



**H30-06 THREE SPAN
PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE STANDARDS**

REVISED 04-13 - THE GENERAL NOTES AND SPECIFICATIONS MOVED TO STANDARD SHEET H30-01A-06. SRL NOTATION ADDED.

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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.

04-13

LATEST REVISION DATE

Harmon L. McDaniel
APPROVED BY BRIDGE ENGINEER



STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES

PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGES

DECEMBER, 2006

INDEX SHEET

H30-01-06

REVISED 04-13 - THIS STANDARD RENAMED TO H30-01A-06. INDEX SHEET INFORMATION ON STANDARD H30-01-06.

GENERAL NOTES:

THE H30-06 BRIDGE STANDARDS, IF PROPERLY USED, PROVIDE THE STRUCTURAL PLANS NECESSARY TO CONSTRUCT THREE SPAN 30’ 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.

FOR CLARITY, MOST SECTIONS SHOWN ON THE FOLLOWING SHEETS ARE DRAWN WITH BARRIER RAIL ONLY. THESE SECTIONS WILL BE IDENTICAL FOR OPEN RAIL DESIGN WITH ANY MODIFICATIONS SHOWN ON SHEET H30-42-06 AND H30-43-06.

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 ½" 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 2501.03, Q 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 H30-02-06 .

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 H30-17-06, H30-24-06, AND H30-31-06 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 H30 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 (PIOL), STANDARD PRESTRESSED CONCRETE PILES (PIOL), OR STANDARD H-PILES (PIOL 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.

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 E177, E718, E719, E818, AND E819 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](http://www.iowadot.gov/bridge/index.htm).

THESE STANDARDS CAN BE USED FOR BRIDGES WITH OR WITHOUT EPOXY COATED REINFORCING. REINFORCING BAR LAP LENGTHS ARE BASED ON THE USE OF EPOXY COATED REINFORCING, BUT NEED NOT BE MODIFIED IF NON-COATED BARS ARE TO BE USED. THE DESIGNER SHALL SPECIFY THE APPROPRIATE BID ITEM NO. FOR THE EPOXY COATED OR NON-EPOXY COATED REINFORCING.

IT IS RECOMMENDED THAT THE EPOXY COATED REINFORCING OPTION BE USED IF IT IS ANTICIPATED THAT THE BRIDGE DECK AND/OR THE BRIDGE APPROACHES WILL BE CHEMICALLY TREATED FOR THE REMOVAL OF ICE OR SNOW.

IF EPOXY COATED BARS ARE USED IN THE DECK, THEN ALL BARS USED IN THE ABUTMENT (FOOTING AND BACKWALL), CAP, AND BARRIER RAILS SHALL BE EPOXY COATED.

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 (501 IS ⅝ INCH DIAMETER BAR). ENGLISH REINFORCING STEEL RECEIVED IN THE FIELD MAY DISPLAY THE FOLLOWING "BAR DESIGNATION". THE "BAR DESIGNATION" IS THE STAMPED IMPRESSION ON THE REINFORCING BARS, AND IS EQUIVALENT TO THE BAR DIAMETER IN MILLIMETERS.

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

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 H30-32-06 THRU H30-37-06

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.

04-13 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER		
		STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES DECEMBER, 2006	
		GENERAL NOTES	H30-01A-06

REVISED 04-13 - TEE PIER NOTES WERE CHANGED TO LRFD SPECS.

EXAMPLES OF BRIDGE SEAT AND STEP CALCULATIONS:

THE DESIGNER SHALL SHOW ON THE PLANS THE 5 ELEVATIONS AND THE 4 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' $\angle$ TO $\angle$ OF ABUTMENT BEARINGS WITH 30° SKEW RIGHT AHEAD.

STATIONS

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

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

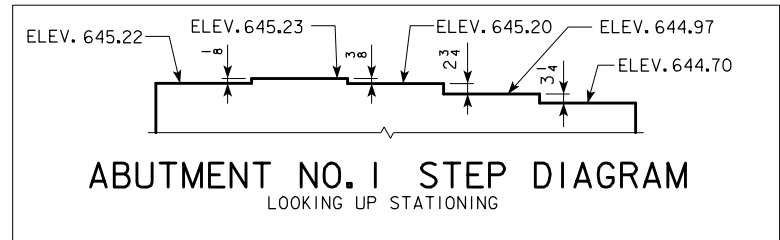
$\angle$ ABUT. BRG. =	653.29-[(104+78.08)-(103+75.00)](0.0325) =	649.94
$\angle$ PIER BRG. =	653.29-[(105+46.33)-(103+75.00)](0.0325) =	647.72
$\angle$ PIER BRG. =	653.29-[(106+23.67)-(103+75.00)](0.0325) =	645.21
$\angle$ ABUT. BRG. =	653.29-[(106+91.92)-(103+75.00)](0.0325) =	642.99

ELEVATIONS TOP OF SLAB FACING ALONG THE STATIONING

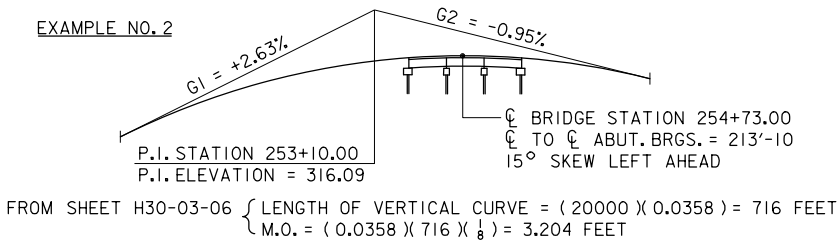
(BEAM SPACING X TAN. SK. Δ)(GRADE) = (6.75') TAN 30° (0.0325) = 0.13'

ABUTMENT NO. 1

BEAMS	EXTERIOR	INTERIOR	CENTER	INTERIOR	EXTERIOR
PGL ELEV.	649.94	649.94	649.94	649.94	649.94
SK. Δ CORRECT	+0.26	0.13	0.00	-0.13	-0.26
SLAB CROWN	-0.24	-0.10	0.00	-0.10	-0.24
TOP SLAB ELEV.	649.96	649.97	649.94	649.71	649.44
- "U" (4'-8 $\frac{1}{2}$)	-4.74	-4.74	-4.74	-4.74	-4.74
BR. SEAT ELEV.	645.22	645.23	645.20	644.97	644.70



EXAMPLE NO. 2



STATIONS

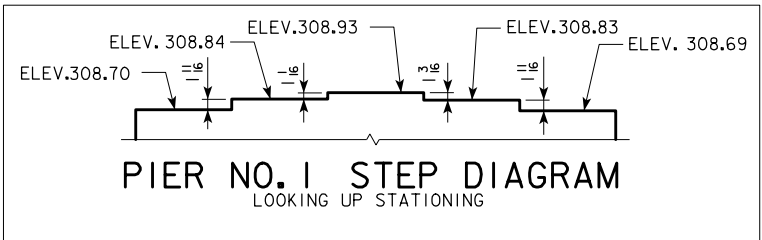
$\angle$ BRIDGE STA.	=	254+73.00	
$\pm \frac{1}{2}$ OF L2	$\pm$	38.67	
$\angle$ PIER BRGS.	=	254+34.33	255+11.67
$\pm$ LI	-	68.25	+ 68.25
$\angle$ ABUTMENT BRGS.	=	253+66.08	255+79.92

ELEVATIONS TOP OF SLAB FACING ALONG THE STATIONING

(BEAM SPACING X TAN. SK. Δ) = (6.75') TAN 15° = 1.81'

PIER NO. 1

BEAMS	EXTERIOR	INTERIOR	CENTER	INTERIOR	EXTERIOR
STATION	254+37.95	254+36.14	254+34.33	254+32.52	254+30.71
PGL ELEV.	+313.55	+313.55	313.54	313.54	313.54
SLAB CROWN	-0.24	-0.10	0.00	-0.10	-0.24
TOP SLAB ELEV.	313.31	313.45	313.54	313.44	313.30
- "U" (4'-7 $\frac{5}{8}$)	-4.61	-4.61	-4.61	-4.61	-4.61
BR. SEAT ELEV.	308.70	308.84	308.93	308.83	308.69



TEE PIER NOTES:

THE TEE PIERS SHOWN IN THESE PLANS ARE DESIGNED FOR USE WITH THE H30-06 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 SRL-1 FRICTION BEARING PILES AND 365 KIPS FOR HP10x57 SRL-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 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 d₁ COLUMN BAR PROJECTION INTO THE CAP AND d₁/d₂ LAP DISTANCE ACCORDINGLY.

04-13
LATEST REVISION DATE

Harmon L. McDaniel
APPROVED BY BRIDGE ENGINEER



STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES

PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGES

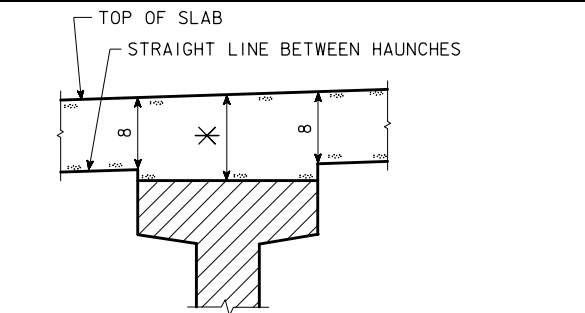
DECEMBER, 2006

GENERAL INFORMATION

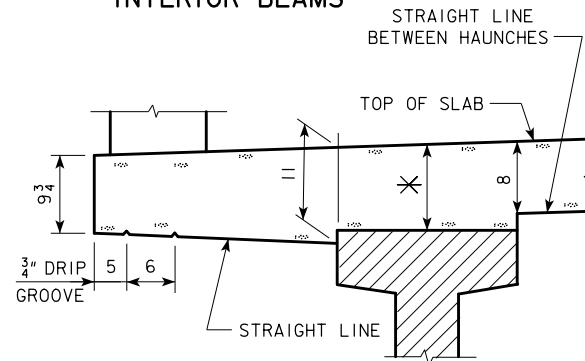
H30-02-06



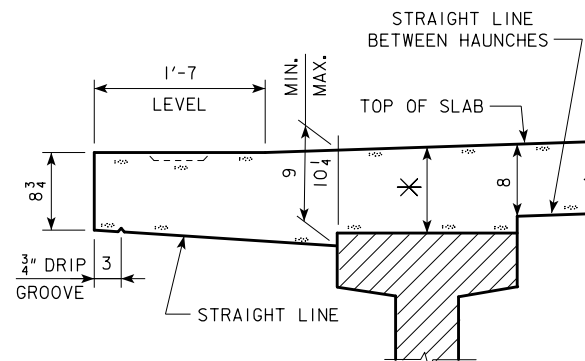
REVISED 06-12 - I.M. REQUIREMENT ADDED TO BAR CHAIR NOTE.



INTERIOR BEAMS

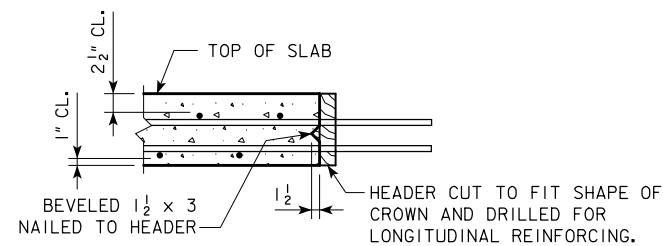


EXTERIOR BEAMS @ OPEN RAIL

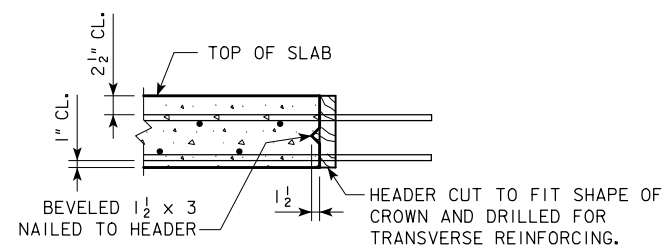


EXTERIOR BEAMS @ BARRIER RAIL
TYPICAL SLAB AND HAUNCH DETAIL

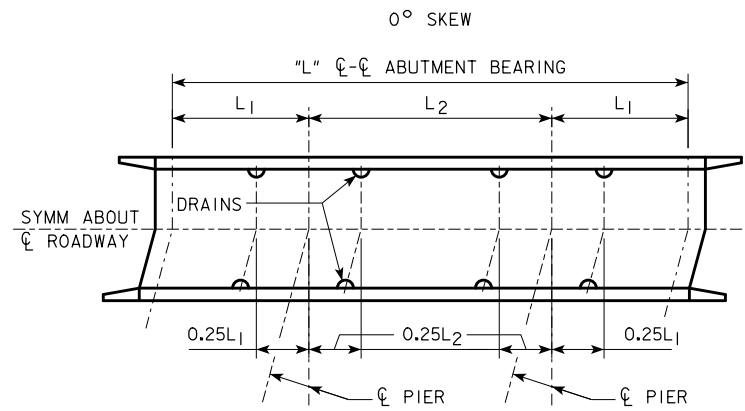
* FOR SLAB THICKNESS OVER BEAMS SEE "SLAB THICKNESS DETAILS" ON SHEET H30-03-06.



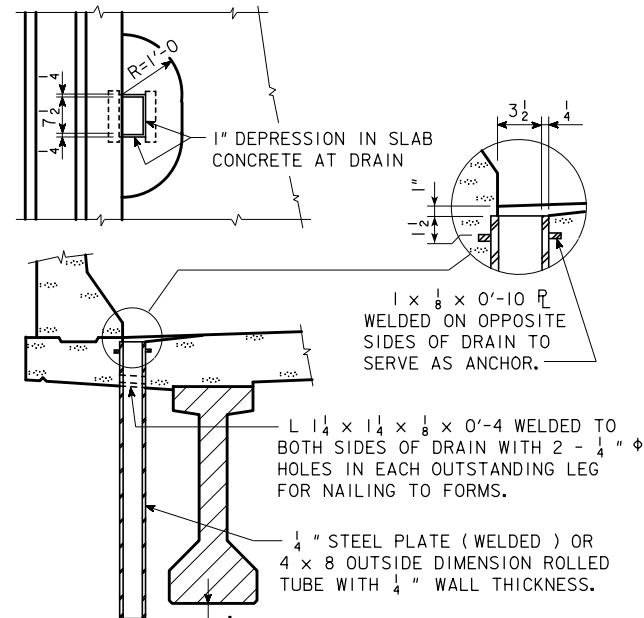
TRANSVERSE SLAB
CONSTRUCTION JOINT



LONGITUDINAL SLAB
CONSTRUCTION JOINT



SITUATION SKETCH
(SHOWING DRAIN LOCATIONS)



DRAIN DETAILS
USE FOR BARRIER RAIL ONLY.
NOT REQUIRED FOR OPEN RAIL.

NOTE :
DRAINS ARE TO BE GALVANIZED AFTER FABRICATION.
SEE "SITUATION SKETCH" FOR LOCATION OF DRAINS.
WEIGHT OF DRAINS IS INCLUDED IN THE QUANTITY
FOR "STRUCTURAL STEEL".
WEIGHT IS BASED ON ROLLED TUBE.

DATA FOR ONE DRAIN			
BEAM SIZE	A	B	C
WT. LBS.	85	96	106
LENGTH FT.	4'-4 3/4	4'-11 3/4	5'-5 3/4

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.

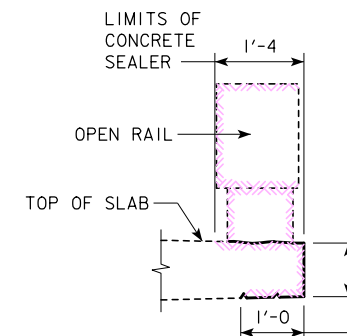
FORMS FOR THE SLAB AND RAILS ARE TO BE SUPPORTED BY THE PRESTRESSED CONCRETE BEAMS.

WEIGHT OF DRAINS IS INCLUDED IN THE STRUCTURAL STEEL QUANTITY.

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

ALL REINFORCING STEEL IS TO BE GRADE 60.

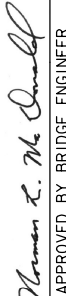
COST OF ALL PREFORMED EXPANSION JOINT FILLER MATERIAL IS TO BE INCLUDED IN THE PRICE BID FOR "STRUCTURAL CONCRETE (BRIDGE)".



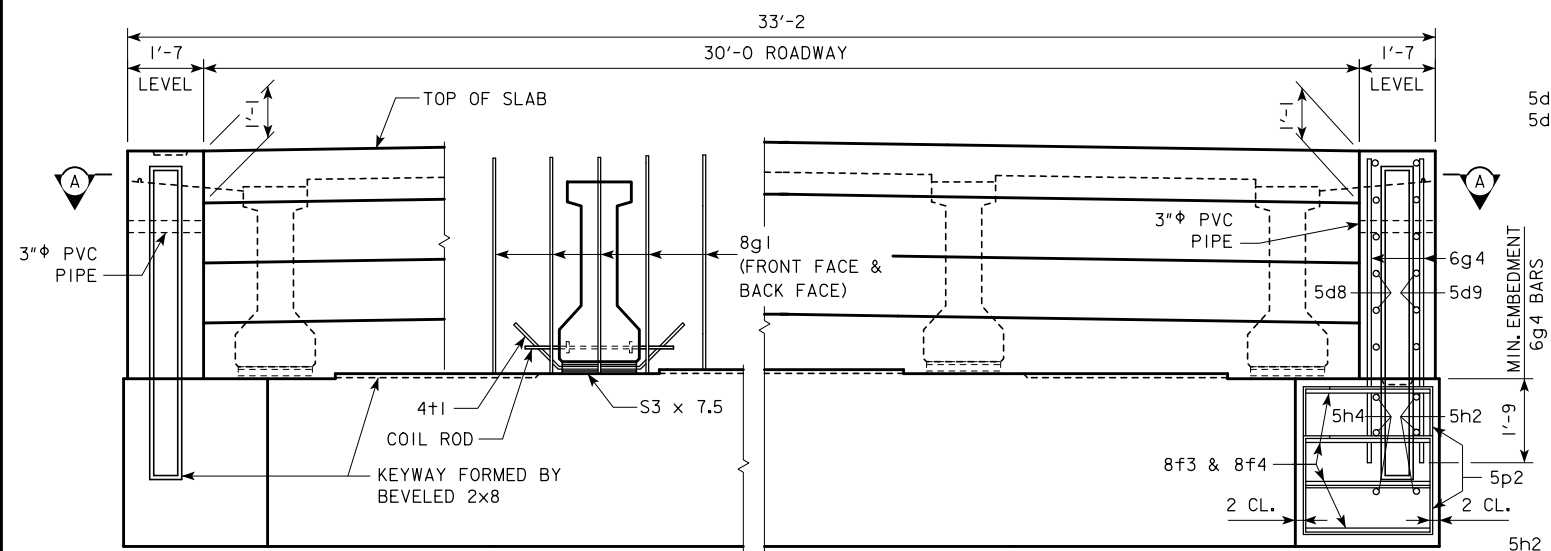
CONCRETE SEALER
LIMITS FOR OPEN RAILS

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

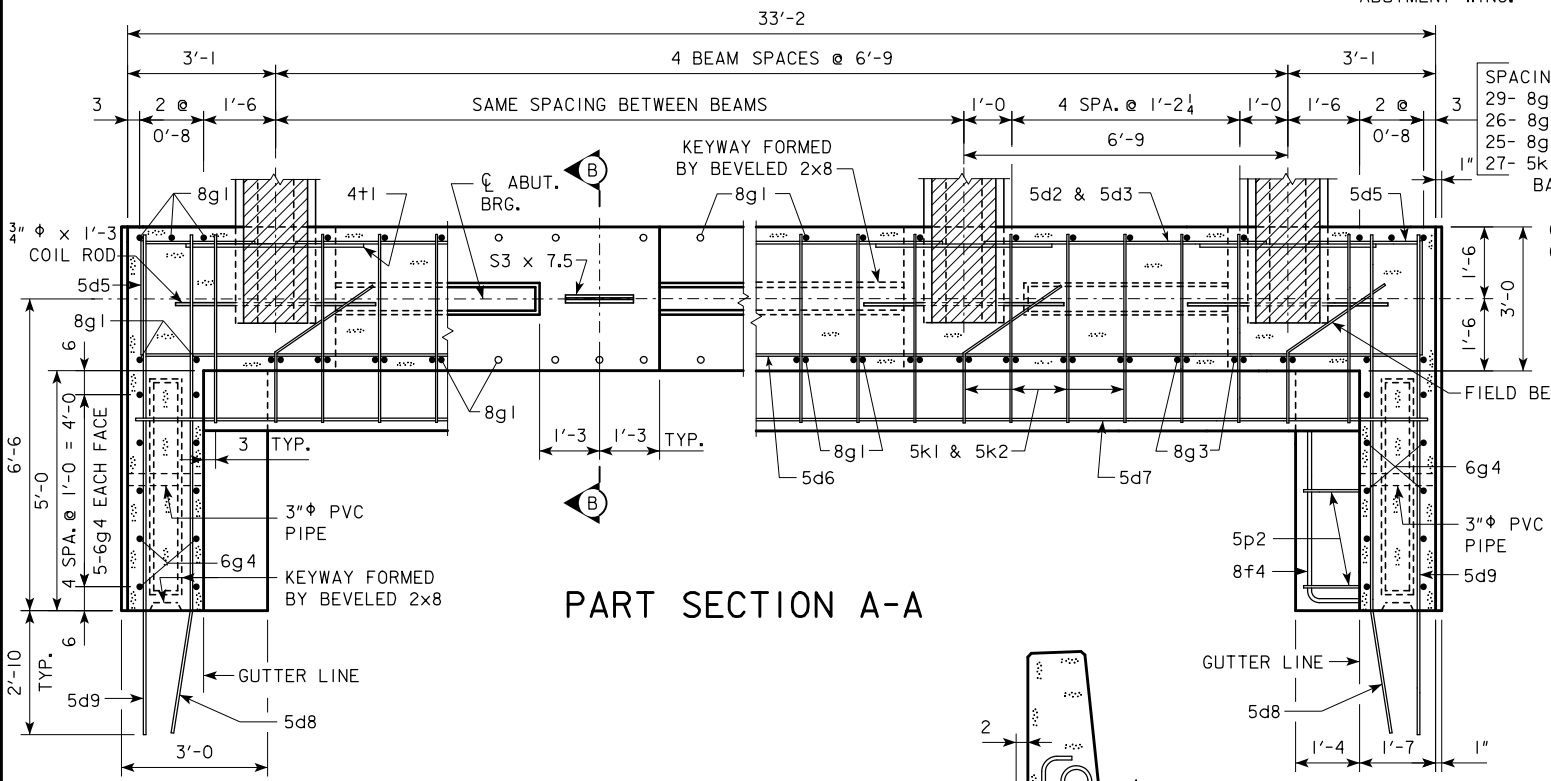
THE CONCRETE SEALER LIMITS ARE SHOWN IN THE DETAIL AND SHALL APPLY TO THE FULL LENGTH OF BRIDGE. CONCRETE SEALER SHALL BE APPLIED IN ACCORDANCE WITH ARTICLE 2403.03, P, 3, OF THE STANDARD SPECIFICATIONS.

06-12 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES DECEMBER, 2006
		SUPERSTRUCTURE DETAILS
		H30-04-06

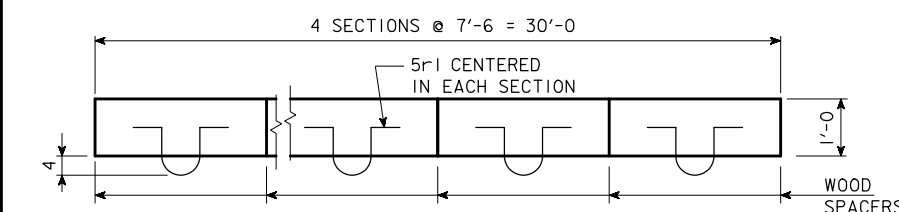
REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.



PART REAR ELEVATION AT ABUTMENT
NOTE: TOP OF ABUTMENT SHOWN FOR SOLID BARRIER RAIL

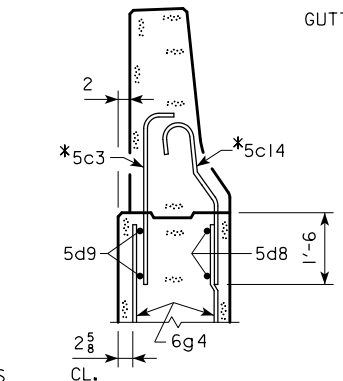


PART SECTION A-A



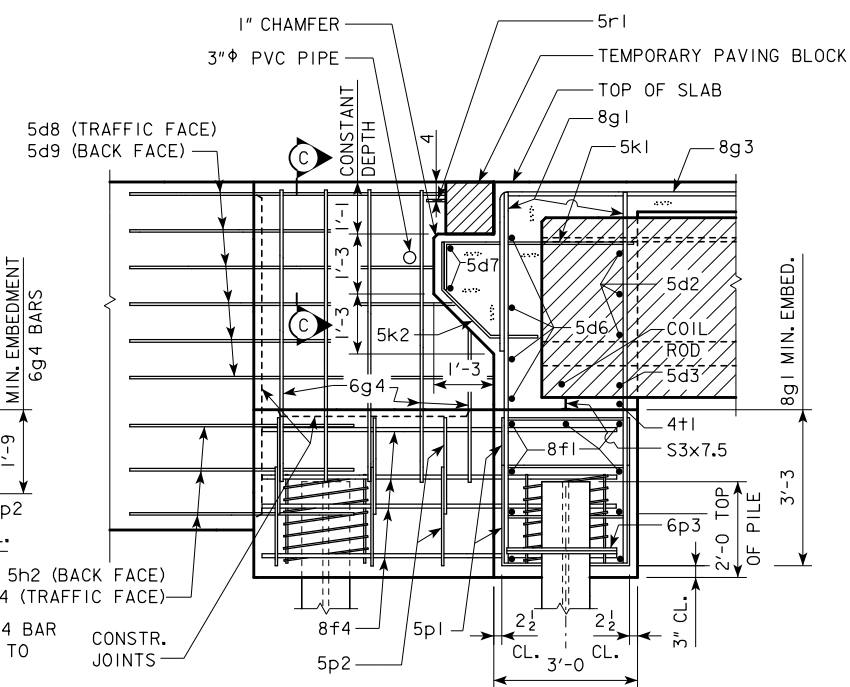
PLAN OF TEMPORARY PAVING BLOCK

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



PART SECTION C-C

* NOTE: SEE BARRIER RAIL SHEET FOR DETAILS. REINFORCING BARS 5c3 AND 5c14 ARE INCLUDED IN SUPERSTRUCTURE QUANTITIES.



PART SECTION B-B

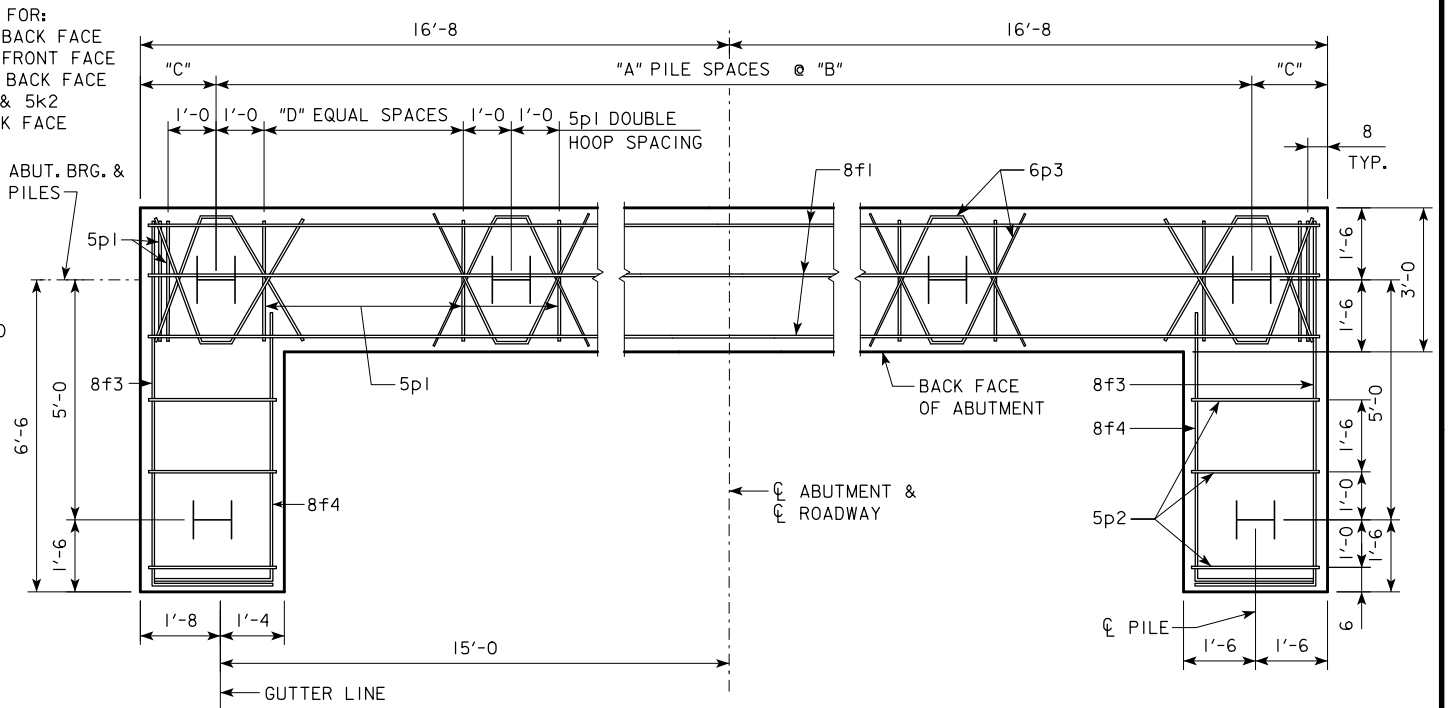
ABUTMENT NOTES:
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.

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 - L₈ x 7/8 x 8 SPACERS PUNCHED TO HOLD SPIRAL.



ABUTMENT PILE PLAN

ABUTMENT PILE SPACING		201'-4	213'-10	226'-4	243'-0
WITH STEEL H-PILES	"A" PILE SPACES	5	6	6	6
	"B" (FT. - IN.)	5'-9	4'-9	4'-9	4'-9
	"C" (FT. - IN.)	2'-3 1/2	2'-5	2'-5	2'-5
	"D" EQUAL SPACES	3	3	3	3
	NO. OF PILES PER ABUT.	8	9	9	9
	P _u , STRENGTH I DESIGN LOAD (KIPS)	143	126	130	138

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

04-13
LATEST REVISION DATE

Harmon L. McDaniel
APPROVED BY BRIDGE ENGINEER

STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
DECEMBER, 2006

ABUTMENT DETAILS
0° SKEW C BEAMS

H30-06-06

7'-0" BARRIER RAIL END SECTION
FACE TO FACE OF BARRIER RAIL END SECTIONS
(SEE BARRIER RAIL LAYOUT SHEET)

SEE DETAIL "C"
TEMPORARY PAVING BLOCK
TOP OF SLAB
5k1
5j1
3" ϕ PVC PIPE
5d7
5k2
8g3
5d6
5d2
5d3
4" MIN. CL.
5e1 & 5e4 BARS
5b1 @ 10" CTRS.
5b1 & b3
BEAM PRESTRESSING STEEL STRANDS
5d8 (TRAFFIC FACE)
5d9 (BACK FACE)
3" ϕ PVC PIPE
ELEV. A
ELEV. B
ELEV. C
5c5-10
5c4
5c3
5d5
4" MIN. CL.
5d4
5d3
5e3
5e1
5e2
5e3
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NOTE:
PLUG 3" ϕ PVC PIPE WITH
EXPANDING FOAM PRIOR TO
BACKFILLING BEHIND
ABUTMENTS.

ABUTMENT
PART LONGITUDINAL SECTION NEAR GUTTER
(FOR DETAILS OF INTERMEDIATE DIAPHRAGM SEE SHEET H30-38-06)

FIXED PIER

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

ABUTMENT FIXED PIER
 PART LONGITUDINAL SECTION NEAR GUTTER
 (FOR DETAILS OF INTERMEDIATE DIAPHRAGM SEE SHEET H30-38-06)

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.

SECTION A-A

LOCATION OF BEAM COIL TIES AND STEEL DIAPHRAGM BOLT HOLES

SECTION D-D

Δ NOTE: SEE END SECTION DETAILS IN THESE PLANS FOR DETAILS OF BARRIER RAIL END SECTION. REINFORCING BARS 6c3, 6c4, 5c5-10, 6d2 & 4+1 ARE INCLUDED IN THE SUPERSTRUCTURE QUANTITIES.

DETAIL "C"

PART PLAN

TOP OF FIXED PIER

DETAILS

SECTION B-B

NOTE:
SEE SHEET H30-44-06
FOR EXPANSION PIER
BEARING DETAILS

PART SECTION
AT PIER

PART SECTION C-C



STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

LONGITUDINAL SECTION
0° SKEW C BEAMS

H30-08-06

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



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 INCLUDING HAUNCH, ABUT. DIAPHRAGM, & WINGWALLS** , SECTIONS 1 & 3	WITH BARRIER RAIL	C.Y.	90.8	97.0	107.2	113.4	119.6	134.2	140.6	147.2	162.0
	WITH OPEN RAIL	C.Y.	92.1	98.4	108.8	115.1	121.5	136.1	142.6	149.4	164.4
SLAB INCLUDING HAUNCH, SECTION 2	WITH BARRIER RAIL	C.Y.	33.5	36.2	38.9	41.6	44.1	47.0	49.7	52.4	52.4
	WITH OPEN RAIL	C.Y.	34.2	37.0	39.7	42.5	45.1	48.0	50.7	53.5	53.5
SLAB INCLUDING HAUNCH & PIER DIAPHRAGM, SECTIONS 4 & 5	WITH BARRIER RAIL	C.Y.	34.2	36.0	40.0	41.8	43.8	47.0	48.6	50.6	50.6
	WITH OPEN RAIL	C.Y.	34.7	36.5	40.6	42.4	44.4	47.6	49.3	51.3	51.3
PAVING BLOCKS		C.Y.	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
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.	25.3	25.2	25.2	25.1	25.1	----	----	----	----
ABUTMENT FOOTINGS (w/ STEEL H PILES)		C.Y.	26.6	26.6	26.6	26.6	26.6	34.4	34.4	34.4	34.4

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.

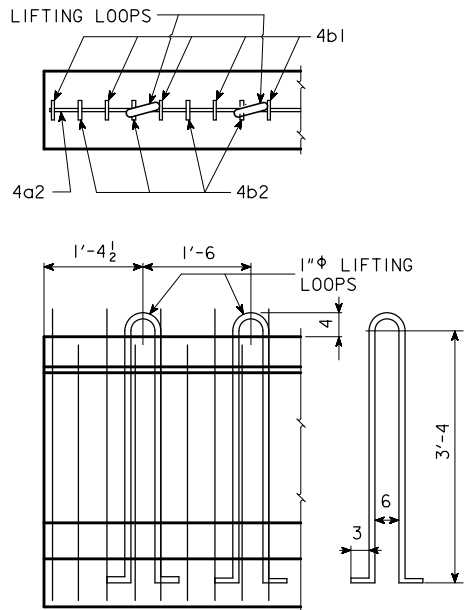
** WINGWALLS APPLY ONLY TO BRIDGES USING "C" BEAMS.

07-15 LATEST REVISION DATE <i>Norman L. McDaniel</i> APPROVED BY BRIDGE ENGINEER	 Highway Division	
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES DECEMBER, 2006	
	SUPERSTRUCTURE DETAILS 0° SKEW	H30-09-06

REVISED 05-11 - CORRECTED THE OPEN RAIL REBAR QUANTITIES FOR THE 201'-4, 231'-10, 226'-4, & 243'-0 BRIDGE LENGTHS.

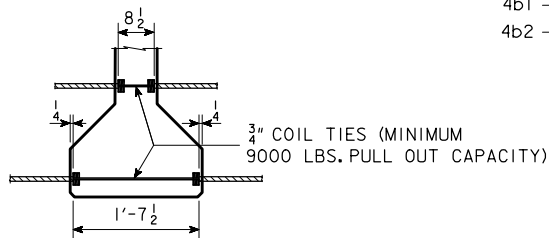
REINFORCING BAR LIST ONE SUPERSTRUCTURE AND TWO ABUTMENTS			C-C ABUT. BRG.			138'-10			151'-4			163'-10			176'-4			188'-10			201'-4			213'-10			226'-4			243'-0			
			C-C BEAM BRG.			42'-6	50'-10	42'-6	46'-8	55'-0	46'-8	50'-10	59'-2	50'-10	55'-0	63'-4	55'-0	59'-2	67'-6	59'-2	63'-4	71'-8	63'-4	67'-6	75'-10	67'-6	71'-8	80'-0	71'-8	80'-0	80'-0		
			BEAM SERIES			A BEAM			A BEAM			B BEAM			B BEAM			B BEAM			C BEAM			C BEAM			C BEAM			C BEAM			
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
6a1	SLAB TRANSV. TOP & BOTT.			339	32'-10	16,718	369	32'-10	18,197	399	32'-10	19,677	429	32'-10	21,156	459	32'-10	22,636	489	32'-10	24,115	519	32'-10	25,595	549	32'-10	27,074	589	32'-10	29,047			
5b1	SLAB LONGITUDINAL, TOP & BOTT.			152	40'-0	6,341	152	40'-0	6,341	228	40'-0	9,512	228	40'-0	9,512	228	40'-0	9,512	304	40'-0	12,683	304	40'-0	12,683	304	40'-0	12,683	380	40'-0	15,854			
5b2	SLAB LONGITUDINAL, TOP & BOTT., ENDS			152	33'-9	5,351	152	40'-0	6,341	152	27'-3	4,320	152	33'-6	5,311	152	39'-9	6,302	152	27'-0	4,280	152	33'-3	5,271	152	39'-6	6,262	152	28'-10	4,571			
6b3	SLAB LONGITUDINAL, TOP @ PIERS			66	12'-10	1,272	66	13'-10	1,371	66	14'-10	1,470																					
7b3	SLAB LONGITUDINAL, TOP @ PIERS												66	15'-10	2,136	66	17'-0	2,293	66	18'-0	2,428												
8b3	SLAB LONGITUDINAL, TOP @ PIERS																					66	19'-0	3,348	66	20'-0	3,524	66	20'-0	3,524			
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	12	3'-6	44
5d2	PIER & ABUT. DIAPH. LONGIT.			72	6'-1	457	72	6'-1	457	72	6'-1	457	72	6'-1	457	72	6'-1	457	72	5'-10	438	72	5'-10	438	72	5'-10	438	72	5'-10	438	72	5'-10	438
5d3	PIER & ABUT. DIAPH. LONGIT.			24	5'-2	129	24	5'-2	129	24	5'-2	129	24	5'-2	129	24	5'-2	129	24	4'-11	123	24	4'-11	123	24	4'-11	123	24	4'-11	123	24	4'-11	123
5d4	PIER DIAPH. LONGIT.			2	29'-9	62	2	29'-9	62	2	29'-9	62	2	29'-9	62	2	29'-9	62	2	29'-9	62	2	29'-9	62	2	29'-9	62	2	29'-9	62	2	29'-9	62
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	12	5'-0	63
5d6	ABUT. DIAPH. LONGIT. B.F.			8	32'-9	273	8	32'-9	273	8	32'-9	273	8	32'-9	273	8	32'-9	273	8	32'-9	273	8	32'-9	273	8	32'-9	273	8	32'-9	273	8	32'-9	273
5d7	PAVING NOTCH LONGIT.			4	32'-9	137	4	32'-9	137	4	32'-9	137	4	32'-9	137	4	32'-9	137	4	32'-9	137	4	32'-9	137	4	32'-9	137	4	32'-9	137	4	32'-9	137
5d8	ABUT. DIAPH. WING EXT. LONGIT.																		24	10'-9	269	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	24	10'-8	267
5e1	PIER DIAPH. HOOPS			32	8'-5	281	32	8'-5	281	32	9'-8	323	32	9'-8	323	32	9'-8	323	32	10'-8	356	32	10'-8	356	32	10'-8	356	32	10'-8	356	32	10'-8	356
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	4	2'-7	11
5e3	PIER DIAPH. TIES			32	2'-9	92	32	2'-9	92	32	2'-9	92	32	2'-9	92	32	2'-9	92	32	2'-9	92	32	2'-9	92	32	2'-9	92	32	2'-9	92	32	2'-9	92
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	4	10'-6	44
8f1	ABUT. FOOTING LONGIT.			18	32'-10	1,578	18	32'-10	1,578	18	32'-10	1,578	18	32'-10	1,578	18	32'-10	1,578	18	33'-0	1,586	18	33'-0	1,586	18	33'-0	1,586	18	33'-0	1,586	18	33'-0	1,586
8f3	ABUT. EXTENSION LONGIT.																		16	10'-1	431	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	16	8'-6	363
8g1	ABUT. VERT.			114	6'-8	2,029	114	6'-8	2,029	114	7'-3	2,207	114	7'-3	2,207	114	7'-3	2,207	110	7'-9	2,276	110	7'-9	2,276	110	7'-9	2,276	110	7'-9	2,276	110	7'-10	2,301
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	50	15'-9	2,103
6g4	ABUT. DIAPH. WING EXT. VERT.																		40	6'-6	391	40	6'-6	391	40	6'-6	391	40	6'-7	396	40	6'-7	396
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	36	6'-8	250
5h2	ABUT. TO WING ANCHOR																																

REVISED 07-10 - THE SPECIFICATION REFERENCES WERE CHANGED. THE BEAM DATA WAS UPDATED TO THE CURRENT BEAMS.



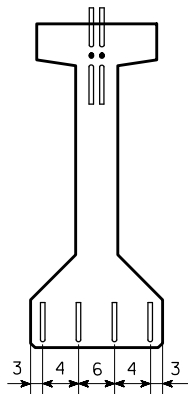
LIFTING LOOP DETAIL

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

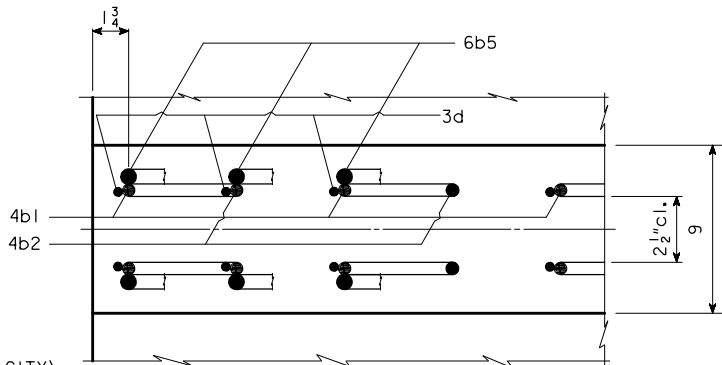


COIL TIE DETAIL

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

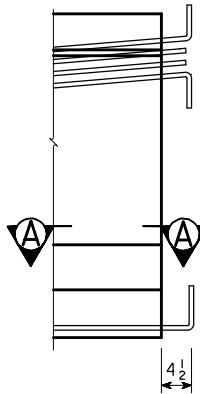


STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS



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

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.

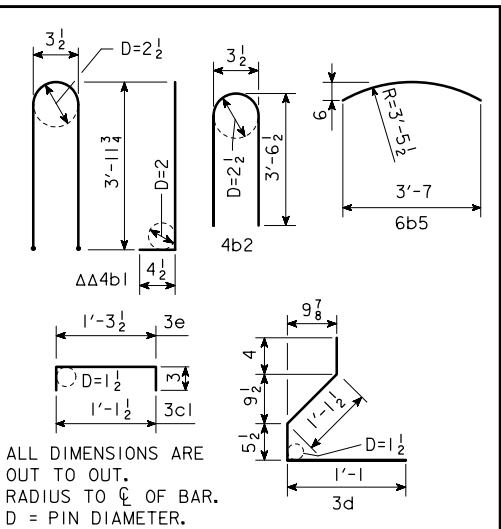


TYPICAL AT BOTH BEAM ENDS

** WHERE DEFLECTING STRANDS INTERFERE WITH PLACEMENT, SOME IN-PLACE BENDING MAY BE NECESSARY.
ΔΔ 4b1 BARS TO BE EPOXY COATED.

REINFORCING BAR LIST

REINFORCING BAR LIST											
BEAM \ SPAN		C63		C67		C71		C75		C80	
63'-4		67'-6		71'-8		75'-10		80'-0			
BAR	SHAPE	NO. LENGTH		NO. LENGTH		NO. LENGTH		NO. LENGTH		NO. LENGTH	
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 ϕ OF BAR. D = PIN DIAMETER.

C BEAM DATA

BEAM	SPAN LENGTH ℄-℄ BEARING	OVERALL BEAM LENGTH (L)	STRAND SIZE DIA. (inches)	NO. OF STRANDS		TOTAL INITIAL PRESTRESS KIPS	HOLD DOWN FORCE-KIPS	CAMBER (in.)				DEFLECTION (in.) Δ _D				PERMISSIBLE SPACING				WEIGHT (TONS)	CONCRETE (C. Y.)	REINFORCING STEEL-(lb)	
				STRAIGHT	DEFLECTED			AT RELEASE	AFTER LOSSES	IMMEDIATE ^① (ELASTIC) Δ _I		TIME ^② (PLASTIC) Δ _T				HL93 LOADING							
										CONC. DIAPH.	STEEL DIAPH.	CONC. DIAPH.	STEEL DIAPH.			CONC. DIAPH.	STEEL DIAPH.						
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 ϕ 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 ϕ 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 $A_s = 0.217$ 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 α BARS WHICH RUN THE FULL LENGTH OF THE BEAM IN THE TOP FLANGE.

07-10
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER
Harmon L. McQuinn

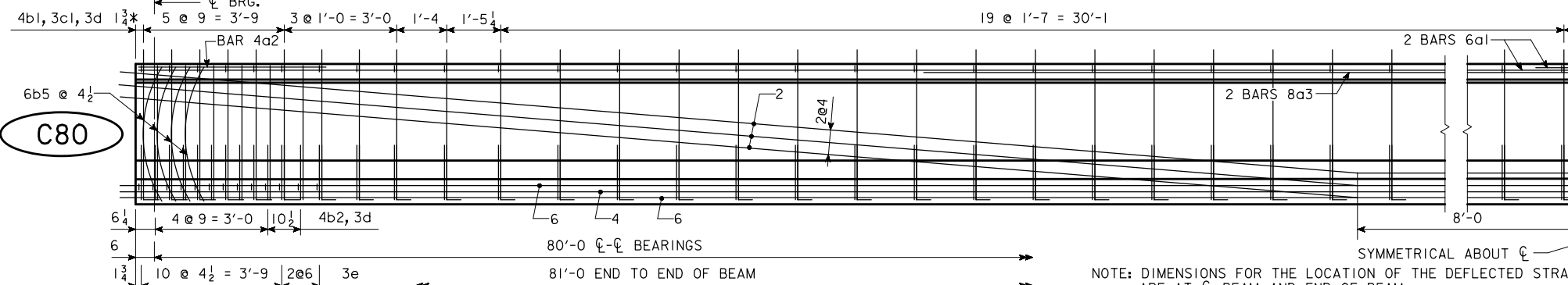
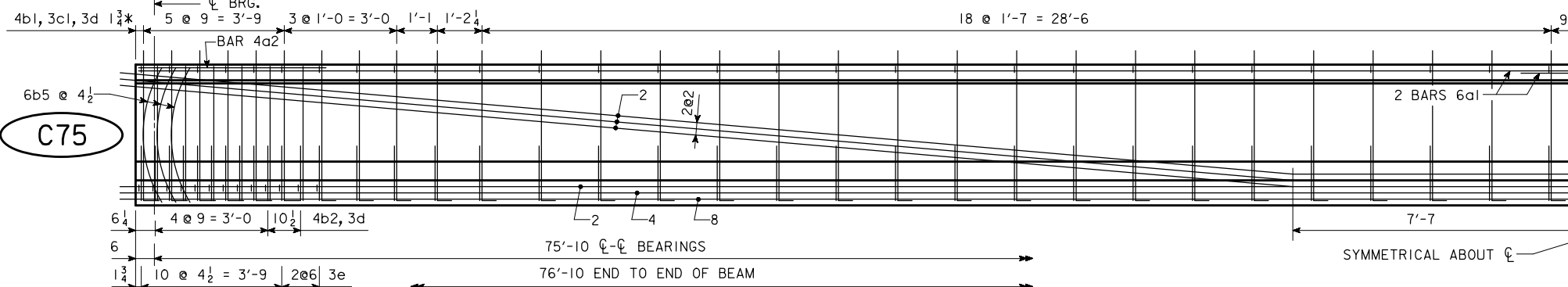
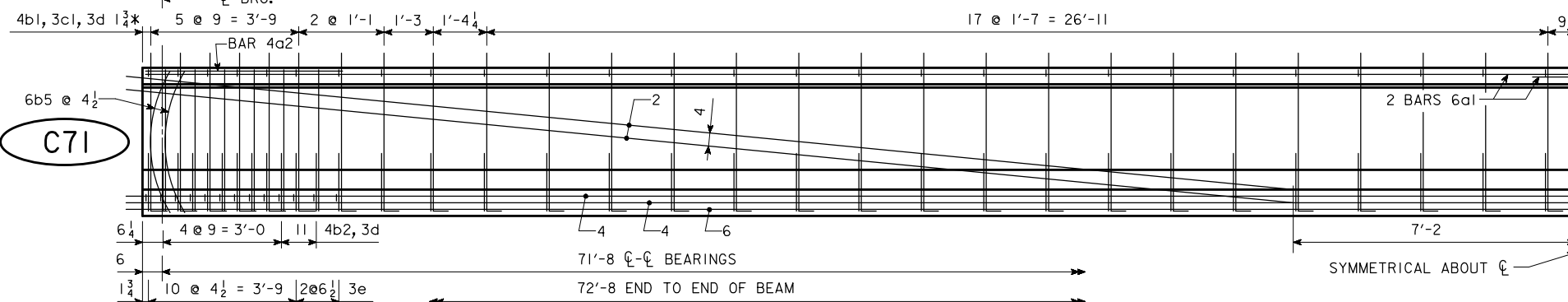
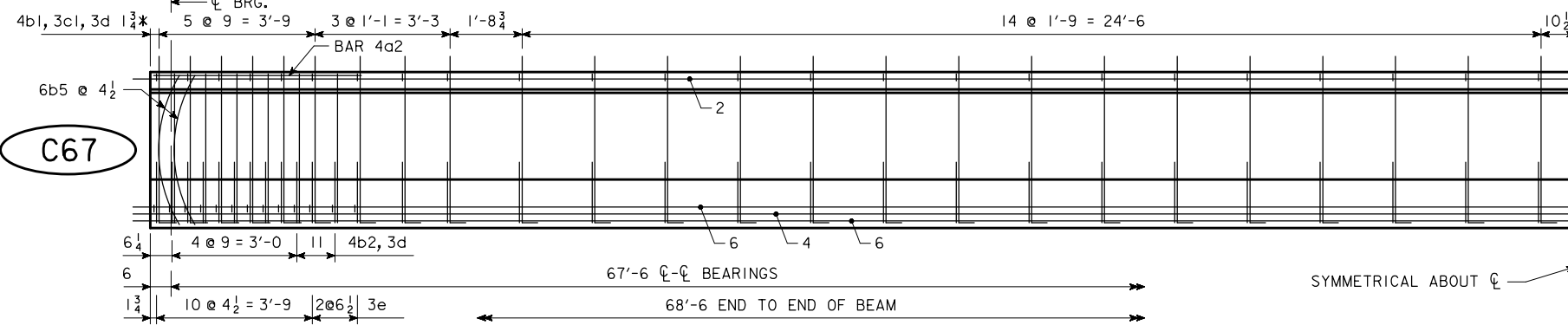
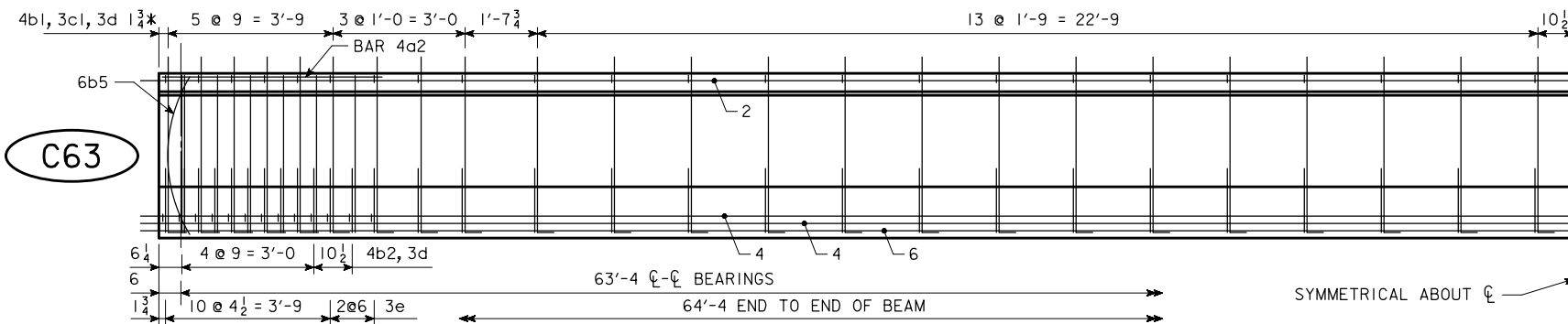
IOWA DOT Highway Division

STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES
**PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGES**
DECEMBER, 2006

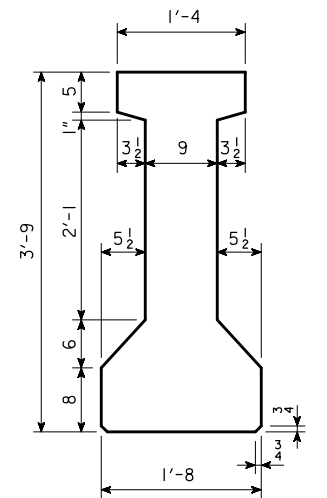
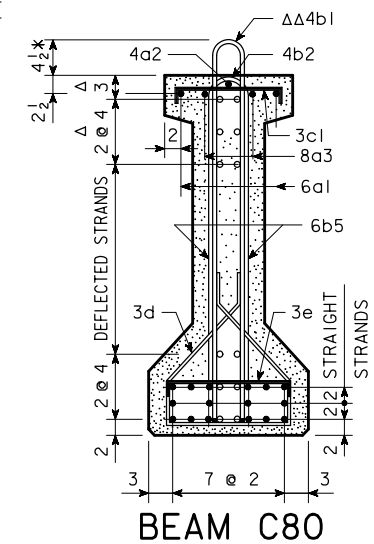
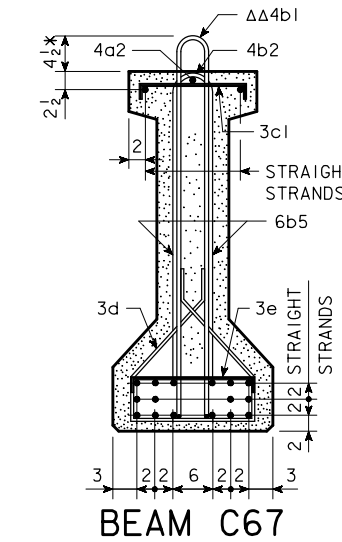
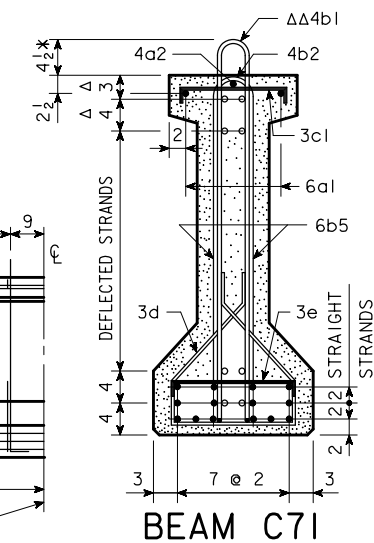
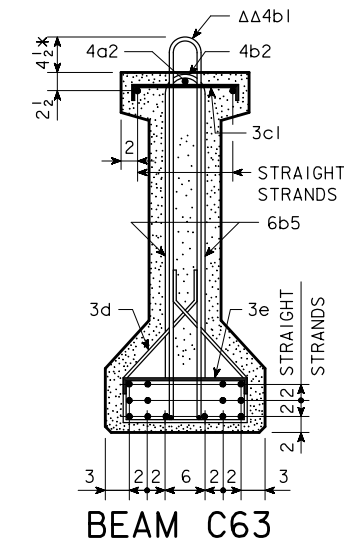
C BEAM DETAILS

H30-36-06

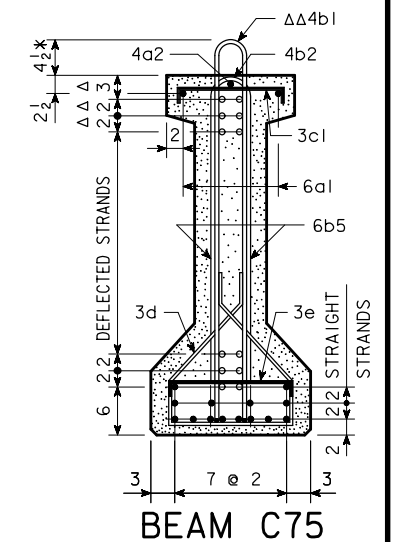
REVISED 07-10 - THE SPECIFICATION REFERENCES WERE CHANGED. THE BEAM DATA WAS UPDATED TO THE CURRENT BEAMS.



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



"C" BEAM CROSS SECTION
A = 564.5 in²
Y_b = 20.23 in
I = 116,354 in⁴



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

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

LATEST REVISION DATE
07-10

APPROVED BY BRIDGE ENGINEER
Herman L. McQuinn

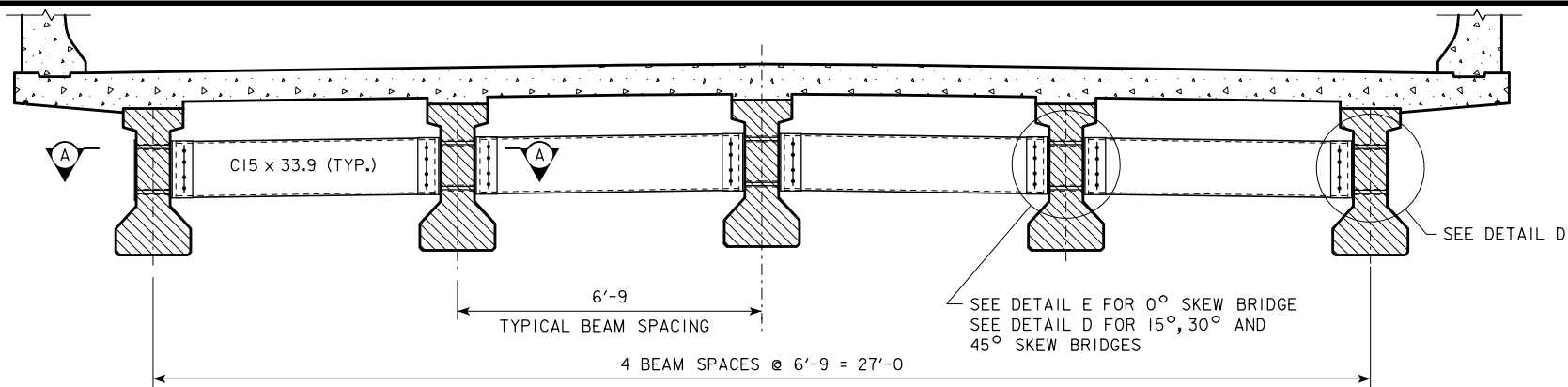
IOWA DOT Highway Division

STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
DECEMBER, 2006

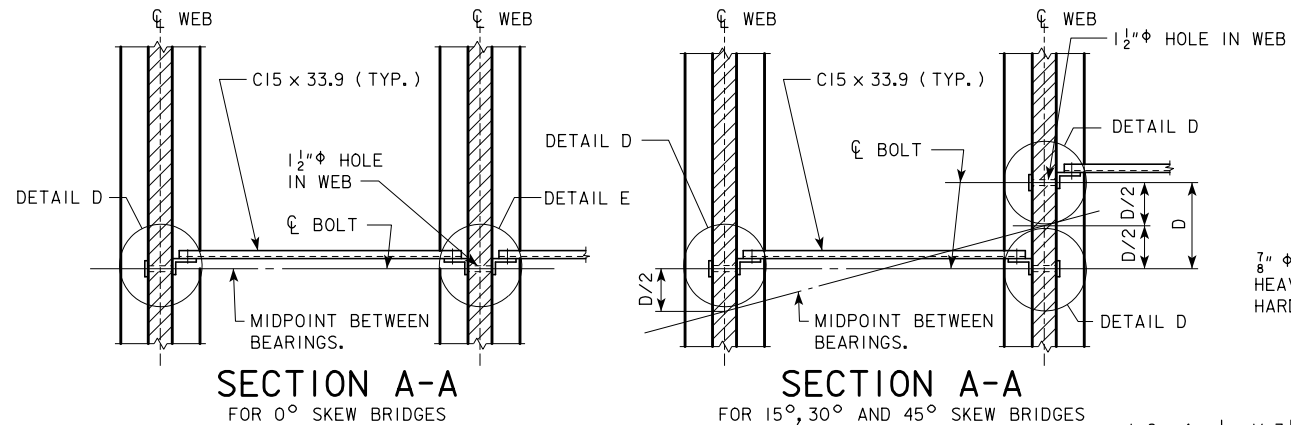
C BEAM DETAILS

H30-37-06

REVISED 07-10 - MINOR CHANGES WERE MADE TO AGREE WITH OFFICE STANDARD.



SECTION SHOWING INTERMEDIATE DIAPHRAGM



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		BRIDGE SKEW	
			0°	15°, 30° & 45°	0°	15°, 30° & 45°
6	9	4.30	9	0	38.7	0.0
9	12	5.34	9	0	48.1	0.0
2 - L 6 x 4 x 1/2 x 1'-3 1/4 = 41.2 LB			9	0	370.8	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		BRIDGE SKEW	
			0°	15°, 30° & 45°	0°	15°, 30° & 45°
6	9	4.30	6	24	25.8	103.2
9	12	5.34	6	24	32.0	128.2
1 - BACKING PL 4 x 3/8 x 1'-3 1/4 = 6.5 LB			6	24	39.0	156.0
1 - L 6 x 4 x 1/2 x 1'-3 1/4 = 20.6 LB			6	24	123.6	494.4

* ONE C15 x 33.9 DIAPHRAGM

WEB THICKNESS (IN.)	BEAM SPACING	LENGTH	NO. OF DIAPH.	UNIT WEIGHT (LB.)	WEIGHT (LB.)
6	6'-9"	5'-11 5/8"	12	202.3	2427.6
9	6'-9"	5'-8 3/8"	12	193.9	2326.8

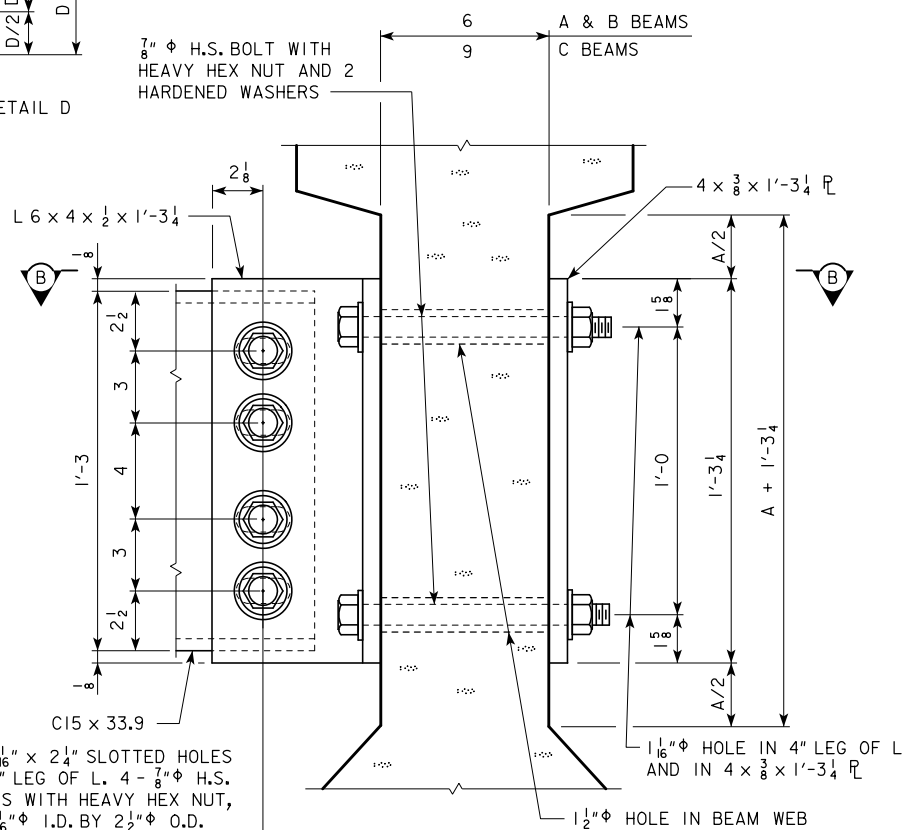
DIAPHRAGM CONNECTION BOLTS

8-7/8" ϕ x 0'-2 3/4" H.S. BOLTS WITH NUTS AND WASHERS, PER UNIT DIAPHRAGM = 10.3 LB	NO. OF DIAPH.	WEIGHT (LB.)
	12	123.6

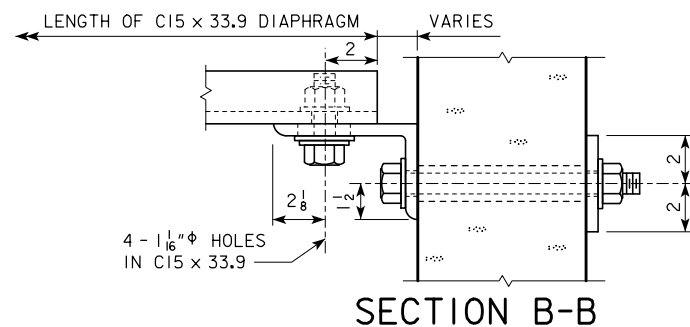
* THE LENGTH OF THE C15 x 33.9 IS BASED ON A VARIABLE CLEARANCE OF 1/16" TO 2/16" BETWEEN THE FACE OF BEAM WEB AND END OF C15 x 33.9.

TOTAL WEIGHT

	WEB THICKNESS (IN.)	BRIDGE SKEW	
		0°	15°, 30° & 45°
INTERMEDIATE DIAPHR. STRUCT. STEEL - TOTAL (LB.) =	6	3149	3305
INTERMEDIATE DIAPHR. STRUCT. STEEL - TOTAL (LB.) =	9	3064	3229



DETAIL D



SECTION B-B

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

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.

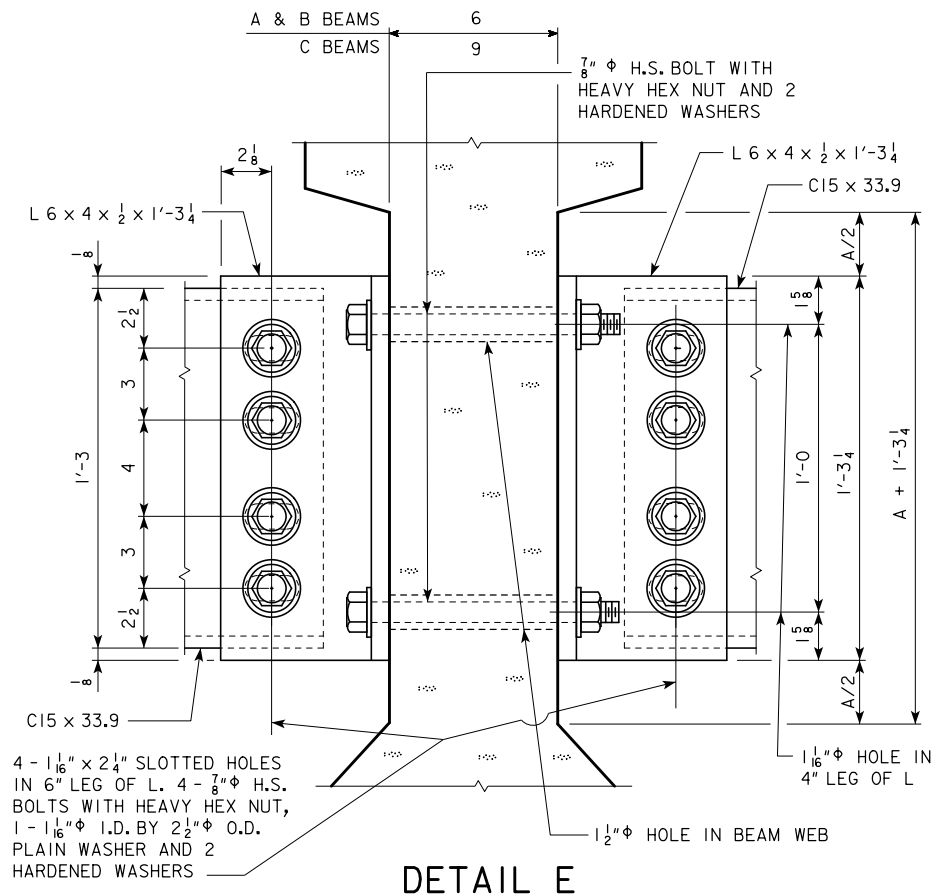
ALL COSTS FOR FURNISHING AND INSTALLING STEEL INTERMEDIATE DIAPHRAGMS SHALL BE INCLUDED IN THE PRICE BID FOR STRUCTURAL STEEL.

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.

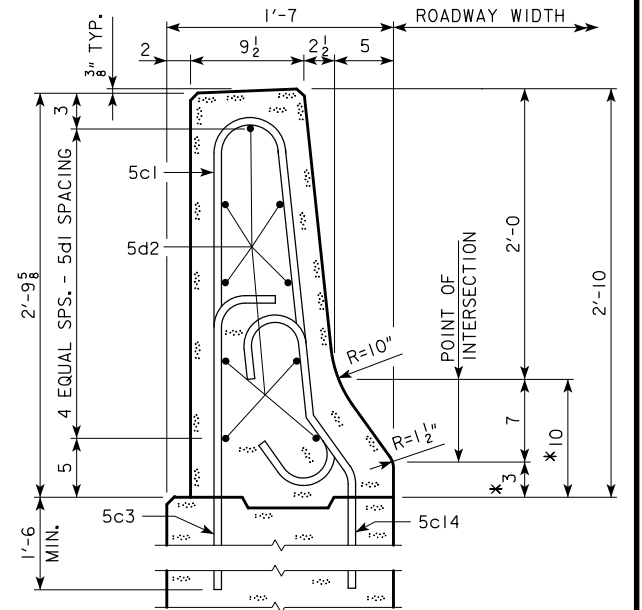
ALL BOLTS ARE TO BE TIGHTENED PRIOR TO PLACING BRIDGE FLOOR CONCRETE.

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



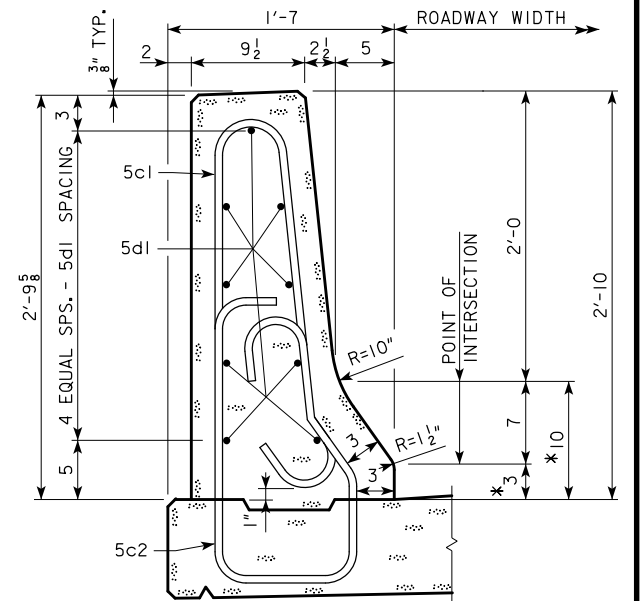
DETAIL E

07-10 LATEST REVISION DATE	<i>Harvey L. McDaniel</i> APPROVED BY BRIDGE ENGINEER	IOWA DOT Highway Division	
		STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES	
		PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES	
		DECEMBER, 2006	
		INTERMEDIATE STEEL DIAPHRAGMS	H30-38-06

[illegible]

* DENOTES THE MAXIMUM VALUE
FOR THIS DIMENSION. THIS
DIMENSION MAY VARY DUE TO
CONSTRUCTION INACCURACIES.

TABLE OF BARRIER RAIL DIMENSIONS AND NUMBERS																							
℄-℄ ABUT. BRG		188'-10				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°	0°	15°	30°	45°	SKEW	
DIMENSION OR NUMBER	L (FT.-IN.)	205'-10	205'-11 $\frac{1}{4}$	206'-3 $\frac{5}{8}$	207'-0 $\frac{7}{8}$	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.)	
	B (FT.-IN.)	191'-10	191'-11 $\frac{1}{4}$	192'-3 $\frac{5}{8}$	193'-0 $\frac{7}{8}$	214'-4	214'-4	214'-4	214'-4	226'-10	226'-10	226'-10	226'-10	239'-4	239'-4	239'-4	239'-4	256'-0	256'-0	256'-0	256'-0	B (FT.-IN.)	
	S (FT.-IN.)	191'-10	191'-11 $\frac{1}{4}$	192'-3 $\frac{5}{8}$	193'-0 $\frac{7}{8}$	204'-4	204'-5 $\frac{1}{4}$	204'-9 $\frac{5}{8}$	205'-6 $\frac{7}{8}$	216'-10	216'-11 $\frac{1}{4}$	217'-3 $\frac{5}{8}$	218'-0 $\frac{7}{8}$	229'-4	229'-5 $\frac{1}{4}$	229'-9 $\frac{5}{8}$	230'-6 $\frac{7}{8}$	246'-0	246'-1 $\frac{1}{4}$	246'-5 $\frac{5}{8}$	247'-2 $\frac{7}{8}$	S (FT.-IN.)	
	C	183	183	183	183	195	195	195	195	208	208	208	208	220	220	220	220	237	237	237	237	C	
	D (FT.-IN.)	183'-0	183'-0	183'-0	183'-0	195'-0	195'-0	195'-0	195'-0	208'-0	208'-0	208'-0	208'-0	220'-0	220'-0	220'-0	220'-0	237'-0	237'-0	237'-0	237'-0	D (FT.-IN.)	
	E	184	184	184	184	196	196	196	196	209	209	209	209	221	221	221	221	238	238	238	238	E	
	F (FT.-IN.)	0	0	0	0	5'-0	4'-11 $\frac{3}{8}$	4'-9 $\frac{1}{4}$	4'-4 $\frac{1}{2}$	5'-0	4'-11 $\frac{3}{8}$	4'-9 $\frac{1}{4}$	4'-4 $\frac{1}{2}$	5'-0	4'-11 $\frac{3}{8}$	4'-9 $\frac{1}{4}$	4'-4 $\frac{1}{2}$	5'-0	4'-11 $\frac{3}{8}$	4'-9 $\frac{1}{4}$	4'-4 $\frac{1}{2}$	F (FT.-IN.)	
W (FT.-IN.)	3'-11	3'-11 $\frac{5}{8}$	4'-1 $\frac{3}{4}$	4'-6 $\frac{1}{2}$	4'-2	4'-2 $\frac{5}{8}$	4'-4 $\frac{3}{4}$	4'-9 $\frac{1}{2}$	3'-11	3'-11 $\frac{5}{8}$	4'-1 $\frac{3}{4}$	4'-6 $\frac{1}{2}$	4'-2	4'-2 $\frac{5}{8}$	4'-4 $\frac{3}{4}$	4'-9 $\frac{1}{2}$	4'-0	4'-0 $\frac{5}{8}$	4'-2 $\frac{3}{4}$	4'-7 $\frac{1}{2}$	W (FT.-IN.)		
a	0	0	0	0	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	a		

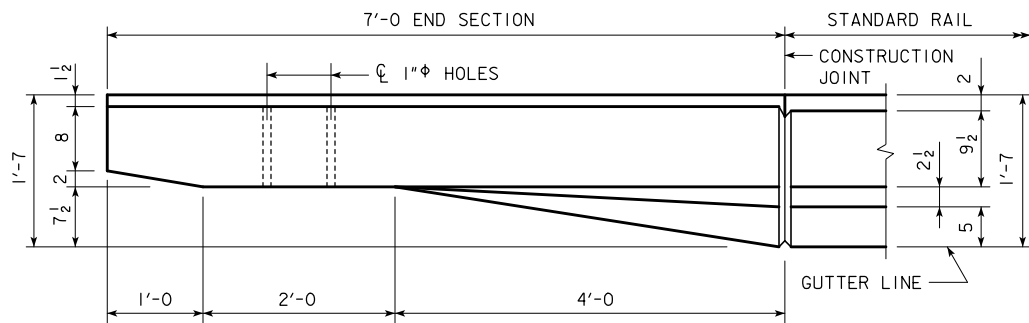


** APPLIES TO 201'-4, 213'-10, 226'-4 & 243'-0 BRIDGES ONLY.

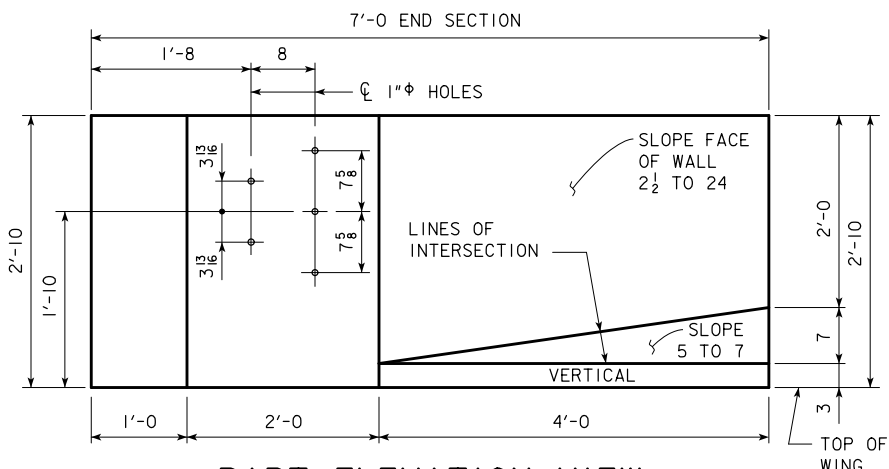
CONCRETE BARRIER RAILS PLACED USING THE SLIPFORM METHOD WILL REQUIRE THE USE OF A CLASS BR CONCRETE IN ACCORDANCE WITH ARTICLE 2513.03B OF THE STANDARD SPECIFICATION. CAST-IN-PLACE BARRIER RAILS SHALL USE CLASS C MIX. CLASS D CONCRETE IS NOT PERMITTED FOR CONCRETE BARRIER RAILS (CAST-IN-PLACE OR SLIPFORMED METHOD).

H30-39-06

REVISED 07-10 - THE END SECTION STEEL WAS CHANGED TO AGREE WITH THE OFFICE STANDARD.

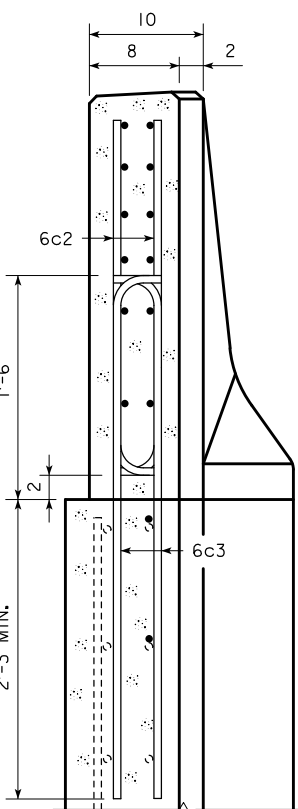


PART PLAN VIEW

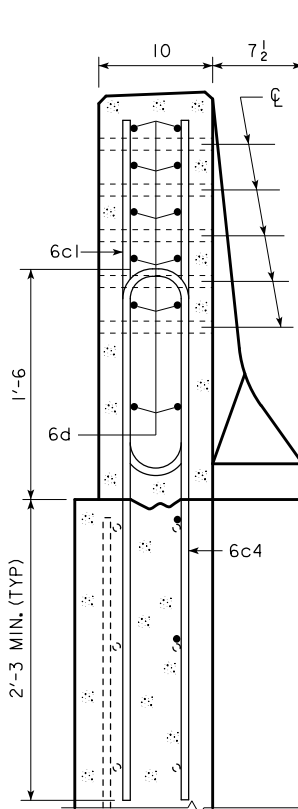


PART ELEVATION VIEW

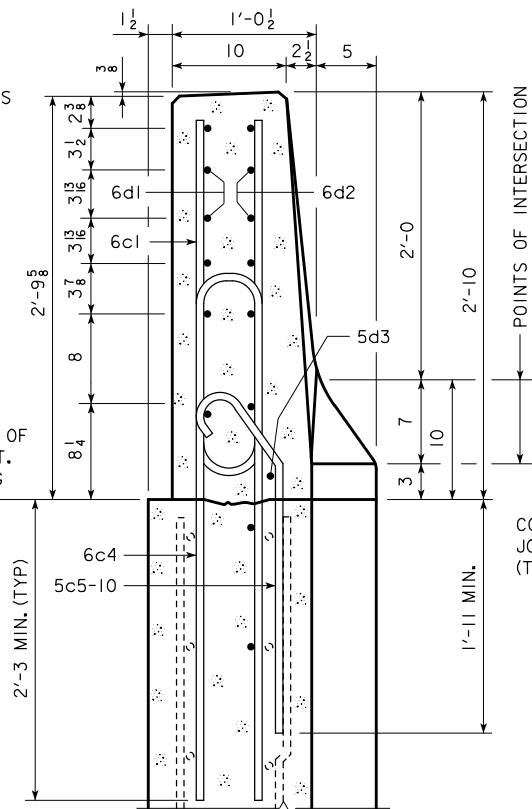
PROVIDE 5 HOLES FORMED WITH 1" ϕ PLASTIC CONDUIT. COST TO BE INCLUDED IN PRICE BID FOR CONCRETE BARRIER RAILING.



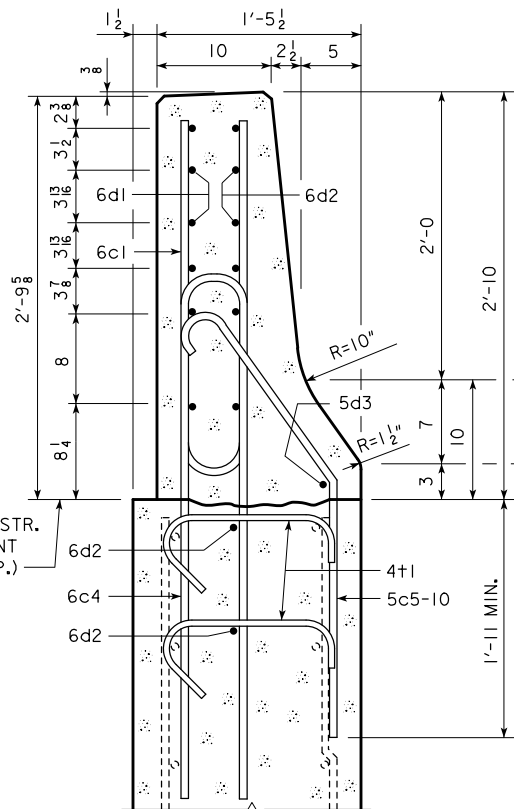
VIEW A-A



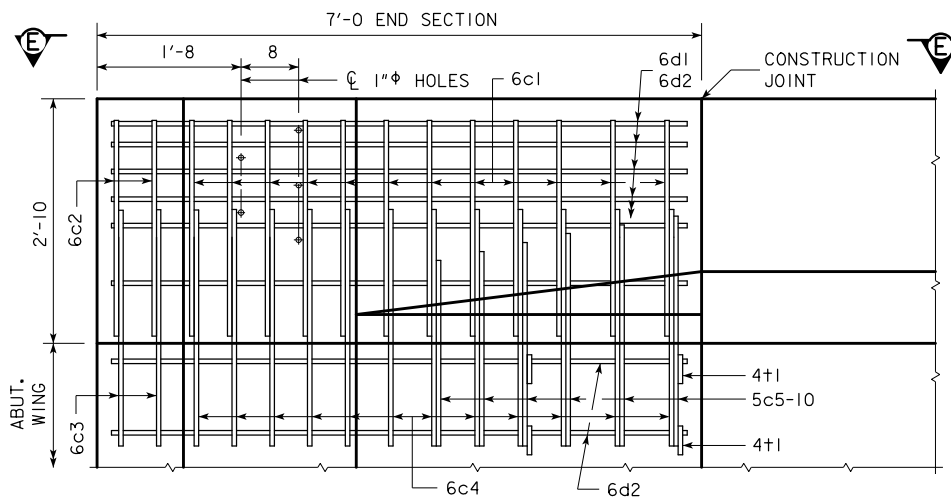
SECTION B-B



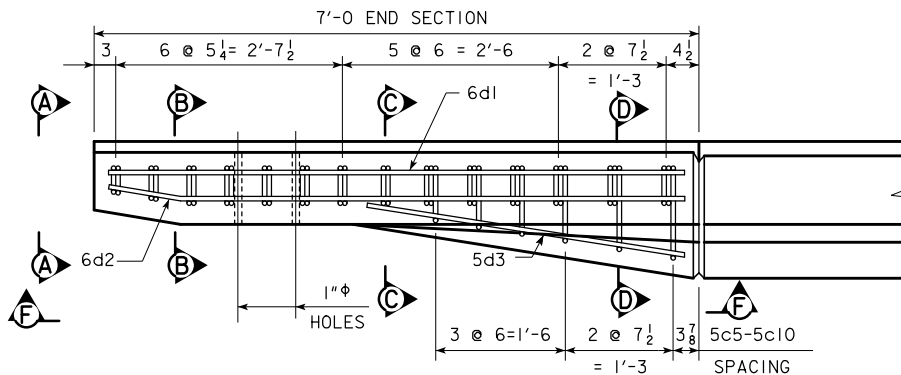
SECTION C-C



SECTION D-D



PART VIEW E-E



PART VIEW E-E

PART VIEW F-F

NOTE:
4+1 PLACEMENT- 2 BARS EACH
LEVEL OF 6d2 IN WING FOOTING.

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

NOTE:
THE 10" RADIUS AND 1 1/2" RADIUS
ARE TYPICAL AND SHALL BE
USED WHEN CONSTRUCTING THE
CORNERS FOR VIEW A-A,
SECTION B-B, SECTION C-C AND
SECTION D-D.

NOTE:
THE 6c4, 6c3, 5c5-10, 2 - 6d2 AND
4+1 BARS ARE TO BE PLACED
WITH THE ABUTMENT WING. THE
DETAILS FOR PLACEMENT ARE
SHOWN ON THE WING ABUTMENT
SHEET.

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

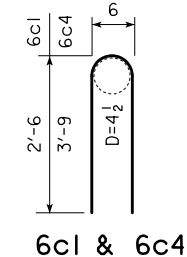
EPOXY REINFORCING STEEL - ONE END SECTION

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6c1	VERTICAL		12	5'-6	99
6c2	VERTICAL		4	2'-10	17
6c3	VERTICAL		4	4'-1	25
6c4	VERTICAL		12	8'-0	144
5c5-10	VERTICAL		6	VARIES	23
6d1	HORIZONTAL		6	6'-8	60
6d2	HORIZONTAL		8	6'-9	81
5d3	HORIZONTAL		1	3'-9	4
4+1	ABUTMENT WING TIE BARS		4	VARIES	5
(INCLUDE WITH BARRIER RAIL REINFORCING)					TOTAL WEIGHT (LBS.)
					458

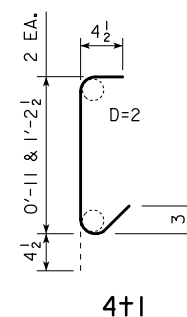
CONCRETE PLACEMENT SUMMARY

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

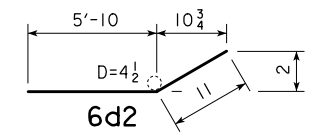
BENT BAR DETAILS



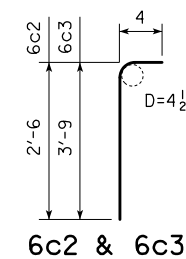
6c1 & 6c4



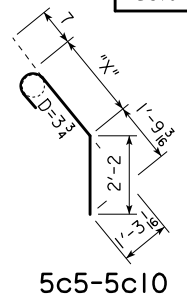
4+1



6d2



6c2 & 6c3



5c5-5c10

BAR	"X"
5c5	0'-6 1/2
5c6	0'-8 1/2
5c7	0'-10 1/4
5c8	1'-0 1/4
5c9	1'-2
5c10	1'-4

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

LATEST REVISION DATE
07-10

APPROVED BY BRIDGE ENGINEER
Harmon L. McDaniel

IOWA DOT Highway Division

STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES
**PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGES**
DECEMBER, 2006

BARRIER RAIL DETAILS
SHEET 2 OF 3

H30-40-06

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

NOTE: ALL BARRIER RAIL REINFORCEMENT TO BE EPOXY COATED IF EPOXY COATING OPTION IS USED. SEE SHEET H30-01-06.

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

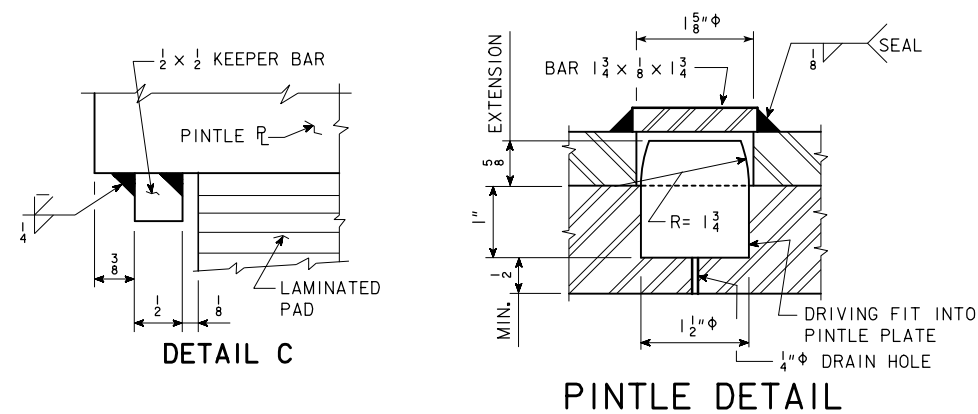
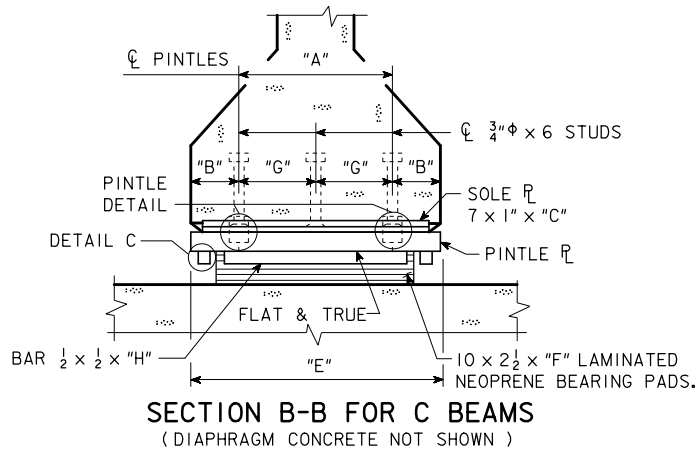
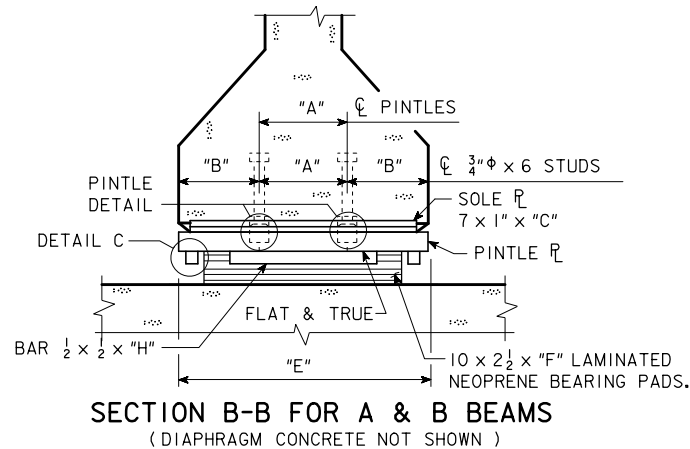
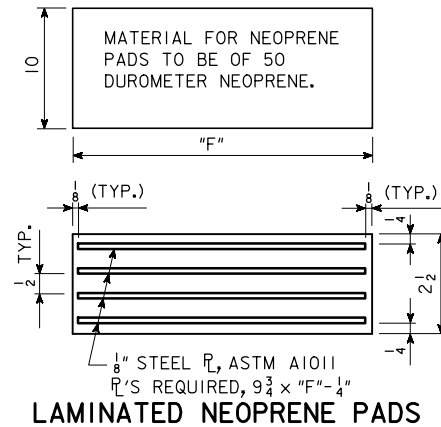
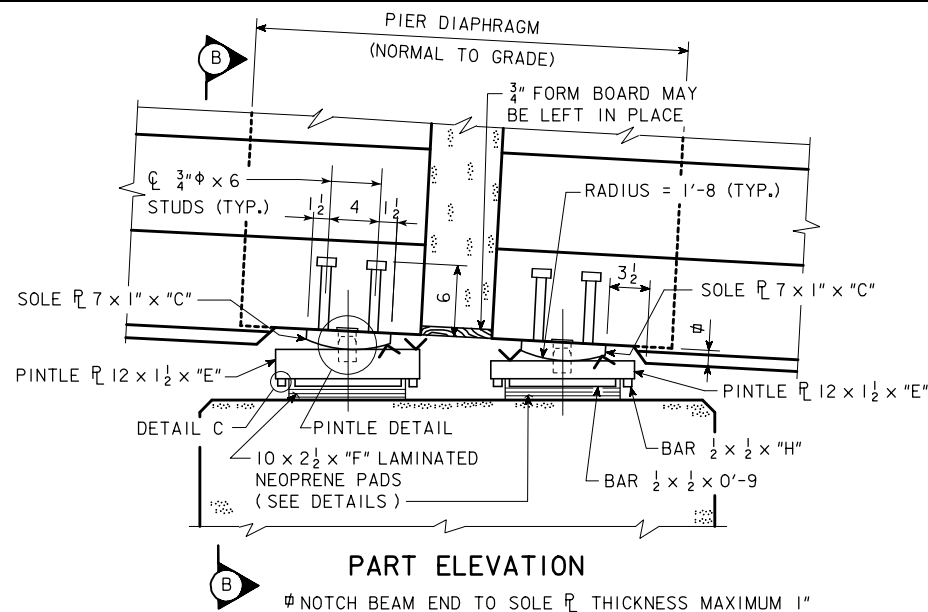
[illegible]

* SEE SHEET H30-39-06 FOR DIMENSION "B". CONCRETE QUANTITIES SHOWN ARE BASED ON 45° SKEW BID LENGTHS.

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

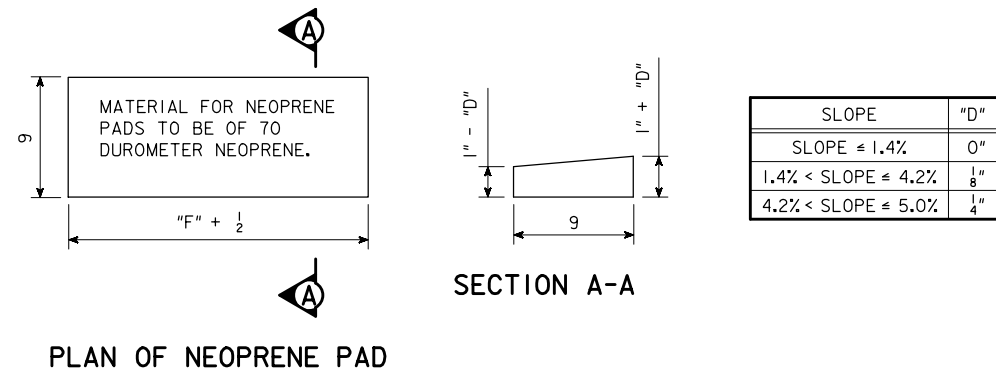
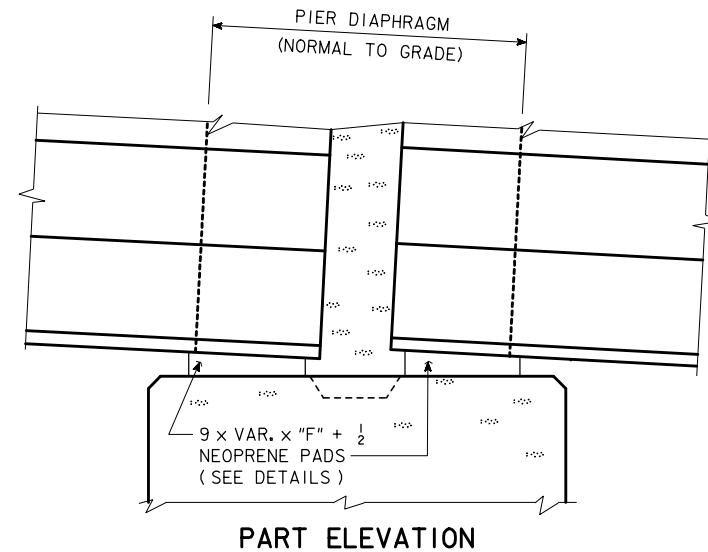
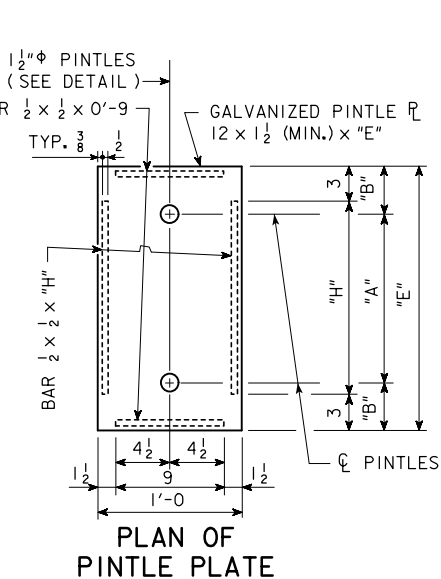
REVISED 07-10 - THE REINFORCING STEEL WAS CHANGED TO AGREE WITH H30-40-06.

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



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



SLOPE CALCULATION FORMULA

$$\text{SLOPE}_{\text{SPAN 1}} = 100\% \times \frac{\text{P/G ELEV. @ NEAR ABUT.} - \text{P/G ELEV. @ PIER 1}}{\text{SPAN 1 LENGTH}}$$
$$\text{SLOPE}_{\text{SPAN 2}} = 100\% \times \frac{\text{P/G ELEV. @ PIER 1} - \text{P/G ELEV. @ PIER 2}}{\text{SPAN 2 LENGTH}}$$
$$\text{SLOPE}_{\text{SPAN 3}} = 100\% \times \frac{\text{P/G ELEV. @ PIER 2} - \text{P/G ELEV. @ FAR ABUT.}}{\text{SPAN 3 LENGTH}}$$

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 1'-5"	C BEAMS 1'-8"
"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

Harmon L. McQuinn
APPROVED BY BRIDGE ENGINEER

IOWADOT Highway Division

STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES

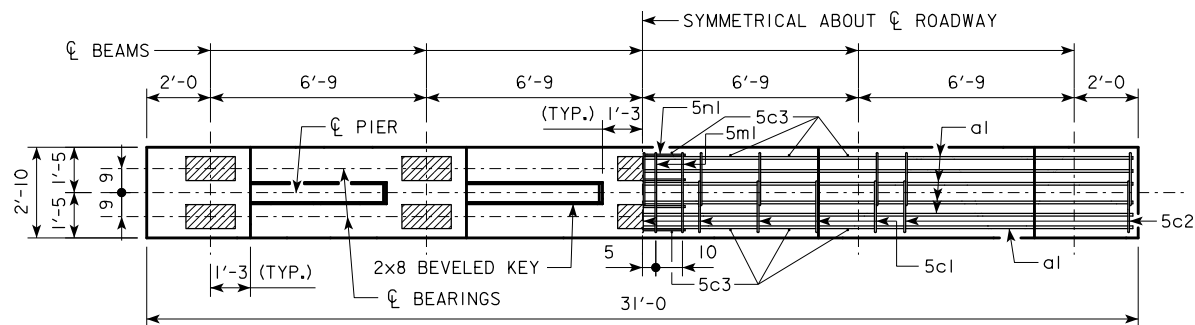
**PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGES**

DECEMBER, 2006

PIER BEARING DETAILS

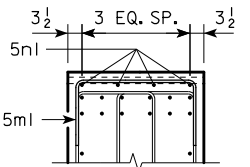
H30-44-06

REVISED 07-10 - SHEET WAS REVISED TO MEET LRFD SPECIFICATIONS.



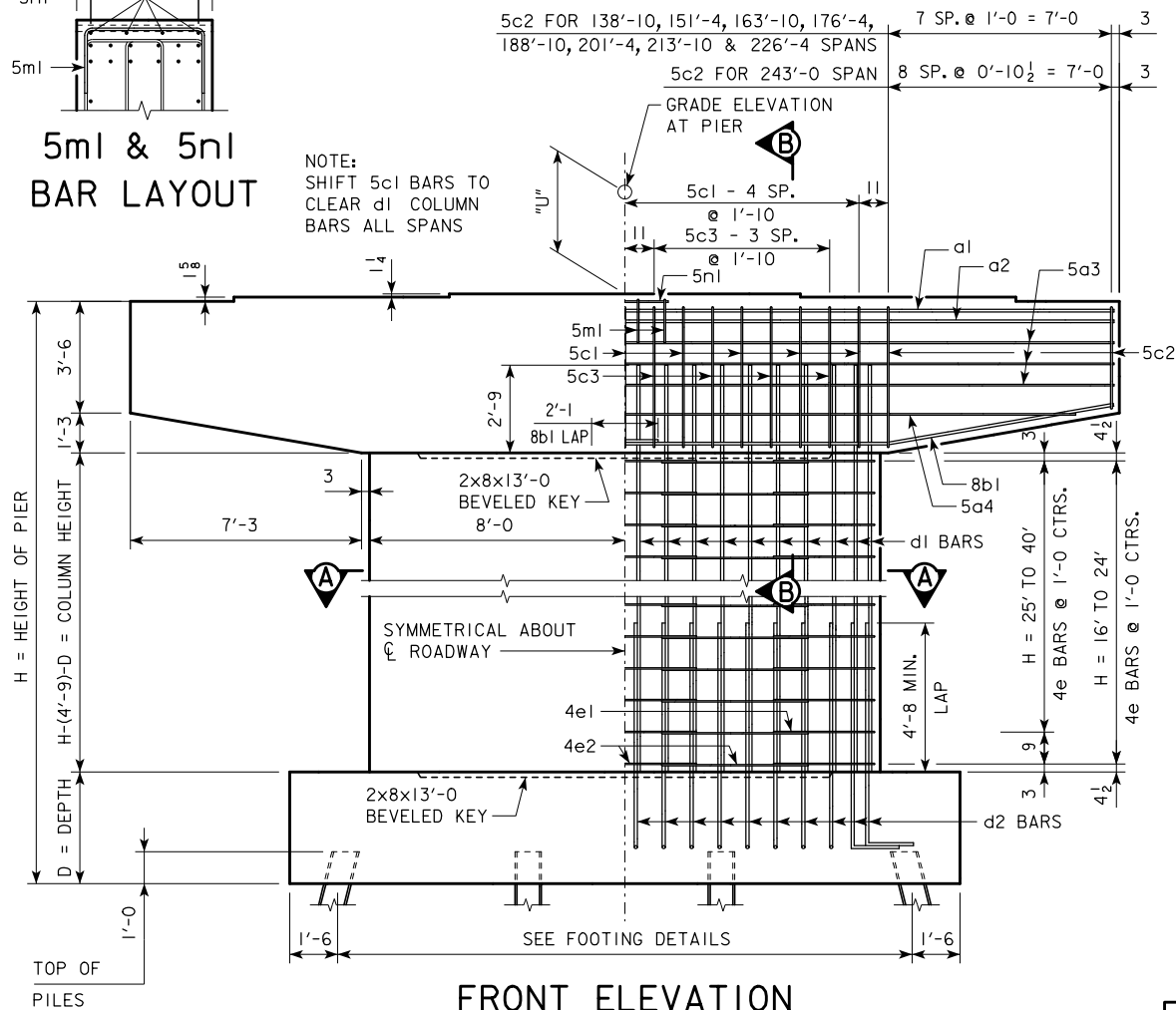
CAP PLAN

NOTE:
FOR SIZE OF BEARING PADS SEE H30-44-06.

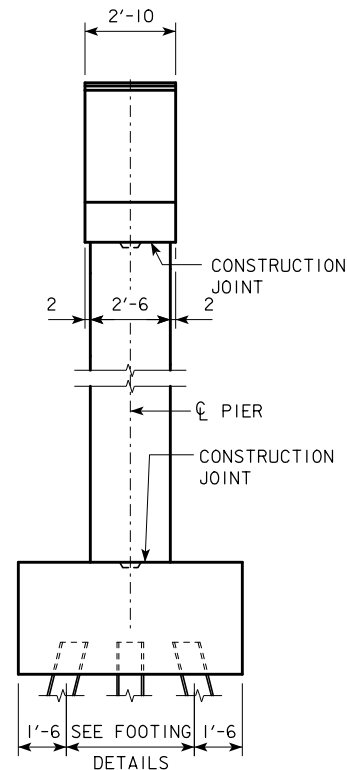


5m1 & 5n1
BAR LAYOUT

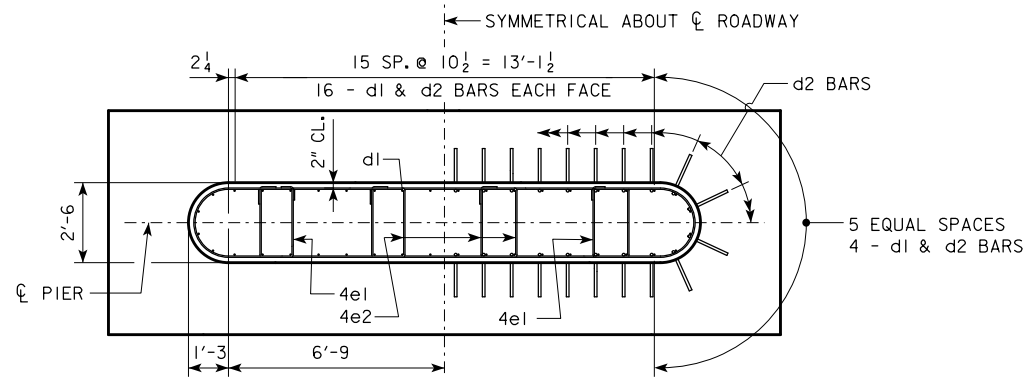
NOTE:
SHIFT 5c1 BARS TO
CLEAR d1 COLUMN
BARS ALL SPANS



FRONT ELEVATION



END ELEVATION



SECTION A-A

PIER NOTES:

SEE "TEE PIER NOTES" ON H30-02-06 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.

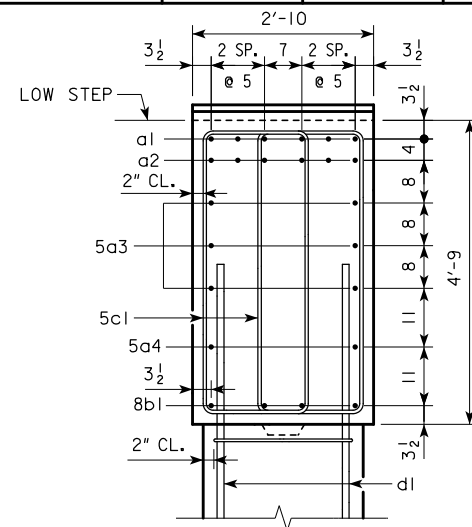
ELIMINATE 2x8 BEVELED KEYWAY ON TOP OF CAP FOR EXPANSION PIERS.

SEE SHEET H30-09-06 FOR "U" DIMENSION.

CAP

REINFORCING STEEL	CAP			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	30'-8		6	7	376	6	7	376	6	7	376	6	8	491	6	8	491	6	8	491	6	8	491	6	8	491	6	8	491
a2	30'-8			6	7	376	6	7	376	6	7	376	6	7	376	6	7	376	6	8	491	6	8	491	6	8	491	6	8	491
5a3	30'-8			6	5	192	6	5	192	6	5	192	6	5	192	6	5	192	6	5	192	6	5	192	6	5	192	6	5	192
5a4	28'-3			2	5	59	2	5	59	2	5	59	2	5	59	2	5	59	2	5	59	2	5	59	2	5	59	2	5	59
8b1	16'-6			8	8	352	8	8	352	8	8	352	8	8	352	8	8	352	8	8	352	8	8	352	8	8	352	8	8	352
5c1	13'-2			18	5	247	18	5	247	18	5	247	18	5	247	18	5	247	18	5	247	18	5	247	18	5	247	18	5	247
5c2	VARIES			32	5	399	32	5	399	32	5	399	32	5	399	32	5	399	32	5	399	32	5	399	32	5	399	36	5	449
5c3	4'-11			16	5	82	16	5	82	16	5	82	16	5	82	16	5	82	16	5	82	16	5	82	16	5	82	16	5	82
5m1	5'-4			4	5	22	4	5	22	4	5	22	4	5	22	4	5	22	4	5	22	4	5	22	4	5	22	4	5	22
5n1	2'-8			4	5	11	4	5	11	4	5	11	4	5	11	4	5	11	4	5	11	4	5	11	4	5	11	4	5	11
TOTAL (LB.)				2116			2116			2116			2231			2231			2346			2346			2481			2531		
STRUCTURAL CONCRETE (CY)				15.0			15.0			15.0			15.0			15.0			15.0			15.0			15.0			15.0		

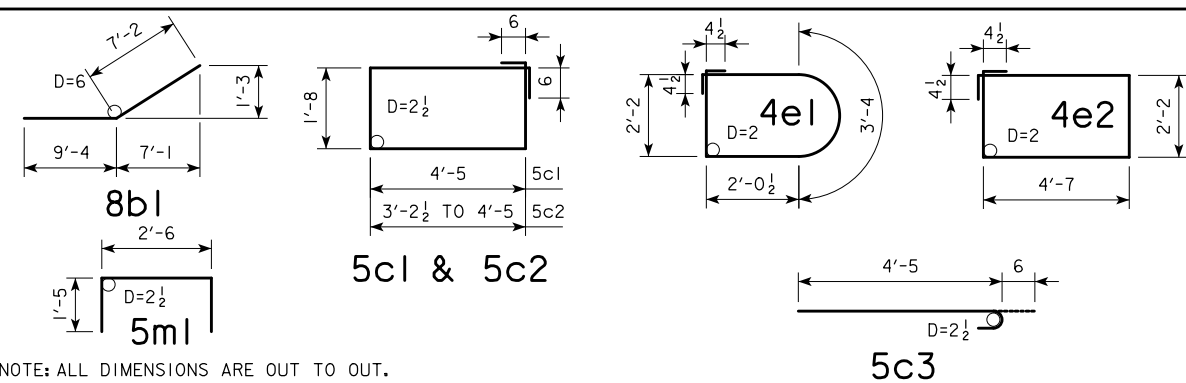
COLUMN



SECTION B-B

H IN FEET	COLUMN HEIGHT	STRUCTURAL CONCRETE (CY)	REINFORCING STEEL												TOTAL WEIGHT (LB.)
			d1 BAR				4e1 BAR				4e2 BAR				
			NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	
16	7'-9	11.1	40	9	10'-6	1428	16	4	10'-4	110	24	4	14'-3	228	1766
17	8'-9	12.5	40	9	11'-6	1564	18	4	10'-4	124	27	4	14'-3	257	1945
18	9'-9	14.0	40	9	12'-6	1700	20	4	10'-4	138	30	4	14'-3	286	2124
19	10'-9	15.4	40	9	13'-6	1836	22	4	10'-4	152	33	4	14'-3	314	2302
20	11'-9	16.8	40	9	14'-6	1972	24	4	10'-4	166	36	4	14'-3	343	2481
21	12'-9	18.3	40	9	15'-6	2108	26	4	10'-4	179	39	4	14'-3	371	2658
22	13'-9	19.7	40	9	16'-6	2244	28	4	10'-4	193	42	4	14'-3	400	2837
23	14'-9	21.1	40	9	17'-6	2380	30	4	10'-4	207	45	4	14'-3	428	3015
24	15'-9	22.6	40	9	18'-6	2516	32	4	10'-4	221	48	4	14'-3	457	3194
25	16'-3	23.3	40	9	19'-0	2584	34	4	10'-4	235	51	4	14'-3	485	3304
26	17'-3	24.7	40	9	20'-0	2720	36	4	10'-4	248	54	4	14'-3	514	3482
27	18'-3	26.1	40	9	21'-0	2856	38	4	10'-4	262	57	4	14'-3	543	3661
28	19'-3	27.6	40	9	22'-0	2992	40	4	10'-4	276	60	4	14'-3	571	3839
29	20'-3	29.0	40	9	23'-0	3128	42	4	10'-4	290	63	4	14'-3	600	4018
30	21'-3	30.4	40	9	24'-0	3264	44	4	10'-4	304	66	4	14'-3	628	4196
31	22'-3	31.9	40	9	25'-0	3400	46	4	10'-4	318	69	4	14'-3	657	4375
32	23'-3	33.3	40	9	26'-0	3536	48	4	10'-4	331	72	4	14'-3	685	4552
33	24'-3	34.7	40	9	27'-0	3672	50	4	10'-4	345	75	4	14'-3	714	4731
34	25'-3	36.2	40	9	28'-0	3808	52	4	10'-4	359	78	4	14'-3	742	4909
35	26'-3	37.6	40	9	29'-0	3944	54	4	10'-4	373	81	4	14'-3	771	5088
36	27'-3	39.0	40	9	30'-0	4080	56	4	10'-4	387	84	4	14'-3	800	5267
37	28'-3	40.4	40	9	31'-0	4216	58	4	10'-4	400	87	4	14'-3	828	5444
38	29'-3	41.9	40	9	32'-0	4352	60	4	10'-4	414	90	4	14'-3	857	5623
39	30'-3	43.3	40	9	33'-0	4488	62	4	10'-4	428	93	4	14'-3	885	5801
40	31'-3	44.7	40	9	34'-0	4624	64	4	10'-4	442	96	4	14'-3	914	5980

BENT BAR DETAILS



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



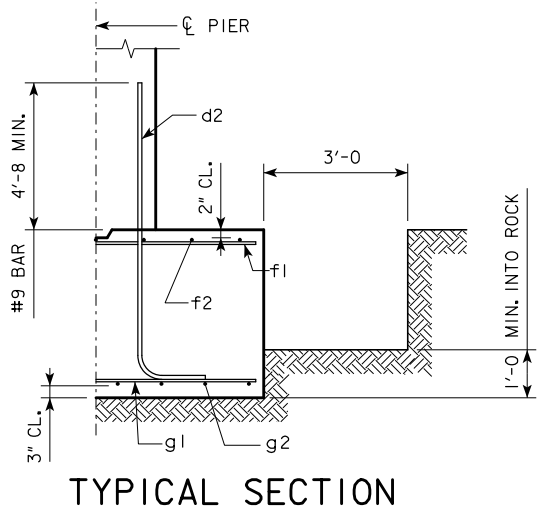
STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES
**PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGES**
DECEMBER, 2006

**TEE PIER
CAP AND COLUMN**
0° SKEW

H30-57-06

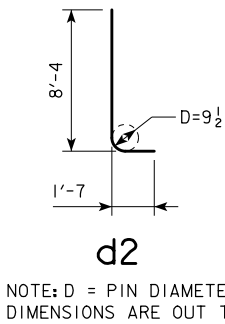
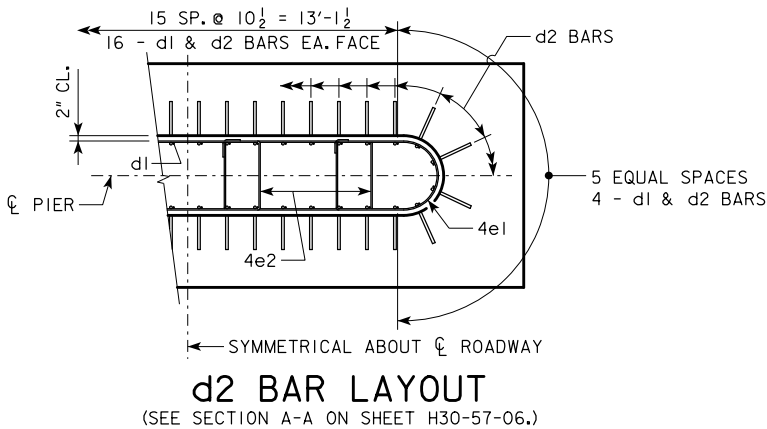
REVISED 04-13 - FOOTING NOTES MODIFIED.

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



TYPICAL SECTION

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	40 - #9 AS SHOWN	9'-11	1349	2471	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 - #8 @ 1'-0	22'-8	484		
4' x 8' x 25'	d2	40 - #9 AS SHOWN	9'-11	1349	2882	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 - #9 @ 0'-10	24'-8	839		
4' x 9' x 25'	d2	40 - #9 AS SHOWN	9'-11	1349	3041	33.3
	f1	25 - #5 @ 1'-0	8'-8	226		
	f2	9 - #5 @ 1'-0	24'-8	232		
	g1	29 - #6 @ 0'-10½	8'-8	378		
	g2	13 - #8 @ 0'-8½	24'-8	856		
4' x 9' x 27'	d2	40 - #9 AS SHOWN	9'-11	1349	3607	36.0
	f1	27 - #5 @ 1'-0	8'-8	244		
	f2	9 - #5 @ 1'-0	26'-8	250		
	g1	31 - #6 @ 0'-10½	8'-8	404		
	g2	15 - #9 @ 0'-7	26'-8	1360		

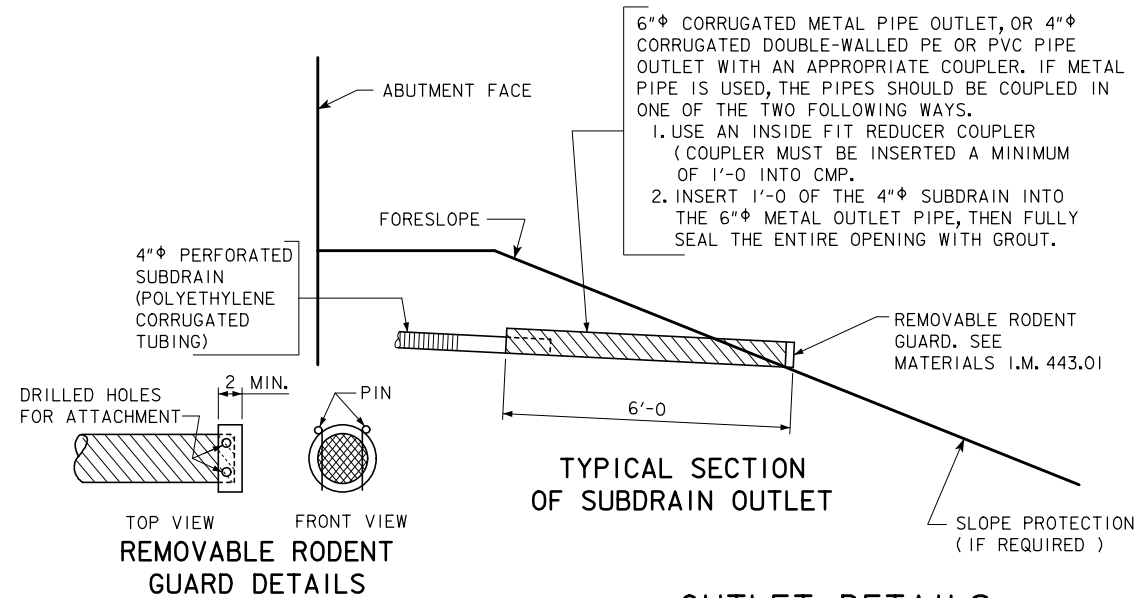


FOOTING NOTES:

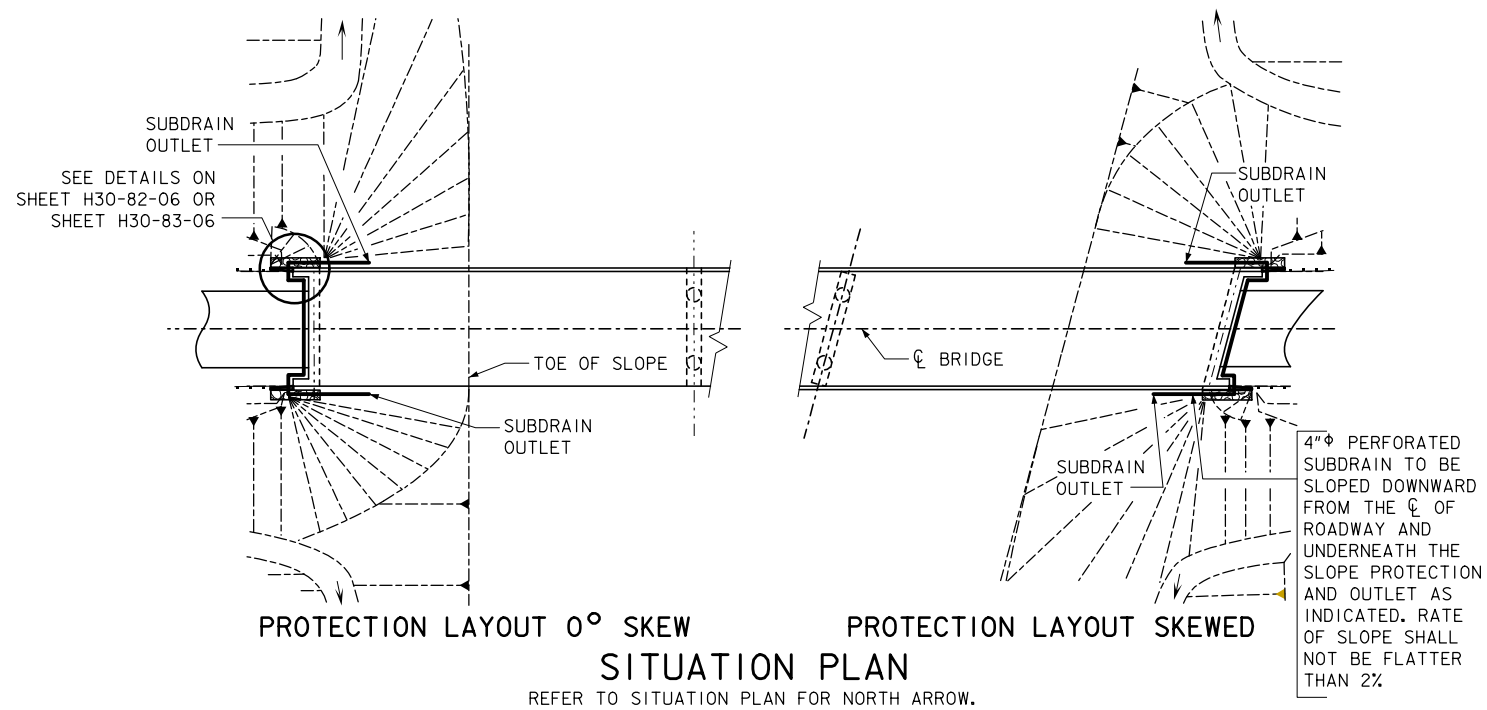
THESE SPREAD FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H30-57-06.

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 SERVICE LOAD BEARING VALUE OF AT LEAST 10 KIPS PER SQUARE FOOT).

04-13 LATEST REVISION DATE	<i>Harmon L. McQuinn</i> APPROVED BY BRIDGE ENGINEER		
		STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES DECEMBER, 2006	
		TEE PIER - SPREAD FOOTINGS 0° SKEW - H=25' to 40'	H30-63-06



OUTLET DETAILS

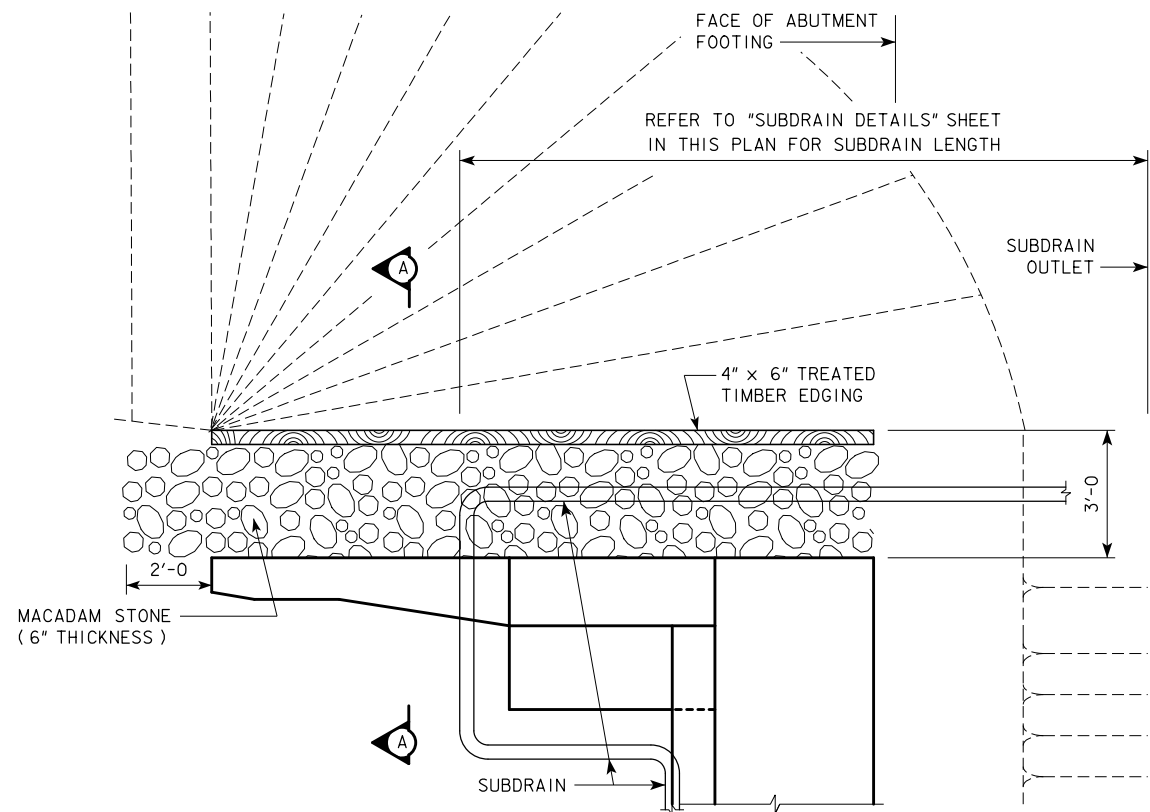


NOTE:
SEE ABUTMENT BACKFILL DETAILS SHEET FOR DETAILS NOT SHOWN ON THIS SHEET WHICH ARE PERTINENT TO THIS STRUCTURE.

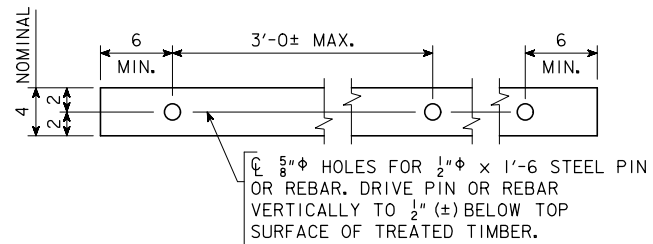
07-10 LATEST REVISION DATE	<i>Harmon L. McQuinn</i> APPROVED BY BRIDGE ENGINEER		
		STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES DECEMBER, 2006	
		SUBDRAIN DETAILS	H30-85-06

REVISED 07-10 - REMOVED THE GRANULAR BACKFILL DETAIL.

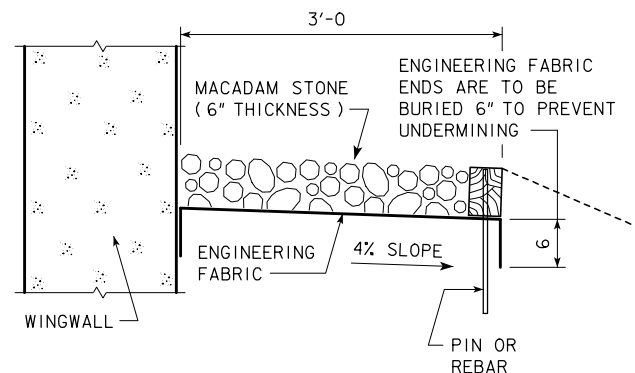
REVISED 09-14 - CHANGED THE AREA OF THE MACADAM STONE AREA TO 2'-0" IN FRONT OF THE BRIDGE WING.



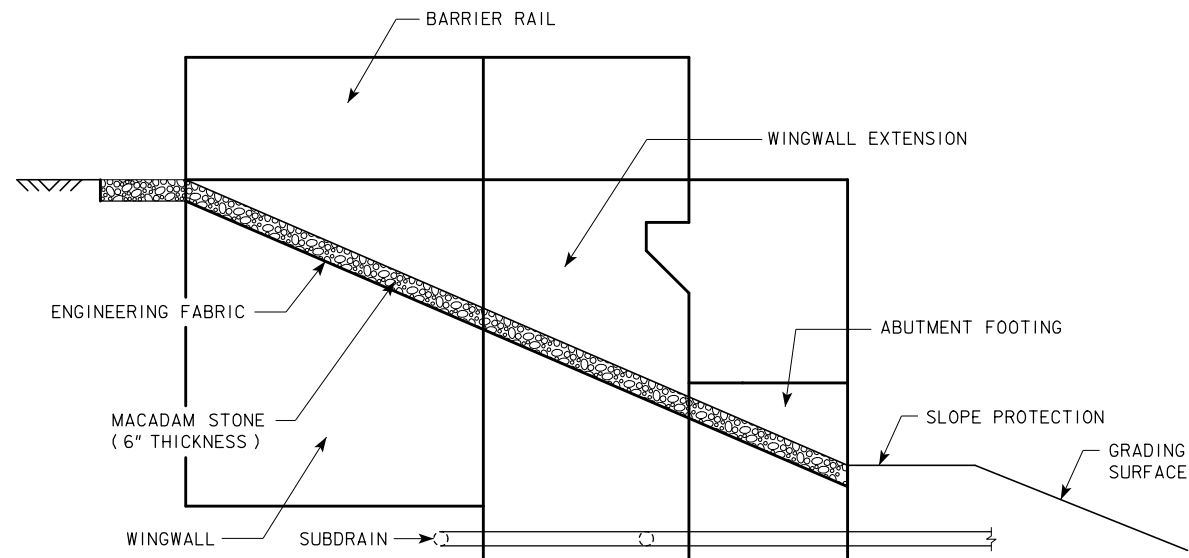
TOP VIEW OF WING ARMORING WITH WING EXTENSION



4" x 6" TREATED TIMBER EDGING DETAILS



SECTION A-A



PROFILE VIEW OF WING ARMORING WITH WING EXTENSION
(SHOWN FOR INTEGRAL ABUTMENT WITH WING EXTENSIONS)

SUBDRAIN NOTES:

SEE H30-85-06 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.

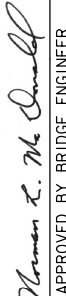
THE ENGINEERING FABRIC SHALL MEET THE REQUIREMENTS OF 4196.01 C. IF THE ENGINEERING FABRIC IS LAPPED THE LAPS SHALL BE A MINIMUM OF ONE FOOT IN LENGTH, SHINGLE FASHION WITH UP SLOPE LAP PIECE ON TOP AND STAPLED FOR CONTINUITY.

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

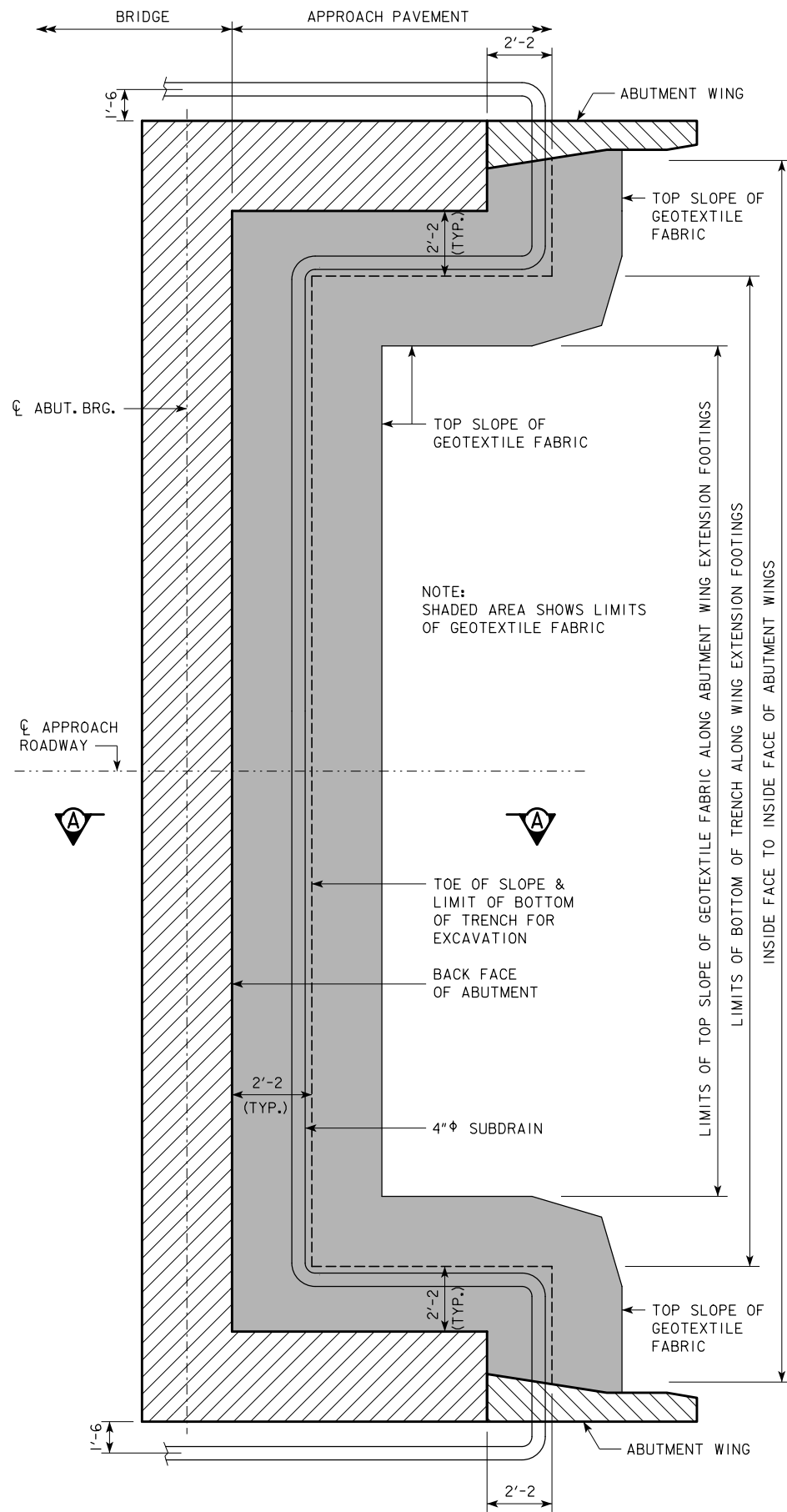
WOOD PRESERVATIVE TREATMENT FOR THE TIMBER EDGING SHALL MEET THE REQUIREMENTS FOR GUARDRAIL POSTS, SAWED FOUR SIDES, AS SPECIFIED IN 4161.

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.

09-14 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER		
		STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES DECEMBER, 2006	
		WING ARMORING DETAILS C BEAMS	H30-87-06

REVISED 09-14 - THE TECHNICAL DATA INFORMATION TABLE WAS REMOVED AND A NOTE ADDED TO REFER TO THE STANDARDS SPECIFICATIONS FOR THIS INFORMATION.



ABUTMENT PLAN WITH 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.

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

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

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

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

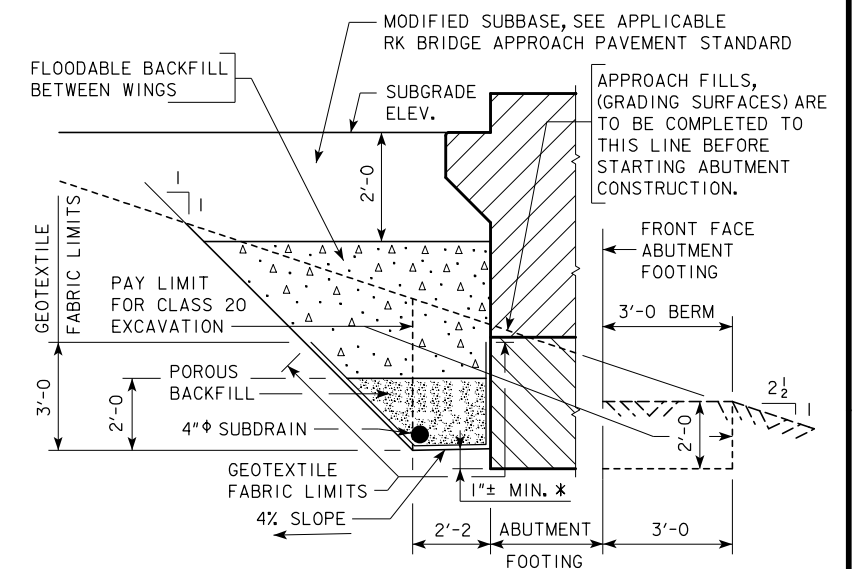
NOTE:
SEE SUBDRAIN DETAILS SHEET FOR DETAILS NOT SHOWN ON THIS SHEET WHICH ARE PERTINENT TO THIS STRUCTURE.

NOTE:

SUBDRAIN SHALL SLOPE DOWNWARD 2% FROM $\mathcal{C}$ APPROACH ROADWAY WHEN OUTLETTING BOTH SIDES OF THE ABUTMENT.

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

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



SECTION A-A BACKFILL DETAILS

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

* DIMENSION VARIES DUE TO 2% SUBDRAIN SLOPE.

09-14 LATEST REVISION DATE	<i>Harmon L. McDaniel</i> APPROVED BY BRIDGE ENGINEER		
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		ABUTMENT BACKFILL DETAILS C BEAMS - 0° SKEW	H30-90-06