	26'-9	112	4	26'-9	112	4	26'-9	112
5d8	ABUT. DIAPH. WING EXT. LONGIT.		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	24	10'-9	269	24	10'-9	269	24	10'-9	269	24	10'-9	269
5d9	ABUT. DIAPH. WING EXT. LONGIT.		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	24	10'-8	267	24	10'-8	267	24	10'-8	267	24	10'-8	267
5e1	PIER DIAPH. HOOPS		24	8'-5	211	24	8'-5	211	24	9'-8	242	24	9'-8	242	24	9'-8	242	24	10'-8	267	24	10'-8	267	24	10'-8	267	24	10'-8	267
5e2	PIER DIAPH. TIES ENDS		4	2'-7	11	4	2'-7	11	4	2'-7	11	4	2'-7	11	4	2'-7	11	4	2'-7	11	4	2'-7	11	4	2'-7	11	4	2'-7	11
5e3	PIER DIAPH. TIES		24	2'-9	69	24	2'-9	69	24	2'-9	69	24	2'-9	69	24	2'-9	69	24	2'-9	69	24	2'-9	69	24	2'-9	69	24	2'-9	69
5e4	PIER DIAPH. HOOPS ENDS		4	8'-3	34	4	8'-3	34	4	9'-6	40	4	9'-6	40	4	9'-6	40	4	10'-6	44	4	10'-6	44	4	10'-6	44	4	10'-6	44
8f1	ABUT. FOOTING LONGIT.		18	26'-10	1,290	18	26'-10	1,290	18	26'-10	1,290	18	26'-10	1,290	18	26'-10	1,290	18	27'-0	1,298	18	27'-0	1,298	18	27'-0	1,298	18	27'-0	1,298
8f3	ABUT. EXTENSION LONGIT.		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	10'-1	431	16	10'-1	431	16	10'-1	431	16	10'-1	431
8f4	ABUT. EXTENSION LONGIT.		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	8'-6	363	16	8'-6	363	16	8'-6	363	16	8'-6	363
8g1	ABUT. VERT.		92	5'-7	1,371	92	5'-7	1,371	92	6'-2	1,515	92	6'-2	1,515	92	6'-2	1,515	88	6'-8	1,566	88	6'-8	1,566	88	6'-8	1,566	88	6'-9	1,586
8g3	ABUT. DIAPH. VERT. B.F.		38	15'-3	1,547	38	15'-3	1,547	38	15'-3	1,547	38	15'-3	1,547	38	15'-3	1,547	38	15'-9	1,598	38	15'-9	1,598	38	15'-9	1,598	38	15'-9	1,598
6g4	ABUT. DIAPH. WING EXT. VERT.		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	40	6'-0	360	40	6'-0	360	40	6'-1	365	40	6'-1	365
5h1	ABUT. WING HORIZ. B.F.		28	6'-8	195	28	6'-8	195	28	6'-8	195	28	6'-8	195	28	6'-8	195	36	6'-8	250	36	6'-8	250	36	6'-8	250	36	6'-8	250
5h2	ABUT. TO WING ANCHOR		56	4'-11	287	56	4'-11	287	56	4'-11	287	56	4'-11	287	56	4'-11	287	12	4'-11	62	12	4'-11	62	12	4'-11	62	12	4'-11	62
5h3	ABUT. WING HORIZ. TRAFFIC FACE		28	6'-9	197	28	6'-9	197	28	6'-9	197	28	6'-9	197	28	6'-9	197	36	6'-9	253	36	6'-9	253	36	6'-9	253	36	6'-9	253
5h4	ABUT. TO WING ANCHOR		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12	4'-11	62	12	4'-11	62	12	4'-11	62	12	4'-11	62
5j1	TOP OF SLAB TRANSV. (AT RAIL)		338	6'-3	2,203	368	6'-3	2,399	398	6'-3	2,594	428	6'-3	2,790	458	6'-3	2,986	488	6'-3	3,181	518	6'-3	3,377	548	6'-3	3,572	588	6'-3	3,833
5k1	PAVING NOTCH		42	4'-9	208	42	4'-9	208	42	4'-9	208	42	4'-9	208	42	4'-9	208	42	4'-9	208	42	4'-9	208	42	4'-9	208	42	4'-9	208
5k2	PAVING NOTCH		42	3'-5	150	42	3'-5	150	42	3'-5	150	42	3'-5	150	42	3'-5	150	42	3'-5	150	42	3'-5	150	42	3'-5	150	42	3'-5	150
5p1	ABUTMENT HOOPS (WOOD/STEEL)		80/72	10'-6	876/789	80/72	10'-6	876/789	88/72	10'-6	964/789	88/72	10'-6	964/789	88/68	10'-6	964/745	76	10'-6	832	76	10'-6	832	76	10'-6	832	76	10'-6	832
5p2	ABUTMENT HOOPS		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	24	10'-8	267	24	10'-8	267	24	10'-8	267	24	10'-8	267
6p3	ABUT. BOTT. AT PILES		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	24	6'-8	240	24	6'-8	240	24	6'-8	240	24	6'-8	240
5r1	PAVING BLOCK LIFTING LOOPS		8	2'-10	24	8	2'-10	24	8	2'-10	24	8	2'-10	24	8	2'-10	24	8	2'-10	24	8	2'-10	24	8	2'-10	24	8	2'-10	24
5s1	WING VERT.		64	5'-10	389	64	5'-10	389	64	6'-2	412	64	6'-2	412	64	6'-2	412	64	6'-11	462	64	6'-11	462	64	6'-11	462	64	6'-11	462
4t1	UNDER BEAMS AT ABUTMENTS		8	4'-6	24	8	4'-6	24	8	4'-6	24	8	4'-6	24	8	4'-6	24	8	4'-9	25	8	4'-9	25	8	4'-9	25	8	4'-9	25
#2	PILE SPIRAL (WOOD/STEEL)		20/10	38'-6	129/64	20/10	38'-6	129/64	22/10	38'-6	141/64	22/10	38'-6	141/64	22/12	38'-6	141/77	16	38'-6	103	16	38'-6	103	16	38'-6	103	16	38'-6	103
	SPIRAL SPACERS, L 7/8 x 7/8 x 1/8 x 0.70 (WOOD/STL.)		60/30	1'-10	77/39	60/30	1'-10	77/39	66/30	1'-10	85/39	66/30	1'-10	85/39	66/36	1'-10	85/46	48	1'-10	62	48	1'-10	62	48	1'-10	62	48	1'-10	62
	OPEN RAIL				8,856			9,379			10,085			10,793			11,313			13,036			13,504			14,268			15,050
	TOTAL W/ WOOD PILES				43,047			45,845			49,244			52,656			55,495			—			—			—			—
	TOTAL W/ STEEL H-PILES				42,857			45,655			48,946			52,358			55,173			61,750			65,116			68,217			72,059



BENT BAR DETAILS

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

12-10
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

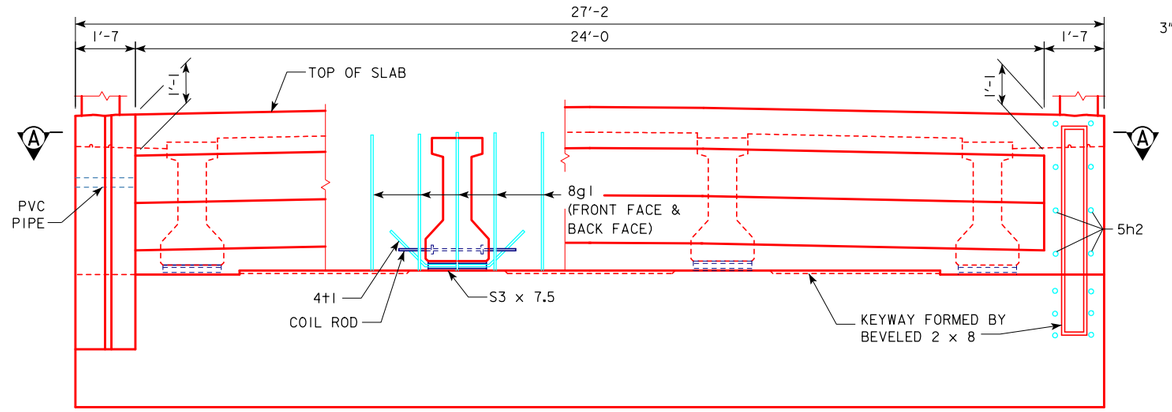
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

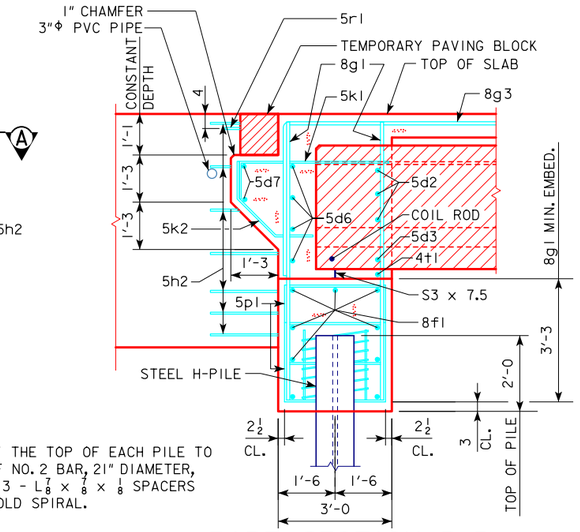
DECK & ABUTMENT REINF.
0° SKEW

H24-10-06

REVISED 12-10 - CORRECTED THE OPEN RAIL REBAR QUANTITIES FOR THE 201'-4, 213'-10, 226'-4, & 243'-0 BRIDGE LENGTHS.

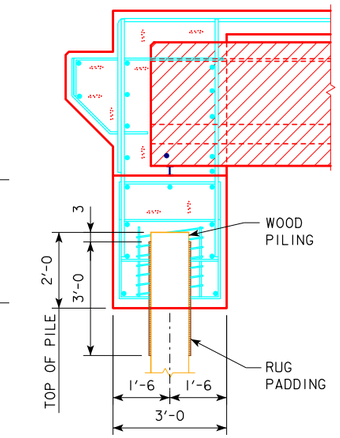


PART REAR ELEVATION AT ABUTMENT



NOTE:
THE SPIRAL AT THE TOP OF EACH PILE TO BE 7 TURNS OF NO. 2 BAR, 21" DIAMETER, 3" PITCH WITH 3 - $L\frac{7}{8} \times \frac{7}{8} \times \frac{1}{8}$ SPACERS PUNCHED TO HOLD SPIRAL.

PART SECTION B-B
(FOR STEEL H-PILING)



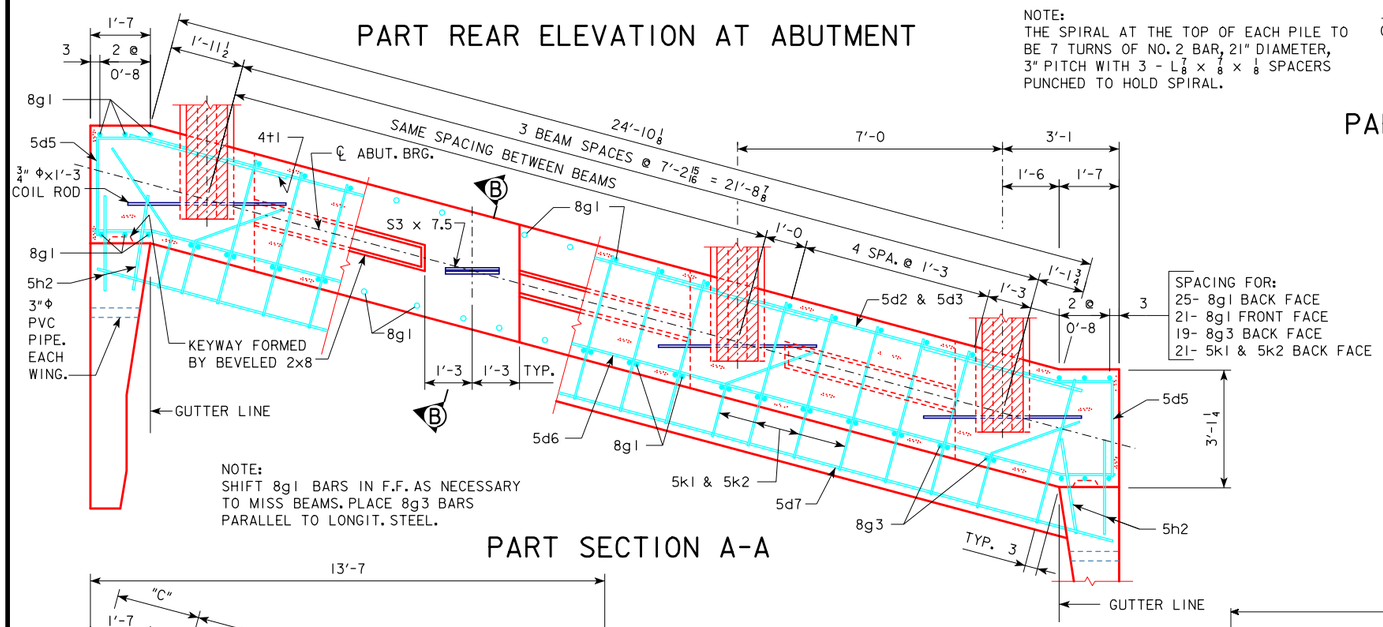
PART SECTION B-B
(FOR WOOD PILING)

WOOD PILING NOTE:

AFTER PILES ARE CUT OFF, THE UPPER 3', EXCEPT AS SHOWN, IS TO BE WRAPPED WITH A DOUBLE THICKNESS OF RUG PADDING HELD IN PLACE BY TACKING WITH GALVANIZED ROOFING NAILS AND WRAPPED WITH #14 GAUGE GALVANIZED WIRE AT A 4" PITCH, CARE IS TO BE TAKEN NOT TO DAMAGE PADDING WHEN PLACING CONCRETE. RUG PADDING MAY BE EITHER OF THE FOLLOWING:

(1) HAIR AND JUTE RUG PADDING, RUBBERIZED ON BOTH SIDES, AND WEIGHING NOT LESS THAN 47 OZ. PER SQ. YD.

(2) BONDED URETHANE OR BONDED POLYFOAM WITH A MINIMUM DENSITY OF 5 LBS. PER CU. FT. AND SHALL BE AT LEAST $\frac{1}{2}$ IN. THICK, (MATERIAL LESS THAN $\frac{1}{2}$ IN. IN THICKNESS MAY BE USED, BUT WILL REQUIRE ADDITIONAL WRAPS FOR A TOTAL OF AT LEAST ONE INCH).

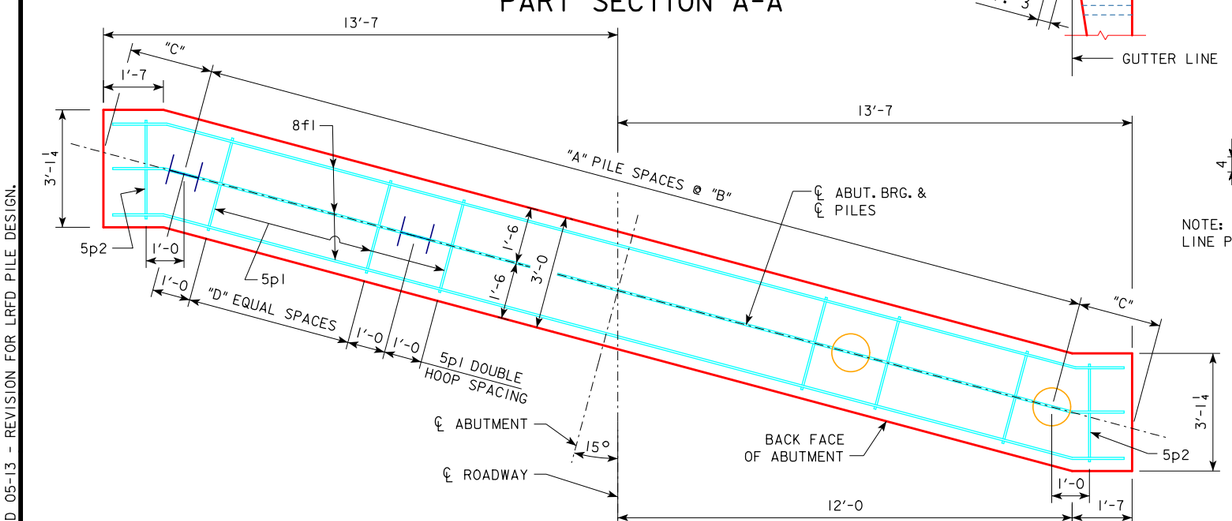


NOTE:
SHIFT 8g1 BARS IN F.F. AS NECESSARY TO MISS BEAMS. PLACE 8g3 BARS PARALLEL TO LONGIT. STEEL.

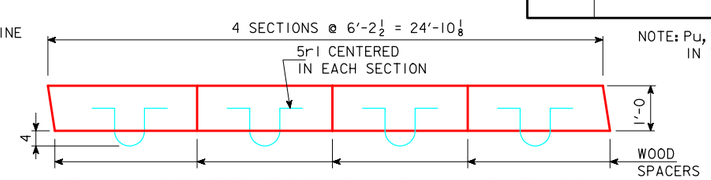
PART SECTION A-A

ABUTMENT PILE SPACING		℄-℄ ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10
WITH WOOD PILES	"A" PILE SPACES		9	10	10	10	10
	"B" (FT. - IN.)		2'-9	2'-6	2'-6	2'-6	2'-6
	"C" (FT. - IN.)		1'-8 1/4	1'-6 3/4	1'-6 3/4	1'-6 3/4	1'-6 3/4
	"D" EQUAL SPACES		1	1	1	1	1
	NO. OF PILES PER ABUT.		10	11	11	11	11
	PU, STRENGTH I DESIGN LOAD (KIPS)		56	53	57	59	61
WITH STEEL H-PILES	"A" PILE SPACES		4	4	4	4	5
	"B" (FT. - IN.)		5'-10	5'-10	5'-10	5'-10	4'-8
	"C" (FT. - IN.)		2'-4 3/4	2'-4 3/4	2'-4 3/4	2'-4 3/4	2'-4 3/4
	"D" EQUAL SPACES		4	4	4	4	3
	NO. OF PILES PER ABUT.		5	5	5	5	6
	PU, STRENGTH I DESIGN LOAD (KIPS)		125	130	138	143	123

NOTE: Pu, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



ABUTMENT PILE PLAN



PLAN OF TEMPORARY PAVING BLOCK

NOTE:
LINE PAVING NOTCH WITH TAR PAPER BEFORE PLACING THE TEMPORARY PAVING BLOCK.

ABUTMENT NOTES:

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

ABUTMENT PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

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

BARRIER RAIL NOT SHOWN IN DETAILS.

IF ROCK IS CLOSER THAN 15' BELOW ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.

05-13
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

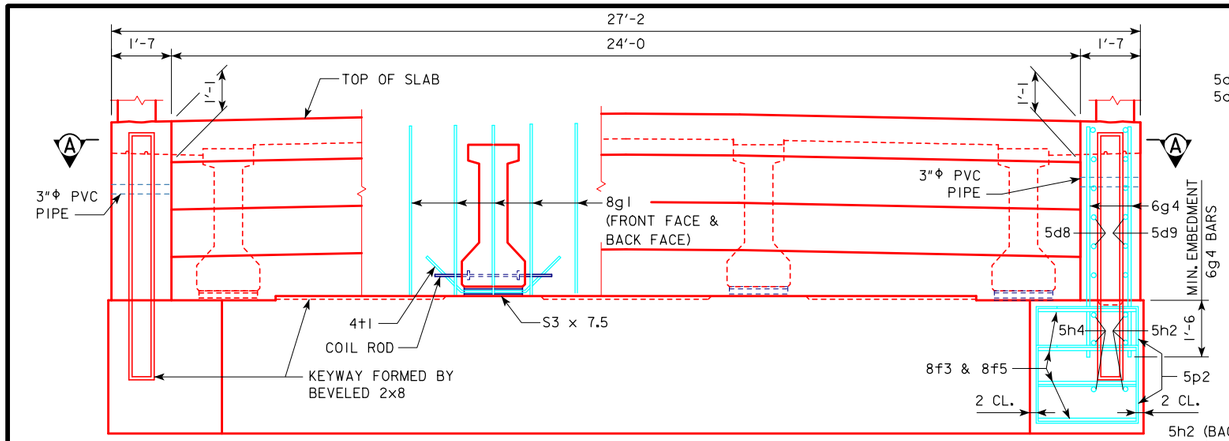
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

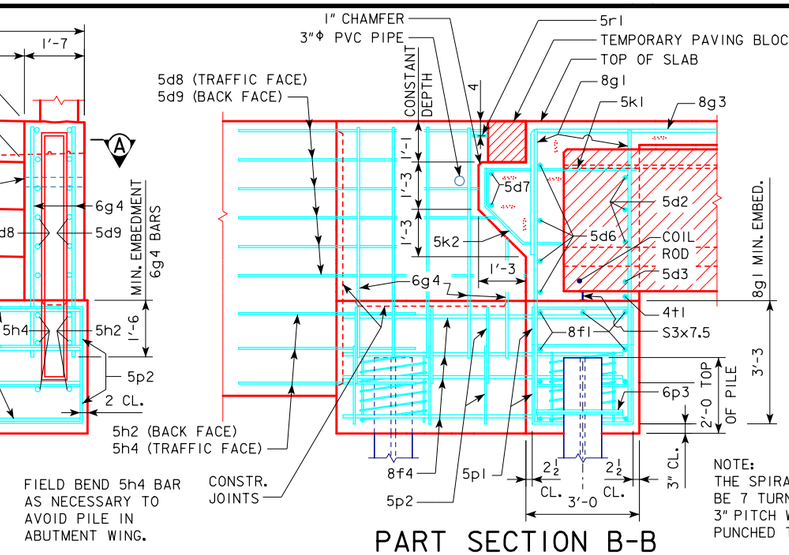
ABUTMENT DETAILS
15° SKEW A & B BEAMS

H24-11-06

REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.



PART REAR ELEVATION AT ABUTMENT



PART SECTION B-B

NOTE:
THE SPIRAL AT THE TOP OF EACH PILE TO BE 7 TURNS OF NO. 2 BAR, 21" DIAMETER, 3" PITCH WITH 3 - L 7/8 x 7/8 x 1/8 SPACERS PUNCHED TO HOLD SPIRAL.

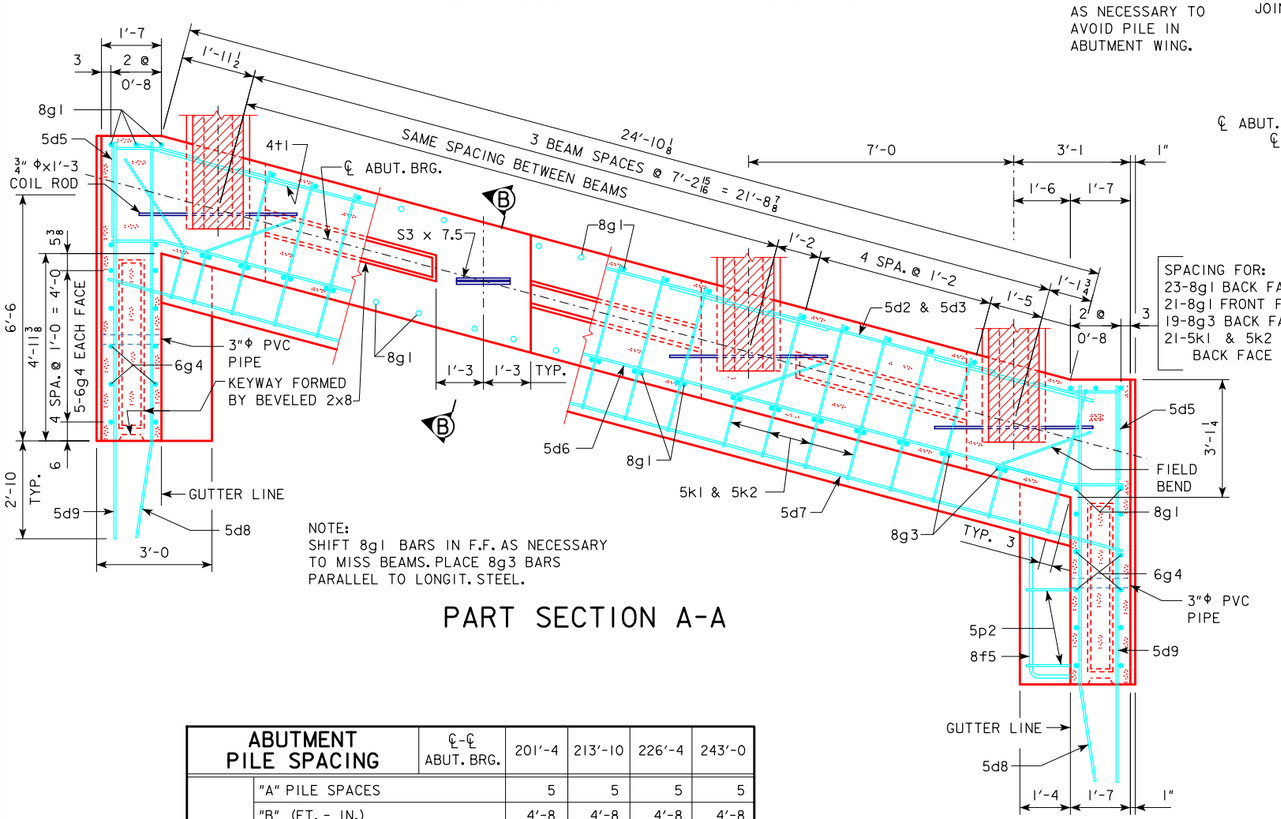
ABUTMENT NOTES:

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

ABUTMENT PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

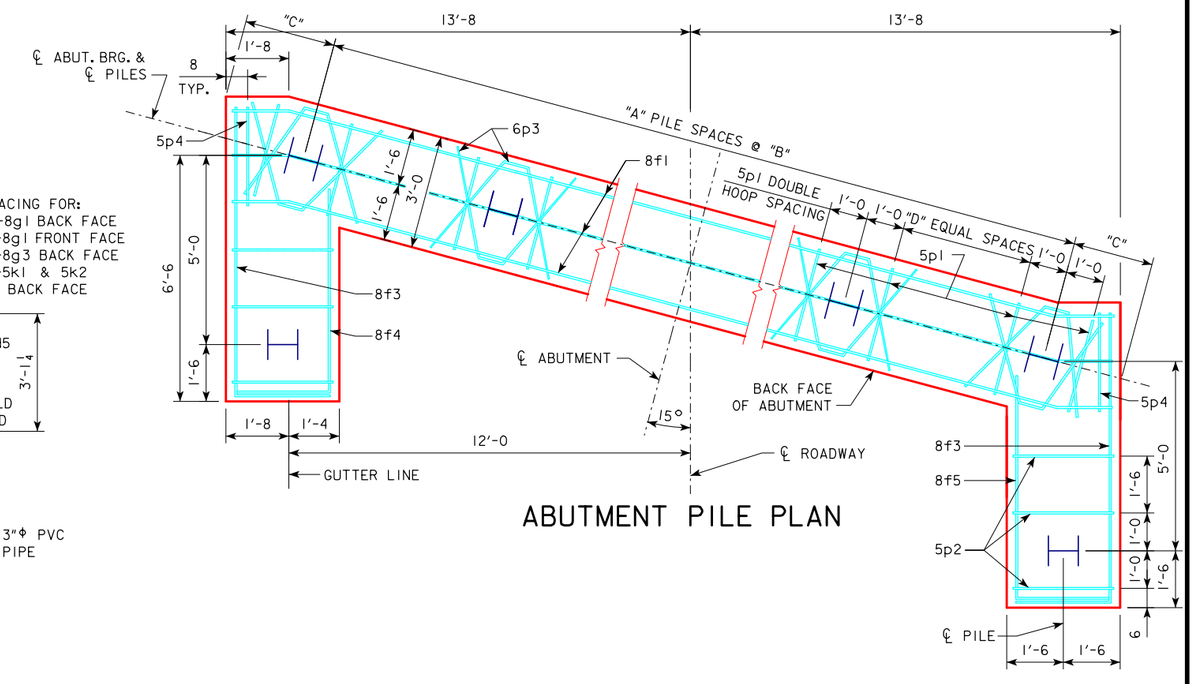
BARRIER RAIL NOT SHOWN IN DETAILS.

IF ROCK IS CLOSER THAN 15' BELOW ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.



NOTE:
SHIFT 8g1 BARS IN F.F. AS NECESSARY TO MISS BEAMS. PLACE 8g3 BARS PARALLEL TO LONGIT. STEEL.

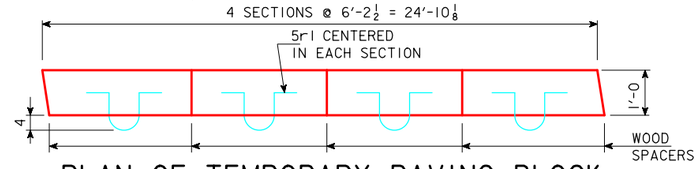
PART SECTION A-A



ABUTMENT PILE PLAN

ABUTMENT PILE SPACING	℄-℄ ABUT. BRG.	201'-4	213'-10	226'-4	243'-0
WITH STEEL H-PILES: "A" PILE SPACES		5	5	5	5
"B" (FT. - IN.)		4'-8	4'-8	4'-8	4'-8
"C" (FT. - IN.)		2'-5 13/16	2'-5 13/16	2'-5 13/16	2'-5 13/16
"D" EQUAL SPACES		3	3	3	3
NO. OF PILES PER ABUT.		8	8	8	8
PU, STRENGTH I DESIGN LOAD (KIPS)		129	133	137	145

NOTE: Pu, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



PLAN OF TEMPORARY PAVING BLOCK

NOTE:
LINE PAVING NOTCH WITH TAR PAPER BEFORE PLACING THE TEMPORARY PAVING BLOCK.

10-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

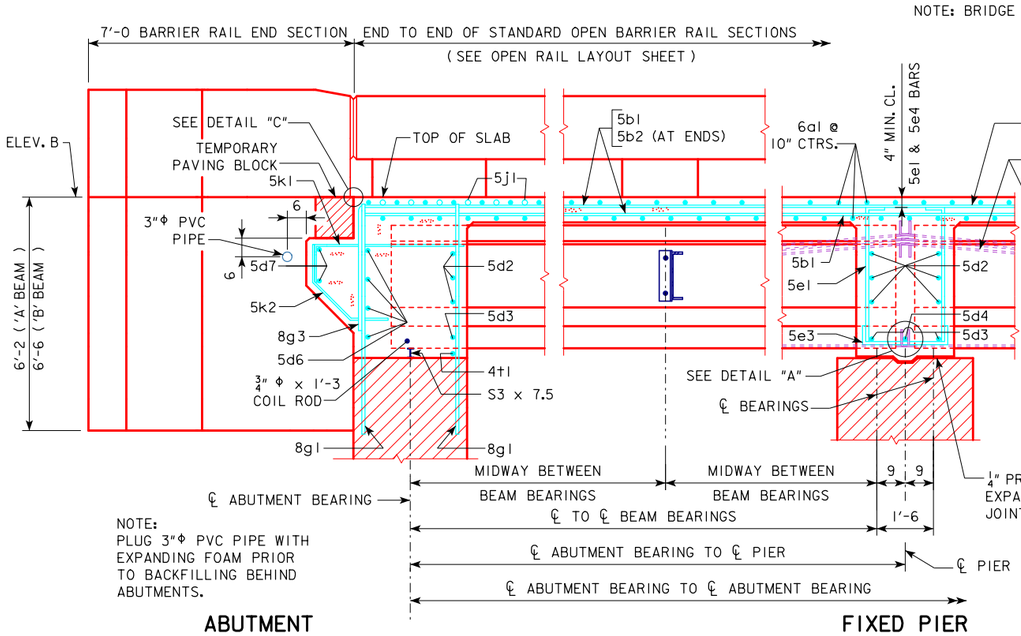
DECEMBER, 2006

ABUTMENT DETAILS

15° SKEW C BEAMS

H24-12-06

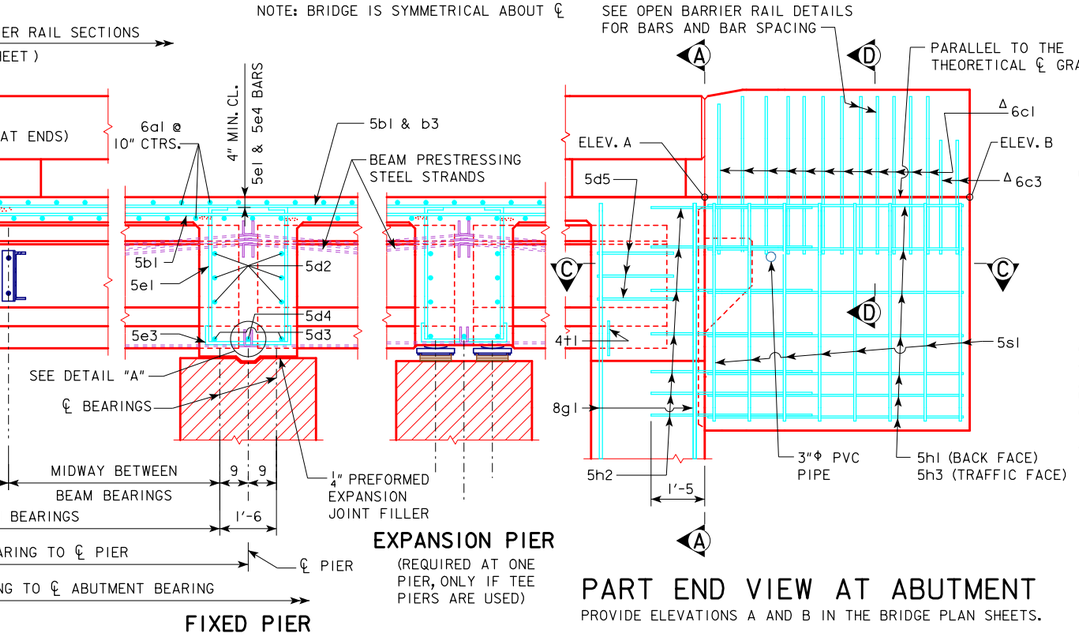
REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 10-2016 - REMOVED SECTION DIRECTORS "C-C" FROM PART SECTION B-B, THEY WERE VOID BECAUSE THERE WAS NO SECTION C-C DETAIL.



NOTE:
PLUG 3"Φ PVC PIPE WITH EXPANDING FOAM PRIOR TO BACKFILLING BEHIND ABUTMENTS.

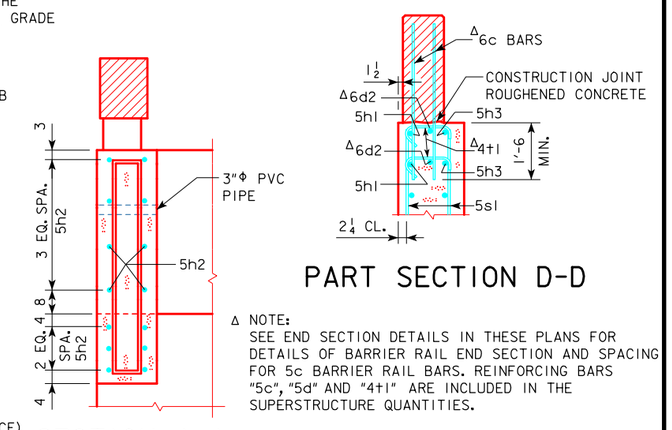
PART LONGITUDINAL SECTION NEAR GUTTER

(FOR DETAILS OF INTERMEDIATE DIAPHRAGM SEE SHEET H24-38-06)



PART END VIEW AT ABUTMENT

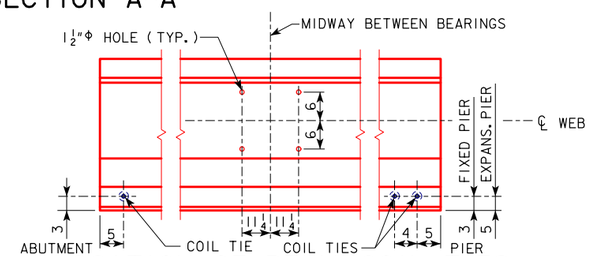
PROVIDE ELEVATIONS A AND B IN THE BRIDGE PLAN SHEETS.



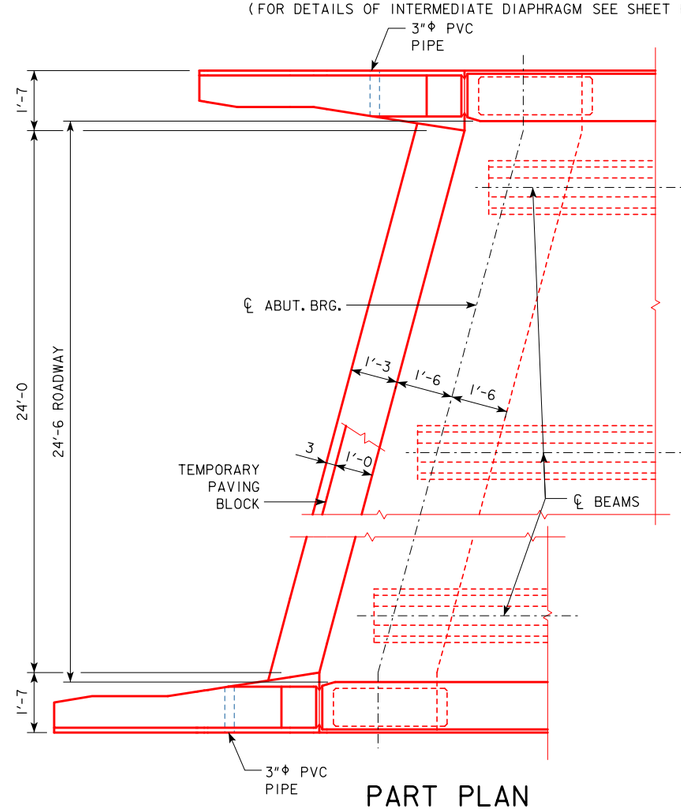
SECTION A-A

PART SECTION D-D

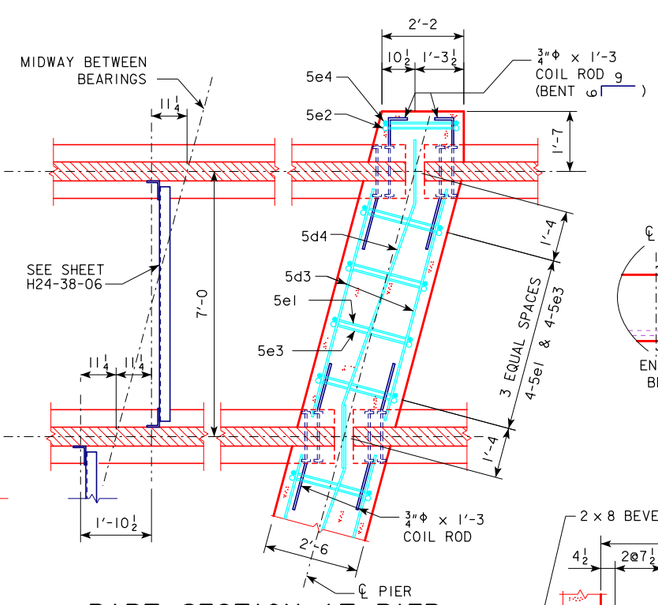
Δ NOTE:
SEE END SECTION DETAILS IN THESE PLANS FOR DETAILS OF BARRIER RAIL END SECTION AND SPACING FOR 5c BARRIER RAIL BARS. REINFORCING BARS "5c", "5d" AND "4t1" ARE INCLUDED IN THE SUPERSTRUCTURE QUANTITIES.



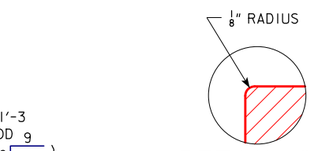
LOCATION OF BEAM COIL TIES AND STEEL DIAPHRAGM BOLT HOLES



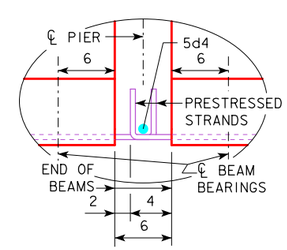
PART PLAN



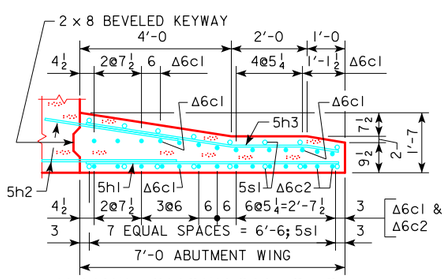
PART SECTION AT PIER



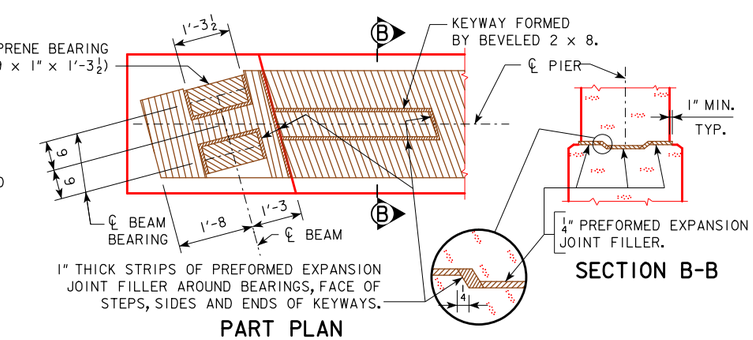
DETAIL "C"



DETAIL "A"



PART SECTION C-C



PART PLAN

SECTION B-B

TOP OF FIXED PIER DETAILS

(SEE SHEET H24-41-06 FOR EXPANSION PIER BEARING DETAILS)

01-10
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

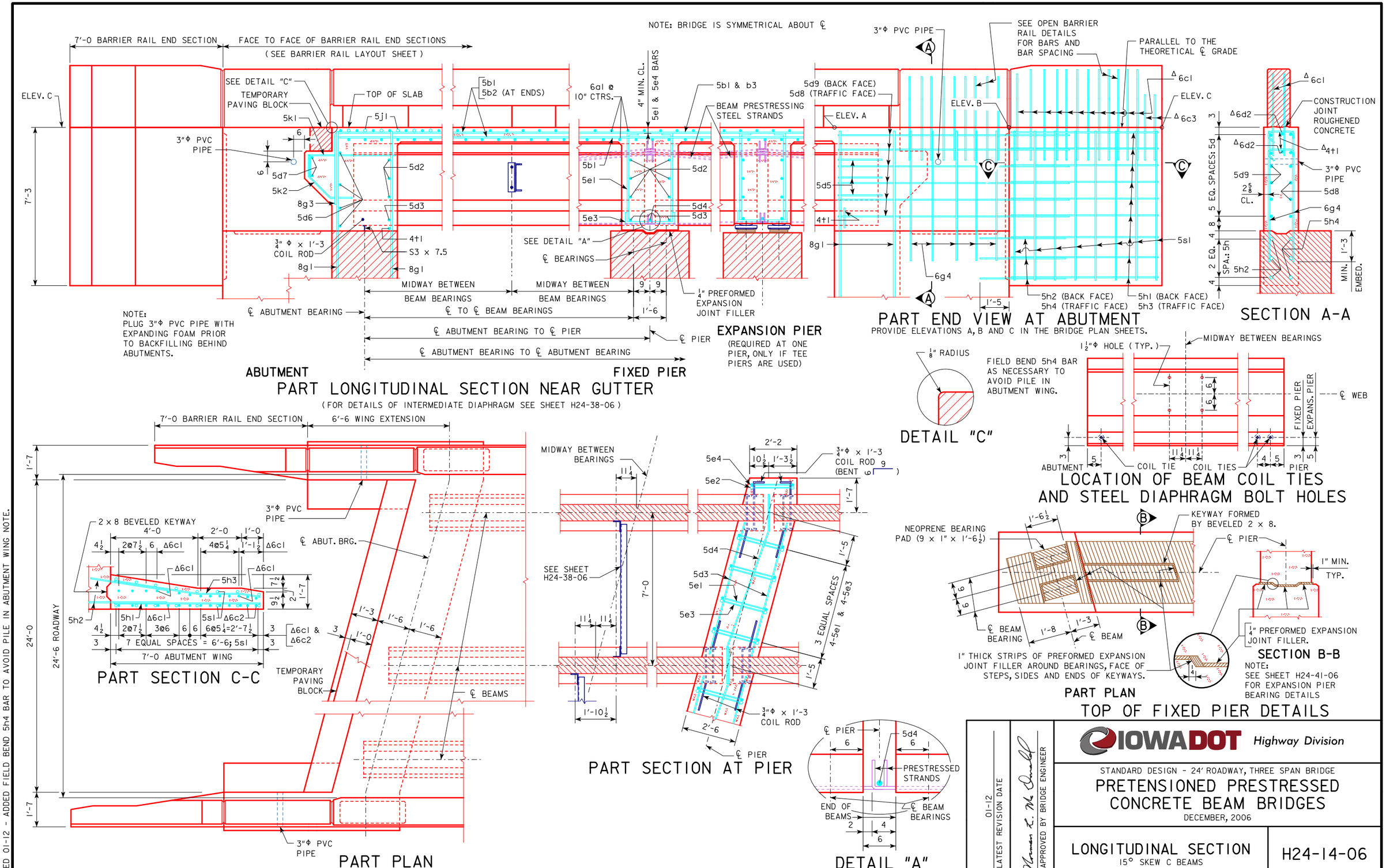
DECEMBER, 2006

LONGITUDINAL SECTION

15° SKEW A & B BEAMS

H24-13-06

CORRECTION 09-10 - MINOR MODIFICATIONS TO PART SECTION C-C.
REVISED 01-10 - ABUT. WINGS SHAPE CHANGED.



REVISED 01-12 - ADDED FIELD BEND 5h4 BAR TO AVOID PILE IN ABUTMENT WING NOTE.

01-12
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

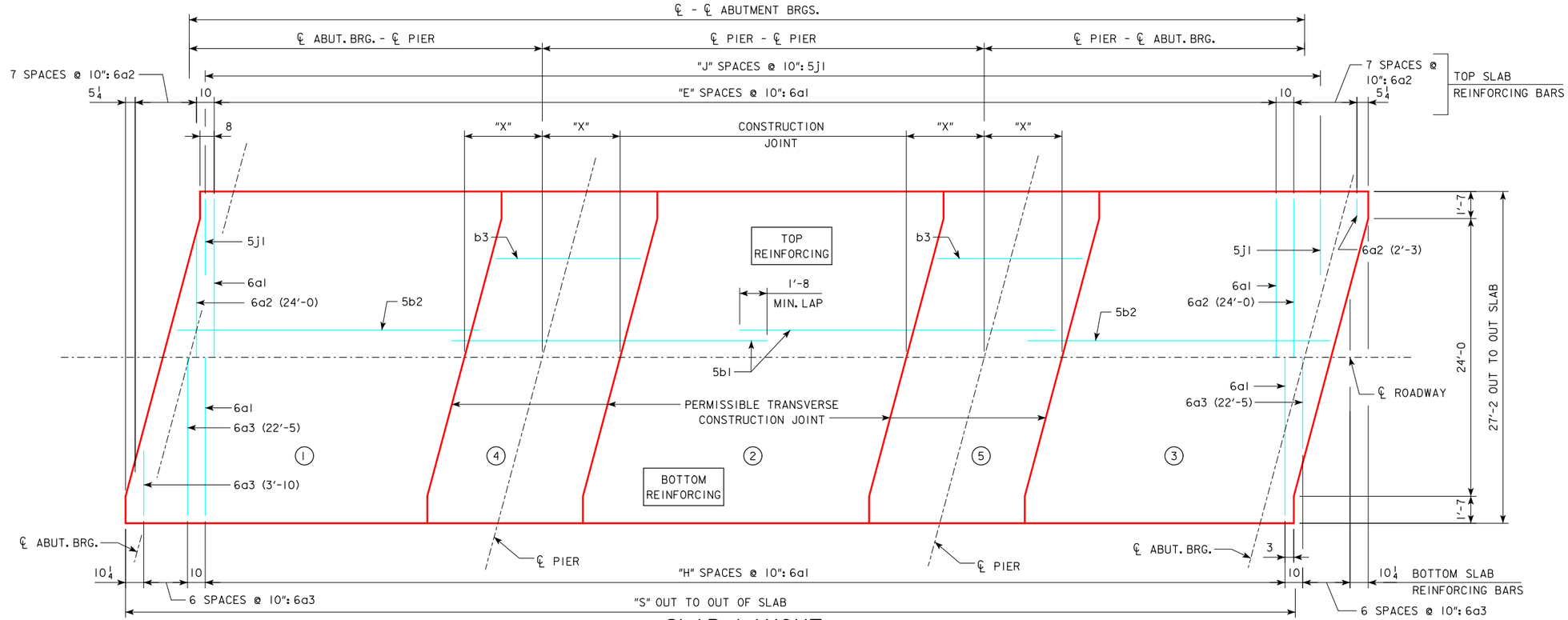
STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

LONGITUDINAL SECTION
15° SKEW C BEAMS

H24-14-06



SLAB LAYOUT

(LEFT AHEAD SKEW SHOWN, RIGHT AHEAD SKEW SIMILAR)

GENERAL DATA

		℄-℄ ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
VERTICAL CURVE	TOP OF SLAB TO ABUT. CONSTR. JT. AT C.L. ABUT. BRG.	"U"	3'-8	3'-7 7/8	4'-2 7/8	4'-2 7/8	4'-2 7/8	4'-8 1/2	4'-8 11/16	4'-9 1/8	4'-9 1/2
	TOP OF SLAB TO PIER TOP AT C.L. PIER*	"U"	3'-6 3/8	3'-6 5/8	4'-1 3/8	4'-1 9/16	4'-1 15/16	4'-7 5/16	4'-7 5/16	4'-7 9/16	4'-7 9/16
STRAIGHT GRADE	TOP OF SLAB TO ABUT. CONSTR. JT. AT C.L. ABUT. BRG.	"U"	3'-8 1/16	3'-7 7/8	4'-2 15/16	4'-2 15/16	4'-3 1/16	4'-8 3/4	4'-8 7/8	4'-9 3/8	4'-9 15/16
	TOP OF SLAB TO PIER TOP AT C.L. PIER*	"U"	3'-6 5/8	3'-6 13/16	4'-1 5/8	4'-1 7/8	4'-2 5/16	4'-7 3/4	4'-7 3/4	4'-8 1/16	4'-8 1/16
D.L. PIER REACTION (D.L. + F.W.S.) SERVICE LOADS		KIPS	295.3	318.9	363.5	388.4	413.4	493.2	521.1	549.2	576.4
L.L. PIER REACTION (HL93) NO IMPACT SERVICE LOADS		KIPS	207.6	215.3	222.7	229.9	237.0	244.0	253.2	268.2	284.4
NO. OF SPACES FOR 6a1 BARS (TOP)		"E"	161	176	191	206	221	236	251	266	286
NO. OF SPACES FOR 6a1 BARS (BOTTOM)		"H"	162	177	192	207	222	237	252	267	287
NO. OF SPACES FOR 5j1 BARS (TOP)		"J"	167	182	197	212	227	242	257	272	292
OUT TO OUT OF SLAB		"S"	141'-11 1/4	154'-5 1/4	166'-11 1/4	179'-5 1/4	191'-11 1/4	204'-5 1/4	216'-11 1/4	229'-5 1/4	246'-1 1/4
SLAB TRANSVERSE CONSTR. JT. DISTANCE FROM C.L. PIER		"X"	6'-7	7'-1	7'-7	8'-1	8'-8	9'-2	9'-8	10'-2	10'-2

ESTIMATED QUANTITIES

(SUPERSTRUCTURE PLUS INTEGRAL ABUTMENTS)

	℄-℄ ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
STRUCTURAL CONCRETE SUPERSTRUCTURE (INCLUDES ABUT. WINGS)	C.Y.	145.4	154.6	169.6	178.8	188.2	207.2	216.4	226.0	238.4
STRUCTURAL CONCRETE ABUTMENTS (w/ WOOD PILES) ***	C.Y.	21.2	21.1	21.1	21.1	21.1	-----	-----	-----	-----
STRUCTURAL CONCRETE ABUTMENTS (w/ STEEL H PILES) ***	C.Y.	22.4	22.4	22.4	22.4	22.4	30.2	30.2	30.2	30.2
PRETENSIONED PRESTRESSED CONCRETE BEAM, CENTER SPAN	NO.	4-A50	4-A55	4-B59	4-B63	4-B67	4-C71	4-C75	4-C80	4-C80
PRETENSIONED PRESTRESSED CONCRETE BEAM, END SPAN	NO.	8-A42	8-A46	8-B50	8-B55	8-B59	8-C63	8-C67	8-C71	8-C80
CONCRETE RAIL	L.F.	311.9	336.9	361.9	386.9	411.9	456.7	481.7	506.7	540.0
STRUCTURAL STEEL (w/ PILE BENT PIERS)	LB.	2555	2555	2555	2555	2555	2498	2498	2498	2498
STRUCTURAL STEEL (w/ TEE PIERS)	LB.	3272	3272	3272	3272	3272	3344	3344	3344	3344
REINFORCING STEEL (w/ WOOD PILES)	LB.	43,173	46,078	49,367	52,780	55,619	-----	-----	-----	-----
REINFORCING STEEL (w/ STEEL H PILES)	LB.	43,157	45,955	49,244	52,657	55,516	62,100	65,465	68,567	72,409
NO. OF WOOD PILES, TREATED FOR TWO ABUTMENTS	NO.	20	22	22	22	22	-----	-----	-----	-----
NO. OF STEEL H-PILES (HP 10 x 57) FOR TWO ABUTMENTS	NO.	10	10	10	10	12	16	16	16	16
PREBORED HOLES (w/ WOOD PILES)	L.F.	200	220	220	220	220	-----	-----	-----	-----
PREBORED HOLES (w/ STEEL H-PILES)	L.F.	100	100	100	100	120	160	160	160	160

CONCRETE PLACEMENT QUANT.

(SUPERSTRUCTURE PLUS INTEGRAL ABUTMENTS)

	℄-℄ ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
SLAB INCL. HAUNCH, ABUT. DIAPHR., & WINGWALLS** , SECT. 1 & 3	C.Y.	76.9	82.2	90.8	96.1	101.5	114.5	120.0	125.6	138.0
SLAB INCLUDING HAUNCH, SECTION 2	C.Y.	28.4	30.7	33.0	35.3	37.5	39.9	42.1	44.5	44.5
SLAB INCLUDING HAUNCH & PIER DIAPHRAGM, SECTIONS 4 & 5	C.Y.	30.9	32.5	36.2	37.8	39.6	42.4	43.9	45.5	45.5
PAVING BLOCKS	C.Y.	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ABUTMENT WINGS	C.Y.	7.2	7.2	7.6	7.6	7.6	8.4	8.4	8.4	8.4
ABUTMENT FOOTINGS (w/ WOOD PILES) ***	C.Y.	21.2	21.1	21.1	21.1	21.1	-----	-----	-----	-----
ABUTMENT FOOTINGS (w/ STEEL H PILES) ***	C.Y.	22.4	22.4	22.4	22.4	22.4	30.2	30.2	30.2	30.2

NOTE: CONCRETE DECK SHALL BE PLACED IN SECTIONS AND SEQUENCES INDICATED. ALTERNATE PROCEDURES FOR PLACING DECK CONCRETE MAY BE SUBMITTED FOR APPROVAL TOGETHER WITH A STATEMENT OF THE PROPOSED METHOD AND EVIDENCE THAT THE CONTRACTOR POSSESSES THE NECESSARY EQUIPMENT AND FACILITIES TO ACCOMPLISH THE REQUIRED RESULTS. FOR APPROVED ALTERNATE PROCEDURES THE ENGINEER SHALL DETERMINE IF A RETARDING ADMIXTURE IS REQUIRED TO MAINTAIN PLASTICITY OF THE CONCRETE DECK DURING PLACEMENT.

* VALUES SHOWN ARE FOR FIXED PIERS ONLY AND ALLOW FOR 1/16 INCH DEFLECTION OF THE 1 INCH NEOPRENE BEARING PAD. AT EXPANSION PIER LOCATIONS ADD 3/16 INCHES TO "U" VALUES SHOWN.

** WINGWALLS APPLY ONLY TO BRIDGES USING "C" BEAMS.

*** SEE SHEET H24-17-06 FOR ADDITIONAL CONCRETE REQUIRED IN ABUTMENT FOOTINGS.

07-15
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

SUPERSTRUCTURE DETAILS

15° SKEW

H24-15-06

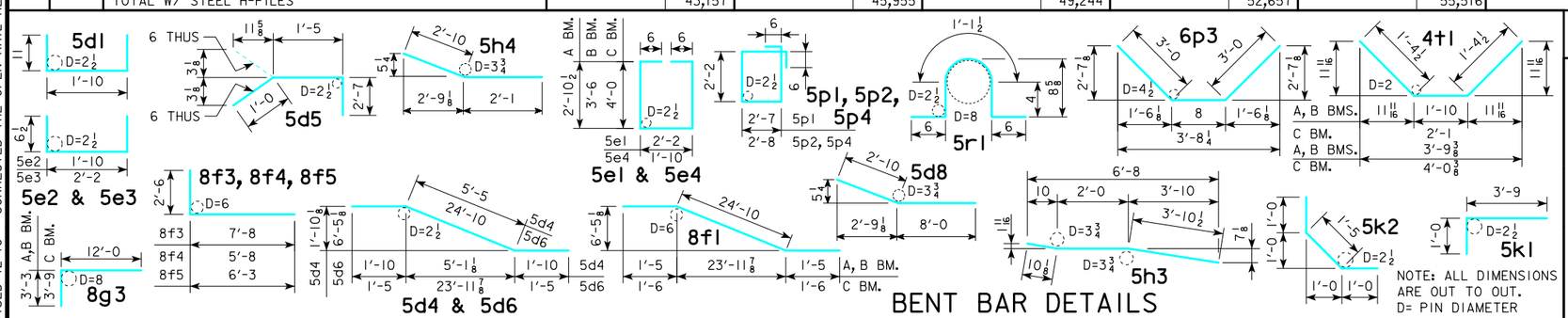
REVISED 07-2015 - CHANGED CONCRETE PLACEMENT NOTE TO ACCOUNT FOR THE POSSIBLE ADDITION OF A RETARDING ADMIXTURE TO THE CONCRETE.

REINFORCING BAR LIST

ONE SUPERSTRUCTURE AND TWO ABUTMENTS

BAR	LOCATION	SHAPE	138'-10 (42'-6, 50'-10, 42'-6) A BEAM NO.	LENGTH	WEIGHT	151'-4 (46'-8, 55'-0, 46'-8) A BEAM NO.	LENGTH	WEIGHT	163'-10 (50'-10, 59'-2, 50'-10) B BEAM NO.	LENGTH	WEIGHT	176'-4 (55'-0, 63'-4, 55'-0) B BEAM NO.	LENGTH	WEIGHT
6a1	SLAB TRANSV. TOP & BOTT.		325	26'-10	13,099	355	26'-10	14,308	385	26'-10	15,517	415	26'-10	16,726
6a2	SLAB TRANSV. TOP ENDS		16	VARIES	315	16	VARIES	315	16	VARIES	315	16	VARIES	315
6a3	SLAB TRANSV. BOTT. ENDS		14	VARIES	276	14	VARIES	276	14	VARIES	276	14	VARIES	276
5b1	SLAB LONGITUDINAL, TOP & BOTT.		122	40'-0	5,090	122	40'-0	5,090	183	40'-0	7,635	183	40'-0	7,635
5b2	SLAB LONGITUDINAL, TOP & BOTT., ENDS		122	33'-4	4,242	122	39'-7	5,037	122	26'-8	3,393	122	32'-11	4,189
6b3	SLAB LONGITUDINAL, TOP @ PIERS		50	12'-10	964	50	13'-10	1,039	50	14'-10	1,114	—	—	—
7b3	SLAB LONGITUDINAL, TOP @ PIERS		—	—	—	—	—	—	—	—	—	50	15'-10	1,618
8b3	SLAB LONGITUDINAL, TOP @ PIERS		—	—	—	—	—	—	—	—	—	—	—	—
5d1	PIER DIAPH. ENDS		12	3'-8	46	12	3'-8	46	12	3'-8	46	12	3'-8	46
5d2	PIER & ABUT. DIAPH. LONGIT.		54	6'-6	366	54	6'-6	366	54	6'-6	366	54	6'-6	366
5d3	PIER & ABUT. DIAPH. LONGIT.		18	5'-7	105	18	5'-7	105	18	5'-7	105	18	5'-7	105
5d4	PIER DIAPH. LONGIT.		6	9'-1	57	6	9'-1	57	6	9'-1	57	6	9'-1	57
5d5	ABUT. DIAPH. ENDS		12	5'-0	63	12	5'-0	63	12	5'-0	63	12	5'-0	63
5d6	ABUT. DIAPH. LONGIT. B.F.		8	27'-8	231	8	27'-8	231	8	27'-8	231	8	27'-8	231
5d7	PAVING NOTCH LONGIT.		4	27'-8	115	4	27'-8	115	4	27'-8	115	4	27'-8	115
5d8	ABUT. DIAPH. WING EXT. LONGIT.		—	—	—	—	—	—	—	—	—	—	—	—
5d9	ABUT. DIAPH. WING EXT. LONGIT.		—	—	—	—	—	—	—	—	—	—	—	—
5e1	PIER DIAPH. HOOPS		24	8'-11	223	24	8'-11	223	24	10'-2	254	24	10'-2	254
5e2	PIER DIAPH. TIES ENDS		4	2'-11	12	4	2'-11	12	4	2'-11	12	4	2'-11	12
5e3	PIER DIAPH. TIES		24	3'-3	81	24	3'-3	81	24	3'-3	81	24	3'-3	81
5e4	PIER DIAPH. HOOPS ENDS		4	8'-7	36	4	8'-7	36	4	9'-10	41	4	9'-10	41
8f1	ABUT. FOOTING LONGIT.		18	27'-8	1,330	18	27'-8	1,330	18	27'-8	1,330	18	27'-8	1,330
8f3	ABUT. EXTENSION LONGIT.		—	—	—	—	—	—	—	—	—	—	—	—
8f4	ABUT. EXTENSION LONGIT.		—	—	—	—	—	—	—	—	—	—	—	—
8f5	ABUT. EXTENSION LONGIT.		—	—	—	—	—	—	—	—	—	—	—	—
8g1	ABUT. VERT.		92	5'-7	1,371	92	5'-7	1,371	92	6'-2	1,515	92	6'-2	1,515
8g3	ABUT. DIAPH. VERT. B.F.		38	15'-3	1,547	38	15'-3	1,547	38	15'-3	1,547	38	15'-3	1,547
6g4	ABUT. DIAPH. WING EXT. VERT.		—	—	—	—	—	—	—	—	—	—	—	—
5h1	ABUT. WING HORIZ. B.F.		28	6'-8	195	28	6'-8	195	28	6'-8	195	28	6'-8	195
5h2	ABUT. TO WING ANCHOR		56	4'-11	287	56	4'-11	287	56	4'-11	287	56	4'-11	287
5h3	ABUT. WING HORIZ. TRAFFIC FACE		28	6'-9	197	28	6'-9	197	28	6'-9	197	28	6'-9	197
5h4	ABUT. TO WING ANCHOR		—	—	—	—	—	—	—	—	—	—	—	—
5j1	TOP OF SLAB TRANSV. (AT RAIL)		336	6'-3	2,190	366	6'-3	2,386	396	6'-3	2,581	426	6'-3	2,777
5k1	PAVING NOTCH		42	4'-9	208	42	4'-9	208	42	4'-9	208	42	4'-9	208
5k2	PAVING NOTCH		42	3'-5	150	42	3'-5	150	42	3'-5	150	42	3'-5	150
5p1	ABUTMENT HOOPS (WOOD/STEEL)		72/80	10'-6	789/876	80/80	10'-6	876/876	80/80	10'-6	876/876	80/80	10'-6	876/876
5p2	ABUTMENT HOOPS		8	10'-8	89	8	10'-8	89	8	10'-8	89	8	10'-8	89
6p3	ABUT. BOTT. AT PILES		—	—	—	—	—	—	—	—	—	—	—	—
5p4	ABUT. HOOPS AT ENDS		—	—	—	—	—	—	—	—	—	—	—	—
5r1	PAVING BLOCK LIFTING LOOPS		8	2'-10	24	8	2'-10	24	8	2'-10	24	8	2'-10	24
5s1	WING VERT.		64	5'-10	389	64	5'-10	389	64	6'-2	412	64	6'-2	412
4t1	UNDER BEAMS AT ABUTMENTS		8	4'-7	24	8	4'-7	24	8	4'-7	24	8	4'-7	24
#2	PILE SPIRAL (WOOD/STEEL)		20/10	38'-6	129/64	22/10	38'-6	141/64	22/10	38'-6	141/64	22/10	38'-6	141/64
	SPIRAL SPACERS, L 7/8 x 7/8 x 1/8 x 0.70 (WOOD/STL.)		60/30	1'-10	77/39	66/30	1'-10	85/39	66/30	1'-10	85/39	66/30	1'-10	85/39
	OPEN RAIL				8,856			9,379			10,085			10,793
	TOTAL W/ WOOD PILES				43,173			46,078			49,367			52,780
	TOTAL W/ STEEL H-PILES				43,157			45,955			49,244			52,657

BAR	LOCATION	188'-10 (59'-2, 67'-6, 59'-2) B BEAM NO.	LENGTH	WEIGHT	201'-4 (63'-4, 71'-8, 63'-4) C BEAM NO.	LENGTH	WEIGHT	213'-10 (67'-6, 75'-10, 67'-6) C BEAM NO.	LENGTH	WEIGHT	226'-4 (71'-8, 80'-0, 71'-8) C BEAM NO.	LENGTH	WEIGHT	243'-0 (80'-0, 80'-0, 80'-0) C BEAM NO.	LENGTH	WEIGHT
6a1	SLAB TRANSV. TOP & BOTT.	445	26'-10	17,935	475	26'-10	19,144	505	26'-10	20,353	535	26'-10	21,562	575	26'-10	23,175
6a2	SLAB TRANSV. TOP ENDS	16	VARIES	315	16	VARIES	315	16	VARIES	315	16	VARIES	315	16	VARIES	315
6a3	SLAB TRANSV. BOTT. ENDS	14	VARIES	276	14	VARIES	276	14	VARIES	276	14	VARIES	276	14	VARIES	276
5b1	SLAB LONGITUDINAL, TOP & BOTT.	183	40'-0	7,635	244	40'-0	10,180	244	40'-0	10,180	244	40'-0	10,180	305	40'-0	12,725
5b2	SLAB LONGITUDINAL, TOP & BOTT., ENDS	122	39'-2	4,984	122	26'-3	3,340	122	32'-6	4,135	122	38'-9	4,931	122	27'-11	3,552
6b3	SLAB LONGITUDINAL, TOP @ PIERS	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7b3	SLAB LONGITUDINAL, TOP @ PIERS	50	17'-0	1,737	50	18'-0	1,840	—	—	—	—	—	—	—	—	—
8b3	SLAB LONGITUDINAL, TOP @ PIERS	—	—	—	—	—	—	50	19'-0	2,537	50	20'-0	2,670	50	20'-0	2,670
5d1	PIER DIAPH. ENDS	12	3'-8	46	12	3'-8	46	12	3'-8	46	12	3'-8	46	12	3'-8	46
5d2	PIER & ABUT. DIAPH. LONGIT.	54	6'-6	366	54	6'-3	352	54	6'-3	352	54	6'-3	352	54	6'-3	352
5d3	PIER & ABUT. DIAPH. LONGIT.	18	5'-7	105	18	5'-4	100	18	5'-4	100	18	5'-4	100	18	5'-4	100
5d4	PIER DIAPH. LONGIT.	6	9'-1	57	6	9'-1	57	6	9'-1	57	6	9'-1	57	6	9'-1	57
5d5	ABUT. DIAPH. ENDS	12	5'-0	63	12	5'-0	63	12	5'-0	63	12	5'-0	63	12	5'-0	63
5d6	ABUT. DIAPH. LONGIT. B.F.	8	27'-8	231	8	27'-8	231	8	27'-8	231	8	27'-8	231	8	27'-8	231
5d7	PAVING NOTCH LONGIT.	4	27'-8	115	4	27'-8	115	4	27'-8	115	4	27'-8	115	4	27'-8	115
5d8	ABUT. DIAPH. WING EXT. LONGIT.	—	—	—	24	10'-10	271	24	10'-10	271	24	10'-10	271	24	10'-10	271
5d9	ABUT. DIAPH. WING EXT. LONGIT.	—	—	—	24	10'-9	269	24	10'-9	269	24	10'-9	269	24	10'-9	269
5e1	PIER DIAPH. HOOPS	24	10'-2	254	24	11'-2	280	24	11'-2	280	24	11'-2	280	24	11'-2	280
5e2	PIER DIAPH. TIES ENDS	4	2'-11	12	4	2'-11	12	4	2'-11	12	4	2'-11	12	4	2'-11	12
5e3	PIER DIAPH. TIES	24	3'-3	81	24	3'-3	81	24	3'-3	81	24	3'-3	81	24	3'-3	81
5e4	PIER DIAPH. HOOPS ENDS	4	9'-10	41	4	10'-10	45	4	10'-10	45	4	10'-10	45	4	10'-10	45
8f1	ABUT. FOOTING LONGIT.	18	27'-8	1,330	18	27'-10	1,338	18	27'-10	1,338	18	27'-10	1,338	18	27'-10	1,338
8f3	ABUT. EXTENSION LONGIT.	—	—	—	16	10'-2	434	16	10'-2	434	16	10'-2	434	16	10'-2	434
8f4	ABUT. EXTENSION LONGIT.	—	—	—	8	8'-2	174	8	8'-2	174	8	8'-2	174	8	8'-2	174
8f5	ABUT. EXTENSION LONGIT.	—	—	—	8	8'-9	187	8	8'-9	187	8	8'-9	187	8	8'-9	187
8g1	ABUT. VERT.	92	6'-2	1,515	88	6'-8	1,566	88	6'-8	1,566	88	6'-8	1,566	88	6'-9	1,586
8g3	ABUT. DIAPH. VERT. B.F.	38	15'-3	1,547	38	15'-9	1,598	38	15'-9	1,598	38	15'-9	1,598	38	15'-9	1,598
6g4	ABUT. DIAPH. WING EXT. VERT.	—	—	—	40	6'-0	360	40	6'-0	360	40	6'-1	365	40	6'-1	365
5h1	ABUT. WING HORIZ. B.F.	28	6'-8	195	36	6'-8	250	36	6'-8	250	36	6'-8	250	36	6'-8	250
5h2	ABUT. TO WING ANCHOR	56	4'-11	287	12	4'-11	62	12	4'-11	62	12	4'-11	62	12	4'-11	62
5h3	ABUT. WING HORIZ. TRAFFIC FACE	28	6'-9	197	36	6'-9	253	36	6'-9	253	36	6'-9	253	36	6'-9	253
5h4	ABUT. TO WING ANCHOR	—	—	—	12	4'-11	62	12	4'-11	62	12	4'-11	62	12	4'-11	62
5j1	TOP OF SLAB TRANSV. (AT RAIL)	456	6'-3	2,973	486	6'-3	3,168	516	6'-3	3,364	546	6'-3	3,559	586	6'-3	3,820
5k1	PAVING NOTCH	42	4'-9	208	42	4'-9	208	42	4'-9	208	42	4'-9	208	42	4'-9	208
5k2	PAVING NOTCH	42	3'-5	150	42	3'-5	150	42	3'-5	150	42	3'-5	150	42	3'-5	150
5p1	ABUTMENT HOOPS (WOOD/STEEL)	80/80	10'-6	876/876	88	10'-6	964	88	10'-6	964	88	10'-6	964	88	10'-6	964
5p2	ABUTMENT HOOPS	8	10'-8	89	24	10'-8	267	24	10'-8	267	24	10'-8	267	24	10'-8	267
6p3	ABUT. BOTT. AT PILES	—	—	—	24	6'-8	240	24	6'-8	240	24	6'-8	240	24	6'-8	240
5p4	ABUT. HOOPS AT ENDS	—	—	—	8	10'-8	89	8	10'-8	89	8	10'-8	89	8	10'-8	89
5r1	PAVING BLOCK LIFTING LOOPS	8	2'-10	24	8	2'-10	24	8	2'-10	24	8	2'-10	24	8	2'-10	24
5s1	WING VERT.	64	6'-2	412	64	6'-11	462	64	6'-11	462	64	6'-11	462	64	6'-11	462
4t1	UNDER BEAMS AT ABUTMENTS	8	4'-7	24	8	4'-10	26	8	4'-10	26	8	4'-10	26	8	4'-10	26
#2	PILE SPIRAL (WOOD/STEEL)	22/12	38'-6	141/77	16	38'-6	103	16	38'-6	103	16	38'-6	103	16	38'-6	103
	SPIRAL SPACERS, L 7/8 x 7/8 x 1/8 x 0.70 (WOOD/STL.)	66/36	1'-10	85/46	48	1'-10	62	48	1'-10	62	48	1'-10	62	48	1'-10	62
	OPEN RAIL			11,313			13,036			13,504			14,268			15,050
	TOTAL W/ WOOD PILES			55,619			—			—			—			—
	TOTAL W/ STEEL H-PILES			55,516			62,100			65,465			68,567			72,409



BENT BAR DETAILS

12-10
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

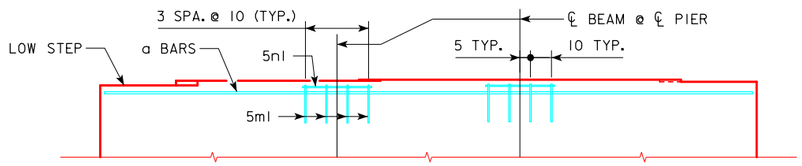
DECEMBER, 2006

DECK & ABUTMENT REINF.

15° SKEW

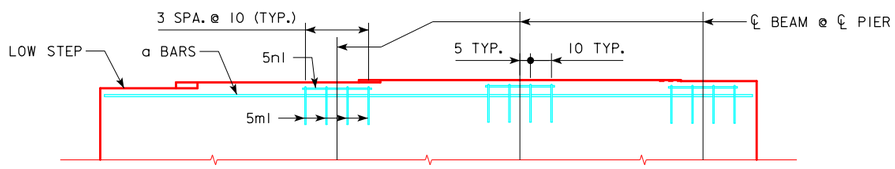
H24-16-06

REVISED 12-10 - CORRECTED THE OPEN RAIL REBAR QUANTITIES FOR THE 201'-4, 213'-10, 226'-4, & 243'-0 BRIDGE LENGTHS.



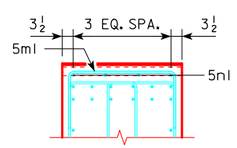
PART ELEVATION VIEW OF PIER CAP

GRADE (G): G <= 2.5%



PART ELEVATION VIEW OF PIER CAP

GRADE (G): 2.5% < G <= 5.0%



TYPICAL SECTION

STEP REINFORCING BAR LIST ONE TEE PIER

			G <= 2.5%			2.5% < G <= 5.0%		
BAR	LENGTH	SHAPE	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
5m1	5'-10		8	5	49	12	5	73
5n1	2'-8		8	5	22	12	5	33
TOTAL (LB.)					71			106

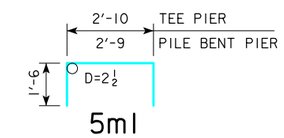
G = GRADE (%)

STEP REINFORCING BAR LIST ONE PILE BENT PIER

			G <= 2.5%			2.5% < G <= 5.0%		
BAR	LENGTH	SHAPE	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
5m1	5'-9		8	5	48	12	5	72
5n1	2'-8		8	5	22	12	5	33
TOTAL (LB.)					70			105

G = GRADE (%)

BENT BAR DETAILS



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

NOTES:

THE TABLE BELOW LISTS THE ADDITIONAL CONCRETE VOLUME REQUIRED IN EACH ABUTMENT FOOTING/PIER CAP BASED ON THE ROADWAY GRADE AT EACH ABUTMENT FOOTING/PIER CAP. ADDITIONAL CONCRETE SHOULD BE ADDED TO THE PLANS FOR EACH ABUTMENT FOOTING/PIER CAP THAT HAS 0.5 CU. YDS. OR MORE OF ADDITIONAL CONCRETE. VALUES IN THE TABLE BELOW HAVE BEEN EXCLUDED FOR SCENARIOS THAT HAVE LESS THAN 0.5 CU. YDS. OF ADDITIONAL CONCRETE PER SUBSTRUCTURE UNIT. VALUES MAY BE INTERPOLATED FOR GRADES BETWEEN THE VALUES SHOWN IN THE TABLE.

ADDITIONAL CONCRETE VOLUME PER SUBSTRUCTURE UNIT (C.Y.)

	ROADWAY GRADE AT SUBSTRUCTURE UNIT				
	1%	2%	3%	4%	5%
EACH ABUTMENT FOOTING					
A, B BEAMS	-----	-----	-----	-----	-----
C BEAMS	-----	-----	-----	-----	0.6
EACH TEE PIER CAP - ALL BEAMS	-----	-----	-----	-----	-----
EACH PILE BENT PIER - ALL BEAMS	-----	-----	-----	-----	-----

LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWADOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

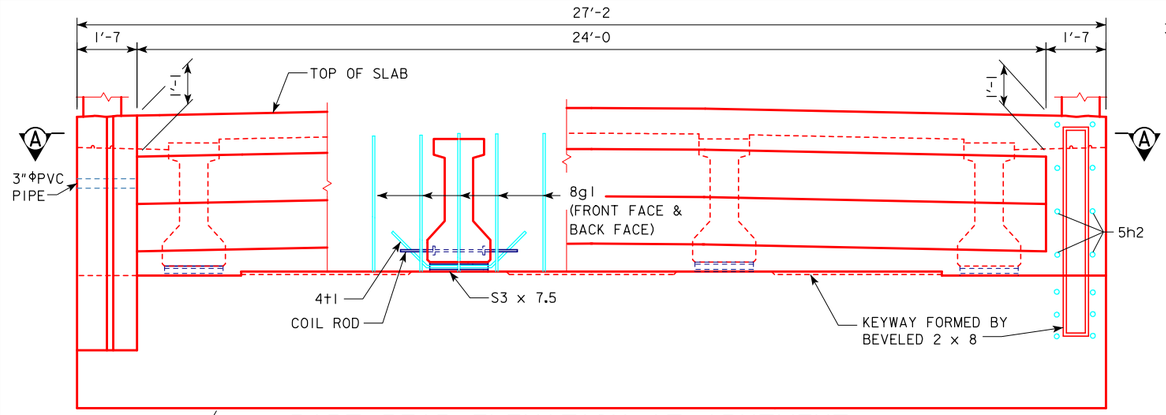
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

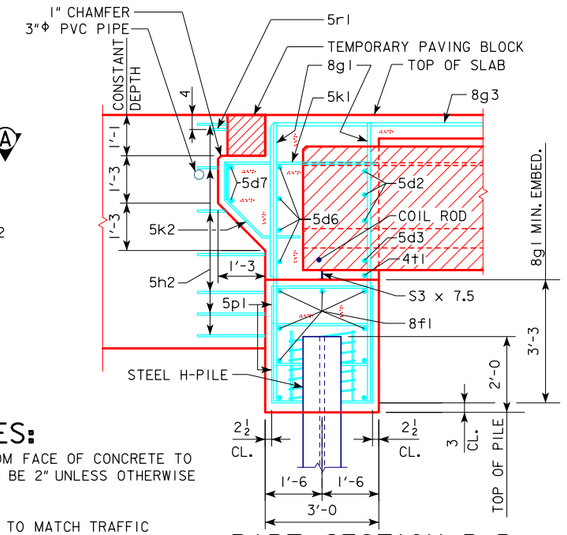
ADDITIONAL QUANTITIES

15° SKEW

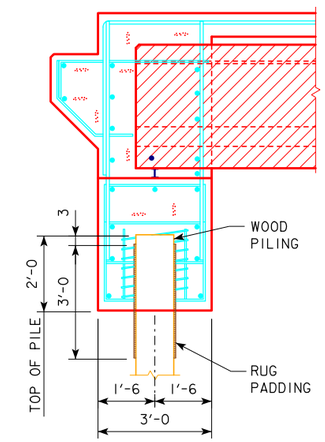
H24-17-06



PART REAR ELEVATION AT ABUTMENT



PART SECTION B-B
(FOR STEEL H-PILING)



PART SECTION B-B
(FOR WOOD PILING)

WOOD PILING NOTE:

AFTER PILES ARE CUT OFF, THE UPPER 3', EXCEPT AS SHOWN, IS TO BE WRAPPED WITH A DOUBLE THICKNESS OF RUG PADDING HELD IN PLACE BY TACKING WITH GALVANIZED ROOFING NAILS AND WRAPPED WITH #14 GAUGE GALVANIZED WIRE AT A 4" PITCH, CARE IS TO BE TAKEN NOT TO DAMAGE PADDING WHEN PLACING CONCRETE. RUG PADDING MAY BE EITHER OF THE FOLLOWING:

(1) HAIR AND JUTE RUG PADDING, RUBBERIZED ON BOTH SIDES, AND WEIGHING NOT LESS THAN 47 OZ. PER SQ. YD.

(2) BONDED URETHANE OR BONDED POLYFOAM WITH A MINIMUM DENSITY OF 5 LBS. PER CU. FT. AND SHALL BE AT LEAST ½ IN. THICK, (MATERIAL LESS THAN ½ IN. IN THICKNESS MAY BE USED, BUT WILL REQUIRE ADDITIONAL WRAPS FOR A TOTAL OF AT LEAST ONE INCH).

NOTE:
THE SPIRAL AT THE TOP OF EACH PILE TO BE 7 TURNS OF NO. 2 BAR, 21" DIAMETER, 3" PITCH WITH 3 - L $\frac{7}{8}$ x $\frac{7}{8}$ x $\frac{1}{8}$ SPACERS PUNCHED TO HOLD SPIRAL.

ABUTMENT NOTES:

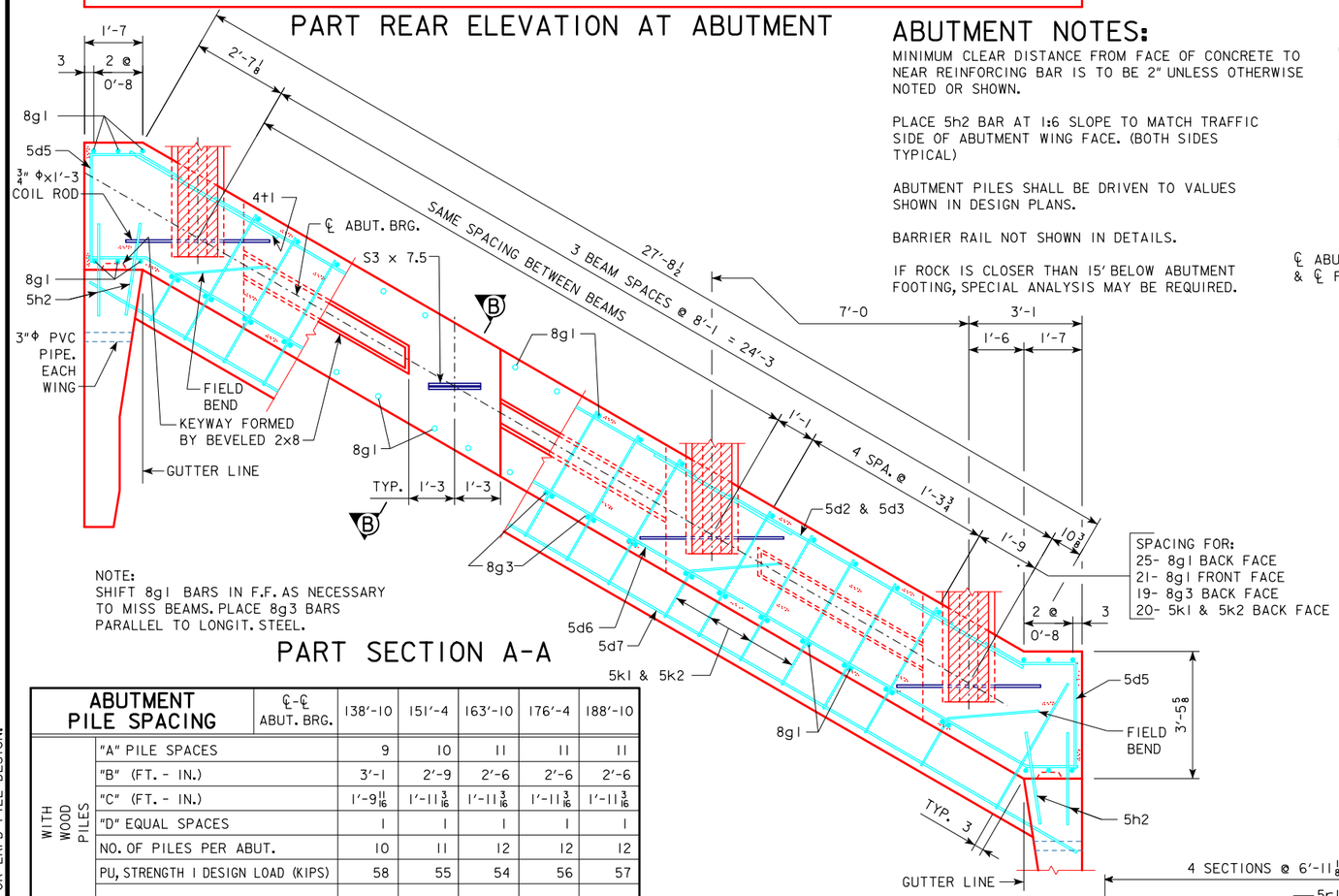
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.

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

ABUTMENT PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

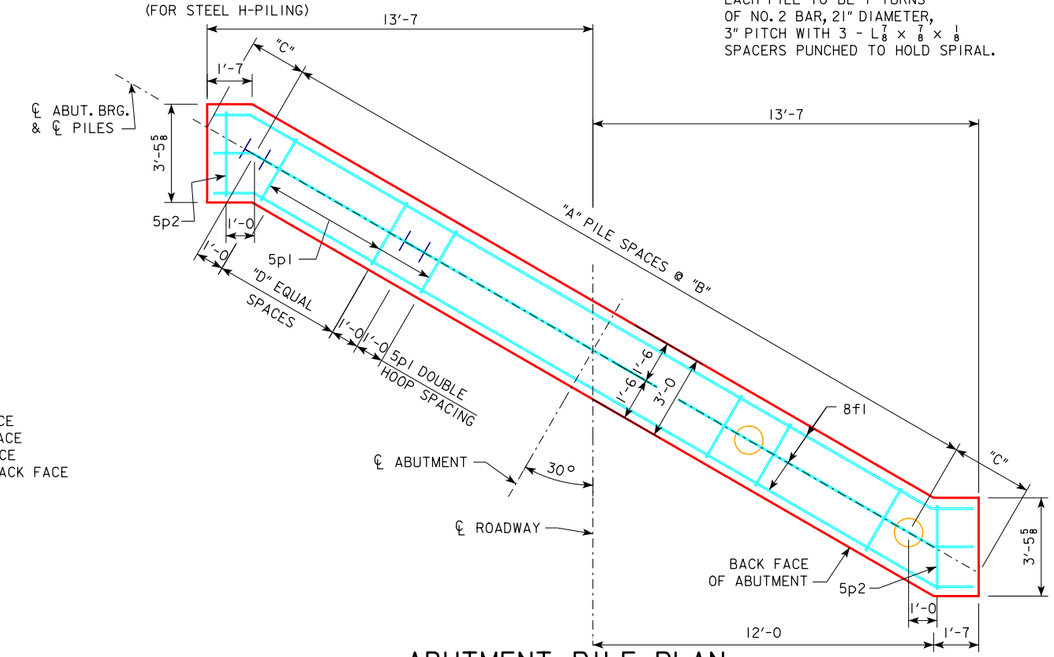
BARRIER RAIL NOT SHOWN IN DETAILS.

IF ROCK IS CLOSER THAN 15' BELOW ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.



NOTE:
SHIFT 8g1 BARS IN F.F. AS NECESSARY TO MISS BEAMS. PLACE 8g3 BARS PARALLEL TO LONGIT. STEEL.

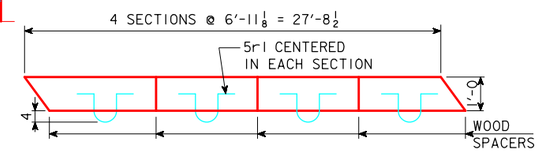
PART SECTION A-A



ABUTMENT PILE PLAN

ABUTMENT PILE SPACING		℄-℄ ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10
WITH WOOD PILES	"A" PILE SPACES		9	10	11	11	11
	"B" (FT. - IN.)		3'-1	2'-9	2'-6	2'-6	2'-6
	"C" (FT. - IN.)		1'-9 11/16	1'-11 3/16	1'-11 3/16	1'-11 3/16	1'-11 3/16
	"D" EQUAL SPACES		1	1	1	1	1
	NO. OF PILES PER ABUT.		10	11	12	12	12
	PU, STRENGTH I DESIGN LOAD (KIPS)		58	55	54	56	57
WITH STEEL H-PILES	"A" PILE SPACES		4	4	4	4	5
	"B" (FT. - IN.)		6'-6	6'-6	6'-6	6'-6	5'-2
	"C" (FT. - IN.)		2'-8 3/16	2'-8 3/16	2'-8 3/16	2'-8 3/16	2'-9 3/16
	"D" EQUAL SPACES		4	4	4	4	3
	NO. OF PILES PER ABUT.		5	5	5	5	6
	PU, STRENGTH I DESIGN LOAD (KIPS)		128	132	141	146	126

NOTE: Pu, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



PLAN OF TEMPORARY PAVING BLOCK

NOTE :
LINE PAVING NOTCH WITH TAR PAPER BEFORE PLACING THE TEMPORARY PAVING BLOCK.

05-13
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

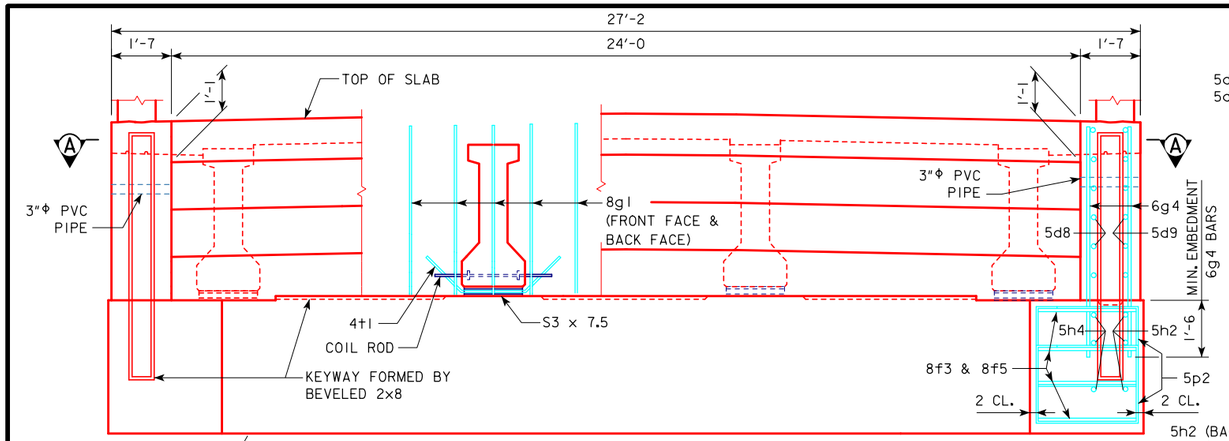
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

ABUTMENT DETAILS
30° SKEW A & B BEAMS

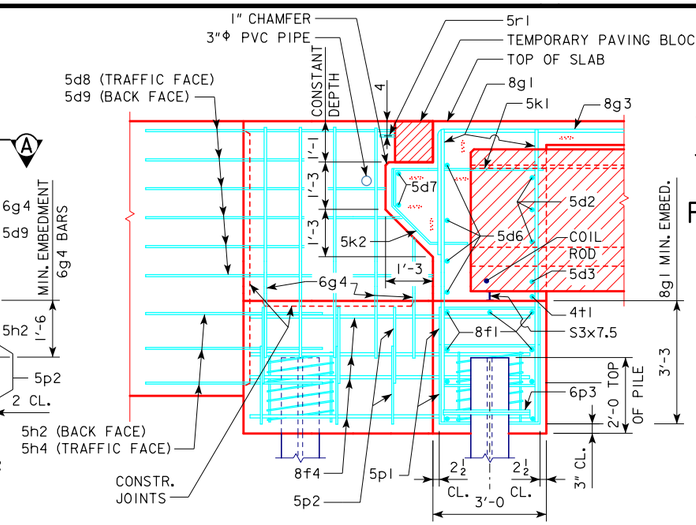
H24-18-06

REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.

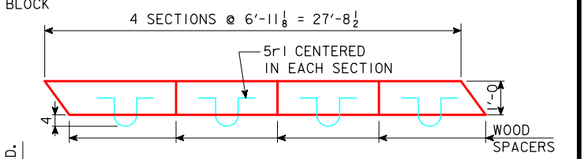


PART REAR ELEVATION AT ABUTMENT

FIELD BEND 5h4 BAR AS NECESSARY TO AVOID PILE IN ABUTMENT WING.



PART SECTION B-B



PLAN OF TEMPORARY PAVING BLOCK

NOTE :
LINE PAVING NOTCH WITH TAR PAPER BEFORE PLACING THE TEMPORARY PAVING BLOCK.

ABUTMENT NOTES:

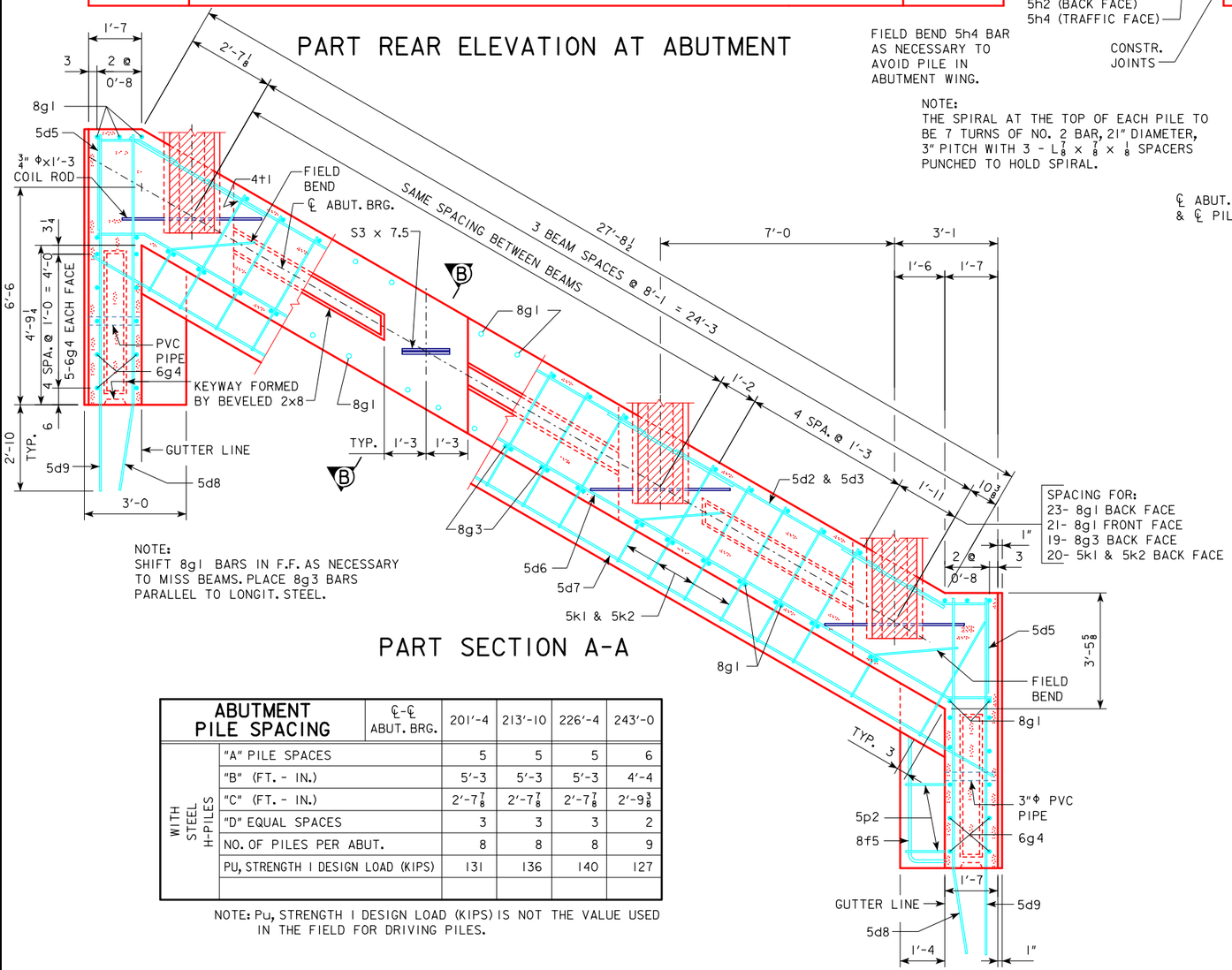
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.

ABUTMENT PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

BARRIER RAIL NOT SHOWN IN DETAILS.

IF ROCK IS CLOSER THAN 15' BELOW ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.

NOTE:
THE SPIRAL AT THE TOP OF EACH PILE TO BE 7 TURNS OF NO. 2 BAR, 21" DIAMETER, 3" PITCH WITH 3 - L 7/8 x 7/8 x 1/8 SPACERS PUNCHED TO HOLD SPIRAL.

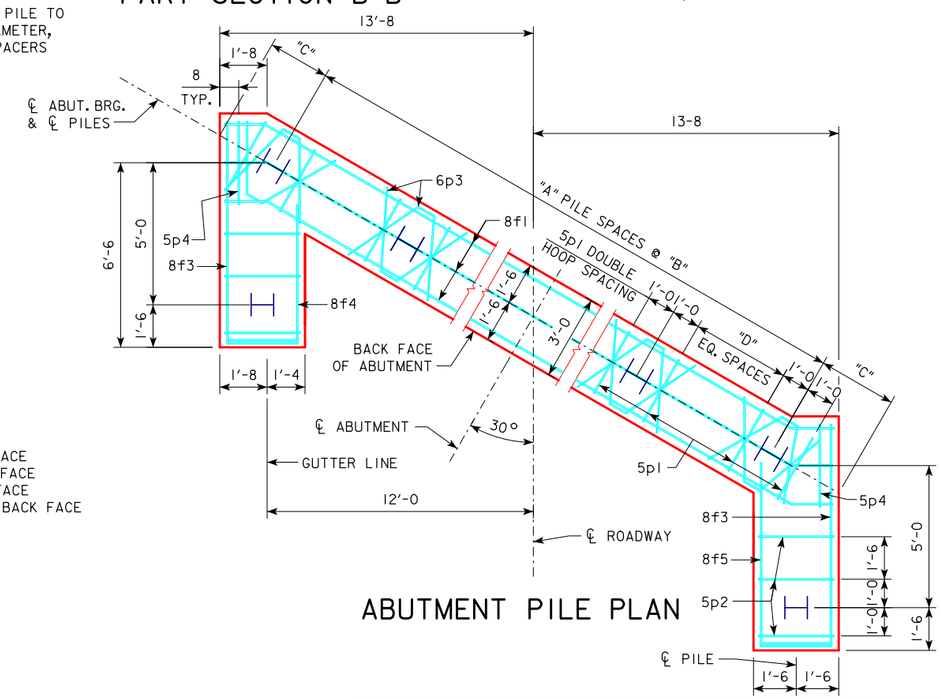


NOTE:
SHIFT 8g1 BARS IN F.F. AS NECESSARY TO MISS BEAMS. PLACE 8g3 BARS PARALLEL TO LONGIT. STEEL.

PART SECTION A-A

ABUTMENT PILE SPACING		℄-℄ ABUT. BRG.	201'-4	213'-10	226'-4	243'-0
WITH STEEL H-PILES	"A" PILE SPACES		5	5	5	6
	"B" (FT. - IN.)		5'-3	5'-3	5'-3	4'-4
	"C" (FT. - IN.)		2'-7 7/8	2'-7 7/8	2'-7 7/8	2'-9 3/8
	"D" EQUAL SPACES		3	3	3	2
	NO. OF PILES PER ABUT.		8	8	8	9
	PU, STRENGTH I DESIGN LOAD (KIPS)		131	136	140	127

NOTE: Pu, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



ABUTMENT PILE PLAN

10-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

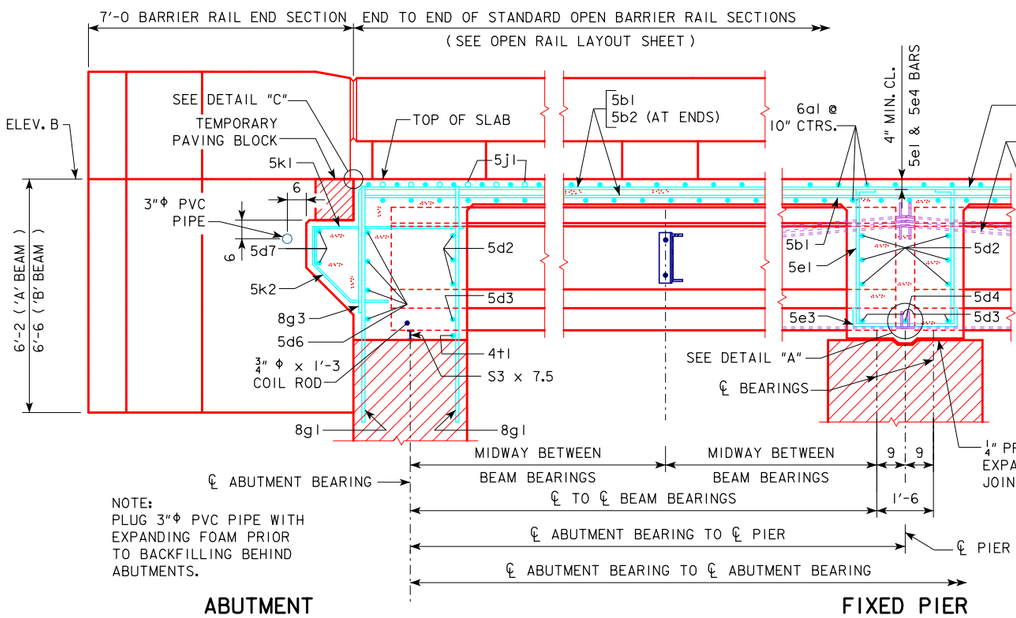
DECEMBER, 2006

ABUTMENT DETAILS

30° SKEW C BEAMS

H24-19-06

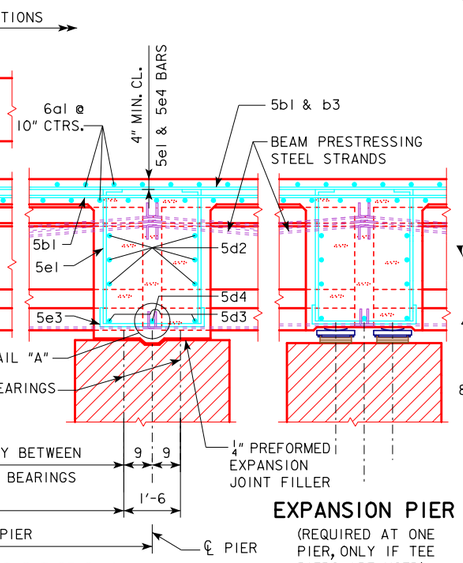
REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 10-2016 - REMOVED SECTION DIRECTORS "C-C" FROM PART SECTION B-B, THEY WERE VOID BECAUSE THERE WAS NO SECTION C-C DETAIL.



NOTE:
PLUG 3"Φ PVC PIPE WITH EXPANDING FOAM PRIOR TO BACKFILLING BEHIND ABUTMENTS.

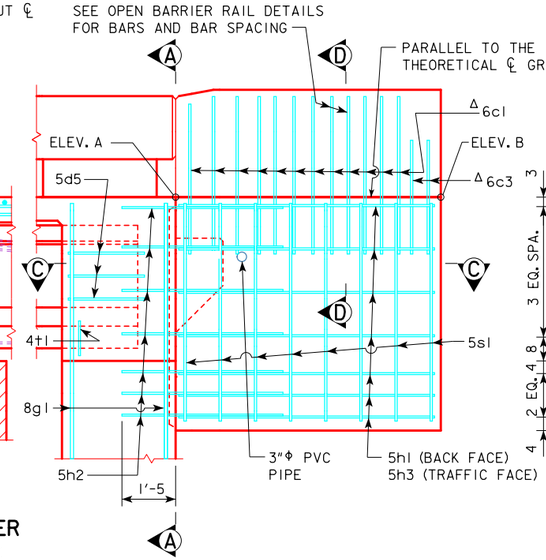
PART LONGITUDINAL SECTION NEAR GUTTER

(FOR DETAILS OF INTERMEDIATE DIAPHRAGM SEE SHEET H24-38-06)



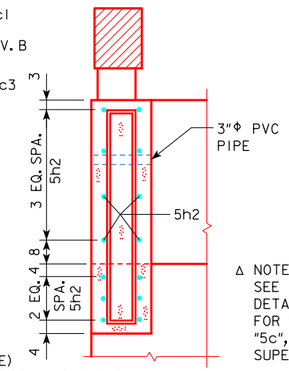
EXPANSION PIER

(REQUIRED AT ONE PIER, ONLY IF TEE PIERS ARE USED)

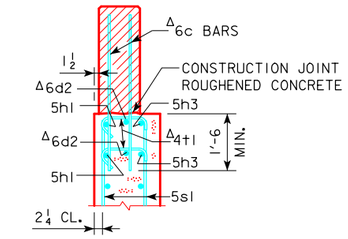


PART END VIEW AT ABUTMENT

PROVIDE ELEVATIONS A AND B IN THE BRIDGE PLAN SHEETS.

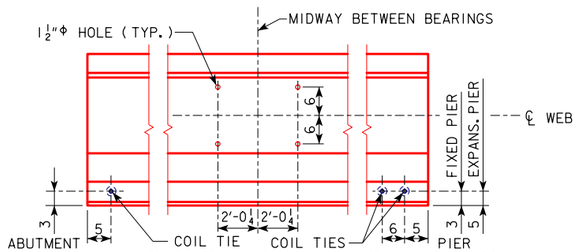


SECTION A-A

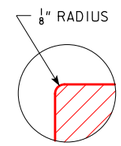


PART SECTION D-D

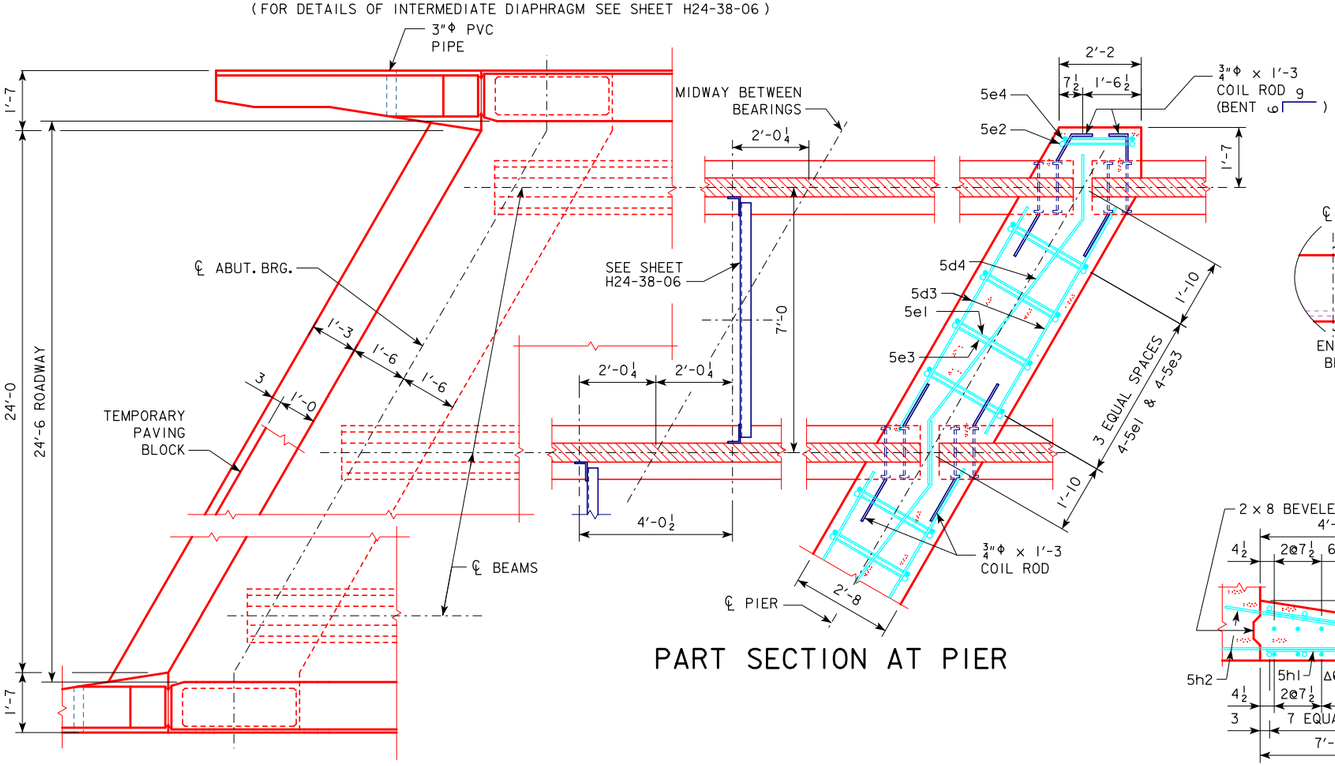
Δ NOTE:
SEE END SECTION DETAILS IN THESE PLANS FOR DETAILS OF BARRIER RAIL END SECTION AND SPACING FOR 5c BARRIER RAIL BARS. REINFORCING BARS "5c", "5d" AND "4t1" ARE INCLUDED IN THE SUPERSTRUCTURE QUANTITIES.



LOCATION OF BEAM COIL TIES AND STEEL DIAPHRAGM BOLT HOLES

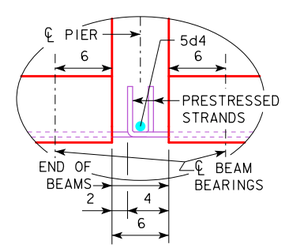


DETAIL "C"

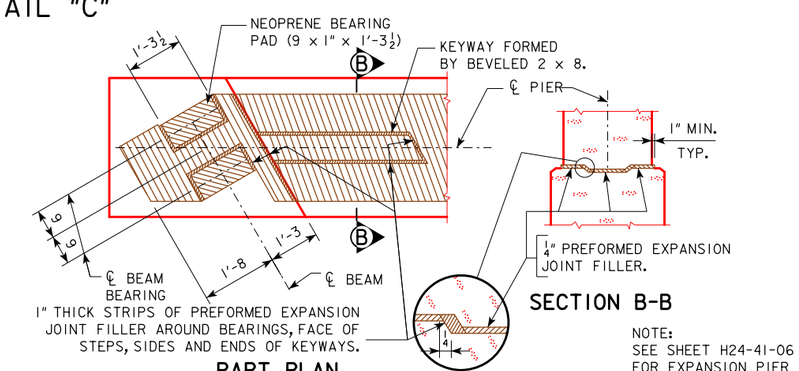


PART PLAN

PART SECTION AT PIER



DETAIL "A"

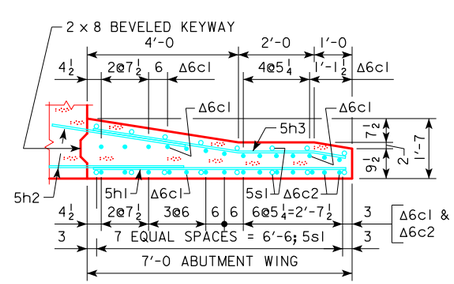


PART PLAN

SECTION B-B

NOTE:
SEE SHEET H24-41-06 FOR EXPANSION PIER BEARING DETAILS

TOP OF FIXED PIER DETAILS



PART SECTION C-C

01-10
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

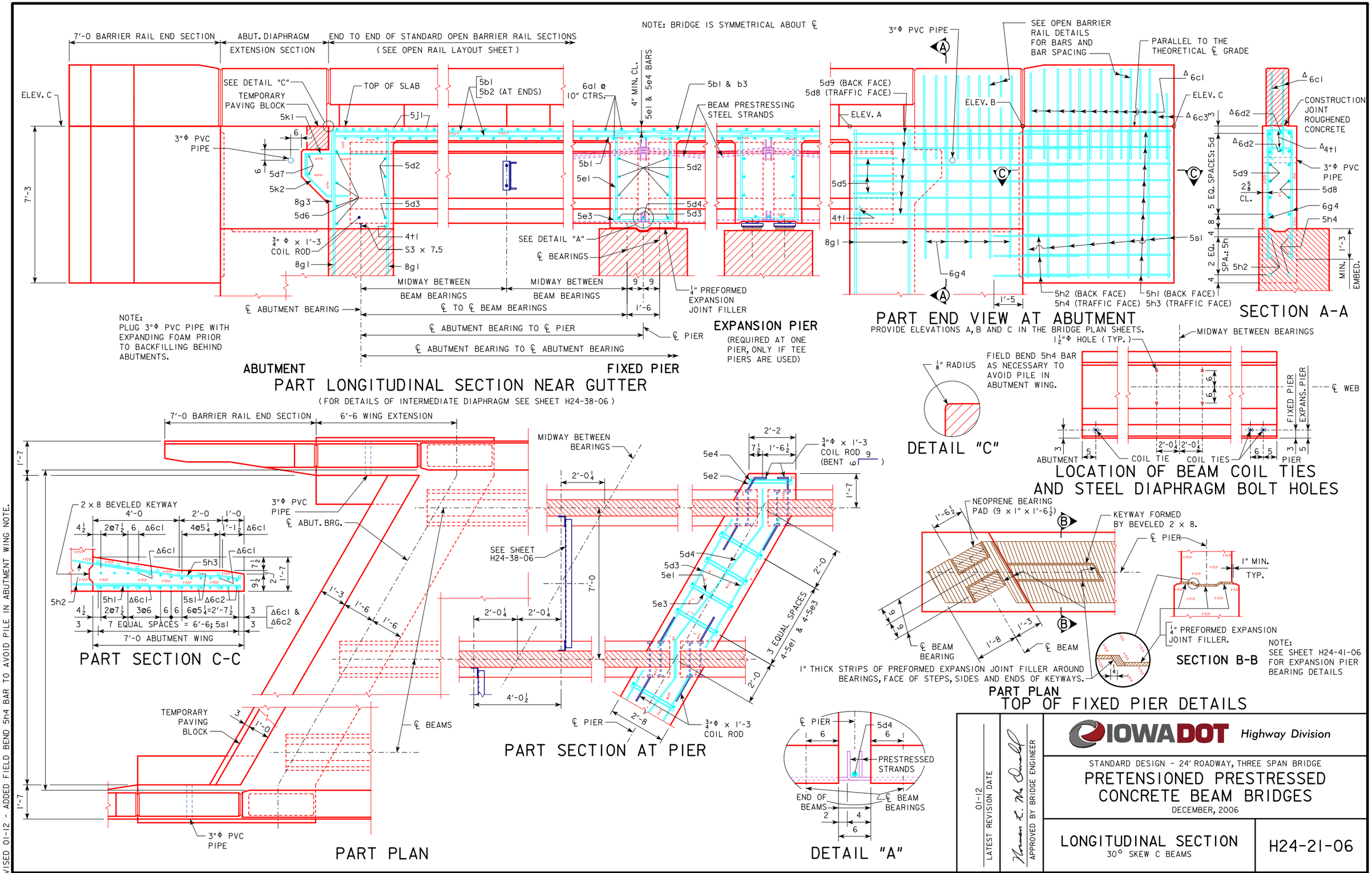
DECEMBER, 2006

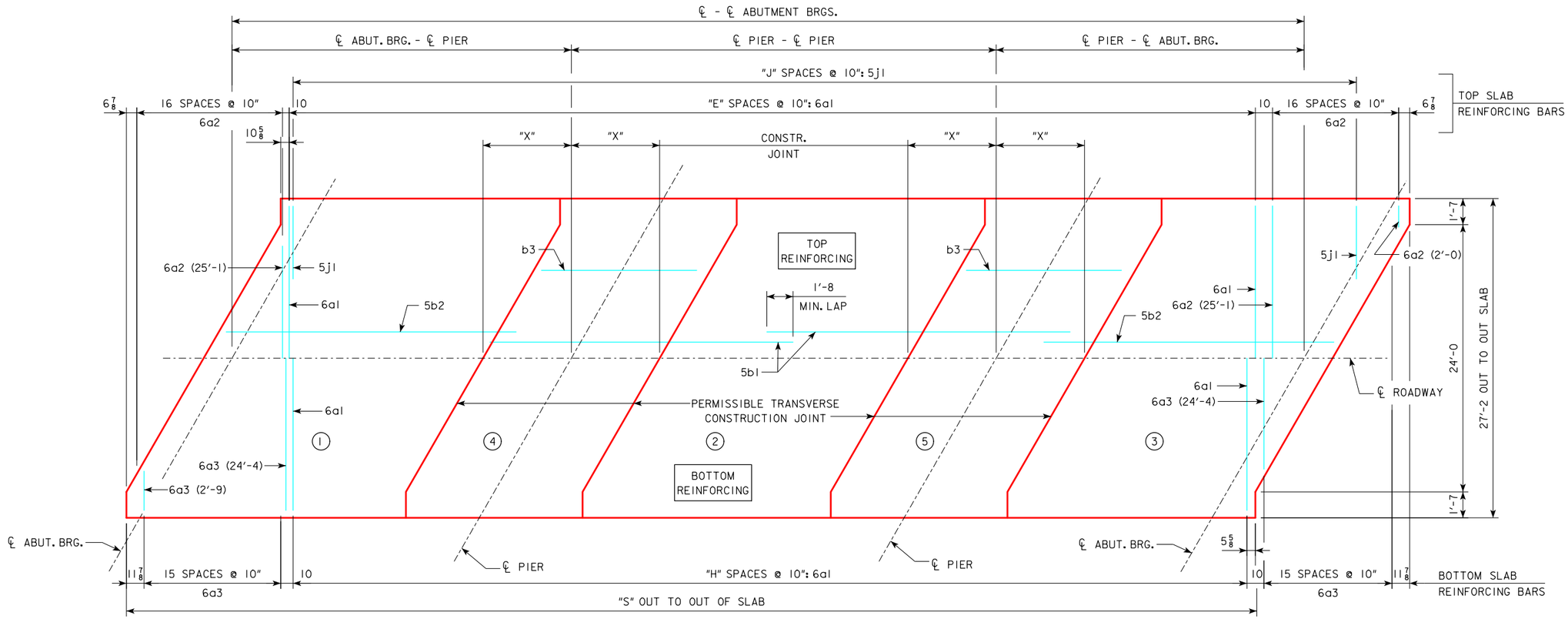
LONGITUDINAL SECTION

30° SKEW A & B BEAMS

H24-20-06

CORRECTION 09-10 - MINOR MODIFICATIONS TO PART SECTION C-C.
REVISED 01-10 - ABUT. WINGS SHAPE CHANGED.


7'-0 BARRIER RAIL END SECTION
ABUT. DIAPHRAGM EXTENSION SECTION
END TO END OF STANDARD OPEN BARRIER RAIL SECTIONS (SEE OPEN RAIL LAYOUT SHEET)
NOTE: BRIDGE IS SYMMETRICAL ABOUT ℄
ELEV. C
SEE DETAIL "C"
TEMPORARY PAVING BLOCK
TOP OF SLAB
5b1
5b2 (AT ENDS)
6a1 @ 10" CTRS.
4" MIN. CL.
5e1 & 5e4 BARS
5b1 & b3
BEAM PRESTRESSING STEEL STRANDS
3"Φ PVC PIPE
5k1
5j1
5d7
5k2
5d2
8g3
5d6
5d3
5b1
5e1
5e3
5d4
3/4" Φ x 1'-3 COIL ROD
4t1
S3 x 7.5
8g1
SEE DETAIL "A"
℄ BEARINGS
MIDWAY BETWEEN BEAM BEARINGS
℄ TO ℄ BEAM BEARINGS
1/4" PREFORMED EXPANSION JOINT FILLER
℄ ABUTMENT BEARING
℄ ABUTMENT BEARING TO ℄ PIER
℄ PIER
℄ ABUTMENT BEARING TO ℄ ABUTMENT BEARING
NOTE: PLUG 3"Φ PVC PIPE WITH EXPANDING FOAM PRIOR TO BACKFILLING BEHIND ABUTMENTS.
ABUTMENT
FIXED PIER
EXPANSION PIER
(REQUIRED AT ONE PIER, ONLY IF TEE PIERS ARE USED)
PART LONGITUDINAL SECTION NEAR GUTTER
(FOR DETAILS OF INTERMEDIATE DIAPHRAGM SEE SHEET H24-38-06)
5d9 (BACK FACE)
5d8 (TRAFFIC FACE)
ELEV. A
ELEV. B
SEE OPEN BARRIER RAIL DETAILS FOR BARS AND BAR SPACING
PARALLEL TO THE THEORETICAL ℄ GRADE
6c1
6c3
5d5
4t1
8g1
6g4
5s1
5h2 (BACK FACE)
5h4 (TRAFFIC FACE)
5h1 (BACK FACE)
5h3 (TRAFFIC FACE)
PART END VIEW AT ABUTMENT
PROVIDE ELEVATIONS A, B AND C IN THE BRIDGE PLAN SHEETS.
6d2
CONSTRUCTION JOINT ROUGHENED CONCRETE
4t1
5 EQ. SPACES; 5d
2 5/8" CL.
5h4
2 EQ. SPA.; 5h
5h2
MIN. 1'-3 EMBED.
SECTION A-A
7'-0 BARRIER RAIL END SECTION
6'-6 WING EXTENSION
2 x 8 BEVELED KEYWAY
4'-0
2'-0
1'-0
5h3
5h1
5s1
6c1
6c2
7 EQUAL SPACES = 6'-6; 5s1
7'-0 ABUTMENT WING
PART SECTION C-C
3"Φ PVC PIPE
℄ ABUT. BRG.
TEMPORARY PAVING BLOCK
℄ BEAMS
3"Φ PVC PIPE
PART PLAN
MIDWAY BETWEEN BEARINGS
SEE SHEET H24-38-06
2'-0 1/4
7'-0
4'-0 1/2
℄ PIER
5e4
5e2
3/4"Φ x 1'-3 COIL ROD (BENT 9)
5d4
5d3
5e1
5e3
3 EQUAL SPACES
4-5e1 & 4-5e3
3/4"Φ x 1'-3 COIL ROD
PART SECTION AT PIER
℄ PIER
5d4
PRESTRESSED STRANDS
END OF BEAMS
℄ BEAM BEARINGS
DETAIL "A"
1/8" RADIUS
DETAIL "C"
1/2"Φ HOLE (TYP.)
MIDWAY BETWEEN BEARINGS
FIELD BEND 5h4 BAR AS NECESSARY TO AVOID PILE IN ABUTMENT WING.
℄ WEB
FIXED PIER
EXPANS. PIER
ABUTMENT
COIL TIE
COIL TIES
PIER
LOCATION OF BEAM COIL TIES AND STEEL DIAPHRAGM BOLT HOLES
NEOPRENE BEARING PAD (9 x 1" x 1'-6 1/2)
KEYWAY FORMED BY BEVELED 2 x 8.
℄ PIER
1" MIN. TYP.
℄ BEAM BEARING
℄ BEAM
1/4" PREFORMED EXPANSION JOINT FILLER.
1" THICK STRIPS OF PREFORMED EXPANSION JOINT FILLER AROUND BEARINGS, FACE OF STEPS, SIDES AND ENDS OF KEYWAYS.
PART PLAN
SECTION B-B
NOTE: SEE SHEET H24-41-06 FOR EXPANSION PIER BEARING DETAILS
TOP OF FIXED PIER DETAILS
REVISED 01-12 - ADDED FIELD BEND 5h4 BAR TO AVOID PILE IN ABUTMENT WING NOTE.
01-12
LATEST REVISION DATE
APPROVED BY BRIDGE ENGINEER
IOWA DOT Highway Division
STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
DECEMBER, 2006
LONGITUDINAL SECTION
30° SKEW C BEAMS
H24-21-06



SLAB LAYOUT

(LEFT AHEAD SKEW SHOWN, RIGHT AHEAD SKEW SIMILAR)

GENERAL DATA

		℄-℄ ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
VERTICAL CURVE	TOP OF SLAB TO ABUT. CONSTR. JT. AT C.L. ABUT. BRG.	"U"	3'-8	3'-7 7/8	4'-2 7/8	4'-2 7/8	4'-2 7/8	4'-8 1/2	4'-8 11/16	4'-9 1/8	4'-9 1/2
	TOP OF SLAB TO PIER TOP AT C.L. PIER*	"U"	3'-6 3/8	3'-6 5/8	4'-1 3/8	4'-1 9/16	4'-1 15/16	4'-7 5/16	4'-7 5/16	4'-7 9/16	4'-7 9/16
STRAIGHT GRADE	TOP OF SLAB TO ABUT. CONSTR. JT. AT C.L. ABUT. BRG.	"U"	3'-8 1/16	3'-7 7/8	4'-2 15/16	4'-2 15/16	4'-3 1/16	4'-8 3/4	4'-8 7/8	4'-9 3/8	4'-9 15/16
	TOP OF SLAB TO PIER TOP AT C.L. PIER*	"U"	3'-6 5/8	3'-6 13/16	4'-1 5/8	4'-1 7/8	4'-2 5/16	4'-7 3/4	4'-7 3/4	4'-8 1/16	4'-8 1/16
D.L. PIER REACTION (D.L. + F.W.S.) SERVICE LOADS		KIPS	299.4	323.0	368.5	393.4	418.5	498.6	526.5	554.6	581.9
L.L. PIER REACTION (HL93) NO IMPACT SERVICE LOADS		KIPS	207.6	215.3	222.7	229.9	237.0	244.0	253.2	268.2	284.4
NO. OF SPACES FOR 6a1 BARS (TOP)		"E"	152	167	182	197	212	227	242	257	277
NO. OF SPACES FOR 6a1 BARS (BOTTOM)		"H"	153	168	183	198	213	228	243	258	278
NO. OF SPACES FOR 5j1 BARS (TOP)		"J"	165	180	195	210	225	240	255	270	290
OUT TO OUT OF SLAB		"S"	142'-3 5/8	154'-9 5/8	167'-3 5/8	179'-9 5/8	192'-3 5/8	204'-9 5/8	217'-3 5/8	229'-9 5/8	246'-5 5/8
SLAB TRANSVERSE CONSTR. JT. DISTANCE FROM C.L. PIER		"X"	6'-7	7'-1	7'-7	8'-1	8'-8	9'-2	9'-8	10'-2	10'-2

ESTIMATED QUANTITIES

(SUPERSTRUCTURE PLUS INTEGRAL ABUTMENTS)

	℄-℄ ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
STRUCTURAL CONCRETE SUPERSTRUCTURE (INCLUDES ABUT. WINGS)	C.Y.	150.6	159.4	175.6	184.6	193.9	213.2	222.4	232.1	244.6
STRUCTURAL CONCRETE ABUTMENTS (w/ WOOD PILES) ***	C.Y.	23.8	23.7	23.6	23.6	23.6	-----	-----	-----	-----
STRUCTURAL CONCRETE ABUTMENTS (w/ STEEL H PILES) ***	C.Y.	25.0	25.0	25.0	25.0	25.0	32.6	32.6	32.6	32.6
PRETENSIONED PRESTRESSED CONCRETE BEAM, CENTER SPAN	NO.	4-A50	4-A55	4-B59	4-B63	4-B67	4-C71	4-C75	4-C80	4-C80
PRETENSIONED PRESTRESSED CONCRETE BEAM, END SPAN	NO.	8-A42	8-A46	8-B50	8-B55	8-B59	8-C63	8-C67	8-C71	8-C80
CONCRETE RAIL	L.F.	312.6	337.6	362.6	387.6	412.6	456.7	481.7	506.7	540.0
STRUCTURAL STEEL (w/ PILE BENT PIERS)	LB.	2555	2555	2555	2555	2555	2498	2498	2498	2498
STRUCTURAL STEEL (w/ TEE PIERS)	LB.	3272	3272	3272	3272	3272	3344	3344	3344	3344
REINFORCING STEEL (w/ WOOD PILES)	LB.	43,430	46,335	49,734	53,148	55,986	-----	-----	-----	-----
REINFORCING STEEL (w/ STEEL H PILES)	LB.	43,414	46,212	49,503	52,917	55,775	62,370	65,736	68,837	72,650
NO. OF WOOD PILES, TREATED FOR TWO ABUTMENTS	NO.	20	22	24	24	24	-----	-----	-----	-----
NO. OF STEEL H-PILES (HP 10 x 57) FOR TWO ABUTMENTS	NO.	10	10	10	10	12	16	16	16	18
PREBORED HOLES (w/ WOOD PILES)	L.F.	200	220	240	240	240	-----	-----	-----	-----
PREBORED HOLES (w/ STEEL H-PILES)	L.F.	100	100	100	100	120	160	160	160	180

CONCRETE PLACEMENT QUANT.

(SUPERSTRUCTURE PLUS INTEGRAL ABUTMENTS)

	℄-℄ ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
SLAB INCL. HAUNCH, ABUT. DIAPHR., & WINGWALLS** , SECT. 1 & 3	C.Y.	79.7	84.8	94.0	99.3	104.6	117.7	123.2	128.9	141.4
SLAB INCLUDING HAUNCH, SECTION 2	C.Y.	28.4	30.7	33.0	35.3	37.5	39.9	42.1	44.5	44.5
SLAB INCLUDING HAUNCH & PIER DIAPHRAGM, SECTIONS 4 & 5	C.Y.	33.1	34.5	38.8	40.2	42.0	45.0	46.5	48.1	48.1
PAVING BLOCKS	C.Y.	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
ABUTMENT WINGS	C.Y.	7.2	7.2	7.6	7.6	7.6	8.4	8.4	8.4	8.4
ABUTMENT FOOTINGS (w/ WOOD PILES) ***	C.Y.	21.2	21.1	21.1	21.1	21.1	-----	-----	-----	-----
ABUTMENT FOOTINGS (w/ STEEL H PILES) ***	C.Y.	22.4	22.4	22.4	22.4	22.4	30.2	30.2	30.2	30.2

NOTE: CONCRETE DECK SHALL BE PLACED IN SECTIONS AND SEQUENCES INDICATED. ALTERNATE PROCEDURES FOR PLACING DECK CONCRETE MAY BE SUBMITTED FOR APPROVAL TOGETHER WITH A STATEMENT OF THE PROPOSED METHOD AND EVIDENCE THAT THE CONTRACTOR POSSESSES THE NECESSARY EQUIPMENT AND FACILITIES TO ACCOMPLISH THE REQUIRED RESULTS. FOR APPROVED ALTERNATE PROCEDURES THE ENGINEER SHALL DETERMINE IF A RETARDING ADMIXTURE IS REQUIRED TO MAINTAIN PLASTICITY OF THE CONCRETE DECK DURING PLACEMENT.

* VALUES SHOWN ARE FOR FIXED PIERS ONLY AND ALLOW FOR 1/16 INCH DEFLECTION OF THE 1 INCH NEOPRENE BEARING PAD. AT EXPANSION PIER LOCATIONS ADD 3 1/16 INCHES TO "U" VALUES SHOWN.

** WINGWALLS APPLY ONLY TO BRIDGES USING "C" BEAMS.

*** SEE SHEET H24-24-06 FOR ADDITIONAL CONCRETE REQUIRED IN ABUTMENT FOOTINGS.

07-15
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

SUPERSTRUCTURE DETAILS
30° SKEW

H24-22-06

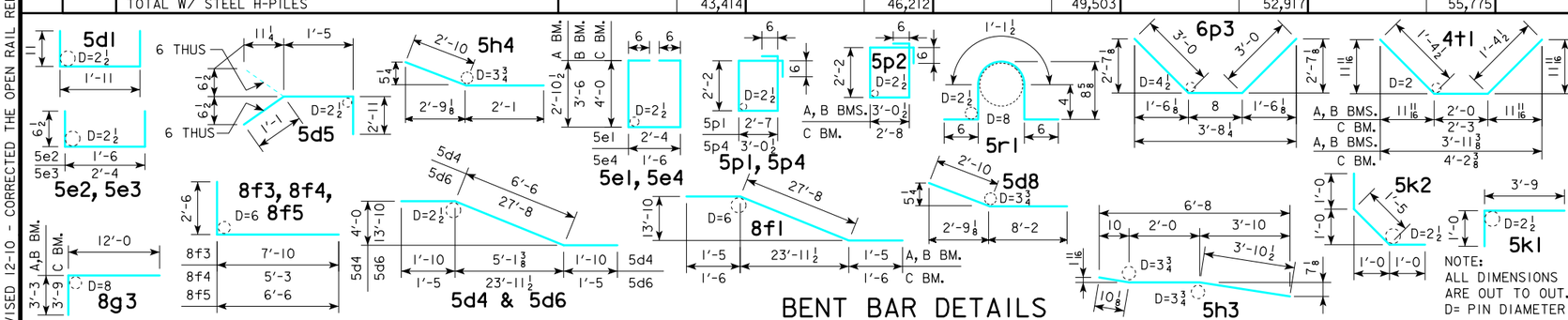
REVISED 07-2015 - CHANGED CONCRETE PLACEMENT NOTE TO ACCOUNT FOR THE POSSIBLE ADDITION OF A RETARDING ADMIXTURE TO THE CONCRETE.

REINFORCING BAR LIST

ONE SUPERSTRUCTURE AND TWO ABUTMENTS

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT
	℄-℄ ABUT. BRG.		138'-10			151'-4			163'-10			176'-4			188'-10			201'-4			213'-10			226'-4			243'-0					
	℄-℄ BEAM BRG.		42'-6	50'-10	42'-6	46'-8	55'-0	46'-8	50'-10	59'-2	50'-10	55'-0	63'-4	55'-0	59'-2	67'-6	59'-2	63'-4	71'-8	63'-4	67'-6	75'-10	67'-6	71'-8	80'-0	71'-8	80'-0	80'-0	80'-0			
	BEAM SERIES		A BEAM			A BEAM			B BEAM			B BEAM			B BEAM			C BEAM			C BEAM			C BEAM			C BEAM					
6a1	SLAB TRANSV. TOP & BOTT.		307	26'-10	12,373	337	26'-10	13,582	367	26'-10	14,791	397	26'-10	16,001	427	26'-10	17,210	457	26'-10	18,419	487	26'-10	19,628	517	26'-10	20,837	557	26'-10	22,449			
6a2	SLAB TRANSV. TOP ENDS		34	VARIES	692	34	VARIES	692	34	VARIES	692	34	VARIES	692	34	VARIES	692	34	VARIES	692	34	VARIES	692	34	VARIES	692	34	VARIES	692			
6a3	SLAB TRANSV. BOTT. ENDS		32	VARIES	651	32	VARIES	651	32	VARIES	651	32	VARIES	651	32	VARIES	651	32	VARIES	651	32	VARIES	651	32	VARIES	651	32	VARIES	651			
5b1	SLAB LONGITUDINAL, TOP & BOTT.		122	40'-0	5,090	122	40'-0	5,090	183	40'-0	7,635	183	40'-0	7,635	183	40'-0	7,635	244	40'-0	10,180	244	40'-0	10,180	244	40'-0	10,180	305	40'-0	12,725			
5b2	SLAB LONGITUDINAL, TOP & BOTT., ENDS		122	33'-6	4,263	122	39'-9	5,058	122	26'-10	3,414	122	33'-1	4,210	122	39'-4	5,005	122	26'-5	3,361	122	32'-8	4,157	122	38'-11	4,952	122	28'-1	3,573			
6b3	SLAB LONGITUDINAL, TOP @ PIERS		50	12'-10	964	50	13'-10	1,039	50	14'-10	1,114	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
7b3	SLAB LONGITUDINAL, TOP @ PIERS		—	—	—	—	—	—	—	—	—	50	15'-10	1,618	50	17'-0	1,737	50	18'-0	1,840	—	—	—	—	—	—	—	—	—			
8b3	SLAB LONGITUDINAL, TOP @ PIERS		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	19'-0	2,537	50	20'-0	2,670	50	20'-0	2,670			
5d1	PIER DIAPH. ENDS		12	3'-9	47	12	3'-9	47	12	3'-9	47	12	3'-9	47	12	3'-9	47	12	3'-9	47	12	3'-9	47	12	3'-9	47	12	3'-9	47			
5d2	PIER & ABUT. DIAPH. LONGIT.		54	7'-3	408	54	7'-3	408	54	7'-3	408	54	7'-3	408	54	7'-3	408	54	7'-0	394	54	7'-0	394	54	7'-0	394	54	7'-0	394			
5d3	PIER & ABUT. DIAPH. LONGIT.		18	6'-3	117	18	6'-3	117	18	6'-3	117	18	6'-3	117	18	6'-3	117	18	5'-11	111	18	5'-11	111	18	5'-11	111	18	5'-11	111			
5d4	PIER DIAPH. LONGIT.		6	10'-2	64	6	10'-2	64	6	10'-2	64	6	10'-2	64	6	10'-2	64	6	10'-2	64	6	10'-2	64	6	10'-2	64	6	10'-2	64			
5d5	ABUT. DIAPH. ENDS		12	5'-5	68	12	5'-5	68	12	5'-5	68	12	5'-5	68	12	5'-5	68	12	5'-5	68	12	5'-5	68	12	5'-5	68	12	5'-5	68			
5d6	ABUT. DIAPH. LONGIT. B.F.		8	30'-6	254	8	30'-6	254	8	30'-6	254	8	30'-6	254	8	30'-6	254	8	30'-6	254	8	30'-6	254	8	30'-6	254	8	30'-6	254			
5d7	PAVING NOTCH LONGIT.		4	30'-10	129	4	30'-10	129	4	30'-10	129	4	30'-10	129	4	30'-10	129	4	30'-10	129	4	30'-10	129	4	30'-10	129	4	30'-10	129			
5d8	ABUT. DIAPH. WING EXT. LONGIT.		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	24	11'-0	275	24	11'-0	275	24	11'-0	275	24	11'-0	275			
5d9	ABUT. DIAPH. WING EXT. LONGIT.		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	24	10'-11	273	24	10'-11	273	24	10'-11	273	24	10'-11	273			
5e1	PIER DIAPH. HOOPS		24	9'-1	227	24	9'-1	227	24	10'-4	259	24	10'-4	259	24	10'-4	259	24	11'-4	284	24	11'-4	284	24	11'-4	284	24	11'-4	284			
5e2	PIER DIAPH. TIES ENDS		4	2'-7	11	4	2'-7	11	4	2'-7	11	4	2'-7	11	4	2'-7	11	4	2'-7	11	4	2'-7	11	4	2'-7	11	4	2'-7	11			
5e3	PIER DIAPH. TIES		24	3'-5	86	24	3'-5	86	24	3'-5	86	24	3'-5	86	24	3'-5	86	24	3'-5	86	24	3'-5	86	24	3'-5	86	24	3'-5	86			
5e4	PIER DIAPH. HOOPS ENDS		4	8'-3	34	4	8'-3	34	4	9'-6	40	4	9'-6	40	4	9'-6	40	4	10'-6	44	4	10'-6	44	4	10'-6	44	4	10'-6	44			
8f1	ABUT. FOOTING LONGIT.		18	30'-6	1,466	18	30'-6	1,466	18	30'-6	1,466	18	30'-6	1,466	18	30'-6	1,466	18	30'-8	1,474	18	30'-8	1,474	18	30'-8	1,474	18	30'-8	1,474			
8f3	ABUT. EXTENSION LONGIT.		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	10'-4	441	16	10'-4	441	16	10'-4	441	16	10'-4	441			
8f4	ABUT. EXTENSION LONGIT.		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	7'-9	166	8	7'-9	166	8	7'-9	166	8	7'-9	166			
8f5	ABUT. EXTENSION LONGIT.		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	9'-0	192	8	9'-0	192	8	9'-0	192	8	9'-0	192			
8g1	ABUT. VERT.		92	5'-7	1,371	92	5'-7	1,371	92	6'-2	1,515	92	6'-2	1,515	92	6'-2	1,515	88	6'-8	1,566	88	6'-8	1,566	88	6'-8	1,566	88	6'-9	1,586			
8g3	ABUT. DIAPH. VERT. B.F.		38	15'-3	1,547	38	15'-3	1,547	38	15'-3	1,547	38	15'-3	1,547	38	15'-3	1,547	38	15'-9	1,598	38	15'-9	1,598	38	15'-9	1,598	38	15'-9	1,598			
6g4	ABUT. DIAPH. WING EXT. VERT.		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	40	6'-0	360	40	6'-0	360	40	6'-1	365	40	6'-1	365			
5h1	ABUT. WING HORIZ. B.F.		28	6'-8	195	28	6'-8	195	28	6'-8	195	28	6'-8	195	28	6'-8	195	36	6'-8	250	36	6'-8	250	36	6'-8	250	36	6'-8	250			
5h2	ABUT. TO WING ANCHOR		56	4'-11	287	56	4'-11	287	56	4'-11	287	56	4'-11	287	56	4'-11	287	12	4'-11	62	12	4'-11	62	12	4'-11	62	12	4'-11	62			
5h3	ABUT. WING HORIZ. TRAFFIC FACE		28	6'-9	197	28	6'-9	197	28	6'-9	197	28	6'-9	197	28	6'-9	197	36	6'-9	253	36	6'-9	253	36	6'-9	253	36	6'-9	253			
5h4	ABUT. TO WING ANCHOR		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12	4'-11	62	12	4'-11	62	12	4'-11	62	12	4'-11	62			
5j1	TOP OF SLAB TRANSV. (AT RAIL)		332	6'-3	2,164	362	6'-3	2,360	392	6'-3	2,555	422	6'-3	2,751	452	6'-3	2,946	482	6'-3	3,142	512	6'-3	3,338	542	6'-3	3,533	582	6'-3	3,794			
5k1	PAVING NOTCH		40	4'-9	198	40	4'-9	198	40	4'-9	198	40	4'-9	198	40	4'-9	198	40	4'-9	198	40	4'-9	198	40	4'-9	198	40	4'-9	198			
5k2	PAVING NOTCH		40	3'-5	143	40	3'-5	143	40	3'-5	143	40	3'-5	143	40	3'-5	143	40	3'-5	143	40	3'-5	143	40	3'-5	143	40	3'-5	143			
5p1	ABUTMENT HOOPS (WOOD/STEEL)		72/80	10'-6	789/876	80/80	10'-6	876/876	88/80	10'-6	964/876	88/80	10'-6	964/876	88/80	10'-6	964/876	88	10'-6	964	88	10'-6	964	88	10'-6	964	80	10'-6	876			
5p2	ABUTMENT HOOPS		8	11'-5	95	8	11'-5	95	8	11'-5	95	8	11'-5	95	8	11'-5	95	24	10'-8	267	24	10'-8	267	24	10'-8	267	24	10'-8	267			
6p3	ABUT. BOTT. AT PILES		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	24	6'-8	240	24	6'-8	240	24	6'-8	240	28	6'-8	280			
5p4	ABUT. HOOPS AT ENDS		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	11'-5	95	8	11'-5	95	8	11'-5	95	8	11'-5	95			
5r1	PAVING BLOCK LIFTING LOOPS		8	2'-10	24	8	2'-10	24	8	2'-10	24	8	2'-10	24	8	2'-10	24	8	2'-10	24	8	2'-10	24	8	2'-10	24	8	2'-10	24			
5s1	WING VERT.		64	5'-10	389	64	5'-10	389	64	6'-2	412	64	6'-2	412	64	6'-2	412	64	6'-11	462	64	6'-11	462	64	6'-11	462	64	6'-11	462			
4t1	UNDER BEAMS AT ABUTMENTS		8	4'-9	25	8	4'-9	25	8	4'-9	25	8	4'-9	25	8	4'-9	25	8	5'-0	27	8	5'-0	27	8	5'-0	27	8	5'-0	27			
#2	PILE SPIRAL (WOOD/STEEL)		20/10	38'-6	129/64	22/10	38'-6	141/64	24/10	38'-6	154/64	24/10	38'-6	154/64	24/12	38'-6	154/77	16	38'-6	103	16	38'-6	103	16	38'-6	103	18	38'-6	116			
	SPIRAL SPACERS, L 7/8 x 7/8 x 1/8 x 0.70 (WOOD/STL.)		60/30	1'-10	77/39	66/30	1'-10	85/39	72/30	1'-10	92/39	72/30	1'-10	92/39	72/36	1'-10	92/46	48	1'-10	62	48	1'-10	62	48	1'-10	62	54	1'-10	69			
	OPEN RAIL				8,856			9,379			10,085			10,793			11,313			13,036			13,504			14,268			15,050			
	TOTAL W/ WOOD PILES				43,430			46,335			49,734			53,148			55,986			—			—			—			—			
	TOTAL W/ STEEL H-PILES				43,414			46,212			49,503			52,917			55,775			62,370			65,736			68,837			72,650			

REVISED 12-10 - CORRECTED THE OPEN RAIL REBAR QUANTITIES FOR THE 201'-4, 213'-10, 226'-4, & 243'-0 BRIDGE LENGTHS.



BENT BAR DETAILS

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

12-10
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

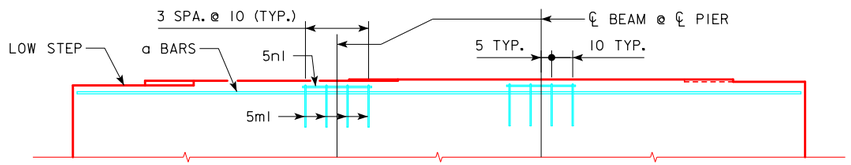
STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

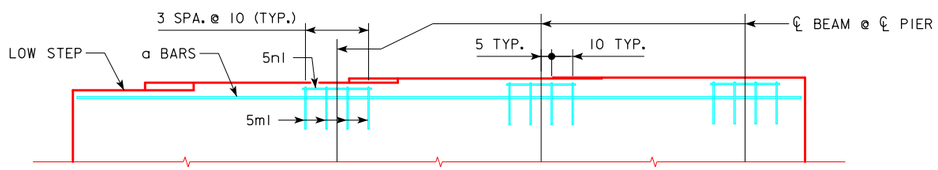
DECK & ABUTMENT REINF.
30° SKEW

H24-23-06



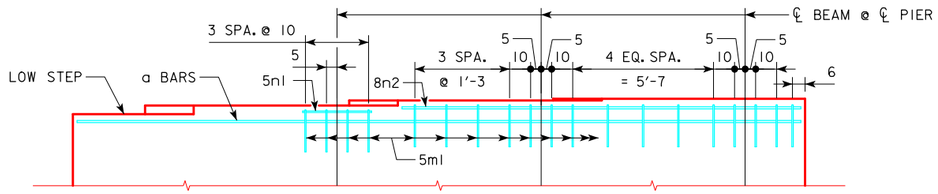
PART ELEVATION VIEW OF PIER CAP

GRADE (G): G <= 1.2%



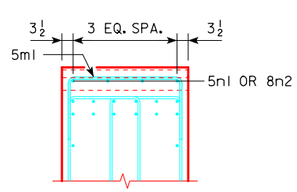
PART ELEVATION VIEW OF PIER CAP

GRADE (G): 1.2% < G <= 4.1%



PART ELEVATION VIEW OF PIER CAP

GRADE (G): 4.1% < G <= 5.0%



TYPICAL SECTION

STEP REINFORCING BAR LIST
ONE TEE PIER

			G <= 1.2%			1.2% < G <= 4.1%			4.1% < G <= 5.0%		
BAR	LENGTH	SHAPE	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
5m1	6'-4		8	5	53	12	5	79	19	5	126
5n1	2'-8		8	5	22	12	5	33	4	5	11
*8n2	VARIES		--	--	--	--	--	--	4	8	178
TOTAL (LB.)					75			112			315

G = GRADE (%)

*8n2 BARS VARY FROM 15'-11 TO 17'-6

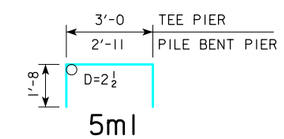
STEP REINFORCING BAR LIST
ONE PILE BENT PIER

			G <= 1.2%			1.2% < G <= 4.1%			4.1% < G <= 5.0%		
BAR	LENGTH	SHAPE	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
5m1	6'-3		8	5	52	12	5	78	19	5	124
5n1	2'-8		8	5	22	12	5	33	4	5	11
*8n2	VARIES		--	--	--	--	--	--	4	8	178
TOTAL (LB.)					74			111			313

G = GRADE (%)

*8n2 BARS VARY FROM 15'-11 TO 17'-5

BENT BAR DETAILS



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

NOTES:

THE TABLE BELOW LISTS THE ADDITIONAL CONCRETE VOLUME REQUIRED IN EACH ABUTMENT FOOTING/PIER CAP BASED ON THE ROADWAY GRADE AT EACH ABUTMENT FOOTING/PIER CAP. ADDITIONAL CONCRETE SHOULD BE ADDED TO THE PLANS FOR EACH ABUTMENT FOOTING/PIER CAP THAT HAS 0.5 CU. YDS. OR MORE OF ADDITIONAL CONCRETE. VALUES IN THE TABLE BELOW HAVE BEEN EXCLUDED FOR SCENARIOS THAT HAVE LESS THAN 0.5 CU. YDS. OF ADDITIONAL CONCRETE PER SUBSTRUCTURE UNIT. VALUES MAY BE INTERPOLATED FOR GRADES BETWEEN THE VALUES SHOWN IN THE TABLE.

ADDITIONAL CONCRETE VOLUME PER SUBSTRUCTURE UNIT (C.Y.)

	ROADWAY GRADE AT SUBSTRUCTURE UNIT				
	1%	2%	3%	4%	5%
EACH ABUTMENT FOOTING					
A, B BEAMS	-----	-----	0.6	0.8	1.0
C BEAMS	-----	-----	0.8	1.0	1.3
EACH TEE PIER CAP - ALL BEAMS	-----	-----	0.6	0.9	1.1
EACH PILE BENT PIER - ALL BEAMS	-----	-----	0.6	0.8	1.1

LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

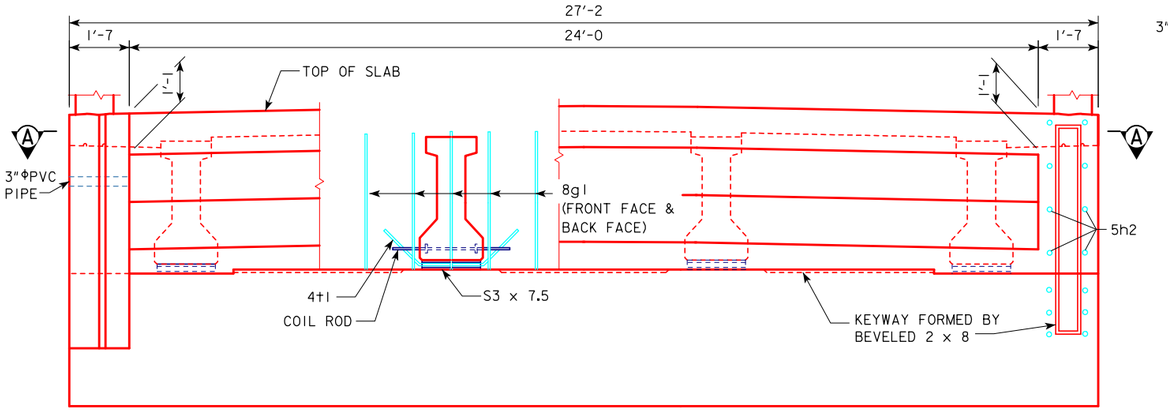
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

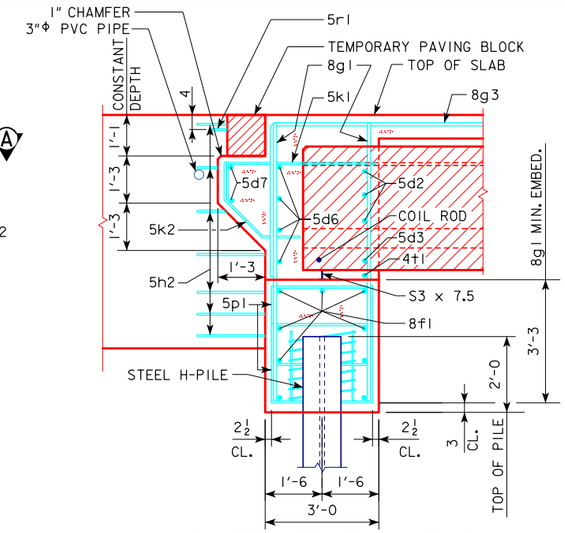
ADDITIONAL QUANTITIES

30° SKEW

H24-24-06



PART REAR ELEVATION AT ABUTMENT



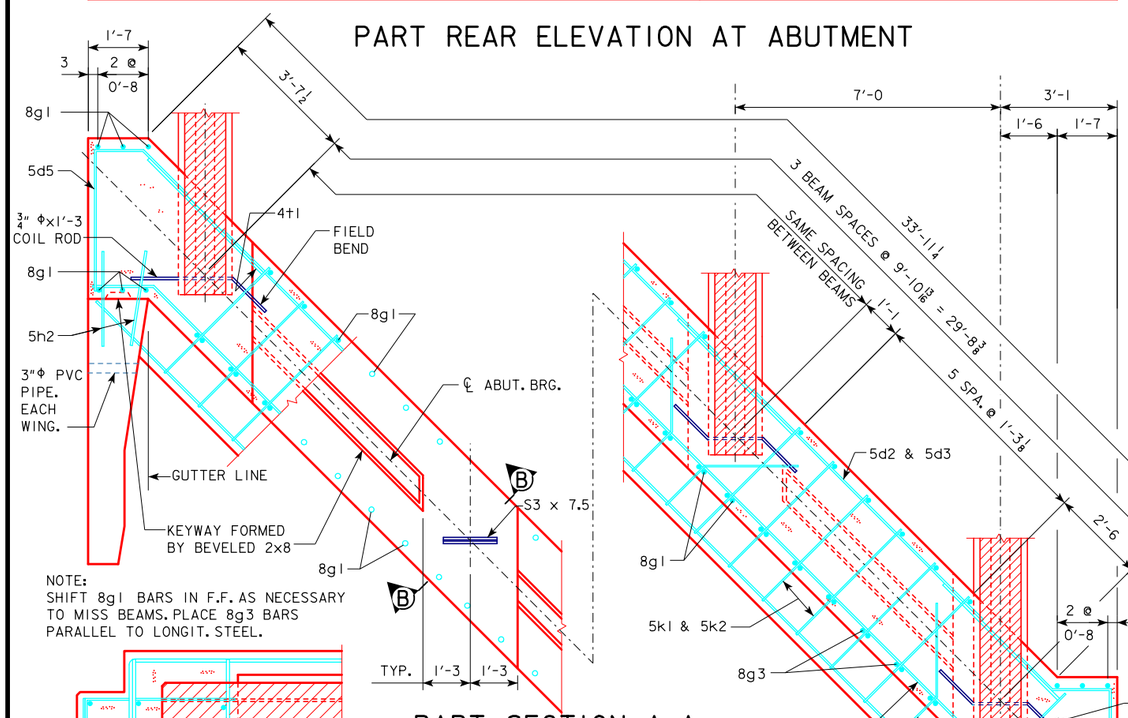
PART SECTION B-B

(FOR STEEL H-PILING)

NOTE:
THE SPIRAL AT THE TOP OF EACH PILE TO BE 7 TURNS OF NO. 2 BAR, 21" DIAMETER, 3" PITCH WITH 3 - $L\frac{7}{8} \times \frac{7}{8} \times \frac{1}{8}$ SPACERS PUNCHED TO HOLD SPIRAL.

ABUTMENT PILE SPACING	℄-℄ ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10
WITH WOOD PILES	"A" PILE SPACES	10	10	11	12	12
	"B" (FT. - IN.)	3'-5	3'-5	3'-1	2'-10	2'-10
	"C" (FT. - IN.)	2'-1½	2'-1½	2'-3	2'-2½	2'-2½
	"D" EQUAL SPACES	2	2	1	1	1
	NO. OF PILES PER ABUT.	11	11	12	13	13
	PU, STRENGTH I DESIGN LOAD (KIPS)	55	57	56	54	56
WITH STEEL H-PILES	"A" PILE SPACES	4	4	5	5	5
	"B" (FT. - IN.)	8'-0	8'-0	6'-4	6'-4	6'-4
	"C" (FT. - IN.)	3'-2½	3'-2½	3'-4½	3'-4½	3'-4½
	"D" EQUAL SPACES	5	5	4	4	4
	NO. OF PILES PER ABUT.	5	5	6	6	6
	PU, STRENGTH I DESIGN LOAD (KIPS)	134	139	123	127	131

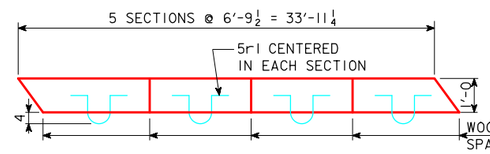
NOTE: Pu, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



NOTE:
SHIFT 8g1 BARS IN F.F. AS NECESSARY TO MISS BEAMS. PLACE 8g3 BARS PARALLEL TO LONGIT. STEEL.

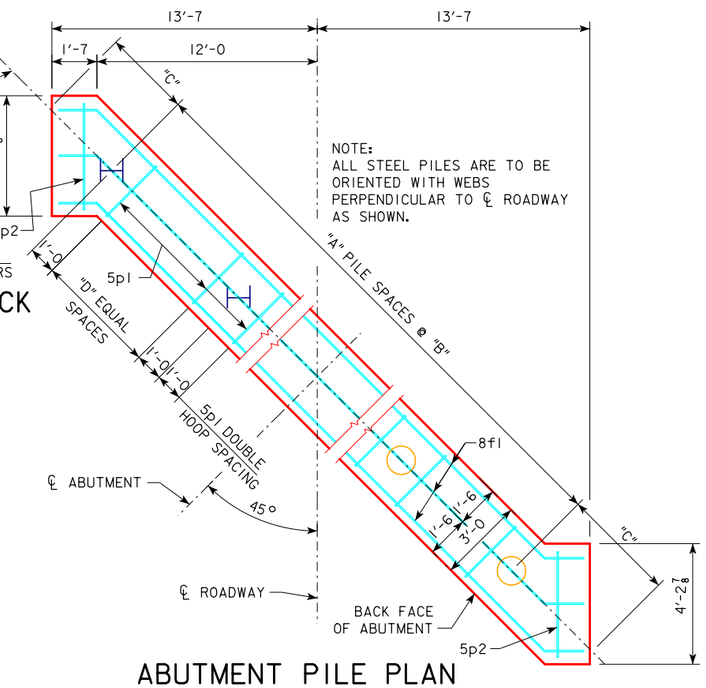
SPACING FOR:
31- 8g1 BACK FACE
24- 8g1 FRONT FACE
25- 8g3 BACK FACE
26- 5k1 & 5k2 BACK FACE

PART SECTION A-A



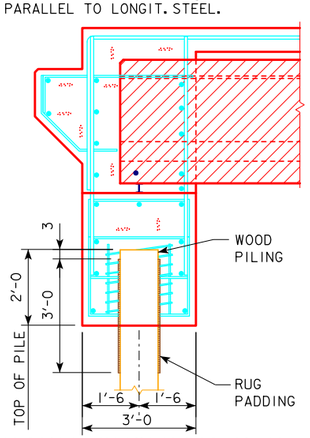
PLAN OF TEMPORARY PAVING BLOCK

NOTE :
LINE PAVING NOTCH WITH TAR PAPER BEFORE PLACING THE TEMPORARY PAVING BLOCK.



NOTE:
ALL STEEL PILES ARE TO BE ORIENTED WITH WEBS PERPENDICULAR TO ℄ ROADWAY AS SHOWN.

ABUTMENT PILE PLAN



PART SECTION B-B

(FOR WOOD PILING)

WOOD PILING NOTE:

AFTER PILES ARE CUT OFF, THE UPPER 3', EXCEPT AS SHOWN, IS TO BE WRAPPED WITH A DOUBLE THICKNESS OF RUG PADDING HELD IN PLACE BY TACKING WITH GALVANIZED ROOFING NAILS AND WRAPPED WITH #14 GAUGE GALVANIZED WIRE AT A 4" PITCH, CARE IS TO BE TAKEN NOT TO DAMAGE PADDING WHEN PLACING CONCRETE. RUG PADDING MAY BE EITHER OF THE FOLLOWING:

(1) HAIR AND JUTE RUG PADDING, RUBBERIZED ON BOTH SIDES, AND WEIGHING NOT LESS THAN 47 OZ. PER SQ. YD.

(2) BONDED URETHANE OR BONDED POLYFOAM WITH A MINIMUM DENSITY OF 5 LBS. PER CU. FT. AND SHALL BE AT LEAST ½ IN. THICK, (MATERIAL LESS THAN ½ IN. IN THICKNESS MAY BE USED, BUT WILL REQUIRE ADDITIONAL WRAPS FOR A TOTAL OF AT LEAST ONE INCH).

ABUTMENT NOTES:

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

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

ABUTMENT PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

BARRIER RAIL NOT SHOWN IN DETAILS.

IF ROCK IS CLOSER THAN 15' BELOW ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.

05-13
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

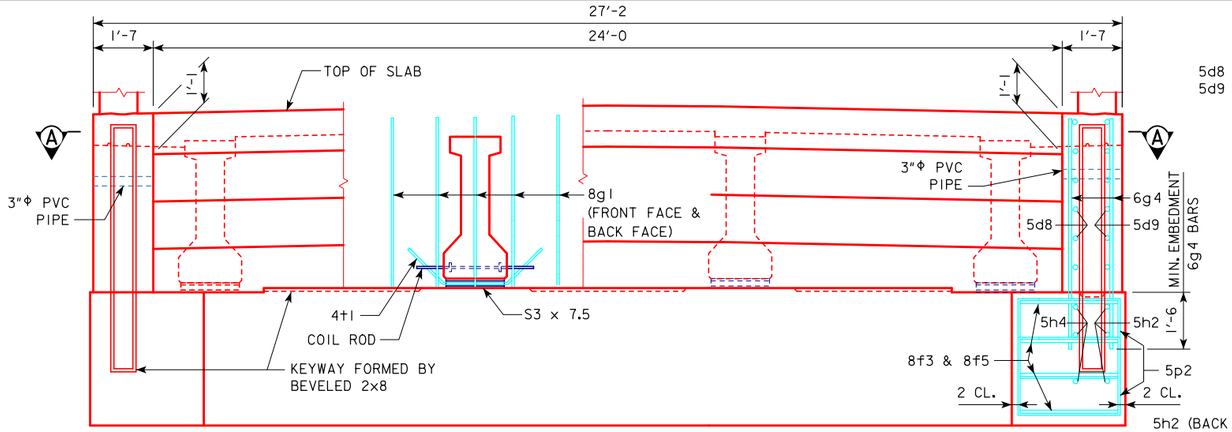
DECEMBER, 2006

ABUTMENT DETAILS

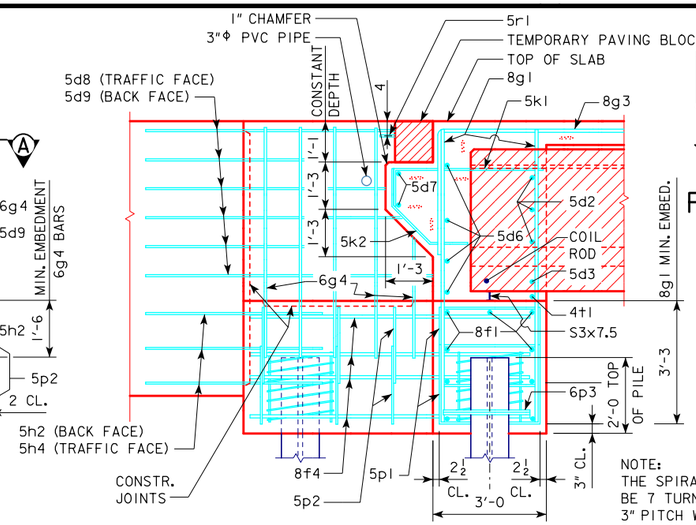
45° SKEW A & B BEAMS

H24-25-06

REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.



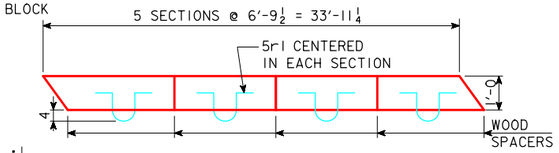
PART REAR ELEVATION AT ABUTMENT



FIELD BEND 5h4 BAR AS NECESSARY TO AVOID PILE IN ABUTMENT WING.

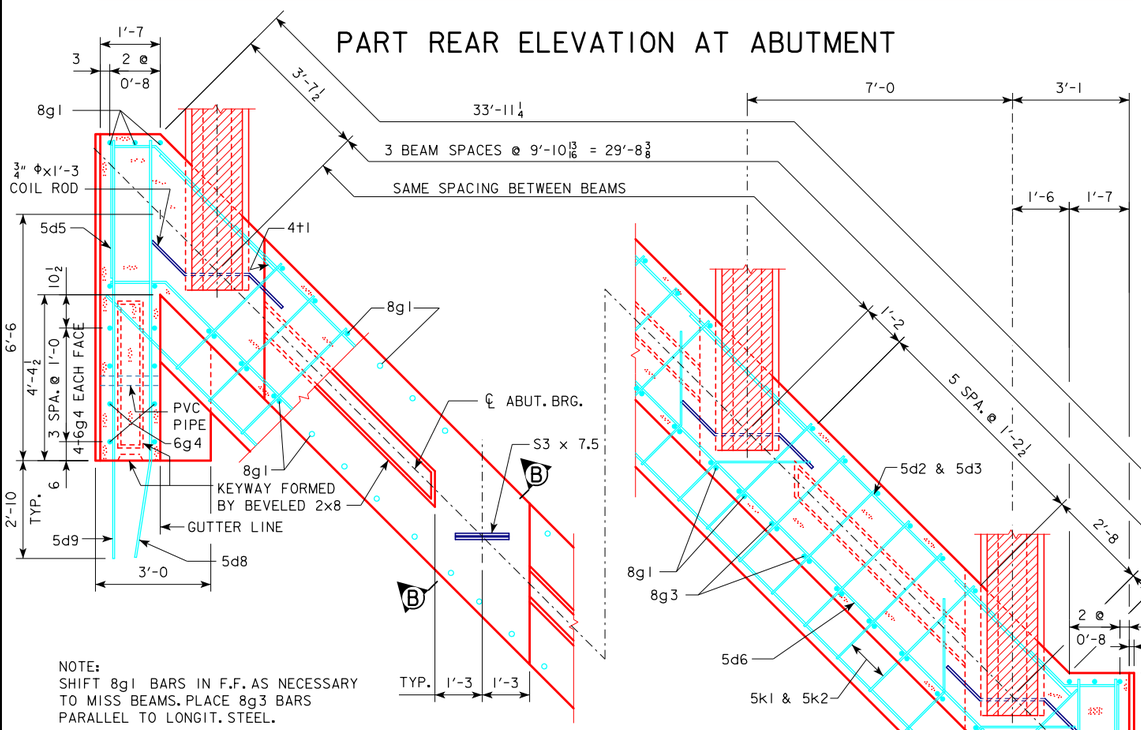
PART SECTION B-B

NOTE:
THE SPIRAL AT THE TOP OF EACH PILE TO BE 7 TURNS OF NO. 2 BAR, 21" DIAMETER, 3" PITCH WITH 3 - L $\frac{7}{8}$ x $\frac{7}{8}$ x $\frac{1}{8}$ SPACERS PUNCHED TO HOLD SPIRAL.



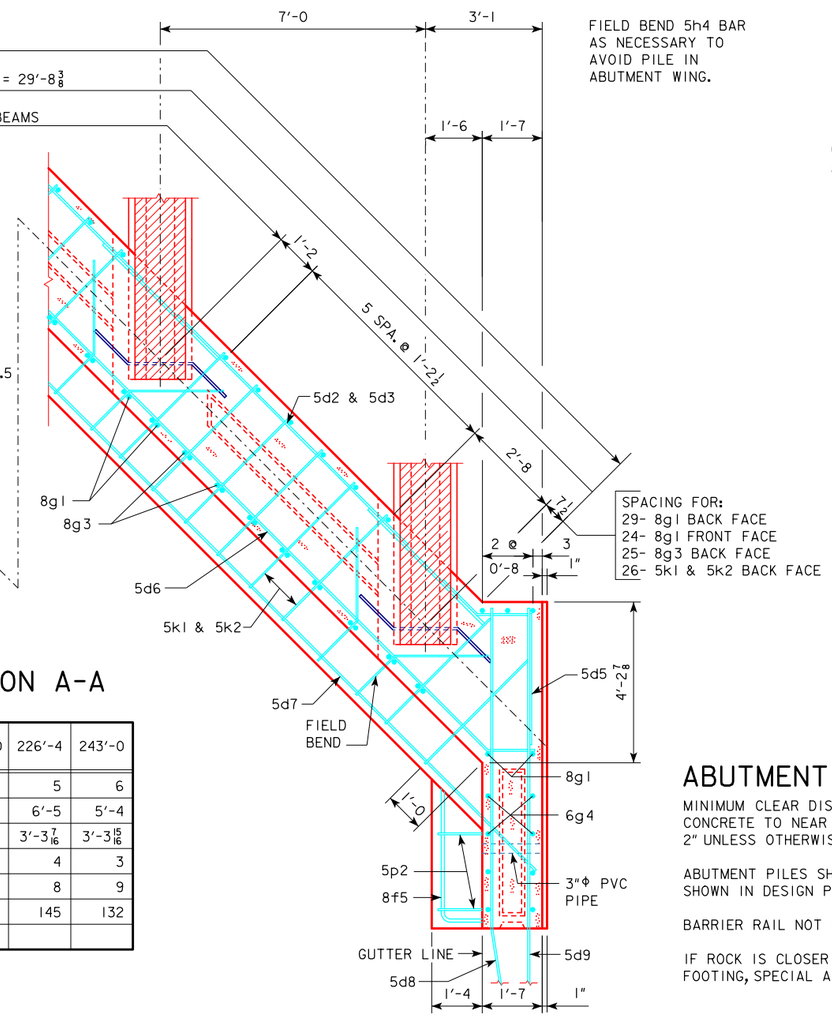
PLAN OF TEMPORARY PAVING BLOCK

NOTE :
LINE PAVING NOTCH WITH TAR PAPER BEFORE PLACING THE TEMPORARY PAVING BLOCK.

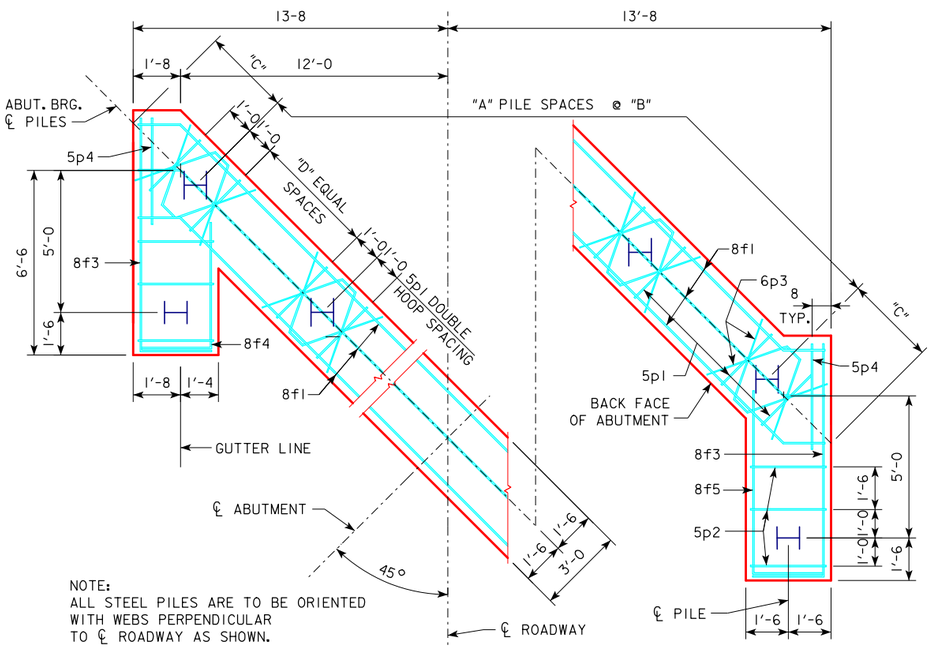


NOTE:
SHIFT 8g1 BARS IN F.F. AS NECESSARY TO MISS BEAMS. PLACE 8g3 BARS PARALLEL TO LONGIT. STEEL.

PART SECTION A-A



SPACING FOR:
29- 8g1 BACK FACE
24- 8g1 FRONT FACE
25- 8g3 BACK FACE
26- 5k1 & 5k2 BACK FACE



NOTE:
ALL STEEL PILES ARE TO BE ORIENTED WITH WEBS PERPENDICULAR TO ℄ ROADWAY AS SHOWN.

ABUTMENT PILE PLAN

ABUTMENT PILE SPACING		℄-℄ ABUT. BRG.	201'-4	213'-10	226'-4	243'-0
WITH STEEL H-PILES	"A" PILE SPACES		5	5	5	6
	"B" (FT. - IN.)		6'-5	6'-5	6'-5	5'-4
	"C" (FT. - IN.)		3'-3 7/16	3'-3 7/16	3'-3 7/16	3'-3 15/16
	"D" EQUAL SPACES		4	4	4	3
	NO. OF PILES PER ABUT.		8	8	8	9
	PU, STRENGTH I DESIGN LOAD (KIPS)		137	141	145	132

NOTE: Pu, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

ABUTMENT NOTES:

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

ABUTMENT PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

BARRIER RAIL NOT SHOWN IN DETAILS.

IF ROCK IS CLOSER THAN 15' BELOW ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.

10-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

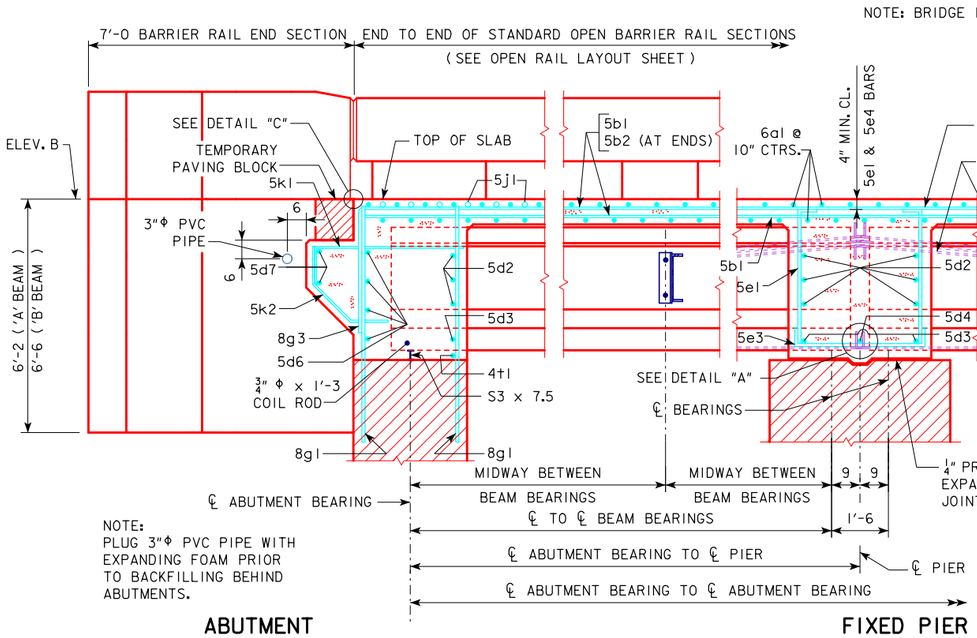
DECEMBER, 2006

ABUTMENT DETAILS

45° SKEW C BEAMS

H24-26-06

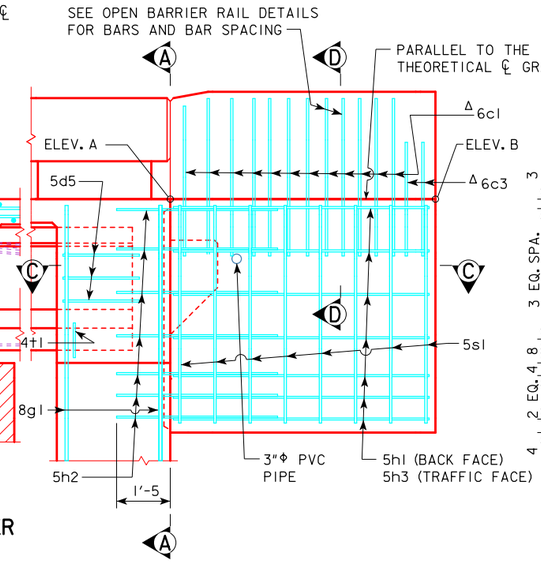
REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 10-2016 - REMOVED SECTION DIRECTORS "C-C" FROM PART SECTION B-B, THEY WERE VOID BECAUSE THERE WAS NO SECTION C-C DETAIL.



NOTE:
PLUG 3"Φ PVC PIPE WITH EXPANDING FOAM PRIOR TO BACKFILLING BEHIND ABUTMENTS.

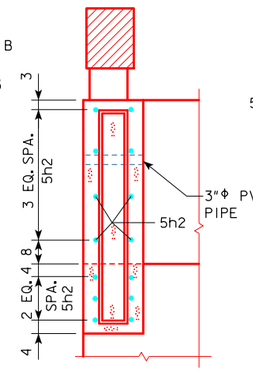
PART LONGITUDINAL SECTION NEAR GUTTER

(FOR DETAILS OF INTERMEDIATE DIAPHRAGM SEE SHEET H24-38-06)

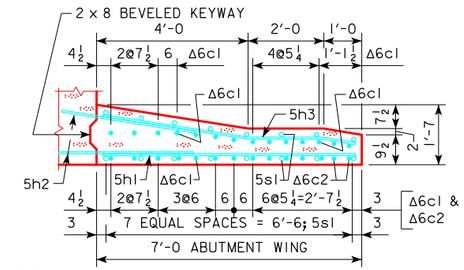


PART END VIEW AT ABUTMENT

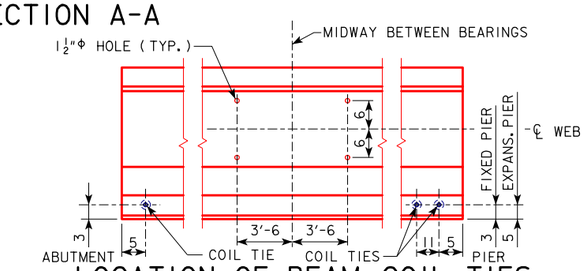
PROVIDE ELEVATIONS A AND B IN THE BRIDGE PLAN SHEETS.



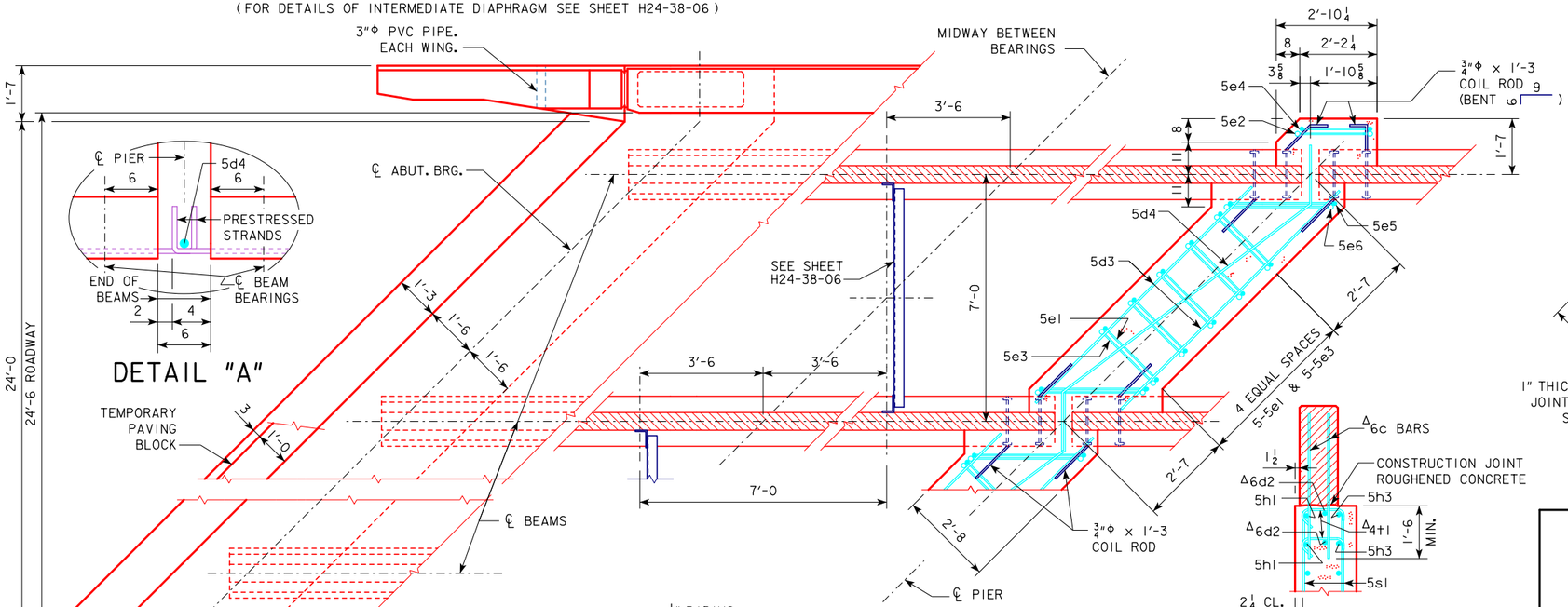
SECTION A-A



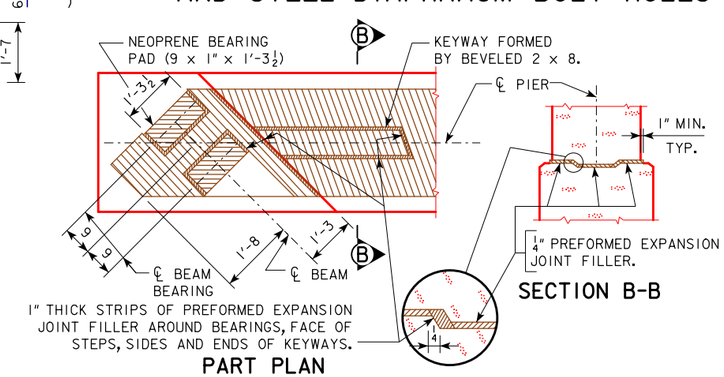
PART SECTION C-C



LOCATION OF BEAM COIL TIES AND STEEL DIAPHRAGM BOLT HOLES



Δ 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.



TOP OF FIXED PIER DETAILS

(SEE SHEET H24-41-06 FOR EXPANSION PIER BEARING DETAILS)

01-10
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

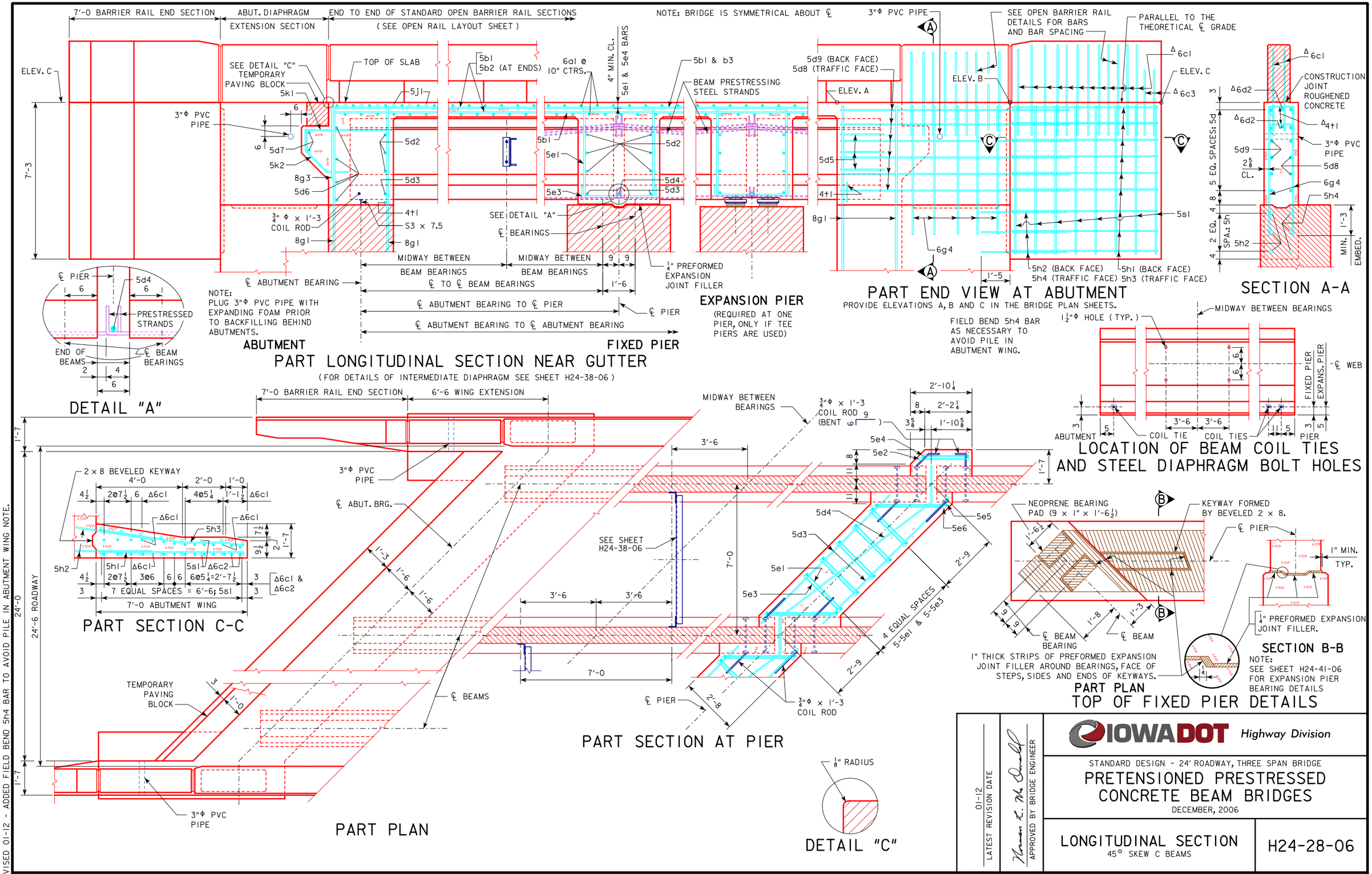
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

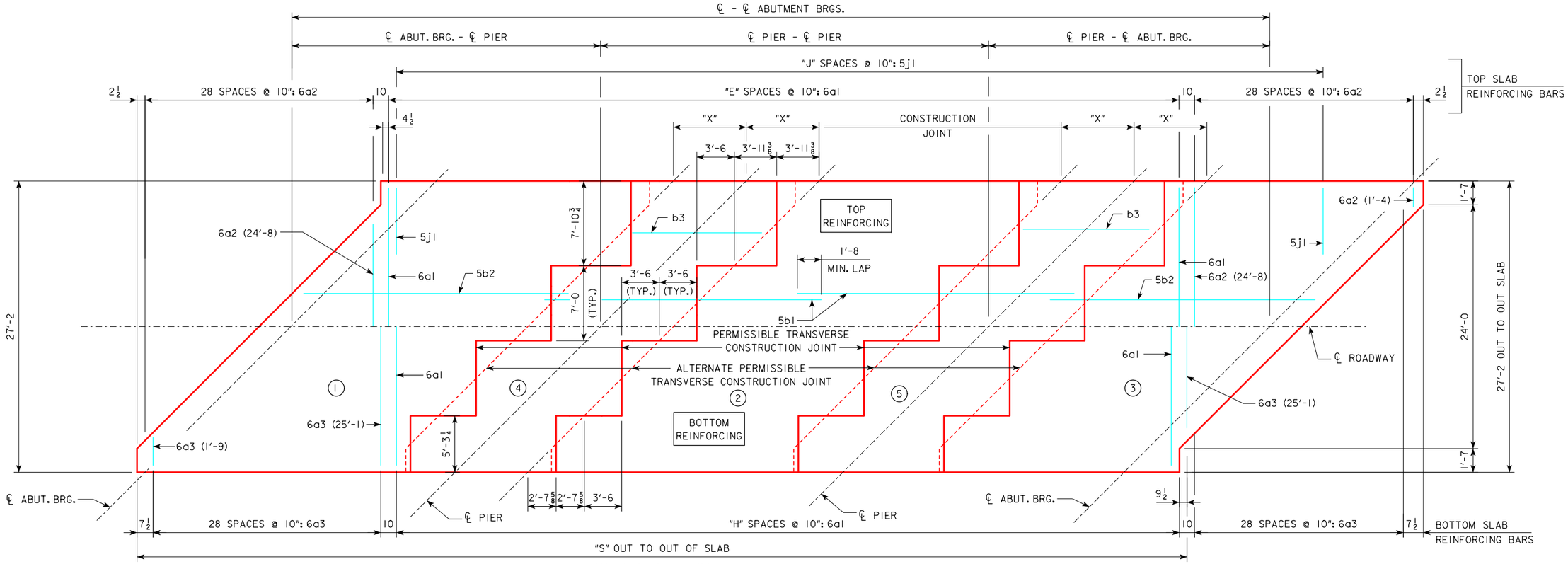
DECEMBER, 2006

LONGITUDINAL SECTION
45° SKEW A & B BEAMS

H24-27-06

CORRECTION 09-10 - MINOR MODIFICATIONS TO PART SECTION C-C.
REVISED 01-10 - ABUT. WINGS SHAPE CHANGED.


7'-0 BARRIER RAIL END SECTION
ABUT. DIAPHRAGM EXTENSION SECTION
END TO END OF STANDARD OPEN BARRIER RAIL SECTIONS (SEE OPEN RAIL LAYOUT SHEET)
NOTE: BRIDGE IS SYMMETRICAL ABOUT ℄
3"Φ PVC PIPE
SEE OPEN BARRIER RAIL DETAILS FOR BARS AND BAR SPACING
PARALLEL TO THE THEORETICAL ℄ GRADE
ELEV. C
SEE DETAIL "C" TEMPORARY PAVING BLOCK
TOP OF SLAB
5b1 5b2 (AT ENDS)
6a1 @ 10" CTRS.
4" MIN. CL.
5e1 & 5e4 BARS
5b1 & b3
BEAM PRESTRESSING STEEL STRANDS
5d9 (BACK FACE) 5d8 (TRAFFIC FACE)
ELEV. A
ELEV. B
ELEV. C
Δ6c1
Δ6c3
5k1
5j1
5d7
5k2
8g3
5d6
5d2
5d3
4t1
S3 x 7.5
8g1
3/4" Φ x 1'-3 COIL ROD
SEE DETAIL "A"
℄ BEARINGS
5b1
5e1
5e3
5d4
5d5
6g4
5s1
5h2 (BACK FACE) 5h4 (TRAFFIC FACE)
5h1 (BACK FACE) 5h3 (TRAFFIC FACE)
1'-5
MIDWAY BETWEEN BEAM BEARINGS
℄ TO ℄ BEAM BEARINGS
℄ ABUTMENT BEARING
℄ ABUTMENT BEARING TO ℄ PIER
℄ ABUTMENT BEARING TO ℄ ABUTMENT BEARING
1/4" PREFORMED EXPANSION JOINT FILLER
℄ PIER
NOTE: PLUG 3"Φ PVC PIPE WITH EXPANDING FOAM PRIOR TO BACKFILLING BEHIND ABUTMENTS.
ABUTMENT
FIXED PIER
PART LONGITUDINAL SECTION NEAR GUTTER
(FOR DETAILS OF INTERMEDIATE DIAPHRAGM SEE SHEET H24-38-06)
EXPANSION PIER
(REQUIRED AT ONE PIER, ONLY IF TEE PIERS ARE USED)
PART END VIEW AT ABUTMENT
PROVIDE ELEVATIONS A, B AND C IN THE BRIDGE PLAN SHEETS.
FIELD BEND 5h4 BAR AS NECESSARY TO AVOID PILE IN ABUTMENT WING.
SECTION A-A
CONSTRUCTION JOINT ROUGHENED CONCRETE
Δ6d2
Δ4t1
5d9
5d8
6g4
5h4
5h2
2 5/8 CL.
5 EQ. SPACES: 5d
2 EQ. SPA.: 5h
MIN. EMBED. 1'-3
℄ PIER
5d4
PRESTRESSED STRANDS
END OF BEAMS
℄ BEAM BEARINGS
DETAIL "A"
7'-0 BARRIER RAIL END SECTION
6'-6 WING EXTENSION
MIDWAY BETWEEN BEARINGS
3/4"Φ x 1'-3 COIL ROD (BENT 6)
2'-10 1/4
2'-2 1/4
1'-10 5/8
5e4
5e2
3'-6
1'-7
24'-0
24'-6 ROADWAY
2 x 8 BEVELED KEYWAY
4'-0
2'-0
1'-0
Δ6c1
5h3
5h1
5s1
Δ6c2
7 EQUAL SPACES = 6'-6; 5s1
7'-0 ABUTMENT WING
Δ6c1 & Δ6c2
PART SECTION C-C
℄ ABUT. BRG.
SEE SHEET H24-38-06
1'-3
1'-6
7'-0
℄ BEAMS
TEMPORARY PAVING BLOCK
3"Φ PVC PIPE
PART PLAN
5d4
5d3
5e1
5e3
5e5
5e6
2'-9
4 EQUAL SPACES 5-5e1 & 5-5e3
℄ PIER
2'-8
3/4"Φ x 1'-3 COIL ROD
PART SECTION AT PIER
1/8" RADIUS
DETAIL "C"
1 1/2"Φ HOLE (TYP.)
MIDWAY BETWEEN BEARINGS
℄ WEB
FIXED PIER
EXPANS. PIER
ABUTMENT
COIL TIE
COIL TIES
PIER
LOCATION OF BEAM COIL TIES AND STEEL DIAPHRAGM BOLT HOLES
NEOPRENE BEARING PAD (9 x 1" x 1'-6 1/2)
KEYWAY FORMED BY BEVELED 2 x 8.
℄ PIER
1" MIN. TYP.
1/4" PREFORMED EXPANSION JOINT FILLER.
℄ BEAM BEARING
℄ BEAM
1" THICK STRIPS OF PREFORMED EXPANSION JOINT FILLER AROUND BEARINGS, FACE OF STEPS, SIDES AND ENDS OF KEYWAYS.
PART PLAN
SECTION B-B
NOTE: SEE SHEET H24-41-06 FOR EXPANSION PIER BEARING DETAILS
TOP OF FIXED PIER DETAILS
REVISED 01-12 - ADDED FIELD BEND 5h4 BAR TO AVOID PILE IN ABUTMENT WING NOTE.
01-12
LATEST REVISION DATE
APPROVED BY BRIDGE ENGINEER
IOWA DOT Highway Division
STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
DECEMBER, 2006
LONGITUDINAL SECTION
45° SKEW C BEAMS
H24-28-06



SLAB LAYOUT

(LEFT AHEAD SKEW SHOWN, RIGHT AHEAD SKEW SIMILAR)

GENERAL DATA

	℄-℄ ABUT. BRG.		138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
VERTICAL CURVE	TOP OF SLAB TO ABUT. CONSTR. JT. AT C.L. ABUT. BRG.	"U"	3'-8	3'-7 7/8	4'-2 7/8	4'-2 7/8	4'-2 7/8	4'-8 1/2	4'-8 11/16	4'-9 1/8	4'-9 1/2
	TOP OF SLAB TO PIER TOP AT C.L. PIER*	"U"	3'-6 3/8	3'-6 5/8	4'-1 3/8	4'-1 9/16	4'-1 15/16	4'-7 5/16	4'-7 5/16	4'-7 9/16	4'-7 9/16
STRAIGHT GRADE	TOP OF SLAB TO ABUT. CONSTR. JT. AT C.L. ABUT. BRG.	"U"	3'-8 1/16	3'-7 7/8	4'-2 15/16	4'-2 15/16	4'-3 1/16	4'-8 3/4	4'-8 7/8	4'-9 3/8	4'-9 15/16
	TOP OF SLAB TO PIER TOP AT C.L. PIER*	"U"	3'-6 5/8	3'-6 13/16	4'-1 5/8	4'-1 7/8	4'-2 5/16	4'-7 3/4	4'-7 3/4	4'-8 1/16	4'-8 1/16
D.L. PIER REACTION (D.L. + F.W.S.) SERVICE LOADS		KIPS	305.3	328.9	375.5	400.5	425.6	506.3	534.2	562.4	589.7
L.L. PIER REACTION (HL93) NO IMPACT SERVICE LOADS		KIPS	207.6	215.3	222.7	229.9	237.0	244.0	253.2	268.2	284.4
NO. OF SPACES FOR 6a1 BARS (TOP)		"E"	142	157	172	187	202	217	232	247	267
NO. OF SPACES FOR 6a1 BARS (BOTTOM)		"H"	141	156	171	186	201	216	231	246	266
NO. OF SPACES FOR 5j1 BARS (TOP)		"J"	164	179	194	209	224	239	254	269	289
OUT TO OUT OF SLAB		"S"	143'-0 7/8	155'-6 7/8	168'-0 7/8	180'-6 7/8	193'-0 7/8	205'-6 7/8	218'-0 7/8	230'-6 7/8	247'-2 7/8
SLAB TRANSVERSE CONSTR. JT. DISTANCE FROM C.L. PIER		"X"	6'-7	7'-1	7'-7	8'-1	8'-8	9'-2	9'-8	10'-2	10'-2

ESTIMATED QUANTITIES
(SUPERSTRUCTURE PLUS INTEGRAL ABUTMENTS)

	℄-℄ ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
STRUCTURAL CONCRETE SUPERSTRUCTURE (INCLUDES ABUT. WINGS)	C.Y.	160.0	169.0	186.6	195.6	204.9	224.8	233.8	243.5	256.2
STRUCTURAL CONCRETE ABUTMENTS (w/ WOOD PILES) ***	C.Y.	29.5	29.5	29.4	29.3	29.3	-----	-----	-----	-----
STRUCTURAL CONCRETE ABUTMENTS (w/ STEEL H PILES) ***	C.Y.	30.8	30.8	30.8	30.8	30.8	37.8	37.8	37.8	37.8
PRETENSIONED PRESTRESSED CONCRETE BEAM, CENTER SPAN	NO.	4-A50	4-A55	4-B59	4-B63	4-B67	4-C71	4-C75	4-C80	4-C80
PRETENSIONED PRESTRESSED CONCRETE BEAM, END SPAN	NO.	8-A42	8-A46	8-B50	8-B55	8-B59	8-C63	8-C67	8-C71	8-C80
CONCRETE RAIL	L.F.	314.2	339.2	364.2	389.2	414.2	456.7	481.7	506.7	540.0
STRUCTURAL STEEL (w/ PILE BENT PIERS)	LB.	2555	2555	2555	2555	2555	2498	2498	2498	2498
STRUCTURAL STEEL (w/ TEE PIERS)	LB.	3272	3272	3272	3272	3272	3344	3344	3344	3344
REINFORCING STEEL (w/ WOOD PILES)	LB.	45,732	48,636	51,540	55,061	57,899	-----	-----	-----	-----
REINFORCING STEEL (w/ STEEL H PILES)	LB.	45,346	48,250	51,548	54,961	57,799	64,417	67,783	70,883	74,744
NO. OF WOOD PILES, TREATED FOR TWO ABUTMENTS	NO.	22	22	24	26	26	-----	-----	-----	-----
NO. OF STEEL H-PILES (HP 10 x 57) FOR TWO ABUTMENTS	NO.	10	10	12	12	12	16	16	16	18
PREBORED HOLES (w/ WOOD PILES)	L.F.	220	220	240	260	260	-----	-----	-----	-----
PREBORED HOLES (w/ STEEL H-PILES)	L.F.	100	100	120	120	120	160	160	160	180

CONCRETE PLACEMENT QUANT.
(SUPERSTRUCTURE PLUS INTEGRAL ABUTMENTS)

	℄-℄ ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
SLAB INCL. HAUNCH, ABUT. DIAPHR., & WINGWALLS** , SECT. 1 & 3	C.Y.	85.7	90.8	101.0	106.1	111.4	124.9	130.2	135.9	148.6
SLAB INCLUDING HAUNCH, SECTION 2	C.Y.	28.4	30.7	33.0	35.3	37.5	39.9	42.1	44.5	44.5
SLAB INCLUDING HAUNCH & PIER DIAPHRAGM, SECTIONS 4 & 5	C.Y.	35.9	37.5	42.2	43.8	45.6	48.8	50.3	51.9	51.9
PAVING BLOCKS	C.Y.	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
ABUTMENT WINGS	C.Y.	7.2	7.2	7.6	7.6	7.6	8.4	8.4	8.4	8.4
ABUTMENT FOOTINGS (w/ WOOD PILES) ***	C.Y.	29.5	29.5	29.4	29.3	29.3	-----	-----	-----	-----
ABUTMENT FOOTINGS (w/ STEEL H PILES) ***	C.Y.	30.8	30.8	30.8	30.8	30.8	37.8	37.8	37.8	37.8

NOTE: CONCRETE DECK SHALL BE PLACED IN SECTIONS AND SEQUENCES INDICATED. ALTERNATE PROCEDURES FOR PLACING DECK CONCRETE MAY BE SUBMITTED FOR APPROVAL TOGETHER WITH A STATEMENT OF THE PROPOSED METHOD AND EVIDENCE THAT THE CONTRACTOR POSSESSES THE NECESSARY EQUIPMENT AND FACILITIES TO ACCOMPLISH THE REQUIRED RESULTS. FOR APPROVED ALTERNATE PROCEDURES THE ENGINEER SHALL DETERMINE IF A RETARDING ADMIXTURE IS REQUIRED TO MAINTAIN PLASTICITY OF THE CONCRETE DECK DURING PLACEMENT.

* VALUES SHOWN ARE FOR FIXED PIERS ONLY AND ALLOW FOR 1/16 INCH DEFLECTION OF THE 1 INCH NEOPRENE BEARING PAD. AT EXPANSION PIER LOCATIONS ADD 3/16 INCHES TO "U" VALUES SHOWN.

** WINGWALLS APPLY ONLY TO BRIDGES USING "C" BEAMS.

*** SEE SHEET H24-31-06 FOR ADDITIONAL CONCRETE REQUIRED IN ABUTMENT FOOTINGS.

07-15
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

SUPERSTRUCTURE DETAILS
45° SKEW

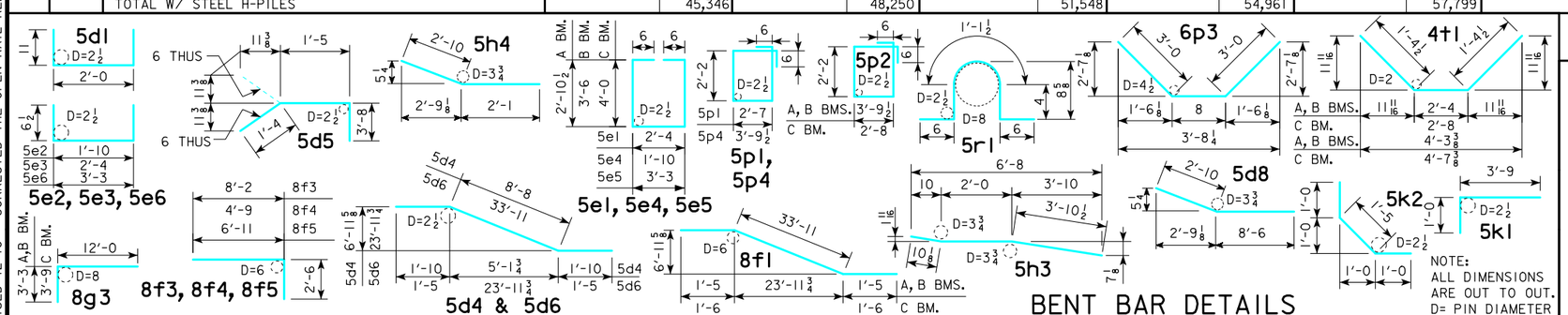
H24-29-06

REVISED 07-2015 - CHANGED CONCRETE PLACEMENT NOTE TO ACCOUNT FOR THE POSSIBLE ADDITION OF A RETARDING ADMIXTURE TO THE CONCRETE.

REINFORCING BAR LIST

ONE SUPERSTRUCTURE AND TWO ABUTMENTS

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT
	℄-℄ ABUT. BRG.		138'-10			151'-4			163'-10			176'-4			188'-10			201'-4			213'-10			226'-4			243'-0					
	℄-℄ BEAM BRG.		42'-6	50'-10	42'-6	46'-8	55'-0	46'-8	50'-10	59'-2	50'-10	55'-0	63'-4	55'-0	59'-2	67'-6	59'-2	63'-4	71'-8	63'-4	67'-6	75'-10	67'-6	71'-8	80'-0	71'-8	80'-0	80'-0	80'-0			
	BEAM SERIES		A BEAM			A BEAM			B BEAM			B BEAM			B BEAM			C BEAM			C BEAM			C BEAM			C BEAM					
6a1	SLAB TRANSV. TOP & BOTT.		285	26'-10	11,487	315	26'-10	12,696	345	26'-10	13,905	375	26'-10	15,114	405	26'-10	16,323	435	26'-10	17,532	465	26'-10	18,741	495	26'-10	19,950	535	26'-10	21,562			
6a2	SLAB TRANSV. TOP ENDS		58	VARIES	1,133	58	VARIES	1,133	58	VARIES	1,133	58	VARIES	1,133	58	VARIES	1,133	58	VARIES	1,133	58	VARIES	1,133	58	VARIES	1,133	58	VARIES	1,133			
6a3	SLAB TRANSV. BOTT. ENDS		58	VARIES	1,169	58	VARIES	1,169	58	VARIES	1,169	58	VARIES	1,169	58	VARIES	1,169	58	VARIES	1,169	58	VARIES	1,169	58	VARIES	1,169	58	VARIES	1,169			
5b1	SLAB LONGITUDINAL, TOP & BOTT.		122	40'-0	5,090	183	40'-0	7,635	183	40'-0	7,635	183	40'-0	7,635	183	40'-0	7,635	244	40'-0	10,180	244	40'-0	10,180	244	40'-0	10,180	305	40'-0	12,725			
5b2	SLAB LONGITUDINAL, TOP & BOTT., ENDS		122	33'-11	4,316	122	21'-0	2,672	122	27'-3	3,467	122	33'-6	4,263	122	39'-9	5,058	122	26'-10	3,414	122	33'-1	4,210	122	39'-4	5,005	122	28'-6	3,627			
6b3	SLAB LONGITUDINAL, TOP @ PIERS		50	12'-10	964	50	13'-10	1,039	50	14'-10	1,114	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
7b3	SLAB LONGITUDINAL, TOP @ PIERS		—	—	—	—	—	—	—	—	—	50	15'-10	1,618	50	17'-0	1,737	50	18'-0	1,840	—	—	—	—	—	—	—	—	—			
8b3	SLAB LONGITUDINAL, TOP @ PIERS		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	19'-0	2,537	50	20'-0	2,670	50	20'-0	2,670			
5d1	PIER DIAPH. ENDS		12	3'-10	48	12	3'-10	48	12	3'-10	48	12	3'-10	48	12	3'-10	48	12	3'-10	48	12	3'-10	48	12	3'-10	48	12	3'-10	48			
5d2	PIER & ABUT. DIAPH. LONGIT.		54	8'-6	479	54	8'-6	479	54	8'-6	479	54	8'-6	479	54	8'-6	479	54	8'-4	469	54	8'-4	469	54	8'-4	469	54	8'-4	469			
5d3	PIER & ABUT. DIAPH. LONGIT.		18	7'-7	142	18	7'-7	142	18	7'-7	142	18	7'-7	142	18	7'-7	142	18	7'-3	136	18	7'-3	136	18	7'-3	136	18	7'-3	136			
5d4	PIER DIAPH. LONGIT.		6	12'-4	77	6	12'-4	77	6	12'-4	77	6	12'-4	77	6	12'-4	77	6	12'-4	77	6	12'-4	77	6	12'-4	77	6	12'-4	77			
5d5	ABUT. DIAPH. ENDS		12	6'-5	80	12	6'-5	80	12	6'-5	80	12	6'-5	80	12	6'-5	80	12	6'-5	80	12	6'-5	80	12	6'-5	80	12	6'-5	80			
5d6	ABUT. DIAPH. LONGIT. B.F.		8	36'-9	307	8	36'-9	307	8	36'-9	307	8	36'-9	307	8	36'-9	307	8	36'-9	307	8	36'-9	307	8	36'-9	307	8	36'-9	307			
5d7	PAVING NOTCH LONGIT.		4	37'-9	157	4	37'-9	157	4	37'-9	157	4	37'-9	157	4	37'-9	157	4	37'-9	157	4	37'-9	157	4	37'-9	157	4	37'-9	157			
5d8	ABUT. DIAPH. WING EXT. LONGIT.		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	24	11'-4	284	24	11'-4	284	24	11'-4	284	24	11'-4	284			
5d9	ABUT. DIAPH. WING EXT. LONGIT.		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	24	11'-3	282	24	11'-3	282	24	11'-3	282	24	11'-3	282			
5e1	PIER DIAPH. HOOPS		30	9'-1	284	30	9'-1	284	30	10'-4	323	30	10'-4	323	30	10'-4	323	30	11'-4	355	30	11'-4	355	30	11'-4	355	30	11'-4	355			
5e2	PIER DIAPH. TIES ENDS		4	2'-11	12	4	2'-11	12	4	2'-11	12	4	2'-11	12	4	2'-11	12	4	2'-11	12	4	2'-11	12	4	2'-11	12	4	2'-11	12			
5e3	PIER DIAPH. TIES		30	3'-5	107	30	3'-5	107	30	3'-5	107	30	3'-5	107	30	3'-5	107	30	3'-5	107	30	3'-5	107	30	3'-5	107	30	3'-5	107			
5e4	PIER DIAPH. HOOPS ENDS		4	8'-7	36	4	8'-7	36	4	9'-10	41	4	9'-10	41	4	9'-10	41	4	10'-10	45	4	10'-10	45	4	10'-10	45	4	10'-10	45			
5e5	PIER DIAPH. HOOPS		12	10'-0	125	12	10'-0	125	12	11'-3	141	12	11'-3	141	12	11'-3	141	12	12'-3	153	12	12'-3	153	12	12'-3	153	12	12'-3	153			
5e6	PIER DIAPH. TIES		12	4'-4	54	12	4'-4	54	12	4'-4	54	12	4'-4	54	12	4'-4	54	12	4'-4	54	12	4'-4	54	12	4'-4	54	12	4'-4	54			
8f1	ABUT. FOOTING LONGIT.		18	36'-9	1,766	18	36'-9	1,766	18	36'-9	1,766	18	36'-9	1,766	18	36'-9	1,766	18	36'-11	1,774	18	36'-11	1,774	18	36'-11	1,774	18	36'-11	1,774			
8f3	ABUT. EXTENSION LONGIT.		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	10'-8	456	16	10'-8	456	16	10'-8	456	16	10'-8	456			
8f4	ABUT. EXTENSION LONGIT.		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	7'-3	155	8	7'-3	155	8	7'-3	155	8	7'-3	155			
8f5	ABUT. EXTENSION LONGIT.		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	9'-5	201	8	9'-5	201	8	9'-5	201	8	9'-5	201			
8g1	ABUT. VERT.		110	5'-7	1,640	110	5'-7	1,640	110	6'-2	1,811	110	6'-2	1,811	110	6'-2	1,811	106	6'-8	1,887	106	6'-8	1,887	106	6'-8	1,887	106	6'-9	1,910			
8g3	ABUT. DIAPH. VERT. B.F.		50	15'-3	2,036	50	15'-3	2,036	50	15'-3	2,036	50	15'-3	2,036	50	15'-3	2,036	50	15'-9	2,103	50	15'-9	2,103	50	15'-9	2,103	50	15'-9	2,103			
6g4	ABUT. DIAPH. WING EXT. VERT.		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	32	6'-0	288	32	6'-0	288	32	6'-1	292	32	6'-1	292			
5h1	ABUT. WING HORIZ. B.F.		28	6'-8	195	28	6'-8	195	28	6'-8	195	28	6'-8	195	28	6'-8	195	36	6'-8	250	36	6'-8	250	36	6'-8	250	36	6'-8	250			
5h2	ABUT. TO WING ANCHOR		56	4'-11	287	56	4'-11	287	56	4'-11	287	56	4'-11	287	56	4'-11	287	12	4'-11	62	12	4'-11	62	12	4'-11	62	12	4'-11	62			
5h3	ABUT. WING HORIZ. TRAFFIC FACE		28	6'-9	197	28	6'-9	197	28	6'-9	197	28	6'-9	197	28	6'-9	197	36	6'-9	253	36	6'-9	253	36	6'-9	253	36	6'-9	253			
5h4	ABUT. TO WING ANCHOR		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12	4'-11	62	12	4'-11	62	12	4'-11	62	12	4'-11	62			
5j1	TOP OF SLAB TRANSV. (AT RAIL)		330	6'-3	2,151	360	6'-3	2,347	390	6'-3	2,542	420	6'-3	2,738	450	6'-3	2,933	480	6'-3	3,129	510	6'-3	3,325	540	6'-3	3,520	580	6'-3	3,781			
5k1	PAVING NOTCH		52	4'-9	258	52	4'-9	258	52	4'-9	258	52	4'-9	258	52	4'-9	258	52	4'-9	258	52	4'-9	258	52	4'-9	258	52	4'-9	258			
5k2	PAVING NOTCH		52	3'-5	185	52	3'-5	185	52	3'-5	185	52	3'-5	185	52	3'-5	185	52	3'-5	185	52	3'-5	185	52	3'-5	185	52	3'-5	185			
5p1	ABUTMENT HOOPS (WOOD/STEEL)		120/96	10'-6	1314/1051	120/96	10'-6	1314/1051	88/100	10'-6	964/1095	96/100	10'-6	1051/1095	96/100	10'-6	1051/1095	108	10'-6	1,183	108	10'-6	1,183	108	10'-6	1,183	104	10'-6	1,139			
5p2	ABUTMENT HOOPS		8	12'-11	108	8	12'-11	108	8	12'-11	108	8	12'-11	108	8	12'-11	108	24	10'-8	267	24	10'-8	267	24	10'-8	267	24	10'-8	267			
6p3	ABUT. BOTT. AT PILES		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	24	6'-8	240	24	6'-8	240	24	6'-8	240	28	6'-8	280			
5p4	ABUT. HOOPS AT ENDS		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	12'-11	108	8	12'-11	108	8	12'-11	108	8	12'-11	108			
5r1	PAVING BLOCK LIFTING LOOPS		10	2'-10	30	10	2'-10	30	10	2'-10	30	10	2'-10	30	10	2'-10	30	10	2'-10	30	10	2'-10	30	10	2'-10	30	10	2'-10	30			
5s1	WING VERT.		64	5'-10	389	64	5'-10	389	64	6'-2	412	64	6'-2	412	64	6'-2	412	64	6'-11	462	64	6'-11	462	64	6'-11	462	64	6'-11	462			
4t1	UNDER BEAMS AT ABUTMENTS		8	5'-1	27	8	5'-1	27	8	5'-1	27	8	5'-1	27	8	5'-1	27	8	5'-5	29	8	5'-5	29	8	5'-5	29	8	5'-5	29			
#2	PILE SPIRAL (WOOD/STEEL)		22/10	38'-6	141/64	22/10	38'-6	141/64	24/12	38'-6	154/77	26/12	38'-6	167/77	26/12	38'-6	167/77	16	38'-6	103	16	38'-6	103	16	38'-6	103	18	38'-6	116			
	SPIRAL SPACERS, L 7/8 x 7/8 x 1/8 x 0.70 (WOOD/STL.)		66/30	1'-10	85/39	66/30	1'-10	85/39	72/36	1'-10	92/46	78/36	1'-10	100/46	78/36	1'-10	100/46	48	1'-10	62	48	1'-10	62	48	1'-10	62	54	1'-10	69			
	OPEN RAIL				8,856			9,379			10,085			10,793			11,313			13,036			13,504			14,268			15,050			
	TOTAL W/ WOOD PILES				45,732			48,636			51,540			55,061			57,899			—			—			—			—			
	TOTAL W/ STEEL H-PILES				45,346			48,250			51,548			54,961			57,799			64,417			67,783			70,883			74,744			



BENT BAR DETAILS

12-10
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

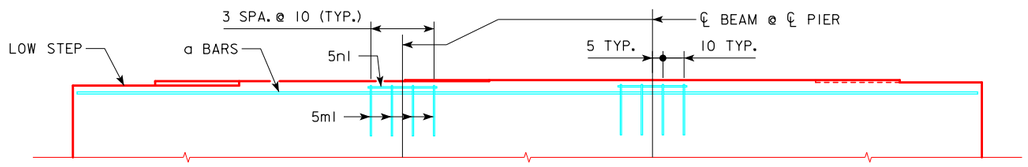
DECEMBER, 2006

DECK & ABUTMENT REINF.

45° SKEW

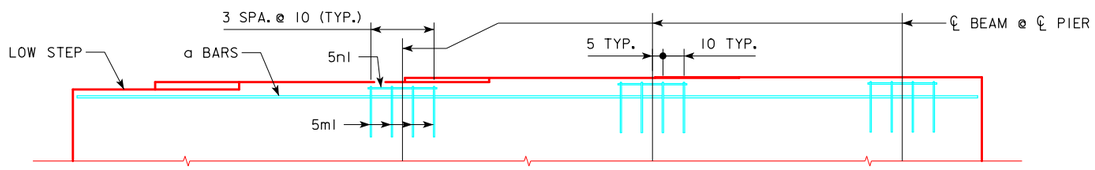
H24-30-06

REVISED 12-10 - CORRECTED THE OPEN RAIL REBAR QUANTITIES FOR THE 201'-4, 213'-10, 226'-4, & 243'-0 BRIDGE LENGTHS.



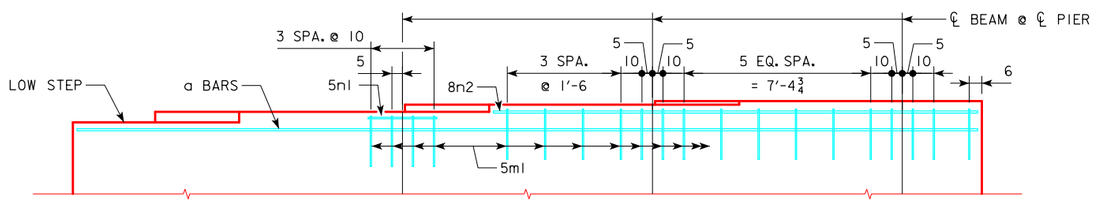
PART ELEVATION VIEW OF PIER CAP

GRADE (G): G <= 0.6%



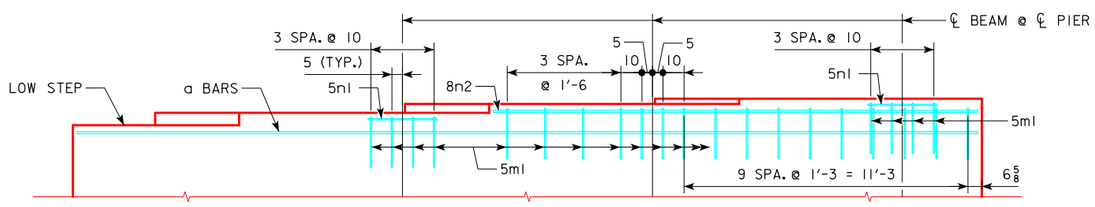
PART ELEVATION VIEW OF PIER CAP

GRADE (G): 0.6% < G <= 2.3%



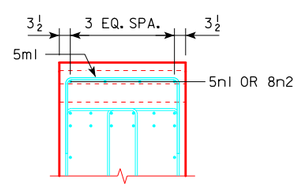
PART ELEVATION VIEW OF PIER CAP

GRADE (G): 2.3% < G <= 4.0%



PART ELEVATION VIEW OF PIER CAP

GRADE (G): 4.0% < G <= 5.0%



TYPICAL SECTION

STEP REINFORCING BAR LIST
ONE TEE PIER

			G <= 0.6%			0.6% < G <= 2.3%			2.3% < G <= 4.0%			4.0% < G <= 5.0%		
BAR	LENGTH	SHAPE	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
5m1	7'-0		8	5	58	12	5	88	20	5	146	24	5	175
5n1	2'-8		8	5	22	12	5	33	4	5	11	8	5	22
*8n2	VARIES		--	--	--	--	--	--	4	8	221	4	8	221
TOTAL (LB.)					80			121			378			418

G = GRADE (%)

*8n2 BARS VARY FROM 19'-4 TO 22'-1

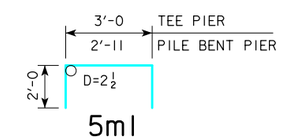
STEP REINFORCING BAR LIST
ONE PILE BENT PIER

			G <= 0.6%			0.6% < G <= 2.3%			2.3% < G <= 4.0%			4.0% < G <= 5.0%		
BAR	LENGTH	SHAPE	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
5m1	6'-11		8	5	58	12	5	87	20	5	144	24	5	173
5n1	2'-8		8	5	22	12	5	33	4	5	11	8	5	22
*8n2	VARIES		--	--	--	--	--	--	4	8	221	4	8	221
TOTAL (LB.)					80			120			376			416

G = GRADE (%)

*8n2 BARS VARY FROM 19'-4 TO 22'-0

BENT BAR DETAILS



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

NOTES:

THE TABLE BELOW LISTS THE ADDITIONAL CONCRETE VOLUME REQUIRED IN EACH ABUTMENT FOOTING/PIER CAP BASED ON THE ROADWAY GRADE AT EACH ABUTMENT FOOTING/PIER CAP. ADDITIONAL CONCRETE SHOULD BE ADDED TO THE PLANS FOR EACH ABUTMENT FOOTING/PIER CAP THAT HAS 0.5 CU. YDS. OR MORE OF ADDITIONAL CONCRETE. VALUES IN THE TABLE BELOW HAVE BEEN EXCLUDED FOR SCENARIOS THAT HAVE LESS THAN 0.5 CU. YDS. OF ADDITIONAL CONCRETE PER SUBSTRUCTURE UNIT. VALUES MAY BE INTERPOLATED FOR GRADES BETWEEN THE VALUES SHOWN IN THE TABLE.

ADDITIONAL CONCRETE VOLUME PER SUBSTRUCTURE UNIT (C.Y.)

	ROADWAY GRADE AT SUBSTRUCTURE UNIT				
	1%	2%	3%	4%	5%
EACH ABUTMENT FOOTING					
A, B BEAMS	-----	0.8	1.2	1.7	2.1
C BEAMS	-----	1.0	1.5	2.1	2.6
EACH TEE PIER CAP - ALL BEAMS	-----	0.8	1.4	1.9	2.5
EACH PILE BENT PIER - ALL BEAMS	-----	0.8	1.4	1.9	2.4

LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

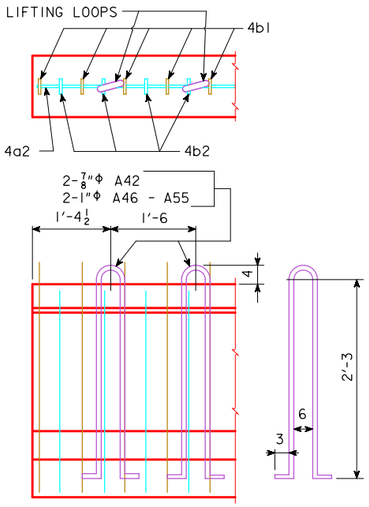
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

ADDITIONAL QUANTITIES

45° SKEW

H24-31-06



LIFTING LOOP DETAIL

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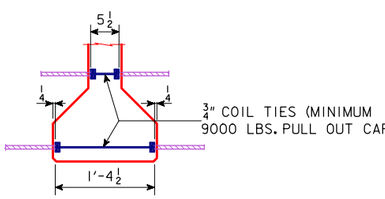
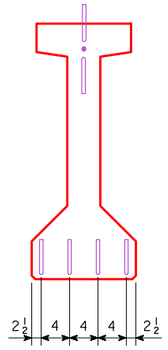
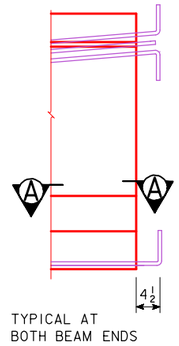


COIL TIE DETAIL

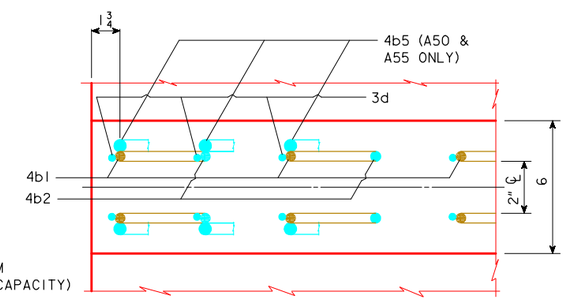
NUMBER AND EXACT LOCATION OF COIL TIES TO BE AS DETAILED ON SPECIFIC BRIDGE DESIGN.



2 TOP DEFLECTED OR STRAIGHT STRANDS ARE TO BE CUT WITH 1'-0 PROJECTIONS AND SHOP BENT UP OR DOWN AS SHOWN (BEND TOP AND BOTTOM ROWS). THE REMAINING TOP STRANDS ARE TO BE CUT WITH 0'-3 PROJECTIONS.
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.



STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS



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

A BEAM DATA

BEAM	SPAN LENGTH ℄-℄ BEARING	OVERALL BEAM LENGTH (L)	STRAND SIZE	NO. OF STRANDS		TOTAL INITIAL PRESTRESS ③ KIPS	HOLD DOWN FORCE-KIPS	CAMBER (in.)				DEFLECTION (in.) Δ_D				PERMISSIBLE SPACING				WEIGHT (TONS)		CONCRETE (C. Y.)	REINFORCING STEEL-(lb)
								AT RELEASE		AFTER LOSSES		IMMEDIATE① (ELASTIC) Δ_I		TIME ② (PLASTIC) Δ_T				HL93 LOADING					
				STRAIGHT	DEFLECTED							CONC. DIAPH.	STEEL DIAPH.	CONC. DIAPH.	STEEL DIAPH.			CONC. DIAPH.	STEEL DIAPH.				
A42	42'-6	43'-6	0.6"	7	2	383	9.3	0.70		1.24		0.38	0.35	0.09	0.09			7'-6	7'-6	7.1		3.49	452
*A46	46'-8	47'-8	0.6"	8	2	426	8.5	0.76		1.35		0.50	0.47	0.13	0.12			7'-6	7'-6	7.7		3.82	488
*A50	50'-10	51'-10	0.6"	9	3	510.9	11.7	1.02		1.82		0.69	0.65	0.17	0.16			7'-6	7'-6	8.4		4.15	503
*A55	55'-0	56'-0	0.6"	10	3	553.4	10.8	1.29		2.30		0.94	0.88	0.23	0.22			7'-6	7'-6	9.1		4.49	547

① DEFLECTIONS AT MID-SPAN DUE TO WEIGHT OF SLAB AND DIAPHRAGM. THE DEFLECTIONS SHOWN ARE FOR A SLAB WEIGHT OF 757 #/FT. (8" SLAB AND 7'-6 BEAM SPACING) AND ONE CONCRETE DIAPHRAGM (1912 #) OR ONE STEEL DIAPHRAGM (285 #) AT ℄ OF SPAN. FOR DIFFERENT SLAB AND DIAPHRAGM WEIGHTS, DEFLECTIONS WILL BE DIRECTLY PROPORTIONAL.

② DEFLECTIONS DUE TO THE COMBINED EFFECT OF CREEP DUE TO WEIGHT OF SLAB AND SHRINKAGE OF SLAB.

TOTAL BEAM DEFLECTIONS AT ℄ OF SPAN, Δ_D, DUE TO WEIGHT OF SLAB AND DIAPHRAGMS FOR DETAILING PURPOSE:
(A) $\Delta_D = \Delta_I + \Delta_T$ FOR SIMPLE SPAN.
(B) $\Delta_D = \Delta_I + \frac{3}{4}\Delta_T$ FOR END SPANS OF CONTINUOUS BRIDGE.
(C) $\Delta_D = \Delta_I + \frac{1}{2}\Delta_T$ FOR INTERIOR SPANS OF CONTINUOUS BRIDGE.

③ TOTAL INITIAL PRESTRESS IS BASED ON 72.6% f's, f's = 270 ksi AND As = 0.217 sq. in.

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

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.

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.

CONCRETE IN ACCORDANCE WITH SECTION 5, f'c = 5000 psi (EXCEPT AS NOTED)

PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 5, f's = 270,000 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 ARE TO BE STRUCK OFF LEVEL AND FINSHED AS PER MATERIALS IM570.

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 AND PIER DIAPHRAGMS SHALL BE ROUGHENED FOR A DISTANCE OF 10" FROM THE BEAM END BY SANDBLASTING OR OTHER APPROVED METHODS TO PROVIDE SUITABLE BOND BETWEEN THE BEAM AND THE DIAPHRAGM IN ACCORDANCE WITH ARTICLE 2403.03, I, OF THE STANDARD SPECIFICATIONS.

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

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.

IF SOLE PLATE IS REQUIRED FOR BEARING, SOLE PLATE IS TO BE SET IN FORMS WHEN BEAM IS CAST AND FORMED OUT BELOW TO EXCLUDE CONCRETE AS DETAILED ON THE BEARING SHEET.

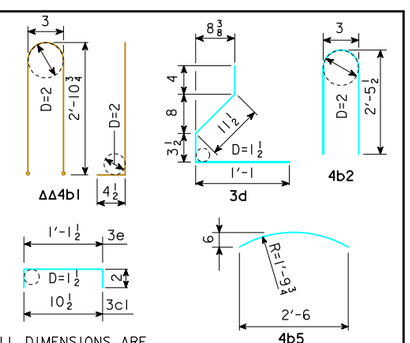
0.6" DIAMETER STRANDS STRESSED TO NOT MORE THAN 5,000 LBS. EACH MAY BE USED IN LIEU OF THE a BARS WHICH RUN THE FULL LENGTH OF THE BEAM IN THE TOP FLANGE.

REINFORCING BAR LIST

	BEAM / SPAN		A42 42'-6		A46 46'-8		A50 50'-10		A55 55'-0	
	BAR	SHAPE	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
	5a1		4	22'-10	4	24'-11	4	27'-0	4	29'-1
	4a2		2	3'-3	2	3'-3	2	3'-3	2	3'-3
ΔΔ	4b1		40	6'-8	44	6'-8	46	6'-8	50	6'-8
	4b2		12	5'-0	12	5'-0	8	5'-0	8	5'-0
	4b5		—	—	—	—	8	2'-9	12	2'-9
	3c1		40	1'-3	44	1'-3	46	1'-3	50	1'-3
**	3d		104	2'-8	112	2'-8	108	2'-8	116	2'-8
	3e		20	1'-6	20	1'-6	18	1'-6	18	1'-6

ΔΔ 4b1 BARS TO BE EPOXY COATED.

** WHERE DEFLECTING STRANDS INTERFERE WITH PLACEMENT, SOME IN-PLACE BENDING MAY BE NECESSARY.



ALL DIMENSIONS ARE OUT TO OUT.
RADIUS TO ℄ BAR.
D = PIN DIAMETER.

01-10
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

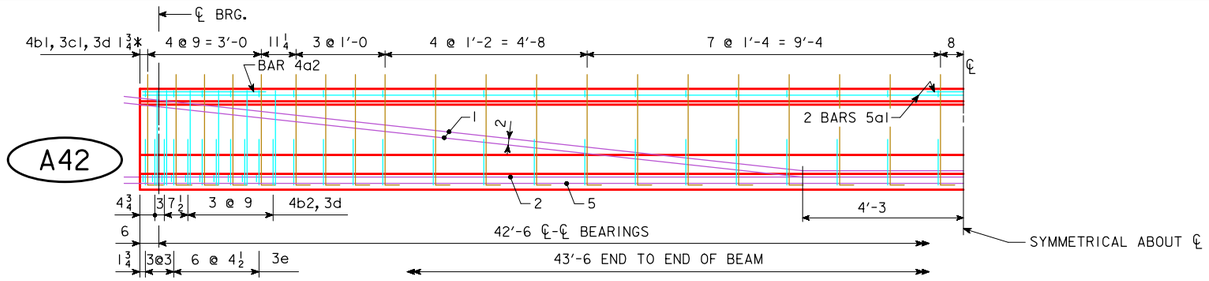
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

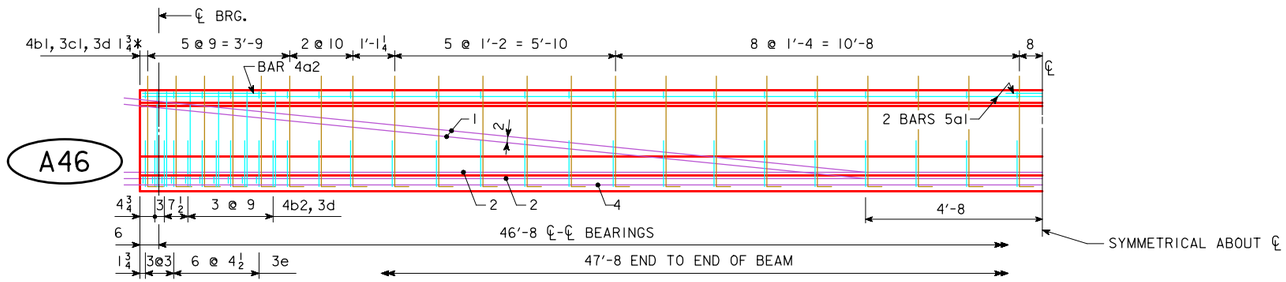
DECEMBER, 2006

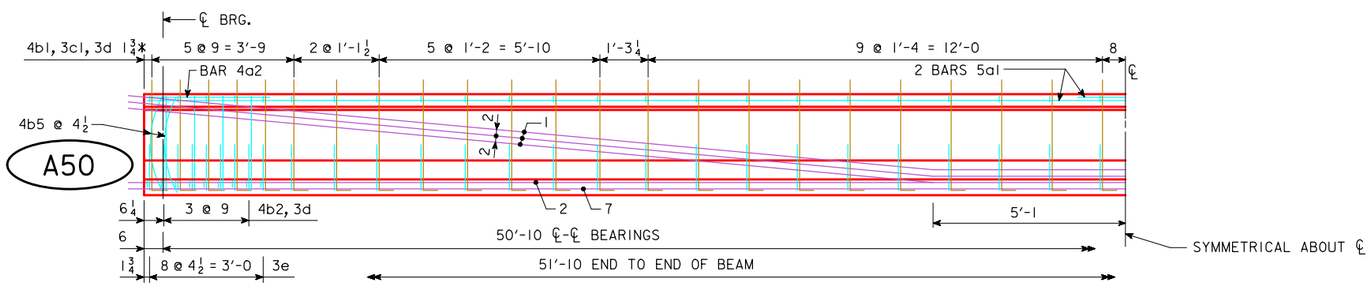
A BEAM DETAILS

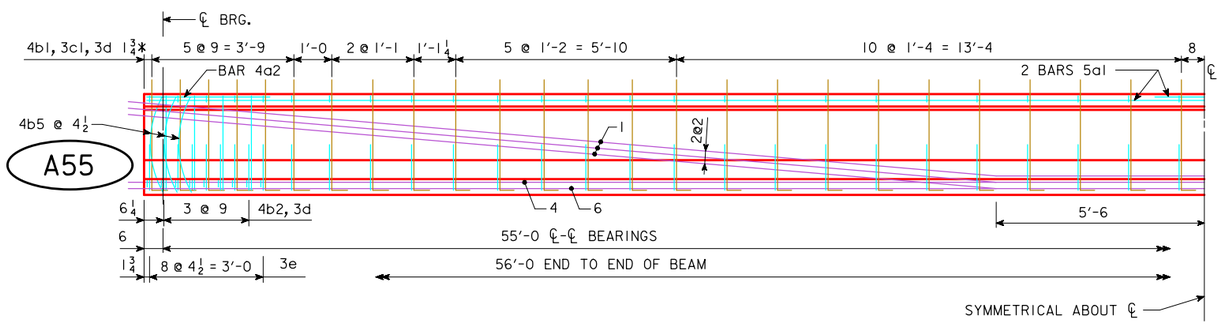
H24-32-06

REVISED 01-10 - THE SPECIFICATION REFERENCES WERE CHANGED. THE BEAM DATA WAS UPDATED TO THE CURRENT BEAMS.

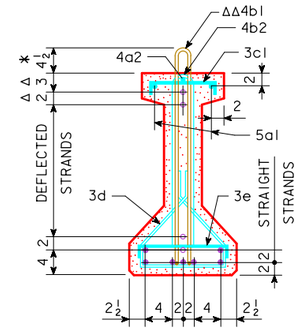




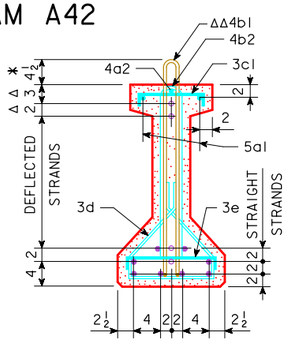




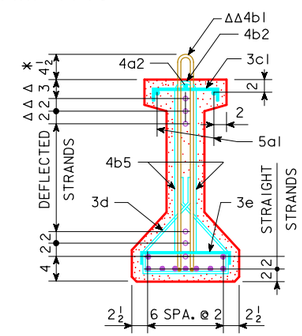
NOTE: DIMENSIONS FOR THE LOCATION OF THE DEFLECTED STRANDS ARE AT ℄ BEAM AND END OF BEAM.



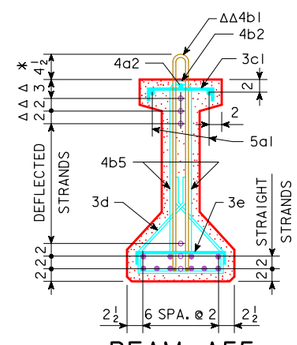
BEAM A42



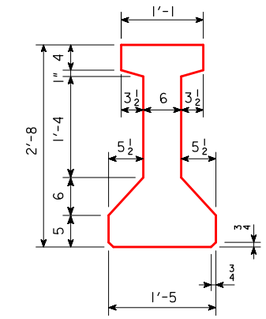
BEAM A46



BEAM A50



BEAM A55



"A" BEAM CROSS SECTION

A = 311.5 in²
Y_b = 14.05 in.
I = 34,082 in.⁴

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

○ DEFLECTED STRANDS
* KEEP
Δ DIMENSIONS AT END OF BEAM
ΔΔ EPOXY COATED BARS

01-10
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DECEMBER, 2006

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H24-33-06

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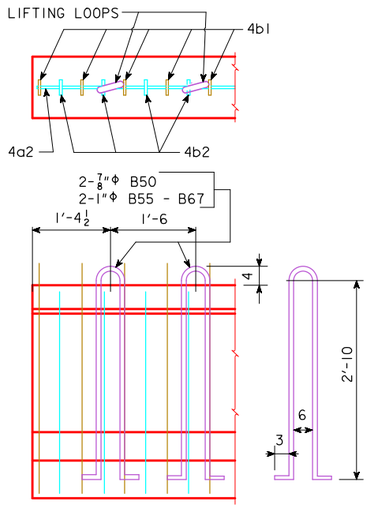

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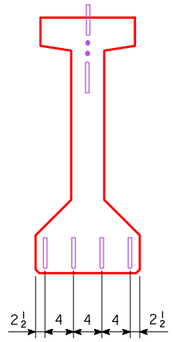

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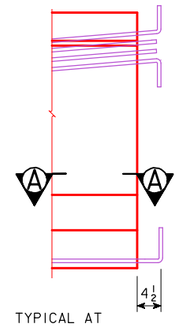
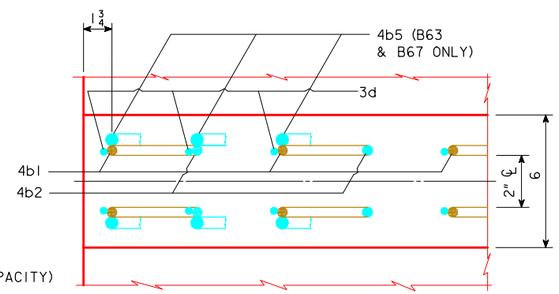
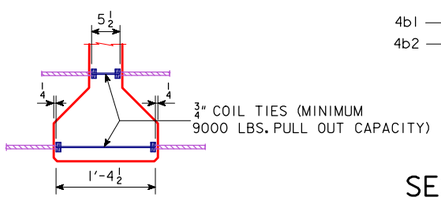


TYPICAL AT BOTH BEAM ENDS.

STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS



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



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B BEAM DATA

BEAM	SPAN LENGTH ℄-℄ BEARING	OVERALL BEAM LENGTH (L)	STRAND SIZE DIA. (inches)	NO. OF STRANDS		TOTAL INITIAL PRESTRESS KIPS ③	HOLD DOWN FORCE-KIPS	CAMBER (in.)				DEFLECTION (in.) Δ_D				PERMISSIBLE SPACING				WEIGHT (TONS)		CONCRETE (C. Y.)	REINFORCING STEEL-(lb)
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B50	50'-10	51'-10	0.60	8	2	425	10.8	0.67		1.24		0.43	0.39	0.11	0.10			7'-6	7'-6	10.3		5.10	607
*B55	55'-0	56'-0	0.60	8	3	468	14.1	0.85		1.51		0.58	0.54	0.14	0.13			7'-6	7'-6	11.2		5.51	635
*B59	59'-2	60'-2	0.60	10	3	554	13.2	1.12		1.99		0.82	0.77	0.21	0.19			7'-6	7'-6	12.0		5.92	680
*B63	63'-4	64'-4	0.60	12	3	639	12.3	1.30		2.32		0.91	0.84	0.23	0.21			7'-6	7'-6	12.8		6.33	733
*B67	67'-6	68'-6	0.60	14	3	724	11.6	1.69		2.98		1.16	1.09	0.29	0.27			7'-6	7'-6	13.6		6.74	778

① DEFLECTIONS AT MID-SPAN DUE TO WEIGHT OF SLAB AND DIAPHRAGM. THE DEFLECTIONS SHOWN ARE FOR A SLAB WEIGHT OF 757 #/FT. (8" SLAB AND 7'-6 BEAM SPACING) AND ONE CONCRETE DIAPHRAGM (2270 #) OR ONE STEEL DIAPHRAGM (285 #) AT ℄ OF SPAN. FOR DIFFERENT SLAB AND DIAPHRAGM WEIGHTS, DEFLECTIONS WILL BE DIRECTLY PROPORTIONAL.

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BEARINGS SHALL BE AS DETAILED ON OTHER DESIGN SHEETS.

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THE PORTIONS OF THE PRESTRESS BEAMS THAT ARE TO BE EMBEDDED IN THE ABUTMENT AND PIER DIAPHRAGMS SHALL BE ROUGHENED FOR A DISTANCE OF 10" FROM THE BEAM END BY SANDBLASTING OR OTHER APPROVED METHODS TO PROVIDE SUITABLE BOND BETWEEN THE BEAM AND THE DIAPHRAGM IN ACCORDANCE WITH ARTICLE 2403.14 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.

IF SOLE PLATE IS REQUIRED FOR BEARING, SOLE PLATE IS TO BE SET IN FORMS WHEN BEAM IS CAST AND FORMED OUT BELOW TO EXCLUDE CONCRETE AS DETAILED ON THE BEARING SHEET.

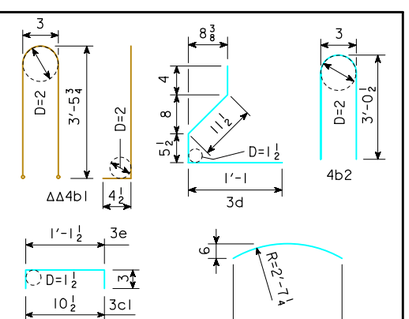
0.6" DIAMETER STRANDS STRESSED TO NOT MORE THAN 5,000 LBS. EACH MAY BE USED IN LIEU OF THE a BARS WHICH RUN THE FULL LENGTH OF THE BEAM IN THE TOP FLANGE.

ΔΔ4b1 BARS TO BE EPOXY COATED.

** WHERE DEFLECTING STRANDS INTERFERE WITH PLACEMENT, SOME IN-PLACE BENDING MAY BE NECESSARY.

REINFORCING BAR LIST

	BEAM / SPAN		B50 / 50'-10		B55 / 55'-0		B59 / 59'-2		B63 / 63'-4		B67 / 67'-6	
	BAR	SHAPE	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
	6a1		4	27'-3	4	29'-4	4	31'-5	4	33'-6	4	35'-7
	4a2		2	4'-2	2	4'-2	2	4'-2	2	4'-2	2	4'-2
ΔΔ	4b1		44	7'-10	46	7'-10	50	7'-10	52	7'-10	56	7'-10
	4b2		12	6'-2	12	6'-2	12	6'-2	12	6'-2	12	6'-2
	4b5		—	—	—	—	—	—	12	3'-3	12	3'-3
	3c1		44	1'-5	46	1'-5	50	1'-5	52	1'-5	56	1'-5
**	3d		112	2'-10	116	2'-10	124	2'-10	128	2'-10	136	2'-10
	3e		24	1'-8	24	1'-8	24	1'-8	24	1'-8	24	1'-8



ALL DIMENSIONS ARE OUT TO OUT.
RADIUS TO ℄ BAR.
D = PIN DIAMETER.

01-10
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

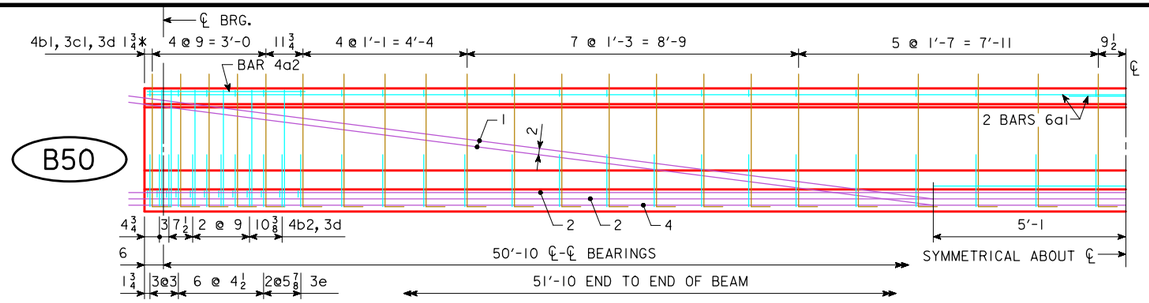
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

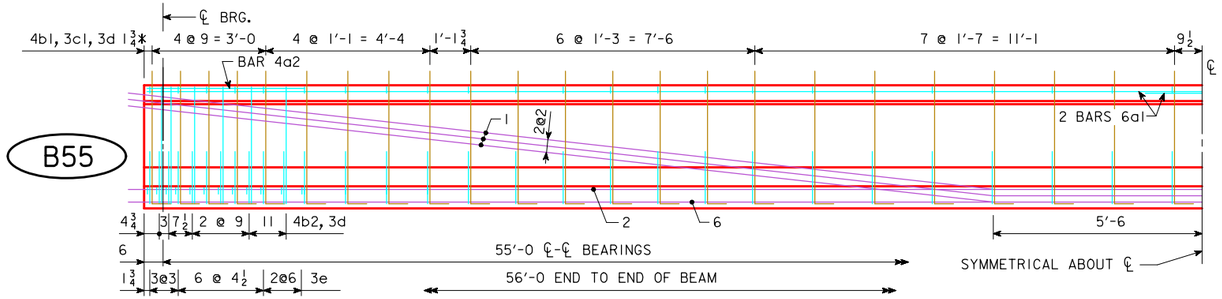
DECEMBER, 2006

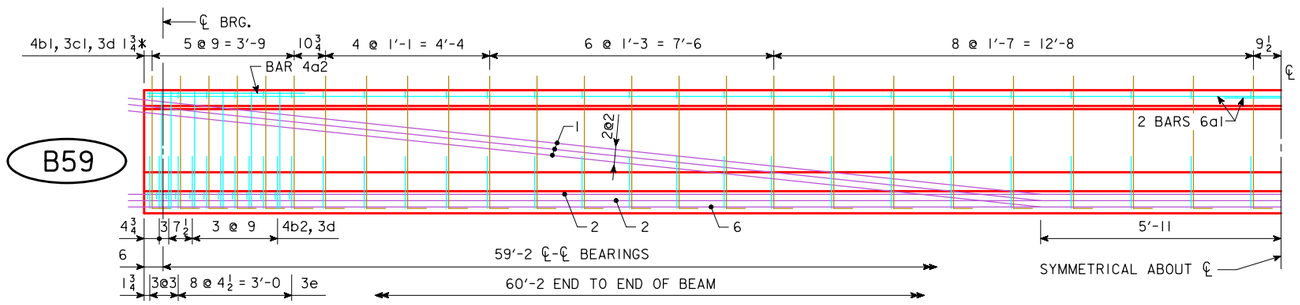
B BEAM DETAILS

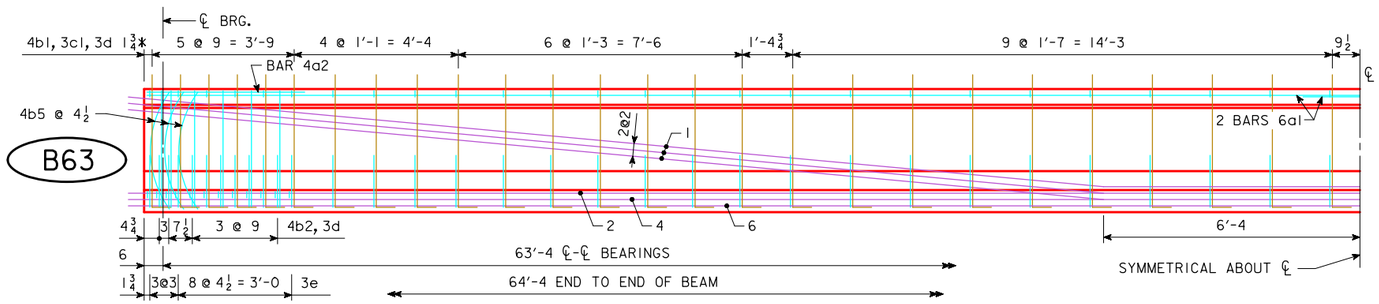
H24-34-06

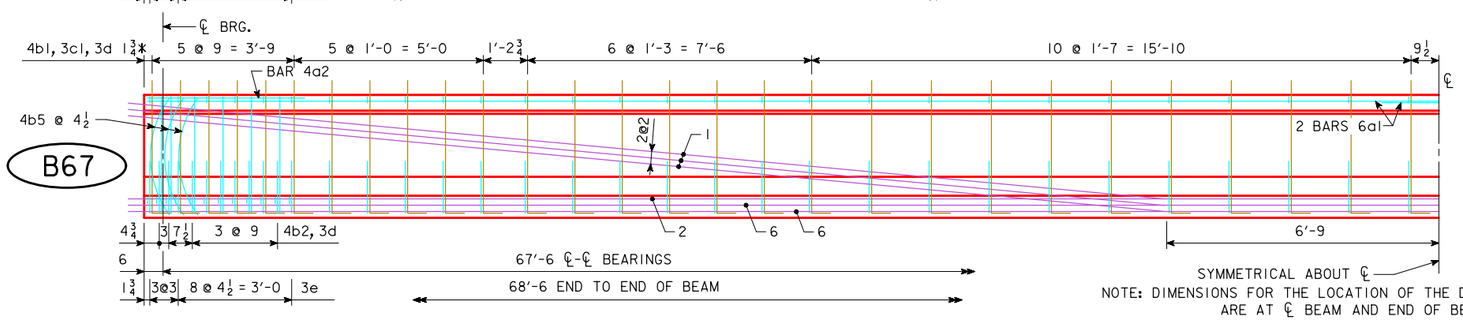
REVISED 01-10 - THE SPECIFICATION REFERENCES WERE CHANGED. THE BEAM DATA WAS UPDATED TO THE CURRENT BEAMS.



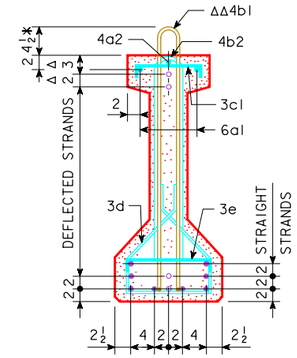




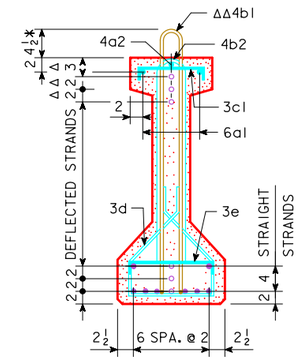




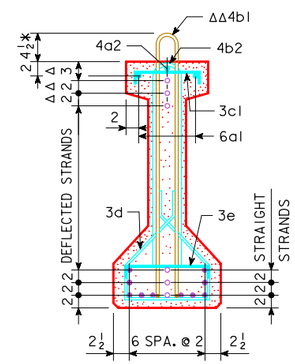
NOTE: DIMENSIONS FOR THE LOCATION OF THE DEFLECTED STRANDS ARE AT ℄ BEAM AND END OF BEAM.



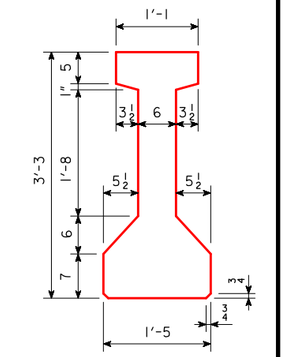
BEAM B50



BEAM B55

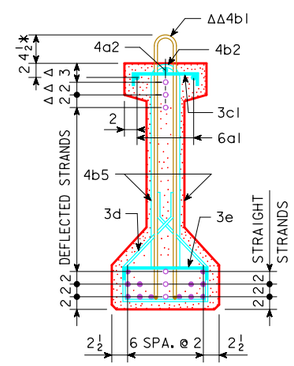


BEAM B59

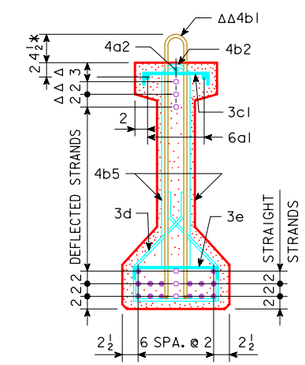


"B" BEAM
CROSS SECTION

A = 382.5 in.²
Yb = 17.06 in.
I = 62,000 in.⁴



BEAM B63



BEAM B67

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

○ DEFLECTED STRANDS
✱ KEEP
Δ DIMENSIONS AT END OF BEAM
ΔΔ EPOXY COATED BARS

REVISED 01-10 - THE BEAM DETAILS WERE UPDATED TO THE CURRENT BEAMS.

01-10
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

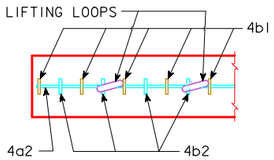
STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

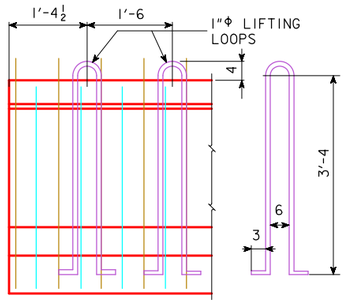
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

B BEAM DETAILS

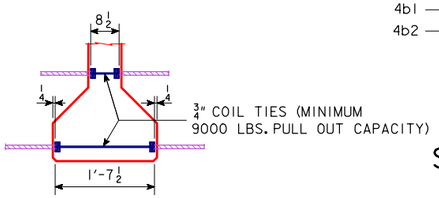
H24-35-06





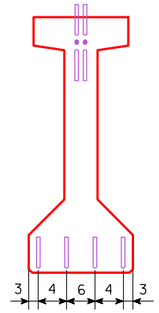
LIFTING LOOP DETAIL

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

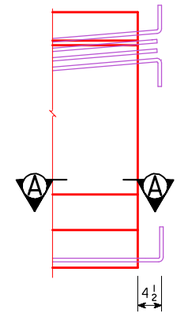


COIL TIE DETAIL

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

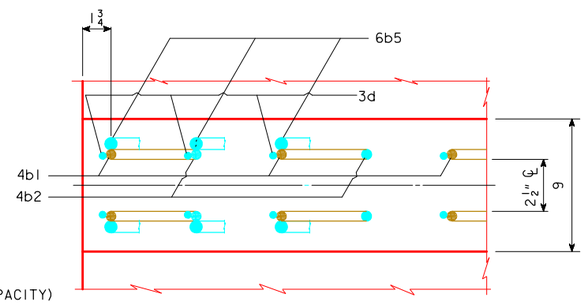


THE TOP STRAIGHT STRANDS OF BEAMS C63 AND C67 ARE TO BE CUT WITH 1'-0 PROJECTIONS AND SHOP BENT UP. THE TOP AND BOTTOM DEFLECTED STRANDS OF BEAMS C71 THROUGH C80 ARE TO BE CUT WITH 1'-0 PROJECTIONS AND SHOP BENT UP OR DOWN AS SHOWN. THE REMAINING TOP STRANDS ARE TO BE CUT WITH 0'-3 PROJECTIONS.
FOUR 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.



TYPICAL AT BOTH BEAM ENDS

STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS



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

C BEAM DATA

BEAM	SPAN LENGTH ℄-℄ BEARING	OVERALL BEAM LENGTH (L)	STRAND SIZE DIA. (inches)	NO. OF STRANDS STRAIGHT	NO. OF STRANDS DEFLECTED	TOTAL INITIAL PRESTRESS KIPS ③	HOLD DOWN FORCE-KIPS	CAMBER (in.) AT RELEASE		CAMBER (in.) AFTER LOSSES		DEFLECTION (in.) Δ_D IMMEDIATE ① (ELASTIC) Δ_I CONC. DIAPH.	DEFLECTION IMMEDIATE STEEL DIAPH.	DEFLECTION TIME ② (PLASTIC) Δ_T CONC. DIAPH.	DEFLECTION TIME STEEL DIAPH.	PERMISSIBLE SPACING		PERMISSIBLE SPACING HL93 LOADING CONC. DIAPH.	PERMISSIBLE SPACING HL93 LOADING STEEL DIAPH.	WEIGHT (TONS)		CONCRETE (C. Y.)	REINFORCING STEEL -(lb)
C63	63'-4	64'-4	0.60	16	—	681	—	0.70		1.24		0.59	0.54	0.15	0.14			7'-6	7'-6	18.9		9.34	536
C67	67'-6	68'-6	0.60	18	—	766	—	0.92		1.62		0.76	0.71	0.19	0.18			7'-6	7'-6	20.1		9.95	576
*C71	71'-8	72'-8	0.60	14	4	766	16	1.21		2.13		0.88	0.82	0.22	0.20			7'-6	7'-6	21.4		10.55	855
*C75	75'-10	76'-10	0.60	14	6	851	22	1.33		2.34		1.07	0.99	0.27	0.25			7'-6	7'-6	22.6		11.16	925
*C80	80'-0	81'-0	0.60	16	6	937	21	1.64		2.90		1.31	1.24	0.33	0.31			7'-6	7'-6	23.8		11.76	1191

① DEFLECTIONS AT MID-SPAN DUE TO WEIGHT OF SLAB AND DIAPHRAGM. THE DEFLECTIONS SHOWN ARE FOR A SLAB WEIGHT OF 757 #/FT. (8" SLAB AND 7'-6 BEAM SPACING) AND ONE CONCRETE DIAPHRAGM (2635 #) OR ONE STEEL DIAPHRAGM (285 #) AT ℄ OF SPAN. FOR DIFFERENT SLAB AND DIAPHRAGM WEIGHTS, DEFLECTIONS WILL BE DIRECTLY PROPORTIONAL.

② DEFLECTIONS DUE TO THE COMBINED EFFECT OF CREEP DUE TO WEIGHT OF SLAB AND SHRINKAGE OF SLAB.

TOTAL BEAM DEFLECTIONS AT ℄ OF SPAN, Δ_D, DUE TO WEIGHT OF SLAB AND DIAPHRAGMS FOR DETAILING PURPOSE:
(A) $\Delta_D = \Delta_I + \Delta_T$ FOR SIMPLE SPAN.
(B) $\Delta_D = \Delta_I + \frac{3}{4}\Delta_T$ FOR END SPANS OF CONTINUOUS BRIDGE.
(C) $\Delta_D = \Delta_I + \frac{1}{2}\Delta_T$ FOR INTERIOR SPANS OF CONTINUOUS BRIDGE.

③ TOTAL INITIAL PRESTRESS IS BASED ON 72.664% f's, f's = 270 ksi AND As = 0.217 sq. in.

* MINIMUM CONCRETE f'c (AT 28 DAYS) SHALL BE 6,000 psi. MINIMUM f'ci AT RELEASE SHALL BE 5,000 psi.

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 2004, WITH MINOR MODIFICATIONS.

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 2004:

REINFORCING STEEL IN ACCORDANCE WITH SECTION 5, GRADE 60.

CONCRETE IN ACCORDANCE WITH SECTION 5, f'c = 5000 psi (EXCEPT AS NOTED)

PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 5, f's = 270,000 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 ARE TO BE STRUCK OFF LEVEL AND FINISHED AS PER MATERIALS IM570.

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 AND PIER DIAPHRAGMS SHALL BE ROUGHENED FOR A DISTANCE OF 10" FROM THE BEAM END BY SANDBLASTING OR OTHER APPROVED METHODS TO PROVIDE SUITABLE BOND BETWEEN THE BEAM AND THE DIAPHRAGM IN ACCORDANCE WITH ARTICLE 2403.14 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.

IF SOLE PLATE IS REQUIRED FOR BEARING, SOLE PLATE IS TO BE SET IN FORMS WHEN BEAM IS CAST AND FORMED OUT BELOW TO EXCLUDE CONCRETE AS DETAILED ON THE BEARING SHEET.

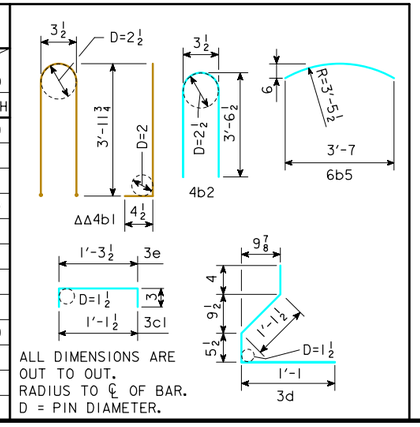
0.6" DIAMETER STRANDS STRESSED TO NOT MORE THAN 5,000 LBS. EACH MAY BE USED IN LIEU OF THE a BARS WHICH RUN THE FULL LENGTH OF THE BEAM IN THE TOP FLANGE.

** WHERE DEFLECTING STRANDS INTERFERE WITH PLACEMENT, SOME IN-PLACE BENDING MAY BE NECESSARY.

ΔΔ 4b1 BARS TO BE EPOXY COATED.

REINFORCING BAR LIST

	BAR	SHAPE	C63 NO.	C63 LENGTH (63'-4)	C67 NO.	C67 LENGTH (67'-6)	C71 NO.	C71 LENGTH (71'-8)	C75 NO.	C75 LENGTH (75'-10)	C80 NO.	C80 LENGTH (80'-0)
	6a1		—	—	—	—	4	37'-8	4	39'-9	4	41'-10
	4a2		2	5'-0	2	5'-0	2	5'-0	2	5'-0	2	5'-0
	8a3		—	—	—	—	—	—	—	—	2	40'-0
ΔΔ	4b1		46	8'-10	48	8'-10	54	8'-10	58	8'-10	60	8'-10
	4b2		12	7'-2	12	7'-2	12	7'-2	12	7'-2	12	7'-2
	6b5		4	3'-9	8	3'-9	8	3'-9	12	3'-9	16	3'-9
	3c1		46	1'-8	48	1'-8	54	1'-8	58	1'-8	60	1'-8
**	3d		116	3'-0	120	3'-0	132	3'-0	140	3'-0	144	3'-0
	3e		26	1'-10	26	1'-10	26	1'-10	26	1'-10	26	1'-10



ALL DIMENSIONS ARE OUT TO OUT.
RADIUS TO ℄ OF BAR.
D = PIN DIAMETER.

12-10
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

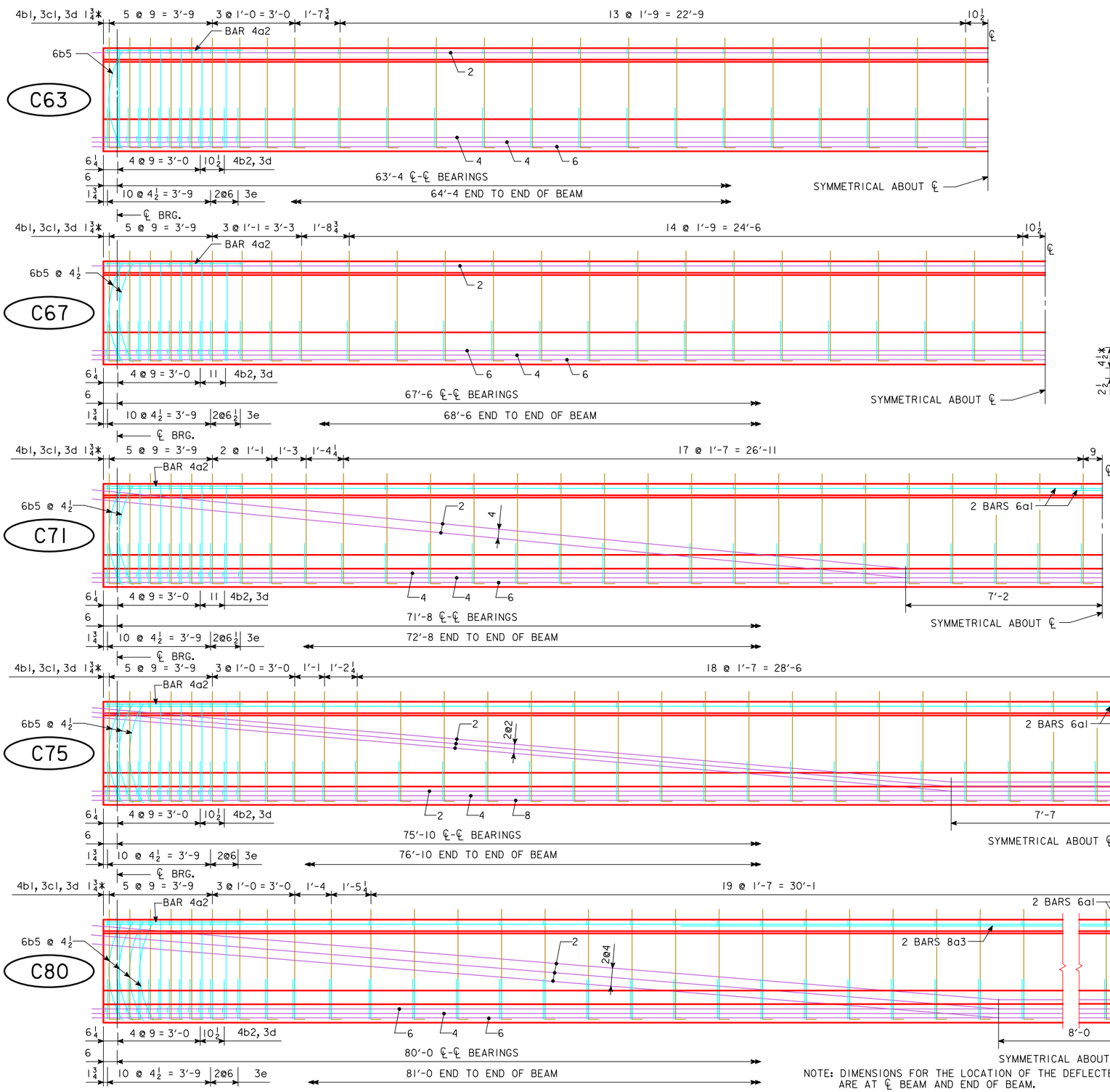
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

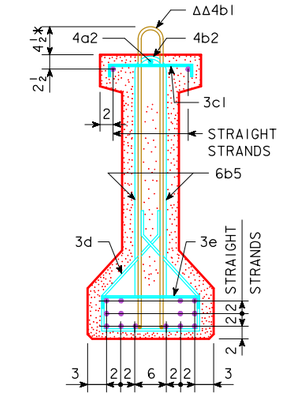
C BEAM DETAILS

H24-36-06

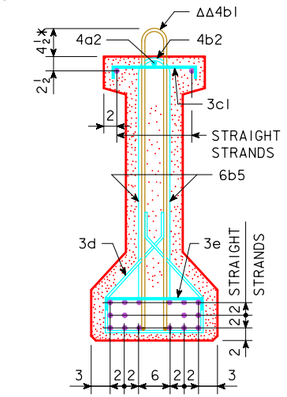
REVISED 12-10 - THE CONCRETE STRENGTH WAS ADDED TO THE DESIGN STRESSES NOTE.



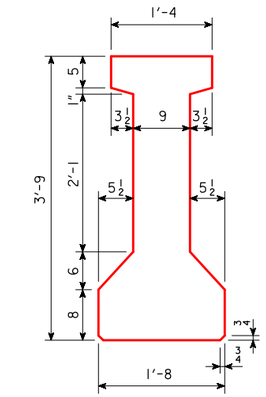
NOTE: DIMENSIONS FOR THE LOCATION OF THE DEFLECTED STRANDS ARE AT ℄ BEAM AND END OF BEAM.



BEAM C63

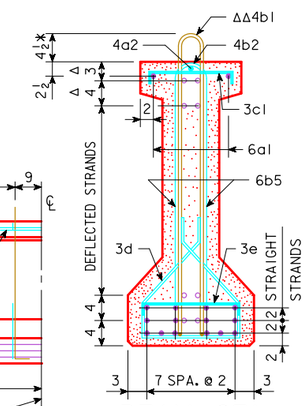


BEAM C67

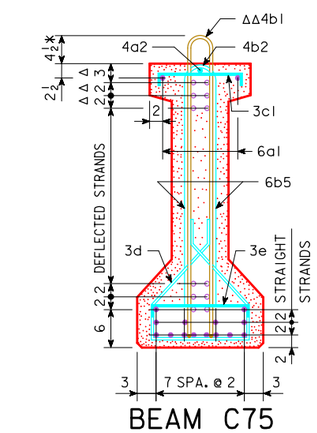


"C" BEAM CROSS SECTION

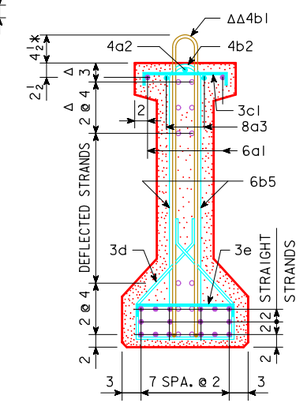
A = 564.5 in²
Yb = 20.20 in
I = 116,354 in⁴



BEAM C71



BEAM C75



BEAM C80

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

* KEEP

Δ DIMENSIONS AT END OF BEAM

ΔΔ EPOXY COATED BARS

REVISED 01-10 - THE BEAM DETAILS WERE UPDATED TO THE CURRENT BEAMS.

01-10
LATEST REVISION DATE

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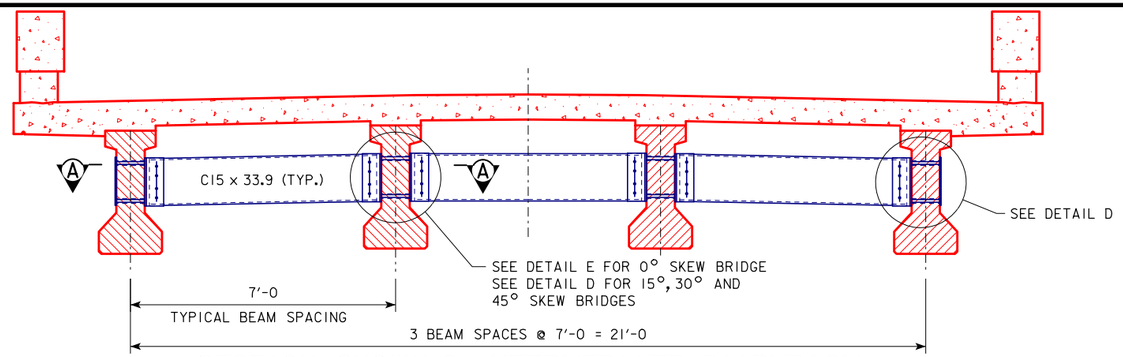
STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

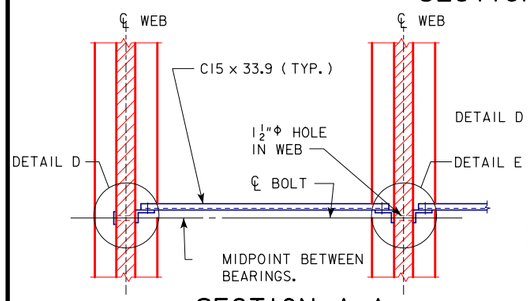
DECEMBER, 2006

C BEAM DETAILS

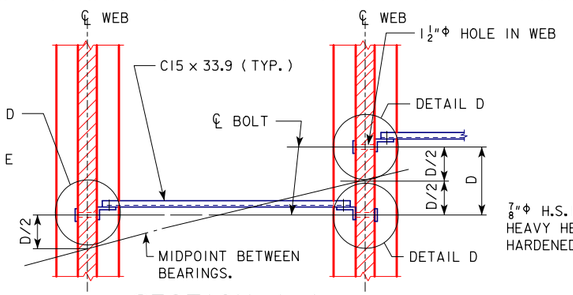
H24-37-06



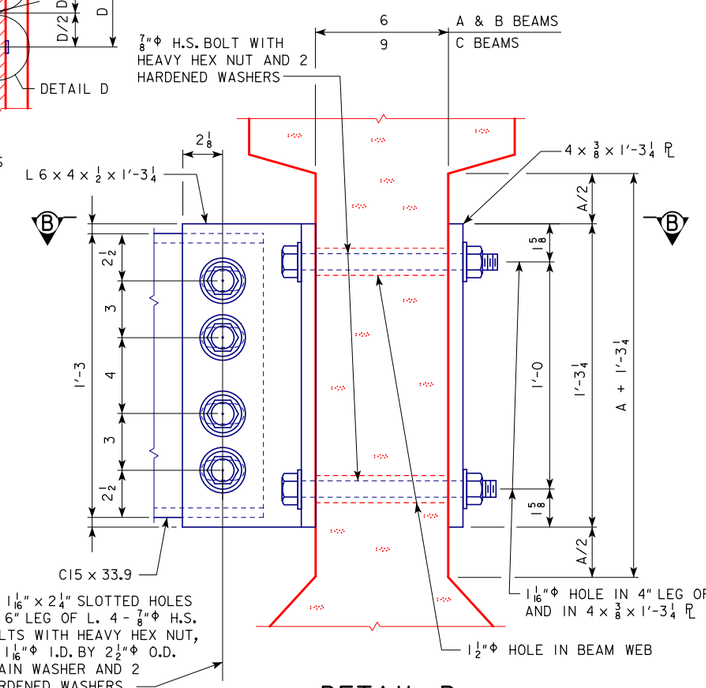
SECTION SHOWING INTERMEDIATE DIAPHRAGM



SECTION A-A
FOR 0° SKEW BRIDGES



SECTION A-A
FOR 15°, 30° AND 45° SKEW BRIDGES



DETAIL D

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.

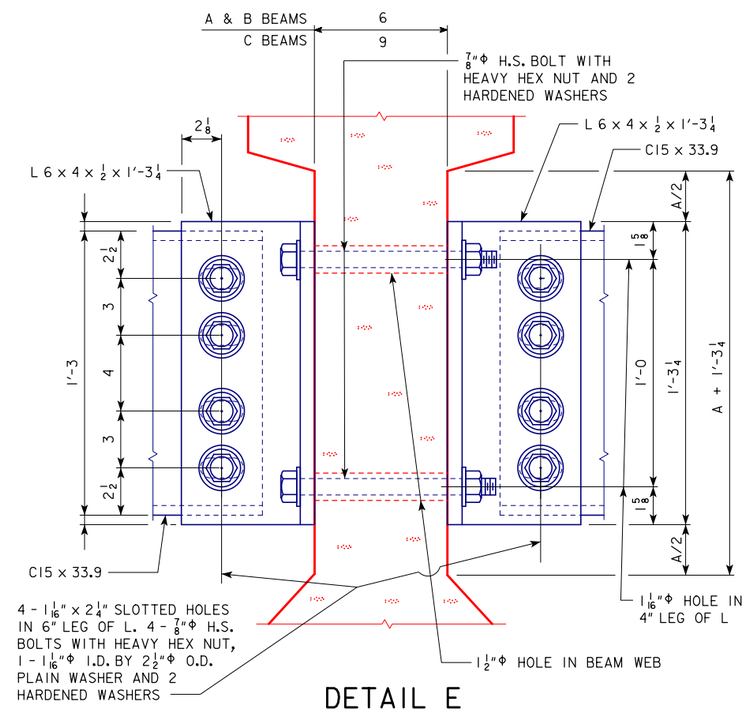
ALL COSTS FOR FURNISHING AND INSTALLING STEEL INTERMEDIATE DIAPHRAGMS SHALL BE INCLUDED IN THE PRICE BID FOR STRUCTURAL STEEL.

THE 1 1/2"Φ HOLES FOR THE 7/8"Φ H.S. BOLTS SHALL BE CAST INTO THE WEB. DRILLING IS NOT ALLOWED.

THE 7/8"Φ 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.

CONCRETE DIAPHRAGMS DETAILS SHALL BE PROVIDED IN THE BRIDGE PLANS FOR OVERHEAD BRIDGES. DESIGNER SHALL ADJUST THE CONCRETE, REINFORCING AND STRUCTURAL STEEL QUANTITIES ACCORDINGLY.



DETAIL E

INTERMEDIATE DIAPHRAGM STRUCTURAL STEEL

ONE CONNECTION DETAIL "E"

2 - 7/8"Φ x LENGTH H.S. BOLTS WITH NUTS AND WASHERS

WEB THICKNESS (IN.)	LENGTH OF H.S. BOLTS (IN.)	WEIGHT PER DETAIL "E" (LB.)	BRIDGE SKEW 0°	BRIDGE SKEW 15°, 30° & 45°	BRIDGE SKEW 0°	BRIDGE SKEW 15°, 30° & 45°
			NUMBER OF DETAIL "E"		WEIGHT (LB.)	
6	9	4.30	6	0	25.8	0.0
9	12	5.34	6	0	32.0	0.0
2 - L6x4 x 1/2 x 1'-3 1/4 = 41.2 LB			6	0	247.2	0.0

ONE CONNECTION DETAIL "D"

2 - 7/8"Φ x LENGTH H.S. BOLTS WITH NUTS AND WASHERS

WEB THICKNESS (IN.)	LENGTH OF H.S. BOLTS (IN.)	WEIGHT PER DETAIL "D" (LB.)	BRIDGE SKEW 0°	BRIDGE SKEW 15°, 30° & 45°	BRIDGE SKEW 0°	BRIDGE SKEW 15°, 30° & 45°
			NUMBER OF DETAIL "D"		WEIGHT (LB.)	
6	9	4.30	6	18	25.8	77.4
9	12	5.34	6	18	32.0	96.1
1 - BACKING PL 4 x 3/8 x 1'-3 1/4 = 6.5 LB			6	18	39.0	117.0
1 - L6 x 4 x 1/2 x 1'-3 1/4 = 20.6 LB			6	18	123.6	370.8

* ONE C15 x 33.9 DIAPHRAGM

WEB THICKNESS (IN.)	BEAM SPACING	LENGTH	NO. OF DIAPH.	UNIT WEIGHT (LB.)	WEIGHT (LB.)
6	7'-0	6'-2 5/8	9	210.8	1897.3
9	7'-0	5'-11 5/8	9	202.3	1821.1

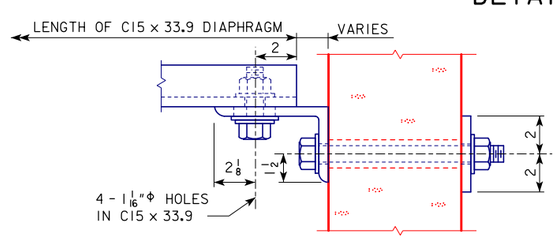
DIAPHRAGM CONNECTION BOLTS

	NO. OF DIAPH.	WEIGHT (LB.)
8 - 7/8"Φ x 0'-2 3/4 H.S. BOLTS WITH NUTS AND WASHERS, PER UNIT DIAPHRAGM = 10.3 LB	9	92.7

* THE LENGTH OF THE C15 x 33.9 IS BASED ON A VARIABLE CLEARANCE OF 1 11/16 TO 2 1/16 BETWEEN THE FACE OF BEAM WEB AND END OF C15 x 33.9.

TOTAL WEIGHT

	WEB THICKNESS (IN.)	BRIDGE SKEW 0°	BRIDGE SKEW 15°, 30° & 45°
INTERMEDIATE DIAPHR. STRUCT. STEEL - TOTAL (LB) =	6	2451	2555
INTERMEDIATE DIAPHR. STRUCT. STEEL - TOTAL (LB) =	9	2388	2498



SECTION B-B

BEAM SERIES	DIMENSIONS A + 1'-3 1/4	DIMENSIONS A/2
A	1'-4	3/8
B	1'-8	2 3/8
C	2'-1	4 3/8

01-10
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

INTERMEDIATE STEEL DIAPHRAGMS

H24-38-06

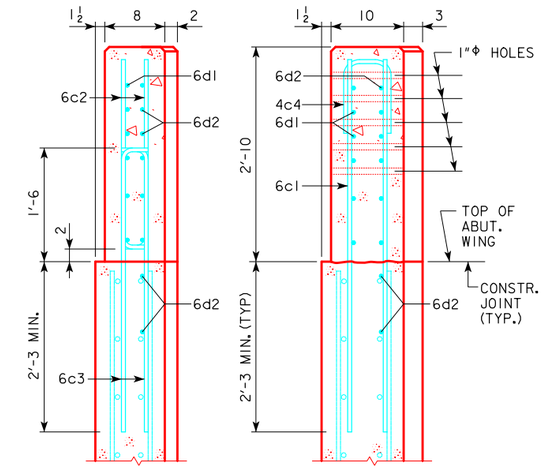
REVISED 01-10 - MINOR CHANGES WERE MADE TO AGREE WITH OFFICE STANDARD.

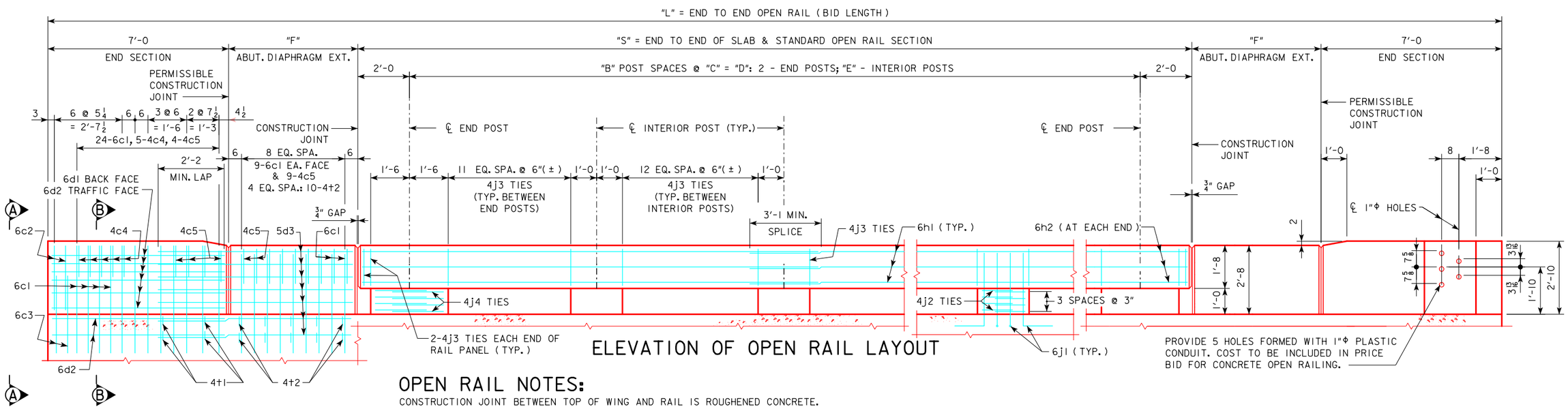
TABLE OF OPEN RAIL DIMENSIONS AND NUMBERS

℄-℄ ABUT. BRG		138′-10				151′-4				163′-10				176′-4				188′-10				℄-℄ ABUT. BRG	
SKEW		0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	SKEW	
DIMENSION OR NUMBER	L (FT.-IN.)	155′-10	155′-11 1/4	156′-3 5/8	157′-0 7/8	168′-4	168′-5 1/4	168′-9 5/8	169′-6 7/8	180′-10	180′-11 1/4	181′-3 5/8	182′-0 7/8	193′-4	193′-5 1/4	193′-9 5/8	194′-6 7/8	205′-10	205′-11 1/4	206′-3 5/8	207′-0 7/8	L (FT.-IN.)	DIMENSION OR NUMBER
	S (FT.-IN.)	141′-10	141′-11 1/4	142′-3 5/8	143′-0 7/8	154′-4	154′-5 1/4	154′-9 5/8	155′-6 7/8	166′-10	166′-11 1/4	167′-3 5/8	168′-0 7/8	179′-4	179′-5 1/4	179′-9 5/8	180′-6 7/8	191′-10	191′-11 1/4	192′-3 5/8	193′-0 7/8	S (FT.-IN.)	
	B	18	18	18	18	19	19	19	19	21	21	21	21	23	23	23	23	24	24	24	24	B	
	C (FT.-IN.)	7′-7 7/8	7′-8	7′-8 1/4	7′-8 3/4	7′-11	7′-11	7′-11 1/4	7′-11 3/4	7′-9	7′-9 1/8	7′-9 3/8	7′-9 3/4	7′-7 1/2	7′-7 1/2	7′-7 3/4	7′-8 1/8	7′-9 7/8	7′-10	7′-10 1/8	7′-10 1/2	C (FT.-IN.)	
	D (FT.-IN.)	137′-10	137′-11 1/4	138′-3 5/8	139′-0 7/8	150′-4	150′-5 1/4	150′-9 5/8	151′-6 7/8	162′-10	162′-11 1/4	163′-3 5/8	164′-0 7/8	175′-4	175′-5 1/4	175′-9 5/8	176′-6 7/8	187′-10	187′-11 1/4	188′-3 5/8	189′-0 7/8	D (FT.-IN.)	
	E	17	17	17	17	18	18	18	18	20	20	20	20	22	22	22	22	23	23	23	23	E	
	F (FT.-IN.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	F (FT.-IN.)	

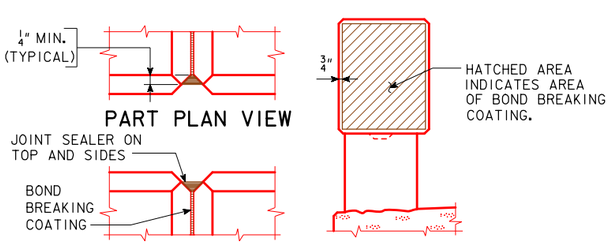
TABLE OF OPEN RAIL DIMENSIONS AND NUMBERS

℄-℄ ABUT. BRG		201′-4				213′-10				226′-4				243′-0				℄-℄ ABUT. BRG	
SKEW		0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	SKEW	
DIMENSION OR NUMBER	L (FT.-IN.)	228′-4	228′-4	228′-4	228′-4	240′-10	240′-10	240′-10	240′-10	253′-4	253′-4	253′-4	253′-4	270′-0	270′-0	270′-0	270′-0	L (FT.-IN.)	DIMENSION OR NUMBER
	S (FT.-IN.)	204′-4	204′-5 1/4	204′-9 5/8	205′-6 7/8	216′-10	216′-11 1/4	217′-3 5/8	218′-0 7/8	229′-4	229′-5 1/4	229′-9 5/8	230′-6 7/8	246′-0	246′-1 1/4	246′-5 5/8	247′-2 7/8	S (FT.-IN.)	
	B	26	26	26	26	27	27	27	27	29	29	29	29	31	31	31	31	B	
	C (FT.-IN.)	7′-8 1/2	7′-8 1/2	7′-8 5/8	7′-9	7′-10 5/8	7′-10 5/8	7′-10 3/4	7′-11 1/8	7′-9 1/4	7′-9 1/4	7′-9 3/8	7′-9 3/4	7′-9 5/8	7′-9 3/4	7′-9 7/8	7′-10 1/8	C (FT.-IN.)	
	D (FT.-IN.)	200′-4	200′-5 1/4	200′-9 5/8	201′-6 7/8	212′-10	212′-11 1/4	213′-3 5/8	214′-0 7/8	225′-4	225′-5 1/4	225′-9 5/8	226′-6 7/8	242′-0	242′-1 1/4	242′-5 5/8	243′-2 7/8	D (FT.-IN.)	
	E	25	25	25	25	26	26	26	26	28	28	28	28	30	30	30	30	E	
	F (FT.-IN.)	5′-0	4′-11 3/8	4′-9 1/4	4′-4 1/2	5′-0	4′-11 3/8	4′-9 1/4	4′-4 1/2	5′-0	4′-11 3/8	4′-9 1/4	4′-4 1/2	5′-0	4′-11 3/8	4′-9 1/4	4′-4 1/2	F (FT.-IN.)	





ELEVATION OF OPEN RAIL LAYOUT



OPEN RAIL JOINT DETAILS

OPEN RAIL NOTES:

CONSTRUCTION JOINT BETWEEN TOP OF WING AND RAIL IS ROUGHENED CONCRETE.

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

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

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.

THE CAST-IN-PLACE OPEN RAIL SHALL USE CLASS C MIX. CLASS D CONCRETE IS NOT PERMITTED.

TOP OF THE OPEN RAIL IS TO BE PARALLEL TO THEORETICAL ℄ GRADE.

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.

07-10
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24′ ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

OPEN RAIL, TL-4 DETAILS

SHEET 1 OF 2

H24-39-06

REVISED 07-10 - PROVIDED A 3/4" GAP BETWEEN RAIL AND ABUT. DIAPH. EXT.

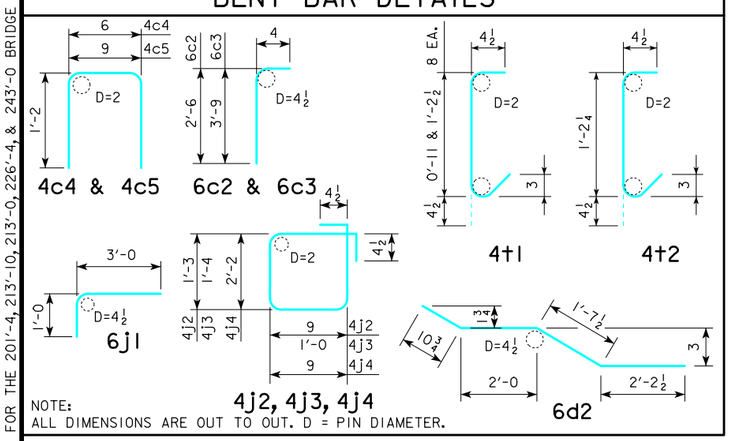
REINFORCING STEEL-TWO OPEN RAILS

(NOTE: THESE REINFORCING BARS TO BE USED ON ALL SKEWS)

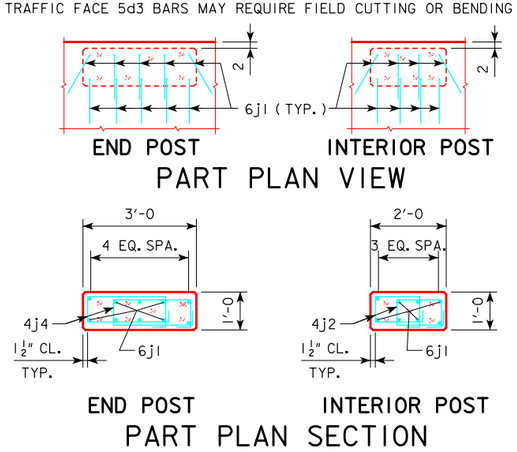
BRIDGE LENGTH			138'-10			151'-4			163'-10			176'-4			188'-10			201'-4			213'-10			226'-4			243'-0		
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT
6c1	VERTICAL, END SECTION & ABUT. DIAPH. EXT.		96	4'-11	709	96	4'-11	709	96	4'-11	709	96	4'-11	709	96	4'-11	709	168	4'-11	1,241	168	4'-11	1241	168	4'-11	1241	168	4'-11	1241
6c2	VERTICAL, END SECTION		16	2'-10	68	16	2'-10	68	16	2'-10	68	16	2'-10	68	16	2'-10	68	16	2'-10	68	16	2'-10	68	16	2'-10	68	16	2'-10	68
6c3	VERTICAL, END SECTION		16	4'-1	98	16	4'-1	98	16	4'-1	98	16	4'-1	98	16	4'-1	98	16	4'-1	98	16	4'-1	98	16	4'-1	98	16	4'-1	98
4c4	VERTICAL HOOPS, END SECTION		20	2'-10	38	20	2'-10	38	20	2'-10	38	20	2'-10	38	20	2'-10	38	20	2'-10	38	20	2'-10	38	20	2'-10	38	20	2'-10	38
4c5	VERT. HOOPS, END SEC. & ABUT. DIAPH. EXT.		16	3'-1	33	16	3'-1	33	16	3'-1	33	16	3'-1	33	16	3'-1	33	52	3'-1	107	52	3'-1	107	52	3'-1	107	52	3'-1	107
6d1	HORIZONTAL, END SECTION-BACK FACE		24	6'-8	240	24	6'-8	240	24	6'-8	240	24	6'-8	240	24	6'-8	240	24	6'-8	240	24	6'-8	240	24	6'-8	240	24	6'-8	240
6d2	HORIZONTAL, END SECTION-TRAFFIC FACE		32	6'-9	324	32	6'-9	324	32	6'-9	324	32	6'-9	324	32	6'-9	324	32	6'-9	324	32	6'-9	324	32	6'-9	324	32	6'-9	324
5d3*	HORIZONTAL, ABUT. DIAPH. EXT.-BOTH FACES		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	48	7'-2	359	48	7'-2	359	48	7'-2	359	48	7'-2	359
6h1	LONGITUDINAL, OPEN RAIL		24	40'-0	1,442	36	40'-0	2,163	36	40'-0	2,163	36	40'-0	2,163	48	40'-0	2,884	48	40'-0	2,884	48	40'-0	2,884	60	40'-0	3,605	60	40'-0	3,605
6h2	LONGITUDINAL, OPEN RAIL, ENDS		24	36'-0	1,298	24	23'-10	859	24	30'-1	1,084	24	36'-4	1,310	24	24'-1	868	24	30'-4	1,093	24	36'-7	1,319	24	24'-5	880	24	32'-9	1,181
6j1	VERTICAL DOWELS, OPEN RAIL		312	4'-0	1,875	328	4'-0	1,971	360	4'-0	2,163	392	4'-0	2,355	408	4'-0	2,451	440	4'-0	2,644	456	4'-0	2,740	488	4'-0	2,932	520	4'-0	3,124
4j2	HOOP, INTERIOR POST		272	4'-9	863	288	4'-9	914	320	4'-9	1,015	352	4'-9	1,117	368	4'-9	1,168	400	4'-9	1,269	416	4'-9	1,320	448	4'-9	1,422	480	4'-9	1,523
4j3	HOOP, OPEN RAIL		472	5'-5	1,708	498	5'-5	1,802	550	5'-5	1,990	602	5'-5	2,178	628	5'-5	2,272	680	5'-5	2,460	706	5'-5	2,555	758	5'-5	2,743	810	5'-5	2,931
4j4	HOOP, END POST		32	6'-7	141	32	6'-7	141	32	6'-7	141	32	6'-7	141	32	6'-7	141	32	6'-7	141	32	6'-7	141	32	6'-7	141	32	6'-7	141
4t1	WING FOOTING TIE BARS		16	VARIES	19	16	VARIES	19	16	VARIES	19	16	VARIES	19	16	VARIES	19	16	VARIES	19	16	VARIES	19	16	VARIES	19	16	VARIES	19
4t2	WING FOOTING TIE BARS		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	40	1'-11	51	40	1'-11	51	40	1'-11	51	40	1'-11	51
TOTAL LBS. (INCLUDE WITH SUPERSTRUCTURE REINFORCING)					8,856			9,379			10,085			10,793			11,313			13,036			13,504			14,268			15,050

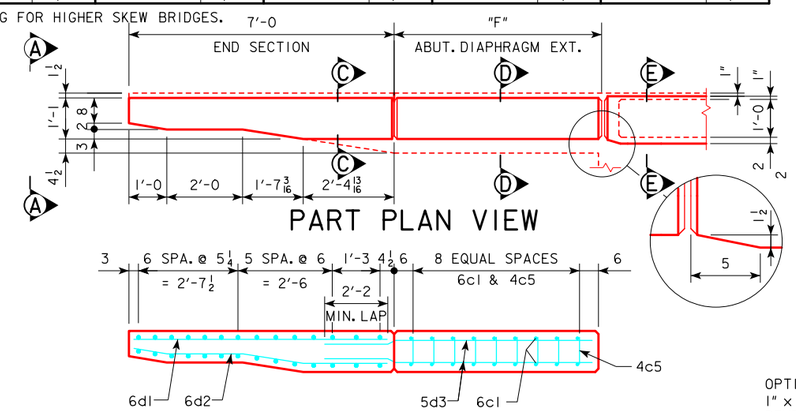
* TRAFFIC FACE 5d3 BARS MAY REQUIRE FIELD CUTTING OR BENDING FOR HIGHER SKEW BRIDGES.

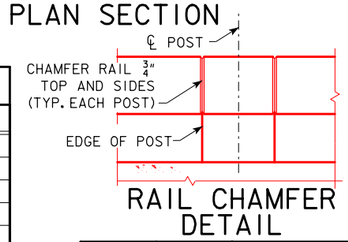
BENT BAR DETAILS

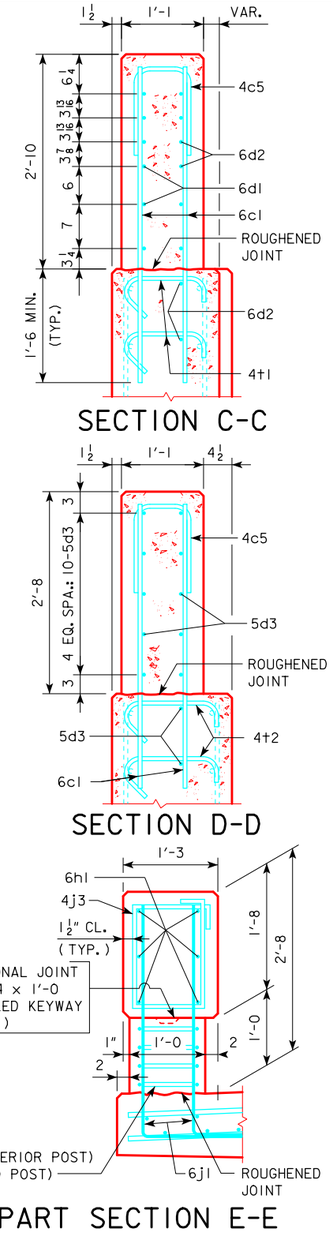


NOTE:
ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.









CONCRETE PLACEMENT SUMMARY - C.Y.

BRIDGE LENGTH		138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
OPEN RAIL SECTION	2 @ 0.077 CU. YDS. PER FT.	22.0	24.0	25.9	27.8	29.7	31.7	33.6	35.5	38.1
OPEN RAIL-END SECTION	4 @ 0.687 CU. YDS.	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
OPEN RAIL-ABUT. DIAPH. SECTION	4 @ 0.107 CU. YDS. PER FT.	—	—	—	—	—	1.9	1.9	1.9	1.9
OPEN RAIL-END POSTS	4 @ 0.11 CU. YDS.	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
OPEN RAIL-INTERIOR POSTS	2 x "E" @ 0.07 CU. YDS.	2.4	2.5	2.8	3.1	3.2	3.5	3.6	3.9	4.2
	TOTAL (C.Y.)	27.5	29.6	31.8	34.0	36.0	40.2	42.2	44.4	47.3

CONCRETE QUANTITIES SHOWN ARE BASED ON 45° SKEW. FOR "E" SEE SHEET H24-39-06.

OPEN CONCRETE RAIL, TL-4 QUANTITIES - L.F.

BRIDGE LENGTH		138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
OPEN CONCRETE RAILING, TL-4	0° SKEW	311.7 E	336.7	361.7	386.7	411.7	456.7	481.7	506.7	540.0
OPEN CONCRETE RAILING, TL-4	15° SKEW	311.9	336.9	361.9	386.9	411.9	456.7	481.7	506.7	540.0
OPEN CONCRETE RAILING, TL-4	30° SKEW	312.6	337.6	362.6	387.6	412.6	456.7	481.7	506.7	540.0
OPEN CONCRETE RAILING, TL-4	45° SKEW	314.2	339.2	364.2	389.2	414.2	456.7	481.7	506.7	540.0

REVISED 12-10 - CORRECTED THE OPEN RAIL REBAR QUANTITIES FOR THE 201'-4, 213'-10, 213'-0, 226'-4, & 243'-0 BRIDGE LENGTHS.

12-10
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

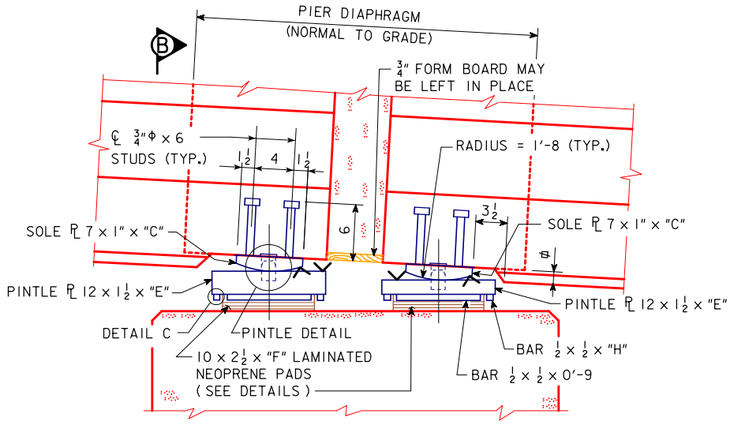
STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

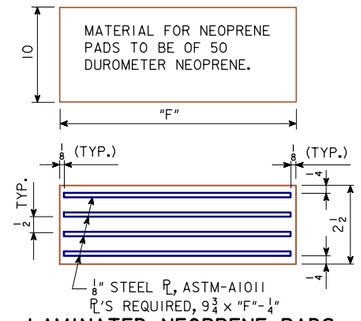
OPEN RAIL, TL-4 DETAILS
SHEET 2 OF 2

H24-40-06

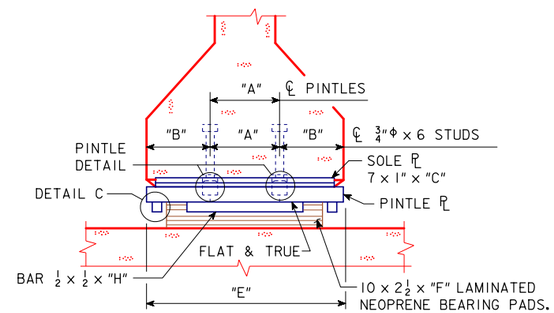


PART ELEVATION

Φ NOTCH BEAM END TO SOLE PL THICKNESS MAXIMUM 1"

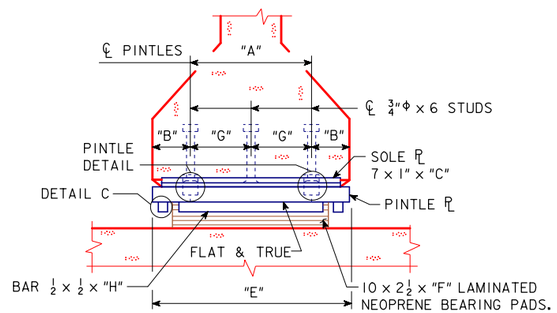


LAMINATED NEOPRENE PADS



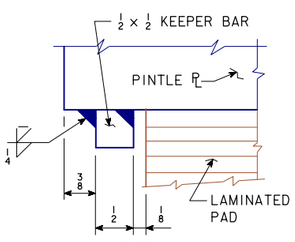
SECTION B-B FOR A & B BEAMS

(DIAPHRAGM CONCRETE NOT SHOWN)

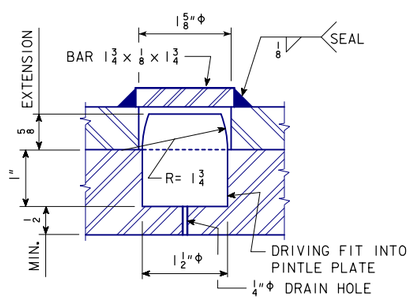


SECTION B-B FOR C BEAMS

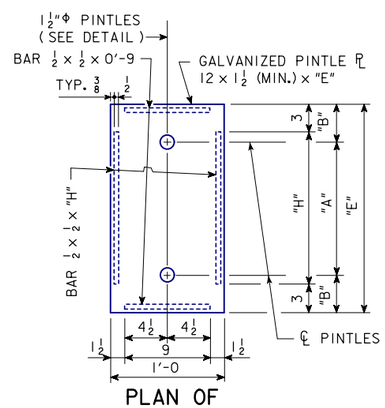
(DIAPHRAGM CONCRETE NOT SHOWN)



DETAIL C



PINTLE DETAIL



PLAN OF PINTLE PLATE

EXPANSION PIER BEARING NOTES:

SURFACES MARKED "V" SHALL BE FINISHED ANSI 250.

PINTLE PLATES ARE A PART OF THE SUPERSTRUCTURE "STRUCTURAL STEEL QUANTITY".

COSTS OF ANCHORED CURVED SOLE PLATES AND NEOPRENE PADS ARE TO BE INCLUDED IN THE PRICE BID FOR "PRETENSIONED PRESTRESSED CONCRETE BEAMS".

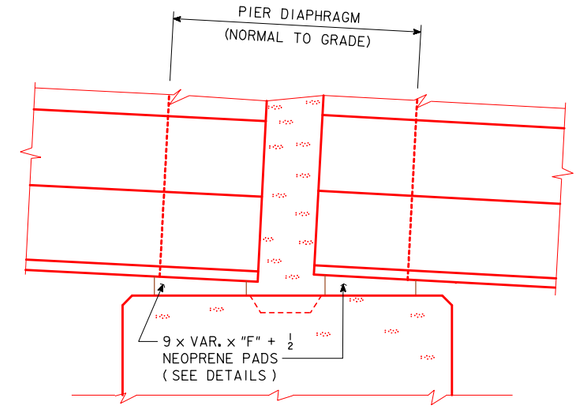
THE SOLE PLATES AND PINTLE PLATES SHALL BE GALVANIZED. ALL WELDING SHALL BE COMPLETED PRIOR TO GALVANIZING. THE SURFACE OF THE PINTLE PLATE IN CONTACT WITH THE LAMINATED NEOPRENE PADS SHALL BE FREE OF PROJECTIONS DUE TO THE GALVANIZING.

SOLE PLATES ARE TO BE SET IN FORMS WHEN BEAMS ARE CAST AND THE BOTTOM OF BEAMS FORMED OUT AS SHOWN TO EXCLUDE CONCRETE.

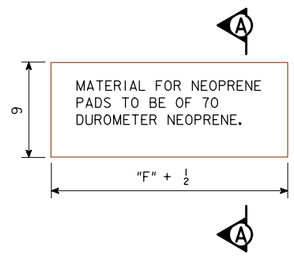
SOLE PLATES SHALL COMPLY WITH ONE OF THE FOLLOWING :

- ASTM A 514 GRADE B
- ASTM A 709 GRADE HPS 70W

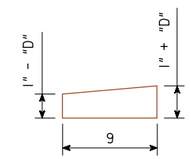
EXPANSION PIER



PART ELEVATION



PLAN OF NEOPRENE PAD



SECTION A-A

SLOPE	"D"
SLOPE ≤ 1.4%	0"
1.4% < SLOPE ≤ 4.2%	1/8"
4.2% < SLOPE ≤ 5.0%	1/4"

$$\text{SLOPE}_{\text{SPAN 1}} = 100\% \left| \frac{\text{P/G ELEV. @ NEAR ABUT.} - \text{P/G ELEV. @ PIER 1}}{\text{SPAN 1 LENGTH}} \right|$$

$$\text{SLOPE}_{\text{SPAN 2}} = 100\% \left| \frac{\text{P/G ELEV. @ PIER 1} - \text{P/G ELEV. @ PIER 2}}{\text{SPAN 2 LENGTH}} \right|$$

$$\text{SLOPE}_{\text{SPAN 3}} = 100\% \left| \frac{\text{P/G ELEV. @ PIER 2} - \text{P/G ELEV. @ FAR ABUT.}}{\text{SPAN 3 LENGTH}} \right|$$

SLOPE CALCULATION FORMULA

FIXED PIER BEARING NOTES:

IF CALCULATED SLOPE FOR A GIVEN SPAN EXCEEDS 1.4%, THE NEOPRENE BEARING PADS AT THE FIXED PIER FOR THAT SPAN SHALL BE TAPERED. REFER TO TABLE FOR DIMENSIONS OF TAPERED PADS.

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

FIXED PIER

VARIABLE DIMENSIONS

	BEAM BOTTOM FLANGE WIDTH	
	A & B BEAMS	C BEAMS
"A"	0'-6	1'-0
"B"	0'-5 1/2	0'-4
"C"	1'-3 1/2	1'-6 1/2
"E"	1'-5	1'-8
"F"	1'-3	1'-6
"G"	———	0'-6
"H"	0'-11	1'-2

09-12
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

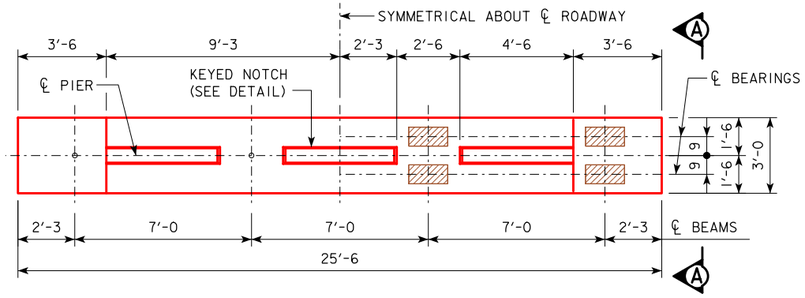
STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

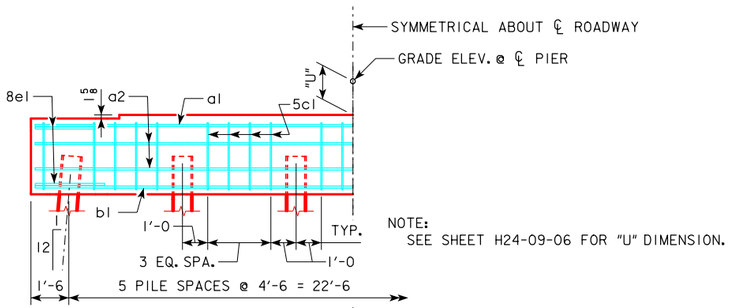
DECEMBER, 2006

PIER BEARING DETAILS | H24-41-06

CORRECTION 09-12 - REFERENCE TO ASTM A852 WAS DELETED.

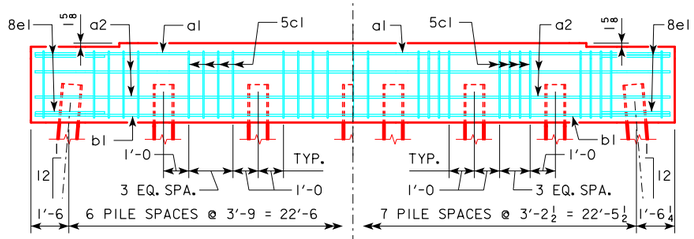


TYPICAL PLAN



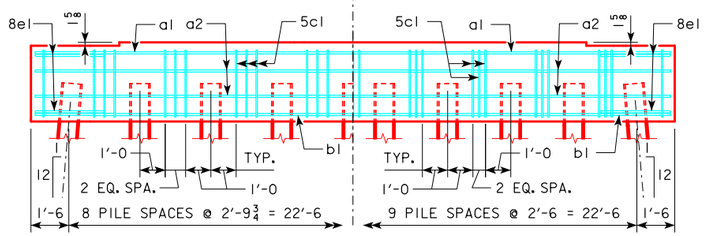
NOTE:
SEE SHEET H24-09-06 FOR "U" DIMENSION.

6 PILE BENT



7 PILE BENT

8 PILE BENT



9 PILE BENT

10 PILE BENT

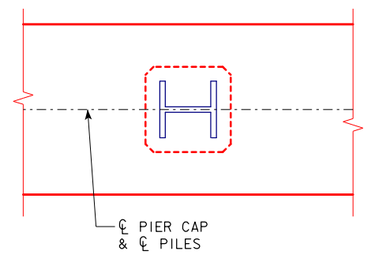
PILE BENT NOTES:

THESE PIER BENTS ARE DESIGNED FOR USE IN LOCATIONS WHERE ICE AND DRIFT CONDITIONS ARE NOT SEVERE.

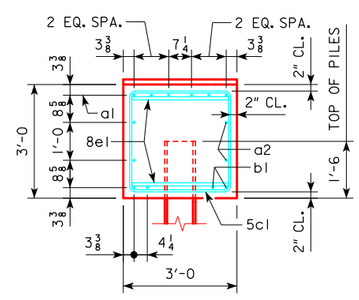
FOR DETAILS OF TRESTLE PILES, TYPES 1, 2 AND 3, SEE STANDARD PIOL.

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

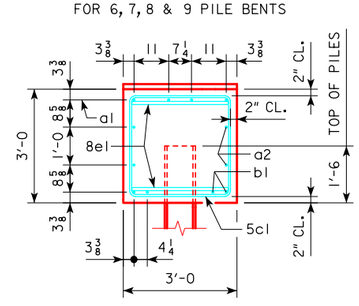
PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.



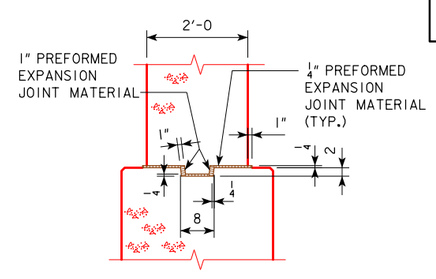
PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES



VIEW A-A
FOR 6, 7, 8 & 9 PILE BENTS



VIEW A-A
FOR 10 PILE BENT

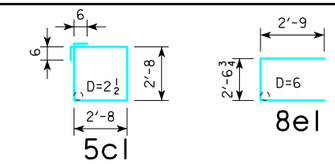


KEYED NOTCH DETAIL

REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

			6 PILE BENT			7 PILE BENT			8 PILE BENT			9 PILE BENT			10 PILE BENT		
BAR	LENGTH	SHAPE	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
a1	25'-2		6	9	513	6	9	513	6	9	513	6	9	513	4	9	342
a2	25'-2		4	8	269	4	8	269	4	8	269	4	8	269	4	8	269
b1	25'-2		4	8	269	4	8	269	4	8	269	4	8	269	4	8	269
5c1	11'-8		22	5	268	26	5	316	30	5	365	26	5	316	29	5	353
8e1	8'-1		4	8	86	4	8	86	4	8	86	4	8	86	4	8	86
REINFORCING STEEL (LB.)			1405			1453			1502			1453			1319		
STRUCTURAL CONCRETE (CY) ①		PILE TYPE															
		1, 2	-----			-----			8.4			8.4			8.3		
		3	8.8			8.8			8.8			8.8			8.8		

BENT BAR DETAILS



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

℄-℄ ABUTMENT BEARING	FRICTION BEARING PILING			FRICTION OR POINT BEARING PILING		
	PIOL TYPE 1 OR 2			PIOL TYPE 3		
	NUMBER OF TRESTLE PILES	② "K" (INCHES)	③ LRFD Pu, STRENGTH I, DES. LOAD (KIPS)	NUMBER OF TRESTLE PILES	PILE SIZE	③ LRFD Pu, STRENGTH I, DES. LOAD (KIPS)
138'-10	-----	--	-----	6	HP10x57	141
	-----	--	-----	7	HP12x53	121
151'-4	-----	--	-----	7	HP10x57	127
	-----	--	-----	7	HP12x53	127
163'-10	-----	--	-----	7	HP10x57	137
				8	HP12x53	119
176'-4	-----	--	-----	7	HP10x57	143
				8	HP12x53	125
188'-10	-----	--	-----	8	HP10x57	130
				8	HP12x53	130
201'-4	-----	--	-----	8	HP10x57	144
				9	HP12x53	128
213'-10	-----	--	-----	9	HP10x57	135
				10	HP12x53	121
226'-4	-----	--	-----	9	HP10x57	142
				10	HP12x53	128
243'-0	-----	--	-----	10	HP10x57	135

① CONCRETE QUANTITIES SHOWN HAVE HAD THE VOLUME OF EMBEDDED PILES DEDUCTED FOR TYPES 1 AND 2 BASED ON 0.8 FT^3 PER FOOT OF EMBEDMENT. THE CONCRETE QUANTITIES FOR TYPE 3 PILES DO NOT REQUIRE REDUCTION FOR PILE EMBEDMENT.

② SEE STANDARD PIOL FOR "K" DIMENSION.

③ NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

NOTE: FRICTION BEARING INCLUDES SIDE FRICTION AND END BEARING IN SOIL.
POINT BEARING INCLUDES SIDE FRICTION AND POINT BEARING IN ROCK.

05-13
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

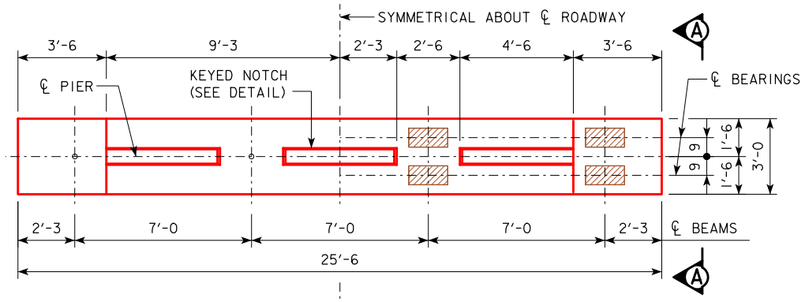
DECEMBER, 2006

PILE BENT PIERS

0° SKEW

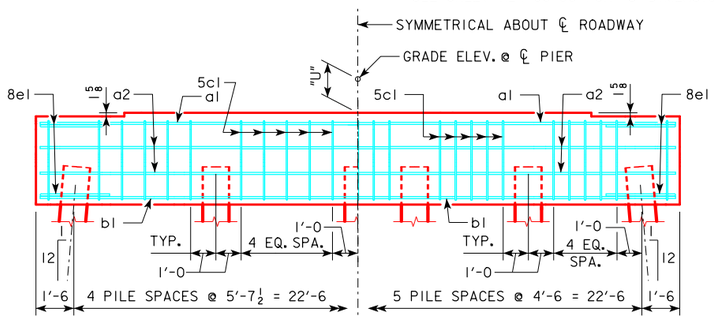
H24-42-06

REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.



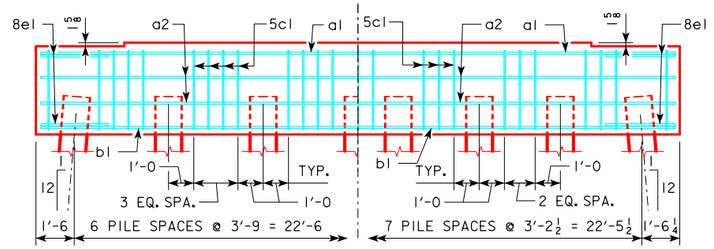
TYPICAL PLAN

NOTE:
SEE SHEET H24-09-06 FOR "U" DIMENSION.



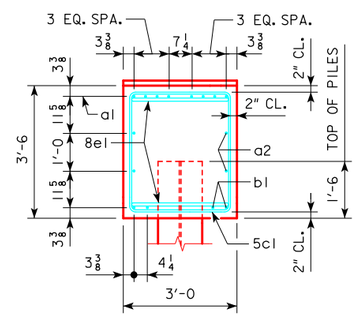
5 PILE BENT

6 PILE BENT

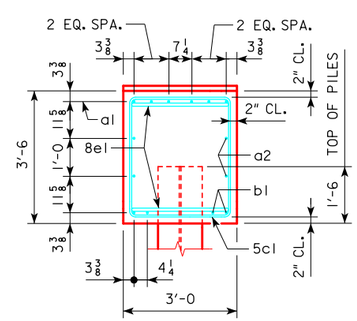


7 PILE BENT

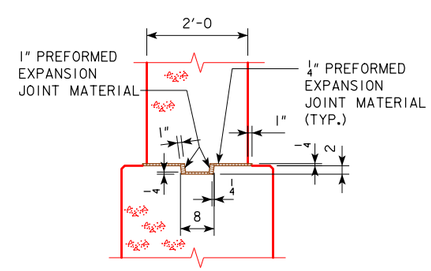
8 PILE BENT



VIEW A-A
FOR 5 & 6 PILE BENTS



VIEW A-A
FOR 7 & 8 PILE BENTS



KEYED NOTCH DETAIL

PILE BENT NOTES:

THESE PIER BENTS ARE DESIGNED FOR USE IN LOCATIONS WHERE ICE AND DRIFT CONDITIONS ARE NOT SEVERE.

FOR DETAILS OF TRESTLE PILES, SEE STANDARD PIOL.

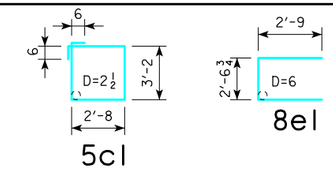
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

			5 PILE BENT			6 PILE BENT			7 PILE BENT			8 PILE BENT		
BAR	LENGTH	SHAPE	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
a1	25'-2		8	9	685	8	9	685	6	9	513	6	9	513
a2	25'-2		4	8	269	4	8	269	4	8	269	4	8	269
b1	25'-2		4	8	269	4	8	269	4	8	269	4	8	269
5c1	12'-8		22	5	291	27	5	357	26	5	343	23	5	304
8e1	8'-1		4	8	86	4	8	86	4	8	86	4	8	86
REINFORCING STEEL (LB.)			1600			1666			1480			1441		
STRUCTURAL CONCRETE (CY)		PILE TYPE 3	10.2			10.2			10.2			10.2		

BENT BAR DETAILS



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

FRICTION OR POINT BEARING PILING

℄-℄ ABUTMENT BEARING	PIOL TYPE 3		
	NUMBER OF TRESTLE PILES	PILE SIZE	(1) LRFD Pu, STRENGTH I, DES. LOAD (KIPS)
138'-10	5	HP14x73	170
	5	HP14x89	170
151'-4	5	HP14x73	179
	5	HP14x89	179
163'-10	6	HP14x73	161
	5	HP14x89	193
176'-4	6	HP14x73	168
	5	HP14x89	201
188'-10	6	HP14x73	175
	5	HP14x89	210
201'-4	7	HP14x73	166
	6	HP14x89	194
213'-10	7	HP14x73	174
	6	HP14x89	203
226'-4	7	HP14x73	184
	6	HP14x89	214
243'-0	8	HP14x73	169
	6	HP14x89	226

(1) NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

NOTE: FRICTION BEARING INCLUDES SIDE FRICTION AND END BEARING IN SOIL. POINT BEARING INCLUDES SIDE FRICTION AND POINT BEARING IN ROCK.

05-13
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

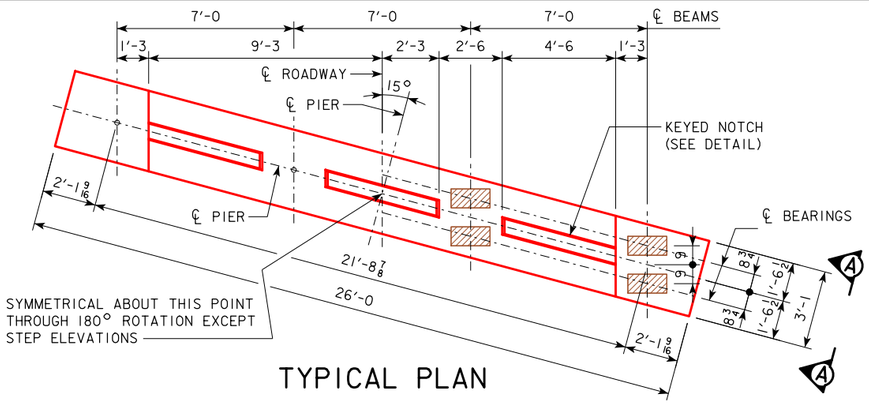
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

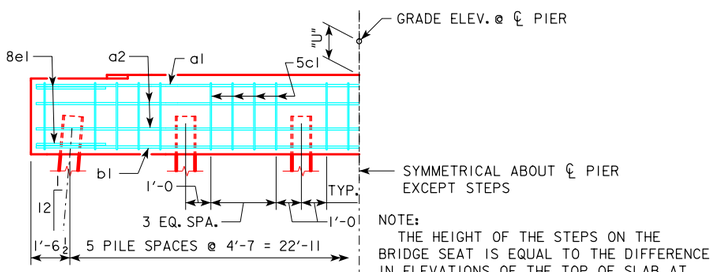
PILE BENT PIERS
HP14 PILES
0° SKEW

H24-43-06

REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.

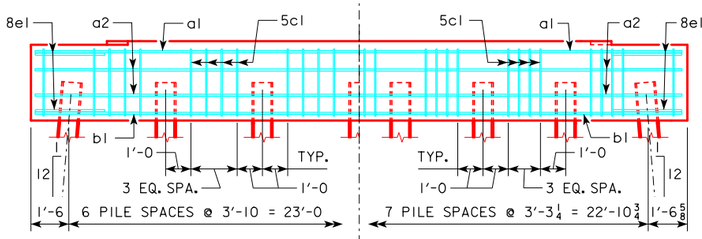


TYPICAL PLAN



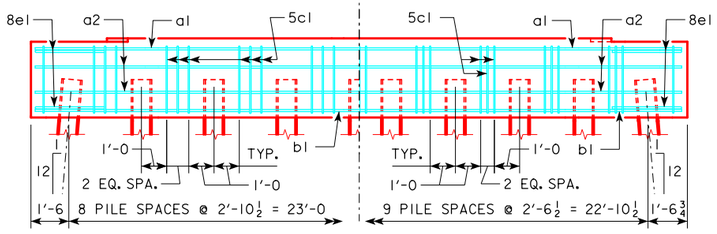
NOTE:
THE HEIGHT OF THE STEPS ON THE BRIDGE SEAT IS EQUAL TO THE DIFFERENCE IN ELEVATIONS OF THE TOP OF SLAB AT ADJACENT BEAMS ALONG ℄ PIER.
SEE SHEET H24-15-06 FOR "U" DIMENSION.

6 PILE BENT



7 PILE BENT

8 PILE BENT



9 PILE BENT

10 PILE BENT

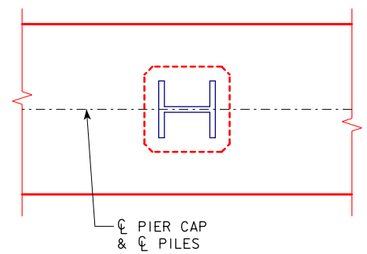
PILE BENT NOTES:

THESE PIER BENTS ARE DESIGNED FOR USE IN LOCATIONS WHERE ICE AND DRIFT CONDITIONS ARE NOT SEVERE.

FOR DETAILS OF TRESTLE PILES, TYPES 1, 2 AND 3, SEE STANDARD PIOL.

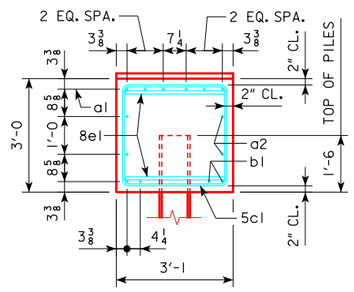
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

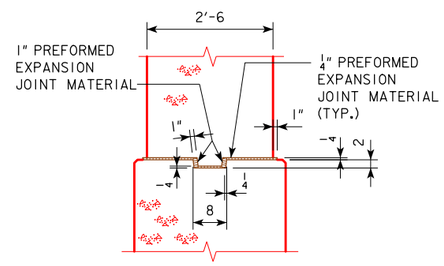


PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

NOTE: FRICTION BEARING INCLUDES SIDE FRICTION AND END BEARING IN SOIL. POINT BEARING INCLUDES SIDE FRICTION AND POINT BEARING IN ROCK.



VIEW A-A
FOR 6, 7, 8, 9 & 10 PILE BENTS

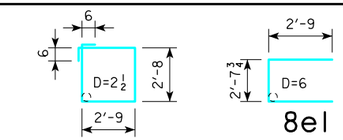


KEYED NOTCH DETAIL

REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

			6 PILE BENT			7 PILE BENT			8 PILE BENT			9 PILE BENT			10 PILE BENT		
BAR	LENGTH	SHAPE	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
a1	25'-8		6	9	524	6	9	524	6	9	524	6	9	524	6	9	524
a2	25'-8		4	8	274	4	8	274	4	8	274	4	8	274	4	8	274
b1	25'-8		4	8	274	4	8	274	4	8	274	4	8	274	4	8	274
5c1	11'-10		22	5	272	26	5	321	30	5	370	26	5	321	29	5	358
8e1	8'-2		4	8	87	4	8	87	4	8	87	4	8	87	4	8	87
(1) REINFORCING STEEL (LB.)			1431			1480			1529			1480			1517		
STRUCTURAL (2) CONCRETE (CY)		PILE TYPE															
		1, 2	-----			-----			8.8			8.8			8.8		
		3	9.2			9.2			9.2			9.2			9.2		

BENT BAR DETAILS



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

℄-℄ ABUTMENT BEARING	FRICTION BEARING PILING			FRICTION OR POINT BEARING PILING		
	PIOL TYPE 1 OR 2			PIOL TYPE 3		
	NUMBER OF TRESTLE PILES	(3) "K" (INCHES)	(4) LRFD Pu, STRENGTH I, DES. LOAD (KIPS)	NUMBER OF TRESTLE PILES	PILE SIZE	(4) LRFD Pu, STRENGTH I, DES. LOAD (KIPS)
138'-10	-----	--	-----	6	HP10x57	142
	-----	--	-----	7	HP12x53	122
151'-4	-----	--	-----	7	HP10x57	128
	-----	--	-----	7	HP12x53	128
163'-10	-----	--	-----	7	HP10x57	138
				8	HP12x53	121
176'-4	-----	--	-----	7	HP10x57	144
				8	HP12x53	126
188'-10	-----	--	-----	8	HP10x57	132
				8	HP12x53	132
201'-4	-----	--	-----	9	HP10x57	130
				9	HP12x53	130
213'-10	-----	--	-----	9	HP10x57	136
				10	HP12x53	123
226'-4	-----	--	-----	9	HP10x57	144
				10	HP12x53	129
243'-0	-----	--	-----	10	HP10x57	136

(1) SEE SHEET H24-17-06 FOR STEP REINFORCING STEEL QUANTITIES AND DETAILS.

(2) CONCRETE QUANTITIES SHOWN HAVE HAD THE VOLUME OF EMBEDDED PILES DEDUCTED FOR TYPES 1 AND 2 BASED ON 0.8 FT^3 PER FOOT OF EMBEDMENT. THE CONCRETE QUANTITIES FOR TYPE 3 PILES DO NOT REQUIRE REDUCTION FOR PILE EMBEDMENT.

(3) SEE STANDARD PIOL FOR "K" DIMENSION.

(4) NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

05-13
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

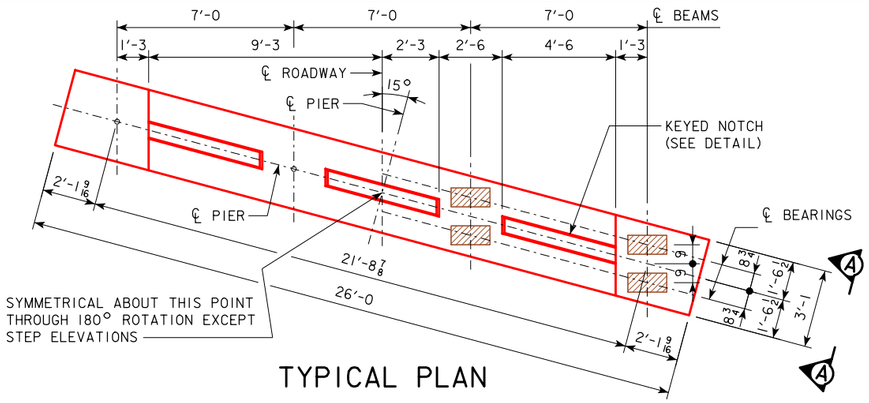
DECEMBER, 2006

PILE BENT PIERS

15° SKEW

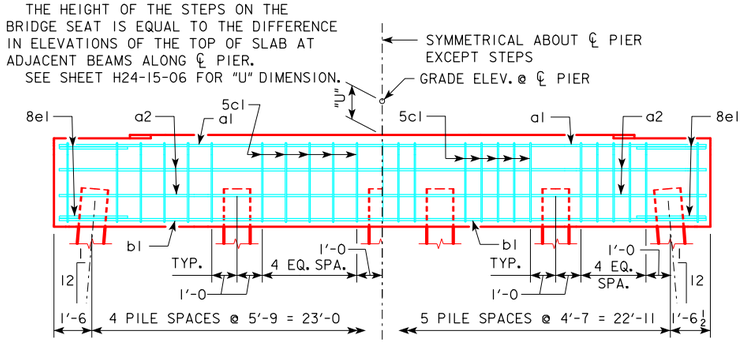
H24-44-06

REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.



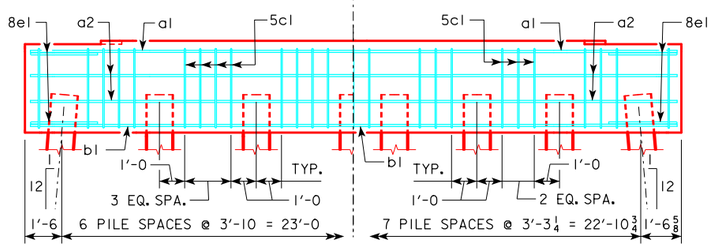
TYPICAL PLAN

NOTE:
THE HEIGHT OF THE STEPS ON THE BRIDGE SEAT IS EQUAL TO THE DIFFERENCE IN ELEVATIONS OF THE TOP OF SLAB AT ADJACENT BEAMS ALONG ℄ PIER.
SEE SHEET H24-15-06 FOR "U" DIMENSION.



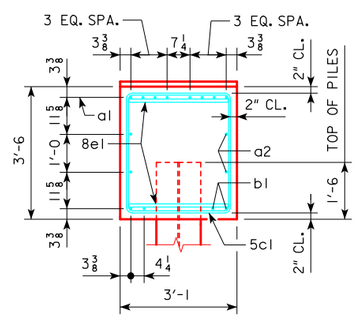
5 PILE BENT

6 PILE BENT

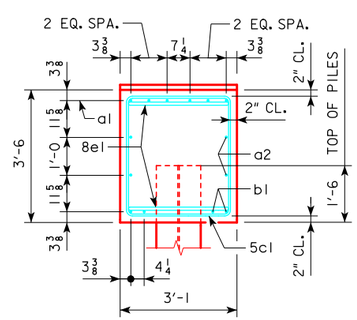


7 PILE BENT

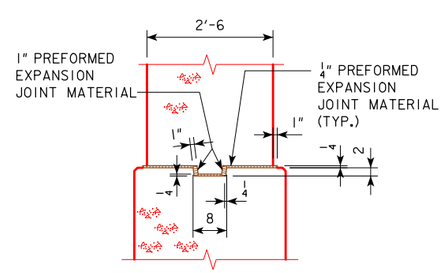
8 PILE BENT



VIEW A-A
FOR 5 & 6 PILE BENTS



VIEW A-A
FOR 7 & 8 PILE BENTS



KEYED NOTCH DETAIL

PILE BENT NOTES:

THESE PIER BENTS ARE DESIGNED FOR USE IN LOCATIONS WHERE ICE AND DRIFT CONDITIONS ARE NOT SEVERE.

FOR DETAILS OF TRESTLE PILES, SEE STANDARD PIOL.

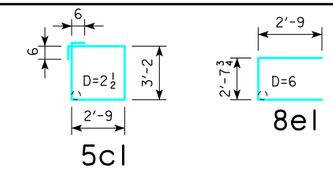
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

			5 PILE BENT			6 PILE BENT			7 PILE BENT			8 PILE BENT		
BAR	LENGTH	SHAPE	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
a1	25'-8		8	9	698	8	9	698	6	9	524	6	9	524
a2	25'-8		4	8	274	4	8	274	4	8	274	4	8	274
b1	25'-8		4	8	274	4	8	274	4	8	274	4	8	274
5c1	12'-10		22	5	294	27	5	361	26	5	348	23	5	308
8e1	8'-2		4	8	87	4	8	87	4	8	87	4	8	87
(1) REINFORCING STEEL (LB.)			1627			1694			1507			1467		
STRUCTURAL CONCRETE (CY)		PILE TYPE 3	10.7			10.7			10.7			10.7		

BENT BAR DETAILS



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

FRICTION OR POINT BEARING PILING

℄-℄ ABUTMENT BEARING	PIOL TYPE 3		
	NUMBER OF TRESTLE PILES	PILE SIZE	(2) LRFD Pu, STRENGTH I, DES. LOAD (KIPS)
138'-10	5	HP14x73	172
	5	HP14x89	172
151'-4	5	HP14x73	181
	5	HP14x89	181
163'-10	6	HP14x73	162
	5	HP14x89	195
176'-4	6	HP14x73	170
	5	HP14x89	204
188'-10	6	HP14x73	177
	5	HP14x89	212
201'-4	7	HP14x73	168
	6	HP14x89	196
213'-10	7	HP14x73	176
	6	HP14x89	206
226'-4	8	HP14x73	162
	6	HP14x89	217
243'-0	8	HP14x73	171
	7	HP14x89	195

(1) SEE SHEET H24-17-06 FOR STEP REINFORCING STEEL QUANTITIES AND DETAILS.

(2) NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

NOTE: FRICTION BEARING INCLUDES SIDE FRICTION AND END BEARING IN SOIL. POINT BEARING INCLUDES SIDE FRICTION AND POINT BEARING IN ROCK.

05-13
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

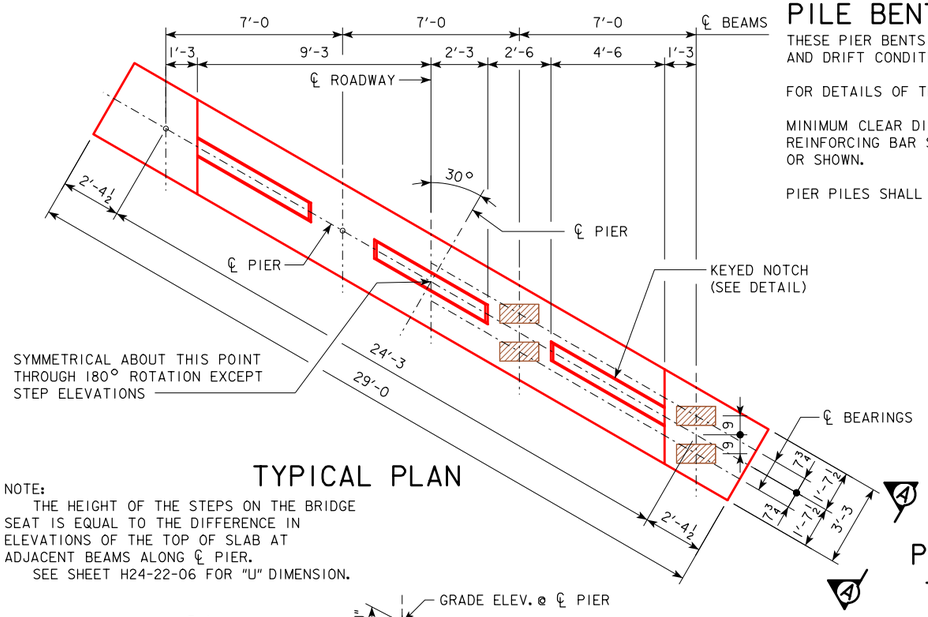
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

PILE BENT PIERS
HP14 PILES
15° SKEW

H24-45-06

REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.



TYPICAL PLAN

NOTE:
THE HEIGHT OF THE STEPS ON THE BRIDGE SEAT IS EQUAL TO THE DIFFERENCE IN ELEVATIONS OF THE TOP OF SLAB AT ADJACENT BEAMS ALONG ℄ PIER.
SEE SHEET H24-22-06 FOR "U" DIMENSION.

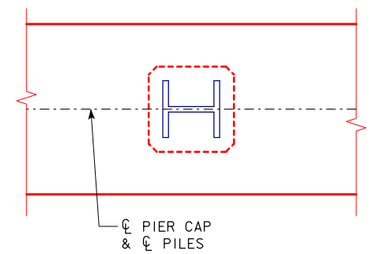
PILE BENT NOTES:

THESE PIER BENTS ARE DESIGNED FOR USE IN LOCATIONS WHERE ICE AND DRIFT CONDITIONS ARE NOT SEVERE.

FOR DETAILS OF TRESTLE PILES, TYPES 1, 2 AND 3, SEE STANDARD PIOL.

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

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

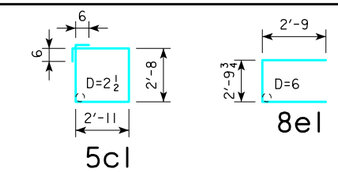


PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

			6 PILE BENT			7 PILE BENT			8 PILE BENT			9 PILE BENT			10 PILE BENT			11 PILE BENT		
BAR	LENGTH	SHAPE	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
a1	28'-8		8	9	780	6	9	585	6	9	585	6	9	585	6	9	585	6	9	585
a2	28'-8		4	8	306	4	8	306	4	8	306	4	8	306	4	8	306	4	8	306
b1	28'-8		4	9	390	4	9	390	4	9	390	4	9	390	4	8	306	4	8	306
5c1	12'-2		27	5	343	26	5	330	30	5	381	34	5	431	29	5	368	32	5	406
8e1	8'-4		4	8	89	4	8	89	4	8	89	4	8	89	4	8	89	4	8	89
(1) REINFORCING STEEL (LB.)			1908			1700			1751			1801			1654			1692		
STRUCTURAL CONCRETE (CY) (2)		PILE TYPE																		
		1, 2	-----			-----			10.5			10.4			10.4			10.3		
		3	10.8			10.8			10.8			10.8			10.8			10.8		

BENT BAR DETAILS



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

℄-℄ ABUTMENT BEARING	FRICTION BEARING PILING — PIOL TYPE 1 OR 2: NUMBER OF TRESTLE PILES	(3) "K" (INCHES)	(4) LRFD Pu, STRENGTH I, DES. LOAD (KIPS)	FRICTION OR POINT BEARING PILING — PIOL TYPE 3: NUMBER OF TRESTLE PILES	PILE SIZE	(4) LRFD Pu, STRENGTH I, DES. LOAD (KIPS)
138'-10	-----	--	-----	6	HP10x57	145
	-----	--	-----	7	HP12x53	124
151'-4	-----	--	-----	7	HP10x57	130
	-----	--	-----	7	HP12x53	130
163'-10	-----	--	-----	7	HP10x57	140
	-----	--	-----	8	HP12x53	123
176'-4	-----	--	-----	8	HP10x57	128
	-----	--	-----	8	HP12x53	128
188'-10	-----	--	-----	8	HP10x57	134
				8	HP12x53	134
201'-4	-----	--	-----	9	HP10x57	131
				9	HP12x53	131
213'-10	-----	--	-----	9	HP10x57	138
				10	HP12x53	124
226'-4	-----	--	-----	9	HP10x57	145
				10	HP12x53	131
243'-0	-----	--	-----	10	HP10x57	138
				11	HP12x53	125

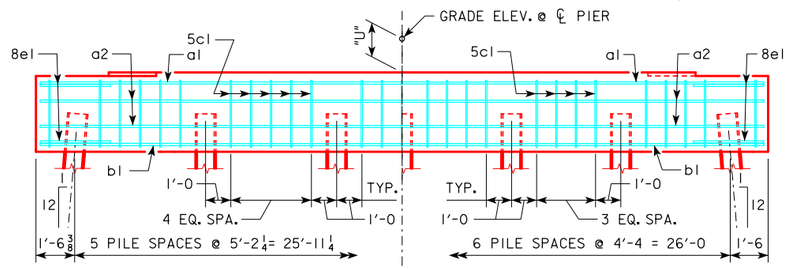
(1) SEE SHEET H24-24-06 FOR STEP REINFORCING STEEL QUANTITIES AND DETAILS.

(2) CONCRETE QUANTITIES SHOWN HAVE HAD THE VOLUME OF EMBEDDED PILES DEDUCTED FOR TYPES 1 AND 2 BASED ON 0.8 FT^3 PER FOOT OF EMBEDMENT. THE CONCRETE QUANTITIES FOR TYPE 3 PILES DO NOT REQUIRE REDUCTION FOR PILE EMBEDMENT.

(3) SEE STANDARD PIOL FOR "K" DIMENSION.

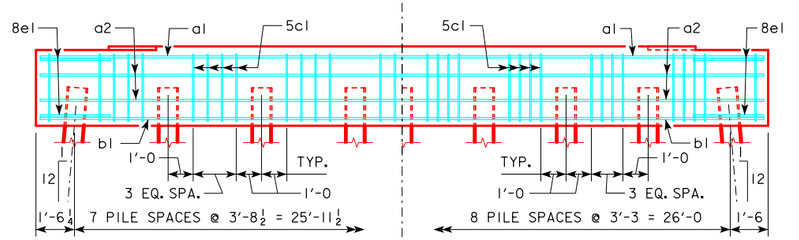
(4) NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

NOTE: FRICTION BEARING INCLUDES SIDE FRICTION AND END BEARING IN SOIL. POINT BEARING INCLUDES SIDE FRICTION AND POINT BEARING IN ROCK.



6 PILE BENT

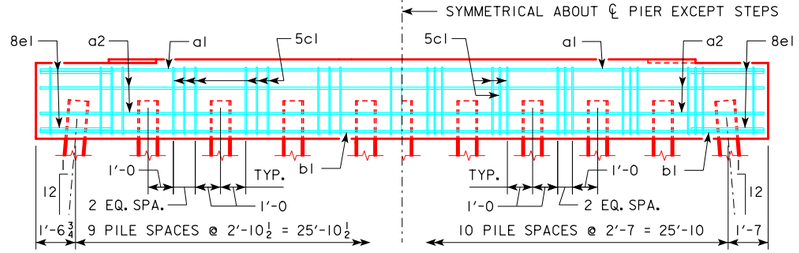
7 PILE BENT



8 PILE BENT

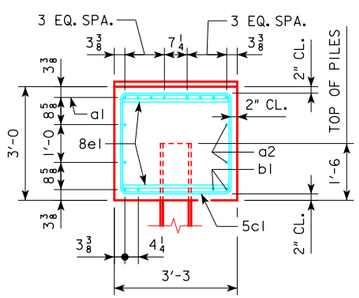
9 PILE BENT

SYMMETRICAL ABOUT ℄ PIER EXCEPT STEPS

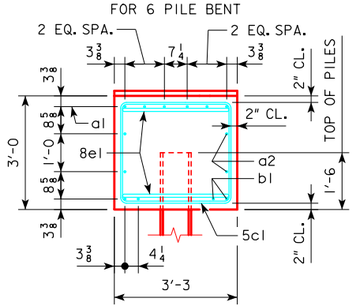


10 PILE BENT

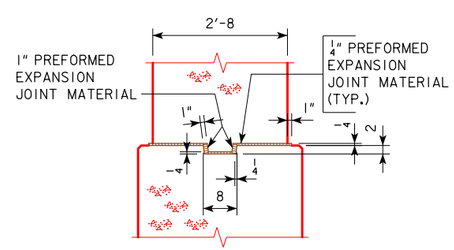
11 PILE BENT



VIEW A-A
FOR 6 PILE BENT



VIEW A-A
FOR 7, 8, 9, 10 & 11 PILE BENTS



KEYED NOTCH DETAIL

05-13
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

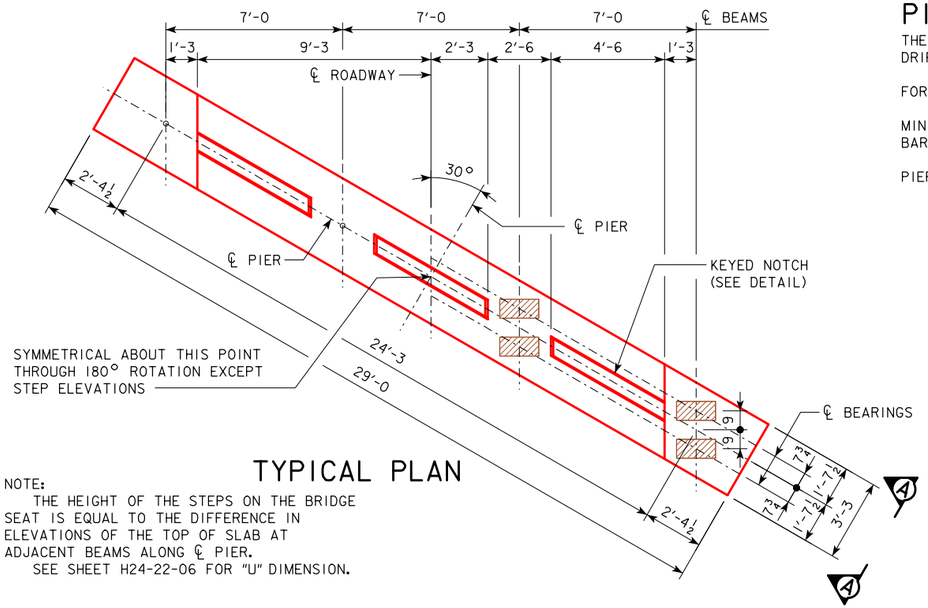
DECEMBER, 2006

PILE BENT PIERS

30° SKEW

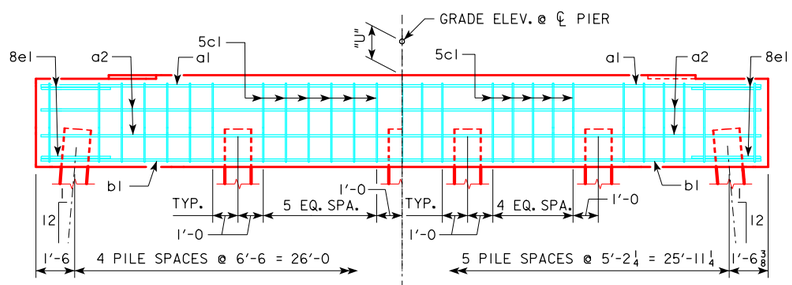
H24-46-06

REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.



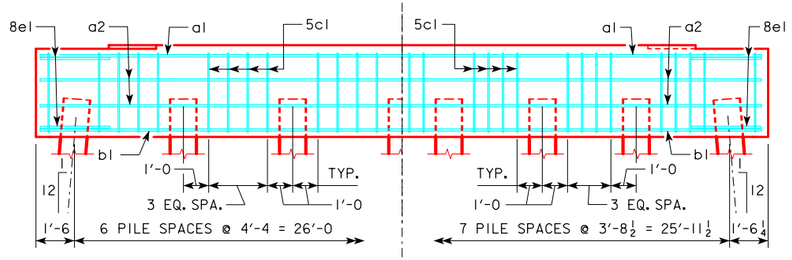
TYPICAL PLAN

NOTE:
THE HEIGHT OF THE STEPS ON THE BRIDGE SEAT IS EQUAL TO THE DIFFERENCE IN ELEVATIONS OF THE TOP OF SLAB AT ADJACENT BEAMS ALONG ℄ PIER.
SEE SHEET H24-22-06 FOR "U" DIMENSION.



5 PILE BENT

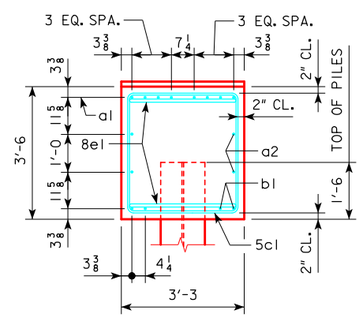
6 PILE BENT



7 PILE BENT

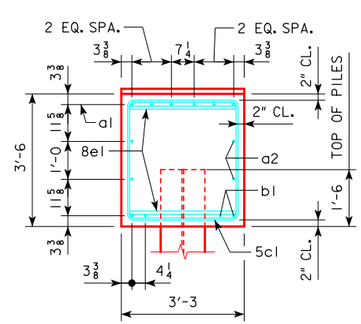
8 PILE BENT

SYMMETRICAL ABOUT ℄ PIER EXCEPT STEPS



VIEW A-A

FOR 5 & 6 PILE BENTS



VIEW A-A

FOR 7 & 8 PILE BENTS

PILE BENT NOTES:

THESE PIER BENTS ARE DESIGNED FOR USE IN LOCATIONS WHERE ICE AND DRIFT CONDITIONS ARE NOT SEVERE.

FOR DETAILS OF TRESTLE PILES, SEE STANDARD PIOL.

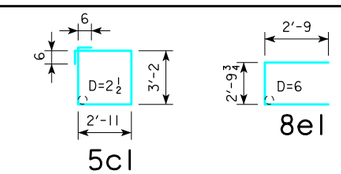
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

			5 PILE BENT			6 PILE BENT			7 PILE BENT			8 PILE BENT		
BAR	LENGTH	SHAPE	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
a1	28'-8		8	9	780	8	9	780	6	9	585	6	9	585
a2	28'-8		4	8	306	4	8	306	4	8	306	4	8	306
b1	28'-8		4	8	306	4	8	306	4	8	306	4	8	306
5c1	13'-2		26	5	357	27	5	371	26	5	357	30	5	412
8e1	8'-4		4	8	89	4	8	89	4	8	89	4	8	89
(1) REINFORCING STEEL (LB.)			1838			1852			1643			1698		
STRUCTURAL		PILE TYPE												
CONCRETE (CY)		3	12.6			12.6			12.6			12.6		

BENT BAR DETAILS



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

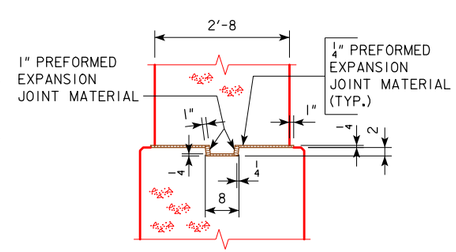
FRICTION OR POINT BEARING PILING

℄-℄ ABUTMENT BEARING	PIOL TYPE 3		
	NUMBER OF TRESTLE PILES	PILE SIZE	(2) LRFD Pu, STRENGTH I, DES. LOAD (KIPS)
138'-10	5	HP14x73	175
	5	HP14x89	175
151'-4	5	HP14x73	184
	5	HP14x89	184
163'-10	6	HP14x73	165
	5	HP14x89	198
176'-4	6	HP14x73	172
	5	HP14x89	207
188'-10	6	HP14x73	180
	5	HP14x89	216
201'-4	7	HP14x73	170
	6	HP14x89	199
213'-10	7	HP14x73	179
	6	HP14x89	208
226'-4	8	HP14x73	165
	6	HP14x89	219
243'-0	8	HP14x73	173
	7	HP14x89	198

(1) SEE SHEET H24-24-06 FOR STEP REINFORCING STEEL QUANTITIES AND DETAILS.

(2) NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

NOTE: FRICTION BEARING INCLUDES SIDE FRICTION AND END BEARING IN SOIL. POINT BEARING INCLUDES SIDE FRICTION AND POINT BEARING IN ROCK.



KEYED NOTCH DETAIL

05-13
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

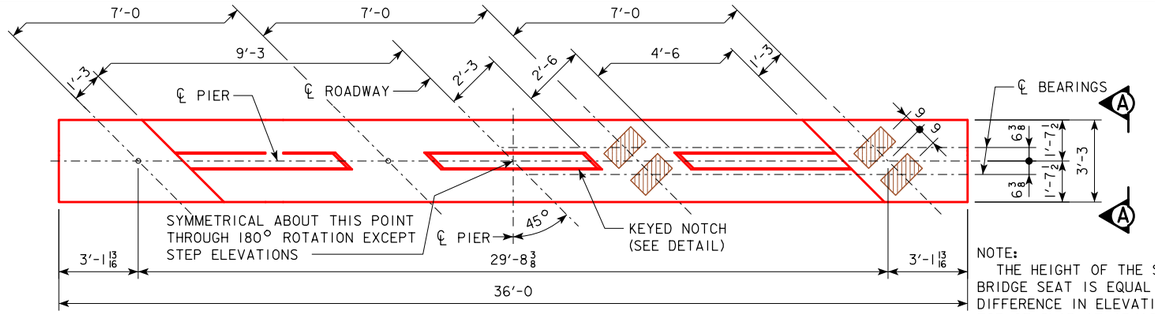
DECEMBER, 2006

PILE BENT PIERS HP14 PILES

30° SKEW

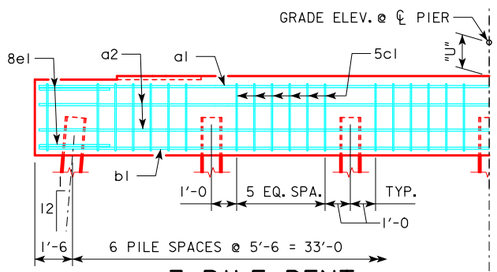
H24-47-06

REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.

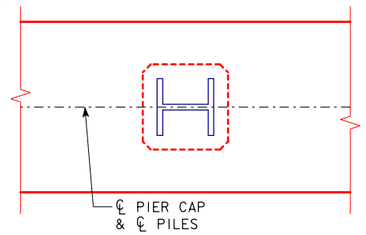


TYPICAL PLAN

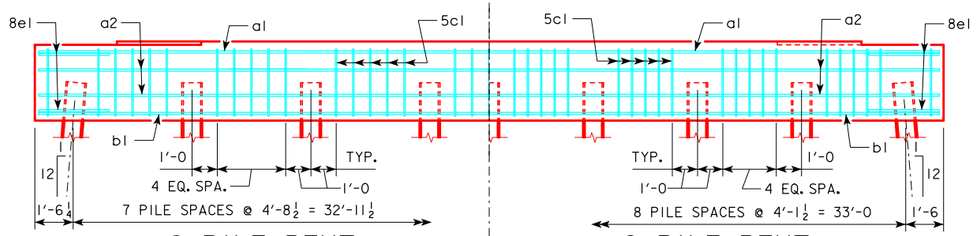
NOTE:
THE HEIGHT OF THE STEPS ON THE BRIDGE SEAT IS EQUAL TO THE DIFFERENCE IN ELEVATIONS OF THE TOP OF SLAB AT ADJACENT BEAMS ALONG ℄ PIER.
SEE SHEET H24-29-06 FOR "U" DIMENSION.



7 PILE BENT



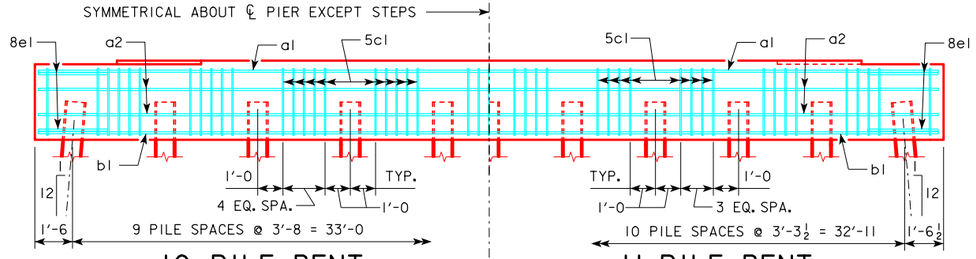
PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES



8 PILE BENT

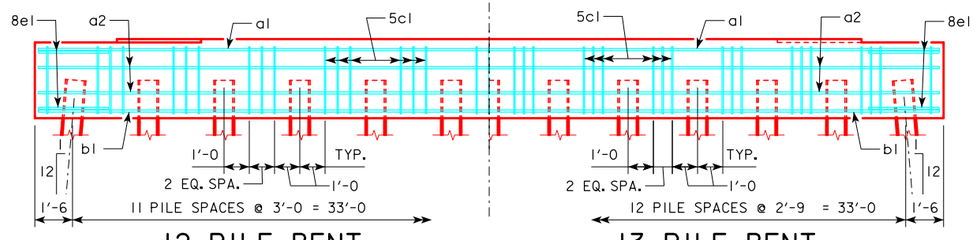
9 PILE BENT

SYMMETRICAL ABOUT ℄ PIER EXCEPT STEPS



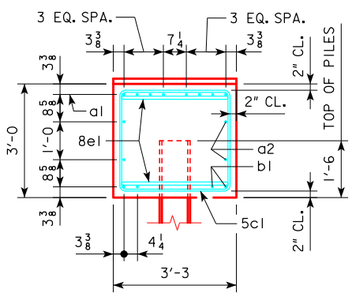
10 PILE BENT

11 PILE BENT

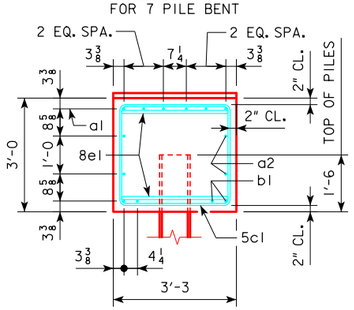


12 PILE BENT

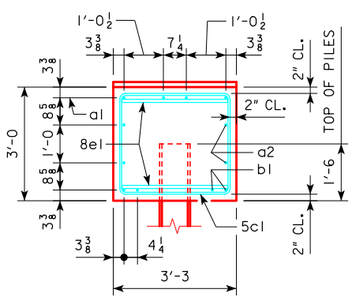
13 PILE BENT



VIEW A-A
FOR 7 PILE BENT



VIEW A-A
FOR 8, 9, 10 & 11 PILE BENTS



VIEW A-A
FOR 12 & 13 PILE BENTS

REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

			7 PILE BENT			8 PILE BENT			9 PILE BENT			10 PILE BENT			11 PILE BENT			12 PILE BENT			13 PILE BENT		
BAR	LENGTH	SHAPE	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
a1	35'-8		8	9	970	6	9	728	6	9	728	6	9	728	6	9	728	4	9	485	4	9	485
a2	35'-8		4	8	381	4	8	381	4	8	381	4	8	381	4	8	381	4	8	381	4	8	381
b1	35'-8		4	9	485	4	9	485	4	9	485	4	9	485	4	9	485	4	8	381	4	8	381
5c1	12'-2		38	5	482	37	5	470	42	5	533	47	5	596	42	5	533	35	5	444	38	5	482
8e1	8'-4		4	8	89	4	8	89	4	8	89	4	8	89	4	8	89	4	8	89	4	8	89
(1) REINFORCING STEEL (LB.)			2407			2153			2216			2279			2216			1780			1818		
STRUCTURAL CONCRETE (CY)	(2)	PILE TYPE																					
		1, 2	-----			-----			13.2			13.1			13.1			13.1			13.0		
		3	13.6			13.6			13.6			13.6			13.6			-----			-----		

PILE BENT NOTES:

THESE PIER BENTS ARE DESIGNED FOR USE IN LOCATIONS WHERE ICE AND DRIFT CONDITIONS ARE NOT SEVERE.

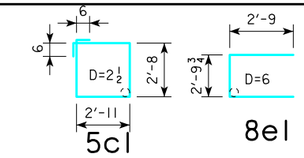
FOR DETAILS OF TRESTLE PILES, TYPES 1, 2 AND 3, SEE STANDARD PIOL.

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

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

BENT BAR DETAILS

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



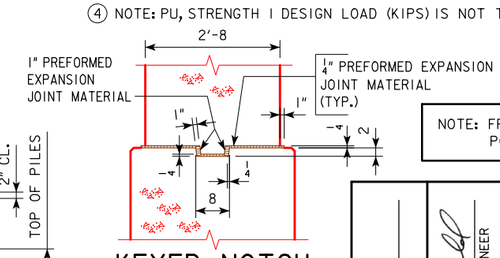
℄-℄ ABUTMENT BEARING	FRICTION BEARING PILING			FRICTION OR POINT BEARING PILING		
	PIOL TYPE 1 OR 2			PIOL TYPE 3		
	NUMBER OF TRESTLE PILES	(3) "K" (INCHES)	(4) LRFD Pu, STRENGTH I, DES. LOAD (KIPS)	NUMBER OF TRESTLE PILES	PILE SIZE	(4) LRFD Pu, STRENGTH I, DES. LOAD (KIPS)
138'-10	10	14	89	7	HP10x57	127
	9	16	99	7	HP12x53	127
151'-4	10	14	93	7	HP10x57	133
	9	16	104	7	HP12x53	133
163'-10	11	14	91	7	HP10x57	144
	10	16	101	8	HP12x53	126
176'-4	12	14	87	8	HP10x57	131
	10	16	105	8	HP12x53	131
188'-10	12	14	91	8	HP10x57	137
	10	16	109	9	HP12x53	121
201'-4	-----	--	-----	9	HP10x57	134
	-----	--	-----	9	HP12x53	134
213'-10	-----	--	-----	9	HP10x57	141
				10	HP12x53	127
226'-4	-----	--	-----	10	HP10x57	133
				10	HP12x53	133
243'-0	-----	--	-----	10	HP10x57	140
				11	HP12x53	127

(1) SEE SHEET H24-31-06 FOR STEP REINFORCING STEEL QUANTITIES AND DETAILS.

(2) CONCRETE QUANTITIES SHOWN HAVE HAD THE VOLUME OF EMBEDDED PILES DEDUCTED FOR TYPES 1 AND 2 BASED ON 0.8 FT^3 PER FOOT OF EMBEDMENT. THE CONCRETE QUANTITIES FOR TYPE 3 PILES DO NOT REQUIRE REDUCTION FOR PILE EMBEDMENT.

(3) SEE STANDARD PIOL FOR "K" DIMENSION.

(4) NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



KEYED NOTCH DETAIL

NOTE: FRICTION BEARING INCLUDES SIDE FRICTION AND END BEARING IN SOIL.
POINT BEARING INCLUDES SIDE FRICTION AND POINT BEARING IN ROCK.

05-13
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

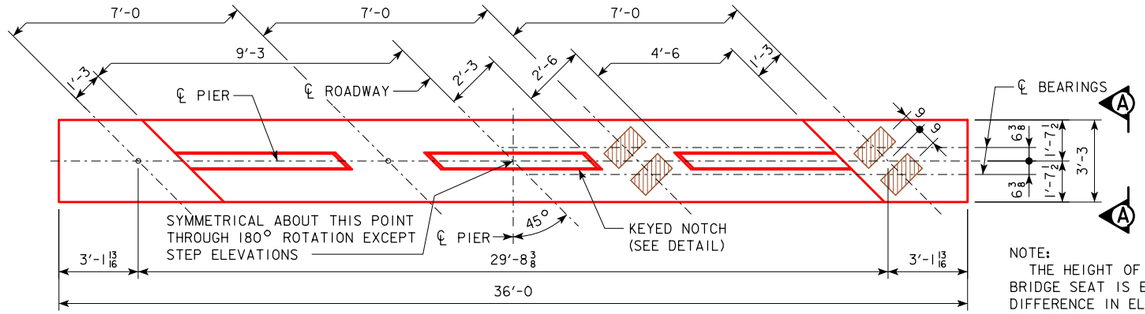
DECEMBER, 2006

PILE BENT PIERS

45° SKEW

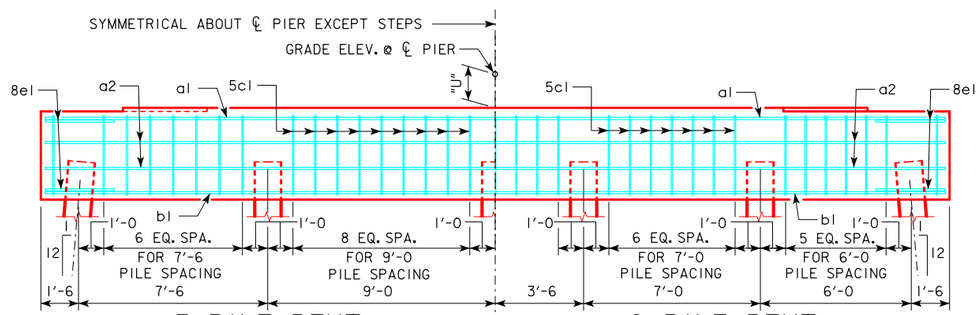
H24-48-06

REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.



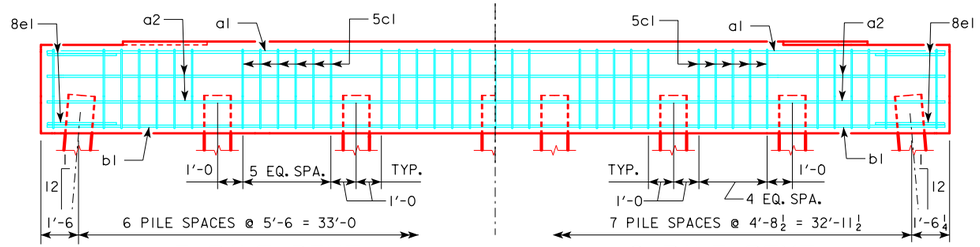
TYPICAL PLAN

NOTE:
THE HEIGHT OF THE STEPS ON THE BRIDGE SEAT IS EQUAL TO THE DIFFERENCE IN ELEVATIONS OF THE TOP OF SLAB AT ADJACENT BEAMS ALONG ℄ PIER.
SEE SHEET H24-29-06 FOR "U" DIMENSION.



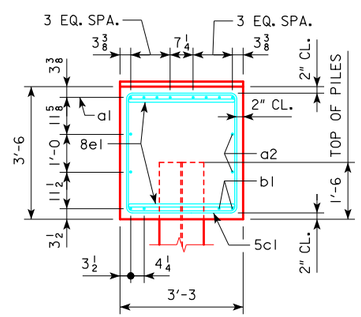
5 PILE BENT

6 PILE BENT

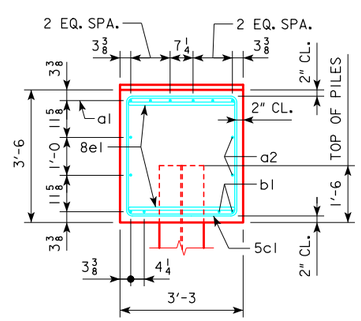


7 PILE BENT

8 PILE BENT



VIEW A-A
FOR 5, 6 & 7 PILE BENTS



VIEW A-A
FOR 8 PILE BENT

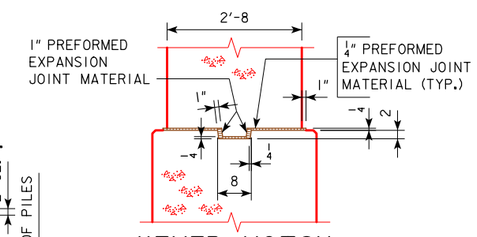
PILE BENT NOTES:

THESE PIER BENTS ARE DESIGNED FOR USE IN LOCATIONS WHERE ICE AND DRIFT CONDITIONS ARE NOT SEVERE.

FOR DETAILS OF TRESTLE PILES, SEE STANDARD PIOL.

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

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

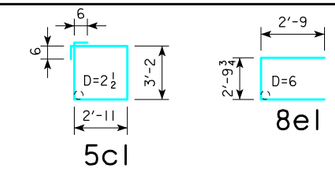


KEYED NOTCH DETAIL

REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

BAR	LENGTH	SHAPE	5 PILE BENT NO.	5 PILE BENT SIZE	5 PILE BENT WEIGHT	6 PILE BENT NO.	6 PILE BENT SIZE	6 PILE BENT WEIGHT	7 PILE BENT NO.	7 PILE BENT SIZE	7 PILE BENT WEIGHT	8 PILE BENT NO.	8 PILE BENT SIZE	8 PILE BENT WEIGHT
a1	35'-8		8	9	970	8	9	970	8	9	970	6	9	728
a2	35'-8		4	8	381	4	8	381	4	8	381	4	8	381
b1	35'-8		4	8	381	4	10	614	4	9	485	4	8	381
5c1	13'-2		34	5	467	35	5	481	38	5	522	37	5	508
8e1	8'-4		4	8	89	4	8	89	4	8	89	4	8	89
(1) REINFORCING STEEL (LB.)			2288			2535			2447			2087		
STRUCTURAL CONCRETE (CY)		PILE TYPE 3	15.8			15.8			15.8			15.8		

BENT BAR DETAILS



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

FRICTION OR POINT BEARING PILING

℄-℄ ABUTMENT BEARING	PIOL TYPE 3: NUMBER OF TRESTLE PILES	PILE SIZE	(2) LRFD Pu, STRENGTH I, DES. LOAD (KIPS)
138'-10	5	HP14x73	180
	5	HP14x89	180
151'-4	6	HP14x73	157
	5	HP14x89	189
163'-10	6	HP14x73	169
	5	HP14x89	203
176'-4	6	HP14x73	177
	5	HP14x89	212
188'-10	6	HP14x73	184
	5	HP14x89	221
201'-4	7	HP14x73	174
	6	HP14x89	203
213'-10	7	HP14x73	182
	6	HP14x89	213
226'-4	8	HP14x73	168
	6	HP14x89	224
243'-0	8	HP14x73	176
	7	HP14x89	202

(1) SEE SHEET H24-31-06 FOR STEP REINFORCING STEEL QUANTITIES AND DETAILS.

(2) NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

NOTE: FRICTION BEARING INCLUDES SIDE FRICTION AND END BEARING IN SOIL. POINT BEARING INCLUDES SIDE FRICTION AND POINT BEARING IN ROCK.

05-13
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

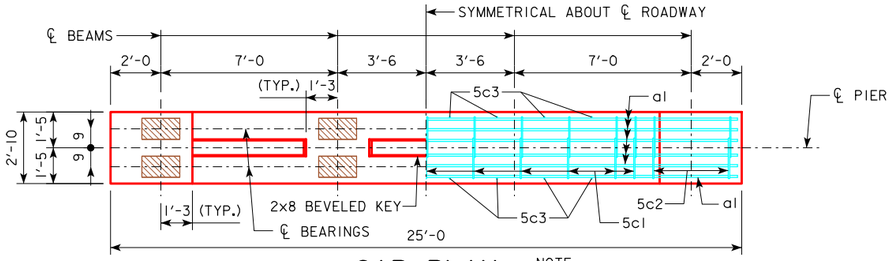
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

PILE BENT PIERS
HP14 PILES
45° SKEW

H24-49-06

REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.

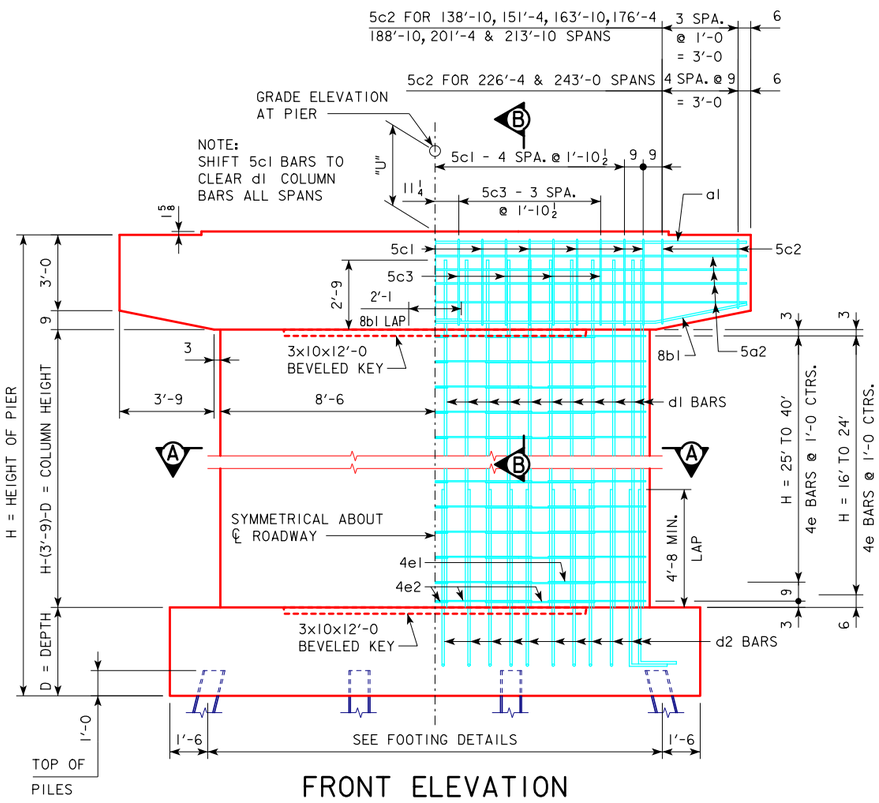


CAP PLAN

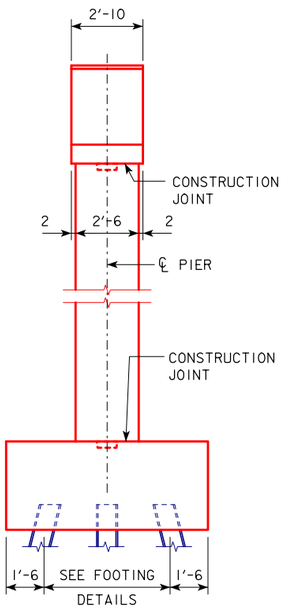
NOTE:
FOR SIZE OF BEARING PADS SEE H24-41-06.

CAP

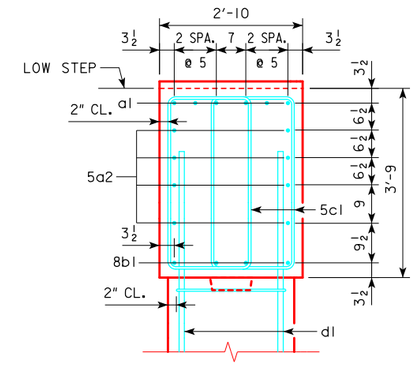
REINFORCING STEEL			℄ - ℄ ABUT. BEARINGS	138'-10			151'-4			163'-10			176'-4			188'-10			201'-4			213'-10			226'-4			243'-0		
BAR	LENGTH	SHAPE		NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
a1	24'-8			6	8	395	6	8	395	6	8	395	6	8	395	6	8	395	6	8	395	6	8	395	6	9	503	6	9	503
5a2	24'-8			8	5	206	8	5	206	8	5	206	8	5	206	8	5	206	8	5	206	8	5	206	8	5	206	8	5	206
8b1	13'-6			8	8	288	8	8	288	8	8	288	8	8	288	8	8	288	8	8	288	8	8	288	8	8	288	8	8	288
5c1	11'-2			22	5	256	22	5	256	22	5	256	22	5	256	22	5	256	22	5	256	22	5	256	22	5	256	22	5	256
5c2	VARIES			16	5	175	16	5	175	16	5	175	16	5	175	16	5	175	16	5	175	16	5	175	20	5	219	20	5	219
5c3	3'-11			16	5	65	16	5	65	16	5	65	16	5	65	16	5	65	16	5	65	16	5	65	16	5	65	16	5	65
		TOTAL (LB.)		1385			1385			1385			1385			1385			1385			1385			1537			1537		
STRUCTURAL CONCRETE (CY)				9.8			9.8			9.8			9.8			9.8			9.8			9.8			9.8			9.8		



FRONT ELEVATION



END ELEVATION

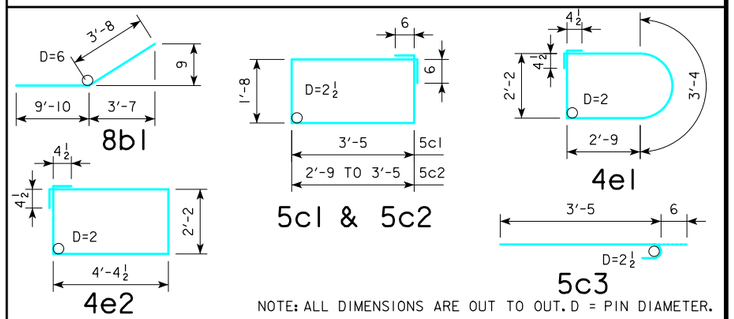


SECTION B-B

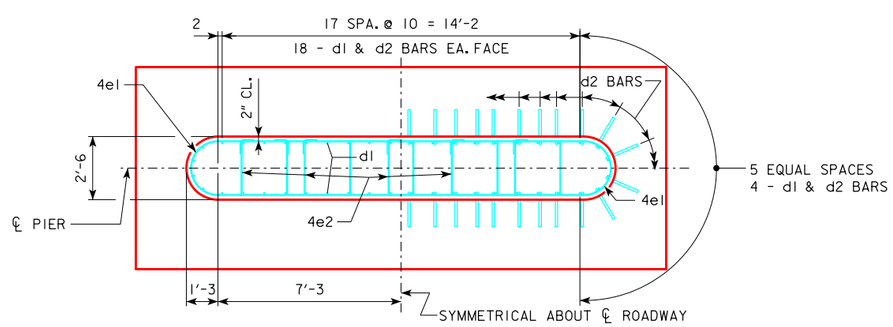
COLUMN

H IN FEET	COLUMN HEIGHT	STRUCTURAL CONCRETE (CY)	REINFORCING STEEL: d1 BAR				4e1 BAR				4e2 BAR				TOTAL WEIGHT (LB.)
			NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	
16	8'-9	13.3	44	9	11'-6	1720	18	4	11'-9	141	36	4	13'-10	333	2194
17	9'-9	14.9	44	9	12'-6	1870	20	4	11'-9	157	40	4	13'-10	370	2397
18	10'-9	16.4	44	9	13'-6	2020	22	4	11'-9	173	44	4	13'-10	407	2600
19	11'-9	17.9	44	9	14'-6	2169	24	4	11'-9	188	48	4	13'-10	444	2801
20	12'-9	19.4	44	9	15'-6	2319	26	4	11'-9	204	52	4	13'-10	481	3004
21	13'-9	21.0	44	9	16'-6	2468	28	4	11'-9	220	56	4	13'-10	517	3205
22	14'-9	22.5	44	9	17'-6	2618	30	4	11'-9	235	60	4	13'-10	554	3407
23	15'-9	24.0	44	9	18'-6	2768	32	4	11'-9	251	64	4	13'-10	591	3610
24	16'-9	25.5	44	9	19'-6	2917	34	4	11'-9	267	68	4	13'-10	628	3812
25	17'-3	26.3	44	9	20'-0	2992	36	4	11'-9	283	72	4	13'-10	665	3940
26	18'-3	27.8	44	9	21'-0	3142	38	4	11'-9	298	76	4	13'-10	702	4142
27	19'-3	29.3	44	9	22'-0	3291	40	4	11'-9	314	80	4	13'-10	739	4344
28	20'-3	30.9	44	9	23'-0	3441	42	4	11'-9	330	84	4	13'-10	776	4547
29	21'-3	32.4	44	9	24'-0	3590	44	4	11'-9	345	88	4	13'-10	813	4748
30	22'-3	33.9	44	9	25'-0	3740	46	4	11'-9	361	92	4	13'-10	850	4951
31	23'-3	35.4	44	9	26'-0	3890	48	4	11'-9	377	96	4	13'-10	887	5154
32	24'-3	37.0	44	9	27'-0	4039	50	4	11'-9	392	100	4	13'-10	924	5355
33	25'-3	38.5	44	9	28'-0	4189	52	4	11'-9	408	104	4	13'-10	961	5558
34	26'-3	40.0	44	9	29'-0	4338	54	4	11'-9	424	108	4	13'-10	998	5760
35	27'-3	41.5	44	9	30'-0	4488	56	4	11'-9	440	112	4	13'-10	1035	5963
36	28'-3	43.1	44	9	31'-0	4638	58	4	11'-9	455	116	4	13'-10	1072	6165
37	29'-3	44.6	44	9	32'-0	4787	60	4	11'-9	471	120	4	13'-10	1109	6367
38	30'-3	46.1	44	9	33'-0	4937	62	4	11'-9	487	124	4	13'-10	1146	6570
39	31'-3	47.6	44	9	34'-0	5086	64	4	11'-9	502	128	4	13'-10	1183	6771
40	32'-3	49.2	44	9	35'-0	5236	66	4	11'-9	518	132	4	13'-10	1220	6974

BENT BAR DETAILS



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



SECTION A-A

PIER NOTES:

SEE "TEE PIER NOTES" ON H24-02-06 FOR NOTES REGARDING APPLICATION OF THESE PIER STANDARDS.

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

ELIMINATE 2x8 BEVELED KEYWAY ON TOP OF CAP FOR EXPANSION PIERS.

SEE SHEET H24-09-06 FOR "U" DIMENSION.

10-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

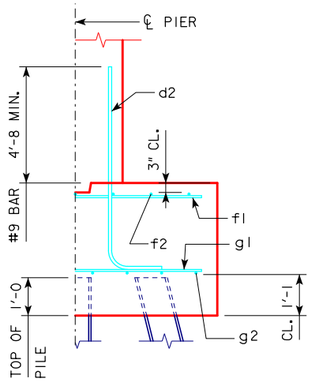
DECEMBER, 2006

TEE PIER CAP AND COLUMN

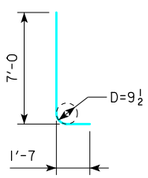
0° SKEW

H24-50-06

REVISED 01-10 - SHEET WAS REVISED TO MEET LRFD SPECIFICATIONS.
REVISED 09-2016 - CHANGED PIER COLUMN CAP AND FOOTING BEVELED KEYWAY TO 3" x 10" (WAS 2" x 8").
REVISED 10-2016 - CHANGED BEVELED KEYWAY LENGTH OF PIER COLUMN CAP AND FOOTING TO BE 5'-0 LESS THAN WIDTH OF PIER COLUMN (WAS 14'-0).

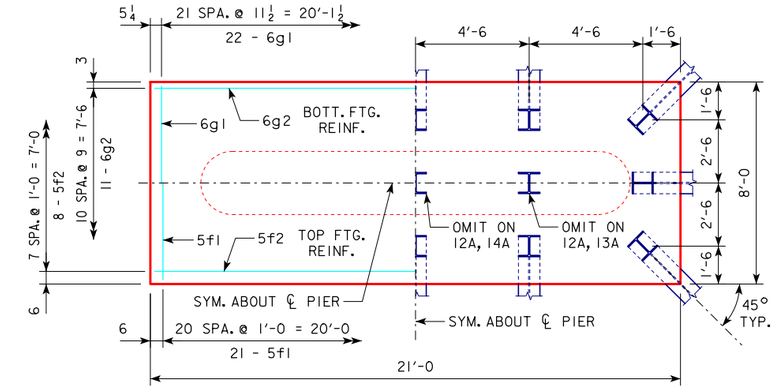


TYPICAL SECTION

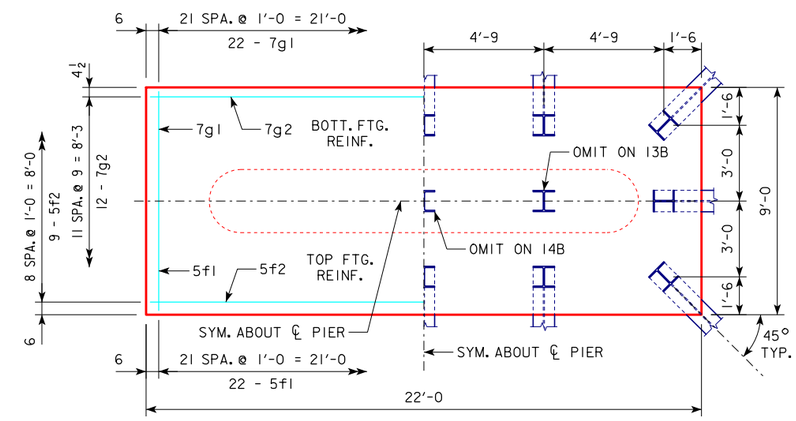


d2

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



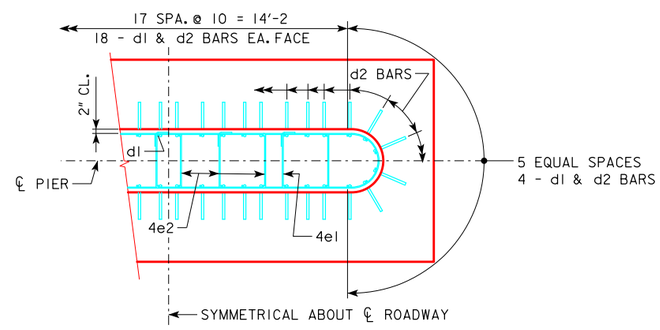
3'-6 x 8'-0 x 21'-0 FOR 12A, 13A & 14A



3'-6 x 9'-0 x 22'-0 FOR 13B & 14B

H IN FT.	℄ - ℄ ABUT. BRG.	PILING (HP10x57) NO. & LAYOUT	PILING (HP10x57) ① LRFD Pu, STRENGTH I, DES. LOAD (KIPS)	FOOTING SIZE
16 TO 18	201'-4	12A	138	3'-6 x 8' x 21'
	213'-10	12A	143	
	226'-4	13A	142	
	243'-0	14A	139	
19 TO 21	201'-4	12A	143	3'-6 x 8' x 21'
	213'-10	13A	141	
	226'-4	14A	138	
	243'-0	14A	144	
22 TO 24	201'-4	13B	138	3'-6 x 9' x 22'
	213'-10	13B	142	
	226'-4	14B	139	
	243'-0	14B	144	

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING) BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
3'-6 x 8' x 21'	d2	44 - #9 AS SHOWN	8'-7	1284	2218	21.8
	f1	21 - #5 @ 1'-0	7'-8	168		
	f2	8 - #5 @ 1'-0	20'-8	172		
	g1	22 - #6 @ 0'-11½	7'-8	253		
	g2	11 - #6 @ 0'-9	20'-8	341		
3'-6 x 9' x 22'	d2	44 - #9 AS SHOWN	8'-7	1284	2607	25.7
	f1	22 - #5 @ 1'-0	8'-8	199		
	f2	9 - #5 @ 1'-0	21'-8	203		
	g1	22 - #7 @ 1'-0	8'-8	390		
	g2	12 - #7 @ 0'-9	21'-8	531		



d2 BAR LAYOUT
(SEE SECTION A-A ON SHEET H24-50-06.)

① NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

FOOTING NOTES:

THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-50-06.

BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

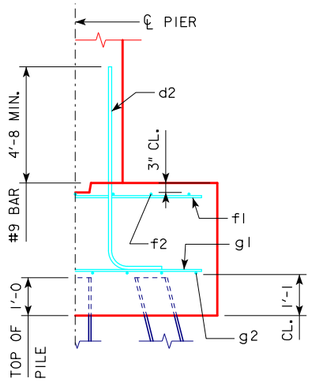
DECEMBER, 2006

TEE PIER-HP10x57 SRL-I STEEL PILE FOOTINGS

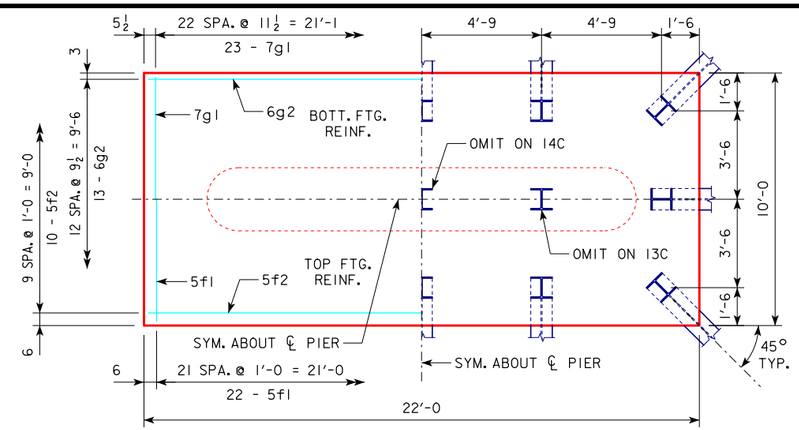
0° SKEW - H=16' TO 24'

H24-51-06

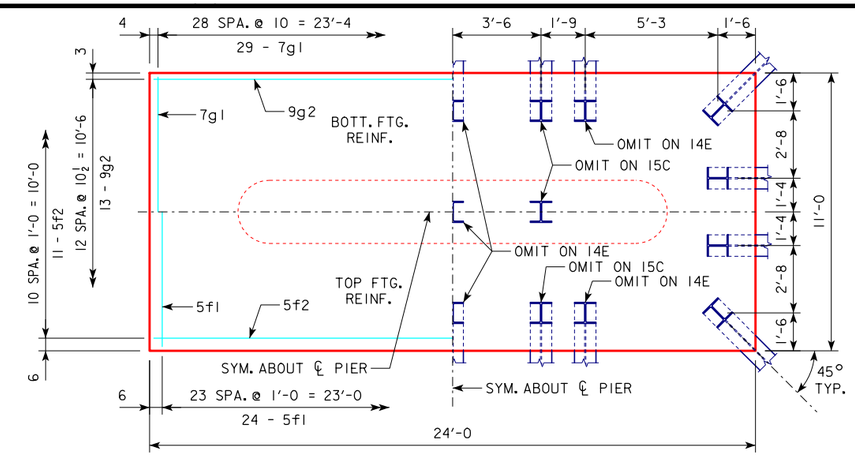
REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").



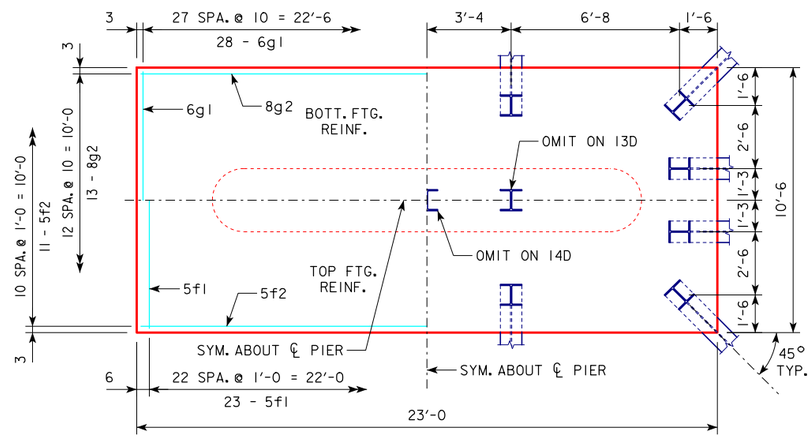
TYPICAL SECTION



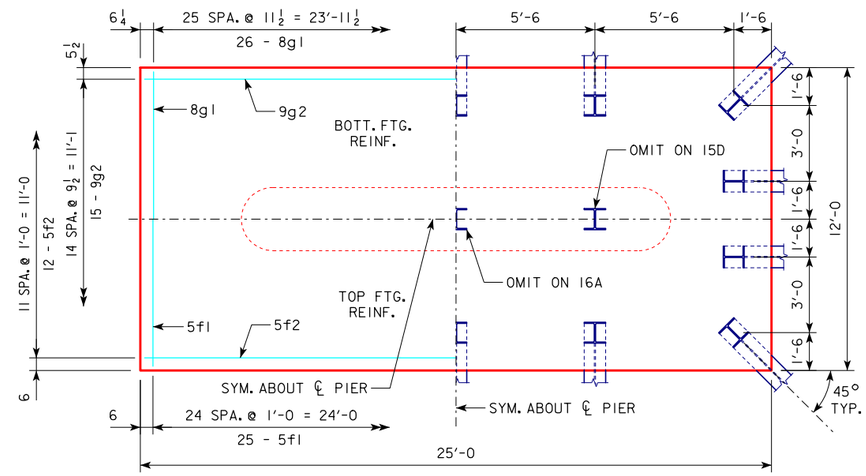
4'-0 x 10'-0 x 22'-0 FOR 13C, 14C & 15A



4'-0 x 11'-0 x 24'-0 FOR 14E & 15C



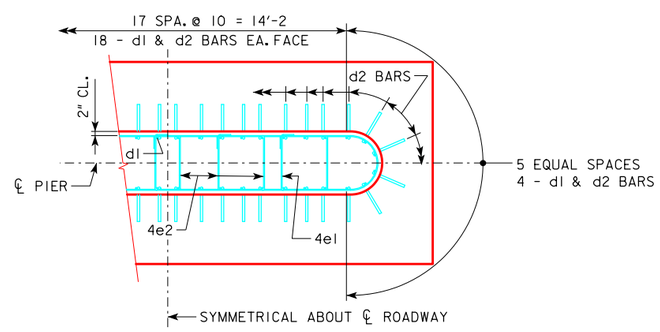
4'-0 x 10'-6 x 23'-0 FOR 13D, 14D & 15B



4'-0 x 12'-0 x 25'-0 FOR 15D & 16A

H IN FT.	℄ - ℄ ABUT. BRG.	PILING (HP10x57) NO. & LAYOUT	PILING (HP10x57) ① LRFD Pu, STRENGTH I, DES. LOAD (KIPS)	FOOTING SIZE
25 TO 27	201'-4	13C	144	4' x 10' x 22'
	213'-10	14C	138	
	226'-4	14C	142	
	243'-0	15A	141	
28 TO 30	201'-4	13D	145	4' x 10'-6 x 23'
	213'-10	14D	143	
	226'-4	15B	141	
	243'-0	15B	146	
31 TO 33	201'-4	14E	142	4' x 11' x 24'
	213'-10	14E	146	
	226'-4	15C	137	
	243'-0	15C	142	
34 TO 36	201'-4	15C	137	4' x 11' x 24'
	213'-10	15C	140	
	226'-4	15C	142	
	243'-0	15C	146	
37 TO 40	201'-4	15D	142	4' x 12' x 25'
	213'-10	15D	145	
	226'-4	16A	140	
	243'-0	16A	143	

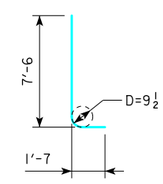
FOOTING SIZE	REINFORCING STEEL (ONE FOOTING) BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
4' x 10' x 22'	d2	44 - #9 AS SHOWN	9'-1	1359	2684	32.6
	f1	22 - #5 @ 1'-0	9'-8	222		
	f2	10 - #5 @ 1'-0	21'-8	226		
	g1	23 - #7 @ 0'-11½	9'-8	454		
	g2	13 - #6 @ 0'-9½	21'-8	423		
4' x 10'-6 x 23'	d2	44 - #9 AS SHOWN	9'-1	1359	3078	35.8
	f1	23 - #5 @ 1'-0	10'-2	244		
	f2	11 - #5 @ 1'-0	22'-8	260		
	g1	28 - #6 @ 0'-10	10'-2	428		
	g2	13 - #8 @ 0'-10	22'-8	787		
4' x 11' x 24'	d2	44 - #9 AS SHOWN	9'-1	1359	3576	39.1
	f1	24 - #5 @ 1'-0	10'-8	267		
	f2	11 - #5 @ 1'-0	23'-8	272		
	g1	29 - #7 @ 0'-10	10'-8	632		
	g2	13 - #9 @ 0'-10½	23'-8	1046		
4' x 12' x 25'	d2	44 - #9 AS SHOWN	9'-1	1359	4040	44.4
	f1	25 - #5 @ 1'-0	11'-8	304		
	f2	12 - #5 @ 1'-0	24'-8	309		
	g1	26 - #8 @ 0'-11½	11'-8	810		
	g2	15 - #9 @ 0'-9½	24'-8	1258		



d2 BAR LAYOUT

(SEE SECTION A-A ON SHEET H24-50-06.)

① NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



d2

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

FOOTING NOTES:

THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-50-06.

BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

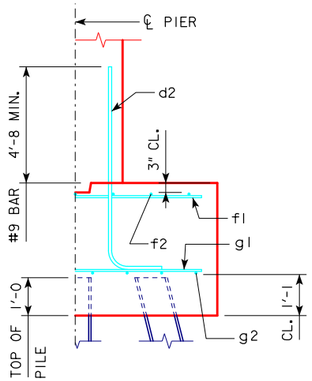
DECEMBER, 2006

TEE PIER-HP10x57 SRL-1 STEEL PILE FOOTINGS

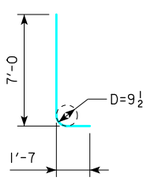
0° SKEW - H=25' TO 40'

H24-52-06

REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").

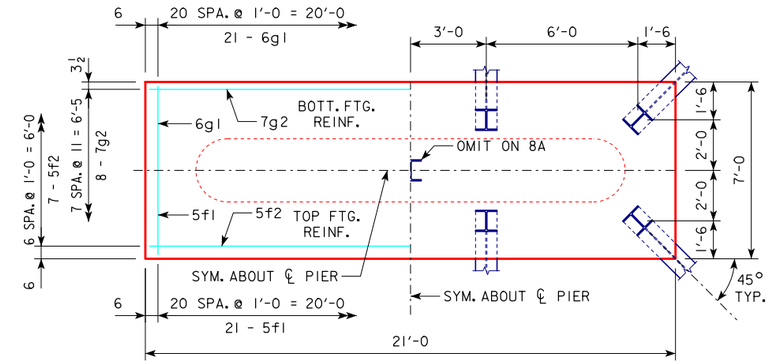


TYPICAL SECTION

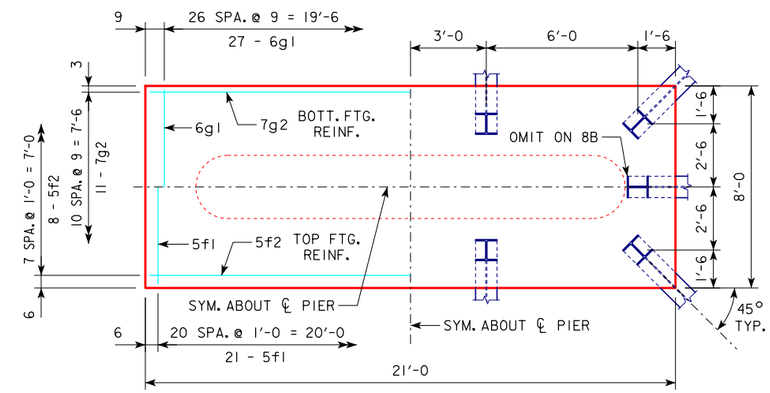


d2

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



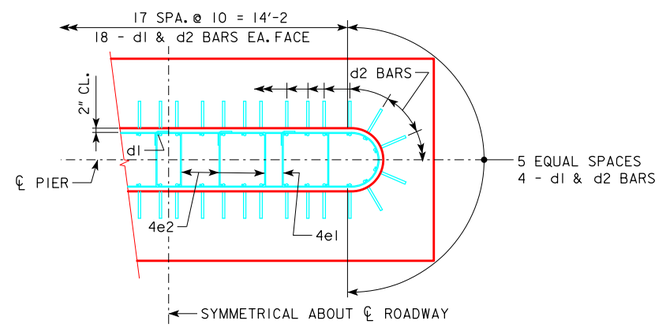
3'-6 x 7'-0 x 21'-0 FOR 8A & 9A



3'-6 x 8'-0 x 21'-0 FOR 8B & 10A

H IN FT.	℄ - ℄ ABUT. BRG.	PILING (HP10x57) NO. & LAYOUT	PILING (HP10x57) ① LRFD Pu, STRENGTH I, DES. LOAD (KIPS)	FOOTING SIZE
16 TO 18	201'-4	8A	207	3'-6 x 7' x 21'
	213'-10	8A	215	
	226'-4	9A	209	
	243'-0	9A	217	
19 TO 21	201'-4	8B	210	3'-6 x 8' x 21'
	213'-10	8B	218	
	226'-4	10A	184	
	243'-0	10A	191	
22 TO 24	201'-4	10A	178	3'-6 x 8' x 21'
	213'-10	10A	185	
	226'-4	10A	192	
	243'-0	10A	199	

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING) BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
3'-6 x 7' x 21'	d2	44 - #9 AS SHOWN	8'-7	1284	2129	19.1
	f1	21 - #5 @ 1'-0	6'-8	146		
	f2	7 - #5 @ 1'-0	20'-8	151		
	g1	21 - #6 @ 1'-0	6'-8	210		
	g2	8 - #7 @ 0'-11	20'-8	338		
3'-6 x 8' x 21'	d2	44 - #9 AS SHOWN	8'-7	1284	2400	21.8
	f1	21 - #5 @ 1'-0	7'-8	168		
	f2	8 - #5 @ 1'-0	20'-8	172		
	g1	27 - #6 @ 0'-9	7'-8	311		
	g2	11 - #7 @ 0'-9	20'-8	465		



d2 BAR LAYOUT
(SEE SECTION A-A ON SHEET H24-50-06.)

① NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

FOOTING NOTES:

THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-50-06.

BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

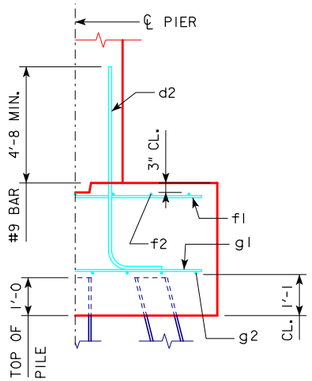
DECEMBER, 2006

TEE PIER-HP10x57 SRL-2 STEEL PILE FOOTINGS

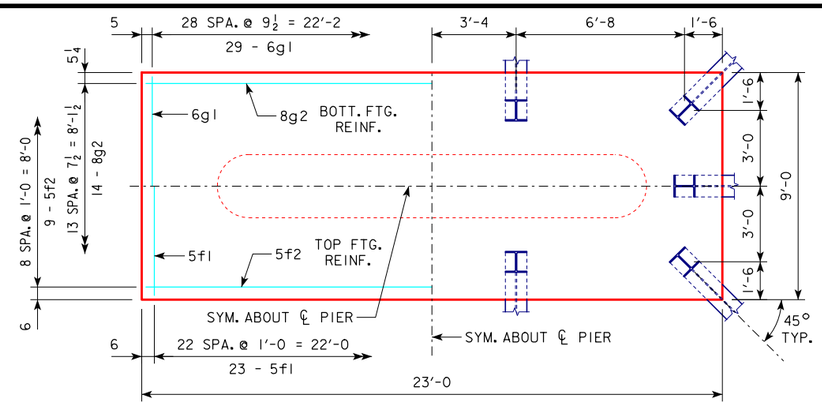
0° SKEW - H=16' TO 24'

H24-53-06

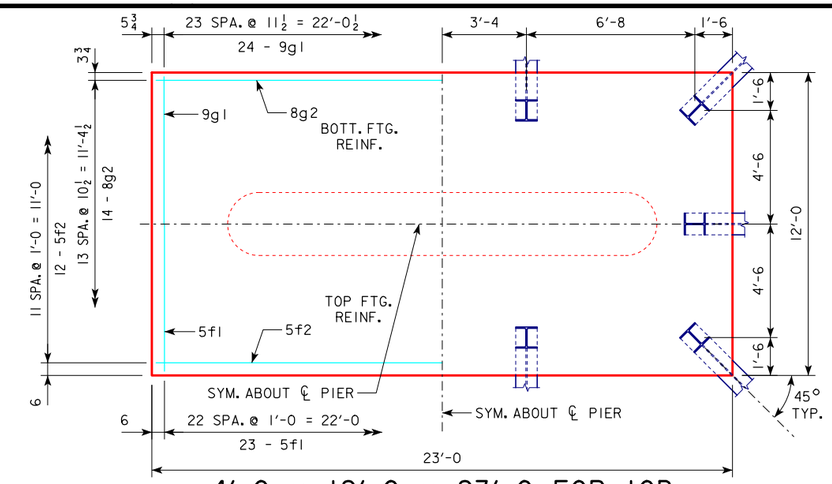
REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").



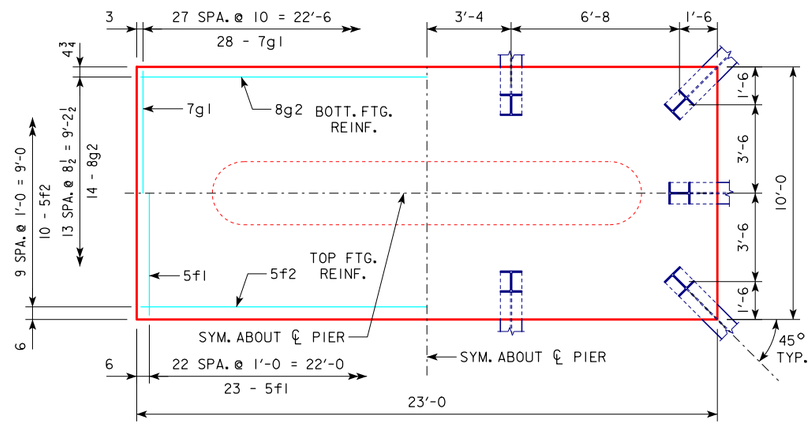
TYPICAL SECTION



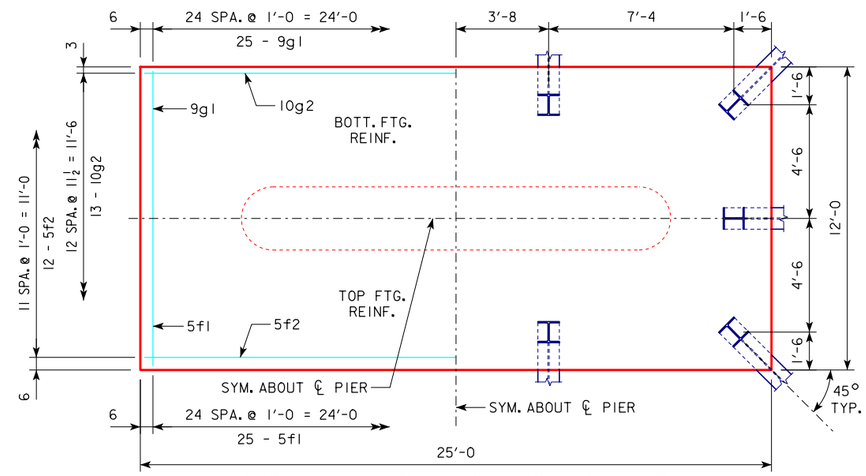
4'-0 x 9'-0 x 23'-0 FOR 10B



4'-0 x 12'-0 x 23'-0 FOR 10D



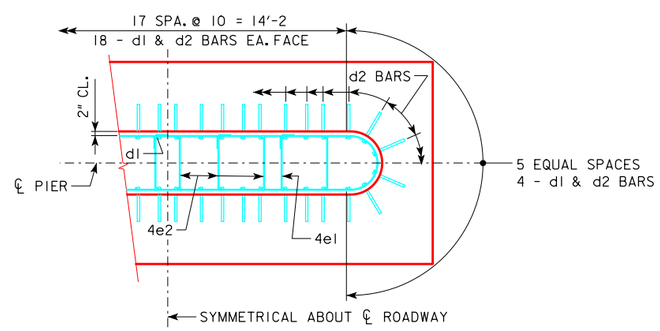
4'-0 x 10'-0 x 23'-0 FOR 10C



4'-0 x 12'-0 x 25'-0 FOR 10E

H IN FT.	℄ - ℄ ABUT. BRG.	PILING (HP10x57) NO. & LAYOUT	PILING (HP10x57) ① LRFD Pu, STRENGTH I, DES. LOAD (KIPS)	FOOTING SIZE
25 TO 27	201'-4	10B	180	4' x 9' x 23'
	213'-10	10B	186	
	226'-4	10B	194	
	243'-0	10B	200	
28 TO 30	201'-4	10B	187	4' x 9' x 23'
	213'-10	10B	193	
	226'-4	10B	200	
	243'-0	10B	207	
31 TO 33	201'-4	10C	192	4' x 10' x 23'
	213'-10	10C	196	
	226'-4	10C	202	
	243'-0	10C	209	
34 TO 36	201'-4	10D	198	4' x 12' x 23'
	213'-10	10D	202	
	226'-4	10D	206	
	243'-0	10D	211	
37 TO 40	201'-4	10E	205	4' x 12' x 25'
	213'-10	10E	209	
	226'-4	10E	213	
	243'-0	10E	217	

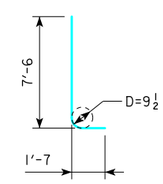
FOOTING SIZE	REINFORCING STEEL (ONE FOOTING) BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
4' x 9' x 23'	d2	44 - #9 AS SHOWN	9'-1	1359	3005	30.7
	f1	23 - #5 @ 1'-0	8'-8	208		
	f2	9 - #5 @ 1'-0	22'-8	213		
	g1	29 - #6 @ 0'-9½	8'-8	378		
	g2	14 - #8 @ 0'-7½	22'-8	847		
4' x 10' x 23'	d2	44 - #9 AS SHOWN	9'-1	1359	3227	34.1
	f1	23 - #5 @ 1'-0	9'-8	232		
	f2	10 - #5 @ 1'-0	22'-8	236		
	g1	28 - #7 @ 0'-10	9'-8	553		
	g2	14 - #8 @ 0'-8½	22'-8	847		
4' x 12' x 23'	d2	44 - #9 AS SHOWN	9'-1	1359	3722	40.9
	f1	23 - #5 @ 1'-0	11'-8	280		
	f2	12 - #5 @ 1'-0	22'-8	284		
	g1	24 - #9 @ 0'-11½	11'-8	952		
	g2	14 - #8 @ 0'-10½	22'-8	847		
4' x 12' x 25'	d2	44 - #9 AS SHOWN	9'-1	1359	4344	44.4
	f1	25 - #5 @ 1'-0	11'-8	304		
	f2	12 - #5 @ 1'-0	24'-8	309		
	g1	25 - #9 @ 1'-0	11'-8	992		
	g2	13 - #10 @ 0'-11½	24'-8	1380		



d2 BAR LAYOUT

(SEE SECTION A-A ON SHEET H24-50-06.)

① NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



d2

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

FOOTING NOTES:

THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-50-06.

BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

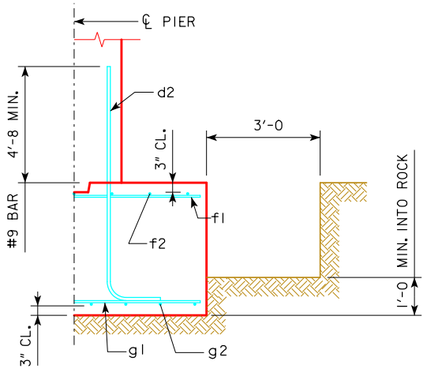
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

TEE PIER-HP10x57 SRL-2 STEEL PILE FOOTINGS

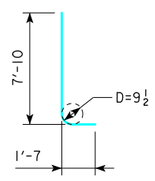
0° SKEW - H=25' TO 40'

H24-54-06



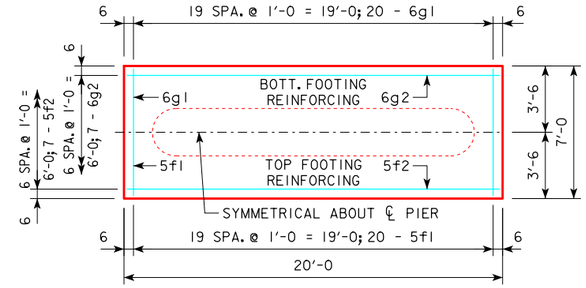
TYPICAL SECTION

H IN FT.	℄ - ℄ ABUT. BRG.	FOOTING SIZE
16 TO 18	138'-10 151'-4 163'-10 176'-4	3'-6 x 7' x 20'
	188'-10 201'-4 213'-10	3'-6 x 7' x 22'
	226'-4 243'-0	3'-6 x 8' x 22'
19 TO 21	138'-10 151'-4 163'-10 176'-4 188'-10	3'-6 x 7' x 22'
	201'-4 213'-10 226'-4 243'-0	3'-6 x 8' x 22'
22 TO 24	138'-10 151'-4 163'-10 176'-4 188'-10 201'-4 213'-10 226'-4	3'-6 x 8' x 22'
	243'-0	3'-6 x 9' x 22'

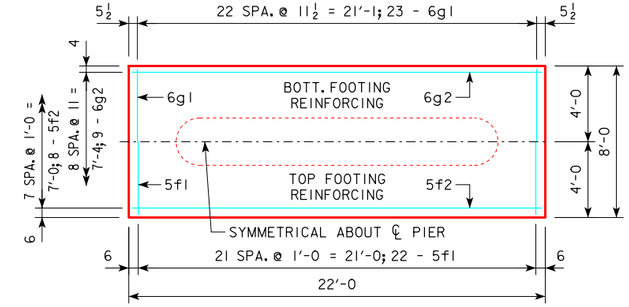


d2

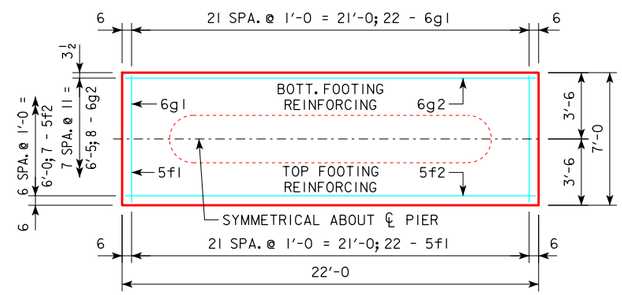
NOTE: D = PIN DIAMETER.
DIMENSIONS ARE OUT TO OUT.



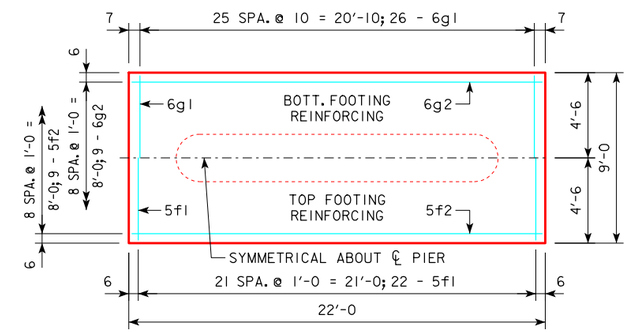
3'-6 x 7'-0 x 20'-0



3'-6 x 8'-0 x 22'-0

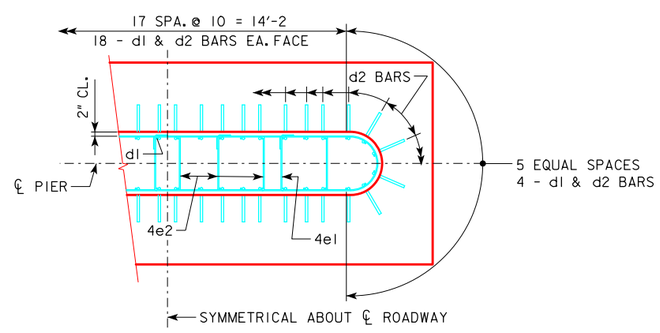


3'-6 x 7'-0 x 22'-0



3'-6 x 9'-0 x 22'-0

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)					STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	
3'-6 x 7' x 20'	d2	44 - #9 AS SHOWN	9'-5	1409	2099	18.1
	f1	20 - #5 @ 1'-0	6'-8	139		
	f2	7 - #5 @ 1'-0	19'-8	144		
	g1	20 - #6 @ 1'-0	6'-8	200		
	g2	7 - #6 @ 1'-0	19'-8	207		
3'-6 x 7' x 22'	d2	44 - #9 AS SHOWN	9'-5	1409	2200	20.0
	f1	22 - #5 @ 1'-0	6'-8	153		
	f2	7 - #5 @ 1'-0	21'-8	158		
	g1	22 - #6 @ 1'-0	6'-8	220		
	g2	8 - #6 @ 0'-11	21'-8	260		
3'-6 x 8' x 22'	d2	44 - #9 AS SHOWN	9'-5	1409	2324	22.8
	f1	22 - #5 @ 1'-0	7'-8	176		
	f2	8 - #5 @ 1'-0	21'-8	181		
	g1	23 - #6 @ 0'-11½	7'-8	265		
	g2	9 - #6 @ 0'-11	21'-8	293		
3'-6 x 9' x 22'	d2	44 - #9 AS SHOWN	9'-5	1409	2442	25.7
	f1	22 - #5 @ 1'-0	8'-8	199		
	f2	9 - #5 @ 1'-0	21'-8	203		
	g1	26 - #6 @ 0'-10	8'-8	338		
	g2	9 - #6 @ 1'-0	21'-8	293		



d2 BAR LAYOUT
(SEE SECTION A-A ON SHEET H24-50-06.)

FOOTING NOTES:

THESE SPREAD FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-50-06.

THESE SPREAD FOOTINGS 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 30 KIPS PER SQUARE FOOT (ALLOWABLE BEARING VALUE OF AT LEAST 10 KIPS PER SQUARE FOOT).

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

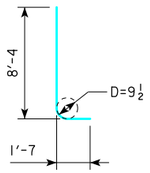
DECEMBER, 2006

TEE PIER - SPREAD FOOTINGS

0° SKEW - H=16' TO 24'

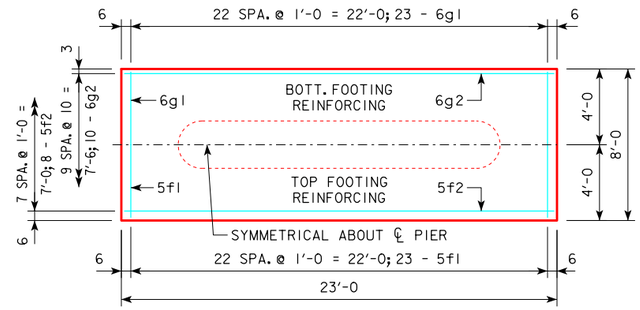
H24-55-06

REVISED 04-12 - EXCAVATION LIMIT WAS CHANGED TO 3'-0.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").

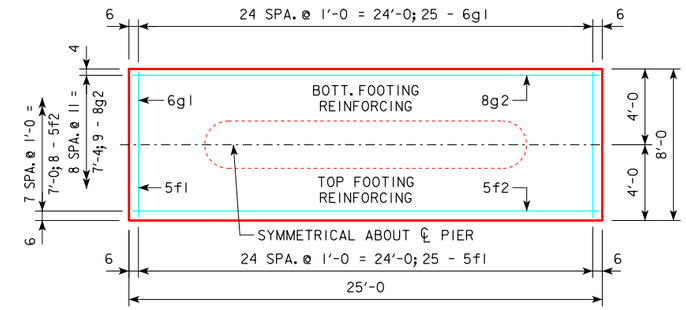


d2

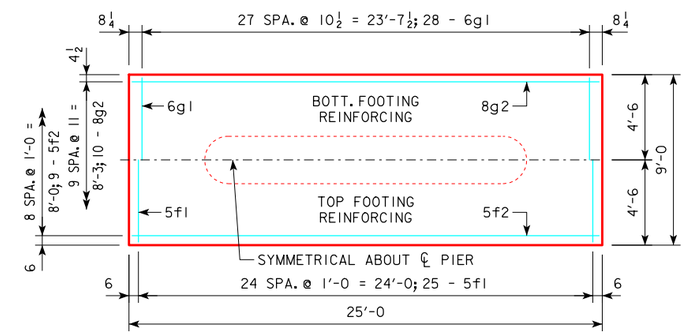
NOTE: D = PIN DIAMETER.
DIMENSIONS ARE OUT TO OUT.



4'-0 x 8'-0 x 23'-0



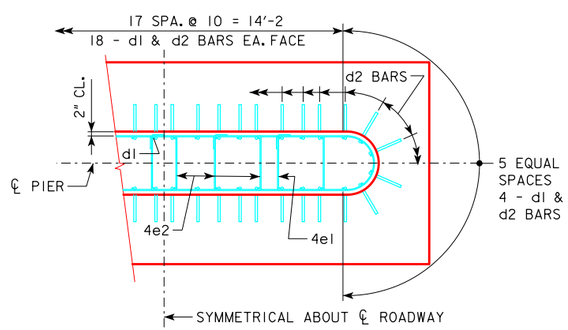
4'-0 x 8'-0 x 25'-0



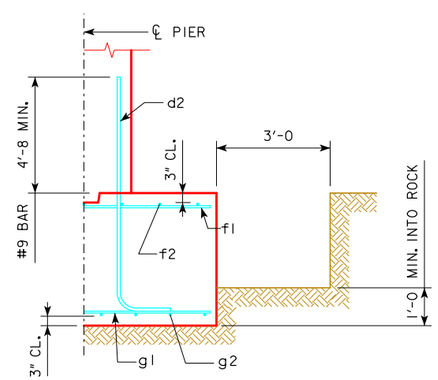
4'-0 x 9'-0 x 25'-0

H IN FT.	℄ - ℄ ABUT. BRG.	FOOTING SIZE
25 TO 27	138'-10 151'-4 163'-10 176'-4 188'-10 201'-4 213'-10 226'-4 243'-0	4' x 8' x 23'
28 TO 30	138'-10 151'-4 163'-10 176'-4 188'-10 201'-4 213'-10 226'-4 243'-0	4' x 8' x 25'
31 TO 33	201'-4 213'-10 226'-4	4' x 8' x 25'
	243'-0	4' x 9' x 25'
34 TO 36	201'-4 213'-10 226'-4 243'-0	4' x 9' x 25'
37 TO 40	201'-4 213'-10 226'-4 243'-0	4' x 9' x 25'

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)					STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	
4' x 8' x 23'	d2	44 - #9 AS SHOWN	9'-11	1484	2462	27.3
	f1	23 - #5 @ 1'-0	7'-8	184		
	f2	8 - #5 @ 1'-0	22'-8	189		
	g1	23 - #6 @ 1'-0	7'-8	265		
	g2	10 - #6 @ 0'-10	22'-8	340		
4' x 8' x 25'	d2	44 - #9 AS SHOWN	9'-11	1484	2771	29.6
	f1	25 - #5 @ 1'-0	7'-8	200		
	f2	8 - #5 @ 1'-0	24'-8	206		
	g1	25 - #6 @ 1'-0	7'-8	288		
	g2	9 - #8 @ 0'-11	24'-8	593		
4' x 9' x 25'	d2	44 - #9 AS SHOWN	9'-11	1484	2965	33.3
	f1	25 - #5 @ 1'-0	8'-8	226		
	f2	9 - #5 @ 1'-0	24'-8	232		
	g1	28 - #6 @ 0'-10½	8'-8	364		
	g2	10 - #8 @ 0'-11	24'-8	659		



d2 BAR LAYOUT
(SEE SECTION A-A ON SHEET H24-50-06.)



TYPICAL SECTION

FOOTING NOTES:

THESE SPREAD FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-50-06.

THESE SPREAD FOOTINGS 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 30 KIPS PER SQUARE FOOT (ALLOWABLE BEARING VALUE OF AT LEAST 10 KIPS PER SQUARE FOOT).

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

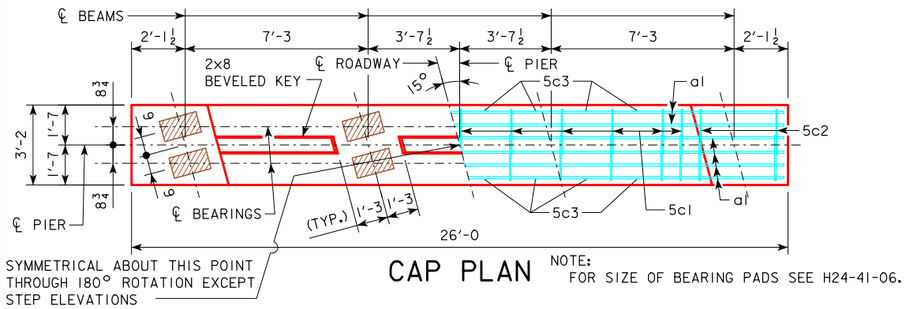
DECEMBER, 2006

TEE PIER - SPREAD FOOTINGS

0° SKEW - H=25' TO 40'

H24-56-06

REVISED 04-12 - EXCAVATION LIMIT WAS CHANGED TO 3'-0.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").



CAP PLAN

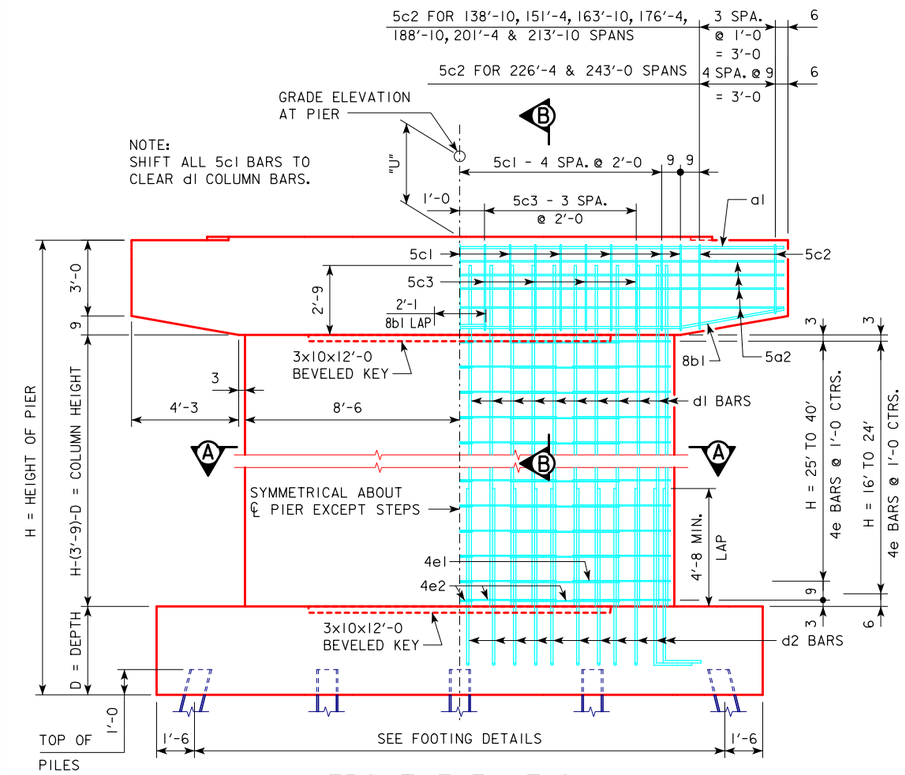
NOTE:
FOR SIZE OF BEARING PADS SEE H24-41-06.

CAP

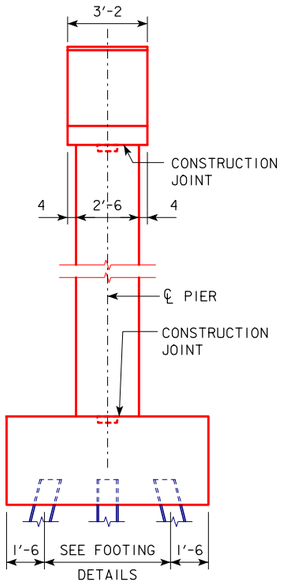
REINFORCING STEEL			℄ - ℄ ABUT. BEARINGS			138'-10			151'-4			163'-10			176'-4			188'-10			201'-4			213'-10			226'-4			243'-0		
BAR	LENGTH	SHAPE	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
a1	25'-8		6	9	524	6	9	524	6	9	524	6	9	524	6	9	524	6	9	524	6	9	524	6	9	524	6	9	524	6	9	524
5a2	25'-8		8	5	214	8	5	214	8	5	214	8	5	214	8	5	214	8	5	214	8	5	214	8	5	214	8	5	214	8	5	214
8b1	14'-0		8	8	299	8	8	299	8	8	299	8	8	299	8	8	299	8	8	299	8	8	299	8	8	299	8	8	299	8	8	299
5c1	11'-6		22	5	264	22	5	264	22	5	264	22	5	264	22	5	264	22	5	264	22	5	264	22	5	264	22	5	264	22	5	264
5c2	VARIES		16	5	179	16	5	179	16	5	179	16	5	179	16	5	179	16	5	179	16	5	179	16	5	179	20	5	223	20	5	223
5c3	3'-11		16	5	65	16	5	65	16	5	65	16	5	65	16	5	65	16	5	65	16	5	65	16	5	65	16	5	65	16	5	65
(1) TOTAL (LB.)			1545			1545			1545			1545			1545			1545			1545			1589			1589					
STRUCTURAL CONCRETE (CY)			11.4			11.4			11.4			11.4			11.4			11.4			11.4			11.4			11.4					

COLUMN

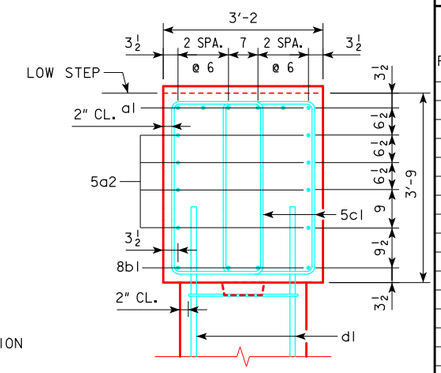
H IN FEET	COLUMN HEIGHT	STRUCTURAL CONCRETE (CY)	REINFORCING STEEL: d1 BAR NO.	SIZE	LENGTH	WEIGHT	4e1 BAR NO.	SIZE	LENGTH	WEIGHT	4e2 BAR NO.	SIZE	LENGTH	WEIGHT	TOTAL WEIGHT (LB.)
16	8'-9	13.3	44	9	11'-6	1720	18	4	11'-9	141	36	4	13'-10	333	2194
17	9'-9	14.9	44	9	12'-6	1870	20	4	11'-9	157	40	4	13'-10	370	2397
18	10'-9	16.4	44	9	13'-6	2020	22	4	11'-9	173	44	4	13'-10	407	2600
19	11'-9	17.9	44	9	14'-6	2169	24	4	11'-9	188	48	4	13'-10	444	2801
20	12'-9	19.4	44	9	15'-6	2319	26	4	11'-9	204	52	4	13'-10	481	3004
21	13'-9	21.0	44	9	16'-6	2468	28	4	11'-9	220	56	4	13'-10	517	3205
22	14'-9	22.5	44	9	17'-6	2618	30	4	11'-9	235	60	4	13'-10	554	3407
23	15'-9	24.0	44	9	18'-6	2768	32	4	11'-9	251	64	4	13'-10	591	3610
24	16'-9	25.5	44	9	19'-6	2917	34	4	11'-9	267	68	4	13'-10	628	3812
25	17'-3	26.3	44	9	20'-0	2992	36	4	11'-9	283	72	4	13'-10	665	3940
26	18'-3	27.8	44	9	21'-0	3142	38	4	11'-9	298	76	4	13'-10	702	4142
27	19'-3	29.3	44	9	22'-0	3291	40	4	11'-9	314	80	4	13'-10	739	4344
28	20'-3	30.9	44	9	23'-0	3441	42	4	11'-9	330	84	4	13'-10	776	4547
29	21'-3	32.4	44	9	24'-0	3590	44	4	11'-9	345	88	4	13'-10	813	4748
30	22'-3	33.9	44	9	25'-0	3740	46	4	11'-9	361	92	4	13'-10	850	4951
31	23'-3	35.4	44	9	26'-0	3890	48	4	11'-9	377	96	4	13'-10	887	5154
32	24'-3	37.0	44	9	27'-0	4039	50	4	11'-9	392	100	4	13'-10	924	5355
33	25'-3	38.5	44	9	28'-0	4189	52	4	11'-9	408	104	4	13'-10	961	5558
34	26'-3	40.0	44	9	29'-0	4338	54	4	11'-9	424	108	4	13'-10	998	5760
35	27'-3	41.5	44	9	30'-0	4488	56	4	11'-9	440	112	4	13'-10	1035	5963
36	28'-3	43.1	44	9	31'-0	4638	58	4	11'-9	455	116	4	13'-10	1072	6165
37	29'-3	44.6	44	9	32'-0	4787	60	4	11'-9	471	120	4	13'-10	1109	6367
38	30'-3	46.1	44	9	33'-0	4937	62	4	11'-9	487	124	4	13'-10	1146	6570
39	31'-3	47.6	44	9	34'-0	5086	64	4	11'-9	502	128	4	13'-10	1183	6771
40	32'-3	49.2	44	9	35'-0	5236	66	4	11'-9	518	132	4	13'-10	1220	6974



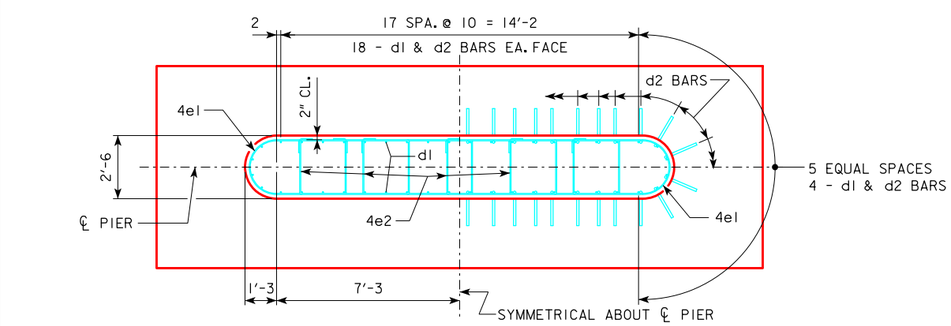
FRONT ELEVATION



END ELEVATION



SECTION B-B



SECTION A-A

(1) SEE SHEET H24-17-06 FOR STEP REINFORCING STEEL QUANTITY AND DETAILS.

PIER NOTES:

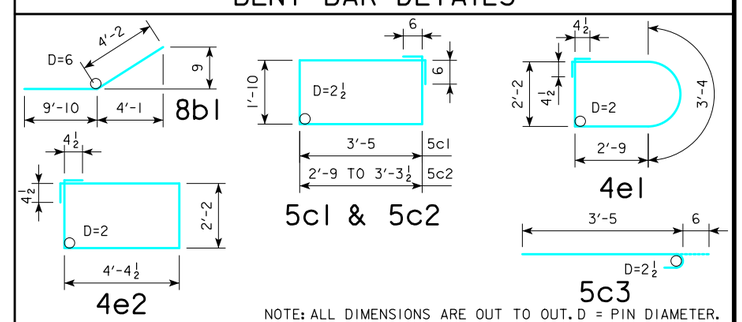
SEE "TEE PIER NOTES" ON H24-02-06 FOR NOTES REGARDING APPLICATION OF THESE PIER STANDARDS.

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

ELIMINATE 2x8 BEVELED KEYWAY ON TOP OF CAP FOR EXPANSION PIERS.

SEE SHEET H24-15-06 FOR "U" DIMENSION.

BENT BAR DETAILS



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

10-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

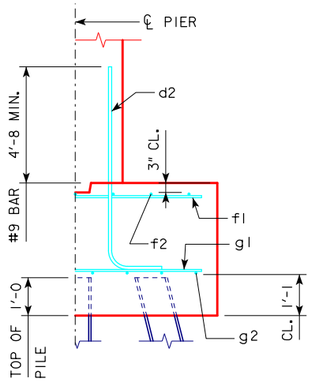
DECEMBER, 2006

TEE PIER CAP AND COLUMN

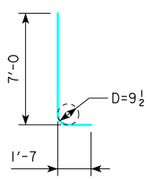
15° SKEW

H24-57-06

REVISED 01-10 - SHEET WAS REVISED TO MEET LRFD SPECIFICATIONS.
REVISED 09-2016 - CHANGED PIER COLUMN CAP AND FOOTING BEVELED KEYWAY TO 3" x 10" (WAS 2" x 8").
REVISED 10-2016 - CHANGED BEVELED KEYWAY LENGTH OF PIER COLUMN CAP AND FOOTING TO BE 5'-0 LESS THAN WIDTH OF PIER COLUMN (WAS 14'-0).

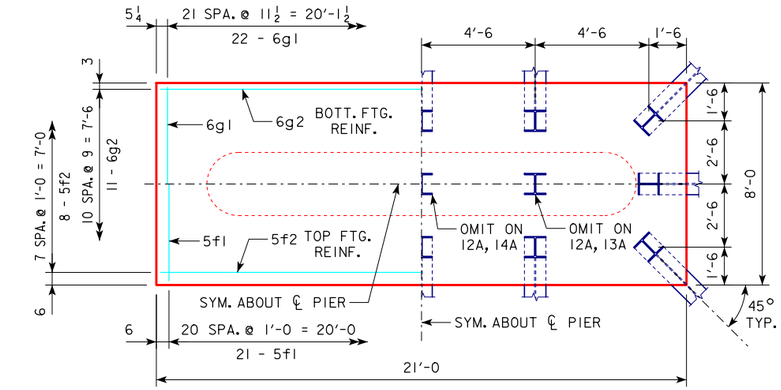


TYPICAL SECTION

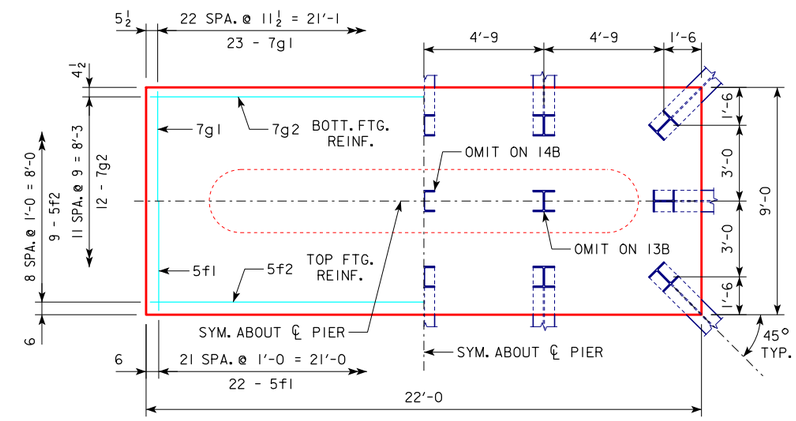


d2

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



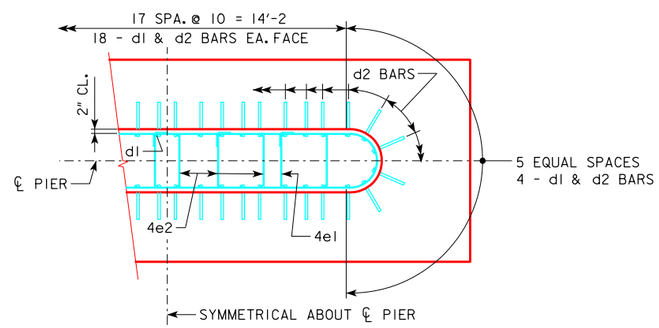
3'-6 x 8'-0 x 21'-0 FOR 12A, 13A & 14A



3'-6 x 9'-0 x 22'-0 FOR 13B & 14B

H IN FT.	℄ - ℄ ABUT. BRG.	PILING (HP10x57) NO. & LAYOUT	PILING (HP10x57) ① LRFD Pu, STRENGTH I, DES. LOAD (KIPS)	FOOTING SIZE
16 TO 18	201'-4	12A	142	3'-6 x 8' x 21'
	213'-10	13A	140	
	226'-4	13A	146	
	243'-0	14A	143	
19 TO 21	201'-4	13A	139	3'-6 x 8' x 21'
	213'-10	13A	144	
	226'-4	14A	141	
	243'-0	14A	146	
22 TO 24	201'-4	13B	140	3'-6 x 9' x 22'
	213'-10	13B	145	
	226'-4	14B	141	
	243'-0	14B	147	

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING) BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
3'-6 x 8' x 21'	d2	44 - #9 AS SHOWN	8'-7	1284	2218	21.8
	f1	21 - #5 @ 1'-0	7'-8	168		
	f2	8 - #5 @ 1'-0	20'-8	172		
	g1	22 - #6 @ 0'-11½	7'-8	253		
	g2	11 - #6 @ 0'-9	20'-8	341		
3'-6 x 9' x 22'	d2	44 - #9 AS SHOWN	8'-7	1284	2624	25.7
	f1	22 - #5 @ 1'-0	8'-8	199		
	f2	9 - #5 @ 1'-0	21'-8	203		
	g1	23 - #7 @ 0'-11½	8'-8	407		
	g2	12 - #7 @ 0'-9	21'-8	531		



d2 BAR LAYOUT
(SEE SECTION A-A ON SHEET H24-57-06.)

① NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

FOOTING NOTES:

THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-57-06.

BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

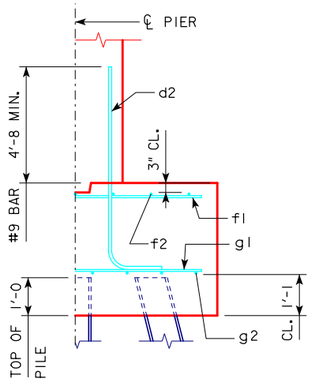
DECEMBER, 2006

TEE PIER-HP10x57 SRL-1 STEEL PILE FOOTINGS

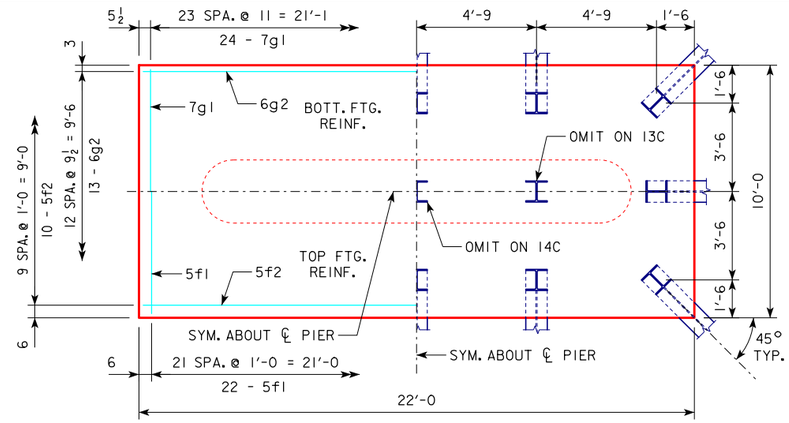
15° SKEW - H=16' TO 24'

H24-58-06

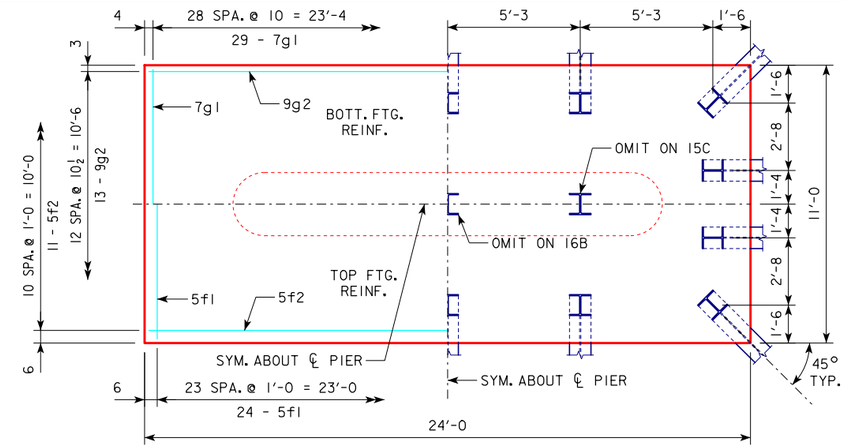
REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").



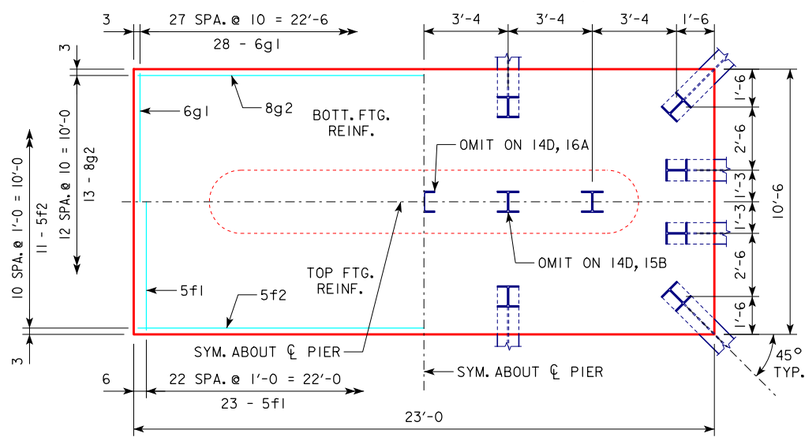
TYPICAL SECTION



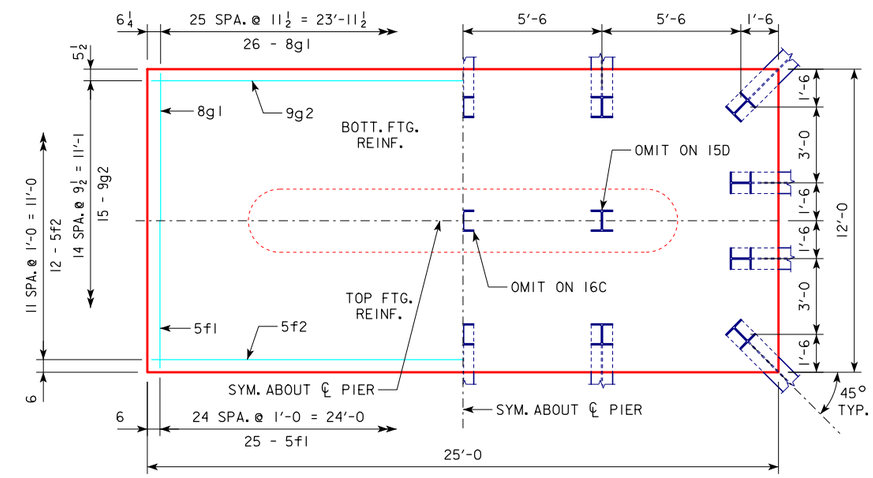
4'-0 x 10'-0 x 22'-0 FOR 13C, 14C & 15A



4'-0 x 11'-0 x 24'-0 FOR 15C & 16B



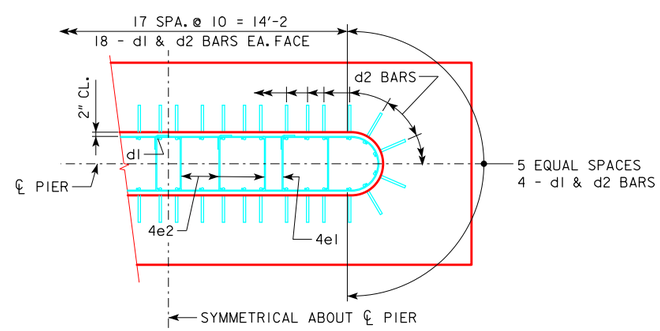
4'-0 x 10'-6 x 23'-0 FOR 14D, 15B & 16A



4'-0 x 12'-0 x 25'-0 FOR 15D & 16C

H IN FT.	℄ - ℄ ABUT. BRG.	PILING (HP10x57) NO. & LAYOUT	① LRFD Pu, STRENGTH I, DES. LOAD (KIPS)	FOOTING SIZE
25 TO 27	201'-4	13C	146	4' x 10' x 22'
	213'-10	14C	140	
	226'-4	14C	143	
	243'-0	15A	143	
28 TO 30	201'-4	14D	138	4' x 10'-6 x 23'
	213'-10	14D	143	
	226'-4	15B	141	
	243'-0	15B	146	
31 TO 33	201'-4	14D	145	4' x 10'-6 x 23'
	213'-10	15B	142	
	226'-4	15B	146	
	243'-0	16A	144	
34 TO 36	201'-4	15C	139	4' x 11' x 24'
	213'-10	15C	141	
	226'-4	15C	144	
	243'-0	16B	140	
37 TO 40	201'-4	15D	144	4' x 12' x 25'
	213'-10	15D	146	
	226'-4	16C	142	
	243'-0	16C	144	

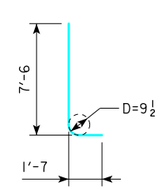
FOOTING SIZE	REINFORCING STEEL (ONE FOOTING) BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
4' x 10' x 22'	d2	44 - #9 AS SHOWN	9'-1	1359	2704	32.6
	f1	22 - #5 @ 1'-0	9'-8	222		
	f2	10 - #5 @ 1'-0	21'-8	226		
	g1	24 - #7 @ 0'-11	9'-8	474		
	g2	13 - #6 @ 0'-9½	21'-8	423		
4' x 10'-6 x 23'	d2	44 - #9 AS SHOWN	9'-1	1359	3078	35.8
	f1	23 - #5 @ 1'-0	10'-2	244		
	f2	11 - #5 @ 1'-0	22'-8	260		
	g1	28 - #6 @ 0'-10	10'-2	428		
	g2	13 - #8 @ 0'-10	22'-8	787		
4' x 11' x 24'	d2	44 - #9 AS SHOWN	9'-1	1359	3576	39.1
	f1	24 - #5 @ 1'-0	10'-8	267		
	f2	11 - #5 @ 1'-0	23'-8	272		
	g1	29 - #7 @ 0'-10	10'-8	632		
	g2	13 - #9 @ 0'-10½	23'-8	1046		
4' x 12' x 25'	d2	44 - #9 AS SHOWN	9'-1	1359	4040	44.4
	f1	25 - #5 @ 1'-0	11'-8	304		
	f2	12 - #5 @ 1'-0	24'-8	309		
	g1	26 - #8 @ 0'-11½	11'-8	810		
	g2	15 - #9 @ 0'-9½	24'-8	1258		



d2 BAR LAYOUT

(SEE SECTION A-A ON SHEET H24-57-06.)

① NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



d2

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

FOOTING NOTES:

THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-57-06.

BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

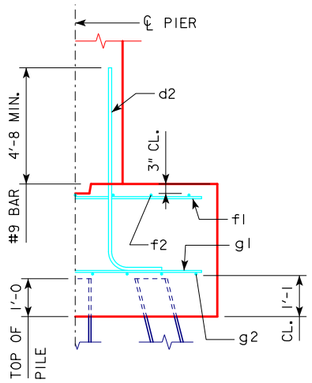
DECEMBER, 2006

TEE PIER-HP10x57 SRL-1 STEEL PILE FOOTINGS

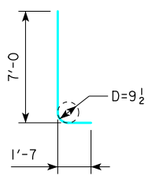
15° SKEW - H=25' TO 40'

H24-59-06

REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").

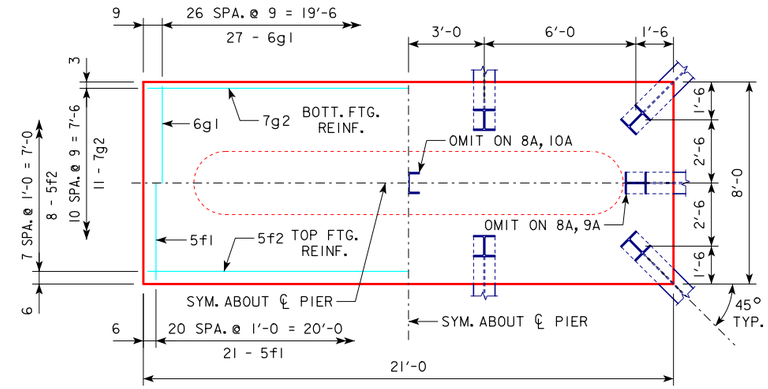


TYPICAL SECTION



d2

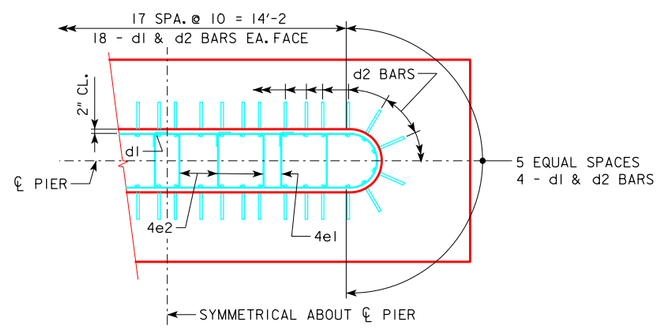
NOTE: D = PIN DIAMETER.
DIMENSIONS ARE OUT TO OUT.



3'-6 x 8'-0 x 21'-0 FOR 8A, 9A & 10A

H IN FT.	℄ - ℄ ABUT. BRG.	PILING (HP10x57) NO. & LAYOUT	① LRFD Pu, STRENGTH I, DES. LOAD (KIPS)	FOOTING SIZE
16 TO 18	201'-4	8A	211	3'-6 x 8' x 21'
	213'-10	8A	219	
	226'-4	9A	212	
	243'-0	10A	189	
19 TO 21	201'-4	8A	217	3'-6 x 8' x 21'
	213'-10	10A	182	
	226'-4	10A	189	
	243'-0	10A	196	
22 TO 24	201'-4	10A	182	3'-6 x 8' x 21'
	213'-10	10A	188	
	226'-4	10A	195	
	243'-0	10A	202	

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING) BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
3'-6 x 8' x 21'	d2	44 - #9 AS SHOWN	8'-7	1284	2400	21.8
	f1	21 - #5 @ 1'-0	7'-8	168		
	f2	8 - #5 @ 1'-0	20'-8	172		
	g1	27 - #6 @ 0'-9	7'-8	311		
	g2	11 - #7 @ 0'-9	20'-8	465		



d2 BAR LAYOUT
(SEE SECTION A-A ON SHEET H24-57-06.)

① NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

FOOTING NOTES:

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BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

09-2016
LATEST REVISION DATE

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IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

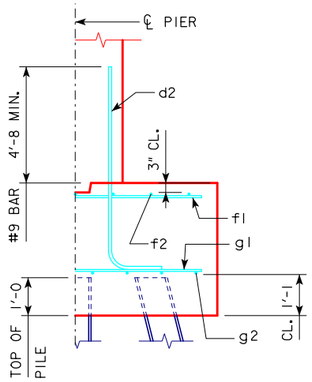
DECEMBER, 2006

TEE PIER-HP10x57 SRL-2 STEEL PILE FOOTINGS

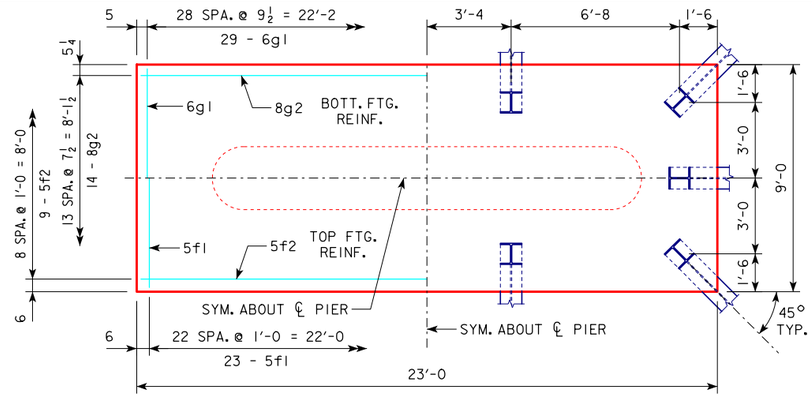
15° SKEW - H=16' TO 24'

H24-60-06

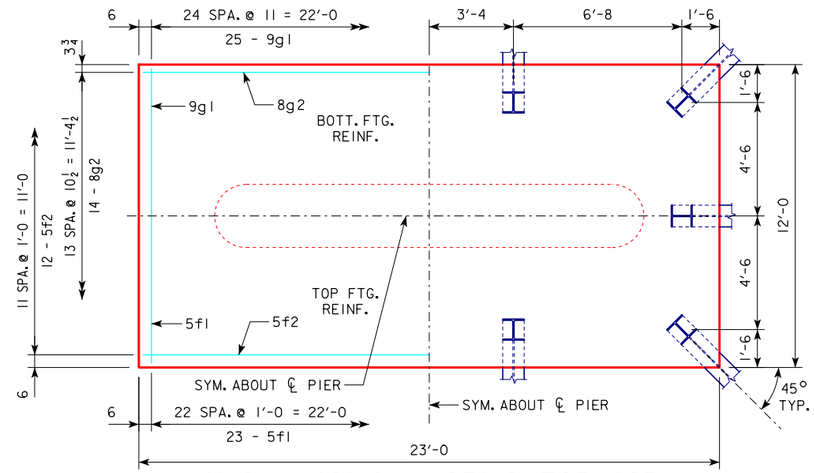
REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").



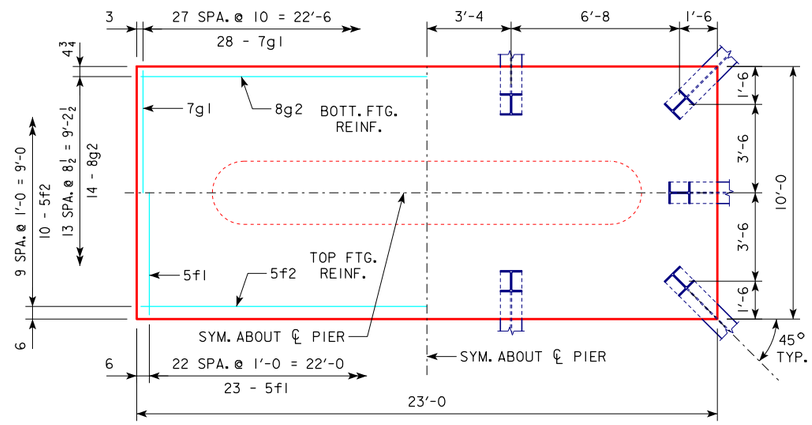
TYPICAL SECTION



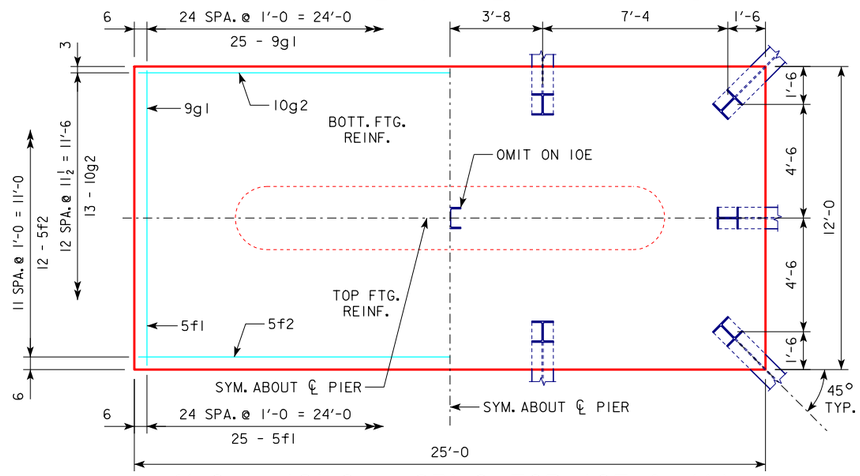
4'-0 x 9'-0 x 23'-0 FOR 10B



4'-0 x 12'-0 x 23'-0 FOR 10D



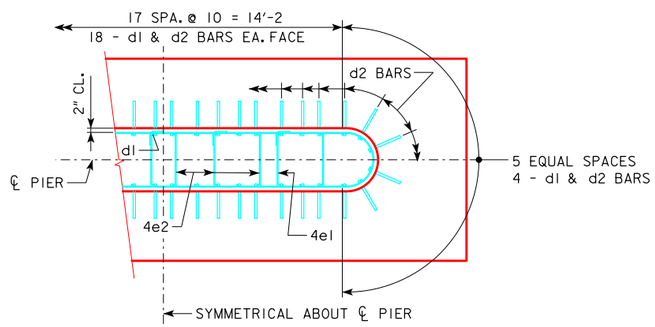
4'-0 x 10'-0 x 23'-0 FOR 10C



4'-0 x 12'-0 x 25'-0 FOR 10E & 11A

H IN FT.	℄ - ℄ ABUT. BRG.	PILING (HP10x57) NO. & LAYOUT	① LRFD Pu, STRENGTH I, DES. LOAD (KIPS)	FOOTING SIZE
25 TO 27	201'-4	10B	183	4' x 9' x 23'
	213'-10	10B	189	
	226'-4	10B	196	
	243'-0	10B	203	
28 TO 30	201'-4	10B	188	4' x 9' x 23'
	213'-10	10B	194	
	226'-4	10B	202	
	243'-0	10B	209	
31 TO 33	201'-4	10C	195	4' x 10' x 23'
	213'-10	10C	199	
	226'-4	10C	203	
	243'-0	10C	210	
34 TO 36	201'-4	10D	201	4' x 12' x 23'
	213'-10	10D	205	
	226'-4	10D	209	
	243'-0	10D	213	
37 TO 40	201'-4	10E	207	4' x 12' x 25'
	213'-10	10E	211	
	226'-4	10E	216	
	243'-0	11A	208	

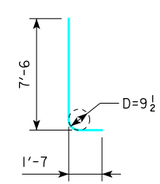
FOOTING SIZE	REINFORCING STEEL (ONE FOOTING) BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
4' x 9' x 23'	d2	44 - #9 AS SHOWN	9'-1	1359	3005	30.7
	f1	23 - #5 @ 1'-0	8'-8	208		
	f2	9 - #5 @ 1'-0	22'-8	213		
	g1	29 - #6 @ 0'-9½	8'-8	378		
	g2	14 - #8 @ 0'-7½	22'-8	847		
4' x 10' x 23'	d2	44 - #9 AS SHOWN	9'-1	1359	3227	34.1
	f1	23 - #5 @ 1'-0	9'-8	232		
	f2	10 - #5 @ 1'-0	22'-8	236		
	g1	28 - #7 @ 0'-10	9'-8	553		
	g2	14 - #8 @ 0'-8½	22'-8	847		
4' x 12' x 23'	d2	44 - #9 AS SHOWN	9'-1	1359	3762	40.9
	f1	23 - #5 @ 1'-0	11'-8	280		
	f2	12 - #5 @ 1'-0	22'-8	284		
	g1	25 - #9 @ 0'-11	11'-8	992		
	g2	14 - #8 @ 0'-10½	22'-8	847		
4' x 12' x 25'	d2	44 - #9 AS SHOWN	9'-1	1359	4344	44.4
	f1	25 - #5 @ 1'-0	11'-8	304		
	f2	12 - #5 @ 1'-0	24'-8	309		
	g1	25 - #9 @ 1'-0	11'-8	992		
	g2	13 - #10 @ 0'-11½	24'-8	1380		



d2 BAR LAYOUT

(SEE SECTION A-A ON SHEET H24-57-06.)

① NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



d2

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

FOOTING NOTES:

THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-57-06.

BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

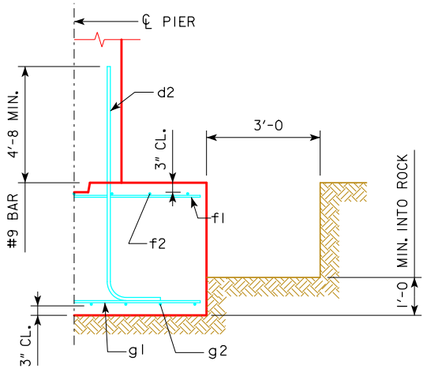
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

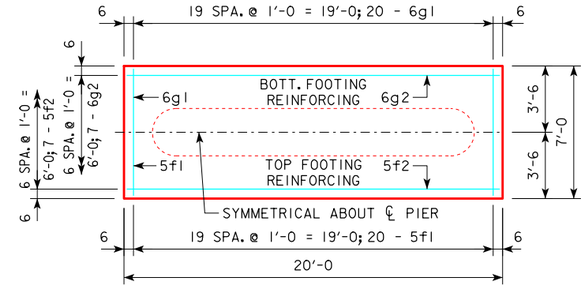
TEE PIER-HP10x57 SRL-2 STEEL PILE FOOTINGS

15° SKEW - H=25' TO 40'

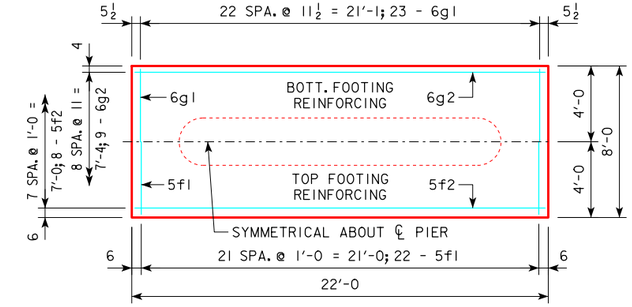
H24-61-06



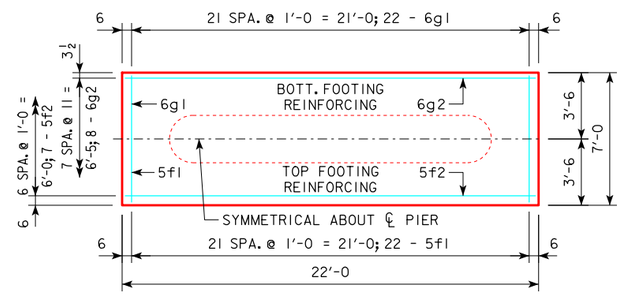
TYPICAL SECTION



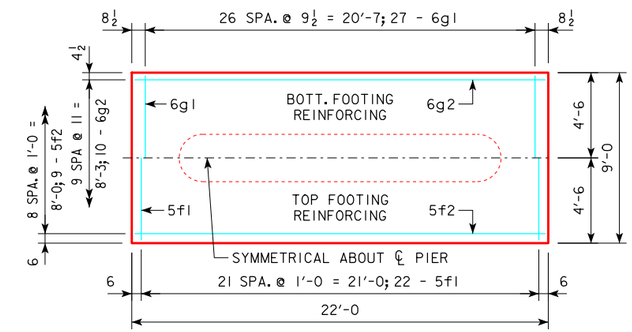
3'-6 x 7'-0 x 20'-0



3'-6 x 8'-0 x 22'-0

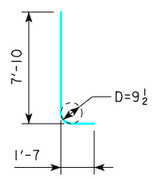


3'-6 x 7'-0 x 22'-0



3'-6 x 9'-0 x 22'-0

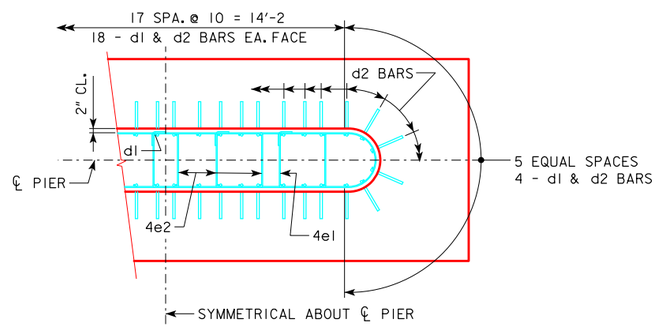
H IN FT.	℄ - ℄ ABUT. BRG.	FOOTING SIZE
16 TO 18	138'-10 151'-4 163'-10 176'-4	3'-6 x 7' x 20'
	188'-10 201'-4	3'-6 x 7' x 22'
	213'-10 226'-4 243'-0	3'-6 x 8' x 22'
19 TO 21	138'-10 151'-4 163'-10 176'-4 188'-10	3'-6 x 7' x 22'
	201'-4 213'-10 226'-4 243'-0	3'-6 x 8' x 22'
22 TO 24	138'-10 151'-4 163'-10 176'-4 188'-10 201'-4 213'-10 226'-4	3'-6 x 8' x 22'
	243'-0	3'-6 x 9' x 22'



d2

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

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)					STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	
3'-6 x 7' x 20'	d2	44 - #9 AS SHOWN	9'-5	1409	2099	18.1
	f1	20 - #5 @ 1'-0	6'-8	139		
	f2	7 - #5 @ 1'-0	19'-8	144		
	g1	20 - #6 @ 1'-0	6'-8	200		
	g2	7 - #6 @ 1'-0	19'-8	207		
3'-6 x 7' x 22'	d2	44 - #9 AS SHOWN	9'-5	1409	2200	20.0
	f1	22 - #5 @ 1'-0	6'-8	153		
	f2	7 - #5 @ 1'-0	21'-8	158		
	g1	22 - #6 @ 1'-0	6'-8	220		
	g2	8 - #6 @ 0'-11	21'-8	260		
3'-6 x 8' x 22'	d2	44 - #9 AS SHOWN	9'-5	1409	2324	22.8
	f1	22 - #5 @ 1'-0	7'-8	176		
	f2	8 - #5 @ 1'-0	21'-8	181		
	g1	23 - #6 @ 0'-11½	7'-8	265		
	g2	9 - #6 @ 0'-11	21'-8	293		
3'-6 x 9' x 22'	d2	44 - #9 AS SHOWN	9'-5	1409	2487	25.7
	f1	22 - #5 @ 1'-0	8'-8	199		
	f2	9 - #5 @ 1'-0	21'-8	203		
	g1	27 - #6 @ 0'-9½	8'-8	351		
	g2	10 - #6 @ 0'-11	21'-8	325		



d2 BAR LAYOUT
(SEE SECTION A-A ON SHEET H24-57-06.)

FOOTING NOTES:

THESE SPREAD FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-57-06.

THESE SPREAD FOOTINGS 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 30 KIPS PER SQUARE FOOT (ALLOWABLE BEARING VALUE OF AT LEAST 10 KIPS PER SQUARE FOOT).

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

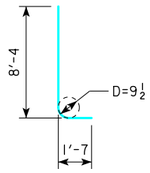
DECEMBER, 2006

TEE PIER - SPREAD FOOTINGS

15° SKEW - H=16' TO 24'

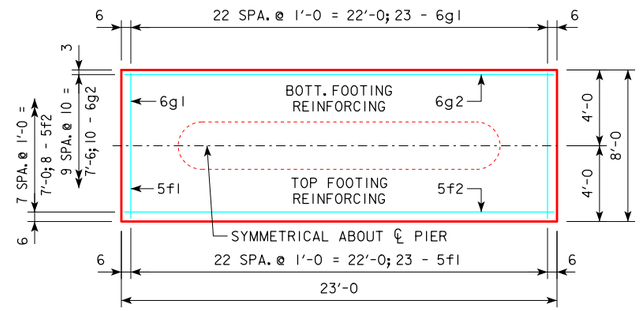
H24-62-06

REVISED 04-12 - EXCAVATION LIMIT WAS CHANGED TO 3'-0.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").

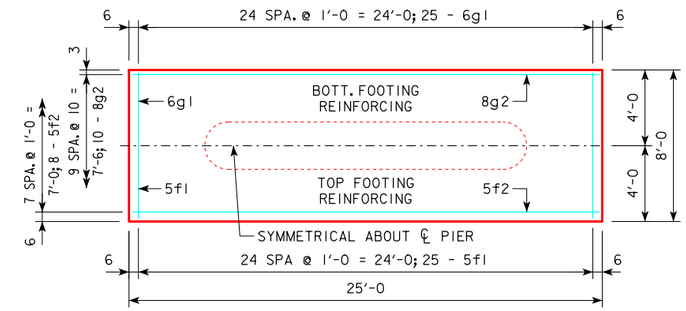


d2

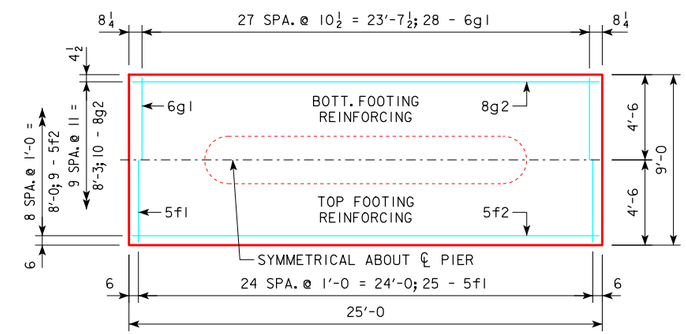
NOTE: D = PIN DIAMETER.
DIMENSIONS ARE OUT TO OUT.



4'-0 x 8'-0 x 23'-0



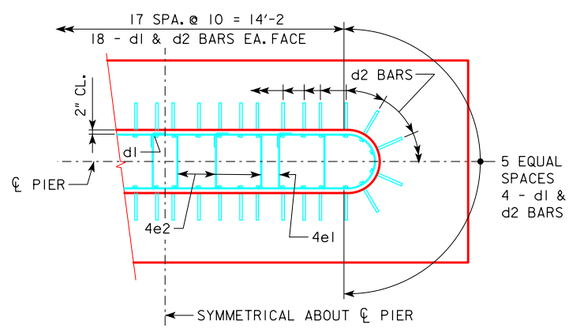
4'-0 x 8'-0 x 25'-0



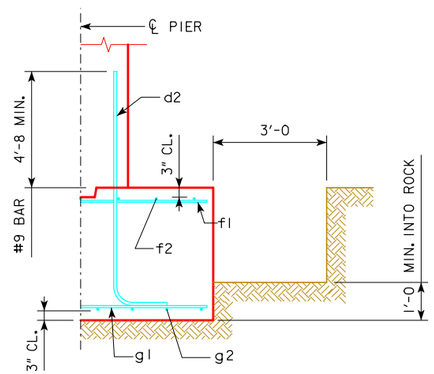
4'-0 x 9'-0 x 25'-0

H IN FT.	℄ - ℄ ABUT. BRG.	FOOTING SIZE
25 TO 27	138'-10 151'-4 163'-10 176'-4 188'-10 201'-4 213'-10 226'-4	4' x 8' x 23'
	243'-0	4' x 8' x 25'
28 TO 30	138'-10 151'-4 163'-10 176'-4 188'-10 201'-4 213'-10 226'-4 243'-0	4' x 8' x 25'
31 TO 33	201'-4 213'-10 226'-4	4' x 8' x 25'
	243'-0	4' x 9' x 25'
34 TO 36	201'-4 213'-10 226'-4 243'-0	4' x 9' x 25'
37 TO 40	201'-4 213'-10 226'-4 243'-0	4' x 9' x 25'

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)					STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	
4' x 8' x 23'	d2	44 - #9 AS SHOWN	9'-11	1484	2462	27.3
	f1	23 - #5 @ 1'-0	7'-8	184		
	f2	8 - #5 @ 1'-0	22'-8	189		
	g1	23 - #6 @ 1'-0	7'-8	265		
	g2	10 - #6 @ 0'-10	22'-8	340		
4' x 8' x 25'	d2	44 - #9 AS SHOWN	9'-11	1484	2837	29.6
	f1	25 - #5 @ 1'-0	7'-8	200		
	f2	8 - #5 @ 1'-0	24'-8	206		
	g1	25 - #6 @ 1'-0	7'-8	288		
	g2	10 - #8 @ 0'-10	24'-8	659		
4' x 9' x 25'	d2	44 - #9 AS SHOWN	9'-11	1484	2965	33.3
	f1	25 - #5 @ 1'-0	8'-8	226		
	f2	9 - #5 @ 1'-0	24'-8	232		
	g1	28 - #6 @ 0'-10½	8'-8	364		
	g2	10 - #8 @ 0'-11	24'-8	659		



d2 BAR LAYOUT
(SEE SECTION A-A ON SHEET H24-57-06.)



TYPICAL SECTION

FOOTING NOTES:

THESE SPREAD FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-57-06.

THESE SPREAD FOOTINGS 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 30 KIPS PER SQUARE FOOT (ALLOWABLE BEARING VALUE OF AT LEAST 10 KIPS PER SQUARE FOOT).

09-2016
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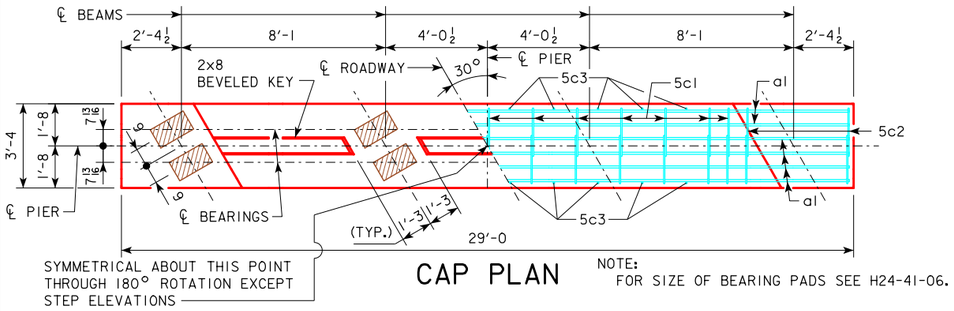
IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
DECEMBER, 2006

TEE PIER - SPREAD FOOTINGS
15° SKEW - H=25' TO 40'

H24-63-06

REVISED 04-12 - EXCAVATION LIMIT WAS CHANGED TO 3'-0.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").



CAP PLAN

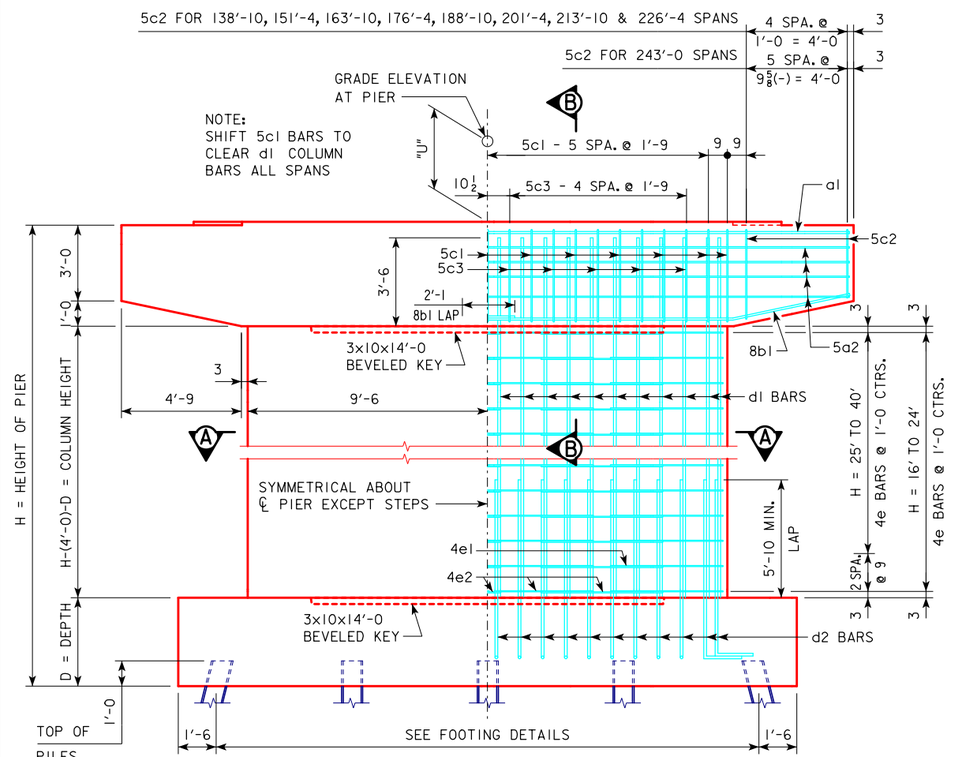
NOTE:
FOR SIZE OF BEARING PADS SEE H24-41-06.

CAP

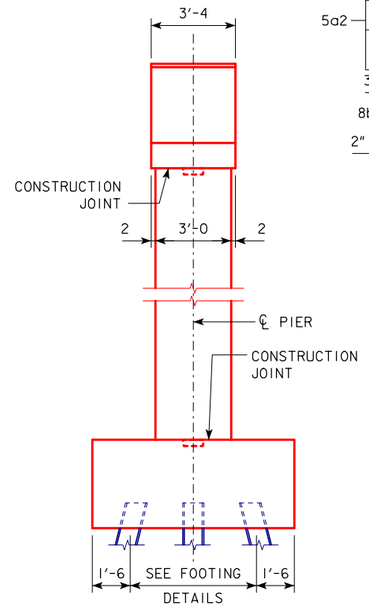
REINFORCING STEEL	℄ - ℄ ABUT. BEARINGS		138'-10			151'-4			163'-10			176'-4			188'-10			201'-4			213'-10			226'-4			243'-0		
BAR	LENGTH	SHAPE	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
a1	28'-8		6	9	585	6	9	585	6	9	585	6	9	585	6	9	585	6	9	585	6	9	585	6	9	585	6	10	740
5a2	28'-8		8	5	239	8	5	239	8	5	239	8	5	239	8	5	239	8	5	239	8	5	239	8	5	239	8	5	239
8b1	15'-6		8	8	331	8	8	331	8	8	331	8	8	331	8	8	331	8	8	331	8	8	331	8	8	331	8	8	331
5c1	12'-2		26	5	330	26	5	330	26	5	330	26	5	330	26	5	330	26	5	330	26	5	330	26	5	330	26	5	330
5c2	VARIES		20	5	232	20	5	232	20	5	232	20	5	232	20	5	232	20	5	232	20	5	232	20	5	232	24	5	278
5c3	4'-2		20	5	87	20	5	87	20	5	87	20	5	87	20	5	87	20	5	87	20	5	87	20	5	87	20	5	87
(1) TOTAL (LB.)			1804			1804			1804			1804			1804			1804			1804			1804			2005		
STRUCTURAL CONCRETE (CY)			14.2			14.2			14.2			14.2			14.2			14.2			14.2			14.2			14.2		

COLUMN

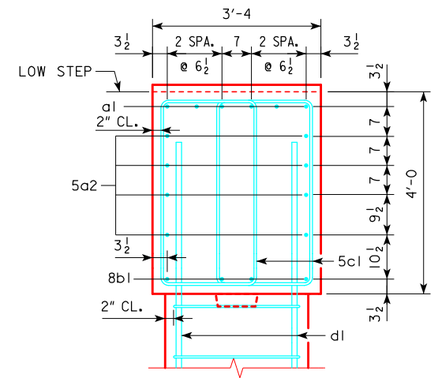
H IN FEET	COLUMN HEIGHT	STRUCTURAL CONCRETE (CY)	REINFORCING STEEL: d1 BAR				4e1 BAR				4e2 BAR				TOTAL WEIGHT (LB.)
			NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	
16	8'-6	17.3	44	10	12'-0	2272	18	4	13'-9	165	36	4	15'-9	379	2816
17	9'-6	19.4	44	10	13'-0	2461	20	4	13'-9	184	40	4	15'-9	421	3066
18	10'-6	21.4	44	10	14'-0	2651	22	4	13'-9	202	44	4	15'-9	463	3316
19	11'-6	23.5	44	10	15'-0	2840	24	4	13'-9	220	48	4	15'-9	505	3565
20	12'-6	25.5	44	10	16'-0	3029	26	4	13'-9	239	52	4	15'-9	547	3815
21	13'-6	27.5	44	10	17'-0	3219	28	4	13'-9	257	56	4	15'-9	589	4065
22	14'-6	29.6	44	10	18'-0	3408	30	4	13'-9	276	60	4	15'-9	631	4315
23	15'-6	31.6	44	10	19'-0	3597	32	4	13'-9	294	64	4	15'-9	673	4564
24	16'-6	33.7	44	10	20'-0	3787	34	4	13'-9	312	68	4	15'-9	715	4814
25	17'-0	34.7	44	10	20'-6	3881	36	4	13'-9	331	72	4	15'-9	758	4970
26	18'-0	36.7	44	10	21'-6	4071	38	4	13'-9	349	76	4	15'-9	800	5220
27	19'-0	38.8	44	10	22'-6	4260	40	4	13'-9	367	80	4	15'-9	842	5469
28	20'-0	40.8	44	10	23'-6	4449	42	4	13'-9	386	84	4	15'-9	884	5719
29	21'-0	42.8	44	10	24'-6	4639	44	4	13'-9	404	88	4	15'-9	926	5969
30	22'-0	44.9	44	10	25'-6	4828	46	4	13'-9	423	92	4	15'-9	968	6219
31	23'-0	46.9	44	10	26'-6	5017	48	4	13'-9	441	96	4	15'-9	1010	6468
32	24'-0	48.9	44	10	27'-6	5207	50	4	13'-9	459	100	4	15'-9	1052	6718
33	25'-0	51.0	44	10	28'-6	5396	52	4	13'-9	478	104	4	15'-9	1094	6968
34	26'-0	53.0	44	10	29'-6	5585	54	4	13'-9	496	108	4	15'-9	1136	7217
35	27'-0	55.1	44	10	30'-6	5775	56	4	13'-9	514	112	4	15'-9	1178	7467
36	28'-0	57.1	44	10	31'-6	5964	58	4	13'-9	533	116	4	15'-9	1220	7717
37	29'-0	59.1	44	10	32'-6	6153	60	4	13'-9	551	120	4	15'-9	1263	7967
38	30'-0	61.2	44	10	33'-6	6343	62	4	13'-9	569	124	4	15'-9	1305	8217
39	31'-0	63.2	44	10	34'-6	6532	64	4	13'-9	588	128	4	15'-9	1347	8467
40	32'-0	65.3	44	10	35'-6	6721	66	4	13'-9	606	132	4	15'-9	1389	8716



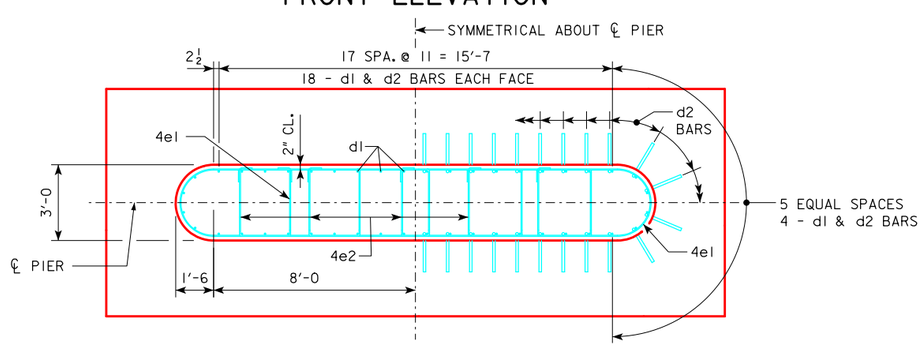
FRONT ELEVATION



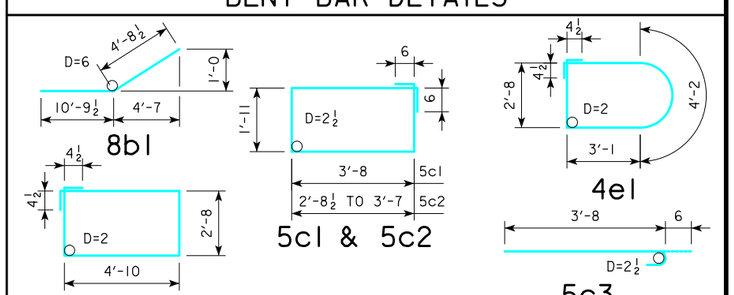
END ELEVATION



SECTION B-B



SECTION A-A



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

(1) SEE SHEET H24-24-06 FOR STEP REINFORCING STEEL QUANTITY AND DETAILS.

PIER NOTES:

SEE "TEE PIER NOTES" ON H24-02-06 FOR NOTES REGARDING APPLICATION OF THESE PIER STANDARDS.

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

ELIMINATE 2x8 BEVELED KEYWAY ON TOP OF CAP FOR EXPANSION PIERS.

SEE SHEET H24-22-06 FOR "U" DIMENSION.

10-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

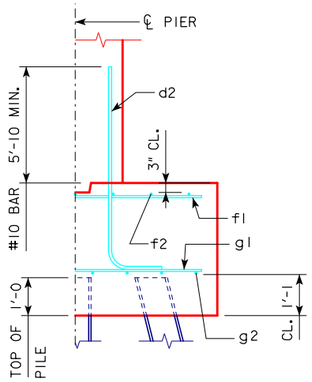
DECEMBER, 2006

TEE PIER CAP AND COLUMN

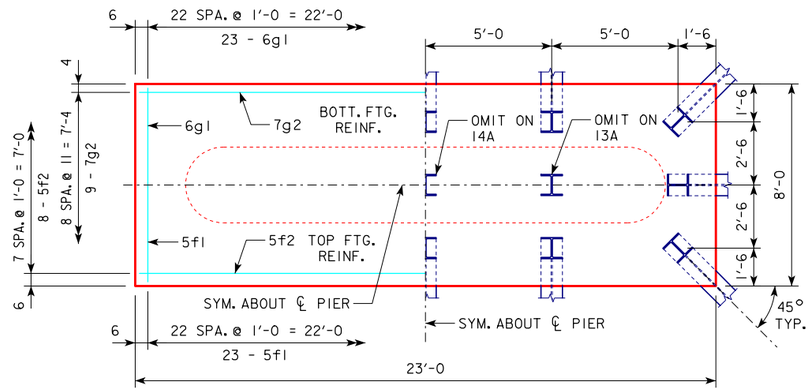
30° SKEW

H24-64-06

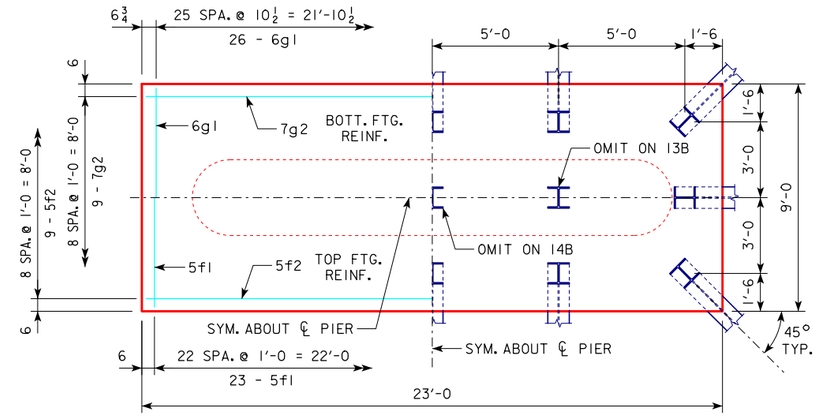
REVISED 01-10- SHEET WAS REVISED TO MEET LRFD SPECIFICATIONS.
REVISED 09-2016 - CHANGED TOP OF FOOTING TO TOP OF REBAR VERTICAL CLEARANCE TO 3" (WAS 2"),
REVISED 10-2016 - CHANGED BEVELED KEYWAY LENGTH OF PIER COLUMN CAP AND FOOTING TO BE 5'-0 LESS THAN WIDTH OF PIER COLUMN (WAS 16'-0).



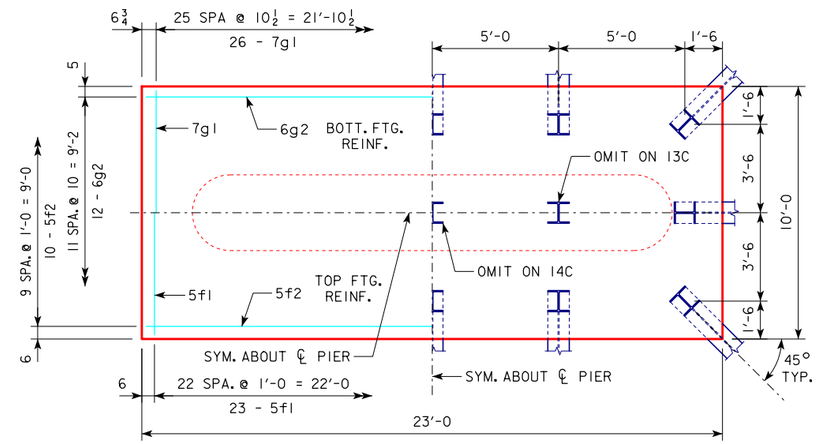
TYPICAL SECTION



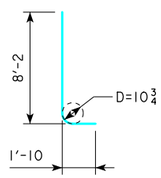
3'-6 x 8'-0 x 23'-0 FOR 13A, 14A & 15A



3'-6 x 9'-0 x 23'-0 FOR 13B, 14B & 15B



3'-6 x 10'-0 x 23'-0 FOR 13C, 14C & 15C

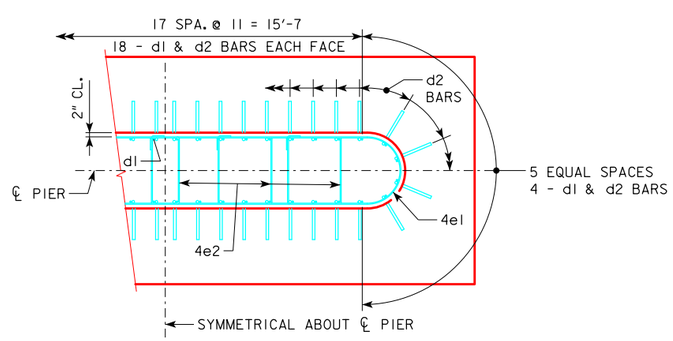


d2

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

H IN FT.	℄ - ℄ ABUT. BRG.	PILING (HP10x57) NO. & LAYOUT	PILING (HP10x57) ① LRFD Pu, STRENGTH I, DES. LOAD (KIPS)	FOOTING SIZE
16 TO 18	201'-4	13A	139	3'-6 x 8' x 23'
	213'-10	13A	145	
	226'-4	14A	141	
	243'-0	15A	140	
19 TO 21	201'-4	13B	143	3'-6 x 9' x 23'
	213'-10	14B	139	
	226'-4	14B	145	
	243'-0	15B	143	
22 TO 24	201'-4	13C	147	3'-6 x 10' x 23'
	213'-10	14C	142	
	226'-4	15C	141	
	243'-0	15C	146	

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING) BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
3'-6 x 8' x 23'	d2	44 - #10 AS SHOWN	10'-0	1893	2948	23.9
	f1	23 - #5 @ 1'-0	7'-8	184		
	f2	8 - #5 @ 1'-0	22'-8	189		
	g1	23 - #6 @ 1'-0	7'-8	265		
	g2	9 - #7 @ 0'-11	22'-8	417		
3'-6 x 9' x 23'	d2	44 - #10 AS SHOWN	10'-0	1893	3069	26.8
	f1	23 - #5 @ 1'-0	8'-8	208		
	f2	9 - #5 @ 1'-0	22'-8	213		
	g1	26 - #6 @ 0'-10½	8'-8	338		
	g2	9 - #7 @ 1'-0	22'-8	417		
3'-6 x 10' x 23'	d2	44 - #10 AS SHOWN	10'-0	1893	3284	29.8
	f1	23 - #5 @ 1'-0	9'-8	232		
	f2	10 - #5 @ 1'-0	22'-8	236		
	g1	26 - #7 @ 0'-10½	9'-8	514		
	g2	12 - #6 @ 0'-10	22'-8	409		



d2 BAR LAYOUT
(SEE SECTION A-A ON SHEET H24-64-06.)

① NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

FOOTING NOTES:

THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-64-06.

BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

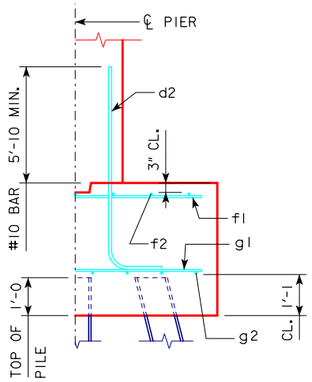
DECEMBER, 2006

TEE PIER-HP10x57 SRL-I STEEL PILE FOOTINGS

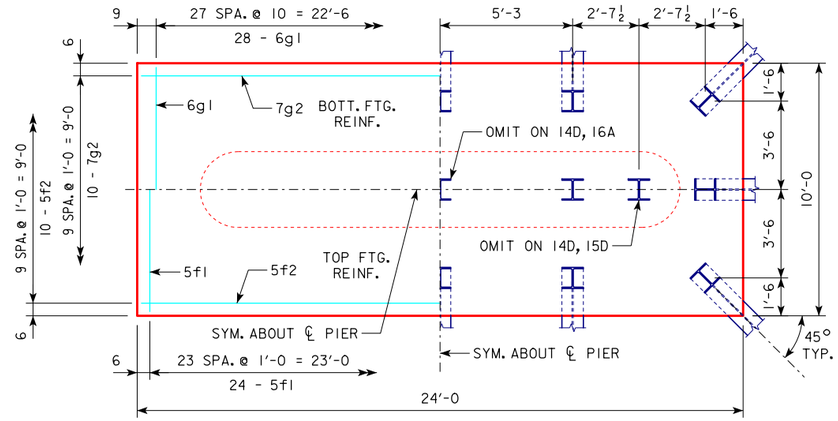
30° SKEW - H=16' TO 24'

H24-65-06

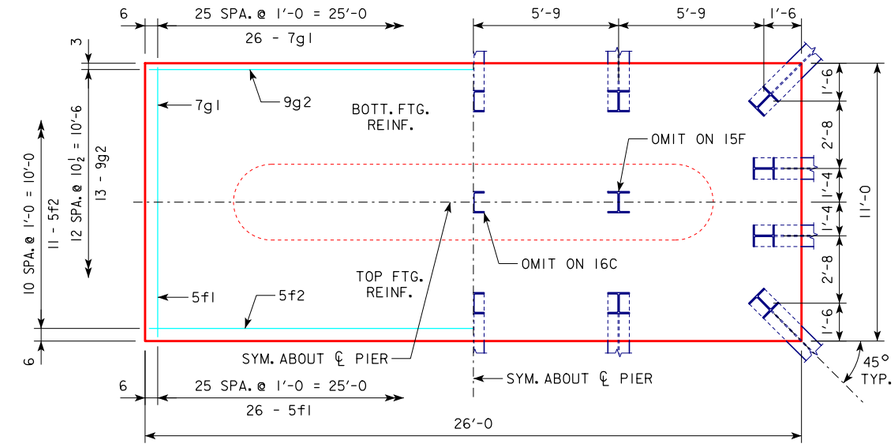
REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").



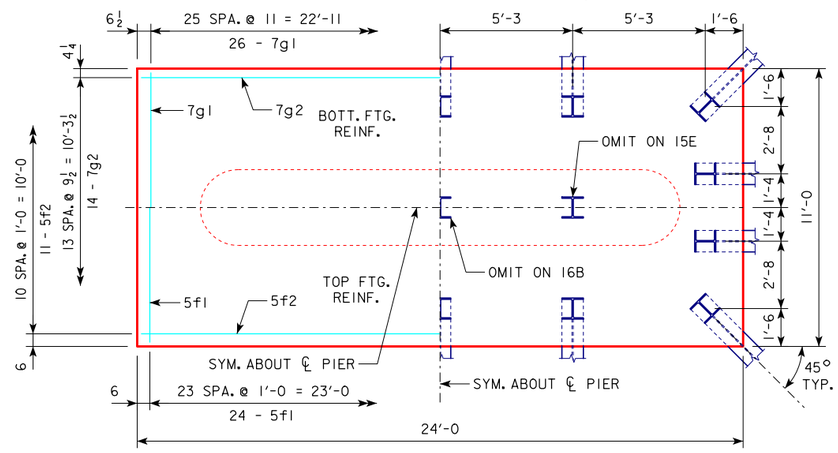
TYPICAL SECTION



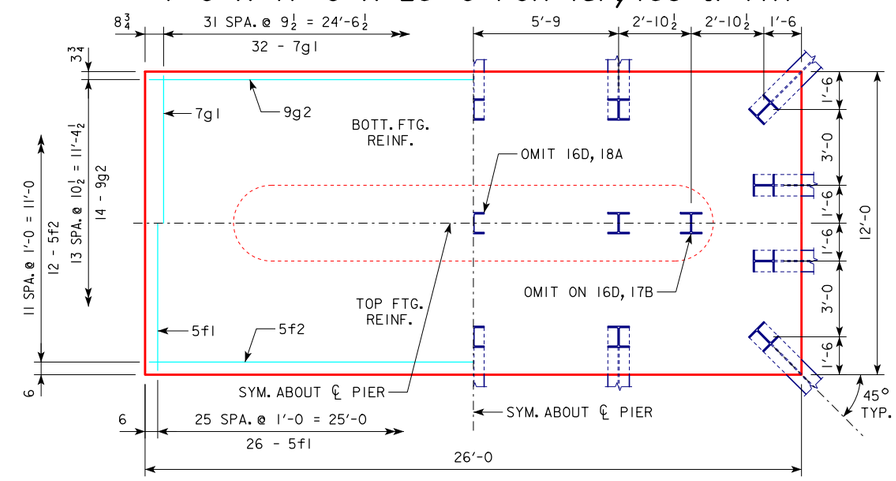
4'-0 x 10'-0 x 24'-0 FOR 14D, 15D & 16A



4'-0 x 11'-0 x 26'-0 FOR 15F, 16C & 17A



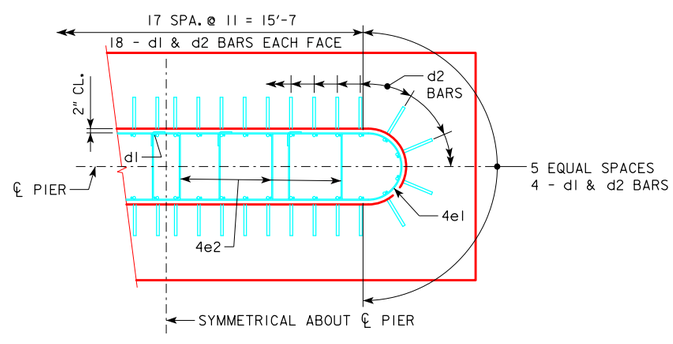
4'-0 x 11'-0 x 24'-0 FOR 15E & 16B



4'-0 x 12'-0 x 26'-0 FOR 16D, 17B & 18A

H IN FT.	℄ - ℄ ABUT. BRG.	PILING (HP10x57) NO. & LAYOUT	① LRFD Pu, STRENGTH I, DES. LOAD (KIPS)	FOOTING SIZE
25 TO 27	201'-4	14D	142	4' x 10' x 24'
	213'-10	15D	141	
	226'-4	15D	145	
	243'-0	16A	138	
28 TO 30	201'-4	15E	134	4' x 11' x 24'
	213'-10	15E	138	
	226'-4	15E	142	
	243'-0	16B	139	
31 TO 33	201'-4	15E	141	4' x 11' x 24'
	213'-10	15E	145	
	226'-4	16B	141	
	243'-0	16B	144	
34 TO 36	201'-4	15F	145	4' x 11' x 26'
	213'-10	16C	141	
	226'-4	16C	145	
	243'-0	17A	142	
37 TO 40	201'-4	16D	144	4' x 12' x 26'
	213'-10	17B	143	
	226'-4	17B	147	
	243'-0	18A	140	

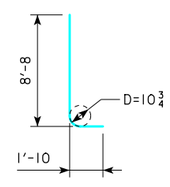
FOOTING SIZE	REINFORCING STEEL (ONE FOOTING) BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
4' x 10' x 24'	d2	44 - #10 AS SHOWN	10'-6	1988	3368	35.6
	f1	24 - #5 @ 1'-0	9'-8	242		
	f2	10 - #5 @ 1'-0	23'-8	247		
	g1	28 - #6 @ 0'-10	9'-8	407		
	g2	10 - #7 @ 1'-0	23'-8	484		
4' x 11' x 24'	d2	44 - #10 AS SHOWN	10'-6	1988	3771	39.1
	f1	24 - #5 @ 1'-0	10'-8	267		
	f2	11 - #5 @ 1'-0	23'-8	272		
	g1	26 - #7 @ 0'-11	10'-8	567		
	g2	14 - #7 @ 0'-9½	23'-8	677		
4' x 11' x 26'	d2	44 - #10 AS SHOWN	10'-6	1988	4272	42.4
	f1	26 - #5 @ 1'-0	10'-8	289		
	f2	11 - #5 @ 1'-0	25'-8	294		
	g1	26 - #7 @ 1'-0	10'-8	567		
	g2	13 - #9 @ 0'-10½	25'-8	1134		
4' x 12' x 26'	d2	44 - #10 AS SHOWN	10'-6	1988	4610	46.2
	f1	26 - #5 @ 1'-0	11'-8	316		
	f2	12 - #5 @ 1'-0	25'-8	321		
	g1	32 - #7 @ 0'-9½	11'-8	763		
	g2	14 - #9 @ 0'-10½	25'-8	1222		



d2 BAR LAYOUT

(SEE SECTION A-A ON SHEET H24-64-06.)

① NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



d2

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

FOOTING NOTES:

THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-64-06.

BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

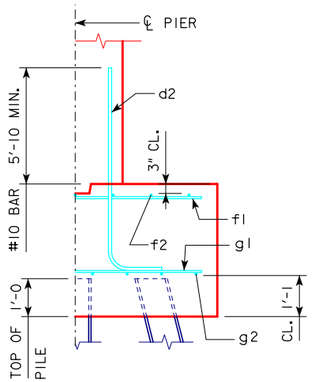
DECEMBER, 2006

TEE PIER-HP10x57 SRL-I STEEL PILE FOOTINGS

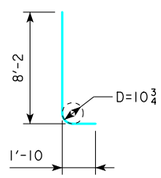
30° SKEW - H=25' TO 40'

H24-66-06

REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").

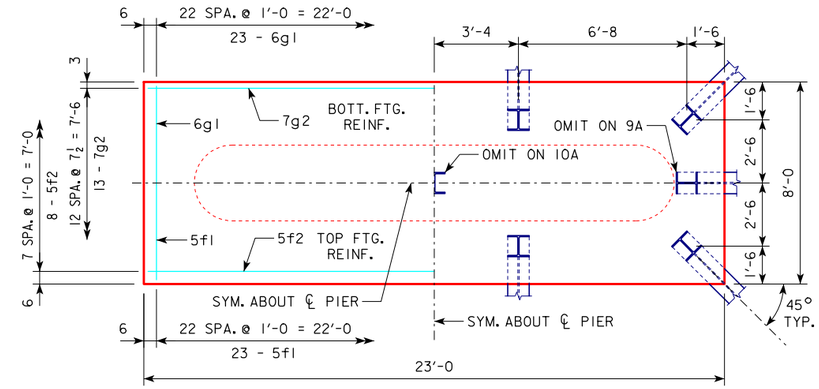


TYPICAL SECTION



d2

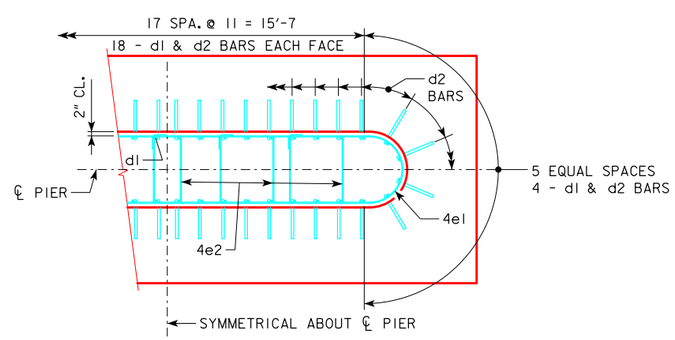
NOTE: D = PIN DIAMETER.
DIMENSIONS ARE OUT TO OUT.



3'-6 x 8'-0 x 23'-0 FOR 9A & 10A

H IN FT.	℄ - ℄ ABUT. BRG.	PILING (HP10x57) NO. & LAYOUT	PILING (HP10x57) ① LRFD Pu, STRENGTH I, DES. LOAD (KIPS)	FOOTING SIZE
16 TO 18	201'-4	9A	203	3'-6 x 8' x 23'
	213'-10	9A	210	
	226'-4	9A	219	
	243'-0	10A	195	
19 TO 21	201'-4	10A	182	3'-6 x 8' x 23'
	213'-10	10A	188	
	226'-4	10A	196	
	243'-0	10A	202	
22 TO 24	201'-4	10A	189	3'-6 x 8' x 23'
	213'-10	10A	196	
	226'-4	10A	203	
	243'-0	10A	209	

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING) BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
3'-6 x 8' x 23'	d2	44 - #10 AS SHOWN	10'-0	1893	3133	23.9
	f1	23 - #5 @ 1'-0	7'-8	184		
	f2	8 - #5 @ 1'-0	22'-8	189		
	g1	23 - #6 @ 1'-0	7'-8	265		
	g2	13 - #7 @ 0'-7½	22'-8	602		



d2 BAR LAYOUT
(SEE SECTION A-A ON SHEET H24-64-06.)

① NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

FOOTING NOTES:

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BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

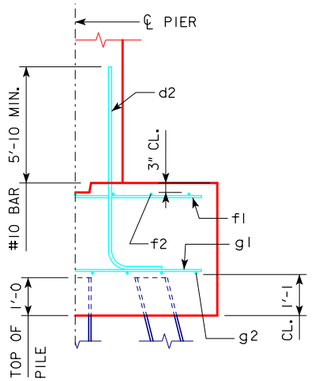
DECEMBER, 2006

TEE PIER-HP10x57 SRL-2 STEEL PILE FOOTINGS

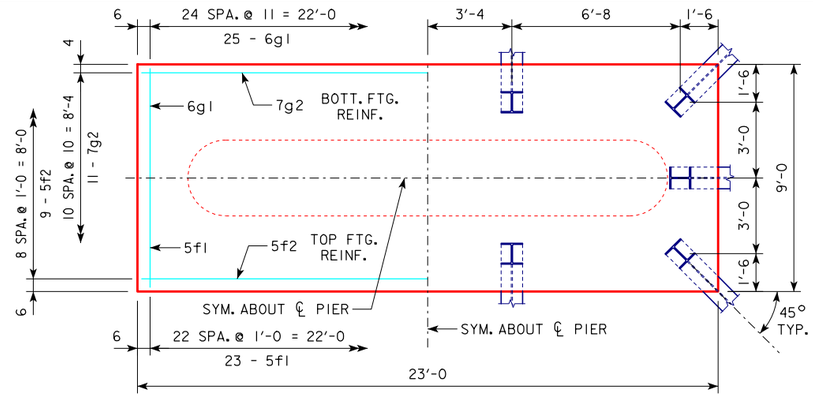
30° SKEW - H=16' TO 24'

H24-67-06

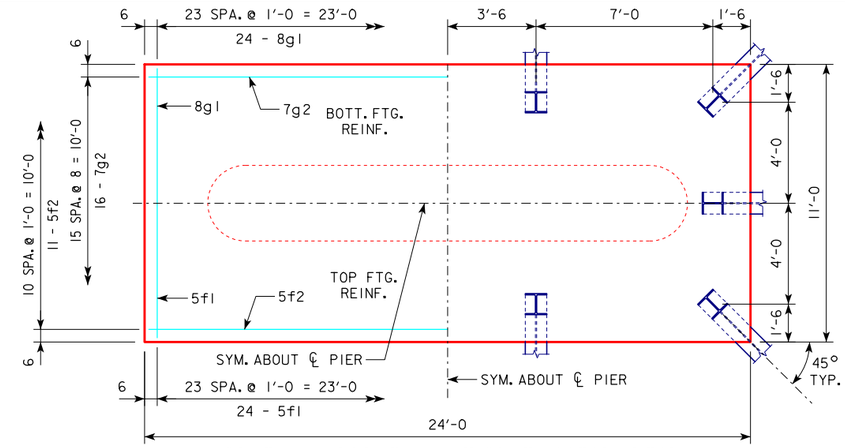
REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").



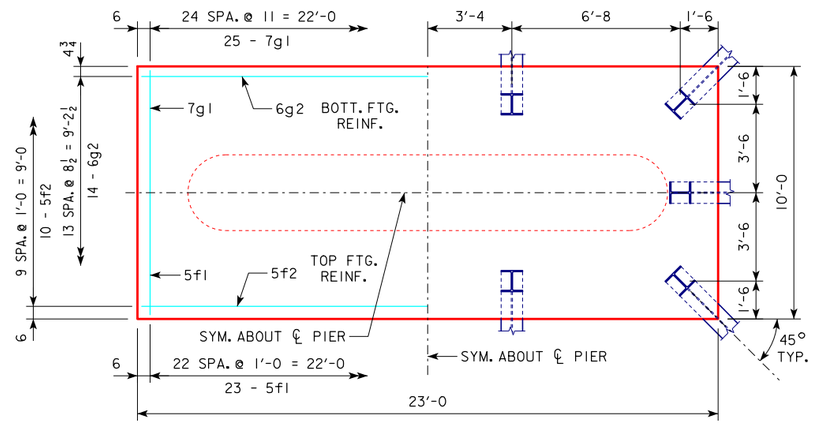
TYPICAL SECTION



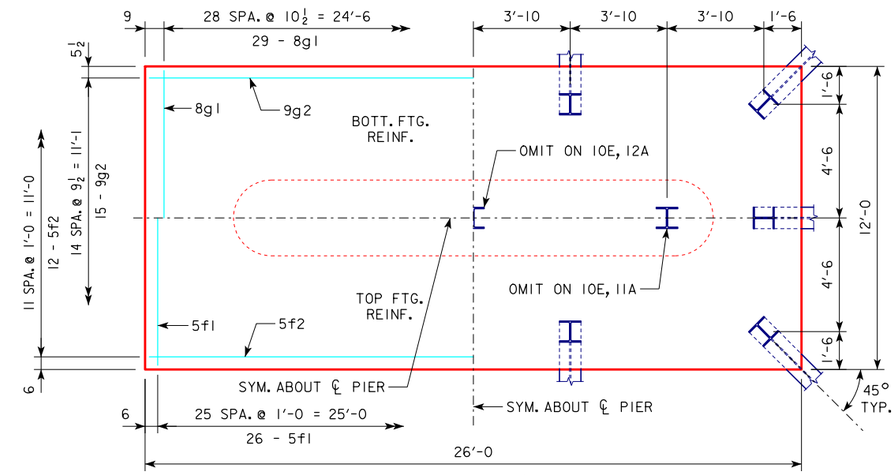
4'-0 x 9'-0 x 23'-0 FOR 10B



4'-0 x 11'-0 x 24'-0 FOR 10D



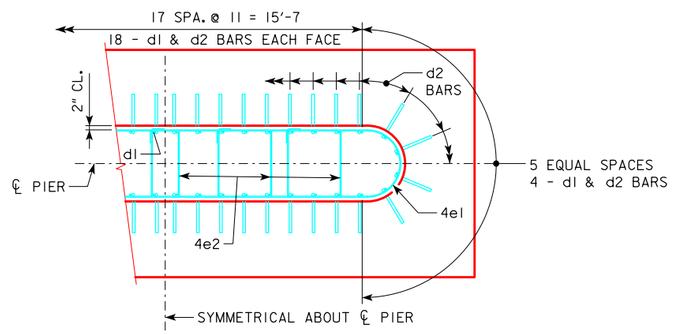
4'-0 x 10'-0 x 23'-0 FOR 10C



4'-0 x 12'-0 x 26'-0 FOR 10E, 11A & 12A

H IN FT.	℄ - ℄ ABUT. BRG.	PILING (HP10x57) NO. & LAYOUT	① LRFD Pu, STRENGTH I, DES. LOAD (KIPS)	FOOTING SIZE
25 TO 27	201'-4	10B	193	4' x 9' x 23'
	213'-10	10B	199	
	226'-4	10B	206	
	243'-0	10B	212	
28 TO 30	201'-4	10C	197	4' x 10' x 23'
	213'-10	10C	203	
	226'-4	10C	210	
	243'-0	10C	216	
31 TO 33	201'-4	10D	203	4' x 11' x 24'
	213'-10	10D	209	
	226'-4	10D	215	
	243'-0	10D	220	
34 TO 36	201'-4	10E	208	4' x 12' x 26'
	213'-10	10E	213	
	226'-4	10E	219	
	243'-0	11A	211	
37 TO 40	201'-4	10E	219	4' x 12' x 26'
	213'-10	11A	213	
	226'-4	11A	218	
	243'-0	12A	203	

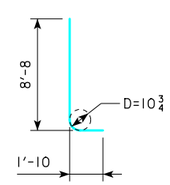
FOOTING SIZE	REINFORCING STEEL (ONE FOOTING) BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
4' x 9' x 23'	d2	44 - #10 AS SHOWN	10'-6	1988	3244	30.7
	f1	23 - #5 @ 1'-0	8'-8	208		
	f2	9 - #5 @ 1'-0	22'-8	213		
	g1	25 - #6 @ 0'-11	8'-8	325		
	g2	11 - #7 @ 0'-10	22'-8	510		
4' x 10' x 23'	d2	44 - #10 AS SHOWN	10'-6	1988	3427	34.1
	f1	23 - #5 @ 1'-0	9'-8	232		
	f2	10 - #5 @ 1'-0	22'-8	236		
	g1	25 - #7 @ 0'-11	9'-8	494		
	g2	14 - #6 @ 0'-8 1/2	22'-8	477		
4' x 11' x 24'	d2	44 - #10 AS SHOWN	10'-6	1988	3985	39.1
	f1	24 - #5 @ 1'-0	10'-8	267		
	f2	11 - #5 @ 1'-0	23'-8	272		
	g1	24 - #8 @ 1'-0	10'-8	684		
	g2	16 - #7 @ 0'-8	23'-8	774		
4' x 12' x 26'	d2	44 - #10 AS SHOWN	10'-6	1988	4837	46.2
	f1	26 - #5 @ 1'-0	11'-8	316		
	f2	12 - #5 @ 1'-0	25'-8	321		
	g1	29 - #8 @ 0'-10 1/2	11'-8	903		
	g2	15 - #9 @ 0'-9 1/2	25'-8	1309		



d2 BAR LAYOUT

(SEE SECTION A-A ON SHEET H24-64-06.)

① NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



d2

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

FOOTING NOTES:

THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-64-06.

BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

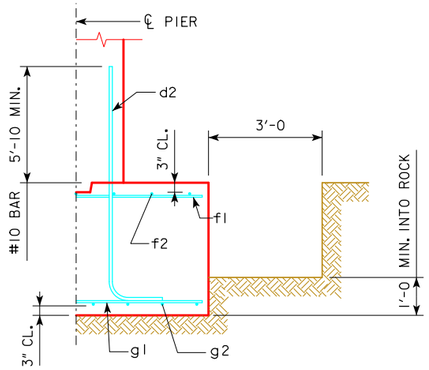
DECEMBER, 2006

TEE PIER-HP10x57 SRL-2 STEEL PILE FOOTINGS

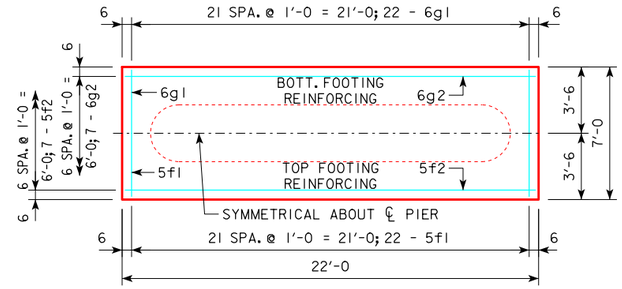
30° SKEW - H=25' TO 40'

H24-68-06

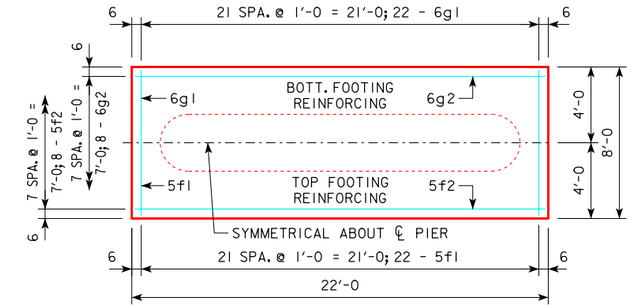
REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "F2" TO TOP OF PIER FOOTING TO 3" (WAS 2").



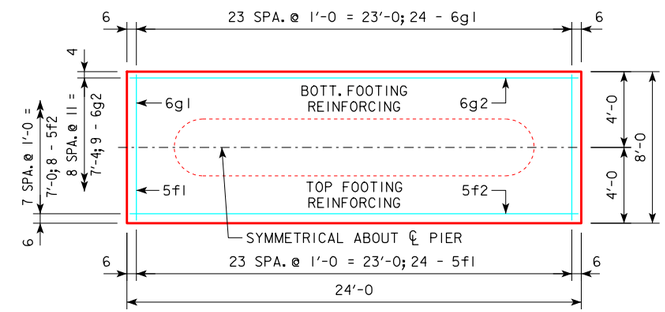
TYPICAL SECTION



3'-6 x 7'-0 x 22'-0

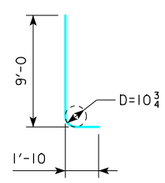


3'-6 x 8'-0 x 22'-0



3'-6 x 8'-0 x 24'-0

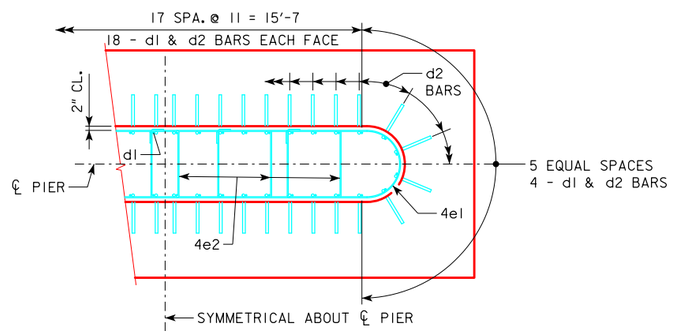
H IN FT.	℄ - ℄ ABUT. BRG.	FOOTING SIZE
16 TO 18	138'-10 151'-4 163'-10 176'-4 188'-10	3'-6 x 7' x 22'
	201'-4 213'-10 226'-4 243'-0	3'-6 x 8' x 22'
19 TO 21	138'-10 151'-4	3'-6 x 7' x 22'
	163'-10 176'-4 188'-10 201'-4 213'-10 226'-4	3'-6 x 8' x 22'
	243'-0	3'-6 x 8' x 24'
22 TO 24	138'-10 151'-4 163'-10 176'-4 188'-10 201'-4	3'-6 x 8' x 22'
	213'-10 226'-4 243'-0	3'-6 x 8' x 24'



d2

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

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)					STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	
3'-6 x 7' x 22'	d2	44 - #10 AS SHOWN	10'-10	2051	2810	20.0
	f1	22 - #5 @ 1'-0	6'-8	153		
	f2	7 - #5 @ 1'-0	21'-8	158		
	g1	22 - #6 @ 1'-0	6'-8	220		
	g2	7 - #6 @ 1'-0	21'-8	228		
3'-6 x 8' x 22'	d2	44 - #10 AS SHOWN	10'-10	2051	2921	22.8
	f1	22 - #5 @ 1'-0	7'-8	176		
	f2	8 - #5 @ 1'-0	21'-8	181		
	g1	22 - #6 @ 1'-0	7'-8	253		
	g2	8 - #6 @ 1'-0	21'-8	260		
3'-6 x 8' x 24'	d2	44 - #10 AS SHOWN	10'-10	2051	3036	24.9
	f1	24 - #5 @ 1'-0	7'-8	192		
	f2	8 - #5 @ 1'-0	23'-8	197		
	g1	24 - #6 @ 1'-0	7'-8	276		
	g2	9 - #6 @ 0'-11	23'-8	320		



d2 BAR LAYOUT
(SEE SECTION A-A ON SHEET H24-64-06.)

FOOTING NOTES:

THESE SPREAD FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-64-06.

THESE SPREAD FOOTINGS 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 30 KIPS PER SQUARE FOOT (ALLOWABLE BEARING VALUE OF AT LEAST 10 KIPS PER SQUARE FOOT).

REVISED 04-12 - EXCAVATION LIMIT WAS CHANGED TO 3'-0.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "F2" TO TOP OF PIER FOOTING TO 3" (WAS 2").

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

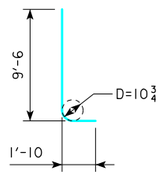
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

TEE PIER - SPREAD FOOTINGS

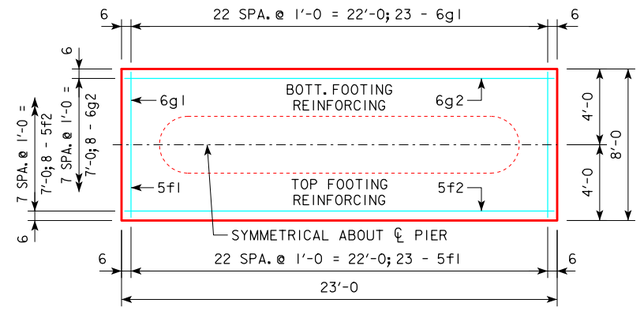
30° SKEW - H=16' TO 24'

H24-69-06

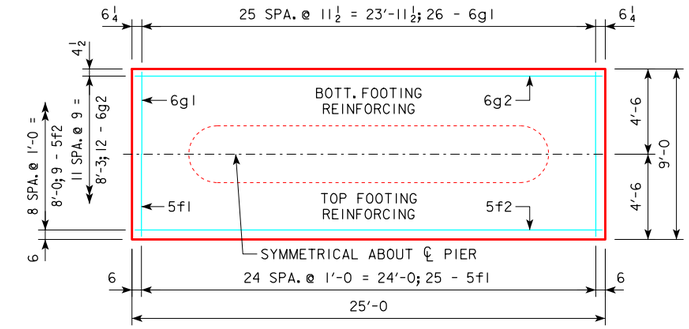


d2

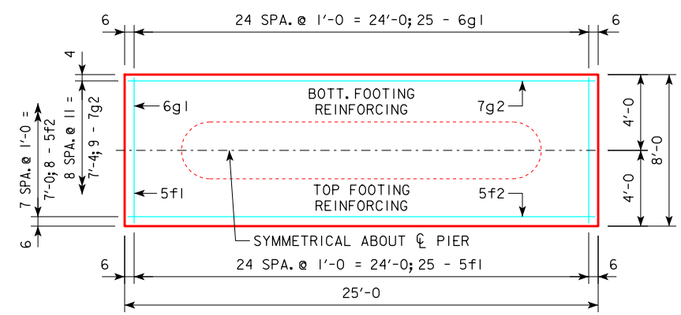
NOTE: D = PIN DIAMETER.
DIMENSIONS ARE OUT TO OUT.



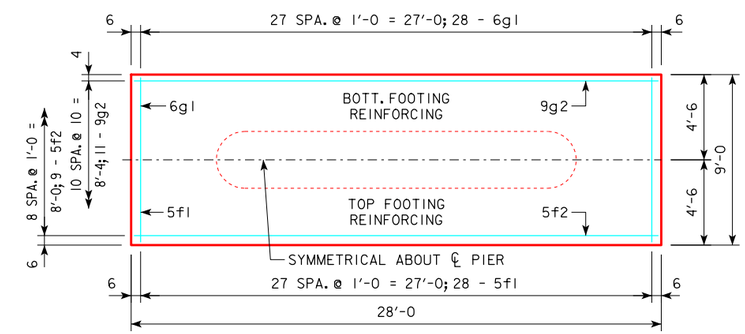
4'-0 x 8'-0 x 23'-0



4'-0 x 9'-0 x 25'-0



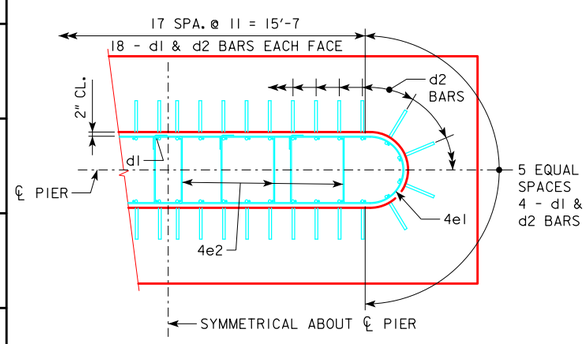
4'-0 x 8'-0 x 25'-0



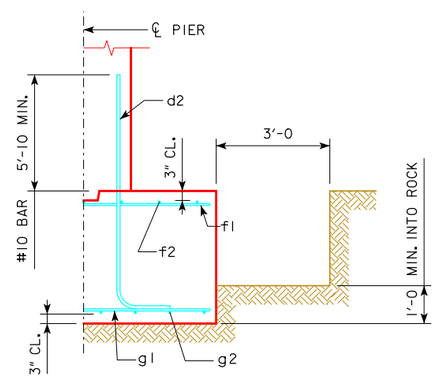
4'-0 x 9'-0 x 28'-0

H IN FT.	℄ - ℄ ABUT. BRG.	FOOTING SIZE
25 TO 27	138'-10 151'-4 163'-10 176'-4 188'-10	4' x 8' x 23'
	201'-4 213'-10 226'-4 243'-0	4' x 8' x 25'
28 TO 30	138'-10	4' x 8' x 23'
	151'-4 163'-10 176'-4 188'-10 201'-4 213'-10	4' x 8' x 25'
	226'-4 243'-0	4' x 9' x 25'
31 TO 33	201'-4 213'-10 226'-4 243'-0	4' x 9' x 25'
34 TO 36	201'-4 213'-10 226'-4 243'-0	4' x 9' x 25'
37 TO 40	201'-4 213'-10 226'-4 243'-0	4' x 9' x 28'

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)					STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	
4' x 8' x 23'	d2	44 - #10 AS SHOWN	11'-4	2146	3056	27.3
	f1	23 - #5 @ 1'-0	7'-8	184		
	f2	8 - #5 @ 1'-0	22'-8	189		
	g1	23 - #6 @ 1'-0	7'-8	265		
	g2	8 - #6 @ 1'-0	22'-8	272		
4' x 8' x 25'	d2	44 - #10 AS SHOWN	11'-4	2146	3294	29.6
	f1	25 - #5 @ 1'-0	7'-8	200		
	f2	8 - #5 @ 1'-0	24'-8	206		
	g1	25 - #6 @ 1'-0	7'-8	288		
	g2	9 - #7 @ 0'-11	24'-8	454		
4' x 9' x 25'	d2	44 - #10 AS SHOWN	11'-4	2146	3387	33.3
	f1	25 - #5 @ 1'-0	8'-8	226		
	f2	9 - #5 @ 1'-0	24'-8	232		
	g1	26 - #6 @ 0'-11½	8'-8	338		
	g2	12 - #6 @ 0'-9	24'-8	445		
4' x 9' x 28'	d2	44 - #10 AS SHOWN	11'-4	2146	4058	37.3
	f1	28 - #5 @ 1'-0	8'-8	253		
	f2	9 - #5 @ 1'-0	27'-8	260		
	g1	28 - #6 @ 1'-0	8'-8	364		
	g2	11 - #9 @ 0'-10	27'-8	1035		



d2 BAR LAYOUT
(SEE SECTION A-A ON SHEET H24-64-06.)



TYPICAL SECTION

FOOTING NOTES:

THESE SPREAD FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-64-06.

THESE SPREAD FOOTINGS 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 30 KIPS PER SQUARE FOOT (ALLOWABLE BEARING VALUE OF AT LEAST 10 KIPS PER SQUARE FOOT).

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

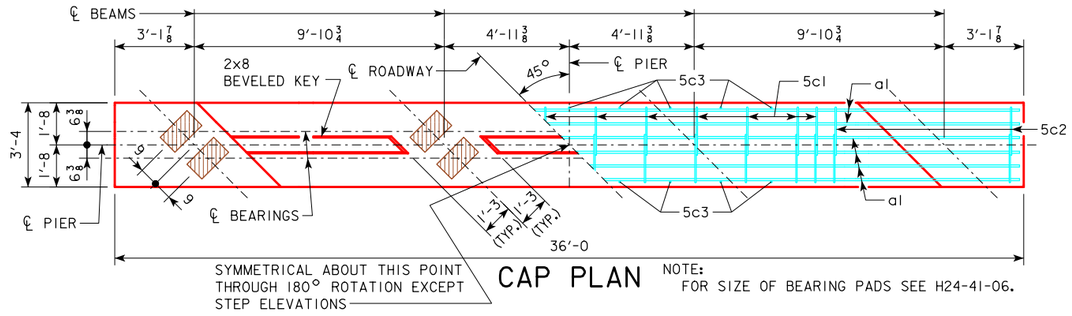
DECEMBER, 2006

TEE PIER - SPREAD FOOTINGS

30° SKEW - H=25' TO 40'

H24-70-06

REVISED 04-12 - EXCAVATION LIMIT WAS CHANGED TO 3'-0.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").



CAP PLAN

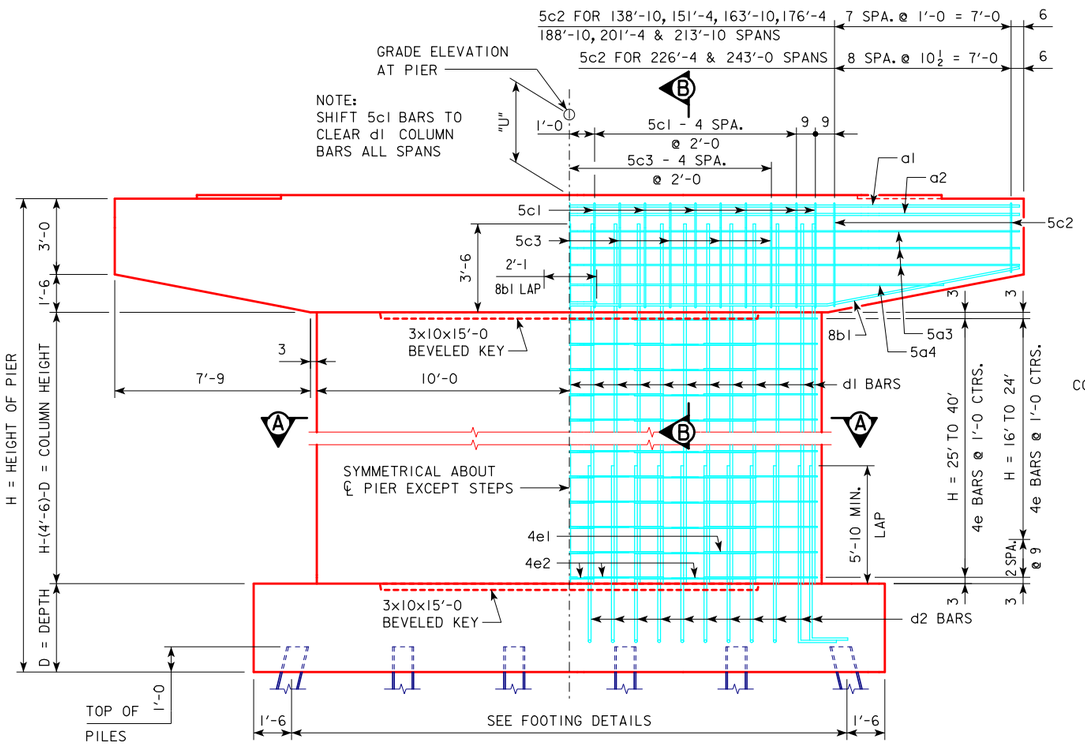
NOTE:
FOR SIZE OF BEARING PADS SEE H24-41-06.

CAP

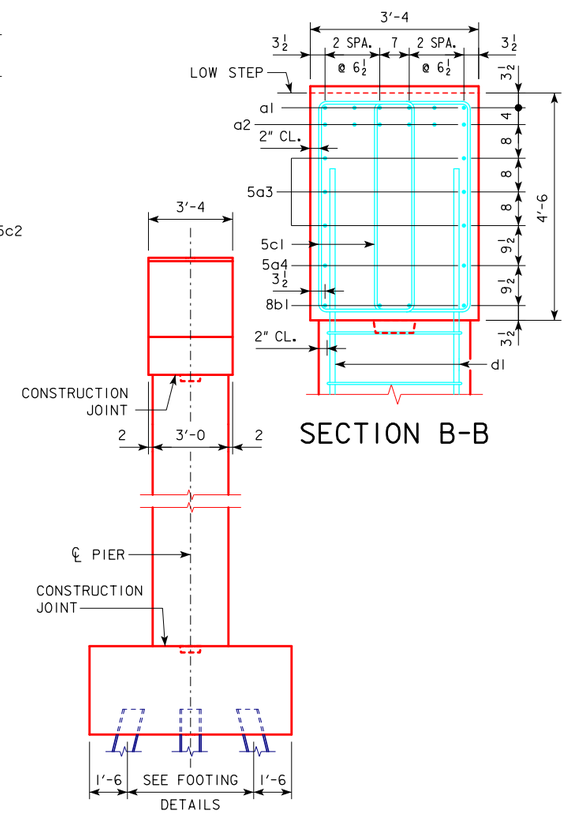
REINFORCING STEEL			℄ - ℄ ABUT. BEARINGS	138'-10			151'-4			163'-10			176'-4			188'-10			201'-4			213'-10			226'-4			243'-0		
BAR	LENGTH	SHAPE		NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
a1	35'-8			6	7	437	6	7	437	6	7	437	6	8	571	6	8	571	6	8	571	6	8	571	6	9	728	6	9	728
a2	35'-8			6	7	437	6	7	437	6	7	437	6	7	437	6	7	437	6	8	571	6	8	571	6	8	571	6	8	571
5a3	35'-8			6	5	223	6	5	223	6	5	223	6	5	223	6	5	223	6	5	223	6	5	223	6	5	223	6	5	223
5a4	29'-8			2	5	62	2	5	62	2	5	62	2	5	62	2	5	62	2	5	62	2	5	62	2	5	62	2	5	62
8b1	19'-1			8	8	408	8	8	408	8	8	408	8	8	408	8	8	408	8	8	408	8	8	408	8	8	408	8	8	408
5c1	13'-2			24	5	330	24	5	330	24	5	330	24	5	330	24	5	330	24	5	330	24	5	330	24	5	330	24	5	330
5c2	VARIES			32	5	391	32	5	391	32	5	391	32	5	391	32	5	391	32	5	391	32	5	391	36	5	440	36	5	440
5c3	4'-8			18	5	88	18	5	88	18	5	88	18	5	88	18	5	88	18	5	88	18	5	88	18	5	88	18	5	88
(1)	TOTAL (LB.)			2376			2376			2376			2510			2510			2644			2644			2850			2850		
STRUCTURAL CONCRETE (CY)				19.2			19.2			19.2			19.2			19.2			19.2			19.2			19.2			19.2		

COLUMN

H IN FEET	COLUMN HEIGHT	STRUCTURAL CONCRETE (CY)	REINFORCING STEEL: d1 BAR				4e1 BAR				4e2 BAR				TOTAL WEIGHT (LB.)
			NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	
16	8'-0	17.2	46	10	11'-6	2276	18	4	13'-10	166	36	4	15'-8	377	2819
17	9'-0	19.4	46	10	12'-6	2474	20	4	13'-10	185	40	4	15'-8	419	3078
18	10'-0	21.5	46	10	13'-6	2672	22	4	13'-10	203	44	4	15'-8	460	3335
19	11'-0	23.7	46	10	14'-6	2870	24	4	13'-10	222	48	4	15'-8	502	3594
20	12'-0	25.8	46	10	15'-6	3068	26	4	13'-10	240	52	4	15'-8	544	3852
21	13'-0	28.0	46	10	16'-6	3266	28	4	13'-10	259	56	4	15'-8	586	4111
22	14'-0	30.1	46	10	17'-6	3464	30	4	13'-10	277	60	4	15'-8	628	4369
23	15'-0	32.3	46	10	18'-6	3662	32	4	13'-10	296	64	4	15'-8	670	4628
24	16'-0	34.4	46	10	19'-6	3860	34	4	13'-10	314	68	4	15'-8	712	4886
25	16'-6	35.5	46	10	20'-0	3959	34	4	13'-10	314	68	4	15'-8	712	4985
26	17'-6	37.6	46	10	21'-0	4157	36	4	13'-10	333	72	4	15'-8	754	5244
27	18'-6	39.8	46	10	22'-0	4355	38	4	13'-10	351	76	4	15'-8	795	5501
28	19'-6	41.9	46	10	23'-0	4553	40	4	13'-10	370	80	4	15'-8	837	5760
29	20'-6	44.1	46	10	24'-0	4751	42	4	13'-10	388	84	4	15'-8	879	6018
30	21'-6	46.2	46	10	25'-0	4948	44	4	13'-10	407	88	4	15'-8	921	6276
31	22'-6	48.4	46	10	26'-0	5146	46	4	13'-10	425	92	4	15'-8	963	6534
32	23'-6	50.5	46	10	27'-0	5344	48	4	13'-10	444	96	4	15'-8	1005	6793
33	24'-6	52.7	46	10	28'-0	5542	50	4	13'-10	462	100	4	15'-8	1047	7051
34	25'-6	54.8	46	10	29'-0	5740	52	4	13'-10	481	104	4	15'-8	1088	7309
35	26'-6	57.0	46	10	30'-0	5938	54	4	13'-10	499	108	4	15'-8	1130	7567
36	27'-6	59.1	46	10	31'-0	6136	56	4	13'-10	517	112	4	15'-8	1172	7825
37	28'-6	61.3	46	10	32'-0	6334	58	4	13'-10	536	116	4	15'-8	1214	8084
38	29'-6	63.4	46	10	33'-0	6532	60	4	13'-10	554	120	4	15'-8	1256	8342
39	30'-6	65.6	46	10	34'-0	6730	62	4	13'-10	573	124	4	15'-8	1298	8601
40	31'-6	67.7	46	10	35'-0	6928	64	4	13'-10	591	128	4	15'-8	1340	8859



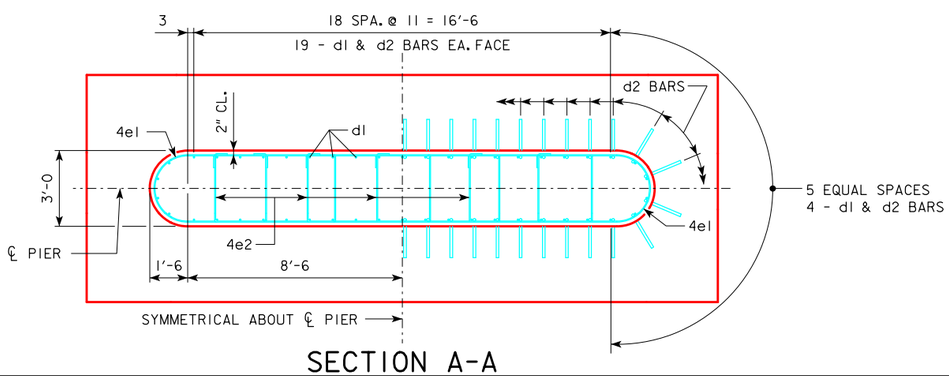
FRONT ELEVATION



SECTION B-B

END ELEVATION

(1) SEE SHEET H24-31-06 FOR STEP REINFORCING STEEL QUANTITY AND DETAILS.



SECTION A-A

PIER NOTES:

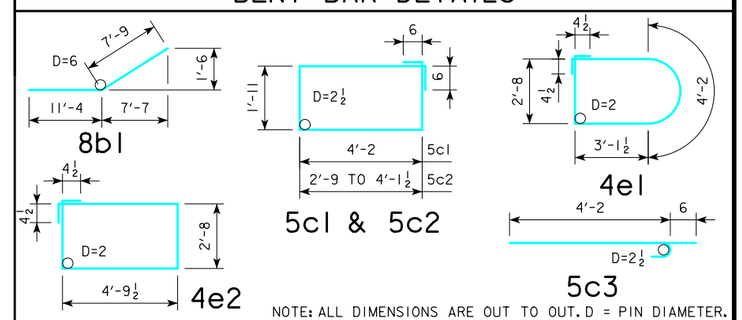
SEE "TEE PIER NOTES" ON H24-02-06 FOR NOTES REGARDING APPLICATION OF THESE PIER STANDARDS.

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

ELIMINATE 2x8 BEVELED KEYWAY ON TOP OF CAP FOR EXPANSION PIERS.

SEE SHEET H24-29-06 FOR "U" DIMENSION.

BENT BAR DETAILS



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

10-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

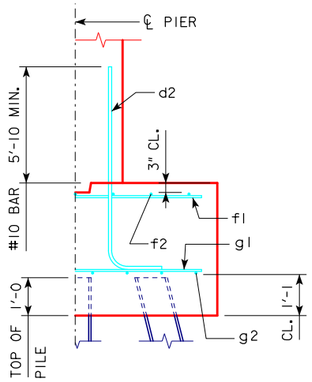
DECEMBER, 2006

TEE PIER CAP AND COLUMN

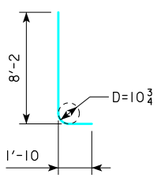
45° SKEW

H24-71-06

REVISED 01-10- SHEET WAS REVISED TO MEET LRFD SPECIFICATIONS.
REVISED 09-2016 - CHANGED TOP OF FOOTING TO TOP OF REBAR VERTICAL CLEARANCE TO 3" (WAS 2").
REVISED 10-2016 - CHANGED BEVELED KEYWAY LENGTH OF PIER COLUMN CAP AND FOOTING TO BE 5'-0 LESS THAN WIDTH OF PIER COLUMN (WAS 17'-0).

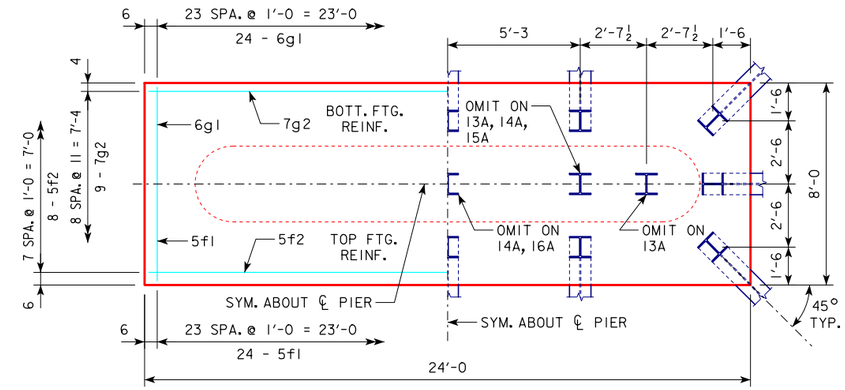


TYPICAL SECTION

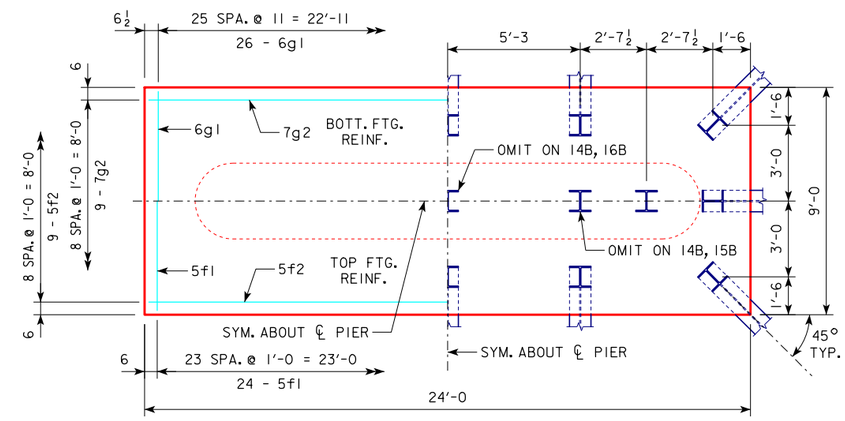


d2

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



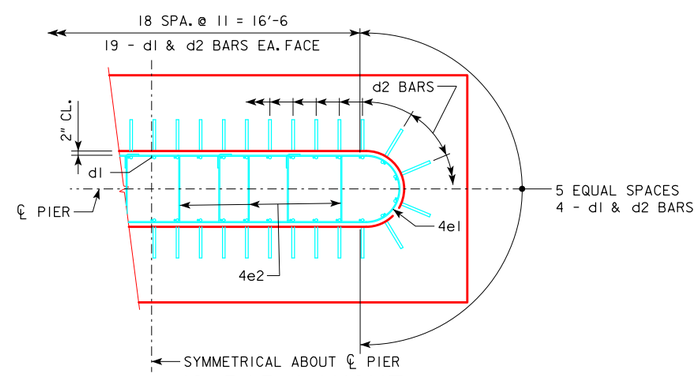
3'-6 x 8'-0 x 24'-0 FOR 13A, 14A, 15A & 16A



3'-6 x 9'-0 x 24'-0 FOR 14B, 15B & 16B

H IN FT.	℄ - ℄ ABUT. BRG.	PILING (HP10x57) NO. & LAYOUT	① LRFD Pu, STRENGTH I, DES. LOAD (KIPS)	FOOTING SIZE
16 TO 18	201'-4	13A	146	3'-6 x 8' x 24'
	213'-10	14A	139	
	226'-4	14A	145	
	243'-0	15A	144	
19 TO 21	201'-4	14A	139	3'-6 x 8' x 24'
	213'-10	14A	145	
	226'-4	15A	144	
	243'-0	16A	142	
22 TO 24	201'-4	14B	142	3'-6 x 9' x 24'
	213'-10	14B	147	
	226'-4	15B	146	
	243'-0	16B	144	

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING) BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
3'-6 x 8' x 24'	d2	46 - #10 AS SHOWN	10'-0	1979	3079	24.9
	f1	24 - #5 @ 1'-0	7'-8	192		
	f2	8 - #5 @ 1'-0	23'-8	197		
	g1	24 - #6 @ 1'-0	7'-8	276		
	g2	9 - #7 @ 0'-11	23'-8	435		
3'-6 x 9' x 24'	d2	46 - #10 AS SHOWN	10'-0	1979	3191	28.0
	f1	24 - #5 @ 1'-0	8'-8	217		
	f2	9 - #5 @ 1'-0	23'-8	222		
	g1	26 - #6 @ 0'-11	8'-8	338		
	g2	9 - #7 @ 1'-0	23'-8	435		



d2 BAR LAYOUT
(SEE SECTION A-A ON SHEET H24-71-06.)

① NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

FOOTING NOTES:

THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-71-06.

BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

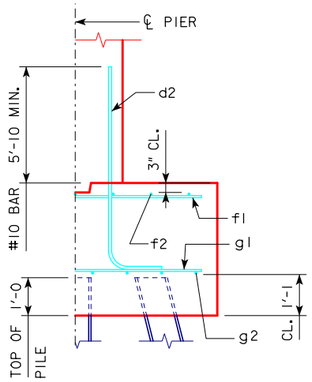
DECEMBER, 2006

TEE PIER-HP10x57 SRL-I STEEL PILE FOOTINGS

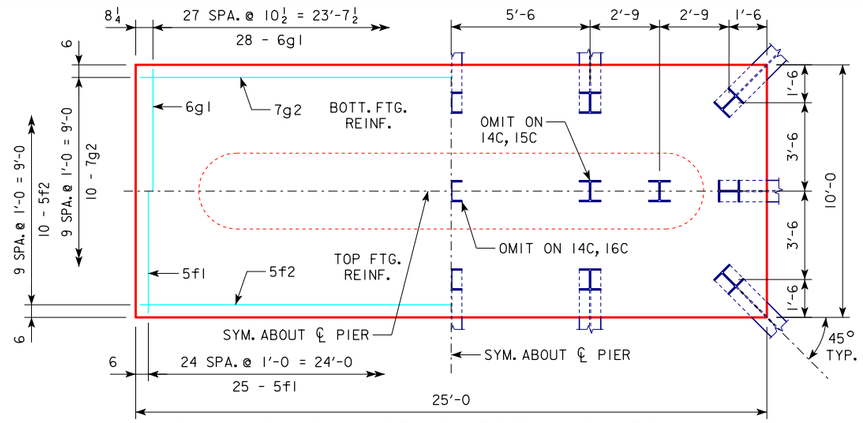
45° SKEW - H=16' TO 24'

H24-72-06

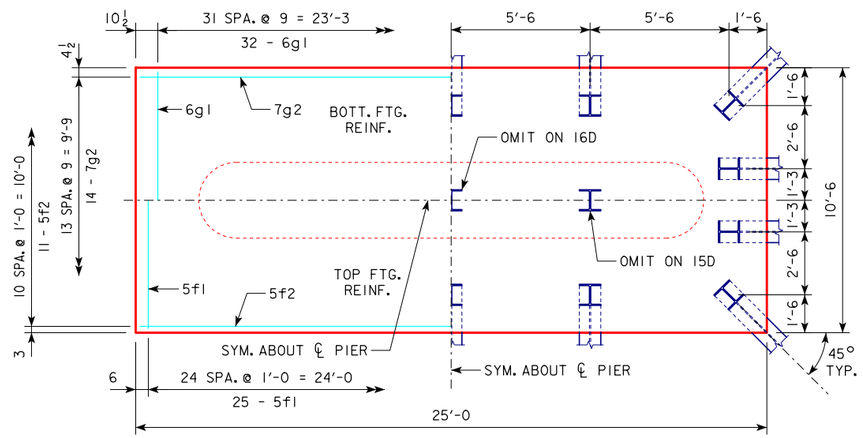
REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").



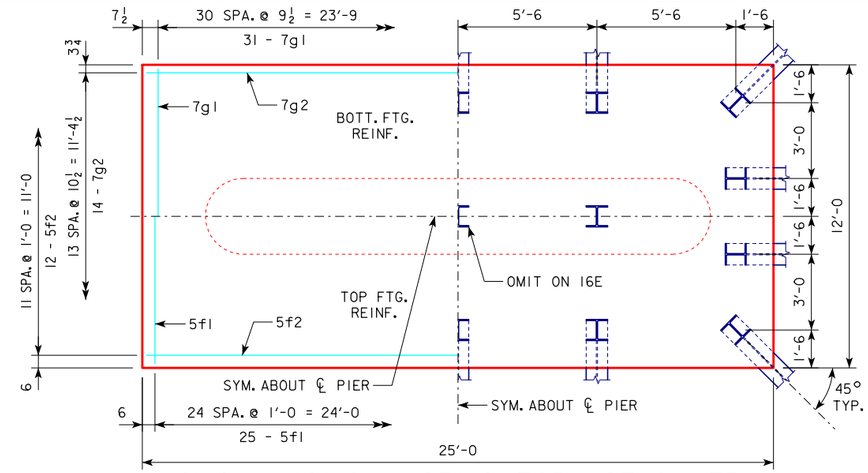
TYPICAL SECTION



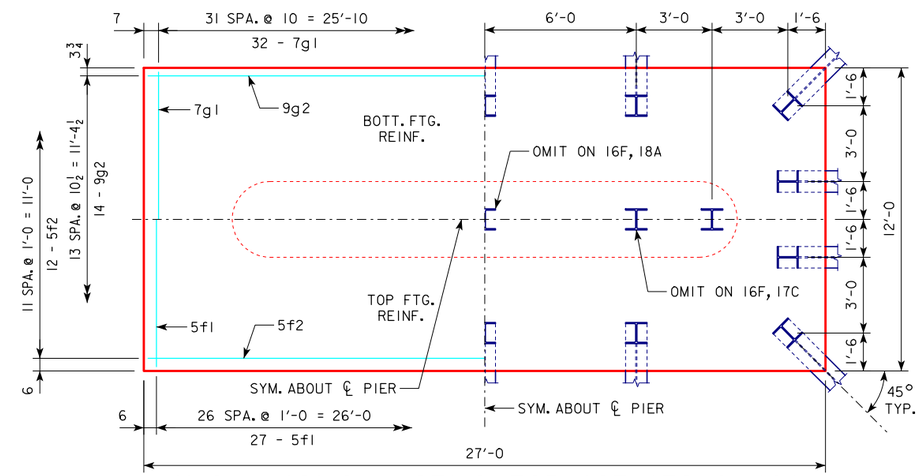
4'-0 x 10'-0 x 25'-0 FOR 14C, 15C & 16C



4'-0 x 10'-6 x 25'-0 FOR 15D, 16D & 17A



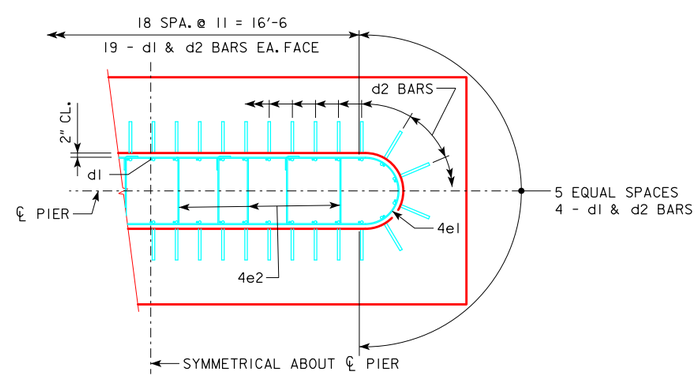
4'-0 x 12'-0 x 25'-0 FOR 16E & 17B



4'-0 x 12'-0 x 27'-0 FOR 16F, 17C & 18A

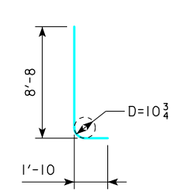
H IN FT.	℄ - ℄ ABUT. BRG.	PILING (HP10x57) NO. & LAYOUT	PILING (HP10x57) ① LRFD Pu, STRENGTH I, DES. LOAD (KIPS)	FOOTING SIZE
25 TO 27	201'-4	14C	144	4' x 10' x 25'
	213'-10	15C	142	
	226'-4	16C	141	
	243'-0	16C	145	
28 TO 30	201'-4	15D	138	4' x 10'-6 x 25'
	213'-10	15D	143	
	226'-4	16D	141	
	243'-0	16D	146	
31 TO 33	201'-4	15D	143	4' x 10'-6 x 25'
	213'-10	16D	141	
	226'-4	16D	146	
	243'-0	17A	145	
34 TO 36	201'-4	16E	140	4' x 12' x 25'
	213'-10	16E	144	
	226'-4	17B	143	
	243'-0	17B	146	
37 TO 40	201'-4	16F	144	4' x 12' x 27'
	213'-10	17C	142	
	226'-4	17C	146	
	243'-0	18A	144	

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING) BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
4' x 10' x 25'	d2	46 - #10 AS SHOWN	10'-6	2078	3498	37.0
	f1	25 - #5 @ 1'-0	9'-8	252		
	f2	10 - #5 @ 1'-0	24'-8	257		
	g1	28 - #6 @ 0'-10½	9'-8	407		
	g2	10 - #7 @ 1'-0	24'-8	504		
4' x 10'-6 x 25'	d2	46 - #10 AS SHOWN	10'-6	2078	3821	38.9
	f1	25 - #5 @ 1'-0	10'-2	265		
	f2	11 - #5 @ 1'-0	24'-8	283		
	g1	32 - #6 @ 0'-9	10'-2	489		
	g2	14 - #7 @ 0'-9	24'-8	706		
4' x 12' x 25'	d2	46 - #10 AS SHOWN	10'-6	2078	4136	44.4
	f1	25 - #5 @ 1'-0	11'-8	304		
	f2	12 - #5 @ 1'-0	24'-8	309		
	g1	31 - #7 @ 0'-9½	11'-8	739		
	g2	14 - #7 @ 0'-10½	24'-8	706		
4' x 12' x 27'	d2	46 - #10 AS SHOWN	10'-6	2078	4773	48.0
	f1	27 - #5 @ 1'-0	11'-8	329		
	f2	12 - #5 @ 1'-0	26'-8	334		
	g1	32 - #7 @ 0'-10	11'-8	763		
	g2	14 - #9 @ 0'-10½	26'-8	1269		



d2 BAR LAYOUT
(SEE SECTION A-A ON SHEET H24-71-06.)

① NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



d2

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

FOOTING NOTES:

THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-71-06.

BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

PIER PILES SHALL BE DIVINED TO VALUES SHOWN IN DESIGN PLANS.

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

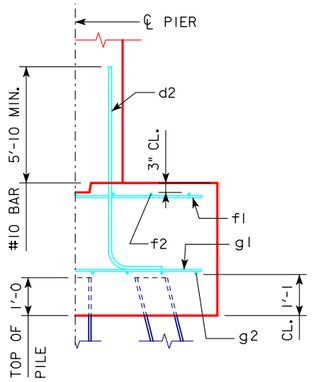
DECEMBER, 2006

TEE PIER-HP10x57 SRL-1 STEEL PILE FOOTINGS

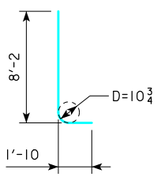
45° SKEW - H=25' TO 40'

H24-73-06

REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").

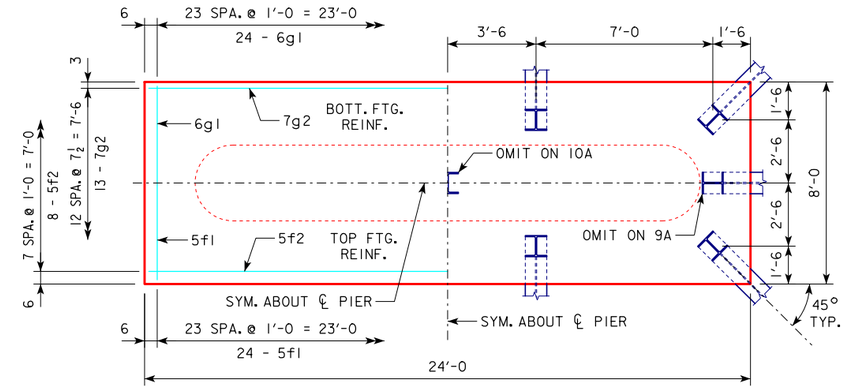


TYPICAL SECTION

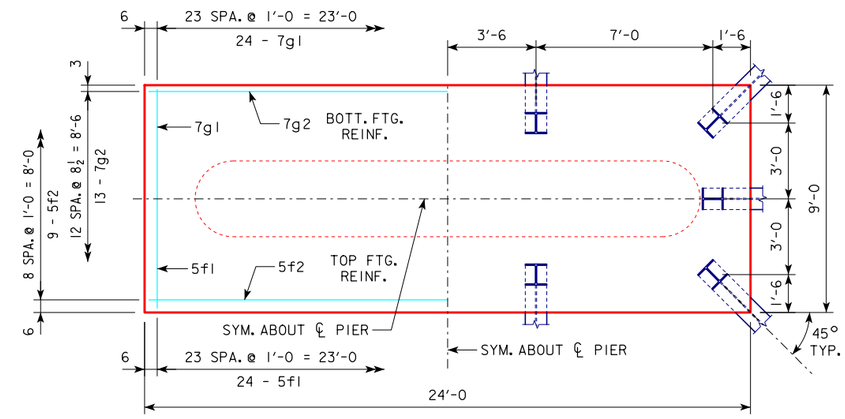


d2

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



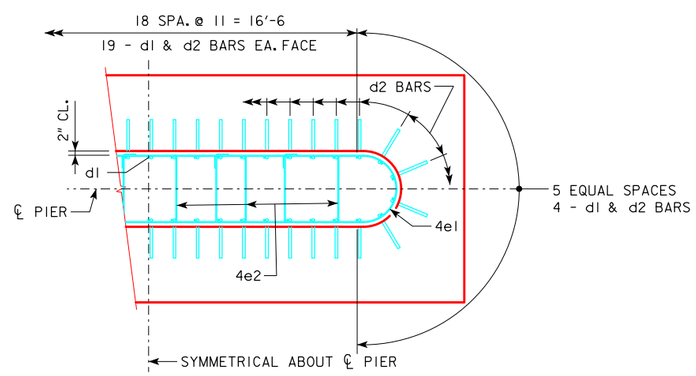
3'-6 x 8'-0 x 24'-0 FOR 9A & 10A



3'-6 x 9'-0 x 24'-0 FOR 10B

H IN FT.	℄ - ℄ ABUT. BRG.	PILING (HP10x57) NO. & LAYOUT	PILING (HP10x57) ① LRFD Pu, STRENGTH I, DES. LOAD (KIPS)	FOOTING SIZE
16 TO 18	201'-4	9A	214	3'-6 x 8' x 24'
	213'-10	10A	187	
	226'-4	10A	197	
	243'-0	10A	202	
19 TO 21	201'-4	10A	186	3'-6 x 8' x 24'
	213'-10	10A	193	
	226'-4	10A	201	
	243'-0	10A	208	
22 TO 24	201'-4	10B	191	3'-6 x 9' x 24'
	213'-10	10B	198	
	226'-4	10B	206	
	243'-0	10B	213	

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING) BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
3'-6 x 8' x 24'	d2	46 - #10 AS SHOWN	10'-0	1979	3273	24.9
	f1	24 - #5 @ 1'-0	7'-8	192		
	f2	8 - #5 @ 1'-0	23'-8	197		
	g1	24 - #6 @ 1'-0	7'-8	276		
	g2	13 - #7 @ 0'-7½	23'-8	629		
3'-6 x 9' x 24'	d2	46 - #10 AS SHOWN	10'-0	1979	3472	28.0
	f1	24 - #5 @ 1'-0	8'-8	217		
	f2	9 - #5 @ 1'-0	23'-8	222		
	g1	24 - #7 @ 1'-0	8'-8	425		
	g2	13 - #7 @ 0'-8½	23'-8	629		



d2 BAR LAYOUT
(SEE SECTION A-A ON SHEET H24-71-06.)

① NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

FOOTING NOTES:

THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-71-06.

BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").

09-2016
LATEST REVISION DATE

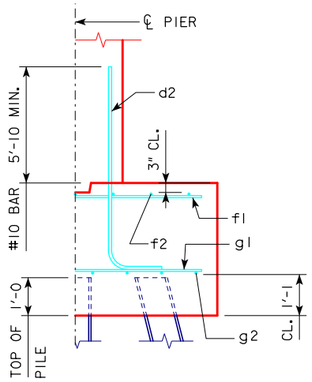
APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

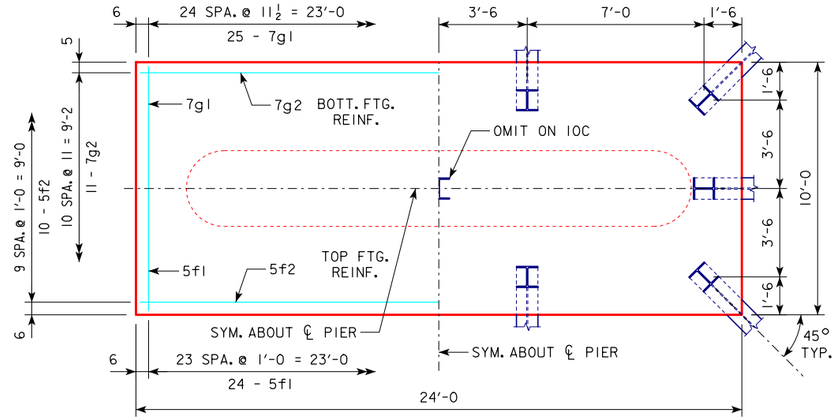
STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
DECEMBER, 2006

TEE PIER-HP10x57 SRL-2 STEEL PILE FOOTINGS
45° SKEW - H=16' TO 24'

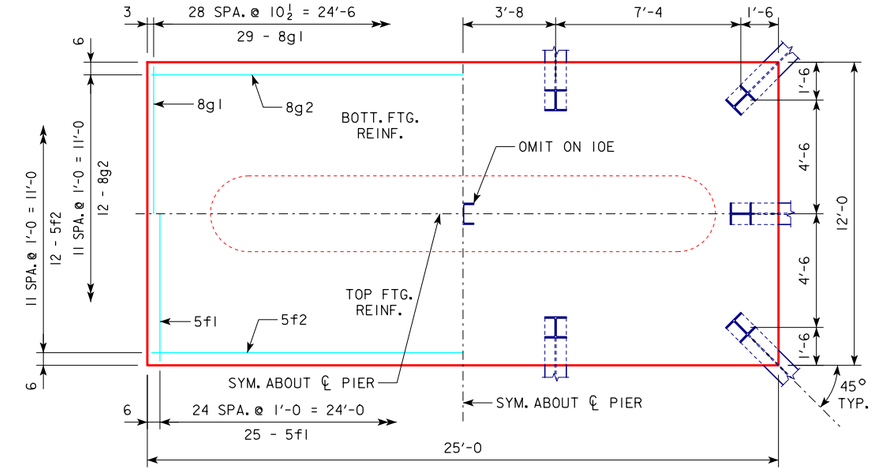
H24-74-06



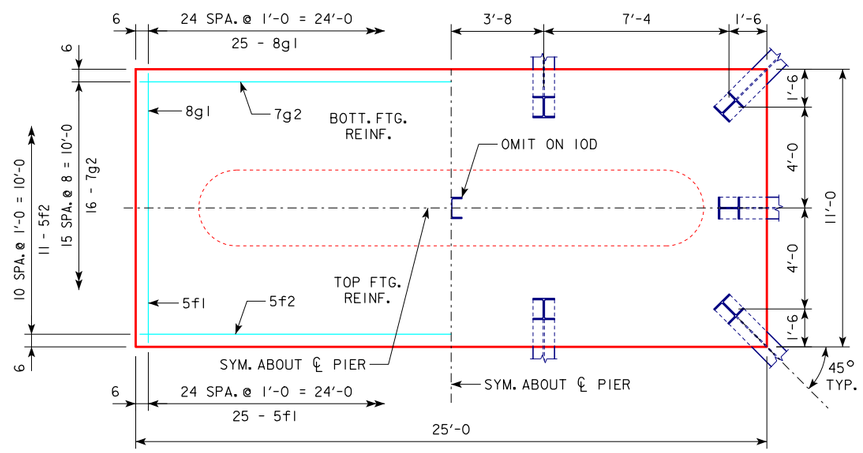
TYPICAL SECTION



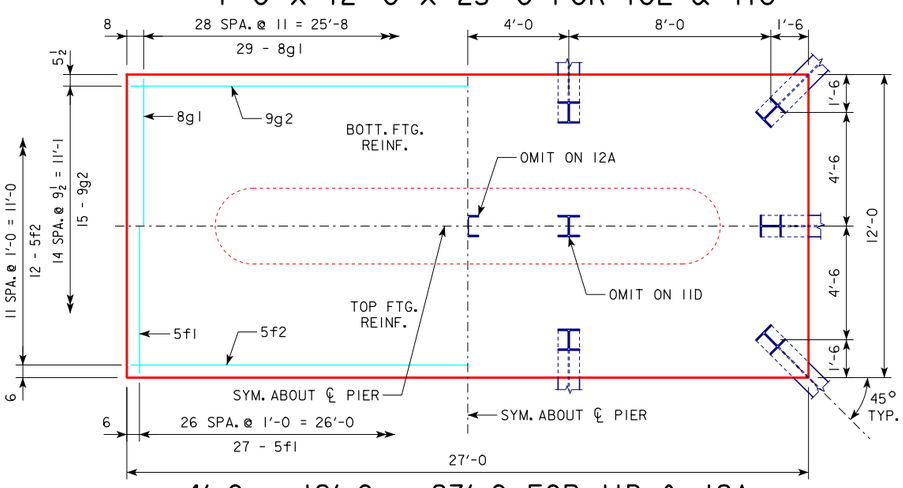
4'-0 x 10'-0 x 24'-0 FOR 10C & 11A



4'-0 x 12'-0 x 25'-0 FOR 10E & 11C



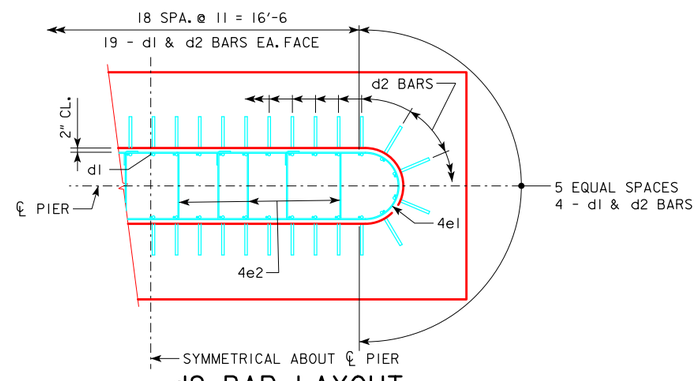
4'-0 x 11'-0 x 25'-0 FOR 10D & 11B



4'-0 x 12'-0 x 27'-0 FOR 11D & 12A

H IN FT.	℄ - ℄ ABUT. BRG.	PILING (HP10x57) NO. & LAYOUT	① LRFD Pu, STRENGTH I, DES. LOAD (KIPS)	FOOTING SIZE
25 TO 27	201'-4	10C	196	4' x 10' x 24'
	213'-10	10C	203	
	226'-4	10C	211	
	243'-0	10C	218	
28 TO 30	201'-4	10C	202	4' x 10' x 24'
	213'-10	10C	208	
	226'-4	10C	216	
	243'-0	11A	210	
31 TO 33	201'-4	10D	206	4' x 11' x 25'
	213'-10	10D	212	
	226'-4	10D	219	
	243'-0	11B	213	
34 TO 36	201'-4	10E	214	4' x 12' x 25'
	213'-10	10E	220	
	226'-4	11C	214	
	243'-0	11C	218	
37 TO 40	201'-4	11D	210	4' x 12' x 27'
	213'-10	11D	215	
	226'-4	12A	208	
	243'-0	12A	211	

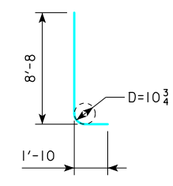
FOOTING SIZE	REINFORCING STEEL (ONE FOOTING) BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
4' x 10' x 24'	d2	46 - #10 AS SHOWN	10'-6	2078	3593	35.6
	f1	24 - #5 @ 1'-0	9'-8	242		
	f2	10 - #5 @ 1'-0	23'-8	247		
	g1	25 - #7 @ 0'-11½	9'-8	494		
	g2	11 - #7 @ 0'-11	23'-8	532		
4' x 11' x 25'	d2	46 - #10 AS SHOWN	10'-6	2078	4158	40.7
	f1	25 - #5 @ 1'-0	10'-8	278		
	f2	11 - #5 @ 1'-0	24'-8	283		
	g1	25 - #8 @ 1'-0	10'-8	712		
	g2	16 - #7 @ 0'-8	24'-8	807		
4' x 12' x 25'	d2	46 - #10 AS SHOWN	10'-6	2078	4384	44.4
	f1	25 - #5 @ 1'-0	11'-8	304		
	f2	12 - #5 @ 1'-0	24'-8	309		
	g1	29 - #8 @ 0'-10½	11'-8	903		
	g2	12 - #8 @ 1'-0	24'-8	790		
4' x 12' x 27'	d2	46 - #10 AS SHOWN	10'-6	2078	5004	48.0
	f1	27 - #5 @ 1'-0	11'-8	329		
	f2	12 - #5 @ 1'-0	26'-8	334		
	g1	29 - #8 @ 0'-11	11'-8	903		
	g2	15 - #9 @ 0'-9½	26'-8	1360		



d2 BAR LAYOUT

(SEE SECTION A-A ON SHEET H24-71-06.)

① NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



d2

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

FOOTING NOTES:

THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-71-06.

BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

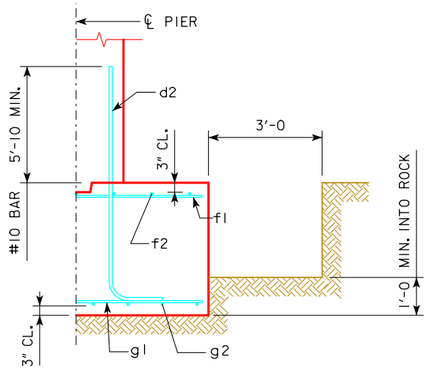
DECEMBER, 2006

TEE PIER-HP10x57 SRL-2 STEEL PILE FOOTINGS

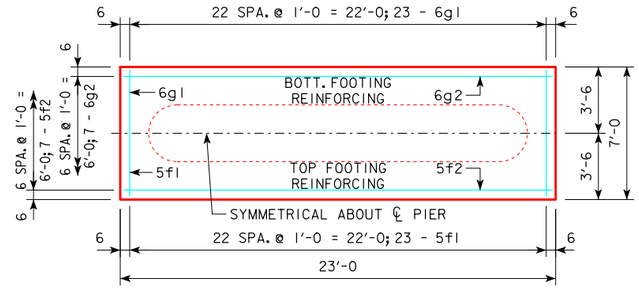
45° SKEW - H=25' TO 40'

H24-75-06

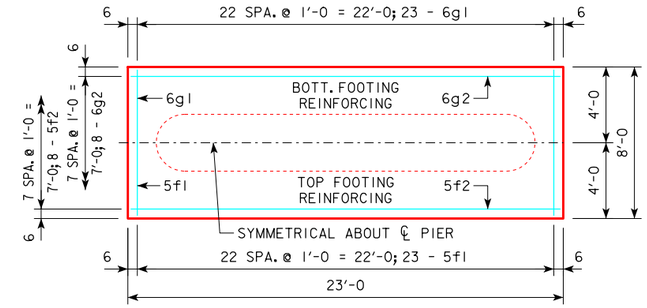
REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").



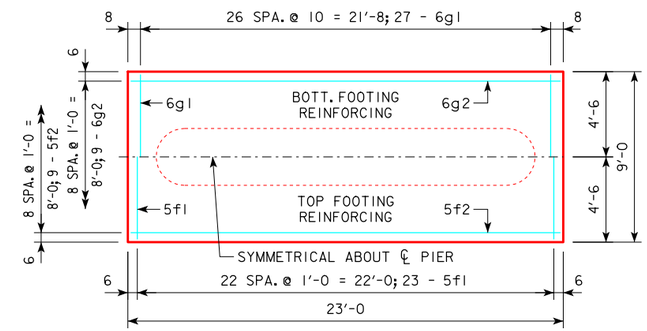
TYPICAL SECTION



3'-6 x 7'-0 x 23'-0

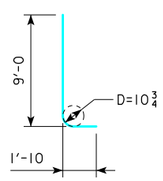


3'-6 x 8'-0 x 23'-0



3'-6 x 9'-0 x 23'-0

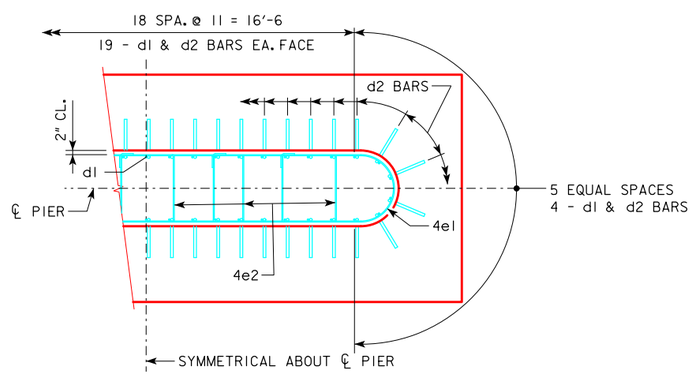
H IN FT.	℄ - ℄ ABUT. BRG.	FOOTING SIZE
16 TO 18	138'-10 151'-4 163'-10 176'-4 188'-10	3'-6 x 7' x 23'
	201'-4 213'-10 226'-4	3'-6 x 8' x 23'
	243'-0	3'-6 x 9' x 23'
19 TO 21	138'-10 151'-4 163'-10 176'-4	3'-6 x 7' x 23'
	188'-10 201'-4 213'-10	3'-6 x 8' x 23'
	226'-4 243'-0	3'-6 x 9' x 23'
22 TO 24	138'-10 151'-4 163'-10 176'-4 188'-10 201'-4	3'-6 x 8' x 23'
	213'-10 226'-4 243'-0	3'-6 x 9' x 23'



d2

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

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)					STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	
3'-6 x 7' x 23'	d2	46 - #10 AS SHOWN	10'-10	2144	2937	20.9
	f1	23 - #5 @ 1'-0	6'-8	160		
	f2	7 - #5 @ 1'-0	22'-8	165		
	g1	23 - #6 @ 1'-0	6'-8	230		
	g2	7 - #6 @ 1'-0	22'-8	238		
3'-6 x 8' x 23'	d2	46 - #10 AS SHOWN	10'-10	2144	3054	23.9
	f1	23 - #5 @ 1'-0	7'-8	184		
	f2	8 - #5 @ 1'-0	22'-8	189		
	g1	23 - #6 @ 1'-0	7'-8	265		
	g2	8 - #6 @ 1'-0	22'-8	272		
3'-6 x 9' x 23'	d2	46 - #10 AS SHOWN	10'-10	2144	3222	26.8
	f1	23 - #5 @ 1'-0	8'-8	208		
	f2	9 - #5 @ 1'-0	22'-8	213		
	g1	27 - #6 @ 0'-10	8'-8	351		
	g2	9 - #6 @ 1'-0	22'-8	306		



d2 BAR LAYOUT
(SEE SECTION A-A ON SHEET H24-71-06.)

FOOTING NOTES:

THESE SPREAD FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-71-06.

THESE SPREAD FOOTINGS 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 30 KIPS PER SQUARE FOOT (ALLOWABLE BEARING VALUE OF AT LEAST 10 KIPS PER SQUARE FOOT).

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

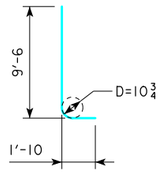
DECEMBER, 2006

TEE PIER - SPREAD FOOTINGS

45° SKEW - H=16' TO 24'

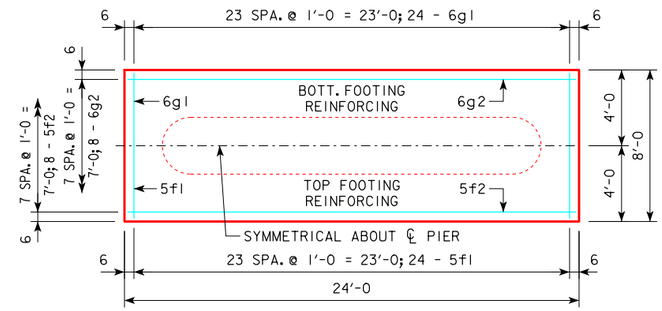
H24-76-06

REVISED 04-12 - EXCAVATION LIMIT WAS CHANGED TO 3'-0.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "F2" TO TOP OF PIER FOOTING TO 3" (WAS 2").

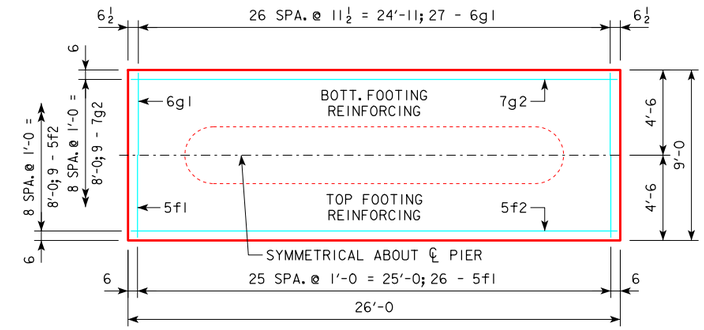


d2

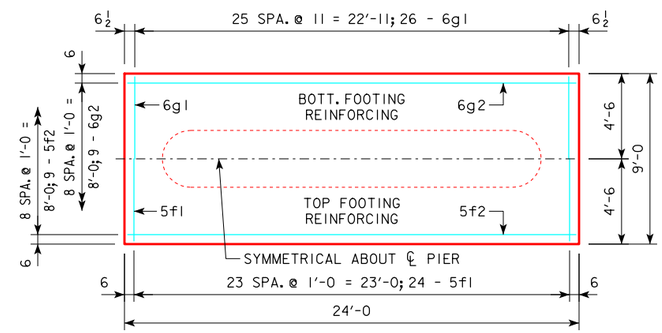
NOTE: D = PIN DIAMETER.
DIMENSIONS ARE OUT TO OUT.



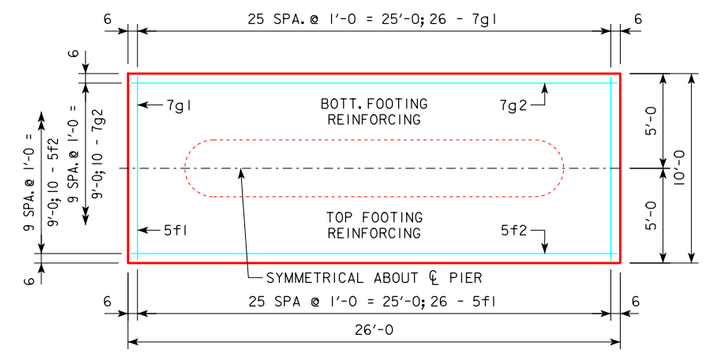
4'-0 x 8'-0 x 24'-0



4'-0 x 9'-0 x 26'-0



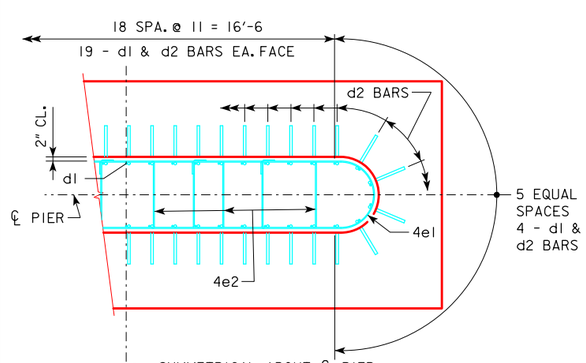
4'-0 x 9'-0 x 24'-0



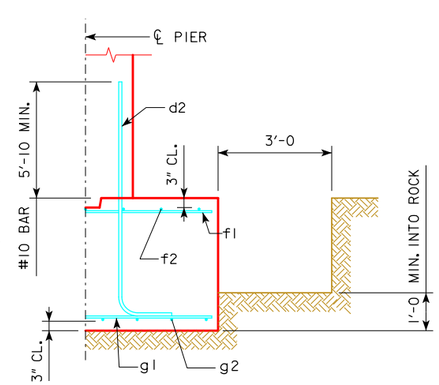
4'-0 x 10'-0 x 26'-0

H IN FT.	℄ - ℄ ABUT. BRG.	FOOTING SIZE
25 TO 27	138'-10 151'-4 163'-10 176'-4 188'-10 201'-4	4' x 8' x 24'
	213'-10 226'-4 243'-0	4' x 9' x 24'
28 TO 30	138'-10 151'-4 163'-10	4' x 8' x 24'
	176'-4 188'-10 201'-4 213'-10 226'-4 243'-0	4' x 9' x 24'
31 TO 33	201'-4 213'-10 226'-4	4' x 9' x 24'
	243'-0	4' x 9' x 26'
34 TO 36	201'-4 213'-10 226'-4	4' x 9' x 26'
	243'-0	4' x 10' x 26'
37 TO 40	201'-4 213'-10 226'-4 243'-0	4' x 10' x 26'

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)					STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	
4' x 8' x 24'	d2	46 - #10 AS SHOWN	11'-4	2243	3192	28.4
	f1	24 - #5 @ 1'-0	7'-8	192		
	f2	8 - #5 @ 1'-0	23'-8	197		
	g1	24 - #6 @ 1'-0	7'-8	276		
	g2	8 - #6 @ 1'-0	23'-8	284		
4' x 9' x 24'	d2	46 - #10 AS SHOWN	11'-4	2243	3340	32.0
	f1	24 - #5 @ 1'-0	8'-8	217		
	f2	9 - #5 @ 1'-0	23'-8	222		
	g1	26 - #6 @ 0'-11	8'-8	338		
	g2	9 - #6 @ 1'-0	23'-8	320		
4' x 9' x 26'	d2	46 - #10 AS SHOWN	11'-4	2243	3542	34.7
	f1	26 - #5 @ 1'-0	8'-8	235		
	f2	9 - #5 @ 1'-0	25'-8	241		
	g1	27 - #6 @ 0'-11½	8'-8	351		
	g2	9 - #7 @ 1'-0	25'-8	472		
4' x 10' x 26'	d2	46 - #10 AS SHOWN	11'-4	2243	3812	38.5
	f1	26 - #5 @ 1'-0	9'-8	262		
	f2	10 - #5 @ 1'-0	25'-8	268		
	g1	26 - #7 @ 1'-0	9'-8	514		
	g2	10 - #7 @ 1'-0	25'-8	525		



d2 BAR LAYOUT
(SEE SECTION A-A ON SHEET H24-71-06.)



TYPICAL SECTION

FOOTING NOTES:

THESE SPREAD FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-71-06.

THESE SPREAD FOOTINGS 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 30 KIPS PER SQUARE FOOT (ALLOWABLE BEARING VALUE OF AT LEAST 10 KIPS PER SQUARE FOOT).

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

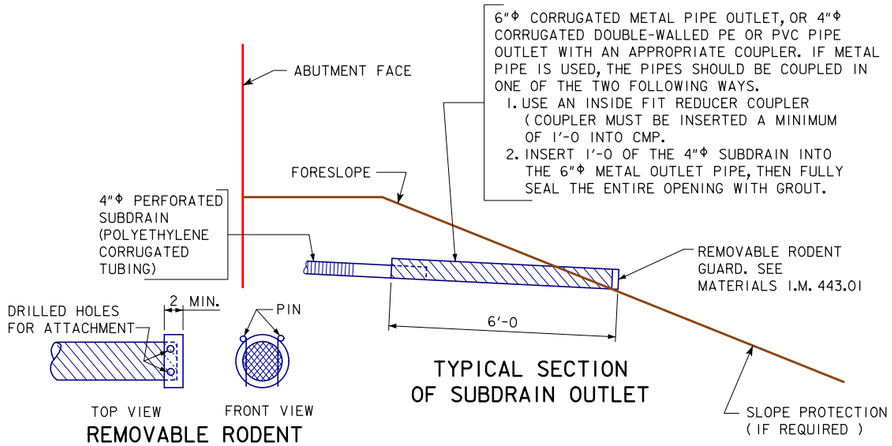
DECEMBER, 2006

TEE PIER - SPREAD FOOTINGS

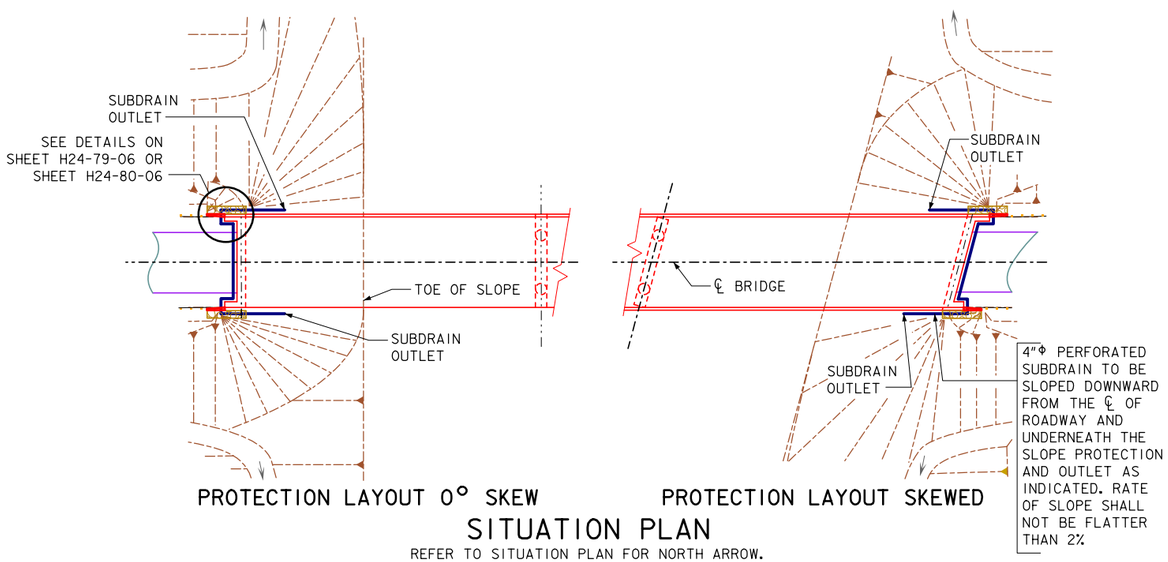
45° SKEW - H=25' TO 40'

H24-77-06

REVISED 04-12 - EXCAVATION LIMIT WAS CHANGED TO 3'-0.
REVISED 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").



OUTLET DETAILS



PROTECTION LAYOUT 0° SKEW

PROTECTION LAYOUT SKEWED

SITUATION PLAN

REFER TO SITUATION PLAN FOR NORTH ARROW.

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

01-10
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWADOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

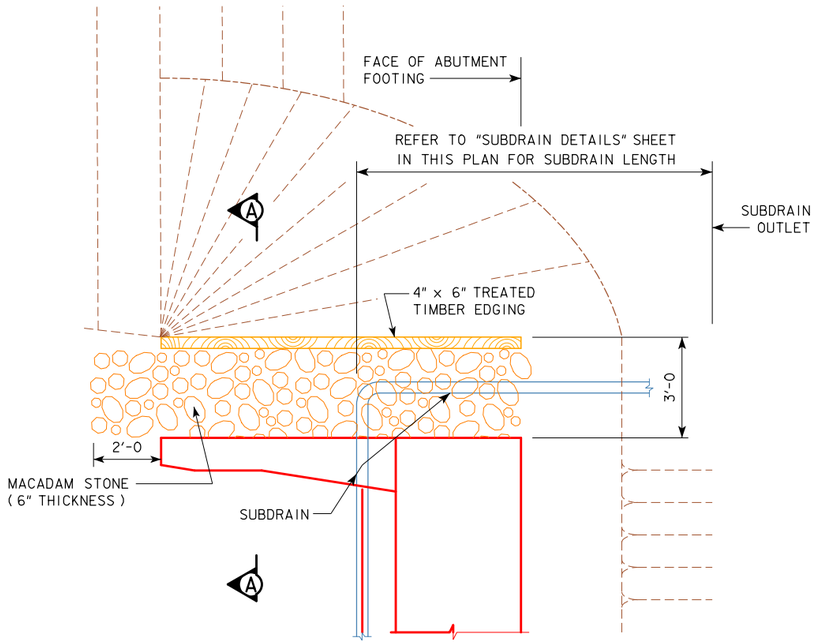
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

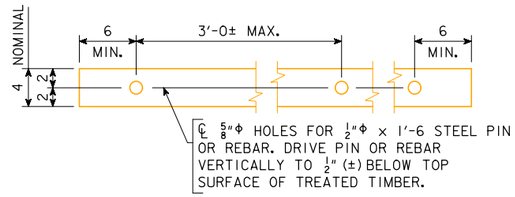
SUBDRAIN DETAILS

H24-78-06

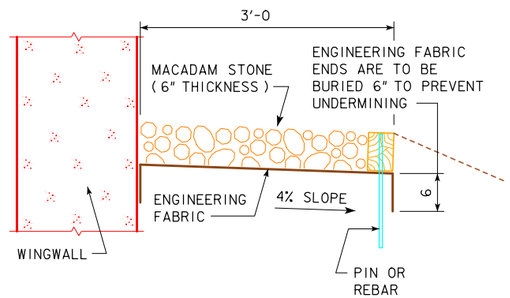
REVISED 01-10 - REMOVED THE GRANULAR BACKFILL DETAIL.



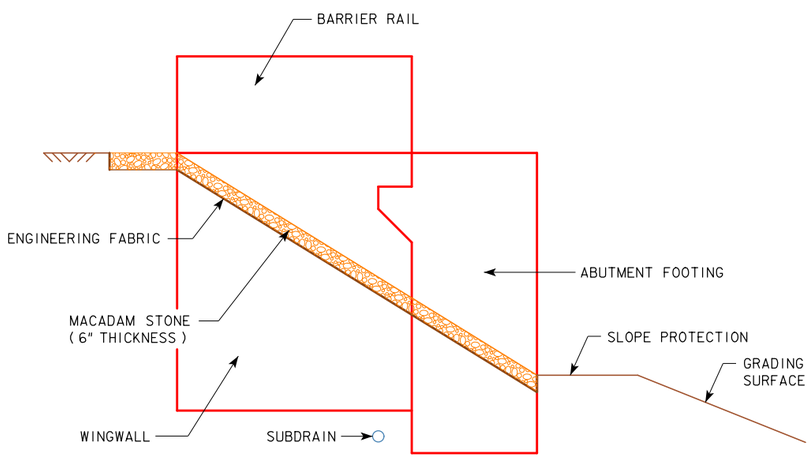
TOP VIEW OF WING ARMORING



4" x 6" TREATED TIMBER EDGING DETAILS



SECTION A-A



PROFILE VIEW OF WING ARMORING

(SHOWN FOR INTEGRAL ABUTMENT)

SUBDRAIN NOTES:

SEE H24-78-06 AND "GENERAL ELEVATION DATA" SHEETS FOR DETAILS OF PLACING ALL SUBDRAINS AND SUBDRAIN OUTLETS REQUIRED FOR THIS STRUCTURE.

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.

REVISED 09-14 - CHANGED THE AREA OF THE MACADAM STONE AREA TO 2'-0 IN FRONT OF THE BRIDGE WING.

09-14
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWADOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

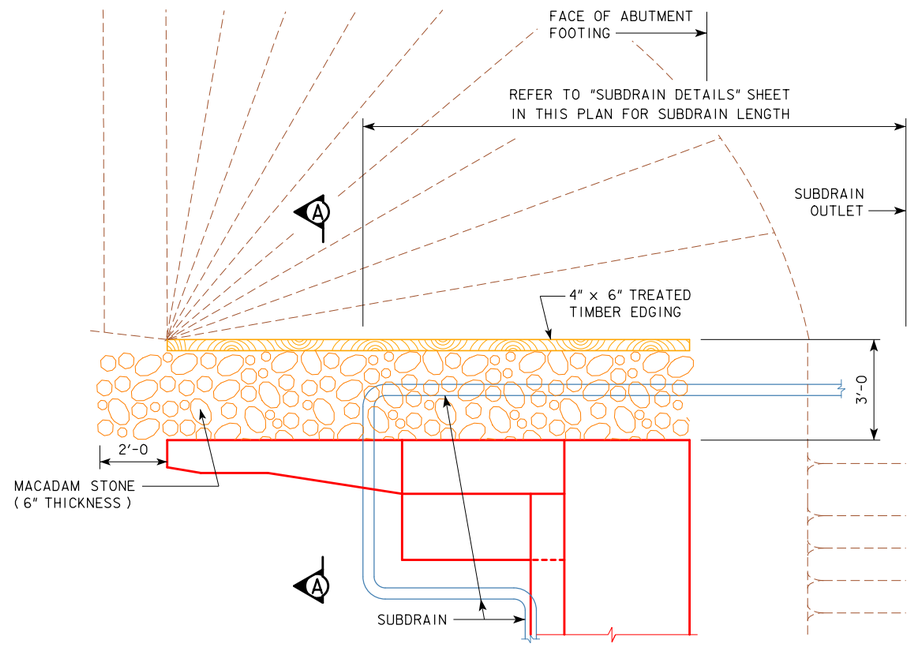
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

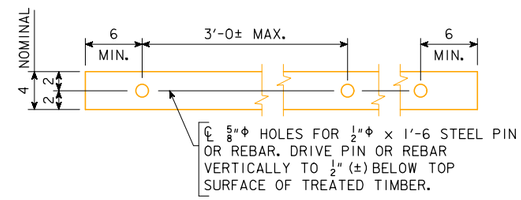
WING ARMORING DETAILS

A & B BEAMS

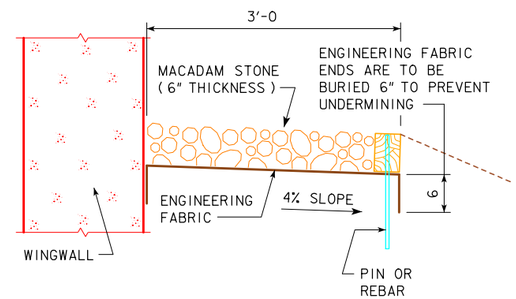
H24-79-06



TOP VIEW OF WING ARMORING WITH WING EXTENSION



4" x 6" TREATED TIMBER EDGING DETAILS



SECTION A-A

SUBDRAIN NOTES:

SEE H24-78-06 AND "GENERAL ELEVATION DATA" SHEETS FOR DETAILS OF PLACING ALL SUBDRAINS AND SUBDRAIN OUTLETS REQUIRED FOR THIS STRUCTURE.

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.

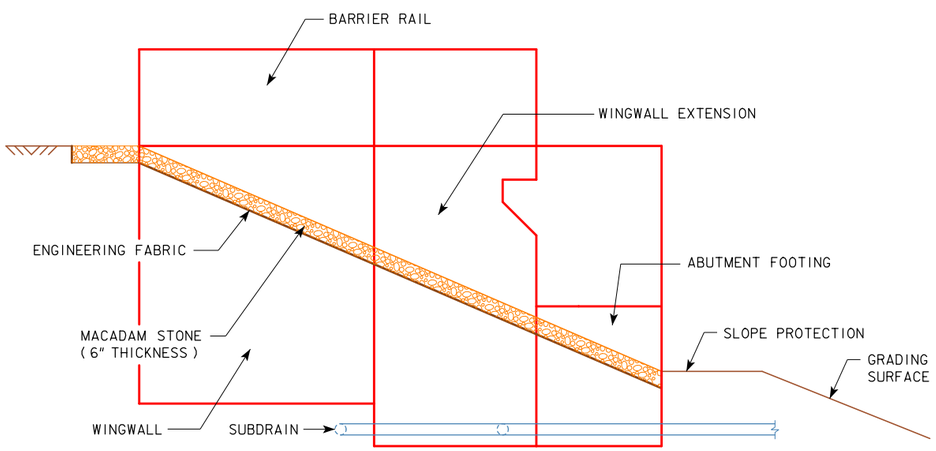
THE ENGINEERING FABRIC SHALL MEET THE REQUIREMENTS OF 4196.01 C. IF THE ENGINEERING FABRIC IS LAPPED THE LAPS SHALL BE A MINIMUM OF ONE FOOT IN LENGTH, SHINGLE FASHION WITH UP SLOPE LAP PIECE ON TOP AND STAPLED FOR CONTINUITY.

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.



PROFILE VIEW OF WING ARMORING WITH WING EXTENSION

(SHOWN FOR INTEGRAL ABUTMENT WITH WING EXTENSIONS)

REVISED 09-14 - CHANGED THE AREA OF THE MACADAM STONE AREA TO 2'-0 IN FRONT OF THE BRIDGE WING.

09-14
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWADOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

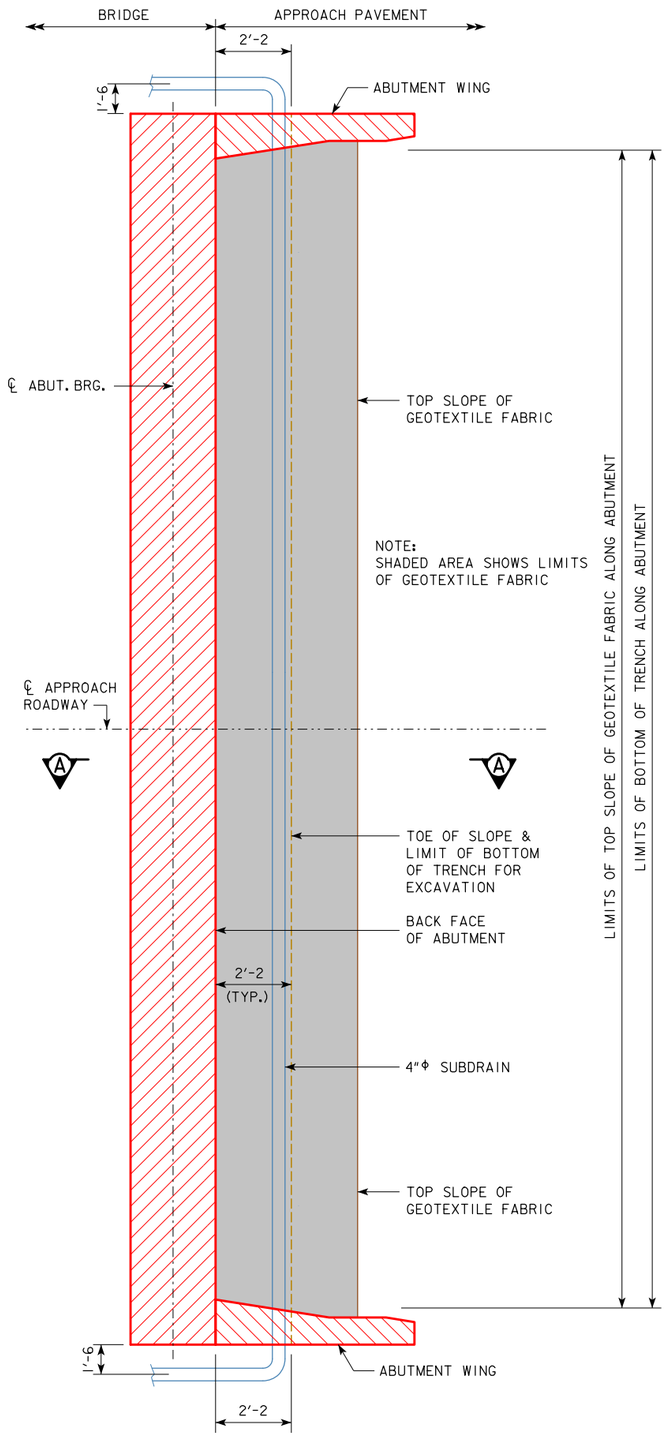
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

WING ARMORING DETAILS

C BEAMS

H24-80-06



ABUTMENT PLAN WITHOUT WING EXTENSIONS

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.

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

NOTE:

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

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

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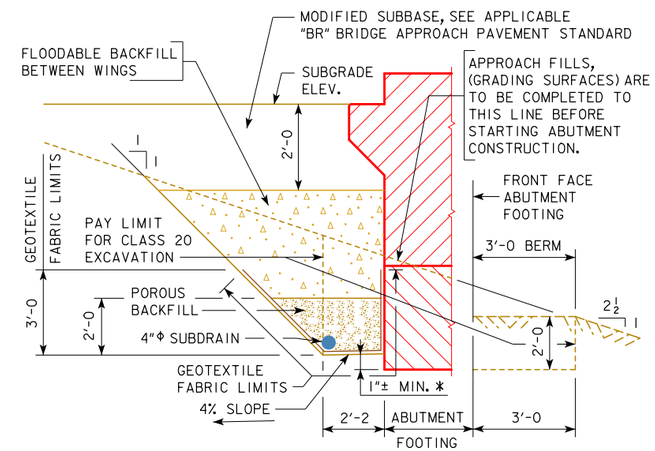


SECTION A-A

BACKFILL DETAILS

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

* DIMENSION VARIES DUE TO 2% SUBDRAIN SLOPE.

09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

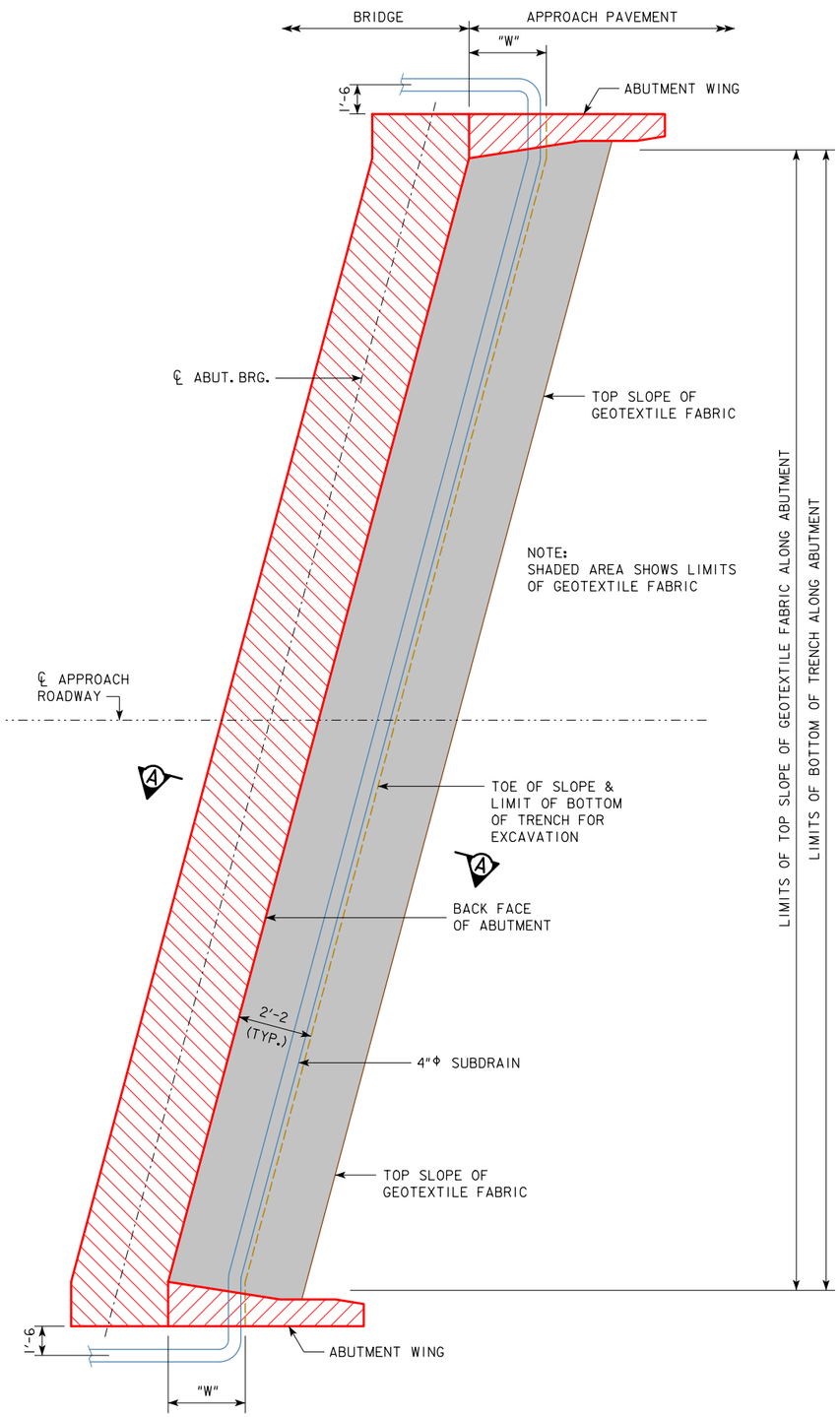
DECEMBER, 2006

ABUTMENT BACKFILL DETAILS

A & B BEAMS - 0° SKEW

H24-81-06

REVISED 09-14 - THE TECHNICAL DATA INFORMATION TABLE WAS REMOVED AND A NOTE ADDED TO REFER TO THE STANDARDS SPECIFICATIONS FOR THIS INFORMATION.
REVISION 09-2016 - CHANGED THE BRIDGE APPROACH PAVEMENT STANDARD TO "BR" (WAS "RK").



SKEWED ABUTMENT PLAN WITHOUT WING EXTENSIONS

(SKEWED LEFT AHEAD SHOWN, SKEWED RIGHT AHEAD SIMILIAR)

"W" DIMENSION	
SKEW	DIMENSION
15°	2'-2 7/8
30°	2'-6
45°	3'-0 3/4

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.

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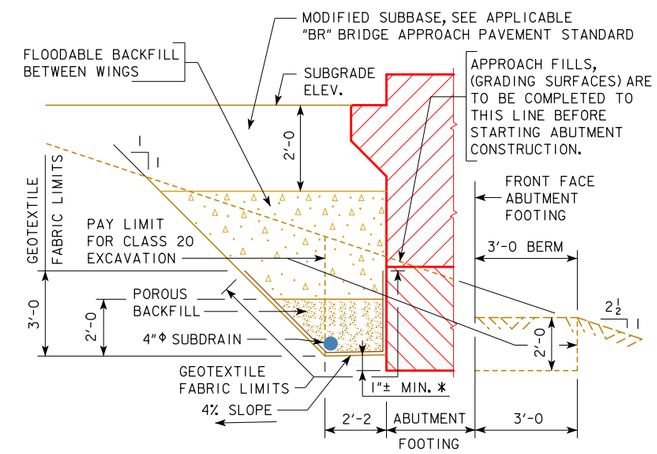

SECTION A-A

BACKFILL DETAILS

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09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

ABUTMENT BACKFILL DETAILS

A & B BEAMS - SKEWED

H24-82-06

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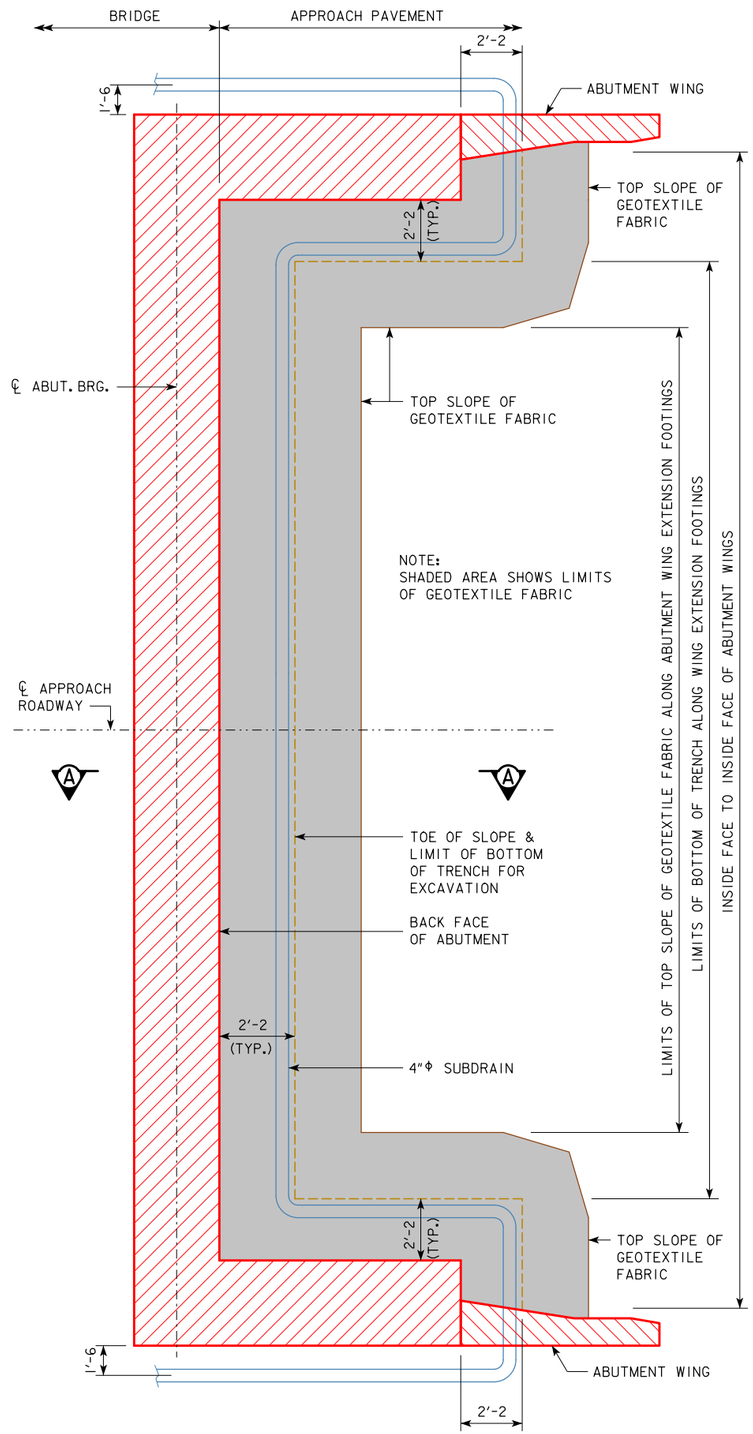

ABUTMENT PLAN WITH WING EXTENSIONS

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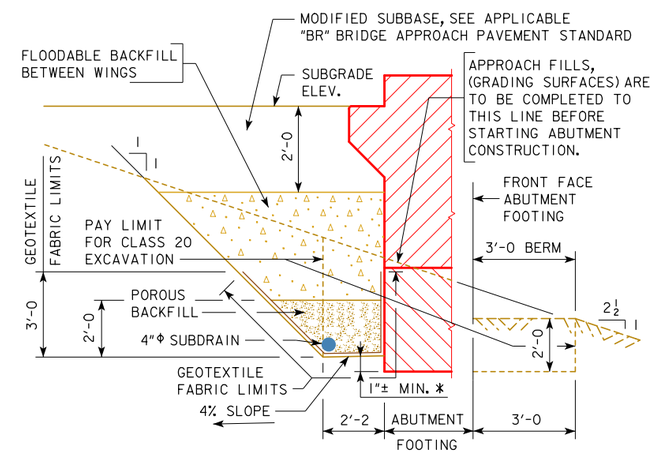

SECTION A-A

BACKFILL DETAILS

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09-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

ABUTMENT BACKFILL DETAILS

C BEAMS - 0° SKEW

H24-83-06

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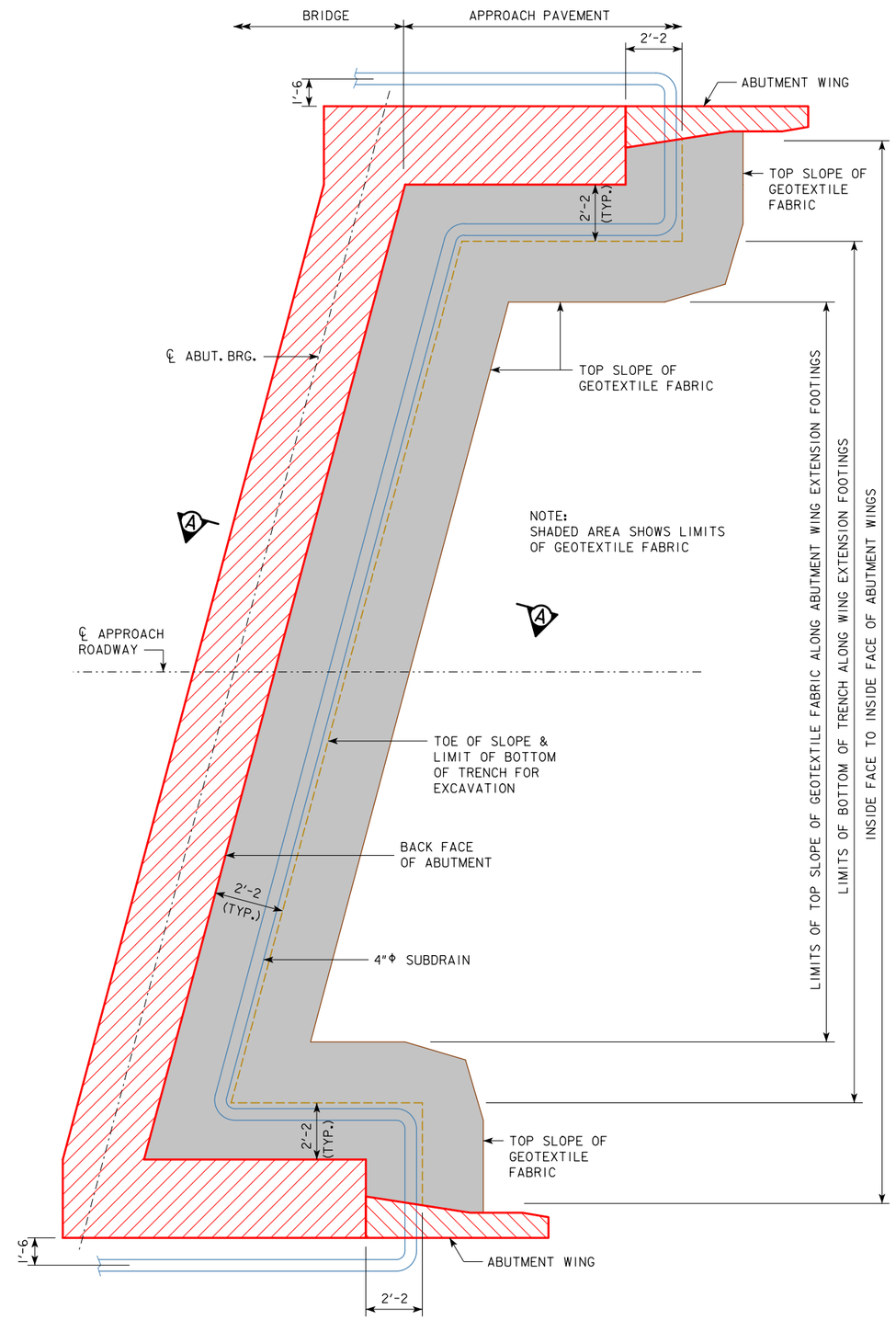

SKEWED ABUTMENT PLAN WITH WING EXTENSIONS

(SKEWED LEFT AHEAD SHOWN, SKEWED RIGHT AHEAD SIMILIAR)

ABUTMENT BACKFILL PROCESS:

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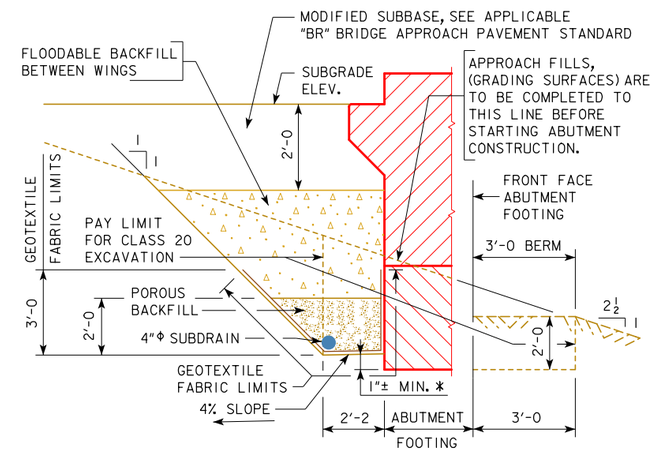

SECTION A-A

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PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

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C BEAMS - SKEWED

H24-84-06

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