

STATE OF OKLAHOMA  
GRAND RIVER DAM AUTHORITY

PLAN OF PROPOSED  
**STATE HIGHWAY**  
PROJECT NO. 41806  
BRIDGE WIDENING AND REHABILITATION  
SH 28  
**MAYES COUNTY**  
CONTROL SECTION 28-49-16

BRIDGE A LOCATION NO. 4916-1450X,  
BRIDGE B LOCATION NO. 4916-1628X,  
BRIDGE C LOCATION NO. 4916-1651X  
NBI NOS. 27569,29642 AND 29645

GRAND RIVER DAM AUTHORITY

60%  
PLANS  
W/ COMMENTS INCORPORATED  
JUNE 2018

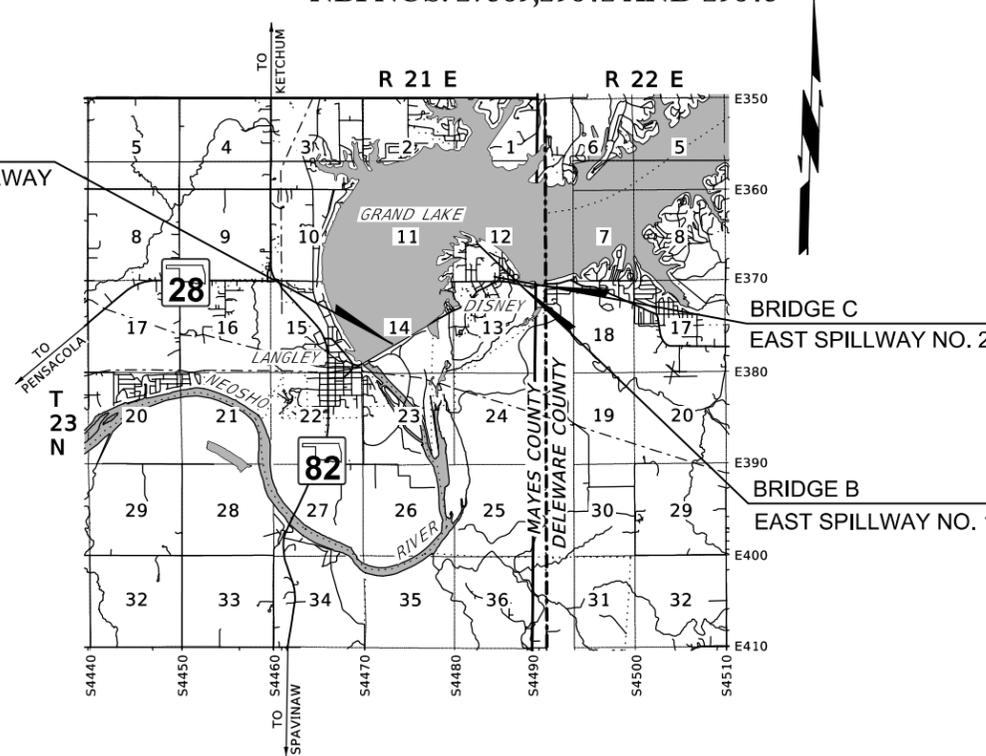
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**DESIGN DATA**

AADT 2017	2300
AADT 2037	3300
K (DHV / ADT-TWO WAY)	11%
D (DIRECTIONAL DIST.)	58%
T (% OF DHV)	11%
T (% OF AADT)	14%
T <sub>3</sub> OVERLOADS (AXLES)	7%
20-YR FLEX ESALS	1.97 MIL
SH 28	V=65 MPH

BRIDGE A  
MAIN DAM & SPILLWAY

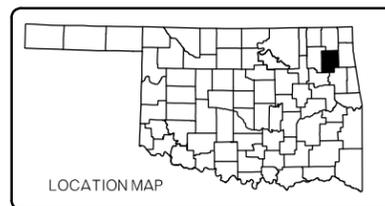


SCALES

PLAN	1" = 50'
PROFILE HOR.	1" = 50'
VER.	1" = 5'
LAYOUT MAP	1" = 3000'

CONVENTIONAL SYMBOLS

- PROPOSED ROAD
- RAILROADS
- RANGE & TOWNSHIP
- SECTION LINES
- QUARTER SECTION LINES
- FENCES
- GROUND LINE
- EXISTING ROADS
- BASE LINE
- GRADE LINES
- TELEPHONE & TELEGRAPH
- POWER LINES
- BUILDINGS
- OILWELL
- DRAINAGE STRUCTURES - IN PLACE
- DRAINAGE STRUCTURES - NEW
- RIGHT-OF-WAY LINES - EXISTING
- RIGHT-OF-WAY LINES - NEW
- CONTROLLED ACCESS
- RIGHT-OF-WAY FENCE



NOTE: PROJECT LENGTH BASED ON PENSACOLA DAM STATIONING.

BRIDGE A LENGTH	5678.67	FT.	1.075	MI.
BRIDGE B LENGTH	451.00	FT.	0.085	MI.
BRIDGE C LENGTH	410.00	FT.	0.077	MI.
ROADWAY LENGTH	00.00	FT.	0.000	MI.
PROJECT LENGTH	1.237			MI.

EQUATIONS : NONE  
EXCEPTIONS : NONE

THE FOLLOWING ODOT STANDARDS WILL BE REQUIRED

( TO BE ADDED AT LATER DATE )

CERTIFICATE OF AUTHORIZATION NO. 7569 P.E., L.S. RENEWAL DATE 6-30-18



Benham Design, LLC  
One West Third Street, Suite 200  
Tulsa, Oklahoma 74103  
(918) 492-1600

Susan Owen Tryon, P.E.  
OK P.E. NO. 15852  
PROJECT MANAGER  
DATE :

GRAND RIVER DAM AUTHORITY	
DATE APPROVED	DATE APPROVED
BY	BY
CHIEF ENGINEER	DIVISION ADMINISTRATOR
SWO N/A	PROJECT NO. 41806
COUNTY MAYES	HIGHWAY SH-28 SHEET NO. 0001

JOB NO. 41806		BRIDGE "A" PAY ITEMS		NBI NO. 27569	
0200 BRIDGE A					
REPAIR EXISTING BRIDGE WITH 51 ARCH SECTIONS @ 84', 21 GRAVITY OVERFLOW SECTIONS @ 41', AND 11 GRAVITY NON-OVERFLOW SECTIONS; 19'-8" CLEAR ROADWAY, SKEW 0°, CONCRETE PARAPETS AT $\pm$ STA. 38+68.85 SH 28 MAIN BRIDGE OVER PENSACOLA DAM & SPILLWAY.					
ITEM NO.	CODE NO.	DESCRIPTION	NOTES	UNIT	TOTAL
303(A)	2100	AGGREGATE BASE TYPE A		CY	20
307(K)	4300	STABILIZED SUBGRADE		SY	100
407(B)	0250	TACK COAT		GAL	8
411(C)	5950	SUPERPAVE, TYPE S4(PG 76-28 OK)		TON	15
414(B)	5725	DOWEL JOINTED P.C.C. PAVT. (PLACEMENT)		SY	100
414(G)	5275	P.C. CONCRETE FOR PAVFMENT		CY	250
503(A)	xxxx	PRESTRESSED BOX BEAMS (TEXAS)	(BR-1)	LF	4284
503(A)	xxxx	ARCH BEAM	(BR-1)	EA	51
503(A)	1313	PRESTRESSED CONCRETE BEAMS (TYPE IV)	(BR-1)	LF	1312
504(D)	6245	CONCRETE RAIL (TR3)	(BR-1)	LF	215
504(D)	xxxx	CONCRETE RAIL TYPE C411 (TEXAS)	(BR-1)	LF	5600
506(A)	1322	STRUCTURAL STEEL		LB	6810
509	xxxx	SPECIAL CONCRETE FINISH (BLEND CFRP TO EXISTING)		SY	12420
509(A)	1326	CLASS AA CONCRETE	(BR-1)	CY	3925
509(B)	1328	CLASS A CONCRETE	(BR-1)	CY	66
511(B)	6010	EPOXY COATED REINFORCING STEEL	(BR-1)	LBS	915400
520(A)	6058	PREPARATION OF CRACKS, ABOVE WATER		LF	3000
520(C)	6060	EPOXY RESIN, ABOVE WATER		GAL	250
521(A)	6210	PNEUMATICALLY PLACED MORTAR		SY	1000
523(A)	6550	SEALER CRACK PREPARATION		LF	5853
523(B)	6560	SEALER RESIN		GAL	65
524(A)	6610	(SP) CARBON FIBER-REINFORCED POLYMER		SF	16000
535	6130	(SP) CORROSION INHIBITOR (SURFACE APPLIED)		SY	1000
540	4515	(PL) REPAIR BRIDGE ITEM (TYPE A)	(BR-2)	EA	20
540	4525	(PL) REPAIR BRIDGE ITEM (TYPE B)	(BR-3)	EA	20
616(B)	xxxx	4" POLYVINYL CHLORIDE (PVC) PIPE	(BR-1,4)	LF	1088
619(B)	2500	REMOVAL OF BRIDGE ITEMS	(BR-5)	LSUM	1
623(A)	0932	BEAM GUARDRAIL W-BEAM SINGLE		LF	137.5
623(G)	8590	GUARDRAIL END TREATMENT (31")		EA	2
623(I)	8700	GUARDRAIL BRIDGE CONN-THRIE BEAM (31")		EA	2
871(A)	8325	IMPACT ATTENUATOR		EA	2
880(J)	8905	CONSTRUCTION TRAFFIC CONTROL		LSUM	1

JOB NO. 41806		BRIDGE "B" PAY ITEMS		NBI NO. 29642	
0201 BRIDGE B					
REPAIR BRIDGE WITH 11 CONCRETE GIRDER SPANS @ 41', 20'-0" CLEAR ROADWAY, SKEW 0°, CONCRETE PARAPETS AT $\pm$ STA. 2+25.50 SH 28 OVER EAST SPILLWAY NO. 1					
ITEM NO.	CODE NO.	DESCRIPTION	NOTES	UNIT	TOTAL
303(A)	2100	AGGREGATE BASE TYPE A		CY	25
307(K)	4300	STABILIZED SUBGRADE		SY	100
407(B)	0250	TACK COAT		GAL	8
411(C)	5950	SUPERPAVE, TYPE S4(PG 76-28 OK)		TON	98
414(B)	5725	DOWEL JOINTED P.C.C. PAVT. (PLACEMENT)		SY	100
414(G)	5275	P.C. CONCRETE FOR PAVEMENT		CY	250
503(A)	1313	PRESTRESSED CONCRETE BEAMS (TYPE IV)	(BR-1)	LF	451
504(D)	xxxx	CONCRETE RAIL TYPE C411 (TEXAS)	(BR-1)	LF	451
506(A)	1322	STRUCTURAL STEEL		LB	475
509	xxxx	SPECIAL CONCRETE FINISH (BLEND CFRP TO EXISTING)		SY	1013
509(A)	1326	CLASS AA CONCRETE	(BR-1)	CY	414
511(B)	6010	EPOXY COATED REINFORCING STEEL	(BR-1)	LBS	229400
520(A)	6058	PREPARATION OF CRACKS, ABOVE WATER		LF	25
520(C)	6060	EPOXY RESIN, ABOVE WATER		GAL	2
521(A)	6210	PNEUMATICALLY PLACED MORTAR		SY	20
523(A)	6550	SEALER CRACK PREPARATION		LF	50
523(B)	6560	SEALER RESIN		GAL	1
524(A)	6610	(SP) CARBON FIBER-REINFORCED POLYMER	(BR-1)	SF	1400
535	6130	(SP) CORROSION INHIBITOR (SURFACE APPLIED)		SY	20
540	4515	(PL) REPAIR BRIDGE ITEM (TYPE A)	(BR-2)	EA	5
616(B)	xxxx	4" POLYVINYL CHLORIDE (PVC) PIPE	(BR-1,4)	LF	120
619(B)	2500	REMOVAL OF BRIDGE ITEMS	(BR-5)	LSUM	1
623(A)	0932	BEAM GUARDRAIL W-BEAM SINGLE		LF	100
623(G)	8590	GUARDRAIL END TREATMENT (31")		EA	4
623(I)	8700	GUARDRAIL BRIDGE CONN-THRIE BEAM (31")		EA	4
880(J)	8905	CONSTRUCTION TRAFFIC CONTROL		LSUM	1

JOB NO. 41806		BRIDGE "C" PAY ITEMS		NBI NO. 29645	
0202 BRIDGE C					
REPAIR BRIDGE WITH 10 CONCRETE GIRDER SPANS @ 41', 20'-0" CLEAR ROADWAY, SKEW 0°, CONCRETE PARAPETS AT $\pm$ STA. 2+05.00 SH 28 OVER EAST SPILLWAY NO. 2					
ITEM NO.	CODE NO.	DESCRIPTION	NOTES	UNIT	TOTAL
303(A)	2100	AGGREGATE BASE TYPE A		CY	25
307(K)	4300	STABILIZED SUBGRADE		SY	100
407(B)	0250	TACK COAT		GAL	8
411(C)	5950	SUPERPAVE, TYPE S4(PG 76-28 OK)		TON	98
414(B)	5725	DOWEL JOINTED P.C.C. PAVT. (PLACEMENT)		SY	100
414(G)	5275	P.C. CONCRETE FOR PAVEMENT		CY	250
503(A)	1313	PRESTRESSED CONCRETE BEAMS (TYPE IV)	(BR-1)	LF	410
504(D)	xxxx	CONCRETE RAIL TYPE C411 (TEXAS)	(BR-1)	LF	410
506(A)	1322	STRUCTURAL STEEL		LB	440
509	xxxx	SPECIAL CONCRETE FINISH (BLEND CFRP TO EXISTING)		SY	904
509(A)	1326	CLASS AA CONCRETE	(BR-1)	CY	380
511(B)	6010	EPOXY COATED REINFORCING STEEL	(BR-1)	LBS	176800
520(A)	6058	PREPARATION OF CRACKS, ABOVE WATER		LF	25
520(C)	6060	EPOXY RESIN, ABOVE WATER		GAL	2
521(A)	6210	PNEUMATICALLY PLACED MORTAR		SY	20
523(A)	6550	SEALER CRACK PREPARATION		LF	50
523(B)	6560	SEALER RESIN		GAL	1
524(A)	6610	(SP) CARBON FIBER-REINFORCED POLYMER	(BR-1)	SF	1250
535	6130	(SP) CORROSION INHIBITOR (SURFACE APPLIED)		SY	20
540	4515	(PL) REPAIR BRIDGE ITEM (TYPE A)	(BR-2)	EA	5
616(B)	xxxx	4" POLYVINYL CHLORIDE (PVC) PIPE	(BR-1,4)	LF	110
619(B)	2500	REMOVAL OF BRIDGE ITEMS	(BR-5)	LSUM	1
623(A)	0932	BEAM GUARDRAIL W-BEAM SINGLE		LF	300
623(G)	8590	GUARDRAIL END TREATMENT (31")		EA	4
623(I)	8700	GUARDRAIL BRIDGE CONN-THRIE BEAM (31")		EA	4
880(J)	8905	CONSTRUCTION TRAFFIC CONTROL		LSUM	1

JOB NO. 41806		CONSTRUCTION PAY ITEMS			
0600 STAKING					
ITEM NO.	CODE NO.	DESCRIPTION	NOTE	UNIT	TOTAL
642(B)	0096	CONSTRUCTION STAKING LEVEL II	(BR-11)	LSUM	1

JOB NO. 41806		CONSTRUCTION PAY ITEMS			
0640 CONSTRUCTION					
ITEM NO.	CODE NO.	DESCRIPTION	NOTE	UNIT	TOTAL
220	2800	SWPPP DOCUMENTATION AND MANAGEMENT		LSUM	1
640(A)	1398	FIELD OFFICE		EA	1
641	1399	MOBILIZATION		LSUM	1

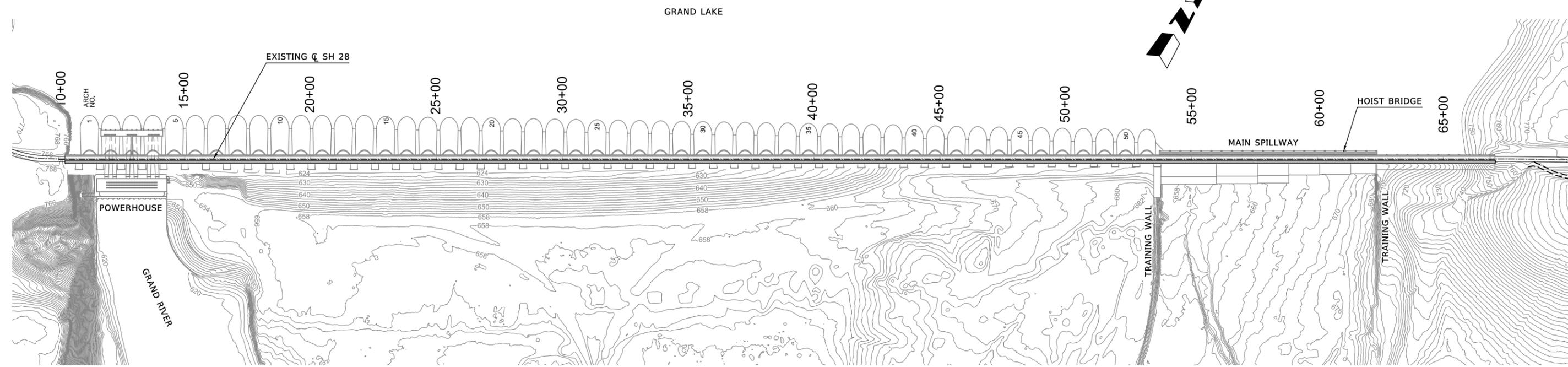
**PAY ITEM NOTES**

- (BR-1) PAY PLAN QUANTITY PER SECTION 109.01(B) OF THE STANDARD SPECIFICATIONS.
- (BR-2) REMOVE AND REPLACE CATWALK AND HANDRAIL. REPAIR DAMAGE AT PIER AS NECESSARY TO BE USED AT THE DISCRETION OF GRDA.
- (BR-3) REMOVE AND REPLACE A MAXIMUM OF 3 LINEAR FEET OF UPSTREAM LONGITUDINAL GIRDER AT HINGE POINTS. INCLUDE ALL COSTS INCLUDING ENGINEERING FALSEWORK AND OTHER INCIDENTALS NECESSARY TO COMPLETE THE WORK. TO BE USED AT THE DISCRETION OF GRDA.
- (BR-4) PIPE FOR DECK DRAINS, INCLUDE ALL COSTS OF RESETTING DECK DRAINS TO FINISH GRADE.
- (BR-5) REMOVAL OF BRIDGE ITEMS SHALL INCLUDE:
  - REMOVAL OF EXISTING PARAPET.
  - REMOVAL OF EXISTING CONCRETE DECK FROM BEGIN/END OF BRIDGE AT THE ABUTMENTS.
  - REMOVAL OF EXISTING CONCRETE AT PIERS, BUTTRESSES AND ABUTMENTS AS SHOWN IN THE PLANS.

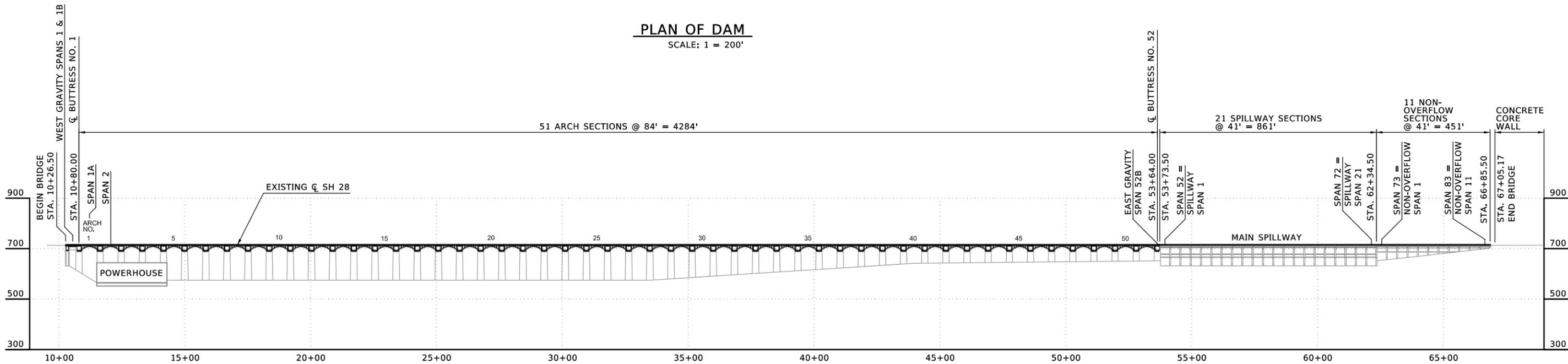
GRAND RIVER DAM AUTHORITY  
**60%**  
 PLANS  
 W/ COMMENTS INCORPORATED  
 JUNE 2018

DESIGN	MKR	3/17	GRAND RIVER DAM AUTHORITY
DRAWN	JT	3/17	
CHECKED	STF	6/17	
APPROVED	SOT	2/18	
SQUAD	BENHAM		
COUNTY	MAYES		
HIGHWAY SH-28			STATE JOB NO. 41806
			SHEET NO. 0002

**BRIDGE PAY ITEMS & NOTES**



**PLAN OF DAM**  
 SCALE: 1 = 200'



**DOWNSTREAM ELEVATION OF DAM**  
 SCALE: 1 = 200'

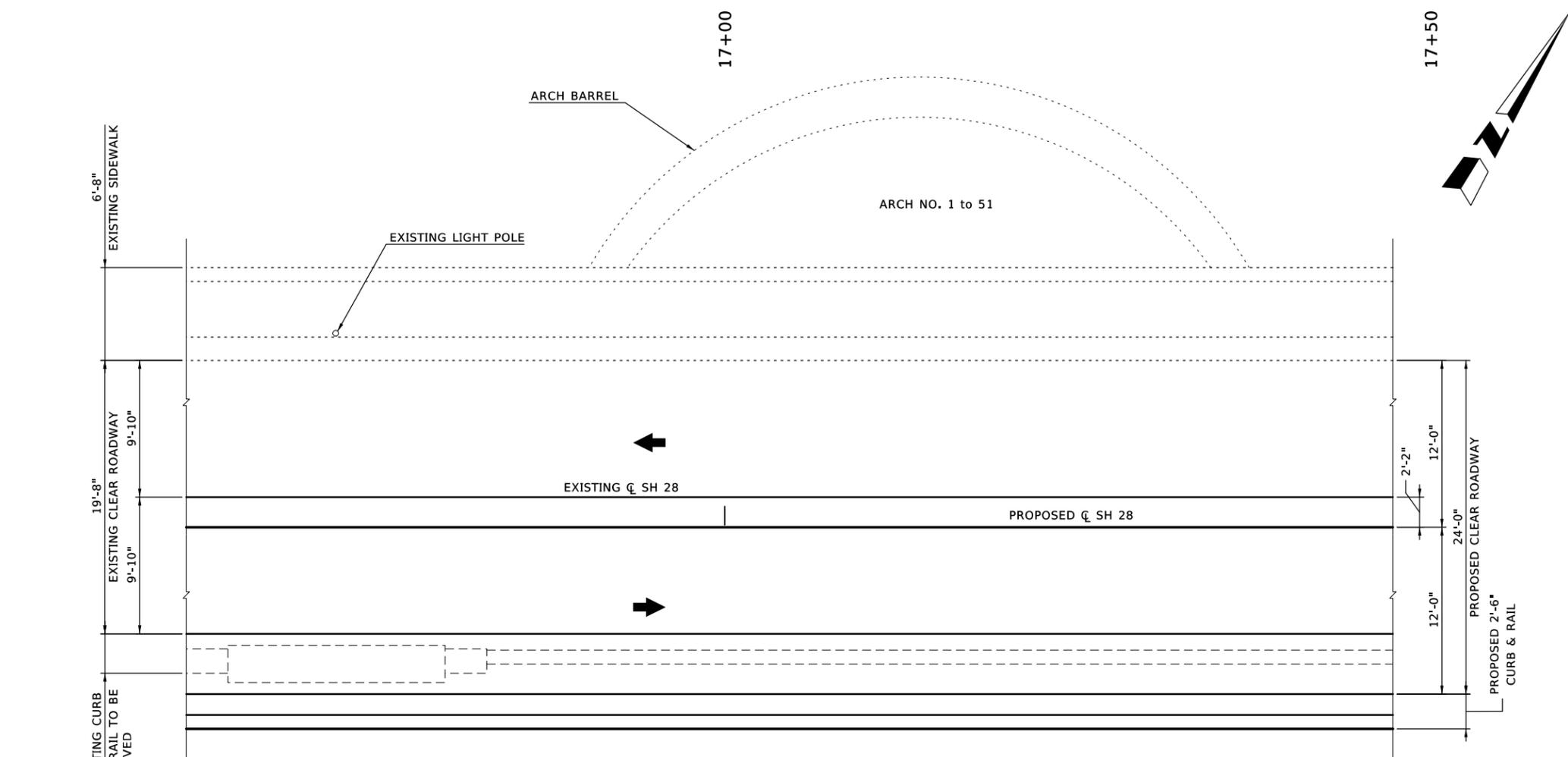
BRIDGE A

DESIGN	KSJ	2/18	GRAND RIVER DAM AUTHORITY <b>GENERAL DAM PLAN AND ELEVATION (1)</b> Q STA. 38+65.83
DRAWN	JLB	2/18	
CHECKED			
APPROVED	SOT	2/18	
SQUAD	BENHAM		
COUNTY	MAYES	HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0003	

6/29/2018

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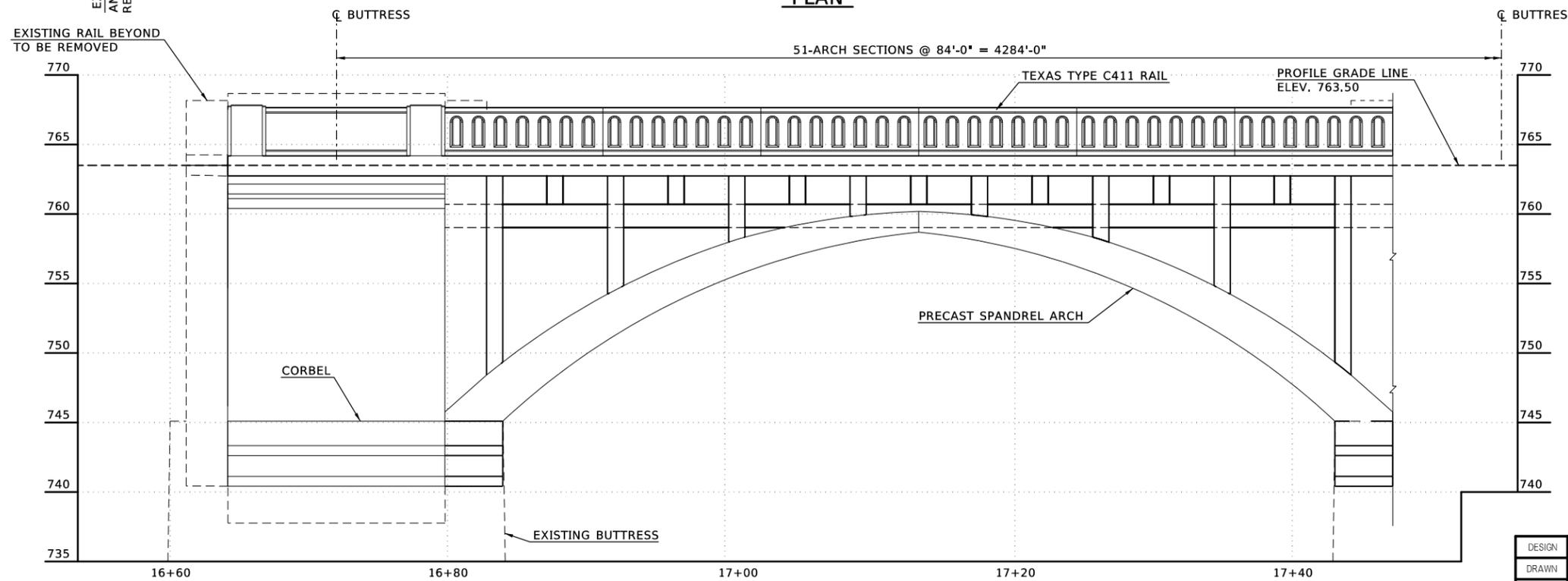
**DESIGN DATA**  
**NEW CONSTRUCTION**

**MATERIALS**  
 CONCRETE  
 CLASS AA  $f'_c = 4,000$  PSI  
 CLASS A  $f'_c = 3,000$  PSI  
 REINFORCING STEEL:  
 STRUCTURAL STEEL M270 (GRADE 50W)  $F_y = 60,000$  PSI  
 STAINLESS STEEL A240 (TYPE 316)  $F_y = 50,000$  PSI  
 STAINLESS STEEL A320; CLASS 2 (GRADE B8M)  $F_y = 30,000$  PSI  
 $F_y = 58,000$  PSI

**LOADING:**  
 H-20

**DESIGN:**  
 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION  
 ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE  
 ANSI/AWS D1.6 STRUCTURAL WELDING CODE-STAINLESS STEEL

**PLAN**



**NOTES:**

1. X

**ELEVATION - TYPICAL ARCH SECTION**

DESIGN			GRAND RIVER DAM AUTHORITY	
DRAWN			<b>GENERAL DAM PLAN AND ELEVATION (2)</b> <b>DOWNSTREAM WIDENING</b>	
CHECKED				
APPROVED	SOT	2/18		
SQUAD	BENHAM			
COUNTY	MAYES	HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0004		

BRIDGE A

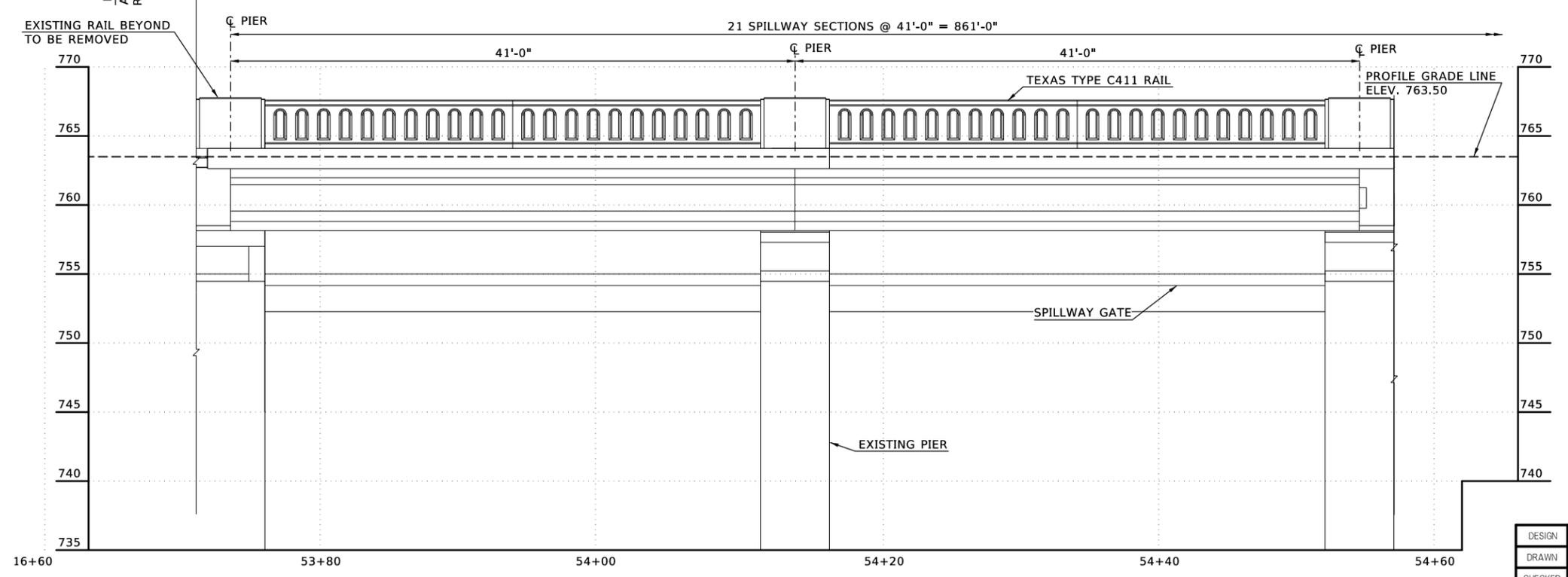
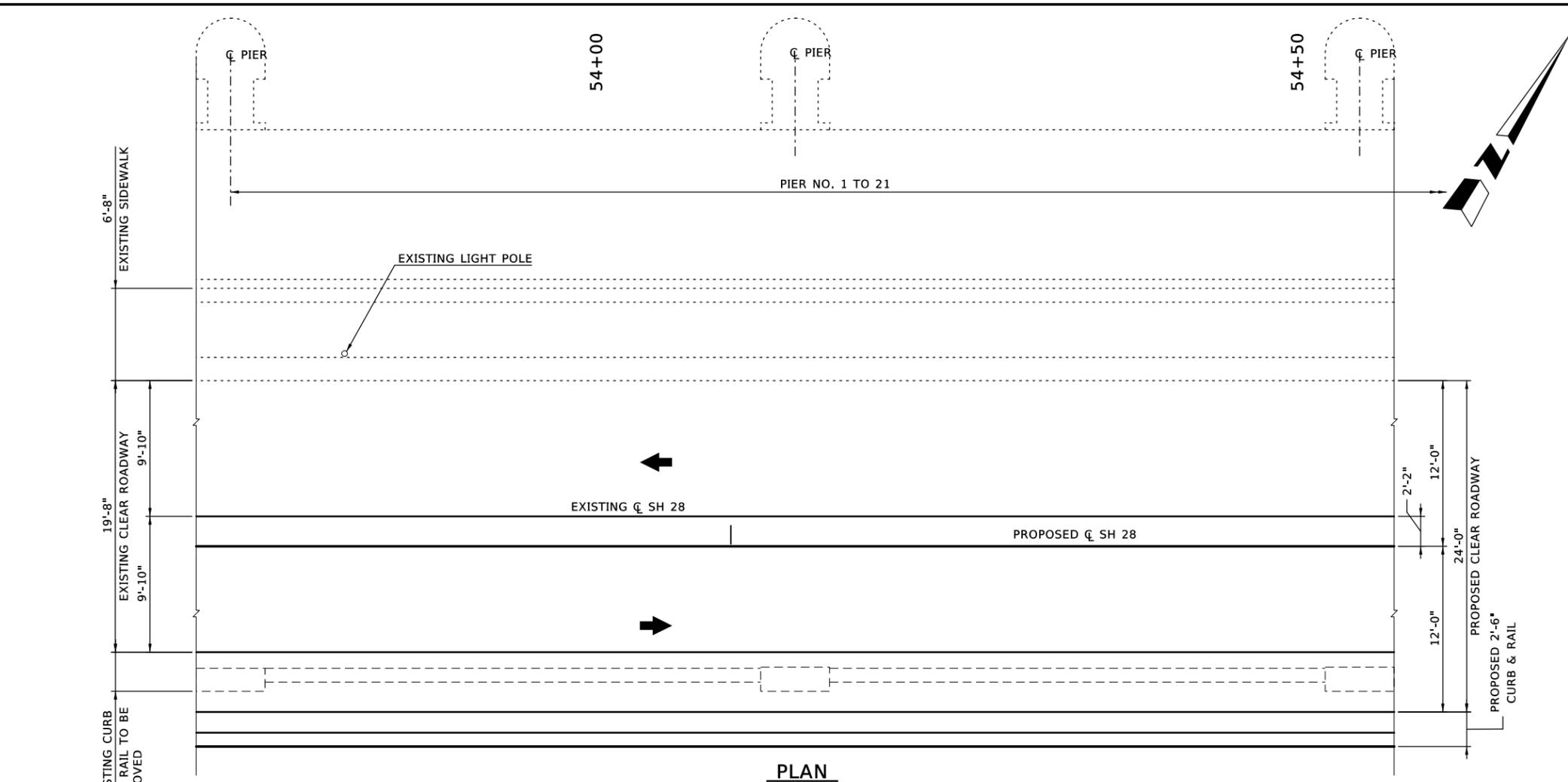
**DESIGN DATA**  
**NEW CONSTRUCTION**

**MATERIALS**

CONCRETE	
CLASS AA	$f_c = 4,000$ PSI
CLASS A	$f_c = 3,000$ PSI
REINFORCING STEEL:	
STRUCTURAL STEEL M270 (GRADE 50W)	$F_y = 60,000$ PSI
STAINLESS STEEL A240 (TYPE 316)	$F_y = 50,000$ PSI
STAINLESS STEEL A320; CLASS 2 (GRADE B8M)	$F_y = 30,000$ PSI
	$F_y = 58,000$ PSI

**LOADING:**  
 H-20

**DESIGN:**  
 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION  
 ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE  
 ANSI/AWS D1.6 STRUCTURAL WELDING CODE-STAINLESS STEEL



**NOTES:**  
 1. X

DESIGN			GRAND RIVER DAM AUTHORITY	
DRAWN			<b>GENERAL DAM PLAN AND ELEVATION (3)</b> <b>DOWNSTREAM WIDENING</b>	
CHECKED				
APPROVED	SOT	2/18		
SQUAD	BENHAM			
COUNTY	MAYES	HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0005		

BRIDGE A

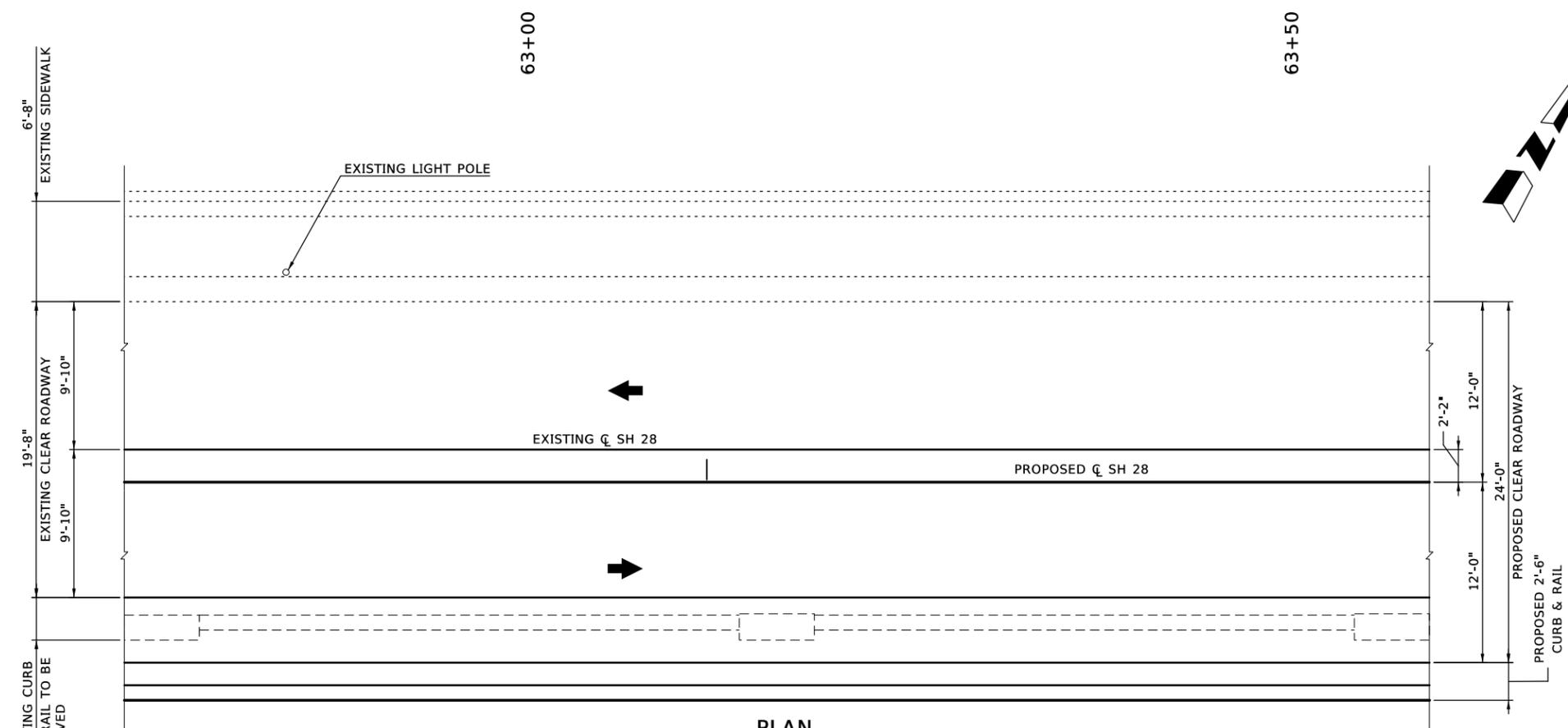
**DESIGN DATA**  
**NEW CONSTRUCTION**

**MATERIALS**

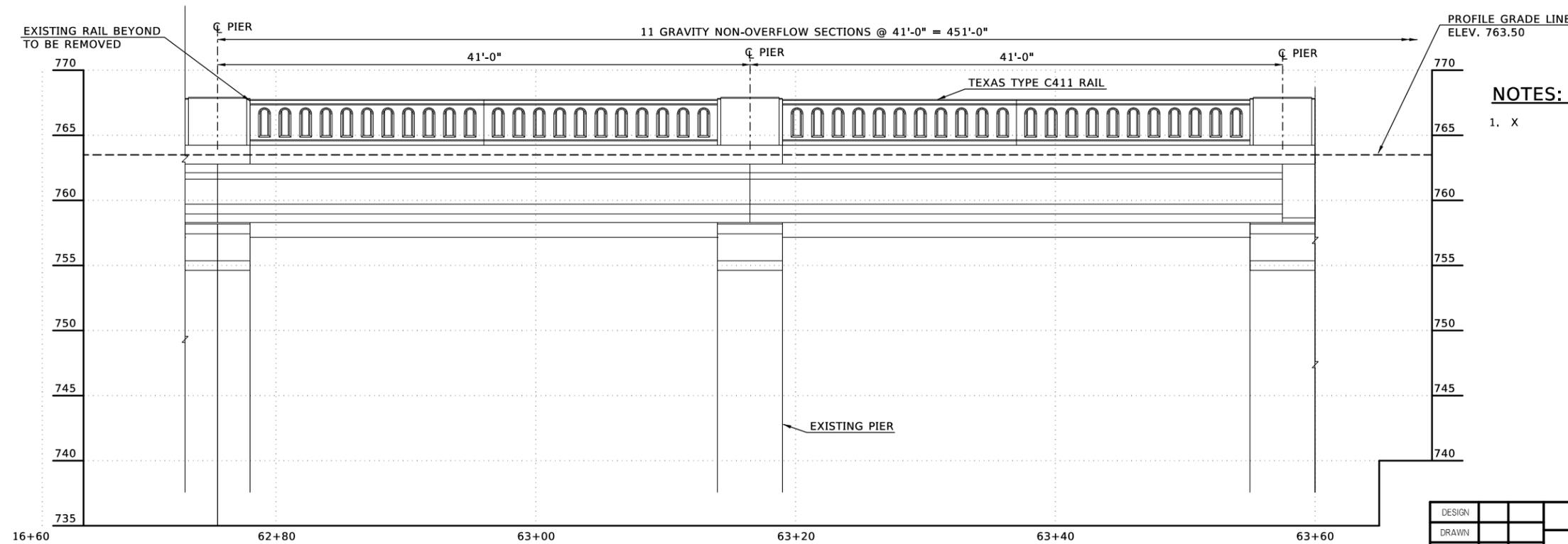
CONCRETE	
CLASS AA	$f'_c = 4,000$ PSI
CLASS A	$f'_c = 3,000$ PSI
REINFORCING STEEL:	$F_y = 60,000$ PSI
STRUCTURAL STEEL M270 (GRADE 50W)	$F_y = 50,000$ PSI
STAINLESS STEEL A240 (TYPE 316)	$F_y = 30,000$ PSI
STAINLESS STEEL A320; CLASS 2 (GRADE B8M)	$F_y = 58,000$ PSI

**LOADING:**  
 H-20

**DESIGN:**  
 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION  
 ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE  
 ANSI/AWS D1.6 STRUCTURAL WELDING CODE-STAINLESS STEEL



**PLAN**

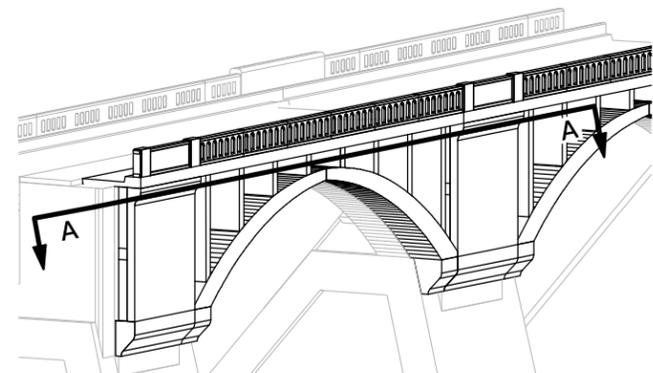


**ELEVATION - GRAVITY NON-OVERFLOW SECTION**

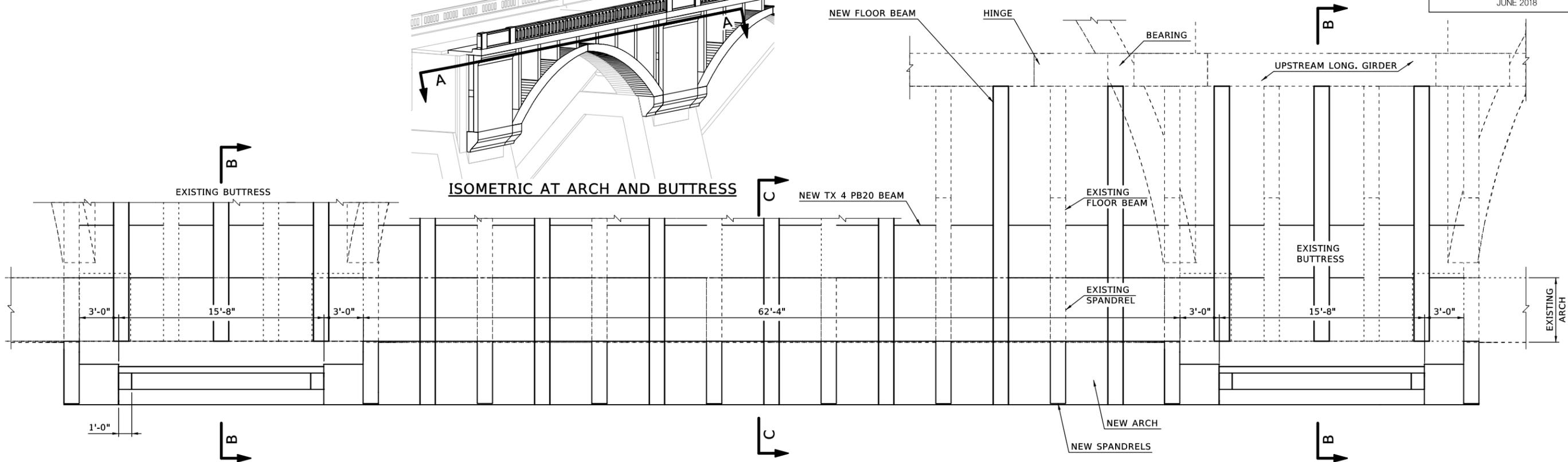
**NOTES:**  
 1. X

DESIGN			GRAND RIVER DAM AUTHORITY				
DRAWN			<b>GENERAL DAM PLAN AND ELEVATION (4)</b> <b>DOWNSTREAM WIDENING</b>				
CHECKED							
APPROVED	SOT	2/18					
SQUAD	BENHAM						
COUNTY	MAYES	HIGHWAY			SH-28	STATE JOB NO.	41806

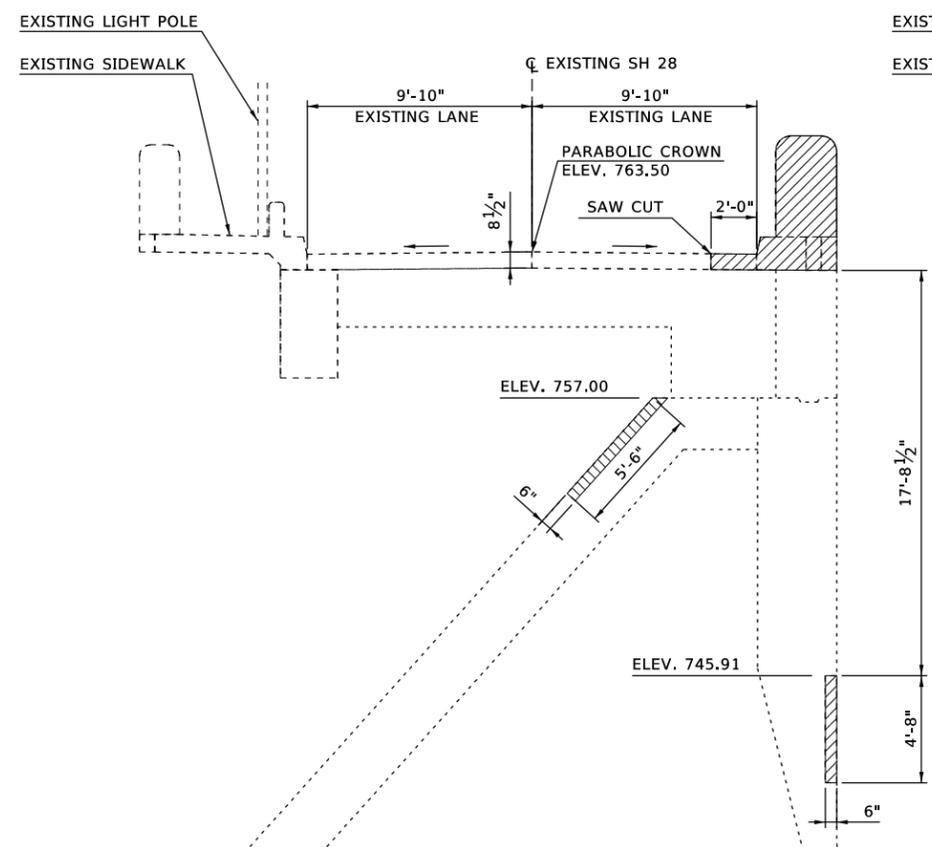
BRIDGE A



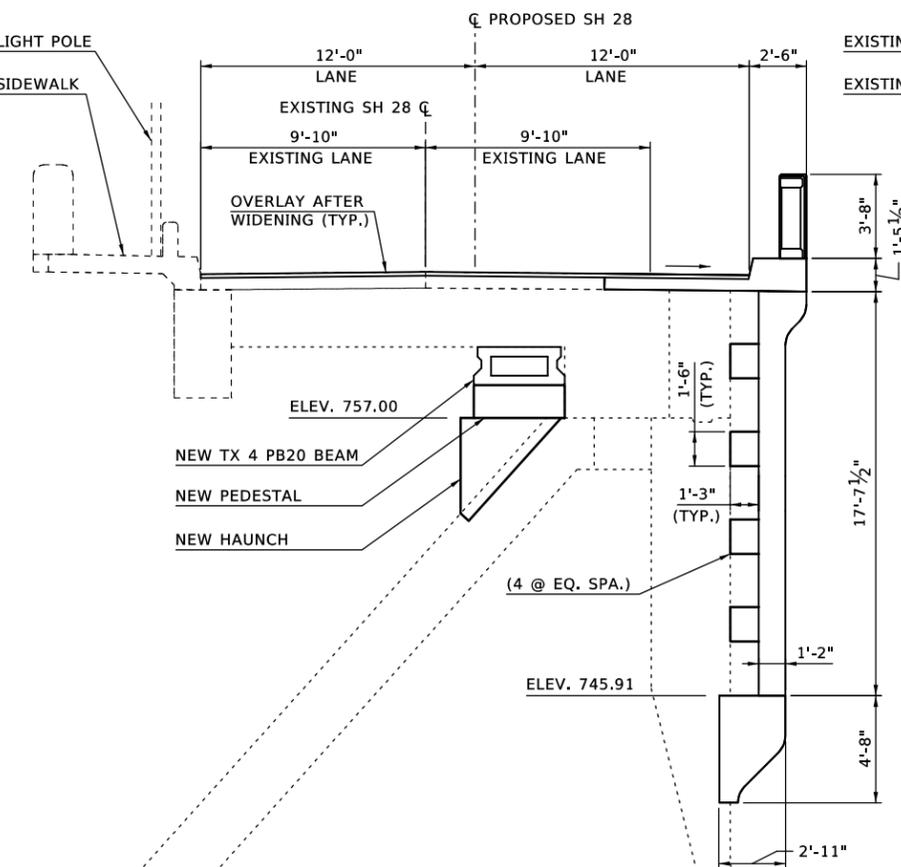
ISOMETRIC AT ARCH AND BUTTRESS



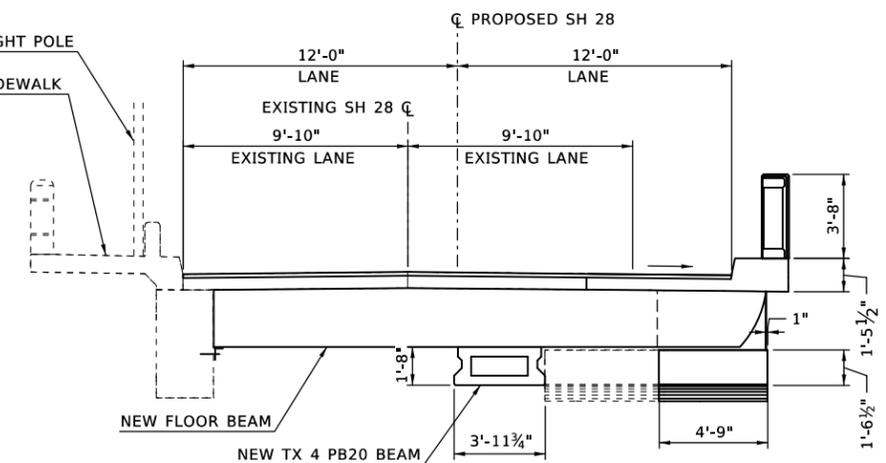
SECTION A-A



TYPICAL SECTION OF REMOVAL

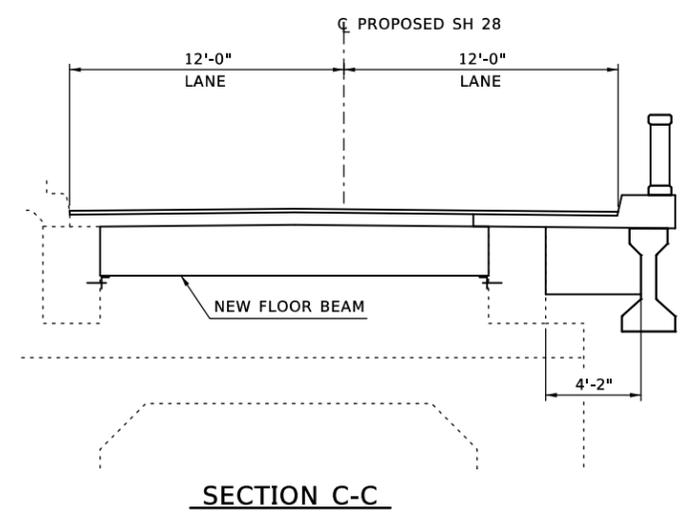
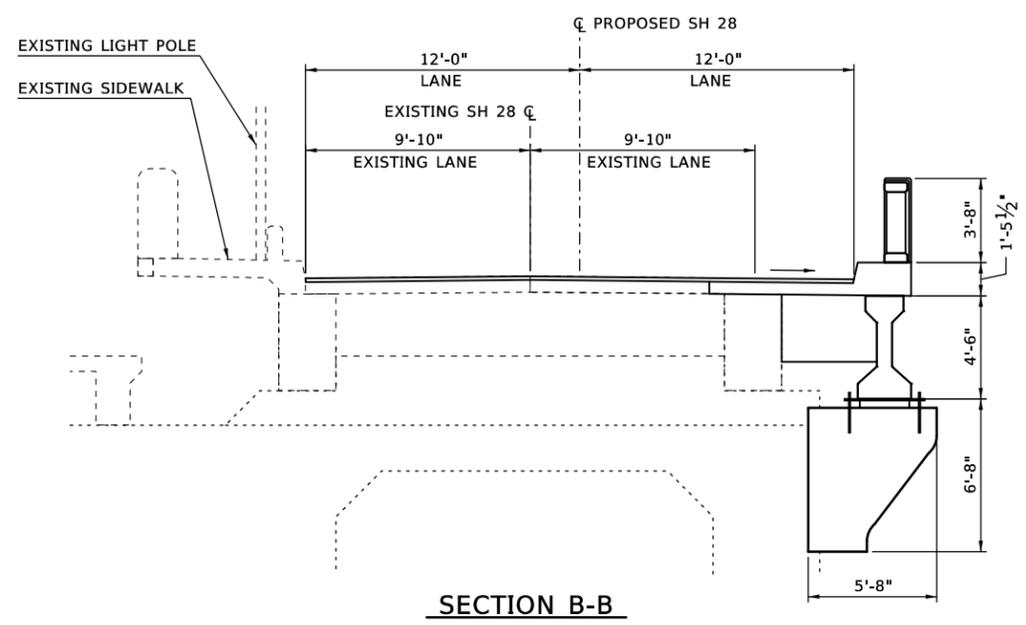
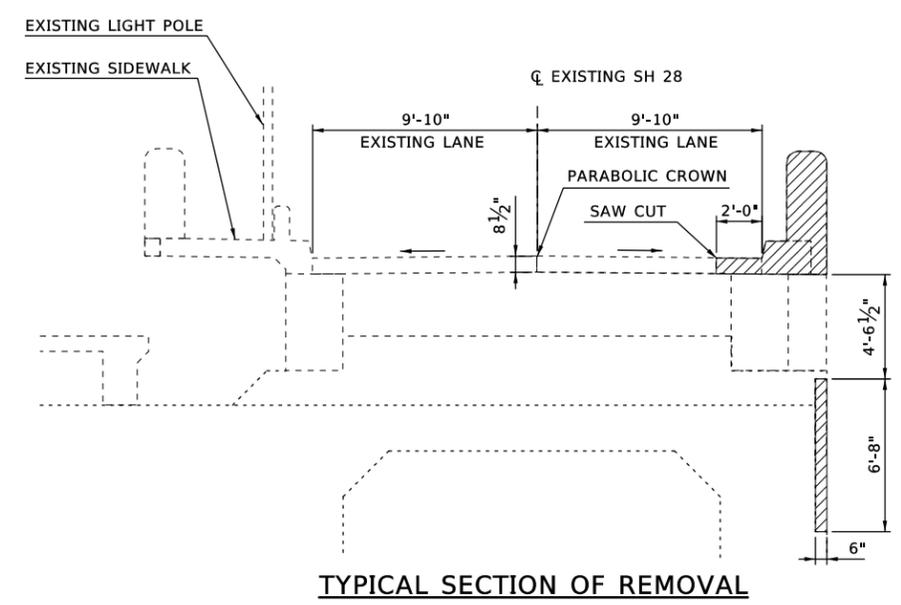
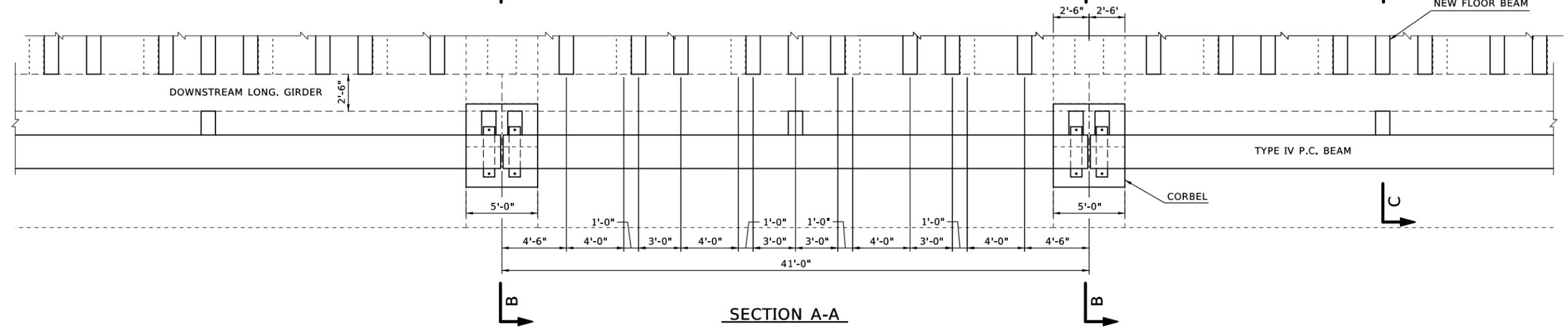
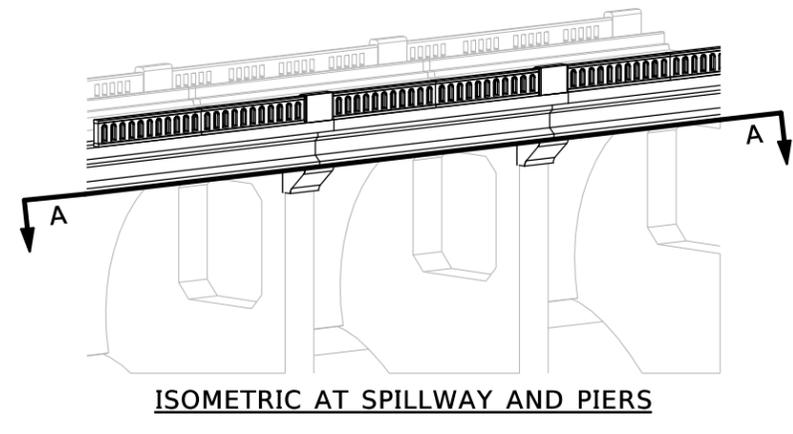


SECTION B-B



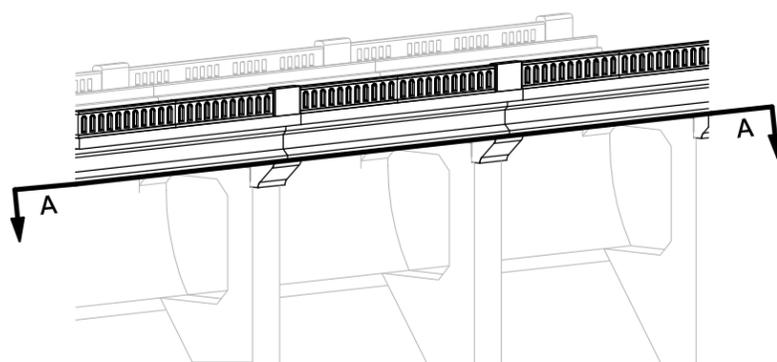
SECTION C-C

DESIGN			GRAND RIVER DAM AUTHORITY				
DRAWN			<b>MAIN DAM ARCH TYPICAL SECTION</b>				
CHECKED							
APPROVED	SOT	2/18					
SQUAD	BENHAM						
COUNTY	MAYES	HIGHWAY	SH-28	STATE JOB NO.	41806	SHEET NO.	0007

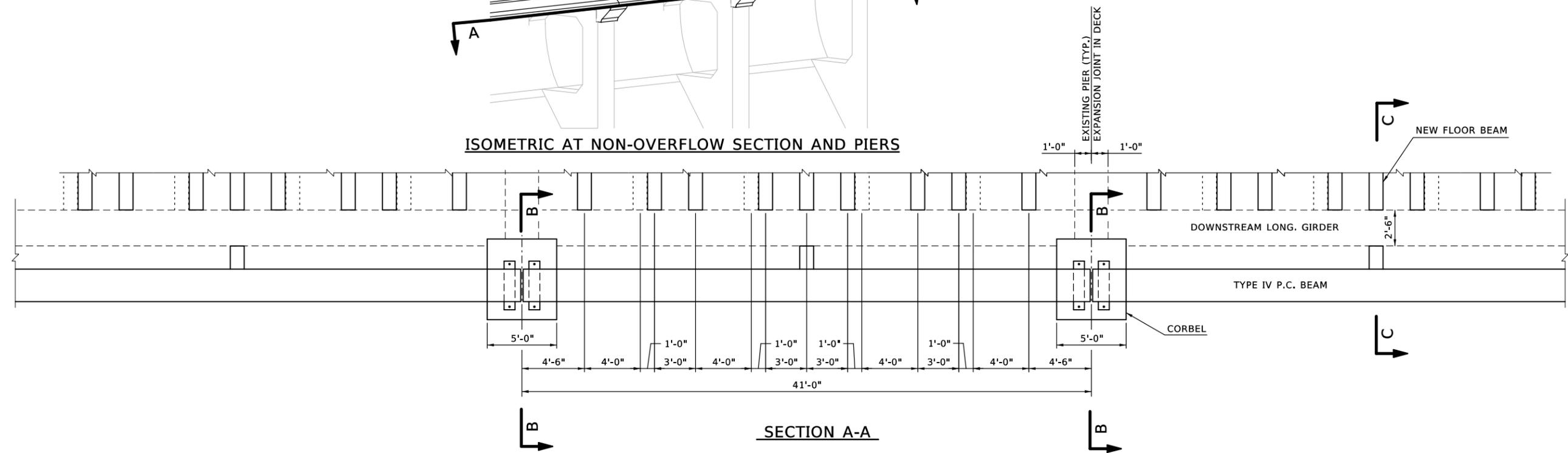


BRIDGE A

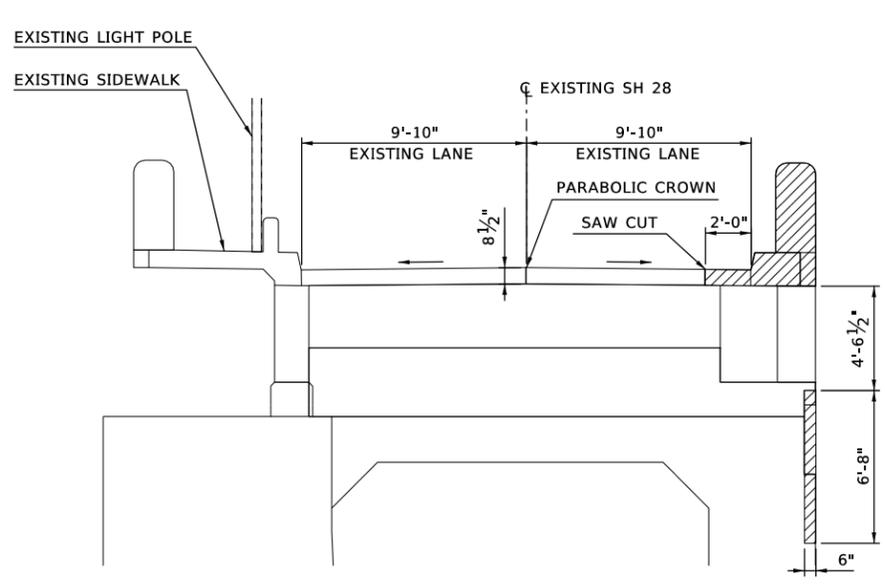
DESIGN		GRAND RIVER DAM AUTHORITY					
DRAWN		<b>MAIN DAM SPILLWAY TYPICAL SECTION</b>					
CHECKED							
APPROVED	SOT 2/18						
SQUAD	BENHAM						
COUNTY	MAYES	HIGHWAY	SH-28	STATE JOB NO.	41806	SHEET NO.	0008



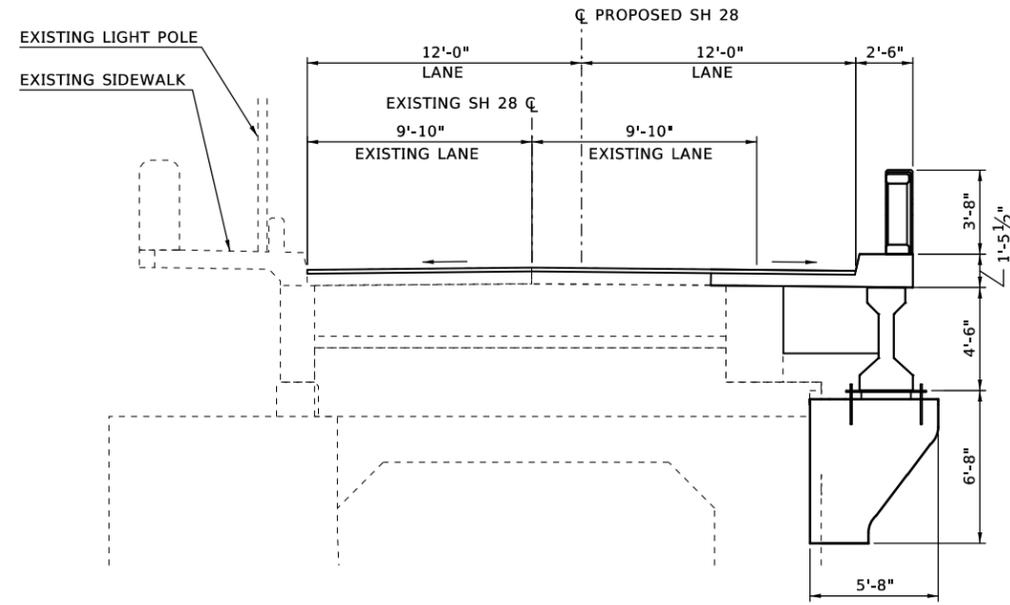
**ISOMETRIC AT NON-OVERFLOW SECTION AND PIERS**



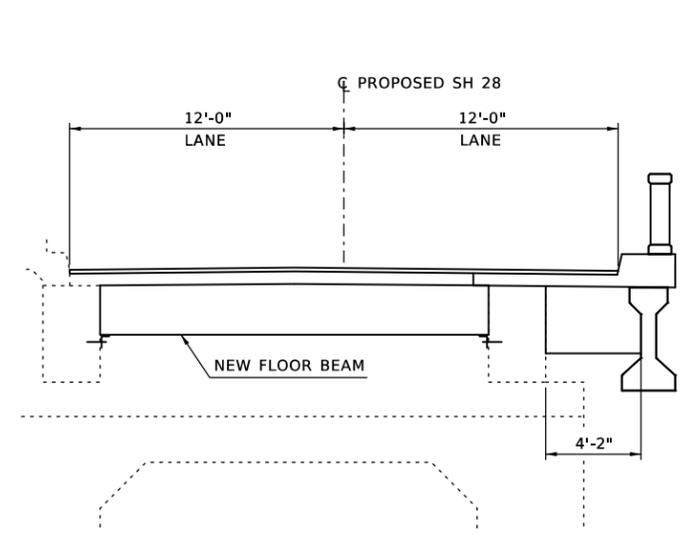
**SECTION A-A**



**TYPICAL SECTION OF REMOVAL**



**SECTION B-B**



**SECTION C-C**

P:\FIB\650-TUL\CIV\400204-GRDA-PensDam\20\_DESON\40\_CAD\5\Bridg A 41806 Main Dam NonOverflow Typical Sections.dwg 6/21/18 2:10 PM

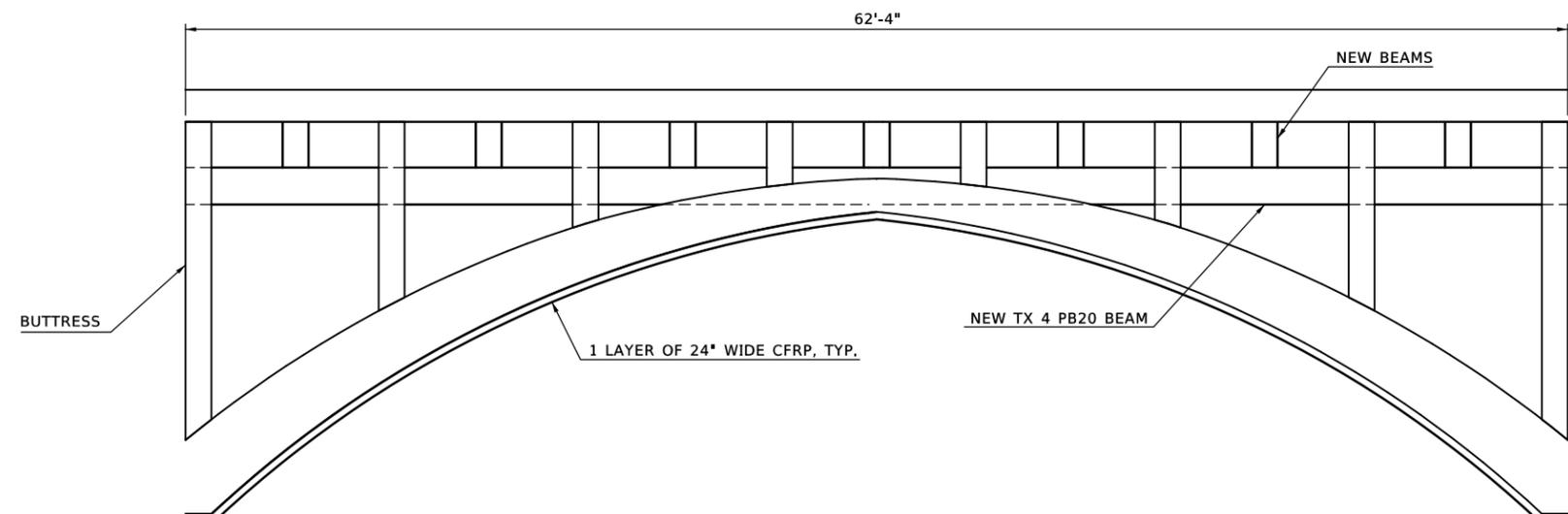
BRIDGE A

DESIGN		GRAND RIVER DAM AUTHORITY	
DRAWN		<b>MAIN DAM NON-OVERFLOW TYPICAL SECTION</b>	
CHECKED			
APPROVED	SOT 2/18		
SQUAD	BENHAM		
COUNTY	MAYES	HIGHWAY	SH-28
		STATE JOB NO.	41806
		SHEET NO.	0009

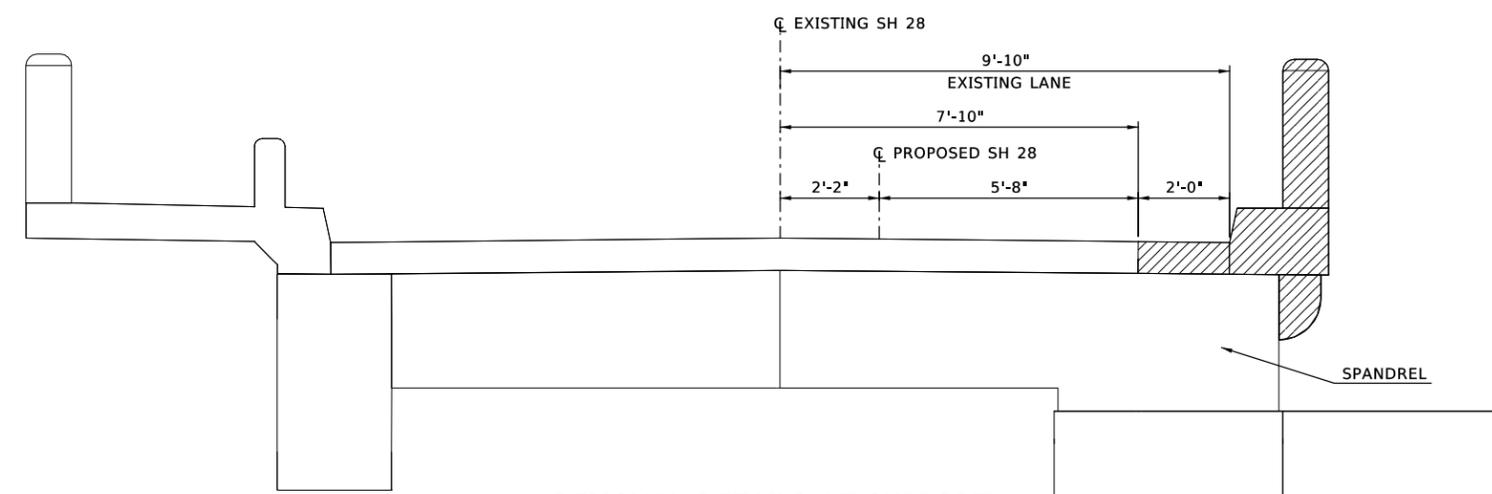
6/29/2018

2:26:23 PM

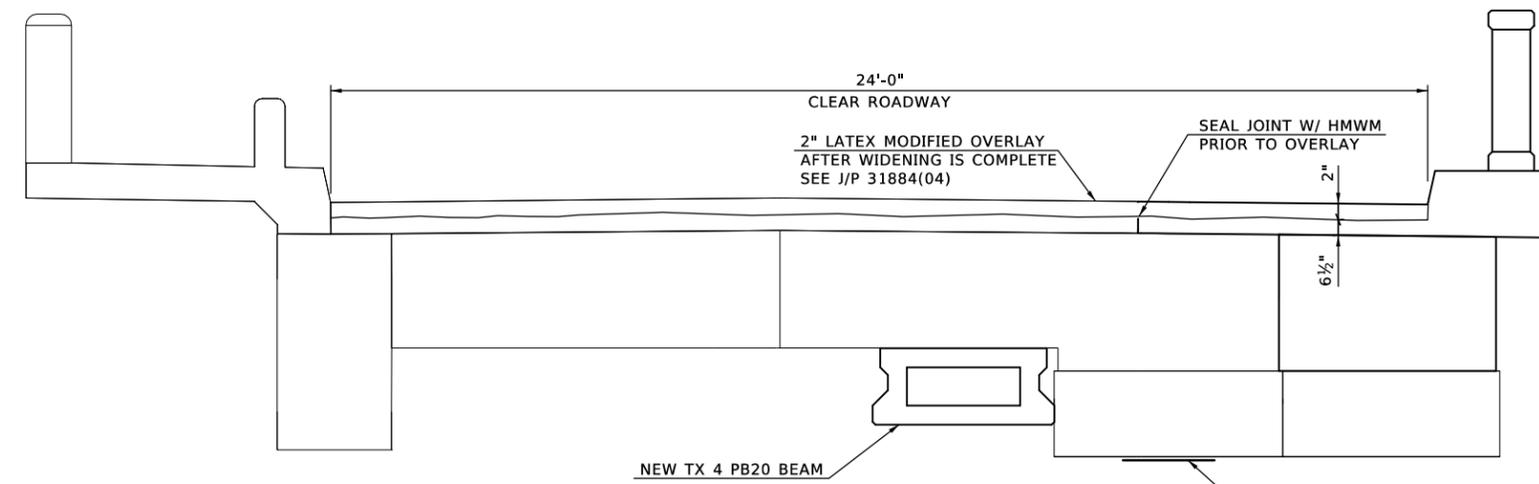
P:\FDB\650-TUL\CIV\400204-GRDA-PensDam\20\_DESIGN\40\_CAD\AS\Bridg A\4806 Superstructure Details Oldgn



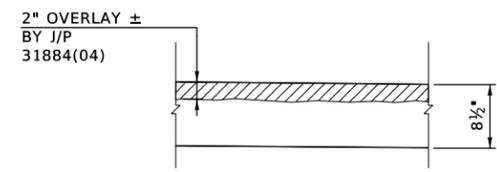
**LONGITUDINAL SECTION AT EXISTING ARCH SPANDREL**



**REMOVAL DETAILS AT SUPPORT**



**DECK SECTION AT SUPPORT**



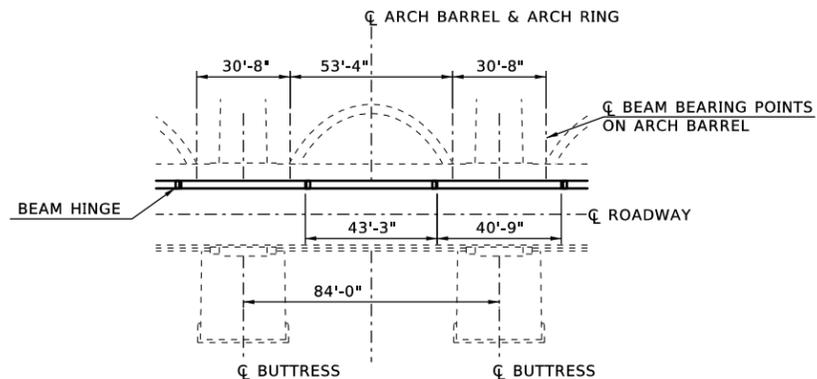
**TYPICAL AT SHALLOW OVERLAY DECK DETAIL**

SEE LONGITUDINAL SECTION AT EXISTING ARCH

BRIDGE A

DESIGN			GRAND RIVER DAM AUTHORITY				
DRAWN			<b>SUPERSTRUCTURE DETAILS (1)</b> <b>STRUCTURAL REPAIRS</b>				
CHECKED							
APPROVED	SOT	2/18					
SQUAD	BENHAM						
COUNTY	MAYES	HIGHWAY	SH-28	STATE JOB NO.	41806	SHEET NO.	0010

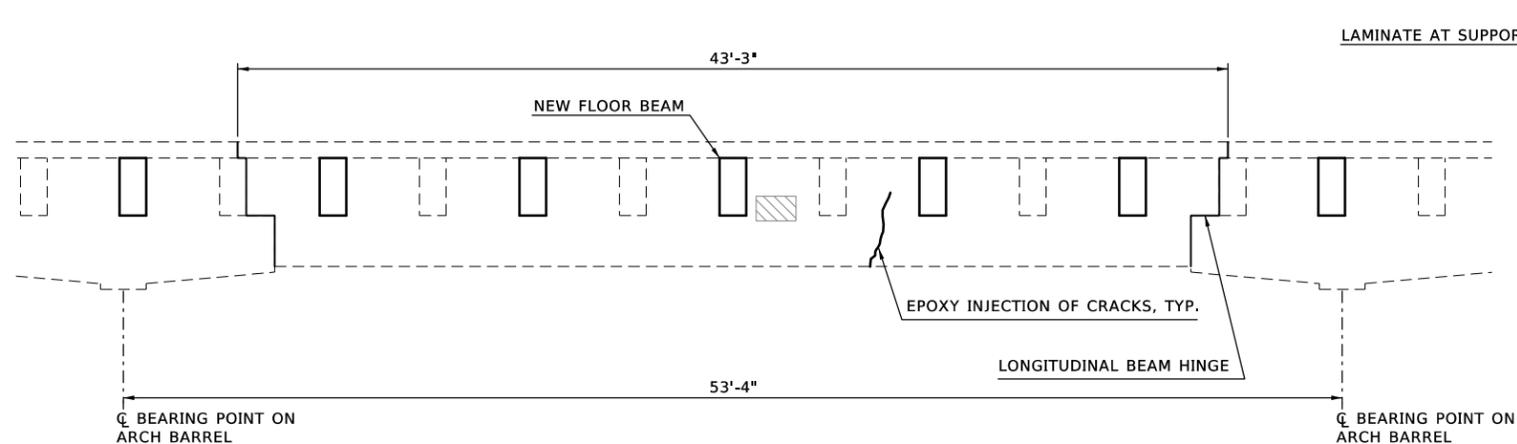
NOTE:  
1. SOUND ALL HINGE POINTS AND PERFORM PULL-OFF TEST. DETERMINE IF CRACKS EXTEND THRU ENTIRE MEMBER. IF THESE TESTS INDICATE THE MEMBERS ARE STRUCTURALLY SOUND, REPAIR WITH PNEUMATICALLY PLACED MORTAR AND INJECT CRACKS WITH EPOXY. IF THE MEMBERS ARE UNSOUND, SUPPORT GIRDER AND CUT BACK TO SOUND CONCRETE A MINIMUM OF 3 FEET EACH SIDE OF C OF HINGE AND REPLACE WITH CLASS AA CONCRETE. FOLLOWING CURE TIME, APPLY BI-DIRECTIONAL CARBON FIBER REINFORCEMENT.



LONGITUDINAL BEAM KEY PLAN

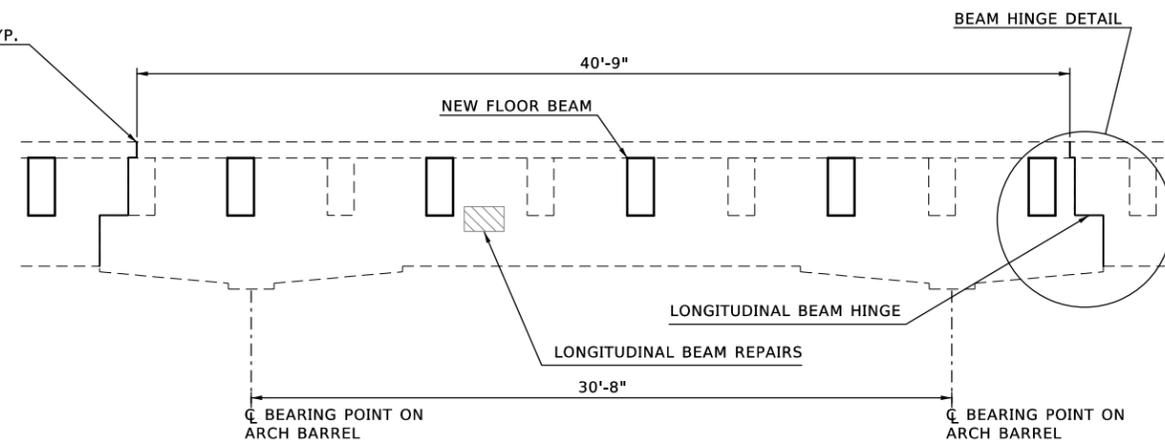
LEGEND:

- PNEUMATICALLY PLACED MORTAR REPAIR
- CLASS AA BEAM REPAIRS OR PNEUMATICALLY PLACED MORTAR REPAIR AND EPOXY INJECTION OF CRACKS. APPLY BI-DIRECTIONAL CARBON FIBER REINFORCEMENT.



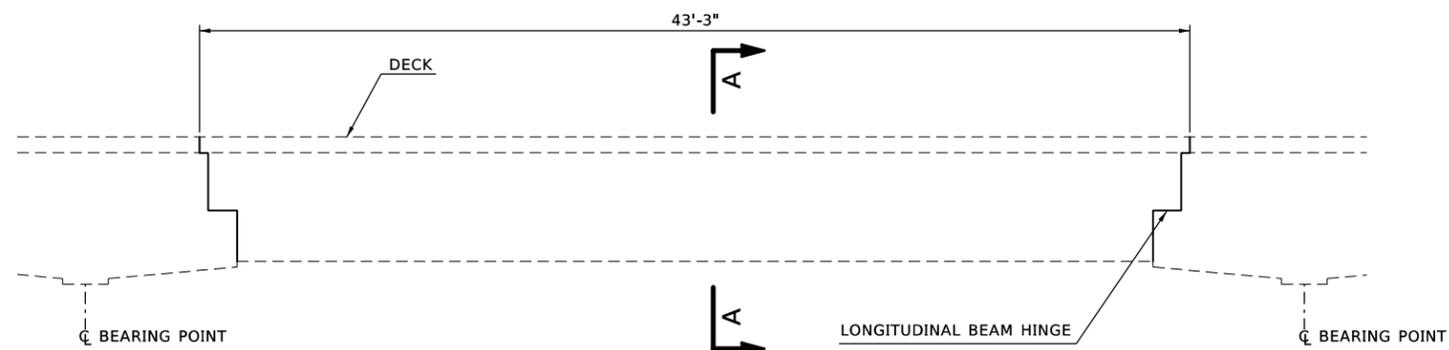
DECK ELEVATION AT ARCH BARREL

NOTE:  
SEE DECK SECTIONS FOR FABRIC AND LAMINATE DETAILS

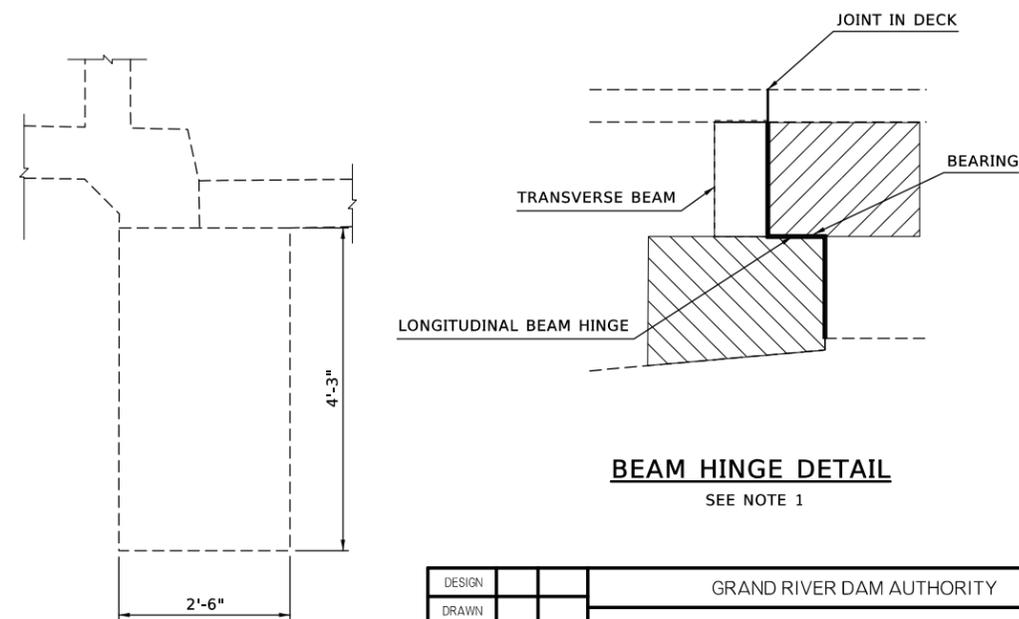


DECK ELEVATION AT BUTTRESS

(ONLY DECK STRENGTHENING IS SHOWN)



LONGITUDINAL BEAM OVER ARCH BARREL



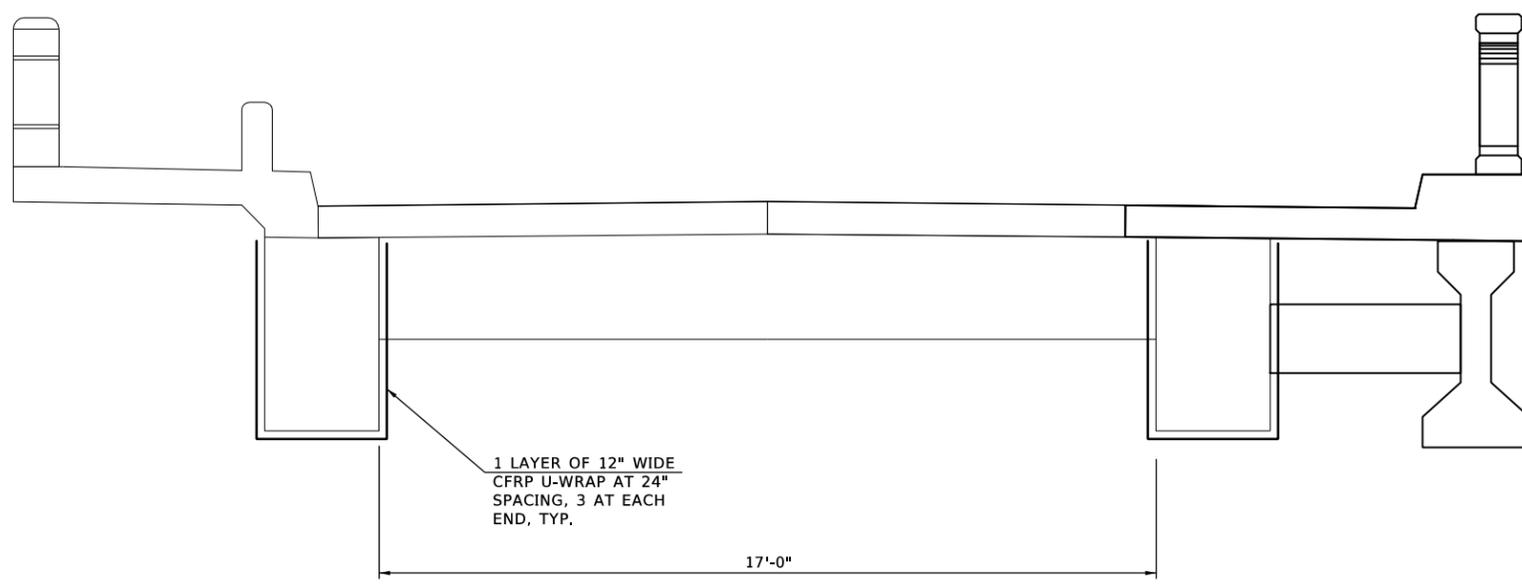
BEAM HINGE DETAIL

SEE NOTE 1

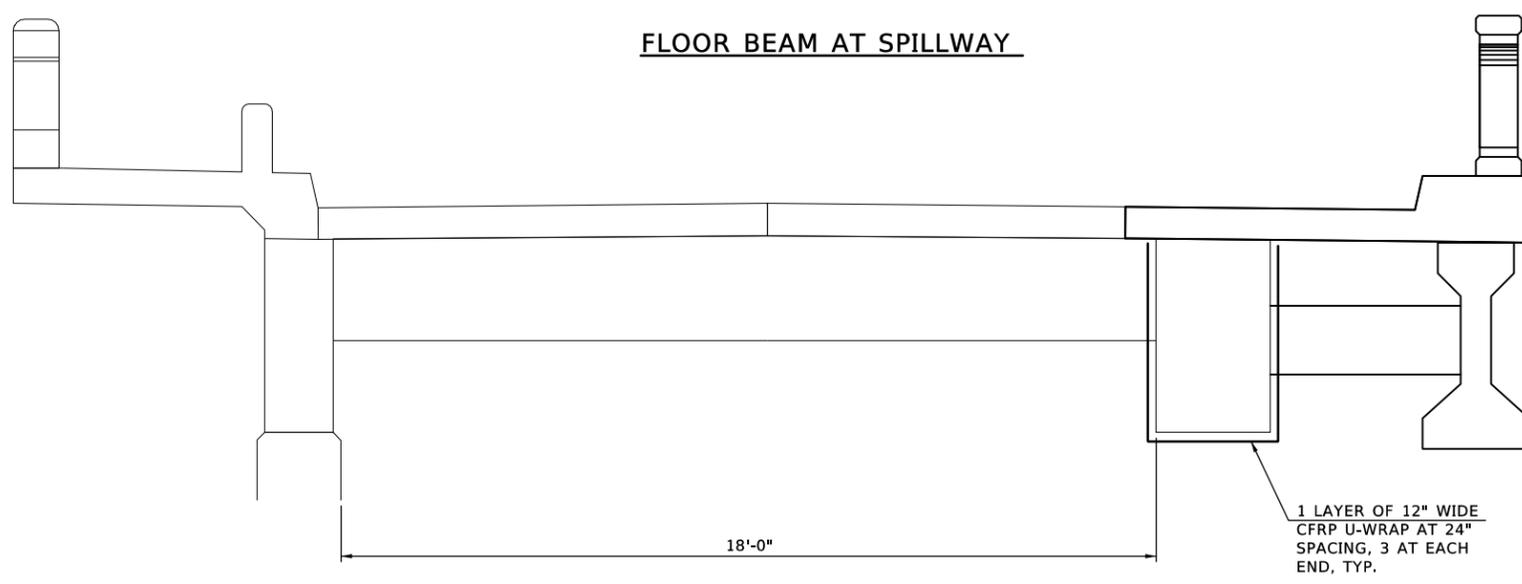
SECTION A-A

DESIGN			GRAND RIVER DAM AUTHORITY	
DRAWN			SUPERSTRUCTURE DETAILS (2)	
CHECKED			STRUCTURAL REPAIRS	
APPROVED	SOT	2/18		
SQUAD	BENHAM			
COUNTY	MAYES	HIGHWAY	SH-28	STATE JOB NO. 41806 SHEET NO. 0011

BRIDGE A



FLOOR BEAM AT SPILLWAY



FLOOR BEAM AT NON-OVERFLOW

DESIGN			GRAND RIVER DAM AUTHORITY				
DRAWN			<b>SUPERSTRUCTURE DETAILS (3)</b> <b>STRUCTURAL REPAIRS</b>				
CHECKED							
APPROVED	SOT	2/18					
SQUAD	BENHAM						
COUNTY	MAYES	HIGHWAY	SH-28	STATE JOB NO.	41806	SHEET NO.	0012

BRIDGE A  
FLOOR BEAMS

Span Type	West Gravity Non-Overflow			Arch Section																			
	1			Arch No. 1										Arch No. 2									
Span No.																							
Floor Beam No.	1	2	3	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Pneumatic Mortar Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epoxy Injection of Cracks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Fiber Wrap	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Span Type	Arch Section																														
	Arch No. 3										Arch No. 4										Arch No. 5										
Span No.																															
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	
Pneumatic Mortar Repair																															
Epoxy Injection of Cracks																															
Carbon Fiber Wrap																															

Span Type	Arch Section																														
	Arch No. 6										Arch No. 7										Arch No. 8										
Span No.																															
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	
Pneumatic Mortar Repair																															
Epoxy Injection of Cracks																															
Carbon Fiber Wrap																															

Span Type	Arch Section																														
	Arch No. 9										Arch No. 10										Arch No. 11										
Span No.																															
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	
Pneumatic Mortar Repair																															
Epoxy Injection of Cracks																															
Carbon Fiber Wrap																															

Span Type	Arch Section																														
	Arch No. 12										Arch No. 13										Arch No. 14										
Span No.																															
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	
Pneumatic Mortar Repair																															
Epoxy Injection of Cracks																															
Carbon Fiber Wrap																															

Span Type	Arch Section																														
	Arch No. 15										Arch No. 16										Arch No. 17										
Span No.																															
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	
Pneumatic Mortar Repair																															
Epoxy Injection of Cracks																															
Carbon Fiber Wrap																															

Span Type	Arch Section																														
	Arch No. 18										Arch No. 19										Arch No. 20										
Span No.																															
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	
Pneumatic Mortar Repair																															
Epoxy Injection of Cracks																															
Carbon Fiber Wrap																															

BRIDGE A

DESIGN			GRAND RIVER DAM AUTHORITY		
DRAWN			REHABILITATION SUMMARY (1)		
CHECKED					
APPROVED	SOT	2/18			
SQUAD	BENHAM				
COUNTY	MAYES	HIGHWAY	SH-28	STATE JOB NO.	41806
				SHEET NO.	0013

BRIDGE A  
FLOOR BEAMS CONT.

Span Type	Arch Section																														
Span No.	Arch No. 21										Arch No. 22										Arch No. 23										
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	
Pneumatic Mortar Repair																															
Epoxy Injection of Cracks																															
Carbon Fiber Wrap																															

Span Type	Arch Section																														
Span No.	Arch No. 24										Arch No. 25										Arch No. 26										
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	
Pneumatic Mortar Repair																															
Epoxy Injection of Cracks																															
Carbon Fiber Wrap																															

Span Type	Arch Section																														
Span No.	Arch No. 27										Arch No. 28										Arch No. 29										
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	
Pneumatic Mortar Repair																															
Epoxy Injection of Cracks																															
Carbon Fiber Wrap																															

Span Type	Arch Section																														
Span No.	Arch No. 30										Arch No. 31										Arch No. 32										
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	
Pneumatic Mortar Repair																															
Epoxy Injection of Cracks																															
Carbon Fiber Wrap																															

Span Type	Arch Section																														
Span No.	Arch No. 33										Arch No. 34										Arch No. 35										
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	
Pneumatic Mortar Repair																															
Epoxy Injection of Cracks																															
Carbon Fiber Wrap																															

Span Type	Arch Section																														
Span No.	Arch No. 36										Arch No. 37										Arch No. 38										
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	
Pneumatic Mortar Repair																															
Epoxy Injection of Cracks																															
Carbon Fiber Wrap																															

Span Type	Arch Section																														
Span No.	Arch No. 39										Arch No. 40										Arch No. 41										
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	
Pneumatic Mortar Repair																															
Epoxy Injection of Cracks																															
Carbon Fiber Wrap																															

BRIDGE A

DESIGN			GRAND RIVER DAM AUTHORITY				
DRAWN			REHABILITATION SUMMARY (2)				
CHECKED							
APPROVED	SOT	2/18					
SQUAD	BENHAM						
COUNTY	MAYES	HIGHWAY	SH-28	STATE JOB NO.	41806	SHEET NO.	0014

BRIDGE A  
FLOOR BEAMS CONT.

Span Type	Arch Section																													
Span No.	Arch No. 42										Arch No. 43										Arch No. 44									
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Arch Section																													
Span No.	Arch No. 45										Arch No. 46										Arch No. 47									
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Arch Section																													
Span No.	Arch No. 48										Arch No. 49										Arch No. 50									
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Arch Section										East Gravity Non-Overflow			Spillway Section																	
Span No.	Arch No. 51										Span No. 52B			Spillway Span 1				Spillway Span 2				Spillway Span 3									
Floor Beam No.	1	2	3	4	5	6	7	8	9	10	1	2	3	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Pneumatic Mortar Repair																															
Epoxy Injection of Cracks																															
Carbon Fiber Wrap																															

Span Type	Spillway Section																													
Span No.	Spillway Span 4						Spillway Span 5						Spillway Span 6						Spillway Span 7						Spillway Span 8					
Floor Beam No.	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Spillway Section																													
Span No.	Spillway Span 9						Spillway Span 10						Spillway Span 11						Spillway Span 12						Spillway Span 13					
Floor Beam No.	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Spillway Section																													
Span No.	Spillway Span 14						Spillway Span 15						Spillway Span 16						Spillway Span 17						Spillway Span 18					
Floor Beam No.	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Spillway Section																	
Span No.	Spillway Span 19						Spillway Span 20						Spillway Span 21					
Floor Beam No.	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Pneumatic Mortar Repair																		
Epoxy Injection of Cracks																		
Carbon Fiber Wrap																		

BRIDGE A

DESIGN			GRAND RIVER DAM AUTHORITY				
DRAWN			REHABILITATION SUMMARY (3)				
CHECKED							
APPROVED	SOT	2/18					
SQUAD	BENHAM						
COUNTY	MAYES	HIGHWAY	SH-28	STATE JOB NO.	41806	SHEET NO.	0015

BRIDGE A FLOOR BEAMS CONT.

Table with columns for Span Type, Span No., Floor Beam No., and repair methods (Pneumatic Mortar Repair, Epoxy Injection of Cracks, Carbon Fiber Wrap) across Non-Overflow Spans 1-6.

Table with columns for Span Type, Span No., Floor Beam No., and repair methods across Non-Overflow Spans 7-11.

BRIDGE A LONGITUDINAL GIRDERS

Table with columns for Span Type, West Gravity Non-Overflow, and Arch Section (Spans 1-10) including repair methods.

Table with columns for Span Type, Span No., and Arch Section (Spans 11-20) including repair methods.

Table with columns for Span Type, Span No., and Arch Section (Spans 21-30) including repair methods.

Table with columns for Span Type, Span No., and Arch Section (Spans 31-40) including repair methods.

Table with columns for Span Type, Span No., and Arch Section (Spans 41-51) including repair methods.

BRIDGE A

Approval and summary block containing: DESIGN, DRAWN, CHECKED, APPROVED SOT 2/18, SQUAD BENHAM, COUNTY MAYES, HIGHWAY SH-28, STATE JOB NO. 41806, SHEET NO. 0016, GRAND RIVER DAM AUTHORITY, REHABILITATION SUMMARY (4)

BRIDGE A  
 LONGITUDINAL GIRDERS CONT.

Span Type	Spillway Section																									
	Spillway Span 1		Spillway Span 2		Spillway Span 3		Spillway Span 4		Spillway Span 5		Spillway Span 6		Spillway Span 7		Spillway Span 8		Spillway Span 9		Spillway Span 10		Spillway Span 11		Spillway Span 12		Spillway Span 13	
Span No.	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long
Upstream or Downstream	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pneumatic Mortar Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epoxy Injection of Cracks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Fiber Wrap	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Span Type	Spillway Section														
	Spillway Span 14		Spillway Span 15		Spillway Span 16		Spillway Span 17		Spillway Span 18		Spillway Span 19		Spillway Span 20		Spillway Span 21
Span No.	US Long	DS Long													
Upstream or Downstream	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Pneumatic Mortar Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Epoxy Injection of Cracks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Carbon Fiber Wrap	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Span Type	Non-Overflow Section													
	N-O'flow Span 1		N-O'flow Span 2		N-O'flow Span 3		N-O'flow Span 4		N-O'flow Span 5		N-O'flow Span 6		N-O'flow Span 7	
Span No.	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long
Upstream or Downstream	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pneumatic Mortar Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epoxy Injection of Cracks	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Fiber Wrap	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Span Type	Non-Overflow Section									
	N-O'flow Span 8		N-O'flow Span 9		N-O'flow Span 10		N-O'flow Span 11		East Gravity Section	
Span No.	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long
Upstream or Downstream	-	-	-	-	-	-	-	-	-	-
Pneumatic Mortar Repair	-	-	-	-	-	-	-	-	-	-
Epoxy Injection of Cracks	-	-	-	-	-	-	-	-	-	-
Carbon Fiber Wrap	-	-	-	-	-	-	-	-	-	-

DESIGN			GRAND RIVER DAM AUTHORITY		
DRAWN			<b>REHABILITATION SUMMARY (5)</b>		
CHECKED					
APPROVED	SOT	2/18			
SQUAD	BENHAM				
COUNTY	MAYES	HIGHWAY	SH-28	STATE JOB NO.	41806
				SHEET NO.	0017

BRIDGE B - EAST SPILLWAY NO. 1  
FLOOR BEAMS

Span Type	Spillway Section																																			
	Spillway Span 1						Spillway Span 2						Spillway Span 3						Spillway Span 4						Spillway Span 5						Spillway Span 6					
Span No.	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Floor Beam No.																																				
Pneumatic Mortar Repair																																				
Epoxy Injection of Cracks																																				
Carbon Fiber Wrap																																				

Span Type	Spillway Section																													
	Spillway Span 7						Spillway Span 8						Spillway Span 9						Spillway Span 10						Spillway Span 11					
Span No.	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Floor Beam No.																														
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

BRIDGE B - EAST SPILLWAY NO. 1  
LONGITUDINAL GIRDERS

Span Type	Spillway Section																					
	Spillway Span 1		Spillway Span 2		Spillway Span 3		Spillway Span 4		Spillway Span 5		Spillway Span 6		Spillway Span 7		Spillway Span 8		Spillway Span 9		Spillway Span 10		Spillway Span 11	
Span No.	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long
Upstream or Downstream																						
Pneumatic Mortar Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epoxy Injection of Cracks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Fiber Wrap	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

BRIDGE C - EAST SPILLWAY NO. 2  
FLOOR BEAMS

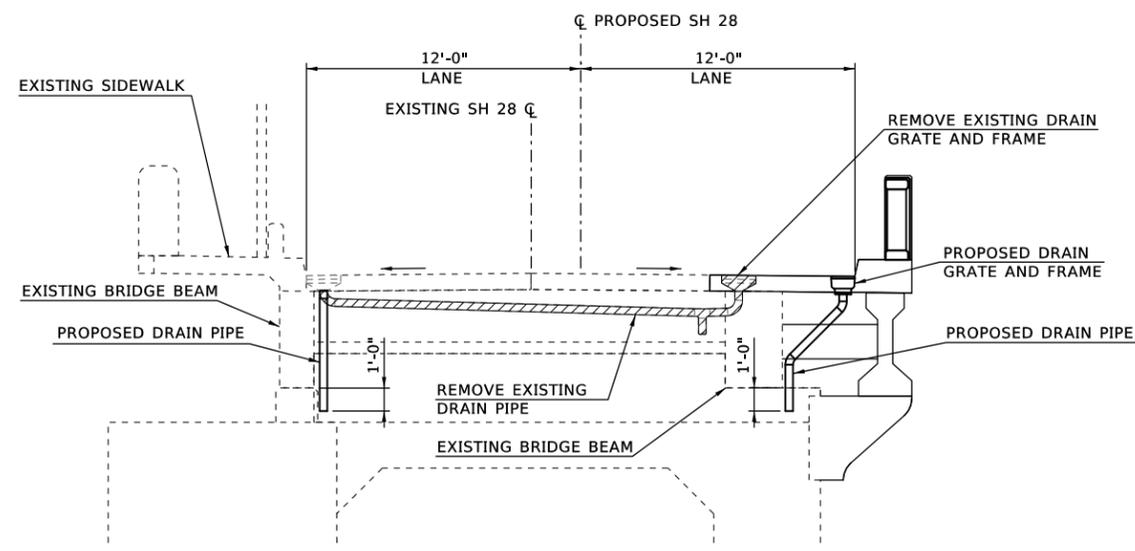
Span Type	Spillway Section																													
	Spillway Span 1						Spillway Span 2						Spillway Span 3						Spillway Span 4						Spillway Span 5					
Span No.	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Floor Beam No.																														
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

Span Type	Spillway Section																													
	Spillway Span 6						Spillway Span 7						Spillway Span 8						Spillway Span 9						Spillway Span 10					
Span No.	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Floor Beam No.																														
Pneumatic Mortar Repair																														
Epoxy Injection of Cracks																														
Carbon Fiber Wrap																														

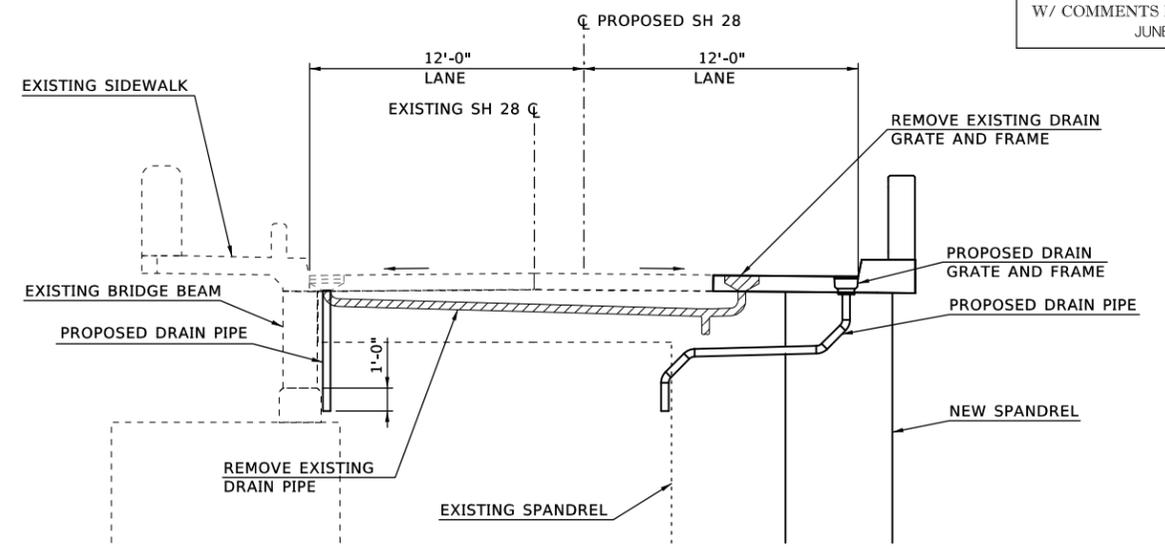
BRIDGE C - EAST SPILLWAY NO. 2  
LONGITUDINAL GIRDERS

Span Type	Spillway Section																			
	Spillway Span 1		Spillway Span 2		Spillway Span 3		Spillway Span 4		Spillway Span 5		Spillway Span 6		Spillway Span 7		Spillway Span 8		Spillway Span 9		Spillway Span 10	
Span No.	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long	US Long	DS Long
Upstream or Downstream																				
Pneumatic Mortar Repair	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Epoxy Injection of Cracks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Fiber Wrap	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

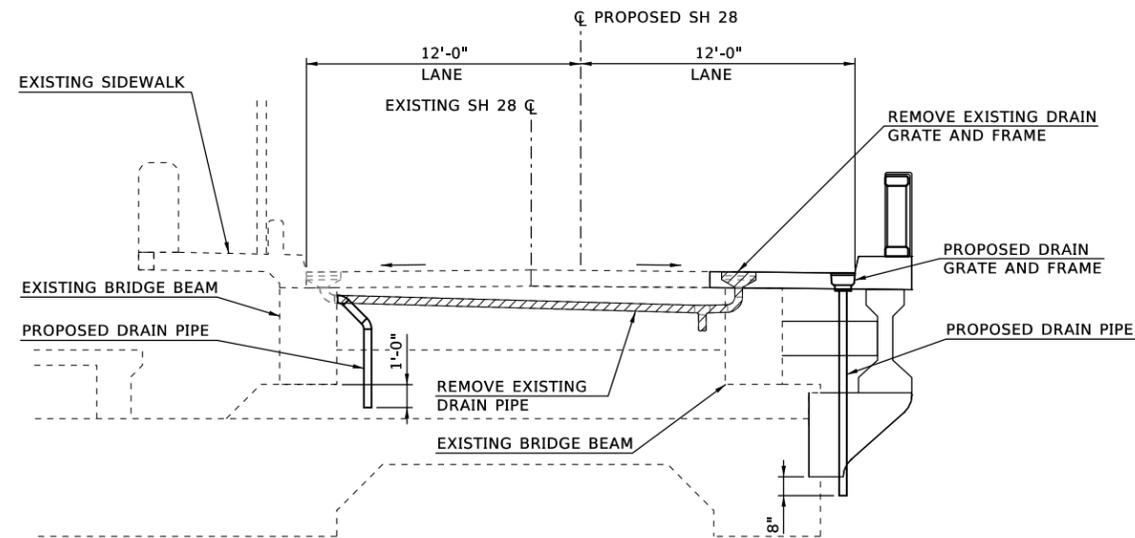
DESIGN			GRAND RIVER DAM AUTHORITY				
DRAWN			REHABILITATION SUMMARY (6)				
CHECKED							
APPROVED	SOT	2/18					
SQUAD	BENHAM						
COUNTY	MAYES	HIGHWAY	SH-28	STATE JOB NO.	41806	SHEET NO.	0013



**DRAIN SECTION AT NON-OVERFLOW**



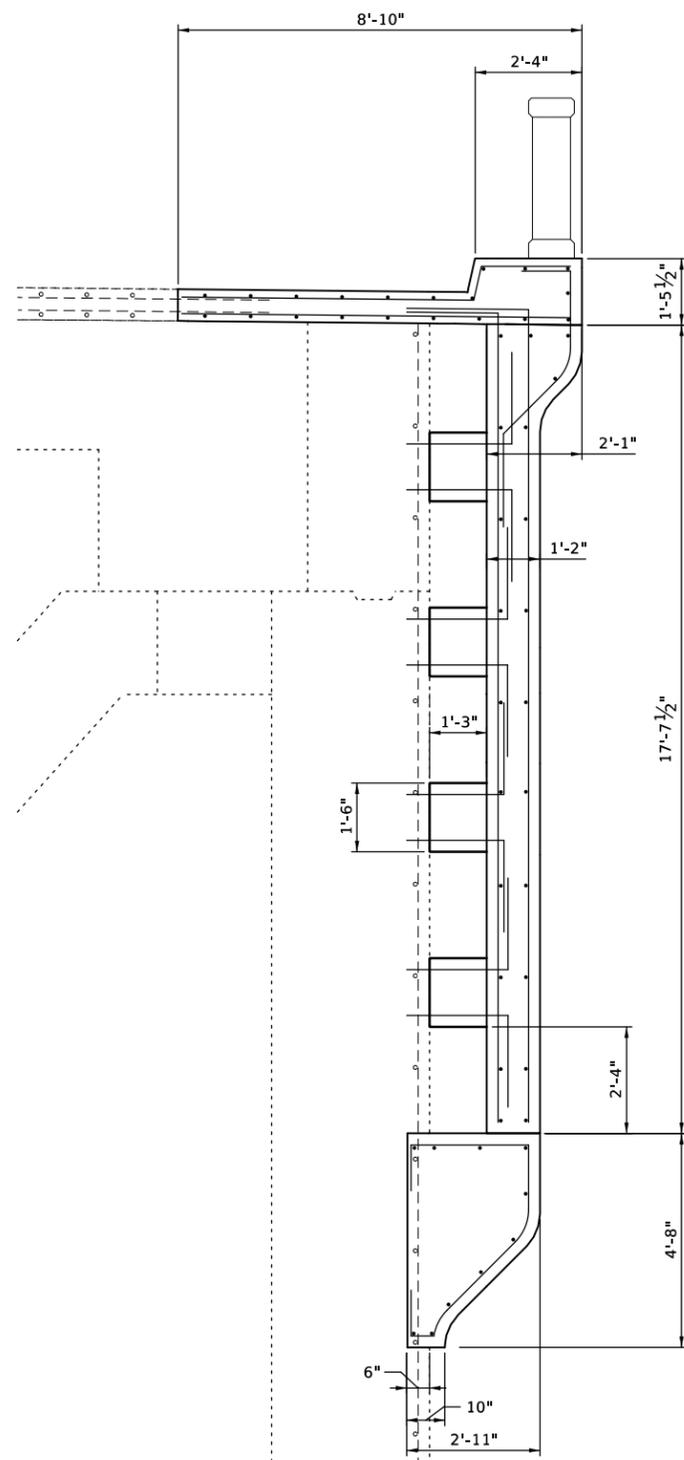
**DRAIN SECTION AT ARCH**



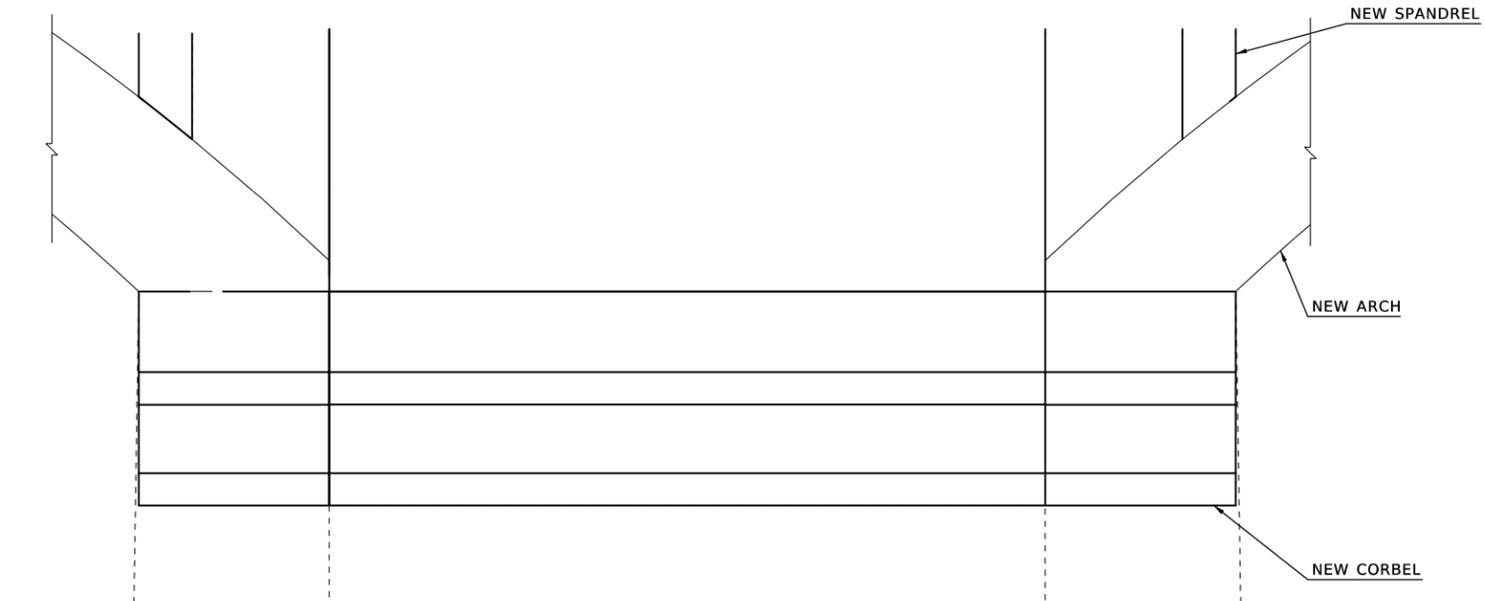
**DRAIN SECTION AT SPILLWAY**  
(BRIDGES B&C SIMILAR)

BRIDGE A

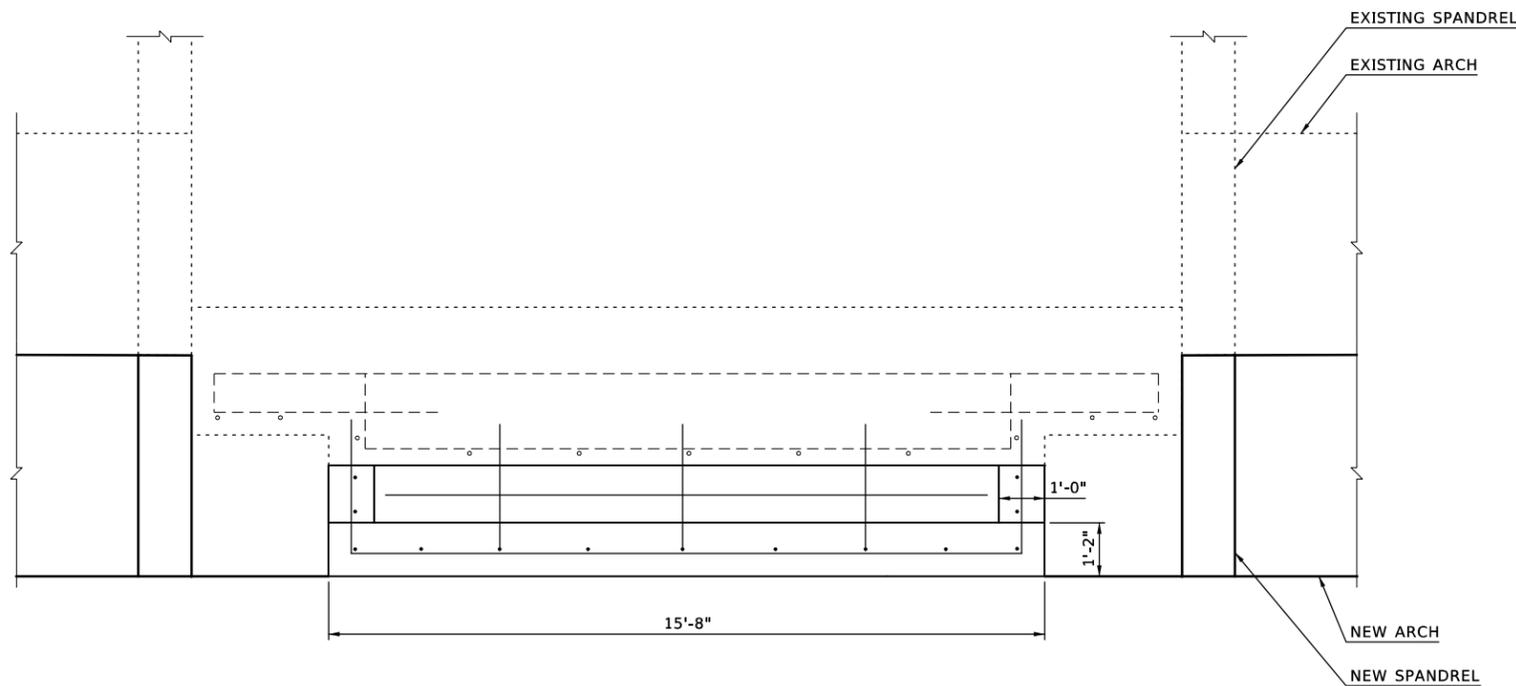
DESIGN			GRAND RIVER DAM AUTHORITY				
DRAWN			<b>DECK DETAILS (1)</b>				
CHECKED							
APPROVED	SOT	2/18					
SQUAD	BENHAM						
COUNTY	MAYES	HIGHWAY	SH-28	STATE JOB NO.	41806	SHEET NO.	0019



SECTION AT ARCH

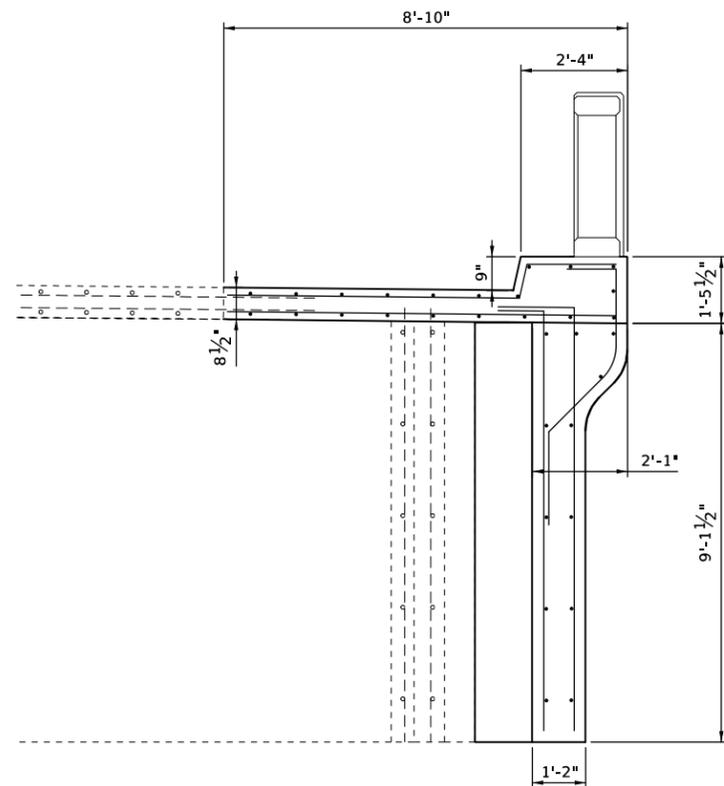


ELEVATION AT ARCH AND BUTTRESS

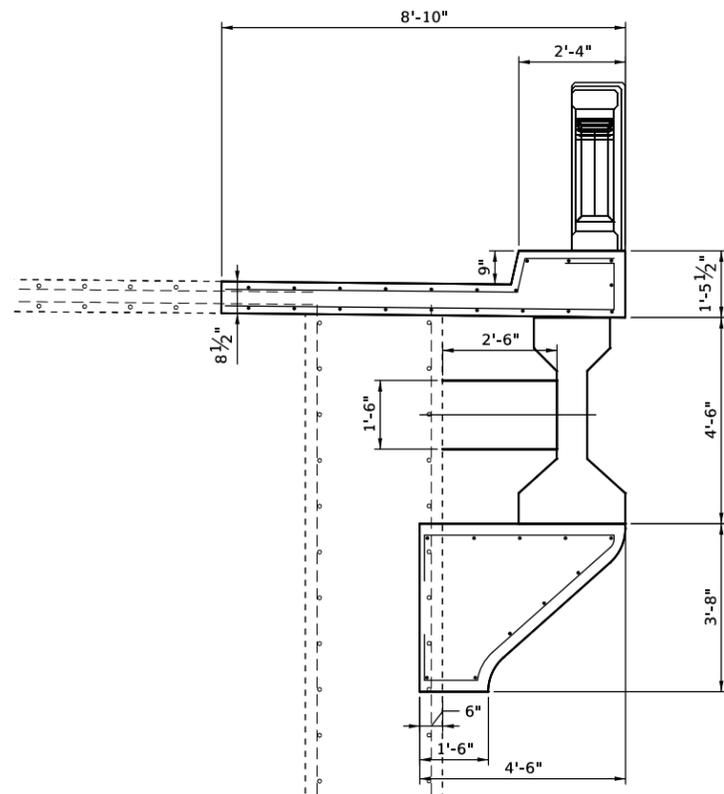


DETAIL AT ARCH BUTTRESS

DESIGN			GRAND RIVER DAM AUTHORITY				
DRAWN			<b>ARCH BUTTRESS DETAILS (1)</b>				
CHECKED							
APPROVED	SOT	2/18					
SQUAD	BENHAM						
COUNTY	MAYES	HIGHWAY	SH-28	STATE JOB NO.	41806	SHEET NO.	0020



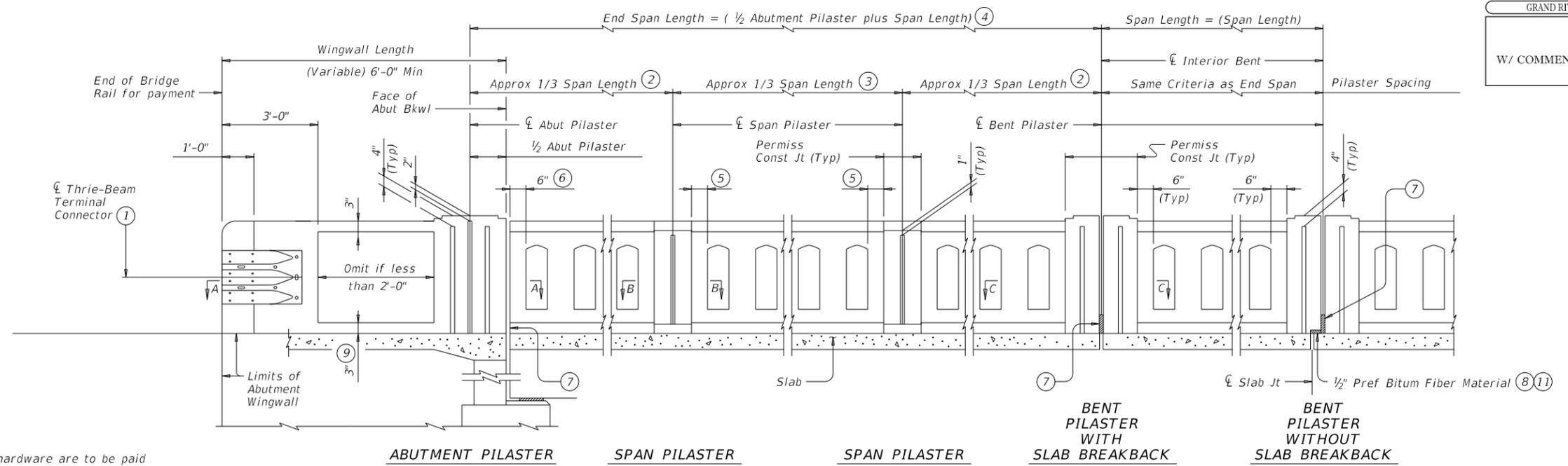
**SECTION AT DAM WEST ABUTMENT**



**SECTION AT DAM EAST ABUTMENT**

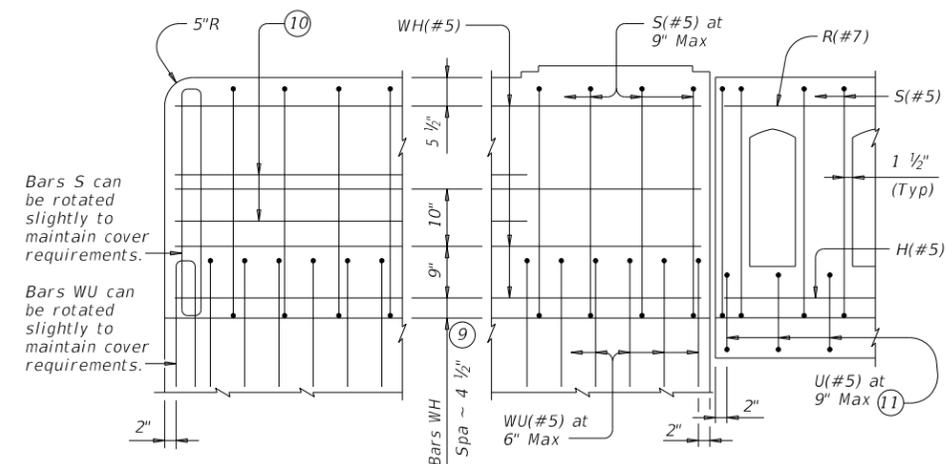
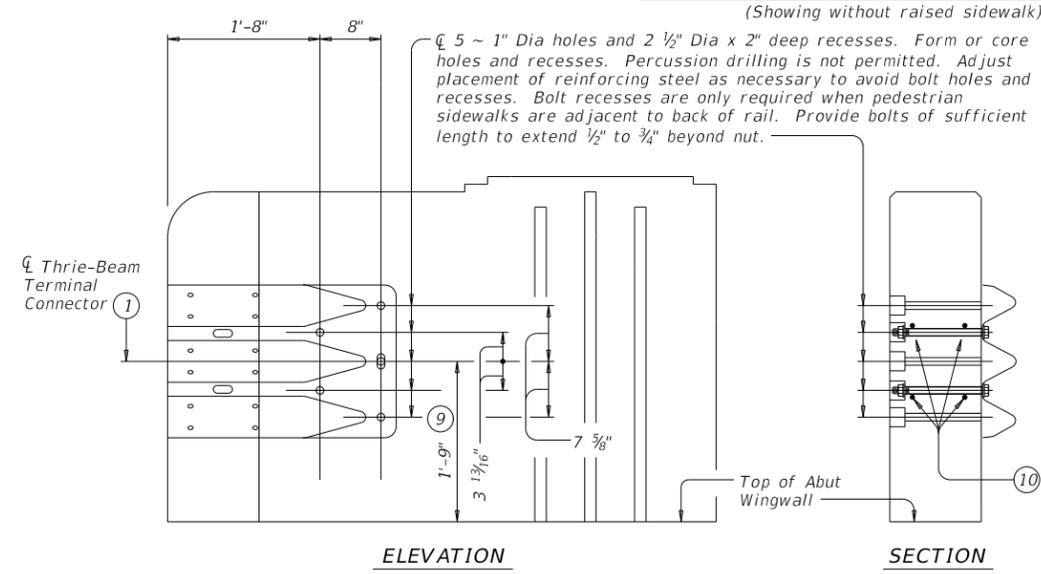
BRIDGE A

DESIGN			GRAND RIVER DAM AUTHORITY				
DRAWN			<b>ABUTMENT DETAILS (1)</b>				
CHECKED							
APPROVED	SOT	2/18					
SQUAD	BENHAM						
COUNTY	MAYES	HIGHWAY	SH-28	STATE JOB NO.	41806	SHEET NO.	0021

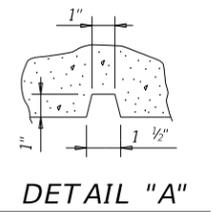


- ① Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
- ② Number of windows in exterior bays are equal.
- ③ Number of windows in interior bay(s) are not less than the amount in exterior bays (Note 2).
- ④ Space Span Pilasters at 1/3 span length (Approx) when spans are 100 ft and less, as shown. Space Span Pilasters at 1/5 span length (Approx) for spans greater than 100 ft.
- ⑤ Dimension is 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".
- ⑥ Min = 6", Max = 1'-3".
- ⑦ Provide rail joints at ends of all spans the same width as Slab joint opening, except that Rail Joints over construction joints must be 1/4" Min to 3/4" Max in width. Joints must be open if slab joint opening is not sealed. Joints over construction joints and over sealed deck joints must be plugged. Forming material used in joints may be left in place if it is light in color and compressible, such as the following materials: polystyrene, molded cork granules, sponge rubber sheet, etc. If forming material is not left in place, plug the bottom 6" with slab joint sealing compound to prevent drainage and staining.
- ⑧ Place Preformed Bituminous Fiber Material between slab and rail when rail extends over expansion joint. Shift Bars U as necessary.
- ⑨ Increase 2" for structures with overlay.
- ⑩ Place 4 additional Bars WH(#5) 3'-8" in length inside Bars S(#5) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.
- ⑪ Shift U Bars from region below 1/2" Preformed Bituminous Fiber Material at joints.

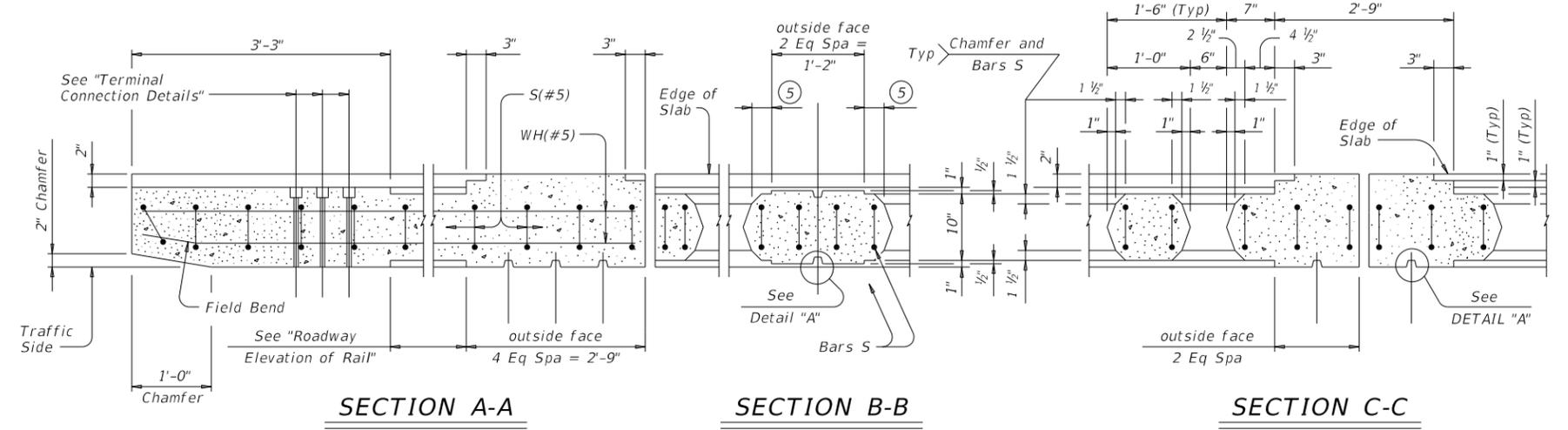
**ROADWAY ELEVATION OF RAIL**  
 (Showing without raised sidewalk)



The use of this railing is restricted to speeds of 45 mph or less.

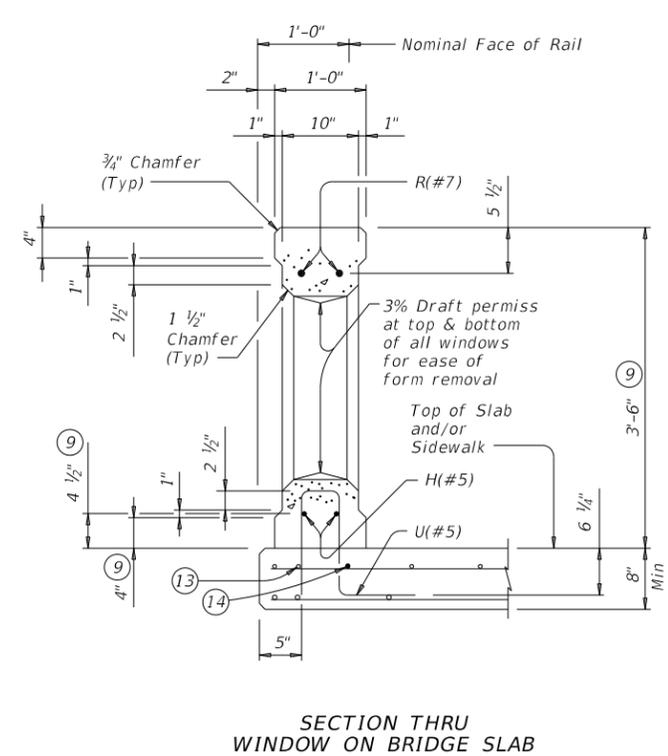
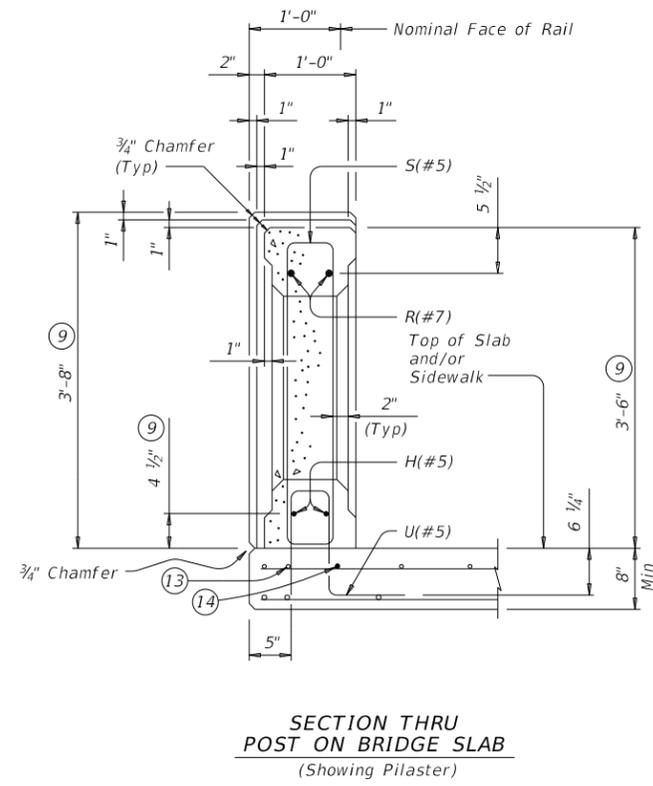
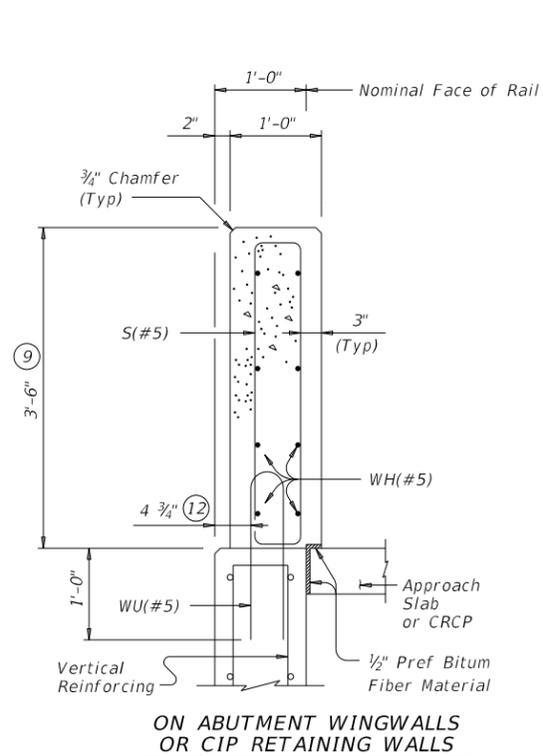


**TxDOT**  
 COMBINATION RAIL  
 TEXAS CLASSIC  
 TYPE C411



DESIGN		GRAND RIVER DAM AUTHORITY
DRAWN		
CHECKED		
APPROVED	SOT 2/18	<b>PARAPET DETAILS (1)</b>
SQUAD	BENHAM	
COUNTY	MAYES	HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0022

BRIDGE A

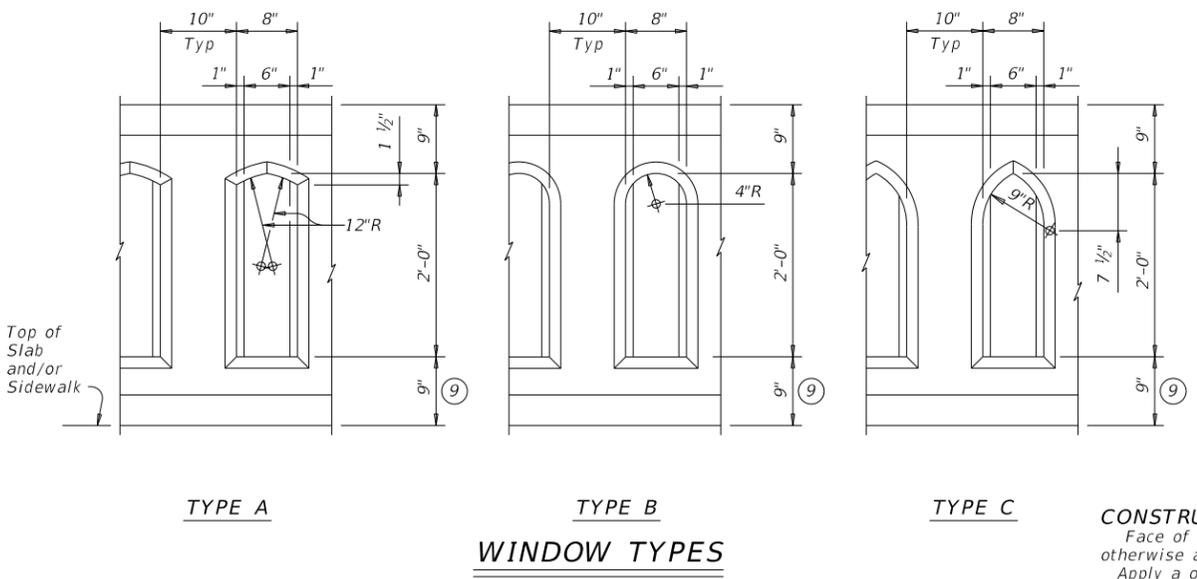
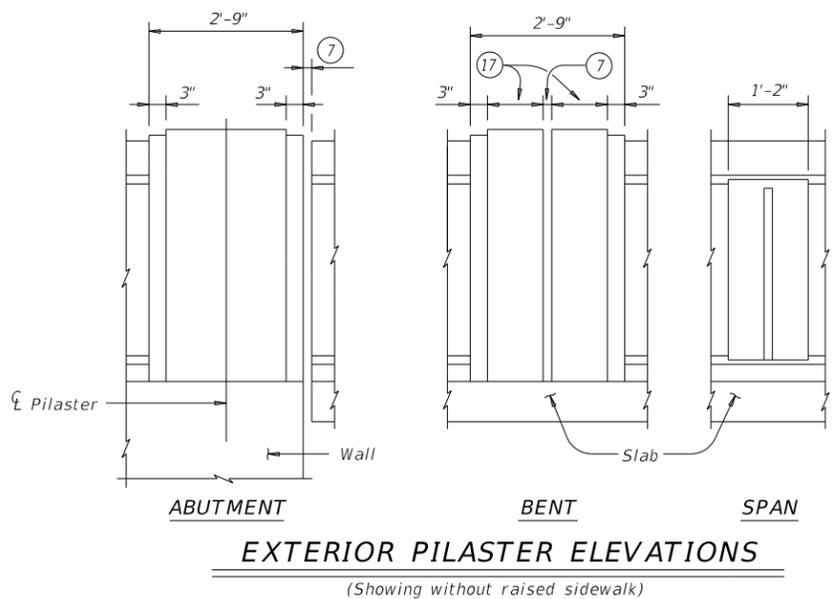


**SECTIONS THRU RAIL WITHOUT RAISED SIDEWALK**

- ⑨ Increase 2" for structures with overlay.
- ⑫ 5 1/4" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.
- ⑬ As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars must be furnished at the Contractor's expense.
- ⑭ Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

**TxDOT**  
 COMBINATION RAIL  
 TEXAS CLASSIC  
 TYPE C411

BRIDGE A		
DESIGN		GRAND RIVER DAM AUTHORITY
DRAWN		
CHECKED		
APPROVED	SOT 2/18	<b>PARAPET DETAILS (2)</b>
SQUAD	BENHAM	
COUNTY	MAYES	HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0023



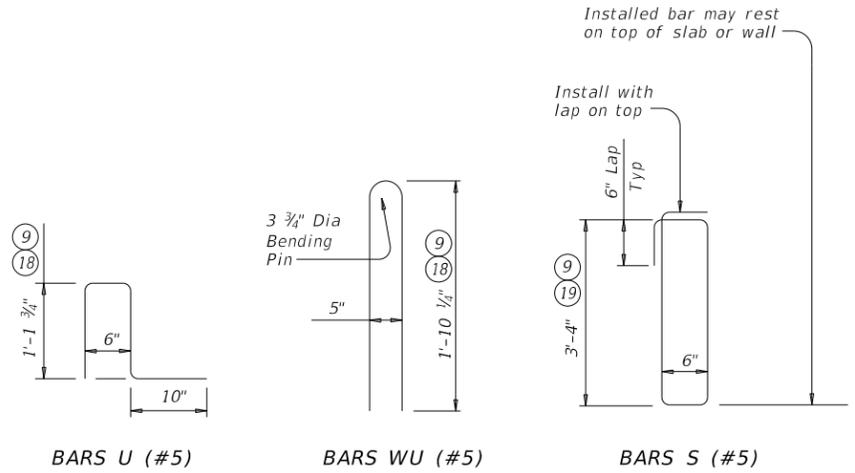
**EXTERIOR PILASTER ELEVATIONS**  
 (Showing without raised sidewalk)

**WINDOW TYPES**

**CONSTRUCTION NOTES:**  
 Face of rail and pilasters, parapet must be plumb unless otherwise approved.  
 Apply a one rub finish to all railing surfaces unless otherwise shown elsewhere on the plans.

**MATERIAL NOTES:**  
 Provide Class AA concrete for railing. Provide Class AA concrete if shown elsewhere in the plans.  
 Provide Grade 60 reinforcing steel.  
 Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.  
 Provide bar laps, where required, as follows:  
 Uncoated or galvanized ~ #5 = 2'-0"  
 Uncoated or galvanized ~ #7 = 2'-11"  
 Epoxy coated ~ #5 = 3'-0"  
 Epoxy coated ~ #7 = 4'-4"

**GENERAL NOTES:**  
 This rail was evaluated based on the results of previous crash tests and approved for a NCHRP Report 350 TL-2 rating. This rail is only approved for low speed use, speeds of 45 mph and less.  
 Do not use this railing on bridges with expansion joints providing more than 5" movement.  
 Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.  
 Shop drawings will not be required for this rail.  
 See Bridge Layout or other plan sheets for the following: dimensions with the number of span pilasters, dimensions with the number of windows, window type, inclusion of bronze stars, inclusion of construction year with abutment identity.  
 Submit erection drawings showing span number, span pilaster locations, number of windows between pilasters and spacing to first window (see Note 6) to the Engineer for approval.  
 Average weight of railing with no overlay increase and no pilasters is 350 plf.



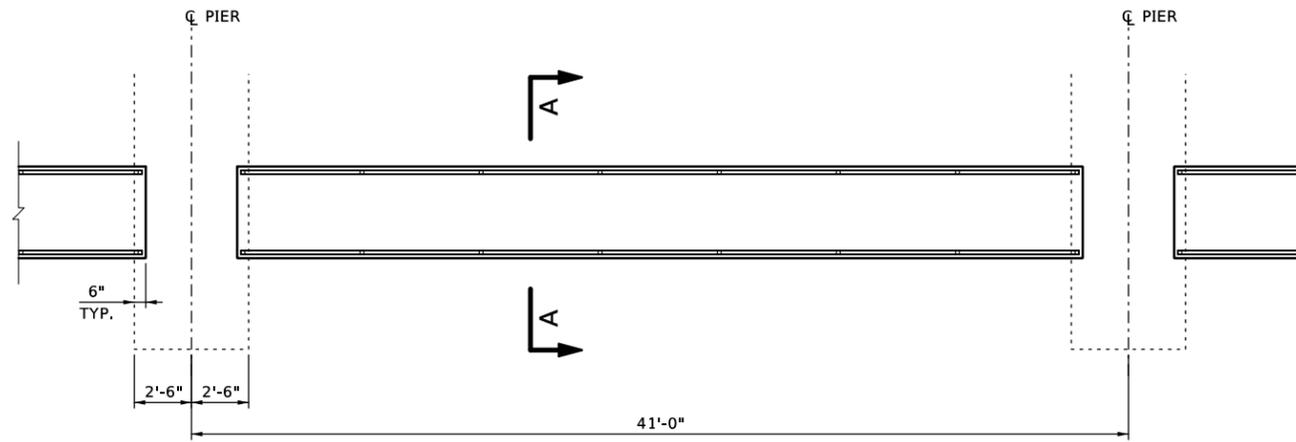
**BARS U (#5)**      **BARS WU (#5)**      **BARS S (#5)**

- ⑦ Provide rail joints at ends of all spans the same width as Slab joint opening, except that Rail Joints over construction joints must be 1/4" Min to 3/4" Max in width. Joints must be open if slab joint opening is not sealed. Joints over construction joints and over sealed deck joints must be plugged. Forming material used in joints may be left in place if it is light in color and compressible, such as the following materials: polystyrene, molded cork granules, sponge rubber sheet, etc. If forming material is not left in place, plug the bottom 6" with slab joint sealing compound to prevent drainage and staining.
- ⑨ Increase 2" for structures with overlay.
- ①⑥ Construction year (use if shown elsewhere on plans) 3" High "Plantin Bold" Typeface with 1/4" recess. Placed at one Abutment only or as directed by the Engineer.
- ①⑦ Dimensions must be the same on each side of joint.
- ①⑧ For raised sidewalks, add sidewalk height to total bar height. Use sidewalk height at rail's location.
- ①⑨ Reduce by 2" or field bend over Preformed Bituminous Fiber Material to gain cover.

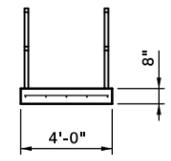
Cover dimensions are clear dimensions, unless noted otherwise.  
 Reinforcing bar dimensions shown are out-to-out of bar.

**TxDOT**  
 COMBINATION RAIL  
 TEXAS CLASSIC  
 TYPE C411

DESIGN			GRAND RIVER DAM AUTHORITY	
DRAWN			<b>PARAPET DETAILS (3)</b>	
CHECKED				
APPROVED	SOT	2/18		
SQUAD	BENHAM			
COUNTY	MAYES	HIGHWAY SH-28		



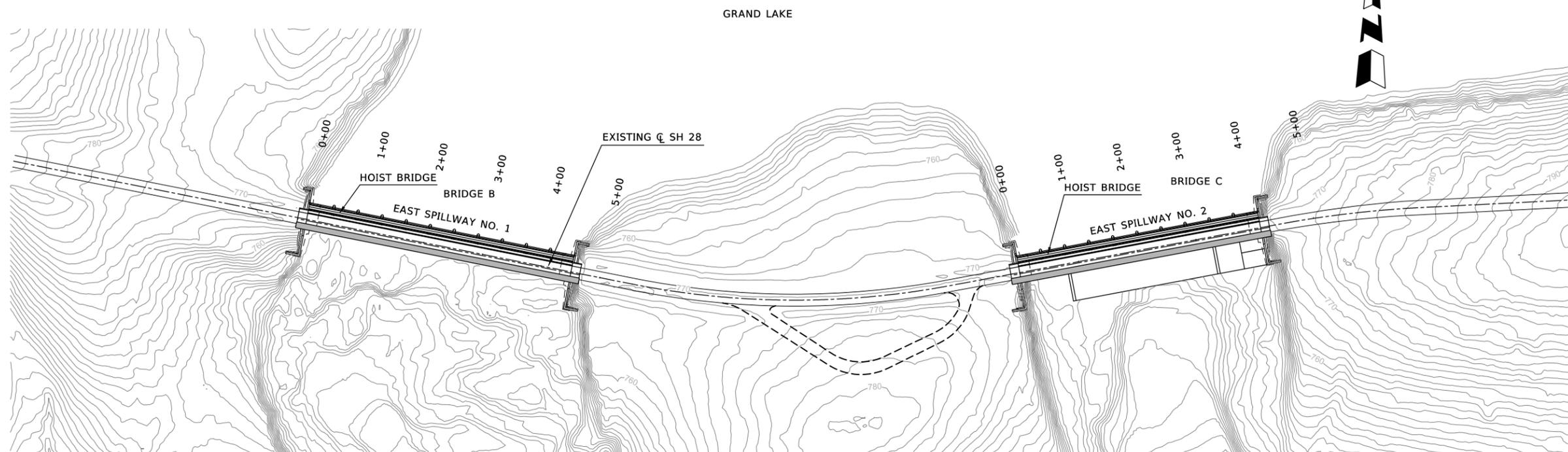
CATWALK PLAN AT SPILLWAY SECTION



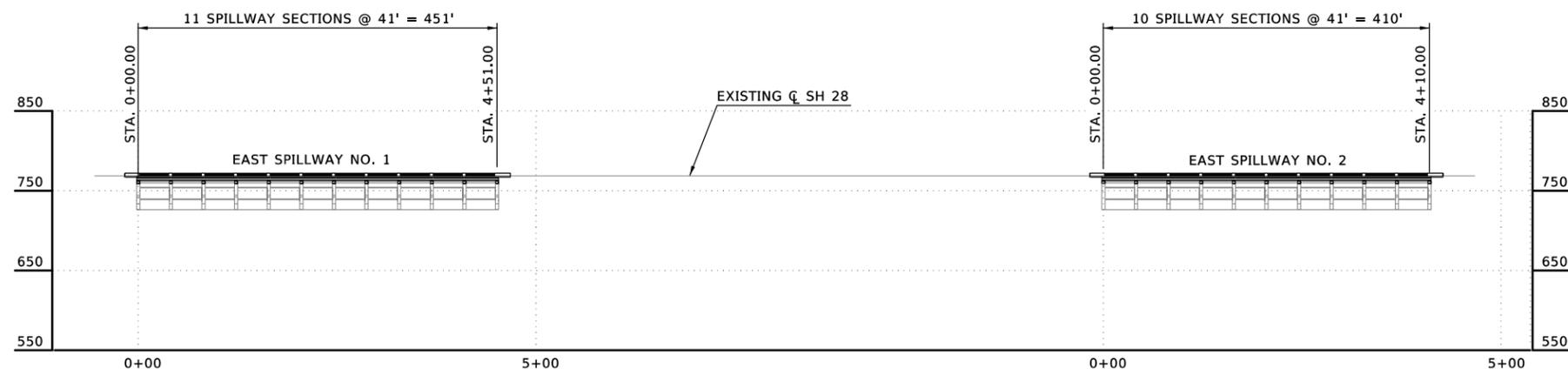
SECTION A-A

BRIDGE A

DESIGN			GRAND RIVER DAM AUTHORITY				
DRAWN			<b>CATWALK DETAILS</b>				
CHECKED							
APPROVED	SOT	2/18					
SQUAD	BENHAM						
COUNTY	MAYES	HIGHWAY	SH-28	STATE JOB NO.	41806	SHEET NO.	0025



**PLAN OF EAST SPILLWAYS**  
SCALE: 1 = 100'

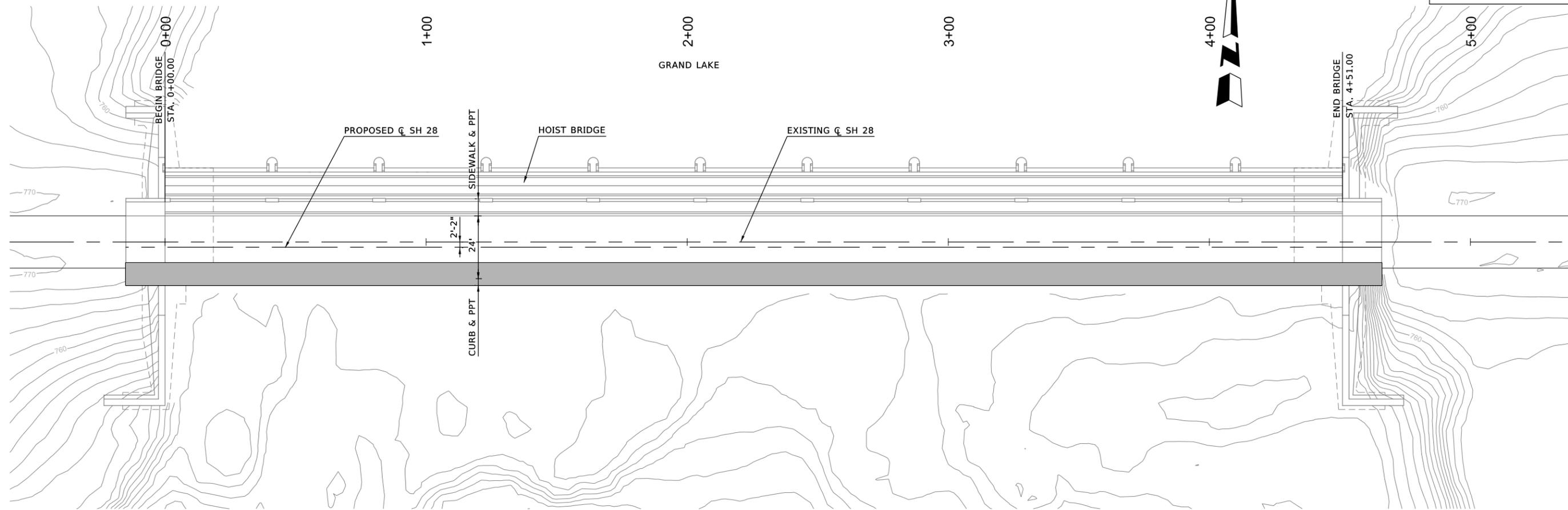


**DOWNSTREAM ELEVATION OF EAST SPILLWAYS**  
SCALE: 1 = 100'

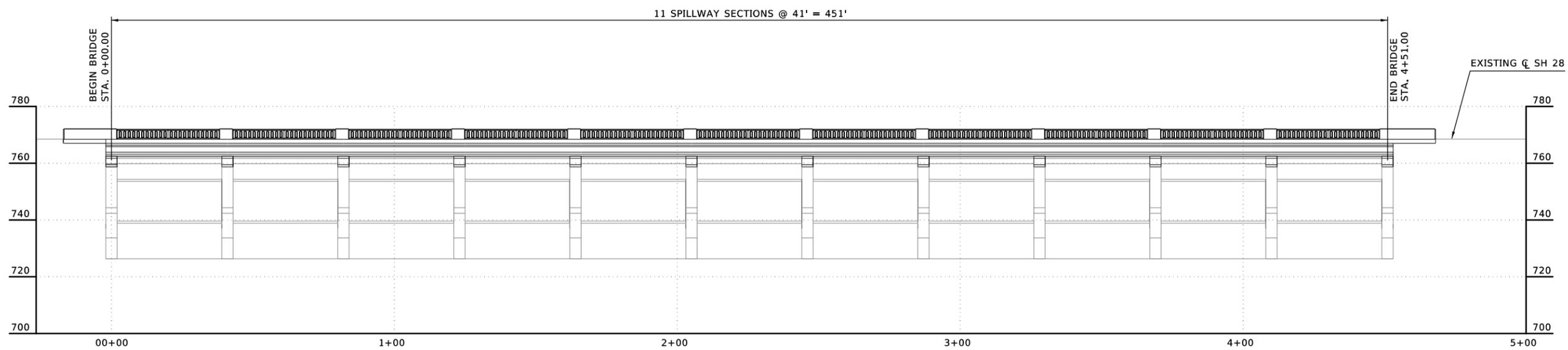
BRIDGE B&C

DESIGN	KSJ	2/18	GRAND RIVER DAM AUTHORITY				
DRAWN	JLB	2/18					
CHECKED							
APPROVED	SOT	2/18					
SQUAD	BENHAM						
COUNTY	MAYES	HIGHWAY	SH-28	STATE JOB NO.	41806	SHEET NO.	0026

**GENERAL EAST SPILLWAY  
PLAN AND ELEVATION**

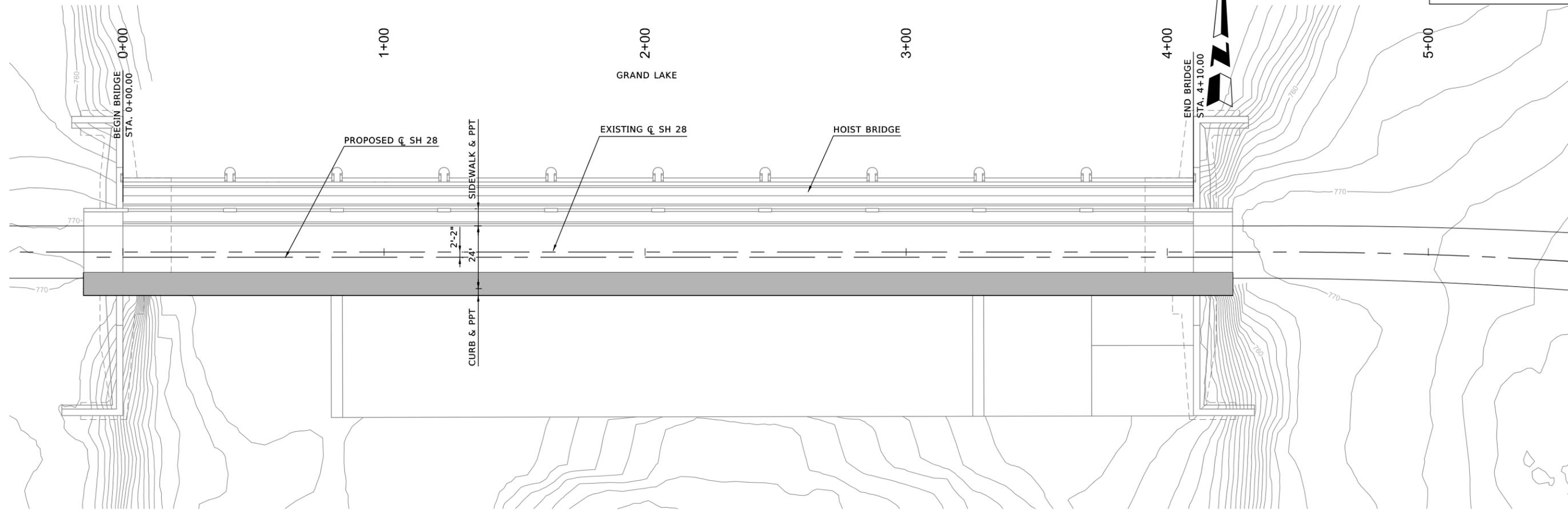


**PLAN OF EAST SPILLWAY NO. 1**  
 SCALE: 1 = 20'

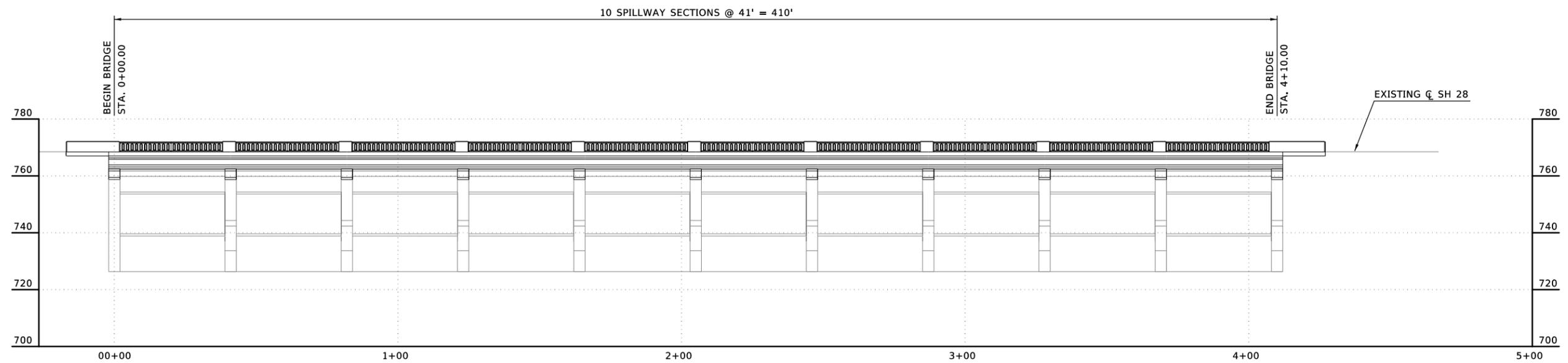


**DOWNSTREAM ELEVATION OF EAST SPILLWAY NO. 1**  
 SCALE: 1 = 20'

DESIGN	KSJ	2/18	GRAND RIVER DAM AUTHORITY <b>GENERAL EAST SPILLWAY NO. 1</b> <b>PLAN AND ELEVATION</b> <b>C STA. 2+25.50</b>
DRAWN	JLB	2/18	
CHECKED			
APPROVED	SOT	2/18	
SQUAD	BENHAM		
COUNTY	MAYES	HIGHWAY SH-28 STATE JOB NO. 41806 SHEET NO. 0027	



**PLAN OF EAST SPILLWAY NO. 2**  
 SCALE: 1 = 20'



**DOWNSTREAM ELEVATION OF EAST SPILLWAY NO. 2**  
 SCALE: 1 = 20'

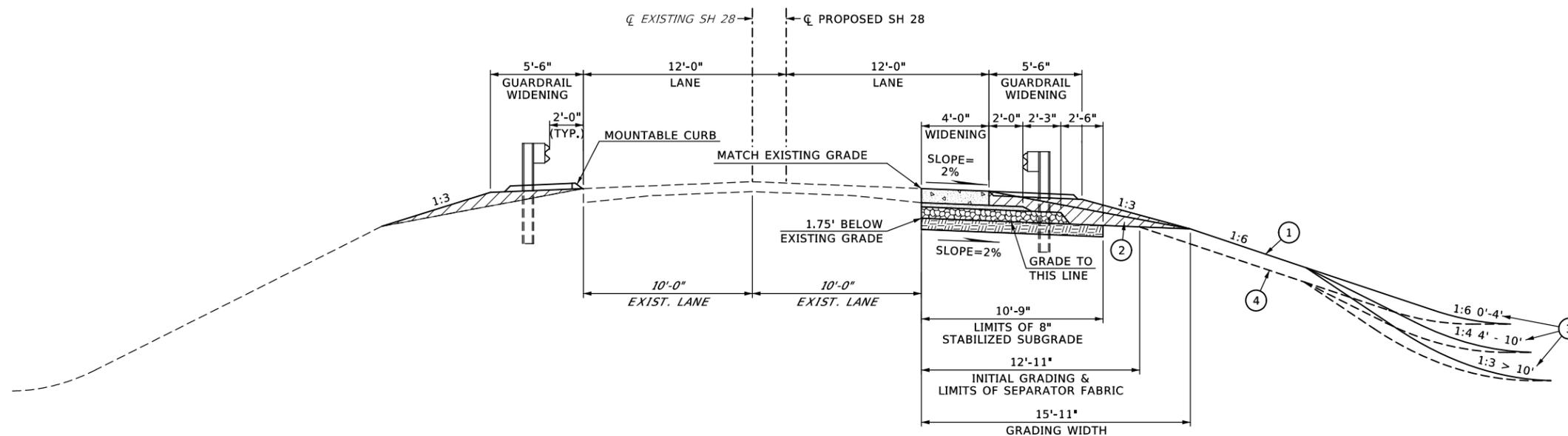
DESIGN	KSJ	2/18	GRAND RIVER DAM AUTHORITY <b>GENERAL EAST SPILLWAY NO. 2</b> <b>PLAN AND ELEVATION</b> <b>C STA. 2+05.00</b>				
DRAWN	JLB	2/18					
CHECKED							
APPROVED	SOT	2/18					
SQUAD	BENHAM						
COUNTY	MAYES	HIGHWAY	SH-28	STATE JOB NO.	41806	SHEET NO.	0028

BRIDGE C

6/29/2018

2:27:05 PM

P:\FDB\650-TUL\CIV\400204-GRDA-PensDam\20\_DESIGN\40\_CAD\C\Roadway\TYPICAL 01.dgn

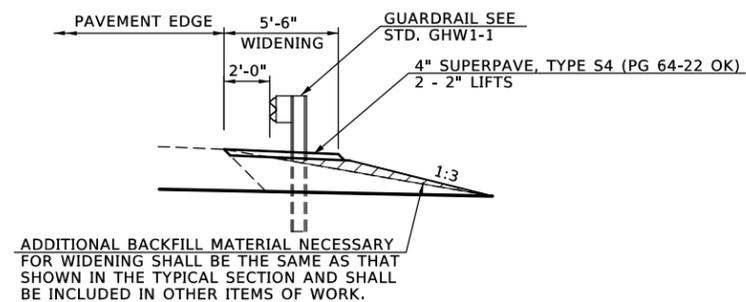


PAVEMENT REQUIREMENT	
PAVEMENT STRUCTURE	4'-0" WIDENING
SURFACE COURSE	10" TIED PC PAVEMENT
BASE COURSE	3" SUPERPAVE, TYPE S3(PG 64-22 OK)
	8" AGGREGATE BASE TYPE A

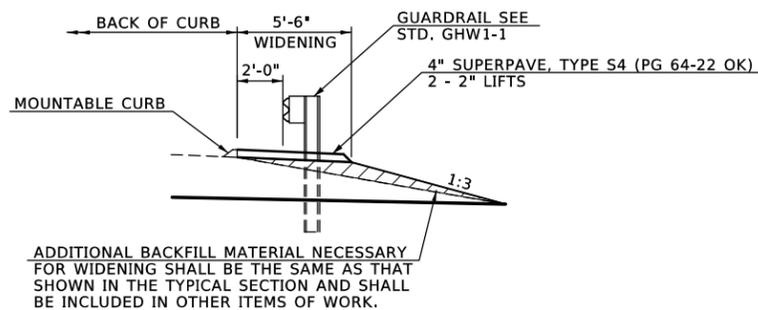
**A** TYPICAL SECTION - SH 28  
N.T.S.

- ① PERMANENT SLOPE PROTECTION.
- ② TO BE BACKFILLED & COMPACTED AS PART OF THE FINISHING OPERATIONS. COST TO BE INCLUDED IN TBSC TYPE E.
- ③ DISTANCE MEASURED VERTICALLY FROM EDGE OF FINISHED GRADE SHOULDER.
- ④ TOPSOIL NOTE :  
THE CONTRACTOR SHALL STRIP ALL OF THE AVAILABLE TOPSOIL, STOCKPILE IT AND PLACE IT BACK ON THE SECTION IN ACCORDANCE WITH SECTION 205 OF THE STANDARD SPECIFICATIONS. RESERVED TOPSOIL SHALL BE SPREAD FIRST ON THE COMPLETE SLOPES OF THE CUT SECTIONS AND THE REMAINDER ON COMPLETED FILL SLOPES OR OTHER PRIORITY AREAS LOCATED BY THE ENGINEER. ALL ADDITIONAL COSTS ASSOCIATED WITH OPERATION SHALL BE INCLUDED IN THE PAY ITEMS FOR SALVAGED TOPSOIL, LUMP SUM.

THE GRADING LINE AS SHOWN ON THE TYPICAL AND CROSS SECTIONS IS TO TOP OF THE SOIL. EARTHWORK QUANTITIES WERE NOT ADJUSTED FOR SALVAGE AND TOPSOIL QUANTITY IS INCLUDED IN THE SUMMARIZED EARTHWORK.

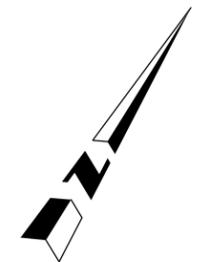
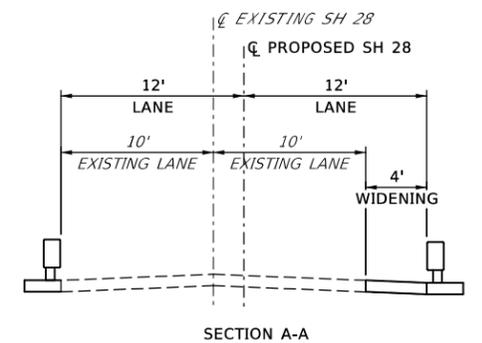


**GUARDRAIL WIDENING DETAIL**  
N.T.S.



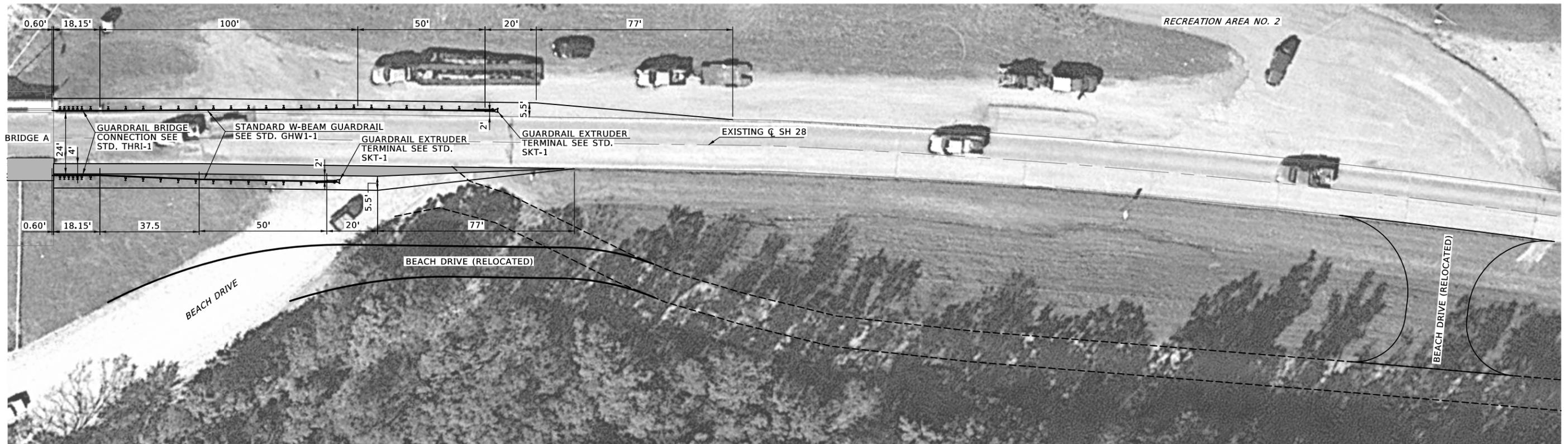
**GUARDRAIL WIDENING DETAIL W/ MOUNTABLE CURB**  
N.T.S.

DESIGN	LLW	2/18	GRAND RIVER DAM AUTHORITY
DRAWN	JDH	2/18	
CHECKED			TYPICAL SECTION
APPROVED	SOT	2/18	
SQUAD	BENHAM		
COUNTY	MAYES	HIGHWAY	SH-28 STATE JOB NO. 41806 SHEET NO. 0029



**PLAN OF MAIN DAM & SPILLWAY WEST END**

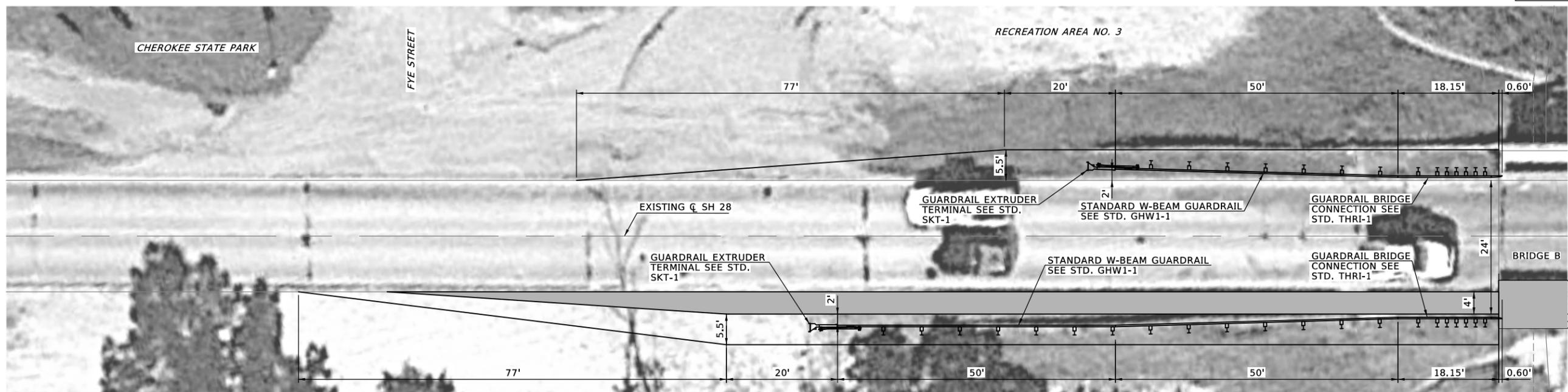
SCALE: 1 = 40'



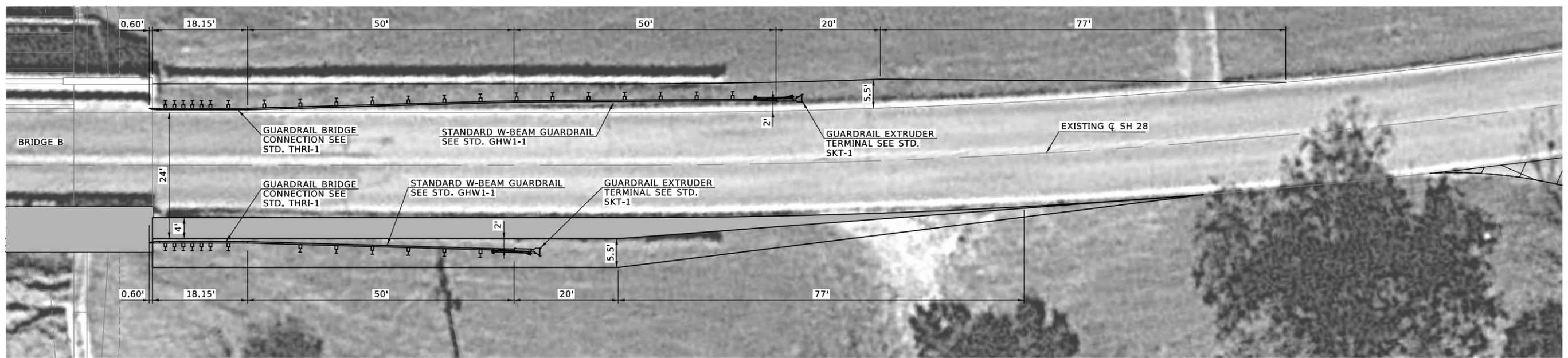
**PLAN OF MAIN DAM & SPILLWAY EAST END**

SCALE: 1 = 40'

DESIGN	LLW	2/18	GRAND RIVER DAM AUTHORITY <b>MAIN DAM &amp; SPILLWAY ROADWAY, BARRIER AND GUARDRAIL LAYOUT</b>				
DRAWN	JLB	2/18					
CHECKED							
APPROVED	SOT	2/18					
SQUAD	BENHAM						
COUNTY	MAYES	HIGHWAY	SH-28	STATE JOB NO.	41806	SHEET NO.	0030



**PLAN OF EAST SPILLWAY NO. 1 WEST END**  
 SCALE: 1 = 20'

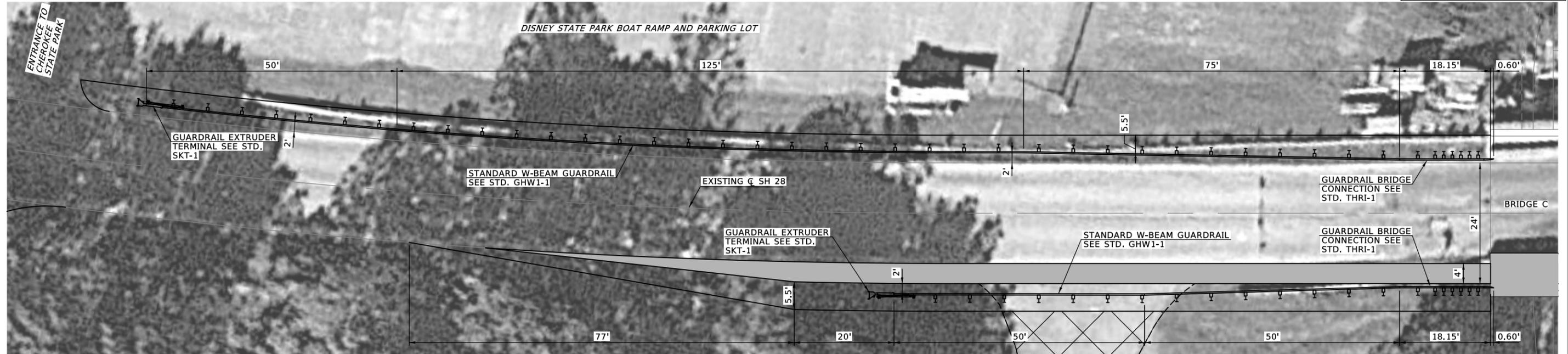


**PLAN OF EAST SPILLWAY NO. 1 EAST END**  
 SCALE: 1 = 20'

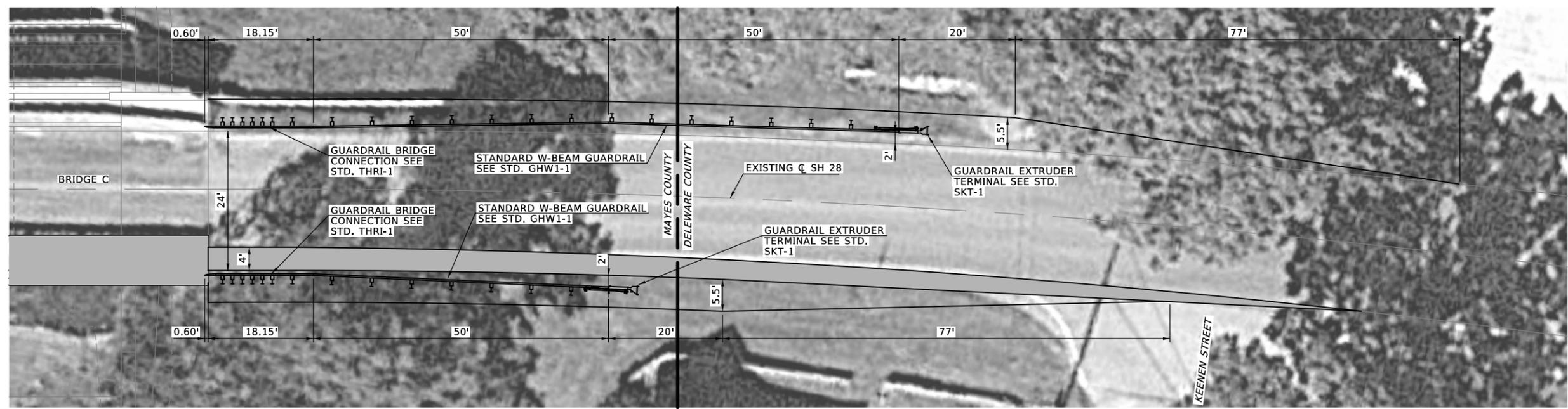
P:\FDB\650-TUL\CIV\400204-GRDA-PensDam\20\_DESIGN\40\_CAD\C\Roadway\41806 EAST SPILLWAY NO. 1 ROADWAY AND GUARDRAIL LAYOUT.dgn

DESIGN	LLW	2/18	GRAND RIVER DAM AUTHORITY
DRAWN	JLB	2/18	
CHECKED			
APPROVED	SOT	2/18	
SQUAD	BENHAM		
COUNTY MAYES			HIGHWAY SH-28
STATE JOB NO. 41806			SHEET NO. 0031

**EAST SPILLWAY NO. 1  
 ROADWAY AND GUARDRAIL LAYOUT**



**PLAN OF EAST SPILLWAY NO. 2 WEST END**  
 SCALE: 1 = 20'



**PLAN OF EAST SPILLWAY NO. 2 EAST END**  
 SCALE: 1 = 20'



DESIGN	LLW	2/18	GRAND RIVER DAM AUTHORITY
DRAWN	JLB	2/18	
CHECKED			
APPROVED	SOT	2/18	
SQUAD	BENHAM		
COUNTY	MAYES	HIGHWAY	SH-28 STATE JOB NO. 41806 SHEET NO. 0032



**PLAN OF CIRCULAR DRIVE SOUTH OF DISNEY STATE PARK**

SCALE: 1 = 40'

DESIGN	LLW	2/18	GRAND RIVER DAM AUTHORITY				
DRAWN	JDH	2/18					
CHECKED							
APPROVED	SOT	2/18					
SQUAD	BENHAM						
COUNTY	MAYES	HIGHWAY	SH-28	STATE JOB NO.	41806	SHEET NO.	0033

**CIRCULAR DRIVE REALIGNMENT  
SOUTH OF DISNEY STATE PARK**

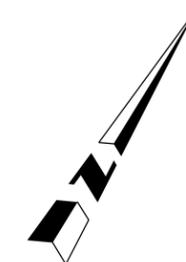


NOT TO SCALE

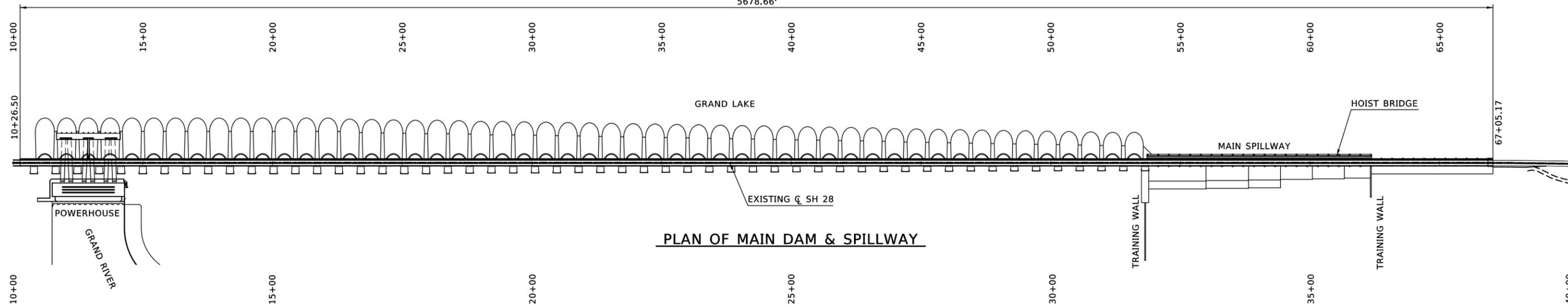
DESIGN	LLW	2/18	GRAND RIVER DAM AUTHORITY
DRAWN	JDH	2/18	
CHECKED			<b>EMERGENCY DETOUR ROUTES</b>
APPROVED	SOT	2/18	
SQUAD	BENHAM		
COUNTY	MAYES	HIGHWAY	SH-28 STATE JOB NO. 41806 SHEET NO. 0034

6/29/2018

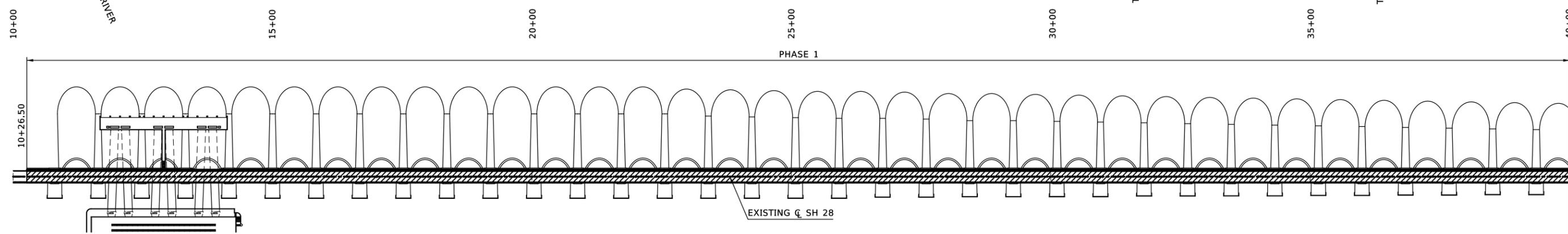
PHASE 1		
ITEM	CONSTRUCTION	TRAFFIC
Bridge A	Construction on downstream and upstream sides	SH 28 Eastbound: closed, on Detour
Main Dam & Spillway	(widening, hydrodemolition, overlay)	SH 28 Westbound: closed, on Detour
Bridge B	No construction	SH 28 Eastbound: open
East Spillway No. 1		SH 28 Westbound: open
Bridge C	No construction	SH 28 Eastbound: open
East Spillway No. 2		SH 28 Westbound: open



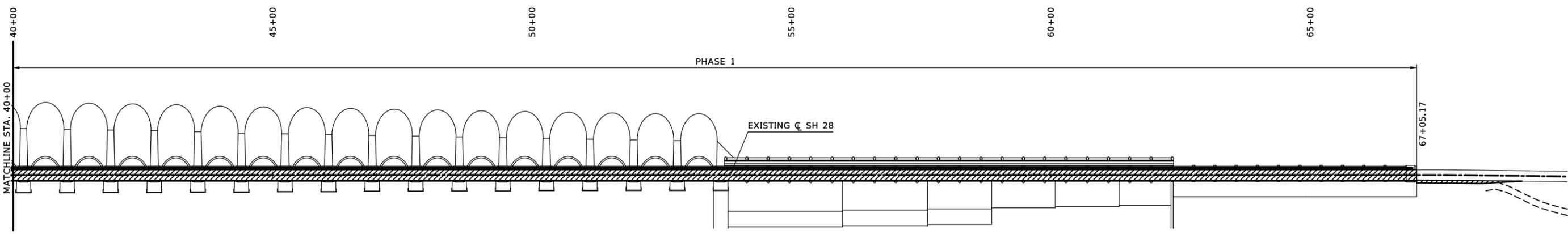
PHASE 1  
WORK ZONE  
5678.66'



PLAN OF MAIN DAM & SPILLWAY



PLAN STA. 10+26.50 THRU 40+00



PLAN STA. 40+00 THRU 67+05.17

LEGEND:

WORK ZONE

DESIGN	LLW	2/18	GRAND RIVER DAM AUTHORITY <b>CONSTRUCTION SEQUENCE MAIN DAM &amp; SPILLWAY PHASE 1</b>				
DRAWN	JLB	2/18					
CHECKED							
APPROVED	SOT	2/18					
SQUAD	BENHAM						
COUNTY	MAYES	HIGHWAY	SH-28	STATE JOB NO.	41806	SHEET NO.	0035

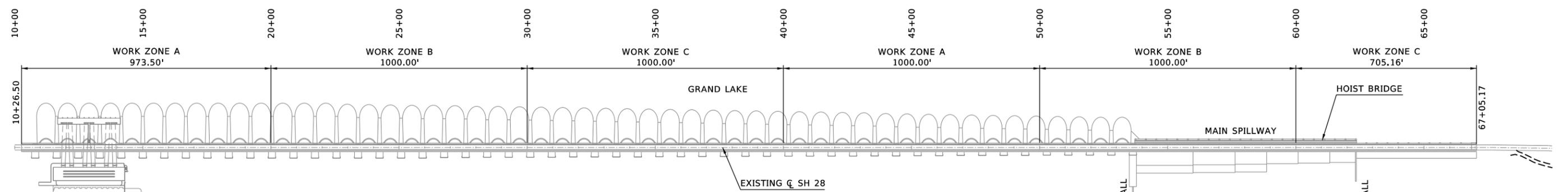
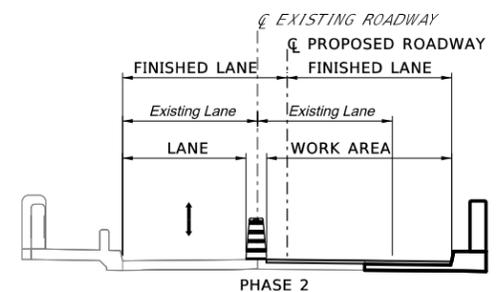
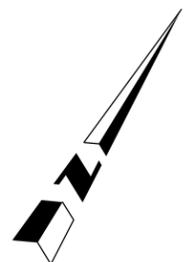
P:\FDB\650-TUL\CIV\400204-GRDA-PensDam\20\_DESON\40\_CAD\C\Construction Sequence\CONSTRUCTION SEQUENCE 01.dgn 2:27:46 PM

BRIDGE A

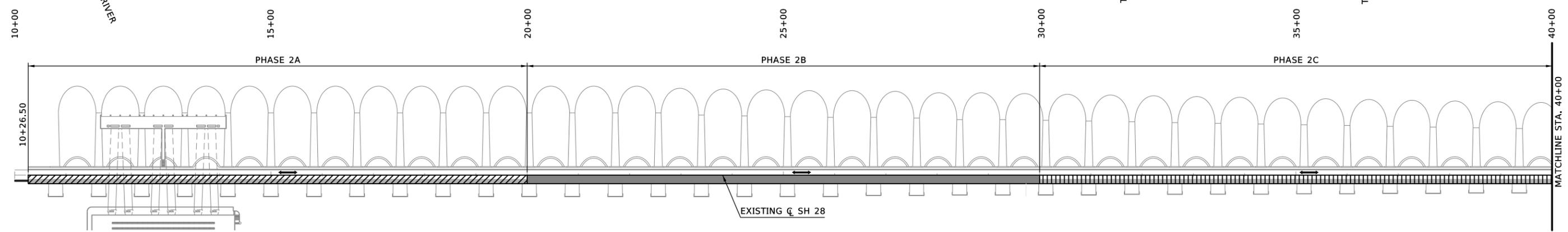
6/29/2018

PHASE 2		
ITEM	CONSTRUCTION	TRAFFIC
Bridge A	Construction on downstream side (rehabilitation below bridge deck)	SH 28 Eastbound: open, on SH 28 Westbound in work zones
Main Dam & Spillway	No construction	SH 28 Westbound: open
Bridge B	No construction	SH 28 Eastbound: open
East Spillway No. 1	No construction	SH 28 Westbound: open
Bridge C	No construction	SH 28 Eastbound: open
East Spillway No. 2	No construction	SH 28 Westbound: open

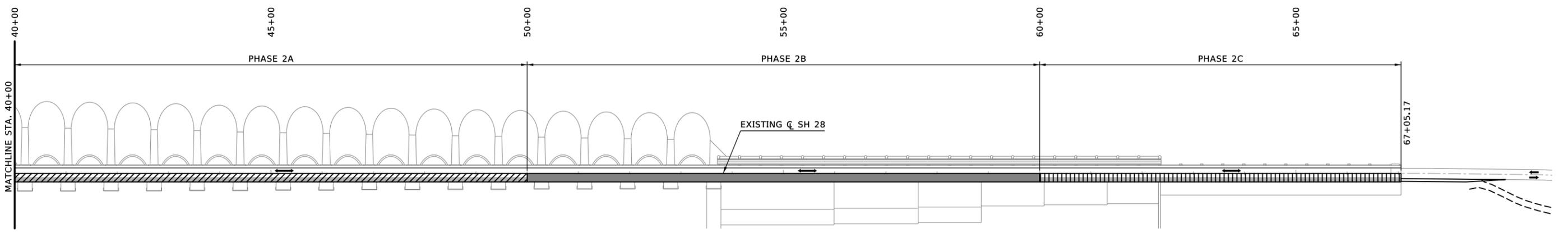
Due to the length of the Main Dam & Spillway, work zone lengths shall be limited to 1000 feet. A maximum of two work zones, separated by 2000 feet, can be operational at one time.



PLAN OF MAIN DAM & SPILLWAY



PLAN STA. 10+26.50 THRU 40+00



PLAN STA. 40+00 THRU 67+05.17

- LEGEND:**
- WORK ZONE A
  - WORK ZONE B
  - WORK ZONE C
  - TRAFFIC FLOW DIRECTION

DESIGN	LLW	2/18	GRAND RIVER DAM AUTHORITY <b>CONSTRUCTION SEQUENCE MAIN DAM &amp; SPILLWAY PHASE 2</b>
DRAWN	JLB	2/18	
CHECKED			
APPROVED	SOT	2/18	
SQUAD	BENHAM		
COUNTY	MAYES	HIGHWAY	SH-28
		STATE JOB NO.	41806
		SHEET NO.	0036

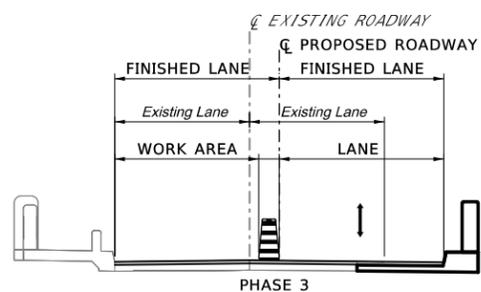
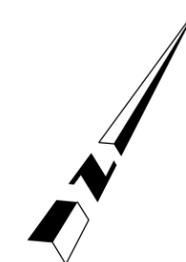
P:\FDB\650-TUL\CIV\400204-GRDA-PensDam\20\_DESIGN\40\_CAD\C\Construction Sequence\CONSTRUCTION SEQUENCE 02.dgn 2:27:47 PM

BRIDGE A

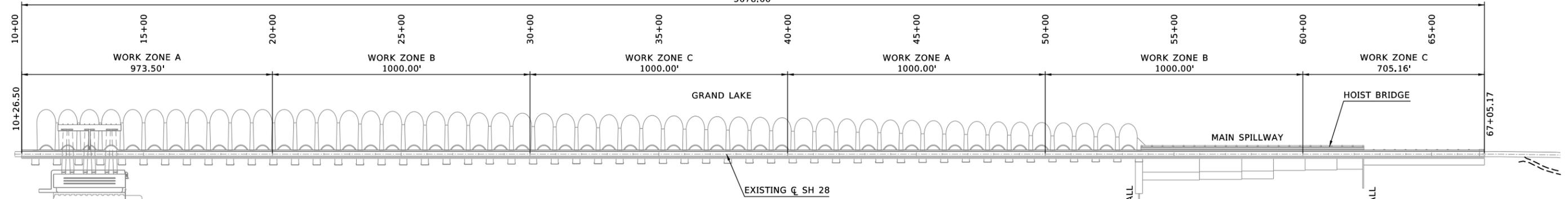
6/29/2018

PHASE 3		
ITEM	CONSTRUCTION	TRAFFIC
Bridge A	Construction on upstream side (rehabilitation below bridge deck)	SH 28 Eastbound: open
Main Dam & Spillway	No construction	SH 28 Westbound: open, on SH 28 Eastbound in work zones
Bridge B	No construction	SH 28 Eastbound: open
East Spillway No. 1	No construction	SH 28 Westbound: open
Bridge C	No construction	SH 28 Eastbound: open
East Spillway No. 2	No construction	SH 28 Westbound: open

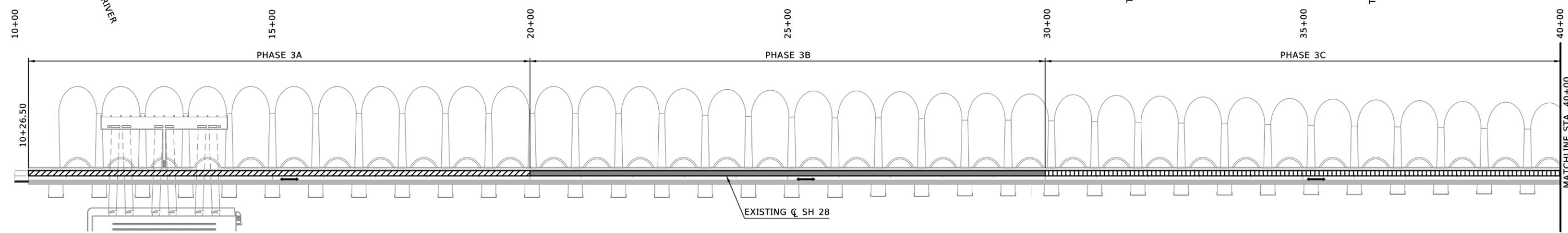
Due to the length of the Main Dam & Spillway, work zone lengths shall be limited to 1000 feet. A maximum of two work zones, separated by 2000 feet, can be operational at one time.



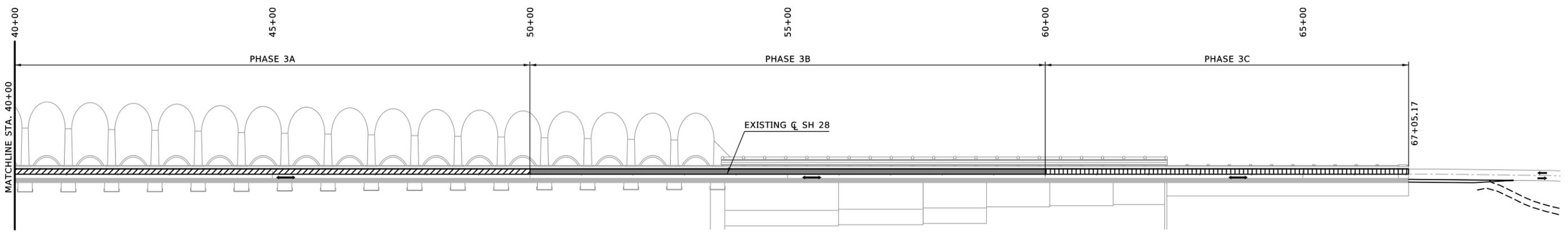
PHASE 3  
WORK ZONE  
5678.66'



PLAN OF MAIN DAM & SPILLWAY



PLAN STA. 10+26.50 THRU 40+00



PLAN STA. 40+00 THRU 67+05.17

LEGEND:

- WORK ZONE A
- WORK ZONE B
- WORK ZONE C
- TRAFFIC FLOW DIRECTION

DESIGN	LLW	2/18
DRAWN	JLB	2/18
CHECKED		
APPROVED	SOT	2/18
SQUAD	BENHAM	

BRIDGE A

GRAND RIVER DAM AUTHORITY

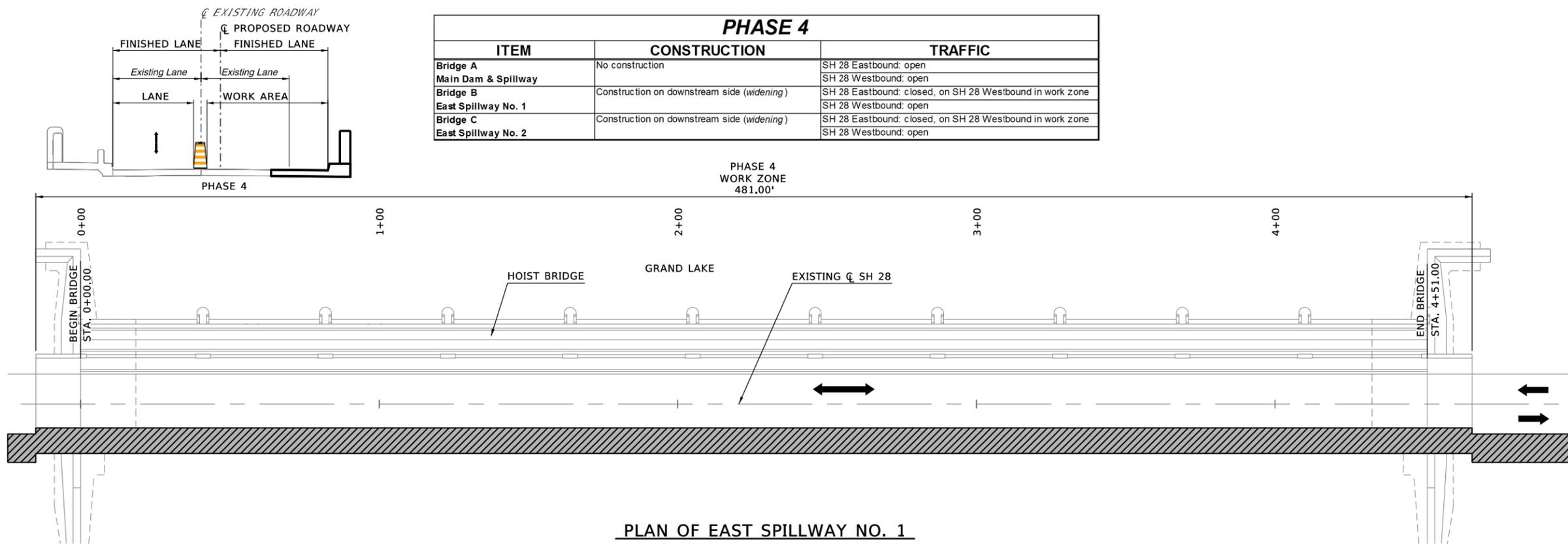
**CONSTRUCTION SEQUENCE**

**MAIN DAM & SPILLWAY**

**PHASE 3**

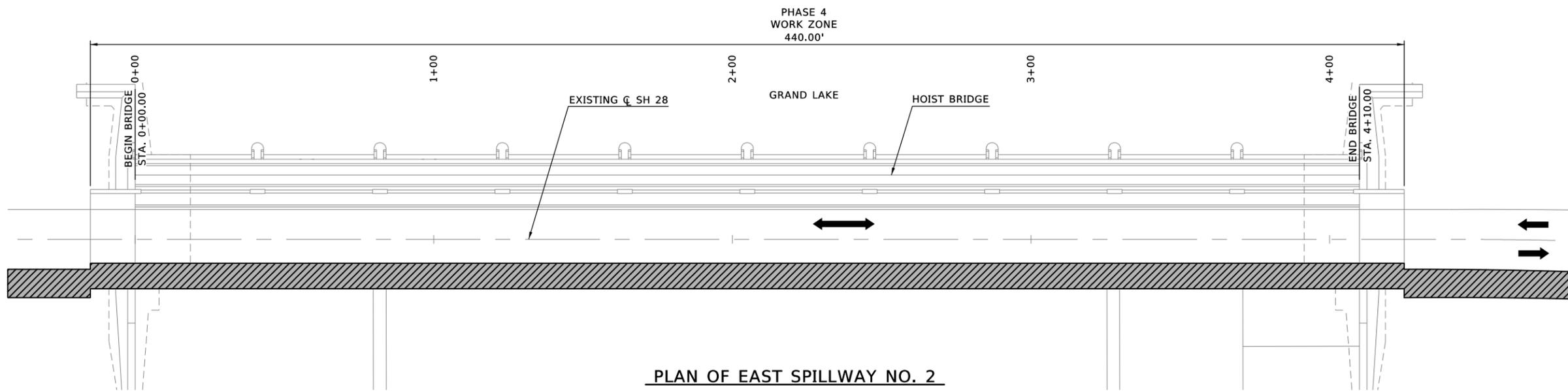
P:\FDB\650-TUL\CIV\400204-GRDA-PensDam\20-DESIGN\40-CAD\C\Construction Sequence\CONSTRUCTION SEQUENCE 03.dgn 2:27:48 PM

PHASE 4		
ITEM	CONSTRUCTION	TRAFFIC
Bridge A	No construction	SH 28 Eastbound: open
Main Dam & Spillway	No construction	SH 28 Westbound: open
Bridge B	Construction on downstream side (widening)	SH 28 Eastbound: closed, on SH 28 Westbound in work zone
East Spillway No. 1	Construction on downstream side (widening)	SH 28 Westbound: open
Bridge C	Construction on downstream side (widening)	SH 28 Eastbound: closed, on SH 28 Westbound in work zone
East Spillway No. 2	Construction on downstream side (widening)	SH 28 Westbound: open



PLAN OF EAST SPILLWAY NO. 1

BRIDGE B



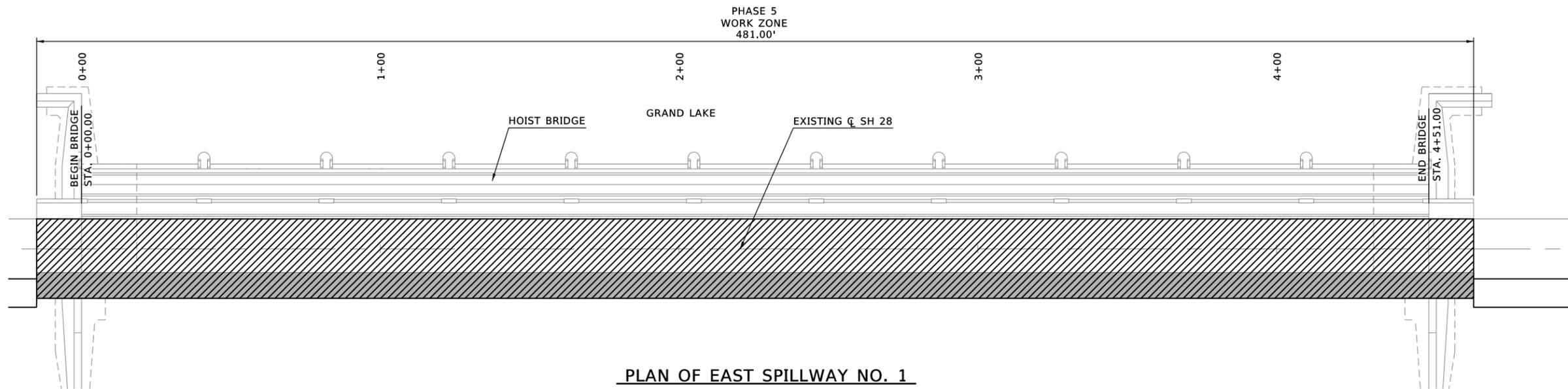
PLAN OF EAST SPILLWAY NO. 2

BRIDGE C

**LEGEND:**  
 WORK ZONE  
 TRAFFIC FLOW DIRECTION

DESIGN	LLW	2/18	GRAND RIVER DAM AUTHORITY <b>CONSTRUCTION SEQUENCE EAST SPILLWAY NO. 1 &amp; EAST SPILLWAY NO. 2 PHASE 4</b>				
DRAWN	JLB	2/18					
CHECKED							
APPROVED	SOT	2/18					
SQUAD	BENHAM						
COUNTY	MAYES	HIGHWAY	SH-28	STATE JOB NO.	41806	SHEET NO.	0038

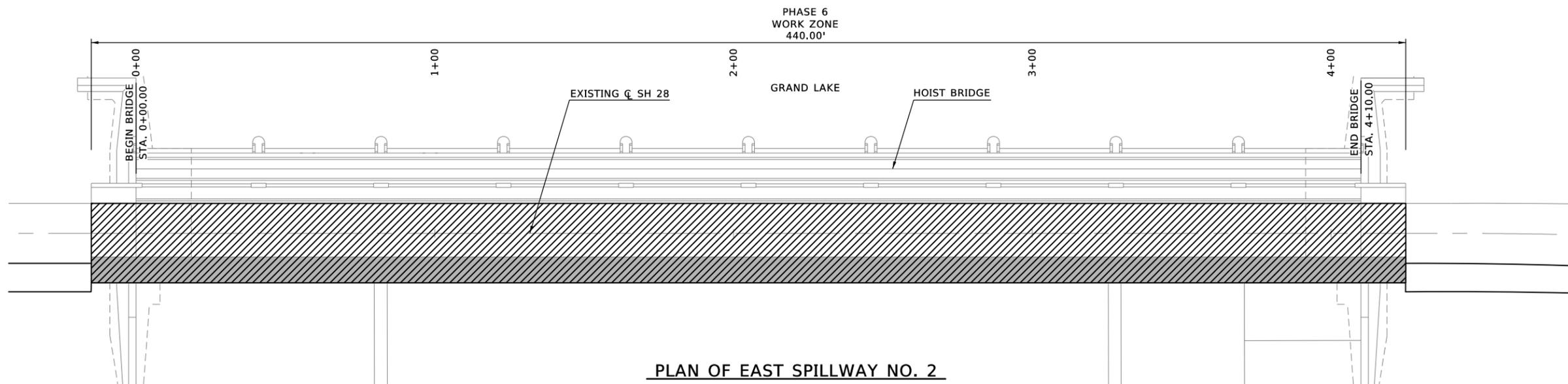
PHASE 5		
ITEM	CONSTRUCTION	TRAFFIC
Bridge A	No construction	SH 28 Eastbound: open
Main Dam & Spillway		SH 28 Westbound: open
Bridge B	Construction on downstream and upstream sides	SH 28 Eastbound: closed, on Detour
East Spillway No. 1	(hydrodemolition, overlay)	SH 28 Westbound: closed, on Detour
Bridge C	No construction	SH 28 Eastbound: open
East Spillway No. 2		SH 28 Westbound: open



PLAN OF EAST SPILLWAY NO. 1

BRIDGE B

PHASE 6		
ITEM	CONSTRUCTION	TRAFFIC
Bridge A	No construction	SH 28 Eastbound: open
Main Dam & Spillway		SH 28 Westbound: open
Bridge B	No construction	SH 28 Eastbound: open
East Spillway No. 1		SH 28 Westbound: open
Bridge C	Construction on downstream and upstream sides	SH 28 Eastbound: closed, on Detour
East Spillway No. 2	(hydrodemolition, overlay)	SH 28 Westbound: closed, on Detour



PLAN OF EAST SPILLWAY NO. 2

BRIDGE C

**LEGEND:**



WORK ZONE



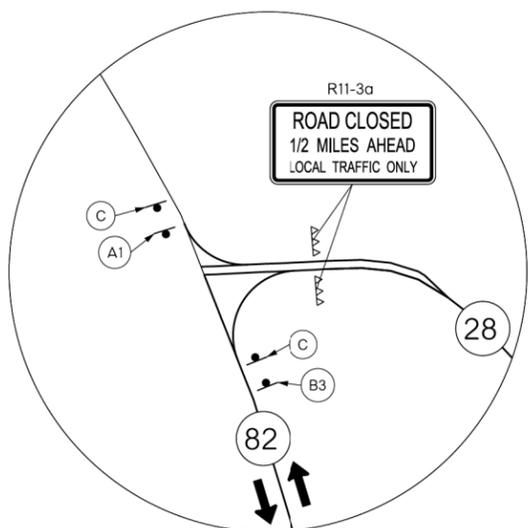
TRAFFIC FLOW DIRECTION

DESIGN	LLW	2/18
DRAWN	JLB	2/18
CHECKED		
APPROVED	SOT	2/18
SQUAD	BENHAM	

GRAND RIVER DAM AUTHORITY

**CONSTRUCTION SEQUENCE  
EAST SPILLWAY NO. 1  
& EAST SPILLWAY NO. 2  
PHASES 5 AND 6**

	A	B
	 M4-8 M3-2 M1-6(3)	 M4-8 M3-4 M1-6(3)
1	 M6-3	 M6-3
2	 M6-1(R)	 M6-1(R)
3	 M4-6	 M4-6

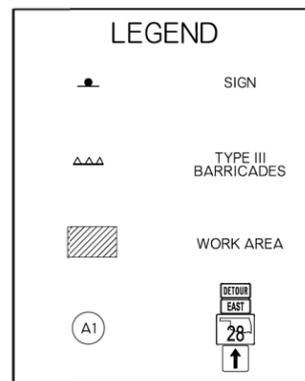
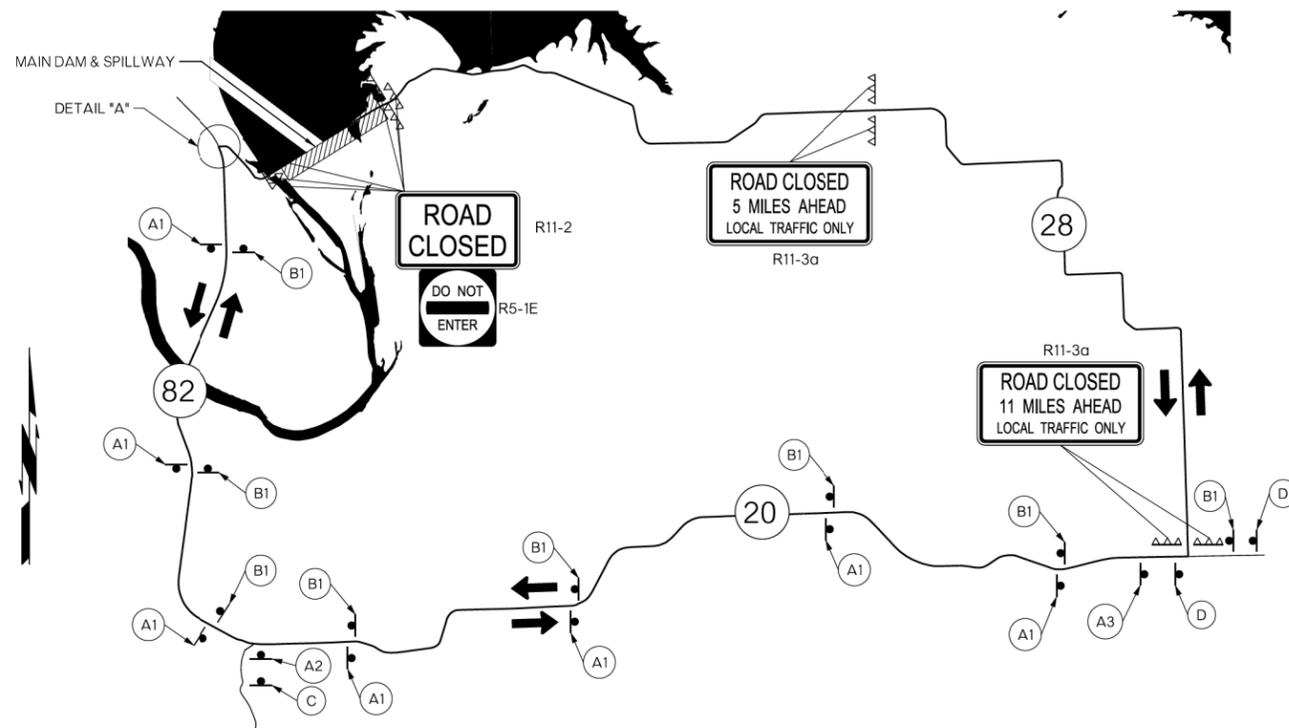


DETAIL "A"

C	D
 CONSTRUCTION EAST TO 20 CLOSED	 CONSTRUCTION WEST TO 82 CLOSED

\* SEE SPECIAL SIGN DETAILS SHEET

SIGN ASSEMBLY DETAILS



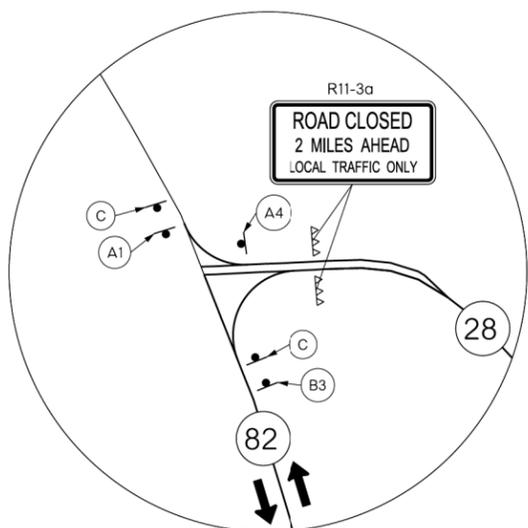
DESIGN	LLW	2/18	GRAND RIVER DAM AUTHORITY
DRAWN	JLB	2/18	
CHECKED			TRAFFIC CONTROL PLAN PHASE 1
APPROVED	SOT	2/18	
SQUAD	BENHAM		
COUNTY	MAYES	HIGHWAY	SH-28 STATE JOB NO. 41806 SHEET NO. 0040

6/29/2018

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	A	B
	<p>DETOUR EAST M4-8 M3-2 M1-6(3) 28</p>	<p>DETOUR WEST M4-8 M3-4 M1-6(3) 28</p>
1	<p>↑ M6-3</p>	<p>↑ M6-3</p>
2	<p>→ M6-1(R)</p>	<p>→ M6-1(R)</p>
3	<p>END M4-6</p>	<p>END M4-6</p>
4	<p>← M6-1(L)</p>	<p>← M6-1(L)</p>

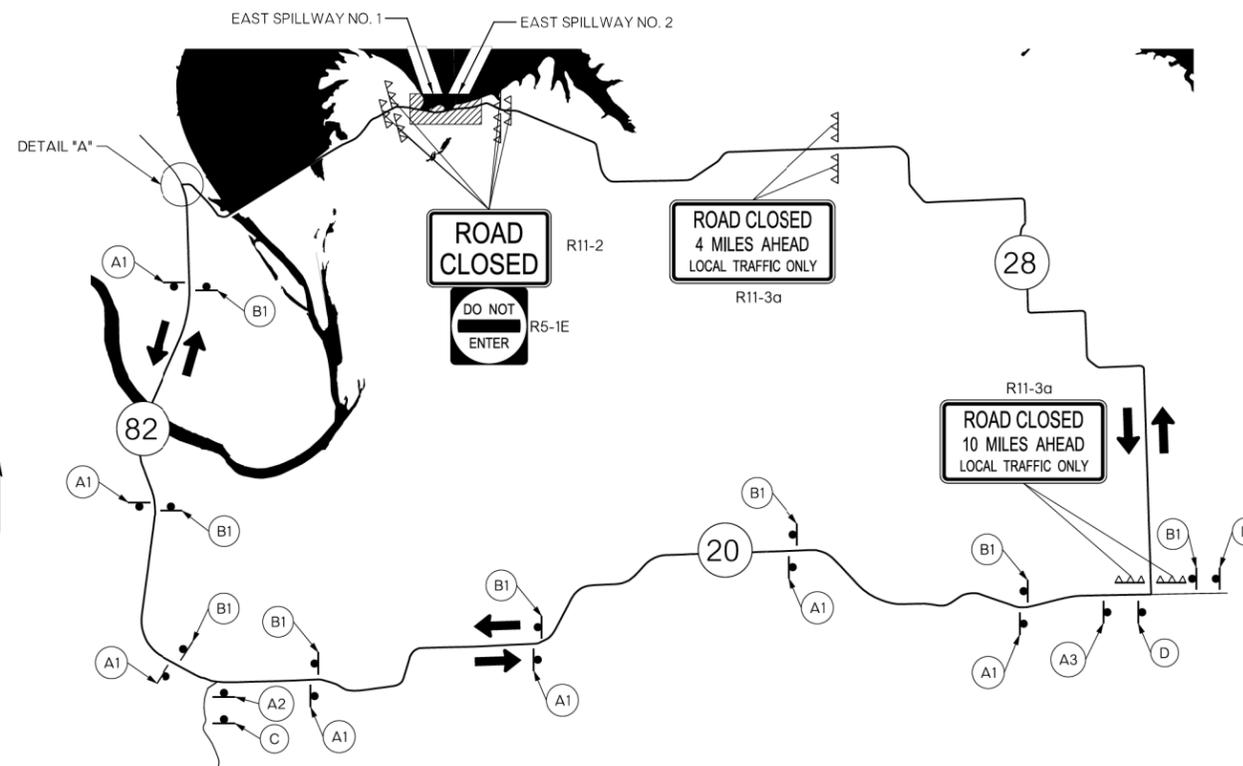


DETAIL "A"

C	D
<p>CONSTRUCTION 28 EAST TO 20 CLOSED</p>	<p>CONSTRUCTION 28 WEST TO 82 CLOSED</p>

\* SEE SPECIAL SIGN DETAILS SHEET

SIGN ASSEMBLY DETAILS

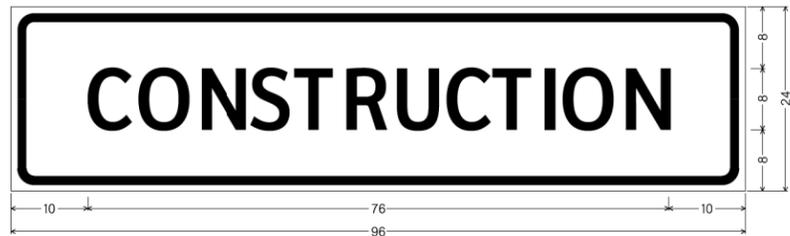


LEGEND

	SIGN
	TYPE III BARRICADES
	WORK AREA
	A1
	DETOUR EAST 28 ↑

NOTE:  
PHASE 5: EAST SPILLWAY NO. 1 CLOSED; EAST SPILLWAY NO. 2 OPEN  
PHASE 6: EAST SPILLWAY NO. 1 OPEN; EAST SPILLWAY NO. 2 CLOSED

DESIGN	LLW	2/18	GRAND RIVER DAM AUTHORITY
DRAWN	JLB	2/18	
CHECKED			TRAFFIC CONTROL PLAN PHASES 5 AND 6
APPROVED	SOT	2/18	
SQUAD	BENHAM		
COUNTY	MAYES	HIGHWAY SH-28	STATE JOB NO. 41806
			SHEET NO. 0041



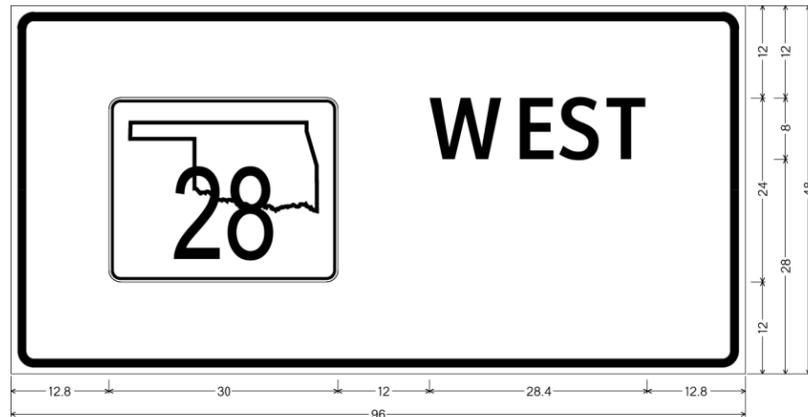
Construction; 3.0" Radius, 1.1" Border, 0.8" Indent, Black on Orange;  
 [CONSTRUCTION] ClearviewHwy-3-W 62) spacing;

SPECIAL SIGN NO. 1



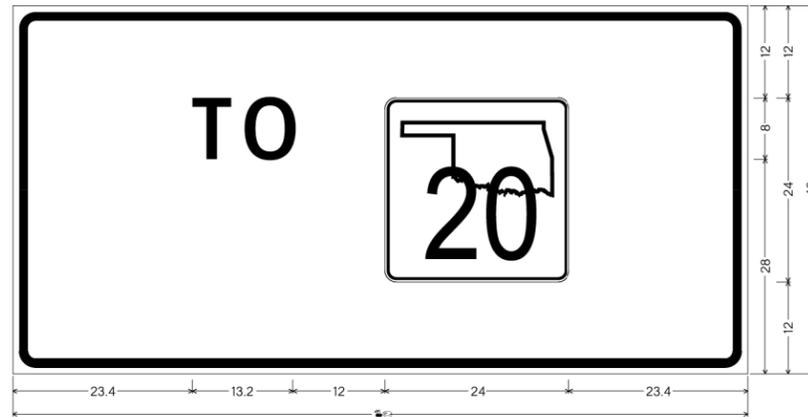
Closed; 3.0" Radius, 1.1" Border, 0.8" Indent, Black on Orange;  
 [CLOSED] ClearviewHwy-3-W 58) spacing;

SPECIAL SIGN NO. 2



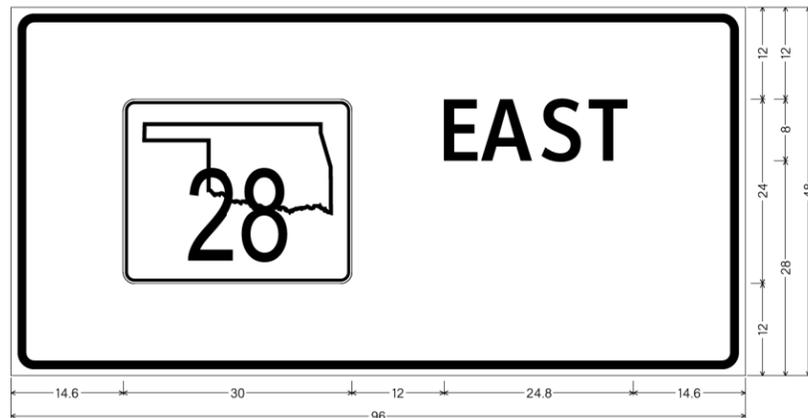
152 WEST; 3.0" Radius, 1.1" Border, 0.8" Indent, Black on Orange;  
 Rectangle White; [WEST] ClearviewHwy-3-W;

SPECIAL SIGN NO. 3



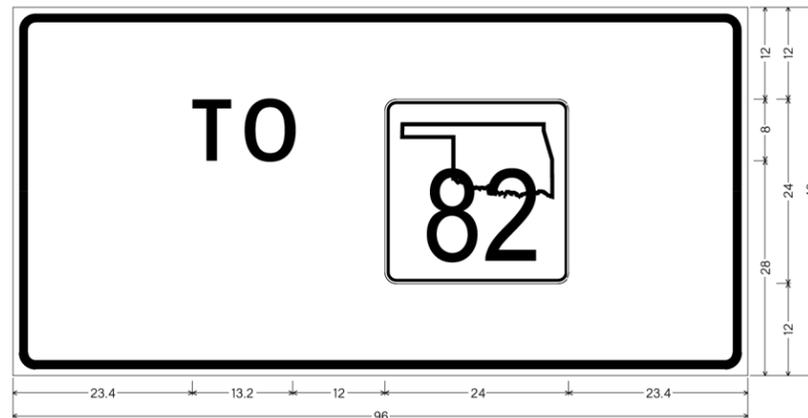
TO 44; 3.0" Radius, 1.1" Border, 0.8" Indent, Black on Orange;  
 [TO] ClearviewHwy-3-W; Rectangle White;

SPECIAL SIGN NO. 4



152 EAST; 3.0" Radius, 1.1" Border, 0.8" Indent, Black on Orange;  
 Rectangle White; [EAST] ClearviewHwy-3-W;

SPECIAL SIGN NO. 5



TO 6; 3.0" Radius, 1.1" Border, 0.8" Indent, Black on Orange;  
 [TO] ClearviewHwy-3-W; Rectangle White;

SPECIAL SIGN NO. 6

DESIGN	LLW	2/18	GRAND RIVER DAM AUTHORITY
DRAWN	JLB	2/18	
CHECKED			TRAFFIC CONTROL SPECIAL SIGN DETAILS
APPROVED	SOT	2/18	
SQUAD	BENHAM		
COUNTY	MAYES	HIGHWAY	SH-28 STATE JOB NO. 41806 SHEET NO. 0042