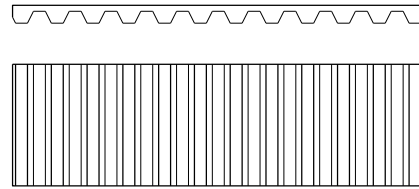


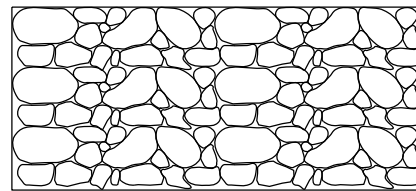
SECTION THRU FORMLINER

⚠ 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.



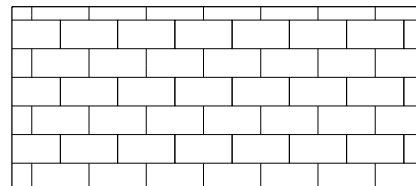
BROKEN RIB

FORMLINER THICKNESS = $3" \pm 1/2"$
WIDTH = $2" \pm 1/2"$
MAX. RELIEF = $2" \pm 1/2"$



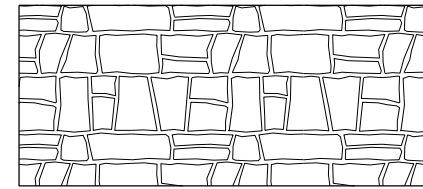
FIELD STONE - RANDOM

FORMLINER THICKNESS = $3 1/2"$
SIZES BETWEEN $6"$ & $24"$
MAX. RELIEF = $2 1/2"$



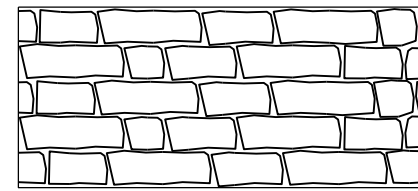
RECTANGULAR BRICK

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 $5 1/2"$
COURSE HEIGHT = $\pm 2"$
MAX. RELIEF = $3"$ TO $4 1/2"$

WARNING

FORMLINER SHOWN ON THIS STANDARD IS A NON-PARTICIPATING ITEM (CSS).

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.

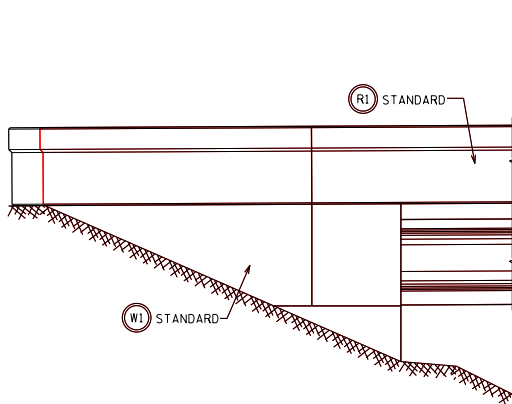
FORMLINER DETAILS



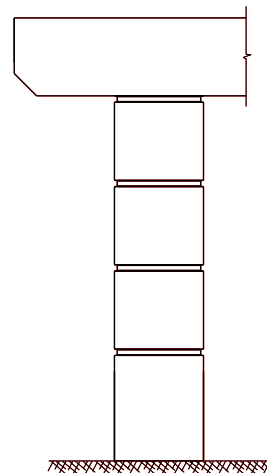
**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

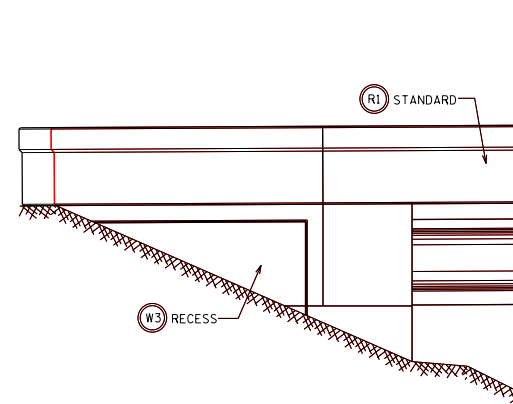
DATE:
7-16



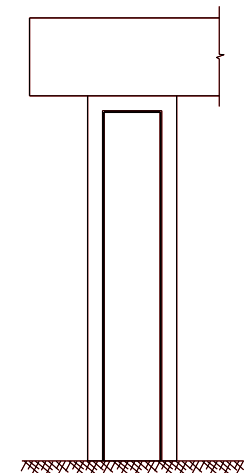
TYPE I



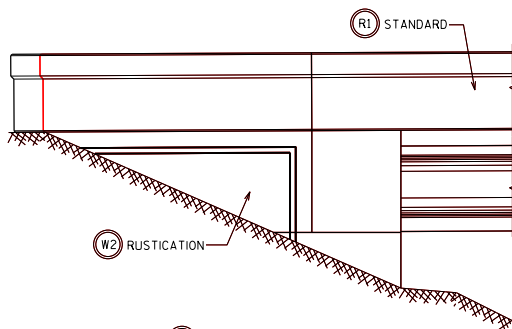
(P1) SINGLE RUSTICATION LINES



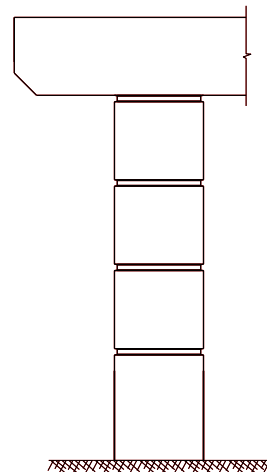
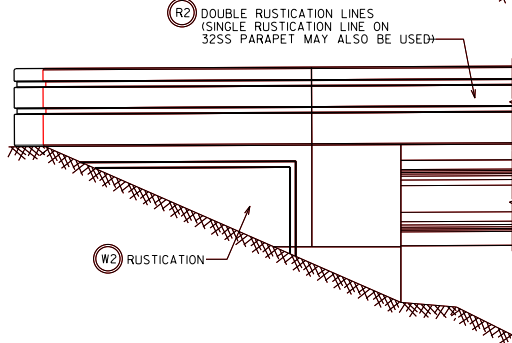
TYPE III



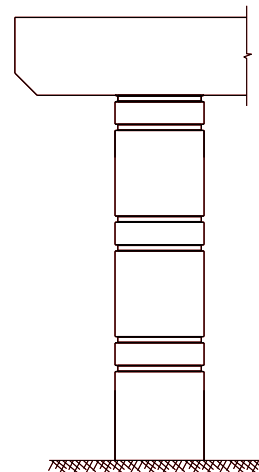
(P3) RECESSED PANEL



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 CSS FUNDING.

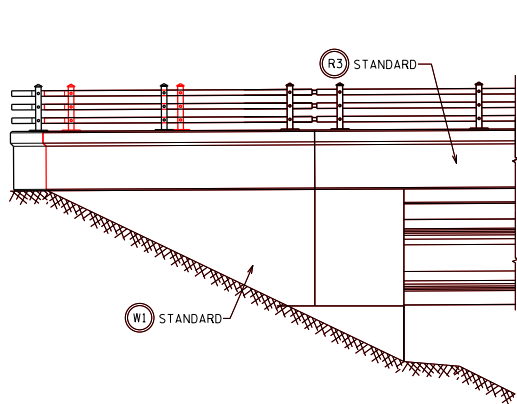
ONLY THE CHOICE OF PARAPET, WING AND PIER DETAILS SHOWN FOR A GIVEN TYPE SHOULD BE USED FOR THAT TYPE.

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

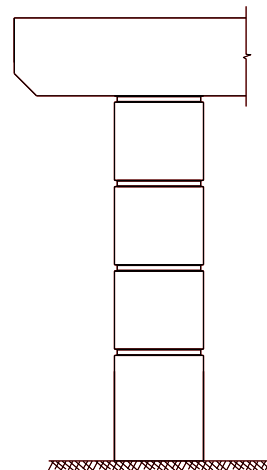
SEE STANDARDS 4.04 AND 4.05 FOR ADDITIONAL DETAILS.

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

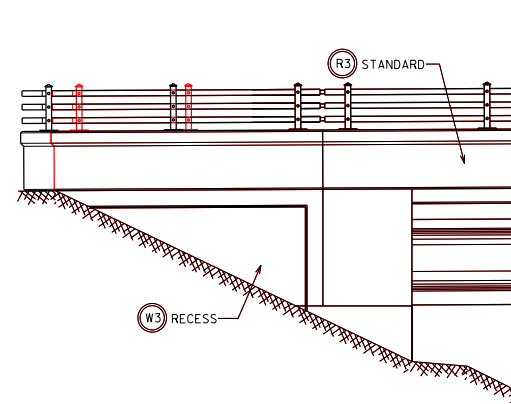
AESTHETIC CONCEPTS WITHOUT PEDESTRIAN ACCOMMODATIONS	
	BUREAU OF STRUCTURES
APPROVED: <u>Abir O Bank</u>	DATE: <u>7-22</u>



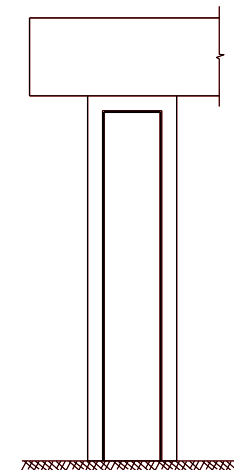
TYPE I



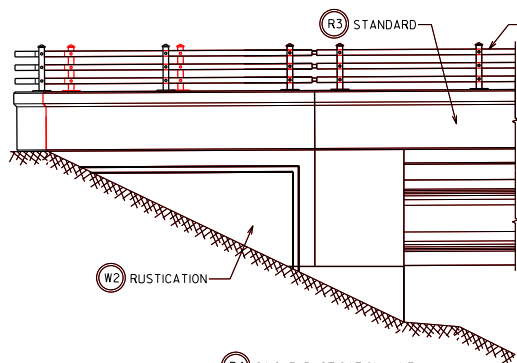
(P1) SINGLE RUSTICATION LINES



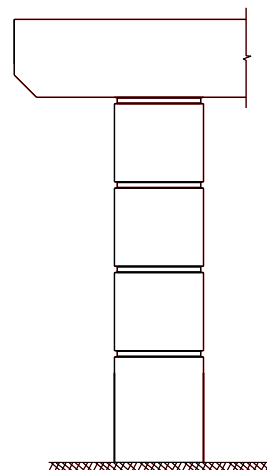
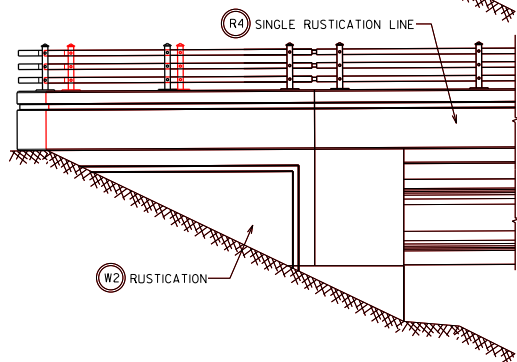
TYPE III



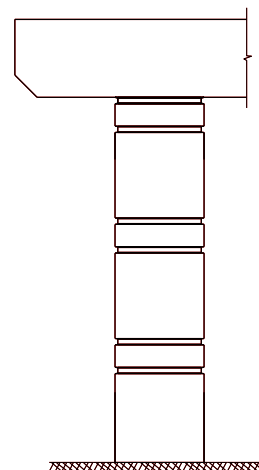
(P3) RECESSED PANEL



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 CSS FUNDING.

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

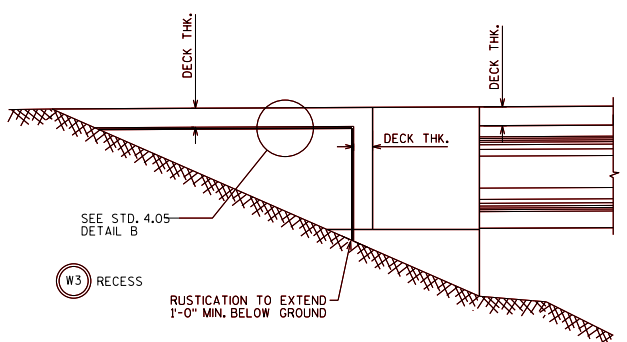
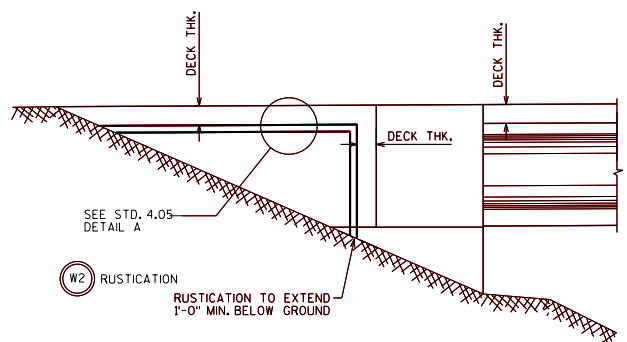
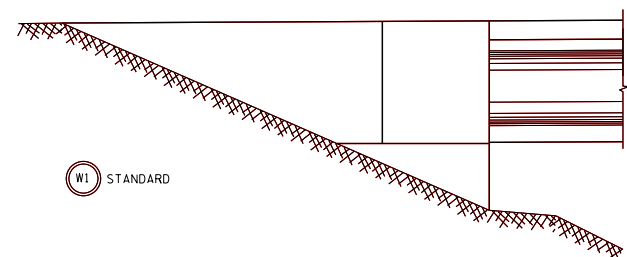
WINGS PARALLEL TO CENTERLINE OF ABUTMENT (ELEPHANT EAR) ARE TO BE PLAIN (TYPE I).

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

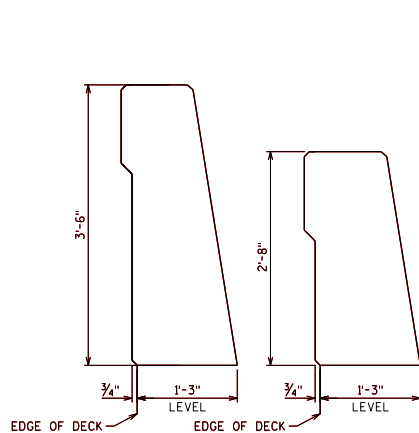
SEE STANDARDS 4.04 AND 4.05 FOR ADDITIONAL DETAILS.

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

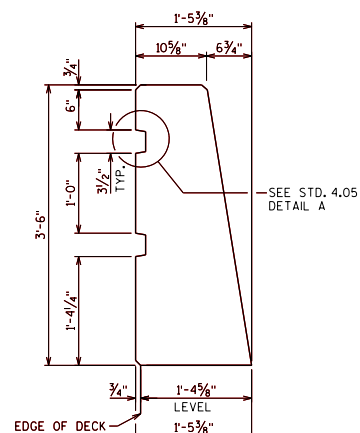
AESTHETIC CONCEPTS WITH PEDESTRIAN ACCOMMODATIONS	
	BUREAU OF STRUCTURES
	DATE: _____
APPROVED: <i>Abir O Bank</i>	7-22



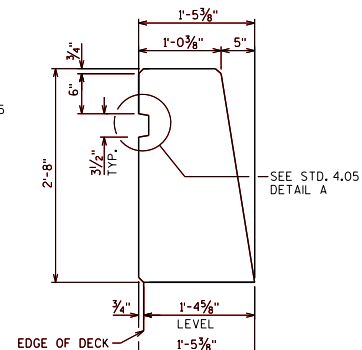
WING OPTIONS



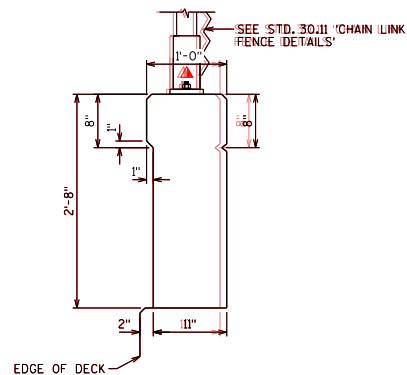
(R1) STANDARD
SEE STD. 30.32 'SINGLE SLOPE PARAPET 42SS' OR STD. 30.30 'SINGLE SLOPE PARAPET 32SS' FOR DETAILS



(R2) DOUBLE RUSTICATION LINES
MODIFIED 'SINGLE SLOPE PARAPET 42SS'
(AREA = 4.01 SF, WEIGHT = 602 LB/FT.)

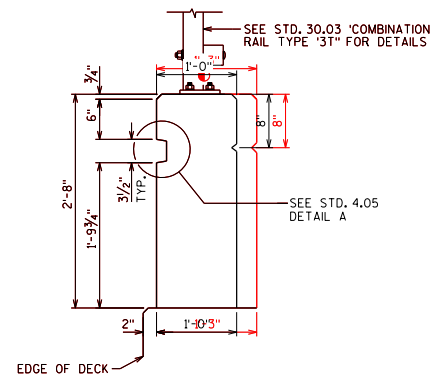


(R2) SINGLE RUSTICATION LINES
MODIFIED 'SINGLE SLOPE PARAPET 32SS'
(AREA = 3.25 SF, WEIGHT = 488 LB/FT.)



(R3) STANDARD
SEE STD. 30.07 'VERTICAL FACE PARAPET 'A'' FOR DETAILS

▲ USE 1'-3" TOP DIMENSION WHEN USED WITH 'COMBINATION RAIL TYPE '3T'' (AREA = 3.27 SF, WEIGHT = 474 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

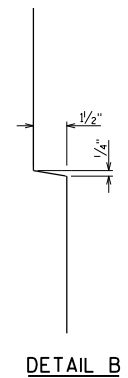
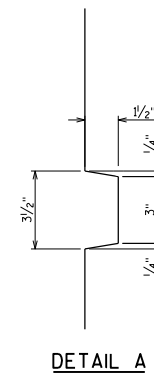
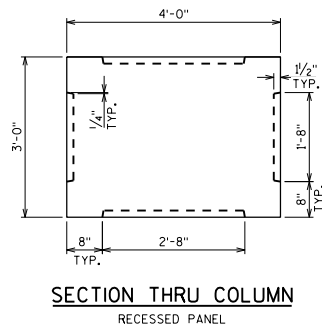
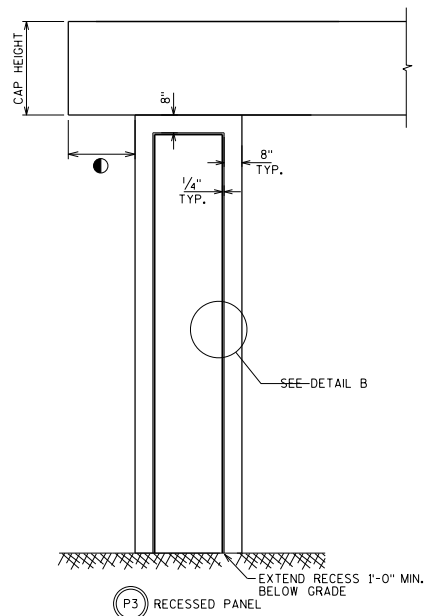
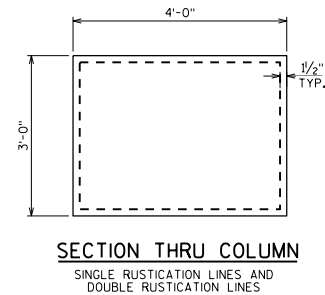
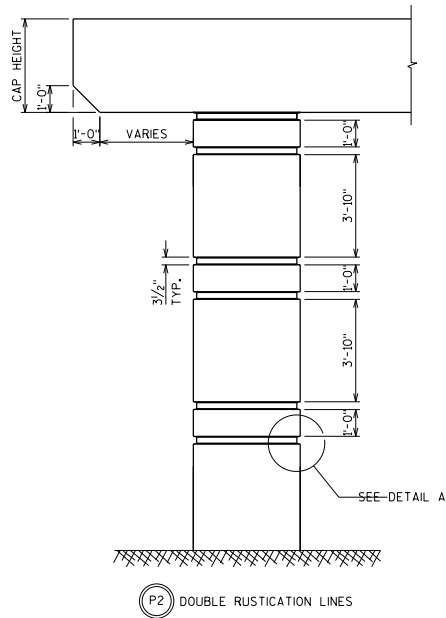
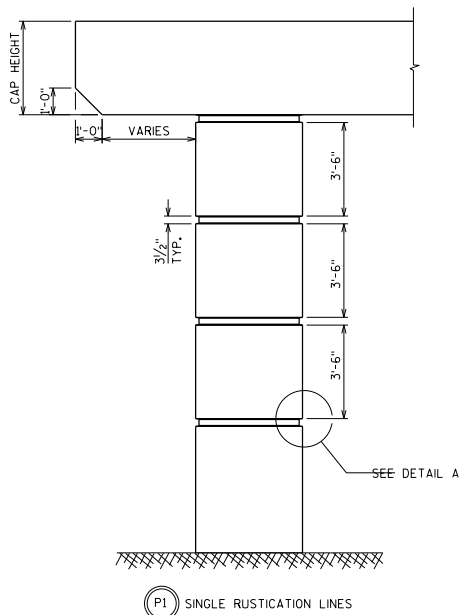
PARAPET OPTIONS


DESIGNER NOTES

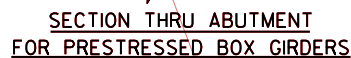
WINGS PARALLEL TO CENTERLINE OF ABUTMENT
(ELEPHANT EAR) ARE TO BE PLAIN (TYPE I).

WING & PARAPET AESTHETIC DETAILS	
	BUREAU OF STRUCTURES
	APPROVED: <u>Bill Oliva</u> DATE: 1-19

STANDARD 4.04



MULTI-COLUMNED PIER AESTHETIC DETAILS	
	BUREAU OF STRUCTURES
	APPROVED: <u>Bill Oliva</u>
DATE: 7-15	



● LIMITS OF GRS BACKFILL TO BE PAID FOR UNDER THE BID ITEM
'GEOSYNTHETIC REINFORCED SOIL ABUTMENT'

** CONCRETE SPREAD FOOTING TO BE DETERMINED PER DESIGN.

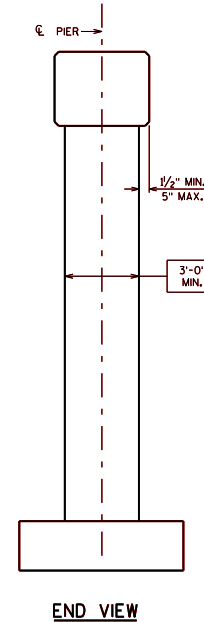
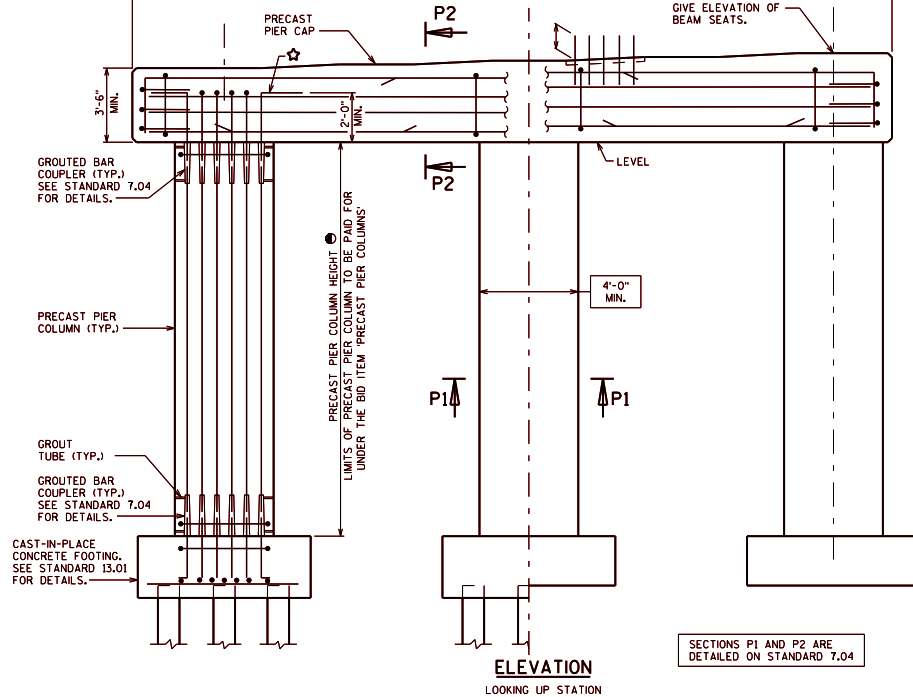


*LENGTH MEASURED FROM FRONT FACE OF MODULAR
BLOCK TO END OF FRONT FINGER (DOES NOT INCLUDE
WRAPPED GEOTEXTILE WHERE APPLICABLE).
GEOTEXTILE FABRIC,
(DOES NOT INCLUDE WRAPPED
GEOTEXTILE FABRIC WHERE APPLICABLE).

STANDARD 7.02

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

PRECAST PIER CAP LENGTH (MAXIMUM LENGTH OF EACH CAP SEGMENT IS BASED ON WEIGHT)
LIMITS OF PRECAST PIER CAP TO BE PAID FOR UNDER THE BID ITEM "PRECAST PIER CAPS"
SEE KEYED CONSTR. JOINT DETAIL (STANDARD 7.04) WHEN MULTIPLE PIER CAP SEGMENTS ARE REQUIRED



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 SUPPORT BY A MINIMUM OF 2 COLUMNS.

THE FOLLOWING SPECIAL PROVISIONS SHALL BE USED:

GRouted BAR COUPLERS (S09.0000.0XXX)
PRECAST PIER COLUMNS (SPV.0090.0XXX)
PRECAST PIER CAPS (SPV.0090.0XXX)

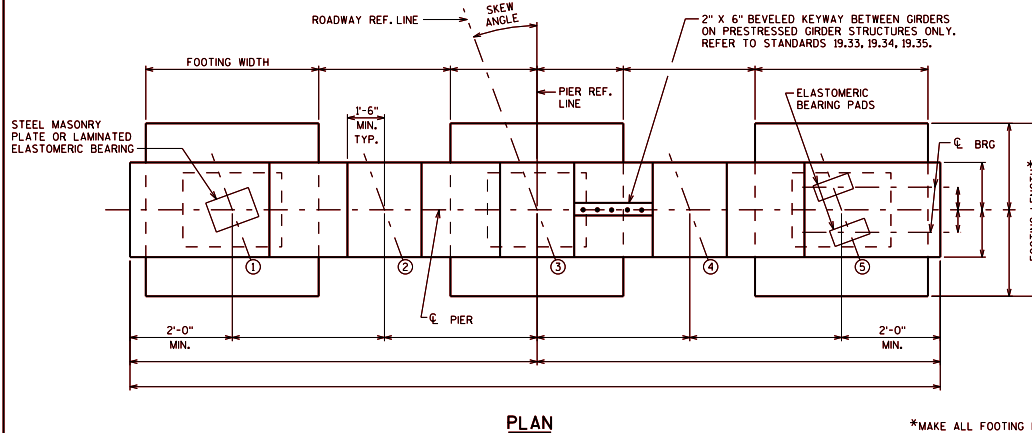
THE MAXIMUM WEIGHT OF EACH PRECAST ELEMENT SHALL BE 90 KIP.

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.

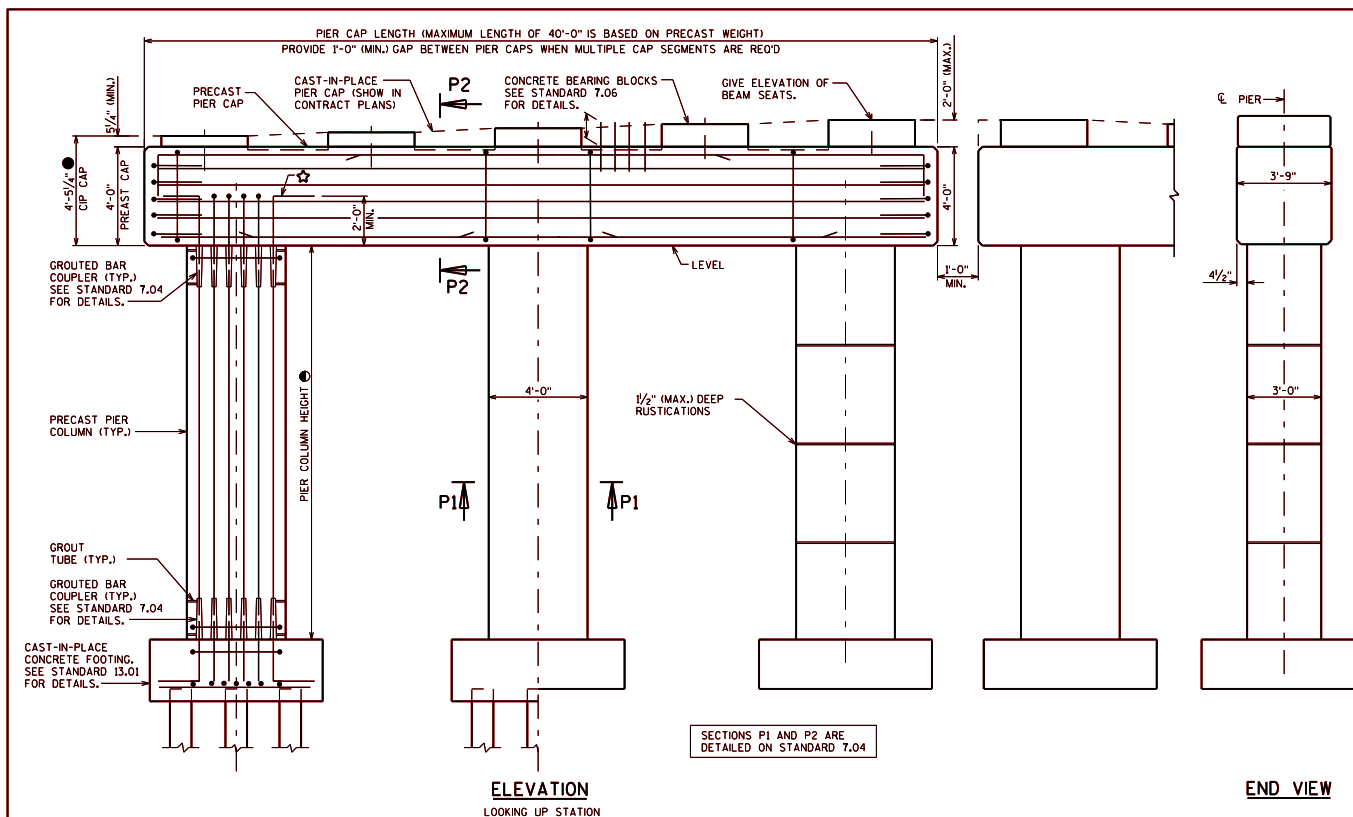
DETAILS AS SHOWN ON THIS STANDARD ARE INTENDED FOR REQUIRED PRECAST PIERS DESIGNED TO MEET PROJECT SPECIFIC REQUIREMENTS. SEE 7.1.4.1.2 IN THE 'BRIDGE' / 90 MANUAL AND STANDARDS 7.05 AND 7.06 FOR ADDITIONAL GUIDANCE. ALTERNATIVES TO CAST-IN-PLACE PIERS: SEE 7.1.4.1.2 IN THE BRIDGE MANUAL AND STANDARDS 7.05 AND 7.06 FOR ADDITIONAL GUIDANCE.



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: <u>Bill Oliva</u>
DATE: 1-19	



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 UNITS.

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 (SBP050000XK)
PRECAST PIER COLUMNS (SBP000900XKX)
PRECAST PIER CAPS (SBP000900XKX)

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.

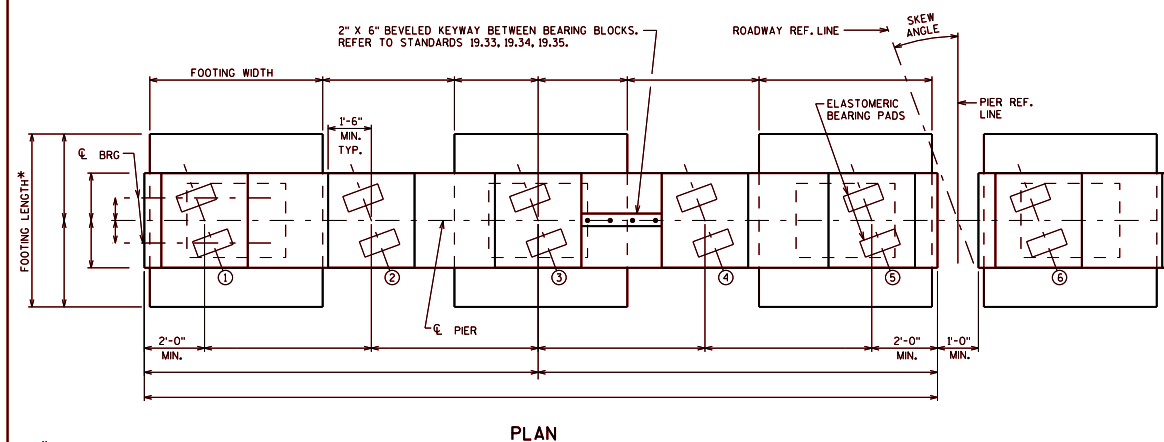
SEE 7.1.4.1.2 FOR ADDITIONAL PRECAST PIER GUIDANCE.

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

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

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

POLICY AND DETAILS REGARDING THE USE OF PRECAST PIER CAPS AND COLUMNS IS BEING DEVELOPED BY THE BUREAU OF STRUCTURES IN CONJUNCTION WITH THE I-39/90 PROJECT. SEE 7.1.4.1.2 FOR ADDITIONAL GUIDANCE.

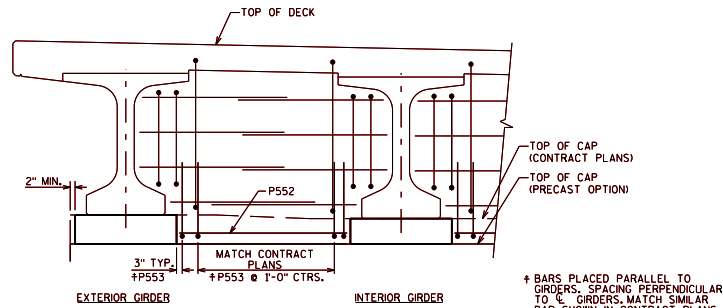


*MAKE ALL FOOTING LENGTHS THE SAME WITHIN A GIVEN PIER

MATERIAL PROPERTIES:
CONCRETE MASONRY
BAR REINFORCEMENT, GRADE 60

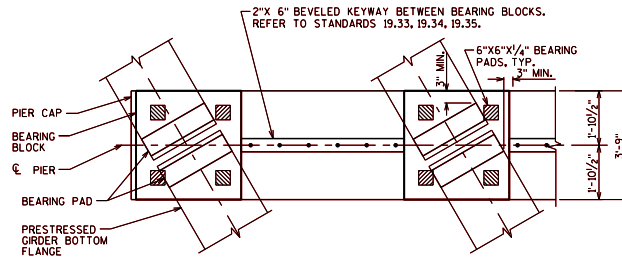
$f'_c = 3,500$ P.S.I.
 $f_y = 60,000$ P.S.I.

PRECAST PIER (OPTIONAL) CAP AND COLUMNS	
	BUREAU OF STRUCTURES
APPROVED: <u>Bill Oliva</u>	DATE: <u>1-18</u>

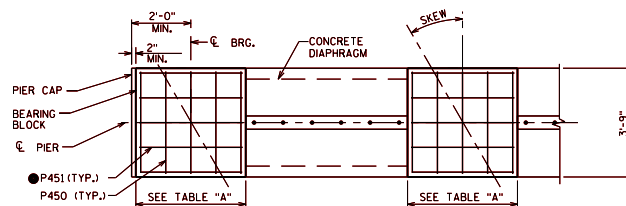


PARTIAL TRANSVERSE SECTION AT DIAPHRAGM PIER

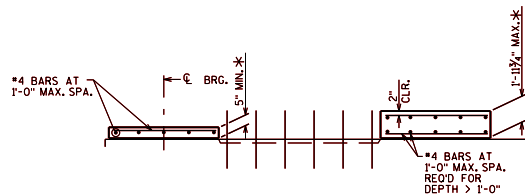
STD. 19.35 SHOWN (STD. 19.33 & 19.34 SIM.)



PLAN



PLAN



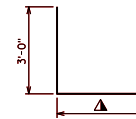
ELEVATION

BILL OF BARS

TOTAL COATED: XX LBS

BAR MARK	NO. REQ'D.	LENGTH	COAT	BENT	LOCATION
P450		3'-5"	X	-	TOP & BOTT. TRANS.
P451		3'-5"	X	-	TOP & BOTT. LONG.
P552		1'-10"	X	-	PIER DIAPHRAGM - BOTH FACES HORIZ. - BTWN GIRDERS
P553		1'-10"	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.



▲ 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 KIPS.

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 3/4" 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.

POLICY AND DETAILS REGARDING THE USE OF PRECAST PIER CAPS AND COLUMNS IS BEING DEVELOPED BY THE BUREAU OF STRUCTURES IN CONJUNCTION WITH THE I-39/90 PROJECT. SEE 7.1.4.1.2 FOR ADDITIONAL GUIDANCE.

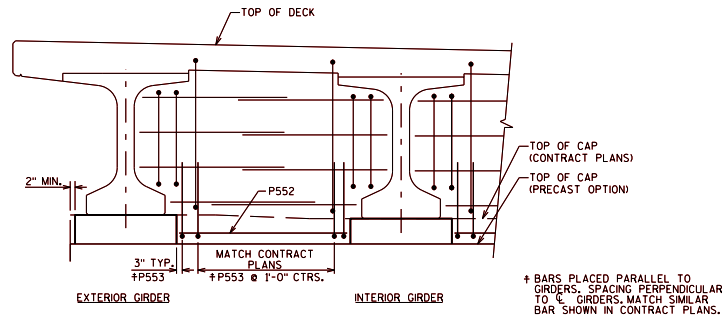
PRECAST BEARING BLOCK DETAILS



**BUREAU OF
STRUCTURES**

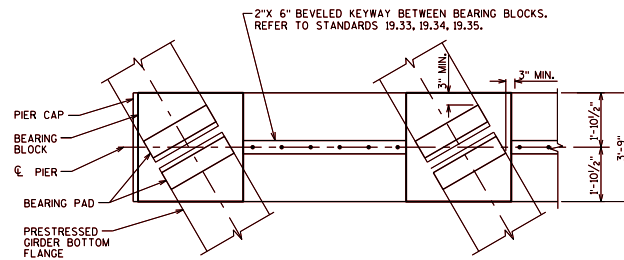
APPROVED: Bill Oliva

DATE:
1-18

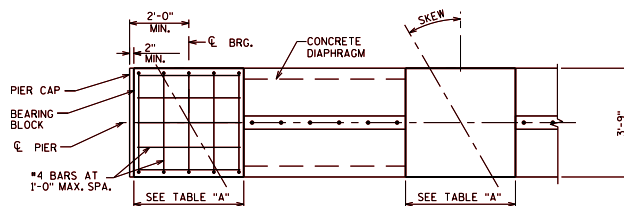


PARTIAL TRANSVERSE SECTION AT DIAPHRAGM PIER

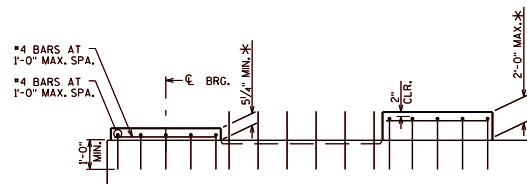
STD. 19.35 SHOWN (STD. 19.33 & 19.34 SIM.)



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 (5/4" MIN. TO 2'-0" MAX.). CONTRACTOR TO DETERMINE THE CAST-IN-PLACE BEARING BLOCK HEIGHTS.

POLICY AND DETAILS REGARDING THE USE OF PRECAST PIER CAPS AND COLUMNS IS BEING DEVELOPED BY THE BUREAU OF STRUCTURES IN CONJUNCTION WITH THE I-39/90 PROJECT. SEE 7.1.4.1.2 FOR ADDITIONAL GUIDANCE.

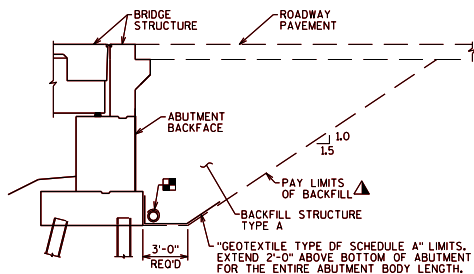
CAST-IN-PLACE BEARING BLOCK DETAILS



**BUREAU OF
STRUCTURES**

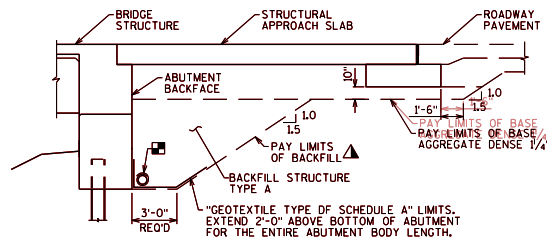
APPROVED: Bill Oliva

DATE:
1-18



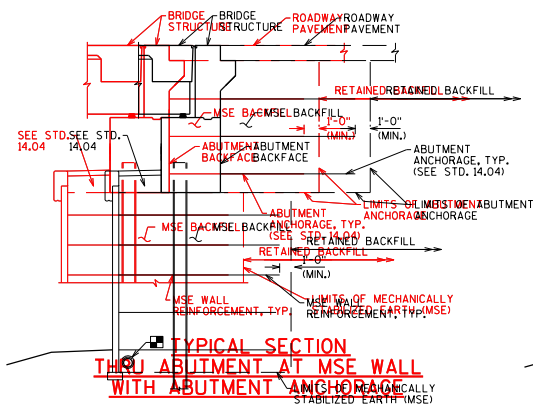
TYPICAL SECTION THRU ABUTMENT

(A3 ABUTMENT WITHOUT STRUCTURAL APPROACH)



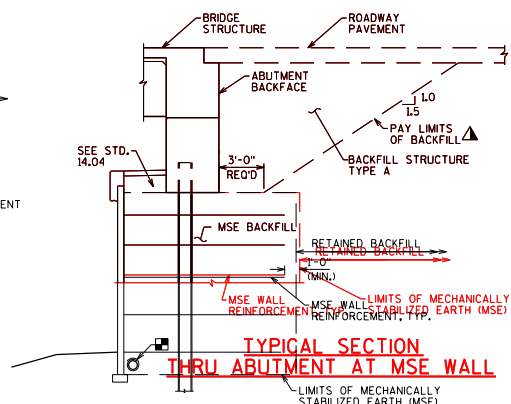
TYPICAL SECTION THRU ABUTMENT

(A1 ABUTMENT WITH STRUCTURAL APPROACH)

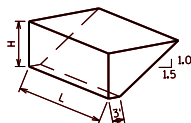


TYPICAL SECTION THRU ABUTMENT AT MSE WALL WITH ABUTMENT ANCHORAGE

(A3 ABUTMENT WITH ABUTMENT ANCHORAGE)

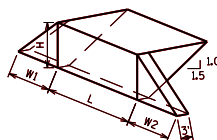


(A1 ABUTMENT WITHOUT STRUCTURAL APPROACH)



ABUTMENT BACKFILL DIAGRAM FOR WINGS PARALLEL TO ROADWAY

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)
 $V_{CF} = (L)(3.0)(H) + (L)(W1)(H) + (L)(W2)(H)$
 $V_{CF} = V_{CF}(EF)/27$
 $V_{TON} = V_{CF}(2.0)$



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)
 $V_{CF} = (L)(3.0)(H) + (L)(W1)(H) + (L)(W2)(H)$
 $V_{CF} = V_{CF}(EF)/27$
 $V_{TON} = V_{CF}(2.0)$

NOTES

THE UPPER LIMITS OF EXCAVATION FOR STRUCTURES BRIDGES B-1-1 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 PLE 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. GEOTEXTILE ARE NOT REQUIRED BEHIND ABUTMENTS. 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 9.03 FOR WING FILL SECTIONS AT WING TIPS. SEE STANDARD 9.02 FOR RETAINING WALL AND BOX CULVERT DETAILS.

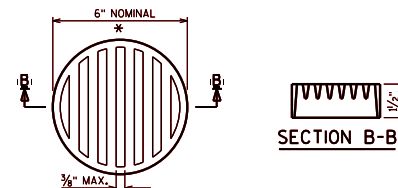
SEE STANDARD 9.03 FOR WING FILL SECTIONS AT WING TIPS.

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

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

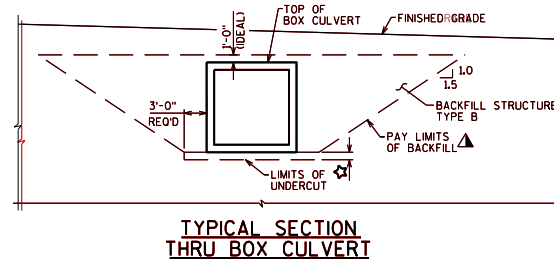
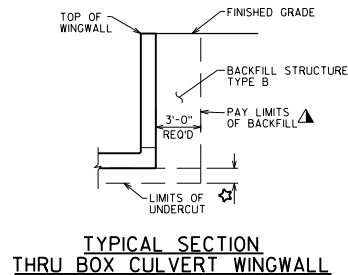


**BUREAU OF
STRUCTURES**

APPROVED: *Bill Oliva*

DATE:
7-20

STANDARD 9.01



☆ CULVERT UNDERCUT AND BEDDING BACKFILL TO BE DETERMINED BY GEOTECHNICAL ENGINEER. (CHOOSE APPLICABLE NOTE, MODIFY AS NEEDED)

NOTES (BOX CULVERTS)

THE UPPER LIMITS OF "EXCAVATION FOR STRUCTURES CULVERTS 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 #1 OR #2 CONCRETE COARSE AGGREGATE, 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.

ALL PRECAST BOX SECTIONS SHALL BE PLACED ON A BEDDING OF "BACKFILL STRUCTURE TYPE B" OF 6" MINIMUM DEPTH. (NOTE APPLICABLE WHEN PRECAST NOTE IS SHOWN ON THE PLANS)

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

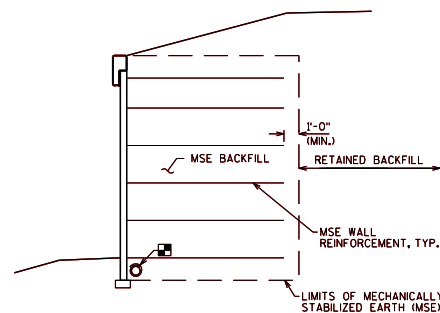
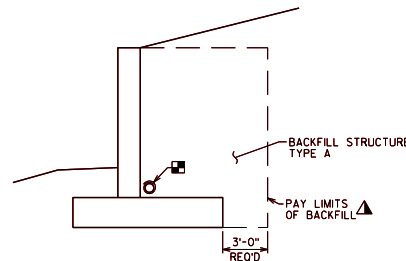
▲ THE DESIGN ENGINEER SHOULD PROVIDE ALL NECESSARY BACKFILL PAY LIMITS AND NOTES IN ORDER TO DETERMINE QUANTITIES. SEE BRIDGE MANUAL SECTIONS 6.4.2 AND 9.10 FOR ADDITIONAL INFORMATION.

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.

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: *Abitha O Bank*

DATE:
7-22

WINGS PARALLEL TO ROADWAY

WINGS PARALLEL TO ABUTMENT

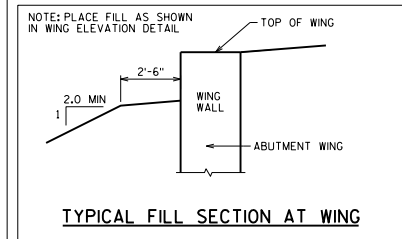
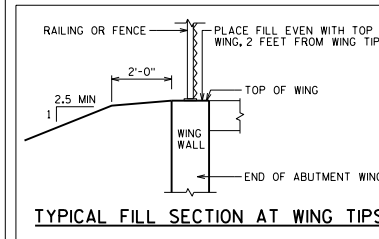
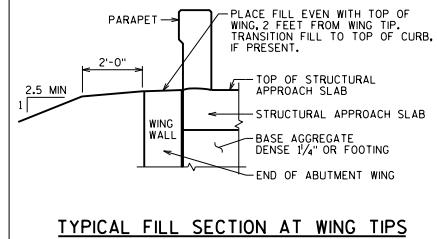
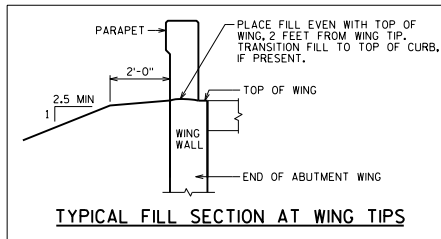
STANDARD WING

WITH STRUCTURAL APPROACH SLAB

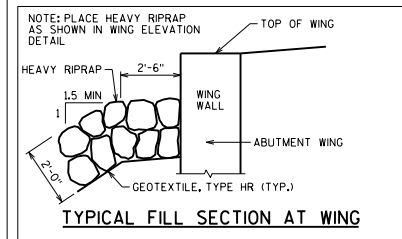
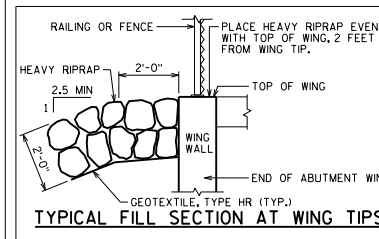
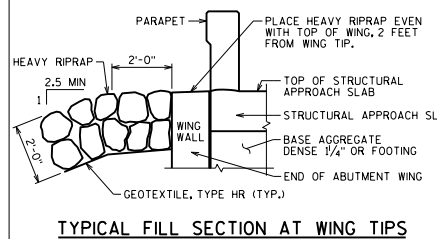
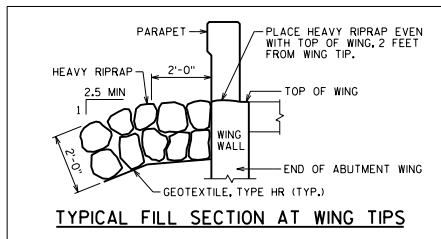
WITH RAILING OR FENCE ONLY

STANDARD WING

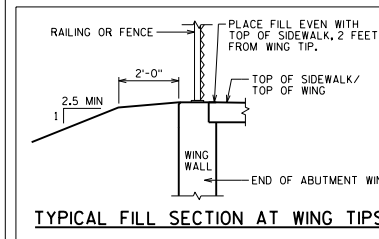
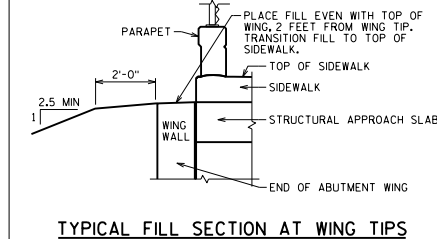
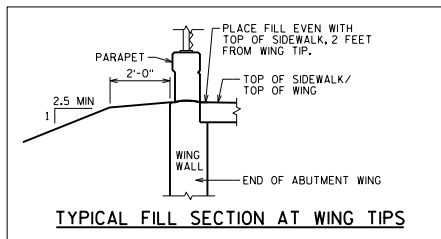
STANDARD FILL



RIP RAP



STANDARD FILL WITH SIDEWALK



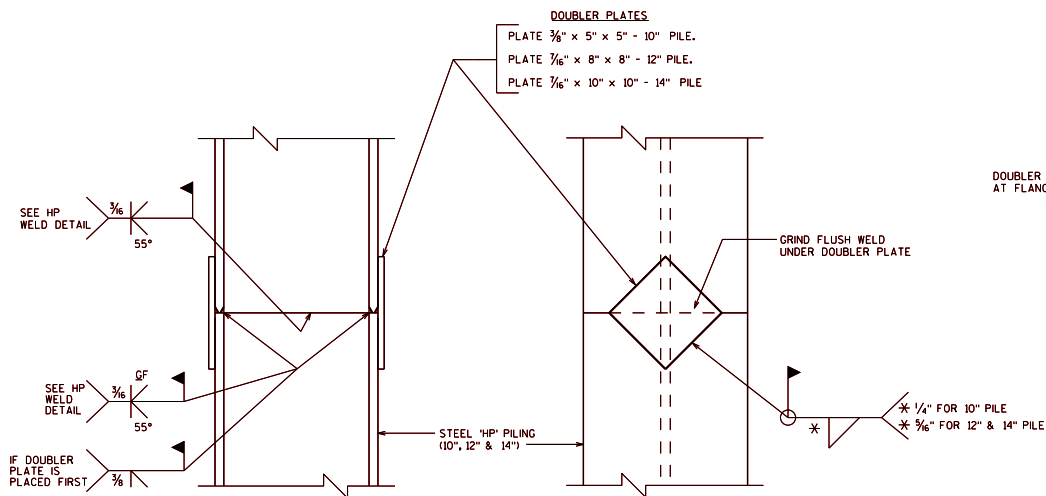
WING FILL SECTIONS AT WING TIPS



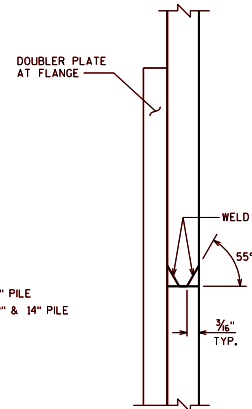
BUREAU OF STRUCTURES

APPROVED: *Bill Oliva*

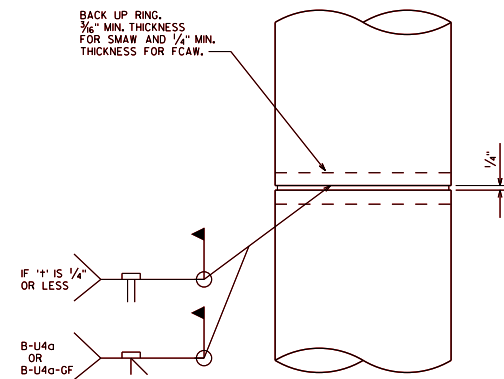
DATE: 1-18



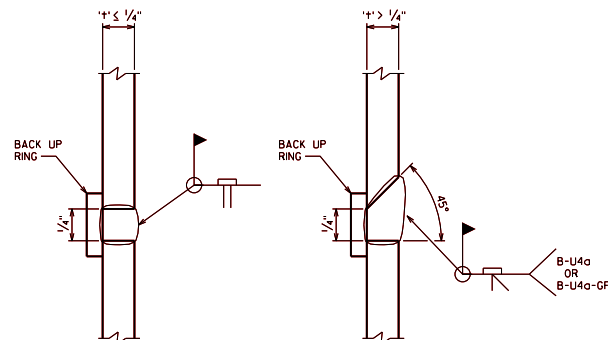
STEEL 'HP' SHAPES



HP WELD DETAIL
FLANGE SHOWN, WEB SIMILAR



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



CIP PILE WELD DETAIL

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.

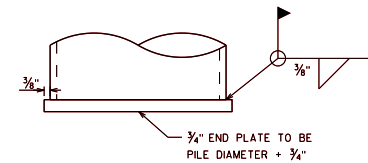
SEE BRIDGE MANUAL SECTION 11.3.1.17.7 FOR PILE RESISTANCE VALUES.

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.

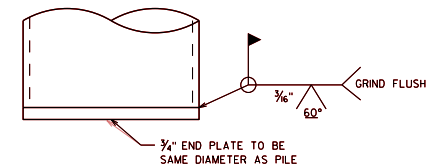
NOTES

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.



END PLATE DETAIL FOR CIP PILING



END PLATE DETAIL FOR CIP PILING

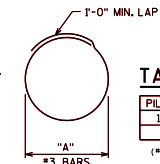
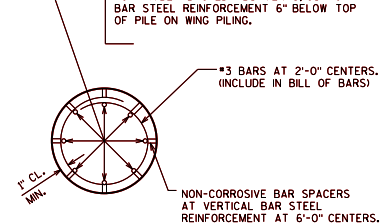
IN ARTESIAN CONDITIONS

(ONLY USE FOR ARTESIAN CONDITIONS)

FOR 12 3/4" DIA. PILES, USE 6 - #7 BARS.
FOR 14" DIA. PILES, USE 8 - #7 BARS.
INCLUDE IN BILL OF BARS, EXTEND 1'-2" (FOR ALL PILE SIZES) INTO CONCRETE CAP.

TERMINATE REINFORCEMENT 10'-0" BELOW GROUNDLINE OR STREAMBED ELEVATION.

FOR TIMBER BACKED ABUTMENTS, CUT OFF BAR STEEL REINFORCEMENT 6" BELOW TOP OF PILE ON WING PILING.



TABLE

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

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

SECTION THRU CONCRETE

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

PILE DETAILS



**BUREAU OF
STRUCTURES**

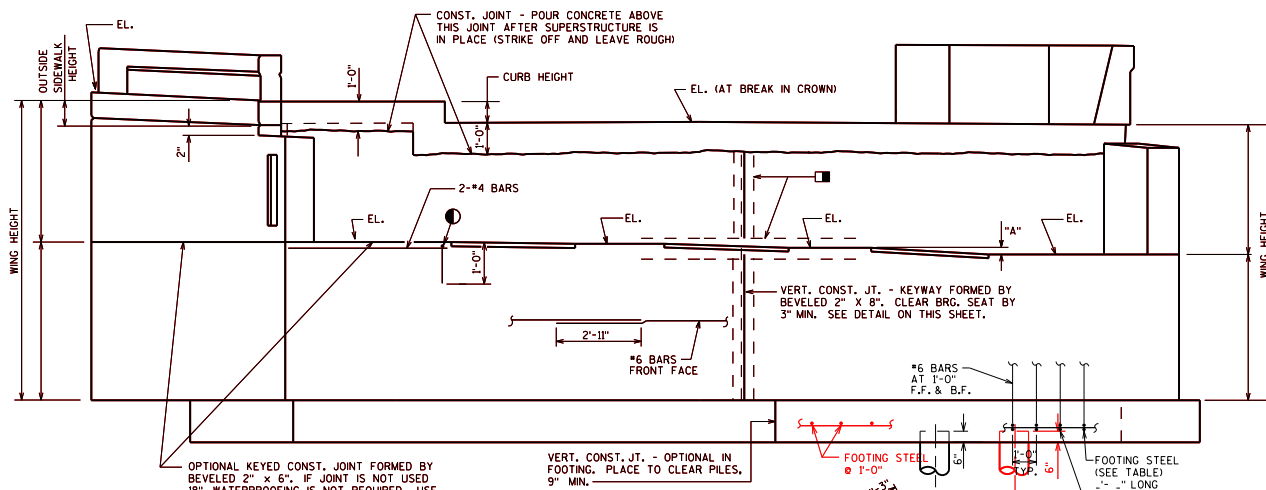
APPROVED: Bill Oliva

DATE:
7-28

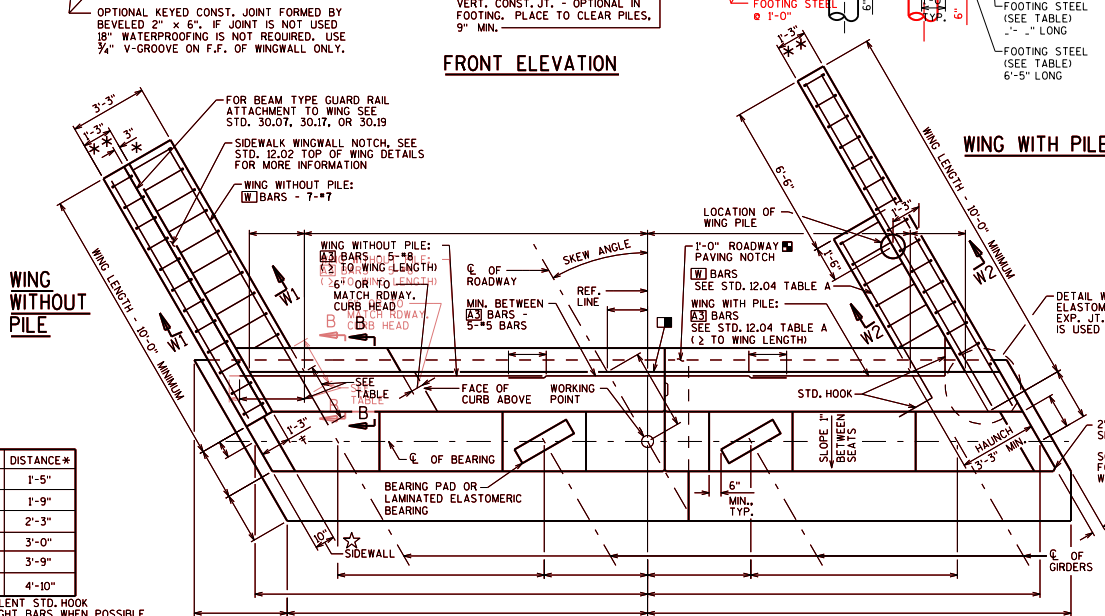
STANDARD 11.01



STANDARD 12.01



FRONT ELEVATION



TABLE

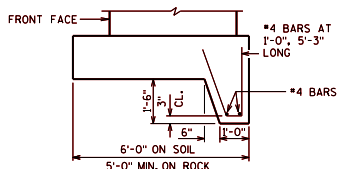
BAR SIZE	DISTANCE*
#5	1'-5"
#6	1'-9"
#7	2'-3"
#8	3'-0"
#9	3'-9"
#10	4'-10"

* OR EQUIVALENT STD. HOOK
USE STRAIGHT BARS WHEN POSSIBLE

WING WITH SIDEWALK

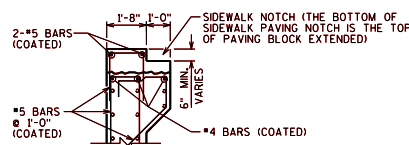
PLAN

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 = $P[(0.22+X/4.25)] + [(h+2.25)^3/310] + 4.6$
BACK ROW = $P[(0.78-X/4.25)] - [(h+2.25)^3/705] + 16.8$

NOTES:

h = WING HEIGHT (FT.)

$P = \gamma D_c (P_{DC} + \gamma D_w P_{DW}) + \gamma (LL) (LL) (k/FT.)$

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 γ_{EH} MIN. = 0.90, 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 2 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.

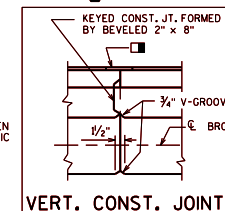
PARAPET NOT SHOWN IN PLAN VIEW FOR CLARITY.

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

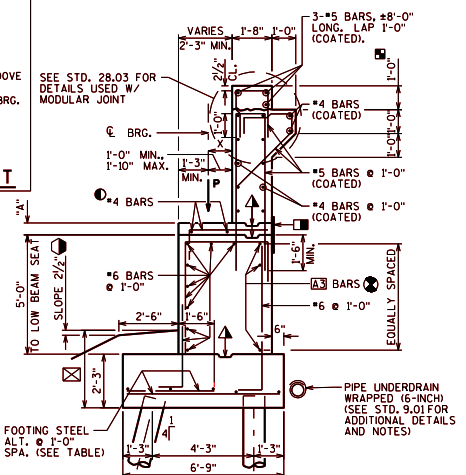
SEE STANDARDS 12.01 AND 13.01 FOR SLOPED BEAM SEAT CRITERIA AND DETAILS.

LEGEND

- 18" RUBBERIZED MEMBRANE WATERPROOFING. SEAL ALL HORIZ. AND VERT. JOINTS ON BACKFACE ABOVE FOOTING. WATERPROOFING. SEAL ALL HORIZ. AND VERT. JOINTS ON BACKFACE ABOVE FOOTING.
- KEYED CONSTRUCTION JOINT FORMED BY BEVELED 2" X 6".
- 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'-0" BETWEEN SEATS. THIS STEEL IS REQUIRED ONLY IF DIMENSION "A" EXCEEDS 4'-0".
- 1'-5" WHEN VERTICAL FACE PARAPET TYPE "TX" IS USED.
- 4" WHEN VERTICAL FACE PARAPET TYPE "TX" IS USED.
- 2" WHEN VERTICAL FACE PARAPET TYPE "TX" IS USED.
- WINGWALL WIDTH SHALL BE 1'-6" WHEN TYPE "W" RAILING. VERTICAL FACE PARAPET "TX" OR SINGLE SLOPE PARAPET "56SS" IS USED. "56SS" 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.
- 3'-3" (SLOPE PAVING), 4'-6" (HEAVY RIPRAP)
- 1'-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. STEEL BAR (STD. 12.12) FOR STRUCTURAL APPROACH SLAB ON THE ABUTMENT SHEET.
- SIDEWALL IS 1'-3" WIDE IF STRUCTURAL APPROACH SLAB (STD. 12.10) IS USED.
- SIDEWALL 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.



VERT. CONST. JOINT



SECTION THRU BODY

ALL FOOTING BARS NOT IDENTIFIED ARE #5 BARS

ABUTMENT TYPE A3

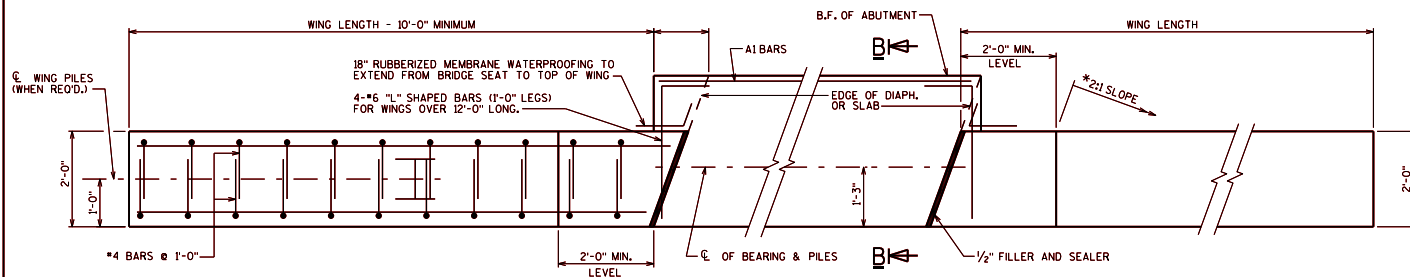


BUREAU OF STRUCTURES

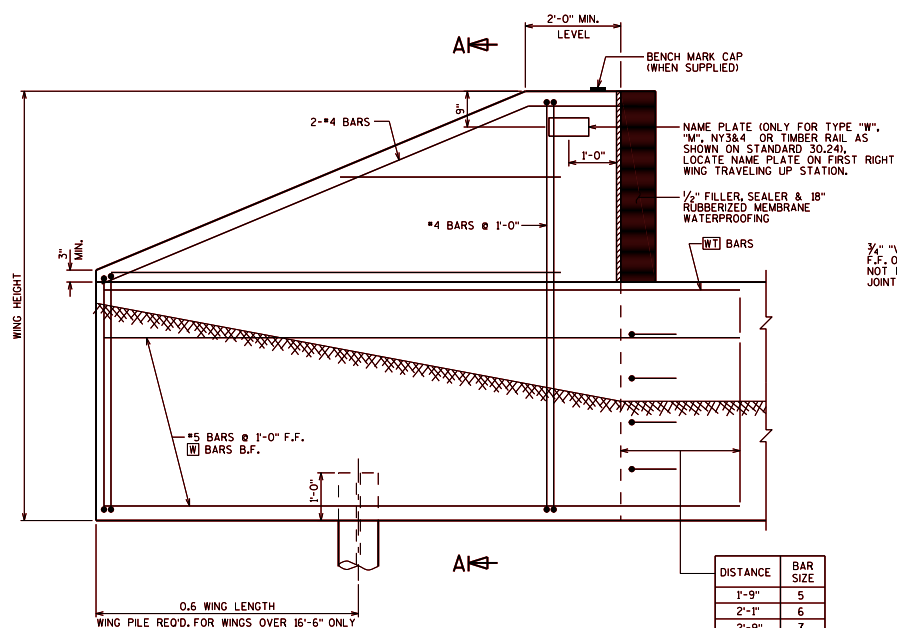
APPROVED: *Bill Oliva*

DATE:

7-20

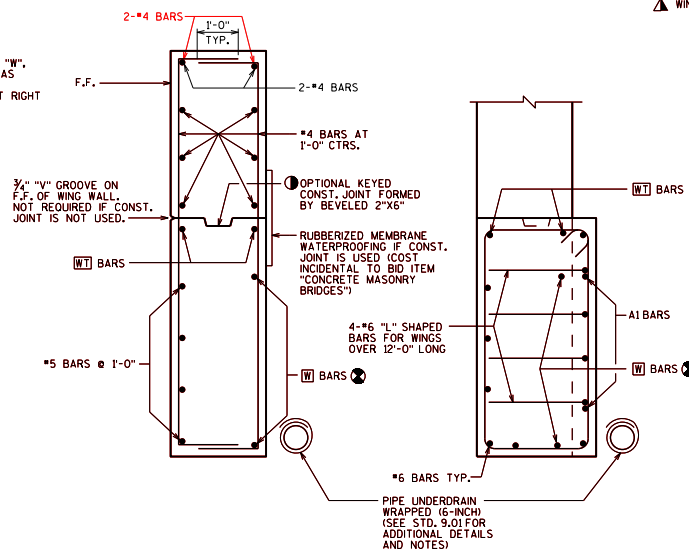


PLAN FOR TYPE A1 ABUTMENT
(SEE STD. 12.01 FOR ABUTMENT BODY DETAILS)



WING ELEVATION
(A1 ABUTMENT)

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



SECTION A-A

SECTION B-B
SEE STD. 12.01 & 12.02 FOR NOTES & DETAILS

DESIGNER NOTES

THIS TYPE OF WING SHOULD BE USED WHEN POSSIBLE IN LIEU OF WINGS PARALLEL TO THE ROADWAY. DO NOT USE FOR STREAM CROSSINGS WHERE HIGH WATER ELEVATION IS ABOVE THE BOTTOM OF ABUTMENT.

*USE 2/21 FOR THE UNSTABLE CLAYS

*USE 2/21 FOR THE UNSTABLE CLAYS WHICH ARE SOMETIMES ENCOUNTERED IN NORTHWEST WISC. (SUPERIOR AREA)

- WHEN TIMBER RAILING IS USED AS PER STANDARD 30.24, AND THE SKEW IS > 0°, THIS CONSTRUCTION JOINT SHALL BE MANDATORY. THE WING CONCRETE SHALL BE PLACED ABOVE CONSTR. JT. AFTER THE TIMBER END POSTS ARE IN PLACE.

ALL WING BARS SHALL BE EPOXY COATED.

- SHOW ALL LONGITUDINAL BARS FOR CLARITY.

LRFD DESIGN LOADS (WINGS)

LIVE LOAD = 1'-0" SURCHARGE

LOAD FACTORS:

$\gamma_{DC} = 1.25$

$\gamma_{EH} = 1.50$

$\gamma_{FS} = 1.75$

EXPOSURE CLASS 2, $\gamma_e = 0.75$

HORIZ. EARTH LOAD BASED ON: 35 P.C.F. EQUIV. FLUID UNIT

WEIGHT OF SOIL

F_y = 60,000 P.S.I.

F_c = 3,500 P.S.I.

TABLE A

WING LENGTH	WING HEIGHT	WING HEIGHT	WING HEIGHT	WING HEIGHT	WING HEIGHT
8'-6"	10'-0"	11'-6"	13'-0"	15'-0"	20'-0"
5-#5s	5-#5s	6-#5s	6-#5s	W	W
2-#5s	2-#5s	2-#5s	2-#5s	WT	WT
4-#6s	4-#6s	5-#6s	5-#6s	A1	A1
5-#6s	5-#6s	5-#7s	6-#7s	W	W
2-#7s	2-#7s	2-#7s	2-#8s	WT	WT
5-#6s	6-#6s	6-#7s	6-#7s	A1	A1
5-#8s	6-#8s	5-#9s	5-#9s	W	W
2-#8s	2-#8s	2-#9s	2-#9s	WT	WT
5-#8s	6-#8s	7-#8s	7-#8s	A1	A1
8-#8s	8-#8s	8-#9s	8-#9s	W	W
2-#8s	2-#8s	2-#9s	2-#9s	WT	WT
7-#9s	8-#9s	8-#9s	8-#9s	A1	A1

▲ WING PILE REQUIRED

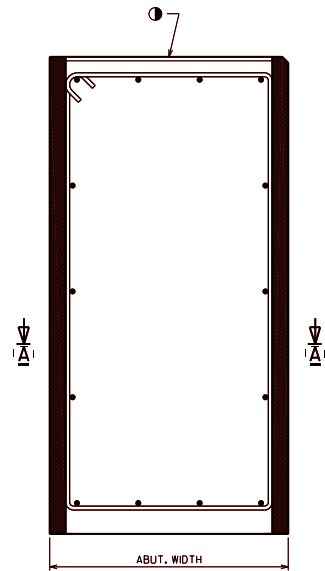
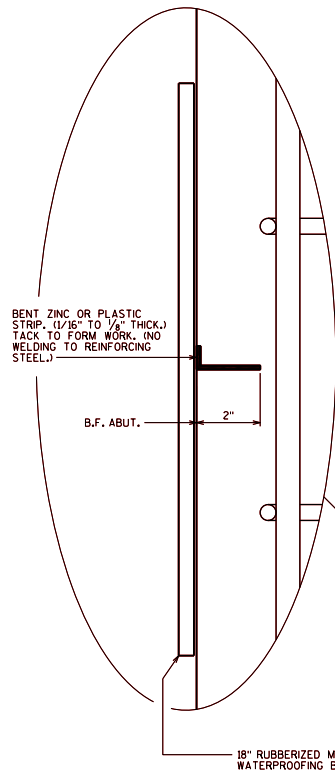
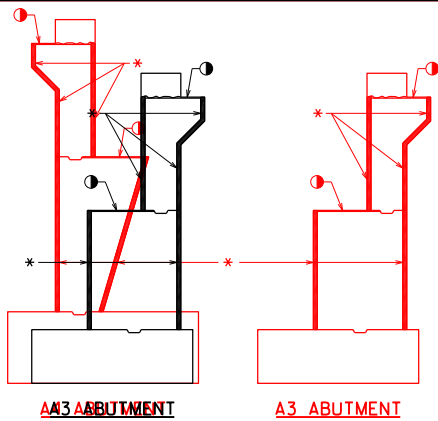
DETAILS FOR WINGS
PARALLEL TO A1
ABUTMENT CENTERLINE



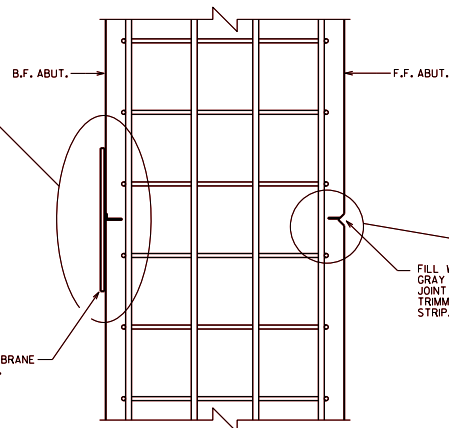
**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

DATE:
7-21

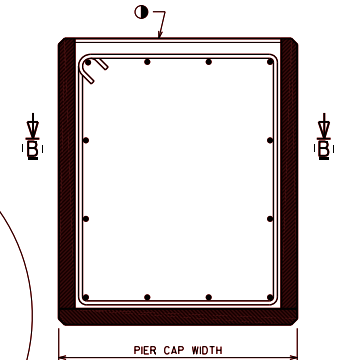
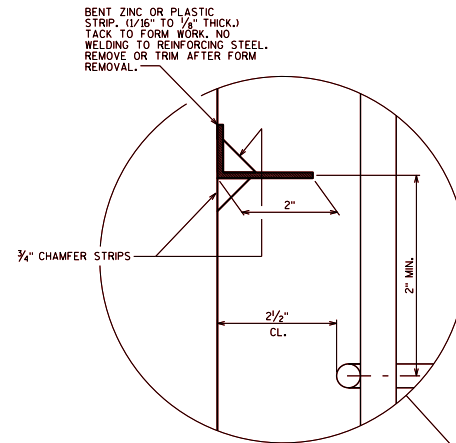


SECTION THRU
ABUTMENT BODY
A1 ABUTMENT SHOWN, A5 SIMILAR

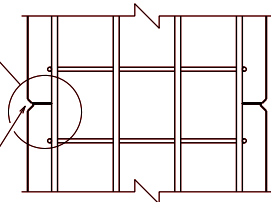


SECTION A-A

ALTERNATE CONSTRUCTION JOINT AT ABUTMENT



SECTION THRU
PIER CAP



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.

① USE A JOINT TOOL TO CONSTRUCT A CONTRACTION JOINT APPROXIMATELY 1/2\"/>

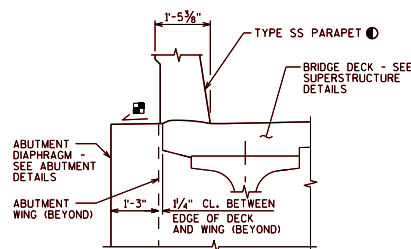
* BENT ZINC OR PLASTIC STRIP.

ALTERNATE CONSTRUCTION JOINT	
	BUREAU OF STRUCTURES
	APPROVED: <u>Bill Oliva</u> DATE: <u>1-18</u>

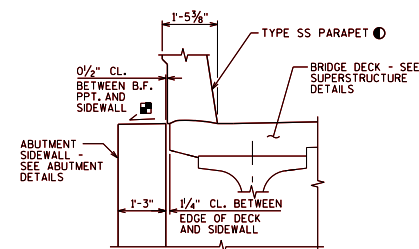


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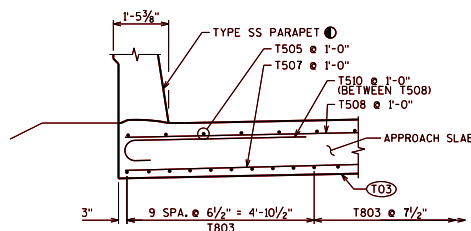
SECTION C-C
(AT WINGWALLS PARALLEL TO BRIDGE)



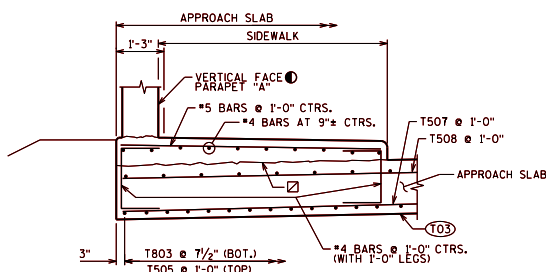
SECTION D-D
(AT WINGWALLS PARALLEL TO BRIDGE - A1ABUT.)



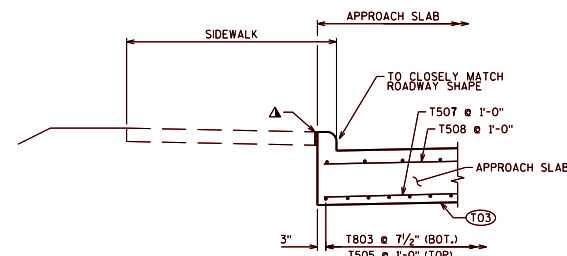
SECTION D-D*
(AT AT WING WALLS PARALLEL TO BRIDGE A3 ABUT.)



SECTION C-C*
(AT WINGWALLS PARALLEL TO ABUT.)

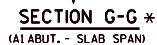
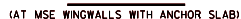


SECTION C-C*
(AT WINGWALLS PARALLEL TO ABUT.)



SECTION C-C*
(AT WINGWALLS PARALLEL TO ABUT.)

STANDARD 12.11



SECTIONS A-A THRU G-G ARE FROM STANDARD 12.10

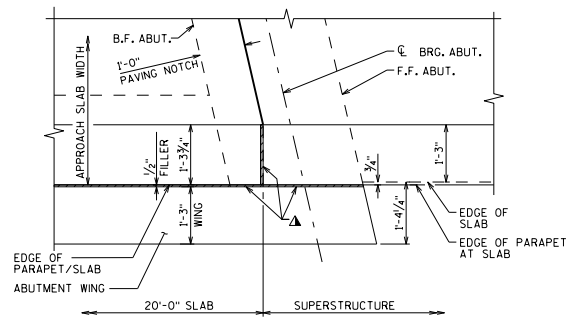
STRUCTURAL APPROACH
SLAB DETAILS 2



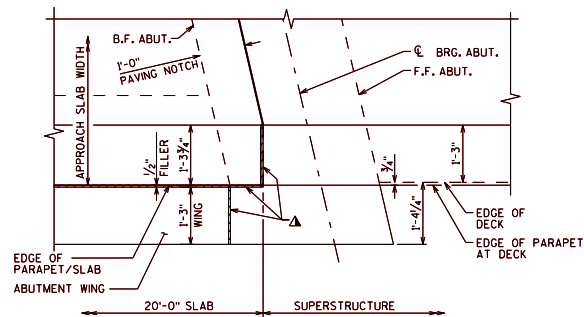
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APPROVED: *Bill Oliva*

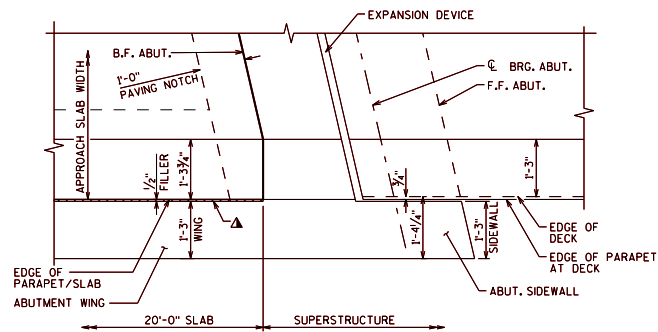
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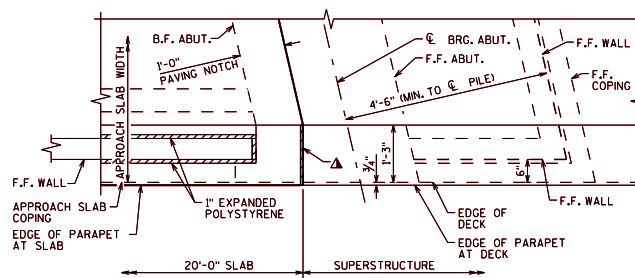
APPROACH SLAB PARTIAL PLAN
(AT WINGWALLS PARALLEL TO BRIDGE - A1 ABUT. - SLAB SPAN)



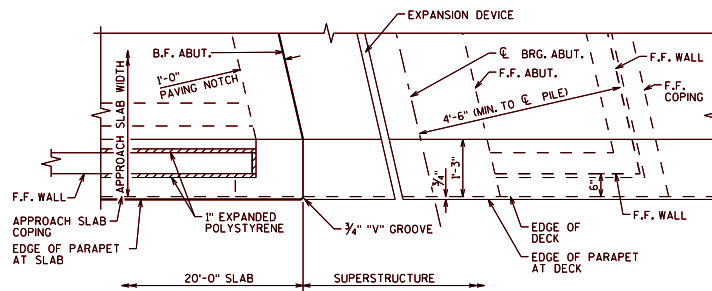
APPROACH SLAB PARTIAL PLAN
(AT WINGWALLS PARALLEL TO BRIDGE - B1 ABUT. - SLAB SPAN)



APPROACH SLAB PARTIAL PLAN *
(AT WINGWALLS PARALLEL TO BRIDGE - B1 ABUT. - SLAB SPAN)



APPROACH SLAB PARTIAL PLAN *
(AT WINGWALLS PARALLEL TO BRIDGE - B1 ABUT. - SLAB SPAN)



APPROACH SLAB PARTIAL PLAN *
(AT WINGWALLS PARALLEL TO BRIDGE - B1 ABUT. - SLAB SPAN)

PARTIAL PLANS SHOWN HERE ARE FROM STANDARD 12.10

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.

STRUCTURAL APPROACH SLAB DETAILS 3



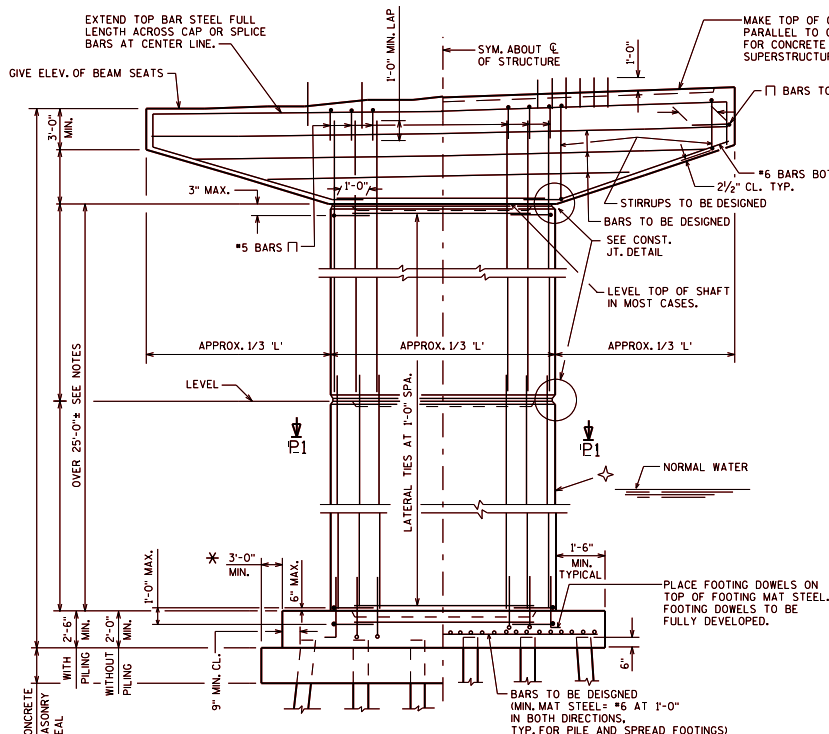
**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

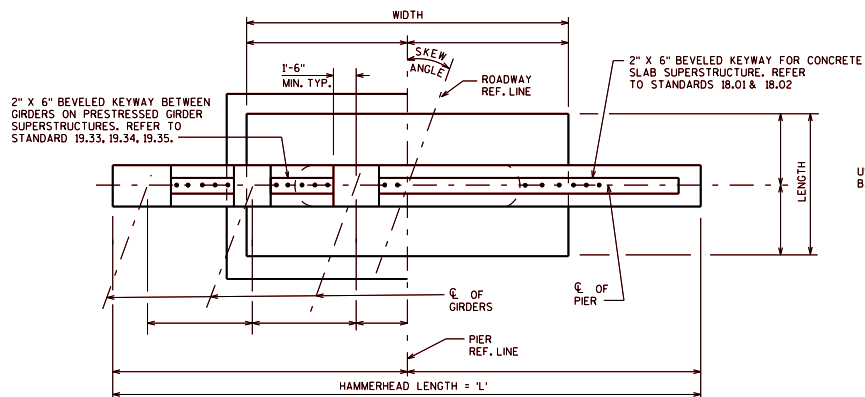
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7-18

GIRDER STRUCTURES

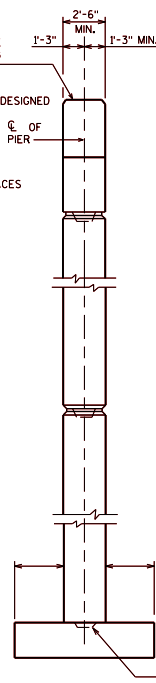
CONCRETE SLAB STRUCTURES



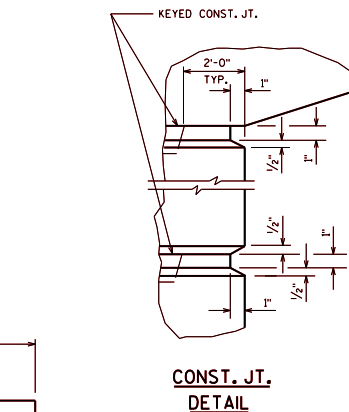
ELEVATION
LOOKING UP STATION



PLAN



END VIEW



DESIGNER NOTES

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 10X 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 1/2" ELASTOMERIC BEARING PADS WHEN THE BOTTOM OF THE GIRDERS SLOPE MORE THAN 1X. 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 1X 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.

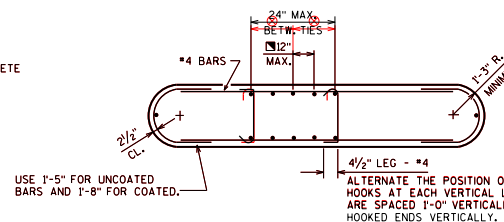
EPOXY COAT BAR STEEL DOWN TO TOP OF FOOTINGS IN ALL PIERS UNDER EXPANSION JOINTS AND ON ALL PIERS AT GRADE SEPARATIONS.

* 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).

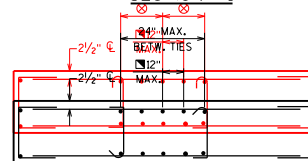
✧ MAXIMUM SPACING BETWEEN UNRESTRAINED VERTICAL BAR AND RESTRAINED (TIED ACROSS MEMBER) VERTICAL BAR IS 24 INCHES.

PLAN 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 BARS INSTALLED.



SECTION B1



ALTERNATE SECTION B1

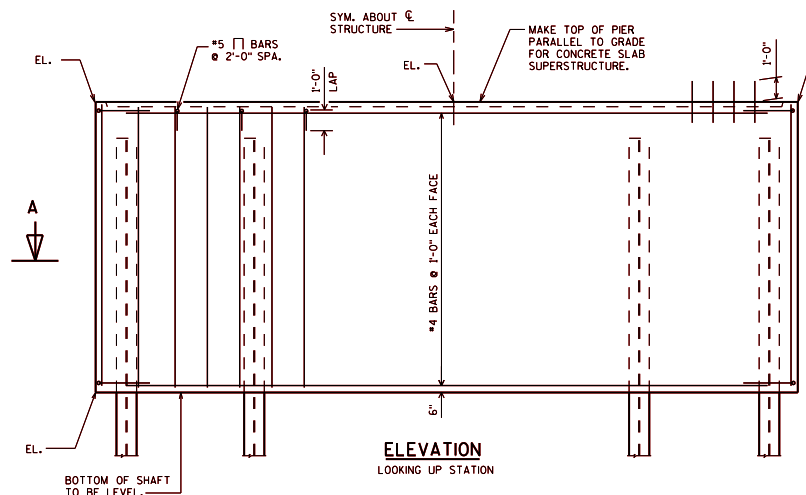
HAMMERHEAD PIER



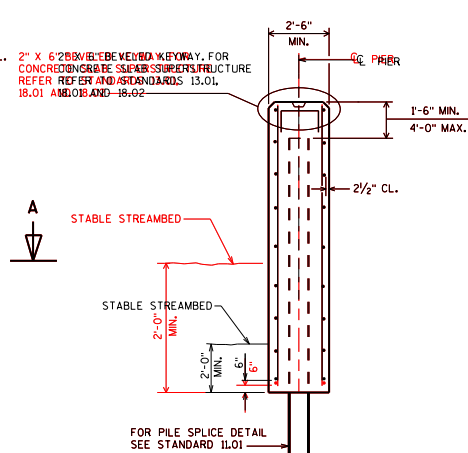
BUREAU OF
STRUCTURES

APPROVED: Bill Oliva

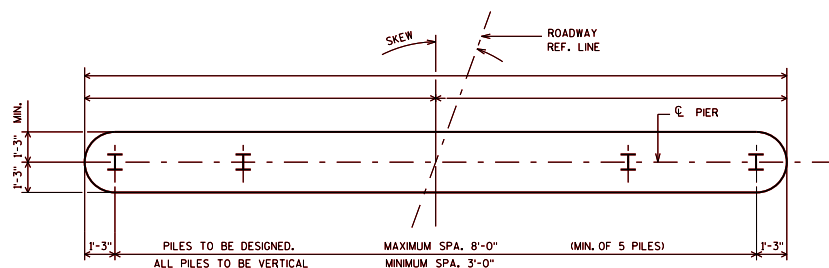
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7-21



ELEVATION
LOOKING UP STATION

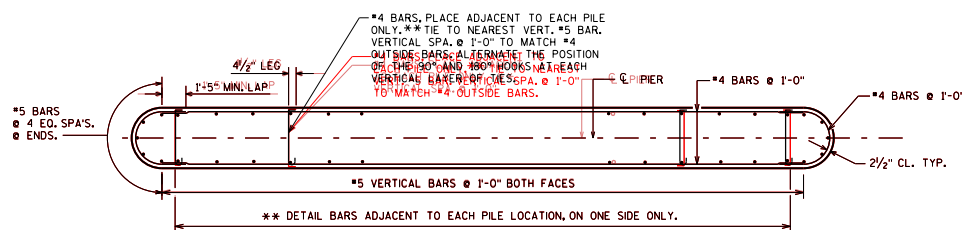


END VIEW

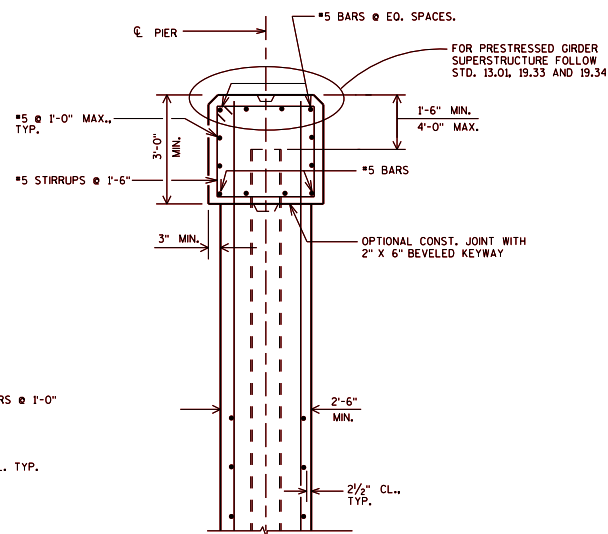


PLAN

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



SECTION A-A



CAP TYPE DETAIL

USE WHEN ECONOMICAL FOR GIRDERS
ON LARGE SKEWS

NOTES

- TYPE 1 [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. **SECTION 13.11.5 FOR**
- TYPE 2 [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 [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: Bill Oliva

DATE:

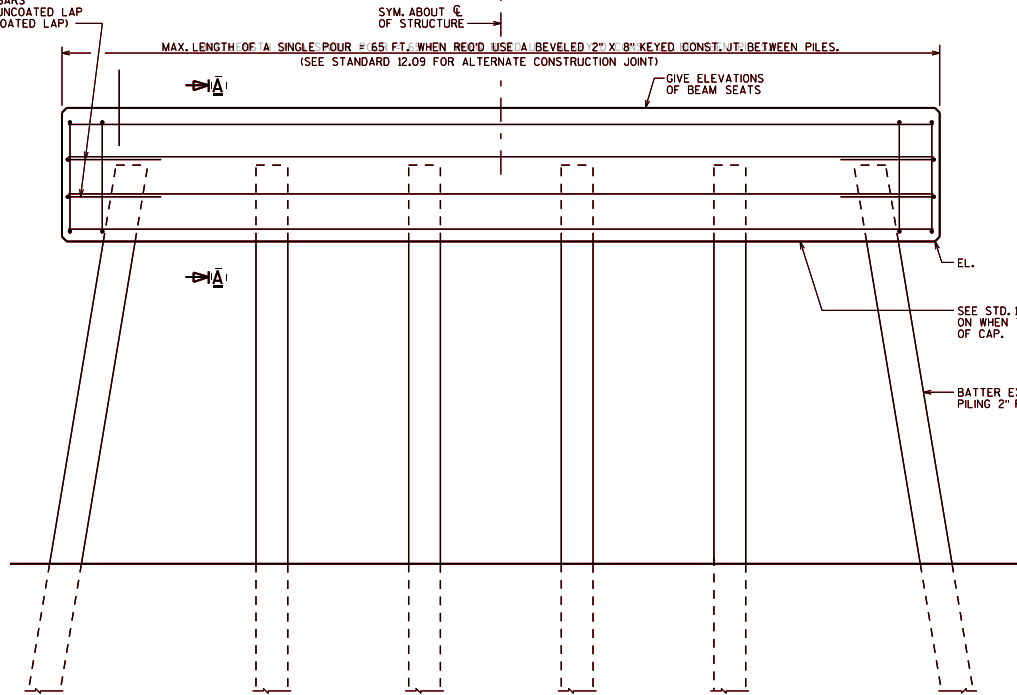
1-19

*5 U-BARS
(1'-5" UNCOATED LAP
1'-9" COATED LAP)

SYM. ABOUT C
OF STRUCTURE

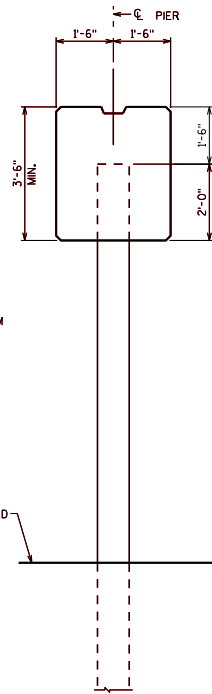
MAX. LENGTH OF A SINGLE POUR = 65 FT. WHEN REQ'D USE A BEVELED 2" X 8" KEYED CONSTRUCTION BETWEEN PILES.
(SEE STANDARD 12.09 FOR ALTERNATE CONSTRUCTION JOINT)

GIVE ELEVATIONS
OF BEAM SEATS



ELEVATION

LOOKING UP STATION



END VIEW

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 1/2" ELASTOMERIC BEARING PADS WHEN THE BOTTOM OF THE GIRDERS SLOPE MORE THAN 1%. SEE STANDARD 13.01.

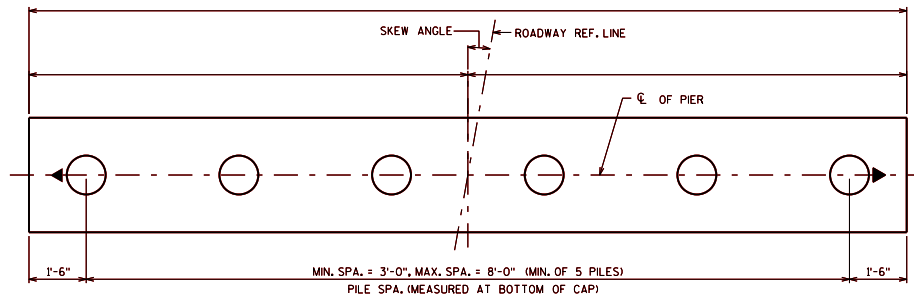
2. FOR CONCRETE SLAB SUPERSTRUCTURES MAKE THE TOP OF THE CAP PARALLEL TO GRADE. SEE STANDARD 18.01.

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

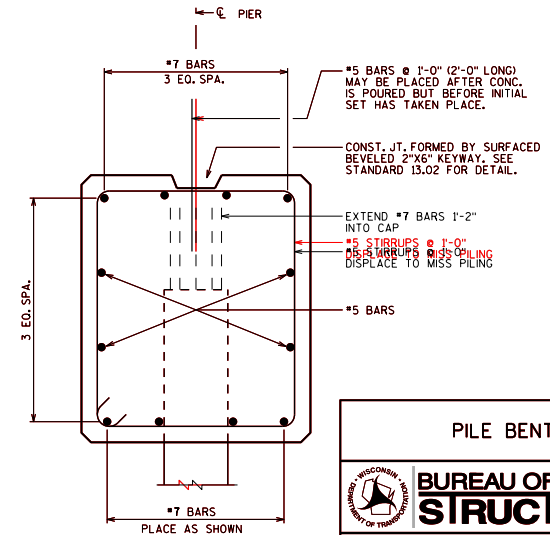
SEE STANDARD 12.01 FOR ADDITIONAL REINFORCING STEEL IN BEARING AREA FOR BEAM SEATS OF NON-SLOPED CAPS THAT ARE 4" OR MORE ABOVE LOWEST BEAM SEAT.

PILES SHALL BE 12 3/4" OR 14" DIAMETER CAST-IN-PLACE WITH MINIMUM WALL THICKNESS OF 3/4".

SEE STANDARD 11.01 FOR REQUIRED PILE REINFORCING DETAILS. THE STRUCTURES DEVELOPMENT CHIEF, (608) 266-0075. H-PILE USE REQUIRES PRIOR APPROVAL DURING DESIGN OF THE STRUCTURES DEVELOPMENT CHIEF, (608) 266-0075.



PLAN



SECTION A-A

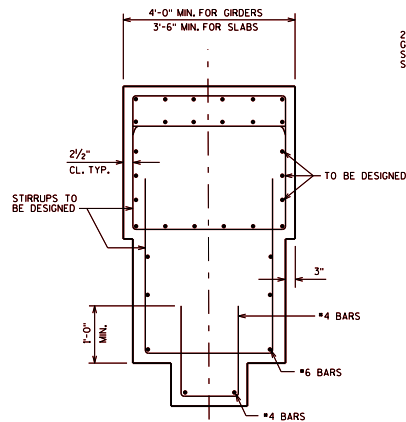
PILE BENT



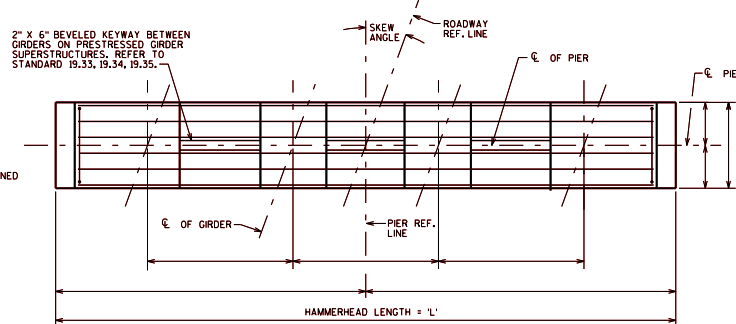
**BUREAU OF
STRUCTURES**

APPROVED: *Abitha O Bank*

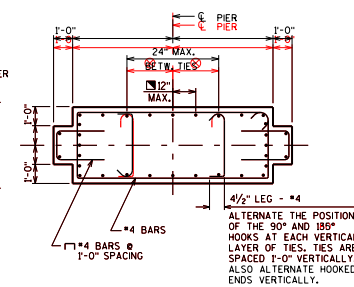
DATE:
1-23



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 BARS INSTALLED.

DESIGNER NOTES (CONT.)

- THIS MAXIMUM VERT. BAR SPACING APPLIES ONLY WHEN THE VERTICAL REINFORCEMENT IS 1% OR MORE OF THE GROSS CONCRETE AREA.
- MAXIMUM SPACING BETWEEN UNRESTRAINED VERTICAL BAR AND RESTRAINED (TIED ACROSS MEMBER) VERTICAL BAR IS 24 INCHES

DESIGNER NOTES

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".

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:

1. FOR GIRDER WITH 1/2" ELASTOMERIC BEARING PADS WHEN THE BOTTOM OF THE GIRDERS SLOPE MORE THAN 1%.

2. WHEN A CAP IS USED FOR CONCRETE SLAB SUPERSTRUCTURES MAKE THE TOP OF CAP PARALLEL TO GRADE. SEE STANDARD 13.01.

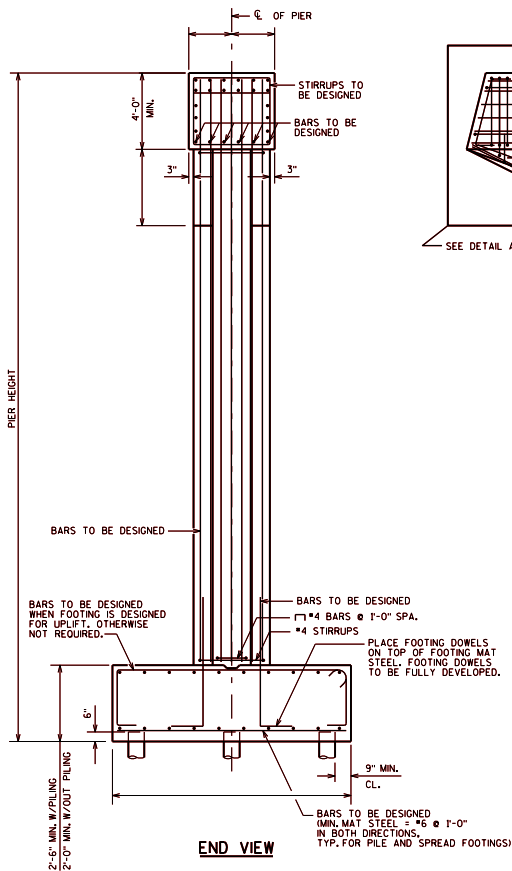
BEAM SEATS MAY BE ANGLED TO MATCH SKEW AT THE DESIGN ENGINEER'S DISCRETION.

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

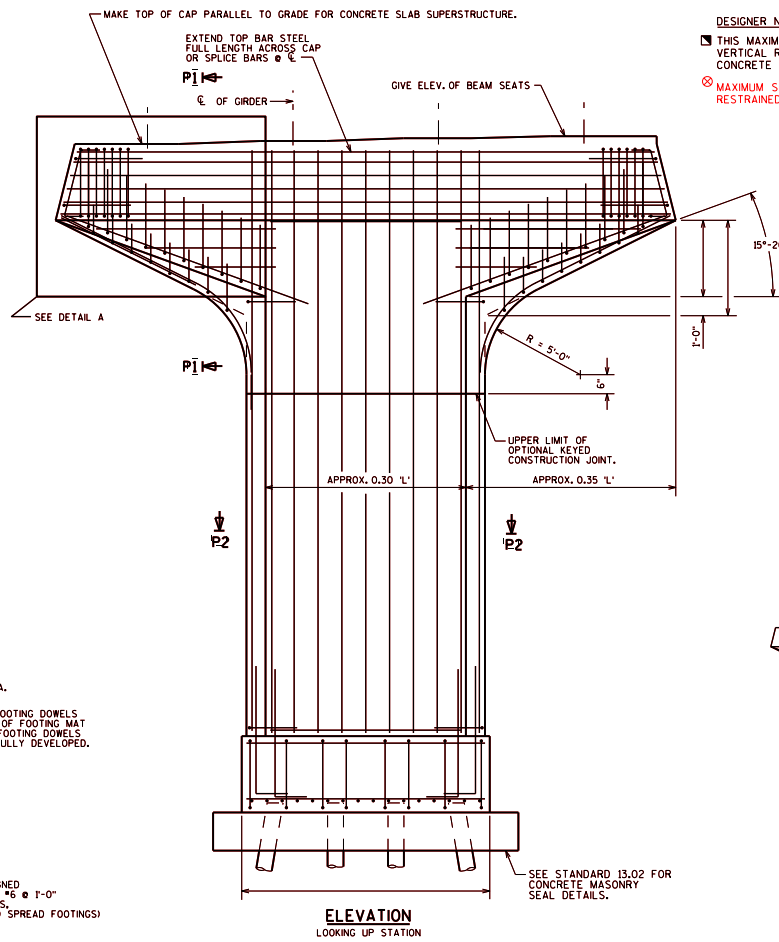
FOR "HAMMERHEAD LENGTH" GREATER THAN 45'-0", CONSIDER A TWO SHAFT PIER FRAME RESEMBLING TWO HAMMERHEAD PIERS PLACED SIDE BY SIDE.

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

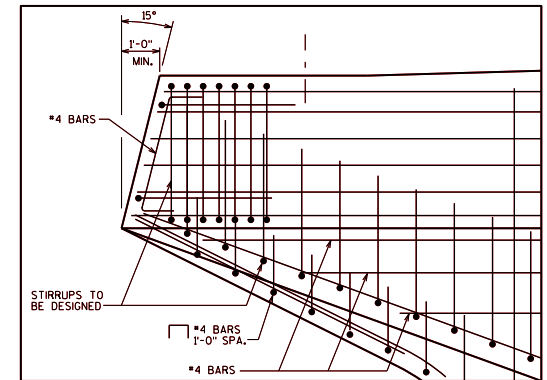
EPOXY COAT BAR STEEL DOWN TO TOP OF FOOTINGS IN ALL PIERS UNDER EXPANSION JOINTS AND ON ALL PIERS AT GRADE SEPARATIONS.



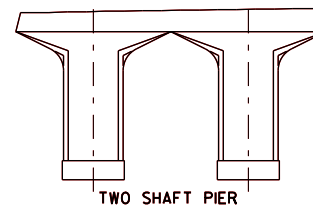
END VIEW



ELEVATION
LOOKING UP STATION



DETAIL A



TWO SHAFT PIER

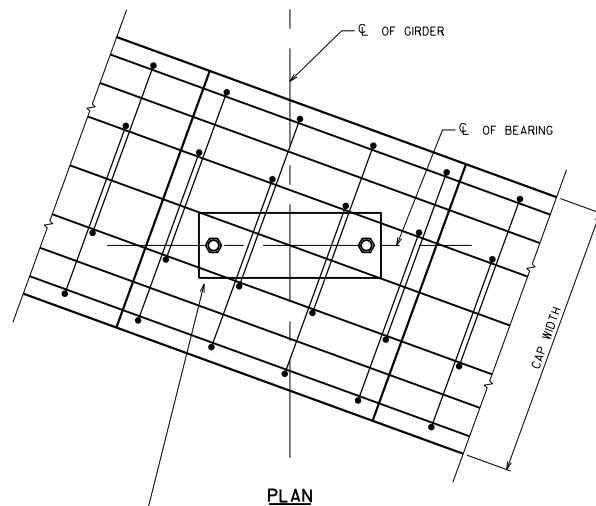
HAMMERHEAD PIER - TYPE 2



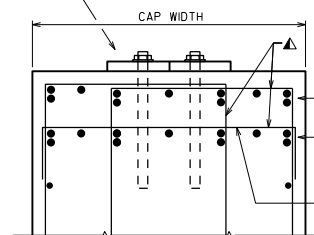
BUREAU OF STRUCTURES

APPROVED: *Bill Oliva*

DATE:
7-21



PROVIDE ADEQUATE CLEARANCE FOR
POST-INSTALLED ANCHORS



SECTION THRU PIER CAP

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: Bill Oliva

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:

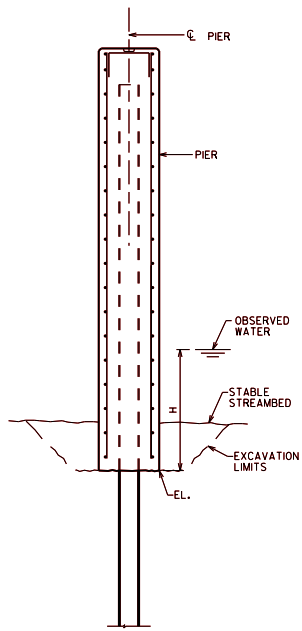
TYPE 1 - COFFERDAM BID ITEM NOT PROVIDED. CONSIDER PROVIDING UNDERWATER INSPECTION BID ITEM.

TYPE 2 - COFFERDAM AND UNDERWATER INSPECTION BID ITEMS REQUIRED.

TYPE 3 - COFFERDAM AND SEAL BID ITEMS REQUIRED.

WALL PIER ALTERNATIVES:

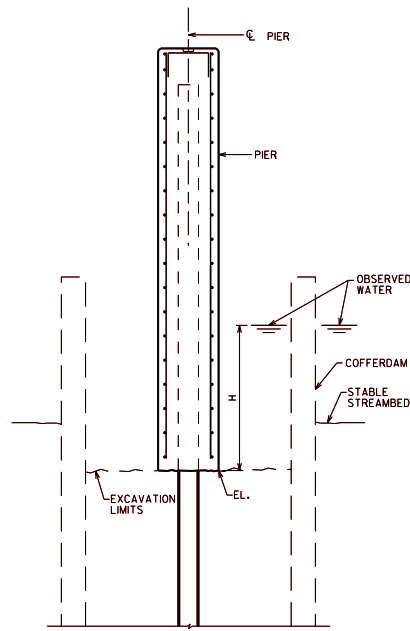
- SOLID WALL (AS SHOWN ON THIS STANDARD)
- HAMMERHEAD (SEE STANDARD 13.02)



END VIEW

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

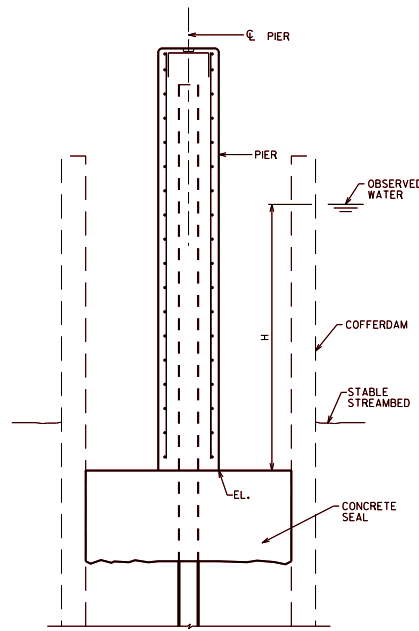
ITEM NUMBER	BID ITEM	UNIT
206.5000	COFFERDAMS (STRUCTURE)	LS
502.9000.S	UNDERWATER SUBSTRUCTURES INSPECTION (STRUCTURE)	EACH



END VIEW

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

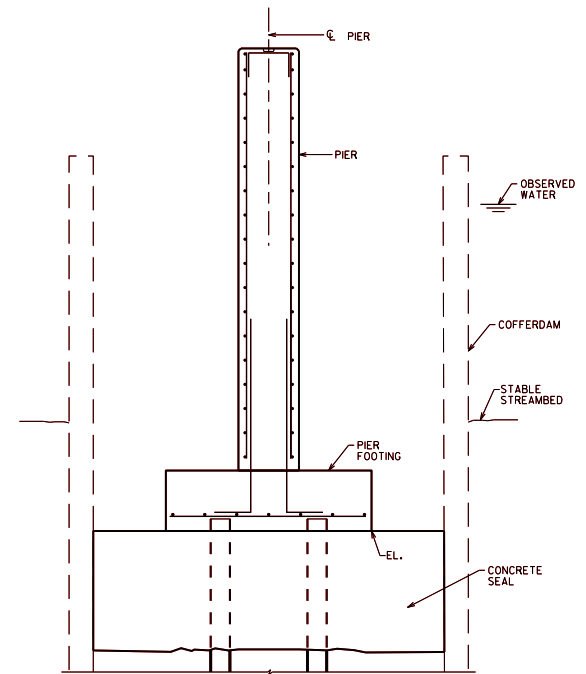
ITEM NUMBER	BID ITEM	UNIT
206.5000	COFFERDAMS (STRUCTURE)	LS
502.1100	CONCRETE MASONRY SEAL	CY



END VIEW

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

ITEM NUMBER	BID ITEM	UNIT
206.5000	COFFERDAMS (STRUCTURE)	LS
502.1100	CONCRETE MASONRY SEAL	CY



END VIEW

SOLID WALL PIER
(PILE ENCASED PIER ALTERNATIVE)

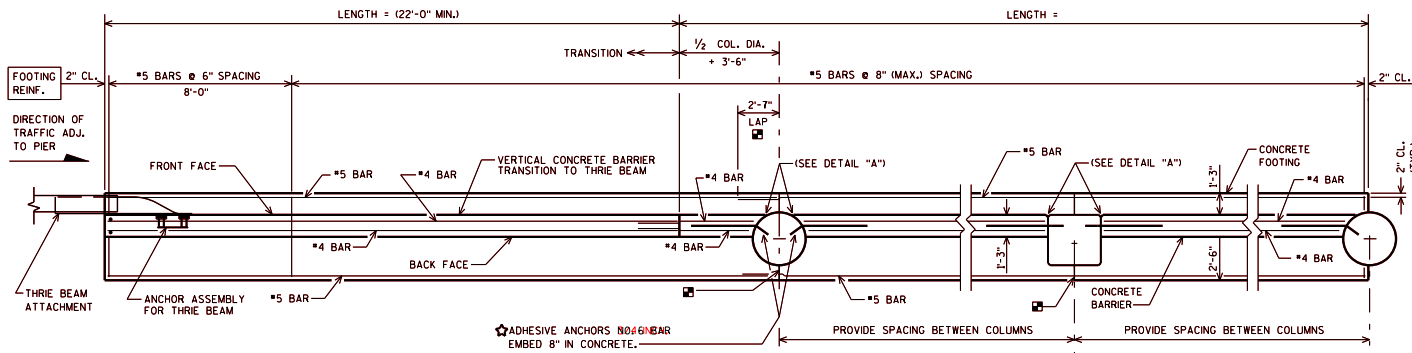
PILE ENCASED PIER (TYPES)



**BUREAU OF
STRUCTURES**

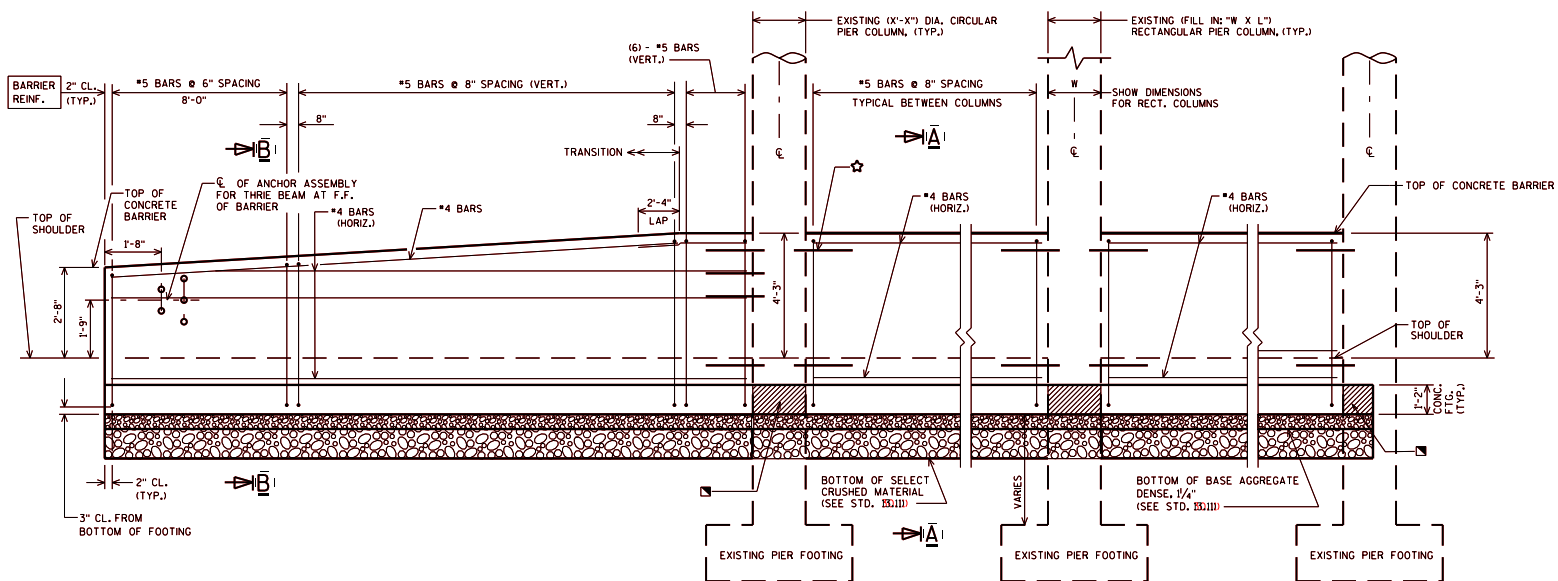
APPROVED: Bill Oliva

DATE:
7-20



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

PLAN
DETAILS FOR CIRCULAR AND RECTANGULAR COLUMNS



ULTIMATE DESIGN STRESSES:

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

ELEVATION
LOOKING AT B.F. OF BARRIER

NOTE: 51-INCH BARRIER REFERS TO THE DISTANCE FROM THE TOP OF THE SHOULDER TO THE TOP OF THE BARRIER.

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.

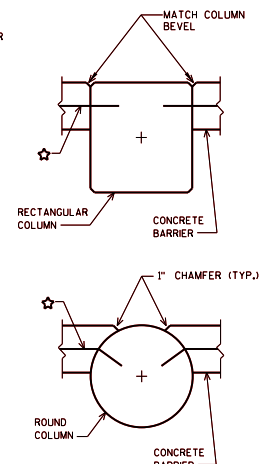
USE 2-INCH MINIMUM BAR CLEARANCE, EXCEPT AT FOOTINGS. PROVIDE 3-INCH BAR CLEARANCE FROM BOTTOM OF FOOTING TO BOTTOM TRANSVERSE REINFORCEMENT.

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

PROVIDE 3/4-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

PLACE 1/2" FILLER BETWEEN COLUMN AND CONCRETE FOOTING (TYP.)

51-INCH CONCRETE INTEGRAL BARRIER



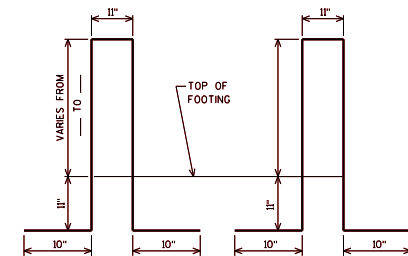
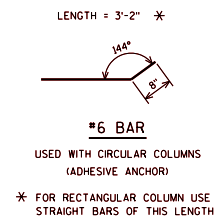
BUREAU OF STRUCTURES

APPROVED: _____

Bill Oliva

DATE:

7-26



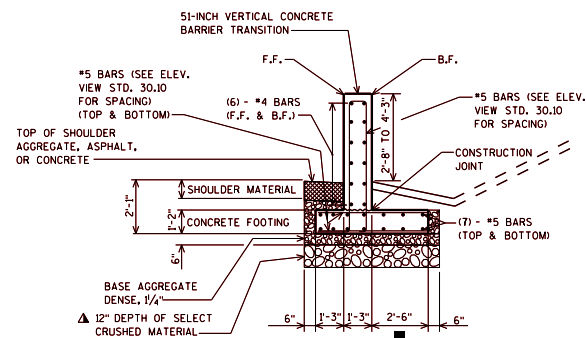
#5 BAR
BARRIER REINF. IN
TRANSITION REGION

#5 BAR
BARRIER REINF.
BETWEEN COLUMNS

BAR BENDING DIAGRAMS

BAR DIMENSIONS ARE OUT TO OUT OF BAR

SECTION A-A
BETWEEN COLUMNS



SECTION B-B
TRANSITION REGION

▲ 12" SELECT CRUSHED MATERIAL MAY BE ELIMINATED IF IT IS DETERMINED BY THE ENGINEER THAT THE EXISTING MATERIAL IS COMPACTED, GRANULAR MATERIAL.

■ FOR COLUMNS WITH "DIA." OR "L" GREATER THAN 3'-0", INCREASE THIS VALUE SO THAT B.F. OF FOOTING EXTENDS 9" BEYOND B.F. OF COLUMN.

DESIGNER NOTES

THE DETAILS SHOWN ON STANDARDS 13.10 AND 13.11 ARE FOR VEHICLE PROTECTION AND ARE USED WITH EXISTING STRUCTURES.

CONSIDER PROVIDING AN ADDITIONAL TRANSITION SECTION ADJACENT TO THE OTHER EXTERIOR PIER COLUMN FOR THE FOLLOWING CONDITIONS:

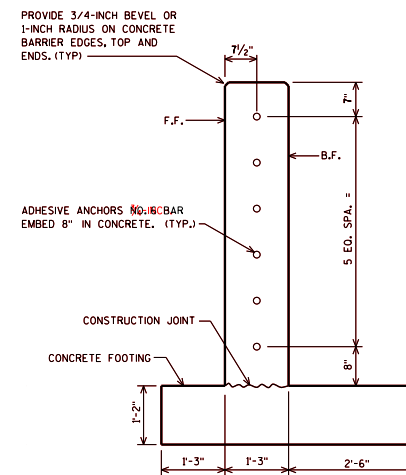
- TWO-LANE ROAD IS ADJACENT TO BARRIER AND THERE IS A CONCERN FOR TRAFFIC TO CROSS-OVER.
- FUTURE TRAFFIC CONTROL NEEDS MAY CAUSE THE DIRECTION OF TRAFFIC ADJACENT TO BARRIER TO BE REVERSED.
- HAZARDS MAY EXIST IN THIS REGION THAT REQUIRE SHIELDING.

CONTACT THE REGIONAL OFFICE FOR VERIFICATION OF ANY OF THESE CONDITIONS.

THESE DETAILS MEET CRITERIA FOR TEST LEVELS TL-3/TL-4.

FOR VEHICLE PROTECTION, SEE FDM 11-35-1 TO DETERMINE WHEN BEAM GUARD OR CONCRETE BARRIER SHOULD BE PLACED BETWEEN THE TRAFFIC AND THE PIER, OR WHEN AN INTEGRAL BARRIER SHOULD BE USED.

F.F. = FRONT FACE
B.F. = BACK FACE



ADHESIVE ANCHOR LAYOUT

INTEGRAL BARRIER DETAILS



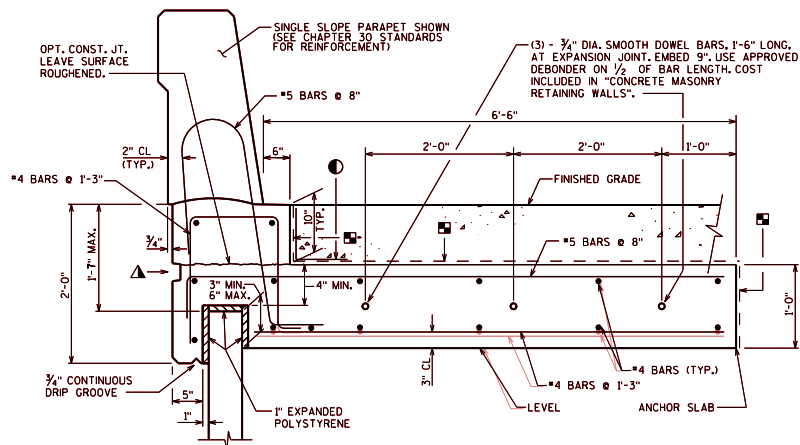
BUREAU OF STRUCTURES

APPROVED: Bill Oliva

DATE: 7-26

51-INCH VERTICAL CONCRETE BARRIER AND TRANSITION

SEE STANDARD 13.10 FOR ADDITIONAL DETAILS



CAST-IN-PLACE CONCRETE TRAFFIC BARRIER DETAIL FOR PRECAST WALL PANELS

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".

ALL BAR STEEL SHALL BE EPOXY COATED.

CONCRETE QUANTITY BASED ON 3" PANEL EMBEDMENT.

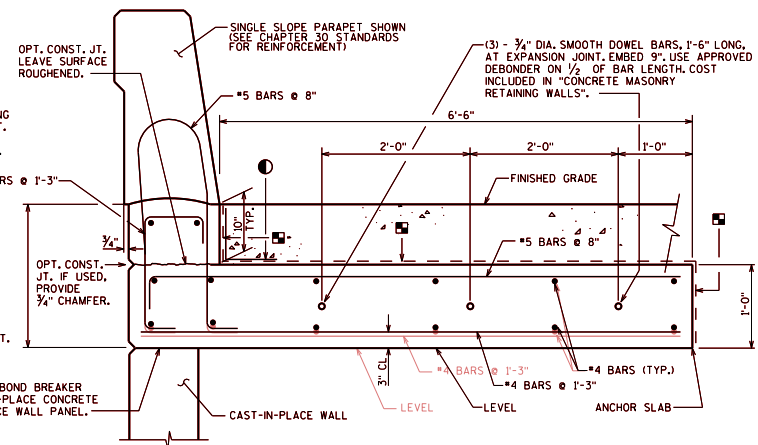
18" RUBBERIZED MEMBRANE WATERPROOFING TO BE PLACED ON THESE SURFACES AT EACH JOINT.

IF THE OPT. CONST. JOINT IS USED, PLACE 18" MEMBRANE WATERPROOFING ALONG THE ENTIRE LONGITUDINAL JOINT. THE MEMBRANE WATERPROOFING SEALING THE OPTIONAL CONST. JOINT IS INCIDENTAL TO THE CONCRETE MASONRY BID ITEM.

RUSTICATION DETAIL

PROVIDE RUSTICATION IF OPT. CONST. JOINT IS USED.

LIQUID OR OTHER BOND BREAKER BETWEEN CAST-IN-PLACE CONCRETE AND CAST-IN-PLACE WALL PANEL.

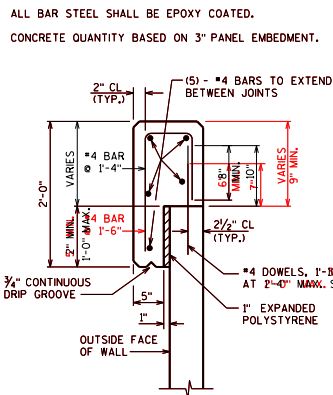


CAST-IN-PLACE CONCRETE TRAFFIC BARRIER DETAIL FOR CAST-IN-PLACE WALL PANELS

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.

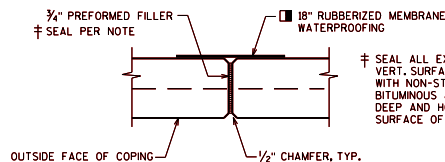
LAP LONGITUDINAL #4 BARS A MINIMUM OF 1'-0".

ALL BAR STEEL SHALL BE EPOXY COATED.



CAST-IN-PLACE CONCRETE COPING DETAIL

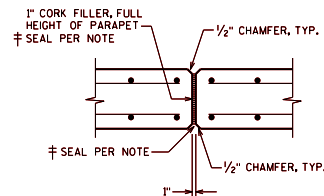
NOTES: (1) CONCRETE REINFORCING DESIGNED FOR 18" STANDARD PRECAST WALL PANELS WITH 18" MAXIMUM OF OPT. SPACING AFTER CURING IS MADE.



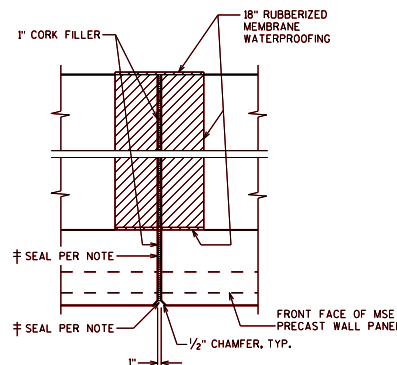
COPING EXPANSION JOINT

DO NOT RUN BAR STEEL THRU JOINT. MAX. SPACING OF JOINT = 50'

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

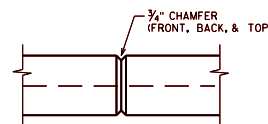


TRAFFIC BARRIER EXPANSION JOINT DETAIL



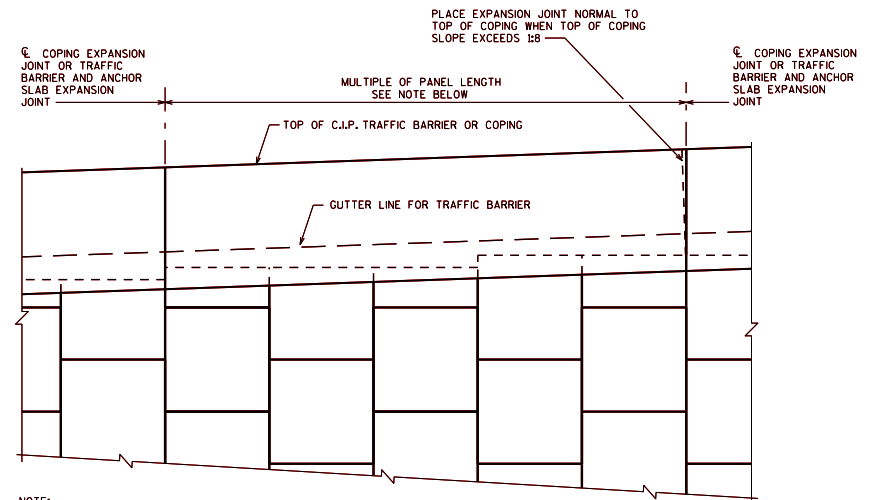
ANCHOR SLAB EXPANSION JOINT DETAIL

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.



COPING CONTRACTION JOINT

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



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

C.I.P. TRAFFIC BARRIER OR COPING PARTIAL ELEVATION

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.

MSE RETAINING WALL DETAILS



BUREAU OF STRUCTURES

APPROVED: *Bill Oliva*

DATE: 7-20

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

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.
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

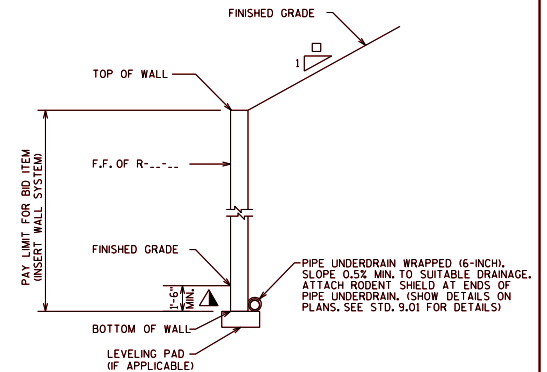
THE LENGTHS PROVIDED IN THE TABLE ARE THE MINIMUM REQUIRED REINFORCEMENT LENGTHS BASED UPON THE MINIMUM DESCRIBED IN THE WALL SYSTEM SPECIAL PROVISIONS OR EXTERNAL AND OVERALL STABILITY AT THE DESIGNATED LOCATIONS. THESE DESIGNATED LOCATIONS REPRESENT TYPICAL AND CRITICAL WALL LOCATIONS, BUT SHALL NOT 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 CONTRACTOR'S 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 EMBEDMENT. 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 5-10 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 PANEL DIMENSIONS.



TYP. CROSS SECT. OF RETAINING WALL

LIST OF DRAWINGS

1. (INSERT WALL SYSTEM)
2. SUBSURFACE EXPLORATION

LRFD PROPRIETARY RETAINING WALLS (GENERAL PLAN)



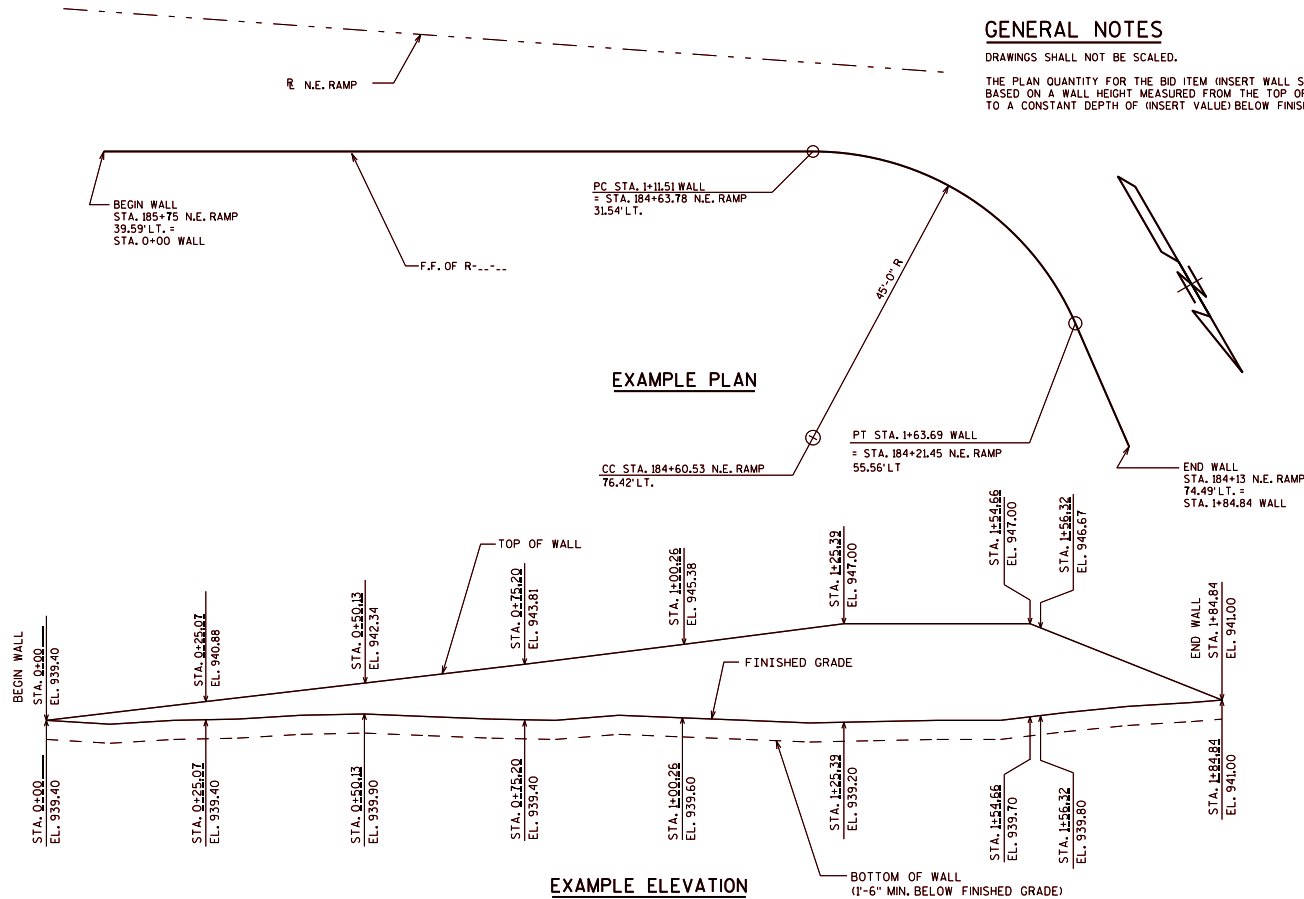
BUREAU OF STRUCTURES

APPROVED: *Bill Oliva*

DATE: 1-18

STANDARD 14.03

EXAMPLE PLAN



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.

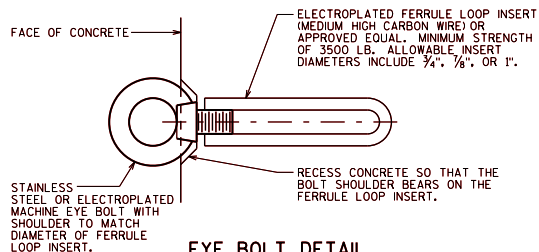
SOIL PARAMETERS

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

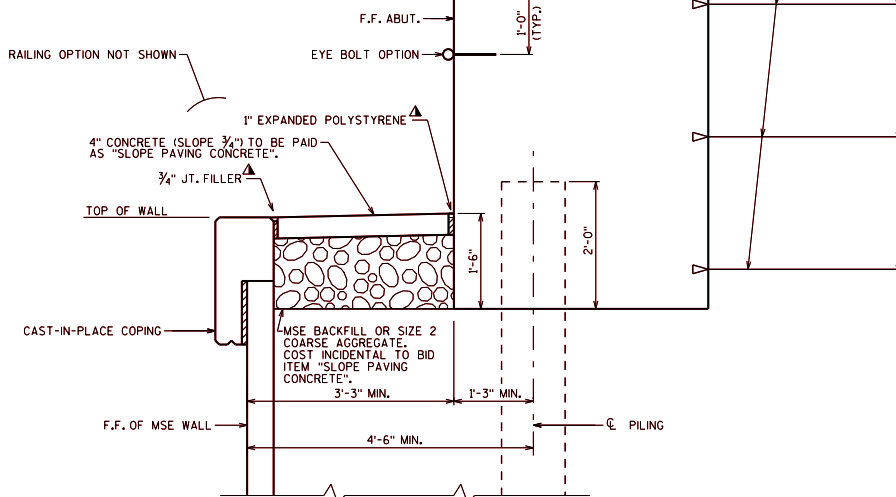
WALL EXTERNAL & OVERALL STABILITY EVALUATION

DIMENSIONS	EVALUATED LOCATIONS
WALL HEIGHT (FEET)	
EXPOSED WALL HEIGHT (FEET)	
MINIMUM LENGTH OF REINFORCEMENT (FEET) <input checked="" type="checkbox"/>	
WALL STATION	
BORING USED	
CAPACITY TO DEMAND RATIO (CDR)	
SLIDING (CDR>1.0)	
ECCENTRICITY (CDR>1.0)	
OVERALL STABILITY (CDR>1.0) <input checked="" type="checkbox"/>	
BEARING RESISTANCE (CDR>1.0)	
FACTORED BEARING RESISTANCE (PSF)	



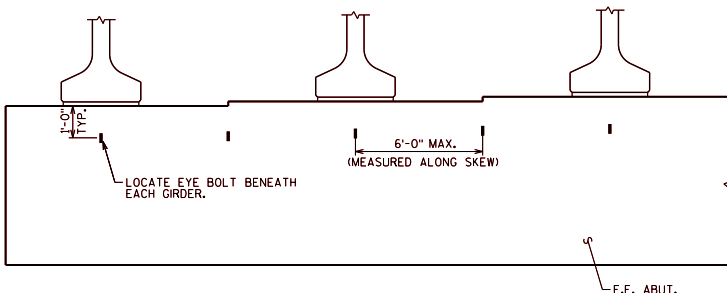
EYE BOLT DETAIL

COST INCIDENTAL TO BID ITEM "CONCRETE MASONRY BRIDGES".



CROSS SECTION THRU ABUTMENT AT MSE WALL

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



PARTIAL ELEVATION OF F.F. ABUTMENT SHOWING EYE BOLT FALL PROTECTION OPTION

RETAINING WALL NOT SHOWN

DESIGNER NOTES

DUE TO MAINTENANCE CONCERNS, MSE WALLS SHALL NOT BE USED FOR THE SINGULAR PURPOSE OF REDUCING SPAN LENGTH. IF THE GRADE LINE CANNOT BE RAISED, THEN MSE WALLS MAY BE USED TO MAINTAIN THE SUPERSTRUCTURE DEPTH. OTHER CIRCUMSTANCES MAY ALSO JUSTIFY THE USE OF MSE WALLS AT ABUTMENTS.

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

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

"SLOPE PAVING CONCRETE" ITEMS TO BE SHOWN AS PART OF BRIDGE PLAN.

BID ITEM SHALL BE "ABUTMENT ANCHORAGE" (UNDER DEVELOPMENT).

NOTES

- UNFACTORED SUPERSTRUCTURE LATERAL LOADS TRANSFERRED TO THE ABUTMENT ARE TAKEN TO BE KIPS 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 ON PLAN:

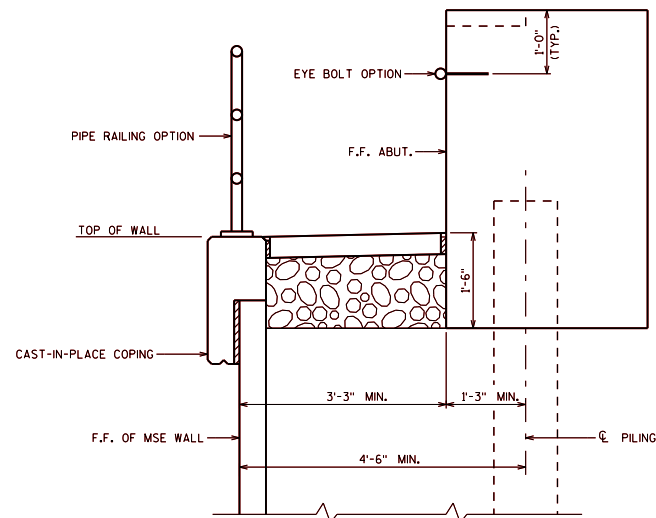
BR = --- KLF WS = --- KLF
TU = --- KLF WL = --- KLF

FOR SEMI-EXPANSION OR FIXED TYPE A1 ABUTMENTS:

THE DESIGN OF THE WALL IN FRONT OF THE ABUTMENT SHALL INCLUDE THE HORIZONTAL EARTH LOADS AND 240 PSF LIVE LOAD SURCHARGE ACTING ON THE BACK OF THE ABUTMENT BELOW 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).

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



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

TYPE A1 SEMI-EXPANSION ABUTMENT SHOWN

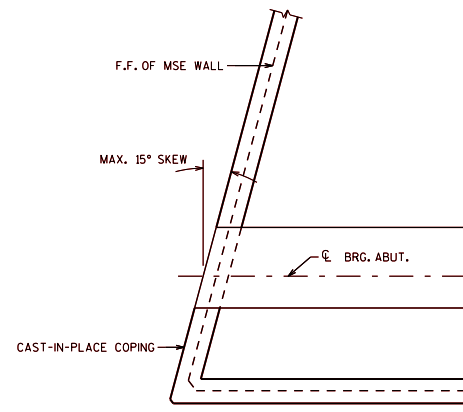
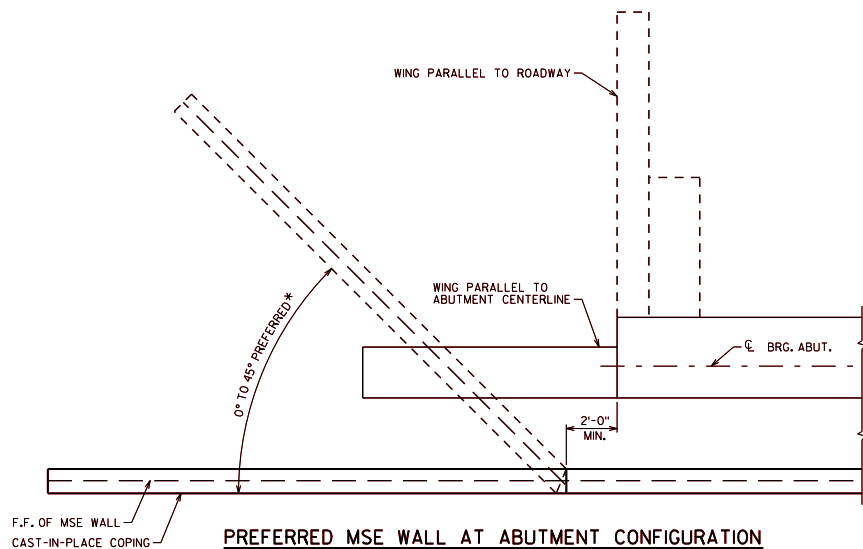
MSE WALL AT ABUTMENT



BUREAU OF STRUCTURES

APPROVED: *Bill Oliva*

DATE:
1-18

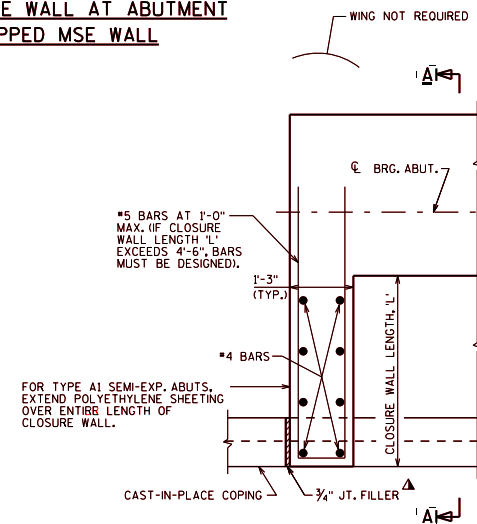
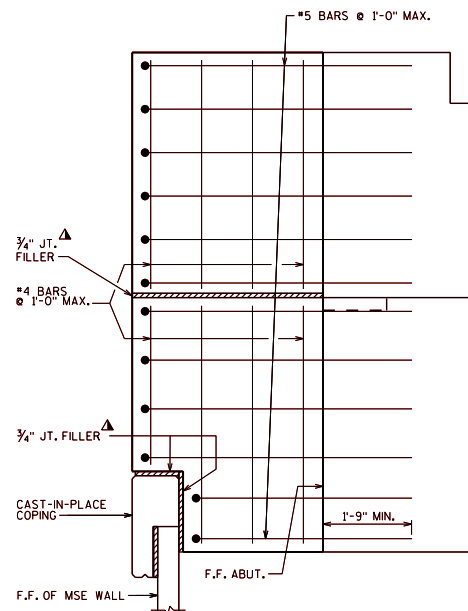
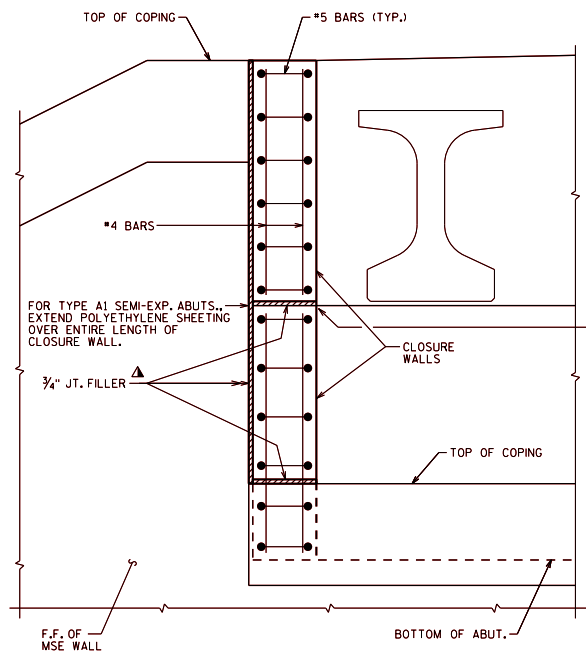


DESIGNER NOTES

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.

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.



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.

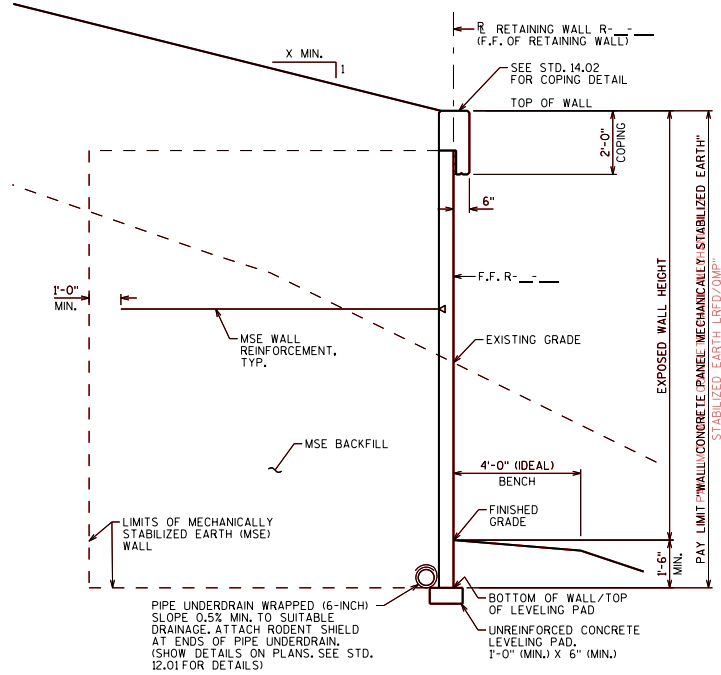
MSE WALL AT ABUTMENT LAYOUT DETAILS



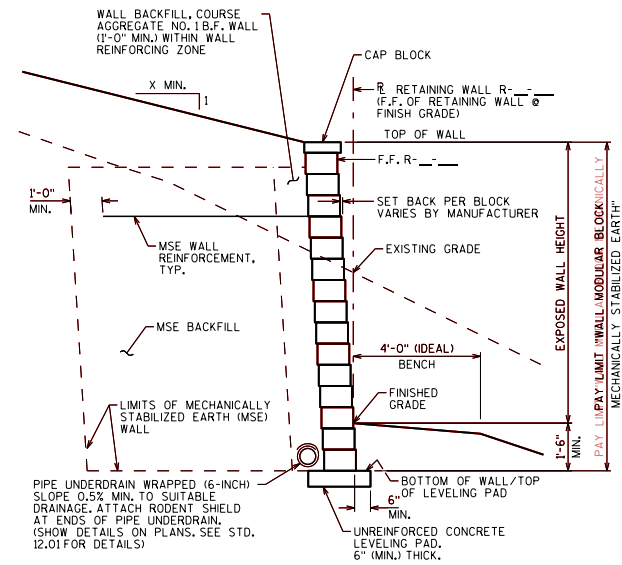
BUREAU OF STRUCTURES

APPROVED: *Bill Oliva*

DATE: 7-17




TYPICAL SECTION
(MSE WALL WITH CONCRETE PANEL FACING)

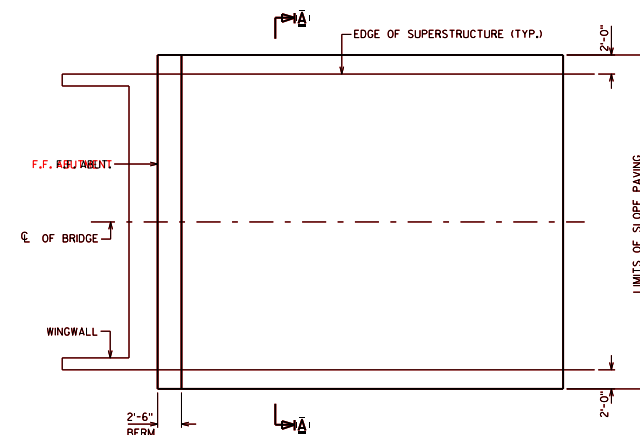
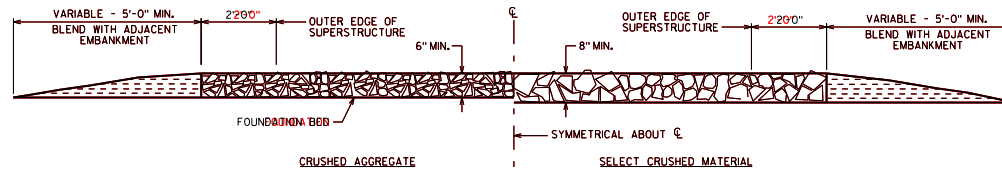
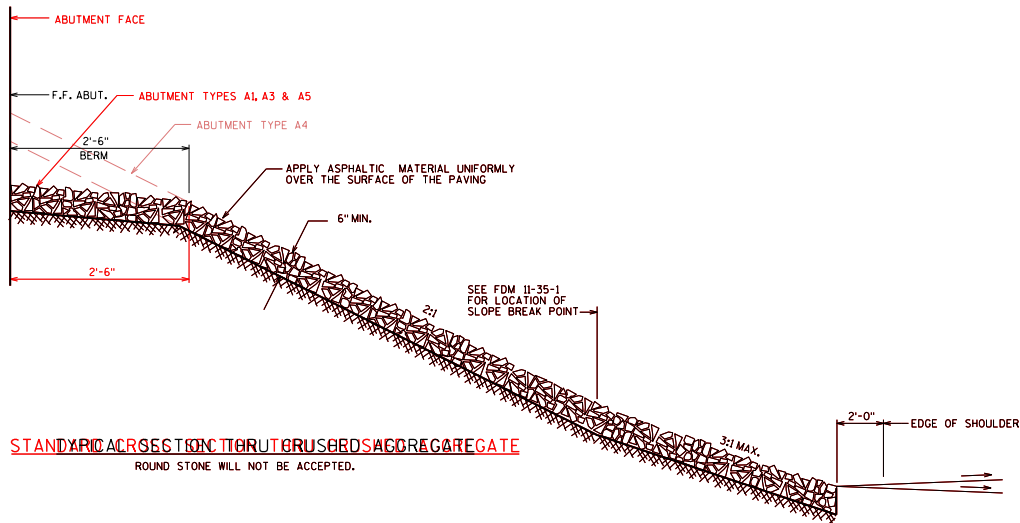
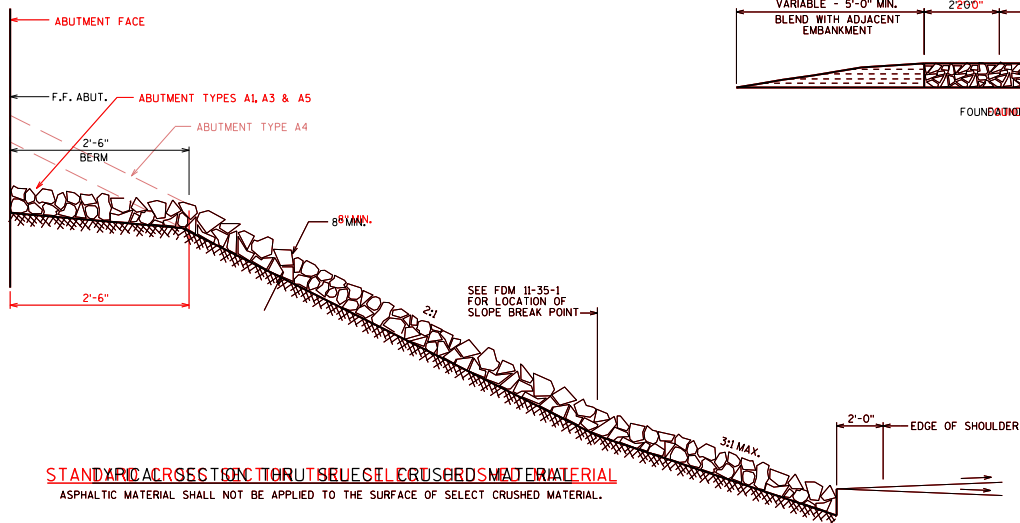


TYPICAL SECTION
(MSE WALL WITH MODULAR BLOCK FACING)

DESIGNER NOTE

SEE STANDARD 14.02 FOR ADDITIONAL INFORMATION

MSE WALL PANEL AND BLOCK FACING	
	BUREAU OF STRUCTURES
	APPROVED: <u>Bill Oliva</u>
DATE: <u>7-20</u>	




NOTES

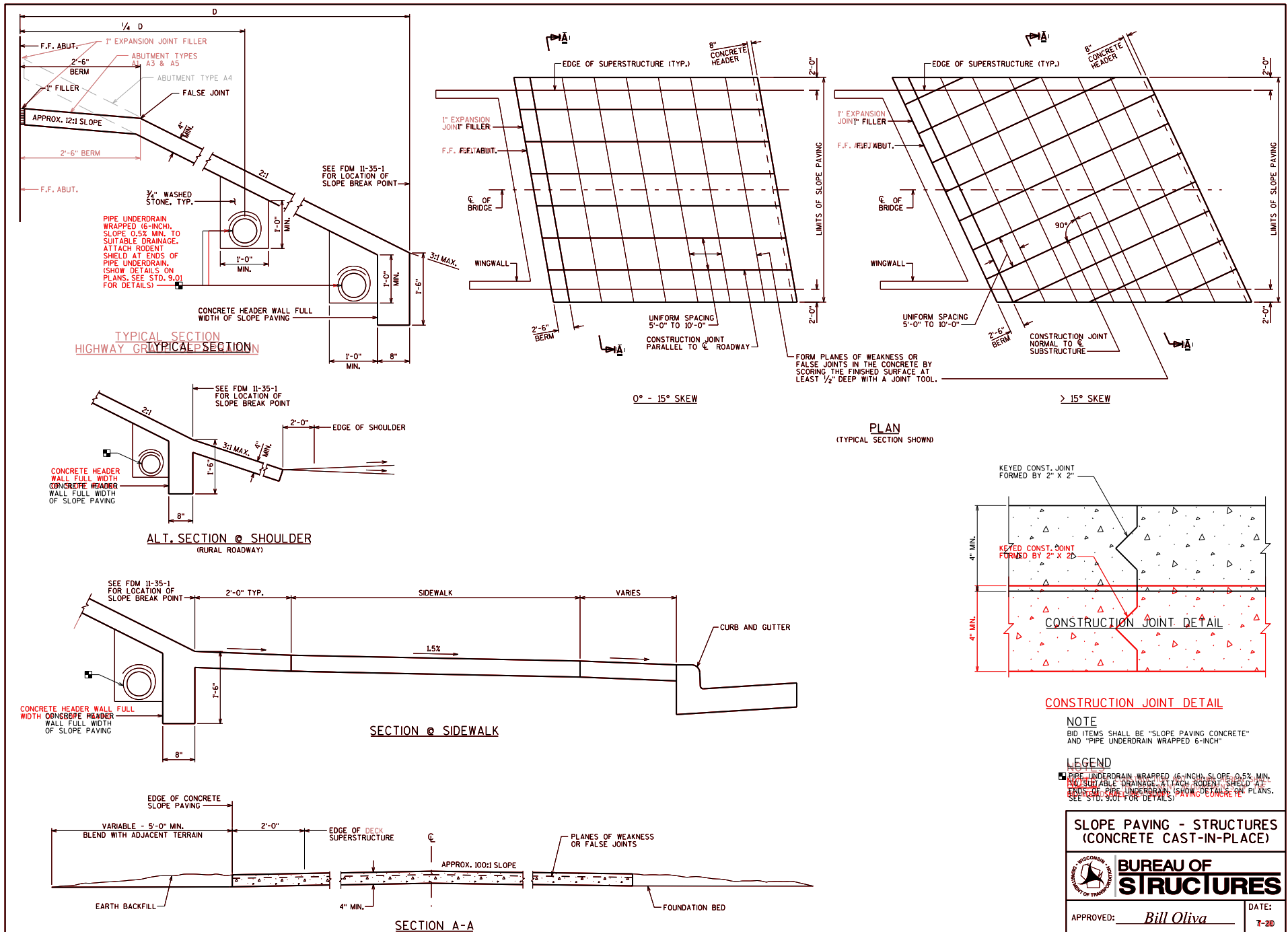
BID ITEM SHALL BE "SLOPE PAVING CRUSHED AGGREGATE" FOR "SLOPE PAVING SELECT CRUSHED MATERIAL".

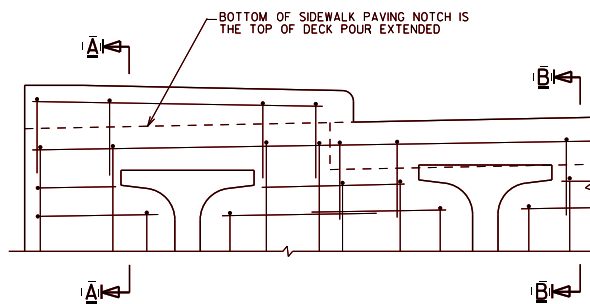
DESIGNER SHALL BE RESPONSIBLE FOR THE SELECTION OF MATERIALS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP MAY BE SHOWN ON THIS DRAWING OF A QUALITY UNACCEPTABLE TO THE ENGINEER.

WOOD FORMS MAY BE LEFT IN PLACE WHEN OF DESIGNER'S CHOICE TO THE ENGINEER.

PREFERRED SECTION SHOWN; FOR ALTERNATE SECTION SEE FDM II-35-1.

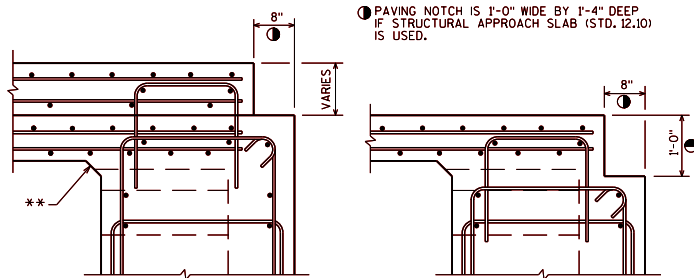
SLOPE PAVING - STRUCTURES (CRUSHED AGGREGATE & SELECT CRUSHED MATERIAL)	
	BUREAU OF STRUCTURES
APPROVED: <u>Bill Oliva</u>	DATE: <u>7-18</u>





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.)

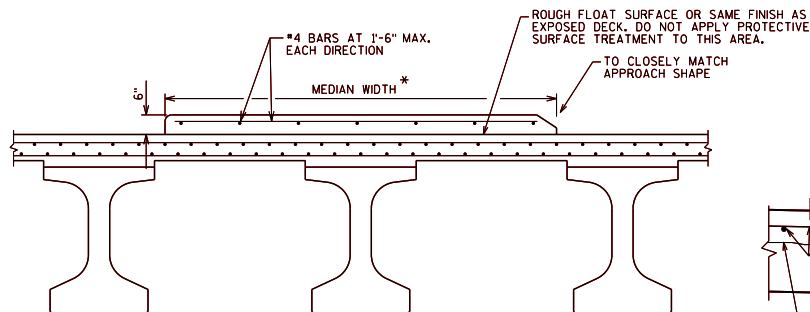


SECTION A-A

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

SECTION B-B

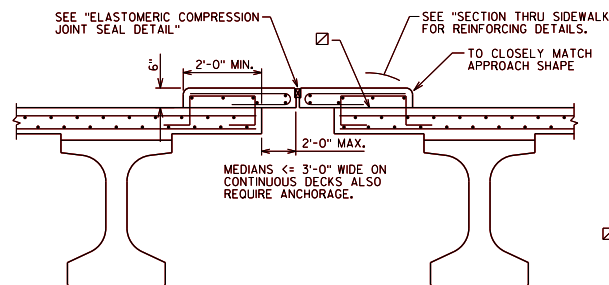
- SEE STANDARDS 19.33, 19.34, 19.35 FOR REINFORCEMENT DETAILS
- DETAILS SHOWN ARE FOR GIRDER STRUCTURES. SIMILAR REINFORCEMENT FOR SLAB STRUCTURES SHALL BE USED WITH A REMINDER THAT THE TRANSVERSE AND LONGITUDINAL REINFORCEMENT LAYERS ARE REVERSED.



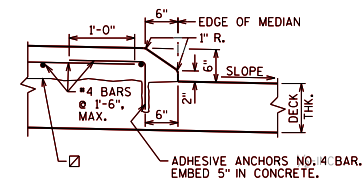
CROSS SECTION THRU UNANCHORED MEDIAN

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

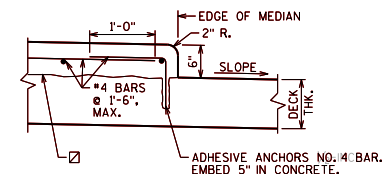
NOTE: CLEAN ALL LOOSE MATERIAL ON THE DECK AT THE MEDIAN LOCATION PRIOR TO MEDIAN PLACEMENT USING HIGH PRESSURE WATER OR AIR, ENSURING ALL FREE-STANDING WATER IS REMOVED PRIOR TO MEDIAN PLACEMENT. NEAT CEMENT IS REQUIRED AS PER 509.3.9.2 OF THE STANDARD SPECIFICATIONS UNLESS THE MEDIAN IS POURED WITHIN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



CROSS SECTION THRU MEDIAN WITH A JOINT

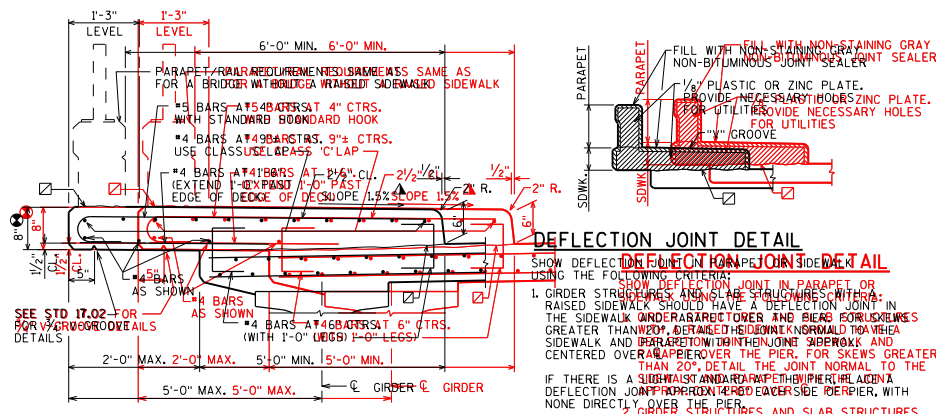


ANCHORED MEDIAN CURB DETAIL



ANCHORED MEDIAN CURB DETAIL

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



SECTION C-C THRU SIDEWALK

NOTES

WHEN PARAPETS ARE POURED CONTINUOUSLY FROM END TO END, THEY SHALL BE SEPARATED AT THE DEFLECTION JOINTS BY A PIECE OF 1/8" 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.

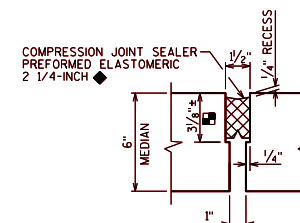
8" MIN. SIDEWALK THICKNESS ALSO REQ'D AT EDGE OF DECK/SLOPE.

±0.5% CONSTRUCTION TOLERANCE IN SIDEWALK CROSS SLOPE. THE SIDEWALK CROSS SLOPE SHALL NOT EXCEED 2% WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

DESIGNER'S 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.

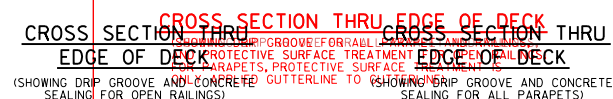
FOR DEAD LOAD PURPOSES, THE SUPERSTRUCTURE DESIGN SHALL ACCOUNT FOR A MAXIMUM 2% SIDEWALK CROSS SLOPE.



ELASTOMERIC COMPRESSION SEAL DETAIL

VARIES BASED ON JOINT MANUFACTURER
MANUFACTURER SHALL LABEL TOP OF SEAL

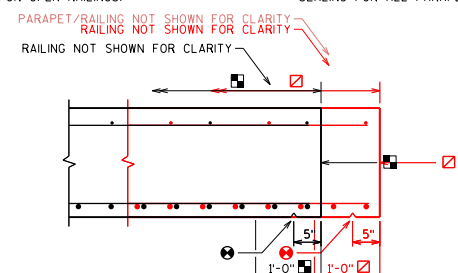
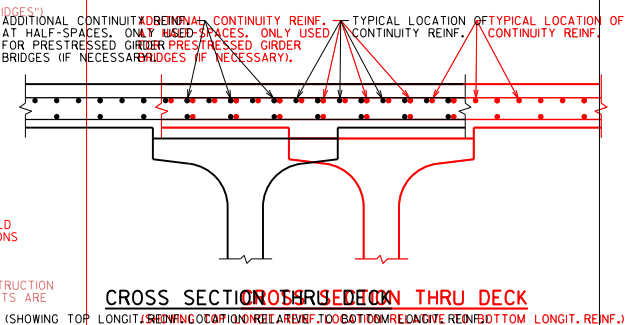
MEDIAN AND RAISED SIDEWALK DETAILS	
	BUREAU OF STRUCTURES
	APPROVED: <u>Bill Oliva</u>
DATE: <u>1-22</u>	



DETAIL REQUIRED: NUMBER AND WIDTH OF DECK EXCEEDS 90 FEET FOR RIDGER GIRDERS. SUPERSTRUCTURE SPACING 5 FEET FOR ISLAND SUPERSTRUCTURES. DETAILS SHOULD BE USED FOR STAGED CONSTRUCTION AND FOR ADDITIONAL JOINT APPLICATIONS. WITHIN THE DECK, OPTIONAL CONTRACTOR JOINTS MAY BE ADOPTED PROVIDED BY THE JOINTED CONCRETE CONTRACTOR.

DETAIL REQUIRED: NUMBER AND WIDTH OF DECK EXCEEDS 90 FEET FOR RIDGER SUPERSTRUCTURES. JOINTS SHOULD BE PLACED AT LEAST 16 INCHES FROM THE EDGE OF THE TOP OF THE ANGLE OR ARCH GIRDER AND BEARING RIGIDLY BEHIND THE MEDIAN OR DRAIN GUTS ARE TO BE PLACED IN THE MIDDLE OF THE LANE. PLACES AT LANE LINES OR IN THE MIDDLE OF THE LANE (LANE).

JOINTS SHOULD BE PLACED AT LEAST 6 INCHES FROM THE EDGE OF THE TOP FLANGE OF THE GIRDER AND PREFERABLY 12 INCHES FROM THE EDGE OF THE TOP FLANGE. AVOID PLACING NEAR WHEEL PLACES OF THE JOINT OR IN THE MIDDLE OF THE LANE.



CROSS SECTION THROUGH EDGE OF SLAB

(SHOWING CORROSION PROTECTION FOR ALL OF THE ABOVE TRAININGS, RAILINGS, AND PROTECTIVE SURFACE TREATMENT FOR OPEN FRAMING RAILINGS, FOR FRAMERS, PROTECTIVE SURFACE TREATMENT MUST BE ONLY APPLIED (GUTTERLINE TO GUTTERLINE))

DESIGNER NOTES

NOTES

DESIGNER	NOTES	NOTES
	1/2" V-GROOVE, TERMINATE 2'-0" FROM TOP FACE OF ABUTMENT BODY OR S.F. OF ABUT. DIAPH. IF TYPE AT FIXED AND SEMI-EXPANSION ABUTMENTS.	1/2" V-GROOVE REOD. EXTEND TO 2'-0" FROM TOP FACE OF ABUTMENT BODY OR S.F. OF ABUT. DIAPH. IF TYPE AT FIXED AND SEMI-EXPANSION ABUTMENTS.
3/4" V-GROOVE REQUIRED FOR ABUTMENTS WITH DECK AND SLAB.	1/2" V-GROOVE, EXTEND V-GROOVE TO 2'-0" FROM TOP FACE OF ABUTMENT DIAPHRAGM OR TYPE AT FIXED AND SEMI-EXPANSION ABUTMENTS.	1/2" V-GROOVE REOD. EXTEND TO 2'-0" FROM TOP FACE OF ABUTMENT BODY OR S.F. OF ABUT. DIAPH. IF TYPE AT FIXED AND SEMI-EXPANSION ABUTMENTS.
BAR	CONCRETE TO STANDARD FORM TYPE AT FIXED AND SEMI-EXPANSION ABUTMENTS.	1/2" V-GROOVE REOD. EXTEND TO 6" FROM TOP FACE OF ABUTMENT DIAPHRAGM OR TYPE AT FIXED AND SEMI-EXPANSION ABUTMENTS.
DO NOT APPLY CRACKING SEALER TO SURFACES OR STAINED.	CRACKING SEALER REQUIRED.	

DESIGNER NOTES	NOTES
<p>1/2" V-GROOVE REO'D. EXTEND TO DECK AND SLAB.</p> <p>CONCRETE SURFACES FOR TYPE A FIXED AND SEMI-EXPANSION ABUTMENTS.</p> <p>DO NOT APPLY CONCRETE SEALER TO SURFACES TO BE STAINED OR OTHER</p>	<p>1/2" V-GROOVE REO'D. EXTEND TO 2"-0" FROM FACE OF ABUTMENT BODY/FORMS.</p> <p>1/2" V-GROOVE, EXTEND V-GROOVE TO 6" FROM FRONT FACE OF ABUTMENT DIAPHRAGM.</p> <p>1/4" V-GROOVE REO'D. EXTEND TO 6" FROM F.F. OF ABUT. DIAPH. (FOR TYPE A FIXED AND SEMI-EXPANSION ABUTMENTS)</p>
<p>BID ITEM "PROTECTIVE SURFACE TREATMENT SHALL BE APPLIED TO DECK AND CONCRETE SURFACES. PROTECTIVE SURFACE TREATMENT FOR EXTERIOR EXPOSED SURFACES OF JOISTS AND BEAMS, 1'-0" OF THE FRONT AND REAR VIEWS OF THE FRONT FACE OF ABUTMENT.</p> <p>APPLY TO THE VERTICAL AND HORIZONTAL SURFACES OF SIDEWALKS, MEDIANS, AND PAVING NOTHES.</p>	<p>PROTECTIVE SURFACE TREATMENT SHALL BE APPLIED TO TREATMENTS SPEC'D HEREIN.</p> <p>PIGMENTED SURFACE SEALER SHALL BE APPLIED TO THE (INSERT LOCATIONS).</p>
<p>BID ITEM "PIGMENTED SURFACE SEALERS OF PARAPETS ON WINGS."</p>	<p>USE "PIGMENTED SURFACE SEALER"</p>

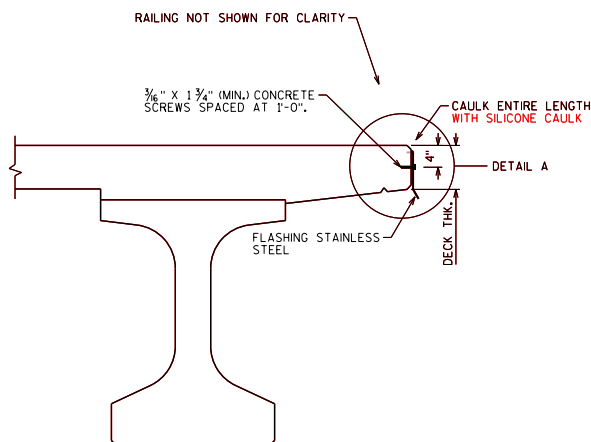
DECK AND SLAB DETAILS



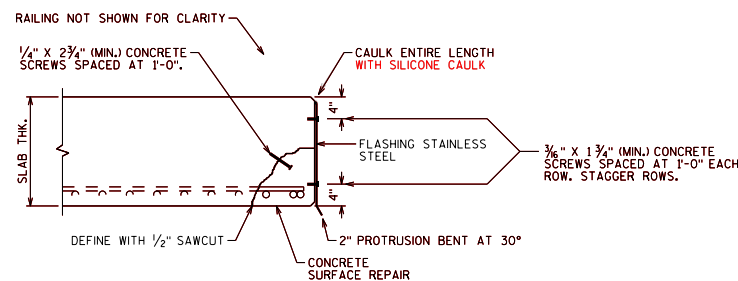
**BUREAU OF
STRUCTURES**

APPROVED: *Bill Oliva*

DATE: 1-21



THE BID ITEM "FLASHING STAINLESS STEEL" SHALL INCLUDE PROVIDING AND INSTALLING THE STAINLESS STEEL FLASHING, SAULING, CONCRETE SCREWS AND REINFORCING CHAIRS. THE BIDDER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS PRIOR TO COMMENCEMENT OF FLASHING.



DETAIL 1 NOT TO BE USED IF CLEARANCE IS AN ISSUE OR
IF DEBRIS IS A CONCERN.

THE BID ITEM "FLASHING STAINLESS STEEL" SHALL INCLUDE PROVIDING AND INSTALLING THE STAINLESS STEEL FLASHING AND CONCRETE SCREWS, INCLUDING THE 1/4" SCREWS USED TO SECURE THE CONCRETE SURFACE REPAIR.

THE BID ITEM "FLASHING STAINLESS STEEL" SHALL INCLUDE, PROVIDING AND INSTALLING THE STAINLESS STEEL FLASHING, GALV. 16 GA., 1/8" CONCRETE SCREWS, AND SEALS AND GUTTER EDGE OF EDGE DECK OR ROCK PRIOR TO ATTACHMENT OF THE FLASHING.

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. CONCEPTUAL DETAILS ARE SHOWN ON THIS STANDARD.

DO NOT USE FLASHING IF FREEBOARD IS LESS THAN 3"
FOR A SLAB BRIDGE.

FOR A SL

NOTES

THE BID ITEM "FLASHING-STAINLESS STEEL" SHALL INCLUDE PROVIDING AND INSTALLING THE STAINLESS STEEL FLASHING, SILICONE CAULK AND 3/16" CONCRETE SCREWS.

FLASHING TO BE INSTALLED AFTER PROTECTIVE SURFACE
TREATMENT APPLICATION.

NOTES

NOTES
CONCRETE SCREWS SHALL BE 410 STAINLESS STEEL.

THE BID ITEM FLASHING TO BE INSTALLED SHALL INCLUDE PROVIDING AND INSTALLING THE STAINLESS STEEL FLASHING, SECURE FLASHING TO THE CONCRETE BY SCREWS BELOW TOP OF DECK/SLAB SURFACE. FLASHING TO BE INSTALLED AFTER PROTECTIVE SURFACE TREATMENT APPLICATION. A CONSTANT HEIGHT BASED ON THE THINNESS SLAB DEPTH OVER THE BRIDGE LENGTH. 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
SEALER.

2" LEG. BEND TO FINAL POSITION AFTER FORMS ARE REMOVED.

DETAIL FOR CONCRETE SLAB BRIDGE SIMILAR

STANDARD 17.03



NOTES

TOP TRANSVERSE BARS IN SLAB SHALL BE SUPPORTED BY INDIVIDUAL BARS AT APPROXIMATELY 3'-0" CENTERS EACH WAY. BOTTOM LONGITUDINAL BARS SHALL BE SUPPORTED BY CONTINUOUS BAR CHAIRS AT APPROXIMATELY 3'-0" CENTERS EACH WAY. BOTTOM LONGITUDINAL BARS SHALL BE SUPPORTED BY CONTINUOUS BARS AT APPROXIMATELY 3'-0" CENTERS EACH WAY. ALL SLAB THICKNESS DIMENSIONS ARE MINIMUM. ANY TOLERANCES NECESSARY TO CORRECT CONSTRUCTION DISCREPANCIES ARE TO BE PLUS (+).

ALL SLAB THICKNESS DIMENSIONS ARE MINIMUM, ANY TOLERANCES
PARAPET SIDEWALKS (INCL. MEDIAN) PLACED ON OR UNDER THIS SLAB BE PLUS (+).
IF PARAPET SIDEWALKS AND MEDIAN PLACED ON TOP OF THE SLAB SHALL
BE SUBMITTED, SEWAGE CHAMBER SHALL BE RE-PLACED EXCEPT ALL STAGES
OF THE SUPERSTRUCTURE HAS CURED, FOR DEFLECTION CONTROL BETWEEN
STAGES DO NOT RELEASE ANY FASEWORK UNTIL PARAPET SIDEWALKS
AND MEDIAN HAVE CURED. SEWAGE CHAMBER SHALL INCLUDE ALLOWANCE FOR FORM
AND CURING CRACK. CUMBER DOES NOT INCLUDE ALLOWANCE FOR FORM

SETTLEMENT
CAMBER SPANS AS SHOWN TO PROVIDE FOR DEAD LOAD DEFLECTION AND
FLOOR CRACKING. RELEASING SLAB FALSEWORK ALLOWANCE FOR SLAB EVALUATIONS
SET AT THE 1/4 OF ABUTMENTS, THE 1/4 OF PIERS AND AT 5/10 PTS. TO
VERIFY CAMBER TAKE ELEVATIONS ALONG GUTTER LINES AND CROWN
OR BELT LINE ELEVATIONS. SET AT THE 1/4 OF ABUTMENTS, THE 1/4 OF PIERS AND AT 5/10 PTS. TO
VERIFY CAMBER TAKE ELEVATIONS ALONG GUTTER LINES AND CROWN
OR BELT LINE ELEVATIONS AS BUILT PLANS. SEE STD. 18.03

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

DESIGNER NOTES

DESIGNER'S NOTES

ALL BAR SPLICES TO BE BASED ON "CLASS C" TENSION LAP SPLICE.
THE MAXIMUM ALLOWABLE SKEW ANGLE OF STRUCTURE SHALL BE 30°.

USE OPTIONAL LONGITUDINAL JOINTS WHEN OVERALL SLAB WIDTH IS
ALL BAR SPLICES TO BE BASED ON "CLASS C" TENSION LAP SPLICE.

USE OPTIONAL LONGITUDINAL JOINTS WHEN OVERALL SLAB WIDTH IS
OVER 52'-0".
 ALL BAR SPLICES TO BE BASED ON "CLASS C" TENSION LAP SPLICE.

USE OPTIONAL LONGITUDINAL JOINTS WHEN OVERALL SLAB WIDTH IS OVER 52'-0".
JOINT WHEN POOR EXCEEDS 40 C.Y. PLACE KEYED JOINT NEAR POINT
FOR BRIDGES LOCATED IN REMOTE AREAS USE OPTIONAL TRANSVERSE JOINT
WHEN POOR EXCEEDS 400 C.Y. PLACE KEYED JOINT NEAR POINT OF DEAD LOAD
INFECTION.
TRANSVERSE BAR STEEL REINFORCEMENT SHALL BE PLACED ON THE

ALL TRANSVERSE BAR STEEL REINFORCEMENT SHALL BE PLACED ON THE SKEW.
ALL TRANSVERSE BAR STEEL REINFORCEMENT SHALL BE PLACED ON THE SKEW.
FLOOR DRAINS ARE TO BE OMITTED FROM SLAB STRUCTURES WHERE POSSIBLE.
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.
PIER CAP OR WALL TYPE PIERS SHALL BE USED ON MOST STRUCTURES.
"COLUMN WITHOUT TYPE PIER" (SEE 512-8.1) 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.

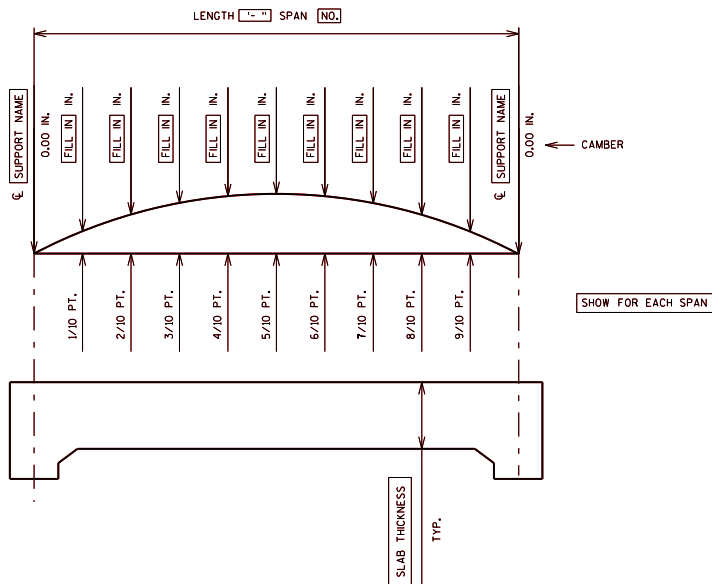
CONTINUOUS FLAT SLAB



BUREAU OF STRUCTURES

APPROVED: *Abigail Bionk*

DATE: 1-23



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 OR RELEASING CAMBER DOES NOT INCLUDE ALLOWANCE FOR
FORM SETTLEMENT.

CAMBER SHOWN IS BASED ON 3 TIMES DEAD LOAD DEFLECTION,
PARAPETS, SIDEWALKS, AND MEDIANS PLACED ON TOP OF THE SLAB
SHALL BE FLOORED AFTER FALSEWORK HAS BEEN RELEASED, FLECTION
OR NON-RELEASING CONSTRUCTION NOT INCLUDE ALLOWANCE FOR
FORM SETTLEMENT.

SLAB-SUPPORTING FALSEWORK SHALL REMAIN IN-PLACE UNTIL ALL STAGES
OR THE SUPERSTRUCTURE HAS BEEN RELEASED, FOR DEFLECTION CONTROL BETWEEN
SPACE SUB-STRUCTURE RELEASE, THIS FALSEWORK UNTIL RELEASE OF SIDEWALKS
AND MEDIANS HAVE TOURED, (FOR STAGED CONSTRUCTION)

SELECT ONE

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

	€ BRG. SUPPORT NAME	5/10 PT.	€ BRG. SUPPORT NAME
<input type="text"/> GUTTER			
<input type="text"/> CROWN AND/OR €			
<input type="text"/> GUTTER			

PRIOR TO RELEASING SLAB FALSEWORK, TAKE TOP OF SLAB
ELEVATIONS AT THE € OF ABUTMENTS, THE € OF PIERS AND
AT 5/10 PTS. TO VERIFY CAMBER, TAKE ELEVATIONS ALONG
GUTTER LINES AND CROWN OR € 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.

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.

FOR BRIDGES WITH € LINE NOT ON THE CROWN, PROVIDE ELEVATIONS
AT BOTH LOCATIONS.

TOP OF SLAB ELEVATIONS

SHOW FOR EACH SPAN

	€ BRG. SUPPORT NAME	1/10	2/10	3/10	4/10	5/10	6/10	7/10	8/10	9/10	€ BRG. SUPPORT NAME
<input type="text"/> EDGE OF SLAB											
<input type="text"/> CROWN AND/OR €											
<input type="text"/> EDGE OF SLAB											

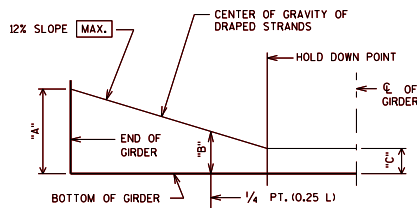
CONCRETE SLAB DETAILS



**BUREAU OF
STRUCTURES**

APPROVED: Abir O Bank

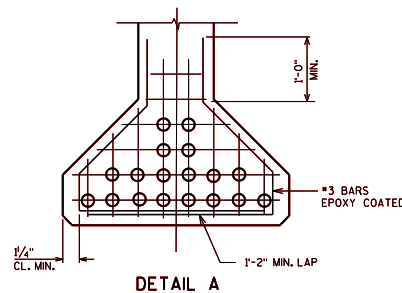
DATE:
1-23



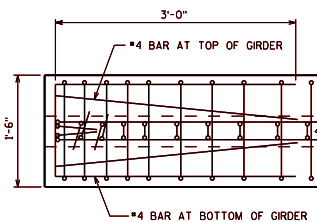
"A" TO BE GIVEN TO THE NEAREST 1"
 "B" = $\frac{1}{4}"A + 3"$ (MIN.)
 "C" = $\frac{1}{4}"A + 3"$ (MAX.)

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

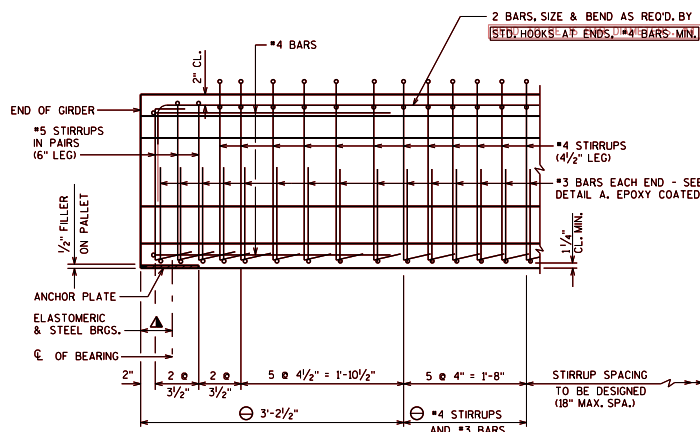
LOCATION OF DRAPED STRANDS



DETAIL A



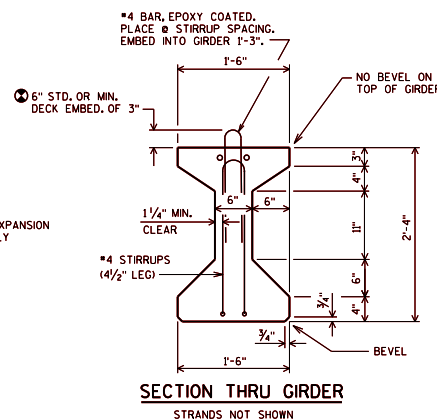
PLAN VIEW



SUPPORT WITH STEEL
OR ELASTOMERIC BRGS.

SUPPORT WITH
1/2" ELASTOMERIC BRG. PAD

SIDE VIEW OF GIRDER



SECTION THRU GIRDER

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 MAINTENANCE SECTION. USE OF WWF SUBSTITUTION DETAILS SHALL BE SUBMITTED ELECTRONICALLY TO THE WISDOT FABRICATION LIBRARY AND ACCEPTED PRIOR TO SHOP DRAWING SUBMITTAL. MIN. ULTIMATE STRENGTH OF 270,000 PSI.

PRESTRESSING STRANDS SHALL BE (1 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" A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. MAXIMUM RELEASE 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.

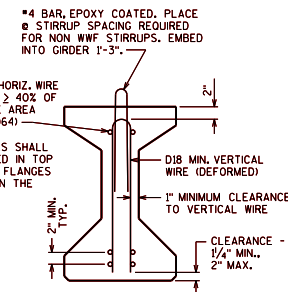
THE DESIGNER SHALL BASE THE DESIGN ON STANDARD 19.02 AND REINFORCEMENT IN STANDARD END SECTION OF THE GIRDER IS BASED ON THE STANDARD STRAND PATTERNS LISTED ON STANDARD 19.02 AND THE SPAN LENGTHS SHOWN IN TABLE 19.3-L. USING DIFFERENT STRAND PATTERNS OR LONGER SPANS WILL REQUIRE A COMPLETE DESIGN OF THIS REINFORCEMENT, WHICH REQUIRES PRIOR APPROVAL FROM THE BUREAU OF STRUCTURES, BRGS. (STD. 27.07) AND STEEL BRGS. (STD. 27.09).

1. FROM ONLY ONE STRAND BASED ON THE PLANS AND STEEL BRGS. (STD. 27.09)

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

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 *4 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 = TO KSI)

28" PRESTRESSED GIRDER DETAILS

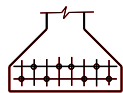


BUREAU OF
STRUCTURES

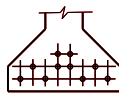
APPROVED: *Bill Oliva*

DATE:

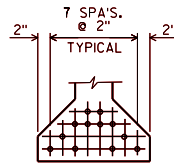
1-22



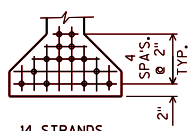
8 STRANDS



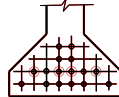
10 STRANDS



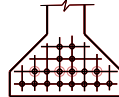
12 STRANDS



14 STRANDS



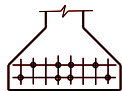
*16 STRANDS



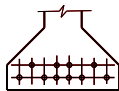
*18 STRANDS

* NEEDS BOND BREAKERS AT ENDS. SEE BOND BREAKER DETAIL.
 * MAY REQUIRE DEBONDING AT ENDS, WHICH IS TO BE AVOIDED.
 @ INDICATES STRAND TO BE DEBONDED

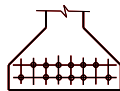
STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY TO AVOID DRAPING OF 0.6" DIA. STRANDS (0.5" DIA. STRANDS MAY ALSO BE USED)



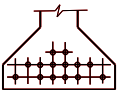
8 STRANDS



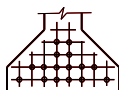
10 STRANDS



12 STRANDS



14 STRANDS



16 STRANDS



18 STRANDS

ARRANGEMENT AT $\frac{1}{4}$ 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
 $P_i \text{ PER } 0.5" \text{ DIA. STRAND} = 0.1531 \times 202,500 = \underline{31.00 \text{ KIPS}}$
 $P_i \text{ PER } 0.6" \text{ DIA. STRAND} = 0.217 \times 202,500 = \underline{43.94 \text{ KIPS}}$
 $\frac{y_B}{r^2} = \frac{-13.42}{91.95} = -0.1459 \text{ IN./IN.}^2$
 $f_B (\text{init.}) = \frac{A_s f_s}{A} (1 + \frac{e_s y_B}{r^2})$

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	-10.40	352	2.848
10	-9.80	439	3.428
12	-8.75	527	3.846
14	-7.99	615	4.269
*16	-9.42	703	5.395
*18	-9.64	791	6.102
STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS (0.5" DIA.)			
8	-10.42	248	2.008
10	-10.62	310	2.534
12	-10.42	372	2.715
14	-10.00	434	3.023
16	-9.42	496	3.775
18	-9.64	558	4.305

NO. STRANDS	e (inches)	$P(\text{init.}) = A_s f_s$ (KIPS)	$f_B (\text{init.})$ (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

END OF GIRDER
 DEBONDING LENGTH FOR TWO OUTSIDE STRANDS
 DEBONDING LENGTH FOR TWO INSIDE STRANDS
 BOND BREAKER DETAIL
 SHOWING LENGTHS OF DEBONDING FROM
 END OF GIRDER. DEBOND LENGTHS TO BE
 DESIGNED. STRAND TRANSFER LENGTH
 IS 60 X STRAND DIAMETER.

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.

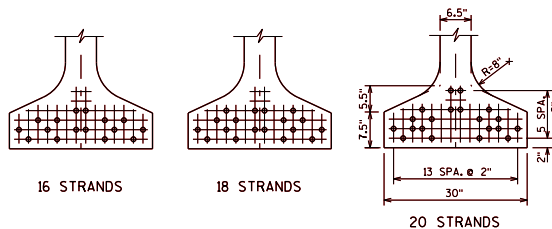
28" PRESTRESSED GIRDER DESIGN DATA



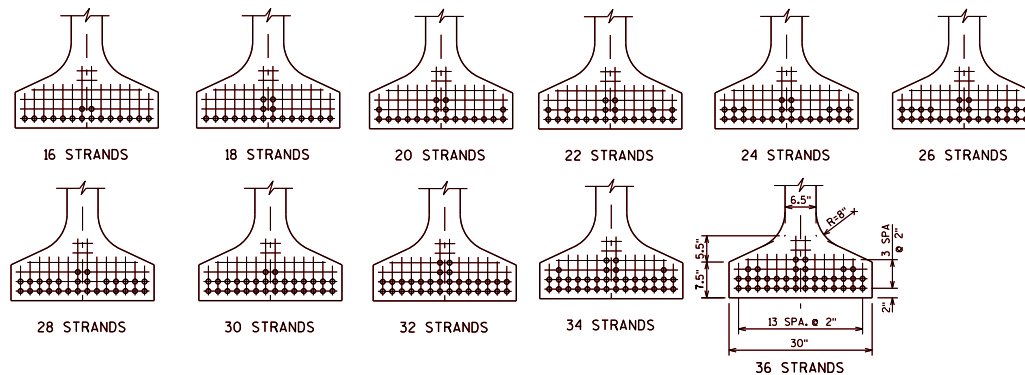
BUREAU OF STRUCTURES

APPROVED: Bill Oliva

DATE: 1-22



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



ARRANGEMENT AT $\frac{L}{4}$ SPAN - FOR GIRDERS WITH DRAPED 0.6" DIA. STRANDS

36W" GIRDER

$$A = 632 \text{ SQ. IN.}$$

$$r^2 = 158.20 \text{ IN.}^2$$

$$y_T = 19.37 \text{ IN.}$$

$$y_B = -16.63 \text{ IN.}$$

$$I = 99,980 \text{ IN.}^4$$

$$S_T = 5,162 \text{ IN.}^3$$

$$S_B = -6,012 \text{ IN.}^3$$

$$\text{WT.} = 658 \text{ \# / FT.}$$

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

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

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

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

(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	-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.

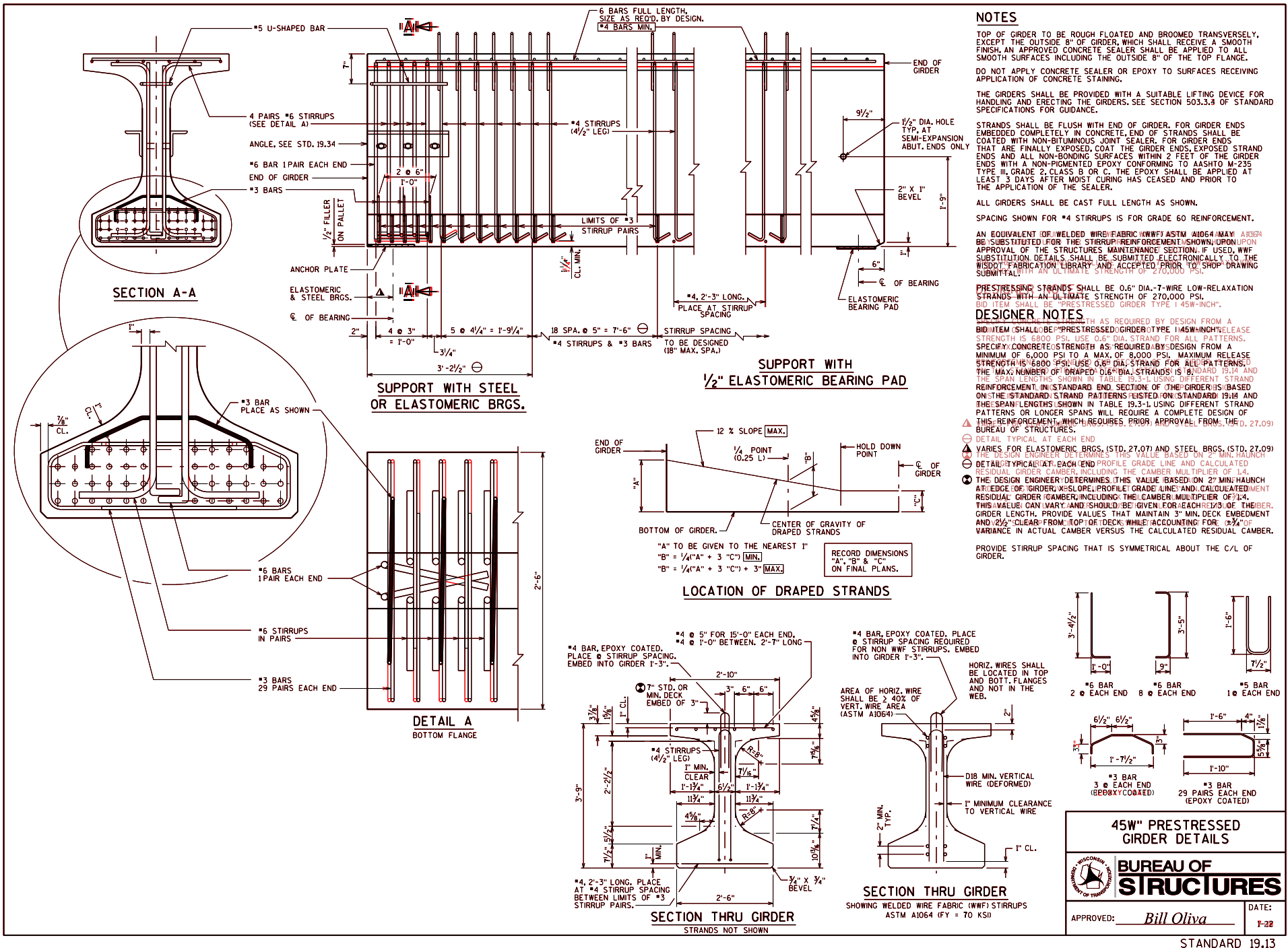
36W" PRESTRESSED GIRDER DESIGN DATA



**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

DATE:
7-12



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 503.3.9 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 II, 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 MAINTENANCE SECTION. IF USED, WWF SUBSTITUTION DETAILS SHALL BE SUBMITTED ELECTRONICALLY TO THE WSDOT FABRICATION LIBRARY AND ACCEPTED PRIOR TO SHOP DRAWING SUBMITTAL WITH AN ULTIMATE STRENGTH OF 270,000 PSI.

PRESTRESSING STRANDS SHALL BE 0.6" DIA., 7-WIRE LOW-RELAXATION STRANDS WITH AN ULTIMATE STRENGTH OF 270,000 PSI. BID ITEM SHALL BE "PRESTRESSED GIRDER TYPE 145W-INCH".

DESIGNER NOTES

THIS REINFORCEMENT SHALL BE AS REQUIRED BY DESIGN FROM A BID ITEM SHALL BE "PRESTRESSED GIRDER TYPE 145W-INCH" RELEASE STRENGTH IS 6800 PSI. USE 0.6" DIA. STRAND FOR ALL PATTERNS. 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 18 GIRDER 19.13 AND THE SPAN LENGTHS SHOWN IN TABLE 19.3-1 USING DIFFERENT STRAND REINFORCEMENT IN STANDARD END SECTION OF THE GIRDER IS BASED ON THE STANDARD STRAND PATTERNS LISTED ON STANDARD 19.13 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 D, 27.09) BUREAU OF STRUCTURES.

DETAIL TYPICAL AT EACH END

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

THE DESIGN ENGINEER DETERMINES THIS VALUE BASED ON 2" MIN. HAUNCH

DETAIL TYPICAL AT EACH END PROFILE GRADE LINE AND CALCULATED RESIDUAL GIRDER CAMBER INCLUDING THE CAMBER MULTIPLIER OF 1.4.

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 ORDER LENGTH. PROVIDE VALUES THAT MAINTAIN 3" MIN. DECK EMBEDMENT AND 2 1/2" CLEAR FROM TOP OF DECK WHILE ACCOUNTING FOR ± 3/4" OF VARIANCE IN ACTUAL CAMBER VERSUS THE CALCULATED RESIDUAL CAMBER.

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

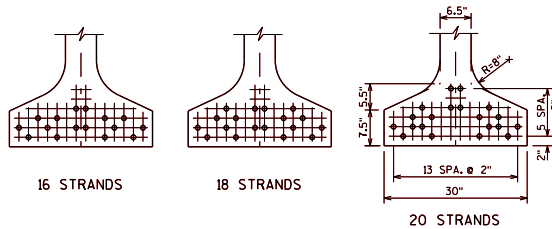
45W" PRESTRESSED GIRDER DETAILS

BUREAU OF STRUCTURES

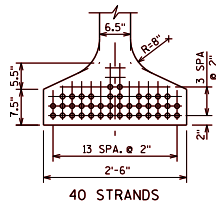
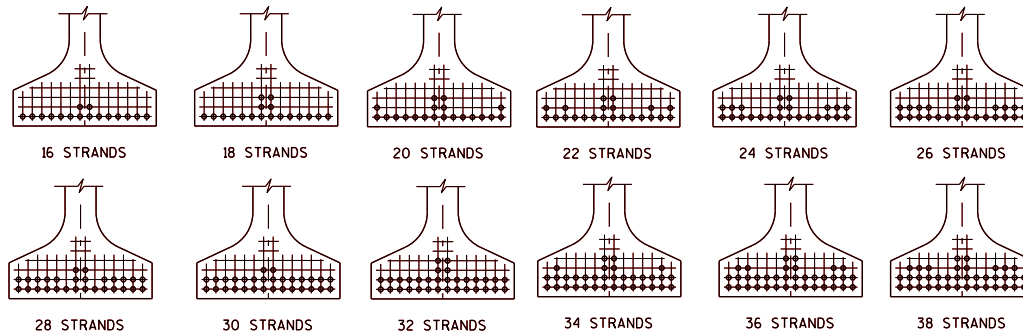
APPROVED: *Bill Oliva*

DATE: *1-22*

STANDARD 19.13



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



ARRANGEMENT AT $\frac{1}{4}$ SPAN - FOR GIRDERS WITH DRAPED 0.6" DIA. STRANDS

45W" GIRDER

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

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

$y_T = 24.26 \text{ IN.}$

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

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

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

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

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

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

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

$\frac{y_B}{r^2} = \frac{-20.74}{258.70} = -0.08017 \text{ in/in}^2$

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

(COMPRESSION IS POSITIVE)			
NO. STRANDS	e _s (inches)	P(ini.t.)=A _s f _s (KIPS)	f _B (ini.t.) (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.

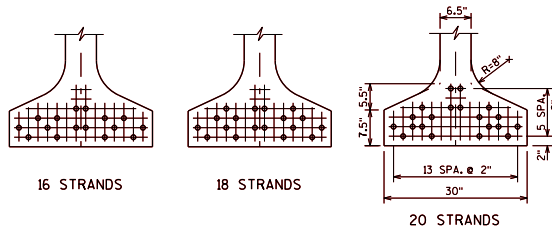
45W" PRESTRESSED GIRDER DESIGN DATA



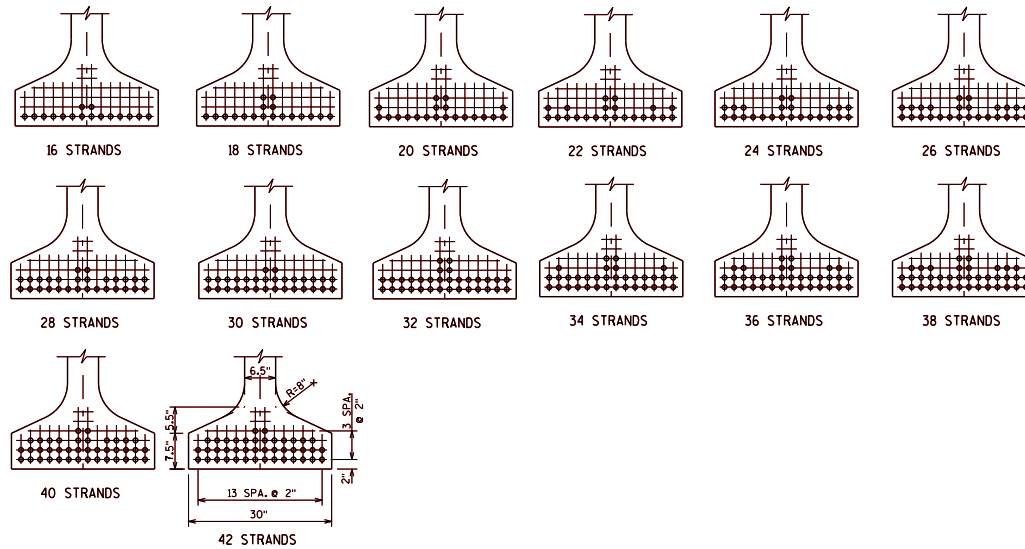
**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

DATE:
7-14



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



ARRANGEMENT AT $\frac{1}{4}$ SPAN - FOR GIRDERS WITH DRAPED 0.6" DIA. STRANDS

54W" GIRDER

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

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

$y_T = 27.70 \text{ IN.}$

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

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

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

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

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

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

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

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

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

(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	-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.

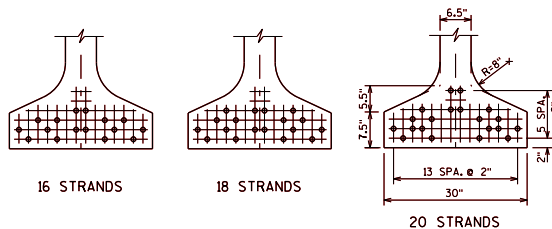
54W" PRESTRESSED
GIRDER DESIGN DATA



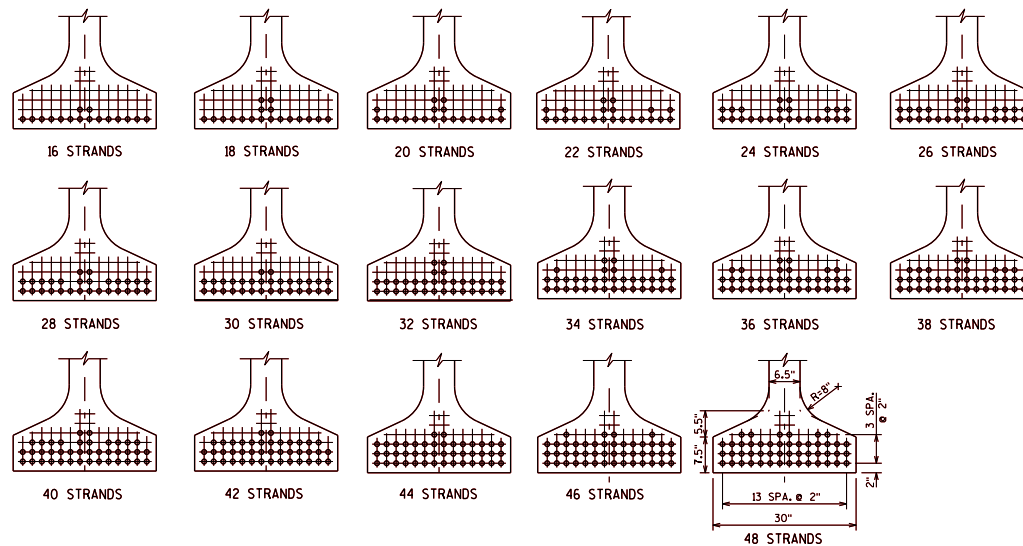
**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

DATE:
7-18



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



ARRANGEMENT AT $\frac{L}{4}$ SPAN - FOR GIRDERS WITH DRAPED 0.6" DIA. STRANDS

72W" GIRDER

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

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

$$y_T = 37.13 \text{ IN.}$$

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

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

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

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

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

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

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

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

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

NO. STRANDS	e _s (inches)	P(ini.t.)=A _s f _s (KIPS)	(COMPRESSION IS POSITIVE)
			f _B (ini.t.) (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.

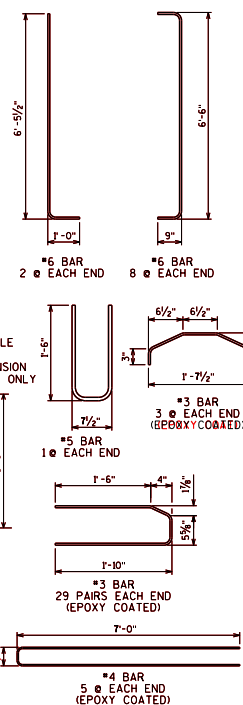
72W" PRESTRESSED GIRDER DESIGN DATA



**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

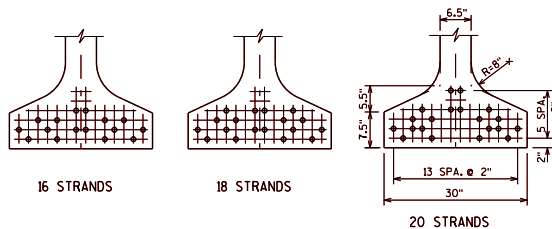
DATE:
7-18



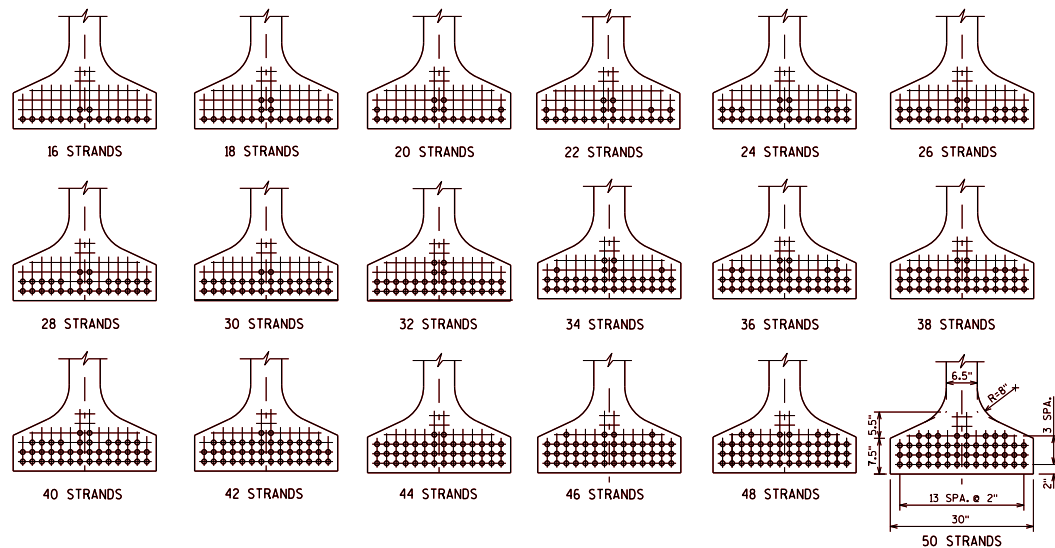
THIS NOTE APPLIES TO LONG SPANS AS DEFINED IN THE NOTES FOR THE 82"W" STORAGE, TABLE 19.3.2 OF THE BRIDGE MANUAL. CONTRACTOR IS RESPONSIBLE FOR LATERAL STABILITY OF THE GIRDER. THE GIRDER IS REINFORCED TO ALLOW A MAXIMUM OVERHANG FROM THE LIFTING LOCATION OR POINT OF APPLICATION OF THE LIFTING DEVICE. THE CONTRACTOR IS RESPONSIBLE FOR LATERAL STABILITY OF THE GIRDER UNTIL IT IS CURED. IF NOTE DOES NOT APPLY, REFERENCE SECT. 503.3.4 OF STD. SPEC. FOR GUIDANCE.

LOCATION OF DRAPED STRANDS

I-28



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



ARRANGEMENT AT $\frac{1}{4}$ 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 = $0.217 \times 202,500 = 43.94 \text{ KIPS}$

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

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

(COMPRESSION IS POSITIVE)			
NO. STRANDS	e _s (inches)	P(ini.t.)=A _s f _s (KIPS)	f _B (ini.t.) (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.

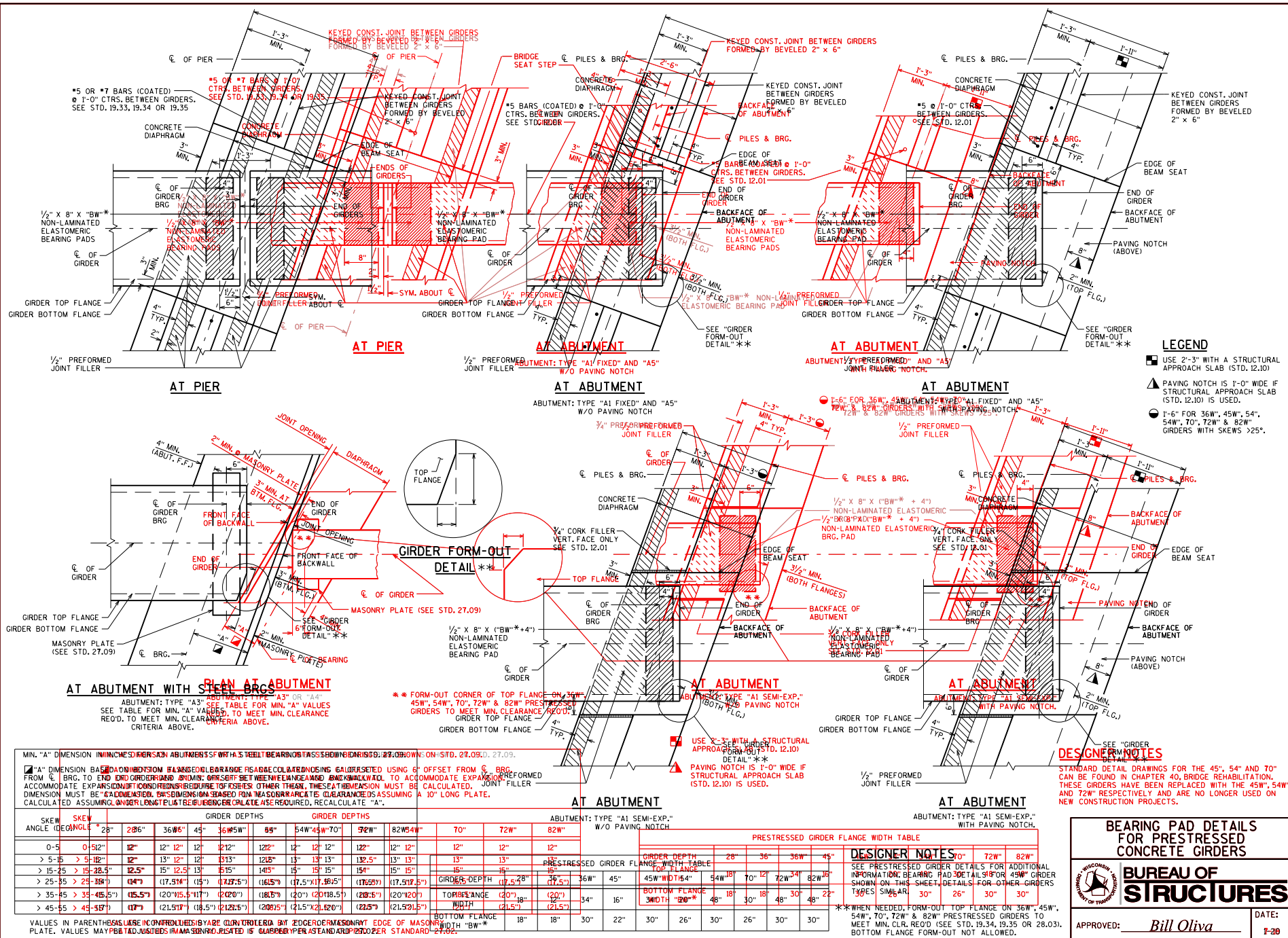
82W" PRESTRESSED GIRDER DESIGN DATA

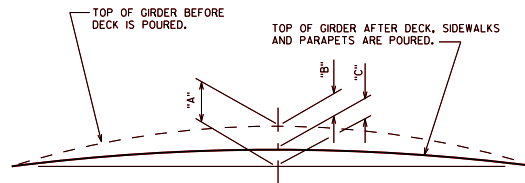
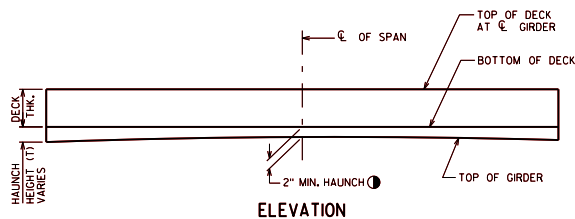


**BUREAU OF
STRUCTURES**

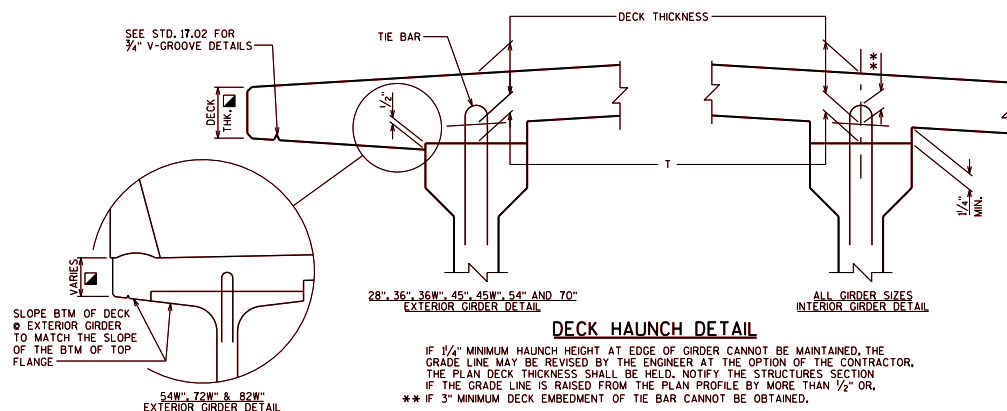
APPROVED: Bill Oliva

DATE:
7-17





- * "A" = PRESTRESS CAMBER
- * "B" = DEAD LOAD DEFLECTION * ROUND OFF TO NEAREST 1/8"
- * "C" = RESIDUAL CAMBER



DESIGNER NOTES

- 1 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 1/4".

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.

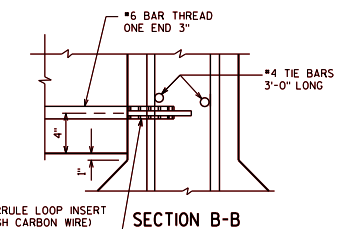
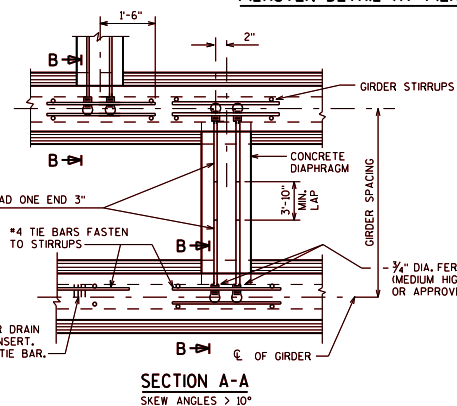
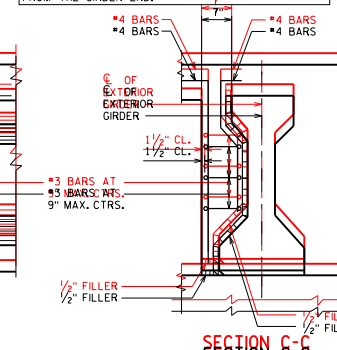
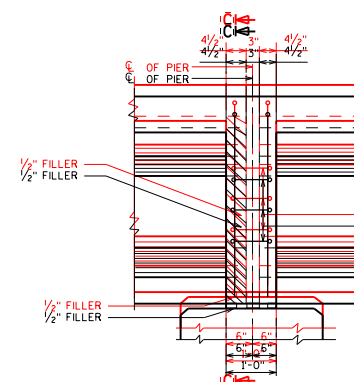
FOR SKEWS $\leq 10^\circ$, PLACE INTERMEDIATE DIAPHRAGMS IN A STRAIGHT LINE. REFER TO STANDARD 19.36, PROVIDE OFFSET FOR SKEWS $> 10^\circ$.

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
- 1" MIN. FOR TYPE "NY3/NY4" RAILINGS

DIAPHRAGM SPACING: FOR SPANS $\leq 80'-0"$ PLACE ONE DIAPHRAGM AT MIDLENGTH 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

SECTION THRU DIAPHRAGM

INTERMEDIATE CONCRETE DIAPHRAGM DETAILS

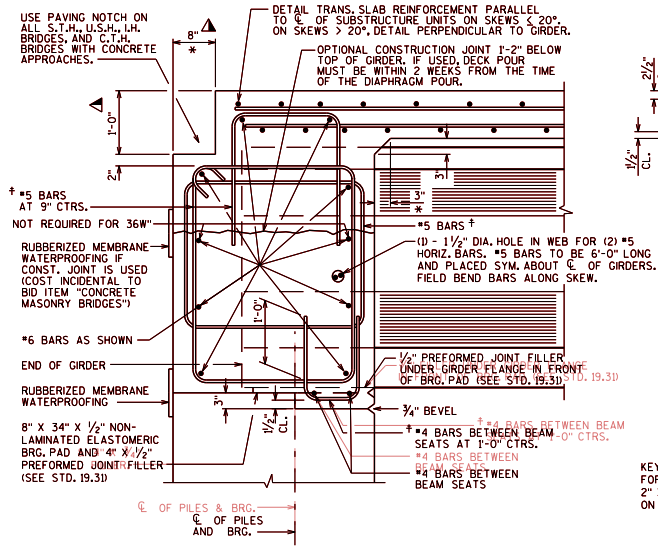
PRESTRESSED GIRDER DETAILS



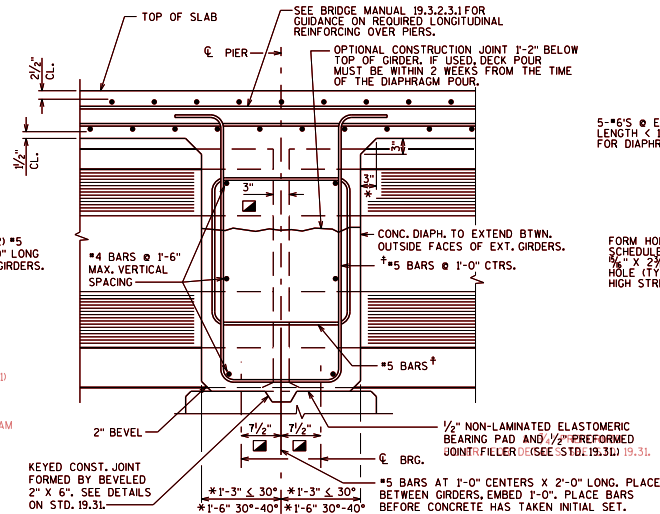
BUREAU OF STRUCTURES

APPROVED: Bill Oliva

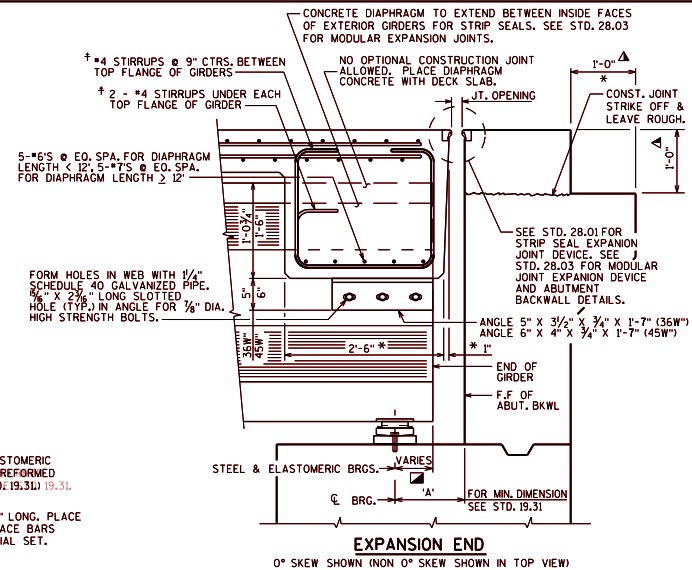
DATE: 1-19



PRESTRESSED GIRDER WITH SEMI-EXPANSION SEAT



DIAPHRAGM AT 1/2" ELASTOMERIC BEARING



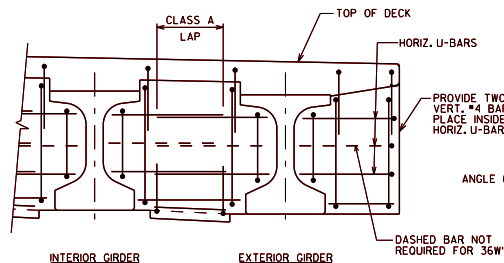
LEGEND

■ DIMENSION IS TAKEN PARALLEL TO ϕ GIRDER.

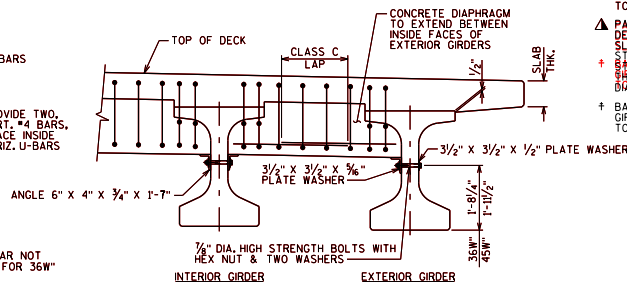
* DIMENSION IS TAKEN NORMAL TO ϕ SUBSTRUCTURE UNITS.

▲ 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 BRIDGE SECTION ABOVE ABUT. DIAPH. GIRDERS.

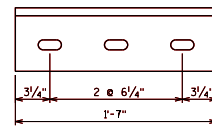
† BARS PLACED PARALLEL TO GIRDERS. SPACING PERPENDICULAR TO ϕ GIRDERS.



PART TRANSVERSE SECTION AT DIAPHRAGM SEMI-EXPANSION END



PART TRANSVERSE SECTION AT DIAPHRAGM EXPANSION END



NOTES

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

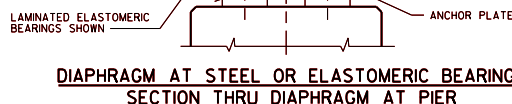
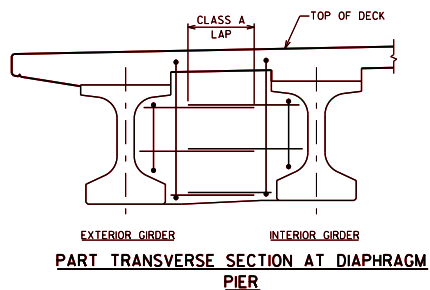
DIAPHRAGM SUPPORT ANGLES SHALL BE ASTM A709 GRADE 36.

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

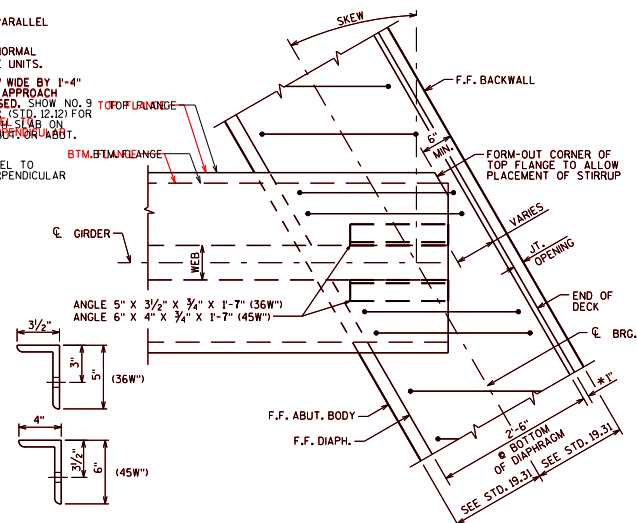
STEEL DIAPHRAGM SUPPORT ANGLE TO CONCRETE WEB CONNECTION SHALL BE SHUT-TIGHT PLUS 1/4" TURN. HIGH STRENGTH BOLTS FOR WEB CONNECTION SHALL MEET THE REQUIREMENTS FOR ASTM A325 OR ASTM A449.

DESIGNER NOTE

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



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



TOP VIEW OF DIAPHRAGM (EXPANSION END)

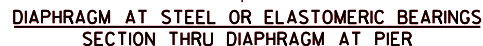
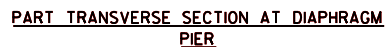
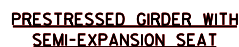
PRESTRESSED 36W" & 45W" GIRDER SLAB & SUPERSTRUCTURE DETAILS



BUREAU OF STRUCTURES

APPROVED: *Bill Oliva*

DATE: 1-19



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



- ❌ DIMENSION IS TAKEN PARALLEL TO GIRDER.
- ❑ DIMENSION IS TAKEN PARALLEL TO GIRDER.
- * DIMENSION IS TAKEN NORMAL TO GIRDER.
- * DIMENSION IS TAKEN NORMAL TO GIRDER.
- ⚠️ PAVING NOT RISE THE WIDE BY 1'-DEEP IF STRUCTURAL APPROACH SLAB IS USED.
- ⚠️ SLAB IS USED FOR 1'-DEEP IF STRUCTURAL APPROACH SLAB IS USED.
- ⚠️ FOR STRUCTURAL APPROACH SLAB ON THE SECTION, PARALLEL OR PERPENDICULAR TO GIRDER.
- + PARALLEL TO GIRDER, SPACING PERPENDICULAR TO GIRDER.
- + PARALLEL TO GIRDER, SPACING PERPENDICULAR TO GIRDER.



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



**BUREAU OF
STRUCTURES**

APPROVED: *Bill Oliva*

DATE: 7-19

NOTES

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

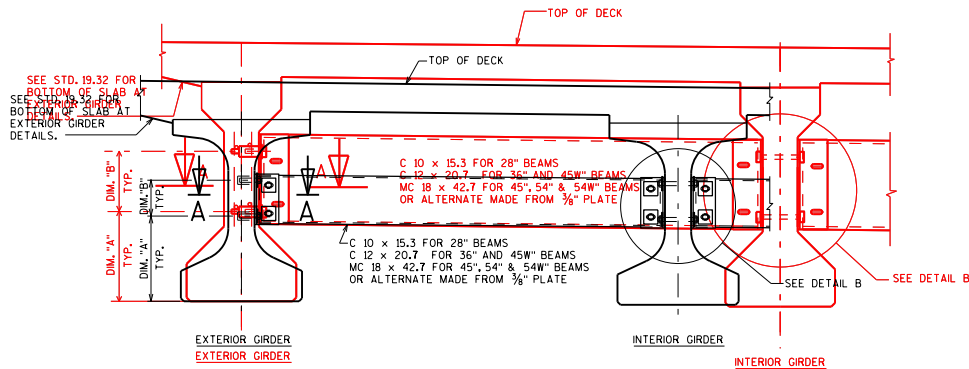
DIAPHRAGM SUPPORT ANGLES SHALL BE ASTM A709 GRADE 36.

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 1/4 TURN. HIGH STRENGTH BOLTS FOR WEB CONNECTION SHALL MEET THE REQUIREMENTS FOR ASTM A325 OR ASTM A449.

DESIGNER NOTES

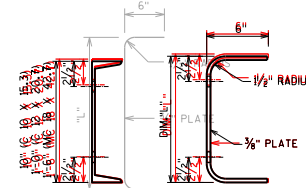
LAP LENGTHS FOR DIAPHRAGM REINFORCEMENT SHALL BE BASED ON A CLASS "C" TENSION LAP SPLICE, UNLESS OTHERWISE NOTED.



PART TRANSVERSE SECTION AT DIAPHRAGM
PART TRANSVERSE SECTION AT DIAPHRAGM

TABLE

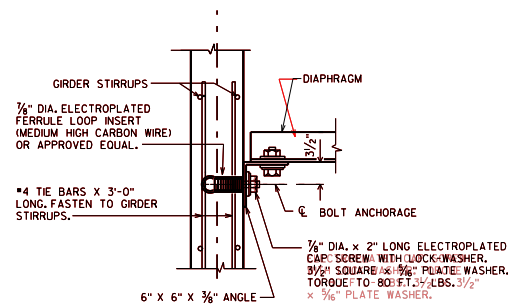
GIRDER HEIGHT	DIM. "A"	DIM. "B"	DIM. "L"	* DIM. "X"
28"	1'-0 1/4"	5 3/8"	9 1/2"	2 1/4"
36"	1'-2 7/8"	9 3/8"	1'-1 1/2"	3 1/4"
45"	1'-5 3/8"	1'-1 1/8"	1'-5 1/2"	2 1/4"
45W"	1'-9 1/4"	8 3/8"	1'-0 1/2"	2 3/4"
54"	1'-7 7/8"	1'-5 3/8"	1'-9 1/2"	4 1/4"
54W"	1'-9 1/8"	1'-5 3/8"	1'-9 1/2"	4 1/4"



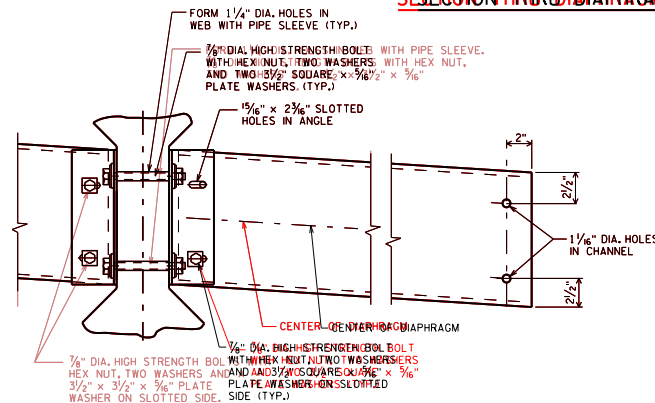
SECTION THROUGH DIAPHRAGM
SECTION THROUGH DIAPHRAGM

*DIM. "X" FOR ALTERNATE PLATE DIAPHRAGM

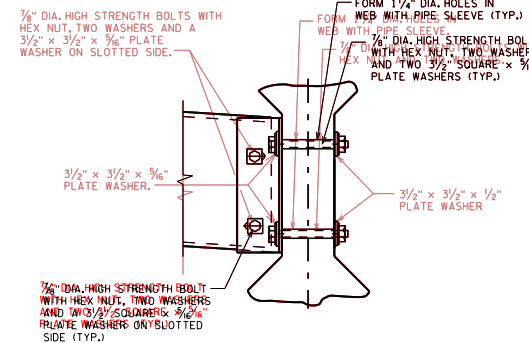
SECTION THROUGH DIAPHRAGM



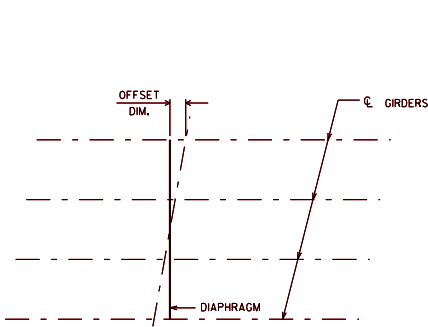
SECTION A-A
(FOR EXTERIOR ATTACHMENT)



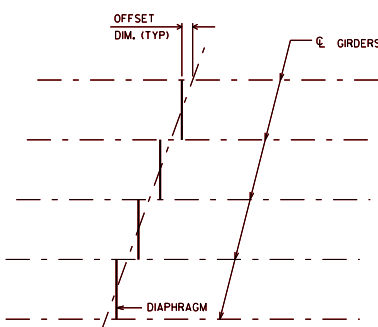
DETAIL B
(FOR CONTINUOUS LINE OF DIAPHRAGMS)



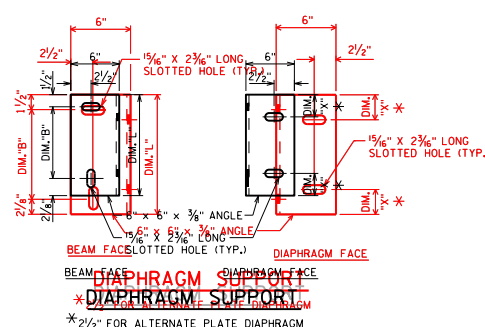
SECTION AT INTERIOR GIRDERS THRU DIAPHRAGM FOR SKEW ANGLES > 10°



PLAN FOR SKEW ANGLES ≤ 10°



PLAN FOR SKEW ANGLES > 10°



DIAPHRAGM SUPPORT
DIAPHRAGM SUPPORT

*2 1/2" FOR ALTERNATE PLATE DIAPHRAGM

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

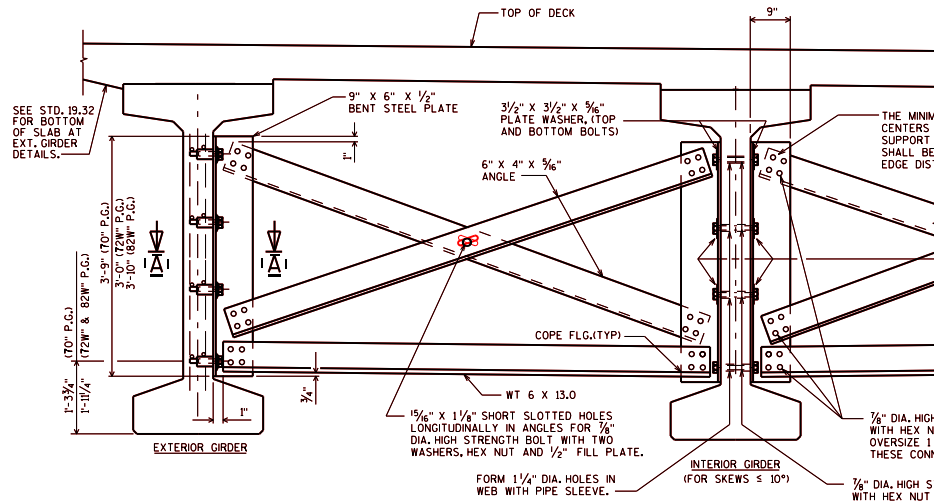
FOR SPANS EQUAL TO OR LESS THAN 80'-0", PLACE ONE DIAPHRAGM AT MID-LENGTH OF GIRDER. FOR SPANS OVER 80'-0", PLACE AT 1/3 AND 2/3 POINTS.

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.

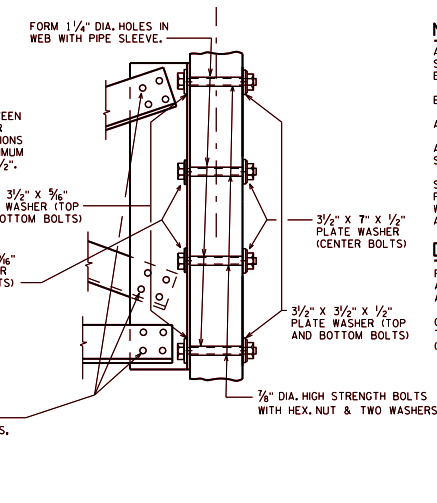
INTERM. STEEL DIAPHS. FOR 28", 36", 45", 45W" 54" & 54W" PRESTRESSED GIRDERS

BUREAU OF STRUCTURES

APPROVED: *Abitha Bunk* DATE: 7-22



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.

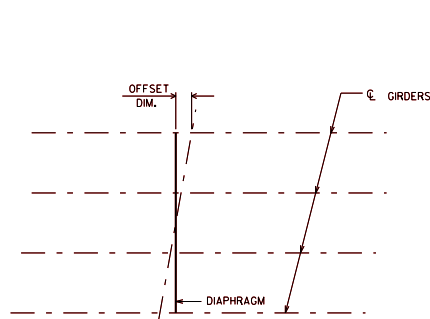
ALL DIAPHRAGM MATERIAL INCLUDING BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AFTER FABRICATION.

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.

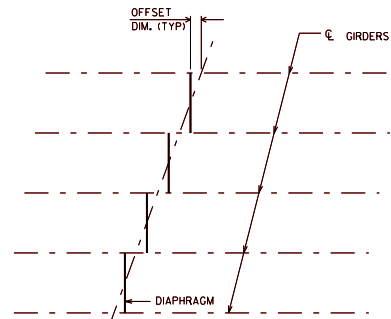
DESIGNER NOTES

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.

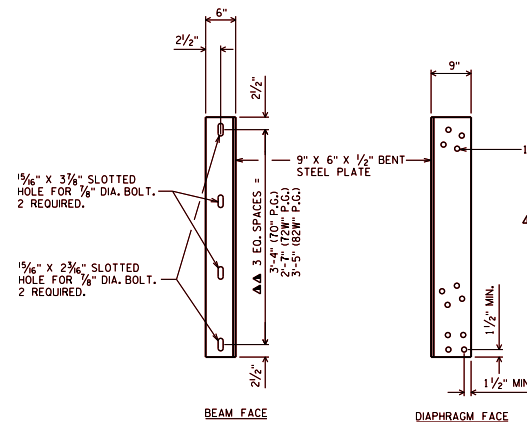
ON THE PLANS, SHOW LOCATION OF INSERTS/HOLES FOR DIAPHRAGM TO WEB CONNECTION, NOT ONLY FROM THE BOTTOM OF THE GIRDER (DIM "A" AND "B"), BUT ALSO FROM THE ENDS OF EACH GIRDER.



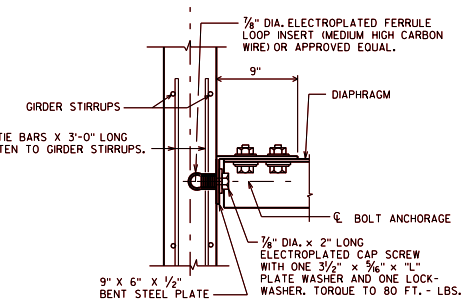
PLAN FOR SKEW ANGLES ≤ 10°



PLAN FOR SKEW ANGLES > 10°



DIAPHRAGM SUPPORT



**SECT. A-A
(FOR EXTERIOR ATTACHMENT)**

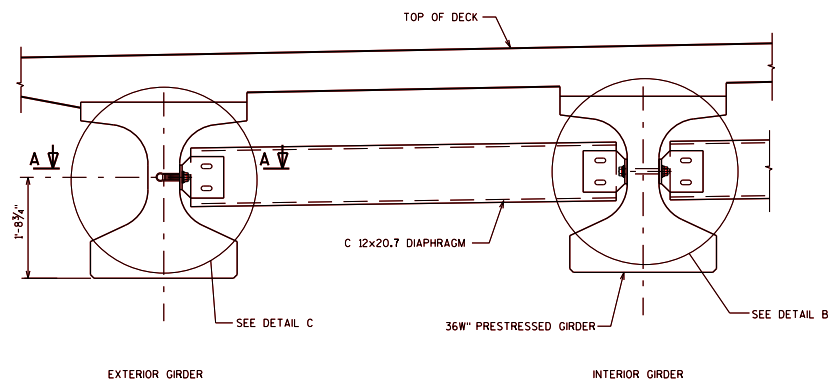
"L" = 3 1/2"; TOP & BOTTOM BOLTS
"L" = 7"; CENTER BOLTS

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

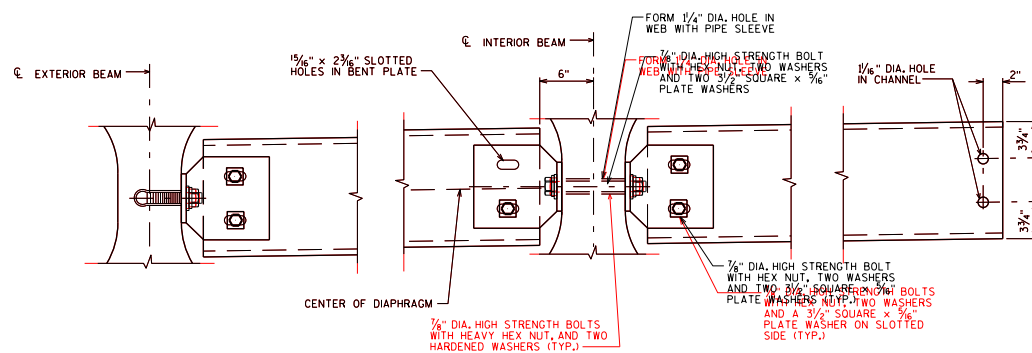
INTERMEDIATE STEEL DIAPHRAGMS FOR 70", 72W" & 82W" PRESTRESSED GIRDERS

BUREAU OF STRUCTURES

APPROVED: Bill Oliva DATE: 7-17

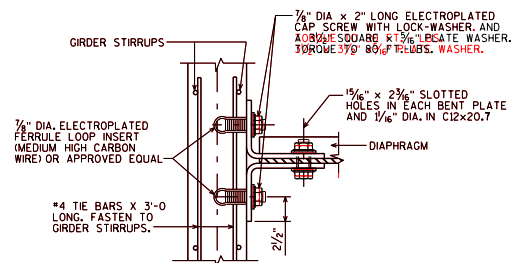


PART TRANSVERSE SECTION AT DIAPHRAGM

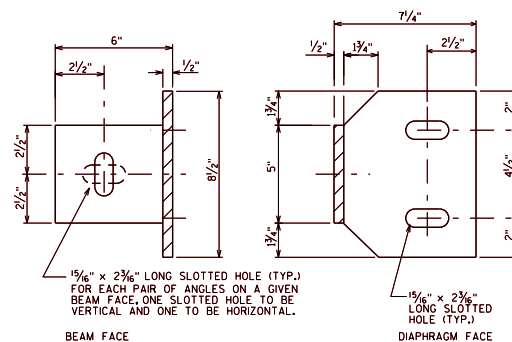


DETAIL C

DETAIL B

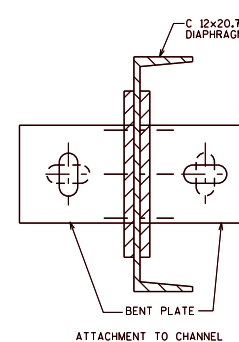


SECTION A-A
(FOR EXTERIOR ATTACHMENT)

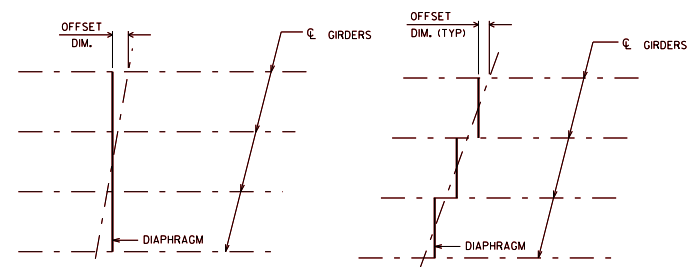


BEAM FACE

DIAPHRAGM FACE

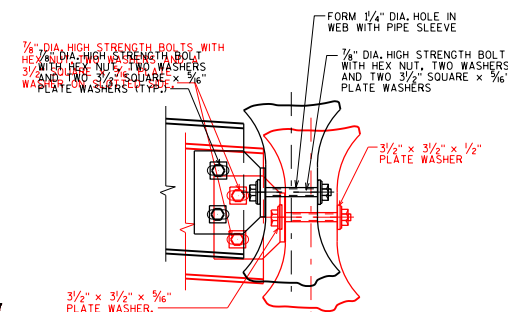


ATTACHMENT TO CHANNEL



PLAN FOR SKEW ANGLES ≤ 10°

PLAN FOR SKEW ANGLES > 10°



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

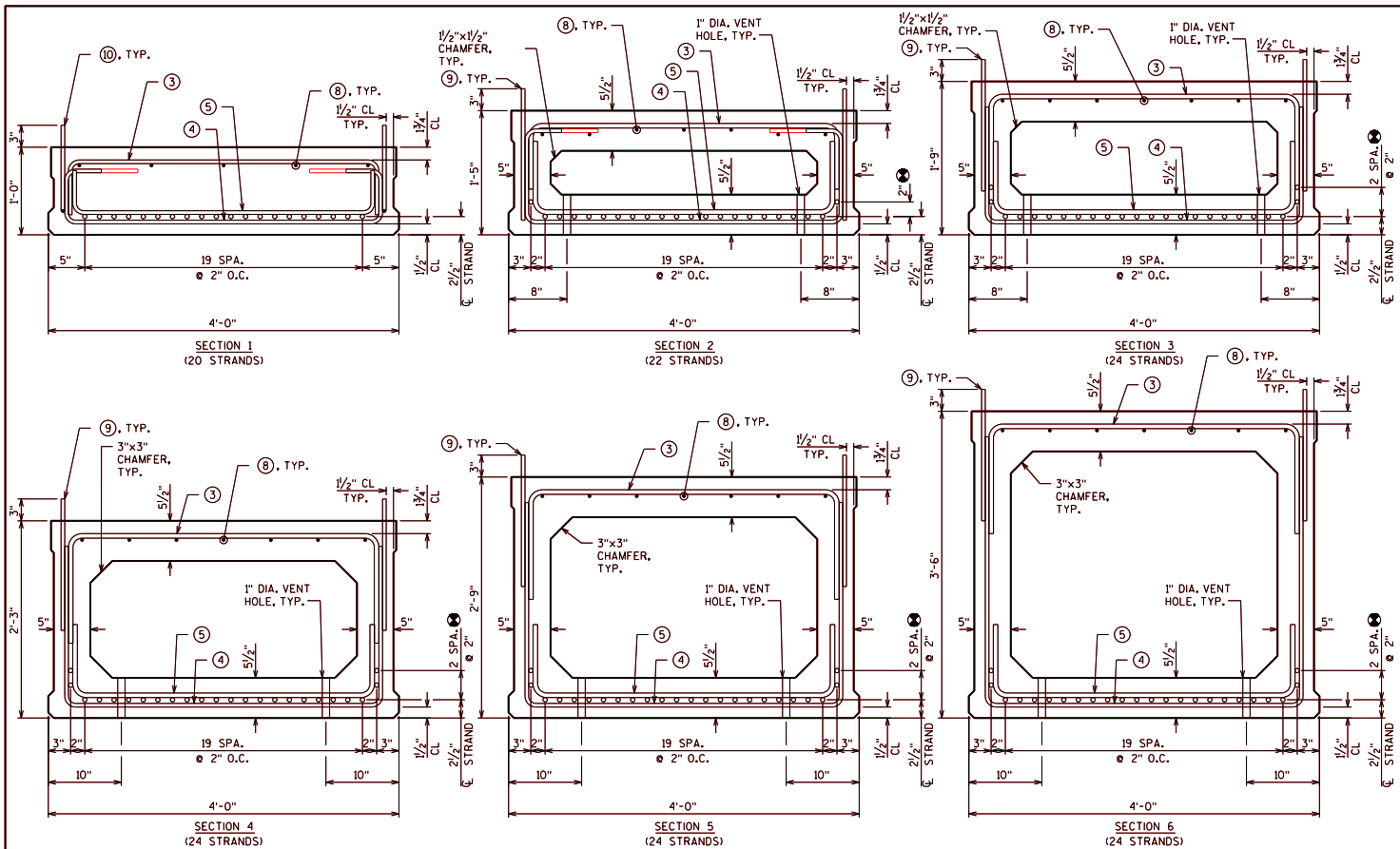
INTER. STEEL DIAPHS. FOR
36W PRESTRESSED GIRDERS



**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

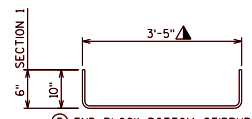
DATE:
7-19



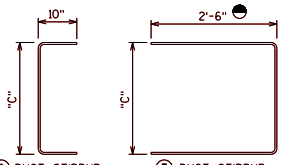
4'-0" SECTIONS

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"



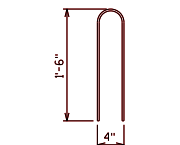
⑤ END BLOCK BOTTOM STIRRUP
#4 AND #5 BARS
SEE ELEVATION FOR SPACING



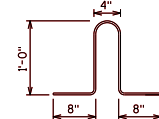
⑥ DUCT STIRRUP
#4 AT 9" MAX.
(16) EACH GIRDER END
⑦ DUCT STIRRUP
#4 AT 9" MAX.
(16) EACH GIRDER END



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



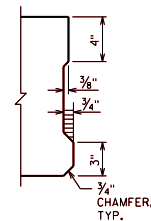
⑨ SHEAR CONNECTOR
TIE ONE LEG OF BAR TO ③
EPOXY COAT BARS
#4 AT 2'-0" MAX.
(FOR SECTIONS 2-6)



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.

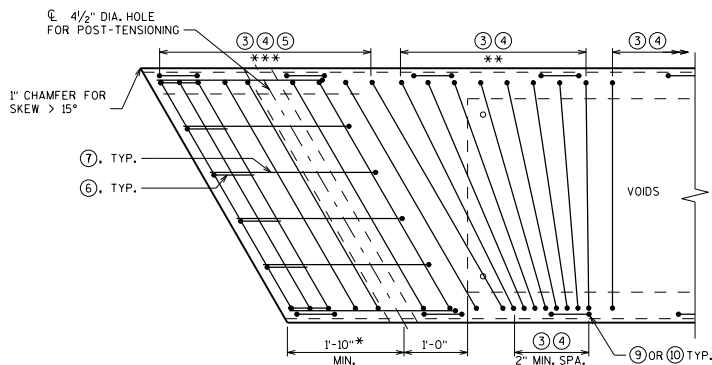
**4'-0" PRESTRESSED
BOX GIRDER SECTIONS**



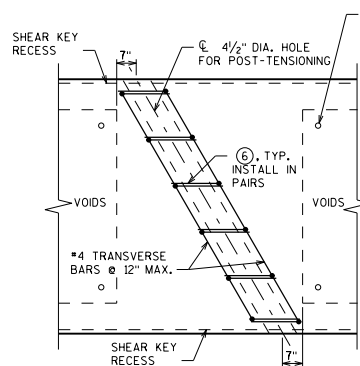
**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

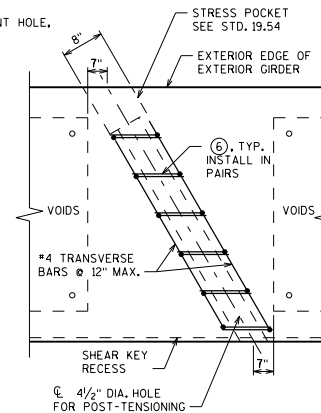
DATE:
1-18



PART GIRDER PLAN WITH SKEW
①, ② & #4 TRANSVERSE BARS NOT SHOWN FOR CLARITY



INTERIOR GIRDER DUCT PLAN



EXTERIOR GIRDER DUCT PLAN

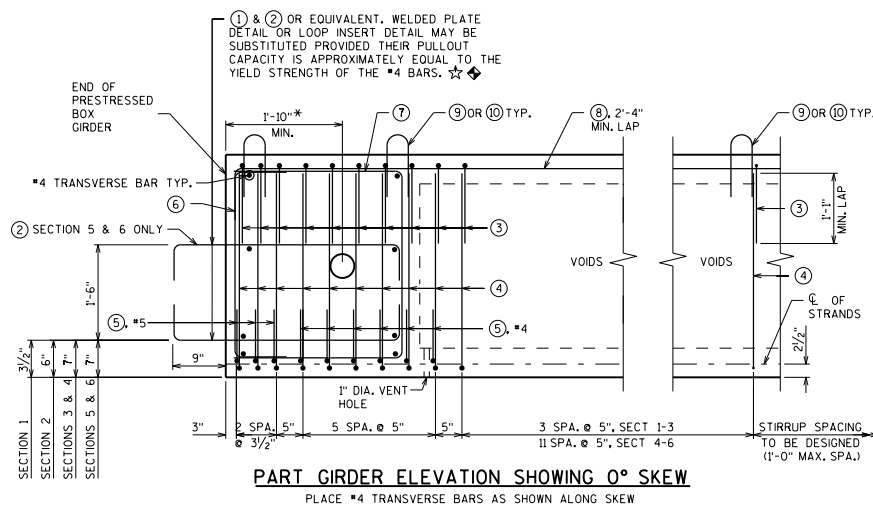
LEGEND

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

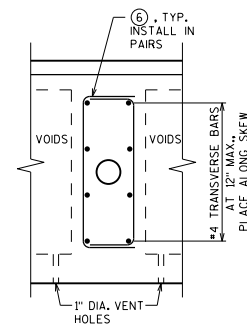
DESIGNER NOTES

FOR BAR BEND DETAILS, SEE STANDARD 19.50 AND STANDARD 19.51

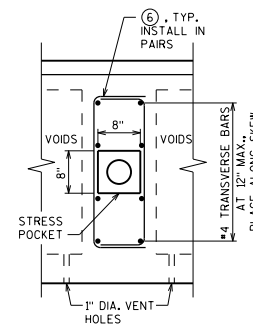
FOR SKEWED STRUCTURES CAST END OF PRESTRESSED BOX GIRDER ALONG SKEW.



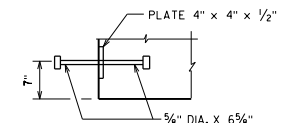
PART GIRDER ELEVATION SHOWING 0° SKEW
PLACE #4 TRANSVERSE BARS AS SHOWN ALONG SKEW



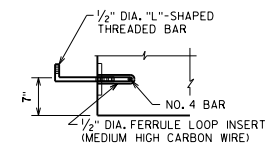
INTERIOR GIRDER DUCT ELEVATION



EXTERIOR GIRDER DUCT ELEVATION



WELDED PLATE DETAIL
(EQUIVALENT TO ONE #4 BAR)



LOOP INSERT DETAIL

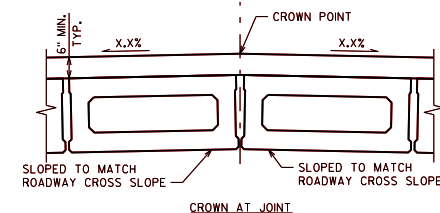
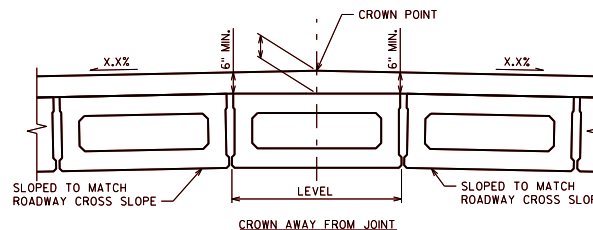
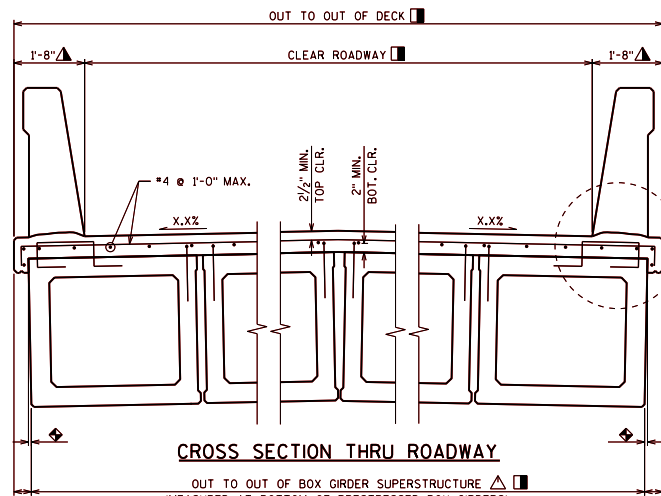
PRESTRESSED BOX GIRDER DETAILS 1



**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

DATE:
1-17

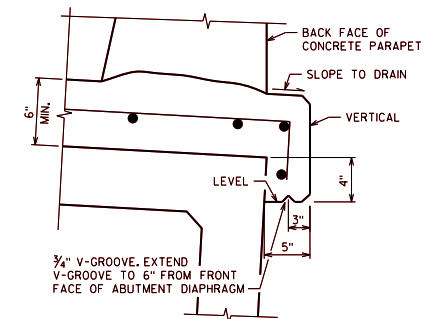


CROWN DETAIL AT LOCATION OF MIN. DECK THICKNESS

NUMBER OF SECTIONS

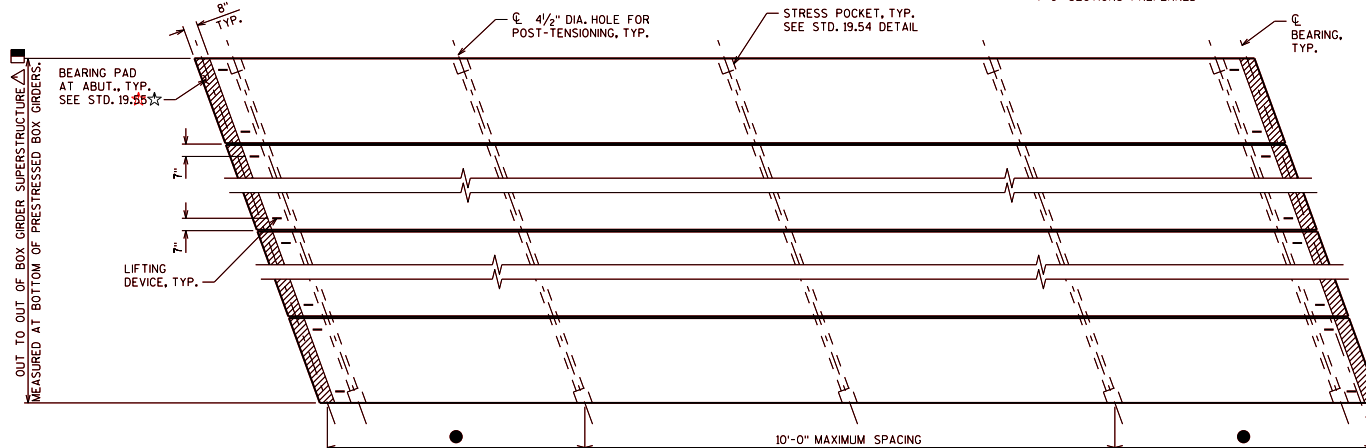
CLEAR ROADWAY	3'-0" SECTION	4'-0" * SECTION
26'-0"	10	7
30'-0"	11	8
36'-0"	13	10
40'-0"	14	11
44'-0"	16	12

* 4'-0" SECTIONS PREFERRED



DECK OVERHANG DETAIL

SEE STANDARD 19.56 FOR ADDITIONAL DETAILS



DESIGNER NOTES

△ ACCOUNT FOR NUMBER OF PRESTRESSED BOX GIRDERS, NUMBER OF JOINTS (AT 1" NORMAL TO G 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 1/4" MUST BE SUBMITTED BY THE FIELD ENGINEER TO THE STRUCTURES DESIGN SECTION FOR REVIEW.

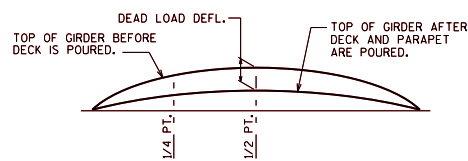
LEGEND

☆ BEARING PAD NOT REQUIRED FOR GRS ABUTMENTS.

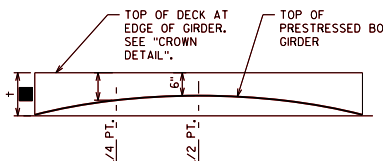
● 1/4 SPAN FOR SPANS UP TO 80'-0".
1/5 SPAN FOR SPANS OVER 80'-0".

■ 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.



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, †

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 †. 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 f'c (PSI)	DIA. OF STRAND (IN.)	UNDRAINED PATTERN	TOTAL NO. OF STRANDS	TOTAL INITIAL PRESTRESS FORCE (KIPS)	f'ci (PSI) *
1			1/4 PT. 1/2 PT.						*

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

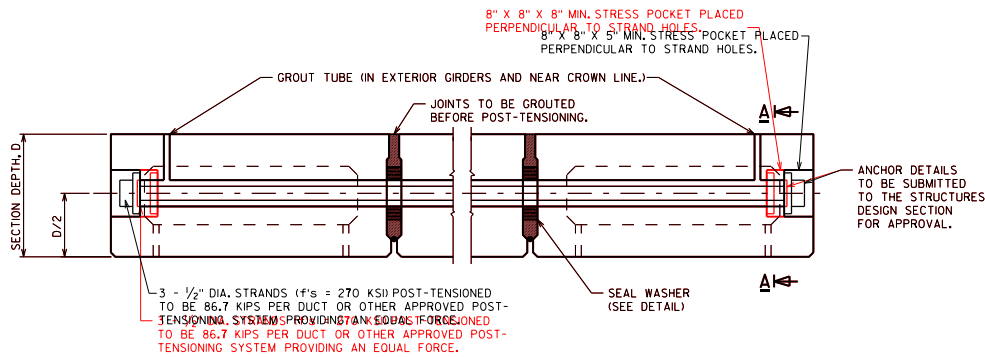
PRESTRESSED BOX GIRDER DETAILS 2



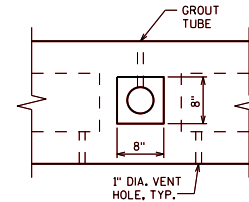
BUREAU OF STRUCTURES

APPROVED: Bill Oliva

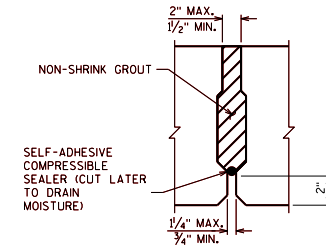
DATE: 7-18



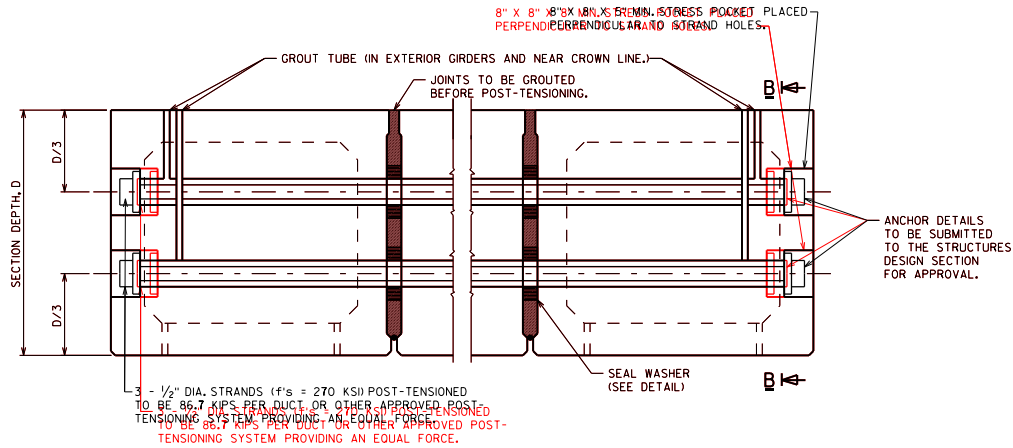
POST-TENSIONING DETAILS - ONE DUCT PER DIAPHRAGM
(SECTIONS 1 THROUGH 4)



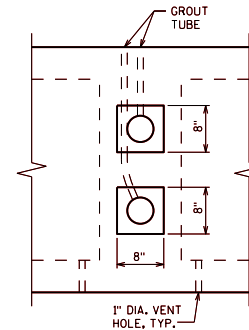
SECTION A-A



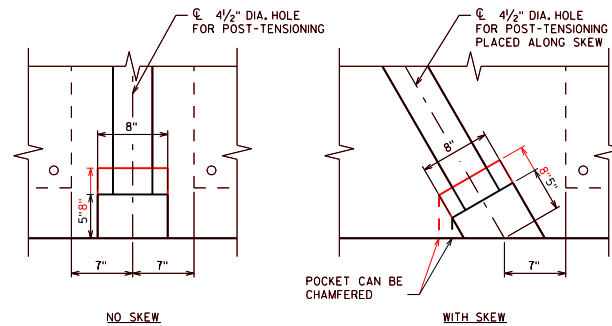
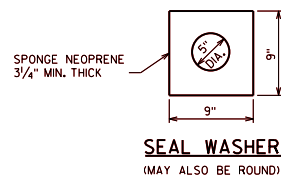
SHEAR KEY DETAIL



POST-TENSIONING DETAILS - TWO DUCTS PER DIAPHRAGM
(SECTIONS 5 AND 6)



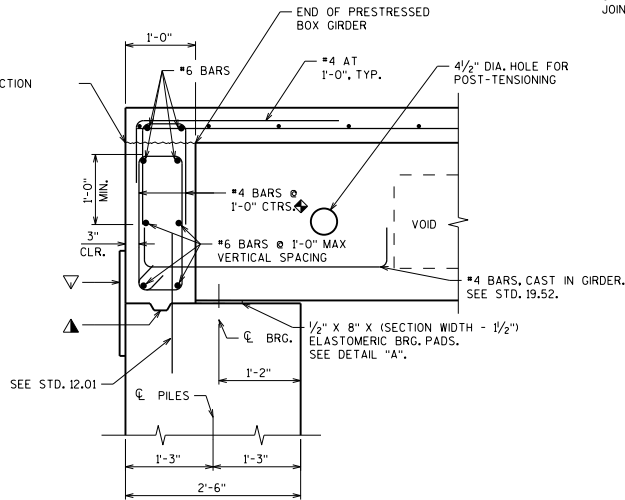
SECTION B-B



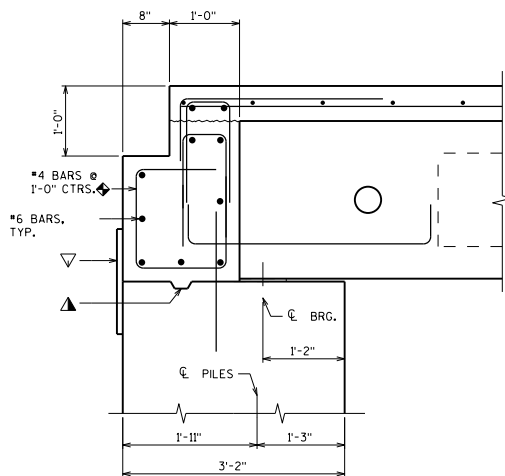
STRESS POCKET DETAIL

PRESTRESSED BOX GIRDER DETAILS 3	
	BUREAU OF STRUCTURES
	APPROVED: <u>Bill Oliva</u> DATE: <u>1-18</u>

OPTIONAL CONSTRUCTION JOINT.



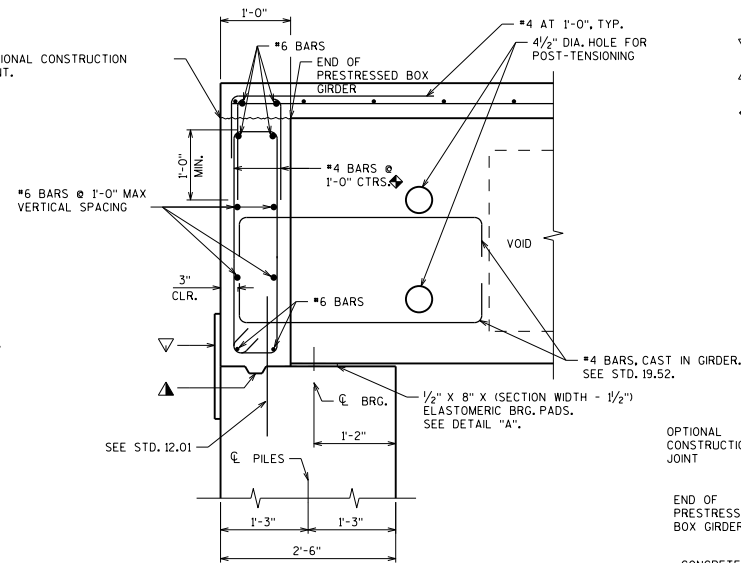
NO PAVING NOTCH - SECTIONS 1 THROUGH 4



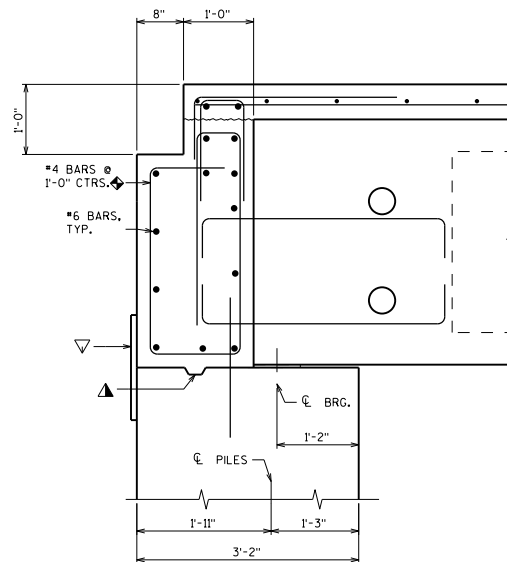
WITH PAVING NOTCH - SECTIONS 1 THROUGH 4

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

OPTIONAL CONSTRUCTION JOINT.



NO PAVING NOTCH - SECTIONS 5 AND 6

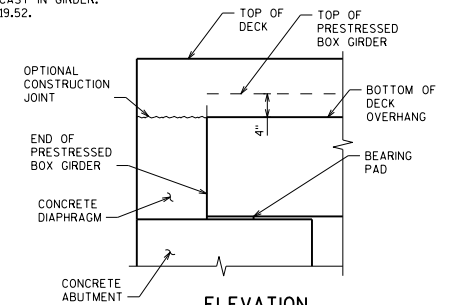


WITH PAVING NOTCH - SECTIONS 5 AND 6

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

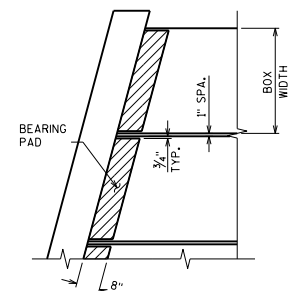
LEGEND

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



ELEVATION

(SHOWING DECK OVERHANG TERMINATION AT CONCRETE ABUTMENT)



DETAIL "A"

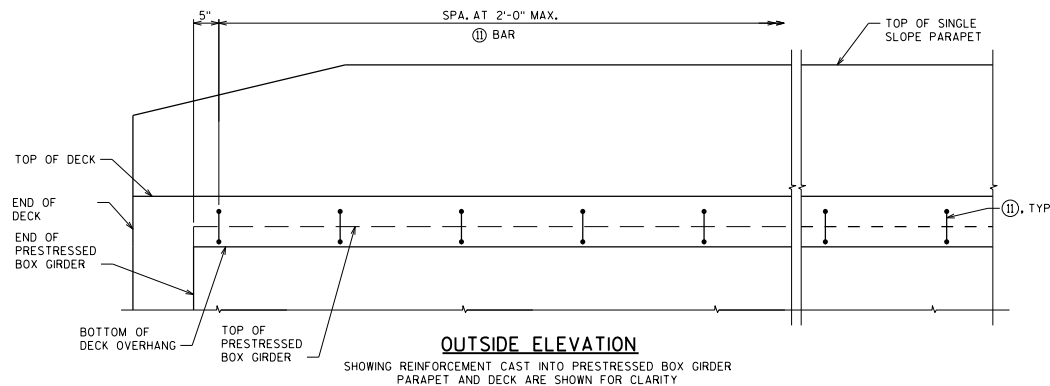
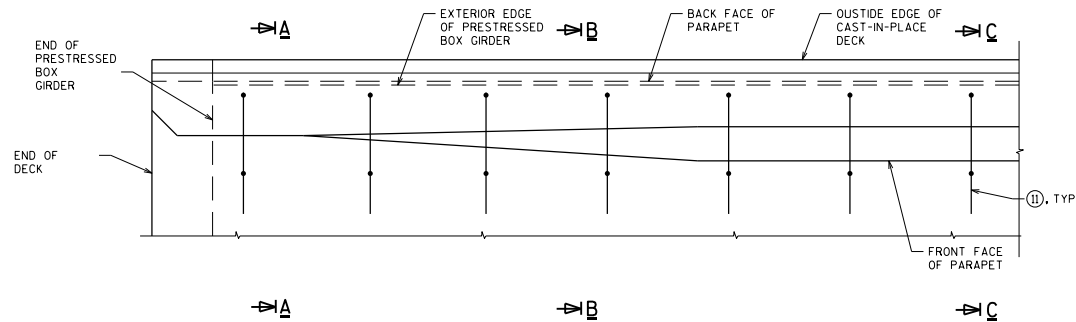
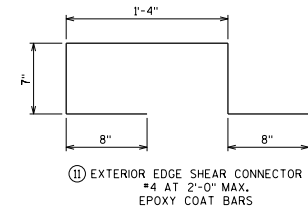
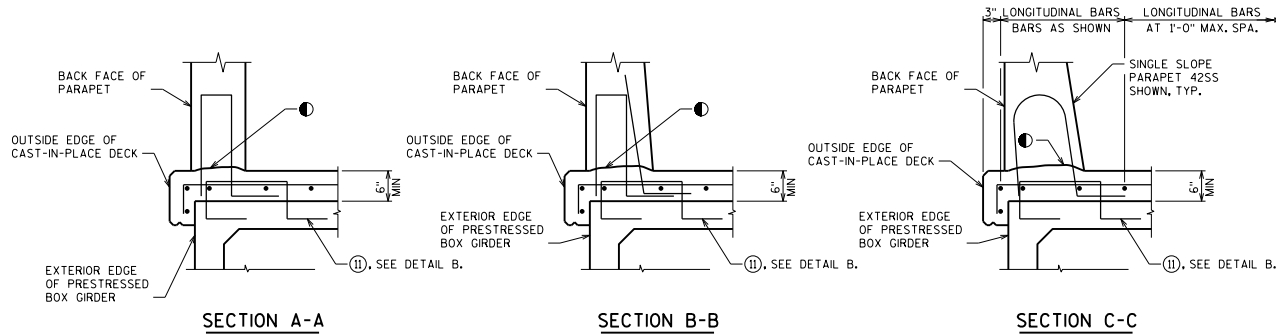
PRESTRESSED BOX GIRDER DETAILS 4



BUREAU OF STRUCTURES

APPROVED: *Bill Oliva*

DATE: 1-16



LEGEND

● CONST. JOINT - STRIKE OFF AS SHOWN.

NOTE

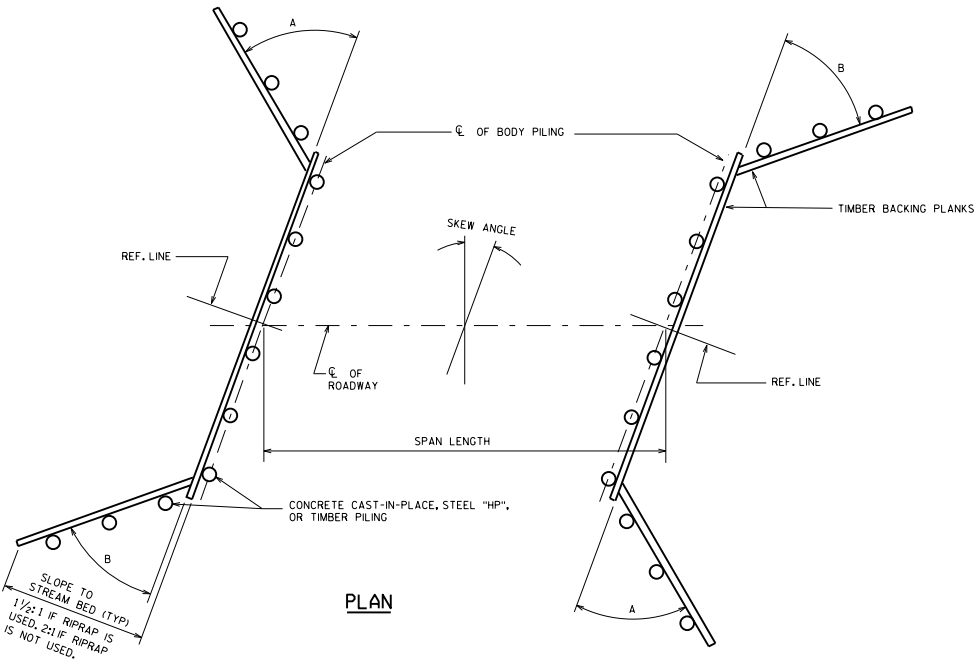
BAR 11 TO BE PAID AS PART OF BID ITEM "PRESTRESSED BOX GIRDER TYPE XX-INCH".

DESIGNER NOTES

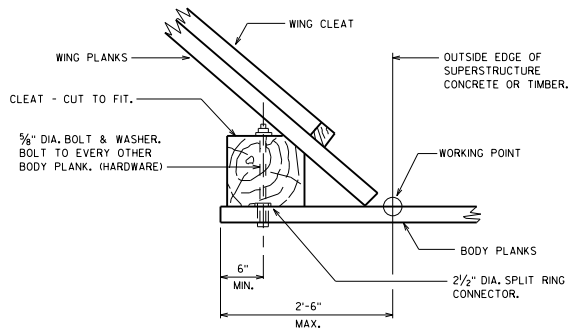
SEE CHAPTER 30 STANDARDS FOR SINGLE SLOPE PARAPET DETAILS.

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

PRESTRESSED BOX GIRDER DETAILS 5	
	BUREAU OF STRUCTURES
	APPROVED: <u>Bill Oliva</u> DATE: <u>7-16</u>



PLAN



CORNER DETAIL

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 ($f_b = 18$ K.S.I.)
7 GAGE (6' x 2') GRADE A * ARMCO	30.0 ($f_b = 18$ K.S.I.)

*ASTM A446

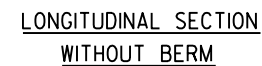
TIMBER ABUTMENTS GENERAL

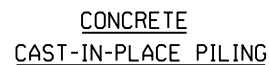


**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

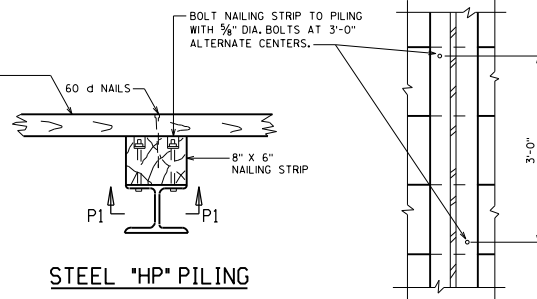
DATE:
7-16

STANDARD 23.02

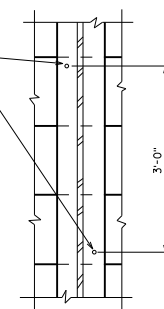


A cross-sectional diagram of a timber beam. A horizontal line represents the beam's top surface, with a label '60 d NAILS' pointing to a vertical line of nails passing through it. Below the beam, a circular cross-section of a log is shown, with a label 'BACKING PLANK' pointing to the space between the beam and the log.

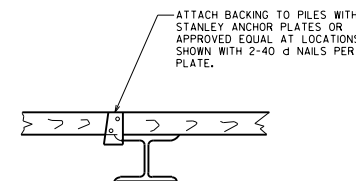
TIMBER PILING



STEEL "HP" PILING



SECTION P1



STEEL "HP" PILING
(ALTERNATE ATTACHMENT)

WEARING SURFACE

DECKING

$\frac{1}{2}$ " DIA. DRIFT BOLT x 2'-0" LONG

PILE CAP 12" X 12"

$\frac{3}{4}$ " DIA. X 2'-6" LONG

TREATED TIMBER PILE

$\frac{3}{4}$ " DIA. BOLT WITH PLATE WASHERS.

6'-0"

1'-0"

1'-6"

8" X 8" X 5'-0" PILE STAY

■ 4 STIRRUPS
AT 1'-6" CENTERS

1'-6"

■ 4 BARS
FULL LENGTH
OF DEADMAN.

1'-6"

1 1/4" DIA. TIE ROD

3" CL. TYP.

PLATE WASHER

2'-6"

1'-6"

1 1/2" DIA. PIPE
SLEEVE.

HEAVY HEX. NUT

SECTION THRU DEADMAN

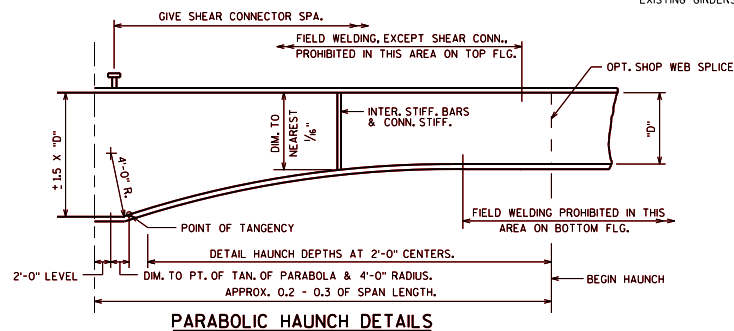
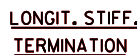
TIMBER ABUTMENT DETAILS



BUREAU OF STRUCTURES

APPROVED: Bill Oliva

DATE:	3-16
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SLAB OVERHANG DEFINITION



† EXCEPT THAT THE WELD SIZE SHALL NOT EXCEED THE THICKNESS OF THE THINNER PART JOINED.

△ MIN. PASS SIZE IS $\frac{5}{16}$ "

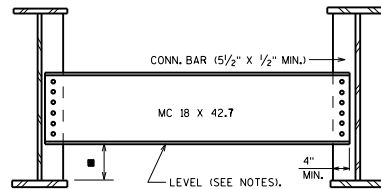
PLATE GIRDER DETAILS



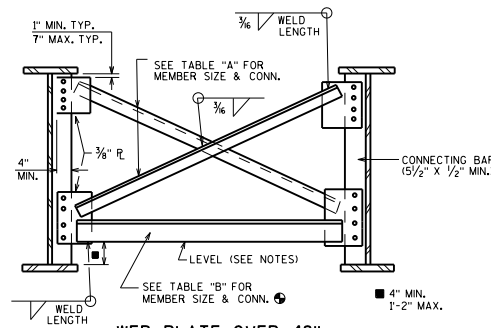
BUREAU OF STRUCTURES

APPROVED: *Bill Oliva*

DATE: 1-18



WEB PLATE < 48"
TYP. IN SPAN & AT PIER



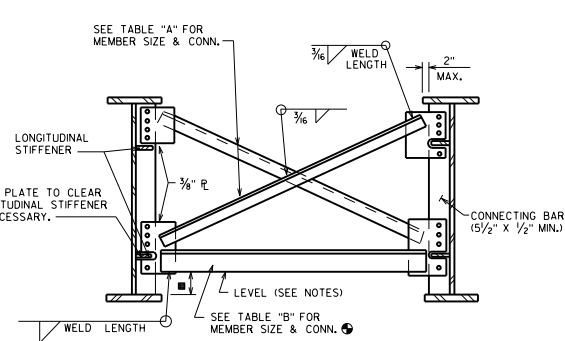
WEB PLATE OVER 48"
TYP. IN SPAN & AT PIER

TABLE "A"

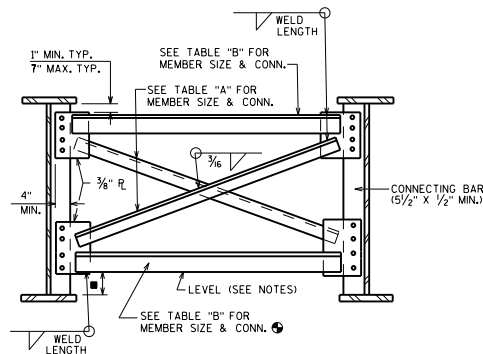
SIZE	MAX. LENGTH OF MEMBER	WELD LENGTH	NO. OF 3/4" ϕ BOLTS	WEIGHT PER FT.
L 3 1/2 X 3 1/2 X 5/16	21'-6"	9"	4	7.2*
L 4 X 4 X 5/16	25'-0"	11"	4	8.2*
L 5 X 5 X 5/16	31'-0"	14"	5	10.3*

TABLE "B"

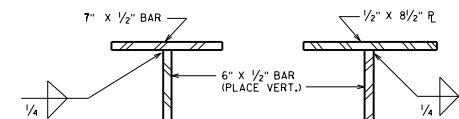
SIZE	MAX. LENGTH OF MEMBER	WELD SIZE	WELD LENGTH	NO. OF 3/4" ϕ BOLTS	WEIGHT PER FT.
L 5 X 5 X 5/16	11'-6"	1/4"	11"	4	10.3*
L 6 X 6 X 5/16	13'-6"	5/16"	13"	6	14.9*
1/2" T SECTION SEE DETAIL "A"	17'-6"	5/16"	14"	7	16.6*
1/2" T SECTION SEE DETAIL "B"	22'-0"	5/16"	13"	7	18.5*



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



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

NOTES

ALL BOLTED CONNECTIONS SHALL BE FRICTION TYPE USING 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.

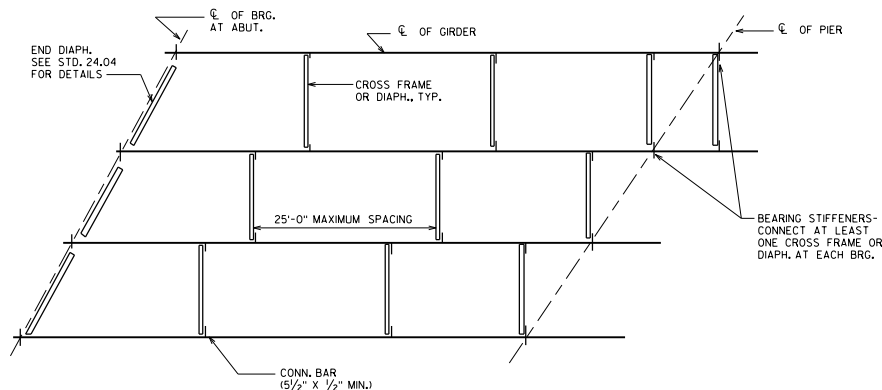
HOLES IN CROSS FRAME CONNECTIONS MAY BE OVERSIZED ϕ 1/16" DIA. IN 1 PLY.

DESIGNER NOTES

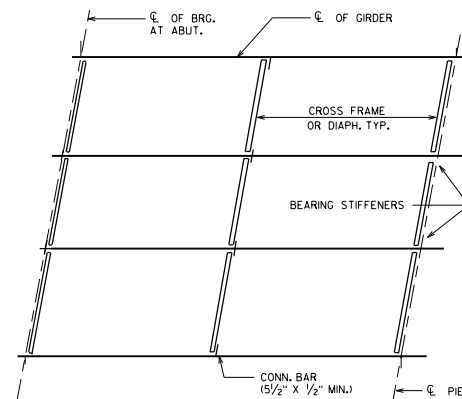
SEE STD. 24.02 FOR CONNECTION BAR CORNER COPE & WELD DETAILS.

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

* 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.

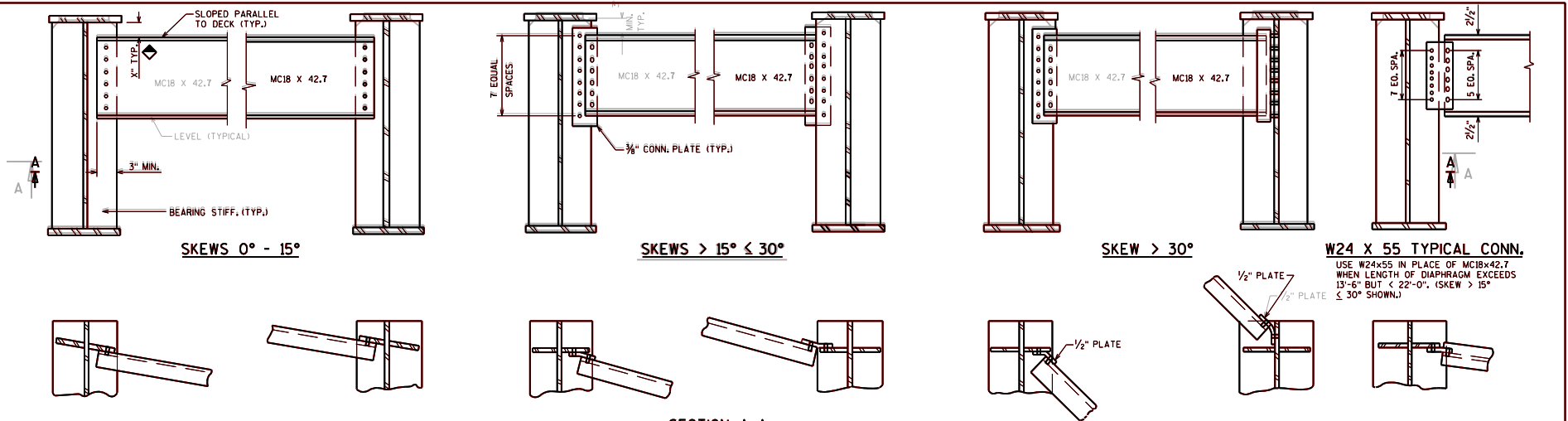


FRAMING PLAN FOR SKEW > 15°

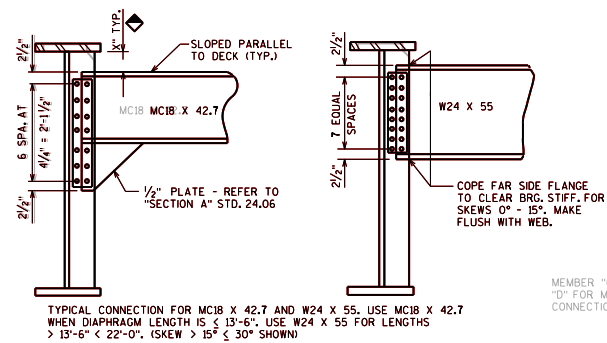


FRAMING PLAN FOR SKEW < 15°

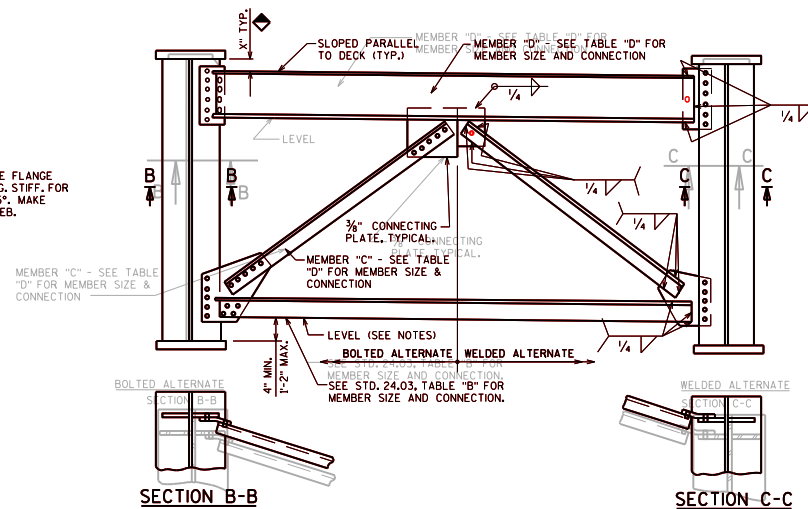
PLATE GIRDER DIAPHRAGMS AND CROSS FRAMES	
	BUREAU OF STRUCTURES
APPROVED: <u>Bill Oliva</u>	DATE: <u>7-15</u>



SECTION A-A
END DIAPHRAGM CONNECTIONS - WEB DEPTHS ≤ 48"



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



END DIAPHRAGM CONNECTIONS - WEB DEPTHS > 60"
SKEWS > 15° ≤ 30° SHOWN

TABLE "D"

MEMBER "C"	WEB DEPTH									MEMBER "D"	MEMBER "D" CONN.	
	5'-0" - 6'-6"			6'-6" - 7'-6"			7'-6" - 8'-9"				NO. OF 3/4" DIA. BOLTS	
	MEMBER "C" SIZE	NO. OF 3/4" DIA. BOLTS	LENGTH OF 1/4" WELD	MEMBER "C" SIZE	NO. OF 3/4" DIA. BOLTS	LENGTH OF 1/4" WELD	MEMBER "C" SIZE	NO. OF 3/4" DIA. BOLTS	LENGTH OF 1/4" WELD		CONN. PLATE TO BRG. STIFF.	MEMBER "D"
MAXIMUM LENGTH												
11'-6"	4 x 4 x 3/8	5	13	4 x 4 x 3/8	5	12	4 x 4 x 3/8	5	11	C12 x 20.7	6 @ 2 1/2"	4 @ 2 1/2"
13'-6"	5 x 5 x 3/8	6	17	5 x 5 x 3/8	6	16	5 x 5 x 3/8	6	15	C12 x 20.7	6 @ 2 1/2"	4 @ 2 1/2"
17'-6"	6 x 6 x 3/8	8	20	5 x 5 x 3/8	7	18	5 x 5 x 3/8	6	16	C15 x 33.9	7 @ 2 1/2"	5 @ 2 1/2"
22'-0"	6 x 6 x 3/8	9	23	6 x 6 x 3/8	8	21	6 x 6 x 3/8	7	19	MC18 x 42.7	7 @ 2 1/2"	6 @ 2 1/2"

NOTE: ALL MEMBER "C" SIZES REPRESENT ANGLES.

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.)

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.

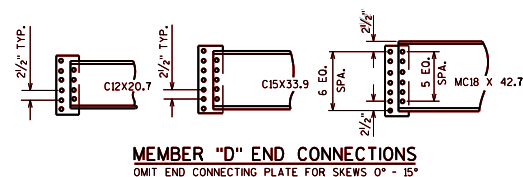
NOTES

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

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.



MEMBER "D" END CONNECTIONS
OMIT END CONNECTING PLATE FOR SKEWS 0° - 15°

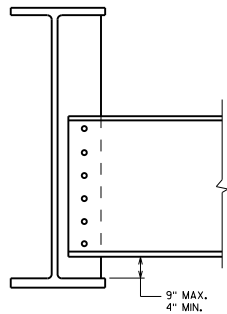
END DIAPHRAGMS



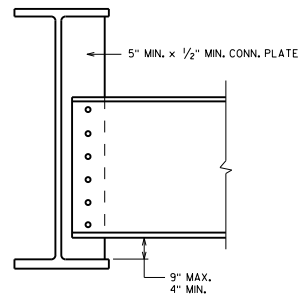
**BUREAU OF
STRUCTURES**

APPROVED: *Bill Oliva*

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

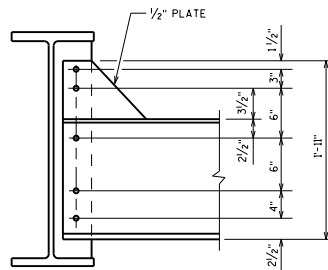
DIAPHRAGMS SHALL BE HORIZONTAL EXCEPT WHEN THE DIFFERENCE IN ADJACENT GIRDER ELEVATIONS IS OF A MAGNITUDE THAT NECESSITATES SLOPING THE DIAPHRAGMS.

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

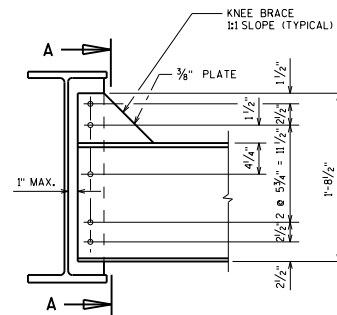
ALL BOLTED CONNECTIONS SHALL BE MADE WITH 3/4" ϕ HIGH STRENGTH ASTM A325 BOLTS.

DESIGNER NOTES

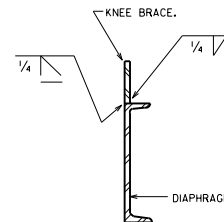
SEE STANDARD 24.02 FOR CONNECTION BAR CORNER COPE & WELD DETAILS.



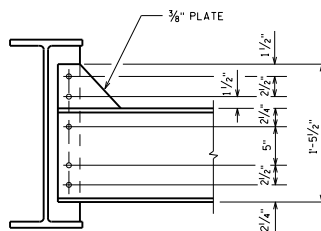
30" W. GIRDER



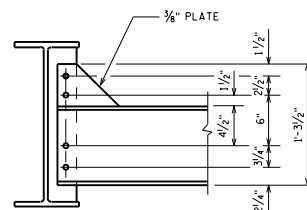
27" W. GIRDER



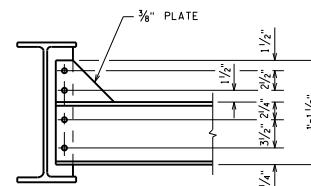
SECTION A



24" W. GIRDER



21" W. GIRDER



18" W. GIRDER

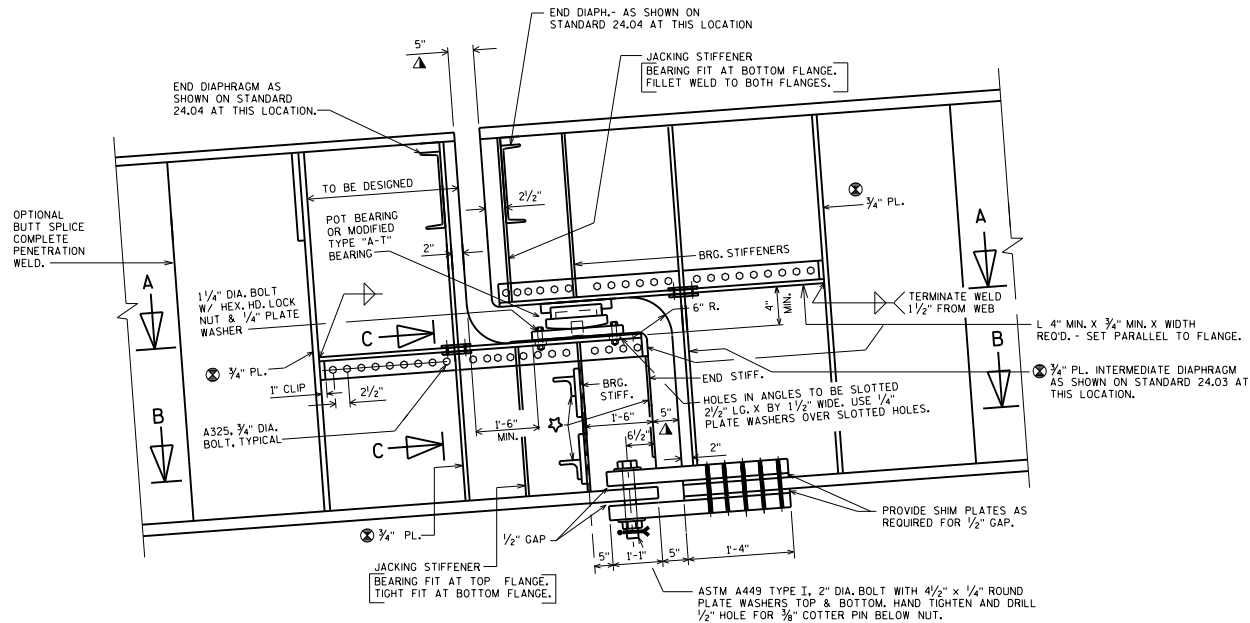
ROLLED GIRDER DIAPHRAGMS



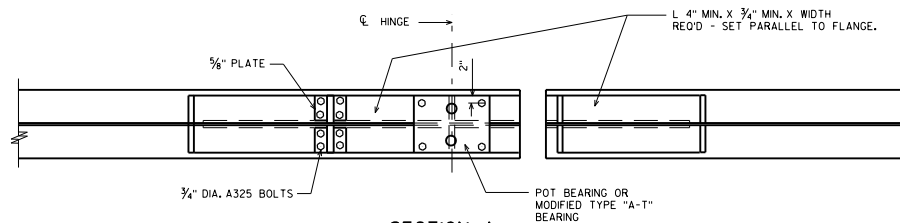
BUREAU OF STRUCTURES

APPROVED: Bill Oliva

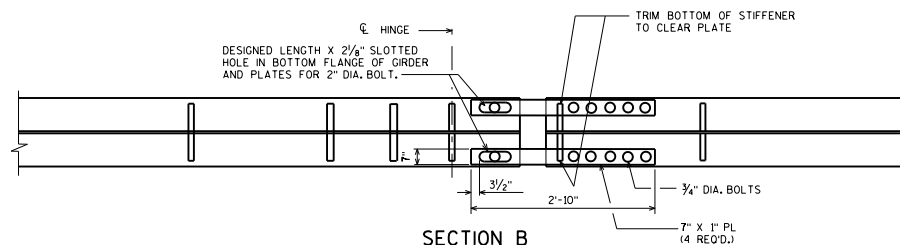
DATE:
7-15



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

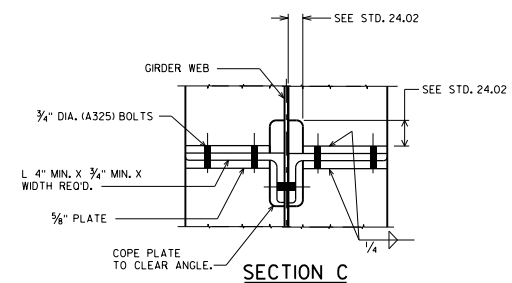
SIZE AND LENGTH OF ANGLES, NUMBER OF BOLTS THRU ANGLES, THICKNESS OF WEB PLATE, AND SIZE OF BEARING STIFFENERS AND JACKING STIFFENERS SHALL BE DETERMINED FROM AN ANALYSIS USING THE VERTICAL AND HORIZONTAL FORCES ACTING AT THE HINGE.

- △ THE 5\"/>

SLOTTED HOLES OF 6\"/>

- ✳ 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.



SECTION C

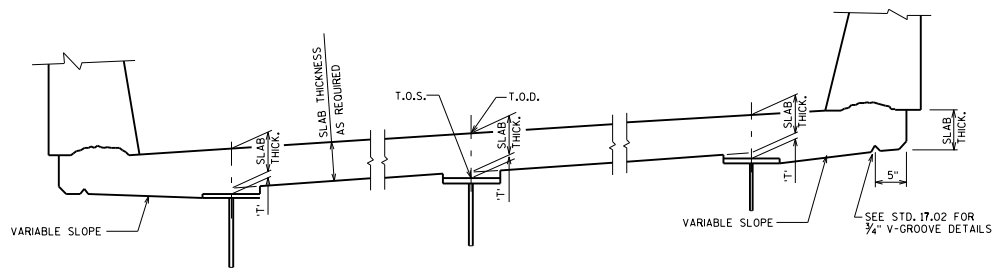
EXPANSION HINGE JOINT DETAILS



**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

DATE:
7-16



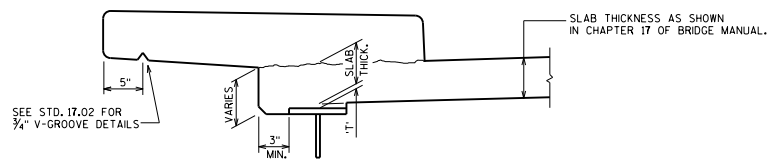
SECTION THRU SLAB

DESIGNER NOTES

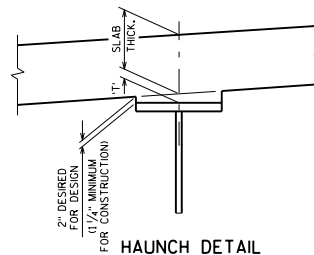
HAUNCH HEIGHTS WILL NORMALLY BE MADE 2" AT EDGE OF GIRDER, AT ABUTMENTS, HINGES, AND FIELD SPLICES.

HAUNCH DEPTH VARIATIONS NEED NOT BE SHOWN ON THE PLANS.

IF HAUNCH VARIATIONS EXCEED 3/4", THE GIRDER SHALL BE CAMBERED TO REDUCE THE VARIATIONS IN HAUNCH THICKNESS.



**TREATMENT OF EXTERIOR GIRDER
AT SIDEWALK OVERHANG**



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.

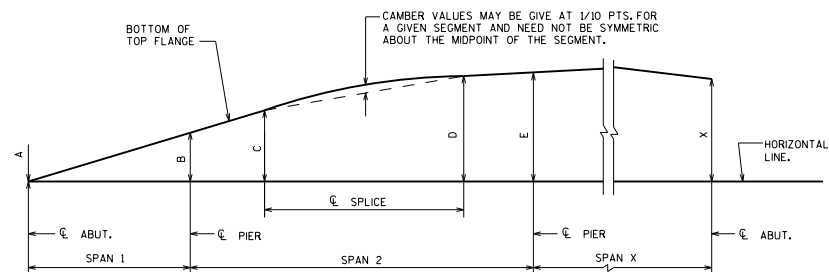
TOP OF DECK ELEVATION AT FINAL GRADE

- 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



BLOCKING DIAGRAM

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	€ PIER	€ SPLICE	€ 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 (SPLICE 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 SPLICE POINTS SHALL BE CHECKED, AND CORRECTED, IF POSSIBLE, AFTER ERECTION AND BEFORE PERMANENTLY BOLTING THE DIAPHRAGMS IN PLACE.

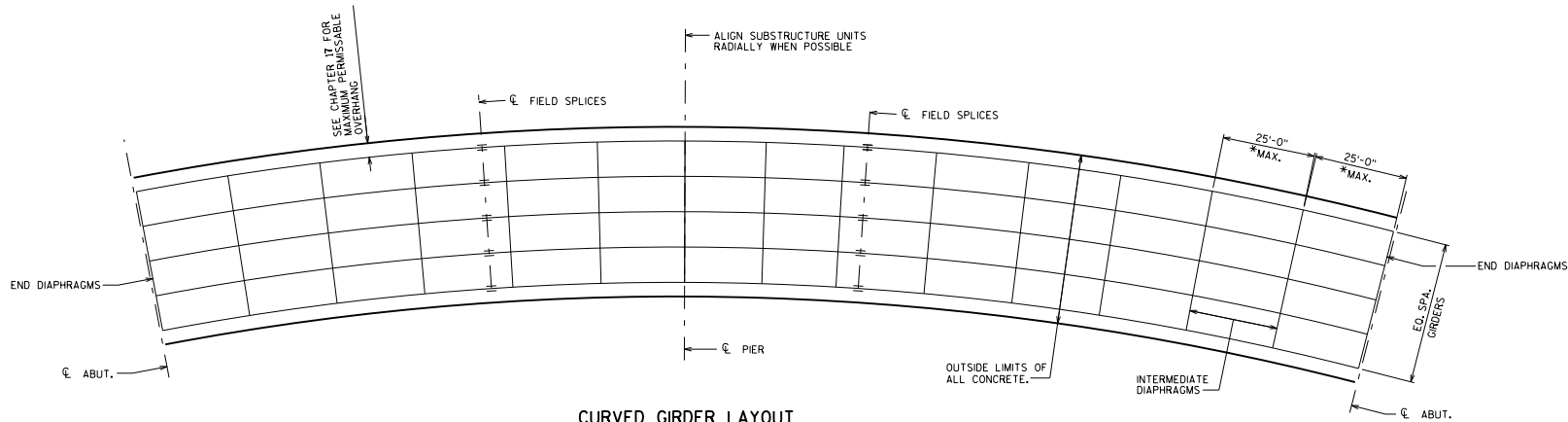
BLOCKING & SLAB HAUNCH DETAILS



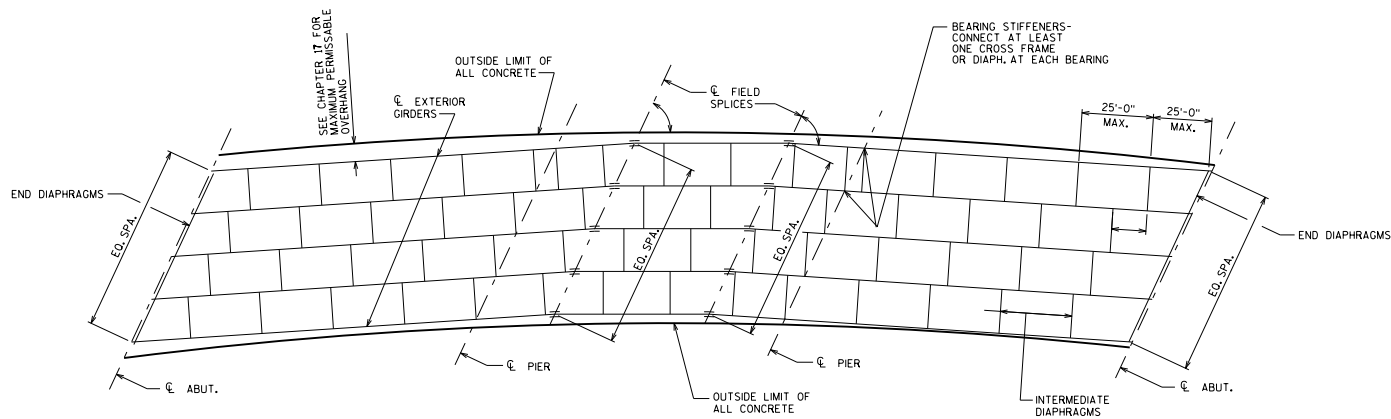
**BUREAU OF
STRUCTURES**

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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 SPICES 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 ϕ OF SUBSTRUCTURE UNITS AND ϕ OF SPICES PARALLEL TO EACH OTHER WHEN POSSIBLE.

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

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

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

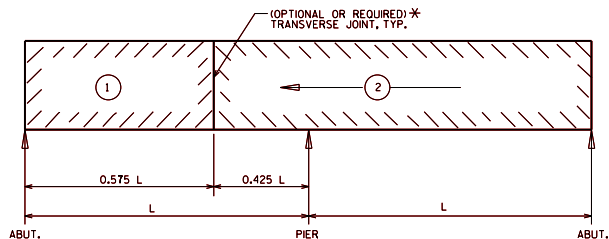
GIRDER LAYOUT ON CURVE



**BUREAU OF
STRUCTURES**

APPROVED: Scot Becker

DATE:
7-10

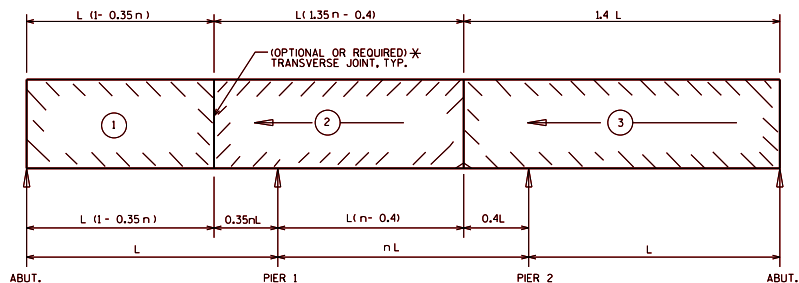


IDEAL DECK POUR SEQUENCE
(CONTINUOUS STEEL GIRDER - 2 SPANS SHOWN)

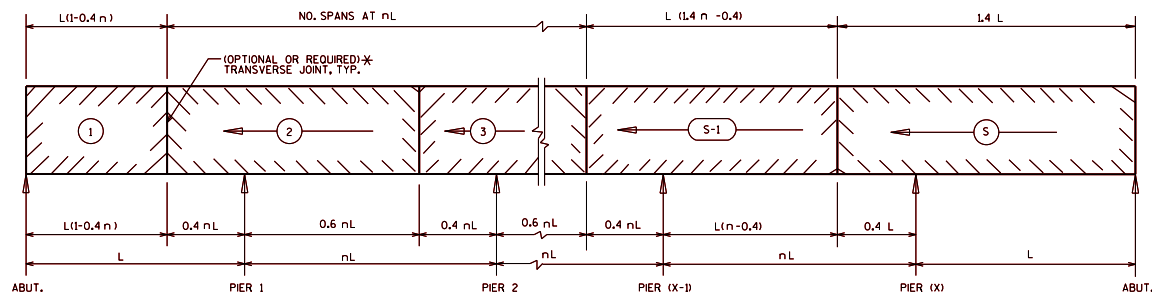
← ② → INDICATES POUR NUMBER AND DIRECTION OF POUR

S = TOTAL NUMBER OF SPANS
L = LENGTH OF END SPAN

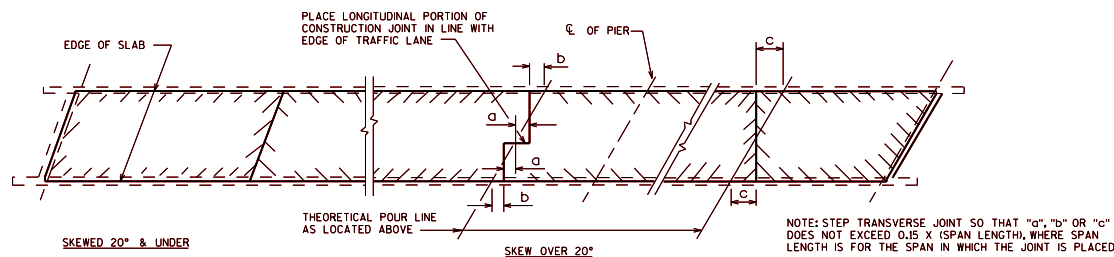
n = $\frac{\text{INTERIOR SPAN}}{\text{END SPAN}}$



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 NEXT DECK POUR CAN BE MADE NO LESS THAN 72 HOURS AFTER THE PREVIOUS POUR.

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

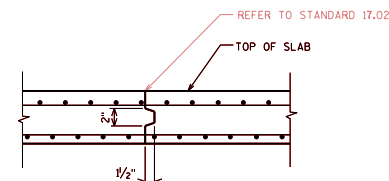
* THE DESIGNER SHALL DETERMINE IF TRANSVERSE JOINTS ARE OPTIONAL OR REQUIRED.

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 20 FEET, A LONGITUDINAL CONSTRUCTION JOINT SHALL BE DETAILED. FOR DECK WIDTHS BETWEEN 20 AND 30 FEET, LONGITUDINAL CONSTRUCTION JOINTS SHALL BE DETAILED. FOR DECK WIDTHS GREATER THAN 30 FEET, LONGITUDINAL CONSTRUCTION JOINTS SHALL BE DETAILED. FOR GRADES OVER 3% THE PREFERRED DIRECTION OF POUR IS UPHILL. AN ALTERNATE POURING SEQUENCE IS TO POUR THE DL POSITIVE MOMENT AREAS FIRST THEN POUR THE DL NEGATIVE MOMENT AREAS. THE SEQUENCE MAY BE STARTED ANYWHERE ON THE BRIDGE.



SECTION THRU TRANSVERSE OR LONGITUDINAL JOINT

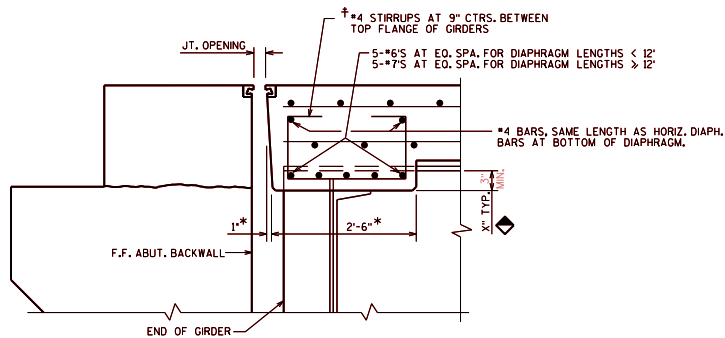
SLAB POURING SEQUENCE



BUREAU OF STRUCTURES

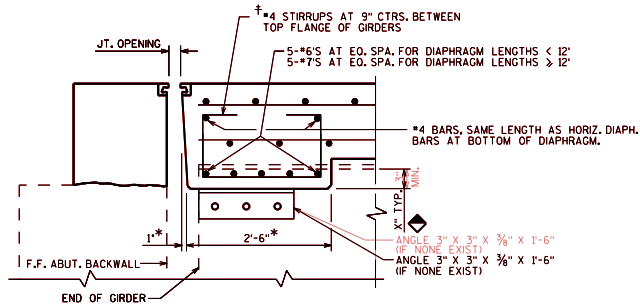
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DATE:
7-19



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 3/4" DIA. ALL BOLTS, NUTS AND WASHERS SHALL BE
ASTM A325 TYPE 1 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.

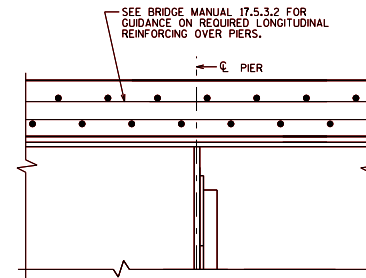
DESIGNER NOTE

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

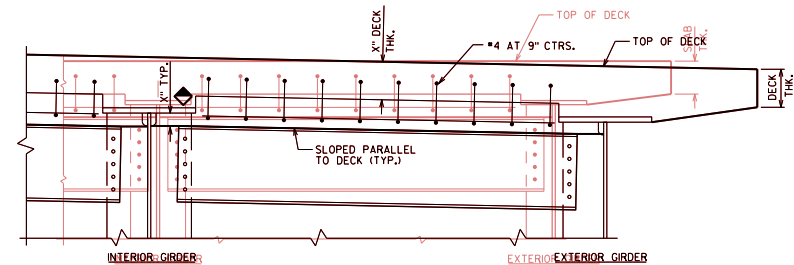
LEGEND

† BARS PLACED PARALLEL TO GIRDERS.
SPACING PERPENDICULAR TO ϕ GIRDERS.

* DIMENSION IS TAKEN NORMAL TO ϕ ABUTMENT



SECTION AT PIER



**PART TRANSVERSE SECTION AT DIAPHRAGM
EXPANSION END**

STEEL GIRDER SLAB & SUPERSTRUCTURE DETAILS



**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

DATE:

1-18

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

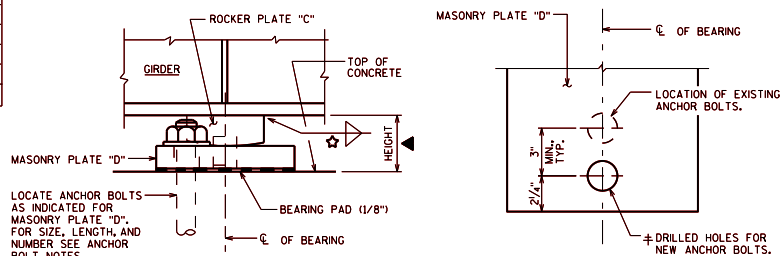
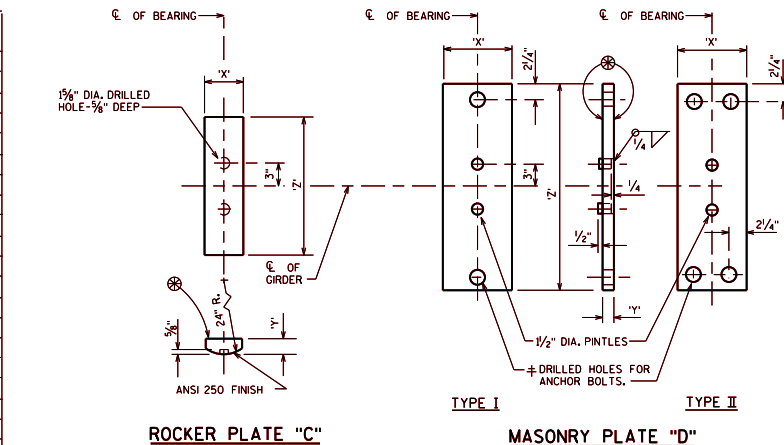
ANCHOR BOLT NOTES

FOR SPAN LENGTHS UP TO 100'-0":
USE A TYPE I MASONRY PLATE "D" WITH
(2) - 1/4" 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) - 1/2" DIA. x 1'-10" LONG ANCHOR BOLTS.

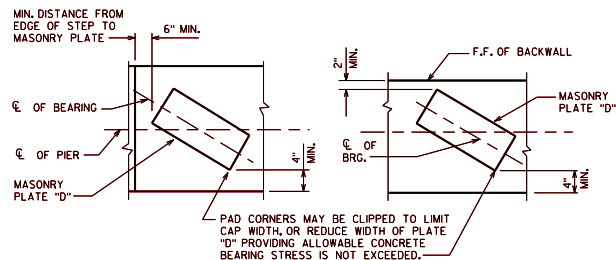
FOR SPAN LENGTHS GREATER THAN 150'-0":
USE A TYPE II MASONRY PLATE "D" WITH
(4) - 1/2" DIA. x 1'-10" LONG ANCHOR BOLTS.

CHECK THAT ANCHOR BOLTS PROVIDE ADEQUATE
HORIZONTAL CAPACITY.

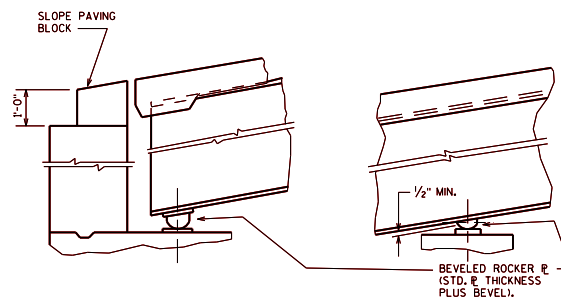


FIXED BEARING ASSEMBLY
(SEE "DESIGNER NOTES" FOR BEARING REPLACEMENTS)

MASONRY PLATE "D"
BEARING REPLACEMENTS



AT SKEWED PIER
AT SKEWED ABUTMENTS
CLEARANCE DIAGRAM



AT EXPANSION BRG.
AT FIXED BRG.
BEVELED ROCKERS WITH GRADES GREATER THAN 3%

BEARING NOTES

ALL BEARINGS ARE SYMMETRICAL ABOUT CL OF GIRDER AND CL 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 + 2/4", 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 FOR ADEQUATE YIELD STRENGTH AND ELONGATION.

ALL MATERIAL IN TYPE "A" BEARINGS, INCLUDING SHIM PLATES AND BEARING PADS, SHALL BE GALVANIZED OR HOT DIPPED IN GALVANIZING SOLUTION. GALVANIZING SHALL BE PAID FOR AT THE UNIT PRICE BID FOR BEARING ASSEMBLIES FIXED B-1-1, EACH.

CHAMFER TOP OF PINTLES 1/8". 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. 1/8" 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 50, 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".

FINISH THESE SURFACES TO ANSI 250 IF "Y" DIMENSION IS GREATER THAN 2".

DESIGNER NOTES

HEIGHT OF BEARINGS GIVEN IN TABLE INCLUDES 1/8" BEARING PAD.

DETAIL SHIM PLATES AS DESCRIBED IN NOTES ON STANDARD 24.02.

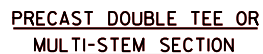
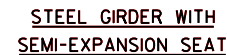
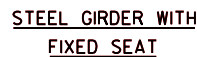
REFER TO THE DETAILS BELOW FOR THE USE OF BEVELED ROCKER PLATE "C" ON GRADES GREATER THAN 3% AND ALSO CLEARANCE REQUIREMENTS.

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".
CALCULATE THE REACTION AT THE BEARINGS DUE TO "TOTAL LOADS".
USE THE AASHTO LRFD SERVICE I LOAD COMBINATION, CONSIDERING 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".



FOR SKEWED STRUCTURES CAST END OF PRECAST
TEE ALONG SKEW.

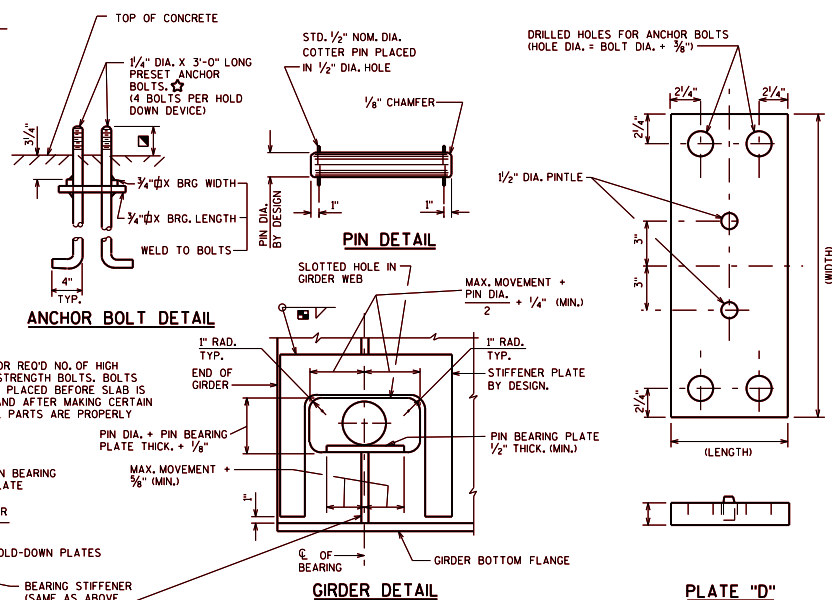
- DIMENSION IS TAKEN NORMAL TO BOLT, SUBSTRUCTURE ADDITIONAL FILLER BETWEEN BRG. PAD AND $\frac{1}{2} \times 4$ FILLER.
- 1" RUBBERIZED MEMBRANE WATERPROOFING
- DIMENSION IS TAKEN NORMAL TO $\frac{1}{2}$ SUBSTRUCTURE BARS, PLACED PARALLEL TO GIRDERS, SPACING PERPENDICULAR TO GIRDERS.
- 1" RUBBERIZED MEMBRANE WATERPROOFING
- DESIGNER NOTES: GIRDERS, SPACING PERPENDICULAR TO SUBSTRUCTURE BARS. SEE STANDARD 19.55 FOR PRESTRESSED BOX GIRDER BEARING DETAILS.
- DESIGNER NOTES: JOINT IS NOT RECOMMENDED FOR SKEWS. JOINT IS THE NO. GAGE DEAD END. NO ROTATION IS ANTICIPATED.
- USE PAVING NOT CHOICE ON BRIDGES. BRIDGES IS, T.H. BRIDGES, NO. BRIDGES (CONCRETE), BRIDGES, INDE CONCRETE APPROACHES IS ANTICIPATED.
- PAVING NOT CHOICE ON SUBS. IS, BRIDGES IS, T.H. STRUCTURAL APPROACH. SUBS. IS, TO BRIDGES IS USED. CONCRETE APPROACHES.
- SEE STD. 12.01
- PAVING NOT IS 1'-0" WIDE BY 1'-4" DEEP IF STRUCTURAL APPROACH SLAB (STD. 12.01) IS USED.
- SEE STD. 12.01

BRG. DETAILS FOR STEEL
GDRS. AND PRECAST
UNITS ON A1 ABUTMENTS

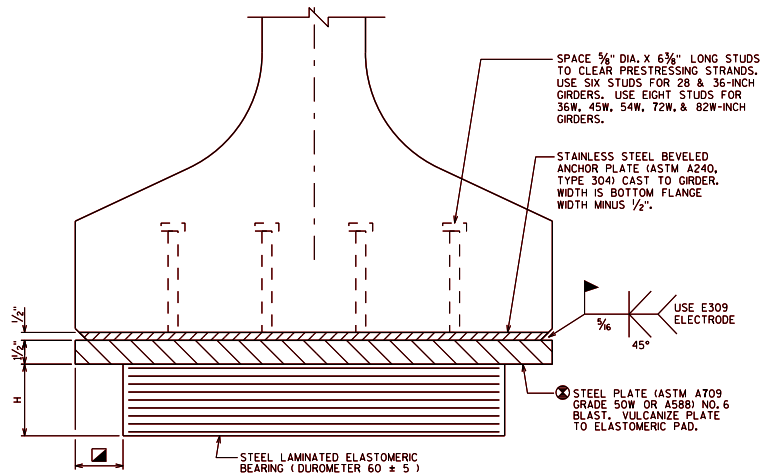
**BUREAU OF
STRUCTURES**

APPROVED: *Bill Oliva*

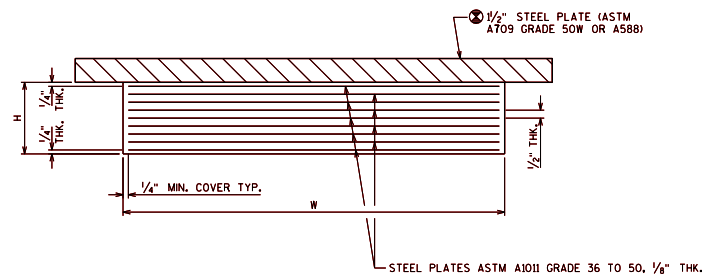
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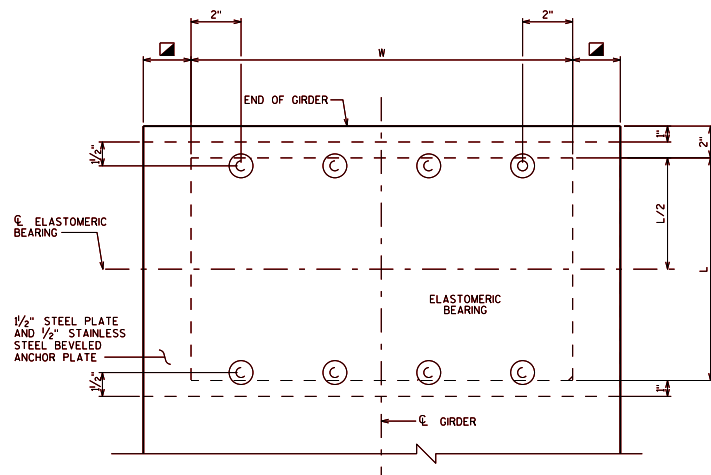
PLACE ONE ANCHOR ROD PER GIRDER AT ABUTMENT WHERE SLAB POUR TERMINATES. LOCATE 4" (NORMAL) OFF C OF GIRDER. ANCHOR ROD, NUT, WASHER, AND DRILLED HOLE IN GIRDER FLANGE SHALL BE PAID FOR AS "ADHESIVE ANCHORS 3/4-INCH".



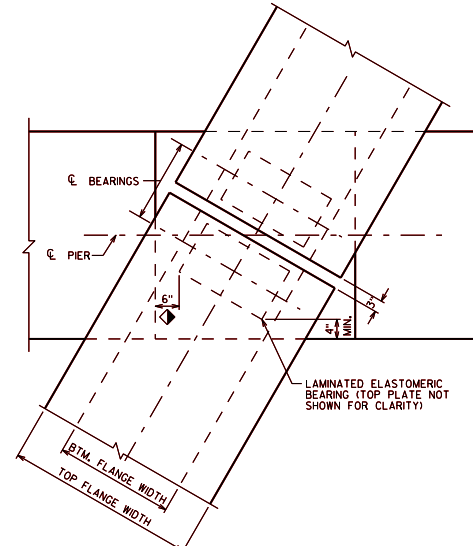
END VIEW



SECTION THRU ELASTOMERIC BEARING

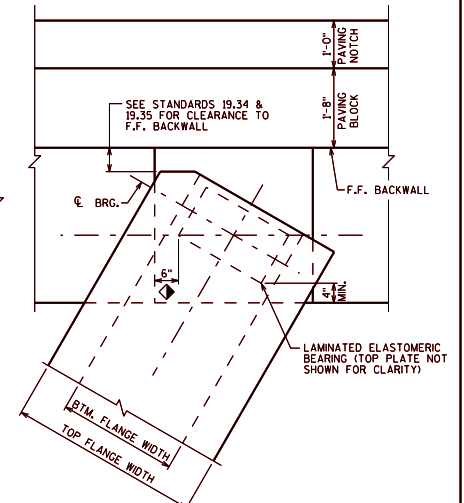


PLAN VIEW



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 1/2" FOR LAMINATED STEEL GIRDER BRIDGES.

FOR BEARINGS USED IN BEARING REPLACEMENT PROJECTS, THE STEEL TOP PLATE THICKNESS MAY BE REDUCED TO A MINIMUM OF 3/4" TO MATCH THE OVERALL EXISTING BEARING HEIGHT. WHEN THE THICKNESS IS REDUCED, THE FOLLOWING NOTE SHALL BE LOCATED ON THE PLANS: MAY BE REDUCED TO A MINIMUM OF 3/4" WELDING PROCEDURES SHALL BE ESTABLISHED BY THE WHEN CONTRACTOR TO RESTRICT THE MAXIMUM TEMPERATURE. L BE 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. TOWER TO 200°F (93°C). TEMPERATURES SHALL BE CONTROLLED 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 RADIANS OR IF THIS ANGLE MULTIPLIED BY THE TOP PLATE LENGTH IS 1/8" OR MORE. TO DETERMINE THIS ANGLE, ADD THESE TWO VALUES:
- LONGITUDINAL GRADE OF GIRDER
- CAMBER EFFECT = 480/L, WHERE:
RC = RESIDUAL CAMBER (INCHES)
L = GIRDER LENGTH (INCHES)

NOTES

BEARINGS SHALL NOT BE PLACED AT A TEMPERATURE GREATER THAN 85° F.

ALL MATERIAL USED FOR BEARINGS SHALL BE PAID FOR AND BEARING PRICE FOR BEARING PADS, ELASTOMERIC LAMINATED, EACH, ALL MATERIAL USED FOR BEARINGS SHALL BE ALL STRUCTURAL STEEL PLATES SHALL BE FLAT ROLLED WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND FAULTS (SMOOTH STRAIGHT AND VERTICAL, AND VERTICAL STEEL PLATES SHALL BE FLAT ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS (WATER CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS).

BEARINGS DESIGNED PER METHOD A IN THE CURRENT AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, LINE PLATE CUTS.

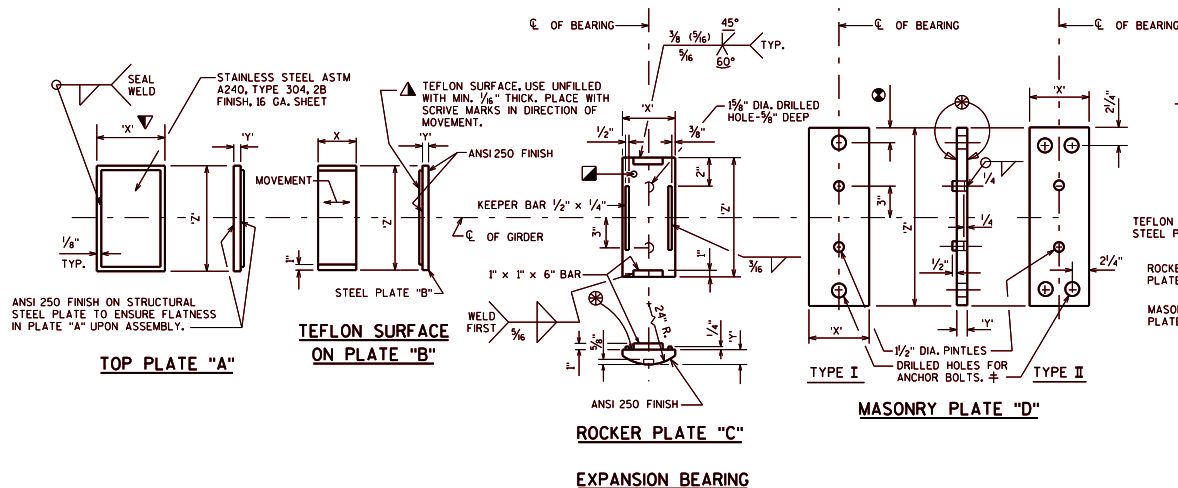
ELASTOMERIC BEARINGS FOR PRESTRESSED CONCRETE GIRDERS



BUREAU OF STRUCTURES

APPROVED: *Abitha O Bank*

DATE: 7-22



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"	3/8"	10"	5"	1/2"	10"	7"	1 1/8"	1'-0 1/4"	8"	1/2"	1'-8"	0.360
180	1'-1"	3/8"	10"	9"	1/2"	10"	11"	2 3/8"	1'-0 1/4"	8"	1/2"	1'-8"	0.438
260	1'-5"	3/8"	10"	1'-1"	1/2"	10"	1'-3"	3 3/8"	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"	3/8"	1'-2"	7"	1/2"	1'-2"	9"	1 1/8"	1'-4 1/4"	8"	1/2"	2'-0"	0.401
375	1'-5"	3/8"	1'-2"	1'-1"	1/2"	1'-2"	1'-3"	3 3/8"	1'-4 1/4"	1'-2"	2 3/8"	2'-0"	0.677
500	1'-9"	3/8"	1'-2"	1'-5"	1/2"	1'-2"	1'-7"	4 7/8"	1'-4 1/4"	1'-5"	3 3/8"	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"	3/8"	1'-6"	7"	1/2"	1'-6"	9"	1 1/8"	1'-8 1/4"	9"	2"	2'-4"	0.443
360	1'-1"	3/8"	1'-6"	9"	1/2"	1'-6"	11"	2 3/8"	1'-8 1/4"	11"	2"	2'-4"	0.479
600	1'-7"	3/8"	1'-6"	1'-3"	1/2"	1'-6"	1'-5"	3 3/8"	1'-8 1/4"	1'-5"	3 3/8"	2'-5"	0.719
650	1'-11"	3/8"	1'-6"	1'-7"	1/2"	1'-6"	1'-9"	4 7/8"	1'-8 1/4"	1'-10"	3 3/8"	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"	3/8"	1'-0"	5"	1/2"	1'-0"	7"	1 1/8"	1'-2 1/4"	8"	1/2"	1'-10"	0.360
175	11"	3/8"	1'-0"	7"	1/2"	1'-0"	9"	1 1/8"	1'-2 1/4"	8"	1/2"	1'-10"	0.401
275	1'-3"	3/8"	1'-0"	11"	1/2"	1'-0"	1'-1"	2 3/8"	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"	3/8"	1'-4"	7"	1/2"	1'-4"	9"	1 1/8"	1'-6 1/4"	8"	1/2"	2'-2"	0.401
370	1'-3"	3/8"	1'-4"	11"	1/2"	1'-4"	1'-1"	2 3/8"	1'-6 1/4"	1'-0"	2 3/8"	2'-3"	0.552
525	1'-7"	3/8"	1'-4"	1'-3"	1/2"	1'-4"	1'-5"	3 3/8"	1'-6 1/4"	1'-4"	3 3/8"	2'-3"	0.719
575	1'-9"	3/8"	1'-4"	1'-5"	1/2"	1'-4"	1'-7"	4 7/8"	1'-6 1/4"	1'-6"	3 3/8"	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"	3/8"	1'-8"	5"	1/2"	1'-8"	7"	1 1/8"	1'-10 1/4"	8"	1/2"	2'-6"	0.360
315	11"	3/8"	1'-8"	7"	1/2"	1'-8"	9"	1 1/8"	1'-10 1/4"	9"	2"	2'-6"	0.443
495	1'-3"	3/8"	1'-8"	11"	1/2"	1'-8"	1'-1"	2 3/8"	1'-10 1/4"	1'-1"	2 3/8"	2'-7"	0.594
675	1'-7"	3/8"	1'-8"	1'-3"	1/2"	1'-8"	1'-5"	3 3/8"	1'-10 1/4"	1'-6"	3 3/8"	2'-7"	0.760
705	1'-11"	3/8"	1'-8"	1'-7"	1/2"	1'-8"	1'-9"	4 7/8"	1'-10 1/4"	1'-11"	3 3/8"	2'-7"	0.844

BEARING NOTES

ALL BEARINGS ARE SYMMETRICAL ABOUT \bar{C} OF GIRDER AND \bar{C} OF BEARING.

FINISH THESE SURFACES TO ANSI250 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 WEARABLE PRIMER 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 1/4" DIA. ANCHOR BOLTS ARE USED AND 2 1/4" WHEN 1/2" 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-T", 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 1/4" 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 + 2/4", 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 50W. YIELD STRENGTH AND ELONGATION. ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO: ASTM F1554 GRADE 80, 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 3/16" LARGER THAN ANCHOR BOLT.

AT INSTALLATION, ENSURE STAINLESS STEEL SLIDING FACE OF THE UPPER ELEMENT AND THE 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 1/8" BEARING PAD, 16 GAGE STAINLESS STEEL SHEET AND 1/8" 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 \bar{C} OF BEARING TO END OF ORDER.

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 "D". SEE STANDARD 40.08 FOR DETAILS. FOR BEARING REPLACEMENTS, SEE STD. 27.02 FOR MINIMUM ANCHOR 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 ASHTO 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) - 1/4" 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) - 1/2" DIA. x 1'-10" LONG ANCHOR BOLTS.

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

CHECK THAT ANCHOR BOLTS PROVIDE ADEQUATE HORIZONTAL CAPACITY.

STAINLESS STEEL - TFE EXPANSION BEARING DETAILS TYPE 'A-T'

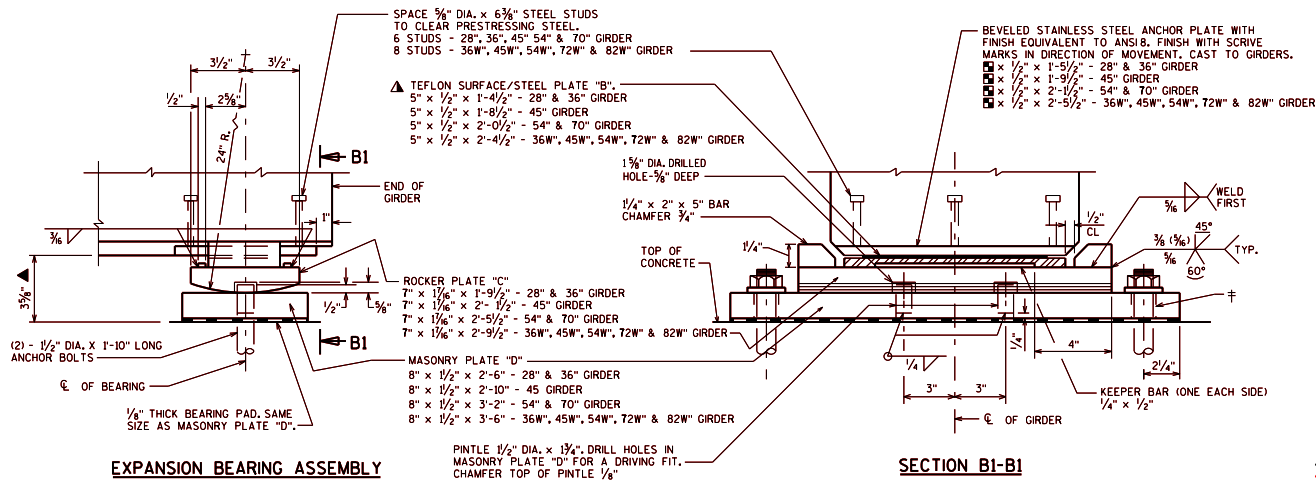


BUREAU OF STRUCTURES

APPROVED: *Abitha B. B.*

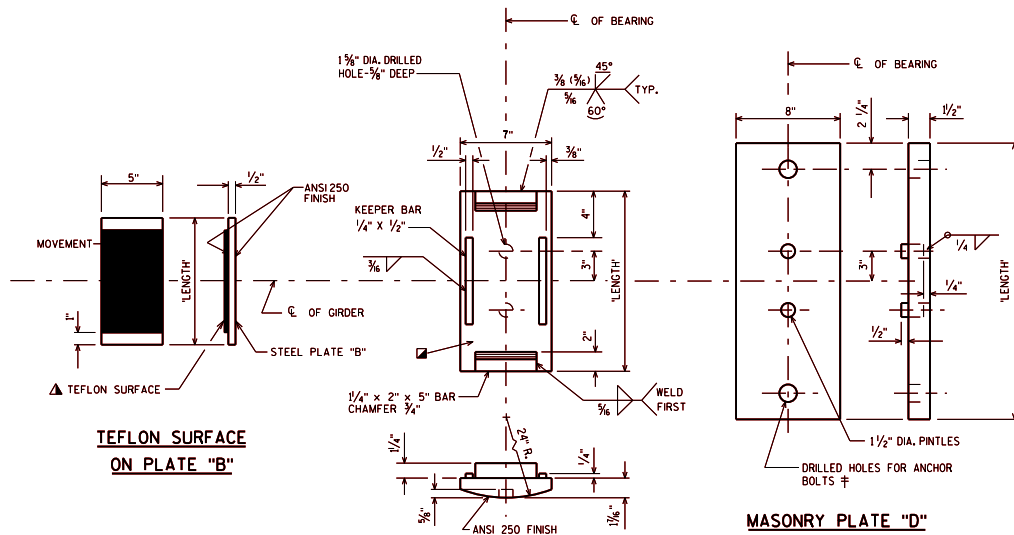
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EXPANSION BEARING ASSEMBLY

SECTION B1-B1



TEFLON SURFACE ON PLATE "B"

MASONRY PLATE "D"

ROCKER PLATE "C"

EXPANSION BEARING

BEARING NOTES

ALL BEARINGS ARE SYMMETRICAL ABOUT CL OF GIRDER AND CL 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 50YIELD STRENGTH AND ELONGATION.

ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM F1554 GRADE 50, OR WATERBURY GRADE 50W AND WELDING SHALL CONFORM TO ASTM A709 GRADE 50, 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.

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 BOLT PER ANCHOR BOLT. PROVIDE ANCHOR BOLTS IN MASONRY PLATE "D" WITH A MINIMUM OF 10" EMBEDMENT IN CONCRETE. PROJECT ANCHOR BOLTS, MASONRY PLATE "D" THICKNESS + 2 $\frac{1}{4}$ " ABOVE TOP OF CONCRETE.

CHAMFER ANCHOR BOLTS PRIOR TO THREADING.

CHAMFER ANCHOR BOLTS PRIOR TO THREADING.

MASONRY PLATE "D", ROCKER PLATE "C", ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A106, GRADE 50, 50W. STEEL PLATES SHALL BE SHOP PAINTED, DO NOT PAINT TEFLON SURFACE.

ALL MATERIAL IN "STEEL BEARINGS FOR PRESTRESSED CONCRETE GIRDERS", INCLUDING BEARING PADS, SHALL BE PAINTED FOR THE ENTIRE SURFACE OF BEARING ASSEMBLY. EXPANSION PADS, SHALL BE PAINTED FOR AT THE UNIT PRICE BID FOR "BEARING ASSEMBLY EXPANSION PADS", EACH.

DRILLED HOLES FOR ANCHOR BOLTS IN MASONRY PLATE "D" SHALL HAVE A DIAMETER $\frac{3}{8}$ " LARGER THAN ANCHOR BOLT.

TEFLON SURFACE, USE UNFILLED WITH MINIMUM $\frac{1}{16}$ " THICKNESS. PLACE WITH SCRIBE MARKS IN DIRECT TOWARD MOVEMENT. BEARING PLATE "D" THICKNESS ON WHICH THE SURFACE MATERIAL MEETING THE REQUIREMENTS, FOUND IN THE STANDARD SPECIFICATION, WITH ADHESIVE MATERIAL MEETING THE REQUIREMENTS FOUND IN THE STANDARD SPECIFICATION.

PROVIDE A METHOD FOR HANDLING ROCKER PLATE "C" DURING GALVANIZING.

PROVIDE A METHOD FOR HANDLING ROCKER PLATE "C" DURING GALVANIZING. AT INSTALLATION, ENSURE STAINLESS STEEL SLIDING FACE OF THE UPPER ELEMENT AND THE STAINLESS STEEL 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 ON A GIVEN SUBSTRUCTURE UNIT ARE FIXED, UTILIZE $\frac{1}{2}$ " THICK ELASTOMERIC BEARING PADS AND FULL-DEPTH CONCRETE DIAPHRAGMS. $\frac{1}{2}$ " THICK ELASTOMERIC BEARING PADS AND FULL-DEPTH CONCRETE DIAPHRAGMS. FOR EXPANSION BEARINGS, USE LAMINATED ELASTOMERIC BEARINGS WHENEVER POSSIBLE. FOR EXPANSION BEARINGS, USE LAMINATED ELASTOMERIC BEARINGS WHENEVER POSSIBLE. SEE STANDARD 27.02 AND 19.31 FOR CLEARANCE REQUIREMENTS AND STANDARD 27.02 FOR TENSILE STRENGTH OF ROCKER PLATE "C" ON GRADES GREATER THAN 36. FOR THE USE OF BEVELED ROCKER PLATE "C" ON GRADES GREATER THAN 36, HEIGHT OF BEARING SHOWN IN "EXPANSION BEARING ASSEMBLY" INCLUDES $\frac{1}{8}$ " BEARING PAD AND $\frac{1}{16}$ " OF TEFLON SURFACE IN "EXPANSION BEARING ASSEMBLY" INCLUDES $\frac{1}{8}$ " BEARING PAD AND $\frac{1}{16}$ " OF TEFLON SURFACE.

ADJUST HEIGHT IF BEVELED ROCKER PLATE "C" IS USED.

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 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"
TOTAL LOAD (DC+DW+(LL+IM))	180	230	280	330
DEAD LOAD (DC + DW)	110	140	170	200

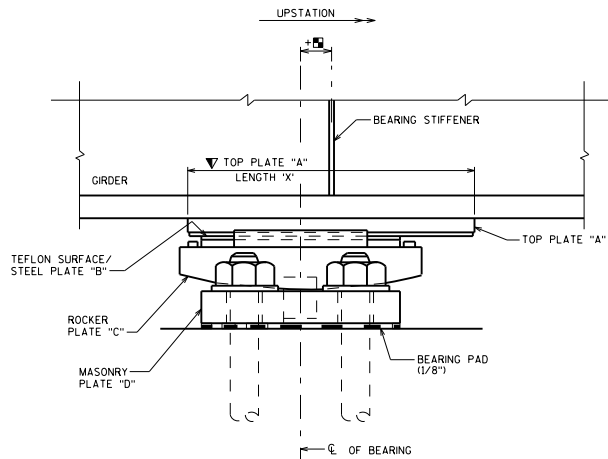
BEARING CAPACITY (KIPS)

STEEL BEARINGS FOR PRESTRESSED CONCRETE GIRDERS

BUREAU OF STRUCTURES

APPROVED: *Bill Oliva*

DATE: 7-28



EXPANSION BEARING ASSEMBLY
FOR STEEL GIRDER
(SHOW ON PLANS)

E
S. ABUT

E

E

F

F

E

E
N. ABUT

PIER 1

PIER 2

PIER 3

PIER 4

PIER 5

PIER 6

BELOW SHOWS AN EXAMPLE BEARING OFFSET TABLE BASED ON THE SAMPLE BRIDGE SHOWN ABOVE. SUCH A TABLE SHOULD BE PROVIDED FOR STEEL GIRDER BRIDGES. THE OFFSET TABLE MAY BE OMITTED AT THE DISCRETION OF THE DESIGN ENGINEER IF THE VALUES ARE NEGLIGIBLE.

(THE BRIDGE SCHEMATIC SHOULD NOT BE SHOWN ON THE PLANS)

*F S. ABUT	PIER 1	PIER 2	PIER 5	PIER 6	N. ABUT
30	0.7	0.5	0.3	-0.3	-0.5
45	0	0	0	0	0
60	-0.7	-0.5	-0.3	0.3	0.5
75	-1.6	-1.1	-0.7	0.7	1.1
90	-2.4	-1.7	-1.0	1.0	1.7

BEARING OFFSET TABLE

ALL DIMENSIONS IN INCHES

AMBIENT TEMPERATURE DURING GIRDER INSTALLATION

NOTES

FOR STEEL GIRDER BEARINGS:
USE TEMPERATURE SETTING TABLE, RATHER THAN CENTERING BEARINGS BENEATH BEARING STIFFENERS FOR ALL TEMPERATURES.

FOR PRESTRESSED GIRDER BEARINGS:
PLACE BEARINGS AS SHOWN ON THE SUBSTRUCTURE PLAN, PROVIDING ADJUSTMENT FOR SUBSTRUCTURE LOCATION DISCREPANCIES. PLACE EACH GIRDER CENTERED BETWEEN ITS GIVEN BEARINGS.

DESIGNER NOTES

THIS STANDARD SHOULD ONLY BE USED FOR STEEL BEARINGS.

TOP PLATE "A" FOR STEEL GIRDER BEARINGS TO BE DESIGNED TO ACCOUNT FOR THERMAL MOVEMENT AND CONSTRUCTION TOLERANCE. (USE GREATER OF VALUE FROM PROCEDURE BELOW OR SIZE FROM STANDARD 27.08).

PROCEDURE FOR SIZING TOP PLATE "A":

$\frac{1}{2}$ TEFLON PLATE "B" LENGTH "X"
+ THERMAL MOVEMENT (USE $60 - (-30) = 90$ DEGREES)
+ F CONSTRUCTION TOLERANCE
= $\frac{1}{2}$ TOP PLATE "A" LENGTH (DOUBLE THIS FOR PLATE "A" LENGTH)

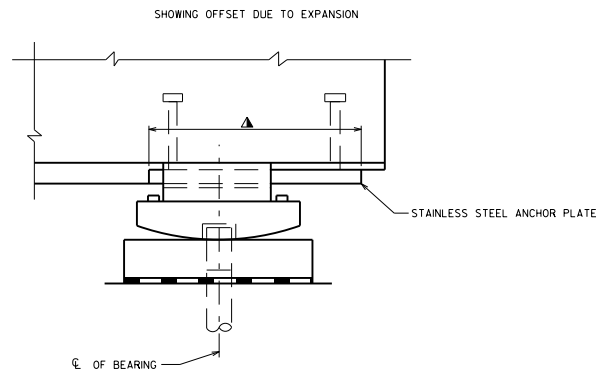
ANCHOR PLATES IN PRESTRESSED GIRDERS TO BE DESIGNED TO ACCOUNT FOR THERMAL MOVEMENT, GIRDER SHRINKAGE AND CONSTRUCTION TOLERANCE.

PROCEDURE FOR SIZING ANCHOR PLATE:

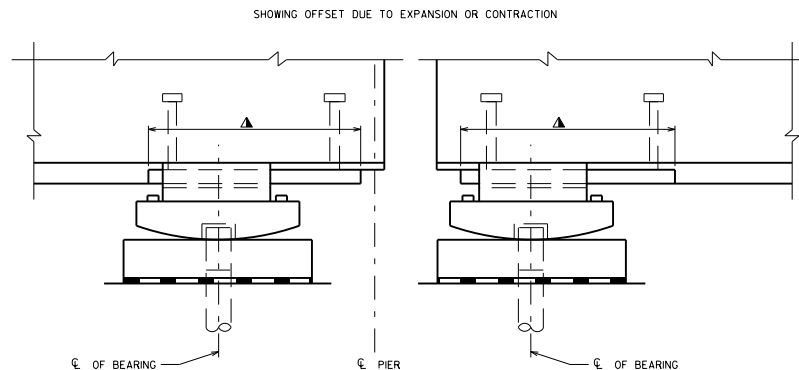
$\frac{2}{3}$ INCHES = $\frac{1}{2}$ TEFLON PLATE LENGTH
+ THERMAL MOVEMENT (USE $60 - 5 = 55$ DEGREES)
+ SHRINKAGE = 0.0003 L
+ F CONSTRUCTION TOLERANCE
= $\frac{1}{2}$ ANCHOR PLATE LENGTH (DOUBLE THIS FOR ANCHOR PLATE LENGTH)

ACCORDING TO AASHTO, THE LOAD FACTOR FOR TU IS 1.20 FOR DEFORMATIONS. THE PROCEDURE OUTLINED ABOVE SHOULD BE USED WITH A LOAD FACTOR OF 1.0, WITH THE 1" CONSTRUCTION TOLERANCE BEING USED IN LIEU OF THE HIGHER LOAD FACTOR.

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.



EXPANSION BEARING AT ABUTMENT
PRESTRESSED CONCRETE GIRDER
FOR DESIGNER INFORMATION, ONLY
(DO NOT PUT ON THE PLANS)



EXPANSION BEARINGS AT PIER
PRESTRESSED GIRDER (CONC. DIAPHS. NOT SHOWN FOR CLARITY)
FOR DESIGNER INFORMATION, ONLY
(DO NOT PUT ON THE PLANS)

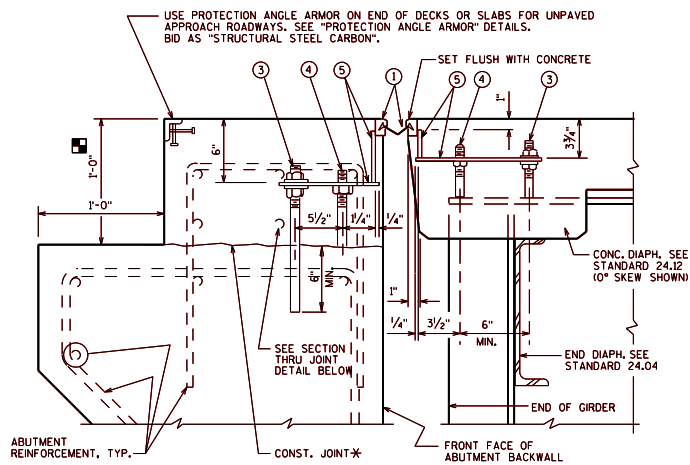
STEEL EXPANSION BEARING DETAILS



BUREAU OF STRUCTURES

APPROVED: Bill Oliva

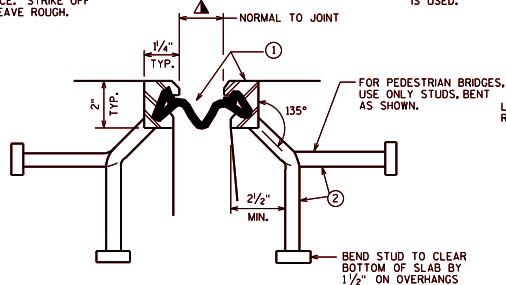
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TYPICAL SECTION THRU JOINT AT STEEL GIRDER

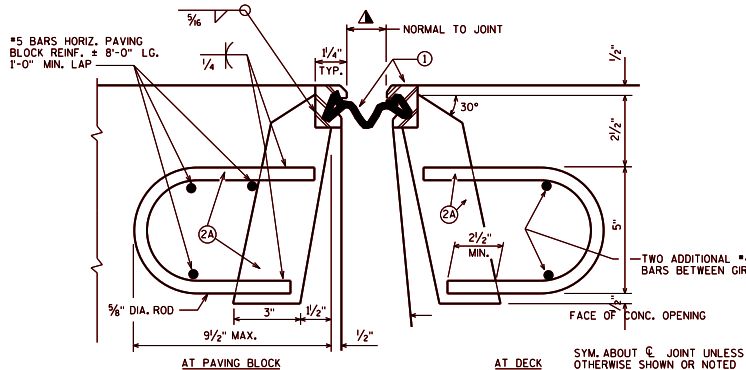
* POUR CONC. ABOVE THIS JOINT AFTER SUPERSTRUCTURE IS IN PLACE, STRIKE OFF AND LEAVE ROUGH.

PAVING NOTCH IS 1'-0" WIDE BY 1'-4" DEEP IF STRUCTURAL APPROACH SLAB (STD. 12.12) IS USED.



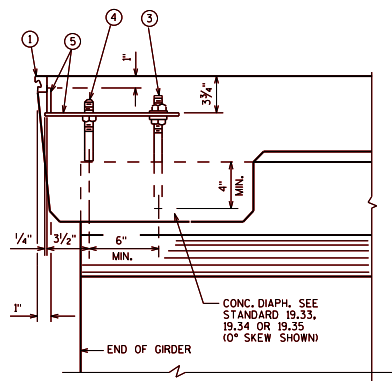
SECTION THRU JOINT

EXTERIOR GIRDER TO EDGE OF DECK, AND AT PARAPETS, MEDIANS AND SIDEWALKS



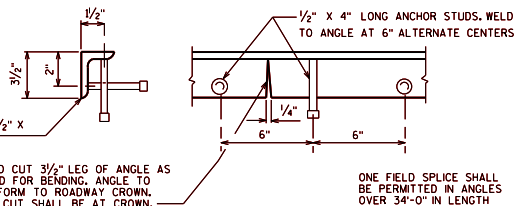
SECTION THRU JOINT

ROADWAY TRAFFIC AREA BETWEEN EXTERIOR GIRDERS.



PART SECTION THRU JOINT AT PRESTRESSED GIRDERS

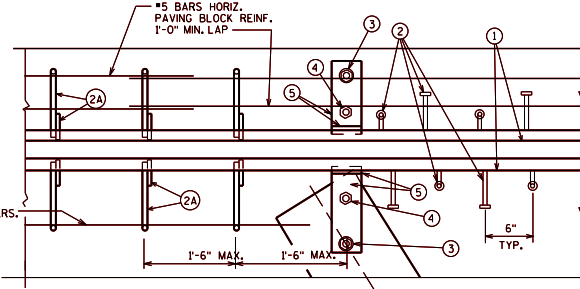
NORMAL TO ϕ SUBSTRUCTURE



PROTECTION ANGLE ARMOR

SANDBLAST PROTECTION ANGLE AFTER FABRICATION PER NOTES. AFTER BLAST CLEANING, THE PROTECTION ANGLE SHALL BE HOT DIPPED GALVANIZED.

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."



PART PLAN

LEGEND

- ▲ ① NEOPRENE STRIP SEAL (1-INCH) AND STEEL EXTRUSIONS. SET JOINT OPENING AT 1 1/2" WHEN EXPANSION LENGTH < 230'-0". WHEN EXPANSION LENGTH > 230'-0", PREPARE A TEMPERATURE TABLE SHOWING JOINT OPENINGS FROM 5" TO 65" IN 10" INCREMENTS. ACCOUNT FOR PRESTRESSED GIRDER SHRINKAGE DUE TO CREEP WHEN DETERMINING THIS TABLE. JOINT OPENINGS GIVEN NORMAL TO JOINT. ■
- ② STUDS 3/4" DIA. X 6 3/4" LONG AT 6" ALTERNATE CENTERS. WELD TO EXTRUSIONS AND BEND AS SHOWN AFTER WELDING.
- ③ 1/2" THICK ANCHOR PLATE WITH 3/4" DIA. ROD (OR ALTERNATE STRIP SEAL ANCHOR). WELD ROD TO ANCHOR PLATE, WELD ANCHOR PLATE TO NO. 1 AT 1'-6" CENTERS BETWEEN GIRDERS.
- ④ 3/4" DIA. THREADED ROD WITH 2 NUTS AND PLATE WASHERS. FOR PRESTRESSED GIRDERS, GROUT THREADED ROD INTO FIELD DRILLED HOLES ON ϕ 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.
- ⑤ 3/4" DIA. THREADED ROD WITH NUT. TACK WELD NUT TO NO. 5.
- ⑥ FABRICATE SUPPORT FROM 3" X 1 1/2" 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 1/2" DIA. HOLE FOR NO. 3 AND 1" DIA. HOLE FOR NO. 4.
- ⑦ GALVANIZED PLATE 3/4" X 10" X 12'-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.
- ⑧ 3/4" DIA. X 1 1/2" STAINLESS STEEL SOCKET FLAT HEAD SCREWS WITH ANTI-SEIZE LUBRICANT. PLACE IN COUNTERSUNK HOLE. RECESS 1/16" BELOW PLATE SURFACE.
- ⑨ 3/4" DIA. X 4" GALVANIZED HEX HEAD BOLT, BEND 45°.
- ⑩ 3/4" DIA. X 2 1/4" GALVANIZED THREADED COUPLING.
- ⑪ SIDEWALK COVER PLATE 3/4" X 12'-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 IS APPLIED.
- ⑫ 1" X 5" SLOTTED COUNTERSUNK HOLE FOR NO. 7. PLACE SLOT PARALLEL TO DIRECTION OF MOVEMENT.

NOTES

ONE FIELD SPLICE PERMITTED IN STEEL EXTRUSIONS, UNLESS MORE ARE REQUIRED FOR STAGED CONSTRUCTION, HANDLING OR GALVANIZING REQUIREMENTS. IF USED, ANCHOR PLATES SHALL BE PROVIDED FROM EACH SIDE OF THE FIELD. SPLICE DETAILS SHALL BE SUBMITTED FOR APPROVAL. NO SPLICING PERMITTED IN NEOPRENE STRIP SEAL.

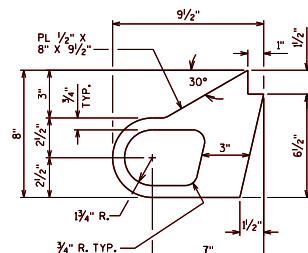
AFTER FABRICATION, BUT BEFORE SHIPMENT, STRAIGHTEN STEEL EXTRUSIONS SUCH THAT THEY SHALL BE FREE FROM WARP, TWIST AND SWEEP.

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 A53 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" ELEC. 1.1.



ALTERNATE STRIP SEAL ANCHOR

STRIP SEAL EXPANSION JOINT DETAILS

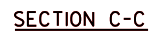


BUREAU OF STRUCTURES

APPROVED: *Abitha O Bank*

DATE:

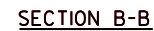
T-28



"X" - VALUES IN INCHES				USE "X" = 6½" FOR 0° SKEW										
SKW	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	
RHF	6½	6½	6½	6½	6½	6½	6½	6½	6½	7	7	7½	8	
LHF	7	7½	8	8½	9	9½	10½	11	11½	13	13½	14½	15½	



† 1'-2" WHEN "VERTICAL FACE PARAPET TYPE 'TX' IS USED



FROM ROADWAY
SINGLE SLOPE PARAPET

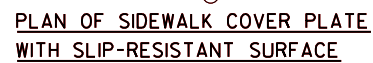
- ⊗ BLOCK OUT CONCRETE 2" EACH SIDE
OF JOINT OPENING
- ▣ JOINT OPENING DIM. ALONG SKEW PLUS 1/2"

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.



PLACE SLIP-RESISTANT SURFACE ON TOP WALKING SURFACE
IN SHADED AREA ONLY (NOT ON CURB FACE).

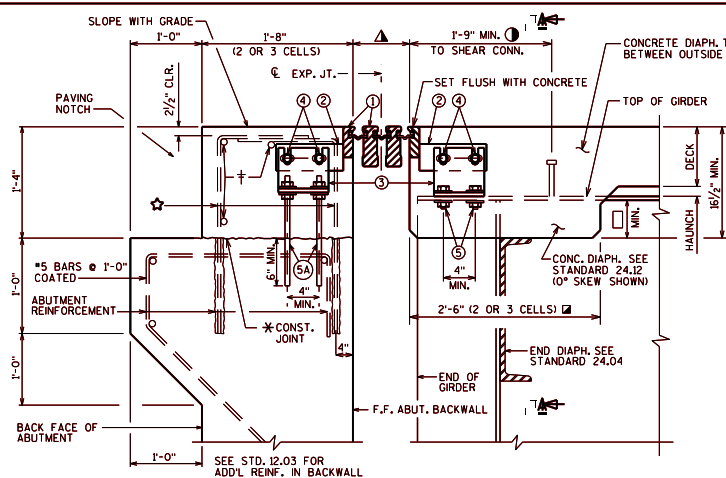
APPROVED SLIP-RESISTANT APPLIED SURFACES FOR STEEL PLATES		
PRODUCT	MANUFACTURER	CONTACT AT
SLIPNOT GRADE 2, STEEL	W. S. MOLNAR COMPANY	1-800-SLIPNOT
ALGRIP, STEEL	ROSS TECHNOLOGY CORP.	1-800-345-8170

STRIP SEAL COVER PLATES
SINGLE SLOPE PARA./SDWK.



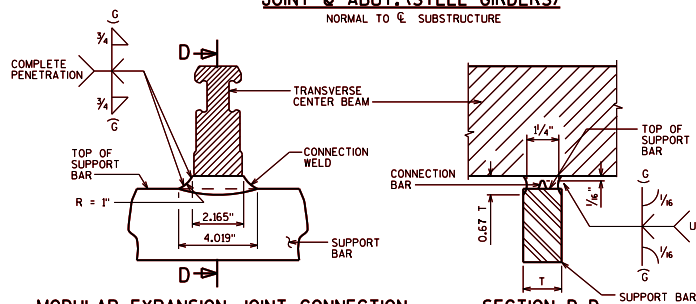
APPROVED: Bill Oliva

DATE: 7-19



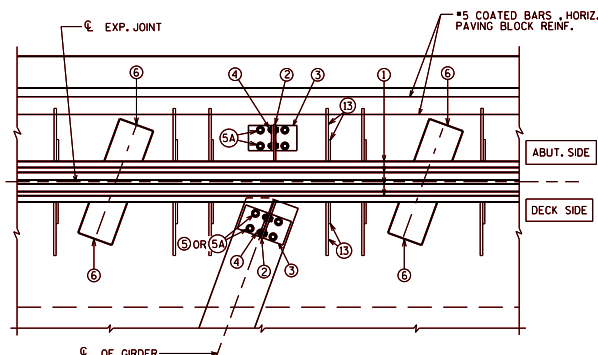
JOINT @ ABUT. (STEEL GIRDERS)

NORMAL TO ϵ SUBSTRUCTURE



JOINT @ PIER (PRESTRESSED GIRDERS)

NORMAL TO ϵ SUBSTRUCTURE



PART PLAN

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.

■ AT LOCATION WHERE EXT. OR. IS ADJACENT TO A RAISED SIDEWALK (STD. 30.07), CONC. DIAPH. DOES NOT EXTEND OUT TO EDGE OF DECK, BUT IS TERMINATED AT INSIDE FACE OF EXT. GR.

† #5 COATED BARS, \pm 8'-0" LONG, 1'-0" MIN. LAP. CUT IN FIELD TO CLEAR JOINT SUPPORT SYSTEM AS REQ'D.

* POUR CONC. ABOVE THIS JOINT AFTER SUPERSTRUCTURE CONC. IS IN PLACE. STRIKE OFF & LEAVE ROUGH.

① DIMENSION IS PARALLEL TO ϵ GIRDER.

▲ MANUFACTURER'S RECOMMENDED JOINT OPENING BASED ON THE TEMPERATURE ON THE DAY OF PLACEMENT PER TEMPERATURE TABLE. THE MODULAR EXPANSION DEVICE SHALL HAVE THE NUMBER OF CELLS AS INDICATED (Q).

☆ (2) COATED L-SHAPED ADHESIVE ANCHORS NO. 5 BARS EMBEDDED 12" IN CONCRETE. SPACE AT 1'-0". PLACE ADHESIVE ANCHORS AFTER MODULAR JOINT IS IN POSITION.

■ TOP FLANGE WIDTH WITHIN LIMITS OF CONC. DIAPH. SHALL BE \leq 20" FOR SKEWS \leq 30°

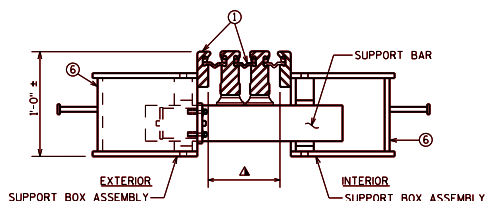
▲ FOR PRESTRESSED GIRDERS, PLACE THE FOLLOWING NOTE ON PLANS: "JOINT MANUFACTURER SHALL INFORM AND PROVIDE NECESSARY DETAILS TO THE PRESTRESSED GIRDER FABRICATOR, WHEN FORM-OUT OF THE TOP FLANGE IS REQ'D. TO ALLOW PLACEMENT OF SUPPORT BOX ASSEMBLY."

LEGEND

- ① MODULAR EXPANSION JOINT DEVICE, \square CELLS.
- ② 1/2" PLATE, ONE PER GIRDER MIN. PROVIDE 2 - 1" x 2" MIN. SLOTTED HOLES PLACED HORIZONTALLY FOR NO. 4.
- ③ WT. 6 x 29 OR EQUIVALENT BUILT UP T-SECTION, ONE PER GIRDER. PROVIDE 2 - 1" x 3" MIN. SLOTTED HOLES PLACED VERTICALLY IN WEB OF WT FOR BOLTS NO. 4.
- ④ 3/4" DIA. HIGH STRENGTH BOLTS WITH NUTS & WASHERS. (A325 GALV.)
- ⑤ 3/4" DIA. HIGH STRENGTH BOLTS WITH NUTS & WASHERS. FIELD DRILL HOLES IN GIRDER TOP FLANGE. (A325 GALV.)
- ⑤A 3/4" DIA. HIGH STRENGTH BOLTS WITH NUTS & WASHERS. GROUT THREADED ROD INTO FIELD DRILLED HOLES (GALV.)
- ⑥ SUPPORT BOX ASSEMBLY FOR SUPPORT BAR (SPA. PER MANUFACTURER). FABRICATE BOX FROM 1/2" PLATES.
- ⑦ 3/8" BULKHEAD PLATE. WELD TO NO. 1, NO. 8 AND NO. 14. WHEN CONDUIT IS PRESENT IN PARAPET OR SIDEWALK, ACCOMMODATE FOR BY PROVIDING OPENING IN NO. 7.
- ⑧ INSIDE PLATE. FABRICATE FROM 3/8" PLATE.
- ⑨ OUTSIDE PLATE. FABRICATE FROM 3/8" PLATE.
- ⑩ 1/8" SQUARE BAR. WELD TO NO. 8 AS SHOWN.
- ⑪ 1/2" DIA. x 4" LONG STUDS. WELD TO NO. 7, 8, & 14 AS SHOWN.
- ⑫ 3/4" DIA. x 2" STAINLESS STEEL FLAT CTSK. SLOTTED HEAD CAP SCREWS W/ ANTI-SEIZE LUBRICANT. RECESS 1/16" BELOW PL. SURFACE.
- ⑬ 1/2" PLATE WITH 3/8" DIA. LOOP ANCHOR FABRICATED AS SHOWN. SPACED AT MANUFACTURER'S SPEC.
- ⑭ INSIDE PLATE. FABRICATE FROM 3/8" PLATE
- ⑮ ADIPRENE BUTTON. SEE DETAIL. SET IN OUTSIDE PLATE.

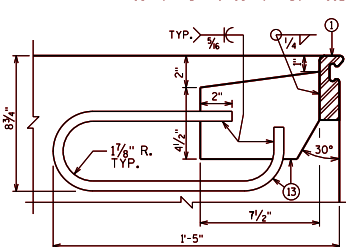
MODULAR EXPANSION JOINT CONNECTION DETAIL AND WELD SPECIFICATION

SECTION D-D



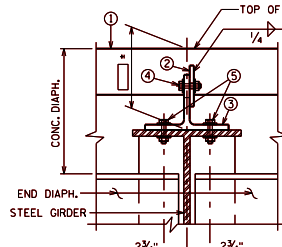
JOINT DETAIL

AT SUPPORT BAR & SUPPORT BOX ASSEMBLY

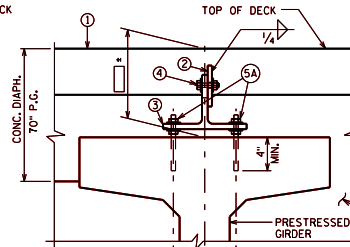


ANCHORAGE DETAIL

PLACE ADJACENT TO SUPPORT BOXES IN PAVING BLOCK @ ABUT. & IN DECK @ CONC. DIAPH.



SECTION A-A



SECTION B-B

TEMP. TABLE

TEMPERATURE TABLE FOR SETTING JOINT OPENINGS TO BE DETERMINED BY JOINT MANUFACTURER WITH THE FOLLOWING DESIGN DATA:

1. \square IN. OF MOVEMENT PER 10° F
2. MEDIAN TEMPERATURE OF 45° F
3. TEMP. RANGE IN TABLE FROM (5°F) TO (85°F) FOR PRESTRESSED CONCRETE GIRDERS AND FROM (-5°F) TO (+85°F) FOR STEEL GIRDERS.
4. ADJUST INITIAL JOINT OPENINGS BY A REDUCTION OF 1" 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.

STANDARD COVERS:

- SKEWS \leq 30°
- 2 OR 3 CELL MODULAR EXPANSION JOINTS
- STEEL GIRDER BRIDGES
- PRESTRESSED GIRDER BRIDGES (70", 36", 45W", 54W", 72W" AND 82W" SECTION)

NOTES

ONE FIELD SPLICE PERMITTED IN STEEL EXTRUSIONS. DETAILS SHALL BE SUBMITTED FOR APPROVAL. NO SPLICING 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 PLACED, 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.

EXPANSION JOINT EXTRUSIONS SHALL BE FABRICATED TO CONFORM TO ROADWAY CROWN & GRADE. FABRICATOR SHALL PROVIDE MEANS OF KEEPING GALVANIZED EXTRUSIONS CLEAN & SMOOTH DURING SHIPMENT AND PRIOR TO APPLYING LUBRICANT ADHESIVE FOR NEOPRENE GLAND INSTALLATION.

SANDBLAST BARS, PLATES, WT-SECTION, ANCHORAGE LOOP, & EXTRUSIONS AFTER FABRICATION IN ACCORDANCE WITH SSPC SP. 6 "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 STEEL EXPANSION JOINTS MODULAR JOINT.

BAR STEEL REINF. IN DECK AND CONC. DIAPHRAGM SHALL BE RESPAVED AS NECESSARY TO ALLOW PLACEMENT OF JOINT ASSEMBLY. TOP TRANSVERSE BARS, ADJACENT TO MOD. JT., TO BE CUT AND PLACED BETWEEN JT. SUPPORT SYSTEM.

MODULAR EXPANSION JOINT DETAILS

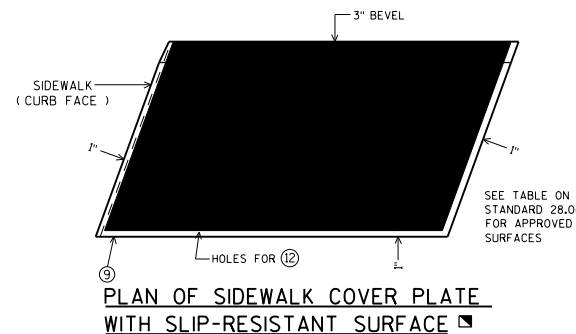
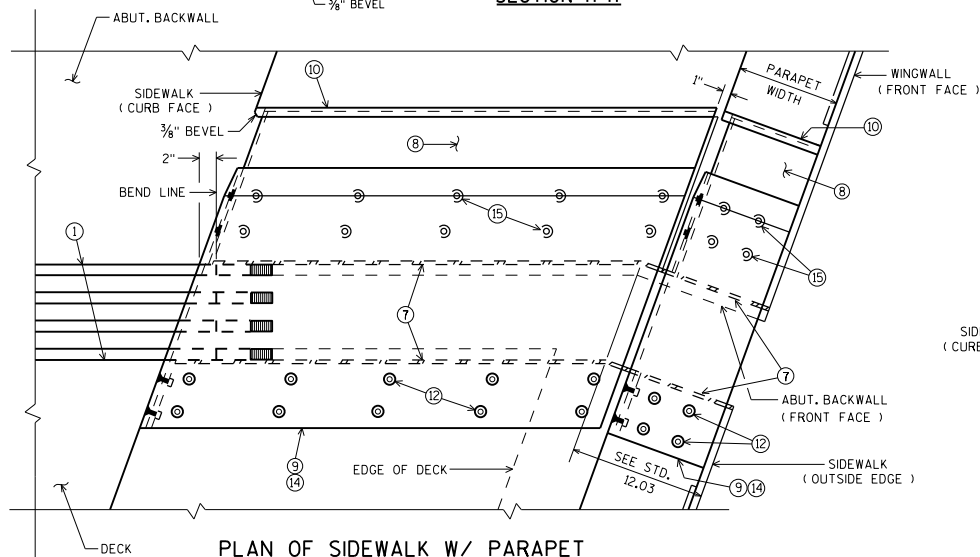
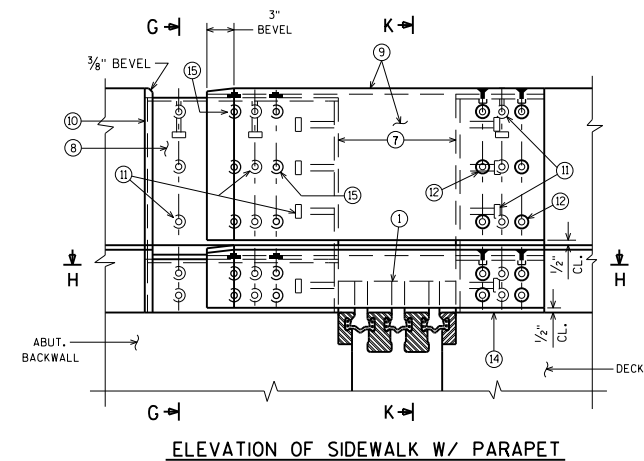
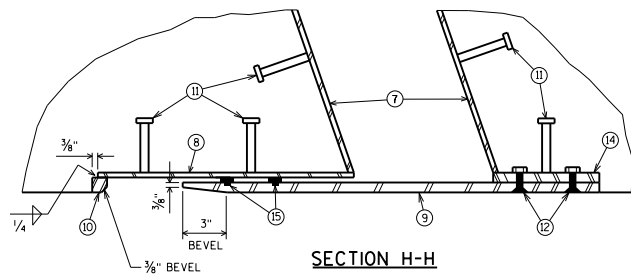
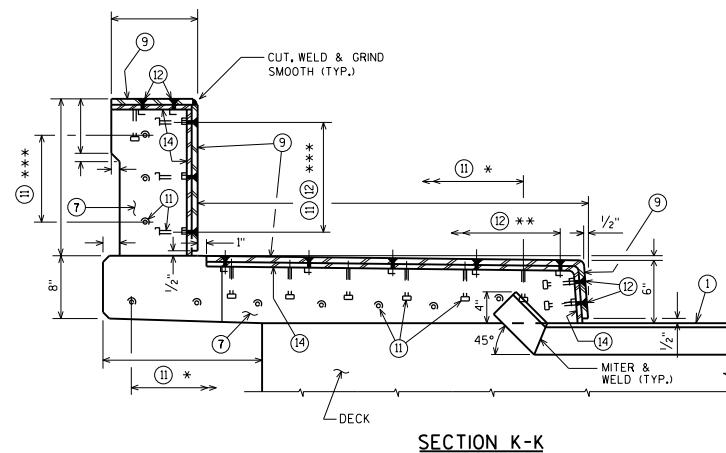


**BUREAU OF
STRUCTURES**

APPROVED: *Abith O Bank*

DATE:

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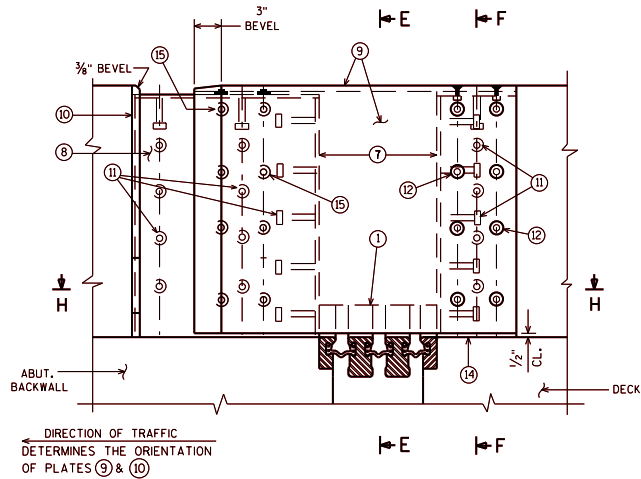
■ PLACE SLIP-RESISTANT SURFACE ON TOP WALKING SURFACE IN SHADED AREA ONLY (NOT ON CURB FACE). GALVANIZE PLATE AFTER SLIP-RESISTANT SURFACE IS APPLIED.

COVER PLATES FOR
SIDEWALK W/ CONC. PARA.

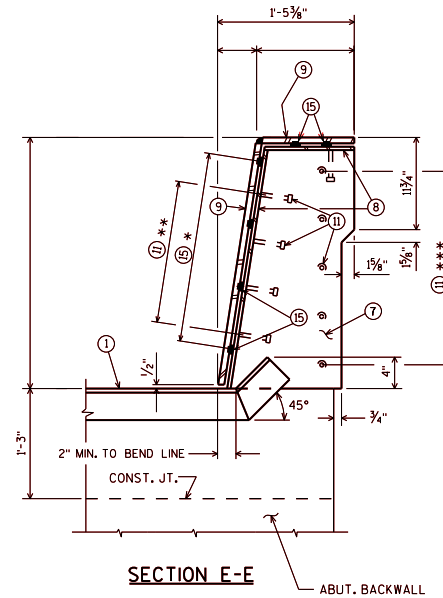
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APPROVED: Scot Becker

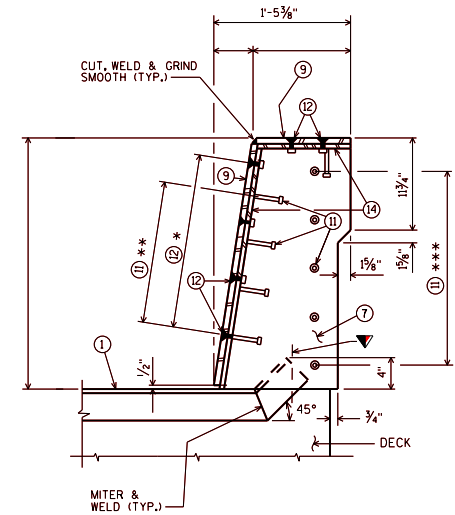
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ELEVATION OF SINGLE SLOPE PARAPET

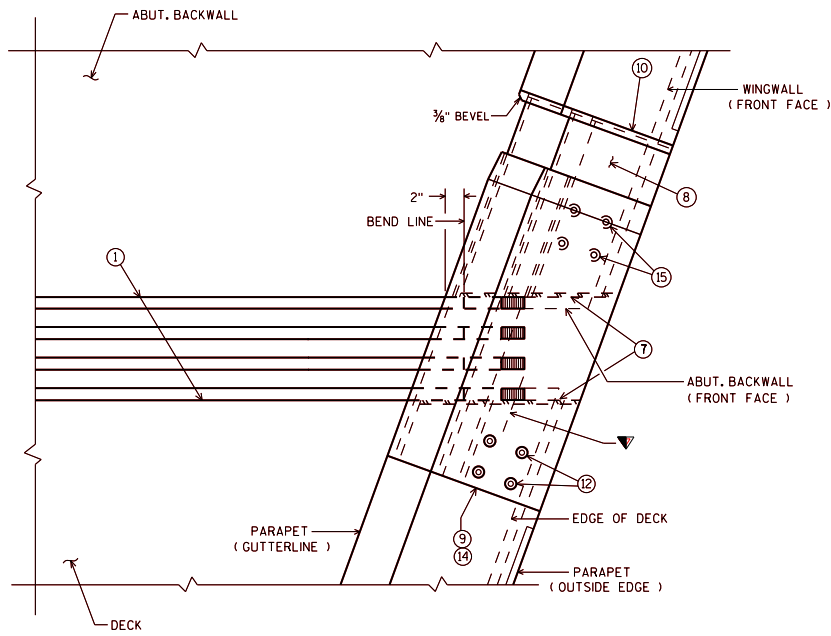


SECTION E-E

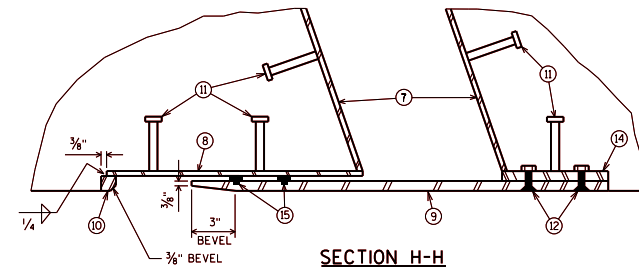


SECTION F-F

CROSS SECTION SHOWN FOR 32", 36", AND 42" SINGLE SLOPE PARAPET.
DETAILS FOR 56" PARAPET ARE SIMILAR.



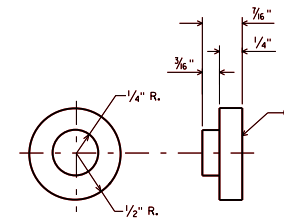
PLAN OF SINGLE SLOPE PARAPET



SECTION H-H

- * 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"



ADIPRENE BUTTON DETAIL

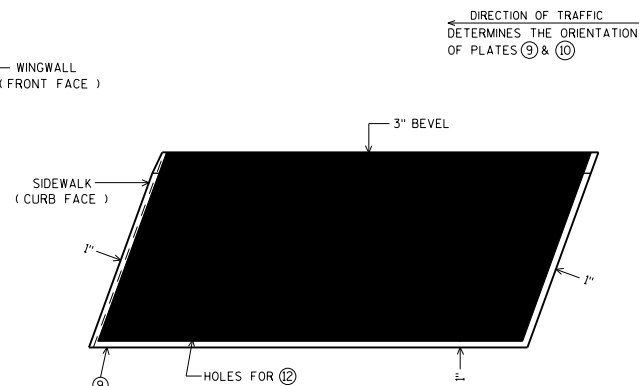
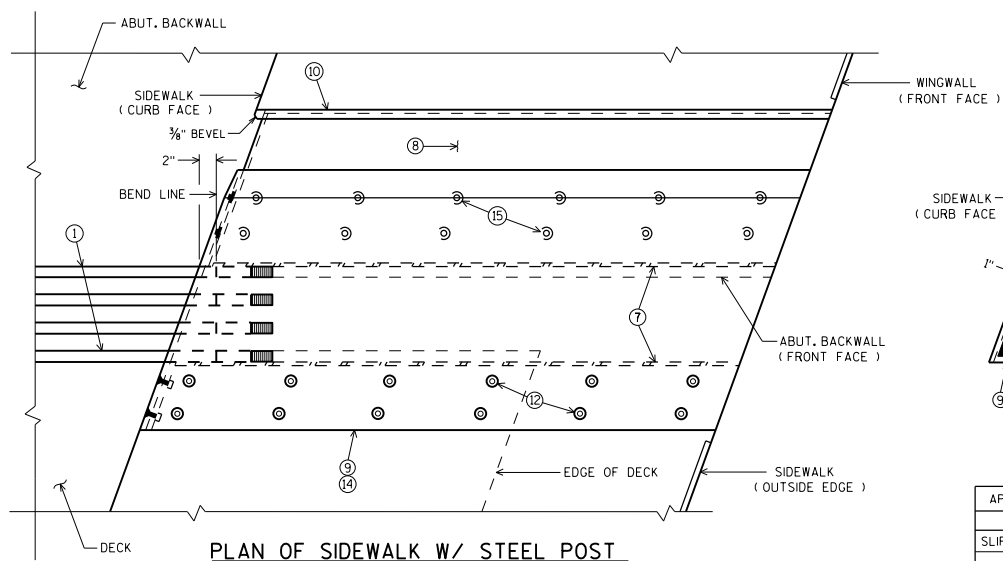
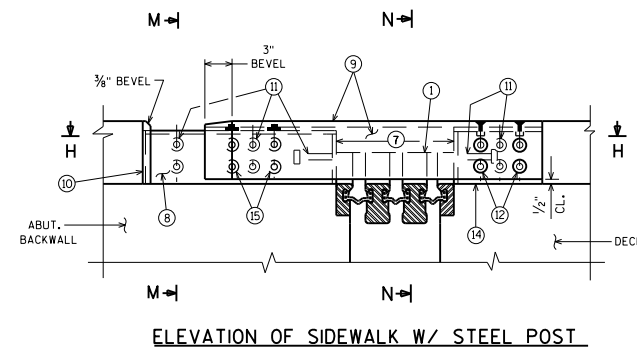
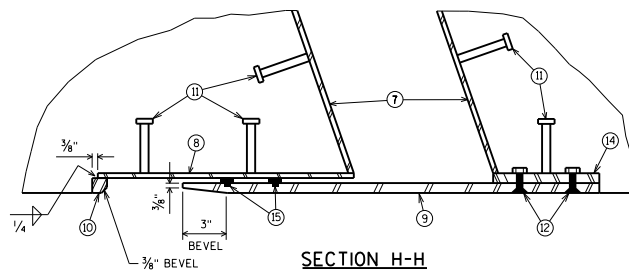
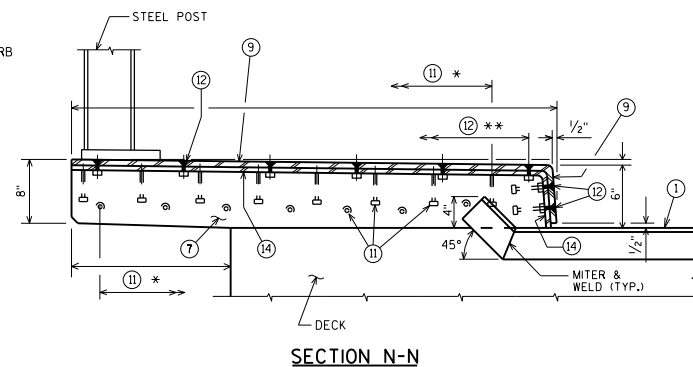
COVER PLATES FOR
SINGLE SLOPE PARAPET



**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

DATE:
7-18



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.	1-800-345-817

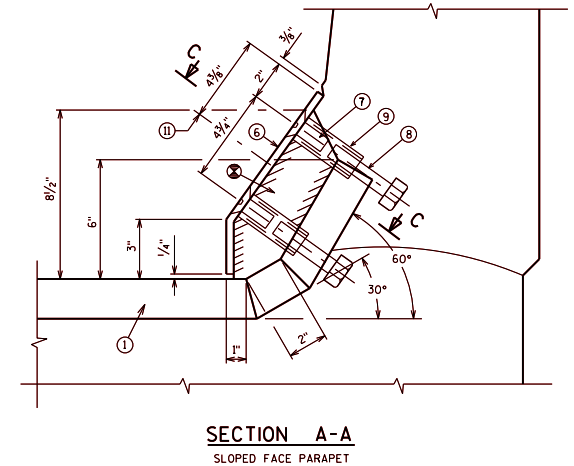
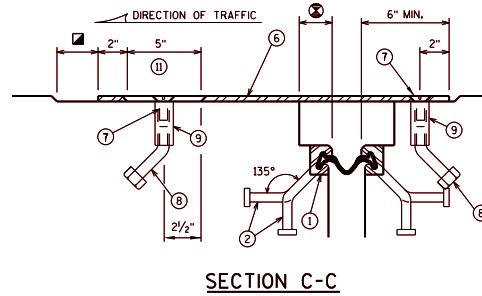
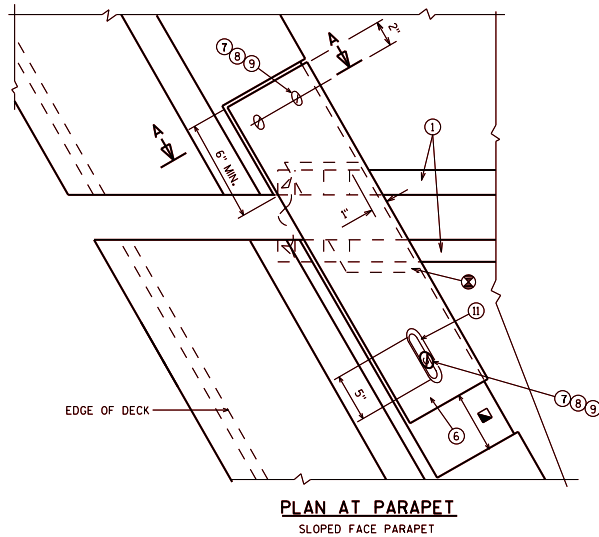
■ PLACE SLIP-RESISTANT SURFACE ON TOP WALKING SURFACE IN SHADED AREA ONLY (NOT ON CURB FACE). GALVANIZE PLATE AFTER SLIP-RESISTANT SURFACE IS APPLIED.

COVER PLATES FOR
SIDEWALK W/ STEEL RAIL

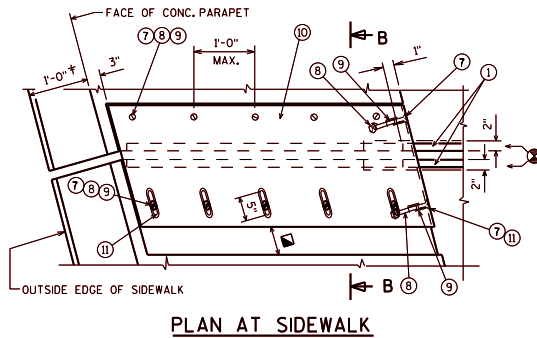
BUREAU OF STRUCTURES

APPROVED: *Scot Becker*

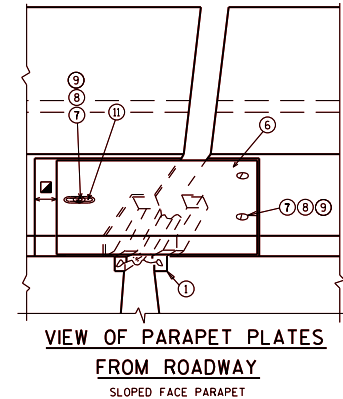
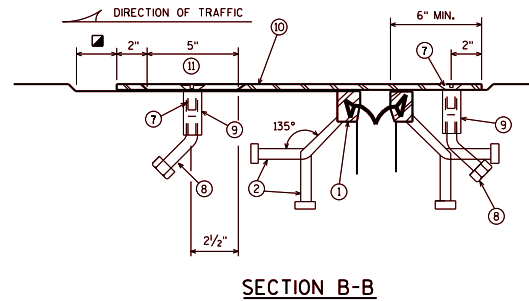
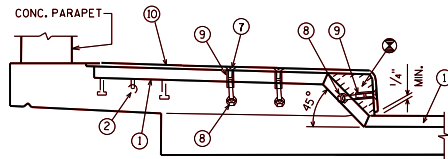
DATE:	3-11
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⑥ GALVANIZED PLATE $\frac{3}{8}$ " \times $10\frac{1}{2}$ " \times (2'-2" LONG FOR SKEWS TO 45° AND 3'-0" LONG FOR SKEWS \geq 45°) WITH HOLES FOR NO. 7. BEND AS SHOWN.



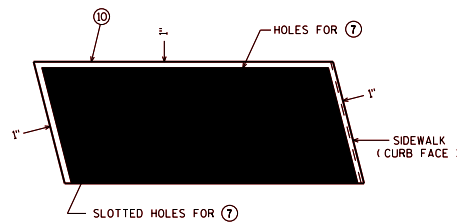
* 1'-2" WHEN "VERTICAL FACE PARAPET TYPE 'TX' IS USED



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.



PLAN OF SIDEWALK COVER PLATE WITH SLIP-RESISTANT SURFACE

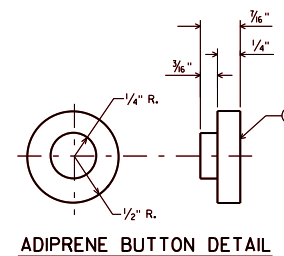
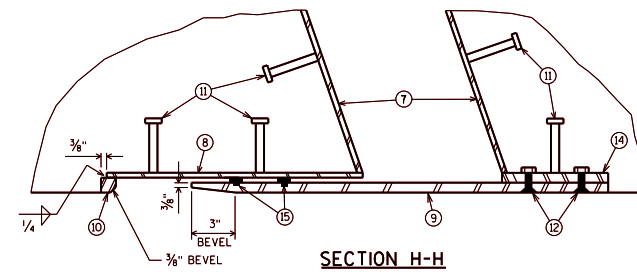
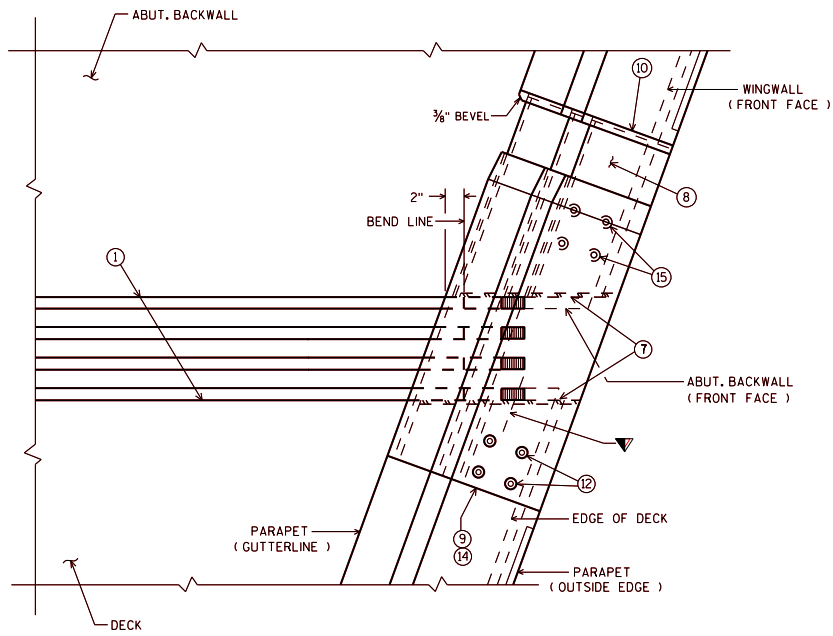
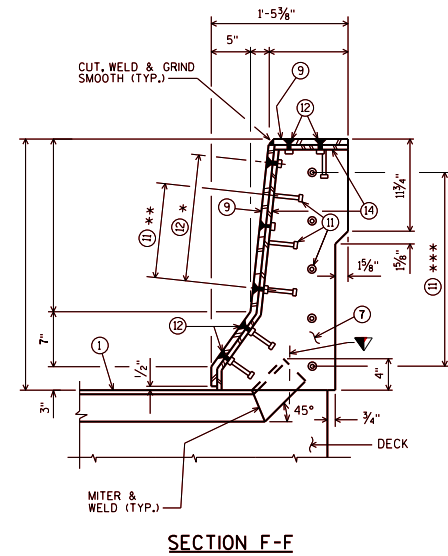
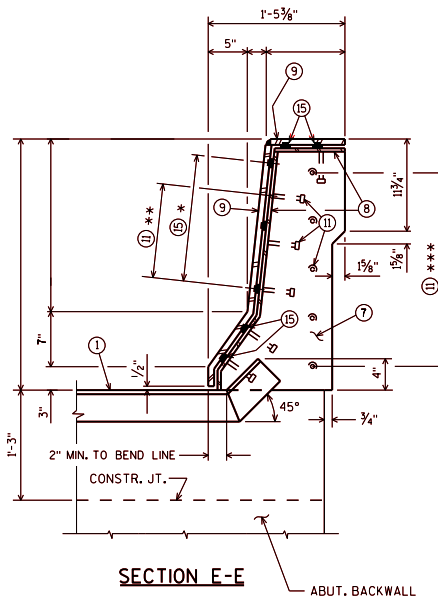
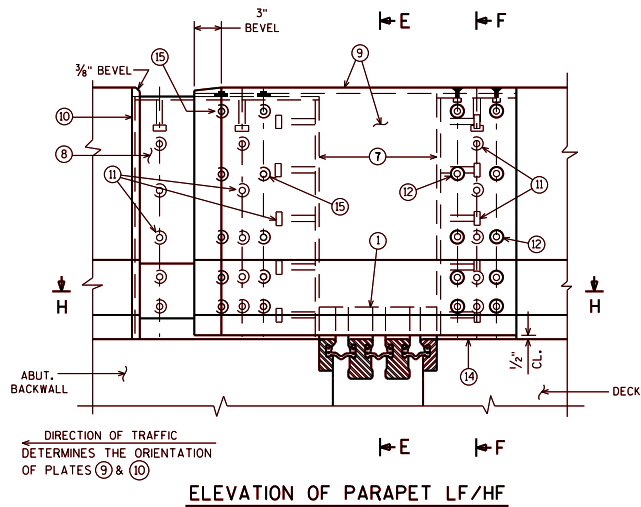
PLACE SLIP-RESISTANT SURFACE ON TOP WALKING SURFACE IN SHADED AREA ONLY (NOT ON CURB FACE).

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.




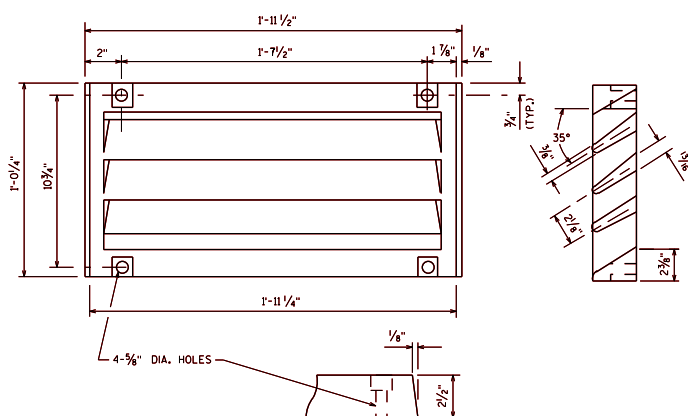
APPROVED: Bill Oliva DATE: 7-20



- * 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"

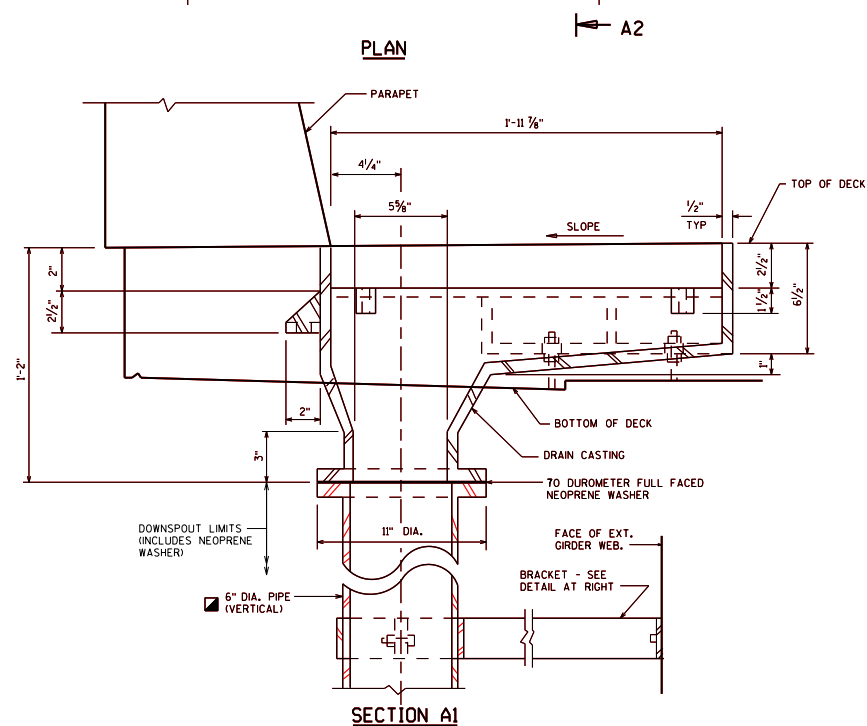
COVER PLATES FOR PARAPET 'LF/HF'	
 BUREAU OF STRUCTURES	DATE:
APPROVED: <u>Bill Oliva</u>	T-18



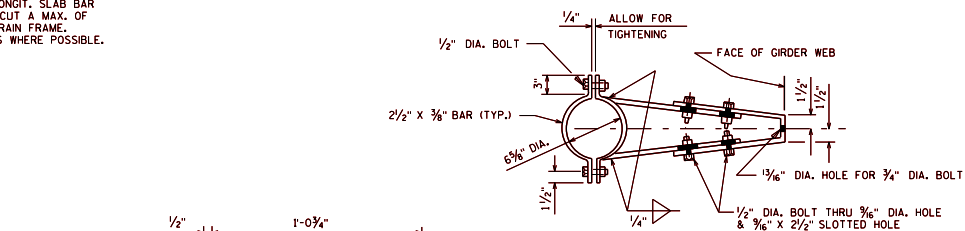
GRATE CASTING DETAIL

ATTACH GRATE TO FRAME FOR SHIPMENT

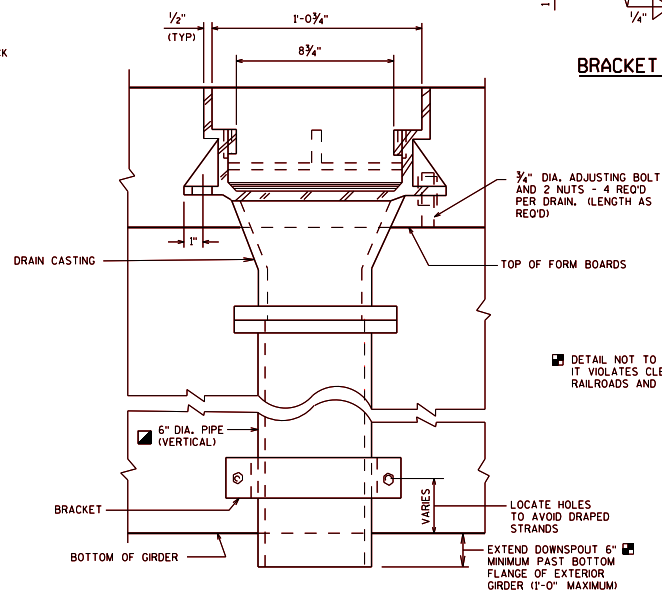
TRANS. AND LONGIT. SLAB BAR
REINF. TO BE CUT A MAX. OF
1" CL. FROM DRAIN FRAME.
DISPLACE BARS WHERE POSSIBLE.



SECTION A1



BRACKET DETAIL



SECTION A2

ALL MATERIAL FOR TYPE "GC" CASTING, EXCLUDING GRADE HOLD DOWN SCREWS, SHALL BE GRAY IRON ~~DOWNPOUT~~ CONFORMING TO ASTM A8, CLASS 30.
(APPROXIMATE WEIGHT = 225#)
ALL MATERIAL FOR TYPE "GC" CASTING, EXCLUDING GRADE HOLD DOWN SCREWS, SHALL BE ALUMINUM ~~DOWNPOUT~~ CONFORMING TO ASTM A8, CLASS 30.
(APPROXIMATE WEIGHT = 225#)
ALL MATERIAL FOR TYPE "GC" DRAINS TO BE INCLUDED WITH GRADE HOLD DOWN DRAINS ~~TYPE "D"~~ TO ASTM A36.
ALL MATERIAL FOR DOWNSPOUTS, DOWNSPOUT CONNECTIONS AND BRACKET SITS TO BE INCLUDED WITH GRADE HOLD DOWN DRAINS ~~TYPE "D"~~ TO ASTM A36.
GRADE HOLD DOWN DRAINS SHALL BE REINFORCED ~~INTERMEDIATE BRACKETS ARE NOT ALLOWED~~ REINFORCED STANDARD PIPE CONFORMING TO ASTM A53.
GRADE HOLD DOWN DRAINS SHALL BE REINFORCED ~~INTERMEDIATE BRACKETS ARE NOT ALLOWED~~ REINFORCED STANDARD PIPE CONFORMING TO ASTM A53.

ON THE PRESTRESSED GIRDER SHEET, SHOW LOCATION OF HOLES FOR BRACKET ANCHORAGE FROM TOP/BOTTOM AND END OF GIRDER. IN THE BID ITEM "DOWNSPOUT 6-INCH". ALL MATERIAL FOR DOWNSPOUTS AND BRACKETS ON THE PRESTRESSED GIRDER SHEET, SHOWED LOCATION OF HOLES FOR BRACKET ANCHORAGE FROM TOP/BOTTOM AND END OF GIRDER. ON THE PRESTRESSED GIRDER SHEET, SHOW LOCATION OF HOLES FOR BRACKET ANCHORAGE FROM TOP/BOTTOM AND END OF GIRDER.

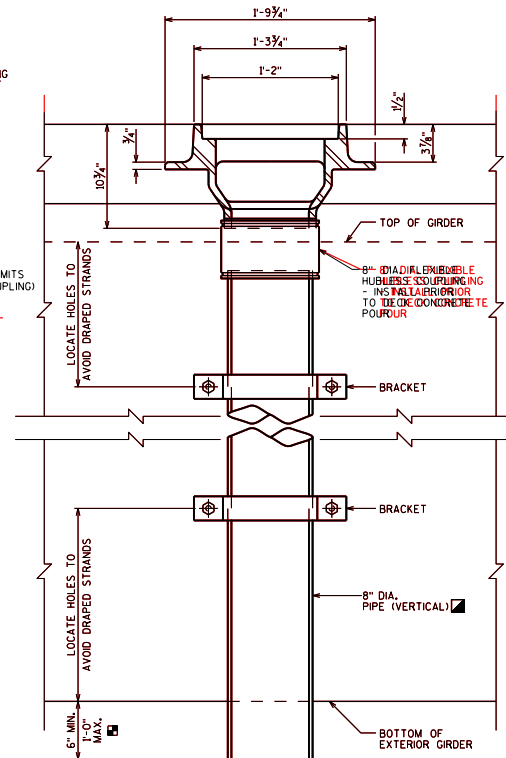
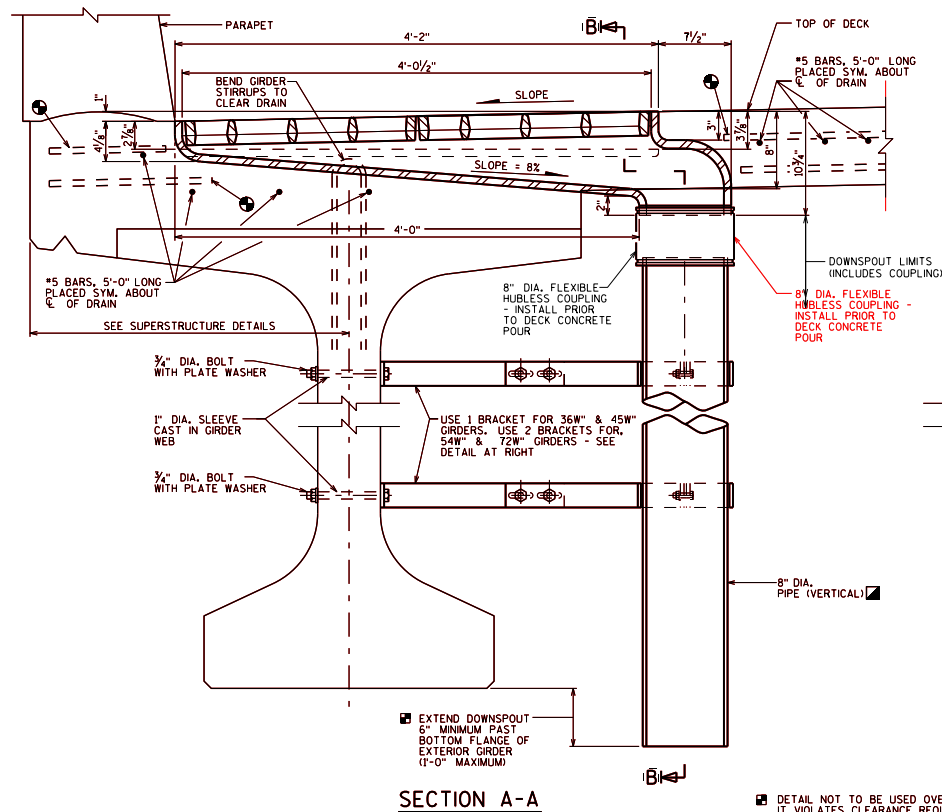
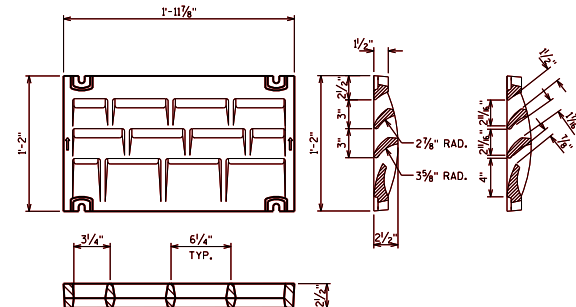
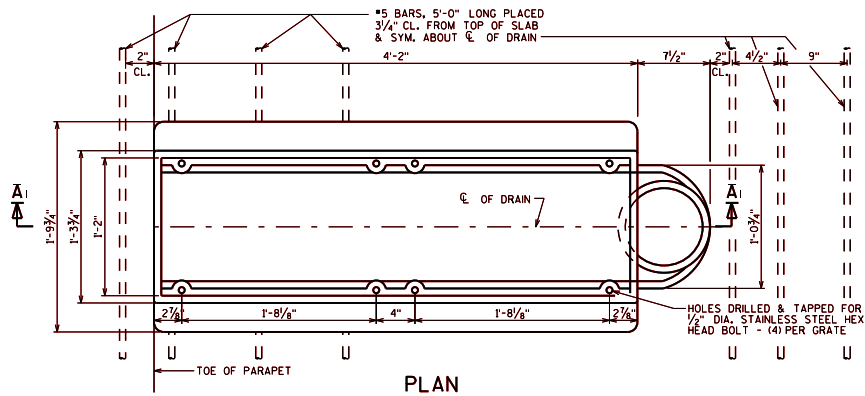
FLOOR DRAIN TYPE 'GC'



**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

DATE: 7-20



NOTES

ALL MATERIAL FOR TYPE "WF" CASTING AND 8" DIA. **HOLES FOR** PIPE, EXCLUDING GRATE HOLD DOWN **STAYS** SHALL BE GRAY IRON CONFORMING TO ASTM A88, CLASS 30. **WF** CASTING AND 8" DIA. CONNECTION PIPE, EXCLUDING GRATE HOLD DOWN MATERIAL SHALL CONFORM TO ASTM A88, CLASS 30.

MATERIAL BRACKETS ARE NOT ALLOWED TO ASTM A36.

ALL MATERIAL FOR FLOOR DRAINS TO BE INCLUDED **IN THE BID ITEM "DOWNSPOUTS AND BRACKETS"** AND **TYPE OF BRACKET** IS THE PROPOSED ALTERNATE **TYPE OF BRACKET** FOR DOWNSPOUTS AND BRACKETS TO BE INCLUDED IN THE BID ITEM "DOWNSPOUTS AND BRACKETS".

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TRANSVERSE & LONGITUDINAL SLAB BAR REINFORCEMENT TO BE CUT IN A MAXIMUM OF 1" THERMOSETTING RESIN PIPE (STRAP) BARS

WHERE POSSIBLE LONGITUDINAL SLAB BAR TRANSVERSE & LONGITUDINAL SLAB BAR OF 1" REINFORCEMENT TO BE CUT IN A MAXIMUM OF 1" CLEAR FROM DRAIN FRAME. REPLACE BARS WHERE POSSIBLE.

DESIGNER'S NOTE ALL MATERIAL FOR FLOOR DRAINS AS SHOWN ON THIS SHEET SHALL BE INCLUDED IN THE BID ITEM "DOWNSPOUTS AND BRACKETS".

ON THE PRESTRESSED GIRDER SHEET, SHOW LOCATION OF HOLES FOR BRACKET ANCHORAGE FROM TOP/BOTTOM AND END OF GIRDER. IT SHALL BE INCLUDED IN THE BID ITEM "DOWNSPOUTS AND BRACKETS" FOR DOWNSPOUTS, CONNECTORS, AND BRACKETS AS SHOWN ON THIS SHEET SHALL

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FLOOR DRAIN TYPE 'WF'



BUREAU OF STRUCTURES

APPROVED: Bill Oliva

DATE: 7-20

POSTS, RAIL MEMBER
VE PROVISIONS FOR
BEAM CONNECTION
ON SDD 14 B 20
OS.

END POST

FIRST PANEL VARIABLE
IF NEEDED 6'-3" MAX.

11" MIN.

TYPICAL POST
SPACING = 6'-3"

11" MIN.

FIRST PANEL VARIABLE
IF NEEDED 6'-3" MAX.

END POST

END OF WINGWALL

11" MIN.
1'-7" MAX.

FIXED JOINT

10" MIN.

SLAB CONST. JT.

EXPANSION JOINT

11" MIN.
1'-7" MAX.

END OF WINGWALL

EXPANSION SPlice IN BEAM GUARD AND CHANNEL
RAIL SHALL BE DETAILED AT A POST ON EITHER
SIDE OF EXPANSION JOINT. (ONLY ONE REQ'D.)



SHIM PLATES 6" X $\frac{1}{16}$ " X 6" MAY BE USED BETWEEN TOP OF POST AND CHANNEL MEMBER TO ACHIEVE VERT. ALIGNMENT.

- ① W6x25 with 2 - $3/4"$ x 2 $1/2"$ VERT. SLOTS IN FLG. (SLOT ON OTHER SIDE OF WEB IS OPTIONAL) FOR NO. 7, CUT BOTTOM OF POST TO MATCH CROSS SLOPE OF ROADWAY. PLACE POSTS VERTICAL AND NORMAL TO GRADE LINE.
- ② C8x15.15 with $13/16"$ DIA. HOLES FOR NO. 8.
- ③ BASE PLATE 1" x 9 $1/2"$ x 10" with $1/16"$ x $1/2"$ SLOTTED HOLES FOR ANCHOR BOLTS NO. 4, WELD TO NO. 1 AS SHOWN.
- ④ A325 - $3/8"$ HEX BOLTS (GALVANIZED) WITH A325 NUT AND WASHER, 1 $1/4"$ LONG AT END POSTS AND AT POSTS ON CONCRETE SUB. SUPERSTRUCTURES WHERE THE SLAB THICKNESS IS $> 15"$, USE 8" LONG AT ALL OTHER LOCATIONS. 4 REOD. PER POST, THREAD 3" AND PLACE NORMAL TO PLATE NO. 3. CHAMFER TOP OF BOLTS BEFORE THREADING.
- ⑤ $1/4"$ x 8" x 8" FLAT BAR WITH $1/16"$ DIA. HOLES FOR ANCHOR BOLTS NO. 4.
- ⑥ $13/4"$ x 3" MOUNTING BOLT WASHER (GALVANIZED).
- ⑦ $3/8"$ DIA. BUTTON HEAD POST MOUNTING BOLT WITH ROUND WASHER AND NUT.
- ⑧ $3/8"$ DIA. x 2" HEX BOLTS WITH NUT AND TWO WASHERS EACH.
- ⑨ PLATE $1/2"$ x $53/4"$ x 6" AT BASIC POST CONNECTION. 1 $1/4"$ DIA. HOLES IN PLATE. $13/16"$ DIA. HOLES IN CHANNEL.
- ⑩ PLATE $1/2"$ x $53/4"$ x 1 $1/2"$. 1 $1/4"$ DIA. HOLES IN PLATE. $13/16"$ DIA. HOLES IN CHANNEL. EXPANSION SLOTS ON JOINT SIDE OF POST. $1/16"$ x 2 $1/4"$ IN PLATE. $13/16"$ x 2 $1/4"$ IN CHANNEL. (AT EXPANSION SPLIC.)
- ⑪ PLATE $1/2"$ x $53/4"$ x 1 $1/2"$. 1 $1/4"$ DIA. HOLES IN PLATE. $13/16"$ DIA. HOLES IN CHANNEL. (AT TYPICAL SPLIC.)

BID ITEM SHALL BE "RAILING STEEL TYPE W" B-.-.-
WHICH INCLUDES ALL 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 CUTS.

ALL MATERIAL EXCEPT ANCHORAGE DETAIL NO. 5
SHALL BE GALVANIZED AFTER FABRICATION.

PRIOR TO GALVANIZING, ALL STEEL RAILING POSTS
AND CHANNELS SHALL BE GIVEN A NO. 6 COMMERCIAL
BLAST CLEANING BY SSPC SPECS.

ALL MATERIAL USED IN FABRICATION SHALL BE
MADE FROM MATERIALS CONFORMING TO ASTM
DESIGNATION A709 GRADE 36 UNLESS NOTED
OTHERWISE.

FILL BOLT SLOT OPENINGS IN POST SHIMS & PLATE NO. 3 WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

SEE STANDARD SPECIFICATIONS FOR RAIL TYPE.

CHANNEL MEMBER SHALL BE ATTACHED CONTINUOUSLY TO A MINIMUM OF FOUR POSTS AND A MAXIMUM OF EIGHT (EXCEPT AT ABUTMENTS).

AT EXPANSION SLOTS IN RAIL AND CHANNEL MEMBERS, TIGHTEN BOLTS, BACK OFF ONE HALF TURN AND BURR THREADS. RAIL MEMBERS SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC AND THE UPPER RAIL SHALL LAP THE LOWER RAIL.

STEEL POST SHIMS MAY BE USED UNDER POSTS
WHERE REQ'D. FOR ALIGNMENT.

SEE BRIDGE MANUAL 30.2 FOR ALLOWED USE.

▲ TIE TO TOP MAT OF STEEL. PUT THESE BARS IN BILL OF BARS FOR SUPERSTRUCTURE. NOT REQ'D. FOR BOX CULVERT HEADERS.

⊗ PAY LIMITS FOR TYPE "W" STEEL RAILING.

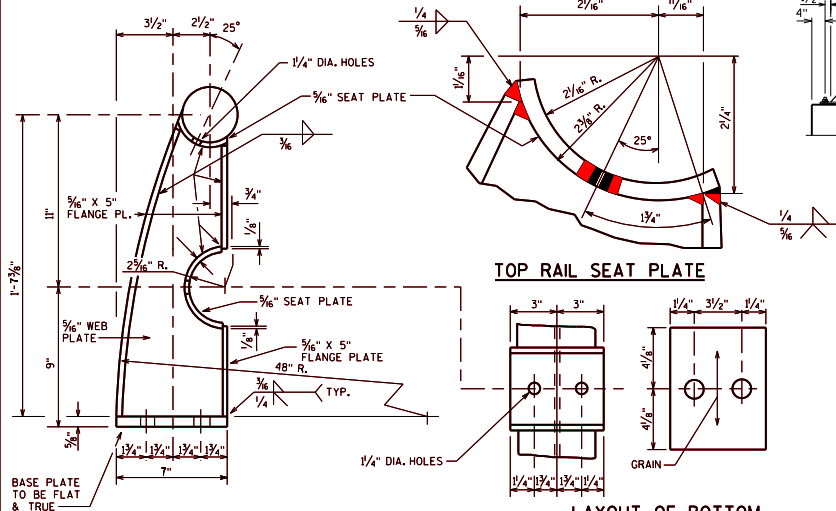
WEIGHT = 45 LB/FT

STEEL RAILING TYPE 'W'

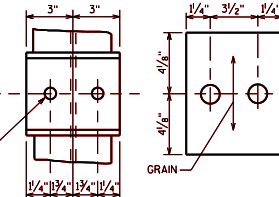


APPROVED: *Bill Oliva*

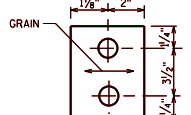
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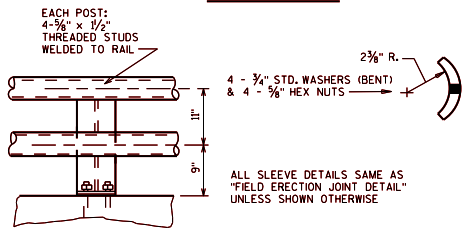
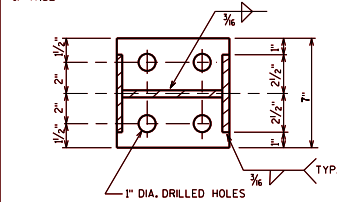
TOP RAIL SEAT PLATE



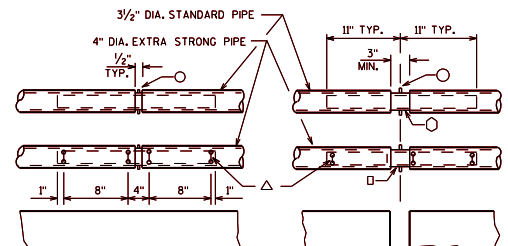
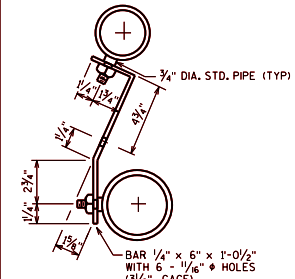
LAYOUT OF BOTTOM RAIL SEAT PL.



LAYOUT OF TOP RAIL SEAT PL.

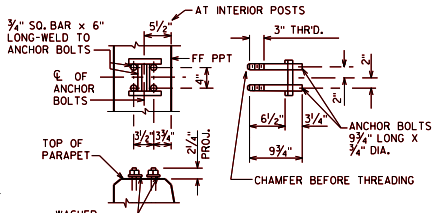
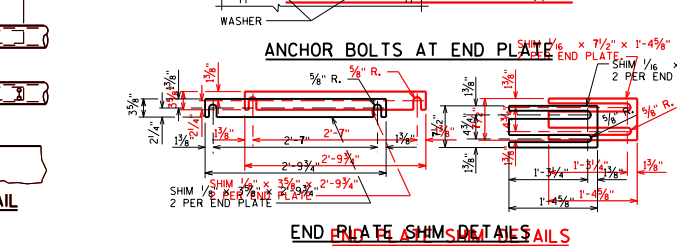
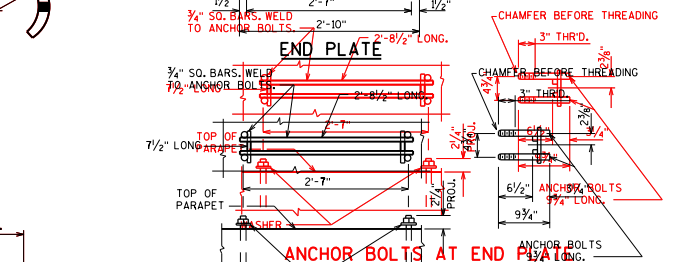
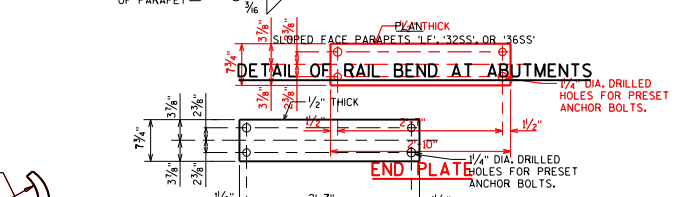
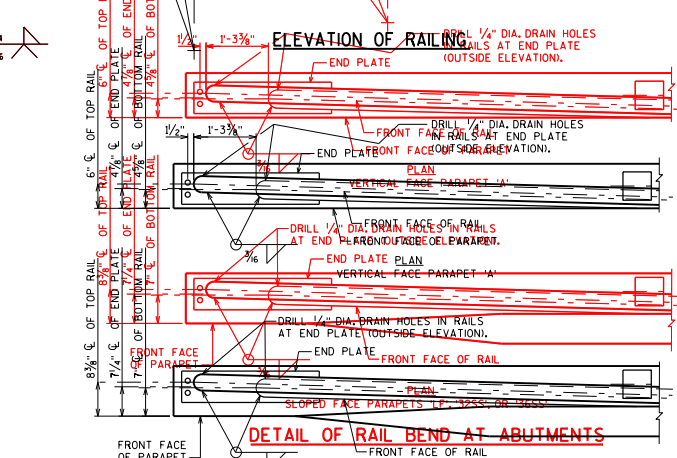
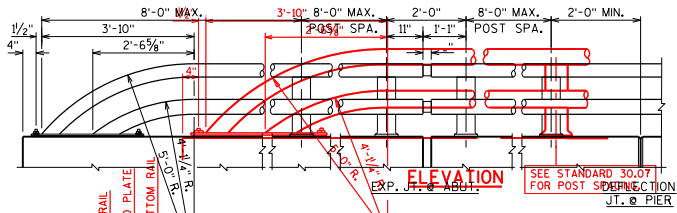


RAIL TO POST CONN.

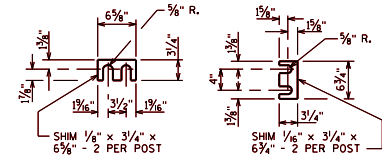


FIELD ERECTION
JOINT DETAIL

DETAIL AT RAIL
OPENING



ANCHOR BOLTS AT POSTS



POST SHIM DETAILS


NOTES

- BID ITEM SHALL BE "RAILING TUBULAR TYPE 'H' B--" WHICH INCLUDES ALL ITEMS SHOWN.
- ANCHOR BOLTS, NUTS AND WASHERS SHALL BE EITHER STAINLESS STEEL OR ASTM A307. IF A307 IS USED ELECTRO-GALVANIZE NUTS, WASHERS & TOP 3/2" OF ANCHOR BOLTS.
- CLOSURE ENDS ON STEEL RAILING SHALL BE 1/4" PLATE. WELD AND GRIND SMOOTH.
- RAILINGS SHALL BE FABRICATED IN 2 AND 3 PANEL LENGTHS.
- RAILING POSTS SHALL BE SET NORMAL TO GRADE LINE.
- ALL POST SPACINGS ARE MEASURED HORIZONTALLY ALONG CENTERLINE OF THE POST BASE.
- SHIMS SHALL BE USED UNDER POSTS AND END PLATES WHERE REQ'D. FOR ALIGNMENT.
- FILL ALL EXPOSED OPENINGS BETWEEN SHIMS AND POST ANCHOR BOLT HOLES WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.
- RAILS, POSTS & SHIMS SHALL BE MADE FROM MATERIALS CONFORMING TO ASTM DESIGNATION A709, GRADE 36.
- ALL MATERIALS, EXCEPT ANCHORAGES, SHALL BE GALVANIZED AFTER FABRICATION. PRIOR TO GALVANIZING, ALL STEEL SHALL BE GIVEN A NO. 6 BLAST CLEANING BY SSPC SPECIFICATIONS.
- RAILS SHALL BE BUILT STRAIGHT AND SPRUNG INTO PLACE FOR STRUCTURES CURVED UP TO 3". FOR STRUCTURES CURVED GREATER THAN 3", RAILS SHALL BE CURVED TO FIT.

RAILING WEIGHT = 30 LB/FT

LEGEND

- 3/8" x 3/8" WELDED STUDS
- 3" DIA. STD. PIPE x 1'-10" LONG
- 3" DIA. EXTRA STRONG PIPE x 1'-10" LONG
- △ 1/2" DIA. WELD BEADS AT 1/3 PTS. ON PIPE 11" CIRCUMF. GRIND BEADS SO THAT SLEEVE FITS FREELY IN THE I.D. OF 4" DIA. EXTRA STRONG PIPE.

TUBULAR RAILING TYPE 'H' (STEEL)	
	BUREAU OF STRUCTURES
APPROVED: <u>Bill Oliva</u>	DATE: <u>7-19</u>



SECTION B-B

SLEEVE DETAIL

(AT MODULAR EXP. JT.)

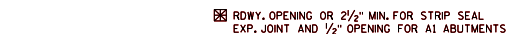
NOTE: CONSTRUCT BOTTOM RAIL AND SLEEVE CONNECTION FIRST, THEN MIDDLE RAIL, AND THEN TOP RAIL, TO ALLOW EASE IN PLACEMENT OF BOLT NO. 12.



★NOTE: ANCHOR PLATE NOT REQUIRED WHEN ADHESIVE ANCHORS ARE USED.



(2 SETS PER POST)



FIELD ERECTION JOINT DETAIL

☆ 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 $\frac{5}{8}$ " 6" x 10" WITH $\frac{3}{4}$ " x $\frac{1}{2}$ " SLOTTED HOLES FOR THIRD RODS NO. 3, WELD TO NO. 4 AS SHOWN; SLOTS PARALLEL TO LONG SIDE OF PLATE.
- ② $\frac{1}{4}$ " x 5" x 9" ANCHOR PLATE (GALVANIZED) WITH $\frac{3}{8}$ " DIA. HOLES FOR THIRD, RODS NO. 3.
- ③ $\frac{3}{4}$ " DIA. x 9" LONG, TYPE 316 STAINLESS STEEL THREADED RODS (MIN. TENSILE STRENGTH = TO K51) WITH NUT AND WASHERS OF SAME ALLOY GROUP. ☆
- ④ STRUCTURAL TUBING 3" x 3" x $\frac{3}{8}$ " POSTS, PLACE VERTICAL, WELD TO NO. 1, AND USE 1" DIA. HOLES (FRONT AND BACK) FOR BOLT NO. 6.
- ⑤ STRUCTURAL TUBING 3" x 3" x $\frac{3}{8}$ " RAILS, WITH $\frac{1}{8}$ " DIA. HOLES (FRONT AND BACK) FOR BOLT NO. 6, BOLT TO NO. 4.
- ⑥ $\frac{3}{4}$ " DIA. A325 SLOTTED ROUND HEAD BOLT WITH HEX NUT, $\frac{3}{4}$ " x $1\frac{1}{2}$ " x $1\frac{1}{2}$ " WASHER, AND LOCK WASHER.
- ⑦ RECTANGULAR SLEEVE FABRICATED FROM $\frac{3}{8}$ " PLATES. PROVIDE "SLIDING FIT".
- ⑧ RECTANGULAR SLEEVE FABRICATED FROM $\frac{3}{8}$ " PLATES. (1'-4" @ FIELD ERECTION JTS.) (1'-4" @ STRIP SEAL EXP. JTS.)
- ⑨ SLEEVE FABRICATED FROM STRUCTURAL TUBING $2\frac{1}{2}$ " x $2\frac{1}{2}$ " x $\frac{3}{8}$ " x "-"- LONG. SLOTTED HOLES IN TOP AND BOTTOM.
- ⑩ $\frac{1}{2}$ " DIA. STAINLESS STEEL BOLT WITH NUT AND LOCKWASHER.

★ ALTERNATIVE ANCHORAGE: 4 EQUIVALENT STAINLESS STEEL CONCRETE ADHESIVE ANCHORS 5/8-INCH, EMBED 7" IN CONCRETE. ADHESIVE ANCHORS SHALL CONFORM TO SECTIONS 560.2.2220 AND 560.2.3140 AND THE STANDARDS SPECIFICATIONS.

NOTES

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.

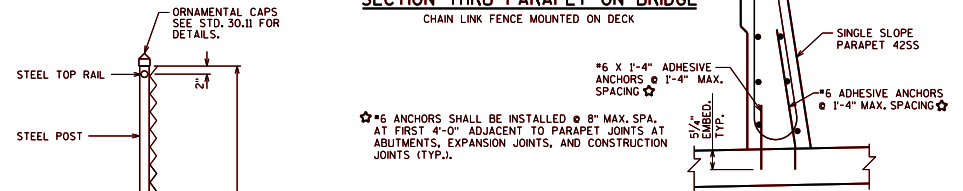
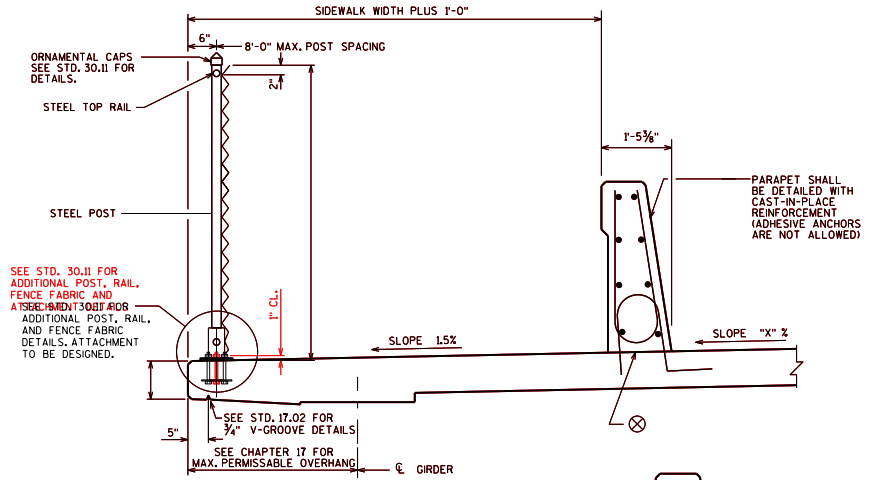
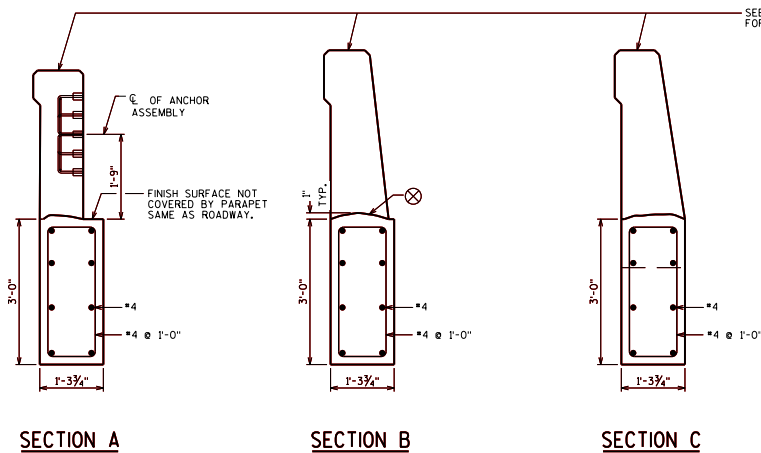
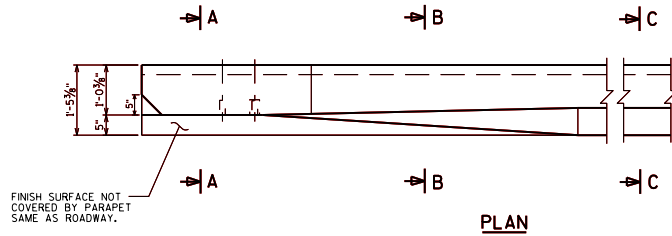
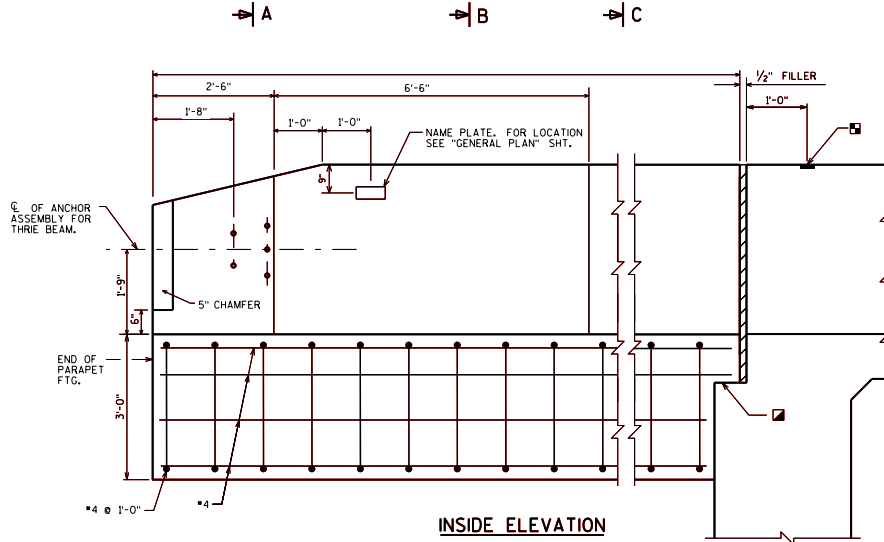
WHEN PAINTING REQ'D: (ADD)

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.

■ BENCHMARK (WHEN SUPPLIED), AVOID PLACING BELOW A RAIL OR FENCE SYSTEM THAT IS ATTACHED TO THE TOP OF THE PARAPET.



ADHESIVE ANCHOR CONNECTION

INTERIOR PARAPET USED IN CONJUNCTION WITH CRASHWORTHY ADJACENT EXTERIOR PARAPET

NOTES:
DRILLING OR BURNING THRU DECK REINFORCEMENT SHALL BE PROHIBITED

PARTIALLY DRILLED HOLES ABANDONED IN THE DECK SHALL BE FILLED WITH NON-SHRINK COMMERCIAL GROUT PER THE APPROVED PRODUCTS LIST

★ #6 ANCHORS SHALL BE "ADHESIVE ANCHORS NO. 6 BAR". EMBED 5/4" IN CONCRETE. ADHESIVE ANCHORS SHALL CONFORM TO SECTIONS 502.2.12 AND 502.3.14 OF THE STANDARD SPECIFICATIONS.

⊗ CONST. JT. - STRIKE OFF AS SHOWN & LEAVE ROUGH

■ STEEL TROWEL HORIZONTAL SURFACE OF PAVING NOTCH. PLACE MULTIPLE LAYERS OF POLYETHYLENE SHEETS BETWEEN PARAPET FOOTING AND HORIZONTAL SURFACE OF PAVING NOTCH. TOTAL THICKNESS OF SHEETS SHALL BE AT LEAST 0.03".

DESIGNER NOTES

*42SS PARAPET SHOWN IN THIS STANDARD. FOR DETAILS, INCLUDING REINFORCING, SEE STANDARD 30.32.

ALL PARAPET FOOTING BARS SHALL BE EPOXY COATED.

DO NOT SHOW THE ADHESIVE ANCHOR CONNECTION DETAIL ON THE PLAN. THE CONTRACTOR MAY REQUEST THIS DETAIL IF DESIRED.

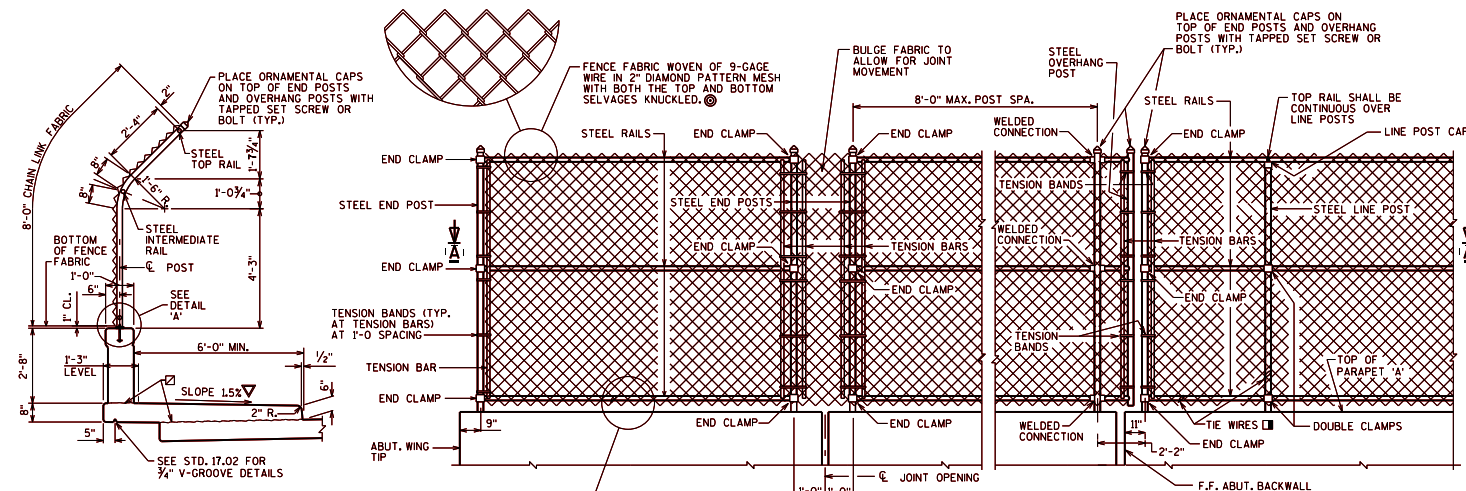
★ #6 BAR
LENGTH = 2'-10"
(ADHESIVE ANCHOR CONNECTION)

PARAPET FOOTING



APPROVED: *Abitha O Bank* DATE: *1-28*

STANDARD 30.10



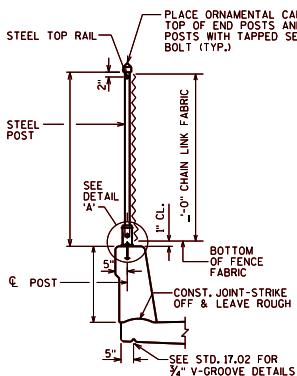
SECTION THRU FENCE ON PARAPET 'A'

PROTECTIVE SCREENING MAY BE BENT OR STRAIGHT FOR RAISED SIDEWALKS OR SIDEWALKS SEPARATED FROM TRAFFIC BY A BARRIER. SEE BRIDGE MANUAL 30.3 (D) 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

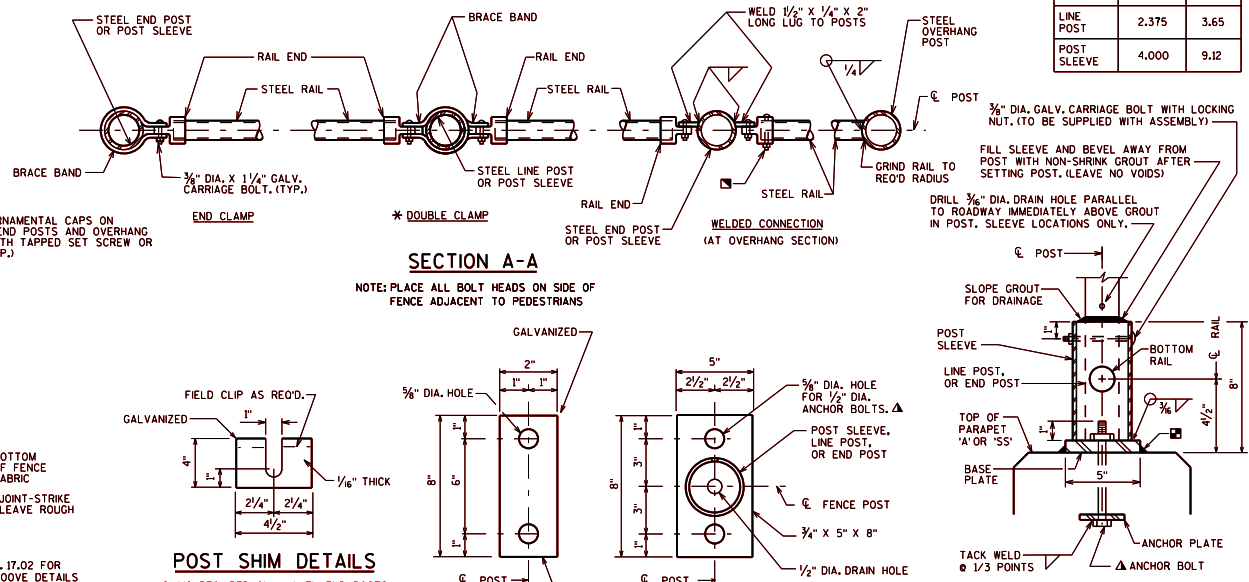
±0.5% CONSTRUCTION TOLERANCE IN SIDEWALK CROSS SLOPE. THE SIDEWALK CROSS SLOPE SHALL NOT EXCEED 2% WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

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



SECTION THRU FENCE ON SINGLE SLOPE PARAPET

FOR TRAFFIC BARRIER APPLICATION, USE VERTICAL POST (NO BEND)



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."

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 1/2" INCH, EMBED 1" 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".

BOLT RAIL TO RAIL END TO SECURE OVERHANG SECTION. ALTERNATE IS TO WELD RAIL DIRECTLY TO END POST.

MINIMUM LENGTH OF TOP RAIL BETWEEN SPLICES SHALL BE 20'-0". LOCATE SPLICES NEAR 1/4 POINT OF POST SPACING.

DESIGNER NOTES

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 DESIGNER AND USER CONSIDERATION, THE SUPERSEDED DESIGNER SHALL ACCOUNT FOR A MAXIMUM 2% SIDEWALK CROSS SLOPE.

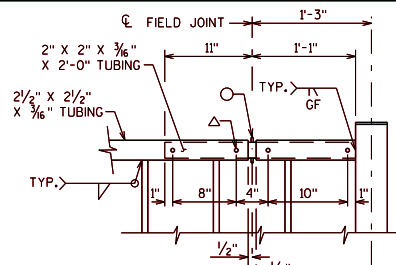
CHAIN LINK FENCE DETAILS



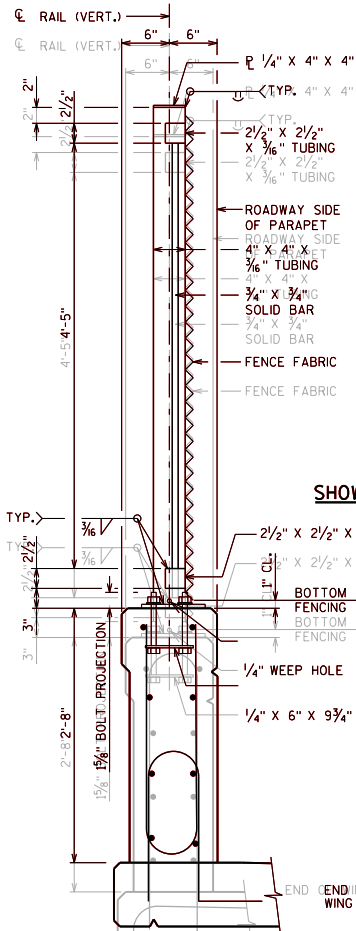
BUREAU OF STRUCTURES

APPROVED: *Bill Oliva*

DATE: **7-20**

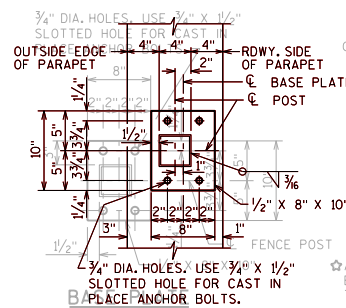


RAILING EXPANSION JOINT DETAIL

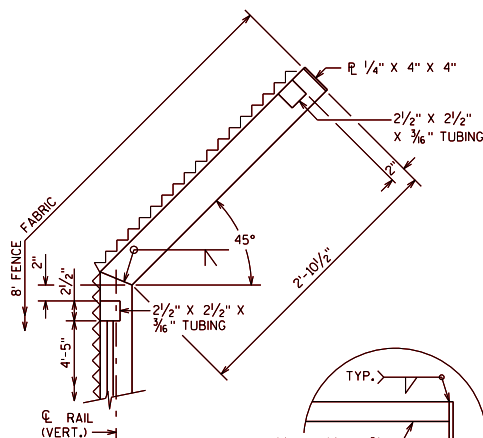


SECTION THRU RAILING

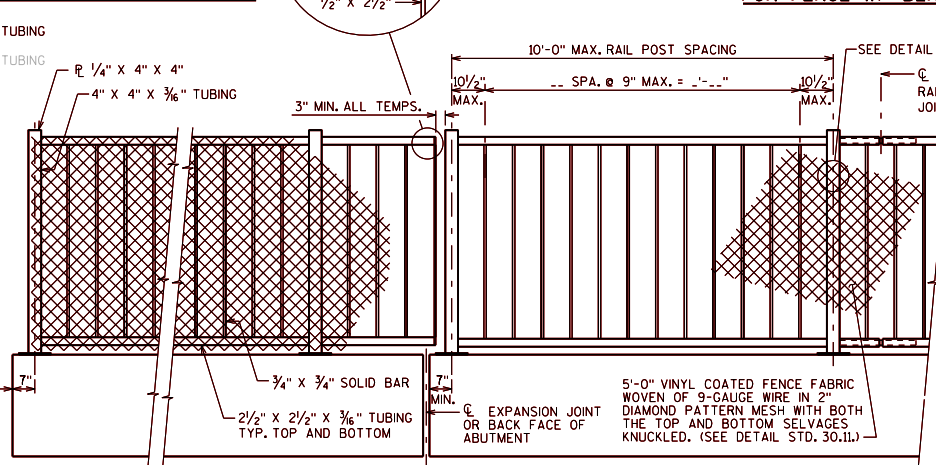
(SEE STD. 30.07 FOR PARAPET REINFORCEMENT AND DETAILS)



BASE PLATE



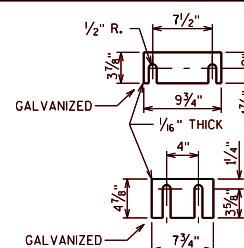
**SECTION THRU FENCE
SHOWING DETAILS FOR BENT TOP**



INSIDE ELEVATION OF RAILING

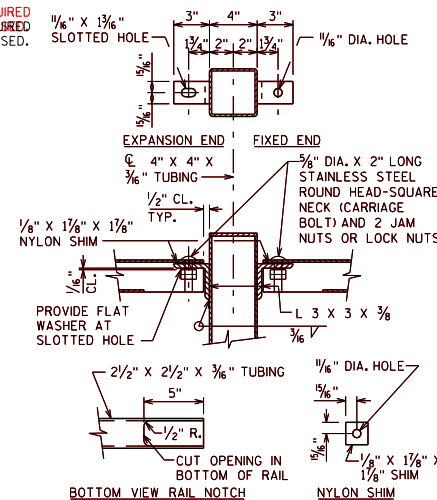
ANCHORAGE DETAIL

ALTERNATIVE ANCHORAGE: ADHESIVE ANCHORS, 5/8"-INCH. EMBEDDED, 7" IN CONCRETE. ADHESIVE ANCHORS SHALL CONFORM TO SECTION 502.05 OF SDG 502.05 AND 502.05.1.1. NOTE: ANCHOR PLATE NOT REQUIRED WHEN ADHESIVE ANCHORS ARE USED.



SHIM PLATE DETAILS

TWO SHIMS OF EACH SIZE REQUIRED PER POST



**TOP RAIL CONNECTION
FOR FENCE W/ BENT TOP**

NOTES

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.

ANCHORAGES SHALL BE ACCURATELY PLACED TO PROVIDE CORRECT ALIGNMENT OF RAILING. SET POSTS NORMAL TO GRADE.

ALL POST SPACINGS ARE TAKEN HORIZONTAL ALONG CENTERLINE OF RAILING AT BASE OF POST.

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.

CUT BOTTOM OF POST TO MAKE VERTICAL IN TRANSVERSE DIRECTION.

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 TIE 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.

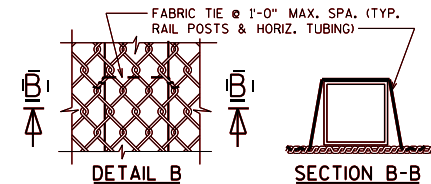
THE END OF THE FABRIC SHALL BE ATTACHED TO THE POST BY MEANS OF A TENSION BAR THREADED THROUGH THE END LOOPS OF THE FABRIC AND SECURED TO THE POST WITH CLAMPS & BOLT. THE FABRIC SHALL BE STRETCHED TO REMOVE ALL SLACK.

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.

THIS RAILING MAY BE MOUNTED DIRECTLY TO A BRIDGE SIDEWALK OR RETAINING WALL PROVIDED THE SIDEWALK IS SEPARATED FROM THE ROADWAY BY A TRAFFIC BARRIER. USE 6" CLEAR SPACING BETWEEN VERTICAL MEMBERS IF CHAIN LINK FENCE IS NOT USED.

FENCE HEIGHT, CURVED OR STRAIGHT, MESH SIZE, COATING AND COLOR SHOULD BE COORDINATED WITH THE REGION. SEE BRIDGE MANUAL 30.3 (8) FOR ADDITIONAL GUIDANCE.



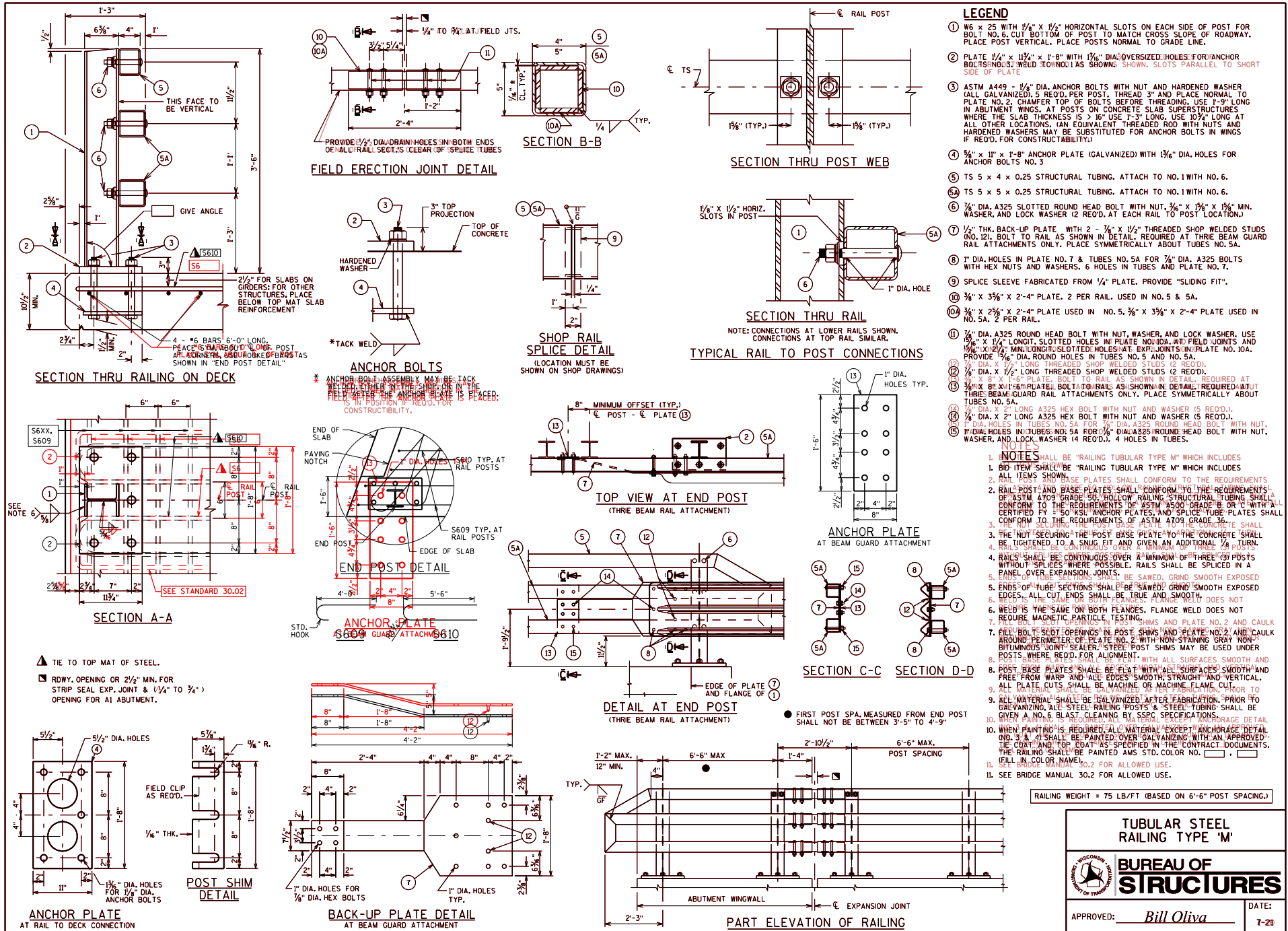
**TUBULAR STEEL
RAILING SCREENING**

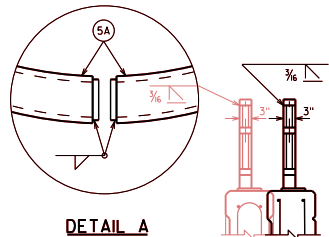


**BUREAU OF
STRUCTURES**

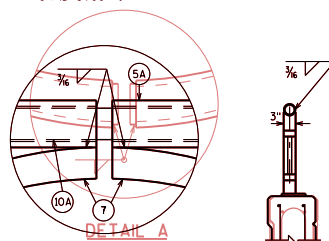
APPROVED: *Bill Oliva*

DATE:
7-20

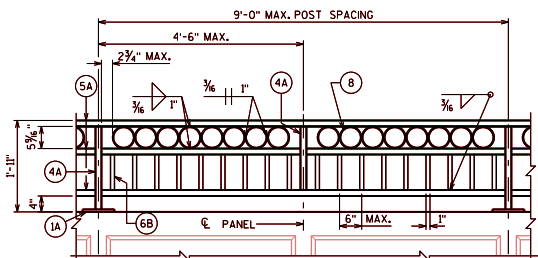




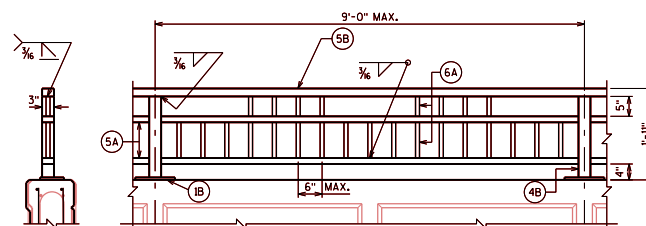
DETAIL A
SEAL ENDS ON CURVED
STRUCTURAL TUBING WITH
1/4" PLATE WELD AND
GRIND SMOOTH.



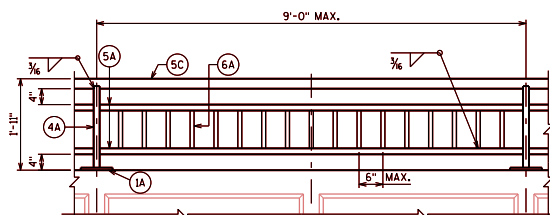
DETAIL A
SEAL ENDS ON CURVED
STRUCTURAL TUBING WITH
1/4" PLATE WELD AND
GRIND SMOOTH.
DETAIL B
SEAL ENDS ON CURVED
STRUCTURAL TUBING WITH
1/4" PLATE WELD AND
GRIND SMOOTH.



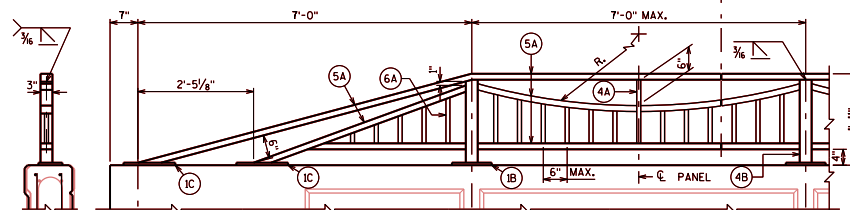
TYPE C1



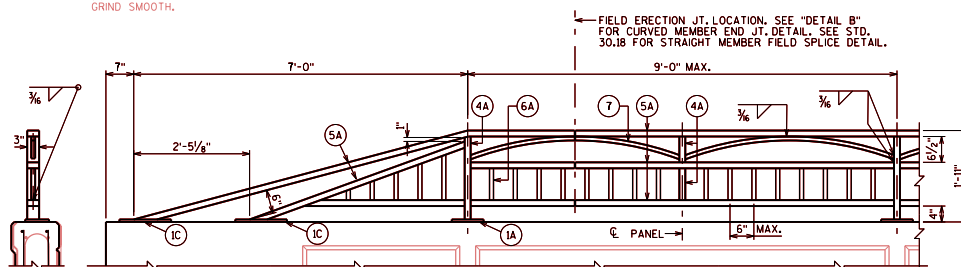
TYPE C4



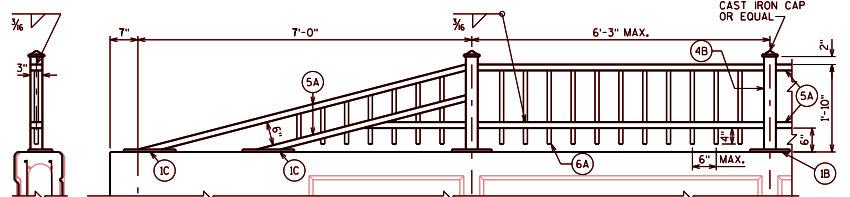
TYPE C2



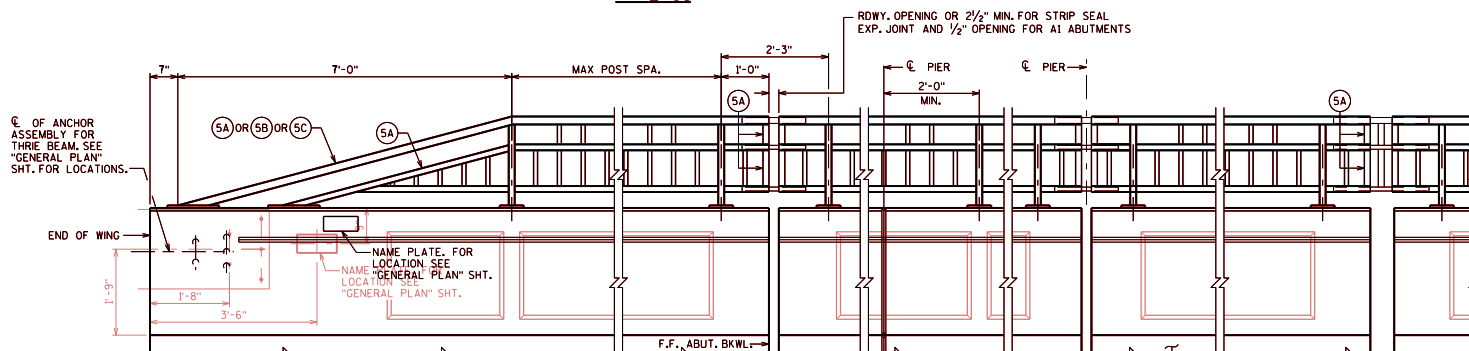
TYPE C5



TYPE C3



TYPE C6



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

DESIGNER NOTES

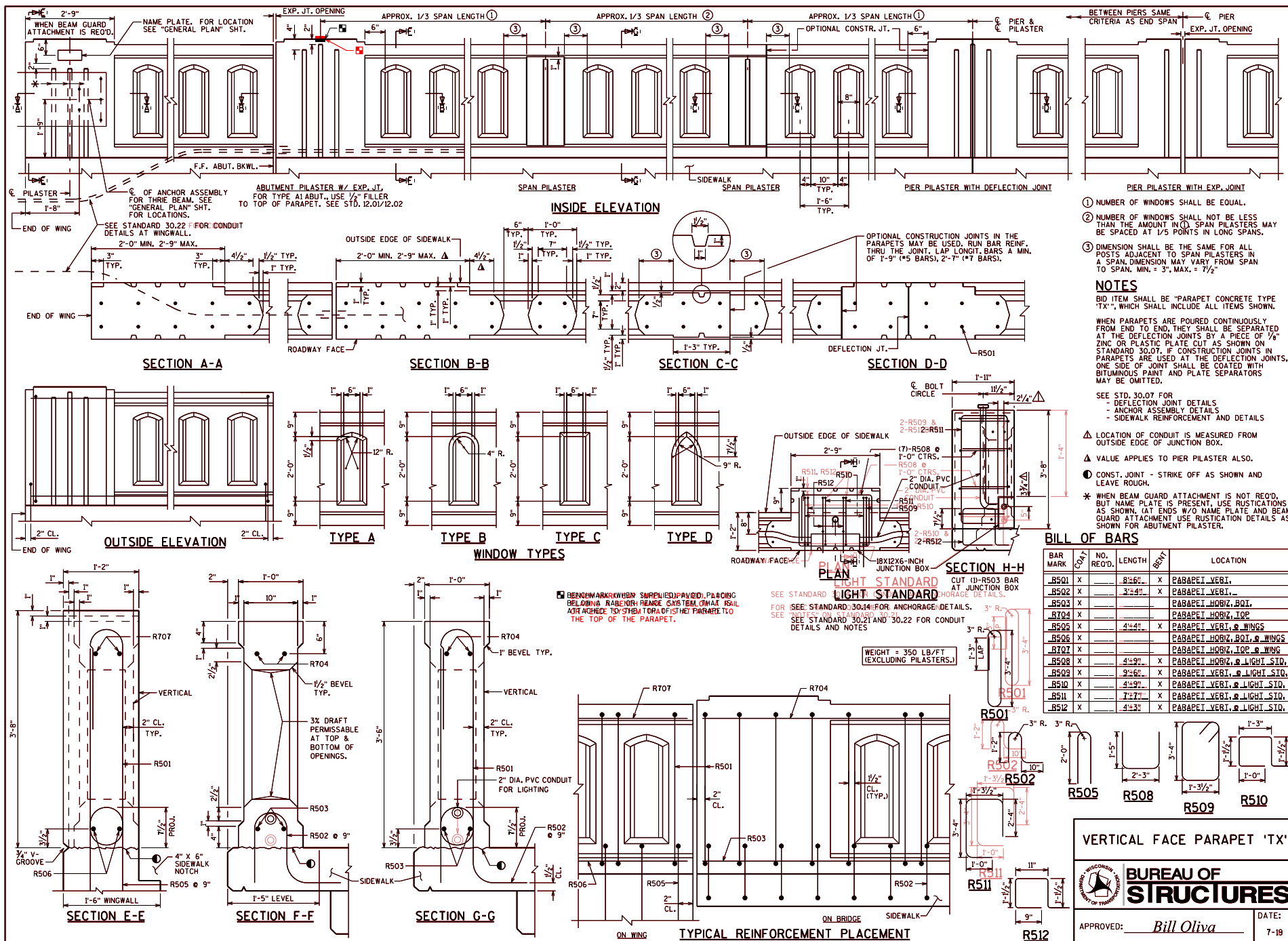
COMBINATION RAILINGS TYPE C1-C6 MAY ALSO BE USED AS A
PEDESTRIAN RAIL MOUNTED DIRECTLY TO A BRIDGE SIDEWALK
OR RETAINING WALL BY INCREASING THE RAILING HEIGHT TO A
MINIMUM OF 3'-6" AND A MAXIMUM OF 4'-6" AND USING A
MINIMUM POST SIZE OF 3"x3"x3/8". WHEN USED ON A BRIDGE,
A TRAFFIC BARRIER IS REQUIRED BETWEEN THE ROADWAY
AND THE SIDEWALK. FOR THIS PEDESTRIAN RAILING, BD ITEM
SHALL BE "RAILING STEEL PEDESTRIAN TYPE C1-C6". THE
CLEAR SPACE BETWEEN THE TOP TWO RAILS MAY BE
INCREASED TO A 6" MAXIMUM EXCEPT FOR "TYPE C1"
RAILING.

A MINIMUM 12'-0" WIND 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

COMBINATION RAILING TYPES 'C1 - C6'	
	BUREAU OF STRUCTURES
	APPROVED: <u>Bill Oliva</u> DATE: <u>7-19</u>



- ① NUMBER OF WINDOWS SHALL BE EQUAL.
- ② NUMBER OF WINDOWS SHALL NOT BE LESS THAN THE AMOUNT IN ①. SPAN PILASTERS MAY BE SPACED AT 1/5 POINTS IN LONG SPANS.
- ③ DIMENSION SHALL BE THE SAME FOR ALL POSTS ADJACENT TO SPAN PILASTERS IN A SPAN. DIMENSION MAY VARY FROM SPAN TO SPAN, MIN. = 3', MAX. = 7 1/2'.

NOTES

BID ITEM SHALL BE "PARAPET CONCRETE TYPE 'TX'", WHICH SHALL INCLUDE ALL ITEMS SHOWN.

WHEN PARAPETS ARE POURED CONTINUOUSLY FROM END TO END, THEY SHALL BE SEPARATED AT THE DEFLECTION JOINTS BY A PIECE OF 1/4" ZINC OR PLASTIC PLATE CUT AS SHOWN ON STANDARD 30.07. IF CONSTRUCTION JOINTS IN PARAPETS ARE USED AT THE DEFLECTION JOINTS, ONE SIDE OF JOINT SHALL BE COATED WITH BITUMINOUS PAINT AND PLATE SEPARATORS MAY BE OMITTED.

SEE STD. 30.07 FOR
- DEFLECTION JOINT DETAILS
- ANCHOR ASSEMBLY DETAILS
- SIDEWALK REINFORCEMENT AND DETAILS

△ LOCATION OF CONDUIT IS MEASURED FROM OUTSIDE EDGE OF JUNCTION BOX.

△ VALUE APPLIES TO PIER PILASTER ALSO.

● CONST. JOINT - STRIKE OFF AS SHOWN AND LEAVE ROUGH.

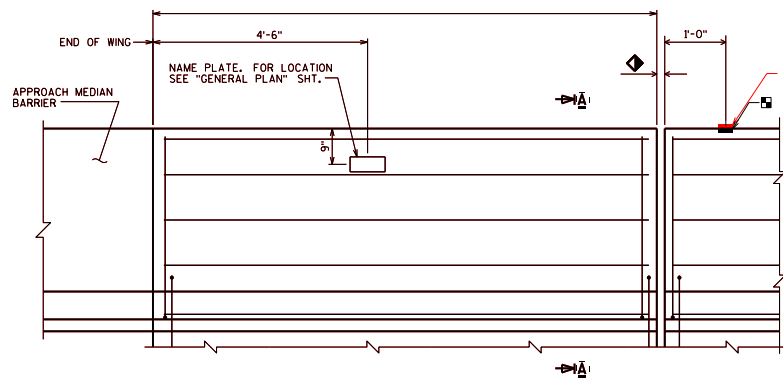
* WHEN BEAM GUARD ATTACHMENT IS NOT REQ'D, BUT NAME PLATE IS PRESENT, USE RUSTICATIONS AS SHOWN. (AT ENDS W/O NAME PLATE AND BEAM GUARD ATTACHMENT USE RUSTICATION DETAILS AS SHOWN FOR ABUTMENT PILASTER.

VERTICAL FACE PARAPET 'TX'



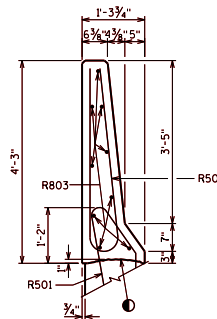
APPROVED: Bill Oliva DATE: 7-19

5 BENCHMARK WHEN SUPPLIED TO AVOID PEACING
BELOW APPROACH OR FENCE SYSTEMS THAT ATTACHED
TO TABS OF THE TOP OF THE PARAPET.

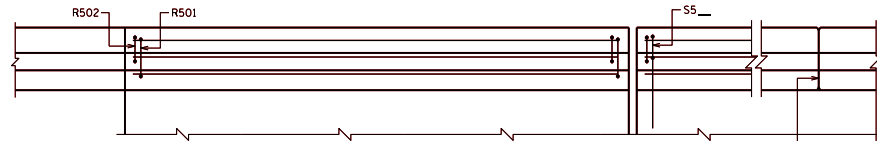


INSIDE ELEVATION

◆ ROADWAY OPENING OR 2 1/2" MIN. FOR EXPANSION JOINT.
USE 1/2" OPENING WITH FILLER FOR A1 ABUTMENTS



SECTION A

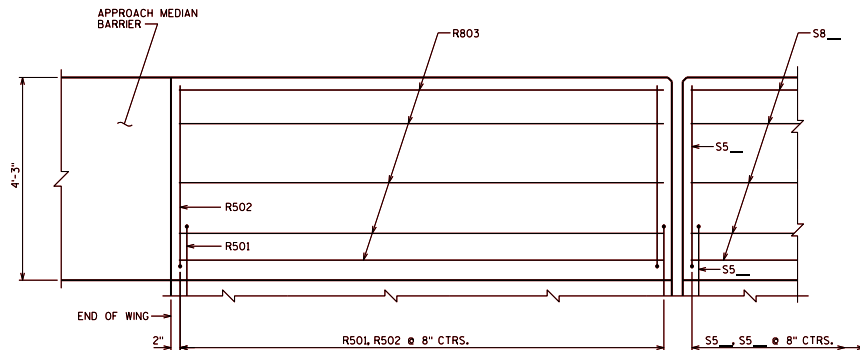


PLAN

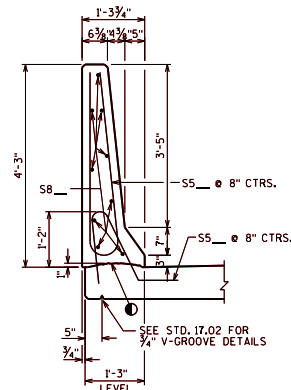
EXPANSION JOINT @ ABUT.
0° SKEW SHOWN, MATCH EXP.
JT. OPENING.

FOR TYPE A1 ABUT., USE 1/4" 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
3/4" - 'V' GROOVE.



OUTSIDE ELEVATION

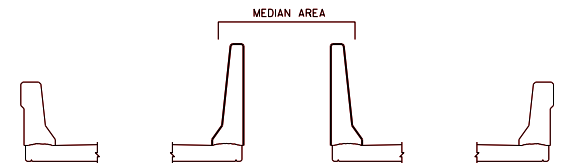
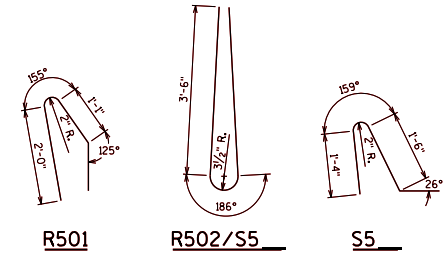


SECTION THRU PARAPET ON BRIDGE

SEE STD. 17.02 FOR
3/4" V-GROOVE DETAILS

BILL OF BARS FOR ABUTMENT PARAPETS

BAR MARK	COAT	ABUT.	ABUT.	LENGTH	REIN.	LOCATION
B501	X			4'-6"	X	PARAPET VERT.
B502	X			7'-11"	X	PARAPET VERT.
B803	X					PARAPET HORIZ.
S5	X			4'-2"	X	PARAPET VERT.
S5	X			7'-11"	X	PARAPET VERT.
S8	X					PARAPET HORIZ.



SLOPED FACE PARAPET "51F" MAY BE USED IN MEDIAN AREA
OF ADJACENT STRUCTURES WHEN HIGHWAY MEDIAN APPROACH
CONCRETE BARRIER IS 51" HIGH

◆ 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.

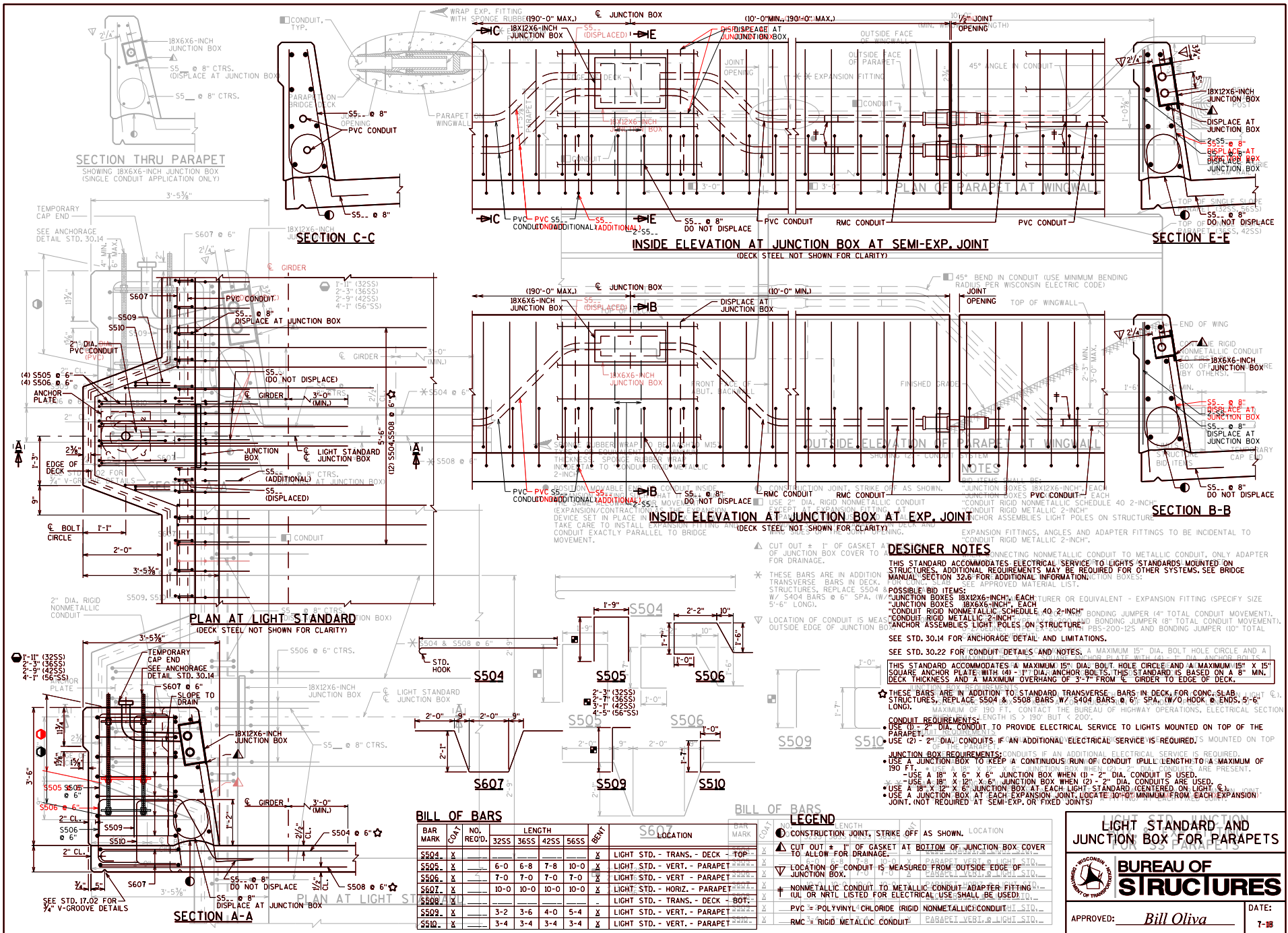
SLOPED FACE PARAPET '51F'

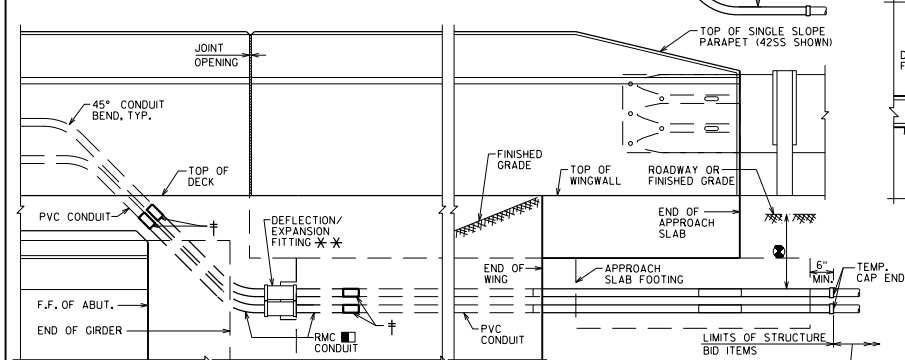
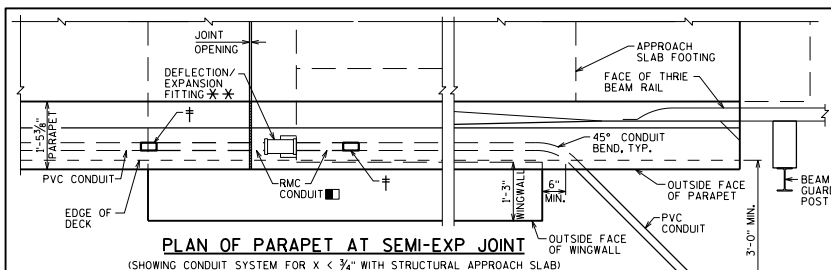


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STRUCTURES

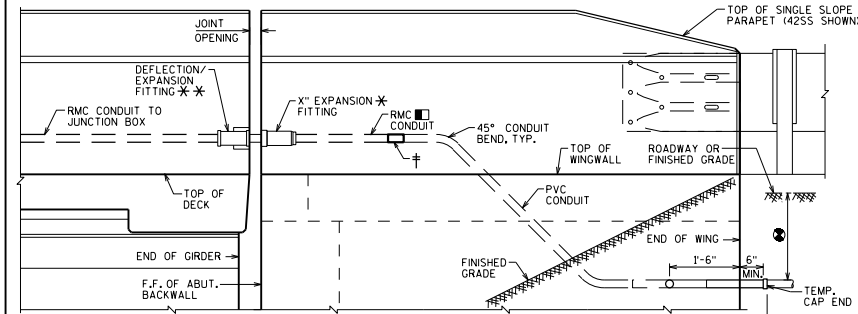
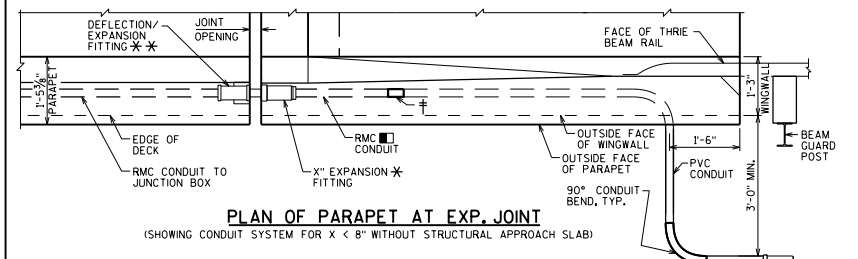
APPROVED: *Bill Oliva*

DATE:
7-19

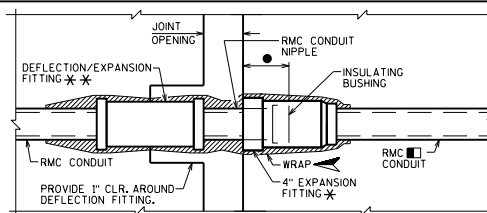




OUTSIDE ELEVATION OF PARAPET AT SEMI-EXP. JOINT
(SHOWING CONDUIT SYSTEM FOR $X < \frac{3}{4}$ WITH STRUCTURAL APPROACH SLAB)

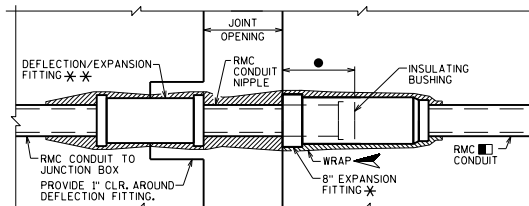


OUTSIDE ELEVATION OF PARAPET AT EXP. JOINT
(SHOWING CONDUIT SYSTEM FOR $X < 8$ WITHOUT STRUCTURAL APPROACH SLAB)



DEFLECTION/EXPANSION AND 4" EXPANSION FITTING

THIS DETAIL ACCOMMODATES A MAXIMUM OF 4" TOTAL MOVEMENT AND UP TO 30 DEGREES OF ANGULAR MISALIGNMENT IN ANY DIRECTION. BOND JUMPER NOT SHOWN FOR CLARITY



DEFLECTION/EXPANSION AND 8" EXPANSION FITTING

THIS DETAIL ACCOMMODATES A MAXIMUM OF 8" TOTAL MOVEMENT AND UP TO 30 DEGREES OF ANGULAR MISALIGNMENT IN ANY DIRECTION. BOND JUMPER NOT SHOWN FOR CLARITY

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'-0" 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 - 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):
4" UP TO 3/4" CONDUIT CONTRACTION OR EXPANSION AND UP TO 30 DEGREES OF ANGULAR MISALIGNMENT IN ANY DIRECTION WITH BONDING JUMPER

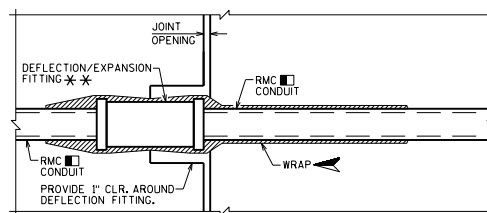
CONDUIT FITTING RECOMMENDATIONS TABLE:

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
		$S \leq 30^\circ$ $S \geq 30^\circ$	DEFL./EXP. AND 4" EXP. FITTING
	EXPANSION	$X < 4'$ $4' \leq X < 8'$ $X \geq 8'$	DEFL./EXP. AND 4" EXP. FITTING DEFL./EXP. AND 8" EXP. FITTING CONSIDER FLEXIBLE METAL CONDUIT SYSTEM (NOT SHOWN)
WALL	CONTRACTION	NONE	NONE - RUN PVC CONDUIT THRU JOINT
	EXPANSION	$L < 90$ FEET	DEFL./EXP. FITTING

X = TOTAL ANTICIPATED LONGITUDINAL JOINT MOVEMENT

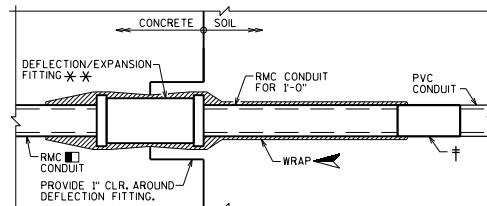
L = DISTANCE BETWEEN EXPANSION JOINTS

S = SKEW



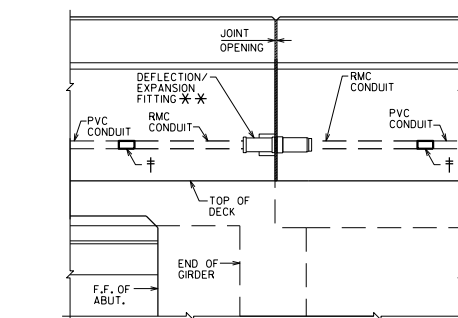
DEFLECTION/EXPANSION FITTING

THIS DETAIL ACCOMMODATES A MAXIMUM OF 3/4" TOTAL MOVEMENT AND UP TO 30 DEGREES OF ANGULAR MISALIGNMENT IN ANY DIRECTION. BOND JUMPER NOT SHOWN FOR CLARITY (CONCRETE TO CONCRETE FITTING)



DEFLECTION/EXPANSION FITTING

THIS DETAIL ACCOMMODATES A MAXIMUM OF 3/4" TOTAL MOVEMENT AND UP TO 30 DEGREES OF ANGULAR MISALIGNMENT IN ANY DIRECTION. BOND JUMPER NOT SHOWN FOR CLARITY (CONCRETE TO SOIL FITTING)



OUTSIDE ELEVATION OF PARAPET AT SEMI-EXP JOINT
(SHOWING CONDUIT SYSTEM FOR $X \geq \frac{3}{4}$ WITHOUT STRUCTURAL APPROACH SLAB)

CONDUIT DETAILS AND NOTES

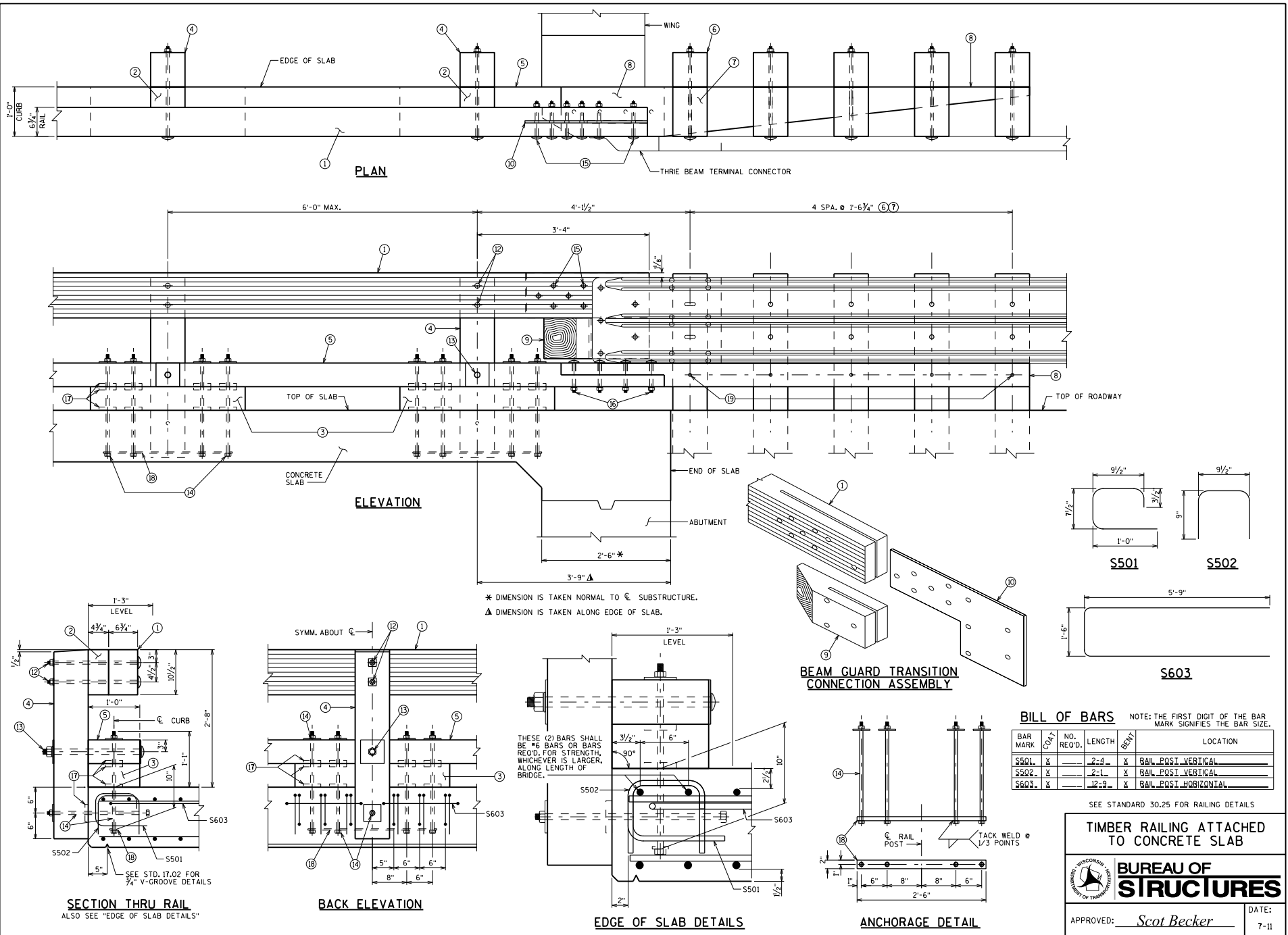


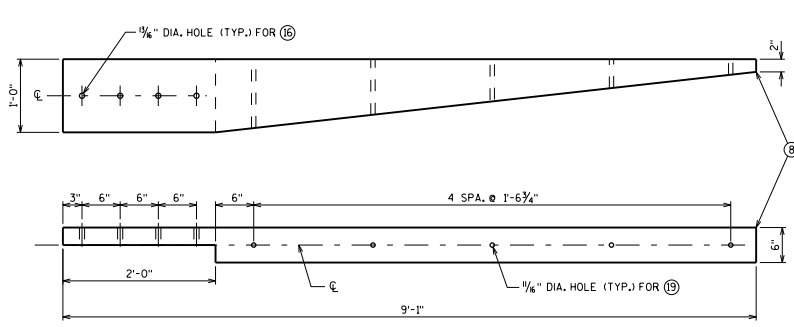
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STRUCTURES**

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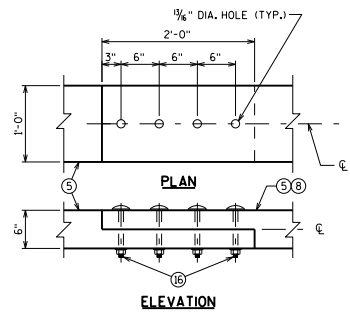
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7-17

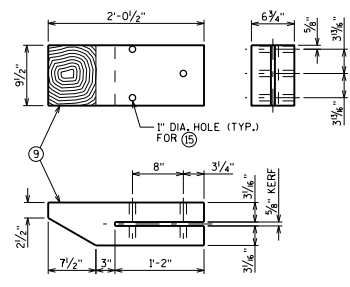




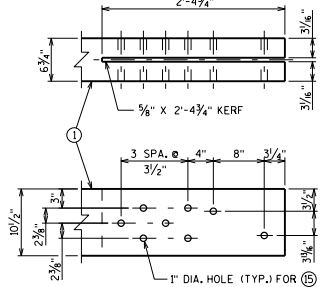
CURB TRANSITION



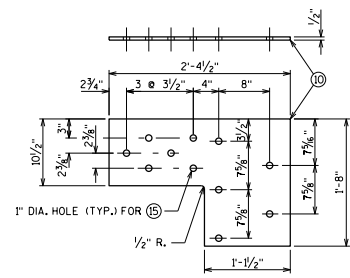
CURB SPLICE DETAIL



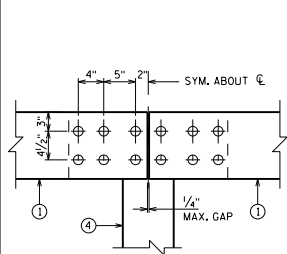
TRANSITION BLOCK



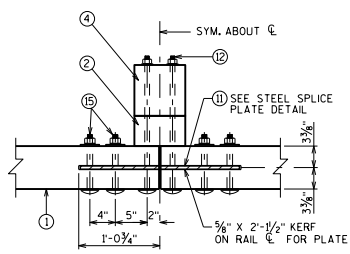
TRANSITION GLULAM RAIL BORING DETAIL



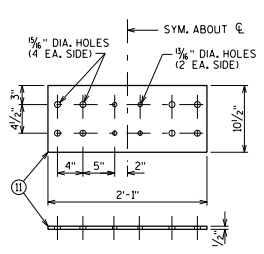
STEEL TRANSITION PLATE



ELEVATION



PLAN VIEW



STEEL SPLICE PLATE

RAIL SPLICE DETAILS

LEGEND

- ① GLULAM RAIL 6 3/4" X 10 1/2"
- ② RAIL SPACER BLOCK 8" X 4 3/4" X 10 1/2"
- ③ SCUPPER BLOCK 6" X 12" X 3'-0"
- ④ RAIL POST @ STRUCTURE 8" X 8" X 3'-8"
- ⑤ CURB 6" X 12"
- ⑥ RAIL POST @ BEAM GUARD 8" X 8"
- ⑦ RAIL SPACER BLOCK @ BEAM GUARD 8" X 10 1/2" X 1'-10 1/2"
- ⑧ CURB TRANSITION @ BEAM GUARD
- ⑨ TRANSITION BLOCK @ BEAM GUARD
- ⑩ STEEL TRANSITION PLATE, ASTM A36.
- ⑪ STEEL SPLICE PLATE, ASTM A36.
- ⑫ 3/4" 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).
- ⑬ 1/4" DIA. X 1'-10" LONG ASTM A325, DOME-HEAD BOLT W/ 2 - 5/2" X 5/2" X 1/4" PLATE WASHERS, W/ 1/8" DIA. HOLE. (1 REQ'D. @ EACH CURB TO POST CONNECTION.)
- ⑭ 3/4" DIA. X 1'-11" LONG ASTM A325 BOLT, 1 - 4" X 4" X 3/8" PLATE WASHER REQ'D. AT CURB TO SLAB CONNECTION, 1 - 4" X 4" X 3/8" PLATE WASHER REQ'D. AT POST TO SLAB CONNECTION.
- ⑮ 3/4" DIA. X 9" LONG ASTM A307, GRADE 2, DOME HEAD BOLT AT RAIL SPLICE DETAIL AND AT BEAM GUARD ATTACHMENT.
- ⑯ 3/4" DIA. X 8" LONG ASTM A307, GRADE 2, DOME-HEAD BOLT (4 REQ'D. @ EACH CURB SPLICE DETAIL).
- ⑰ 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.
- ⑱ 2" X 2'-6" X 3/8" ANCHOR PLATE WITH 4 - 1/8" DIA. HOLES FOR ANCHOR BOLTS NO. 14 (CURB TO SLAB CONNECTION).
- ⑲ 3/4" DIA. ASTM A325 DOME-HEAD BOLT W/ 1-PLATE WASHER PER BOLT. (1 REQ'D. @ EACH THREE BEAM POST TO CURB TRANSITION CONNECTION.)

NOTES

1. BID ITEM SHALL BE "TREATED LUMBER AND TIMBER" WHICH INCLUDES ALL ITEMS SHOWN EXCEPT ITEMS NO. 6, 7 AND THREE BEAM TERMINAL CONNECTOR.
2. DIMENSIONS GIVEN FOR GLUED-LAMINATED (GLULAM) TIMBER RAILS ARE ACTUAL DIMENSIONS.
3. 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.
4. 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 15 POST SPACINGS AWAY FROM RAIL SPLICES. IT IS RECOMMENDED THAT GLULAM RAILS BE CONTINUOUS OVER THE LENGTH OF THE BRIDGE.
5. 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.
6. 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:
 $F_b = 1,800 \text{ LB/IN}^2$ $E = 1,800,000 \text{ LB/IN}^2$
7. 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:
 $F_b = 1,350 \text{ LB/IN}^2$ $E = 1,500,000 \text{ LB/IN}^2$
8. ALL STEEL COMPONENTS AND FASTENERS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M118 OR M232.
9. 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.
10. 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.
11. 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.
12. DESTROY THREADS ON ALL BOLTS WITH A CENTER PUNCH AFTER TIGHTENING NUT. EXPOSED BOLT PROJECTION OVER T SHALL BE CUT OFF. REPAIR END OF BOLT BY PAINTING WITH ZINC RICH PRIMER.
13. 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.
14. THIS RAILING MEETS NCHRP REPORT 350 EVALUATION CRITERIA FOR TEST LEVEL 2 (TL-2).

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 3/4" X 10 1/2"	---	---
SCUPPER BLOCK	---	6" X 12" X 3'-0"	---	---
RAIL POST	---	8" X 8" X 3'-8"	---	---
CURB	---	6" X 12"	---	---
CURB TRANSITION	---	8" X 10 1/2" X 1'-10 1/2"	---	---
TRANSITION BLOCK	---	---	---	---
TOTAL MBM	---	---	---	---

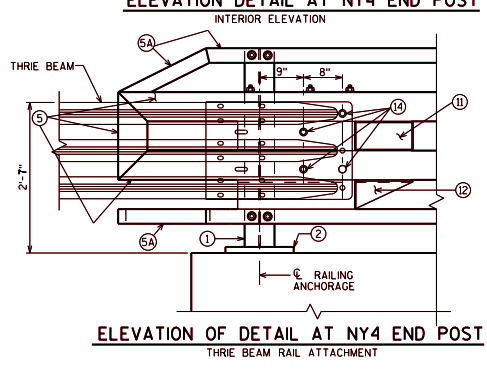
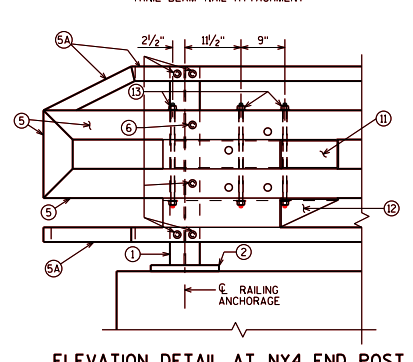
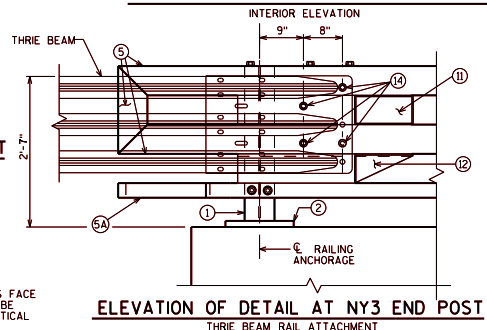
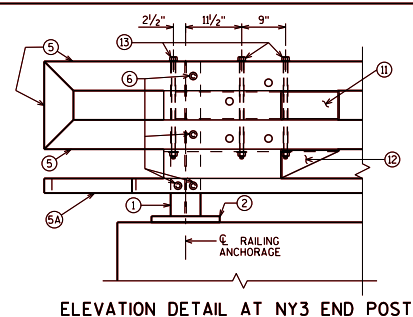
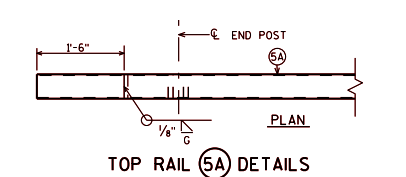
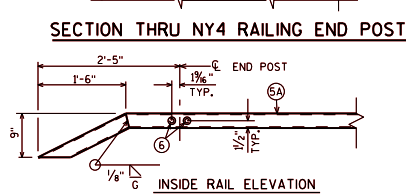
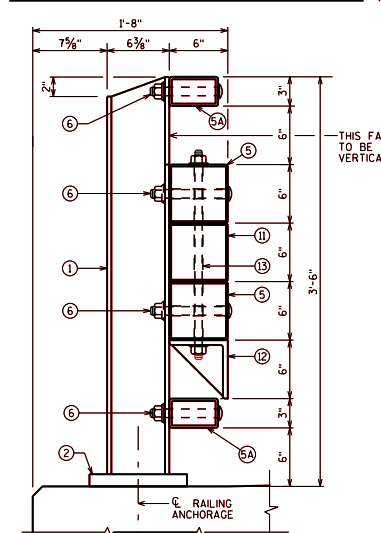
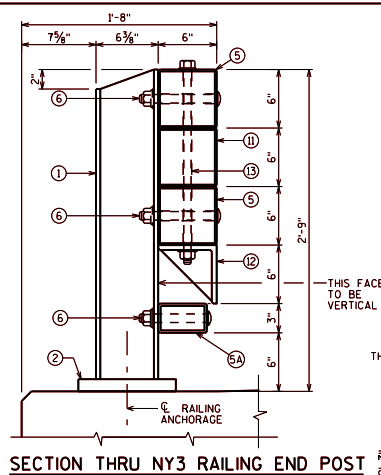
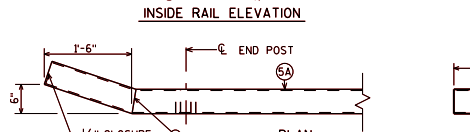
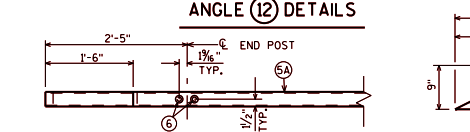
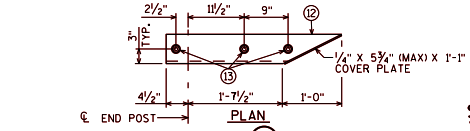
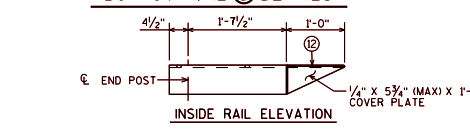
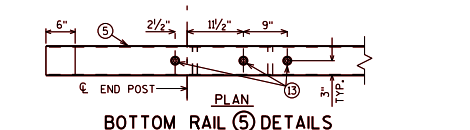
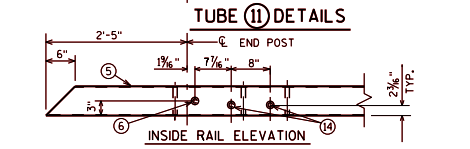
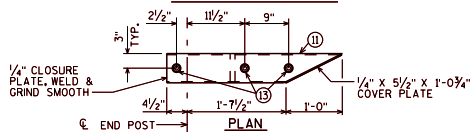
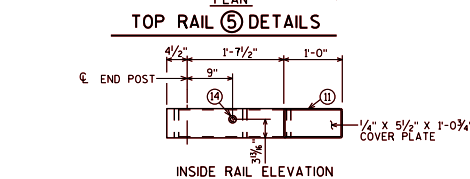
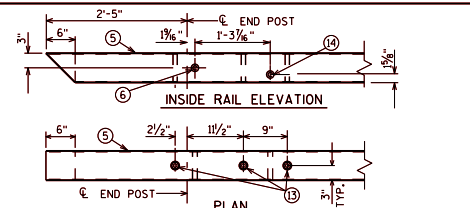
THESE RAILING DETAILS MAY BE USED WITH CONCRETE SLAB SUPERSTRUCTURES (SLAB DEPTH > 14") THAT HAVE ABUTMENTS WITH WINGS PARALLEL TO ϵ OF ABUTMENT OR HAVE AS ABUTMENTS.

TIMBER RAILING ATTACHED TO CONCRETE SLAB DETAILS

BUREAU OF STRUCTURES

DATE: _____

APPROVED: Bill Oliva

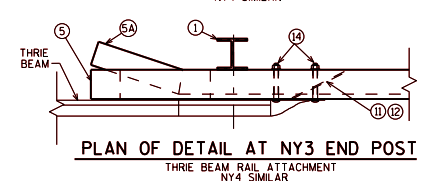
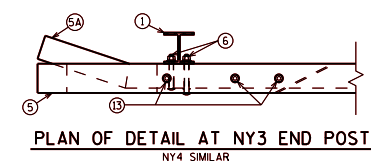


LEGEND

1. W6 X 25 WITH 1/4" X 1 3/4" HORIZONTAL SLOTTED HOLES ON SIDE OF POST FOR BOLT NO. 6 AT NO. 5 (AND TOP RAIL FOR NY4). USE 1" DIA. HOLE FOR BOLT NO. 6 AT NO. 5A BOTTOM RAIL. CUT BOTTOM OF POST TO MATCH CROSS SLOPE OF ROADWAY. PLACE POST VERTICAL. PLACE POSTS NORMAL TO GRADE LINE.
2. PLATE 1/2" X 10" X 1-2". SEE STANDARDS 30.26 AND 30.27 FOR MORE INFORMATION.
3. TS 6 X 6 X 3/4" STRUCTURAL TUBING. USE 7/8" DIA. HOLES IN TOP AND BOTTOM OF RAILS FOR BOLT NO. 13 AS SHOWN IN PLAN DETAILS. USE 1" DIA. HOLES IN FRONT AND BACK OF RAILS FOR BOLTS NO. 6 & NO. 14 AS SHOWN IN ELEVATION DETAILS.
4. TS 5 X 3 X 1/2" STRUCTURAL TUBING. USE 1" DIA. HOLES FOR BOLT NO. 6 IN TOP RAIL FOR NY4 (FRONT & BACK). USE 1/8" X 1 3/4" HORIZONTAL SLOTTED HOLES FOR BOLT NO. 6 IN BOTTOM RAIL (FRONT & BACK) AND A 2" O.D. WASHER UNDER BOLT HEAD.
5. 7/8" DIA. A325 SLOTTED ROUND HEAD BOLT WITH HEX NUT, 3/4" X 1 3/4" X 1 3/4" WASHER, AND SPRING LOCK WASHER (1 REQUIRED AT RAIL NO. 5 TO POST NO. 1 CONNECTION LOCATIONS SHOWN, 2 REQUIRED AT RAIL NO. 5A TO POST NO. 1 CONNECTION LOCATIONS SHOWN).
6. TS 6 X 6 X 3/4" STRUCTURAL TUBING. USE 1" DIA. HOLES IN FRONT AND BACK FOR BOLT NO. 14 & 7/8" DIA. HOLES IN TOP & BOTTOM FOR BOLT NO. 13.
7. L 6 X 6 X 1/2" STRUCTURAL ANGLE. USE 7/8" DIA. HOLES IN TOP FLANGE FOR BOLT NO. 13.
8. 3/4" DIA. A325 FULLY THREADED BOLTS, 2 WASHERS AND A HEAVY HEX NUT, ON EACH BOLT. NUT TO BE FINGER TIGHT, 3 BOLTS AT EACH END POST.
9. 7/8" DIA. A325 SLOTTED ROUND HEAD BOLT WITH HEX NUT AND 7/8" X 2" X 2" WASHER FOR CONNECTION OF THRIE BEAM (4 REQUIRED)

NOTES

STRUCTURAL TUBING SHALL CONFORM TO THE REQUIREMENTS OF ASTM A500 GRADE B OR C WITH A CERTIFIED $F_y \geq 50$ KSI. STRUCTURAL ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM A709 GRADE 50.



END POST DETAILS FOR TUBULAR STEEL RAILING TYPE NY3 & NY4



BUREAU OF STRUCTURES


APPROVED: *Bill Oliva*

DATE:
1-21



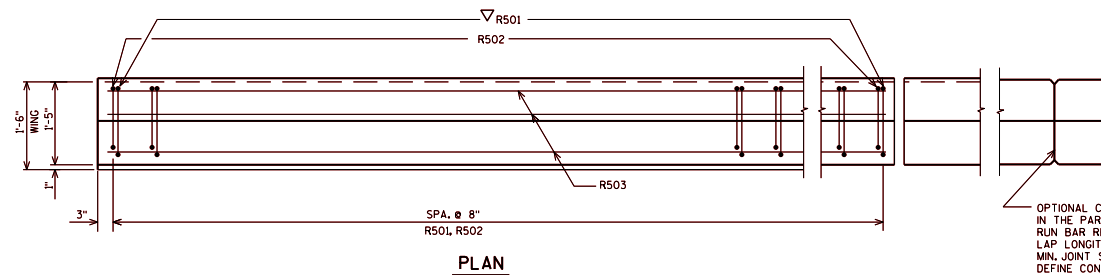
- FOR ALL TUBULAR STEEL RAILING TYPE NY4 DETAILS SEE STD. 30.27.

BENCH BENCHMARK WHEN SUPPLIED), AVOID PLACING SUPPLIED BELOW A RAIL OR FENCE SYSTEM THAT IS A BENCH ATTACHED TO THE TOP OF THE PARAPET.

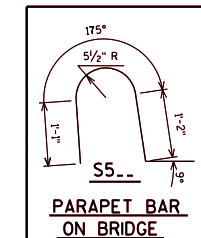
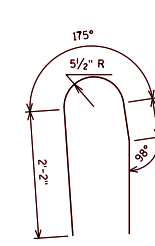


The diagram shows a cross-section of a parapet. The parapet is 8 3/4" high. A bench is attached to the top of the parapet. The bench is 1'-5 3/4" high. The bench is attached to the top of the parapet.

ROADWAY OPENING OR 2½" MIN. FOR EXPANSION JOINT.
USE ½" OPENING WITH FILLER FOR A1 ABUTMENTS



— 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.



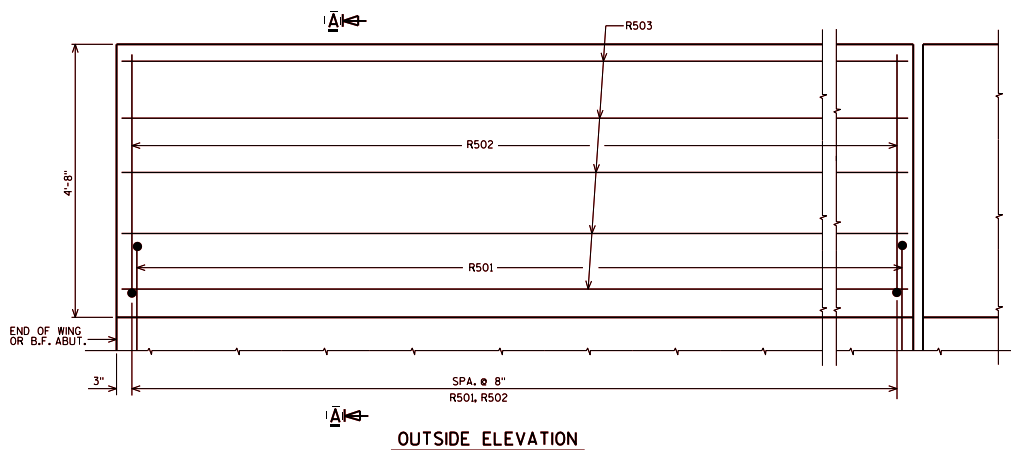
THE '56SS' PARAPET IS ONLY TO BE USED IF A 'TYPE S56'
SINGLE SLOPE CONCRETE ROADWAY BARRIER ADJOINS THE END OF
THE '56SS' PARAPET.

USE A 1'-6" WING WIDTH FOR WINGS PARALLEL TO THE ROADWAY.

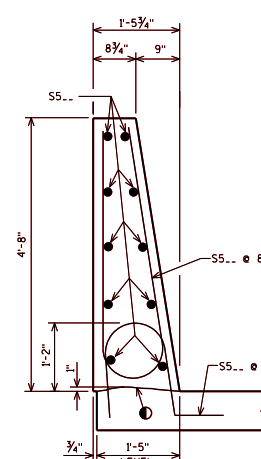
AREA = 5.16 SF
WEIGHT = 774 LB/FT

① CONST. JOINT - STRIKE OFF AS SHOWN.

▽ R501 BARS TO BE TIED TO WING STEEL BEFORE WING IS POURED.
DESIGNER MAY ELECT TO USE A R501 BAR IN LIEU OF A S5... BAR ADJACENT TO THE PAVING NOTCH ON TYPE ABUTMENTS.



OUTSIDE ELEVATION



SECTION THRU PARAPET ON BRIDGE

BILL OF BARS

FOR ABUTMENT PARAPETS

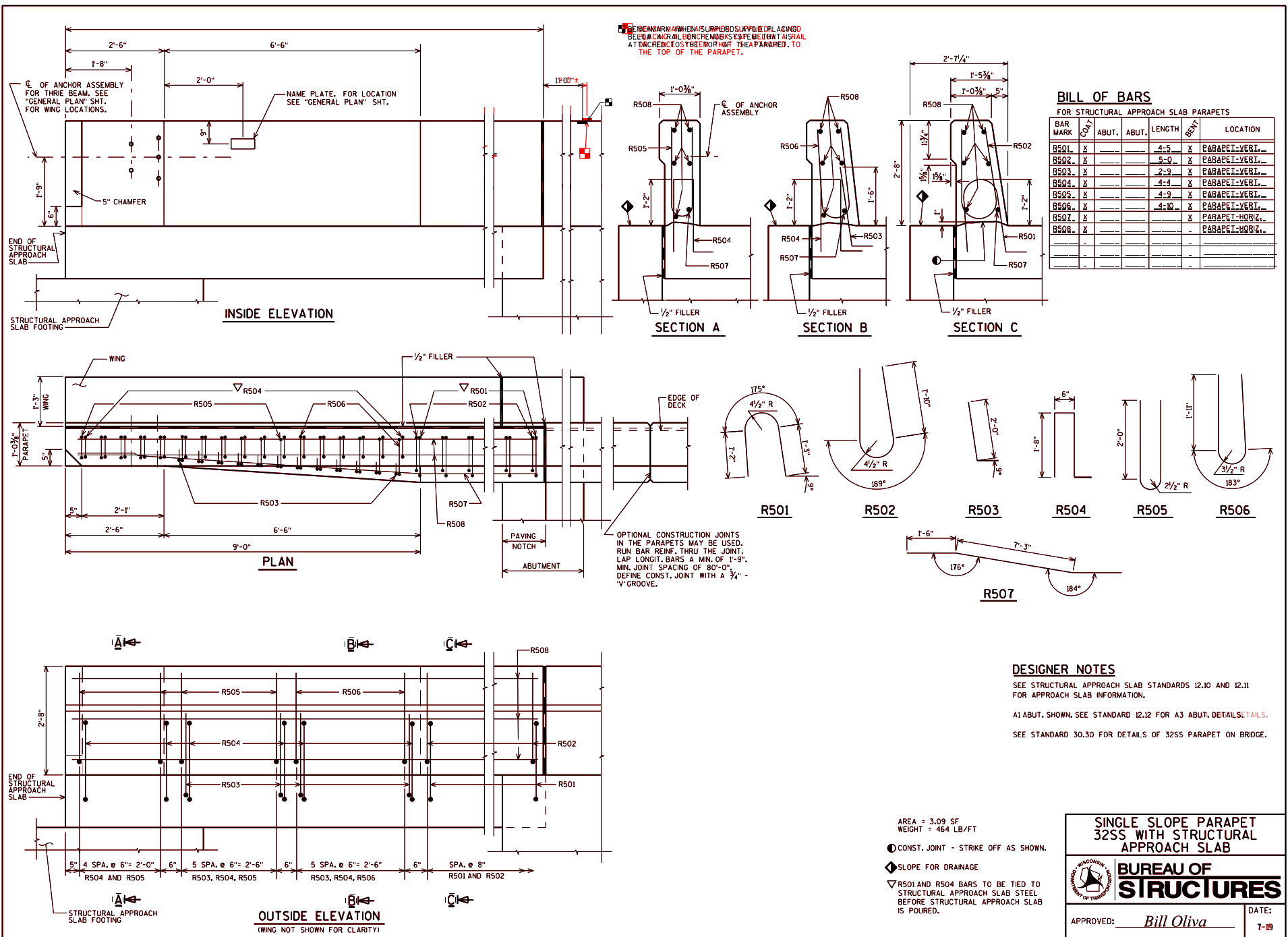
BAR MARK	COUNT	ABUT.	ABUT.	LENGTH	BENT	LOCATION
B501.	X	-	-	5-11	X	PAPAPETI-VGB1.
B502.	X	-	-	9-1	X	PAPAPETI-VGB1.
B503.	X	-	-			PAPAPETI-HDBZ1.
S5..	X	-	-	4-6	X	PAPAPETI-VGB1.

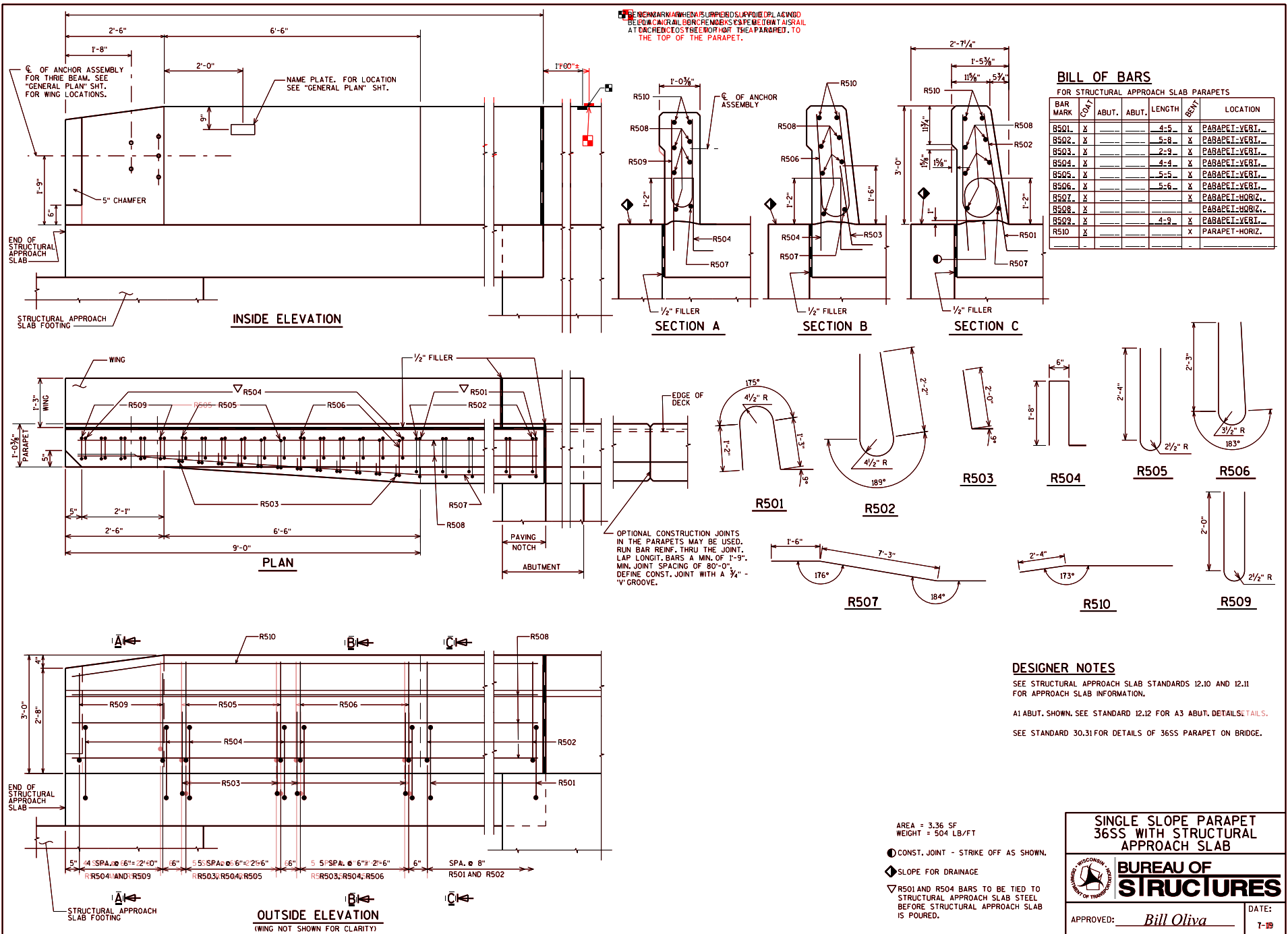


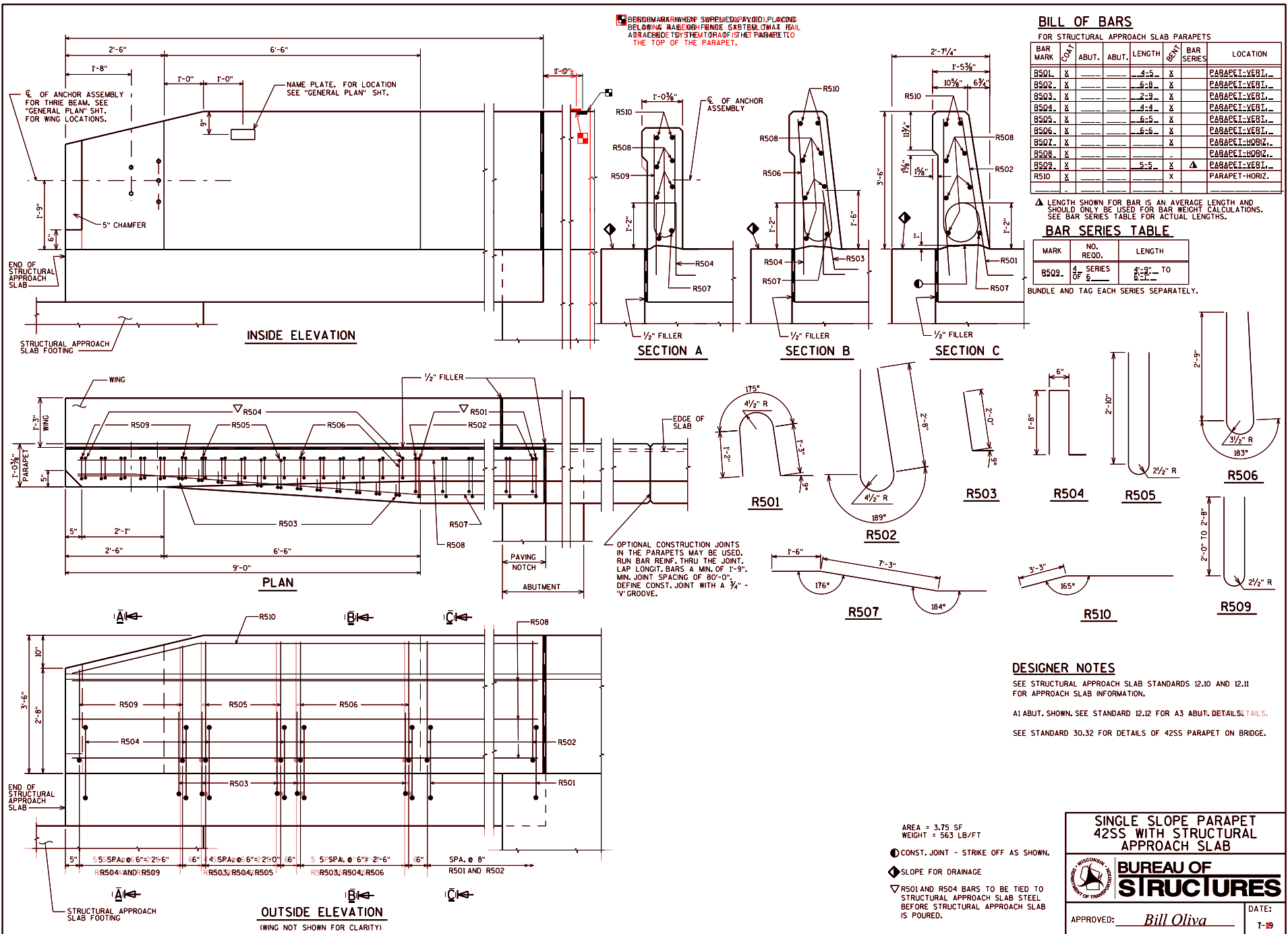
BUREAU OF STRUCTURES

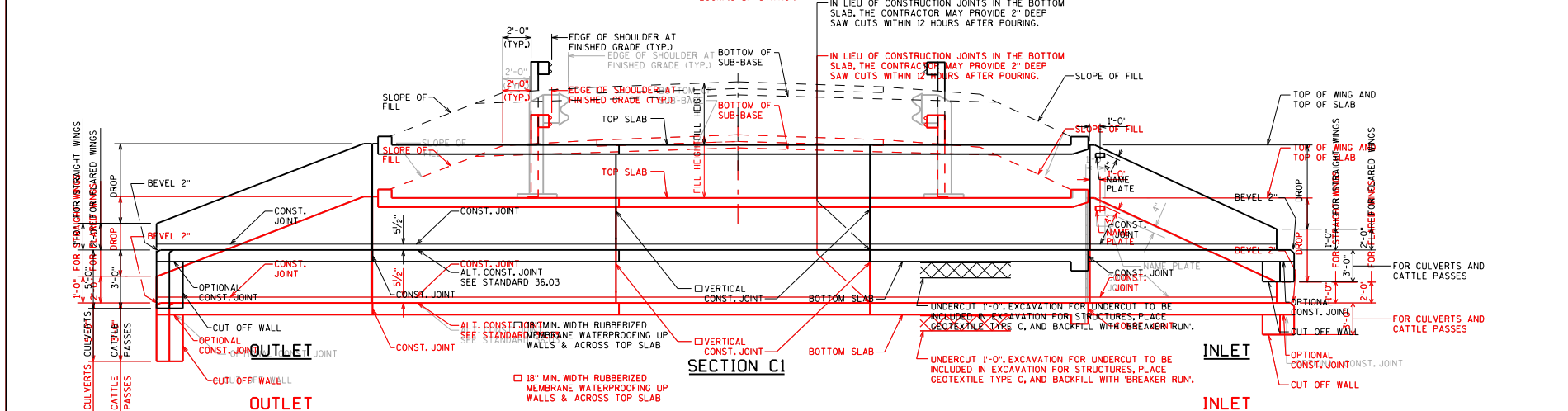
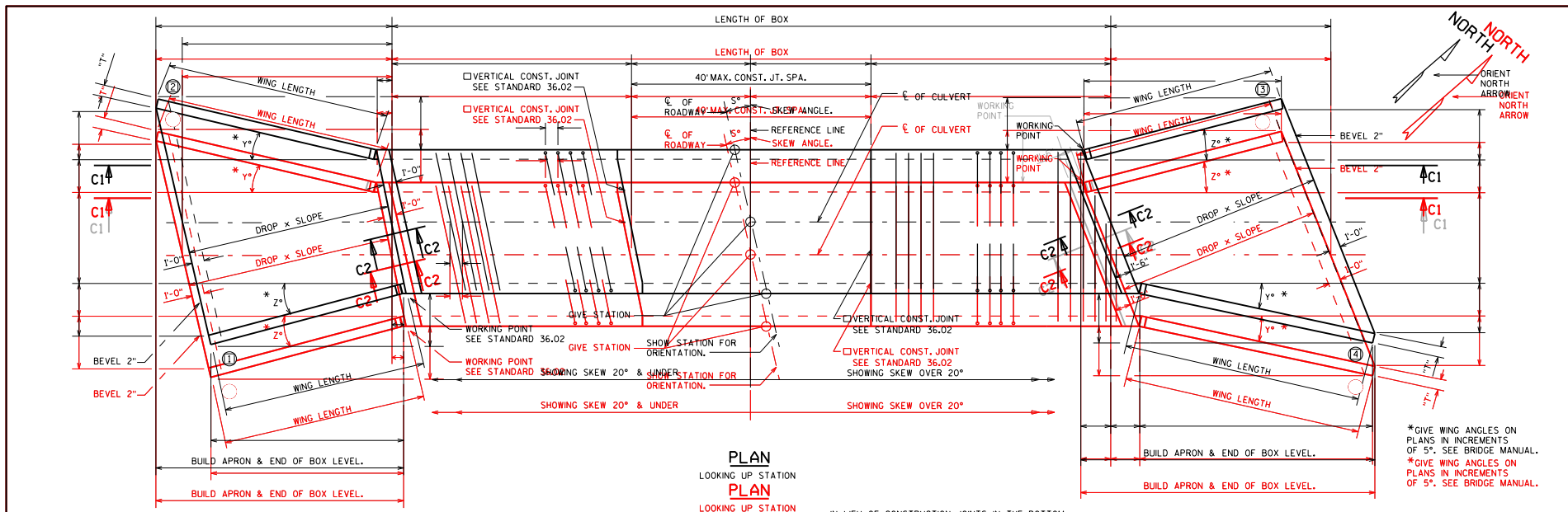
APPROVED: *Bill Oliva*

DATE:









LEGEND
 ○ INDICATES WING NUMBER
 ○ INDICATES WING NUMBER

DESIGN DATA
 LIVE LOAD: DESIGN LOAD: HL-93
 INVENTORY RATING FACTOR: RF=1.05
 DESIGN RATING FACTOR: RF=1.35
 OPERATING RATING FACTOR: RF=1.35
 WISCONSIN STANDARD PERMIT VEHICLE (WIS.-SPV: 255 (KIPS))
 ** DESIGNED FOR FILL HEIGHT RANGE OF 0 FEET TO 4 FEET
MATERIAL PROPERTIES:
 CONCRETE MASONRY $f_c = 3,500$ P.S.I.
 BAR STEEL REINFORCEMENT $f_y = 60,000$ P.S.I.
 CONCRETE MASONRY $f_c = 3.5$ K.S.I.
 BAR STEEL REINFORCEMENT $f_y = 60.0$ K.S.I.

NOTES
 SEE STANDARD 36.02 FOR NOTES.
 TYPICAL UNDERCUT, SHOWN, SEE STANDARD 9.01 FOR ALTERNATIVES.
DESIGNER'S NOTES
 NO ADDITIONAL NOTES
 ** SEE SECTION 36.5 FOR DESIGN RANGE OF FILL HEIGHTS, HEIGHT TO QUARRY, BENT, OR NEAREST 0.5 FEET ON FILLS OVER 4 FEET, AND 10 FEET NEAREST 1 FOOT ON FILLS UNDER 4 FEET.
 ** SEE SECTION 36.5 FOR DESIGN RANGE OF FILL HEIGHTS, HEIGHT TO QUARRY, BENT, OR NEAREST 0.5 FEET ON FILLS OVER 4 FEET, AND 10 FEET NEAREST 1 FOOT ON FILLS UNDER 4 FEET.

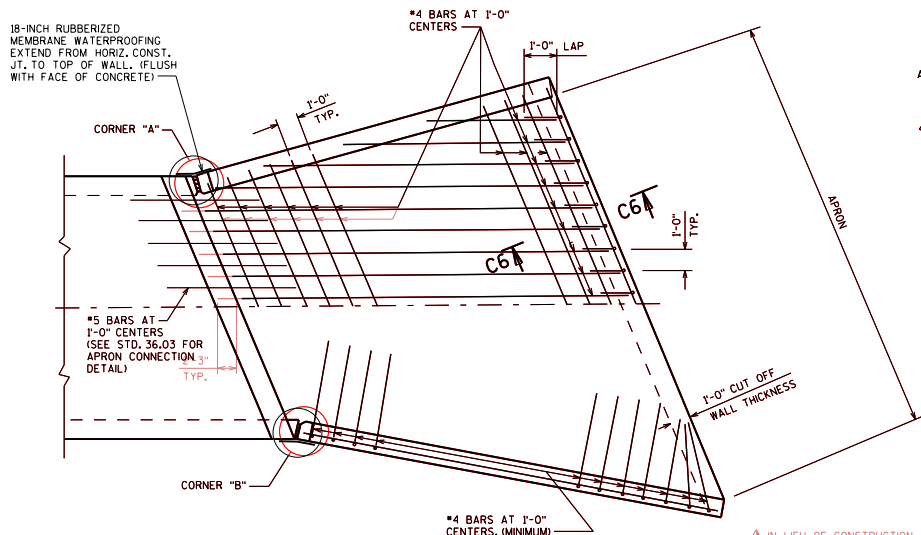
BOX CULVERT LAYOUT

**BUREAU OF
STRUCTURES**

DATE: 7-20

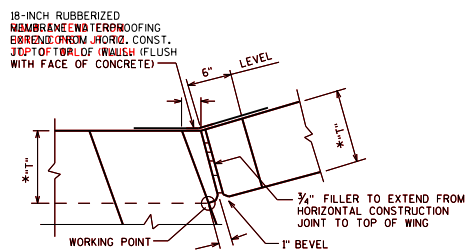
APPROVED: Bill Oliva

7-20



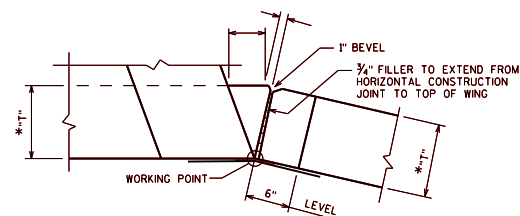
APRON DETAIL

APRON DETAIL

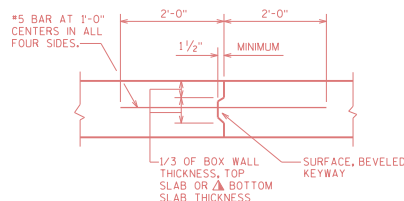


CORNER "A"

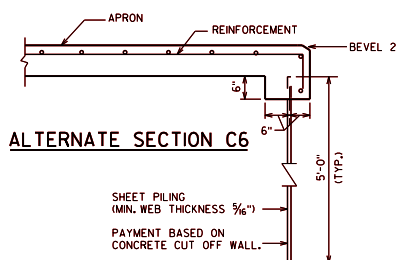
* DIMENSION "T" TO BE DETERMINED FROM BARREL DESIGN



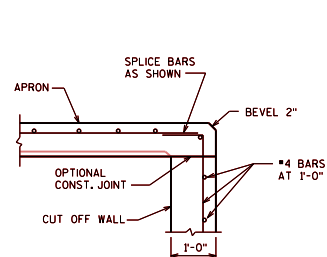
CORNER "B"



VERTICAL CONSTRUCTION JOINT



ALTERNATE CUT OFF WALL



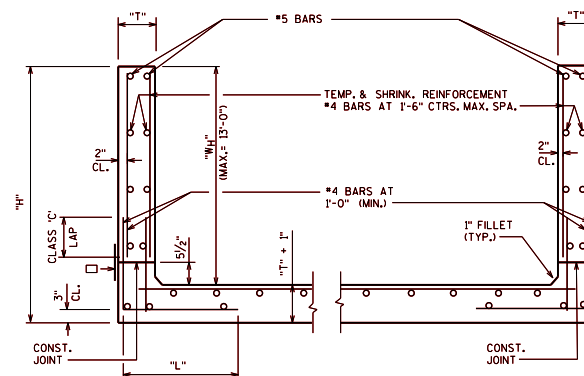
SECTION C6

"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

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"



SECTION THRU WINGWALLS

□ 18" MIN. WIDTH RUBBERIZED MEMBRANE WATERPROOFING ALONG HORIZ. CONSTR. JT. IN WING.

NOTES

BAR STEEL REINFORCEMENT SHALL BE EPOXY COATED UNLESS OTHERWISE SHOWN OR NOTED.

THE CONCRETE IN THE CUT OFF WALL SHALL BE PLACED UNDER WATER THE EXCAVATION CAN ONLY BE REINFORCED.

THE ALTERNATE CUT OFF WALL DETAIL SHOWN ON THIS SHEET MAY BE USED CONCRETE LIE OF THE CAST-IN-PLACE CONCRETE CUT OFF WALLS SHALL BE BASED ON CONCRETE CUT OFF WALLS.

LOCATE NAME PLATE ON NEAREST RIGHT WING TRAVELING UP STATION, FACE NAME PLATE UP STATION.

DESIGNER NOTES

THE CONCRETE IN THE CUT OFF WALL SHALL BE PLACED UNDER WATER THE EXCAVATION CAN ONLY BE REINFORCED.

DESIGNER NOTES

SEE STANDARDS 9.01 AND 36.01 FOR PRECAST CONCRETE BOX CULVERT DETAILS. PRECAST CONCRETE BOX CULVERTS SHALL BE CAST-IN-PLACE. ALL BAR UNLESS DESIGNATED OTHERWISE SHALL BE EPOXY COATED. PRECAST ELEMENTS UNCOATED EXCEPT WHERE SHOWN OTHERWISE. PRECAST ONLY DESIGNS REQUIRE BARS SHOWN BY BUREAU OF STRUCTURES. WHEN PRECAST ELEMENTS HAVE BEEN DETERMINED TO BE PROHIBITED ELEMENTS SHALL BE NOTED ACCORDINGLY. BAR STEEL FOR WINGWALL DOWELS AND ALL WINGWALL BARS SHALL BE EPOXY COATED. CAST-IN-PLACE DETAILS FOLLOWING STANDARDS 36.05 AND 36.06 WITH THE FOLLOWING SPECIFICATIONS:

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 9.01 AND 36.01 FOR ADDITIONAL NOTES.

SEE STANDARDS 36.05 AND 36.06 FOR PRECAST BOX CULVERT DETAILS.

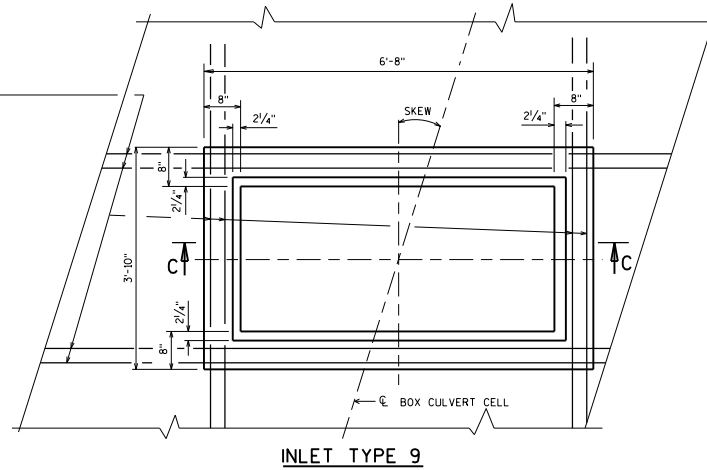
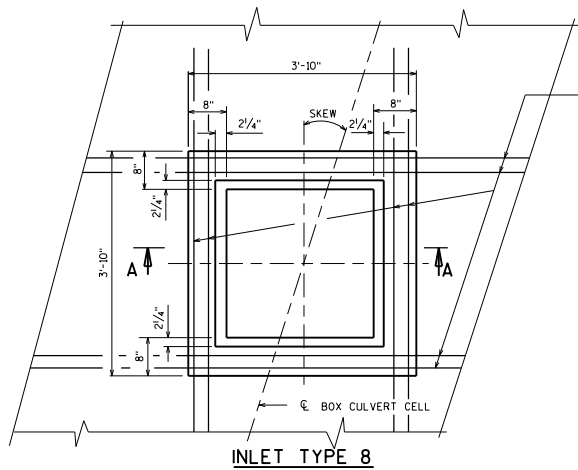
BOX CULVERT APRON DETAILS



**BUREAU OF
STRUCTURES**

APPROVED: *Bill Oliva*

DATE:
1-21



MEDIAN INLET PLAN
(INLET COVER NOT SHOWN)

NOTES

FIELD CUT BAR STEEL REINFORCEMENT IN TOP SLAB TO CLEAR THE OPENING PROVIDED FOR MEDIAN INLET.

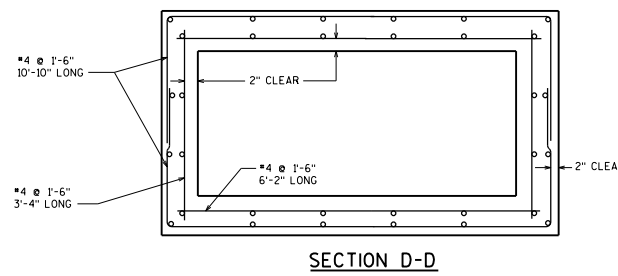
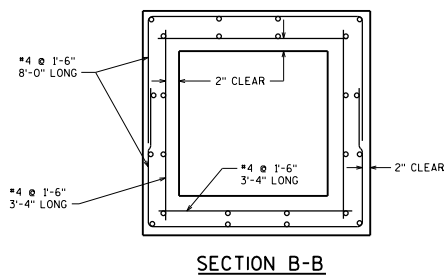
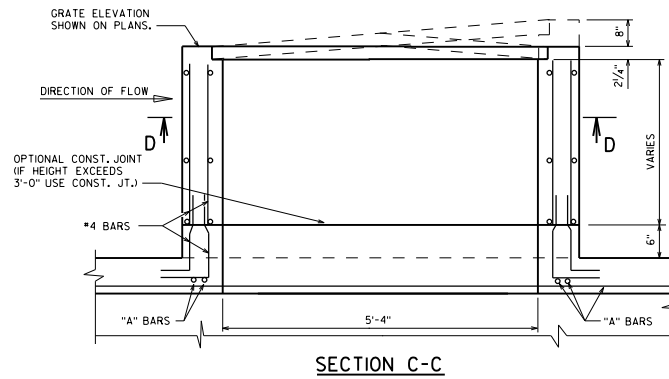
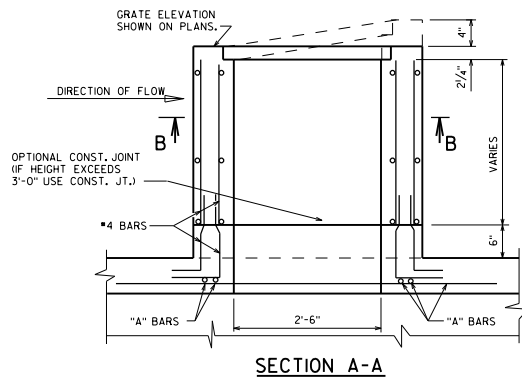
ADJUSTMENT OF THE COVER TO GRADE MAY BE ACCOMPLISHED BY THE USE OF MORTAR AND BRICK. MAXIMUM ADJUSTMENT SHALL BE 8".

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..



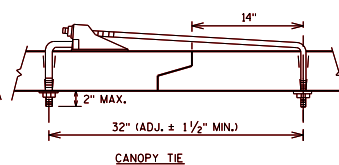
BOX CULVERT MANHOLE
FOR INLET TYPE 8 & 9

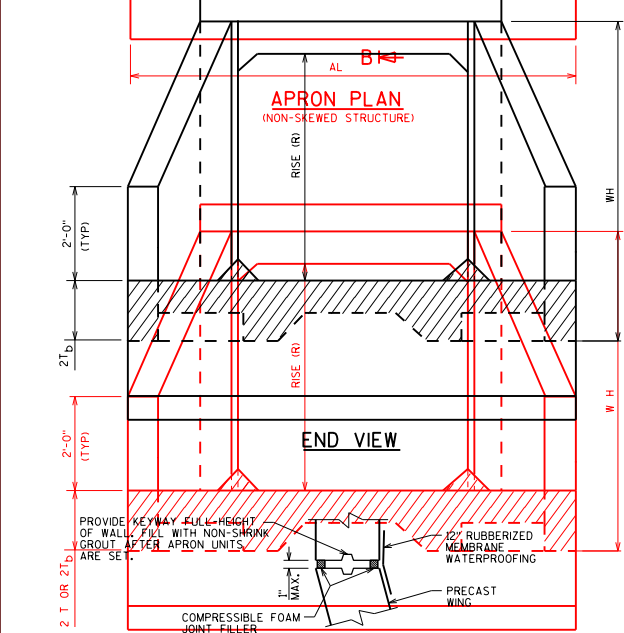


**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

DATE:
7-16

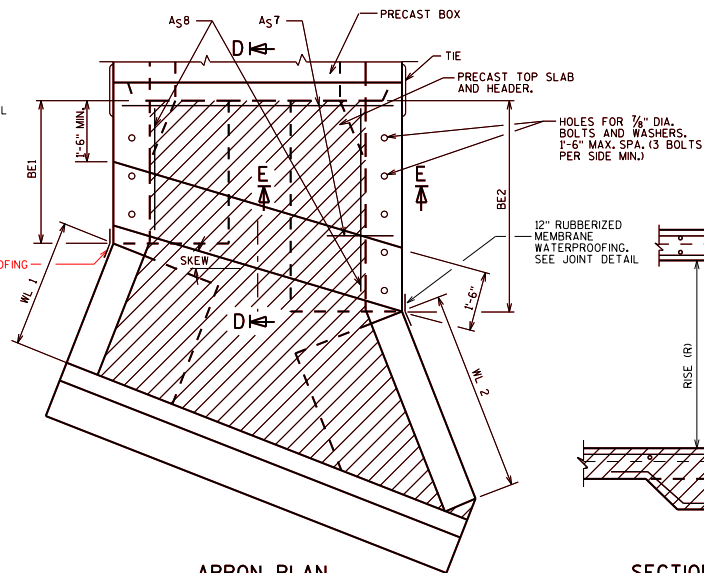




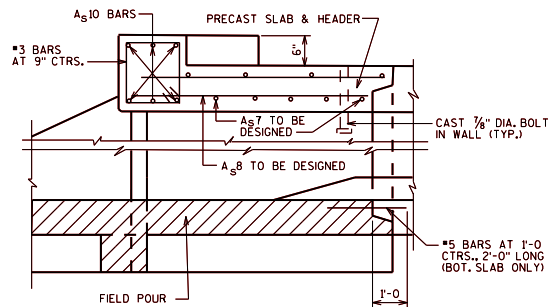
JOINT DETAIL

JOINT DETAIL EXAMPLE SHOWN. PRECAST
SUPPLIER TO SUBMIT JOINT DETAIL FOR
ACCEPTANCE.

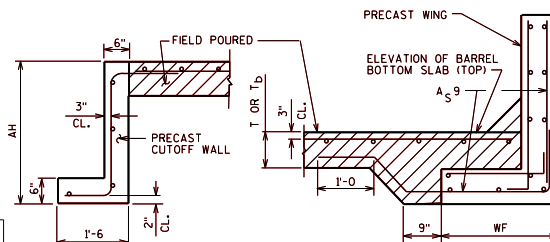
BOX CULVERT APRON DATA

[illegible]

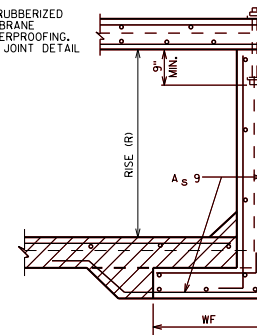
APRON PLAN
(SKEWED STRUCTURE)



SECTION D-D



SECTION B-B

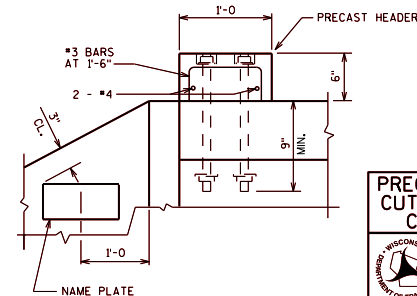


SECTION E-E

RISE(R)	A _{S9} IN. ² /FT	WF
4'-0"	0.19	2'-6"
6'-0"	0.24	3'-6"
8'-0"	0.31	4'-0"
10'-0"	0.34	4'-9"

[illegible]

SPAN (S)	A 430 BARS		
	0°-15°	16°-30°	31°-45°
6'-0"	(6b = 86	(6) = 96	(6) = 96
7'-0"	(6b = 86	(6) = 96	(6) = 97
8'-0"	(6b = 86	(6) = 97	(6) = 98
10'-0"	(6b = 97	(6) = 98	(6) = 98



SECTION C-C

NOTES

CONCRETE COVER ON ALL REINFORCEMENT IN THE
PRECAST ELEMENTS SHALL BE 2" UNLESS SHOWN
OR NOTED OTHERWISE.

STEEL REINFORCEMENT MAY BE EITHER GRADE 60 DEFORMED BARS ($F_y = 60,000$ P.S.I.) OR WELDED DEFORMED - WIRE FABRIC OF EQUIVALENT AREA, ($F_y = 65,000$ P.S.I.)

THE MINIMUM CONCRETE STRENGTH OF THE FIELD POURED CONCRETE SHALL BE 3,500 P.S.I.

ALTERNATE DETAILS OF EQUAL STRENGTH AND
HYDRAULIC CAPACITY TO THE DETAILS SHOWN ON
THIS SHEET MAY BE SUBMITTED TO THE ENGINEER
FOR APPROVAL.

THE MINIMUM CONCRETE STRENGTH OF THE CONCRETE IN THE PRECAST ELEMENTS SHALL BE 4,000 P.S.I.

THE PRECAST ELEMENTS SHALL BE PROVIDED WITH SUITABLE LIFTING DEVICES FOR HANDLING AND PLACEMENT OF THE ELEMENTS.

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 CONFORM TO THE FOLLOWING
TEMPERATURE AND SHRINKAGE REQUIREMENTS:

THICKNESS	T&S REINF.
≤ 12"	#4 @ 18"
> 12" - 18"	#4 @ 12"

THE MAXIMUM BAR SIZE OF GRADE 60 DEFORMED BARS, OTHER THAN THE A₅10 BARS, SHALL BE #5.

THE 7/8" DIA. ANCHOR BOLTS SHALL BE GALVANIZED AND CONFORM TO THE REQUIREMENTS OF A.S.T.M. A575.

ALL EXPOSED CORNERS SHALL BE BEVELED $\frac{3}{4}$ " ON THE SIDES OR TOOL EDGED WITH A $\frac{1}{2}$ " MINIMUM RADIUS EDGER.

PRECAST CUT OFF WALLS MAY BE FIELD SPICED BY EXTENDING THE REINFORCING STEEL FROM BOTH SEGMENTS TO BE SPICED 1'-6" INTO THE SPICE ZONE, LAPPING THE STEEL \pm 1'-6" AND FIELD POURING A SECTION OF CUT OFF WALL 1'-6" LONG.

PRECAST ELEMENTS MAY BE POURED IN PLACE AT THE OPTION OF THE CONTRACTOR.

APRON SHALL BE POURED AND CURED PRIOR TO
BACKFILLING WINGWALLS.

DESIGNER NOTE:

PROVIDE "BOX CULVERT APRON DATA" TABLE ON
CONTRACT PLANS WHEN A PRECAST ONLY DESIGN IS
PROVIDED.

RISE(R)	A _S 9 IN. ² /FT	WF
4'-0	.19	2'-6
6'-0	.24	3'-6
8'-0	.31	4'-0
10'-0	.34	4'-9



BUREAU OF STRUCTURES

APPROVED: Bill Oliva

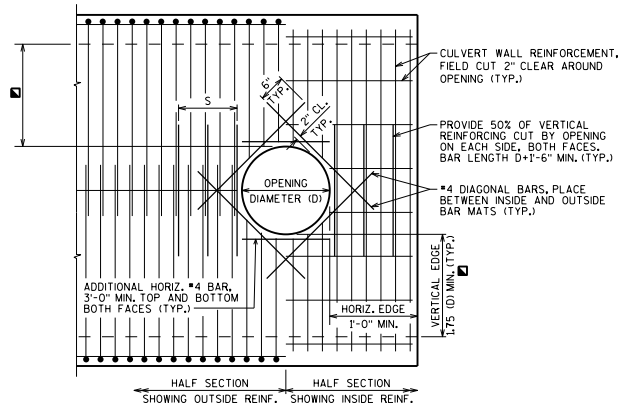
DATE: 7-26

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.

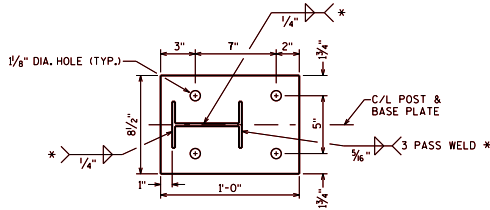


ELEVATION

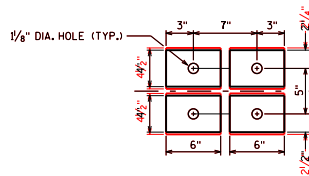
WHEN D ≤ 1'-6" S = 1'-6"
WHEN D > 1'-6" S = 1'-6" MIN, D MAX

PIPE OPENING IN CULVERT WALL	
	BUREAU OF STRUCTURES
APPROVED: <u>Bill Oliva</u>	DATE: 1-13

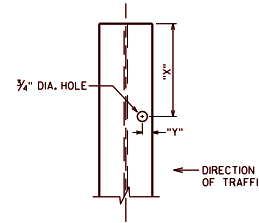
* WELDING IS TO BE COMPLETED USING THE GAS-METAL ARC WELDING (GMAW) PROCESS WITH ER70S-3 WELDING WIRE AND ARGON-OXYGEN OR CO₂ COVER GAS.



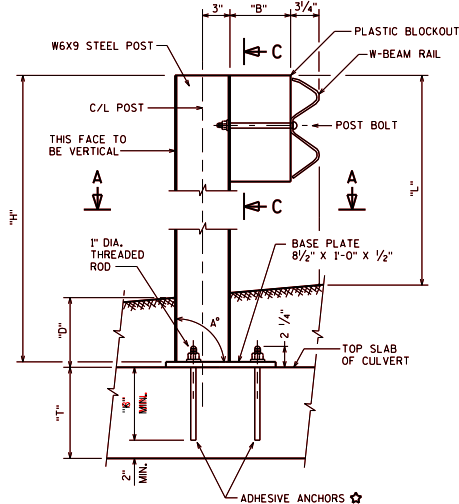
SECTION A-A
POST & BASE PLATE



SECTION B-B
(4)-BOTTOM PLATES



SECTION C-C
HOLE IN POST FLANGE ON
APPROACHING TRAFFIC SIDE

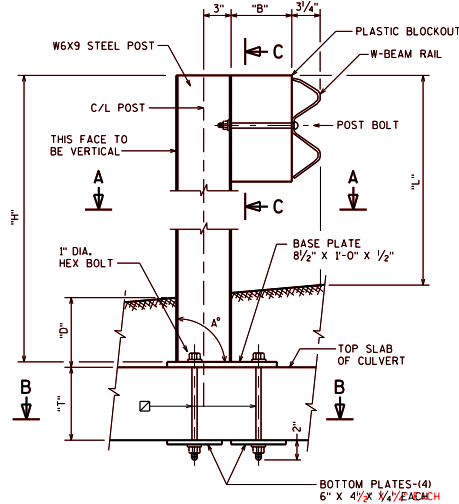


ELEVATION

GUARDRAIL POST ANCHORS TYPE 1

USE FOR THICKNESS "T" OF 8-INCHES OR MORE WITH A MINIMUM EMBEDMENT "D" OF 8-INCHES OR MORE AND CONCRETE STRENGTH (f'_c) OF 3,500 PSI.

USE FOR THICKNESS "T" OF 10-INCHES OR MORE WITH A MINIMUM EMBEDMENT "D" OF 8-INCHES OR A CONCRETE STRENGTH (f'_c) OF 4,000 PSI.



ELEVATION

GUARDRAIL POST ANCHORS TYPE 2

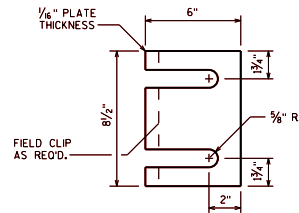
USE FOR THICKNESS "T" OF 8-INCHES OR MORE AND MINIMUM CONCRETE STRENGTH (f'_c) OF 3,500 PSI.

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 5/8"	8"	7"	13/16"	SDD 14 B 15
MGS GUARDRAIL	2'-7 1/8"	12"	7 7/8"	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 FULLY THREADED 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 50S.

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 (WHICH INCLUDE THREADED RODS, EMBEDDED IN CONCRETE AS DETAILED) CHARACTERISTICS AND STRENGTH SHALL MEET OR EXCEED THE REQUIREMENTS FOR CRACKED CONCRETE. SEE STANDARD SPECIFICATION 502.3.14 AND APPLY TO THREADED RODS.
- STEEL SHIMS MAY BE USED BETWEEN PLATES AND SLAB WHEN THROUGH BOLTS (OR ANCHORS) (HEX BOLT), DRILL THRU TOP SLAB WHEN THE CONCRETE HAS ACHIEVED ITS DESIGN STRENGTH (f'_c).

DESIGNER NOTES

FOR ALIGNED ROADWAYS, THE 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).

DESIGNER NOTES

FOR CRATERED ROADWAYS, 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 3'-1/2" PER FDM SDD 14 B 51. SEE FDM SDD 14 B 51 FOR MINIMUM CLEARANCES FROM EDGES OR OBSTRUCTIONS TO ANCHORAGE SYSTEM FOR TYPE 2 ANCHORAGE. MAKE SURE BOTTOM PLATE IS NOT PLACED AT THE SLOPED BRUNCH BETWEEN THE WALL AND TOP SLAB. SHIFT LOCATION IN OR 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.

POST SPACING IS 3'-1/2" PER FDM SDD 14 B 51. SEE FDM SDD 14 B 51 FOR MINIMUM CLEARANCES FROM EDGES, OBSTRUCTIONS, AND OBSTRUCTIONS TO ANCHORAGE SYSTEM FOR TYPE 2 ANCHORAGE. MAKE SURE BOTTOM PLATE IS NOT PLACED AT THE SLOPED BRUNCH BETWEEN THE WALL AND TOP SLAB. SHIFT LOCATION IN OR 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 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 "Y" 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 LEST LEVEL 3 (TL-3).

GUARDRAIL POST ANCHORAGE SYSTEM



**BUREAU OF
STRUCTURES**

APPROVED: *Abir O Bank*

DATE:
1-28

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 SDDOT 4848 PLUS PLUS 6" .

FOR SHORTER SPAN CULVERTS, WHERE BEAM GUARD CROSSES THE LENGTH OF THE STRUCTURE, CONSIDERATION SHALL BE GIVEN TO THE DETAILS SHOWN ON SDDOT 4848 PROVIDED REQUIREMENTS DON'T SHOW STANDARD AND BEAM MEET.

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 SDDOT 4838 AND SDDOT 4834 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.

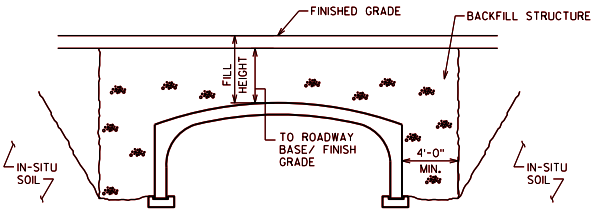
PLACE FOOTINGS BELOW SCOUR AND FROST DEPTHS. PLACE BOTTOM OF FOOTING AT A MINIMUM DEPTH EQUAL TO PREVAILING FROST DEPTH OR SCOUR DEPTH BUT NOT LESS THAN 4'-0" BELOW GROUND ELEVATION UNLESS CONSTRUCTED ON ROCK FOUNDATION OR OTHERWISE INDICATED.

PROVIDE DUCTILE JOINT SYSTEM BETWEEN VERTICAL LEG OF THE PRECAST SEGMENT AND FOOTER AS INDICATED ON THE STANDARD DETAIL DRAWINGS.

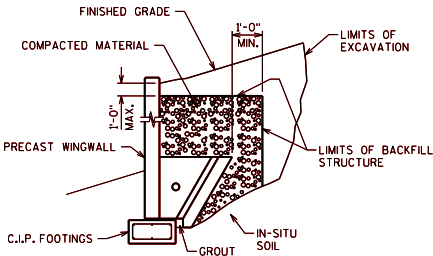
BENDING OF REINFORCEMENT FOR PRECAST BRIDGE UNITS - THE OUTSIDE AND INSIDE CIRCUMFERENTIAL REINFORCING STEEL FOR THE CORNERS OF THE BRIDGE SHALL BE BENT TO SUCH AN ANGLE THAT IS APPROXIMATELY EQUAL TO THE CONFIGURATION OF THE BRIDGE'S OUTSIDE CORNER.

LRFD DESIGN LOADS

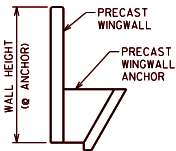
LIVE LOAD: HL-93
HORIZONTAL EARTH PRESSURE: UNIT WEIGHT = 125 PCF
VERTICAL EARTH PRESSURE: UNIT WEIGHT = 120 PCF



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*

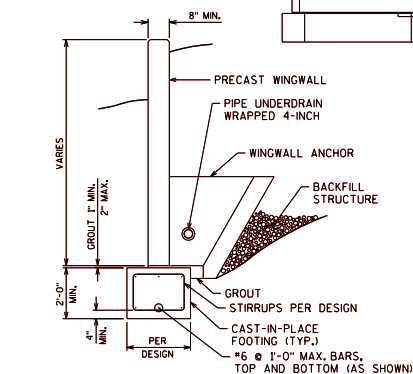
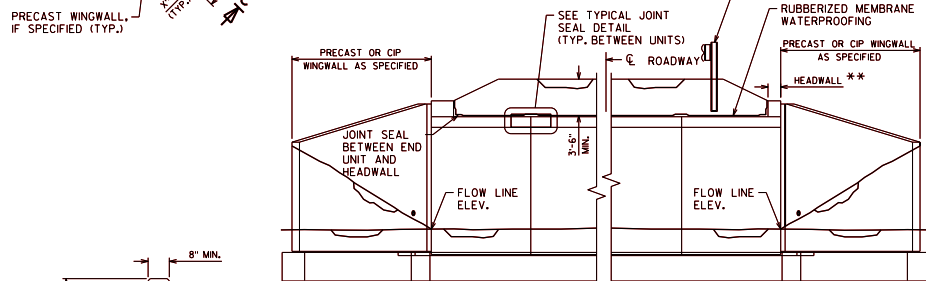
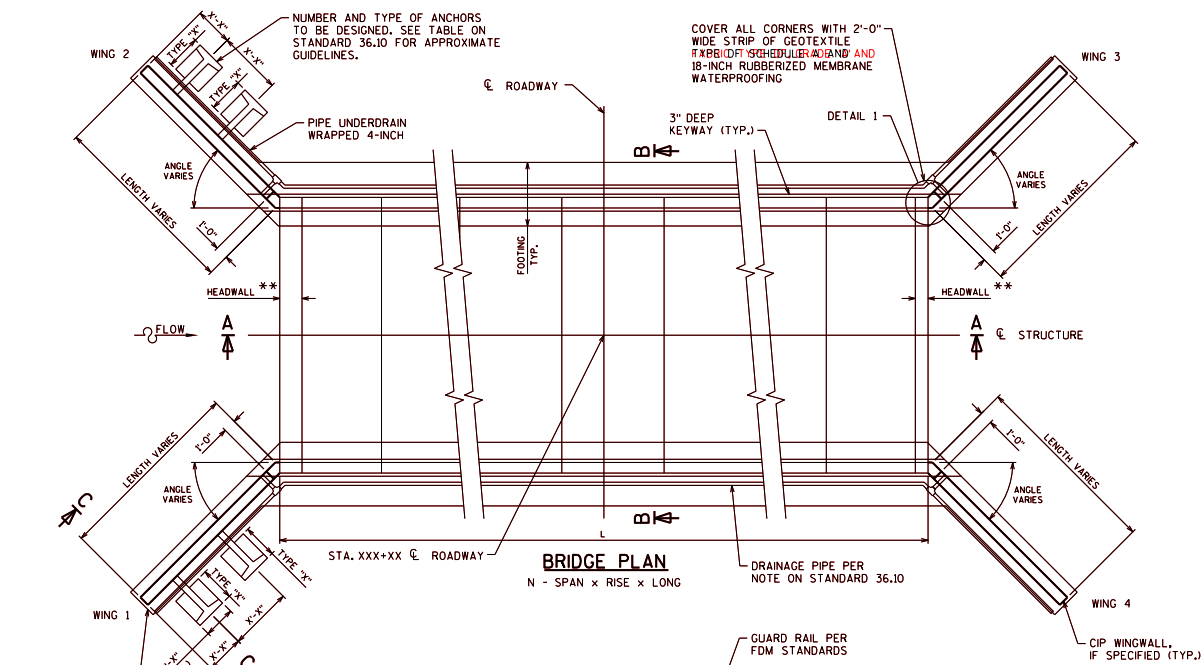
*NOTE: ADJACENT SEGMENTS SHALL BE ATTACHED TO EACH OTHER TO KEEP FRONT FACES IN ALIGNMENT. PLACE A FILLER AT THESE JOINTS WITH A MEMBRANE ALONG THE JOINT AT THE BACK FACE.

PRECAST THREE-SIDED BOX
CULVERT DESIGN NOTES

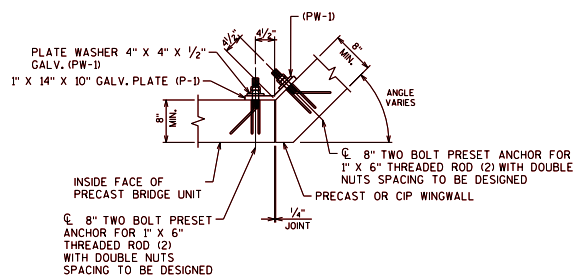


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STRUCTURES

APPROVED: Bill Oliva DATE: 7-21



SECTION C



DETAIL 1

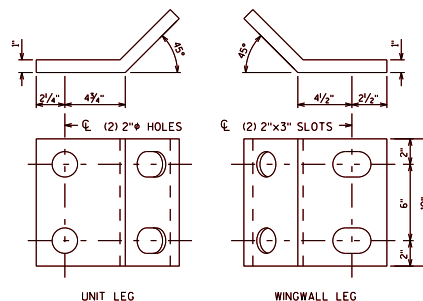
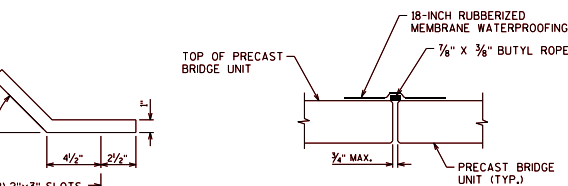


PLATE P-1



TYPICAL JOINT SEAL DETAIL

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. $f'_c = 4$ KSI (MIN.)

PROVIDE CONCRETE COVER ON REINFORCING BARS AS NOTED HEREIN.

CHAMFER EXPOSED CONCRETE EDGES $3/4" \times 3/4"$ 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.

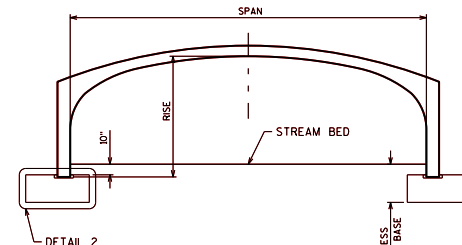
AT ANY TIME DURING PLACEMENT OF THE BACKFILL, DO NOT PERMIT A DIFFERENCE IN FILL ELEVATION ON THE SIDES OF THE CULVERT BARREL IN EXCESS OF 2'-0". DURING COMPACTION OF THE BACKFILL, DO NOT ALLOW THE WHEELS OF ROLLERS TO COME CLOSER THAN 1'-0" TO THE FACE OF THE OF THE STRUCTURE.

DESIGNER NOTES:

ALL BAR SPLICES TO BE "CLASS C" TENSION LAP SPLICES.

PRECAST CONCRETE CULVERT UNITS PLUS (N-D) JOINTS @ $1/4"$ TO $1/2"$ PER JOINT = L

** SEE STANDARD 36.13 AND STANDARD 36.14 FOR HEADWALL DETAILS AND FEASIBILITY GUIDELINES



SECTION B

PRECAST THREE-SIDED BOX CULVERT LAYOUT DESIGNS

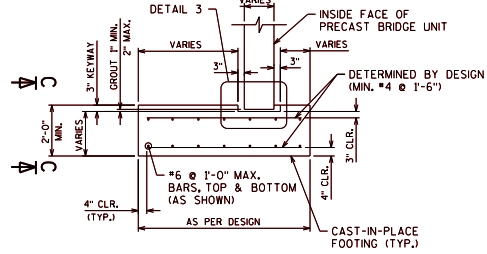


BUREAU OF STRUCTURES

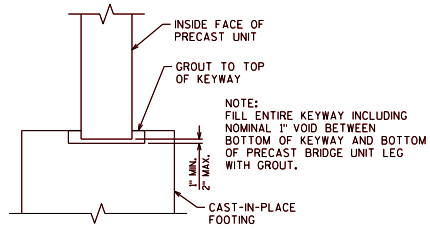
APPROVED: Bill Oliva

DATE: 7-18

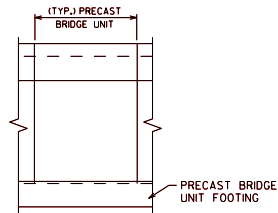
SPREAD FOOTING SHOWN, OTHER FOUNDATION TYPES POSSIBLE. (FOR PEDESTAL WALL, PILE AND BASE SLAB FOUNDATIONS, "SEE OPTIONAL DETAIL 2")



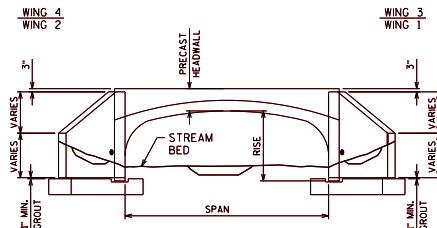
DETAIL 2



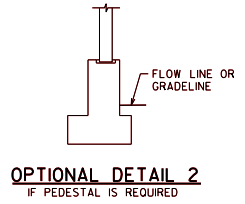
DETAIL 3



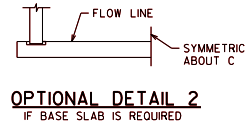
SECTION C



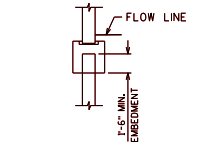
TYPICAL END ELEVATION



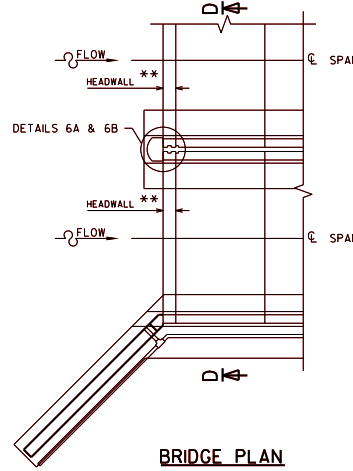
OPTIONAL DETAIL 2
IF PEDESTAL IS REQUIRED



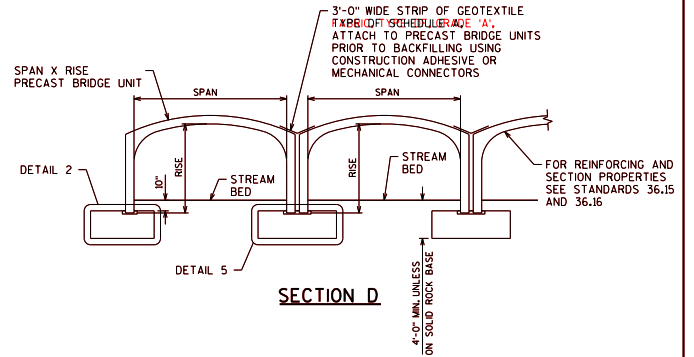
OPTIONAL DETAIL 2
IF BASE SLAB IS REQUIRED



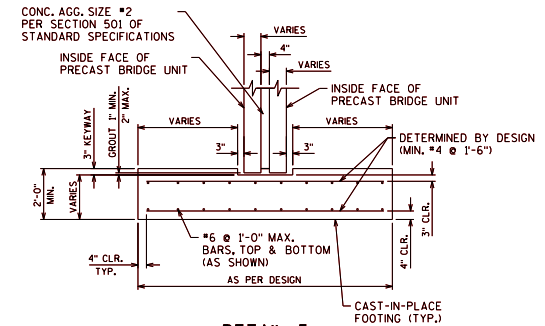
OPTIONAL DETAIL 2
IF PILES ARE REQUIRED



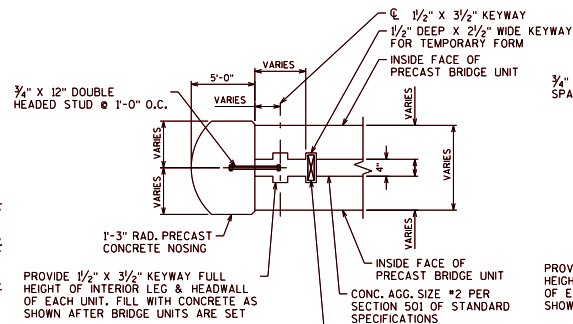
BRIDGE PLAN



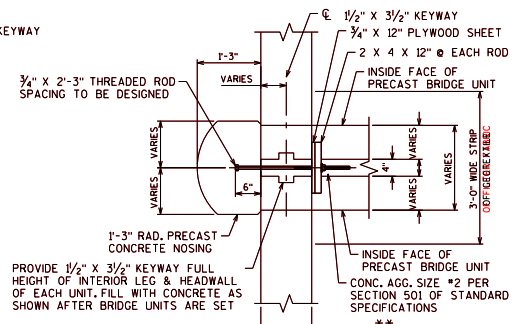
SECTION D



DETAIL 5



DETAIL 6A



DETAIL 6B

NOTES:

**SEE STANDARDS 36.13 AND 36.14 FOR HEADWALL DETAILS AND FEASIBILITY GUIDELINES

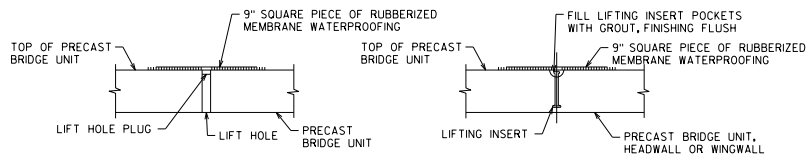
PRECAST THREE-SIDED BOX CULVERT DETAILS



BUREAU OF STRUCTURES

APPROVED: *S. Bill Dierker*

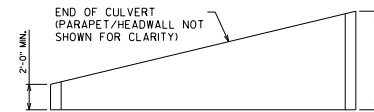
DATE: 7-18



LIFTING HOLES

LIFTING INSERTS

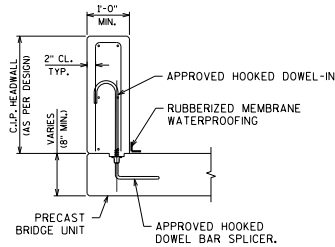
TYPICAL LIFT POINT SEALING DETAIL



SKewed UNITS

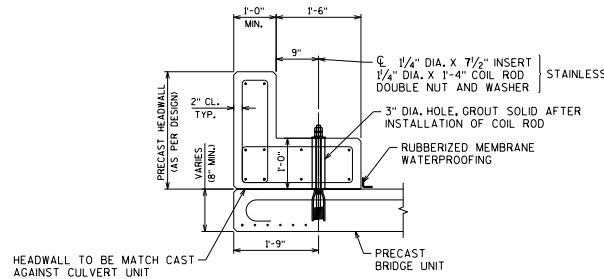
TYPICAL SKEW LIMITS PLAN VIEW - NOT TO SCALE

7'-9" MAX. FOR SPANS ≤ 24'-0"
5'-9" MAX. FOR SPANS 28'-0" - 42'-0"



CAST-IN-PLACE HEADWALL DETAIL

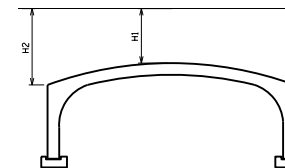
NOT TO SCALE



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 3/4"
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

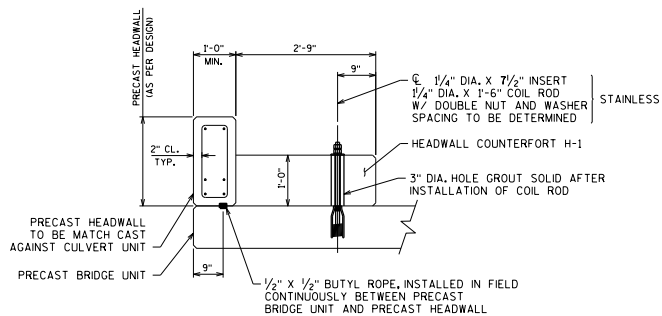
PRECAST THREE-SIDED BOX CULVERT HEADWALL DETAILS



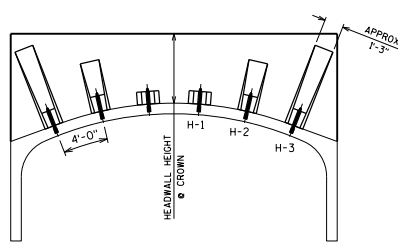
BUREAU OF STRUCTURES

APPROVED: Scot Becker

DATE:
1-11



PRECAST HEADWALL TYPE H-1 COUNTERFORT
NOT TO SCALE



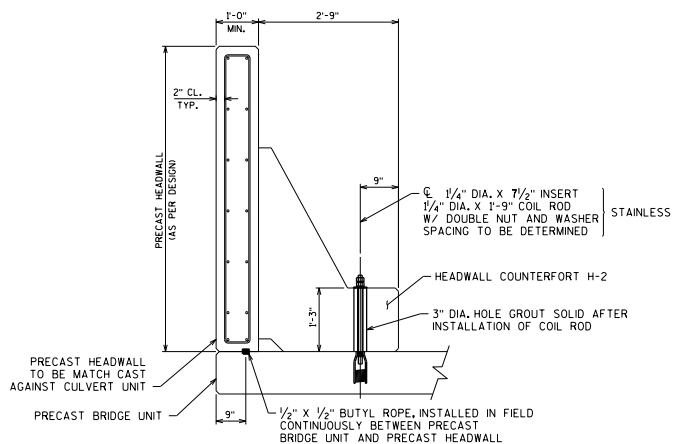
SAMPLE ELEVATION

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.

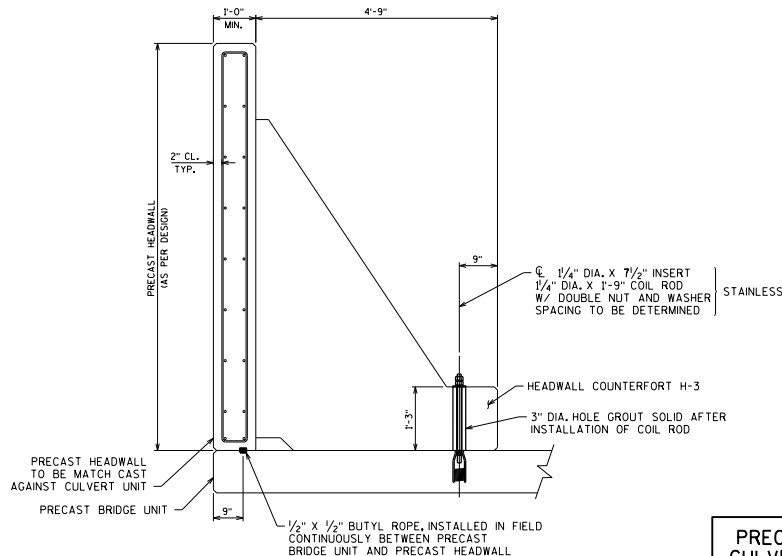
	COUNTERFORT	MAX HEADWALL HEIGHT @ COUNTERFORT LOCATION	
		NO SURCHARGE	W/ 2'-0" SURCHARGE
14'-0" SPAN	H-1	7'-0"	5'-0"
	H-2	7'-0"	5'-0"
	H-3	8'-0"	6'-0"
20'-0" - 42'-0" SPANS	H-1	8'-0"	6'-0"
	H-2	10'-0"	7'-0"
	H-3	10'-0"	8'-0"

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 HEADWALL TYPE H-2 COUNTERFORT
NOT TO SCALE



PRECAST HEADWALL TYPE H-3 COUNTERFORT
NOT TO SCALE

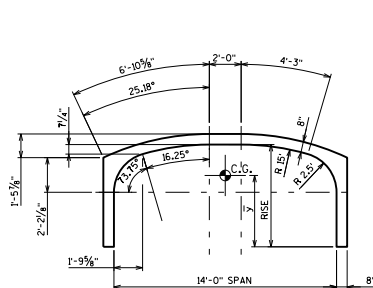
PRECAST THREE-SIDED BOX CULVERT HEADWALL DETAILS



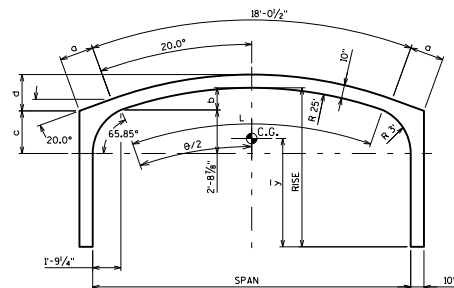
**BUREAU OF
STRUCTURES**

APPROVED: Scot Becker

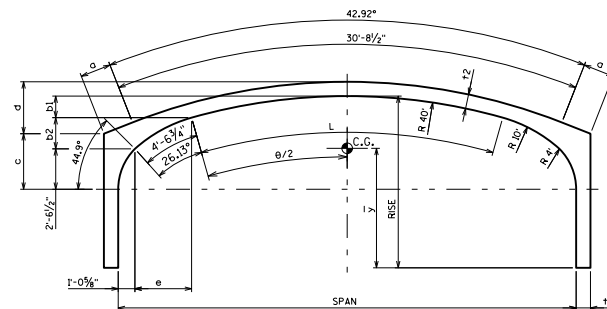
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14'-0" SPAN



20'-0" TO 24'-0" SPANS



28'-0" TO 42'-0" SPANS

RISE FT	SPAN - 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

RISE FT	SPAN - 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

	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)

COVER ft	ARCH UNIT PRIMARY REINFORCING (MINIMUM)																	
	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 SO. IN/FT	A3 SO. IN/FT	f'c REQ'D. PSI	A1 SO. IN/FT	A3 SO. IN/FT	f'c REQ'D. PSI	A1 SO. IN/FT	A3 SO. IN/FT	f'c REQ'D. PSI	A1 SO. IN/FT	A3 SO. IN/FT	f'c REQ'D. PSI	A1 SO. IN/FT	A3 SO. IN/FT	f'c REQ'D. PSI	A1 SO. IN/FT	A3 SO. IN/FT	f'c 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 ④
9	0.66	0.48	5000	0.72	0.90	5000	0.72	1.44	5000	0.96	1.68	5000 ④	1.50	2.40	6000	1.44	1.92	6000 ④
12	0.66	0.60	5000	0.72	1.08	5000	0.72	1.80	6000 ④	0.96	1.80	6000 ④	1.50	3.00	6000 ④	1.44	2.16	6000 ④

- 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"

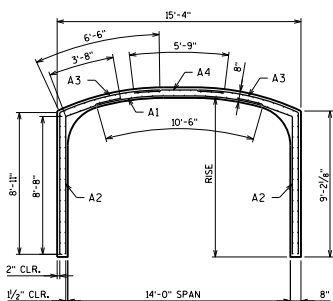
NOTE:
THESE STEEL AREAS ARE SHOWN FOR COVER OF 12'-0" OR LESS.

**PRECAST THREE-SIDED BOX
CULVERT CROSS SECTIONS**

**BUREAU OF
STRUCTURES**

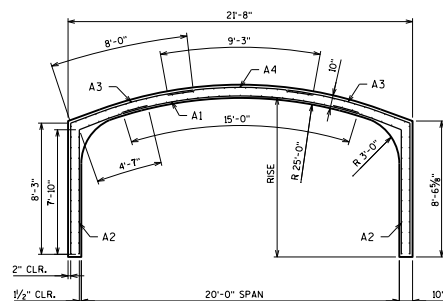
APPROVED: Scot Becker

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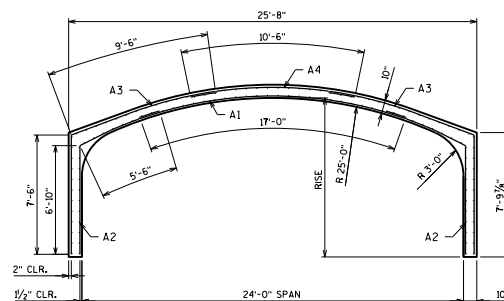
14'-0" SPAN

RISE = 10'-0" **SEE NOTE



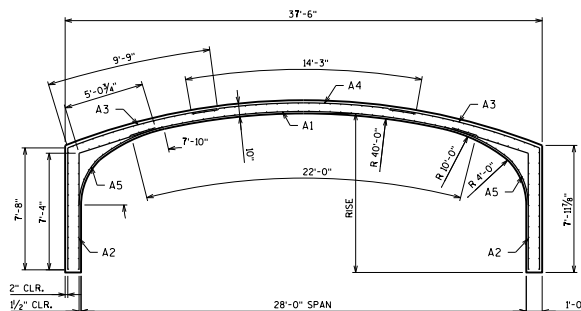
20'-0" SPAN

RISE = 10'-0" **SEE NOTE



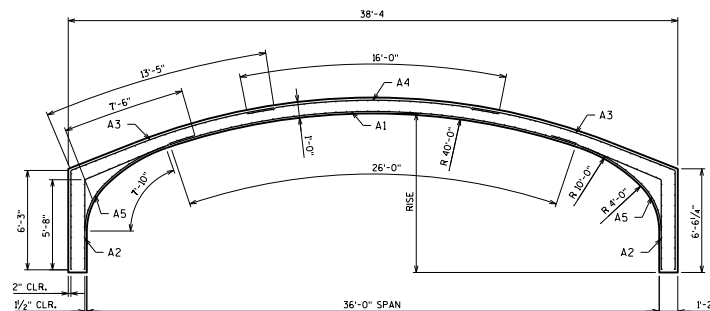
24'-0" SPAN

RISE = 10'-0" **SEE NOTE



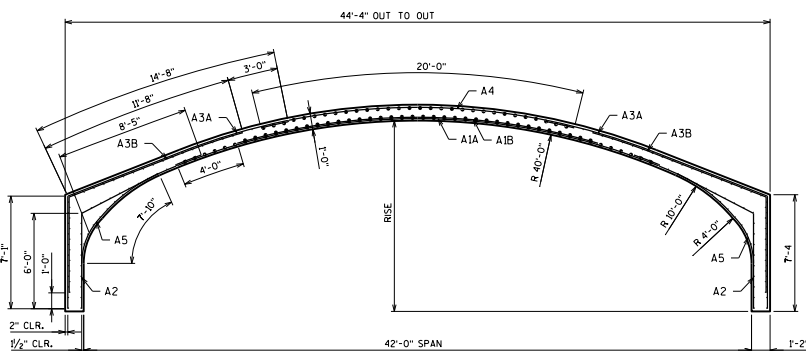
28'-0" SPAN

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 1/2 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 = 5000 PSI MINIMUM FOR CONCRETE
fy = 60,000 PSIFOR STEEL REINFORCING BARS
fy = 65,000 PSIFOR 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			
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	
A1 = **	0.13	10'-6"		A1 = **	0.13	15'-0"	
A2 = 0.24	0.13	12'-3"		A2 = 0.24	0.13	12'-5"	
A3 = **	0.13	15'-4"		A3 = **	0.13	16'-3"	
A4 = 0.24	0.13	5'-9"		A4 = 0.24	0.13	9'-3"	

28'-0" SPAN				36'-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	
A1A = **	0.13	22'-0"		A1A = **	0.13	26'-0"	
A1B = **	NOT REQ'D	16'-0"		A1B = **	NOT REQ'D	18'-0"	
A2 = 0.36	0.13	12'-6"		A2 = 0.36	0.13	13'-2"	
A3A = **	0.13	17'-6"		A3A = **	0.13	19'-8"	
A3B = **	NOT REQ'D	13'-6"		A3B = **	NOT REQ'D	15'-8"	
A4 = 0.36	0.13	14'-3"		A4 = 0.36	0.13	16'-0"	
A5 = 0.24	0.13	7'-10"		A5 = 0.24	0.13	7'-10"	

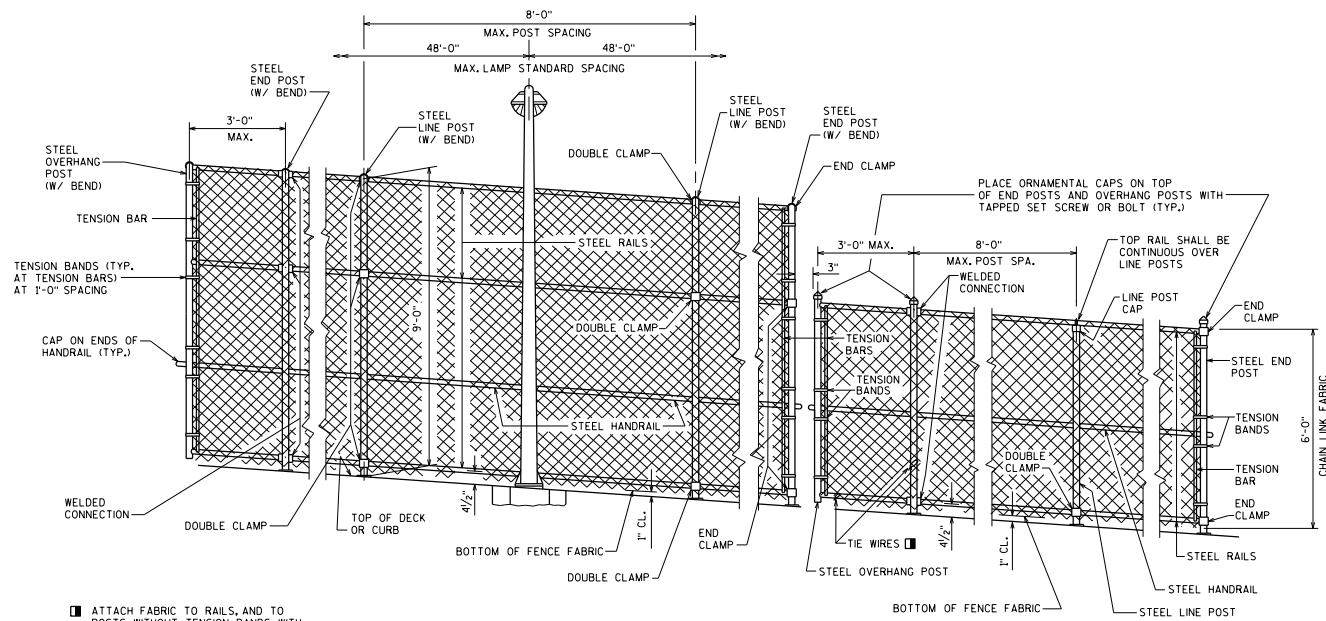
PRECAST THREE-SIDED BOX
CULVERT REINFORCEMENT



**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

DATE:
7-14

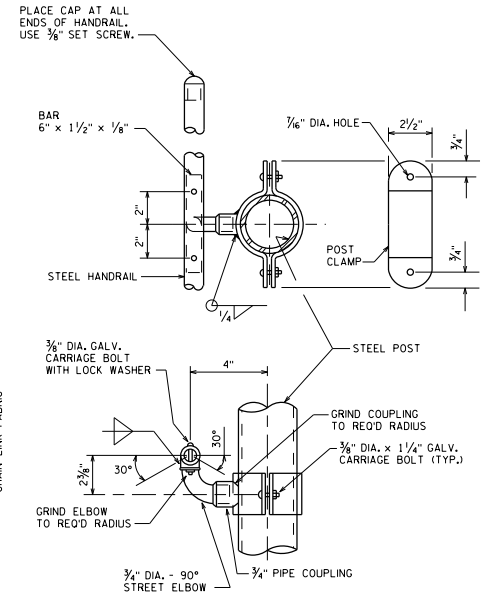


ATTACH FABRIC TO RAILS, AND TO POSTS WITHOUT TENSION BANDS, WITH TIE WIRES (ROUND, 9-GAGE) SPACED AT 1'-0".

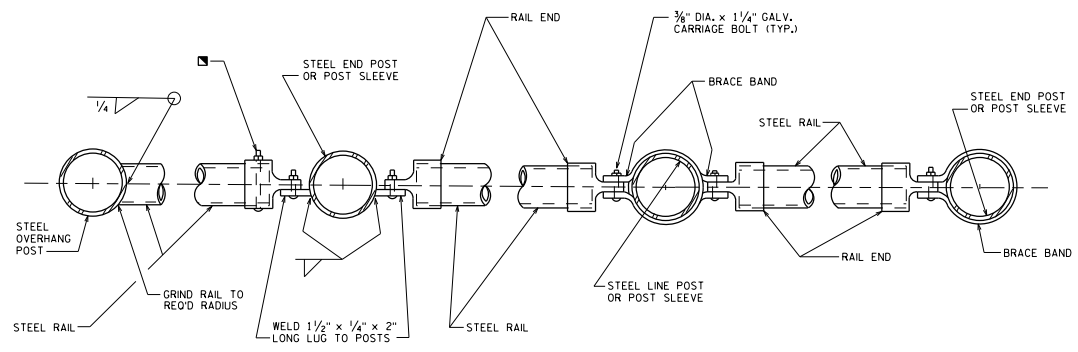
AT LAMP STANDARD

AT EXPANSION JOINT

ELEVATION OF FENCE



HANDRAIL DETAILS



WELDED CONNECTION (AT OVERHANG SECTION)

* DOUBLE CLAMP

END CLAMP

PLAN OF RAILING

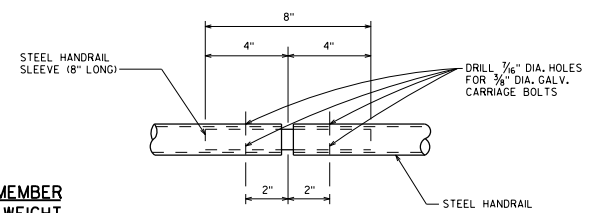
BOLT RAIL TO RAIL END TO SECURE OVERHANG SECTION. ALTERNATE IS TO WELD RAIL DIRECTLY TO END POST.

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 30.1)

FENCE MEMBER SIZE & WEIGHT

STEEL FENCE MEMBER	OUTSIDE DIAMETER (INCHES)	WEIGHT (LB/FT)
RAILS	1.660	2.27
END POST	2.375	3.65
OVERHANG POST	2.375	3.65
LINE POST	2.375	3.65
HANDRAIL	1.660	2.27
CROSS RAIL SLEEVE	1.900	2.72
HANDRAIL SLEEVE	1.315	1.68
POST SLEEVE	4.000	9.12



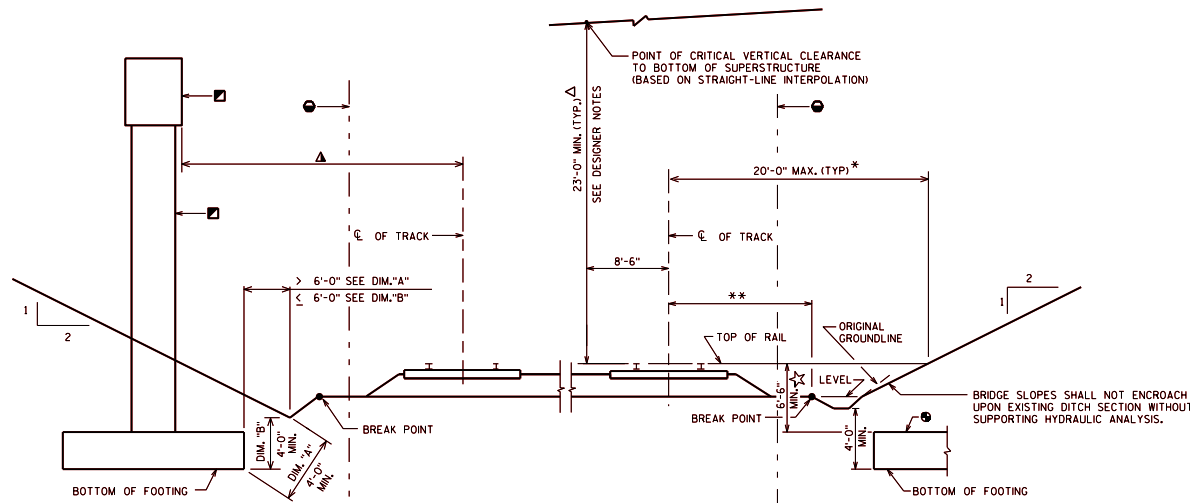
HANDRAIL SPLICE

PEDESTRIAN OVERPASS DETAILS

BUREAU OF STRUCTURES

APPROVED: Scot Becker

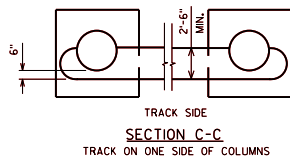
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RAILROAD IN FILL

RAILROAD CROSS SECTIONS

RAILROAD IN CUT

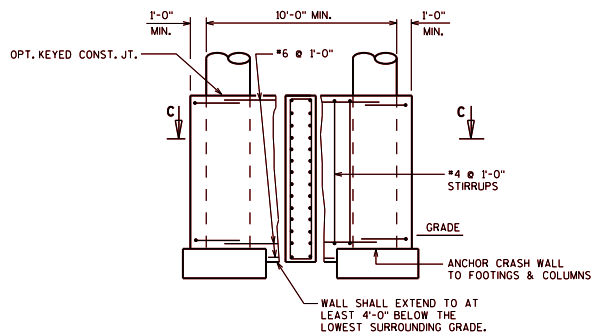


SECTION C-C

TRACK ON ONE SIDE OF COLUMNS

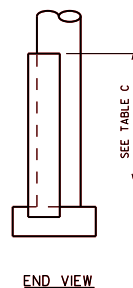
	PIER LOCATION	HEIGHT OF CRASH WALL ABOVE TOP OF RAIL
GENERAL AREMA REQUIREMENT	PIERS $\leq 12'-0"$ FROM ϕ TRACK	12'-0"
	PIERS $12'-0"$ TO $25'-0"$	6'-0"
CP RAIL REQUIREMENT	PIERS $< 15'-0"$ FROM ϕ TRACK	12'-0"
	PIERS $\geq 15'-0"$ TO $25'-0"$	8'-0"

TABLE C

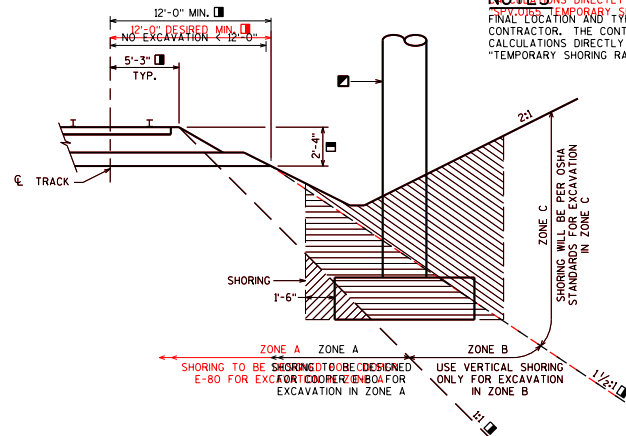


ELEVATION

CRASH WALL DETAILS



END VIEW



LIMITS BEFORE SHORING REQUIRED

DESIGNER NOTES

DIMENSIONS SHOWN APPLY TO CUT OR FILL SITUATIONS.

DECK DRAINS OR DOWN SPOUTS SHALL NOT DISCHARGE ONTO RAILROAD TRACK BED.

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. I.E. 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'-3/4" 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 (30.50 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.

▲ ACCOMMODATION 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 SPECATED IN SECTION 07.17 OF THE STANDARD SPECIFICATIONS. DESIGNER SHALL ALSO DETERMINE IF THE SHORING IS TO BE DESIGNED FOR ZONE A. DESIGNER SHALL SHOW HORIZONTAL LOCATION OF SHORING NEEDED IN PLAN VIEW. INCLUDE BID ITEM "TEMPORARY SHORING RAILROAD" WHEN SHORING ENCROACHES ZONE A AND/OR BEDROCK IS PRESENT.

★ BNSF AND UP RAILROADS REQUIRE BEDROCK PRESENTATIONS ONLY. THE DESIGN ENGINEER SHALL CONTACT THE RAILROAD FOR THEIR REQUIREMENTS. THIS STANDARD IS TO MEET WISDOT REQUIREMENTS ONLY.

★ BNSF AND UP RAILROADS REQUIRE BEDROCK PRESENTATIONS ONLY. THE DESIGN ENGINEER SHALL CONTACT THE RAILROAD FOR THEIR REQUIREMENTS. THIS STANDARD IS TO MEET WISDOT REQUIREMENTS ONLY.

★ BNSF AND UP RAILROADS REQUIRE BEDROCK PRESENTATIONS ONLY. THE DESIGN ENGINEER SHALL CONTACT THE RAILROAD FOR THEIR REQUIREMENTS. THIS STANDARD IS TO MEET WISDOT REQUIREMENTS ONLY.

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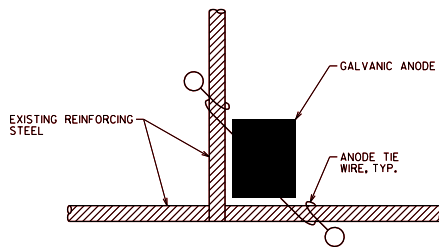
HIGHWAY OVER RAILROAD DESIGN REQUIREMENTS



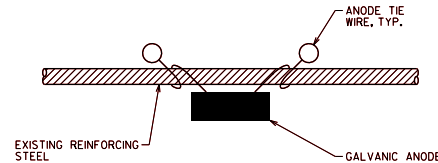
BUREAU OF STRUCTURES

APPROVED: Bill Oliva

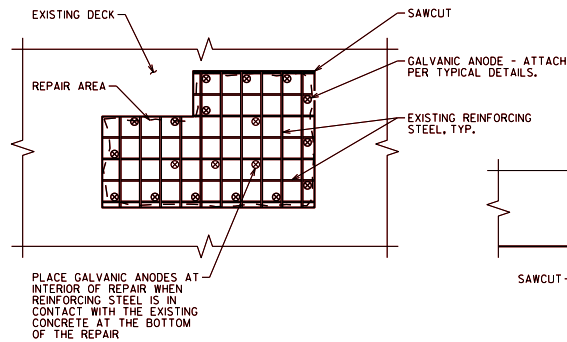
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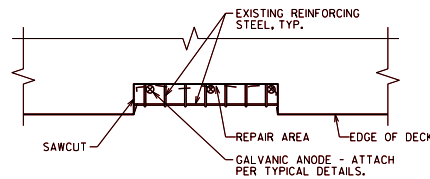
TYPICAL INSTALLATION AT
BAR STEEL INTERSECTION



TYPICAL INSTALLATION
FOR BAR STEEL



NOTE:
EXISTING REINFORCING STEEL TO BE
COMPLETELY CLEANED OF CORRODED
MATERIAL PRIOR TO INSTALLATION
OF GALVANIC ANODES.



PART. PLAN TYPICAL REPAIR DETAIL

509.1500 CONCRETE SURFACE REPAIR SF
SPV.0060 EMBEDDED GALVANIC ANODES EACH

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.

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 1/2" AND A MINIMUM BOTTOM COVER OF 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.

NOTES

SEE SPECIAL PROVISION "EMBEDDED GALVANIC ANODES" FOR DESCRIPTION, MATERIALS, CONSTRUCTION, MEASUREMENT, AND PAYMENT INFORMATION.

ANODES NEAREST TO EDGE OF REPAIR TO BE WITHIN 6" OF EDGE.

AFTER PLACEMENT, GALVANIC ANODES SHOULD MAINTAIN A MINIMUM TOP COVER OF 1/2" AND A MINIMUM BOTTOM COVER OF 3/4".

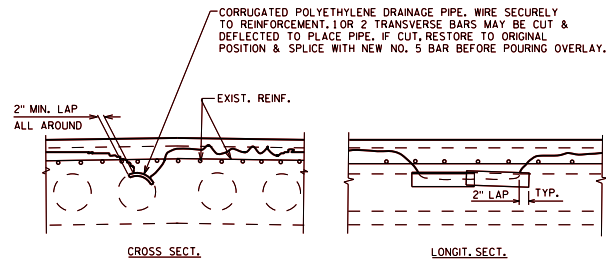
CATHODIC PROTECTION



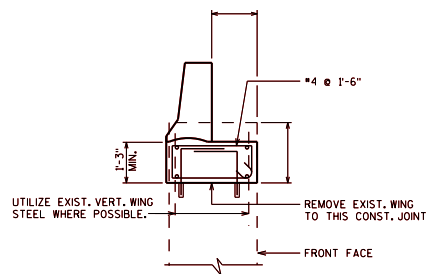
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APPROVED: Bill Oliva

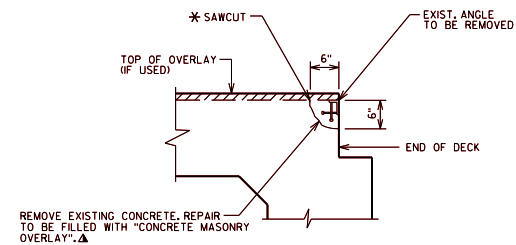
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RUPTURED VOID REPAIR



SECTION THRU PARAPET ON WING

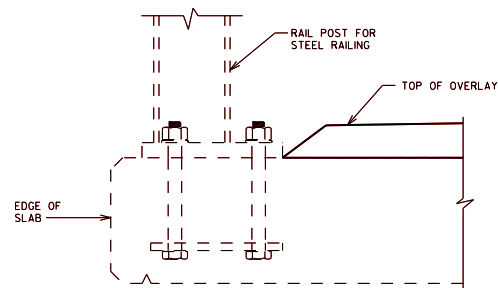


SECTION AT END OF SLAB

509.0301	PREPARATION DECKS TYPE 1	SY
509.0302	PREPARATION DECKS TYPE 2	SY
*509.0300.5	SAWING PAVEMENT DECK PREPARATION AREAS	LF
509.2000	CONCRETE MASONRY DECK REPAIR AREAS	SY
509.2500	CONCRETE MASONRY OVERLAY AREAS	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.



SECTION THRU RAILING

ATTACHING PARAPETS OR RAILINGS TO BRIDGE DECKS WITH EPOXY ANCHORS IS NOT ALLOWED BY FHWA.

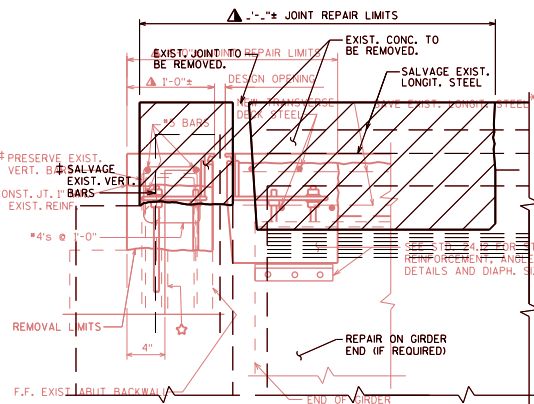
OVERLAY DETAILS



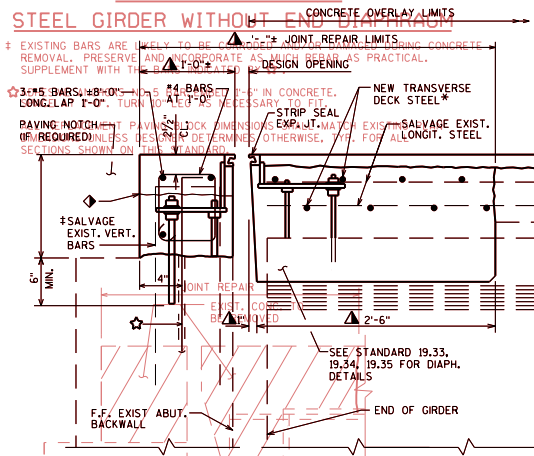
BUREAU OF STRUCTURES

APPROVED: Bill Oliva

DATE:
1-18

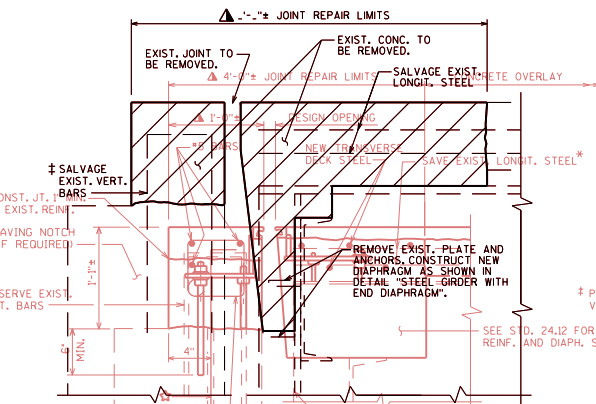


**JOINT REPAIR-REMOVAL
PRESTRESSED GIRDER**

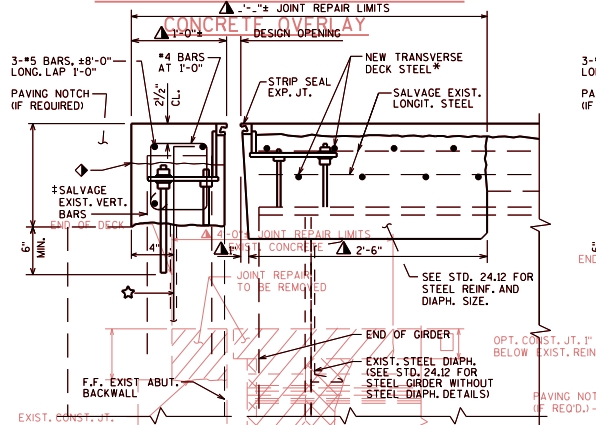


**SECTION THRU PROPOSED JOINT
PRESTRESSED GIRDER WITH END DIAPHRAGM
CONCRETE OVERLAY**

**JOINT REPAIR-REMOVAL
STEEL GIRDER**



**SECTION THRU PROPOSED JOINT
STEEL GIRDER WITH END DIAPHRAGM
CONCRETE OVERLAY**



**SECTION THRU PROPOSED JOINT
STEEL GIRDER WITH END DIAPHRAGM
CONCRETE OVERLAY**

TOTAL ESTIMATED QUANTITIES

BID ITEM NUMBER	BID ITEMS	UNIT	TOTAL
502.3101	EXPANSION DEVICE B	LF	
502.4205	ADHESIVE ANCHORS NO. 5 BAR	EACH	
509.1000	JOINT REPAIR	LF	
509.2100.5	CONCRETE MASONRY DECK REPAIR	CY	
509.2500	CONCRETE MASONRY OVERLAY DECKS	CY	
505.0400	BAR STEEL REINFORCEMENT HS STRUCTURES	LB	
505.0600	BAR STEEL REINFORCEMENT HS COATED STRUCTURES	LB	
505.0600	BAR STEEL REINFORCEMENT HS COATED STRUCTURES	LB	
509.2500	CONCRETE MASONRY OVERLAY DECKS	CY	

THIS IS A PARTIAL LIST OF POSSIBLE BID ITEMS. BID ITEMS MAY NEED TO BE ADDED OR REMOVED TO FIT EACH INDIVIDUAL CASE.

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. JT. 1" MIN. BELOW EXIST. REINF.

▲ DIMENSIONS GIVEN ARE NORMAL TO ¼ 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.

SEE STD. 24.12 FOR STEEL REINF. AND DIAPH. SIZE.

SEE STD. 24.12 FOR STEEL REINF. AND DIAPH. SIZE.

SEE STD. 24.12 FOR STEEL REINF. AND DIAPH. SIZE.

SEE STD. 24.12 FOR STEEL REINF. AND DIAPH. SIZE.

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SEE STD. 24.12 FOR STEEL REINF. AND DIAPH. SIZE.

▲ DIMENSIONS GIVEN ARE NORMAL TO ¼ OF SUBSTRUCTURE UNIT. INCORPORATE EXISTING REINFORCEMENT.

STRIP SEALS & DIAPH. DETAILS FOR OVERLAYS

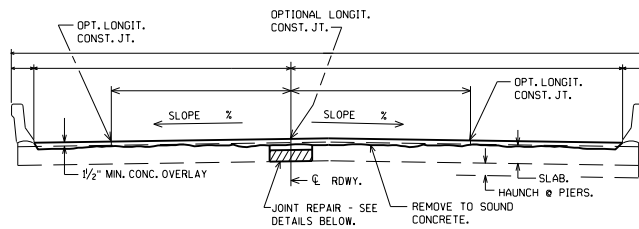


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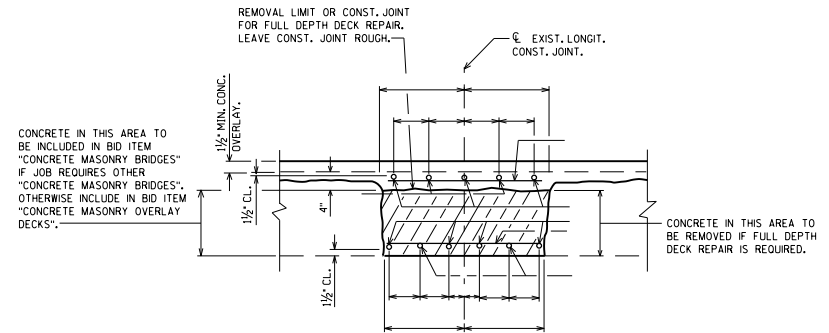
APPROVED: *Abitha O Bank*

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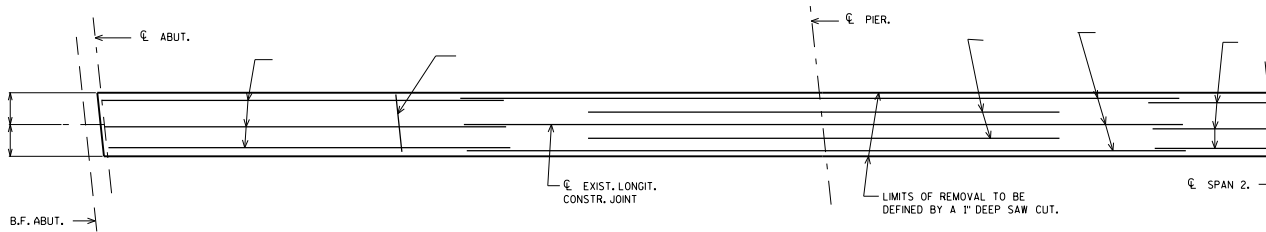
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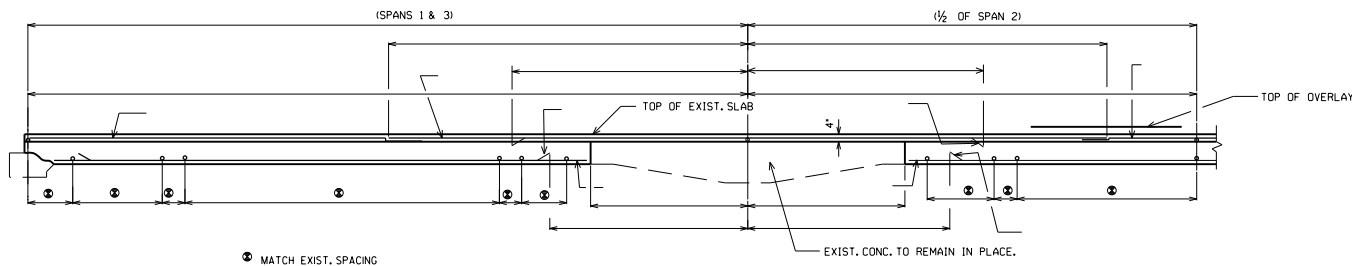
CROSS SECTION THRU ROADWAY LOOKING EAST



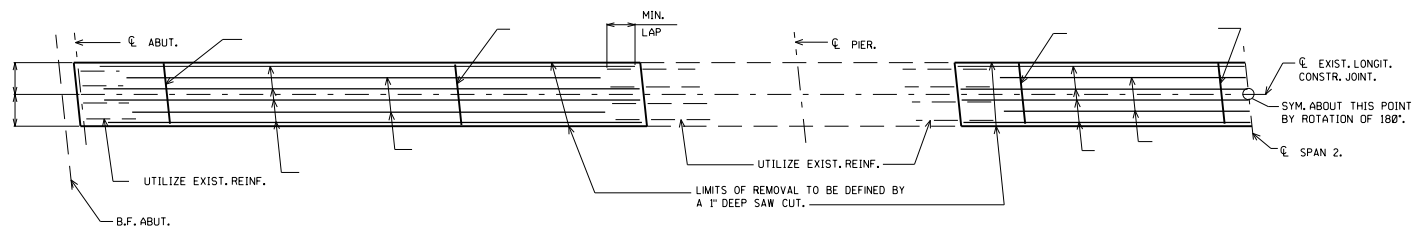
TYP. SECTION THRU JOINT



HALF PLAN SHOWING TOP BAR STEEL REINF.



HALF LONGIT. SECTION



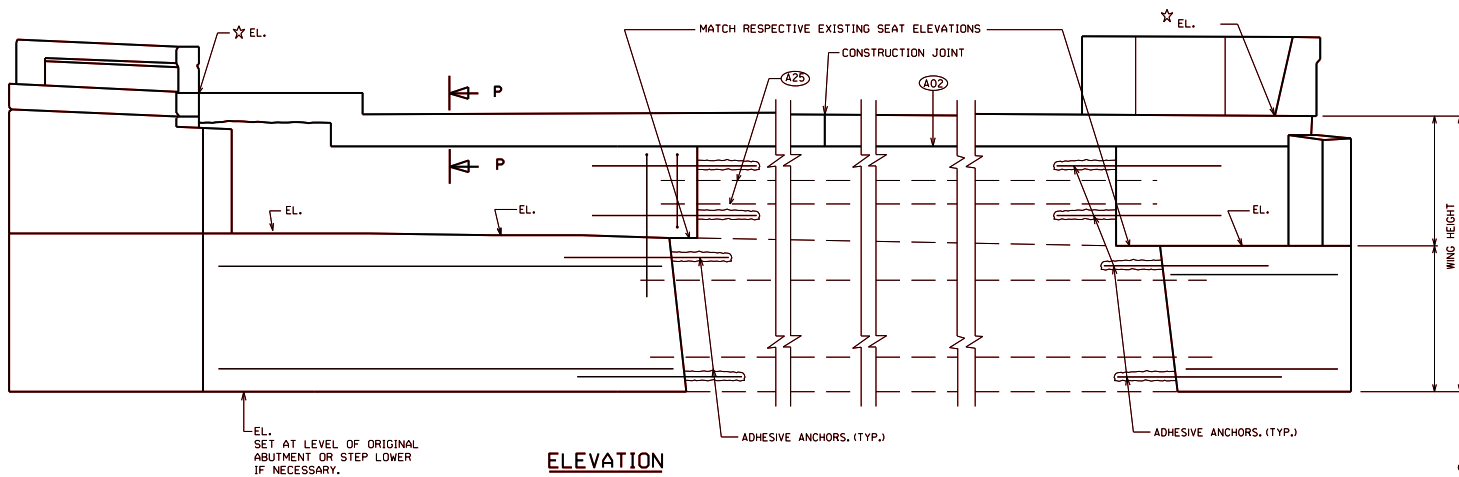
HALF PLAN SHOWING BOTTOM BAR STEEL REINF

(REQUIRED ONLY FOR FULL DEPTH DECK REPAIR)

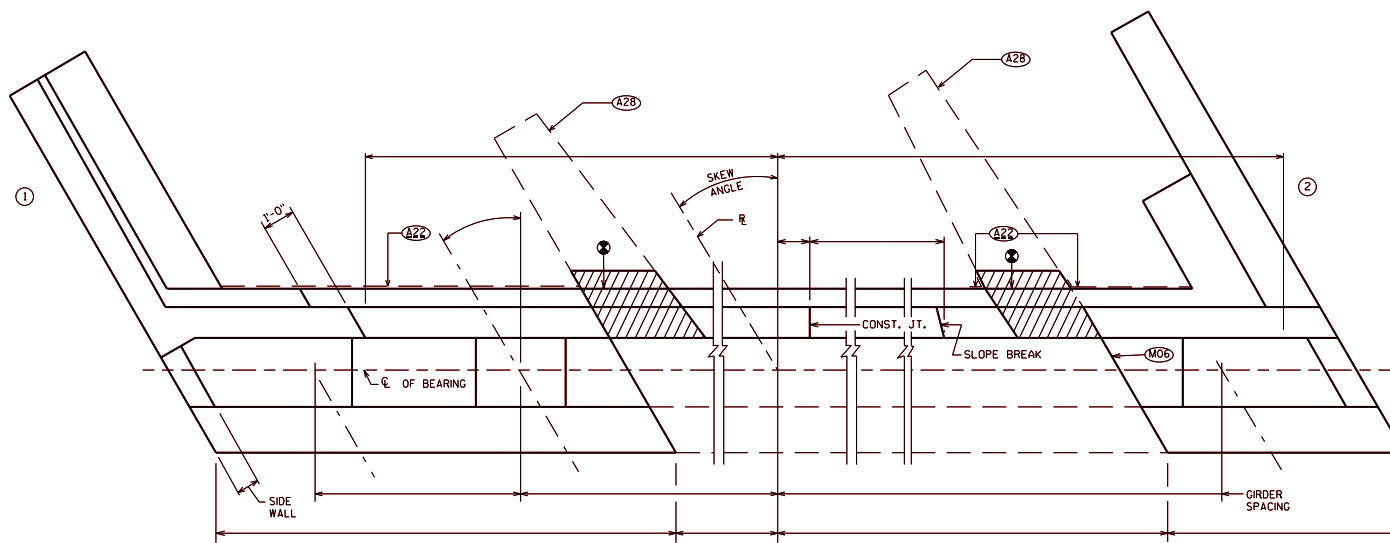
TOTAL ESTIMATED QUANTITIES

BID ITEMS	
JOINT REPAIR	SY
BAR STEEL REINFORCEMENT HS COATED STRUCTURES	LB
CONCRETE MASONRY BRIDGES	CY
CONCRETE MASONRY OVERLAY DECKS	CY

LONGIT. CONST. JOINT REPAIRS	
BUREAU OF STRUCTURES	
APPROVED: <u>Bill Oliva</u>	DATE: 7-16

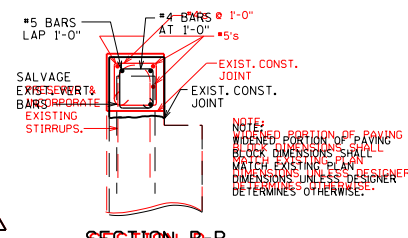
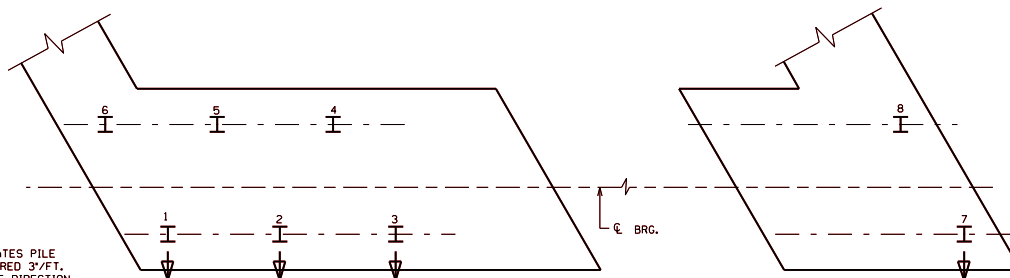


ELEVATION



WING WITHOUT PILE

WING WITH PILE



NOTES

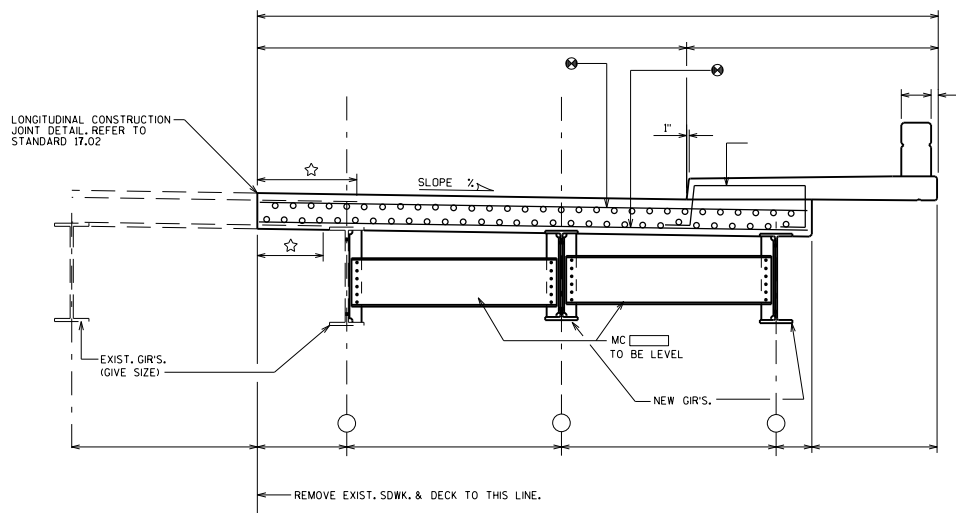
- Ⓐ02 CONSTRUCTION JOINT: POUR CONCRETE ABOVE THIS JOINT AFTER SUPERSTRUCTURE CONCRETE IS IN PLACE. STRIKE OFF AND LEAVE ROUGH.
- Ⓐ22 18" (RMW) RUBBERIZED MEMBRANE WATERPROOFING SEAL ALL HORIZ. & VERT. JOINTS AT BACKFACE.
- Ⓐ25 SALVAGE EXIST. REINF. & EXTEND FULL LENGTH INTO NEW WORK.
- MO6 ROUGHEN SURFACE OF CONCRETE 1/4" DEEP MINIMUM AT ALL AREAS WHERE NEW CONCRETE CONTACTS EXISTING CONCRETE.
- Ⓐ28 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

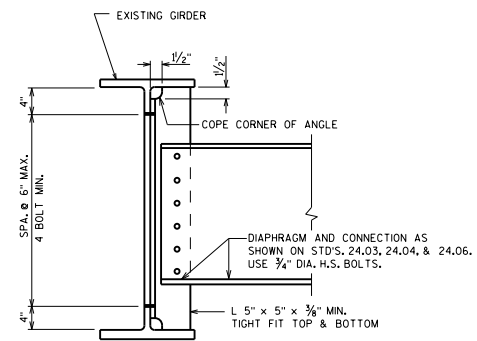
SEE CHAPTER 12 FOR NEW BAR STEEL PLACEMENT, DETAILS, DIMENSIONS, & NOTES.

ABUTMENT WIDENING	
	BUREAU OF STRUCTURES
APPROVED: <u>Bill Oliva</u>	DATE: <u>7-19</u>

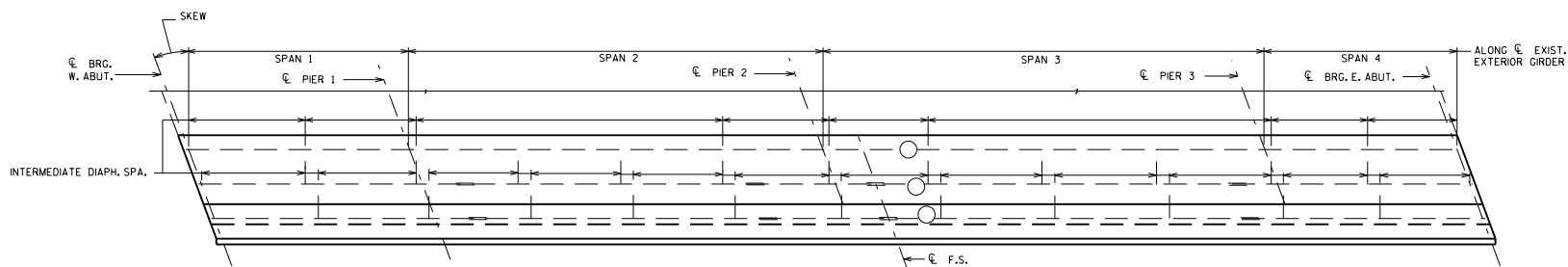
☆ MIN. LAP, TOP.
 ☉ MIN. LAP, BOT.
 ● LAP TO EXIST. TRANS. BARS.



CROSS SECT. THRU RDWY.



DIAPHRAGM CONNECTION TO
EXISTING STEEL GIRDER



PLAN

SLAB WIDENING



**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

DATE:
7-16

STANDARD 40.07

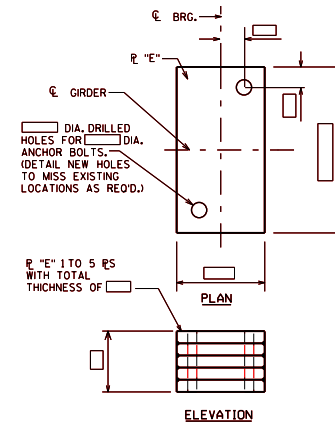
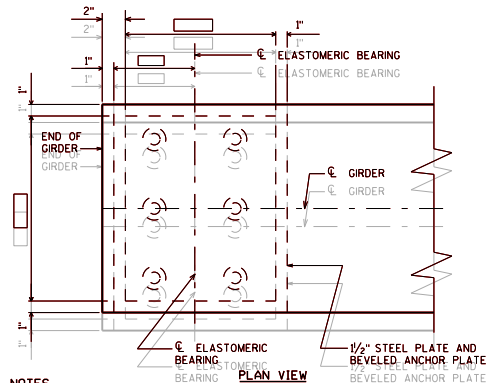


PLATE 'E' DETAILS
(SEE STD. 40.10 FOR CONCRETE BLOCK ALTERNATE)



ALL MATERIAL USED FOR BEARINGS SHALL BE PAID AT THE UNIT PRICE BID FOR "BEARING PAD ELASTOMERIC LAMINATED." IF THE THICKNESS IS REDUCED, THE FOLLOWING NOTE SHALL BE LOCATED ON THE PLANS:

GRIND EXIST. WELD THAT ATTACHED EXIST. TOP PLATE TO EXIST. BOT. FLANGE. GRIND AFFECTED AREAS SMOOTH. WELD EXIST. TOP PLATE TO EXIST. BOT. FLANGE.

DESIGNER NOTES

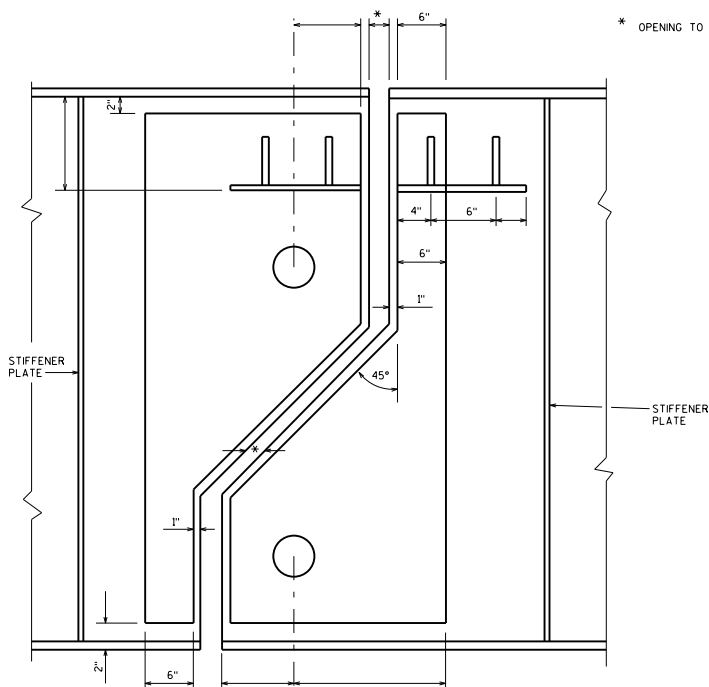
THE STEEL TOP PLATE THICKNESS MAY BE REDUCED ($\frac{1}{8}$ " MIN.) TO MATCH THE OVERALL HEIGHT. IF THE THICKNESS IS REDUCED, THE FOLLOWING NOTE SHALL BE LOCATED ON THE PLANS:

NOTE: WELDING PROCEDURES SHALL BE ESTABLISHED BY THE CONTRACTOR TO RESTRICT THE MAXIMUM TEMPERATURE REACHED BY SURFACES IN CONTACT WITH CUSTOMER'S EQUIPMENT TO 200°F. SURFACES IN CONTACT WITH CUSTOMER'S EQUIPMENT SHALL BE CONTROLLED BY TEMPERATURE INDICATING VACUUM PENCILS OR OTHER SUITABLE MEANS APPROVED BY THE ENGINEER.

PRESTRESSED GIRDERS

NOTES & DESIGNER NOTES
SEE "EXPANSION BEARING REPLACEMENT - PRESTRESSED
GIRDERS" ON THIS STANDARD.

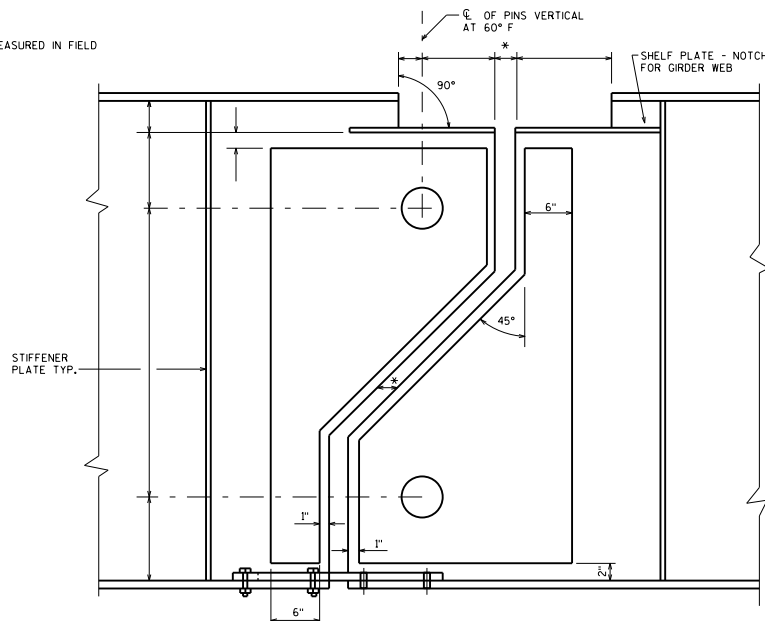
STANDARD	40.08
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TYPICAL HINGE DETAIL FOR WATERTIGHT EXPANSION DEVICE

NOTES:
DETAILS NOT SHOWN ARE IDENTICAL TO DETAILS SHOWN
FOR "FINGER TYPE EXPANSION DEVICE".

* OPENING TO BE MEASURED IN FIELD



TYPICAL HINGE DETAIL FOR FINGER TYPE EXPANSION DEVICE

(HANGER PLATES NOT SHOWN)

NOTES

INSIDE HOLES OF HANGER PLATES SHALL BE COATED WITH "BLOXIDE" OR AN APPROVED EQUAL AFTER FINISHING. THE BUSHINGS SHALL HAVE A PRESS FIT INTO HANGER PLATES. THE INSIDE DIAMETER OF THE BUSHING SHALL PROVIDE A CLEARANCE OF 0.005" MINIMUM AND 0.010" MAXIMUM OVER THE FINISHED DIAMETER OF THE PIN. NOTE THAT THE HOLE DIAMETER SHALL BE SMALLER THAN THE BUSHING O.D. BY AT LEAST 0.001" FINISH ANSI125.

REMOVE EXISTING HANGER PLATES, PINS, AND WIND TRANSFER PLATES AND REPLACE WITH NEW MATERIALS.

BID ITEM SHALL BE "HINGE REPLACEMENT", EACH. ALL MATERIAL AND WORK INVOLVED SHALL BE PAID FOR UNDER "HINGE REPLACEMENT".

NEW PINS SHALL MATCH THE DIAMETER OF THE EXISTING PINS. CONTRACTOR TO CONTACT ENGINEER IF CORROSION AT EXISTING PIN IS PRESENT.

BLAST CLEAN GIRDER WEB AND FLANGES WITHIN 2'-0" OF $\frac{1}{4}$ " OF HINGE IN ACCORDANCE WITH THE STEEL STRUCTURES PAINTING COUNCIL'S SPECIFICATION SSPC-SP6. PAINT AREA CLEANED WITH ORGANIC ZINC RICH PAINT SYSTEM.

HANGER PLATES AND WIND TRANSFER PLATES SHALL BE SHOP PAINTED.

BUSHINGS SHALL BE THE SAME LENGTH AS THE HANGER PLATE THICKNESS.

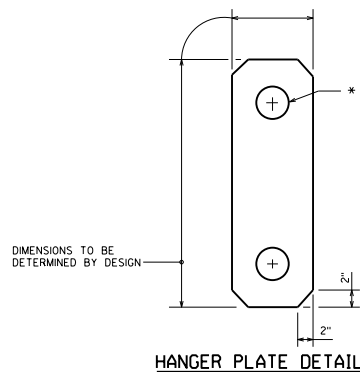
NON-METALLIC WASHERS SHALL HAVE AN INSIDE DIAMETER OF BETWEEN 0.005" AND 0.010" LARGER THAN THE PIN DIAMETER.

STEEL FOR PINS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 6.4.2 AND ASTM A276. PINS TO BE FINISHED ANSI63.

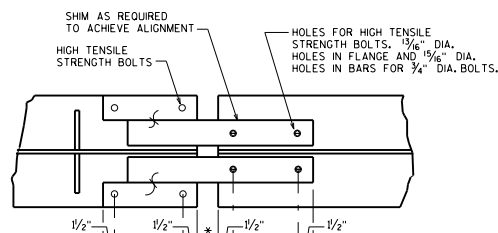
- BUSHINGS SHALL BE GAR-MAX AS MANUFACTURED BY GARLOCK BEARINGS, INC. OR DURALON JOURNAL BEARINGS AS MANUFACTURED BY REKNORD BEARING DIVISION, OR APPROVED EQUAL. BUSHINGS SHALL HAVE A NOMINAL WALL THICKNESS OF $\frac{1}{4}$ ".

- △ NON-METALLIC WASHERS REQUIRED FOR USE AS SPACERS BETWEEN THE PIN PLATES AND THE HANGER PLATES AND THE HANGER PLATES AND NUTS SHALL BE MADE FROM ONE OF THE FOLLOWING MATERIALS:

1. PHENOLIC, CANVAS REINFORCED, MIL-P-15035
2. POLYETHYLENE, HIGH DENSITY, ASTM D4976, CLASS 3
3. ACETAL, FEDERAL SPECIFICATION L-P-392
4. TEFLON TFE, MIL-P-22241A

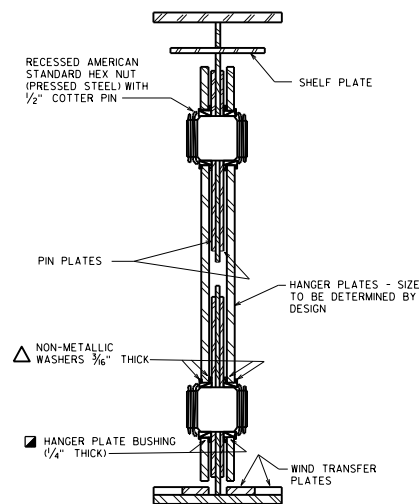


HANGER PLATE DETAIL



TYPICAL WIND TRANSFER PLATES DETAIL

CONTACT AREA OF WIND TRANSFER PLATES TO BE FINISHED ANSI 125.



SECTION THRU HINGE

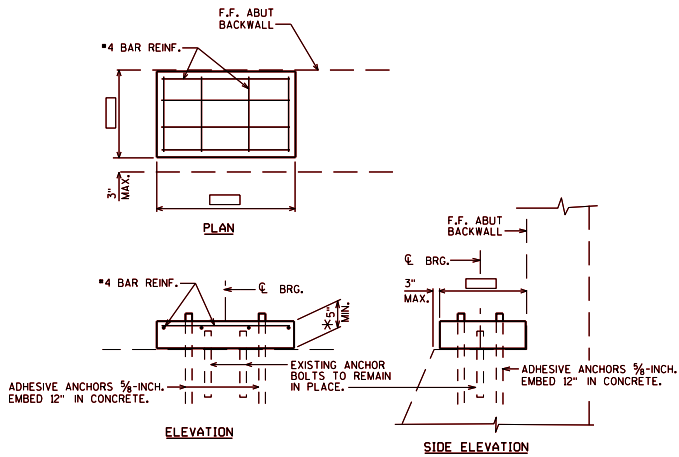
HINGED JOINT REHABILITATION



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STRUCTURES**

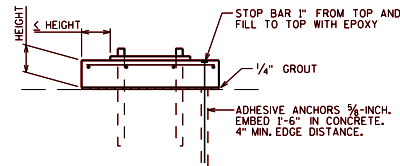
APPROVED: Bill Oliva

DATE:
7-15



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" *

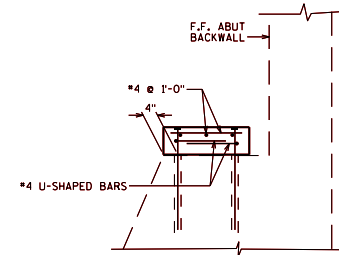
ANCHOR IN AT LEAST 4 LOCATIONS (ANCHORS INCLUDE ADHESIVE ANCHORS, ANCHOR BOLTS OR COMBINATION).

GROUT 1/4" 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)

		CL BRG. SUPPORT NAME	CL BRG. SUPPORT NAME	CL BRG. SUPPORT NAME
INTERIOR GIRDER	DL			
	LL			
EXTERIOR GIRDER	DL			
	LL			

NOTES

THEORETICAL SERVICE LOADS (UNFACTORED) SHOWN IN THE TABLE ARE BASED ON THE BRIDGE IN ITS FINAL CONFIGURATION. ADDITIONAL LOAD RESULTING FROM SPACING AND FOR CONTRACTOR OPERATIONS, SUCH AS UNEVEN JACKING OF ADJACENT GIRDERS OR ADJACENT SUBSTRUCTURE UNITS, IS NOT INCLUDED FOR CONTRACTOR OPERATIONS, SUCH AS UNEVEN JACKING OF ADJACENT GIRDERS OR THE REACTIONS ARE BASED ON HS-20 AND INCLUDE IMPACT.

INTERIOR GIRDER DEAD LOAD REACTIONS WERE INCREASED 10% TO ACCOUNT FOR VARIABILITY IN COMPOSITE DL DISTRIBUTION METHODS. EXTERIOR GIRDER DEAD LOAD REACTIONS WERE INCREASED 10% TO ACCOUNT FOR VARIABILITY IN COMPOSITE DL DISTRIBUTION METHODS. ADEQUACY OF THE GIRDER AT THE JACKING LOCATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE ADEQUACY OF THE GIRDER AT THE JACKING LOCATION.

DESIGNER NOTES

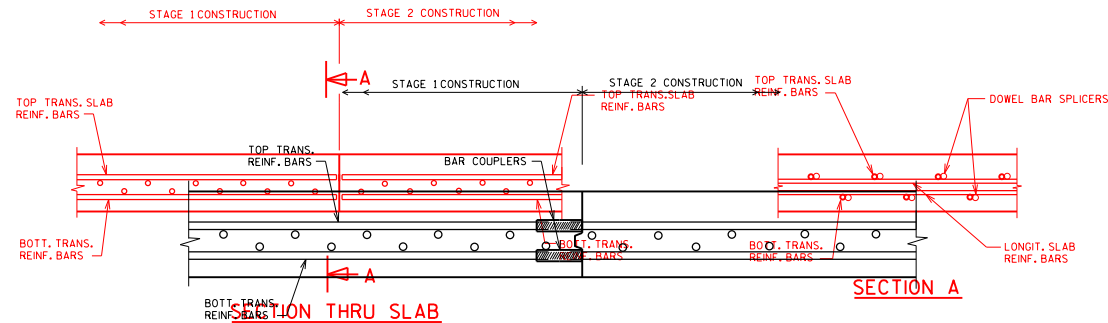
DO NOT REMOVE OR JACKING GIRDERS AND REMOVING EXISTING BEARINGS IS STEP - REMOVING BEARINGS. ADD 10% TO THE EXTERIOR GIRDER DL TO ACCOUNT FOR TABLE ITEM FOR JACKING BRIDGES ONLY (IS 10% BRIDGE JACKING).

ADD 10% TO THE EXTERIOR GIRDER DEAD LOAD TO ACCOUNT FOR VARIABILITY IN COMPOSITE DL DISTRIBUTION METHODS, WHICH INCLUDE IMPACT.

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
APPROVED: <u>Abir O Bank</u>	DATE: <u>1-23</u>

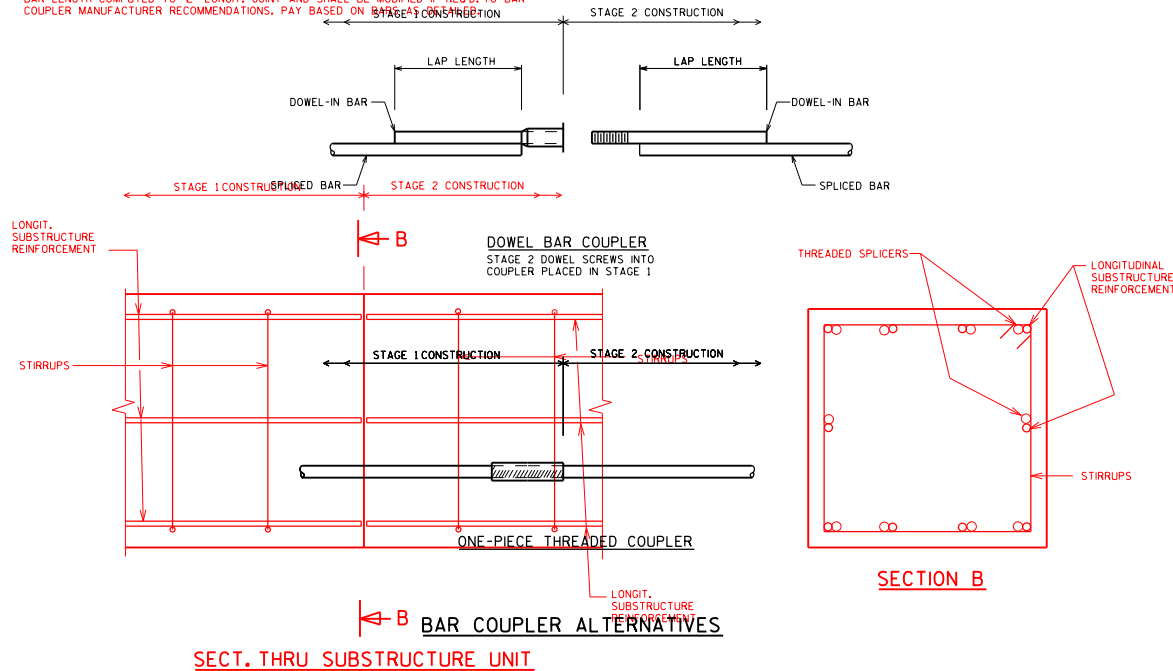


SECTION THRU DECK
ONE-PIECE THREADED COUPLER SHOWN

DOWEL BAR SPLICER LAP LENGTHS

CONCRETE UNDER BAR	BAR SIZE	4	5	6	7	8	9	10	11
12" OR LESS	$f_c = 3500$	1'-8"	2'-8"	3'-2"	4'-3"	5'-6"	7'-0"	8'-9"	10'-11"
	$f_c = 4000$	1'-8"	2'-8"	3'-2"	4'-0"	5'-2"	6'-6"	8'-3"	10'-2"
MORE THAN 12"	$f_c = 3500$	2'-3"	2'-11"	3'-6"	4'-8"	6'-1"	7'-10"	9'-10"	12'-1"
	$f_c = 4000$	2'-3"	2'-11"	3'-6"	4'-5"	5'-8"	7'-4"	9'-2"	11'-4"

BAR LENGTH COMPUTED TO 6' LONGIT. JOINT AND SHALL BE MODIFIED IF REQ'D. TO BAR COUPLER MANUFACTURER RECOMMENDATIONS. PAY BASED ON



SECT. THRU SUBSTRUCTURE UNIT

NOTES

FOR DOWEL BAR COUPLERS, ALL DOWEL BARS SHALL BE LAPPED AND TIED TO THE LAP REINFORCEMENT BARS. 125% OF THE YIELD STRENGTH OF THE SPLICED REINFORCEMENT BARS.

DOWEL BAR SPLICERS SHALL BE OF MINIMUM 60 ksi YIELD STRENGTH, AND HAVE TENSILE STRENGTH NOT LESS THAN THAT OF THE LAPPED 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)".

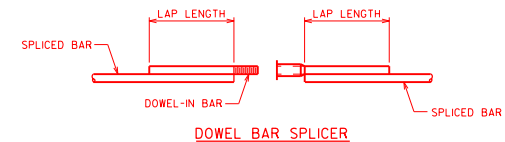
FOR DOWEL BAR SPLICERS, ALL REINFORCEMENT BARS SHALL BE LAPPED AND TIED TO THE LONGIT. BARS. SHOW DETAILS SIMILAR TO "SECTION THRU DECK" AND "BAR COUPLER ALTERNATIVES".

SPLICER (COUPLER) ASSEMBLY IN THE SLAB SHALL BE EPOXY COATED IN ACCORDANCE WITH ARE THEOREMATIC. (SEE BAR COUPLER) HIGH 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 10' OF THE CONSTRUCTION JOINT AND SHALL BE MODIFIED IF REQ'D. TO BAR COUPLER MANUFACTURER RECOMMENDATIONS. TESTING DOWEL BARS ARE NOT TO BE DETAILED AS THOSE BARS ARE INCLUDED IN THE BAR LAPPING REQUIREMENT. ITEM SHOULD THE DOWEL OPTION BE CHOSEN.

① MINIMUM CAPACITY = $1.25 \times f_y \times \text{AREA OF SPLICED REINFORCEMENT BAR}$

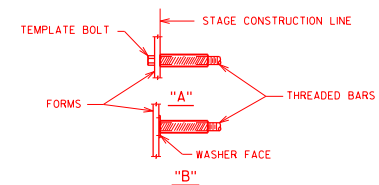
WHERE f_y = YIELD STRENGTH OF SPLICED REINFORCEMENT BARS

ON 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)".



ONE PIECE THREADED SPLICER

SPLICER ALTERNATIVES



INSTALLATION AND SETTING METHODS

"A" SET SPLICER BY MEANS OF A TEMPLATE BOLT
"B" SET SPLICER BY NAILING TO WOOD FORMS OR CEMENTING TO STEEL FORMS.

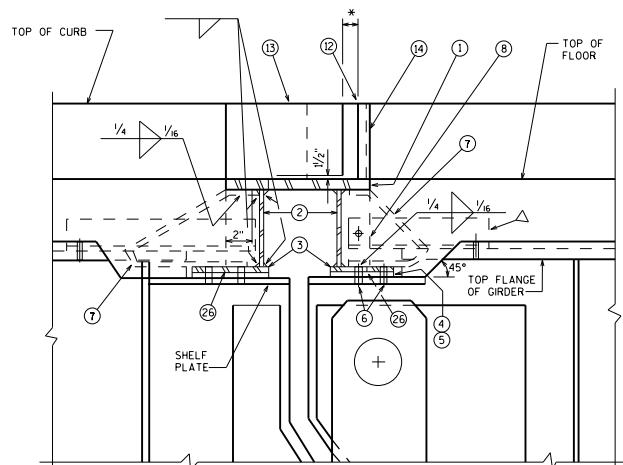
BAR SPLICER (COUPLER)
DETAILS AT STAGE
CONSTRUCTION



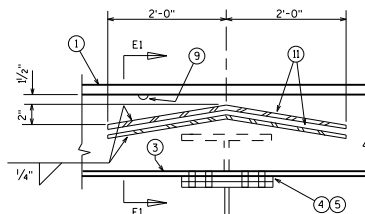
BUREAU OF
STRUCTURES

APPROVED: *S. Bill Dinkar*

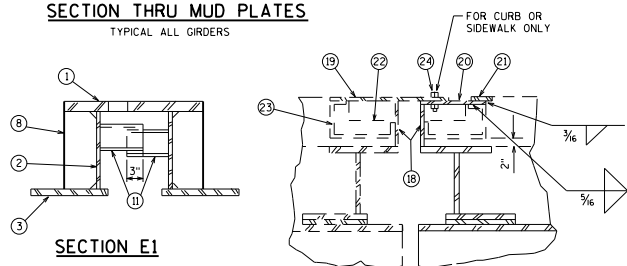
DATE:
7-13



SECTION THRU JOINT
MUD PLATES NOT SHOWN

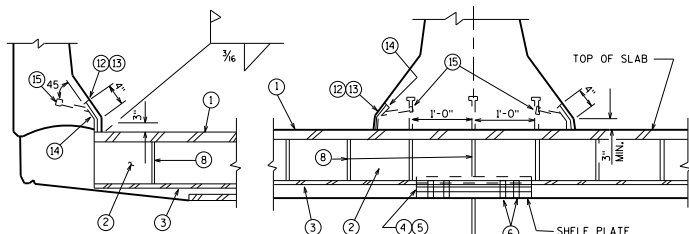


SECTION THRU MUD PLATES
TYPICAL ALL GIRDERS



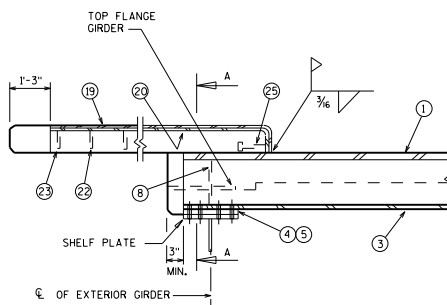
SECTION E1

SECTION A-A

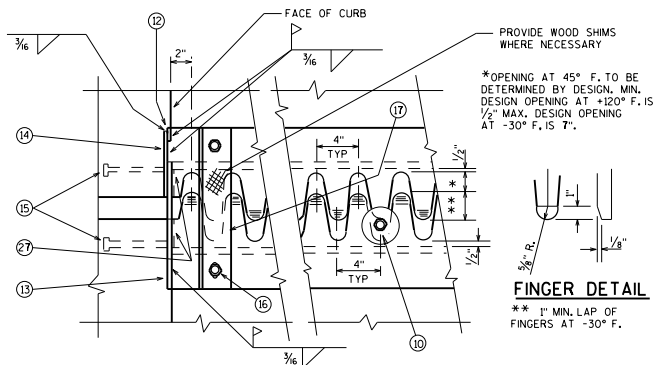


DETAIL AT PARAPET

DETAIL AT MEDIAN



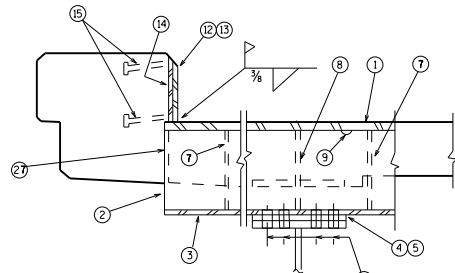
SECTION THRU SIDEWALK



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 3/4" x 3/4" x 3/4" FIELD DRILL 3/4" 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 5/8" DIA. AT 1'-0" CENTERS, BEND AS SHOWN.
8. STIFFENER BAR 3/8" THICK, 1/4" FILLET WELD ALL AROUND. PLACE AT 1/2" OF GIRDER AND AT +2'-0" CENTERS BETWEEN GIRDERS.
9. 3/8" VENT HOLES AT 3'-0" CENTERS.
10. 3/4" DIA. ADJUSTING BOLT AT APPROX. 4'-0" CENTERS WITH TWO 3/8" DIA. X 3/8" PLATE WASHERS, ONE ON EACH SIDE OF FINGER PLATE.
11. MUD PLATE 1/4" 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 3/8" LONG, WELD TO PLATES NO. 13 AND NO. 14.
16. 3/4" DIA. BOLT FOR SHIPPING, TACK WELD NUT TO BOTTOM OF PLATE NO. 1.
17. 3" DIA. X 3" DIA. X 1/4" + 5'-0" SPACING, SLOTTED HOLE 3/8" X 2 3/8" IN ONE END OF ANGLE AS SHOWN, FOR BOLT NO. 16.
18. CLOSING PLATE 3/8" 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, 1/4" FILLET WELD TO PLATES NO. 18, 19, & 20.
23. 3/8" DIA. STUDS X 6 3/8" LONG, BEND AFTER WELD.
24. 3/4" DIA. BOLT WITH SO. NUT, GREASE FOR EASY REMOVAL. 3/8" X 1 1/2" SLOTTED HOLE IN PL. NO. 19, LONG DIMENSION OF HOLE PARALLEL TO 1/2" OF ROADWAY. TACK WELD NUT TO PLATE NO. 20 + 2'-0" SPA.
25. 3/8" DIA. STUDS X 6 3/8" 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. 3/8" 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.

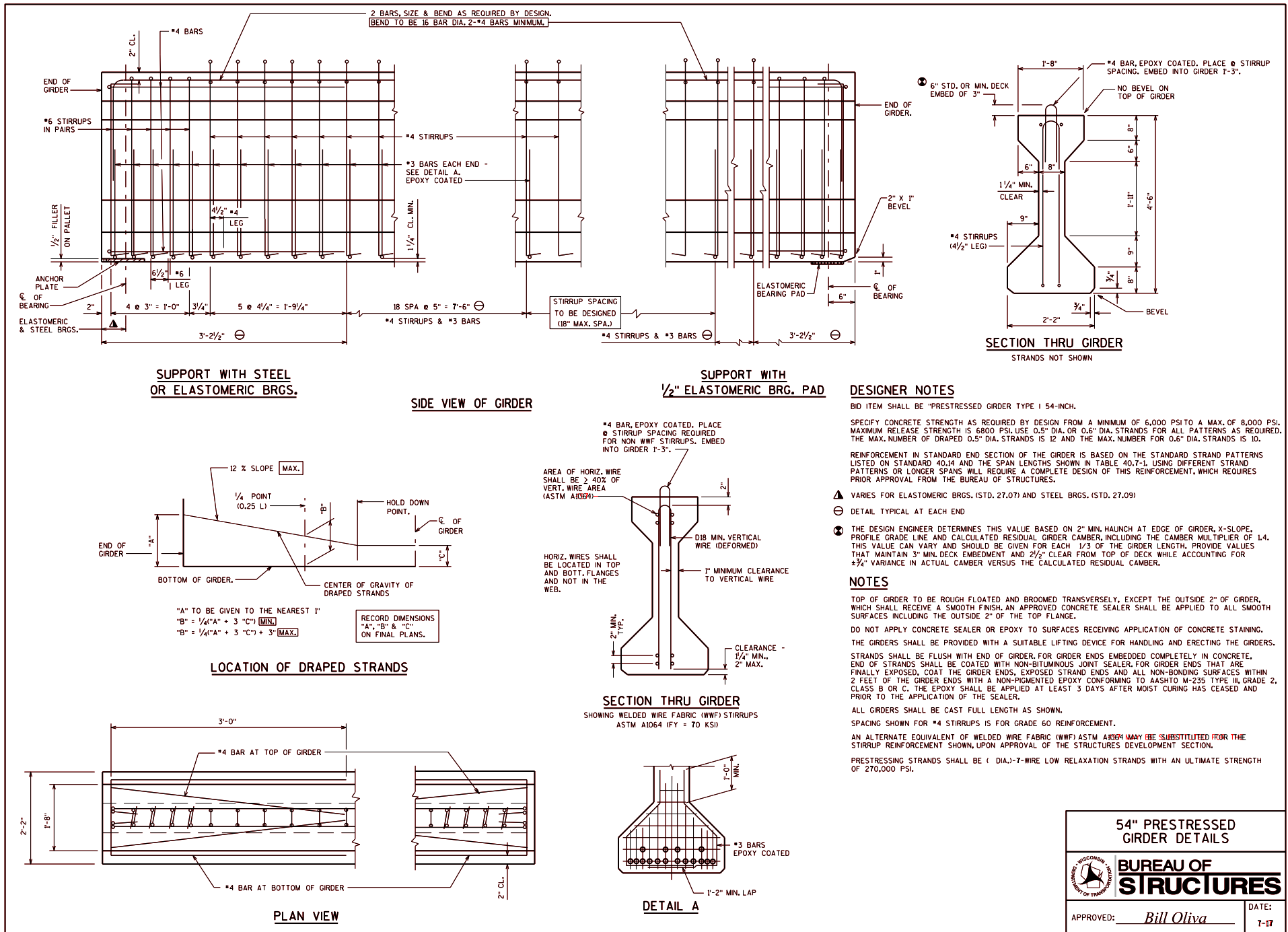
FINGER TYPE EXPANSION JOINT - PLATE GIRDER



BUREAU OF STRUCTURES

APPROVED: Bill Oliva

DATE:
7-16

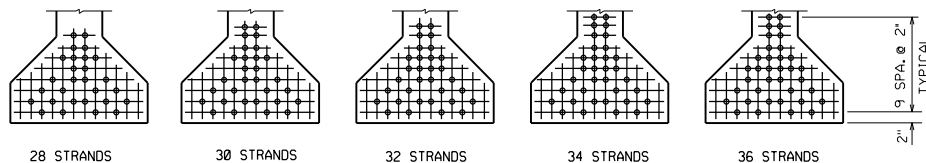
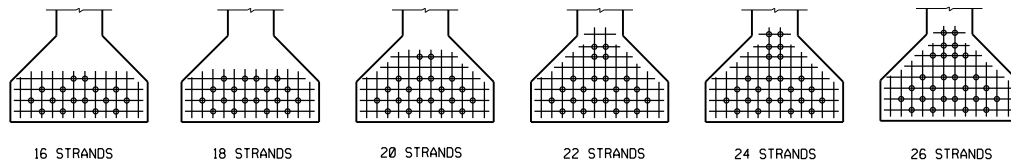


54" PRESTRESSED GIRDER DETAILS

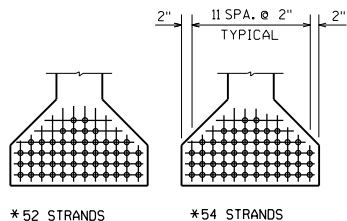
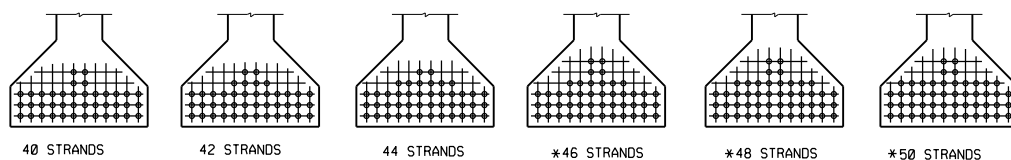
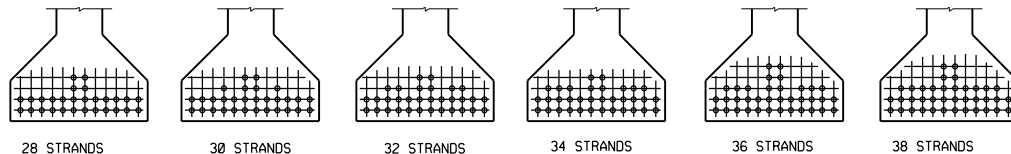
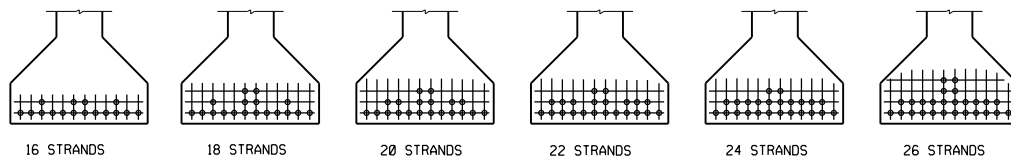
BUREAU OF STRUCTURES

APPROVED: Bill Oliva DATE: 7-17

STANDARD 40.13



**STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY
TO AVOID DRAPING OF 0.5" DIA. AND 0.6" DIA. STRANDS**



ARRANGEMENT AT $\frac{1}{4}$ SPAN - FOR GIRDERS WITH DRAPED 0.5" DIA. AND 0.6" DIA. STRANDS

* 0.5" DIA. STRANDS ONLY

54" GIRDER

$A = 789 \text{ SQ. IN.}$
 $r^2 = 330.46 \text{ IN.}^2$
 $y_T = 29.27 \text{ IN.}$
 $y_B = -24.73 \text{ IN.}$
 $I = 260,730 \text{ IN.}^4$
 $S_T = 8,908 \text{ IN.}^3$
 $S_B = -10,543 \text{ IN.}^3$
 $WT. = 822 \text{ #/FT.}$

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.
 $P_i \text{ PER } 0.5" \text{ DIA. STRAND} = 0.1531 \times 202,500 = 31.00 \text{ KIPS}$
 $P_i \text{ PER } 0.6" \text{ DIA. STRAND} = 0.217 \times 202,500 = 43.94 \text{ KIPS}$

$$\frac{y_B}{r^2} = \frac{-24.73}{330.46} = -0.07484 \text{ IN./IN.}^2$$

$$f_B (ini +) = \frac{(4)}{(3)} \quad (K/Sq. \text{ In.})$$

(COMPRESSION IS POSITIVE)

N NO. STRANDS	(1) e_s (inches)	(2) $(1 + \frac{e_s y_B}{r^2})$	(3) $(A/(2))$ (sq. in.)	(4) $P(ini +) = A_s f_s$ 0.5" DIA. STRANDS (KIPS)	(4) $P(ini +) = A_s f_s$ 0.6" DIA. STRANDS (KIPS)	(5) $f_B (ini +) = (4)/(3)$ 0.5" DIA. STRANDS (K/Sq. In.)	(5) $f_B (ini +) = (4)/(3)$ 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	

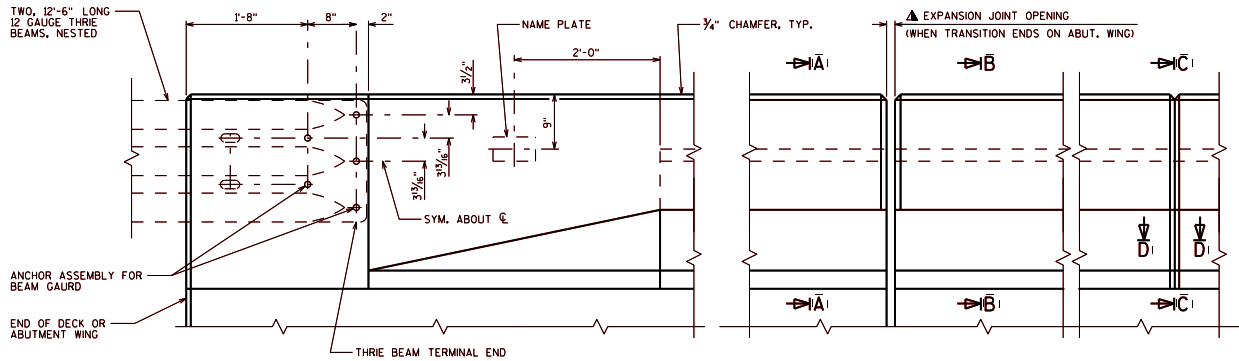
54" PRETENSIONED GIRDER DESIGN DATA



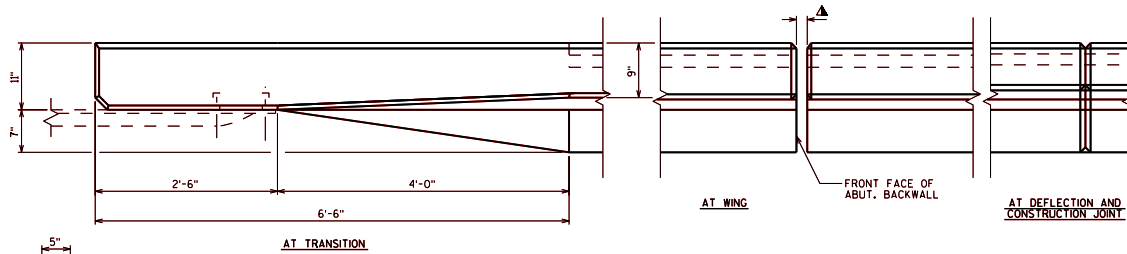
**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

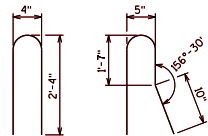
DATE:
7-16



ELEVATION OF PARAPET

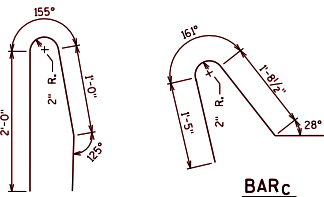


PART PLAN ON PARAPET



BAR A

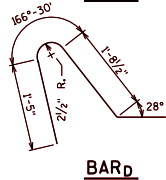
BAR E



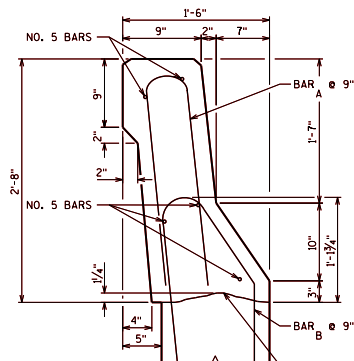
BAR B

BAR C

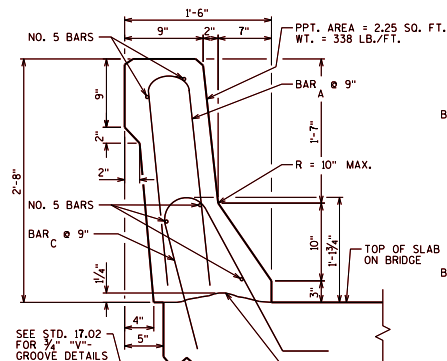
BAR	LENGTH
A	4'-10"
B	4'-7"
C	4'-3"
D	4'-4"
E	4'-4"



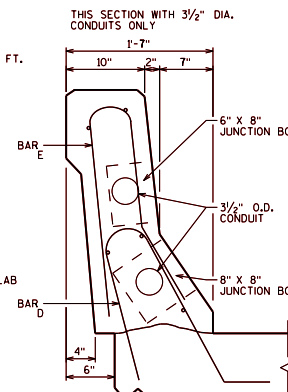
BAR D



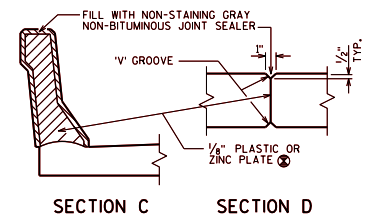
SECTION A



SECTION B



SECTION B1



SECTION C

SECTION D

NOTES

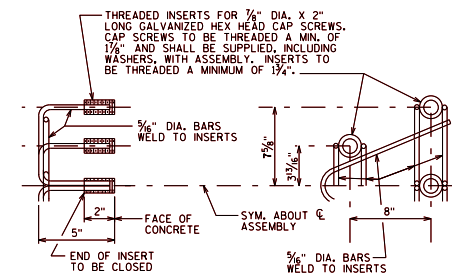
ALL SLOPED FACE PARAPET "B" REINFORCEMENT ARE NO. 4 BARS UNLESS OTHERWISE SHOWN.

- ⊗ 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.

- CONST. JOINT - STRIKE OFF AS SHOWN & FINISH WITH A WOODEN TROWEL.

	PARAPET
AREA	2.25 SF
WEIGHT	338 LB/FT



DETAIL OF ANCHOR ASSEMBLY

NOTE: HEX HEAD CAP SCREWS & WASHERS TO BE GALVANIZED IN ACCORDANCE WITH AASHTO M232, CLASS C.

ASSEMBLY SHALL BE BID ITEM "ANCHOR ASSEMBLIES FOR STEEL PLATE BEAM GUARD" EACH -

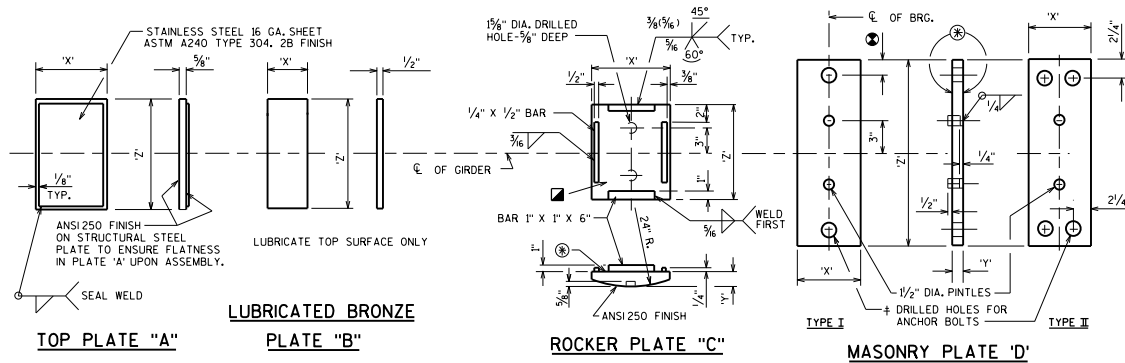
SLOPED FACE PARAPET 'B'



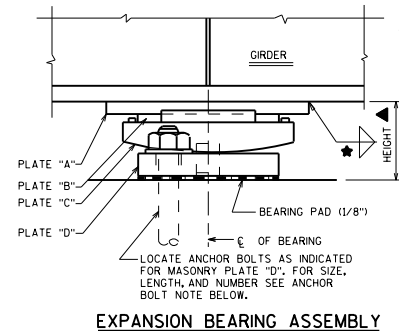
BUREAU OF STRUCTURES

APPROVED: Bill Oliva

DATE: 1-13



✓ PROVIDE A METHOD FOR HANDLING PLATE "C" DURING GALVANIZING.



NOTES

FOR BEARING NOTES, CLEARANCE DIAGRAM, AND WHEN TO BEVEL ROCKER PLATES, SEE STANDARD 27.02.

⑥ FINISH THESE SURFACES ANS1250 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 12" INCREASE STANDARD DISTANCE FROM 1/2" 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.

⑦ DIMENSION IS 2" WHEN 1/4" DIA. ANCHOR BOLTS ARE USED AND 2 1/4" WHEN 1/2" DIA. ANCHOR BOLTS ARE USED.

FOR NEW OR REPLACEMENT STEEL BEARINGS, INCLUDING STEEL BEARINGS USED FOR BRIDGE WIDENINGS, USE TYPE "A-1" 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 1/8"	1'-0 1/4"	8"	1 1/2"	1'-8"	.354
105	11"	10"	7"	10"	9"	1 1/8"	1'-0 1/4"	8"	1 1/2"	1'-8"	.375
135	1'-1"	10"	9"	10"	11"	1 1/8"	1'-0 1/4"	8"	1 1/2"	1'-8"	.396
160	1'-3"	10"	11"	10"	1'-1"	2 3/8"	1'-0 1/4"	9"	1 1/2"	1'-8"	.432
190	1'-5"	10"	1'-1"	10"	1'-3"	2 3/8"	1'-0 1/4"	10"	1 3/4"	1'-8"	.495
220	1'-7"	10"	1'-3"	10"	1'-5"	3 3/8"	1'-0 1/4"	1'-0"	2"	1'-8"	.599
250	1'-9"	10"	1'-5"	10"	1'-7"	3 3/8"	1'-0 1/4"	1'-1"	2 3/8"	1'-8"	.630
280	1'-11"	10"	1'-7"	10"	1'-9"	4 3/8"	1'-0 1/4"	1'-3"	2 3/8"	1'-8"	.755
310	2'-1"	10"	1'-9"	10"	1'-11"	4 3/8"	1'-0 1/4"	1'-4"	2 3/8"	1'-8"	.755

12" BEARING

CAP. KIPS	PLATE A		PLATE B		PLATE C		PLATE D		HEIGHT FEET		
	X	Z	X	Z	X	Z	X	Z			
90	9"	1'-0"	5"	1'-0"	7"	1 1/8"	1'-2 1/4"	8"	1 1/2"	1'-10"	.354
125	11"	1'-0"	7"	1'-0"	9"	1 1/8"	1'-2 1/4"	8"	1 1/2"	1'-10"	.375
160	1'-1"	1'-0"	9"	1'-0"	11"	1 1/8"	1'-2 1/4"	8"	1 1/2"	1'-10"	.396
195	1'-3"	1'-0"	11"	1'-0"	1'-1"	2 3/8"	1'-2 1/4"	9"	1 1/2"	1'-10"	.432
230	1'-5"	1'-0"	1'-1"	1'-0"	1'-3"	2 3/8"	1'-2 1/4"	11"	2"	1'-10"	.516
265	1'-7"	1'-0"	1'-3"	1'-0"	1'-5"	3 3/8"	1'-2 1/4"	1'-1"	2 3/8"	1'-10"	.630
300	1'-9"	1'-0"	1'-5"	1'-0"	1'-7"	3 3/8"	1'-2 1/4"	1'-2"	2 3/8"	1'-10"	.630
335	1'-11"	1'-0"	1'-7"	1'-0"	1'-9"	4 3/8"	1'-2 1/4"	1'-4"	2 3/8"	1'-10"	.755
370	2'-1"	1'-0"	1'-9"	1'-0"	1'-11"	4 3/8"	1'-2 1/4"	1'-5"	2 3/8"	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 1/8"	1'-4 1/4"	8"	1 1/2"	2'-0"	.354
145	11"	1'-2"	7"	1'-2"	9"	1 1/8"	1'-4 1/4"	8"	1 1/2"	2'-0"	.375
185	1'-1"	1'-2"	9"	1'-2"	11"	1 1/8"	1'-4 1/4"	8"	1 1/2"	2'-0"	.396
225	1'-3"	1'-2"	11"	1'-2"	1'-1"	2 3/8"	1'-4 1/4"	10"	1 3/4"	2'-0"	.453
270	1'-5"	1'-2"	1'-1"	1'-2"	1'-3"	2 3/8"	1'-4 1/4"	1'-0"	2"	2'-0"	.516
310	1'-7"	1'-2"	1'-3"	1'-2"	1'-5"	3 3/8"	1'-4 1/4"	1'-1"	2 3/8"	2'-0"	.630
350	1'-9"	1'-2"	1'-5"	1'-2"	1'-7"	3 3/8"	1'-4 1/4"	1'-3"	2 7/8"	2'-1"	.672
390	1'-11"	1'-2"	1'-7"	1'-2"	1'-9"	4 3/8"	1'-4 1/4"	1'-4"	2 7/8"	2'-1"	.755
435	2'-1"	1'-2"	1'-9"	1'-2"	1'-11"	4 3/8"	1'-4 1/4"	1'-6"	3 3/8"	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 1/8"	1'-6 1/4"	8"	1 1/2"	2'-2"	.354
165	11"	1'-4"	7"	1'-4"	9"	1 1/8"	1'-6 1/4"	8"	1 1/2"	2'-2"	.375
215	1'-1"	1'-4"	9"	1'-4"	11"	1 1/8"	1'-6 1/4"	9"	1 1/2"	2'-2"	.396
260	1'-3"	1'-4"	11"	1'-4"	1'-1"	2 3/8"	1'-6 1/4"	11"	2"	2'-2"	.474
310	1'-5"	1'-4"	1'-1"	1'-4"	1'-3"	2 3/8"	1'-6 1/4"	1'-0"	2"	2'-2"	.516
355	1'-7"	1'-4"	1'-3"	1'-4"	1'-5"	3 3/8"	1'-6 1/4"	1'-2"	2 3/8"	2'-3"	.630
400	1'-9"	1'-4"	1'-5"	1'-4"	1'-7"	3 3/8"	1'-6 1/4"	1'-3"	2 3/8"	2'-3"	.672
450	1'-11"	1'-4"	1'-7"	1'-4"	1'-9"	4 3/8"	1'-6 1/4"	1'-5"	2 3/8"	2'-3"	.755
500	2'-1"	1'-4"	1'-9"	1'-4"	1'-11"	4 3/8"	1'-6 1/4"	1'-7"	3 3/8"	2'-3"	.838

18" BEARING

CAP. KIPS	PLATE A		PLATE B		PLATE C		PLATE D		HEIGHT FEET		
	X	Z	X	Z	X	Z	X	Z			
135	9"	1'-6"	5"	1'-6"	7"	1 1/8"	1'-8 1/4"	8"	1 1/2"	2'-4"	.354
185	11"	1'-6"	7"	1'-6"	9"	1 1/8"	1'-8 1/4"	8"	1 1/2"	2'-4"	.375
240	1'-1"	1'-6"	9"	1'-6"	11"	1 1/8"	1'-8 1/4"	9"	1 1/2"	2'-4"	.396
295	1'-3"	1'-6"	11"	1'-6"	1'-1"	2 3/8"	1'-8 1/4"	11"	2"	2'-4"	.474
350	1'-5"	1'-6"	1'-1"	1'-6"	1'-3"	2 3/8"	1'-8 1/4"	1'-1"	2 3/8"	2'-5"	.547
400	1'-7"	1'-6"	1'-3"	1'-6"	1'-5"	3 3/8"	1'-8 1/4"	1'-2"	2 3/8"	2'-5"	.630
455	1'-9"	1'-6"	1'-5"	1'-6"	1'-7"	3 3/8"	1'-8 1/4"	1'-4"	2 3/8"	2'-5"	.672
505	1'-11"	1'-6"	1'-7"	1'-6"	1'-9"	4 3/8"	1'-8 1/4"	1'-6"	3 3/8"	2'-5"	.838
560	2'-1"	1'-6"	1'-9"	1'-6"	1'-11"	4 3/8"	1'-8 1/4"	1'-8"	3 3/8"	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 1/8"	1'-10 1/4"	8"	1 1/2"	2'-6"	.354
210	11"	1'-8"	7"	1'-8"	9"	1 1/8"	1'-10 1/4"	8"	1 1/2"	2'-6"	.375
270	1'-1"	1'-8"	9"	1'-8"	11"	1 1/8"	1'-10 1/4"	10"	1 3/4"	2'-6"	.417
325	1'-3"	1'-8"	11"	1'-8"	1'-1"	2 3/8"	1'-10 1/4"	11"	2"	2'-6"	.474
385	1'-5"	1'-8"	1'-1"	1'-8"	1'-3"	2 3/8"	1'-10 1/4"	1'-1"	2 3/8"	2'-7"	.547
445	1'-7"	1'-8"	1'-3"	1'-8"	1'-5"	3 3/8"	1'-10 1/4"	1'-3"	2 3/8"	2'-7"	.672
505	1'-9"	1'-8"	1'-5"	1'-8"	1'-7"	3 3/8"	1'-10 1/4"	1'-5"	2 3/8"	2'-7"	.672
565	1'-11"	1'-8"	1'-7"	1'-8"	1'-9"	4 3/8"	1'-10 1/4"	1'-7"	3 3/8"	2'-7"	.838
625	2'-1"	1'-8"	1'-9"	1'-8"	1'-11"	4 3/8"	1'-10 1/4"	1'-9"	3 3/8"	2'-7"	.838

ANCHOR BOLT NOTES:

FOR SPAN LENGTHS UP TO 100'-0", USE A TYPE I MASONRY PLATE "D" WITH (2) 1/4" 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) 1/2" DIA. X 1'-10" LONG ANCHOR BOLTS.

FOR SPAN LENGTHS GREATER THAN 150'-0", USE A TYPE II MASONRY PLATE "D" WITH (4) 1/2" 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.

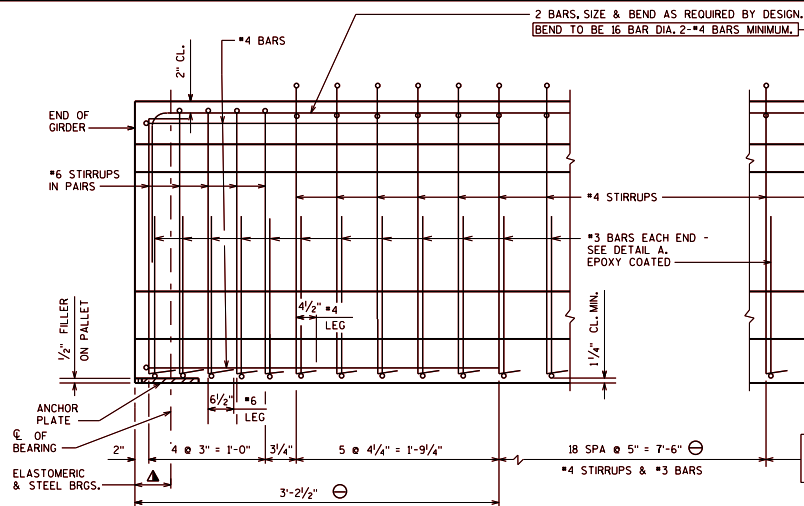
EXPANSION BEARING DETAILS TYPE 'A' - STEEL GIRDERS



**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

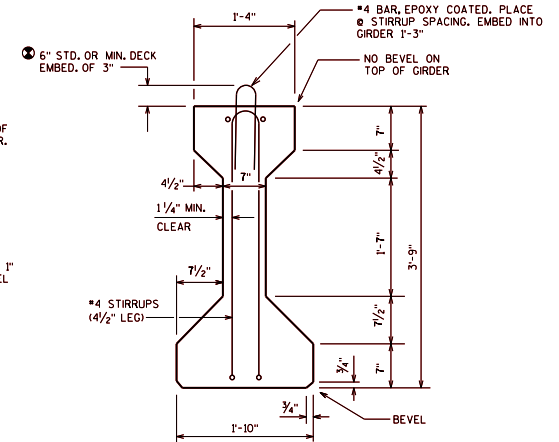
DATE:
7-16



SUPPORT WITH STEEL OR ELASTOMERIC BRGS.

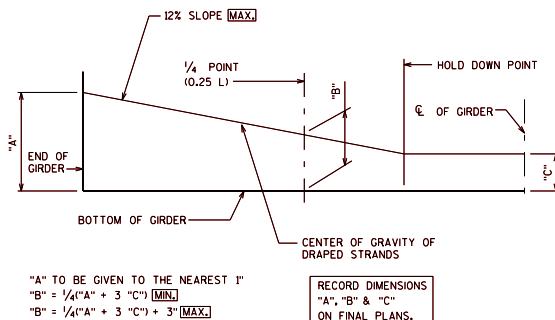
SIDE VIEW OF GIRDER

SUPPORT WITH 1/2" ELASTOMERIC BRG. PAD

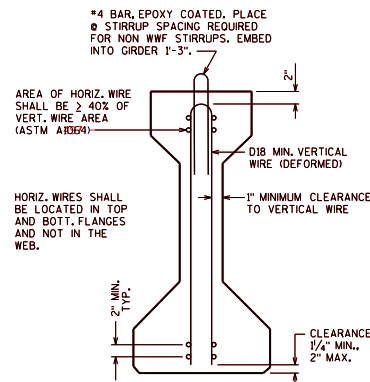


SECTION THRU GIRDER

STRANDS NOT SHOWN

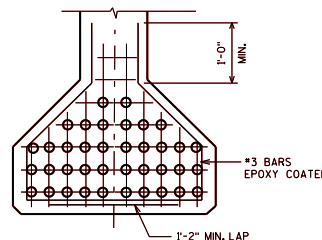


LOCATION OF DRAPED STRANDS



SECTION THRU GIRDER

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



DETAIL A

DESIGNER NOTES

BD 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 1/3 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% 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.

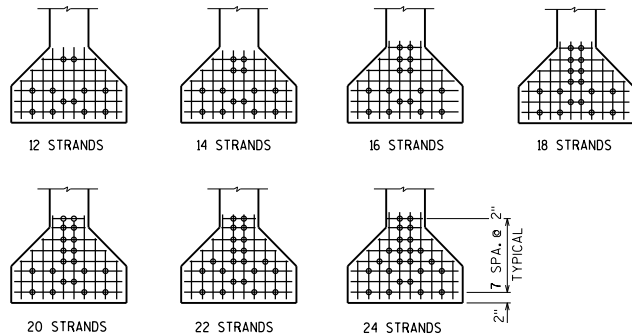
45" PRESTRESSED GIRDER DETAILS



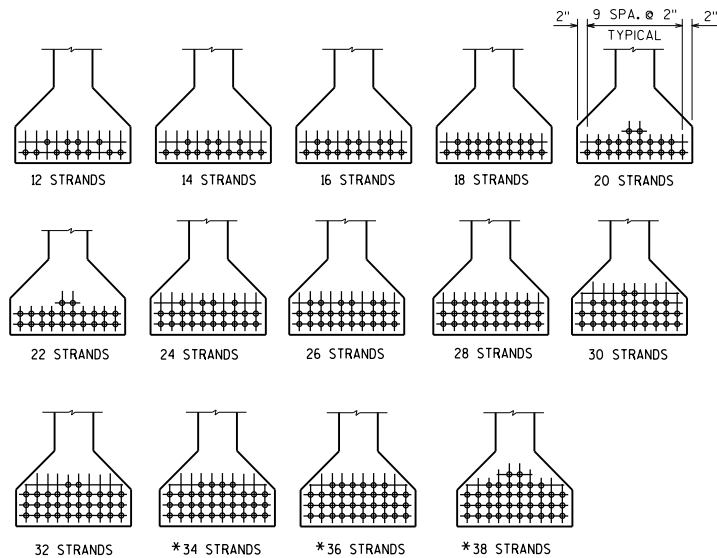
BUREAU OF STRUCTURES

APPROVED: Bill Oliva

DATE: 7-17



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



ARRANGEMENT AT $\frac{1}{4}$ SPAN - FOR GIRDERS WITH DRAPED 0.5" DIA. AND 0.6" DIA. STRANDS
*0.5" DIA. STRANDS ONLY

45" GIRDER

$A = 560 \text{ SQ. IN.}$
 $r^2 = 223.91 \text{ IN.}^2$
 $y_T = 24.73 \text{ IN.}$
 $y_B = -20.27 \text{ IN.}$
 $I = 125,390 \text{ IN.}^4$
 $S_T = 5,070 \text{ IN.}^3$
 $S_B = -6,186 \text{ IN.}^3$
 $WT. = 583 \text{ #/FT.}$

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.
 $P_i \text{ PER } 0.5" \text{ DIA. STRAND} = 0.1531 \times 202,500 = \underline{31.00 \text{ KIPS}}$
 $P_i \text{ PER } 0.6" \text{ DIA. STRAND} = 0.217 \times 202,500 = \underline{43.94 \text{ KIPS}}$
 $\frac{y_B}{r^2} = \frac{-20.27}{223.91} = -0.09053 \text{ IN./IN.}^2$

(COMPRESSION IS POSITIVE)

N NO. STRANDS	(1) e_s (inches)	(2) $(1 + \frac{e_s y_B}{r^2})$	(3) $(A/(2))$ (sq. in.)	(4) $P(i n i t.) = A_s f_s$ 0.5" DIA. STRANDS (KIPS)	(4) $P(i n i t.) = A_s f_s$ 0.6" DIA. STRANDS (KIPS)	(5) $f_B (i n i t.) = (4)/(3)$ 0.5" DIA. STRANDS (K/Sq. in.)	(5) $f_B (i n i t.) = (4)/(3)$ 0.6" DIA. STRANDS (K/Sq. in.)
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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	

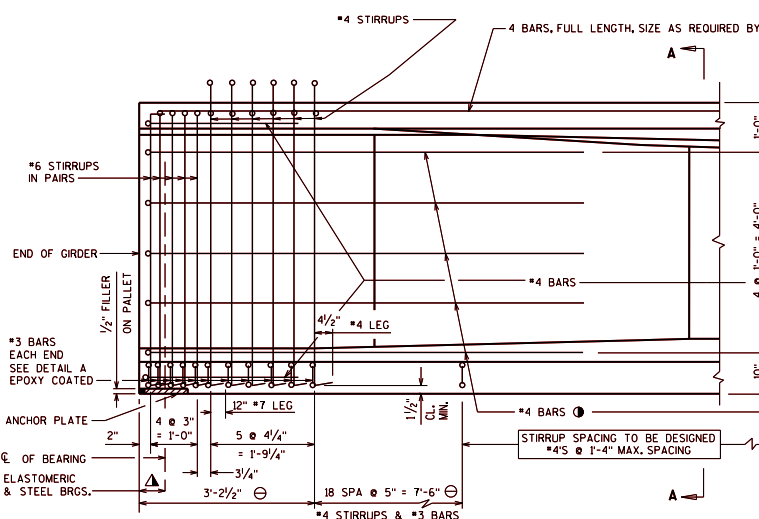
45" PRESTRESSED GIRDER DESIGN DATA



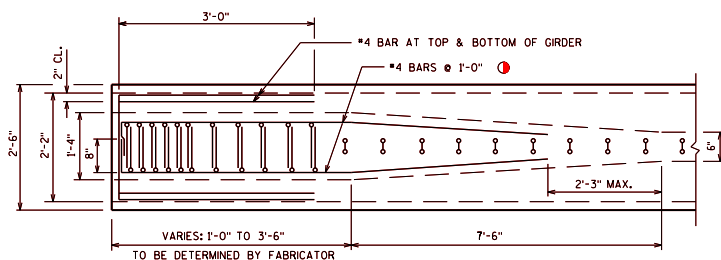
**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

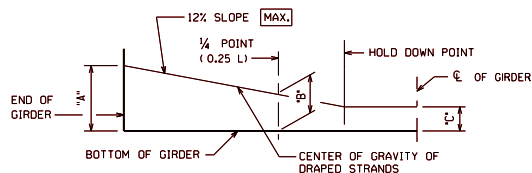
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7-16



SUPPORT WITH STEEL OR ELASTOMERIC BRGS.



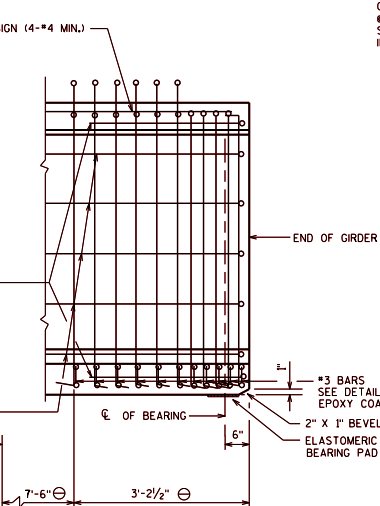
PLAN VIEW



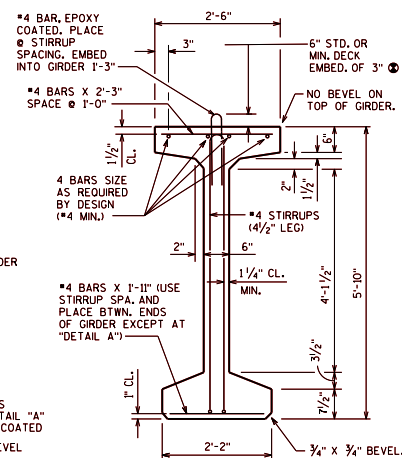
"A" TO BE GIVEN TO THE NEAREST 1"
 "B" = $\frac{1}{4}A + 3$ "C" (MIN.)
 "B" = $\frac{1}{4}A + 3$ "C" + 3" (MAX.)

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

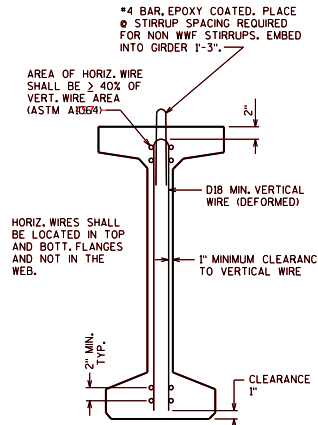
LOCATION OF DRAPED STRANDS



SUPPORT WITH 1/2" ELASTOMERIC BEARING PAD



SECTION THRU GIRDER
 STRANDS NOT SHOWN



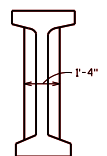
SECTION THRU GIRDER
 SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS
 ASTM A1064 (FY = 70 KSI)

DESIGNER NOTES

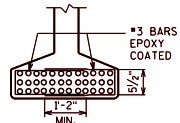
- BID ITEM SHALL BE "PRESTRESSED GIRDER TYPE I 70-INCH. SHOW ONLY ONE STRAND SIZE ON THE PLANS.
- GIRDER LENGTHS IN EXCESS OF 140 FEET MAY BE CONTROLLED BY TRANSPORTATION LIMITATIONS AND REQUIRE APPROVAL BY THE PRESTRESS GIRDER MANUFACTURERS AND CONCURRENCE BY THE STRUCTURES DEVELOPMENT SECTION.
- SPECIFY 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
- 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 1/2" DIA. 7-WIRE LOW-RELAXATION STRANDS WITH AN ULTIMATE STRENGTH OF 270,000 PSI.

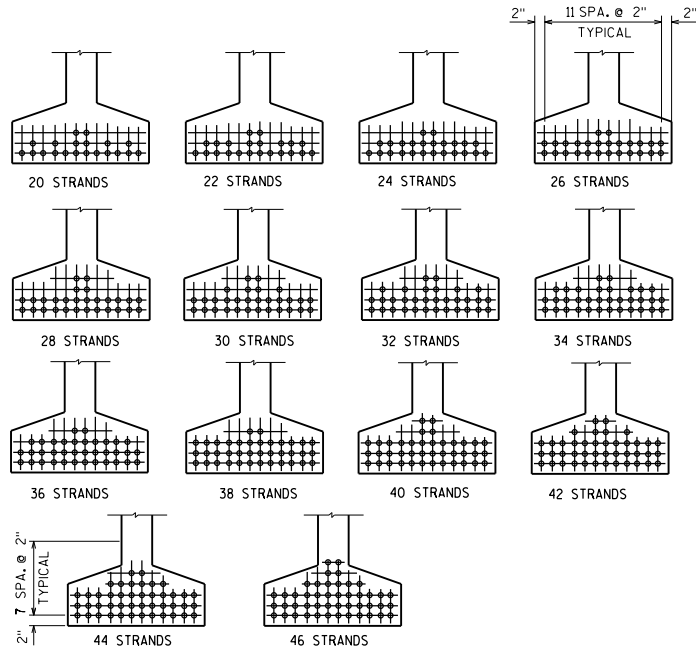


SECTION A-A



DETAIL A

70" PRESTRESSED GIRDER DETAILS	
	BUREAU OF STRUCTURES
APPROVED: <u>Bill Oliva</u>	DATE: <u>7-17</u>



ARRANGEMENT AT $\frac{1}{4}$ SPAN FOR GIRDERS WITH DRAPED 0.5" DIA. STRANDS

(COMPRESSION IS NEGATIVE)					
N NO. STRANDS	(1) e_s 0.5" DIA. STRANDS (inches)	(2) $(1 + \frac{e_s y_B}{r^2})$ 0.5" DIA. STRANDS (sq. in.)	(3) $(A/(2))$ 0.5" DIA. STRANDS (sq. in.)	(4) $P(\text{init.}) = A_s f_s$ 0.5" DIA. STRANDS (KIPS)	(5) $f_B (\text{init.}) = (4)/(3)$ 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

$$A = 774 \text{ SQ. IN.}$$

$$r^2 = 659.70 \text{ IN.}^2$$

$$y_T = 35.38 \text{ IN.}$$

$$y_B = -34.62 \text{ IN.}$$

$$I = 510,613 \text{ IN.}^4$$

$$S_T = 14,430 \text{ IN.}^3$$

$$S_B = -14,750 \text{ IN.}^3$$

$$WT. = 0.806 \text{ KIPS/FT.} +$$

$$6.6 \text{ KIPS FOR BOTH END BLOCKS}$$

(COMPRESSION IS NEGATIVE)					
N NO. STRANDS	(1) e_s 0.6" DIA. STRANDS (inches)	(2) $(1 + \frac{e_s y_B}{r^2})$ 0.6" DIA. STRANDS (sq. in.)	(3) $(A/(2))$ 0.6" DIA. STRANDS (sq. in.)	(4) $P(\text{init.}) = A_s f_s$ 0.6" DIA. STRANDS (KIPS)	(5) $f_B (\text{init.}) = (4)/(3)$ 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

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

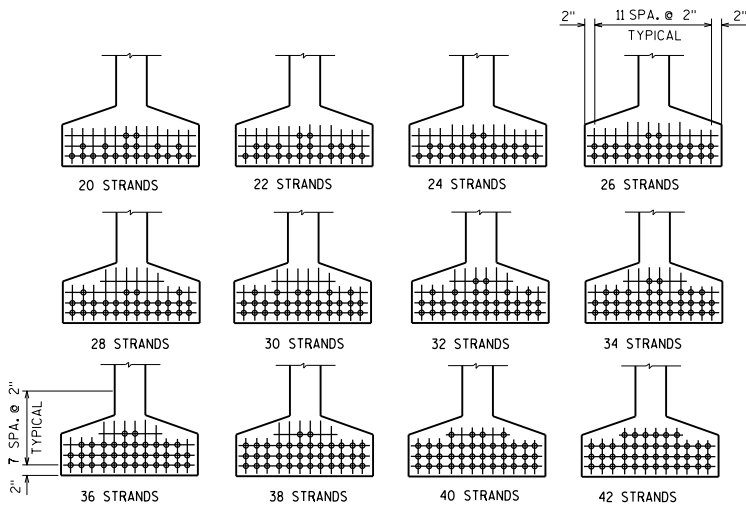
$$P_i \text{ PER } 0.5" \text{ DIA. STRAND}$$

$$= 0.1531 \times 202,500 = 31.00 \text{ KIPS}$$


$$P_i \text{ PER } 0.6" \text{ DIA. STRAND}$$

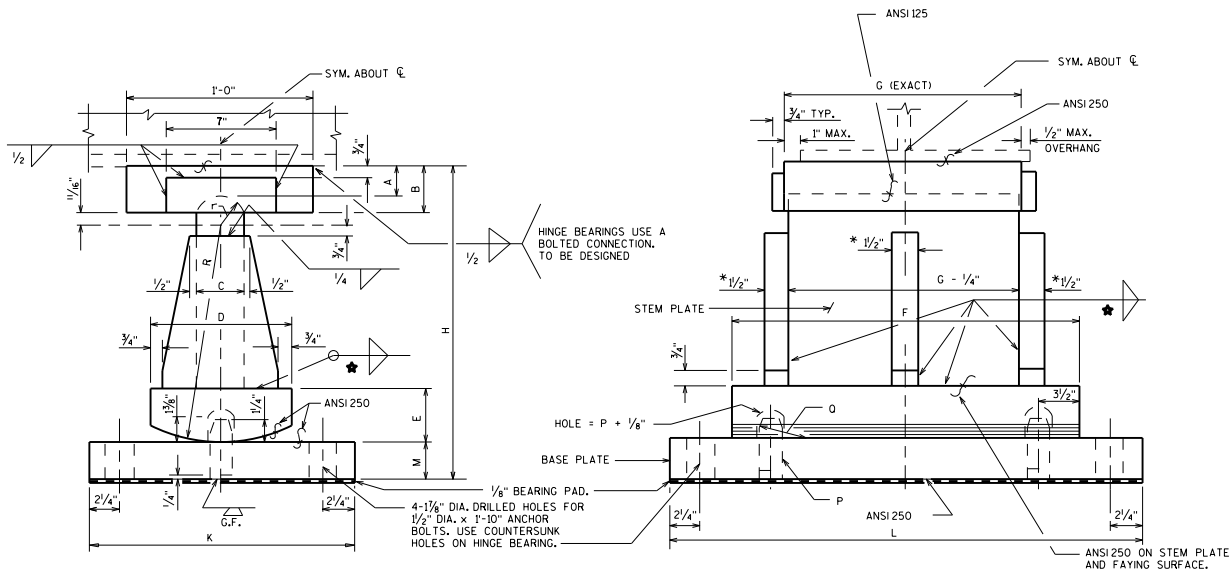
$$= 0.217 \times 202,500 = 43.94 \text{ KIPS}$$

$$\frac{y_B}{r^2} = \frac{-34.62}{659.70} = -0.05248 \text{ IN./IN.}^2$$



ARRANGEMENT AT $\frac{1}{4}$ SPAN FOR GIRDERS WITH DRAPED 0.6" DIA. STRANDS

70" PRESTRESSED GIRDER DESIGN DATA	
	BUREAU OF STRUCTURES
APPROVED: <u>Bill Oliva</u>	DATE: <u>7-16</u>



ROCKER

★ 400 K ≤ REACTION < 1000 K, USE 5/8" WELD.
1000 K ≤ REACTION ≤ 1500 K, USE 3/4" WELD.

* FOR REACTION ≥ 1000 KIPS
USE 2" STIFFENERS.

TABLE OF DIMENSIONS

REACTION (KIPS)	A	B	C	D	E	G VALUES												H	K	M	R	r		PINTLE	
						G=1'-7"		G=1'-9"		G=1'-11"		G=2'-1"		G=2'-3"		G=2'-5"						STEM	PLATE	P DIA.	O
						F	L	F	L	F	L	F	L	F	L	F	L								
400-499	1 5/8"	2 5/8"	3"	1'-2"	2 7/8"	2'-0"	2'-11"	2'-2"	2'-11"	2'-4"	3'-0"	2'-6"	3'-2"	—	—	—	—	1'-7 1/2"	1'-6"	2 7/8"	1'-1"	1 1/8"	1 5/8"	2"	3 1/2"
500-599	1 5/8"	2 5/8"	3"	1'-2"	2 7/8"	2'-1"	3'-4"	2'-2"	3'-4"	2'-4"	3'-4"	2'-6"	3'-4"	—	—	—	—	1'-8 1/2"	1'-7"	2 7/8"	1'-2"	1 1/8"	1 5/8"	2"	3 1/2"
600-699	1 5/8"	2 5/8"	3"	1'-2"	2 7/8"	—	—	2'-3"	3'-8"	2'-4"	3'-8"	2'-6"	3'-8"	—	—	—	—	1'-9 1/2"	1'-8"	2 7/8"	1'-3"	1 1/8"	1 5/8"	2"	3 1/2"
700-799	2 3/8"	3 3/8"	3 1/2"	1'-4"	3 3/8"	—	—	—	—	2'-6"	3'-10"	2'-6"	3'-10"	2'-8"	3'-10"	2'-10"	3'-10"	1'-11 1/2"	1'-10"	3 3/8"	1'-4"	1 5/8"	1 5/8"	2"	3 1/2"
800-899	2 3/8"	3 3/8"	3 1/2"	1'-4"	3 3/8"	—	—	—	—	2'-7"	3'-11"	2'-7"	3'-11"	2'-8"	3'-11"	2'-10"	3'-11"	2'-0 1/2"	2'-0"	3 3/8"	1'-5"	1 5/8"	1 5/8"	2"	3 1/2"
900-999	2 3/8"	3 3/8"	3 1/2"	1'-4"	3 3/8"	—	—	—	—	2'-11"	4'-0"	2'-11"	4'-0"	2'-11"	4'-0"	2'-11"	4'-0"	2'-1 1/2"	2'-2"	3 3/8"	1'-6"	1 5/8"	1 5/8"	2"	3 1/2"
1000-1099	2 3/8"	3 3/8"	4"	1'-6"	3 7/8"	—	—	—	—	—	3'-1"	4'-1"	3'-1"	4'-1"	3'-1"	4'-1"	2'-3 1/2"	2'-4"	3 7/8"	1'-7"	2 3/8"	2 5/8"	2 1/2"	3 3/4"	
1100-1199	2 3/8"	3 3/8"	4"	1'-6"	3 7/8"	—	—	—	—	—	3'-3"	4'-2"	3'-3"	4'-2"	3'-3"	4'-2"	2'-4 1/2"	2'-6"	3 7/8"	1'-8"	2 3/8"	2 5/8"	2 1/2"	3 3/4"	
1200-1299	2 3/8"	3 3/8"	4"	1'-6"	3 7/8"	—	—	—	—	—	—	—	—	3'-5"	4'-4"	3'-5"	4'-4"	2'-5 1/2"	2'-7"	3 7/8"	1'-9"	2 3/8"	2 5/8"	2 1/2"	3 3/4"
1300-1399	2 3/8"	3 3/8"	4"	1'-6"	3 7/8"	—	—	—	—	—	—	—	—	3'-7"	4'-7"	3'-7"	4'-7"	2'-6 1/2"	2'-8"	3 7/8"	1'-10"	2 3/8"	2 5/8"	2 1/2"	3 3/4"
1400-1500	2 3/8"	3 3/8"	4"	1'-6"	3 7/8"	—	—	—	—	—	—	—	—	3'-9"	4'-9"	3'-9"	4'-9"	2'-7 1/2"	2'-9"	3 7/8"	1'-11"	2 3/8"	2 5/8"	2 1/2"	3 3/4"
							G=1'-2"				G=1'-3"				G=1'-4"										
							G=1'-7"	2'-3"			1'-8"	2'-4"			1'-9"	2'-5"		1'-5"		2 3/8"	11"	1 1/8"	1 5/8"	2"	3 1/2"
0-300	1 5/8"	2 5/8"	3"	1'-0"	2 3/8"																				

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 IN TYPE "B" ROCKER BEARINGS, INCLUDING SHIMS, SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "BEARING ASSEMBLIES EXPANSION B-...".

ALL MATERIALS FOR BEARINGS INCLUDING SHIMS BUT EXCLUDING PINTLES, ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM SPECIFICATION TYPE A709 GRADE 50W STEEL.

PINTLES SHALL CONFORM TO ASTM SPECIFICATION TYPE A449 STEEL. PINTLES SHALL BE MACHINED TO A DRIVING FIT.

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 "M" PLATE THICKNESS + 2/4" ABOVE TOP OF CONCRETE MASONRY. CHAMFER ANCHOR BOLTS PRIOR TO THREADING.

RADIAL SURFACES ON ROCKER SHALL BE MACHINE FINISHED AFTER WELDING.

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 EDGE DISTANCE ALONG "L" MAY BE INCREASED FROM MINIMUM SHOWN WHEN A COMMON GRID DETAIL IS DESIRED FOR SEVERAL BEARINGS.

FOR UNPAINTED STRUCTURES THE UPPER 6" OF ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AS REQUIRED BY ASTM DESIGNATION A153, CLASS C OR B633.

USE AASHTO LRFD SERVICE 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.

ROCKER SETTING DATA

TEMPERATURE TIME OF SETTING - °F	(+)		(-)	
	PIER	PIER	PIER	PIER
120				
100				
80				
60				
40				
20				
0				
-20				

ROCKER BEARING SHALL BE SET VERTICAL AT 45° F.

ROCKER BEARING SHALL BE USED WITH A MINIMUM FRICTION VALUE OF 2% AND A MAXIMUM FRICTION VALUE OF 4%.

MAXIMUM MOVEMENT FROM 45° F = (D - 1")/2 BUT ACTUAL MOVEMENT NOT TO EXCEED R/3.

OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.

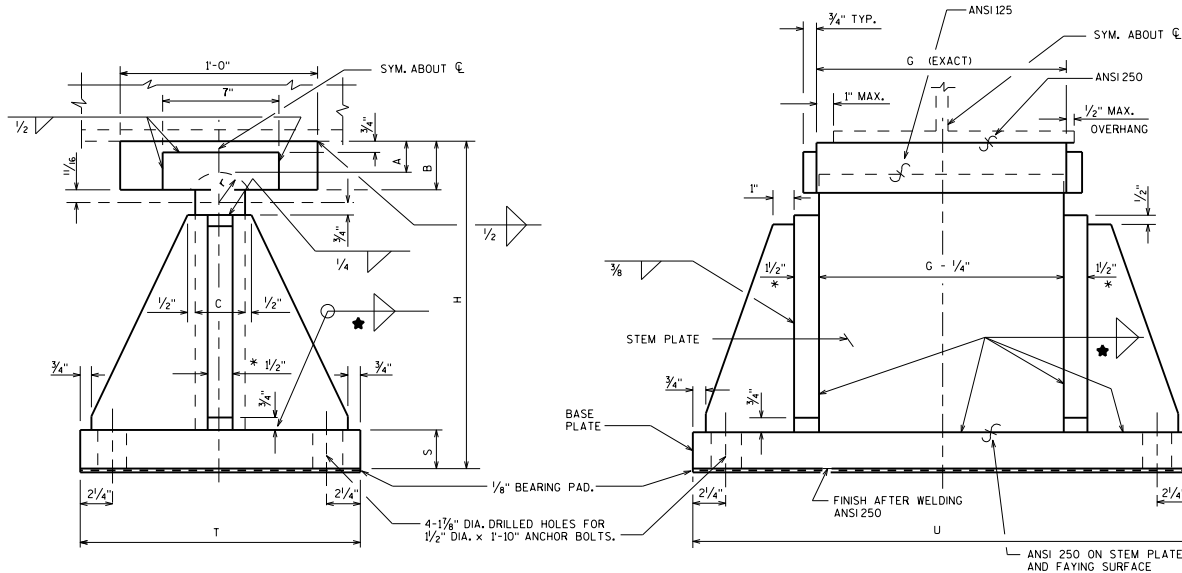
ROCKER BEARING TYPE 'B' - STEEL GIRDERS



**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

DATE:
7-16



FIXED SHOE

★ 400 K ≤ REACTION < 1000 K, USE 5/8" WELD.
1000 K ≤ REACTION ≤ 1500 K, USE 3/4" WELD

* FOR REACTIONS > 1000 KIPS
USE 2" STIFFENERS.

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 + 2/4" 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 "F" 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 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.

TABLE OF DIMENSIONS

REACTION (KIPS)	A	B	C	G VALUES						H	r		S	T
				G=1'-7" U	G=1'-9" U	G=1'-11" U	G=2'-1" U	G=2'-3" U	G=2'-5" U		STEM	PLATE		
400-499	1 5/8"	2 5/8"	3"	2'-8"	2'-8"	2'-10"	3'-0"	—	—	1'-6"	1 5/8"	1 5/8"	2 3/8"	1'-4"
500-599	1 5/8"	2 5/8"	3"	3'-0"	3'-0"	3'-0"	3'-0"	—	—	1'-7"	1 5/8"	1 5/8"	2 3/8"	1'-5"
600-699	1 5/8"	2 5/8"	3"	—	3'-3"	3'-3"	3'-3"	3'-3"	—	1'-9"	1 5/8"	1 5/8"	2 3/8"	1'-6"
700-799	2 3/8"	3 1/8"	3 1/2"	—	—	3'-6"	3'-6"	3'-6"	3'-6"	1'-10"	1 5/8"	1 5/8"	2 7/8"	1'-7"
800-899	2 3/8"	3 1/8"	3 1/2"	—	—	3'-9"	3'-9"	3'-9"	3'-9"	2'-0"	1 5/8"	1 5/8"	2 7/8"	1'-8"
900-999	2 3/8"	3 1/8"	3 1/2"	—	—	3'-10"	3'-10"	3'-10"	3'-10"	2'-1"	1 5/8"	1 5/8"	2 7/8"	1'-10"
1000-1099	2 1/8"	3 3/8"	4"	—	—	—	4'-0"	4'-0"	4'-0"	2'-3"	2 3/8"	2 3/8"	3 3/8"	1'-11"
1100-1199	2 1/8"	3 3/8"	4"	—	—	—	4'-2"	4'-2"	4'-2"	2'-4"	2 3/8"	2 3/8"	3 3/8"	2'-0"
1200-1299	2 1/8"	3 3/8"	4"	—	—	—	4'-4"	4'-4"	4'-4"	2'-5"	2 3/8"	2 3/8"	3 3/8"	2'-1"
1300-1399	2 1/8"	3 3/8"	4"	—	—	—	4'-6"	4'-6"	4'-6"	2'-6"	2 3/8"	2 3/8"	3 3/8"	2'-2"
1400-1500	2 1/8"	3 3/8"	4"	—	—	—	4'-8"	4'-8"	4'-8"	2'-7"	2 3/8"	2 3/8"	3 3/8"	2'-3"

TYPE 'B' - STEEL
GIRDERS FIXED SHOE



**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

DATE:
7-16

★ FOR CULVERT WINGS:

WITH WING WALL THICKNESS $\geq 8"$ USE:
ADHESIVE ANCHORS $\frac{3}{4}"$ INCH.
EMBED 5" IN CONCRETE.
SEE DETAIL "A"

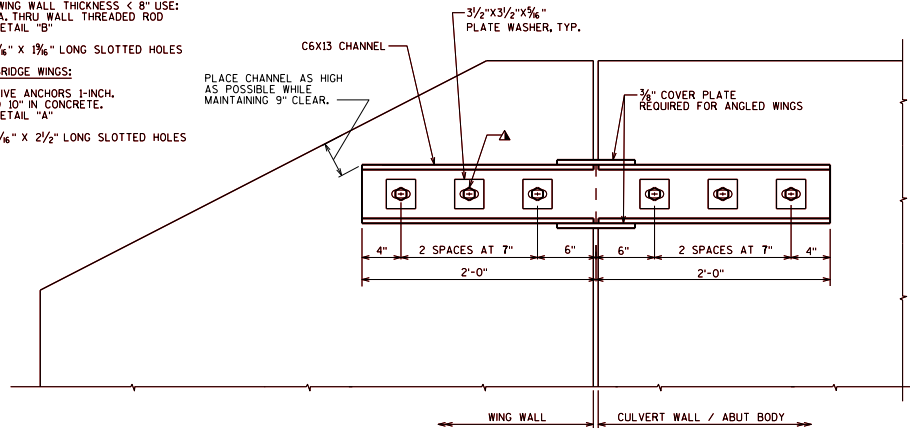
WITH WING WALL THICKNESS $< 8"$ USE:
 $\frac{3}{8}"$ DIA. THRU WALL THREADED ROD
SEE DETAIL "B"

USE $\frac{1}{4}" \times 1\frac{1}{4}"$ LONG SLOTTED HOLES

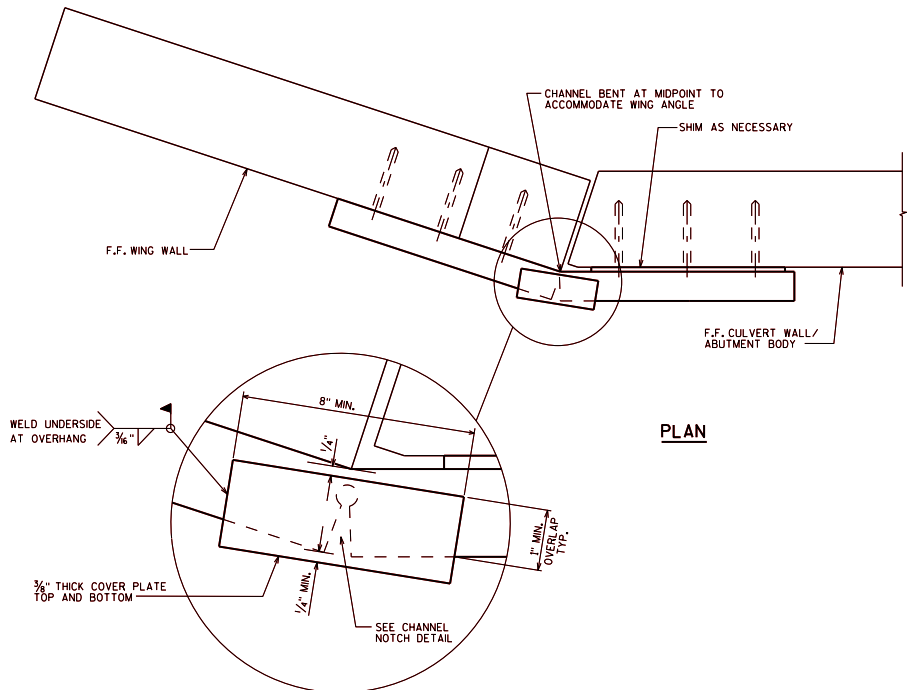
FOR BRIDGE WINGS:

ADHESIVE ANCHORS 1-INCH.
EMBED 10" IN CONCRETE.
SEE DETAIL "A"

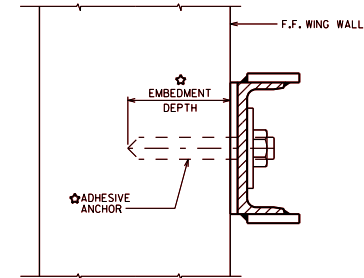
USE $\frac{1}{4}" \times 2\frac{1}{2}"$ LONG SLOTTED HOLES



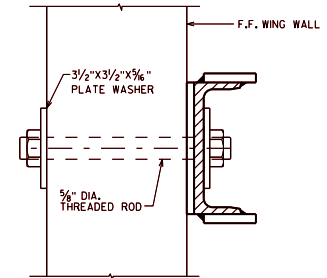
WING ELEVATION



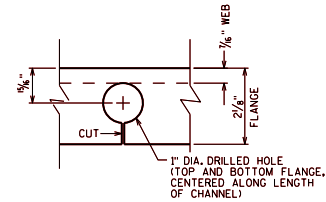
PLAN



DETAIL "A"
SECTION THRU CHANNEL



DETAIL "B"
SECTION THRU CHANNEL



CHANNEL NOTCH DETAIL
FOR USE WITH ANGLED WINGS ONLY

NOTES

WING STRAPPING DETAIL FOR THE PURPOSE OF MITIGATING INWARD WING TIPPING, AS AN ALTERNATIVE TO THE PREFERRED METHOD OF WING REPLACEMENT.

BID ITEM SHALL BE "STRAPPING B-XX-XXX" WHICH INCLUDES ALL ITEMS SHOWN.

WISDOT REGIONAL BRIDGE MAINTENANCE ENGINEER TO APPROVE USE OF DETAIL PRIOR TO INSTALLATION.

ALL PROVIDED 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.

CUTTING AND DRILLING OF CHANNEL SHALL BE DONE IN FABRICATION SHOP, PRIOR TO GALVANIZING.

IF WELDING COVER PLATE 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.

ADHESIVE ANCHORS SHALL CONFORM TO SECTION 502.2.12 OF THE STANDARD SPECIFICATIONS.

WING STRAPPING



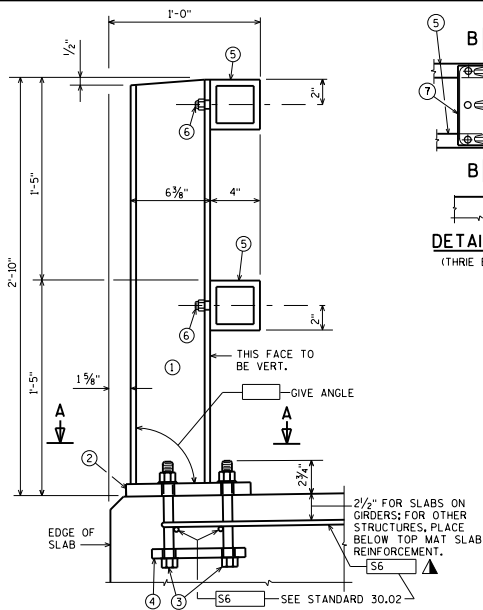
**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

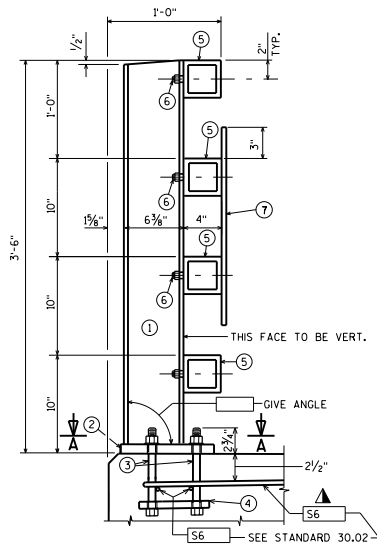
DATE:
7-18



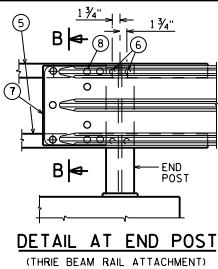
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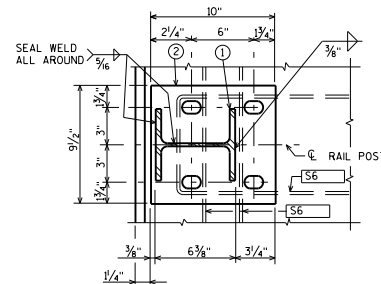
SECTION THRU RAILING ON DECK



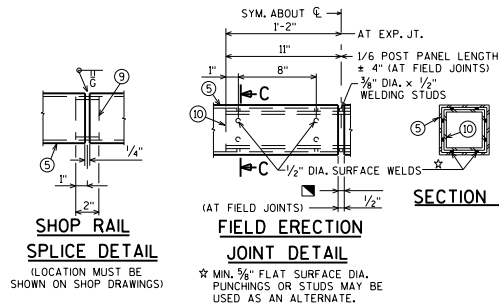
SECTION THRU RAILING ON SIDEWALK



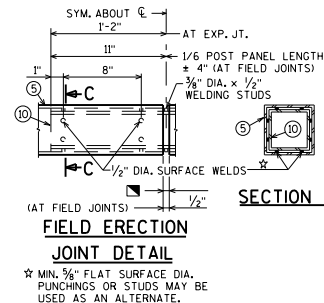
DETAIL AT END POST
(THREE BEAM RAIL ATTACHMENT)



SECTION A

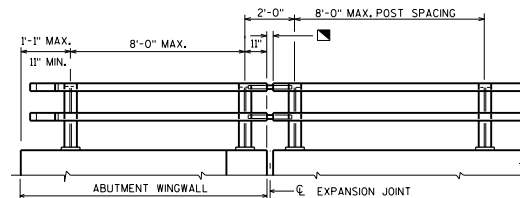


SHOP RAIL
SPLICE DETAIL
(LOCATION MUST BE
SHOWN ON SHOP DRAWINGS)

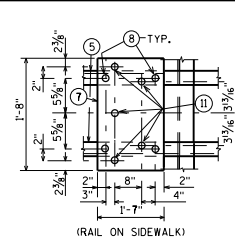


FIELD ERECTION
JOINT DETAIL

★ MIN. 3/8" FLAT SURFACE DIA.
PUNCHIONS OR STUDS MAY BE
USED AS AN ALTERNATE.

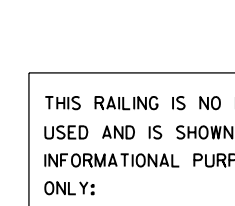


PART ELEVATION OF RAILING



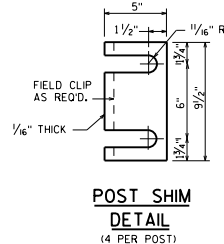
DETAIL FOR END POSTS

WITH OR WITHOUT THREE BEAM RAIL ATTACHMENT
(END POST MAY BE LOCATED ON
SUPERSTRUCTURE OR WINGWALLS)

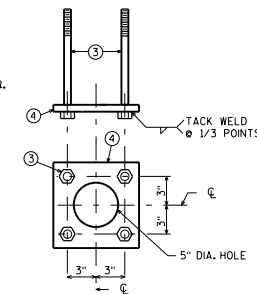


SECTION C

THIS RAILING IS NO LONGER
USED AND IS SHOWN FOR
INFORMATIONAL PURPOSES
ONLY:



POST SHIM
DETAIL
(4 PER POST)



ANCHORAGE DETAIL

LEGEND

- W6 x 25 WITH 1/4" 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 1/6" x 1/2" SLOTTED HOLES FOR ANCHOR BOLTS NO. 3, WELD TO NO. 1 AS SHOWN.
- A325 - 3/8" 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.
- 1/4" x 8" x 8" FLAT BAR WITH 15/16" 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.
- 3/8" 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 3/8" x 1'-4" (1'-7" ON SDWK.) x 1'-8". BOLT TO RAIL AS SHOWN IN DETAIL. REQ'D. AT THREE BEAM GUARD RAIL ATTACHMENTS ONLY. PLACE SYMMETRICALLY ABOUT TUBES NO. 5.
- 1" DIA. HOLES IN PLATE NO. 7 & TUBES NO. 5 FOR 3/8" DIA. A325 BOLTS W/ HEX NUTS AND WASHERS.
- SQUARE SLEEVE FABRICATED FROM 1/4" PLATE. PROVIDE "SLIDING FIT" WITH A MINIMUM OUT TO OUT DIMENSION OF 3 13/32".
- 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 3/8" DIA. x 1 1/2" WELDING STUDS ON TOP AND BOTTOM SURFACES AT CENTERLINE.
- 3/8" DIA. x 1 1/2" LONG THREADED SHOP WELDED STUDS. (REQ'D. FOR SDWK. 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. 6 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.)

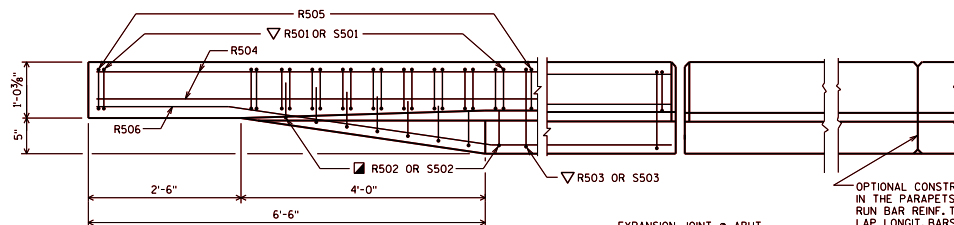
▣ RDWY. OPENING OR 2 1/2" MIN. FOR
STRIP SEAL EXP. JOINT & 1/2"
OPENING FOR A1 ABUTMENTS.

▲ TIE TO TOP MAT OF STEEL.

TUBULAR STEEL RAILING TYPE 'F'	
BUREAU OF STRUCTURES	
APPROVED: <u>Bill Oliva</u>	DATE: <u>7-16</u>

[illegible]

◆ ROADWAY OPENING OR 2½" MIN. FOR EXPANSION JOINT.
USE ½" OPENING WITH FILLER FOR A1 ABUTMENTS

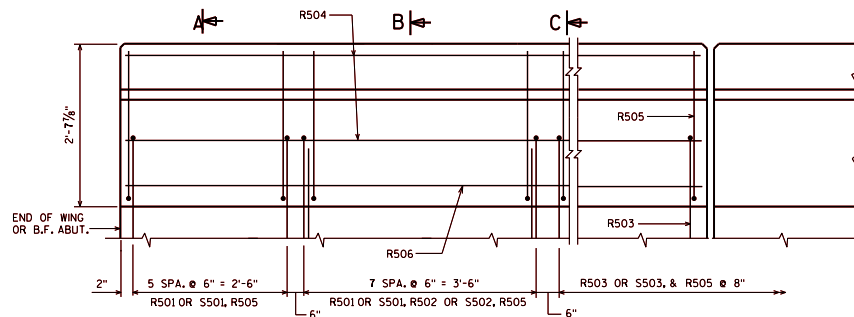


PLAN

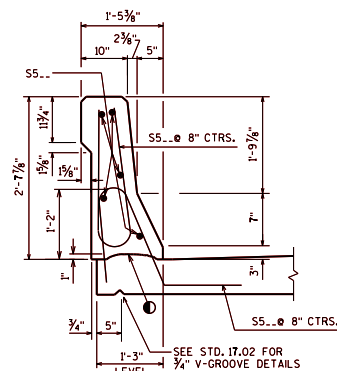
EXPANSION JOINT @ ABUT.
0° SKEW SHOWN. MATCH EXP.
JT. OPENING.

FOR TYPE A1 ABUT., USE 1/2"
FILLER TO TOP OF PARAPET.
SEE STD. 12.01.

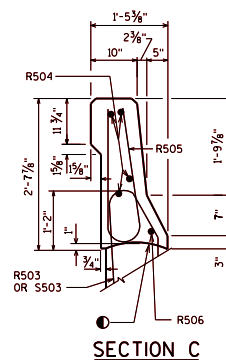
OPTIONAL CONSTRUCTION JOINTS
IN THE PARAPETS MAY BE USED.
RUN BAR REINF. THRU THE JOINT.
LAP LONGIT. BARS A MIN. OF 1'-9".
MIN. JOINT SPACING OF 80'-0".
DEFINE CONST. JOINT WITH A $\frac{3}{4}$ " -
"V" GROOVE.



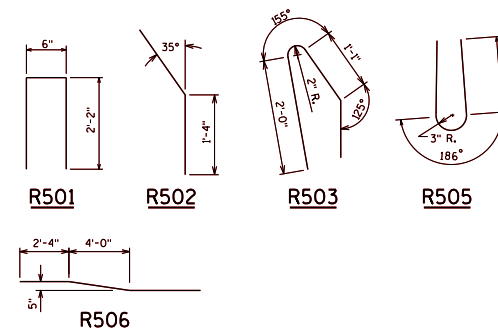
OUTSIDE ELEVATION



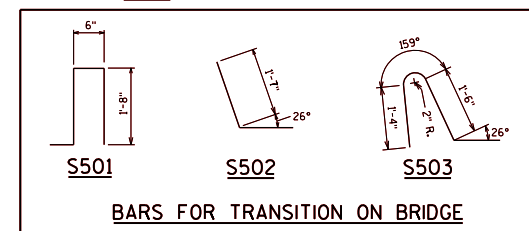
SECTION THRU PARAPET ON BRIDGE



SECTION C



R506



BARS FOR TRANSITION ON BRIDGE

● CONST. JOINT - STRIKE OFF AS SHOWN.

▽ 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.

FOR ABUTMENT PARAPETS

BAR MARK	COAT	LENGTH		SEAL	LOCATION
		ABUT.	ABUT.		
B501.	X	-	4'-7"	X	PAPAPET VERB.
B502.	X	-	2'-4"	X	PAPAPET VERB.
B503.	X	-	4'-7"	-	PAPAPET VERB.
B504.	X	-	-	-	PAPAPET HORIZ.
B505.	X	-	4'-10"	X	PAPAPET VERB.
B506.	X	-	-	X	PAPAPET HORIZ.
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
S501.	X	-	4'-5"	X	PAPAPET VERB.
S502.	X	-	2'-4"	X	PAPAPET VERB.
S503.	X	-	4'-2"	X	PAPAPET VERB.

SLOPED FACE PARAPET 'LF'



**BUREAU OF
STRUCTURES**

APPROVED: *Bill Oliva*

DATE:



BID ITEM NUMBER	BID ITEMS	BID ITEM NUMBER	BID ITEMS	UNIT	TOTAL	BID ITEMS	ON THE EXISTING OVERLAY JOINTS, SHALL BE AT LOCATIONS COORDINATE STAGING TO AVOID GRAD SEPARATE OVERLAY POURS.	UNITS
502.3200	PROTECTIVE SURFACE TREATMENT	502.3200	PROTECTIVE SURFACE TREATMENT	SY				SY
509.0301	PREPARATION DECKS TYPE 1	509.0301	PREPARATION DECKS TYPE 1	SY				SY
509.0302	PREPARATION DECKS TYPE 2	509.0302	PREPARATION DECKS TYPE 2	SY				SY
509.0500	CLEANING DECKS	509.0500	CLEANING DECKS	SY				SY
509.2000	FULL-DEPTH DECK REPAIR	509.2000	FULL-DEPTH DECK REPAIR	SY				SY
509.2500	CONCRETE MASONRY OVERLAY DECKS	509.2500	CONCRETE MASONRY OVERLAY DECKS	CY				CY
	POSSIBLE ADDITIONAL BID ITEMS		POSSIBLE ADDITIONAL BID ITEMS					
502.3210	PIGMENTED SURFACE SEALER	502.3210	PIGMENTED SURFACE SEALER	SY				SY
509.0505.S	CLEANING DECKS TO REAPPLY CONCRETE MASONRY OVERLAY	509.0505.S	CLEANING DECKS TO REAPPLY CONCRETE MASONRY OVERLAY	SY				SY
509.9005.S	REMOVING CONCRETE MASONRY DECK OVERLAY (STRUCTURE)	509.9005.S	REMOVING CONCRETE MASONRY DECK OVERLAY (STRUCTURE)	SY				SY
514.0900	ADJUSTING FLOOR DRAINS	514.0900	ADJUSTING FLOOR DRAINS	EACH				EACH

▲ 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.

STANDARD 40.31

POLYMER MODIFIED
ASPHALTIC OVERLAY

DESIGN DATA

LIVE LOAD:
INVENTORY RATING: HS-20-44
OPERATING RATING: HS-20-44
WISCONSIN STANDARD PERMIT VEHICLE (WIS-SPV) \pm 100 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.

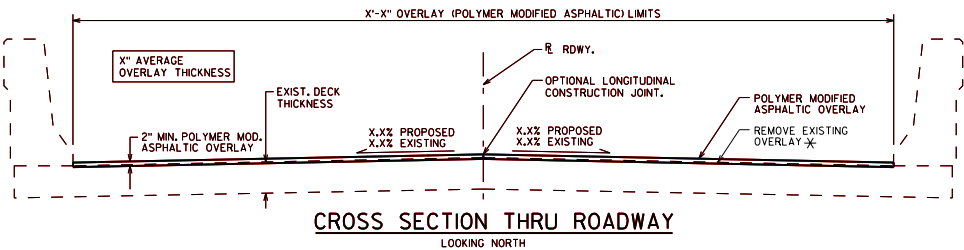
AREAS OF "PREPARATION DECKS TYPE 1" SHALL BE DEFINED BY A SAW CUT.

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 $2\frac{1}{2}$ " (OR AS GIVEN ON THE PLANS). IF EXPECTED AVERAGE OVERLAY THICKNESS IS EXCEEDED BY MORE THAN $\frac{1}{2}$ ", CONTACT THE STRUCTURES DESIGN SECTION.



CROSS SECTION THRU ROADWAY

LOOKING NORTH

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. $\frac{1}{4}$ " MINIMUM REMOVAL OF EXISTING DECK IS INCLUDED WITHIN "REMOVING (OVERLAY TYPE) DECK OVERLAY (STRUCTURE)" BID ITEMS.

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	
509.2090	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.

ASPHALTIC OVERLAY

DESIGN DATA

LIVE LOAD:
INVENTORY RATING: HS-20-44
OPERATING RATING: HS-20-44
WISCONSIN STANDARD PERMIT VEHICLE (WIS-SPV) \pm 100 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.

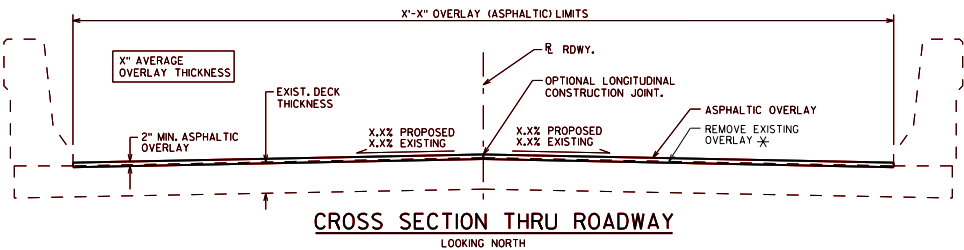
AREAS OF "PREPARATION DECKS TYPE 1" SHALL BE DEFINED BY A SAW CUT.

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 $2\frac{1}{2}$ " (OR AS GIVEN ON THE PLANS). IF EXPECTED AVERAGE OVERLAY THICKNESS IS EXCEEDED BY MORE THAN $\frac{1}{2}$ ", CONTACT THE STRUCTURES DESIGN SECTION.



CROSS SECTION THRU ROADWAY

LOOKING NORTH

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.

THE PLAN QUANTITY FOR THE BID ITEM "HMA PAVEMENT TYPE E-X" IS BASED ON THE AVERAGE OVERLAY THICKNESS.

RESTRICTIONS ON REMOVAL ITEMS SHALL BE PLACED ON THE PLANS TO PREVENT DAMAGE TO REINFORCING STEEL. ADDITIONAL INFORMATION IS PROVIDED.

* 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. $\frac{1}{4}$ " MINIMUM REMOVAL OF EXISTING DECK IS INCLUDED WITHIN "REMOVING (OVERLAY TYPE) DECK OVERLAY (STRUCTURE)" BID ITEMS.

THE PLAN QUANTITY FOR THE BID ITEM "TACK COAT" IS BASED ON AN APPLICATION RATE OF 0.05 TO 0.07 GALLONS/SY. ASSUME 0.07 GALLONS/SY IF PLACING OVER MILLED HMA OR CONCRETE.

RESTRICTIONS ON REMOVAL ITEMS SHALL BE PLACED ON THE PLANS TO PREVENT DAMAGE TO REINFORCING STEEL.

TOTAL ESTIMATED QUANTITIES

BID ITEM NUMBER	BID ITEMS	UNIT	TOTAL
455.0605	TACK COAT MATERIAL PGXX-XX	GAL	
460.0000	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	
SPV.0090	SAWING PAVEMENT DECK PREPARATION AREAS	LF	
	POSSIBLE ADDITIONAL BID ITEMS		
* 509.9005.S	REMOVING CONCRETE MASONRY DECK OVERLAY (STRUCTURE)	SY	
* 509.9010.S	REMOVING ASPHALTIC CONCRETE DECK OVERLAY (STRUCTURE)	SY	

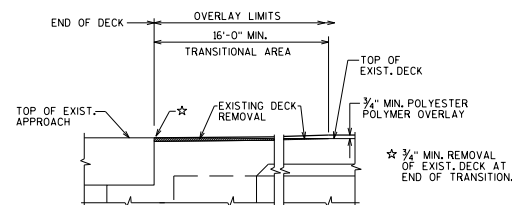
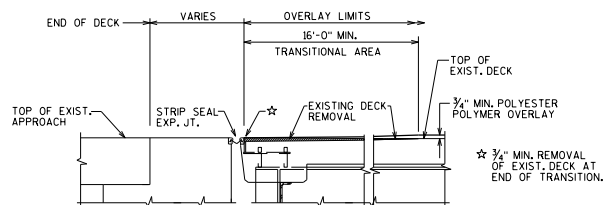
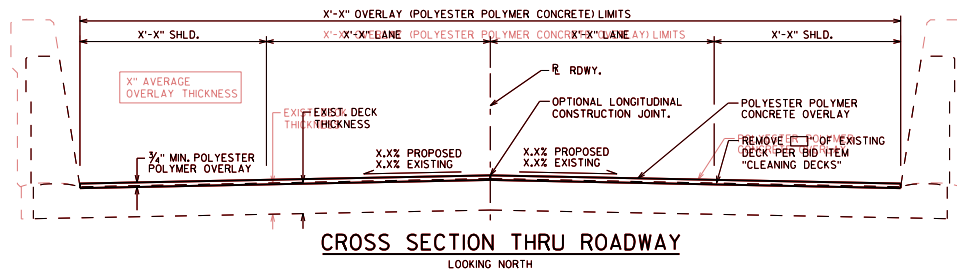
THIS IS A PARTIAL LIST OF POSSIBLE BID ITEMS. BID ITEMS MAY NEED TO BE ADDED OR REMOVED TO FIT EACH INDIVIDUAL CASE.

POLYMER MODIFIED ASPHALTIC
AND ASPHALTIC OVERLAYS

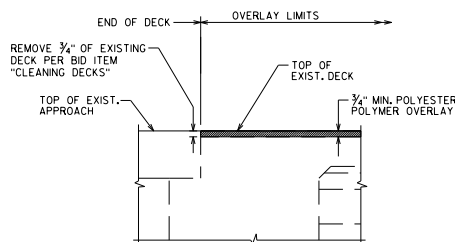


BUREAU OF
STRUCTURES

APPROVED: Bill Oliva DATE: 1-28



NOTE: TRANSITIONAL AREA REQUIRED WHEN APPROACH PAVEMENT HAS BEEN PLACED PRIOR TO OVERLAY PLACEMENT.



DESIGN DATA

LIVE LOAD:
INVENTORY RATING: HS-20
OPERATING RATING: HS-20
MAXIMUM STANDARD PERMIT VEHICLE (WIS-SPV)=... KIPS

NOTES

DRAWINGS SHALL NOT BE SCALED.

DIMENSIONS SHOWN ARE BASED ON THE ORIGINAL STRUCTURE PLANS.

1/4-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 OTHER 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.

SPECIFICATIONS FOR 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 IN TRANSITIONAL AREAS, ARE NOT RECOMMENDED ON CONCRETE APPROACHES. SHALL BEARS SHALL SPECIFY THE MINIMUM TRANSITION TAPER LENGTH. THE PROVIDED TRANSITION LENGTH, ARE SHOWN ON THIS SHEET. BASED ON THE 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.

DO NOT PROVIDE A PROFILE GRADE LINE ON THE PLANS.

TOTAL ESTIMATED QUANTITIES

BID ITEM NUMBER	BID ITEMS	UNIT	TOTAL
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			
POSSIBLE ADDITIONAL BID ITEMS			
509.0500D	"CLEANING DECKS" (UAL CASE)	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: Bill Oliva

DATE:
7-20



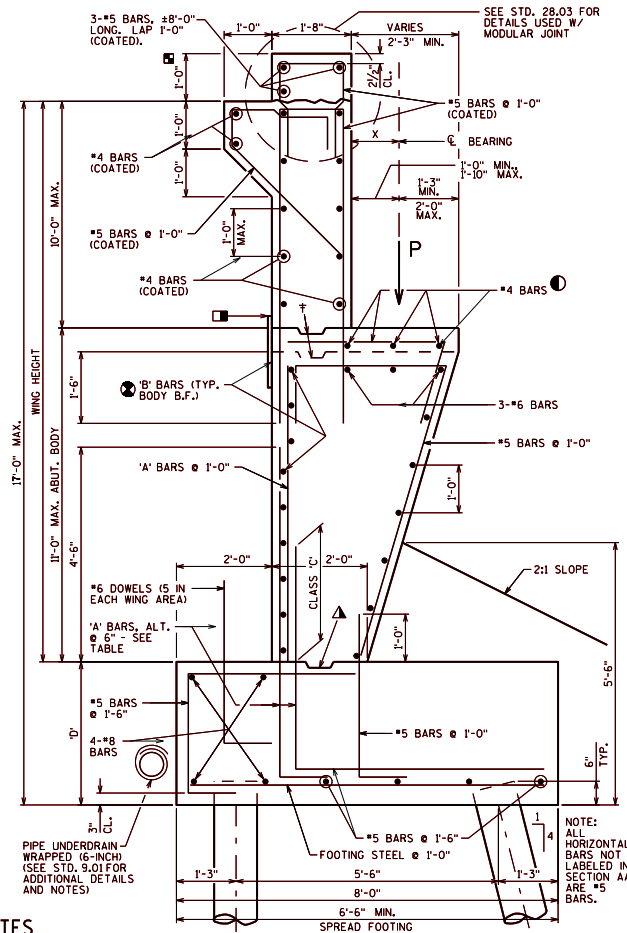
SPC	DC	SDW	SW	SEL	EL
"P" K/FT	"A" BAR SIZE		FOOTING STEEL SIZE		FOOTING DEPTH "D"
16	#6		#6		3'-0"
24	#7		#6		3'-0"
27	#7		#7		3'-0"
38	#8		#6		3'-3"
41	#8		#7		3'-3"
48	#9		#6		3'-3"
54	#9		#7		3'-3"

ABUTMENT BODY DEPTH	'B' BARS
< 7'	9- #11
≥ 7'	10- #10

h = WING HEIGHT

PILE REACTIONS PER FOOT IN KIPS
BACK ROW = $P(0.56-X/5.5)-n^3/915+17.2$
FRONT ROW = $P(0.44+X/5.5)+n^3/425+7.9$

(PILES MUST ALSO BE DESIGNED TO ACCOUNT FOR LATERAL LOADS)



DESIGNER NOTES

USAGE OF A4 ABUTMENTS IS DISCONTINUED. OVER THE YEARS
 AND RECURRENTLY UNDER REVIEW TO BE CONTINUED.
 RUND SPACING THE ABUTMENT FOOTING SHALL BE CONTINUED.
 8'-0" MAXIMUM.
 PILING SPACING IN ABUTMENT FOOTING SHALL BE CONTINUED SHALL BE
 WHEN BODY SECTION IS MORE THAN 50'-0" LONG.
 PROVIDE TYPICAL CONSTRUCTION JOINT. RUN BAR
 STEEL FLOOR SLAB TO SEAM JOINT WITH 60'-0" LONG.
 RUBBERIZED MEMBRANE WATERPROOFING. SEE STD.
 22.09 FOR ALTERNATE CONSTRUCTION JOINT WITH 18"
 RUBBERIZED MEMBRANE WATERPROOFING. SEE STD.
 12.09 FOR ALTERNATE CONSTRUCTION JOINT.

LEGEND

- | | |
|---|-------------------------------------|
| <p>■ 18" RUBBERIZED MEMBRANE WATERPROOFING. SEAL ALL HORIZ. AND VERT. JOINTS ON BACKFACE ABOVE FOOTING.</p> <p>▲ KEED CATION KEYED JOINT FORMED BY BEVELED 2" x 6".</p> <p>● 4 AT 9" BEAM SEAT. SPACE AT 1'-6" BETWEEN SECTIONS. THIS STEEL IS REQUIRED ONLY IF DIMENSION "A" EXCEEDS 4'.</p> <p>† OPTIONAL KEYED JOINTED JOINT FORMED BY BEVELED 2" x 6". USE ¾" "V" GROOVE ON F.F. OF WING WALL ONLY. IF JOINT IS NOT USED, WATERPROOFING IS NOT REQUIRED.</p> <p>✱ WINGWALL WIDTH SHALL BE 1'-6" WHEN TYPE "M" 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'-9" WHEN TYPE "NY3" OR "NY4" RAILING IS USED.</p> <p>■ PAVING NOTCH IS 1'-0" WIDE BY 1'-4" DEEP IF STRUCTURAL APPROACH SLAB (STD. 12.10) IS USED.</p> <p>☆ SIDEWALL IS 1'-3" WIDE IF STRUCTURAL APPROACH SLAB (STD. 12.10) IS USED.</p> <p>■ SHOW ALL BARS FOR CLARITY.</p> | <p>SEE</p> <p>ABOUT SLAB DETAIL</p> |
|---|-------------------------------------|

SECTION A-A

DESIGNER NOTES CONT'D

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.

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

PARAPET NOT SHOWN IN PLAN VIEW FOR CLARITY.

SEE STD. 12.03 FOR ADDITIONAL DETAILS.

ABUTMENT DETAILED WITHOUT STRUCTURAL

SLAB, SEE STD. 12.10 THRU 12.13 FOR STRUCTURAL APPROACH
DETAILS.

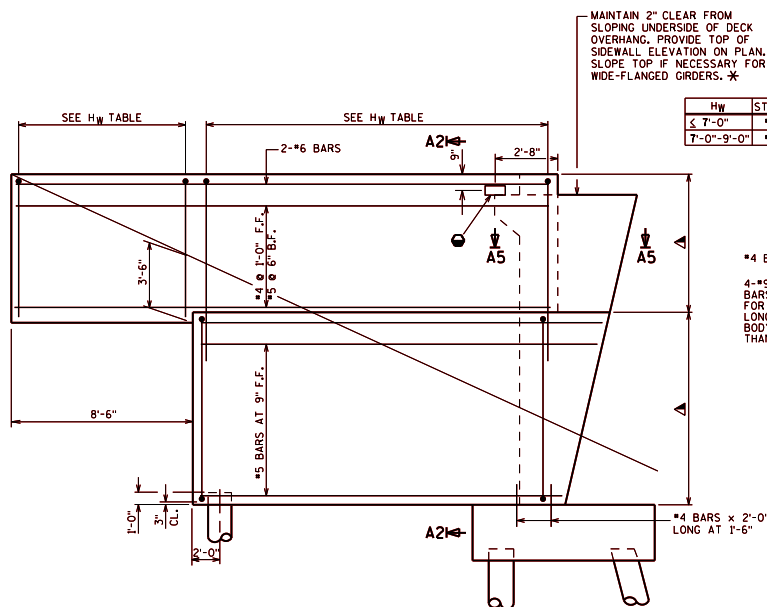
ABUTMENT A4 PILE FOOTING



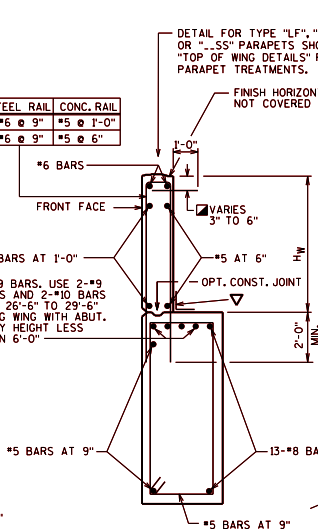
BUREAU OF STRUCTURES

APPROVED: *Bill Oliva*

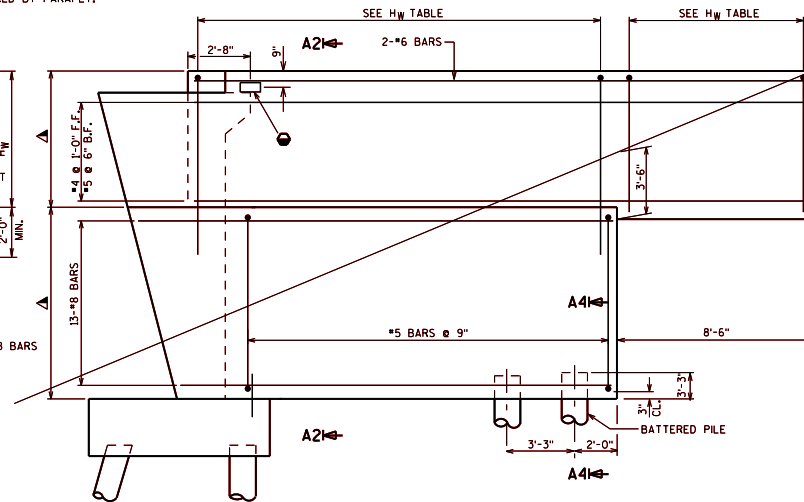
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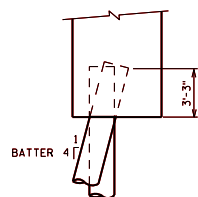
WING ELEVATION
WING LENGTH TO 26'-6"



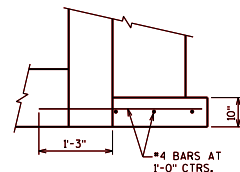
SECTION A2
ALL WING LENGTHS



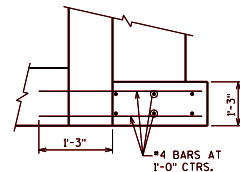
WING ELEVATION
WING LENGTH OVER 26'-6" TO 29'-6"



SECTION A4



SECTION A5
(WITHOUT STRUCTURAL APPROACH SLAB)



SECTION A5
(WITH STRUCTURAL APPROACH SLAB)

DESIGNER NOTES

DESIGNER HAS BEEN LIMITED OVER THE YEARS. CHARGE OF ABUTMENTS IS DISCONTINUED. SUPERSTRUCTURE AND DECK DESIGN IS REQUIRED.

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 $\gamma_{DEH} = 1.50$, AND SUPERSTRUCTURE REACTIONS "P". BACK ROW PILE DESIGN IS BASED ON AN EQUIVALENT FLUID UNIT WEIGHT OF SOIL OF 20 P.C.F. WITH $\gamma_{DEH_{MIN}} = 0.90$, 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.

BARS 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:
 $\gamma_{DC} = 1.25$
 $\gamma_{DW} = 1.50$
 $\gamma_{DEH} = 1.50$
 $\gamma_{DEH_{MIN}} = 0.90$
 $\gamma_{DEY} = 1.35$
 $\gamma_{LL} = 1.75$
EXPOSURE CLASS 2, $\gamma_E = 0.75$
 $f_y = 60,000$ P.S.I.
 $f'_c = 3,500$ P.S.I.

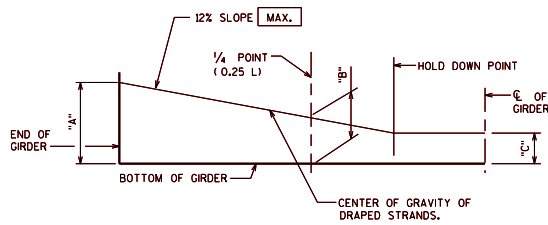
ABUTMENT A4 PILE FOOTING



**BUREAU OF
STRUCTURES**

APPROVED: Bill Oliva

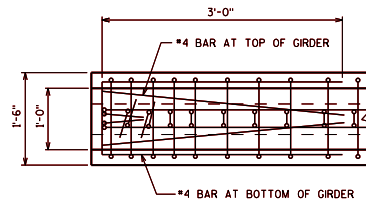
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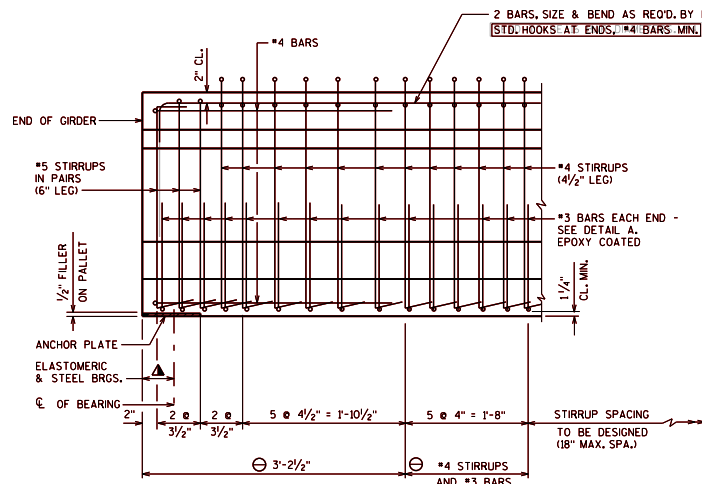
"A" TO BE GIVEN TO THE NEAREST 1"
 "B" = $\frac{1}{4}"A + 3" C$ (MIN.)
 "B" = $\frac{1}{4}"A + 3" C + 3"$ (MAX.)

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

LOCATION OF DRAPED STRANDS

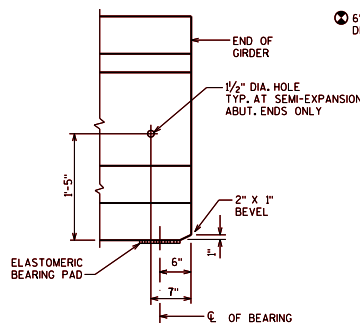


PLAN VIEW

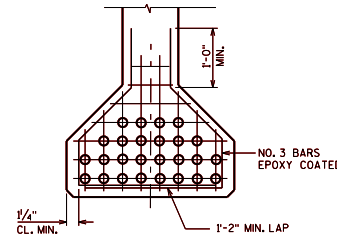


SUPPORT WITH STEEL OR ELASTOMERIC BRGS.

SIDE VIEW OF GIRDER

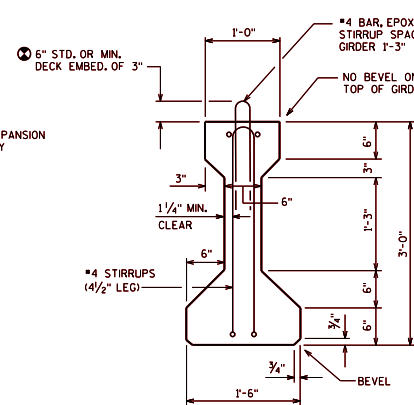


SUPPORT WITH 1/2" ELASTOMERIC BRG. PAD



DETAIL A

DO NOT USE THE 36" PRESTRESSED GIRDER SHOWN ON THIS SHEET.
 IT WILL BE MOVED TO CH 40 IN THE FUTURE.



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.

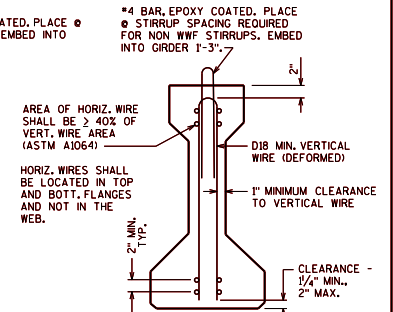
REINFORCEMENT IN STANDARD END SECTION OF THE GIRDER IS BASED ON THE STANDARD STRAND PATTERNS LISTED ON STANDARD R004 AND THE SPAN LENGTHS SHOWN IN TABLE 19.3-1. USING DIFFERENT STRAND PATTERNS OR LONGER SPANS WILL REQUIRE A COMPLETE DESIGN OF THIS REINFORCEMENT, WHICH REQUIRES PRIOR APPROVAL FROM THE 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 ± 3/4" 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)

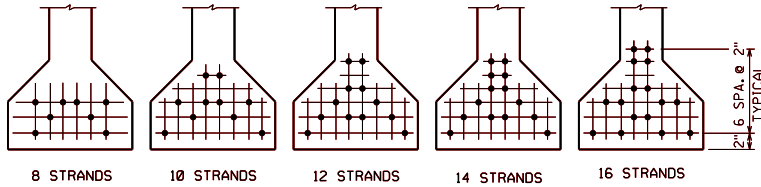
36" PRESTRESSED GIRDER DETAILS



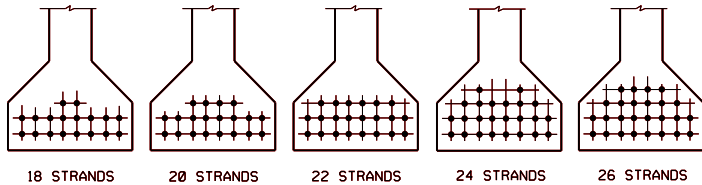
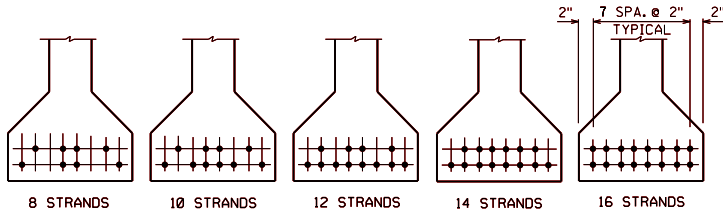
BUREAU OF STRUCTURES

APPROVED: *Bill Oliva*

DATE:
7-21



**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 $\frac{L}{4}$ 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
 $P_i \text{ PER } 0.5" \text{ DIA. STRAND} = 0.1531 \times 202,500 = \underline{31.00 \text{ KIPS}}$
 $P_i \text{ PER } 0.6" \text{ DIA. STRAND} = 0.217 \times 202,500 = \underline{43.94 \text{ KIPS}}$
 $\frac{y_B}{r^2} = \frac{-15.83}{138.15} = -0.1146 \text{ IN./IN.}^2$
 $f_B (\text{init.}) = \frac{A_s f_s}{A} (1 + \frac{e_s y_B}{r^2})$

**DO NOT USE THE 36" PRESTRESSED
GIRDER SHOWN ON THIS SHEET.
IT WILL BE MOVED TO CH 40 IN
THE FUTURE.**

(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: <u>Bill Oliva</u> DATE: <u>7-21</u>