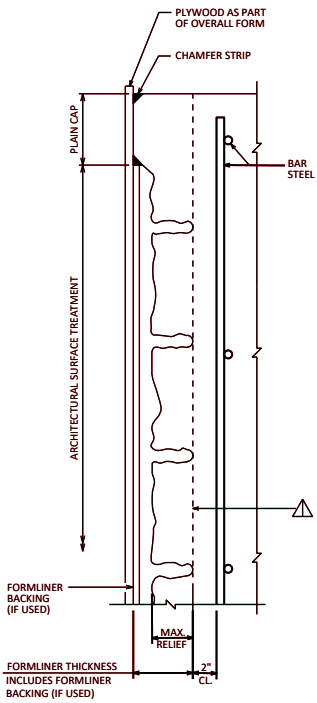
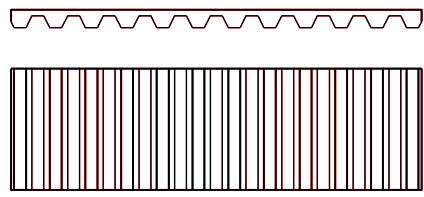


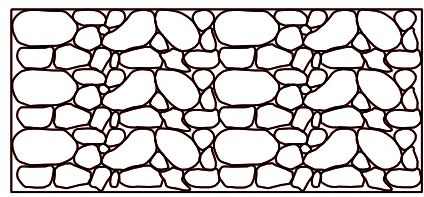


SECTION THRU FORMLINER

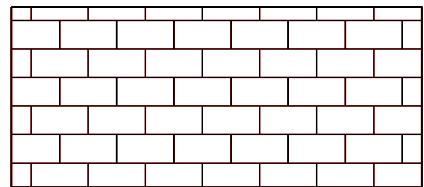
⚠ STRUCTURAL CONCRETE CAN ONLY BE ASSUMED TO TO THIS LINE. PROVIDE ADDITIONAL STRUCTURE SIZE AS NECESSARY TO MAINTAIN MINIMUM FULL STRUCTURAL CONCRETE DIMENSIONS AS INDICATED ON THE STANDARDS.



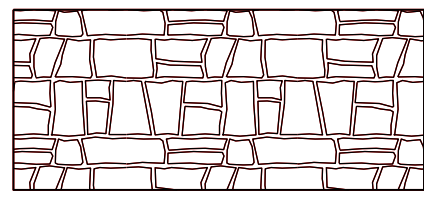
BROKEN RIB
FORMLINER THICKNESS = $3'' \pm \frac{1}{2}''$
WIDTH = $2'' \pm \frac{1}{2}''$
MAX. RELIEF = $2'' \pm \frac{1}{2}''$



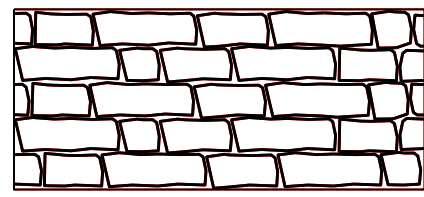
FIELD STONE - RANDOM
FORMLINER THICKNESS = $3\frac{1}{2}''$
SIZES BETWEEN 6" & 24"
MAX. RELIEF = $2\frac{1}{2}''$



RECTANGULAR BRICK
FORMLINER THICKNESS = 2"
SIZE = VARIES
MAX. RELIEF = 1"



RUSTIC ASHLAR
FORMLINER THICKNESS = 3"
SIZE = 8" TO 32"
MAX. RELIEF = 2"



RECTANGULAR CUT STONE
FORMLINER THICKNESS = 4" TO $5\frac{1}{2}''$
COURSE HEIGHT = $\pm 2''$
MAX. RELIEF = 3" TO $4\frac{1}{2}''$

WARNING
FORMLINER SHOWN ON THIS STANDARD IS A NON-PARTICIPATING AMENITY (CSD).

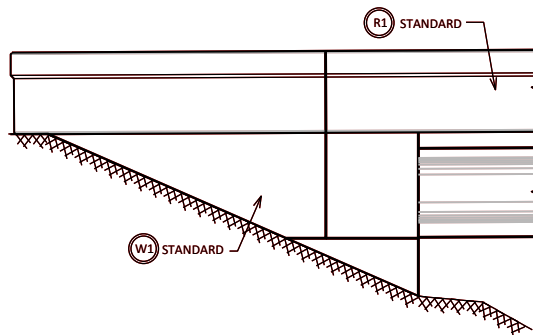
RETAINING WALL NOTES
FORMLINER COURSING ON RETAINING WALLS SHALL BE LEVEL.

ABUTMENT NOTES
FORMLINER COURSING ON ABUTMENTS AND WINGS SHALL BE LEVEL.
THE FORMLINER COURSING ON THE WINGS SHALL BE VERTICALLY ALIGNED WITH THE FORMLINER COURSING ON THE FRONT OF THE ABUTMENT.
THE FORMLINER PATTERN SHALL BE CONTINUOUS ACROSS CONSTRUCTION JOINTS.
WRAPAROUND/MATCH FORMLINER PATTERN AT CORNERS.

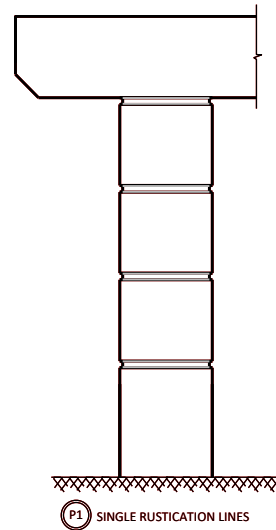
PIER NOTES
FORMLINER COURSING ON PIERS SHALL BE LEVEL.
THE FORMLINER COURSING ON ALL FACES OF EACH COLUMN SHALL BE VERTICALLY ALIGNED.
SPACE ADJACENT PORTIONS OF FORMLINER ON SLOPED FACE SO THAT COURSING IS ALIGNED VERTICALLY WITH COURSING ON VERTICAL FACE.
THE FORMLINER PATTERN SHALL BE CONTINUOUS ACROSS CONSTRUCTION JOINTS.
WRAPAROUND/MATCH FORMLINER PATTERN AT CORNERS.

PARAPET NOTES
FORMLINER COURSING ON PARAPETS SHALL BE PARALLEL TO TOP OF PARAPET.

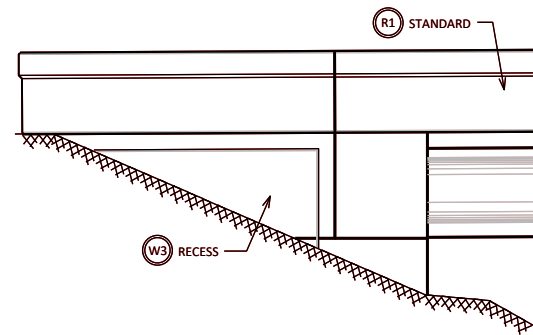
FORMLINER DETAILS	
 BUREAU OF STRUCTURES	DATE: 7-24
APPROVED: <i>Laura Shadewald</i>	



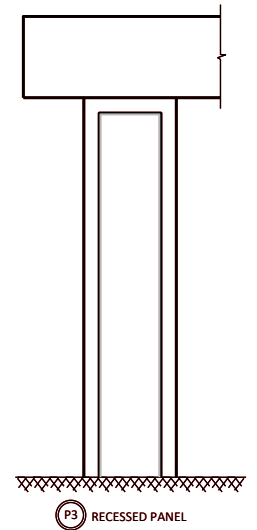
TYPE I



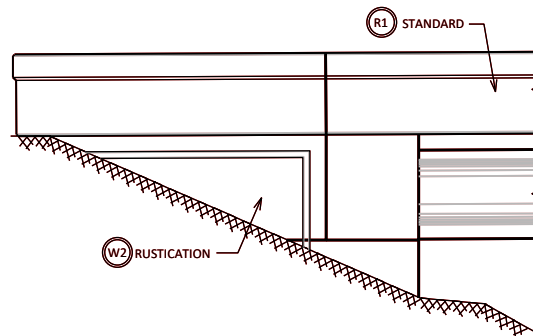
P1 SINGLE RUSTICATION LINES



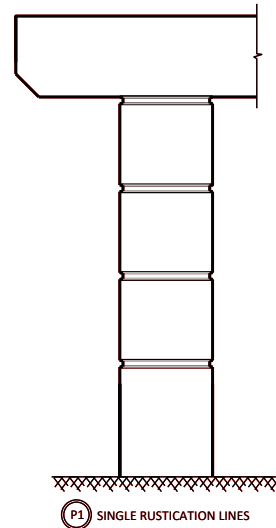
TYPE III



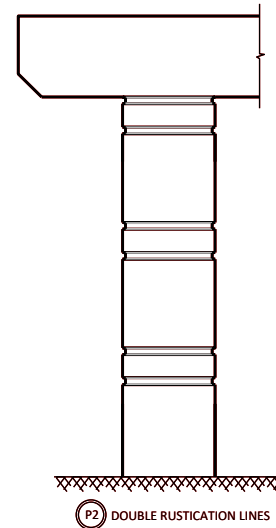
P3 RECESSED PANEL



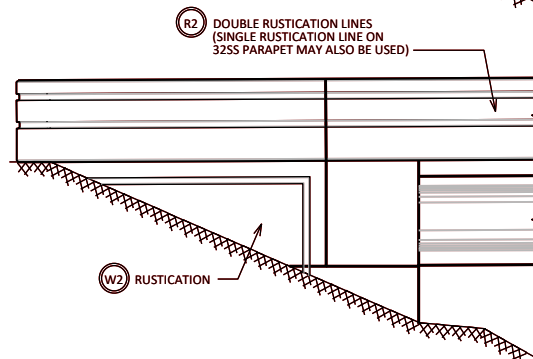
TYPE II



P1 SINGLE RUSTICATION LINES



P2 DOUBLE RUSTICATION LINES



DESIGNER NOTES

THE THREE TYPES SHOWN ARE PREFERRED AESTHETIC CONCEPTS FOR WISDOT PROJECTS. WHEN USED WITHOUT STAINING, COSTS ARE INCIDENTAL TO "CONCRETE MASONRY BRIDGES" AND NOT SUBJECT TO CSD FUNDING.

ONLY THE CHOICE OF PARAPET, WING AND PIER DETAILS SHOWN FOR A GIVEN TYPE SHOULD BE USED FOR THAT TYPE.

WINGS PARALLEL TO CENTERLINE OF ABUTMENT (ELEPHANT EAR) ARE TO BE PLAIN (TYPE I).

SEE STANDARDS 4.04 AND 4.05 FOR ADDITIONAL DETAILS.

SEE BRIDGE MANUAL SECTION 4.9 FOR LOCATION OF USE AND RENDERINGS.

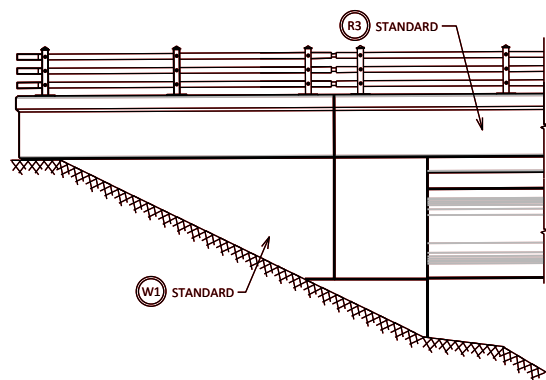
AESTHETIC CONCEPTS WITHOUT PEDESTRIAN ACCOMMODATIONS



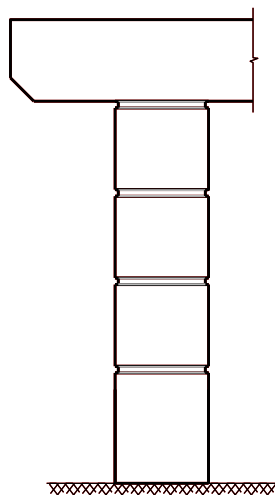
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STRUCTURES**

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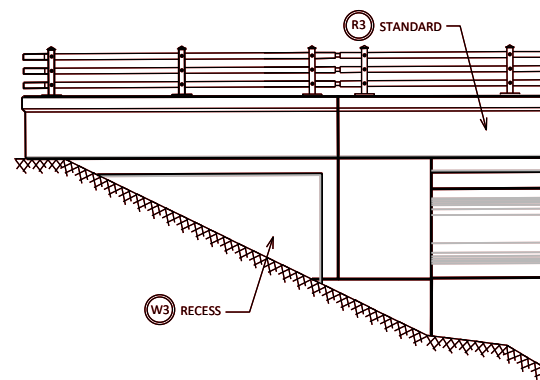
DATE:
7-24



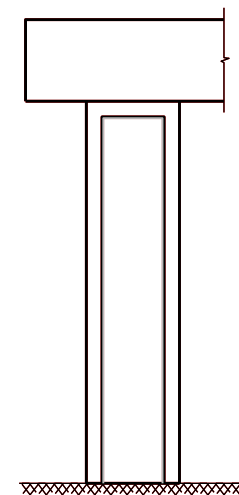
TYPE I



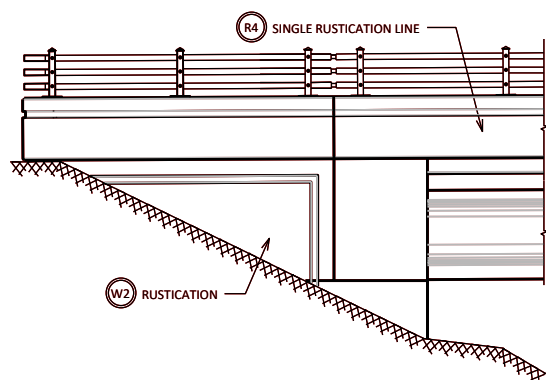
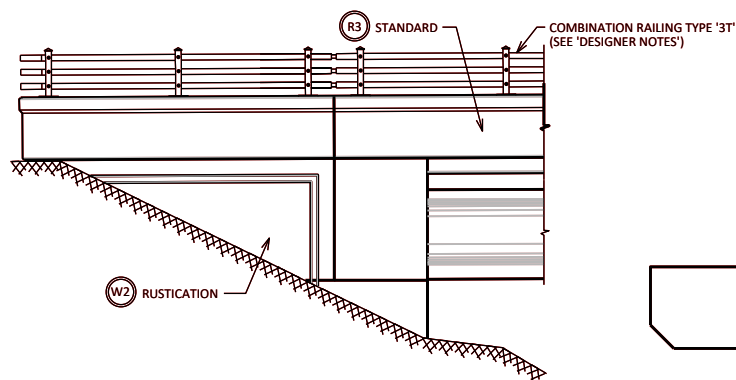
P1 SINGLE RUSTICATION LINES



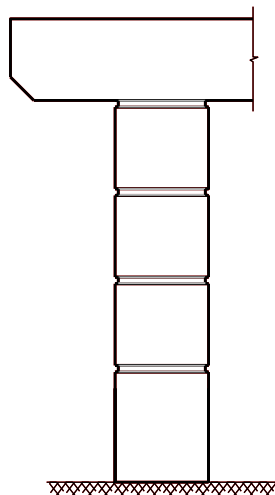
TYPE III



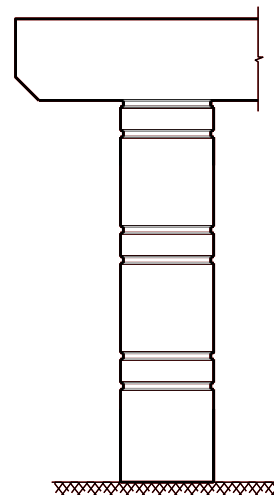
P3 RECESSED PANEL



TYPE II



P1 SINGLE RUSTICATION LINES



P2 DOUBLE RUSTICATION LINES

DESIGNER NOTES

THE THREE TYPES SHOWN ARE PREFERRED AESTHETIC CONCEPTS FOR WISDOT PROJECTS. WHEN USED WITHOUT STAINING, COSTS ARE INCIDENTAL TO "CONCRETE MASONRY BRIDGES" AND NOT SUBJECT TO CSD FUNDING.

ONLY THE CHOICE OF PARAPET, WING AND PIER DETAILS SHOWN FOR A GIVEN TYPE SHOULD BE USED FOR THAT TYPE.

WINGS PARALLEL TO CENTERLINE OF ABUTMENT (ELEPHANT EAR) ARE TO BE PLAIN (TYPE I).

IN LIEU OF THE 'COMBINATION RAILING TYPE '3T' SHOWN, CHAIN LINK FENCING MAY BE USED. SEE STANDARD 4.04 FOR DETAILS.

SEE STANDARDS 4.04 AND 4.05 FOR ADDITIONAL DETAILS.

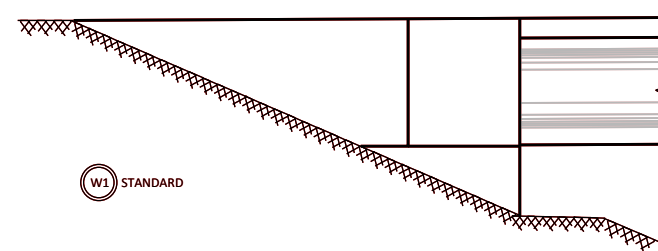
SEE BRIDGE MANUAL SECTION 4.9 FOR LOCATION OF USE AND RENDERINGS.

AESTHETIC CONCEPTS WITH PEDESTRIAN ACCOMMODATIONS

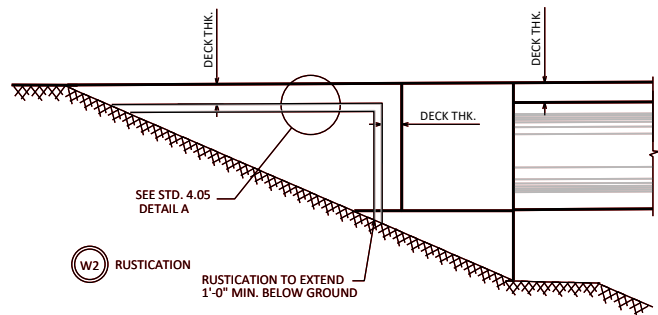


APPROVED: *Laura Shadewald*

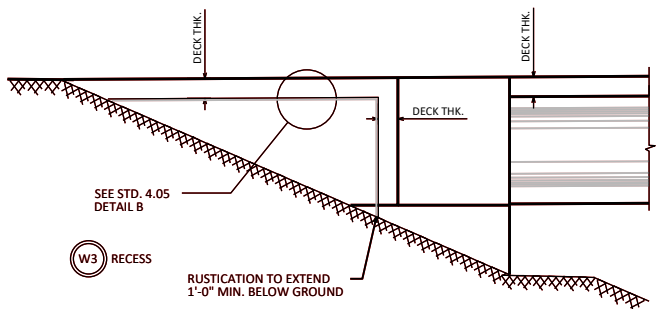
DATE:
7-24



W1 STANDARD

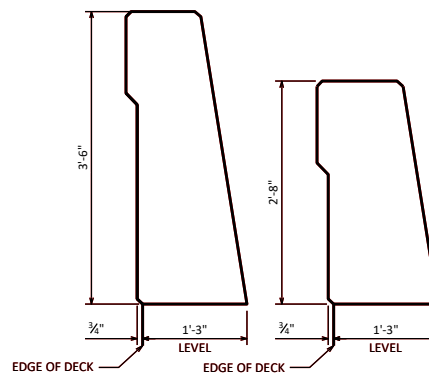


W2 RUSTICATION



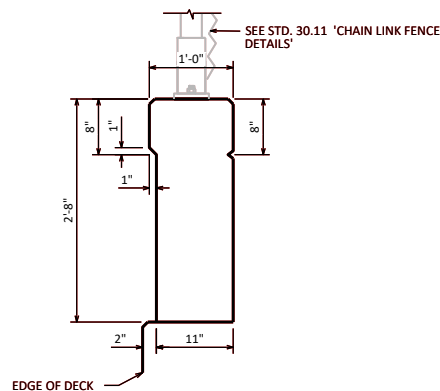
W3 RECESS

WING OPTIONS



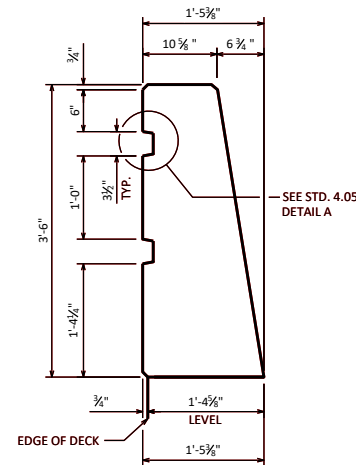
R1 STANDARD

SEE STD. 30.32 'SINGLE SLOPE PARAPET 42SS' OR STD. 30.30 'SINGLE SLOPE PARAPET 32SS' FOR DETAILS



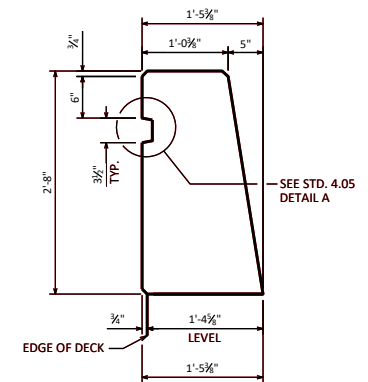
R3 STANDARD

SEE STD. 30.07 'VERTICAL FACE PARAPET 'A'' FOR DETAILS



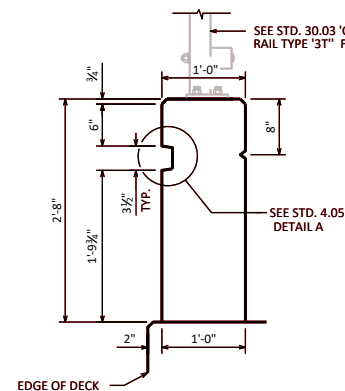
R2

DOUBLE RUSTICATION LINES MODIFIED 'SINGLE SLOPE PARAPET 42SS' (AREA = 4.01 SF, WEIGHT = 602 LB/FT.)



R2

SINGLE RUSTICATION LINES MODIFIED 'SINGLE SLOPE PARAPET 32SS' (AREA = 3.25 SF, WEIGHT = 488 LB/FT.)

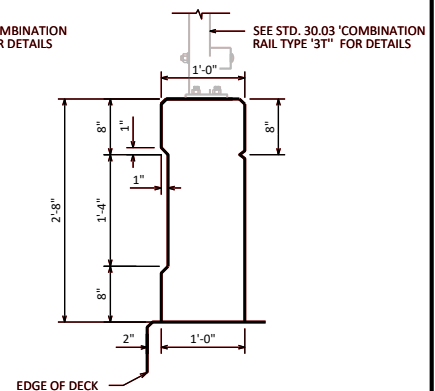


R4

SINGLE RUSTICATION LINES

MODIFIED 'VERTICAL FACE PARAPET 'A'' (AREA = 2.63 SF, WEIGHT = 395 LB/FT.)

SEE STD. 30.07 'VERTICAL FACE PARAPET 'A'' FOR DETAILS



R5

RECESSED PANEL (OR SIMILAR)

MODIFIED 'VERTICAL FACE PARAPET 'A'' (AREA = TBD, WEIGHT = TBD)

SEE STD. 30.07 'VERTICAL FACE PARAPET 'A'' FOR DETAILS

PARAPET OPTIONS

DESIGNER NOTES

WINGS PARALLEL TO CENTERLINE OF ABUTMENT (ELEPHANT EAR) ARE TO BE PLAIN (TYPE I).

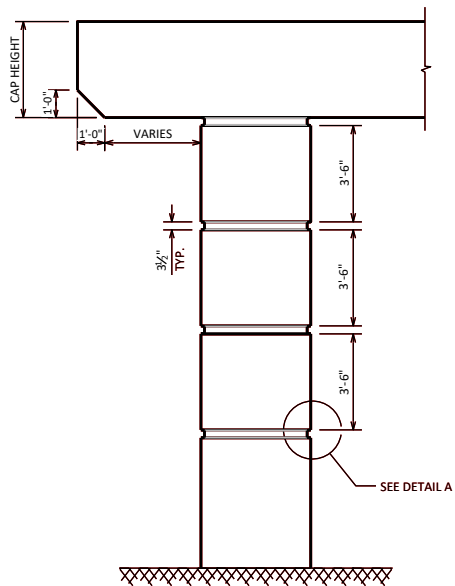
WING & PARAPET AESTHETIC DETAILS



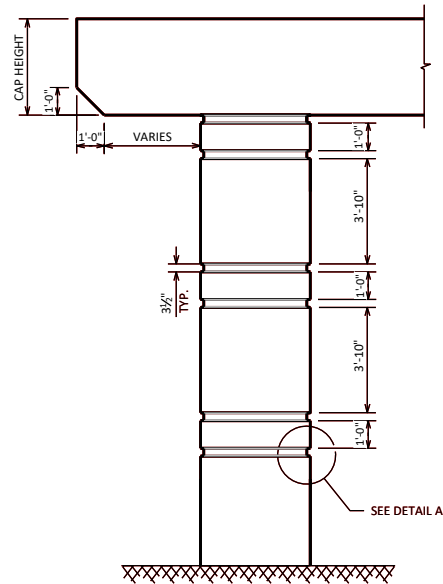
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APPROVED: *Laura Shadewald*

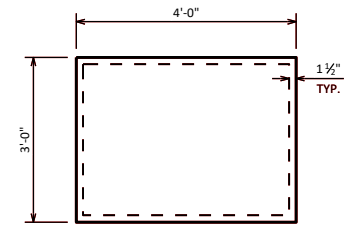
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1-26



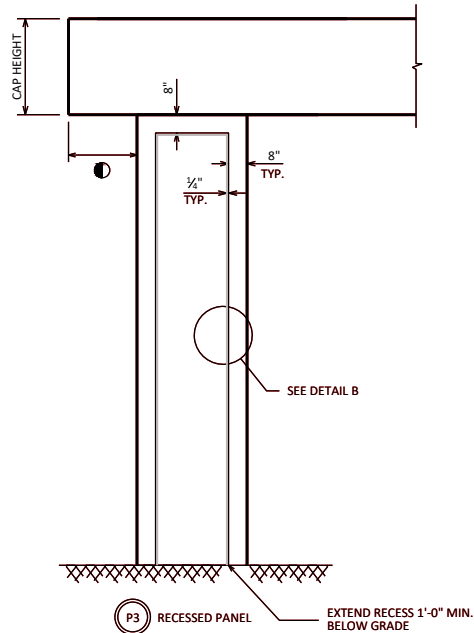
P1 SINGLE RUSTICATION LINES



P2 DOUBLE RUSTICATION LINES

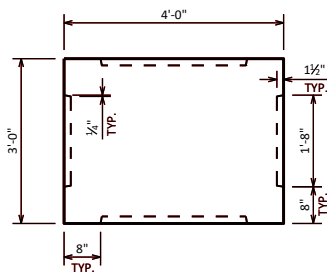


SECTION THRU COLUMN
SINGLE RUSTICATION LINES AND DOUBLE
RUSTICATION LINES

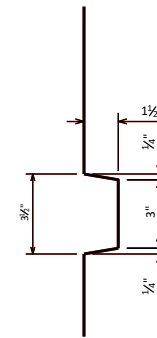


P3 RECESSED PANEL
EXTEND RECESS 1'-0" MIN.
BELOW GRADE

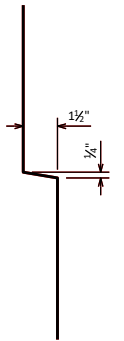
1 DIM. = APPROXIMATELY 1/4 CAP HEIGHT



SECTION THRU COLUMN
RECESSED PANEL



DETAIL A



DETAIL B

**MULTI-COLUMNED PIER
AESTHETIC DETAILS**



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
7-22

DRAWINGS SHALL NOT BE SCALED.

ALL GRS ABUTMENT STATIONING AND OFFSETS ARE GIVEN AT THE FRONT FACE OF THE 'ALIGNMENT KEYBLOCK', SEE SECTIONS A-A AND B-B ON STANDARD 7.02 FOR LOCATION OF THE 'ALIGNMENT KEYBLOCK'.

FACTORED BEARING RESISTANCE OF XX PSF AT BOTTOM OF REINFORCED SOIL FOUNDATION.

- 1 MAXIMUM ALLOWABLE WALL BATTER IS 8 VERTICAL TO 1 HORIZONTAL OR 7.1 DEGREES.**
- PROTECT MODULAR BLOCK DURING PLACEMENT OF HEAVY RIPRAP.
- SEE SECTIONS A-A AND B-B AND 'GRS ABUTMENT INFORMATION' TABLE ON STANDARD 7.02 FOR REQUIRED LENGTHS OF GEOTEXTILE REINFORCEMENT.
- ☒ PROVIDE CORNER BLOCKS AND/OR DETAILS COMPATIBLE WITH THE SELECTED MODULAR BLOCK SYSTEM. ROUNDED CORNERS ARE ALLOWABLE.
- TEMPORARY FALSEROCK NOT TO BE SUPPORTED ON THE GRS ABUTMENT UNLESS APPROVED BY THE BUREAU OF STRUCTURES DEVELOPMENT SECTION.

DESIGNER NOTES

THE USE OF GRS ABUTMENTS IS SUBJECT TO PRIOR APPROVAL BY THE BUREAU OF STRUCTURES.

- ★ PROVIDE AN ADEQUATE WORKING WIDTH FOR GUARDRAIL DEFLECTION PER FDM REQUIREMENTS. MINIMUM WIDTH SHALL BE 6'-6" FROM FRONT FACE OF THIRIE BEAM TO FRONT FACE OF WALL.
 - MAXIMUM SKEW ANGLE IS 15°.
 - THE TOP OF THE CONTRAST-COLORED BLOCKS SHALL BE 2-3 BLOCK COURSES BELOW THE TOP OF RIPRAP ELEVATION.
 - ▲ NAME PLATE TO BE LOCATED ON THE OUTSIDE OF THE FIRST RIGHT GRS ABUTMENT WHEN TRAVELING UPSTATION (FOR OPEN RAILINGS).
- THE MINIMUM REQUIRED TENSILE STRENGTH OF THE GEOSYNTHETIC REINFORCEMENT SHALL BE SHOWN WITHIN THE SPECIAL PROVISION, "GEOSYNTHETIC REINFORCED SOIL ABUTMENT".

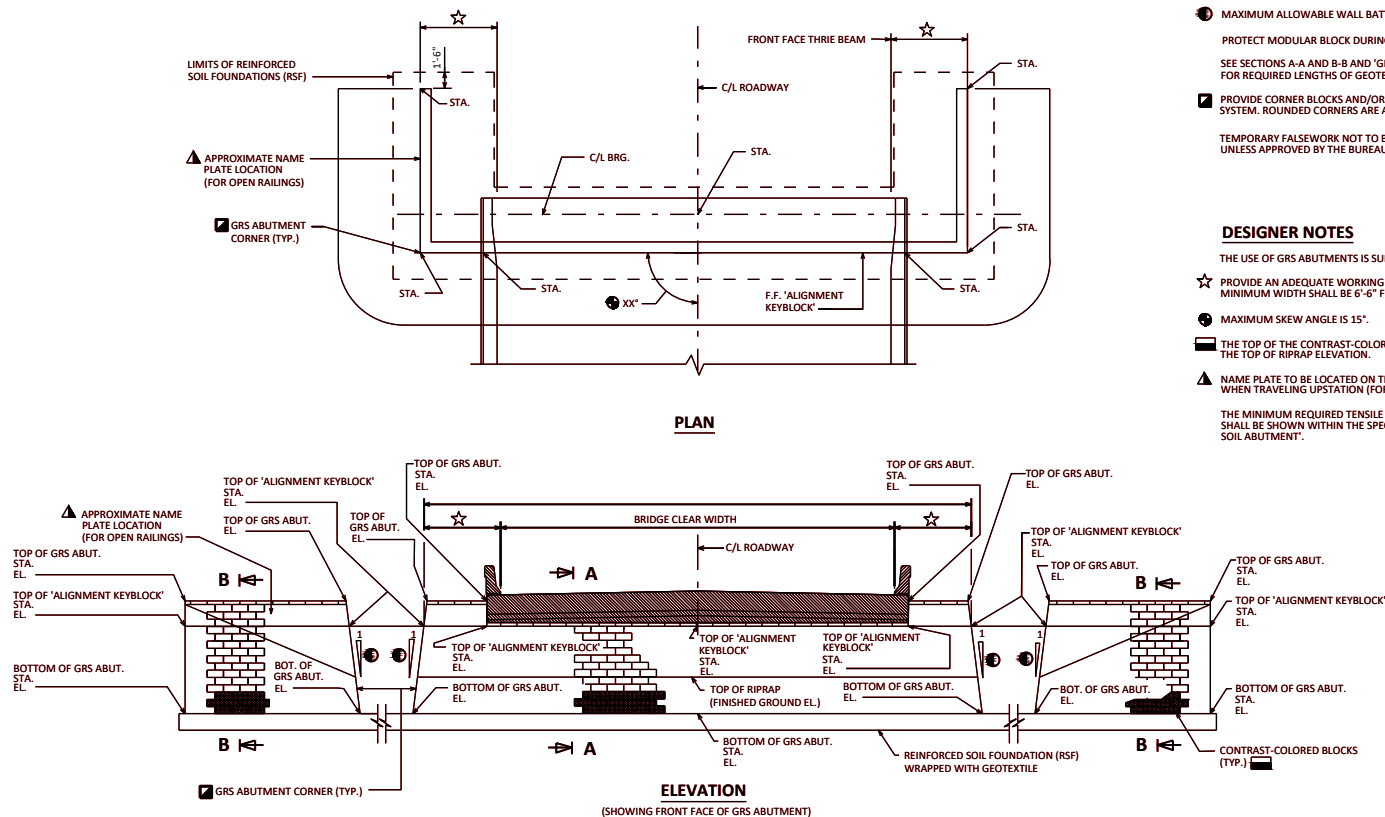


TABLE OF GRS ABUTMENT STATIONS AND ELEVATIONS

[illegible]

NOTE: STATIONS AND OFFSETS GIVEN AT FRONT FACE OF 'ALIGNMENT KEYBLOCK' AND AT ELEVATION XX.XX.
THESE STATIONS AND OFFSETS SHALL BE HELD REGARDLESS OF ACTUAL MODULAR BLOCK SIZE OR GRS ABUTMENT BATTER.



FRONT FACE OF 'ALIGNMENT KEYBLOCK' LOCATION TO BE HELD REGARDLESS OF ACTUAL MODULAR BLOCK SIZE OR GRS ABUTMENT BATTER.

- 4'-0" WRAP (TYP.)
- INDICATES GEOSYNTHETIC REINFORCEMENT LAYER NUMBER, FOR LAYERS, SEE "GRS ABUTMENT INFORMATION" TABLE.
- SOLING OF GEOSYNTHETIC REINFORCEMENT LAYERS TO BE DESIGNED.
- FULL HEIGHT BLOCK IS TYPICAL IN FRONT OF BEARING SEAT BUT A HALF HEIGHT BLOCK AND A SPECIAL EXPANDED POLYSTYRENE THICKNESS MAY BE REQUIRED IN SOME APPLICATIONS.
- LIMITS OF GRS BACKFILL TO BE PAID FOR UNDER THE BID ITEM "GEOSYNTHETIC REINFORCED SOIL ABUTMENT"

 THE TOP OF THE CONTRAST-COLORED BLOCKS SHALL BE 2-3 BLOCK COURSES BELOW THE TOP OF RIPRAP ELEVATION.

- ◆ DIMENSION TO BE DESIGNED**
- THE MINIMUM REQUIRED TENSILE STRENGTH OF THE GEOSYNTHETIC REINFORCEMENT SHALL BE SHOWN WITHIN THE SPECIAL PROVISION, "GEOSYNTHETIC REINFORCED SOIL ABUTMENT".
- ⊗ MINIMUM CLEAR SPACE SHALL BE 3" OR 2% OF GRS ABUTMENT HEIGHT, WHICHEVER IS GREATER. MINIMUM CLEAR SPACE SHALL BE SHOWN ON THE PLANS.**
- ✱ CONCRETE SPREAD FOOTING TO BE DETERMINED PER DESIGN.**

[illegible]

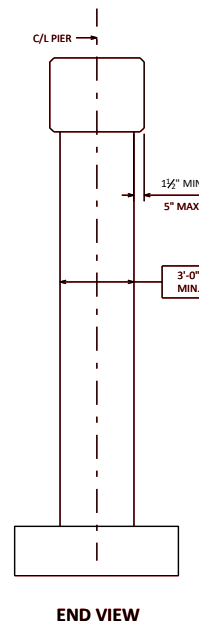
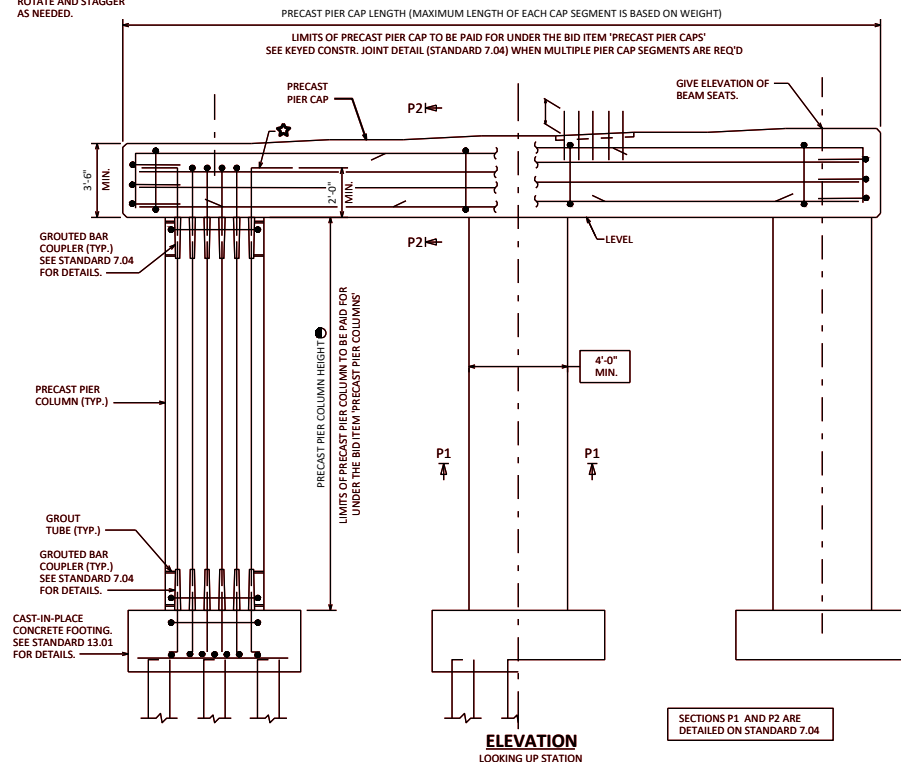
*LENGTH MEASURED FROM FRONT FACE OF MODULAR BLOCK TO END OF GEOTEXTILE, (DOES NOT INCLUDE WRAPPED GEOTEXTILE WHERE APPLICABLE).

BUREAU OF
STRUCTURES

APPROVED: *Laura Shadewald*

DATE: 7-18

★ STD. HOOK (TYP.)
ROTATE AND STAGGER
AS NEEDED.



NOTES

PROVIDE A SUITABLE LIFTING DEVICE FOR THE PRECAST CAP AND COLUMN UNIT(S).

CAST-IN-PLACE ALTERNATIVE IS NOT ALLOWED.

STIRRUPS AT THE GROUTED COUPLERS ARE SIZED BASED ON A XX" OUTER DIAMETER COUPLER SLEEVE. ADJUST STIRRUP DIMENSIONS AS REQUIRED IF THE ACTUAL COUPLER SLEEVE DIAMETER DIFFERS.

● MANUFACTURER TO DETERMINE THE PRECAST PIER COLUMN LENGTHS ASSUMING 1/2" STEEL SHIMS AT THE TOP AND BOTTOM OF THE COLUMN.

BID ITEM "PRECAST PIER COLUMNS" PAID PER PLAN VALUE AS BOTTOM OF PIER CAP ELEVATION MINUS TOP OF FOOTING ELEVATION.

DESIGNER NOTES

PIERS SHALL BE SUPPORTED BY A MINIMUM OF 3 COLUMNS. WHEN MULTIPLE PIER CAPS ARE USED EACH SEGMENT SHALL BE SUPPORTED BY A MINIMUM OF 2 COLUMNS.

THE FOLLOWING SPECIAL PROVISIONS SHALL BE USED:

GROUTED BAR COUPLERS	(S05.1000.S)
PRECAST PIER COLUMNS	(SPV.0090.XXX)
PRECAST PIER CAPS	(SPV.0090.XXX)

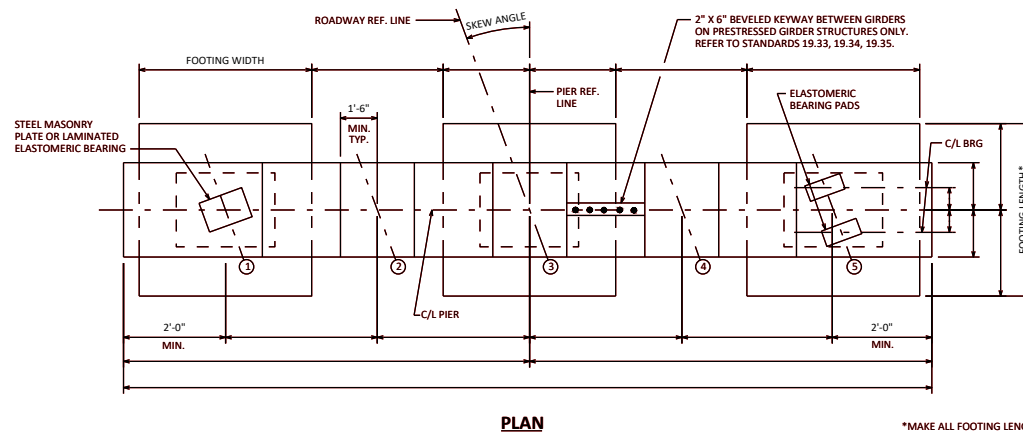
THE MAXIMUM WEIGHT OF EACH PRECAST ELEMENT SHALL BE 90 KIP.

GROUTED COUPLER SLEEVES MAY BE OVERSIZED TO ALLOW FOR ADDITIONAL LATERAL TOLERANCE IN THE FIELD. STANDARD WISDOT PRACTICE IS TO OVERSIZE COUPLER SLEEVES BY 1 BAR SIZE. ADJUST SHEAR STIRRUPS AS NECESSARY TO ACCOUNT FOR LARGER DIAMETER COUPLER SLEEVES.

VERIFY SEVERAL MANUFACTURER'S COUPLER SLEEVE DIMENSIONS PRIOR TO DESIGN. ASSUME THE MAXIMUM DIAMETER OF COUPLER SLEEVE FOR COLUMN REINFORCEMENT DESIGN.

SEE STANDARDS 13.01 AND 13.07 FOR ADDITIONAL PIER NOTES AND DETAILS.

DETAILS AS SHOWN ON THIS STANDARD ARE INTENDED FOR REQUIRED PRECAST PIERS DESIGNED TO MEET PROJECT SPECIFIC REQUIREMENTS. SEE 7.1.4.1.2 IN THE BRIDGE MANUAL AND STANDARDS 7.05 AND 7.06 FOR ADDITIONAL GUIDANCE.



*MAKE ALL FOOTING LENGTHS
THE SAME WITHIN A GIVEN PIER

MATERIAL PROPERTIES:
CONCRETE MASONRY
BAR REINFORCEMENT, GRADE 60

$f'_c = 3,500$ P.S.I.
 $f_y = 60,000$ P.S.I.

PRECAST PIER CAP AND COLUMNS



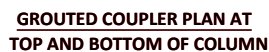
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

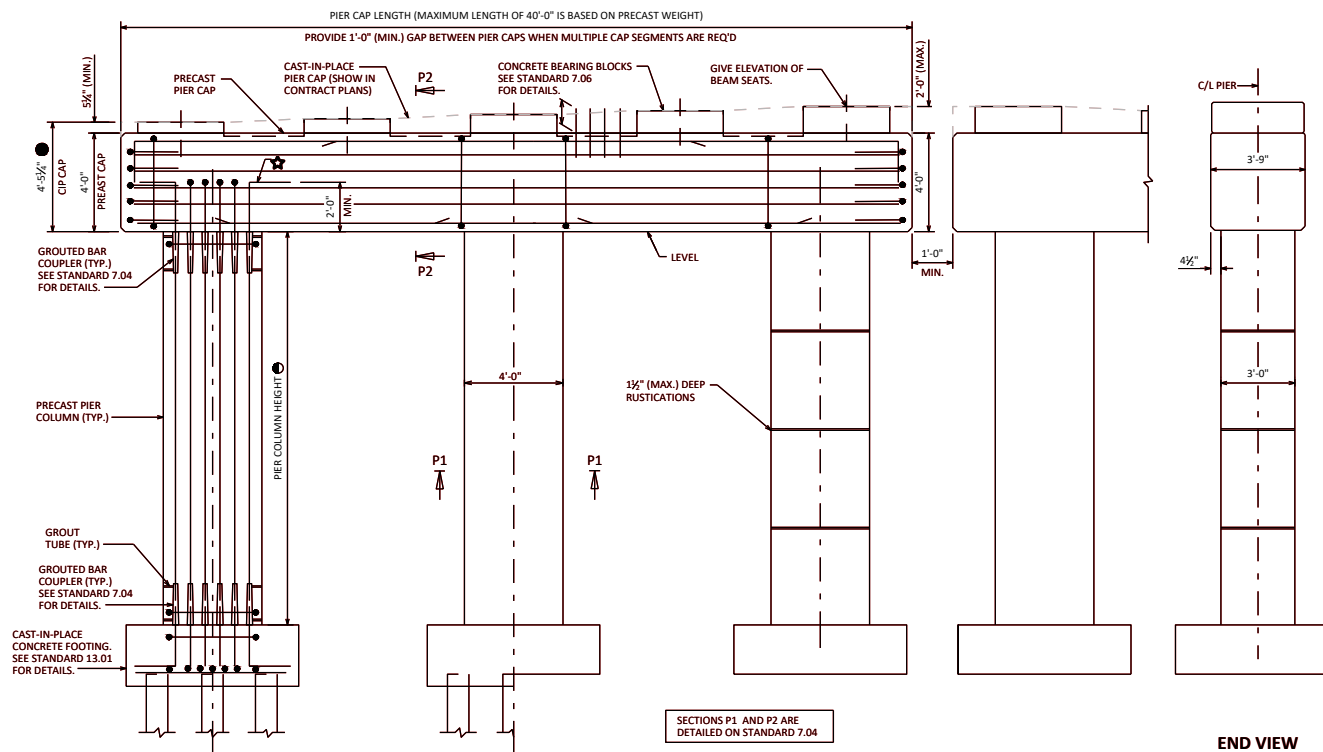
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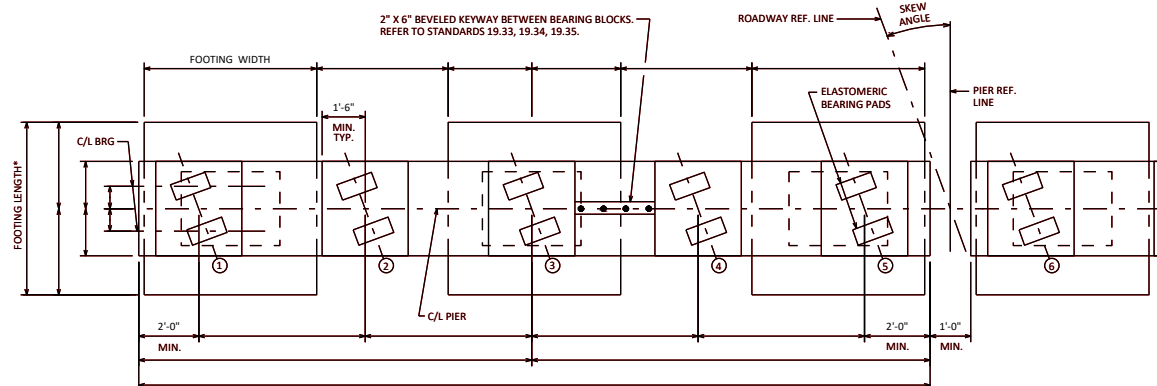
NOTE: THIS BILL OF BARS IS SHOWN FOR INFORMATION ONLY. PAYMENT FOR REINFORCEMENT IN PRECAST COLUMNS AND PRECAST CAP IS INCLUDED IN THE BID ITEMS 'PRECAST PIER COLUMNS' AND 'PRECAST PIER CAPS'.



STANDARD 7.04



ELEVATION
LOOKING UP STATION



PLAN

END VIEW

CONTRACTOR NOTES

THE CONTRACTOR SHALL FOLLOW THIS STANDARD WHEN PRECAST PIERS ARE USED IN LIEU OF THE CAST-IN-PLACE PIER. THE USE OF OPTIONAL PRECAST PIER DETAILS SHALL ONLY BE USED WHEN PLANS INDICATE ALLOWANCE OR WITH APPROVAL BY THE BUREAU OF STRUCTURES.

PROVIDE A SUITABLE LIFTING DEVICE FOR THE PRECAST CAP, COLUMN AND BEARING BLOCK UNIT(S).

STIRRUPS AT THE GROUTED COUPLERS ARE SIZED BASED ON A XX" OUTER DIAMETER COUPLER SLEEVE. ADJUST STIRRUP DIMENSIONS AS REQUIRED IF THE ACTUAL COUPLER SLEEVE DIAMETER DIFFERS.

● MANUFACTURER TO DETERMINE THE PRECAST PIER COLUMN LENGTHS ASSUMING 1/2" STEEL SHIMS AT THE TOP AND BOTTOM OF THE COLUMN.

GROUTED COUPLER SLEEVES MAY BE OVERSIZED TO ALLOW FOR ADDITIONAL LATERAL TOLERANCE IN THE FIELD. STANDARD WISDOT PRACTICE IS TO OVERSIZE COUPLER SLEEVES BY 1 BAR SIZE. ADJUST SHEAR STIRRUPS AS NECESSARY TO ACCOUNT FOR LARGER DIAMETER COUPLER SLEEVES.

ALL PRECAST ELEMENTS AND DIAPHRAGM ITEMS PAID PER C.I.P BID ITEMS. NO ADDITIONAL PAYMENT WILL BE PROVIDED FOR THE PRECAST PIER OPTION.

THE FOLLOWING SPECIAL PROVISIONS SHALL BE USED:

GROUTED BAR COUPLERS (SOS.1000.S)
PRECAST PIER COLUMNS (SPV.0090.XXX)
PRECAST PIER CAPS (SPV.0090.XXX)

THE FOLLOWING ADDITIONAL STANDARDS SHALL BE USED:

STANDARD 7.04 - PRECAST PIER CAP AND COLUMN DETAILS
STANDARD 7.06 - PRECAST BEARING BLOCKS DETAILS

THE CONTRACTOR MAY USE PRECAST SEGMENTS AT THEIR DISCRETION (E.G. PRECAST CAP ONLY) WITH APPROVAL BY THE BUREAU OF STRUCTURES. SEE STANDARD 7.07 FOR CAST-IN-PLACE BEARING BLOCK DETAILS AND ADDITIONAL NOTES.

DESIGNER NOTES

INCLUDE THE FOLLOWING NOTE ON AT LEAST ONE PIER SHEET FOR EACH PIER.

THE CONTRACTOR MAY FURNISH A PRECAST CONCRETE PIER (INSERT ALLOWABLE PRECAST ELEMENTS) IN LIEU OF THE CAST-IN-PLACE PIER WITH THE ACCEPTANCE OF THE SHOP DRAWINGS BY THE STRUCTURES DESIGN SECTION. THE PRECAST CONCRETE PIER SHALL CONFORM TO PRECAST DETAILS IN CHAPTER 7 STANDARDS OF THE CURRENT WISCONSIN DOT BRIDGE MANUAL AND SPECIAL PROVISIONS RELATED TO PRECAST ELEMENTS WITH THE EXCEPTION OF METHOD OF PAYMENT. PAYMENT FOR THE PRECAST PIER SHALL BE BASED ON THE QUANTITIES AND PRICES BID FOR THE ITEMS LISTED IN THE "TOTAL ESTIMATED QUANTITIES" FOR THE CAST-IN-PLACE PIER.

ALLOWABLE PRECAST ELEMENTS INCLUDE COLUMNS, CAPS, AND BEARING BLOCKS THAT HAVE BEEN DETERMINED TO BE INTERCHANGEABLE BETWEEN C.I.P. AND PRECAST OPTIONS. WHEN A PIER CAP HAS BEEN DETERMINED NON-INTERCHANGEABLE "COLUMNS ONLY" MAY BE USED.

PROVIDE CAST-IN-PLACE DETAILS ONLY. PRECAST PIER REFERENCES ARE FOR DESIGNER INFORMATIONAL PURPOSES ONLY AND SHALL NOT BE PLACED ON THE PLANS. PRECAST PIER CONFIGURATION SHALL BE INTERCHANGEABLE BETWEEN C.I.P. AND PRECAST OPTIONS.

ONLY THE PIER CAP LENGTH AND COLUMN LENGTHS SHALL BE MODIFIED. ALL NOTED DIMENSIONS SHALL BE FOLLOWED.

PIERS SHALL BE SUPPORTED BY A MINIMUM OF 3 COLUMNS. WHEN MULTIPLE PIER CAPS ARE USED, EACH SEGMENT SHALL BE SUPPORTED BY A MINIMUM OF 2 COLUMNS.

PROVIDE A CONCRETE DIAPHRAGM BETWEEN PIER CAP SEGMENTS.

MULTIPLE PIER CAP SEGMENTS MAY BE SET AT DIFFERENT ELEVATIONS TO ACCOMMODATE BEARING ELEVATIONS BEYOND CONCRETE BEARING BLOCK LIMITS.

THE MAXIMUM WEIGHT OF EACH PRECAST ELEMENT SHALL BE 90 KIP.

SEE STANDARDS 7.03, 7.04, 7.06, 13.01 AND 13.07 FOR ADDITIONAL PIER NOTES AND DETAILS.

SEE 7.1.4.1.2 FOR ADDITIONAL PRECAST PIER GUIDANCE.

LEGEND

☆ STD. HOOK (TYP.) ROTATE AND STAGGER AS NEEDED.

● DIMENSION IS FROM BOTTOM OF PIER CAP TO LOW BEAM SEAT.

PRECAST PIER (OPTIONAL) CAP AND COLUMNS



**BUREAU OF
STRUCTURES**

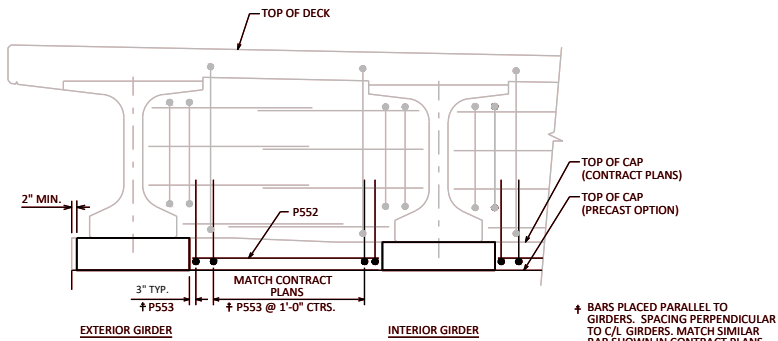
APPROVED: *Laura Shadewald*

DATE:
1-19

MATERIAL PROPERTIES:

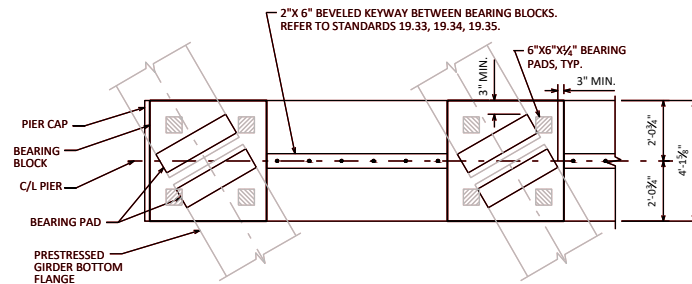
CONCRETE MASONRY
BAR REINFORCEMENT, GRADE 60

$f'_c = 3,500$ P.S.I.
 $f_y = 60,000$ P.S.I.

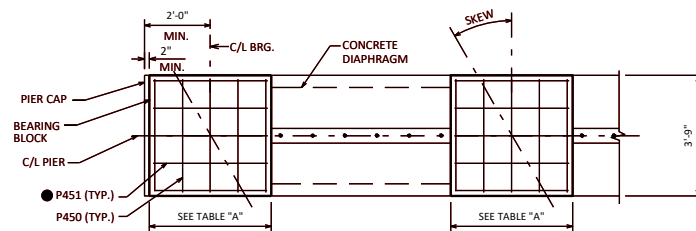


PARTIAL TRANSVERSE SECTION AT DIAPHRAGM PIER

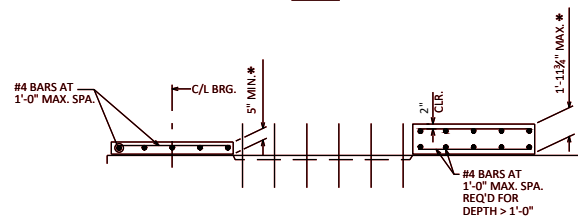
STD. 19.35 SHOWN (STD. 19.33 & 19.34 SIM.)



PLAN



PLAN



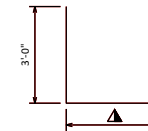
ELEVATION

BILL OF BARS

TOTAL COATED: XX LBS

BAR MARK	NO. REQ'D	LENGTH	COAT	BENT	LOCATION
P450		3'-5"	X		TOP & BOTT. TRANS.
P451			X		TOP & BOTT. LONG.
P552			X		PIER DIAPHRAGM - BOTH FACES HORIZ. - BTWN GIRDERS
P553			X	X	PIER DIAPHRAGM - VERT. - BTWN GIRDERS

NOTE: THIS BILL OF BARS IS SHOWN FOR INFORMATION ONLY. PRECAST PIER SHOP DRAWINGS SHALL INCLUDE BILL OF BARS FOR DIAPHRAGM REINFORCEMENT. PAYMENT FOR ALL ITEMS ASSOCIATED WITH THE OPTIONAL PRECAST PIERS SHALL BE INCLUDED IN THE CAST-IN-PLACE CONCRETE BID ITEMS.



P553

△ MATCH SIMILAR DIAPHRAGM REIN. AS SHOWN IN CONTRACT PLANS.

TABLE "A"

SKEW ANGLE	BEARING BLOCK WIDTH (MIN.)	LONG. BAR LENGTH ●
0° TO 15°	3'-3"	2'-11"
15° TO 20°	3'-6"	3'-2"
> 20°	3'-9"	3'-5"

DESIGNER NOTE

SEE 7.1.4.1.2 FOR ADDITIONAL PRECAST PIER GUIDANCE.

CONTRACTOR NOTES

THE CONTRACTOR SHALL FOLLOW THIS STANDARD WHEN PRECAST PIERS ARE USED IN LIEU OF THE CAST-IN-PLACE PIER.

THE CONTRACTOR MAY USE CAST-IN-PLACE BEARING BLOCKS IN LIEU OF PRECAST BEARING BLOCK DETAILS. THE CONTRACTOR IS RESPONSIBLE FOR THE ADDITIONAL WEIGHT, WHICH MAY CAUSE PIER CAP SEGMENTS TO BE IN EXCESS OF 90 KIIPS.

SEE STANDARD 7.07 FOR CAST-IN-PLACE BEARING BLOCK DETAILS AND ADDITIONAL NOTES.

PRECAST CONCRETE DETAIL NOTES

PRECAST BEARING BLOCK DETAILS SHALL ONLY BE USED WHEN PLANS INDICATE ALLOWANCE FOR PRECAST PIERS.

* PRECAST HEIGHT = VARIES (5" MIN. TO 1'-11 1/2" MAX.). MANUFACTURER TO DETERMINE THE PRECAST BEARING BLOCK HEIGHT ASSUMING 1/4" GROUT AT THE BOTTOM OF THE BEARING BLOCK.

GROUT 1/4" BENEATH PRECAST ELEMENT.

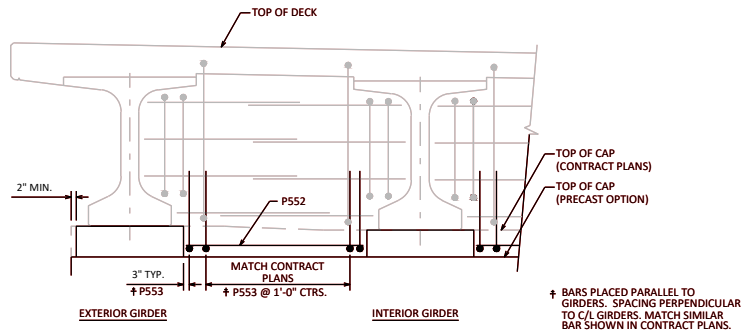
PRECAST BEARING BLOCK DETAILS



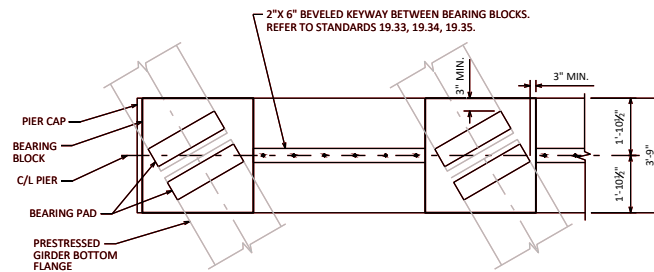
BUREAU OF
STRUCTURES

APPROVED: Laura Shadewald

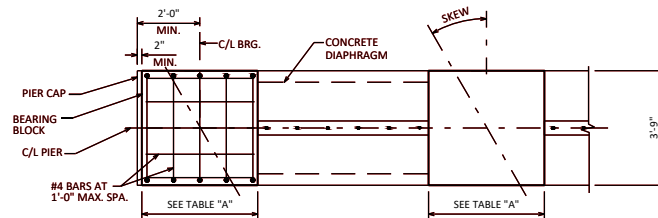
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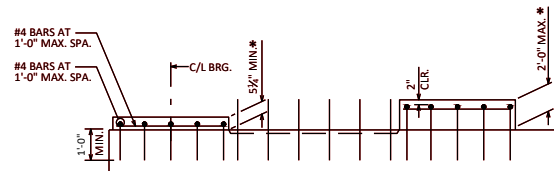
**PARTIAL TRANSVERSE SECTION
AT DIAPHRAGM PIER**
STD. 19.35 SHOWN (STD. 19.33 & 19.34 SIM.)



PLAN



PLAN



ELEVATION

DESIGNER NOTE

SEE 7.1.4.1.2 FOR ADDITIONAL PRECAST PIER GUIDANCE.

CONTRACTOR NOTES

THE CONTRACTOR SHALL FOLLOW THIS STANDARD WHEN PRECAST PIERS ARE USED AND WHEN CAST-IN-PLACE BEARING BLOCKS ARE USED IN LIEU OF PRECAST BEARING BLOCKS.

SEE STANDARD 7.06 FOR ADDITIONAL NOTES AND DETAILS.

CAST-IN-PLACE CONCRETE DETAIL NOTES

CAST-IN-PLACE BEARING BLOCK DETAILS SHALL ONLY BE USED WHEN PLANS INDICATE ALLOWANCE FOR PRECAST PIERS.

* CAST-IN-PLACE HEIGHT = VARIES (5/8" MIN. TO 2'-0" MAX.). CONTRACTOR TO DETERMINE THE CAST-IN-PLACE BEARING BLOCK HEIGHTS.

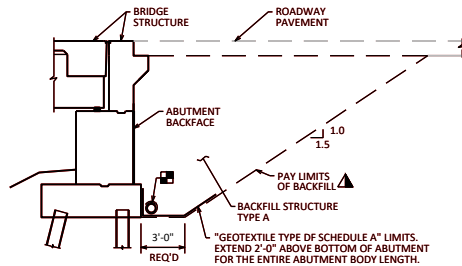
CAST-IN-PLACE BEARING BLOCK DETAILS



**BUREAU OF
STRUCTURES**

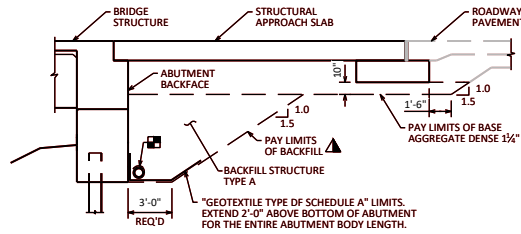
APPROVED: *Laura Shadewald*

DATE:
1-18



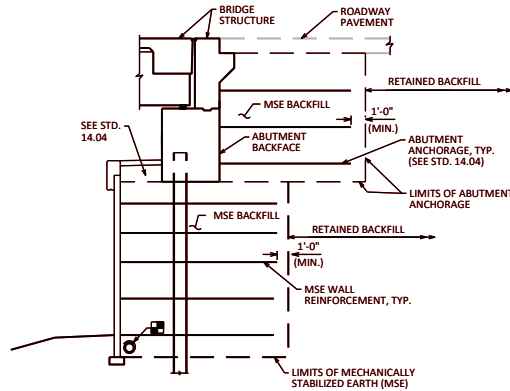
**TYPICAL SECTION
THRU ABUTMENT**

(A3 ABUTMENT WITHOUT STRUCTURAL APPROACH)



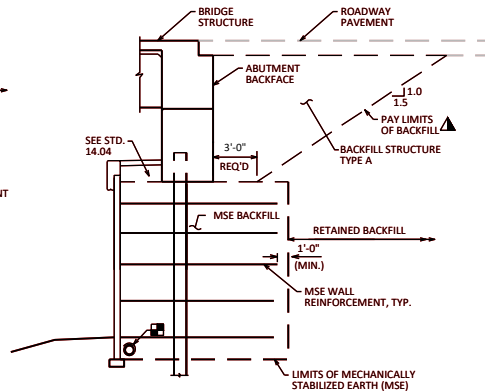
**TYPICAL SECTION
THRU ABUTMENT**

(A1 ABUTMENT WITH STRUCTURAL APPROACH)



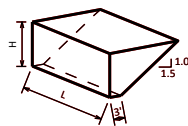
**TYPICAL SECTION
THRU ABUTMENT AT MSE WALL**

(A3 ABUTMENT WITH ABUTMENT ANCHORAGE)



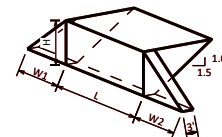
**TYPICAL SECTION
THRU ABUTMENT AT MSE WALL**

(A1 ABUTMENT WITHOUT STRUCTURAL APPROACH)



**ABUTMENT BACKFILL DIAGRAM
FOR WINGS PARALLEL TO ROADWAY**

L = OUT TO OUT OF ABUTMENT, INCLUDING WINGS (FT)
H = AVERAGE ABUTMENT FILL HEIGHT (FT)
EF = EXPANSION FACTOR (1.20 FOR CY BID ITEMS AND 1.00 FOR TON BID ITEMS)
 $V_{CF} = (L)(3.0')(H) + (L)(0.5)(1.5H)(H)$
 $V_{CY} = V_{CF}(EF)/27$
 $V_{TON} = V_{CY}(2.0)$



**ABUTMENT BACKFILL DIAGRAM
FOR WINGS PARALLEL TO ABUTMENT**

L = OUT TO OUT OF ABUTMENT BODY (FT)
H = AVERAGE ABUTMENT FILL HEIGHT (FT)
W1 = WING 1 LENGTH (FT)
W2 = WING 2 LENGTH (FT)
EF = EXPANSION FACTOR (1.20 FOR CY BID ITEMS AND 1.00 FOR TON BID ITEMS)
 $V_{CF} = (L)(3.0')(H) + (L)(0.5)(1.5H)(H) + (3.0')(0.5)(W1+W2)(H)$
 $V_{CY} = V_{CF}(EF)/27$
 $V_{TON} = V_{CY}(2.0)$

NOTES

THE UPPER LIMITS OF "EXCAVATION FOR STRUCTURES BRIDGES B-..." SHALL BE THE EXISTING GROUNDLINE.

THE BACKFILL QUANTITIES ARE BASED ON THE PAY LIMITS SHOWN ON THE PLANS AND MAY NOT REFLECT ACTUAL PLACED QUANTITIES. "BACKFILL STRUCTURE TYPE A" REQUIRED DIRECTLY BEHIND ABUTMENTS AND ABUTMENT WINGS FOR 3 FEET. BACKFILL PLACED BEYOND PAY LIMITS OR EXCEEDING PLAN QUANTITIES SHALL BE INCIDENTAL TO EXCAVATION FOR STRUCTURES.

EXCAVATION BELOW THE ABUTMENT AND ABUTMENT BEDDING MATERIALS REQUIRES ENGINEER APPROVAL. GEOTEXTILE SHALL BE SET AT THE BOTTOM OF EXCAVATION AND EXTEND 2'-0" ABOVE BOTTOM OF ABUTMENT. (NOTE INTENDED FOR PILE SUPPORTED ABUTMENTS. SEE DESIGNER NOTES FOR MORE INFORMATION)

DESIGNER NOTES

▲ THE DESIGN ENGINEER SHOULD PROVIDE ALL NECESSARY BACKFILL PAY LIMITS AND NOTES IN ORDER TO DETERMINE QUANTITIES. FOR ABUTMENTS, PROVIDE AN ABUTMENT BACKFILL DIAGRAM AS SHOWN ON THIS SHEET. SEE BRIDGE MANUAL SECTIONS 6.4.2 AND 9.10 FOR ADDITIONAL INFORMATION.

■ SUBSURFACE DRAINAGE DETAILS AND NOTES SHOULD DIRECT DRAINAGE AROUND THE ABUTMENT RATHER THAN BELOW THE ABUTMENT. DRAINAGE UNDER THE ABUTMENT MAY CAUSE SLOPE PAVING DAMAGE OR FAILURE. GEOTEXTILE SHALL EXTEND THE ENTIRE LENGTH OF THE ABUTMENT BODY. SEE STANDARD 12.08 FOR GUIDANCE ON UNDERDRAIN PLACED ABOVE NORMAL WATER. FOR UNDERDRAIN EXPOSED TO HIGH WATER, CONSIDER CAPPING THE UPSTREAM END TO PREVENT CLOGGING.

FOR ABUTMENTS WITH MSE BACKFILL BELOW THE REQUIRED "BACKFILL STRUCTURE TYPE A" WIDTH, PIPE UNDERDRAIN AND GEOTEXTILE ARE NOT REQUIRED BEHIND ABUTMENTS. PIPE UNDERDRAIN IS REQUIRED AT THE BOTTOM OF THE MSE WALL.

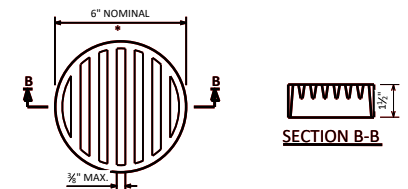
SEE STANDARD 9.02 FOR RETAINING WALL AND BOX CULVERT DETAILS.

SEE STANDARD 9.03 FOR WING FILL SECTIONS AT WING TIPS.

LEGEND

▲ BACKFILL PAY LIMITS. BACKFILL BEYOND BACKFILL PAY LIMITS SHALL BE INCIDENTAL TO EXCAVATION FOR STRUCTURES. LIMITS OF EXCAVATION SHALL BE DETERMINED BY THE CONTRACTOR.

■ PIPE UNDERDRAIN WRAPPED (6-INCH). SLOPE 0.5% MIN. TO SUITABLE DRAINAGE. ATTACH RODENT SHIELD AT ENDS OF PIPE UNDERDRAIN. (SHOW DETAIL ON PLANS)



RODENT SHIELD DETAIL

* DIMENSIONS ARE APPROXIMATE. THE GRATE IS SIZED TO FIT INTO A PIPE COUPLING. ORIENT SO SLOTS ARE VERTICAL.

THE RODENT SHIELD, PIPE COUPLING AND SCREWS SHALL BE CONSIDERED INCIDENTAL TO THE BID ITEM "PIPE UNDERDRAIN WRAPPED 6-INCH".

THE RODENT SHIELD SHALL BE A PVC GRATE SIMILAR TO THIS DETAIL. THE GRATE IS COMMERCIALY AVAILABLE AS A FLOOR STRAINER. A PIPE COUPLING IS REQUIRED FOR THE ATTACHMENT OF THIS SHIELD TO THE EXPOSED END OF THE PIPE UNDERDRAIN. THE SHIELD SHALL BE FASTENED TO THE PIPE COUPLING WITH TWO OR MORE NO. 10 X 1-INCH STAINLESS STEEL SHEET METAL SCREWS.

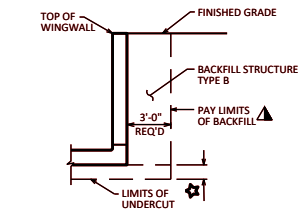
STRUCTURE BACKFILL LIMITS AND NOTES 1



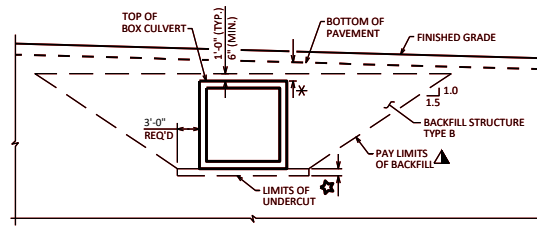
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

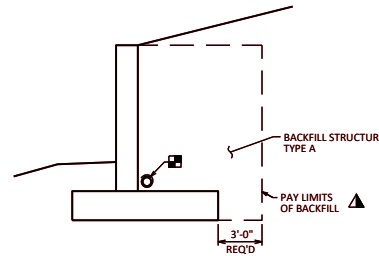
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7-24



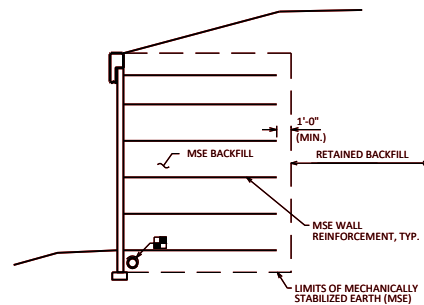
**TYPICAL SECTION
THRU BOX CULVERT WINGWALL**



**TYPICAL SECTION
THRU BOX CULVERT**
(CIP BOX CULVERT WITH SHALLOW FILLS)



**TYPICAL SECTION
THRU RETAINING WALL**



**TYPICAL SECTION
THRU MSE RETAINING WALL**

NOTES (BOX CULVERTS)

THE UPPER LIMITS OF "EXCAVATION FOR STRUCTURES C-_-_" SHALL BE THE EXISTING GROUNDLINE.

THE BACKFILL QUANTITIES ARE BASED ON THE PAY LIMITS SHOWN ON THE PLANS AND MAY NOT REFLECT ACTUAL PLACED QUANTITIES. "BACKFILL STRUCTURE TYPE B" REQUIRED ON THE BOX CULVERT SIDES AND BEHIND APRON WINGS FOR 3 FEET. BACKFILL PLACED BEYOND PAY LIMITS OR EXCEEDING PLAN QUANTITIES SHALL BE INCIDENTAL TO EXCAVATION FOR STRUCTURES.

NOTE AND DIMENSION NOT REQUIRED. (UNDERCUT NOT REQUIRED PER GEOTECHNICAL ENGINEER OR WHEN CONSTRUCTED ON FILLS)

UNDER CUT "X"-X". EXCAVATION FOR UNDER CUT TO BE INCLUDED IN EXCAVATION FOR STRUCTURES. BACKFILL WITH "BACKFILL STRUCTURE TYPE B".

UNDER CUT "X"-X". EXCAVATION FOR UNDER CUT TO BE INCLUDED IN EXCAVATION FOR STRUCTURES. PLACE "GEOTEXTILE TYPE C" AND BACKFILL WITH "BREAKER RUN".

IN LIEU OF USING BREAKER RUN FOR THE BOX CONSTRUCTION PLATFORM, THE CONTRACTOR MAY ELECT TO SUBSTITUTE COARSE AGGREGATE AASHTO NO. 67 OR AASHTO NO. 4 IN ACCORDANCE WITH STANDARD SPEC 310 AND 604, RESPECTIVELY, SELECT CRUSHED MATERIAL OR OTHER GRANULAR MATERIAL AS APPROVED BY THE ENGINEER. THE CONTRACTOR IS RESPONSIBLE FOR BASE STABILITY WITH ANY SUBSTITUTED MATERIAL. THE REGION GEOTECHNICAL ENGINEER MAY BE CONTACTED TO DETERMINE IF "OTHER GRANULAR MATERIAL" IS ACCEPTABLE.

PRECAST ELEMENTS SHALL BE PLACED ON A BEDDING OF "BACKFILL STRUCTURE TYPE B" OF 6" MINIMUM DEPTH AND AS APPROVED BY THE ENGINEER. (NOTE APPLICABLE WHEN PRECAST ELEMENTS ARE ALLOWED PER STANDARD 36.02)

NOTES (RETAINING WALLS)

THE UPPER LIMITS OF "EXCAVATION FOR STRUCTURES RETAINING WALLS R-_-_" SHALL BE THE EXISTING GROUNDLINE.

THE BACKFILL QUANTITIES ARE BASED ON THE PAY LIMITS SHOWN ON THE PLANS AND MAY NOT REFLECT ACTUAL PLACED QUANTITIES. "BACKFILL STRUCTURE TYPE A" REQUIRED FOR THE ENTIRE WALL LENGTH. BACKFILL PLACED BEYOND PAY LIMITS OR EXCEEDING PLAN QUANTITIES SHALL BE INCIDENTAL TO EXCAVATION FOR STRUCTURES.

DESIGNER NOTES

▲ THE DESIGN ENGINEER SHOULD PROVIDE ALL NECESSARY BACKFILL PAY LIMITS AND NOTES IN ORDER TO DETERMINE QUANTITIES. SEE BRIDGE MANUAL SECTIONS 6.4.2 AND 9.10 FOR ADDITIONAL INFORMATION.

FOR CULVERTS, THE ABOVE NOTE REGARDING POTENTIAL SUBSTITUTION OF BREAKER RUN SHOULD ONLY BE INCLUDED ON THE PLANS IF ALLOWED BY THE REGION GEOTECHNICAL ENGINEER.

* 6" MINIMUM OF "BACKFILL STRUCTURE TYPE B" REQUIRED BETWEEN BOTTOM OF ROADWAY SURFACE AND TOP OF CULVERT.

LEGEND

▲ BACKFILL PAY LIMITS. BACKFILL BEYOND BACKFILL PAY LIMITS SHALL BE INCIDENTAL TO EXCAVATION FOR STRUCTURES. LIMITS OF EXCAVATION SHALL BE DETERMINED BY THE CONTRACTOR.

■ PIPE UNDERDRAIN WRAPPED (6-INCH). SLOPE 0.5% MIN. TO SUITABLE DRAINAGE. ATTACH RODENT SHIELD AT ENDS OF PIPE UNDERDRAIN. (SHOW DETAIL ON PLANS)

STRUCTURE BACKFILL LIMITS AND NOTES 2



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
7-24

WINGS PARALLEL TO ROADWAY				WINGS PARALLEL TO ABUTMENT
	STANDARD WING	WITH STRUCTURAL APPROACH SLAB	WITH RAILING OR FENCE ONLY	STANDARD WING
STANDARD FILL	TYPICAL FILL SECTION AT WING TIPS	TYPICAL FILL SECTION AT WING TIPS	TYPICAL FILL SECTION AT WING TIPS	TYPICAL FILL SECTION AT WING
RIP RAP	TYPICAL FILL SECTION AT WING TIPS	TYPICAL FILL SECTION AT WING TIPS	TYPICAL FILL SECTION AT WING TIPS	TYPICAL FILL SECTION AT WING
STANDARD FILL WITH SIDEWALK	TYPICAL FILL SECTION AT WING TIPS	TYPICAL FILL SECTION AT WING TIPS	TYPICAL FILL SECTION AT WING TIPS	

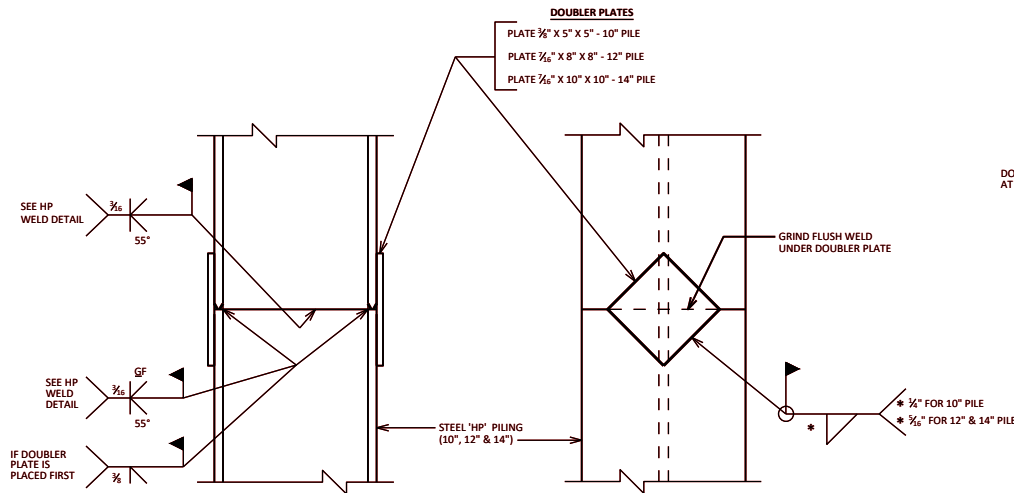
WING FILL SECTIONS AT WING TIPS



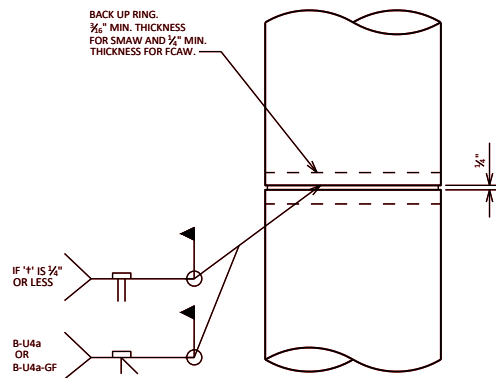
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APPROVED: *Laura Shadewald*

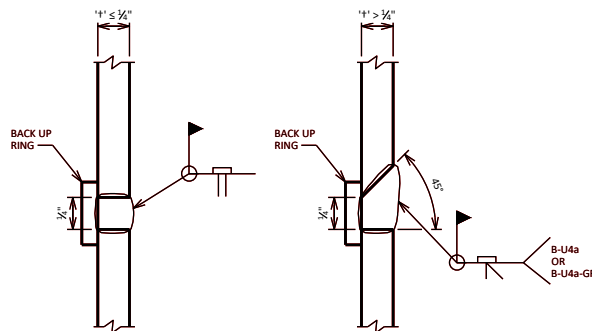
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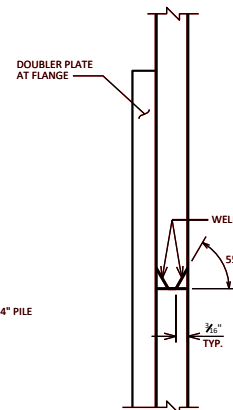
STEEL 'HP' SHAPES



**CAST-IN-PLACE
'PILE PIPE'**



CIP PILE WELD DETAIL



HP WELD DETAIL
FLANGE SHOWN, WEB SIMILAR

NOTES

CAST-IN-PLACE PILE SHELL MATERIAL SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATION.

IF APPLICABLE, PLACE THE FOLLOWING NOTE ON THE PLANS:

PILES PLACED IN PREBORED HOLES CORED INTO ROCK DO NOT REQUIRE DRIVING.

DESIGNER NOTES

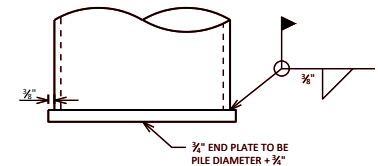
FULL DESIGN LOADING CAN BE USED IF PREBORED HOLE IS LARGE ENOUGH TO AVOID PILE HANGUPS AND ALLOW FILLING WITH SAND.

SEE WISDOT POLICY ITEM IN BRIDGE MANUAL 11.3.1.12.3 FOR GUIDANCE ON "HP" PILES.

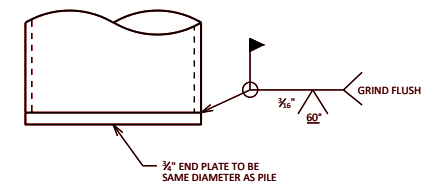
SEE BRIDGE MANUAL SECTION 11.3.1.17.7 FOR PILE RESISTANCE VALUES.

IF LESS THAN THE MAXIMUM AXIAL RESISTANCE IS REQUIRED BY DESIGN, STATE ONLY THE REQUIRED CORRESPONDING DRIVING RESISTANCE ON THE PLANS. CONSULT WITH THE GEOTECHNICAL ENGINEER REGARDING POSSIBLE ESTIMATED PILE LENGTH ADJUSTMENT.

WHEN RECOMMENDED IN THE SOILS REPORT, USE BID ITEM "PILE POINTS" AND PROVIDE THE APPROPRIATE PILE POINT DETAIL.

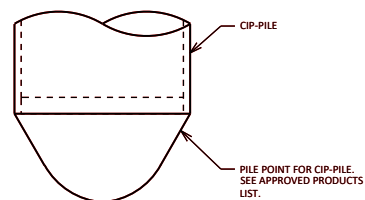


END PLATE DETAIL FOR CIP PILING



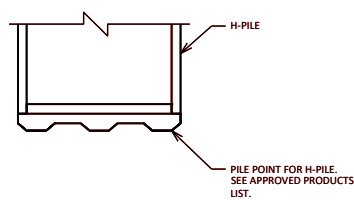
**END PLATE DETAIL FOR CIP PILING
IN ARTESIAN CONDITIONS**

DESIGNER NOTE: ONLY USE FOR ARTESIAN CONDITIONS



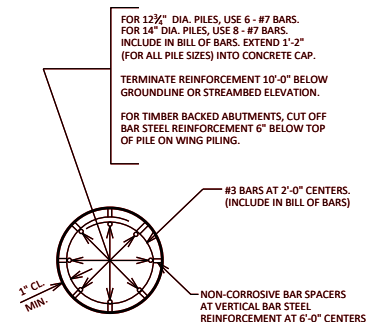
PILE POINT FOR CIP PILING

PILE POINT SHALL BE INSTALLED ACCORDING TO THE PILE POINT MANUFACTURE'S INSTRUCTIONS. ENSURE PILE POINT WELDS ARE WATERTIGHT.



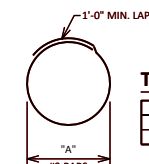
PILE POINT FOR H-PILING

PILE POINT SHALL BE INSTALLED ACCORDING TO THE PILE POINT MANUFACTURE'S INSTRUCTIONS.



SECTION THRU CONCRETE

CAST-IN-PLACE PILING
USED WHEN PILES ARE EXPOSED
(OPEN PILE BENTS OR TIMBER BACKED ABUTMENTS)



TABLE

PILE DIA.	DIM "A"	LENGTH
12 3/4"	9 1/2"	3'-7"
14"	11"	3'-11"

(#3 BAR WT. = 0.38 LB/FT)

PILE DETAILS



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
1-26

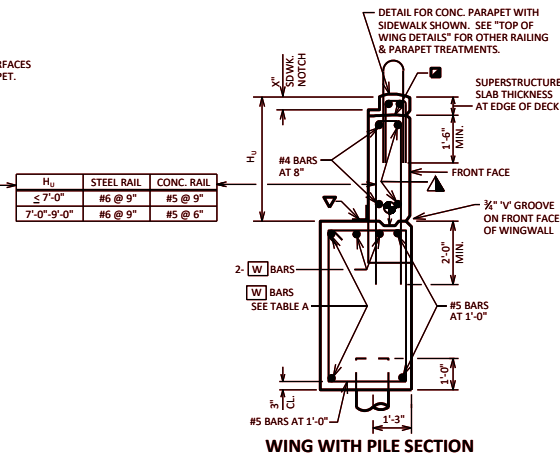
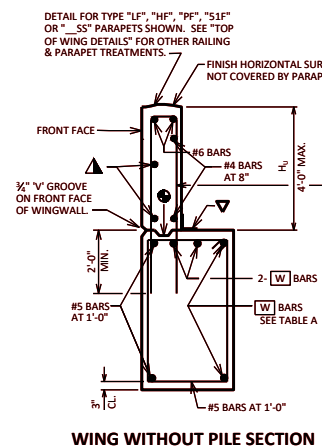
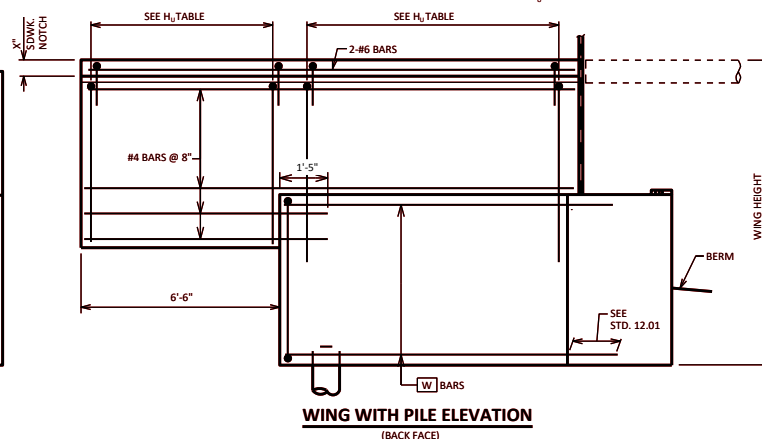
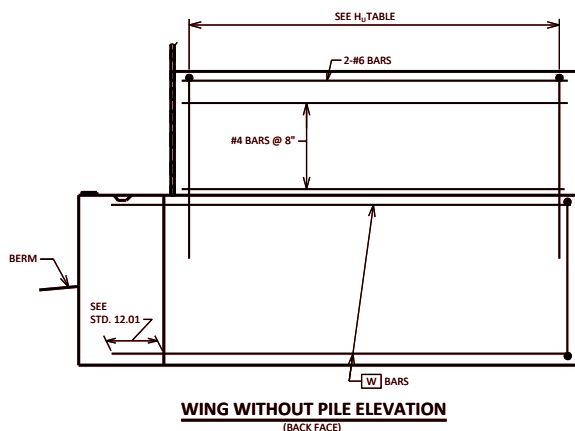
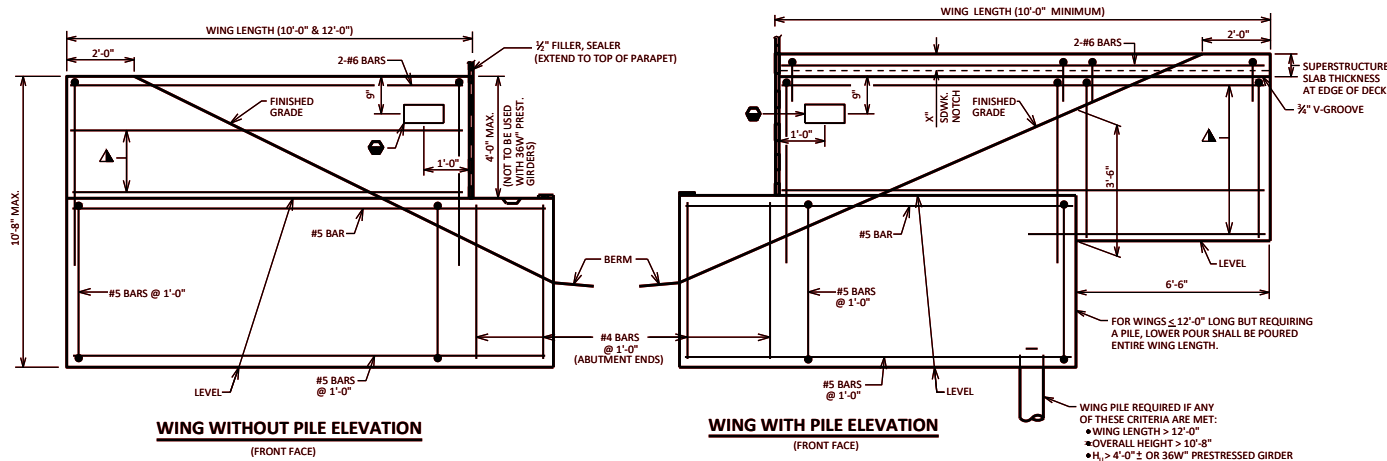


BAR SIZE	DISTANCE *
#5	1'-9"
#6	2'-1"
#7	2'-9"
#8	3'-8"
#9	4'-7"
#10	5'-10"

* OR EQUIVALENT STD. HOOK
USE STRAIGHT BARS WHEN POSSIBLE



NO SLOPE FOR HEAVY RIPRAP. SEE STANDARD 12.08 FOR DETAILS.



DESIGNER NOTES

SEE STD. 12.01 FOR ADDITIONAL DESIGNER NOTES.

WING WITH PILE & WING WITHOUT PILE CAN BE USED FOR EITHER SIDEWALK OR SLOPED FACE PARAPETS. THE TYPE OF WING TO USE IS BASED ONLY ON THE WING HEIGHT AND WING LENGTH LIMITATIONS SHOWN.

- NAME PLATE (ONLY FOR TYPE "F", "W" AND "M" OR TIMBER RAIL AS SHOWN ON STANDARD 30.24), LOCATE NAME PLATE ON FIRST RIGHT WING TRAVELING UP STATION.

SEAL ALL EXPOSED HORIZONTAL AND VERTICAL SURFACES OF 1/2" FILLER WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER, (1" DEEP AND HOLD 1/2" BELOW SURFACE OF CONCRETE). EXTEND SEALER 3" BELOW GUTTER LINE AT INSIDE FACE.

LRFD DESIGN LOADS

LIVE LOAD = 2'-0" SURCHARGE

LOAD FACTORS:

$\gamma_{DC} = 1.25$

$\gamma_{DW} = 1.50$

$\gamma_{LL} = 1.35$

$\gamma_{LS} = 1.75$

EXPOSURE CLASS 2, $X_t = 0.75$

$f_y = 60,000$ P.S.I.

$f'_c = 3,500$ P.S.I.

HORIZ. EARTH LOAD BASED ON:

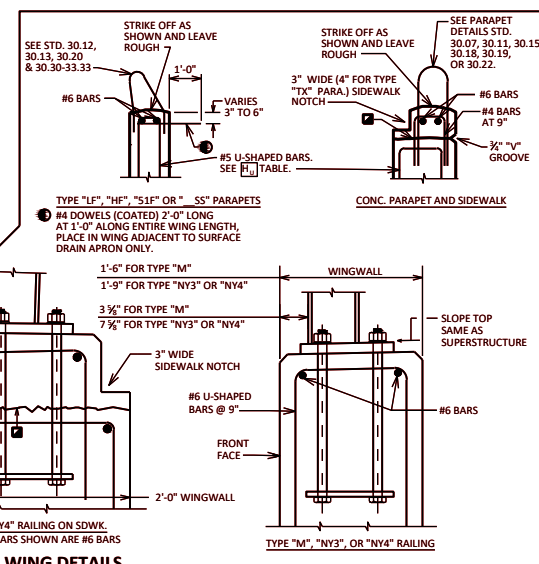
35 P.C.F. EQUIV. FLUID UNIT

WEIGHT OF SOIL

TABLE A

WING LENGTH	WING HEIGHT	8'-6"	10'-0"	11'-6"	13'-0"	14'-0"
8'-6"	6'-6"	6-#6'S	6-#6'S	6-#5'S	6-#5'S	W
10'-0"	6'-6"	6-#6'S	6-#6'S	6-#5'S	6-#5'S	A1
12'-0"	6'-6"	6-#6'S	6-#6'S	6-#5'S	6-#5'S	W
14'-0"	6'-6"	6-#6'S	6-#6'S	6-#5'S	6-#5'S	A1
16'-0"	6'-6"	6-#6'S	6-#6'S	6-#5'S	6-#5'S	W
18'-0"	6'-6"	6-#6'S	6-#6'S	6-#5'S	6-#5'S	A1
20'-0"	6'-6"	6-#6'S	6-#6'S	6-#5'S	6-#5'S	W
22'-0"	6'-6"	6-#6'S	6-#6'S	6-#5'S	6-#5'S	A1
24'-0"	6'-6"	6-#6'S	6-#6'S	6-#5'S	6-#5'S	W
26'-0"	6'-6"	6-#6'S	6-#6'S	6-#5'S	6-#5'S	A1
28'-0"	6'-6"	6-#6'S	6-#6'S	6-#5'S	6-#5'S	W
30'-0"	6'-6"	6-#6'S	6-#6'S	6-#5'S	6-#5'S	A1

* WING WITHOUT PILE VALUES SHOWN. USE 10'-0" WING HEIGHT VALUES FOR WING HEIGHTS UP TO 10'-8". (FOR WING WITH PILE THAT HAS WING LENGTH IN THIS REGION, USE VALUES FOR 11'-6" WING HEIGHT)



- CONSTRUCTION JOINT, LEAVE ROUGH. REQUIRED FOR PRESTRESSED CONCRETE SUPERSTRUCTURES. OPTIONAL FOR OTHERS. POUR CONCRETE ABOVE THIS JOINT AFTER DECK IS IN PLACE. IF JOINT IS USED, UTILIZE RUBBERIZED MEMBRANE WATERPROOFING (COST INCIDENTAL TO BID ITEM "CONCRETE MASONRY BRIDGES").

- 18" RUBBERIZED MEMBRANE WATERPROOFING. SEAL ALL HORIZONTAL AND VERTICAL JOINTS ON BACKFACE.

- USE #4 BARS @ 1'-0"

- OPTIONAL CONST. JOINT FORMED BY BEVELED 2" X 6" KEYWAY WITH MEMBRANE ON BACKFACE.

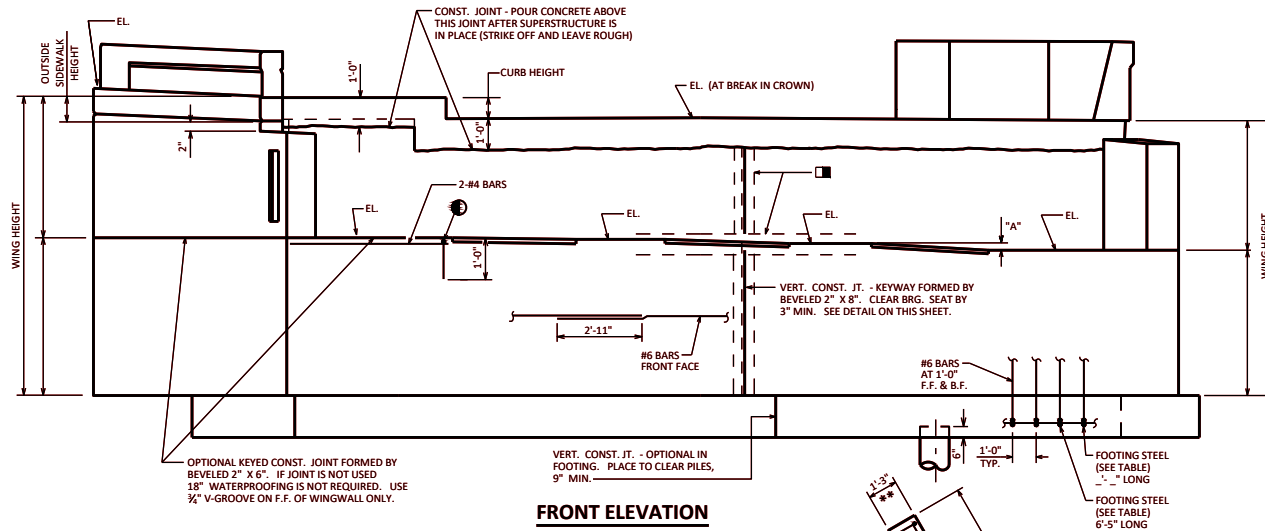
ABUTMENT TYPE A1



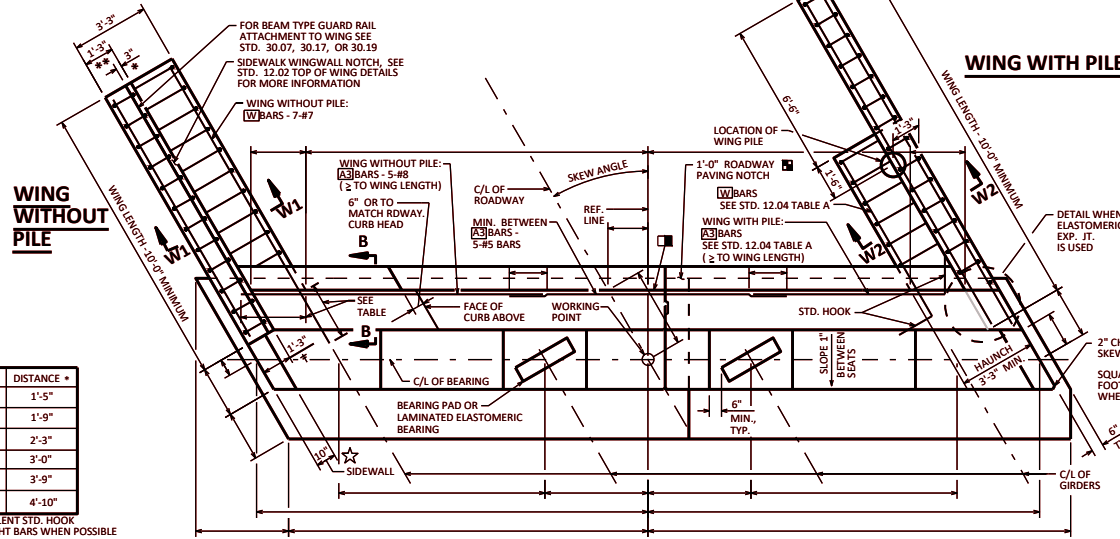
BUREAU OF STRUCTURES

APPROVED: Laura Shadewald

DATE: 7-23



FRONT ELEVATION



TABLE

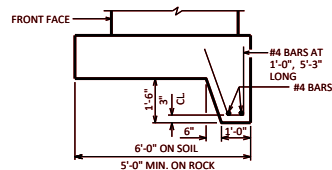
BAR SIZE	DISTANCE +
#5	1'-5"
#6	1'-9"
#7	2'-3"
#8	3'-0"
#9	3'-9"
#10	4'-10"

* OR EQUIVALENT STD. HOOK
USE STRAIGHT BARS WHEN POSSIBLE

WING WITH SIDEWALK

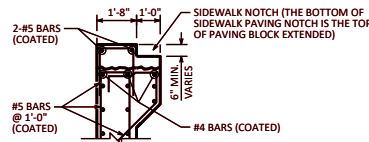
PLAN

WING WITH SLOPED FACE PARAPET



KEY DETAIL

FOR SILL ABUTMENT WITHOUT PILING PLACED ON SOIL



SECTION B-B

PILE REACTIONS PER FOOT IN KIPS	
FRONT ROW = $P[(0.22 \times X/4.25)] + [(h+2.25)/310] + 4.6$	
BACK ROW = $P[(0.78 \times X/4.25)] - [(h+2.25)/705] + 16.8$	

NOTES:

h = WING HEIGHT (FT.)

$P = \frac{1}{2} \rho_{dc} (P_{dc}) + \frac{1}{2} \rho_{dw} (P_{dw}) + \frac{1}{2} \rho_{ll} (L) (K/FT.)$

FRONT ROW PILE DESIGN IS BASED ON AN EQUIVALENT FLUID UNIT WEIGHT OF SOIL OF 40 P.C.F. WITH $\gamma_{EH} = 1.50$, AND SUPERSTRUCTURE REACTIONS "P". BACK ROW PILE DESIGN IS BASED ON AN EQUIVALENT FLUID UNIT WEIGHT OF SOIL OF 40 P.C.F. WITH $\gamma_{EH} \text{ MIN.} = 0.50$, AND "P".

PILES MUST ALSO BE DESIGNED TO ACCOUNT FOR LATERAL LOADS

DESIGNER NOTES

LAP LENGTHS FOR HORIZONTAL BARS SHALL BE BASED ON A "CLASS C" TOP TENSION LAP SPLICE.

BARS IN WINGS, ABUTMENT BACKWALL, AND PAVING BLOCK SHALL BE EPOXY COATED.

PILING SPACING IN ABUTMENT FOOTING SHALL BE 8'-0" MAXIMUM.

PILE REACTION EQUATIONS ARE FOR PRELIMINARY PILE LAYOUT PURPOSES ONLY.

TOTAL LENGTH OF #3 BARS SHALL BE $\geq$ TO WING LENGTH.

WHEN BODY SECTION IS MORE THAN 50'-0" LONG, PROVIDE VERTICAL CONSTRUCTION JOINT, RUN BAR STEEL THRU JOINT. SEAL JOINT WITH 18" RUBBERIZED MEMBRANE WATERPROOFING. SEE STD. 12.09 FOR ALTERNATE CONSTRUCTION JOINT.

IN "FRONT ELEVATION" VIEW, GIVE ELEVATION OF ALL BEARING AREAS AND ELEVATION AT BOTTOM OF PARAPETS AT EACH END OF WINGS. ALL ELEVATIONS ARE TAKEN AT FRONT FACE OF BACKWALL.

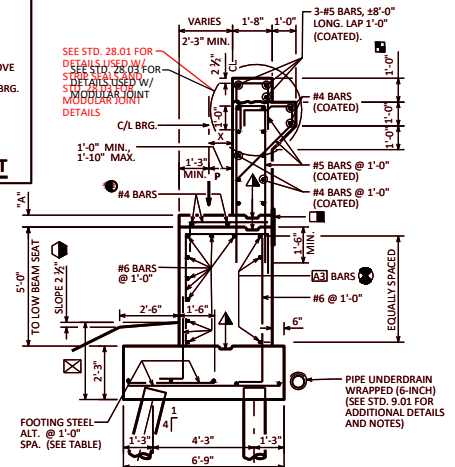
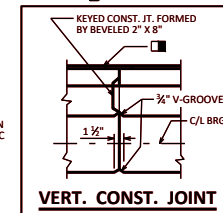
PARAPET NOT SHOWN IN PLAN VIEW FOR CLARITY.

ABUTMENT DETAILED WITHOUT STRUCTURAL APPROACH SLAB. SEE STD. 12.10 THRU 12.13 FOR STRUCTURAL APPROACH DETAILS.

SEE STANDARDS 12.01 AND 13.01 FOR SLOPED BEAM SEAT CRITERIA AND DETAILS.

LEGEND

- 18" RUBBERIZED MEMBRANE WATERPROOFING. SEAL ALL HORIZ. AND VERT. JOINTS ON BACKFACE ABOVE FOOTING.
- KEYED CONSTRUCTION JOINT FORMED BY BEVELED 2" X 6".
- #4 AT 9" BEAM SEAT. SPACE AT 1'-0" BETWEEN SEATS. THIS STEEL IS REQUIRED ONLY IF DIMENSION "A" EXCEEDS 4".
- 1'-5" WHEN VERTICAL FACE PARAPET TYPE "TX" IS USED.
- 4" WHEN VERTICAL FACE PARAPET TYPE "TX" IS USED.
- ** WINGWALL WIDTH SHALL BE 1'-6" WHEN TYPE "TM" RAILING, VERTICAL FACE PARAPET "TX", OR SINGLE SLOPE PARAPET "565S" IS USED. "565S" SHOULD NOT BE USED ON A SIDEWALK. WINGWALL WIDTH SHALL BE 1'-4" WHEN PARAPET "A" ON A RAISED SIDEWALK IS USED. WINGWALL WIDTH SHALL BE 1'-9" WHEN TYPE "NY3" OR "NY4" RAILING IS USED. (USE 2'-0" WIDTH WHEN NY4 IS USED ON A SIDEWALK)
- 3'-3" (SLOPE PAVING), 4'-6" (HEAVY RIPRAP)
- PAVING NOTCH IS 1'-0" WIDE BY 1'-4" DEEP IF STRUCTURAL APPROACH SLAB (STD. 12.10) IS USED. SHOW NO. 9 STAINLESS STEEL BAR (STD 12.12) FOR STRUCTURAL APPROACH SLAB ON THE ABUTMENT SHEET.
- ☆ SIDEWALK IS 1'-3" WIDE IF STRUCTURAL APPROACH SLAB (STD. 12.10) IS USED.
- SHOW ALL BARS FOR CLARITY.
- NO SLOPE FOR HEAVY RIPRAP. SEE STANDARD 12.08 FOR DETAILS.



SECTION THRU BODY

ALL FOOTING BARS NOT IDENTIFIED ARE #5 BARS

P K/FT.	FOOTING STEEL SIZE
20	#6
40	#7
62	#8
75	#9

ABUTMENT TYPE A3

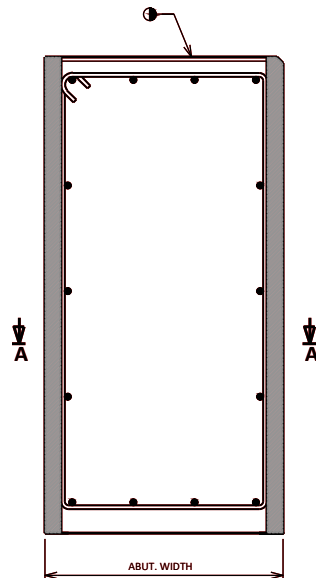
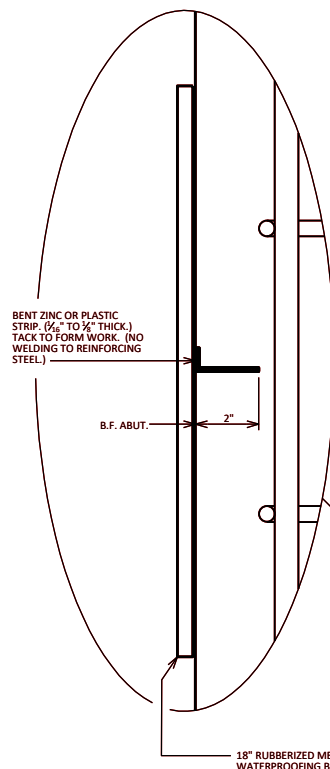


**BUREAU OF
STRUCTURES**

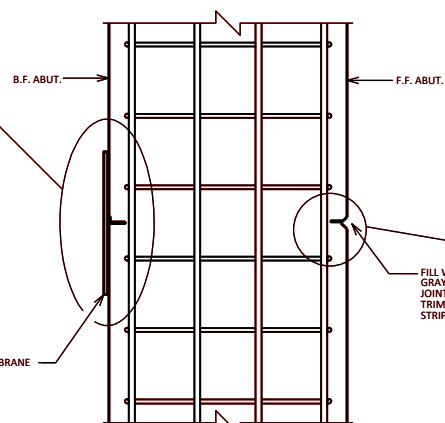
APPROVED: *Laura Shadewald*

DATE:
7-23

A3 ABUTMENT

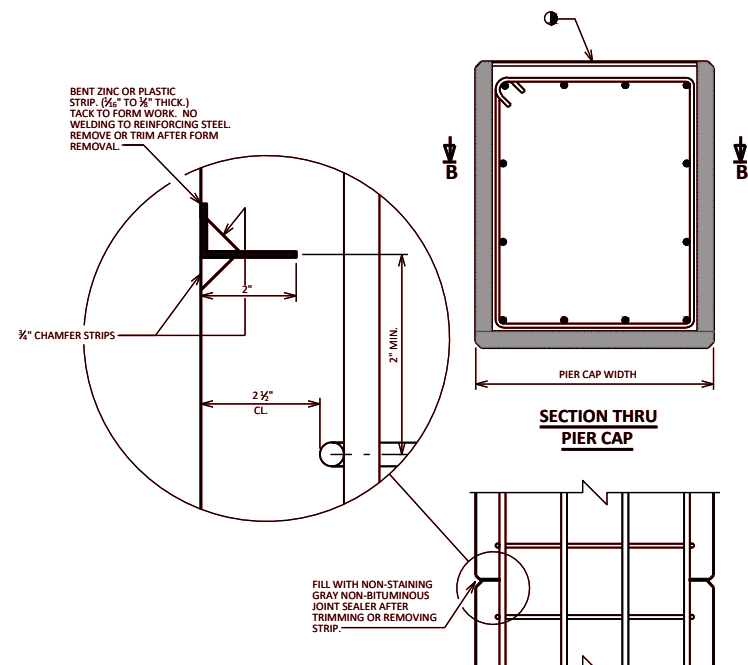


SECTION THRU
ABUTMENT BODY
A1 ABUTMENT SHOWN, A5 SIMILAR



SECTION A-A

ALTERNATE CONSTRUCTION JOINT AT ABUTMENT



SECTION B-B

ALTERNATE CONSTRUCTION JOINT AT PIER CAP

NOTES

PARTIAL ZINC OR PLASTIC BULKHEAD MAY BE USED AS ALTERNATE CONSTRUCTION JOINT, WITH THE PERMISSION OF THE ENGINEER, AT THE CONTRACTOR'S EXPENSE.

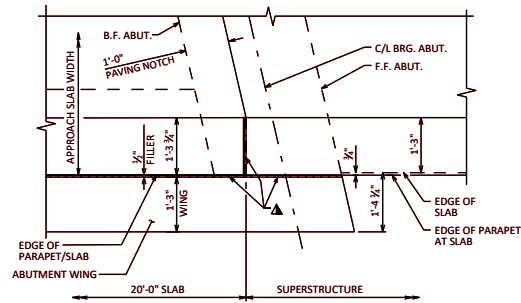
VERTICAL CONSTRUCTION JOINT KEYWAY IS NOT
REQUIRED WHEN USING ALTERNATE CONSTRUCTION
JOINT.

CARE IS TO BE USED IN CASTING CONCRETE AROUND BULKHEAD TO PREVENT DISLOCATION OR MISALIGNMENT OF THE BULKHEAD.

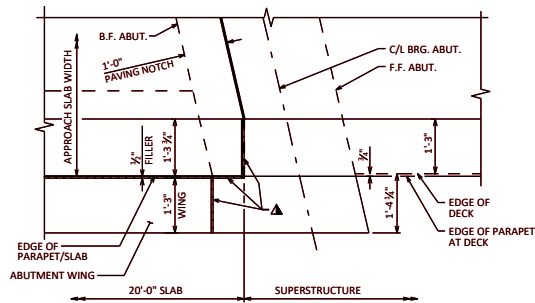
SAW CUTTING JOINT IS NOT ALLOWED.

- USE A JOINT TOOL TO CONSTRUCT A CONTRACTION JOINT APPROXIMATELY 1/2" DEEP.
- * BENT ZINC OR PLASTIC STRIP.

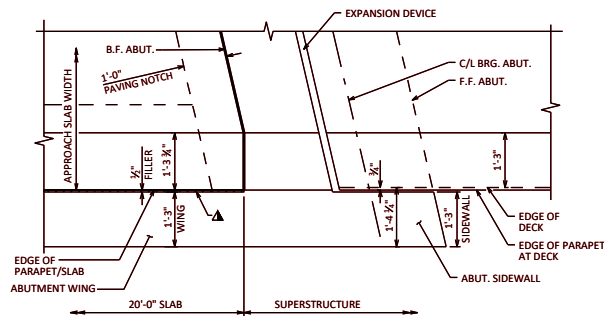
ALTERNATE CONSTRUCTION JOINT	
	BUREAU OF S T R U C T U R E S
APPROVED: <i>Laura Shadewald</i>	DATE: <i>1-18</i>



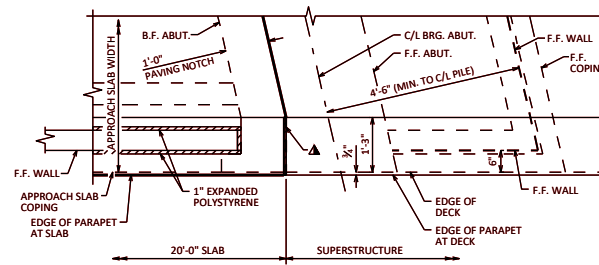
APPROACH SLAB PARTIAL PLAN
(AT WINGWALLS PARALLEL TO BRIDGE - A1 ABUT. - SLAB SPAN)



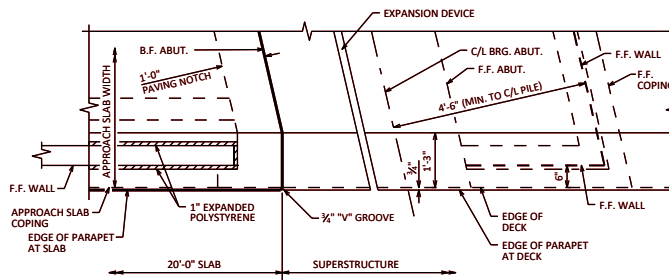
APPROACH SLAB PARTIAL PLAN
(AT WINGWALLS PARALLEL TO BRIDGE - A1 ABUT. - GIRDER SPAN)



APPROACH SLAB PARTIAL PLAN *
(AT WINGWALLS PARALLEL TO BRIDGE - A3 ABUT. - GIRDER SPAN)



APPROACH SLAB PARTIAL PLAN *
(AT WINGWALLS PARALLEL TO BRIDGE - A1 ABUT. AT MSE WINGWALLS - GIRDER SPAN)



APPROACH SLAB PARTIAL PLAN *
(AT WINGWALLS PARALLEL TO BRIDGE - A3 ABUT. AT MSE WINGWALLS - GIRDER SPAN)

LEGEND

- ▲ SEAL ALL EXPOSED HORIZONTAL AND VERTICAL SURFACES OF 1/2" FILLER WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. (1" DEEP AND HOLD 1/8" BELOW SURFACE OF CONCRETE).
- * PARTIAL PLAN REPRESENTATIVE OF SIMILAR LOCATION AS SHOWN ON STANDARD 12.10 FOR DIFFERENT APPLICATION.

PARTIAL PLANS SHOWN HERE ARE FROM STANDARD 12.10

STRUCTURAL APPROACH SLAB DETAILS 3

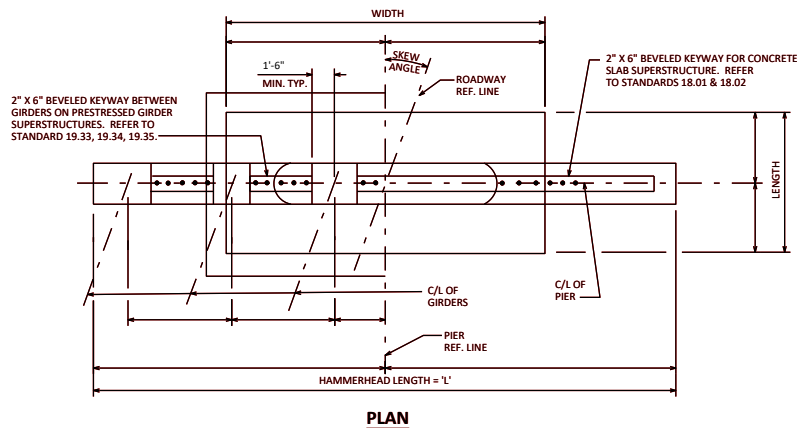


**BUREAU OF
STRUCTURES**

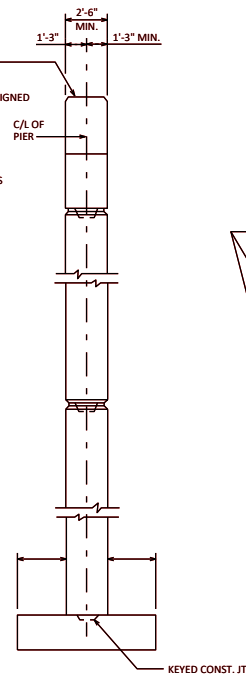
APPROVED: *Laura Shadewald*

DATE:
7-18

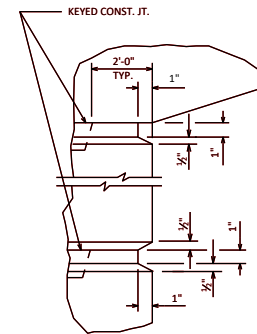
CONCRETE SLAB STRUCTURES



END VIEW



CONST. JT.
DETAIL



ALL BAR SPLICES TO BE BASED ON "CLASS C" TENSION LAP SPLICE
UNLESS OTHERWISE SHOWN.

OPTIONAL KEYED CONSTRUCTION JOINTS IN SHAFT, IF PROVIDED, SHALL BE PLACED APPROXIMATELY 2'-0" ABOVE NORMAL WATER ELEVATION. OPTIONAL KEYED CONSTRUCTION JOINTS IN SHAFT SHOULD BE PROVIDED SO THAT THE MAXIMUM HEIGHT OF POUR NEED NOT EXCEED 25'-0". DETAIL BAR SPLICES AT OPTIONAL JOINTS IF THE BAR PROJECTION WOULD BE GREATER THAN 20'-0". RUSTICATIONS SHOWN IN "CONST. JT. DETAIL" MAY BE OMITTED AT THE OPTION OF THE DESIGNER.

KEYED CONSTRUCTION JOINTS SHALL BE FORMED BY BEVELED KEYWAY 4" DEEP X 1/3 THICKNESS OF SHAFT X 4'-0" LESS THAN LENGTH OF SHAFT.

✦ A STANDARD SHAFT TAPER OF 10% MAY BE USED AT THE OPTION OF THE DESIGNER. (LATERAL DIRECTION ONLY)

SHAFT MAY BE TAPERED IN ONE OR TWO DIRECTIONS WHEN REQUIRED FOR STRUCTURAL REASONS.

A NON-STANDARD SHAFT CROSS-SECTION, SHAPE, OR TAPER, NOT REQUIRED FOR STRUCTURAL REASONS, MAY BE USED ONLY WITH THE APPROVAL OF THE STRUCTURES DESIGN SECTION.

BEARING SEAT AREAS SHALL BE LEVEL EXCEPT FOR THE TWO CASES LISTED BELOW:

1. FOR GIRDERS WITH $\frac{1}{2}$ " ELASTOMERIC BEARING PADS
WHEN THE BOTTOM OF THE GIRDERS SLOPE MORE THAN 1%.
SEE STANDARD 13.01.

2. FOR CONCRETE SLAB SUPERSTRUCTURES MAKE THE TOP OF CAP PARALLEL TO GRADE. SEE STANDARD 18.01.

BEAM SEATS MAY BE ANGLED TO MATCH SKEW AT THE DESIGN ENGINEER'S DISCRETION.

SEE STANDARD 12.01 FOR ADDITIONAL REINFORCING STEEL IN BEARING AREA FOR BEAM SEATS OF NON-SLOPED CAPS THAT ARE 4 INCHES OR MORE ABOVE THE LOWEST BEAM SEAT.

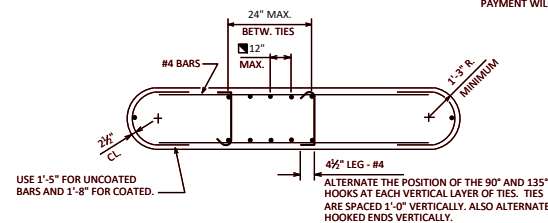
■ THIS MAXIMUM VERT. BAR SPACING APPLIES ONLY WHEN THE VERTICAL REINFORCEMENT IS 1% OR MORE OF THE GROSS CONCRETE AREA.

SEE STANDARD 13.01 FOR MINIMUM OFFSETS FROM BEARINGS TO SIDES OF CAP AND TO ADJACENT BEARING SEAT STEPS.

EPOXY COAT BAR STEEL DOWN TO TOP OF FOOTINGS IN ALL PIERS
UNDER EXPANSION JOINTS AND ON ALL PIERS AT GRADE SEPARATIONS.

* INCREASE THIS DIMENSION IF NECESSARY TO PREVENT BATTERED PILES FROM DRIVING INTO SHEET PILING. ALSO INCREASE DIMENSION TO FACILITATE OVERHEAD SHEETING CLEARANCE IF THE TOP OF PIER IS BEYOND NORMAL SEAL SIZE AND NO CONSTRUCTION JOINT IS PROVIDED IN THE SHAFT/CAP REGION (E.G. TAPERED WALL PIERS OR SHORTER HAMMERHEADS WITH RADIUS TRANSITION FROM SHAFT TO CAP).

THE BAR SPLICES AT THE OPTIONAL KEYED CONSTRUCTION JOINTS MAY BE ELIMINATED WHETHER OR NOT THE JOINT IS UTILIZED. PAYMENT WILL BE FOR THE ACTUAL BARS INSTALLED.

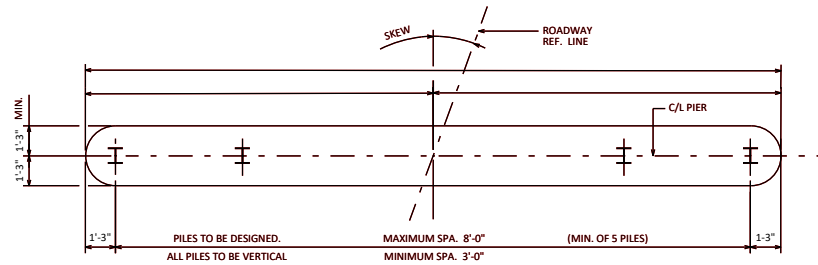
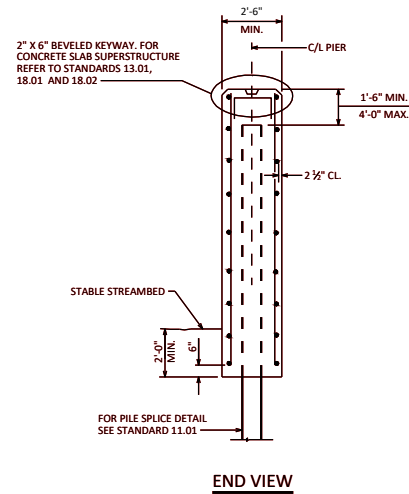
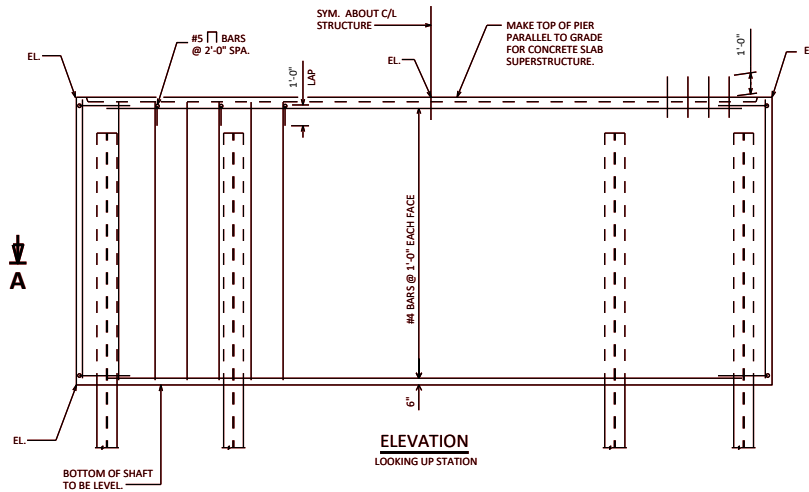


ALTERNATE SECTION P1

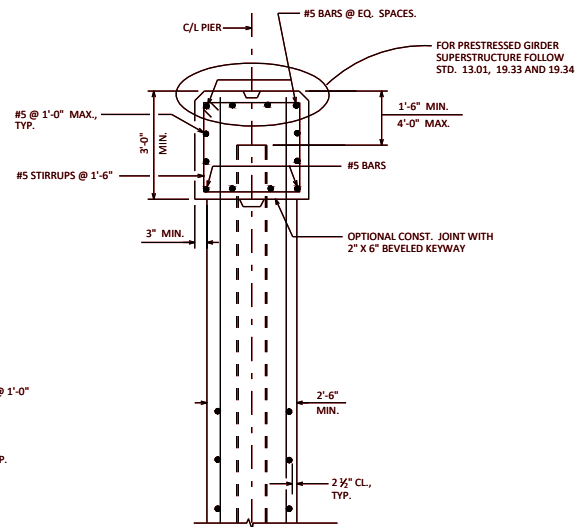
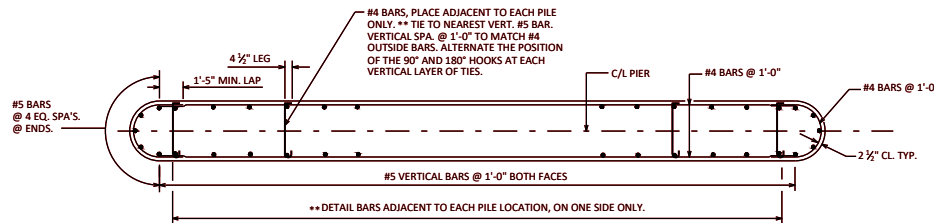
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
7-21



STEEL PILING SHOWN. CAST IN PLACE CONC. PILING LAYOUT SIMILAR.



USE WHEN ECONOMICAL FOR GIRDERS ON LARGE SKEWS

NOTES

- TYPE 1 PIER AT PIER __, CONCRETE POURED UNDERWATER WILL BE ALLOWED AND SHALL BE DONE IN ACCORDANCE WITH STANDARD SPEC 502.3.5.3. CONCRETE POURED UNDERWATER SHALL NOT EXCEED 10.0 FEET IN DEPTH, UNLESS APPROVED OTHERWISE.
- TYPE 2 PIER AT PIER __, COFFERDAM REQUIRED. CONCRETE POURED UNDERWATER WILL BE ALLOWED AND SHALL BE DONE IN ACCORDANCE WITH STANDARD SPEC 502.3.5.3. CONCRETE POURED UNDERWATER SHALL NOT EXCEED 10.0 FEET IN DEPTH, UNLESS APPROVED OTHERWISE.
- TYPE 3 PIER AT PIER __, COFFERDAM AND COFFERDAM DEWATERING REQUIRED. COFFERDAM SHALL BE DEWATERED PRIOR TO PLACING PIER CONCRETE.

DESIGNER NOTES

SEE BRIDGE MANUAL SECTION 13.2.3 AND STANDARD 13.09 FOR GUIDANCE ON PIER TYPES, DETAILS, AND APPLICABLE BID ITEMS.

SEE BRIDGE MANUAL SECTION 13.11.5 FOR GUIDANCE ON COFFERDAMS.

CONSTRUCTION JOINTS ARE NOT REQUIRED, REGARDLESS OF LENGTH OF PILE ENCASED PIER.

SEE STANDARD 13.01 FOR ADDITIONAL, APPLICABLE DESIGNER NOTES

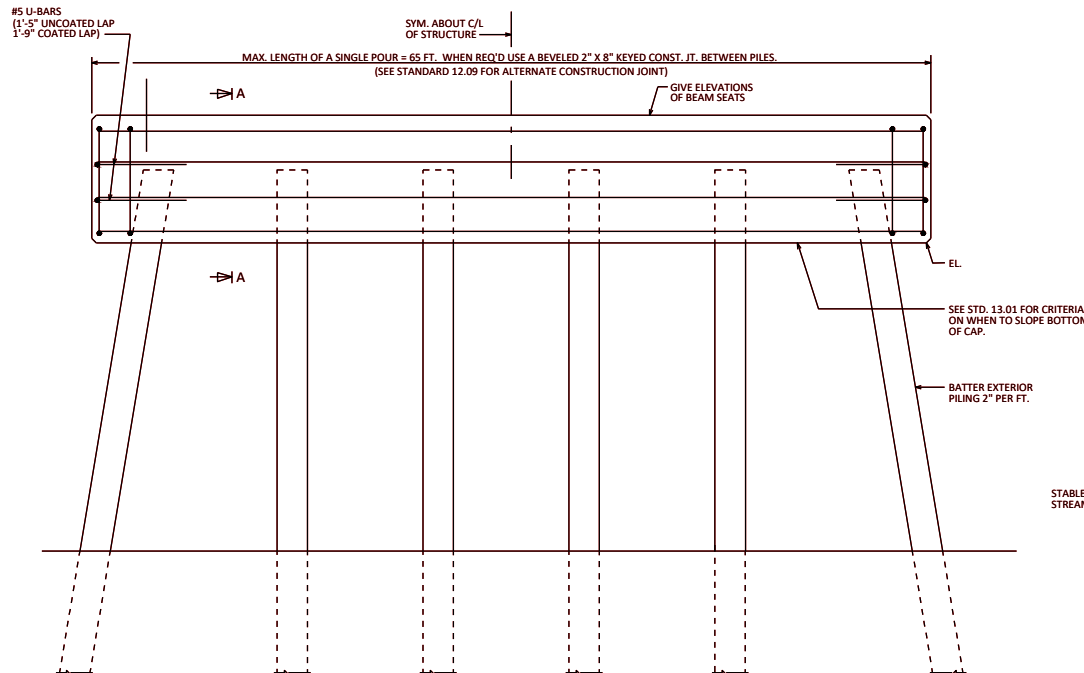
PILE ENCASED PIER



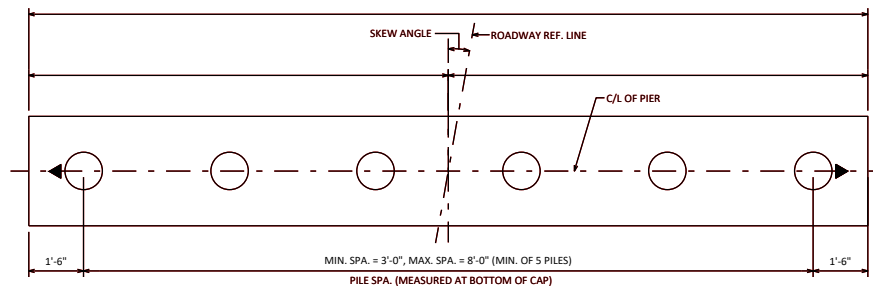
BUREAU OF
STRUCTURES

APPROVED: *Laura Shadewald*

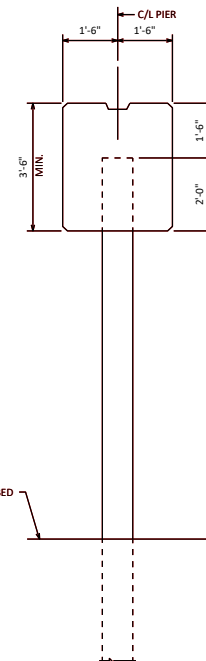
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7-19



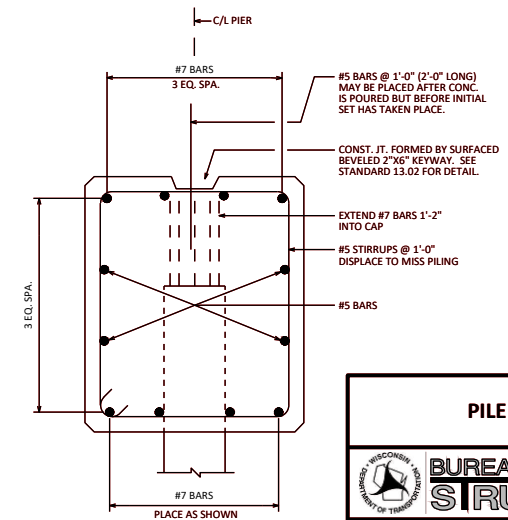
ELEVATION
LOOKING UP STATION



PLAN



END VIEW



SECTION A-A

NOTES

PILES SHALL BE PAINTED IN ACCORDANCE WITH SECTION 550.3.11.3 OF THE STANDARD SPECIFICATIONS.

DESIGNER NOTES

ALL BAR SPLICES TO BE BASED ON "CLASS C" TENSION LAP SPLICE UNLESS OTHERWISE SHOWN.

BEARING SEAT AREAS SHALL BE LEVEL EXCEPT FOR THE TWO CASES LISTED BELOW:

1. FOR GIRDERS WITH $\frac{1}{2}$ " ELASTOMERIC BEARING PADS WHEN THE BOTTOM OF THE GIRDERS SLOPE MORE THAN 1%. SEE STANDARD 13.01.
2. FOR CONCRETE SLAB SUPERSTRUCTURES MAKE THE TOP OF THE CAP PARALLEL TO GRADE. SEE STANDARD 18.01.

BEAM SEATS MAY BE ANGLED TO MATCH SKEW AT THE DESIGN ENGINEER'S DISCRETION.

SEE STANDARD 12.01 FOR ADDITIONAL REINFORCING STEEL IN BEARING AREA FOR BEAM SEATS OF NON-SLOPED CAPS THAT ARE 4" OR MORE ABOVE LOWEST BEAM SEAT.

PILES SHALL BE 12 $\frac{1}{2}$ " OR 14" DIAMETER CAST-IN-PLACE WITH MINIMUM WALL THICKNESS OF $\frac{3}{8}$ ".

SEE STANDARD 11.01 FOR REQUIRED PILE REINFORCING DETAILS.

H-PILE USE REQUIRES PRIOR APPROVAL DURING DESIGN OF THE STRUCTURES DEVELOPMENT CHIEF, (608) 266-0075.

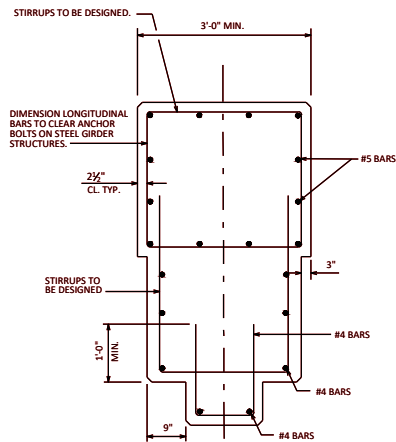
PILE BENT



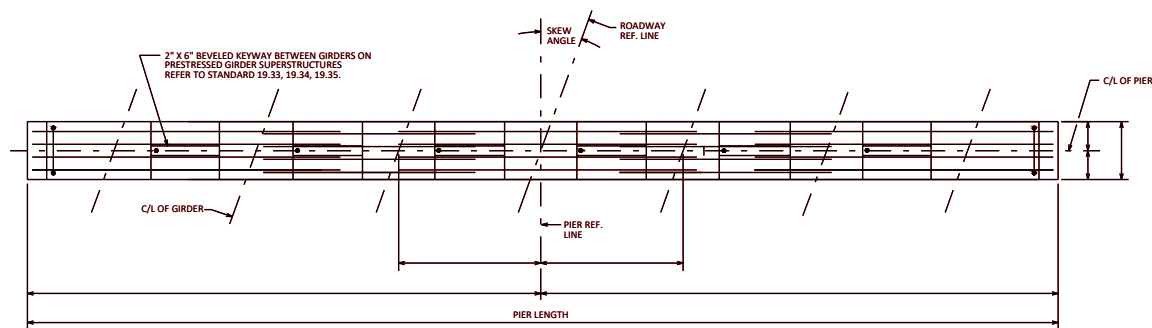
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

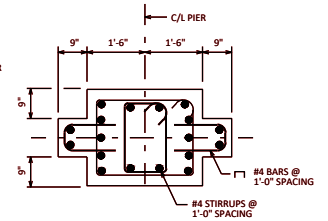
DATE:
1-23



SECTION P1



PLAN OF PIER CAP



SECTION P2

DESIGNER NOTES

ALL BAR SPICES TO BE BASED ON "CLASS C" TENSION LAP SPICE UNLESS OTHERWISE SHOWN.

OPTIONAL KEYED CONSTRUCTION JOINTS IN COLUMNS (IF USED) AND REQUIRED KEYED JOINTS FOR FOOTINGS SHALL BE FORMED BY A BEVELED KEYWAY 2" DEEP X 1'-3" X 1'-3". EXPOSED EDGES OF CONSTRUCTION JOINTS SHALL BE FLUSH AND NOT BEVELED IN COLUMNS.

BEARING SEAT AREAS SHALL BE LEVEL EXCEPT FOR THE TWO CASES LISTED BELOW:

1. FOR GIRDERS WITH 3/8" ELASTOMERIC BEARING PADS WHEN THE BOTTOM OF THE GIRDERS SLOPE MORE THAN 1%. SEE STANDARD 13.01.
2. FOR CONCRETE SLAB SUPERSTRUCTURES MAKE THE TOP OF THE CAP PARALLEL TO GRADE. SEE STANDARD 18.01.

BEAM SEATS MAY BE ANGLED TO MATCH SKEW AT THE DESIGN ENGINEER'S DISCRETION.

SEE STANDARD 12.01 FOR ADDITIONAL REINFORCING STEEL IN BEARING AREA FOR BEAM SEATS THAT ARE 4" OR MORE ABOVE LOWEST BEAM SEAT.

EPOXY COAT BAR STEEL DOWN TO TOP OF FOOTINGS IN ALL PIERS UNDER EXPANSION JOINTS AND ON ALL PIERS AT GRADE SEPARATIONS.

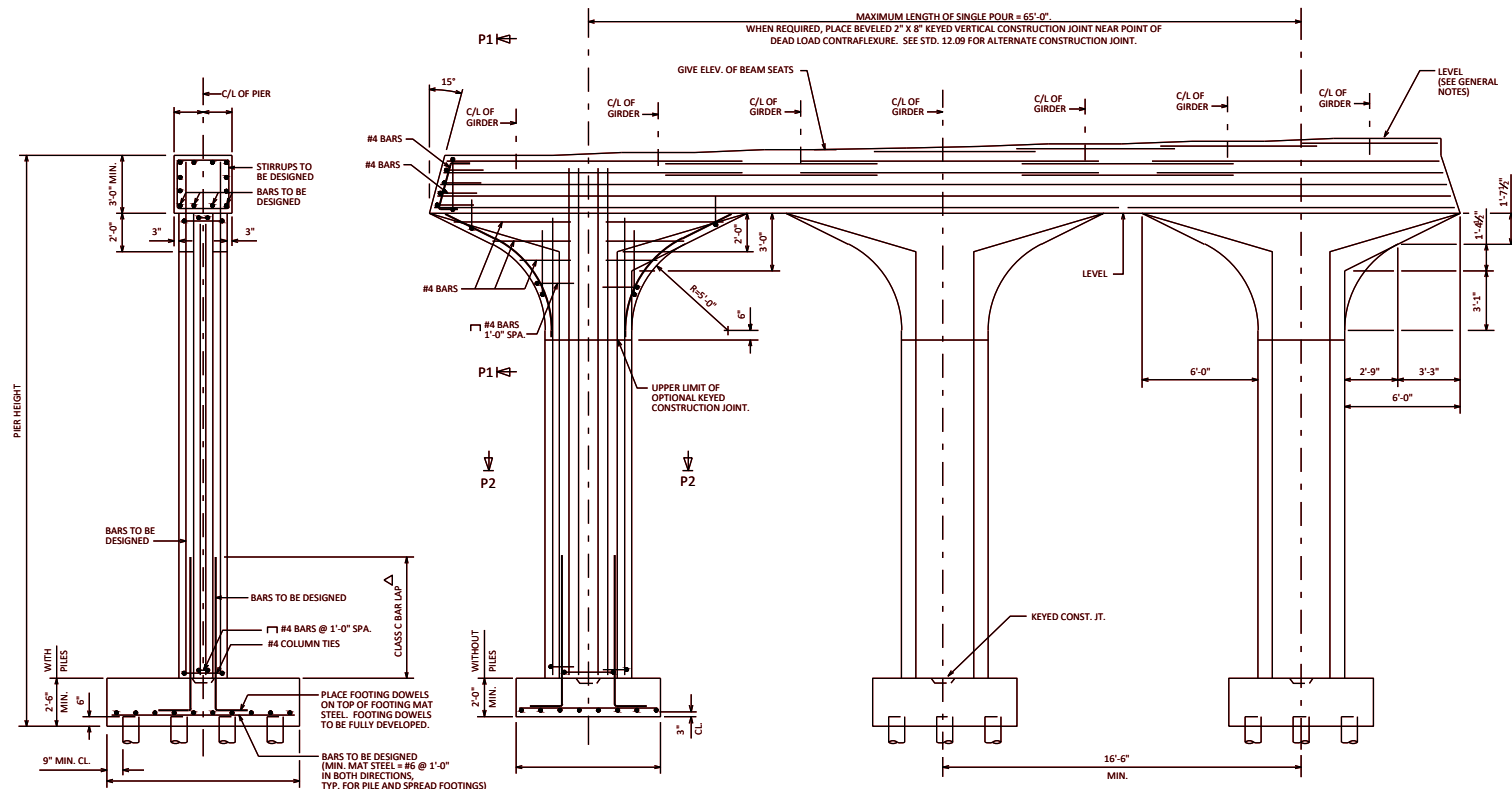
BAR STEEL REQUIRED FOR BENDING IN PIER CAP SHALL BE DETAILED IN LENGTHS AS REQUIRED FOR CONSTRUCTIBILITY AND BY DESIGN SPECIFICATIONS. MAXIMUM REQUIRED BAR STEEL IN THE TOP OF THE PIER CAP (NEGATIVE MOMENT STEEL) MAY BE DETAILED FULL LENGTH IF A MINOR COST INCREASE.

SEE STANDARD 13.01 FOR MINIMUM OFFSETS FROM BEARINGS TO SIDES OF CAP AND TO ADJACENT BEARING SEAT STEPS.

FOR CASES WITH CRASH WALLS, DEFER TO NON-AESTHETIC TYPE MULTI-COLUMNED PIERS.

SEE BRIDGE MANUAL 13.4.10 FOR MULTI-COLUMNED PIER DESIGN REGARDING VEHICULAR COLLISION FORCE.

△ NORMALLY THIS LAP IS OMITTED AND FOOTING DOWELS EXTENDED INTO THE CAP IF THE LAP IS GREATER THAN ONE-HALF THE COLUMN HEIGHT.



ELEVATION
LOOKING UP STATION

END VIEW

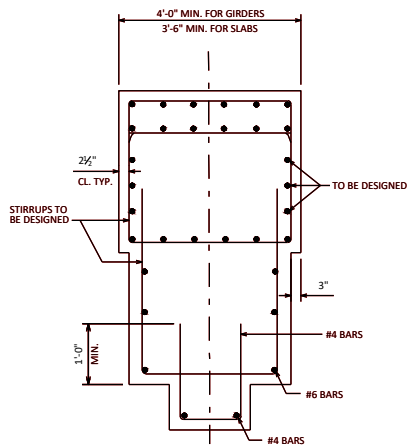
**MULTI-COLUMNED
PIER TYPE 2**



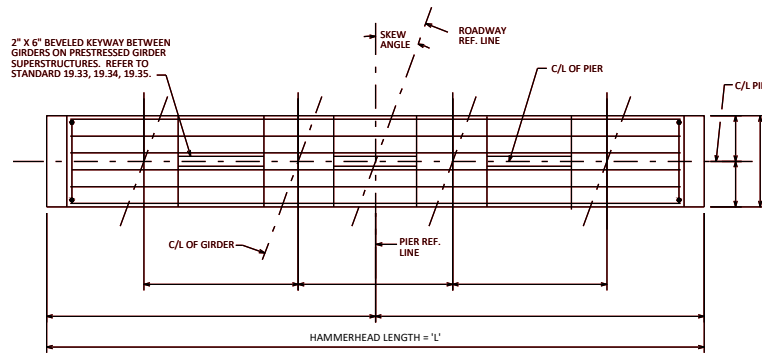
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

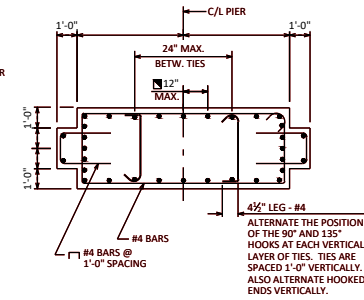
DATE:
1-20



SECTION P1



PLAN OF PIER CAP



SECTION P2

NOTES

THE BAR SPLICES AT THE OPTIONAL KEYED CONSTRUCTION JOINTS MAY BE ELIMINATED WHETHER OR NOT THE JOINT IS UTILIZED. PAYMENT WILL BE FOR THE ACTUAL BATS INSTALLED.

DESIGNER NOTES (CONT')

- THIS MAXIMUM VERT. BAR SPACING APPLIES ONLY WHEN THE VERTICAL REINFORCEMENT IS 1% OR MORE OF THE GROSS CONCRETE AREA.

DESIGNER NOTES

ALL BAR SPLICES TO BE BASED ON "CLASS C" TENSION LAP SPICE UNLESS OTHERWISE SHOWN.

OPTIONAL KEYED CONSTRUCTION JOINTS IN SHAFT, IF PROVIDED, SHALL BE PLACED APPROXIMATELY 2'-0" ABOVE NORMAL WATER ELEVATION. OPTIONAL KEYED CONSTRUCTION JOINTS IN SHAFT SHOULD BE PROVIDED SO THAT THE MAXIMUM HEIGHT OF POUR NEED NOT EXCEED 25'-0" ±. DETAIL BAR SPLICES AT OPTIONAL JOINTS IF THE BAR PROJECTION WOULD BE GREATER THAN 20'-0" ±.

KEYED CONSTRUCTION JOINTS SHALL BE FORMED BY BEVELED KEYWAY 4" DEEP X 1/3 THICKNESS OF SHAFT X 4'-0" LESS THAN LENGTH OF SHAFT. EXPOSED EDGES OF CONSTRUCTION JOINT SHALL BE FLUSH AND NOT BEVELED.

BEARING SEAT AREAS SHALL BE LEVEL EXCEPT FOR THE TWO CASES LISTED BELOW:

- FOR GIRDER WITH 1/2" ELASTOMERIC BEARING PADS WHEN THE BOTTOM OF THE GIRDERS SLOPE MORE THAN 1%. SEE STANDARD 13.01.
- WHEN A CAP IS USED FOR CONCRETE SLAB SUPERSTRUCTURES MAKE THE TOP OF CAP PARALLEL TO GRADE. SEE STANDARD 18.01.

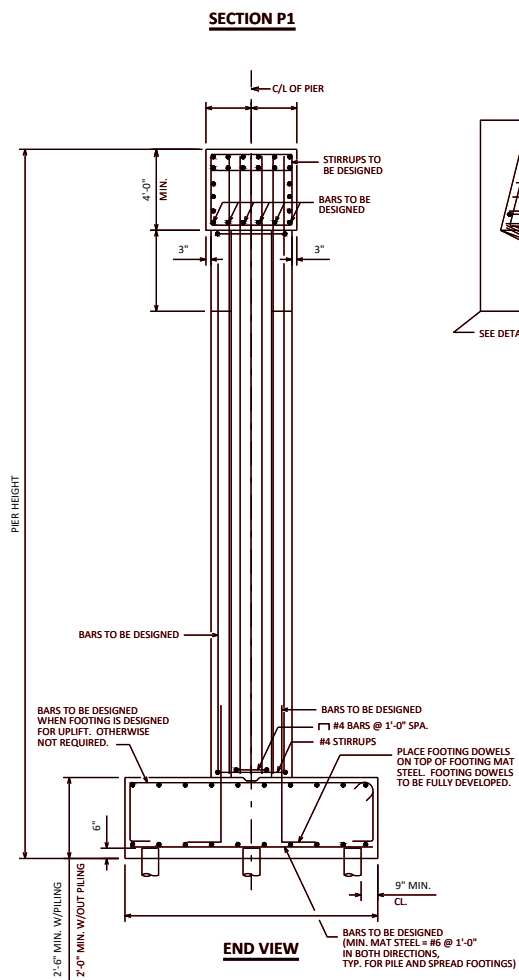
BEAM SEATS MAY BE ANGLED TO MATCH SKEW AT THE DESIGN ENGINEER'S DISCRETION.

SEE STANDARD 12.01 FOR ADDITIONAL REINFORCING STEEL IN BEARING AREA FOR BEAM SEATS THAT ARE 4" OR MORE ABOVE LOWEST BEAM SEAT.

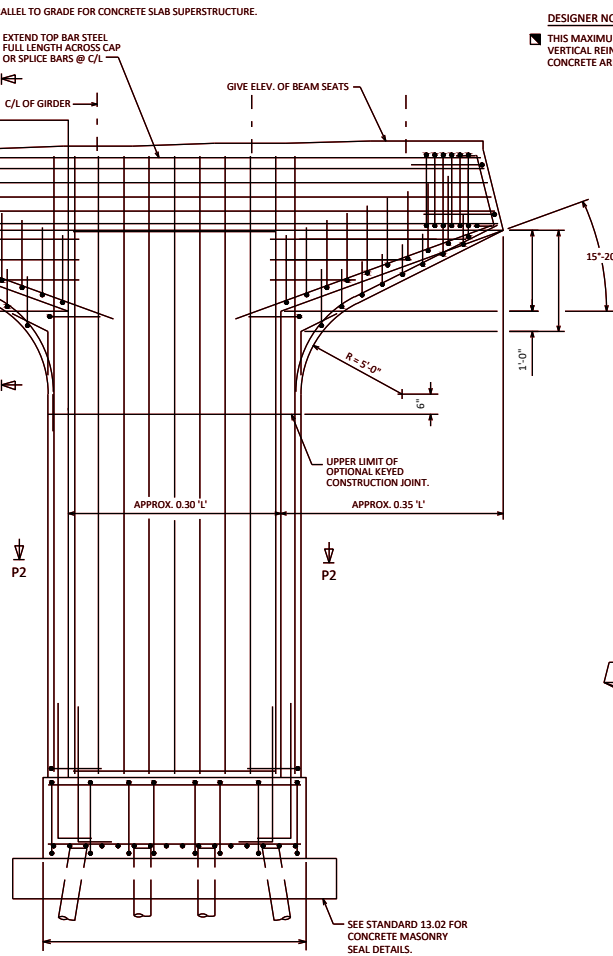
FOR "HAMMERHEAD LENGTH" GREATER THAN 45'-0", CONSIDER A TWO SHAFT PIER FRAME RESEMBLING TWO HAMMERHEAD PIERS PLACED SIDE BY SIDE.

SEE STANDARD 13.01 FOR MINIMUM OFFSETS FROM BEARINGS TO SIDES OF CAP AND TO ADJACENT BEARING SEAT STEPS.

EPOXY COAT BAR STEEL DOWN TO TOP OF FOOTINGS IN ALL PIERS UNDER EXPANSION JOINTS AND ON ALL PIERS AT GRADE SEPARATIONS.

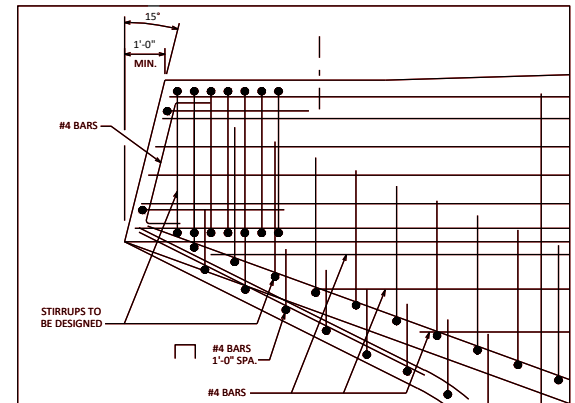


END VIEW

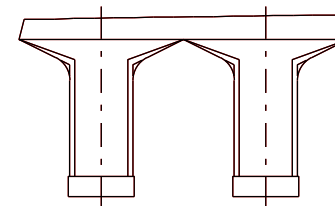


ELEVATION

LOOKING UP STATION



DETAIL A



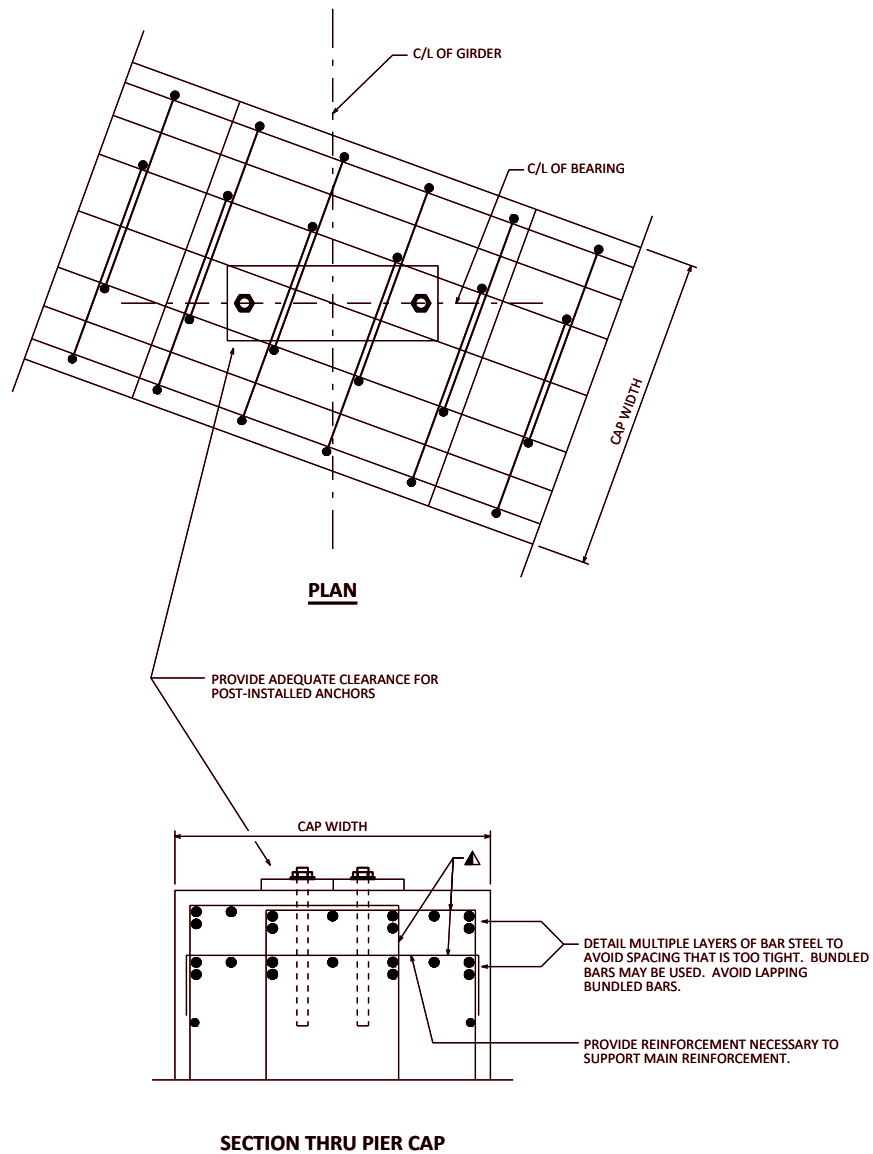
TWO SHAFT PIER

HAMMERHEAD PIER - TYPE 2



APPROVED: *Laura Shadewald*

DATE:
7-21



DESIGNER NOTES

PROVIDE 4" MIN. CLEAR BETWEEN ANCHOR BOLTS AND REINFORCEMENT.

FOR PIER CAPS UP TO 3'-6" WIDE, PROVIDE AT LEAST ONE 5" MIN. CLEARANCE BETWEEN REINFORCING BARS FOR CONCRETE PLACEMENT BY TREMIE AND FOR VIBRATION. FOR CAPS GREATER THAN 3'-6" WIDE, PROVIDE AT LEAST TWO SUCH GAPS.

SHOW ANCHORS LOCATIONS ON PIER CAP SHEETS.

ABUTMENT REINFORCEMENT LAYOUT SIMILAR TO PIER CAP REINFORCEMENT DETAILING.

NOTE

- ▲ DISPLACE TRANSVERSE STIRRUP BARS AS NEEDED TO PROVIDE 4" MIN. CLEAR BETWEEN ANCHOR BOLTS AND REINFORCEMENT.

PIER CAP REINFORCEMENT DETAILING



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
1-17

DESIGNER NOTES

PIER TYPES SHOWN ON THIS STANDARD ARE BASED ON THE OBSERVED WATER ELEVATION. OTHER FACTORS (VELOCITY, H₂ ELEVATION, ETC.) SHOULD ALSO BE CONSIDERED WHEN SELECTING THE APPROPRIATE BID ITEMS AND PLAN NOTES.

PILE ENCASED PIER TYPES:

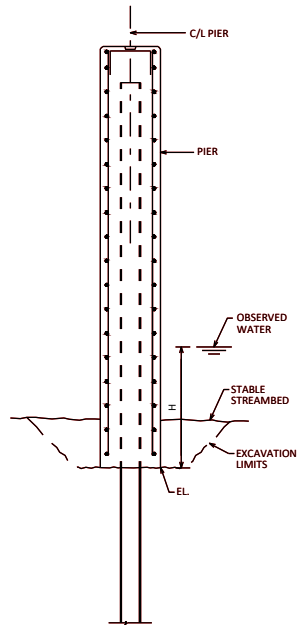
TYPE 1 - COFFERDAM BID ITEM NOT PROVIDED. CONSIDER PROVIDING UNDERWATER INSPECTION BID ITEM.

TYPE 2 - COFFERDAM AND UNDERWATER INSPECTION BID ITEMS REQUIRED.

TYPE 3 - COFFERDAM AND SEAL BID ITEMS REQUIRED.

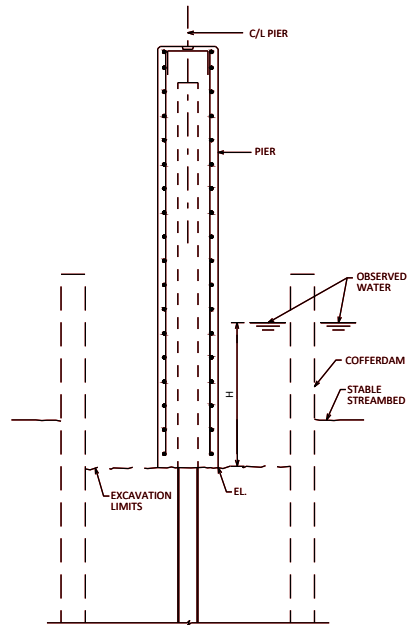
WALL PIER ALTERNATIVES:

- SOLID WALL (AS SHOWN ON THIS STANDARD)
- HAMMERHEAD (SEE STANDARD 13.02)



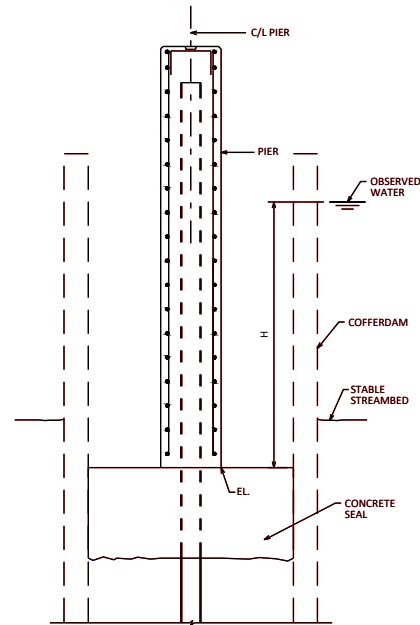
END VIEW

PILE ENCASED PIER - TYPE 1
(H ≤ 5.0 FEET)



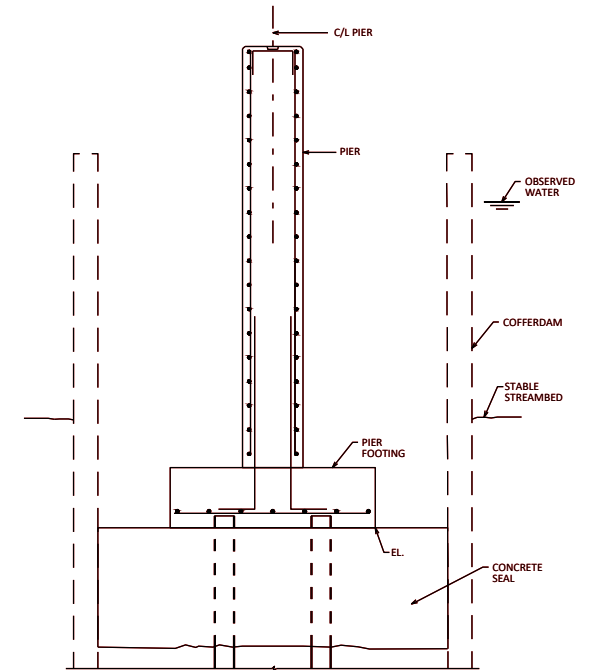
END VIEW

PILE ENCASED PIER - TYPE 2
(5.0 FT < H ≤ 10.0 FT)



END VIEW

PILE ENCASED PIER - TYPE 3
(H > 10.0 FT)



END VIEW

SOLID WALL PIER
(PILE ENCASED PIER ALTERNATIVE)

ITEM NUMBER	BID ITEM	UNIT
206.5001	COFFERDAMS (STRUCTURE)	EACH
502.9000.5	UNDERWATER SUBSTRUCTURE INSPECTION (STRUCTURE)	EACH

ITEM NUMBER	BID ITEM	UNIT
206.5001	COFFERDAMS (STRUCTURE)	EACH
502.1100	CONCRETE MASONRY SEAL	CY

ITEM NUMBER	BID ITEM	UNIT
206.5001	COFFERDAMS (STRUCTURE)	EACH
502.1100	CONCRETE MASONRY SEAL	CY

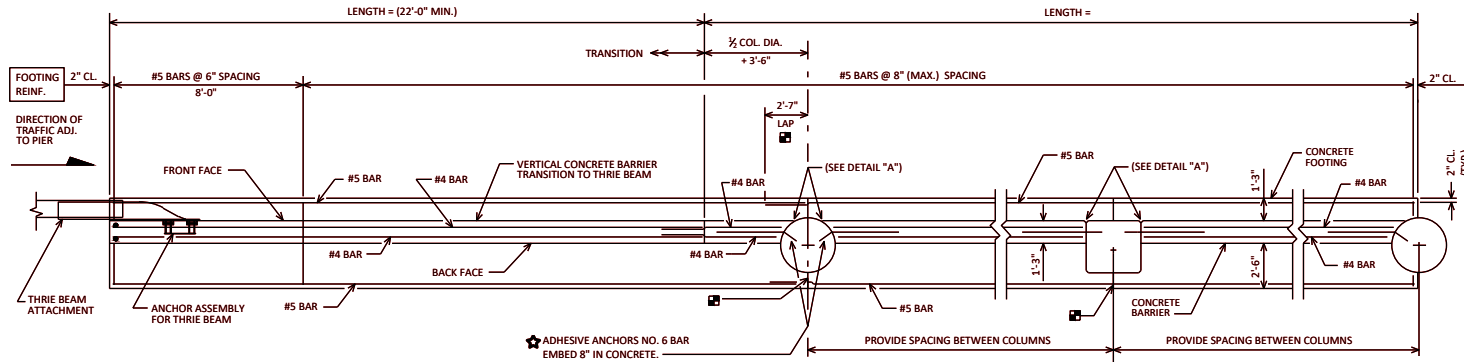
PILE ENCASED PIER (TYPES)



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

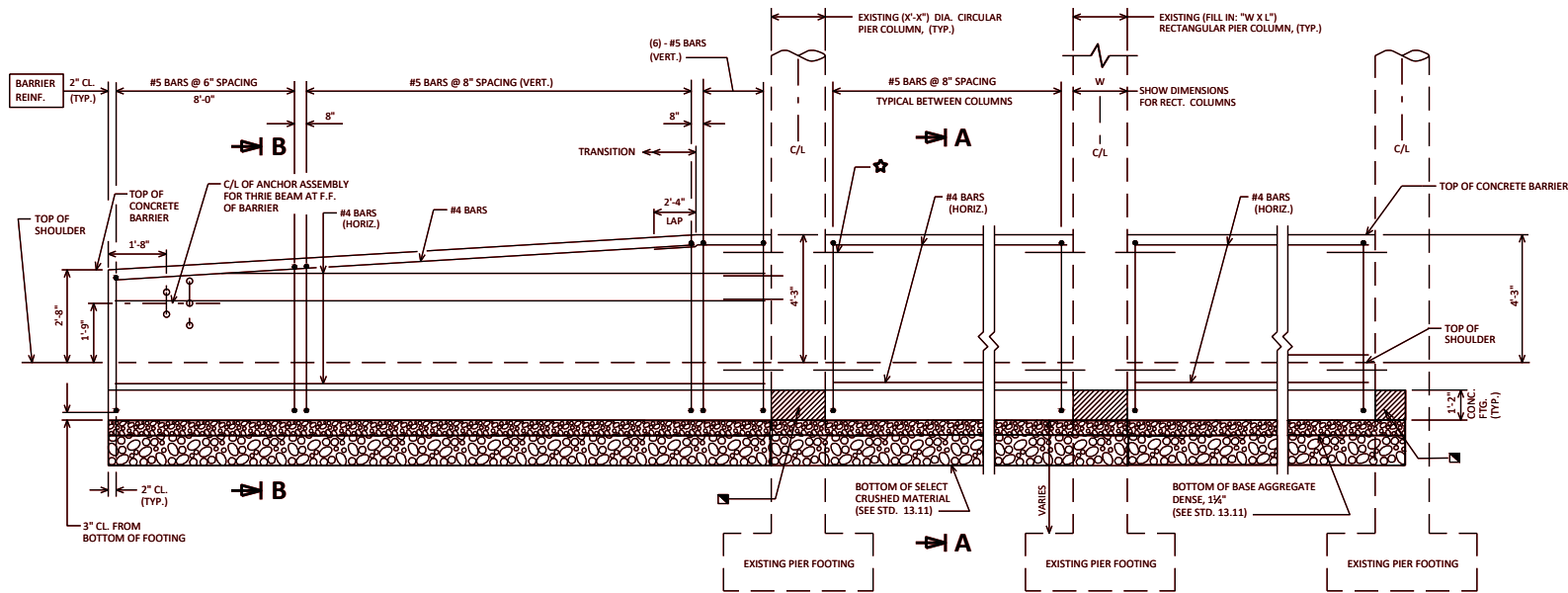
DATE:
7-23



OPTIONAL CONSTRUCTION JOINTS IN FOOTINGS PLACED ALONG C/L OF COLUMN. IF USED, LAP LONGITUDINAL REINFORCEMENT 2'-7" IN ADJACENT POUR.

PLAN

DETAILS FOR CIRCULAR AND RECTANGULAR COLUMNS



ULTIMATE DESIGN STRESSES:

CONCRETE MASONRY $f_c = 4,000$ P.S.I.
HIGH-STRENGTH BAR STEEL REINFORCEMENT, GRADE 60 $f_y = 60,000$ P.S.I.

ELEVATION

LOOKING AT B.F. OF BARRIER

PLACE ½" FILLER BETWEEN COLUMN AND CONCRETE FOOTING (TYP.)

NOTES

DETAILS OF CONSTRUCTION MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATION AND THE APPLICABLE SPECIAL PROVISIONS.

BARrier AND FOOTING SHALL CONSIST OF CAST IN PLACE CONSTRUCTION. NO JOINTS SHALL BE ALLOWED IN THE BARrier. CONSTRUCTION JOINTS WILL ONLY BE ALLOWED IN THE FOOTING AT LOCATIONS SHOWN IN THE "PLAN VIEW".

DO NOT CUT OR DRILL INTO EXISTING COLUMN BAR STEEL.

ALL REINFORCEMENT SHALL BE EPOXY-COATED.

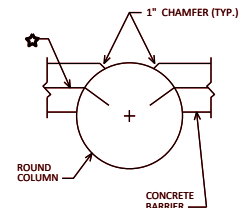
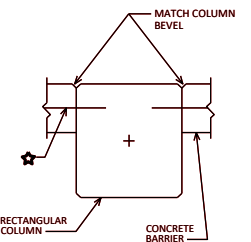
USE 2-INCH MINIMUM BAR CLEARANCE. EXCEPT AT FOOTINGS PROVIDE 3-INCH BAR CLEARANCE FROM BOTTOM OF FOOTING TO BOTTOM TRANSVERSE REINFORCEMENT.

PLACE REINFORCEMENT SUCH THAT IT WILL NOT CONFLICT WITH THE ANCHOR ASSEMBLY FOR THRIE BEAM ATTACHMENT.

PROVIDE ¾-INCH BEVEL OR 1-INCH RADIUS ON BARRIER EDGES, TOP AND ENDS.

SEE STANDARD 13.11 FOR ADDITIONAL DETAILS.

SEE STANDARD 13.11 FOR DESIGNER NOTES.



DETAIL A

F.F. OF BARRIER IS FLUSH WITH FACE OF COLUMN

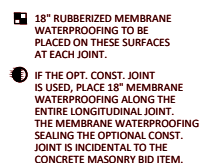
51-INCH CONCRETE INTEGRAL BARRIER



BUREAU OF STRUCTURES

APPROVED: Laura Shadewald

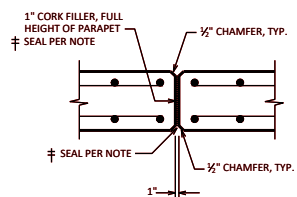
DATE:
1-21



OPTIONAL CONSTRUCTION JOINTS IN THE PARAPET AND ANCHOR SLAB BETWEEN EXPANSION JOINTS MAY BE USED. RUN BAR REINFORCEMENT THRU THE JOINT. SEE STANDARDS 30.07, 30.12, 30.13 & 30.30-30.32 FOR MINIMUM LAP LENGTHS IN PARAPET BARS. DEFINE CONSTRUCTION JOINT WITH A $\frac{3}{4}$ " "V" GROOVE.

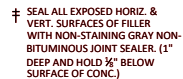
LAP LONGITUDINAL #4 BARS A MINIMUM OF 1'-0".

CONCRETE QUANTITY BASED ON 3" PANEL EMBEDMENT.

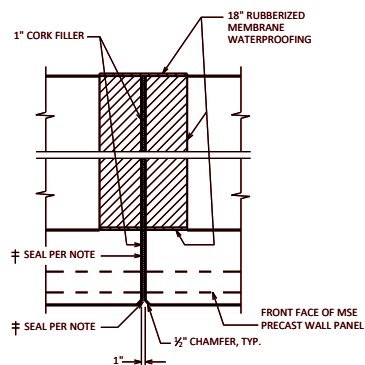


CAST-IN-PLACE
CONCRETE COPING DETAIL

DESIGNER NOTE: CONCRETE COPING DESIGNED FOR
STANDARD PEDESTRIAN RAILING WITH 10 FT MAXIMUM
POST SPACING PER LRFD 13.8.2.



MEMBRANE WATERPROOFING TO EXTEND FROM TOP OF COPING TO 6" BELOW TOP OF PANELS.



EXPANSION JOINTS TO BE SPACED AT A MINIMUM OF 20' AND A MAXIMUM OF 30'. LOCATE EXPANSION JOINTS OVER WALL JOINTS. DO NOT RUN BAR STEEL THRU JOINT, EXCEPT FOR DOWEL BARS. JOINT TO EXTEND FULL DEPTH OF PARAPET AND ANCHOR SLAB.

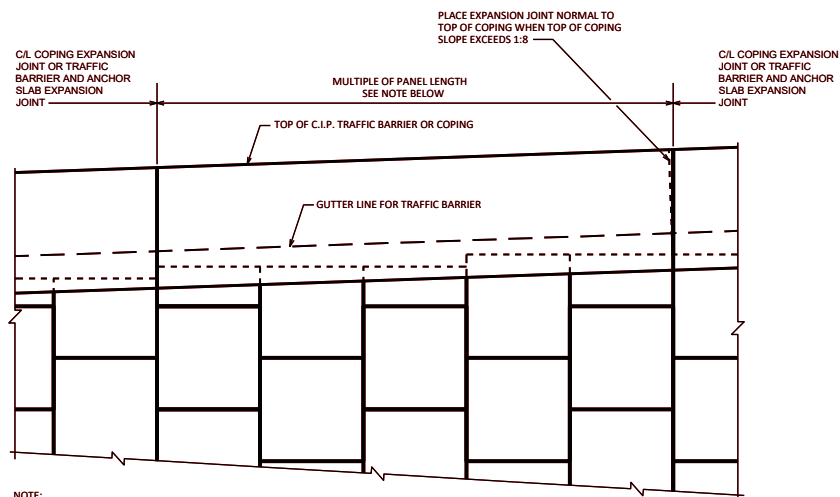
PROVIDE THE NUMBER OF BARS AND OVERALL LENGTH FOR QUANTITY PURPOSES, ONLY. DO NOT DETAIL SPECIFIC BAR LENGTHS BETWEEN EXPANSION JOINTS AS THESE LENGTHS ARE BASED ON UNKNOWN MSE PANEL LENGTH AND CONFIGURATION.



OPTIONAL CONSTRUCTION JOINTS IN THE PARAPET AND ANCHOR SLAB BETWEEN EXPANSION JOINTS MAY BE USED. RUN BAR REINFORCEMENT THRU THE JOINT. SEE STANDARDS 30.07, 30.12, 30.13 & 30.30-30.32 FOR MINIMUM LAP LENGTHS IN PARAPET BARS. DEFINE CONSTRUCTION JOINT WITH A ¼" "V" GROOVE.

LAP LONGITUDINAL #4 BARS A MINIMUM OF 1'-0".

ALL BAR STEEL SHALL BE EPOXY COATED.



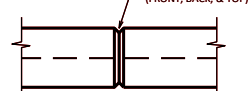
NOTE:
ALL JOINTS SHALL BE LOCATED AS SHOWN ON WALL ELEVATIONS
AND MUST COINCIDE WITH PANEL JOINT ON FRONT FACE.

DESIGNER NOTES

MODIFIED ANCHOR SLAB DETAILS SHALL SATISFY
AASHTO LRFD STRENGTH AND STABILITY REQUIREMENTS.

PROVIDE CONCRETE, REINFORCEMENT, AND RUBBERIZED MEMBRANE WATERPROOFING QUANTITIES FOR TRAFFIC BARRIERS. PROVIDE BILL OF BARS.

FOR STANDARD COPING, AS SHOWN ON THIS SHEET, SHOW BAR SIZE AND BAR SPACING, ONLY. DO NOT PROVIDE BILL OF BARS. CONCRETE, REINFORCEMENT, AND RUBBERIZED MEMBRANE WATERPROOFING ARE INCLUDED IN BID ITEM FOR THE MSE WALL.



COPING CONTRACTION JOINT

DO NOT RUN BAR STEEL THRU JOINT.
MAX. SPACING OF JOINT = 12'

BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE: 7-25

GENERAL NOTES

DRAWINGS SHALL NOT BE SCALED.

THE PLAN QUANTITY FOR THE BID ITEM (INSERT WALL SYSTEM) IS BASED ON A WALL HEIGHT MEASURED FROM THE TOP OF WALL TO A CONSTANT DEPTH OF (INSERT VALUE) BELOW FINISHED GRADE.

DESIGN DATA

THE CONTRACTOR SHALL PROVIDE COMPLETE DESIGN, PLANS, DETAILS, SPECIFICATIONS, AND SHOP DRAWINGS FOR THE RETAINING WALLS IN ACCORDANCE WITH THE SPECIAL PROVISIONS. THE RETAINING WALL MANUFACTURER SHALL PROVIDE TECHNICAL ASSISTANCE TO THE CONTRACTOR DURING CONSTRUCTION. THE COST OF FURNISHING THESE ITEMS SHALL BE INCLUDED IN THE BID ITEM "(INSERT WALL SYSTEM OR SYSTEMS)".

PLANS, ELEVATIONS AND DETAILS SHOWN ON THESE DRAWINGS ARE INTENDED TO INDICATE WALL LOCATIONS, LENGTHS, HEIGHTS, AND DETAILS COMMON TO THE WALL SYSTEM SELECTED. THE CONTRACTOR SHALL VERIFY THAT THE WALL SYSTEM SELECTED WILL CONFORM TO THE REQUIRED ALIGNMENTS AND DETAILS.

THE RETAINING WALL IS TO BE DESIGNED USING THE ELEVATIONS GIVEN ON THIS SHEET.

DESIGN FOR RETAINING WALL TO PROVIDE FOR FINISHED GRADE SLOPED BEHIND WALL AS SHOWN.

DESIGN RETAINING WALL FOR A LIVE LOAD SURCHARGE OF (INSERT VALUE).

THE MAXIMUM VALUE OF THE ANGLE OF INTERNAL FRICTION OF THE WALL BACKFILL MATERIAL IN THE REINFORCED ZONE SHALL BE ASSUMED TO BE 30° WITHOUT CERTIFIED TEST VALUES.

DESIGNER NOTES

THE LENGTHS PROVIDED IN THE TABLE ARE THE MINIMUM REQUIRED REINFORCEMENT LENGTHS BASED UPON THE MINIMUM DESCRIBED IN THE WALL SYSTEM SPECIAL PROVISIONS OR EXTERNAL AND OVERALL STABILITY AT THE DESIGNATED LOCATIONS. THESE DESIGNATED LOCATIONS REPRESENT TYPICAL AND CRITICAL WALL LOCATIONS, BUT SHALL NOT BE CONSIDERED ALL INCLUSIVE. THE CONTRACTOR DESIGN LENGTHS SHALL MEET OR EXCEED THE MINIMUM VALUES REPRESENTED IN THE TABLE AT THESE DESIGNATED LOCATIONS.

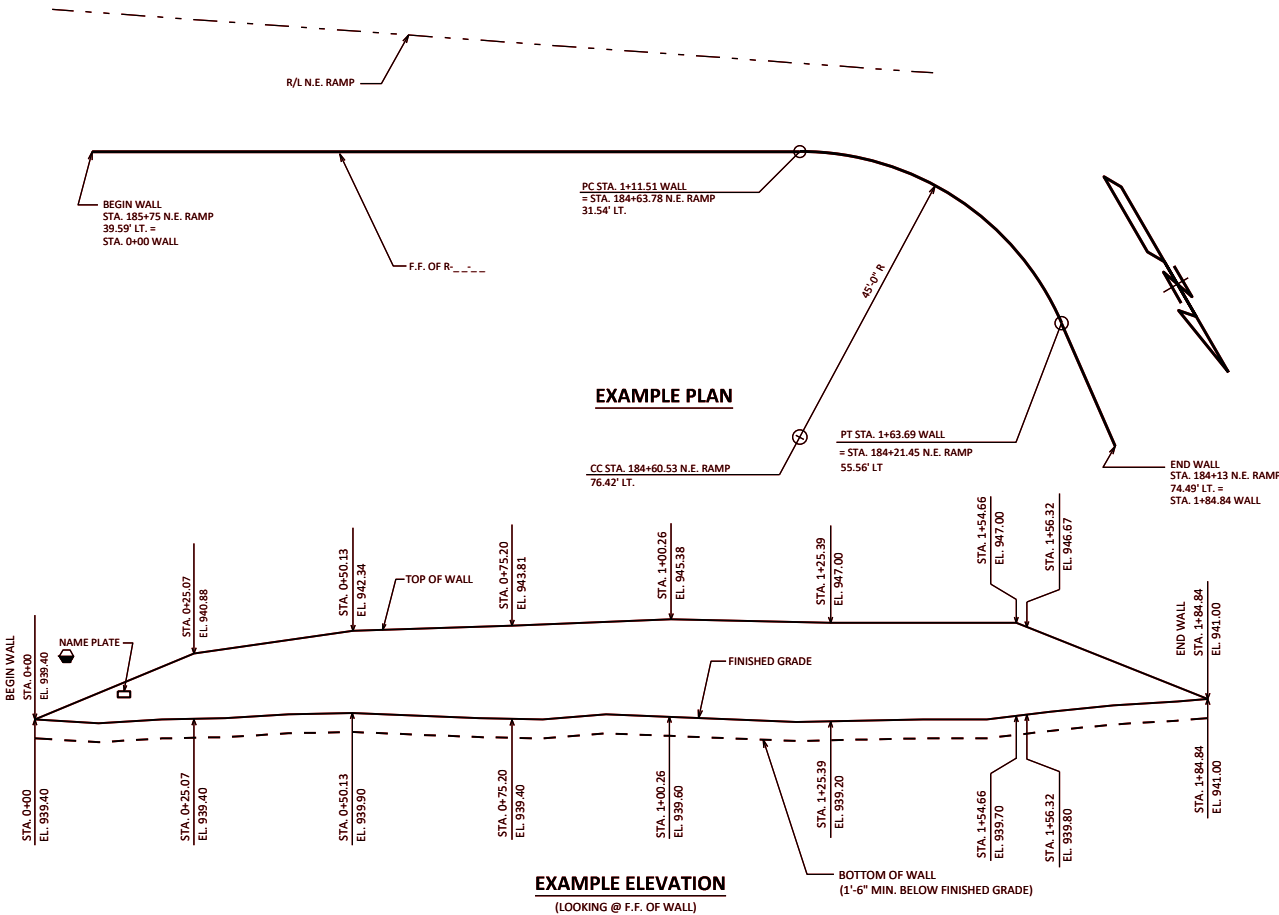
THE LENGTHS PROVIDED IN THE TABLE ARE THE MINIMUM REQUIRED REINFORCEMENT LENGTHS BASED ON OVERALL STABILITY PERFORMED BY THE WALL DESIGNER. COMPOUND STABILITY IS THE CONTRACTORS RESPONSIBILITY.

MINIMUM EMBEDMENT BASED ON SITE SPECIFIC PARAMETERS (1'-6" MINIMUM FOR ALL WALLS ON LEVEL GROUND). FIELD EMBEDMENTS SHALL MEET OR EXCEED THE MINIMUM EMBEDMENTS. FIELD EMBEDMENTS BELOW MINIMUM EMBEDMENT SHALL NOT BE INCLUDED IN THE PAY LIMITS.

STRATUM LOCATIONS & SOIL DESCRIPTIONS AT EACH BORING LOCATION.

NOMINAL MSE PANEL DIMENSIONS ARE 5-FOOT HIGH AND 5 TO 10 FOOT WIDE. THE WALL DESIGNER SHALL PROVIDE DETAILS BASED ON NOMINAL PANEL DIMENSIONS AND CONFIGURATION. DETAILS SHALL BE ABLE TO ACCOMMODATE VARIOUS PANEL DIMENSIONS. THE CONTRACTOR AND WALL SUPPLIER SHALL COORDINATE DETAILS BASED ON THE ACTUAL DIMENSIONS.

LOCATE NAME PLATE ON THE FRONT OF WALL. APPROXIMATELY 3' TO 6' HIGH. CENTER NAME PLATE BETWEEN CAST-IN-PLACE CONCRETE COPING JOINTS, CENTERED ON A NON-CAP BLOCK, OR AS DIRECTED BY THE FIELD ENGINEER



EXAMPLE ELEVATION
(LOOKING @ F.F. OF WALL)

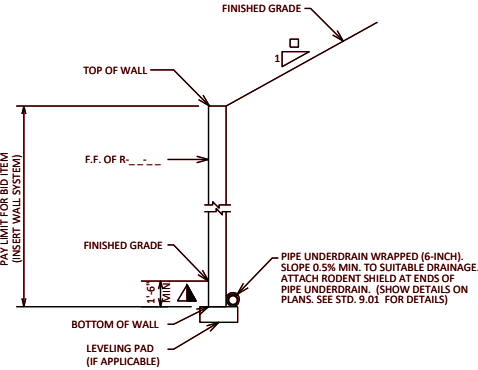
GEOMETRY TABLE

WALL STATION	ROADWAY STATION	OFFSET TO F.F. WALL	TOP OF WALL ELEV.	FINISHED GRADE ELEV.

SOIL PARAMETERS

STRATUM LOCATIONS & SOIL DESCRIPTIONS	TOTAL UNIT WEIGHT (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PCF)
GRANULAR BACKFILL (REINFORCING ZONE OR BACKFILL)			
(INSERT SOIL TYPE) RETAINED SOIL *			
(INSERT SOIL TYPE) FILL			
EL. --- - EL. ---			
(INSERT SOIL TYPE)			
EL. --- - EL. ---			
(INSERT SOIL TYPE)			
EL. --- - EL. ---			

* DESIGN WALL FOR THESE VALUES



TYP. CROSS SECT. OF RETAINING WALL

WALL EXTERNAL & OVERALL STABILITY EVALUATION

DIMENSIONS	EVALUATED LOCATIONS
WALL HEIGHT (FEET)	
EXPOSED WALL HEIGHT (FEET)	
MINIMUM LENGTH OF REINFORCEMENT (FEET)	
WALL STATION	
BORING USED	
CAPACITY TO DEMAND RATIO (CDR)	
SLIDING (CDR>1.0)	
ECCENTRICITY (CDR>1.0)	
OVERALL STABILITY (CDR>1.0)	
BEARING RESISTANCE (CDR>1.0)	
FACTORED BEARING RESISTANCE (PSF)	

LIST OF DRAWINGS

1. (INSERT WALL SYSTEM)
2. SUBSURFACE EXPLORATION

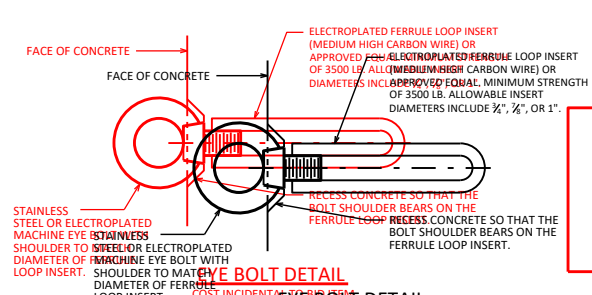
LRFD PROPRIETARY RETAINING WALLS (GENERAL PLAN)



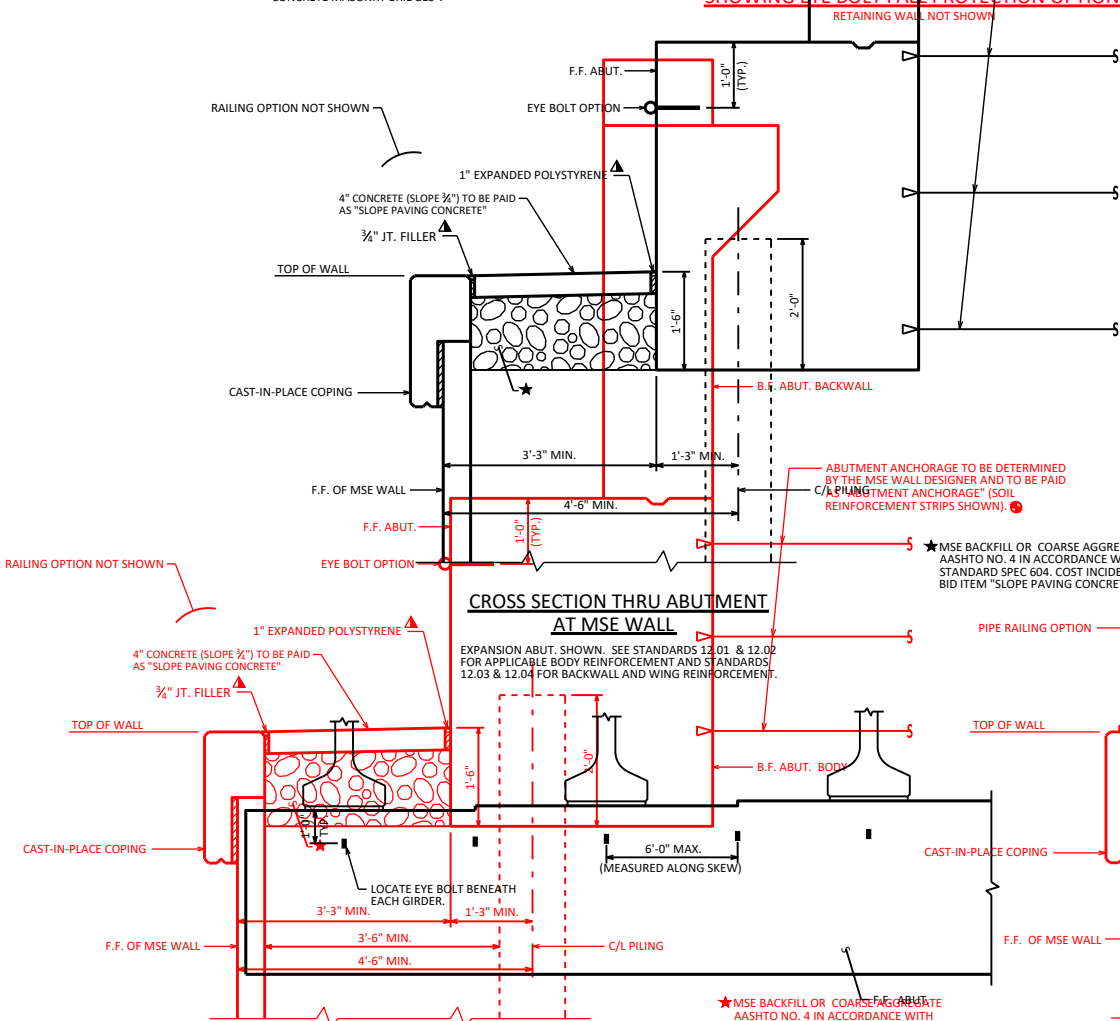
BUREAU OF
STRUCTURES

APPROVED: Laura Shadewald

DATE:
7-23



EYE BOLT DETAIL
COST INCIDENTAL TO BID ITEM "CONCRETE MASONRY BRIDGES".



CROSS SECTION THRU ABUTMENT AT MSE WALL
PARTIAL ELEVATION OF F.F. ABUTMENT SHOWING EYE BOLT FALL PROTECTION OPTION
RETAINING WALL NOT SHOWN

EXPANSION ABUT. SHOWN. SEE STANDARDS 12.01 & 12.02 FOR APPLICABLE BODY REINFORCEMENT AND STANDARDS 12.03 & 12.04 FOR BACKWALL AND WING REINFORCEMENT.

CROSS SECTION THRU ABUTMENT AT MSE WALL SHOWING BOTH EYE BOLT AND RAILING FALL PROTECTION OPTIONS

TYPE A1 SEMI-EXPANSION ABUTMENT SHOWN

DESIGNER NOTES

MSE WALLS SHALL NOT BE USED FOR THE SINGULAR PURPOSE OF REDUCING SPAN LENGTH. SEE BRIDGE MANUAL SECTION 12.12 FOR ADDITIONAL INFORMATION.

DESIGNER NOTES

PROVIDED. THE OPTION PROVIDED SHOULD BE BASED ON THE MISE WALLS SHALL NOT BE USED FOR THE SINGULAR PURPOSE OF REDUCING SPAN LENGTH. SEE BRIDGE MANUAL SECTION 12.12 FOR ADDITIONAL INFORMATION. IS USED, SEE STD. 30.26 FOR APPLICABLE NOTES. (NOTE: STD. 30.26 IS STILL UNDER DEVELOPMENT)

FALL PROTECTION SHALL BE PROVIDED. THE OPTION PROVIDED SHOULD BE BASED ON THE PREFERENCE OF THE BRIDGE MAINTENANCE AND REGIONAL PROJECT STAFF.

TYPE A1 ABUTMENTS:

IF PIPE RAILING IS USED, SEE STD. 30.26 FOR APPLICABLE NOTES. (NOTE: STD. 30.26 IS STILL UNDER DEVELOPMENT)

TYPE A3 ABUTMENTS:

ABUTMENT AND CONCRETE ITEMS TO BE SHOWN AS PART OF BRIDGE PLAN. MAY BE CONSIDERED. WHEN ABUTMENT ANCHORAGE IS USED, THE DESIGNER SHALL PROVIDE THE ABUTMENT ANCHORAGE DETAIL AND LOADS REQUIRED FOR THE DESIGN OF THE ABUTMENT ANCHORAGE.

NOTES

UNFACTORED SUPERSTRUCTURE LATERAL LOADS TRANSFERRED TO THE ABUTMENT ARE TO BE TAKEN TO BE KEPT PER FOOT OF ABUTMENT LENGTH. THE VALUES ARE TO BE USED FOR THE LRFD DESIGN OF THE ABUTMENT ANCHORAGE BY THE MSE MANUFACTURER (MSE SYSTEM). DEAD MAN ANCHOR. OTHER. THE FOLLOWING AASHTO LINE LOADS SHALL BE NOTED OUR RANGE ACTING ON THE BACK OF THE ABUTMENT. KLEW THE BEAM SEATS.

UNFACTORED SUPERSTRUCTURE LATERAL LOADS TRANSFERRED TO THE ABUTMENT ARE TO BE TAKEN TO BE KEPT PER FOOT OF ABUTMENT LENGTH. THE VALUES ARE TO BE USED FOR THE LRFD DESIGN OF THE ABUTMENT ANCHORAGE BY THE MSE MANUFACTURER (MSE SYSTEM). DEAD MAN ANCHOR. OTHER. THE FOLLOWING AASHTO LINE LOADS SHALL BE NOTED OUR RANGE ACTING ON THE BACK OF THE ABUTMENT. KLEW THE BEAM SEATS.

SEAL ALL EXPOSED HORIZONTAL AND VERTICAL SURFACES OF FILLER AND EXPANDED POLYSTYRENE WITH NON-STAINING, GRAY, NON-BITUMINOUS JOINT SEALER, 1" DEEP AND HOLD 1/8" BELOW SURFACE OF CONCRETE. KLF

EXPANSION ABUTMENTS TO BE BACKFILLED TO A MINIMUM OF THE BEAM SEAT ELEVATION PRIOR TO PLACING GIRDERS. REINFORCEMENT FOR ABUTMENT ANCHORAGE SHALL BE TAKEN AS THE GREATER OF 0.7 TIMES THE HEIGHT OF THE ABUTMENT OR 8 FEET. HEIGHT OF THE ABUTMENT IS DEFINED AS PAVEMENT GRADE MINUS BOTTOM OF THE ABUTMENT.

THE CONTRACTOR SHALL PROVIDE COMPLETE DESIGN PLANS, DETAILS, AND SHOP DRAWINGS FOR THE MSE BACKFILL SYSTEM, IN ACCORDANCE WITH THE SPECIAL PROVISIONS. THE MSE WALL MANUFACTURER SHALL PROVIDE TECHNICAL ASSISTANCE TO THE CONTRACTOR FOR PLACING CO. ABUTMENT. THE COST OF FURNISHING THESE ITEMS IS INCLUDED IN THE BID ITEM "ABUTMENT ANCHORAGE".

THE COST OF FURNISHING AND PLACING MSE BACKFILL WITHIN A REINFORCED SOIL ZONE IS TO BE INCLUDED IN THE BID ITEM "ABUTMENT ANCHORAGE". REINFORCED SOIL ZONE LIMITS SHALL EXTEND 1-FOOT MINIMUM BEYOND SOIL REINFORCEMENTS IN ALL DIRECTIONS.

ABUTMENT TO BE BACKFILLED TO A MINIMUM OF THE BEAM SEAT ELEVATION PRIOR TO PLACING GIRDERS.

TYPE A1 ABUTMENTS (SEMI-EXPANSION OR FIXED):

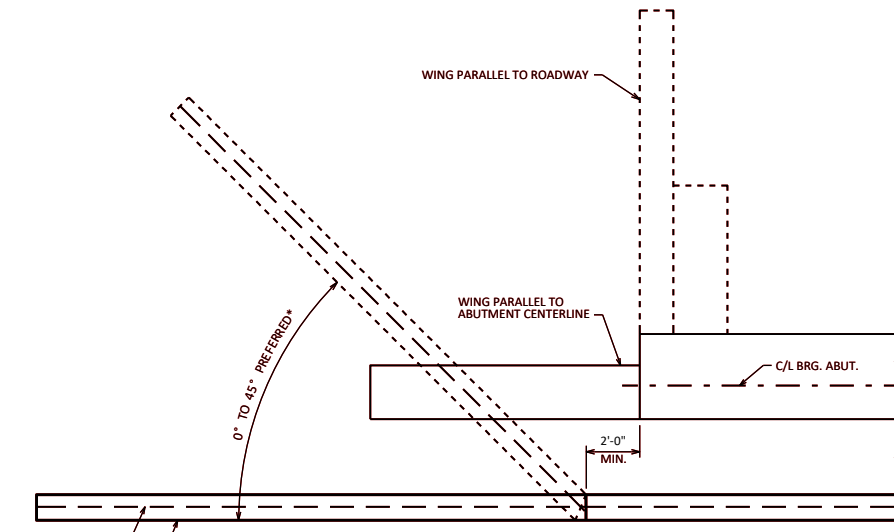
TYPE A3 ABUTMENTS (WITH ABUTMENT ANCHORAGE):

MSE WALL AT ABUTMENT



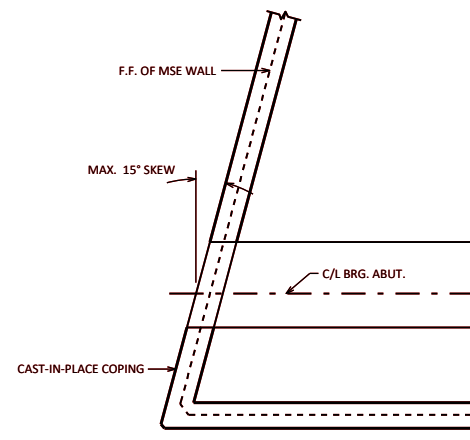
APPROVED: Laura Shadewald

DATE: 7-28



PREFERRED MSE WALL AT ABUTMENT CONFIGURATION

* 0° WALL ANGLE REQUIRED FOR WING PARALLEL TO ABUTMENT CENTERLINE



ALTERNATE MSE WALL AT ABUTMENT WITH WRAPPED MSE WALL

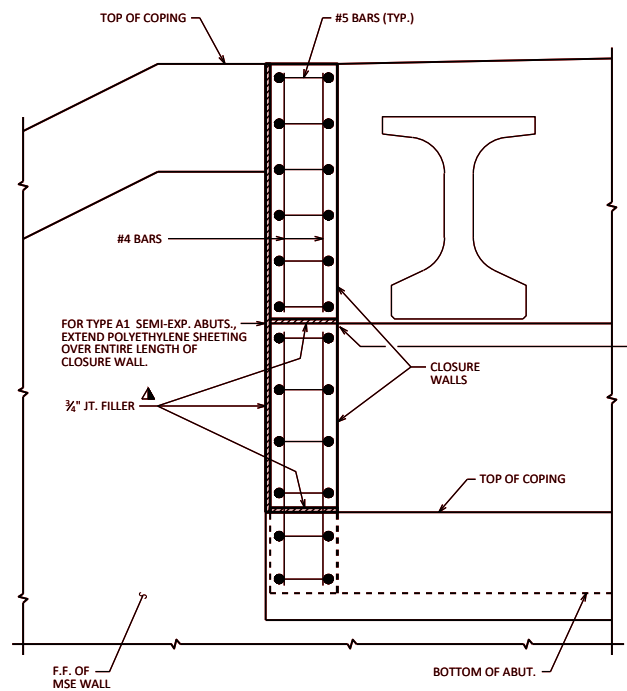
DESIGNER NOTES

THE "PREFERRED MSE WALL AT ABUTMENT CONFIGURATION" IS THE DESIRED OPTION AS IT SEPARATES THE MSE WALL FROM THE ABUTMENT, MINIMIZING COMPLICATED DETAILS AND POTENTIAL SETTLEMENT ISSUES. THIS ADVICE IS MORE RELEVANT AS SKEW INCREASES.

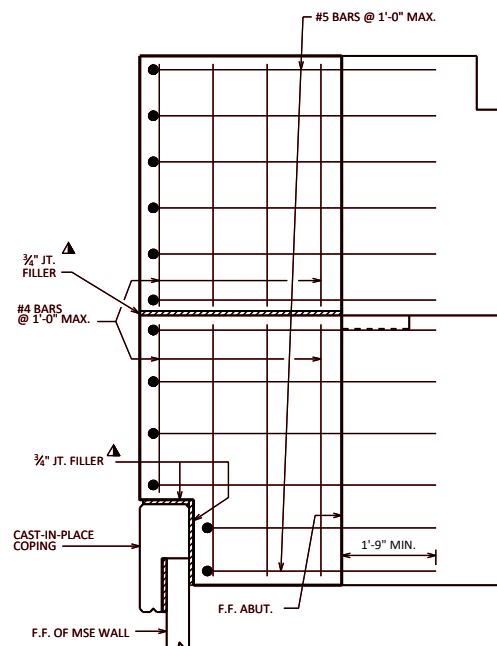
SEE STANDARD 14.06 FOR "ALTERNATE MSE WALL AT ABUTMENT WITH WRAPPED MSE WALL" DETAILS.

NOTES

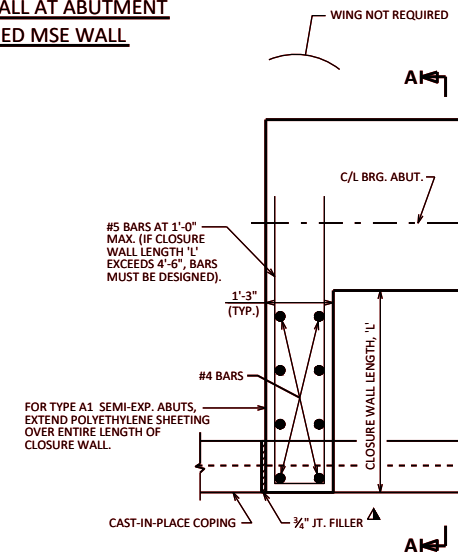
- ▲ SEAL ALL EXPOSED HORIZONTAL AND VERTICAL SURFACES OF FILLER WITH NON-STAINING GRAY, NON-BITUMINOUS JOINT SEALER. (1" DEEP AND HOLD 3/4" BELOW SURFACE OF CONCRETE).



FRONT ELEVATION OF ALTERNATE MSE WALL AT ABUTMENT WITH CLOSURE WALL



SECTION A-A



PLAN VIEW OF ALTERNATE MSE WALL AT ABUTMENT WITH CLOSURE WALL

ABUT. TYPE A1 SHOWN. EXPANSION ABUT. WOULD REQUIRE CLOSURE WALL GOING TO BACKWALL WITH BENT BARS TO ACHIEVE DEVELOPMENT.

MSE WALL AT ABUTMENT LAYOUT DETAILS



BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE:
7-24

DESIGNER NOTES

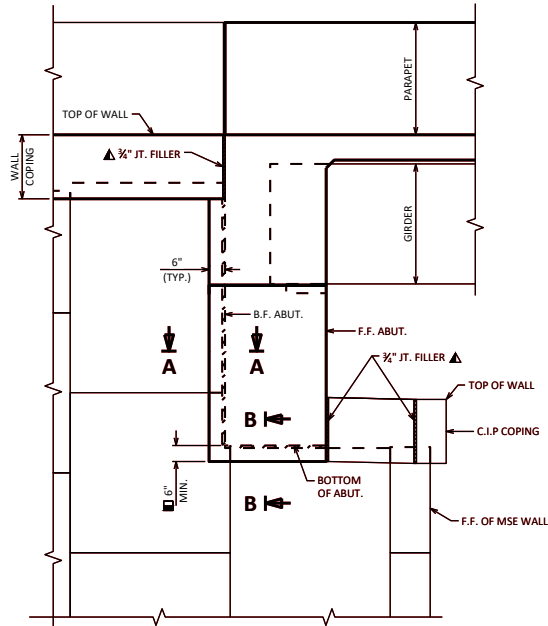
THIS STANDARD IS FOR INFORMATIONAL PURPOSES ONLY.
MODIFY DETAILS TO THE PROJECT-SPECIFIC REQUIREMENTS.

- 6-INCH MINIMUM ASSUMES NO LONG-TERM DIFFERENTIAL SETTLEMENT BETWEEN THE ABUTMENT AND MSE WALL.

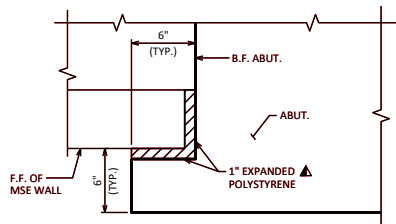
SEE STANDARD 14.04 FOR ADDITIONAL INFORMATION.

NOTES

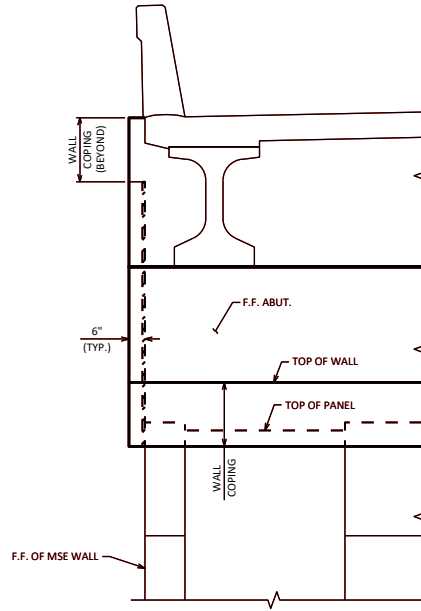
- SEAL ALL EXPOSED HORIZONTAL AND VERTICAL SURFACES OF FILLER WITH NON-STAINING GRAY, NON-BITUMINOUS JOINT SEALER. (1" DEEP AND HOLD $\frac{1}{8}$ " BELOW SURFACE OF CONCRETE).



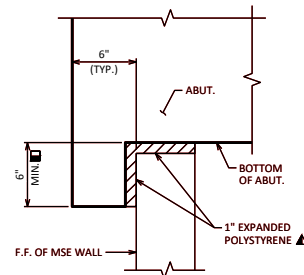
**ALTERNATE MSE WALL AT ABUTMENT
WITH WRAPPED MSE WALL**



SECTION A-A



**FRONT ELEVATION OF ALTERNATE MSE
WALL AT ABUTMENT WITH WRAPPED MSE WALL**



SECTION B-B

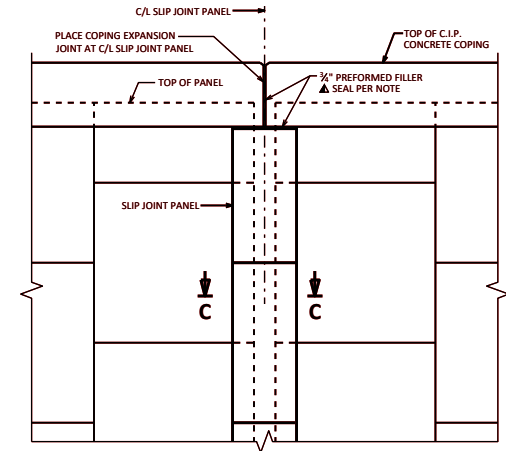
DESIGNER NOTES

SEE STANDARD 14.02 FOR C.I.P. CONCRETE COPING DETAILS.

WHEN REQUIRED FOR STAGING OR BY DESIGN, PROVIDE SLIP JOINT LOCATIONS ON THE PLANS AND PROVIDE COPING NOTES AND DETAILS TO ACCOMMODATE A SLIP JOINT. DO NOT RUN BAR STEEL THRU COPING EXPANSION JOINT.

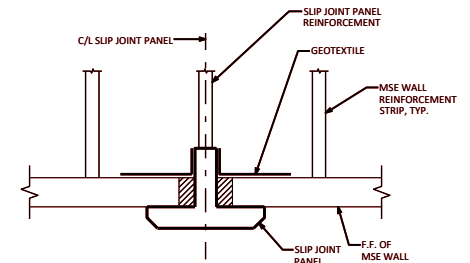
NOTES

- SEAL ALL EXPOSED HORIZONTAL AND VERTICAL SURFACES OF FILLER WITH NON-STAINING GRAY, NON-BITUMINOUS JOINT SEALER. (1" DEEP AND HOLD $\frac{1}{8}$ " BELOW SURFACE OF CONCRETE).



C.I.P. CONCRETE COPING PARTIAL ELEVATION AT SLIP JOINT

DO NOT RUN BAR STEEL THRU COPING EXPANSION JOINT
(RAILING NOT SHOWN FOR CLARITY)



SECTION C-C

SLIP JOINT DETAIL SHOWN FOR INFORMATIONAL PURPOSES ONLY.
WALL SUPPLIER TO SUBMIT JOINT DETAIL FOR ACCEPTANCE.

MSE WALL DETAILS



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
1-25



STANDARD 14.11



STANDARD 14.12

DRAWINGS SHALL NOT BE SCALED.

AT THE BACK FACE OF THE WALL ALL EXCAVATED VOLUME NOT OCCUPIED BY NEW STRUCTURE SHALL BE BACKFILLED WITH BACKFILL TYPE A OR GRANULAR BACKFILL GRADE 1 AS SHOWN IN THE TYPICAL SECTION. BACKFILLING SHALL BE INCIDENTAL TO BID ITEM "WALL MODULAR BLOCK GRAVITY (STRUCTURE)". LIMITS OF EXCAVATION SHALL BE DETERMINED BY THE CONTRACTOR.

THE CONTRACTOR SHALL PROVIDE COMPLETE DESIGN, PLANS, DETAILS, SPECIFICATIONS, AND SHOP DRAWINGS FOR THE RETAINING WALLS IN ACCORDANCE WITH THE SPECIAL PROVISIONS. THE RETAINING WALL MANUFACTURER SHALL PROVIDE TECHNICAL ASSISTANCE TO THE CONTRACTOR DURING CONSTRUCTION. THE COST OF FURNISHING THESE ITEMS SHALL BE INCLUDED IN THE BID ITEM ("INERT WALL SYSTEM OR SYSTEMS)".

THE RETAINING WALL IS TO BE DESIGNED USING THE ELEVATIONS GIVEN ON THIS SHEET.

SEE SPECIAL PROVISIONS FOR AESTHETIC TREATMENT TO WALL.

■ THE CONTRACTOR SHALL COORDINATE POST INSTALLATION WITH THE WALL DESIGN AND WALL DETAILS (WHEN APPLICABLE).

THE WIDTH PROVIDED IN THE TABLE ARE THE MINIMUM REQUIRED BLOCK WIDTHS BASED UPON THE MINIMUM DESCRIBED IN THE WALL SYSTEM SPECIAL PROVISIONS OR EXTERNAL AND OVERALL STABILITY AT THE DESIGNATED LOCATIONS. THESE DESIGNATED LOCATIONS REPRESENT TYPICAL AND CRITICAL WALL LOCATIONS, BUT SHALL NOT BE CONSIDERED ALL INCLUSIVE. THE CONTRACTOR DESIGN SHALL MEET OR EXCEED THE MINIMUM VALUES REPRESENTED IN THE TABLE AT THESE DESIGNATED LOCATIONS.

■ WHEN APPLICABLE, RAILING OR FENCING SHOULD BE PLACED BEHIND WALL FACING.



BID ITEM NUMBER	BID ITEM	UNIT	TOTAL
612.0406	PIPE UNDERDRAIN WRAPPED 6-INCH	LF	
SPV.0165.XX	WALL MODULAR BLOCK GRAVITY (STRUCTURE)	SF	

DIMENSIONS		EVALUATED LOCATIONS	
WALL HEIGHT (FEET)			
EXPOSED WALL HEIGHT (FEET)			
MINIMUM BASE WIDTH (INCHES)			
WALL STATION			
BORING USED			
CAPACITY TO DEMAND RATIO (CDR)			
SLIDING (CDR > 1.0)			
ECCENTRICITY (CDR > 1.0)			
OVERALL STABILITY (CDR > 1.0)			
BEARING RESISTANCE (CDR > 1.0)			
FACTORED BEARING RESISTANCE (PSF)			

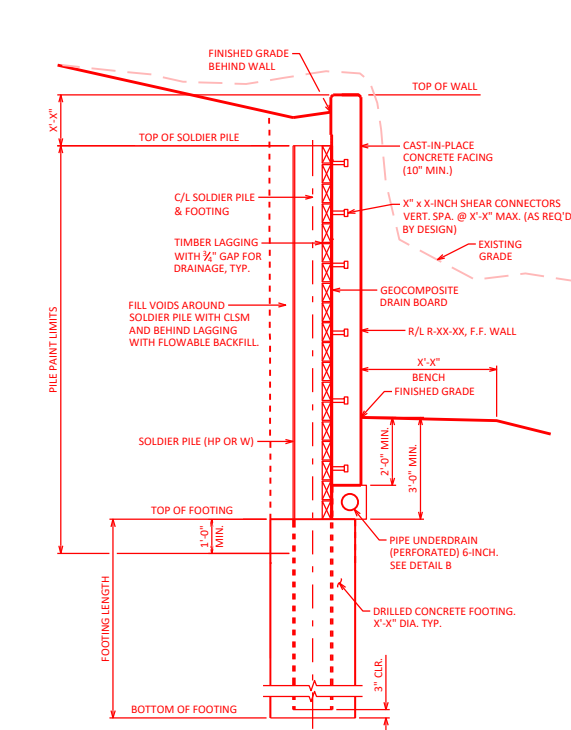
WALL STATION	ROADWAY STATION	OFFSET TO F.F. WALL	COHESION TOP OF WALL ELEV.	FINISHED GRADE ELEV.

SOIL DESCRIPTIONS	TOTAL UNIT WEIGHT (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PCF)
WALL BACKFILL	120	30	0
RETAINED SOIL * (INSERT VALUES)	--	--	--
FOUNDATION SOIL * (INSERT VALUES)	--	--	--

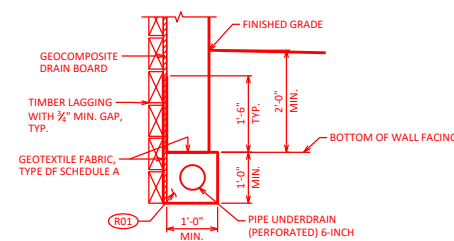
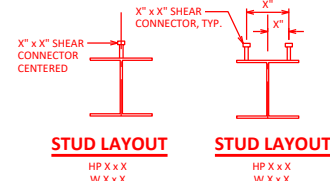
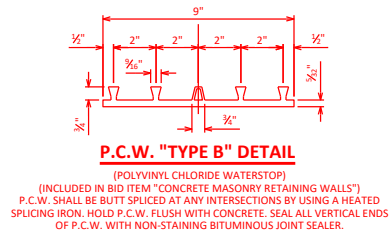
* DESIGN WALL FOR THESE VALUES

BUREAU OF STRUCTURES

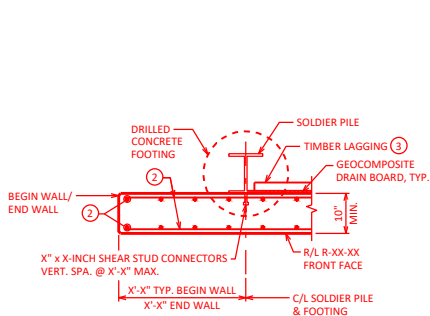
DATE: 7-24



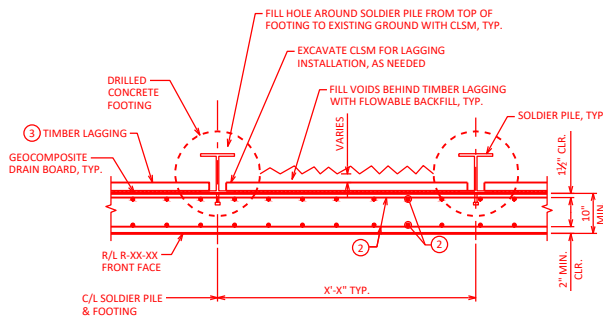
TYPICAL SECTION
(SOLDIER PILE WALL WITH CIP CONCRETE FACING)



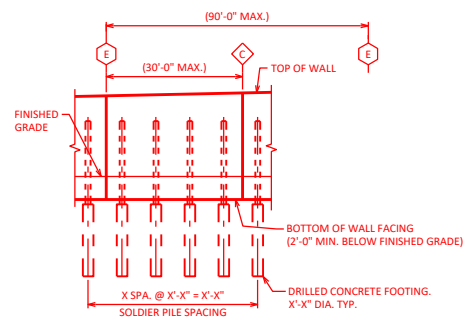
DETAIL B
(BETWEEN SOLDIER PILES)
(RDL) ENCLOSE PIPE UNDERDRAIN IN MINIMUM 1'-0" X 1'-0" AREA OF BASE AGGREGATE OPEN GRADED MATERIAL WRAPPED IN GEOTEXTILE FABRIC. AGGREGATE IS INCLUDED IN THE PIPE UNDERDRAIN.



SECTION AT BEGINNING/END OF WALL

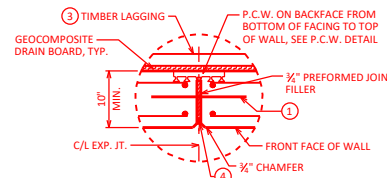


SECTION THRU SOLDIER PILE WALL

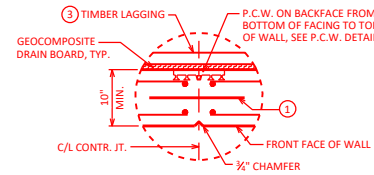


PARTIAL WALL ELEVATION

- LOOKING AT FRONT FACE OF WALL
- WALL FACING EXPANSION JOINT
 - WALL FACING CONTRACTION JOINT



EXPANSION JOINT DETAIL
(SEE GENERAL PLAN & ELEVATION SHEETS FOR LOCATION OF JOINTS. MAX. SPACING OF EXPANSION JOINTS = 90')



CONTRACTION JOINT DETAIL
(SEE GENERAL PLAN & ELEVATION SHEETS FOR LOCATION OF JOINTS. MAX. SPACING OF CONTRACTION JOINTS = 30')

- 1/2" DIA. X 1'-6" SMOOTH EPOXY COATED DOWELS PLACED AT 2'-0" CENTERS MID-DEPTH IN THE WALL. DOWELS SHALL BE LIGHTLY COATED WITH A DEBONDING SURFACE TREATMENT OVER 1/2" THE DOWEL LENGTH. EMBED 9" INTO ADJACENT WALL. DOWELS INCLUDED IN THE BID ITEM "CONCRETE MASONRY RETAINING WALLS".
- WALL FACING REINFORCEMENT TO BE DESIGNED AND DETAILED BY THE DESIGN ENGINEER.
- TIMBER LAGGING. ANCHOR LAGGING TO PILES AS NECESSARY TO RETAIN MATERIAL AND AS A LEFT-IN-PLACE CONCRETE FACING FORM FOR THE BACK FACE. SET LAGGING WITH 1/2" VERTICAL GAPS FOR DRAINAGE. FLOWABLE FILL MATERIAL SHALL BE COMPATIBLE WITH THE VERTICAL GAP.
- SEAL ALL EXPOSED HORIZ. AND VERT. SURFACES OF FILLER WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. (1" DEEP AND 1/2" BELOW SURFACE OF CONCRETE)

GENERAL NOTES

DRAWINGS SHALL NOT BE SCALED.

BAR STEEL REINFORCEMENT SHALL BE EMBEDDED 2" CLEAR UNLESS OTHERWISE SHOWN OR NOTED.

THE FIRST OR FIRST TWO DIGITS OF THE BAR MARK SIGNIFIES THE BAR SIZE.

BEVEL EXPOSED EDGES OF CONCRETE 3/4" UNLESS OTHERWISE SHOWN OR NOTED.

ALL DIMENSIONS ARE ALONG THE FRONT FACE OF WALL UNLESS OTHERWISE SHOWN OR NOTED.

THE EXISTING GROUND LINE SHALL BE USED AS THE UPPER LIMITS OF "EXCAVATION FOR STRUCTURES RETAINING WALLS R-XX-XX".

FLOWABLE BACKFILL SHALL BE IN ACCORDANCE WITH SPECIAL PROVISION "FLOWABLE BACKFILL". NO CEMENTITIOUS MATERIAL WILL BE ALLOWED IN FLOWABLE BACKFILL. ALL MATERIAL AND WORK IS INCLUDED IN THE BID ITEM "EXCAVATION FOR STRUCTURES RETAINING WALLS (R-XX-XX)".

CONTROLLED LOW STRENGTH MATERIAL (CLSM) SHALL BE IN ACCORDANCE WITH "BACKFILL CONTROLLED LOW STRENGTH" (209.0200.5). ALL MATERIAL AND WORK IS INCLUDED IN THE BID ITEM "EXCAVATION FOR STRUCTURES RETAINING WALLS (R-XX-XX)".

THE QUANTITY OF CAST-IN-PLACE CONCRETE MASONRY FOR THE SOLDIER PILE CAST-IN-PLACE CONCRETE FACING IS PAID FOR UNDER THE BID ITEM "CONCRETE MASONRY RETAINING WALLS".

THE VOLUME OF EARTHWORK REQUIRED TO INSTALL THE SOLDIER PILE AND FOOTINGS IS INCLUDED IN THE BID ITEM "EXCAVATION FOR STRUCTURES RETAINING WALLS (R-XX-XX)".

DO NOT SPLICE SOLDIER PILES.

SURFACE PREP AND SHOP PAINT SOLDIER PILES FROM TOP OF PILE TO 1'-0" BELOW TOP OF FOOTING WITH ONE COAT OF ZINC-RICH PRIMER AS SPECIFIED IN SECTION 517 OF THE STANDARD SPECIFICATIONS. WELDED STUD SHEAR CONNECTORS ARE NOT REQUIRED TO BE PAINTED. PAINTING OF PILES PAID FOR UNDER BID ITEM "PAINTING EPOXY SYSTEM (R-XX-XX)".

DESIGN DATA

MATERIALS PROPERTIES:

CONCRETE (FACING)	$f'_c = 4,000$ PSI
CONCRETE (FOOTING)	$f'_c = 3,500$ PSI
BAR STEEL REINFORCEMENT, GRADE 60	$f_y = 60,000$ PSI
HIGH STRENGTH STRUCTURAL STEEL	$f_y = 50,000$ PSI
TIMBER LAGGING	$E = 1,700,000$ PSI
	$t_{min} = (3" \text{ MIN.})$

* MATERIAL VALUES BASED ON DOUGLAS FIR-LARCH NO. 1 & 2 IN WIDE, REFERENCE AASHTO LRFD SPECIFICATION TABLE 8.4.1.1.4-1.

LIVE LOAD:

LIVE LOAD SURCHARGE: XXX PSF

DESIGNER NOTES

MODIFY DETAILS, NOTES, AND BID ITEMS AS REQUIRED.

TIMBER LAGGING SHALL BE DESIGNED AS A TEMPORARY WALL FACING AND NOT CONTRIBUTE TO THE FINAL WALL FACING. PROVIDE THE MINIMUM REQUIRED THICKNESS ON THE PLANS AND UPDATE TIMBER LAGGING MATERIAL PROPERTIES, AS REQUIRED BY DESIGN.

TOTAL ESTIMATED QUANTITIES

BID ITEM NUMBER	BID ITEMS	UNIT	TOTALS
203.0220	REMOVING STRUCTURE (R-XX-XX)	EACH	1
206.3001	EXCAVATION FOR STRUCTURES RETAINING WALLS (R-XX-XX)	EACH	1
502.0110.S	CONCRETE MASONRY SOLDIER PILE FOOTINGS	CY	
504.0500	CONCRETE MASONRY RETAINING WALLS	CY	
505.0600	BAR STEEL REINFORCEMENT HS COATED STRUCTURES	LB	
506.0605	STRUCTURAL STEEL HS	LB	
506.30XX	WELDED STUD SHEAR CONNECTORS, X INCH	EACH	
517.0601	PAINTING EPOXY SYSTEM (R-XX-XX)	EACH	1
612.0106	PIPE UNDERDRAIN 6-INCH	LF	
645.0111	GEOTEXTILE TYPE DF SCHEDULE A	SY	
SPV.0090	FOUNDATION DRILLING	LF	
SPV.0110	TIMBER LAGGING	MBM	
SPV.0165	GEOTEXTILE DRAIN BOARD	SF	
	NON-BID ITEMS		
	FILLER	SIZE	1/2", 3/4"

SOLDIER PILE DATA TABLE

PILE NO.	WALL R/L STA.	OFFSET (FT.)	APPROX. EXISTING GRADE	FOUNDATION DRILLING LENGTH (FT.)	TOP OF WALL	TOP OF SOLDIER PILE	FINISHED GRADE AT WALL FACE	EXPOSED HEIGHT (FT.)	TOP OF FOOTING	BOTTOM OF FOOTING	FOOTING LENGTH (FT.)	FOOTING DIAMETER (FT.)	SOLDIER PILE SECTION	SOLDIER PILE LENGTH (FT.)	NO. OF SHEAR STUDS REQ'D (FACING)
1															
2															

SOLDIER PILE WALL ANALYSIS SOIL PARAMETERS

SOIL UNIT	TOTAL UNIT WEIGHT (PCF)	UNDRAINED		DRAINED	
		COHESION (PSF)	FRICTION ANGLE (DEG)	COHESION (PSF)	FRICTION ANGLE (DEG)

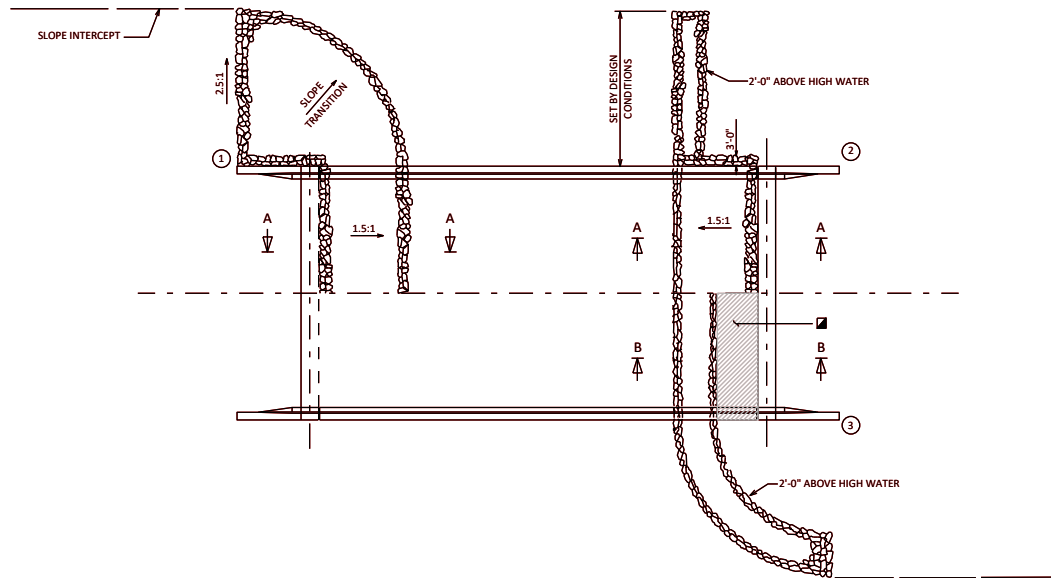
SOLDIER PILE WALL



BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE:
7-26



ALTERNATE ①

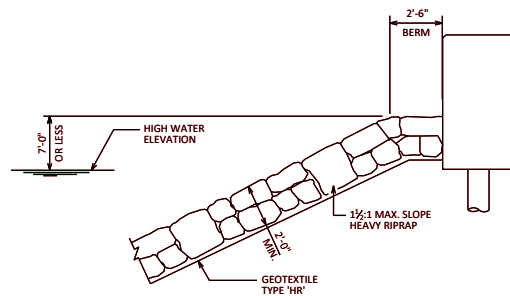
NORMAL CONDITION FOR EMBANKMENT FILLS

ALTERNATE ②

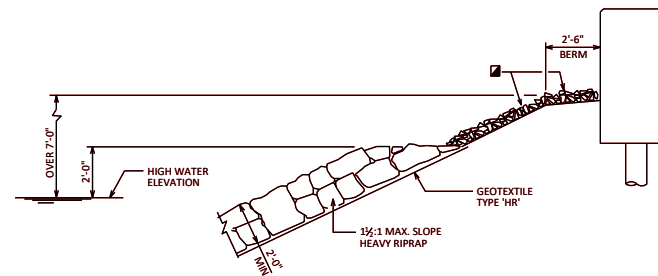
USE WHERE BERM ELEVATION IS LESS THAN 7'-0" ABOVE HIGH WATER

ALTERNATE ③

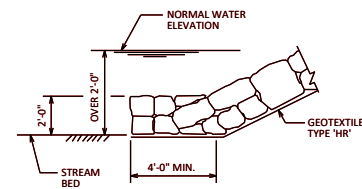
USE WHERE BERM ELEVATION IS OVER 7'-0" ABOVE HIGH WATER



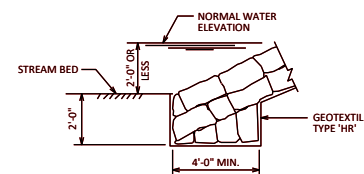
SECTION A-A



SECTION B-B



TOE DETAIL
NORMAL WATER ELEVATION > 2'-0" ABOVE STREAM BED



TOE DETAIL
NORMAL WATER ELEVATION ≤ 2'-0" ABOVE STREAM BED

☑ HEAVY RIPRAP OR OTHER SLOPE PROTECTION.
IF HEAVY RIPRAP IS USED, PLACE GEOTEXTILE TYPE 'HR' BELOW IT.

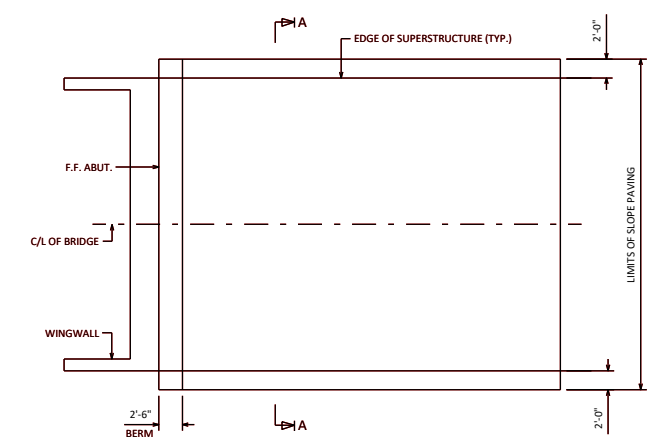
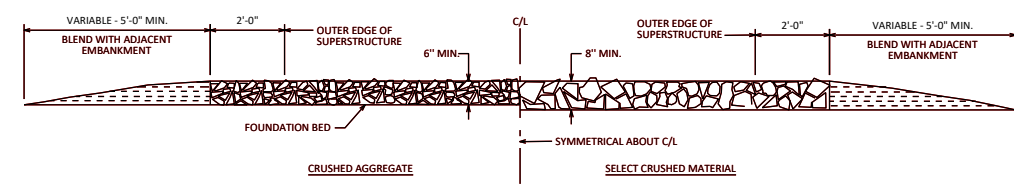
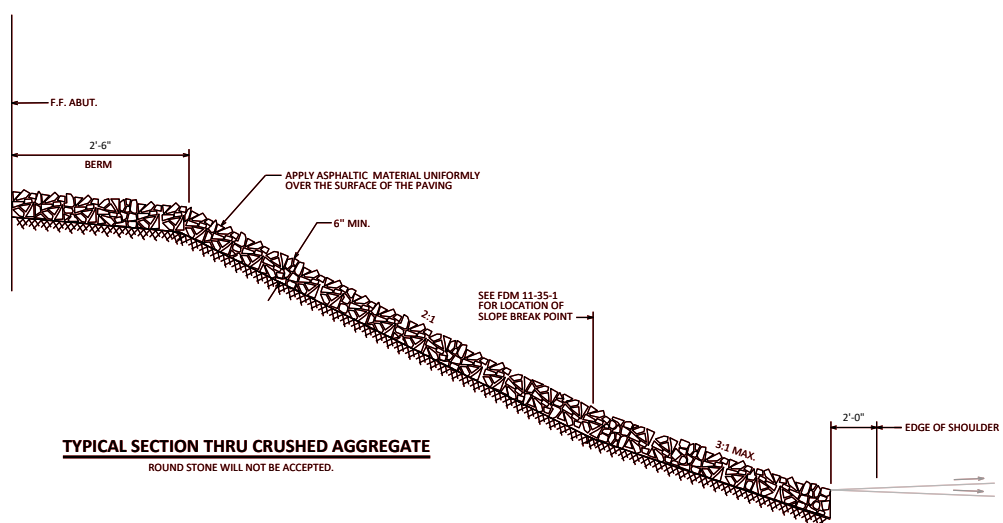
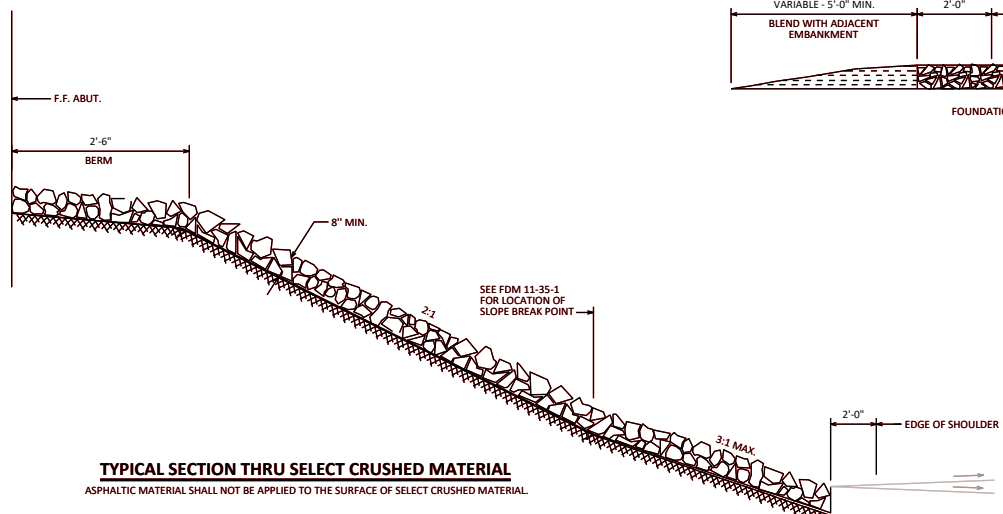
PLACEMENT OF HEAVY RIPRAP AT RIVER CROSSINGS



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

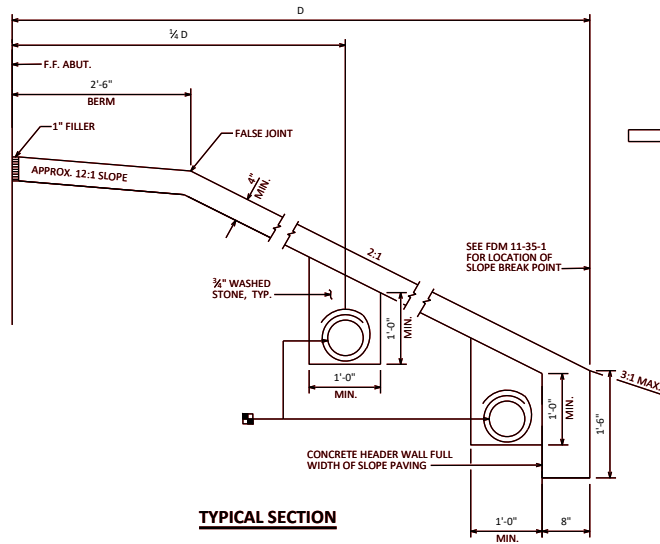
DATE:
1-19



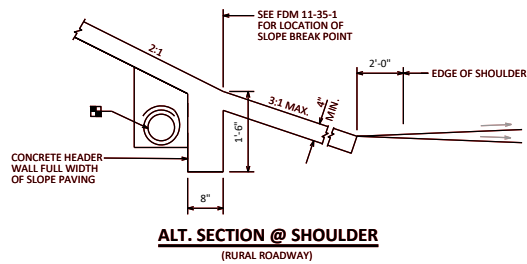
NOTES
 BID ITEM SHALL BE "SLOPE PAVING CRUSHED AGGREGATE" (OR "SLOPE PAVING SELECT CRUSHED MATERIAL")
 WOOD FORMS MAY BE LEFT IN PLACE WHEN OF A QUALITY ACCEPTABLE TO THE ENGINEER.

DESIGNER NOTE
 PREFERRED SECTION SHOWN. FOR ALTERNATE SECTION SEE FDM 11-35-1.

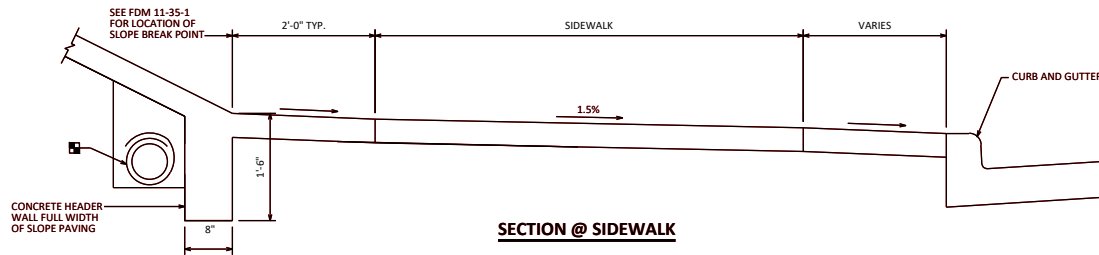
SLOPE PAVING - STRUCTURES (CRUSHED AGGREGATE & SELECT CRUSHED MATERIAL)	
	BUREAU OF STRUCTURES
APPROVED: <i>Laura Shadewald</i>	DATE: 7-18



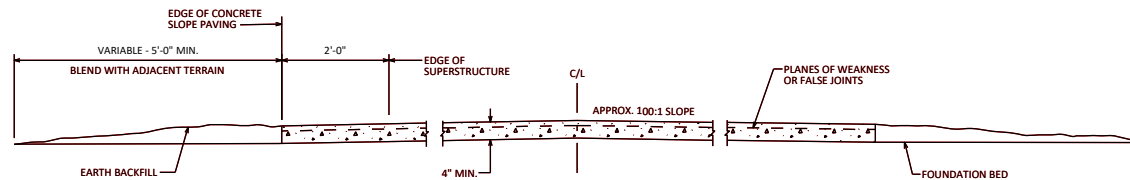
TYPICAL SECTION



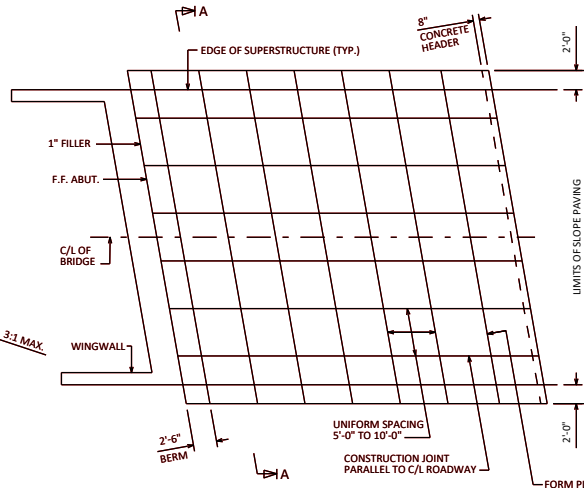
ALT. SECTION @ SHOULDER
(RURAL ROADWAY)



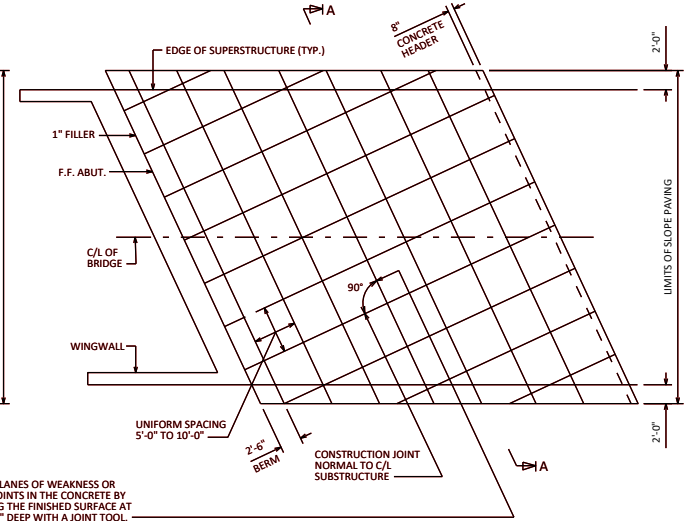
SECTION @ SIDEWALK



SECTION A-A

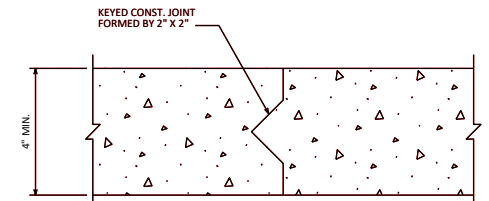


0° - 15° SKEW



> 15° SKEW

PLAN
(TYPICAL SECTION SHOWN)



CONSTRUCTION JOINT DETAIL

NOTE

BID ITEMS SHALL BE "SLOPE PAVING CONCRETE" AND "PIPE UNDERDRAIN WRAPPED 6-INCH"

LEGEND

- PIPE UNDERDRAIN WRAPPED (6-INCH). SLOPE 0.5% MIN. TO SUITABLE DRAINAGE. ATTACH RODENT SHIELD AT ENDS OF PIPE UNDERDRAIN. (SHOW DETAILS ON PLANS. SEE STD. 9.01 FOR DETAILS)

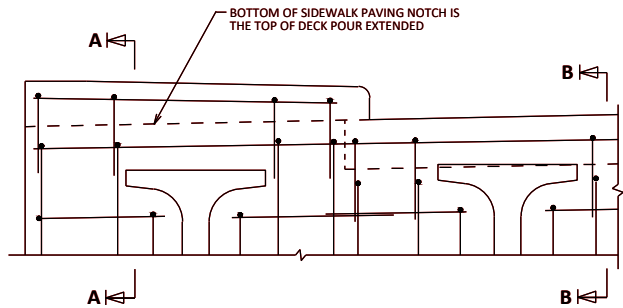
SLOPE PAVING - STRUCTURES
(CONCRETE CAST-IN-PLACE)



BUREAU OF
STRUCTURES

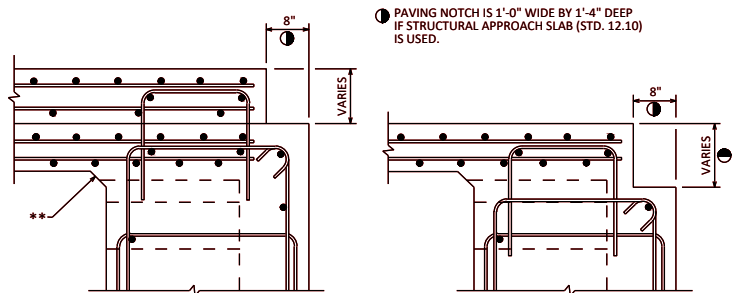
APPROVED: *Laura Shadewald*

DATE:
7-20



PART TRANSVERSE SECTION AT ABUTMENT TYPE A1 DIAPHRAGM WITH A RAISED SIDEWALK

(HORIZ. BARS SHOWN ARE THE FF BARS.
DECK REINFORCEMENT NOT SHOWN FOR CLARITY.)

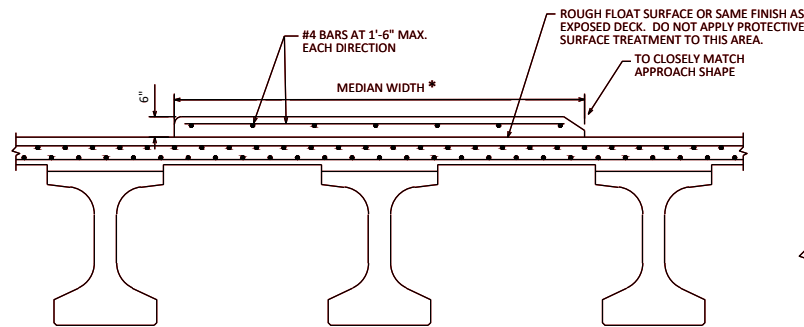


SECTION A-A

** 3" X 3" BEVEL ENDS AT EDGE OF BRIDGE DECK

SECTION B-B

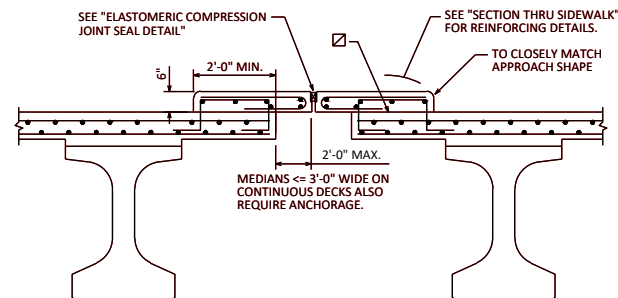
- SEE STANDARDS 19.33, 19.34, 19.35 FOR REINFORCEMENT DETAILS
- DETAILS SHOWN ARE FOR GIRDER STRUCTURES. SIMILAR REINFORCEMENT FOR SLAB STRUCTURES SHALL BE USED WITH A REMINDER THAT THE TRANSVERSE AND LONGITUDINAL REINFORCEMENT LAYERS ARE REVERSED.



CROSS SECTION THRU UNANCHORED MEDIAN

* (ANCHORAGE TO DECK NOT REQUIRED FOR WIDTHS > 3'-0", EXCEPT ALL MEDIAN SECTIONS ON TOP OF PAVING BLOCK MUST BE ANCHORED)

NOTE: CLEAN ALL LOOSE MATERIAL ON THE DECK AT THE MEDIAN LOCATION PRIOR TO MEDIAN PLACEMENT USING HIGH PRESSURE WATER OR AIR, ENSURING ALL FREE-STANDING WATER IS REMOVED PRIOR TO MEDIAN PLACEMENT. NEAT CEMENT IS REQUIRED AS PER 509.3.9.2 OF THE STANDARD SPECIFICATIONS UNLESS THE MEDIAN IS POURED WITHIN 45 DAYS OF COMPLETING THE DECK POUR.



CROSS SECTION THRU MEDIAN WITH A JOINT

NOTES

WHEN PARAPETS ARE POURED CONTINUOUSLY FROM END TO END, THEY SHALL BE SEPARATED AT THE DEFLECTION JOINTS BY A PIECE OF 1/2" ZINC OR PLASTIC PLATE CUT AS SHOWN IN THE "DEFLECTION JOINT DETAIL". IF CONSTRUCTION JOINTS IN PARAPETS ARE USED AT THE DEFLECTION JOINTS, ONE SIDE OF JOINT SHALL BE COATED WITH AN APPROVED LIQUID BOND BREAKER AND PLATE SEPARATORS MAY BE OMITTED.

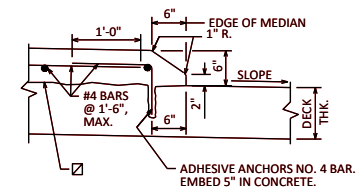
- ☑ CONST. JOINT-STRIKE OFF AS SHOWN AND LEAVE ROUGH. FOR DECK POUR, MATCH BRIDGE X-SLOPE.
- ⊕ 8" MIN. SIDEWALK THICKNESS ALSO REQ'D AT EDGE OF DECK/SLAB.
- ⚠ ± 0.5% CONSTRUCTION TOLERANCE IN SIDEWALK CROSS SLOPE. THE SIDEWALK CROSS SLOPE SHALL NOT EXCEED 2% WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

DESIGNER NOTES

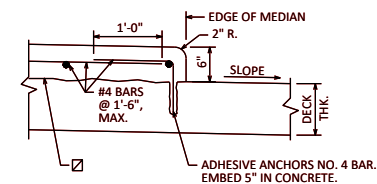
FOR EXTREME SIDEWALK WIDTHS AND/OR SUPERELEVATIONS THE DECK MAY BE LEVEL BENEATH THE SIDEWALK (MAINTAIN CONSTANT DECK THICKNESS) TO REDUCE EXCESSIVE SIDEWALK THICKNESS.

FOR DEAD LOAD PURPOSES, THE SUPERSTRUCTURE DESIGN SHALL ACCOUNT FOR A MAXIMUM 2% SIDEWALK CROSS SLOPE.

SEE STD. 30.41 FOR ALTERNATIVE RAISED SIDEWALK DETAILS.

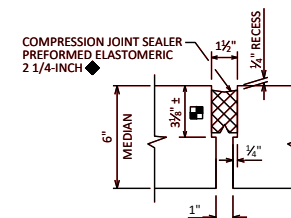


ANCHORED MEDIAN CURB DETAIL



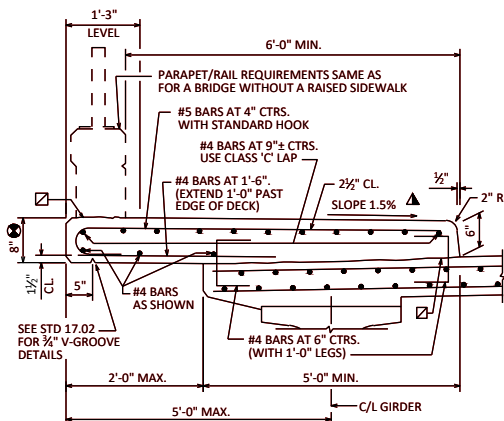
ANCHORED MEDIAN CURB DETAIL

- ☑ CONST. JOINT-STRIKE OFF AS SHOWN AND LEAVE ROUGH. FOR DECK POUR, MATCH BRIDGE X-SLOPE.



ELASTOMERIC COMPRESSION SEAL DETAIL

- ◻ VARIES BASED ON JOINT MANUFACTURER
- ◆ MANUFACTURER SHALL LABEL TOP OF SEAL



SECTION THRU SIDEWALK

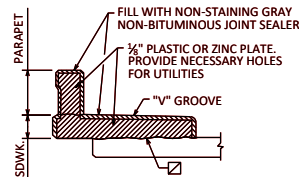
DEFLECTION JOINT DETAIL

SHOW DEFLECTION JOINT IN PARAPET OR SIDEWALK USING THE FOLLOWING CRITERIA:

1. GIRDER STRUCTURES AND SLAB STRUCTURES WITH A RAISED SIDEWALK SHOULD HAVE A DEFLECTION JOINT IN THE SIDEWALK AND PARAPET OVER THE PIER. FOR SKEWS GREATER THAN 20°, DETAIL THE JOINT NORMAL TO THE SIDEWALK AND PARAPET WITH THE JOINT APPROX. CENTERED OVER C/L PIER.

IF THERE IS A LIGHT STANDARD AT THE PIER, PLACE A DEFLECTION JOINT APPROX. 4'-0" EACH SIDE OF PIER, WITH NONE DIRECTLY OVER THE PIER.

2. GIRDER STRUCTURES AND SLAB STRUCTURES WITHOUT SIDEWALKS SHOULD HAVE NO DEFLECTION JOINTS IN THE PARAPETS.



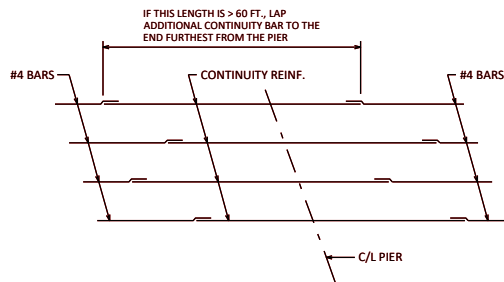
MEDIAN AND RAISED SIDEWALK DETAILS



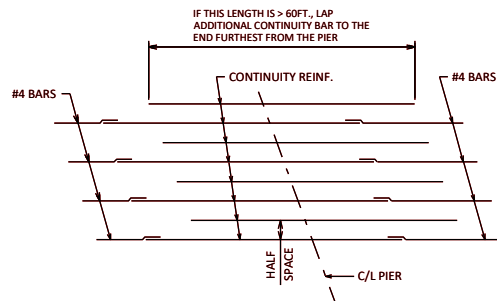
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
7-25



**PLAN VIEW OF DECK CONTINUITY REINFORCEMENT
FOR PRESTRESSED GIRDER BRIDGES**
(SHOWING TYPICAL BAR SPACING FROM CHAPTER 17 TABLES)



**PLAN VIEW OF DECK CONTINUITY REINFORCEMENT
FOR PRESTRESSED GIRDER BRIDGES SHOWING HALF-SPACES**
(SHOWING TYPICAL BAR SPACING FROM CHAPTER 17 TABLES + HALF-SPACE)

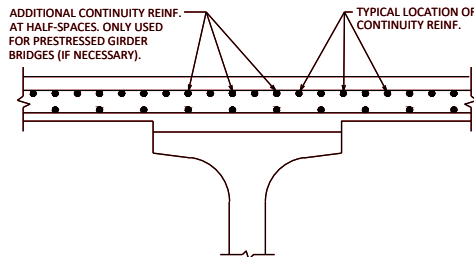
LONGITUDINAL CONSTRUCTION JOINT DETAIL

SEE STD. 24.11 FOR GIRDER SUPERSTRUCTURES
SEE STD. 24.11 FOR GIRDER SUPERSTRUCTURES
SEE STD. 18.02 FOR SLAB SUPERSTRUCTURES

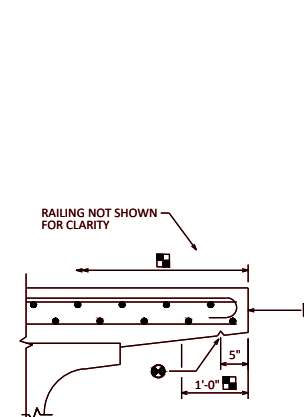
DESIGNER NOTES

DETAIL REQUIRED WHEN WIDTH OF DECK EXCEEDS 90 FEET FOR GIRDER SUPERSTRUCTURES AND 52 FEET FOR SLAB SUPERSTRUCTURES. ~~DETAIL SHOULD~~ BE USED FOR STAGED CONSTRUCTION AND FOR OTHER COLD JOINT APPLICATIONS WITHIN THE DECK. ~~OPTIONAL (CONTRACTOR) JOINTS ARE TO BE APPROVED BY THE ENGINEER.~~

JOINTS SHOULD BE PLACED AT LEAST 6 INCHES FROM THE EDGE OF THE TOP FLANGE OF THE GIRDER AND PREFERABLY LOCATED BENEATH THE MEDIAN OR PARAPET. AVOID PLACING NEAR WHEEL PATHS (PLACE AT LANE LINES OR IN THE MIDDLE OF THE LANE).

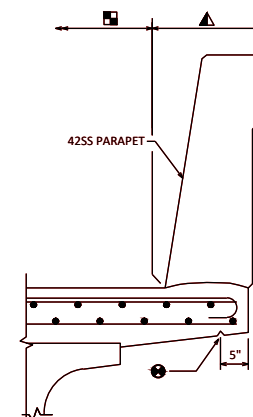


CROSS SECTION THRU DECK
(SHOWING TOP LONGIT. REINF. LOCATION RELATIVE TO BOTTOM LONGIT. REINF.)



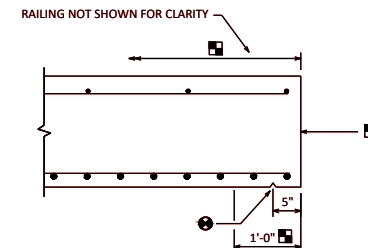
CROSS SECTION THRU EDGE OF DECK

(SHOWING DRIP GROOVE AND CONCRETE SEALING FOR OPEN RAILINGS)



CROSS SECTION THRU EDGE OF DECK

(SHOWING DRIP GROOVE AND CONCRETE SEALING FOR ALL PARAPETS)



CROSS SECTION THRU EDGE OF SLAB

(SHOWING DRIP GROOVE FOR ALL PARAPET AND RAILINGS, AND PROTECTIVE SURFACE TREATMENT FOR OPEN RAILINGS. FOR PARAPETS, PROTECTIVE SURFACE TREATMENT IS ONLY APPLIED GUTTERLINE TO GUTTERLINE)

DESIGNER NOTES

- 3/4" V-GROOVE REQUIRED AT THE EDGE OF DECK AND SLAB.

REFER TO STANDARD 40.01 FOR RESEALING CONCRETE SURFACES.

DO NOT APPLY CONCRETE SEALER TO SURFACES TO BE STAINED OR OTHER

- **BID ITEM "PROTECTIVE SURFACE TREATMENT":**

- APPLY TO DECK AND CONCRETE OVERLAY SURFACES.
- FOR OPEN RAILINGS, ~~APPLY TO THE TOP AND~~ EXTERIOR EXPOSED FACE OF WINGS, AND THE END 1'-0" OF THE FRONT FACE OF ABUTMENT.
- APPLY TO THE VERTICAL AND HORIZONTAL SURFACES OF SIDEWALKS, MEDIANS, AND PAVING NOTCHES.

- **BID ITEM "PIGMENTED SURFACE SEALER":**

- APPLY TO INSIDE & TOP FACES OF PARAPETS, INCLUDING PARAPETS ON WINGS.

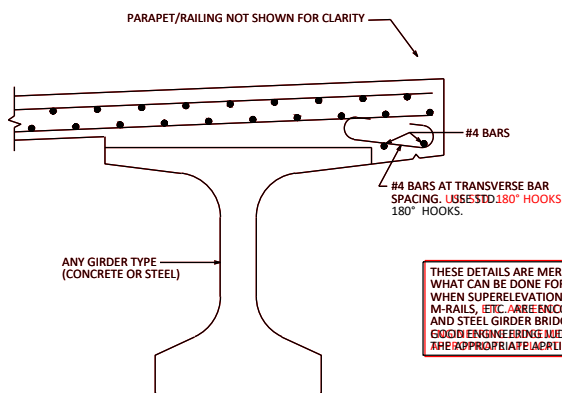
NOTES

- 3/4" V-GROOVE REQ'D. EXTEND TO 2'-0" FROM F.F. OF ABUT. BODY (FOR ABUTMENTS WITH EXPANSION JOINTS)

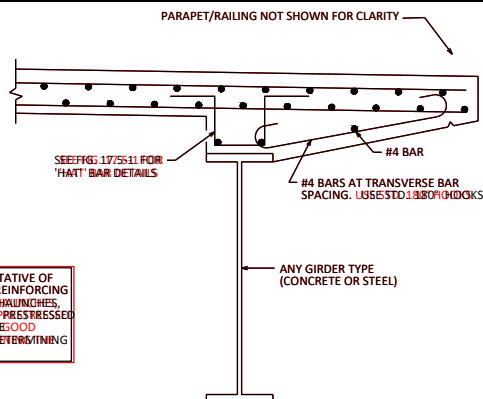
3/4" V-GROOVE REQ'D. EXTEND TO 6" FROM F.F. OF ABUT. DIAPH. (FOR TYPE A1 FIXED AND SEMI-EXPANSION ABUTMENTS)

- PROTECTIVE SURFACE TREATMENT SHALL BE APPLIED TO THE (INSERT LOCATIONS).

- PIGMENTED SURFACE SEALER SHALL BE APPLIED TO THE (INSERT LOCATIONS).



CROSS SECTION THRU EDGE OF DECK
(SHOWING ADDITIONAL OVERHANG REINFORCEMENT)



CROSS SECTION THRU EDGE OF DECK
(SHOWING ADDITIONAL OVERHANG REINFORCEMENT)

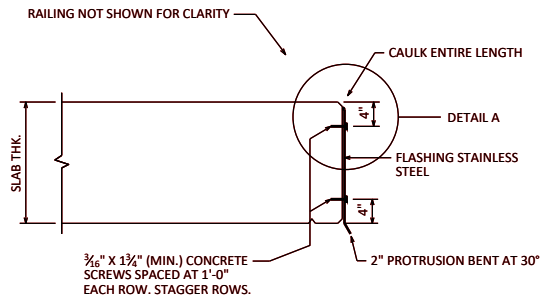
THESE DETAILS ARE MERELY REPRESENTATIVE OF WHAT CAN BE DONE FOR OVERHANG REINFORCING WHEN SUPERELEVATIONS, EXCESSIVE HAUNCHES, M-RAILS, ETC. ARE ENCOUNTERED ON PRESTRESSED AND STEEL GIRDER BRIDGE DECKS. USE GOOD ENGINEERING JUDGEMENT IN DETERMINING THE APPROPRIATE APPLICATION.

DECK AND SLAB DETAILS

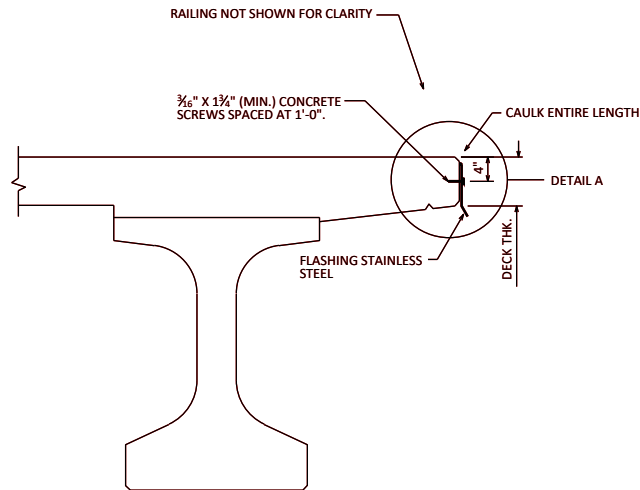


APPROVED: *Laura Shadewald*

DATE:
7-25



FLASHING DETAIL FOR NEW BRIDGES WITH OPEN RAILING



DESIGNER NOTES

EDGE OF DECK FLASHING IS FOR OPEN RAIL BRIDGES AND MAY BE USED FOR REHABILITATION OR NEW CONSTRUCTION. CONTACT THE REGION BRIDGE MAINTENANCE ENGINEER FOR THE DECISION ON WHETHER OR NOT TO USE THE FLASHING ON NEW BRIDGES.

DETAIL 1 OR DETAIL 2, OR A COMBINATION OF THE TWO, MAY BE USED FOR REHABILITATION.

THE DESIGN ENGINEER SHALL PROVIDE CONCRETE SURFACE REPAIR DETAILS AS NEEDED AND WILL BE PAID FOR SEPARATELY. CONCEPTUAL DETAILS ARE SHOWN ON THIS STANDARD.

DO NOT USE FLASHING IF FREEBOARD IS LESS THAN 3" FOR A SLAB BRIDGE. DETAIL 1 NOT TO BE USED IF CLEARANCE IS AN ISSUE OR IF DEBRIS IS A CONCERN.

NOTES (NEW BRIDGES WITH OPEN RAILINGS)

THE BID ITEM "FLASHING STAINLESS STEEL" SHALL INCLUDE PROVIDING AND INSTALLING THE STAINLESS STEEL FLASHING, SILICONE CAULK, CONCRETE SCREWS, AND CLEANING THE EDGE OF THE DECK PRIOR TO ATTACHMENT OF THE FLASHING .

FLASHING TO BE INSTALLED AFTER PROTECTIVE SURFACE TREATMENT APPLICATION. PROTECTIVE SURFACE TREATMENT SHALL BE APPLIED TO THE TOP SURFACE OF THE SLAB, THE EXTERIOR EDGE OF THE SLAB, AND THE FIRST 1'-0" OF THE UNDERSIDE OF THE SLAB.

CONCRETE SCREWS SHALL BE 410 STAINLESS STEEL.

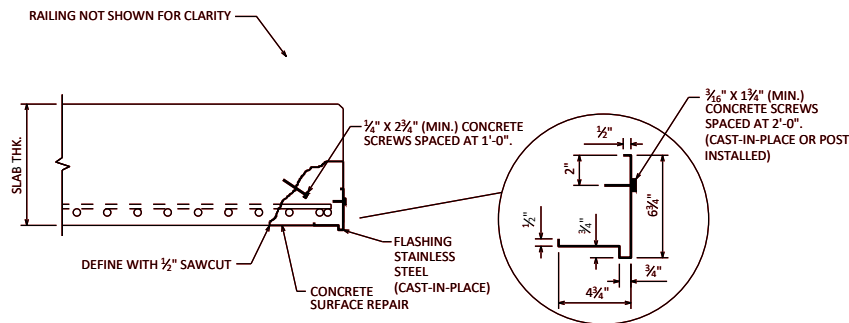
EXTEND FLASHING TO B.F. OF ABUTMENT DIAPHRAGM.

TOP OF FLASHING TO BEGIN APPROX. 1-INCH BELOW TOP OF DECK/SLAB SURFACE.

THE FLASHING IS TO BE A CONSTANT HEIGHT BASED ON THE THINNEST SLAB DEPTH OVER THE BRIDGE LENGTH.

PROVIDE 2" MINIMUM FLASHING OVERLAP, FASTEN WITH 3/8" X 2" (MIN.) CONCRETE SCREWS.

CAULK SHALL BE NON-STAINING, GRAY NON-BITUMINOUS JOINT SEALER.



REHABILITATION FLASHING DETAIL 1

NOTES (REHAB DETAIL 1)

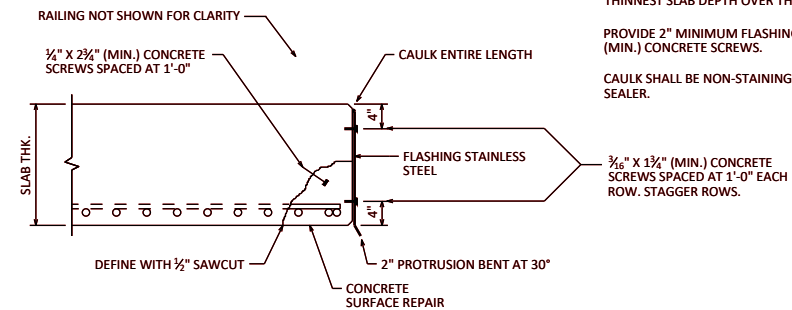
THE BID ITEM "FLASHING STAINLESS STEEL" SHALL INCLUDE PROVIDING AND INSTALLING THE STAINLESS STEEL FLASHING, AND CONCRETE SCREWS.

PROTECTIVE SURFACE TREATMENT TO BE APPLIED AFTER FLASHING IS INSTALLED AND LIMITED TO THE EXPOSED CONCRETE SURFACES. PROTECTIVE SURFACE TREATMENT SHALL BE APPLIED TO THE TOP SURFACE OF THE SLAB, THE EXTERIOR EDGE OF THE SLAB, AND THE FIRST 1'-0" OF THE UNDERSIDE OF THE SLAB.

CONCRETE SCREWS SHALL BE 410 STAINLESS STEEL.

EXTEND FLASHING TO B.F. OF ABUTMENT DIAPHRAGM.

PROVIDE 2" MINIMUM FLASHING OVERLAP, FASTEN WITH 3/8" X 2" (MIN.) CONCRETE SCREWS.



REHABILITATION FLASHING DETAIL 2

NOTES (REHAB DETAIL 2)

THE BID ITEM "FLASHING STAINLESS STEEL" SHALL INCLUDE PROVIDING AND INSTALLING THE STAINLESS STEEL FLASHING, SILICONE CAULK, CONCRETE SCREWS, AND AND CLEANING THE EDGE OF THE DECK PRIOR TO ATTACHMENT OF THE FLASHING .

FLASHING TO BE INSTALLED AFTER PROTECTIVE SURFACE TREATMENT APPLICATION. PROTECTIVE SURFACE TREATMENT SHALL BE APPLIED TO THE TOP SURFACE OF THE SLAB, THE EXTERIOR EDGE OF THE SLAB, AND THE FIRST 1'-0" OF THE UNDERSIDE OF THE SLAB.

CONCRETE SCREWS SHALL BE 410 STAINLESS STEEL.

EXTEND FLASHING TO B.F. OF ABUTMENT DIAPHRAGM.

TOP OF FLASHING TO BEGIN APPROX. 1-INCH BELOW TOP OF DECK/SLAB SURFACE.

THE FLASHING IS TO BE A CONSTANT HEIGHT BASED ON THE THINNEST SLAB DEPTH OVER THE BRIDGE LENGTH.

PROVIDE 2" MINIMUM FLASHING OVERLAP, FASTEN WITH 3/8" X 2" (MIN.) CONCRETE SCREWS.

CAULK SHALL BE NON-STAINING, GRAY NON-BITUMINOUS JOINT SEALER.

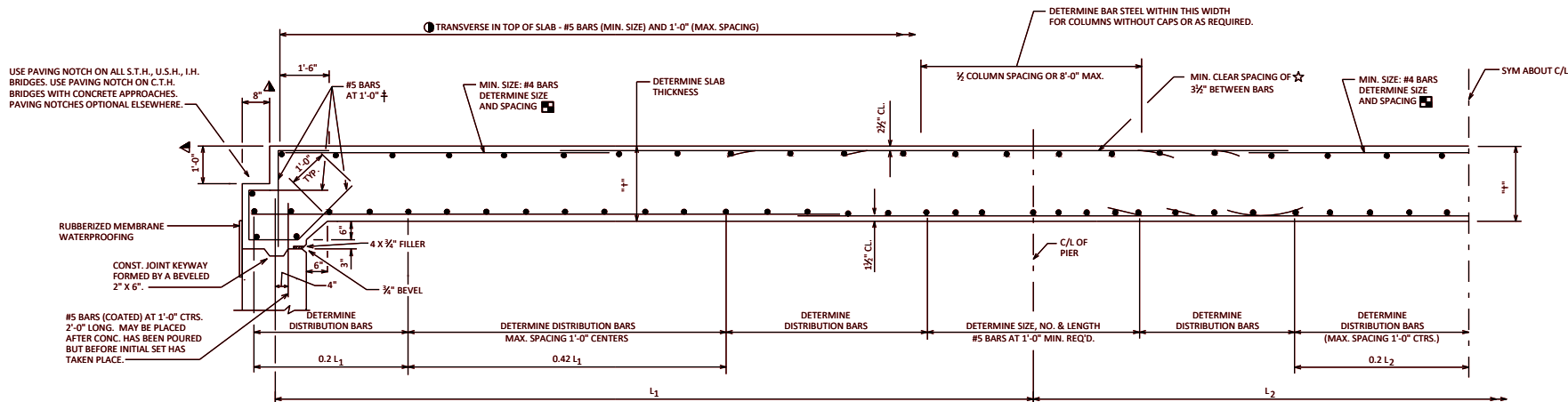
EDGE OF DECK FLASHING



BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE:
1-25



HALF LONGITUDINAL SECTION

‡ BARS PLACED PARALLEL TO R/L
SPACING PERPENDICULAR TO R/L

NOTES

TOP TRANSVERSE BARS IN SLAB SHALL BE SUPPORTED BY INDIVIDUAL BAR CHAIRS AT APPROXIMATELY 3'-0" CENTERS EACH WAY. BOTTOM LONGITUDINAL BARS SHALL BE SUPPORTED BY CONTINUOUS BAR CHAIRS AT APPROXIMATELY 4'-0" CENTERS.

ALL SLAB THICKNESS DIMENSIONS ARE MINIMUM. ANY TOLERANCES NECESSARY TO CORRECT CONSTRUCTION DISCREPANCIES ARE TO BE PLUS (+).

PARAPETS, SIDEWALKS, AND MEDIANS PLACED ON TOP OF THE SLAB SHALL BE POURED AFTER FALSEWORK HAS BEEN RELEASED. (FOR NON-STAGED CONSTRUCTION)

SLAB-SUPPORTING FALSEWORK SHALL REMAIN IN-PLACE UNTIL ALL STAGES OF THE SUPERSTRUCTURE HAS CURED, FOR DEFLECTION CONTROL BETWEEN STAGES. DO NOT RELEASE ANY FALSEWORK UNTIL PARAPETS, SIDEWALKS, AND MEDIANS HAVE CURED. (FOR STAGED CONSTRUCTION)

CAMBER SPANS AS SHOWN TO PROVIDE FOR DEAD LOAD DEFLECTION AND FUTURE CREEP. CAMBER DOES NOT INCLUDE ALLOWANCE FOR FORM SETTLEMENT.

PRIOR TO RELEASING SLAB FALSEWORK, TAKE TOP OF SLAB ELEVATIONS AT THE C/L OF ABUTMENTS, THE C/L OF PIERS AND AT 5/10 PTS. TO VERIFY CAMBER. TAKE ELEVATIONS ALONG GUTTER LINES AND CROWN OR R/L. RECORD ELEVATIONS ON AS BUILT PLANS. SEE STD. 18.03

DESIGNER NOTES

THE MAXIMUM ALLOWABLE SKEW ANGLE OF STRUCTURE SHALL BE 30°.

ALL BAR SPLICES TO BE BASED ON "CLASS C" TENSION LAP SPLICE.

USE OPTIONAL LONGITUDINAL JOINTS WHEN OVERALL SLAB WIDTH IS OVER 52'-0".

FOR BRIDGES LOCATED IN REMOTE AREAS USE OPTIONAL TRANSVERSE JOINT WHEN POUR EXCEEDS 400 C.Y. PLACE KEYS JOINT NEAR POINT OF DEAD LOAD INFLECTION.

ALL TRANSVERSE BAR STEEL REINFORCEMENT SHALL BE PLACED ON THE SKEW.

FLOOR DRAINS ARE TO BE OMITTED FROM SLAB STRUCTURES WHERE POSSIBLE. IF FLOOR DRAINS ARE REQUIRED, PLACE ONLY AT THE 2/10 AND 8/10 PTS. BEND MAIN REBARS PAST DRAINS - DO NOT CUT.

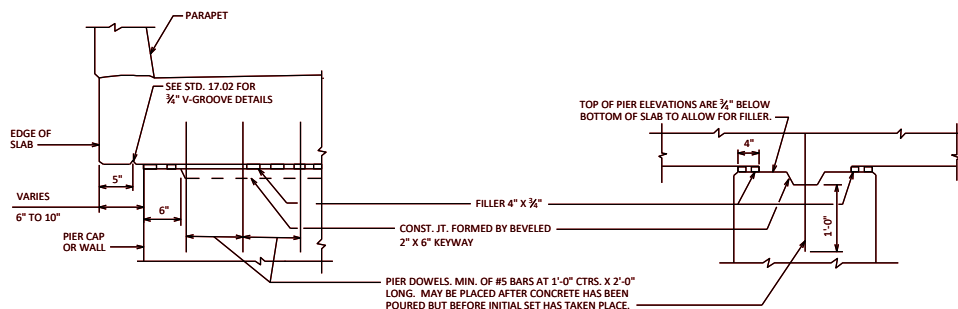
PIER CAP OR WALL TYPE PIERS SHALL BE USED ON MOST STRUCTURES. "COLUMN WITHOUT CAP" TYPE PIERS (SEE STD. 18.01) MAY BE USED WITH THE APPROVAL OF THE STRUCTURES DESIGN SECTION.

ON THE PLANS, PROVIDE CAMBER VALUES AT THE TENTH POINTS OF ALL SPANS. ALSO PROVIDE TOP OF SLAB ELEVATIONS AT THE REFERENCE LINE (OR CROWN) AND OUTSIDE EDGES OF SLAB AT TENTH POINTS. SEE STD. 18.03

▲ PAVING NOTCH IS 1'-0" WIDE BY 1'-4" DEEP IF STRUCTURAL APPROACH SLAB (STD. 12.10) IS USED.

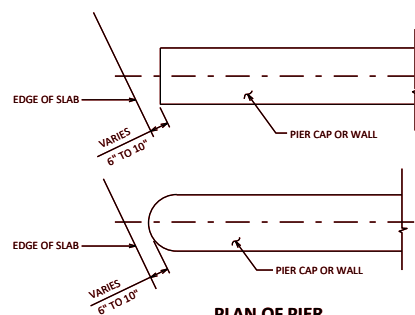
■ REINFORCEMENT IN SLAB MUST MEET TEMPERATURE AND SHRINKAGE REQUIREMENTS.

☆ REFER TO CHAPTER 18 FOR BAR CUTOFF LOCATIONS AND STANDARD 17.02 FOR BAR SPACING CONSIDERATIONS OVER PIERS.

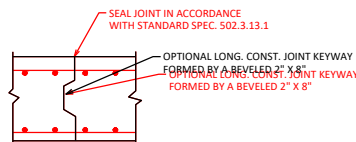


PIER CAP OR WALL TYPE PIER

SEE STD. 18.01 FOR COLUMN W/O CAP PIER DETAIL.



PLAN OF PIER



OPTIONAL LONGITUDINAL CONSTRUCTION JOINT

TOP TRANSVERSE REINF. FOR RAILINGS/PARAPETS		
SINGLE SLOPE OR SLOPED FACE PARAPETS	MAIN BARS RUN FROM EDGE TO EDGE OF SLAB	SHORT BARS PLACED BETWEEN MAIN BARS AT EDGE OF SLAB
SLAB THICK. ≥ 15"	(#5 @ 1'-0")	(#5 @ 1'-0") 5'-0" LONG NO HOOK REQ'D. AT END
13" ≤ SLAB THICK. < 15"	(#5 @ 10")	(#5 @ 10") 5'-0" LONG STD. HOOK REQ'D. AT END
STEEL RAILINGS TYPE "NY"/"M"/"W"	● TOP TRANSVERSE REINF. SPECIFIED IN "LONGIT. SECTION" IS ADEQUATE	

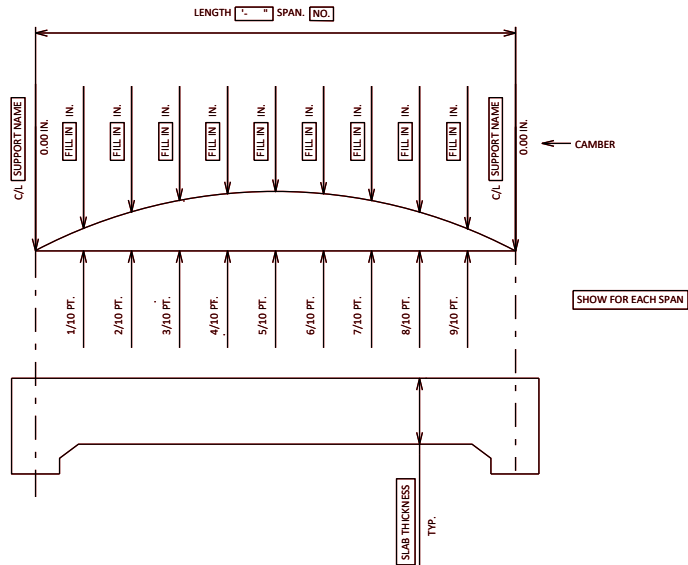
CONTINUOUS FLAT SLAB



BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE: 7-25



CAMBER AND SLAB THICKNESS DIAGRAM

CAMBER SHOWN IS BASED ON 3 TIMES DEAD LOAD DEFLECTION.

CAMBER SPANS AS SHOWN TO PROVIDE FOR DEAD LOAD DEFLECTION AND FUTURE CREEP. CAMBER DOES NOT INCLUDE ALLOWANCE FOR FORM SETTLEMENT.

- SELECT ONE
- PARAPETS, SIDEWALKS, AND MEDIANS PLACED ON TOP OF THE SLAB SHALL BE POURED AFTER FALSEWORK HAS BEEN RELEASED. (FOR NON-STAGED CONSTRUCTION)
 - SLAB-SUPPORTING FALSEWORK SHALL REMAIN IN-PLACE UNTIL ALL STAGES OF THE SUPERSTRUCTURE HAS CURED, FOR DEFLECTION CONTROL BETWEEN STAGES. DO NOT RELEASE ANY FALSEWORK UNTIL PARAPETS, SIDEWALKS, AND MEDIANS HAVE CURED. (FOR STAGED CONSTRUCTION)

TO DETERMINE FALSEWORK ELEVATION AT EDGE OF SLAB, CROWN OR REFERENCE LINE FOLLOW THIS PROCEDURE:

TOP OF SLAB ELEVATION AT FINAL GRADE
 MINUS..... SLAB THICKNESS
 PLUS..... CAMBER
 PLUS..... FORM SETTLEMENT/DEFLECTION DUE TO PLACEMENT OF SLAB CONCRETE (TO BE COMPUTED BY THE CONTRACTOR)
 EQUALS = TOP OF SLAB FALSEWORK ELEVATION

SURVEY TOP OF SLAB ELEVATIONS

SHOW FOR EACH SPAN

	C/L BRG. SUPPORT NAME	5/10 PT.	C/L BRG. SUPPORT NAME
GUTTER			
CROWN AND/OR R/L			
GUTTER			
EDGE OF SLAB ☆			

(FOR SIDEWALK OR OPEN RAILING APPLICATIONS)

PRIOR TO RELEASING SLAB FALSEWORK, TAKE TOP OF SLAB ELEVATIONS AT THE C/L OF ABUTMENTS, THE C/L OF PIERS AND AT 5/10 PTS. TO VERIFY CAMBER. TAKE ELEVATIONS ALONG GUTTER LINES AND CROWN OR R/L. RECORD THE ELEVATIONS IN THE ABOVE TABLE FOR THE "AS BUILT" PLANS.

NOTES

FILL IN THE TABLE OF "SURVEY TOP OF SLAB ELEVATIONS" FOR EACH SPAN ON AS BUILT PLANS.

☆ EDGE OF SLAB ELEVATION IS THE TOP OUTER EDGE OF THE SLAB BENEATH SIDEWALK. (FOR SIDEWALK OR OPEN RAILING APPLICATIONS)

DESIGNER NOTES

PROVIDE A "CAMBER AND SLAB THICKNESS DIAGRAM" AND TABLE OF "TOP OF SLAB ELEVATIONS" FOR EACH SPAN ON CONTRACT PLANS.

INCLUDE THE "SURVEY TOP OF SLAB ELEVATIONS" TABLE ON THE CONTRACT PLANS SO THAT IT MAY BE FILLED IN DURING CONSTRUCTION. TO VERIFY CAMBER, SURVEY LOCATIONS SHALL CORRESPOND WITH THE TABLE OF "TOP OF SLAB ELEVATIONS".

FOR BRIDGES WITH R/L LINE NOT ON THE CROWN, PROVIDE ELEVATIONS AT BOTH LOCATIONS.

TOP OF SLAB ELEVATIONS

SHOW FOR EACH SPAN

	C/L BRG. SUPPORT NAME	1/10	2/10	3/10	4/10	5/10	6/10	7/10	8/10	9/10	C/L BRG. SUPPORT NAME
GUTTER											
CROWN AND/OR R/L											
GUTTER											

EDGE OF SLAB ☆ (FOR SIDEWALK OR OPEN RAILING APPLICATIONS)

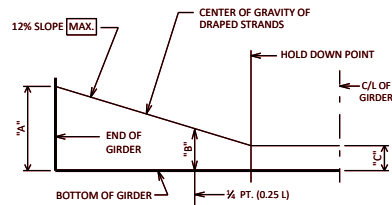
CONCRETE SLAB DETAILS



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

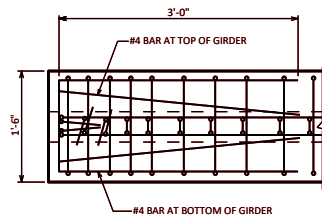
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7-23



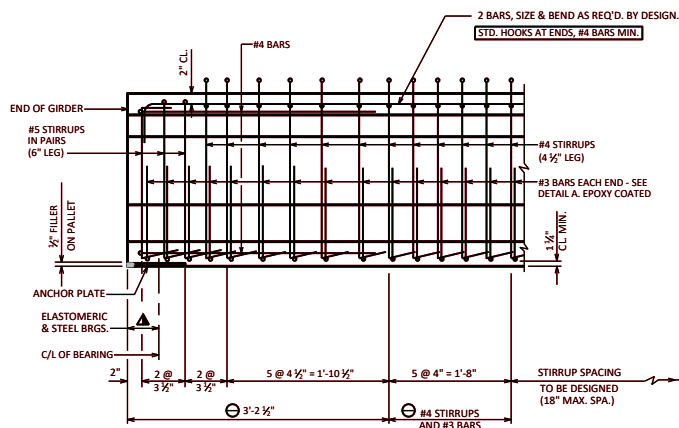
"A" TO BE GIVEN TO THE NEAREST 1"
 "B" = $\frac{1}{4} ("A" + 3 "C")$ [MIN]
 "B" = $\frac{1}{4} ("A" + 3 "C") + 3"$ [MAX]

RECORD DIMENSIONS
 "A", "B" & "C"
 ON FINAL PLANS.

LOCATION OF DRAPED STRANDS



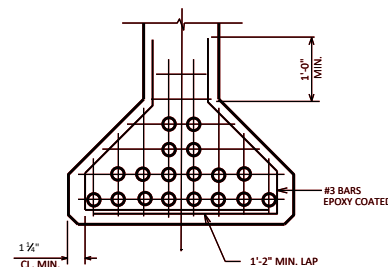
PLAN VIEW



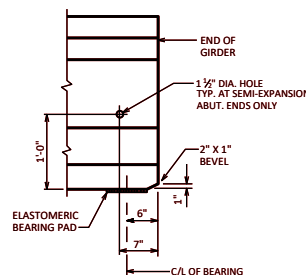
SUPPORT WITH STEEL OR ELASTOMERIC BRGS.

⊖ DETAIL TYPICAL AT EACH END

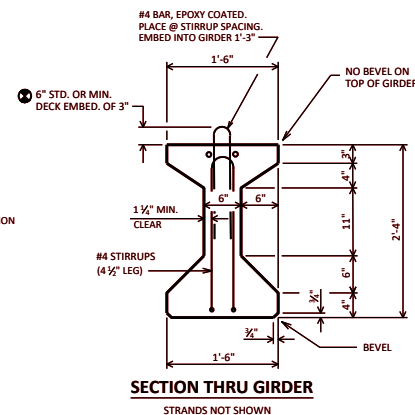
SIDE VIEW OF GIRDER



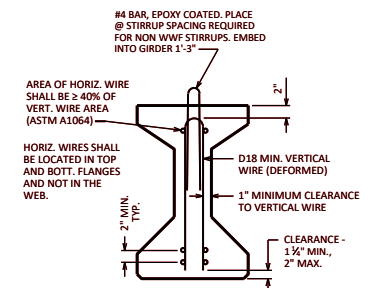
DETAIL A



SUPPORT WITH 1/2" ELASTOMERIC BRG. PAD



SECTION THRU GIRDER STRANDS NOT SHOWN



SECTION THRU GIRDER SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS ASTM A1064 (FY = 70 KSI)

NOTES

TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY, EXCEPT THE OUTSIDE 2" OF GIRDER, WHICH SHALL RECEIVE A SMOOTH FINISH. AN APPROVED CONCRETE SEALER SHALL BE APPLIED TO ALL SMOOTH SURFACES INCLUDING THE OUTSIDE 2" OF THE TOP FLANGE.

DO NOT APPLY CONCRETE SEALER OR EPOXY TO SURFACES RECEIVING APPLICATION OF CONCRETE STAINING.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS. SEE SECTION 503.3.4 OF STANDARD SPECIFICATIONS FOR GUIDANCE.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. FOR GIRDER ENDS EMBEDDED COMPLETELY IN CONCRETE, END OF STRANDS SHALL BE COATED WITH NON-BITUMINOUS JOINT SEALER. FOR GIRDER ENDS THAT ARE FINALLY EXPOSED, COAT THE GIRDER ENDS, EXPOSED STRAND ENDS AND ALL NON-BONDING SURFACES WITHIN 2 FEET OF THE GIRDER ENDS WITH A NON-PIGMENTED EPOXY CONFORMING TO AASHTO M-235 TYPE III, GRADE 2, CLASS B OR C. THE EPOXY SHALL BE APPLIED AT LEAST 3 DAYS AFTER MOIST CURING HAS CEASED AND PRIOR TO THE APPLICATION OF THE SEALER.

ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.

SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT.

AN EQUIVALENT OF WELDED WIRE FABRIC (WWF) ASTM A1064 MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DESIGN SECTION. IF USED, WWF SUBSTITUTION DETAILS SHALL BE SUBMITTED ELECTRONICALLY TO THE WISDOT FABRICATION LIBRARY AND ACCEPTED PRIOR TO SHOP DRAWING SUBMITTAL.

PRESTRESSING STRANDS SHALL BE (DIA.) 7-WIRE LOW-RELAXATION STRANDS WITH AN ULTIMATE STRENGTH OF 270,000 PSI.

DESIGNER NOTES

BID ITEM SHALL BE "PRESTRESSED GIRDER TYPE I 28-INCH".

SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. MAXIMUM RELEASE STRENGTH IS 6,800 PSI. USE ONLY 0.5" DIA. STRAND FOR THE DRAPED PATTERN. THE MAX. NUMBER OF DRAPED 0.5" DIA. STRANDS IS 8. USE 0.8" DIA. FOR THE STRAIGHT PATTERN, UNLESS ONLY 0.5" DIA. WORK FOR KEEPING STRESSES AT ACCEPTABLE LEVELS.

REINFORCEMENT IN STANDARD END SECTION OF THE GIRDER IS BASED ON THE STANDARD STRAND PATTERNS LISTED ON STANDARD 19.02 AND THE SPAN LENGTHS SHOWN IN TABLE 19.3-1. USING DIFFERENT STRAND PATTERNS OR LONGER SPANS WILL REQUIRE A COMPLETE DESIGN OF THIS REINFORCEMENT, WHICH REQUIRES PRIOR APPROVAL FROM THE BUREAU OF STRUCTURES.

SHOW ONLY ONE STRAND SIZE ON THE PLANS.

▲ VARIES FOR ELASTOMERIC BRGS. (STD. 27.07) AND STEEL BRGS. (STD. 27.09)

⑥ THE DESIGN ENGINEER DETERMINES THIS VALUE BASED ON 2" MIN. HAUNCH AT EDGE OF GIRDER, X-SLOPE, PROFILE GRADELINE AND CALCULATED RESIDUAL GIRDER CAMBER, INCLUDING THE CAMBER MULTIPLIER OF 1.4. THIS VALUE CAN VARY AND SHOULD BE GIVEN FOR EACH 1/3 OF THE GIRDER LENGTH. PROVIDE VALUES THAT MAINTAIN 3" MIN. DECK EMBEDMENT AND 2 1/2" CLEAR FROM TOP OF DECK WHILE ACCOUNTING FOR ±3% VARIANCE IN ACTUAL CAMBER VERSUS THE CALCULATED RESIDUAL CAMBER.

PROVIDE STIRRUP SPACING THAT IS SYMMETRICAL ABOUT THE C/L OF GIRDER.

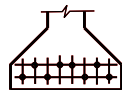
28" PRESTRESSED GIRDER DETAILS



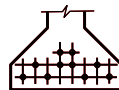
BUREAU OF
STRUCTURES

APPROVED: *Laura Shadewald*

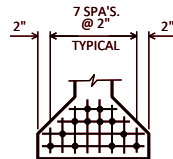
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7-23



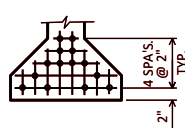
8 STRANDS



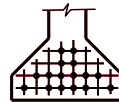
10 STRANDS



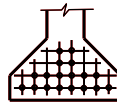
12 STRANDS



14 STRANDS



*16 STRANDS



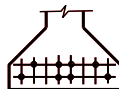
*18 STRANDS

*MAY REQUIRE DEBONDING AT ENDS,
WHICH IS TO BE AVOIDED.

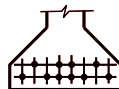
STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY TO AVOID DRAPING OF 0.6" DIA. STRANDS

(0.5" DIA. STRANDS MAY ALSO BE USED)

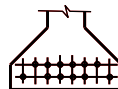
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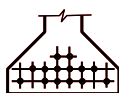
8 STRANDS



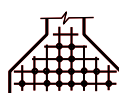
10 STRANDS



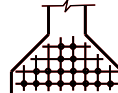
12 STRANDS



14 STRANDS



16 STRANDS



18 STRANDS

ARRANGEMENT AT C/L SPAN - FOR GIRDERS WITH DRAPED 0.5" DIA. STRANDS

28" GIRDER

A = 312 SQ. IN.
 $r^2 = 91.95 \text{ IN.}^2$
 $Y_T = 14.58 \text{ IN.}$
 $Y_B = -13.42 \text{ IN.}$
 $I = 28,687 \text{ IN.}^4$
 $S_T = 1,968 \text{ IN.}^3$
 $S_B = -2,138 \text{ IN.}^3$
 WT. = 325 #/FT.

PRE-TENSION

$f'_s = 270,000 \text{ P.S.I.}$
 $f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I.}$
 for low relaxation strands
 Pi PER 0.5" DIA. STRAND = $0.1531 \times 202,500 = 31.00 \text{ KIPS}$
 Pi PER 0.6" DIA. STRAND = $0.217 \times 202,500 = 43.94 \text{ KIPS}$
 $\frac{Y_B}{r^2} = \frac{-13.42}{91.95} = -0.1459 \text{ IN./IN.}^2$
 $f_b(\text{init.}) = \frac{A_s f_s}{A} \left(1 + \frac{e_s Y_B}{r^2}\right)$

(COMPRESSION IS
POSITIVE)

NO. STRANDS	e_s (inches)	P(init.) = $A_s f_s$ (KIPS)	f_b (init.) (K/sq.in.)
STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS (0.6" DIA.)			
8	-10.42	352	2.844
10	-9.82	439	3.424
12	-8.75	527	3.846
14	-7.99	615	4.269
*16	-9.42	703	5.351
*18	-9.64	791	6.102
STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS (0.5" DIA.)			
8	-10.42	248	2.004
10	-9.82	310	2.418
12	-8.75	372	2.715
14	-7.99	434	3.013
16	-9.42	496	3.775
18	-9.64	558	4.305

(COMPRESSION IS
POSITIVE)

NO. STRANDS	e (inches)	P(init.) = $A_s f_s$ (KIPS)	f_b (init.) (K/sq.in.)
STANDARD STRAND PATTERNS FOR DRAPED STRANDS (0.5" DIA.)			
8	-10.42	248	2.004
10	-10.62	310	2.534
12	-10.42	372	3.006
14	-10.0	434	3.421
16	-9.42	496	3.775
18	-9.64	558	4.305

DESIGNER NOTES

ON THE STRAND PATTERN SHEET, PLACE A
BOX AROUND EACH STRAND PATTERN THAT
APPLIES TO THE DESIGNED STRUCTURE AND
LABEL THE SPAN IT IS USED IN.

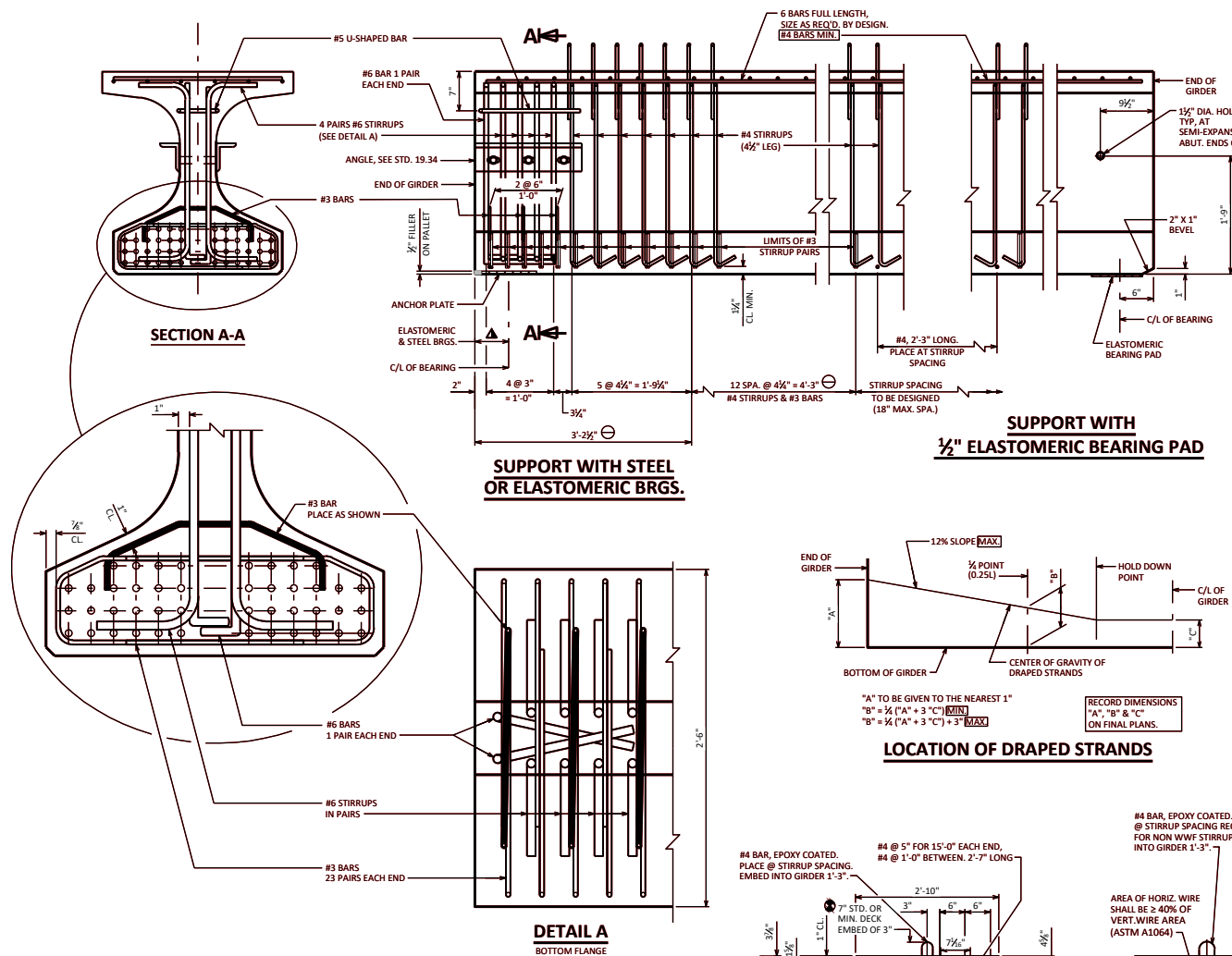
28" PRESTRESSED GIRDER DESIGN DATA



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
1-22



NOTES

TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY, EXCEPT THE OUTSIDE 8" OF GIRDER, WHICH SHALL RECEIVE A SMOOTH FINISH. AN APPROVED CONCRETE SEALER SHALL BE APPLIED TO ALL SMOOTH SURFACES INCLUDING THE OUTSIDE 8" OF THE TOP FLANGE.

DO NOT APPLY CONCRETE SEALER OR EPOXY TO SURFACES RECEIVING APPLICATION OF CONCRETE STAINING.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS. SEE SECTION 503.3.4 OF STANDARD SPECIFICATIONS FOR GUIDANCE.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. FOR GIRDER ENDS EMBEDDED COMPLETELY IN CONCRETE, END OF STRANDS SHALL BE COATED WITH NON-BITUMINOUS JOINT SEALER. FOR GIRDER ENDS THAT ARE FINALLY EXPOSED, COAT THE GIRDER ENDS, EXPOSED STRAND ENDS AND ALL NON-BONDING SURFACES WITHIN 2 FEET OF THE GIRDER ENDS WITH A NON-PIGMENTED EPOXY CONFORMING TO AASHTO M-235 TYPE III, GRADE 2, CLASS B OR C. THE EPOXY SHALL BE APPLIED AT LEAST 3 DAYS AFTER MOST CURING HAS CEASED AND PRIOR TO THE APPLICATION OF THE SEALER.

ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.

SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT.

AN EQUIVALENT OF WELDED WIRE FABRIC (WWF) ASTM A1064 MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DESIGN SECTION. IF USED, WWF SUBSTITUTION DETAILS SHALL BE SUBMITTED ELECTRONICALLY TO THE WISDOT FABRICATION LIBRARY AND ACCEPTED PRIOR TO SHOP DRAWING SUBMITTAL.

PRESTRESSING STRANDS SHALL BE 0.6" DIA. 7-WIRE LOW-RELAXATION STRANDS WITH AN ULTIMATE STRENGTH OF 270,000 PSI.

DESIGNER NOTES

BID ITEM SHALL BE "PRESTRESSED GIRDER TYPE I 36W-INCH".

SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. MAXIMUM RELEASE STRENGTH IS 6,800 PSI. USE 0.6" DIA. STRAND FOR ALL PATTERNS. THE MAX. NUMBER OF DRAPED 0.6" DIA. STRANDS IS 8.

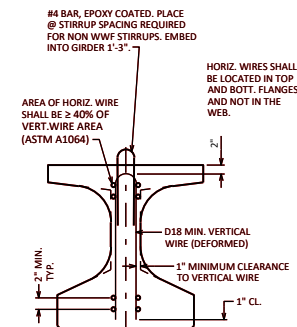
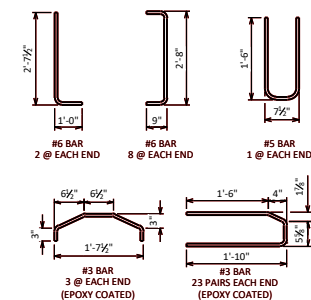
REINFORCEMENT IN STANDARD END SECTION OF THE GIRDER IS BASED ON THE STANDARD STRAND PATTERNS LISTED ON STANDARD 19.12 AND THE SPAN LENGTHS SHOWN IN TABLE 19.3-1. USING DIFFERENT STRAND PATTERNS OR LONGER SPANS WILL REQUIRE A COMPLETE DESIGN OF THIS REINFORCEMENT, WHICH REQUIRES PRIOR APPROVAL FROM THE BUREAU OF STRUCTURES.

▲ VARIES FOR ELASTOMERIC BRGS. (STD. 27.07) AND STEEL BRGS. (STD. 27.09)

⊖ DETAIL TYPICAL AT EACH END

● THE DESIGN ENGINEER DETERMINES THIS VALUE BASED ON 2" MIN. HAUNCH AT EDGE OF GIRDER, X-SLOPE, PROFILE GRADE LINE AND CALCULATED RESIDUAL GIRDER CAMBER, INCLUDING THE CAMBER MULTIPLIER OF 1.4. THIS VALUE CAN VARY AND SHOULD BE GIVEN FOR EACH 1/3 OF THE GIRDER LENGTH. PROVIDE VALUES THAT MAINTAIN 3" MIN. DECK EMBEDMENT AND 2/3" CLEAR FROM TOP OF DECK WHILE ACCOUNTING FOR 1/32" VARIANCE IN ACTUAL CAMBER VERSUS THE CALCULATED RESIDUAL CAMBER.

PROVIDE STIRRUP SPACING THAT IS SYMMETRICAL ABOUT THE C/L OF GIRDER.



SECTION THRU GIRDER

SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS
ASTM A1064 (FY = 70 KSI)

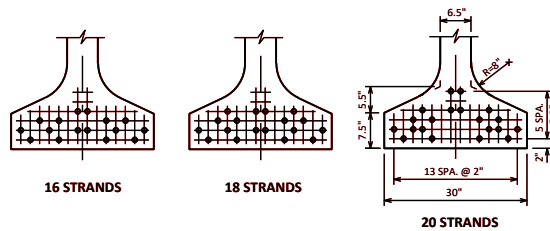
36W" PRESTRESSED GIRDER DETAILS



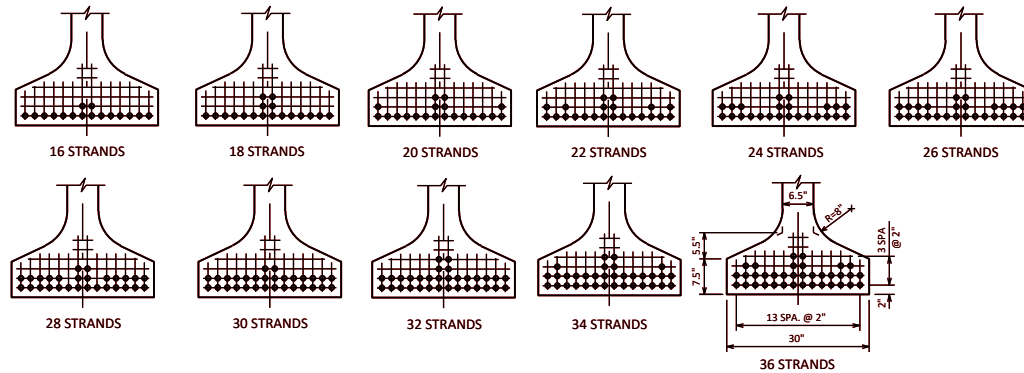
BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE:
1-25



**STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY
TO AVOID DRAPING OF 0.6" DIA. STRANDS**



ARRANGEMENT AT C/L SPAN - FOR GIRDERS WITH DRAPED 0.6" DIA. STRANDS

36W" GIRDER

A = 632 SQ.IN.
 $r^2 = 158.20 \text{ IN.}^2$
 $y_T = 19.37 \text{ IN.}$
 $y_B = -16.63 \text{ IN.}$
 $I = 99,980 \text{ IN.}^4$
 $S_T = 5,162 \text{ IN.}^3$
 $S_B = -6,012 \text{ IN.}^3$
 WT. = 658 #/FT

PRE-TENSION

$f_s' = 270,000 \text{ P.S.I.}$
 $f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I.}$
 for low relaxation strands

PI PER 0.6" DIA. STRAND = $0.217 \times 202,500 = 43.94 \text{ KIPS}$

$$\frac{y_B}{r^2} = \frac{-16.63}{158.20} = -0.10512 \text{ in/in}^2$$

$$f_b(\text{init.}) = \frac{A_s f_s}{A} \left(1 + \frac{e_s y_B}{r^2} \right)$$

(COMPRESSION IS POSITIVE)			
NO. STRANDS	e_s (inches)	$P(\text{init.}) = A_s f_s$ (KIPS)	$f_b(\text{init.})$ (K/sq.in.)
STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS			
16	-12.13	703	2.531
18	-11.74	791	2.796
20	-11.03	879	3.003
STANDARD STRAND PATTERNS FOR DRAPED STRANDS			
16	-14.38	703	2.794
18	-13.96	791	3.088
20	-13.83	879	3.413
22	-13.72	967	3.737
24	-13.63	1055	4.061
26	-13.55	1143	4.385
28	-13.49	1230	4.706
30	-13.43	1318	5.030
32	-13.13	1406	5.295
34	-12.98	1494	5.589
36	-12.85	1582	5.885

DESIGNER NOTES

ON THE STRAND PATTERN SHEET, PLACE A BOX AROUND EACH STRAND PATTERN THAT APPLIES TO THE DESIGNED STRUCTURE AND LABEL THE SPAN IT IS USED IN.

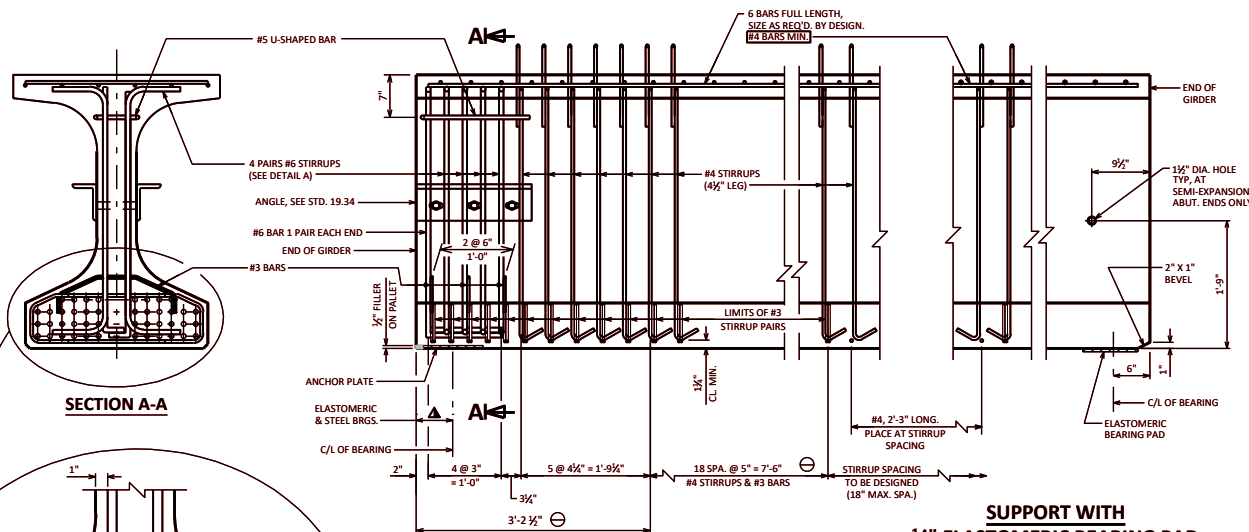
36W" PRESTRESSED GIRDER DESIGN DATA



BUREAU OF STRUCTURES

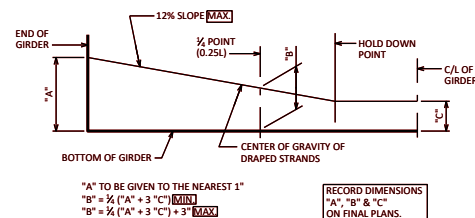
APPROVED: *Laura Shadewald*

DATE:
7-17

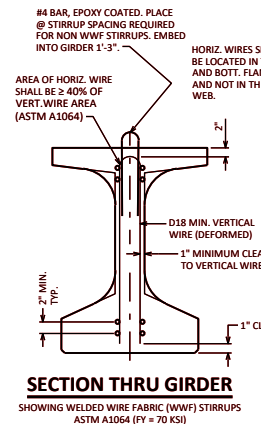
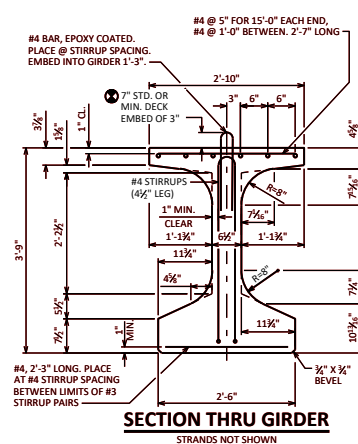


SUPPORT WITH STEEL OR ELASTOMERIC BRGS.

SUPPORT WITH 1/2" ELASTOMERIC BEARING PAD



LOCATION OF DRAPED STRANDS



NOTES

TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY, EXCEPT THE OUTSIDE 8" OF GIRDER, WHICH SHALL RECEIVE A SMOOTH FINISH. AN APPROVED CONCRETE SEALER SHALL BE APPLIED TO ALL SMOOTH SURFACES INCLUDING THE OUTSIDE 8" OF THE TOP FLANGE.

DO NOT APPLY CONCRETE SEALER OR EPOXY TO SURFACES RECEIVING APPLICATION OF CONCRETE STAINING.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS. SEE SECTION 503.3.4 OF STANDARD SPECIFICATIONS FOR GUIDANCE.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. FOR GIRDER ENDS EMBEDDED COMPLETELY IN CONCRETE, END OF STRANDS SHALL BE COATED WITH NON-BITUMINOUS JOINT SEALER. FOR GIRDER ENDS THAT ARE FINALLY EXPOSED, COAT THE GIRDER ENDS, EXPOSED STRAND ENDS AND ALL NON-BONDING SURFACES WITHIN 2 FEET OF THE GIRDER ENDS WITH A NON-PIGMENTED EPOXY CONFORMING TO AASHTO M-235 TYPE III, GRADE 2, CLASS B OR C. THE EPOXY SHALL BE APPLIED AT LEAST 3 DAYS AFTER MOIST CURING HAS CEASED AND PRIOR TO THE APPLICATION OF THE SEALER.

ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.

SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT.

AN EQUIVALENT OF WELDED WIRE FABRIC (WWF) ASTM A1064 AMY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DESIGN SECTION. IF USED, WWF SUBSTITUTION DETAILS SHALL BE SUBMITTED ELECTRONICALLY TO THE WISDOT FABRICATION LIBRARY AND ACCEPTED PRIOR TO SHOP DRAWING SUBMITTAL.

PRESTRESSING STRANDS SHALL BE 0.6" DIA.-7 WIRE LOW-RELAXATION STRANDS WITH AN ULTIMATE STRENGTH OF 270,000 PSI.

DESIGNER NOTES

BID ITEM SHALL BE "PRESTRESSING GIRDER TYPE I 45W-INCH".

SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. MAXIMUM RELEASE STRENGTH IS 6,800 PSI. USE 0.6" DIA. STRAND FOR ALL PATTERNS. THE MAX. NUMBER OF DRAPED 0.6" DIA. STRANDS IS 8.

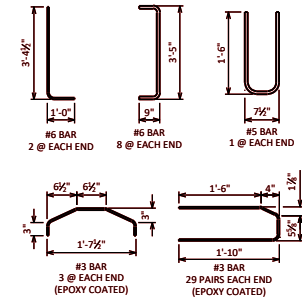
REINFORCEMENT IN STANDARD END SECTION OF THE GIRDER IS BASED ON THE STANDARD STRAND PATTERNS LISTED ON STANDARD 19.14 AND THE SPAN LENGTHS SHOWN IN TABLE 19.3-1. USING DIFFERENT STRAND PATTERNS OR LONGER SPANS WILL REQUIRE A COMPLETE DESIGN OF THIS REINFORCEMENT, WHICH REQUIRES PRIOR APPROVAL FROM THE BUREAU OF STRUCTURES.

VARIES FOR ELASTOMERIC BRGS. (STD. 27.07) AND STEEL BRGS. (STD. 27.09)

DETAIL TYPICAL AT EACH END

THE DESIGN ENGINEER DETERMINES THIS VALUE BASED ON 2" MIN. HAUNCH AT EDGE OF GIRDER, X-SLOPE, PROFILE GRADE LINE AND CALCULATED RESIDUAL GIRDER CAMBER, INCLUDING THE CAMBER MULTIPLIER OF 1.4. THIS VALUE CAN VARY AND SHOULD BE GIVEN FOR EACH 1/3 OF THE GIRDER LENGTH. PROVIDE VALUES THAT MAINTAIN 3" MIN. DECK EMBEDMENT AND 2 1/2" CLEAR FROM TOP OF DECK WHILE ACCOUNTING FOR ± 1/2" VARIANCE IN ACTUAL CAMBER VERSUS THE CALCULATED RESIDUAL CAMBER.

PROVIDE STIRRUP SPACING THAT IS SYMMETRICAL ABOUT THE C/L OF GIRDER.



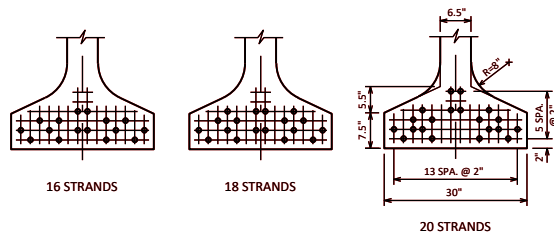
45W" PRESTRESSED GIRDER DETAILS



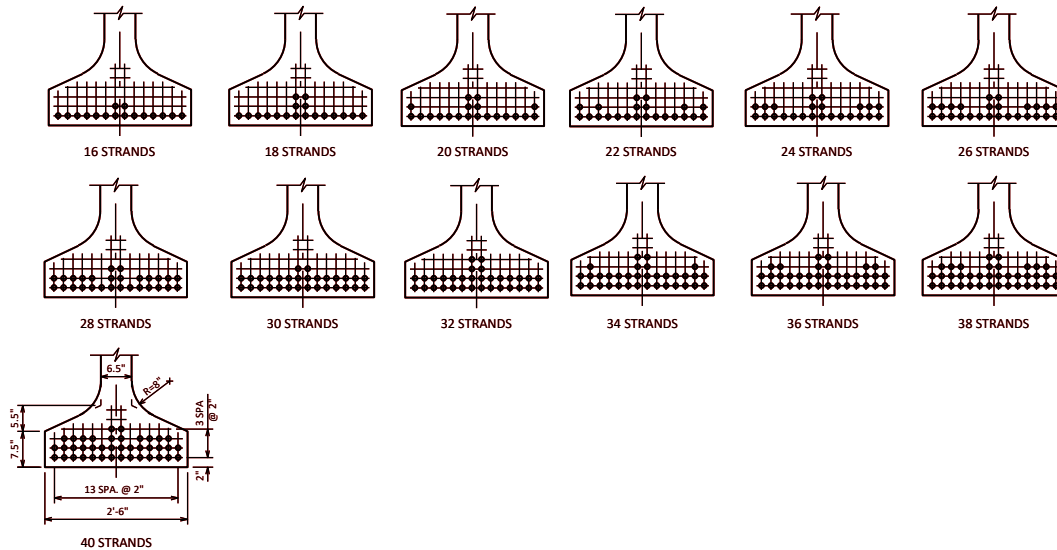
BUREAU OF STRUCTURES

APPROVED: Laura Shadewald

DATE: 1-25



**STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY
TO AVOID DRAPING OF 0.6" DIA. STRANDS**



ARRANGEMENT AT C/L SPAN - FOR GIRDERS WITH DRAPED 0.6" DIA. STRANDS

45W" GIRDER

$$A = 692 \text{ SQ. IN.}$$

$$r^2 = 258.70 \text{ IN.}^2$$

$$Y_T = 24.26 \text{ IN.}^2$$

$$Y_B = -20.74 \text{ IN.}$$

$$I = 178,971 \text{ IN.}^4$$

$$S_T = 7,377 \text{ IN.}^3$$

$$S_B = -8,629 \text{ IN.}^3$$

$$\text{WT.} = 721 \text{ \#/FT.}$$

PRE-TENSION

$$f'_s = 270,000 \text{ P.S.I.}$$

$$f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I.}$$

for low relaxation strands

$$\text{PI PER 0.6" DIA. STRAND} = 0.217 \times 202,500 = 43.94 \text{ KIPS}$$

$$\frac{Y_B}{r^2} = \frac{-20.74}{258.70} = -0.08017 \text{ IN/IN}^2$$

$$f_b (\text{init.}) = \frac{A_s f_s}{A} (1 + \frac{e_s Y_B}{r^2})$$

(COMPRESSION IS POSITIVE)			
NO. STRANDS	e_s (inches)	$P(\text{init.}) = A_s f_s$ (KIPS)	$f_b (\text{init.})$ (K/sq.in.)
STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS			
16	-16.24	703	2.339
18	-15.85	791	2.596
20	-15.14	879	2.812
STANDARD STRAND PATTERNS FOR DRAPED STRANDS			
16	-18.49	703	2.521
18	-18.07	791	2.799
20	-17.94	879	3.097
22	-17.83	967	3.394
24	-17.74	1055	3.693
26	-17.66	1143	3.991
28	-17.60	1230	4.285
30	-17.54	1318	4.583
32	-17.24	1406	4.840
34	-17.09	1494	5.117
36	-16.96	1582	5.395
38	-16.85	1670	5.674
40	-16.74	1758	5.950

DESIGNER NOTES

ON THE STRAND PATTERN SHEET, PLACE A BOX AROUND EACH STRAND PATTERN THAT APPLIES TO THE DESIGNED STRUCTURE AND LABEL THE SPAN IT IS USED IN.

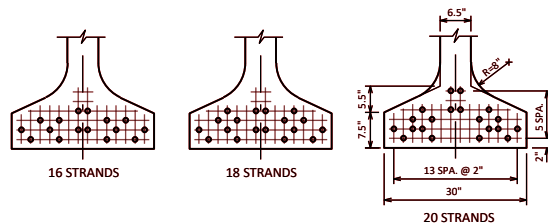
45W" PRESTRESSED GIRDER DESIGN DATA



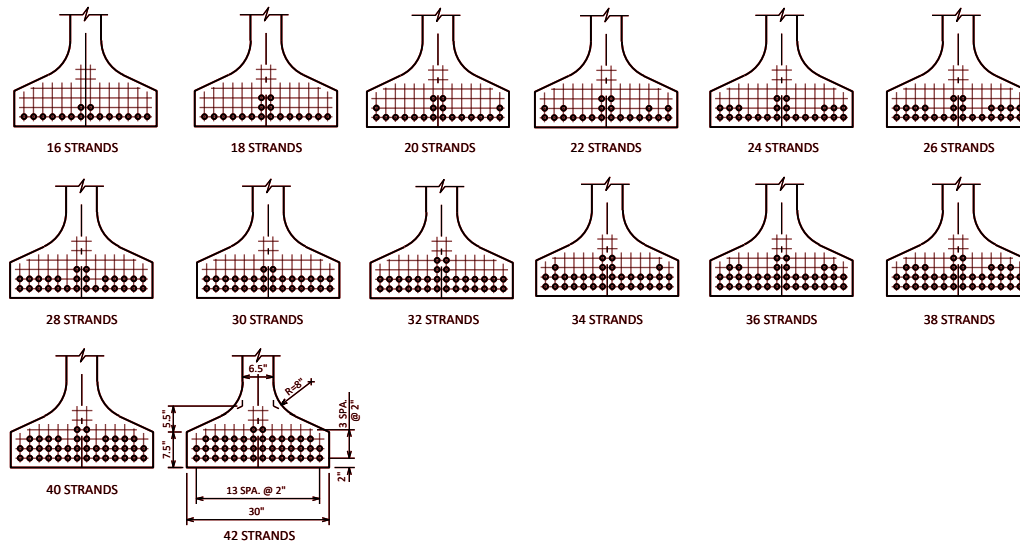
BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE:
7-18



**STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY
TO AVOID DRAPING OF 0.6" DIA. STRANDS**



ARRANGEMENT AT C/L SPAN - FOR GIRDERS WITH DRAPED 0.6" DIA. STRANDS

54W" GIRDER

$$A = 798 \text{ SQ. IN.}$$

$$I^2 = 402.41 \text{ IN.}^2$$

$$y_T = 27.70 \text{ IN.}$$

$$y_B = -26.30 \text{ IN.}$$

$$I = 321,049 \text{ IN.}^4$$

$$S_T = 11,592 \text{ IN.}^3$$

$$S_B = -12,205 \text{ IN.}^3$$

$$\text{WT.} = 831 \text{ \#/FT.}$$

PRE-TENSION

$$f'_s = 270,000 \text{ P.S.I.}$$

$$f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I.}$$

for low relaxation strands

$$P_i \text{ PER } 0.6" \text{ DIA. STRAND} = 0.217 \times 202,500 = \underline{43.94 \text{ KIPS}}$$

$$\frac{y_B}{r^2} = \frac{-26.30}{402.41} = -0.06536 \text{ in/in}^2$$

$$f_b(\text{init.}) = \frac{A_s f_s}{A} \left(1 + \frac{e_s y_B}{r^2} \right)$$

(COMPRESSION IS POSITIVE)

NO. STRANDS	e_s (inches)	$P(\text{init.})=A_s f_s$ (KIPS)	f_b (init.) (K/sq.in.)
STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS			
16	-21.80	703	2.136
18	-21.41	791	2.378
20	-20.70	879	2.592
STANDARD STRAND PATTERNS FOR DRAPED STRANDS			
16	-24.05	703	2.266
18	-23.63	791	2.522
20	-23.50	879	2.793
22	-23.39	967	3.065
24	-23.30	1055	3.336
26	-23.22	1143	3.607
28	-23.16	1230	3.875
30	-23.10	1318	4.146
32	-22.80	1406	4.387
34	-22.65	1494	4.643
36	-22.52	1582	4.901
38	-22.41	1670	5.159
40	-22.30	1758	5.413
42	-22.20	1846	5.670

DESIGNER NOTES

ON THE STRAND PATTERN SHEET, PLACE A BOX AROUND EACH STRAND PATTERN THAT APPLIES TO THE DESIGNED STRUCTURE AND LABEL THE SPAN IT IS USED IN.

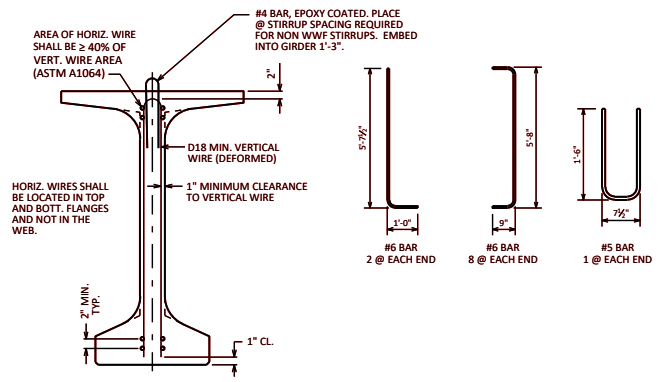
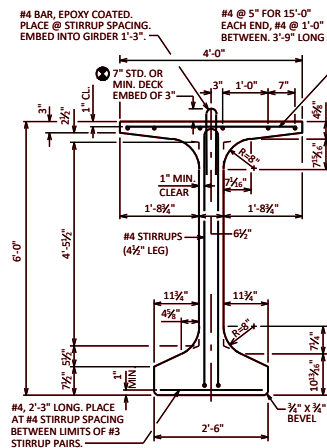
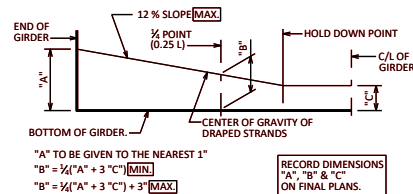
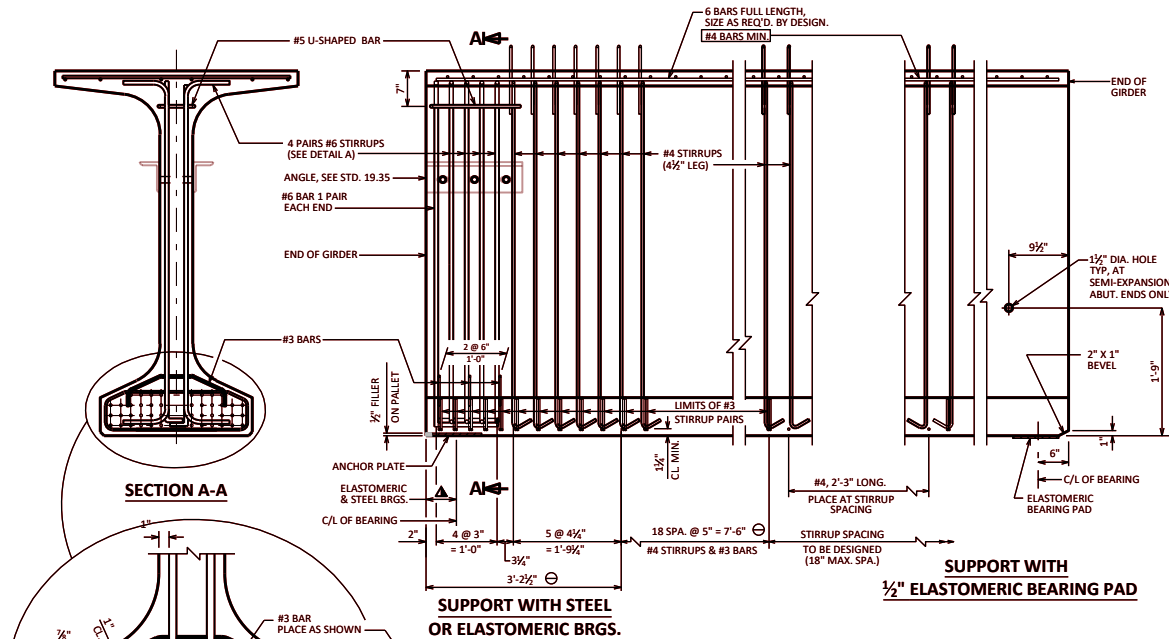
54W" PRESTRESSED GIRDER DESIGN DATA



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
7-17



NOTES

TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY, EXCEPT THE OUTSIDE 15" OF GIRDER, WHICH SHALL RECEIVE A SMOOTH FINISH. AN APPROVED CONCRETE SEALER SHALL BE APPLIED TO ALL SMOOTH SURFACES INCLUDING THE OUTSIDE 15" OF THE TOP FLANGE.

DO NOT APPLY CONCRETE SEALER OR EPOXY TO SURFACES RECEIVING APPLICATION OF CONCRETE STAINING.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. FOR GIRDER ENDS EMBEDDED COMPLETELY IN CONCRETE, END OF STRANDS SHALL BE COATED WITH NON-BITUMINOUS JOINT SEALER. FOR GIRDER ENDS THAT ARE FINALLY EXPOSED, COAT THE GIRDER ENDS, EXPOSED STRAND ENDS AND ALL NON-BONDING SURFACES WITHIN 2 FEET OF THE GIRDER ENDS WITH A NON-PIGMENTED EPOXY CONFORMING TO AASHTO M-235 TYPE III, GRADE 2, CLASS B OR C. THE EPOXY SHALL BE APPLIED AT LEAST 3 DAYS AFTER MOIST CURING HAS CEASED AND PRIOR TO THE APPLICATION OF THE SEALER.

ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.

SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT.

AN EQUIVALENT OF WELDED WIRE FABRIC (WWF) ASTM A1064 MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DESIGN SECTION. IF USED, WWF SUBSTITUTION DETAILS SHALL BE SUBMITTED ELECTRONICALLY TO THE WISDOT FABRICATION LIBRARY AND ACCEPTED PRIOR TO SHOP DRAWING SUBMITTAL.

PRESTRESSING STRANDS SHALL BE 0.6" DIA.-7 WIRE LOW-RELAXATION STRANDS WITH AN ULTIMATE STRENGTH OF 270,000 PSI.

THIS NOTE APPLIES TO LONG SPANS AS DEFINED IN THE NOTES FOR THE 72W" GIRDER, TABLE 19.3-2 OF THE BRIDGE MANUAL: FOR STORAGE, HANDLING, AND TRANSPORTING, THIS GIRDER IS REINFORCED TO ALLOW A MAXIMUM OVERHANG FROM THE LIFTING LOCATION OR POINT OF SUPPORT OF UP TO 1/10 THE GIRDER LENGTH. THE CONTRACTOR IS RESPONSIBLE FOR LATERAL STABILITY OF THE GIRDER UNTIL THE DECK IS CURED. (IF NOTE DOESN'T APPLY, REFERENCE SECT. 503.3.4 OF STD. SPEC. FOR GUIDANCE)

DESIGNER NOTES

BID ITEM SHALL BE "PRESTRESSED GIRDER TYPE I 72W-INCH".

SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. MAXIMUM RELEASE STRENGTH IS 6,800 PSI. USE 0.6" DIA. STRAND FOR ALL PATTERNS. THE MAX. NUMBER OF DRAPED 0.6" DIA. STRANDS IS 6.

REINFORCEMENT IN STANDARD END SECTION OF THE GIRDER IS BASED ON THE STANDARD STRAND PATTERNS LISTED ON STANDARD 19.18 AND THE SPAN LENGTHS SHOWN IN TABLE 19.3-2. USING DIFFERENT STRAND PATTERNS OR LONGER SPANS WILL REQUIRE A COMPLETE DESIGN OF THIS REINFORCEMENT, WHICH REQUIRE PRIOR APPROVAL FROM THE BUREAU OF STRUCTURES.

- ▲ VARIES FOR ELASTOMERIC BRGS. (STD. 27.07) AND STEEL BRGS (STD. 27.09)
- ⊖ DETAIL TYPICAL AT EACH END
- THE DESIGN ENGINEER DETERMINES THIS VALUE BASED ON 2" MIN. HAUNCH AT EDGE OF GIRDER, X-SLOPE, PROFILE GRADE LINE AND CALCULATED RESIDUAL GIRDER CAMBER, INCLUDING THE CAMBER MULTIPLIER OF 1.4. THIS VALUE CAN VARY AND SHOULD BE GIVEN FOR EACH 1/5 OF THE GIRDER LENGTH. PROVIDE VALUES THAT MAINTAIN 3" MIN. DECK EMBEDMENT AND 2 1/2" CLEAR FROM TOP OF DECK WHILE ACCOUNTING FOR 1/2" VARIANCE IN ACTUAL CAMBER VERSUS THE CALCULATED RESIDUAL CAMBER.

PROVIDE STIRRUP SPACING THAT IS SYMMETRICAL ABOUT THE C/L OF GIRDER.

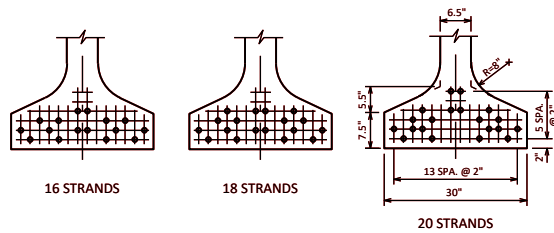
72W" PRESTRESSED GIRDER DETAILS



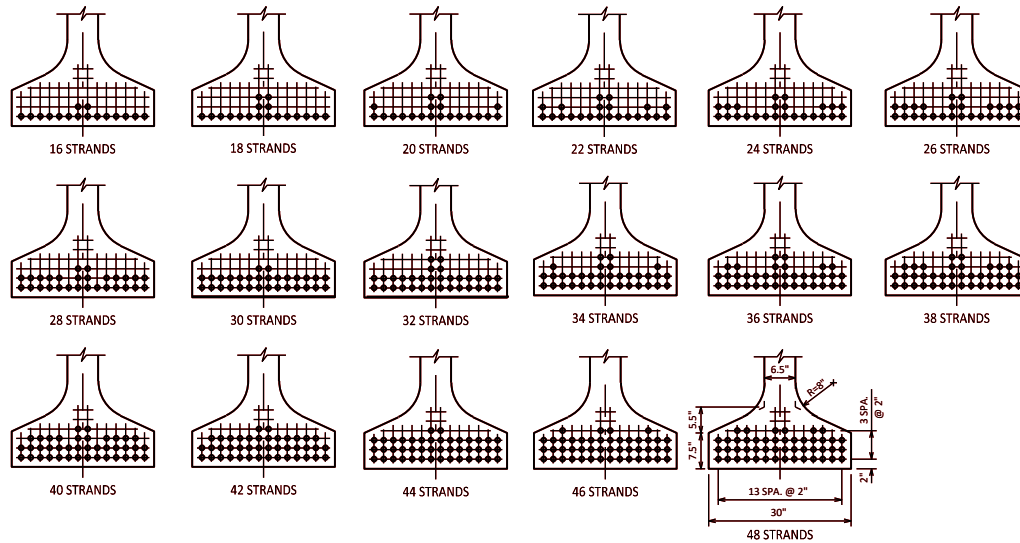
BUREAU OF STRUCTURES

APPROVED: Laura Shadewald

DATE: 7-23



**STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY
TO AVOID DRAPING OF 0.6" DIA. STRANDS**



ARRANGEMENT AT C/L SPAN - FOR GIRDERS WITH DRAPED 0.6" DIA. STRANDS

72W" GIRDER

$A = 915 \text{ SQ. IN.}$

$r^2 = 717.5 \text{ IN.}^2$

$y_T = 37.13 \text{ IN.}$

$y_B = -34.87 \text{ IN.}$

$I = 656,426 \text{ IN.}^4$

$S_T = 17,680 \text{ IN.}^3$

$S_B = -18,825 \text{ IN.}^3$

$WT. = 953 \text{ \#/FT}$

PRE-TENSION

$f'_s = 270,000 \text{ P.S.I.}$

$f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I.}$
for low relaxation strands

Pi PER 0.6" DIA. STRAND = $0.217 \times 202,500 = 43.94 \text{ KIPS}$

$$\frac{y_B}{r^2} = \frac{-34.87}{717.50} = -0.0486 \text{ in/in}^2$$

$$f_b(\text{init.}) = \frac{A_f f_s}{A} \left(1 + \frac{e_s y_b}{r^2} \right)$$

(COMPRESSION IS POSITIVE)			
NO. STRANDS	e_s (inches)	$P(\text{init.})=A_s f_s$ (KIPS)	f_b (init.) (K/sq.in.)
STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS			
16	-30.37	703	1.902
18	-29.98	791	2.124
20	-29.27	879	2.328
STANDARD STRAND PATTERNS FOR DRAPED STRANDS			
16	-32.62	703	1.986
18	-32.20	791	2.217
20	-32.07	879	2.458
22	-31.96	967	2.698
24	-31.87	1055	2.939
26	-31.79	1143	3.179
28	-31.73	1230	3.417
30	-31.67	1318	3.657
32	-31.37	1406	3.880
34	-31.22	1494	4.110
36	-31.09	1582	4.341
38	-30.98	1670	4.574
40	-30.87	1758	4.803
42	-30.77	1846	5.034
44	-30.69	1933	5.265
46	-30.52	2021	5.484
48	-30.37	2109	5.707

DESIGNER NOTES

ON THE STRAND PATTERN SHEET, PLACE A BOX AROUND EACH STRAND PATTERN THAT APPLIES TO THE DESIGNED STRUCTURE AND LABEL THE SPAN IT IS USED IN.

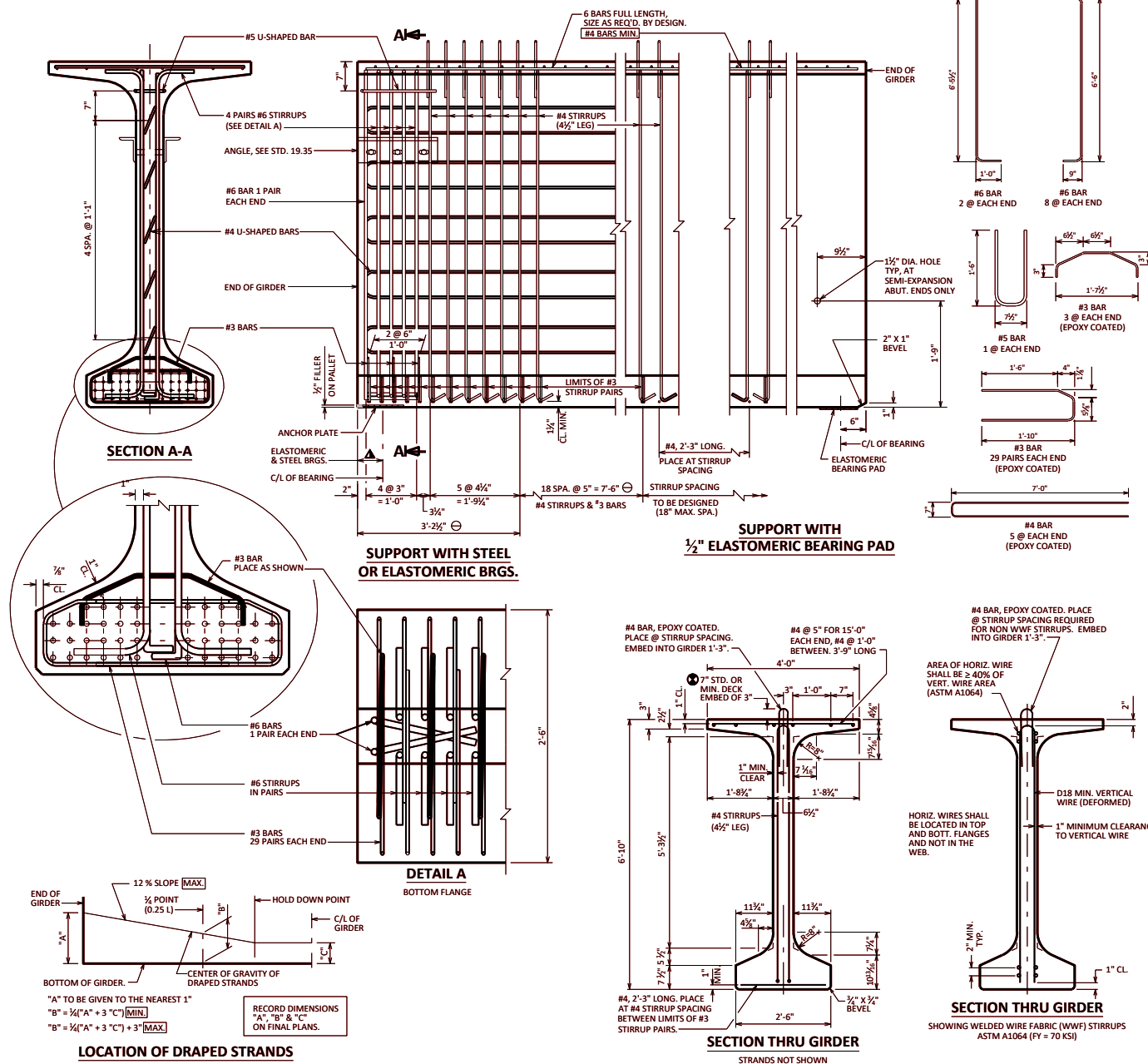
72W" PRESTRESSED GIRDER DESIGN DATA



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
7-17



NOTES

TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY, EXCEPT THE OUTSIDE 15' OF GIRDER, WHICH SHALL RECEIVE A SMOOTH FINISH. AN APPROVED CONCRETE SEALER SHALL BE APPLIED TO ALL SMOOTH SURFACES INCLUDING THE OUTSIDE 15' OF THE TOP FLANGE.

DO NOT APPLY CONCRETE SEALER OR EPOXY TO SURFACES RECEIVING APPLICATION OF CONCRETE STAINING.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. FOR GIRDER ENDS EMBEDDED COMPLETELY IN CONCRETE, END OF STRANDS SHALL BE COATED WITH NON-BITUMINOUS JOINT SEALER. FOR GIRDER ENDS THAT ARE FINALLY EXPOSED, COAT THE GIRDER ENDS, EXPOSED STRAND ENDS AND ALL NON-BONDING SURFACES WITHIN 2 FEET OF THE GIRDER ENDS WITH A NON-PIGMENTED EPOXY CONFORMING TO AASHTO M-235 TYPE III, GRADE 2, CLASS B OR C. THE EPOXY SHALL BE APPLIED AT LEAST 3 DAYS AFTER MOIST CURING HAS CEASED AND PRIOR TO THE APPLICATION OF THE SEALER.

ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.

SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT

AN EQUIVALENT OF WELDED WIRE FABRIC (WWF) ASTM A1064 MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DESIGN SECTION. IF USED, WWF SUBSTITUTION DETAILS SHALL BE SUBMITTED ELECTRONICALLY TO THE WISDOT FABRICATION LIBRARY AND ACCEPTED PRIOR TO SHOP DRAWING SUBMITTAL.

PRESTRESSING STRANDS SHALL BE 0.6" DIA.-7-WIRE LOW-RELAXATION STRANDS WITH AN ULTIMATE STRENGTH OF 270,000 PSI.

THIS NOTE APPLIES TO LONG SPANS AS DEFINED IN THE NOTES FOR THE 82W" GIRDER, TABLE 19.3-2 OF THE BRIDGE MANUAL: FOR STORAGE, HANDLING, AND TRANSPORTING, THIS GIRDER IS REINFORCED TO ALLOW A MAXIMUM OVERHANG FROM THE LIFTING LOCATION OR POINT OF SUPPORT OF UP TO 1/10 THE GIRDER LENGTH. THE CONTRACTOR IS RESPONSIBLE FOR LATERAL STABILITY OF THE GIRDER UNTIL THE DECK IS CURED. (IF NOTE DOESN'T APPLY, REFERENCE SECT. 503.3.4 OF STD. SPEC. FOR GUIDANCE)

DESIGNER NOTES

BID ITEM SHALL BE "PRESTRESSED GIRDER TYPE I 82W-INCH".

SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. MAXIMUM RELEASE STRENGTH IS 6,800 PSI. USE 0.6" DIA. STRAND FOR ALL PATTERNS. THE MAX. NUMBER OF DRAPED 0.6" DIA. STRANDS IS 8.

REINFORCEMENT IN STANDARD END SECTION OF THE GIRDER IS BASED ON THE STANDARD STRAND PATTERNS LISTED ON STANDARD 19.20 AND THE SPAN LENGTHS SHOWN IN TABLE 19.3-2. USING DIFFERENT STRAND PATTERNS OR LONGER SPANS WILL REQUIRE A COMPLETE DESIGN OF THIS REINFORCEMENT, WHICH REQUIRES PRIOR APPROVAL FROM THE BUREAU OF STRUCTURES.

▲ VARIES FOR ELASTOMERIC BRGS. (STD. 27.07) AND STEEL BRGS. (STD. 27.09)

○ DETAIL TYPICAL AT EACH END

● THE DESIGN ENGINEER DETERMINES THIS VALUE BASED ON 2" MIN. HAUNCH AT EDGE OF GIRDER, X-SLOPE, PROFILE GRADE LINE AND CALCULATED RESIDUAL GIRDER CAMBER, INCLUDING THE CAMBER MULTIPLIER OF 1.4. THIS VALUE CAN VARY AND SHOULD BE GIVEN FOR EACH 1/3 OF THE GIRDER LENGTH. PROVIDE VALUES THAT MAINTAIN 3" MIN. DECK EMBEDMENT AND 25" CLEAR FROM TOP OF DECK WHILE ACCOUNTING FOR ±3% VARIANCE IN ACTUAL CAMBER VERSUS THE CALCULATED RESIDUAL CAMBER. PROVIDE STIRRUP SPACING THAT IS SYMMETRICAL ABOUT THE C/L OF GIRDER.

THERE IS CURRENTLY A MORATORIUM ON THE USE OF 82W" PRESTRESSED GIRDERS.

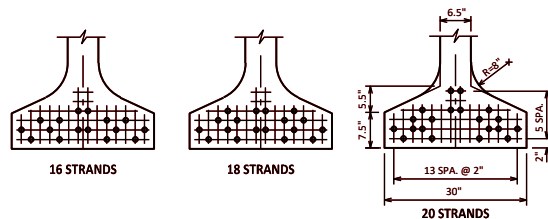
82W" PRESTRESSED GIRDER DETAILS



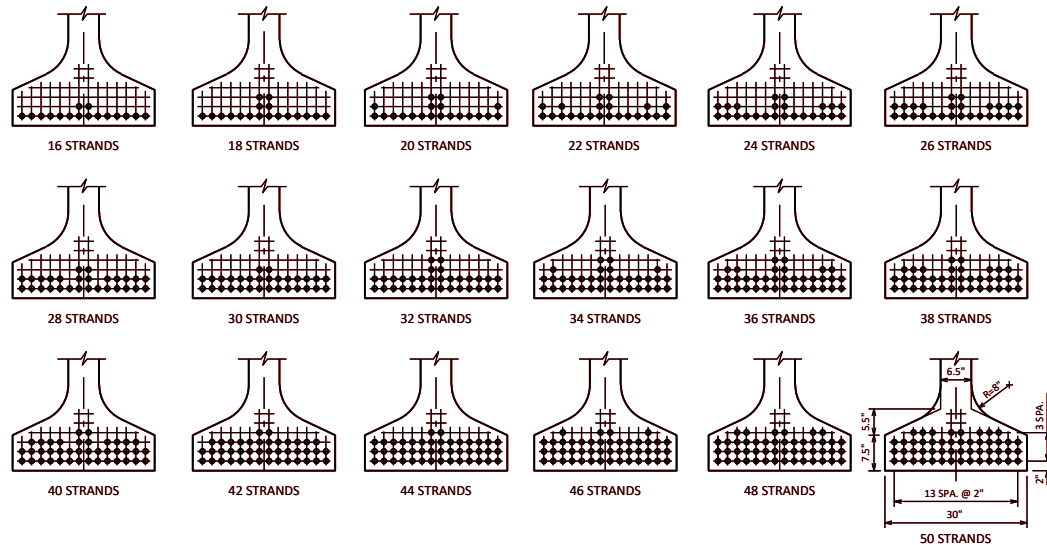
BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE:
7-23



**STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY
TO AVOID DRAPING OF 0.6" DIA. STRANDS**



ARRANGEMENT AT C/L SPAN - FOR GIRDERS WITH DRAPED 0.6" DIA. STRANDS

82W" GIRDER

A = 980 SQ. IN.

$r^2 = 924.1 \text{ IN.}^2$

$y_T = 42.32 \text{ IN.}$

$y_B = -39.68 \text{ IN.}$

$I = 905,453 \text{ IN.}^4$

$S_T = 21,396 \text{ IN.}^3$

$S_B = -22,819 \text{ IN.}^3$

WT. = 1021 #/FT.

PRE-TENSION

$f'_s = 270,000 \text{ P.S.I.}$

$f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I.}$
for low relaxation strands

PI PER 0.6" DIA. STRAND = $0.217 \times 202,500 = 43.94 \text{ KIPS}$

$$\frac{y_B}{r^2} = \frac{-39.68}{924.10} = -0.04294 \text{ in/in}^2$$

$$f_b (\text{init.}) = \frac{A_s f_s}{A} \left(1 + \frac{e_s y_B}{r^2} \right)$$

(COMPRESSION IS POSITIVE)			
NO. STRANDS	e_s (inches)	$P(\text{init.}) = A_s f_s$ (KIPS)	$f_b (\text{init.})$ (K/sq.in.)
STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS			
16	-35.18	703	1.801
18	-34.79	791	2.013
20	-34.08	879	2.209
STANDARD STRAND PATTERNS FOR DRAPED STRANDS			
16	-37.43	703	1.870
18	-37.01	791	2.090
20	-36.88	879	2.318
22	-36.77	967	2.545
24	-36.68	1055	2.772
26	-36.60	1143	3.000
28	-36.54	1230	3.224
30	-36.48	1318	3.451
32	-36.18	1406	3.664
34	-36.03	1494	3.883
36	-35.90	1582	4.104
38	-35.79	1670	4.323
40	-35.68	1758	4.542
42	-35.58	1846	4.762
44	-35.50	1933	4.978
46	-35.33	2021	5.191
48	-35.18	2109	5.404
50	-35.04	2197	5.616

DESIGNER NOTES

ON THE STRAND PATTERN SHEET, PLACE A BOX AROUND EACH STRAND PATTERN THAT APPLIES TO THE DESIGNED STRUCTURE AND LABEL THE SPAN IT IS USED IN.

THERE IS CURRENTLY A MORATORIUM
ON THE USE OF 82W" PRESTRESSED
GIRDERS.

82W" PRESTRESSED GIRDER DESIGN DATA



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
7-17



*"A" = PRESTRESS CAMBER

* "B" = DEAD LOAD DEFLECTION

* ROUND OFF TO NEAREST 1/4"

*"C" = RESIDUAL CAMBER



IF 1½" MINIMUM HAUNCH HEIGHT AT EDGE OF GIRDER CANNOT BE MAINTAINED, THE GRADE LINE MAY BE REVISED BY THE ENGINEER AT THE OPTION OF THE CONTRACTOR, THE PLAN DECK THICKNESS SHALL BE HELD. NOTIFY THE STRUCTURES SECTION IF THE GRADE LINE IS RAISED FROM THE PLAN PROFILE BY MORE THAN ½" OR,
* IF 3" MINIMUM DECK EMBEDMENT OF THE BAR CANNOT BE OBTAINED.

*** IF 3" MINIMUM DECK EMBEDMENT OF TIE BAR CANNOT BE OBTAINED

TO DETERMINE 'T', ELEV. OF TOP OF GIR'S. AT C/L OF SUBSTRUCTURE UNITS
& AT 1/10 POINTS OF EACH SPAN SHALL BE TAKEN. THEN FOLLOW THIS
PROCESS:

TOP OF DECK ELEV. AT FINAL GRADE
- TOP OF GIRDER ELEVATION
+ DEAD LOAD DEFLECTION
- DECK THICKNESS
= HAUNCH HEIGHT 'T'

NOTE: AN AVERAGE HAUNCH ("T") OF WAS USED IN THE QUANTITY "CONCRETE MASONRY BRIDGES".



PRESENT PRACTICE IS TO USE A MINIMUM "HAUNCH HEIGHT" (AT EDGE OF GIRDER FLANGE) OF 2" FOR DESIGN CALCULATIONS.

THE MINIMUM HAUNCH (AT EDGE OF GIRDER FLANGE) ALLOWED IN CONSTRUCTION IS $1\frac{1}{4}$ "

USE THE CALCULATED THEORETICAL AVERAGE "HAUNCH HEIGHT" AT CENTERLINE OF FLANGE FOR COMPUTING THE HAUNCH CONCRETE QUANTITY.

USE TOP OF DECK ELEVATIONS AND CALCULATED "HAUNCH HEIGHT" AT CENTERLINE OF GIRDER FOR COMPUTING BEAM SEAT ELEVATIONS AT SUBSTRUCTURES.

"INTERMEDIATE CONCRETE DIAPHRAGMS" SHALL BE USED ONLY WHEN THE USE OF STEEL DIAPHRAGMS IS NOT FEASIBLE BECAUSE OF UTILITIES OR FOR OTHER SPECIAL SITUATIONS. ONLY ONE TYPE OF INTERMEDIATE DIAPHRAGM SHALL BE SHOWN ON THE PLANS. THE USE OF BOTH INTERMEDIATE CONCRETE & STEEL DIAPHRAGMS ON THE SAME BRIDGE IS NOT ALLOWED.

FOR SKEWS $\leq 10^\circ$, PLACE INTERMEDIATE DIAPHRAGMS IN A STRAIGHT LINE. REFER TO STANDARD 19.36. PROVIDE OFFSET FOR SKEWS $> 10^\circ$.

PIER PILASTERS ARE TYPICALLY NOT USED, BUT MAY BE USED AS PART OF THE BRIDGE AESTHETIC PACKAGE ON 28", 36", 45", 54" AND 70" PRESTRESSED GIRDERS. PILASTERS ARE NOT USED ON 36W", 45W", 54W", 72W" OR 82W".

10 1/2" MIN. FOR TYPE "M" RAILINGS
11" MIN. FOR TYPE "NY3/NY4" RAILINGS

DIAPHRAGM SPACING: FOR SPANS $\leq 80'-0"$ PLACE ONE DIAPHRAGM AT MID-LENGTH OF GIRDER. FOR SPANS OVER $80'-0"$, PLACE AT $1/3$ AND $2/3$ POINTS OF THE GIRDER LENGTH.

NOTE ON PLAN THAT DIAPHRAGM SPACING IS FROM THE GIRDER END.



GIRDER DEPTH	DIAPHRAGM WEIGHT
28"	207 #/FT.
36"	270 #/FT.
36W"	259 #/FT.
45"	338 #/FT.
45W"	353 #/FT.
54"	405 #/FT.
54W"	446 #/FT.
70"	634 #/FT.
72W"	634 #/FT.
82W"	738 #/FT.

ELEVATION OF DIAPHRAGM

INTERMEDIATE CONCRETE DIAPHRAGM DETAILS

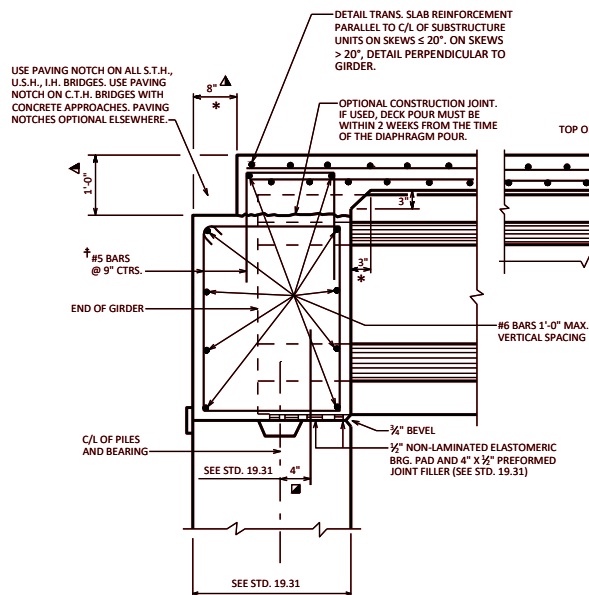
PRESTRESSED GIRDER DETAILS



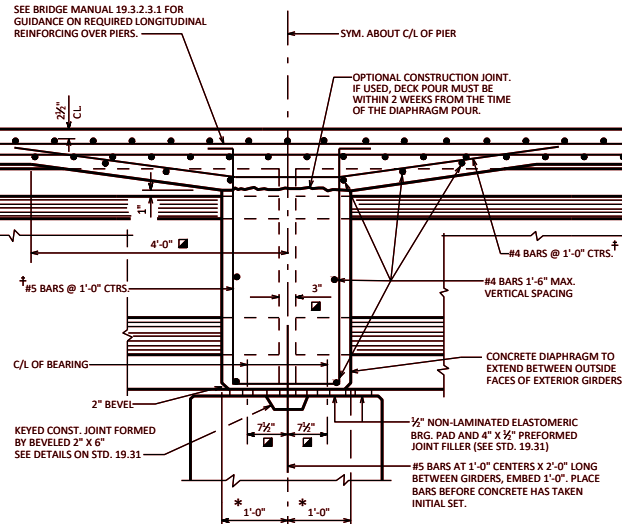
BUREAU OF
STRUCTURES

APPROVED: *Laura Shadewald*

DATE: 1-19

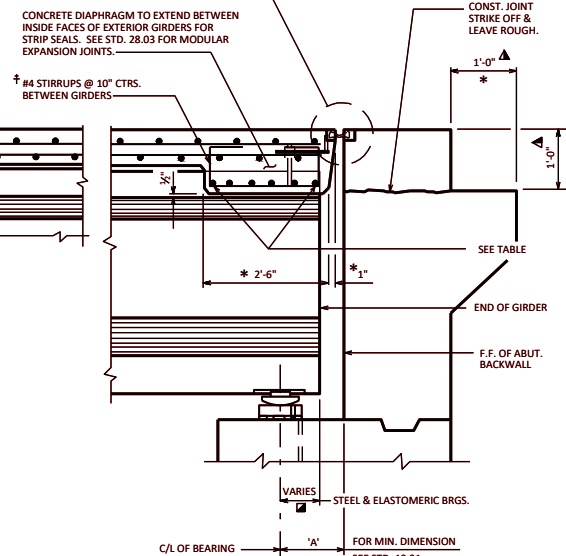


**FIXED END
FOR SKEWED AND SQUARE STRUCTURES**



DIAPHRAGM AT 1/2" ELASTOMERIC BEARING

SEE STD. 28.01 FOR STRIP SEAL EXPANSION JOINT DEVICE.
SEE STD. 28.03 FOR MODULAR JOINT EXPANSION JOINT DEVICE AND ABUTMENT BACKWALL DETAILS.



EXPANSION END

EXPANSION END DIAPHRAGM STEEL

DIAPHRAGM LENGTH (ALONG SKEW) (C/L TO C/L OF GIRDERS)	NO. OF BARS AND BAR SIZE	
	28"	36"
$\leq 8'-4"$	6 - #6	6 - #6
$> 8'-4" \leq 11'-4"$	6 - #8	6 - #7
$> 11'-4" \leq 14'-9"$		6 - #8

DESIGNER NOTES

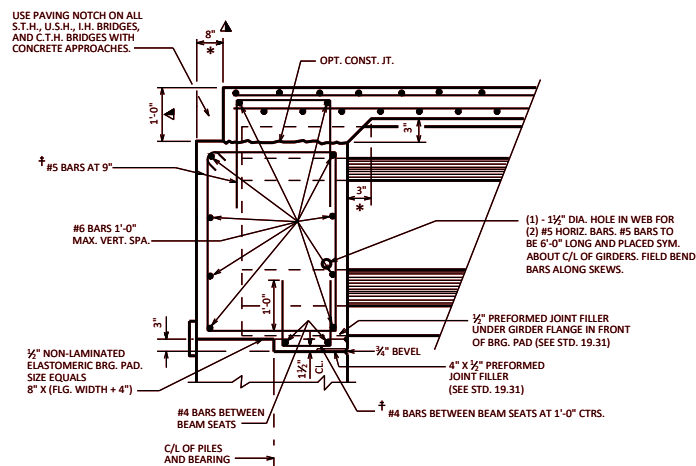
LAP LENGTHS FOR ALL BARS SHALL BE BASED ON A "CLASS C" TENSION LAP SPLICE, EXCEPT HORIZONTAL DIAPHRAGM BARS, IF SPLICED, CAN UTILIZE A "CLASS A" TENSION LAP SPLICE.

LEGEND

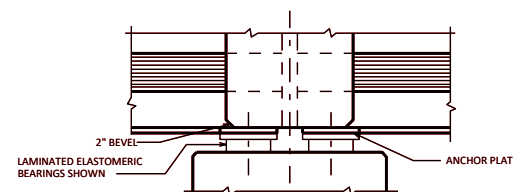
- DIMENSION IS TAKEN PARALLEL TO C/L GIRDER.
- * DIMENSION IS TAKEN NORMAL TO C/L SUBSTRUCTURE UNITS.
- ▲ PAVING NOTCH IS 1'-0" WIDE BY 1'-4" DEEP IF STRUCTURAL APPROACH SLAB (STD. 12.10) IS USED. SHOW NO. 9 STAINLESS STEEL BAR (STD. 12.12) FOR STRUCTURAL APPROACH SLAB ON THE SECTION THRU ABUT. OR ABUT. DIAPH.
- † BARS PLACED PARALLEL TO GIRDERS. SPACING PERPENDICULAR TO C/L GIRDERS.

SEE STANDARD 19.34 FOR 36W" & 45W" PRESTRESSED GIRDERS SLAB AND SUPERSTRUCTURE DETAILS

SEE STANDARD 19.35 FOR 54W", 72W" & 82W" PRESTRESSED GIRDERS SLAB & SUPERSTRUCTURE DETAILS.



**PRESTRESSED GIRDER WITH
SEMI-EXPANSION SEAT**



**DIAPHRAGM AT STEEL OR ELASTOMERIC BEARINGS
SECTION THRU DIAPHRAGM AT PIER**

FOR STEEL BEARINGS, FORM DIAPHRAGM APPROXIMATELY 1/2" ABOVE BEARING KEEPER BARS

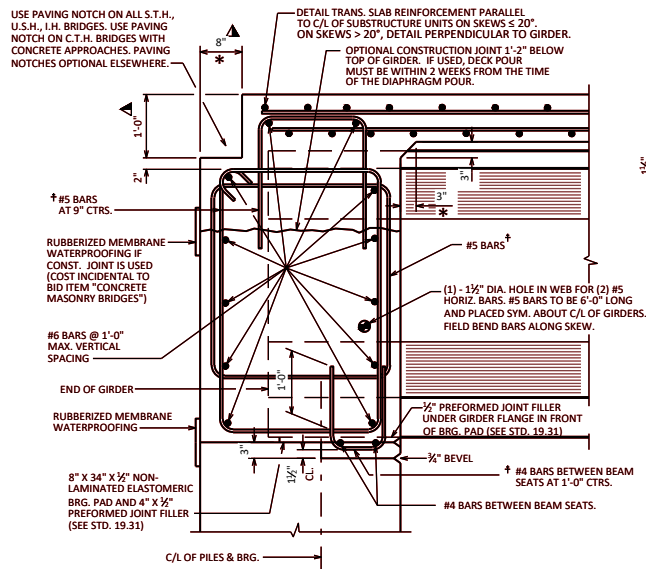
**28" & 36" PRESTRESSED
GIRDERS SLAB &
SUPERSTRUCTURE DETAILS**



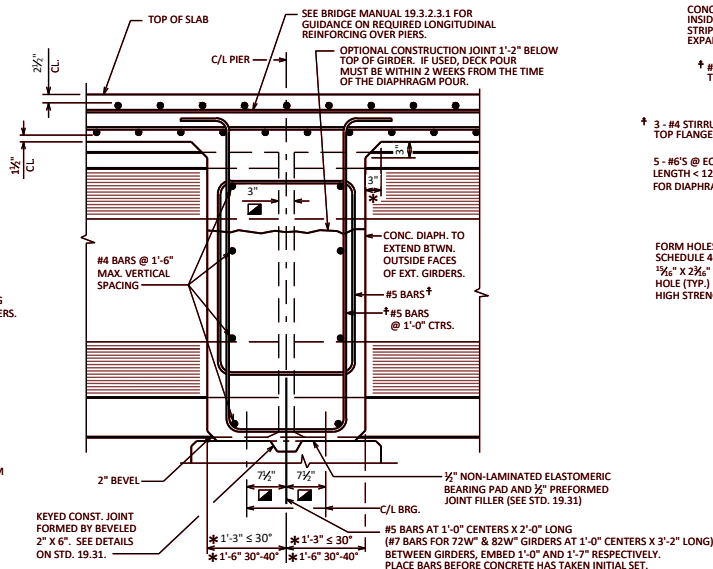
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

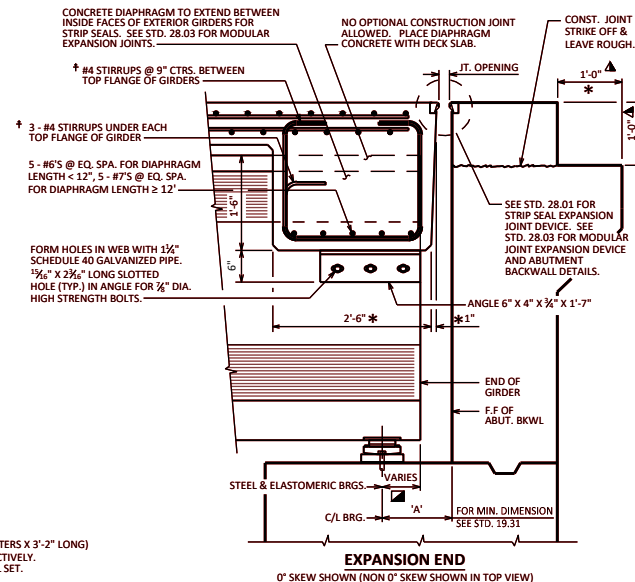
DATE:
7-25



PRESTRESSED GIRDER WITH SEMI-EXPANSION SEAT

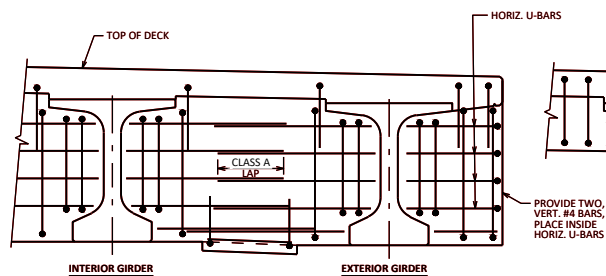


DIAPHRAGM AT 1/2" ELASTOMERIC BEARING

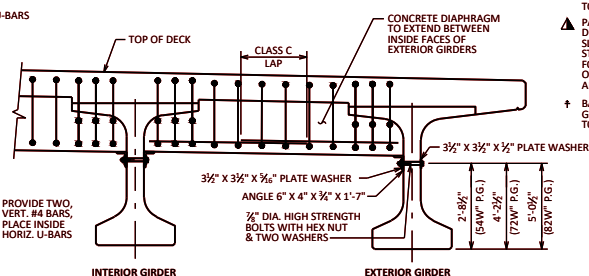


LEGEND

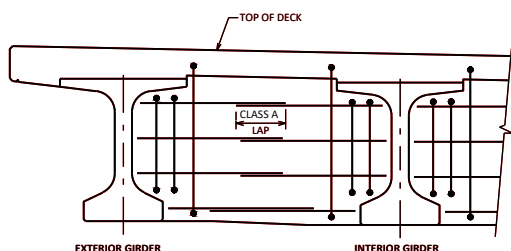
- DIMENSION IS TAKEN PARALLEL TO C/L GIRDER.
- * DIMENSION IS TAKEN NORMAL TO C/L SUBSTRUCTURE UNITS.
- ▲ PAVING NOTCH IS 1'-0" WIDE BY 1'-4" DEEP IF STRUCTURAL APPROACH SLAB (STD. 12.10) IS USED. SHOW NO. 9 STAINLESS STEEL BAR (STD. 12.12) FOR STRUCTURAL APPROACH SLAB ON THE SECTION THRU ABUT. OR ABUT. DIAPH.
- † BARS PLACED PARALLEL TO GIRDERS. SPACING PERPENDICULAR TO C/L GIRDERS.



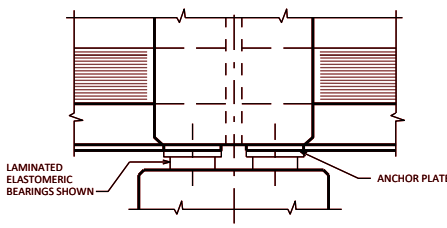
PART TRANSVERSE SECTION AT DIAPHRAGM SEMI EXPANSION END



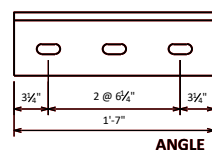
PART TRANSVERSE SECTION AT DIAPHRAGM EXPANSION END



PART TRANSVERSE SECTION AT DIAPHRAGM PIER



DIAPHRAGM AT STEEL OR ELASTOMERIC BEARINGS SECTION THRU DIAPHRAGM AT PIER
FOR STEEL BEARINGS, FORM DIAPHRAGM APPROXIMATELY 3/4" ABOVE BEARING KEEPER BARS



NOTES

ALL DIAPHRAGM SUPPORT HARDWARE SHALL BE INCIDENTAL TO "CONCRETE MASONRY BRIDGES".

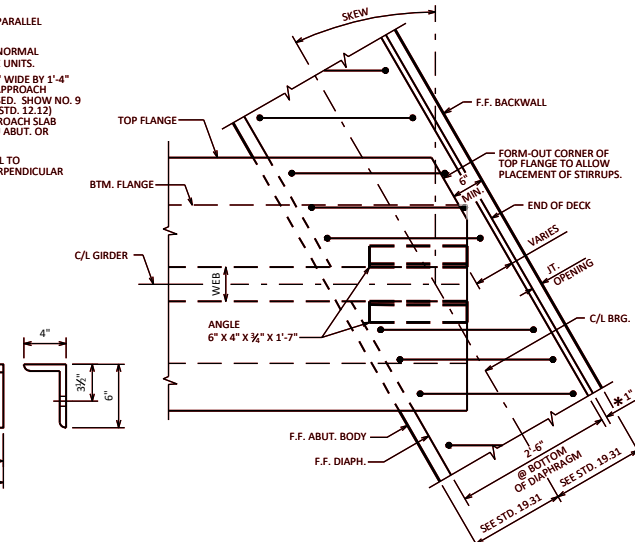
DIAPHRAGM SUPPORT ANGLES SHALL BE ASTM A709 GRADE 36.

ALL DIAPHRAGM SUPPORT HARDWARE INCLUDING BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AFTER FABRICATION.

STEEL DIAPHRAGM SUPPORT ANGLE TO CONCRETE WEB CONNECTION SHALL BE SNUG-TIGHT PLUS 1/2 TURN. HIGH STRENGTH BOLTS FOR WEB CONNECTION SHALL MEET THE REQUIREMENTS FOR ASTM A325 OR ASTM A449.

DESIGNER NOTES

LAP LENGTHS FOR DIAPHRAGM REINFORCEMENT SHALL BE BASED ON A CLASS "C" TENSION LAP SPLICE, UNLESS OTHERWISE NOTED.



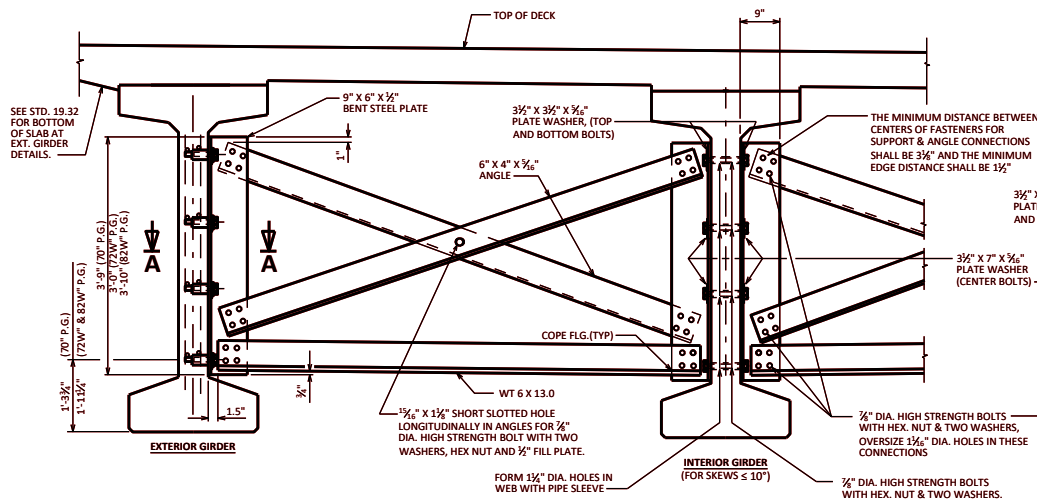
TOP VIEW OF DIAPHRAGM (EXPANSION END)

PRESTRESSED 54W" , 72W" & 82W" GIRDER SLAB & SUPERSTRUCTURE DETAILS

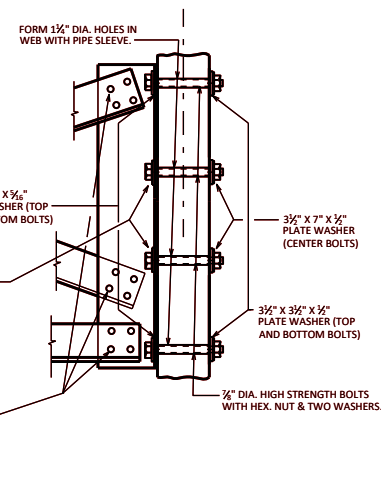


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DATE: 7-25



PART TRANSVERSE SECTION AT DIAPHRAGM



SECTION AT INTERIOR GIRDERS THRU DIAPHRAGM FOR SKEW ANGLES > 10°

NOTES

ALL DIAPHRAGM MATERIAL NOT EMBEDDED IN THE CONCRETE GIRDER SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "STEEL DIAPHRAGMS B-...", EACH.

EACH DIAPHRAGM BETWEEN GIRDERS SHALL CONSTITUTE ONE UNIT.

ALL DIAPHRAGM STRUCTURAL STEEL SHALL BE ASTM A709 GRADE 36.

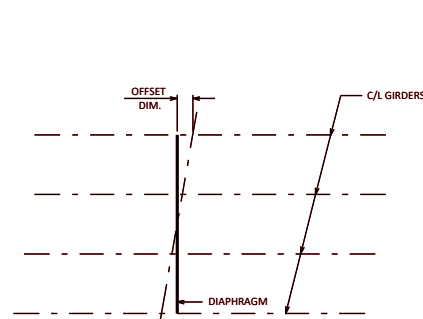
ALL DIAPHRAGM MATERIAL INCLUDING BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AFTER FABRICATION.

STEEL DIAPHRAGM TO CONCRETE WEB CONNECTION SHALL BE SNUG-TIGHT PLUS 1/4 TURN, UNLESS NOTED OTHERWISE. HIGH STRENGTH BOLTS FOR WEB CONNECTION SHALL MEET THE REQUIREMENTS FOR ASTM A325 OR ASTM A449.

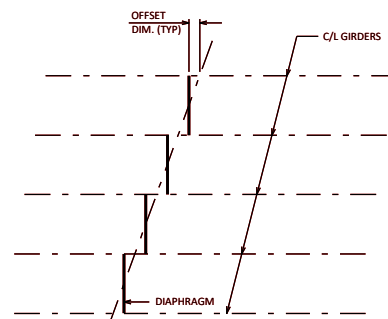
DESIGNER NOTES

FOR SPANS EQUAL TO OR LESS THAN 80'-0", PLACE ONE DIAPHRAGM AT MID-LENGTH OF GIRDER. FOR SPANS OVER 80'-0", PLACE AT 1/3 AND 2/3 POINTS.

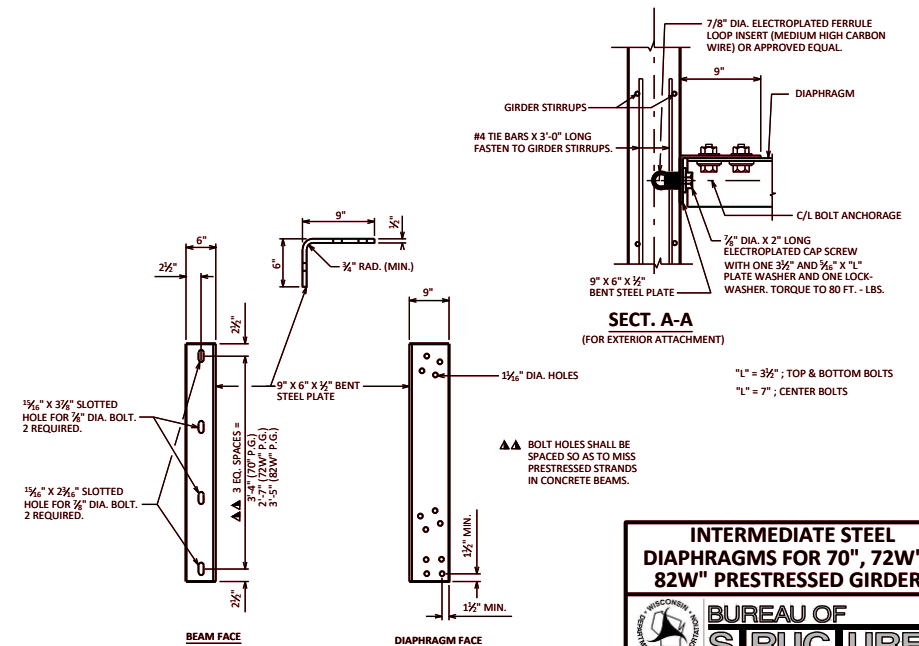
ON THE PLANS, SHOW LOCATION OF INSERTS/HOLES FOR DIAPHRAGM TO WEB CONNECTION, NOT ONLY FROM THE BOTTOM OF THE GIRDER (DIM "A" AND "B"), BUT ALSO FROM THE ENDS OF EACH GIRDER.



PLAN FOR SKEW ANGLES ≤ 10°



PLAN FOR SKEW ANGLES > 10°



DIAPHRAGM SUPPORT

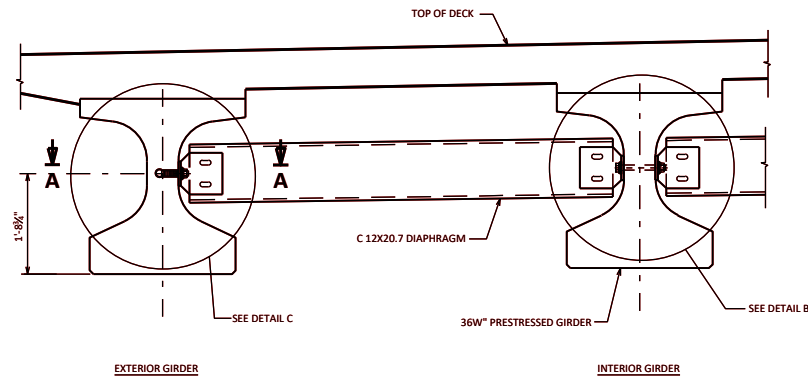
SECT. A-A
(FOR EXTERIOR ATTACHMENT)

▲▲ BOLT HOLES SHALL BE SPACED SO AS TO MISS PRESTRESSED STRANDS IN CONCRETE BEAMS.

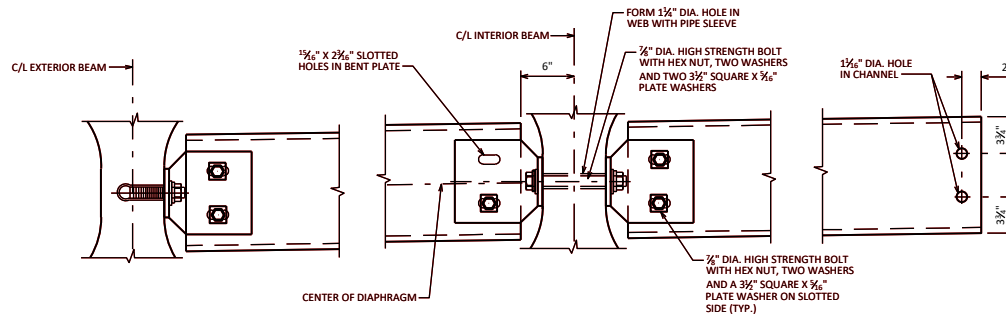
INTERMEDIATE STEEL DIAPHRAGMS FOR 70", 72W" & 82W" PRESTRESSED GIRDERS	
 BUREAU OF STRUCTURES	

APPROVED: *Laura Shadewald*

DATE:
1-25

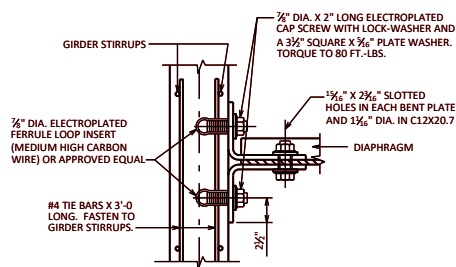


PART TRANSVERSE SECTION AT DIAPHRAGM

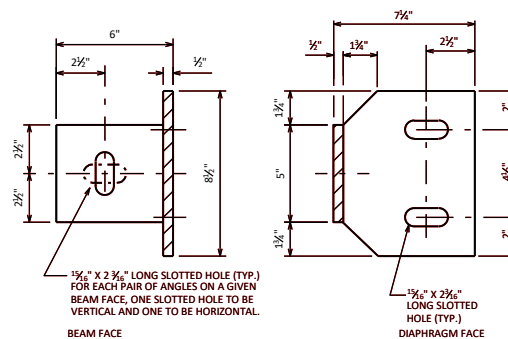


DETAIL C

DETAIL B

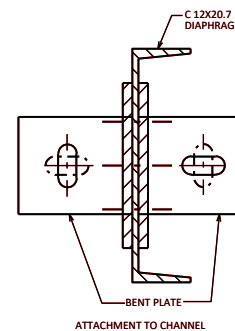


**SECTION A-A
(FOR EXTERIOR ATTACHMENT)**

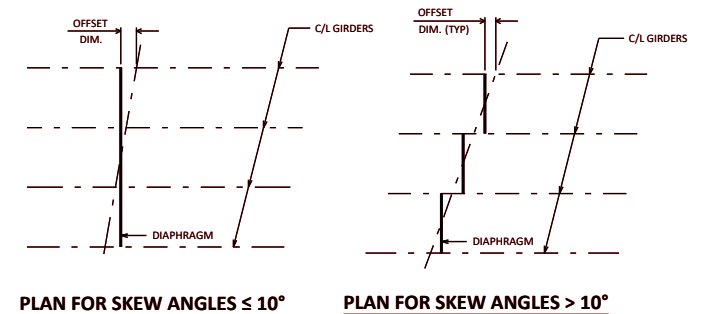


BEAM FACE

DIAPHRAGM FACE

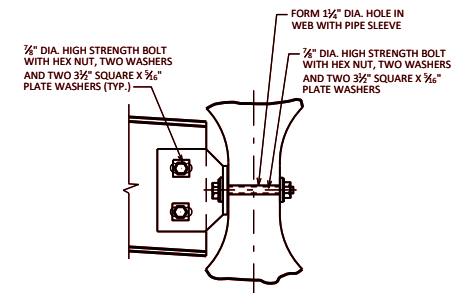


ATTACHMENT TO CHANNEL



PLAN FOR SKEW ANGLES ≤ 10°

PLAN FOR SKEW ANGLES > 10°



**SECTION AT INTERIOR GIRDERS THRU
DIAPHRAGM FOR SKEW ANGLES > 10°**

NOTES

ALL DIAPHRAGM MATERIAL NOT EMBEDDED IN THE CONCRETE GIRDER SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "STEEL DIAPHRAGMS B-...", EACH.

EACH DIAPHRAGM BETWEEN GIRDERS SHALL CONSTITUTE ONE UNIT.

ALL DIAPHRAGM STRUCTURAL STEEL SHALL BE ASTM A709 GRADE 36.

ALL DIAPHRAGM MATERIAL INCLUDING BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AFTER FABRICATION.

STEEL DIAPHRAGM TO CONCRETE WEB CONNECTION SHALL BE SNUG-TIGHT PLUS 1/2 TURN, UNLESS NOTED OTHERWISE. HIGH STRENGTH BOLTS FOR WEB CONNECTION SHALL MEET THE REQUIREMENTS FOR ASTM A325 OR ASTM A449.

DESIGNER NOTES

FOR SPANS EQUAL TO OR LESS THAN 80'-0", PLACE ONE DIAPHRAGM AT MID-LENGTH OF GIRDER. FOR SPANS OVER 80'-0", PLACE AT 1/3 AND 2/3 POINTS.

ON THE PLANS, SHOW LOCATION OF INSERTS/HOLES FOR DIAPHRAGM TO WEB CONNECTION, NOT ONLY FROM THE BOTTOM OF THE GIRDER (DIM "A" AND "B"), BUT ALSO FROM THE ENDS OF EACH GIRDER.

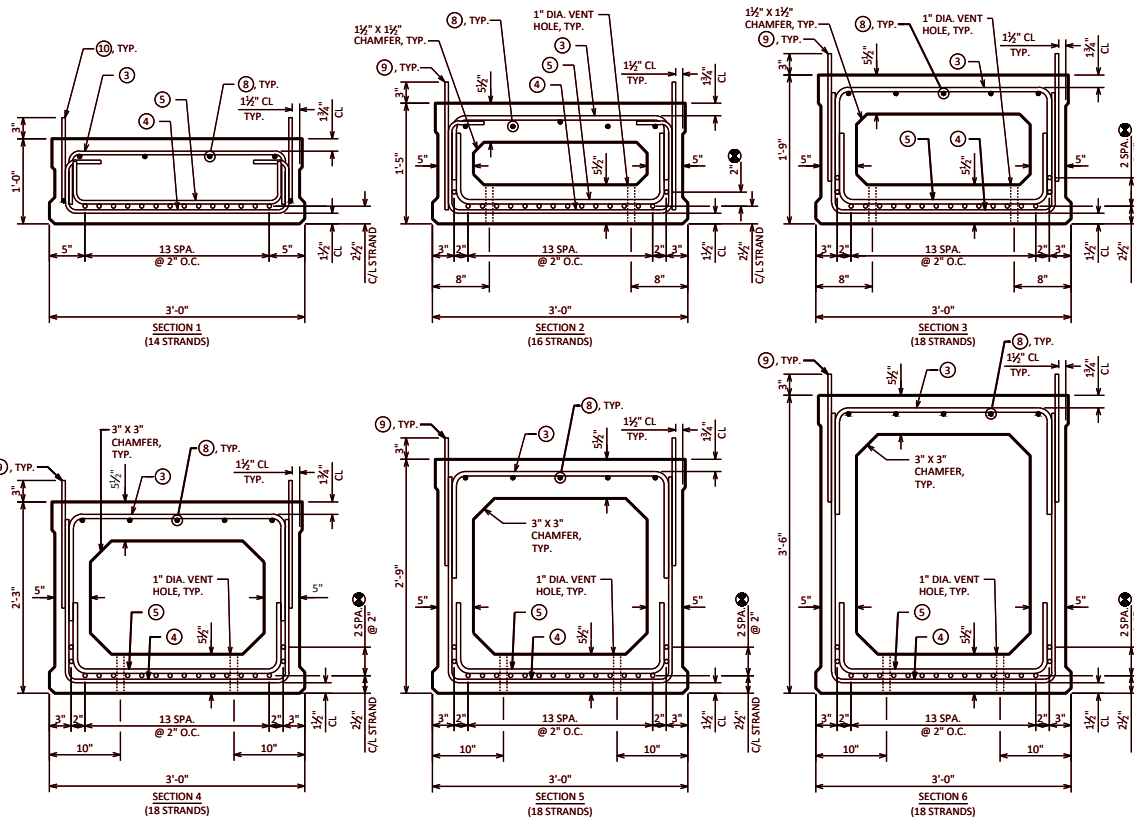
**INTERM. STEEL DIAPHS. FOR
36W" PRESTRESSED GIRDERS**



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

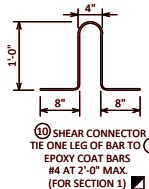
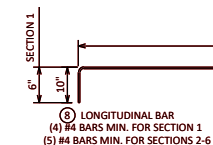
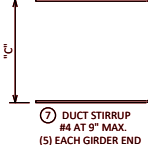
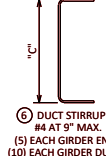
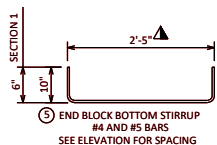
DATE:
7-25



3'-0" SECTIONS

REBAR DIMENSION

SECT. DEPTH	SECT. NO.	"A"	"B"	"C"
1'-0"	1	7 1/2"	7 1/2"	6"
1'-5"	2	9"	1'-1"	10"
1'-9"	3	1'-3"	1'-5"	1'-2"
2'-3"	4	1'-3"	1'-11"	1'-8"
2'-9"	5	1'-3"	2'-5"	2'-2"
3'-6"	6	1'-3"	3'-2"	2'-11"



NOTES

THE CONCRETE MIX FOR THE PRESTRESSED BOX GIRDERS SHALL CONFORM TO SECTION 503.2.2 OF THE STANDARD SPECIFICATIONS.

AN APPROVED CONCRETE SEALER SHALL BE APPLIED TO THE BOTTOM OF THE GIRDERS AND THE EXTERIOR FACE OF EXTERIOR GIRDERS. DO NOT APPLY CONCRETE SEALER OR EPOXY TO THE SHEAR KEY OR THE TOP OF GIRDERS.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. FOR CONCRETE ABUTMENTS, END OF STRANDS SHALL BE COATED WITH NON-BITUMINOUS JOINT SEALER. FOR GRS ABUTMENTS, COAT THE GIRDER ENDS, EXPOSED STRAND ENDS, AND ALL NON-BONDING SURFACES WITHIN 2 FEET OF THE GIRDER ENDS WITH A NON-PIGMENTED EPOXY CONFORMING TO AASHTO M-235 TYPE III, GRADE 2, CLASS B OR C. THE EPOXY SHALL BE APPLIED AT LEAST 3 DAYS AFTER MOIST CURING HAS CEASED AND PRIOR TO THE APPLICATION OF THE SEALER.

VOIDS SHALL BE VENTED AND DRAINED BY CASTING (2)-1" DIA. TUBES AT EACH END OF VOID SEGMENT. LOCATE TUBES AT BOTTOM EDGES OF THE CORNER FILLETS. AVOID STRAND LOCATIONS.

FOUR WAY SLING MUST BE USED TO ENGAGE ALL 4 LIFTING DEVICES ON BOTH ENDS OF UNITS.

POST-TENSIONING OF THE TRANSVERSE TENDONS SHALL NOT BEGIN UNTIL THE GROUT BETWEEN THE PRECAST BOX GIRDERS HAS BEEN ALLOWED TO CURE FOR 48 HOURS AND GROUT HAS REACHED A COMPRESSIVE STRENGTH OF 3,000 PSI.

SEAL WASHER SHALL BE SPONGE NEOPRENE GASKET 3/8" MIN. THICK. STRESS POCKETS SHALL BE FILLED WITH CHLORIDE FREE NON-SHRINK GROUT AFTER POST-TENSIONING.

TRANSITION BETWEEN CHANGING SLOPES OF POST-TENSIONING DUCTS SHALL BE PROVIDED BY EITHER A CIRCULAR OR PARABOLIC CURVE WITH A MINIMUM LENGTH OF 3'-0".

DESIGNER NOTES

USE OF PRESTRESSED BOX GIRDERS IS SUBJECT TO PRIOR-APPROVAL BY THE BUREAU OF STRUCTURES. SEE 19.3.2.3.2 IN THE BRIDGE MANUAL FOR ADDITIONAL GUIDANCE.

THE MAXIMUM RECOMMENDED SKEW ANGLE OF THE STRUCTURE SHALL BE 30°.

BEAM SEATS SHALL BE SLOPED ALONG THE SUBSTRUCTURE UNITS TO ACCOUNT FOR THE CROSS SLOPE OR SUPERELEVATION ON THE DECK.

SLOPE BEAM SEATS PARALLEL TO GRADE LINE IF GRADE AT BRG. >1%, PLACE ELEVATIONS ON PLANS TO MEET THESE REQUIREMENTS.

STRANDS TO BE DESIGNED. MAXIMUM NUMBER OF STRANDS AND STRAND ARRANGEMENTS ARE SHOWN. STRANDS NOT TO BE DRAPED.

MULTI-SPAN STRUCTURES REQUIRE ANCHOR DOWELS AT THE PIERS, WHICH MAY REDUCE THE MAXIMUM NUMBER OF STRANDS AVAILABLE BY 2. (CURRENTLY NOT USED)

CONTACT THE BUREAU OF STRUCTURES FOR THE MOST CURRENT PRESTRESSED BOX GIRDER SPECIAL PROVISION.

SEE STANDARD 19.51 FOR SHEAR KEY RECESS DETAIL.

MATERIAL PROPERTIES

CONCRETE MASONRY BRIDGES

$f'_c = 4,000$ PSI

BAR STEEL REINFORCEMENT, GRADE 60

$f_y = 60,000$ PSI

PRESTRESSED BOX GIRDERS, CONCRETE MASONRY

$f'_c = 5,000$ PSI

STRANDS - 0.5" OR 0.6" DIA. ULTIMATE TENSILE STRENGTH

$f_y = 270,000$ PSI

PRE-TENSION

$f'_p = 270,000$ P.S.I

$f'_p = 0.75 \times 270,000 = 202,500$ P.S.I

for low relaxation strands

PI PER 0.5" DIA. STRAND = 0.1531 X 202,500 = 31.00 KIIPS

PI PER 0.6" DIA. STRAND = 0.217 X 202,500 = 43.94 KIIPS

LEGEND

● DIMENSION GIVEN FOR A POST-TENSIONING DUCT 1'-10" FROM END OF PRESTRESSED BOX GIRDER.

▲ DIMENSION GIVEN FOR STIRRUPS PERPENDICULAR TO THE PRESTRESSED BOX GIRDER LENGTH. ADJUST THE DIMENSION FOR STIRRUPS AT SKEWED PRESTRESSED BOX GIRDER ENDS.

⊗ SHOW SPACING FOR THESE STRANDS ONLY IF REQUIRED BY DESIGN.

■ SUBSTITUTE (1) BAR ON EXTERIOR EDGE OF EXTERIOR GIRDERS. SEE STANDARD 19.56.

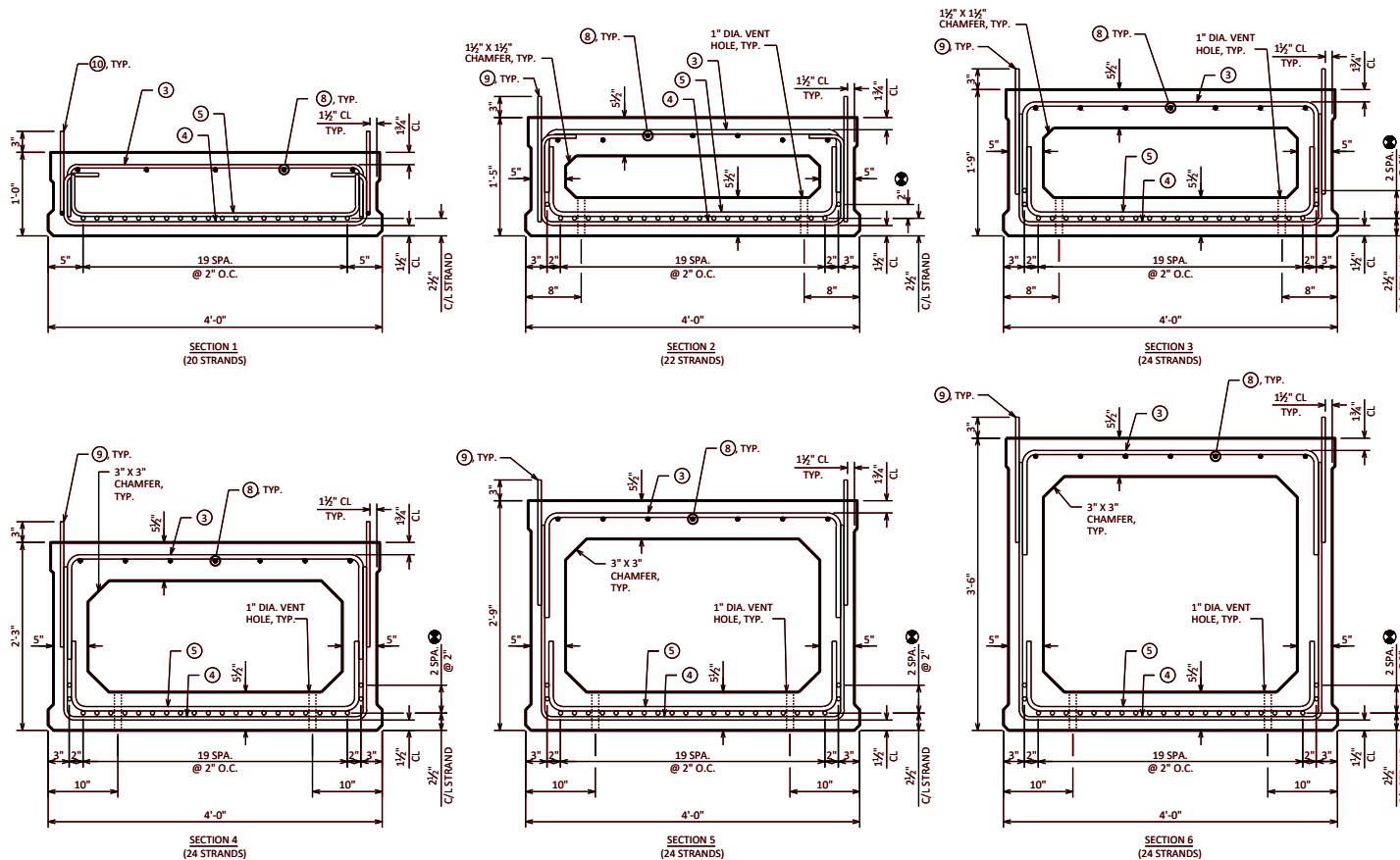
3'-0" PRESTRESSED BOX GIRDER SECTIONS



BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE:
7-18



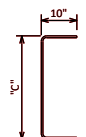
4'-0" SECTIONS

REBAR DIMENSION

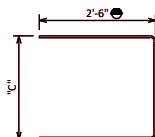
SECT. DEPTH	SECT. NO.	"A"	"B"	"C"
1'-0"	1	7½"	7½"	6"
1'-5"	2	9"	1'-1"	10"
1'-9"	3	1'-3"	1'-5"	1'-2"
2'-3"	4	1'-3"	1'-11"	1'-8"
2'-9"	5	1'-3"	2'-5"	2'-2"
3'-6"	6	1'-3"	3'-2"	2'-11"



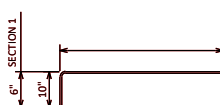
⑤ END BLOCK BOTTOM STIRRUP
#4 AT 9" MAX.
SEE ELEVATION FOR SPACING



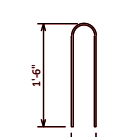
⑥ DUCT STIRRUP
#4 AT 9" MAX.
(6) EACH GIRDER END
(12) EACH GIRDER DUCT



⑦ DUCT STIRRUP
#4 AT 9" MAX.
(6) EACH GIRDER END



⑧ LONGITUDINAL BAR
(5) #4 BARS MIN. FOR SECTION 1
(7) #4 BARS MIN. FOR SECTIONS 2-6



⑨ SHEAR CONNECTOR
TIE ONE LEG OF BAR TO ③
EPOXY COAT BARS
#4 AT 2'-0" MAX.
(FOR SECTIONS 2-6) ■



⑩ SHEAR CONNECTOR
TIE ONE LEG OF BAR TO ③
EPOXY COAT BARS
#4 AT 2'-0" MAX.
(FOR SECTION 1) ■

SHEAR KEY RECESS DETAIL

OMIT SHEAR KEY ON EXTERIOR FACE OF EXTERIOR GIRDERS.

DESIGNER NOTE

SEE STANDARD 19.50 FOR NOTES, DESIGNER NOTES, MATERIAL PROPERTIES.

LEGEND

- DIMENSION GIVEN FOR A POST-TENSIONING DUCT 1'-10" FROM END OF PRESTRESSED BOX GIRDER.
- ▲ DIMENSION GIVEN FOR STIRRUPS PERPENDICULAR TO THE PRESTRESSED BOX GIRDER LENGTH. ADJUST THE DIMENSION FOR STIRRUPS AT SKEWED PRESTRESSED BOX GIRDER ENDS.
- ⊙ SHOW SPACING FOR THESE STRANDS ONLY IF REQUIRED BY DESIGN.
- SUBSTITUTE ⑪ BAR ON EXTERIOR EDGE OF EXTERIOR GIRDERS. SEE STANDARD 19.56.

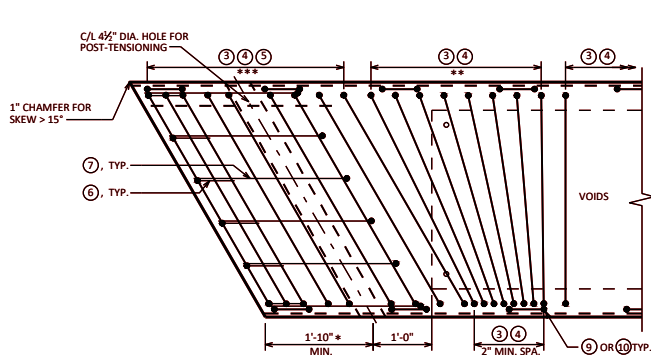
4'-0" PRESTRESSED BOX GIRDER SECTIONS



BUREAU OF
STRUCTURES

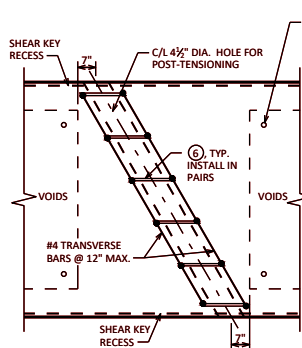
APPROVED: *Laura Shadewald*

DATE:
1-18

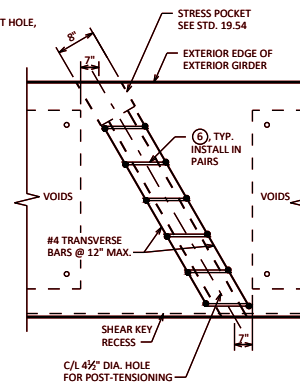


PART GIRDER PLAN WITH SKEW

①, ② & #4 TRANSVERSE BARS NOT SHOWN FOR CLARITY



INTERIOR GIRDER DUCT PLAN



EXTERIOR GIRDER DUCT PLAN

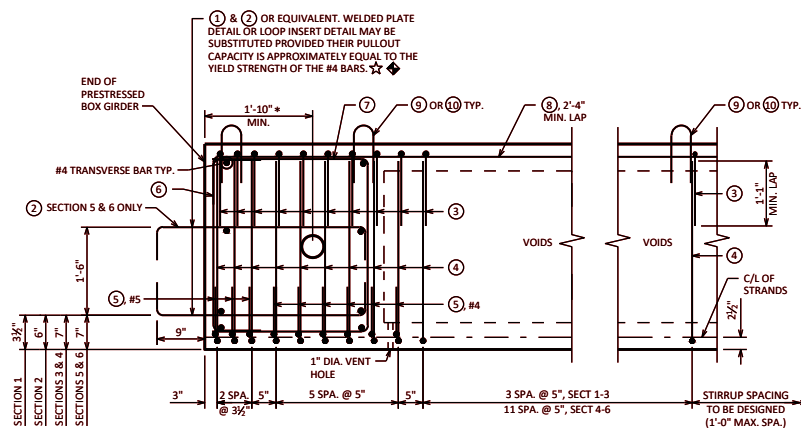
LEGEND

- ★ BARS NOT REQUIRED WHEN USED ON GRS ABUTMENTS.
- ◆ BARS PLACED PARALLEL TO GIRDERS. SPACING IS PERPENDICULAR TO THE C/L OF THE GIRDERS.
- * WHEN WINGS ARE PARALLEL TO ABUTMENT C/L, USE DIMENSIONS TO ALLOW FOR EASE OF POST-TENSIONING OPERATION.
- ** PLACE AT 5" MAX. SPACING UNTIL PERPENDICULAR TO THE C/L OF THE GIRDER.
- *** PLACE ALONG SKEW FROM END OF PRESTRESSED BOX GIRDER UNTIL ALL END BLOCK BOTTOM STIRRUP BARS, ⑤, ARE PLACED.

DESIGNER NOTES

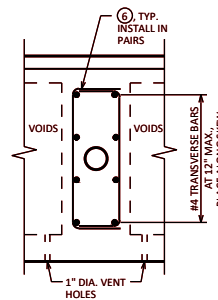
FOR BAR BEND DETAILS, SEE STANDARD 19.50 AND STANDARD 19.51

FOR SKEWED STRUCTURES CAST END OF PRESTRESSED BOX GIRDER ALONG SKEW.

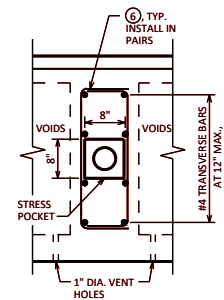


PART GIRDER ELEVATION SHOWING 0° SKEW

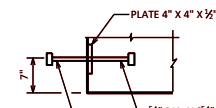
PLACE #4 TRANSVERSE BARS AS SHOWN ALONG SKEW



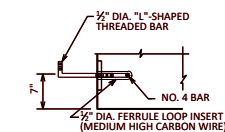
INTERIOR GIRDER DUCT ELEVATION



EXTERIOR GIRDER DUCT ELEVATION



WELDED PLATE DETAIL
(EQUIVALENT TO ONE #4 BAR)



LOOP INSERT DETAIL

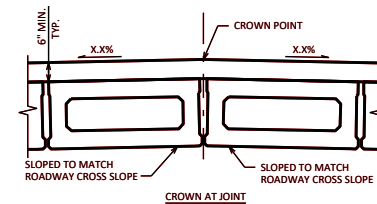
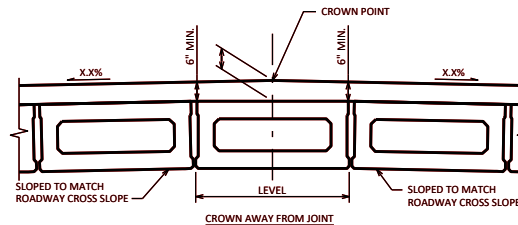
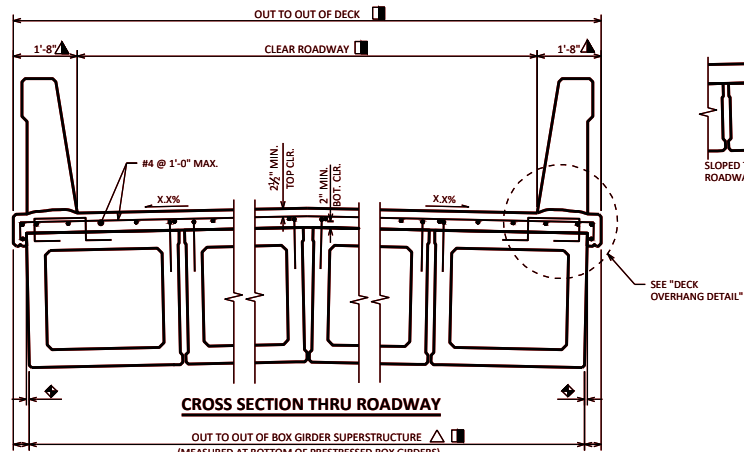
PRESTRESSED BOX GIRDER DETAILS 1



**BUREAU OF
STRUCTURES**

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DATE:
1-17

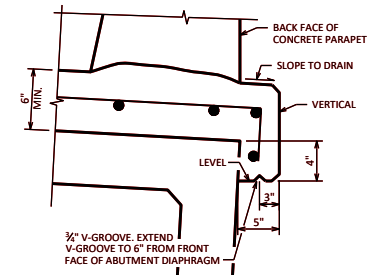


CROWN DETAIL AT LOCATION OF MIN. DECK THICKNESS

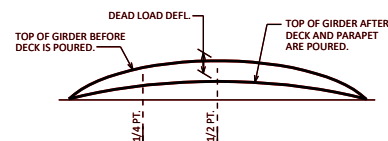
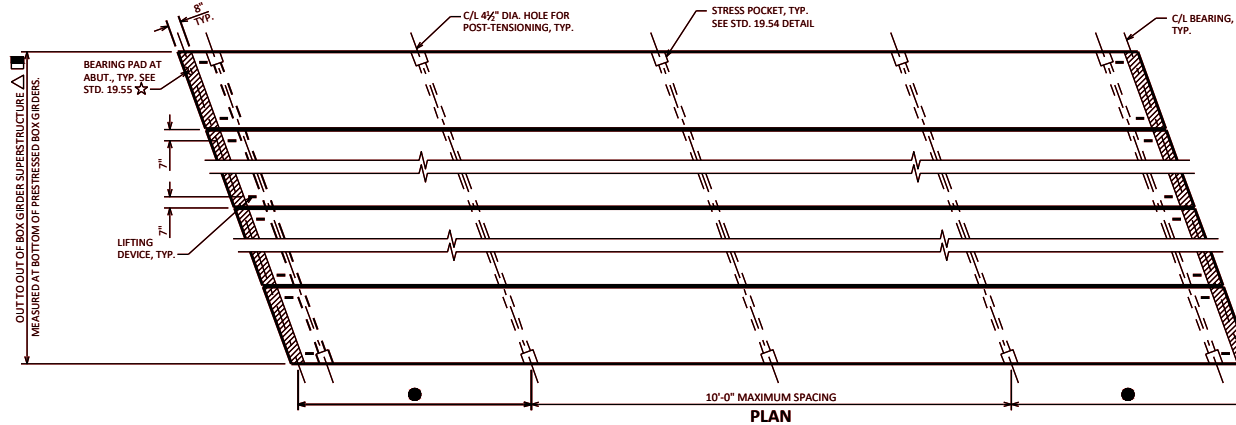
NUMBER OF SECTIONS

CLEAR ROADWAY	3'-0" SECTION	4'-0" SECTION
26'-0"	10	7
30'-0"	11	8
36'-0"	13	10
40'-0"	14	11
44'-0"	16	12

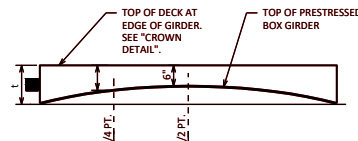
* 4'-0" SECTIONS PREFERRED



DECK OVERHANG DETAIL
SEE STANDARD 19.56 FOR ADDITIONAL DETAILS



DEAD LOAD DEFLECTION DIAGRAM



DECK THICKNESS DIAGRAM

■ TO DETERMINE DECK THICKNESS AT GIRDER ENDS FOLLOW THIS PROCESS:

- 6" MIN. DECK SLAB THICKNESS
- + FIELD MEASURED GIRDER CAMBER (AT MID SPAN)
- = DEADLOAD DEFLECTION (AT MIDSPAN)
- = DECK THICKNESS, T

NOTE: PLAN DECK THICKNESS BASED ON THEORETICAL INITIAL CAMBER VALUE. 1/4 PT. MAY BE INTERPOLATED. USE FIELD MEASURED GIRDER CAMBER FOR ACTUAL DECK THICKNESS. THE 1/4 PT. IS INTERPOLATED BETWEEN DECK THICKNESS AT THE END OF DECK AND MIDSPAN.

** THE THEORETICAL INITIAL CAMBER VALUE AT THE TIME OF STRAND RELEASE AT MIDSPAN MULTIPLIED BY A FACTOR OF 1.4 TO ACCOUNT FOR CAMBER GROWTH FROM THE TIME OF STRAND RELEASE TO JOBSITE PLACEMENT.

SPAN	CAMBER (IN.) **
1	

THESE VALUES ARE NOT TO BE USED IN DETERMINING Y, USE FIELD MEASURED GIRDER CAMBER.

THESE VALUES ARE FOR INFORMATIONAL PURPOSES ONLY.

GIRDER DATA						
SPAN	GIRDER	GIRDER LENGTH "L"	DEAD LOAD DEFL. (IN.)		CONC. STRENGTH FC (PSI)	DIA. OF STRAND (IN.)
			1/4 PT.	1/2 PT.		
1						

* MINIMUM CYLINDER STRENGTH OF CONCRETE @ TIME OF TRANSFER OF PRESTRESS FORCE.

DESIGNER NOTES

△ ACCOUNT FOR NUMBER OF PRESTRESSED BOX GIRDERS, NUMBER OF JOINTS (AT 1' NORMAL TO C/L GIRDER), AND ROADWAY CROSS SLOPE.

◆ DIMENSION IS HORIZONTAL DISTANCE FROM TOP OF PRESTRESSED BOX GIRDER TO BOTTOM OF PRESTRESSED BOX GIRDER.

DECK THICKNESS DETERMINATION PROCEDURE IS BASED ON TANGENT PROFILE GRADE LINE. STRUCTURES WITH VERTICAL CURVE PROFILE GRADE LINES MAY REQUIRE ADDITIONAL INVESTIGATION.

NOTES

NOTE: AN AVERAGE DECK THICKNESS OF _____ WAS USED IN THE QUANTITY "CONCRETE MASONRY BRIDGES".

VARIATIONS TO THE GRADE LINE OVER 3/4" MUST BE SUBMITTED BY THE FIELD ENGINEER TO THE STRUCTURES DESIGN SECTION FOR REVIEW.

LEGEND

☆ BEARING PAD NOT REQUIRED FOR GRS ABUTMENTS.

● 1/4 SPAN FOR SPANS UP TO 80'-0".

● 1/2 SPAN FOR SPANS OVER 80'-0".

■ DIMENSION ASSUMES 1" JOINT WIDTH. JOINT WIDTH DIMENSIONS MAY VARY DUE TO 1/4" JOINT TOLERANCES.

▲ MAY BE REDUCED TO 1'-7" TO MAINTAIN ROADWAY CLEAR WIDTH.

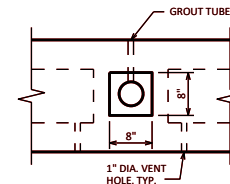
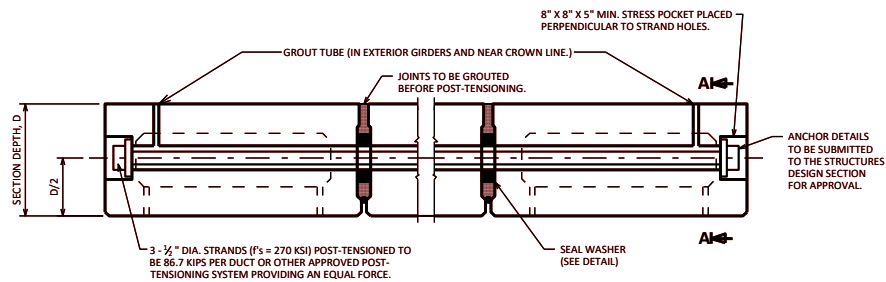
PRESTRESSED BOX GIRDER DETAILS 2



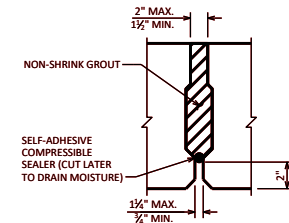
BUREAU OF STRUCTURES

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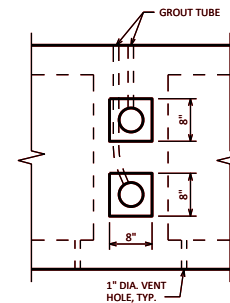
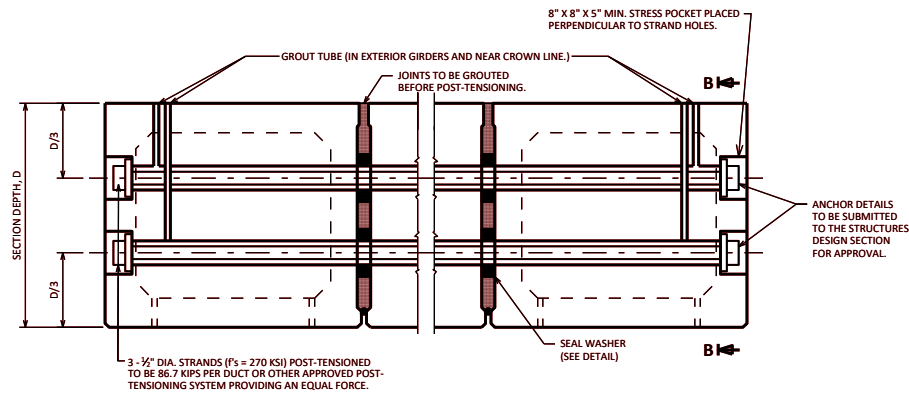
SECTION A-A



SHEAR KEY DETAIL

POST-TENSIONING DETAILS - ONE DUCT PER DIAPHRAGM

(SECTIONS 1 THROUGH 4)



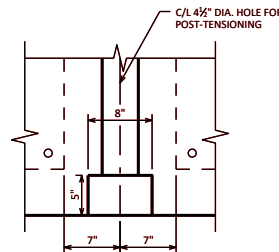
SECTION B-B

POST-TENSIONING DETAILS - TWO DUCTS PER DIAPHRAGM

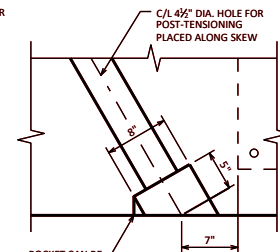
(SECTIONS 5 AND 6)



SEAL WASHER
(MAY ALSO BE ROUND)



NO SKEW



WITH SKEW

STRESS POCKET DETAIL

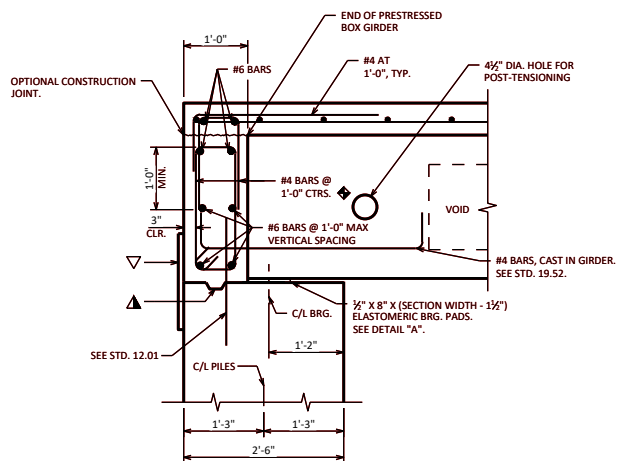
PRESTRESSED BOX GIRDER DETAILS 3



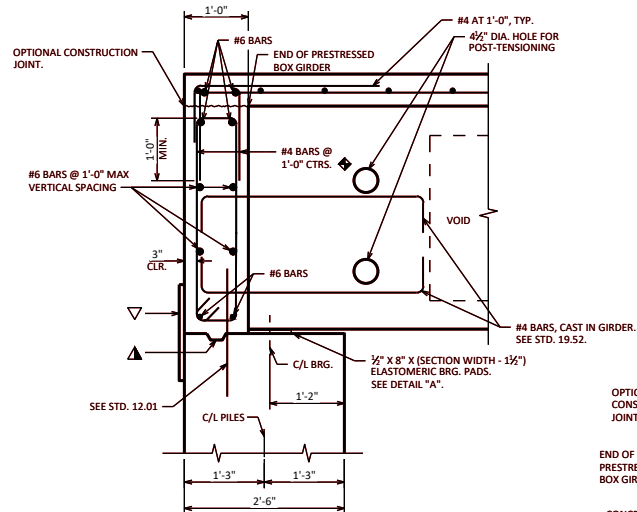
BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

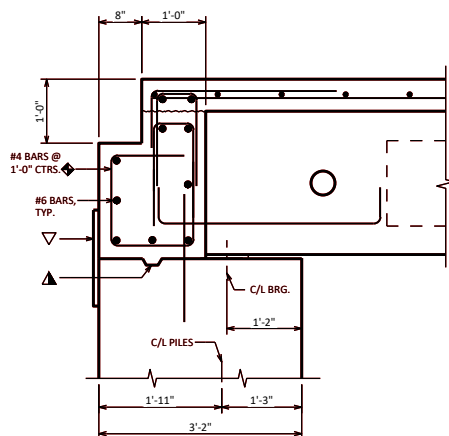
DATE:
1-18



NO PAVING NOTCH - SECTIONS 1 THROUGH 4

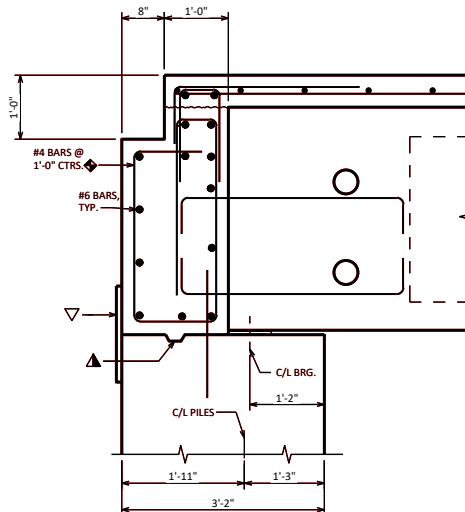


NO PAVING NOTCH - SECTIONS 5 AND 6



WITH PAVING NOTCH - SECTIONS 1 THROUGH 4

SEE NO PAVING NOTCH - SECTIONS 1 THROUGH 4 DETAIL FOR ADDITIONAL INFORMATION

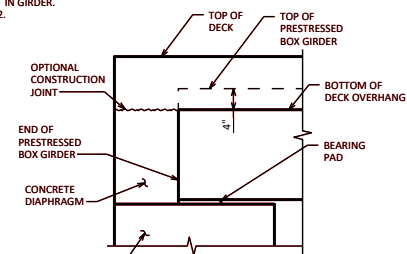


WITH PAVING NOTCH - SECTIONS 5 AND 6

SEE NO PAVING NOTCH - SECTIONS 5 AND 6 DETAIL FOR ADDITIONAL INFORMATION

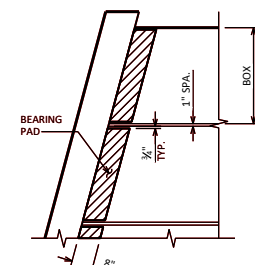
LEGEND

- ▽ 1'-6" RUBBERIZED MEMBRANE WATERPROOFING
- ▲ KEVED CONSTRUCTION JOINT FORMED BY BEVELED 2" X 6"
- ◆ BARS PLACED PARALLEL TO GIRDERS. SPACING PERPENDICULAR TO C/L GIRDERS.



ELEVATION

(SHOWING DECK OVERHANG TERMINATION AT CONCRETE ABUTMENT)



DETAIL "A"

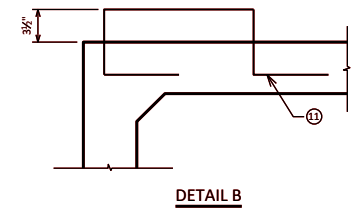
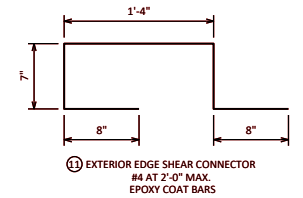
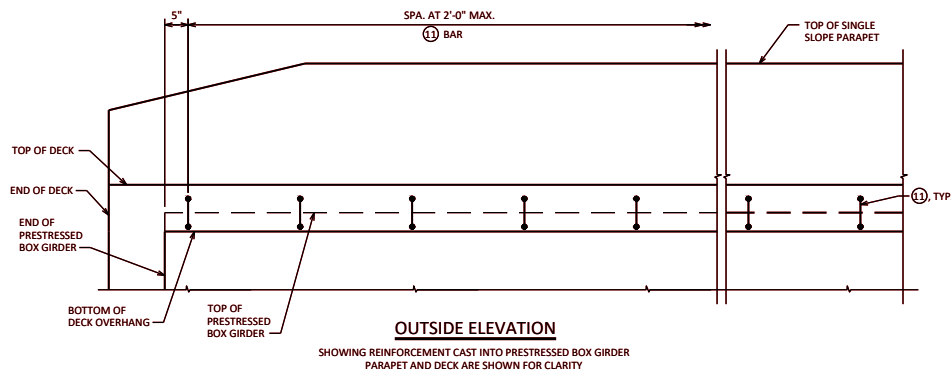
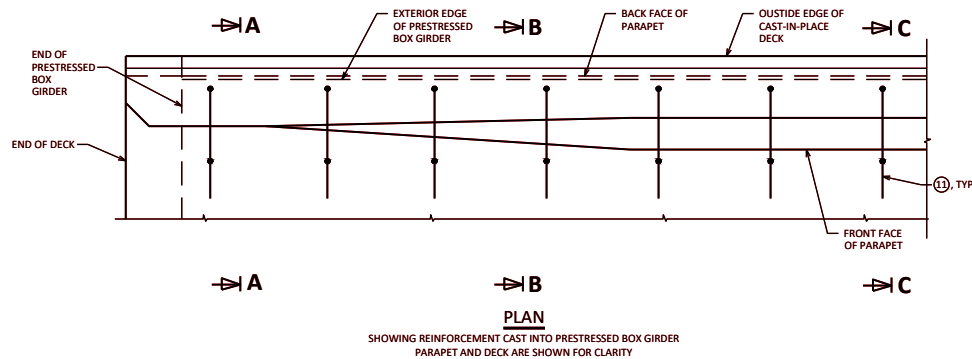
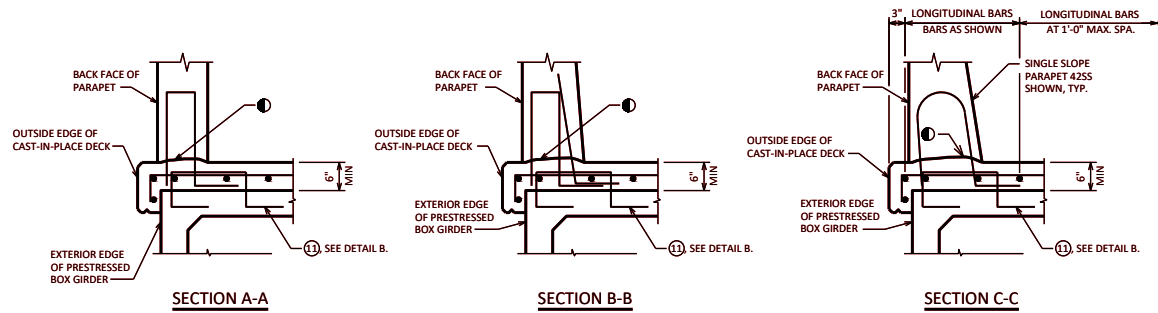
PRESTRESSED BOX GIRDER DETAILS 4



**BUREAU OF
STRUCTURES**

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1-16



LEGEND

(1) CONST. JOINT - STRIKE OFF AS SHOWN.

NOTE

BAR (1) TO BE PAID AS PART OF BID ITEM "PRESTRESSED BOX GIRDER TYPE XX-INCH".

DESIGNER NOTES

SEE CHAPTER 30 STANDARDS FOR SINGLE SLOPE PARAPET DETAILS.

DETAILS SHOWN ARE APPLICABLE FOR CONCRETE ABUTMENTS. DETAILS TO BE MODIFIED FOR GRS ABUTMENTS.

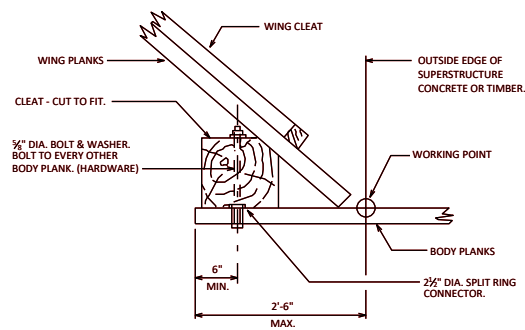
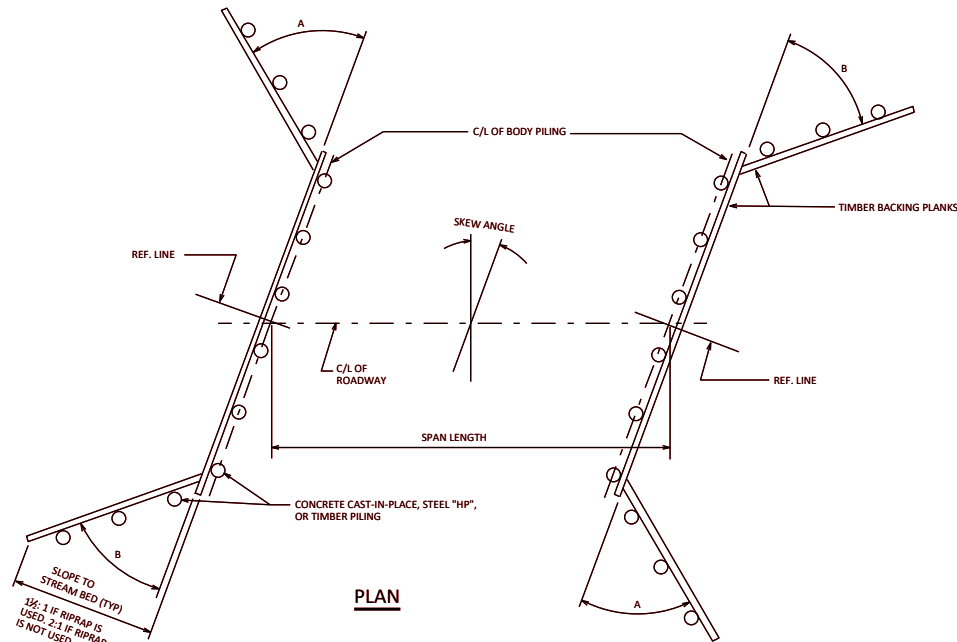
PRESTRESSED BOX GIRDER DETAILS 5



**BUREAU OF
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DATE:
7-16



NOTES

ALL TIMBER CONNECTORS AND HARDWARE EXCEPT THOSE OF MALLEABLE IRON SHALL BE GALVANIZED.

TREAT ALL LUMBER AND TIMBER WITH ONE OF THE PRESERVATIVES RECOMMENDED IN THE STANDARD SPECIFICATIONS.

TIE RODS SHALL BE COATED WITH THE COAL TAR OR BITUMASTIC COMPOUND USED FOR COVERING WING PILE ENDS.

REFER TO AASHTO LRFD SPECIFICATIONS FOR LUMBER AND TIMBER DESIGN REQUIREMENTS.

THE BODY BACKING PLANKS SHALL BE CONTINUOUS OVER 4 PILES (3 PANELS). PLANK SPLICES, IF REQUIRED SHALL BE AT THE CENTERLINE OF PILING AND ADJACENT SPLICES SHALL BE STAGGERED.

ALL TIE RODS, TURNBUCKLES, NUTS AND WASHERS SHALL BE PAID FOR AS "STRUCTURAL STEEL CARBON".

TIMBER CONNECTORS AND HARDWARE SHALL BE INCLUDED IN THE COST FOR "TREATED LUMBER AND TIMBER".

ALTERNATE DETAILS MAY BE SUBMITTED USING EITHER GALVANIZED STEEL BRIDGE PLANK OR PRECAST CONCRETE PLANK IN LIEU OF TIMBER BACKED ABUTMENT PLANKING, SUBJECT TO APPROVAL BY THE ENGINEER.

SKEW ANGLE	"H" HEIGHT FROM STREAM BED OR BERM TO GRADE	WING ANGLE "A"	WING ANGLE "B"
0° TO 15° INCL.	$H \leq 10'-0"$	45°	45°
0° TO 15° INCL.	$H > 10'-0"$	50°	50°
15° TO 20° INCL.	$H \leq 10'-0"$	55°	30°
15° TO 20° INCL.	$H > 10'-0"$	50°	50°
OVER 20°	$H \leq 10'-0"$	65°	25°
OVER 20°	$H > 10'-0"$	65°	25°

* USE TIE RODS ON WING PILING

● USE TIE RODS WITH A DEADMAN ON WING PILING.

SECTION	MOMENT CAPACITY (INCH - KIPS/FT.)
10 GAGE (6' X 2') GRADE A*ARMCO	22.9 ($f_u = 18$ K.S.I.)
7 GAGE (6' X 2') GRADE A*ARMCO	30.0 ($f_u = 18$ K.S.I.)

*ASTM A446

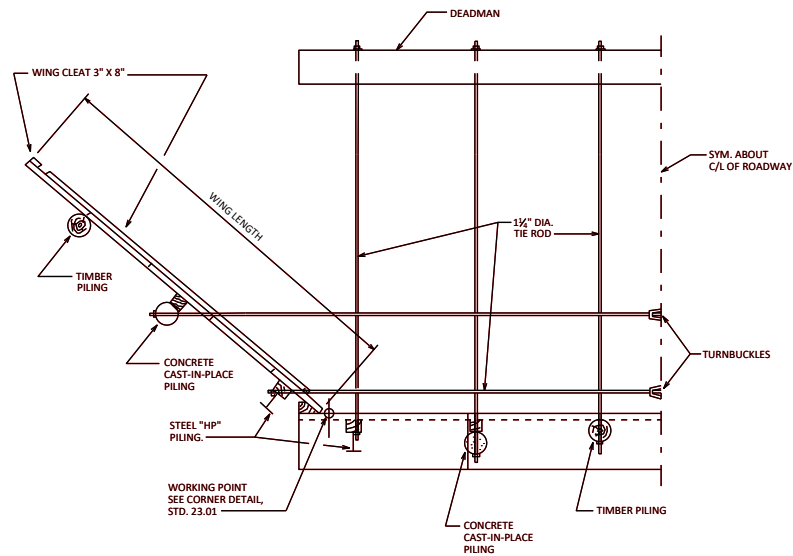
TIMBER ABUTMENTS GENERAL



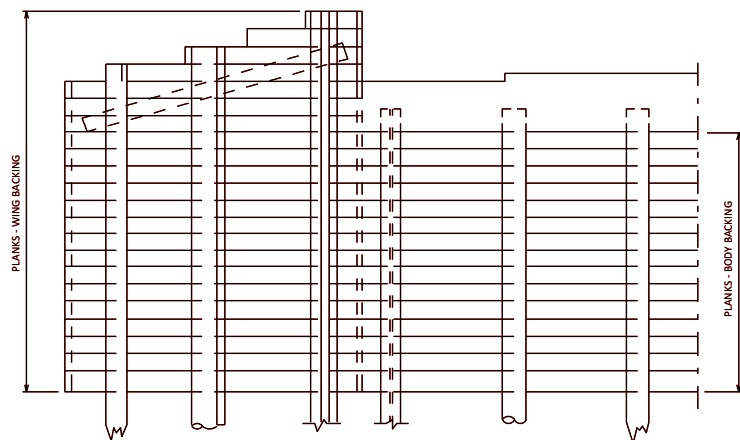
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

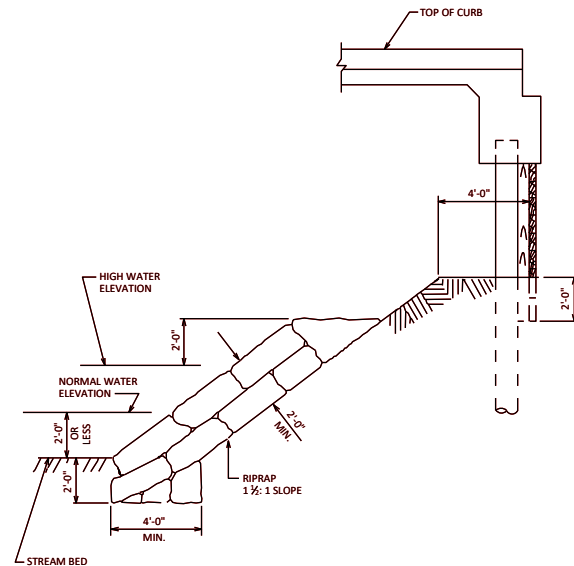
DATE:
7-16



HALF PLAN

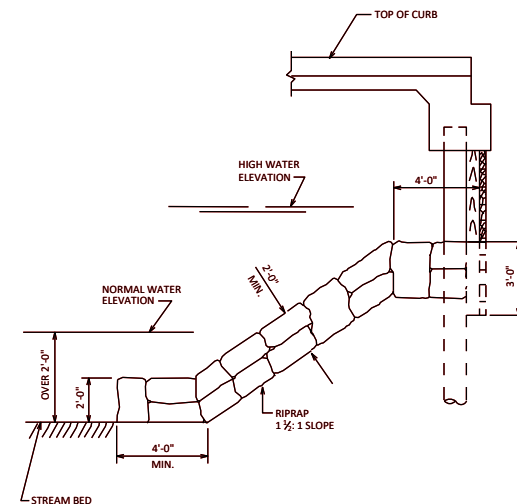


HALF ELEVATION



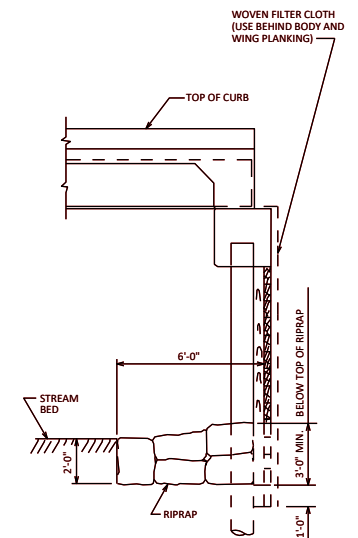
LONGITUDINAL SECTION WITH BERM

SHOWING TOE OF RIPRAP WHEN WATER IS 2'-0" OR LESS IN DEPTH.



LONGITUDINAL SECTION WITH BERM

SHOWING TOE OF RIPRAP WHEN WATER IS OVER 2'-0" IN DEPTH.



**LONGITUDINAL SECTION
WITHOUT BERM**

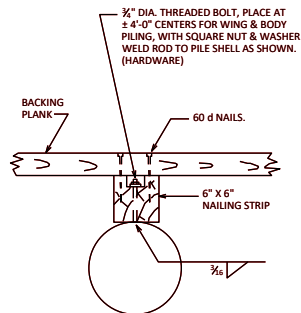
TIMBER ABUTMENT



**BUREAU OF
STRUCTURES**

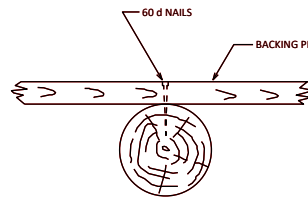
APPROVED: *Laura Shadewald*

DATE:
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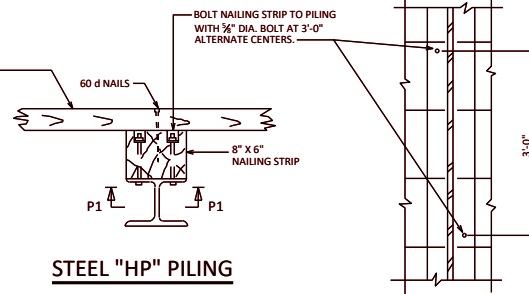


**CONCRETE
CAST-IN-PLACE PILING**

REFER TO STANDARD 11.01 FOR SECTION
THRU REINFORCED CAST-IN-PLACE PILING
WHEN PILES ARE EXPOSED.

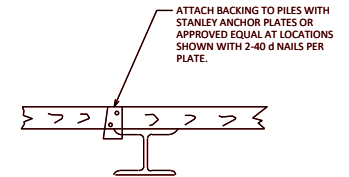


TIMBER PILING



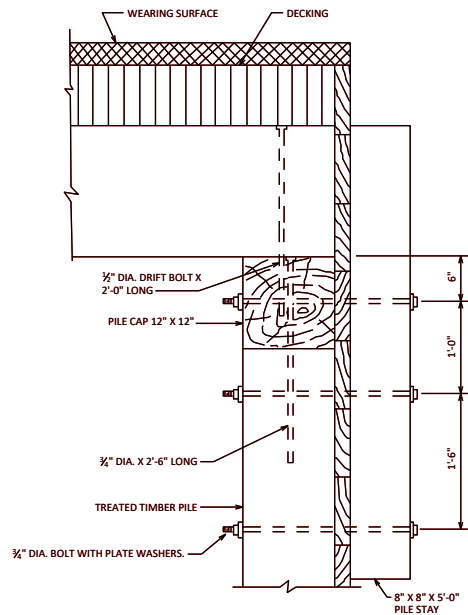
STEEL "HP" PILING

SECTION P1

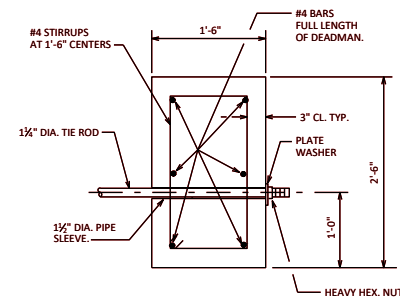


**STEEL "HP" PILING
(ALTERNATE ATTACHMENT)**

BODY & WING PLANK CONNECTION DETAILS



**PILE CAP DETAIL
(TIMBER GIRDER)**



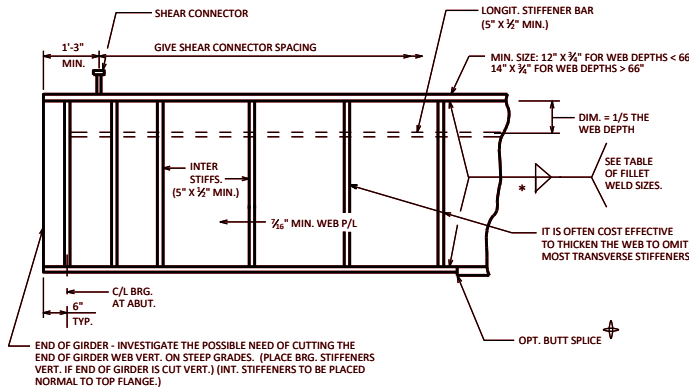
SECTION THRU DEADMAN

TIMBER ABUTMENT DETAILS

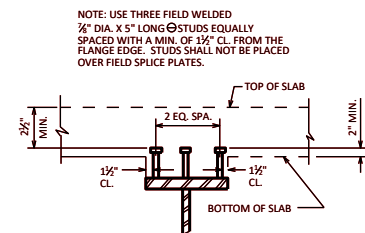


APPROVED: *Laura Shadewald*

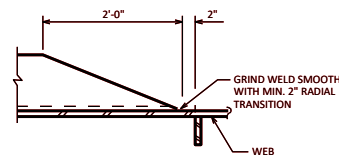
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7-16



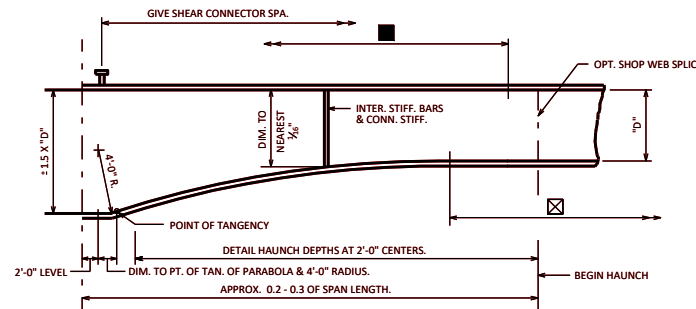
PART GIRDER ELEVATION



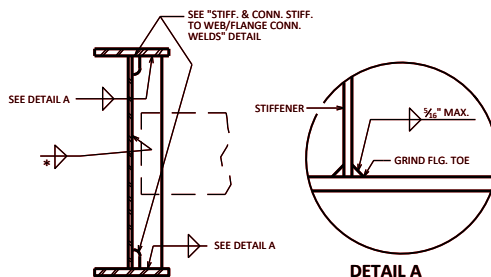
SHEAR CONN. DETAILS



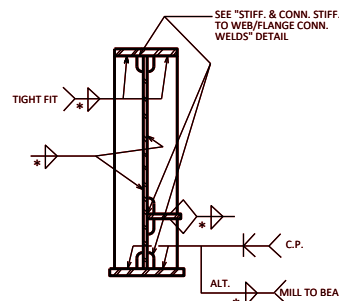
LONGIT. STIFF. TERMINATION



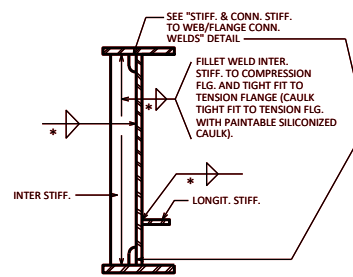
PARABOLIC HAUNCH DETAILS



CONNECTION STIFF. DETAILS



BRG. STIFF. DETAILS TYP. AT ABUT. & PIER



INTERMEDIATE & LONGITUDINAL STIFF. DETAILS (ALL GIRDERS)

*** TABLE OF FILLET WELD SIZES**

MATERIAL THICKNESS OF THICKER PART JOINED.	+ MIN. SIZE OF FILLET WELD
TO 1/2" INCLUSIVE	3/8"
OVER 1/2" TO 3/4"	1/2"
OVER 3/4" TO 1 1/2"	5/8"
OVER 1 1/2"	3/4"

*EXCEPT THAT THE WELD SIZE SHALL NOT EXCEED THE THICKNESS OF THE THINNER PART JOINED.
 Δ MIN. PASS SIZE IS 1/8"

NOTES

OPTIONAL WELDED SHOP SPICES MAY BE USED FOR ALL FLANGE AND WEB PLATES OVER 60'-0" LONG. IF USED, THE LOCATION OF THE SPICE SHALL BE SHOWN ON SHOP DRAWINGS AND WILL BE SUBJECT TO THE APPROVAL OF THE STRUCTURES DESIGN SECTION.

OPTIONAL FLANGE BUTT SPICE. A FLANGE PLATE OF THE LARGER SIZE MAY BE FURNISHED FULL LENGTH, BUT PAY WEIGHT SHALL BE BASED ON SECTIONS AS DETAILED. IF A PERMANENT HOLD DOWN DEVICE IS USED AT THE ABUTMENT, THEN THE BUTT SPICE SHALL NOT BE OPTIONAL.

PRIOR TO STEEL BLAST, ALL FLAME CUT EDGES OF PLATE THAT ARE TO BE PAINTED SHALL BE GROUND OR PLANED TO REMOVE THE HARDENED SURFACE CAUSE BY THE FLAME, AND CORNERS CHAMFERED 1/8" MINIMUM.

TOP FLANGE TENSION ZONE. FIELD WELDING PROHIBITED IN TOP FLANGE TENSION ZONE AREAS, EXCEPT SHEAR CONNECTORS.

BOTTOM FLANGE TENSION ZONE. FIELD WELDING PROHIBITED IN BOTTOM FLANGE TENSION ZONE AREAS.

DESIGNER NOTES

BASE BEAM SEAT ELEVATIONS AT ABUTMENT ON THICKER FLANGE AND DETAIL SHIM PLATES TO ACCOMMODATE THINNER FLANGE.

AT EXTERIOR GIRDERS PLACE INTERMEDIATE TRANSVERSE STIFFENERS ON INTERIOR FACE OF GIRDER. PLACE LONGITUDINAL STIFFENERS ON THE OUTSIDE FACE.

AT INTERIOR GIRDERS PLACE INTERMEDIATE TRANSVERSE STIFFENERS ON ONE SIDE OF GIRDER AND LONGITUDINAL STIFFENERS ON THE OPPOSITE SIDE OF GIRDER. KEEP INTERMEDIATE STIFFENERS ON ONE SIDE WHEN LONGITUDINAL STIFFENERS ARE NOT REQUIRED.

AVOID USE OF LONGITUDINAL STIFFENERS IF PRACTICAL BY THICKENING WEB. WHERE LONGITUDINAL STIFFENERS ARE USED, RUN THEM CONTINUOUS WITHOUT BREAKS AT CONNECTION STIFFENERS.

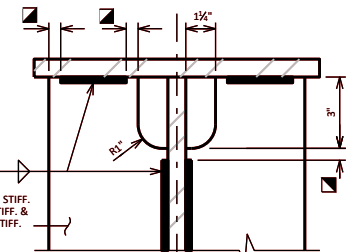
AT EXTERIOR GIRDER PLACE INTERMEDIATE STIFFENERS ALONG ENTIRE LENGTH OF GIRDER AT A MAX. SPACING EQUAL TO 1.5 X THE DEPTH OF WEB. SPACE EQUALLY BETWEEN DIAPHRAGM CONNECTION STIFFENER. THIS REQUIREMENT IS NECESSARY TO SUPPORT THE FALSEWORK FOR THE SLAB OVERHANG AND MAY BE DISREGARDED IF THE SLAB OVERHANG, MEASURED FROM C/L WEB, IS 1'-6" OR LESS OR ANY OF THE FOLLOWING CRITERIA ARE SATISFIED:

- ...WEB THICKNESS > 3/8" AND WEB DEPTH < 48"
- ...WEB THICKNESS > 1/2" AND WEB DEPTH < 60"
- ...WEB THICKNESS > 3/4" AND WEB DEPTH < 66"

SEE STANDARD 40.07 FOR CONNECTING ANY NEW STIFFENERS TO EXISTING GIRDERS.

SHOW THE TENSION ZONES ON THE PLANS.

SLAB OVERHANG DEFINITION



STIFF. & CONN. STIFF. TO WEB/FLANGE CONN. WELDS

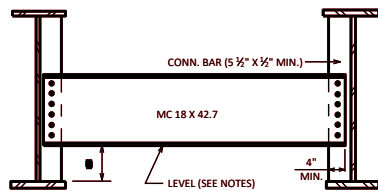
PLATE GIRDER DETAILS



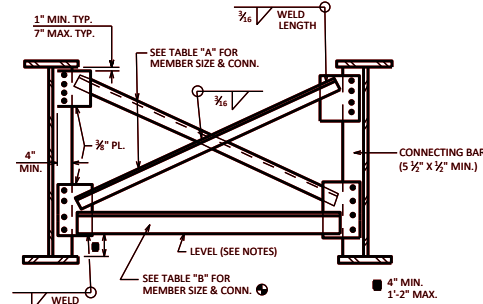
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DATE:
1-24



**WEB PLATE $\leq 48"$
TYP. IN SPAN & AT PIER**



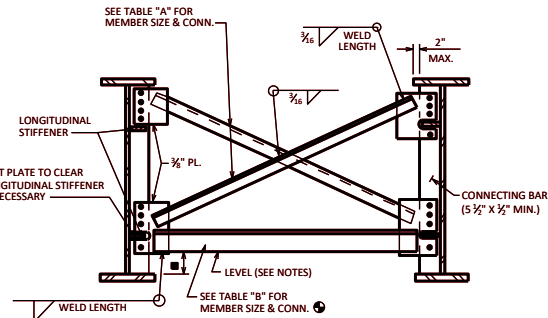
**WEB PLATE OVER 48"
TYP. IN SPAN & AT PIER**

TABLE "A"

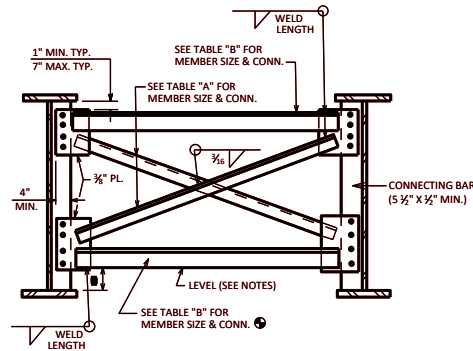
SIZE	MAX. LENGTH OF MEMBER	WELD LENGTH	NO. OF $\frac{3}{4}"$ ϕ BOLTS	WEIGHT PER FT.
L 3 $\frac{1}{2}$ X 3 $\frac{1}{2}$ X $\frac{3}{16}$	21'-6"	9"	4	7.2#
L 4 X 4 X $\frac{3}{16}$	25'-0"	11"	4	8.2#
L 5 X 5 X $\frac{3}{16}$	31'-0"	14"	5	10.3#

TABLE "B"

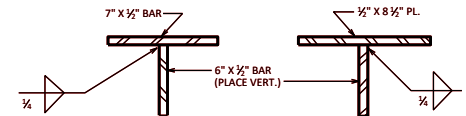
SIZE	MAX. LENGTH OF MEMBER	WELD SIZE	WELD LENGTH	NO. OF $\frac{3}{4}"$ ϕ BOLTS	WEIGHT PER FT.
L 5 X 5 X $\frac{3}{16}$	11'-6"	$\frac{3}{16}"$	11"	4	10.3#
L 6 X 6 X $\frac{3}{16}$	13'-6"	$\frac{3}{16}"$	13"	6	14.9#
$\frac{3}{2}"$ T SECTION SEE DETAIL "A"	17'-6"	$\frac{3}{16}"$	14"	7	16.6#
$\frac{3}{2}"$ T SECTION SEE DETAIL "B"	22'-0"	$\frac{3}{16}"$	13"	7	18.5#



**WEB PLATE OVER 48" WITH LONGITUDINAL STIFFENERS
TYP. IN SPAN & AT PIER**



TYP. CURVED GIRDER DIAPHRAGM
ALSO USE TOP HORIZONTAL MEMBER AT DIAPHRAGMS
ADJACENT TO KINK POINTS OF KINKED GIRDERS



DETAIL "A"

NOTE: WT 6 X 25 MAY BE SUBSTITUTED FOR DETAIL "A" OR "B"

DETAIL "B"

NOTES

ALL BOLTED CONNECTIONS SHALL BE FRICTION TYPE USING $\frac{3}{4}"$ ϕ HIGH STRENGTH ASTM A325 BOLTS WITH DOUBLE WASHERS.

DIAPHRAGMS OR LOWER CROSS FRAME MEMBERS ARE SLOPED WHEN DIFFERENCE IN ADJACENT BOTTOM FLANGE ELEVATIONS EXCEEDS 6". HOLD 8" FROM TOP OF ADJACENT FLANGES TO BOTTOM OF DIAPHRAGMS OR LOWER CROSS FRAME WHEN THESE MEMBERS ARE SLOPED.

DIAPHRAGMS OR LOWER CROSS FRAME MEMBERS THAT ARE LEVEL SHALL BE PLACED 4" ABOVE THE TOP OF THE HIGHER BOTTOM FLANGE OF ADJACENT GIRDERS.

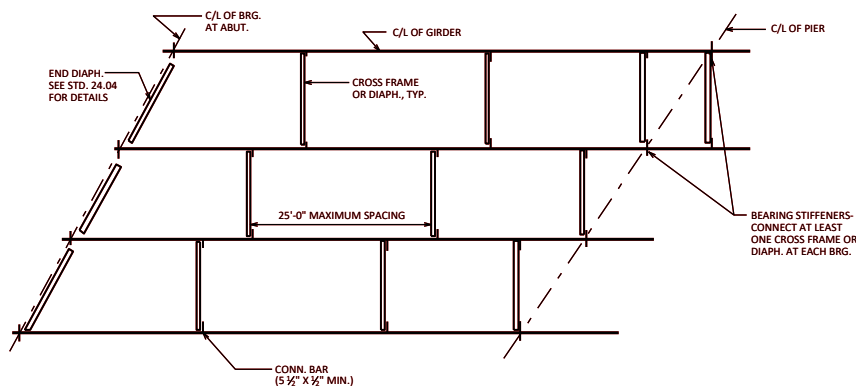
HOLES IN CROSS FRAME CONNECTIONS MAY BE OVERSIZED @ $\frac{1}{16}"$ DIA. IN 1 PLY.

DESIGNER NOTES

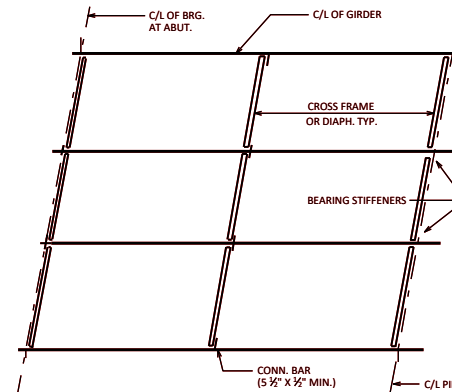
SEE STD. 24.02 FOR CONNECTION BAR CORNER COPE & WELD DETAILS.

FOR SPANS OVER 200', THE CROSS FRAMES AT THE PIERS SHALL BE DESIGNED TO RESIST THE LATERAL LOADS THAT ARE TRANSFERRED TO THE PIERS.

ϕ HORIZONTAL CROSSFRAME MEMBER TO HAVE HORIZONTAL LEG TOP (AS SHOWN) WHEN NO LOWER LATERALS ARE USED. WHEN LOWER LATERALS ARE USED THE HORIZONTAL LEG SHALL BE ON THE BOTTOM, THIS IS TO ALLOW FRAMING INTO THE LOWER LATERAL GUSSET. CURRENT PRACTICE IS TO AVOID THE USE OF LOWER LATERALS, HOWEVER.



FRAMING PLAN FOR SKEW $> 15^\circ$



FRAMING PLAN FOR SKEW $\leq 15^\circ$

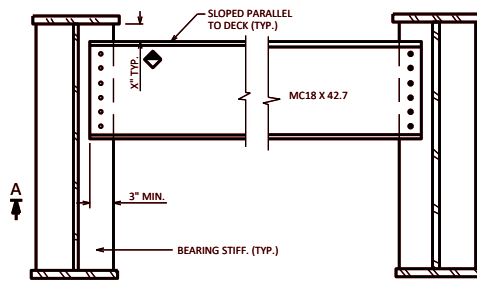
PLATE GIRDER DIAPHRAGMS AND CROSS FRAMES



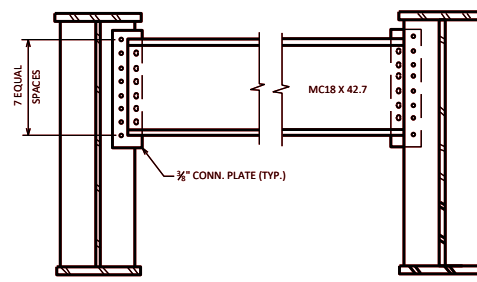
**BUREAU OF
STRUCTURES**

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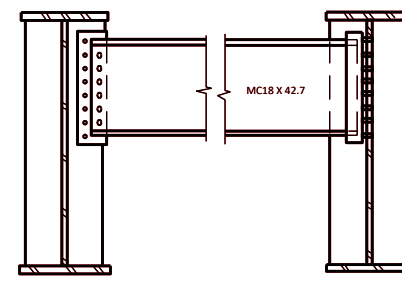
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7-15



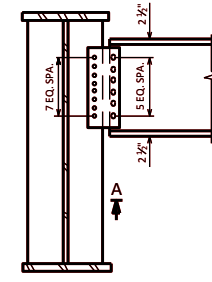
SKEWS 0° - 15°



SKEWS > 15° ≤ 30°

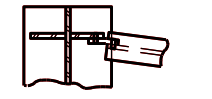
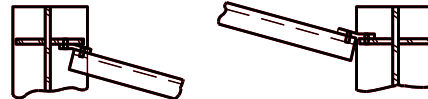


SKEW > 30°



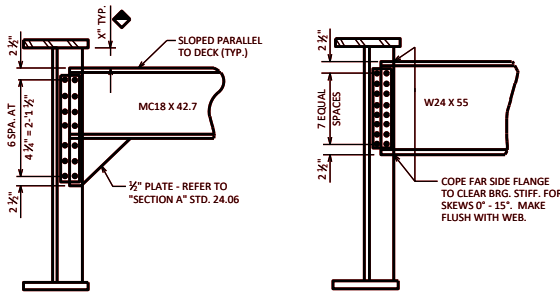
W24 X 55 TYPICAL CONN.

USE W24X55 IN PLACE OF MC18X42.7 WHEN LENGTH OF DIAPHRAGM EXCEEDS 13'-6" BUT < 22'-0". (SKEW > 15° ≤ 30° SHOWN.)



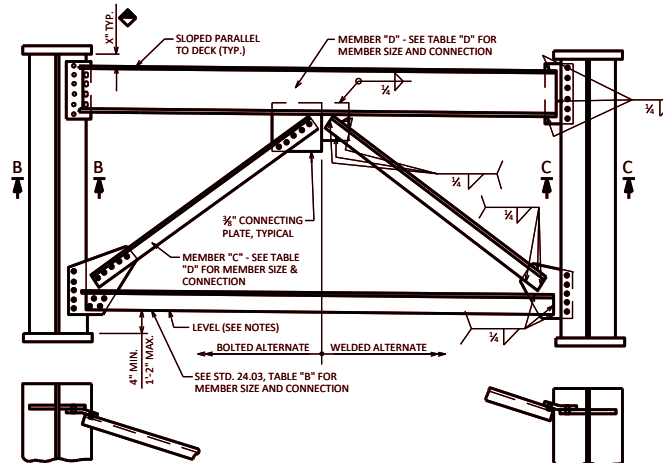
SECTION A-A

END DIAPHRAGM CONNECTIONS - WEB DEPTHS ≤ 48"



TYPICAL CONNECTION FOR MC18 X 42.7 AND W24 X 55. USE MC18 X 42.7 WHEN DIAPHRAGM LENGTH IS ≤ 13'-6". USE W24 X 55 FOR LENGTHS > 13'-6" < 22'-0". (SKEW > 15° ≤ 30° SHOWN)

END DIAPHRAGM CONNECTIONS - WEB DEPTHS > 48" ≤ 60"



SECTION B-B

SECTION C-C

END DIAPHRAGM CONNECTIONS - WEB DEPTHS > 60"

SKEWS > 15° ≤ 30° SHOWN

NOTES

ALL BOLTED CONNECTIONS SHALL BE FRICTION TYPE USING 3/4" DIA. HIGH STRENGTH ASTM A325 BOLTS WITH DOUBLE WASHERS.

LOWER CROSS FRAME MEMBERS ARE SLOPED WHEN DIFFERENCE IN ADJACENT BOTTOM FLANGE ELEVATIONS EXCEEDS 6". HOLD 8" FROM TOP OF ADJACENT FLANGES TO BOTTOM OF DIAPHRAGMS OR LOWER CROSS FRAME WHEN THESE MEMBERS ARE SLOPED.

LOWER CROSS FRAME MEMBERS THAT ARE LEVEL SHALL BE PLACED 4" ABOVE THE TOP OF THE HIGHER BOTTOM FLANGE OF ADJACENT GIRDERS.

DESIGNER NOTES

SEE STANDARD 24.02 FOR BEARING STIFFENER COPE & WELD DETAILS.

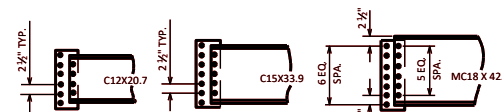
FOR WEB DEPTHS GREATER THAN 60", THE NUMBER OF BOLTS REQUIRED BETWEEN BEARING STIFFENERS AND LOWER CONNECTING PLATES EQUALS THE NUMBER OF BOLTS REQUIRED IN MEMBER "C" OR THE NUMBER REQUIRED IN THE LOWER HORIZONTAL MEMBER, WHICHEVER IS GREATER.

◆ 3" MINIMUM. USE 3" UNLESS INCREASED TO ACCOMMODATE LARGE EXPANSION DEVICES.

TABLE "D"

MEMBER "C" MAXIMUM LENGTH	WEB DEPTH									MEMBER "D" SIZE	MEMBER "D" CONN.		
	5'-0" - 6'-6"			6'-6" - 7'-6"			7'-6" - 8'-9"				NO. OF ¾" DIA. BOLTS		
	MEMBER "C" SIZE	NO. OF ¾" DIA. BOLTS	LENGTH OF ½" WELD	MEMBER "C" SIZE	NO. OF ¾" DIA. BOLTS	LENGTH OF ½" WELD	MEMBER "C" SIZE	NO. OF ¾" DIA. BOLTS	LENGTH OF ½" WELD		CONN. PLATE TO BRG. STIFF.	MEMBER "D"	
11'-6"	4 x 4 x ⅜	5	13	4 x 4 x ⅜	5	12	4 x 4 x ⅜	5	11	C12 x 20.7	6 @ 2 ½"	4 @ 2 ½"	
13'-6"	5 x 5 x ⅜	6	17	5 x 5 x ⅜	6	16	5 x 5 x ⅜	6	15	C12 x 20.7	6 @ 2 ½"	4 @ 2 ½"	
17'-6"	6 x 6 x ⅜	8	20	5 x 5 x ⅜	7	18	5 x 5 x ⅜	6	16	C15 x 33.9	7 @ 2 ½"	5 @ 2 ½"	
22'-0"	6 x 6 x ⅜	9	23	6 x 6 x ⅜	8	21	6 x 6 x ⅜	7	19	MC18 x 42.7	7 @ 2 ½"	6 @ 2 ½"	

NOTE: ALL MEMBER "C" SIZES REPRESENT ANGLES.



MEMBER "D" END CONNECTIONS

OMIT END CONNECTING PLATE FOR SKEWS 0° - 15°

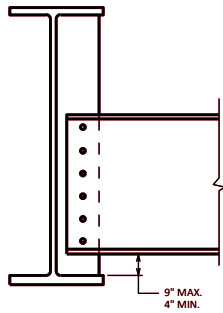
END DIAPHRAGMS



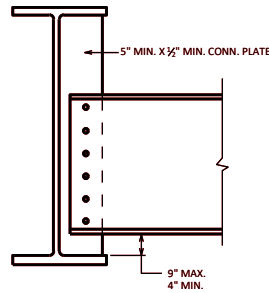
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APPROVED: *Laura Shadewald*

DATE: 7-21



36" W. GIRDER



33" W. GIRDER

INTERMEDIATE DIAPHRAGM SIZES

ALL INTERMEDIATE CONNECTIONS	
GIRDER DEPTH	INTERMEDIATE DIAPHRAGMS
36"	MC18 X 42.7
33"	MC18 X 42.7
30"	C15 X 33.9
27"	C15 X 33.9
24"	C12 X 20.7
21"	C10 X 15.3
18"	C8 X 11.5

NOTES

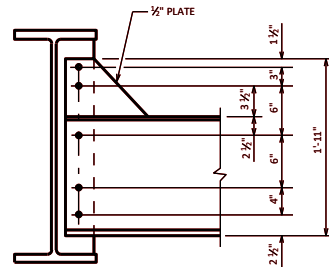
DIAPHRAGMS SHALL BE HORIZONTAL EXCEPT WHEN THE DIFFERENCE IN ADJACENT GIRDER ELEVATIONS IS OF A MAGNITUDE THAT NECESSITATES SLOPING THE DIAPHRAGMS.

WHEN DIAPHRAGMS ARE SLOPED, PLACE CENTER OF DIAPHRAGM AT MID-DEPTH OF GIRDER.

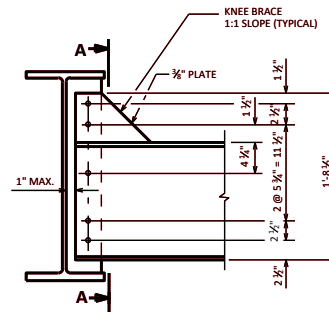
ALL BOLTED CONNECTIONS SHALL BE MADE WITH $\frac{3}{4}$ " ϕ HIGH STRENGTH ASTM A325 BOLTS.

DESIGNER NOTES

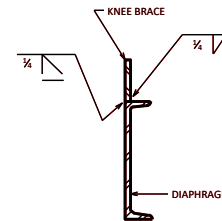
SEE STANDARD 24.02 FOR CONNECTION BAR CORNER COPE & WELD DETAILS.



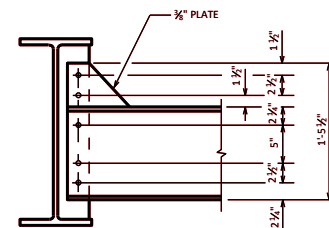
30" W. GIRDER



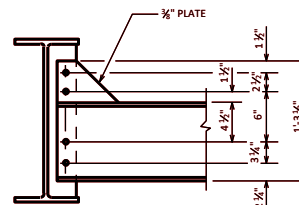
27" W. GIRDER



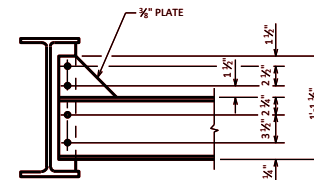
SECTION A



24" W. GIRDER



21" W. GIRDER



18" W. GIRDER

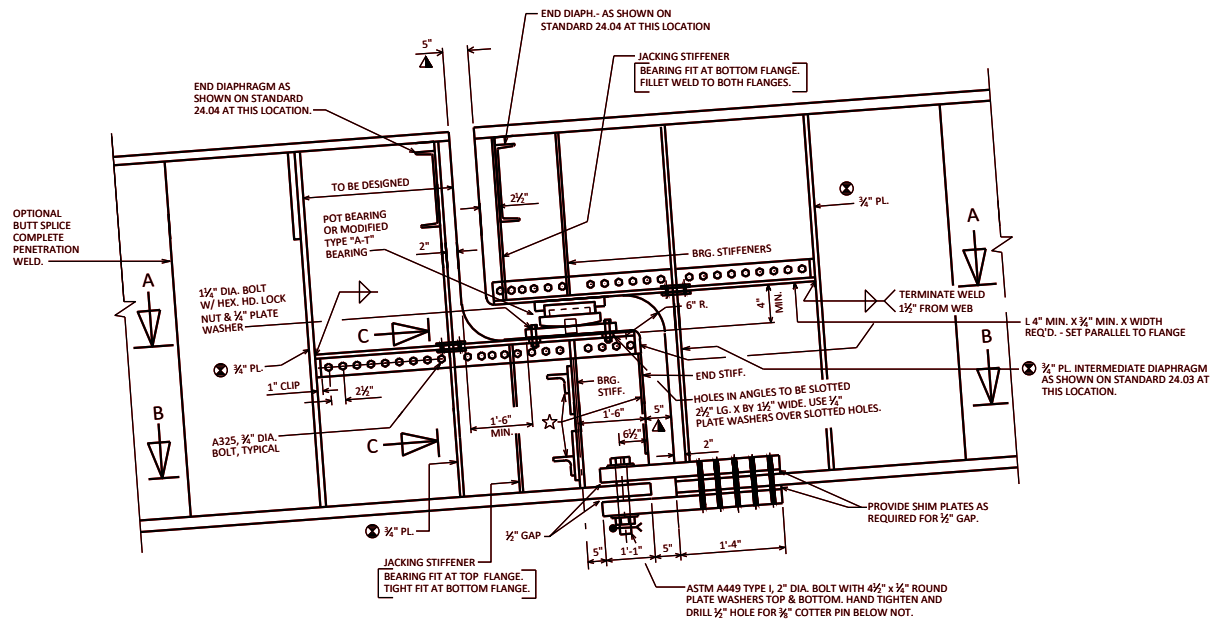
ROLLED GIRDER DIAPHRAGMS



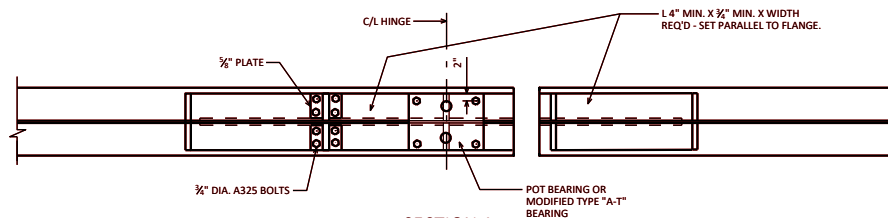
BUREAU OF STRUCTURES

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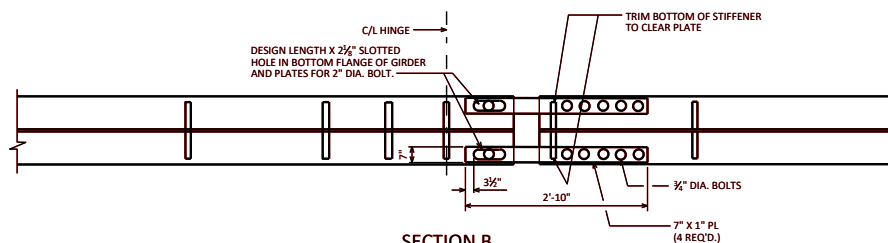
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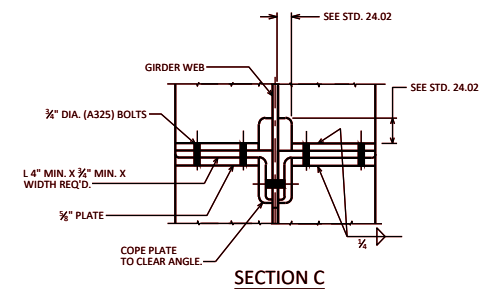
ELEVATION



SECTION A



SECTION B



NOTES

- FOR WELDING DETAILS SEE "CONNECTION STIFFENER DETAILS" ON STANDARD 24.02 MINIMUM PLATE SIZE SHOWN. DESIGN ACTUAL SIZE REQUIRED.

STIFFENERS AND BEARING PLATES ARE ALL PERPENDICULAR TO FLANGES. ANGLES ARE PARALLEL TO FLANGES.

DESIGNER NOTES

SIZE AND LENGTH OF ANGLES, NUMBER OF BOLTS THRU ANGLES, THICKNESS OF WEB PLATE, AND SIZE OF BEARING STIFFENERS AND JACKING STIFFENERS SHALL BE DETERMINED FROM AN ANALYSIS USING THE VERTICAL AND HORIZONTAL FORCES ACTING AT THE HINGE.

- THE 5" OPENING BETWEEN GIRDER WEB AND FLANGE PLATES IS FOR FABRICATION ACTUAL OPENING IS BASED ON EXPANSION LENGTH AND TEMPERATURE.

SLOTTED HOLES OF 6" IN THE FLANGES AND CONNECTING BARS WILL ACCOMMODATE A TOTAL TEMPERATURE MOVEMENT OF 8" (± 4" FROM 45° F). THE DESIGNER MAY NEED TO INCREASE OR DECREASE THE LENGTH OF THE SLOT TO MEET SPECIFIC JOB REQUIREMENTS.

- CROSS FRAME UNDER BRG. AND END STIFFENER IS ONLY REQ'D. IF TOTAL WEB HEIGHT EXCEEDS 8'-0".

SEE BRIDGE MANUAL, SECTION 24.1 FOR CRITERIA FOR LOCATING HINGE JOINTS.

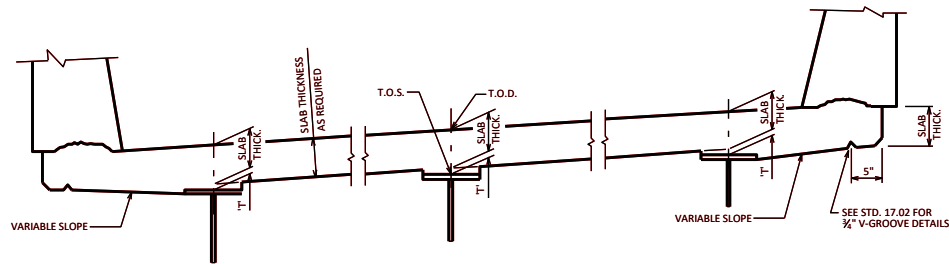
EXPANSION HINGE JOINT DETAILS



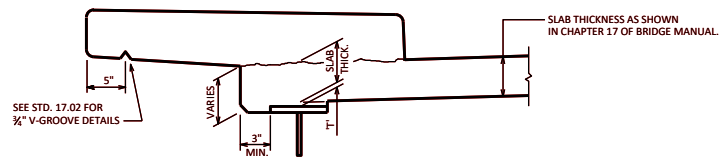
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APPROVED: *Laura Shadewald*

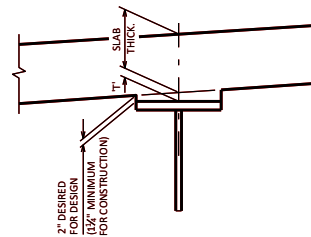
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7-16



SECTION THRU SLAB



**TREATMENT OF EXTERIOR GIRDER
AT SIDEWALK OVERHANG**



HAUNCH DETAIL

DESIGNER NOTES

HAUNCH HEIGHTS WILL NORMALLY BE MADE 2" AT EDGE OF GIRDER, AT ABUTMENTS, HINGES, AND FIELD SPICES.

HAUNCH DEPTH VARIATIONS NEED NOT BE SHOWN ON THE PLANS.

IF HAUNCH VARIATIONS EXCEED 1/4", THE GIRDER SHALL BE CAMBERED TO REDUCE THE VARIATIONS IN HAUNCH THICKNESS.

NOTES

"T" = HAUNCH HEIGHT AT CENTERLINE OF GIRDER.

TO DETERMINE "T": AFTER ALL STRUCTURAL STEEL HAS BEEN ERECTED, ELEVATIONS OF THE TOP FLANGES SHALL BE TAKEN AT CENTERLINE OF BEARINGS AND AT 0.1 POINTS.

TOP OF DECK ELEVATION AT FINAL GRADE

- TOP OF STEEL ELEVATION AFTER STEEL ERECTION

+ CONC. ONLY DEFLECTION; DOWNWARD DEFLECTION IS ADDED, UPWARD DEFLECTION IS SUBTRACTED

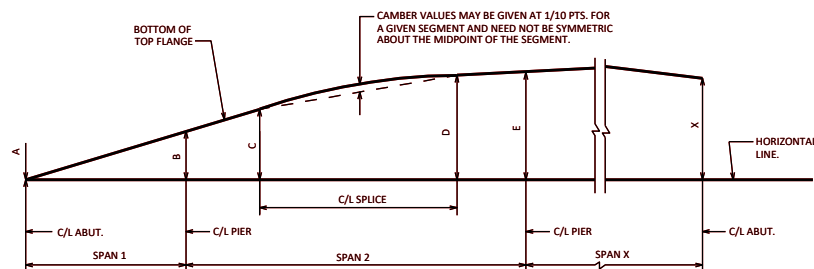
- SLAB THICKNESS

= "T" VALUE FOR SETTING HAUNCH

ELEVATIONS AT TOP OF DECK (T.O.D.) & TOP OF STEEL (T.O.S.)

		W. ABUT.	0.1 SPAN	0.2 SPAN	0.3 SPAN	C/L PIER	C/L SPICE		C/L ABUT.
GIRDER 1	T.O.D.	861.17	861.13	861.08	861.04	860.99			860.69
	T.O.S.	860.48				860.35	860.35		860.00
GIRDER 2	T.O.D.	860.62	860.58	860.53	860.49	860.45			860.16
	T.O.S.	859.93				859.80	859.80		859.59
GIRDER X	T.O.D.								
	T.O.S.								

THESE ELEVATIONS ARE TO TOP OF STEEL (SPICE AND COVER PLATE THICKNESS, IF APPLICABLE, ARE ACCOUNTED FOR) AND THEY ARE FOR THE MATERIAL AS ERECTED. THE ELEVATION OF THE TOP STEEL AT THE FIELD SPICE POINTS SHALL BE CHECKED, AND CORRECTED, IF POSSIBLE, AFTER ERECTION AND BEFORE PERMANENTLY BOLTING THE DIAPHRAGMS IN PLACE.



BLOCKING DIAGRAM

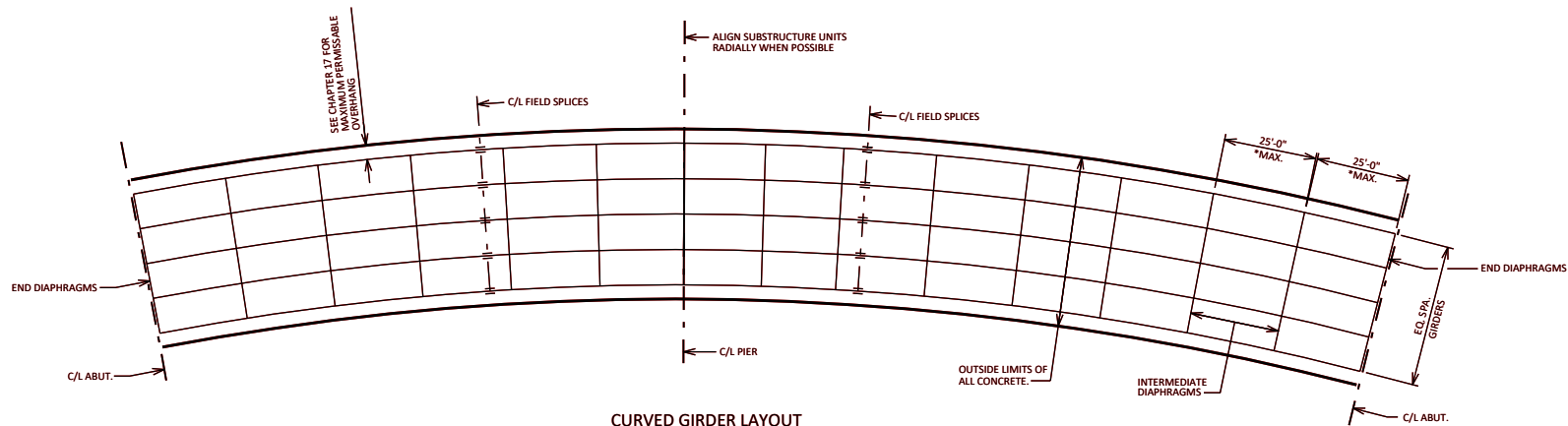
**BLOCKING & SLAB
HAUNCH DETAILS**



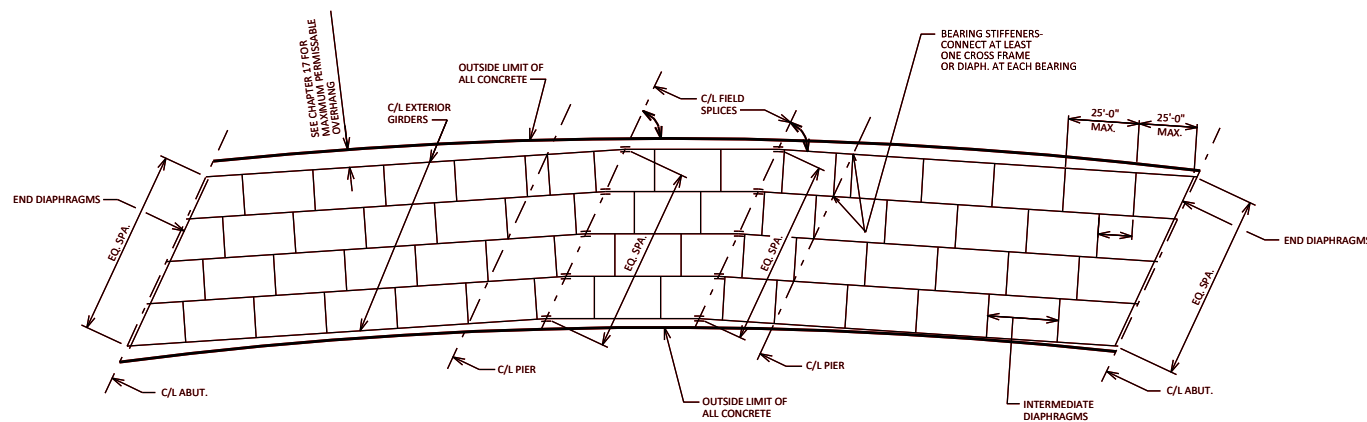
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
1-12



CURVED GIRDER LAYOUT



KINKED GIRDER LAYOUT

GENERAL NOTES

SKETCHES AND NOTES APPLY TO ANY NUMBER OF SPANS.

NUMBER AND SIZE OF GIRDERS AND LOCATION OF FIELD SPLICES TO BE DETERMINED BY DESIGN.

FOR HORIZONTAL CURVES WITH A RADIUS OF LESS THAN 1400 FT., THE GIRDERS SHALL BE FABRICATED ALONG THE CURVE. FOR A RADIUS GREATER THAN 1400 FT., CONSIDERATION SHALL BE GIVEN TO KINKING GIRDERS AT FIELD SPICE LOCATIONS.

FOR KINKED GIRDER LAYOUT:
HOLD C/L OF SUBSTRUCTURE UNITS AND C/L OF SPLICES PARALLEL TO EACH OTHER WHEN POSSIBLE.

GIRDERS ARE TO BE HELD PARALLEL TO EACH OTHER BETWEEN FIELD SPLICES.

FOR CURVED GIRDER LAYOUT:
PLACE SUBSTRUCTURE UNITS ON RADIAL LINES WHEN POSSIBLE.

*TIGHTER SPACING MAY BE REQ'D. FOR MORE SEVERE CURVATURES

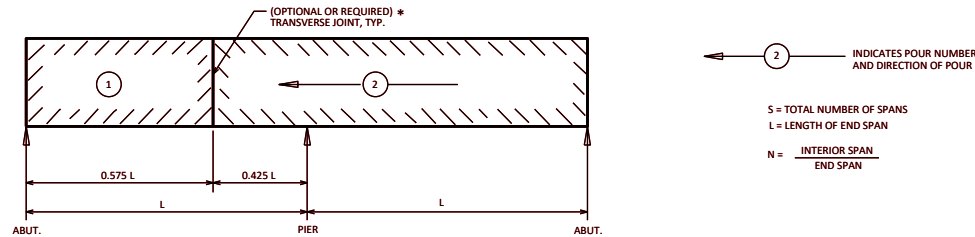
GIRDER LAYOUT ON CURVE



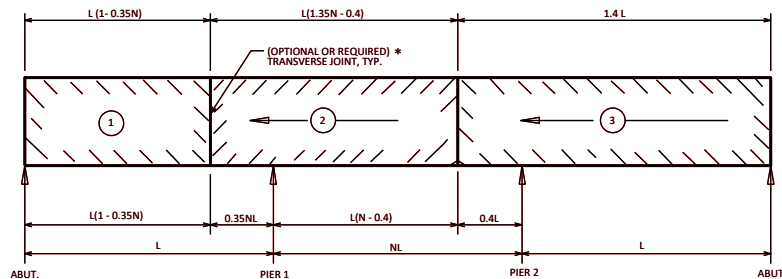
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

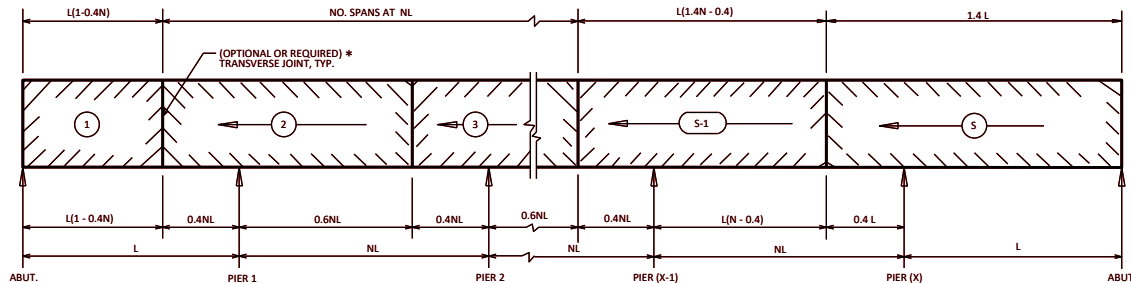
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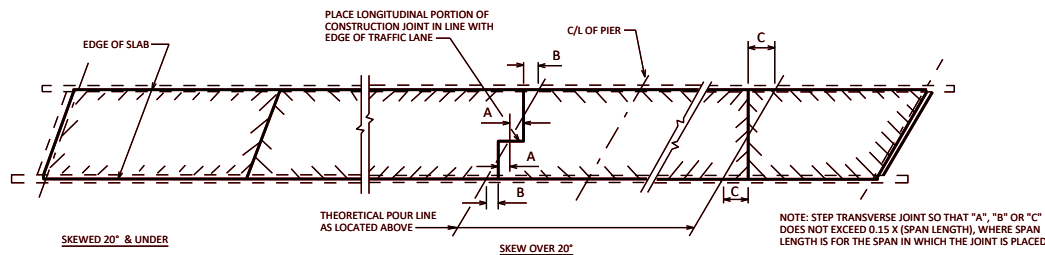
IDEAL DECK POUR SEQUENCE
(CONTINUOUS STEEL GIRDER - 2 SPANS SHOWN)



IDEAL DECK POUR SEQUENCE
(CONTINUOUS STEEL GIRDER - 3 SPANS SHOWN)



IDEAL DECK POUR SEQUENCE
(CONTINUOUS STEEL GIRDER - ANY NUMBER OF SPANS SHOWN)



PLAN VIEW - SHOWING PLACEMENT OF TRANSVERSE CONSTRUCTION JOINTS

NOTES

THE RATE OF PLACING CONCRETE SHALL EQUAL OR EXCEED $\frac{1}{2}$ SPAN LENGTH PER HOUR BUT NEED NOT EXCEED 100 CU. YDS. PER HOUR. (REQUIRED ONLY FOR CONTINUOUS STEEL GIRDERS.)

IF OPTIONAL JOINTS ARE PROVIDED, TWO OR MORE SEQUENTIAL POURS MAY BE COMBINED AND PLACED IN ONE CONTINUOUS OPERATION. TWO OR MORE ALTERNATE DECK POURS (E.G. 1 & 3) MAY BE PLACED ON THE SAME DAY.

THE CONTRACTOR SHALL NOT PLACE CONCRETE IN AN ADJACENT POUR UNTIL A MINIMUM OF 72 HOURS HAS PASSED AFTER THE COMPLETION OF THE PRECEDING POUR. (NOTE: SEE DESIGNER NOTES WHEN FOR HPC IS USED)

THE CONTRACTOR MAY SUBMIT AN ALTERNATE POURING SEQUENCE SUBJECT TO THE APPROVAL OF THE STRUCTURES DESIGN SECTION. (NOTE: APPLICABLE WHEN OPTIONAL TRANSVERSE CONSTRUCTION JOINTS ARE SHOWN.)

THE CONTRACTOR SHALL POUR THE ENTIRE DECK PER THE DECK POUR SEQUENCE IF REQUIRED TRANSVERSE CONSTRUCTION JOINTS ARE SHOWN ON THE PLANS. THE CONTRACTOR MAY SUBMIT AN ALTERNATE POURING SEQUENCE SUBJECT TO THE APPROVAL OF THE STRUCTURES DESIGN SECTION. (NOTE: REQUIRED WHEN REQUIRED TRANSVERSE CONSTRUCTION JOINTS ARE SHOWN.)

DESIGNER NOTES

* THE DESIGNER SHALL DETERMINE IF TRANSVERSE JOINTS ARE OPTIONAL OR REQUIRED.

OPTIONAL TRANSVERSE CONSTRUCTION JOINTS SHALL BE DETAILED ON THE PLANS TO LIMIT THE VOLUME OF POUR TO < 600 CU. YDS. IN URBAN AREAS AND < 300 CU. YDS. IN OTHER AREAS. GENERALLY FOR STEEL GIRDER SUPERSTRUCTURES LOCATE THE TRANSVERSE JOINTS AT THE 0.6 POINT (CONCRETE IN 60% OF SPAN) AND FOR PRESTRESS GIRDER SUPERSTRUCTURES LOCATE JOINTS NEAR THE 0.75 POINT. (CONCRETE IN 75% OF SPAN) CONSIDER CUT-OFF POINTS OF CONTINUITY REINFORCING STEEL WHEN LOCATING JOINTS FOR PRESTRESS GIRDER SUPERSTRUCTURES. LOCATION OF JOINTS IN STEEL GIRDER SUPERSTRUCTURES MAY VARY IF DEFLECTIONS ARE INFLUENCED BY IN SPAN HINGES OR UNUSUAL SPAN LENGTH RATIOS. CHECK WITH THE STRUCTURES DEVELOPMENT SECTION FOR ADDITIONAL INFORMATION.

REQUIRED TRANSVERSE CONSTRUCTION JOINTS SHALL BE DETAILED ON THE PLANS ONLY WHEN REQUIRED BY DESIGN. SEQUENTIAL STAGES ARE DISCUSSED IN SECTION 24.12.2. ALL PLACEMENT REQUIREMENTS SHALL BE NOTED ON THE PLANS.

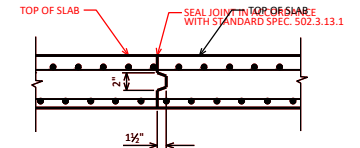
DETAIL TRANSVERSE CONSTRUCTION JOINTS 5'-0" FROM C/L OF IN SPAN HINGES, (ONE ON EACH SIDE OF HINGE) THE CONCRETE BETWEEN THESE JOINTS SHOULD BE THE LAST POUR PLACED.

WHEN THE WIDTH OF THE DECK IS GREATER THAN 120 FEET, A LONGITUDINAL CONSTRUCTION JOINT SHALL BE DETAILED. FOR DECK WIDTHS BETWEEN 90 AND 120 FEET, AND OPTIONAL LONGITUDINAL JOINT SHALL BE DETAILED. LOCATE LONGITUDINAL CONSTRUCTION JOINT ALONG EDGE OF LANE LINE AND AT LEAST 6 INCHES FROM EDGE OF TOP FLANGE OF GIRDER.

FOR GRADES OVER 3% THE PREFERRED DIRECTION OF POUR IS UPHILL.

AN ALTERNATE POURING SEQUENCE IS TO POUR THE DL POSITIVE MOMENT AREAS AND THEN THE DL NEGATIVE MOMENT AREAS. THE SEQUENCE MAY BE STARTED ANYWHERE ON THE BRIDGE.

THE DEPARTMENT MAY CONSIDER THE FOLLOWING ALLOWANCE FOR HPC DECK POURS: THE CONTRACTOR SHALL NOT PLACE CONCRETE IN AN ADJACENT POUR UNTIL A MINIMUM OF 48 HOURS HAS PASSED AFTER THE COMPLETION OF THE PRECEDING POUR AND ACHIEVED A MINIMUM STRENGTH OF 75% OF THE 28-DAY STRENGTH.



**SECTION THROUGH TRANSVERSE
OR LONGITUDINAL JOINT**

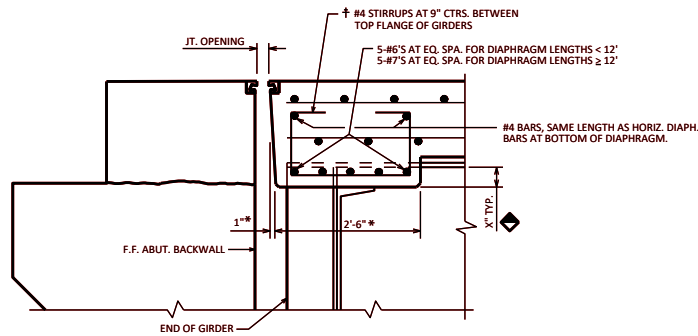
SLAB POURING SEQUENCE



**BUREAU OF
STRUCTURES**

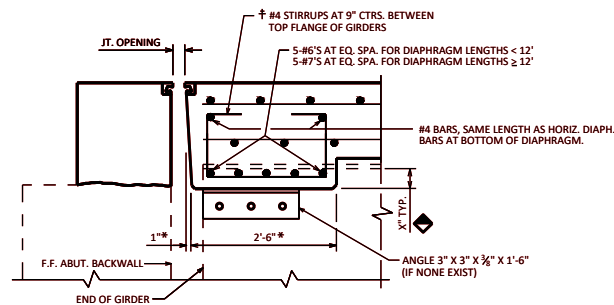
APPROVED: *Laura Shadewald*

DATE:
1-26



SECTION THRU EXPANSION END

DIAPHRAGM TO EXTEND TO GIRDER WEB
(SEE PART TRANSVERSE SECTION AT DIAPHRAGM
EXPANSION END FOR TYPICAL EXTENTS)



SECTION THRU EXPANSION END OF NEW DECK

SHOWING EXISTING STEEL GIRDER

WITHOUT EXISTING STEEL DIAPHRAGM

(SEE STD. 40.04 FOR ADDITIONAL DETAILS)

NOTES

FOR REHABILITATION PROJECTS:

DIAPHRAGM SUPPORT ANGLES SHALL BE ASTM A709 GRADE 36.
BOLTS ARE 3/2" DIA. ALL BOLTS, NUTS AND WASHERS SHALL BE
ASTM A325 TYPE 1.

ALL SUPPORT ANGLES SHALL BE HOT-DIPPED GALVANIZED.
ALL BOLTS, NUTS AND WASHERS SHALL BE HOT-DIPPED GALVANIZED
IN ACCORDANCE WITH ASTM A153 CLASS C. GALVANIZED NUTS SHALL
BE TAPPED OVERSIZED IN ACCORDANCE WITH THE REQUIREMENTS OF
ASTM A563 AND SHALL MEET THE REQUIREMENTS OF SUPPLEMENTARY
REQUIREMENT S1 OF ASTM A563, LUBRICANT AND TEST FOR COATED NUTS.

ALL DIAPHRAGM SUPPORT HARDWARE SHALL BE INCIDENTAL TO
"CONCRETE MASONRY BRIDGES".

ALL REPLACEMENT PAVING BLOCK DIMENSIONS SHALL MATCH EXISTING
PLAN DIMENSIONS UNLESS DESIGNER DETERMINES OTHERWISE.

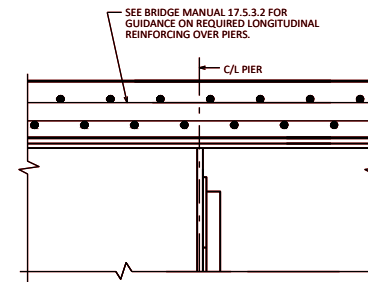
DESIGNER NOTE

3" MINIMUM. USE 3" UNLESS INCREASED TO ACCOMMODATE LARGE EXPANSION DEVICES.

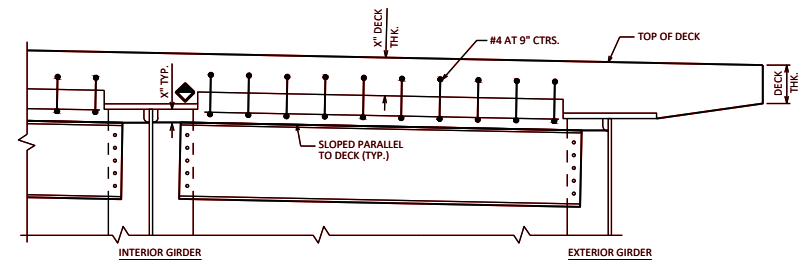
LEGEND

† BARS PLACED PARALLEL TO GIRDERS.
SPACING PERPENDICULAR TO C/L GIRDERS.

* DIMENSION IS TAKEN NORMAL TO C/L ABUTMENT



SECTION AT PIER



PART TRANSVERSE SECTION AT DIAPHRAGM

EXPANSION END

STEEL GIRDER SLAB & SUPERSTRUCTURE DETAILS



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
1-18

LENGTH OF PLATE "C" IN	TOTAL LOAD KIPS	PLATE C			PLATE D			HEIGHT FEET
		X	Y	Z	X	Y	Z	
10"	215	5"	2 3/8"	10"	8"	1 3/4"	1'-7"	0.354
12"	260	5"	2 3/8"	1'-0"	9"	1 3/4"	1'-9"	0.354
	280	5"	2 3/8"	1'-0"	10"	2 3/8"	1'-9"	0.406
	280	5"	1 5/8"	1'-2"	9"	1 3/4"	1'-11"	0.318
14"	335	5"	2 3/8"	1'-2"	11"	2 3/8"	1'-11"	0.406
	385	5"	2 3/8"	1'-2"	1'-1"	2 3/8"	1'-11"	0.448
	410	5"	2 3/8"	1'-2"	1'-3"	2 3/8"	2'-0"	0.448
	275	5"	1 5/8"	1'-4"	8"	1 3/4"	2'-1"	0.318
16"	330	5"	1 5/8"	1'-4"	10"	2 3/8"	2'-1"	0.370
	390	5"	2 3/8"	1'-4"	1'-0"	2 3/8"	2'-1"	0.406
	465	5"	2 3/8"	1'-4"	1'-2"	2 3/8"	2'-2"	0.448
	490	5"	2 3/8"	1'-4"	1'-4"	3 3/8"	2'-2"	0.490
18"	325	5"	1 5/8"	1'-6"	9"	1 3/4"	2'-3"	0.318
	390	5"	1 5/8"	1'-6"	11"	2 3/8"	2'-3"	0.370
	465	5"	2 3/8"	1'-6"	1'-1"	2 3/8"	2'-4"	0.448
	495	5"	2 3/8"	1'-6"	1'-2"	2 3/8"	2'-4"	0.448
	560	5"	2 3/8"	1'-6"	1'-4"	3 3/8"	2'-4"	0.490
20"	350	5"	1 5/8"	1'-8"	9"	1 3/4"	2'-5"	0.318
	380	5"	1 5/8"	1'-8"	10"	2 3/8"	2'-5"	0.370
	460	5"	2 3/8"	1'-8"	1'-0"	2 3/8"	2'-6"	0.406
	530	5"	2 3/8"	1'-8"	1'-2"	2 3/8"	2'-6"	0.448
	600	5"	2 3/8"	1'-8"	1'-4"	3 3/8"	2'-6"	0.490
22"	640	5"	2 3/8"	1'-8"	1'-6"	3 3/8"	2'-6"	0.531
	405	5"	1 5/8"	1'-10"	10"	2 3/8"	2'-7"	0.370
	490	5"	1 5/8"	1'-10"	1'-0"	2 3/8"	2'-8"	0.370
	565	5"	2 3/8"	1'-10"	1'-2"	2 3/8"	2'-8"	0.448
	635	5"	2 3/8"	1'-10"	1'-4"	3 3/8"	2'-8"	0.490
24"	705	5"	2 3/8"	1'-10"	1'-6"	3 3/8"	2'-8"	0.531
	720	5"	2 3/8"	1'-10"	1'-8"	3 3/8"	2'-8"	0.531

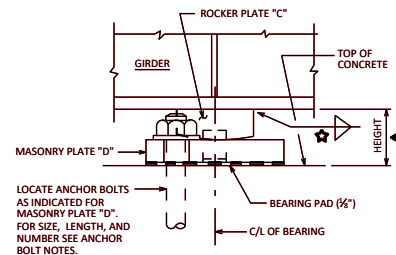
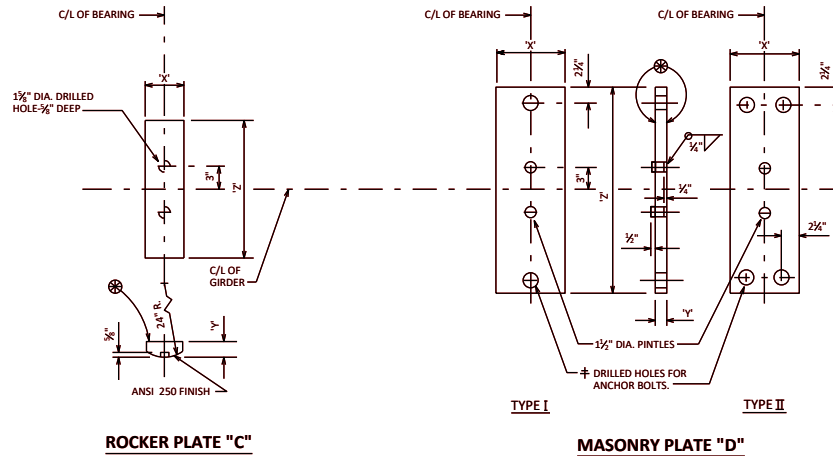
ANCHOR BOLT NOTES

FOR SPAN LENGTHS UP TO 100'-0":
USE A TYPE I MASONRY PLATE "D" WITH
(2) - 1 1/2" DIA. x 1'-5" LONG ANCHORS BOLTS.

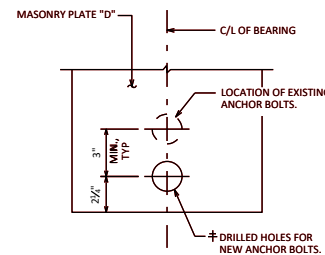
FOR SPAN LENGTHS FROM 100'-0" UP TO 150'-0":
USE A TYPE I MASONRY PLATE "D" WITH
(2) - 1 1/2" DIA. x 1'-10" LONG ANCHORS BOLTS.

FOR SPAN LENGTHS GREATER THAN 150'-0":
USE A TYPE II MASONRY PLATE "D" WITH
(4) - 1 1/2" DIA. x 1'-10" LONG ANCHORS BOLTS.

CHECK THAT ANCHOR BOLTS PROVIDE ADEQUATE
HORIZONTAL CAPACITY.



FIXED BEARING ASSEMBLY
(SEE "DESIGNER NOTES" FOR BEARING REPLACEMENTS)



MASONRY PLATE "D"
BEARING REPLACEMENTS

BEARING NOTES

ALL BEARINGS ARE SYMMETRICAL ABOUT C/L OF GIRDER AND C/L OF BEARING.

IN LIEU OF USING SHIM PLATES, FABRICATOR MAY INCREASE THICKNESS OF
MASONRY PLATE "D" BY THE SHIM PLATE THICKNESS.

ALL STRUCTURAL STEEL BEARING PLATES SHALL BE FLAT ROLLED STEEL
PLATES WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES
SMOOTH, STRAIGHT AND VERTICAL.

ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS.

ALL FINISHED SURFACES SHALL BE MACHINE FINISHED BY AN AUTOMATIC PROCESS.

ANCHOR BOLTS SHALL BE THREADED 3". PROVIDE ONE STANDARD WROUGHT
WASHER AND ONE HEX NUT PER BOLT. PROJECT ANCHOR BOLTS, MASONRY PLATE "D"
THICKNESS + 2 1/2", ABOVE TOP OF CONCRETE.

ALL MATERIAL IN BEARINGS, INCLUDING SHIM PLATES, BUT EXCLUDING PINTLES, ANCHOR
BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A709 GRADE 50W.

STEEL PINTLES SHALL CONFORM TO ASTM A449 OR ASTM A572 GRADE 50.

ALL MATERIAL IN TYPE "A" BEARINGS, INCLUDING SHIM PLATES AND BEARING PADS,
SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "BEARING ASSEMBLIES FIXED B-...",
EACH.

CHAMFER TOP OF PINTLES 1/4". DRILL HOLES FOR ALL PINTLES IN MASONRY PLATE "D"
FOR A DRIVING FIT.

PROVIDE 1/4" THICK BEARING PAD THE SAME SIZE AS MASONRY PLATE "D" FOR EACH
BEARING.

CHAMFER ANCHOR BOLTS PRIOR TO THREADING.

ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM F1554 GRADE 55,
OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.

ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH
ASTM A153, CLASS C.

ROCKER PLATE "C" SHALL BE SHOP PAINTED WITH A WELDABLE PRIMER.

MASONRY PLATE "D" SHALL BE GALVANIZED.

PLACE SHIM PLATES BETWEEN BEARING PAD AND MASONRY PLATE "D". PLATES SHALL
HAVE "X" AND "Z" DIMENSIONS THAT MATCH MASONRY PLATE "D".

✚ DRILLED HOLES FOR ANCHOR BOLTS IN MASONRY PLATE "D" SHALL HAVE A
DIAMETER 3/8" LARGER THAN ANCHOR BOLT.

⊗ FINISH THESE SURFACES TO ANSI 250 IF "Y" DIMENSION IS GREATER THAN 2".

DESIGNER NOTES

HEIGHT OF BEARINGS GIVEN IN TABLE INCLUDES 1/4" BEARING PAD.

DETAIL SHIM PLATES AS DESCRIBED IN NOTES ON STANDARD 24.02.

REFER TO THE DETAILS BELOW FOR THE USE OF BEVELED ROCKER PLATE "C"
ON GRADES GREATER THAN 3% AND ALSO CLEARANCE REQUIREMENTS.

★ FOR WELD SIZE, REFER TO STANDARD 24.02

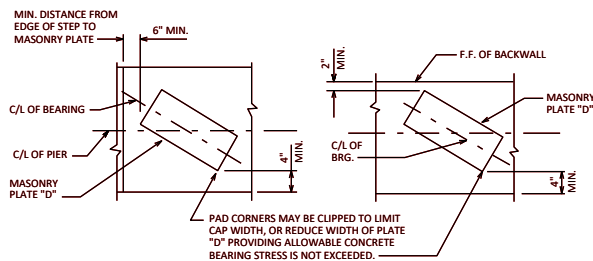
▲ ADJUST HEIGHT IF BEVELED ROCKER PLATE "C" IS USED.

FOR BEARING REPLACEMENTS, DESIGNER SHALL UTILIZE A WIDER BEARING THAN
THE EXISTING GIRDER BOTTOM FLANGE WIDTH TO ALLOW FOR FIELD WELDING
OF THE EDGE OF THE BOTTOM FLANGE TO THE TOP OF PLATE "C".
SEE STANDARD 40.08 FOR DETAILS.

CALCULATE THE REACTION AT THE BEARINGS DUE TO "TOTAL LOADS".
USE THE AASHTO LRFD SERVICE 1 LOAD COMBINATION. CONSIDER
ONLY DEAD LOAD (DC + DW) AND HL-93 LIVE LOADS (LL), INCLUDING A
33% DYNAMIC LOAD ALLOWANCE (IM).

THE VALUES IN THE TABLES ARE THE BEARING CAPACITIES FOR "TOTAL
LOAD" (DC + DW + (LL + IM)).

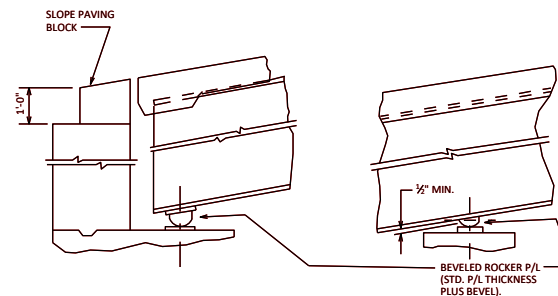
SELECT A BEARING THAT HAS A CAPACITY GREATER THAN OR EQUAL
TO THE CALCULATED REACTION FOR "TOTAL LOADS".



AT SKEWED PIER

AT SKEWED ABUTMENTS

CLEARANCE DIAGRAM



AT EXPANSION BRG.

AT FIXED BRG.

BEVELED ROCKERS WITH GRADES GREATER THAN 3%

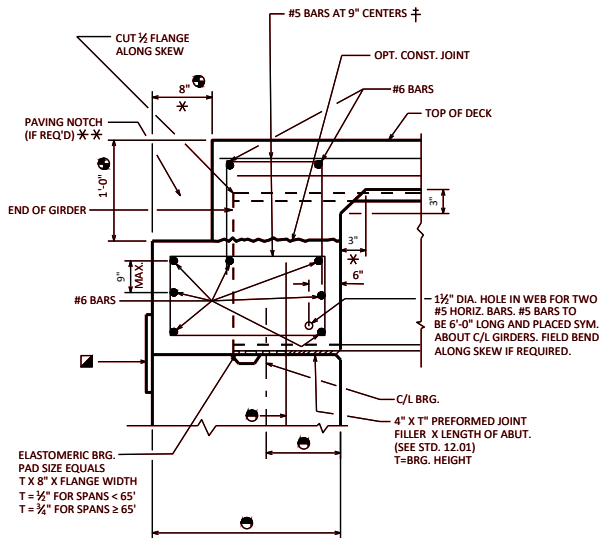
FIXED BEARING DETAILS TYPE 'A' - STEEL GIRDERS



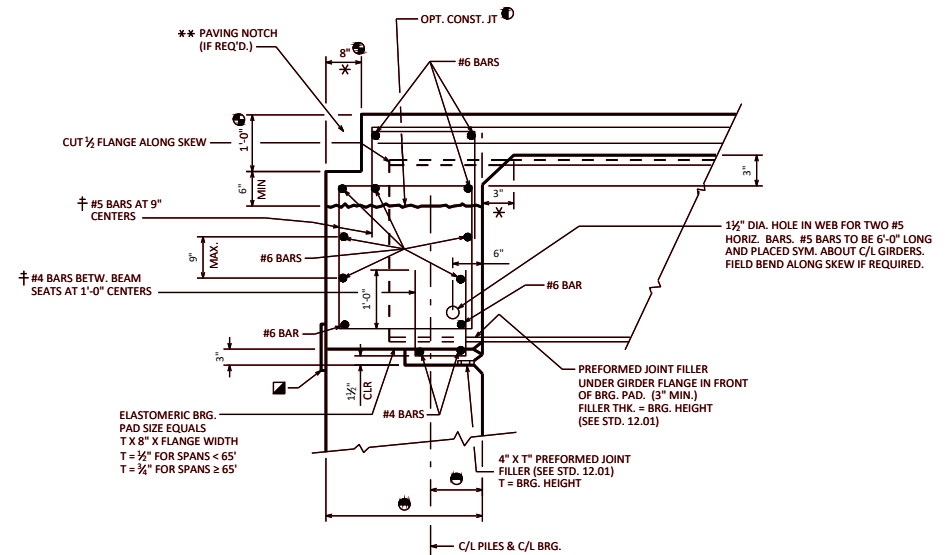
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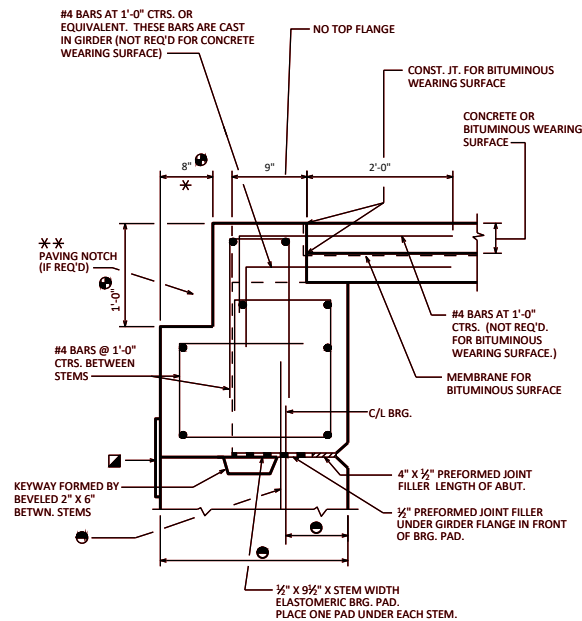
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**STEEL GIRDER WITH
FIXED SEAT**



**STEEL GIRDER WITH
SEMI-EXPANSION SEAT**



**PRECAST DOUBLE TEE OR
MULTI-STEM SECTION**

NOTES

FOR SKEWED STRUCTURES CAST END OF PRECAST TEE ALONG SKEW.

- * DIMENSION IS TAKEN NORMAL TO C/L SUBSTRUCTURE UNITS.
- 1'-6" RUBBERIZED MEMBRANE WATERPROOFING
- † BARS PLACED PARALLEL TO GIRDERS. SPACING PERPENDICULAR TO C/L GIRDERS.

DESIGNER NOTES

SEE STANDARD 19.55 FOR PRESTRESSED BOX GIRDER BEARING DETAILS.

- ① THE USE OF THIS OPT. CONST. JOINT IS NOT RECOMMENDED FOR SKEWS OVER 15° WHEN LARGE DEADLOAD END ROTATION IS ANTICIPATED.
- ** USE PAVING NOTCH ON ALL S.T.H., U.S.H., I.H. BRIDGES. USE PAVING NOTCH ON C.T.H. BRIDGES WITH CONCRETE APPROACHES. PAVING NOTCHES OPTIONAL ELSEWHERE.
- ② PAVING NOTCH IS 1'-0" WIDE BY 1'-4" DEEP IF STRUCTURAL APPROACH SLAB (STD. 12.10) IS USED.
- ③ SEE STD. 12.01

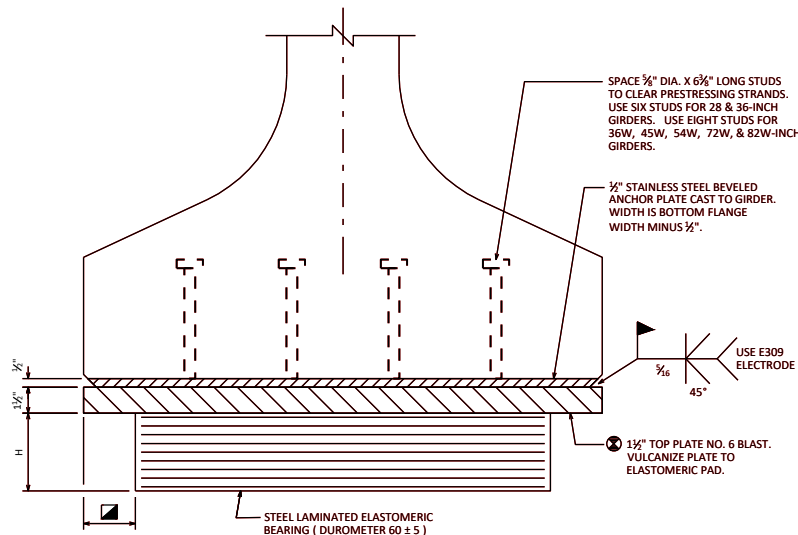
BRG. DETAILS FOR STEEL GDRS. AND PRECAST UNITS ON A1 ABUTMENTS



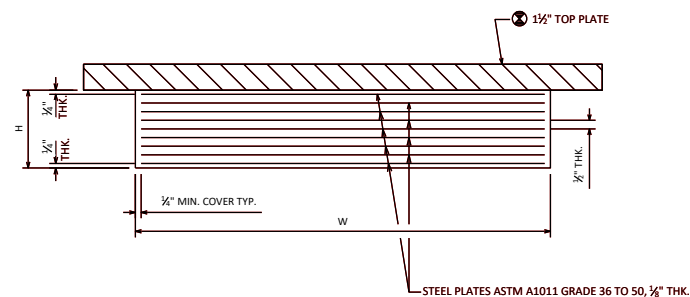
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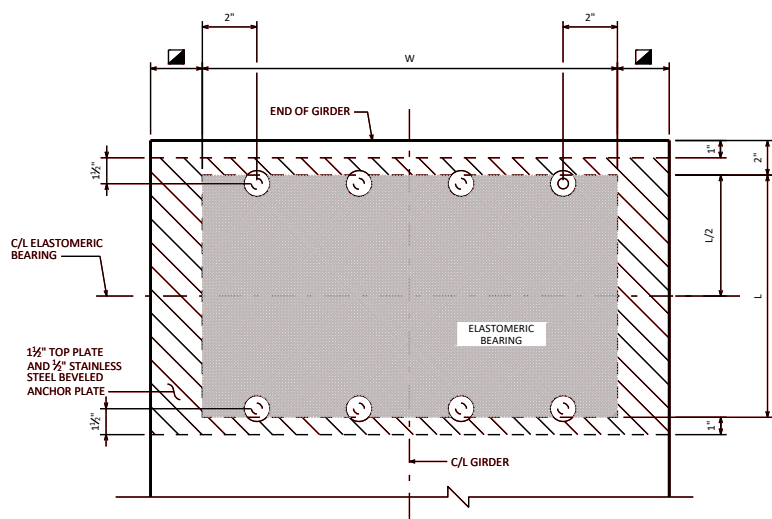
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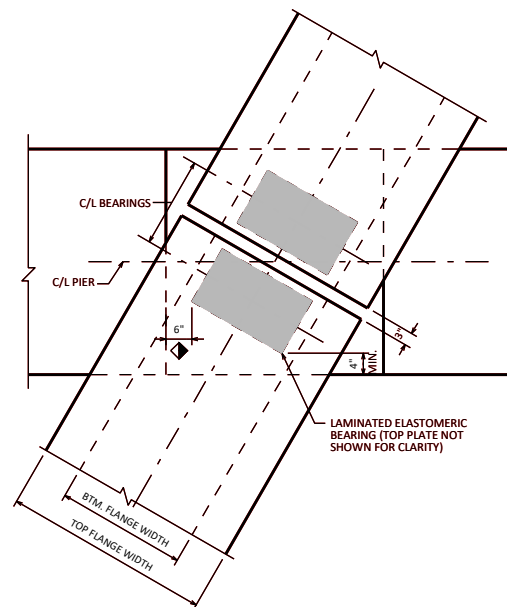
END VIEW



SECTION THRU ELASTOMERIC BEARING

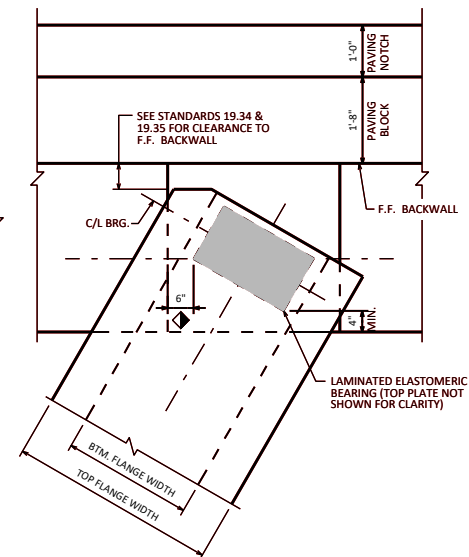


PLAN VIEW



AT SKEWED PIER

DETAIL SHOWN IS FOR A CONTINUOUS DECK AT AN EXPANSION PIER. IF PIER CAP WIDTH BECOMES EXCESSIVE, CONSIDER USING STEEL BEARINGS.



AT SKEWED ABUTMENTS

CLEARANCE DIAGRAM

DESIGNER NOTES

SEE CHAPTER 40 STANDARDS FOR USE OF ELASTOMERIC BEARINGS ON NEW AND REHABILITATED STEEL GIRDER BRIDGES.

FOR ALL NEW BRIDGES, THE STEEL TOP PLATE SHALL HAVE A MINIMUM THICKNESS OF $\frac{1}{2}$ ".

FOR BEARINGS USED IN BEARING REPLACEMENT PROJECTS, THE STEEL TOP PLATE THICKNESS MAY BE REDUCED (TO A MINIMUM OF $\frac{3}{8}$ ") TO MATCH THE OVERALL EXISTING BEARING HEIGHT. WHEN THE THICKNESS IS REDUCED, THE FOLLOWING NOTE SHALL BE LOCATED ON THE PLANS:

"WELDING PROCEDURES SHALL BE ESTABLISHED BY THE CONTRACTOR TO RESTRICT THE MAXIMUM TEMPERATURE REACHED BY SURFACES IN CONTACT WITH ELASTOMER TO 200°F (93°C). TEMPERATURES SHALL BE CONTROLLED BY TEMPERATURE INDICATING WAX PENCILS OR OTHER SUITABLE MEANS APPROVED BY THE ENGINEER."

DO NOT INCLUDE PRESTRESSED GIRDER SHRINKAGE WHEN DESIGNING BEARINGS FOR BRIDGE REHABILITATION PROJECTS.

3" FOR 36W", 45W", 54W", 72W" & 82W"
1" FOR 28" & 36"

MIN. DISTANCE FROM EDGE OF PIER/ABUTMENT. STEP TO LAMINATED ELASTOMERIC BEARING.

TAPER THE TOP PLATE IF THE GIRDER ANGLE RELATIVE TO HORIZONTAL IS GREATER THAN 0.01 RADIAN OR IF THIS ANGLE MULTIPLIED BY THE TOP PLATE LENGTH IS $\frac{1}{8}$ " OR MORE. THIS ANGLE IS BASED ON:

- SLOPE OF GIRDER
- SLOPE DUE TO RESIDUAL CAMBER = $4(RC)/L$, WHERE:
RC = RESIDUAL CAMBER (INCHES)
L = GIRDER LENGTH (INCHES)

NOTES

BEARINGS SHALL NOT BE PLACED AT A TEMPERATURE GREATER THAN 85° F.

ANCHOR PLATE SHALL CONFORM TO ASTM A240 TYPE 304.

TOP PLATE SHALL CONFORM TO ASTM A709 GRADE 50W OR A588 AND SHALL BE PAINTED IN ACCORDANCE WITH SECTION 506.2.8.1 OF THE STANDARD SPECIFICATION.

ALL STRUCTURAL STEEL PLATES SHALL BE FLAT ROLLED WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT, AND VERTICAL.

ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS.

REMOVE THE PAINT FROM TOP PLATE SURFACES THAT REQUIRE FIELD WELDING. AFTER WELDING, PROVIDE ONE COAT OF ORGANIC ZINC-RICH PRIMER AND ONE COAT OF HIGH-BUILD BROWN EPOXY PAINT IN ACCORDANCE WITH SECTION 517.3.1.8.2 OF THE STANDARD SPECIFICATIONS. FIELD APPLIED PAINT SHALL EXTEND BEYOND THE DAMAGED PAINTED SURFACES.

ALL MATERIAL USED FOR BEARINGS SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "BEARING PADS ELASTOMERIC LAMINATED" EACH.

BEARINGS DESIGNED PER METHOD A IN THE CURRENT AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

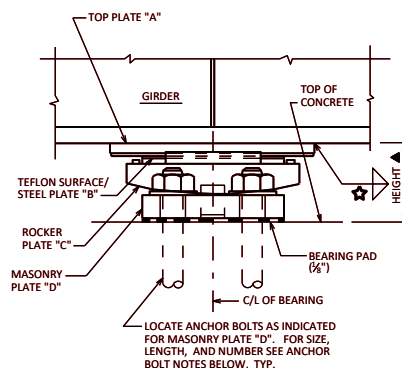
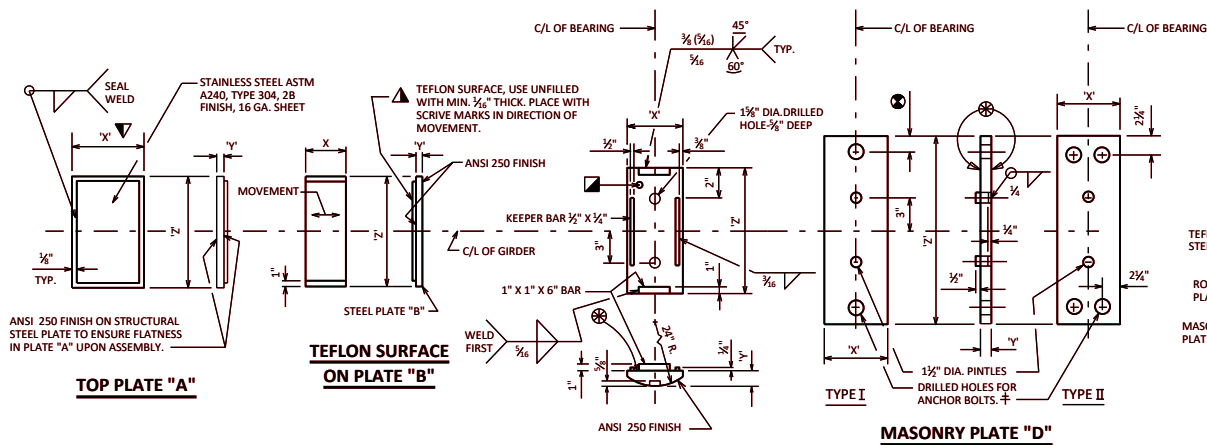
ELASTOMERIC BEARINGS FOR PRESTRESSED CONCRETE GIRDERS



BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE:
1-26



EXPANSION BEARING ASSEMBLY
(SEE "DESIGNER NOTES" FOR BEARING REPLACEMENTS)

BEARING NOTES

ALL BEARINGS ARE SYMMETRICAL ABOUT C/L OF GIRDER AND C/L OF BEARING.

- FINISH THESE SURFACES TO ANSI 250 IF "Y" DIMENSION IS GREATER THAN 2".

ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153, CLASS C.

ROCKER PLATE "C" AND MASONRY PLATE "D" SHALL BE GALVANIZED. TOP PLATE "A" AND STEEL PLATE "B" SHALL BE SHOP PAINTED. USE A SHOP PAINTER ON TOP PLATE "A". DO NOT PAINT STAINLESS STEEL OR TEFLON SURFACES.

ALL MATERIAL IN BEARINGS, INCLUDING SHIM PLATES, BUT EXCLUDING STAINLESS STEEL SHEET, TEFLON SURFACE, PINTLES, ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A709 GRADE 50W.

IN LIEU OF USING SHIM PLATES, FABRICATOR MAY INCREASE THICKNESS OF TOP PLATE "A" OR MASONRY PLATE "D" BY THE SHIM PLATE THICKNESS.

- DIMENSION IS 2" WHEN 1 1/2" DIA. ANCHOR BOLTS ARE USED AND 2 1/2" WHEN 1 3/4" DIA. ANCHOR BOLTS ARE USED.

ALL MATERIAL IN TYPE "A-T" BEARINGS, INCLUDING SHIM PLATES AND BEARING PADS, SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "BEARING ASSEMBLIES EXPANSION B-...", EACH.

CHAMFER ANCHOR BOLTS PRIOR TO THREADING.

ALL FINISHED SURFACES SHALL BE MACHINE FINISHED BY AN AUTOMATIC PROCESS.

ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS.

ALL STRUCTURAL STEEL BEARING PLATES SHALL BE FLAT ROLLED STEEL PLATES WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL.

PROVIDE 1/2" THICK BEARING PAD THE SAME SIZE AS MASONRY PLATE "D" FOR EACH BEARING.

ANCHOR BOLTS SHALL BE THREADED 3". PROVIDE ONE STANDARD WROUGHT WASHER AND ONE HEX NUT PER BOLT. PROJECT ANCHOR BOLTS, MASONRY PLATE "D" THICKNESS + 2 1/2", ABOVE TOP OF CONCRETE.

CHAMFER TOP OF PINTLES 1/4". DRILL HOLES FOR ALL PINTLES IN MASONRY PLATE "D" FOR A DRIVING FIT.

STEEL PINTLES SHALL CONFORM TO ASTM A449 OR ASTM A572 GRADE 50.

ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM F1554 GRADE 55, OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.

PLACE SHIM PLATES BETWEEN BEARING PAD AND MASONRY PLATE "D". PLATES SHALL HAVE "X" AND "Z" DIMENSIONS THAT MATCH MASONRY PLATE "D".

- PROVIDE A METHOD FOR HANDLING ROCKER PLATE "C" DURING GALVANIZING.

- BOND STEEL PLATE "B" AND TEFLON WITH ADHESIVE MATERIAL MEETING THE REQUIREMENTS FOUND IN THE STANDARD SPECIFICATION.

- DRILLED HOLES FOR ANCHOR BOLTS IN MASONRY PLATE "D" SHALL HAVE A DIAMETER 1/8" LARGER THAN ANCHOR BOLT.

AT INSTALLATION, ENSURE STAINLESS STEEL SLIDING FACE OF THE UPPER ELEMENT AND THE TFE SLIDING FACE OF THE LOWER ELEMENT HAVE THE SURFACE FINISH SPECIFIED AND ARE CLEAN AND FREE OF ALL DUST, MOISTURE, OR ANY OTHER FOREIGN MATTER.

DESIGNER NOTES

HEIGHT OF BEARINGS GIVEN IN TABLES INCLUDES 1/2" BEARING PAD, 16 GAGE STAINLESS STEEL SHEET AND 1/2" TEFLON SURFACE.

DETAIL SHIM PLATES AS DESCRIBED IN NOTES ON STANDARD 24.02.

SEE STANDARD 27.02 FOR THE USE OF BEVELED ROCKER PLATE "C" ON GRADES GREATER THAN 3% AND ALSO CLEARANCE REQUIREMENTS.

AT ABUTMENTS, WHEN THE "X" DIMENSION OF PLATE "A" EXCEEDS 11", INCREASE STANDARD DISTANCE FROM C/L OF BEARING TO END OF GIRDER.

- FOR WELD SIZE, REFER TO STANDARD 24.02.

- ADJUST HEIGHT IF BEVELED ROCKER PLATE "C" IS USED.

FOR BEARING REPLACEMENTS, DESIGNER SHALL UTILIZE A WIDER BEARING THAN THE EXISTING GIRDER BOTTOM FLANGE WIDTH TO ALLOW FOR FIELD WELDING OF THE EDGE OF THE BOTTOM FLANGE TO THE TOP OF PLATE "A". SEE STANDARD 40.08 FOR DETAILS.

FOR BEARING REPLACEMENTS, SEE STD. 27.02 FOR MINIMUM ANCHOR BOLT CLEARANCE INFORMATION.

- DIMENSION "X" SHOWN FOR TOP PLATE "A" IS A MINIMUM. PROVIDE ADEQUATE LENGTH TO ENSURE PLATE "B" IS ALWAYS COVERED FOR ALL EXPECTED MOVEMENTS. SEE STD. 27.10 FOR ADDITIONAL GUIDANCE.

CALCULATE THE REACTIONS AT THE BEARINGS DUE TO "TOTAL LOADS" AND ALSO "DEAD LOADS" ONLY. USE THE AASHTO LRFD SERVICE I LOAD COMBINATION. CONSIDER ONLY DEAD LOAD (DC + DW) AND HL-93 LIVE LOADS (LL), INCLUDING A 33% DYNAMIC LOAD ALLOWANCE (IM).

THE VALUES IN THE TABLES ARE THE BEARING CAPACITIES FOR "TOTAL LOAD" (DC + DW + (LL + IM)). TAKE 60% OF THE VALUES IN THE TABLES TO DETERMINE THE BEARING CAPACITIES FOR "DEAD LOAD" ONLY (DC + DW).

SELECT A BEARING THAT HAS A "TOTAL LOAD" CAPACITY GREATER THAN OR EQUAL TO THE CALCULATED "TOTAL LOAD" REACTION AND ALSO A "DEAD LOAD" CAPACITY GREATER THAN OR EQUAL TO THE CALCULATED "DEAD LOAD" REACTION.

ANCHOR BOLT NOTES

FOR SPAN LENGTHS UP TO 100'-0":
USE A TYPE I MASONRY PLATE "D" WITH (2) - 1 1/2" DIA. x 1'-5" LONG ANCHOR BOLTS.

FOR SPAN LENGTHS FROM 100'-0" UP TO 150'-0":
USE A TYPE I MASONRY PLATE "D" WITH (2) - 1 1/2" DIA. x 1'-10" LONG ANCHOR BOLTS.

FOR SPAN LENGTHS GREATER THAN 150'-0":
USE A TYPE II MASONRY PLATE "D" WITH (4) - 1 1/2" DIA. x 1'-10" LONG ANCHOR BOLTS.

CHECK THAT ANCHOR BOLTS PROVIDE ADEQUATE HORIZONTAL CAPACITY.

10" BEARING

TOTAL LOAD (KIPS)	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
100	9"	5/8"	10"	5"	1/2"	10"	7"	1 1/8"	1'-0 1/4"	8"	1 1/2"	1'-8"	0.360
180	1'-1"	5/8"	10"	9"	1/2"	10"	11"	2 3/8"	1'-0 1/4"	8"	1 1/2"	1'-8"	0.438
260	1'-5"	5/8"	10"	1'-1"	1/2"	10"	1'-3"	3 3/4"	1'-0 1/4"	11"	2"	1'-8"	0.604

14" BEARING

TOTAL LOAD (KIPS)	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
210	11"	5/8"	1'-2"	7"	1/2"	1'-2"	9"	1 1/2"	1'-4 3/4"	8"	1 1/2"	2'-0"	0.401
375	1'-5"	5/8"	1'-2"	1'-1"	1/2"	1'-2"	1'-3"	3 3/4"	1'-4 3/4"	1'-2"	2 1/2"	2'-0"	0.677
500	1'-9"	5/8"	1'-2"	1'-5"	1/2"	1'-2"	1'-7"	4 3/4"	1'-4 3/4"	1'-5"	3 3/4"	2'-1"	0.802

18" BEARING

TOTAL LOAD (KIPS)	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
280	11"	5/8"	1'-6"	7"	1/2"	1'-6"	9"	1 1/2"	1'-8 1/4"	9"	2"	2'-4"	0.443
360	1'-1"	5/8"	1'-6"	9"	1/2"	1'-6"	11"	2 1/2"	1'-8 1/4"	11"	2"	2'-4"	0.479
600	1'-7"	5/8"	1'-6"	1'-3"	1/2"	1'-6"	1'-5"	3 3/4"	1'-8 1/4"	1'-5"	3 3/4"	2'-5"	0.719
650	1'-11"	5/8"	1'-6"	1'-7"	1/2"	1'-6"	1'-9"	4 3/4"	1'-8 1/4"	1'-10"	3 3/4"	2'-5"	0.844

12" BEARING

TOTAL LOAD (KIPS)	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
125	9"	5/8"	1'-0"	5"	1/2"	1'-0"	7"	1 1/8"	1'-2 1/4"	8"	1 1/2"	1'-10"	0.360
175	11"	5/8"	1'-0"	7"	1/2"	1'-0"	9"	1 1/8"	1'-2 1/4"	8"	1 1/2"	1'-10"	0.401
275	1'-3"	5/8"	1'-0"	11"	1/2"	1'-0"	1'-1"	2 1/2"	1'-2 1/4"	11"	2"	1'-10"	0.521

16" BEARING

TOTAL LOAD (KIPS)	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
245	11"	5/8"	1'-4"	7"	1/2"	1'-4"	9"	1 1/2"	1'-6 1/4"	8"	1 1/2"	2'-2"	0.401
370	1'-3"	5/8"	1'-4"	11"	1/2"	1'-4"	1'-1"	2 1/2"	1'-6 1/4"	1'-0"	2 1/2"	2'-3"	0.552
525	1'-7"	5/8"	1'-4"	1'-3"	1/2"	1'-4"	1'-5"	3 3/4"	1'-6 1/4"	1'-4"	3 3/4"	2'-3"	0.719
575	1'-9"	5/8"	1'-4"	1'-5"	1/2"	1'-4"	1'-7"	4 3/4"	1'-6 1/4"	1'-6"	3 3/4"	2'-3"	0.844

20" BEARING

TOTAL LOAD (KIPS)	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
225	9"	5/8"	1'-8"	5"	1/2"	1'-8"	7"	1 1/8"	1'-10 1/4"	8"	1 1/2"	2'-6"	0.360
315	11"	5/8"	1'-8"	7"	1/2"	1'-8"	9"	1 1/8"	1'-10 1/4"	9"	2"	2'-6"	0.443
495	1'-3"	5/8"	1'-8"	11"	1/2"	1'-8"	1'-1"	2 1/2"	1'-10 1/4"	1'-1"	2 1/2"	2'-7"	0.594
675	1'-7"	5/8"	1'-8"	1'-3"	1/2"	1'-8"	1'-5"	3 3/4"	1'-10 1/4"	1'-6"	3 3/4"	2'-7"	0.760
705	1'-11"	5/8"	1'-8"	1'-7"	1/2"	1'-8"	1'-9"	4 3/4"	1'-10 1/4"	1'-11"	3 3/4"	2'-7"	0.844

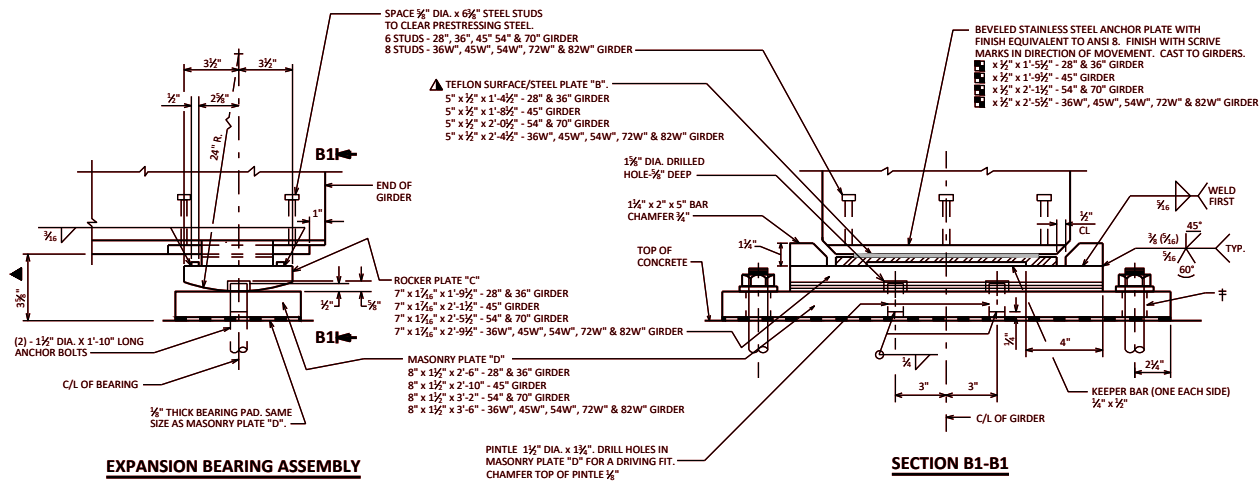
STAINLESS STEEL - TFE EXPANSION BEARING DETAILS TYPE 'A-T'



BUREAU OF STRUCTURES

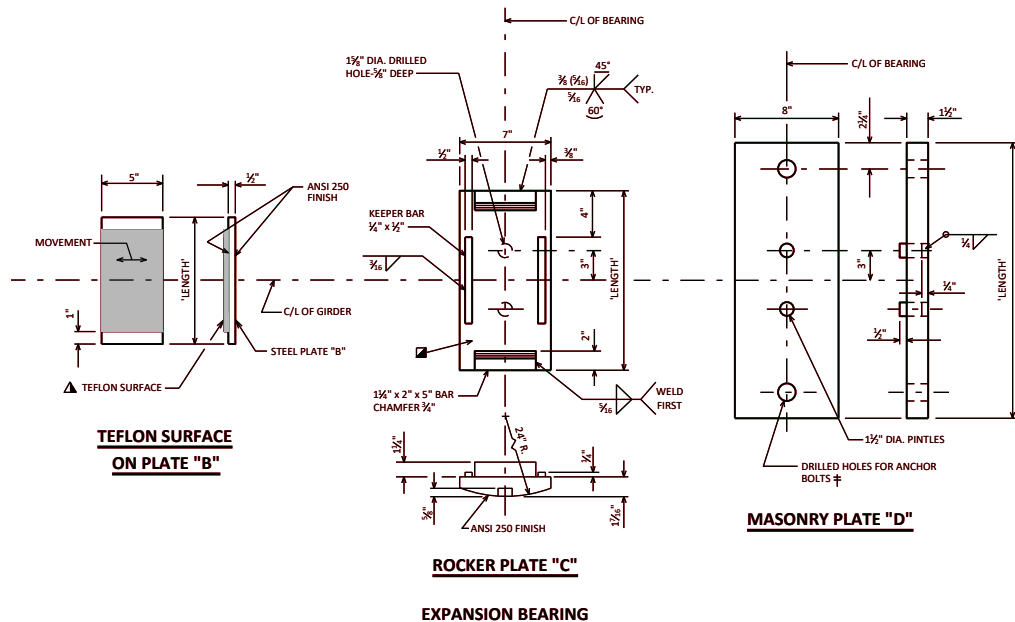
APPROVED: *Laura Shadewald*

DATE:
7-25



EXPANSION BEARING ASSEMBLY

SECTION B1-B1



BEARING NOTES

ALL BEARINGS ARE SYMMETRICAL ABOUT C/L OF GIRDER AND C/L OF BEARING.

ALL MATERIAL IN BEARINGS, BUT EXCLUDING STAINLESS STEEL PLATE, TEFLON SURFACE, PINTLES, ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A709 GRADE 50W.

STAINLESS STEEL PLATE SHALL CONFORM TO ASTM A240, TYPE 304.

STEEL PINTLES SHALL CONFORM TO ASTM A449 OR ASTM A572 GRADE 50.

ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM F1554 GRADE 55, OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.

ALL STRUCTURAL STEEL BEARING PLATES SHALL BE FLAT ROLLED STEEL PLATES WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT, AND VERTICAL.

ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS.

ALL FINISHED SURFACES SHALL BE MACHINE FINISHED BY AN AUTOMATIC PROCESS.

ANCHOR BOLTS SHALL BE THREADED 3". PROVIDE ONE STANDARD WROUGHT WASHER AND ONE HEX NUT PER BOLT. PROJECT ANCHOR BOLTS, MASONRY PLATE "D" THICKNESS + 2 $\frac{1}{4}$ ", ABOVE TOP OF CONCRETE.

CHAMFER ANCHOR BOLTS PRIOR TO THREADING.

MASONRY PLATE "D", ROCKER PLATE "C", ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153, CLASS "C". STEEL PLATE "B" SHALL BE SHOP PAINTED. DO NOT PAINT TEFLON SURFACE.

ALL MATERIAL IN "STEEL BEARINGS FOR PRESTRESSED CONCRETE GIRDERS", INCLUDING BEARING PADS, SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "BEARING ASSEMBLES EXPANSION B _ _", EACH.

DRILLED HOLES FOR ANCHOR BOLTS IN MASONRY PLATE "D" SHALL HAVE A DIAMETER $\frac{1}{8}$ " LARGER THAN ANCHOR BOLT.

TEFLON SURFACE, USE UNFILLED WITH MINIMUM $\frac{1}{16}$ " THICKNESS. PLACE WITH SCRIVE MARKS IN DIRECTION OF MOVEMENT. BOND STEEL PLATE "B" AND TEFLON WITH ADHESIVE MATERIAL MEETING THE REQUIREMENTS FOUND IN THE STANDARD SPECIFICATION.

PROVIDE A METHOD FOR HANDLING ROCKER PLATE "C" DURING GALVANIZING.

AT INSTALLATION, ENSURE STAINLESS STEEL SLIDING FACE OF THE UPPER ELEMENT AND THE TFE SLIDING FACE OF THE LOWER ELEMENT HAVE THE SURFACE FINISH SPECIFIED AND ARE CLEAN AND FREE OF ALL DUST, MOISTURE, AND ANY OTHER FOREIGN MATTER.

DESIGNER NOTES

IF ALL BEARINGS AT A GIVEN SUBSTRUCTURE UNIT ARE FIXED, UTILIZE $\frac{1}{2}$ " THICK ELASTOMERIC BEARING PADS AND FULL-DEPTH CONCRETE DIAPHRAGMS.

FOR EXPANSION BEARINGS, USE LAMINATED ELASTOMERIC BEARINGS WHENEVER POSSIBLE.

SEE STANDARD 27.02 AND 19.31 FOR CLEARANCE REQUIREMENTS AND STANDARD 27.02 FOR THE USE OF BEVELED ROCKER PLATE "C" ON GRADES GREATER THAN 3%.

HEIGHT OF BEARING SHOWN IN "EXPANSION BEARING ASSEMBLY" INCLUDES $\frac{1}{4}$ " BEARING PAD AND $\frac{1}{16}$ " TEFLON SURFACE.

ADJUST HEIGHT IF BEVELED ROCKER PLATE "C" IS USED.

ANCHOR PLATE LENGTH TO BE DESIGNED. MINIMUM LENGTH IS 10". SEE STD. 27.10 FOR ADDITIONAL GUIDANCE.

CALCULATE THE REACTIONS AT THE BEARINGS DUE TO "TOTAL LOADS" AND ALSO "DEAD LOADS" ONLY. USE THE AASHTO LRFD SERVICE I LOAD COMBINATION AND CHECK TO SEE IF THE REACTIONS EXCEED THE BEARING CAPACITIES IN THE TABLE BELOW. CONSIDER ONLY DEAD LOAD (DC + DW) AND HL-93 LIVE LOADS (LL), INCLUDING A 33% DYNAMIC LOAD ALLOWANCE (IM).

IF EITHER REACTION EXCEEDS ITS CORRESPONDING BEARING CAPACITY, THE BEARING DETAILS AS SHOWN ON THIS STANDARD MUST BE MODIFIED TO INCREASE THE BEARING CAPACITY. IF BEARING DETAILS ARE CHANGED AND ANY PLATE HAS A THICKNESS GREATER THAN 2", THEN PROVIDE AN ANSI 250 FINISH TO TOP AND BOTTOM SURFACE OF THESE PLATES.

	GIRDER SIZE	28" & 36"	45"	54" & 70"	36W", 45W", 54W", 72W" & 82W"
BEARING CAPACITY (KIPS)	TOTAL LOAD (DC+DW+(LL+IM))	180	230	280	330
	DEAD LOAD (DC + DW)	110	140	170	200

STEEL BEARINGS FOR PRESTRESSED CONCRETE GIRDERS



BUREAU OF STRUCTURES

APPROVED: Laura Shadewald

DATE: 7-23



ALL DIMENSIONS IN INCHES
AMBIENT TEMPERATURE DURING GIRDER INSTALLATION

THE 90 DEGREE TEMPERATURE RANGE FOR STEEL BEARINGS, BASED ON A 60 DEGREE SETTING TEMPERATURE, IS SLIGHTLY CONSERVATIVE IF THE BEARING OFFSET TABLE IS UTILIZED, SINCE AT 45 DEGREES THE OFFSET WOULD BE ZERO.



STANDARD 27.10

DESIGNER NOTES

- ★ PROTECTION ANGLE ARMOR MAY BE USED ON UNPAVED (GRAVEL) APPROACH ROADWAYS. PROTECTION ANGLE ARMOR SHOULD NOT BE USED ON PAVED (CONCRETE OR ASPHALT) APPROACH ROADWAYS WITH OR WITHOUT PAVING NOTCHES. EXTEND PROTECTION ANGLE FULL WIDTH OF ROADWAY (GUTTER LINE TO GUTTER LINE). PROVIDE PAY LIMITS ON THE PLANS. BID AS "STRUCTURAL STEEL CARBON". SEE BRIDGE MANUAL SECTION 28.7 FOR ADDITIONAL INFORMATION.

- IF TEMPERATURE TABLE IS SHOWN, PLACE FOLLOWING NOTE ADJACENT TO TABLE: "A SMALL JOINT OPENING DUE TO A HIGH TEMPERATURE AT TIME OF CONSTRUCTION MAY REQUIRE NEOPRENE STRIP SEAL INSTALLATION INTO STEEL EXTRUSIONS PRIOR TO SETTING THE EXPANSION JOINT."

LEGEND

- ▲ ① NEOPRENE STRIP SEAL (1-INCH) AND STEEL EXTRUSIONS. SET JOINT OPENING AT 1½" WHEN EXPANSION LENGTH > 230'-0". WHEN EXPANSION LENGTH > 230'-0", PREPARE A TEMPERATURE TABLE SHOWING JOINT OPENINGS FROM 5°F TO 85°F IN 10°F INCREMENTS. ACCOUNT FOR PRESTRESSED GIRDER SHRINKAGE DUE TO CREEP WHEN DETERMINING THIS TABLE. JOINT OPENINGS GIVEN NORMAL TO JOINT. ■
- ② STUDS ¾" DIA. X 6½" LONG AT 6" ALTERNATE CENTERS. WELD TO EXTRUSIONS AND BEND AS SHOWN AFTER WELDING.
- 2A ½" THICK ANCHOR PLATE WITH ¾" DIA. ROD (OR ALTERNATE STRIP SEAL ANCHOR). WELD ROD TO ANCHOR PLATE, WELD ANCHOR PLATE TO NO. 1 AT 1'-6" CENTERS BETWEEN GIRDERS.
- ③ ¾" DIA. THREADED ROD WITH 2 NUTS AND PLATE WASHERS. FOR PRESTRESSED GIRDERS, GROUT THREADED ROD INTO FIELD DRILLED HOLES ON C/L OF GIRDER. FOR STEEL GIRDERS, WELD THREADED ROD TO TOP FLANGE OR ATTACH BY BOLTING THRU FLANGE. ON ABUTMENT SIDE, GROUT THREADED ROD INTO FIELD DRILLED HOLES IN ABUTMENT BACKWALL AS SHOWN.
- ④ ¾" DIA. THREADED ROD WITH NUT. TACK WELD NUT TO NO. 5.
- ⑤ FABRICATE SUPPORT FROM 3" X ¾" BAR AS SHOWN OR EQUIVALENT. ONE PER GIRDER PER SIDE. SHOP OR FIELD WELD TO NO. 1 IF FIELD WELDED, COVER WELDED AREAS WITH EPOXY-COATING MATERIAL. PROVIDE 1½" DIA. HOLE FOR NO. 3 AND 1" DIA. HOLE FOR NO. 4.
- ⑥ GALVANIZED PLATE ¾" X 10" X (2'-2" LONG FOR SKEWS TO 45° AND 3'-0" LONG FOR SKEWS > 45°) WITH HOLES FOR NO. 7. FOR SINGLE SLOPE PARAPET. FOR SLOPED FACE PARAPET, SEE STANDARD 28.07.
- ⑦ ¾" DIA. X 1½" STAINLESS STEEL SOCKET FLAT HEAD SCREWS WITH ANTI-SEIZE LUBRICANT. PLACE IN COUNTERSUNK HOLE. RECESS ¼" BELOW PLATE SURFACE.
- ⑧ ¾" DIA. X 4" GALVANIZED HEX HEAD BOLT, BEND 45°.
- ⑨ ¾" DIA. X 2½" GALVANIZED THREADED COUPLING.
- ⑩ SIDEWALK COVER PLATE ¾" X (2'-0" WIDE FOR SKEWS TO 45° AND 3'-0" WIDE FOR SKEWS > 45°) X LIMITS SHOWN. BEND DOWN FACE OF SIDEWALK WITH HOLES FOR NO. 7. GALVANIZE PLATE AFTER SLIP-RESISTANT SURFACE APPLIED.
- ⑪ 1" X 5" SLOTTED COUNTERSUNK HOLE FOR NO. 7. PLACE SLOT PARALLEL TO DIRECTION OF MOVEMENT.

NOTES

ONE FIELD SPICE PERMITTED IN STEEL EXTRUSIONS, UNLESS MORE ARE REQUIRED FOR STAGED CONSTRUCTION, HANDLING OR GALVANIZING REQUIREMENTS. IF USED, ANCHOR PLATES SHALL BE PROVIDED 3" FROM EACH SIDE OF THE FIELD SPICE. DETAILS SHALL BE SUBMITTED FOR APPROVAL. NO SPLICING PERMITTED IN NEOPRENE STRIP SEAL.

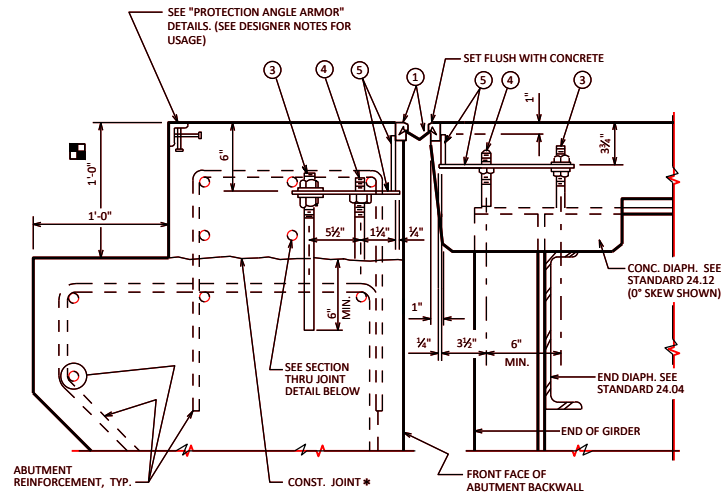
AFTER FABRICATION, BUT BEFORE SHIPMENT, STRAIGHTEN STEEL EXTRUSIONS SUCH THAT THEY SHALL BE FREE FROM WARP, TWIST AND SWEEP.

FABRICATOR SHALL PROVIDE MEANS OF KEEPING GALVANIZED EXTRUSIONS CLEAN AND SMOOTH DURING SHIPMENT AND PRIOR TO APPLYING LUBRICANT ADHESIVE FOR NEOPRENE GLAND INSTALLATION.

SANDBLAST PLATES, SUPPORTS AND EXTRUSIONS AFTER FABRICATION IN ACCORDANCE WITH SSPC SP. #6 "COMMERCIAL BLAST CLEANING". AFTER BLAST CLEANING, THE PLATES, SUPPORTS AND EXTRUSIONS SHALL BE HOT DIPPED GALVANIZED. SLIP-RESISTANT SURFACE IS APPLIED TO SIDEWALK COVER PLATES BY THE MANUFACTURER AND THEN HOT DIPPED GALVANIZED TO THEIR RECOMMENDATIONS TO MAINTAIN THE INTEGRITY OF THIS SURFACE.

ANCHOR SYSTEM NO. 8 AND NO. 9 SHALL CONFORM TO ASTM A307 AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 CLASS C AND D.

ALL MATERIAL IN THE EXPANSION JOINT ASSEMBLY, INCLUDING ANCHOR STUDS AND HARDWARE SHALL BE PAID AT THE UNIT PRICE BID FOR "EXPANSION DEVICE", I.F.

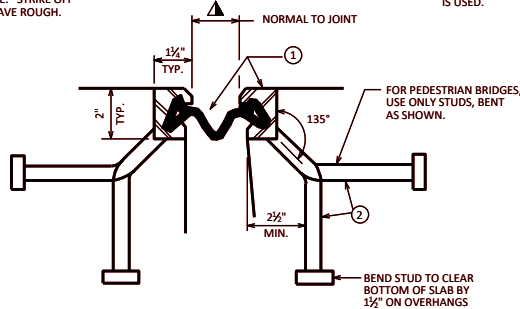


TYPICAL SECTION THRU JOINT AT STEEL GIRDER

★ POUR CONC. ABOVE THIS JOINT AFTER SUPERSTRUCTURE IS IN PLACE. STRIKE OFF AND LEAVE ROUGH.

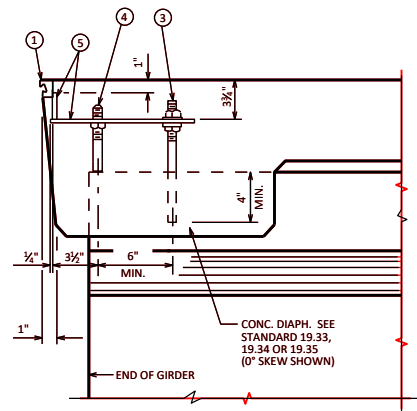
NORMAL TO C/L SUBSTRUCTURE

■ PAVING NOTCH IS 1'-0" WIDE BY 1'-4" DEEP IF STRUCTURAL APPROACH SLAB (STD. 12.12) IS USED.



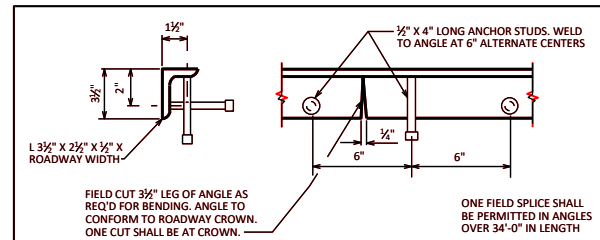
SECTION THRU JOINT

EXTERIOR GIRDER TO EDGE OF DECK, AND AT PARAPETS, MEDIANS AND SIDEWALKS



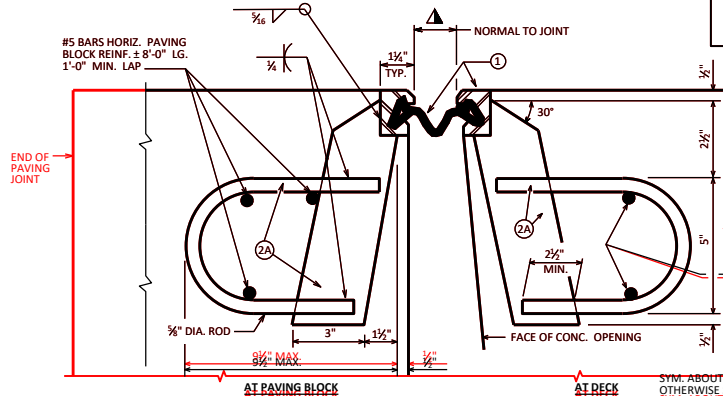
PART SECTION THRU JOINT AT PRESTRESSED GIRDERS

NORMAL TO C/L SUBSTRUCTURE



PROTECTION ANGLE ARMOR ★

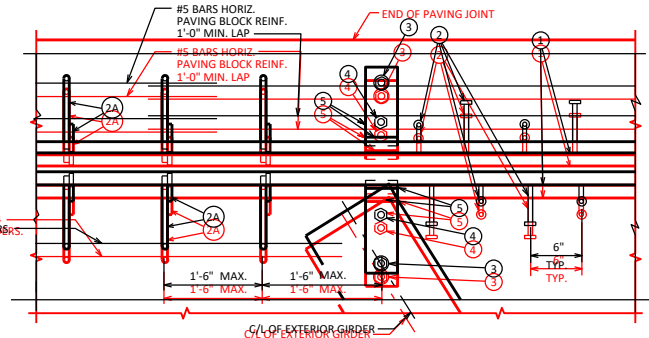
SANDBLAST PROTECTION ANGLE AFTER FABRICATION PER NOTES. AFTER BLAST CLEANING, THE PROTECTION ANGLE SHALL BE HOT DIPPED GALVANIZED.



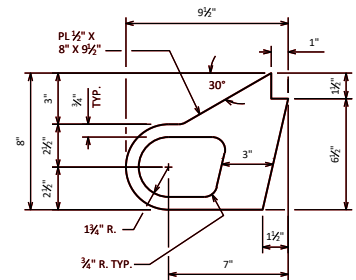
SECTION THRU JOINT

ROADWAY TRAFFIC AREA BETWEEN EXTERIOR GIRDERS.

SYM. ABOUT C/L JOINT UNLESS OTHERWISE SHOWN OR NOTED
SYM. ABOUT C/L JOINT UNLESS OTHERWISE SHOWN OR NOTED



PART PLAN



ALTERNATE STRIP SEAL ANCHOR

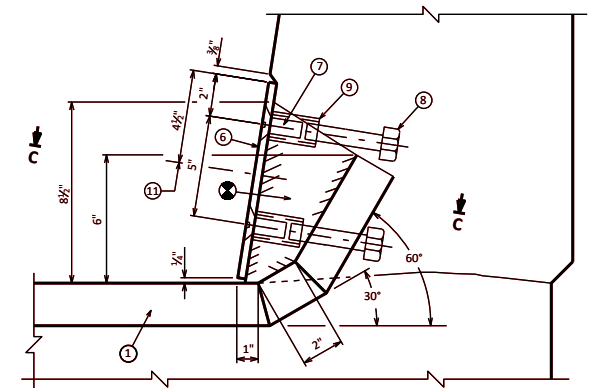
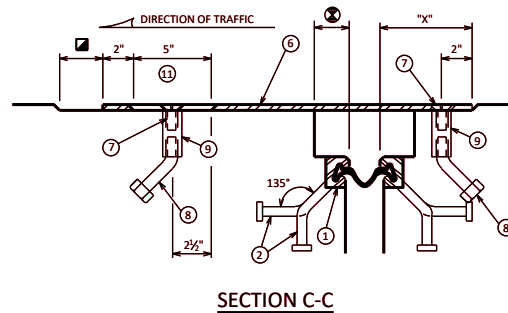
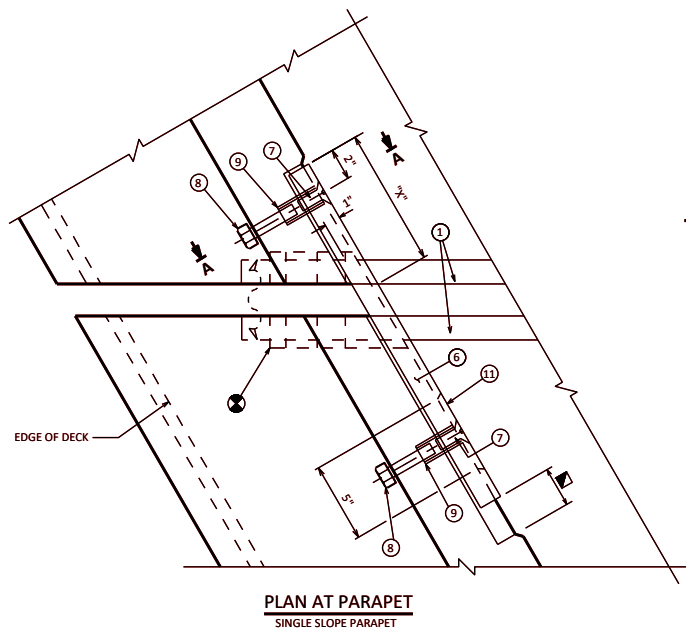
STRIP SEAL EXPANSION JOINT DETAILS



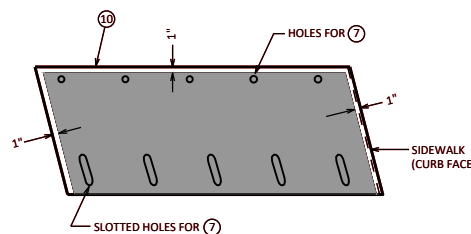
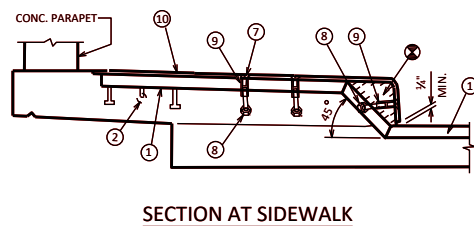
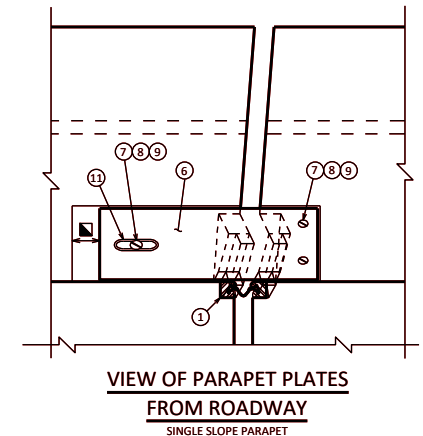
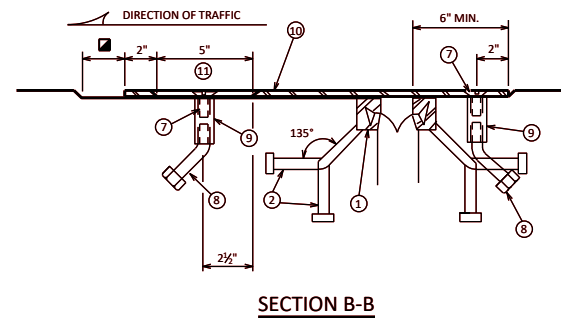
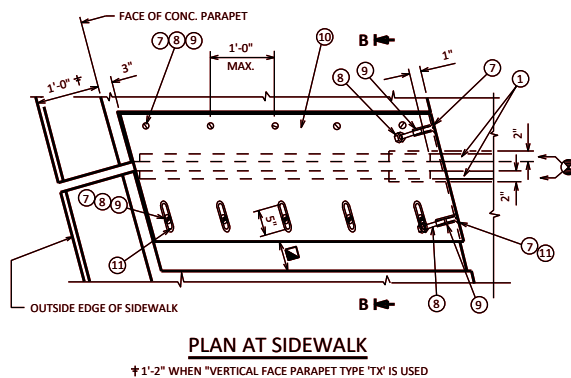
BUREAU OF
STRUCTURES

APPROVED: Laura Shadewald

DATE:
7-25



"X" - VALUES IN INCHES											
USE "X" = 6 1/2" FOR 0° SKEW											
SKEW	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°
RHF	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2	7	7	7 1/2
LHF	7	7 1/2	8	8 1/2	9	9 1/2	10 1/2	11	11 1/2	13	13 1/2



PLAN OF SIDEWALK COVER PLATE WITH SLIP-RESISTANT SURFACE

PLACE SLIP-RESISTANT SURFACE ON TOP WALKING SURFACE
IN SHADED AREA ONLY (NOT ON CURB FACE).

DESIGNER NOTES

FOR NEW BRIDGES, JOINT TO BE DETAILED STRAIGHT.

FOR JOINT REPLACEMENT PROJECTS, JOINT SHALL
BE DETAILED TO MATCH ORIGINAL CONFIGURATION
(STRAIGHT OR KINKED) IN ORDER TO REDUCE
SUBSTRUCTURE MODIFICATIONS REQUIRED.

PLAN DETAILS SHALL REMOVE ENOUGH PARAPET
LATERALLY, AND FULL HEIGHT, TO ENSURE
DURABILITY OF THE JOINT REPLACEMENT.

APPROVED SLIP-RESISTANT APPLIED SURFACES FOR STEEL PLATES		
PRODUCT	MANUFACTURER	CONTACT AT
SLIPNOT GRADE 2, STEEL	W. S. MOLNAR COMPANY	1-800-SLIPNOT
ALGRIP, STEEL	ROSS TECHNOLOGY CORP.	1-800-345-8170

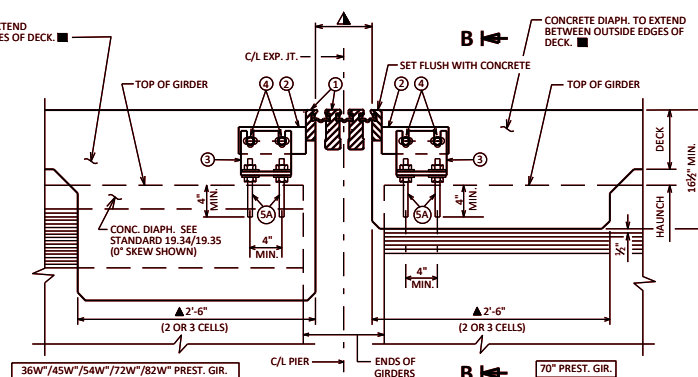
STRIP SEAL COVER PLATES SINGLE SLOPE PARA./SDWK.



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STRUCTURES**

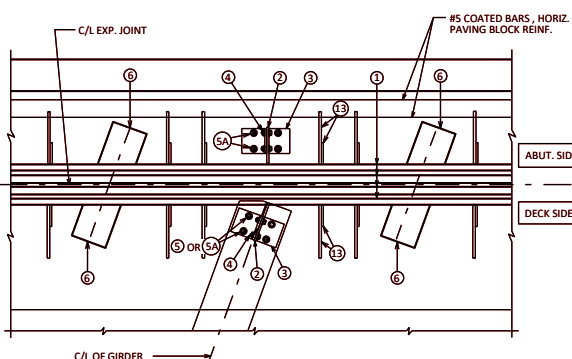
APPROVED: *Laura Shadewald*

DATE:
7-19



NORMAL TO C/L SUBSTRUCTURE

- NORMAL TO C/L SUBSTRUCTURE



NOTE:
MODULAR EXPANSION DEVICE DESIGN AND DETAILS ARE SPECIFIC TO THE MANUFACTURER SELECTED FROM THOSE LISTED IN THE SPECIAL PROVISIONS.

▲ SUPPORT BOXES ARE SHOWN FOR GENERAL INFORMATION AND LOCATION MAY VARY ACCORDING TO FABRICATOR DESIGN. SPACE SUPPORT BOXES TO MISS GIRDER TOP FLANGES WHEN POSSIBLE, BUT NOT TO EXCEED MAXIMUM SPACING PER SPECIAL PROVISIONS.

ONE FIELD SPlice PERMITTED IN STEEL EXTRUSIONS. DETAILS SHALL BE SUBMITTED FOR APPROVAL. NO STEEL PERMITTED IN NEOPRENE GLAND.

AFTER FABRICATION, BUT BEFORE SHIPMENT, STRAIGHTEN STEEL EXTRUSIONS SUCH THAT THEY SHALL BE FREE FROM WARP, TWIST & SWEEP.

NO EXPANSION JOINT PROTRUSIONS PERMITTED ABOVE ROADWAY SURFACE, ON PARAPET ROADWAY FACE OR ABOVE SIDEWALK SURFACE (FOR RAISED SIDEWALK).

THE EXPANSION JOINT SEALS SHALL BE FORMED, BONDED & SEALED AS RECOMMENDED BY THE MANUFACTURER. FORM WORK SHALL BE PLACED BETWEEN THE SUPPORT BOXES TO PREVENT CONCRETE INTRUSION INTO THE SUPPORT BOX. A TECHNICAL REPRESENTATIVE OF THE MANUFACTURER SHALL BE PRESENT DURING INSTALLATION. PRIOR TO SETTING THE JOINT ASSEMBLY INTO POSITION, THE PROJECT ENGINEER SHALL DETERMINE THE PROPER JOINT OPENING.

ROADWAY CROWN & GRADE. FABRICATOR SHALL PROVIDE MEANS OF REMOVING GALVANIZED EXTRUSIONS, CLEAN & SMOOTH DURING SHEARMENT AND BEFORE APPLYING LUBRICANT ADHESIVE FOR NEQUINE GROUND "COSTALATION".

SANDBLAST BLAST, PLATES, WT-SECTION, ANCHORAGE LOOP, & EXTRUSIONS AFTER CLEANING IN ACCORDANCE WITH SSPC SP 16 "COMMERCIAL BLAST CLEANING". AFTER BLAST CLEANING, THIS ASSEMBLY SHALL BE HOT DIPPED GALVANIZED.

ALL MATERIAL IN THE EXPANSION JOINT ASSEMBLY, INCLUDING ANCHOR STUDS/ PARAPET PLATES, SIDEWALK PLATES, AND HARDWARE SHALL BE PAID AT THE UNIT PRICE BID FOR STD "EXPANSION DEVICE MODULAR", LF.

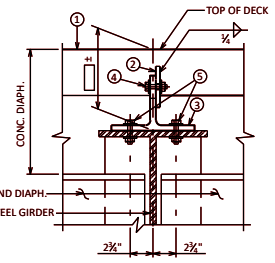
BAR STEEL REIN. IN DECK AND CONC. DIAPHRAGM SHALL BE RESPECED AS NECESSARY TO ALLOW PLACEMENT OF JOINT ASSEMBLY. TOP TRANSVERSE REIN. ADJACENT TO MOD. JTY. TO BE CUT AND PLACED BETWEEN IT. SUPPORT SYSTEM.

BUREAU OF
STRUCTURES

APPROVED: <i>Laura Shadewald</i>	DATE: 1-23
----------------------------------	---------------

STANDARD 28.03

SECTION D-D



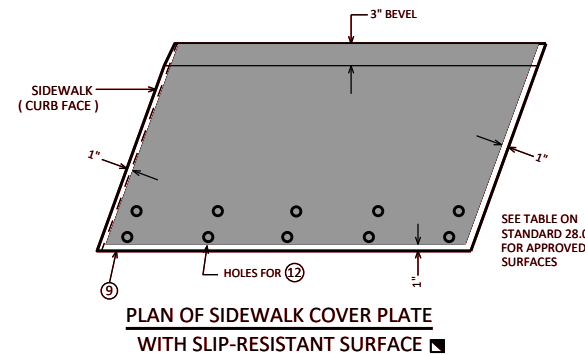
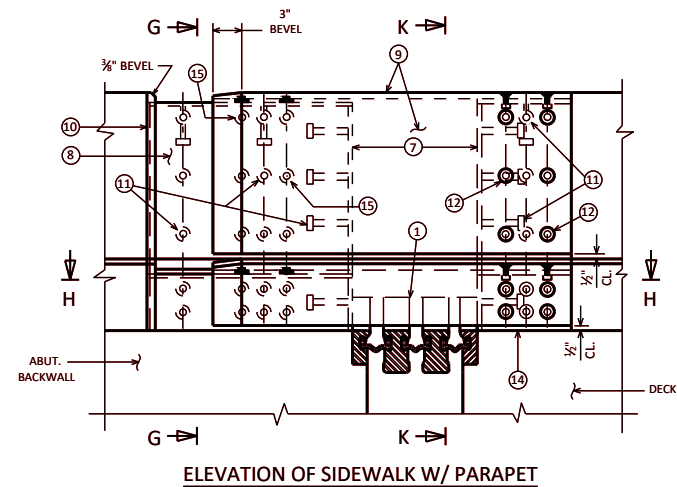
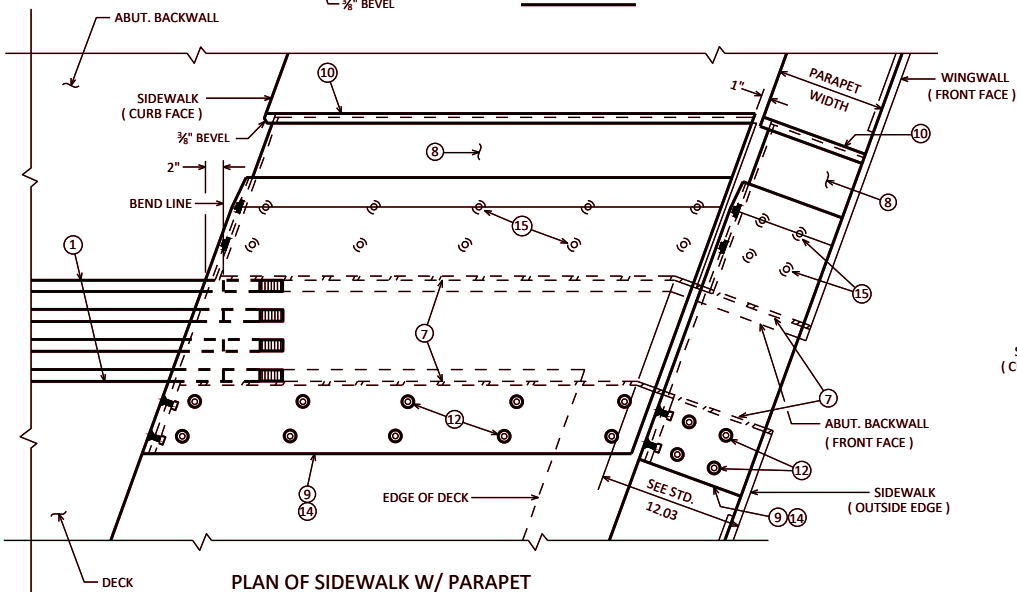
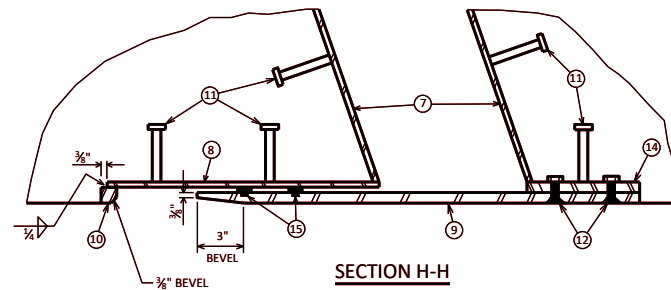
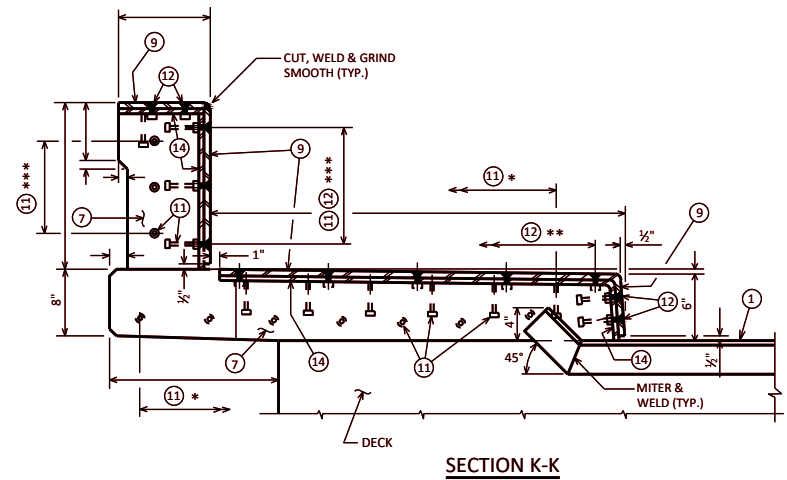
TEMPERATURE TABLE FOR SETTING JOINT OPENINGS TO BE DETERMINED BY JOINT MANUFACTURER WITH THE FOLLOWING DESIGN DATA:

1. ☐ IN. OF MOVEMENT PER 10° F
2. MEDIAN TEMPERATURE OF 45° F
3. TEMP. RAISE IN TABLE FROM (5° F) TO (85° F) FOR PRESTRESSED CONCRETE GIRDERS AND FROM (-5° F) TO (+95° F) FOR STEEL GIRDERS.
4. ADJUST INITIAL JOINT OPENINGS BY A REDUCTION OF ☐ IN., WHICH ACCOUNTS FOR SHRINKAGE (CREEP) OF THE SUPERSTRUCTURE OVER TIME, TO PRODUCE FINAL JOINT OPENINGS FOR TABLE.

A TABLE OF JOINT OPENINGS BASED ON ABOVE DATA SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL

— INCLUDE ITEM 4. FOR PRESTRESSED GIRDER STRUCTURES ONLY. SEE CHAPT. 28 IN BRIDGE DESIGN MANUAL FOR ADJUSTMENT FACTOR.

- SKEWS $\leq 30^\circ$
- 2 OR 3 CELL MODULAR EXPANSION JOINTS
- STEEL GIRDER BRIDGES
- PRESTRESSED GIRDER BRIDGES (70", 36W", 45W", 54W", 72W" AND 82W" SECTION)



■ PLACE SLIP-RESISTANT SURFACE ON TOP WALKING SURFACE IN SHADED AREA ONLY (NOT ON CURB FACE). GALVANIZE PLATE AFTER SLIP-RESISTANT SURFACE IS APPLIED.

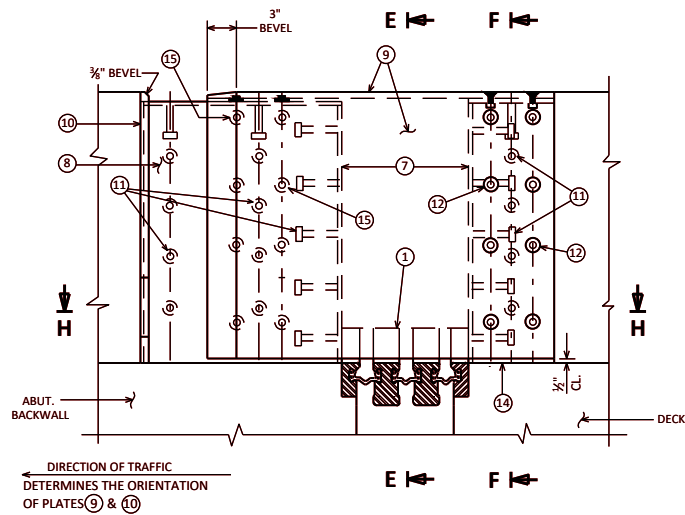
**COVER PLATES FOR SIDEWALK
WITH CON. PARA.**



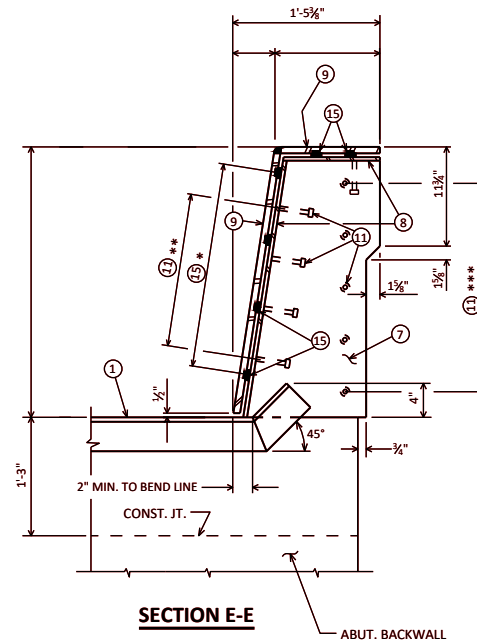
BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

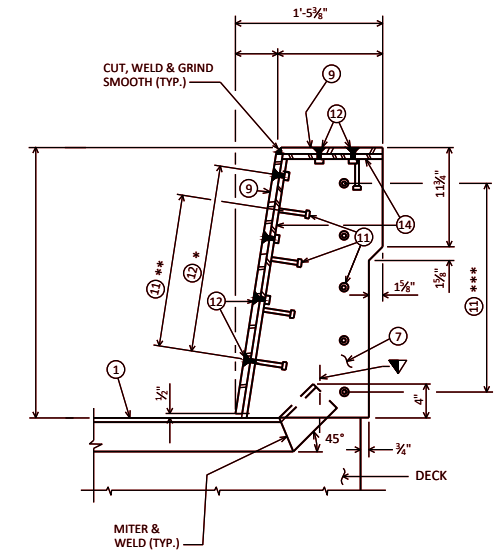
DATE:
7-11



ELEVATION OF SINGLE SLOPE PARAPET

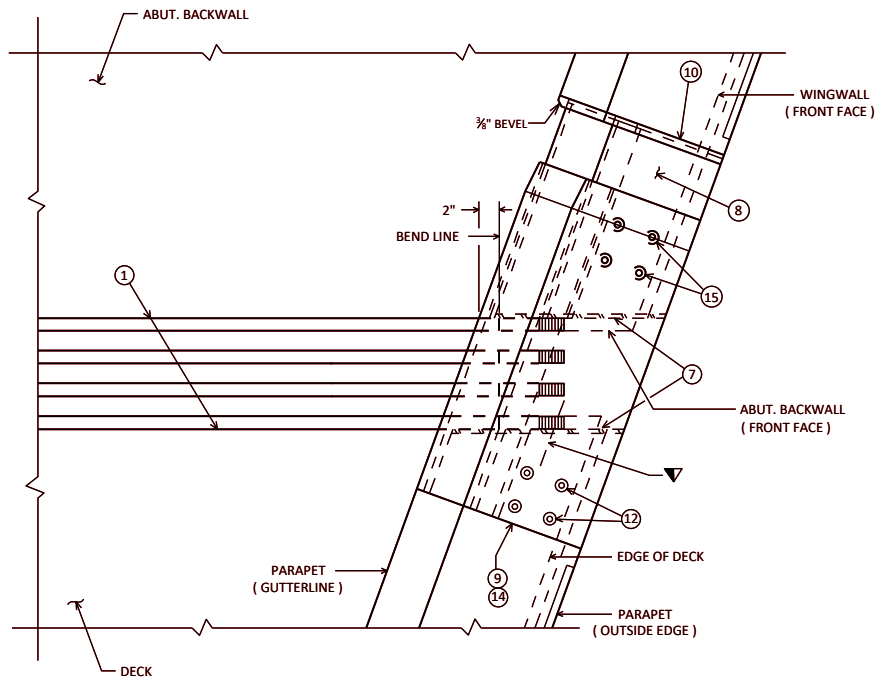


SECTION E-E

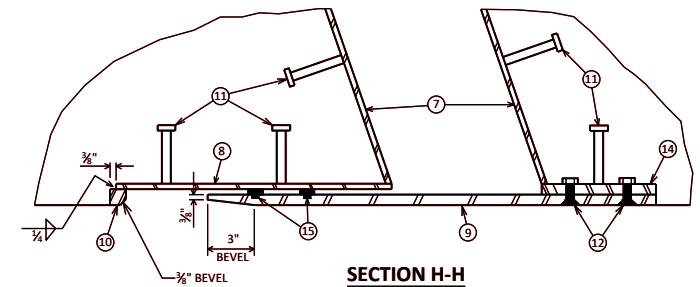


SECTION F-F

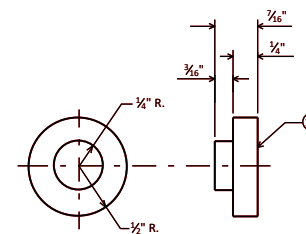
CROSS SECTION SHOWN FOR 32", 36", AND 42" SINGLE SLOPE PARAPET.
DETAILS FOR 56" PARAPET ARE SIMILAR.



PLAN OF SINGLE SLOPE PARAPET



SECTION H-H



ADIPRENE BUTTON DETAIL

- * 3 EQ. SPA. (32")
- 4 EQ. SPA. (36")
- 5 EQ. SPA. (42")
- 7 EQ. SPA. (56")
- ** 3 SPA. (32")
- 4 SPA. (36")
- 5 SPA. (42")
- 7 EQ. SPA. (56")
- *** 4 SPA. (32")
- 5 SPA. (36")
- 6 SPA. (42")
- 8 SPA. (56")

▼ FOR STRUCTURES WITH SKEWS, ADD NOTE
TO PLANS ; "MITER EXTRUSION ENDS AS
REQ'D TO PROVIDE CLEARANCE"

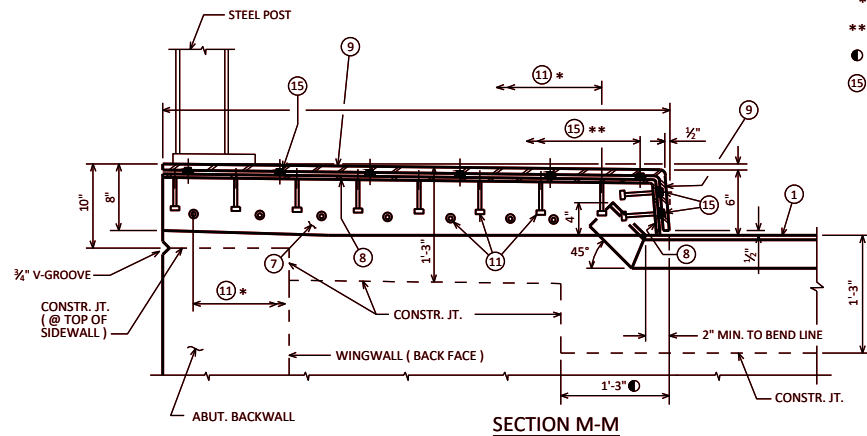
**COVER PLATES FOR
SINGLE SLOPE PARAPET**



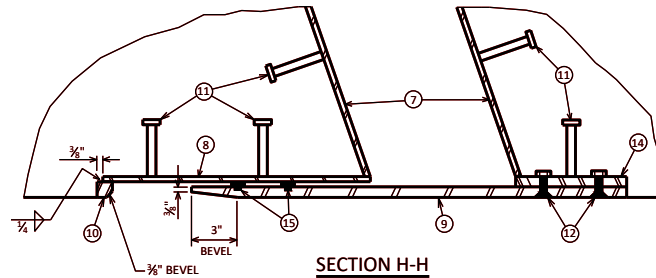
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

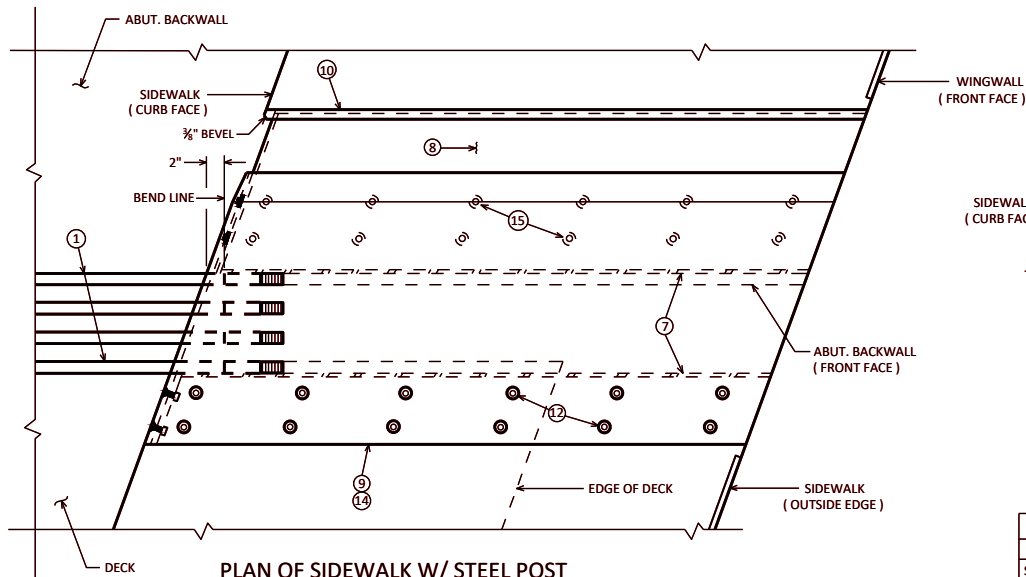
DATE:
7-18



SECTION M-M

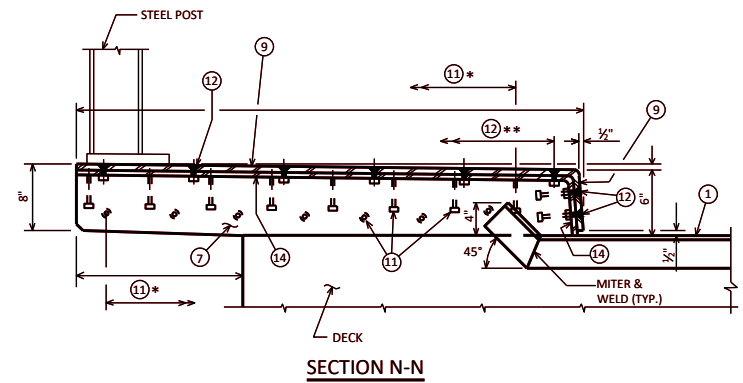


SECTION H-H

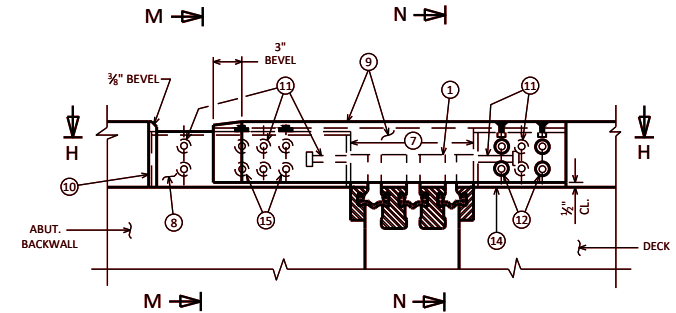


PLAN OF SIDEWALK W/ STEEL POST

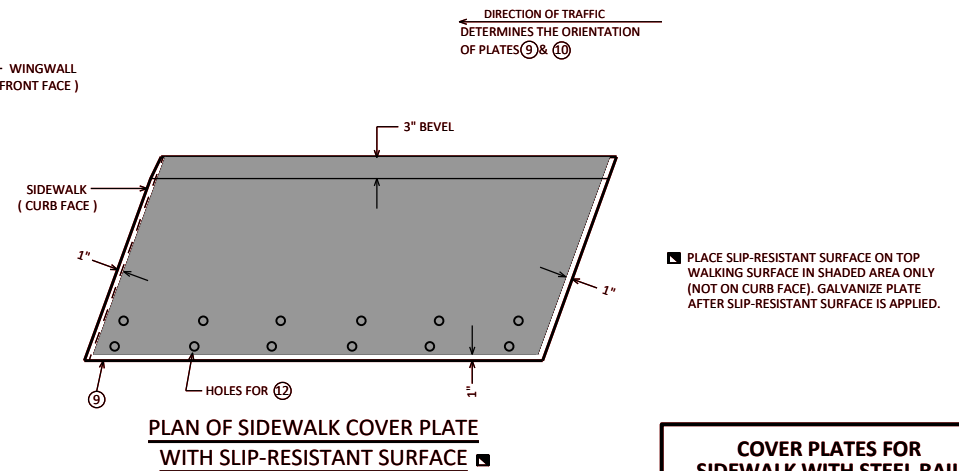
- * 6" MAX. SPA.
- ** 1'-0" MAX. SPA.
- PERPENDICULAR TO FACE OF CURB
- ⑮ SEE DETAIL ON STANDARD 28.05



SECTION N-N



ELEVATION OF SIDEWALK W/ STEEL POST



PLAN OF SIDEWALK COVER PLATE WITH SLIP-RESISTANT SURFACE

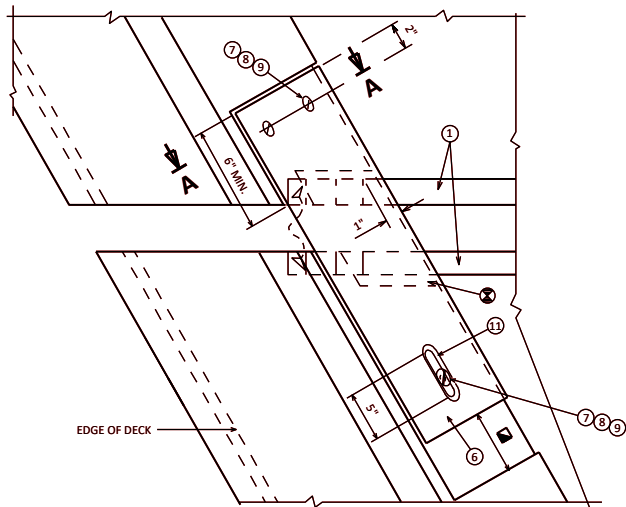
APPROVED SLIP-RESISTANT APPLIED SURFACES FOR STEEL PLATES		
PRODUCT	MANUFACTURER	CONTACT AT
SLIPNOT GRADE 2, STEEL	W. S. MOLNAR COMPANY	1-800-SLIPNOT
ALGRIP, STEEL	ROSS TECHNOLOGY CORP.	1-800-345-8170

COVER PLATES FOR SIDEWALK WITH STEEL RAIL

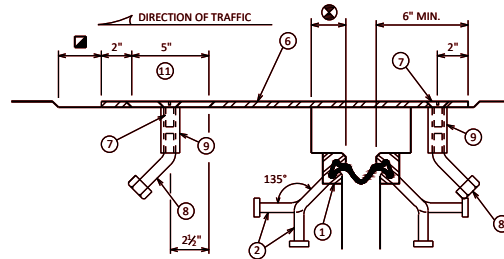
BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

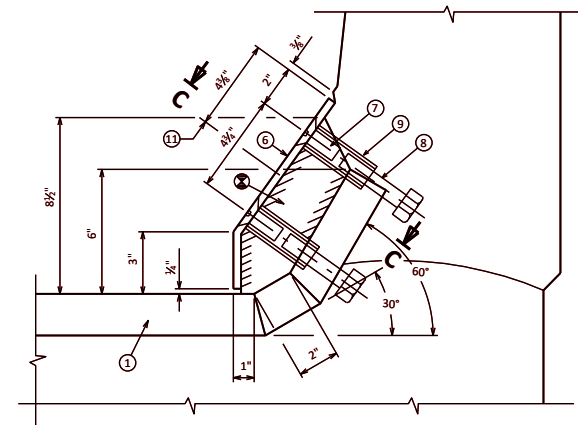
DATE: 7-11



PLAN AT PARAPET
SLOPED FACE PARAPET

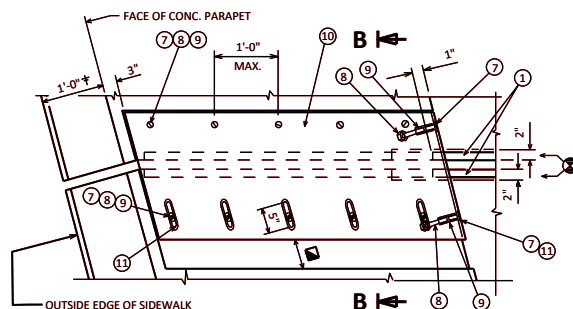


SECTION C-C



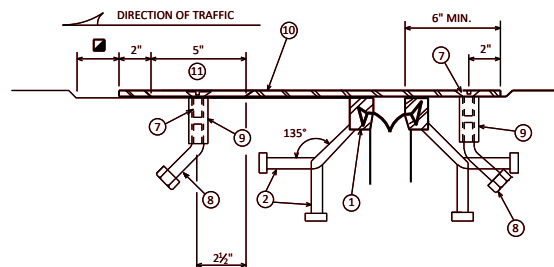
SECTION A-A
SLOPED FACE PARAPET

⑥ GALVANIZED PLATE $\frac{3}{8}$ " X $10\frac{1}{2}$ " X (2'-2" LONG FOR SKEWS TO 45° AND 3'-0" LONG FOR SKEWS $\geq 45^\circ$) WITH HOLES FOR NO. 7. BEND AS SHOWN.

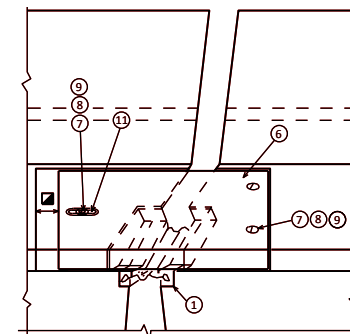


PLAN AT SIDEWALK

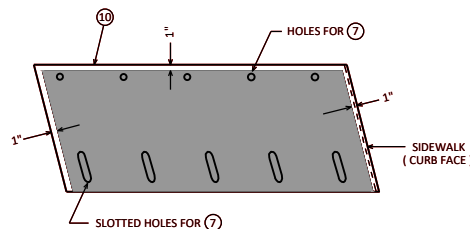
± 1'-2" WHEN "VERTICAL FACE PARAPET TYPE 'TX' IS USED



SECTION B-B



**VIEW OF PARAPET PLATES
FROM ROADWAY**
SLOPED FACE PARAPET



**PLAN OF SIDEWALK COVER PLATE
WITH SLIP-RESISTANT SURFACE**

PLACE SLIP-RESISTANT SURFACE ON TOP WALKING SURFACE IN SHADED AREA ONLY (NOT ON CURB FACE).

DESIGNER NOTES

FOR JOINT REPLACEMENT PROJECTS, JOINT SHALL BE DETAILED TO MATCH ORIGINAL CONFIGURATION (STRAIGHT OR KINKED) IN ORDER TO REDUCE SUBSTRUCTURE MODIFICATIONS REQUIRED.

PLAN DETAILS SHALL REMOVE ENOUGH PARAPET Laterally, AND FULL HEIGHT, TO ENSURE DURABILITY OF THE JOINT REPLACEMENT.

- ⊗ BLOCK OUT CONCRETE 2" EACH SIDE OF JOINT OPENING
- ☑ JOINT OPENING DIM. ALONG SKEW PLUS $\frac{1}{2}$ "

APPROVED SLIP-RESISTANT APPLIED SURFACES FOR STEEL PLATES		
PRODUCT	MANUFACTURER	CONTACT AT
SLIPNOT GRADE 2, STEEL	W. S. MOLNAR COMPANY	1-800-SLIPNOT
ALGRIP, STEEL	ROSS TECHNOLOGY CORP.	1-800-345-8170

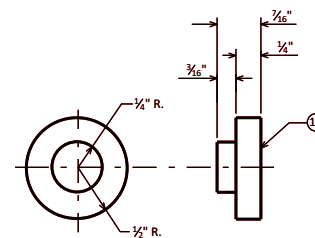
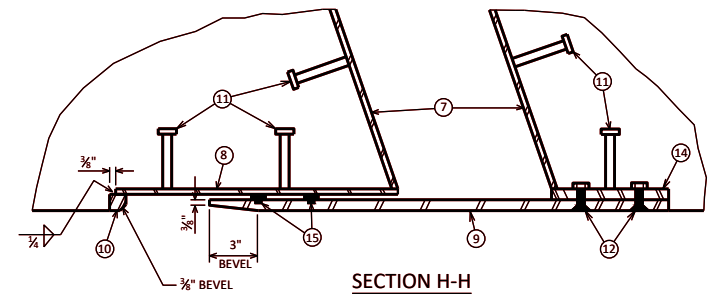
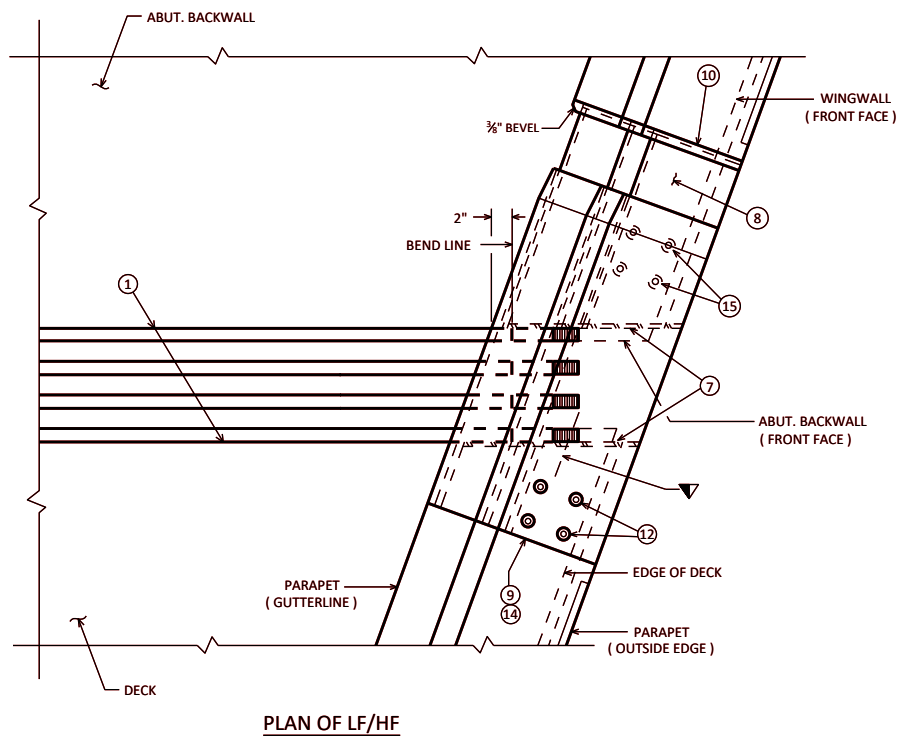
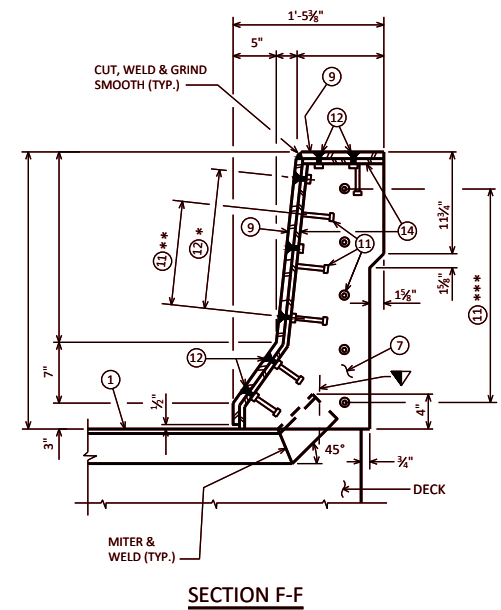
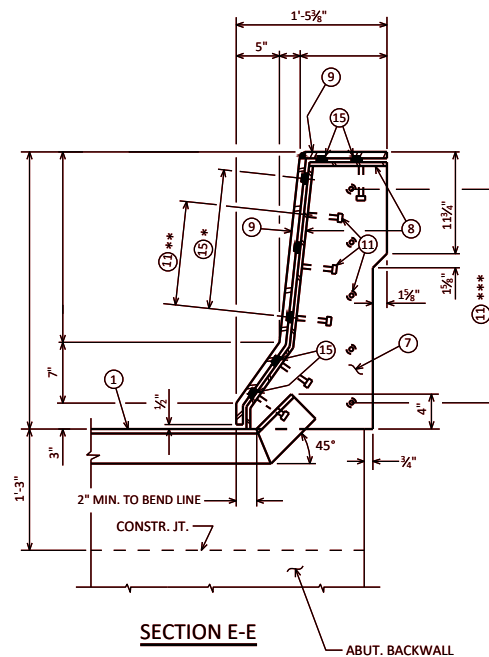
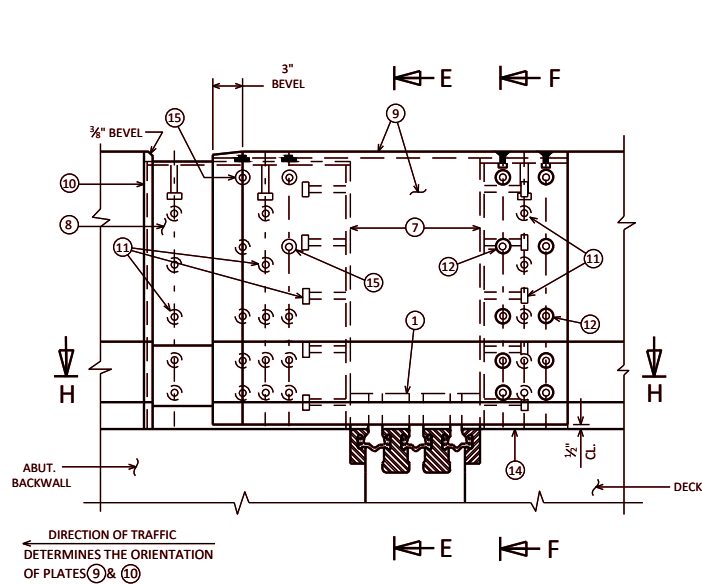
STRIP SEAL COVER PLATES SLOPED FACE PARA./SDWK.



**BUREAU OF
STRUCTURES**

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DATE:
1-20



- * 2 EQ. SPA. (LF)
- 4 EQ. SPA. (HF)
- ** 2 SPA. (LF)
- 4 SPA. (HF)
- *** 4 SPA. (LF)
- 6 SPA. (HF)

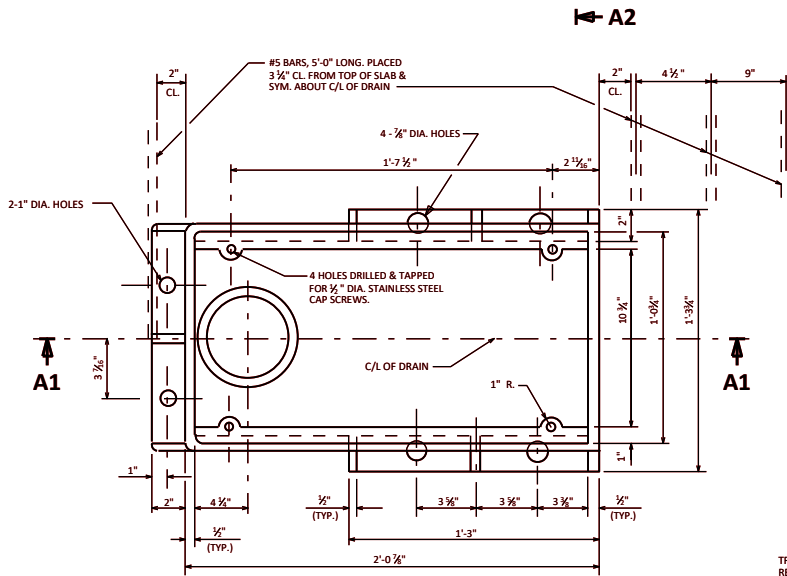
▼ FOR STRUCTURES WITH SKEWS ADD NOTE TO PLANS: "MITER EXTRUSION ENDS AS REQ'D TO PROVIDE CLEARANCE"

COVER PLATES FOR PARAPET 'LF/HF'



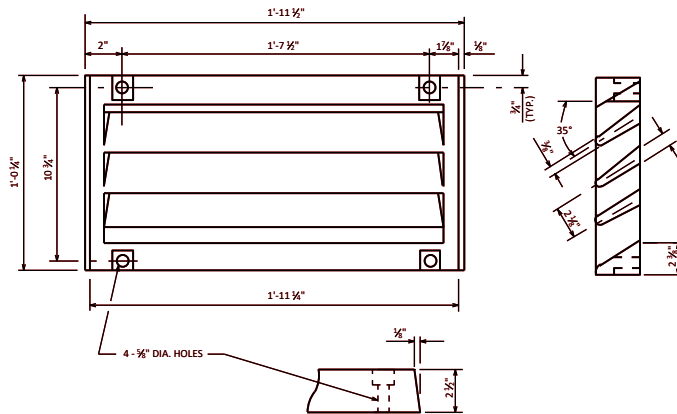
APPROVED: Laura Shadewald

DATE: 7-18



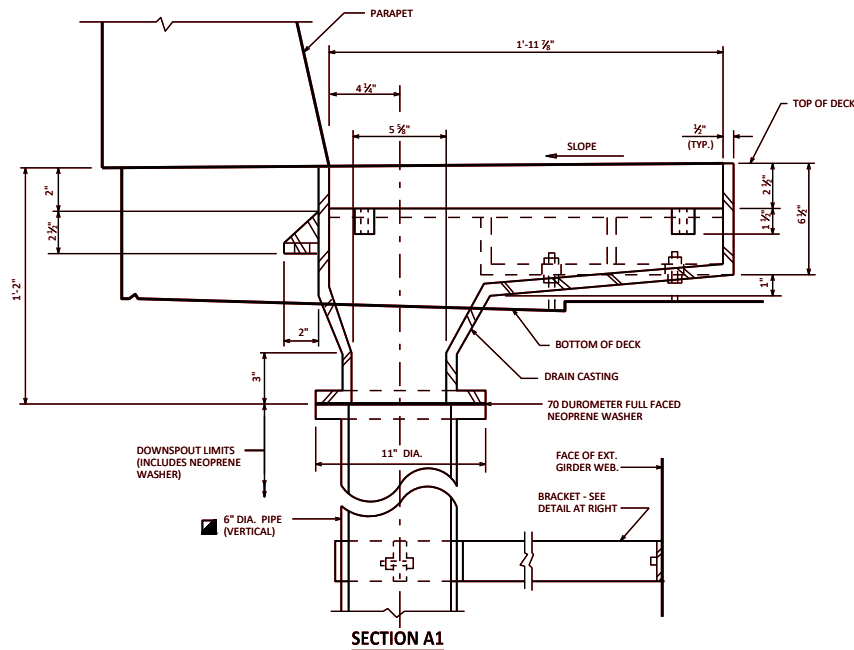
PLAN

TRANS. AND LONGIT. SLAB BAR REINF. TO BE CUT A MAX. OF 1" CL. FROM DRAIN FRAME. DISPLACE BARS WHERE POSSIBLE.

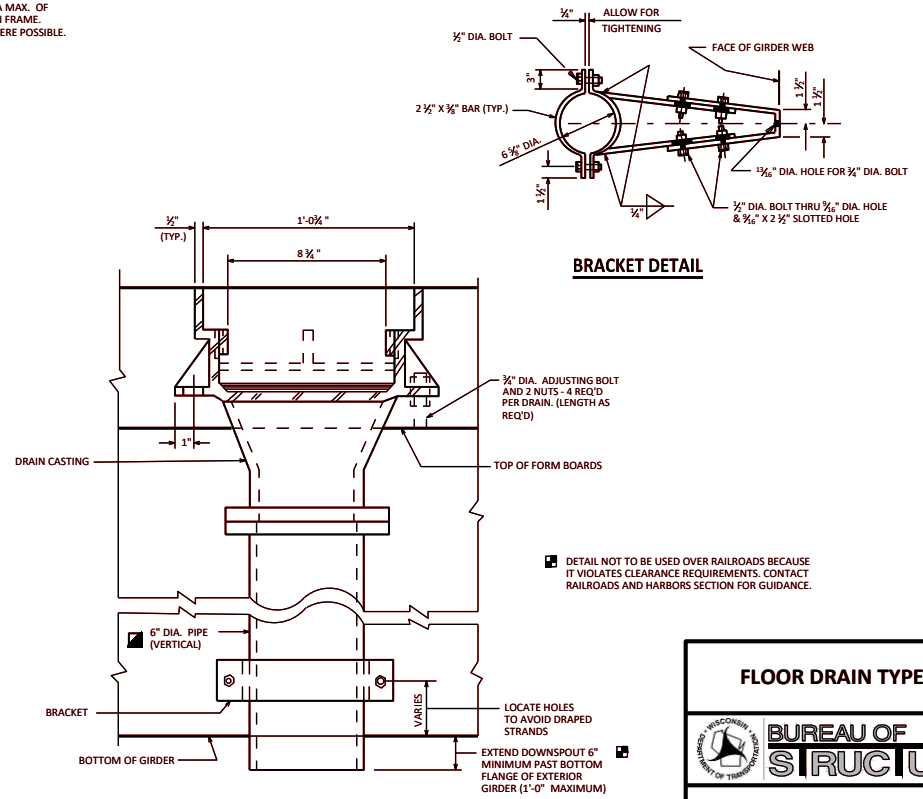


GRATE CASTING DETAIL

ATTACH GRATE TO FRAME FOR SHIPMENT



SECTION A1



SECTION A2

NOTES

ALL MATERIAL FOR TYPE "GC" CASTING, EXCLUDING GRATE HOLD DOWN SCREWS, SHALL BE GRAY IRON CONFORMING TO ASTM A48, CLASS 30. (APPROXIMATE WEIGHT = 225#)

MATERIAL FOR BRACKETS SHALL CONFORM TO ASTM A36.

ALL MATERIAL FOR FLOOR DRAINS TO BE INCLUDED IN THE BID ITEM "FLOOR DRAINS TYPE GC".

ALL MATERIAL FOR DOWNSPOUTS, DOWNSPOUT CONNECTIONS, AND BRACKETS TO BE INCLUDED IN THE BID ITEM "DOWNSPOUT 6-INCH".

ALTERNATE BRACKETS ARE NOT ALLOWED.

FLANGED 6" DIA. DOWNSPOUTS SHALL BE REINFORCED THERMOSETTING RESIN PIPE (RTRP) OR GALVANIZED STANDARD PIPE CONFORMING TO ASTM A53.

DESIGNER NOTE

ON THE PRESTRESSED GIRDER SHEET, SHOW LOCATION OF HOLES FOR BRACKET ANCHORAGE FROM TOP/BOTTOM AND END OF GIRDER.

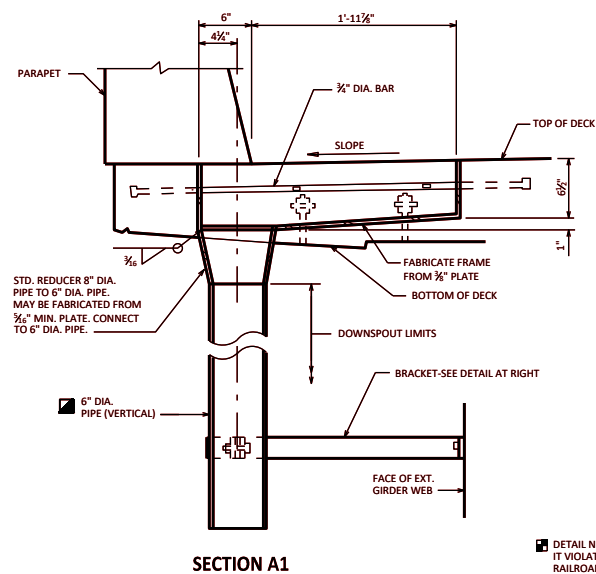
FLOOR DRAIN TYPE 'GC'



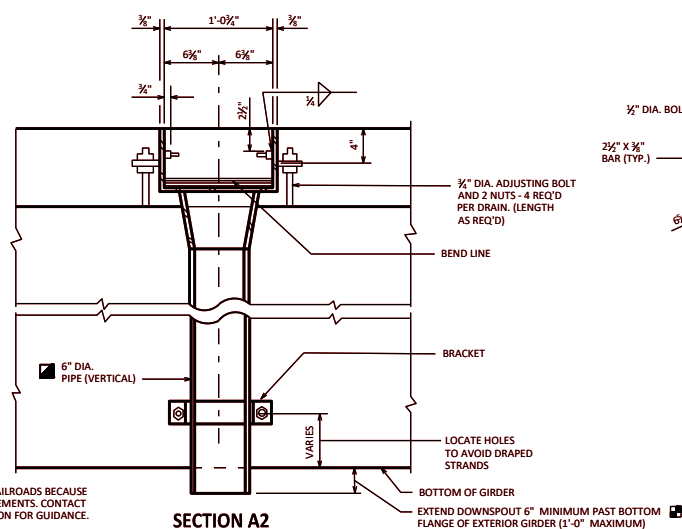
BUREAU OF
STRUCTURES

APPROVED: *Laura Shadewald*

DATE:
1-20



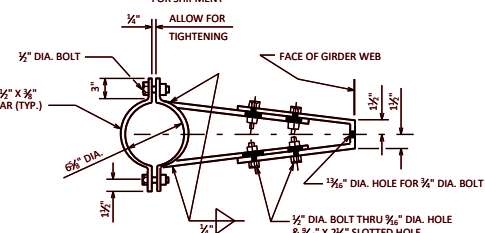
DETAIL NOT TO BE USED OVER RAILROADS BECAUSE IT VIOLATES CLEARANCE REQUIREMENTS. CONTACT RAILROADS AND HARBORS SECTION FOR GUIDANCE.



SECTION A2

— EXTEND DOWNSPOUT 6" MINIMUM PAST BOTTOM FLANGE OF EXTERIOR GIRDER (1'-0" MAXIMUM)

ON THE PRESTRESSED GIRDER SHEET, SHOW
LOCATION OF HOLES FOR BRACKET ANCHORAGE
FROM TOP/BOTTOM AND END OF GIRDER.



BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE: 1-20

NOTES

ALL MATERIAL FOR TYPE "WF" CASTING AND 8" DIA. CONNECTION PIPE, EXCLUDING GRATE HOLD DOWN SCREWS, SHALL BE GRAY IRON CONFORMING TO ASTM A48, CLASS 30.

MATERIAL FOR BRACKETS SHALL CONFORM TO ASTM A36.

ALTERNATE BRACKETS ARE NOT ALLOWED.

ALL MATERIAL FOR FLOOR DRAINS TO BE INCLUDED IN THE BID ITEM "FLOOR DRAINS TYPE WF".

ALL MATERIAL FOR DOWNSPOUTS, DOWNSPOUT CONNECTIONS, AND BRACKETS TO BE INCLUDED IN THE BID ITEM "DOWNSPOUT 8-INCH".

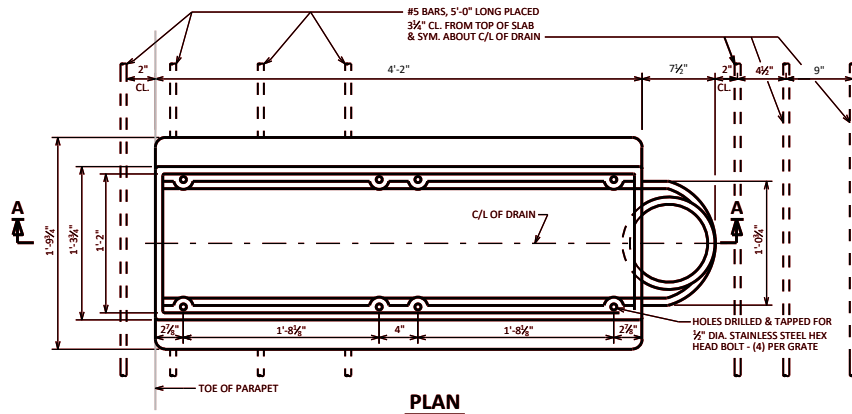
8" DIA. DOWNSPOUTS SHALL BE REINFORCED THERMOSETTING RESIN PIPE (RTRP).

TRANSVERSE & LONGITUDINAL SLAB BAR REINFORCEMENT TO BE CUT A MAXIMUM OF 1" CLEAR FROM DRAIN FRAME. DISPLACE BARS WHERE POSSIBLE.

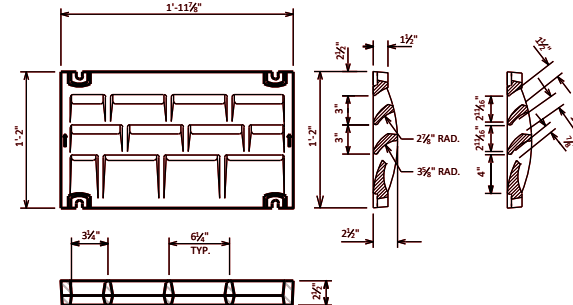
DESIGNER NOTES

ON THE PRESTRESSED GIRDER SHEET, SHOW LOCATION OF HOLES FOR BRACKET ANCHORAGE FROM TOP/BOTTOM AND END OF GIRDER.

* A DECK X-SLOPE OF 2% PROVIDES AN INTERNAL SLOPE OF 8% (AS SHOWN IN THIS DETAIL) AND A PLUMB DOWNSPOUT COUPLER CONNECTION. DECK X-SLOPE MAY BE ADJUSTED UP TO 6% TO MAINTAIN AN INTERNAL SLOPE OF 2%.

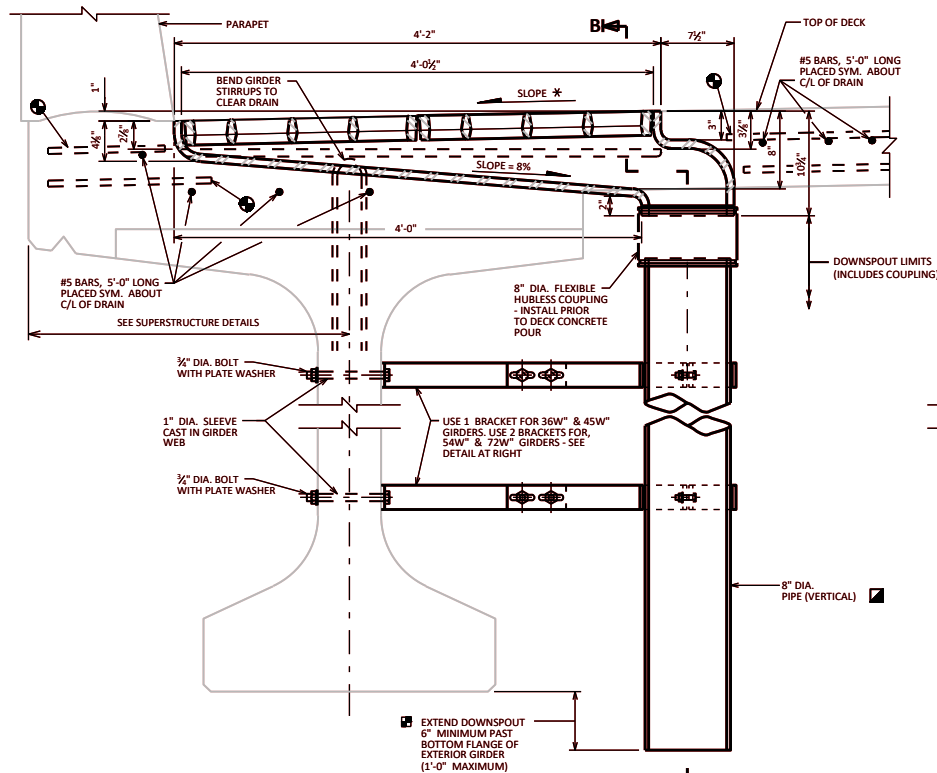


PLAN

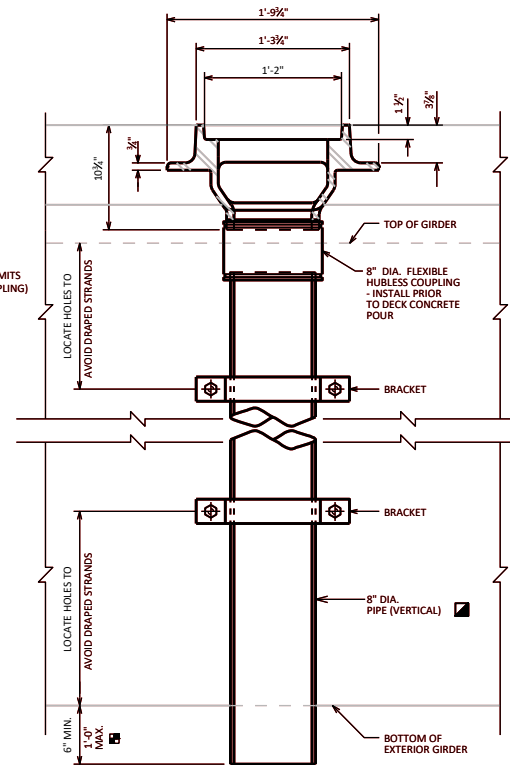


GRATE CASTING DETAILS

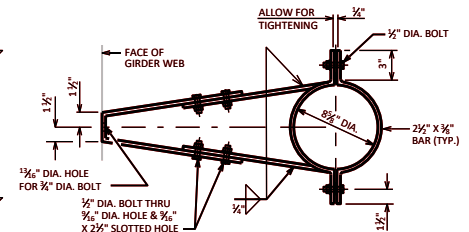
ATTACH GRATES TO FRAME FOR SHIPMENT



SECTION A-A



SECTION B-B



BRACKET DETAIL

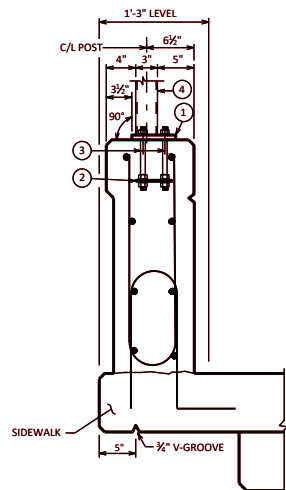
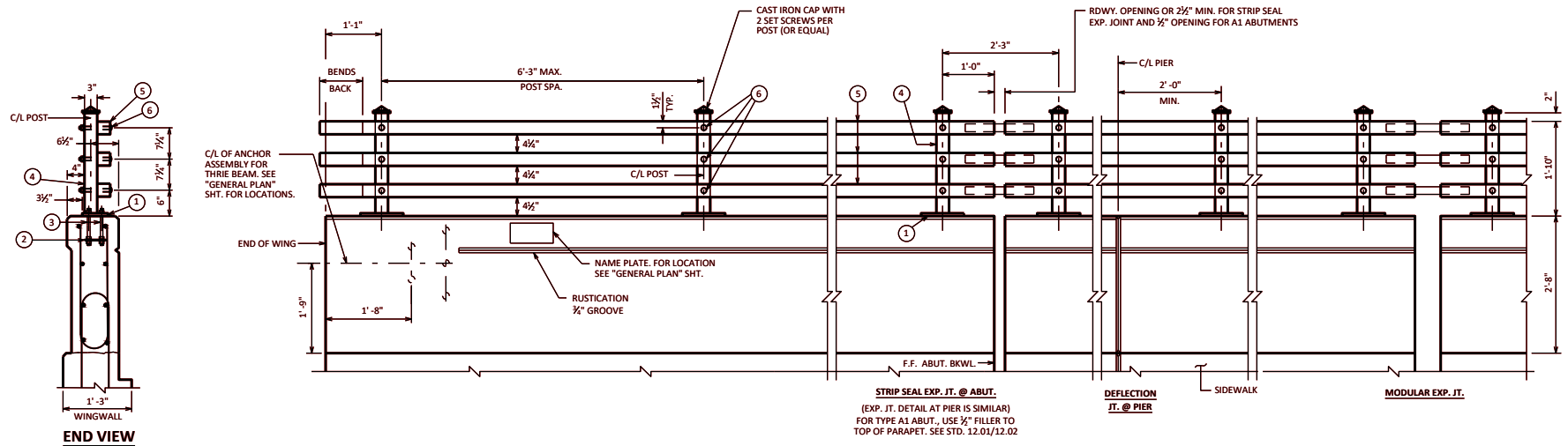
FLOOR DRAIN TYPE 'WF'



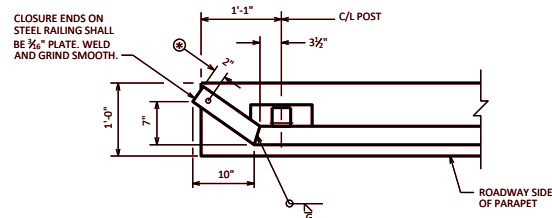
BUREAU OF
STRUCTURES

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DATE:
7-25



*ADJUST LOCATIONS OF BARS TO ALLOW PLACEMENT OF ANCHOR ASSEMBLY FOR RAILING AND BEAM GUARD.



DESIGNER NOTES

SEE STANDARD 30.09 FOR ADDITIONAL RAILING DETAILS

SEE STANDARD 30.07 FOR:

- DEFLECTION JOINT DETAILS AND NOTES
- BEAM GUARD ANCHOR ASSEMBLY DETAILS
- SIDEWALK REINFORCEMENT AND DETAILS
- PARAPET REINFORCING BAR SIZE AND SPACING

STEEL RAILING WEIGHT = 25 LB/FT
BASED ON 6'-3" POST SPA.

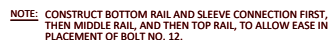
COMBINATION RAILING TYPE '3T'



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DATE:
1-19



★ NOTE: ANCHOR PLATE NOT REQUIRED WHEN ADHESIVE ANCHORS ARE USED.



(2 SETS PER POST)



★MIN. 5/8" FLAT SURFACE DIA. PUNCHINGS OR STUDS MAY BE USED AS AN ALTERNATE.

— PROVIDE $\frac{3}{4}$ " DIA. DRAIN HOLES IN LOW END OF ALL RAILS, CLEAR OF SPLICE SLEEVE.

- 1) BASE PLATE $3\frac{1}{2}$ " $\times$ $6\frac{1}{2}$ " $\times$ 10" WITH $\frac{3}{16}$ " $\times$ 12" SLOTTED HOLES FOR THIRD RODS NO.3 WELD TO NO.4 AS SHOWN. SLOTS PARALLEL TO LONG SIDE OF PLATE.
- 2) $\frac{3}{16}$ " $\times$ 5" $\times$ 9" ANCHOR PLATE (GALVANIZED) WITH $\frac{3}{16}$ " DIA. HOLES FOR THRD. RODS NO.3.
- 3) $\frac{1}{4}$ " DIA. $\times$ 9" LONG, TYPE 316 STAINLESS STEEL THREADED RODS (MIN. TENSILE STRENGTH = 70 KSI) WITH NUTS AND WASHERS OF SAME ALLOY GROUP.
- 4) STRUCTURAL TUBING 3" $\times$ 3" $\times$ $\frac{3}{16}$ " POSTS, PLACE VERTICAL. WELD TO NO.1, AND USE 1" DIA. HOLES (FRONT AND BACK) FOR BOLT NO.6.
- 5) STRUCTURAL TUBING 3" $\times$ 3" $\times$ $\frac{3}{16}$ " RAILS, WITH $\frac{3}{16}$ " DIA. HOLES (FRONT AND BACK) FOR BOLT NO.6. BOLT TO NO.4.
- 6) $\frac{3}{16}$ " DIA. A325 SLOTTED ROUND HEAD BOLT WITH HEX NUT, $\frac{3}{16}$ " $\times$ 12" $\times$ 12" WASHER, AND LOCK WASHER.
- 7) RECTANGULAR SLEEVE FABRICATED FROM $\frac{1}{16}$ " PLATES. PROVIDE "SLIDING FIT".
- 8) RECTANGULAR SLEEVE FABRICATED FROM $\frac{1}{16}$ " PLATES. (1'-4" @ FIELD ERECTION ITS). (1'-4" @ STRIP SEAL ERECTION ITS).
- 9) SLEEVE FABRICATED FROM STRUCTURAL TUBING $2\frac{1}{2}$ " $\times$ $2\frac{1}{2}$ " $\times$ $\frac{3}{16}$ " $\times$ 1" LONG. SLOTTED HOLES IN TOP AND BOTTOM.
- 10) $\frac{1}{4}$ " DIA. SLOTTED STEEL BOLT WITH NUT AND LOCKWASHER.

★ **ALTERNATIVE ANCHORAGE: 4 EQUIVALENT STAINLESS STEEL CONCRETE ADHESIVE ANCHORS $\frac{5}{8}$ - INCH. EMBED 7" IN CONCRETE. ADHESIVE ANCHORS SHALL CONFORM TO SECTIONS 502.2.12 AND 502.3.14 OF THE STANDARD SPECIFICATIONS.**

BID ITEM SHALL BE "RAILING STEEL TYPE 3T", WHICH SHALL INCLUDE ALL STEEL ITEMS SHOWN.

POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT, AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUT.

ENDS OF STRUCTURAL TUBING SHALL BE SAWED. GRIND SMOOTH EXPOSED EDGES. ALL CUT ENDS SHALL BE TRUE AND SMOOTH.

ALL PLATES, AND RECTANGULAR SLEEVES SHALL CONFORM TO ASTM A709 GRADE 36. ALL STRUCTURAL TUBING SHALL CONFORM TO ASTM A500 GRADE B.

ANCHORAGES SHALL BE ACCURATELY PLACED TO PROVIDE CORRECT ALIGNMENT OF RAILING. SET NORMAL TO GRADE.

CUT BOTTOM OF POST TO MAKE POST VERTICAL IN BOTH TRANSVERSE AND LONGITUDINAL DIRECTION.

STEEL SHIMS SHALL BE PROVIDED & USED UNDER BASE PLATE NO. 1, WHERE REQUIRED FOR ALIGNMENT, AND SHALL BE GALVANIZED.

 CAULK AROUND PERIMETER OF BASE PLATES, NO. 1, AND FILL BOLT SLOT OPENINGS IN SHIMS AND BASE PLATES WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

ALL JOINTS IN CONCRETE PARAPET ARE TO BE VERTICAL.

ALL MATERIAL (EXCEPT NO. 3 & 12) SHALL BE GALVANIZED AFTER FABRICATION. PRIOR TO GALVANIZING, THE STEEL RAILING SHALL BE GIVEN A NO. 6 BLAST CLEANING PER SSPC SPECIFICATIONS.

VENT HOLES SHALL BE DRILLED IN POST AND RAIL MEMBERS AS REQUIRED TO FACILITATE GALVANIZING AND DRAINAGE.

RAILING SHALL BE FABRICATED IN LENGTHS THAT INCLUDE 3 OR 4 POSTS.

WHEN PAINTING REQ'D: (ADD)

PAINT OVER GALVANIZING (EXCEPT NO. 2) WITH AN APPROVED TIE COAT AND TOP COAT AS SPECIFIED IN THE CONTRACT DOCUMENTS. THE RAILING SHALL BE PAINTED AMS STD. COLOR NO. (FILL IN COLOR NAME).

INSIDE OF TUBES TO BE PAINTED AT ALL FIELD ERECTION AND EXPANSION JOINTS.

TOUCH-UP PAINTING TO BE DONE AT COMPLETION OF STEEL RAILING INSTALLATION TO THE SATISFACTION OF THE ENGINEER AT NO EXTRA COST.

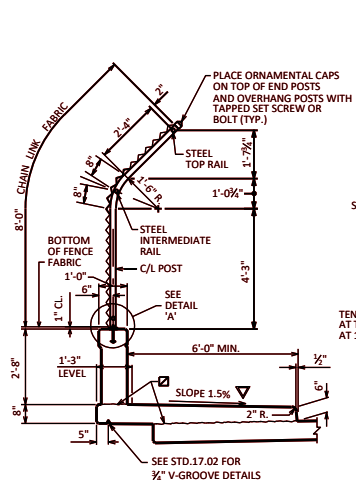
COMBINATION RAILING TYPE '3T' DETAILS



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
1-20

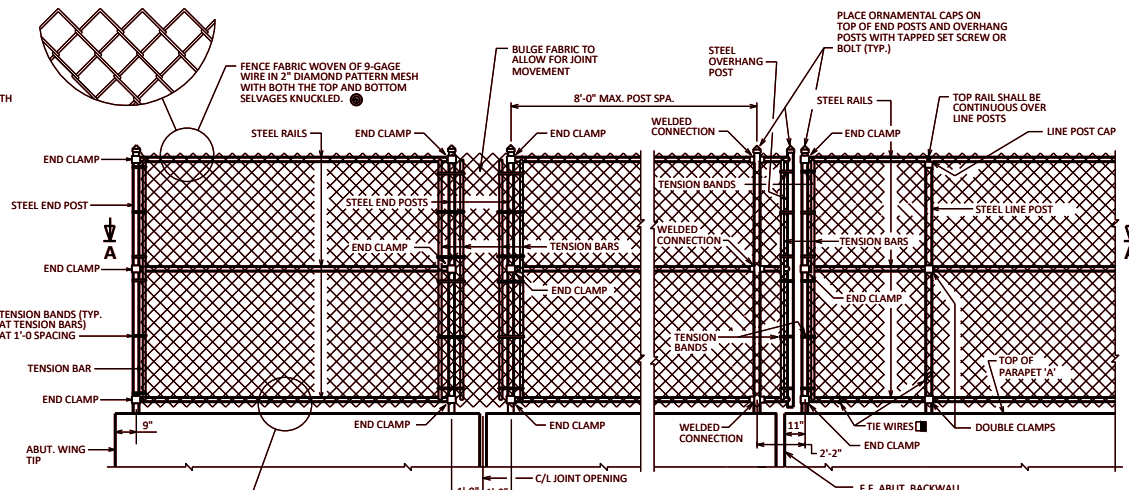


SECTION THRU FENCE ON PARAPET 'A'

PROTECTIVE SCREENING MAY BE BENT OR STRAIGHT FOR RAISED SIDEWALKS OR SIDEWALKS SEPARATED FROM TRAFFIC BY A BARRIER. SEE BRIDGE MANUAL 30.3 (14) FOR ADDITIONAL GUIDANCE. SEE STD. 30.07 FOR PARAPET REINFORCEMENT AND DETAILS. SEE STD. 17.01 FOR SIDEWALK REINFORCEMENT AND DETAILS.

CONST. JOINT - STRIKE OFF & LEAVE ROUGH

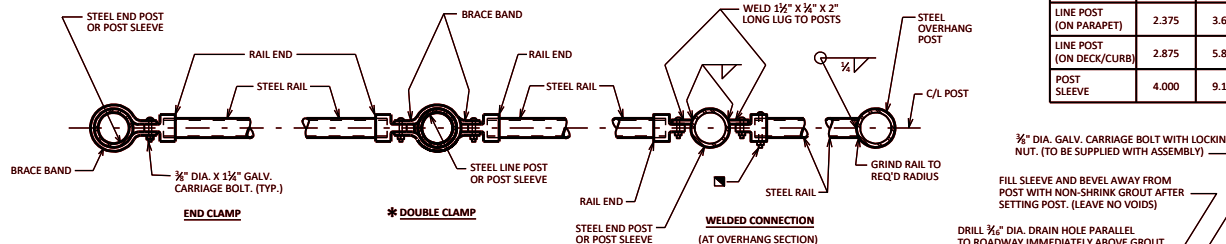
± 0.5% CONSTRUCTION TOLERANCE IN SIDEWALK CROSS SLOPE. THE SIDEWALK CROSS SLOPE SHALL NOT EXCEED 2% WITHOUT PRIOR APPROVAL FROM THE ENGINEER.



FENCE PART ELEVATION (OUTSIDE VIEW OF PARAPET 'A')

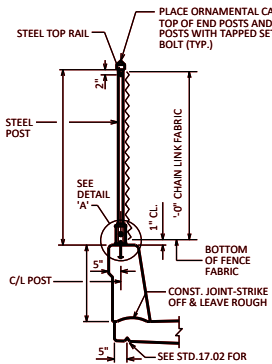
FENCE MEMBER SIZE & WEIGHT

STEEL FENCE MEMBER	OUTSIDE DIAMETER (INCHES)	WEIGHT (LB/FT)
RAILS	1.660	2.27
END POST	2.875	5.80
OVERHANG POST	2.875	5.80
LINE POST (ON PARAPET)	2.375	3.65
LINE POST (ON DECK/CURB)	2.875	5.80
POST SLEEVE	4.000	9.12



SECTION A-A

NOTE: PLACE ALL BOLT HEADS ON SIDE OF FENCE ADJACENT TO PEDESTRIANS



SECTION THRU FENCE ON SINGLE SLOPE PARAPET

FOR TRAFFIC BARRIER APPLICATION, USE STRAIGHT POSTS (NOT BENT POSTS)

POST SHIM DETAILS

SHIMS REQUIRED ONLY WHEN END POSTS AND LINE POSTS ARE WELDED TO BASE PLATES. PROVIDE 4 SHIMS PER POST. USE WHERE REQUIRED FOR ALIGNMENT.

ANCHOR PLATE

ANCHOR PLATE NOT REQUIRED WHEN ADHESIVE ANCHORS ARE USED.

BASE PLATE

DETAIL 'A'

UNIT SHALL BE GALVANIZED AFTER FABRICATION

NOTE: IN LIEU OF USING THE POST SLEEVE, THE FENCE POST MAY BE WELDED TO THE BASE PLATE.

NOTES

POSTS ARE TO BE SET VERTICAL.

METALLIC-COATED FENCE SYSTEM:

ALL FENCE COMPONENTS SHALL BE GALVANIZED STEEL, EXCEPT THE FENCE FABRIC WHICH MAY BE ALUMINUM-COATED STEEL OR GALVANIZED STEEL.

FABRIC SHALL CONFORM TO ASTM A491, OR A392, CLASS 2. STEEL RAILS, POSTS AND POST SLEEVES SHALL CONFORM TO ASTM F1083, STANDARD WEIGHT PIPE (SCHEDULE 40). FITTINGS SHALL CONFORM TO ASTM F626.

THE BID ITEM SHALL BE "FENCE CHAIN LINK - FT."

POLYMER-COATED FENCE SYSTEM:

ALL FENCE COMPONENTS SHALL BE GALVANIZED STEEL WITH A COLORED POLYMER-COATING ON THE OUTSIDE.

FABRIC SHALL CONFORM TO ASTM F668, CLASS 2B. STEEL RAILS, POSTS AND POST SLEEVES SHALL CONFORM TO ASTM F1083, STANDARD WEIGHT PIPE (SCHEDULE 40). FITTINGS SHALL CONFORM TO ASTM F626. SEE THE "BRIDGE SPECIAL PROVISIONS" FOR ADDITIONAL DETAILS.

THE COLOR OF POLYMER-COATING FOR THIS STRUCTURE SHALL BE (SPECIFY: DARK GREEN, BROWN OR BLACK) IN ACCORDANCE WITH ASTM F934.

THE BID ITEM SHALL BE "FENCE CHAIN LINK POLYMER - COATED - FT. B -"

COMPLETE ANY REQUIRED WELDING OF COMPONENTS BEFORE GALVANIZING.

POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUT.

BASE PLATES, ANCHOR PLATES AND SHIMS SHALL BE ASTM A709, GRADE 36.

ALL POST SPACINGS ARE MEASURED HORIZONTALLY ALONG THE C/L OF THE POST.

CAULK AROUND PERIMETER OF BASE PLATE AND FILL PORTION OF SLOTTED HOLE AROUND ANCHOR BOLT IN SHIM WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

ALTERNATE TO DOUBLE CLAMP: USE LINE RAIL CLAMP (BOULEVARD) OR 180° BRACE BAND, WHICH MAY BE USED WHEN THE POSTS ARE EITHER BOLTED TO THE POST SLEEVES OR DIRECTLY WELDED TO THE BASE PLATE.

ANCHOR BOLTS, NUTS AND WASHERS SHALL BE EITHER STAINLESS STEEL OR ASTM 307. IF 307 IS USED, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED.

ALTERNATIVE ANCHORAGE: CONCRETE ADHESIVE ANCHORS ½" INCH EMBED 7" IN CONCRETE. ADHESIVE ANCHORS SHALL CONFORM TO SECTIONS 502.2.12 AND 502.3.14 OF THE STANDARD SPECIFICATIONS.

ATTACH FABRIC TO RAILS, AND TO POSTS WITHOUT TENSION BANDS, WITH THE WIRES (ROUND, 9-GAGE) SPACED AT 1'-0".

RAIL TO RAIL END TO SECURE OVERHANG SECTION. ALTERNATE IS TO WELD RAIL DIRECTLY TO END POST.

MINIMUM LENGTH OF TOP RAIL BETWEEN SPICES SHALL BE 20'-0". LOCATE SPICES NEAR ¼ POINT OF POST SPACING.

DESIGNER NOTES

THIS STANDARD MAY BE USED ON STRUCTURES WITH A 45 M.P.H. DESIGN SPEED OR LESS, OR WHEN THE SIDEWALK IS SEPARATED FROM THE ROADWAY BY A PARAPET. 8'-0" MAXIMUM POST SPACING WITH 8'-0" MAXIMUM FENCE FABRIC HEIGHT WHEN MOUNTED ON PARAPET.

SEE STANDARD 30.40 WHEN MOUNTED ON CURB OR DECK.

THE CHAIN LINK FENCE SYSTEM SELECTED FOR THE STRUCTURE SHALL BE A "METALLIC-COATED FENCE SYSTEM" OR A "POLYMER-COATED FENCE SYSTEM".

A 1" MESH MAY BE USED ON PROTECTIVE SCREENING IN HIGHLY VULNERABLE AREAS, OR AS STATED IN FDM PROCEDURE 11-35-1 FOR PROTECTIVE SCREENING.

PEDESTRIAN RAILING MAY BE USED ON WINGWALL PARAPETS IF CHAIN LINK FENCE DOES NOT CONTINUE BEYOND BRIDGE.

HANDRAILS SHALL BE USED ALONG BRIDGE SIDEWALKS WHERE THE SLOPE OF THE SIDEWALK IS GREATER THAN 5%. TOP OF HANDRAIL GRIPPING SURFACES SHALL BE MOUNTED BETWEEN 30" & 34" ABOVE SIDEWALK SURFACE. USE 30" NEAR SCHOOL ZONES, IF FEASIBLE. HANDRAILS SHALL BE PROVIDED ALONG BOTH SIDES OF SIDEWALK. FOR HANDRAIL DETAILS SEE STANDARD 37.02.

FOR DEAD LOAD PURPOSES, THE SUPERSTRUCTURE DESIGN SHALL ACCOUNT FOR A MAXIMUM 2% SIDEWALK CROSS SLOPE.

CHAIN LINK FENCE DETAILS



BUREAU OF STRUCTURES

APPROVED: Laura Shadewald

DATE: 1-25

NOTES

POSTS ARE TO BE SET VERTICAL.

METALLIC-COATED FENCE SYSTEM:

ALL FENCE COMPONENTS SHALL BE GALVANIZED STEEL, EXCEPT THE FENCE FABRIC WHICH MAY BE ALUMINUM-COATED STEEL OR GALVANIZED STEEL.

FABRIC SHALL CONFORM TO ASTM A491, OR A392, CLASS 2. STEEL RAILS, POSTS AND POST SLEEVES SHALL CONFORM TO ASTM F1083, STANDARD WEIGHT PIPE (SCHEDULE 40). FITTINGS SHALL CONFORM TO ASTM F626.

THE BID ITEM SHALL BE "FENCE CHAIN LINK _ - FT."

POLYMER-COATED FENCE SYSTEM:

ALL FENCE COMPONENTS SHALL BE GALVANIZED STEEL WITH A COLORED POLYMER-COATING ON THE OUTSIDE.

FABRIC SHALL CONFORM TO ASTM F668, CLASS 2B. STEEL RAILS, POSTS AND POST SLEEVES SHALL CONFORM TO ASTM F1083, STANDARD WEIGHT PIPE (SCHEDULE 40). FITTINGS SHALL CONFORM TO ASTM F626. SEE THE "BRIDGE SPECIAL PROVISIONS" FOR ADDITIONAL DETAILS.

THE COLOR OF POLYMER-COATING FOR THIS STRUCTURE SHALL BE [SPECIFY: DARK GREEN, BROWN OR BLACK] IN ACCORDANCE WITH ASTM F934.

THE BID ITEM SHALL BE "FENCE CHAIN LINK POLYMER-COATED _ - FT. B. _ - FT."

ALL POST SPACINGS ARE MEASURED HORIZONTALLY ALONG THE C/L OF THE POST.

ANCHOR RODS SHALL BE F1554 GRADE 36. BOLTS SHALL BE ASTM A307, NUTS SHALL BE ASTM A563, AND WASHERS SHALL BE ASTM A436. POST CLAMPS AND POST CLAMP SPACERS SHALL BE ASTM A709, GRADE 36. TENSION WIRE SHALL BE 7 GAGE STEEL WIRE COATED IN ACCORDANCE WITH ASTM A824 AND A817 AS EITHER TYPE I (ALUMINUMIZED) OR TYPE II, CLASS 4 (GALVANIZED).

ANCHOR RODS, BOLTS, NUTS, POST CLAMPS, POST CLAMP SPACERS AND WASHERS SHALL BE GALVANIZED.

COMPLETE ANY REQUIRED WELDING OF COMPONENTS BEFORE GALVANIZING.

▲ CONCRETE ADHESIVE ANCHORS $\frac{3}{8}$ "-INCH. EMBED 5" IN CONCRETE. ADHESIVE ANCHORS SHALL CONFORM TO SECTIONS 502.2.12 AND 502.3.14 OF THE STANDARD SPECIFICATIONS.

■ ATTACH FABRIC TO RAILS, AND TO POSTS WITHOUT TENSION BANDS, WITH TIE WIRES (ROUND, 9-GAGE) SPACED AT 1'-0".

PROVIDE TENSION POST AND BRACE RAILS TO LIMIT TENSION WIRE RUNS TO LESS THAN 500 FEET.

DESIGNER NOTES

THE SIDE-MOUNTED CHAIN LINK FENCE SHOULD ONLY BE USED WHEN THE DESIGN SPEED EXCEEDS 45 MPH AND PROTECTIVE SCREENING IS WARRANTED. 8'-0" MAXIMUM POST SPACING WITH 8'-0" MAXIMUM FENCE FABRIC HEIGHT WHEN MOUNTED ON PARAPET. FOR DESIGN SPEEDS 45 MPH OR LESS, THE TOP-MOUNTED CHAIN LINK FENCE (STANDARD 30.11) SHOULD BE USED.

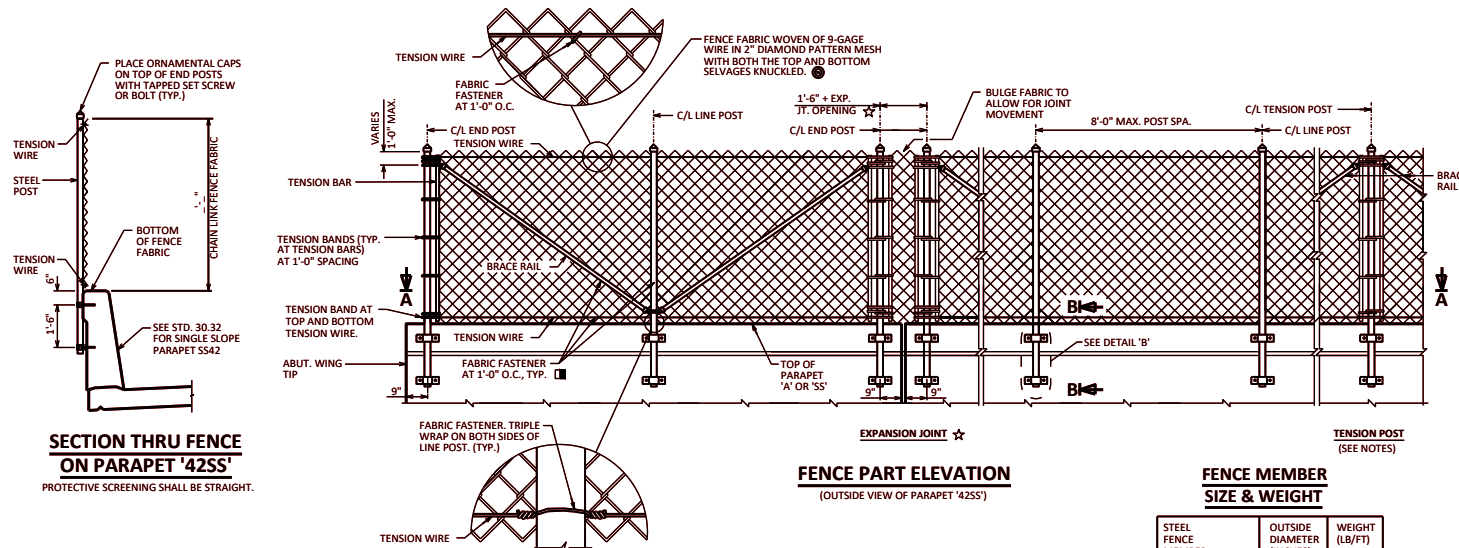
THE CHAIN LINK FENCE SYSTEM SELECTED FOR THE STRUCTURE SHALL BE A "METALLIC-COATED FENCE SYSTEM" OR A "POLYMER-COATED FENCE SYSTEM".

PROVIDE 6'-0" CHAIN LINK FENCE FABRIC, UNLESS DIRECTED OTHERWISE. SEE BRIDGE MANUAL 30.9 FOR ADDITIONAL INFORMATION.

● A 1" MESH MAY BE USED ON PROTECTIVE SCREENING IN HIGHLY VULNERABLE AREAS, OR AS STATED IN FDM PROCEDURE 11-35-1 FOR PROTECTIVE SCREENING.

★ EXPANSION JOINT OPENING $\leq 6'$ OF MOVEMENT. FOR FIXED JOINTS MAINTAIN TYP. VERT. POST SPA. ACROSS JOINT AND PLACE TENSION BAR ON END POST. FOR JOINT OPENINGS $> 6'$ REFER TO STD. 30.11.

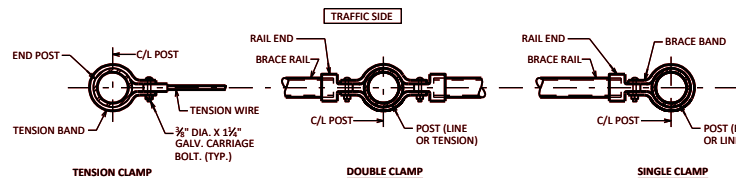
WEIGHT OF CHAIN LINK FENCE:
(BASED ON 8 FT. POST SPACING)
6 FT. HIGH FENCE = 18 LB / FT
8 FT. HIGH FENCE = 21 LB / FT



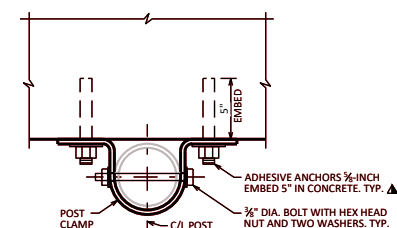
FENCE PART ELEVATION
(OUTSIDE VIEW OF PARAPET '42SS')

FENCE MEMBER SIZE & WEIGHT

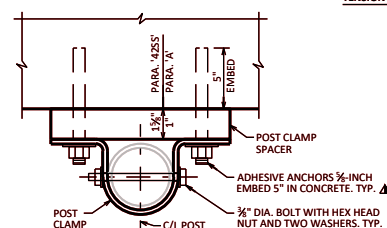
STEEL FENCE MEMBER	OUTSIDE DIAMETER (INCHES)	WEIGHT (LB/FT)
POST (END, LINE, OR TENSION)	3.50	7.576
BRACE RAIL	1.66	2.273



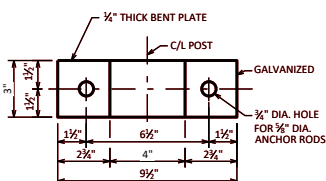
SECTION A-A
NOTE: PLACE ALL BOLT HEADS ON THE TRAFFIC SIDE



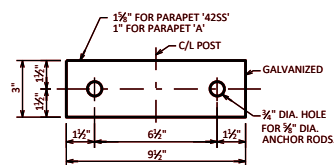
SECTION C-C



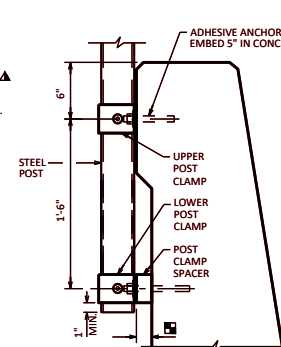
SECTION D-D



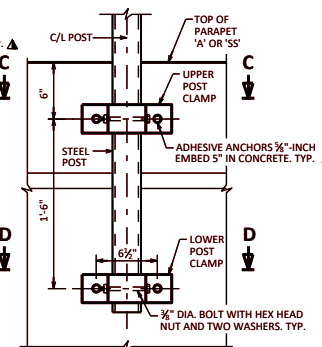
POST CLAMP DETAIL



POST CLAMP SPACER DETAIL



SECTION B-B



DETAIL 'B'

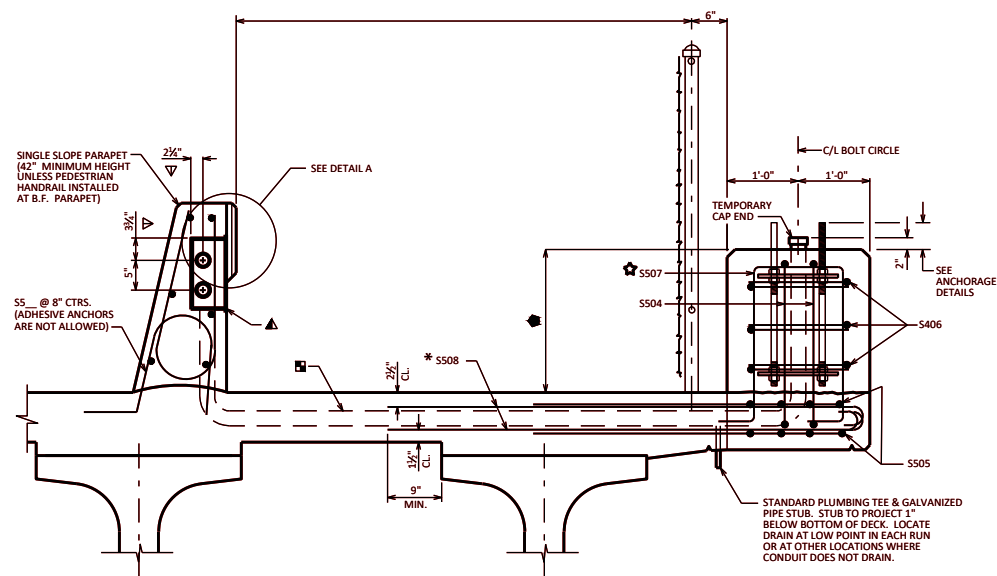
CHAIN LINK FENCE SIDE-MOUNTED DETAILS



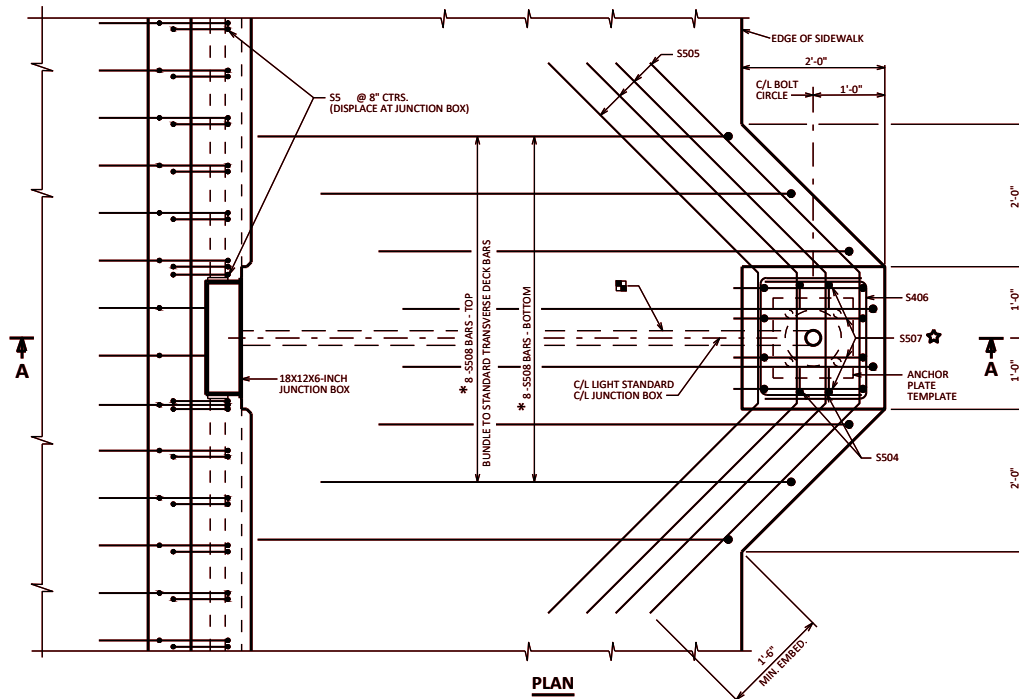
BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

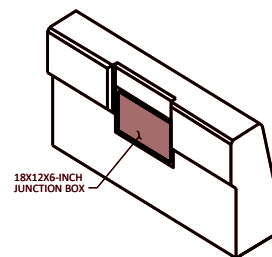
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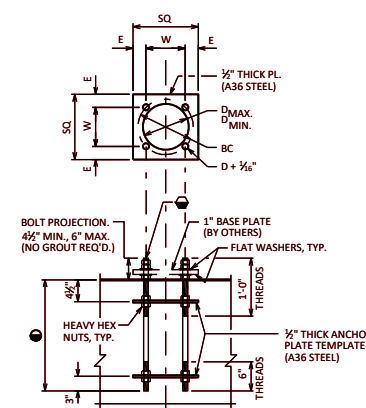
SECTION A-A



PLAN

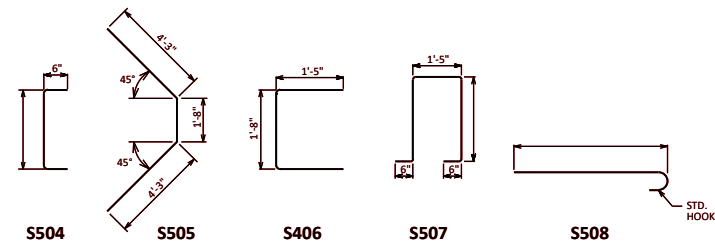


DETAIL A
SHOWING B.F. OF PARAPET WITH
BLOCK OUT FOR JUNCTION BOX.



ANCHOR ROD ASSEMBLY DETAILS

SINGLE ASSEMBLY SHOWN
(4) - RODS REQUIRED PER ASSEMBLY



- ANCHOR RODS
 - 1\"/>
- STAND-ALONE PEDESTAL
 - 1\"/>
- STAND-ALONE PEDESTAL
 - 1\"/>
- PARAPET BLISTER
 - SEE STANDARD 30.21
- CUT OUT $\pm 1'$ OF GASKET AT BOTTOM OF JUNCTION BOX COVER TO ALLOW FOR DRAINAGE.
- LOCATION OF CONDUIT IS MEASURED FROM OUTSIDE EDGE OF JUNCTION BOX.
- TIE IN PLACE AFTER ANCHOR BOLT ASSEMBLY LOCATED.
- THESE BARS ARE IN ADDITION TO STANDARD TRANSVERSE BARS IN DECK.
- CONDUIT SIZE (SELECT ONE):
 - FOR DECK THICKNESS $\leq 8\frac{1}{2}''$ - 1 $\frac{1}{2}''$ DIA. RIGID NONMETALLIC CONDUIT. (DESIGNER TO VERIFY CONDUIT SIZE BASED ON SERVICE NEEDS)
 - FOR DECK THICKNESS $> 8\frac{1}{2}''$ - 2\"/>

NOTE
BID ITEM SHALL BE "ANCHOR ASSEMBLY POLES ON STRUCTURES", EACH

DESIGNER NOTES
ANCHORAGE DETAIL FOR "TYPE 5 LIGHT POLE". ANCHORAGE FOR OTHER LIGHT POLE TYPES MUST BE DESIGNED.

SEE STD. 30.11 FOR FENCE DETAILS.

SEE STD. 30.21 FOR:
- ADDITIONAL NOTES
- END OF BRIDGE DETAILS

THIS STANDARD IS NOT INTENDED TO BE USED WITH TRANSFORMER BASES.

THIS STANDARD ACCOMMODATES A MAXIMUM 15\"/>

BILL OF BARS

BAR MARK	CONV.	NO. REQ'D.	LENGTH	UNIT	LOCATION
S504	X			X	LIGHT STD., VERT.
S505	X	10-2		X	LIGHT STD., HORIZ. IN DECK
S406	X	4-4		X	LIGHT STD., HORIZ.
S507	X			X	LIGHT STD., VERT.
S508	X			X	LIGHT STD., TRANSV. IN DECK

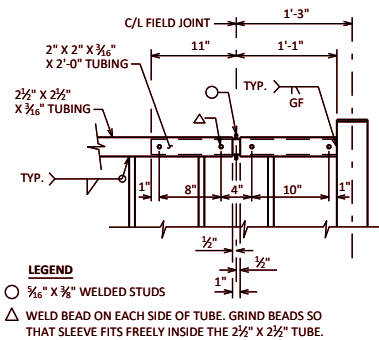
LIGHTING DETAIL



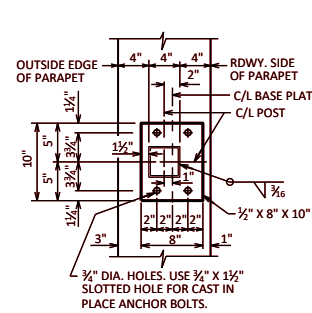
BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

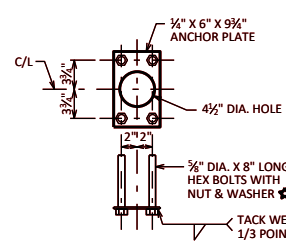
DATE:
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RAILING EXPANSION JOINT DETAIL

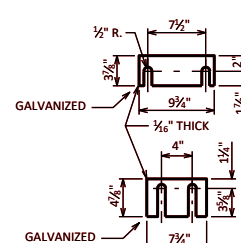


BASE PLATE

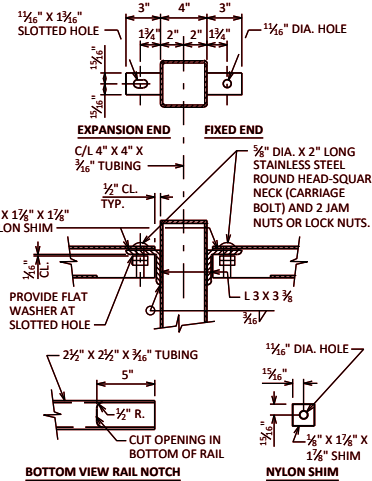


ANCHORAGE DETAIL

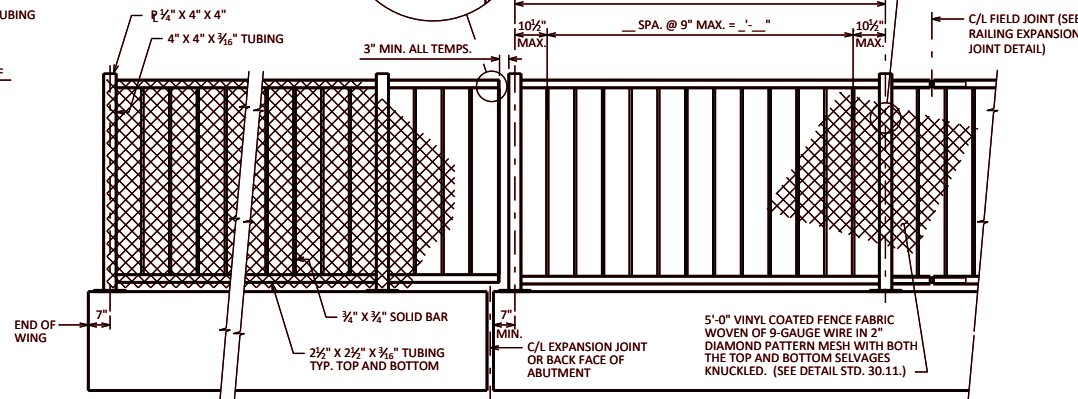
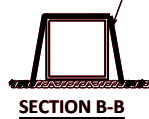
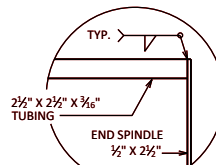
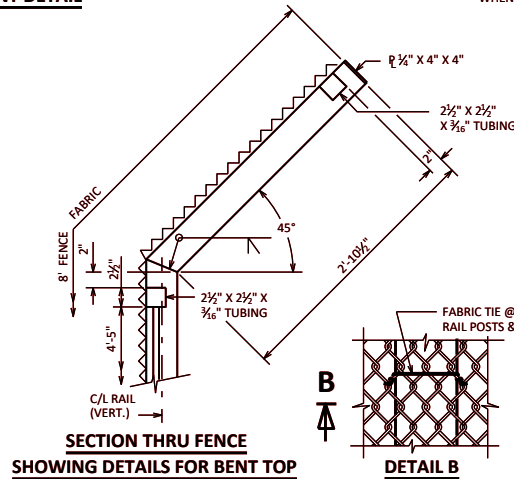
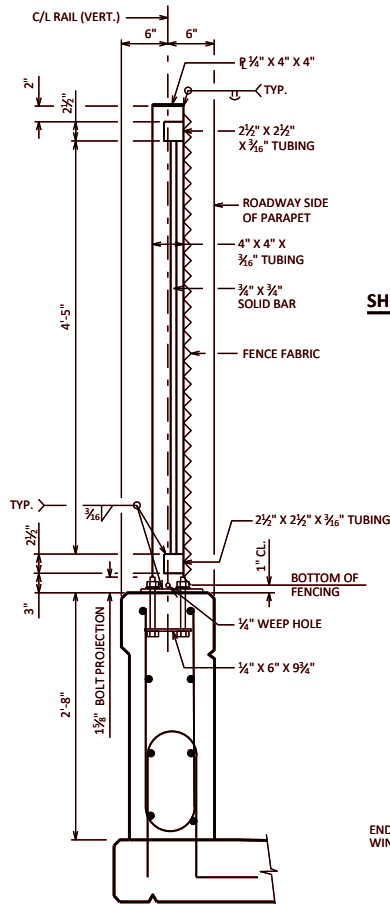
NOTE: ANCHOR PLATE NOT REQUIRED WHEN ADHESIVE ANCHORS ARE USED.



SHIM PLATE DETAILS



TOP RAIL CONNECTION FOR FENCE W/ BENT TOP



NOTES

POSTS SHALL BE SET VERTICAL IN THE TRANSVERSE DIRECTION. CUT BOTTOM OF POST ACCORDINGLY.

POSTS SHALL BE SET (SELECT AS REQ'D: NORMAL TO GRADE OR VERTICAL) IN THE LONGITUDINAL DIRECTION.

ANCHORAGES SHALL BE ACCURATELY PLACED TO PROVIDE CORRECT ALIGNMENT OF RAILING.

ALL POST SPACING ARE TAKEN HORIZONTAL ALONG CENTERLINE OF RAILING AT BASE OF POST.

POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUT.

STRUCTURAL TUBING SHALL CONFORM TO ASTM A500, GRADE B. PLATES, ANGLES, BARS AND SHIMS SHALL CONFORM TO ASTM A709, GRADE 36. FENCE FABRIC SHALL CONFORM TO ASTM F668, CLASS 2B.

STEEL SHIMS SHALL BE PROVIDED & USED UNDER BASE PLATES WHERE REQUIRED FOR ALIGNMENT, AND SHALL BE GALVANIZED.

CAULK AROUND PERIMETER OF BASE PLATES AND FILL PORTION OF SLOTTED HOLES AROUND ANCHOR BOLTS WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

ANCHOR BOLTS, NUTS AND WASHERS SHALL BE EITHER STAINLESS STEEL OR ASTM 307. IF 307 IS USED, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED.

THE BID ITEM SHALL BE "RAILING TUBULAR SCREENING" WHICH SHALL INCLUDE ALL ITEMS SHOWN.

RAILING SHALL BE FABRICATED IN LENGTHS THAT INCLUDE NOT MORE THAN 3 POSTS.

VENT HOLES SHALL BE DRILLED IN MEMBERS AS REQUIRED TO FACILITATE GALVANIZING AND DRAINAGE.

ALL RAILING MATERIAL SHALL BE GALVANIZED AFTER FABRICATION. PRIOR TO GALVANIZING THE STEEL RAILING SHALL BE GIVEN A NO. 6 BLAST CLEANING PER SSPC SPECIFICATIONS. PAINT OVER GALVANIZING WITH AN APPROVED THE COAT AND TOP COAT AS SPECIFIED IN THE CONTRACT DOCUMENTS. THE RAILING SHALL BE PAINTED AMS STD. COLOR NO. (FILL IN COLOR NAME). FENCE FABRIC AND TIES TO BE VINYL-COATED. COLOR SHALL BE (SPECIFY: DARK GREEN, BROWN OR BLACK) IN ACCORDANCE WITH ASTM F934.

THE END OF THE FABRIC SHALL BE ATTACHED TO THE POST BY MEANS OF A TENSION BAR THREADED THROUGH THE END LOOPS OF THE FABRIC AND SECURED TO THE POST WITH CLAMPS & BOLT. THE FABRIC SHALL BE STRETCHED TO REMOVE ALL SLACK.

DESIGNER NOTES

TUBULAR SCREENING MAY BE USED ON STRUCTURES WITH A 45 M.P.H. DESIGN SPEED OR LESS, OR WHEN THE SIDEWALK IS SEPARATED FROM THE ROADWAY BY A PARAPET. 10'-0" MAXIMUM POST SPACING WITH 8'-0" MAXIMUM FENCE FABRIC HEIGHT WHEN MOUNTED ON PARAPET.

THIS RAILING MAY BE MOUNTED DIRECTLY TO A SIDEWALK CURB OR DECK PROVIDED IT IS SEPARATED FROM THE ROADWAY BY A TRAFFIC BARRIER. USE 6" CLEAR SPACING BETWEEN VERTICAL MEMBERS IF CHAIN LINK FENCE IS NOT USED. 8'-0" MAXIMUM POST SPACING WITH 8'-0" MAXIMUM FENCE FABRIC HEIGHT WHEN MOUNTED ON CURB OR DECK.

SEE STANDARD 30.40 WHEN MOUNTED ON CURB OR DECK.

FENCE HEIGHT, BENT OR STRAIGHT, MESH SIZE, COATING AND COLOR SHOULD BE COORDINATED WITH THE REGION. SEE BRIDGE MANUAL 30.3 (14) FOR ADDITIONAL GUIDANCE.

ORIENTATION OF POSTS IN THE LONGITUDINAL DIRECTION ARE TYPICALLY SET NORMAL TO GRADE WHEN FOLLOWING A PROFILE GRADE LINE AND VERTICAL ON STEEP SLOPES (E.G., RETAINING WALL WITH 3:1 SLOPE). CONSIDER AESTHETICS AND CONTRACTIBILITY WHEN DETERMINING POST ORIENTATION AND PROVIDE DETAILS FOR CLARITY.

WEIGHT = 35 LB/FT (W/O BENT SECTION @ TOP)
 WEIGHT = 45 LB/FT (W/ BENT SECTION @ TOP)

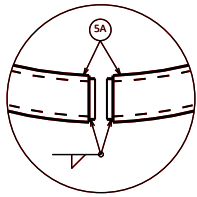
TUBULAR STEEL RAILING SCREENING



BUREAU OF STRUCTURES

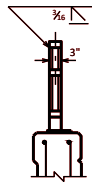
APPROVED: *Laura Shadewald*

DATE: 1-26

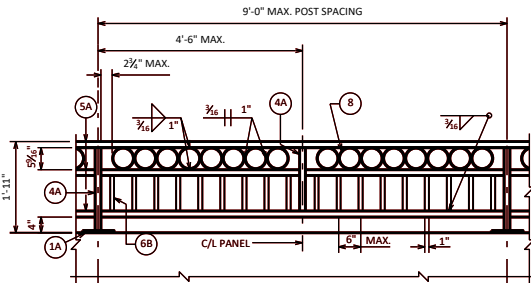
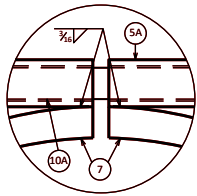


DETAIL A

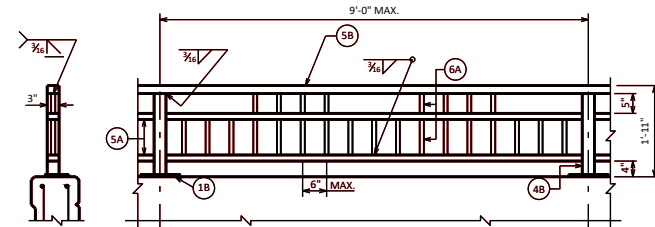
SEAL ENDS ON CURVED
STRUCTURAL TUBING WITH
1/2" PLATE, WELD AND
GRIND SMOOTH.



DETAIL B

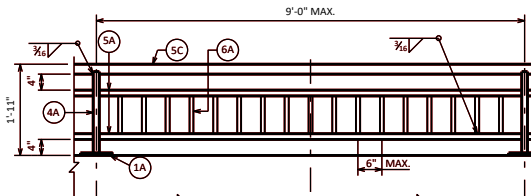


TYPE C1

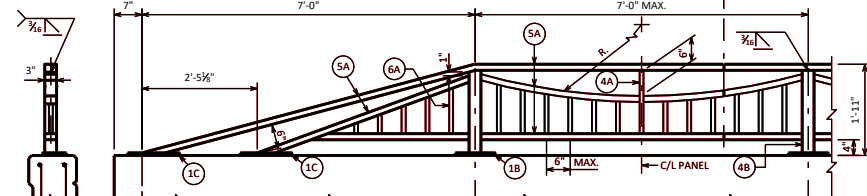


TYPE C4

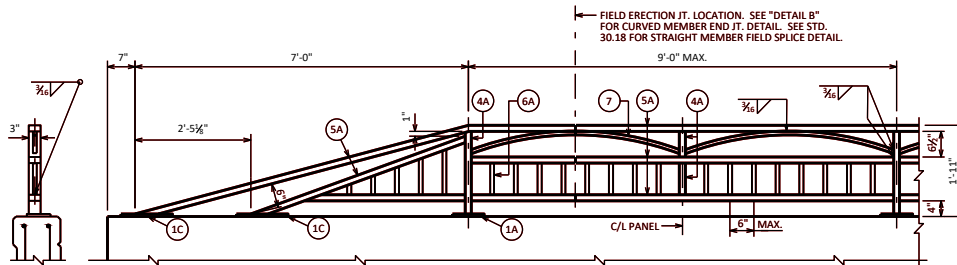
FIELD ERECTION JT. LOCATION. SEE "DETAIL A"
FOR CURVED MEMBER END CLOSURE. SEE STD.
30.18 FOR STRAIGHT MEMBER FIELD SPICE DETAIL.



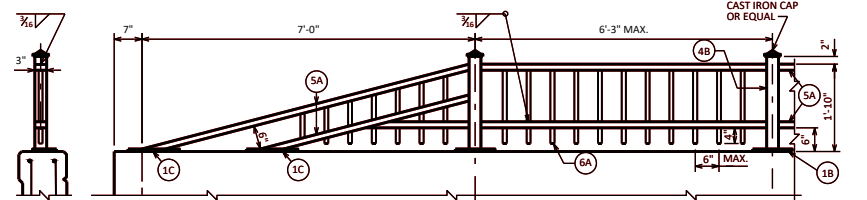
TYPE C2



TYPE C5



TYPE C3



TYPE C6

DESIGNER NOTES

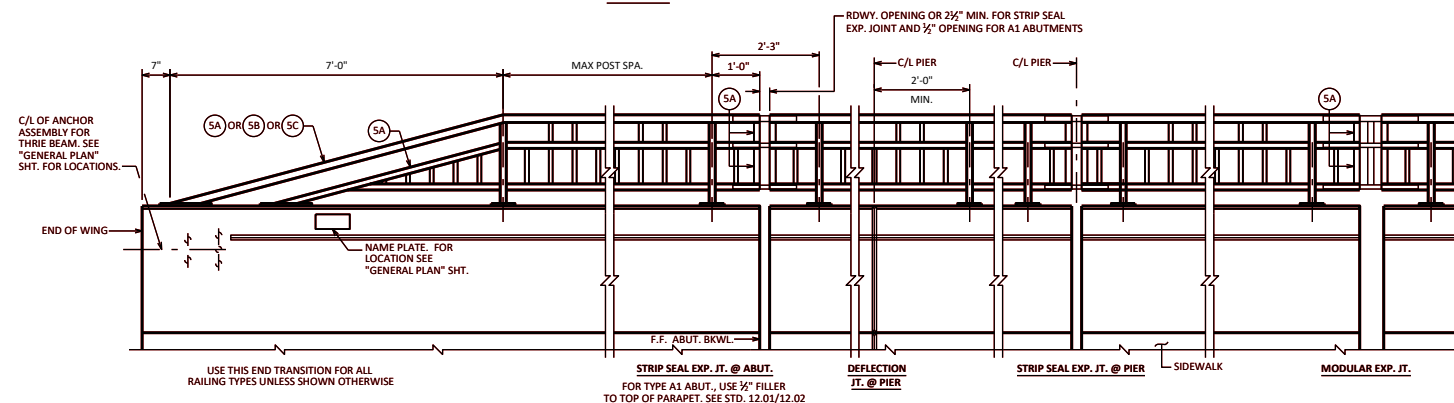
SEE STANDARD 30.40 FOR PEDESTRIAN RAILING MOUNTED ON CURB OR DECK. COMBINATION RAILINGS TYPE C1-C6 MAY BE MODIFIED AS A PEDESTRIAN RAIL MOUNTED DIRECTLY TO A BRIDGE CURB OR DECK BY INCREASING THE RAILING HEIGHT TO A MINIMUM OF 3'-6" AND A MAXIMUM OF 4'-6". USE A MINIMUM POST SIZE OF 3" X 3" X 1/2" WITH A 9'-0" MAXIMUM POST SPACING. WHEN USED AS A PEDESTRIAN RAIL, A TRAFFIC BARRIER IS REQUIRED BETWEEN THE ROADWAY AND THE SIDEWALK. FOR THIS PEDESTRIAN RAILING, BID ITEM SHALL BE "RAILING STEEL PEDESTRIAN TYPE C(1-6)". THE CLEAR SPACE BETWEEN THE TOP TWO RAILS MAY BE INCREASED TO A 6" MAXIMUM EXCEPT FOR "TYPE C1" RAILING.

A MINIMUM 12'-0" WING LENGTH IS RECOMMENDED TO ACCOMMODATE THE RAIL END TRANSITION AND PROVIDE A POST SPACING ON THE WING THAT WILL MAINTAIN THE RAIL AESTHETICS.

SEE STANDARD 30.18 FOR ADDITIONAL RAILING DETAILS.

SEE STANDARD 30.07 FOR:

- DEFLECTION JOINT DETAILS AND NOTES
- BEAM GUARD ANCHOR ASSEMBLY DETAILS
- PARAPET REINFORCING BAR SIZE AND SPACING



C/L OF ANCHOR
ASSEMBLY FOR
THREE BEAM. SEE
"GENERAL PLAN"
SHT. FOR LOCATIONS.

NAME PLATE, FOR
LOCATION SEE
"GENERAL PLAN" SHT.

USE THIS END TRANSITION FOR ALL
RAILING TYPES UNLESS SHOWN OTHERWISE

STRIP SEAL EXP. JT. @ ABUT.
FOR TYPE A1 ABUT., USE 1/2" FILLER
TO TOP OF PARAPET. SEE STD. 12.01/12.02

DEFLECTION
JT. @ PIER

STRIP SEAL EXP. JT. @ PIER

SIDEWALK

MODULAR EXP. JT.

INSIDE ELEVATION

OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED.
RUN BAR REINF. THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 1'-5".
MIN. JOINT SPACING OF 80'-0". DEFINE CONSTR. JT. WITH A 3/4" ~V~ GROOVE.

RAILING WEIGHT = 22 LB/FT

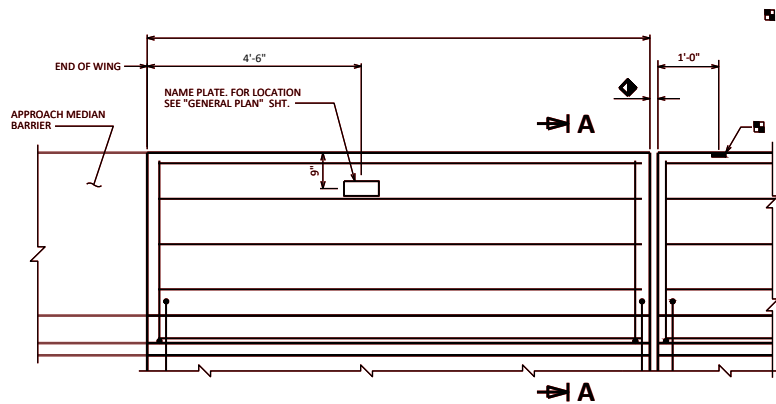
COMBINATION RAILING TYPES 'C1 - C6'



**BUREAU OF
STRUCTURES**

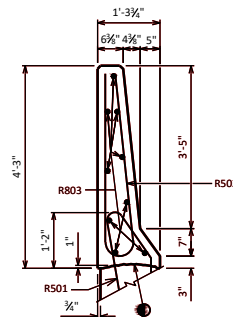
APPROVED: *Laura Shadewald*

DATE:
1-25

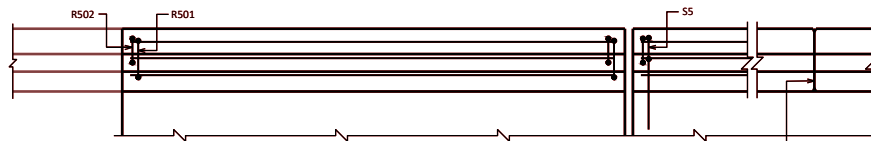


INSIDE ELEVATION

◆ ROADWAY OPENING OR $\geq \frac{1}{2}$ " MIN. FOR EXPANSION JOINT. USE $\frac{1}{2}$ " OPENING WITH FILLER FOR A1 ABUTMENTS



SECTION A

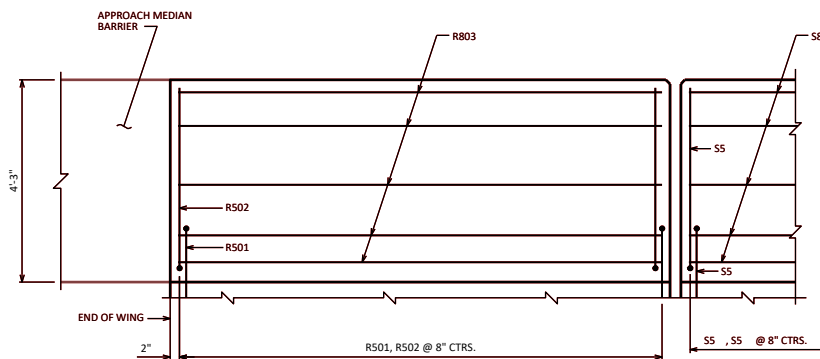


PLAN

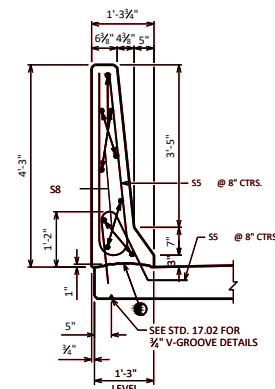
EXPANSION JOINT @ ABUT.
0' SKEW SHOWN. MATCH EXP.
JT. OPENING.

FOR TYPE A1 ABUT., USE $\frac{1}{2}$ "
FILLER TO TOP OF PARAPET.
SEE STD. 12.01.

OPTIONAL CONSTRUCTION JOINTS IN THE
PARAPETS MAY BE USED. RUN BAR REINF.
THRU THE JOINT. LAP LONGIT. BARS A
MIN. OF 3'-5" MIN. JOINT SPACING OF
80'-0". DEFINE CONST. JOINT WITH A
 $\frac{1}{2}$ " - V GROOVE.



OUTSIDE ELEVATION

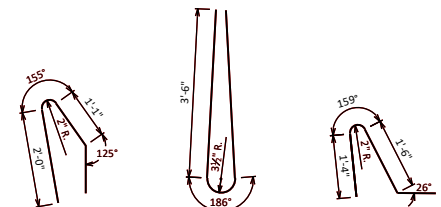


SECTION THRU PARAPET ON BRIDGE

BILL OF BARS

FOR ABUTMENT PARAPETS

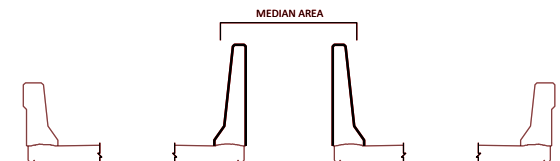
BAR MARK	CONC.	ABUT.	ABUT.	LENGTH	REIN.	LOCATION
R501	X			4'-6"	X	PARAPET VERT.
R502	X			7'-11"	X	PARAPET VERT.
R803	X					PARAPET HORIZ.
S5	X			4'-2"	X	PARAPET VERT.
S5	X			7'-11"	X	PARAPET VERT.
S8	X					PARAPET HORIZ.



R501

R502/S5

S5



SLOPED FACE PARAPET "51F" MAY BE USED IN MEDIAN AREA
OF ADJACENT STRUCTURES WHEN HIGHWAY MEDIAN APPROACH
CONCRETE BARRIER IS 51" HIGH

① CONST. JOINT - STRIKE OFF AS SHOWN.

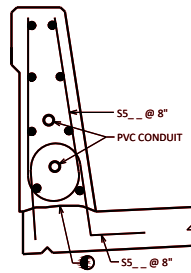
A R501 BAR MAY BE USED IN LIEU OF A
TYPICAL S5 BAR ADJACENT TO THE
PAVING NOTCH ON TYPE A1 ABUTMENTS.
AREA = 3.41 FT.²
WEIGHT = 512 LBS./FT.

SLOPED FACE PARAPET '51F'

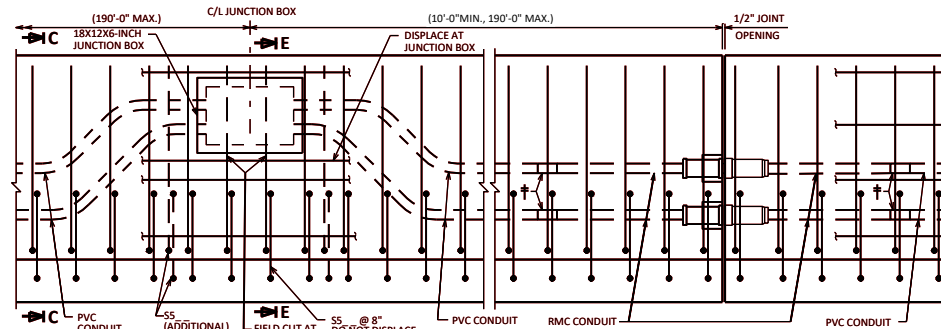


APPROVED: *Laura Shadewald*

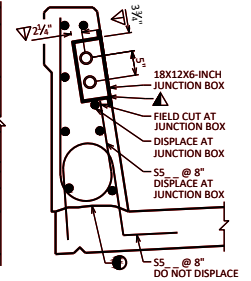
DATE:
7-25



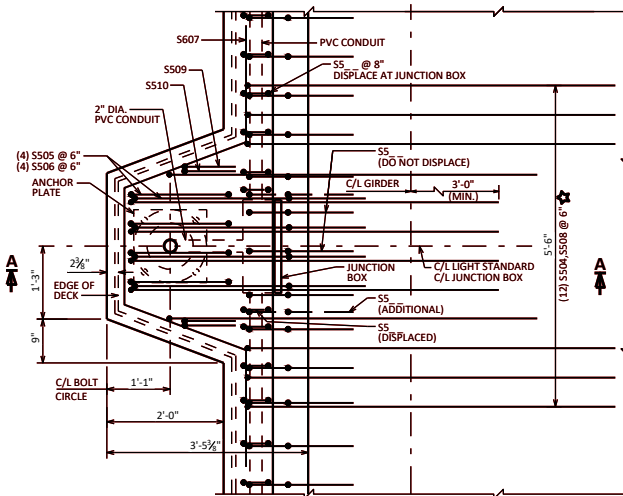
SECTION C-C



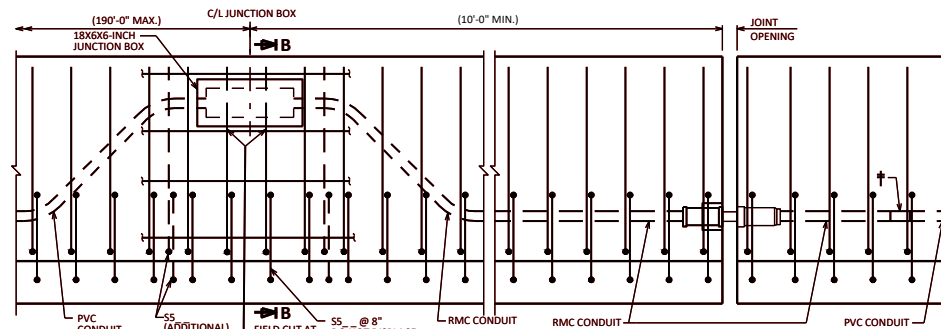
INSIDE ELEVATION AT JUNCTION BOX AT SEMI-EXP. JOINT
(DECK STEEL NOT SHOWN FOR CLARITY)



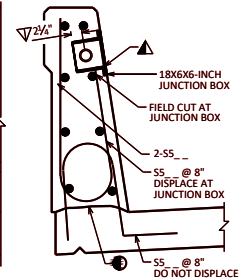
SECTION E-E
(JUNCTION BOX WITH NO LIGHT STANDARD)



PLAN AT LIGHT STANDARD
(DECK STEEL NOT SHOWN FOR CLARITY)



INSIDE ELEVATION AT JUNCTION BOX AT EXP. JOINT
(DECK STEEL NOT SHOWN FOR CLARITY)



SECTION B-B
(JUNCTION BOX WITH NO LIGHT STANDARD)

DESIGNER NOTES

THIS STANDARD ACCOMMODATES ELECTRICAL SERVICE TO LIGHTS STANDARDS MOUNTED ON STRUCTURES. ADDITIONAL REQUIREMENTS MAY BE REQUIRED FOR OTHER SYSTEMS. SEE BRIDGE MANUAL SECTION 32.6 FOR ADDITIONAL INFORMATION.

POSSIBLE BID ITEMS:
"JUNCTION BOXES 18X12X6-INCH", EACH
"JUNCTION BOXES 18X6X6-INCH", EACH
"CONDUIT RIGID NONMETALLIC SCHEDULE 40 2-INCH"
"CONDUIT RIGID METALLIC 2-INCH"
"ANCHOR ASSEMBLIES LIGHT POLES ON STRUCTURE"

SEE STD. 30.14 FOR ANCHORAGE DETAIL AND LIMITATIONS.

SEE STD. 30.22 FOR CONDUIT DETAILS AND NOTES.

THIS STANDARD ACCOMMODATES A MAXIMUM 15" DIA. BOLT HOLE CIRCLE AND A MAXIMUM 15" X 15" SQUARE ANCHOR PLATE WITH (4) 1" DIA. ANCHOR BOLTS. THIS STANDARD IS BASED ON A 8" MIN. DECK THICKNESS AND A MAXIMUM OVERHANG OF 3'-7" FROM C/L GIRDER TO EDGE OF DECK.

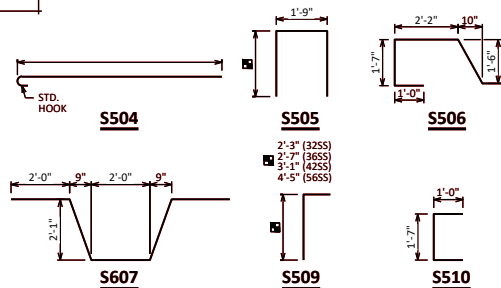
★ THESE BARS ARE IN ADDITION TO STANDARD TRANSVERSE BARS IN DECK. FOR CONC. SLAB STRUCTURES, REPLACE S504 & S508 BARS W/ S404 BARS @ 6" SPA. (W/O HOOK @ ENDS, 5'-6" LONG).

CONDUIT REQUIREMENTS:

- USE (1) - 2" DIA. CONDUIT TO PROVIDE ELECTRICAL SERVICE TO LIGHTS MOUNTED ON TOP OF THE PARAPET.
- USE (1) - 2" DIA. CONDUITS IF AN ADDITIONAL ELECTRICAL SERVICE IS REQUIRED.

JUNCTION BOX REQUIREMENTS:

- USE A JUNCTION BOX TO KEEP A CONTINUOUS RUN OF CONDUIT (PULL LENGTH) TO A MAXIMUM OF 190 FT.
- USE A 18" X 12" X 6" JUNCTION BOX WHEN (1) - 2" DIA. CONDUIT IS USED.
- USE A 18" X 12" X 6" JUNCTION BOX WHEN (2) - 2" DIA. CONDUITS ARE USED.
- USE A 18" X 12" X 6" JUNCTION BOX AT EACH LIGHT STANDARD (CENTERED ON LIGHT C/L).
- USE A JUNCTION BOX AT EACH EXPANSION JOINT. LOCATE 10'-0" MINIMUM FROM EACH EXPANSION JOINT. (NOT REQUIRED AT SEMI-EXP. OR FIXED JOINTS)



BILL OF BARS

BAR MARK	CO. REQ'D	32SS	36SS	42SS	56SS	BENT	LOCATION
S504	X					X	LIGHT STD. - TRANS. - DECK - TOP
S505	X					X	LIGHT STD. - VERT. - PARAPET
S506	X					X	LIGHT STD. - VERT. - PARAPET
S507	X					X	LIGHT STD. - HORIZ. - PARAPET
S508	X					X	LIGHT STD. - TRANS. - DECK - BOT.
S509	X					X	LIGHT STD. - VERT. - PARAPET
S510	X					X	LIGHT STD. - VERT. - PARAPET

LEGEND

CONSTRUCTION JOINT, STRIKE OFF AS SHOWN.

CUT OUT ± 1" OF GASKET AT BOTTOM OF JUNCTION BOX COVER TO ALLOW FOR DRAINAGE.

LOCATION OF CONDUIT IS MEASURED FROM OUTSIDE EDGE OF JUNCTION BOX.

NONMETALLIC CONDUIT TO METALLIC CONDUIT ADAPTER FITTING (UL OR NRTL LISTED FOR ELECTRICAL USE SHALL BE USED).

PVC = POLYVINYL CHLORIDE (RIGID NONMETALLIC) CONDUIT

RMC = RIGID METALLIC CONDUIT

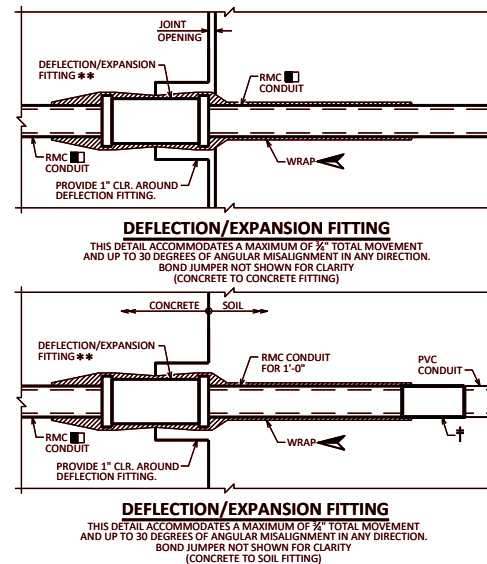
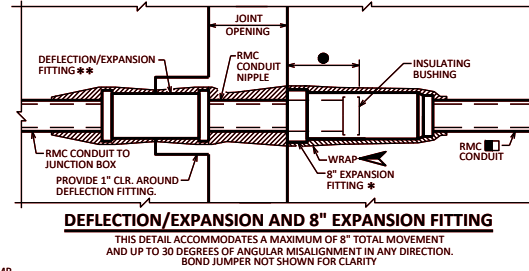
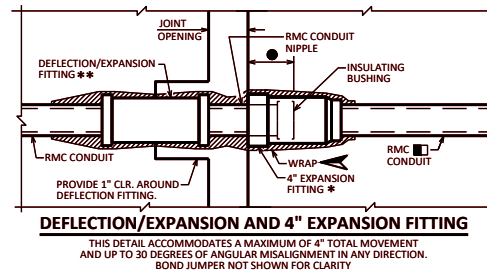
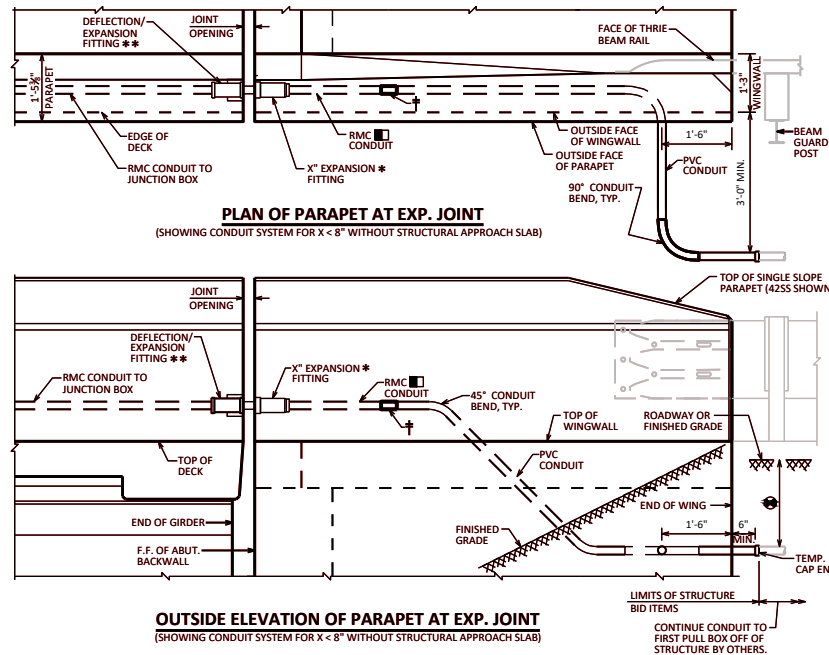
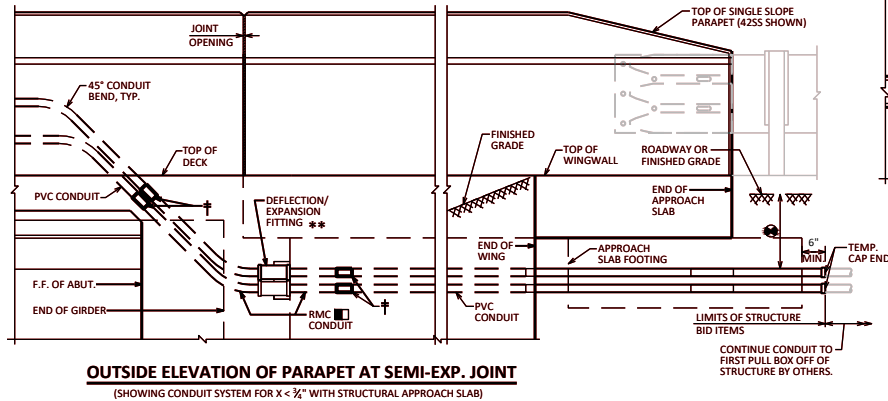
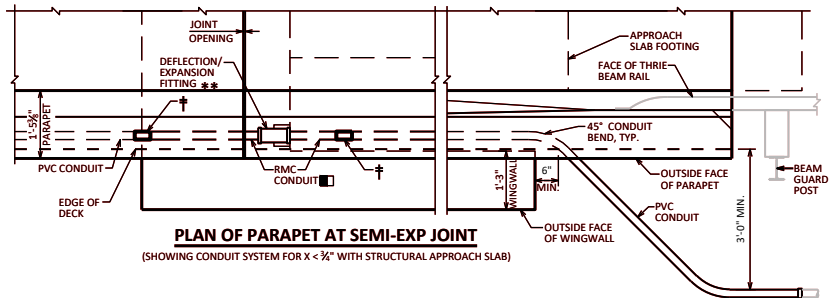
LIGHT STANDARD AND JUNCTION BOX FOR PARAPETS



BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE:
1-26



NOTES

CONDUIT SHALL BE EMBEDDED 2" CLEAR.

USE 2" DIA. RIGID NONMETALLIC CONDUIT (PVC) UNLESS NOTED OTHERWISE.

CONDUIT FITTINGS, CONDUIT BENDS, AND ADAPTER FITTINGS INCIDENTAL TO CONDUIT WORK.

CONDUIT BENDS SHALL CONFORM TO THE NATIONAL ELECTRIC CODE.

• 2" 4" MIN. CONDUIT COVER UNDER ROADWAYS, 1'-6" OTHERWISE. CONDUIT COVER SHOULD NOT EXCEED 3'-0".

PROVIDE JUNCTION BOXES FROM THE APPROVED PRODUCTS LIST.

DESIGNER NOTES

THIS STANDARD ACCOMMODATES A MAXIMUM 8" TOTAL MOVEMENT AND UP TO 30 DEGREES OF ANGULAR MISALIGNMENT IN ANY DIRECTION. SEE BRIDGE MANUAL SECTION 32.6 FOR ADDITIONAL INFORMATION.

PLANS SHALL SPECIFY SIZE, TYPE, AND LOCATION FOR CONDUIT, JUNCTION BOXES, AND FITTINGS. SEE TABLE BELOW FOR CONDUIT FITTING RECOMMENDATIONS.

LEGEND

- USE 2" DIA. RIGID METALLIC (RMC) CONDUIT AT FITTINGS. PROVIDE RMC FOR 3'-0" MIN. ON EACH SIDE OF JOINT OPENINGS UNLESS NOTED OTHERWISE.
- † NONMETALLIC CONDUIT TO METALLIC CONDUIT ADAPTER FITTING (UL OR NRTL LISTED FOR ELECTRICAL USE SHALL BE USED)

◀ SPONGE RUBBER WRAP TO BE AASHTO M153, TYPE 1, OR EQUIVALENT - $\frac{1}{2}$ " MINIMUM THICKNESS. PROVIDE WRAP FOR THE ENTIRE LENGTH OF THE FITTING OR AS SHOWN. SPONGE RUBBER WRAP INCIDENTAL TO "CONDUIT RIGID METALLIC 2-INCH".

● POSITION MOVABLE END OF CONDUIT INSIDE EXPANSION FITTING, SUCH THAT IT WILL HAVE THE SAME ALLOWANCE FOR MOVEMENT (EXPANSION/CONTRACTION) AS THE EXPANSION DEVICE SET IN PLACE IN THE DECK BELOW IT. TAKE CARE TO INSTALL EXPANSION FITTING AND CONDUIT EXACTLY PARALLEL TO BRIDGE MOVEMENT.

- * EXPANSION FITTING REQUIREMENTS (IF USED):
 - 4" TOTAL CONDUIT MOVEMENT WITH BONDING JUMPER
 - 8" TOTAL CONDUIT MOVEMENT WITH BONDING JUMPER

- ** DEFLECTION/EXPANSION FITTING REQUIREMENTS (IF USED):
 - UP TO $\frac{3}{4}$ " CONDUIT CONTRACTION OR EXPANSION AND UP TO 30 DEGREES OF ANGULAR MISALIGNMENT IN ANY DIRECTION WITH BONDING JUMPER

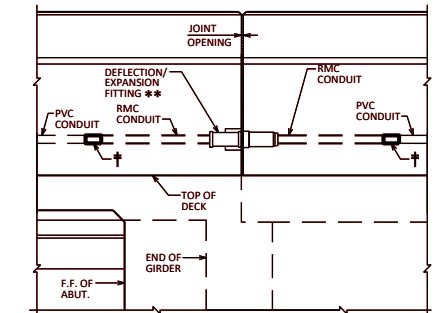
CONDUIT FITTING RECOMMENDATIONS TABLE:

LOCATION	JOINT TYPE	REQUIREMENT	FITTING TYPE
BRIDGE	FIXED	NONE	NONE - RUN PVC CONDUIT THRU JOINT
	SEMI-EXP.	$X < \frac{3}{4}$ "	DEFL./EXP. FITTING
		$\frac{3}{4}" \leq X < 4"$	4" EXP. FITTING
		$S < 30'$	DEFL./EXP. AND 4" EXP. FITTING
	EXPANSION	$X < 4"$	DEFL./EXP. AND 4" EXP. FITTING
		$4" \leq X < 8"$	DEFL./EXP. AND 8" EXP. FITTING
WALL	CONTRACTION	NONE	NONE - RUN PVC CONDUIT THRU JOINT
	EXPANSION	$L < 90$ FEET	DEFL./EXP. FITTING

X = TOTAL ANTICIPATED LONGITUDINAL JOINT MOVEMENT

L = DISTANCE BETWEEN EXPANSION JOINTS

S = SKEW



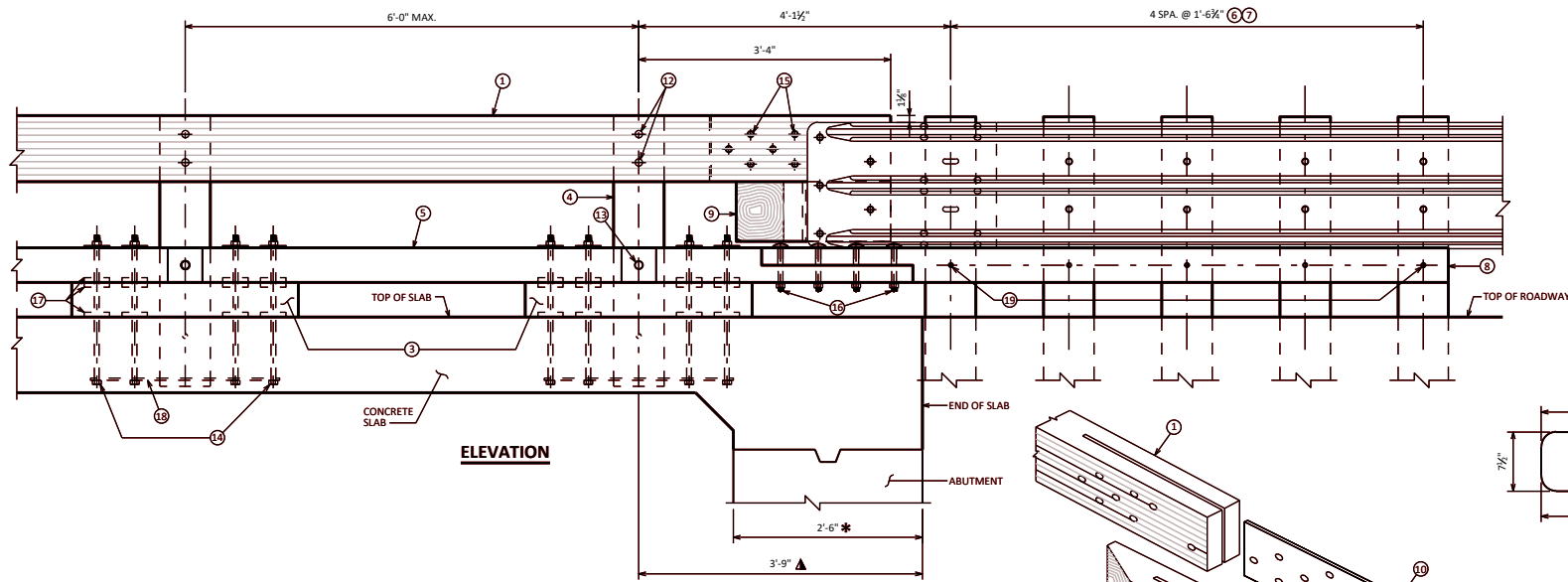
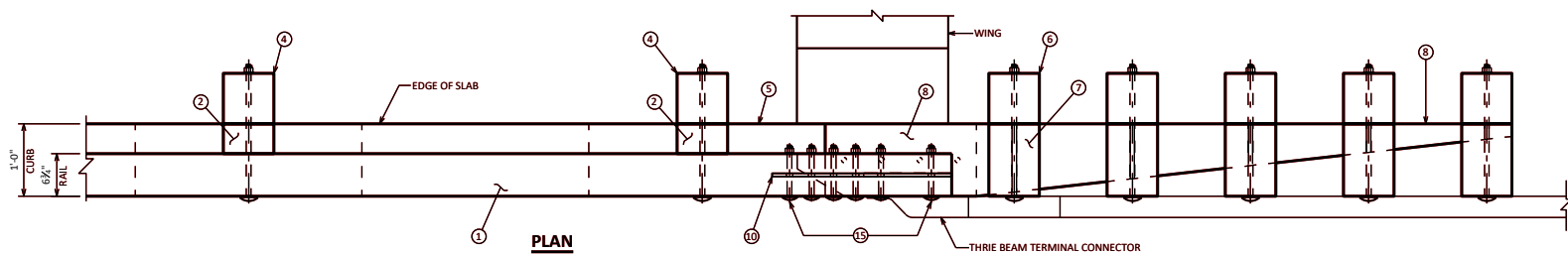
CONDUIT DETAILS AND NOTES



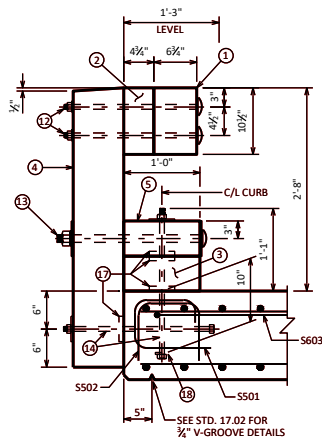
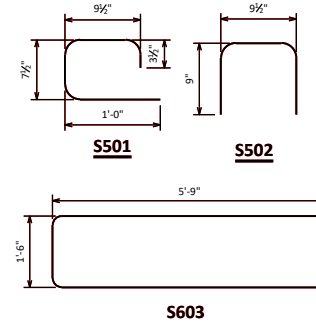
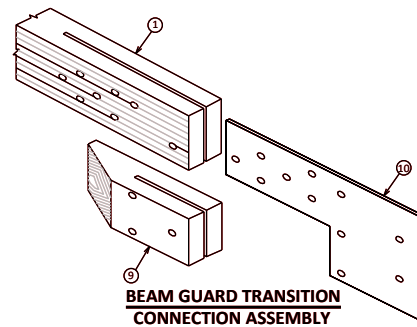
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

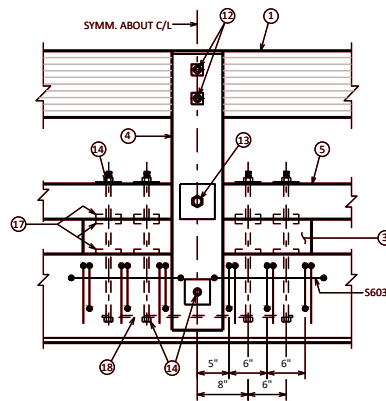
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7-17



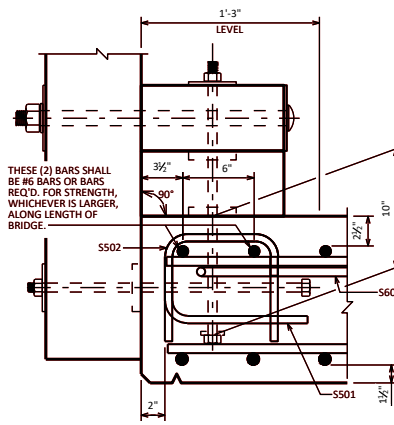
* DIMENSION IS TAKEN NORMAL TO C/L SUBSTRUCTURE.
 ▲ DIMENSION IS TAKEN ALONG EDGE OF SLAB.



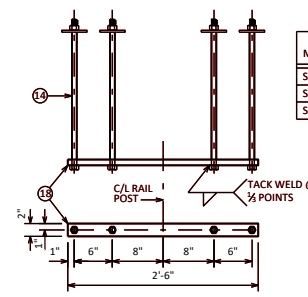
SECTION THRU RAIL
 ALSO SEE "EDGE OF SLAB DETAILS"



BACK ELEVATION



EDGE OF SLAB DETAILS



ANCHORAGE DETAIL

BILL OF BARS

BAR MARK	QTY	NO. REQ'D.	LENGTH	REMARKS	LOCATION
S501	X	2-4	X	RAIL POST VERTICAL	
S502	X	2-1	X	RAIL POST VERTICAL	
S603	X	12-9	X	RAIL POST HORIZONTAL	

NOTE: THE FIRST DIGIT OF THE BAR MARK SIGNIFIES THE BAR SIZE.

SEE STANDARD 30.25 FOR RAILING DETAILS

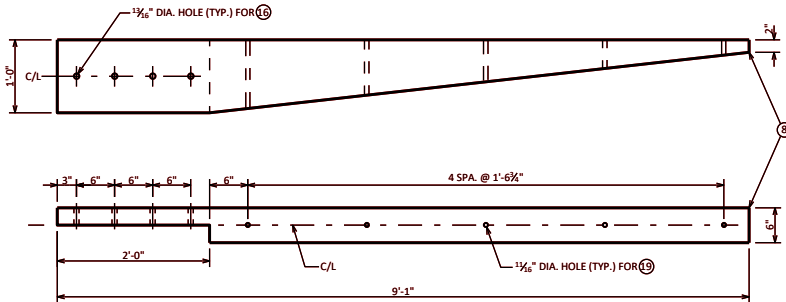
TIMBER RAILING ATTACHED TO CONCRETE SLAB



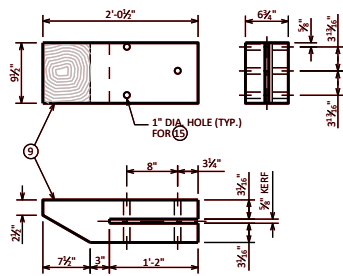
BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

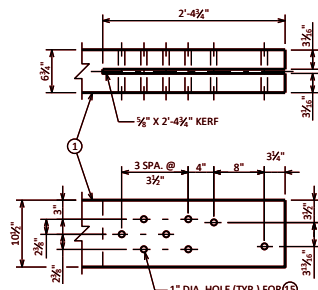
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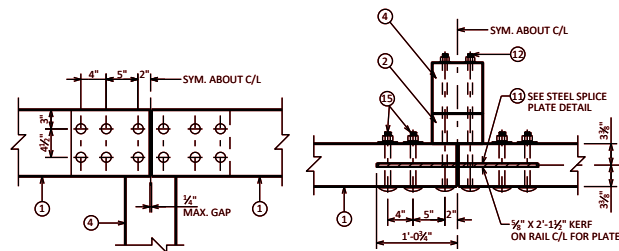
CURB TRANSITION



TRANSITION BLOCK



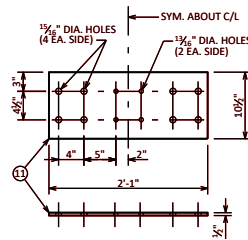
TRANSITION GLULAM RAIL BORING DETAIL



PLAN VIEW

ELEVATION

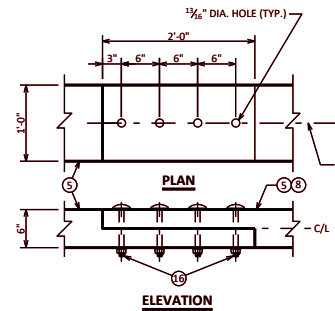
RAIL SPLICE DETAILS



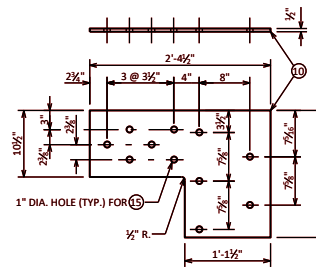
STEEL SPLICE PLATE

BILL OF TREATED LUMBER

ITEM	NO. REQ'D.	SIZE	LENGTH	MBM
GLULAM RAIL		6 3/4" X 10 1/2"		
RAIL SPACER BLOCK		8" X 4 1/2"	10 1/2"	
SCUPPER BLOCK		6" X 12"	3'-0"	
RAIL POST		8" X 8"		
CURB		6" X 12"		
CURB TRANSITION				
TRANSITION BLOCK				
TOTAL MBM				



CURB SPLICE DETAIL



STEEL TRANSITION PLATE

LEGEND

- GLULAM RAIL 6 3/4" X 10 1/2"
- RAIL SPACER BLOCK 8" X 4 1/2" X 10 1/2"
- SCUPPER BLOCK 6" X 12" X 3'-0"
- RAIL POST @ STRUCTURE 8" X 8" X 3'-8"
- CURB 6" X 12"
- RAIL POST @ BEAM GUARD 8" X 8"
- RAIL SPACER BLOCK @ BEAM GUARD 8" X 1 1/2" X 1'-10 1/2"
- CURB TRANSITION @ BEAM GUARD
- TRANSITION BLOCK @ BEAM GUARD
- STEEL TRANSITION PLATE, ASTM A36.
- STEEL SPLICE PLATE, ASTM A36.
- 1/2" DIA. X 1'-10" LONG ASTM A307, GRADE 2, DOME-HEAD BOLT W/ 1-PLATE WASHER PER BOLT. (2 REQ'D. @ EACH RAIL TO POST CONNECTION, 4 REQ'D. @ EACH RAIL SPLICE).
- 1 1/4" DIA. X 1'-10" LONG ASTM A325, DOME-HEAD BOLT W/ 2 - 5/8" X 5/8" X 1/4" PLATE WASHERS, W/ 1 1/4" DIA. HOLE. (1 REQ'D. @ EACH CURB TO POST CONNECTION.)
- 1/2" DIA. X 1'-11" LONG ASTM A325 BOLT. 1 - 4" X 4" X 1/4" PLATE WASHER REQ'D. AT CURB TO SLAB CONNECTION. 1 - 4" X 4" X 1/4" PLATE WASHER REQ'D. AT POST TO SLAB CONNECTION.
- 1/2" DIA. X 9" LONG ASTM A307, GRADE 2, DOME-HEAD BOLT AT RAIL SPLICE DETAIL AND AT BEAM GUARD ATTACHMENT.
- 3/4" DIA. X 8" LONG ASTM A307, GRADE 2, DOME-HEAD BOLT (4 REQ'D. @ EACH CURB SPLICE DETAIL).
- 4" DIA. SHEAR PLATE (8 REQ'D. @ EACH CURB TO SCUPPER CONNECTION, 4 REQ'D. @ EACH SCUPPER TO SLAB CONNECTION AND 1 REQ'D. @ EACH POST TO SLAB CONNECTION). MALLEABLE IRON MEETING REQUIREMENTS OF ASTM A47, GRADE 32510.
- 2" X 2'-6" X 1/4" ANCHOR PLATE WITH 4 - 1 1/4" DIA. HOLES FOR ANCHOR BOLTS NO. 14 (CURB TO SLAB CONNECTION).
- 1/2" DIA. ASTM A325 DOME-HEAD BOLT W/ 1-PLATE WASHER PER BOLT. (1 REQ'D. @ EACH THIRIE BEAM POST TO CURB TRANSITION CONNECTION.)

NOTES

- BID ITEM SHALL BE "TREATED LUMBER AND TIMBER" WHICH INCLUDES ALL ITEMS SHOWN EXCEPT ITEMS NO 6, 7 AND THIRIE BEAM TERMINAL CONNECTOR.
- DIMENSIONS GIVEN FOR GLUED-LAMINATED (GLULAM) TIMBER RAILS ARE ACTUAL DIMENSIONS.
- DIMENSIONS FOR WOOD POSTS, CURBS AND SCUPPERS ARE GIVEN AS NOMINAL DIMENSIONS. ACTUAL DIMENSIONS MAY BE A MAXIMUM OF 1/2 INCH LESS THAN THE STATED NOMINAL DIMENSIONS. DIMENSION FOR SPACER BLOCK DEPTH ARE ACTUAL DIMENSIONS.
- CURB AND RAIL SPLICES SHALL BE LOCATED SO THAT CURB AND RAIL MEMBERS ARE CONTINUOUS OVER NOT LESS THAN TWO POSTS. CURB SPLICES SHALL BE LOCATED A MINIMUM OF 1.5 POST SPACINGS AWAY FROM RAIL SPLICES. IT IS RECOMMENDED THAT GLULAM RAILS BE CONTINUOUS OVER THE LENGTH OF THE BRIDGE.
- SAWN LUMBER AND GLULAM SHALL COMPLY WITH THE REQUIREMENTS OF AASHTO M168 AND SHALL BE PRESSURE TREATED WITH WOOD PRESERVATIVES IN ACCORDANCE WITH AASHTO M133 AND STANDARD SPECIFICATIONS.
- BRIDGE RAIL SHALL BE HORIZONTALLY LAMINATED GLULAM, VISUALLY GRADED WESTERN SPECIES COMBINATION NO. 2 OR VISUALLY GRADED SOUTHERN PINE COMBINATION NO. 48. OTHER SPECIES AND GRADES OF GLULAM MAY BE USED, PROVIDED THE MINIMUM TABULATED VALUES ARE NOT LESS THAN THE FOLLOWING:
 $F_{ty} = 1,800 \text{ LB/IN}^2$ $E = 1,800,000 \text{ LB/IN}^2$
- POSTS, CURBS, SCUPPERS, TRANSITION BLOCKS AND SPACER BLOCKS MAY BE SAWN LUMBER OR GLULAM. WHEN SAWN LUMBER IS USED, MATERIAL SHALL BE VISUALLY GRADED NO. 1 SOUTHERN PINE OR VISUALLY GRADED NO. 1 DOUGLAS FIR-LARCH. GLULAM AND OTHER SPECIES AND GRADES OF SAWN LUMBER MAY BE USED, PROVIDED THE MINIMUM TABULATED VALUES ARE NO LESS THAN THE FOLLOWING:
 $F_b = 1,350 \text{ LB/IN}^2$ $E = 1,500,000 \text{ LB/IN}^2$
- ALL STEEL COMPONENTS AND FASTENERS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111 OR M232.
- TO THE EXTENT POSSIBLE, ALL WOOD SHALL BE CUT, DRILLED, AND COMPLETELY FABRICATED PRIOR TO PRESSURE TREATMENT WITH PRESERVATIVES. WHEN FIELD FABRICATION OF WOOD IS REQUIRED OR IF WOOD IS DAMAGED, ALL CUTS, BORE HOLES, AND DAMAGE SHALL BE IMMEDIATELY TREATED WITH WOOD PRESERVATIVE IN ACCORDANCE WITH AASHTO M133 AND STANDARD SPECIFICATIONS.
- UNLESS NOTED, MALLEABLE IRON WASHERS SHALL BE PROVIDED UNDER BOLT HEADS AND UNDER NUTS THAT ARE IN CONTACT WITH WOOD. WHEN THE SIZE AND STRENGTH OF THE HEAD ARE SUFFICIENT TO DEVELOP CONNECTION STRENGTH WITHOUT WOOD CRUSHING, WASHERS MAY BE OMITTED UNDER HEADS OF DOME-HEAD TIMBER BOLTS.
- TOPS OF RAIL POSTS AND TOP OF THE RAIL SPLICE PLATE KERF SHALL BE SEALED WITH ROOFING CEMENT OR OTHERWISE PROTECTED FROM DIRECT EXPOSURE TO WEATHER.
- DESTROY THREADS ON ALL BOLTS WITH A CENTER PUNCH AFTER TIGHTENING NUT. EXPOSED BOLT PROJECTION OVER 1" SHALL BE CUT OFF. REPAIR END OF BOLT BY PAINTING WITH ZINC RICH PRIMER.
- WHEN PLACING OVERLAY (FWS) ON TOP OF EXISTING SLAB, THE THICKNESS OF THE OVERLAY MUST BE TAPERED NEAR THE VICINITY OF THE RAILING TO MAINTAIN THE REQ'D. (CRASH TESTED) DISTANCE FROM TOP OF SLAB TO TOP OF RAIL TO 32 INCHES.
- THIS RAILING MEETS NCHRP REPORT 350 EVALUATION CRITERIA FOR TEST LEVEL 2 (TL-2).

TIMBER RAILING ATTACHED TO CONCRETE SLAB DETAILS

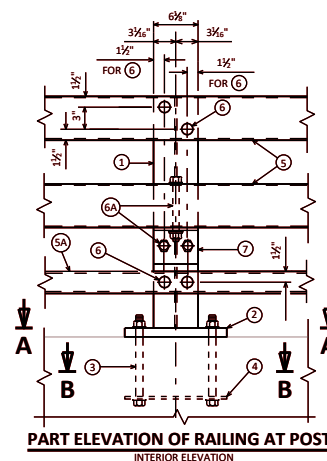
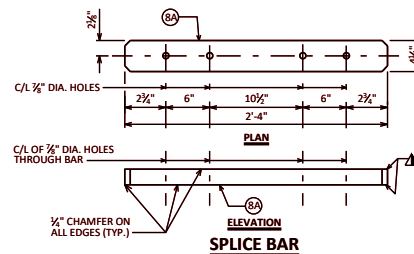
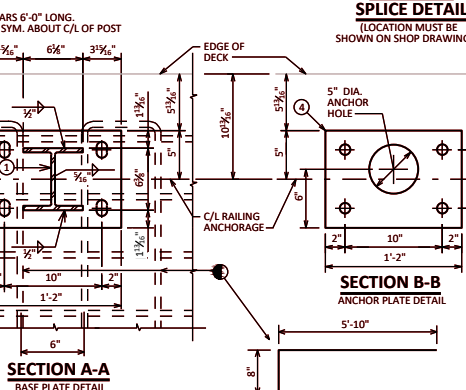
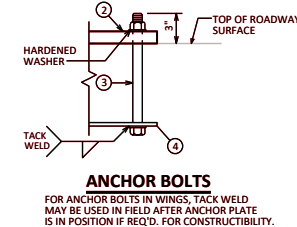
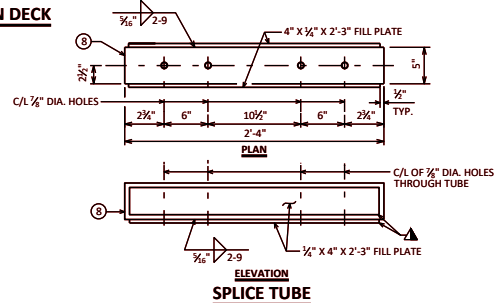
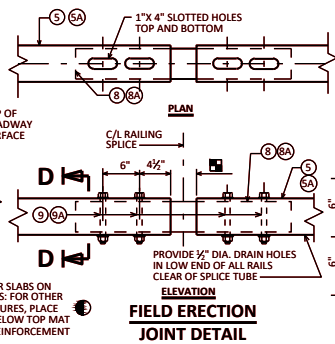
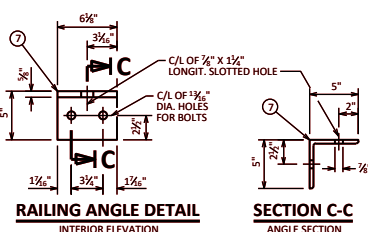
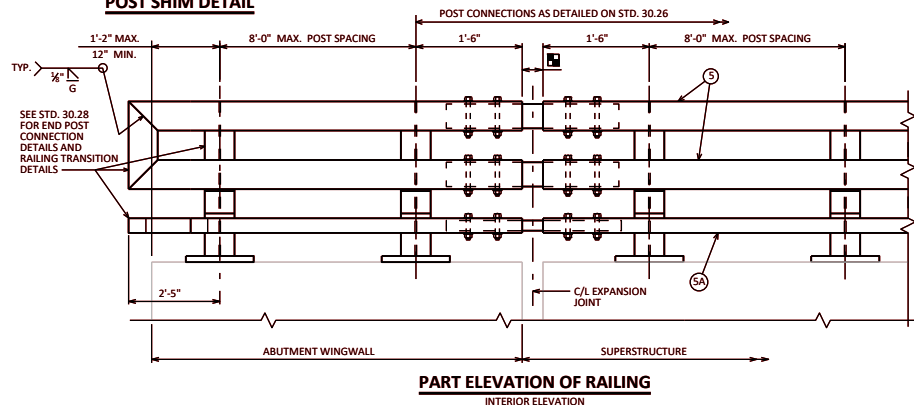
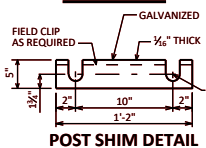
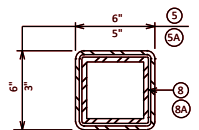
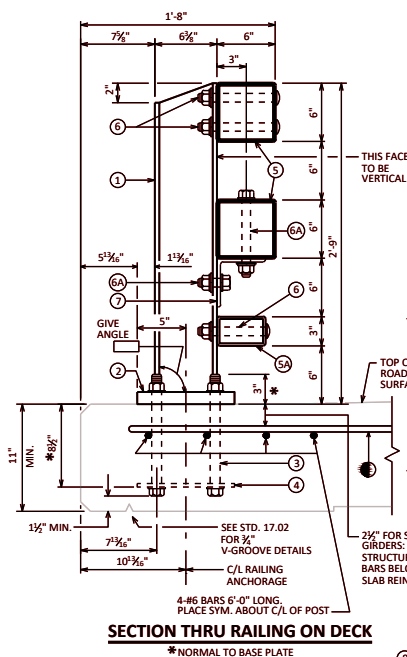


BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE: 7-16

THESE RAILING DETAILS MAY BE USED WITH CONCRETE SLAB SUPERSTRUCTURES (SLAB DEPTH ≥ 14") THAT HAVE A1 ABUTMENTS WITH WINGS PARALLEL TO C/L OF ABUTMENT OR HAVE AS ABUTMENTS.



LEGEND

- ① W6 X 25 WITH 1 1/2" X 1 1/2" HORIZONTAL SLOTTED HOLES ON EACH SIDE OF POST FOR BOLT NO. 6 AT NO. 5. USE 1" DIA. HOLES FOR BOLT NO. 6 AT NO. 5A AND FOR BOLT NO. 6A AT NO. 7. CUT BOTTOM OF POST TO MATCH CROSS SLOPE OF ROADWAY. PLACE POST VERTICAL. PLACE POSTS NORMAL TO GRADE LINE.
- ② PLATE 1 1/2" X 10" X 1/2" WITH 1 1/2" X 1 1/2" SLOTTED HOLES FOR ANCHOR BOLTS NO. 3. WELD TO NO. 1 AS SHOWN. SLOTS PARALLEL TO SHORT SIDE OF PLATE.
- ③ ASTM A449 - 1" DIA. ANCHOR BOLTS WITH HEAVY HEX NUT AND 2" O.D. HARDENED WASHER (ALL GALVANIZED). 4 REQUIRED PER POST. THREAD 3" AND PLACE NORMAL TO PLATE NO. 2. CHAMFER TOP OF BOLTS BEFORE THREADING. USE 1 1/2" LONG BOLT FOR CONCRETE DECKS. ON CONCRETE SLAB SUPERSTRUCTURES, USE 1'-3" LONG BOLT FOR SLAB THICKNESS > 16" AND 1 1/2" LONG FOR THICKNESS ≤ 16". USE 1'-9" LONG IN ABUTMENT WINGS. (AN EQUIVALENT THREADED ROD WITH HEAVY HEX NUTS AND HARDENED WASHERS MAY BE SUBSTITUTED FOR ANCHOR BOLTS IN WINGS IF REQUIRED FOR CONSTRUCTABILITY.)
- ④ 3/4" X 10" X 1/2" ANCHOR PLATE (GALVANIZED) WITH 1 1/2" DIA. HOLES FOR ANCHOR BOLTS NO. 3.
- ⑤ TS 6 X 6 X 3/4" STRUCTURAL TUBING. USE 1" DIA. HOLES FOR BOLT NO. 6 (FRONT & BACK) & 3/4" DIA. HOLES FOR BOLT NO. 6A (TOP & BOTTOM).
- ⑤A TS 5 X 3 X 3/4" STRUCTURAL TUBING. USE 1 1/2" X 1 1/2" HORIZONTAL SLOTTED HOLES FOR BOLT NO. 6 (FRONT & BACK) AND A 2" O.D. WASHER UNDER BOLT HEAD.
- ⑥ 3/4" DIA. A325 SLOTTED ROUND HEAD BOLT WITH HEX NUT, 3/4" X 1 1/2" X 1 1/2" WASHER, AND SPRING LOCK WASHER (2 REQUIRED AT RAIL TO POST LOCATIONS SHOWN).
- ⑥A 3/4" DIA. A325 BOLT WITH HEX NUT & SPRING LOCK WASHER (1 REQUIRED AT RAIL TO ANGLE & 2 REQUIRED AT ANGLE TO POST LOCATIONS SHOWN WITH 3/4" X 1 1/2" X 1 1/2" WASHER).
- ⑦ L 5 X 5 X 3/8" STRUCTURAL ANGLE. ATTACH TO NO. 1 AND NO. 5 AS SHOWN.
- ⑧ TS 5 X 5 X 3/8" X 2'-4" LONG SPLICE TUBE. 1 PER RAIL. USED IN NO. 5.
- ⑧A 3/4" X 2 1/2" X 2'-4" LONG SPLICE BAR. 1 PER RAIL. USED IN NO. 5A.
- ⑨ 3/4" DIA. A325 FULLY THREADED BOLTS, 4 1/2" LONG, WITH 2 WASHERS AND HEAVY HEX NUT ON EACH BOLT. NUT TO BE FINGER TIGHT. (4 REQUIRED PER SPLICE). USE 1" X 4" SLOTTED HOLES IN TOP AND BOTTOM OF NO. 5.
- ⑨A 3/4" DIA. A325 FULLY THREADED BOLTS, 4 1/2" LONG, WITH 2 WASHERS AND HEAVY HEX NUT ON EACH BOLT. NUT TO BE FINGER TIGHT. (4 REQUIRED PER SPLICE). USE 1" X 4" SLOTTED HOLES IN TOP AND BOTTOM OF NO. 5A.
- ⑩ SPLICE SLEEVE FABRICATED FROM 3/4" PLATE. PROVIDE "SLIDING FIT".
- ⚠ ROADWAY OPENING OR 2 1/2" MIN. FOR STRIP SEAL EXP. JOINT & 3/2" OPENING FOR A1 ABUTMENT. 3/2" AT FIXED JOINTS. SPLICES ARE REQUIRED IN ANY RAILING SPAN BETWEEN POSTS THAT CONTAINS A SUPERSTRUCTURE EXPANSION JOINT.
- ⚠ PROTRUSIONS CAUSED BY WELDING OR GALVANIZING ARE NOT PERMITTED ON THE ADJOINING SURFACES OF THE RAILS, SPLICE TUBES AND FILL PLATES.
- ⚠ #6 BARS X 12'-0" LONG. BEND AS SHOWN. TIE TO TOP MAT OF STEEL. (DESIGNER TO PLACE THESE BARS IN BILL OF BARS FOR SUPERSTRUCTURE.)

NOTES

- BID ITEM SHALL BE "RAILING STEEL TYPE NY3", WHICH INCLUDES ALL ITEMS SHOWN.
- RAILING SHALL BE CONTINUOUS OVER A MINIMUM OF THREE (3) POSTS WITHOUT SPLICES WHERE POSSIBLE.
- POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT, AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUT.
- ALL MATERIAL SHALL BE GALVANIZED AFTER FABRICATION. PRIOR TO GALVANIZING, ALL STEEL RAILING POSTS, ANGLES, SPLICE TUBES, SPLICE BARS AND STEEL TUBING SHALL BE GIVEN A NO. 6 BLAST CLEANING PER SSPC SPECIFICATIONS.
- WHEN PAINTING IS REQUIRED, ALL MATERIAL EXCEPT ANCHORAGE DETAIL (NO. 3 & NO. 4) SHALL BE PAINTED OVER GALVANIZING WITH AN APPROVED TIE COAT AND TOP COAT AS SPECIFIED IN THE CONTRACT DOCUMENTS. THE RAILING SHALL BE PAINTED AMS STD. COLOR NO. [] (FILL IN COLOR NAME).
- RAIL POST, BASE PLATES, SPLICE BAR, ANGLES, AND SPLICE PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A709 GRADE 50. STRUCTURAL TUBING SHALL CONFORM TO THE REQUIREMENTS OF ASTM A500 GRADE B OR C WITH A CERTIFIED $f_y = 50$ KSI. ANCHOR PLATES & SHIMS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A709 GRADE 36.
- THE NUT SECURING THE POST BASE PLATE TO THE CONCRETE SHALL BE TIGHTENED TO A SNUG FIT AND GIVEN AN ADDITIONAL 1/4 TURN.
- FILL BOLT SLOT OPENINGS IN POST SHIMS AND PLATE NO. 2 WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. CAULK AROUND PERIMETER OF NO. 2 WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.
- STEEL SHIMS SHALL BE PROVIDED & USED UNDER PLATE NO. 2 WHERE REQUIRED FOR ALIGNMENT, AND SHALL BE GALVANIZED.
- SEE BRIDGE MANUAL 30.2 FOR ALLOWED USE.
- RAILING WEIGHT = 60 LB/LF (BASED ON 8'-0" POST SPACING)

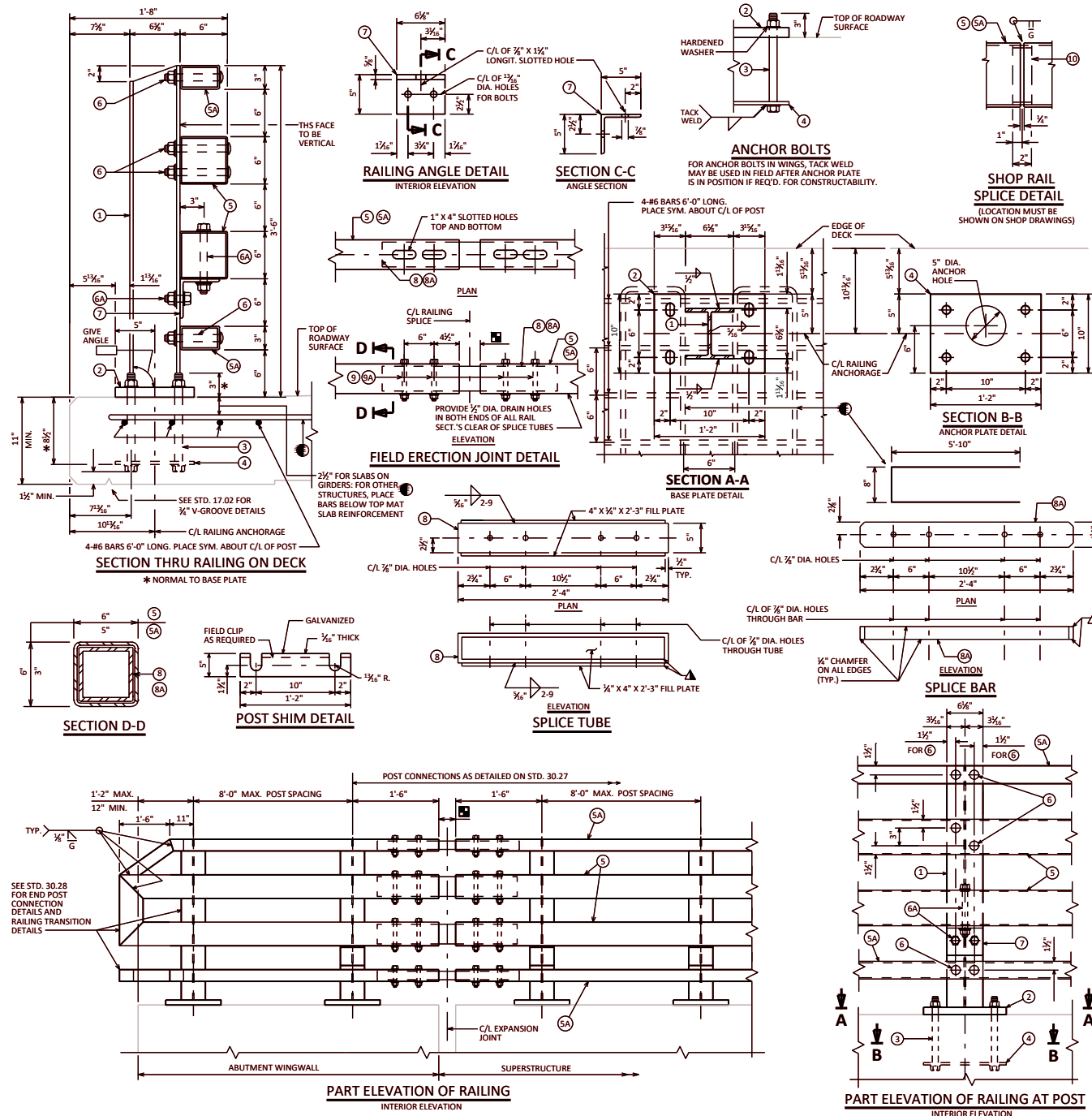
TUBULAR STEEL RAILING TYPE NY3



BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE:
7-19



LEGEND

- ① W6 X 25 WITH $1\frac{1}{2}$ " X $1\frac{1}{2}$ " HORIZONTAL SLOTTED HOLES ON EACH SIDE OF POST FOR BOLT NO. 6 AT TOP TWO RAILS. USE 1" DIA. HOLES FOR BOLT NO. 6 AT BOTTOM NO. 5A & FOR BOLT NO. 6A AT NO. 7. CUT BOTTOM OF POST TO MATCH CROSS SLOPE OF ROADWAY. PLACE POST VERTICAL. PLACE POSTS NORMAL TO GRADE LINE.
- ② PLATE $1\frac{1}{2}$ " X 10 " X 1 "-2" WITH $1\frac{1}{2}$ " X $1\frac{1}{2}$ " SLOTTED HOLES FOR ANCHOR BOLTS NO. 3. WELD TO NO. 1 AS SHOWN. SLOTS PARALLEL TO SHORT SIDE OF PLATE.
- ③ ASTM A449 - 1" DIA. ANCHOR BOLTS WITH HEAVY HEX NUT AND 2" O.D. HARDENED WASHER (ALL GALVANIZED). 4 REQUIRED PER POST. THREAD 3" AND PLACE NORMAL TO PLATE NO. 2. CHAMFER TOP OF BOLTS BEFORE THREADING. USE $1\frac{1}{2}$ " LONG BOLT FOR CONCRETE DECKS. ON CONCRETE SLAB SUPERSTRUCTURES, USE 1'-3" LONG BOLT FOR SLAB THICKNESS > 16" AND $1\frac{1}{2}$ " LONG FOR THICKNESS ≤ 16". USE 1'-9" LONG IN ABUTMENT WINGS. (AN EQUIVALENT THREADED ROD WITH HEAVY HEX NUTS AND HARDENED WASHERS MAY BE SUBSTITUTED FOR ANCHOR BOLTS IN WINGS IF REQUIRED FOR CONSTRUCTABILITY.)
- ④ $\frac{3}{4}$ " X 10 " X 1 "-2" ANCHOR PLATE (GALVANIZED) WITH $1\frac{1}{2}$ " DIA. HOLES FOR ANCHOR BOLTS NO. 3.
- ⑤ T5 6 X 6 X $\frac{3}{16}$ " STRUCTURAL TUBING. USE 1" DIA. HOLES FOR BOLT NO. 6 (FRONT & BACK) & $\frac{7}{8}$ " DIA. HOLES FOR BOLT NO. 6A (TOP & BOTTOM).
- ⑤A T5 5 X 3 X $\frac{3}{16}$ " STRUCTURAL TUBING. USE 1" DIA. HOLES FOR BOLT NO. 6 IN TOP RAIL (FRONT & BACK). USE $1\frac{1}{2}$ " X $1\frac{1}{2}$ " HORIZONTAL SLOTTED HOLES FOR BOLT NO. 6 IN BOTTOM RAIL (FRONT & BACK) AND A 2" O.D. WASHER UNDER BOLT HEAD.
- ⑥ $\frac{7}{8}$ " DIA. A325 SLOTTED ROUND HEAD BOLT WITH HEX NUT, $\frac{3}{4}$ " X $1\frac{1}{2}$ " X $1\frac{1}{2}$ " WASHER, AND SPRING LOCK WASHER (2 REQUIRED AT RAIL TO POST LOCATIONS SHOWN).
- ⑥A $\frac{7}{8}$ " DIA. A325 BOLT WITH HEX NUT AND SPRING LOCK WASHERS (1 REQUIRED AT RAIL TO ANGLE AND 2 REQUIRED AT ANGLE TO POST LOCATIONS SHOWN WITH $\frac{3}{4}$ " X $1\frac{1}{2}$ " X $1\frac{1}{2}$ " WASHER).
- ⑦ L5 X 5 X $\frac{3}{8}$ " STRUCTURAL ANGLE. ATTACH TO NO. 1 AND NO. 5 AS SHOWN.
- ⑧ T5 5 X 5 X $\frac{3}{8}$ " X 2'-4" LONG SPLICE TUBE. 1 PER RAIL. USED IN NO. 5.
- ⑧A $4\frac{1}{2}$ " X $2\frac{1}{2}$ " X 2'-4" LONG SPLICE BAR. 1 PER RAIL. USED IN NO. 5A.
- ⑨ $\frac{3}{4}$ " DIA. A325 FULLY THREADED BOLTS, $7\frac{1}{2}$ " LONG, WITH 2 WASHERS AND HEAVY HEX NUT ON EACH BOLT. NUT TO BE FINGER TIGHT. (4 REQUIRED PER SPLICE). USE 1" X 4" SLOTTED HOLES IN TOP AND BOTTOM OF NO. 5.
- ⑨A $\frac{3}{4}$ " DIA. A325 FULLY THREADED BOLTS, $4\frac{1}{2}$ " LONG, WITH 2 WASHER AND HEAVY HEX NUT ON EACH BOLT. NUT TO BE FINGER TIGHT. (4 REQUIRED PER SPLICE). USE 1" X 4" SLOTTED HOLES IN TOP AND BOTTOM OF NO. 5A.
- ⑩ SPLICE SLEEVE FABRICATED FROM $\frac{1}{4}$ " PLATE. PROVIDE "SLIDING FIT".
- ▲ ROADWAY OPENING OR $2\frac{1}{2}$ " MIN. FOR STRIP SEAL EXP. JOINT & $\frac{1}{2}$ " OPENING FOR A1 ABUTMENT. $\frac{1}{2}$ " AT FIXED JOINTS. SPLICES ARE REQUIRED IN ANY RAILING SPAN BETWEEN POSTS THAT CONTAINS A SUPERSTRUCTURE EXPANSION JOINT.

NOTES

BID ITEM SHALL BE "RAILING STEEL TYPE NY4", WHICH INCLUDES ALL ITEMS SHOWN.

RAILING SHALL BE CONTINUOUS OVER A MINIMUM OF THREE (3) POSTS WITHOUT SPLICES WHERE POSSIBLE.

POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT, AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUT.

ALL MATERIAL SHALL BE GALVANIZED AFTER FABRICATION. PRIOR TO GALVANIZING, ALL STEEL RAILING POSTS, ANGLES, SPLICE TUBES, SPLICE BARS AND STEEL TUBING SHALL BE GIVEN A NO. 6 BLAST CLEANING PER SSPC SPECIFICATIONS.

WHEN PAINTING IS REQUIRED, ALL MATERIAL EXCEPT ANCHORAGE DETAIL (NO. 3 & NO. 4) SHALL BE PAINTED OVER GALVANIZING WITH AN APPROVED TOP COAT AND TOP COAT AS SPECIFIED IN THE CONTRACT DOCUMENTS. THE RAILING SHALL BE PAINTED AMS STD. COLOR NO. [] (FILL IN COLOR NAME).

RAIL POST, BASE PLATES, SPLICE BAR, ANGLES, AND SPLICE PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A709 GRADE 50. STRUCTURAL TUBING SHALL CONFORM TO THE REQUIREMENTS OF ASTM A500 GRADE B OR C WITH A CERTIFIED $f_y \geq 50$ KSI. ANCHOR PLATES & SHIMS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A709 GRADE 36.

THE NUT SECURING THE POST BASE PLATE TO THE CONCRETE SHALL BE TIGHTENED TO A SNUG FIT AND GIVEN AN ADDITIONAL $\frac{1}{2}$ TURN.

FILL BOLT SLOT OPENINGS IN POST SHIMS AND PLATE NO. 2 WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. CAULK AROUND PERIMETER OF NO. 2 WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

STEEL SHIMS SHALL BE PROVIDED & USED UNDER PLATE NO. 2 WHERE REQUIRED FOR ALIGNMENT, AND SHALL BE GALVANIZED.

SEE BRIDGE MANUAL 30.2 FOR ALLOWED USE.

RAILING WEIGHT = 75 LB/LF (BASED ON 8'-0" POST SPACING)

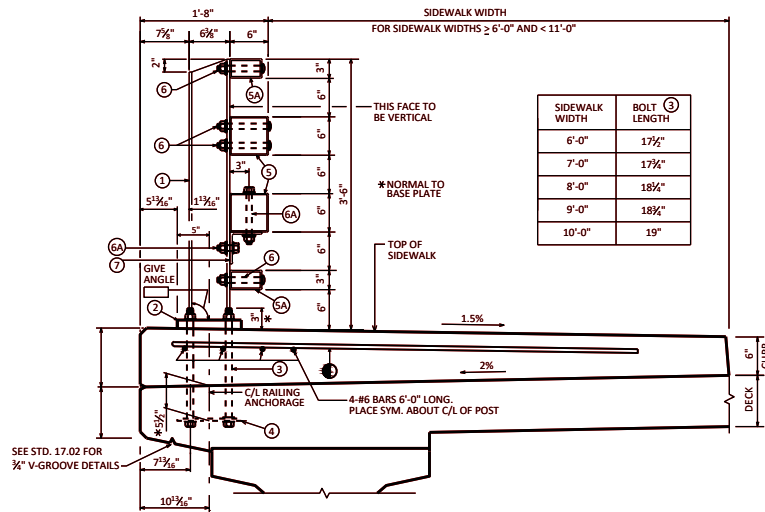
TUBULAR STEEL RAILING TYPE NY4



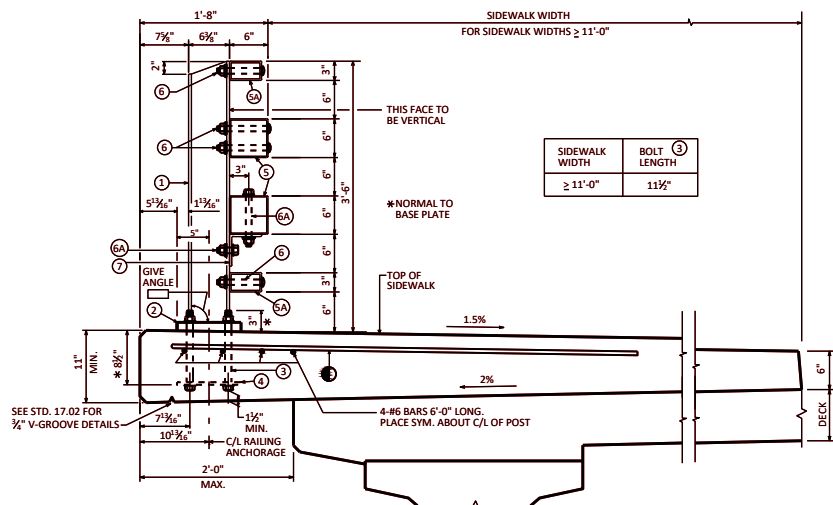
BUREAU OF STRUCTURES

APPROVED: Laura Shadewald

DATE: 7-22



SECTION THRU RAILING ON SIDEWALK



SECTION THRU RAILING ON SIDEWALK

LEGEND

- ① W6 X 25 WITH 1 1/2" X 1 1/2" HORIZONTAL SLOTTED HOLES ON EACH SIDE OF POST FOR BOLT NO. 6 AT TOP TWO RAILS. USE 1" DIA. HOLES FOR BOLT NO. 6 AT BOTTOM NO. 5A & FOR BOLT NO. 6A AT NO. 7. CUT BOTTOM OF POST TO MATCH CROSS SLOPE OF ROADWAY. PLACE POST VERTICAL. PLACE POSTS NORMAL TO GRADE LINE.
- ② PLATE 1 1/2" X 10" X 1'-2" WITH 1 1/2" X 1 1/2" SLOTTED HOLES FOR ANCHORS BOLTS NO. 3. WELD TO NO. 1 AS SHOWN. SLOTS PARALLEL TO SHORT SIDE OF PLATE.
- ③ ASTM A449 - 1" DIA. ANCHOR BOLTS WITH HEAVY HEX NUT AND 2" O.D. HARDENED WASHER (ALL GALVANIZED). 4 REQUIRED PER POST. THREAD 3" AND PLACE NORMAL TO PLATE NO. 2. CHAMFER TOP OF BOLTS BEFORE THREADING. USE 1 1/2" LONG BOLT FOR CONCRETE SIDEWALKS ≥ 11'-0" WIDE AND SEE TABLE TO THE LEFT FOR CONCRETE SIDEWALKS ≥ 6'-0" AND < 11'-0" WIDE FOR PROPER BOLT LENGTHS. USE 1'-9" LONG IN ABUTMENT WINGS. (AN EQUIVALENT THREADED ROD WITH HEAVY HEX NUTS AND HARDENED WASHERS MAY BE SUBSTITUTED FOR ANCHOR BOLTS IN WINGS IF REQUIRED FOR CONSTRUCTABILITY.)
- ④ 3/8" X 10" X 1'-2" ANCHOR PLATE (GALVANIZED) WITH 1 1/8" DIA. HOLES FOR ANCHOR BOLTS NO. 3.
- ⑤ TS 6 X 6 X 3/8" STRUCTURAL TUBING. USE 1" DIA. HOLES FOR BOLT NO. 6 (FRONT & BACK) & 3/8" DIA. HOLES FOR BOLT NO. 6A (TOP & BOTTOM).
- ⑤A TS 5 X 3 X 3/8" STRUCTURAL TUBING. USE 1" DIA. HOLES FOR BOLT NO. 6 IN TOP RAIL (FRONT & BACK). USE 1 1/2" X 1 1/2" HORIZONTAL SLOTTED HOLES FOR BOLT NO. 6 IN BOTTOM RAIL (FRONT & BACK) AND A 2" O.D. WASHER UNDER BOLT HEAD.
- ⑥ 3/4" DIA. A325 SLOTTED ROUND HEAD BOLT WITH HEX NUT, 3/8" X 1 1/2" X 1 1/2" WASHER, AND SPRING LOCK WASHER (2 REQUIRED AT RAIL TO POST LOCATIONS SHOWN).
- ⑥A 3/8" DIA. A325 BOLT WITH HEX NUT AND SPRING LOCK WASHER (1 REQUIRED AT RAIL TO ANGLE AND 2 REQUIRED AT ANGLE TO POST LOCATIONS SHOWN WITH 3/8" X 1 1/2" X 1 1/2" WASHER).
- ⑦ L 5 X 5 X 3/8" STRUCTURAL ANGLE. ATTACH TO NO. 1 AND NO. 5 AS SHOWN.
- ⑧ #6 BARS X 12'-0" LONG. BEND AS SHOWN. TIE TO TOP OF MAT OF STEEL. (DESIGNER TO PLACE THESE BARS IN BILL OF BARS FOR SUPERSTRUCTURE.)

FOR ALL TUBULAR STEEL RAILING TYPE NY4 DETAILS SEE STD. 30.27.

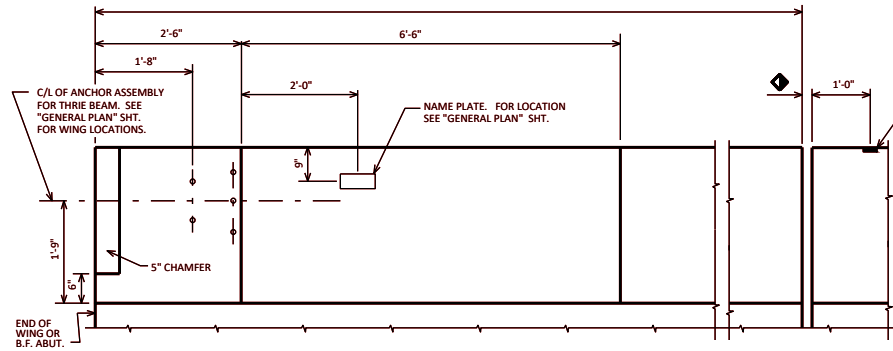
SIDEWALK DETAILS FOR TUBULAR STEEL RAILING TYPE NY4



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
7-16

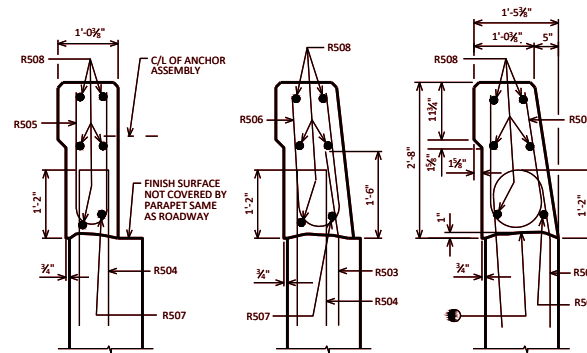


INSIDE ELEVATION

◆ ROADWAY OPENING OR $2\frac{1}{2}$ " MIN. FOR EXPANSION JOINT.
USE $\frac{1}{2}$ " OPENING WITH FILLER FOR A1 ABUTMENTS

■ BENCHMARK (WHEN SUPPLIED). AVOID PLACING BELOW A RAIL OR FENCE SYSTEM THAT IS ATTACHED TO THE TOP OF THE PARAPET.

NOTE: FOR SECTIONS A, B & C ONLY THE PARAPET TERMINATING ON A WING IS SHOWN. TERMINATION ON A DECK IS SIMILAR.



SECTION A

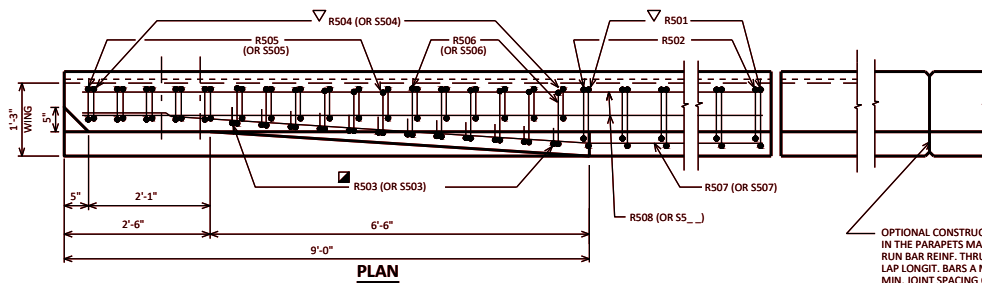
SECTION B

SECTION C

BILL OF BARS

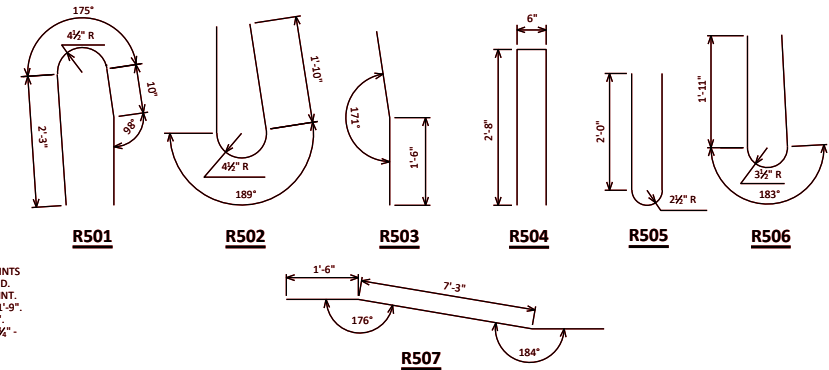
FOR ABUTMENT PARAPETS

BAR MARK	QTY	ABUT.	ABUT.	LENGTH	REIN.	LOCATION
R501	X			5-10	X	PARAPET-VERT.
R502	X			5-0	X	PARAPET-VERT.
R503	X			3-0	X	PARAPET-VERT.
R504	X			5-7	X	PARAPET-VERT.
R505	X			4-9	X	PARAPET-VERT.
R506	X			4-10	X	PARAPET-VERT.
R507	X				X	PARAPET-HORIZ.
R508	X					PARAPET-HORIZ.
S501	X			4-5	X	PARAPET-VERT.
S503	X			2-9	X	PARAPET-VERT.
S504	X			4-4	X	PARAPET-VERT.



PLAN

OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED. RUN BAR REINF. THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 1'-9". MIN. JOINT SPACING OF 80'-0". DEFINE CONST. JOINT WITH A $\frac{3}{4}$ " V-GROOVE.



R501

R502

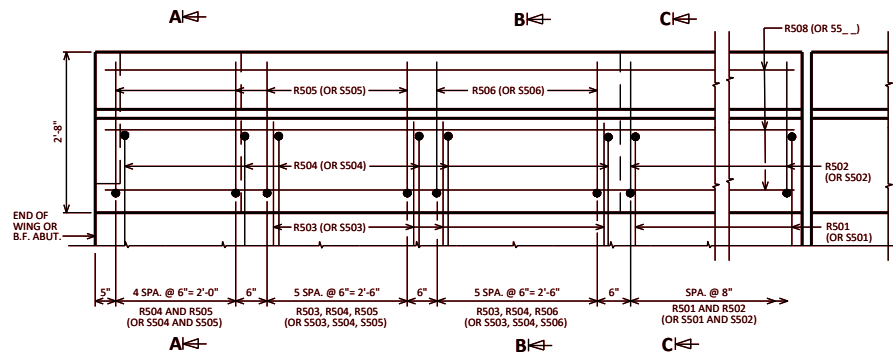
R503

R504

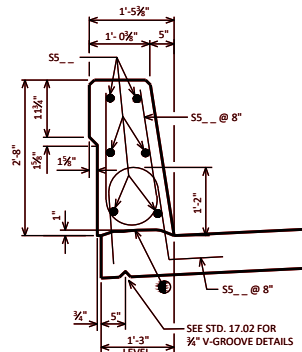
R505

R506

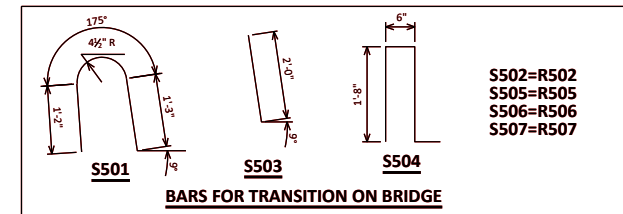
R507



OUTSIDE ELEVATION



SECTION THRU PARAPET ON BRIDGE



AREA = 3.09 SF
WEIGHT = 464 LB/FT

① CONST. JOINT - STRIKE OFF AS SHOWN.

■ R502 BARS MAY BE PLACED AFTER CONCRETE IS POURED BUT BEFORE INITIAL SET HAS TAKEN PLACE. USE CARE TO PLACE R503 OR S503 BARS CORRECTLY ALONG TRANSITION OF PARAPET.

▽ R501 AND R504 BARS TO BE TIED TO WING STEEL BEFORE WING IS POURED. DESIGNER MAY ELECT TO USE A R501 BAR IN LIEU OF A S501 BAR ADJACENT TO THE PAVING NOTCH ON TYPE A1 ABUTMENTS.

SINGLE SLOPE PARAPET 32SS



BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE: 7-19

INSIDE ELEVATION

 ROADWAY OPENING OR 2½" MIN. FOR EXPANSION JOINT.
USE ¾" OPENING WITH FILLER FOR A1 ABUTMENTS

1'-3" WING

5"

5"

2'-1"

2'-6"

6'-6"

9'-0"

R509 (OR S509)

R505 (OR S505)

R506 (OR S506)

R504 (OR S504)

R503 (OR S503)

R502

R507 (OR S507)

R508 (OR S5...)

OPTIONAL CONSTRUCTION IN THE PARAPETS MAY RUN BAR REINF. THROUGH LAP LONGIT. BARS AT MIN. JOINT SPACING

PLAN

OUTSIDE ELEVATION

BENCHMARK (WHEN SUPPLIED). AVOID PLACING BELOW A RAIL OR FENCE SYSTEM THAT IS ATTACHED TO THE TOP OF THE PARAPET.

**NOTE: FOR SECTIONS A, B & C ONLY
THE PARAPET TERMINATING ON A WING
IS SHOWN. TERMINATION ON A DECK
IS SIMILAR.**

IS SIMILAR.

Diagram 1 (Left):

- Top width: 1'-0 3/4"
- Top reinforcement: R510
- Side reinforcement: R508, R509
- Bottom reinforcement: R504, R507
- Height: 1'-2"
- Bottom width: 3/4"
- Label: C/L of ANCHOR ASSEMBLY
- Label: FINISH SURFACE NOT COVERED BY PARAPET SAME AS ROADWAY

Diagram 2 (Middle):

- Top width: 1'-6"
- Top reinforcement: R510
- Side reinforcement: R508, R506
- Bottom reinforcement: R503, R504
- Height: 1'-2"
- Bottom width: 3/4"
- Label: FINISH SURFACE NOT COVERED BY PARAPET SAME AS ROADWAY

Diagram 3 (Right):

- Top width: 1'-5 3/4"
- Top reinforcement: R510
- Side reinforcement: R508, R506
- Bottom reinforcement: R503, R504
- Height: 1'-2"
- Bottom width: 3/4"
- Label: FINISH SURFACE NOT COVERED BY PARAPET SAME AS ROADWAY

SECTION B

SECTION C

BILL OF BARS

FOR ABUTMENT PARAPETS

BAR MARK	COAT	ABUT.	ABUT.	LENGTH	BEAT	LOCATION
R501	X			5-10	X	PARAPET-VERT.
R502	X			5-8	X	PARAPET-VERT.
R503	X			3-0	X	PARAPET-VERT.
R504	X			5-7	X	PARAPET-VERT.
R505	X			5-5	X	PARAPET-VERT.
R506	X			5-6	X	PARAPET-VERT.
R507	X				X	PARAPET-HORIZ.
R508	X					PARAPET-HORIZ.
R509	X			4-9	X	PARAPET-VERT.
R510	X				X	PARAPET-HORIZ.
S501	X			4-5	X	PARAPET-VERT.
S503	X			2-9	X	PARAPET-VERT.
S504	X			4-4	X	PARAPET-VERT.

R501

R502

R503

R504

R504

2'-8"

6"

R506

2'-4"

2'-3"

2 1/2" R

3 1/2" R

183°

2'-0"

2 1/2" R

2'-4"

173°

R505

R500

R507

R510

R50

SECTION THRU PARAPET ON BRIDGE

S501

S503

S504

S502=R502
S505=R505
S506=R506
S507=R507

BARs FOR TRANSITION ON BRIDGE

AREA = 3.36 SF
WEIGHT = 504 LB/FT

CONST. JOINT - STRIKE OFF AS SHOWN.

 R503 BARS MAY BE PLACED AFTER CONCRETE IS POURED BUT BEFORE INITIAL SET HAS TAKEN PLACE. USE CARE TO PLACE R503 OR S503 BARS CORRECTLY ALONG TRANSITION OF PARAPET.

▽ R501 AND R504 BARS TO BE TIED TO WING STEEL BEFORE WING IS POURED.
DESIGNER MAY ELECT TO USE A R501 BAR IN LIEU OF A S501 BAR ADJACENT TO THE PAVING NOTCH ON TYPE A1 ABUTMENTS.

SINGLE SLOPE PARAPET 36SS



BUREAU OF
STRUCTURES

APPROVED: *Laura Shadewald*

DATE: 7-19



ROADWAY OPENING OR 2½" MIN. FOR EXPANSION JOINT. USE ¾" OPENING WITH FILLER FOR A1 ABUTMENTS

SECTION C

PLAN

R50:

R504

R506

R50!

R509

OUTSIDE ELEVATION

SECTION THRU PARAPET ON BRIDGE

BARS FOR TRANSITION ON BRIDGE

AREA = 3.75 SF
WEIGHT = 563 LB/FT

 CONST. JOINT - STRIKE OFF AS SHOWN.

 R503 BARS MAY BE PLACED AFTER CONCRETE IS POURED BUT BEFORE INITIAL SET HAS TAKEN PLACE. USE CARE TO PLACE R503 OR S503 BARS CORRECTLY ALONG TRANSITION OF PARAPET.

▽ R501 AND R504 BARS TO BE TIED TO WING STEEL BEFORE WING IS POURED.

DESIGNER MAY ELECT TO USE A R501 BAR IN LIEU OF A S501 BAR ADJACENT TO THE PAVING NOTCH ON TYPE A1 ABUTMENTS.

FOR ABUTMENT PARAPETS

BAR MARK	COAT	ABUT.	ABUT.	LENGTH	BRV.	BAR SERIES	LOCATION
R501	X			5-10	X		PARAPET-VERT.
R502	X			6-8	X		PARAPET-VERT.
R503	X			3-0	X		PARAPET-VERT.
R504	X			5-7	X		PARAPET-VERT.
R505	X			6-5	X		PARAPET-VERT.
R506	X			6-6	X		PARAPET-VERT.
R507	X				X		PARAPET-HORIZ.
R508	X						PARAPET-HORIZ.
R509	X			5-5	X	▲	PARAPET-VERT.
R510	X				X		PARAPET-HORIZ.
S501	X			4-5	X		PARAPET-VERT.
S503	X			2-9	X		PARAPET-VERT.
S504	X			4-4	X		PARAPET-VERT.

▲ LENGTH SHOWN FOR BAR IS AN AVERAGE LENGTH AND SHOULD ONLY BE USED FOR BAR WEIGHT CALCULATIONS. SEE BAR SERIES TABLE FOR ACTUAL LENGTHS.

BAR SERIES TABLE

MARK	NO. REQD.	LENGTH
R509	4 SERIES OF 6	4'-9" TO 6'-1"

BUNDLE AND TAG EACH SERIES SEPARATELY.

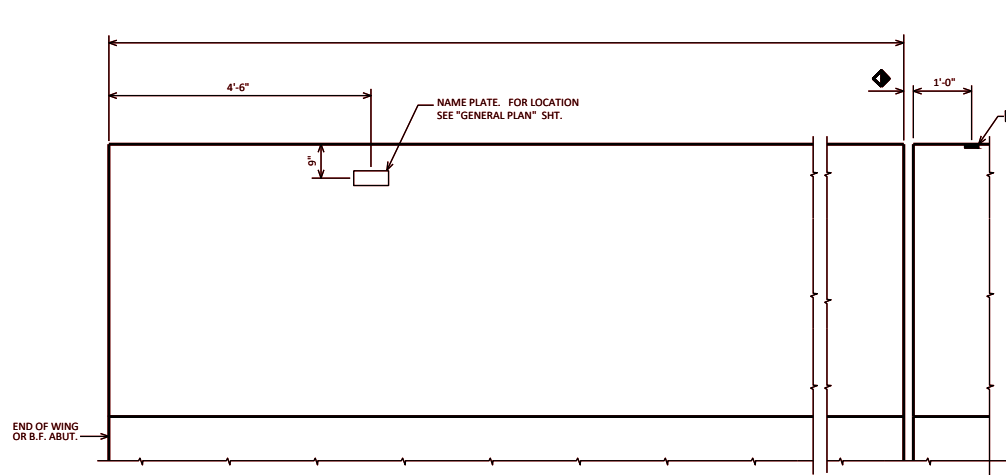
SINGLE SLOPE PARAPET 42SS



**BUREAU OF
STRUCTURES**

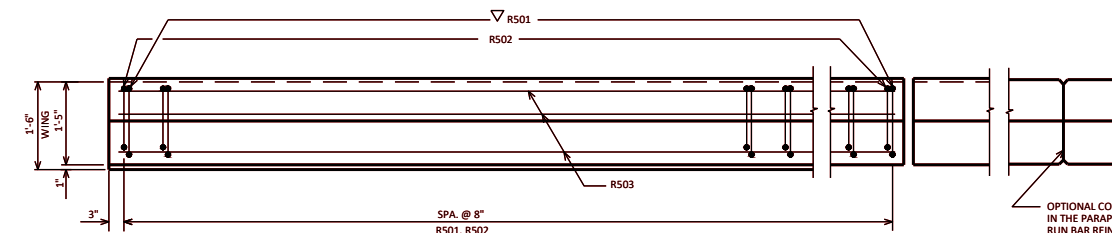
APPROVED: *Laura Shadewald*

DATE: 7-19

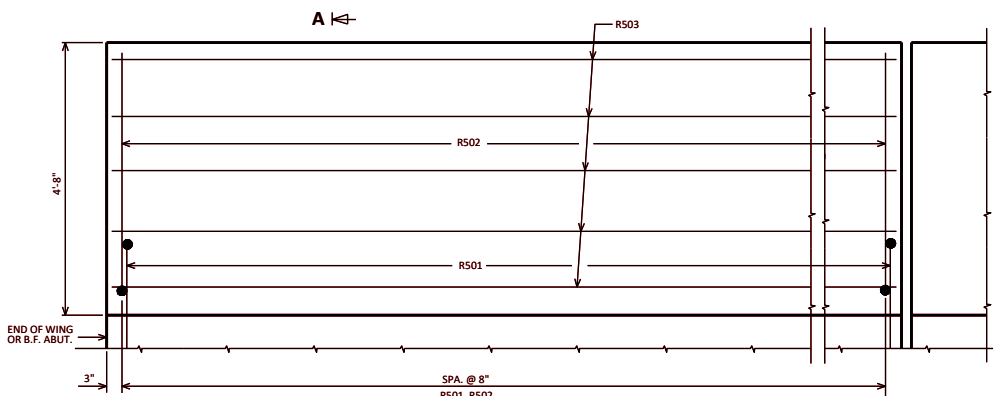


INSIDE ELEVATION

 ROADWAY OPENING OR 2½" MIN. FOR EXPANSION JOINT.
USE ½" OPENING WITH FILLER FOR A1 ABUTMENTS

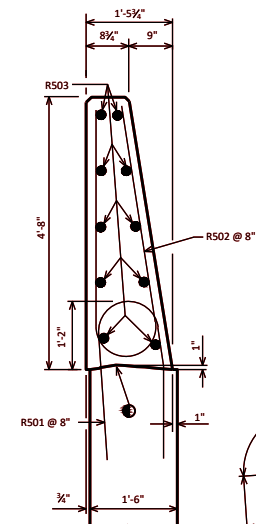


PLAN

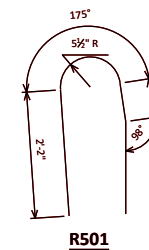


OUTSIDE ELEVATION

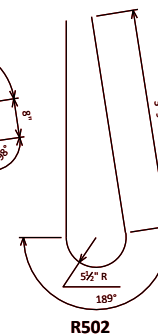
BENCHMARK (WHEN SUPPLIED). AVOID PLACING BELOW A RAIL OR FENCE SYSTEM THAT IS ATTACHED TO THE TOP OF THE PARAPET.



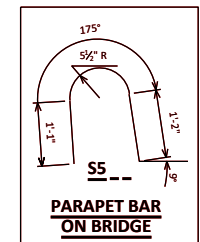
SECTION A



R501



R502



PARAPET BAR
ON BRIDGE

BILL OF BARS

FOR ABUTMENT PARAPETS

[illegible]

DESIGNER NOTES

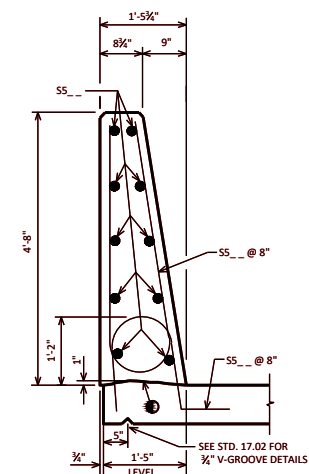
THE '56SS' PARAPET IS ONLY TO BE USED IF A 'TYPE S56' SINGLE SLOPE CONCRETE ROADWAY BARRIER ADJOINS THE END OF THE '56SS' PARAPET.

USE A 1'-6" WING WIDTH FOR WINGS PARALLEL TO THE ROADWAY.

AREA = 5.16 SF
WEIGHT = 774 LB/FT

● CONST. JOINT - STRIKE OFF AS SHOWN.

▽ R501 BARS TO BE TIED TO WING STEEL BEFORE WING IS POURED. DESIGNER MAY ELECT TO USE A S5__ BAR ADJACENT TO THE PAVING NOTCH ON TYPE A1 ABUTMENTS.



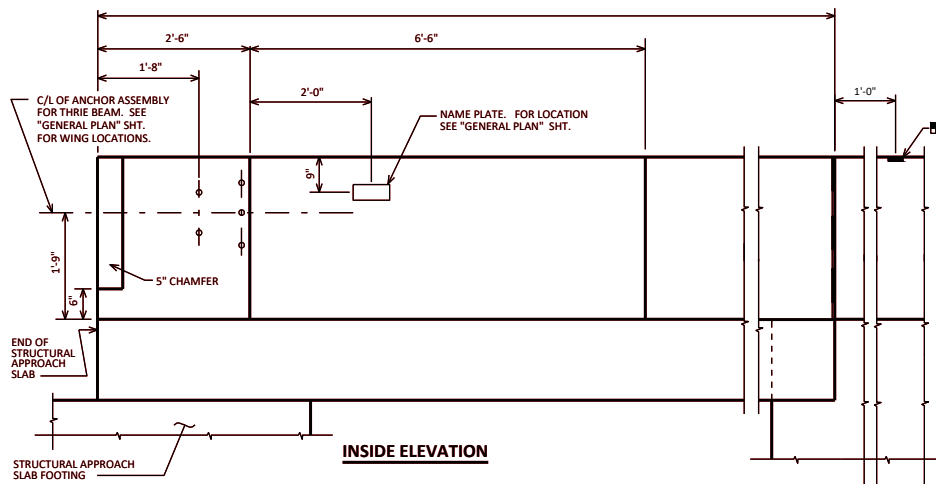
SECTION THRU PARAPET ON BRIDGE

SINGLE SLOPE PARAPET 56SS

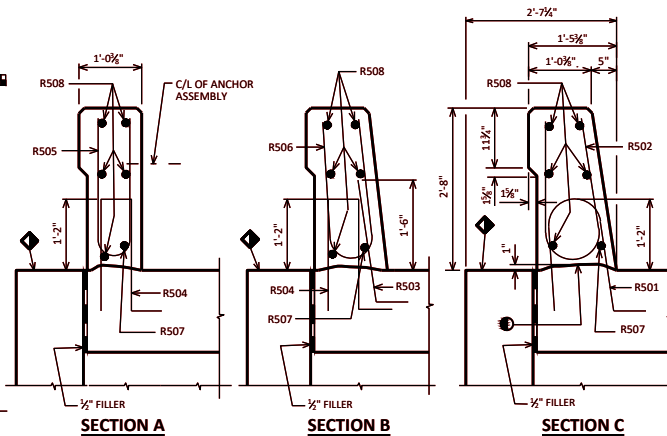


APPROVED: *Laura Shadewald*

DATE: 7-25



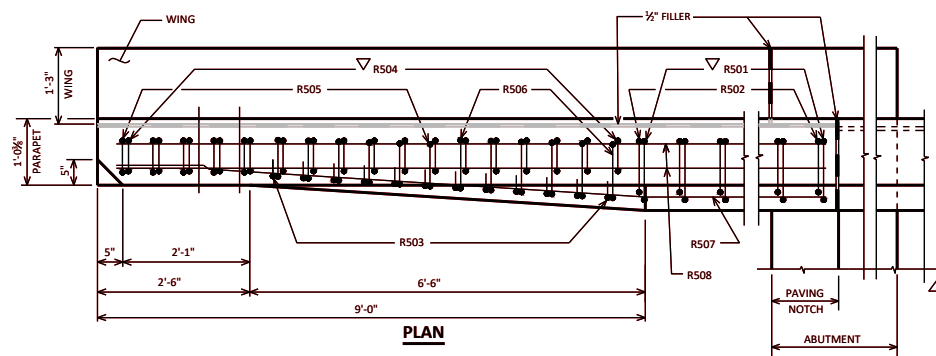
BENCHMARK (WHEN SUPPLIED), AVOID PLACING BELOW A RAIL OR FENCE SYSTEM THAT IS ATTACHED TO THE TOP OF THE PARAPET.



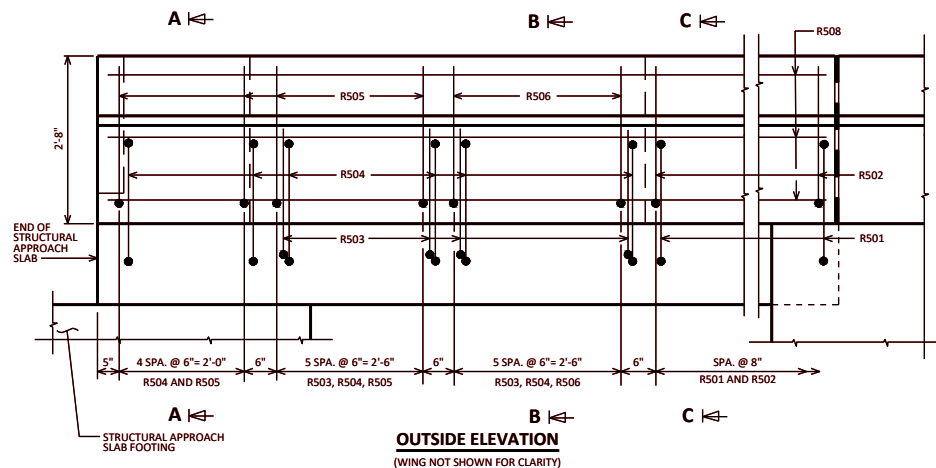
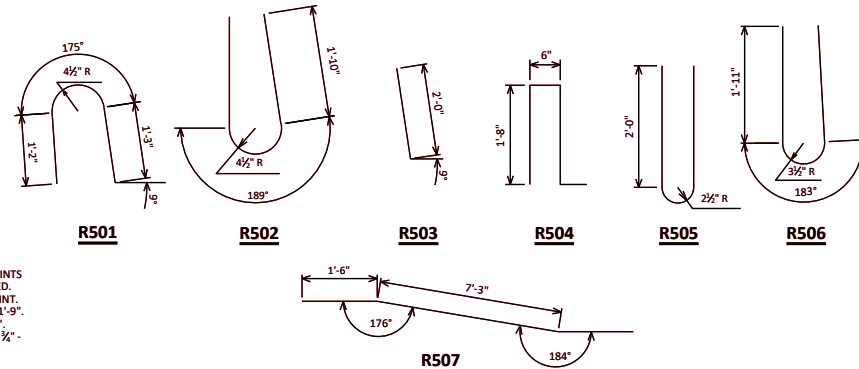
BILL OF BARS

FOR STRUCTURAL APPROACH SLAB PARAPETS

BAR MARK	COYT	ABUT.	ABUT.	LENGTH	BEHT	LOCATION
R501	X			4-5	X	PARAPET-VERT.
R502	X			5-0	X	PARAPET-VERT.
R503	X			2-9	X	PARAPET-VERT.
R504	X			4-4	X	PARAPET-VERT.
R505	X			4-9	X	PARAPET-VERT.
R506	X			4-10	X	PARAPET-VERT.
R507	X				X	PARAPET-HORIZ.
R508	X					PARAPET-HORIZ.



OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED. RUN BAR REINF. THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 1'-9". MIN. JOINT SPACING OF 80'-0". DEFINE CONST. JOINT WITH A 1/2" V GROOVE.



AREA = 3.09 SF
WEIGHT = 464 LB/FT

CONST. JOINT - STRIKE OFF AS SHOWN.

SLOPE FOR DRAINAGE

R501 AND R504 BARS TO BE TIED TO STRUCTURAL APPROACH SLAB STEEL BEFORE STRUCTURAL APPROACH SLAB IS POURED.

DESIGNER NOTES

SEE STRUCTURAL APPROACH SLAB STANDARDS 12.10 AND 12.11 FOR APPROACH SLAB INFORMATION.

A1 ABUT. SHOWN. SEE STANDARD 12.12 FOR A3 ABUT. DETAILS.

SEE STANDARD 30.30 FOR DETAILS OF 32SS PARAPET ON BRIDGE.

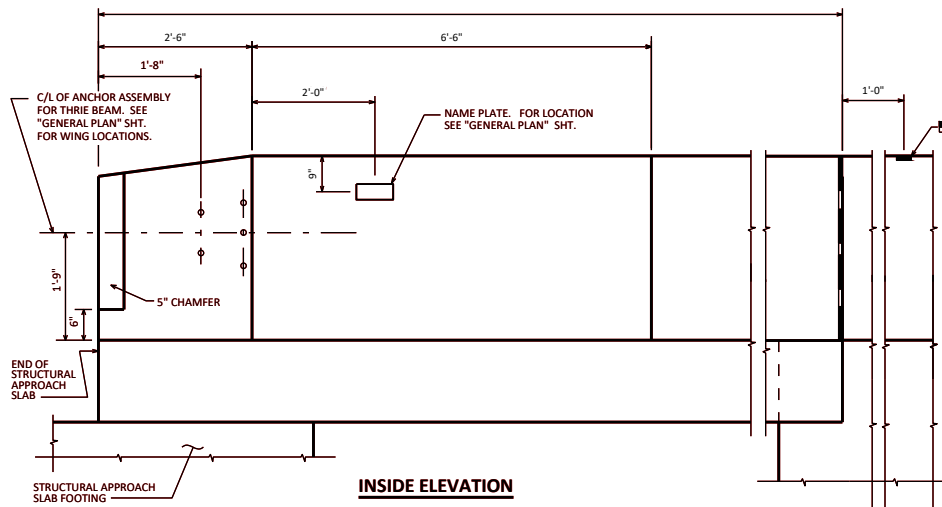
SINGLE SLOPE PARAPET 32SS WITH STRUCTURAL APPROACH SLAB



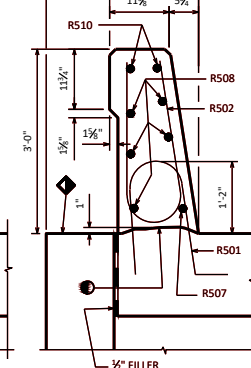
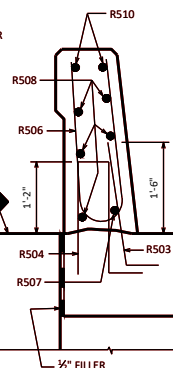
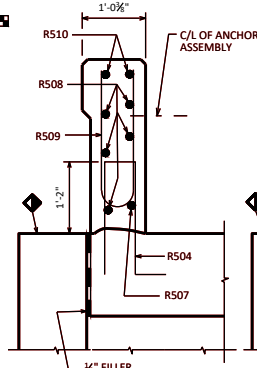
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
7-19

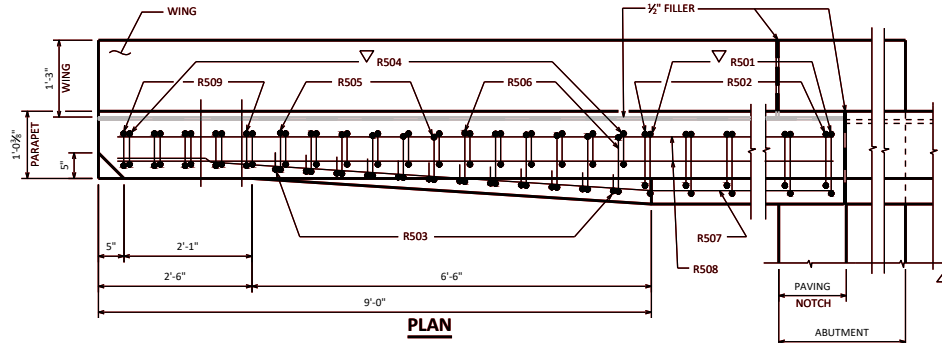


■ BENCHMARK (WHEN SUPPLIED). AVOID PLACING BELOW A RAIL OR FENCE SYSTEM THAT IS ATTACHED TO THE TOP OF THE PARAPET.

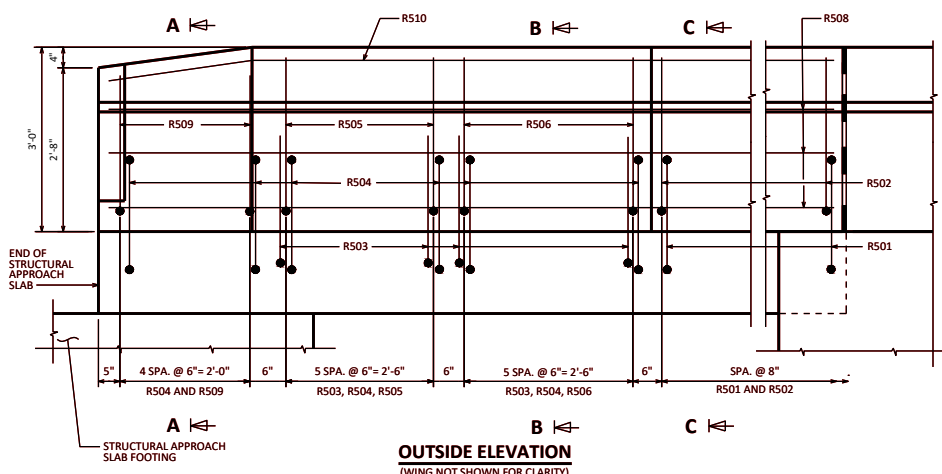
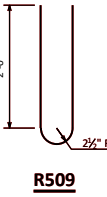
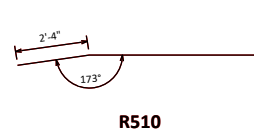
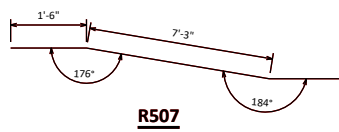
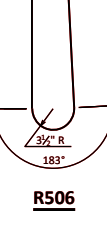
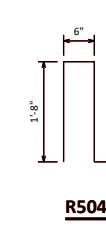
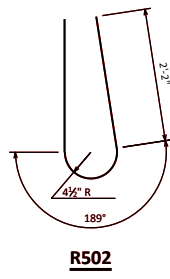
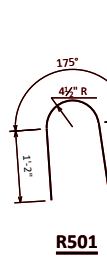


BILL OF BARS

FOR STRUCTURAL APPROACH SLAB PARAPETS						
BAR MARK	COY.	ABUT.	ABUT.	LENGTH	REIN.	LOCATION
R501	X			4-5	X	PARAPET-VERT.
R502	X			5-8	X	PARAPET-VERT.
R503	X			2-9	X	PARAPET-VERT.
R504	X			4-4	X	PARAPET-VERT.
R505	X			5-5	X	PARAPET-VERT.
R506	X			5-6	X	PARAPET-VERT.
R507	X				X	PARAPET-HORIZ.
R508	X				X	PARAPET-HORIZ.
R509	X			4-9	X	PARAPET-VERT.
R510	X				X	PARAPET-HORIZ.



OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED. RUN BAR REIN. THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 1'-9". MIN. JOINT SPACING OF 80'-0". DEFINE CONST. JOINT WITH A 3/4" - 'V' GROOVE.



DESIGNER NOTES

SEE STRUCTURAL APPROACH SLAB STANDARDS 12.10 AND 12.11 FOR APPROACH SLAB INFORMATION.
A1 ABUT. SHOWN. SEE STANDARD 12.12 FOR A3 ABUT. DETAILS.
SEE STANDARD 30.31 FOR DETAILS OF 36SS PARAPET ON BRIDGE.

AREA = 3.36 SF
WEIGHT = 504 LB/FT

● CONST. JOINT - STRIKE OFF AS SHOWN.

◆ SLOPE FOR DRAINAGE

▽ R501 AND R504 BARS TO BE TIED TO STRUCTURAL APPROACH SLAB STEEL BEFORE STRUCTURAL APPROACH SLAB IS POURED.

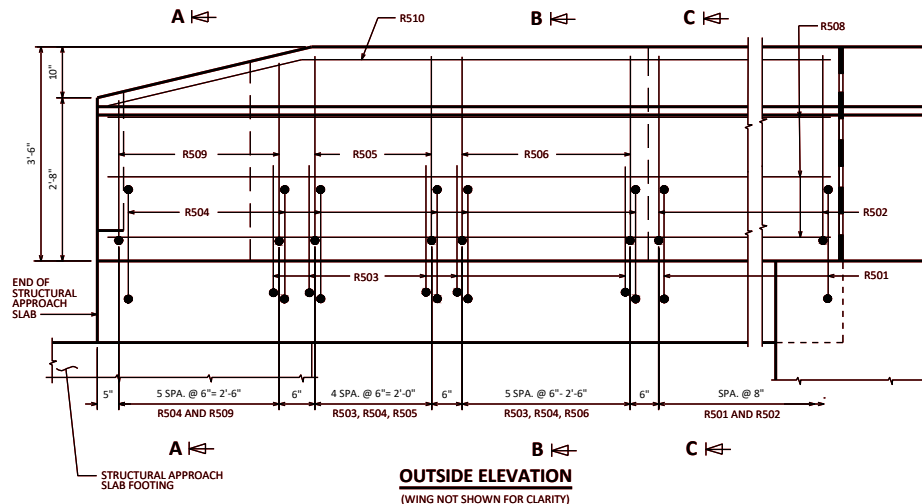
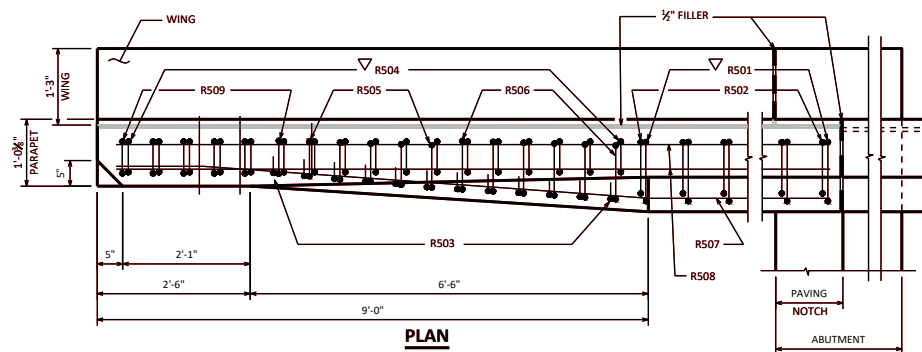
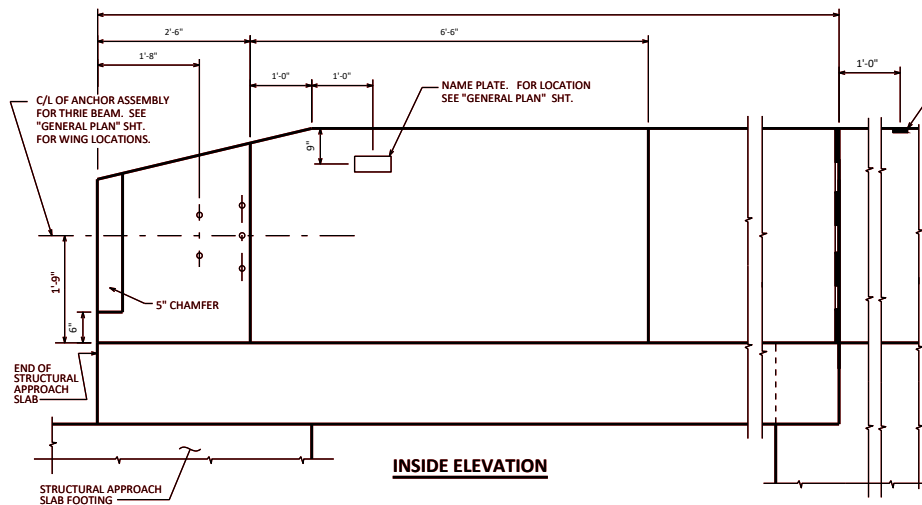
WISCONSIN
DEPARTMENT OF
TRANSPORTATION

**SINGLE SLOPE PARAPET
36SS WITH STRUCTURAL
APPROACH SLAB**

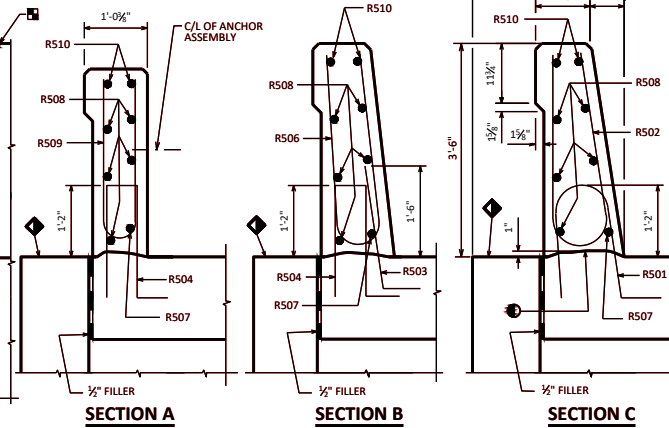
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
7-19



■ BENCHMARK (WHEN SUPPLIED), AVOID PLACING BELOW A RAIL OR FENCE SYSTEM THAT IS ATTACHED TO THE TOP OF THE PARAPET.



BILL OF BAR

FOR STRUCTURAL APPROACH SLAB PARAPETS

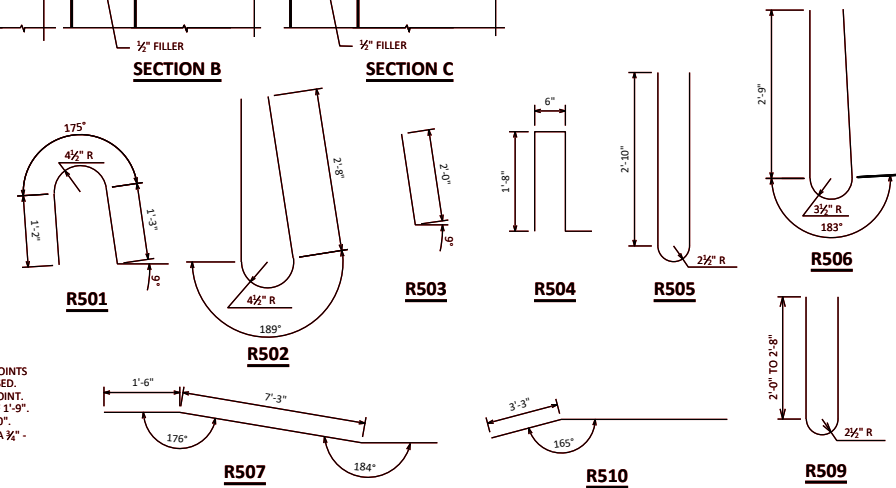
BAR MARK	CO.	ABUT.	ABUT.	LENGTH	REIN.	BAR SERIES	LOCATION
R501	X			4-5	X		PARAPET-VERT.
R502	X			6-8	X		PARAPET-VERT.
R503	X			2-9	X		PARAPET-VERT.
R504	X			4-4	X		PARAPET-VERT.
R505	X			6-5	X		PARAPET-VERT.
R506	X			6-6	X		PARAPET-VERT.
R507	X				X		PARAPET-HORIZ.
R508	X						PARAPET-HORIZ.
R509	X			5-5	X	▲	PARAPET-VERT.
R510	X				X		PARAPET-HORIZ.

▲ LENGTH SHOWN FOR BAR IS AN AVERAGE LENGTH AND SHOULD ONLY BE USED FOR BAR WEIGHT CALCULATIONS. SEE BAR SERIES TABLE FOR ACTUAL LENGTHS.

BAR SERIES TABLE

MARK	NO. REQD.	LENGTH
R509	4 SERIES OF 6	4'-9" TO 6'-1"

BUNDLE AND TAG EACH SERIES SEPARATELY.



DESIGNER NOTES

SEE STRUCTURAL APPROACH SLAB STANDARDS 12.10 AND 12.11 FOR APPROACH SLAB INFORMATION.

A1 ABUT. SHOWN. SEE STANDARD 12.12 FOR A3 ABUT. DETAILS.

SEE STANDARD 30.32 FOR DETAILS OF 42SS PARAPET ON BRIDGE.

AREA = 3.75 SF
WEIGHT = 563 LB/FT

● CONST. JOINT - STRIKE OFF AS SHOWN.

◆ SLOPE FOR DRAINAGE

▽ R501 AND R504 BARS TO BE TIED TO STRUCTURAL APPROACH SLAB STEEL BEFORE STRUCTURAL APPROACH SLAB IS POURED.

SINGLE SLOPE PARAPET 42SS WITH STRUCTURAL APPROACH SLAB

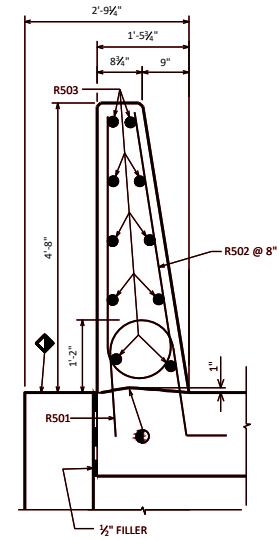
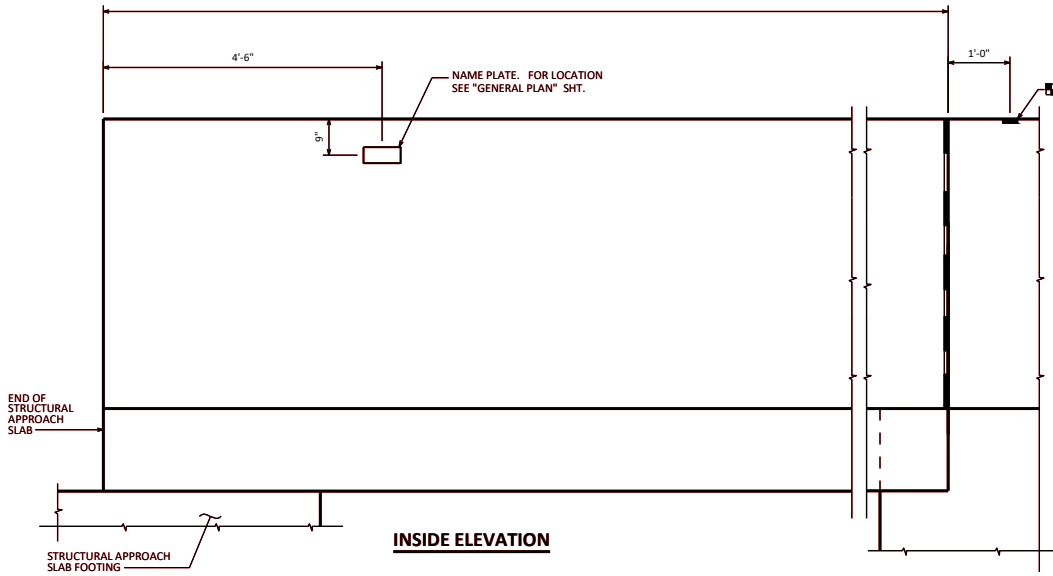


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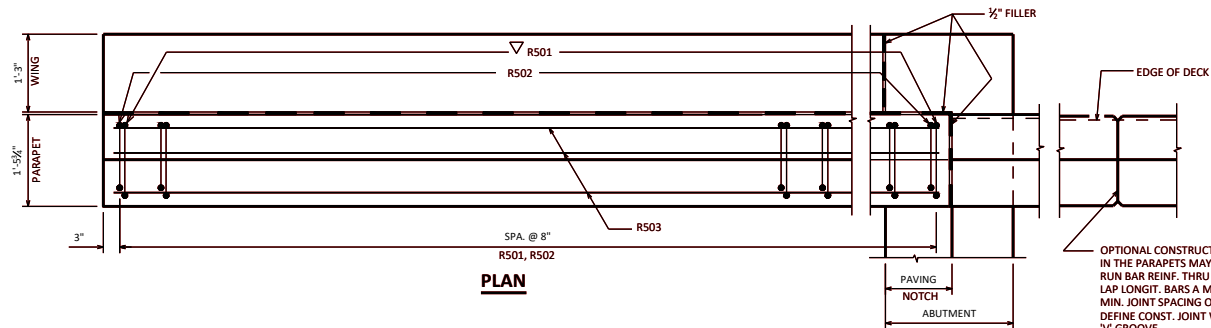
APPROVED: *Laura Shadewald*

DATE:
7-19

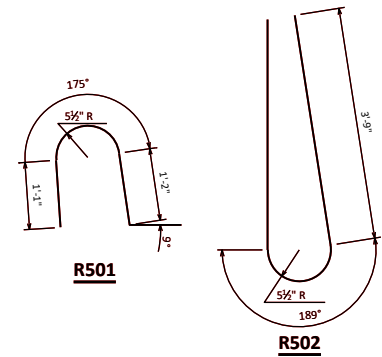
BENCHMARK (WHEN SUPPLIED). AVOID PLACING BELOW A RAIL OR FENCE SYSTEM THAT IS ATTACHED TO THE TOP OF THE PARAPET.



SECTION A



OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED. RUN BAR REINF. THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 1'-9". MIN. JOINT SPACING OF 80'-0". DEFINE CONST. JOINT WITH A ¼" - "V" GROOVE.



R501

R502

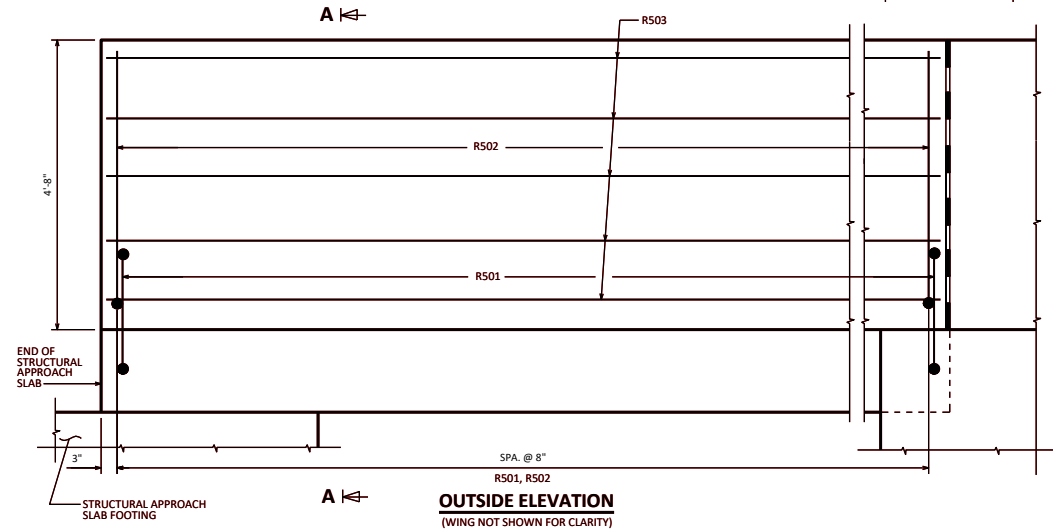
DESIGNER NOTES

THE '56SS' PARAPET IS ONLY TO BE USED IF A 'TYPE S56'
SINGLE SLOPE CONCRETE ROADWAY BARRIER ADJOINS THE END OF
THE '56SS' PARAPET.

SEE STRUCTURAL APPROACH SLAB STANDARDS 12.10 AND 12.11
FOR APPROACH SLAB INFORMATION.

A1 ABUT. SHOWN. SEE STANDARD 12.12 FOR A3 ABUT. DETAILS.

SEE STANDARD 30.33 FOR DETAILS OF 56SS PARAPET ON BRIDGE.



AREA = 5.16 SF
WEIGHT = 774 LB/FT

 CONST. JOINT - STRIKE OFF AS SHOWN.

▽ R501 BARS TO BE TIED TO STRUCTURAL APPROACH SLAB STEEL BEFORE STRUCTURAL APPROACH SLAB IS POURED.

 SLOPE FOR DRAINAGE

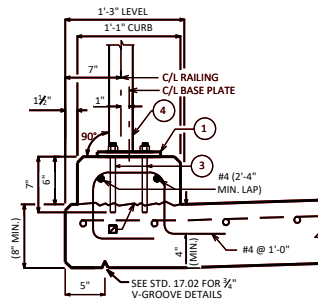
**SINGLE SLOPE PARAPET
56SS WITH STRUCTURAL
APPROACH SLAB**



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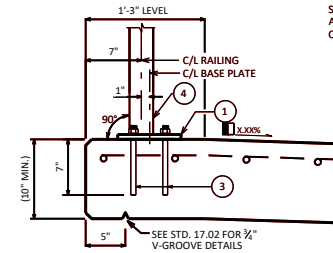
APPROVED: *Laura Shadewald*

DATE: 7-25

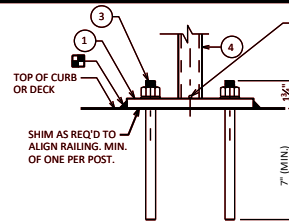


CURB MOUNTED PEDESTRIAN RAILING

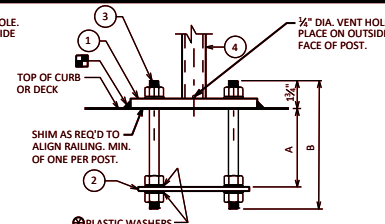
CONST. JOINT-STRIKE OFF AS SHOWN AND LEAVE ROUGH.



DECK MOUNTED PEDESTRIAN RAILING



ADHESIVE ANCHORS



CAST-IN-PLACE ANCHORS

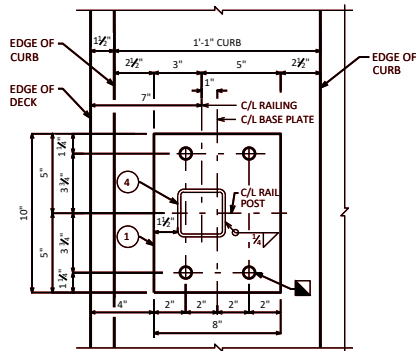
ANCHORAGE FOR RAIL POSTS

NOTE: ANCHOR PLATE NOT REQUIRED WHEN ADHESIVE ANCHORS ARE USED.

APPLICATION	A	B
CURB MOUNTED	7"	10 1/2"
DECK MOUNTED	5 1/2"	9"

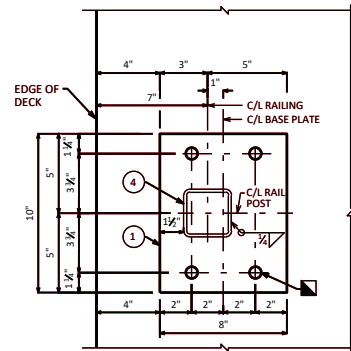
LEGEND

- 1 PLATE 3/8" X 8" X 10" WITH 3/4" HOLES.
 - 2 3/4" X 6" X 9 3/4" ANCHOR PLATE WITH 1 1/8" DIA. HOLES FOR THRD. RODS NO.3.
 - 3 3/4" DIA. X 10 3/4" LONG, TYPE 316 STAINLESS STEEL THREADED RODS (MIN. TENSILE STRENGTH = 70 KSI) WITH NUT AND WASHERS OF SAME ALLOY GROUP. ALTERNATIVE ANCHORAGE: CONCRETE ADHESIVE ANCHORS 3/4"-INCH. EMBED 7" IN CONCRETE FOR RAIL POSTS. ADHESIVE ANCHORS SHALL CONFORM TO SECTIONS 502.2.12 AND 502.3.14 OF THE STANDARD SPECIFICATIONS.
 - 4 3/4" DIA. X 9" LONG, TYPE 316 STAINLESS STEEL THREADED RODS (MIN. TENSILE STRENGTH = 70 KSI) WITH NUT AND WASHERS OF SAME ALLOY GROUP. ALTERNATIVE ANCHORAGE: CONCRETE ADHESIVE ANCHORS 3/4"-INCH. EMBED 7" IN CONCRETE FOR RAIL POSTS. ADHESIVE ANCHORS SHALL CONFORM TO SECTIONS 502.2.12 AND 502.3.14 OF THE STANDARD SPECIFICATIONS.
- STD. 30.11 (4) 4" O.D. POST SLEEVE. PLACE VERTICAL WELD TO NO.1. (2.875" O.D. POSTS)
- STD. 30.15 (4) STRUCTURAL TUBING 4" X 4" X 3/16". PLACE VERTICAL. WELD TO NO.1.
- STD. 30.17 (4) STRUCTURAL TUBING 3" X 3" X 3/16". PLACE VERTICAL. WELD TO NO.1.



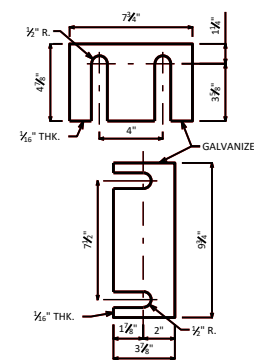
RAIL POST BASE PLATE - CURB MOUNTED

- 1 1/2" DIA. HOLES FOR ADHESIVE ANCHORS
- 3/4" DIA. X 1 1/2" SLOTTED HOLES FOR CAST-IN-PLACE ANCHORS. PLACE SLOTTED HOLES PARALLEL TO C/L RAILING.



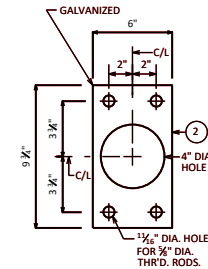
RAIL POST BASE PLATE - DECK MOUNTED

- 1 1/2" DIA. HOLES FOR ADHESIVE ANCHORS
- 3/4" DIA. X 1 1/2" SLOTTED HOLES FOR CAST-IN-PLACE ANCHORS. PLACE SLOTTED HOLES PARALLEL TO C/L RAILING.



SHIM PLATE DETAILS

TWO SHIMS OF EACH SIZE REQUIRED PER POSTS



ANCHOR PLATE

NOTE: ANCHOR PLATE NOT REQUIRED WHEN ADHESIVE ANCHORS ARE USED.

NOTES

BID ITEM SHALL BE "RAILING STEEL PEDESTRIAN TYPE C(1)-6", WHICH SHALL INCLUDE ALL STEEL ITEMS SHOWN.

- CAULK AROUND PERIMETER OF BASE PLATES, NO. 1, AND FILL BOLT SLOT OPENINGS IN SHIMS AND BASE PLATES WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

DESIGNER NOTES

STANDARD 30.17 RAILING DETAILS SHOWN. STANDARDS 30.11 AND 30.15 RAILING DETAILS SIMILAR. SEE TABLE FOR MAXIMUM POST SPACING (WHEN USING THIS STANDARD).

THIS STANDARD MAY BE USED WHEN THE SIDEWALK IS SEPARATED FROM THE ROADWAY BY A TRAFFIC BARRIER. DETAILS SHOWN ON THIS STANDARD PROVIDE PEDESTRIAN RAILING ANCHORAGE DETAILS FOR A REINFORCED CONCRETE CURB AND A REINFORCED CONCRETE DECK. THIS STANDARD MEETS THE REQUIREMENTS OF UFD 13.8.2 FOR PEDESTRIAN RAILINGS.

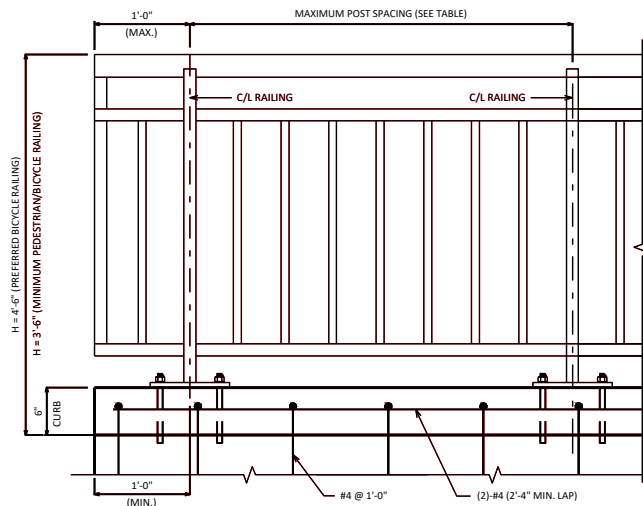
REFER TO STANDARD REFERENCES FOR POST CONNECTIONS AND ADDITIONAL DETAILS.

- FOR DECK MOUNTED APPLICATIONS, SLOPE AWAY FROM EDGE OF DECK. USE CURB MOUNTED DETAILS WHEN SLOPED TOWARDS EDGE OF DECK IS REQUIRED.

DESIGN DATA

CONCRETE STRENGTH, f'_c : 3,500 P.S.I.
REQUIRED CHARACTERISTIC BOND STRESS, λ_{bond} : 970 P.S.I. (MIN.)

RAILING HEIGHT "H"	MAXIMUM POST SPACING	STANDARD REFERENCES
$\leq 4'-6"$	9'-0"	30.17
$> 4'-6"$	8'-0"	30.11 & 30.15



PARTIAL ELEVATION FOR PEDESTRIAN RAIL ON CURB

(SEE STD. 30.17 FOR RAILING DETAILS. DECK REINFORCEMENT NOT SHOWN FOR CLARITY)

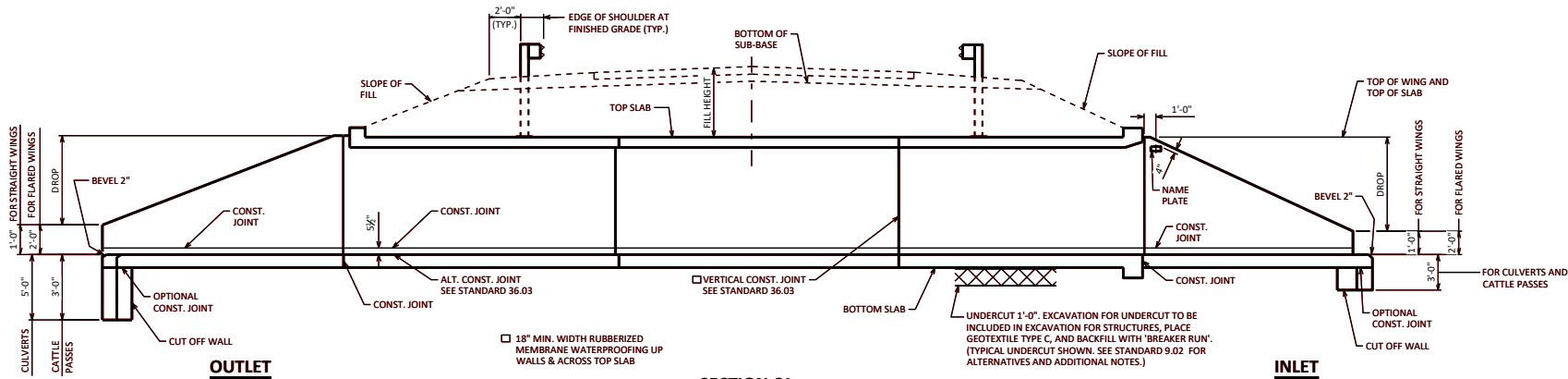
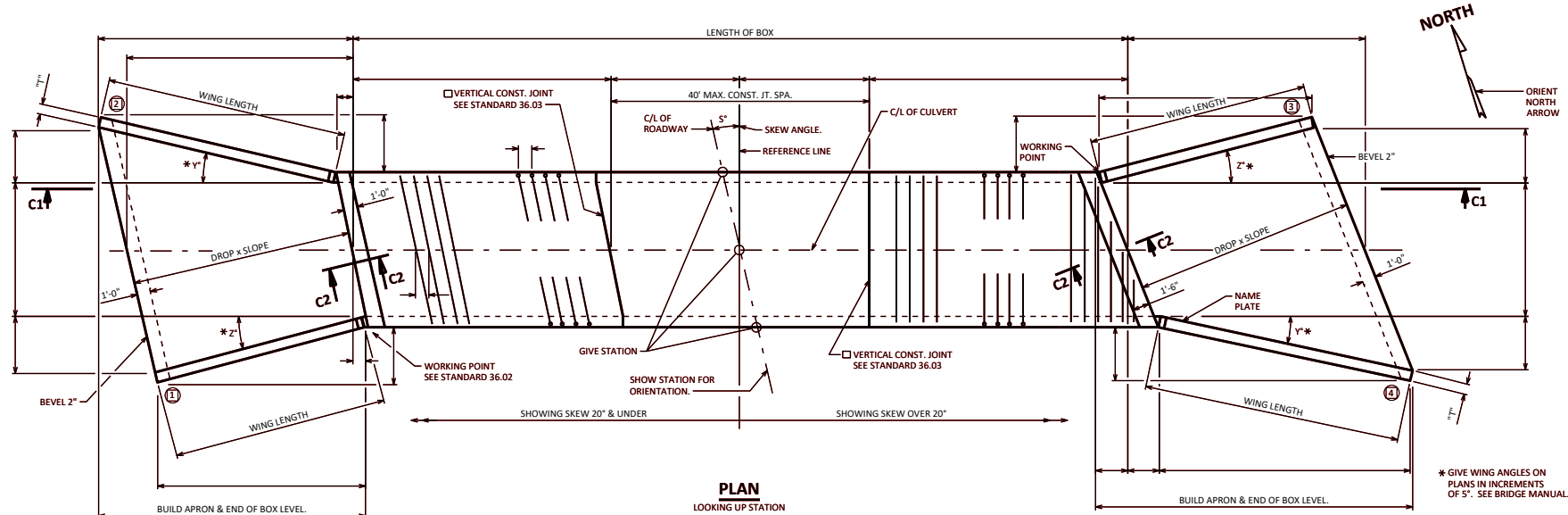
PEDESTRIAN RAILING



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DATE:
7-25



LEGEND

○ INDICATES WING NUMBER

DESIGN DATA

LIVE LOAD:

DESIGN LOADING: HL-93
INVENTORY RATING FACTOR: RF=1.____
OPERATING RATING FACTOR: RF=1.____
WISCONSIN STANDARD PERMIT VEHICLE (WIS.-SPV): ____ (KIPS)

** DESIGNED FOR FILL HEIGHT RANGE OF ____ TO ____ FEET

MATERIAL PROPERTIES:

CONCRETE MASONRY $f'_c = 3,500$ P.S.I.
BAR STEEL REINFORCEMENT $f_y = 60,000$ P.S.I.

NOTES

SEE STANDARD 36.02 FOR NOTES.

DESIGNER NOTES

FOR SECTION C2 AND CONST. JOINT DETAILS SEE STANDARD 36.03

** SEE SECTION 36.5 FOR DESIGN RANGE OF FILL HEIGHTS. HEIGHT TO BE TO THE NEAREST 0.5 FEET ON FILLS UNDER 4 FEET AND TO THE NEAREST FOOT ON FILLS OVER 4 FEET.

SEE STANDARD 36.02 FOR ADDITIONAL DESIGNER NOTES.

SEE CHAPTER 45 FOR LOAD RATING OF EXISTING CONCRETE BOX CULVERTS.

LOCATE THE NAME PLATE ON THE FIRST RIGHT WING TRAVELING IN THE HIGHWAY CARDINAL DIRECTIONS OF NORTH OR EAST.

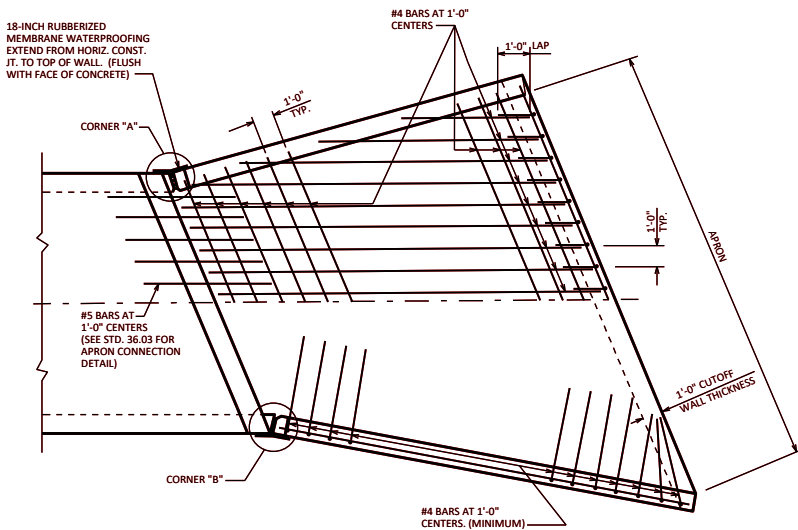
BOX CULVERT LAYOUT



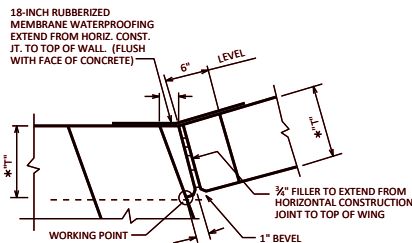
**BUREAU OF
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DATE:
7-24

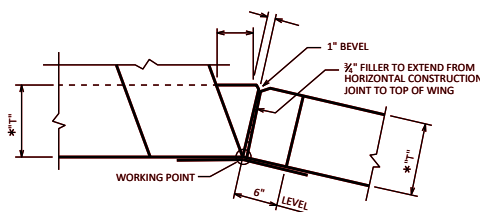


APRON DETAIL



CORNER "A"

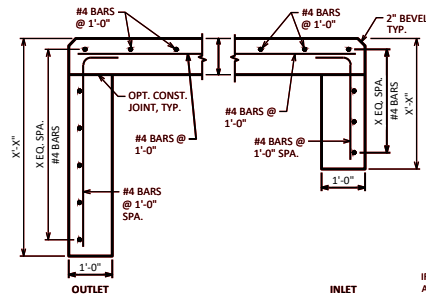
* DIMENSION "T" TO BE DETERMINED FROM BARREL DESIGN



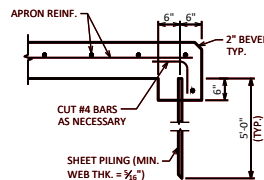
CORNER "B"

"H" (FT.)	"L" (FT.)
≤ 5'-0"	3'-8"
> 5'-0" - 7'-0"	5'-2"
> 7'-0" - 8'-0"	6'-1"
> 8'-0" - 9'-0"	6'-9"
> 9'-0" - 10'-0"	7'-4"
> 10'-0" - 11'-0"	7'-8"
> 11'-0" - 12'-0"	8'-0"
> 12'-0" - 13'-0"	8'-4"
> 13'-0" - 14'-0"	8'-6"

"H" IS MAX. WING WALL HEIGHT

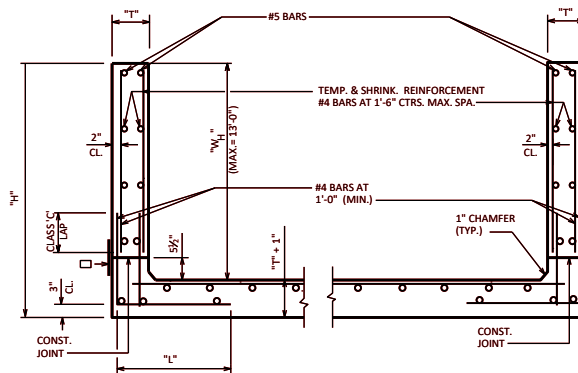


CUTOFF WALLS



ALTERNATE CUTOFF WALLS

THE ABOVE ALTERNATIVE MAY BE USED IN LIEU OF CAST-IN-PLACE CONCRETE CUTOFF WALLS. PAYMENT WILL BE BASED ON THE CONCRETE CUTOFF WALLS.



SECTION THRU WINGWALLS

18" MIN. WIDTH RUBBERIZED MEMBRANE WATERPROOFING ALONG HORIZ. CONST. JT. IN WING.

THE AREA OF REINFORCING STEEL NOT IDENTIFIED IN SECTIONS SHALL CONFORM TO THE FOLLOWING TEMPERATURE AND SHRINKAGE REQUIREMENTS:

THICKNESS	T&S REINF.
≤ 12"	#4 @ 18"
> 12" - 18"	#4 @ 12"

NOTES

BAR STEEL REINFORCEMENT SHALL BE EMBEDDED 2" CLEAR UNLESS OTHERWISE SHOWN OR NOTED.

THE CONCRETE IN THE CUTOFF WALL MAY BE PLACED UNDERWATER IF THE EXCAVATION CANNOT BE DEWATERED.

THE "ALTERNATE CUTOFF WALL" DETAIL SHOWN ON THIS SHEET MAY BE USED IN LIEU OF THE CAST-IN-PLACE CONCRETE CUTOFF WALLS. PAYMENT SHALL BE BASED ON CONCRETE CUTOFF WALLS.

THE CONTRACTOR MAY FURNISH (INSERT ALLOWABLE PRECAST ELEMENTS) IN LIEU OF THE CAST-IN-PLACE BOX CULVERT WITH THE ACCEPTANCE OF THE SHOP DRAWINGS BY THE STRUCTURES DESIGN SECTION. THE PRECAST CONCRETE BOX CULVERT SHALL CONFORM TO PRECAST DETAILS IN CHAPTER 36 STANDARDS OF THE CURRENT WISCONSIN DOT BRIDGE MANUAL AND SPECIAL PROVISIONS. PAYMENT FOR THE PRECAST CULVERT SYSTEM SHALL BE BASED ON THE QUANTITIES AND PRICES BID FOR THE ITEMS LISTED IN THE "TOTAL ESTIMATED QUANTITIES" FOR THE CAST-IN-PLACE CULVERT SYSTEM. ADDITIONAL ITEMS REQUIRED FOR THE PRECAST SYSTEM SHALL BE INCIDENTAL TO "CONCRETE MASONRY CULVERTS".

THE CONTRACTOR SHALL FOLLOW THESE NOTES WHEN PRECAST ELEMENTS ARE USED IN LIEU OF THE CAST-IN-PLACE ELEMENTS:

THE FOLLOWING SPECIAL PROVISIONS SHALL BE USED:

PRECAST CONCRETE WINGWALLS (STRUCTURE) (SPV.0060)
PRECAST CONCRETE BOX CULVERT, (SPAN SIZE) FT X (RISE SIZE) FT (SPV.0090)

THE FOLLOWING STANDARDS SHALL BE USED:

PRECAST CONCRETE BOX CULVERT DETAILS (STANDARD 36.05)
PRECAST WINGS, HEADERS, AND CUTOFF WALLS FOR PRECAST CONCRETE BOX CULVERT (STANDARD 36.06)

THE MOST CURRENT STANDARDS AND SPECIAL PROVISIONS CAN BE OBTAINED ON THE BUREAU OF STRUCTURES' WEBSITE:

<https://wisconsin.dot.gov/Pages/doing-business-with-us/consultants/cnslt-rsres/strct/design-policy-memos.aspx>

JOINT TIES ARE REQUIRED (INSERT LOCATIONS WHERE JOINT TIES ARE REQUIRED).

(INSERT PRECAST BOX CULVERT UNDERCUT AND BEDDING BACKFILL NOTES. NOTES SHALL BE COMPATIBLE WITH A 6" MINIMUM TYPE B BEDDING. REFER TO STANDARD 9.02 FOR TYPICAL CULVERT UNDERCUT AND BEDDING NOTES. MODIFY NOTES AS REQUIRED.)

(INSERT PRECAST ELEMENTS) NOT ALLOWED.

DESIGNER NOTES (CAST-IN-PLACE CONCRETE)

ALL BAR STEEL FOR CAST-IN-PLACE CONCRETE BOX CULVERTS SHALL BE UNCOATED, EXCEPT WHEN FILL IS LESS THAN 2-FT WHILE SUPPORTING TRAFFIC LOAD. EPOXY COATED BARS SHALL BE USED IN THE TOP SLAB (TOP, BOTTOM, AND CORNER BARS). PRECAST BOX CULVERT NOT ALLOWED FOR WHEN FILL IS LESS THAN 2-FT WHILE SUPPORTING TRAFFIC LOAD.

BAR STEEL FOR CAST-IN-PLACE CONCRETE APRONS SHOULD BE UNCOATED AND BAR STEEL FOR WINGWALL DOWELS AND ALL WINGWALL BARS SHALL BE EPOXY COATED.

FOR "B" DESIGNATED CONCRETE BOX CULVERTS HAVING THEIR TOP SURFACE AT GRADE, HAND HELD FINISHING MACHINES MAY BE USED. NOTE THIS ON PLANS WHEN APPLICABLE.

SEE STANDARDS 9.02 AND 36.01 FOR ADDITIONAL NOTES.

DESIGNER NOTES (PRECAST CONCRETE)

IT IS THE RESPONSIBILITY OF THE DESIGNER TO DETERMINE IF PRECAST ELEMENTS ARE ALLOWED. FOR SITE CONDITIONS NOT COVERED BY THE STANDARD DETAILS AND SPECIAL PROVISIONS, ADDITIONAL NOTES AND DETAILS MAY BE REQUIRED.

ALLOWABLE PRECAST ELEMENTS INCLUDE: BOX CULVERT BARREL SECTIONS, WINGWALLS, HEADERS, AND CUTOFF WALLS. APRON FLOORS SHALL BE CAST-IN-PLACE, UNLESS DESIGNED OTHERWISE. THE DESIGNER SHALL DETERMINE IF PRECAST ELEMENTS ARE ALLOWED ON A PROJECT-BY-PROJECT BASIS.

PROVIDE CAST-IN-PLACE DETAILS ONLY, UNLESS SPECIAL PRECAST DETAILS ARE REQUIRED OR WHEN A PRECAST ONLY DESIGN IS PROVIDED.

PRECAST ONLY DESIGNS REQUIRE PRIOR APPROVAL BY THE BUREAU OF STRUCTURES. SEE BRIDGE MANUAL SECTIONS 36.11.4 AND 36.12 FOR ADDITIONAL INFORMATION. IF USED, PROVIDE PRECAST DETAILS FOLLOWING STANDARDS 36.05 AND 36.06 WITH THE FOLLOWING SPECIAL PROVISIONS:

PRECAST CONCRETE WINGWALLS (STRUCTURE) (SPV.0060)
PRECAST CONCRETE BOX CULVERT, (SPAN SIZE) FT X (RISE SIZE) FT (SPV.0090)

JOINT TIES ARE REQUIRED BETWEEN THE LAST TWO BARREL SECTIONS ON SKEWED STRUCTURES OR AT OTHER LOCATIONS DETERMINED BY THE ENGINEER. WHEN JOINT TIES ARE REQUIRED AT OTHER LOCATIONS, PROVIDE A PLAN NOTE OR LIMITS IDENTIFYING THE REQUIRED JOINT LOCATIONS. SITES SUSCEPTIBLE TO DIFFERENTIAL SETTLEMENT MAY WARRANT JOINT TIES ALONG THE BOX CULVERT LENGTH.

SEE STANDARDS 9.02 AND 36.01 FOR ADDITIONAL NOTES.

SEE STANDARDS 36.05 AND 36.06 FOR PRECAST BOX CULVERT DETAILS.

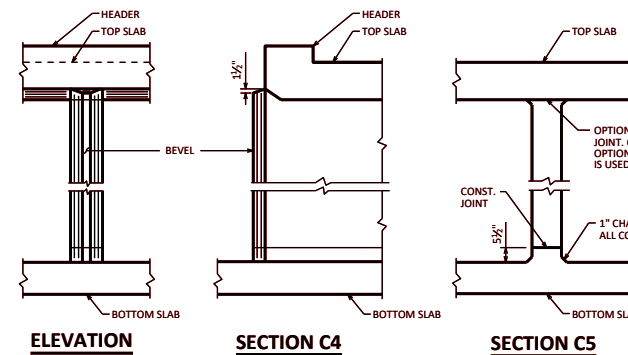
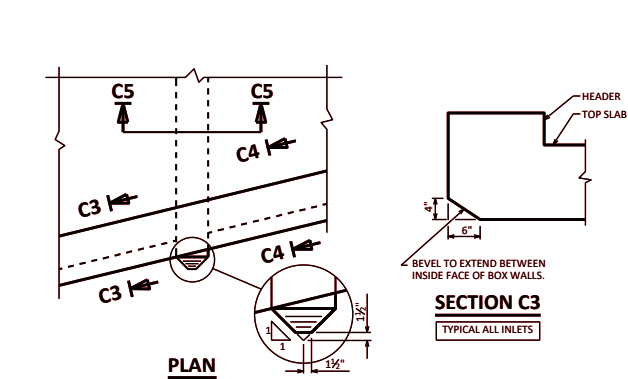
BOX CULVERT APRON DETAILS



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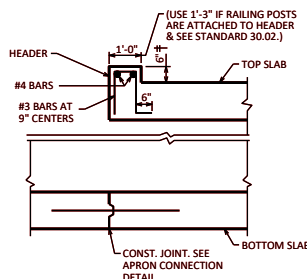
APPROVED: *Laura Shadewald*

DATE:
7-25



INLET NOSE CENTER WALL DETAILS

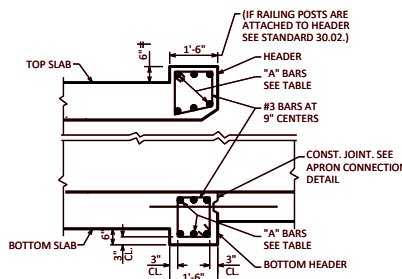
TYPICAL ALL INLETS



SECTION C2

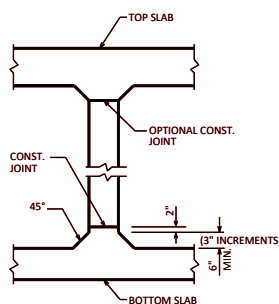
(OUTLET HEADERS SHOWN FOR SKEW OF 20° AND UNDER)

† IF RAILING POSTS ARE ATTACHED TO HEADER THIS DIMENSION MAY BE INCREASED IF NECESSARY TO KEEP RAILING PARALLEL TO ROADWAY. INCREASE WING HEIGHT IF NECESSARY.



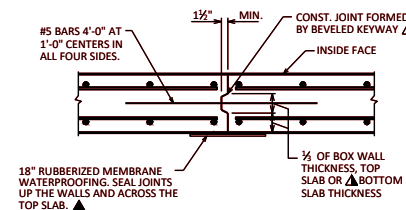
SECTION C2

(INLET HEADERS SHOWN FOR SKEW OVER 20°)



HAUNCH DETAIL

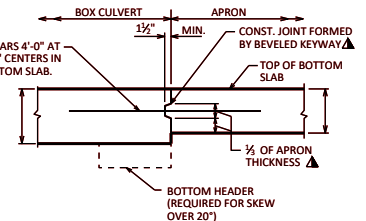
(PROVIDE HAUNCH DETAIL ONLY WHEN REQUIRED AS PER DESIGN)



VERTICAL CONSTRUCTION JOINT

▲ IN LIEU OF KEVED CONST. JOINTS IN THE BOTTOM SLAB, THE CONTRACTOR MAY USE 2" DEEP SAW CUTS WITHIN 12 HOURS AFTER POURING. #5 BARS 4'-0" AT 1'-0" CENTERS REQUIRED FOR KEVED CONST. JOINTS AND SAW CUT JOINTS.

OPTIONAL CONSTRUCTION JOINT. OMIT 1" CHAMFER IF OPTIONAL CONST. JOINT IS USED.



APRON CONNECTION DETAIL

* HEADER LENGTH	"A" BARS
TO 11'-0"	6 - #7
OVER 11'-0" - 14'-0"	6 - #8
OVER 14'-0" - 17'-0"	6 - #9
OVER 17'-0" - 20'-0"	6 - #10

* HEADER LENGTH EQUALS THE DISTANCE BETWEEN C/L OF WALLS IN ONE CELL MEASURED ALONG THE SKEW.

DESIGNER NOTES

SEE BRIDGE MANUAL SECTION 36.2 FOR ADDITIONAL REQUIREMENTS FOR PEDESTRIAN UNDERPASSES AND CATTLE PASSES.

● DETAIL NOT ALLOWED WHEN HAUNCHES ARE REQ'D OR FOR PEDESTRIAN UNDERPASSES. OMIT 1" CHAMFER IF ALTERNATIVE CONSTRUCTION JOINT IS USED.

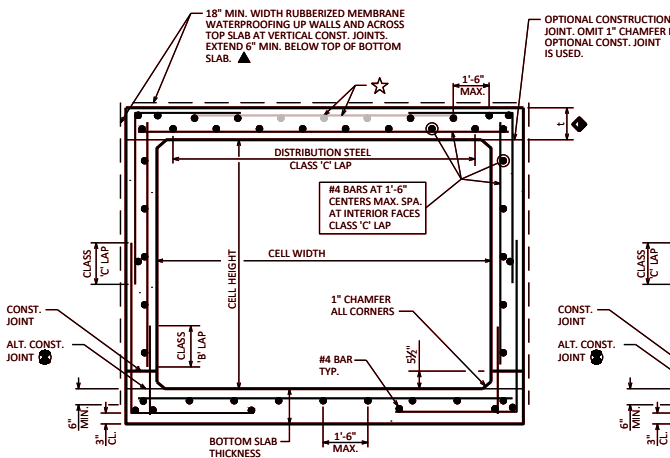
◆ t = 1'-0" MIN. FOR PEDESTRIAN UNDERPASSES.
t = 1'-0" MIN. FOR SLABS WITH DEPTH OF FILLS < 2'-0"
t = 6 1/2" MIN. OTHERWISE

★ TOP BARS FOR TOP SLAB:

- FOR t < 10' WITH DEPTH OF FILLS ≥ 2'-0". BARS NOT REQUIRED
- FOR t ≥ 10': #4 AT 1'-6" MAX. EACH DIRECTION
- FOR PEDESTRIAN UNDERPASSES: #4 AT 1'-6" MAX. EACH DIRECTION
- FOR SLABS WITH DEPTH OF FILLS < 2'-0": #4 AT 1'-0" MAX. EACH DIRECTION. USE CLASS 'C' LAPS

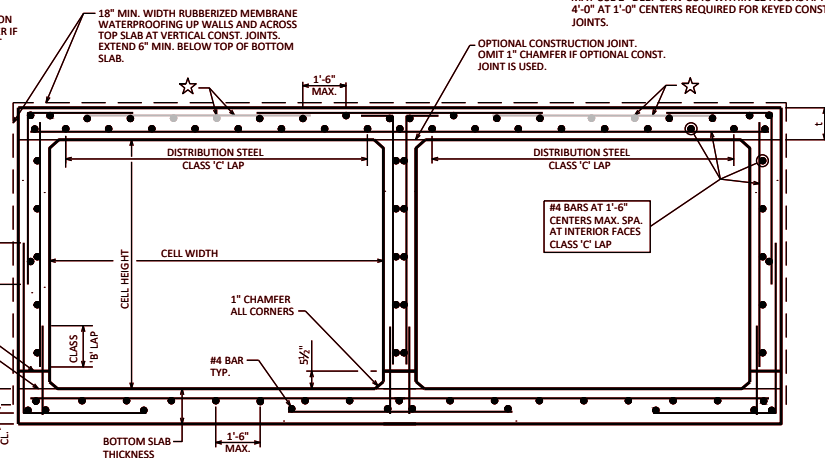
▲ FOR PEDESTRIAN UNDERPASSES, PROVIDE A CONTINUOUS SHEET MEMBRANE FOR THE ENTIRE LENGTH OF THE CULVERT IN LIEU OF 18" WIDE RUBBERIZED MEMBRANE WATERPROOFING STRIPS OVER THE JOINTS. USE BID ITEM "SHEET MEMBRANE WATERPROOFING FOR BURIED STRUCTURES" (516.0610.5), UNLESS DIRECTED OTHERWISE. INCLUDE THE FOLLOWING NOTE:

SHEET MEMBRANE WATERPROOFING REQUIRED ON THE WALLS AND ACROSS TOP SLAB FOR ENTIRE CULVERT LENGTH. EXTEND 6" MIN. BELOW THE TOP OF BOTTOM SLAB.



SECTION THRU BOX

SINGLE CELL BOX



SECTION THRU BOX

TWIN CELL BOX

BOX CULVERT DETAILS



BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE:
1-25



INLET TYPE 8



MEDIAN INLET PLAN

(INLET COVER NOT SHOWN)

NOTES

FIELD CUT BAR STEEL REINFORCEMENT IN TOP SLAB
TO CLEAR THE OPENING PROVIDED FOR MEDIAN INLET.

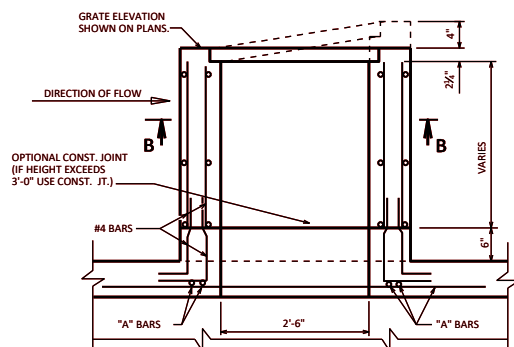
ADJUSTMENT OF THE COVER TO GRADE MAY BE ACCOMPLISHED BY THE USE OF MORTAR AND BRICK. MAXIMUM ADJUSTMENT SHALL BE 8".

DESIGN NOTES

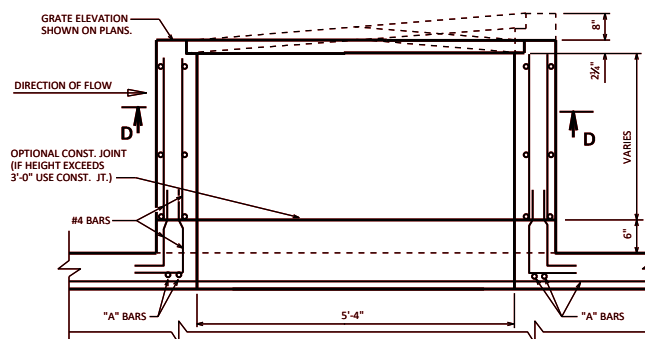
SIZE AND LENGTH OF "A" BARS TO BE DETERMINED BY THE DESIGNER.

STEEL SHOWN IS ADEQUATE TO DEPTHS UP TO 15'-6" FOR INLET TYPE 9 AND 44'-0" FOR INLET TYPE 8, ASSUMING A COEFFICIENT OF LATERAL EARTH PRESSURE OF 0.5 AND A UNIT WEIGHT OF SOIL OF 0.120 KCF.

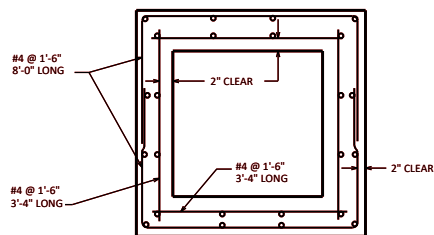
VERTICAL STEEL ADEQUATE FOR DEPTH UP TO 25'-0" ASSUMING WIND LOAD OF 50#/SQ. FT..



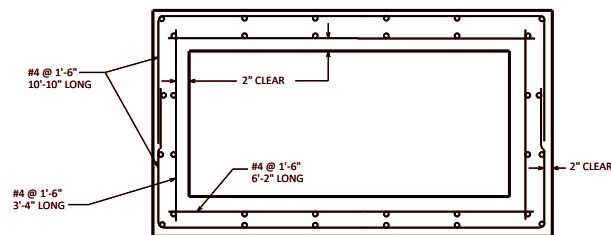
SECTION A-A



SECTION C-C



SECTION B-B



SECTION D-D

BOX CULVERT MANHOLE FOR INLET TYPE 8 & 9



BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE:
7-16

NOTES

DETAILS FOR MATERIALS, FABRICATION, CONSTRUCTION AND DESIGN OF PRECAST BOX CULVERTS NOT SHOWN OR STATED ON THIS DRAWING SHALL BE IN ACCORDANCE WITH THE CURRENT ASTM SPECIFICATION C1577; AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS; WISCONSIN DOT BRIDGE MANUAL; WISCONSIN DOT STANDARD SPECIFICATIONS & APPLICABLE SPECIAL PROVISIONS, EXCEPT THAT THE CONCRETE MIXTURE SHALL CONTAIN NOT LESS THAN 565 LBS. OF CEMENTITIOUS MATERIALS PER CUBIC YARD.

THE DESIGN OF PRECAST BOX CULVERTS WITH ALL FILL HEIGHTS SHALL BE AS STATED IN ASTM C1577.

THE JOINT ON ALL SIDES OF THE CULVERT SHALL BE SEALED WITH A PREFORMED BUTYL RUBBER SEALANT IN CONFORMANCE WITH ASTM C990 SECTION 6.2. A 2'-0" STRIP OF GEOTEXTILE TYPE OF SCHEDULE 4 SHALL BE PLACED OVER THE JOINTS ON THE TOP AND ON THE SIDES OF THE CULVERT. THE GEOTEXTILE SHALL CONFORM TO SECTION 645.2.2.4 OF THE STANDARD SPECIFICATION. (FABRIC NOT REQUIRED OVER INSIDE WALL JOINTS OF MULTICELL INSTALLATION.)

PRECAST CONCRETE SECTIONS SHALL BE PLACED ON A BEDDING OF "STRUCTURE BACKFILL TYPE B" OF 6" MINIMUM DEPTH AND AS APPROVED BY THE ENGINEER.

THE COVER OF CONCRETE OVER THE REINFORCEMENT SHALL BE 1 INCH OR 2 INCHES AS SHOWN WITH AN ALLOWABLE VARIATION OF $\frac{1}{8}$ " TO $+\frac{1}{8}$ ".

THE SPACING CTR. TO CTR. OF THE CIRCUMFERENTIAL WIRES SHALL NOT BE LESS THAN 2 INCHES NOR MORE THAN 4 INCHES. THE SPACING CTR. TO CTR. OF THE LONGIT. WIRES SHALL NOT BE MORE THAN 8 INCHES. PROVIDE 0.03 SQ. IN./FT. MINIMUM LONG. REINFORCEMENT AT EACH FACE IN SLABS AND WALLS.

NOT MORE THAN FOUR (4) HOLES MAY BE CAST, DRILLED OR OTHERWISE NEATLY MADE IN THE SHELL OF EACH PIECE OF BOX SECTION FOR HANDLING. THE HOLES SHALL BE TAPERED UNLESS DRILLED. HOLES SHALL BE FILLED WITH PORTLAND CEMENT MORTAR EXCEPT TAPERED HOLES MAY BE FILLED WITH CONCRETE. PLUGS SECURED WITH PORTLAND CEMENT MORTAR OR OTHER APPROVED ADHESIVE.

WHEN TWO OR MORE BARRELS ARE UTILIZED IN PARALLEL FOR MULTICELL INSTALLATIONS THE CLEAR SPACING BETWEEN BARRELS SHALL BE 6 INCHES AND THE SPACE BETWEEN ADJACENT BARRELS FROM TOP OF BEDDING TO TOP OF TOP SLAB SHALL BE FILLED WITH GRADE "B" CONCRETE.

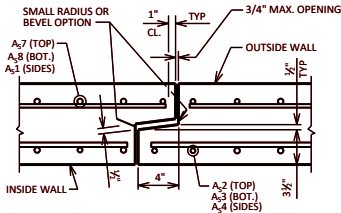
SHOP DRAWINGS SHALL PROVIDE "BOX CULVERT BARREL DATA" WITH REQUIRED AND ACTUAL REINFORCEMENT AREAS.

MATERIAL PROPERTIES:

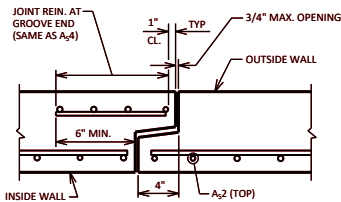
CONCRETE (PRECAST BOX) $F_c = 5,000$ P.S.I.
BAR STEEL REINFORCEMENT $f_y = 60,000$ P.S.I.
STEEL REINFORCEMENT (WIRE) $f_y = 65,000$ P.S.I.

DESIGNER NOTE:

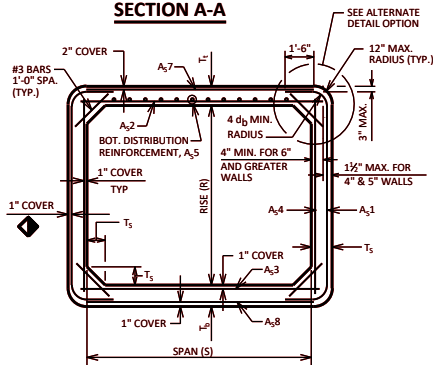
SEE STANDARD 36.02 FOR DESIGNER NOTES.



JOINT DETAIL

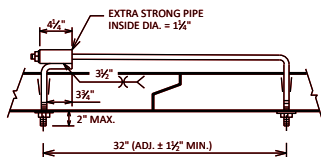


SECTION A-A

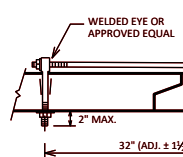


SECTION THRU BARREL

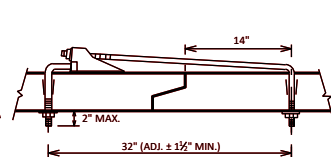
FILL HEIGHT LESS THAN 2 FEET
(LONG. REIN. NOT SHOWN FOR CLARITY)



WELDED PIPE TIE

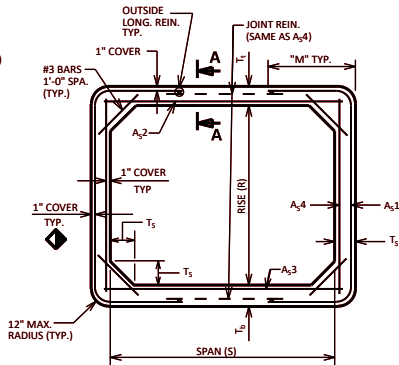


EYE BOLT TIE



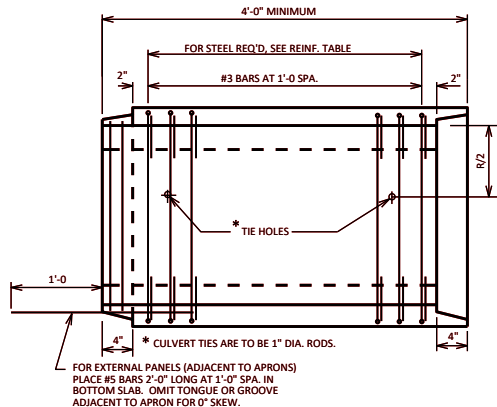
CANOPY TIE

NOTES:
EITHER EYE BOLT TIES, WELDED PIPE TIES, OR CANOPY TIES MAY BE USED.
THREADS MAY BE CUT OR ROLLED. TIE NUTS SHALL BE TIGHTENED AS DIRECTED BY THE ENGINEER. (2 TIES REQ'D. PER JOINT.) (TIES TO BE GALVANIZED.)

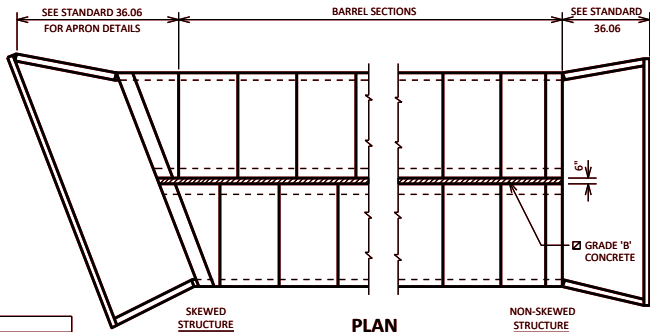


SECTION THRU BARREL

FILL HEIGHT 2'-0" OR GREATER
(LONG. REIN. NOT SHOWN FOR CLARITY,
UNLESS NOTED OTHERWISE.)



LONGITUDINAL SECTION



PLAN
MULTICELL INSTALLATION

ALTERNATE DETAIL OPTION

BOX CULVERT BARREL DATA

FILL HEIGHT (FT)	DIMENSIONS					REINFORCEMENT (IN ² /FT)											
	R (FT)	S (FT)	T ₁ (IN)	T ₂ (IN)	T ₃ (IN)	A ₂ 1		A ₂ 2		A ₂ 3		A ₂ 4		A ₂ 5		A ₂ 7	
	REQ'D	ACT.	REQ'D	ACT.	REQ'D	ACT.	M (IN)	REQ'D	ACT.	REQ'D	ACT.	REQ'D	ACT.	REQ'D	ACT.	REQ'D	ACT.
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

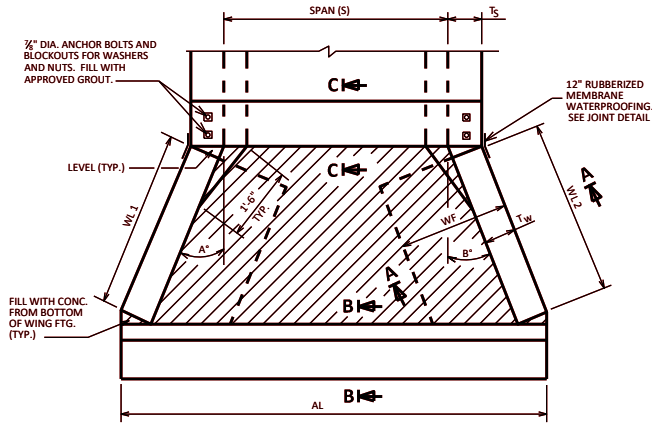
PRECAST CONCRETE BOX CULVERT BARREL DETAILS



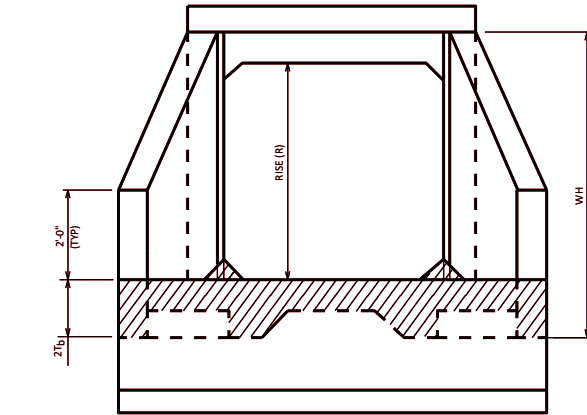
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

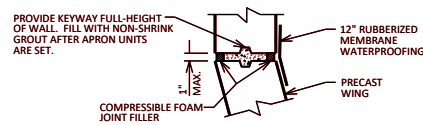
DATE:
7-25



APRON PLAN
(NON-SKEWED STRUCTURE)



END VIEW

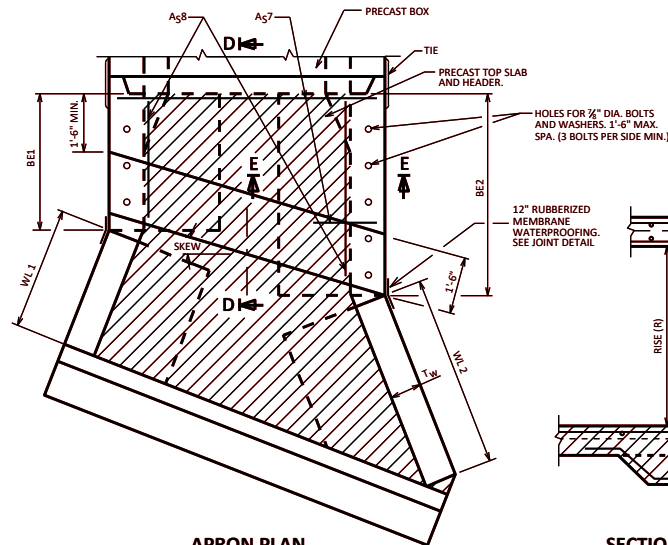


JOINT DETAIL

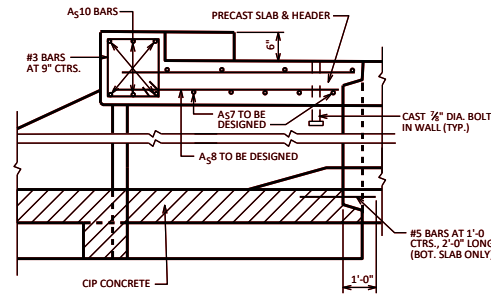
JOINT DETAIL EXAMPLE SHOWN. PRECAST SUPPLIER TO SUBMIT JOINT DETAIL FOR ACCEPTANCE.

BOX CULVERT APRON DATA

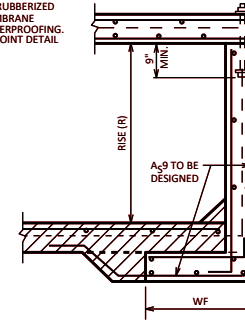
	R (Ft)	S (Ft)	T OR T ₅ (IN)	SKEW	ANGLE A	ANGLE B	WL 1	WL 2	AL	AH	WH	BE1	BE2
INLET													
OUTLET													



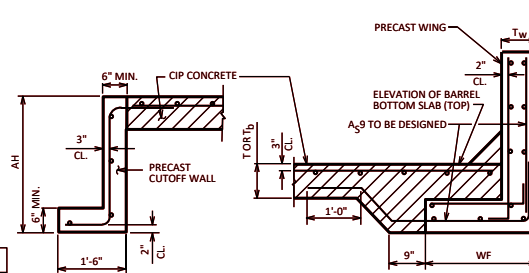
APRON PLAN
(SKEWED STRUCTURE)



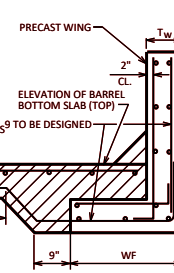
SECTION D-D



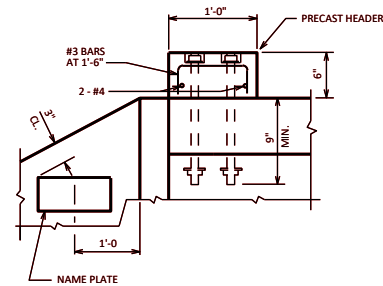
SECTION E-E



SECTION B-B



SECTION A-A



SECTION C-C

NOTES

CONCRETE COVER ON ALL REINFORCEMENT IN THE PRECAST ELEMENTS SHALL BE 2" UNLESS SHOWN OR NOTED OTHERWISE.

ALTERNATE DETAILS OF EQUAL STRENGTH AND HYDRAULIC CAPACITY TO THE DETAILS SHOWN ON THIS SHEET MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

VERTICAL CONSTRUCTION JOINTS THRU THE WALLS AND FOOTING WILL BE ALLOWED ONLY WITH THE APPROVAL OF THE ENGINEER. DETAILS MUST BE SHOWN ON THE SHOP DRAWINGS FOR APPROVAL.

THE AREA OF REINFORCING STEEL NOT IDENTIFIED IN SECTIONS SHALL BE DESIGNED AND SHALL EXCEED TO THE FOLLOWING TEMPERATURE AND SHRINKAGE REQUIREMENTS:

THICKNESS	T&S REINF.
≤ 12"	#4 @ 18"
> 12" - 18"	#4 @ 12"

THE 3/4" DIA. ANCHOR BOLTS SHALL BE GALVANIZED AND CONFORM TO THE REQUIREMENTS OF ASTM A575.

MATERIAL PROPERTIES:

CONCRETE (CAST-IN-PLACE)	f _c = 3,500 P.S.I.
CONCRETE (PRECAST WING)	f _c = 4,000 P.S.I.
BAR STEEL REINFORCEMENT	f _y = 60,000 P.S.I.
STEEL REINFORCEMENT (WIRE)	f _y = 65,000 P.S.I.

RISE (R)	T _w (MIN.)	WF (MIN.)
4'-0"	8"	2'-6"
6'-0"	8"	3'-6"
8'-0"	8"	4'-0"
10'-0"	10"	4'-9"

SPAN (S)	A510 BARS (MIN.)		
	0°-15°	16°-30°	31°-45°
6'-0"	(6) - #6	(6) - #6	(6) - #6
7'-0"	(6) - #6	(6) - #6	(6) - #7
8'-0"	(6) - #6	(6) - #7	(6) - #8
10'-0"	(6) - #7	(6) - #8	(6) - #8

DESIGNER NOTE:

SEE STANDARD 36.02 FOR DESIGNER NOTES.

PROVIDE "BOX CULVERT APRON DATA" TABLE ON CONTRACT PLANS WHEN A PRECAST ONLY DESIGN IS PROVIDED.

PRECAST WINGS, HEADERS, AND CUTOFF WALLS FOR PRECAST CONCRETE BOX CULVERT



APPROVED: *Laura Shadewald*

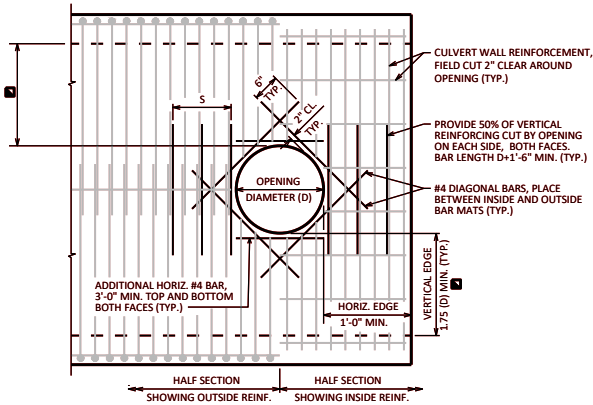
DATE:
7-25

NOTES

ALL BAR STEEL REINFORCEMENT SHALL BE CUT 2" CLEAR AROUND OPENING.

DESIGNER NOTES

DETAILS SHOWN ARE FOR CAST-IN-PLACE CULVERTS. PRECAST CULVERT DETAILS TO BE SIMILAR.



ELEVATION

WHEN $D \leq 1'-6"$ $S = 1'-6"$
WHEN $D > 1'-6"$ $S = 1'-6"$ MIN, D MAX

PIPE OPENING IN
CULVERT WALL

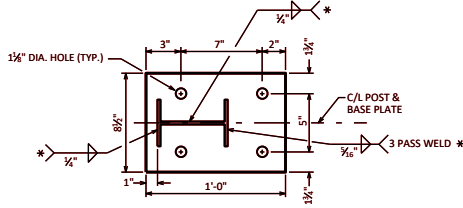


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STRUCTURES

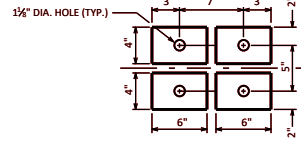
APPROVED: *Laura Shadewald*

DATE:
1-13

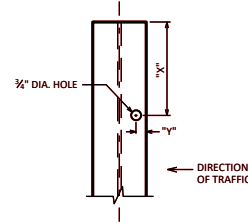
* WELDING IS TO BE COMPLETED USING THE GAS-METAL ARC WELDING (GMAW) PROCESS WITH ER70S-3 WELDING WIRE AND ARGON-OXYGEN OR CO₂ COVER GAS.



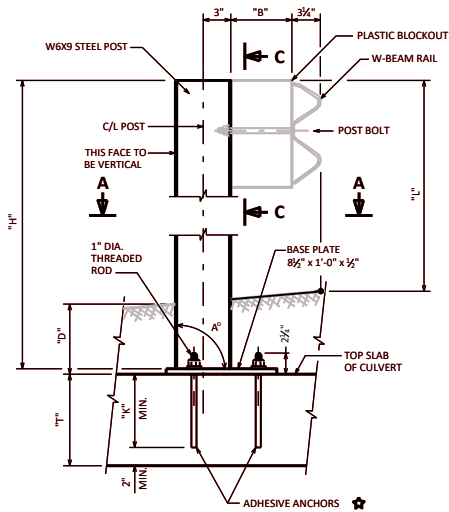
SECTION A-A
POST & BASE PLATE



SECTION B-B
(4)-BOTTOM PLATES



SECTION C-C
HOLE IN POST FLANGE ON
APPROACHING TRAFFIC SIDE

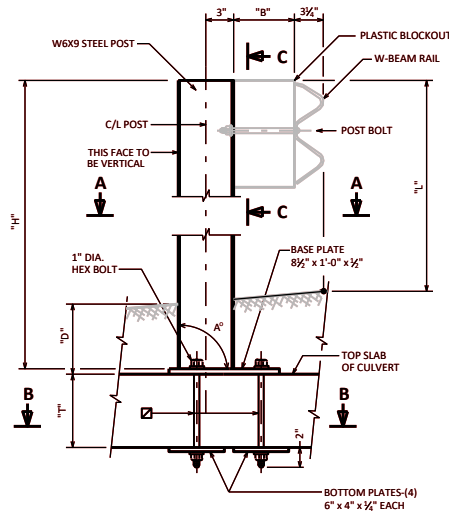


ELEVATION

GUARDRAIL POST ANCHORS TYPE 1

USE FOR THICKNESS "T" OF 11-INCHES OR MORE WITH A MINIMUM EMBEDMENT "K" OF 9-INCHES FOR A CONCRETE STRENGTH (f_c) OF 3,500 PSI

USE FOR THICKNESS "T" OF 10-INCHES OR MORE WITH A MINIMUM EMBEDMENT "K" OF 8-INCHES FOR A CONCRETE STRENGTH (f_c) OF 4,000 PSI



ELEVATION

GUARDRAIL POST ANCHORS TYPE 2

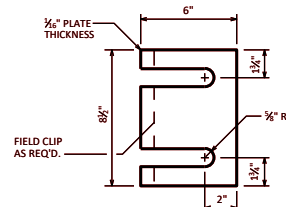
USE FOR THICKNESS "T" OF 8-INCHES OR MORE AND MINIMUM CONCRETE STRENGTH (f_c) OF 3,500 PSI

GUARDRAIL POST ANCHORAGE SYSTEM

CRITERIA:

USE FOR POSTS WITH "D" EMBEDMENT LESS THAN OR EQUAL TO 4'-0" AND GREATER THAN OR EQUAL TO 9".
NOT REQ'D FOR POSTS WITH "D" EMBEDMENT MORE THAN 4'-0".
NOT ALLOWED FOR POSTS WITH "D" EMBEDMENT LESS THAN 9".

	"L"	"B"	"X"	"Y"	SOURCE
CLASS "A" GUARDRAIL	2'-4 3/8"	8"	7"	3/16"	SDD 14 B 15
MGS GUARDRAIL	2'-7 7/8"	12"	7 1/4"	3/4"	SDD 14 B 42



STEEL SHIM DETAIL

4 PER POST

NOTES

DETAILS SHOWN FOR POSTS, PLATES, ANCHORAGE SYSTEM AND INSTALLATION, BLOCKS, AND GUARDRAIL ARE NOT PART OF THE STRUCTURE CONTRACT, BUT ARE BID PER THE ROADWAY DESIGN PLANS.

POST BASE PLATES (AND BOTTOM PLATES IF USED) SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS.

CUT BOTTOM OF POST SO THAT POST WILL BE VERTICAL WHEN POST ASSEMBLY IS PLACED ON TOP OF THE CULVERT. ALONG THE ROADWAY THE POST WILL BE NORMAL TO GRADE LINE. HEX BOLTS AND THREADED RODS ARE TO BE PLACED PERPENDICULAR TO THE BASE PLATE (AND BOTTOM PLATE IF USED).

POST, BASE PLATE (AND BOTTOM PLATE IF USED), AND SHIMS SHALL BE GALVANIZED AFTER FABRICATION.

PRIOR TO GALVANIZING, ALL STEEL POSTS AND PLATES SHALL BE GIVEN A NO. 6 COMMERCIAL BLAST CLEANING BY SSPC SPECS.

ALL MATERIAL USED IN POSTS AND PLATES SHALL BE MADE FROM MATERIAL CONFORMING TO ASTM DESIGNATION A709 GRADE 50 OR S05.

HEX BOLTS, THREADED RODS, HEX NUTS AND WASHERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F1554 GRADE 36, AND SHALL BE GALVANIZED. RODS ARE TO BE FULLY THREADED AND BOLTS TO BE THREADED 3". CHAMFER TOP OF BOLTS AND RODS BEFORE THREADING.

★ ADHESIVE ANCHORS (1-INCH DIA. THREADED ROD), EMBED IN CONCRETE AS DETAILED. CHARACTERISTIC BOND STRENGTH SHALL MEET OR EXCEED 1305 PSI FOR UNCRACKED CONCRETE. SEE STANDARD SPECIFICATION 502.3.14 AND APPLY TO THREADED RODS.

☑ THRU-BOLTS (1-INCH DIA. HEX BOLT), DRILL THRU TOP SLAB WHEN THE CONCRETE HAS ACHIEVED ITS DESIGN STRENGTH (f_c).

STEEL SHIMS MAY BE USED BETWEEN PLATES AND SLAB WHERE REQUIRED FOR ALIGNMENT.

DESIGNER NOTES

CHECK CRITERIA TO SEE IF POST ANCHORAGE SYSTEM IS REQUIRED BASED ON FILL HEIGHT "D" AT POSTS. IF REQUIRED, THEN SELECT WHICH TYPE OF ANCHORAGE (TYPE 1 OR TYPE 2) SHOULD BE USED.

"MGS" GUARDRAIL SHOULD BE USED FOR ALL NEW SYSTEMS. CONTACT THE ROADWAY DESIGN SECTION TO VERIFY THAT CONDITIONS AT THE SITE OF THE STRUCTURE WOULD NOT REQUIRE A CLASS "A" GUARDRAIL SYSTEM TO BE USED.

POST SPACING IS 3'-1 1/2" PER FDM SDD 14 B 51. SEE FDM SDD 14 B 51 FOR MINIMUM CLEARANCES FROM EDGES, JOINTS OR OBSTRUCTIONS TO ANCHORAGE SYSTEM. FOR TYPE 2 ANCHORAGE, MAKE SURE BOTTOM PLATE IS NOT PLACED AT THE SLOPED HAUNCH BETWEEN THE WALL AND TOP SLAB. SHIFT LOCATION OF POSTS (LONGITUDINALLY ALONG C/L OF POSTS) IF REQUIRED TO MEET SPACING AND CLEARANCE REQUIREMENTS. CHECK WITH ROADWAY DESIGN SECTION TO VERIFY SPACING IS ACCEPTABLE.

SHOW DETAILS AND PERTINENT NOTES FOUND ON THIS STANDARD ON THE STRUCTURE PLANS FOR THE CHOSEN ANCHOR TYPE.

SHOW LOCATION OF POSTS AND SPACING ALONG C/L OF POST IN PLAN VIEW OF STRUCTURE PLANS. LABEL EACH POST (P1, P2, ETC.). SHOW A TABLE PROVIDING THE ESTIMATED LENGTH "H" OF EACH POST, AND THE ANGLE "A" BETWEEN BASE PLATE AND POST.

IN THE TOP SLAB PROVIDE A MINIMUM OF #4 BARS AT 1'-0" SPACING IN EACH DIRECTION FOR TOP AND BOTTOM MAT WHEN TYPE 1 OR TYPE 2 ANCHORAGE DETAILS ARE USED.

THIS "MGS" GUARDRAIL SYSTEM AND ANCHORAGE SYSTEM MEET MASH 2016 EVALUATION CRITERIA FOR TEST LEVEL 3 (TL-3).

GUARDRAIL POST ANCHORAGE SYSTEM



BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE:
1-23

DESIGNER NOTES FOR PRECAST CONCRETE STRUCTURE

BID ITEM SHALL BE "THREE-SIDED PRECAST CONCRETE STRUCTURE".

PRECAST BRIDGES WILL BE LIMITED TO SPANS NOT TO EXCEED 42'-0".

SECURE WISDOT BOS AND GEOTECHNICAL (SOILS) ENGINEER'S APPROVAL BEFORE INCORPORATING PRECAST BRIDGES IN ANY PROJECT.

CHECK FOUNDATION PRESSURE, SCOUR AND SETTLEMENT TO ENSURE THAT NO FOUNDATION FAILURE OCCURS. PREFERABLY, PROVIDE FOOTING ON NON-YIELDING FOUNDATION MATERIAL. HOWEVER, ALLOWABLE DIFFERENTIAL SETTLEMENT FOR FOOTING ON SOIL SUPPORTING THE STRUCTURE = 0.002 FT. PER FT. (MAX.) OF THE SPAN. DESIGN STRUCTURE COMPONENTS TO RESIST FORCES CAUSED BY THIS DIFFERENTIAL SETTLEMENT. ADEQUATELY REINFORCE THE ENTIRE FOOTING AS REQUIRED BY THE DESIGN.

WHEN BEAM GUARD POSTS ARE TO BE EMBEDDED IN FILL ABOVE THE PRECAST ARCH UNIT, PROVIDE A DEPTH OF FILL, MEASURED FROM TOP OF ARCH CROWN TO TOP OF ROADWAY, AT LEAST EQUAL TO THE MINIMUM EMBEDMENT DEPTH SHOWN ON SDD 14B42 PLUS 6".

FOR SHORTER SPAN CULVERTS, WHERE BEAM GUARD CROSSES THE LENGTH OF THE STRUCTURE, CONSIDERATION SHALL BE GIVEN TO THE DETAILS SHOWN ON SDD 14B43 PROVIDED ALL REQUIREMENTS ON THIS STANDARD CAN BE MET.

WHEN A CONCRETE BARRIER (SINGLE SLOPE) CROSSES THE LENGTH OF THE STRUCTURE, THE FILL DEPTH MUST BE ADEQUATE TO ACCOMMODATE THE REQUIRED FOOTING DEPTH. SEE SDD 14B32 AND SDD 14B34 FOR CONCRETE BARRIER DETAILS.

PROVIDE A SUITABLE DRAINAGE PIPE ALONG THE CULVERT AND WINGWALLS TO RELEASE HYDROSTATIC PRESSURE. WHERE SIGNIFICANT SEEPAGE OR RELATIVELY RAPID ACCUMULATION OF WATER IS ANTICIPATED BEHIND THE WALL, INCORPORATE PIPE UNDERDRAIN WRAPPED AS SPECIFIED, INTO THE BACKFILL STRUCTURE, BEHIND THE WALL TO IMPROVE DRAINAGE CONDITIONS. DIRECT SEEPAGE FROM DRAINAGE PIPE TO WEEP HOLES ALONG THE EXTERIOR FACE OF THE WALL OR TO THE STORM WATER CONVEYANCES.

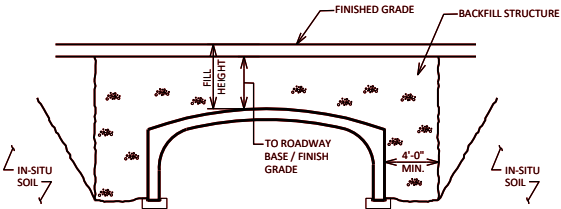
PLACE FOOTINGS BELOW SCOUR AND FROST DEPTHS. PLACE BOTTOM OF FOOTING AT A MINIMUM DEPTH EQUAL TO PREVAILING FROST DEPTH OR SCOUR DEPTH BUT NOT LESS THAN 4'-0" BELOW GROUND ELEVATION UNLESS CONSTRUCTED ON ROCK FOUNDATION OR OTHERWISE INDICATED.

PROVIDE DUCTILE JOINT SYSTEM BETWEEN VERTICAL LEG OF THE PRECAST SEGMENT AND FOOTER AS INDICATED ON THE STANDARD DETAIL DRAWINGS.

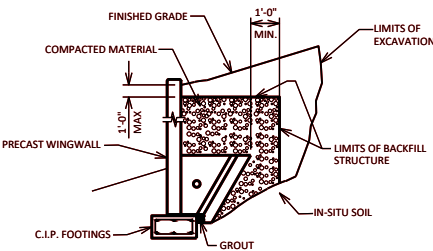
BENDING OF REINFORCEMENT FOR PRECAST BRIDGE UNITS - THE OUTSIDE AND INSIDE CIRCUMFERENTIAL REINFORCING STEEL FOR THE CORNERS OF THE BRIDGE SHALL BE BENT TO SUCH AN ANGLE THAT IS APPROXIMATELY EQUAL TO THE CONFIGURATION OF THE BRIDGE'S OUTSIDE CORNER.

LRFD DESIGN LOADS

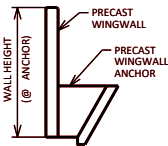
LIVE LOAD: HL-93
HORIZONTAL EARTH PRESSURE: UNIT WEIGHT = 125 PCF
VERTICAL EARTH PRESSURE: UNIT WEIGHT = 120 PCF



BACKFILL REQUIREMENTS



WALL BACKFILL REQUIREMENTS



APPROXIMATE/GUIDELINE NUMBER OF ANCHORS PER WALL	
LENGTH OF WALL	NO. ANCHORS
L = 14'-0"	2
L = 20'-0"	3
L = 24'-0"	4
24'-0" < L	MULTIPLE-PIECE WINGWALL *

*NOTE: ADJACENT SEGMENTS SHALL BE ATTACHED TO EACH OTHER TO KEEP FRONT FACES IN ALIGNMENT. PLACE A FILLER AT THESE JOINTS WITH A MEMBRANE ALONG THE JOINT AT THE BACK FACE.

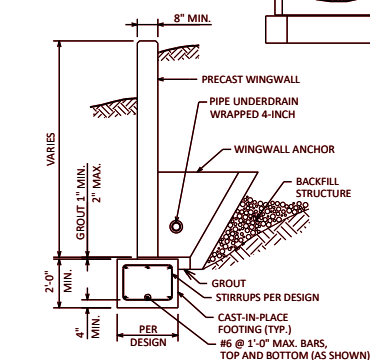
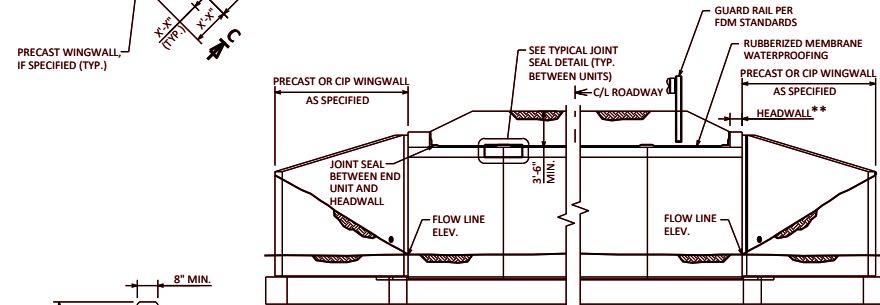
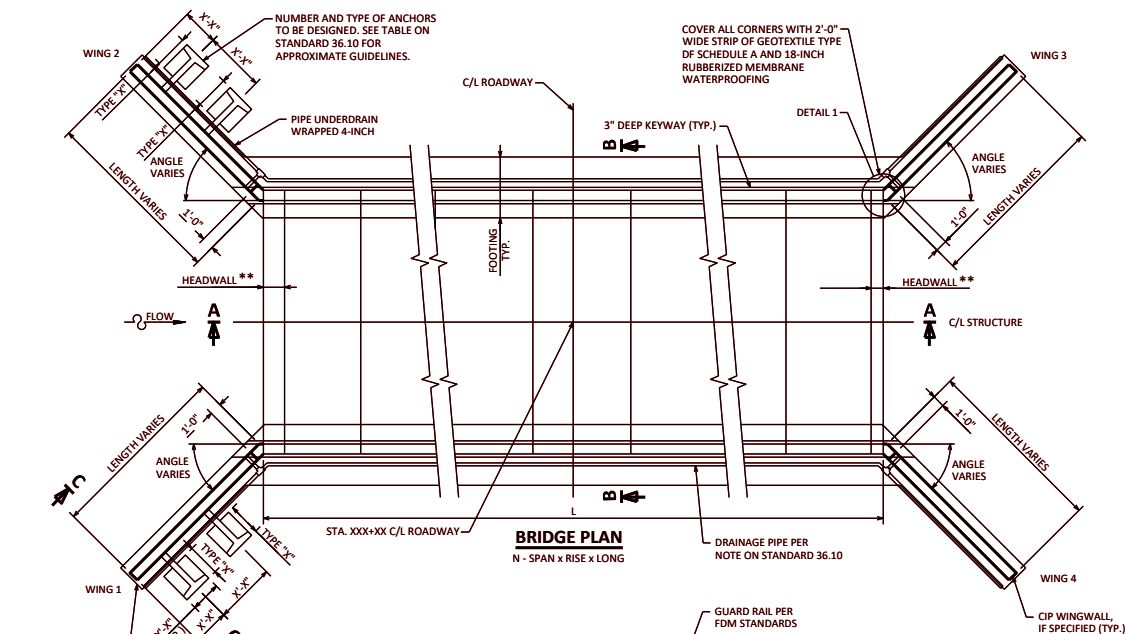
PRECAST THREE-SIDED BOX
CULVERT DESIGN NOTES



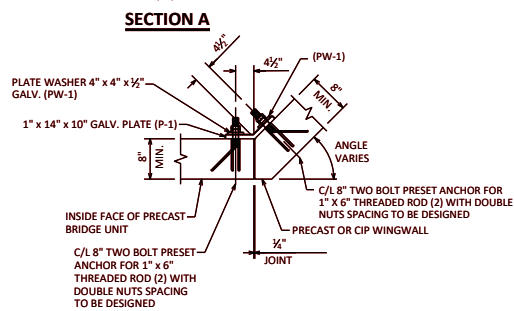
BUREAU OF
STRUCTURES

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DATE:
7-21



SECTION C



DETAIL 1

NOTE: CONNECTION PLATES (P-1) MUST BE POSITIONED WITH SMALL DIAMETER HOLES TOWARD PRECAST BRIDGE UNIT

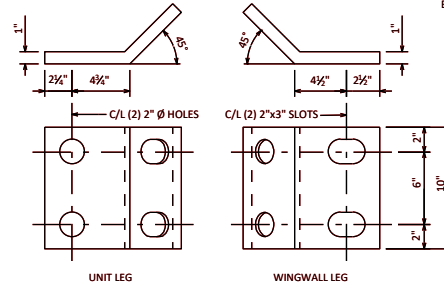


PLATE P-1

NOTE: PLATE LENGTH AND THICKNESS SHALL BE INCREASED AS REQUIRED BY DESIGN.

GENERAL NOTES:

MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH WISCONSIN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, AND THE CONTRACT SPECIAL PROVISIONS.

DESIGN SPECIFICATION: DESIGN STRUCTURE BY CURRENT EDITION AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND AS SUPPLEMENTED BY WISDOT BRIDGE MANUAL.

USE GRADE A CONCRETE IN FOOTING AND WINGWALLS. $f'_c = 4$ KS (MIN.)

PROVIDE CONCRETE COVER ON REINFORCING BARS AS NOTED HEREIN.

CHAMFER EXPOSED CONCRETE EDGES $1/4" \times 1/4"$ EXCEPT AS NOTED.

PROVIDE DEFORMED REINFORCEMENT STEEL MEETING THE REQUIREMENTS OF ASTM DESIGNATION 615, OR 617, GRADE 60 AS SET FORTH IN THE STANDARD SPECIFICATIONS.

IF A CAST-IN-PLACE OPTION IS SHOWN AND SPECIFICATIONS ALLOW FOR A PRECAST SUBSTITUTION, PRECAST STRUCTURE SYSTEM (INCLUDING WINGWALLS AND HEADWALLS) AND FOOTERS WILL BE DESIGNED BY CONTRACTORS.

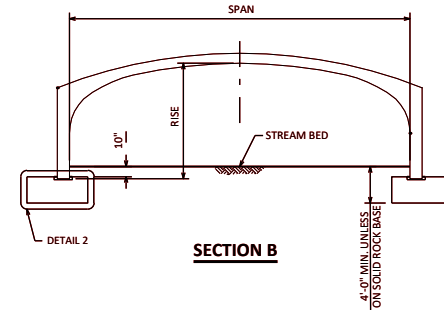
AT ANY TIME DURING PLACEMENT OF THE BACKFILL, DO NOT PERMIT A DIFFERENCE IN FILL ELEVATION ON THE SIDES OF THE CULVERT BARREL IN EXCESS OF 2'-0". DURING COMPACTION OF THE BACKFILL, DO NOT ALLOW THE WHEELS OF ROLLERS TO COME CLOSER THAN 1'-0" TO THE FACE OF THE STRUCTURE.

DESIGNER NOTES:

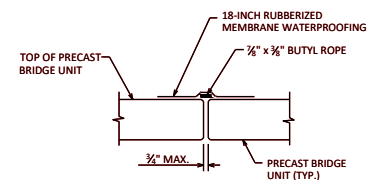
ALL BAR SPLICES TO BE "CLASS C" TENSION LAP SPLICES.

PRECAST CONCRETE CULVERT UNITS PLUS (N-1) JOINTS @ $1/2"$ TO $1/2"$ PER JOINT = L

** SEE STANDARD 36.13 AND STANDARD 36.14 FOR HEADWALL DETAILS AND FEASIBILITY GUIDELINES



SECTION B



TYPICAL JOINT SEAL DETAIL

PRECAST THREE-SIDED BOX CULVERT LAYOUT DESIGNS

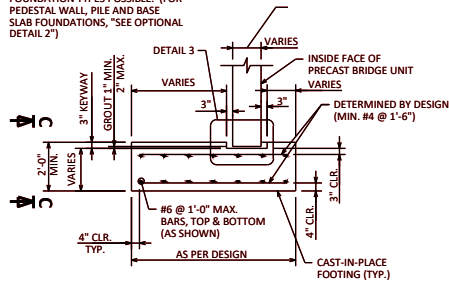


BUREAU OF STRUCTURES

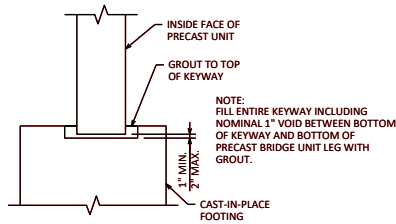
APPROVED: *Laura Shadewald*

DATE: 7-18

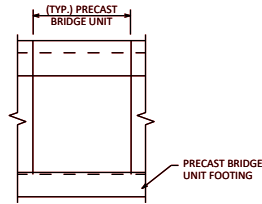
SPREAD FOOTING SHOWN, OTHER FOUNDATION TYPES POSSIBLE. (FOR PEDESTAL WALL, PILE AND BASE SLAB FOUNDATIONS, "SEE OPTIONAL DETAIL 2")



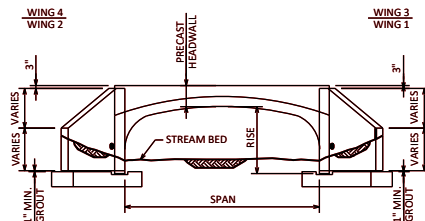
DETAIL 2



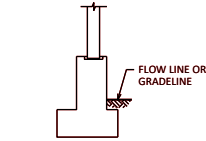
DETAIL 3



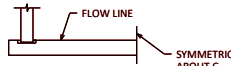
SECTION C



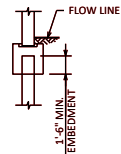
TYPICAL END ELEVATION



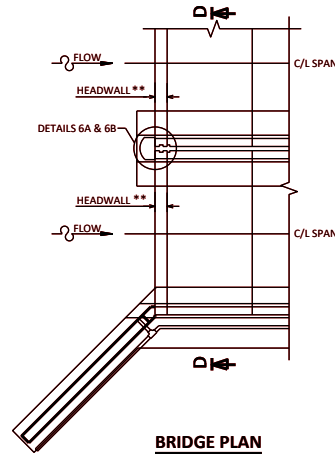
OPTIONAL DETAIL 2
IF PEDESTAL IS REQUIRED



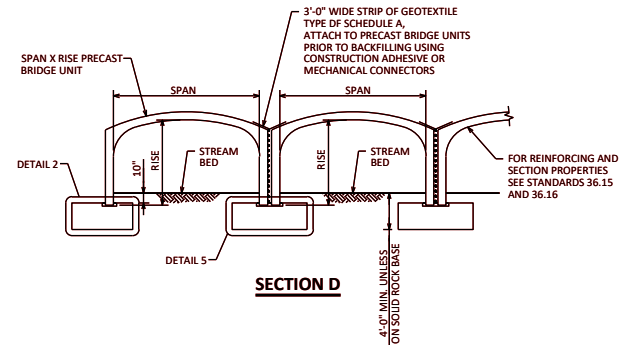
OPTIONAL DETAIL 2
IF BASE SLAB IS REQUIRED



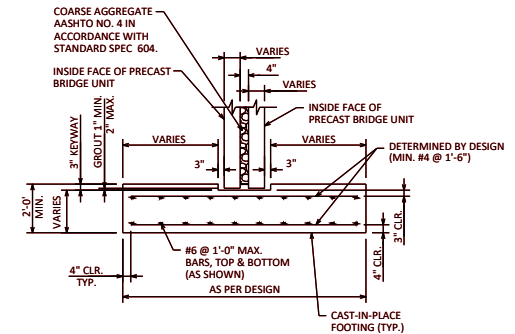
OPTIONAL DETAIL 2
IF PILES ARE REQUIRED



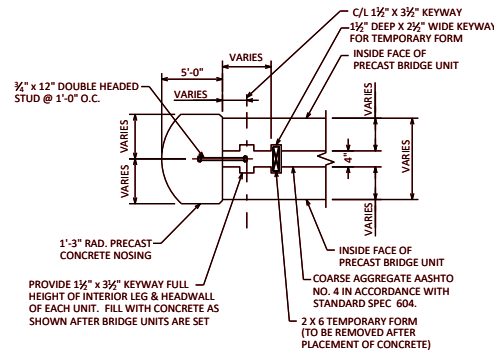
BRIDGE PLAN



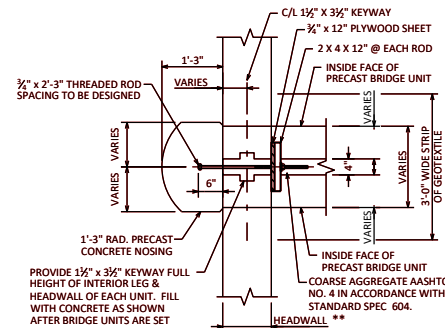
SECTION D



DETAIL 5



DETAIL 6A



DETAIL 6B

NOTES:
**SEE STANDARDS 36.13 AND 36.14 FOR HEADWALL DETAILS AND FEASIBILITY GUIDELINES

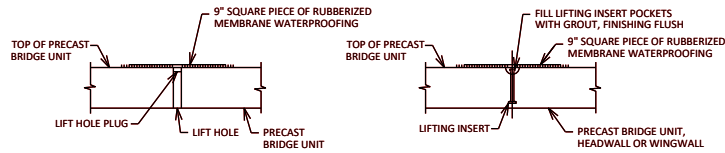
PRECAST THREE-SIDED BOX CULVERT DETAILS



BUREAU OF STRUCTURES

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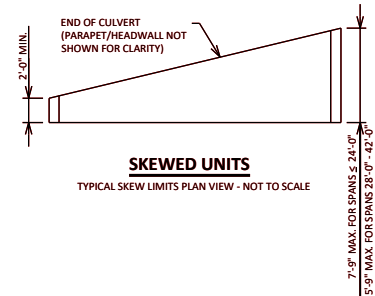
DATE:
7-24



LIFTING HOLES

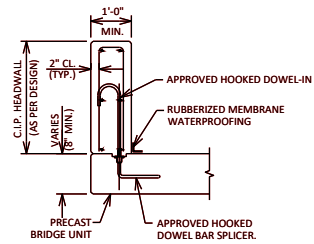
LIFTING INSERTS

TYPICAL LIFT POINT SEALING DETAIL



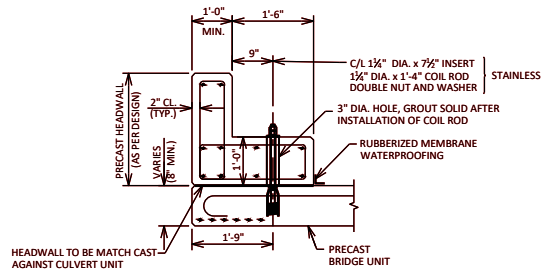
SKEWED UNITS

TYPICAL SKEW LIMITS PLAN VIEW - NOT TO SCALE



CAST-IN-PLACE HEADWALL DETAIL

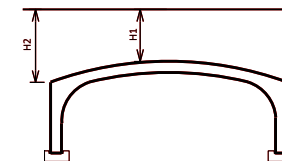
NOT TO SCALE



PRECAST HEADWALL DETAIL WITH COLLAR

NOT TO SCALE

	H1	H2
UNIT SPAN	MAX. HEIGHT @ CROWN TO T/HEADWALL (NO LIVE LOAD SURCHARGE)	MAX. APPROXIMATE HEIGHT @ EDGE OF SPAN
14'-0"	8'-0"	9'-6 1/4"
20'-0" - 28'-0"	7'-0"	10'-0"
36'-0"	6'-0"	10'-6"
42'-0"	4'-0"	10'-0"



LRFD COLLAR/HEADWALL DESIGN NOTES:

- HEADWALL DETAILS SHOWN HERE HAVE ONLY BEEN DESIGNED FOR THE FOLLOWING 2 LOAD CASES:
 - 1) EARTH PRESSURE ONLY
 - 2) EARTH PRESSURE + LIVE LOAD SURCHARGE
 THESE DETAILS ARE NOT TO BE USED WHERE A VEHICLE LOAD CAN BE TRANSMITTED THROUGH A BARRIER TO THE HEADWALL.
- 1'-0" HEADWALL THICKNESS
- 1'-0" COLLAR THICKNESS
- SOIL BEHIND HEADWALL IS AT SAME ELEVATION AS TOP OF HEADWALL
- ADDITIONAL HW HEIGHT MAY BE ACHIEVED WITH ADDITIONAL STEEL REINFORCEMENT OR THICKENED COLLAR
- FOR DETACHED HEADWALL DESIGNS ONLY

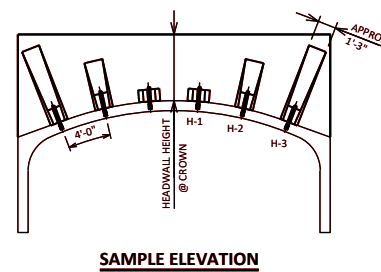
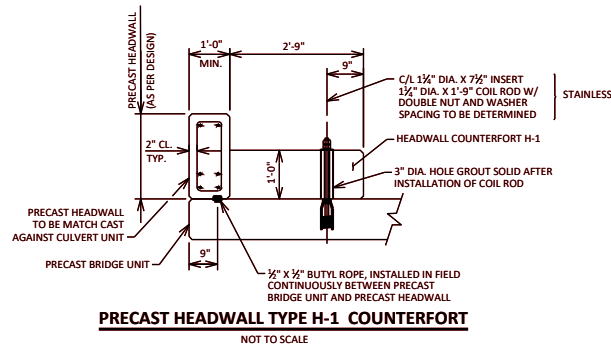
**PRECAST THREE-SIDED
BOX CULVERT
HEADWALL DETAILS**



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
1-11

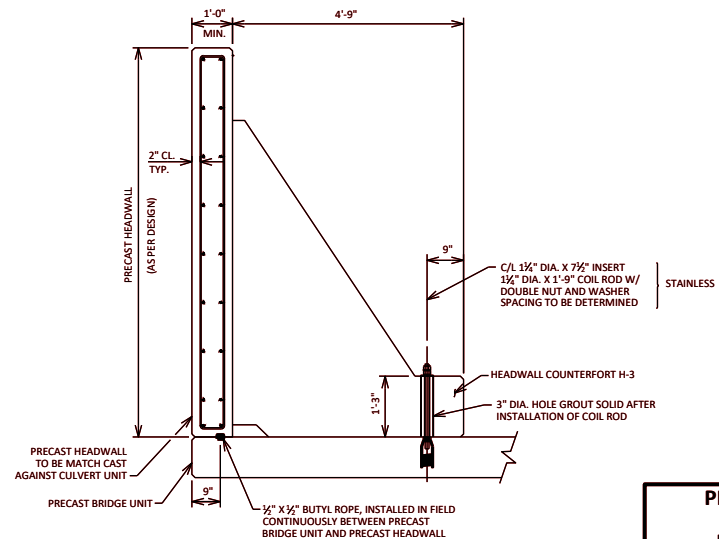
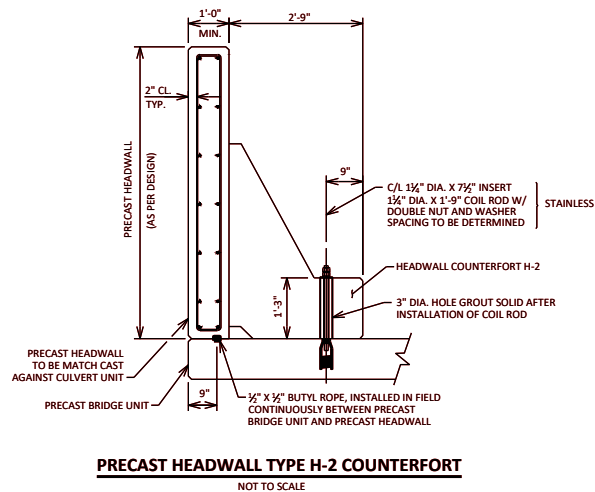


NOTE:
THE ACTUAL NUMBER AND TYPE OF
PRECAST HEADWALL COUNTERFORTS
IS TO BE DESIGNED. HOWEVER, USE
THE FOLLOWING CHART AS A
GENERAL GUIDE TO FEASIBILITY OF
COUNTERFORT USE.

	COUNTERFORT	MAX HEADWALL HEIGHT @ COUNTERFORT LOCATION	
		NO SURCHARGE	W/ 2'-0" SURCHARGE
14'-0" SPAN	H-1	7'-0"	5'-0"
	H-2	7'-0"	5'-0"
	H-3	8'-0"	6'-0"
20'-0" - 42'-0" SPANS	H-1	8'-0"	6'-0"
	H-2	10'-0"	7'-0"
	H-3	10'-0"	8'-0"

LRFD HEADWALL COUNTERFORTS

- HEADWALL DETAILS SHOWN HERE HAVE ONLY BEEN DESIGNED FOR THE FOLLOWING 2 LOAD CASES:
 - 1) EARTH PRESSURE ONLY
 - 2) EARTH PRESSURE + LIVE LOAD SURCHARGE
 THESE DETAILS ARE NOT TO BE USED WHERE A VEHICLE LOAD CAN BE TRANSMITTED THROUGH A BARRIER TO THE HEADWALL.
- ASSUMED 4'-0" SPACING OF COUNTERFORTS
- 1'-0" HEADWALL THICKNESS MIN.
- SOIL BEHIND HEADWALL IS AT SAME ELEVATION AS TOP OF HEADWALL
- ADDITIONAL HEADWALL HEIGHT MAY BE ACHIEVED WITH CLOSER COUNTERFORT SPACING
- FOR DETACHED HEADWALL DESIGNS ONLY



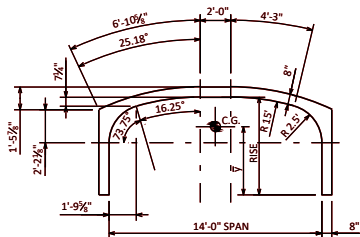
PRECAST THREE-SIDED BOX CULVERT HEADWALL DETAILS



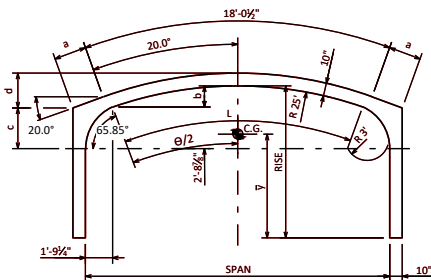
BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

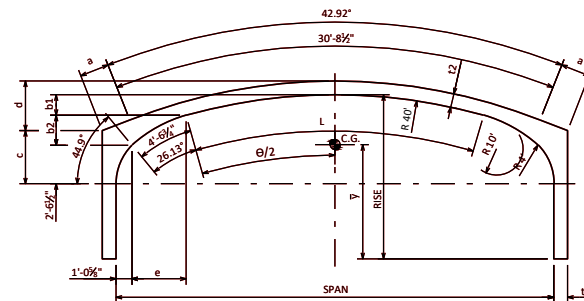
DATE:
1-11



14'-0" SPAN



20'-0" TO 24'-0" SPANS



28'-0" TO 42'-0" SPANS

CENTER OF GRAVITY $\bar{Y}$ FT		SPAN - FT					
RISE FT		14	20	24	28	36	42
4	3.2						
5	3.9	3.8					
6	4.6	4.6	4.6				
7	5.2	5.3	5.3	5.3			
8	5.8	6.0	6.0	6.0	5.8		
9	6.5	6.6	6.6	6.7	6.5		
10	7.1	7.3	7.3	7.4	7.2	6.9	
11				8.0	7.9	7.7	
12					8.6	8.4	
13					9.3	9.1	

AREA OF CONCRETE SECTION SQ. FT		SPAN - FT					
RISE FT		14	20	24	28	36	42
4	15.2						
5	16.5	24.8					
6	17.8	26.5	29.1				
7	19.2	28.2	30.8	39.9			
8	20.5	29.9	32.5	41.9	54.1		
9	21.8	31.5	34.2	43.9	56.4		
10	23.0	33.2	35.8	45.9	58.7	64.7	
11				47.9	61.1	67.0	
12					63.4	69.4	
13					65.7	71.7	

GEOMETRIC PROPERTIES (FT.) (NOT SHOWN ON DRAWING)		SPAN - FT				
		20	24	28	36	42
θ	38.43°	48.29°	25.30°	37.93°	47.86°	
L	16.77	21.07	17.66	26.48	33.41	
a	2.13	4.25	0.00	4.48	4.48	
b	1.39	2.19				
b1			0.97	2.17	3.50	
b2			1.96	2.40	2.75	
c	2.68	2.75	3.76	3.91	4.31	
d	2.29	3.01	2.84	4.48	5.66	
e			4.07	3.83	3.63	
t1			1.00	1.17	1.17	
t2			0.83	1.00	1.00	

(REFER TO STANDARDS 36.16 FOR REINFORCING DETAILS)

ARCH UNIT PRIMARY REINFORCING (MINIMUM)																		
COVER ft	14'-0" SPAN 4'-0" TO 10'-0" RISE			20'-0" SPAN 5'-0" TO 10'-0" RISE			24'-0" SPAN 6'-0" TO 10'-0" RISE			28'-0" SPAN 7'-0" TO 11'-0" RISE			36'-0" SPAN 8'-0" TO 13'-0" RISE			42'-0" SPAN 10'-0" TO 13'-0" RISE		
	A1 SQ. IN/FT	A3 SQ. IN/FT	Fc REQ'D. PSI	A1 SQ. IN/FT	A3 SQ. IN/FT	Fc REQ'D. PSI	A1 SQ. IN/FT	A3 SQ. IN/FT	Fc REQ'D. PSI	A1 SQ. IN/FT	A3 SQ. IN/FT	Fc REQ'D. PSI	A1 SQ. IN/FT	A3 SQ. IN/FT	Fc REQ'D. PSI	A1 SQ. IN/FT	A3 SQ. IN/FT	Fc REQ'D. PSI
3	0.66	0.48	5000	0.90	0.78	5000	0.72	0.84	5000	0.96	1.08	5000	1.50	1.68	6000	1.44	1.44	6000
6	0.66	0.48	5000	0.72	0.78	5000	0.72	1.08	5000	0.96	1.32	5000	1.50	1.92	6000	1.44	1.44	6000
9	0.66	0.48	5000	0.72	0.90	5000	0.72	1.44	5000	0.96	1.68	5000	1.50	2.40	6000	1.44	1.92	6000
12	0.66	0.60	5000	0.72	1.08	5000	0.72	1.80	6000	0.96	1.80	6000	1.50	3.00	6000	1.44	2.16	6000

① SHEAR REINFORCEMENT REQUIRED

② SHEAR REINFORCEMENT REQUIRED FOR 6'-0" & 7'-0" RISE

③ SHEAR REINFORCEMENT REQUIRED FOR 8'-0" & 9'-0" RISE

④ SHEAR REINFORCEMENT REQUIRED FOR 10'-0" & 11'-0" RISE

⑤ MINIMUM PRECAST UNIT WIDTH = 3'-11 1/4"

NOTE:

THESE STEEL AREAS ARE SHOWN FOR COVER OF 12'-0" OR LESS.

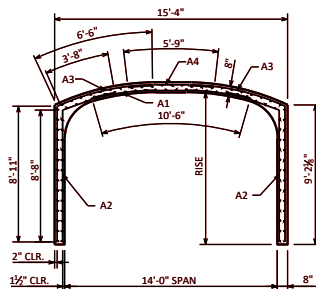
PRECAST THREE-SIDED BOX CULVERT CROSS SECTIONS



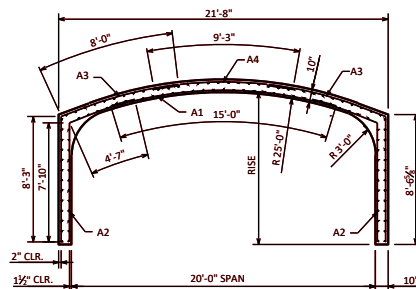
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

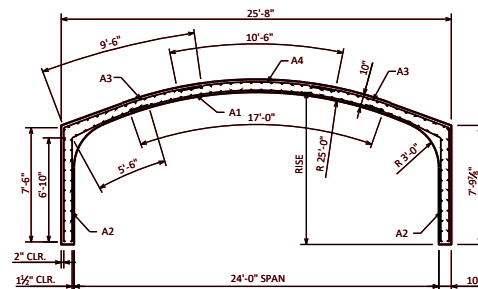
DATE:
1-11



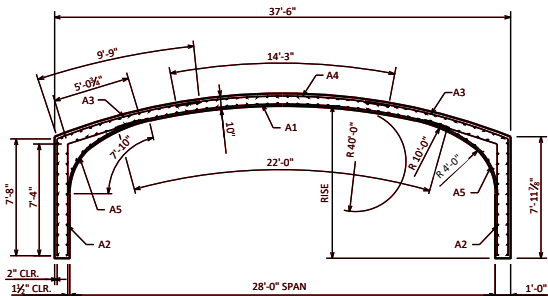
14'-0" SPAN
RISE = 10'-0" **SEE NOTE



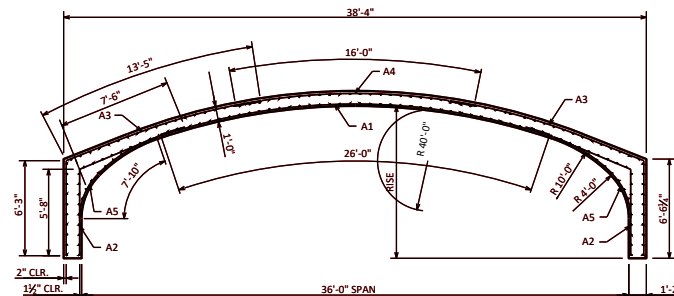
20'-0" SPAN
RISE = 10'-0" **SEE NOTE



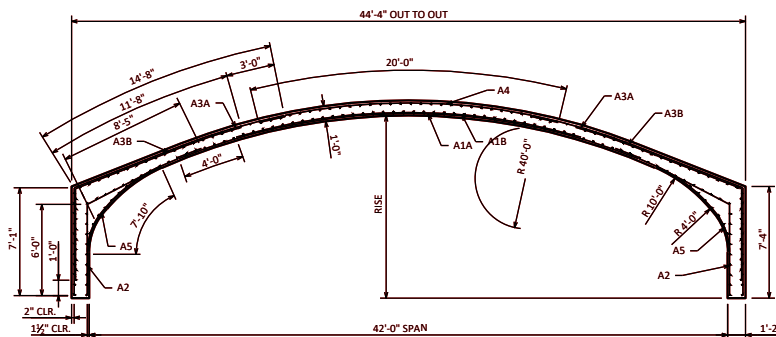
24'-0" SPAN
RISE = 10'-0" **SEE NOTE



28'-0" SPAN
RISE = 10'-0"



36'-0" SPAN
RISE = 10'-0"



42'-0" SPAN
RISE = 12'-0"

NOTES:

** SEE ARCH UNIT PRIMARY REINFORCING CHART ON STANDARD 36.15 FOR MORE INFORMATION.

ALL REINFORCING DIMENSIONS SHOWN ARE FOR 10'-0" RISE. A2 AND A3 STEEL LENGTHS SHALL BE REVISED ACCORDINGLY FOR RISES OTHER THAN 10'-0".

THESE STEEL AREAS, STEEL LENGTHS AND ARCH THICKNESS ARE SHOWN FOR COVER OF 12'-0" OR LESS.

THREE-SIDED PRECAST CONCRETE STRUCTURES SHALL BE DESIGNED FOR COVER GREATER THAN 12'-0", AND CAN BE DESIGNED FOR UP TO THE LIMITS OF COVER SHOWN IN THE TABLE BELOW.

THE COVER OF CONCRETE OVER THE OUTSIDE CIRCUMFERENTIAL REINFORCEMENT SHALL BE 2 INCHES MINIMUM.

THE COVER OF CONCRETE OVER THE INSIDE CIRCUMFERENTIAL REINFORCEMENT SHALL BE 1 1/2 INCHES MINIMUM.

THE CLEAR DISTANCE OF THE END CIRCUMFERENTIAL WIRES SHALL NOT BE LESS THAN 1" NOR MORE THAN 2" FROM THE ENDS OF EACH SECTION.

AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) ASTM A497 MAY BE SUBSTITUTED FOR THE REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DEVELOPMENT SECTION.

MINIMUM COVER FOR WILDED WIRE FABRIC: 1-INCH

DESIGN DATA:

f'_c = 5,000 PSI MINIMUM FOR CONCRETE
 f_y = 60,000 PSI FOR STEEL REINFORCING BARS
 f_y = 65,000 PSI FOR WELDED WIRE FABRIC (IN FLAT SHEET)

SPAN FT	APPROX. MAX. COVER
14'	50'
20' - 24'	30'
28' - 36'	20'
42'	15'

ARCH UNIT LONGITUDINAL REINFORCEMENT (MINIMUM)							
14'-0" SPAN			20'-0" SPAN			24'-0" SPAN	
CIRCUMF. AREA REQ'D SQ. IN/FT	LONGITUDINAL AREA REQ'D SQ. IN/FT	LENGTH FT	CIRCUMF. AREA REQ'D SQ. IN/FT	LONGITUDINAL AREA REQ'D SQ. IN/FT	LENGTH FT	CIRCUMF. AREA REQ'D SQ. IN/FT	LONGITUDINAL AREA REQ'D SQ. IN/FT
A1 = **	0.13	10'-6"	A1 = **	0.13	15'-0"	A1 = **	0.13
A2 = 0.24	0.13	12'-3"	A2 = 0.24	0.13	12'-5"	A2 = 0.24	0.13
A3 = **	0.13	15'-4"	A3 = **	0.13	16'-3"	A3 = **	0.13
A4 = 0.24	0.13	5'-9"	A4 = 0.24	0.13	9'-3"	A4 = 0.24	0.13

28'-0" SPAN			36'-0" SPAN			42'-0" SPAN		
CIRCUMF. AREA REQ'D SQ. IN/FT	LONGITUDINAL AREA REQ'D SQ. IN/FT	LENGTH FT	CIRCUMF. AREA REQ'D SQ. IN/FT	LONGITUDINAL AREA REQ'D SQ. IN/FT	LENGTH FT	CIRCUMF. AREA REQ'D SQ. IN/FT	LONGITUDINAL AREA REQ'D SQ. IN/FT	LENGTH FT
A1A = **	0.13	22'-0"	A1A = **	0.13	26'-0"	A1A = **	0.13	31'-0"
A1B = **	NOT REQ'D	16'-0"	A1B = **	NOT REQ'D	18'-0"	A1B = **	NOT REQ'D	23'-0"
A2 = 0.36	0.13	12'-6"	A2 = 0.36	0.13	13'-2"	A2 = 0.48	0.13	14'-4"
A3A = **	0.13	17'-6"	A3A = **	0.13	19'-8"	A3A = **	0.13	21'-9"
A3B = **	NOT REQ'D	13'-6"	A3B = **	NOT REQ'D	15'-8"	A3B = **	NOT REQ'D	17'-9"
A4 = 0.36	0.13	14'-3"	A4 = 0.36	0.13	16'-0"	A4 = 0.48	0.13	20'-0"
A5 = 0.24	0.13	7'-10"	A5 = 0.24	0.13	7'-10"	A5 = 0.24	0.13	7'-10"

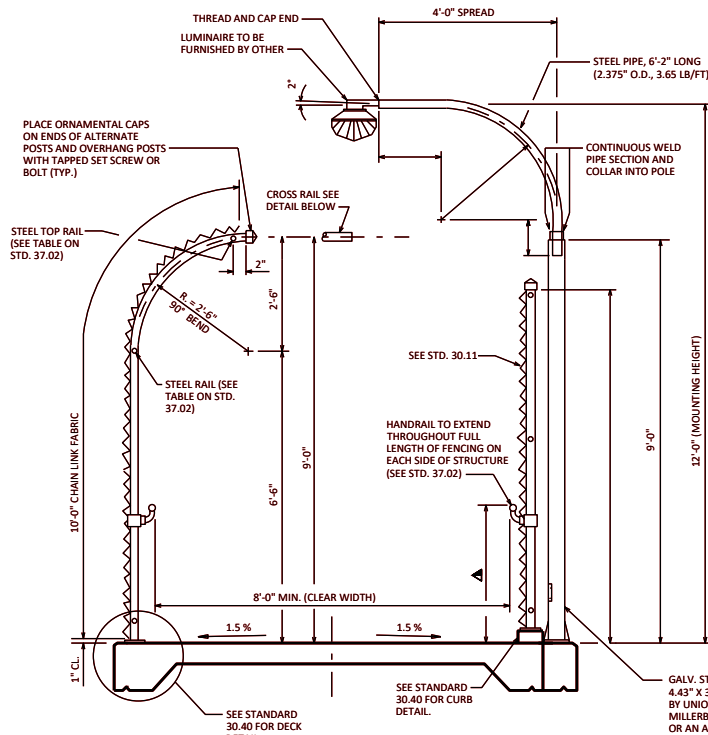
PRECAST THREE-SIDED BOX CULVERT REINFORCEMENT



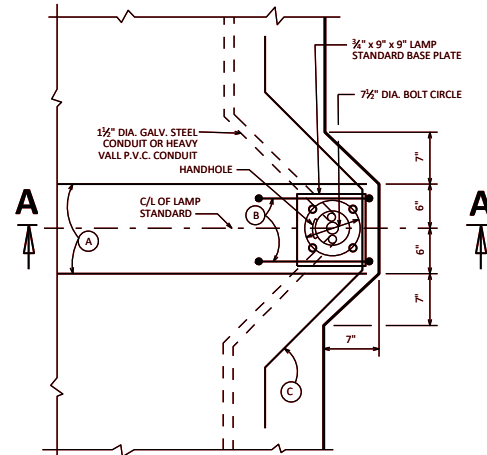
BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE:
7-14



SECTION THRU PEDESTRIAN STRUCTURE

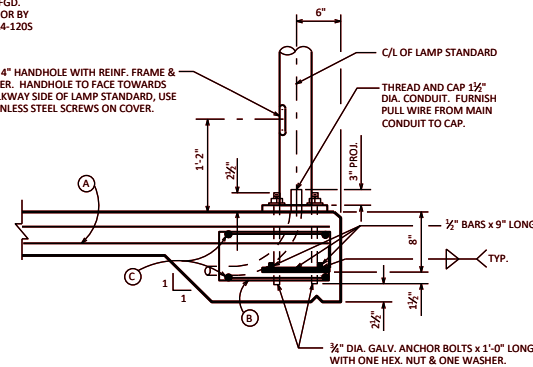


PLAN AT LAMP STANDARD

BAR STEEL REINFORCEMENT AT EACH LAMP STANDARD.

- (A) 4 - #5 BARS 4'-6" LONG
- (B) 2 - #4 BARS 4'-3" LONG
- (C) 2 - #4 BARS 5'-9" LONG

2" x 4" HANDHOLE WITH REIN. FRAME & COVER. HANDHOLE TO FACE TOWARDS WALKWAY SIDE OF LAMP STANDARD. USE STAINLESS STEEL SCREWS ON COVER.



SECTION A-A

NOTES

STEEL RAILS, POSTS, HANDRAILS AND SLEEVES SHALL CONFORM TO ASTM F1083, STANDARD WEIGHT PIPE (SCHEDULE 40).

ALL POSTS, INCLUDING LIGHT POLES, SHALL BE SET VERTICAL. SPACE ALL POSTS OF 9'-0" HIGH FENCE OPPOSITE EACH OTHER TO PERMIT SQUARE PLACEMENT OF CROSS RAILS.

MAXIMUM SPACING FOR CROSS RAILS SHALL BE AT ALTERNATE POSTS. ALL END POSTS SHALL HAVE CROSS RAILS.

HANDRAILS SHALL BE CONTINUOUS EXCEPT AT EXPANSION JOINTS WHERE ENDS SHALL BE CAPPED.

WASHERS, HEX NUTS AND ANCHOR BOLTS FOR LIGHT POLES SHALL BE GALVANIZED AND SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "STRUCTURAL STEEL CARBON".

GALVANIZED STEEL SHIMS OF 1/4" THICKNESS SHALL BE USED UNDER LAMP STANDARD BASE PLATE WHERE REQUIRED FOR ALIGNMENT. CAULK AROUND PERIMETER OF THIS PLATE AND FILL PORTION OF SLOTTED HOLE AROUND ANCHOR BOLT IN SHIM WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

FOR GALVANIZED CONDUIT PROVIDE GROUNDING LUG IN HANDHOLE. GROUND WIRE FROM LUG TO CONDUIT SHALL BE NUMBER 6 AWG BARE OR WEATHER-PROOF COPPER, SINGLE CONDUCTOR.

SEE STANDARD 30.11 AND 30.40 FOR ADDITIONAL "NOTES".

DESIGNER NOTES

8'-0" MAXIMUM POST SPACING WITH 9'-0" MAXIMUM FENCE FABRIC HEIGHT WHEN MOUNTED ON CURB OR DECK.

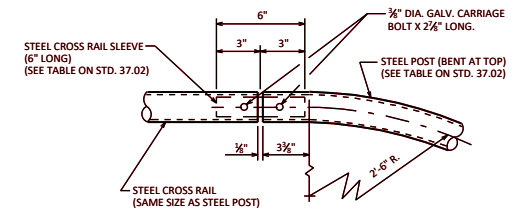
▲ TOP OF HANDRAIL GRIPPING SURFACES SHALL BE MOUNTED BETWEEN 30" AND 34" ABOVE WALKING SURFACE. USE 30" NEAR SCHOOL ZONES.

FENCE HEIGHT, CURVED OR STRAIGHT, MESH SIZE, COATING AND COLOR SHOULD BE COORDINATED WITH THE REGION AND ALL OTHER APPLICABLE AGENCIES. SEE BRIDGE MANUAL SECTION 30.3 FOR ADDITIONAL GUIDANCE.

SEE STANDARD 30.11 FOR ADDITIONAL "DESIGNER NOTES" AND DETAILS.

SEE STANDARD 30.40 FOR CURB OR DECK MOUNTED DETAILS.

SEE STANDARD 37.02 FOR FENCE MEMBER SIZES.



DETAIL OF CROSS RAIL AT TOP

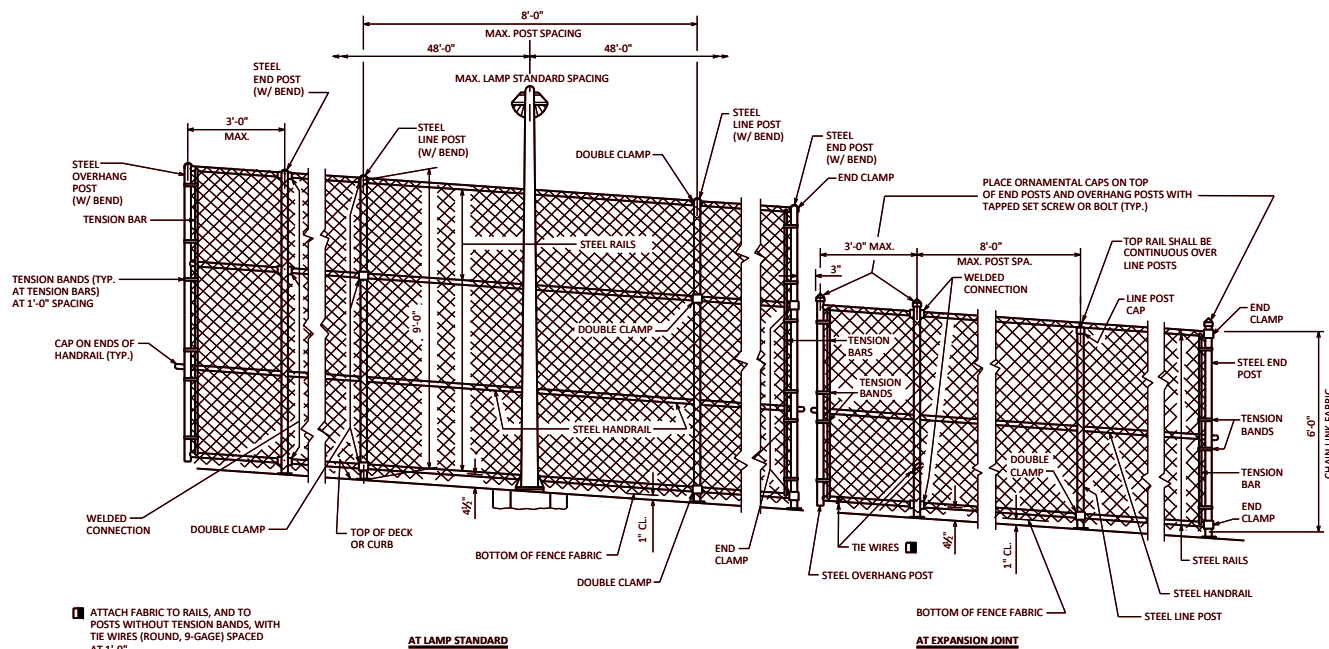
PEDESTRIAN OVERPASS



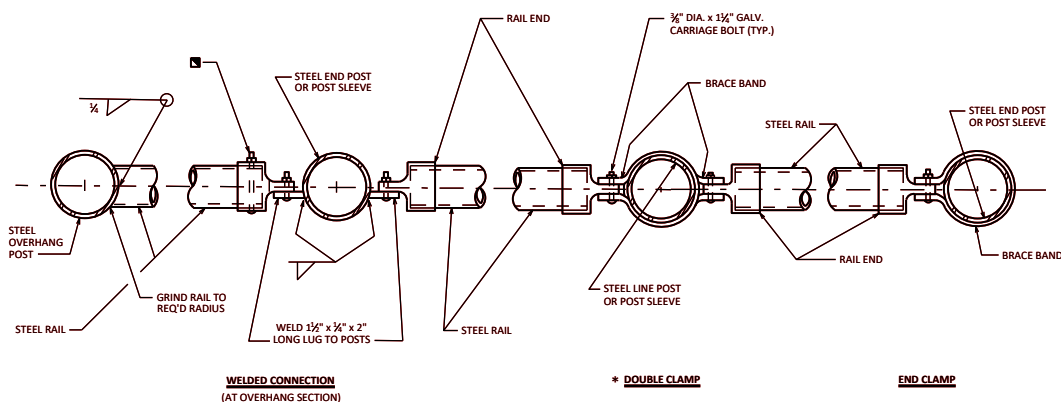
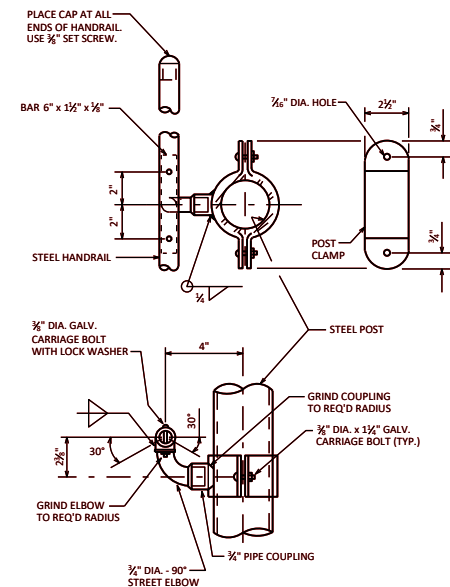
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STRUCTURES**

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1-25



ELEVATION OF FENCE



PLAN OF RAILING

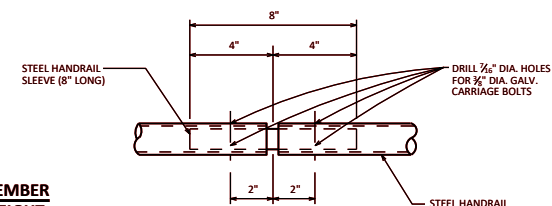
BOLT RAIL TO RAIL END TO SECURE OVERHANG SECTION. ALTERNATE IS TO WELD RAIL DIRECTLY TO END POST.

NOTE: PLACE ALL BOLT HEADS ON SIDE OF FENCE ADJACENT TO PEDESTRIANS

*** ALTERNATE TO DOUBLE CLAMP: USE LINE RAIL CLAMP (BOULEVARD) OR 180° BRACE BAND, WHICH MAY BE USED WHEN THE POSTS ARE EITHER BOLTED TO THE POST SLEEVES OR DIRECTLY WELDED TO THE BASE PLATE. (AS SHOWN ON STANDARD 30.11)**

FENCE MEMBER SIZE & WEIGHT

STEEL FENCE MEMBER	OUTSIDE DIAMETER (INCHES)	WEIGHT (LB/FT)
RAILS	1.660	2.27
END POST	2.875	5.80
OVERHANG POST	2.875	5.80
LINE POST	2.875	5.80
HANDRAIL	1.660	2.27
CROSS RAIL SLEEVE	1.900	2.72
HANDRAIL SLEEVE	1.315	1.68
POST SLEEVE	4.000	9.12



PEDESTRIAN OVERPASS DETAILS



BUREAU OF STRUCTURES

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DATE: 1-25

DIMENSIONS SHOWN APPLY TO CUT OR FILL SITUATIONS.

SINGLE SLOPE PARAPET SHALL BE USED. PEDESTRIAN RAILING WILL ONLY BE PROVIDED IF THERE IS A SIDEWALK. SEE CHAPTER 38 OF THE BRIDGE MANUAL.

SINGLE SLOPE PARAPET SHALL BE USED. PEDESTRIAN RAILING WILL ONLY BE PROVIDED IF THERE IS A SIDEWALK. SEE CHAPTER 38 OF THE BRIDGE MANUAL.

- VERTICAL CLEARANCE MUST BE AT LEAST 23'-0" AFTER CONSTRUCTION. USE A STRAIGHT-LINE INTERPOLATION BETWEEN TOP OF BEARINGS TO DETERMINE THE CLEARANCE, PROVIDED THAT POSITIVE CAMBER IS REALIZED. LL DEFLECTION NEED NOT BE CONSIDERED WITH THE STRAIGHT-LINE APPROACH. DESIGN FOR (APPROX.) 23'-2" TO AVOID GOING BELOW THE MINIMUM DURING CONSTRUCTION. MAXIMUM ALLOWABLE VERTICAL CLEARANCE OF 23'-3 1/2" IS ALLOWED BY FHWA. VERTICAL CLEARANCE LESS THAN 23'-0" MAY BE PROVIDED IN SOME SITUATIONS WITH APPROVAL OF THE OFFICE OF THE COMMISSIONER OF RAILROADS. CONSULT WITH CENTRAL OFFICE RAILROAD UNIT.**

** VARIABLE DISTANCE WHICH IS FOUND FROM FIELD SURVEY.

- * SITE SPECIFIC JUSTIFICATION REQUIRED FOR GREATER DISTANCES. LATERAL CLEARANCES SHALL BE ESTABLISHED BASED ON SITE SPECIFIC CONDITIONS AND ECONOMICAL STRUCTURE DESIGN; CONSULT WITH CENTRAL OFFICE RAILROAD UNIT. SEE 23 CODE OF FEDERAL REGULATIONS PT 646, SUBPT. B APPENDIX.

- ▲ FOR OFFSETS UP TO, AND INCLUDING 25'-0", A CRASH WALL OR HAMMERHEAD PIER DESIGNED TO AREMA STANDARDS (30 SQ. FT. MIN. X-SECT) IS REQUIRED. CP RAIL REQUIRES CRASH WALLS BE DESIGNED TO RESIST A 600 KIP EXTREME EVENT FORCE APPLIED 6 FEET ABOVE THE GROUND. THE CRASH WALLS SHOWN ON THIS STANDARD ARE NOT DESIGNED TO ACCOUNT FOR THIS LOAD.**

- ACCOMODATION FOR ADDITIONAL TRACKS REQUIRES DEPARTMENT APPROVAL. CONFER WITH STATEWIDE RAILROAD STRUCTURE AND TRACK ENGINEER IN CENTRAL OFFICE RAILROADS AND HARBORS SECTION AT (608) 266-0233.**

- HORIZONTAL CLEARANCES LESS THAN 18'-0" SHOULD BE REVIEWED WITH THE STATEWIDE RAILROAD AND TRACK ENGINEER IN THE CENTRAL OFFICE RAILROADS AND HARBORS SECTION. 18'-0" CLEARANCE IS MEASURED TO THE NEAREST ENCROACHING ELEMENT (PIER CAPS, MSE WALL COPING, ETC.)**

TEMPORARY CONSTRUCTION CLEARANCES ARE 21'-0" VERTICAL (21'-6" FOR BNSF AND UP RAILROADS) AND 12'-0" HORIZONTAL (15'-0" FOR BNSF AND UP RAILROADS) FROM CENTERLINE OF TRACK TO FALSEWORK. UNLESS INSTRUCTED OTHERWISE, A CONSTRUCTION CLEARANCE DETAIL SHOULD NOT BE INCLUDED IN THE PLANS AS CONSTRUCTION CLEARANCES ARE STATED IN SECTION 107.17.1 OF THE STANDARD SPECIFICATIONS.

DESIGNER SHALL SHOW HORIZONTAL LOCATION OF SHORING NEEDED IN PLAN VIEW. INCLUDE BID ITEM "TEMPORARY SHORING RAILROAD" WHEN SHORING ENCROACHES ZONE A OR B.

- ★ 6'-6" MIN. NOT REQ'D IF BEDROCK IS PRESENT.

THIS STANDARD IS TO MEET WISDOT REQUIREMENTS ONLY. THE DESIGN ENGINEER SHALL CONTACT THE RAILROAD FOR THEIR REQUIREMENTS.

- 1** BNSF AND UP RAILROADS HAVE GREATER REQUIREMENTS THAN SHOWN. CONFER WITH STATEWIDE RAILROAD STRUCTURE AND TRACK ENGINEER IN CENTRAL OFFICE RAILROADS AND HARBORS SECTION. DESIGNER SHOULD CONSIDER FIELD TOLERANCES AND CONTINGENCIES WHEN SHOWING SHORING REQUIREMENTS. REFER TO "GUIDELINES FOR TEMPORARY SHORING" PUBLICATION BY UP AND BNSF FOR ADDITIONAL INFORMATION.

- BNSF AND UP RAILROAD REQUIRE A DEPTH OF FOOTING 6'-0" MIN. FROM BASE OF RAIL TO TOP OF FOOTING. IN LOCATIONS WHERE BEDROCK IS PRESENT, COORDINATE FOOTING DEPTHS WITH RAILROAD PROJECT COORDINATION ENGINEER.

- LIMITS OF RAILROAD RIGHT-OF-WAY. LOCATIONS SHOWN ARE FOR REFERENCE ONLY AND NEED NOT BE DIMENSIONED.

- ☒ AESTHETICS SHALL NOT BE EMPLOYED ALONG RAILROAD TRACKS.

FINAL LOCATION AND TYPE OF SHORING SYSTEM TO BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL SUBMIT ALL DESIGN DRAWINGS AND CALCULATIONS DIRECTLY TO THE RAILROAD. SHORING COVERED BY BID ITEM "TEMPORARY SHORING RAILROAD".

- FINAL LOCATION AND TYPE OF SHORING SYSTEM TO BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL SUBMIT ALL DESIGN DRAWINGS AND CALCULATIONS DIRECTLY TO THE RAILROAD. SHORING COVERED BY BID ITEM "TEMPORARY SHORING RAILROAD".**

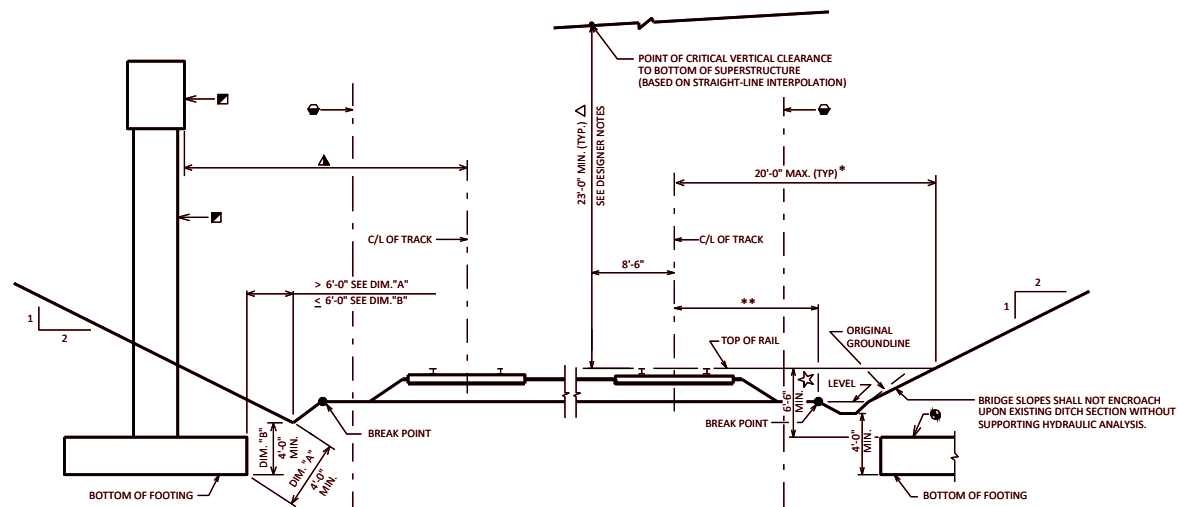


**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
7-17

STANDARD	38.01
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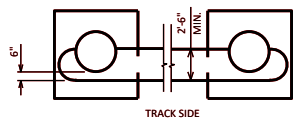
RAILROAD IN FILL

RAILROAD CROSS SECTIONS

RAILROAD IN CUT

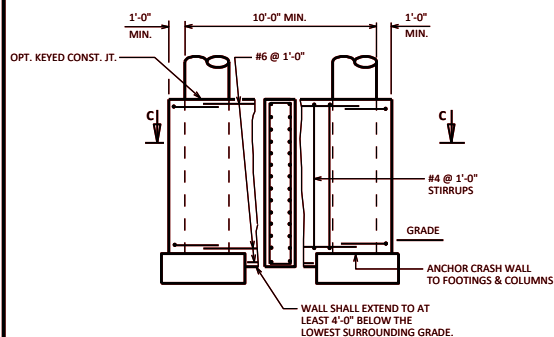
	PIER LOCATION	HEIGHT OF CRASH WALL ABOVE TOP OF RAIL
GENERAL AREMA REQUIREMENT	PIERS $\leq 12'$ -0" FROM C/L TRACK	12'-0"
	PIERS 12'-0" TO 25'-0"	6'-0"
CP RAIL REQUIREMENT	PIERS $< 15'$ -0" FROM C/L TRACK	12'-0"
	PIERS $\geq 15'$ -0" TO 25'-0"	8'-0"

TABLE C



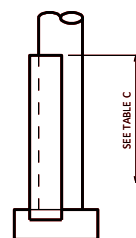
SECTION C-C

TRACK ON ONE SIDE OF COLUMNS

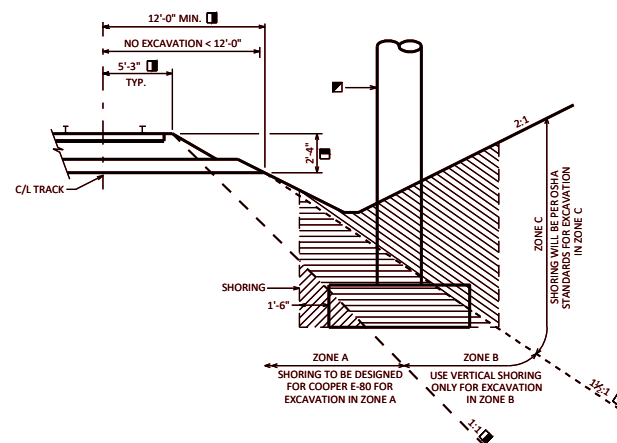


ELEVATION

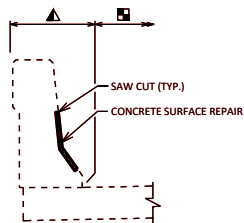
CRASH WALL DETAILS



END VIEW



LIMITS BEFORE SHORING REQUIRED



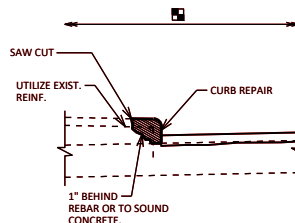
PARAPET REPAIR DETAIL

502.3215	PROTECTIVE SURFACE TREATMENT RESEAL	SY
502.3205	PIGMENTED SURFACE SEALER RESEAL	SY
509.1500	CONCRETE SURFACE REPAIR	SF

NOTES

PROTECTIVE SURFACE TREATMENT RESEAL SHALL BE APPLIED TO THE (INSERT LOCATIONS). SURFACE PREPARATION IS INCLUDED IN THE BID ITEM "PROTECTIVE SURFACE TREATMENT RESEAL"

PIGMENTED SURFACE SEALER RESEAL SHALL BE APPLIED TO THE (INSERT LOCATIONS). SURFACE PREPARATION IS INCLUDED IN THE BID ITEM "PIGMENTED SURFACE SEALER RESEAL"



CURB REPAIR DETAIL

502.3215	PROTECTIVE SURFACE TREATMENT RESEAL	SY
509.1200	CURB REPAIR	LF

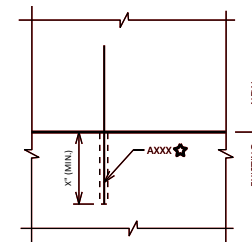
DESIGNER NOTES

DETAILS MAY BE SHOWN ON PLANS IF NECESSARY FOR CLARITY.

INCLUDE APPLICABLE CONCRETE MASONRY BID ITEM TO FILL REPAIRS.

REFER TO STANDARD 17.02 FOR TYPICAL SEALING LOCATIONS.

THE "RESEAL" QUANTITY SHOULD INCLUDE THE REPAIRED CONCRETE SURFACES. FOR EXAMPLE, "PIGMENTED SURFACE SEALER RESEAL" SHOULD BE APPLIED TO THE EXISTING AND REPAIRED PARAPET SURFACES, AS SHOWN.



ANCHOR DETAIL (EXAMPLE)

502.41	ADHESIVE ANCHORS	—INCH	EACH
502.42	ADHESIVE ANCHORS	NO. _BAR	EACH
505.0605	BAR STEEL REINFORCEMENT HS COATED STRUCTURES		LB

DESIGNER NOTES

THE DESIGN ENGINEER SHALL PROVIDE ANCHOR DETAILS AS NEEDED. PLANS SHALL INCLUDE ANCHOR "NOTES" WHEN ADHESIVE ANCHORS ARE USED.

ANCHOR DETAIL EXAMPLE APPLICABLE FOR ADHESIVE ANCHORS LOCATED IN UNCRACKED CONCRETE. SEE CHAPTER 40.16 FOR ADDITIONAL GUIDANCE.

NOTE

ADHESIVE ANCHORS SHALL CONFORM TO SECTION 502.2.12 OF THE STANDARD SPECIFICATIONS. (PROVIDE NOTE WHEN THE ADHESIVE ANCHOR BID ITEM IS NOT USED, BUT ARE ALLOWED AS AN ALTERNATIVE ANCHORAGE)

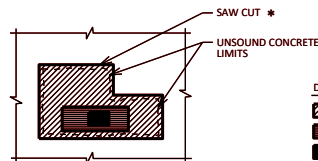
★ (CHOOSE ONE OF THE FOLLOWING AND PLACE ON PLAN)

ADHESIVE ANCHORS X/X-INCH.
EMBED "X" IN CONCRETE.

ADHESIVE ANCHORS NO. X BAR.
EMBED "X" IN CONCRETE.

ADHESIVE ANCHORS X/X-INCH.
EMBED "X" IN CONCRETE.
ANCHORS SHALL BE APPROVED FOR
USE IN CRACKED CONCRETE.

ADHESIVE ANCHORS NO. X BAR.
EMBED "X" IN CONCRETE.
ANCHORS SHALL BE APPROVED FOR
USE IN CRACKED CONCRETE.

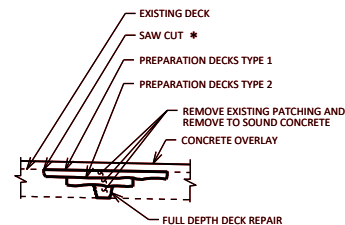


DECK REPAIR DETAIL - PLAN

FOR DESIGNER INFORMATION ONLY
(DO NOT PLACE ON PLANS)

509.0301
509.0302
* 509.0310.S
509.2000
▲ 509.2500

PREPARATION DECKS TYPE 1
PREPARATION DECKS TYPE 2
SAWING PAVEMENT DECK PREPARATION AREAS
FULL-DEPTH DECK REPAIR
CONCRETE MASONRY OVERLAY DECKS



DECK REPAIR DETAIL - SECTION

FOR DESIGNER INFORMATION ONLY
(DO NOT PLACE ON PLANS)

SY
SY
LF
SY
CY



FULL-DEPTH DECK REPAIR DETAIL

FOR DESIGNER INFORMATION ONLY
(DO NOT PLACE ON PLANS)

* 509.0310.S
509.2000
▲ 509.2500

SAWING PAVEMENT DECK PREPARATION AREAS
FULL-DEPTH DECK REPAIR
CONCRETE MASONRY OVERLAY DECKS

LF
SY
CY

DESIGNER NOTES

DETAILS APPLICABLE TO ALL OVERLAY METHODS AND DECK REPAIRS WITHOUT OVERLAYS.

* "SAWING PAVEMENT DECK PREPARATION AREAS" NOT REQUIRED FOR CONCRETE OVERLAYS.

▲ USE "CONCRETE MASONRY DECK REPAIR" (509.2100.S) FOR DECK REPAIRS UNDER POLYMER, ASPHALTIC, OR POLYMER MOD. ASPHALTIC OVERLAYS. USE "CONCRETE MASONRY DECK REPAIR" FOR DECK REPAIRS WITHOUT OVERLAYS.

RESTRICTIONS ON REMOVAL ITEMS SHALL BE PLACED ON THE PLANS TO PREVENT DAMAGE TO REINFORCING STEEL.

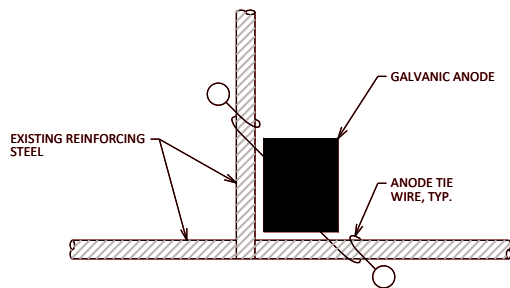
CONCRETE REPAIR DETAILS



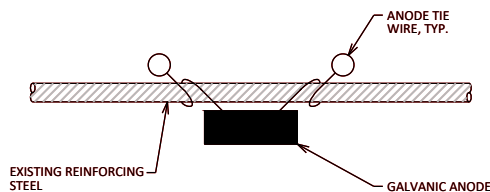
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STRUCTURES**

APPROVED: *Laura Shadewald*

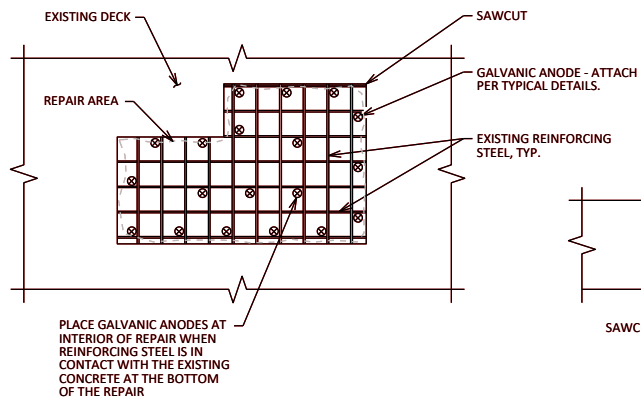
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**TYPICAL INSTALLATION AT
BAR STEEL INTERSECTION**

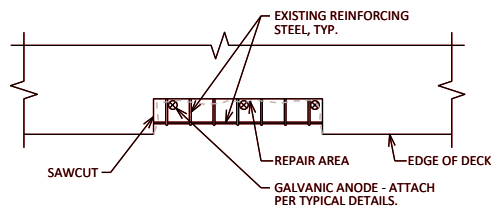


**TYPICAL INSTALLATION
FOR BAR STEEL**



PART. PLAN TYPICAL REPAIR DETAIL

509.1500	CONCRETE SURFACE REPAIR	SF
SPV.0060	EMBEDDED GALVANIC ANODES	EACH



NOTES

SURFACE REPAIR AREAS WITH CATHODIC PROTECTION ARE BASED ON THE PLANS AND AS DETERMINED BY THE ENGINEER. THE PLAN QUANTITY FOR THE BID ITEM "EMBEDDED GALVANIC ANODES" IS BASED ON A MAXIMUM SPACING OF 24-INCHES AROUND THE SURFACE REPAIR PERIMETER. THE ACTUAL QUANTITY SHALL BE BASED ON THE FIELD CONDITIONS AND AS RECOMMENDED BY THE GALVANIC ANODE SUPPLIER.

SURFACE REPAIRS SHALL BE FILLED WITH REPAIR MATERIALS COMPATIBLE WITH CATHODIC PROTECTION, AS RECOMMENDED BY THE ANODE SUPPLIER.

EXISTING REINFORCING STEEL TO BE COMPLETELY CLEANED OF CORRODED MATERIAL AND CONCRETE TO PROVIDE SUFFICIENT ELECTRICAL CONNECTION AND BOND. CATHODIC PROTECTION PREPARATIONS ARE INCLUDED IN THE BID ITEM "EMBEDDED GALVANIC ANODES".

ANODES NEAREST TO EDGE OF REPAIR TO BE WITHIN 6" OF EDGE.

AFTER PLACEMENT, GALVANIC ANODES SHOULD MAINTAIN A MINIMUM TOP COVER OF $1\frac{1}{2}$ " AND A MINIMUM BOTTOM COVER OF $\frac{3}{4}$ "

DESIGNER NOTES

CATHODIC PROTECTION SHALL BE USED ONLY AT THE REQUEST OF THE REGIONAL BRIDGE MAINTENANCE ENGINEER.

INCLUDE APPLICABLE CONCRETE MASONRY BID ITEM TO FILL REPAIRS.

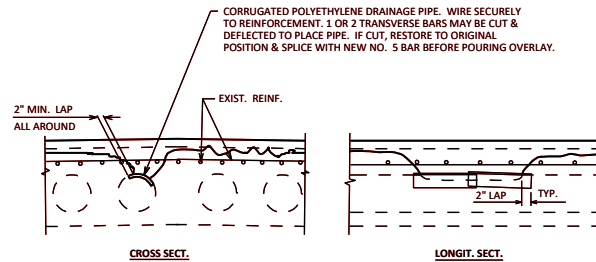
CATHODIC PROTECTION



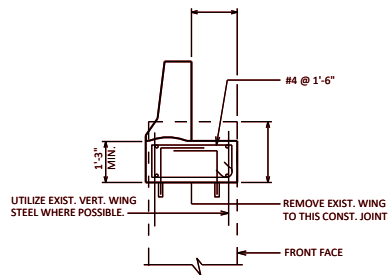
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STRUCTURES**

APPROVED: *Laura Shadewald*

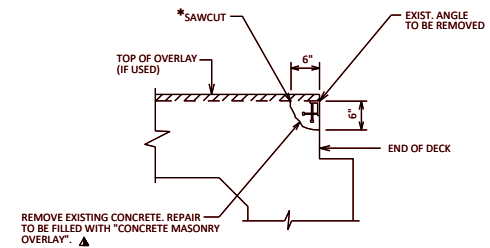
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RUPTURED VOID REPAIR



SECTION THRU PARAPET ON WING



SECTION AT END OF SLAB

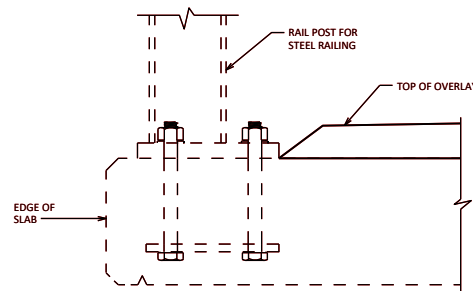
509.0301	PREPARATION DECKS TYPE 1	SY
509.0302	PREPARATION DECKS TYPE 2	SY
* 509.0310.5	SAWING PAVEMENT DECK PREPARATION AREAS	LF
509.2000	FULL-DEPTH DECK REPAIR	SY
▲ 509.2500	CONCRETE MASONRY OVERLAY DECKS	CY

DESIGNER NOTES

* "SAWING PAVEMENT DECK PREPARATION AREAS" NOT REQUIRED FOR CONCRETE OVERLAYS.

▲ USE "CONCRETE MASONRY DECK REPAIR" (SPV.0035) FOR DECK REPAIRS UNDER POLYMER, ASPHALTIC, OR POLYMER MOD. ASPHALTIC OVERLAYS. USE "CONCRETE MASONRY DECK REPAIR" FOR DECK REPAIRS WITHOUT OVERLAYS.

PROVIDE (IF AVAILABLE) THE MOST CURRENT DECK CONDITION ASSESSMENT SURVEY ON PLANS. INCLUDE SURVEY TYPE AND DATE COMPLETED. THERMOGRAPHY DATA CAN BE FOUND IN HIS WITHIN GENERAL INVENTORY/FILE/INSPECTION/DATE/INSPECTION SPECIAL REPORT. DECK CONDITION ASSESSMENT SURVEY DATES CAN BE FOUND WITHIN INSPECTION/HISTORY UNDER THE "DEVAL" ACTIVITY TYPE.



SECTION THRU RAILING

ATTACHING PARAPETS OR RAILINGS TO BRIDGE DECKS WITH EPOXY ANCHORS IS NOT ALLOWED BY FHWA.

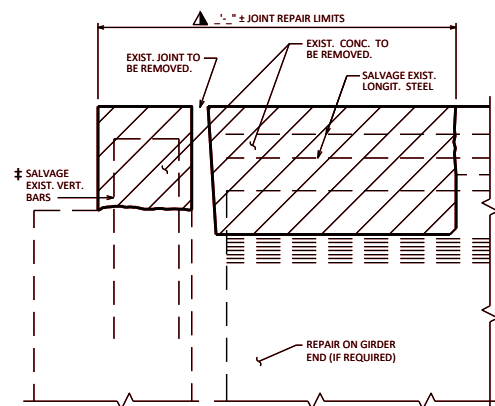
OVERLAY DETAILS



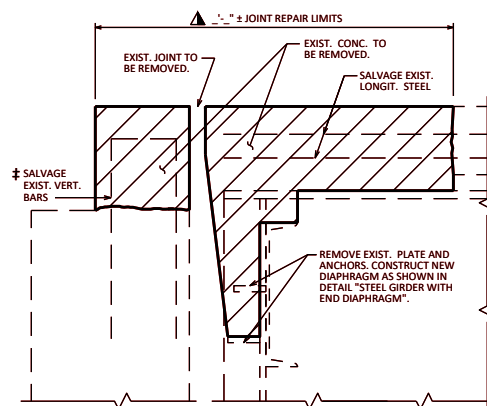
BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

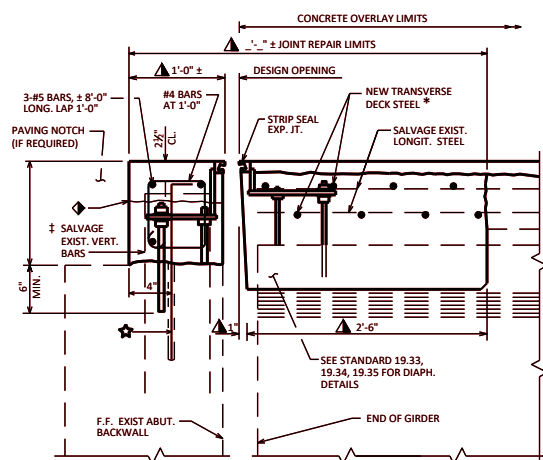
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7-22



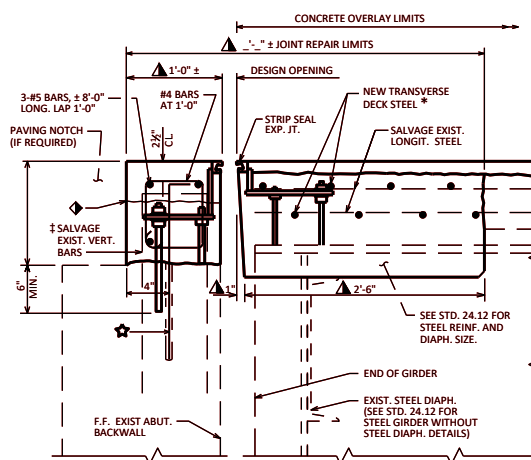
**JOINT REPAIR-REMOVAL
PRESTRESSED GIRDER**



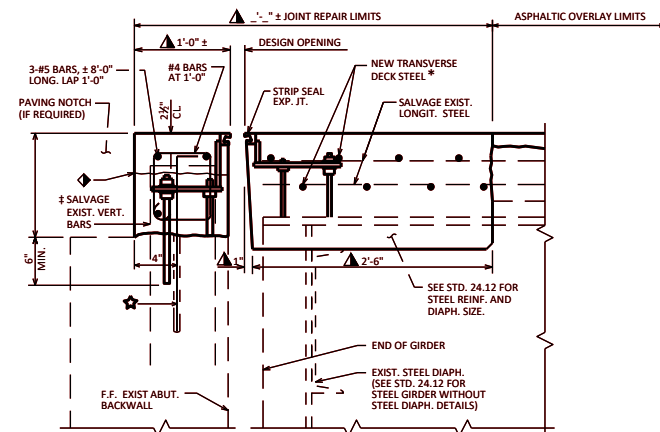
**JOINT REPAIR-REMOVAL
STEEL GIRDER**



**SECTION THRU PROPOSED JOINT
PRESTRESSED GIRDER WITH END DIAPHRAGM
CONCRETE OVERLAY**



**SECTION THRU PROPOSED JOINT
STEEL GIRDER WITH END DIAPHRAGM
CONCRETE OVERLAY**



**SECTION THRU PROPOSED JOINT
STEEL GIRDER WITH END DIAPHRAGM
ASPHALTIC OVERLAY**

LEGEND

‡ EXISTING BARS ARE LIKELY TO BE CORRODED AND/OR DAMAGED DURING CONCRETE REMOVAL. SALVAGE AND INCORPORATE AS MUCH REBAR AS PRACTICAL. SUPPLEMENT WITH THE BARS INDICATED BY ☆.

☆ ADHESIVE ANCHORS NO. 5 BAR. EMBED 1'-0" IN CONCRETE. SPACE AT 1'-0". TURN 10° LEG AS NECESSARY TO FIT.

◆ OPT. CONST. IT. 1" MIN. BELOW EXIST. REINF.

▲ DIMENSIONS GIVEN ARE NORMAL TO C/L OF SUBSTRUCTURE UNIT. INCORPORATE EXISTING REINFORCEMENT.

DESIGNER NOTES

SEE STANDARD 28.01 FOR SUPPORTS USED FOR STRIP SEAL STEEL EXTRUSIONS.

* FOR SKEWS > 20°, WHERE ORIGINAL TRANSVERSE DECK REINFORCEMENT WAS PLACED NORMAL TO THE GIRDERS, SAVE AND INCORPORATE 1'-6" MIN. OF TRANSVERSE REINFORCING BARS. NEW TRANSVERSE BARS ARE PLACED ALONG THE SKEW.

BARS IN JOINT REPAIR SHALL MATCH EXISTING REINFORCEMENT TYPE (COATED OR UNCOATED).

ALL REPLACEMENT PAVING BLOCK DIMENSIONS SHALL MATCH EXISTING PLAN DIMENSIONS UNLESS DESIGNER DETERMINES OTHERWISE, TYP. FOR ALL SECTIONS SHOWN ON THIS STANDARD.

■ FOR STEEL GIRDERS, USE BID ITEM "PREPARATION AND COATING OF TOP FLANGES (STRUCTURE)" FOR JOINT REPAIRS OR DECK REPLACEMENTS.

TOTAL ESTIMATED QUANTITIES

BID ITEM NUMBER	BID ITEMS	UNIT	TOTAL
502.3101	EXPANSION DEVICE	LF	
502.4205	ADHESIVE ANCHORS NO. 5 BAR	EACH	
509.1000	JOINT REPAIR	SF	
509.2100.5	CONCRETE MASONRY DECK REPAIR	CY	
POSSIBLE ADDITIONAL BID ITEMS			
505.0400	BAR STEEL REINFORCEMENT HS STRUCTURES	LB	
505.0600	BAR STEEL REINFORCEMENT HS COATED STRUCTURES	LB	
509.2500	CONCRETE MASONRY OVERLAY DECKS	CY	
517.0901.5	PREPARATION AND COATING OF TOP FLANGES (STRUCTURE)	EACH	

THIS IS A PARTIAL LIST OF POSSIBLE BID ITEMS. BID ITEMS MAY NEED TO BE ADDED OR REMOVED TO FIT EACH INDIVIDUAL CASE.

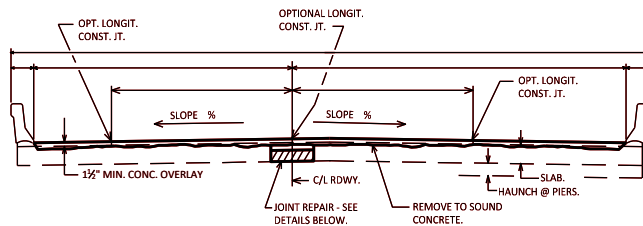
STRIP SEALS & DIAPH. DETAILS FOR OVERLAYS



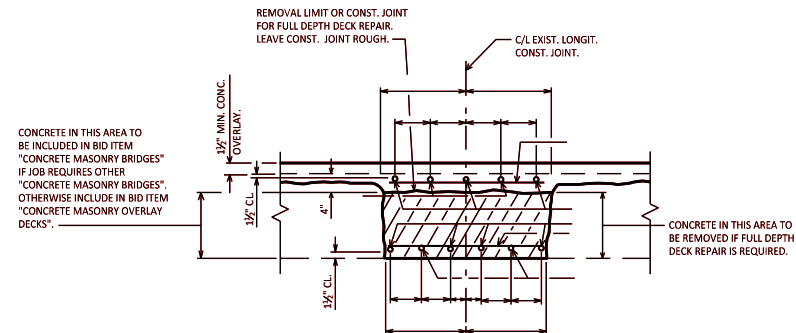
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

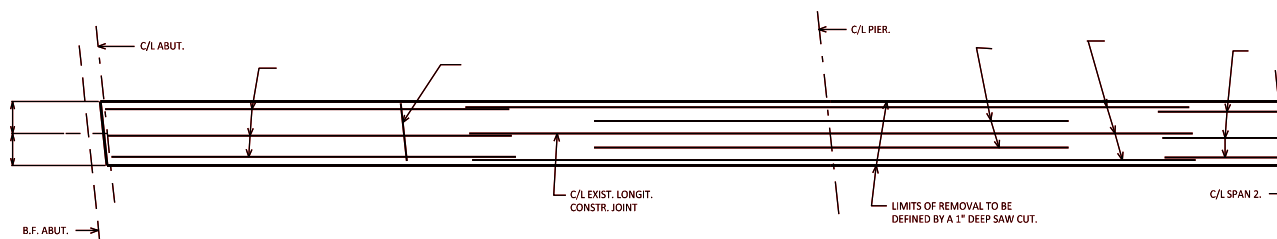
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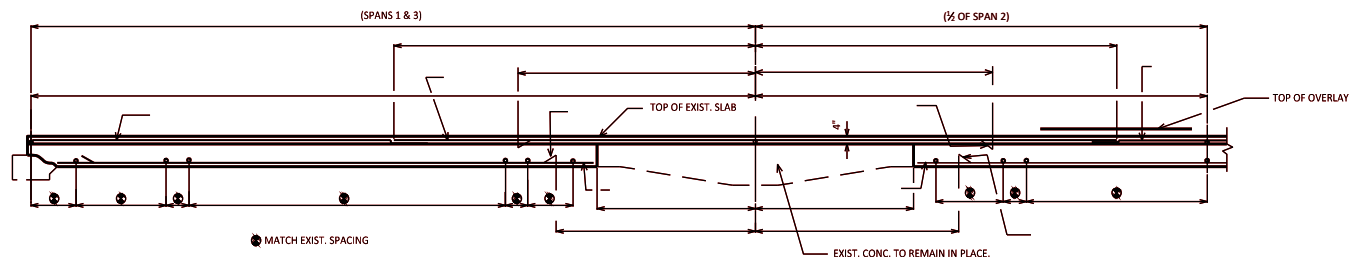
CROSS SECTION THRU ROADWAY LOOKING EAST



TYP. SECTION THRU JOINT



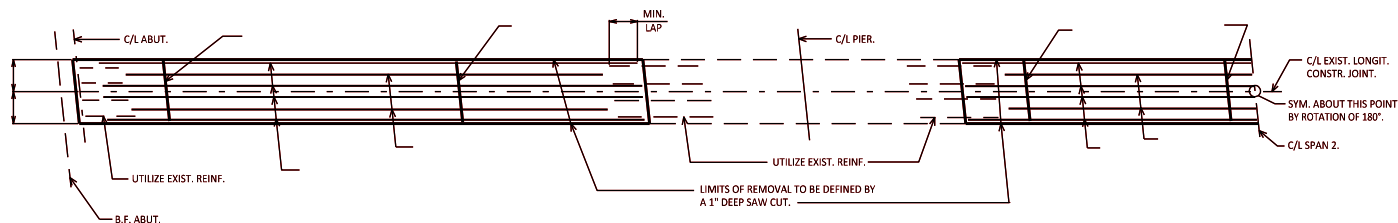
HALF PLAN SHOWING TOP BAR STEEL REINF.



HALF LONGIT. SECTION

TOTAL ESTIMATED QUANTITIES

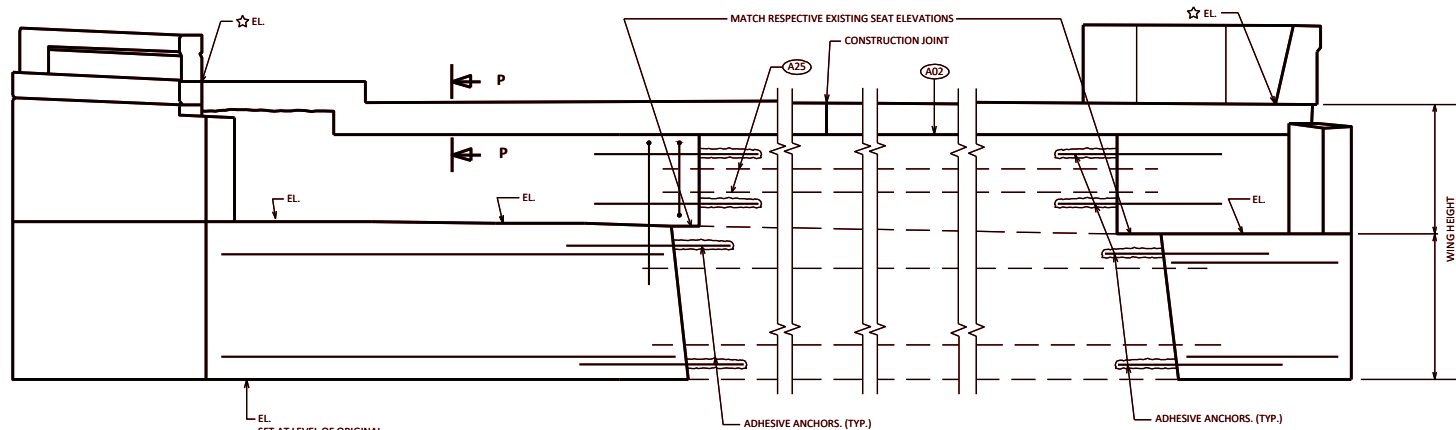
BID ITEMS	
JOINT REPAIR	SY
BAR STEEL REINFORCEMENT HS COATED STRUCTURES	LB
CONCRETE MASONRY BRIDGES	CY
CONCRETE MASONRY OVERLAY DECKS	CY



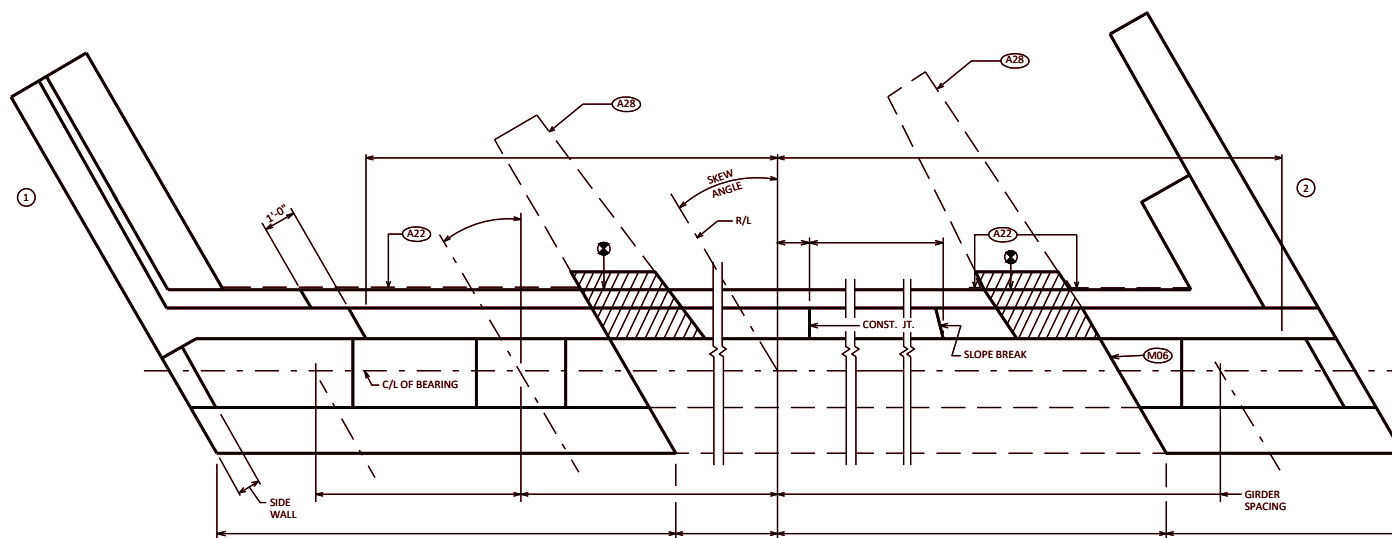
HALF PLAN SHOWING BOTTOM BAR STEEL REINF

(REQUIRED ONLY FOR FULL DEPTH DECK REPAIR)

LONGIT. CONST. JOINT REPAIRS	
 BUREAU OF STRUCTURES	
APPROVED: <i>Laura Shadewald</i>	DATE: 7-16

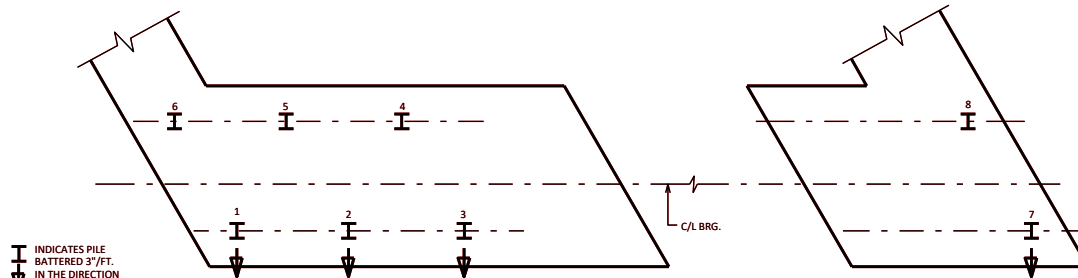


ELEVATION

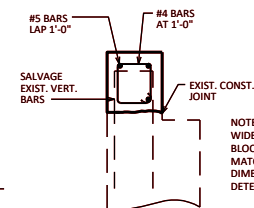


WING WITHOUT PILE

WING WITH PILE



PILE PLAN



SECTION P-P

SEE STANDARD 40.04 FOR ADDITIONAL DETAILS

NOTE:
WIDENED PORTION OF PAVING
BLOCK DIMENSIONS SHALL
MATCH EXISTING PLAN
DIMENSIONS UNLESS DESIGNER
DETERMINES OTHERWISE.

NOTES

- (A02) CONSTRUCTION JOINT: POUR CONCRETE ABOVE THIS JOINT AFTER SUPERSTRUCTURE CONCRETE IS IN PLACE. STRIKE OFF AND LEAVE ROUGH.
- (A22) 18" (RMW) RUBBERIZED MEMBRANE WATERPROOFING SEAL ALL HORIZ. & VERT. JOINTS AT BACKFACE.
- (A25) SALVAGE EXIST. REINF. & EXTEND FULL LENGTH INTO NEW WORK.
- (MOD) ROUGHEN SURFACE OF CONCRETE 3/4" DEEP MINIMUM AT ALL AREAS WHERE NEW CONCRETE CONTACTS EXISTING CONCRETE.
- (A28) EXISTING WINGS. REMOVE A MIN. OF 2'-0" BELOW FINISHED GRADE.
- ☆ ELEV. @ F.F. ABUT. BACKWALL AND GUTTERLINE.
- ⊗ REMOVE CONC. IN THIS AREA DOWN TO EXIST. BRIDGE SEAT. INCORPORATE EXIST. BAR STEEL INTO NEW WORK.

DESIGNER NOTES

SEE CHAPTER 12 FOR NEW BAR STEEL PLACEMENT, DETAILS, DIMENSIONS, & NOTES.

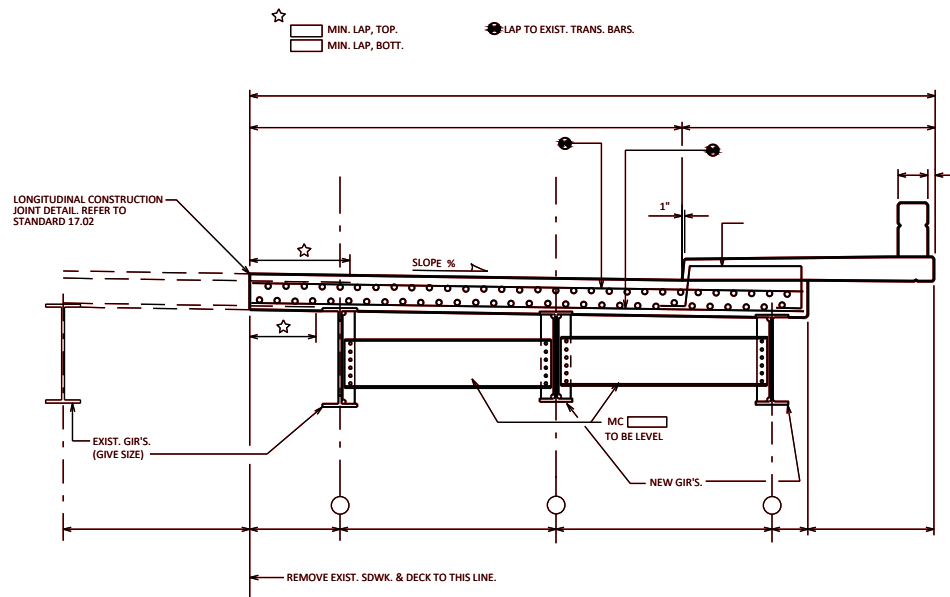
ABUTMENT WIDENING



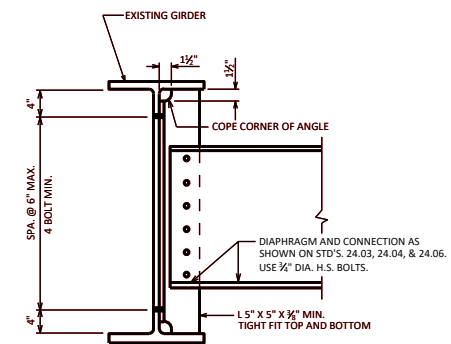
BUREAU OF STRUCTURES

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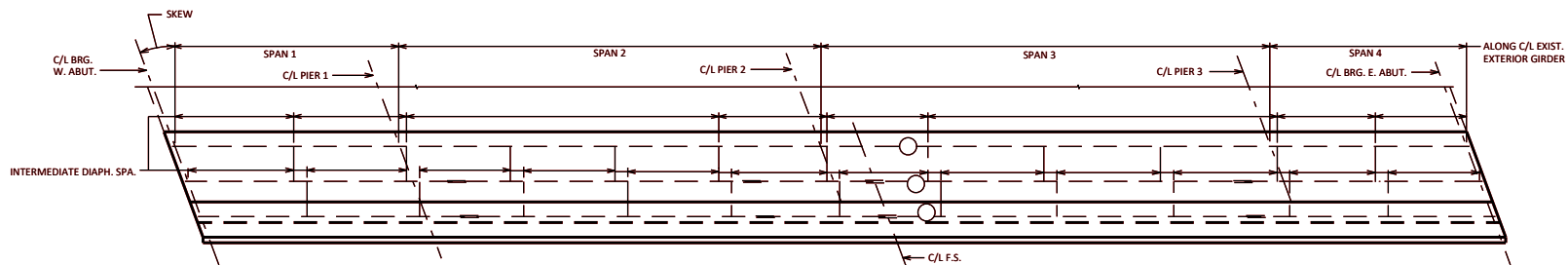
DATE:
7-19



CROSS SECT. THRU RDWY.



DIAPHRAGM CONNECTION TO EXISTING STEEL GIRDER



PLAN

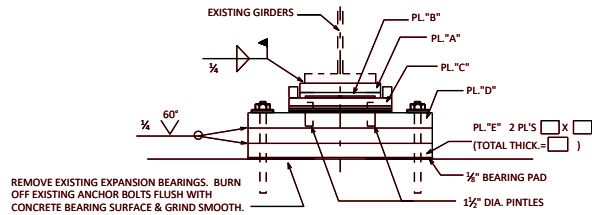
SLAB WIDENING



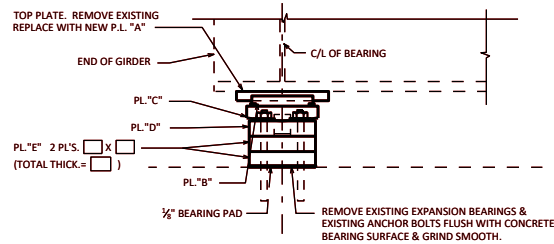
BUREAU OF STRUCTURES

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FRONT ELEVATION

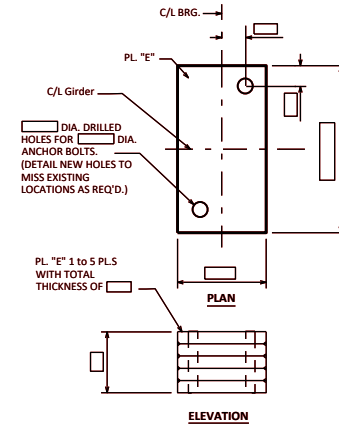


SIDE ELEVATION

EXPANSION BEARING REPLACEMENT - STEEL GIRDERS

STEEL BEARINGS

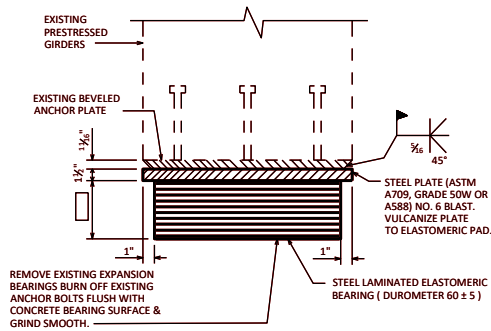
SEE STANDARD 27.08 FOR BEARING DETAILS



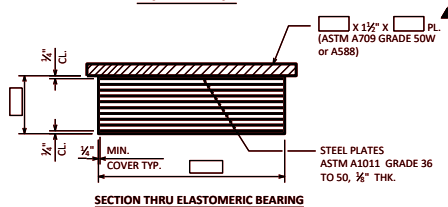
ELEVATION

PLATE 'E' DETAILS

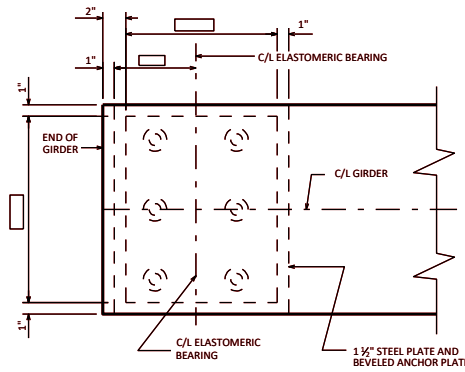
(SEE STD. 40.10 FOR CONCRETE BLOCK ALTERNATE)



FRONT ELEVATION



SECTION THRU ELASTOMERIC BEARING



PLAN VIEW

NOTES

ALL MATERIAL USED FOR BEARINGS SHALL BE PAID AT THE UNIT PRICE BID FOR "BEARING PADS ELASTOMERIC LAMINATED."

GRIND EXIST. WELD THAT ATTACHED EXIST. TOP PLATE TO EXIST. BOT. FLANGE. GRIND AFFECTED AREAS SMOOTH.

DESIGNER NOTES

THE STEEL TOP PLATE THICKNESS MAY BE REDUCED (3/4" MIN.) TO MATCH THE OVERALL EXISTING BEARING HEIGHT. WHEN THE THICKNESS IS REDUCED, THE FOLLOWING NOTE SHALL BE LOCATED ON THE PLANS:

"WELDING PROCEDURES SHALL BE ESTABLISHED BY THE CONTRACTOR TO RESTRICT THE MAXIMUM TEMPERATURE REACHED BY SURFACES IN CONTACT WITH ELASTOMER TO 200°F (93°C). TEMPERATURES SHALL BE CONTROLLED BY TEMPERATURE INDICATING WAX PENCILS OR OTHER SUITABLE MEANS APPROVED BY THE ENGINEER."

TOP STEEL PLATE MAY NOT BE OMITTED.

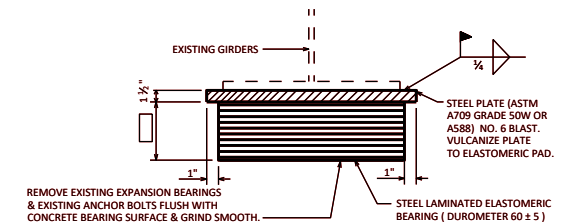
▲ CHECK 27.2.1. ELASTOMERIC BEARINGS IN THE BRIDGE MANUAL FOR REQUIREMENTS TO SEE IF THIS PLATE SHOULD BE TAPERED.

DO NOT INCLUDE PRESTRESSED GIRDER SHRINKAGE WHEN DESIGNING BEARINGS FOR BRIDGE REHABILITATION PROJECTS.

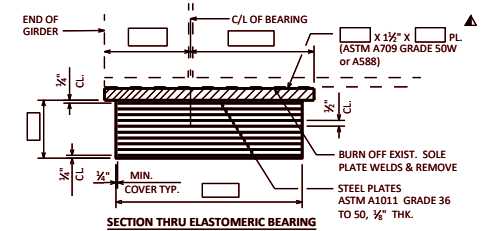
SEE STANDARD 27.07 FOR ADDITIONAL INFORMATION.

EXPANSION BEARING REPLACEMENT - PRESTRESSED GIRDERS

ELASTOMERIC BEARINGS



FRONT ELEVATION



SECTION THRU ELASTOMERIC BEARING

EXPANSION BEARING REPLACEMENT - STEEL GIRDERS

ELASTOMERIC BEARINGS

NOTES & DESIGNER NOTES

SEE "EXPANSION BEARING REPLACEMENT - PRESTRESSED GIRDERS" ON THIS STANDARD.

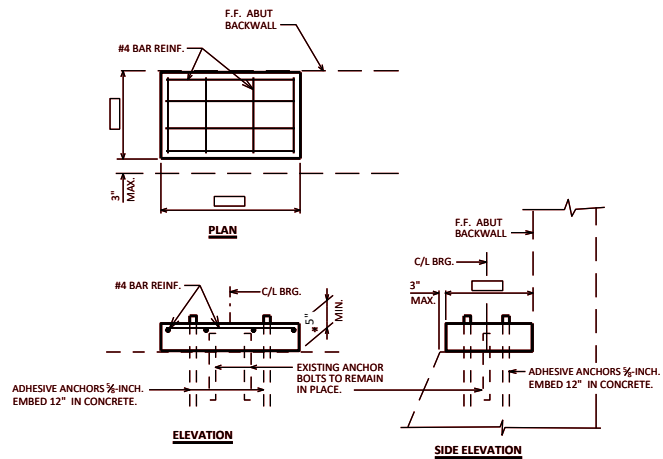
EXPANSION BEARING REPLACEMENT DETAILS



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STRUCTURES

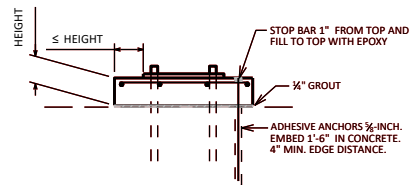
APPROVED: Laura Shadewald

DATE:
1-22



CONCRETE BEARING BLOCK DETAILS

(MAY BE USED IN LIEU OF PLATE "E" AS SHOWN ON STD. 40.08)



PRECAST CONCRETE BLOCK DETAIL

DEPTH = MIN. 5", MAX. 1'-0"

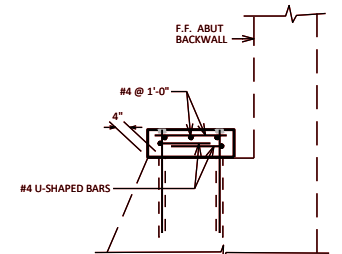
ANCHOR IN AT LEAST 4 LOCATIONS (ANCHORS INCLUDE ADHESIVE ANCHORS, ANCHOR BOLTS OR COMBINATION).

GROUT 1/2" BENEATH PRECAST ELEMENT - ELIMINATE STRESS CONCENTRATION AND REDUCE CRACKING.

PRECAST BLOCK (OR ANY CONCRETE BLOCK) MUST EXTEND BEYOND BEARING A DISTANCE EQUAL TO, OR GREATER THAN, THE HEIGHT OF THE CONCRETE BLOCK. THIS IS TO ACCOUNT FOR 45-DEGREE DOWNWARD AND OUTWARD STRESS DISTRIBUTION. THIS PROVISION CAN BE DISREGARDED IF A FULL-DEPTH CONCRETE DIAPHRAGM IS USED IN CONJUNCTION WITH A 1/2" THICK ELASTOMERIC PAD (FIXED SEAT).

REINFORCEMENT SHOULD BE IN BOTH DIRECTIONS UTILIZING #4 @ 1'-0" MAXIMUM SPACING.

BURN EXISTING ANCHOR BOLTS OFF FLUSH WITH BEAM SEAT.



*ALTERNATE DETAIL

TO BE USED FOR CASES WHERE HEIGHT EXCEEDS 1'-0" OR INSUFFICIENT EDGE DISTANCE (PRECAST OPTION SHOWN)

GIRDER REACTIONS AT BEARINGS (KIPS)

		C/L BRG. [SUPPORT NAME]	C/L BRG. [SUPPORT NAME]	C/L BRG. [SUPPORT NAME]
INTERIOR GIRDER	DL			
	LL			
EXTERIOR GIRDER	DL			
	LL			

NOTES

THE THEORETICAL SERVICE LOADS (UNFACTORED) SHOWN IN THE TABLE ARE BASED ON THE BRIDGE IN ITS FINAL CONFIGURATION. ADDITIONAL LOAD RESULTING FROM STAGING AND/OR CONTRACTOR OPERATIONS, SUCH AS UNEVEN JACKING OF ADJACENT GIRDERS OR ADJACENT SUBSTRUCTURE UNITS, IS NOT INCLUDED.

THE LL REACTIONS ARE BASED ON (HS-20/HL-93) AND INCLUDE IMPACT.

EXTERIOR GIRDER DEAD LOAD REACTIONS WERE INCREASED 10% TO ACCOUNT FOR VARIABILITY IN COMPOSITE DL DISTRIBUTION METHODS.

IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE ADEQUACY OF THE GIRDER AT THE JACKING LOCATION.

DESIGNER NOTES

THE BID ITEM FOR JACKING GIRDERS AND REMOVING EXISTING BEARINGS IS STSP "REMOVING BEARINGS".

THE BID ITEM FOR JACKING BRIDGES ONLY IS STSP "BRIDGE JACKING".

ADD 10% TO THE EXTERIOR GIRDER DL TO ACCOUNT FOR VARIABILITY IN COMPOSITE DL DISTRIBUTION METHODS.

INDICATE WHETHER HS-20 OR HL-93 LOADING WAS USED TO DETERMINE THE LL REACTIONS, WHICH INCLUDE IMPACT.

DO NOT INCLUDE LL REACTIONS FOR JACKING SITUATIONS THAT WILL NOT BE UNDER TRAFFIC.

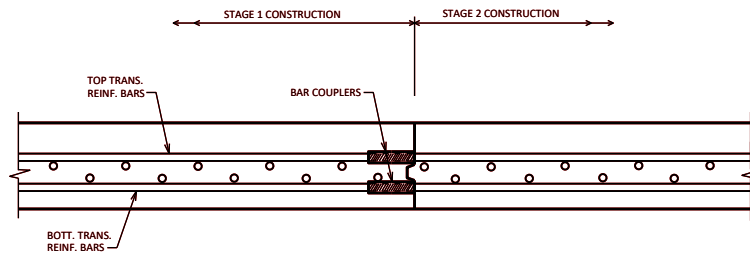
CONCRETE BEARING BLOCK DETAILS



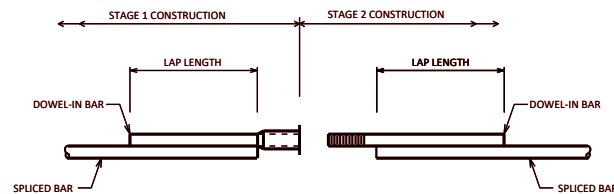
BUREAU OF STRUCTURES

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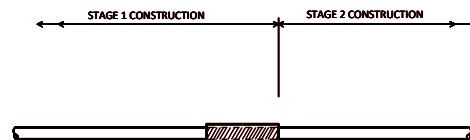
DATE:
1-23



SECTION THRU DECK
ONE-PIECE THREADED COUPLER SHOWN



DOWEL BAR COUPLER
STAGE 2 DOWEL SCREWS INTO
COUPLER PLACED IN STAGE 1



ONE-PIECE THREADED COUPLER

BAR COUPLER ALTERNATIVES

NOTES

FOR DOWEL BAR COUPLERS, ALL DOWEL BARS SHALL BE LAPPED AND TIED TO THE REINFORCEMENT BARS.

DESIGNER NOTES

ON THE PLANS PROVIDE LOCATION, STAGING, SIZE AND QUANTITY REQ'D. DO NOT GIVE SPECIFIC INFORMATION REGARDING THE COUPLER AS THIS IS COVERED BY THE BID ITEM "BAR COUPLERS (SIZE)".

ON THE PLANS SHOW DETAILS SIMILAR TO "SECTION THRU DECK" AND "BAR COUPLER ALTERNATIVES".

AT THE PLAN BILL OF BARS, INDICATE WHICH BARS REQUIRE BAR COUPLERS BY USE OF A SYMBOL. USING THE SAME SYMBOL, ADD A NOTE STATING THAT A BAR COUPLER IS REQUIRED. BAR LENGTHS ARE COMPUTED TO THE C/L OF THE CONSTRUCTION JOINT AND SHALL BE MODIFIED BY THE BAR COUPLER MANUFACTURERS RECOMMENDATIONS. DOWEL BARS ARE NOT TO BE DETAILED, AS THOSE BARS ARE INCLUDED IN THE BAR COUPLER BID ITEM SHOULD THE DOWEL OPTION BE CHOSEN.

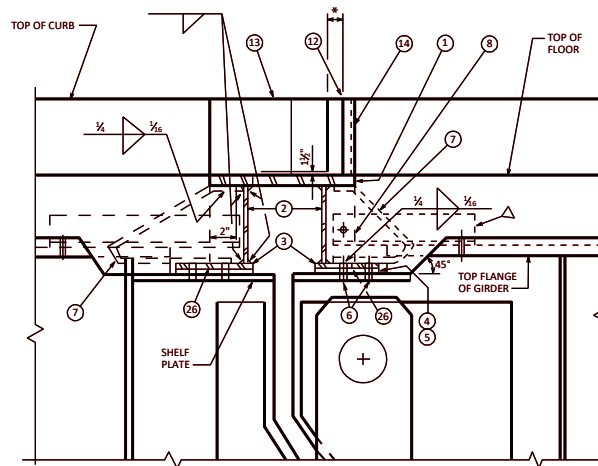
BAR SPLICER (COUPLER) DETAILS AT STAGE CONSTRUCTION



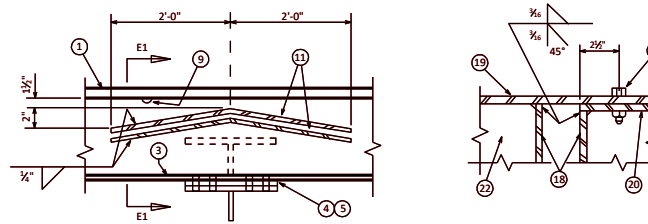
BUREAU OF
STRUCTURES

APPROVED: *Laura Shadewald*

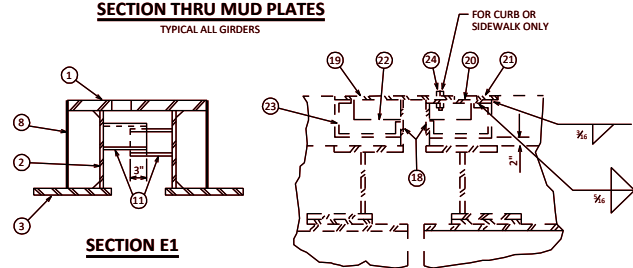
DATE:
7-19



SECTION THRU JOINT
MUD PLATES NOT SHOWN

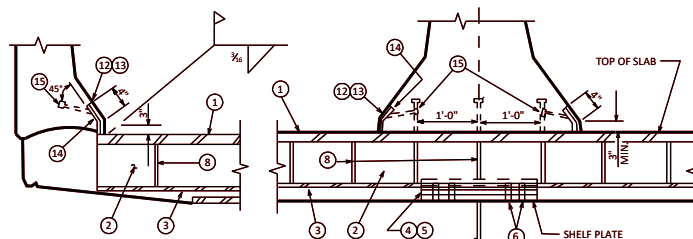


SECTION THRU MUD PLATES
TYPICAL ALL GIRDERS



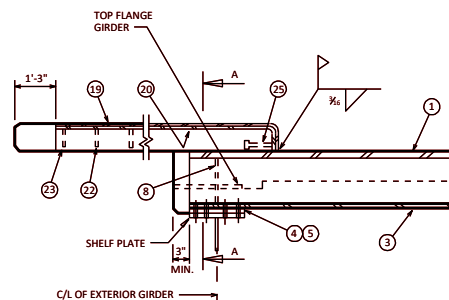
SECTION E1

SECTION A-A

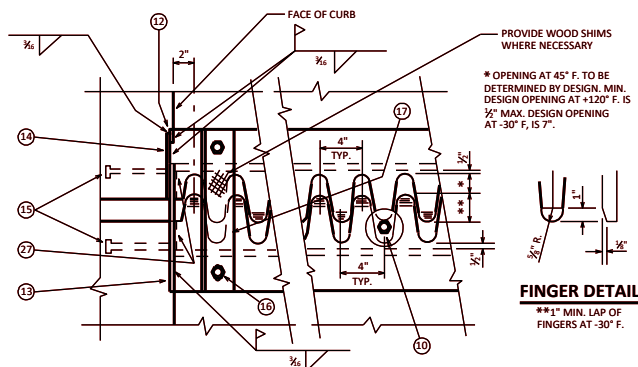


DETAIL AT PARAPET

DETAIL AT MEDIAN

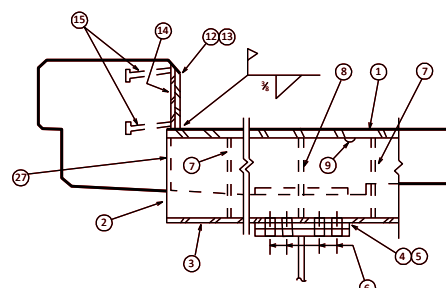


SECTION THRU SIDEWALK



PART PLAN OF FINGER PLATE AT BRUSH CURB
NO SKEW

FINGER DETAIL
**1" MIN. LAP OF FINGERS AT -30° F.



SECTION THRU JOINT AT BRUSH CURB
MUD PLATES NOT SHOWN
ANGLE 3 1/2" X 3 1/2" X 3/16" FIELD DRILL 3/8" DIA. ERECTION BOLT HOLES OR WELD TO STIFFENER OR TOP FLG.

LEGEND

1. FINGER PLATE. SIZE TO BE DETERMINED BY DESIGN.
2. WEB PLATE. SIZE TO BE DETERMINED BY DESIGN.
3. FLANGE PLATE. SIZE TO BE DETERMINED BY DESIGN.
4. BEVELED SHIM PLATE 3/8" THICK. 1/8" DIA. HOLES FOR NO. 6.
5. 3/4" LAMINATED SHIM WITH SLOTTED OPENINGS.
6. 3/4" DIA. ERECTION BOLTS. DRILL HOLES IN SHELF PLATE IN THE FIELD.
7. ANCHOR BAR 3/4" DIA. AT 1'-0" CENTERS. BEND AS SHOWN.
8. STIFFENER BAR 3/4" THICK. 3/4" FILLET WELD ALL AROUND. PLACE AT C/L OF GIRDER AND AT +2'-0" CENTERS BETWEEN GIRDERS.
9. 3/4" VENT HOLES AT 3'-0" CENTERS.
10. 3/4" DIA. ADJUSTING BOLT AT APPROX. 4'-0" CENTERS WITH TWO 3/8" DIA. X 3/4" PLATE WASHERS. ONE ON EACH SIDE OF FINGER PLATE.
11. MUD PLATE 1/2" THICK.
12. 3/8" PLATE. BEND AS SHOWN.
13. 3/8" PLATE. BEND AS SHOWN.
14. 3/8" PLATE. BEND AS SHOWN.
15. 3/8" DIA. STUDS X 6 3/4" LONG. WELD TO PLATES NO. 13 AND NO. 14.
16. 3/8" DIA. BOLT FOR SHIPPING. TACK WELD NUT TO BOTTOM OF PLATE NO. 1.
17. 3" DIA. X 3" DIA. X 3/4" X 5'-0" SPACING. SLOTTED HOLE 3/4" X 2 1/2" IN ONE END OF ANGLE AS SHOWN. FOR BOLT NO. 16.
18. CLOSING PLATE 3/4" CUT AS SHOWN. SEE WELD DETAIL.
19. 3/8" PLATE. BEND AS SHOWN.
20. 3/8" PLATE. BEND AS SHOWN.
21. 3/8" PLATE. BEND AS SHOWN.
22. 3/8" PLATE. WELD ALL AROUND, 3/4" FILLET WELD TO PLATES NO. 18, 19, AND 20.
23. 3/8" DIA. STUDS X 6 3/4" LONG. BEND AFTER WELD.
24. 3/4" DIA. BOLT WITH SQ. NUT. GREASE FOR EASY REMOVAL. 3/4" X 1 1/2" SLOTTED HOLE IN PL. NO. 19. LONG DIMENSION OF HOLE PARALLEL TO C/L OF ROADWAY. TACK WELD NUT TO PLATE NO. 20 + 2'-0" SPA.
25. 3/8" DIA. STUDS X 6 3/4" LONG. WELD TO PLATE NO. 20.
26. FLANGE PLATE. SAME THICKNESS AS PLATE NO. 3 AND SAME WIDTH AS SHELF PLATE. SHOP BUTT WELD TO PLATE NO. 3.
27. 3/4" CLOSING PLATE. WELD TO PLATES NO. 1 AND NO. 2.

NOTES

REMOVE ANGLE NO. 17 AND ADJUSTING BOLT NO. 10 AFTER VERTICAL AND HORIZONTAL ALIGNMENT IS SECURE IN FIELD. FILL HOLES WITH HOT POURED JOINT SEALER.

IN SOME CASES THE GIRDER FLANGES AND WEB PLATES DO NOT HAVE TO BE CUT TO ACCOMMODATE THE FINGER JOINT SECTION, THE SLAB DEPTH MAY BE UTILIZED EFFECTIVELY.

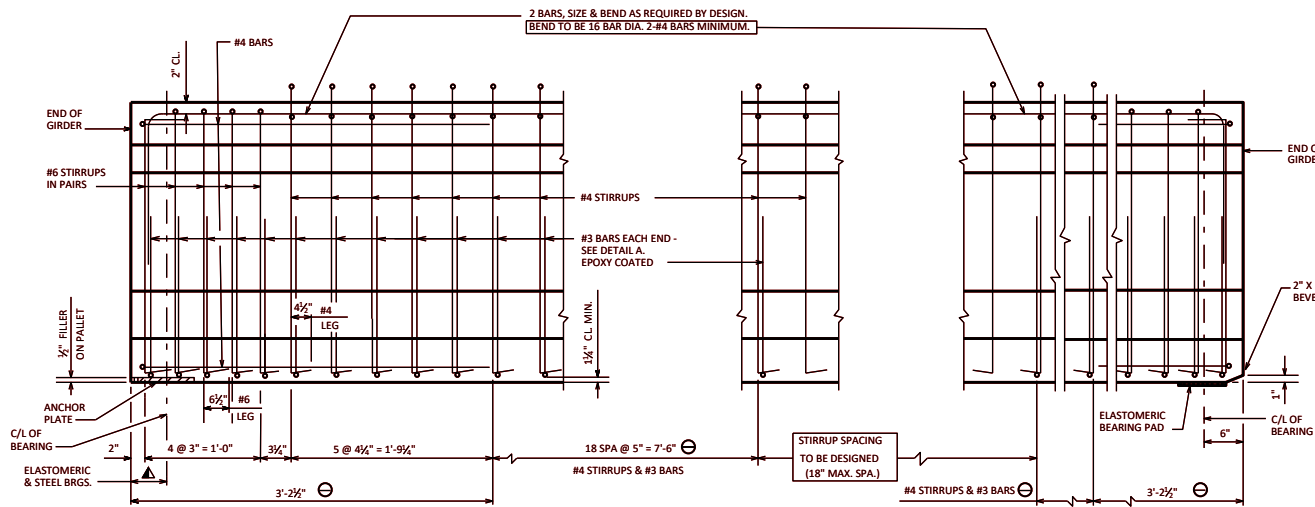
FINGER TYPE EXPANSION JOINT - PLATE GIRDER



BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

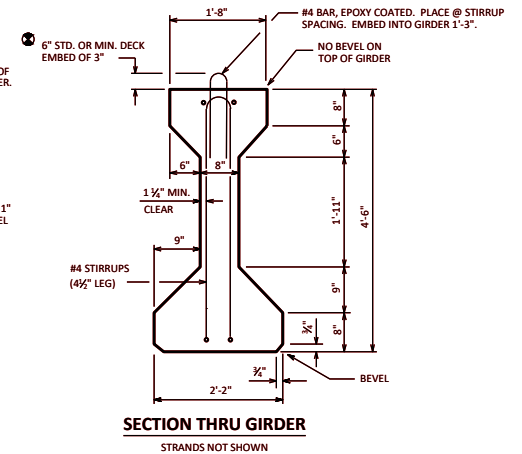
DATE:
7-16



**SUPPORT WITH STEEL
OR ELASTOMERIC BRGS.**

SIDE VIEW OF GIRDER

**SUPPORT WITH
1/2" ELASTOMERIC BRG. PAD**



SECTION THRU GIRDER

STRANDS NOT SHOWN

DESIGNER NOTES

BID ITEM SHALL BE "PRESTRESSED GIRDER TYPE I 54-INCH."

SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. MAXIMUM RELEASE STRENGTH IS 6800 PSI. USE 0.5" DIA. OR 0.6" DIA. STRANDS FOR ALL PATTERNS AS REQUIRED. THE MAX. NUMBER OF DRAPED 0.5" DIA. STRANDS IS 12 AND THE MAX. NUMBER FOR 0.6" DIA. STRANDS IS 10.

REINFORCEMENT IN STANDARD END SECTION OF THE GIRDER IS BASED ON THE STANDARD STRAND PATTERNS LISTED ON STANDARD 40.14 AND THE SPAN LENGTHS SHOWN IN TABLE 40.7-1. USING DIFFERENT STRAND PATTERNS OR LONGER SPANS WILL REQUIRE A COMPLETE DESIGN OF THIS REINFORCEMENT, WHICH REQUIRES PRIOR APPROVAL FROM THE BUREAU OF STRUCTURES.

VARIES FOR ELASTOMERIC BRGS. (STD. 27.07) AND STEEL BRGS. (STD. 27.09)

DETAIL TYPICAL AT EACH END

THE DESIGN ENGINEER DETERMINES THIS VALUE BASED ON 2" MIN. HAUNCH AT EDGE OF GIRDER, X-SLOPE, PROFILE GRADE LINE AND CALCULATED RESIDUAL GIRDER CAMBER, INCLUDING THE CAMBER MULTIPLIER OF 1.4. THIS VALUE CAN VARY AND SHOULD BE GIVEN FOR EACH 1/3 OF THE GIRDER LENGTH. PROVIDE VALUES THAT MAINTAIN 3" MIN. DECK EMBEDMENT AND 2 1/2" CLEAR FROM TOP OF DECK WHILE ACCOUNTING FOR ±1/2" VARIANCE IN ACTUAL CAMBER VERSUS THE CALCULATED RESIDUAL CAMBER.

NOTES

TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY, EXCEPT THE OUTSIDE 2" OF GIRDER, WHICH SHALL RECEIVE A SMOOTH FINISH. AN APPROVED CONCRETE SEALER SHALL BE APPLIED TO ALL SMOOTH SURFACES INCLUDING THE OUTSIDE 2" OF THE TOP FLANGE.

DO NOT APPLY CONCRETE SEALER OR EPOXY TO SURFACES RECEIVING APPLICATION OF CONCRETE STAINING.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS.

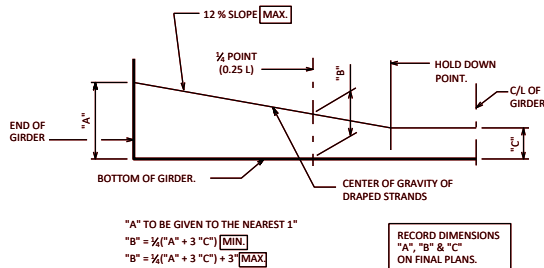
STRANDS SHALL BE FLUSH WITH END OF GIRDER. FOR GIRDER ENDS EMBEDDED COMPLETELY IN CONCRETE, END OF STRANDS SHALL BE COATED WITH NON-BITUMINOUS JOINT SEALER. FOR GIRDER ENDS THAT ARE FINALLY EXPOSED, COAT THE GIRDER ENDS, EXPOSED STRAND ENDS AND ALL NON-BONDING SURFACES WITHIN 2 FEET OF THE GIRDER ENDS WITH A NON-PIGMENTED EPOXY CONFORMING TO AASHTO M-235 TYPE III, GRADE 2, CLASS B OR C. THE EPOXY SHALL BE APPLIED AT LEAST 3 DAYS AFTER MOIST CURING HAS CEASED AND PRIOR TO THE APPLICATION OF THE SEALER.

ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.

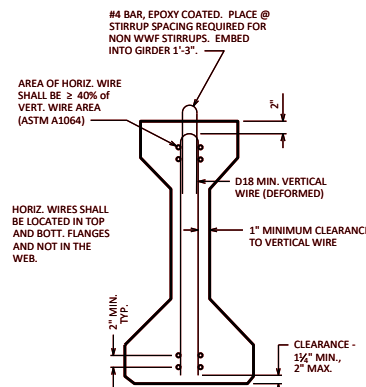
SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT.

AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) ASTM A1064 MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DEVELOPMENT SECTION.

PRESTRESSING STRANDS SHALL BE (DIA.)-7-WIRE LOW RELAXATION STRANDS WITH AN ULTIMATE STRENGTH OF 270,000 PSI.

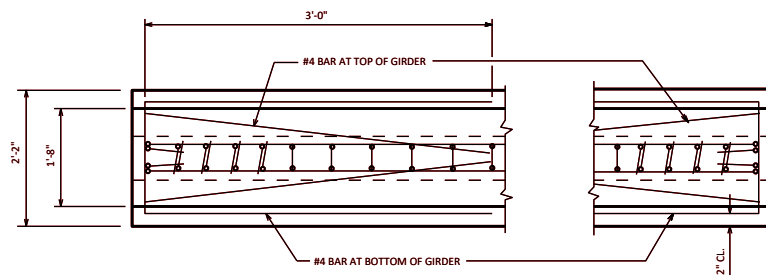


LOCATION OF DRAPED STRANDS

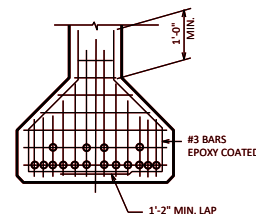


SECTION THRU GIRDER

SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS
ASTM A1064 (FY = 70 KSI)



PLAN VIEW



DETAIL A

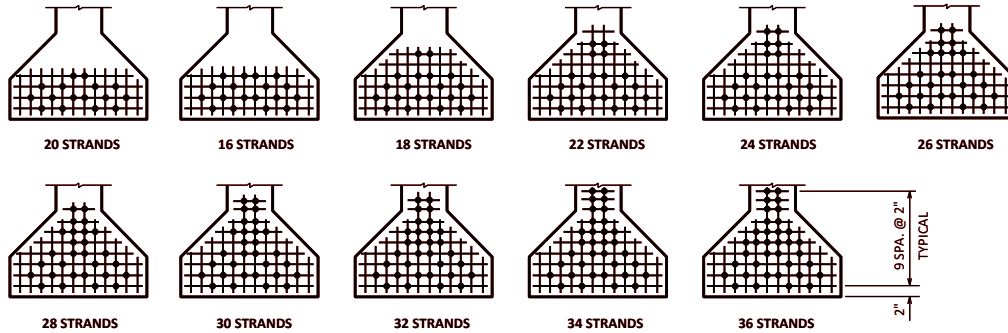
54" PRESTRESSED GIRDER DETAILS



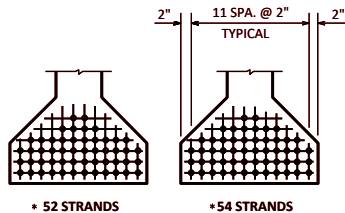
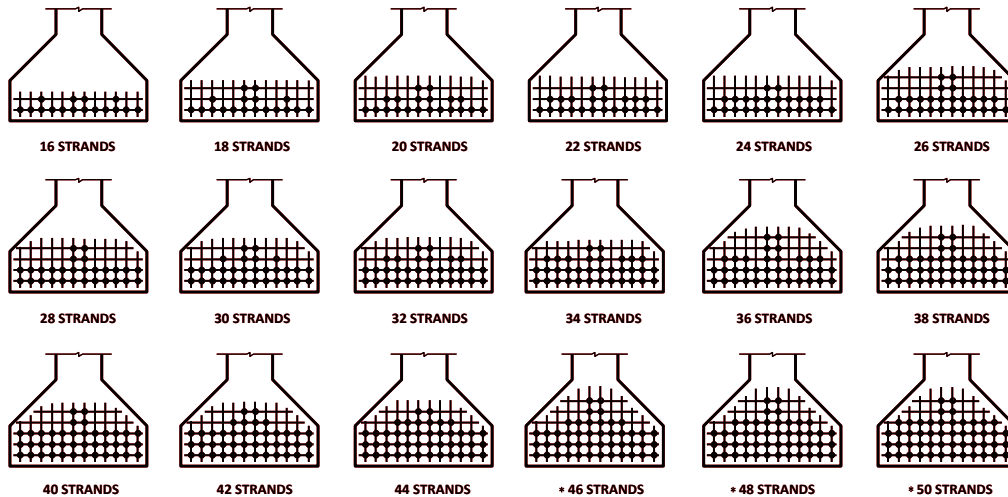
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
7-23



**STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY
TO AVOID DRAPING OF 0.5" DIA. AND 0.6" DIA. STRANDS**



ARRANGEMENT AT C/L SPAN - FOR GIRDERS WITH DRAPED 0.5" DIA. AND 0.6" DIA. STRANDS

* 0.5" DIA. STRANDS ONLY

54" GIRDER

$$A = 789 \text{ SQ. IN.}$$

$$I^2 = 330.46 \text{ IN.}^2$$

$$Y_T = 29.27 \text{ IN.}$$

$$Y_B = -24.73 \text{ IN.}$$

$$I = 260,730 \text{ IN.}^4$$

$$S_T = 8,908 \text{ IN.}^3$$

$$S_B = -10,543 \text{ IN.}^3$$

$$\text{WT.} = 822 \text{ \#/FT.}$$

PRE-TENSION

$$f_s = 270,000 \text{ P.S.I.}$$

$$f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I.}$$

FOR LOW RELAXATION STRANDS.

$$\text{PI PER 0.5" DIA. STRAND} = 0.1531 \times 202,500 = 31.00 \text{ KIPS}$$

$$\text{PI PER 0.6" DIA. STRAND} = 0.217 \times 202,500 = 43.94 \text{ KIPS}$$

(5)

$$f_b (\text{INIT.}) = \frac{(4)}{(3)} \text{ (K/SQ. IN.)}$$

$$\frac{Y_B}{I^2} = \frac{-24.73}{330.46} = -0.07484 \text{ IN./IN.}^2$$

(COMPRESSION IS POSITIVE)

N NO. STRANDS	(1) e _s (INCHES)	(2) (1+ $\frac{e_s Y_B}{I^2}$)	(3) (A/(2)) (SQ. IN.)	(4) P(INIT.) = A _s f _s 0.5" DIA. STRANDS (KIPS)	(4) P(INIT.) = A _s f _s 0.6" DIA. STRANDS (KIPS)	(5) f _b (INIT.)=(4)/(3) 0.5" DIA. STRANDS (K/SQ. IN.)	(5) f _b (INIT.)=(4)/(3) 0.6" DIA. STRANDS (K/SQ. IN.)
STANDARD PATTERNS FOR UNDRAPED STRANDS							
16	-20.23	2.514	313.84	496	703	1.580	2.240
18	-19.84	2.485	317.51	558	791	1.757	2.491
20	-19.13	2.432	324.42	620	879	1.911	2.709
22	-18.37	2.375	332.21	682	967	2.053	2.911
24	-17.55	2.313	341.12	744	1055	2.181	3.093
26	-17.18	2.286	345.14	806	1143	2.335	3.312
28	-17.02	2.274	346.97	868	1230	2.502	3.545
30	-16.33	2.222	355.09	930	1318	2.619	3.712
32	-16.23	2.215	356.21	992	1406	2.785	3.947
34	-15.54	2.163	364.77	1054	1494	2.889	4.096
36	-15.50	2.160	365.28	1116	1582	3.055	4.331
STANDARD PATTERNS FOR DRAPED STRANDS							
16	-22.23	2.664	296.17	496	703	1.675	2.374
18	-21.84	2.634	299.54	558	791	1.863	2.641
20	-21.73	2.626	300.46	620	879	2.064	2.926
22	-21.64	2.619	301.26	682	967	2.264	3.210
24	-21.57	2.614	301.84	744	1055	2.465	3.495
26	-21.19	2.586	305.10	806	1143	2.642	3.746
28	-21.16	2.584	305.34	868	1230	2.843	4.028
30	-20.99	2.571	306.88	930	1318	3.031	4.295
32	-20.85	2.560	308.20	992	1406	3.219	4.562
34	-20.73	2.551	309.29	1054	1494	3.408	4.830
36	-20.39	2.526	312.35	1116	1582	3.573	5.065
38	-20.31	2.520	313.10	1178	1670	3.762	5.334
40	-20.23	2.514	313.84	1240	1758	3.951	5.602
42	-20.06	2.501	315.47	1302	1846	4.127	5.852
44	-19.91	2.490	316.87	1364	1933	4.305	6.100
46	-19.60	2.467	319.82	1426		4.459	
48	-19.48	2.458	320.99	1488		4.636	
50	-19.37	2.450	322.04	1550		4.813	
52	-19.19	2.436	323.89	1612		4.977	
54	-19.03	2.424	325.50	1674		5.143	

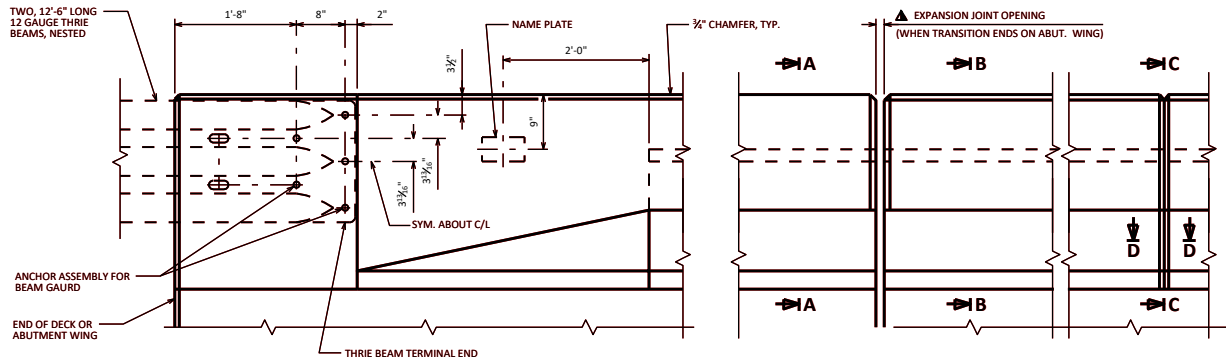
54" PRETENSIONED GIRDER DESIGN DATA



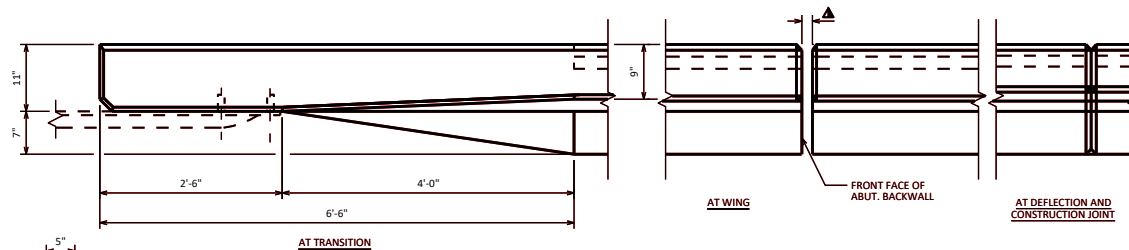
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

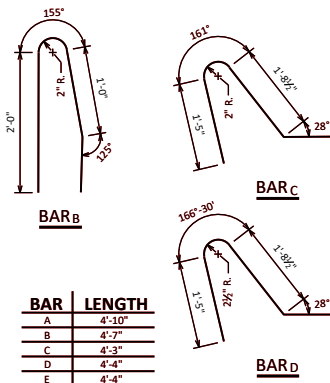
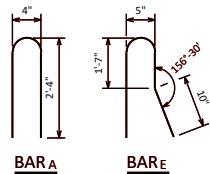
DATE:
7-16



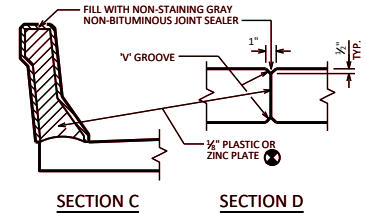
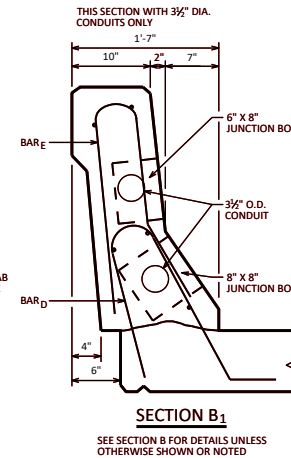
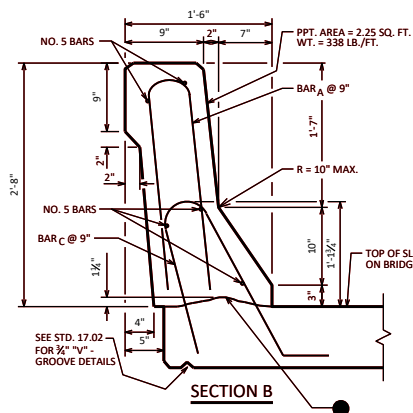
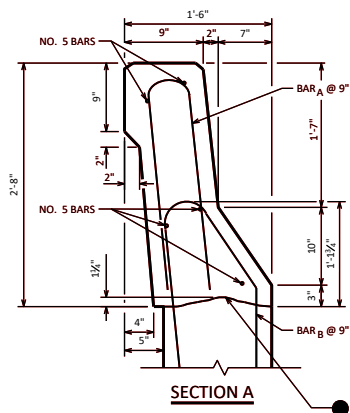
ELEVATION OF PARAPET



PART PLAN ON PARAPET



BAR	LENGTH
A	4'-10"
B	4'-7"
C	4'-3"
D	4'-4"
E	4'-4"



NOTES

ALL SLOPED FACE PARAPET "B" REINFORCEMENT ARE NO. 4 BARS UNLESS OTHERWISE SHOWN.

- 1 PLATE REQUIRED WHEN DEFLECTION JOINTS ARE REQUIRED. IF CONSTRUCTION JOINTS IN PARAPETS ARE USED, PLATE SEPARATORS SHALL BE OMITTED. DEFLECTION JOINTS ARE REQUIRED ON SLAB SPAN STRUCTURES ONLY.

OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED. RUN BAR REINFORCEMENT THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 2'-11". MIN. JOINT SPACING OF 80'-0". DEFINE CONST. JOINT WITH A 1" V-GROOVE.

- 2 CONST. JOINT - STRIKE OFF AS SHOWN & FINISH WITH A WOODEN TROWEL.

	PARAPET
AREA	2.25 SF
WEIGHT	338 LB/FT

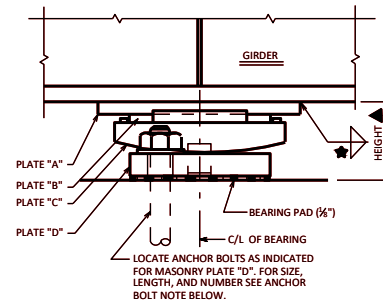
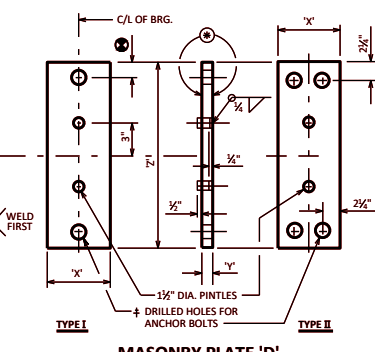
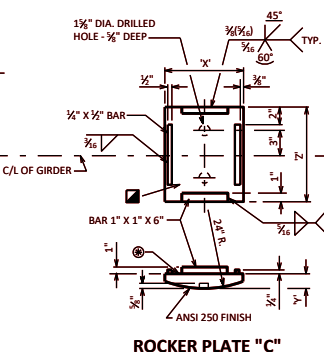
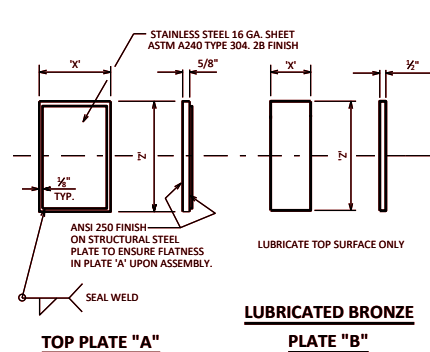
SLOPED FACE PARAPET 'B'



BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE:
7-23



NOTES

FOR BEARING NOTES, CLEARANCE DIAGRAM, AND WHEN TO BEVEL ROCKER PLATES, SEE STANDARD 27.02.

- FINISH THESE SURFACES ANSI 250 IF DIMENSION "Y" IS GREATER THAN 2".

ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AS REQUIRED BY ASTM DESIGNATION A153, CLASS "C". PLATE "C" & "D" SHALL BE GALVANIZED. FOR UNPAINTED STRUCTURES PLATE "C" & "D" SHALL BE SHOP PAINTED AFTER GALVANIZING. PLATE "A" SHALL BE SHOP PAINTED. USE WELDABLE PRIMER ON PLATE "A".

AT ABUTMENTS WHEN THE "X" DIMENSION OF PLATE "A" EXCEEDS 11" INCREASE STANDARD DISTANCE FROM C/L BRG. TO END OF GIRDER.

ALL MATERIAL INCLUDING SHIMS, BUT EXCLUDING STAINLESS STEEL SHEET, BRONZE PLATE, PINTLES, ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A709 GRADE 50W.

- WELD SIZE, REFER TO STANDARD 24.2.

- ADJUST HEIGHT IF TAPERED BEARINGS ARE REQUIRED.

FABRICATOR MAY INCREASE PLATE "A" OR PLATE "D" THICKNESS AS AN ALTERNATE TO SHIMS.

- DIMENSION IS 2" WHEN 1 1/2" DIA. ANCHOR BOLTS ARE USED AND 2 1/2" WHEN 1 1/2" DIA. ANCHOR BOLTS ARE USED.

FOR NEW OR REPLACEMENT STEEL BEARINGS, INCLUDING STEEL BEARINGS USED FOR BRIDGE WIDENINGS, USE TYPE "A-T" AS SHOWN ON STANDARD 27.08. THIS STANDARD IS FOR INFORMATIONAL PURPOSES ONLY.

10" BEARING

CAP. KIPS	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Z		X	Z		X	Y	Z	X	Y	Z	
75	9"	10"	5"	10"	7"	1 1/4"	1'-0 1/4"	8"	1 1/2"	1'-8"			.354
105	11"	10"	7"	10"	9"	1 1/4"	1'-0 1/4"	8"	1 1/2"	1'-8"			.375
135	1'-1"	10"	9"	10"	11"	1 1/4"	1'-0 1/4"	8"	1 1/2"	1'-8"			.396
160	1'-3"	10"	11"	10"	1'-1"	2 3/4"	1'-0 1/4"	9"	1 1/2"	1'-8"			.432
190	1'-5"	10"	1'-1"	10"	1'-3"	2 3/4"	1'-0 1/4"	10"	1 1/2"	1'-8"			.495
220	1'-7"	10"	1'-3"	10"	1'-5"	3 3/4"	1'-0 1/4"	1'-0"	2"	1'-8"			.599
250	1'-9"	10"	1'-5"	10"	1'-7"	3 3/4"	1'-0 1/4"	1'-1"	2 3/4"	1'-8"			.630
280	1'-11"	10"	1'-7"	10"	1'-9"	4 3/4"	1'-0 1/4"	1'-3"	2 3/4"	1'-8"			.755
310	2'-1"	10"	1'-9"	10"	1'-11"	4 3/4"	1'-0 1/4"	1'-4"	2 3/4"	1'-8"			.755

12" BEARING

CAP. KIPS	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Z		X	Z		X	Y	Z	X	Y	Z	
90	9"	1'-0"	5"	1'-0"	7"	1 1/4"	1'-2 1/4"	8"	1 1/2"	1'-10"			.354
125	11"	1'-0"	7"	1'-0"	9"	1 1/4"	1'-2 1/4"	8"	1 1/2"	1'-10"			.375
160	1'-1"	1'-0"	9"	1'-0"	11"	1 1/4"	1'-2 1/4"	8"	1 1/2"	1'-10"			.396
195	1'-3"	1'-0"	11"	1'-0"	1'-1"	2 3/4"	1'-2 1/4"	9"	1 1/2"	1'-10"			.432
230	1'-5"	1'-0"	1'-1"	1'-0"	1'-3"	2 3/4"	1'-2 1/4"	11"	2"	1'-10"			.516
265	1'-7"	1'-0"	1'-3"	1'-0"	1'-5"	3 3/4"	1'-2 1/4"	1'-1"	2 3/4"	1'-10"			.630
300	1'-9"	1'-0"	1'-5"	1'-0"	1'-7"	3 3/4"	1'-2 1/4"	1'-2"	2 3/4"	1'-10"			.630
335	1'-11"	1'-0"	1'-7"	1'-0"	1'-9"	4 3/4"	1'-2 1/4"	1'-4"	2 3/4"	1'-10"			.755
370	2'-1"	1'-0"	1'-9"	1'-0"	1'-11"	4 3/4"	1'-2 1/4"	1'-5"	2 3/4"	1'-11"			.755

14" BEARING

CAP. KIPS	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Z		X	Z		X	Y	Z	X	Y	Z	
105	9"	1'-2"	5"	1'-2"	7"	1 1/4"	1'-4 1/4"	8"	1 1/2"	2'-0"			.354
145	11"	1'-2"	7"	1'-2"	9"	1 1/4"	1'-4 1/4"	8"	1 1/2"	2'-0"			.375
185	1'-1"	1'-2"	9"	1'-2"	11"	1 1/4"	1'-4 1/4"	8"	1 1/2"	2'-0"			.396
225	1'-3"	1'-2"	11"	1'-2"	1'-1"	2 3/4"	1'-4 1/4"	10"	1 1/2"	2'-0"			.453
270	1'-5"	1'-2"	1'-1"	1'-2"	1'-3"	2 3/4"	1'-4 1/4"	1'-0"	2"	2'-0"			.516
310	1'-7"	1'-2"	1'-3"	1'-2"	1'-5"	3 3/4"	1'-4 1/4"	1'-1"	2 3/4"	2'-0"			.630
350	1'-9"	1'-2"	1'-5"	1'-2"	1'-7"	3 3/4"	1'-4 1/4"	1'-3"	2 3/4"	2'-1"			.672
390	1'-11"	1'-2"	1'-7"	1'-2"	1'-9"	4 3/4"	1'-4 1/4"	1'-4"	2 3/4"	2'-1"			.755
435	2'-1"	1'-2"	1'-9"	1'-2"	1'-11"	4 3/4"	1'-4 1/4"	1'-6"	3 3/4"	2'-1"			.838

16" BEARING

CAP. KIPS	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Z		X	Z		X	Y	Z	X	Y	Z	
120	9"	1'-4"	5"	1'-4"	7"	1 1/4"	1'-6 1/4"	8"	1 1/2"	2'-2"			.354
165	11"	1'-4"	7"	1'-4"	9"	1 1/4"	1'-6 1/4"	8"	1 1/2"	2'-2"			.375
215	1'-1"	1'-4"	9"	1'-4"	11"	1 1/4"	1'-6 1/4"	9"	1 1/2"	2'-2"			.396
260	1'-3"	1'-4"	11"	1'-4"	1'-1"	2 3/4"	1'-6 1/4"	11"	2"	2'-2"			.474
310	1'-5"	1'-4"	1'-1"	1'-4"	1'-3"	2 3/4"	1'-6 1/4"	1'-0"	2"	2'-2"			.516
355	1'-7"	1'-4"	1'-3"	1'-4"	1'-5"	3 3/4"	1'-6 1/4"	1'-2"	2 3/4"	2'-3"			.630
400	1'-9"	1'-4"	1'-5"	1'-4"	1'-7"	3 3/4"	1'-6 1/4"	1'-3"	2 3/4"	2'-3"			.672
450	1'-11"	1'-4"	1'-7"	1'-4"	1'-9"	4 3/4"	1'-6 1/4"	1'-5"	2 3/4"	2'-3"			.755
500	2'-1"	1'-4"	1'-9"	1'-4"	1'-11"	4 3/4"	1'-6 1/4"	1'-7"	3 3/4"	2'-3"			.838

18" BEARING

CAP. KIPS	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Z		X	Z		X	Y	Z	X	Y	Z	
135	9"	1'-6"	5"	1'-6"	7"	1 1/4"	1'-8 1/4"	8"	1 1/2"	2'-4"			.354
185	11"	1'-6"	7"	1'-6"	9"	1 1/4"	1'-8 1/4"	8"	1 1/2"	2'-4"			.375
240	1'-1"	1'-6"	9"	1'-6"	11"	1 1/4"	1'-8 1/4"	9"	1 1/2"	2'-4"			.396
295	1'-3"	1'-6"	11"	1'-6"	1'-1"	2 3/4"	1'-8 1/4"	11"	2"	2'-4"			.474
350	1'-5"	1'-6"	1'-1"	1'-6"	1'-3"	2 3/4"	1'-8 1/4"	1'-1"	2 3/4"	2'-5"			.547
400	1'-7"	1'-6"	1'-3"	1'-6"	1'-5"	3 3/4"	1'-8 1/4"	1'-2"	2 3/4"	2'-5"			.630
455	1'-9"	1'-6"	1'-5"	1'-6"	1'-7"	3 3/4"	1'-8 1/4"	1'-4"	2 3/4"	2'-5"			.672
505	1'-11"	1'-6"	1'-7"	1'-6"	1'-9"	4 3/4"	1'-8 1/4"	1'-6"	3 3/4"	2'-5"			.838
560	2'-1"	1'-6"	1'-9"	1'-6"	1'-11"	4 3/4"	1'-8 1/4"	1'-8"	3 3/4"	2'-5"			.838

20" BEARING

CAP. KIPS	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Z		X	Z		X	Y	Z	X	Y	Z	
150	9"	1'-8"	5"	1'-8"	7"	1 1/4"	1'-10 1/4"	8"	1 1/2"	2'-6"			.354
210	11"	1'-8"	7"	1'-8"	9"	1 1/4"	1'-10 1/4"	8"	1 1/2"	2'-6"			.375
270	1'-1"	1'-8"	9"	1'-8"	11"	1 1/4"	1'-10 1/4"	10"	1 1/2"	2'-6"			.417
325	1'-3"	1'-8"	11"	1'-8"	1'-1"	2 3/4"	1'-10 1/4"	11"	2"	2'-6"			.474
385	1'-5"	1'-8"	1'-1"	1'-8"	1'-3"	2 3/4"	1'-10 1/4"	1'-1"	2 3/4"	2'-7"			.547
445	1'-7"	1'-8"	1'-3"	1'-8"	1'-5"	3 3/4"	1'-10 1/4"	1'-3"	2 3/4"	2'-7"			.672
505	1'-9"	1'-8"	1'-5"	1'-8"	1'-7"	3 3/4"	1'-10 1/4"	1'-5"	2 3/4"	2'-7"			.672
565	1'-11"	1'-8"	1'-7"	1'-8"	1'-9"	4 3/4"	1'-10 1/4"	1'-7"	3 3/4"	2'-7"			.838
625	2'-1"	1'-8"	1'-9"	1'-8"	1'-11"	4 3/4"	1'-10 1/4"	1'-9"	3 3/4"	2'-7"			.838

ANCHOR BOLT NOTES:

FOR SPAN LENGTHS UP TO 100'-0", USE A TYPE I MASONRY PLATE "D" WITH (2) 1 1/2" DIA. X 1'-5" LONG ANCHOR BOLTS.

FOR SPAN LENGTHS FROM 100'-0" TO 150'-0", USE A TYPE I MASONRY PLATE "D" WITH (2) 1 1/2" DIA. X 1'-10" LONG ANCHOR BOLTS.

FOR SPAN LENGTHS GREATER THAN 150'-0", USE A TYPE II MASONRY PLATE "D" WITH (4) 1 1/2" DIA. X 1'-10" LONG ANCHOR BOLTS.

- DRILLED HOLES FOR ANCHOR BOLTS IN MASONRY PLATE "D" SHALL HAVE A DIAMETER 3/8" LARGER THAN ANCHOR BOLT.

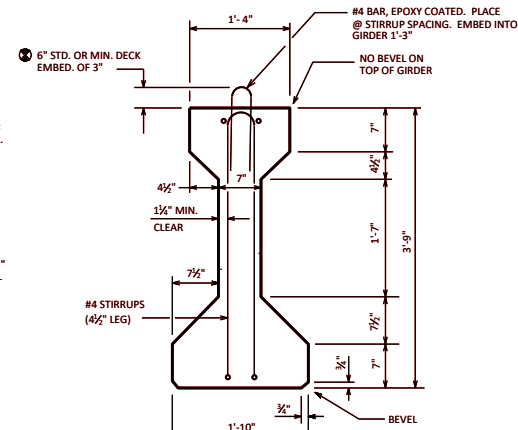
EXPANSION BEARING DETAILS TYPE 'A' - STEEL GIRDERS



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

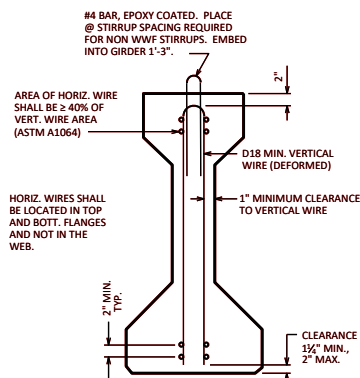
DATE:
7-16



SECTION THRU GIRDER
STRANDS NOT SHOWN

SIDE VIEW OF GIRDER

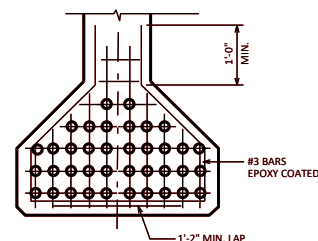
SUPPORT WITH
1/2" ELASTOMERIC BRG. PAD



SECTION THRU GIRDER

SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS
ASTM A1064 (FY = 70 KSI)

LOCATION OF DRAPED STRANDS



PLAN VIEW

DETAIL A

DESIGNER NOTES

BID ITEM SHALL BE "PRESTRESSED GIRDER TYPE I 45-INCH."

SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. MAXIMUM RELEASE STRENGTH IS 6800 PSI. USE 0.5" OR 0.6" DIA. STRANDS FOR THE DRAPED PATTERN AS REQUIRED. THE MAX. NUMBER OF DRAPED 0.5" DIA. STRANDS IS 10 AND THE MAX. NUMBER FOR 0.6" DIA. STRANDS IS 8. FOR THE STRAIGHT PATTERN USE ONLY 0.6" DIA. STRANDS.

REINFORCEMENT IN STANDARD END SECTION OF THE GIRDER IS BASED ON THE STANDARD STRAND PATTERNS LISTED ON STANDARD 40.18 AND THE SPAN LENGTHS SHOWN IN TABLE 40.7-1. USING DIFFERENT STRAND PATTERNS OR LONGER SPANS WILL REQUIRE A COMPLETE DESIGN OF THIS REINFORCEMENT, WHICH REQUIRES PRIOR APPROVAL FROM THE BUREAU OF STRUCTURES.

- VARIES FOR ELASTOMERIC BRGS. (STD. 27.07) AND STEEL BRGS. (STD. 27.09)
- DETAIL TYPICAL AT EACH END
- THE DESIGN ENGINEER DETERMINES THIS VALUE BASED ON 2" MIN. HAUNCH AT EDGE OF GIRDER, X-SLOPE, PROFILE GRADE LINE AND CALCULATED RESIDUAL GIRDER CAMBER, INCLUDING THE CAMBER MULTIPLIER OF 1.4. THIS VALUE CAN VARY AND SHOULD BE GIVEN FOR EACH 1/2 OF THE GIRDER LENGTH. PROVIDE VALUES THAT MAINTAIN 3" MIN. DECK EMBEDMENT AND 2 1/2" CLEAR FROM TOP OF DECK WHILE ACCOUNTING FOR ± 1/4" VARIANCE IN ACTUAL CAMBER VERSUS THE CALCULATED RESIDUAL CAMBER.

NOTES

TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY, EXCEPT THE OUTSIDE 2" OF GIRDER, WHICH SHALL RECEIVE A SMOOTH FINISH. AN APPROVED CONCRETE SEALER SHALL BE APPLIED TO ALL SMOOTH SURFACES INCLUDING THE OUTSIDE 2" OF THE TOP FLANGE.

DO NOT APPLY CONCRETE SEALER OR EPOXY TO SURFACES RECEIVING APPLICATION OF CONCRETE STAINING.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. FOR GIRDER ENDS EMBEDDED COMPLETELY IN CONCRETE, END

OF STRANDS SHALL BE COATED WITH NON-BITUMINOUS JOINT SEALER. FOR GIRDER ENDS THAT ARE FINALLY EXPOSED, COAT THE GIRDER ENDS, EXPOSED STRAND ENDS AND ALL NON-BONDING SURFACES WITHIN 2 FEET OF THE GIRDER ENDS WITH A NON-PIGMENTED EPOXY CONFORMING TO AASHTO M-235 TYPE III, GRADE 2, CLASS B OR C. THE EPOXY SHALL BE APPLIED AT LEAST 3 DAYS AFTER MOIST CURING HAS CEASED AND PRIOR TO THE APPLICATION OF THE SEALER.

ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.

SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT.

AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) ASTM A1064 MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DEVELOPMENT SECTION.

PRESTRESSING STRANDS SHALL BE (DIA.)-7-WIRE LOW-RELAXATION STRANDS WITH AN ULTIMATE STRENGTH OF 270,000 PSI.

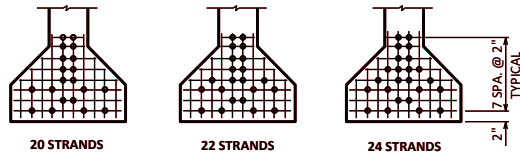
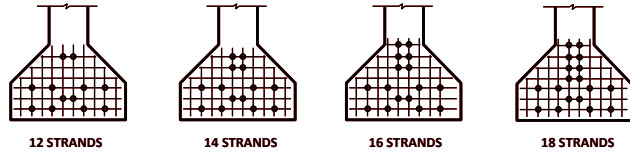
45" PRESTRESSED GIRDER DETAILS



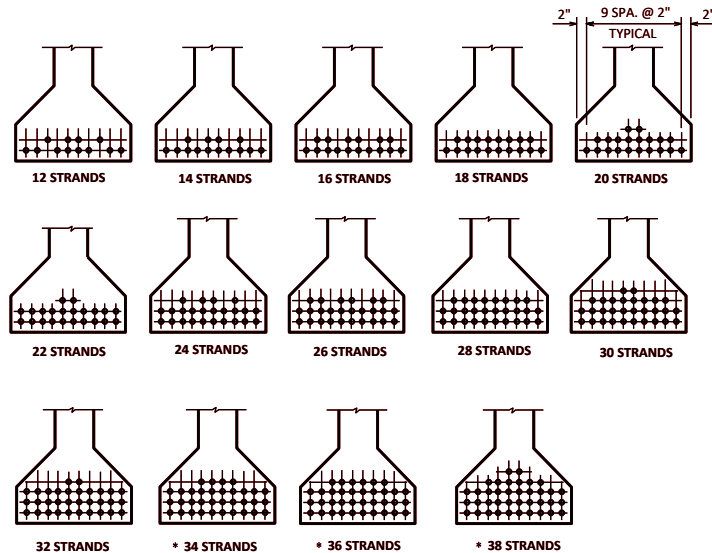
BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE: 7-23



**STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY
TO AVOID DRAPING OF 0.6" DIA. STRANDS**



ARRANGEMENT AT C/L SPAN - FOR GIRDERS WITH DRAPED 0.5" DIA. AND 0.6" DIA. STRANDS

* 0.5" DIA. STRANDS ONLY

45" GIRDER

$$A = 560 \text{ SQ. IN.}$$

$$I^2 = 223.91 \text{ IN.}^2$$

$$Y_T = 24.73 \text{ IN.}$$

$$Y_B = -20.27 \text{ IN.}$$

$$I = 125,390 \text{ IN.}^4$$

$$S_T = 5,070 \text{ IN.}^3$$

$$S_B = -6,186 \text{ IN.}^3$$

$$\text{WT.} = 583 \text{ \#/FT.}$$

PRE-TENSION

$$f_s = 270,000 \text{ P.S.I.}$$

$$f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I.}$$

FOR LOW RELAXATION STRANDS.

$$\text{PI PER 0.5" DIA. STRAND} = 0.1531 \times 202,500 = 31.00 \text{ KIPS}$$

$$\text{PI PER 0.6" DIA. STRAND} = 0.217 \times 202,500 = 43.94 \text{ KIPS}$$

$$\frac{Y_B}{I^2} = \frac{-20.27}{223.91} = -0.09053 \text{ IN./IN.}^2$$

(COMPRESSION IS POSITIVE)

N NO. STRANDS	(1) e_s (INCHES)	(2) $(1 + \frac{e_s Y_B}{I^2})$	(3) $(A/(2))$ (SQ. IN.)	(4) $P(\text{INIT.}) = A_s f_s$ 0.5" DIA. STRANDS (KIPS)	(4) $P(\text{INIT.}) = A_s f_s$ 0.6" DIA. STRANDS (KIPS)	(5) $f_b (\text{INIT.}) = (4)/(3)$ 0.5" DIA. STRANDS (K/SQ.IN.)	(5) $f_b (\text{INIT.}) = (4)/(3)$ 0.6" DIA. STRANDS (K/SQ.IN.)
STANDARD PATTERNS FOR UNDRAPED STRANDS							
12	-14.94	2.352	238.10		527		2.213
14	-14.27	2.292	244.33		615		2.517
16	-13.27	2.201	254.43		703		2.763
18	-13.15	2.190	255.71		791		3.093
20	-12.27	2.111	265.28		879		3.313
22	-12.27	2.111	265.28		967		3.645
24	-12.10	2.095	267.30		1055		3.947
STANDARD PATTERNS FOR DRAPED STRANDS							
12	-17.60	2.593	215.97	372	527	1.722	2.440
14	-17.70	2.602	215.22	434	615	2.017	2.858
16	-17.52	2.586	216.55	496	703	2.290	3.246
18	-17.38	2.573	217.64	558	791	2.564	3.634
20	-17.07	2.545	220.04	620	879	2.818	3.995
22	-17.01	2.540	220.47	682	967	3.093	4.386
24	-16.77	2.518	222.40	744	1055	3.345	4.744
26	-16.58	2.501	223.91	806	1143	3.600	5.105
28	-16.41	2.486	225.26	868	1230	3.853	5.460
30	-16.13	2.460	227.64	930	1318	4.085	5.790
32	-16.02	2.450	228.57	992	1406	4.340	6.151
34	-15.80	2.430	230.45	1054		4.574	
36	-15.60	2.412	232.17	1116		4.807	
38	-15.32	2.387	234.60	1178		5.021	

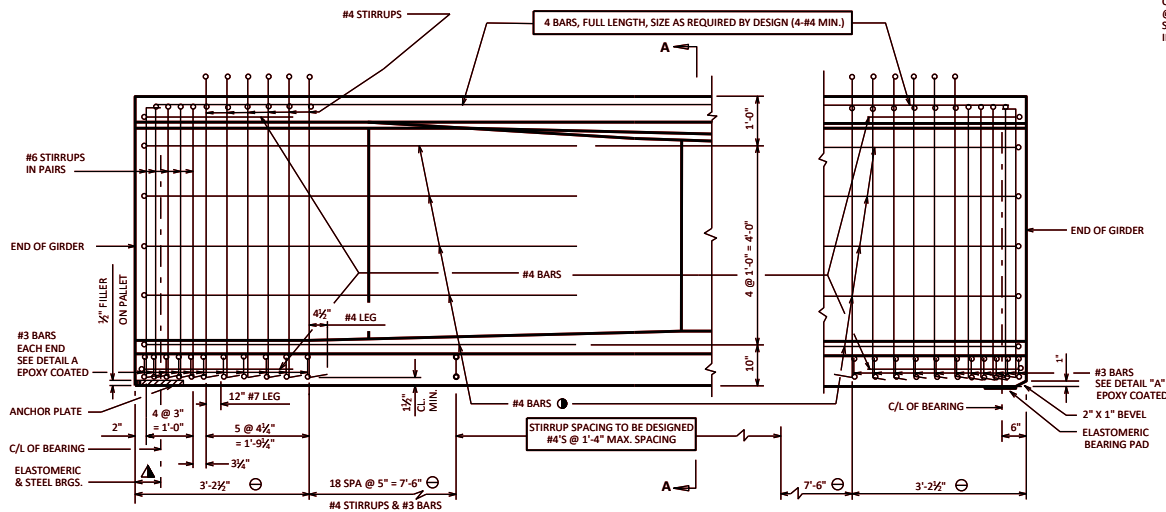
45" PRESTRESSED GIRDER DESIGN DATA



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

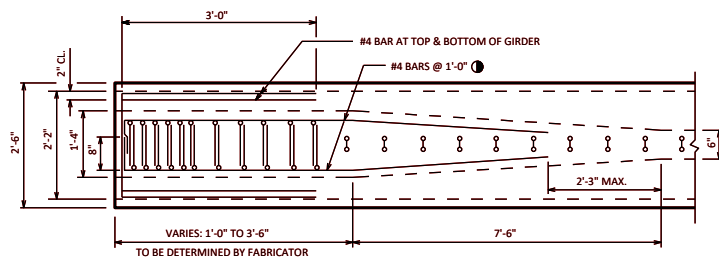
DATE:
7-16



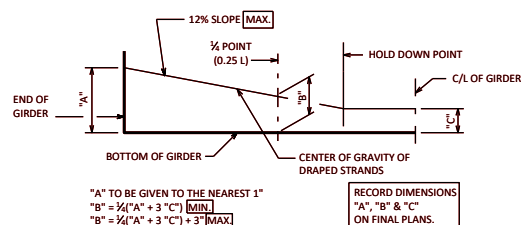
**SUPPORT WITH STEEL
OR ELASTOMERIC BRGS.**

**SUPPORT WITH
1/2" ELASTOMERIC BEARING PAD**

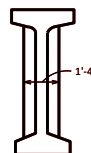
SIDE VIEW OF GIRDER



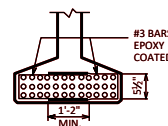
PLAN VIEW



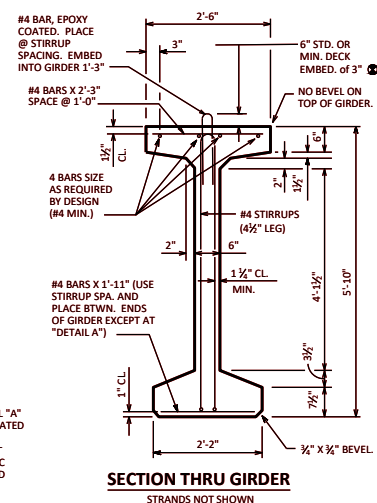
LOCATION OF DRAPED STRANDS



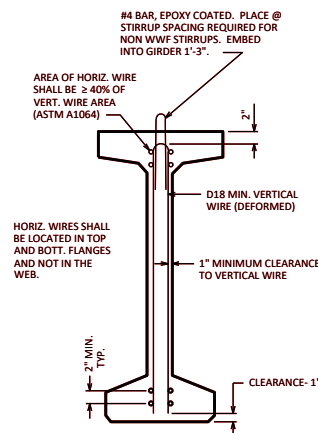
SECTION A-A



DETAIL A



SECTION THRU GIRDER
STRANDS NOT SHOWN



SECTION THRU GIRDER
SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS
ASTM A1064 (FY = 70 KSI)

DESIGNER NOTES

BID ITEM SHALL BE "PRESTRESSED GIRDER TYPE I 70-INCH."

SHOW ONLY ONE STRAND SIZE ON THE PLANS.

GIRDER LENGTHS IN EXCESS OF 140 FEET MAY BE CONTROLLED BY TRANSPORTATION LIMITATIONS AND REQUIRE APPROVAL BY THE PRESTRESS GIRDER MANUFACTURERS AND CONCURRENCE BY THE STRUCTURES DEVELOPMENT SECTION.

SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. MAXIMUM RELEASE STRENGTH IS 6800 PSI. USE 0.5" OR 0.6" DIA. STRANDS FOR ALL PATTERNS AS REQUIRED. USE ONLY ONE STRAND SIZE IN EACH PATTERN. THE MAX. NUMBER OF DRAPED 0.6" DIA. STRANDS IS 8.

REINFORCEMENT IN STANDARD END SECTION OF THE GIRDER IS BASED ON THE STANDARD STRAND PATTERNS LISTED ON STANDARD 40.20 AND THE SPAN LENGTHS SHOWN IN TABLE 40.7.1. USING DIFFERENT STRAND PATTERNS OR LONGER SPANS WILL REQUIRE A COMPLETE DESIGN OF THIS REINFORCEMENT, WHICH REQUIRES PRIOR APPROVAL FROM THE BUREAU OF STRUCTURES.

▲ VARIES FOR ELASTOMERIC BRGS. (STD. 27.07) AND STEEL BRGS. (STD. 27.09)

○ DETAIL TYPICAL AT EACH END

● INCREASE THE SIZE OF THESE BARS IF REQUIRED BY AASHTO LRFD 5.8.3.5

③ THE DESIGN ENGINEER DETERMINES THIS VALUE BASED ON 2" MIN. HAUNCH AT EDGE OF GIRDER, X-SLOPE, PROFILE GRADE LINE AND CALCULATED RESIDUAL GIRDER CAMBER, INCLUDING THE CAMBER MULTIPLIER OF 1.4. THIS VALUE CAN VARY AND SHOULD BE GIVEN FOR EACH 1/3 OF THE GIRDER LENGTH. PROVIDE VALUES THAT MAINTAIN 3" MIN. DECK EMBEDMENT AND 2 1/2" CLEAR FROM TOP OF DECK WHILE ACCOUNTING FOR ± 3/4" VARIANCE IN ACTUAL CAMBER VERSUS THE CALCULATED RESIDUAL CAMBER.

NOTES

TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY, EXCEPT THE OUTSIDE 2" OF GIRDER, WHICH SHALL RECEIVE A SMOOTH FINISH. AN APPROVED CONCRETE SEALER SHALL BE APPLIED TO ALL SMOOTH SURFACES INCLUDING THE OUTSIDE 2" OF THE TOP FLANGE.

DO NOT APPLY CONCRETE SEALER OR EPOXY TO SURFACES RECEIVING APPLICATION OF CONCRETE STAINING.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. FOR GIRDER ENDS EMBEDDED COMPLETELY IN CONCRETE, END OF STRANDS SHALL BE COATED WITH NON-BITUMINOUS JOINT SEALER. FOR GIRDER ENDS THAT ARE FINALLY EXPOSED, COAT THE GIRDER ENDS, EXPOSED STRAND ENDS AND ALL NON-BONDING SURFACES WITHIN 2 FEET OF THE GIRDER ENDS WITH A NON-PIGMENTED EPOXY CONFORMING TO AASHTO M-235 TYPE III, GRADE 2, CLASS B OR C. THE EPOXY SHALL BE APPLIED AT LEAST 3 DAYS AFTER MOIST CURING HAS CEASED AND PRIOR TO THE APPLICATION OF THE SEALER.

ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.

SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT.

AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) ASTM A1064 MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DEVELOPMENT SECTION.

PRESTRESSING STRANDS SHALL BE () DIA.)-7-WIRE LOW-RELAXATION STRANDS WITH AN ULTIMATE STRENGTH OF 270,000 PSI.

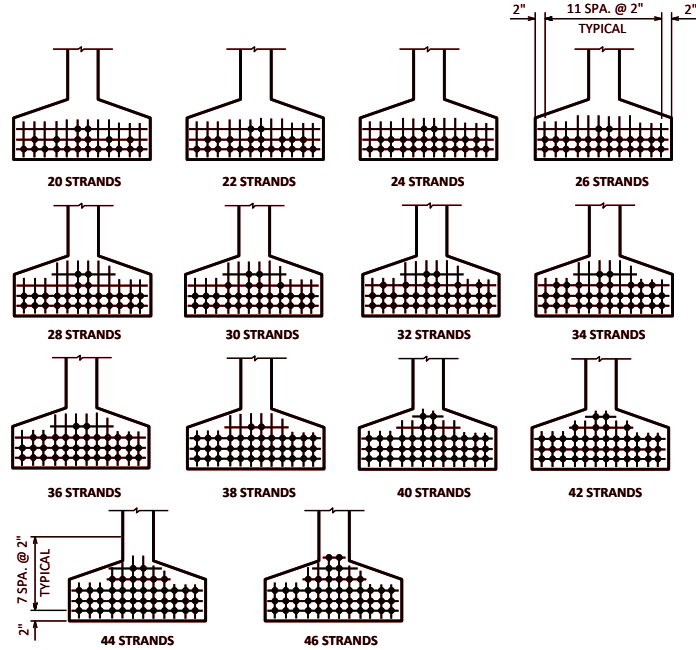
70" PRESTRESSED GIRDER DETAILS



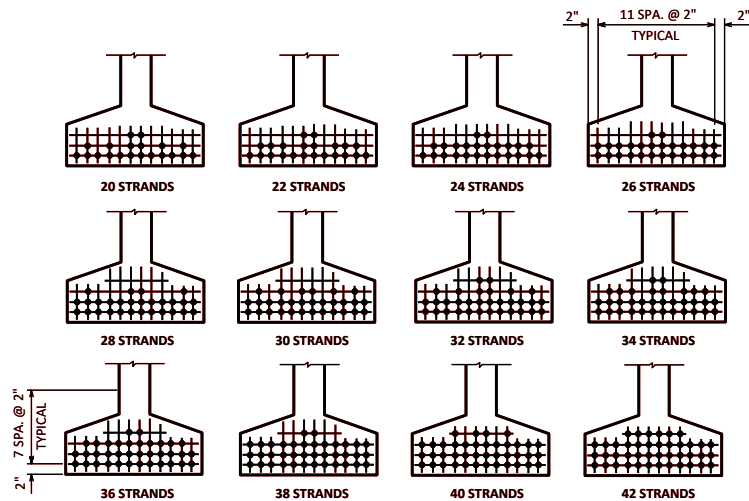
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
7-23



ARRANGEMENT AT C/L SPAN FOR GIRDERS WITH DRAPED 0.5" DIA. STRANDS



ARRANGEMENT AT C/L SPAN FOR GIRDERS WITH DRAPED 0.6" DIA. STRANDS

(COMPRESSION IS NEGATIVE)

N	(1)	(2)	(3)	(4)	(5)
NO. STRANDS	e_s 0.5" DIA. STRANDS (INCHES)	$(1 + \frac{e_s y_b}{r^2})$ 0.5" DIA. STRANDS	$(A/(2))$ 0.5" DIA. STRANDS (SQ.IN.)	$P(INIT.) = A_s f_s$ 0.5" DIA. STRANDS (KIPS)	$f_b(INIT.) = (4)/(3)$ 0.5" DIA. STRANDS (K/SQ.IN)

STANDARD PATTERNS - 0.5" DIA. DRAPED STRANDS

20	-31.62	2.659	291.090	620	2.130
22	-31.53	2.655	291.530	682	2.339
24	-31.45	2.650	292.080	744	2.547
26	-31.39	2.647	292.410	806	2.756
28	-31.05	2.629	294.410	868	2.948
30	-30.89	2.621	295.310	930	3.149
32	-30.75	2.614	296.100	992	3.350
34	-30.62	2.607	296.890	1054	3.550
36	-30.51	2.601	297.580	1116	3.750
38	-30.41	2.596	298.150	1178	3.951
40	-30.12	2.581	299.880	1240	4.135
42	-29.95	2.572	300.930	1302	4.327
44	-29.80	2.564	301.870	1364	4.519
46	-29.49	2.548	303.770	1426	4.694

70" GIRDER

A = 774 SQ. IN.

$$r^2 = 659.70 \text{ IN.}^2$$

$$y_T = 35.38 \text{ IN.}$$

$$y_B = -34.62 \text{ IN.}$$

$$I = 510,613 \text{ IN.}^4$$

$$S_T = 14,430 \text{ IN.}^3$$

$$S_B = -14,750 \text{ IN.}^3$$

$$\text{WT.} = 0.806 \text{ KIPS/FT.} + 6.6 \text{ KIPS FOR BOTH END BLOCKS}$$

PRE-TENSION

$$f'_s = 270,000 \text{ P.S.I.}$$

$$f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I. FOR LOW RELAXATION STRANDS}$$

$$\text{PI FOR 0.5" DIA. STRAND} = 0.1531 \times 202,500 = \underline{31.00 \text{ KIPS}}$$

$$\text{PI FOR 0.6" DIA. STRAND} = 0.217 \times 202,500 = \underline{43.94 \text{ KIPS}}$$

$$\frac{y_b}{r^2} = \frac{-34.62}{659.70} = -0.05248 \text{ IN./IN.}^2$$

(COMPRESSION IS NEGATIVE)

N	(1)	(2)	(3)	(4)	(5)
NO. STRANDS	e_s 0.6" DIA. STRANDS (INCHES)	$(1 + \frac{e_s y_b}{r^2})$ 0.6" DIA. STRANDS	$(A/(2))$ 0.6" DIA. STRANDS (SQ.IN.)	$P(INIT.) = A_s f_s$ 0.6" DIA. STRANDS (KIPS)	$f_b(INIT.) = (4)/(3)$ 0.6" DIA. STRANDS (K/SQ.IN)

STANDARD PATTERNS - 0.6" DIA. DRAPED STRANDS

20	-31.62	2.659	291.090	879	3.020
22	-31.53	2.655	291.530	967	3.317
24	-31.45	2.650	292.080	1055	3.612
26	-31.39	2.647	292.410	1143	3.909
28	-31.19	2.637	293.520	1230	4.191
30	-31.02	2.628	294.520	1318	4.475
32	-30.74	2.614	296.100	1406	4.748
34	-30.62	2.607	296.890	1494	5.032
36	-30.51	2.601	297.580	1582	5.316
38	-30.41	2.596	298.150	1670	5.601
40	-30.22	2.586	299.300	1758	5.874
42	-30.05	2.577	300.350	1846	6.146

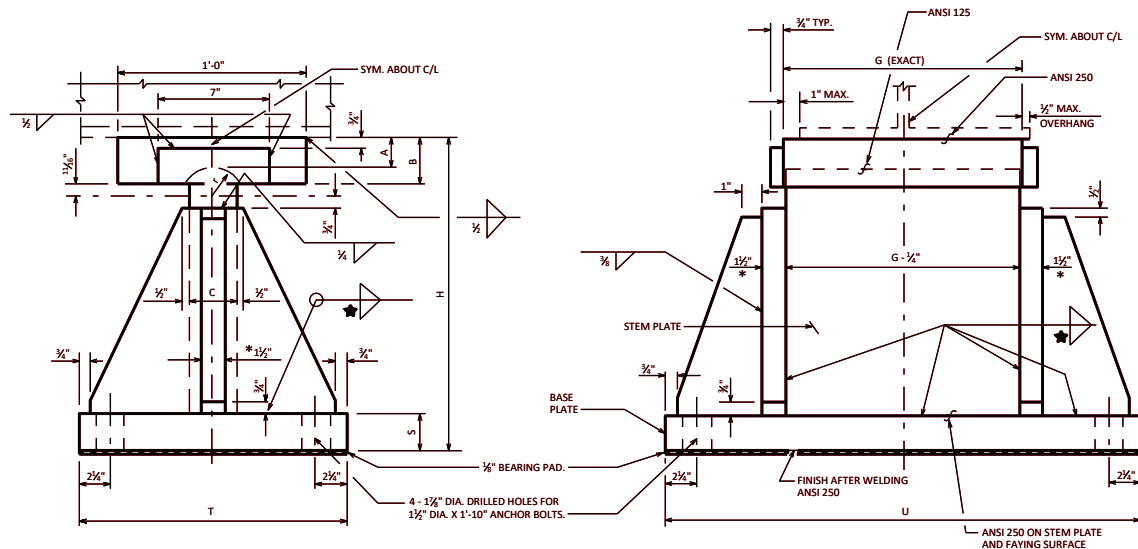
70" PRESTRESSED GIRDER DESIGN DATA



BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE:
7-16



FIXED SHOE

★ 400 K ≤ REACTION < 1000 K, USE 3/4" WELD.
1000 K ≤ REACTION ≤ 1500 K, USE 3/4" WELD.

* FOR REACTIONS ≥ 1000 KIPS
USE 2" STIFFENERS.

TABLE OF DIMENSIONS

REACTION (KIPS)	A	B	C	G VALUES						H	F		S	T
				G=1'-7"	G=1'-9"	G=1'-11"	G=2'-1"	G=2'-3"	G=2'-5"		STEM	PLATE		
400-499	1 3/16"	2 5/16"	3"	2'-8"	2'-8"	2'-10"	3'-0"	—	—	1'-6"	1 1/16"	1 9/16"	2 3/8"	1'-4"
500-599	1 1/16"	2 1/16"	3"	3'-0"	3'-0"	3'-0"	3'-0"	—	—	1'-7"	1 1/16"	1 9/16"	2 3/8"	1'-5"
600-699	1 1/16"	2 1/16"	3"	—	3'-3"	3'-3"	3'-3"	3'-3"	—	1'-9"	1 1/16"	1 9/16"	2 3/8"	1'-6"
700-799	2 1/16"	3 1/16"	3 1/2"	—	—	3'-6"	3'-6"	3'-6"	3'-6"	1'-10"	1 1/16"	1 9/16"	2 3/8"	1'-7"
800-899	2 1/16"	3 1/16"	3 1/2"	—	—	3'-9"	3'-9"	3'-9"	3'-9"	2'-0"	1 1/16"	1 9/16"	2 3/8"	1'-8"
900-999	2 1/16"	3 1/16"	3 1/2"	—	—	3'-10"	3'-10"	3'-10"	3'-10"	2'-1"	1 1/16"	1 9/16"	2 3/8"	1'-10"
1000-1099	2 1/16"	3 1/16"	4"	—	—	—	4'-0"	4'-0"	4'-0"	2'-3"	2 1/16"	2 13/16"	3 3/8"	1'-11"
1100-1199	2 1/16"	3 1/16"	4"	—	—	—	4'-2"	4'-2"	4'-2"	2'-4"	2 1/16"	2 13/16"	3 3/8"	2'-0"
1200-1299	2 1/16"	3 1/16"	4"	—	—	—	4'-4"	4'-4"	2'-5"	2 1/16"	2 13/16"	2 13/16"	3 3/8"	2'-1"
1300-1399	2 1/16"	3 1/16"	4"	—	—	—	4'-6"	4'-6"	2'-6"	2 1/16"	2 13/16"	2 13/16"	3 3/8"	2'-2"
1400-1500	2 1/16"	3 1/16"	4"	—	—	—	4'-8"	4'-8"	2'-7"	2 1/16"	2 13/16"	2 13/16"	3 3/8"	2'-3"

NOTES

FABRICATOR MAY INCREASE 'BASE PLATE' THICKNESS AS AN ALTERNATE TO SHIMS.

ALL STRUCTURAL STEEL BEARING PLATES SHALL BE FLAT ROLLED STEEL PLATES WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL.

ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS, ON WELDED BEARINGS. FINAL MACHINING CAN BE PERFORMED BEFORE WELDING IS COMPLETED.

ALL MATERIAL FOR BEARINGS INCLUDING SHIMS BUT EXCLUDING ANCHOR BOLTS, NUTS, AND WASHERS SHALL CONFORM TO ASTM SPECIFICATION TYPE A709 GRADE 50W STEEL.

ALL ANCHOR BOLTS, NUTS, AND WASHERS SHALL CONFORM TO ASTM SPECIFICATION TYPE A709 GRADE 36 STEEL. ANCHOR BOLTS SHALL BE THREADED 3". PROVIDE ONE STANDARD WROUGHT WASHER AND ONE HEX NUT PER BOLT. PROJECT ANCHOR BOLTS "S" PLATE THICKNESS + 2 1/4" ABOVE TOP OF CONCRETE MASONRY. CHAMFER ANCHOR BOLTS PRIOR TO THREADING.

AFTER WELDING SHOE ASSEMBLY, FINISH BOTTOM OF BASE PLATE TO A FLAT SURFACE.

ALL SURFACES MARKED "J" SHALL BE MACHINE FINISHED BY AN AUTOMATIC PROCESS. THE CONTACT AREA OF BOTTOM SURFACE OF THE GIRDER FLANGE SHALL BE MACHINE FINISHED.

ANCHOR BOLT DISTANCES ALONG "T" OR "U" MAY BE INCREASED FROM MINIMUM SHOWN WHEN A COMMON GRID DETAIL IS DESIRED FOR SEVERAL BEARINGS.

FOR UNPAINTED STRUCTURES THE UPPER 6" OF THE ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AS REQUIRED BY ASTM DESIGNATION A153, CLASS C OR B633.

ALL MATERIALS IN TYPE "B" FIXED SHOE BEARINGS, INCLUDING SHIMS, SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "BEARING ASSEMBLIES FIXED B-...".

OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.

USE AASHTO LRFD SERVICE I LOADS FOR BEARING SELECTION. CONSIDER ONLY DEAD LOAD AND HL-93 LIVE LOADS INCLUDING 33% DYNAMIC LOAD ALLOWANCE. THE BEARINGS ON THIS STANDARD WERE DESIGNED USING THE STANDARD SPECIFICATION.

TYPE 'B' - STEEL GIRDERS FIXED SHOE



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
7-16

★ FOR CULVERT WINGS:

WITH WING WALL THICKNESS $\geq 8"$ USE:
ADHESIVE ANCHORS $\frac{3}{8}"$ - INCH.
EMBED 5" IN CONCRETE.
SEE DETAIL "A".

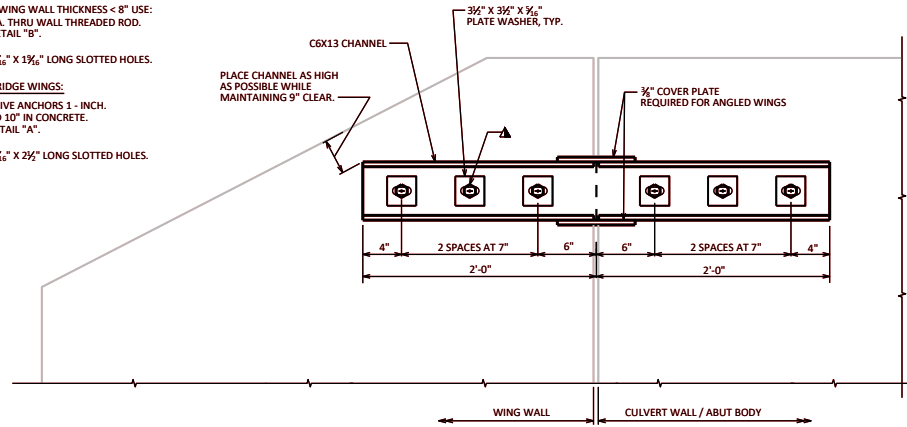
WITH WING WALL THICKNESS $< 8"$ USE:
 $\frac{3}{8}"$ DIA. THRU WALL THREADED ROD.
SEE DETAIL "B".

USE $1\frac{1}{8}" \times 1\frac{1}{8}"$ LONG SLOTTED HOLES.

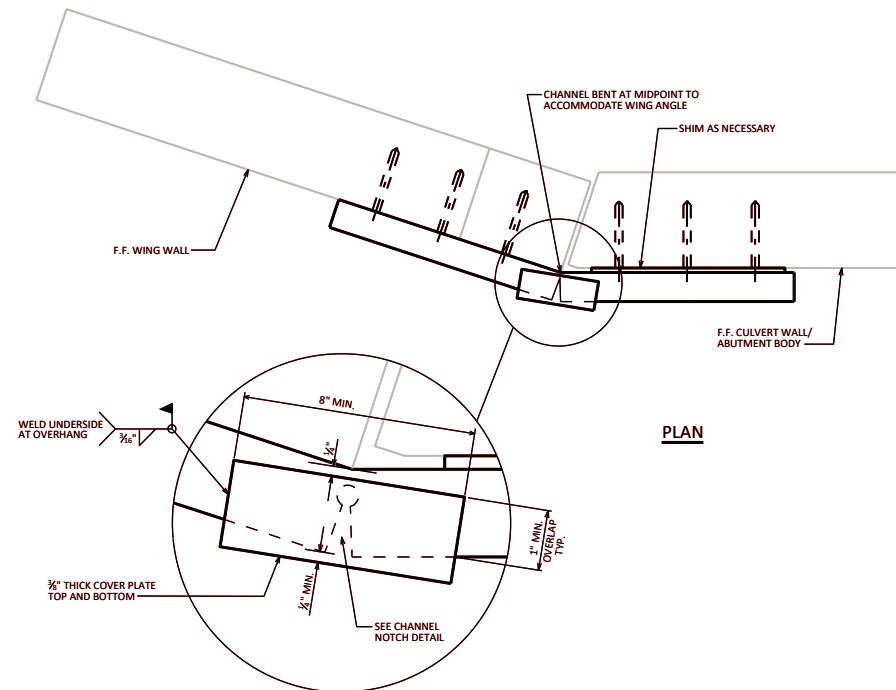
FOR BRIDGE WINGS:

ADHESIVE ANCHORS 1 - INCH.
EMBED 10" IN CONCRETE.
SEE DETAIL "A".

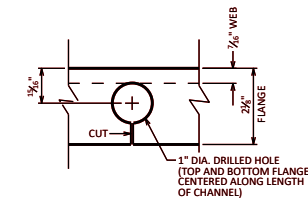
USE $1\frac{1}{8}" \times 2\frac{1}{2}"$ LONG SLOTTED HOLES.



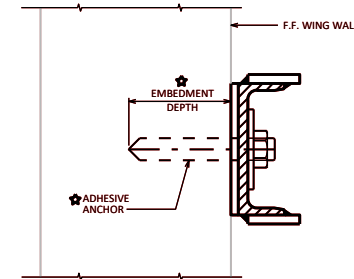
WING ELEVATION



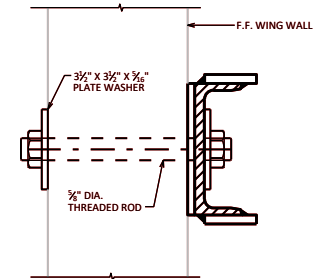
PLAN



CHANNEL NOTCH DETAIL
FOR USE WITH ANGLED WINGS ONLY



DETAIL "A"
SECTION THRU CHANNEL



DETAIL "B"
SECTION THRU CHANNEL

NOTES

DESIGNER'S NOTES

FOR THE PURPOSE OF MITIGATING INWARD WING TIPPING, AS AN ALTERNATIVE TO THE PREFERRED METHOD OF WING REPLACEMENT, FOR THE PURPOSE OF MITIGATING INWARD WING TIPPING, AS AN ALTERNATIVE TO THE PREFERRED METHOD OF WING REPLACEMENT, THE BOTTOM SHALL BE "STRAPPING B-XX-XXX" WHICH INCLUDES ALL ITEMS SHOWN.

WISDOT REGIONAL BRIDGE MAINTENANCE ENGINEER TO APPROVE USE OF OF DETAIL PRIOR TO INSTALLATION.

NOTES

ALL STRUCTURAL STEEL MATERIAL SHALL CONFORM TO ASTM A36.

ALL STRUCTURAL STEEL SHOWN SHALL BE GALVANIZED. THREADED RODS, MASONRY ANCHORS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 CLASS C. ALL PROVIDED STEEL MATERIAL SHALL CONFORM TO ASTM A36.

CUTTING AND DRILLING OF CHANNEL SHALL BE DONE IN FABRICATION SHOP. PRIOR TO GALVANIZING, THREADED RODS, MASONRY ANCHORS, NUTS, AND WASHERS SHALL BE GALVANIZED IN FIELD. PRIOR TO WELDING, REMOVE GALVANIZING FROM AREA TO BE WELDED. TOUCH UP WITH PAINT ALL AREAS LACKING GALVANIZING WHEN COMPLETE.

CAULK AROUND PERIMETER OF CHANNEL AND FILL PORTION OF HOLE AROUND ANCHOR BOLT AND SHIM WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. PRIOR TO WELDING, REMOVE GALVANIZING FROM AREA TO BE WELDED. TOUCH UP WITH PAINT ALL AREAS LACKING GALVANIZING WHEN COMPLETE.

ADHESIVE ANCHORS SHALL CONFORM TO SECTION 502.2.12 OF THE STANDARD SPECIFICATIONS.

CAULK AROUND PERIMETER OF CHANNEL AND FILL PORTION OF HOLE AROUND ANCHOR BOLT AND SHIM WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

ADHESIVE ANCHORS SHALL CONFORM TO SECTION 502.2.12 OF THE STANDARD SPECIFICATIONS.

WING STRAPPING



BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

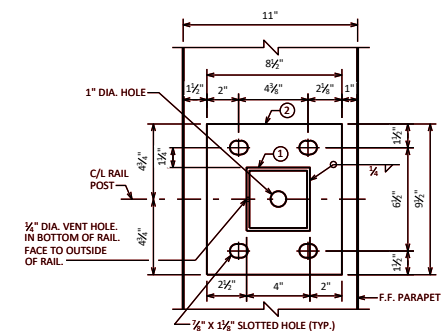
DATE:
7-18



STRIP SEAL EXP. JT. @ ABUT.
FOR TYPE A1 ABUT., USE ½" FILLER
TO TOP OF PARAPET. SEE STD. 12.01/12.02

INSIDE ELEVATION

OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED.
RUN BAR REINF. THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 1'-5".
MIN CONSTR. JT. SPACING OF 80'-0". DEFINE CONSTR. JT. WITH A 3/4" "V"-GROOVE.



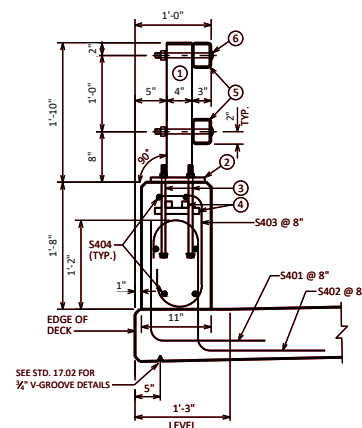
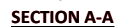
BASE PLATE

DESIGNER NOTES

DETAILS LIMITED TO SKEWS $< 40^\circ$.

SEE STANDARD 40.25 FOR RAILING DETAILS

RAILING WEIGHT = 30 LB/FT



SECTION THRU DECK

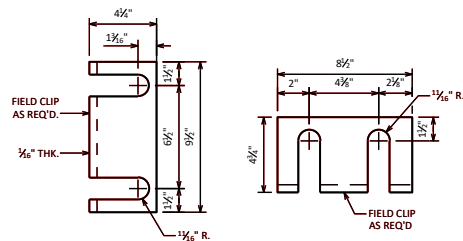
ADJUST LOCATIONS OF BARS TO ALLOW
PLACEMENT OF ANCHOR ASSEMBLY FOR
RAILING AND BEAM GUARD (WHEN REQ'D.).



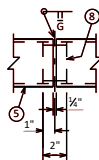
BUREAU OF
STRUCTURES

APPROVED: *Laura Shadewald*

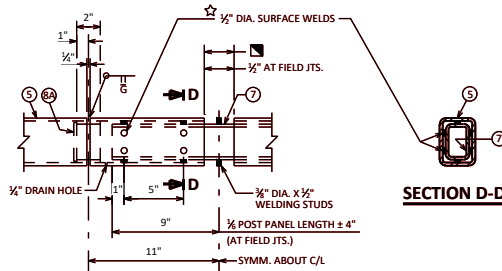
DATE: 1-17



POST SHIM DETAILS



**SHOP RAIL
SPLICE DETAIL**
(LOCATION MUST BE
SHOWN ON SHOP DRAWINGS)



FIELD ERECTION JOINT DETAIL
☆ MIN. 1/8" FLAT SURFACE DIA. PUNCHINGS OR
STUDS MAY BE USED AS AN ALTERNATE.

SECTION D-D

NOTES

BID ITEM SHALL BE "RAILING TUBULAR TYPE PF B-_-_-", WHICH SHALL INCLUDE ALL STEEL ITEMS SHOWN, AND PAINTING.

POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS.

NO. 2, NO. 7 AND NO. 8 SHALL CONFORM TO ASTM A709 GRADE 36. STRUCTURAL TUBING, NO. 1 AND NO. 5, SHALL CONFORM TO ASTM A500 GRADE 8.

ANCHORAGES SHALL BE ACCURATELY PLACED TO PROVIDE CORRECT ALIGNMENT OF RAILING. SET POSTS NORMAL TO GRADE.

CUT BOTTOM OF POST TO MAKE POST VERTICAL IN TRANSVERSE DIRECTION.

STEEL SHIMS SHALL BE PROVIDED & USED UNDER BASE PLATES WHERE REQUIRED FOR ALIGNMENT.

FILL BOLT SLOT OPENINGS IN SHIMS AND PLATE NO. 2 AND CAULK AROUND PERIMETER OF PLATE NO. 2 WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

ALL JOINTS IN CONCRETE PARAPET ARE TO BE VERTICAL.

AFTER FABRICATION, ALL MATERIAL EXCEPT ANCHORAGE NO. 3 & 4 & SHIMS SHALL BE PAINTED WITH A THREE COAT ZINC-RICH EPOXY SYSTEM PER WISDOT STANDARD SPECIFICATION, SECTION 517, EPOXY SYSTEM. SHIMS SHALL BE GIVEN ONE COAT OF ZINC RICH PRIMER PAINT. THE FINISH COLOR SHALL BE AMS STD. COLOR NO. 1.

1/4" DIA. VENT HOLES TO BE LOCATED AT LOW END OF RAILS.

RAILING SHALL BE FABRICATED IN LENGTHS THAT INCLUDE 3 OR 4 POSTS.

TOUCH-UP PAINTING TO BE DONE AT COMPLETION OF STEEL RAILING INSTALLATION TO THE SATISFACTION OF THE ENGINEER AT NO EXTRA COST.

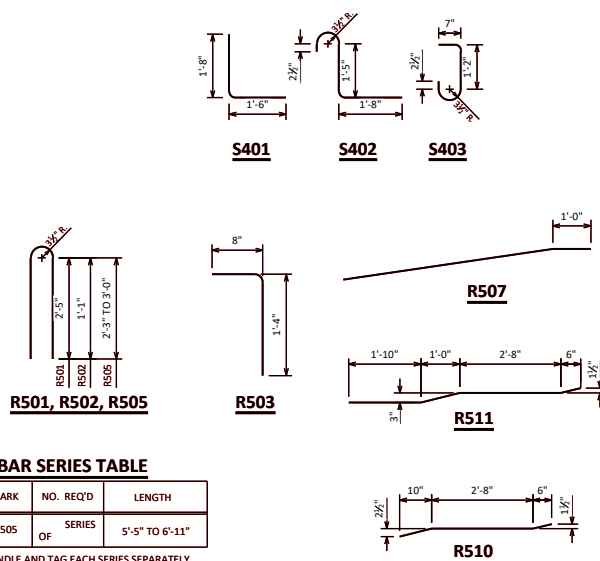
SEE STD. 30.07 FOR BEAM GUARD ANCHOR ASSEMBLY DETAILS.

THIS RAILING MEETS NCHRP REPORT 350 EVALUATION CRITERIA FOR TEST LEVEL 2 (TL-2).

■ RDWY. OPENING OR 2 1/2" MIN. FOR STRIP SEAL EXP. JOINT & 1/2" OPENING FOR A1 ABUTMENT.

LEGEND

- TS 4 x 4 x 0.25 x 1'-9 1/2" STRUCTURAL TUBING WITH 1/16" DIA. HOLES FOR BOLT NO. 6. PLACE POSTS VERTICAL IN TRANSVERSE DIRECTION. WELD TO NO. 2. PLACE POSTS NORMAL TO GRADE LINE.
- PLATE 1/2" x 8 1/2" x 9 1/2" WITH 1/4" x 1 1/2" SLOTTED HOLES FOR ANCHOR BOLTS NO. 3. WELD TO NO. 1 AS SHOWN. SLOTS PARALLEL TO SHORT SIDE OF PLATE.
- 1/2" DIA. x 1'-1" LONG ASTM A325 HEX BOLTS (GALVANIZED) WITH A325 NUT AND WASHER. 4 REQ'D. PER POST. THREAD 3" AND PLACE NORMAL TO PLATE NO. 2. EMBED A MIN. OF 10". CHAMFER TOP OF BOLTS BEFORE THREADING.
- BAR 3/4" SQ. x 7" LONG. WELD TO ANCHOR BOLT NO. 3 (GALVANIZED).
- TS 4 x 3 x 0.25 STRUCTURAL TUBING. ATTACH TO NO. 1 WITH BOLTS NO. 6. PROVIDE 1 1/2" DIA. HOLE FOR NO. 6.
- 1/4" DIA. x 9" LONG ROUND HEAD BOLTS, ASTM A307, WITH HEX NUT AND WASHERS AND LOCK WASHER. (1 REQ'D. AT EACH RAIL TO POST LOCATION.)
- RECTANGULAR SLEEVE FABRICATED FROM 1/4" PLATES. 1'-6" LONG.
- RECTANGULAR SLEEVE FABRICATED FROM 1/4" PLATES. PROVIDE "SLIDING FIT" WITH MIN. OUT TO OUT DIMENSION OF 3 1/2" x 2 1/2".
- RECTANGULAR SLEEVE FABRICATED FROM 1/4" PLATES. PROVIDE "SLIDING FIT" WITH MIN. OUT TO OUT DIMENSION OF 3 1/2" x 2 1/2" WITH 1/4" PLATE AT ONE END WELDED ALL AROUND TO BLOCK WATER.
- 1/4" DIA. x 1'-1" LONG ROUND HEAD BOLTS, ASTM A307, WITH HEX NUT AND WASHERS.



BAR SERIES TABLE

MARK	NO. REQ'D	LENGTH
R505	OF	SERIES
		5'-5" TO 6'-11"

BUNDLE AND TAG EACH SERIES SEPARATELY.

BILL OF BARS

NOTE: THE FIRST OR FIRST TWO DIGITS OF THE BAR MARK SIGNIFIES THE BAR SIZE.

BAR MARK	Qty	NO. REQ'D	LENGTH	Bolt	BAR SERIES	LOCATION
S401	X		3'-0"	X		PARAPET VERT.
S402	X		4'-1"	X		PARAPET VERT.
S403	X		2'-9"	X		PARAPET VERT.
S404	X					PARAPET HORIZ.
R501	X		5'-9"	X		PARAPET VERT.
R502	X		3'-1"	X		PARAPET VERT.
R503	X		1'-11"	X		PARAPET VERT.
R504	X		3'-4"			PARAPET VERT.
R505	X		6'-2"	X	▲	PARAPET VERT.
R506	X					PARAPET HORIZ.
R507	X			X		PARAPET HORIZ.
R508	X		4'-0"			PARAPET HORIZ.
R509	X		5'-8"			PARAPET HORIZ.
R510	X		4'-0"	X		PARAPET HORIZ.
R511	X		6'-0"	X		PARAPET HORIZ.
R512	X					PARAPET HORIZ.
R513	X					PARAPET HORIZ.

▲ LENGTH SHOWN FOR BAR IS AN AVERAGE LENGTH AND SHOULD ONLY BE USED FOR BAR WEIGHT CALCULATIONS. SEE BAR SERIES TABLE FOR ACTUAL LENGTHS.

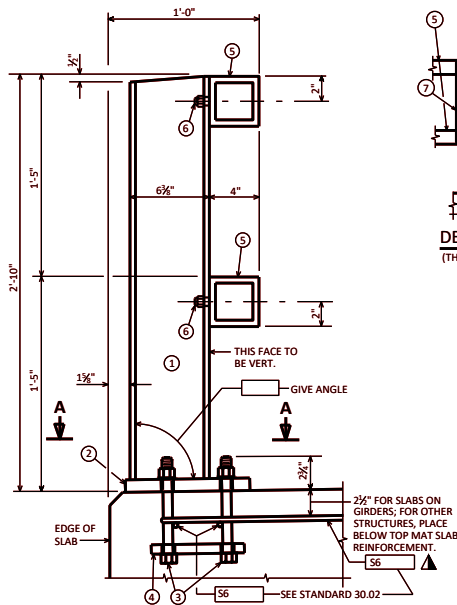
RAILING TUBULAR TYPE 'PF' DETAILS



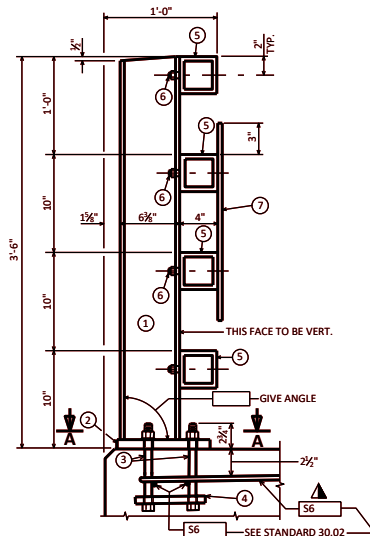
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

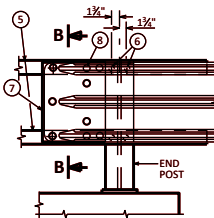
DATE:
1-19



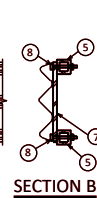
SECTION THRU RAILING ON DECK



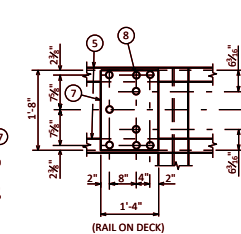
SECTION THRU RAILING ON SIDEWALK



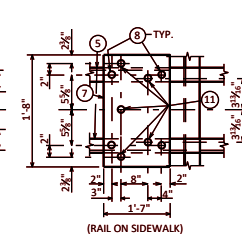
**DETAIL AT END POST
(THREE BEAM RAIL ATTACHMENT)**



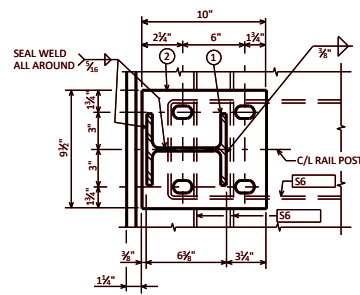
SECTION B



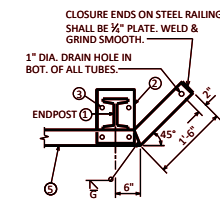
RAIL ON DECK



RAIL ON SIDEWALK

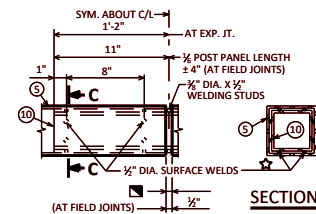


SECTION A

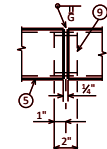


DETAIL FOR END POSTS

WITH OR WITHOUT THREE BEAM RAIL ATTACHMENT
(END POST MAY BE LOCATED ON SUPERSTRUCTURE OR WINGWALLS)



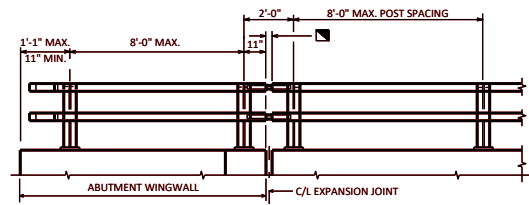
FIELD ERECTION JOINT DETAIL



SHOP RAIL SPLICE DETAIL

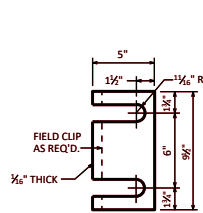
(LOCATION MUST BE SHOWN ON SHOP DRAWINGS)

★ MIN. 3/8" FLAT SURFACE DIA. PUNCHINGS OR STUDS MAY BE USED AS AN ALTERNATE.

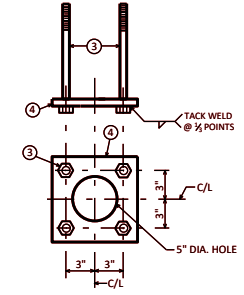


PART ELEVATION OF RAILING

THIS RAILING IS NO LONGER USED AND IS SHOWN FOR INFORMATIONAL PURPOSES ONLY:



**POST SHIM DETAIL
(4 PER POST)**



ANCHORAGE DETAIL

LEGEND

- WE X 25 WITH 1 1/2" DIA. HOLES ON EACH SIDE OF POST FOR STUD NO. 6. CUT BOTTOM OF POST TO MATCH CROSS SLOPE OF ROADWAY (OR SIDEWALK, AS APPLICABLE). PLACE POST VERTICAL. PLACE POSTS NORMAL TO GRADE LINE.
- PLATE 1" X 9 1/2" X 10" WITH 1 1/2" X 1 1/2" SLOTTED HOLES FOR ANCHOR BOLTS NO. 3. WELD TO NO. 1 AS SHOWN.
- A325 - 7/8" DIA. HEX BOLTS (GALVANIZED) WITH A325 NUT & WASHER. 14" LONG AT END POSTS AND AT POSTS ON CONCRETE SLAB SUPERSTRUCTURES WHERE THE SLAB THICKNESS IS > 15". USE 8" LONG AT ALL OTHER LOCATIONS. 4 REQ'D. PER POST. THREAD 3" AND PLACE NORMAL TO PLATE NO. 2. CHAMFER TOP OF BOLTS BEFORE THREADING.
- 1/2" X 8" X 8" FLAT BAR WITH 1 1/2" DIA. HOLES FOR ANCHOR BOLTS NO. 3.
- TS 4 X 4 X 0.25 STRUCTURAL TUBING, CONFORMING TO ASTM DESIGNATION A501 OR A500 GRADE B. ATTACH TO NO. 1 WITH STUDS NO. 6.
- 3/4" DIA. X 1 1/2" LONG SHOP WELDED STUDS WITH HEX NUT AND 2" WASHERS (2 REQ'D. AT EACH RAIL TO POST LOCATION).
- PLATE 3/4" X 1'-4" (1'-7" ON SIDEWALK) X 1'-8". BOLT TO RAIL AS SHOWN IN DETAIL. REQUIRED AT THREE BEAM GUARD RAIL ATTACHMENTS ONLY. PLACE SYMMETRICALLY ABOUT TUBES NO. 5.
- 1" DIA. HOLES IN PLATE NO. 7 & TUBES NO. 5 FOR 3/4" DIA. A325 BOLTS W/ HEX NUTS AND WASHERS.
- SQUARE SLEEVE FABRICATED FROM 1/2" PLATE. PROVIDE "SLIDING FIT" WITH A MINIMUM OUT TO OUT DIMENSION OF 3 1/2".
- TS 3 X 3 X 0.25 X (2'-4" AT EXPANSION JOINTS) & (1'-10" AT FIELD JOINTS) LONG. PROVIDE 1/2" DIA. SURFACE WELDS ON ALL SIDES AS SHOWN. GRIND WELDS TO FIT FREE INTO I.D. OF NO. 5. PROVIDE 3/4" DIA. X 1/2" WELDING STUDS ON TOP AND BOTTOM SURFACES AT CENTERLINE.
- 7/8" DIA. X 1 1/2" LONG THREADED SHOP WELDED STUDS. (REQ'D FOR SIDEWALK RAIL ONLY.)

NOTES

BID ITEM SHALL BE "RAILING TUBULAR TYPE F B-...", WHICH INCLUDES ALL ITEMS SHOWN. RAILING SHALL BE FABRICATED IN LENGTHS THAT INCLUDE 3 OR 4 POSTS.

POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUT.

FOR RAILING NOT TO BE PAINTED, ALL MATERIAL EXCEPT ANCHORAGE DETAIL NO. 4 SHALL BE GALVANIZED AFTER FABRICATION. PRIOR TO GALVANIZING, ALL STEEL RAILING POSTS & STEEL TUBING SHALL BE GIVEN A NO. 11 NEAR WHITE BLAST CLEANING BY SSPC SPECIFICATIONS.

FOR RAILING TO BE PAINTED, ALL MATERIAL EXCEPT ANCHORAGE DETAIL NO. 3 & 4, SHALL BE PAINTED WITH A THREE-COAT ZINC RICH EPOXY SYSTEM. PRIOR TO PAINTING, ALL STEEL RAILING POSTS & STEEL TUBING SHALL BE GIVEN A NO. 11 NEAR WHITE BLAST CLEANING BY SSPC SPECIFICATIONS.

ALL MATERIALS USED IN FABRICATION SHALL BE MADE FROM MATERIALS CONFORMING TO ASTM A709 GRADE 36 UNLESS NOTED OTHERWISE.

FILL BOLT SLOT OPENINGS IN POST SHIMS AND PLATE NO. 2 WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

STEEL POST SHIMS MAY BE USED UNDER POSTS WHERE REQ'D. FOR ALIGNMENT.

PLACE FIRST BOTTOM LONGITUDINAL BAR CLEAR OF DRIP GROOVE.

FOR 2'-10" RAILING ON DECK:
RAILING WEIGHT = 37 LB/LF (BASED ON 8'-0" POST SPACING.)

- RDWY. OPENING OR 2 1/2" MIN. FOR STRIP SEAL EXP. JOINT & 1/2" OPENING FOR A1 ABUTMENTS.
- TIE TO TOP MAT OF STEEL.

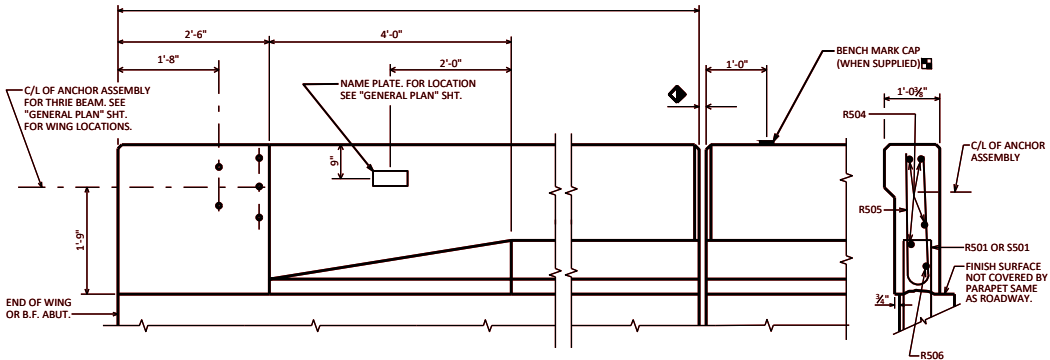
BUREAU OF STRUCTURES

TUBULAR STEEL RAILING TYPE 'F'

APPROVED: *Laura Shadewald*

DATE: 7-16

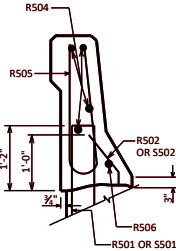
AVOID PLACING A BENCH MARK CAP BELOW A RAIL OR FENCE SYSTEM THAT IS ATTACHED TO THE TOP OF THE PARAPET.



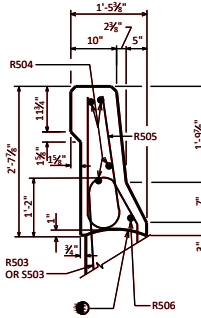
INSIDE ELEVATION

 ROADWAY OPENING OR 2½" MIN. FOR EXPANSION JOINT.
USE ¾" OPENING WITH FILLER FOR A1 ABUTMENTS.

SECTION A



SECTION B

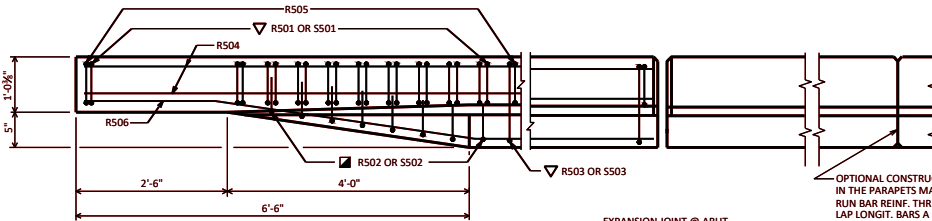


SECTION C

BILL OF BARS

FOR ABUTMENT PARAPETS

BAR MARK	COUNT			LENGTH	BENT	LOCATION
		ABUT.	ABUT.			
R501	X			4'-7"	X	PAPARPET VERT.
R502	X			2'-4"	X	PAPARPET VERT.
R503	X			4'-7"	X	PAPARPET VERT.
R504	X					PAPARPET HORIZ.
R505	X			4'-10"	X	PAPARPET VERT.
R506	X				X	PAPARPET HORIZ.
S501	X			4'-5"	X	PAPARPET VERT.
S502	X			2'-4"	X	PAPARPET VERT.
S503	X			4'-2"	X	PAPARPET VERT.

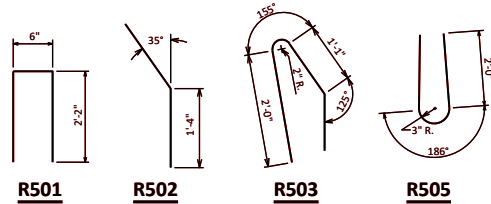


PLA

EXPANSION JOINT @ ABUT.
0° SKEW SHOWN. MATCH EXP.
JT. OPENING.

FOR TYPE A1 ABUT., USE $\frac{3}{2}$ "
FILLER TO TOP OF PARAPET
SEE STD. 12.01.

OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED. RUN BAR REINF. THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 1'-9" MIN. JOINT SPACING OF 80'-0". DEFINE CONST. JOINT WITH A 3/4" - "V" GROOVE.

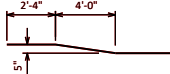


R50

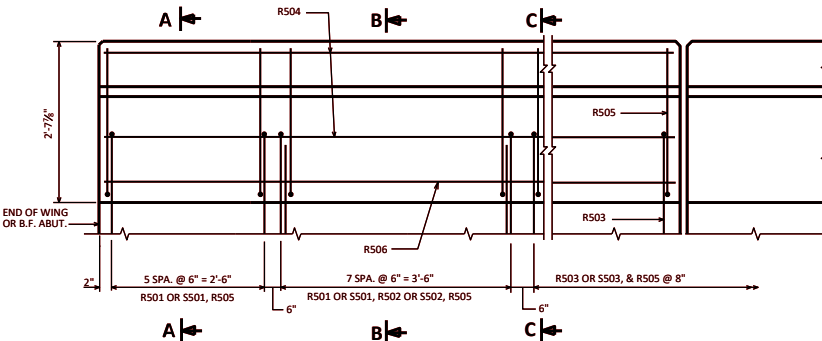
R50

R503

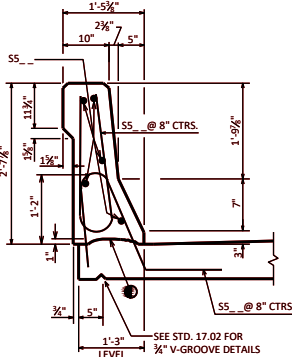
2505



R50



OUTSIDE ELEVATION



SECTION THRU PARAPET ON BRIDGE

AREA = 2.58 SF
WEIGHT = 387 LB/FT

 CONST. JOINT - STRIKE OFF AS SHOWN.

■ R502 BARS MAY BE PLACED AFTER CONCRETE IS POURED BUT BEFORE INITIAL SET HAS TAKEN PLACE. USE CARE TO PLACE R502 OR S502 BARS CORRECTLY ALONG TRANSITION OF PARAPET.

▽ R501 AND R503 BARS TO BE TIED TO WING STEEL BEFORE WING IS POURED.

**A R503 BAR MAY BE USED IN LIEU OF
A S503 BAR ADJACENT TO THE PAVING
NOTCH ON TYPE A1 ABUTMENTS.**

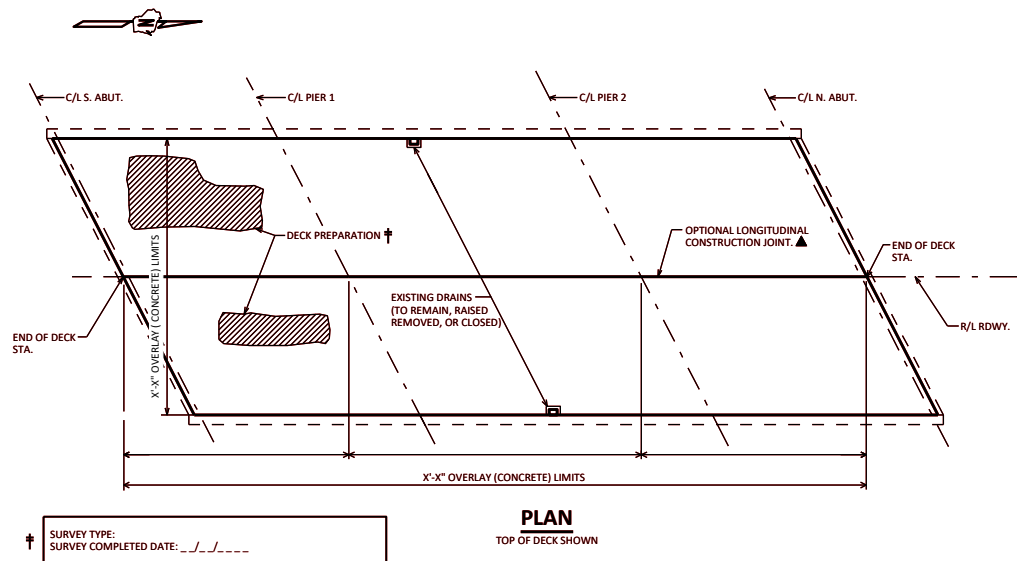
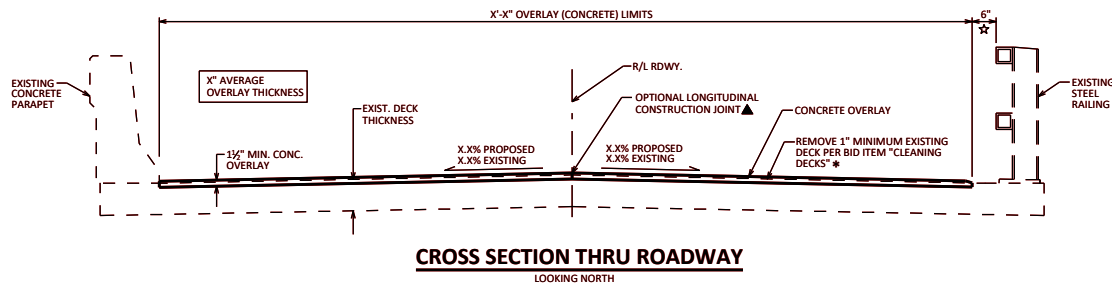
SLOPED FACE PARAPET 'LF'



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE: 1-19



TOTAL ESTIMATED QUANTITIES

BID ITEM NUMBER	BID ITEMS	UNIT	TOTAL
502.3200	PROTECTIVE SURFACE TREATMENT	SY	
509.0301	PREPARATION DECKS TYPE 1	SY	
509.0302	PREPARATION DECKS TYPE 2	SY	
509.0500	CLEANING DECKS	SY	
509.2000	FULL-DEPTH DECK REPAIR	SY	
509.2500	CONCRETE MASONRY OVERLAY DECKS	CY	
	POSSIBLE ADDITIONAL BID ITEMS		
502.3210	PIGMENTED SURFACE SEALER	SY	
* 509.0505.S	CLEANING DECKS TO REAPPLY CONCRETE MASONRY OVERLAY	SY	
* 509.9005.S	REMOVING CONCRETE MASONRY DECK OVERLAY (STRUCTURE)	SY	
514.0900	ADJUSTING FLOOR DRAINS	EACH	

THIS IS A PARTIAL LIST OF POSSIBLE BID ITEMS. BID ITEMS MAY NEED TO BE ADDED OR REMOVED TO FIT EACH INDIVIDUAL CASE.

DESIGN DATA

LIVE LOAD:
INVENTORY RATING: HS-__
OPERATING RATING: HS-__
WISCONSIN STANDARD PERMIT VEHICLE (WIS-SPV) = __ __ __ KIPS

MATERIAL PROPERTIES:
CONCRETE MASONRY OVERLAY DECKS $f'_c = 4,000$ P.S.I.

NOTES

DRAWINGS SHALL NOT BE SCALED.

DIMENSIONS SHOWN ARE BASED ON THE ORIGINAL STRUCTURE PLANS.

PROTECTIVE SURFACE TREATMENT SHALL BE APPLIED TO THE ENTIRE TOP SURFACE OF THE NEW CONCRETE OVERLAY.

SEAL OVERLAY CONSTRUCTION JOINTS ACCORDING TO SECTION 502.3.13.1 OF THE STANDARD SPECIFICATIONS. COST INCIDENTAL TO BID ITEM "CONCRETE MASONRY OVERLAY DECKS".

A MINIMUM OF 1-INCH OF CONCRETE SHALL BE REMOVED FROM THE ENTIRE BRIDGE DECK UNDER THE BID ITEM "CLEANING DECKS".

THE AVERAGE OVERLAY THICKNESS IS BASED ON THE MINIMUM OVERLAY THICKNESS PLUS 1/2-INCH TO ACCOUNT FOR VARIATIONS IN THE DECK SURFACE.

PREPARATION DECKS TYPE 1, PREPARATION DECKS TYPE 2, AND FULL-DEPTH DECK REPAIR AREAS ARE BASED ON THE PLANS AND AS DETERMINED BY THE ENGINEER. DECK PREPARATION AND FULL-DEPTH DECK REPAIRS SHALL BE FILLED WITH "CONCRETE MASONRY OVERLAY DECKS".

ANY EXCAVATION REQUIRED TO COMPLETE THE OVERLAY OR JOINT REPAIRS AT THE ABUTMENTS TO BE CONSIDERED INCIDENTAL TO THE BID ITEM "CONCRETE MASONRY OVERLAY DECKS".

PROFILE GRADE LINE SHALL BE DETERMINED IN THE FIELD BASED ON A MINIMUM OVERLAY THICKNESS OF 1 1/2" PLACED ABOVE THE DECK SURFACE AFTER SURFACE PREPARATION. EXPECTED AVERAGE OVERLAY THICKNESS IS 2" (OR AS GIVEN ON THE PLANS). IF EXPECTED AVERAGE OVERLAY THICKNESS IS EXCEEDED BY MORE THAN 1/2", CONTACT THE STRUCTURES DESIGN SECTION.

DRAINS REMOVED OR CLOSED IS INCIDENTAL TO THE BID ITEM "CONCRETE MASONRY OVERLAY DECKS".

DESIGNER NOTES

PLAN VIEW APPLICABLE TO ALL OVERLAY METHODS AND DECK REPAIRS WITHOUT OVERLAYS.

FOR CROSS SECTIONS NOT IN SUPERELEVATION TRANSITIONS, THE PREFERRED MINIMUM SLOPE IS 2%.

PROVIDE AN AVERAGE OVERLAY THICKNESS ON THE PLANS. THE AVERAGE OVERLAY THICKNESS IS THE MINIMUM OVERLAY THICKNESS PLUS 1/2" TO ACCOUNT FOR VARIATIONS IN THE DECK SURFACE. CHANGES IN CROSS-SLOPE INCREASE THE AVERAGE OVERLAY THICKNESS. QUANTITIES ARE BASED ON THE AVERAGE OVERLAY THICKNESS.

DO NOT PROVIDE A PROFILE GRADE LINE ON THE PLANS.

DO NOT INCLUDE BID ITEM "SAWING PAVEMENT DECK PREPARATION AREAS" FOR DECK PREPARATION.

* REMOVAL OF 1" OF EXISTING DECK UNDER BID ITEM "CLEANING DECKS" IS NOT INTENDED FOR PREVIOUSLY OVERLAID DECKS. EXISTING CONCRETE COVER (1" MIN.) SHALL BE MAINTAINED AND CONSIDERED WHEN DETERMINING CONCRETE REMOVALS. INCLUDE THE BID ITEM "CLEANING DECKS TO REAPPLY CONCRETE MASONRY OVERLAY" WHEN REMOVING EXISTING OVERLAY.

† PROVIDE (IF AVAILABLE) THE MOST CURRENT DECK CONDITION ASSESSMENT SURVEY ON PLANS. INCLUDE SURVEY TYPE AND DATE COMPLETED. THERMOGRAPHY DATA CAN BE FOUND IN HSS WITHIN GENERAL INVENTORY/FILE/INSPECTION/DATE/INSPECTION SPECIAL REPORT. DECK CONDITION ASSESSMENT SURVEY DATES CAN BE FOUND WITHIN INSPECTION/HISTORY UNDER THE "DEVAL" ACTIVITY TYPE.

JOINT REPAIR AREAS SHOULD NOT BE INCLUDED IN DECK REPAIR AREAS OR OVERLAY QUANTITIES. SEE STANDARD 40.04.

INCLUDE THE BID ITEM "ADJUSTING FLOOR DRAINS" WHEN DRAINS ARE TO BE RAISED.

* RESTRICTIONS ON REMOVAL ITEMS SHALL BE PLACED ON THE PLANS TO PREVENT DAMAGE TO REINFORCING STEEL.

▲ OVERLAY LIMIT SHOULD BE OFFSET FROM EXISTING OPEN STEEL RAILING FOR IMPROVED ACCESS FOR DECK REMOVAL AND OVERLAY PLACEMENT. OVERLAY LIMITS FOR PREVIOUSLY OVERLAID DECKS SHALL BE BASED ON THE EXISTING OVERLAY LIMITS.

OPTIONAL CONSTRUCTION JOINTS SHALL BE LOCATED AT CROWN POINTS AND OTHER GRADE BREAK LOCATIONS. COORDINATE STAGING TO AVOID GRADE BREAKS WITHIN A GIVEN STAGE, WHICH WILL REQUIRE SEPARATE OVERLAY POURS.

CONCRETE OVERLAY

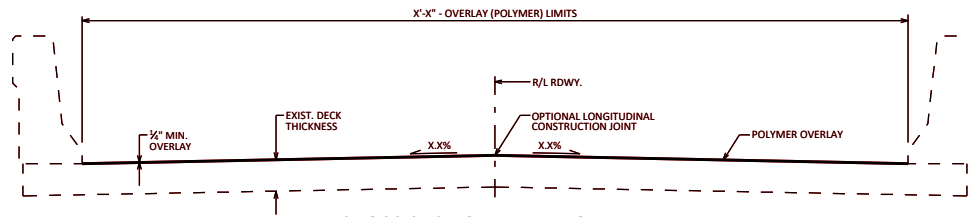


BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE:
7-22

REHABILITATION OVERLAY



CROSS SECTION THRU ROADWAY

LOOKING NORTH

TOTAL ESTIMATED QUANTITIES

BID ITEM NUMBER	BID ITEMS	UNIT	TOTAL
509.0301	PREPARATION DECKS TYPE 1	SY	
509.0302	PREPARATION DECKS TYPE 2	SY	
509.0310.S	SAWING PAVEMENT DECK PREPARATION AREAS	LF	
509.2000	FULL-DEPTH DECK REPAIR	SY	
509.2100.S	CONCRETE MASONRY DECK REPAIR	CY	
509.5100.S	POLYMER OVERLAY	SY	
	POSSIBLE BID ITEM		
SPV.0035	RAPID SET DECK REPAIR	CY	
☆ SPV.0180	HIGH FRICTION SURFACE TREATMENT POLYMER OVERLAY	SY	

THIS IS A PARTIAL LIST OF POSSIBLE BID ITEMS. BID ITEMS MAY NEED TO BE ADDED OR REMOVED TO FIT EACH INDIVIDUAL CASE.

DESIGN DATA

LIVE LOAD:
INVENTORY RATING: HS-20
OPERATING RATING: HS-20
WISCONSIN STANDARD PERMIT VEHICLE (WIS-SPV) = ____ KIPS

MATERIAL PROPERTIES:

CONCRETE MASONRY - DECK PATCHING $f_c = 4,000$ P.S.I.

NOTES

DRAWINGS SHALL NOT BE SCALED.

DIMENSIONS SHOWN ARE BASED ON THE ORIGINAL STRUCTURE PLANS.

AREAS OF "PREPARATION DECKS TYPE 1" SHALL BE DEFINED BY A SAW CUT.

PREPARATION DECKS TYPE 1, PREPARATION DECKS TYPE 2, AND FULL-DEPTH DECK REPAIR AREAS ARE BASED ON THE PLANS AND AS DETERMINED BY THE ENGINEER. DECK PREPARATION AND FULL-DEPTH DECK REPAIRS SHALL BE FILLED WITH "CONCRETE MASONRY DECK REPAIR".

DECK REPAIRS SHALL BE FILLED PRIOR TO OVERLAY PLACEMENT. DECK REPAIRS USING A PORTLAND CEMENT BASED CONCRETE REQUIRES A MINIMUM CURE TIME OF 28 DAYS PRIOR TO OVERLAY PLACEMENT.

SHOT BLASTING, DECK SURFACE PREPARATIONS, AND TRANSITIONAL AREAS ARE INCLUDED IN THE BID ITEM "POLYMER OVERLAY".

DESIGNER NOTES

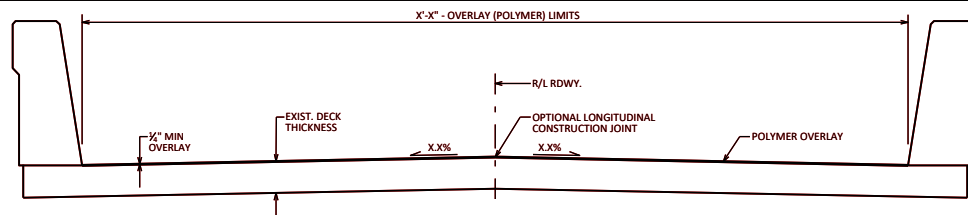
DECK REPAIRS USING A PORTLAND CEMENT BASED CONCRETE REQUIRES A MINIMUM CURE TIME OF 28 DAYS PRIOR TO OVERLAY PLACEMENT. WHEN DEEMED ABSOLUTELY NECESSARY (BY REGION AND BOS DESIGN STAFF) "RAPID SET DECK REPAIR" MAY BE USED IN LIEU OF "CONCRETE MASONRY DECK REPAIR" TO SHORTEN TIME REQUIRED FOR PLACING OVERLAY.

DO NOT PROVIDE A PROFILE GRADE LINE ON THE PLANS.

POLYMER OVERLAYS AND TRANSITIONAL AREAS ARE NOT RECOMMENDED ON CONCRETE APPROACHES.

PROVIDE OVERLAY TRANSITIONAL AREA DETAILS AND IDENTIFY LOCATIONS ON THE PLANS.

☆ WHEN DEEMED NECESSARY (BY REGION AND AGREED UPON BY BOS) "HIGH FRICTION SURFACE TREATMENT POLYMER OVERLAY" MAY BE USED IN LIEU OF "POLYMER OVERLAY". SEE BRIDGE MANUAL SECTION 40.5.1.1 FOR ADDITIONAL GUIDANCE.



CROSS SECTION THRU ROADWAY

LOOKING NORTH

TOTAL ESTIMATED QUANTITIES

BID ITEM NUMBER	BID ITEMS	UNIT	TOTAL
509.5100.S	POLYMER OVERLAY	SY	
	POSSIBLE BID ITEM		
☆ SPV.0180	HIGH FRICTION SURFACE TREATMENT POLYMER OVERLAY	SY	

THIS IS A PARTIAL LIST OF POSSIBLE BID ITEMS. BID ITEMS MAY NEED TO BE ADDED OR REMOVED TO FIT EACH INDIVIDUAL CASE.

DESIGN DATA

LIVE LOAD:
DESIGN LOADING: HL-93
INVENTORY RATING FACTOR: RF=1.0
OPERATING RATING FACTOR: RF=1.0
WISCONSIN STANDARD PERMIT VEHICLE (WIS-SPV) = ____ KIPS

STRUCTURE IS DESIGNED FOR A FUTURE WEARING SURFACE OF 20 POUNDS PER SQUARE FOOT.

NOTES

DRAWINGS SHALL NOT BE SCALED.

SHOT BLASTING, DECK SURFACE PREPARATIONS, AND TRANSITIONAL AREAS ARE INCLUDED IN THE BID ITEM "POLYMER OVERLAY".

DESIGNER NOTES

PREVENTATIVE OVERLAY INTENDED FOR USE ON DECKS WITH A MINIMUM AGE OF 28 DAYS AND A MAXIMUM AGE OF 2 YEARS. AN ADDITIONAL CONTRACT MAY BE REQUIRED FOR APPLYING THE OVERLAY DUE TO SCHEDULE AND DECK AGE CONSIDERATIONS.

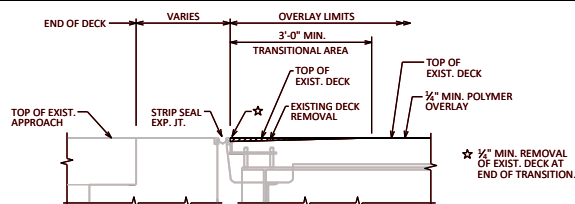
WHEN BID ITEM "POLYMER OVERLAY" IS USED RATING SHOULD INCLUDE THE 5 PSF OVERLAY.

POLYMER OVERLAYS AND TRANSITIONAL AREAS ARE NOT RECOMMENDED ON CONCRETE APPROACHES.

PROVIDE OVERLAY TRANSITIONAL AREA DETAILS AND IDENTIFY LOCATIONS ON THE PLANS.

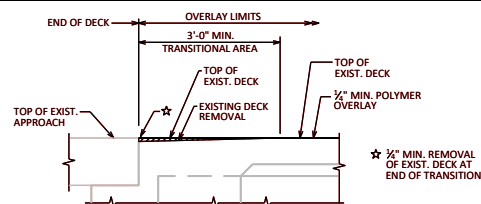
☆ WHEN DEEMED NECESSARY (BY REGION AND AGREED UPON BY BOS) "HIGH FRICTION SURFACE TREATMENT POLYMER OVERLAY" MAY BE USED IN LIEU OF "POLYMER OVERLAY". SEE BRIDGE MANUAL SECTION 40.5.1.1 FOR ADDITIONAL GUIDANCE.

PREVENTATIVE OVERLAY



SECTION THRU ABUTMENT TRANSITIONAL AREA ON DECK AT EXPANSION JOINT

(REMOVAL AND OVERLAY THICKNESS NOT TO SCALE)



SECTION THRU ABUTMENT TRANSITIONAL AREA ON DECK AT SEMI-EXPANSION OR FIXED JOINT

(REMOVAL AND OVERLAY THICKNESS NOT TO SCALE)

NOTE: TRANSITIONAL AREA REQUIRED WHEN APPROACH PAVEMENT HAS BEEN PLACED PRIOR TO OVERLAY PLACEMENT.

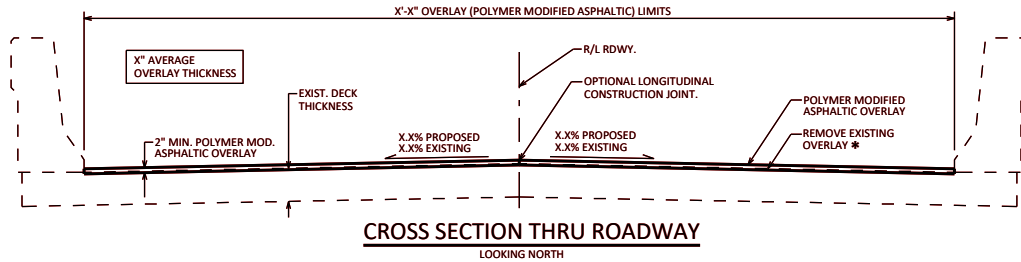
POLYMER OVERLAY



**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

DATE:
7-22



DESIGNER NOTES

CONCRETE OVERLAYS ARE THE CURRENT PREFERRED METHOD TO OVERLAY A BRIDGE.

REPAIRED AREAS REQUIRE A MINIMUM CURE TIME OF 7 DAYS BEFORE PLACING OVERLAY. ALTERNATIVES TO CONCRETE DECK PATCHES MAY BE USED TO SHORTEN TIME REQUIRED FOR PLACING OVERLAY.

PROVIDE AN AVERAGE OVERLAY THICKNESS ON THE PLANS. THIS AVERAGE OVERLAY THICKNESS VALUE IS BASED ON THE THEORETICAL AVERAGE OVERLAY THICKNESS PLUS $\frac{1}{2}$ " TO ACCOUNT FOR VARIATIONS IN THE DECK SURFACE. QUANTITIES ARE BASED ON THE AVERAGE OVERLAY THICKNESS.

DO NOT PROVIDE A PROFILE GRADE LINE ON THE PLANS.

OVERLAYS NOT REQUIRING SHEET MEMBRANE WATERPROOFING ARE PREFERRED.

DESIGNER TO CONTACT THE REGIONAL BRIDGE MAINTENANCE ENGINEER TO DETERMINE IF POLYMER MODIFIED ASPHALTIC MATERIAL IS AVAILABLE.

RESTRICTIONS ON REMOVAL ITEMS SHALL BE PLACED ON THE PLANS TO PREVENT DAMAGE TO REINFORCING STEEL.

* REMOVAL OF 1" OF EXISTING DECK UNDER BID ITEM "CLEANING DECKS" IS NOT INTENDED FOR PREVIOUSLY OVERLAID DECKS. EXISTING CONCRETE COVER (1" MIN.) SHALL BE MAINTAINED AND CONSIDERED WHEN DETERMINING CONCRETE REMOVALS. $\frac{3}{4}$ " MINIMUM REMOVAL OF EXISTING DECK IS INCLUDED WITHIN "REMOVING (OVERLAY TYPE) DECK OVERLAY (STRUCTURE)" BID ITEMS.

PROVIDE (IF AVAILABLE) THE MOST CURRENT DECK CONDITION ASSESSMENT SURVEY ON PLANS. INCLUDE SURVEY TYPE AND DATE COMPLETED. THERMOGRAPHY DATA CAN BE FOUND IN HIS WITHIN GENERAL INVENTORY/FILE/INSPECTION/DATE/INSPECTION SPECIAL REPORT. DECK CONDITION ASSESSMENT SURVEY DATES CAN BE FOUND WITHIN INSPECTION/HISTORY UNDER THE "DEVAL" ACTIVITY TYPE.

TOTAL ESTIMATED QUANTITIES

BID ITEM NUMBER	BID ITEMS	UNIT	TOTAL
509.0301	PREPARATION DECKS TYPE 1	SY	
509.0302	PREPARATION DECKS TYPE 2	SY	
509.0310.S	SAWING PAVEMENT DECK PREPARATION AREAS	LF	
509.2000	FULL-DEPTH DECK REPAIR	SY	
509.2100.S	CONCRETE MASONRY DECK REPAIR	CY	
509.3500.S	HMA OVERLAY POLYMER-MODIFIED	TON	
	POSSIBLE ADDITIONAL BID ITEMS		
* 509.9005.S	REMOVING CONCRETE MASONRY DECK OVERLAY (STRUCTURE)	SY	
* 509.9010.S	REMOVING ASPHALTIC CONCRETE DECK OVERLAY (STRUCTURE)	SY	

THIS IS A PARTIAL LIST OF POSSIBLE BID ITEMS. BID ITEMS MAY NEED TO BE ADDED OR REMOVED TO FIT EACH INDIVIDUAL CASE.

DESIGN DATA

LIVE LOAD:
INVENTORY RATING: HS-__
OPERATING RATING: HS-__
WISCONSIN STANDARD PERMIT VEHICLE (WIS-SPV) = __ __ __ KIPS

MATERIAL PROPERTIES:
CONCRETE MASONRY - DECK PATCHING f'_c = 4,000 P.S.I.

NOTES

DRAWINGS SHALL NOT BE SCALED.

DIMENSIONS SHOWN ARE BASED ON THE ORIGINAL STRUCTURE PLANS.

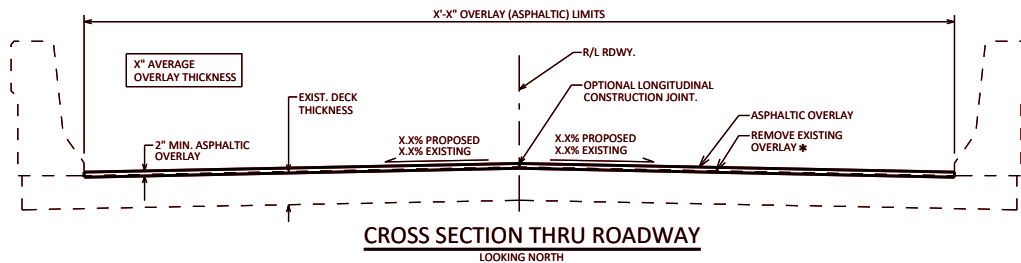
AREAS OF "PREPARATION DECKS TYPE 1" SHALL BE DEFINED BY A SAW CUT.

PREPARATION DECKS TYPE 1, PREPARATION DECKS TYPE 2, AND FULL-DEPTH DECK REPAIR AREAS ARE BASED ON THE PLANS AND AS DETERMINED BY THE ENGINEER. DECK PREPARATION AND FULL-DEPTH DECK REPAIRS SHALL BE FILLED WITH "CONCRETE MASONRY DECK REPAIR".

ANY EXCAVATION REQUIRED TO COMPLETE THE OVERLAY OR JOINT REPAIR AT THE ABUTMENTS TO BE CONSIDERED INCIDENTAL TO THE BID ITEM "HMA OVERLAY POLYMER-MODIFIED".

THE PLAN QUANTITY FOR THE BID ITEM "HMA OVERLAY POLYMER-MODIFIED" IS BASED ON THE AVERAGE OVERLAY THICKNESS.

PROFILE GRADE LINE SHALL BE DETERMINED IN THE FIELD BASED ON A MINIMUM OVERLAY THICKNESS OF 2" PLACED ABOVE THE DECK SURFACE. EXPECTED AVERAGE OVERLAY THICKNESS IS $2\frac{3}{4}$ " (OR AS GIVEN ON THE PLANS). IF EXPECTED AVERAGE OVERLAY THICKNESS IS EXCEEDED BY MORE THAN $\frac{1}{2}$ ", CONTACT THE STRUCTURES DESIGN SECTION.



DESIGNER NOTES

CONCRETE OVERLAYS ARE THE CURRENT PREFERRED METHOD TO OVERLAY A BRIDGE.

REPAIRS USING CONCRETE REQUIRE A MINIMUM CURE TIME OF 7 DAYS BEFORE PLACING OVERLAY. ALTERNATIVES TO CONCRETE DECK PATCHES MAY BE USED TO SHORTEN TIME REQUIRED FOR PLACING OVERLAY.

PROVIDE AN AVERAGE OVERLAY THICKNESS ON THE PLANS. THIS AVERAGE OVERLAY THICKNESS VALUE IS BASED ON THE THEORETICAL AVERAGE OVERLAY THICKNESS PLUS $\frac{1}{2}$ " TO ACCOUNT FOR VARIATIONS IN THE DECK SURFACE. QUANTITIES ARE BASED ON THE AVERAGE OVERLAY THICKNESS.

DO NOT PROVIDE A PROFILE GRADE LINE ON THE PLANS.

OVERLAYS NOT REQUIRING SHEET MEMBRANE WATERPROOFING ARE PREFERRED.

COORDINATE WITH REGION BRIDGE MAINTENANCE AND ROADWAY ENGINEERS FOR THE ASPHALTIC DESIGN AND QUANTITIES.

RESTRICTIONS ON REMOVAL ITEMS SHALL BE PLACED ON THE PLANS TO PREVENT DAMAGE TO REINFORCING STEEL.

* REMOVAL OF 1" OF EXISTING DECK UNDER BID ITEM "CLEANING DECKS" IS NOT INTENDED FOR PREVIOUSLY OVERLAID DECKS. EXISTING CONCRETE COVER (1" MIN.) SHALL BE MAINTAINED AND CONSIDERED WHEN DETERMINING CONCRETE REMOVALS. $\frac{3}{4}$ " MINIMUM REMOVAL OF EXISTING DECK IS INCLUDED WITHIN "REMOVING (OVERLAY TYPE) DECK OVERLAY (STRUCTURE)" BID ITEMS.

PROVIDE (IF AVAILABLE) THE MOST CURRENT DECK CONDITION ASSESSMENT SURVEY ON PLANS. INCLUDE SURVEY TYPE AND DATE COMPLETED. THERMOGRAPHY DATA CAN BE FOUND IN HIS WITHIN GENERAL INVENTORY/FILE/INSPECTION/DATE/INSPECTION SPECIAL REPORT. DECK CONDITION ASSESSMENT SURVEY DATES CAN BE FOUND WITHIN INSPECTION/HISTORY UNDER THE "DEVAL" ACTIVITY TYPE.

TOTAL ESTIMATED QUANTITIES

BID ITEM NUMBER	BID ITEMS	UNIT	TOTAL
455.0605	TACK COAT	GAL	
460.100X	HMA PAVEMENT (INSERT TYPE)	TON	
509.0301	PREPARATION DECKS TYPE 1	SY	
509.0302	PREPARATION DECKS TYPE 2	SY	
509.0310.S	SAWING PAVEMENT DECK PREPARATION AREAS	LF	
509.2000	FULL-DEPTH DECK REPAIR	SY	
509.2100.S	CONCRETE MASONRY DECK REPAIR	CY	
	POSSIBLE ADDITIONAL BID ITEMS		
* 509.9005.S	REMOVING CONCRETE MASONRY DECK OVERLAY (STRUCTURE)	SY	
* 509.9010.S	REMOVING ASPHALTIC CONCRETE DECK OVERLAY (STRUCTURE)	SY	

THIS IS A PARTIAL LIST OF POSSIBLE BID ITEMS. BID ITEMS MAY NEED TO BE ADDED OR REMOVED TO FIT EACH INDIVIDUAL CASE.

POLYMER MODIFIED ASPHALTIC OVERLAY

ASPHALTIC OVERLAY

DESIGN DATA

LIVE LOAD:
INVENTORY RATING: HS-__
OPERATING RATING: HS-__
WISCONSIN STANDARD PERMIT VEHICLE (WIS-SPV) = __ __ __ KIPS

MATERIAL PROPERTIES:
CONCRETE MASONRY - DECK PATCHING f'_c = 4,000 P.S.I.

NOTES

DRAWINGS SHALL NOT BE SCALED.

DIMENSIONS SHOWN ARE BASED ON THE ORIGINAL STRUCTURE PLANS.

AREAS OF "PREPARATION DECKS TYPE 1" SHALL BE DEFINED BY A SAW CUT.

PREPARATION DECKS TYPE 1, PREPARATION DECKS TYPE 2, AND FULL-DEPTH DECK REPAIR AREAS ARE BASED ON THE PLANS AND AS DETERMINED BY THE ENGINEER. DECK PREPARATION AND FULL-DEPTH DECK REPAIRS SHALL BE FILLED WITH "CONCRETE MASONRY DECK REPAIR".

ANY EXCAVATION REQUIRED TO COMPLETE THE OVERLAY OR JOINT REPAIR AT THE ABUTMENTS TO BE CONSIDERED INCIDENTAL TO THE BID ITEM "HMA PAVEMENT TYPE E-X".

THE PLAN QUANTITY FOR THE BID ITEM "HMA PAVEMENT TYPE E-X" IS BASED ON THE AVERAGE OVERLAY THICKNESS.

PROFILE GRADE LINE SHALL BE DETERMINED IN THE FIELD BASED ON A MINIMUM OVERLAY THICKNESS OF 2" PLACED ABOVE THE DECK SURFACE. EXPECTED AVERAGE OVERLAY THICKNESS IS $2\frac{3}{4}$ " (OR AS GIVEN ON THE PLANS). IF EXPECTED AVERAGE OVERLAY THICKNESS IS EXCEEDED BY MORE THAN $\frac{1}{2}$ ", CONTACT THE STRUCTURES DESIGN SECTION.

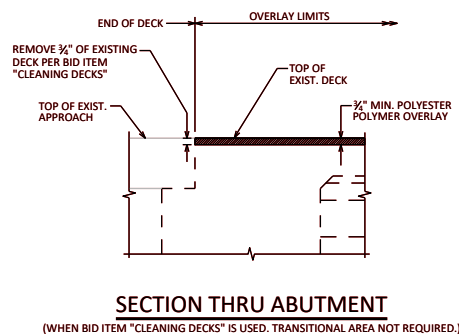
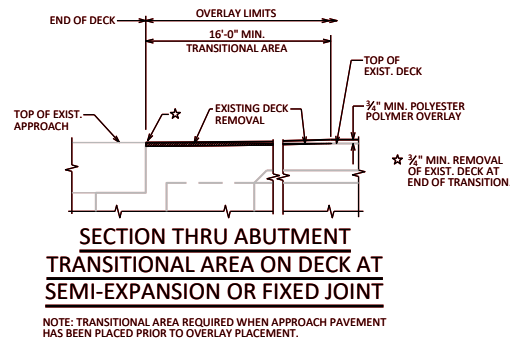
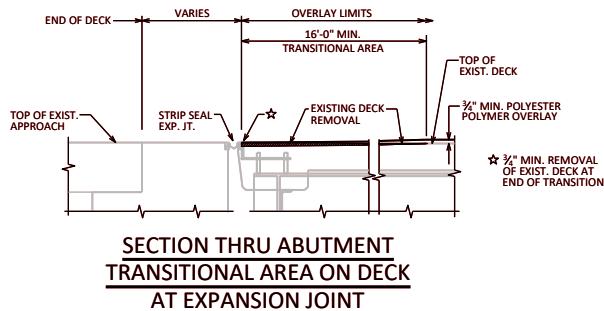
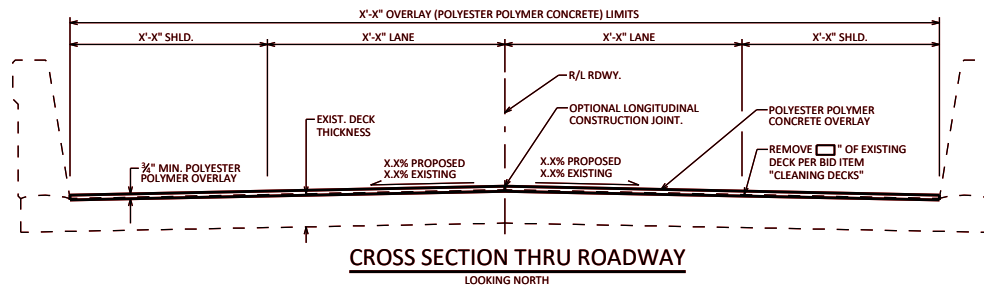
POLYMER MODIFIED ASPHALTIC AND ASPHALTIC OVERLAYS



BUREAU OF
STRUCTURES

APPROVED: *Laura Shadewald*

DATE:
7-22



DESIGN DATA

LIVE LOAD:
INVENTORY RATING: HS-___
OPERATING RATING: HS-___
WISCONSIN STANDARD PERMIT VEHICLE (WIS-SPV) = ___ KIPS

NOTES

DRAWINGS SHALL NOT BE SCALED.

DIMENSIONS SHOWN ARE BASED ON THE ORIGINAL STRUCTURE PLANS.

1/2-INCH OF CONCRETE SHALL BE REMOVED FROM THE ENTIRE BRIDGE DECK UNDER THE BID ITEM "CLEANING DECKS".

AREAS OF "PREPARATION DECKS TYPE 1" SHALL BE DEFINED BY A SAW CUT.

PREPARATION DECKS TYPE 1, PREPARATION DECKS TYPE 2, AND FULL-DEPTH DECK REPAIR AREAS ARE BASED ON THE PLANS AND AS DETERMINED BY THE ENGINEER. DECK PREPARATION AND FULL-DEPTH DECK REPAIRS SHALL BE FILLED WITH "RAPID SET DECK REPAIR". POLYESTER POLYMER CONCRETE AND PORTLAND CEMENT BASED CONCRETE PATCHES MAY BE SUBSTITUTED AT NO EXTRA COST. PORTLAND CEMENT BASED CONCRETE PATCHES SHALL BE USED FOR JOINT REPAIRS AND FULL-DEPTH REPAIRS WITH A PLAN AREA LARGER THAN 4 SF, UNLESS APPROVED OTHERWISE BY THE STRUCTURES DESIGN SECTION.

DECK REPAIRS SHALL BE FILLED PRIOR TO OVERLAY PLACEMENT. DECK REPAIRS USING A PORTLAND CEMENT BASED CONCRETE REQUIRES A MINIMUM CURE TIME OF 28 DAYS PRIOR TO OVERLAY PLACEMENT.

SHOT BLASTING, OVERLAY PRIME COAT, DECK SURFACE PREPARATIONS, AND TRANSITIONAL AREAS ARE INCLUDED IN THE BID ITEM "POLYESTER POLYMER CONCRETE OVERLAY".

OVERLAY CONSTRUCTION JOINTS SHALL BE APPROVED BY THE ENGINEER. AVOID PLACING LONGITUDINAL JOINTS NEAR WHEEL PATHS. WHEN REQUIRED, PLACE LONGITUDINAL JOINTS AT LANE LINES OR IN THE MIDDLE OF THE LANE. WHEEL PATHS DURING TEMPORARY TRAFFIC STAGING NEED NOT BE CONSIDERED.

DESIGNER NOTES

USE OF PPC OVERLAYS ARE LIMITED. SEE 40.5 IN THE BRIDGE MANUAL FOR ADDITIONAL GUIDANCE.

PPC OVERLAYS ARE INTENDED TO BE PLACED ON DECKS WITH MINIMAL SURFACE DISTRESS WHERE FULL-DEPTH JOINT REPAIRS, FULL-DEPTH DECK REPAIRS, OR THE NEED TO PARTIALLY REMOVE THE ENTIRE DECK WITH BID ITEM "CLEANING DECKS" IS NOT EXPECTED OR WARRANTED.

PPC OVERLAYS AND TRANSITIONAL AREAS ARE NOT RECOMMENDED ON CONCRETE APPROACHES. PLANS SHALL SPECIFY THE MINIMUM TRANSITION TAPER LENGTH. THE PROVIDED TRANSITION LENGTH, AS SHOWN ON THIS SHEET, IS BASED ON A 3/4" OVERLAY THICKNESS. PROVIDE OVERLAY TRANSITIONAL AREA DETAILS AND IDENTIFY LOCATIONS ON THE PLANS. SEE 40.5.6 FOR ADDITIONAL GUIDANCE.

WHEN PARTIAL-DEPTH REMOVAL OF THE ENTIRE EXISTING DECK IS WARRANTED, USE BID ITEM "CLEANING DECKS". PLANS SHALL SPECIFY THE REQUIRED REMOVAL DEPTH.

DO NOT PROVIDE A PROFILE GRADE LINE ON THE PLANS.

PROVIDE (IF AVAILABLE) THE MOST CURRENT DECK CONDITION ASSESSMENT SURVEY ON PLANS. INCLUDE SURVEY TYPE AND DATE COMPLETED. THERMOGRAPHY DATA CAN BE FOUND IN HSIS WITHIN GENERAL INVENTORY/FILE/INSPECTION/DATE/INSPECTION SPECIAL REPORT. DECK CONDITION ASSESSMENT SURVEY DATES CAN BE FOUND WITHIN INSPECTION/HISTORY UNDER THE "DEVAL" ACTIVITY TYPE.

TOTAL ESTIMATED QUANTITIES

BID ITEM NUMBER	BID ITEMS	UNIT	TOTAL
509.0301	PREPARATION DECKS TYPE 1	SY	
509.0302	PREPARATION DECKS TYPE 2	SY	
509.0310.5	SAWING PAVEMENT DECK PREPARATION AREAS	LF	
509.2000	FULL-DEPTH DECK REPAIR	SY	
SPV.0035	RAPID SET DECK REPAIR	CY	
SPV.0180	POLYESTER POLYMER CONCRETE OVERLAY	SY	
	POSSIBLE ADDITIONAL BID ITEMS		
509.0500	CLEANING DECKS	SY	

THIS IS A PARTIAL LIST OF POSSIBLE BID ITEMS. BID ITEMS MAY NEED TO BE ADDED OR REMOVED TO FIT EACH INDIVIDUAL CASE.

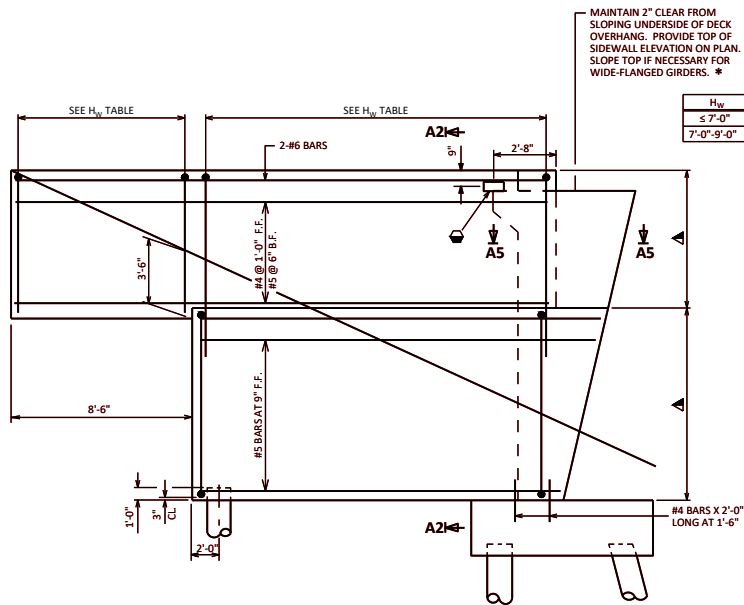
POLYESTER POLYMER CONCRETE OVERLAY



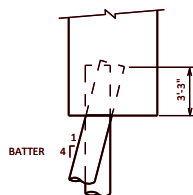
**BUREAU OF
STRUCTURES**

APPROVED: *Laura Shadewald*

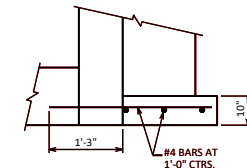
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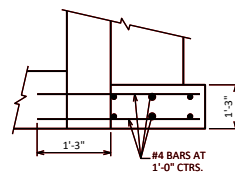
WING ELEVATION
WING LENGTH TO 26'-6"



SECTION A4

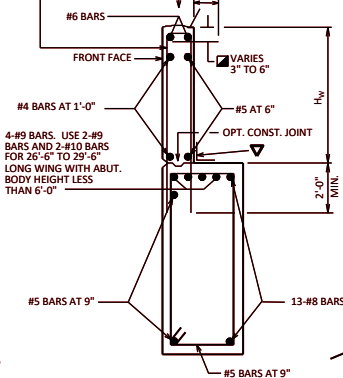


SECTION A5
(WITHOUT STRUCTURAL APPROACH SLAB)

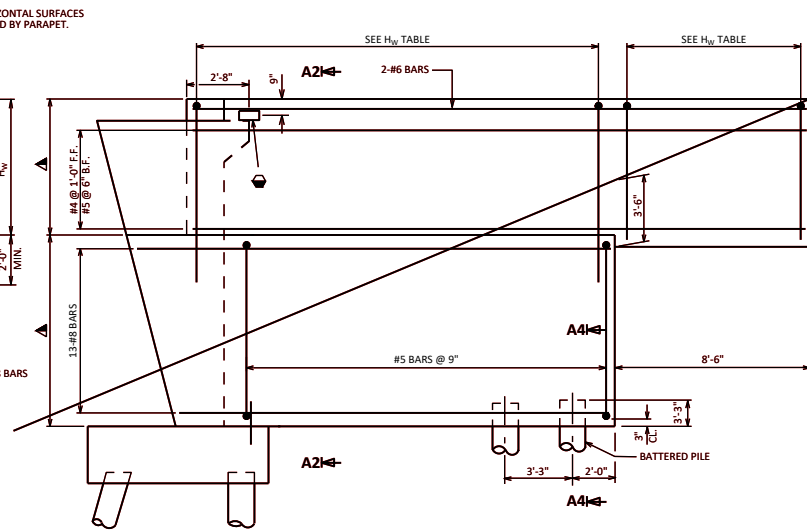


SECTION A5
(WITH STRUCTURAL APPROACH SLAB)

H _w	STEEL RAIL	CONC. RAIL
≤ 7'-0"	#6 @ 9"	#5 @ 1'-0"
7'-0"-9'-0"	#6 @ 9"	#5 @ 6"



SECTION A2
ALL WING LENGTHS



WING ELEVATION
WING LENGTH OVER 26'-6" TO 29'-6"

DESIGNER NOTES

USAGE OF A4 ABUTMENTS IS DISCONTINUED.

BODY DESIGN IS BASED ON AN EQUIVALENT FLUID UNIT WEIGHT OF SOIL OF 40 P.C.F., A 1'-6" SURCHARGE, AND SUPERSTRUCTURE REACTIONS "P".

WING DESIGN IS BASED ON AN EQUIVALENT FLUID UNIT WEIGHT OF SOIL OF 35 P.C.F. AND A 2'-0" SURCHARGE. A 5 KIP LATERAL RESISTANCE IS USED FOR EACH WING PILE.

FRONT ROW PILE DESIGN IS BASED ON AN EQUIVALENT FLUID UNIT WEIGHT OF SOIL OF 40 P.C.F. WITH $\gamma_{EH} = 1.50$, AND SUPERSTRUCTURE REACTIONS "P". BACK ROW PILE DESIGN IS BASED ON AN EQUIVALENT FLUID UNIT WEIGHT OF SOIL OF 20 P.C.F. WITH $\gamma_{EH \text{ MAX}} = 0.90$, AND "P".

UNIT WEIGHT OF SOIL IS ASSUMED AS 120 P.C.F.

BRIDGE SEATS BETWEEN BEARINGS SHALL SLOPE 1" FROM FRONT FACE OF BACKWALL.

PAY LIMITS FOR EXCAVATION FOR STRUCTURES & GRANULAR BACKFILL IS SHOWN IN CHAPTER 12 OF THE BRIDGE MANUAL.

BAR IN WINGS, ABUTMENT BACKWALL, AND PAVING BLOCK SHALL BE EPOXY COATED.

NAME PLATE (ONLY FOR TYPE "W", "M", NY3&4 OR TIMBER RAIL AS SHOWN ON STANDARD 30.24), LOCATE NAME PLATE ON FIRST RIGHT WING TRAVELING UP STATION.

FOR MODULAR EXPANSION JOINTS W/CONC. DIAPH. RUNNING TO EDGE OF DECK: IF SIDEWALL IS USED, FORM SIDEWALL 2" BELOW CONC. DIAPH.

#4 DOWELS (COATED), 2'-0" LONG AT 1'-0" CTRS. FROM WING TIP TO PAVING NOTCH. PLACE IN WING ADJACENT TO SURFACE DRAIN APRON ONLY.

DIMENSIONS TO BE CONSTANT.

18" RUBBERIZED MEMBRANE WATERPROOFING. SEAL ALL HORIZONTAL AND VERTICAL JOINTS ON BACKFACE.

ABUTMENT DETAILED WITHOUT STRUCTURAL APPROACH SLAB. SEE STD. 12.10 THRU 12.13 FOR STRUCTURAL APPROACH DETAILS.

LRFD DESIGN LOADS

LIVE LOAD
BODY = 1'-6" SURCHARGE
WINGS = 2'-0" SURCHARGE
HORIZ. EARTH LOAD BASED ON:
BODY = 40 P.C.F. EQUIV. FLUID UNIT WGT. OF SOIL
WINGS = 35 P.C.F. EQUIV. FLUID UNIT WGT. OF SOIL
LOAD FACTORS:
 $\gamma_{DC} = 1.25$
 $\gamma_{ROW} = 1.50$
 $\gamma_{EH} = 1.50$
 $\gamma_{EH \text{ MAX}} = 0.90$
 $\gamma_{REV} = 1.35$
 $\gamma_L = 1.75$
EXPOSURE CLASS 2, $\gamma_L = 0.75$
 $f_y = 60,000 \text{ P.S.I.}$
 $f'_c = 3,500 \text{ P.S.I.}$

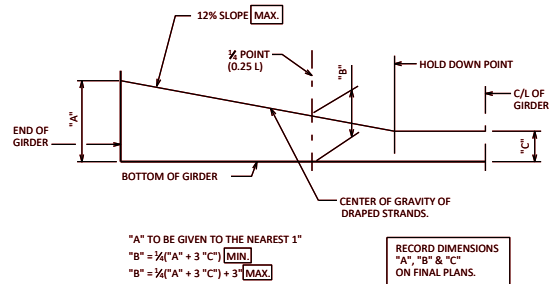
ABUTMENT A4 PILE FOOTING



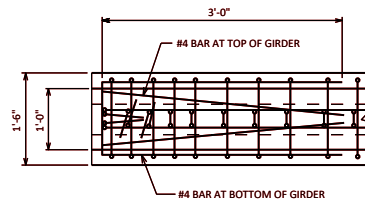
BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

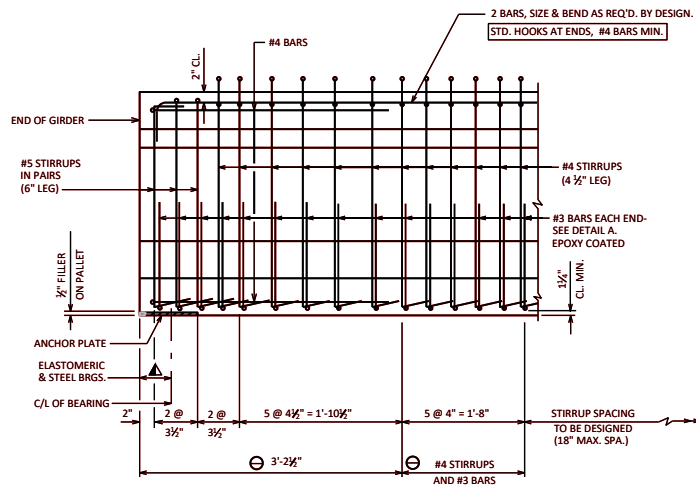
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LOCATION OF DRAPED STRANDS

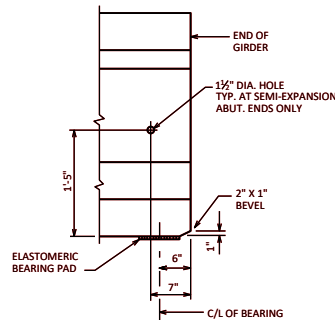


PLAN VIEW

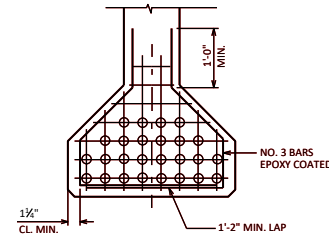


SUPPORT WITH STEEL OR ELASTOMERIC BRGS.

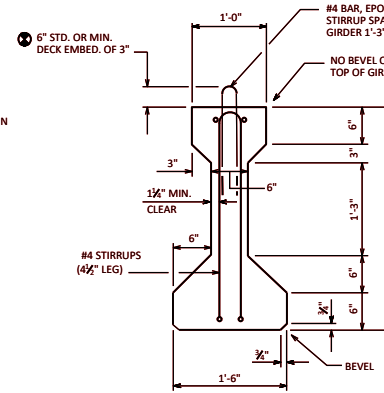
SIDE VIEW OF GIRDER



SUPPORT WITH 1/2" ELASTOMERIC BRG. PAD



DETAIL A



SECTION THRU GIRDER

STRANDS NOT SHOWN

NOTES

TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY, EXCEPT THE OUTSIDE 2" OF GIRDER, WHICH SHALL RECEIVE A SMOOTH FINISH. AN APPROVED CONCRETE SEALER SHALL BE APPLIED TO ALL SMOOTH SURFACES INCLUDING THE OUTSIDE 2" OF THE TOP FLANGE.

DO NOT APPLY CONCRETE SEALER OR EPOXY TO SURFACES RECEIVING APPLICATION OF CONCRETE STAINING.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS. SEE SECTION 503.3.3 OF STANDARD SPECIFICATIONS FOR GUIDANCE.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. FOR GIRDER ENDS EMBEDDED COMPLETELY IN CONCRETE, END OF STRANDS SHALL BE COATED WITH NON-BITUMINOUS JOINT SEALER. FOR GIRDER ENDS THAT ARE FINALLY EXPOSED, COAT THE GIRDER ENDS, EXPOSED STRAND ENDS AND ALL NON-BONDING SURFACES WITHIN 2 FEET OF THE GIRDER ENDS WITH A NON-PIGMENTED EPOXY CONFORMING TO AASHTO M-235 TYPE III, GRADE 2, CLASS B OR C. THE EPOXY SHALL BE APPLIED AT LEAST 3 DAYS AFTER MOIST CURING HAS CEASED AND PRIOR TO THE APPLICATION OF THE SEALER.

ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.

SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT.

AN EQUIVALENT OF WELDED WIRE FABRIC (WWF) ASTM A1064 MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON ACCEPTANCE OF THE STRUCTURES MAINTENANCE SECTION. IF USED, WWF SUBSTITUTION DETAILS SHALL BE SUBMITTED ELECTRONICALLY TO THE WISDOT FABRICATION LIBRARY AND ACCEPTED PRIOR TO SHOP DRAWING SUBMITTAL.

PRESTRESSING STRANDS SHALL BE (DIA.) 7-WIRE LOW-RELAXATION STRANDS WITH AN ULTIMATE STRENGTH OF 270,000 PSI.

DESIGNER NOTES

BID ITEM SHALL BE "PRESTRESSED GIRDER TYPE I 36-INCH".

SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. MAXIMUM RELEASE STRENGTH IS 6800 PSI. USE ONLY 0.5" DIA. STRAND FOR THE DRAPED PATTERN. THE MAX. NUMBER OF DRAPED 0.5" DIA. STRANDS IS 8. USE 0.6" DIA. FOR THE STRAIGHT PATTERN, UNLESS ONLY 0.5" DIA. WORK FOR KEEPING STRESSES AT ACCEPTABLE LEVELS.

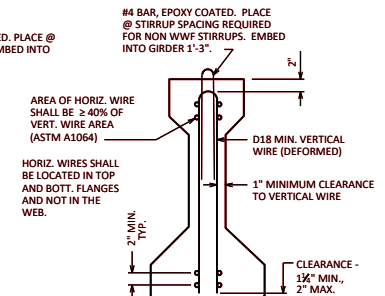
REINFORCEMENT IN STANDARD END SECTION OF THE GIRDER IS BASED ON THE STANDARD STRAND PATTERNS LISTED ON STANDARD 40.43 AND THE SPAN LENGTHS SHOWN IN TABLE 19.3-1. USING DIFFERENT STRAND PATTERNS OR LONGER SPANS WILL REQUIRE A COMPLETE DESIGN OF THIS REINFORCEMENT, WHICH REQUIRES PRIOR APPROVAL FROM THE BUREAU OF STRUCTURES.

VARIES FOR ELASTOMERIC BRGS. (STD. 27.07) AND STEEL BRGS. (STD. 27.09)

DETAIL TYPICAL AT EACH END

THE DESIGN ENGINEER DETERMINES THIS VALUE BASED ON 2" MIN. HAUNCH AT EDGE OF GIRDER, X-SLOPE, PROFILE GRADE LINE AND CALCULATED RESIDUAL GIRDER CAMBER, INCLUDING THE CAMBER MULTIPLIER OF 1.4. THIS VALUE CAN VARY AND SHOULD BE GIVEN FOR EACH 1/3 OF THE GIRDER LENGTH. PROVIDE VALUES THAT MAINTAIN 3" MIN. DECK EMBEDMENT AND 2 1/2" CLEAR FROM TOP OF DECK WHILE ACCOUNTING FOR 4 1/2" VARIANCE IN ACTUAL CAMBER VERSUS THE CALCULATED RESIDUAL CAMBER.

PROVIDE STIRRUP SPACING THAT IS SYMMETRICAL ABOUT THE C/L OF GIRDER.



SECTION THRU GIRDER
SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS
ASTM A1064 (FY = 70 KSI)

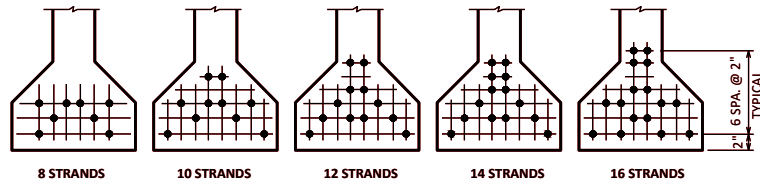
36" PRESTRESSED GIRDER DETAILS



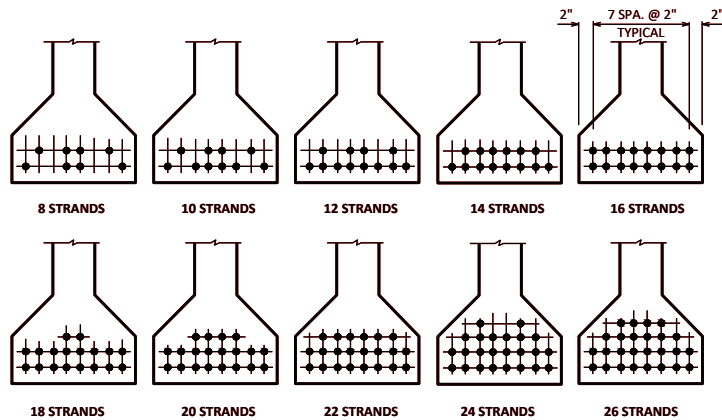
BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE:
7-23



**STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY
TO AVOID DRAPING OF 0.6" DIA. STRANDS**
(0.5" DIA. STRANDS MAY ALSO BE USED)



ARRANGEMENT AT C/L SPAN - FOR GIRDERS WITH DRAPED 0.5" DIA. STRANDS

36" GIRDER

$A = 369 \text{ SQ. IN.}$
 $r^2 = 138.15 \text{ IN.}^2$
 $y_T = 20.17 \text{ IN.}$
 $y_B = -15.83 \text{ IN.}$
 $I = 50,979 \text{ IN.}^4$
 $S_T = 2,527 \text{ IN.}^3$
 $S_B = -3,220 \text{ IN.}^3$
 $WT. = 384 \text{ \#/FT.}$

PRE-TENSION

$f'_s = 270,000 \text{ P.S.I.}$
 $f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I.}$
 FOR LOW RELAXATION STRANDS
 $PI \text{ PER } 0.5" \text{ DIA. STRAND} = 0.1531 \times 202,500 = \underline{31.00 \text{ KIPS}}$
 $PI \text{ PER } 0.6" \text{ DIA. STRAND} = 0.217 \times 202,500 = \underline{43.94 \text{ KIPS}}$

$$\frac{y_B}{r^2} = \frac{-15.83}{138.15} = -0.1146 \text{ IN./IN.}^2$$

$$f_b \text{ (INIT.)} = \frac{A_s f_s}{A} \left(1 + \frac{e_s y_B}{r^2}\right)$$

(COMPRESSION IS POSITIVE)

NO. STRANDS	e_s (INCHES)	$P \text{ (INIT.)} = A_s f_s$ (KIPS)	$f_b \text{ (INIT.)} (K/SQ.IN.)$
STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS (0.6" DIA.)			
8	-11.33	352	2.192
10	-10.23	439	2.584
12	-9.83	527	3.036
14	-9.26	615	3.435
16	-9.08	703	3.887
STANDARD STRAND PATTERNS FOR DRAPED STRANDS (0.5" DIA.)			
8	-12.83	248	1.660
10	-13.03	310	2.094
12	-13.16	372	2.528
14	-12.97	434	2.924
16	-12.83	496	3.320
18	-12.50	558	3.678
20	-12.23	620	4.034
22	-12.01	682	4.392
24	-11.66	744	4.710
26	-11.37	806	5.030

DESIGNER NOTES

ON THE STRAND PATTERN SHEET, PLACE A BOX AROUND EACH STRAND PATTERN THAT APPLIES TO THE DESIGNED STRUCTURE AND LABEL THE SPAN IT IS USED IN.

36" PRESTRESSED GIRDER DESIGN DATA



BUREAU OF STRUCTURES

APPROVED: *Laura Shadewald*

DATE:
7-21