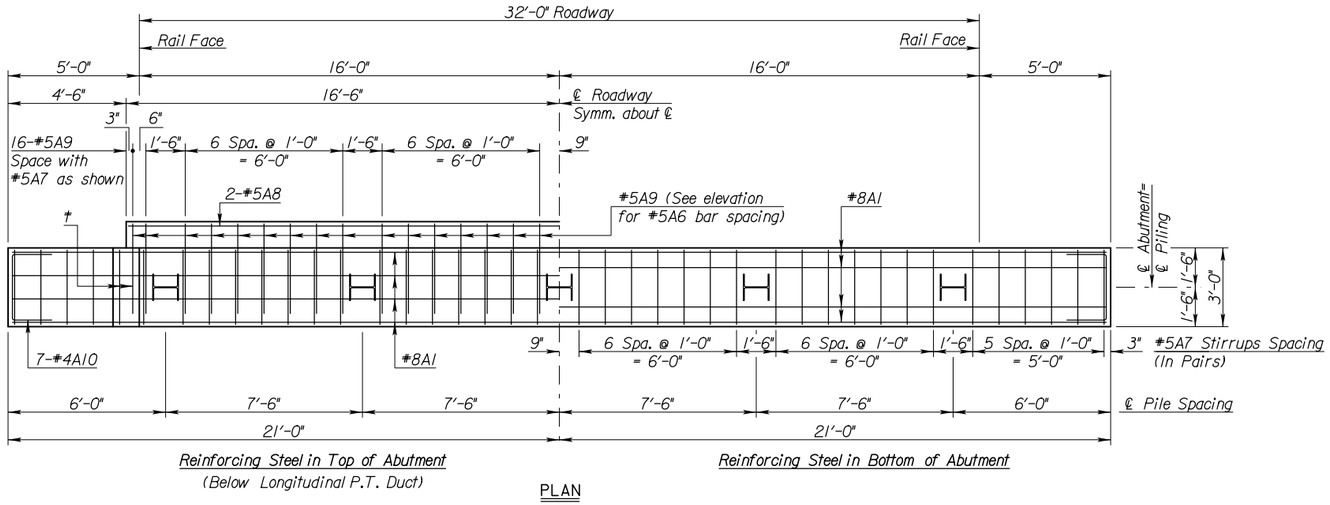
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	Proj. No.	YEAR	0	0

B-55725S\B32RDWY\B32ABT1.dgn

Roadway Width =	32'-0"	Longest Span Length =	112'-0"
Skew and Direction =	0	Total No. of Spans =	3
Loading =	HL-93	Railing Type =	32" Corral



PLAN

LEGEND
EF = Each Face
NF = Near Face
FF = Far Face
P.T. = Post-Tensioning

◔ Note: Top of piling elevations are based on 2'-0" maximum embedment.

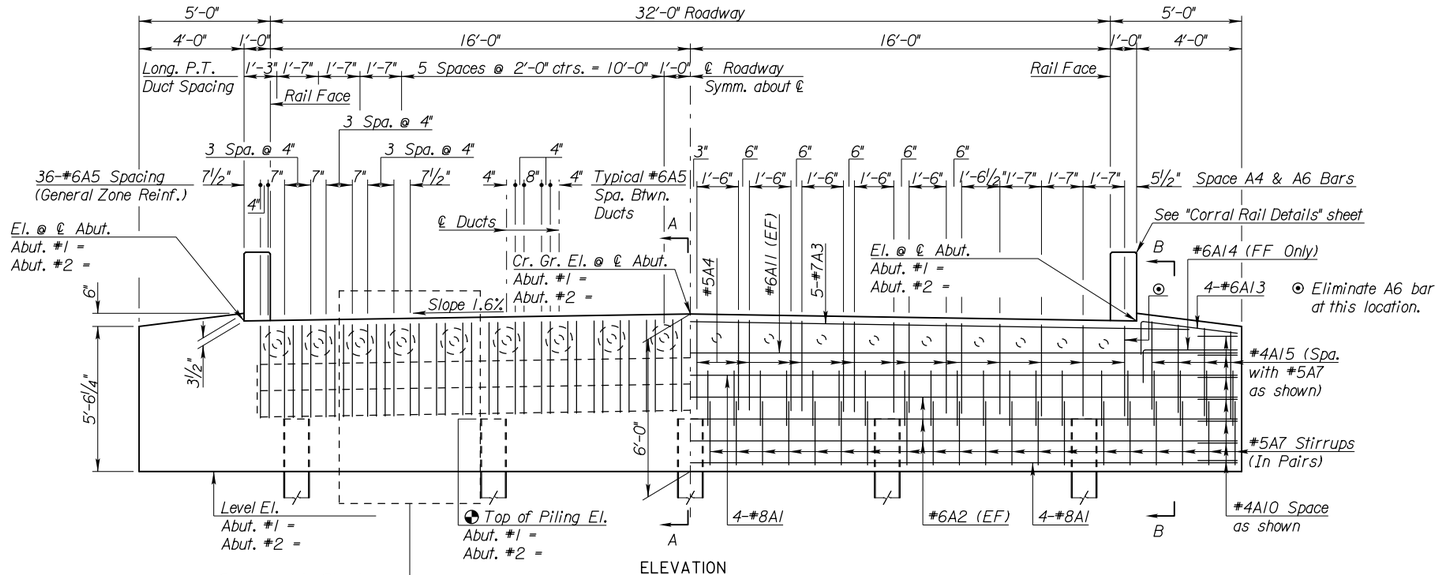
† Adjust stirrups or bar locations to avoid conflict with rail bars.

NOTE:
Construction Joints will not be allowed in the abutment.

NOTE:
Placement of Longitudinal Post-Tensioning Ducts shall have the #1 priority, Transverse Post-Tensioning Ducts #2 priority. Adjust all steel reinforcing to clear the Post-Tensioning Ducts.

See "Abutment Details II" sheet for Section A-A and Section B-B.

See "Post-Tensioning Data & Construction Sequence" sheet for Pre-Drilled Pile Hole Detail.



ELEVATION
Along ℄ Abutment.
#5A12 & #4A16 not shown for clarity, see "Abutment Details II" sheet for locations.

*ABUTMENT PILE LOADING (TONS)

Loading Case	Total Load ①	Total Load ②	Load per Pile ①	Load per Pile ②
Dead Loads	154	161	31	32
ΔHL-93	74	74	15	15
ΔDead + HL-93	228	235	46	47

*The abutment piles shall be HP12x53 steel piles due to the combined interaction of vertical, longitudinal and transverse loads. Allowable load = 70 Tons/Pile (End bearing only). Includes 8 Ton (Dead Loads) and 3 Ton (HL-93) contribution from a 13'-0" x 10" concrete approach slab.

ΔService-I Case, LRFD Specifications.

① Without Vertical Backwall option.
② With Vertical Backwall option.

Plotted By: rlong | Plot Location: Bridge Design
File: B32ABT1.dgn
Plot Date: 10-DEC-2013 14:44

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION
Br. No. Sta.
Br. No. Sta.
ABUTMENT DETAILS I
32' Roadway
Proj. No. Proj. No. Co. Co.

SHEET NO.	OF	SCALE		APP'D			
DESIGNED	A.H.	DETAILED	G.B.	QUANTITIES	B.S.	CADD	G.B.
DESIGN CK.	B.S.	DETAIL CK.	B.S.	QUAN. CK.	A.H.	CADD CK.	B.S.

CADconform Certify This File

Sheet No. 0

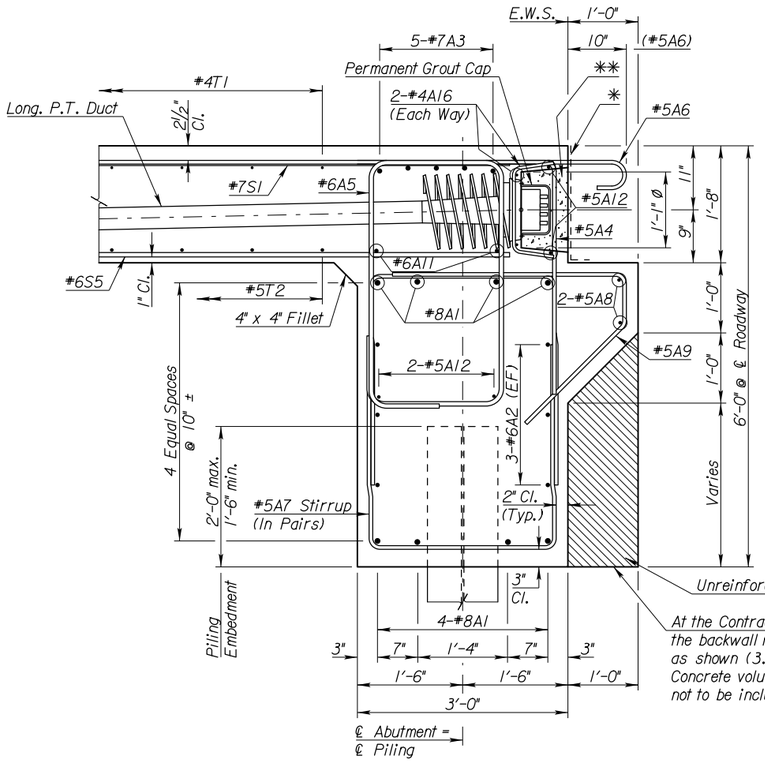
CADconform Certify This File

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	Proj. No.	YEAR	0	0

B-55725S\B32RDW\B32ABT2.dgn

Roadway Width =	32'-0"	Longest Span Length =	72'-0"
Skew and Direction =	0	Total No. of Spans =	3
Loading =	HL-93	Railing Type =	32" Corral

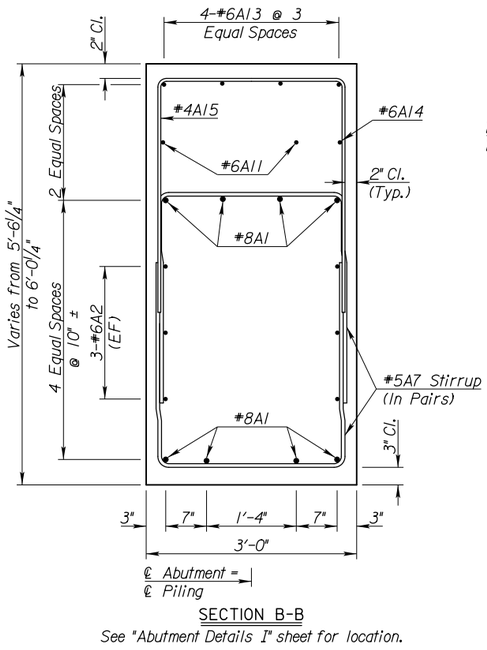
Plotted By: rlong
File: B32ABT2.dgn
Plot Date: 10-DEC-2013 14:44
Plot Location: Bridge Design



At the Contractor's option and expense, the backwall may be formed vertically as shown (3.30 Cu. Yds. concrete). Concrete volume is for information only, not to be included in quantity summary.

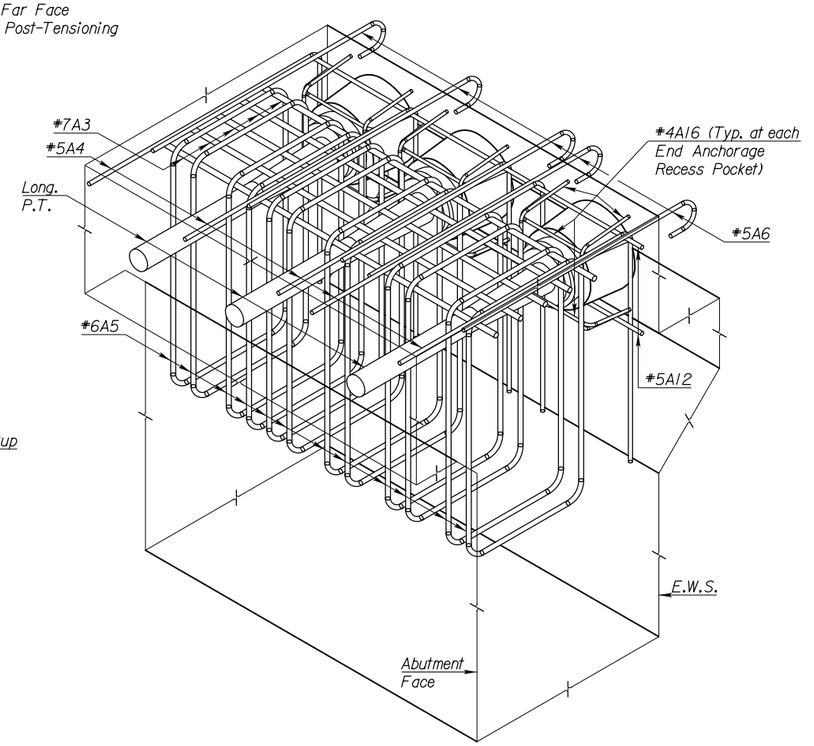
SECTION A-A

See "Abutment Details I" sheet for location.



SECTION B-B

See "Abutment Details I" sheet for location.



ISOMETRIC SHOWING END ANCHORAGE RECESS POCKET REINFORCING

Slab reinforcing, post-tensioning hardware and abutment reinforcing below P.T. not shown for clarity.

LEGEND

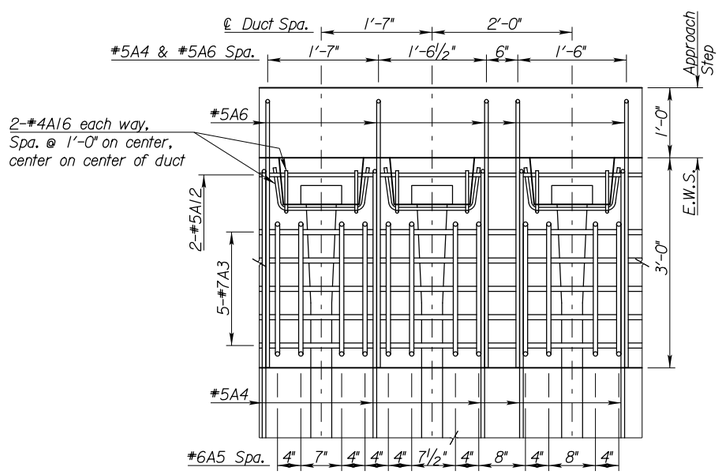
EF = Each Face
NF = Near Face
FF = Far Face
P.T. = Post-Tensioning

✳ Substructure Waterproofing Membrane. Place on the vertical face as shown, from edge to edge of slab. †

✳✳ Fill recess pocket after Post-Tensioning. See KDOT Specifications. †

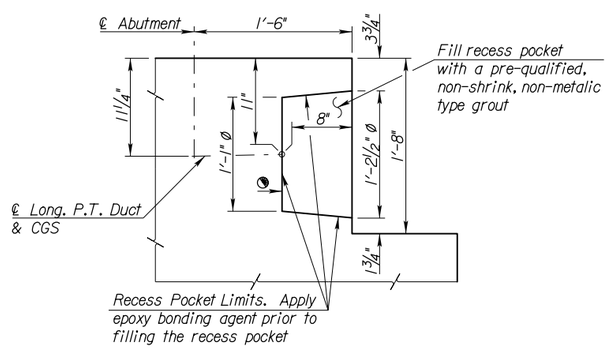
† This work will not be paid for separately but shall be considered subsidiary to the bid item "Concrete Gr. 5.0 (AE)( )."

CAUTION: Proper concrete consolidation is critical at longitudinal Post-Tension end anchorages. Consider this a "confined" area where a hand-held vibrator is required. Take care to not adversely affect reinforcing and Post-Tensioning assemblies during vibration.



PLAN SHOWING END ANCHORAGE RECESS POCKET REINFORCING

Slab reinforcing and abutment reinforcing below P.T. not shown for clarity.



DETAIL SHOWING END ANCHORAGE RECESS POCKET DIMENSIONS

◔ At request of Post-Tension Manufacturer, incline face to be normal to longitudinal P.T. profile.

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

Br. No. Sta.
Br. No. ABUTMENT DETAILS II Sta.
32' Roadway
Proj. No. Proj. No. Co. Co.

SHEET NO.	OF	SCALE		APP'D			
DESIGNED	A.H.	DETAILED	G.B.	QUANTITIES	B.S.	CADD	G.B.
DESIGN CK.	B.S.	DETAIL CK.	B.S.	QUAN. CK.	A.H.	CADD CK.	B.S.

CADconform Certify This File

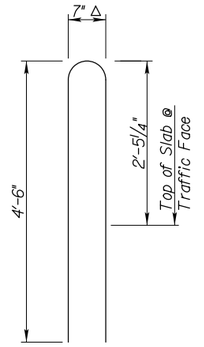
Sheet No. 0

CADconform Certify This File

B-557255\B32RDW\B32BARI.dgn			
Roadway Width =	32'-0"	Longest Span Length =	72'-0"
Skew and Direction =	0	Total No. of Spans =	3
Loading =	HL-93	Railing Type =	32" Corral

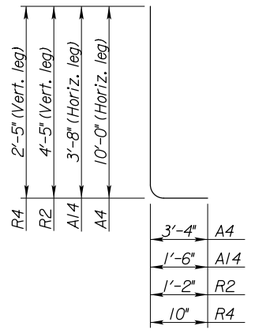
Plotted By: rlong	Plot Location: Bridge Design
File: B32BARI.dgn	
Plot Date: 10-DEC-2013 14:44	

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	Proj. No.	YEAR	0	0

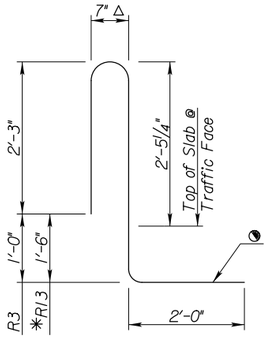


R1

Δ Nonstandard hook Plus 0, Minus ⅜"



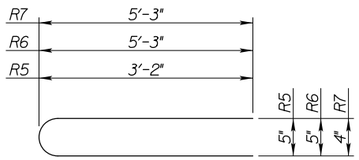
A4, A14, R2 & R4



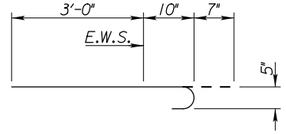
*R3 & R13

*Use R13 bars in place of R3 bars as shown on "Post-Tensioning Data & Construction Sequence" sheet.

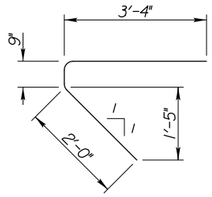
◔ Bend this leg to match the slope of the roadway.



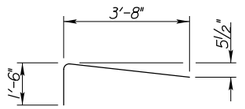
R5, R6 & R7



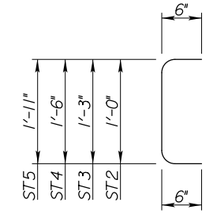
A6



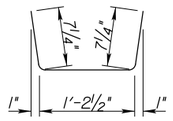
A9



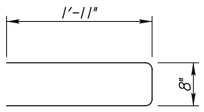
A13



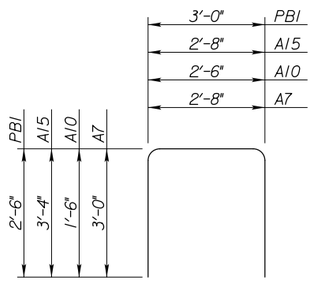
ST2, ST3, ST4 & ST5



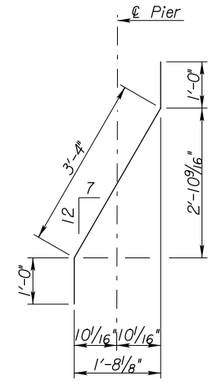
A16



R9

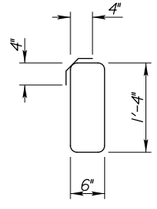


A7, A10, A15 & PB5

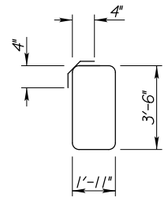


PB5

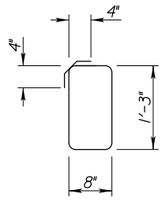
C1



R8



A5



R10

Dia.
1½ Complete turns (Top & Bottom)
6" Pitch

PS1

Note to Designer

1) Use ⅜" ø Spiral bar with #10 column bar and smaller.

2) 3 spacer bars required unless spiral diameter is greater than 2'-6", then use 4 spacer bars.

Weight of spiral spacer bars are included in the weight of reinforcing steel. Spiral reinforcing shall meet the requirements of either ASTM A615 Gr. 40 or 60, or ASTM A82.

Note to Designer:
(To be removed)

If columns are not used, remove the PS1 bar from the bar diagram.

Note to Designer:
(To be removed)

If a curb is not required, remove the C1 bar from the bar diagram. Remove the C1 and C2 bars from the bill on the right. Change the quantity of R9 bars from 144 to 288.

BENDING DIAGRAMS
(All dimensions are out to out of bars)

Note to Designer:
(To be removed)

The bill of reinforcing steel and bending diagram shown on this sheet is a starting point for the 3 spans (55'-72'-55'), 32'-0" roadway, post-tensioned haunched slab bridge. This sheet includes the bill of reinforcing steel and bending diagram for the 32" Kansas Corral Rail (with curb) as specified by KDOT. The curb bars need to be removed if not needed. The designer needs to include the reinforcing steel for the pier (substructure).

†See "Spacer Frame Details" sheet for Spacer Frame Details

BILL OF REINFORCING STEEL
EPOXY COATED GRADE 60

	Straight Bars				Bent Bars			
	Mark	Size	Number	Length	Mark	Size	Number	Length
Superstructure - Deck - Rail								
	A1	#8	16	41'-8"	R1	#7	28	9'-3"
					R2	#7	4	5'-7"
	A3	#7	10	38'-0"	R3	#7	160	7'-9"
	S1	#7	74	44'-2"	R13	#7	136	8'-3"
	S2	#7	74	34'-0"				
	S3	#7	37	39'-0"	A5	#6	144	11'-6"
					A13	#6	16	5'-2"
	A2	#6	12	41'-8"	A14	#6	4	5'-2"
	A11	#6	4	41'-8"				
	R11	#6	24	4'-6"	A4	#5	60	13'-4"
	R12	#6	204	9'-8"	A6	#5	56	4'-5"
	S4	#6	74	45'-2"	A7	#5	160	8'-8"
	S5	#6	74	15'-0"	A9	#5	64	6'-1"
	S6	#6	74	21'-6"	R5	#5	8	6'-6"
	S7	#6	37	38'-0"	R6	#5	8	10'-8"
					ST2	#5	144	2'-0"
	A8	#5	4	32'-8"	ST3	#5	48	2'-3"
	A12	#5	8	35'-6"	ST4	#5	80	2'-6"
	ST1	#5	44	45'-0"	ST5	#5	48	2'-11"
	T2	#5	142	33'-8"				
					A10	#4	28	5'-6"
	C2	#4	20	38'-3"	A15	#4	16	9'-4"
	SC1	#4	108	6'-6"	A16	#4	144	2'-5"
	T1	#4	142	33'-8"	C1	#4	212	3'-1"
					R4	#4	296	3'-3"
					R7	#4	4	10'-8"
					R8	#3	502	4'-4"
					R9	#3	144	4'-6"
					R10	#3	72	4'-6"
					T3-T46	†	†	†
Pier Beam	PB3	#7	14	33'-8"	PB5	#5	132	5'-4"
	PB2	#5	8	33'-8"	PB1	#4	144	8'-0"
	PB4	#5	10	32'-8"				
Substructure	Non - Epoxy							

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

Br. No. Sta.
Br. No. BILL OF REINFORCING STEEL & BENDING DIAGRAMS 32' Roadway Sta.
Proj. No. Proj. No. Co. Co.

SHEET NO.	OF	SCALE		APP'D			
DESIGNED	A.H.	DETAILED	G.B.	QUANTITIES	B.S.	CADD	G.B.
DESIGN CK.	B.S.	DETAIL CK.	B.S.	QUAN. CK.	A.H.	CADD CK.	B.S.

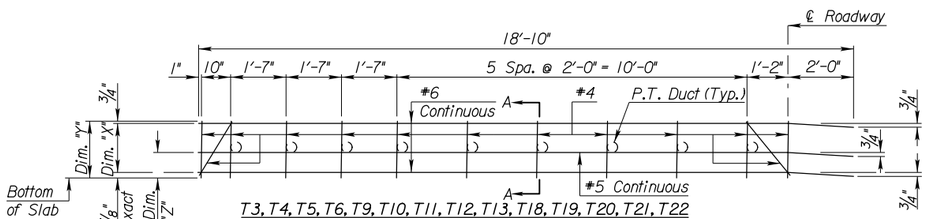
CADconform Certify This File

Sheet No. 0

CADconform Certify This File

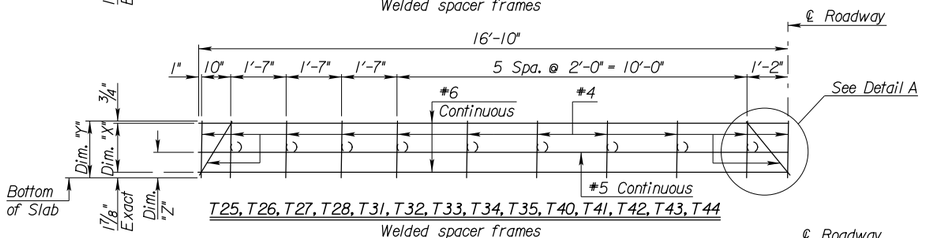
B-557255\B32RDWY\B32BAR2.dgn			
Roadway Width =	32'-0"	Longest Span Length =	122'-0"
Skew and Direction =	0	Total No. of Spans =	3
Loading =	HL-93	Railing Type =	32" Corral

Plotted By: rlong	Plot Location: Bridge Design
File: B32BAR2.dgn	
Plot Date: 10-DEC-2013 14:44	



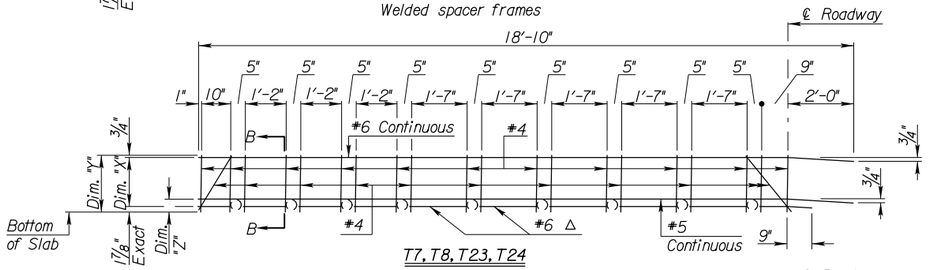
T3, T4, T5, T6, T9, T10, T11, T12, T13, T18, T19, T20, T21, T22

Welded spacer frames



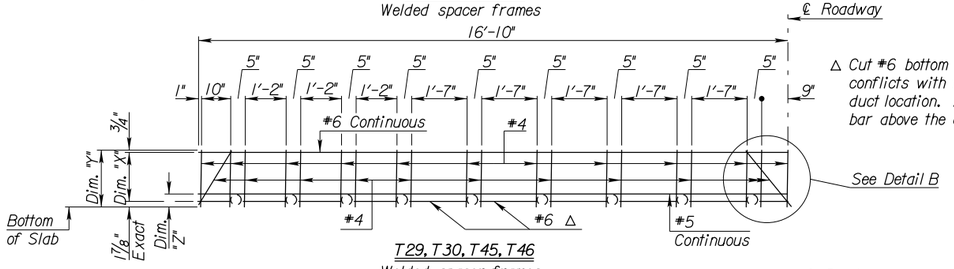
T25, T26, T27, T28, T31, T32, T33, T34, T35, T40, T41, T42, T43, T44

Welded spacer frames



T7, T8, T23, T24

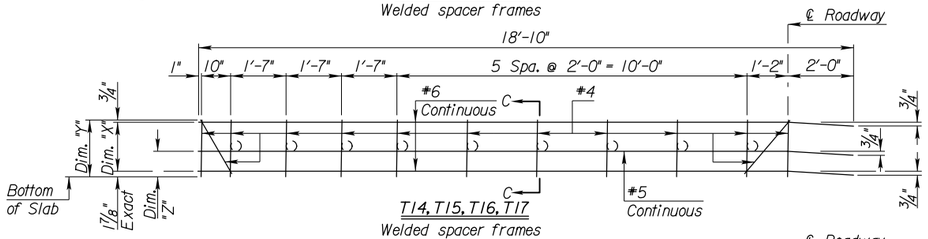
Welded spacer frames



T29, T30, T45, T46

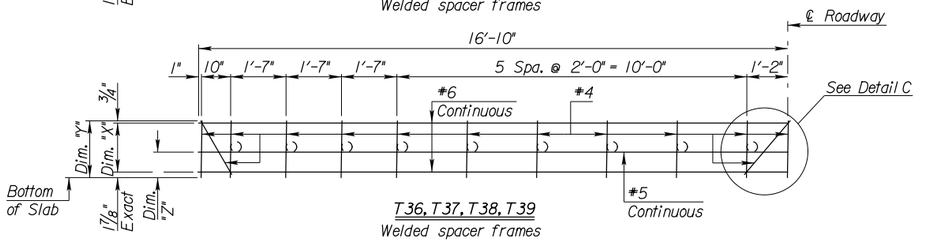
Welded spacer frames

△ Cut #6 bottom bar where it conflicts with the longitudinal duct location. Also place #5 bar above the duct as shown.



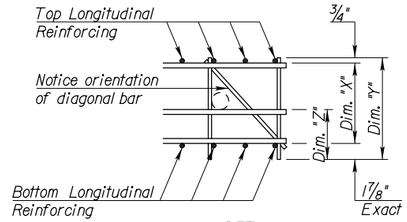
T14, T15, T16, T17

Welded spacer frames

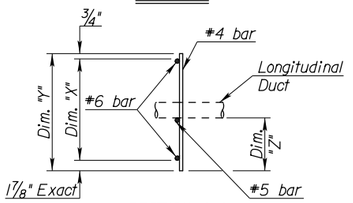


T36, T37, T38, T39

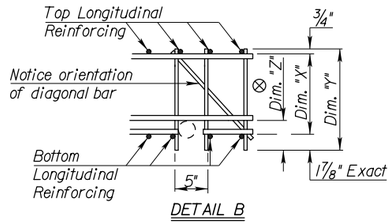
Welded spacer frames



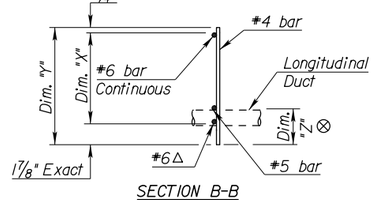
DETAIL A



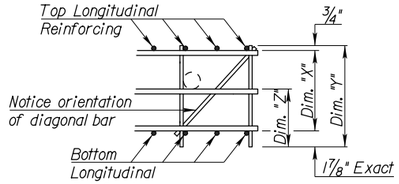
SECTION A-A



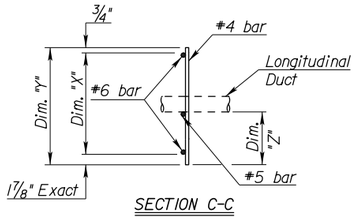
DETAIL B



SECTION B-B



DETAIL C



SECTION C-C

Note:
Dimension "X" is out to out and is an exact dimension.
See Detail "A".

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	Proj. No.	YEAR	0	0

SPACER FRAMES (Epoxy Coated)				
Mark	No. Ea.	Dim. "X"	Dim. "Y"	◔ Dim. "Z"
T3,T25	2	1'-0 5/8"	1'-3 1/4"	0'-4 3/8"
T4,T26	2	1'-0 5/8"	1'-3 1/4"	0'-3 11/16"
T5,T27	2	1'-0 5/8"	1'-3 1/4"	0'-3 3/16"
T6,T28	2	1'-0 5/8"	1'-3 1/4"	0'-2 13/16"
T7,T29	2	1'-0 5/8"	1'-3 1/4"	⊗ 0'-6 1/8"
T8,T30	2	1'-0 13/16"	1'-3 7/16"	⊗ 0'-6 3/16"
T9,T31	2	1'-1 1/4"	1'-3 7/8"	0'-3 5/16"
T10,T32	2	1'-2 1/16"	1'-4 11/16"	0'-4 11/16"
T11,T33	2	1'-3 3/16"	1'-5 13/16"	0'-6 9/16"
T12,T34	2	1'-4 5/8"	1'-7 1/4"	0'-9"
T13,T35	2	1'-6 3/8"	1'-9"	1'-0 1/16"
T14,T36	2	1'-8 1/2"	1'-11 1/8"	1'-3 5/8"
T15,T37	2	1'-10 7/8"	2'-1 1/2"	1'-7 13/16"
T16,T38	2	1'-10 7/8"	2'-1 1/2"	1'-8 1/16"
T17,T39	2	1'-8 1/2"	1'-11 1/8"	1'-3 3/4"
T18,T40	2	1'-6 3/8"	1'-9"	1'-0"
T19,T41	2	1'-4 5/8"	1'-7 1/4"	0'-8 7/8"
T20,T42	2	1'-3 3/16"	1'-5 13/16"	0'-6 1/4"
T21,T43	2	1'-2 1/16"	1'-4 11/16"	0'-4 1/4"
T22,T44	2	1'-1 1/4"	1'-3 7/8"	0'-2 3/4"
T23,T45	2	1'-0 13/16"	1'-3 7/16"	⊗ 0'-5 7/16"
T24,T46	1	1'-0 5/8"	1'-3 1/4"	⊗ 0'-5 1/16"

Weight of spacer frames included in the mass of reinforcing steel.
Weight of spacer frames = 7,447 Lb. (total).

⊗ *Dimension "Z" for spacer frames designated by ⊗ is measured from bottom of slab to top of duct as shown in Section B-B.*

◔ *Dimension "Z" shown above is based on:*

Duct size = 3.59" OD.

Spacer Frames should not be fabricated until the duct sizes have been determined by the Post-Tensioning Manufacturer. If duct size is different than shown above, adjust "Z" dimension accordingly. Adjustment shall be made in a manner to achieve the center of gravity of strands location and the clearance requirements shown on the plans.

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

Br. No. Sta.
Br. No. SPACER FRAME DETAILS Sta.
32' Roadway

Proj. No. Proj. No. Co. Co.

SHEET NO.	OF	SCALE		APP'D			
DESIGNED	A.H.	DETAILED	G.B.	QUANTITIES	B.S.	CADD	G.B.
DESIGN CK.	B.S.	DETAIL CK.	B.S.	QUAN. CK.	A.H.	CADD CK.	B.S.

B-557255\B32RDWY\B326NOT.dgn					
Roadway Width =	32'-0"	Longest Span Length =	72'-0"		
Skew and Direction =	0	Total No. of Spans =	3		
Loading =	HL-93	Railing Type =	32" Corral		

Plotted By: rlang	Plot Location: Bridge Design
File: B326NOT.dgn	
Plot Date: 10-DEC-2013 14:44	

SUMMARY OF QUANTITIES

Item / Location	Excavation Class I Cu. Yds.	Excavation Class II Cu. Yds.	Concrete Grade 4.0 (AE) Cu. Yds.	Concrete Grade 5.0 (AE)( ) Cu. Yds.	Reinforcing Steel Grade 60 Lbs.	Reinforcing Steel Epoxy Coated Grade 60 Lbs.	Steel Piles * Ft.	Pre-Drilled Pile Holes Ft.	Abutment Strip Drain Sq. Yds.	Bridge Backwall Prot. System Sq. Yds.	Slope Protection (Shot Rock) Cu. Yds.	Post-Tensioning for Slab Bridge Lbs.
Abutment #1			-	**		**			17.2	20.4		-
Pier #1				-		-			-	-		-
Pier #2				-		-			-	-		-
Abutment #2			-	**		**			17.2	20.4		-
Substr. Total				-		-			34.4	40.8		-
Superstr. Total			Δ	ΔΔ 462.3					-	-		28,668
Total			Δ	ΔΔ 462.3			†		34.4	40.8		28,668

Note to Designer (to be removed):
The notes on this sheet are a starting point. The Engineer should check that the proper notes are on the sheet. Text defining options are on Level 50. Refer to "Post-Tensioned Concrete Haunched Slab Bridge User's Manual" for substructure design consideration.

** Quantities are included in the Superstructure Total quantity.

Δ Includes 30.90 Cu. Yds. for the 32" Kansas Corral Rail with curb. (Use 25.90 Cu. Yds. for the 32" Kansas Corral Rail without curb.)

ΔΔ Based on 3.59" OD Longitudinal Ducts (without draping) and 3"x1" Transverse Ducts the superstructure concrete total has been reduced by 9.58 Cu. Yds.

† Summary of Piling:

Abutment #1	@	Ft.
Pier #1	@	Ft.
Pier #2	@	Ft.
Abutment #2	@	Ft.

* NOTE: Use only HP12x53 steel piles in the abutments and HP12x74 or HP14x73 steel piles in the piers.

FOR INFORMATION ONLY
All strand weights based on 0.6" Ø strand system
Longitudinal Strands = 24,642 Lbs.
Transverse Strands = 4,026 Lbs.
Total = 28,668 Lbs.
Longitudinal strand weights calculated with a length from E.W.S. to E.W.S. (without draping). Transverse strand weights calculated with a length from edge of slab to edge of slab.

GENERAL NOTES

EXISTING STRUCTURE: Plans of the existing structure are on file and available for inspection by qualified bidders at the State Bridge Office, KDOT, Eisenhower State Office Building, 700 SW Harrison, Topeka, KS.

NOT8000

EMBANKMENT: Complete the embankment at the abutments as shown on the "Bridge Excavation" sheet prior to driving the abutment piling or commencing with the abutment footing excavation.

NOT3500

BRIDGE EXCAVATION: Elevation shall designate the Excavation Boundary Plane of Class I and Class II Excavation; Class I above the plane, Class II below the plane. See the "Bridge Excavation" sheet for the limits of pay excavation.

NOT0010; NOT0000 may apply

BACKFILL COMPACTION: Compact backfill at the abutments.

NOT3300; NOT3310 may apply

PILING: Drive all piling to [penetrate or bear upon the formation](or)[a minimum elevation of]. Driving shall stop when in the opinion of the Engineer additional driving may damage the piling. Drive all piling to the minimum computed bearing value equal to the Allowable Pile Load:

NOT1000; NOT1020 & NOT1010 may apply

Abutment #1	Tons
Pier #1	Tons
Pier #2	Tons
Abutment #2	Tons

Use NOT1005 for LRFD foundation designs

Pile splice location NOT1003 may apply

When using the pile driving formula in the KDOT Specifications, drive the pile to the Allowable Load and penetration, but in no case shall the pile be driven to [MORE THAN 150% OF THE ALLOWABLE LOAD] (or) [MORE THAN TONS at the abutments or TONS at the piers]. At any location where problems are experienced, pile damage is suspected, or apparent refusal occurs significantly above the design pile tip elevation, the Engineer may request that the Pile Driving Analyzer (PDA) equipment be used.

POST-TENSIONING: See the General Notes on the "Grouting Sequence & Post-Tensioning Notes" sheet.

CORRAL RAIL: Build the corral rail after all post-tensioning is complete.

ABUTMENT STRIP DRAIN: See the General Notes on the "Abutment Strip Drain" sheet.

NOT3130

BRIDGE BACKWALL PROTECTION SYSTEM: See the General Notes on the "Abutment Strip Drain" sheet.

NOT3140

SUBSTRUCTURE WATER PROOFING MEMBRANE: Use only an epoxy system substructure waterproofing membrane as per KDOT specifications to seal the vertical face of the longitudinal end anchorage recess pocket.

BROKEN CONCRETE

NOT8230 may apply

REMOVAL OF EXISTING STRUCTURE

NOT8210 or NOT8220 may apply

SLOPE PROTECTION

NOT3510; NOT3520 or NOT8240 may apply

CONCRETE: Superstructure concrete for the slab, abutments, and pier cap is bid as "Concrete (Grade 5.0)(AE)( )". Concrete for the corral rail and substructure concrete is bid as "Concrete (Grade 4.0)(AE)". The Contractor may use Concrete (Grade 4.0) in the footings. Bevel all exposed edges of all concrete with a ¾" triangular molding, except as otherwise noted on the plans. Construction joints are to be used only at locations shown. Construction joints will not be allowed in the superstructure.

REINFORCING STEEL: All reinforcing steel dimensions are to the centerline of bars unless otherwise noted. All reinforcing steel, except the spiral bars, shall conform to the requirements of ASTM A615, Grade 60. Spiral bars may meet the requirements of either ASTM A615 (Gr. 40 or 60) or A82, and are included in the bid item "Reinforcing Steel (Gr. 60)".

NOT7010

CAMBER: Provide camber as shown on the Dead Load And Post-Tensioning Deflection Diagram unless the Contractor uses either long span steel beam falsework (concrete dead load deflection greater than ¼") or timber falsework with greater than 12'-0" clear span. If either case exists, submit falsework plans that show the additional required camber.

Camber either up or down as shown on the plans.

FALSEWORK PLANS: A licensed Professional Engineer shall design the falsework details. Details shall bear the seal of a licensed Professional Engineer. See the Bridge Design Manual, Section 5.1 "Review and Approval of Falsework Plans", for a listing of items to be included on the falsework plan. Submit three sets of details in compliance with KDOT Specifications to the Field Engineer for review.

NOT4110; NOT4100 may apply

FALSEWORK INSPECTION: This project has falsework plan requirements which are considered Type "B" by KDOT specifications. If falsework deficiencies or variations from the approved and sealed plans are found, the falsework design Engineer of Record will provide written approval of the changes. If for the convenience of the Contractor the falsework becomes Type "A" by the use of non-typical supports; then the inspection and review requirement of Type "A" will be fully enforced, but at no cost to the State. Type "B" falsework inspection is not paid for directly, but is subsidiary to other bid items.

NOT4106; NOT4105 may apply

FALSEWORK: Leave the falsework in place for the entire unit until all post-tensioning is complete and 15 days after the last concrete pour for the superstructure slab unit or longer as directed by the Engineer. Notify the Engineer a minimum of two days prior to removal of the falsework.

POST-TENSIONING MEASUREMENT AND PAYMENT: Post-Tensioning will be paid for at the computed weight of prestressing strands, complete and in place for "Post-Tensioning". Payment shall be full compensation for furnishing all post-tensioning strands, anchorage assemblies, ducts, inlets & outlets, local zone reinforcing, spacer frames and additional support steel (if required), anchorage protection systems, grout, testing, inspecting, stressing, grouting, recess pocket filling, finishing and for all labor, material, tools, equipment and incidentals necessary for completing the work in accordance with the latest specifications and the plans.

GROUTING SUPERVISION AND INSPECTION: Provide an American Segmental Bridge Institute (ASBI) Certified Grouting Technician to supervise all grouting operations on the bridge. Provide verification of technician certification to KDOT staff. Provide three days notice of the beginning of grouting operations to the KDOT Engineer to allow adequate time for ASBI-trained KDOT inspection staff to get to the job site.

NOT4400

CONCRETE PLACING SEQUENCE: Place concrete in the slab, including the integral part of abutment beam and pier beam, continuously from end to end of wearing surface. Bucketing will not be allowed. Construction joints will not be allowed in the superstructure except for extreme events such as sudden rain, equipment failure or an extreme emergency. In such an extreme event, the contractor should stop the concrete pour immediately and place a stepped cold joint as shown on the plans.

Submit a plan relative to the placing of the slab concrete. Include the proposed rate of concrete placement in Cu. Yds./hr., the plant capacity, placement direction, a description of the equipment used in placing the concrete and proposed admixtures. Use a KDOT approved superplasticizer in the superstructure concrete. Any additional cost for the Contractor's use of admixtures, including the superplasticizer, shall not be paid for directly, but shall be considered subsidiary to the bid item, "Concrete (Grade 5.0)(AE)( )". Approval of the Contractor's placing plan is required prior to the placement of concrete in the slab.

SLAB CURING PERIOD: The superstructure slab shall be cured as per KDOT Standard Specifications.

SLAB POST-CONSTRUCTION LOADS: Loads applied after the slab is placed and post-tensioned shall comply with the KDOT Standard Specifications.

CONCRETE TESTING: Concrete cylinder testing is required to be performed by the Engineer prior to stressing operations. The test cylinders shall be cast from the same batch of concrete in the superstructure and cured at the site in the same manner as the bridge superstructure concrete. The concrete shall be tested prior to transverse and longitudinal stressing for the initial compressive strengths, f'ci, specified on the plans for stressing operations. All concrete strength tests shall be performed as per KDOT Specifications. No stressing shall commence unless the initial specified compressive strength, f'ci, is attained prior to each stressing phase in accordance with the plans.

SLAB ELEVATIONS: The Contractor shall record elevation readings on the "Slab Elevations" sheet in the table at locations designated by a "(2)".

NOT4300

The Engineer shall submit the table on a half-sized sheet to the State Bridge Office, KDOT, Eisenhower State Office Building, 700 SW Harrison, Topeka, KS.

CONTRACTOR CONSTRUCTION STAKING: Contractor Construction Staking for clear span bridges requires two independent surveys. See KDOT Specifications.

NOT9040

LFD RATING FACTORS			
Truck / Rating Level		Inventory	Operating
HS-20	(36T)	1.15	1.71
Type HET	(110T)		1.79
2002 LFD Rating, 17th Edition AASHTO			

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	Proj. No.	YEAR	0	0

INDEX TO BRIDGE DRAWINGS

DESIGN DATA

NOT9200

NOT9250

DESIGN SPECIFICATIONS:

AASHTO Specifications, 2004 Edition and latest Interim Specifications. Load and Resistance Factor Design

DESIGN LOADING:

NOT9255

HL-93

Design Dead Load includes an allowance of 25 psf for a future wearing surface.

Note to Designer (to be removed):
The structural design shown on these plans does not include the optional "double tandem" design allowed for in commentary of the LRFD specifications. Bridge locations with heavy truck traffic may warrant incorporation of this "double tandem" load combination.

UNIT STRESSES:

Concrete (Grade 4.0)	f'c = 4,000 psi
Concrete (Grade 4.0)(AE)	f'c = 4,000 psi
Concrete (Grade 5.0)(AE)( )	f'ci = 3,800 psi (at jacking)
Concrete (Grade 5.0(AE)( )	f'c = 5,000 psi
Reinforcing Steel (Grade 60)	fy = 60 ksi
Prestressing Steel (Grade 270)	fpu = 270 ksi

DESIGN PILE LOAD:

		Loading	Design Load	Allowable Load (Tons per Piling)
Abut.	Service	-	_____	_____
Piers.	Service	-	_____	_____

Use NOT9301 for LRFD foundation designs

NOT9300; NOT9310 NOT9320 & NOT9321 may apply

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1	04/21/08	P/T Quantity Changed	JPJ	KFH

KANSAS DEPARTMENT OF TRANSPORTATION

Br. No. Sta.

Br. No. Sta.

GENERAL NOTES & QUANTITIES

32' Roadway

Proj. No. Proj. No. Co. Co.

SHEET NO.	OF	SCALE		APP'D	
DESIGNED	A.H.	DETAILED	G.B.	QUANTITIES	B.S.
DESIGN CK.	B.S.	DETAIL CK.	B.S.	QUAN. CK.	A.H.
CADD	G.B.	CADD CK.	B.S.		

CADconform Certify This File

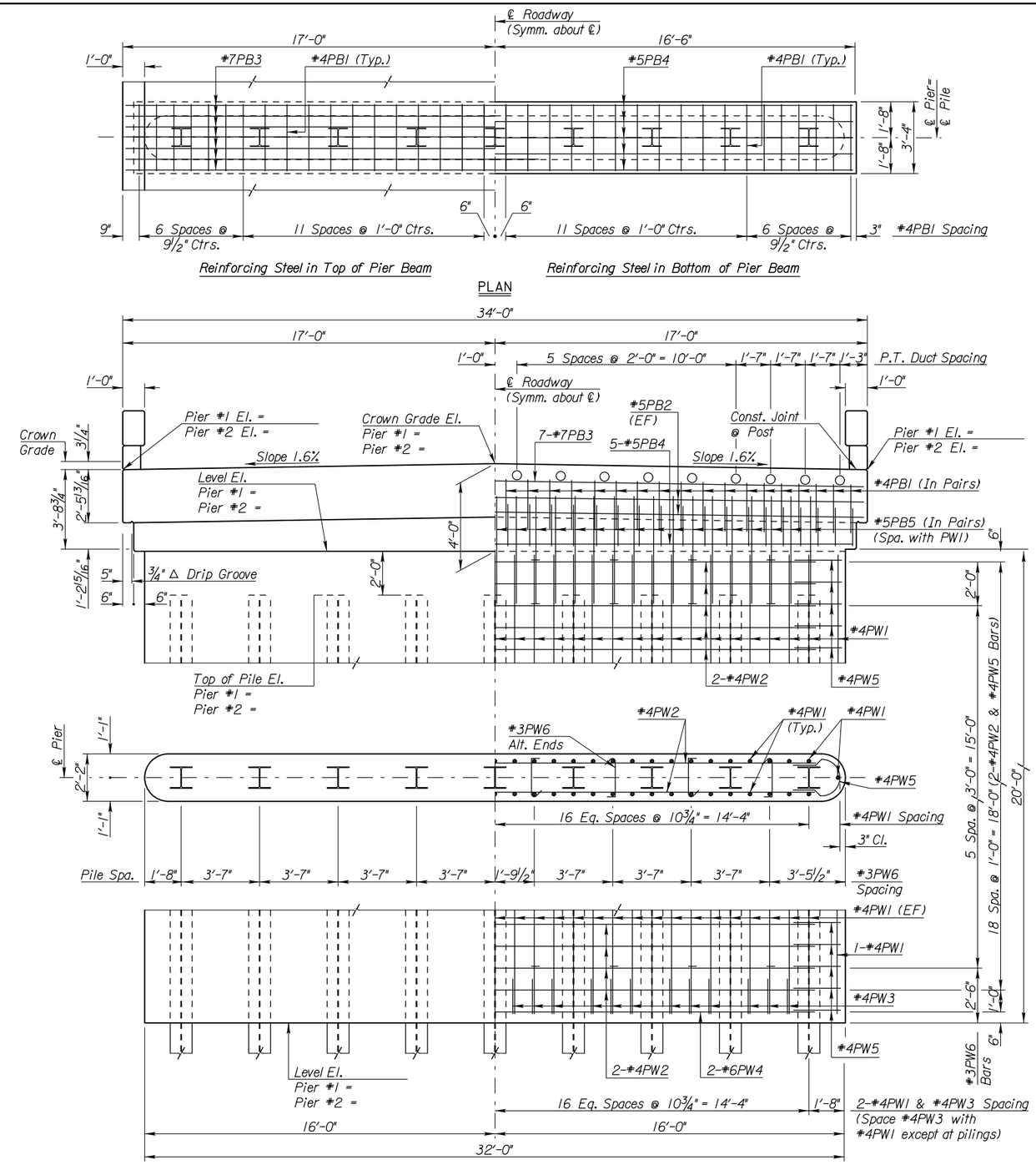
Sheet No. 0

CADconform Certify This File

B-557255\B32RDWY\B32PIER.dgn			
Roadway Width =	32'-0"	Longest Span Length =	72'-0"
Skew and Direction =	0	Total No. of Spans =	3
Loading =	HL-93	Railing Type =	32" Corral

Plotted By: rlong | Plot Location: Bridge Design
File: B32PIER.dgn
Plot Date: 10-DEC-2013 14:44

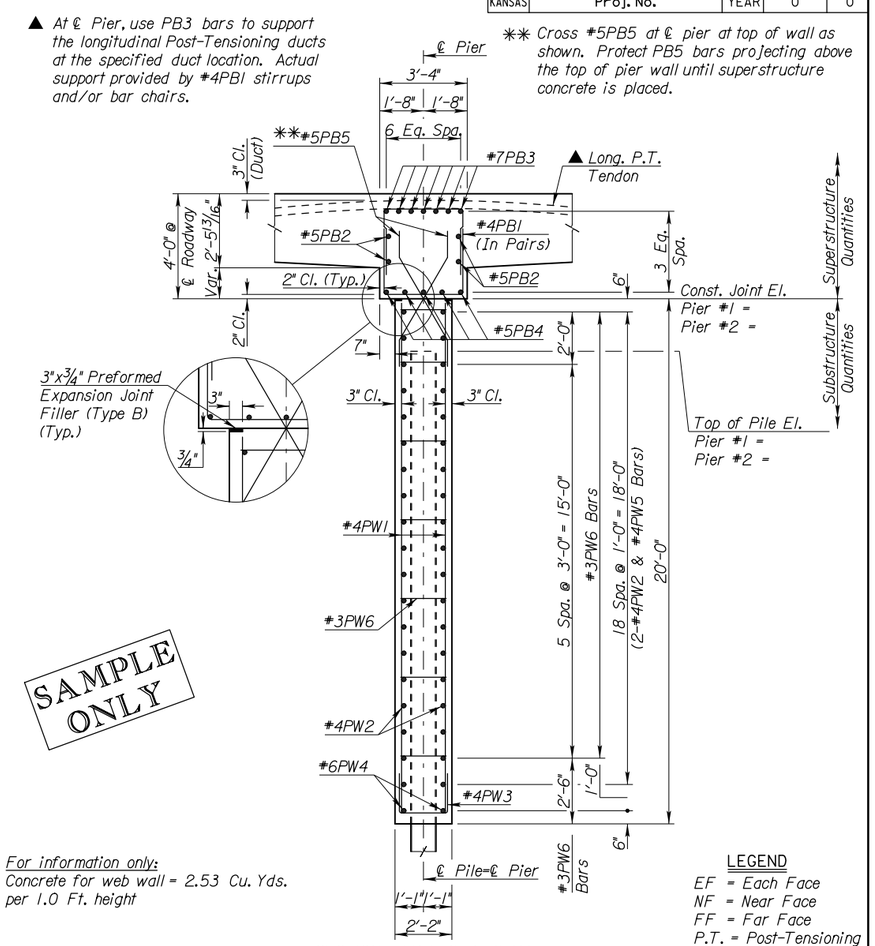
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	Proj. No.	YEAR	0	0



ELEVATION
℄ Face of Pier Beam
Looking Forward with Stationing

▲ At ℄ Pier, use PB3 bars to support the longitudinal Post-Tensioning ducts at the specified duct location. Actual support provided by #4PB1 stirrups and/or bar chairs.

** Cross #5PB5 at ℄ pier at top of wall as shown. Protect PB5 bars projecting above the top of pier wall until superstructure concrete is placed.



SECTION THRU PIER BEAM

SAMPLE ONLY

For information only:
Concrete for web wall = 2.53 Cu. Yds. per 1.0 Ft. height

LEGEND
EF = Each Face
NF = Near Face
FF = Far Face
P.T. = Post-Tensioning

Note to Designer:

The information shown on this sheet is intended as an example only for the purposes of illustrating the preparation of the wall type "Pier Details" sheet for typical post-tensioned concrete haunched slab spans. The designer is responsible for the actual design and plan preparation specific to each project site and conditions.

*PIER LOADING (TONS)	
Loading Case	Total Load
Dead Loads	401
ΔHL-93	121
ΔDead + HL-93	522

*The pier loading shown is the reaction above the top of the pier wall. Piles shall be HP12x74 or HP14x73 steel piles.
Allowable load = 98 Tons/Pile (HP12x74)(End bearing only)
Allowable load = 96 Tons/Pile (HP14x73)(End bearing only)
Δ Service-I Case, LRFD Specifications.

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

Br. No. Sta.
Br. No. Sta.

PIER DETAILS
32' Roadway

Proj. No. Proj. No. Co. Co.

SHEET NO. OF	SCALE	APP'D	
DESIGNED A.H.	DETAILED G.B.	QUANTITIES B.S.	CADD G.B.
DESIGN CK. B.S.	DETAIL CK. B.S.	QUAN. CK. A.H.	CADD CK. B.S.

CADconform Certify This File

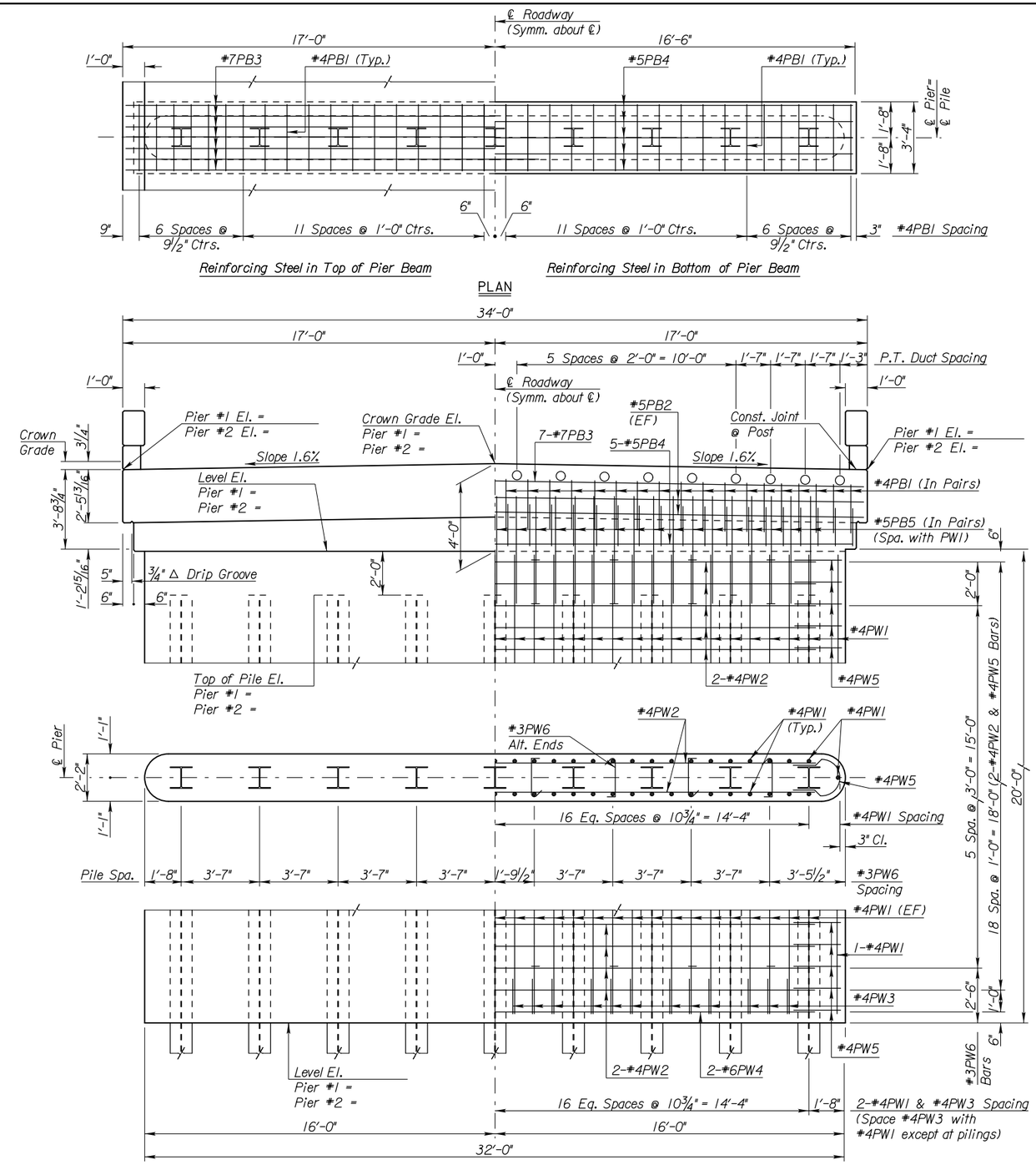
Sheet No. 0

CADconform Certify This File

B-557255\B32RDWY\B32PIER.dgn			
Roadway Width =	32'-0"	Longest Span Length =	72'-0"
Skew and Direction =	0	Total No. of Spans =	3
Loading =	HL-93	Railing Type =	32" Corral

Plotted By: rlong | Plot Location: Bridge Design
File: B32PIER.dgn
Plot Date: 10-DEC-2013 14:44

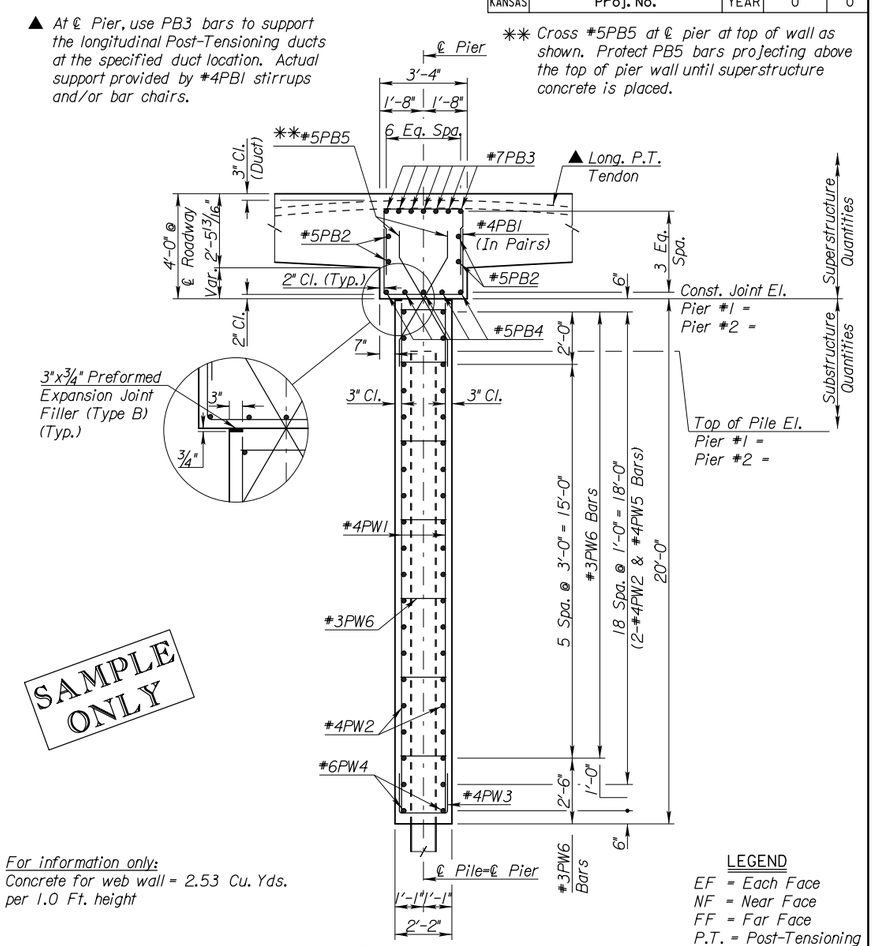
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	Proj. No.	YEAR	0	0



ELEVATION
℄ Face of Pier Beam
Looking Forward with Stationing

▲ At ℄ Pier, use PB3 bars to support the longitudinal Post-Tensioning ducts at the specified duct location. Actual support provided by #4PB1 stirrups and/or bar chairs.

** Cross #5PB5 at ℄ pier at top of wall as shown. Protect PB5 bars projecting above the top of pier wall until superstructure concrete is placed.



SECTION THRU PIER BEAM

SAMPLE ONLY

For information only:
Concrete for web wall = 2.53 Cu. Yds. per 1.0 Ft. height

LEGEND
EF = Each Face
NF = Near Face
FF = Far Face
P.T. = Post-Tensioning

Note to Designer:

The information shown on this sheet is intended as an example only for the purposes of illustrating the preparation of the wall type "Pier Details" sheet for typical post-tensioned concrete haunched slab spans. The designer is responsible for the actual design and plan preparation specific to each project site and conditions.

*PIER LOADING (TONS)	
Loading Case	Total Load
Dead Loads	401
ΔHL-93	121
ΔDead + HL-93	522

*The pier loading shown is the reaction above the top of the pier wall. Piles shall be HP12x74 or HP14x73 steel piles.
Allowable load = 98 Tons/Pile (HP12x74)(End bearing only)
Allowable load = 96 Tons/Pile (HP14x73)(End bearing only)
Δ Service-I Case, LRFD Specifications.

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

Br. No. Sta.
Br. No. Sta.

PIER DETAILS
32' Roadway

Proj. No. Proj. No. Co. Co.

SHEET NO. OF	SCALE	APP'D	
DESIGNED A.H.	DETAILED G.B.	QUANTITIES B.S.	CADD G.B.
DESIGN CK. B.S.	DETAIL CK. B.S.	QUAN. CK. A.H.	CADD CK. B.S.

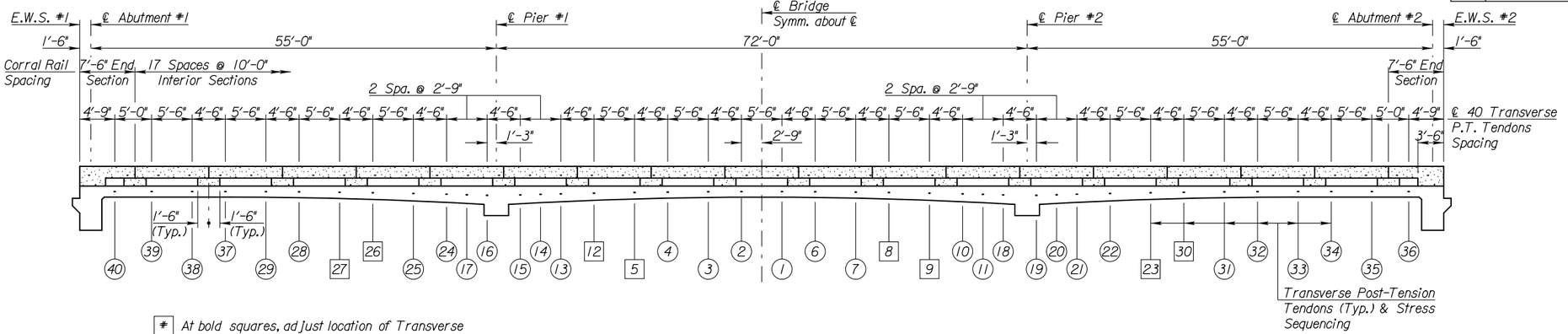
CADconform Certify This File

Sheet No. 0

CADconform Certify This File

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	Proj. No.	YEAR	0	0

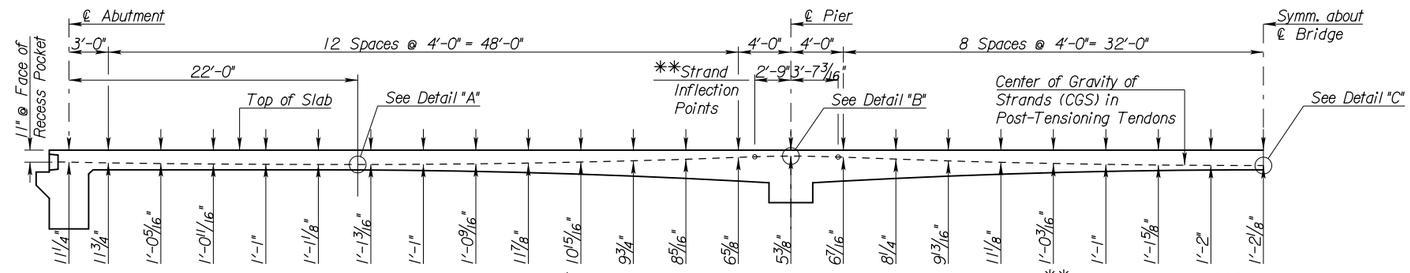
B-55725\S\B32RDWY\B32PTDI.dgn			
Roadway Width =	32'-0"	Longest Span Length =	72'-0"
Skew and Direction =	0	Total No. of Spans =	3
Loading =	HL-93	Railing Type =	32" Corral



# indicates bold squares, adjust location of Transverse Duct up or down to avoid conflict with Longitudinal Ducts. See "Post-Tensioning Details II" sheet.

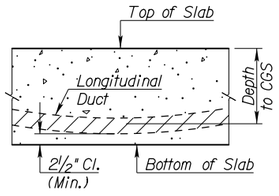
SPACING AND STRESS SEQUENCING OF TRANSVERSE POST-TENSION TENDONS

(Elevation showing Corral Rail)

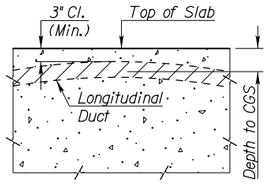


*HALF LONGITUDINAL TENDON PROFILE

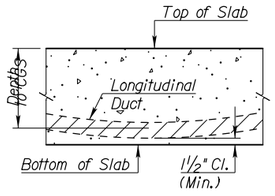
**At inflection points CGS is located at center of P.T. Duct (eccentricity with respect to Duct = 0)



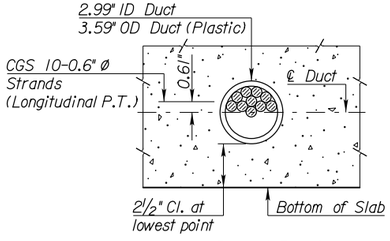
Detail "A"
(At low point of end span)



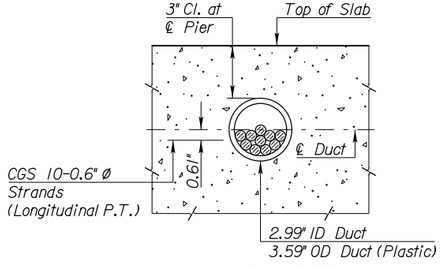
Detail "B"
(At high point over pier)



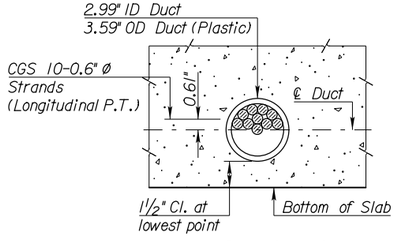
Detail "C"
(At low point of mid-span)



At Low Point of End Span P.T. Duct Profile



At High Point of P.T. Duct Profile



At Low Point of Mid-Span P.T. Duct Profile

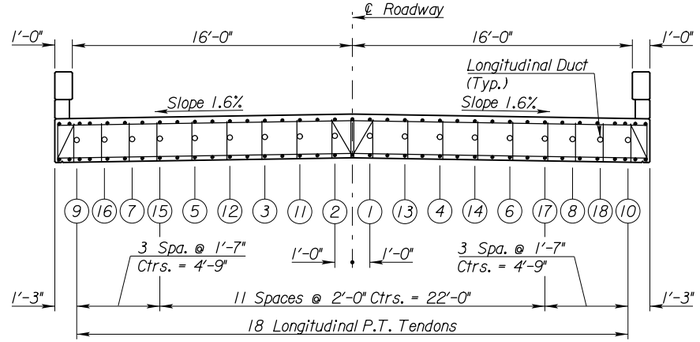
SUGGESTED LONGITUDINAL DUCT SIZE AND PLACEMENT

* NOTE:
The profile of the Longitudinal Tendon shown is for the Center of Gravity of Strands (CGS) in the Post-Tensioning Tendon. The Post-Tension Manufacturer shall show the placement dimensions for the P.T. Ducts on shop drawings such that the CGS shall conform to the profile shown above and meet clearance requirements as shown in Details "A", "B" and "C" on this sheet. The Contractor shall coordinate the placement of P.T. Ducts with steel reinforcing as shown on the plans. Placement of P.T. Ducts shall have the priority. See "Slab Details I & II" sheets for slab details and steel reinforcing. The CGS profile shown is at spacer frame locations. Install the ducts in a manner to achieve smooth curvilinear profile from end to end.

Placement Priority:
#1 - Longitudinal P.T. Ducts & Spacer Frames
#2 - Transverse P.T. Ducts
#3 - Steel Reinforcement

Meet minimum cover requirement for both Post-Tensioning Ducts and Steel Reinforcing except where otherwise noted in the plans.

Stressing Order:
#1 - Transverse Post-Tensioning Stressing
#2 - Longitudinal Post-Tensioning Stressing



SPACING AND STRESS SEQUENCING OF LONGITUDINAL POST-TENSION TENDONS

(Transverse Section)

LEGEND
P.T. = Post-Tension
CGS = Center of Gravity of Strands in Post-Tensioning Tendon

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION
Br. No. Sta.
Br. No. Sta.
POST-TENSIONING DETAILS I
32' Roadway
Proj. No. Proj. No. Co. Co.

SHEET NO.	OF	SCALE		APP'D			
DESIGNED	A.H.	DETAILED	G.B.	QUANTITIES	B.S.	CADD	G.B.
DESIGN CK.	B.S.	DETAIL CK.	B.S.	QUAN. CK.	A.H.	CADD CK.	B.S.

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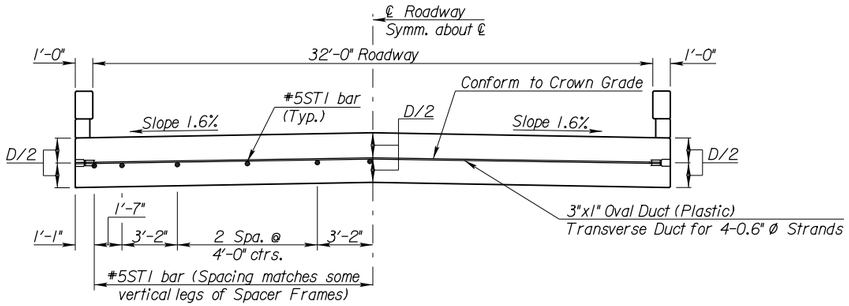
Sheet No. 0

Plotted By: rlong
File: B32PTDI.dgn
Plot Date: 10-DEC-2013 14:44
Plot Location: Bridge Design

CADconform Certify This File

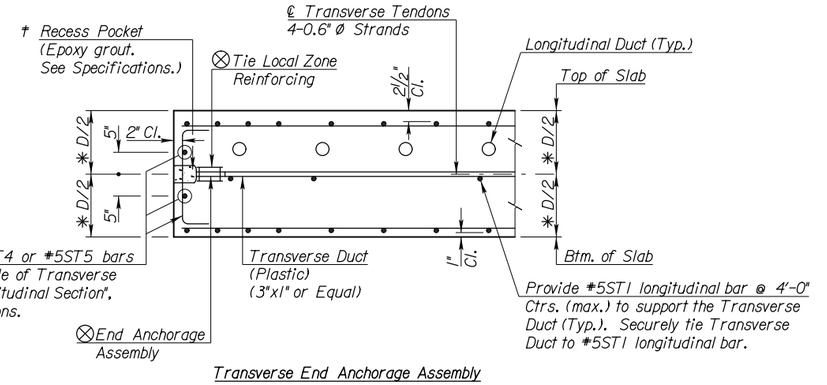
B-55725S\B32RDWY\B32PTD2.dgn			
Roadway Width =	32'-0"	Longest Span Length =	172'-0"
Skew and Direction =	0	Total No. of Spans =	3
Loading =	HL-93	Railing Type =	32" Corral

Plotted By: riang	Plot Location: Bridge Design
File: B32PTD2.dgn	
Plot Date: 10-DEC-2013 14:44	



✳ Section Showing Transverse Duct Placement

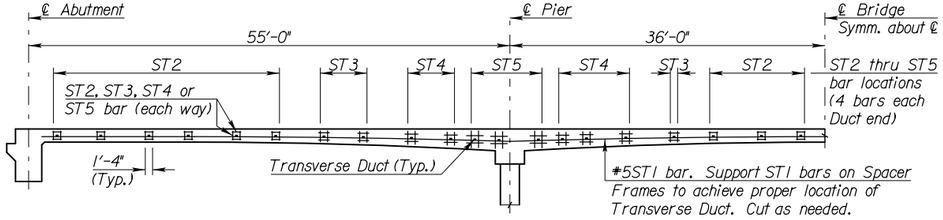
✳ Place transverse duct at mid-depth of slab as shown above except in areas where transverse duct location conflicts with longitudinal duct location. At these conflict locations, adjust transverse duct up or down to clear the longitudinal duct (max $2\frac{1}{2}$"). This can be expected at tendon numbers: 5, 8, 9, 12, 23, 26, 27, and 30. See "Post-Tensioning Details I" sheet for tendon locations.



Transverse End Anchorage Assembly

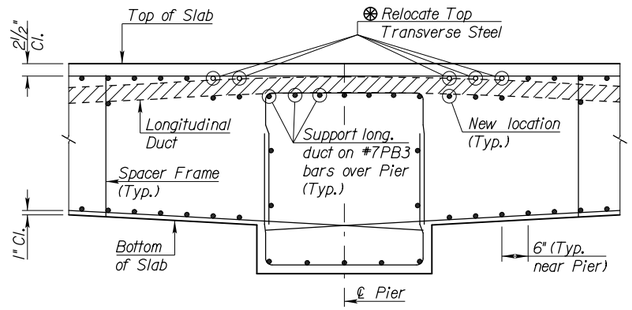
† Max. recess pocket size: 1'-1¾" horizontal x 6⅝" vertical. Use permanent grout cap for the transverse tendon. Apply an epoxy bonding agent prior to filling the recess pocket with a prequalified, non-shrink, non-metalic type grout. Patch the recess pocket after grouting.

In the event of a conflict between a transverse tendon and a spacer frame, move the transverse tendon so the profile of the longitudinal tendon is not affected.

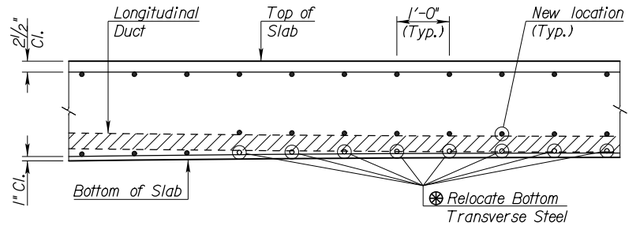


Half Longitudinal Section
Showing ST Bar Locations.
Weight of #5ST bars included in the weight of reinforcing steel.

TRANSVERSE POST-TENSIONING DETAILS

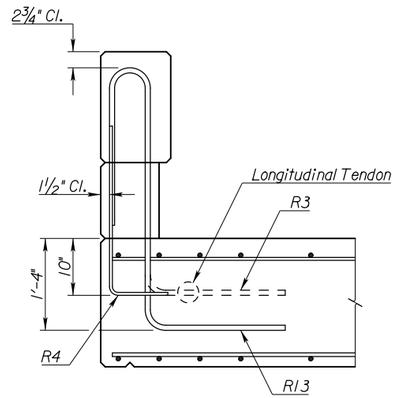


Top Transverse Steel Reinforcing Bars Conflict



Bottom Transverse Steel Reinforcing Bars Conflict

⊛ In areas where the longitudinal Post-Tensioning duct interferes with transverse reinforcing steel, place bottom transverse reinforcing steel above the longitudinal duct and place top transverse reinforcing steel below the longitudinal duct as shown above.

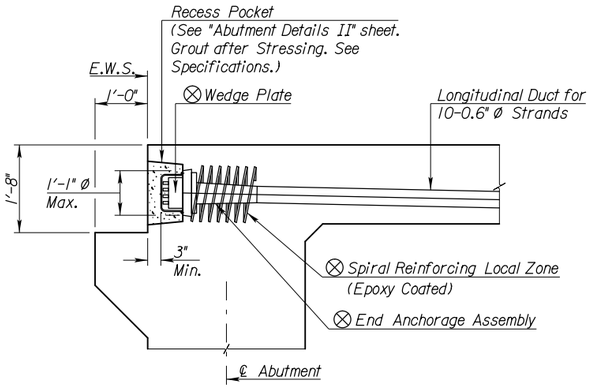


Corral Rail Bar Conflict

Note:
In places where the R3 bar conflicts with the longitudinal tendon, replace the R3 bar with the RI3 bar as shown. See "Post-Tensioning Data & Construction Sequence" sheet for location of RI3 bars.

Note to Designer (to be removed):
If a F4 Barrier Curb is used, resolve any conflicts between the R4 bars and the longitudinal conduits by adjusting the height of the R4 bar (incrementally if necessary) to avoid the Post-Tensioning Tendon. Field cutting of rail bars is not allowed.

LONGITUDINAL DUCT & STEEL REINFORCING CONFLICTS



LONGITUDINAL END ANCHORAGE ASSEMBLY

⊗ Note:
The Post-Tension Manufacturer shall design and supply the end anchorage assembly and the local zone reinforcing for all Post-Tensioned end anchors.

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	Proj. No.	YEAR	0	0

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

Br. No. Sta.
Br. No. Sta.

POST-TENSIONING DETAILS II
32' Roadway

Proj. No. Proj. No. Co. Co.

SHEET NO.	OF	SCALE		APP'D			
DESIGNED	A.H.	DETAILED	G.B.	QUANTITIES	B.S.	CADD	G.B.
DESIGN CK.	B.S.	DETAIL CK.	B.S.	QUAN. CK.	A.H.	CADD CK.	B.S.

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Sheet No. 0

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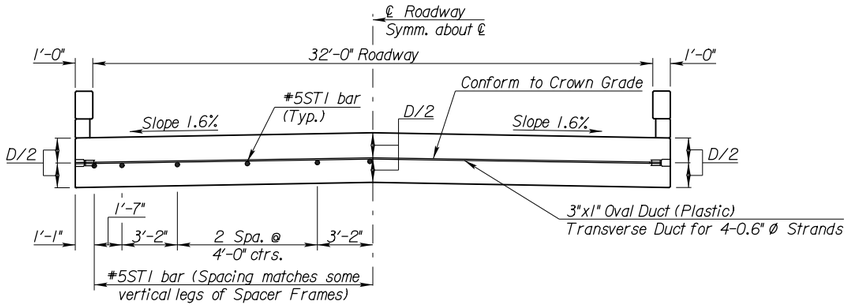
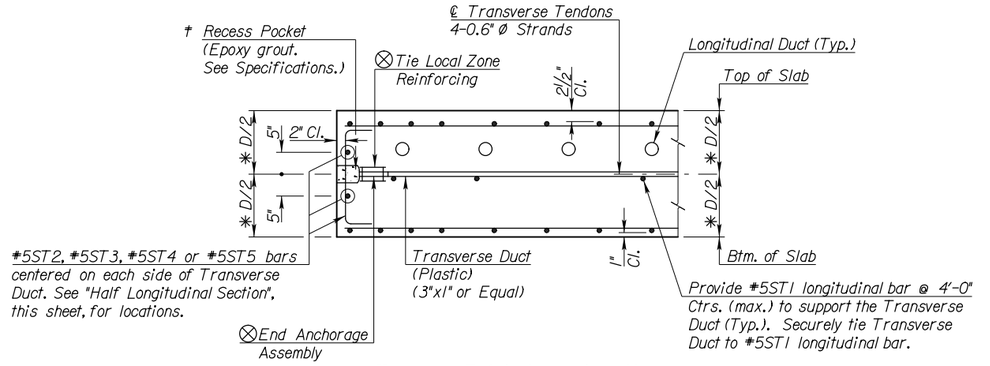
B-55725S\B32RDWY\B32PTD2.dgn			
Roadway Width =	32'-0"	Longest Span Length =	72'-0"
Skew and Direction =	0	Total No. of Spans =	3
Loading =	HL-93	Railing Type =	32" Corral

Plotted By: riang	Plot Location: Bridge Design
File: B32PTD2.dgn	
Plot Date: 10-DEC-2013 14:45	



✳ Section Showing Transverse Duct Placement

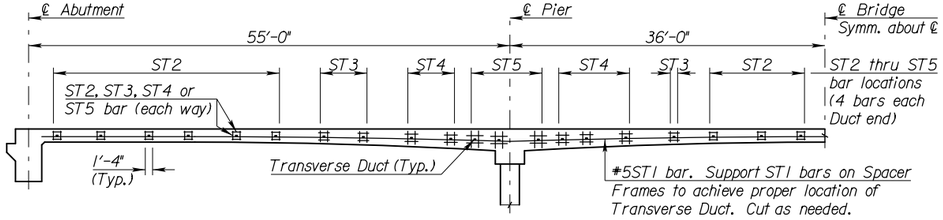
✳ Place transverse duct at mid-depth of slab as shown above except in areas where transverse duct location conflicts with longitudinal duct location. At these conflict locations, adjust transverse duct up or down to clear the longitudinal duct (max 2½"). This can be expected at tendon numbers: 5, 8, 9, 12, 23, 26, 27, and 30. See "Post-Tensioning Details I" sheet for tendon locations.



Transverse End Anchorage Assembly

† Max. recess pocket size: 1'-1¾" horizontal x 6⅝" vertical. Use permanent grout cap for the transverse tendon. Apply an epoxy bonding agent prior to filling the recess pocket with a prequalified, non-shrink, non-metalic type grout. Patch the recess pocket after grouting.

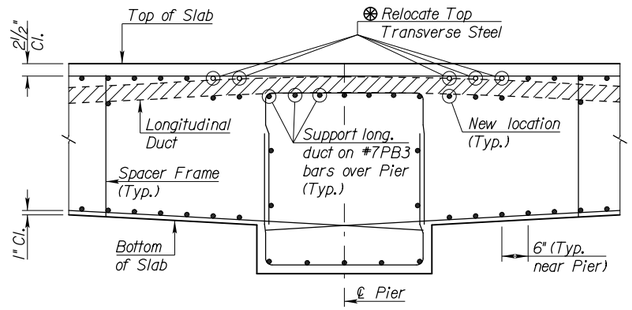
In the event of a conflict between a transverse tendon and a spacer frame, move the transverse tendon so the profile of the longitudinal tendon is not affected.



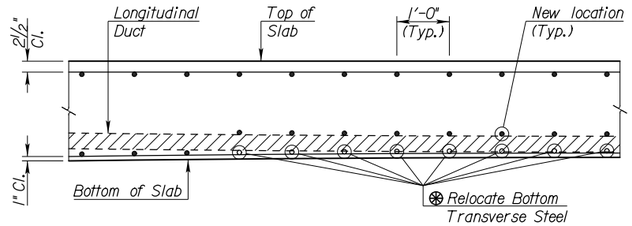
Half Longitudinal Section

Showing ST Bar Locations.
Weight of #5ST bars included in the weight of reinforcing steel.

TRANSVERSE POST-TENSIONING DETAILS

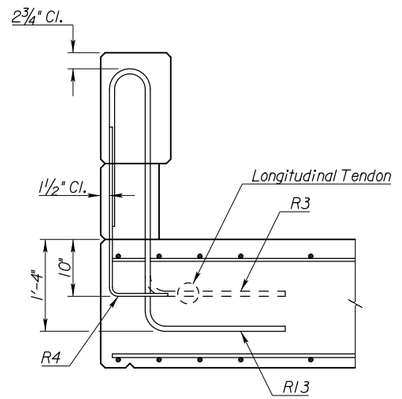


Top Transverse Steel Reinforcing Bars Conflict



Bottom Transverse Steel Reinforcing Bars Conflict

⊛ In areas where the longitudinal Post-Tensioning duct interferes with transverse reinforcing steel, place bottom transverse reinforcing steel above the longitudinal duct and place top transverse reinforcing steel below the longitudinal duct as shown above.

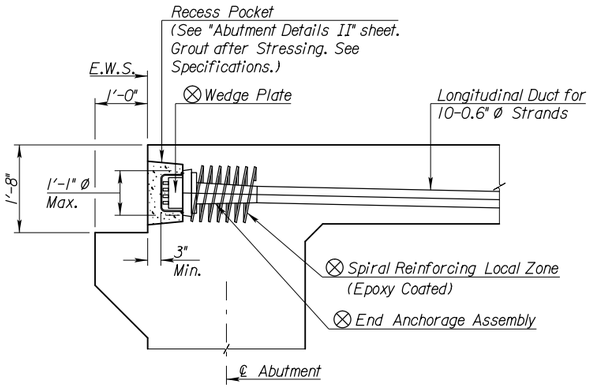


Corral Rail Bar Conflict

Note:
In places where the R3 bar conflicts with the longitudinal tendon, replace the R3 bar with the RI3 bar as shown. See "Post-Tensioning Data & Construction Sequence" sheet for location of RI3 bars.

Note to Designer (to be removed):
If a F4 Barrier Curb is used, resolve any conflicts between the R4 bars and the longitudinal conduits by adjusting the height of the R4 bar (incrementally if necessary) to avoid the Post-Tensioning Tendon. Field cutting of rail bars is not allowed.

LONGITUDINAL DUCT & STEEL REINFORCING CONFLICTS



LONGITUDINAL END ANCHORAGE ASSEMBLY

⊗ Note:
The Post-Tension Manufacturer shall design and supply the end anchorage assembly and the local zone reinforcing for all Post-Tensioned end anchors.

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	Proj. No.	YEAR	0	0

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

Br. No. Sta.
Br. No. Sta.

POST-TENSIONING DETAILS II
32' Roadway

Proj. No. Proj. No. Co. Co.

SHEET NO.	OF	SCALE		APP'D			
DESIGNED	A.H.	DETAILED	G.B.	QUANTITIES	B.S.	CADD	G.B.
DESIGN CK.	B.S.	DETAIL CK.	B.S.	QUAN. CK.	A.H.	CADD CK.	B.S.

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Sheet No. 0

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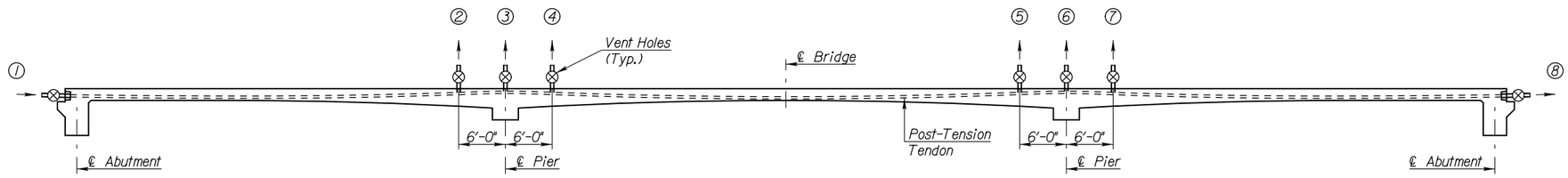
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	Proj. No.	YEAR	0	0

B-55?255\B32RDWY\B32PTNI.dgn

Roadway Width =	32'-0"	Longest Span Length =	72'-0"
Skew and Direction =	0	Total No. of Spans =	3
Loading =	HL-93	Railing Type =	32" Corral



LONGITUDINAL SECTION SHOWING VENT HOLES

NOTE: Additional vents will be needed at the low points of the tendons in the event of cold weather. The vents will be required to avoid potential freezing of trapped water at the low points. The sequence of grout procedure will remain the same as shown on the plans and the extra vents will be closed immediately before grouting.

GROUT PROCEDURE

1. Begin grouting from the lowest grout inlet of either end of the bridge, taking into account the bridge longitudinal grade (vertical profile).
2. Conduct grouting continuously in one direction.
3. Assuming the grout inlet is at point ①, close grout vents in the following sequence after the ASBI Certified Inspector has verified that all residual water and trapped air has been removed as per PTI procedures.

   ②, ④, ③, ⑤, ⑦, ⑥, ⑧, ①
4. Remove inlets and outlets 1½" below the concrete surface; fill recess caused by the removal with epoxy grout as per KDOT Specifications.

Note: For transverse tendons, no intermediate grout vent is required.

NOTE TO DESIGNER (to be removed):
For bridge locations in "highly visibile" areas, such as urban areas or grade crossings, consider rubbing and grouting the outside edges of the slab and corral rail with "Thoroseal" or similar approved equal, to eliminate discoloration from the grouting of the transverse recess pockets.

CONSTRUCTION NOTES FOR POST-TENSIONING

1. Tendon Placement:

Place the tendons so that the center of gravity of strands (CGS) is as per the plans. Position the ducts accurately at the locations shown on the plans and rigidly tie the ducts in place to prevent movement during placement of the slab concrete (The Post-Tensioning Manufacturer's representative will inspect and approve the installation of the duct work.) Reinforcing, additional to that which is shown on the plans, may be required to secure the duct to the smooth curvilinear profile shown on the plans. Any such additional reinforcing will be subsidiary to the bid item, "Post-Tensioning for Slab Bridge". The Post-Tension Manufacturer shall furnish the actual dimensions to the top of the duct so that the CGS of the post-tensioning tendons is as per the plans. The spacer frame details furnished are based on assumed duct sizes as shown on the plans. Verify the spacer frame details and revise if necessary as per the actual size of the duct furnished by the Post-Tension Manufacturer and approved by the Engineer.

Transverse strands must be placed in the ducts prior to the placement of the deck concrete. Provide sufficient additional support bars, ties, spacer frames, additional duct supports, chairs, etc., considered subsidiary to the bid item "Post-Tensioning for Slab Bridge", to prevent displacement of the longitudinal and transverse ducts during concrete placement. All bars, ties, spacer frames, additional duct supports, chairs, etc. shall be epoxy coated.

A qualified representative of the Post-Tension Manufacturer, experienced in the proposed type of work, shall perform a thorough inspection of all tendon placement including anchorages and all post-tension hardware installation prior to the placement of concrete. Do not place concrete in the abutment and the superstructure prior to the approval by the Post-Tension Manufacturer and the Engineer of the superstructure geometry and the post-tension hardware installation.

2. Tolerance:

The tolerance for the slab depth is ±¼" and the tolerance for tendon placement is ±¼".

3. Stressing:

Perform all stressing operations in accordance with AASHTO and PTI specifications under the immediate control of a qualified representative of the Post-Tension Manufacturer. Provide adequate scaffoldings, platforms and safety devices as required by OSHA and the Post-Tension Manufacturer for the stressing procedures.

Do not apply post-tensioning forces until the concrete attains the specified initial compressive strengths, f'ci, as determined by the cylinder tests. Begin stressing as soon as reasonably possible, after concrete has attained sufficient strength, in order to minimize temperature and shrinkage cracks in the concrete. Do not commence stressing before the end of 72 hours after the slab pour is complete and complete stressing within seven days after the slab pour is complete.

Stress the tendons to the jacking forces in accordance with the stressing sequence specified on the plans, but do not exceed 80 percent of the ultimate stresses of the strands. The longitudinal tendons, after stressing is complete, shall have symmetrical stresses such that the point of "no movement" or the "least force" is at the center line of the bridge. This will require stressing from both ends of each cable, but not simultaneously.

4. Grouting:

Plug both ends of each duct after the tendon has been placed. Leave the plugs in place until the duct is grouted. Begin grouting immediately after the stressing is complete and approved by the Engineer. All grouting operations, equipment, mixing and material for grouting shall be in accordance with AASHTO, PTI and the Post-Tension Manufacturer's specifications, subject to the approval of the Engineer.

5. Caution:

Due to the special nature of post-tensioning and high strand forces, inform and train all workers involved in the post-tensioning operations and related construction activities in the safety procedures. Exercise extreme caution and follow all safety procedures required by the Post-Tension Manufacturer and OSHA.

6. Specifications:

AASHTO	-	American Association of State Highway and Transportation Officials
ACI	-	American Concrete Institute
ASBI	-	American Segmental Bridge Institute
ASTM	-	American Standards for Testing Materials
PTI	-	Post-Tensioning Institute

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

Br. No. Sta.
Br. No. Sta.

GROUTING SEQUENCE & POST-TENSIONING NOTES
32' Roadway

Proj. No. Proj. No. Co. Co.

SHEET NO.	OF	SCALE		APP'D			
DESIGNED	A.H.	DETAILED	G.B.	QUANTITIES	B.S.	CADD	G.B.
DESIGN CK.	B.S.	DETAIL CK.	B.S.	QUAN. CK.	A.H.	CADD CK.	B.S.

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Sheet No. 0

Plotted By: riorg | Plot Location: Bridge Design
File: B32PTNI.dgn
Plot Date: 10-DEC-2013 14:45

CADconform Certify This File

B-55725\5\B32RDWY\B32PTN2.dgn	
Roadway Width = 32'-0"	Longest Span Length = 72'-0"
Skew and Direction = 0	Total No. of Spans = 3
Loading = HL-93	Railing Type = 32" Corrol

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	Proj. No.	YEAR	0	0

POST-TENSIONING DATA

Longitudinal Post-Tensioning

Diameter of Strand	=	0.6"
Area of Strand	=	0.217 in²
Number of Strands	=	10 per Tendon
Tendon Profile	=	Parabolic
Assumed Duct ID	=	2.99 in †
Assumed Duct OD	=	3.59 in †
μ (Duct)	=	0.14
κ (Duct)	=	0.001 rad./ft
Jacking Stress (0.75 Fpu)	=	202.5 ksi
Jacking Force per Strand	=	43.9 k
Jacking Force per Tendon	=	439.0 k
Anchor Set	=	3/8" at each end

**Estimated Force Coefficient After All Losses (Span #1)

Location	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Coeff.	0.721	0.727	0.734	0.740	0.745	0.757	0.772	0.785	0.794	0.799	0.812

**Estimated Force Coefficient After All Losses (Span #2)

Location	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Coeff.	0.812	0.804	0.796	0.781	0.759	0.746	0.759	0.781	0.796	0.804	0.812

Losses are symmetrical about ℄ Bridge

† Max. duct size allowed. **Including estimated long-term losses.

Transverse Post-Tensioning

Diameter of Strand	=	0.6"
Area of Strand	=	0.217 in²
Number of Strands	=	4 per Tendon
Tendon Profile	=	Straight
Assumed Duct Size	=	3"x1" Corrugated Oval †
Jacking Stress (0.75 Fpu)	=	202.5 ksi
Jacking Force per Strand	=	43.9 k
Jacking Force per Tendon	=	175.6 k

Begin Post-Tensioning as soon as concrete attains its minimum strength in order to minimize shrinkage or temperature cracking. In any event, stressing shall not commence before 72 hours after the last slab pour is complete, and shall be completed within seven days after the last slab pour is complete. Refer to the "Grouting Sequence & Post-Tensioning Notes" and "Post-Tensioning Details I & II" sheets for stressing.

Note to Contractor:
Due to the special nature of Post-Tensioning, proper vibration and concrete consolidation is important at all locations, but especially critical in the abutments near the end anchorage.

Prestressing Steel (General):
Modulus of Elasticity (E) = 28,500 ksi
Tensile Strength (Fu) = 270 ksi
Yield Strength (Fy) = 243 ksi

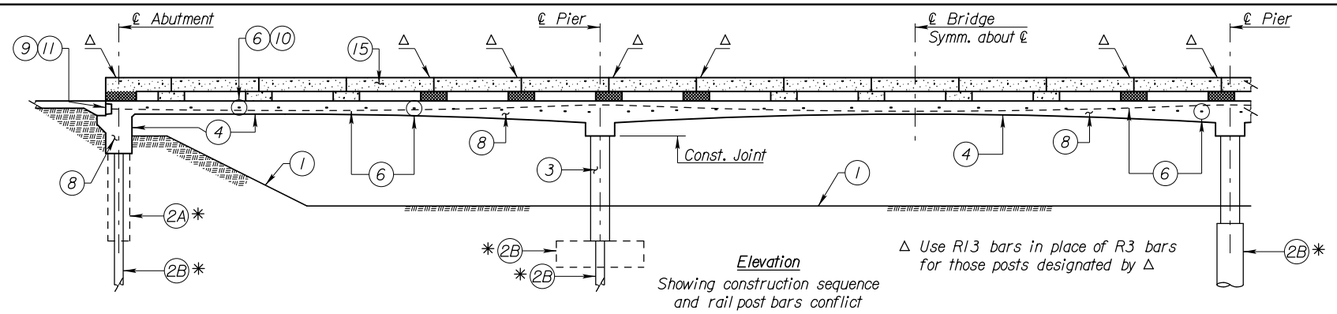
Jacking Ends:
For longitudinal tendons, jack from both ends of each cable, but not simultaneously. Jack in a manner to provide symmetry in prestress profile along the tendons so that the point of no movement is at 0.5 point of span #2 which is the ℄ of bridge.

For transverse tendons, jacking may be done at one end only.

Concrete Strength:
f'c = 5,000 psi (28-Day strength)
f'ci = 3,800 psi (Min. required at jacking for transverse)
f'ci = 4,000 psi (Min. required at jacking for longitudinal)

Special Safety Note:
No person shall ever stand behind an operating jack or in front of either end of a stressed and ungrouted tendon!

Refer to OSHA guidelines for safety procedures during construction.



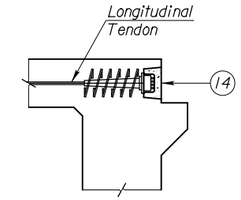
Elevation
Showing construction sequence and rail post bars conflict

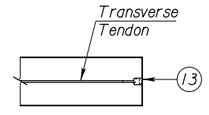
△ Use R13 bars in place of R3 bars for those posts designated by △

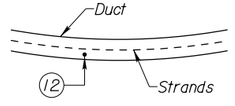
Construction Sequence		
Step	Description	Required action prior to proceeding with this step
1	Channel work and berm slopes at the abutments.	
*2A	Pre-drilled holes for piles at abutments and piers if required by the design.	Complete embankment at the abutments and channel excavation at the piers.
*2B	Driving of abutment and pier piles (or) Construction of spread footing (or) Construction of drilled shaft (as required by the design).	Complete embankment at the abutments and channel excavation at the piers. Complete pre-drilling at a bent before driving of piles.
3	Pier construction.	
4	Forming of the abutments and superstructure.	
5	Pre-Planning meeting between General Contractor, Concrete Supplier and P.T. Manufacturer.	
6	Install Post-Tensioning hardware, transverse strands and steel reinforcing.	Inspect and verify superstructure depth profile prior to installing Post-Tensioning hardware.
7	P.T. Manufacturer to provide a checklist of reviewed construction activities to project Inspector.	
8	Concrete placement in the abutments and superstructure.	Requires approval by the Engineer/Post-Tension Manufacturer prior to concrete placement.
9	Place longitudinal strands in ducts.	
10	Transverse stressing.	Wait until concrete attains required strength prior to Post-Tensioning.
11	Longitudinal stressing. Stressing approval by the Engineer prior to removal of stressing tails.	Wait until concrete attains required strength prior to Post-Tensioning.
12	Grouting operation (transverse and then longitudinal).	All Post-Tensioning stressing must be complete.
13	Fill in transverse recess pockets at Post-Tensioning anchors.	Grouting operation must be complete.
14	Fill longitudinal end anchorage recesses.	Grouting operation must be complete.
15	Bridge rail construction.	All Post-Tensioning stressing must be complete.
16	Removal of slab falsework.	All stressing operations must be complete.

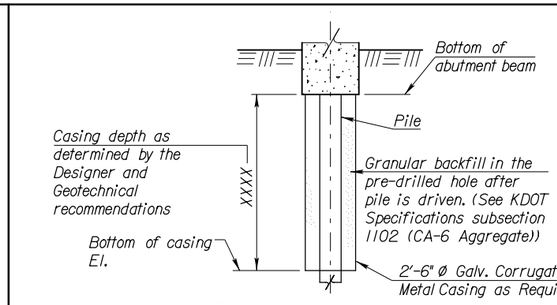
*Abutment and Pier construction may be performed independently from each other.

CONSTRUCTION SEQUENCE DETAILS





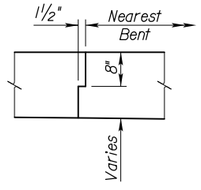




⊗ Pre-Drilled Pile Hole Detail

⊗ All work and materials including dewatering, casing, and granular backfill shall be included in the bid item "Pre-Drilled Pile Holes" paid as lineal Ft. of pre-drilled pile hole.

Note to Designer: Remove the detail for pre-drilled pile hole if not used on the project.



Extreme Event Construction Joint Option

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION
Br. No. Sta.
Br. No. Sta.
POST-TENSIONING DATA & CONSTRUCTION SEQUENCE
32' Roadway
Proj. No. Proj. No. Co. Co.

SHEET NO. OF		SCALE		APP'D			
DESIGNED	A.H.	DETAILED	G.B.	QUANTITIES	B.S.	CADD	G.B.
DESIGN CK.	B.S.	DETAIL CK.	B.S.	QUAN. CK.	A.H.	CADD CK.	B.S.

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Sheet No. 0

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Plotted By: rlang	Plot Location: Bridge Design
File: B32PTN2.dgn	
Plot Date: 10-DEC-2013 14:45	

B-55725\5\B32RDWY\B32PTN2.dgn	
Roadway Width = 32'-0"	Longest Span Length = 72'-0"
Skew and Direction = 0	Total No. of Spans = 3
Loading = HL-93	Railing Type = 32" Corrol

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	Proj. No.	YEAR	0	0

POST-TENSIONING DATA

Longitudinal Post-Tensioning

Diameter of Strand	=	0.6"
Area of Strand	=	0.217 in²
Number of Strands	=	10 per Tendon
Tendon Profile	=	Parabolic
Assumed Duct ID	=	2.99 in †
Assumed Duct OD	=	3.59 in †
μ (Duct)	=	0.14
κ (Duct)	=	0.001 rad./ft
Jacking Stress (0.75 Fpu)	=	202.5 ksi
Jacking Force per Strand	=	43.9 k
Jacking Force per Tendon	=	439.0 k
Anchor Set	=	3/8" at each end

**Estimated Force Coefficient After All Losses (Span #1)

Location	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Coeff.	0.721	0.727	0.734	0.740	0.745	0.757	0.772	0.785	0.794	0.799	0.812

**Estimated Force Coefficient After All Losses (Span #2)

Location	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Coeff.	0.812	0.804	0.796	0.781	0.759	0.746	0.759	0.781	0.796	0.804	0.812

Losses are symmetrical about ℄ Bridge

† Max. duct size allowed. **Including estimated long-term losses.

Transverse Post-Tensioning

Diameter of Strand	=	0.6"
Area of Strand	=	0.217 in²
Number of Strands	=	4 per Tendon
Tendon Profile	=	Straight
Assumed Duct Size	=	3"x1" Corrugated Oval †
Jacking Stress (0.75 Fpu)	=	202.5 ksi
Jacking Force per Strand	=	43.9 k
Jacking Force per Tendon	=	175.6 k

Begin Post-Tensioning as soon as concrete attains its minimum strength in order to minimize shrinkage or temperature cracking. In any event, stressing shall not commence before 72 hours after the last slab pour is complete, and shall be completed within seven days after the last slab pour is complete. Refer to the "Grouting Sequence & Post-Tensioning Notes" and "Post-Tensioning Details I & II" sheets for stressing.

Note to Contractor:
Due to the special nature of Post-Tensioning, proper vibration and concrete consolidation is important at all locations, but especially critical in the abutments near the end anchorage.

Prestressing Steel (General):
Modulus of Elasticity (E) = 28,500 ksi
Tensile Strength (Fu) = 270 ksi
Yield Strength (Fy) = 243 ksi

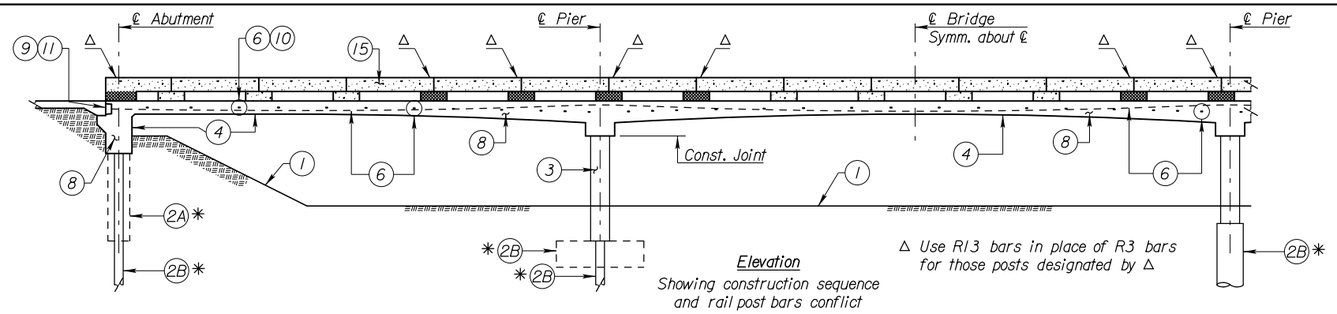
Jacking Ends:
For longitudinal tendons, jack from both ends of each cable, but not simultaneously. Jack in a manner to provide symmetry in prestress profile along the tendons so that the point of no movement is at 0.5 point of span #2 which is the ℄ of bridge.

For transverse tendons, jacking may be done at one end only.

Concrete Strength:
f'c = 5,000 psi (28-Day strength)
f'ci = 3,800 psi (Min. required at jacking for transverse)
f'ci = 4,000 psi (Min. required at jacking for longitudinal)

Special Safety Note:
No person shall ever stand behind an operating jack or in front of either end of a stressed and ungrouted tendon!

Refer to OSHA guidelines for safety procedures during construction.



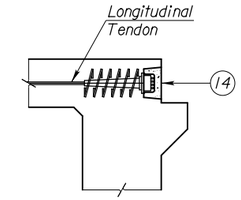
Elevation
Showing construction sequence and rail post bars conflict

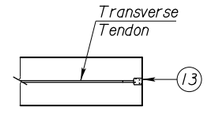
△ Use R13 bars in place of R3 bars for those posts designated by △

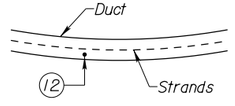
Construction Sequence		
Step	Description	Required action prior to proceeding with this step
1	Channel work and berm slopes at the abutments.	
*2A	Pre-drilled holes for piles at abutments and piers if required by the design.	Complete embankment at the abutments and channel excavation at the piers.
*2B	Driving of abutment and pier piles (or) Construction of spread footing (or) Construction of drilled shaft (as required by the design).	Complete embankment at the abutments and channel excavation at the piers. Complete pre-drilling at a bent before driving of piles.
3	Pier construction.	
4	Forming of the abutments and superstructure.	
5	Pre-Planning meeting between General Contractor, Concrete Supplier and P.T. Manufacturer.	
6	Install Post-Tensioning hardware, transverse strands and steel reinforcing.	Inspect and verify superstructure depth profile prior to installing Post-Tensioning hardware.
7	P.T. Manufacturer to provide a checklist of reviewed construction activities to project Inspector.	
8	Concrete placement in the abutments and superstructure.	Requires approval by the Engineer/Post-Tension Manufacturer prior to concrete placement.
9	Place longitudinal strands in ducts.	
10	Transverse stressing.	Wait until concrete attains required strength prior to Post-Tensioning.
11	Longitudinal stressing. Stressing approval by the Engineer prior to removal of stressing tails.	Wait until concrete attains required strength prior to Post-Tensioning.
12	Grouting operation (transverse and then longitudinal).	All Post-Tensioning stressing must be complete.
13	Fill in transverse recess pockets at Post-Tensioning anchors.	Grouting operation must be complete.
14	Fill longitudinal end anchorage recesses.	Grouting operation must be complete.
15	Bridge rail construction.	All Post-Tensioning stressing must be complete.
16	Removal of slab falsework.	All stressing operations must be complete.

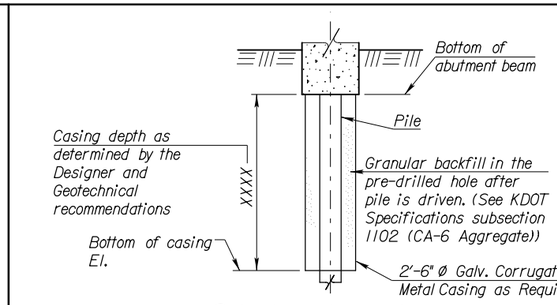
*Abutment and Pier construction may be performed independently from each other.

CONSTRUCTION SEQUENCE DETAILS





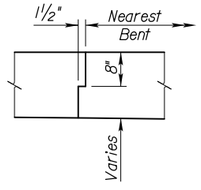




⊗ Pre-Drilled Pile Hole Detail

⊗ All work and materials including dewatering, casing, and granular backfill shall be included in the bid item "Pre-Drilled Pile Holes" paid as lineal Ft. of pre-drilled pile hole.

Note to Designer: Remove the detail for pre-drilled pile hole if not used on the project.



Extreme Event Construction Joint Option

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION
Br. No. Sta.
Br. No. Sta.
POST-TENSIONING DATA & CONSTRUCTION SEQUENCE
32' Roadway
Proj. No. Proj. No. Co. Co.

SHEET NO. OF		SCALE		APP'D			
DESIGNED	A.H.	DETAILED	G.B.	QUANTITIES	B.S.	CADD	G.B.
DESIGN CK.	B.S.	DETAIL CK.	B.S.	QUAN. CK.	A.H.	CADD CK.	B.S.

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Sheet No. 0

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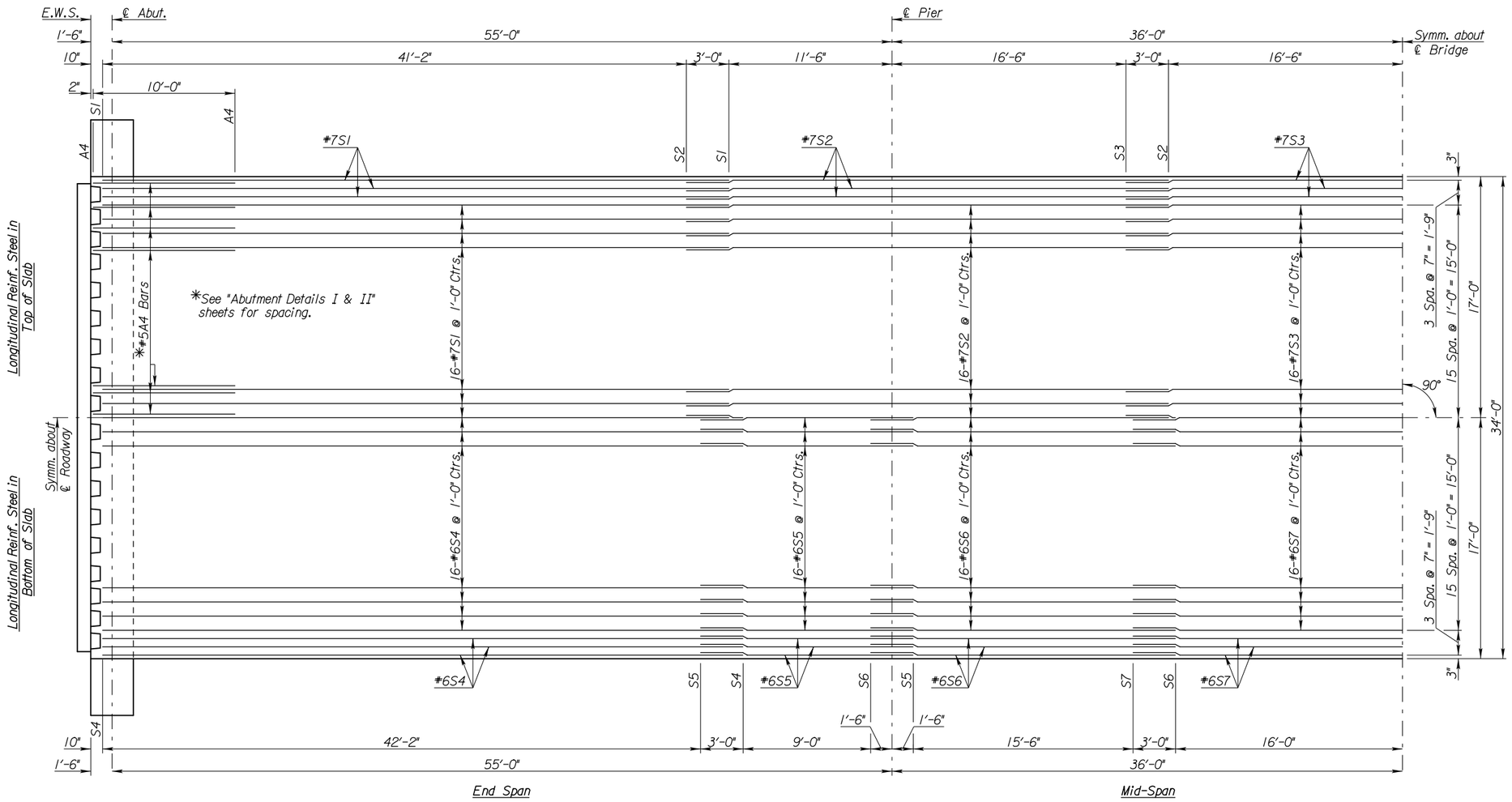
Plotted By: rlang	Plot Location: Bridge Design
File: B32PTN2.dgn	
Plot Date: 10-DEC-2013 14:45	

B-557255\B32RDWY\B32SS1.dgn			
Roadway Width =	32'-0"	Longest Span Length =	72'-0"
Skew and Direction =	0	Total No. of Spans =	3
Loading =	HL-93	Railing Type =	32" Corral

Plotted By: rlang	Plot Location: Bridge Design
File: B32SS1.dgn	
Plot Date: 10-DEC-2013 14:45	

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	Proj. No.	YEAR	0	0



HALF SLAB PLAN

NOTE:
See Half Longitudinal Section, "Slab Details II" sheet, for transverse reinforcing steel. Offset any longitudinal bars that fall directly over a longitudinal duct.

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

Br. No. Sta.
Br. No. Sta.

SLAB DETAILS I
(REINFORCING STEEL)
32' Roadway

Proj. No. Proj. No. Co. Co.

SHEET NO. OF	SCALE	APP'D			
DESIGNED A.H.	DETAILED G.B.	QUANTITIES B.S.	CADD G.B.		
DESIGN CK. B.S.	DETAIL CK. B.S.	QUAN. CK. A.H.	CADD CK. B.S.		

CADconform Certify This File

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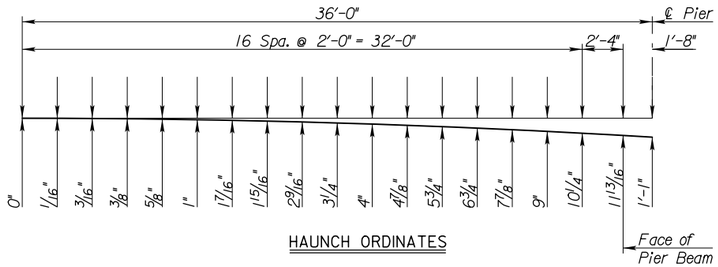
Sheet No. 0

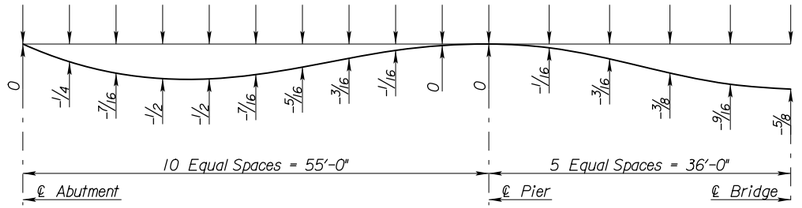
B-557255\B32RDWY\B32SS2.dgn			
Roadway Width =	32'-0"	Longest Span Length =	72'-0"
Skew and Direction =	0	Total No. of Spans =	3
Loading =	HL-93	Railing Type =	32" Corral

Plotted By: rlong	Plot Location: Bridge Design
File: B32SS2.dgn	
Plot Date: 10-DEC-2013 14:45	

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	Proj. No.	YEAR	0	0



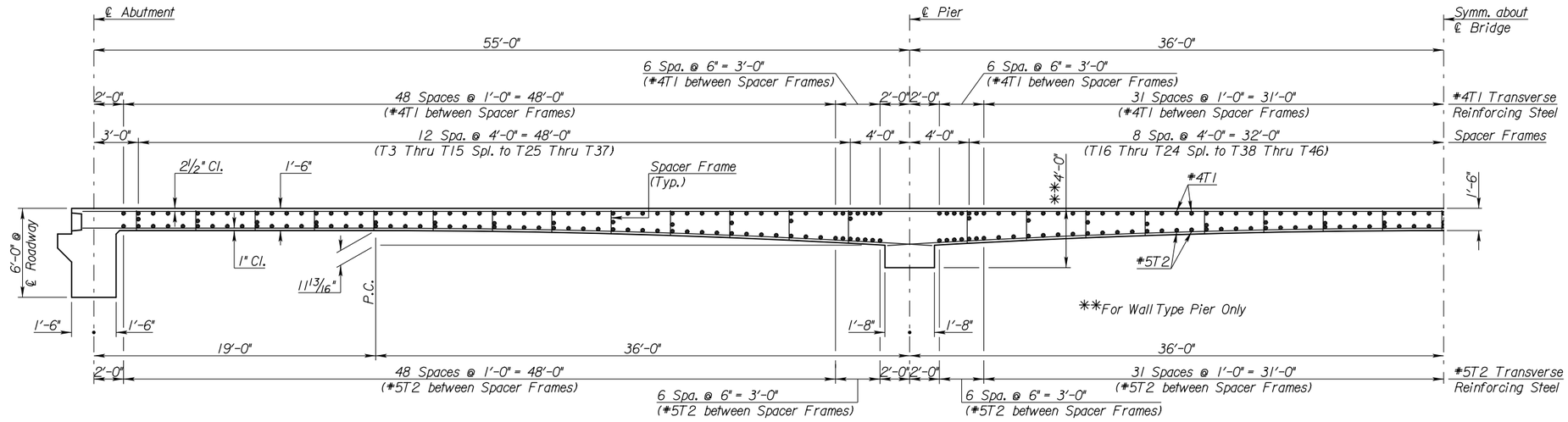
HAUNCH ORDINATES



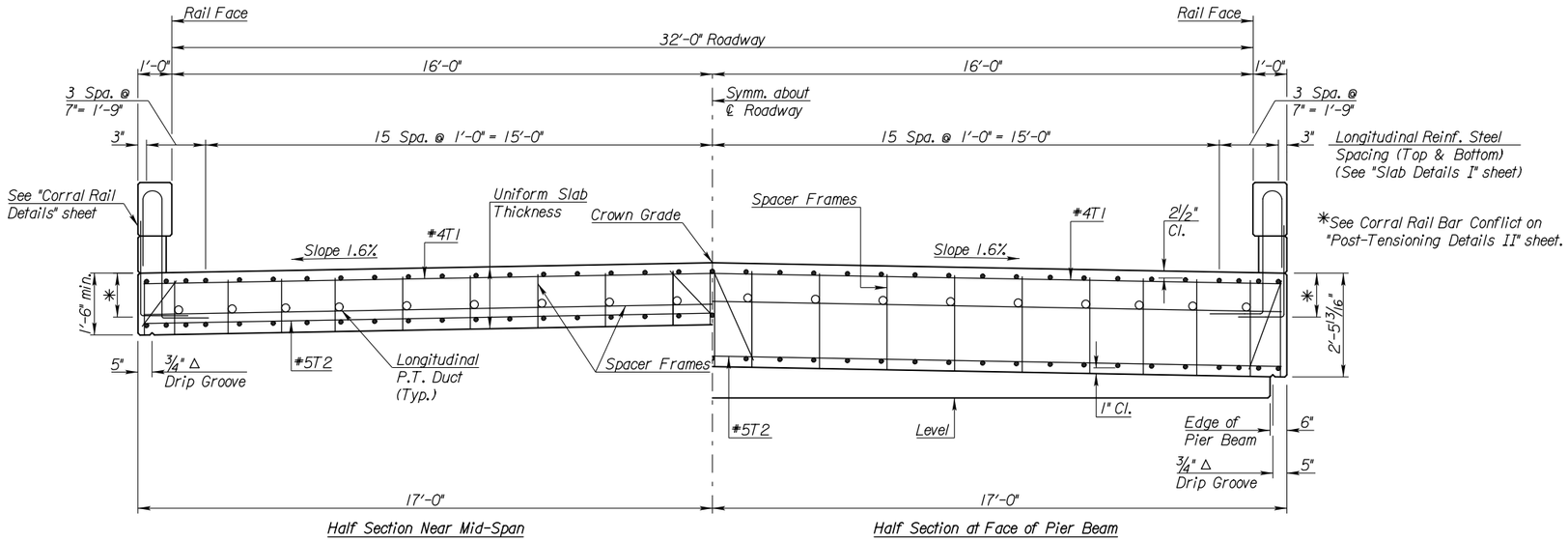
DEAD LOAD AND POST-TENSIONING DEFLECTION DIAGRAM AT TENTH POINTS IN INCHES

The Camber information shown above is for 50 days after longitudinal post-tensioning. Slab age at longitudinal post-tensioning is 9 days.

CAMBER NOTE:
Set the soffit form upwards for positive numbers and downwards for negative numbers.



HALF LONGITUDINAL SECTION ALONG ℄ ROADWAY



TYPICAL SECTION OF SLAB

LEGEND
P.T. = Post-Tensioning

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

Br. No. Sta.
Br. No. Sta.

SLAB DETAILS II
(REINFORCING STEEL)
32' Roadway

Proj. No. Proj. No. Co. Co.

SHEET NO.	OF	SCALE		APP'D			
DESIGNED	A.H.	DETAILED	G.B.	QUANTITIES	B.S.	CADD	G.B.
DESIGN CK.	B.S.	DETAIL CK.	B.S.	QUAN. CK.	A.H.	CADD CK.	B.S.

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Sheet No. 0

CADconform Certify This File

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS				

STATE OF KANSAS

DEPARTMENT OF TRANSPORTATION

KDOT PROJECT NO. 106 K–6469–01

POST–TENSIONED CONCRETE HAUNCHED SLAB SPAN STANDARDS

SPANS : 55′ – 72′ – 55′ (B)

ROADWAY = 32′

B-55725\B32RDWY\B327ITL.dgn			
Roadway Width =	32'-0"	Longest Span Length =	72'-0"
Skew and Direction =	0	Total No. of Spans =	3
Loading =	HL-93	Railing Type =	32" Conrail

Plotted By: rlong	Plot Location: Bridge Design
File: B327ITL.dgn	
Plot Date: 10-DEC-2013 14:45	

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

SHEET NO.	OF	SCALE		APP'D	
DESIGNED	A.H.	DETAILED	G.B.	QUANTITIES	B.S.
DESIGN CK.	B.S.	DETAIL CK.	B.S.	QUAN. CK.	A.H.
CADD	G.B.	CADD CK.	B.S.		

PU 1000