

# GENERAL NOTES

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) 2005 STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2011 EDITION (GREEN BOOK), APPLICABLE TO THE PROJECT.

EXCEPT AS SHOWN IN THE PLANS, STRUCTURE EXCAVATION AND BACKFILL SHALL BE IN ACCORDANCE WITH M-206-2.

EXPANSION JOINT MATERIAL SHALL MEET AASHTO SPECIFICATION M-213.

STRUCTURAL CONCRETE EXPOSED TO SOIL SHALL CONFORM TO CEMENTITIOUS MATERIALS REQUIREMENTS CLASS 0, CORRESPONDING TO SULFATE EXPOSURE CLASS 0.

ALL ELECTRICAL CONDUIT IN BRIDGE CONCRETE LESS THAN 2" IN DIAMETER SHALL BE GALVANIZED RIGID METAL CONDUIT. CONDUIT THAT RUNS IN BRIDGE RAIL SHALL INCLUDE A PULL WIRE FOR WIRING INSTALLATION. PULL WIRE SHALL BE INCIDENTAL TO COST OF CONDUIT.

COMPRESSED JOINT MATERIAL SHALL BE PRE-COMPRESSED, CHEMICALLY RESISTANT, OPEN CELL POLYURETHANE FOAM SEALANT, IMPREGNATED WITH A WATER-REPELLENT MATERIAL, WITH ADHESIVE BACKING ON BOTH SIDES. THE JOINT MATERIAL SHALL BE EPOXIED IN PLACE, AND ALL SPLICES SEALED, AS RECOMMENDED BY THE SUPPLIER OF THE JOINT MATERIAL. THE COST SHALL BE INCLUDED IN THE COST OF ITEM 601, CLASS D CONCRETE.

ACCEPTABLE COMPRESSED JOINT MATERIAL ALTERNATIVES:

- WILL-SEAL
- SEAL-MATE #517
- POLY-TITE "N"

A COLORED STRUCTURAL CONCRETE COATING WILL BE REQUIRED ON EXPOSED CONCRETE SURFACES TO 1'-0" BELOW FINISHED GRADE, AS SHOWN ON THE PLANS. THE COLOR SHALL BE DAVIS COLOR "SEQUOIA SAND" (NO. 641)

THE FINAL FINISH FOR ALL EXPOSED CONCRETE SURFACES SHALL BE CLASS 2 TO 1'-0" BELOW FINISHED GRADE.

ALL EXTERIOR CONCRETE CORNERS SHALL BE CONSTRUCTED WITH 3/8" CHAMFERS, UNLESS OTHERWISE NOTED

STRUCTURAL STEEL PILING SHALL BE AASHTO M270 (ASTM A-572) GRADE 50. ALL OTHER STRUCTURAL STEEL, UNLESS NOTED OTHERWISE, SHALL BE AASHTO M270 (ASTM A-36).

LEVELING PADS ARE UNLAMINATED BEARINGS. THEY SHALL BE CUT OR MOLDED FROM AASHTO ELASTOMER GRADE 3, 4, OR 5 AS DESCRIBED IN TABLES 705-1 AND 705-2 WITH A DUROMETER (SHORE "A") HARDNESS OF 60.

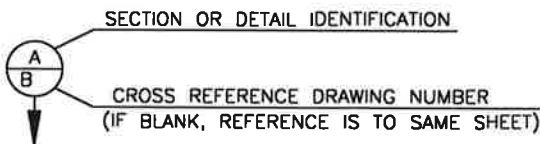
GRADE 60 REINFORCING STEEL IS REQUIRED.

ALL REINFORCING STEEL SHALL HAVE 2" CONCRETE COVER UNLESS NOTED OTHERWISE.

ALL REINFORCING STEEL SHALL BE EPOXY COATED UNLESS OTHERWISE NOTED.

Ⓝ DENOTES NON-COATED REINFORCING STEEL.

ALL THE PROVISIONS FOR BRIDGE DECK CONCRETE SHALL ALSO APPLY TO APPROACH SLAB CONCRETE.



THE FOLLOWING TABLE GIVES THE MINIMUM CLASS B LAP SPLICE LENGTH FOR EPOXY COATED REINFORCING BARS PLACED IN ACCORDANCE WITH SUBSECTION 602.06. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER.

BAR SIZE	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH FOR CLASS D CONCRETE	1'-3"	1'-7"	2'-5"	2'-10"	3'-8"	4'-8"	5'-11"	7'-3"

WHEN THE CONTRACTOR ELECTS TO SUBSTITUTE EPOXY COATED REINFORCEMENT FOR BLACK REINFORCING BARS, THE MINIMUM LAP SPLICE SHALL BE AS DESCRIBED ABOVE.

THE FOLLOWING TABLE GIVES THE MINIMUM CLASS B LAP SPLICE LENGTH FOR BLACK REINFORCING BARS PLACED IN ACCORDANCE WITH SUBSECTION 602.06. THESE SPLICE LENGTHS SHALL BE INCREASED BY 25% FOR BARS SPACED AT LESS THAN 6" ON CENTER.

BAR SIZE	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH FOR CLASS D CONCRETE	1'-1"	1'-4"	1'-7"	1'-11"	2'-6"	3'-1"	3'-11"	4'-10"

PERMANENT STEEL DECK FORMS ARE REQUIRED. → No

PERMANENT PRECAST CONCRETE DECK FORMS ARE NOT ALLOWED. → why not? give details?

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION.

- B.F. = BACK FACE
- E.F. = EACH FACE
- HCL = HORIZONTAL CONTROL LINE
- HMA = HOT MIX ASPHALT
- I.D. = INSIDE DIAMETER
- I.F. = INSIDE FACE
- O.F. = OUTSIDE FACE
- PGL = PROFILE GRADE LINE

NO EXISTING UTILITIES ARE LOCATED IN THE LIMITS OF THE BRIDGE WORK. THE CONTRACTOR IS RESPONSIBLE FOR MAKING HIS OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES WHICH ARE LOCATED OUTSIDE THE BRIDGE LIMITS, AS MAY BE NECESSARY TO AVOID DAMAGE THERETO. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO AT 811 OR 1-800-922-1987 AT LEAST 3 DAYS (2 DAYS NOT INCLUDING THE DAY OF NOTIFICATION) PRIOR TO ANY EXCAVATION OR OTHER EARTHWORK.

STATIONS, ELEVATIONS, AND DIMENSIONS CONTAINED IN THESE PLANS ARE BASED UPON A RECENT FIELD SURVEY. THE CONTRACTOR SHALL VERIFY ALL DEPENDENT DIMENSIONS IN THE FIELD BEFORE ORDERING OR FABRICATING ANY MATERIAL. IF THERE IS A DISCREPANCY, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING WITHIN 48 HOURS.

## DESIGN DATA

AASHTO, SEVENTH EDITION LRFD WITH CURRENT INTERIMS

DESIGN METHOD: LOAD AND RESISTANCE FACTOR DESIGN (LRFD)

SEISMIC PERFORMANCE ZONE 1 → give explanation data per worksheets

- LIVE LOAD: HL-93 (DESIGN TRUCK OR TANDEM, AND DESIGN LANE LOAD)
- DEAD LOAD: ASSUMES 36 LBS. PER SQ. FT. FOR 3" HMA BRIDGE DECK OVERLAY
- ASSUMES 5 LBS. PER SQ. FT. FOR FUTURE UTILITIES
- ASSUMES 5 LBS. PER SQ. FT. FOR PERMANENT STEEL DECK FORMS

REINFORCED CONCRETE:

- CDOT CLASS D CONCRETE:  $f'_c = 4,500$  psi
- REINFORCING STEEL:  $f_y = 60,000$  psi

STEEL PILING: AASHTO M270 (ASTM A709) GRADE 50  $F_y = 50,000$  psi

DIAPHRAGM STEEL: AASHTO M270 (ASTM A709) GRADE 36  $F_y = 36,000$  psi

PRESTRESSED CONCRETE: CLASS PS CONCRETE  $f'_c =$  (SEE DETAILS)  
 $f'_s = 270,000$  psi

## INDEX OF DRAWINGS

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- B27 BRIDGE RAIL (SPECIAL) DETAILS
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- B30 BRIDGE RAIL TYPE 10 (2 OF 2)
- B31 APPROACH SLAB DETAILS
- B32 MECHANICALLY STABILIZED BACKFILL - doesn't match title block

## BRIDGE DESCRIPTION

TWO SPAN (78'-2 1/2" / 78'-2 1/2") BRIDGE  
COMPOSITE CONCRETE SLAB AND  
PRECAST/PRESTRESSED CONCRETE I GIRDERS (BT42)

BELFORD AVENUE OVER HAPPY CANYON CREEK  
72'30"00" SKEW (TO LAYOUT LINE)  
74'-0" ROADWAY WIDTH, EDGE OF SIDEWALK  
TO EDGE OF SIDEWALK (ULTIMATE)  
8'-6" SIDEWALKS

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				Void:	Detailer: C. MIYAMOTO			
6300 South Syracuse Way, Suite 600 Centennial, CO 80111 tel 303.721.1440 fax 303.721.0832					Subset: BRIDGE	Sheets: B1 of 32		Sheet Number 11

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SUMMARY OF QUANTITIES (INTERIM SECTION)								
ITEM NO.	DESCRIPTION	UNIT	SUPER-SUPERSTRUCTURE	ABUTMENT 1	PIER 2	ABUTMENT 3	APPROACH SLABS	TOTALS
206	STRUCTURE EXCAVATION	CY		102	25	102		229
206	STRUCTURE BACKFILL (CLASS 1)	CY		606	15	727		1,348
206	STRUCTURE BACKFILL (CLASS 2)	CY		142		142		284
206	MECHANICAL REINFORCEMENT OF SOIL	CY		512		614		1,126
403	HOT MIX ASPHALT (GRADING ??)	TON	130				36	166
420	GEOTEXTILE (EROSION CONTROL) (CLASS1)	SY						0
503	DRILLED CAISSON (24 INCH)	LF		375		387		762
503	DRILLED CAISSON (48 INCH)	LF			279			279
506	RIPRAP (12 INCH)	CY						0
515	WATERPROOFING (MEMBRANE)	SY	800				220	1,020
519	MAUNFACTURED STONE VENEER	SF						0
601	CONCRETE CLASS D (BRIDGE)	CY	332	117	96	134	86	765
601	STRUCTURAL CONCRETE COATING	SY	497	91	191	113	43	935
602	REINFORCING STEEL	LB						0
602	REINFORCING STEEL (EPOXY COATED)	LB	84,162	20,473	23,327	22,016		149,978
606	BRIDGE RAIL (SPECIAL)	LF	158					158
606	BRIDGE RAIL TYPE 10	LF	158					158
607	FENCE CHAIN LINK (SPECIAL) (48 INCH)	LF						0
613	1 INCH ELECTRICAL CONDUIT	LF	42					42
613	2 INCH ELECRTICAL CONDUIT	LF	443					443
613	LUMINAIRE (SPECIAL)	EA	1					1
618	PRESTRESSED CONCRETE I (BT42)	LF	1,847					1,847

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**As Constructed**  
 No Revisions:  
 Revised:  
 Void:

**BELFORD-HAPPY CANYON CREEK BRIDGE**  
**SUMMARY OF QUANTITIES**

Designer: J. LYNCH  
 Detailer: R. DILLON  
 Subset: BRIDGE

Structure Numbers  
 Sheets: B2 of 32

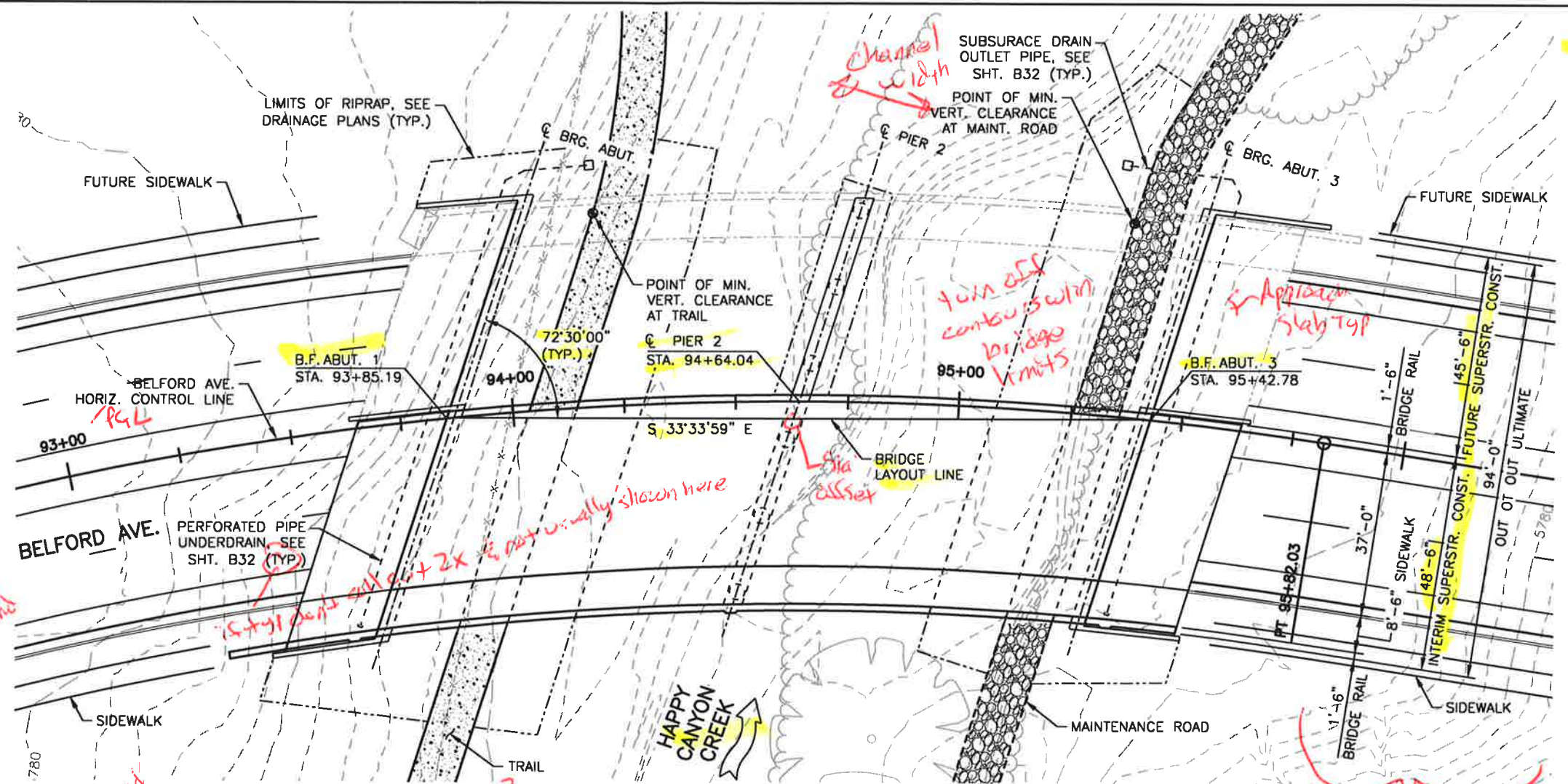
Project No./Code  
 Sheet Number **12**

*Clean up lines thru text*

*Why no approach slab drains? on low end of B4 on high end*

*show trail & road tie sta & HCL*

*why different?*

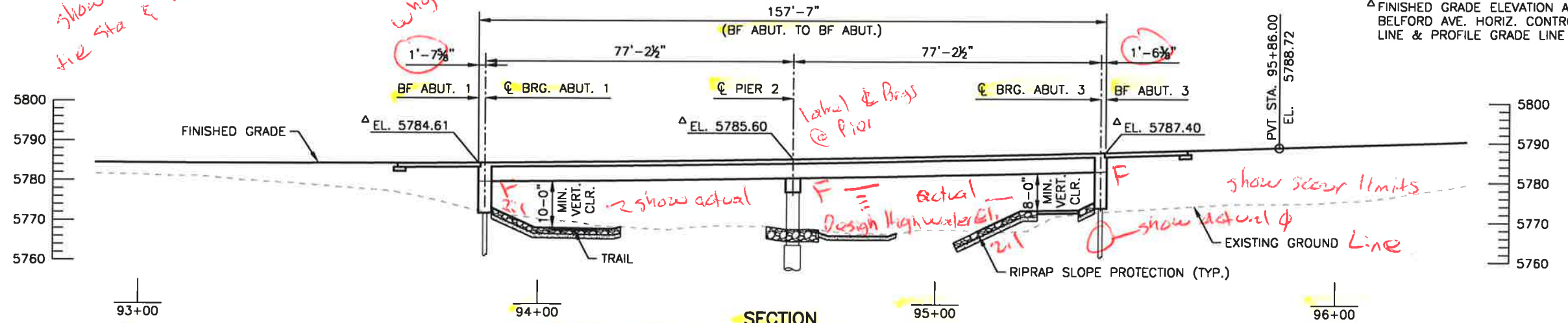


**BELFORD AVE. HCL CURVE DATA**  
 $\Delta = 105^{\circ}24'14''$   
 $D_c = 07^{\circ}26'28''$   
 $R = 770.00'$   
 $L = 1416.53'$   
 $T = 1010.84'$   
**PI STA**

*Town*

*Town*

**PLAN**  
(ULTIMATE ROADWAY SHOWN)



**SECTION**  
(DIMENSIONS SHOWN ALONG BELFORD AVE. HORIZONTAL CONTROL LINE)

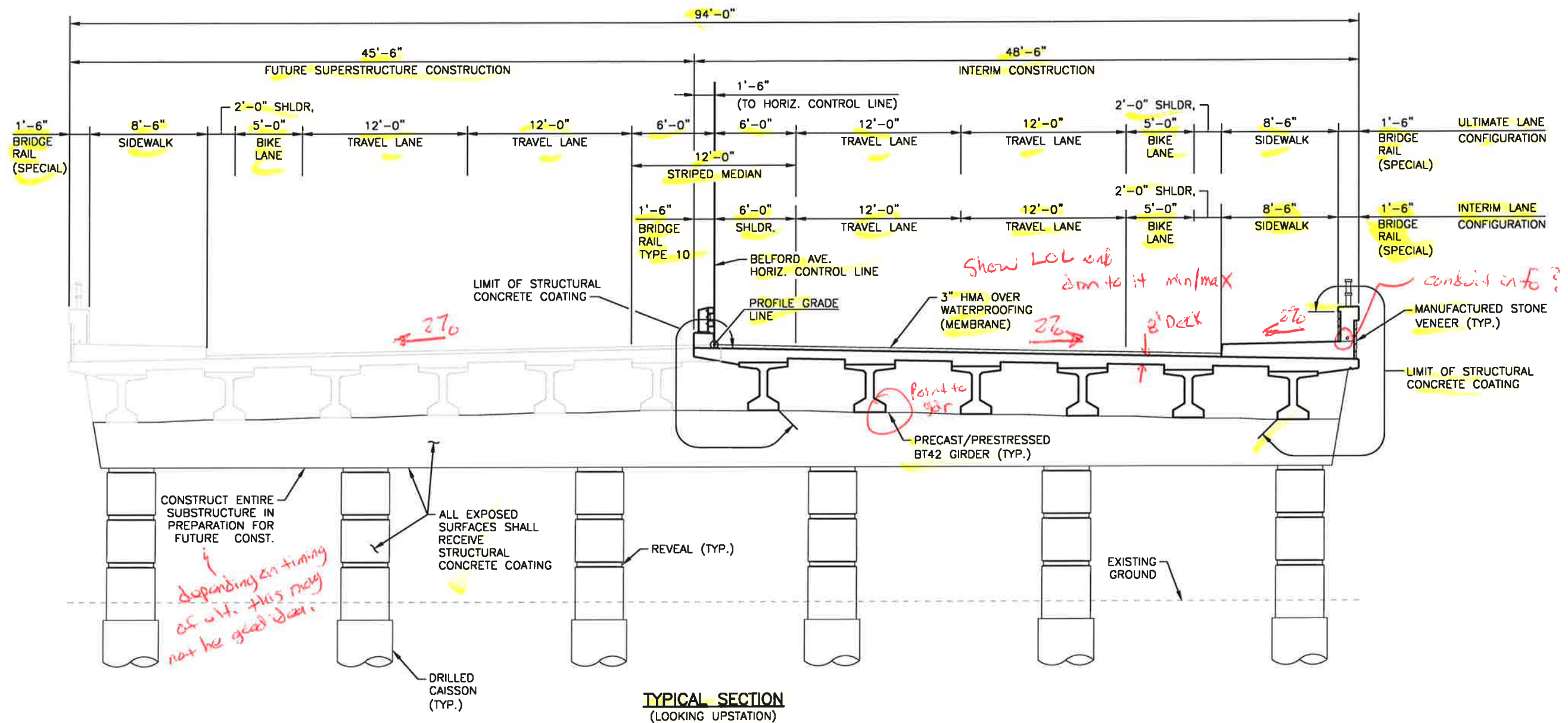
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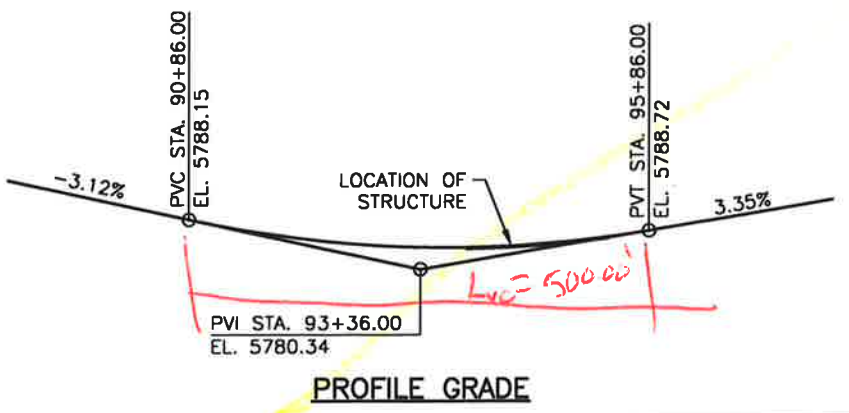
Sheet Revisions		
Date	Comments	Initials



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No Revisions:	GENERAL LAYOUT (1 OF 2)		
Revised:	Designer: J. LYNCH	Structure Numbers	Sheet Number 13
Void:	Detailer: R. DILLON	Sheets: B3 of 32	
	Subset: BRIDGE		



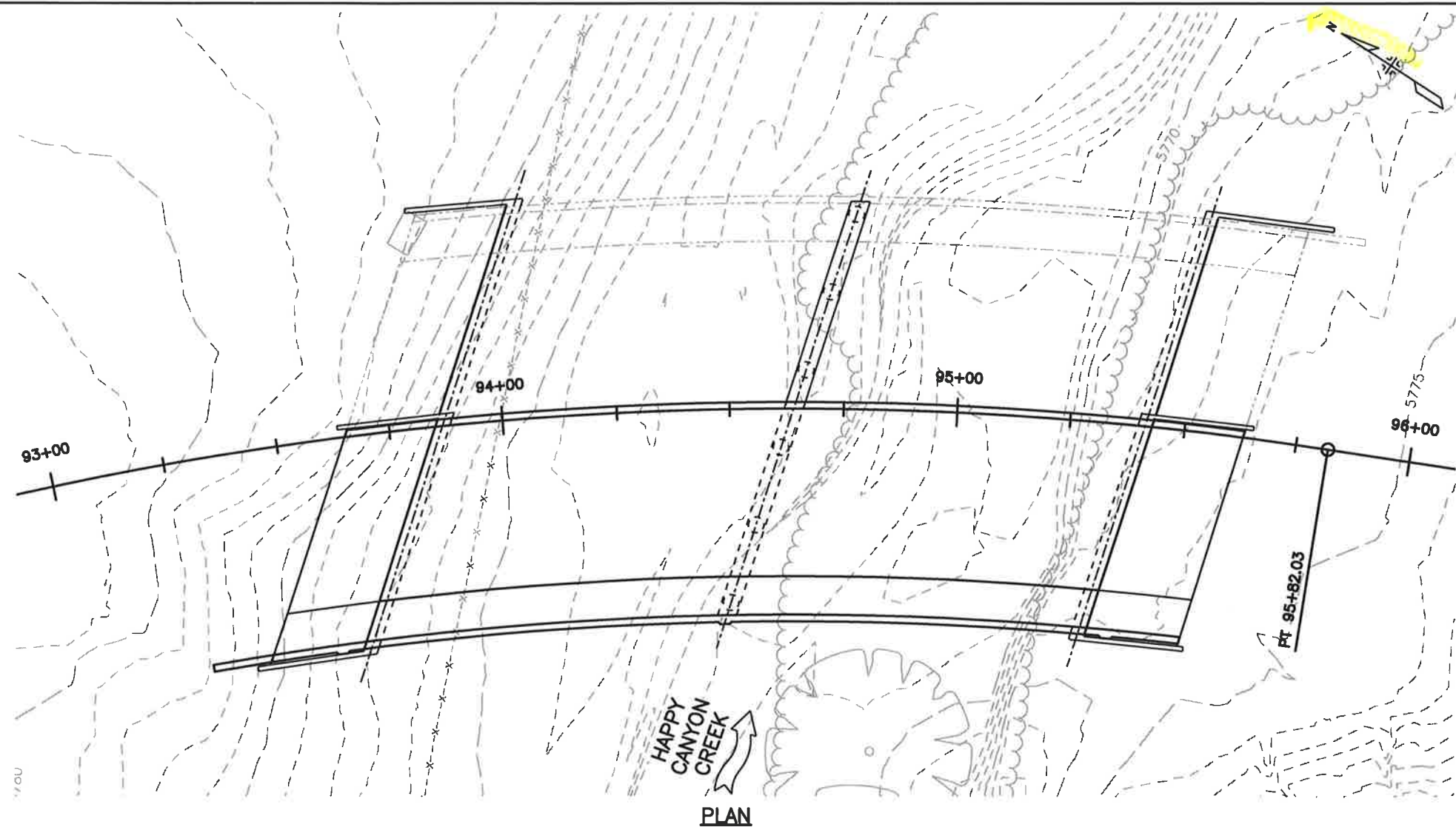
**TYPICAL SECTION**  
(LOOKING UPSTATION)



**PROFILE GRADE**

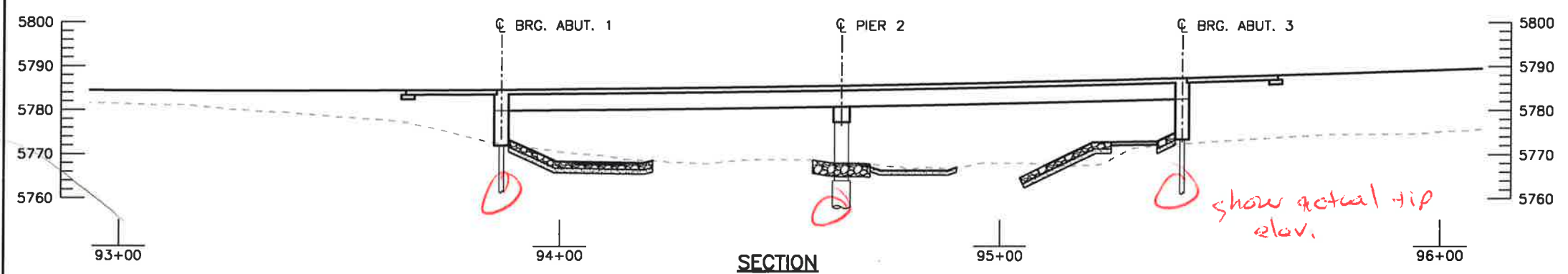
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							Subset: BRIDGE	Sheets: B4 of 32	Sheet Number 14	



*No bearing info provided  
locations in plan, elev.  
test data, mat'l type, Legend*

PLAN



SECTION

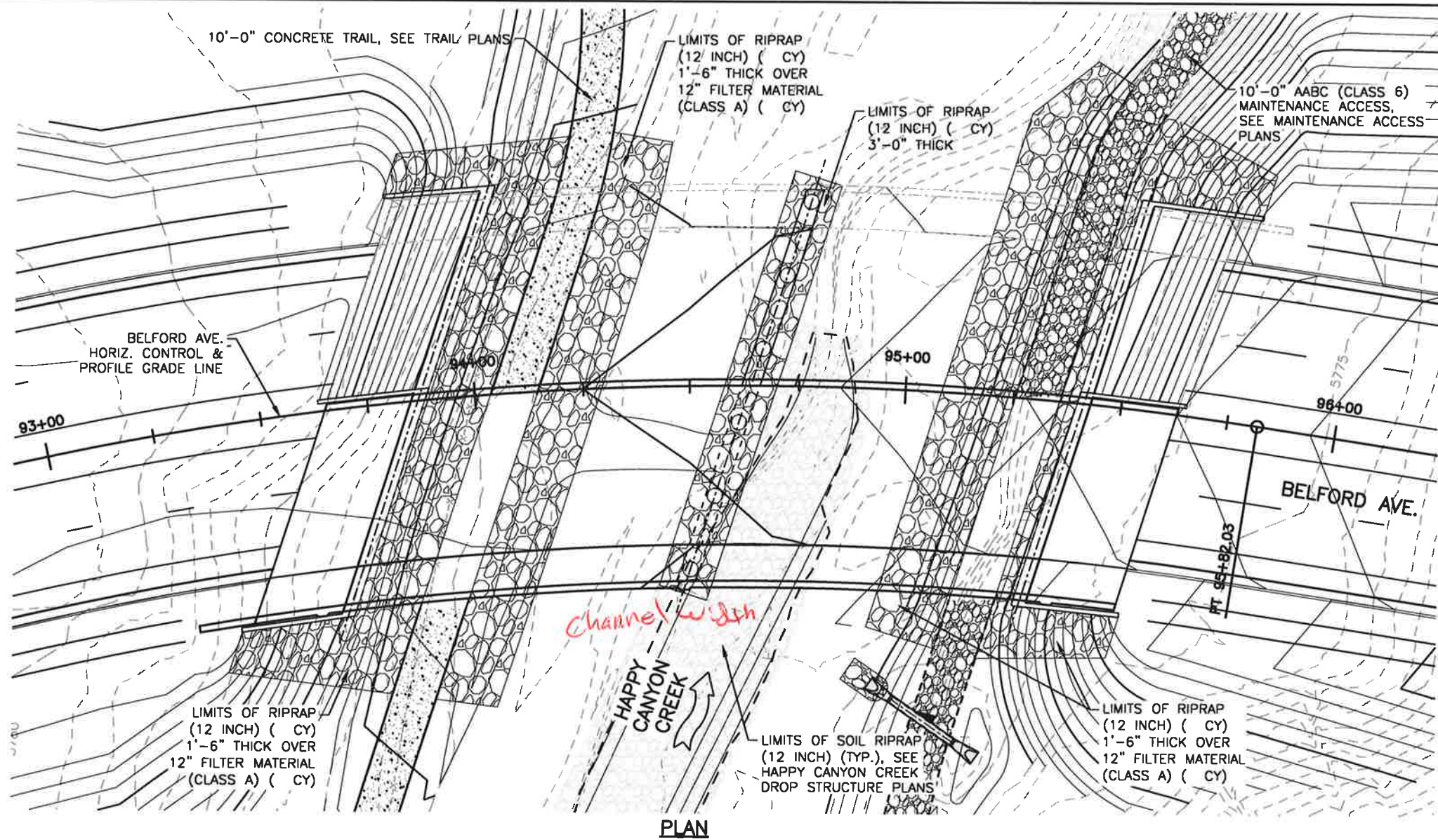
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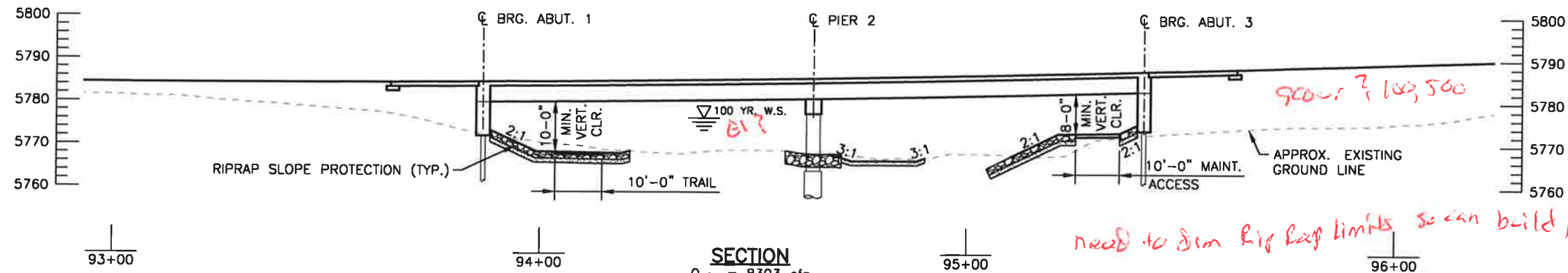
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No Revisions:	ENGINEERING GEOLOGY		
Revised:	Designer: J. LYNCH	Structure Numbers	
Void:	Detailer: R. DILLON	Sheets: 85 of 32	Sheet Number 15



PLAN



SECTION  
 $Q_{100} = 8303 \text{ cfs}$   
 100 YR. W.S. EL. = 5776.28

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No Revisions:	BRIDGE HYDRAULIC INFORMATION (1 OF 2)		
Revised:	Designer: C. TWISS	Structure Numbers	Sheet Number 16
Void:	Detailer: R. FILLON	Numbers	
	Subset: BRIDGE	Sheets: B6 of 32	

**100-YEAR RECURRENCE INTERVAL**

FLOW UPSTREAM OF BRIDGE = 8303 CFS (FHAD)  
 DRAINAGE AREA = 17.5± SQ. MI.

**CHANNEL DESCRIPTION**

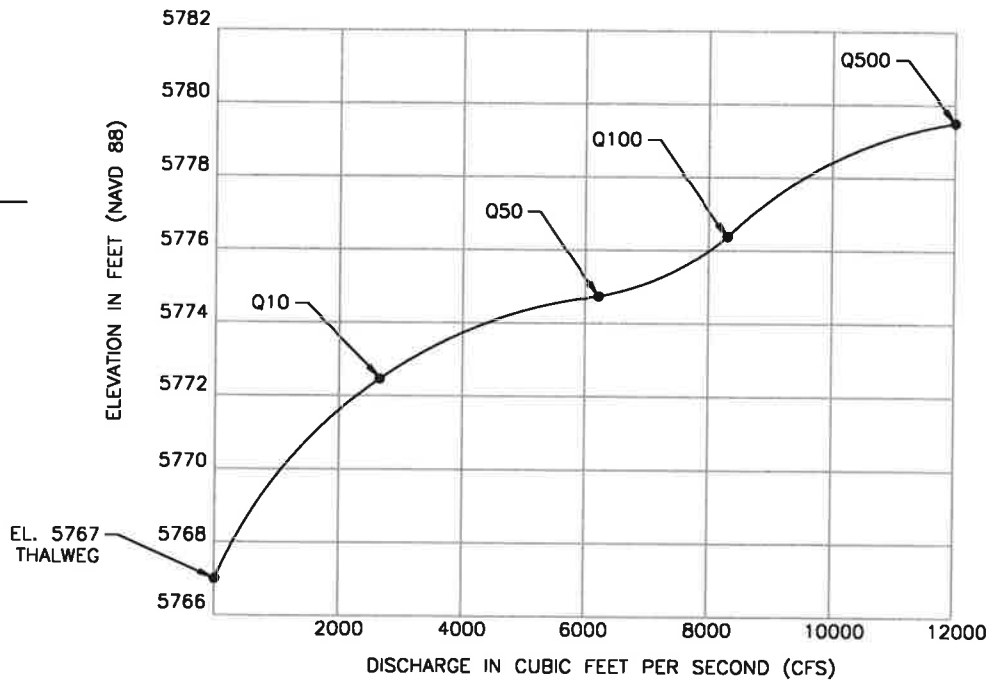
BOTTOM MATERIAL: COHESIVE  NONCOHESIVE   
 BOTTOM MAT. SIZE: CLAY  SILT  SAND  GRAVEL  COBBLES  OTHERS \_\_\_\_\_  
 STREAM FORM: STRAIGHT  MEANDERING  BRAIDED   
 MANNING'S "n" FOR DESIGN: CHANNEL 0.030 OVERBANK 0.035  
 DEBRIS -- BRUSH  TREES/LOGS  ICE  OTHER \_\_\_\_\_

**COMPARISON HYDRAULICS (100 YEAR EVENT)**  
 (AT SECTION LOCATED 32 FEET UPSTREAM OF BRIDGE)

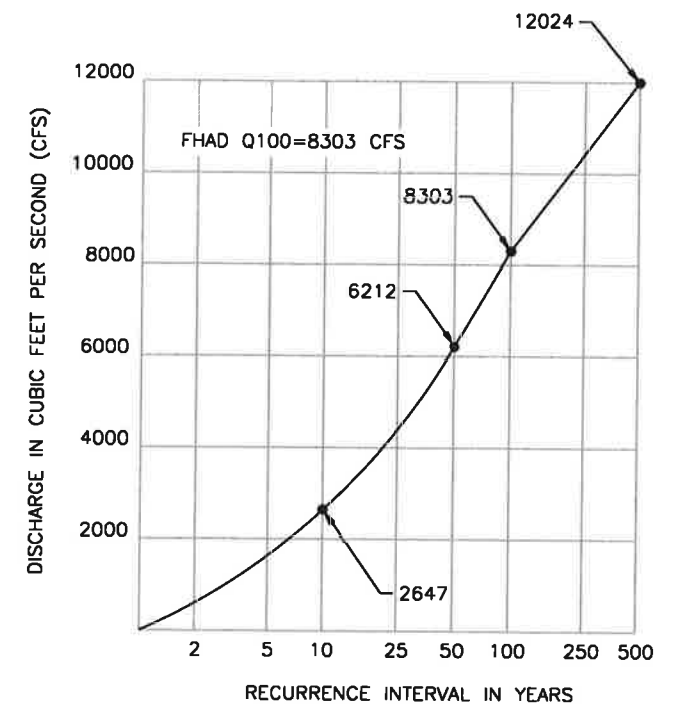
	VELOCITY (FT./SEC)		WS EL. (FT.)	MAX. BACKWATER (FT.)	FROUDE NO.
	AVERAGE	CHANNEL			
EXISTING CONDITIONS	9.81	13.59	5775.57	-	0.89
PROPOSED CONDITIONS	8.24	10.51	5776.36	-	0.62

**HYDRAULIC DATA**

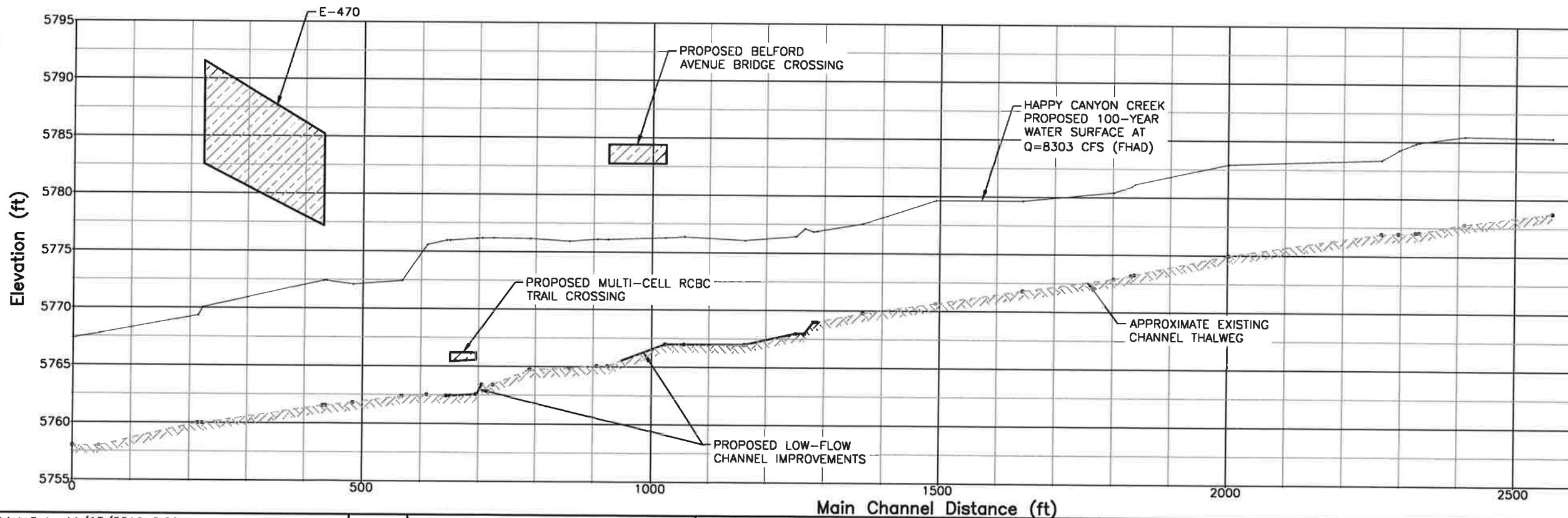
LOCATION	LOW CHORD ELEVATION AT ABUT. FRONT FACE		100-YEAR WATER SURFACE ELEVATION
	ABUT. 1	ABUT. 2	
S. SIDE (UPSTREAM)	5780.07	5782.73	5776.27
N. SIDE (DOWNSTREAM)	5780.07	5782.73	5776.10



**STAGE-DISCHARGE CURVE AT UPSTREAM FACE OF BELFORD AVENUE**



**DISCHARGE-FREQUENCY CURVE**



HORIZ. SCALE: 1"=200'  
 VERT. SCALE: 1"=10'

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No Revisions:	Designer: C. TWISS	Structure Numbers	
Revised:	Detailer: K. TURNER		
Void:	Subset: BRIDGE	Sheets: B7 of 32	Sheet Number 17

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BELFORD AVE. HCL  
 CURVE DATA  
 $\Delta = 105^{\circ}24'14''$   
 $D_c = 07'26'28''$   
 $R = 770.00'$   
 $L = 1416.53'$   
 $T = 1010.84'$

NOTES:  
 1. BRIDGE LAYOUT LINE IS A CHORD BETWEEN ABUTMENT BEARING CENTERLINES AT INTERSECTION WITH BELFORD AVE. HORIZ. CONTROL LINE.

*Provide angle to EOD dim so can build @ 10' pts or gdr*

*Locate light Provide angle btwn abutment and gdr*

*fit line types for EOD, barrier & sidewalk*

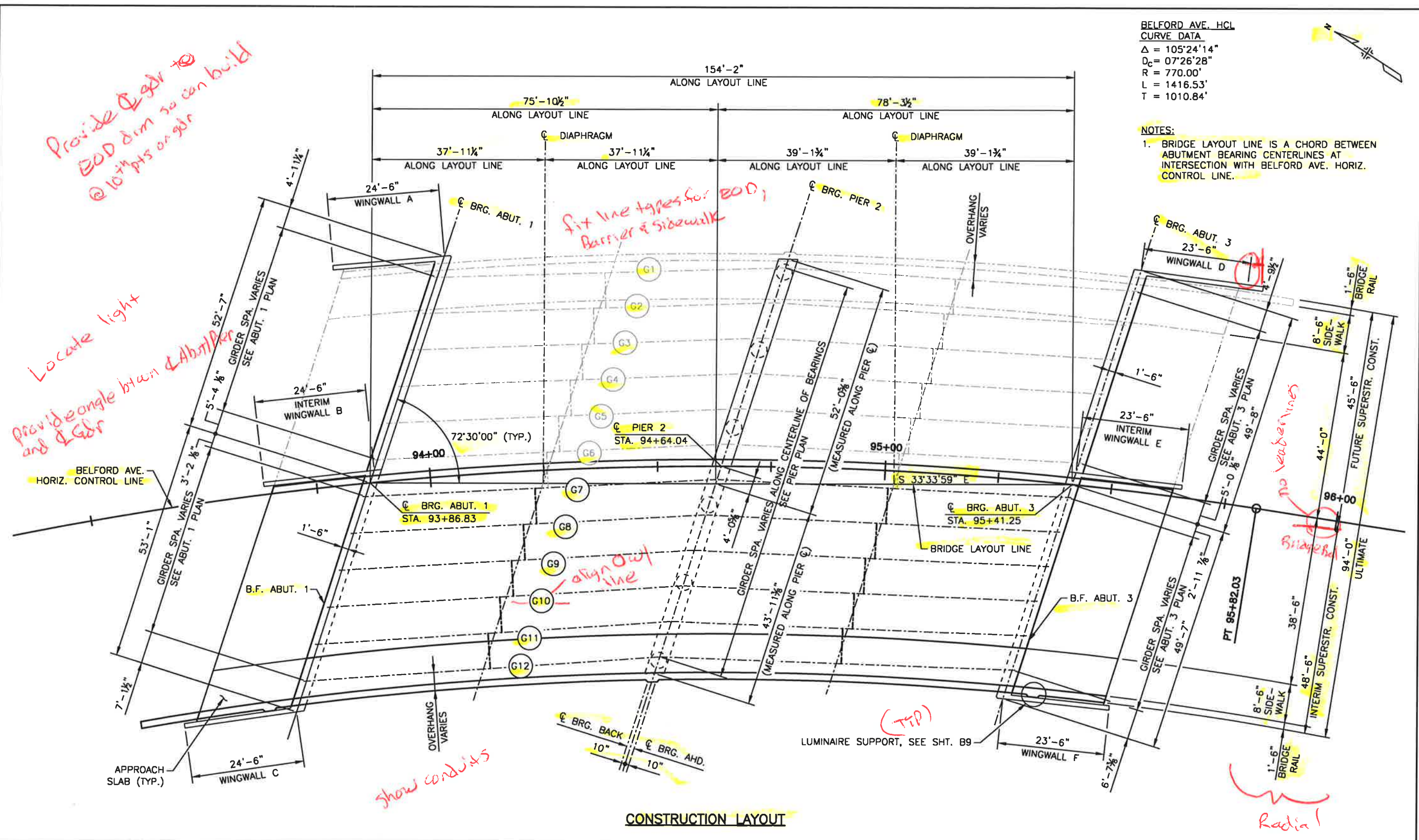
*align owl line*

*show conduits*

*no vend lines*

*bridge*

*Radial*



**CONSTRUCTION LAYOUT**

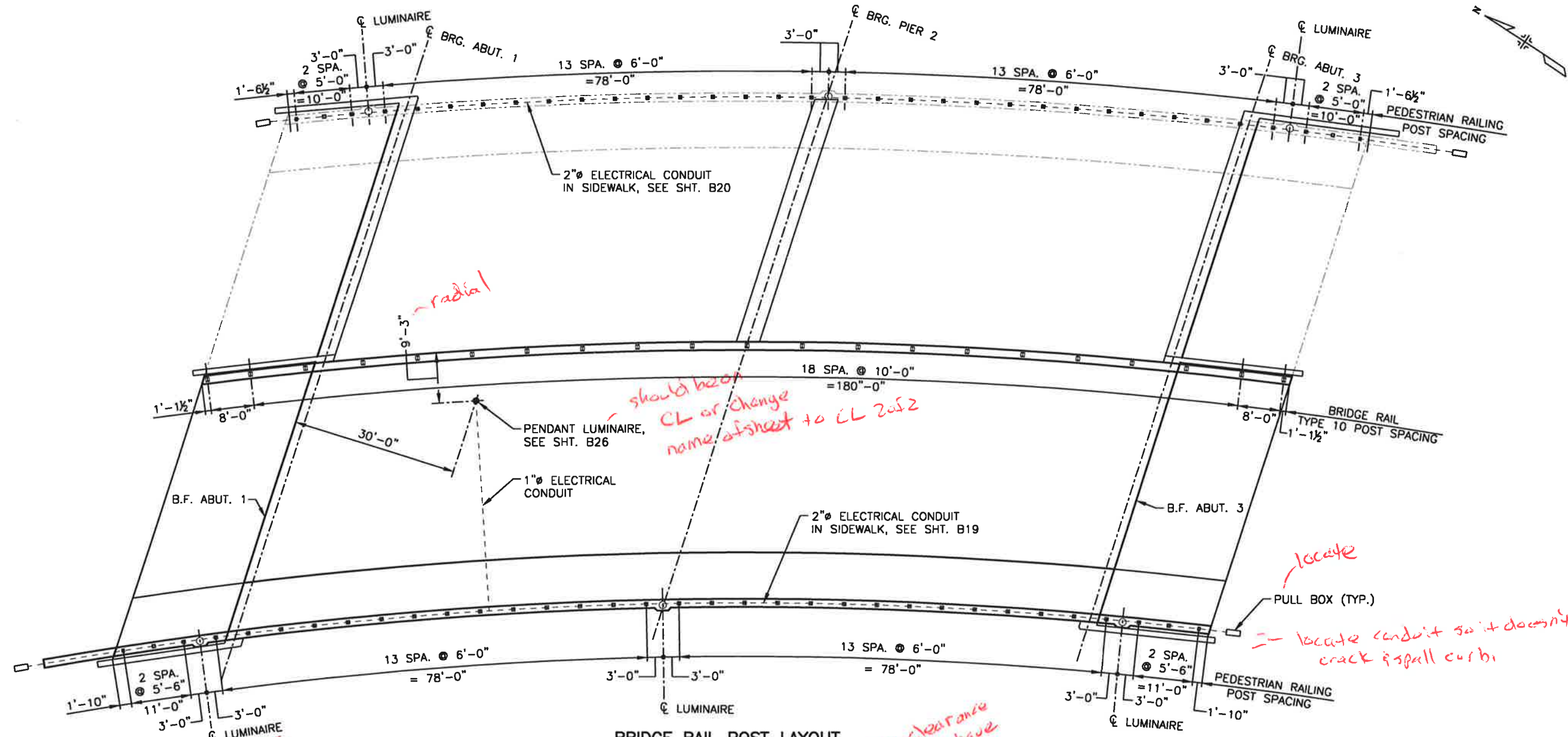
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No Revisions:	CONSTRUCTION LAYOUT		
Revised:	Designer: J. LYNCH	Structure Numbers	
Void:	Detailer: C. MIYAMOTO	Sheets: B8 of 32	Sheet Number 18



*radial*

*should be on CL or change name of sheet to CL 2 of 2*

*locate*

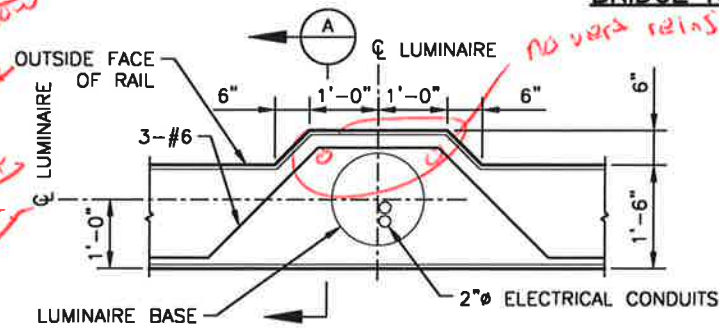
*locate conduit so it doesn't crack & spill curbs*

*show in elev. don't know where it ends & begins. how does it connect w/ deck barrier stop?*

*no vert. reinf?*

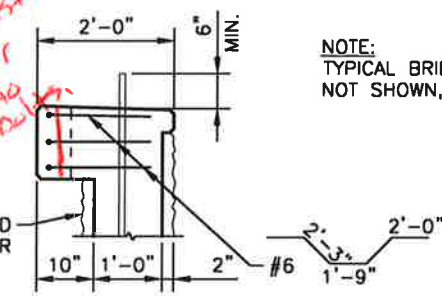
*check bolt pattern clearance to face. Is question you have depth of support to develop the anchor bolts.*

**BRIDGE RAIL POST LAYOUT**



**PLAN-LUMINAIRE SUPPORT DETAIL**

ANCHOR BOLTS FOR LUMINAIRE TO BE PROVIDED AND PLACED PER LUMINAIRE MANUFACTURERS DRAWINGS



**SECTION A**

NOTE: TYPICAL BRIDGE RAIL REINF. NOT SHOWN, SEE SHT. B27.

(3 TOTAL) TO BE INCLUDED IN THE COST OF BRIDGE RAIL (SPECIAL)

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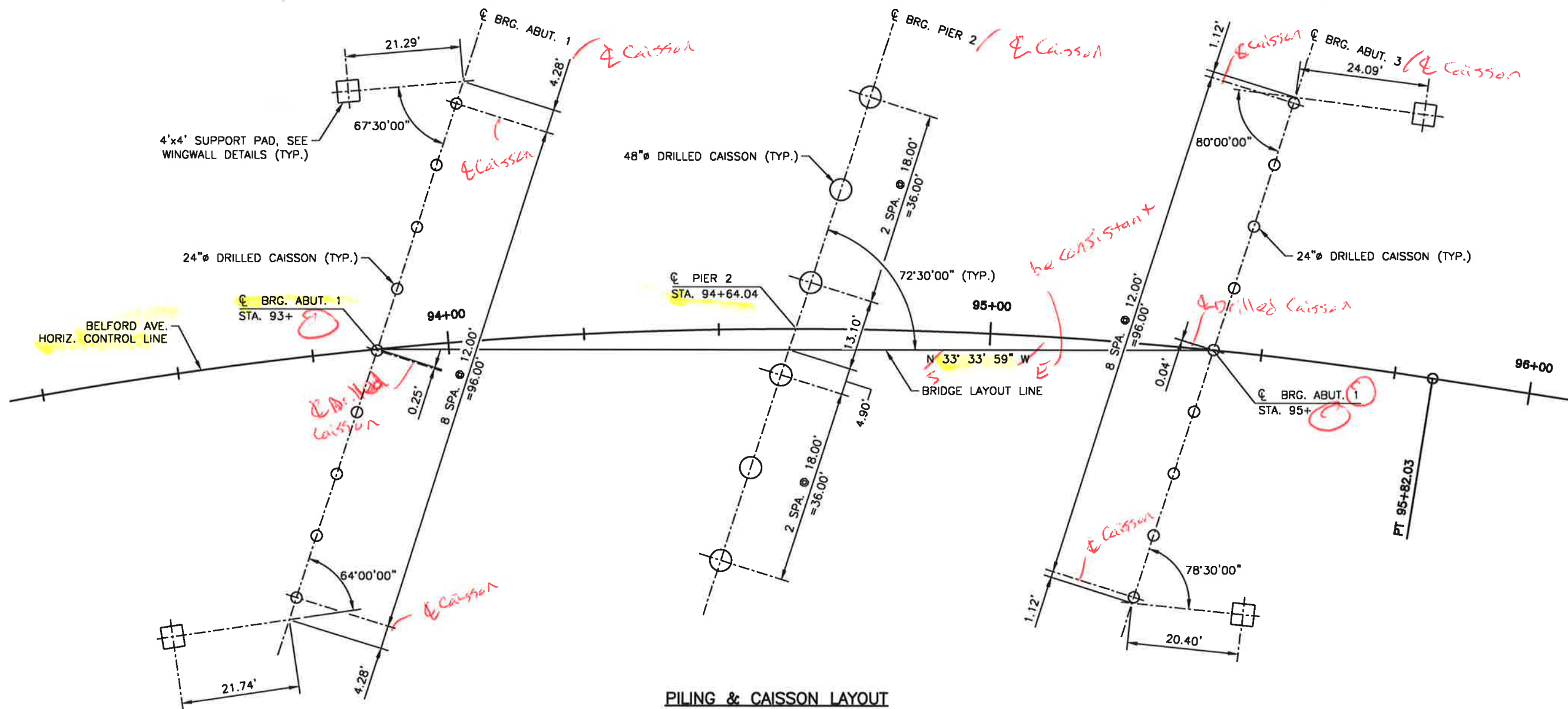
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As Constructed	BELFORD-HAPPY CANYON CREEK BRIDGE		Project No./Code
No Revisions:	BRIDGE RAIL POST LAYOUT		
Revised:	Designer: J. LYNCH	Structure Numbers	Sheet Number 19
Void:	Detailer: C. MIYAMOTO	Sheets: B9 of 32	
	Subset: BRIDGE		

BELFORD AVE. HCL  
 CURVE DATA  
 $\Delta = 105^{\circ}24'14''$   
 $D_c = 07^{\circ}26'28''$   
 $R = 770.00'$   
 $L = 1416.53'$   
 $T = 1010.84'$



**PILING & CAISSON LAYOUT**

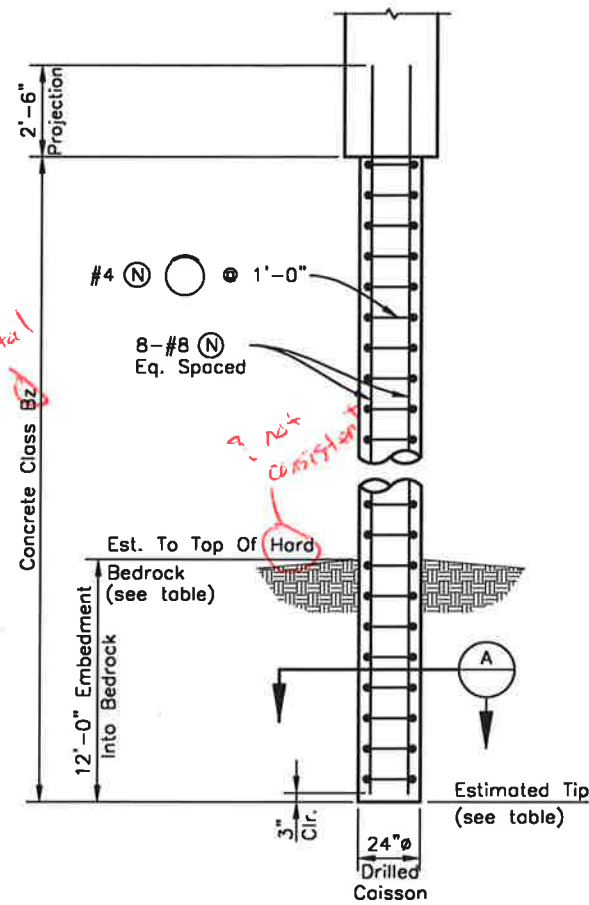
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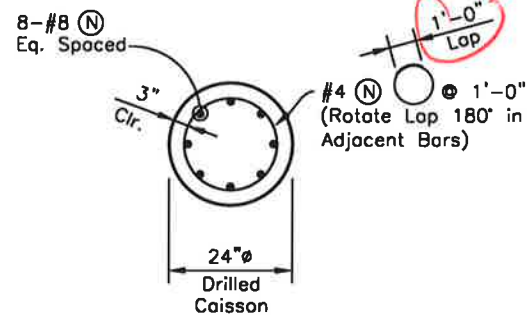
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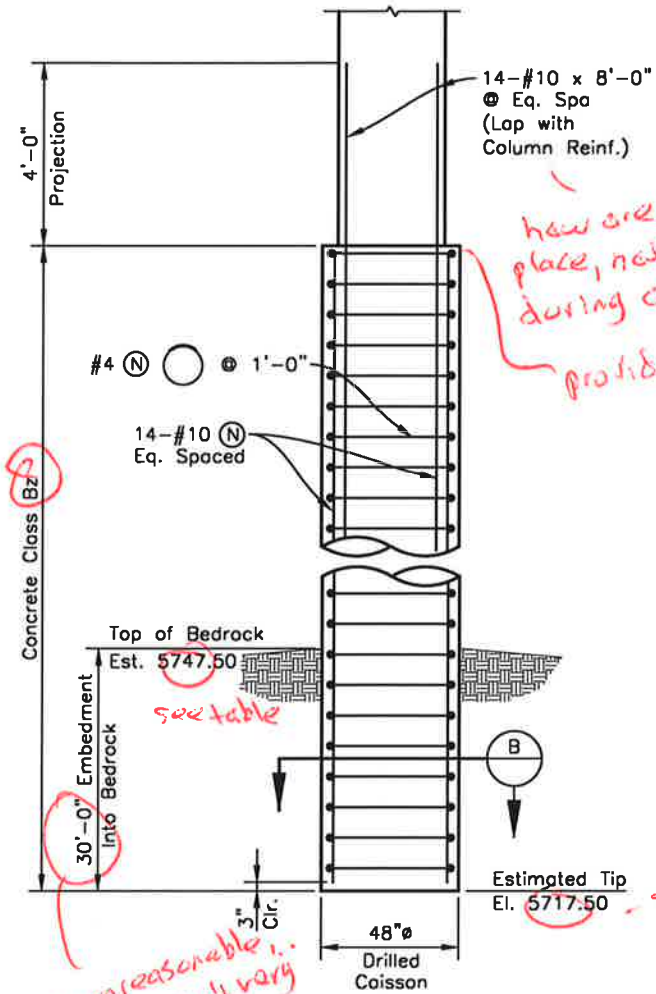
As Constructed	BELFORD-HAPPY CANYON CREEK BRIDGE		Project No./Code
No Revisions:	CAISSON LAYOUT		
Revised:	Designer: J. LYNCH	Structure Numbers	
Void:	Detailer: R. DILLON		
	Subset: BRIDGE	Sheets: B10 of 32	Sheet Number 20



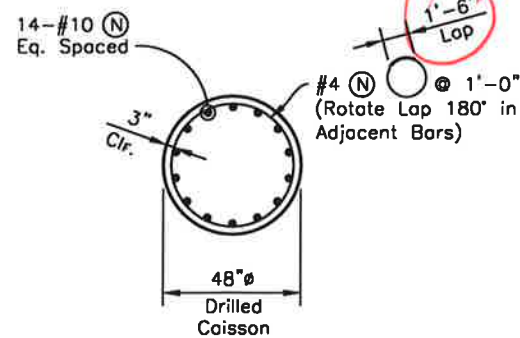
24" CAISSON DETAIL



SECTION A



48" CAISSON DETAIL



SECTION B

Service	MAX. LOAD (unfactored) (kips)	MAX. LOAD (factored) (kips)	TOP OF CAISSON ELEVATION	EST. TOP OF BEDROCK ELEVATION	EST. TIP ELEVATION
ABUTMENT 1	321	447	5771.70	5749.80	5737.80
ABUTMENT 3	321	447	5773.00	5747.30	5735.30

RESISTANCE TYPE	ALLOWABLE RESISTANCE
Side Resistance In Bedrock	3.6 ksf
Base Resistance In Bedrock	40 ksf

**CAISSON NOTES:**

1. Caissons shall extend at least to the estimated tip elevation. Caissons shall be further advanced into the hard bedrock if necessary to obtain the specified minimum embedment below the estimated top of hard bedrock as determined in the field by the Engineer.
2. Top of hard bedrock elevation shall be verified at time of construction by the Engineer.
3. The use of temporary casing & dewatering during drilling caissons may be required. The cost of temporary casing & dewatering shall be included in the cost of item 503 - Drilled Caisson (54 inch).

Capital

how are these held in place, nothing to tie to during caisson pour? provide header caisson entable. El 5764.0 Bedrock or hard bedrock? be consistent & match Geotech report.

Pier 2?

Service form this is LRFD...

Seems unreasonable... but rock isn't vary hard looking as blow counts.

why don't laps = ?

mag? in a stream...

min pier L per geotech is 40' ... only have 34 & 38...

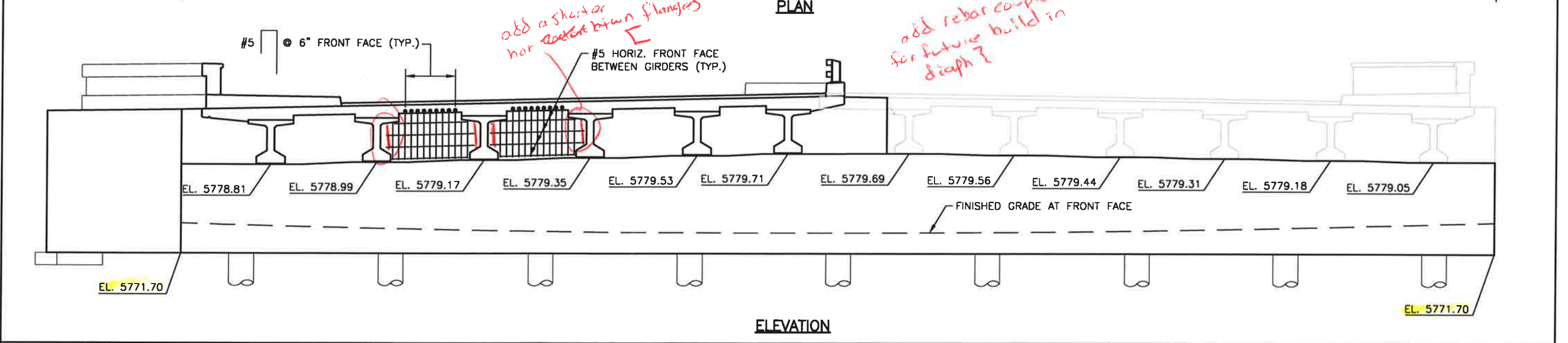
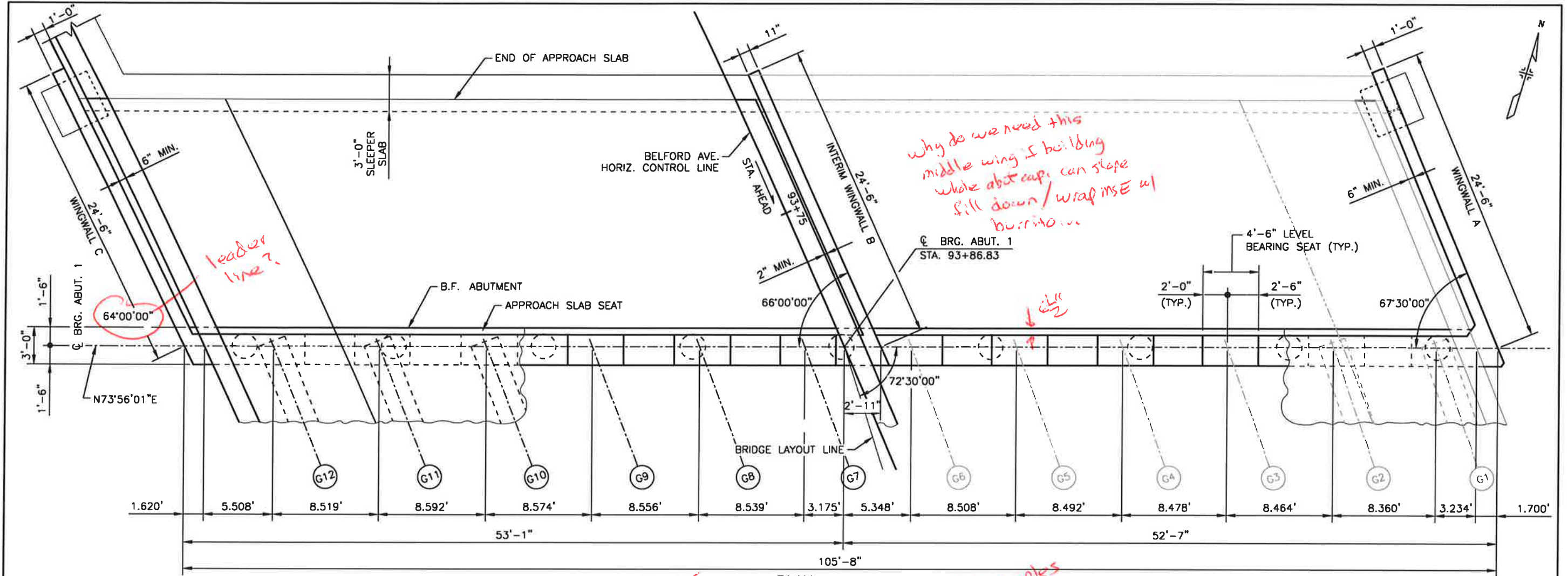
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No Revisions:	Designer: J. LYNCH	Structure Numbers	
Revised:	Detailer: C. MIYAMOTO		
Void:	Subset: BRIDGE	Sheets: B11 of 32	Sheet Number 21



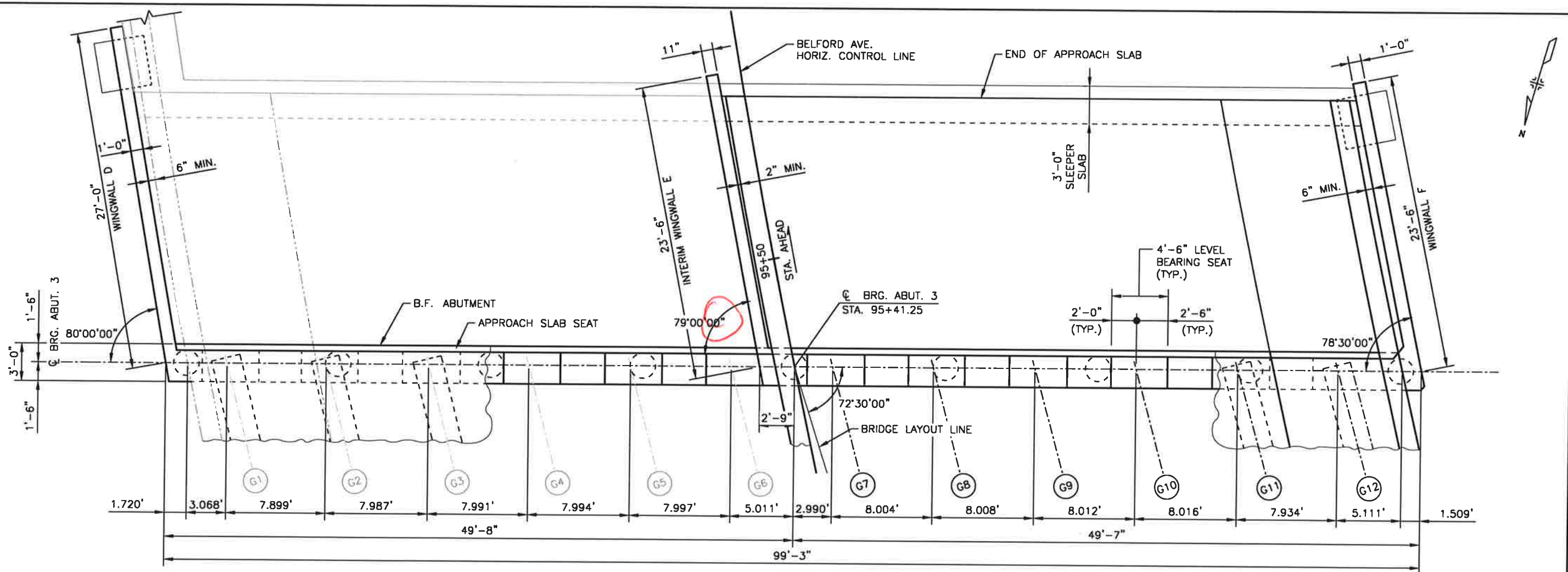
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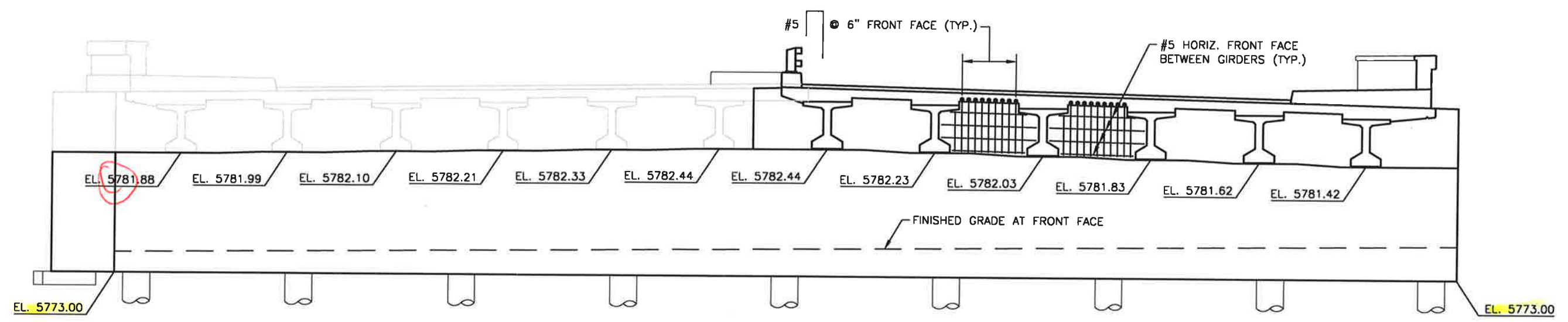
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As Constructed	BELFORD-HAPPY CANYON CREEK BRIDGE ABUTMENT 1		Project No./Code
No Revisions:	PLAN & ELEVATION		
Revised:	Designer: J. LYNCH	Structure Numbers	
Void:	Detailer: R. DILLON	Sheets: B12 of 32	Sheet Number <b>22</b>



PLAN



ELEVATION

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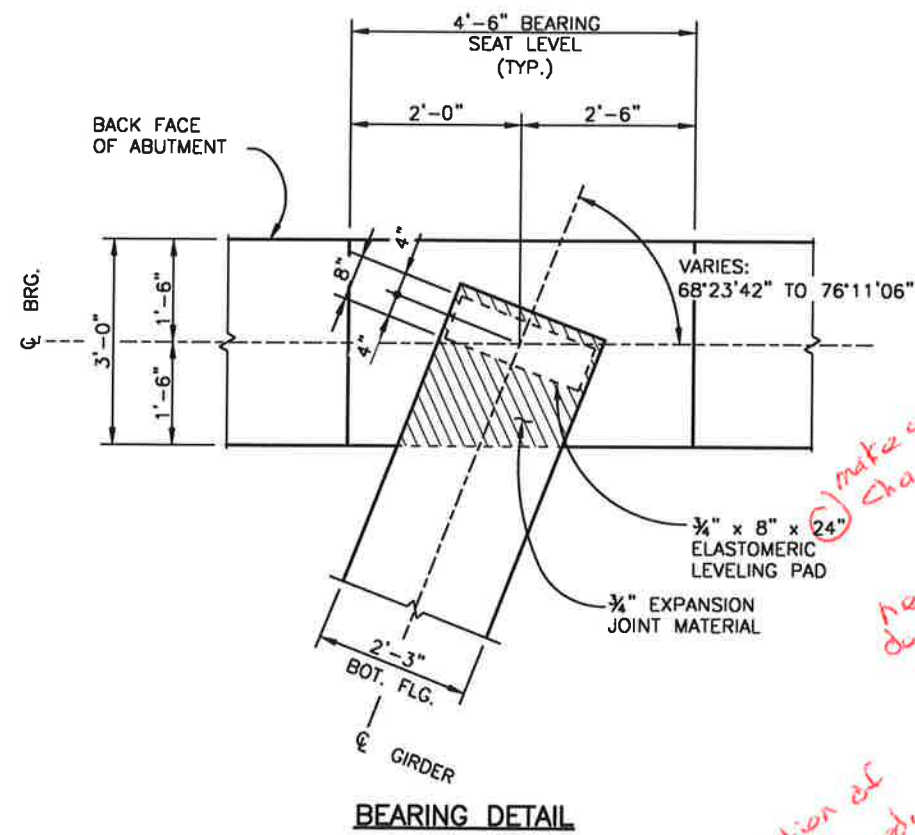
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 Revised:  
 Void:

BELFORD-HAPPY CANYON CREEK BRIDGE  
 ABUTMENT 3  
 PLAN & ELEVATION  
 Designer: J. LYNCH  
 Detailer: R. DILLON  
 Subset: BRIDGE  
 Structure Numbers  
 Sheets: B13 of 32

Project No./Code  
 Sheet Number **23**

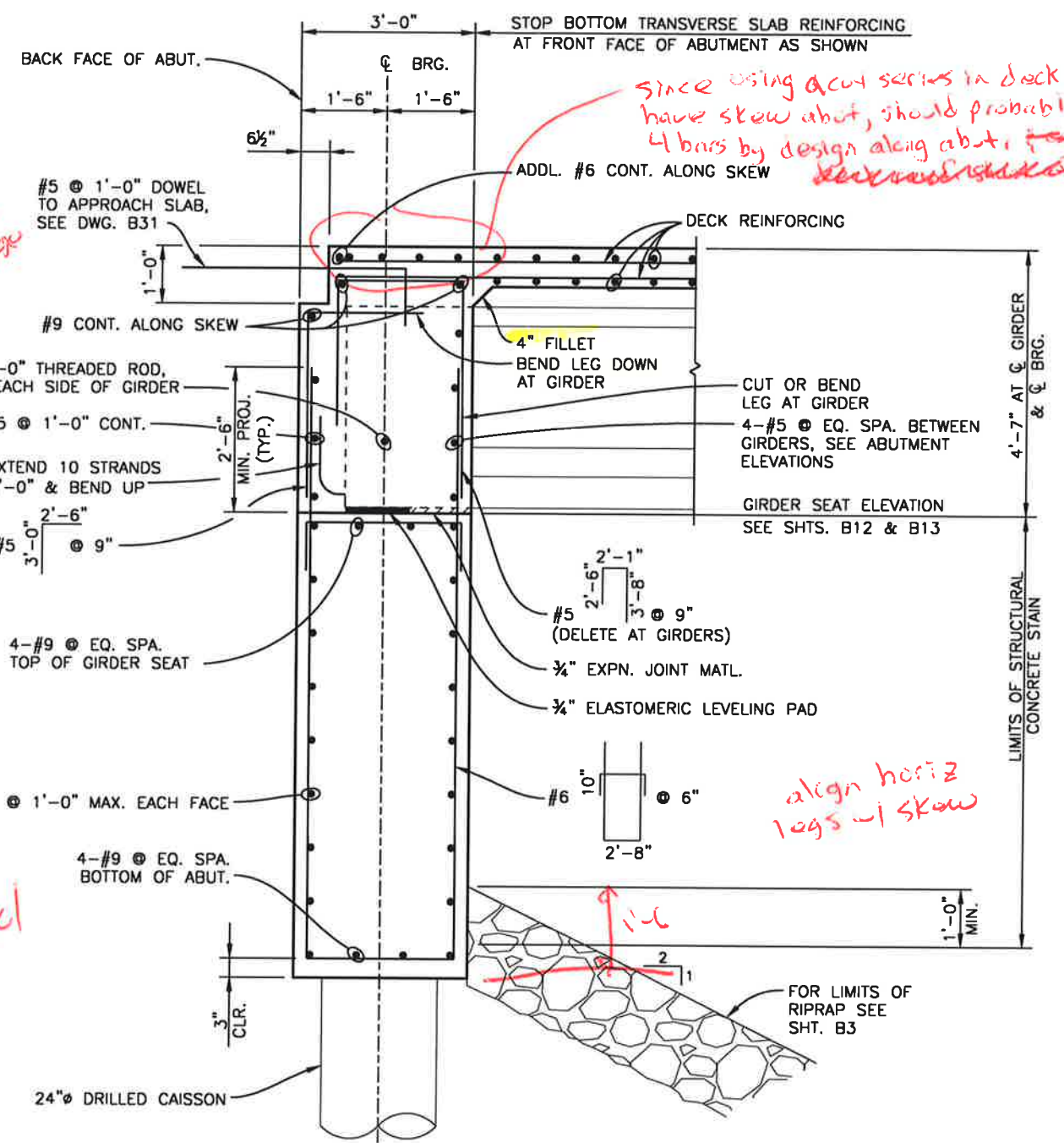


*COOT prefers a pin connection of super to sub. This is fully fixed. How did the designer account for the moment girders will develop and did they account for moment in caisson design*

*make width to start of chamfers on bot flange = 2'-2\"*

*need to be bent due to skew*

*OK to let vert rebar stick up in future position? Aesthetic/safety issue...*



*since using acut series in deck and have skew abut, should probably have 4 bars by design along abut. ~~from design~~*

*align horiz legs w/ skew*

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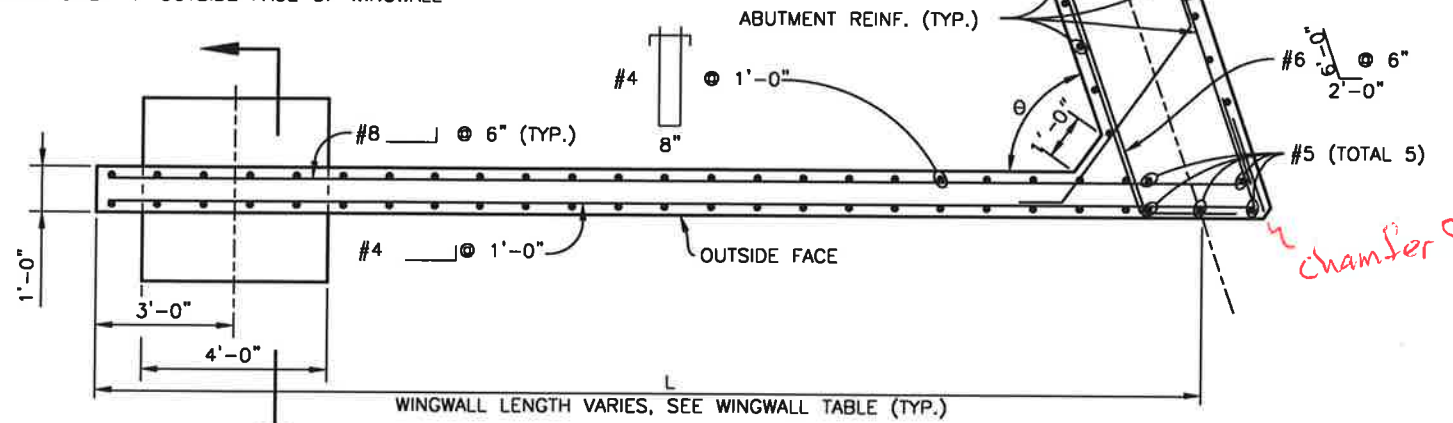


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No Revisions:	Designer: J. LYNCH	Structure Numbers	
Revised:	Detailer: C. MIYAMOTO		
Void:	Subset: BRIDGE	Sheets: B14 of 32	Sheet Number 24

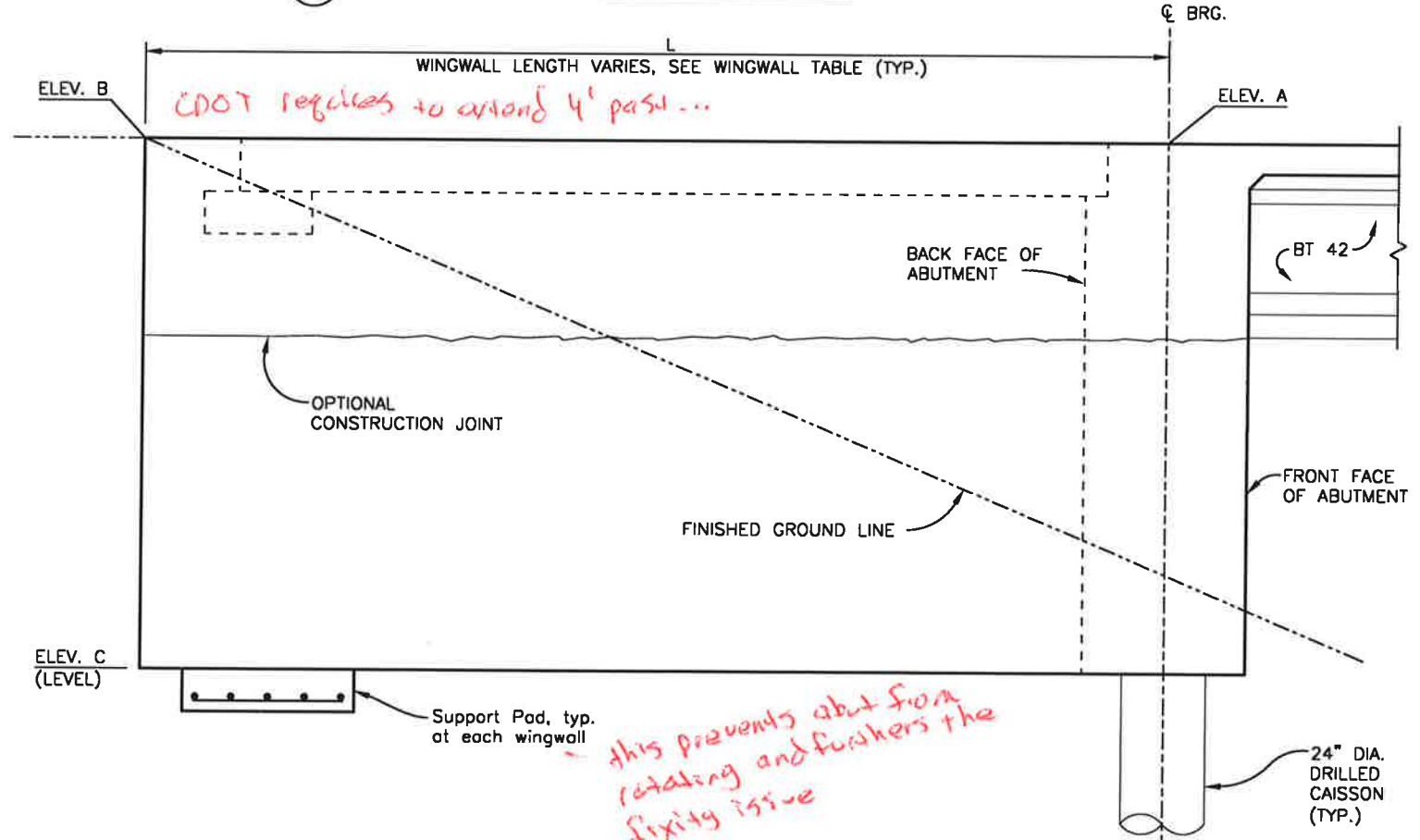
WINGWALL TABLE					
LOCATION	L	θ	ELEV. A	ELEV. B	ELEV. C
WINGWALL A	24'-6"	67°30'00"	5783.56	5783.36	5771.70
WINGWALL C	24'-6"	64°00'00"	5783.25	5783.17	5771.70
WINGWALL D	27'-0"	80°00'00"	5786.39	5787.06	5773.00
WINGWALL F	23'-6"	78°30'00"	5785.83	5786.53	5773.00

ELEVATIONS GIVEN AT OUTSIDE FACE OF WINGWALL

NOTE:  
WINGWALL A OR F  
SHOWN, WINGWALL C  
AND D REINF. IS SIMILAR.



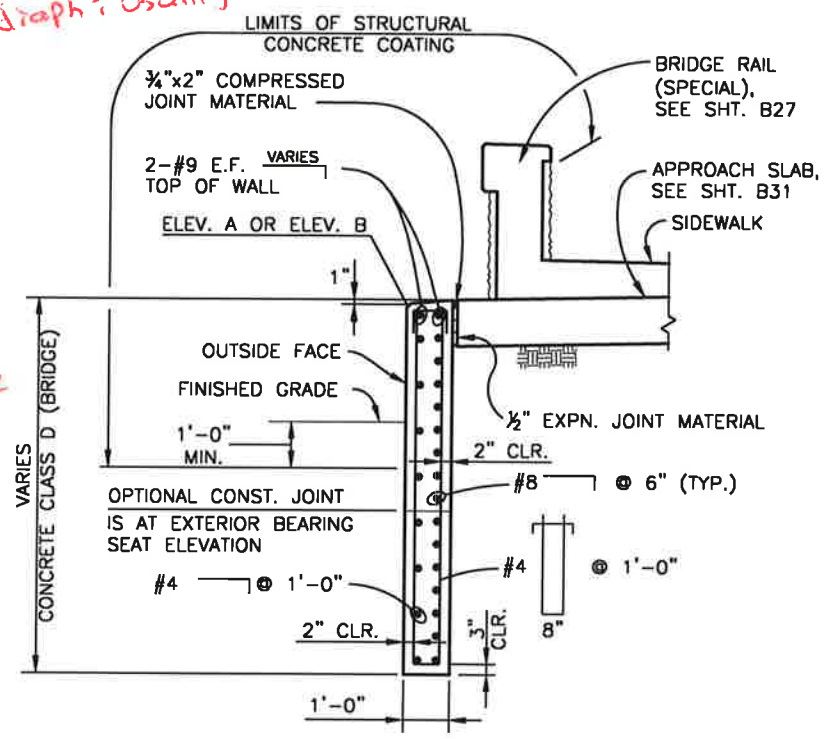
**WINGWALL SECTION**



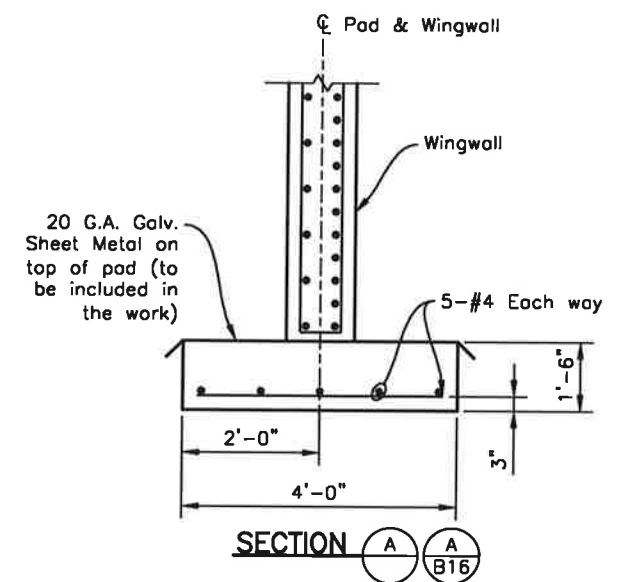
**ELEVATION**

*any interference w/ gdr in diaph? usually is...*

*chamber size*



**TYPICAL WINGWALL SECTION**



**SECTION A-A**

- NOTES:**
- ELEVATIONS A & B ARE AT THE INSIDE FACE OF THE WINGWALL AS SHOWN IN TYPICAL WINGWALL SECTION.
  - BACKFILL AT THE OUTSIDE FACE OF WINGWALLS SHALL BE PLACED CONCURRENTLY WITH BACKFILL BEHIND THE WALLS.

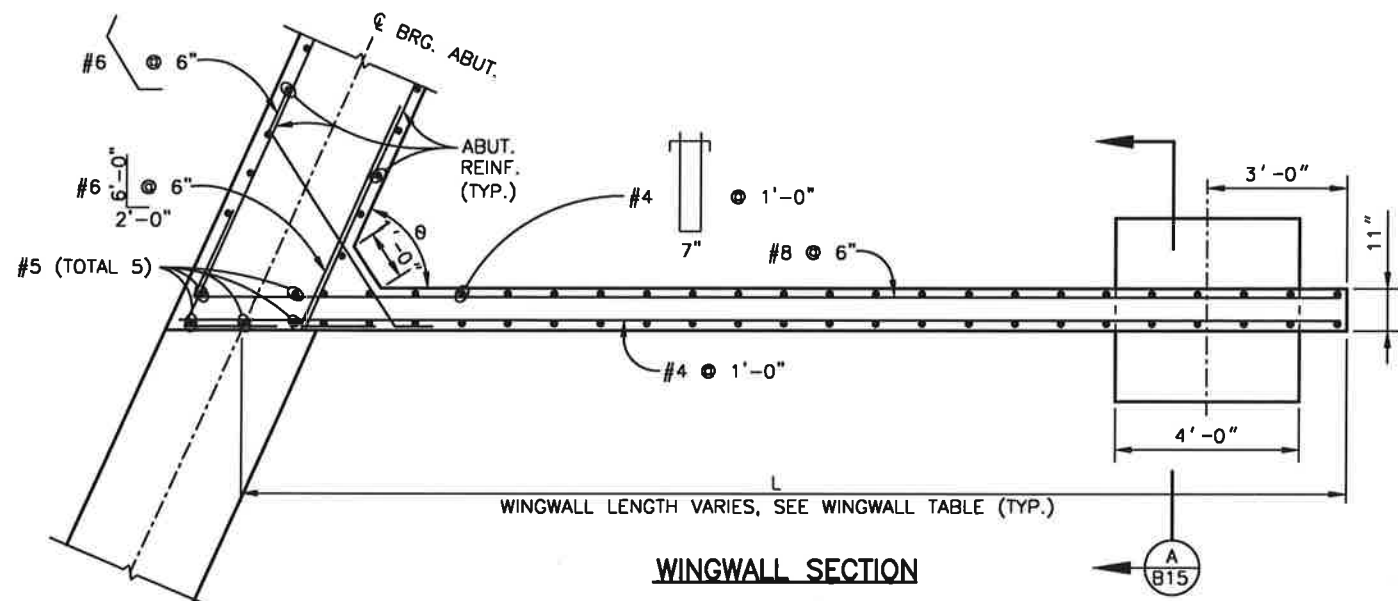
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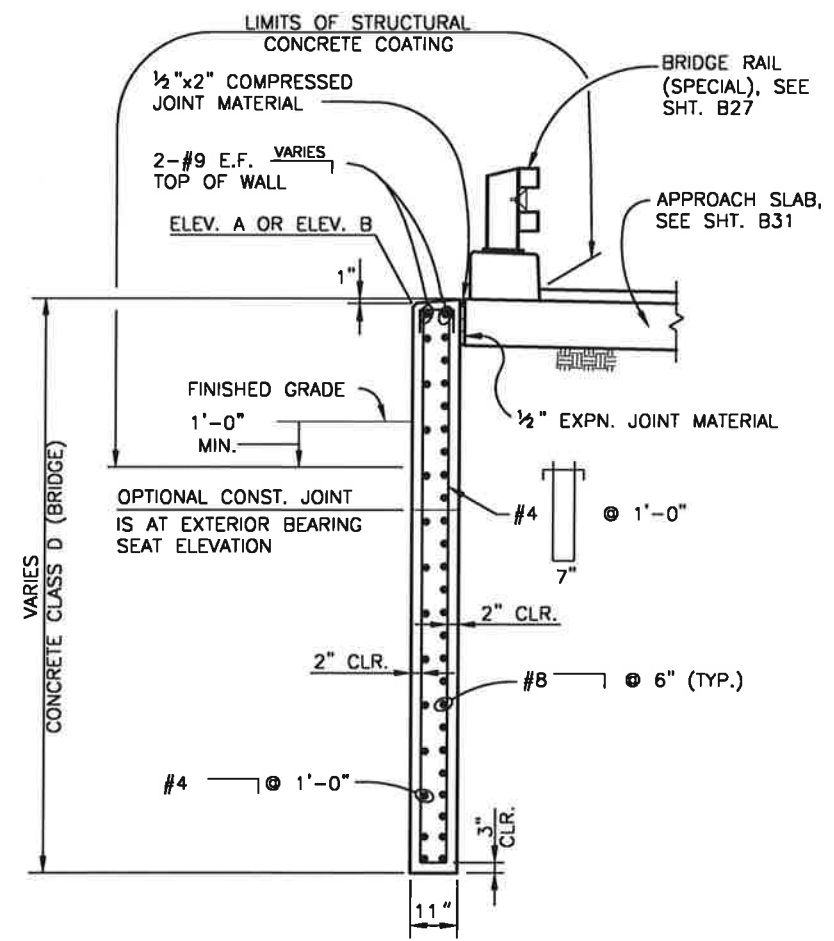
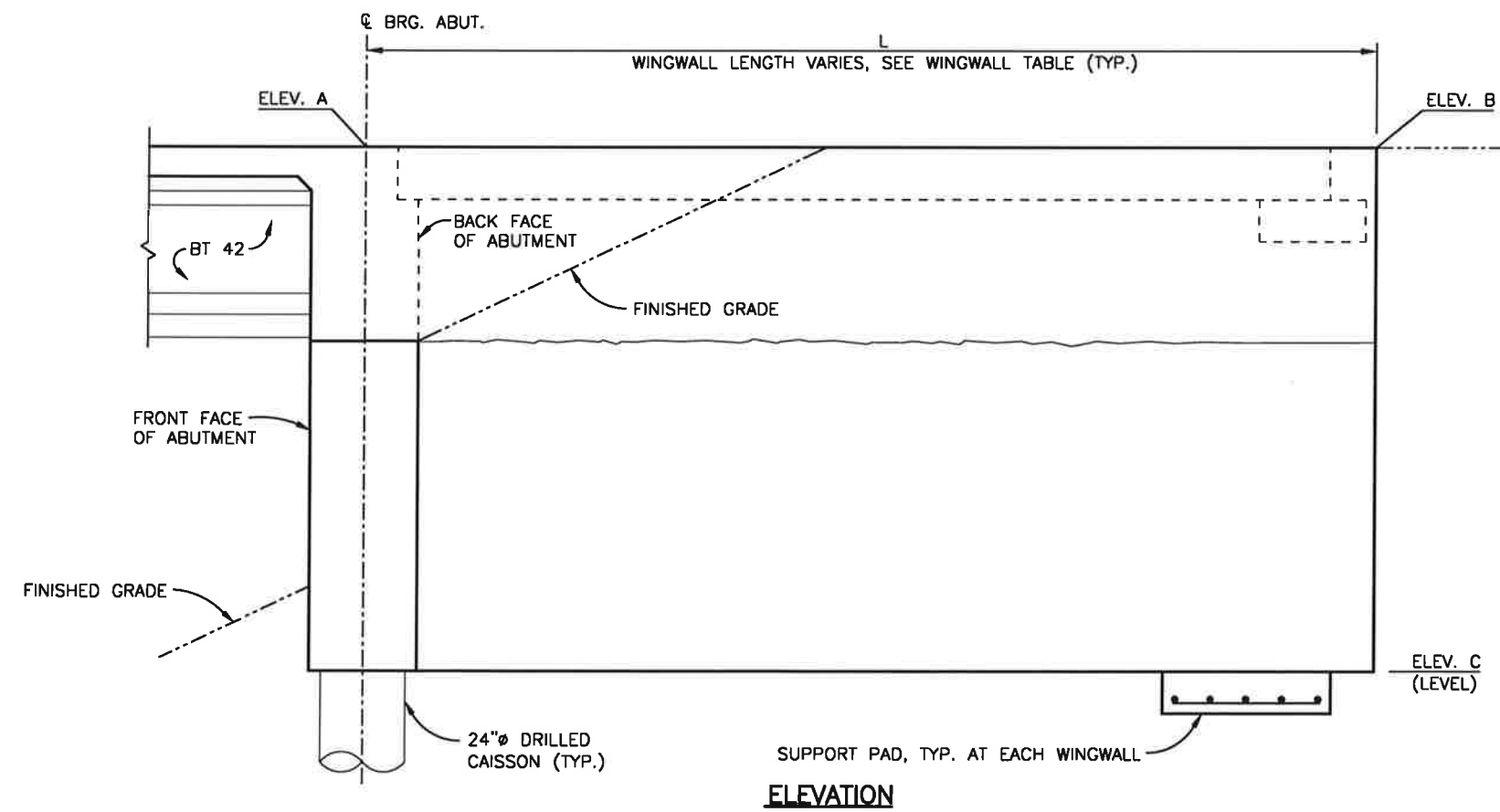
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No Revisions:	Designer: J. LYNCH	Structure Numbers	
Revised:	Detailer: C. MIYAMOTO		
Void:	Subset: BRIDGE	Sheets: B15 of 32	Sheet Number 25



INTERIM WINGWALL TABLE					
LOCATION	L	θ	ELEV. A	ELEV. B	ELEV. C
WINGWALL B	24'-6"	66°00'00"	5784.31	5784.16	5771.70
WINGWALL E	23'-6"	79°00'00"	5787.06	5787.68	5773.00

ELEVATIONS GIVEN AT OUTSIDE FACE OF WINGWALL



TYPICAL INTERIM WINGWALL SECTION

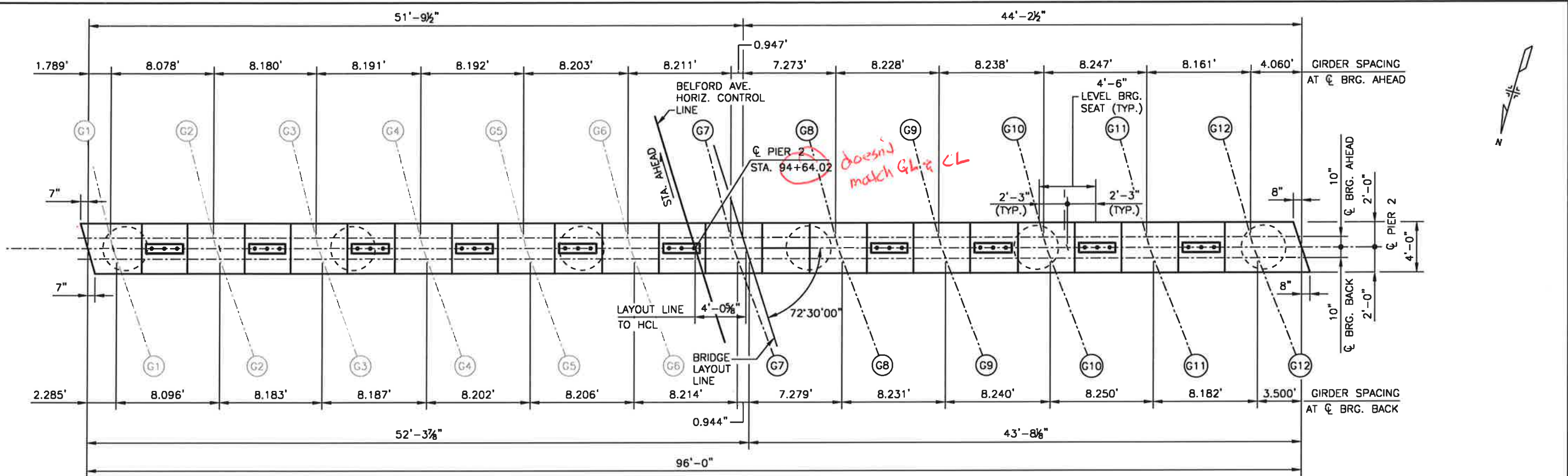
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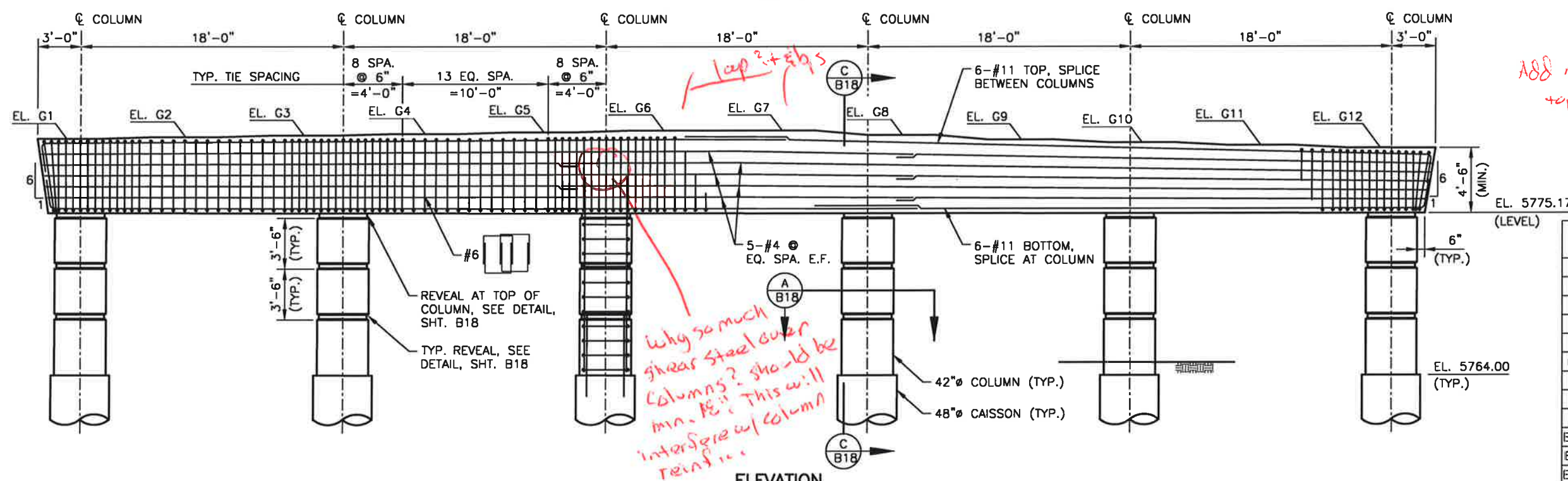
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No Revisions:	Designer: J. LYNCH	Structure Numbers	
Revised:	Detailer: C. MIYAMOTO		
Void:	Subset: BRIDGE	Sheets: B16 of 32	Sheet Number 26



PLAN



ELEVATION

*Arg*  
Add note - elevation of top of concrete.

BEARING SEAT ELEVATIONS	
EL. G1	5780.11
EL. G2	5780.22
EL. G3	5780.33
EL. G4	5780.45
EL. G5	5780.56
EL. G6	5780.67
EL. G7	5780.67
EL. G8	5780.47
EL. G9	5780.27
EL. G10	5780.07
EL. G11	5779.87
EL. G12	5779.67

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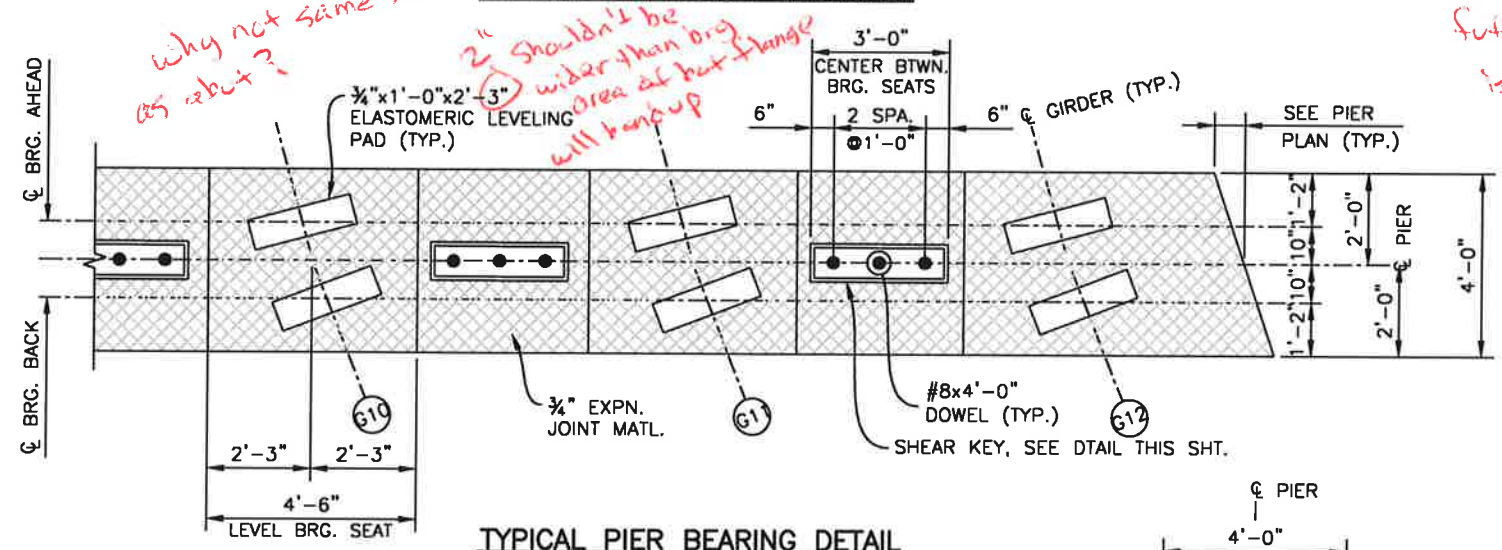
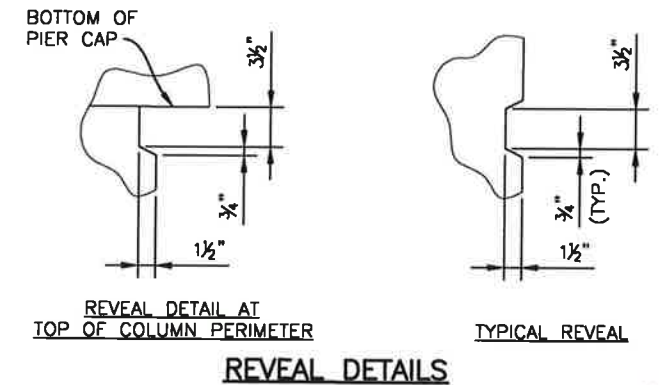
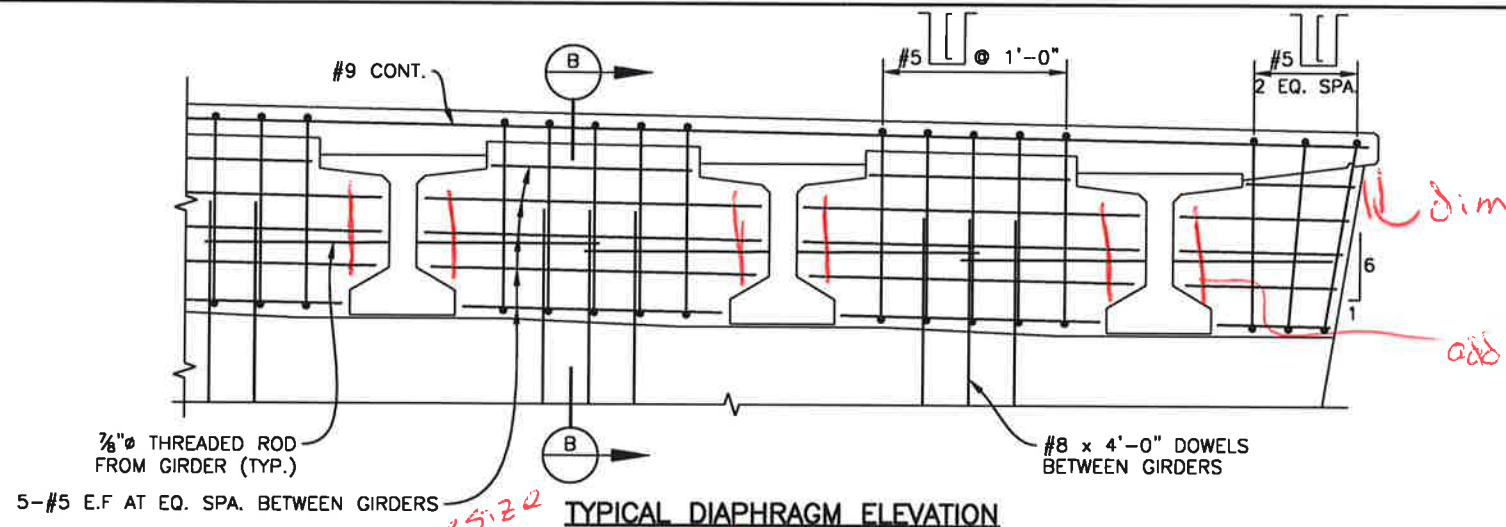
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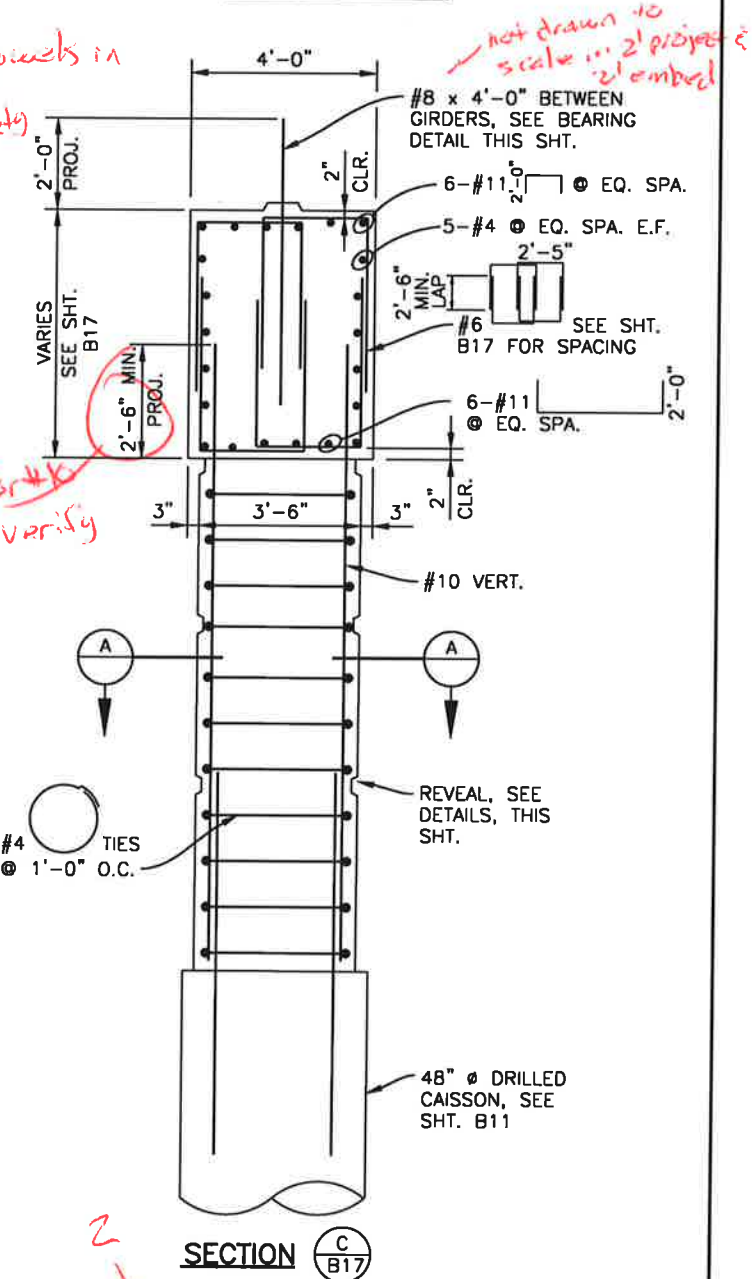
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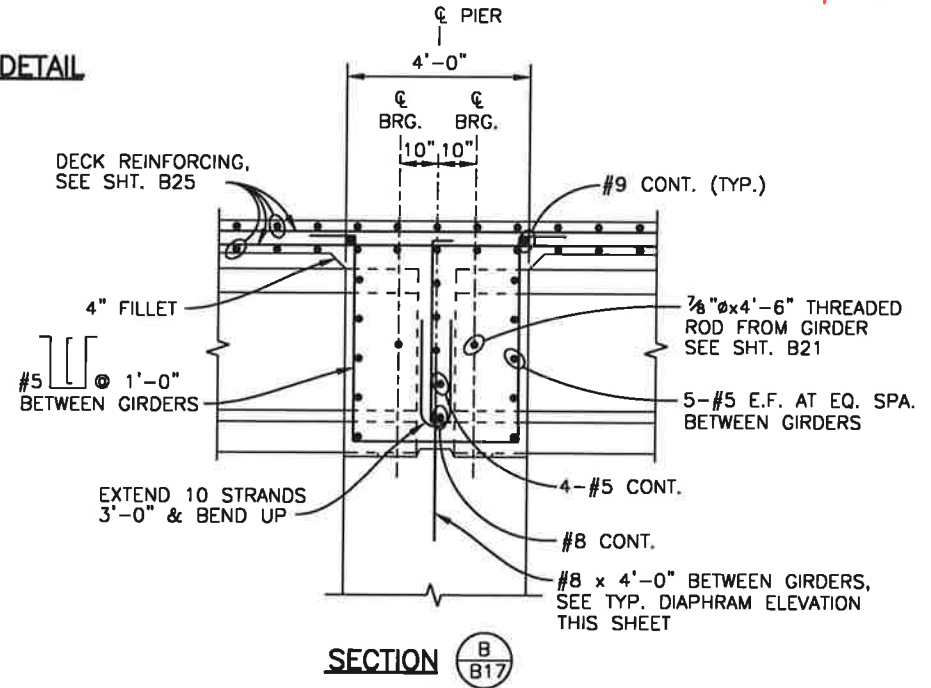
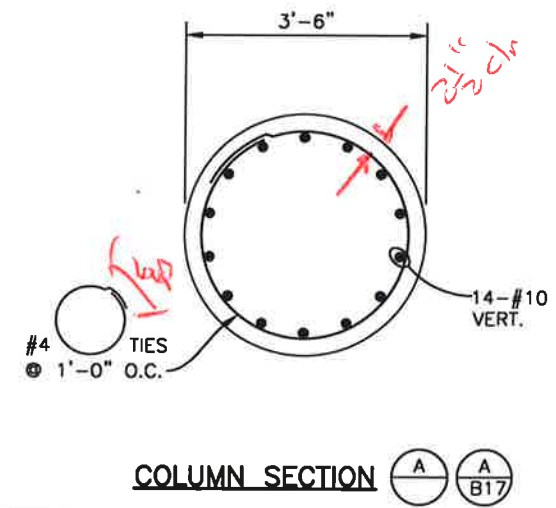
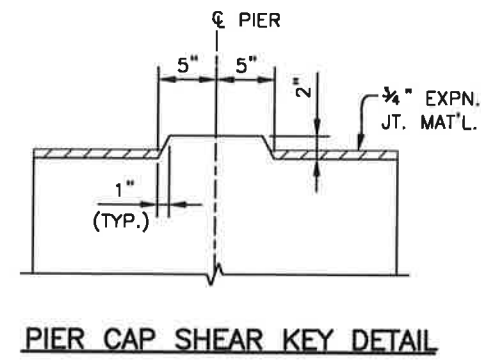
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No Revisions:	PIER 2		
Revised:	Designer: J. LYNCH	Structure Numbers	Sheet Number 27
Void:	Detailer: R. DILLON	Sheets: B17 of 32	
	Subset: BRIDGE		



Are you installing #8 dowels in future? Aesthetic/Safety issue? Drill spacing?



seems small for epoxy barrier verify



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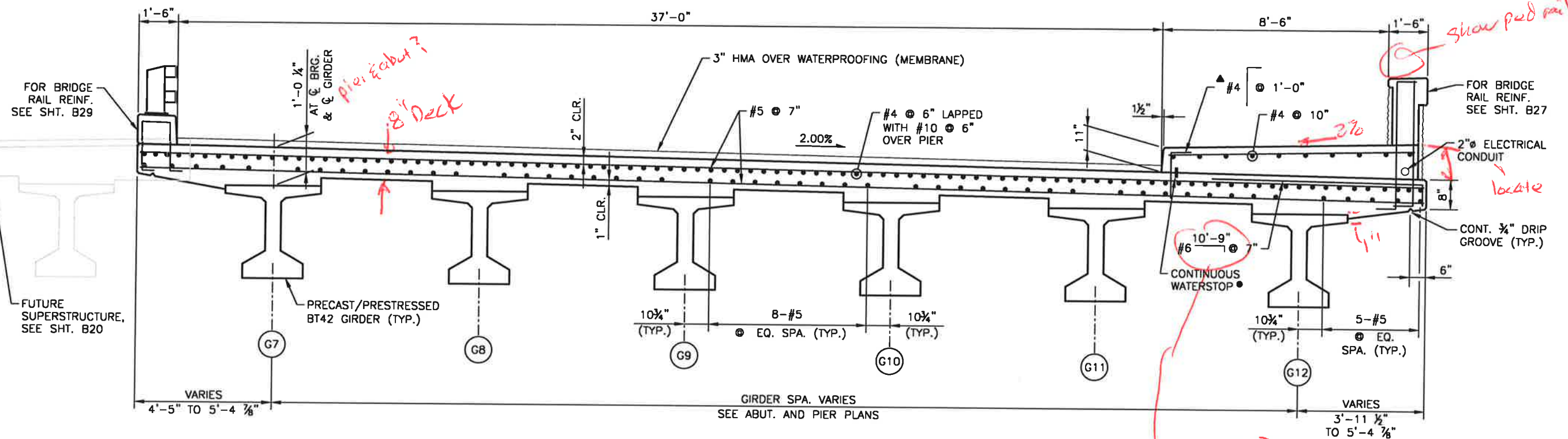
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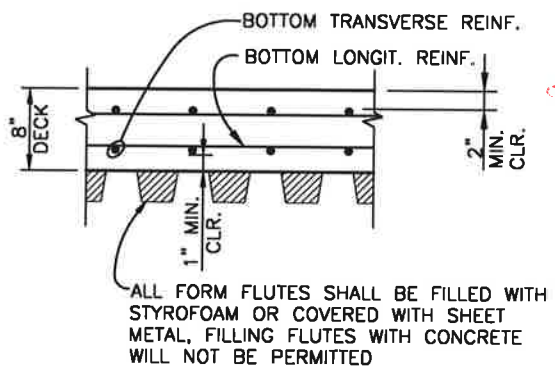
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Revised:	Detailer: DILLON/MIYAMOTO		
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TYPICAL INTERIM SECTION  
(LOOKING SOUTH)



PERMANENT STEEL DECK FORM DETAIL

*What this bar for?  
if for collision, why only on  
1 side? IS because sidewalk load,  
I would think it is a composite deck/sidewalk section...*

NOTES:

1. DECK & SIDEWALK CONCRETE SHALL BE CLASS D (BRIDGE).
2. PROVIDE TRANSVERSE RAKE FINISH ( $\frac{1}{4} \pm$  AMPLITUDE) ON THE BRIDGE DECK IN THE AREAS WHERE SIDEWALK IS TO BE PLACED, CLEAN PRIOR TO PLACING SIDEWALK CONCRETE.
3. DRILL & EPOXY GROUT DOWELS INTO DECK AFTER SLAB HAS BEEN POURED, USE HILTI HIT HY-150 EPOXY ADHESIVE, 6" MIN. EMBEDMENT DEPTH. THE COST OF DRILLING & EPOXY WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN ITEM 601, CONCRETE CLASS D (BRIDGE).
4. PROVIDE CONTINUOUS BENTONITE/BUTYL RUBBER BASED WATERSTOP (CARLISLE MIRASTOP OR APPROVED EQUAL). THE COST OF THE WATERSTOP WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN ITEM 601, CONCRETE CLASS D (BRIDGE).
5. CONCRETE SEALER SHALL BE APPLIED TO CONCRETE SIDEWALK, CURBS AND FACE OF BRIDGE RAIL 6" ABOVE SIDEWALK.
6. STAGGER ALL LONGITUDINAL REINFORCING BAR SPLICES.

*Don't allow  
this?  
Why can't they  
just pour them in  
with concrete?*

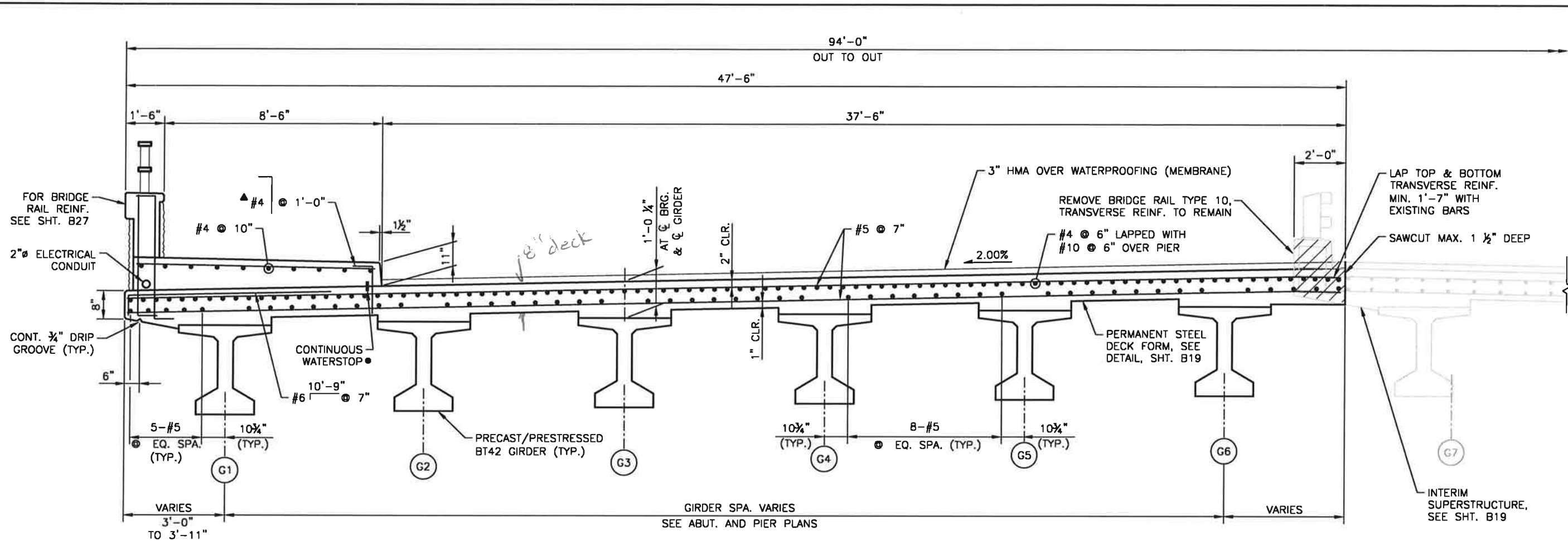
*This ok to do where  
applying veneer???*

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No Revisions:	Designer: J. LYNCH	Structure Numbers	
Revised:	Detailer: C. MIYAMOTO		
Void:	Subset: BRIDGE	Sheets: B19 of 32	Sheet Number 29



TYPICAL FUTURE SECTION  
(LOOKING SOUTH)

*Same comments as interim*

NOTES:

- DECK & SIDEWALK CONCRETE SHALL BE CLASS D (BRIDGE).
- PROVIDE TRANSVERSE RAKE FINISH (1/4"± AMPLITUDE) ON THE BRIDGE DECK IN THE AREAS WHERE SIDEWALK IS TO BE PLACED, CLEAN PRIOR TO PLACING SIDEWALK CONCRETE.
  - ▲ DRILL & EPOXY GROUT DOWELS INTO DECK AFTER SLAB HAS BEEN POURED, USE HILTI HIT HY-150 EPOXY ADHESIVE, 6" MIN. EMBEDMENT DEPTH. THE COST OF DRILLING & EPOXY WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN ITEM 601, CONCRETE CLASS D (BRIDGE).
  - PROVIDE CONTINUOUS BENTONITE/BUTYL RUBBER BASED WATERSTOP (CARLISLE MIRASTOP OR APPROVED EQUAL). THE COST OF THE WATERSTOP WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN ITEM 601, CONCRETE CLASS D (BRIDGE).
- CONCRETE SEALER SHALL BE APPLIED TO CONCRETE SIDEWALK, CURBS AND FACE OF BRIDGE RAIL 6" ABOVE SIDEWALK.
- STAGGER ALL LONGITUDINAL REINFORCING BAR SPLICES.

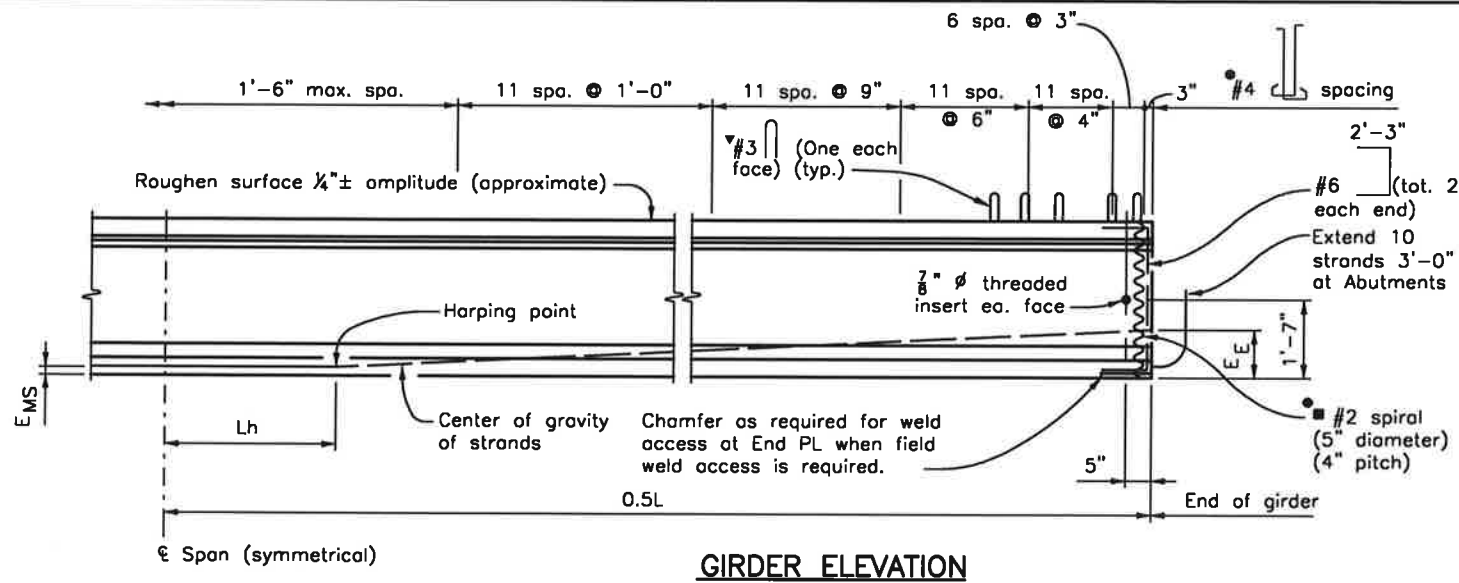
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Sheet Revisions		
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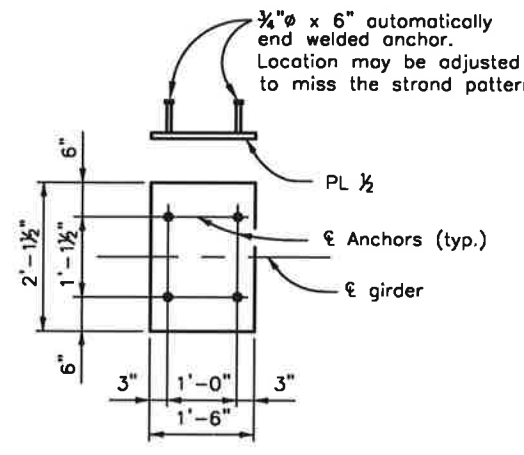
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As Constructed	BELFORD-HAPPY CANYON CREEK BRIDGE		Project No./Code
No Revisions:	FUTURE SUPERSTRUCTION SECTION		
Revised:	Designer: J. LYNCH	Structure Numbers	Sheet Number 30
Void:	Detailer: C. MIYAMOTO	Subsets: BRIDGE	
Sheets: B20 of 32			

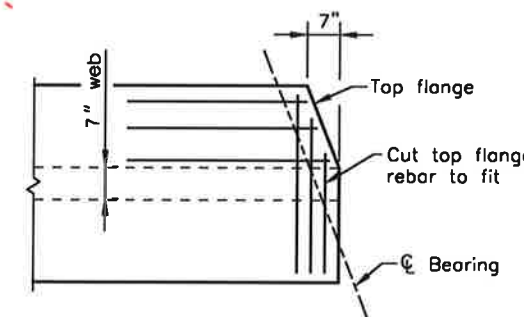


**GIRDER ELEVATION**

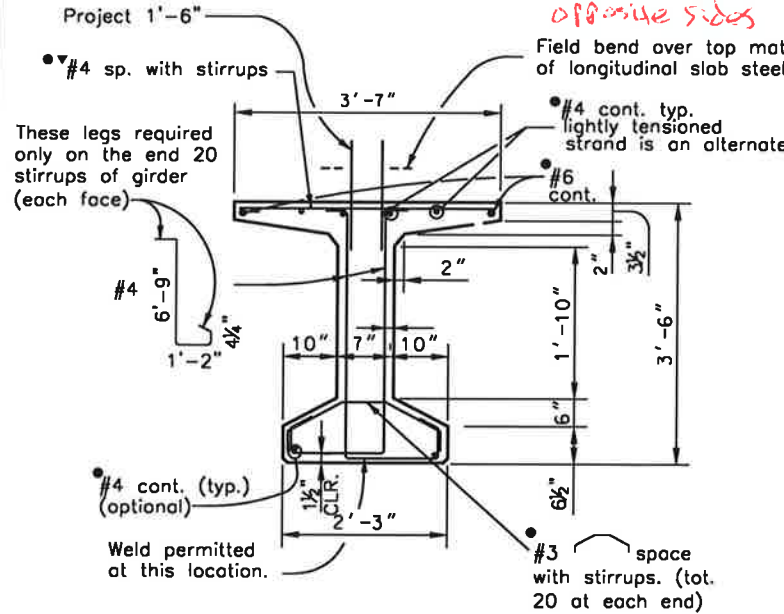
- The Contractor may submit an alternate cross tie arrangement, at the end of the web, for approval by the Engineer.
- ▼ Space with #4 for stirrup spacings of 9" or more. Space at 1'-0" for stirrup spacings less than 9".
- D20 wires may be used in lieu of #4.
- 2 - D20 wires may be used in lieu of #6.
- D11 or W10.9 wires may be used in lieu of #3.
- W5 wires may be used in lieu of #2.



**END PLATE DETAIL**  
Galvanize after fabrication



**CLIPPED TOP FLANGE DETAIL**  
(Typical at both girder ends)



**TYPICAL GIRDER SECTION**

**NOTES:**

All work necessary to fabricate and install the integral parts of the girder (including the intermediate diaphragms, 3/8\"/>

When approved by the Engineer, a minimum of tack welding will be permitted on ASTM A706 uncoated reinforcing steel.

Reinforcing projecting from the top of the girder and reinforcing within eight feet of an expansion device in the bridge deck shall be epoxy coated. Damaged coating on girder reinforcing within the girder need not be repaired. The minimum cover for reinforcing steel is 1".

At girder ends not embedded in concrete diaphragms, cut strands off 1" below the surface of the concrete and finish with an approved epoxy grout. At girder ends embedded in concrete diaphragms, cut strands to project 3", except as shown. Do not make cosmetic repairs (damage less than 1 1/2" deep) to the parts of the girders embedded in concrete.

Use low relaxation strands meeting the requirements of ASTM A-416 Grade 270. The minimum clear distance between groups or individual strands shall be 2.3(ds) but not less than 1 1/4". The minimum cover for prestressing steel is 1 1/2".

A minimum of two harping points shall be used per girder. Harped strands shall be well distributed at the girder ends, starting within 4" of the top of the girder and distributed such that there is no space between strands greater than 1'-0" at the end of the girder. As an alternate the Contractor may place #4 x 10'-0" in the sides of the end of the web parallel to the harped strands such that there is no space greater than 1'-0".

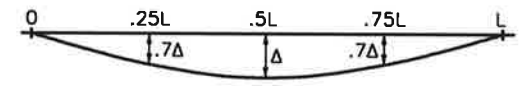
- A\* = minimum area of the prestressing steel.
- ds = nominal strand diameter.
- f's = ultimate strength of prestressing steel.
- Fj = jacking force per girder.
- Ff = final force per girder after all losses.
- f'ci = required concrete strength at release of prestress force.
- f'c = required concrete strength at 28 days of age.
- L = length of girder along the grade of the girder.
- Δ = deflection at centerline of span due to cast-in-place slab, diaphragms, asphalt, curbs, rails, and walks.

Concrete shall be Class PS.

Entrained air is not required for girder concrete.

Use 1/2" chamfer on all corners, except as noted.

Predicted camber is the camber for the girder alone at 60 days. Acceptable camber variability is limited to 20% over the predicted camber and 50% under the predicted camber or ± 1 inch, whichever is greater. The contractor shall report to the Engineer values of camber which require remedial measures. The remedial measures shall be reviewed and approved by the Engineer. The costs associated with all remedial measures shall be borne by the Contractor.



**DEAD LOAD DEFLECTION DIAGRAM**

GIRDER SCHEDULE - INTERIM GIRDERS														
Girder Type	Span No.	Girder No.	L (ft)	Lh (ft)	A <sub>s</sub> (in <sup>2</sup> )	E <sub>MS</sub> (in)	E <sub>E</sub> (in)	F <sub>j</sub> (kips)	F <sub>f</sub> (kips)	f'ci (psi)	f'c (psi)	Δ (in)	Predicted Release Camber (in)	Predicted camber (in)
BT42	1	G7	77.10	7.71	6.08	14.86	4.14	1230	1020	6000	8000	1.17	1.81	3.55
BT42	1	G8-G9	77.10	7.71	6.08	14.86	4.14	1230	1004	6000	8000	1.04	1.96	3.56
BT42	1	G10-G11	77.46	7.75	6.08	14.86	4.14	1230	1004	6000	8000	1.05	1.96	3.57
BT42	1	G12	77.46	7.75	6.08	14.86	4.14	1230	1010	6000	8000	1.10	1.91	3.58
BT42	2	G7	77.06	7.71	6.08	14.86	4.14	1230	1021	6000	8000	1.18	1.81	3.55
BT42	2	G8-G9	77.06	7.71	6.08	14.86	4.14	1230	1004	6000	8000	1.03	1.96	3.55
BT42	2	G10-G11	77.23	7.72	6.08	14.86	4.14	1230	1004	6000	8000	1.04	1.96	3.56
BT42	2	G12	77.23	7.72	6.08	14.86	4.14	1230	1010	6000	8000	1.10	1.90	3.56

GIRDER SCHEDULE - FUTURE GIRDERS														
Girder Type	Span No.	Girder No.	L (ft)	Lh (ft)	A <sub>s</sub> (in <sup>2</sup> )	E <sub>MS</sub> (in)	E <sub>E</sub> (in)	F <sub>j</sub> (kips)	F <sub>f</sub> (kips)	f'ci (psi)	f'c (psi)	Δ (in)	Predicted Release Camber (in)	Predicted camber (in)
BT42	1	G1	76.48	7.65	6.08	14.86	4.14	1230	1021	6000	8000	1.14	1.82	3.52
BT42	1	G2-G3	76.48	7.65	6.08	14.86	4.14	1230	1016	6000	8000	1.15	1.82	3.52
BT42	1	G4	76.78	7.68	6.08	14.86	4.14	1230	1016	6000	8000	1.16	1.82	3.53
BT42	1	G5-G6	76.78	7.68	6.08	14.86	4.14	1230	1016	6000	8000	1.17	1.82	3.54
BT42	2	G1	76.75	7.68	6.08	14.86	4.14	1230	1022	6000	8000	1.18	1.80	3.53
BT42	2	G2-G3	76.75	7.68	6.08	14.86	4.14	1230	1016	6000	8000	1.16	1.82	3.54
BT42	2	G4	76.90	7.69	6.08	14.86	4.14	1230	1016	6000	8000	1.17	1.82	3.54
BT42	2	G5-G6	76.90	7.69	6.08	14.86	4.14	1230	1016	6000	8000	1.17	1.82	3.54

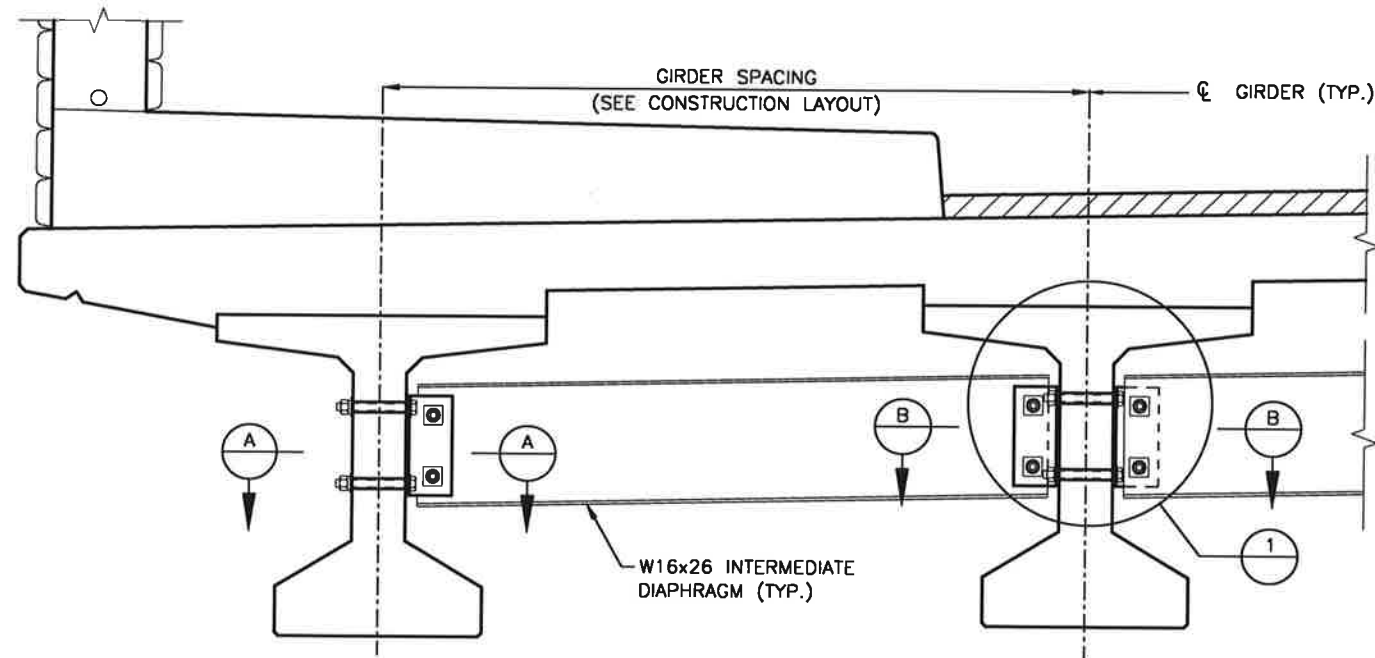
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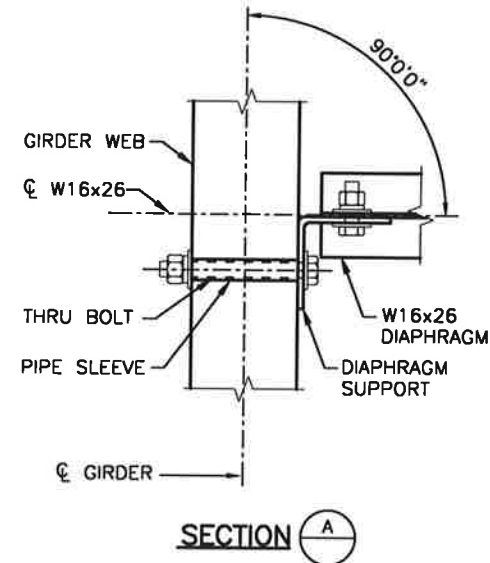
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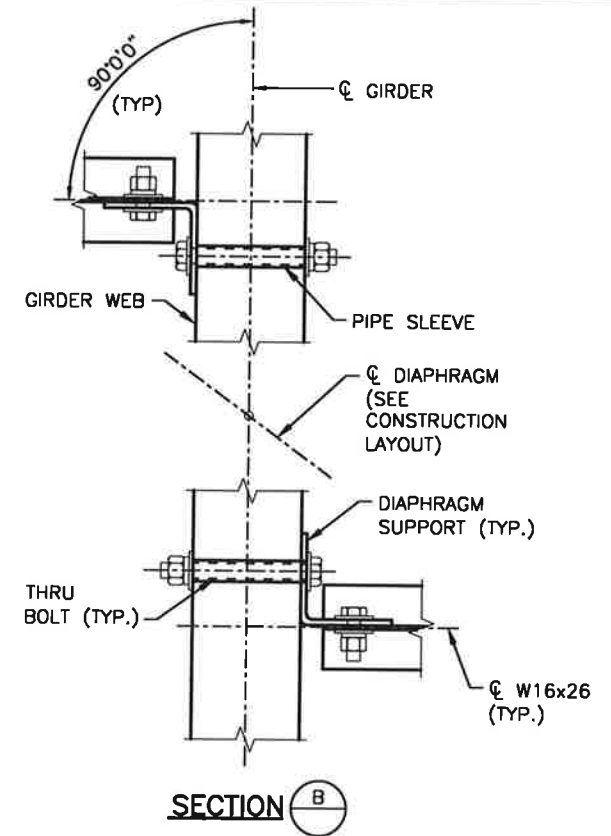
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No Revisions:	Designer: J. LYNCH	Structure	
Revised:	Detailer: C. MIYAMOTO	Numbers	
Void:	Subset: BRIDGE	Sheets: B21 of 32	Sheet Number <b>31</b>



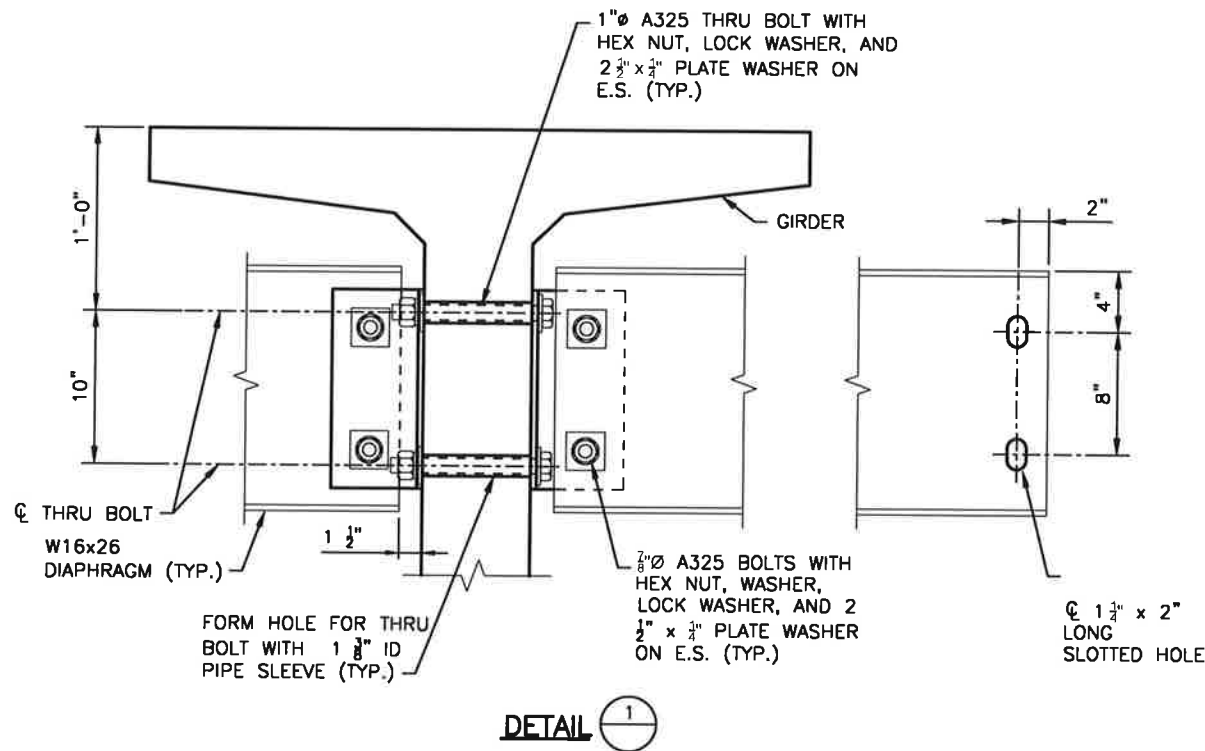
**PARTIAL ELEVATION AT DIAPHRAGM**  
(TAKEN NORMAL TO GIRDER)



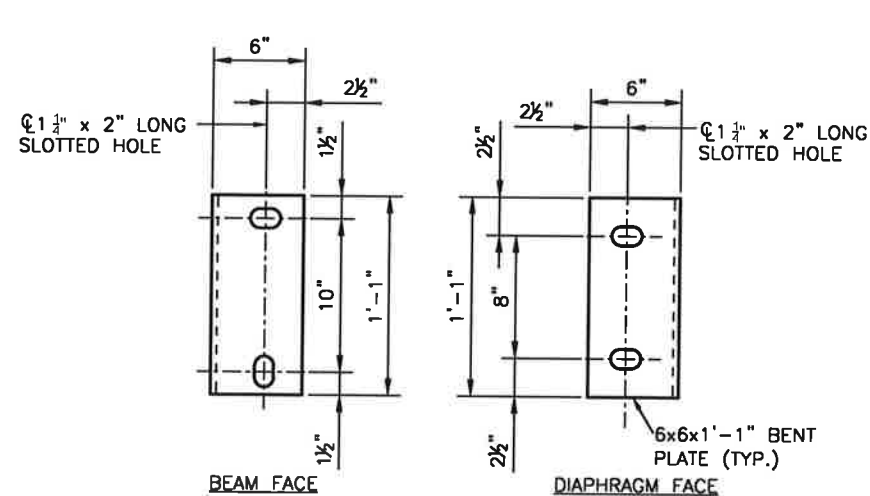
**SECTION A**



**SECTION B**



**DETAIL 1**



**DIAPHRAGM SUPPORT DETAIL**

**NOTES:**

1. SEE CONSTRUCTION LAYOUT FOR INTERMEDIATE DIAPHRAGM LOCATIONS.
2. ALL DIAPHRAGM MATERIALS, INCLUDING BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED. GALVANIZE AFTER FABRICATION.
3. BOLTS, NUTS AND LOCK WASHERS MAY BE ZINC PLATED IN LIEU OF BEING GALVANIZED.
4. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING NECESSARY BRACING REQUIREMENTS AND FOR PROVIDING ADEQUATE BRACING FOR THE SPECIFIC WIND AND WEATHER CONDITIONS TO BE ENCOUNTERED FOR EACH SPECIFIC PROJECT.
5. WHEN BRACING OR DIAPHRAGMS ARE REQUIRED, NO GIRDERS SHALL BE ERECTED AND LEFT UNBRACED. THE INTERMEDIATE DIAPHRAGMS (WHEN USED) SHALL BE CONNECTED TO THE ADJACENT GIRDERS SIMULTANEOUSLY WITH THE ERECTION OF THE GIRDERS.
6. USE AND INSTALLATION OF THE INTERMEDIATE DIAPHRAGMS SHALL NOT RELIEVE THE CONTRACTOR OF FULL RESPONSIBILITY TO CONSTRUCT THE WORK IN A MANNER WHICH PROVIDES ALL NECESSARY RIGIDITY, SUPPORTS ALL LOADS IMPOSED, AND PROVIDES IN THE FINISHED STRUCTURE THE LINES AND GRADES INDICATED ON THE PLANS.
7. THE COST OF THE DIAPHRAGMS SHALL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE COST OF THE GIRDER.

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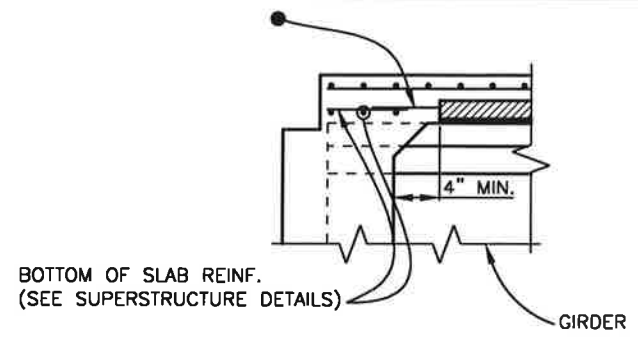
**BELFORD-HAPPY CANYON CREEK BRIDGE  
GIRDER DIAPHRAGM  
DETAILS**

Designer: J. LYNCH  
Detailer: R. DILLON  
Subset: BRIDGE

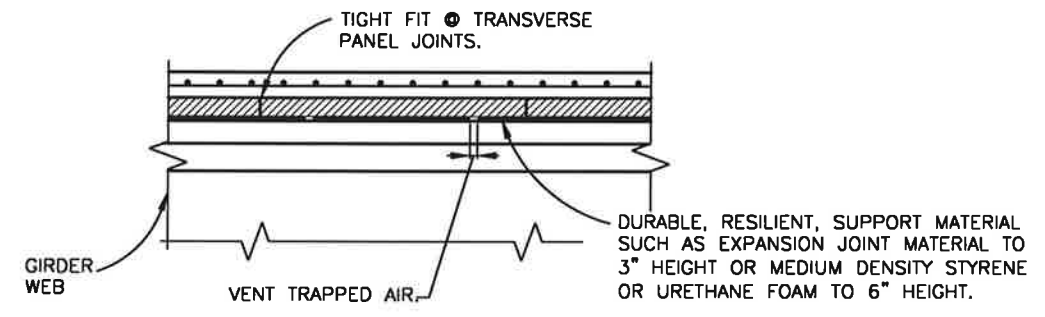
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Structure  
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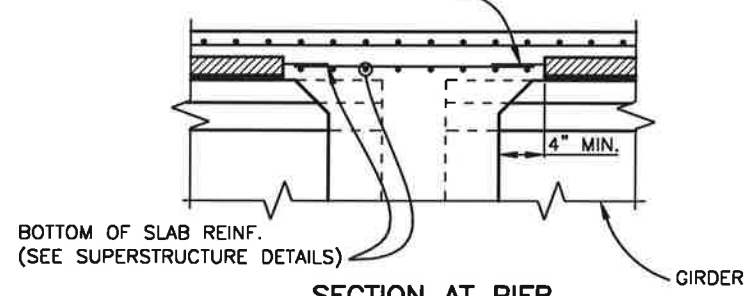
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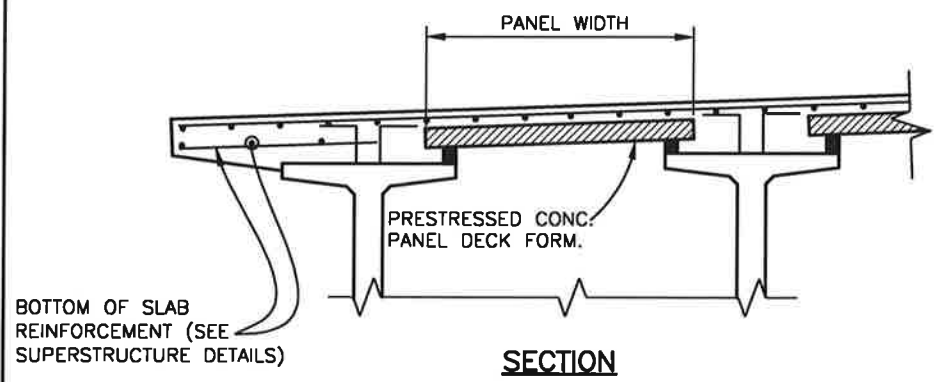
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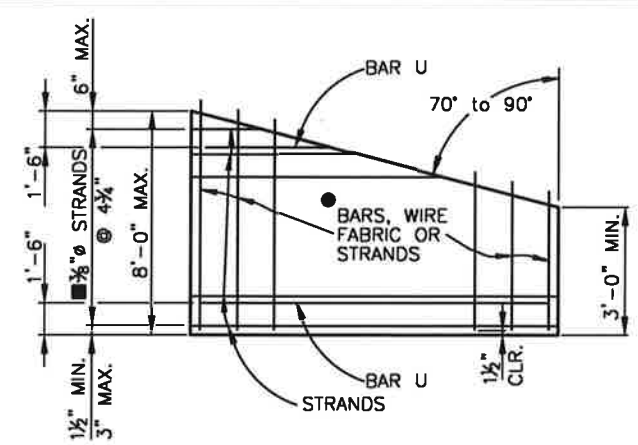
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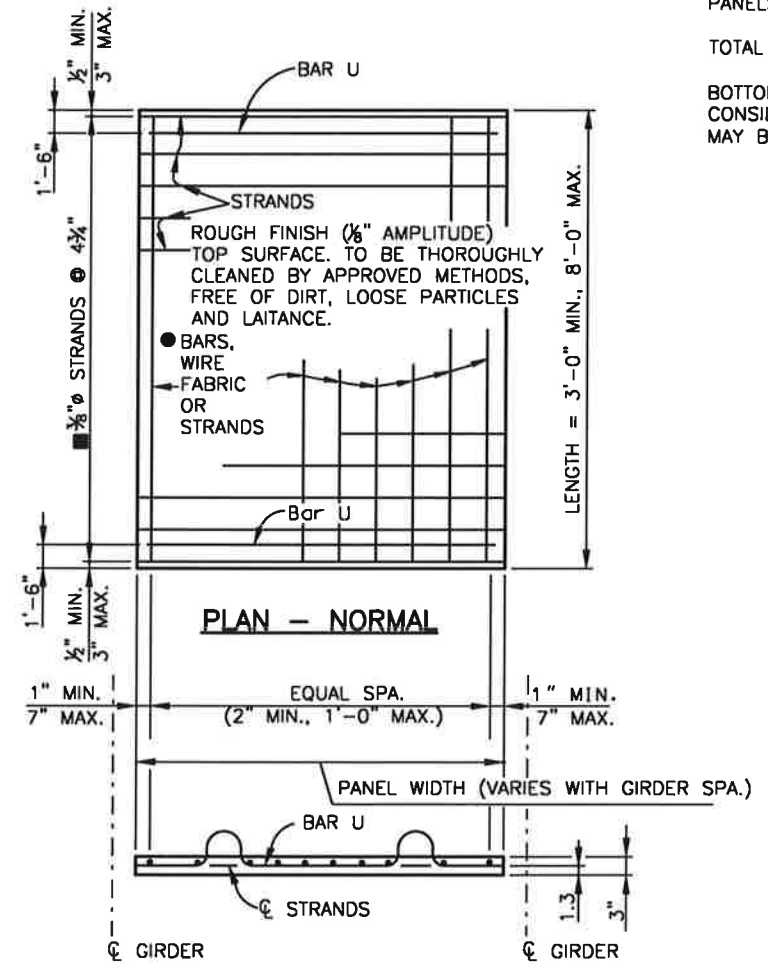
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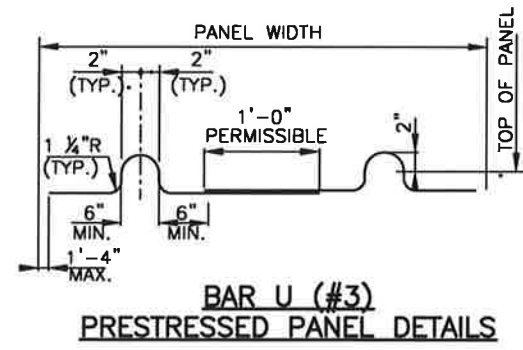
**SECTION**



**PLAN - SKEWS 70 TO 90  
OPTIONAL END PANEL**



**PLAN - NORMAL  
PRESTRESSED PANEL DETAILS**



**NOTES:**

- SAWING OF PANELS IS ACCEPTABLE IN AREAS WHERE PROJECTING REINFORCEMENT IS NOT REQUIRED. IT IS DESIRABLE TO HAVE THE PRESTRESSING STRANDS PROJECT FROM THE PANELS AS LONG AS THE PROJECTING STRANDS DO NOT INTERFERE WITH OTHER BRIDGE COMPONENTS.
- REINFORCING PERPENDICULAR TO STRANDS MAY BE DEFORMED REINF. BARS, WELDED WIRE FABRIC, OR WELDED DEFORMED BAR MATS, AND SHALL BE PLACED DIRECTLY ABOVE THE STRANDS. MINIMUM AREA OF REINFORCING PERPENDICULAR TO STRANDS SHALL BE 0.11 SQ. IN. PER FT. TENSIONED OR UNTENSIONED STRANDS MAY ALSO BE USED. THESE INDIVIDUAL BARS OR WIRES SHALL BE NO LARGER THAN .375" DIAMETER. FOR LOCATION OF LONGITUDINAL BAR EXTENSIONS, SEE PRECAST PANEL DECK FORM SHEET.
- MAY BE REDUCED TO 3/8" STRANDS AT 9 1/2" WHEN THE PANEL WIDTH IS LESS THAN 5'-7" AND THE DESIGN SPAN IS LESS THAN 7'-7".
- THE LONGITUDINAL REINFORCING STEEL IN THE CAST-IN-PLACE PORTION OF THE DECK MAY REST DIRECTLY ON THE PANELS AS NECESSARY TO OBTAIN CLEARANCES AT THE TOP OF DECK, UNLESS OTHERWISE NOTED.
- THE TOLERANCE ON STRAND PLACEMENT SHALL NOT EXCEED ± 1/4".
- THE TOLERANCE ON PANEL THICKNESS SHALL NOT EXCEED ± 1/4".
- CONCENTRATED CONSTRUCTION LOADS SHALL NOT EXCEED 500 LB FOR 3" PANELS, 700 LB FOR 3.5" PANELS, NOR 1100 LB FOR 4" PANELS UNLESS THE LOAD IS DISTRIBUTED TO LESS THAN 117 PSF.
- TOTAL LOADS APPLIED TO ANY PANEL DURING CONSTRUCTION SHALL NOT EXCEED 117 PSF.
- BOTTOM FLEXURAL CRACKS, SAGS GREATER THAN 1/2", OR CAMBERS GREATER THAN 1/2" WILL BE CONSIDERED EVIDENCE OF MISHANDLING, OVERLOADING, OR EXCEEDING ALLOWABLE TOLERANCES, AND MAY BE CAUSE FOR REJECTING PANELS AT THE ENGINEER'S DISCRETION.

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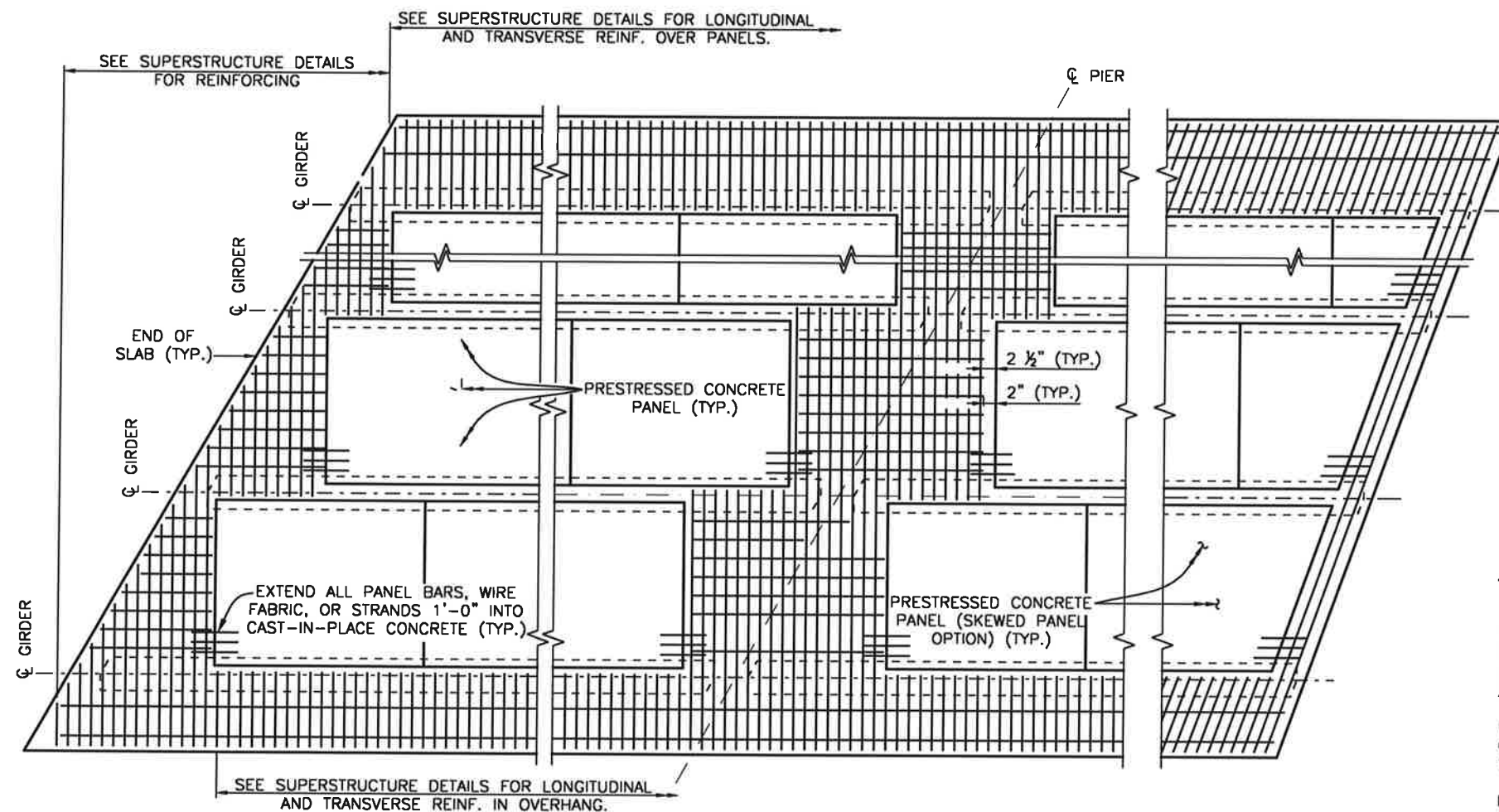
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As Constructed	BELFORD-HAPPY CANYON CREEK BRIDGE OPTIONAL PRECAST PANEL DECK FORM (1 OF 2)		Project No./Code
No Revisions:	Designer: J. LYNCH	Structure Numbers	
Revised:	Detailer: C. MIYAMOTO		
Void:	Subset: BRIDGE	Sheets: B23 of 32	Sheet Number <b>33</b>



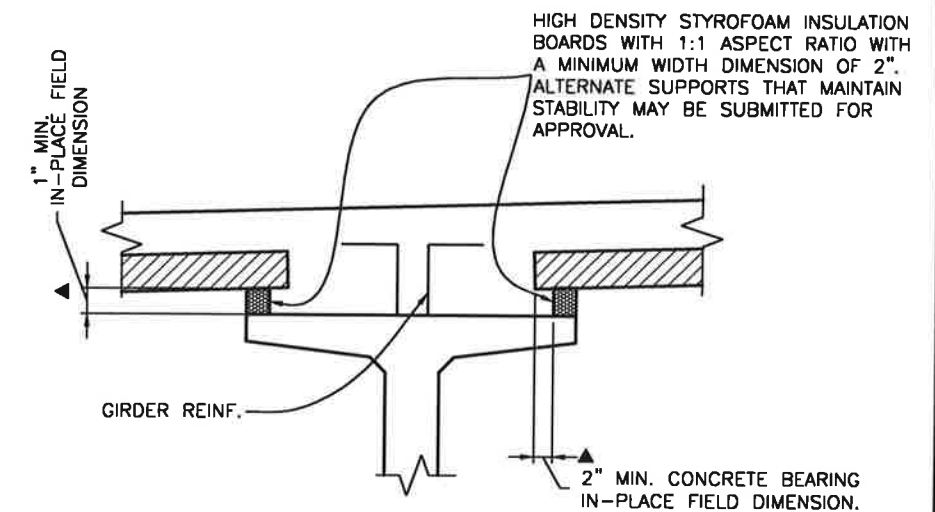
**END OF SLAB  
RECTANGULAR PANEL OPTION AND  
SKEWS LESS THAN 70°**

RECTANGULAR PANEL OPTION SHALL BE USED FOR SKEWS LESS THAN 70°.

**CONTINUOUS SLAB  
OVER PIER**

**END OF SLAB  
SKEWED PANEL OPTION FOR  
SKEWS 70° to 90°**

**PART PLAN**



**SUPPORT DETAIL**

**NOTES:**

COMPOSITE TOTAL SLAB DESIGNED FOR HS 25-44 AND ALTERNATE MILITARY LOADING.

ALL CONCRETE SHALL BE CLASS PS WITH RELEASE STRENGTH  $f'_{ci} = 4500$  PSI AND MINIMUM 28 DAY STRENGTH  $f'_c = 6000$  PSI. ENTRAINED AIR IS NOT REQUIRED FOR PRECAST PANEL DECK FORM CONCRETE. THE STRENGTH SHALL BE AT LEAST 5000 PSI AT THE TIME OF THE DECK POUR.

USE  $\frac{3}{8}$ " LOW RELAXATION STRANDS MEETING THE REQUIREMENTS OF ASTM A416 GRADE 270. JACKING FORCE PER STRAND ( $f'_j$ ) SHALL BE AT LEAST 17.2 KIPS. FINAL FORCE PER STRAND ( $F_j$ ) IS ESTIMATED TO BE 14.2 KIPS.

INSTALLATION OF BAR MU (#3) IS MANDATORY. ALL FOUR BAR U (#3) LOOPS SHALL BE USED SIMULTANEOUSLY FOR LIFTING THE PANELS.

CARE MUST BE TAKEN TO ENSURE PROPER CLEANING OF CONSTRUCTION DEBRIS OFF THE TOPS OF THE PANELS AND CONSOLIDATION OF CONCRETE MORTAR UNDER THE EDGES OF THE PANELS. WATER, DIRT OR OTHER DEBRIS ON TOP OF THE PANELS WILL INHIBIT THE BOND OF THE CAST-IN-PLACE CONCRETE. IT IS ALSO IMPORTANT THAT ADEQUATE SPACE ( $\Delta$  MIN. 1" X 2") IS PROVIDED FOR THE CONCRETE TO FILL THE SPACE UNDER THE PANEL AS THE SLAB CONCRETE IS PLACED. PANEL LENGTHS AND WIDTH SHALL BE DETERMINED BY THE CONTRACTOR AND SHOWN ON THE SHOP PLANS.

THE CONTRACTOR IS RESPONSIBLE FOR THE STABILITY OF THE PANELS ON THE GIRDERS. ERECTED PANELS SHALL BE UNIFORMLY SUPPORTED ALONG THE LENGTH OF THE PANEL. THE CONTRACTOR IS RESPONSIBLE FOR MEETING THE TOTAL SLAB THICKNESS SHOWN ON THE SUPERSTRUCTURE DETAILS.

ALL PLANES OF REINFORCING STEEL SHOWN IN THE SUPERSTRUCTURE DETAILS ARE REQUIRED FOR AREAS NOT FORMED WITH PRECAST PANELS.

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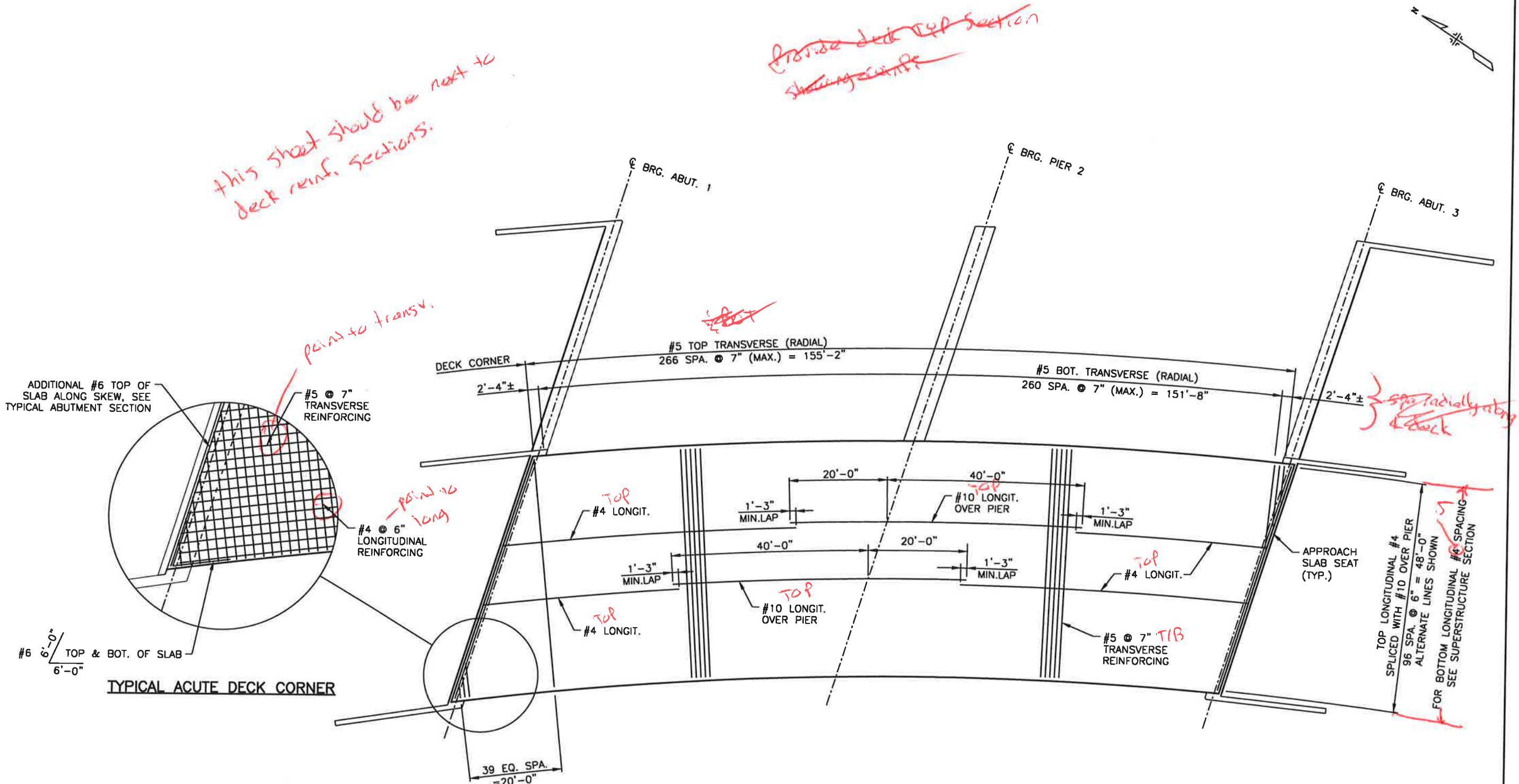
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No Revisions:	Designer: J. LYNCH	Structure Numbers	
Revised:	Detailer: C. MIYAMOTO		
Void:	Subset: BRIDGE	Sheets: B24 of 32	Sheet Number <b>34</b>

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REINFORCING PLAN

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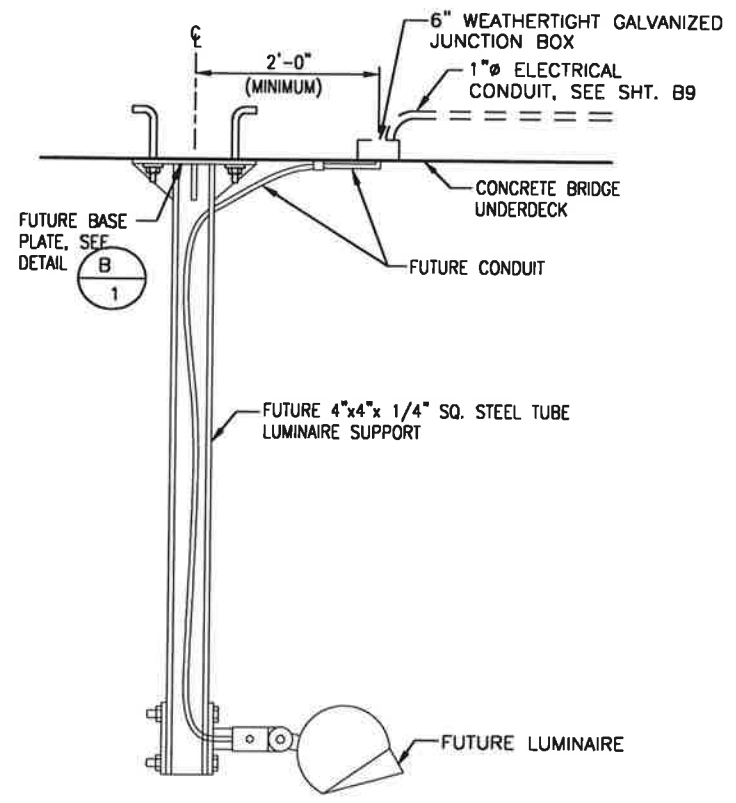
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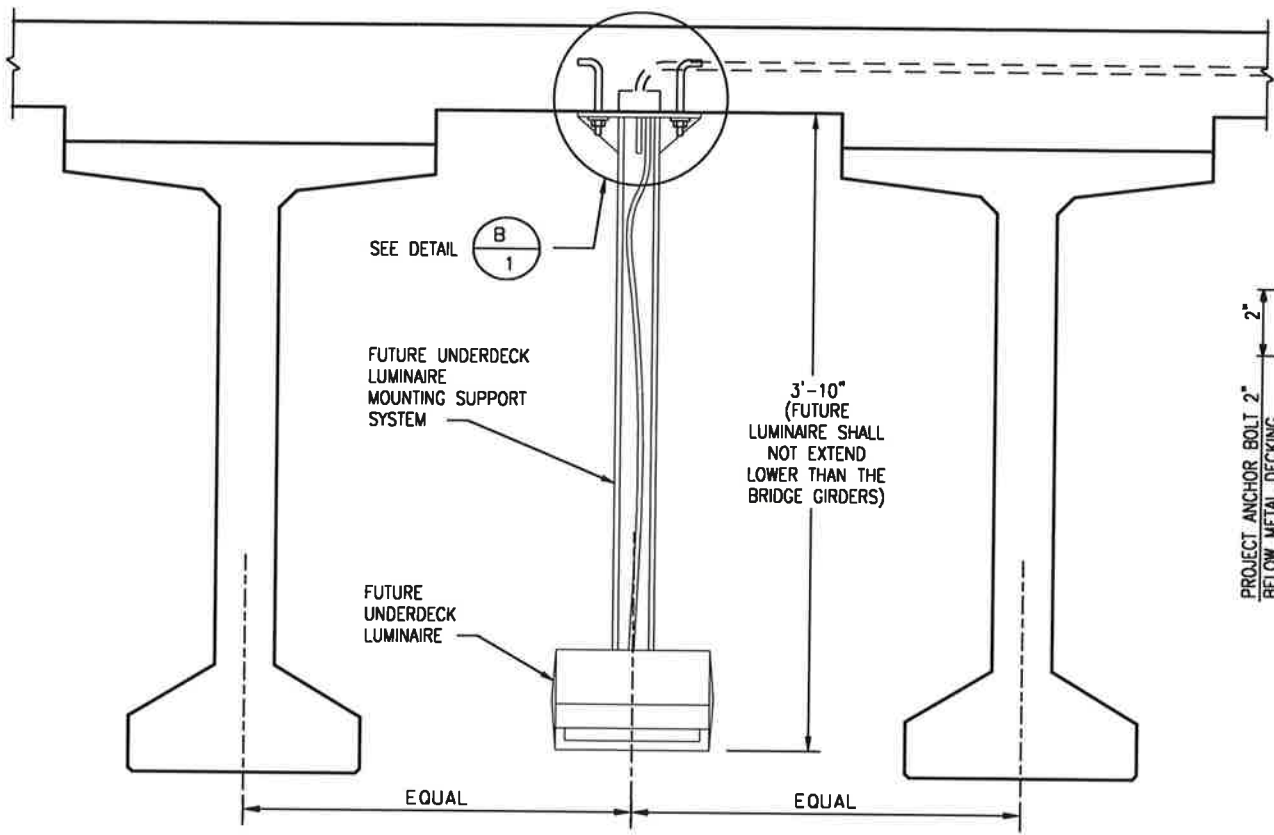
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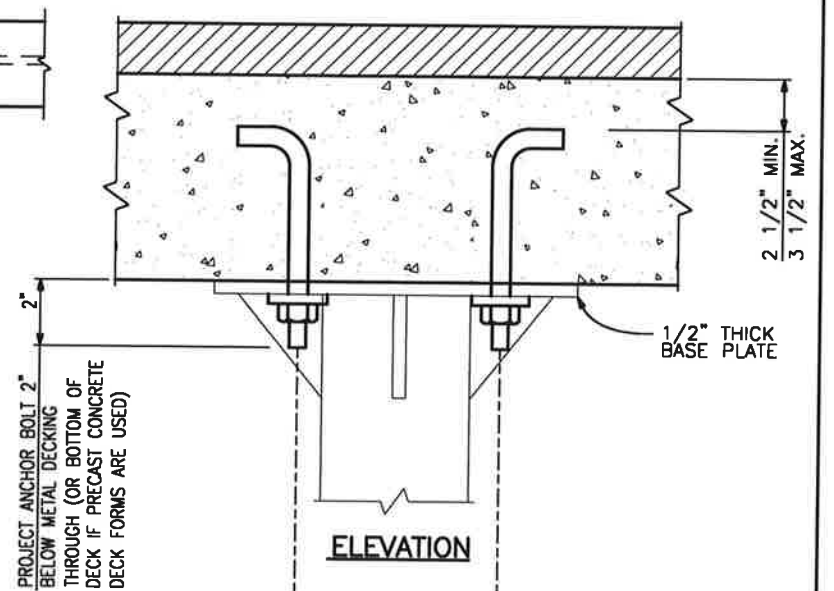
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Revised:	Designer: J. LYNCH	Structure Numbers	Sheet Number <b>35</b>
Void:	Detailer: MIYAMOTO/DILLON	Sheets: B25 of 32	



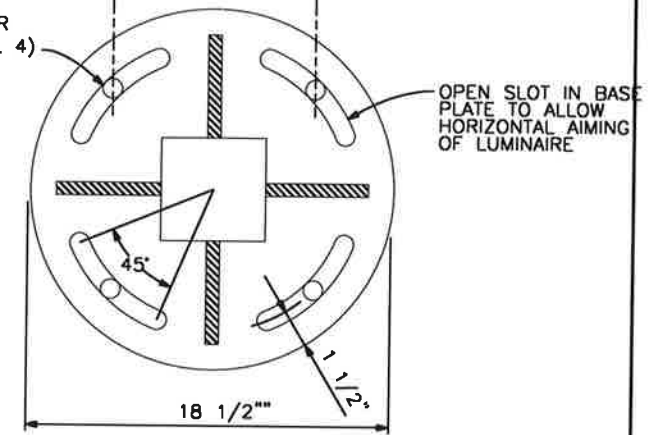
**SECTION VIEW  
FUTURE UNDERDECK LUMINAIRE SUPPORT**



**FRONT VIEW**

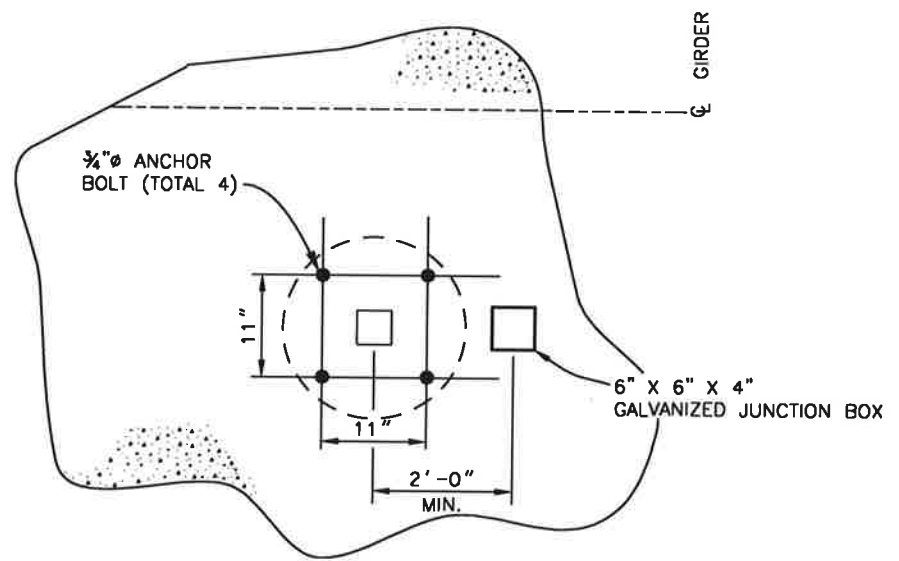


**ELEVATION**



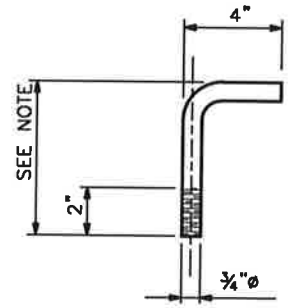
**PLAN  
FUTURE BASE PLATE**

**DETAIL B 1**



**TYPICAL ANCHOR BOLT  
PLACEMENT DIAGRAM**

*Why does it say future when CL shows now & have pay item... for luminaire  
It is sufficient?  
How installing is using precast panels?*



**ANCHOR BOLT DETAIL**

ANCHOR BOLT LENGTH SHALL BE DETERMINED BY CONTRACTOR BASED ON DECK THICKNESS & METAL DECKING DEPTH. (OR ON DECK THICKNESS ONLY IF OPTIONAL PRECAST CONCRETE DECK FORMS ARE USED)

**NOTE:**  
CONTRACTOR SHALL PROVIDE AND INSTALL ONLY THE ANCHOR BOLTS, JUNCTION BOXES, AND CONDUIT WITHIN THE CONCRETE BRIDGE DECK AS PART OF THIS CONTRACT. ALL OTHER ITEMS SHOWN ON THIS SHEET (STEEL PENDANTS AND LUMINAIRES) ARE FUTURE WORK AND NOT PART OF THIS CONTRACT. COST FOR JUNCTION BOXES AND ANCHOR BOLTS WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE COST OF ITEM 613, 1 INCH ELECTRICAL CONDUIT.

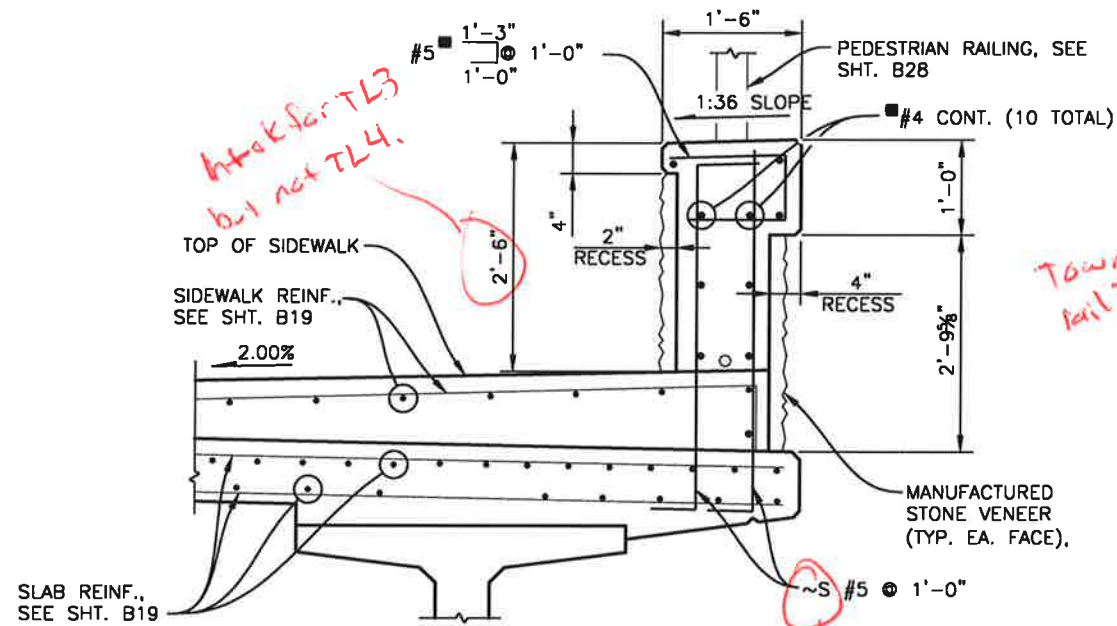
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Sheet Revisions		
Date	Comments	Initials

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As Constructed	BELFORD-HAPPY CANYON CREEK BRIDGE PENDANT LUMINAIRE DETAILS (FUTURE)		Project No./Code
No Revisions:	Designer: J. LYNCH	Structure Numbers	
Revised:	Detailer: R. DILLON		
Void:	Subset: BRIDGE	Sheets: B26 of 32	Sheet Number <b>36</b>



*Hook for TL3 but not TL4.*

*Town ok w/ non crash tested rail?*

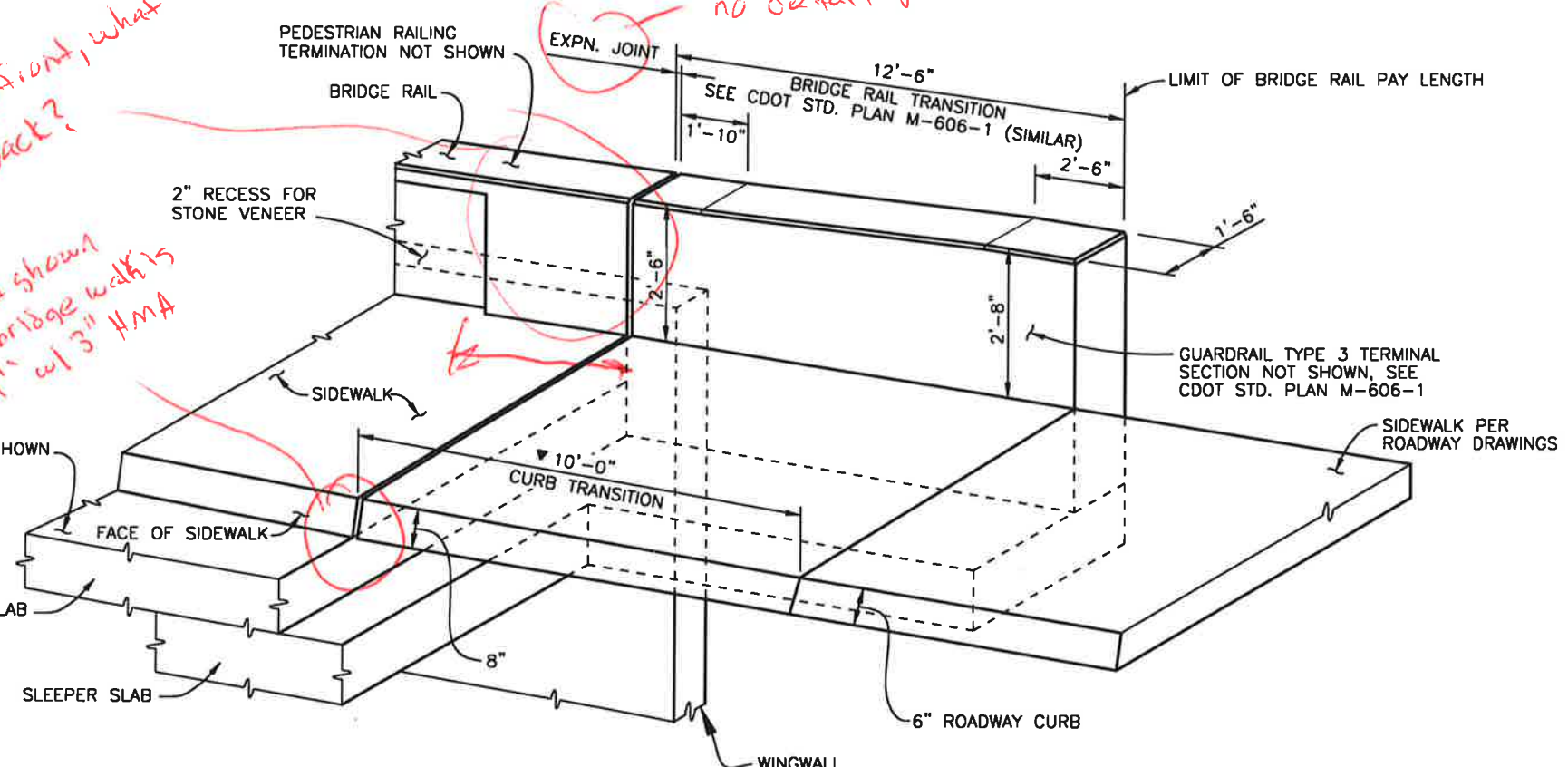
**TYPICAL SECTION**

REINFORCEMENT SHALL BE INCLUDED IN ITEM 606, BRIDGE RAIL (SPECIAL)

*no detail provided*

*show front, what dot back?*  
*this isn't shown correctly. bridge walk is 11' w/ 3" HMA*

H.M.A. NOT SHOWN



**RAIL ISOMETRIC**

**BRIDGE RAIL (SPECIAL) NOTES**

CONCRETE & REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATION SECTIONS 601 & 602, RESPECTIVELY.

ALL BRIDGE RAIL & SIDEWALK CONCRETE SHALL BE CONCRETE CLASS D (BRIDGE).

*confusing to detail it this way why not just make it all Bridge Rail Special sheets 1 & 2?*

**PEDESTRIAN RAILING (STEEL) NOTES**

SEE PROJECT SPECIAL PROVISION, REVISION OF SECTION 514 PEDESTRIAN RAILING (STEEL).

STRUCTURAL STEEL ELEMENTS SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATION SECTION 509.

ALL TUBES SHALL BE ASTM A-500 GRADE B. ALL OTHER STEEL SHALL BE ASTM A-36 UNLESS OTHERWISE NOTED.

STRUCTURAL STEEL:  
AASHTO M-183 (ASTM A-36)  $F_y = 36,000$  PSI  
COLD FORMED ASTM A-500 GRADE B  $F_y = 46,000$  PSI

PEDESTRIAN RAILING (STEEL) SHALL BE FABRICATED IN ACCORDANCE WITH REVISION OF SECTION 514 OF THE STANDARD SPECIFICATIONS. STEEL POSTS, PLATES, TUBE EXPANSION JOINTS AND DEFORMED ANCHOR STUDS WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE COST OF ITEM 606-BRIDGE RAIL (SPECIAL).

PRIOR TO FABRICATION OF THIS ITEM, THREE SETS OF WORKING DRAWINGS WHICH COMPLY WITH THE REQUIREMENTS OF SECTION 105, SHALL BE SUBMITTED TO THE ENGINEER FOR INFORMATION ONLY.

THE TUBES SHALL BE SHOP BENT OR FABRICATED TO FIT HORIZONTAL CURVES.

TUBES SHALL BE CONTINUOUS OVER NOT LESS THAN TWO POSTS OR MORE THAN 3 POSTS. NO WELDED BUTT SPLICES WILL BE ALLOWED IN THE TUBE SECTIONS.

THE CENTERLINE OF THE TUBE SPLICE SHALL BE CENTERED BETWEEN POSTS.

ALL EXPOSED WELDS SHALL BE GROUND SMOOTH.

ALL PEDESTRIAN RAILING COMPONENTS SHALL BE FABRICATED AND INSTALLED WITH POSTS PLUMB AND RAILS TRUE TO LINE IN ACCORDANCE WITH THE PLANS. STRUCTURAL STEEL SHALL BE PAINTED IN ACCORDANCE WITH REVISION OF SECTION 514, AND SECTION 509 AS APPLICABLE, OF THE STANDARD SPECIFICATIONS. COLOR SHALL BE "PARKER BROWN".

BRIDGE RAIL (SPECIAL) FOR INFORMATION ONLY		
DESCRIPTION	UNIT	PER LIN. FT.
CONCRETE CLASS D	CY	0.106
REINFORCING STEEL (EPOXY COATED)	LB	17.6

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Revised:

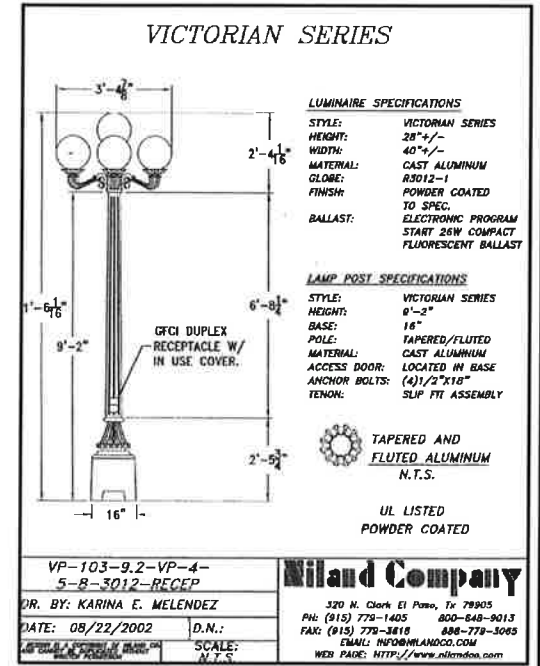
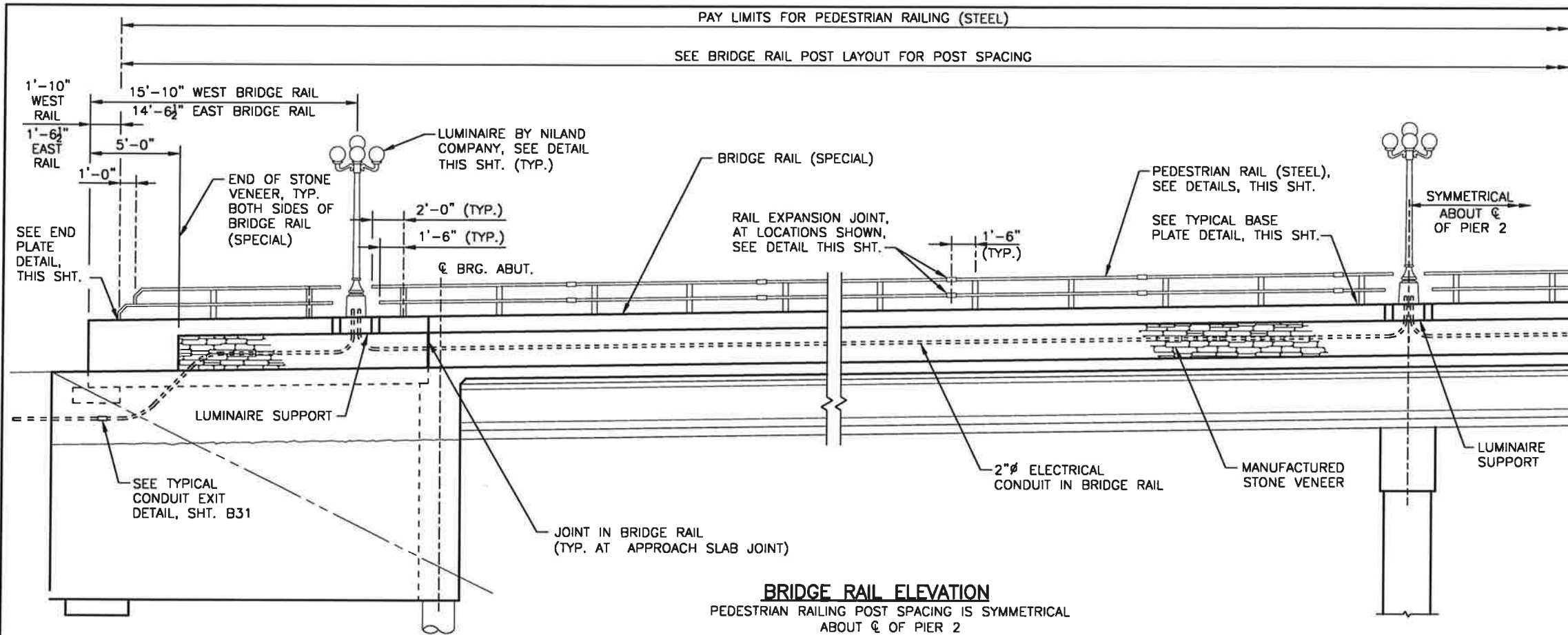
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**BELFORD-HAPPY CANYON CREEK BRIDGE  
BRIDGE RAIL (SPECIAL)  
DETAILS**

Designer:	J. LYNCH	Structure	
Detailer:	R. DILLON	Numbers	
Subset:	BRIDGE	Sheets:	B27 of 32

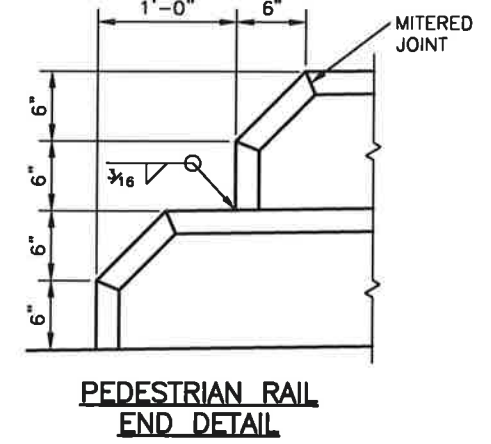
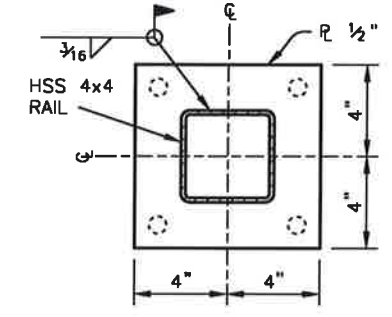
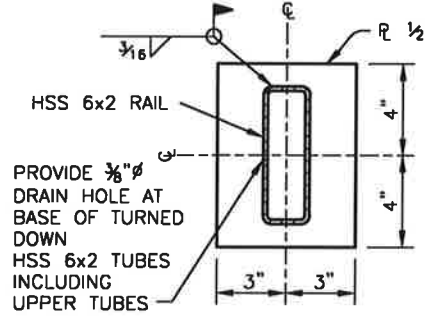
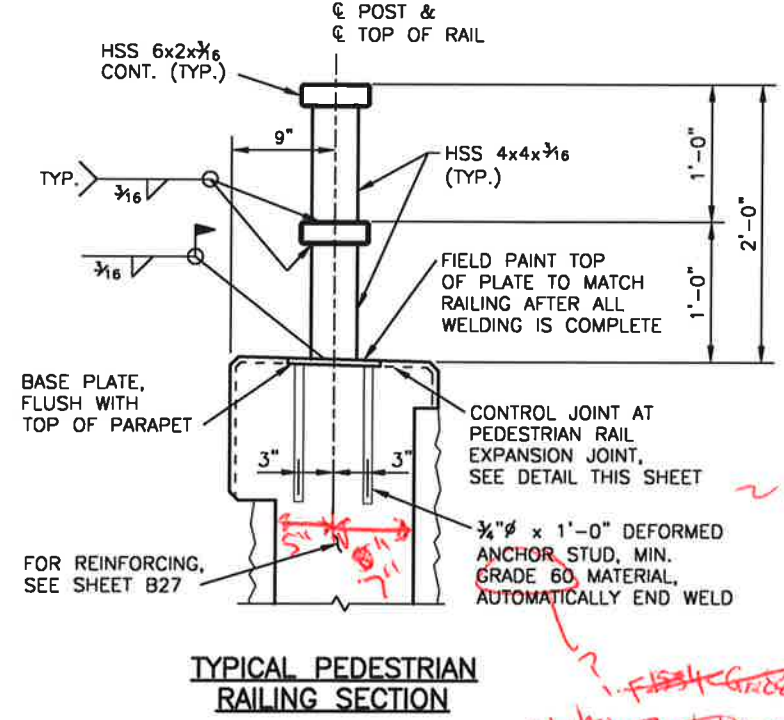
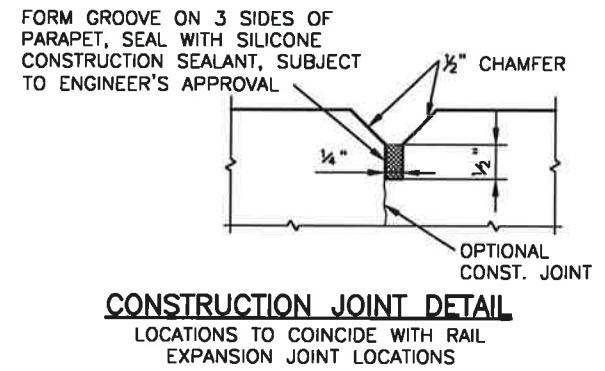
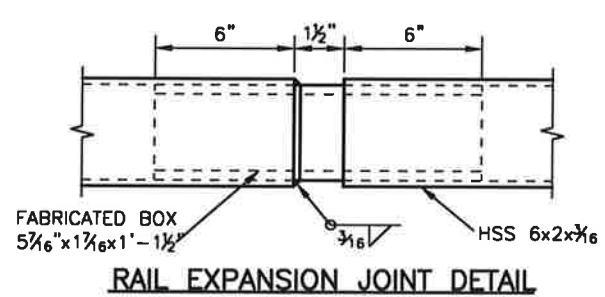
**Project No./Code**

Sheet Number **37**



**LUMINAIRE DETAIL**

*how paying*



*2 section is flipped should be locking up instead unless shown otherwise*

*why bent... is this a deformed bar anchor? end welded*

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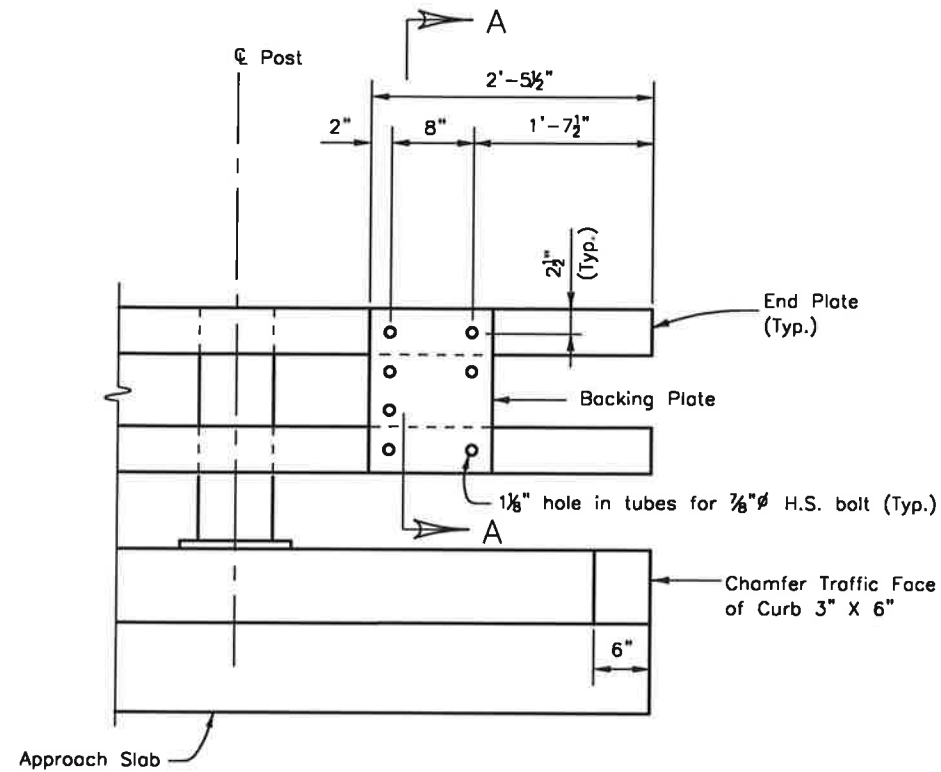
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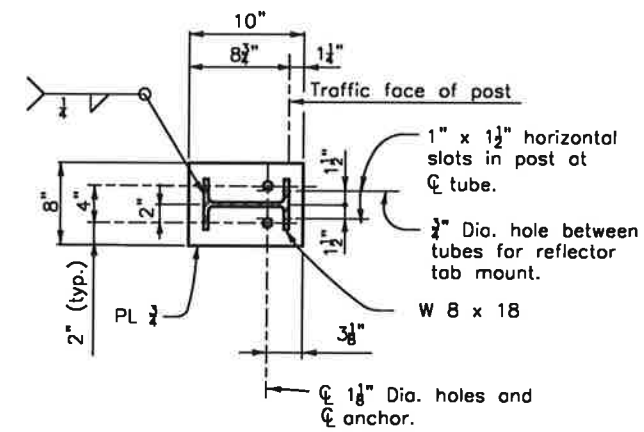


As Constructed	BELFORD-HAPPY CANYON CREEK BRIDGE		Project No./Code
No Revisions:	BRIDGE RAIL ELEVATION & PEDESTRIAN RAILING DETAILS		
Revised:	Designer: J. LYNCH	Structure Numbers	Sheet Number <b>38</b>
Void:	Detailer: R. DILLON		
	Subset: BRIDGE	Sheets: B28 of 32	

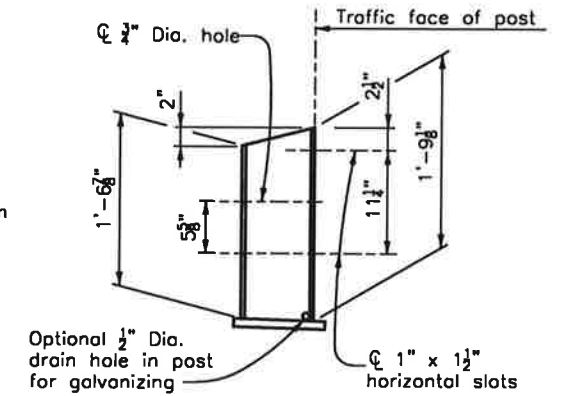




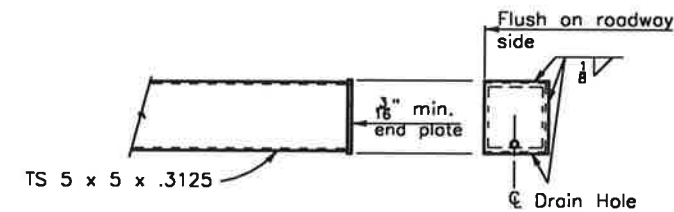
**RAIL TUBE DETAILS**  
Three Beam not Shown



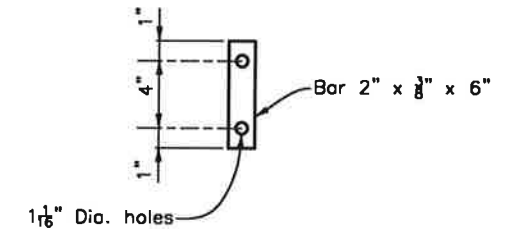
**PLAN - POST DETAIL**



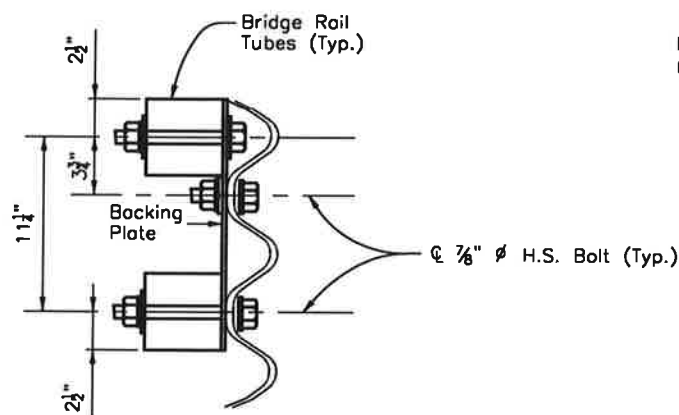
**POST ELEVATION**



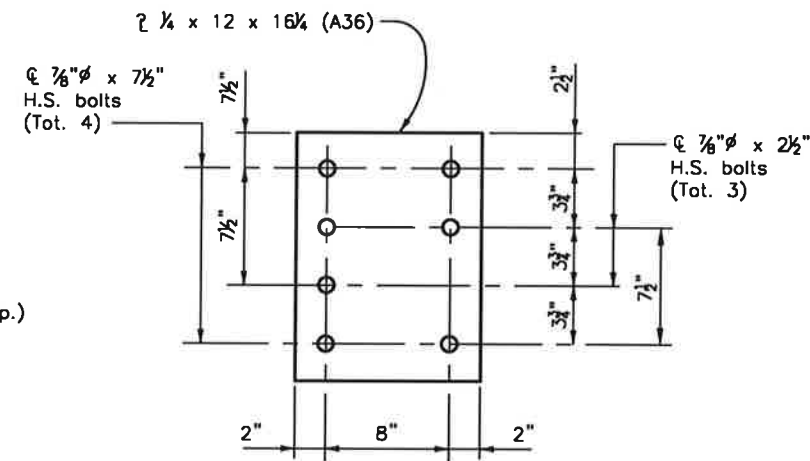
**END PLATE DETAIL**



**ANCHOR DETAIL**

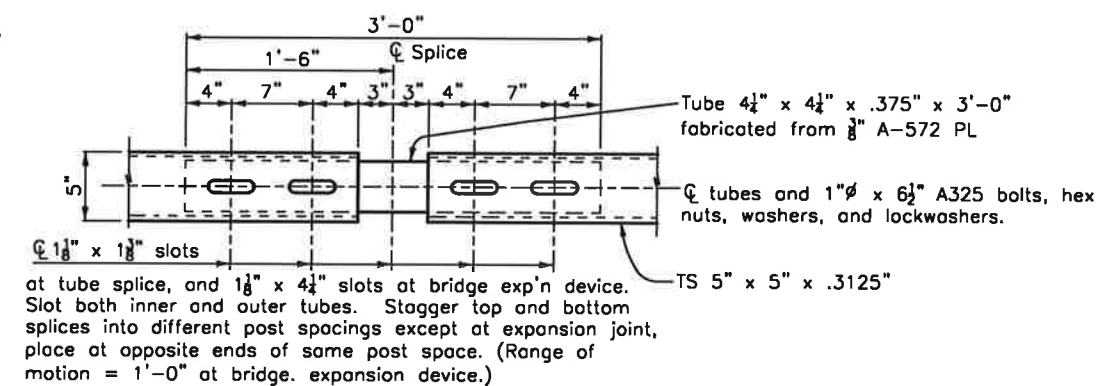


**SECTION A-A**



**BACKING PLATE**

Holes are 1/8" for 7/8" H.S. Bolts with Hex Nuts,  
2 Washers, and 1 Lock Washer



**PLAN - TUBE SPLICE**

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**Sheet Revisions**

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**As Constructed**

No Revisions:

Revised:

Void:

**BELFORD-HAPPY CANYON CREEK BRIDGE  
BRIDGE RAIL TYPE 10  
(2 OF 2)**

Designer: J. LYNCH

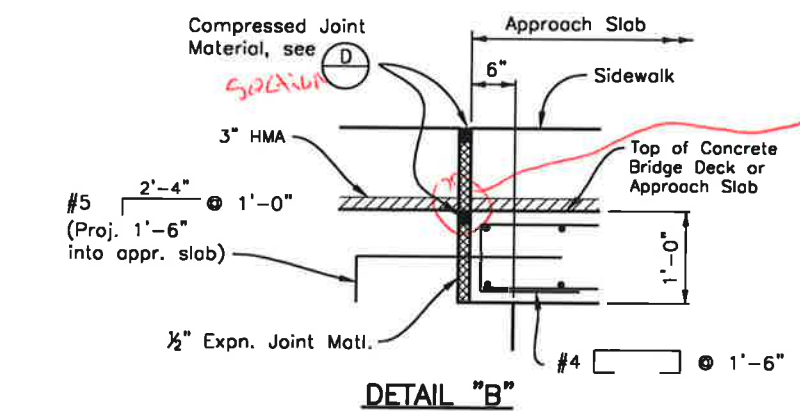
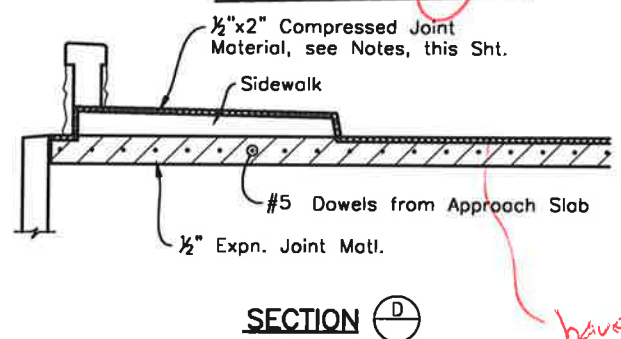
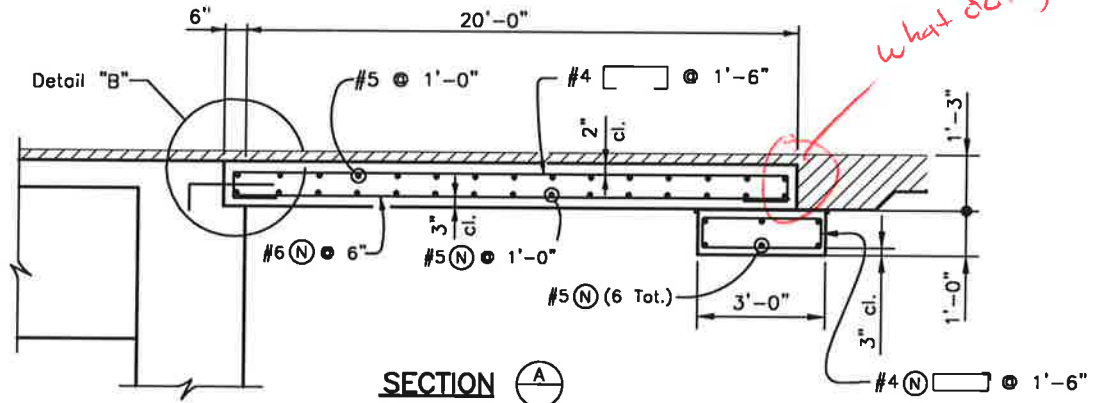
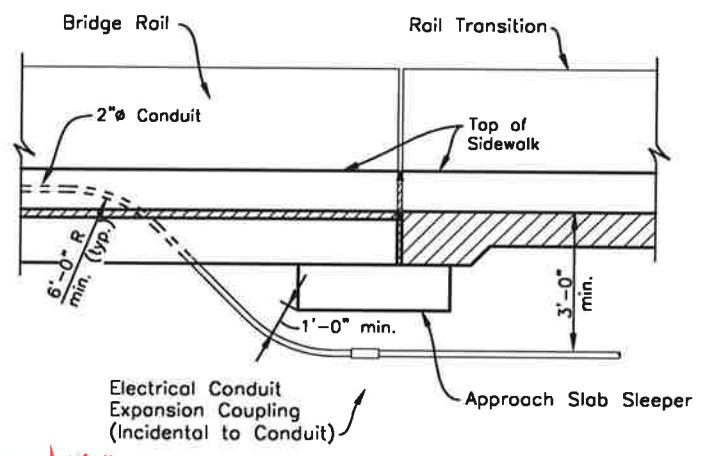
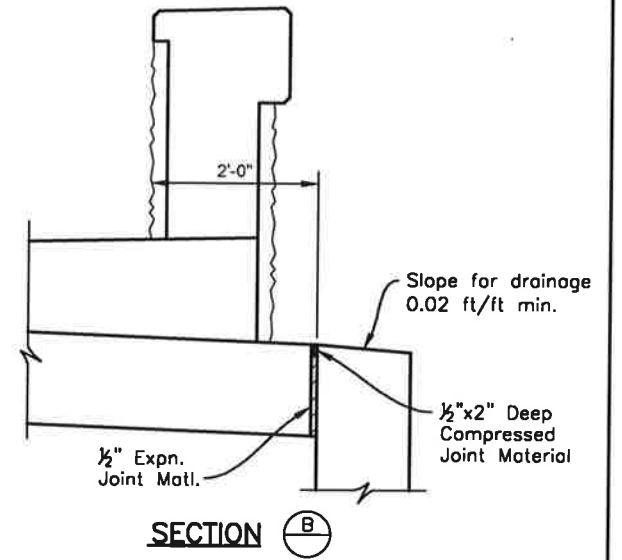
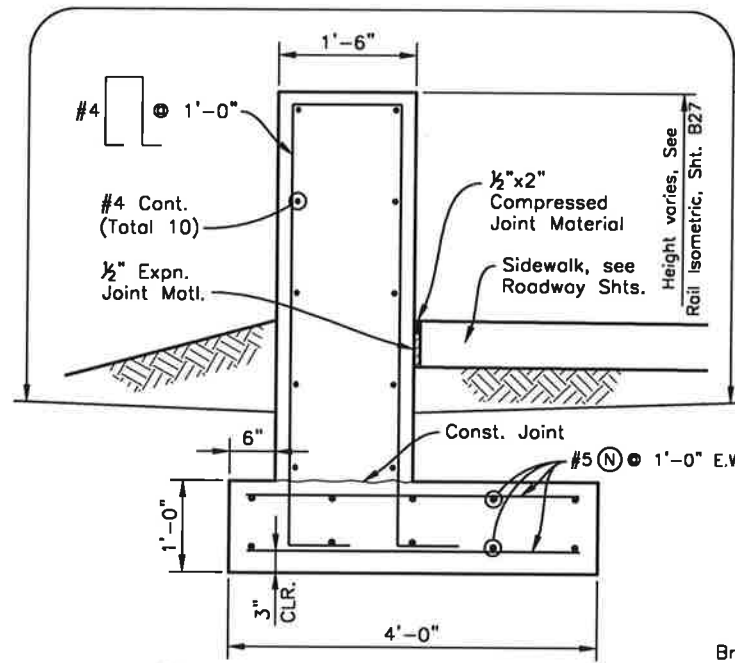
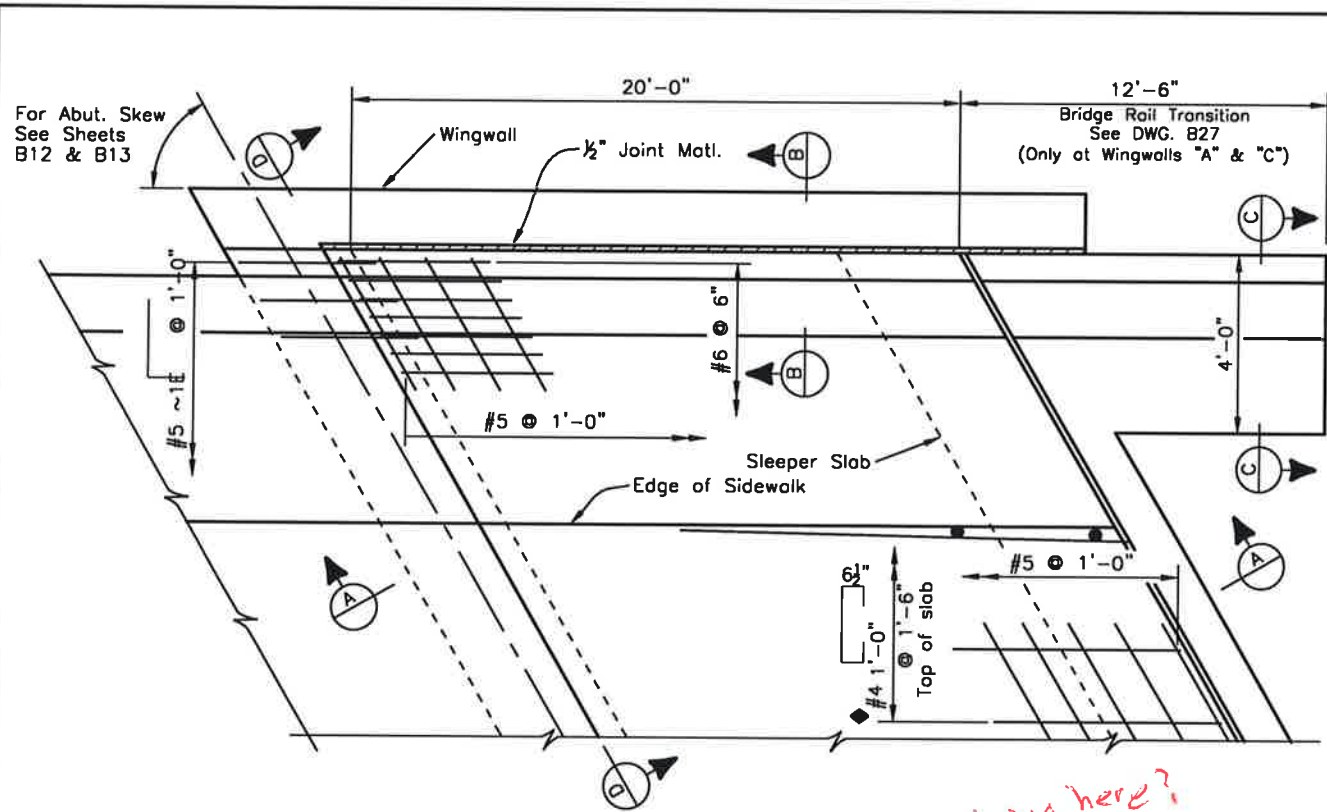
Detailer: C. MIYAMOTO

Subset: BRIDGE

**Project No./Code**

Sheet Number **40**

Structure Numbers  
Sheets: B30 of 32



*What doing here?*

*She'd probably saw cut & hot pour HMA*

*have never seen this done before... question the durability and life span why not hot pour - high maint. detail*

**NOTES:**

CONCRETE CLASS D (BRIDGE) SHALL BE USED FOR APPROACH SLABS.  
 1/2" EXPANSION JOINT MATERIAL SHALL MEET AASHTO SPEC. M213.  
 FOR BRIDGE RAIL DETAILS SEE SHT. B27.  
**COMPRESSED JOINT MATERIAL**  
 COMPRESSED JOINT MATERIAL SHALL BE PRE-COMPRESSED, CHEMICALLY RESISTANT, OPEN CELL POLYURETHANE FOAM SEALANT, IMPREGNATED WITH A WATER-REPELLANT MATERIAL, WITH ADHESIVE BACKING ON BOTH SIDES. THE JOINT MATERIAL SHALL BE EPOXIED IN PLACE, AND ALL SPLICES SEALED, AS RECOMMENDED BY THE SUPPLIER OF THE COMPRESSED JOINT MATERIAL. THE COST SHALL BE INCLUDED IN THE COST OF ITEM 601 CLASS D CONCRETE.

**ACCEPTABLE COMPRESSED JOINT MATERIAL ALTERNATES**

- WILL-SEAL
- SEAL-MATE #517
- POLY-TITE "N"

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As Constructed	BELFORD-HAPPY CANYON CREEK BRIDGE APPROACH SLAB DETAILS		Project No./Code
No Revisions:	Designer: J. LYNCH	Structure Numbers	
Revised:	Detailer: C. MIYAMOTO		
Void:	Subset: BRIDGE	Sheets: B31 of 32	Sheet Number 41