December 9, 2021

MEMORANDUM TO: TONY MENKE, P.E., CHIEF
BUREAU OF CONSTRUCTION & MATERIALS

We are handing you Final Plans for the project noted below for the January 2022 letting.

Debbie Tanking / Brad Rognlie
Design Squad

Project Number	County	Length
54-87 KA-6088-01 ACNHP-A608(801)	Sedgwick	0.001 mile

REMARKS:

Replace deck and rails, add shear studs, paint super, replace approach pavement and steel repair

US-54 bridge (113) at the K-251/US-54 junction

APPROVED:

CHIEF, BUREAU OF ROAD DESIGN

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	1	77

STATE OF KANSAS
DEPARTMENT OF TRANSPORTATION

PROJECT NO. 54-87 KA-6088-01
FEDERAL PROJECT NO. ACNHP-A608(801)

PLAN AND PROFILE OF PROPOSED
STATE HIGHWAY

FEDERAL AID PROJECT
SEDGWICK COUNTY
US-54

GRADING & SURFACING
BRIDGE REHABILITATION
SIGNING
PAVEMENT MARKING
SEEDING

INDEX OF SHEETS

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5	CROSSOVER PAVING DETAILS
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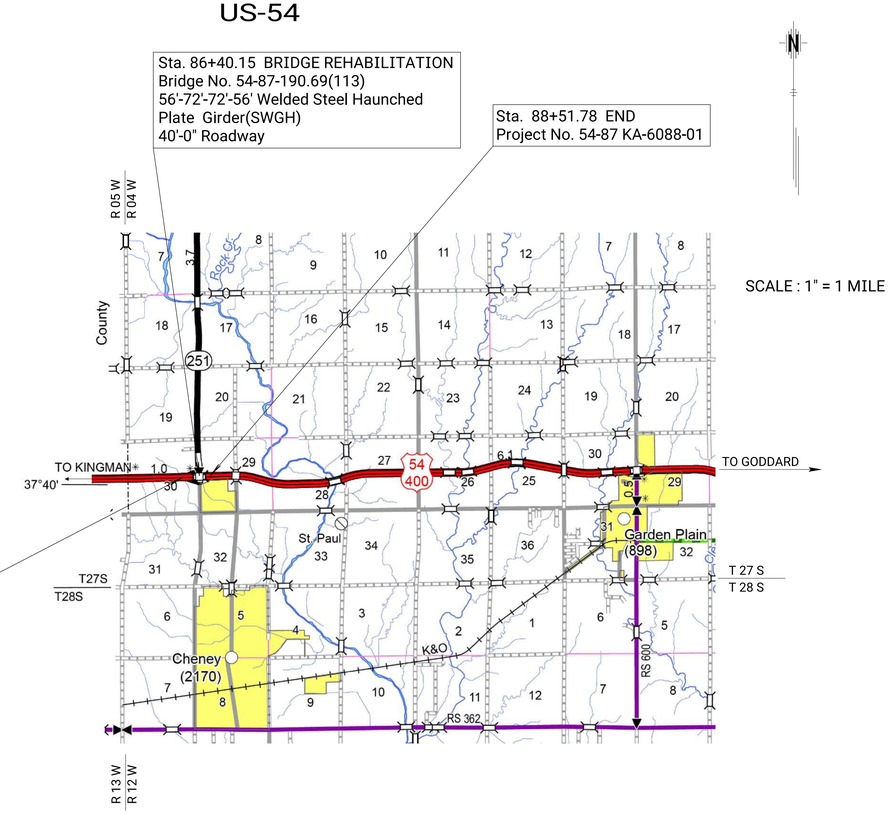

SCALE : 1" = 1 MILE

NOTE: TRAFFIC TO BE CARRIED THROUGH THE PROJECT.

DESIGN DESIGNATION

AADT (2018)	3680 vpd
AADT (2058)	
DHV	19%
D	60/40
T	
V	70
C of A	Full
Clear Zone	30

CONVENTIONAL SIGNS

COUNTY LINE
CITY LIMITS
STATE OR NATIONAL LINE
TOWNSHIP, SECTION or GRANT LINE
PROPERTY LINE
HIGHWAY FENCE
EXISTING FENCE
GUARDRAIL
CONSTRUCTION LIMITS
RIGHT OF WAY LINE
TRAVELED WAY
RAILROADS
CENTER LINE OF PROJECT
TERRACE
CULVERTS
DROP INLET & STORM SEWER
ACCESS CONTROL
POWER POLE
TELEPHONE POLE
MARSH
HEDGE
TREES
PROFILE ELEVATION
STREAM or CREEK

GROSS LENGTH OF PROJECT 423.25 FT. (Includes Equations)

EXCEPTIONS

NET LENGTH OF PROJECT	423.25	FT.	0.080	MILES
NET LENGTH OF BRIDGES	259.25	FT.	0.049	MILES
NET LENGTH OF ROAD	164.00	FT.	0.031	MILES

PLANS PREPARED BY
FINNEY & TURNIPSEED
TRANSPORTATION & CIVIL ENGINEERING, L.L.C.
TOPEKA, KANSAS

CRAIG ALLEN MATTOX LICENSED 11405 PROFESSIONAL ENGINEER

Approved _____
Date

State Transportation Engineer

By:

Chief, Bureau of Road Design

KANSAS DEPARTMENT OF TRANSPORTATION

	BY	DATE
SURVEY		
CADD TECHNICIAN		
DESIGNERS	FINNEY & TURNIPSEED	
SQUAD	TANKING(ROAD)/ROGNLIE(BRIDGE)/FINNEY & TURNIPSEED	

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Drawn By : CAM
File : Title 6088.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	2	77

GENERAL NOTE

THE GEOLOGICAL INFORMATION SHOWN ON THESE PLANS IS FROM STUDIES MADE IN THE FIELD AND REPRESENTS THE BEST INFORMATION AVAILABLE TO THE KANSAS DEPARTMENT OF TRANSPORTATION.

AT BORROW AREA LOCATIONS ADJACENT TO THE RIGHT OF WAY, UTILITY POLES MAY BE SET AT THE PERMANENT LOCATIONS PRIOR TO CONSTRUCTION AS APPROVED BY THE ENGINEER PROVIDED A MINIMUM VERTICAL CLEARANCE, IN ACCORDANCE WITH THE NATIONAL ELECTRICAL SAFETY CODE, IS OBTAINED. THE CONTRACTOR WILL BE REQUIRED TO WORK AROUND THESE POLES TO COMPLETE THE WORK.

ALL BORROW TO BE OBTAINED FROM AREAS PROVIDED BY THE CONTRACTOR SHALL BE APPROVED BY THE ENGINEER, BOTH AS TO SUITABILITY OF MATERIAL AND SITE LOCATION. LOCATIONS WHICH, IN THE OPINION OF THE ENGINEER, CONTAIN UNSUITABLE MATERIAL OR WILL LEAVE AN UNSIGHTLY APPEARANCE ON THE PROJECT WILL NOT BE APPROVED.

CHANNELS SHALL BE CUT AT BOX CULVERTS (UNLESS OTHERWISE NOTED) TO FLOW LINE ELEVATIONS AND TO A WIDTH OF ONE FOOT OUTSIDE OF EACH OUTSIDE WALL AND WITH SLOPES 2 TO 1 PRIOR TO CONSTRUCTION OF THE CULVERT.

EMBANKMENT QUANTITIES FOR INITIAL CONSOLIDATION AND SETTLEMENT SHOWN IN THE EARTHWORK QUANTITIES ARE SUBSIDIARY TO OTHER EARTHWORK ITEMS. MATERIAL FOR THE EMBANKMENT IS INCLUDED IN THE EXCAVATION QUANTITIES.

EXCAVATION REQUIRED FOR PLACING SELECT SOIL IS INCLUDED IN THE COMMON EXCAVATION QUANTITIES.

WHERE EASEMENTS ARE SHOWN ON RAILROAD RIGHT OF WAY, THE CONTRACTOR SHALL BE REQUIRED TO WORK AROUND AND NOT DISTURB THE RAILROAD COMMUNICATION OR SIGNAL POLES OR LINES.

EXCAVATION SHOWN TO BE WASTED SHALL BE WASTED ON SITES PROVIDED BY THE CONTRACTOR. THESE SITES SHALL BE APPROVED BY THE ENGINEER AS TO SUITABILITY, APPEARANCE, AND SITE LOCATION. LOCATIONS THAT, IN THE OPINION OF THE ENGINEER, WILL LEAVE AN UNSIGHTLY APPEARANCE WILL NOT BE APPROVED.

ALL TREES, HEDGE ROWS, SHELTERBELTS, AND WOODY SHRUBS NOT SHOWN TO BE REMOVED AND LOCATED BETWEEN THE CONSTRUCTION LIMITS AND THE RIGHT-OF-WAY LINE OR EASEMENT LINE SHALL BE SPARED UNLESS DIRECTED BY THE ENGINEER TO BE REMOVED. ALL TREES WITHIN THE APPROPRIATE CLEAR ZONE SHALL BE REMOVED.

P.O.T. Sta. 58+75.85
1. $\frac{3}{4}$"x27" rebar, 8" deep
2. ℄ top R/W monument 208.73' NE
3. ℄ top N end RCP 154.53' WNW
4. ℄ top S end RCP 172.74' SW

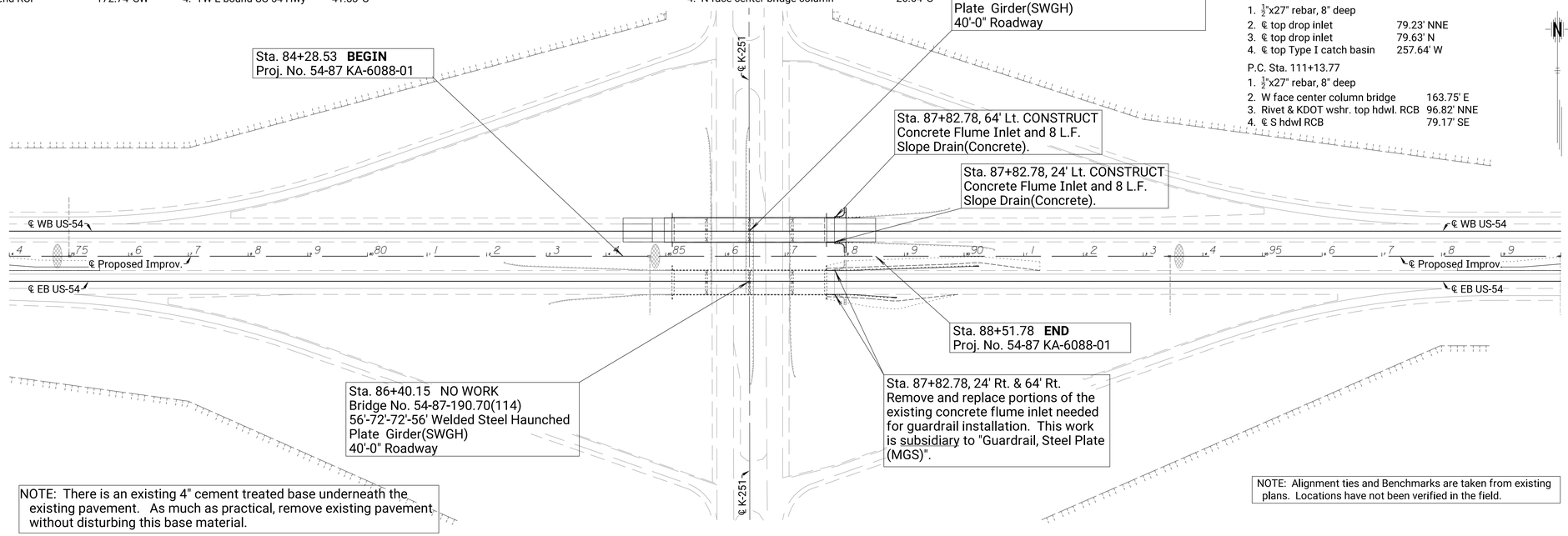
P.O.T. Sta. 70+92.46
1. $\frac{3}{4}$"x27" rebar, 8" deep
2. ℄ top Type I catch basin 142.72' W
3. ℄ top S end RCP 176.28' SW
4. TW E bound US-54 Hwy 41.83' S

P.O.T. Sta. 85+05.23
1. Rivet and KDOT washer in conc.
2. KDOT alum cap stamped "HCP SG 161" 0.31' S
3. NW cor. E handrail EB bridge 24.08' SSE
4. ℄ top Type I catch basin 31.89' W

P.O.T. Sta. 86+40.15
1. $\frac{3}{4}$"x27" rebar, 6" deep
2. Spk. & KDOT wshr. guard fence post 5.18' SE
3. $1\frac{1}{2}$" pipe, 4" deep 0.16' N
4. N face center bridge column 26.64' S

P.O.T. Sta. 96+02.63
1. $\frac{3}{4}$"x27" rebar, 8" deep
2. ℄ top drop inlet 79.23' NNE
3. ℄ top drop inlet 79.63' N
4. ℄ top Type I catch basin 257.64' W

P.C. Sta. 111+13.77
1. $\frac{3}{4}$"x27" rebar, 8" deep
2. W face center column bridge 163.75' E
3. Rivet & KDOT wshr. top hdwl. RCB 96.82' NNE
4. ℄ S hdwl RCB 79.17' SE



NOTE: There is an existing 4" cement treated base underneath the existing pavement. As much as practical, remove existing pavement without disturbing this base material.

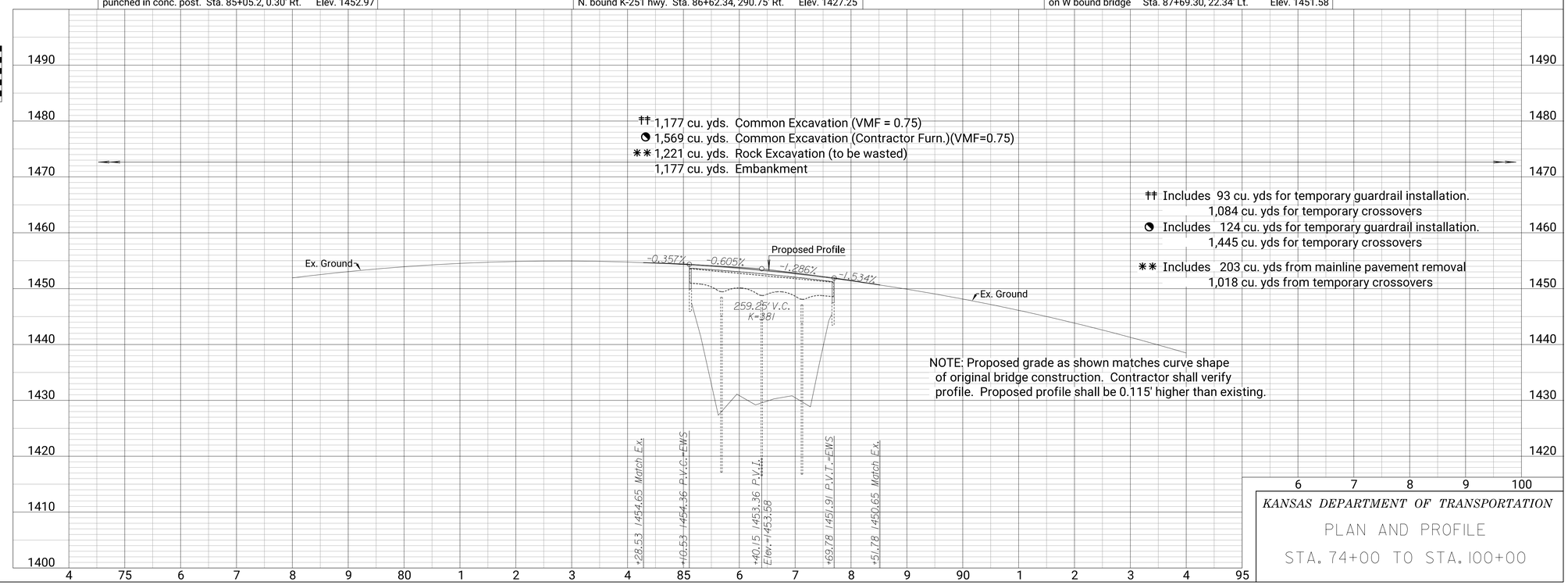
NOTE: Alignment ties and Benchmarks are taken from existing plans. Locations have not been verified in the field.

BM # 17: Alum. cap stamped "KDOT HCP SG-161" ctr. punched in conc. post. Sta. 85+05.2, 0.30' Rt. Elev. 1452.97

BM #17A: Rivet & KDOT wshr. ℄ top hdwl. Type III inlet, N. bound K-251 hwy. Sta. 86+62.34, 290.75' Rt. Elev. 1427.25

BM # 18: Rivet & KDOT wshr. top SE wingwall of E abutment on W bound bridge Sta. 87+69.30, 22.34' Lt. Elev. 1451.58

SCALE
PLAN: Lat. & Long. 100' 0 100' 200'
PROFILE: Horiz. same as above
Vert. 10' 0



†† 1,177 cu. yds. Common Excavation (VMF = 0.75)
◔ 1,569 cu. yds. Common Excavation (Contractor Furn.)(VMF=0.75)
✱✱ 1,221 cu. yds. Rock Excavation (to be wasted)
1,177 cu. yds. Embankment

†† Includes 93 cu. yds for temporary guardrail installation.
1,084 cu. yds for temporary crossovers
◔ Includes 124 cu. yds for temporary guardrail installation.
1,445 cu. yds for temporary crossovers
✱✱ Includes 203 cu. yds from mainline pavement removal
1,018 cu. yds from temporary crossovers

NOTE: Proposed grade as shown matches curve shape of original bridge construction. Contractor shall verify profile. Proposed profile shall be 0.115' higher than existing.

KANSAS DEPARTMENT OF TRANSPORTATION
PLAN AND PROFILE
STA. 74+00 TO STA. 100+00

DATE	BY	
		REFERENCES NOTED
		REFERENCES CHECKED

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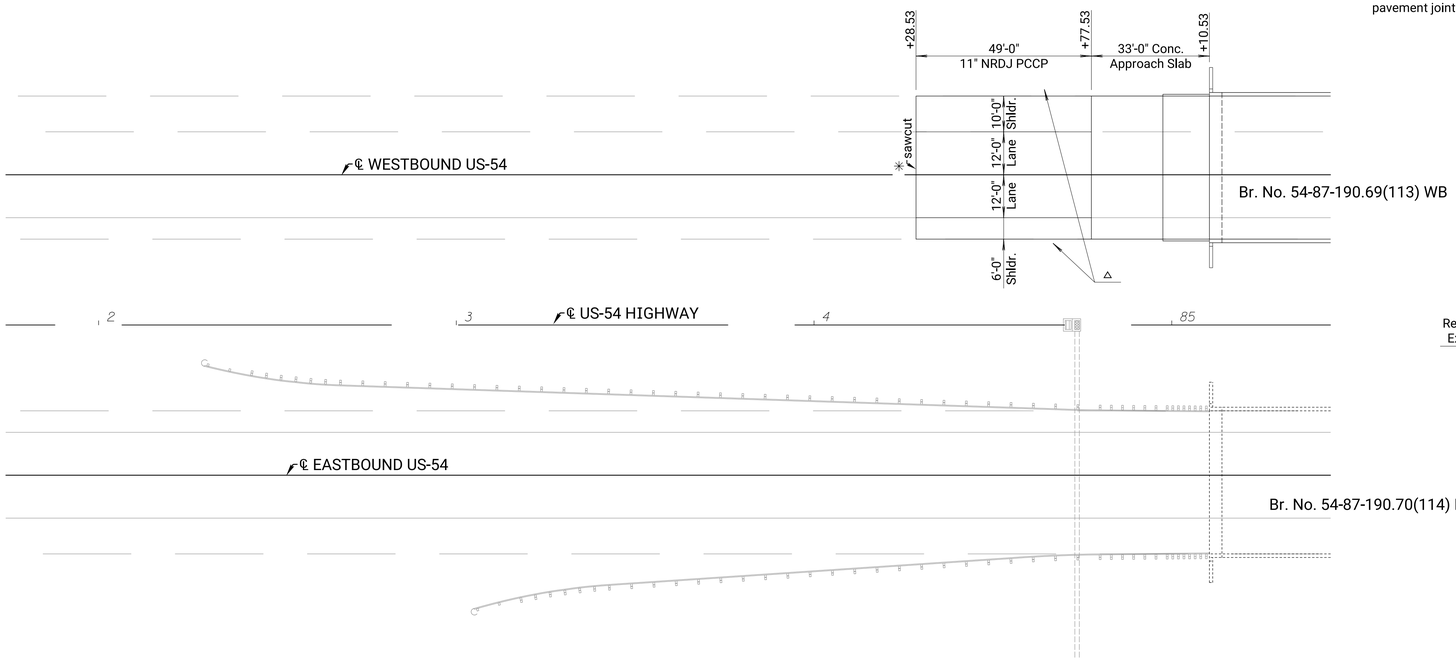
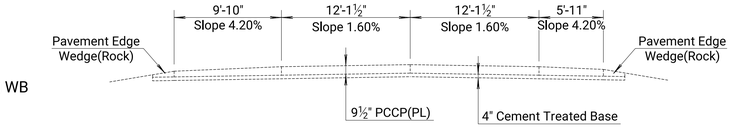
File : P&P 6088.dgn

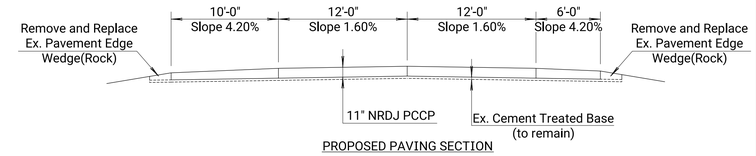
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54–87 KA–6088–01	2022	3	77

✳Note: Saw cut locations are approximate. Concrete pavement shall be removed at an existing pavement joint.





EXISTING PAVING SECTION



PROPOSED PAVING SECTION

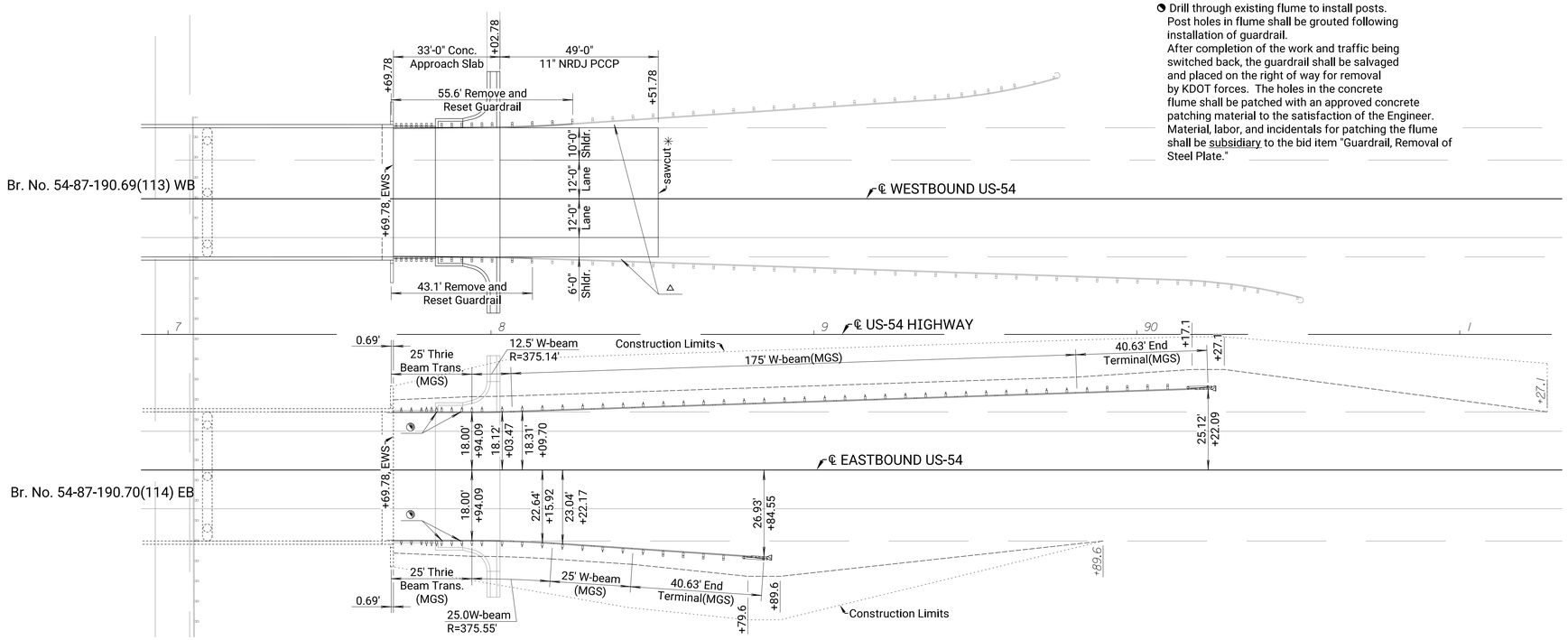
N

SCALE: 1"=20'

◔ Drill through existing flume to install posts. Post holes in flume shall be grouted following installation of guardrail. After completion of the work and traffic being switched back, the guardrail shall be salvaged and placed on the right of way for removal by KDOT forces. The holes in the concrete flume shall be patched with an approved concrete patching material to the satisfaction of the Engineer. Material, labor, and incidentals for patching the flume shall be subsidiary to the bid item "Guardrail, Removal of Steel Plate."

N

SCALE: 1"=20'



△ NOTE:
Removing and replacing Pavement Edge Wedge(Rock), grading of Cement Treated Base, and shoulder excavation and backfill required for removal and replacement of concrete pavement and approach slabs shall be subsidiary to the bid items "Concrete Pavement (11" Unif.)(AE)(NRDJ)" and "Concrete Pavement (11" Unif.)(AR)(Br. App.).

NO.	DATE	REVISIONS	BY	APP'D
1				
2				
3				

KANSAS DEPARTMENT OF TRANSPORTATION

PAVING AND GUARDRAIL LAYOUT

FHWA APPROVAL		APP'D.	
DESIGNED	DETAILED	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK.

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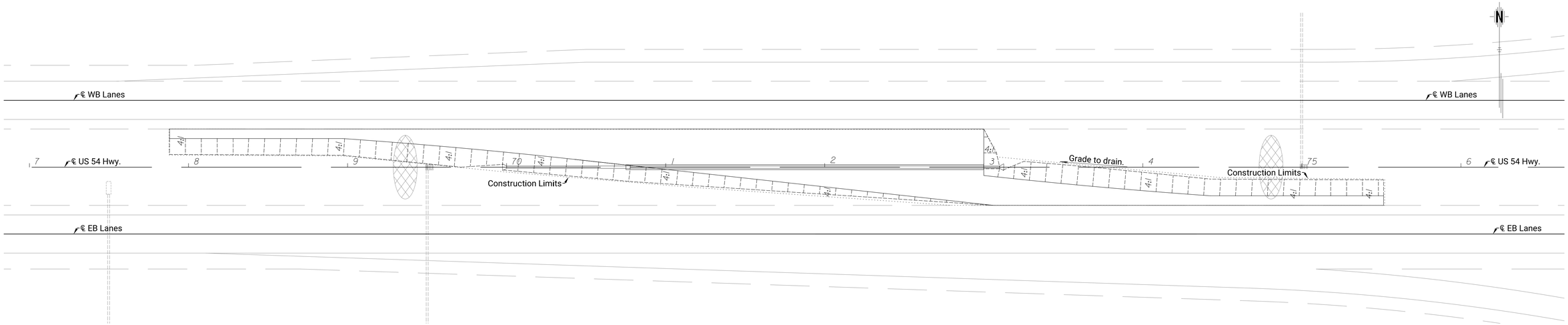
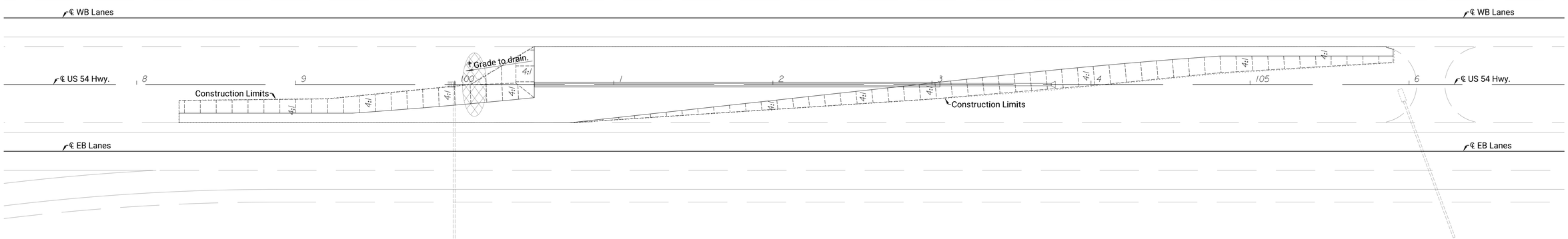
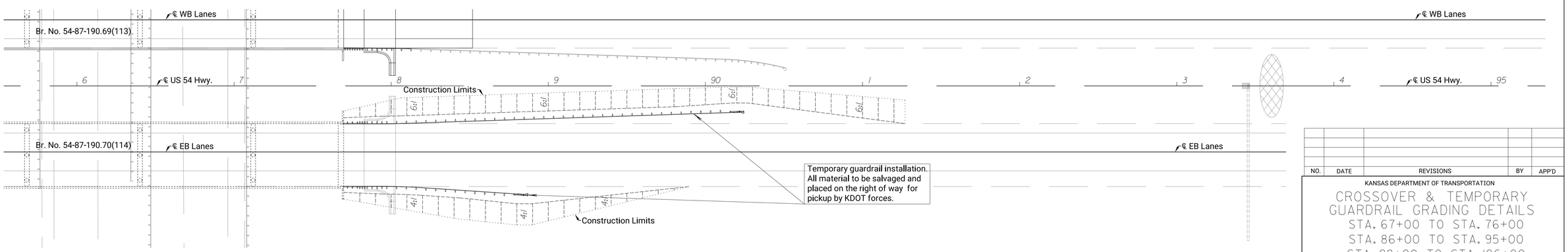
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	4	77



†Remove existing ditch plug.
Reconstruct ditch plug following removal of crossover.





NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION

CROSSOVER & TEMPORARY GUARDRAIL GRADING DETAILS

STA. 67+00 TO STA. 76+00
STA. 86+00 TO STA. 95+00
STA. 98+00 TO STA. 106+00

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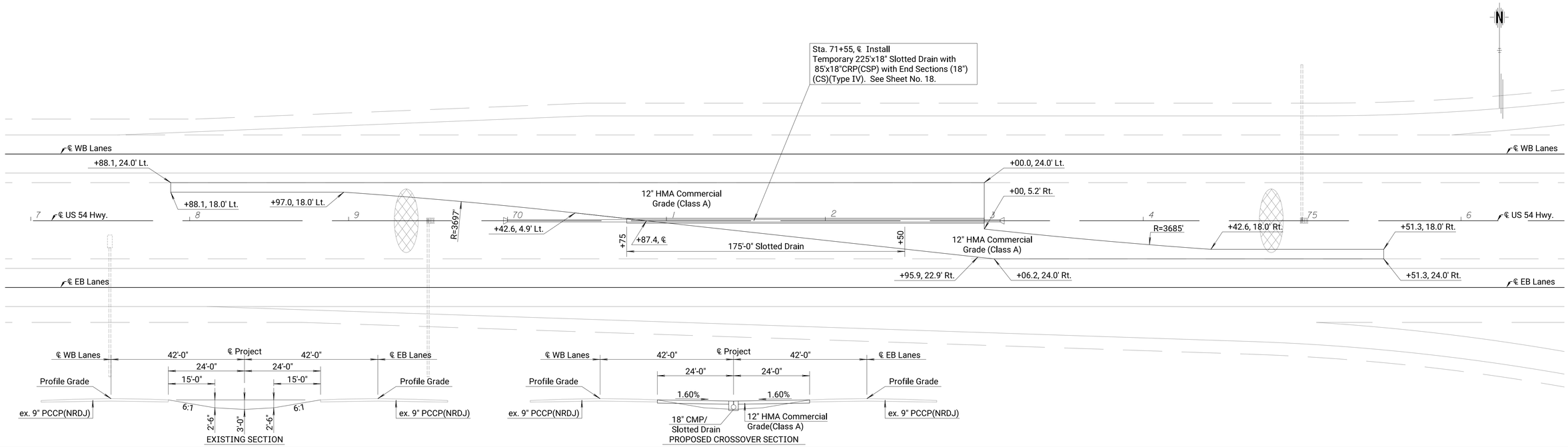
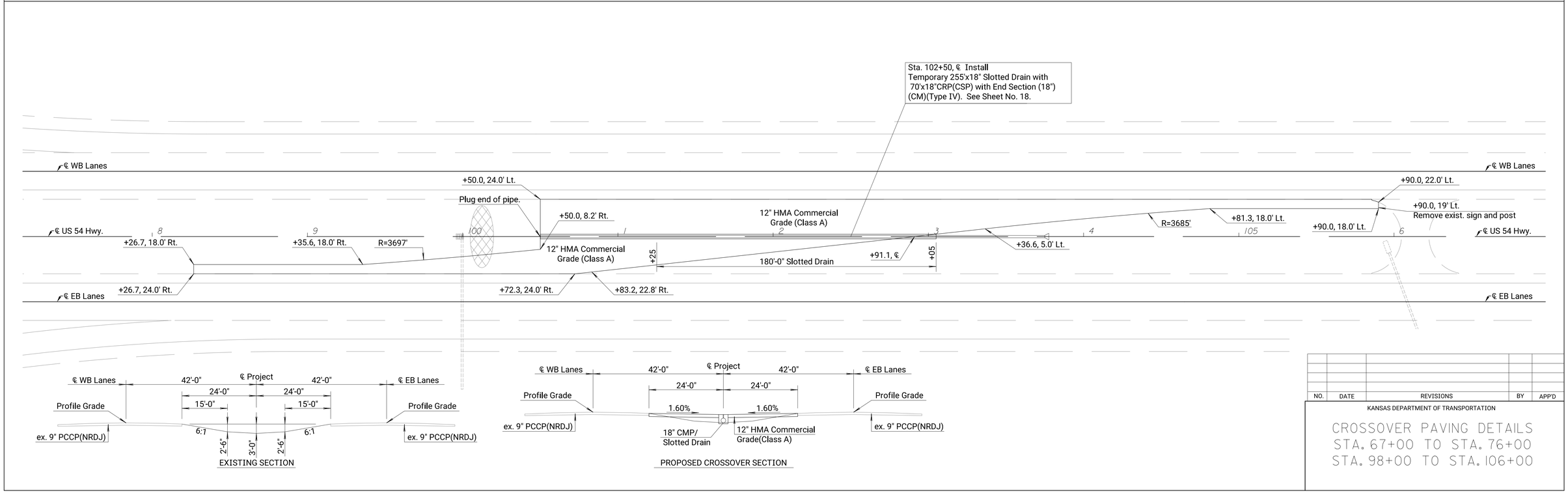
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	5	77





NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION

CROSSOVER PAVING DETAILS
STA. 67+00 TO STA. 76+00
STA. 98+00 TO STA. 106+00

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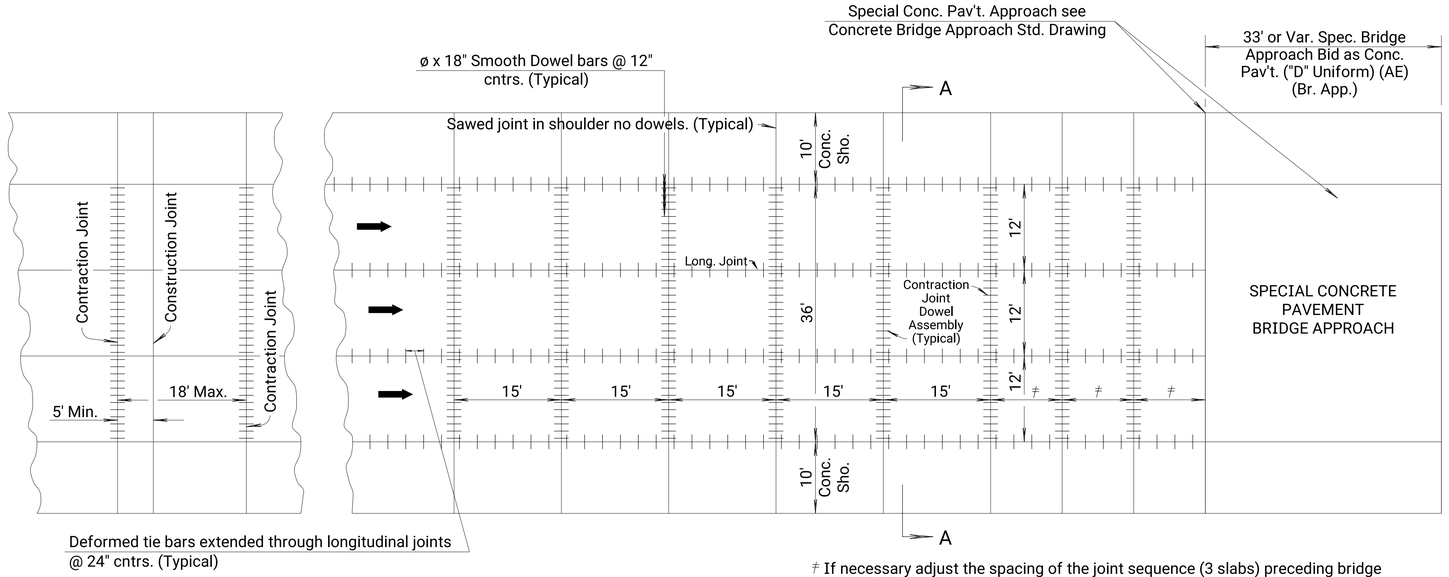
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	6	77



≠ If necessary adjust the spacing of the joint sequence (3 slabs) preceding bridge approach pavement in order to establish slab lengths of no less than 10 ft.

GENERAL NOTE

Epoxy coat all deformed tie bars that are straight. Patch any damage to the epoxy coating in accordance with the Standard Specifications.

Use billet steel Grade 40 reinforcing for deformed tie bars that require bending, may be epoxy coated at the Contractor's option.

Place pressure relief joint at the end of the bridge approach pavement slab (no bars thru joint). For details of pressure relief joint see Standard Drawing RD712.

Use load transfer devices as shown in details at all contraction joints on mainline pavement unless otherwise noted. Shoulder contraction joints have no dowels unless specifically shown on the plans.

Fill all sawed joints on the project in accordance with the Standard Specifications with the exception of those joints in pavement constructed over Cement or Asphalt Treated Base.

Use single saw cut, ⅛" wide, joint in pavement constructed over Cement or Asphalt Treated Base (Non-Sealed Joint Sawcut). Use single saw cut, ⅛" wide, joint for shoulder pavement adjacent to mainline pavement constructed over Asphalt or Cement Treated Base (Non-Sealed Joint Sawcut). See detail this sheet.

Shape all keyed joints similar to section of recessed form leg as shown on this sheet.

Evenly space tie bars along the length of the slab with no tie bar within 12" of contraction joint. All longitudinal joints are tied.

DOWEL SIZE	
D (in.)	Diameter
6 < D < 9	1"
9 ≤ D < 11	1¼"
D ≥ 11	1½"

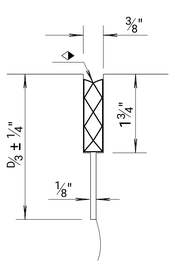
PAVEMENT DEPTH

D= 11"

JOINT LEGEND

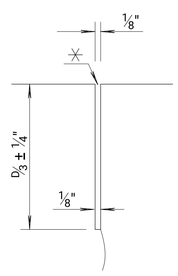
Tied Butt

Tied Keyed



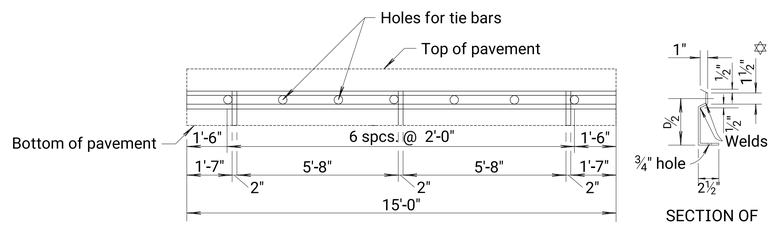
DETAIL OF SEALED JOINT SAWCUT

Make an initial ⅛" saw cut (D/3 ± ¼" depth); the second ⅜" saw cut is a separate operation done after concrete has gained sufficient strength to avoid spalling as determined by the Engineer.



DETAIL OF NON-SEALED JOINT SAWCUT

Make only the initial ⅛" saw cut after concrete has gained sufficient strength to avoid spalling as determined by the Engineer.

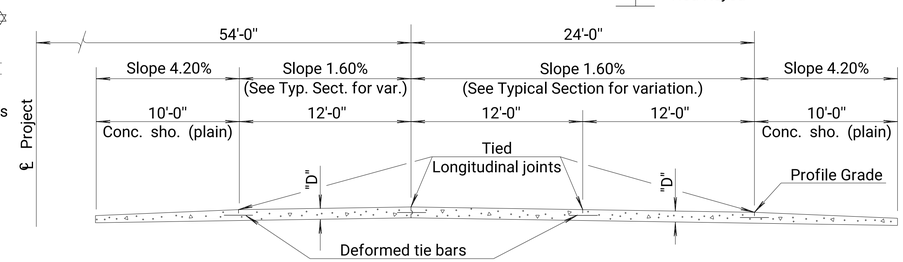


METAL STRIP FOR LONGITUDINAL KEYED CONSTRUCTION JOINT

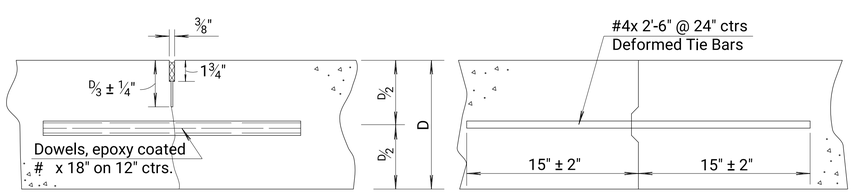
SECTION OF RECESSED FORM LEG

To be used only against forms, do not extend through contraction joints.

Use snap-in leg or other approved designs in lieu of welded leg.



SECTION A-A
TRANSVERSE SECTION



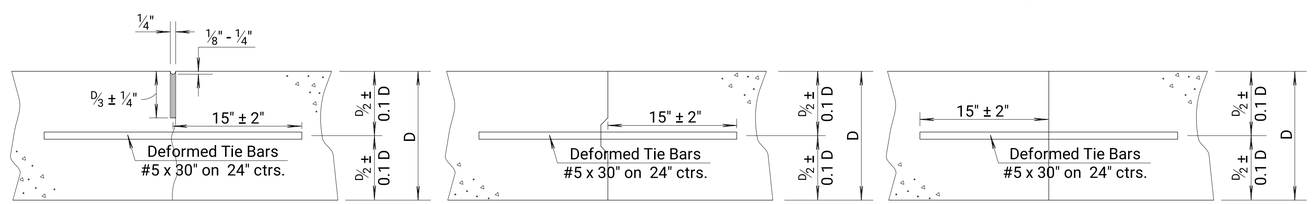
Contraction

Construction

TRANSVERSE JOINTS

Note: Construct contraction joints at plan locations or at the Engineer's direction.

When necessary to interrupt continuous placement for a substantial length of time or at the end of a day's pour, the Contractor has the option of ending placement at a contraction joint or with a construction joint located a minimum of five (5) feet from a contraction joint. Construct either joint type by placing a header at the end of the pour or by paving past the joint location. After the concrete has hardened, saw joint and drill holes for tie bars or dowels.



Tied Non-Keyed

Tied Keyed Construction

Tied Butt Construction

LONGITUDINAL JOINTS

Note: For longitudinal construction joints the contractor has the option of using either the keyed or butt type. Place deformed tie bars mid-depth of the shoulder.

NO.	DATE	REVISIONS	BY	APP'D
11	5-17-13	Revised Note, Longitudinal Joints	S.W.K.	J.O.B.
10	3-21-12	Rev. Table & Add. Det., Non-Seal. Joint	S.W.K.	J.O.B.
9	8-18-10	Revised Dowel Sizes & Notes	S.W.K.	J.O.B.
8	8-24-09	Rev. Joint Note, Rem. Rumble Strips	S.W.K.	J.O.B.

KANSAS DEPARTMENT OF TRANSPORTATION

CONCRETE PAVEMENT (NRDJ)
MULTI-LANE with
CONCRETE SHOULDERS

RD709

FHWA APPROVAL	10-23-13	APP'D. James O. Brewer	
DESIGNED	DETAILED	QUANTITIES	TRACED Bowser
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK. King

Note to Designer: Designer will add applicable dowel sizes and pavement depth "D".

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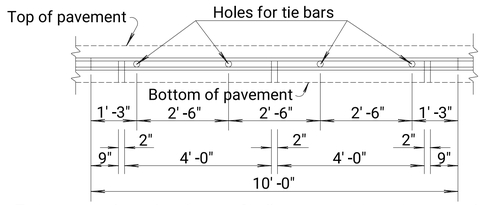
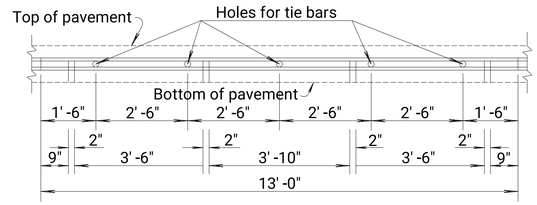
Drawn By : CAM
File : Road Stds.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	7	77



To be used only against forms. Shall not extend through contraction joints.

METAL STRIP FOR
LONGITUDINAL CONSTRUCTION JOINT (10'-0")



To be used only against forms. Shall not extend through contraction joints.

METAL STRIP FOR
LONGITUDINAL CONSTRUCTION JOINT (13'-0")

GENERAL NOTES

All work shall be done in conformity with the Standard Specifications applicable to the project.

The cost of all bars and joint material shown on this sheet is to be included in the bid price for Concrete Pavement.

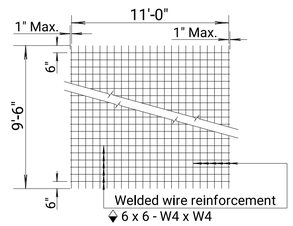
At each planned transverse joint location, a 4 to 6 inch wide strip of the pavement surface shall be protected from the texturing operation to provide a transverse textureless surface centered over the joint sawcut.

All sawed joints on this project shall be filled with sealant in accordance with Standard Specifications.

The 4 inch edge curb shall be constructed integral with the approach slab shoulder.

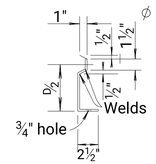
All materials and work required for this construction shall be Subsidiary to the concrete approach slab.

Tie bars shall be evenly spaced along the length of the slab and no tie bars shall be within 12" of contraction joint.



TYPICAL SHEET OF WELDED WIRE REINFORCEMENT
FOR SPECIAL BRIDGE APPROACH PAVEMENT

Note: Epoxy coated #3 bars longitudinally @ 12" ctrs. & #3 bars transversely @ 18" ctrs. may be substituted for each layer of epoxy coated welded wire reinforcement.



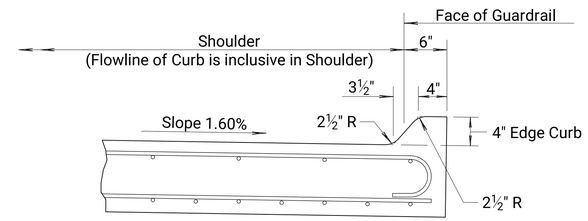
SECTION OF RECESSED
FORM LEG

Snap-in leg or other approved designs may be used in lieu of welded leg.

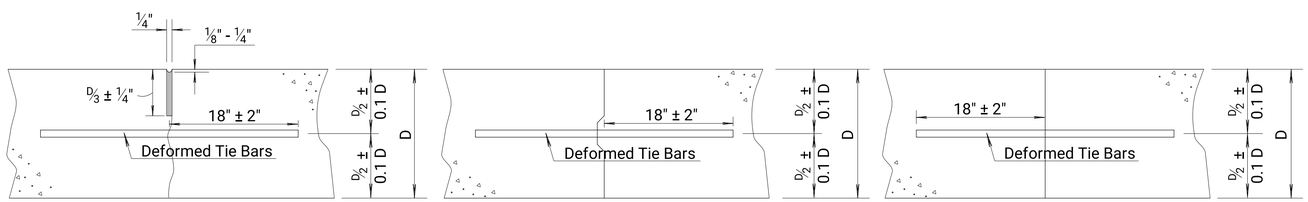
DETAIL OF LAP FOR WELDED WIRE REINFORCEMENT

The lap shall extend beyond the first transverse or bag wire of each sheet.

The sheet shall be wired securely at the edges and at intervals not to exceed 2'-6" for the full width of the sheet. Approximate weight of welded wire reinforcement = 58 lbs. per 100 sq. ft. Other methods for fastening the sheets of welded wire reinforcement at the laps may be used with the approval of the Engineer.



SECTION A-A



Tied Non-Keyed

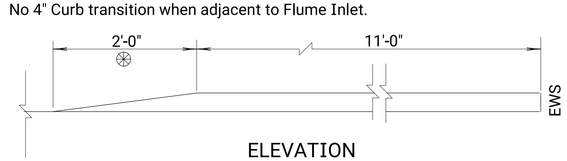
Tied Keyed Construction

Tied Butt Construction

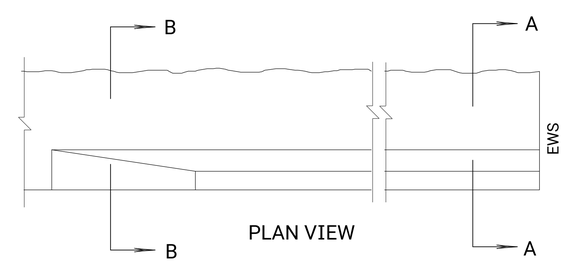
LONGITUDINAL JOINTS

Note: For longitudinal construction joints the contractor has the option of using either the keyed or butt type. Place deformed tie bars mid-depth of the shoulder.

No 4" Curb transition when adjacent to Flume Inlet.

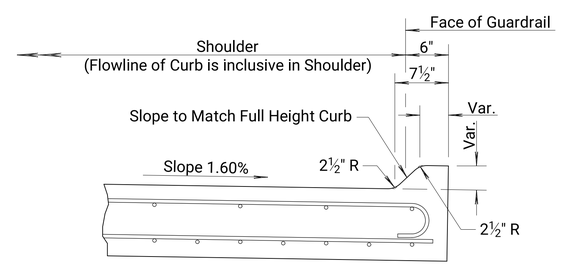


ELEVATION

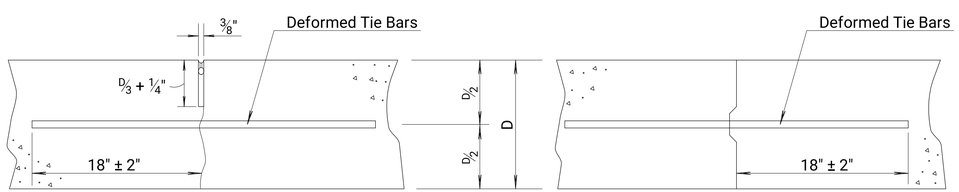


PLAN VIEW

4" EDGE CURB DETAIL



SECTION B-B



Monolithic Pour

Construction Joint

TRANSVERSE JOINTS

Note: A construction joint is required when the concrete placement has been interrupted for a substantial length of time or at the end of a day's placement.

NO.	DATE	REVISIONS	BY	APP'D
13	5-17-13	Revised Note, Longitudinal Joints	S.W.K.	J.O.B.
12	5-1 4-09	Pres. Relief Jt. to RD712/tie bar lab.	S.W.K.	J.O.B.
11	10-23-08	Revised Sec. A-A and Sec. B-B	S.W.K.	J.O.B.
10	10-3-07	Add. manufacturer jt. size recom'd.	S.W.K.	J.O.B.

KANSAS DEPARTMENT OF TRANSPORTATION

MISCELLANEOUS DETAILS
FOR CONCRETE
BRIDGE APPROACH PAVEMENT

RD711

FHWA APPROVAL	10-23-13	APP'D. James O. Brewer	
DESIGNED	DETAILED	QUANTITIES	TRACED Bowser
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK. King

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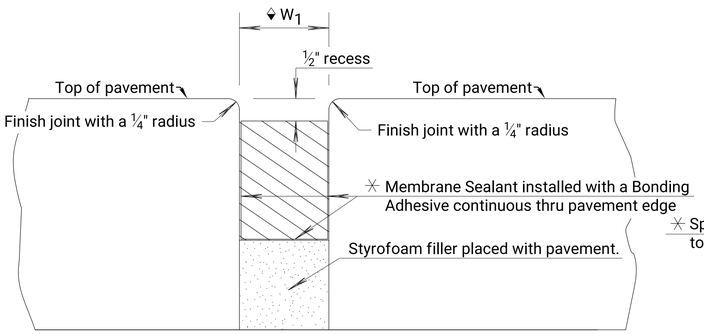
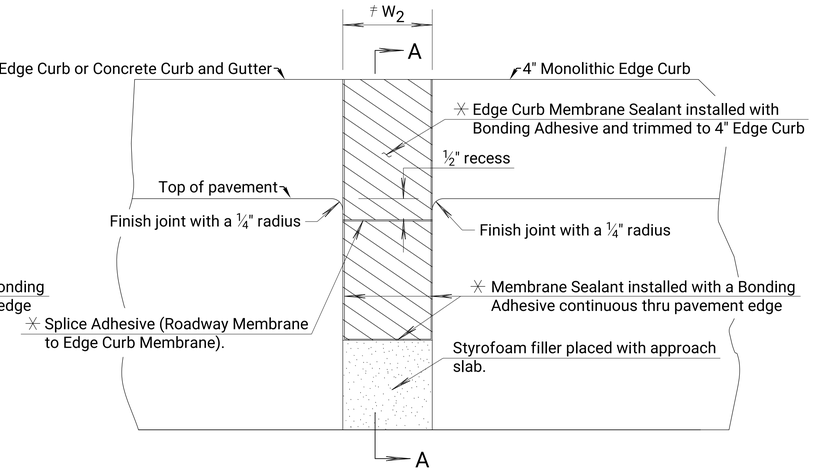
Drawn By : CAM
File : Road Stds.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	8	77

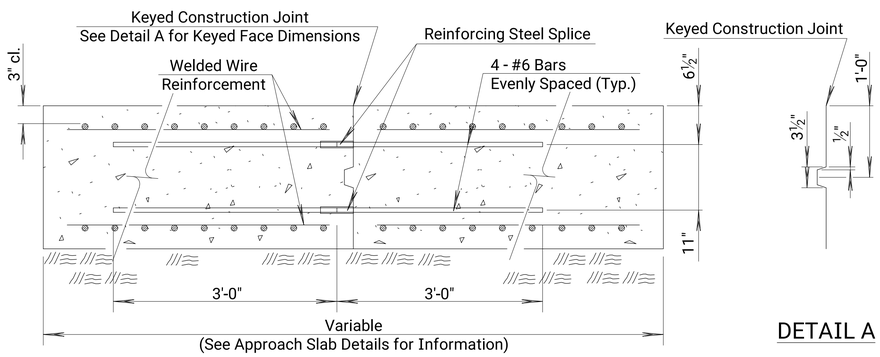
Note to Designer: For Membrane Sealant Expansion Joint on Non-skewed Bridges the maximum length of expansion is: 380' for Steel Bridges, 410' for Concrete Bridges.



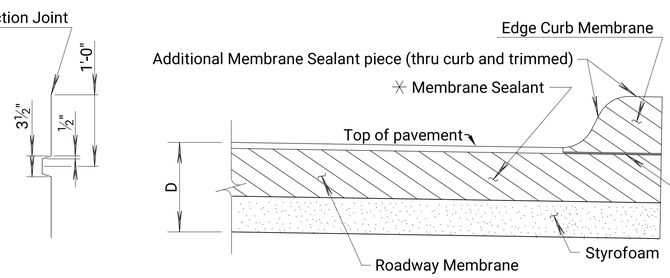
ELEVATION PRESSURE RELIEF JT.



ELEVATION EXPANSION JT.



BRIDGE APPROACH SLAB FOOTING
(PHASING DETAILS)



DETAIL A

SECTION A-A

(See Std. Drawing RD711 for details of 4" Edge Curb.)

GENERAL NOTES

EXPANSION/PRESSURE RELIEF JOINTS

See Concrete Bridge Approach Pavement standard drawings for location of expansion and pressure relief joints.

Form the joint opening prior to placement of the pavement approach. Remove the material used to form the joint after the pavement approach has been in place for a minimum of 6 days.

Clean and construct the joint only after the concrete in the approach slab has cured for a minimum of 7 days.

Thoroughly clean the joint by sandblasting and by high pressure air blast to remove all laitance and contaminants from the joint. When any joint is shaped by saw cutting in lieu of forming, blast the joint with water prior to sandblasting and air cleaning.

Accomplish sandblasting in two passes to clean each face of the joint (one pass for each face). Hold the nozzle 1 to 2 inches from the joint face at an angle to the joint face.

Remove any contaminants such as oil, curing compound, etc. by sandblasting to the satisfaction of the Engineer. Solvents, wire brushing, or grinding are not permitted.

Air blast the joint just prior to installing the Membrane Sealant. Equip the air compressor used to clean the joint with trap devices capable of providing moisture-free and oil-free air at a recommended pressure of 90 psi. Spot check the joint to verify any residual dust or dirt has been removed. The Engineer is required to inspect the joint immediately prior to installing the joint material.

See KDOT Standard Specifications for Membrane Sealant, Bonding Adhesive and Splice Adhesive. The width of the membrane sealant is 4 inches (nominal).

Do not allow traffic on the joint for a minimum of 3 hours unless otherwise directed by the Engineer.

Use splice materials and methods recommended by the Manufacturer.

All work and materials for the preparation, construction, and installation of the joint will be subsidiary to the concrete approach pavement.

BRIDGE APPROACH SLAB FOOTING

Pay for the Bridge Approach Slab Footing at the unit price bid per cubic yard for "Bridge Approach Slab Footing". This price will be full compensation for furnishing all materials and labor including Concrete Grade 4.0 (AE) Pavement, Reinforcing Steel (Gr. 60) (Epoxy Coated), excavation, Type "A" Compaction and materials used to prevent bonding of concrete. The Contractor may use Concrete Grade 4.0 (AE) or the mix used in the concrete pavement for the slab footing.

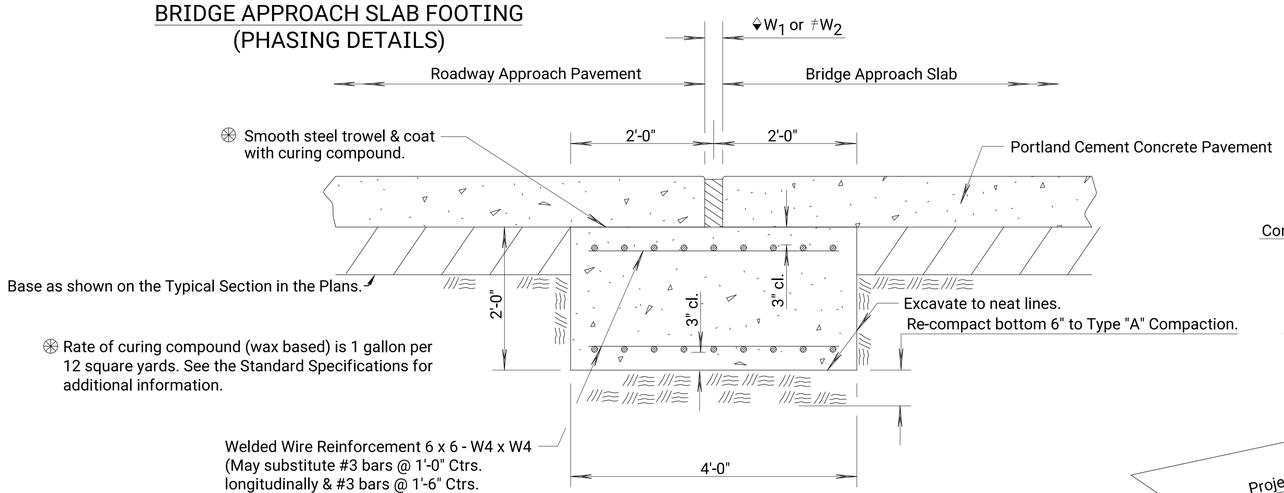
PRESSURE RELIEF JOINT WIDTH DETAILS (W_1)

Temperature (F°)	40°	50°	60°	70°	80°	90°	100°
Formed Concrete Opening Size	4.0"	3¾"	3½"	3¼"	3.0"	2¾"	2½"

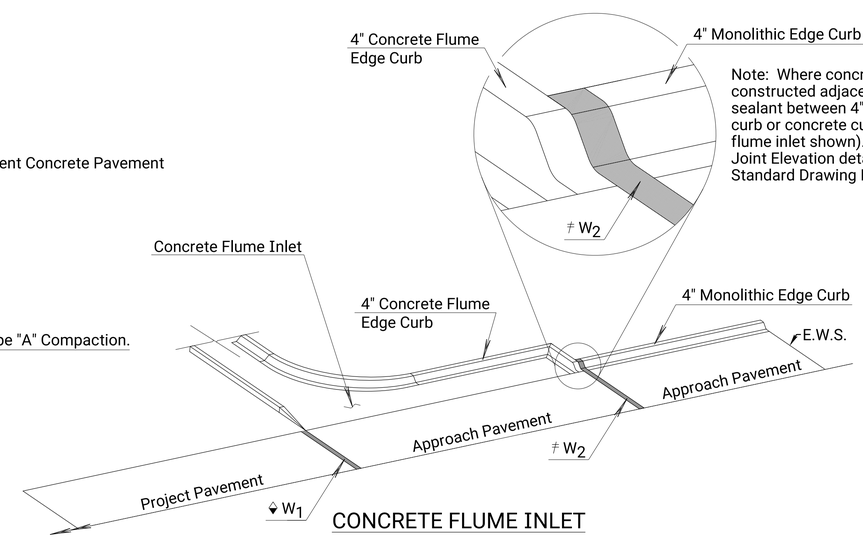
Average Ambient Temperature over previous 24 hours.

EXPANSION JOINT WIDTH DETAILS (W_2)

See bridge construction layout sheet for details.



BRIDGE APPROACH SLAB FOOTING



CONCRETE FLUME INLET

(Membrane Sealant Placed Through Edge Curb Detail)

Note: Where concrete flume inlets or concrete curb and gutter are constructed adjacent to bridge approach slab pavement place membrane sealant between 4" monolithic edge curb and 4" concrete flume inlet edge curb or concrete curb and gutter as shown on this sheet (concrete flume inlet shown). See approach slab Standard Drawings, Expansion Joint Elevation detail this sheet, Standard Drawing RD628, and Standard Drawing RD635 for additional details.

LEGEND

Membrane Sealant

NO.	DATE	REVISIONS	BY	APP'D
10	1-22-16	Add. Det., Keyed Joint & Flume Inlet	T.T.R.	S.W.K.
9	10-16-13	Revised General Note	S.W.K.	J.O.B.
8	4-4-13	Rev. Joint Width Det. Table	S.W.K.	J.O.B.
7	7-10-09	Adjusted Expansion joint table	S.W.K.	J.O.B.

KANSAS DEPARTMENT OF TRANSPORTATION

BRIDGE APPROACH SLAB DETAILS
EXPANSION/PRESSURE RELIEF JOINT/
BRIDGE APPROACH SLAB FOOTING

RD712

FHWA APPROVAL	2-1-16	APP'D.	Scott W. King
DESIGNED	DETAILED	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK.

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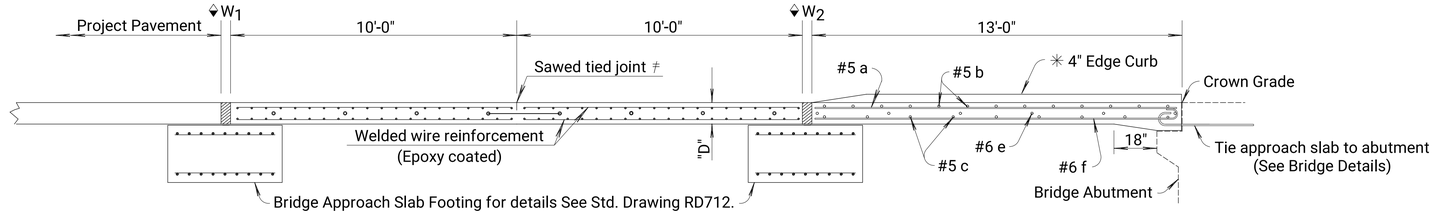
Drawn By : CAM
File : Road Stds.dgn

STATE	PROJECT N0.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	9	77



"D" Thickness = Thickness of Project Concrete Pavement (10" minimum).

LONGITUDINAL SECTION

✳ For details of 4" Edge Curb, See Standard Drawing RD711.

⬙ W_1 and W_2 for Expansion/Pressure Relief Joint width and details See Standard Drawing RD712.

≠ Contractor has the option of substituting a Tied Keyed Construction Joint.

GENERAL NOTE

Special Concrete Bridge Approach shall be paid for as Sq. Yds. of Concrete Pavement (11"Unif.)(AE)(Br. App.) and includes all work and materials required to construct the approach slab as shown on this sheet.

All work and materials required for installation of expansion joints and pressure relief joints shall be subsidiary to this bid item.

At the Contractor's option #4x3'-0" tie bars @ 15" centers may be substituted for the #6 e bars at 2'-6" centers.

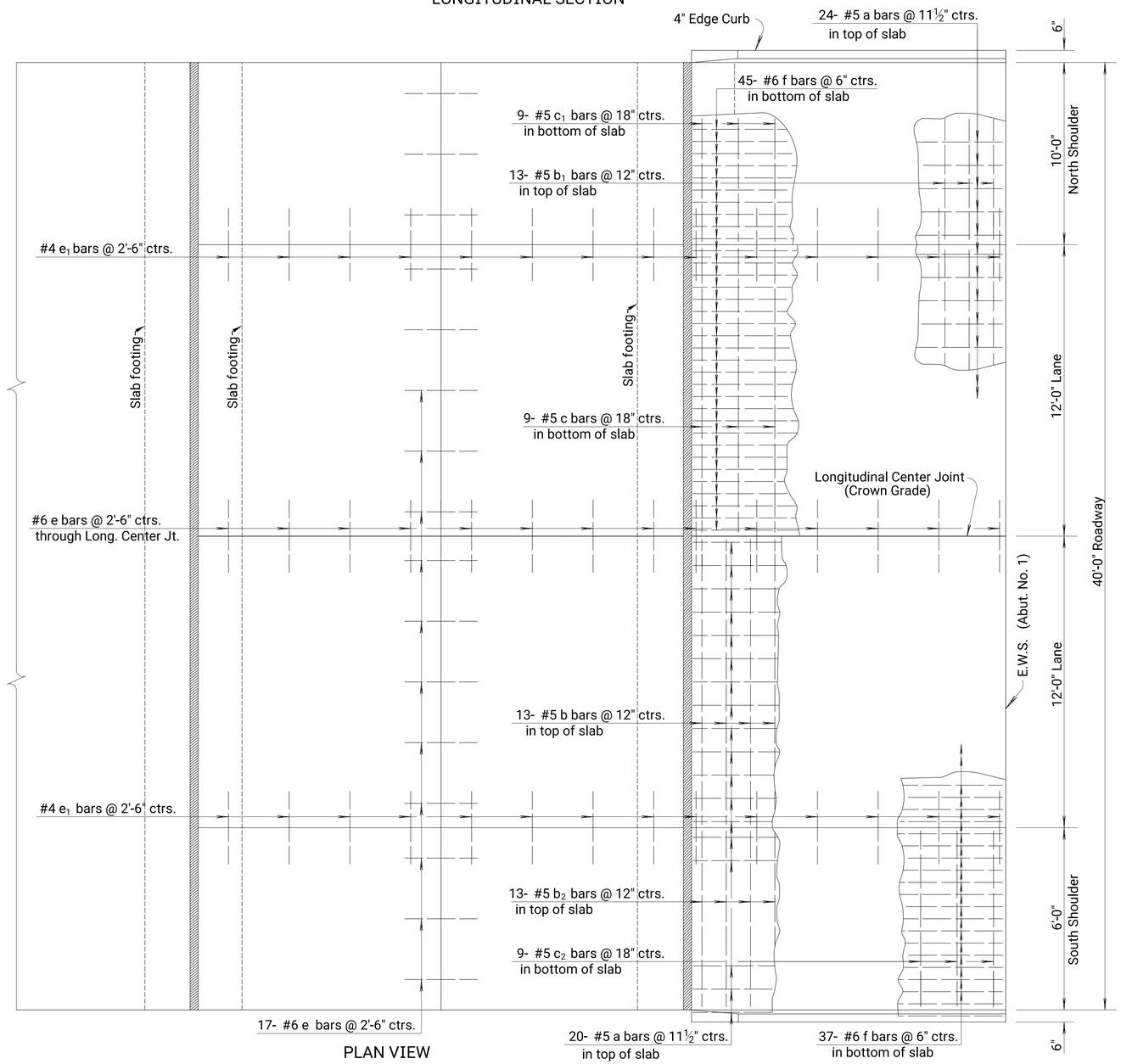
All reinforcing steel shall be epoxy coated.

See Standard Drawing RD711 for details of joints, welded wire reinforcement and edge curb.

Clearance from the face of concrete for all reinforcing steel shall be 2 inches.

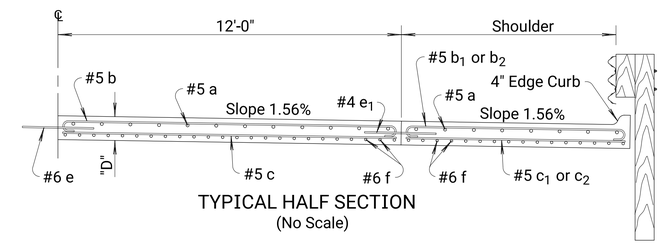
Standard reinforcing bar hooks in accordance with the latest ACI specifications shall be used throughout.

The pressure relief joint shall be omitted when the concrete bridge approach pavement abuts asphalt pavement.

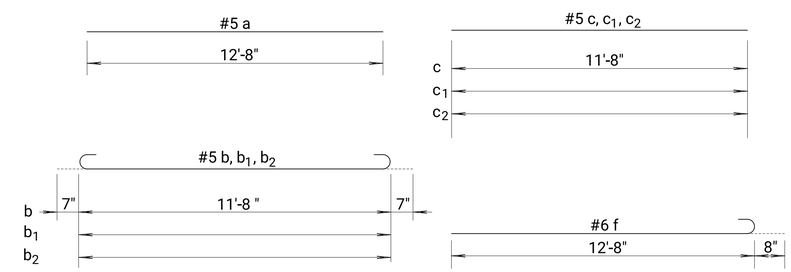


PLAN VIEW

"D" Thickness = 11"



TYPICAL HALF SECTION
(No Scale)



Note: All dimensions are out to out on bars unless noted otherwise.

BENDING DIAGRAMS

BILL OF MATERIALS

Bar Schedule

Bar	a	b	b_1	b_2	c	c_1	c_2	e	e_1	f
No.	44	26	13	13	18	9	9	31	28	82
Size	#5	#5	#5	#5	#5	#5	#5	#6	#4	#6
Length	12'-8"	12'-10"	11'-4"	7'-4"	11'-8"	10'-2"	6'-2"	3'-0"	3'-0"	13'-4"

Reinforcing Steel (Grade 60) (Epoxy Coated)	3,393 lbs.
Concrete Pavement (11" Unif.)(AE)(Br. App.)	148 Sq. Yds.
Expansion Jt. Membrane Sealant	40 Lin. Ft.
Pressure Relief Jt. Membrane Sealant	40 Lin. Ft.

Note: Quantities listed for one approach slab only. Two required per bridge. Reinforcing steel and joint lengths shown for information only.

NO.	DATE	REVISIONS	BY	APP'D
12	4-04-13	Rev. Exp./Pr. Relief Joint Dim.	S.W.K.	J.O.B.
11	9-09-09	Revised Reinforcing Steel listing	S.W.K.	J.O.B.
10	5-14-09	Revised pressure relief jt. material	S.W.K.	J.O.B.
9	10-30-08	Added guardrail post detail at curb	S.W.K.	J.O.B.

KANSAS DEPARTMENT OF TRANSPORTATION

CONCRETE BRIDGE APPROACH PAVEMENT
NORMAL APPROACH

RD713

FHWA APPROVAL	5-21-2013	APP'D. James O. Brewer	
DESIGNED	DETAILED	QUANTITIES	TRACED Bowser
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK. King

Note to Designer: The designer shall be responsible for designating pavement thickness and computing reinforcing steel and concrete quantities and dimensions necessary to complete this sheet.

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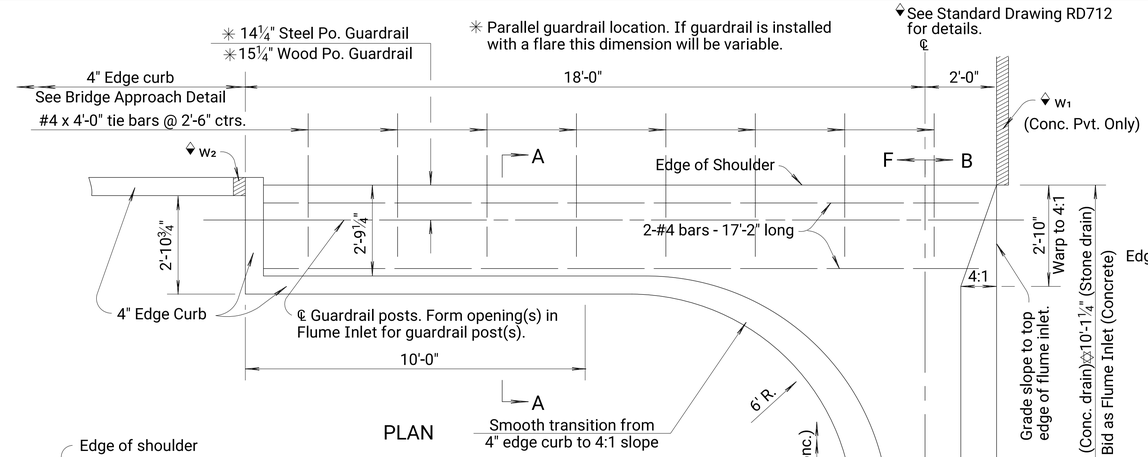
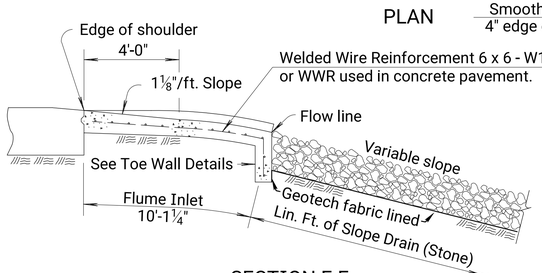
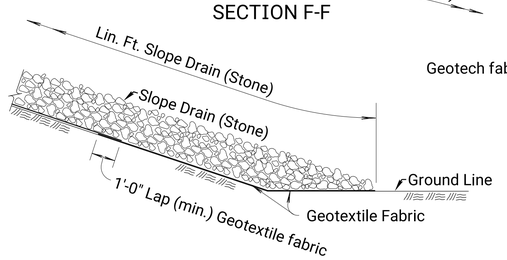
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	10	77



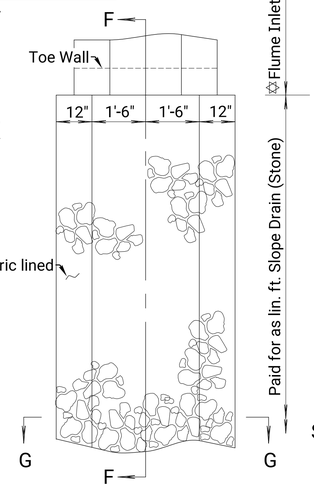
PLAN



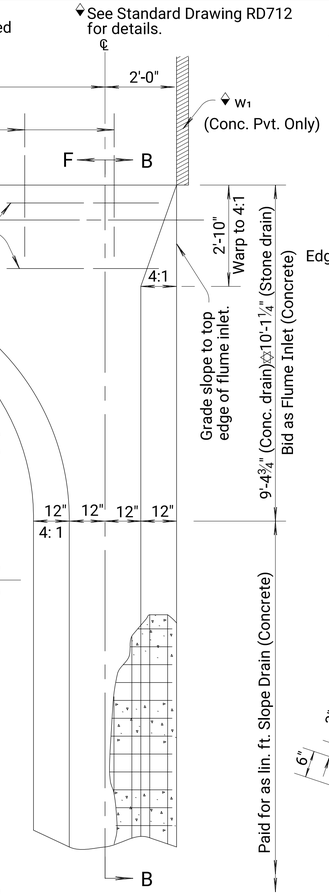
SECTION F-F



SECTION F-F

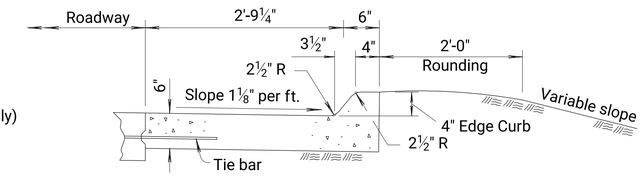


SLOPE DRAIN STONE

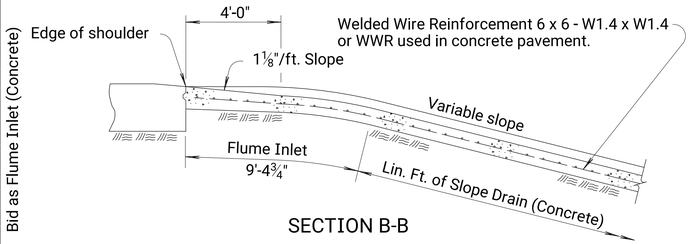


SLOPE DRAIN CONCRETE

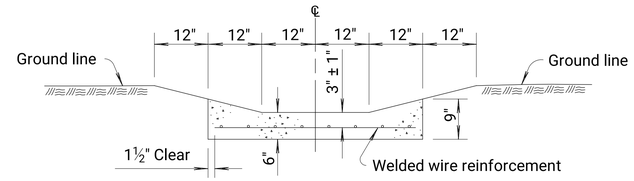
Slope Drain is shown with (STONE) or (CONCRETE) option, type to be determined by the Designer.



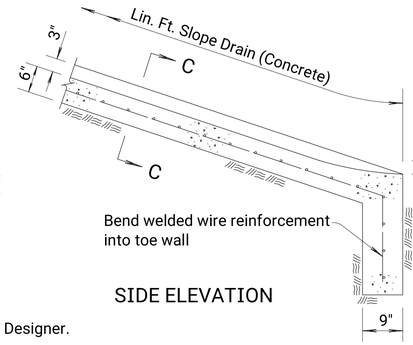
SECTION A-A



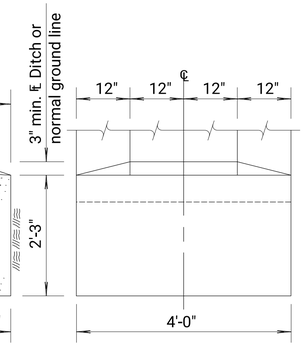
SECTION B-B



SECTION C-C



SIDE ELEVATION



END ELEVATION

SLOPE DRAIN & TOE WALL DETAILS

GENERAL NOTE

Flume Inlets shall be paid for by unit price per each. Slope Drains (Stone or Concrete) shall be paid for by unit price per linear foot. Reinforcing steel & welded wire reinforcement are subsidiary to Flume Inlet and Slope Drain.

Flume Inlets will be constructed without Guide Vanes except at locations noted in plans or as directed by the Engineer. Construction of guide vanes, when required, shall be subsidiary to the bid item "Flume Inlet ".

The entire area of the Flume Inlet & Slope Drain shall be placed monolithic and struck off with a uniform thickness of 6 inches.

Guide Vanes may be formed monolithic with the Flume Inlet or tied to the Flume Inlet in the manner shown if constructed separately. Alternate methods of constructing Guide Vanes may be used with approval of the Engineer.

Concrete Grade 3.0 (AE) shall be used in Flume Inlet and Slope Drain.

On concrete pavement projects, the contractor may substitute the mix used in concrete pavement.

Transverse expansion and contraction joints of same type in pavement are to extend through the flume inlet and 4" edge curb, omitting load transfer devices. The edge curb section will be made continuous through any expansion joint by using a filler material approved by the Engineer to fill the void to the full height of the curb.

Joints will not extend into the Slope Drain.

All exposed edges shall be finished with an edging tool.

For details of 4" edge curb see Standard Drawing RD711.

No adjustment of guardrail post spacing will be permitted.

Flume inlet shall only be constructed adjacent to concrete pavement. Flume inlet shall be tied to the pavement with #4 x 4'-0" tie bars at 2'-6" centers. Tie bars shall be subsidiary to the Flume Inlet.

Shape of guide vane shown is approximate and may be altered slightly to simplify construction. Height and width dimension shall be as shown regardless of shape.

Aggregate for the Slope Drain (STONE) shall meet the reqirements of stone for Aggregate Ditch Lining and have a D_{50} of 4" unless otherwise noted on the plans. The Contractor shall place stone from bottom to the top of slope to produce a well graded mass without segregation of material sizes. Placement, measurement, and payment shall conform to KDOT Standard Specifications.

Slope Drain (STONE) shall be underlain with geotextile fabric that meets the KDOT Standard Specification. All work and materials for the geotextile fabric shall be subsidiary to the Slope Drain (STONE).

QUANTITIES (For information only)

SLOPE DRAIN (CONCRETE)

Flume Inlet Concrete:
1.9 cu. yds. Concrete ⊛
42 lbs. reinf. steel and WWR
Slope Drain (CONCRETE):
0.0833 cu. yds. Concrete per lin. ft.
0.79 lbs. WWR per lin. ft.
Toe wall shall be paid for as 1.5 lin. ft. of Slope drain.

SLOPE DRAIN (STONE)

Flume Inlet & Toe Wall Concrete:
2.2 cu. yds. Concrete ⊛
44 lbs. reinf. steel and WWR
Slope Drain (STONE): 4" Aggregate (D50)
0.25 cu. yds. 4" Agg. (D50) per lin. ft.
0.90 sq. yds. Geotextile fabric per lin. ft.

⊛ Does not include guide vanes.

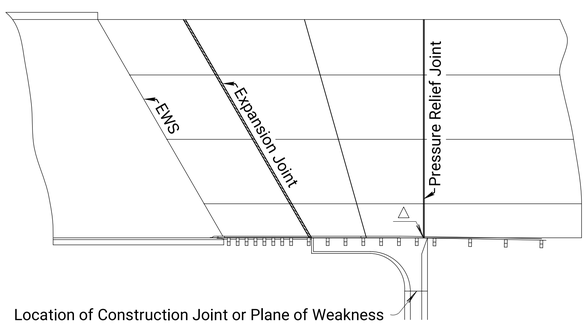
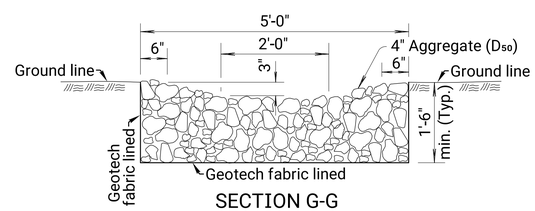
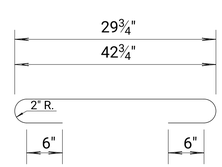


DIAGRAM of FLUME INLET at PRESSURE RELIEF JOINT

△ On projects with concrete paved shoulders where, due to skew of the bridge, the flume inlet extends beyond the 4" pressure relief joint of the special concrete bridge approach, the portion of inlet or gutter extending beyond the pressure relief joint shall not be tied to the concrete shoulder with tie bars.



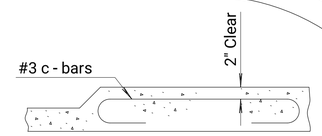
SECTION G-G



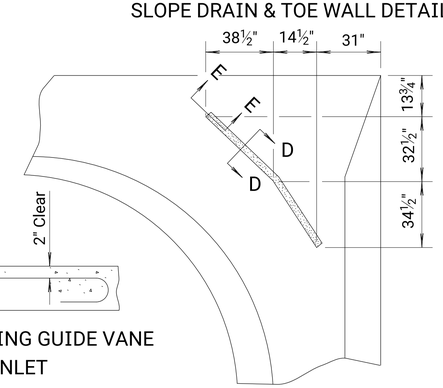
#3 c - bars

Bending Diagram

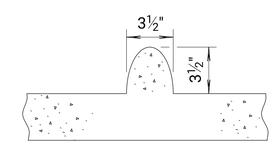
(Bend one bar each length)



METHOD of CONNECTING GUIDE VANE to FLUME INLET

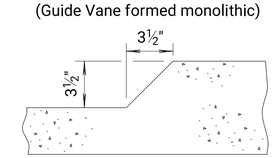


PARTIAL PLAN with GUIDE VANE



SECTION D-D

(Guide Vane formed monolithic)



SECTION E-E

(Typical both ends of vane)

NO.	DATE	REVISIONS	BY	APP'D
6	1-25-16	Added Note to Designer	T.T.R.	S.W.K.
5	9-12-07	Reorg. sheet, add. slope drain stone	S.W.K.	J.O.B.
4	1-28-05	Chg. Class to Grade conc., reinf.	S.W.K.	J.O.B.
3	7-26-04	Revised guard fence to guardrail	S.W.K.	J.O.B.

KANSAS DEPARTMENT OF TRANSPORTATION

FLUME INLET and SLOPE DRAIN (CONCRETE/STONE)

RD628

FHWA APPROVAL	2-1-16	APP'D. Scott. W. King	
DESIGNED	DETAILED	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK.

Note to Designer: When concrete flume inlets are used on projects with asphalt pavment use a 33'-0" bridge approach.

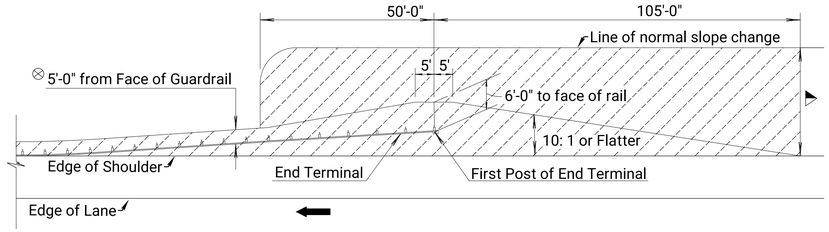
Plotted :12/8/2021 5:48:43 PM

Drawn By : CAM
File : Road Stds.dgn

Note to Designer - Design guardrail installations using guidance shown on KDOT's 'Guardrail Typical Alignments' Standard Drawings. 'Flared' guardrail installations are preferred over 'Parallel' or 'Zero Flare' installations. Where 'Flared' or 'Parallel' installations are used, the flare rate of the guardrail end terminal typically matches the flare rate of the remaining guardrail installation. For 'Zero Flare' installations, 'Parallel' guardrail end terminals should be designed using typical flare rates of 50:1 or flatter for the length of the end terminal. However, while 50:1 or flatter flare rates are typical for 'Parallel' guardrail end terminals, these end terminals may be flared as steep as 26:1 or flatter in order to offset the end terminal head as far from the edge of the through traveled lane as practicable.

GUARDRAIL CLEAR AREA

Applies to all guardrail installations unless otherwise shown in the plans.



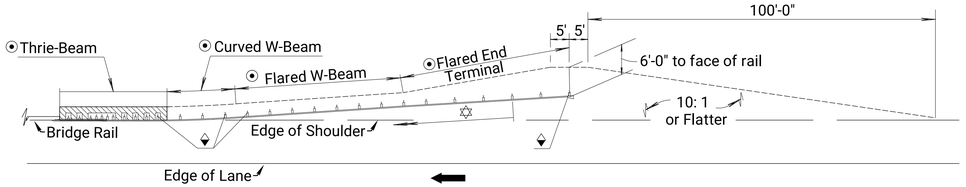
Keep Area Free of Stockpiled Material, Equipment, or Other Obstacles, Such as Temporary Signs, Regardless of Crash Worthiness. This Clear Area Extends 105 Feet in Advance of and 50 Feet behind the First Post of the Guardrail End Terminal and Then, in Order to Maintain Full Post Spacing, Continues 5 Feet behind the Face of the Guardrail through the W-Beam Portion of the Installation as Shown in the 'Guardrail Clear Area' Detail on this Sheet.

Normal Project Side Slope.

Deflection Distance for Normal Post Spacing

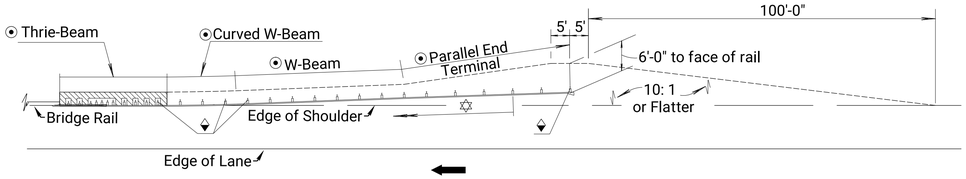
FLARED GUARDRAIL DETAIL

Applies to CGS AND MGS (MGS Shown)



PARALLEL GUARDRAIL DETAIL

Applies to CGS AND MGS (MGS Shown)



See Guardrail Layout Sheets for Details

On Guardrail Layout Sheets, Show Station AND Offset from the Roadway Alignment to the Face of Post at these Locations.

Length of Need (Begins at Post 3)

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	11	77

GENERAL NOTES

Install the guardrail end terminals according to the Manufacturer's Installation Manual. The Contractor will furnish a copy of the Manufacturer's Installation Manual to the Engineer prior to the start of the installation.

Use approved steel (preferred) or wood posts provided by the Manufacturer. The guardrail end terminal post type may be independent of the post type used in the remainder of the installation. However, no mixing of post types is permitted in the remaining w-beam and thrie-beam installation.

Use approved polymer (preferred) or wood blockouts provided by the Manufacturer. The guardrail end terminal blockout size and type may be independent of the blockout size and type used in the remainder of the installation. For blockout size and types for the remaining w-beam and thrie-beam portion of the installation see the details shown on KDOT's 'Guardrail Post Details' and 'Guardrail Thrie-Beam Transition Details' Standard Drawings.

Apply retroreflective sheeting to the end terminal impact head before installation.

Tighten all cable anchor assemblies as per the Manufacturer's Installation Manual.

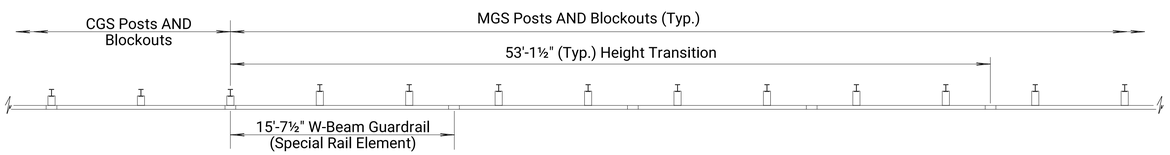
Lap w-beam and thrie-beam guardrail splices, in the direction of permanent traffic, even where temporary traffic may be carried in the opposite direction of the final traffic configuration. Lap end terminal splices per the Manufacturer's Installation Manual in the direction of permanent traffic, even where temporary traffic may be carried in the opposite direction of the final configuration.

The minimum length of w-beam guardrail required between the thrie-beam transition and the guardrail end terminal is 12'-6" for all installations; unless otherwise stated in the Manufacturer's Installation Manual.

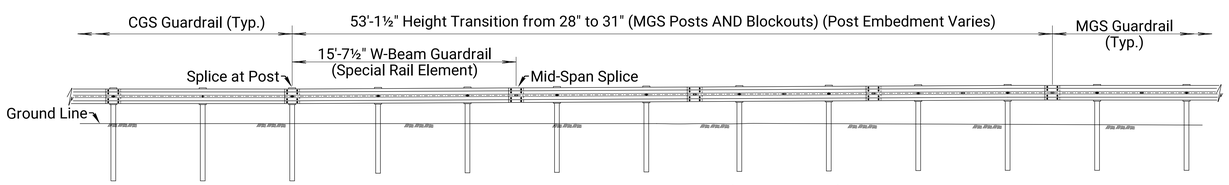
Where pavement with a thickness less than or equal to 8" is encountered during installation, use the details shown on KDOT's 'Guardrail Post Details' Standard Drawings to provide openings in the pavement for the guardrail posts. Where pavement with a thickness greater than 8" or geologic rock is encountered during installation, follow the Manufacturer's Installation Manual for guidance. Where the Manufacturer's Installation Manual does not address pavement with a thickness greater than 8" or geologic rock, contact the manufacturer for instructions or install the guardrail posts as directed by the Engineer.

All work and materials required for w-beam and thrie-bean guardrail installations are paid for under the appropriate bid items for either CGS or MGS guardrail depending on the type of installation.

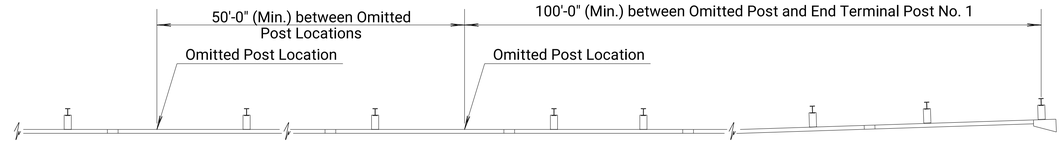
All work and materials required for guardrail end terminal installations are paid for under the bid item for the selected guardrail end terminal. See the table on this sheet for the appropriate end terminal bid item information.



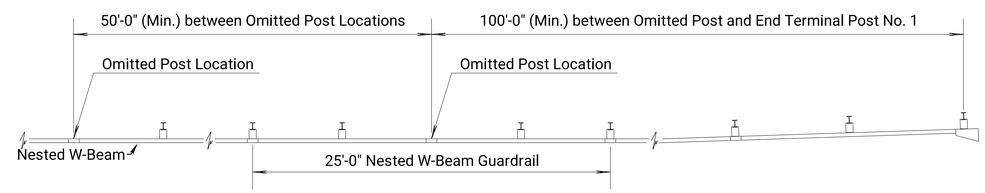
CGS TO MGS TRANSITION DETAILS (PLAN)



CGS TO MGS TRANSITION DETAILS (ELEVATION)



MGS OMITTED POST DETAIL



CGS OMITTED POST DETAIL

MIDWEST GUARDRAIL SYSTEM (MGS) END TERMINALS

END TERMINAL BID ITEM	FLARED OR PARALLEL	MOUNTING HEIGHT	CRASH TESTING CRITERIA	STEEL POST DESIGN AVAILABLE	WOOD POST DESIGN AVAILABLE	ENERGY ABSORBING	MANUFACTURER	DESIGN LENGTH	MANUFACTURER SYSTEM LENGTH
Guardrail End Terminal (MGS-FLEAT)	Flared	31"	NCHRP 350	Yes	Yes	Yes	Road Systems	40'-7½"	37'-6"
Guardrail End Terminal (MGS-SRT)	Flared	31"	NCHRP 350	Yes	Yes	No	Trinity Industries	40'-7½"	37'-6"
Guardrail End Terminal (MGS-MSKT)	Parallel	31"	MASH	Yes	No	Yes	Road Systems	46'-10½"	46'-10½"
Guardrail End Terminal (MGS-SOFTSTOP)	Parallel	31"	MASH	Yes	No	Yes	Trinity Industries	46'-10½"	50'-9½"

CONVENTIONAL GUARDRAIL SYSTEM (CGS) END TERMINALS

END TERMINAL BID ITEM	FLARED OR PARALLEL	MOUNTING HEIGHT	CRASH TESTING CRITERIA	STEEL POST DESIGN AVAILABLE	WOOD POST DESIGN AVAILABLE	ENERGY ABSORBING	MANUFACTURER	DESIGN LENGTH	MANUFACTURER SYSTEM LENGTH
Guardrail End Terminal (FLEAT)	Flared	28"	NCHRP 350	Yes	Yes	Yes	Road Systems	37'-6"	37'-6"
Guardrail End Terminal (SRT)	Flared	28"	NCHRP 350	Yes	Yes	No	Trinity Industries	37'-6"	37'-6"
Guardrail End Terminal (SKT)	Parallel	28"	NCHRP 350	Yes	Yes	Yes	Road Systems	50'-0"	50'-0"

NO.	DATE	REVISIONS	BY	APP'D
2	9-5-18	ADD. OMITTED POST AND TRANS. DETAILS	A.L.R.	T.T.R.
1	6-5-18	INITIAL RELEASE	A.L.R.	T.T.R.

KANSAS DEPARTMENT OF TRANSPORTATION

GUARDRAIL AUXILIARY DETAILS

RD606

FHWA APPROVAL	9-25-18	APP'D.	SCOTT W. KING
DESIGNED	DETAILED	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK.

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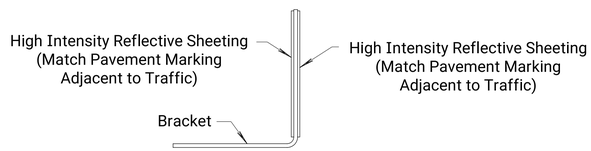
Drawn By : CAM

File : Road Stds-GuardRail2.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	12	77

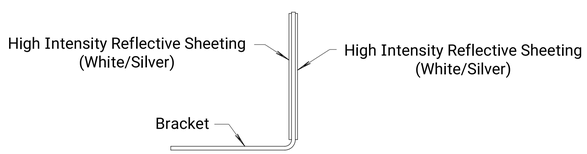
Side View

Flexible Marker
One-Way Traffic



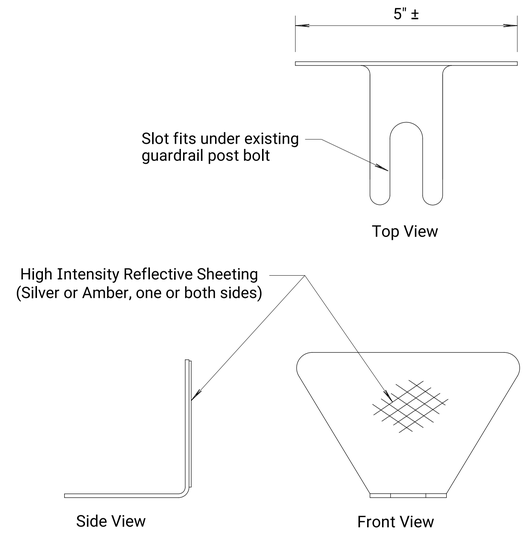
Side View

Flexible Marker
Median Locations



Side View

Flexible Marker
Two-Way Traffic



Flexible Guardrail Marker

(High Impact Polycarbonate approx. .085" thick, 5¼" x 3")

GENERAL NOTES

Install flexible markers on a post behind the guardrail bolt head on the traffic side of guardrail installations at a spacing not to exceed 25'. No marker is installed between the head and post #5 when the guardrail is terminated with a crashworthy end terminal.

Install flexible markers on the top of bridge rails at a spacing not to exceed 50', except for long bridges (greater than 200' long), where spacing may be increased to 100'.

Install flexible markers on the top of concrete safety barrier at a spacing not to exceed 100', except for barrier along a horizontal curve or along ramps and ramp tapers, where spacing is not to exceed 50'.

Where the height of the bridge rail or concrete barrier is greater than 32", mount the flexible markers on the side of the barrier at a height of 32" as shown on this sheet.

For guardrail, bridge rail, or concrete safety barrier located on two-way roadways, use flexible markers with white/silver high intensity reflective sheeting on both sides.

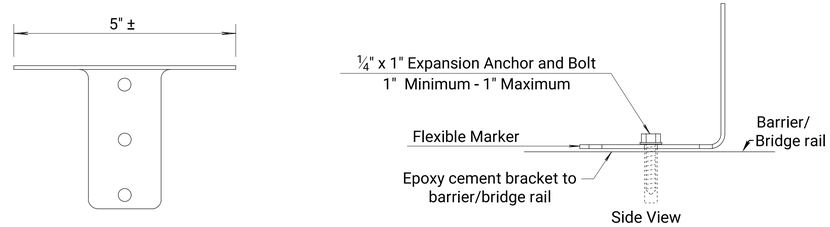
For guardrail located on one-way or divided roadways, use flexible markers with reflective sheeting installed on the approach traffic side of the bracket only. For bridge rail or concrete safety barrier located on the outside edge of one-way or divided roadways, use flexible markers with reflective sheeting installed on the approach traffic side of the bracket only. For bridge rail or concrete safety barrier located in the median, use flexible markers with reflective sheeting installed on both sides of the bracket. Match the color of the marker (yellow/amber or white/silver) to the color of the pavement marking adjacent to the traffic lane.

Use High Impact Polycarbonate Flexible Guardrail Marker with High Intensity Reflective Sheeting or an approved equivalent, see Standard Specifications.

Use zinc or cadmium plated fasteners that comply with Standard Specifications.

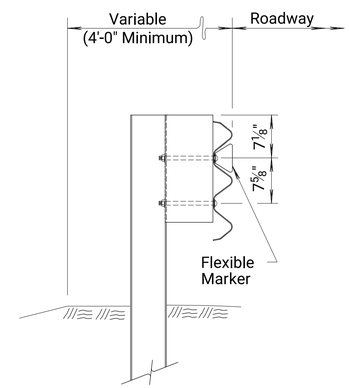
Work and materials required for installation of markers on guardrail, bridge rail, or concrete safety barrier are subsidiary to other bid items in the contract.

Install flexible markers for the final (permanent) traffic configuration.

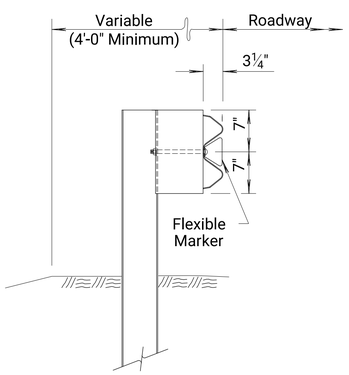


Barrier/Bridge Rail

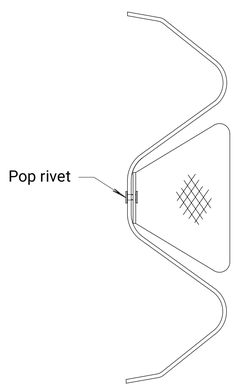
Method of Attaching Flexible
Marker to Barrier/Bridge Rail



THRIE-BEAM GUARDRAIL

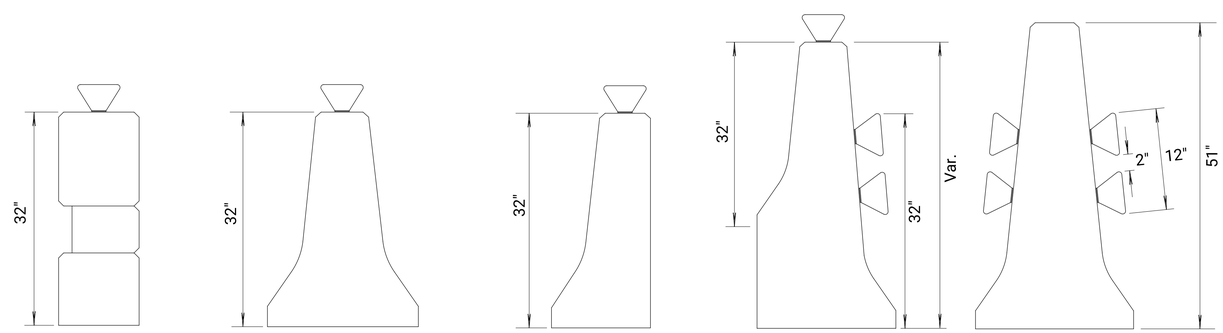


W-BEAM GUARDRAIL



Typical Mounting on W-Beam

Pop rivet attachment to Guardrail when necessary.



CORRAL RAIL | TYPE I CSB | TYPE II CSB or F-SHAPED BRIDGE RAIL | TYPE III CSB | TYPE IV CSB

TYPICAL BARRIER/BRIDGE RAIL MOUNTING DETAILS

NO.	DATE	REVISIONS	BY	APP'D
9	9-11-17	Rev. Det. Markers, Rev. Gen. Note	A.L.R.	S.W.K.
8	11-15-10	Revised notes	S.W.K.	J.O.B.
7	12-21-08	AKT marker or approved equal	S.W.K.	J.O.B.
6	3-10-09	Add. Flexible rem. Button deline	S.W.K.	J.O.B.

KANSAS DEPARTMENT OF TRANSPORTATION

MARKER DETAILS FOR GUARDRAIL, BARRIER, AND BRIDGE RAILS

RD610

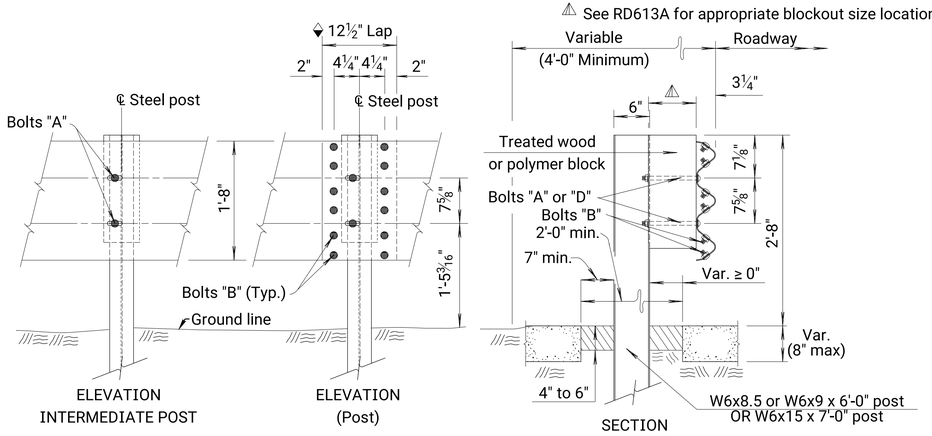
FHWA APPROVAL	3-15-18	APP'D. Scott W. King	
DESIGNED	DETAILED	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK.

Drawn By : CAM Plotted :12/8/2021 5:48:45 PM
File : Road Stds-GuardRail2.dgn

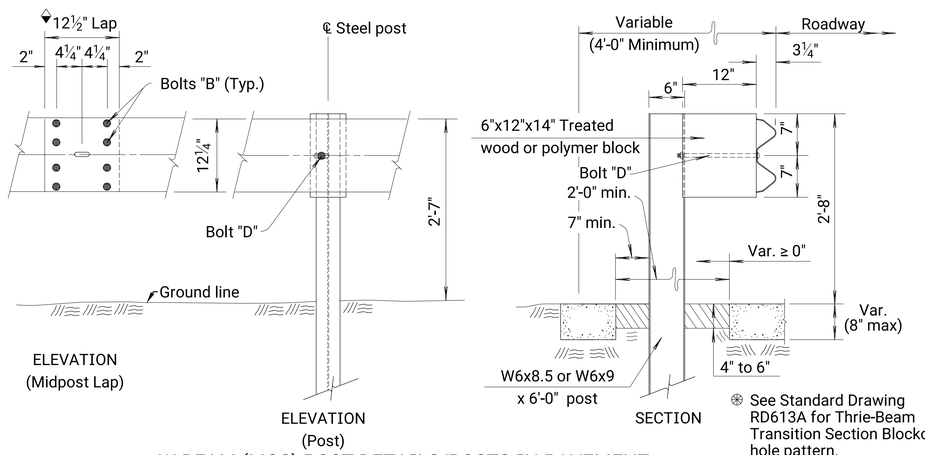
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	13	77

◆ Lap guardrail splices, including terminal connector, in the direction of traffic. Where traffic is temporarily carried in the opposite direction of final configuration, lap rail splices in the direction of permanent traffic.

⚠ See RD613A for appropriate blockout size location.



THRIE BEAM POST DETAILS/POSTS IN PAVEMENT

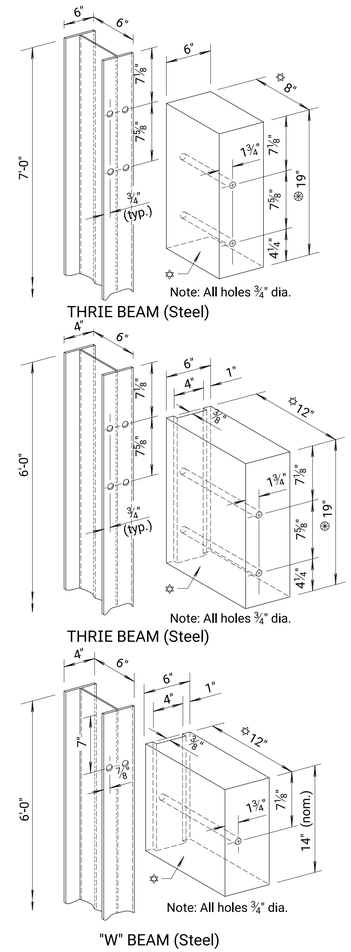


⊛ See Standard Drawing RD613A for Thrie-Beam Transition Section Blockout hole pattern.

✡ Non-Metallic (Polymer) or Treated Wood Block

See Guardrail Layout Sheets for Details.

W-BEAM (MGS) POST DETAILS/POSTS IN PAVEMENT



GENERAL NOTES (Steel Posts)

Use grade of steel for steel posts that meets the requirements of the standard specifications.

Hot dip galvanize the posts after fabrication, see standard specifications.

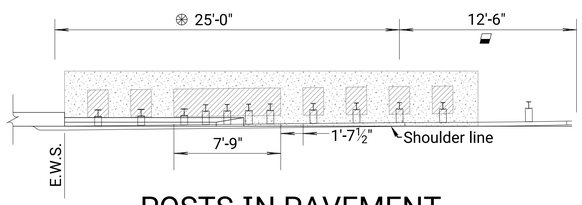
Wood blockouts may be used through the 25'-0" thrie-beam section with wood or polymer blockouts used throughout the remainder of the w-beam installation. The blockout size and material used in the guardrail end terminal may be independent from the remainder of the installation. For wood/polymer blockout requirements see standard specifications.

Use S4S rectangular blockouts for Thrie-Beam/W-Beam installation.

Set guardrail posts by digging or by driving. Use post caps to protect the post from crushing during driving operations.

Contractor must notify Engineer at the earliest time when a non-removable manmade object (footing, pipe, etc.) is encountered that prevents installation of a full length post.

All dimensions are nominal and are subject to manufacturing tolerances. Excavation including rock, shale, and other materials for erection of Guardrail is subsidiary to various bid items for which payment is made.



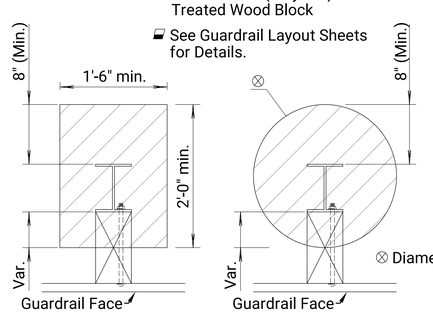
POSTS IN PAVEMENT

(Not to Scale)

Slurry Grout (Low Strength)
See KDOT's Standard Specifications

Pavement (Concrete or Asphalt)

Note: Low Strength Grout must have a 28-day compressive strength of 120 psi or less. All work and materials related to posts in pavement are subsidiary to other guardrail bid items. Rectangular geometry shown in Posts in Pavement detail. Circular geometry, as shown on this sheet, may be used at the Contractor's option.

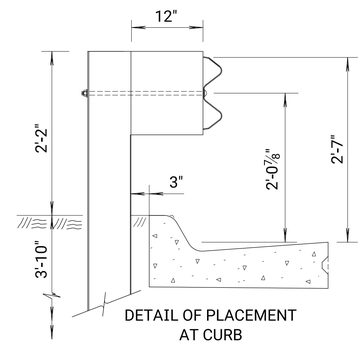


RECTANGULAR GEOMETRY

CIRCULAR GEOMETRY

⊗ Diameter may vary from 1'-6" (min.) to 2'-0".

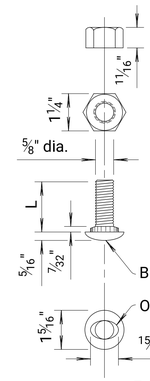
PLAN
(ALTERNATE GEOMETRIES)



DETAIL OF PLACEMENT
AT CURB

Note: Measure height of rail from the pavement surface at the curb/pavement joint as shown. A special design is needed when guardrail is not located as detailed. A Type II (laydown) curb & gutter is preferred when guardrail is adjacent to curb.

All bolts,nuts, and washers shall be galvanized in accordance with the Standard Specifications.



BOLT SIZE SCHEDULE	
Bolt	L
A	10"
B	1¼"
C	18"
D	14"
E	22"

BOLT & NUT DETAILS

NO.	DATE	REVISIONS	BY	J.O.B.
5	9-24-15	Separated Steel/Wood Post Details	T.T.R.	S.W.K.
4	11-8-12	Revised Detail, Posts in Pavement	S.W.K.	J.O.B.
3	8-1-12	Revised Note to Designer	S.W.K.	J.O.B.
2	5-24-12	Revised Detail, Posts in Pavement	S.W.K.	J.O.B.

KANSAS DEPARTMENT OF TRANSPORTATION

GUARDRAIL POST (STEEL)
(MGS) DETAILS

RD611A

FHWA APPROVAL	1-29-16	APP'D. Scott. W. King	
DESIGNED	DETAILED	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK. King

Notes to Designer: For posts installed in pavement thicker than 8" or posts installed in rock formations refer to AASHTO's Roadside Design Guide for details then revise this drawing and all supporting drawings appropriately.

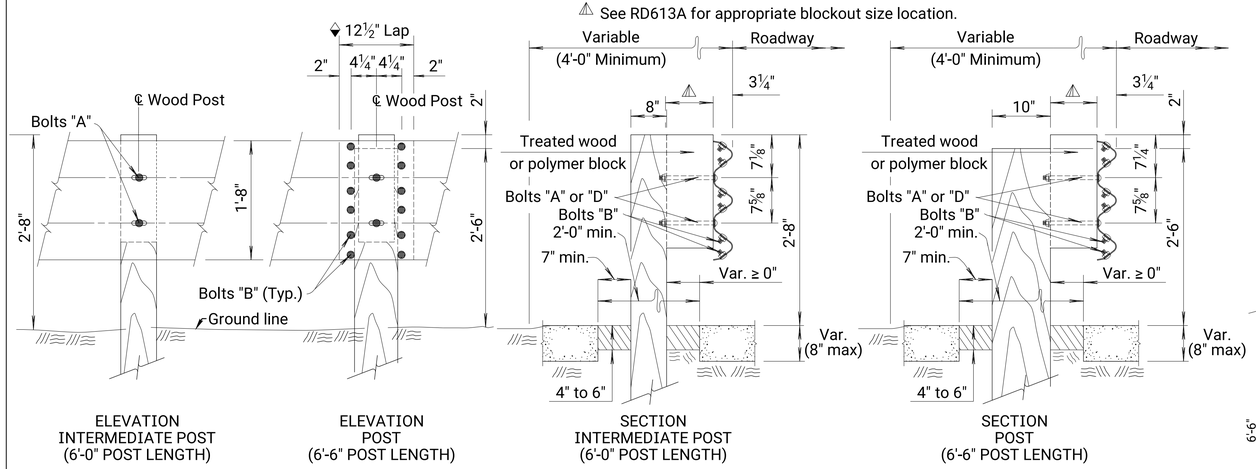
Plotted :12/8/2021 5:48:45 PM

Drawn By : CAM
File : Road Stds-GuardRail2.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	14	77

◆ Lap guardrail splices, including terminal connector, in the direction of traffic. Where traffic is temporarily carried in the opposite direction of final configuration, lap rail splices in the direction of permanent traffic.

⚠ See RD613A for appropriate blockout size location.



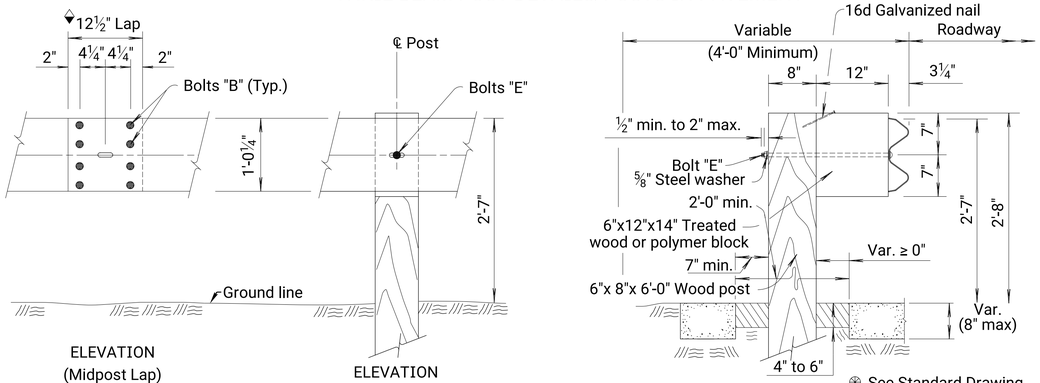
ELEVATION
INTERMEDIATE POST
(6'-0" POST LENGTH)

ELEVATION
POST
(6'-6" POST LENGTH)

SECTION
INTERMEDIATE POST
(6'-0" POST LENGTH)

SECTION
POST
(6'-6" POST LENGTH)

THRIE BEAM POST DETAILS/POSTS IN PAVEMENT



ELEVATION
(Midpost Lap)

ELEVATION
(Post)

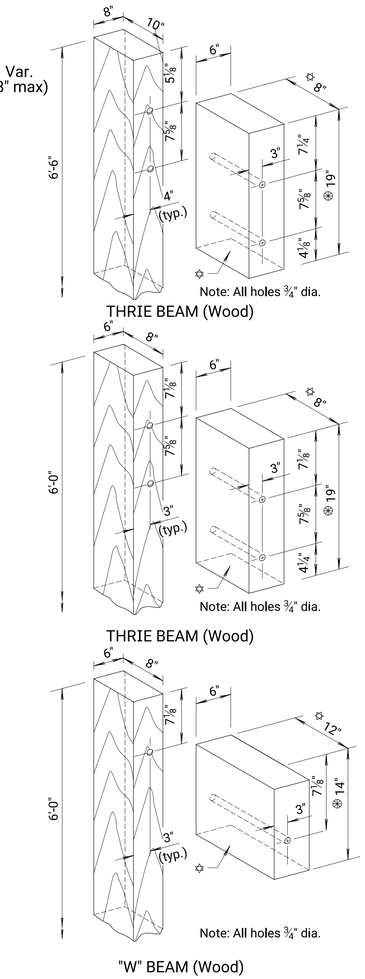
SECTION

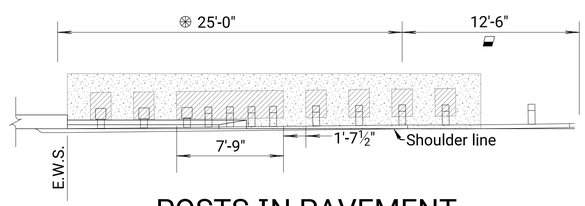
W-BEAM (MGS) POST DETAILS/POSTS IN PAVEMENT

⊛ See Standard Drawing RD613A for Thrie-Beam Transition Section Blockout hole pattern.

✡ Non-Metallic (Polymer) or Treated Wood Block

See Guardrail Layout Sheets for Details.





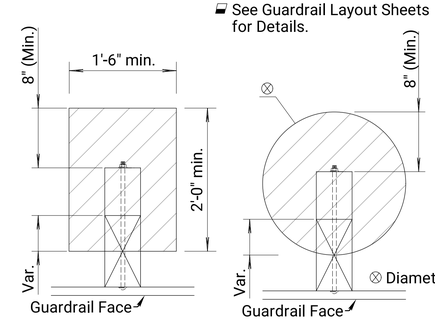
POSTS IN PAVEMENT

(Not to Scale)

Slurry Grout (Low Strength)
See KDOT's Standard Specifications

Pavement (Concrete or Asphalt)

Note: Low Strength Grout must have a 28-day compressive strength of 120 psi or less. All work and materials related to posts in pavement are subsidiary to other guardrail bid items. Rectangular geometry shown in Posts in Pavement detail. Circular geometry, as shown on this sheet, may be used at the Contractor's option.

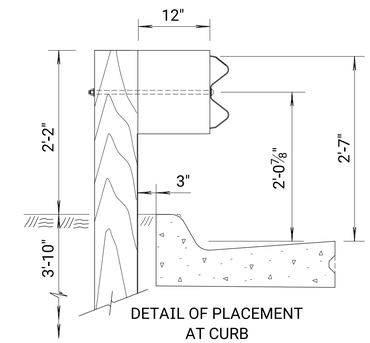


⊗ Diameter may vary from 1'-6" (min.) to 2'-0".

RECTANGULAR GEOMETRY

CIRCULAR GEOMETRY

PLAN
(ALTERNATE GEOMETRIES)



DETAIL OF PLACEMENT
AT CURB

Note: Measure height of rail from the pavement surface at the curb/pavement joint as shown. A special design is needed when guardrail is not located as detailed. A Type II (laydown) curb & gutter is preferred when guardrail is adjacent to curb.

GENERAL NOTES (Wood Posts)

Give all wood posts and wood blocks a preservative treatment, see standard specifications. Thoroughly saturate all cuts, injuries and bolt holes on wood posts and blocks with preservative. Use only one type of preservative treatment on a project.

Set guardrail posts by digging or by driving. Use post caps to protect the post from crushing during driving operations.

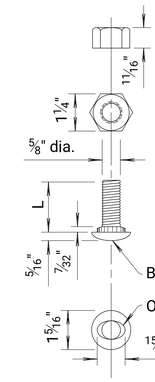
Wood blockouts may be used through the 25'-0" thrie-beam section with wood or polymer blockouts used throughout the remainder of the w-beam installation. The blockout size and material used in the guardrail end terminal may be independent from the remainder of the installation. For wood/polymer blockout requirements see standard specifications.

Use S4S rectangular posts/blockouts for Thrie Beam/W-Beam installation. See standard specifications for additional information.

Contractor must notify Engineer at the earliest time when a non-removable man-made object (footing, pipe, etc.) is encountered and prevents installation of a full length post.

All dimensions are nominal and are subject to manufacturing tolerances.

Excavation including rock, shale, and other materials for erection of Guardrail is subsidiary to various bid items for which payment is made.



All bolts,nuts, and washers shall be galvanized in accordance with the Standard Specifications.

BOLT SIZE SCHEDULE	
Bolt	L
A	10"
B	1¼"
C	18"
D	14"
E	22"

BOLT & NUT DETAILS

NO.	DATE	REVISIONS	BY	APP'D
4	9-24-15	Initial Release	T.T.R.	S.W.K.

KANSAS DEPARTMENT OF TRANSPORTATION

GUARDRAIL POST (WOOD)
(MGS) DETAILS

RD611B

FHWA APPROVAL	1-29-16	APP'D. Scott W. King	
DESIGNED	DETAILED	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK. King

Notes to Designer: For posts installed in pavement thicker than 8" or posts installed in rock formations refer to AASHTO's Roadside Design Guide for details then revise this drawing and all supporting drawings appropriately.

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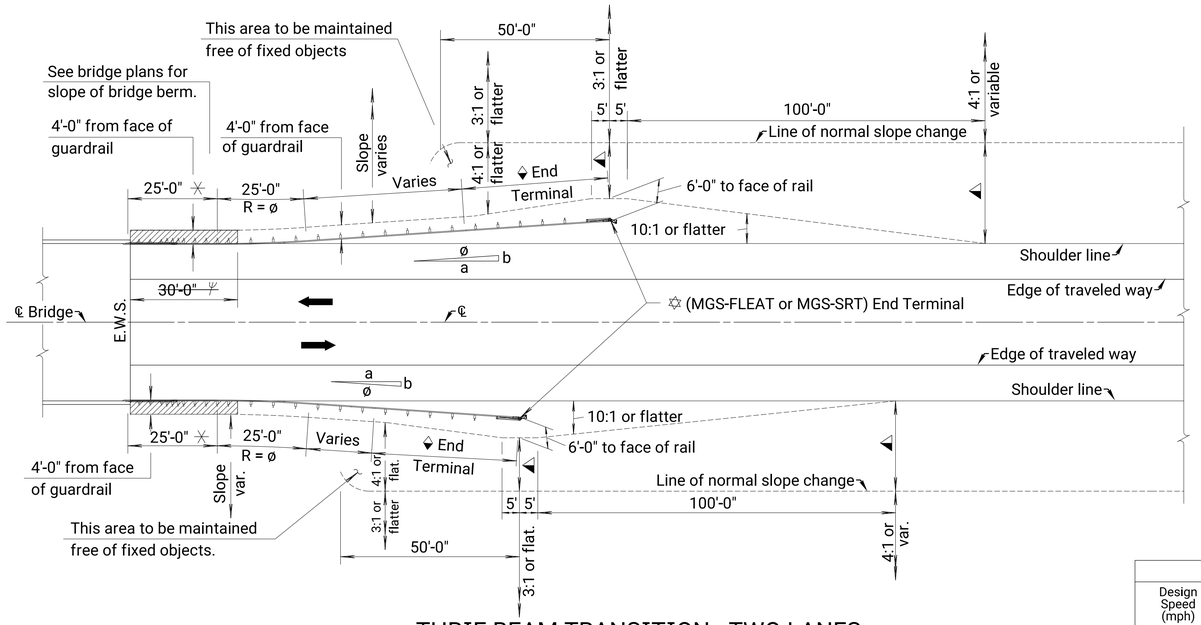
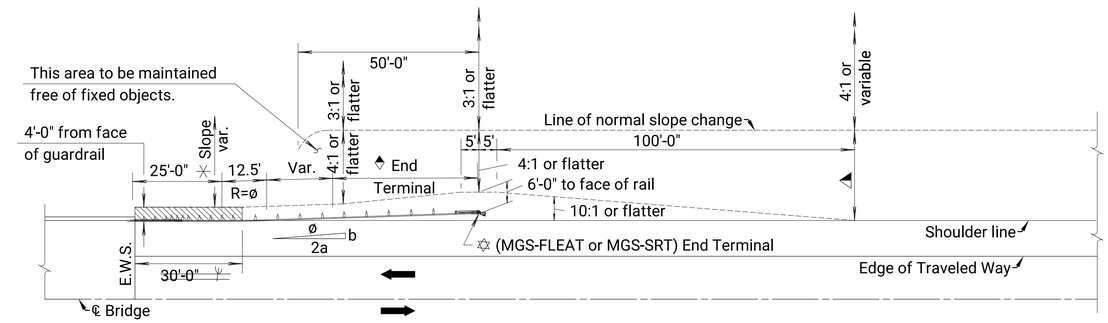
Drawn By : CAM
File : Road Stds-GuardRail2.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	15	77

Note: Use flare rate of a:b and curve length of 25'-0" when guardrail is beyond shyline. Use flare rate of 2a:b and curve length of 12'-6" when guardrail is located inside the shy line.

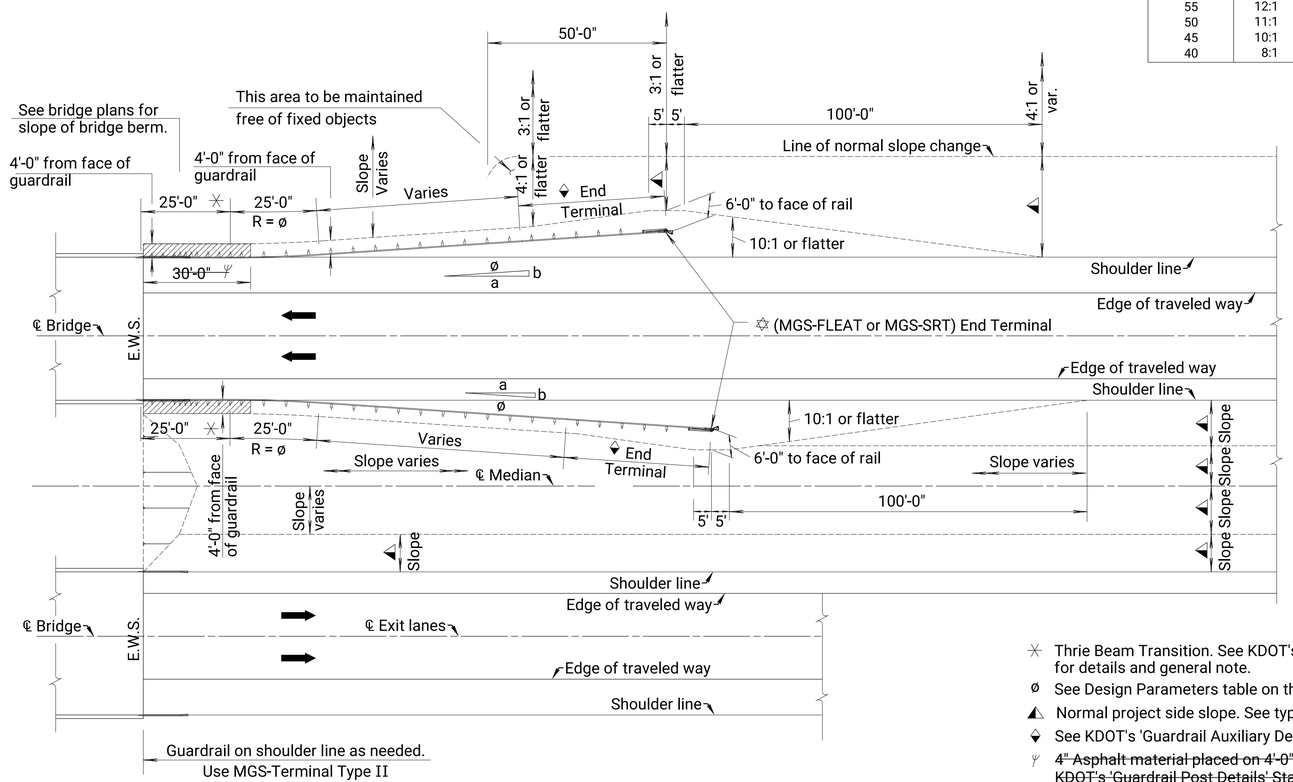


THRIE BEAM TRANSITION - TWO LANES



ALTERNATE TREATMENT - TWO LANES (Flare Rate = 2a:b)

DESIGN PARAMETERS				
Design Speed (mph)	Flare Rate (a:b)	Radius (R)	Flare Rate (2a:b)	Radius (R)
70	15:1	375.55'	30:1	375.14'
60	14:1	350.59'	26:1	325.16'
55	12:1	300.69'	24:1	300.17'
50	11:1	275.76'	21:1	262.70'
45	10:1	250.83'	18:1	225.23'
40	8:1	201.04'	16:1	200.26'



THRIE BEAM TRANSITION - FOUR LANES (DIVIDED)

NOTE: No 4" Asphalt required in Thrie Beam Transition.

- Thrie Beam Transition. See KDOT's 'Thrie Beam Guardrail Transition Details' Standard Drawings for details and general note.
- ø See Design Parameters table on this sheet for radius, length of curve and flare rate information.
- Normal project side slope. See typical sections.
- See KDOT's 'Guardrail Auxiliary Details' Standard Drawing.
- ~~4" Asphalt material placed on 4'-0" embankment widening unless flume inlet and slope drain is constructed. See KDOT's 'Guardrail Post Details' Standard Drawings for "Post in Pavement" details.~~
- The minimum length of w-beam guardrail required between the guardrail end terminal and any transition section, including the thrie-beam transition, is 12'-6".

NO.	DATE	REVISIONS	BY	APP'D
4	6-5-18	Removed Flare-beyond-the-Flare	A.L.R.	T.T.R.
3	5-15-17	Removed X-LITE	A.L.R.	S.W.K.
2	6-7-12	Revised Note to Designer	S.W.K.	J.O.B.
1	1-25-12	Revised Layout, End Term.	S.W.K.	J.O.B.

KANSAS DEPARTMENT OF TRANSPORTATION

THRIE BEAM GUARDRAIL (MGS) BRIDGE APPROACH TRANSITION TYPICAL ALIGNMENTS (FLARED)

~~RD612C~~

FHWA APPROVAL	6-19-18	APP'D.	SCOTT W. KING
DESIGNED	DETAILED	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK.

Notes to Designer: Determine guardrail length of need using either KDOT's Length of Need Equation or a graphic design approach with an L_1 distance measured from the edge of the area of concern to the P.I. of the curved guardrail section. Combine materials for asphalt widening in the plan quantities.

Optional: If approach side is within the shyline, use a flare rate of 2a:b for all quadrants.

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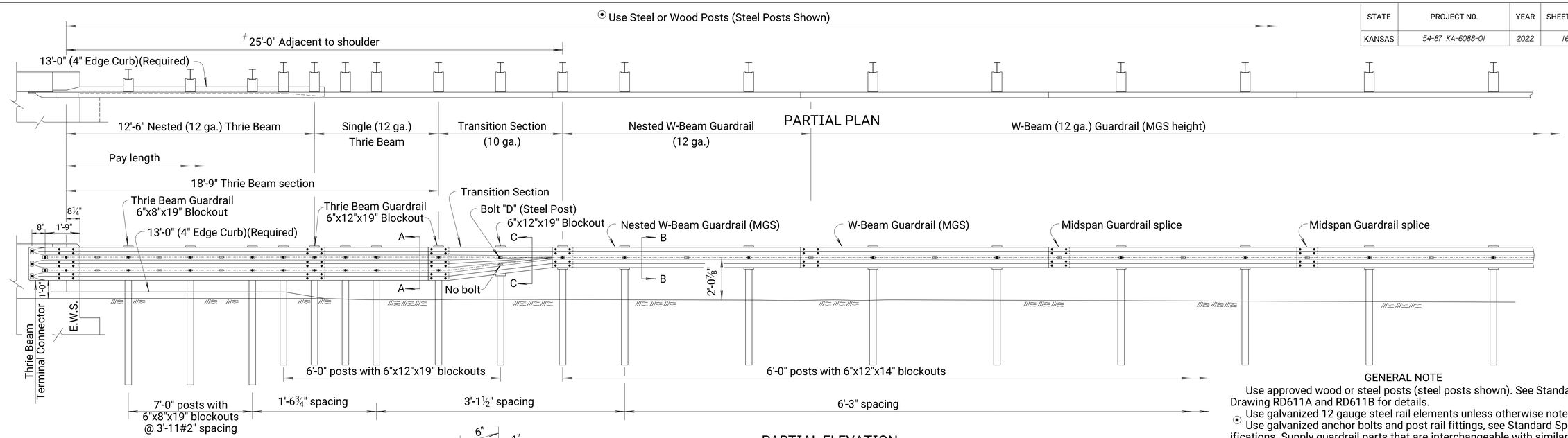
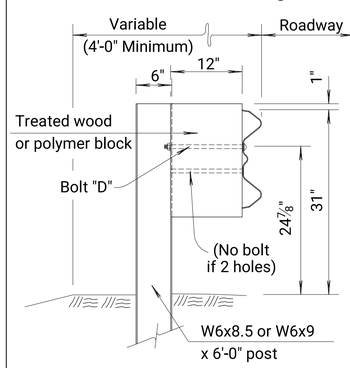
Drawn By : CAM
File : Road Stds-GuardRail2.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	16	77

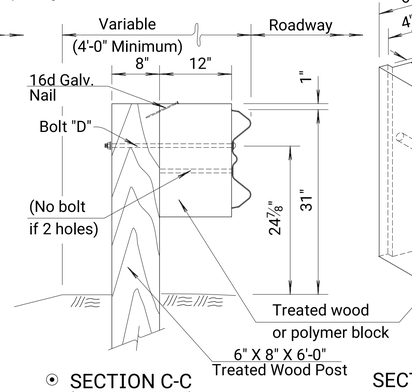


PARTIAL PLAN

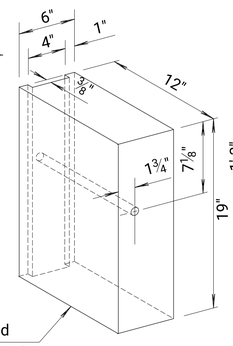
PARTIAL ELEVATION



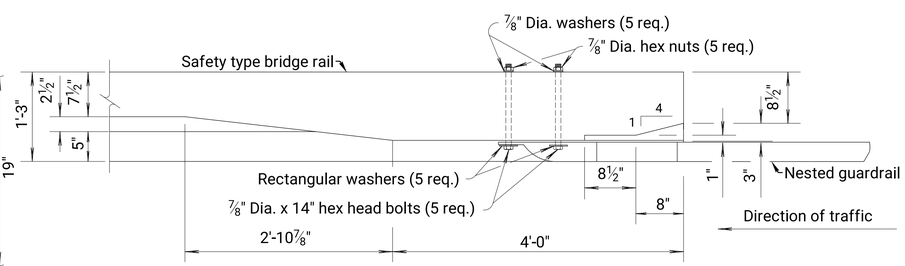
⊙ SECTION C-C (STEEL POST)



⊙ SECTION C-C (WOOD POST)



SECTION C-C (BLOCKOUTS)
Note: All holes ¾" dia.



PLAN VIEW
GUARDRAIL ATTACHMENT
TO SAFETY SHAPE BRIDGE RAIL

GENERAL NOTE

Use approved wood or steel posts (steel posts shown). See Standard Drawing RD611A and RD611B for details.

⊙ Use galvanized 12 gauge steel rail elements unless otherwise noted.

Use galvanized anchor bolts and post rail fittings, see Standard Specifications. Supply guardrail parts that are interchangeable with similar parts regardless of source or manufacturer.

Wood blockouts may be used through the 25'-0" thrie-beam section with wood or composite blockouts used throughout the remainder of the w-beam installation. The blockout size and material used in the guardrail end terminal may be independent from the remainder of the installation.

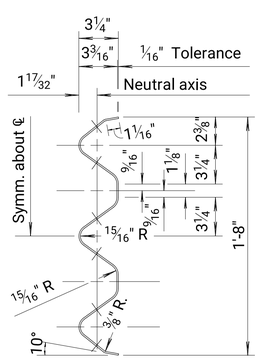
Fabricate Terminal Connector from 10 gauge steel, see Standard Specification. The connector has the same section as thrie beam guardrail. Terminal connector is Subsidiary to the bid item "Guardrail, Steel Plate (MGS)".

Shop bend curve rails when radius is less than 150'.

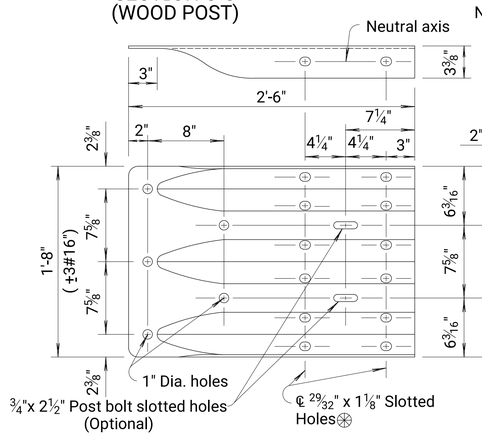
Lap guardrail splices, including terminal connector, in the direction of traffic. Where traffic is temporarily carried in the opposite direction of final configuration, lap rail splices in the direction of permanent traffic.

Bridge to guardrail transition consists of 1- 18'-9" thrie-beam with 1- 12'-6" thrie-beam section nested in back of 18'-9" section (See Layout), 1- Thrie beam to W-beam Asymmetrical transition section, use associated hardware with post sizes and location shown. For the remainder of installation use (MGS) W-beam guardrail with only one post type used within (MGS) guardrail run.

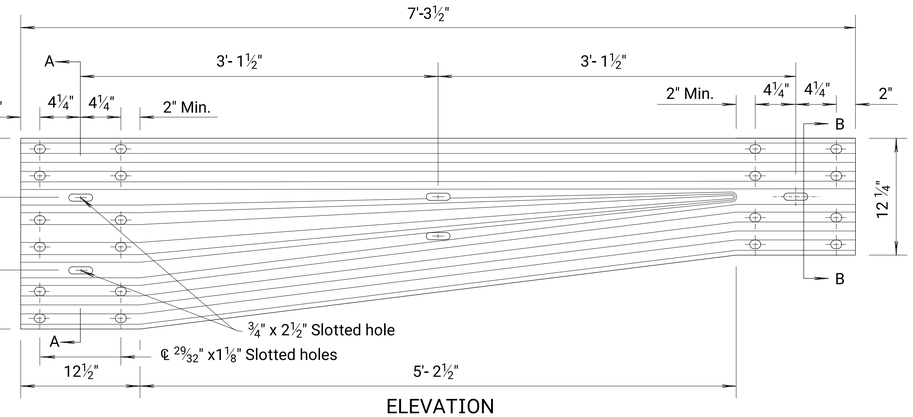
All material and work required for this construction is Subsidiary to the bid item "Guardrail, Steel Plate (MGS)".



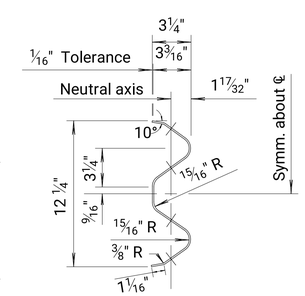
SECTION A-A
THRU RAIL ELEMENT
TYPICAL THRIE BEAM



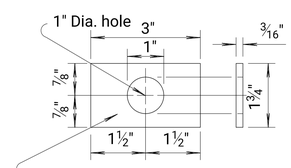
TERMINAL CONNECTOR
⊛ Optional 29/32" x 1¾" Slotted holes Rotated 50° (Typical) (12 req'd.)



ELEVATION
ASYMMETRICAL TRANSITION SECTION
(From Thrie Beam to W-Beam rail)



SECTION B-B
THRU RAIL ELEMENT
TYPICAL W-BEAM



RECTANGULAR WASHER
(Other approved washer may be used.)

NO.	DATE	REVISIONS	BY	APP'D
2	2-10-16	Added Detail, Wood Post	T.T.R.	S.W.K.
1	1-25-12	Revised Details, Thrie-Beam	S.W.K.	J.O.B.

KANSAS DEPARTMENT OF TRANSPORTATION

DETAILS OF THRIE BEAM to (MGS) GUARDRAIL TRANSITION

RD613A

FHWA APPROVAL	4-21-16	APP'D.	SCOTT W. KING
DESIGNED	DETAILED	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK.

Drawn By : CAM
File : Road Stds-GuardRail2.dgn
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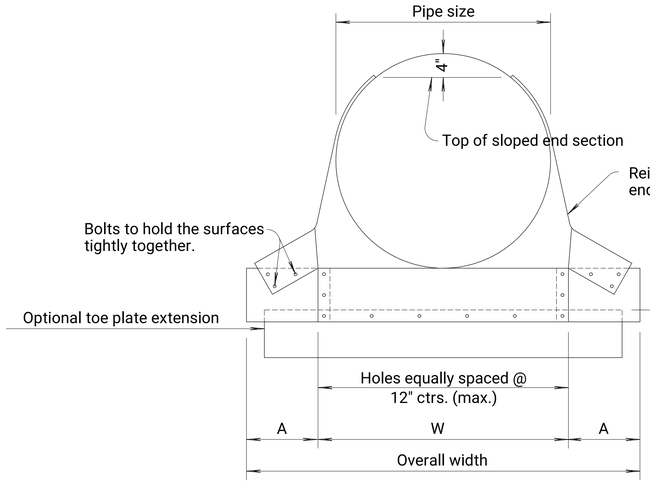
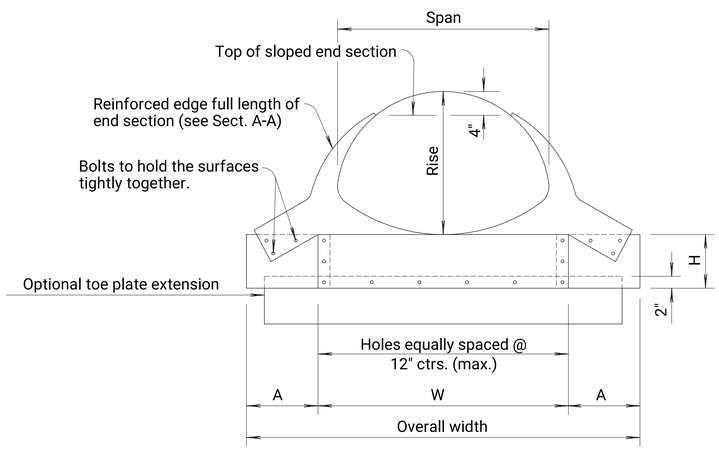
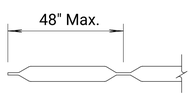
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	17	77



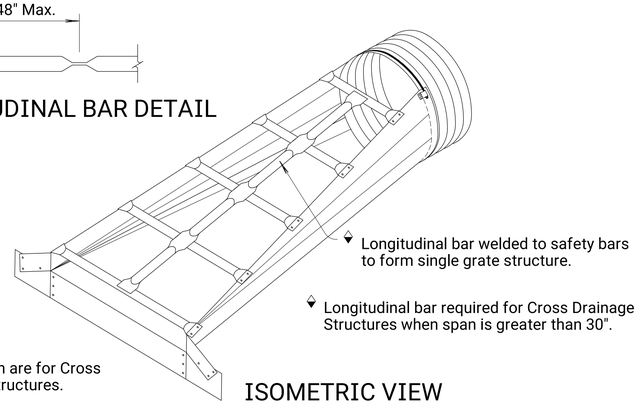
FRONT VIEW CIRCULAR PIPE



FRONT VIEW ARCHED PIPE

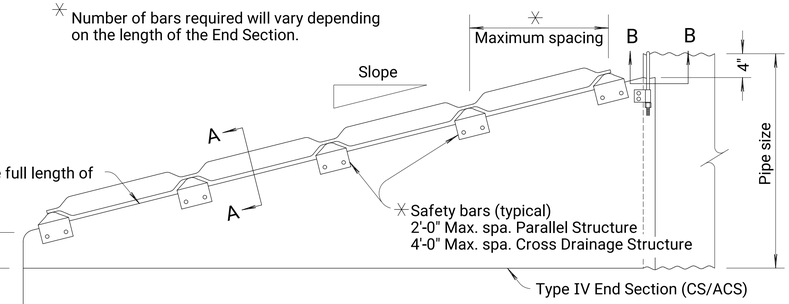


LONGITUDINAL BAR DETAIL

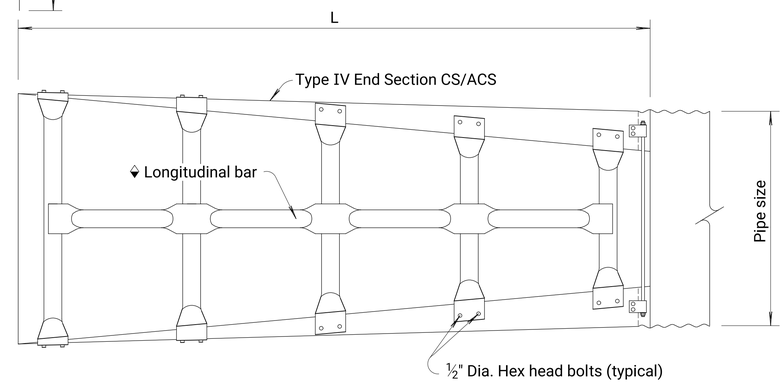


Note: Bars shown are for Cross Drainage Structures.

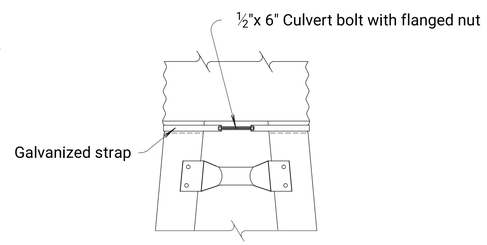
ISOMETRIC VIEW



SIDE ELEVATION

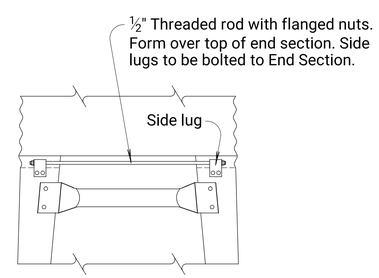


TOP VIEW



TYPE 1 CONNECTOR DETAIL

For 15" thru 24" pipe



TYPE 2 CONNECTOR DETAIL

For 30" and larger round pipes & 21"x15" and larger arched pipes.

GENERAL NOTES

The culvert type shall meet the KDOT Pipe Policy & Standard Specifications.

End sections shall be fabricated from CS (Galvanized) or ACS (Aluminized) steel meeting the requirements of the Standard Specifications.

When required optional toe plate extension shall be punched and bolted to end section apron lip with ⅜" diameter galvanized bolts. Steel for toe plate extension shall be the same gauge and steel type as end section. Dimensions shall be overall width less 6" by 8" high.

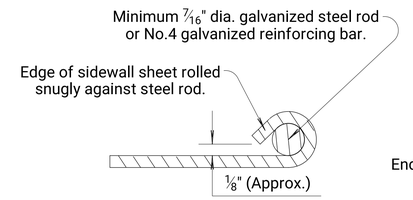
Attachment to circular pipes 15" through 24" diameter shall be made with Type 1 strap. All other sizes shall be attached with Type 2 rod and lugs.

Safety bars shall be fabricated from steel pipe meeting the requirements of Standard Specifications. Safety bars shall be hot dipped galvanized after fabrication.

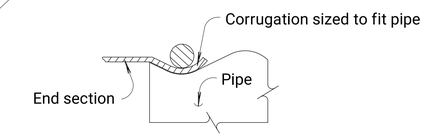
Installation shall be performed in accordance with the Standard Specifications.

All work and materials required for construction and installation of safety slope end section shall be included in the bid item "End Section (Type IV)".

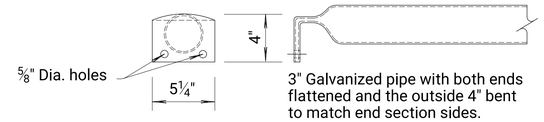
See Std. Drawing RD660 for details of corrugated metal pipe.



SECTION A-A



SECTION B-B



DETAIL OF SAFETY BAR

TYPE IV END SECT. (CS/ACS) FOR CIRCULAR PIPES

Pipe Dia. (In.)	Min. Gauge Ends	Dimensions in Inches				L Dimensions			
		A 1" Tol.	H 1" Tol.	W 2" Tol.	Overall Width	Slope	Length (In.)	Slope	Length (In.)
15"	16	8	6	21	37	4:1	20	6:1	30
18"	16	8	6	24	40	4:1	32	6:1	48
21"	16	8	6	27	43	4:1	44	6:1	66
24"	16	8	6	30	46	4:1	56	6:1	84
30"	12	12	9	36	60	4:1	80	6:1	120
36"	12	12	9	42	66	4:1	104	6:1	156
42"	12	16	12	48	80	4:1	128	6:1	192
48"	12	16	12	54	86	4:1	152	6:1	228
54"	12	16	12	60	92	4:1	176	6:1	264
60"	12	16	12	66	98	4:1	200	6:1	300

TYPE IV END SECTIONS (CS/ACS) FOR ARCHED PIPES

Equiv. Dia. (In.)	Nom. W.W. Area Sq. Ft.	Pipe Arch		Min. Gauge End Sect.	Dimensions in Inches				Slope	Length (In.)	Slope	Length (In.)
		Span (In.)	Rise (In.)		A	H	W	Overall Width				
18	1.6	21	15	16	8	6	27	43	4:1	20	6:1	30
21	2.2	24	18	16	8	6	30	46	4:1	32	6:1	48
24	2.9	28	20	16	8	6	34	50	4:1	40	6:1	60
30	4.5	35	24	14	12	9	41	65	4:1	56	6:1	84
36	6.5	42	29	12	12	9	48	72	4:1	76	6:1	114
42	8.9	49	33	12	16	12	55	87	4:1	92	6:1	138
48	11.6	57	38	12	16	12	63	95	4:1	112	6:1	168
54	14.7	✳	✳	12	16	12	70	102	4:1	132	6:1	198
60	18.1	✳	✳	12	16	12	77	109	4:1	148	6:1	222
72	26.0	✳	✳	12	16	12	89	121	4:1	188	6:1	282

✳ Where CMMAC (CSP/ACSP/CAP) with Type IV End Section is specified in the sizes indicated, pipe corrugation of 2⅔" x ½" and corresponding rise and span in accordance with applicable ASTM Specifications may be substituted for the normally required 3" x 1" corrugated pipe when fill height over top of pipe is equal to or less than 4'-0".

NO.	DATE	REVISIONS	BY	APP'D
5	2-5-08	Added ref. to KDOT Pipe Policy	S.W.K.	J.O.B.
4	1-16-96	Revised tables	R.J.S.	J.O.B.
3	2-24-94	Remove conc. pipe & add slope	R.J.S.	J.O.B.
2	12-11-91	Rev. bid item to End Sect(Type IV)	R.J.S.	J.O.B.

KANSAS DEPARTMENT OF TRANSPORTATION

TYPE IV END SECTION FOR CIRCULAR AND ARCHED PIPES (CORRUGATED METAL PIPE)

RD664

FHWA APPROVAL	5-27-08	APP'D. James O. Brewer			
DESIGNED	DETAILED	QUANTITIES	TRACED	Bowser	
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK.	King	

Note to Designer: KDOT Pipe Policy provides guidance in identifying the prohibited and/or restricted uses of CSP, ACSP, PEP, PVCP, CAP & RCP. Provide end sections of the same type and coating as the pipe. Exceptions to this are noted in the Standard Specifications. Refer to the KDOT Design Manual, Volume I (Part C), Road Section, "Elements of Drainage & Culvert Design" for structural pipe design information which includes: corrugations, sizes, gauges, maximum/minimum fill heights and classes of pipe.

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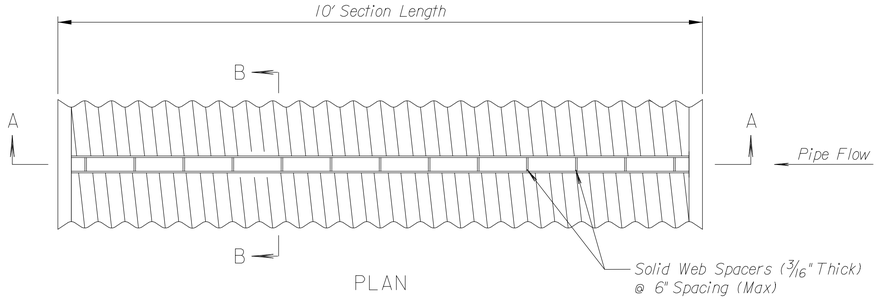
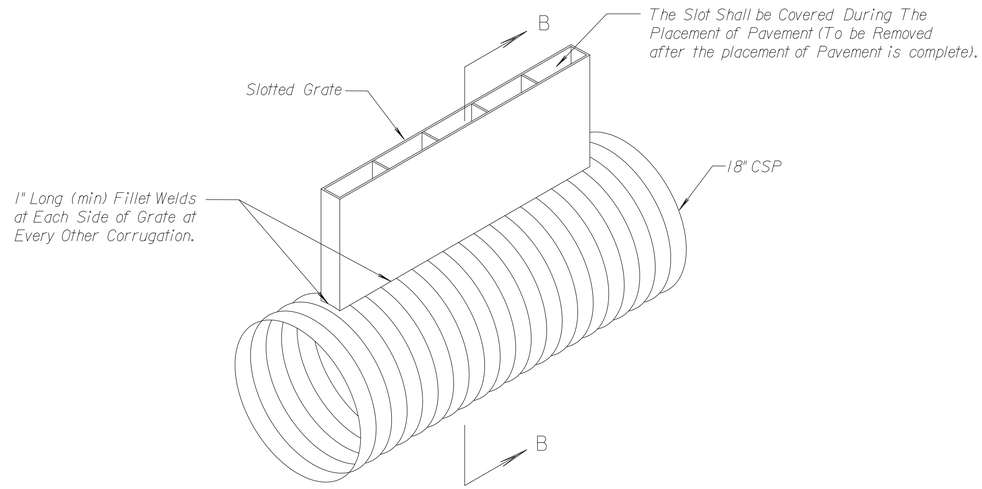
Drawn By : CAM
File : Road Stds.dgn

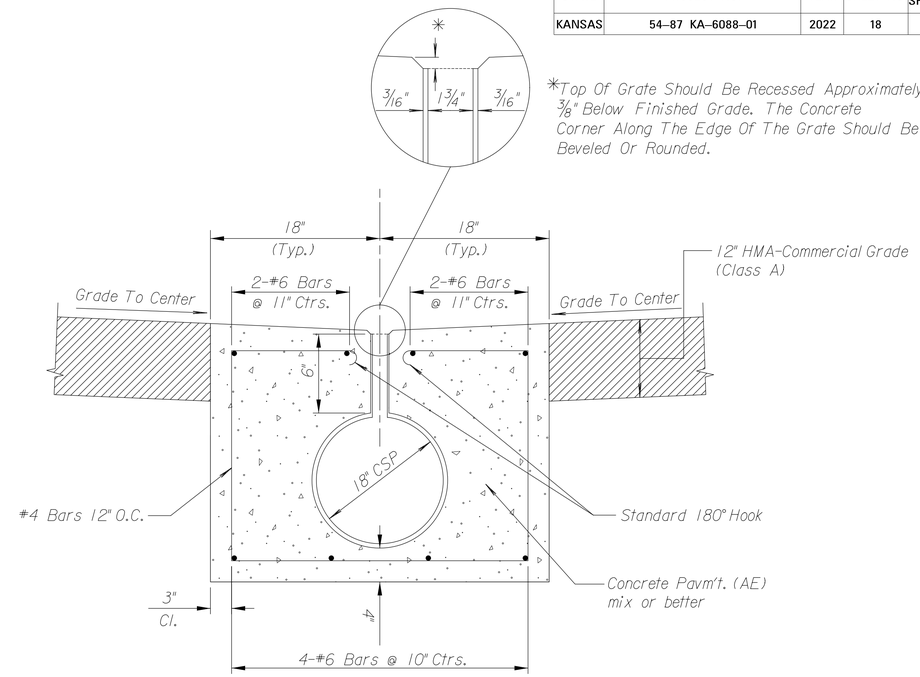
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	18	77



PLAN



DETAIL OF RISER

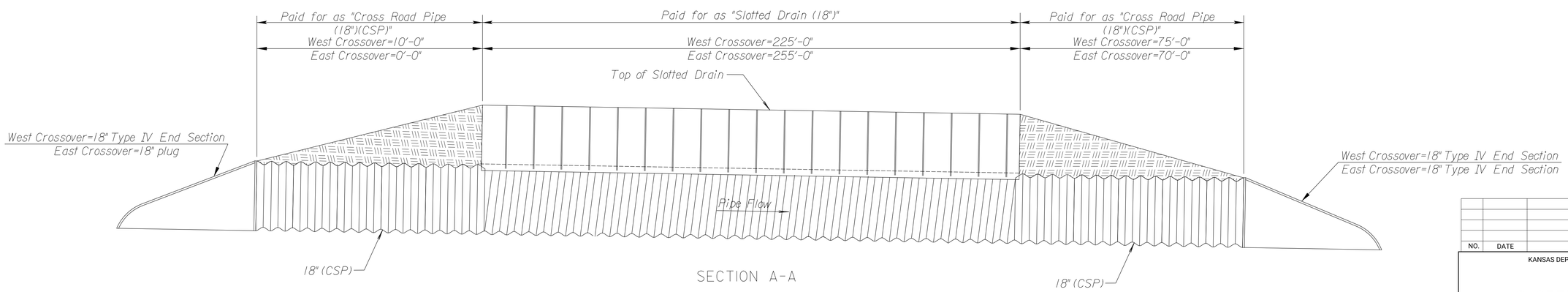


SECTION B-B

All bolts, slots assembly, and coupling bands are to be hot-dip galvanized to meet the provisions of ASTM A-123

Galvanizing shall be repaired at all weld locations

All excavation, backfill, pipe, slotted grate, welding, concrete, reinforcing steel and other materials, equipment and labor required to complete this work shall be included in the bid Item "Slotted Drain (18")".



SECTION A-A

NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION

SLOTTED MEDIAN DRAIN DETAILS

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Y:\KDOT\County\Sedgwick_87\54-87 KA-6088-01_Br(113) Redeck\Slotted median drain.dgn

SUMMARY OF QUANTITIES

Location \ Item	Class III Excavation yd^3	Concrete Grade 4.0 (AE)(SA) yd^3	Reinf. Steel Grade 60 (Epoxy Coated) lbs.	Reinf. Steel Grade 60 (Repair) (Set Price) lbs.	Structural Steel ASTM A709 Grade 36 lbs.	Welded Stud Shear Connector ** Each	Bridge Repair †† Lump Sum	Bridge Deck Grooving Sq. Yds.	Falsework Inspection Lump Sum	Bridge Backwall Protection System Sq. Yds.	Abutment Strip Drain Sq. Yds.	Bridge Painting Organic Zinc/ Acrylic System Lump Sum	Environmental Protection Lump Sum	Heat Straightening Repair Lin. Ft.
Abutment No. 1	35	*								22	19			
Pier No. 1														
Pier No. 2														
Abutment No. 2	35	*								22	19			
Substr. Total	70									44	38			
Super. Total		400.3	99,760	1	12,790	3,780		1,037						42
Total	70	400.3	99,760	1	12,790	3,780	Lump Sum	1,037	Lump Sum	44	38	Lump Sum	Lump Sum	◔42

**1,260- 7/8" Ø x 6" Welded Stud Shear Connnectors
2,520- 7/8" Ø x 7" Welded Stud Shear Connnectors

◔Includes straightening damaged stiffeners and diaphragms.

†† I.D. #1 - 4 each - Bridge Repair (Type A)
I.D. #2 - 3 each - Bridge Repair (Type B)
I.D. #3 - 3 each - Bridge Repair (Type C)

NOTE: See "Contractor Construction Staking" note for bridge survey requirements.

LFD & LRFR RATING FACTORS

Truck \ Rating Level	Inventory	Operating
HS-20 (36T)	1.07	1.78
Type HET (110T)		0.929
2002 LFD Rating. 17th Edition AASHTO		
HL-93 Loading	0.87	1.12
2018 Manual for Bridge Evaluation		

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	19	77

INDEX TO BRIDGE DRAWINGS

Sht No.	Drawing
19	Summary Of Quantities & General Notes
20	General Notes
21	Construction Layout
22-23	Abutment No. 1 Details
24-25	Abutment No. 2 Details
26	Abutment Strip Drain
27	Framing Plan
28	Structural Steel Details
29-30	Structural Steel Repair Details
31	Auxiliary Steel Details
32-33	Superstructure Details
34	Corral Rail Details
35	Superstructure Auxiliary Details
	Standards
36	Bridge Excavation
37	Supports and Spacers for Reinforcing Steel
38	Steel Erection, Fit -Up and Bolting Procedure

GENERAL NOTES

TEMPERATURE: The design temperature for all dimensions is 15°C.

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 St., Topeka, KS. 66603-3929.

REMOVAL OF EXISTING STRUCTURES: The bid item "Removal of Existing Structures" Lump Sum, includes the removal of designated portions of the slab, abutment backwall, and any other portions designated for removal in the details.

Clearly mark the location of the existing girder top flanges on top of the existing deck concrete within the removal limits before sawing or removing any concrete. Concrete sawing shall be limited to a maximum depth of 3 inches directly above any girder and within 3 inches of either edge of a girder top flange. Do not use drop-type pavement breakers. Do not use a hoe ram directly above any girder or within 1'-0" of either edge of a girder top flange. Use a jackhammer no heavier than 15 lb. to remove concrete above and within 1'-0" of either side of a girder top flange.

Damage to the existing structural steel caused by procedures not conforming to the above recommendations shall be repaired as directed by the Engineer at the Contractor's expense (no cost to the State). Any costs incurred for testing or Engineering evaluations will be included in the Contractor's expense for repair.

All materials removed from the existing structure shall become the property of the Contractor and be removed from the site.

BROKEN CONCRETE: The broken concrete and existing reinforcing steel not used shall be removed from the site. Reinforcing bars and broken concrete shall be wasted on sites provided by the Contractor and approved by the Engineer. This work shall not be paid for directly, but shall be subsidiary to other bid items.

DEMOLITION PLANS: This is a Category C Demolition. Submit detailed Demolition Plans to the State Bridge Office at least 4 weeks before beginning the demolition process. Portions of the submitted details shall bear the seal of a Licensed Professional Engineer. Identify, on the plans, the Demolition Supervisor meeting the requirements of the KDOT Specifications. The Demolition Supervisor will attend the required pre-demolition meeting before these operations begin, as described in KDOT Specifications. No demolition work will begin without approved Demolition Plans.

CONCRETE: Superstructure concrete is bid as Concrete Grade 4.0(AE)(SA). Bevel all exposed edges of all concrete with a 3/4" triangular moulding, except where otherwise noted on the plans. Construction joints are optional with the Contractor, but if used, place only at locations shown, or at locations approved by the Engineer.

REINFORCING STEEL: All reinforcing steel dimensions are to centerline of bars unless otherwise noted. All reinforcing steel shall conform to the requirements of ASTM A615, Grade 60.

EPOXY BARS: All reinforcing bars in the superstructure shall be Grade 60 (Epoxy Coated). Epoxy coating shall be in accordance with KDOT specifications. Epoxy coated bars shall not be field bent except as noted. All bar chairs in the superstructure shall be plastic coated.

CONCRETE PLACING SEQUENCE: The sequence of placing concrete in the slab and curbs shall be as shown, or the Contractor shall submit an alternate placing sequence for review. Concrete placement and finishing of the deck shall be normal to centerline. Submit any alternate placing sequence to the Engineer at the Preconstruction Conference. Include the proposed rate of concrete placement in yd^3/h, the plant capacity, placement direction, construction joint location, a description of the equipment to be used in placing the concrete, proposed admixtures, and the quantity of concrete in each placing segment. Any additional cost for the Contractor's alternate plan for placing concrete shall be considered subsidiary to the bid item "Concrete Grade 4.0 (AE)(SA)". Approval of the Contractor's alternate sequence is required prior to placement of concrete in the deck.

Place and hand vibrate all concrete for the abutments above the construction joint to the bottom of the deck just prior to the normal paving train operations. Do this work in a manner to avoid a cold joint in the abutment.

FALSEWORK PLANS AND SHOP DRAWINGS: Use the U.S. Customary system of units on falsework plans and shop drawing details.

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 16.1 "Review and Approval of Falsework Plans", for a listing of items to be included on the falsework plan. Submit electronic plans conforming to Section 105 of the Standard Specification with details in compliance with KDOT Specifications to the Field Engineer for review.

FALSEWORK INSPECTION: This project has falsework plan requirements which are considered "Category I" by KDOT specifications. The falsework designer of record will conduct an inspection of the as-built falsework. The bid item "Falsework Inspection" is full compensation for all materials, labor and equipment. See KDOT specifications.

CONSTRUCTION JOINTS: The construction joints shown are optional with the contractor. If used, place the construction joints only at locations shown or at locations approved by the Engineer. Sandblast and seal the centerline construction joint with concrete masonry sealer.

FILLETS: Construct the finished deck to plan grade by varying the depth of the fillet over the beam to provide for concrete dead load deflection. After the beams are erected measure the camber in the field by taking a profile of each beam. Correct any variation between the actual camber and concrete dead load deflection shown in the plans by varying the depth of concrete fillets over the beam so the finished deck is constructed to the theoretical grade. The minimum depth of finished slab over the beam shall be 9 inches.

The theoretical amount of concrete required for the fillets is included in the Summary of Quantities. Any additional concrete required to construct the fillets will be subsidiary.

DESIGN DATA

DESIGN LOADING: HL-93 A.A.S.H.T.O. Specifications, 2018 Edition and latest Interim Specifications, Load and Resistance Factor Design for deck design. Design loading based on HL-93 and the legal truck loads.

LOADING: Live Load - HL-93 - deck only.

UNIT STRESSES:

Concrete Grade 4.0 (AE)	f'c = 4.0 ksi
Concrete Grade 4.0 (AE)(SA)	f'c = 4.0 ksi
Reinforcing Steel (Grade 60)	fy = 60,000 psi
Structural Steel ASTM A709M Gr. 36	fy = 36 ksi

CONSTRUCTION LOADS: Limited traffic is permitted on the on the new sub-deck, one course deck or any concrete overlay during the curing period, keep any exposed deck wet during the curing period. See KDOT Specifications Section 710 Tables 710-1 & 710-2 for additional information.

††BRIDGE REPAIR: The bid item "Bridge Repair, Lump Sum)" shall include the following:

I.D. #1 - 4 each - Bridge Repair (Type A)
This item includes all dye penetrant testing, grinding, welding and all labor, equipment and materials necessary for a Type A repair as detailed in the plans. See "Structural Steel Repair Details" sheets.

I.D. #2 - 3 each - Bridge Repair (Type B)
This item includes all dye penetrant testing, grinding, welding and all labor, equipment and materials necessary for a Type B repair as detailed in the plans. See "Structural Steel Repair Details" sheets.

I.D. #3 - 3 each - Bridge Repair (Type C)
This item includes all dye penetrant testing, grinding, welding and all labor, equipment and materials necessary for a Type C repair as detailed in the plans. See "Structural Steel Repair Details" sheets.

NO.	DATE	REVISIONS	BY	APP'D
1				

KANSAS DEPARTMENT OF TRANSPORTATION
BR. NO. 54-87-190.69(113) WB STA. 86 + 40.15

SUMMARY OF QUANTITIES & GENERAL NOTES

PROJ. NO. 54-87 KA-6088-01 SEDGWICK CO.

SHEET NO. OF	SCALE		APP'D		
DESIGNED	DETAILED	CAM	QUANTITIES	MEM	CADD CAM
DESIGN CK.	DETAIL CK.		QUAN. CK.	YSC	CADD CK.

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STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54–87 KA–6088–01	2022	20	77

GENERAL NOTES

STRUCTURAL STEEL: New diaphragms and intermediate stiffeners shall conform to ASTM A709 Grade 36. The Contractor may substitute ASTM A709 Grade 50 material for Grade 36.

WELDING: Material and construction shall conform to KDOT Specifications. On the shop drawings, show a code or symbol at the tail of the weld symbol, which refers to an approved prequalified weld procedure.

WELDING OF HEADED STUD ANCHORS: Weld Headed Stud Anchors with automatically timed stud welding equipment connected to a suitable power source. All stud welding shall conform to KDOT Specifications. For bridges with skewed reinforcing steel the contractor has the option to place the Welded Shear Stud Connectors parallel to the skew angle.

BOLTED CONNECTIONS:
Use 7/8" diameter heavy hex structural bolts for the diaphragm connections. Bolt holes shall be 15/16" diameter. Oversize and/or slotted holes, as specified in the KDOT Specifications, may be used on one of the two members connected if shown on the approved shop drawings. Oversize and/or slotted holes may require additional standard hardened washers or plate washers. Report to the Engineer any reaming required that will remove more than 1/4" of material before any reaming is done.

Use Direct Tension Indicators (DTI's) on all high strength bolts. Place the DTI under the bolt head and turn the nut to tighten. This method is preferred whenever possible. Face the protrusions on the DTI to the underside of the bolt head. Place a hardened flat washer under the nut. See KDOT Specifications.

BOLTS: All bolts, nuts and hardened flat washers shall conform to the heavy hex structural requirements of ASTM A325, Type 1, and KDOT Specifications unless otherwise noted. All bolts and bolt holes shall be English dimension. Direct Tension Indicators (DTIs) are to comply with the requirements of the latest edition of ASTM F959. No allowance will be made for high strength bolts used for permanent or temporary connections. This work is subsidiary to the bid item "Structural Steel A709 Grade 36".

QUANTITIES: Items not listed separately in the Summary of Quantities are subsidiary to other items in the proposal.

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

BACKFILL COMPACTION: Compact backfill at the abutments.

BRIDGE EXCAVATION: All excavation shall be Class III Excavation.

ABUTMENT STRIP DRAIN: See the General Notes on the "Abutment Strip Drain and Bridge Excavation" sheets.

BRIDGE BACKWALL PROTECTION SYSTEM: See the General Notes on the "Abutment Strip Drain and Bridge Excavation" sheets.

PAINTING OF TOP FLANGE AND WELDED STUD SHEAR CONNECTORS: Field Work - Blast clean the tops of the top flanges to SSPC-SP6 Specifications (latest Revision) before the studs are applied. After the studs are applied, blast clean the tops of the top flanges and the studs to SSPC-SP6 Specifications and paint with an approved organic zinc primer to a minimum dry film thickness of 3 mils.

BRIDGE PAINTING: The bid item "Bridge Painting (Organic Zinc w/Acrylic System shall include blast cleaning approximately all of the existing structural steel to SSPC-SP6 Specifications (latest revisions) and paint with organic zinc primer and a waterborne acrylic finish coat. At both Abutments sandblast and apply a prime coat to all structural steel including the girders, studs, stiffeners, bearing devices and diaphragms that are to be embedded before placing concrete. Structural steel that is to be embedded in concrete does not require a finish coat of paint. All other exposed structural steel shall receive a final finish coat. Final finish coat color will be Kansas Green. This color will match Federal Standard #24097.

All painting of existing structural steel shall be in conformance with the KDOT Specifications.

All painting of existing structural steel is include in the bid item "Bridge Painting Organic Zinc w/Acrylic System". All painting of new structural steel diaphragms and stiffeners is included in the bid item "Structural Steel A709 Grade 36".

PAINT SYSTEM ON EXISTING STRUCTURE: The structural steel has a paint history of:
1) Original paint system: Basic Lead/Chromate. Date: 1969
2) Repaint system: Inorganic Zinc with Acrylic System. Date: 1997
3) The weight of existing steel to be repainted is 106.7 Tons.

LEAD CONTENT TEST: This structure requires a lead content test (TCLP) on the top flanges after concrete removal..

ENVIRONMENTAL PROTECTION: After removal of the concrete deck, the Contractor will test the remaining paint on the top flange for lead content. If the lead content test (TCLP) is less than 5mg/l, the bid item "Environmental Protection" will not be required. If the lead content test (TCLP) is equal to or greater than 5mg/l, use environmental protection procedures as shown in the KDOT Specifications for Environmental Protection Structure Classification is Class B.

EXISTING DIMENSION VERIFICATION: Dimensions of the existing structure are based on old plans. Verify, by field measurement, the as-built dimensions of the existing structure and submit such verification in writing to the Engineer. The verification will include sketches, drawings, photographs and descriptions as needed to clearly define the as-built dimensions that will be incorporated in the new construction.

ERECTION PLANS: This is a Category B Structure. Submit detailed Erection Plans to the State Bridge Office at least 4 weeks before beginning the erection process. Portions of the submitted details shall bear the seal of a licensed Professional Engineer. Identify, on the Erection Plans, the Erection Supervisor required by KDOT Specifications. No structural erection work will begin without approved erection plans.

TEMPORARY CONSTRUCTION LOADS: The Contractor will not stockpile construction materials, debris/rubble or place equipment weighing more than 20 tons or greater than bridge posted load limits on the bridge without prior written approval by the KDOT Area Engineer. For bridges with highway traffic on or under the bridge, the Contractor will provide plans showing the location, quantity and weight of the proposed materials, debris or equipment weighing more than 20 tons or greater than bridge posted load limit. These plans will bear the Seal of the Contractor's Engineer before approval is granted. The Contractor's Engineer will use AASHTO Specifications for limitations on structural capacities, as the structure is found in the field.

BRIDGE DECK GROOVING: After the bridge deck has cured, transversely groove the deck in accordance with KDOT Specifications. For phased construction groove each completed phase before opening to traffic. Align the grooves from each adjacent phase across the bridge deck without jogs or discontinuities. For skewed bridges all grooving will be perpendicular to the centerline of the bridge.

NO.	DATE	REVISIONS	BY	APP'D
1				

KANSAS DEPARTMENT OF TRANSPORTATION
BR. NO. 54–87–190.69(113) WB STA. 86 + 40.15

GENERAL NOTES

PROJ. NO. 54–87 KA–6088–01 SEDGWICK CO.

SHEET NO. OF	SCALE	APP'D			
DESIGNED	DETAILED CAM	QUANTITIES MEM	CADD CAM		
DESIGN CK.	DETAIL CK.	QUAN. CK. YSC	CADD CK.		

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STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
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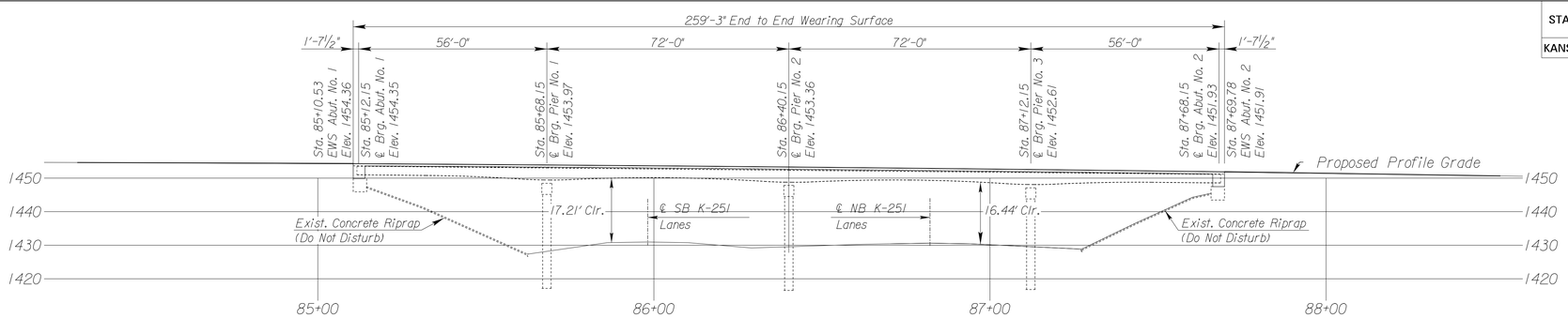


ELEVATION

56'-72'-72'-56' Steel Welded Haunched Plate Girder Spans (SWGH)
Pile Bent Abutments, Column Bent Piers on Spread Footings
40'-0" Roadway

EXPANSION JOINT WIDTH DETAILS (W2)						
℣ Temperature (F°)	40°	50°	60°	70°	80°	90°
Formed Concrete Opening Size	2¼"	2⅛"	2"	1⅞"	1¾"	1⅝"

℣ Average Ambient Temperature over previous 24 hours.

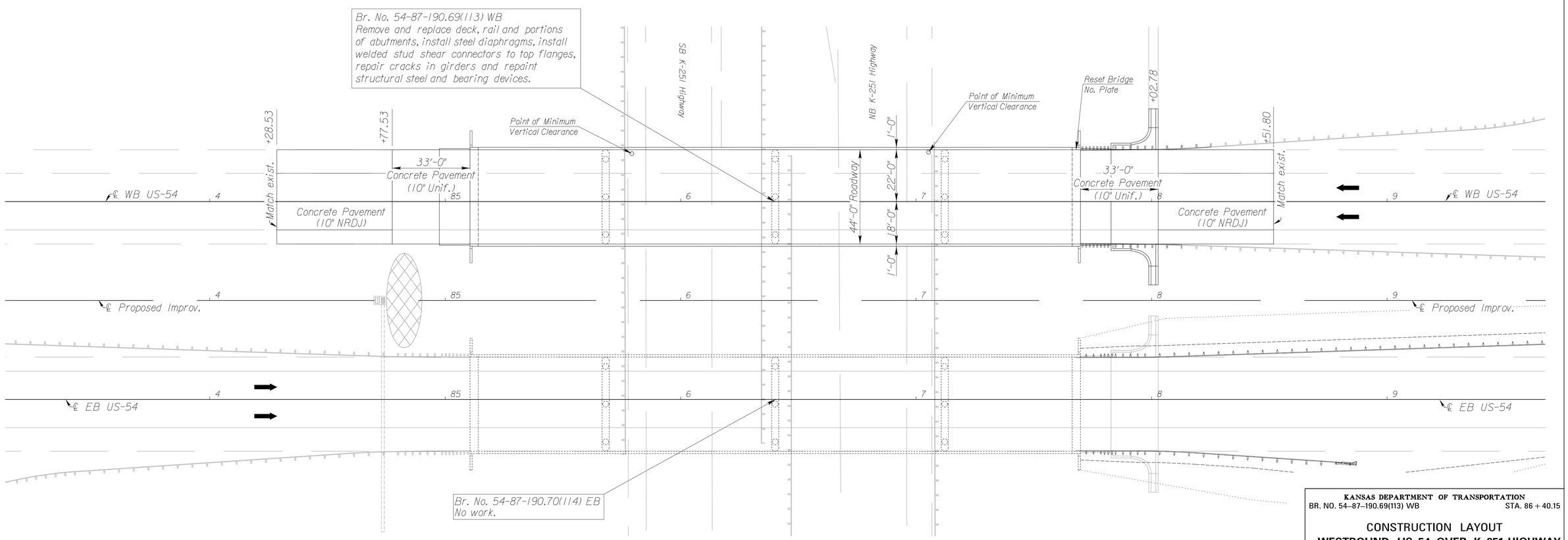
NOTE: Proposed grade as shown matches curve shape of original bridge construction. Contractor shall verify profile. Proposed profile shall be 0.115' higher than existing.

N

SCALE: 1"=20'

BM # 17: Alum. cap stamped "KDOT HCP SG-161" ctr. punched in conc. post. Sta. 85+05.2, 0.30' Rt. Elev. 1452.97

BM # 18: Rivet & KDOT wshr. top SE wingwall of E abutment on W bound bridge Sta. 87+69.30, 22.34' Lt. Elev. 1451.58



PLAN

KANSAS DEPARTMENT OF TRANSPORTATION
BR. NO. 54-87-190.69(113) WB STA. 86 + 40.15

CONSTRUCTION LAYOUT
WESTBOUND US-54 OVER K-251 HIGHWAY

PROJ. NO. 54-87 KA-6088-01 SEDGWICK CO.

SHEET NO. OF		SCALE		APP'D	
DESIGNED	GEM	DETAILED	TAR	QUANTITIES	CADD TAR
DESIGN CK.		DETAIL CK.		QUAN. CK.	CADD CK.

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STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
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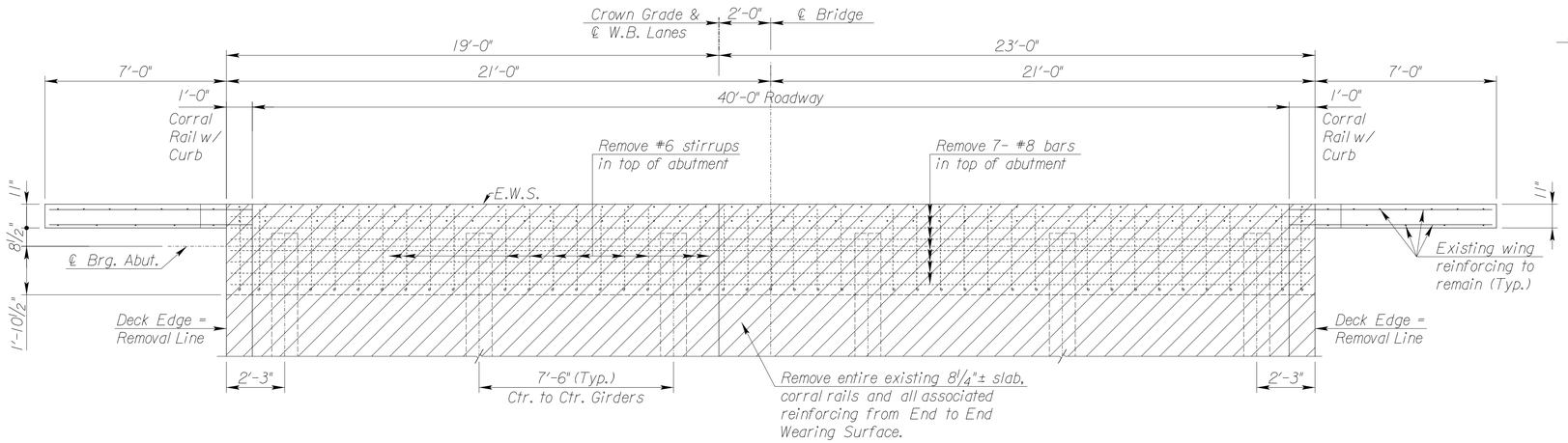
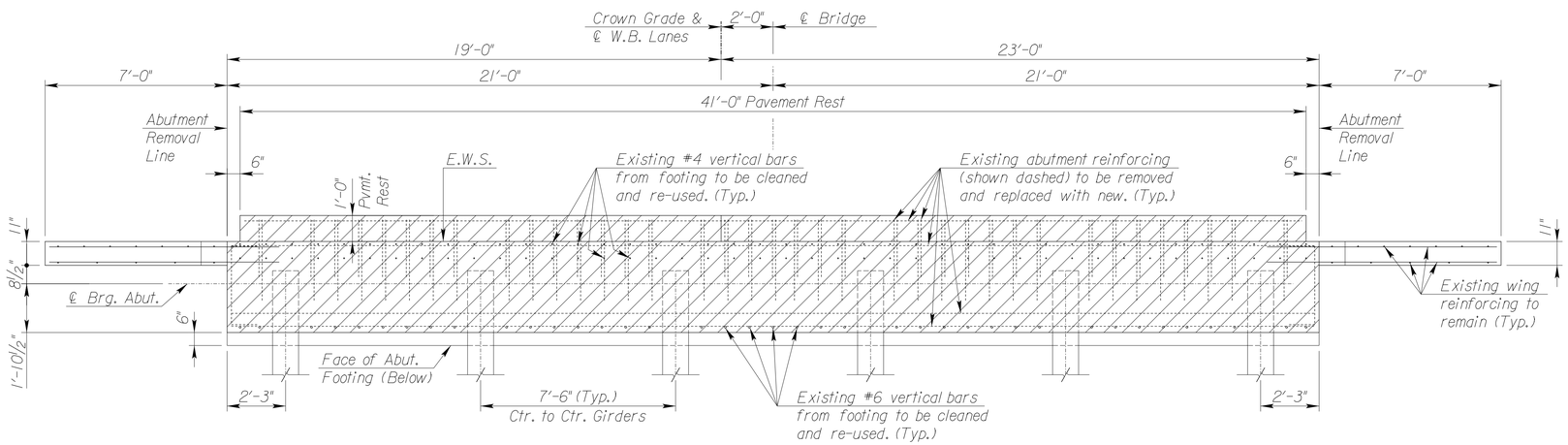


PLAN NEAR TOP OF SLAB



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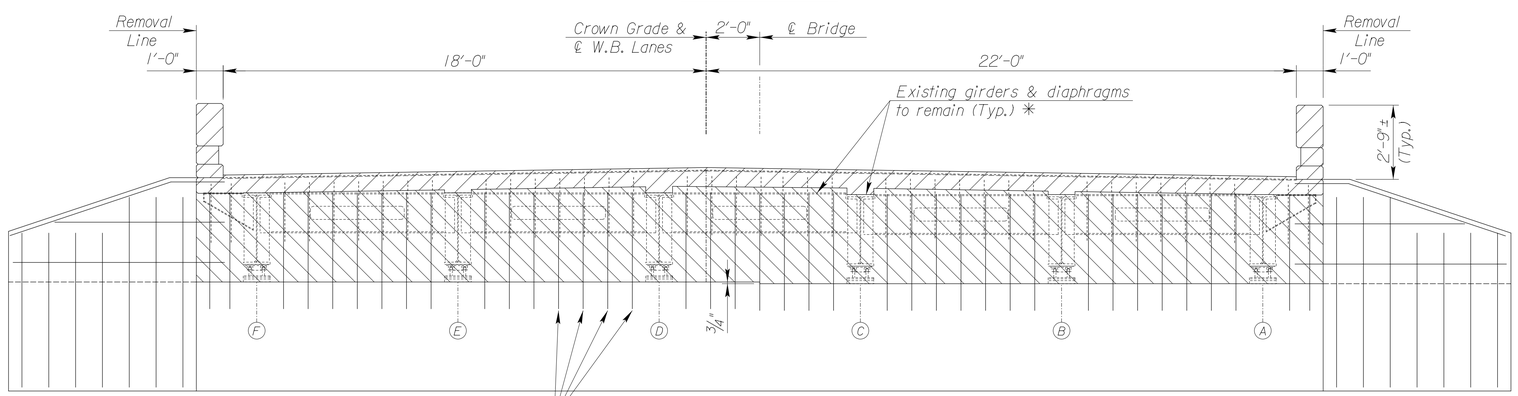
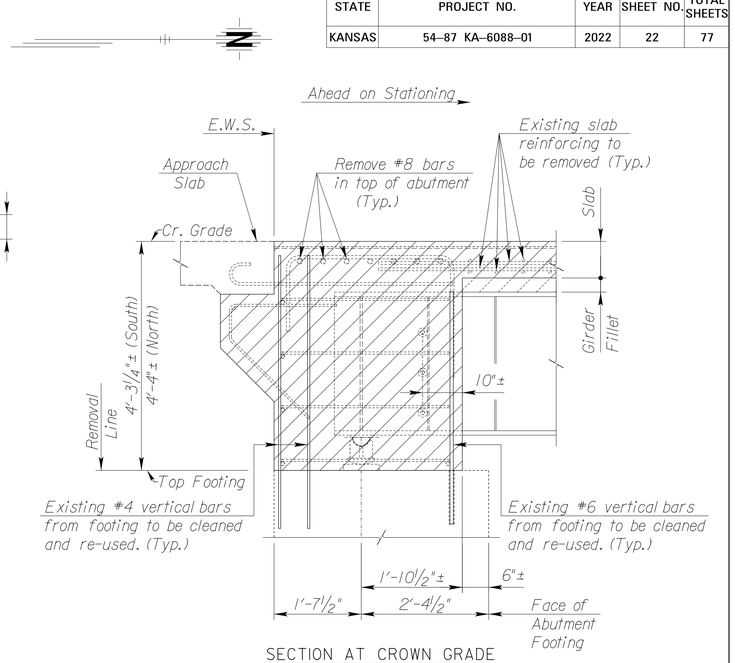


ELEVATION
Looking Back on Stationing
(Horizontal bars not shown)

* Girder Flanges: 1"x 12" top & bot.
Haunched Girder Web: 5/16" thick
x 2'-6 min. depth @ abutments
x 3'-6" max. depth @ piers



SECTION AT CROWN GRADE

Existing abutment reinforcing (shown dashed) to be removed and replaced with new. (Typ.)

Concrete Removal Limits

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

BR. NO. 54–87–190.69(113) WB STA. 86 + 40.15

ABUTMENT NO. 1 REMOVAL DETAILS

WESTBOUND US–54 OVER K–251 HIGHWAY

PROJ. NO. 54–87 KA–6088–01 SEDGWICK CO.

SHEET NO.	OF	SCALE		APP'D			
DESIGNED	GEM	DETAILED	GWM	QUANTITIES		CADD	GWM
DESIGN CK.		DETAIL CK.		QUAN. CK.		CADD CK.	

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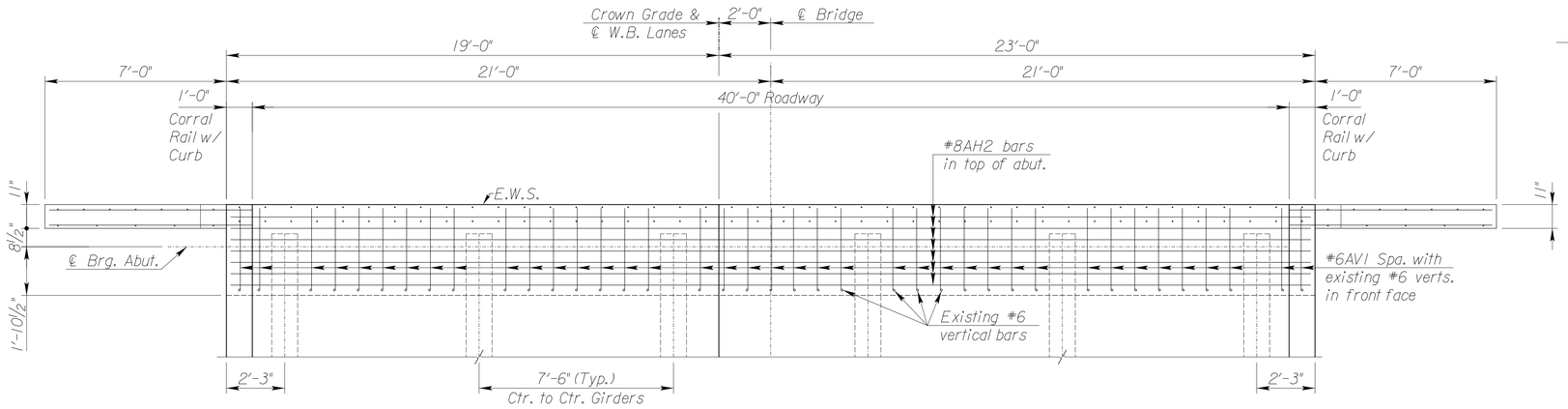
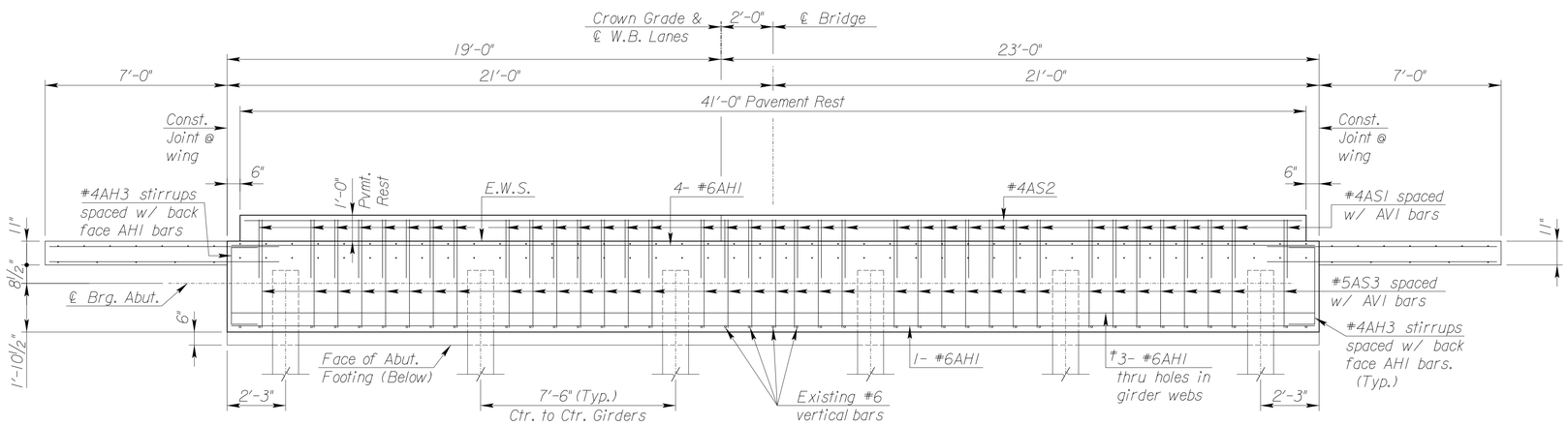
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54–87 KA–6088–01	2022	23	77



PLAN NEAR TOP OF SLAB

(Pavement Rest not shown)



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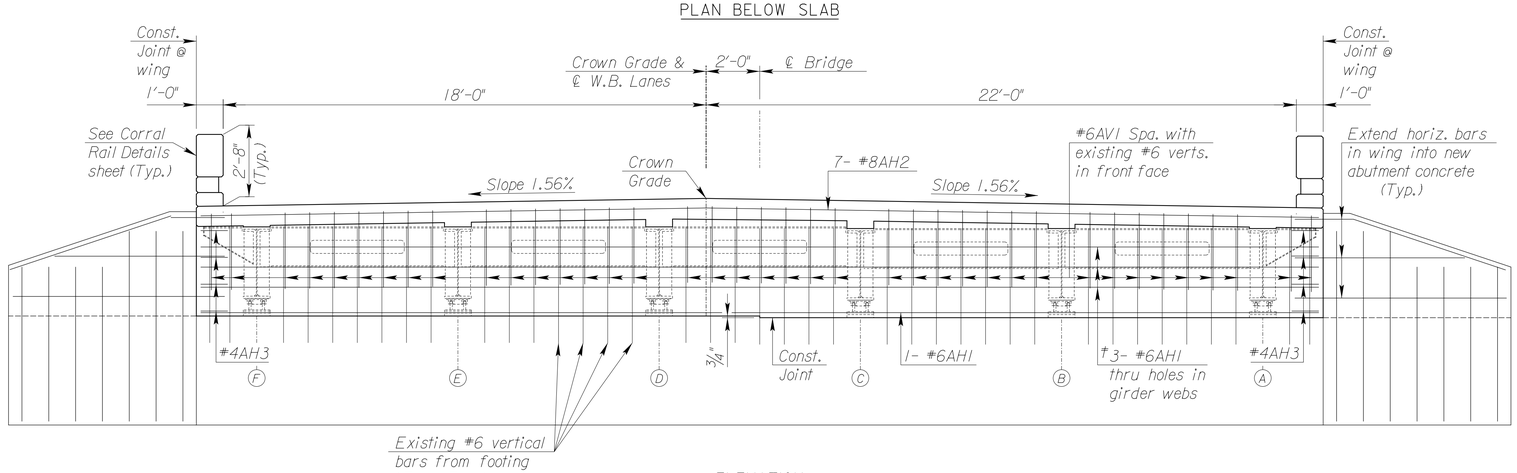
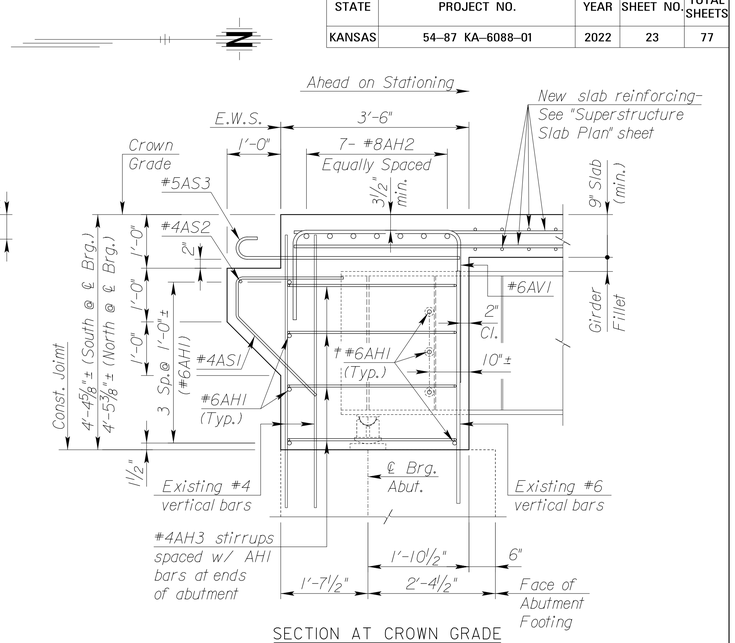


ELEVATION

Looking Back on Stationing



SECTION AT CROWN GRADE

†Wrap AH1 bars with mastic or joint filler through holes in girder webs

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

BR. NO. 54–87–190.69(113) WB STA. 86 + 40.15

ABUTMENT NO. 1 REPAIR DETAILS

WESTBOUND US–54 OVER K–251 HIGHWAY

PROJ. NO. 54–87 KA–6088–01 SEDGWICK CO.

SHEET NO.	OF	SCALE		APP'D			
DESIGNED	GEM	DETAILED	GWM	QUANTITIES		CADD	GWM
DESIGN CK.		DETAIL CK.		QUAN. CK.		CADD CK.	

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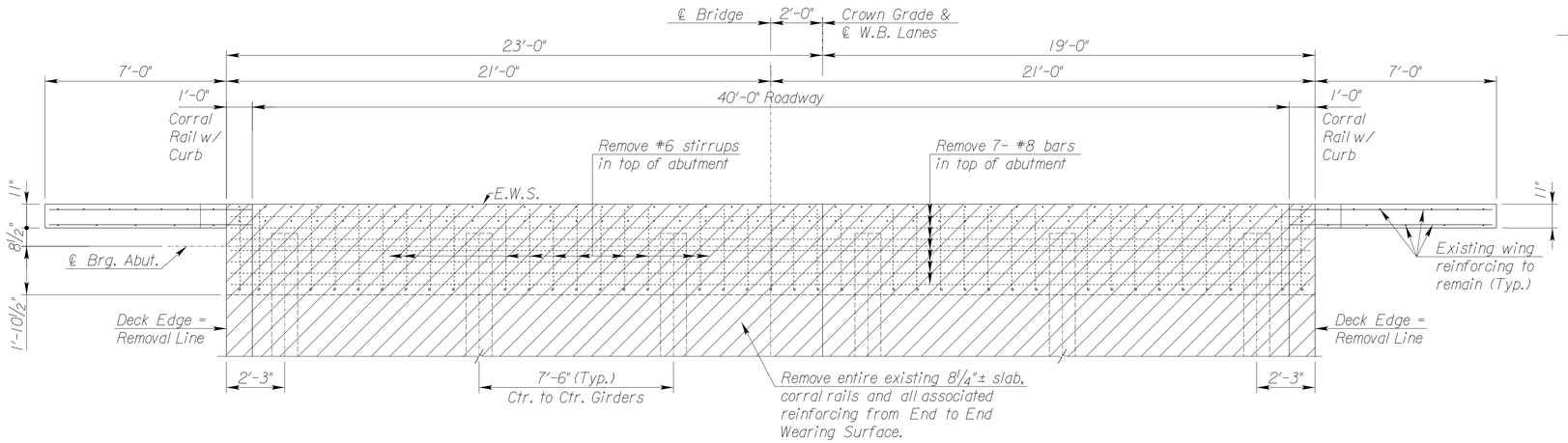
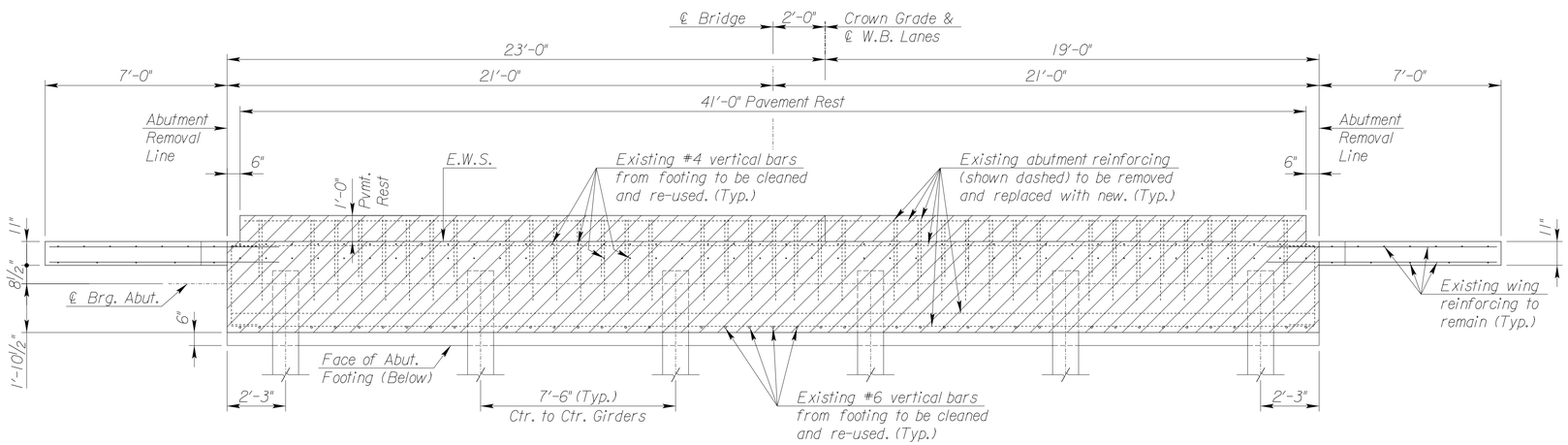
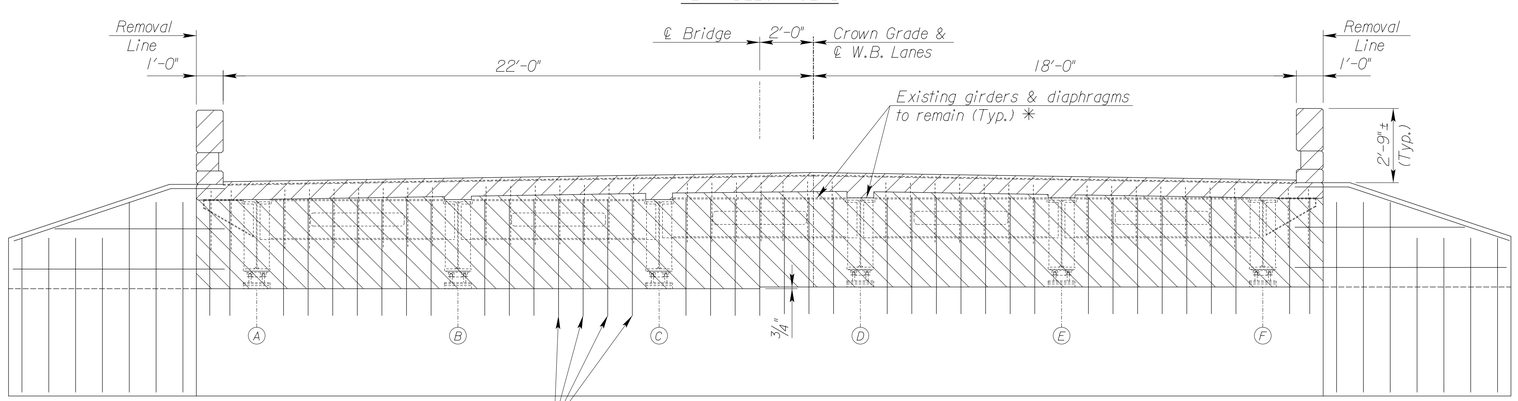
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54–87 KA–6088–01	2022	24	77



PLAN NEAR TOP OF SLAB

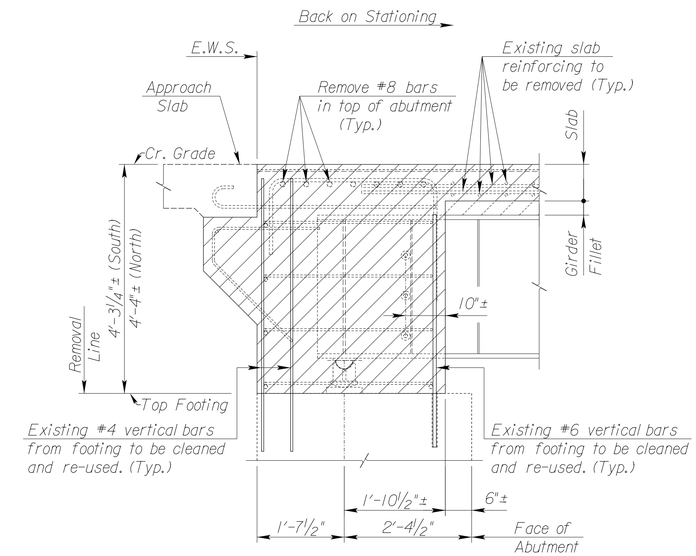


PLAN BELOW SLAB



ELEVATION
Looking Ahead on Stationing
(Horizontal bars not shown)

* Girder Flanges: 1"x 12" top & bot.
Haunched Girder Web: 5/16" thick
x 2'-6 min. depth @ abutments
x 3'-6" max. depth @ piers



SECTION AT CROWN GRADE
Existing abutment reinforcing (shown dashed) to be removed and replaced with new. (Typ.)

Concrete Removal Limits

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION
BR. NO. 54–87–190.69(113) WB STA. 86 + 40.15

ABUTMENT NO. 2 REMOVAL DETAILS

WESTBOUND US–54 OVER K–251 HIGHWAY

PROJ. NO. 54–87 KA–6088–01 SEDGWICK CO.

SHEET NO.	OF	SCALE		APP'D			
DESIGNED	GEM	DETAILED	GWM	QUANTITIES		CADD	GWM
DESIGN CK.		DETAIL CK.		QUAN. CK.		CADD CK.	

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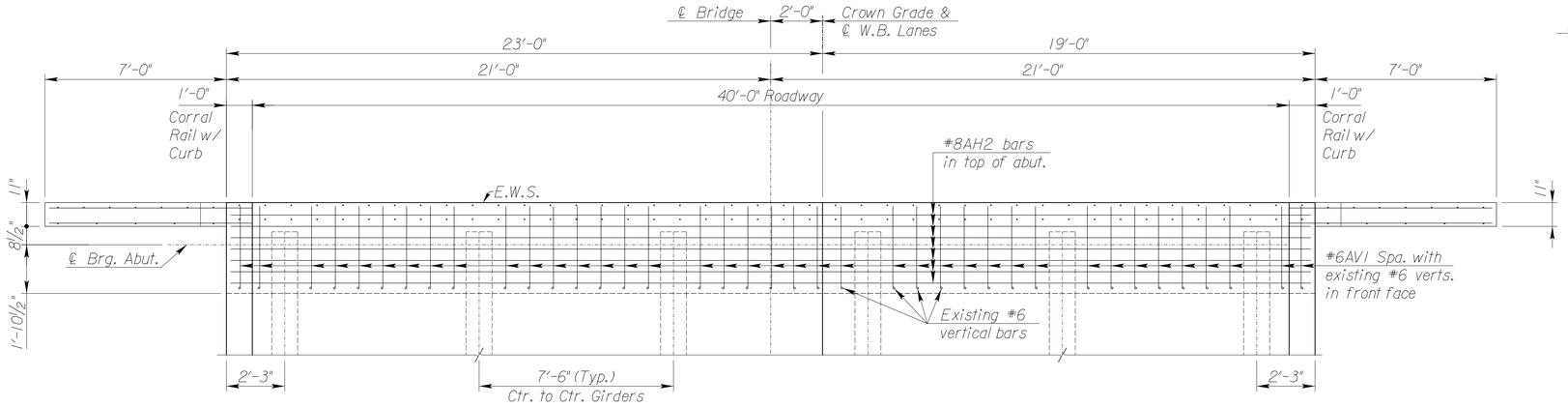
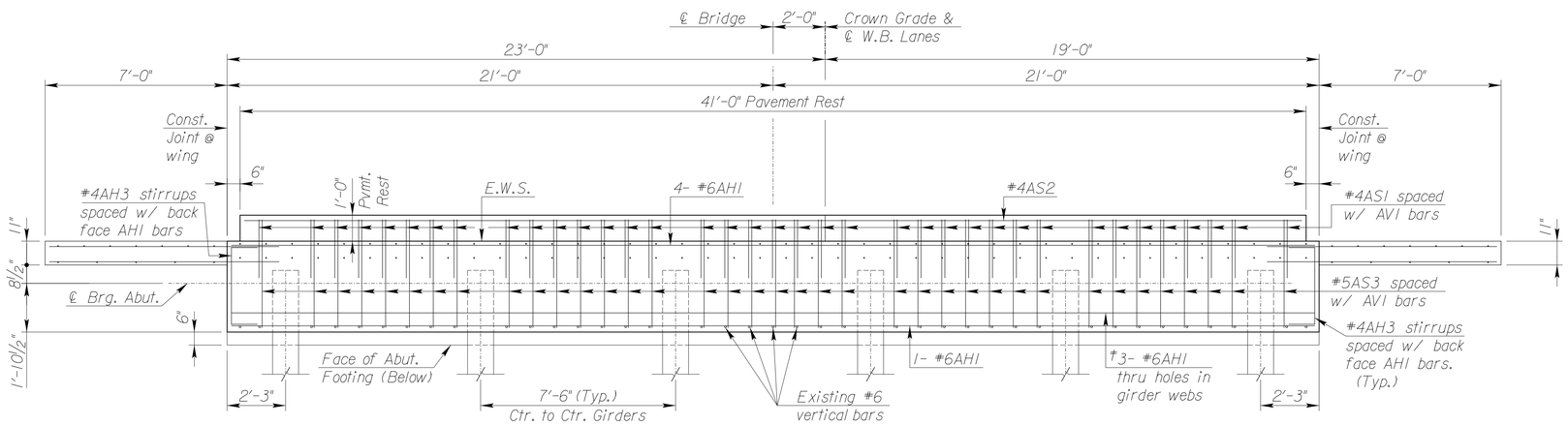
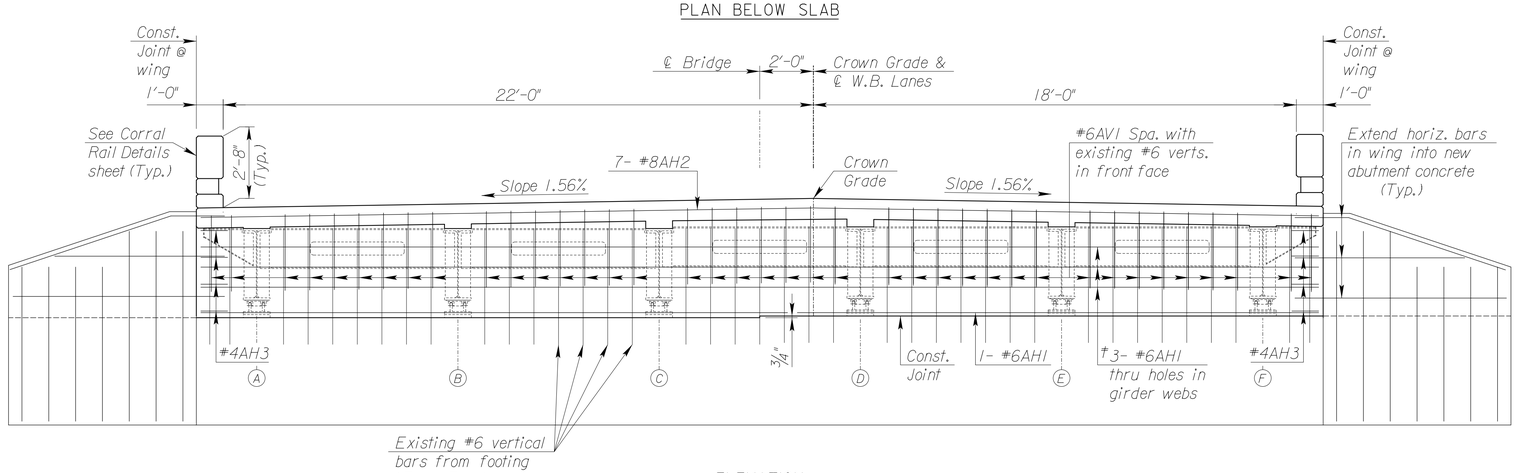
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	25	77



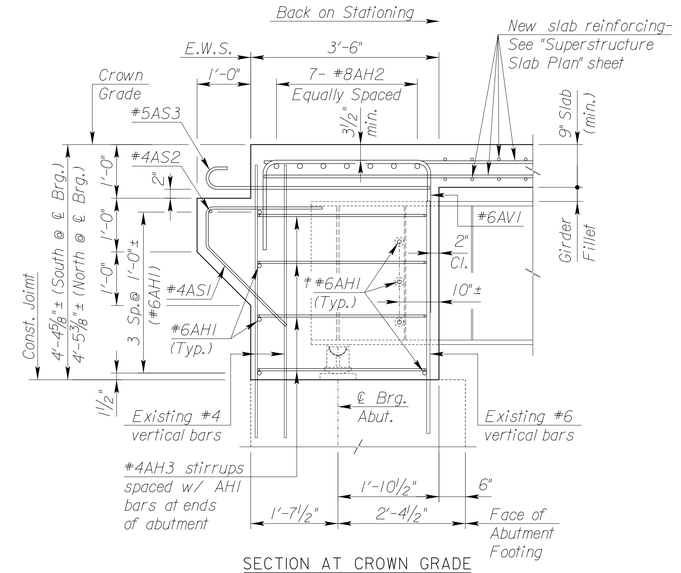
PLAN NEAR TOP OF SLAB
(Pavement Rest not shown)



PLAN BELOW SLAB



ELEVATION
Looking Ahead on Stationing



SECTION AT CROWN GRADE
†Wrap AH1 bars with mastic or joint filler through holes in girder webs

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION
BR. NO. 54-87-190.69(113) WB STA. 86 + 40.15

ABUTMENT NO. 2 REPAIR DETAILS

WESTBOUND US-54 OVER K-251 HIGHWAY

PROJ. NO. 54-87 KA-6088-01 SEDGWICK CO.

SHEET NO.	OF	SCALE		APP'D			
DESIGNED	GEM	DETAILED	GWM	QUANTITIES		CADD	GWM
DESIGN CK.		DETAIL CK.		QUAN. CK.		CADD CK.	

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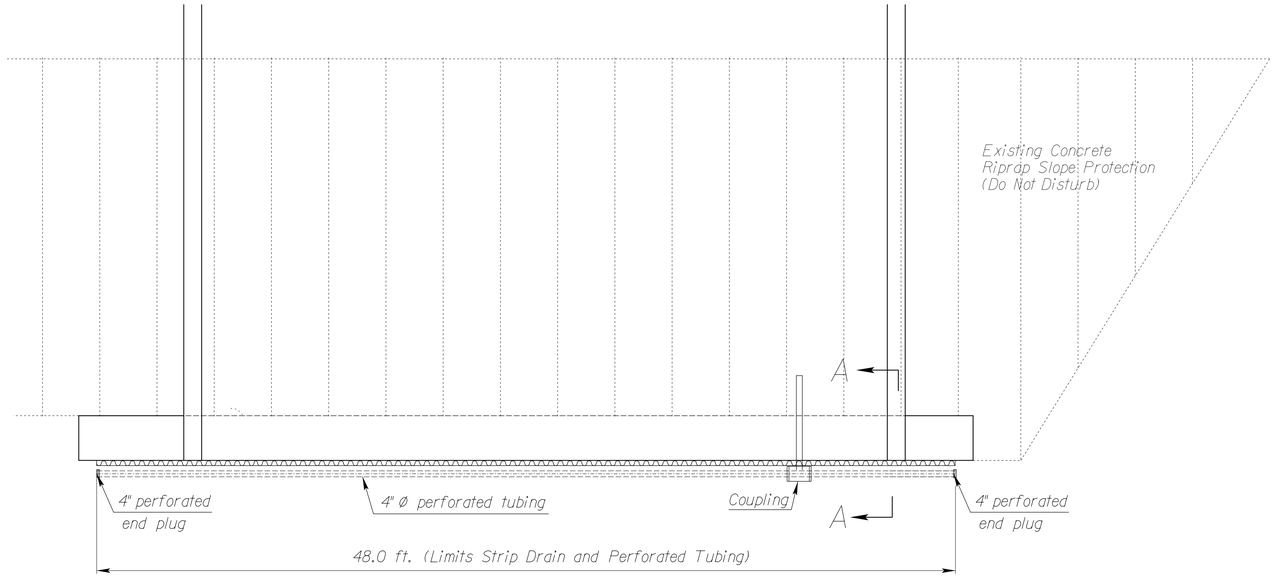
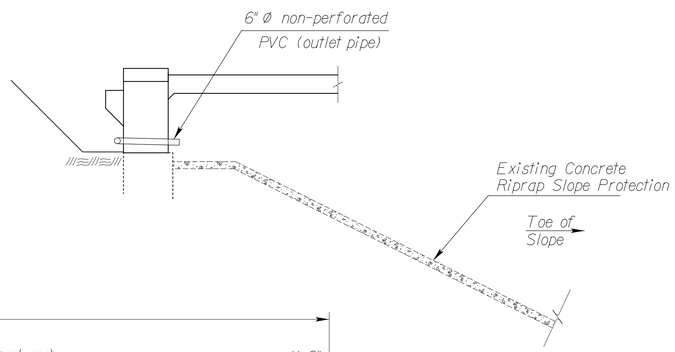
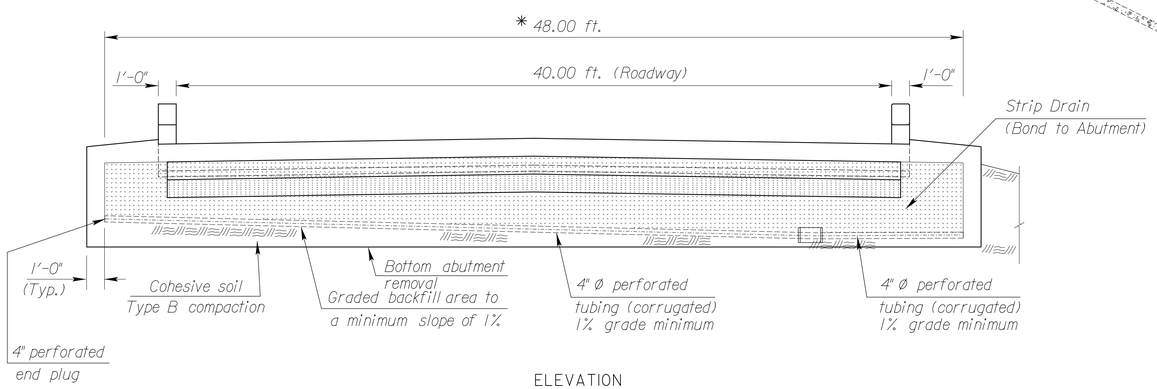
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	26	77



PLAN





ELEVATION

GENERAL NOTES

ABUTMENT STRIP DRAIN: The Bridge Contractor shall excavate to the limits shown on the Bridge Excavation sheet, grade the bottom of the backfill area, place the strip drain, and place the perforated pipe, the outlet pipe, the CMP, and the backfill.

BRIDGE BACKWALL PROTECTION SYSTEM: Apply a Bridge Backwall Protection System to the approach side of the abutments and the wings in accordance with KDOT Specifications and the manufacturer's recommendations. Cover the abutments and wings to the limits shown on the details. Prior to backfilling, repair any damage done to the system at no charge to the state.

Place perforated pipe next to the strip drain. Use non-perforated pipe outside the limits of the strip drain. Enclose the perforated pipe with the extension of the filter fabric.

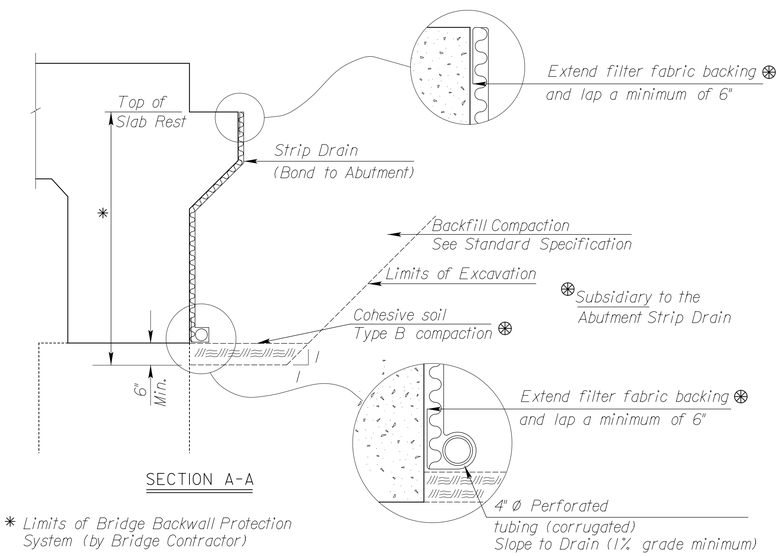
Compact the abutment backfill. See the KDOT Specifications.

Perforated pipe and non-perforated outlet pipe shall be corrugated polyethylene tubing conforming to the KDOT Specifications.

Fit the CMP end section with 1/4" galvanized mesh screen to prevent the entrance of rodents. Seal the joint between the outlet pipe and the end section with a joint sealer. Place coarse aggregate at the outlet end as shown.

Grade the bottom surface of the excavated area to drain. Backfill this area with a cohesive type soil. The soil should be a silty clay or clay under the Kansas Classification System with a minimum plasticity index of 13. Compact the material to Type B standards.

Place the outlet pipe on the downstream side of structures over streams and as shown or noted on other crossings (See the "Construction Layout" sheet).



SECTION A-A

* Limits of Bridge Backwall Protection System (by Bridge Contractor)

SUMMARY OF QUANTITIES	Abutment 1	Abutment 2	
Abutment Strip Drain	19	19	Sq. Yds.
Bridge Backwall Protection System	22	22	Sq. Yds.
			Cu. Yds.
Items Subsidiary to Strip Drain			
4" Ø Perforated Pipe	48	48	Lin. Ft.
6" Ø PVC Outlet Pipe	5	5	Lin. Ft.
Items Subsidiary to Slope Protection			

NO.	DATE	REVISIONS	BY	APP'D
3				
2	7/14/08	Change Type 'C' Compaction to 'B'	JPJ	KFH
1	4-01-04	Current release		

KANSAS DEPARTMENT OF TRANSPORTATION

BR. NO. 54-87-190.69(113) WB STA. 86+40.15

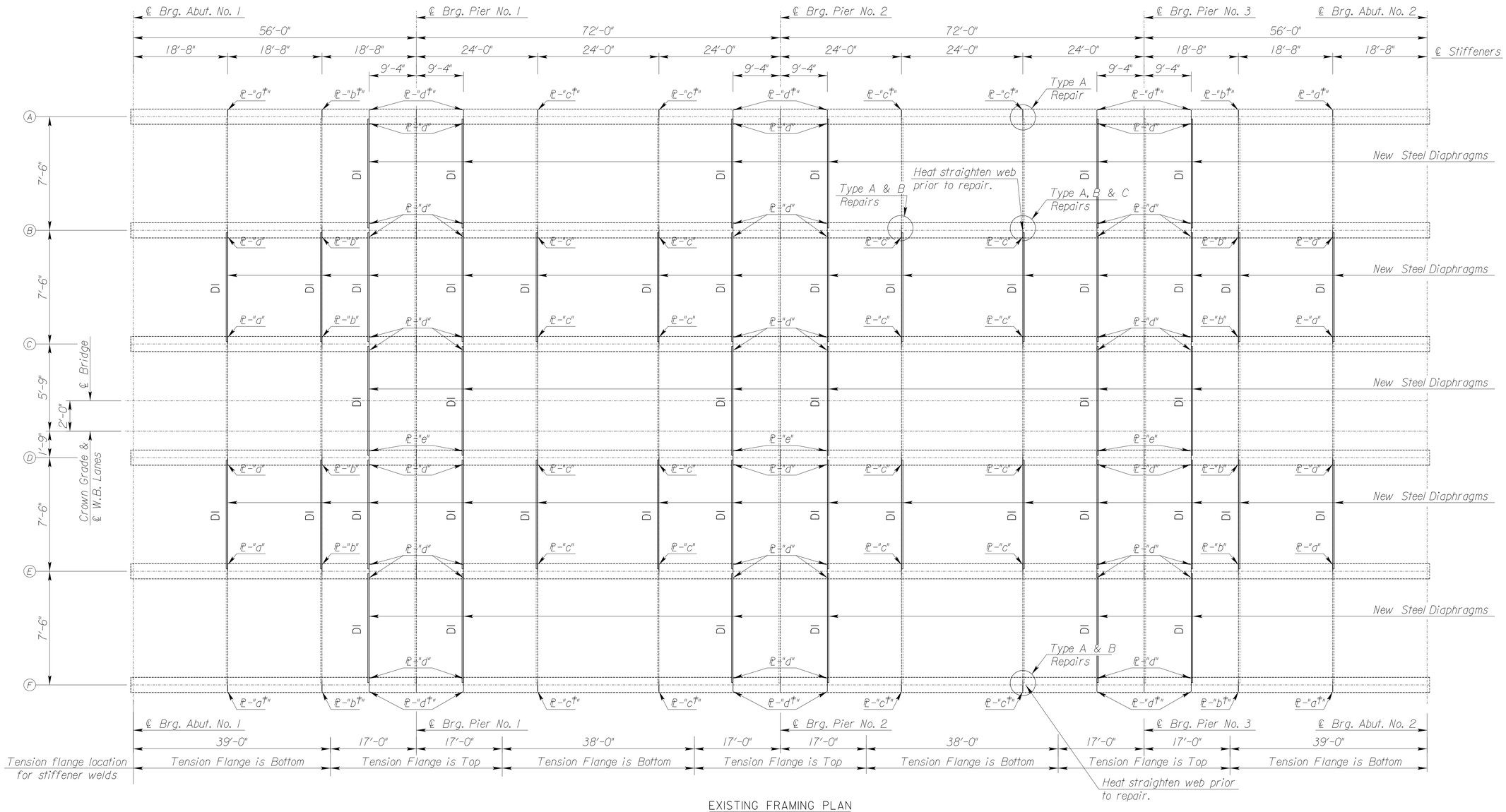
ABUTMENT
STRIP DRAIN

Proj. No. 54-87 KA-6088-01 SEDGWICK CO.

SHEET NO. OF		SCALE		APP'D	
DESIGNED		DETAILED	LRR	QUANTITIES	CADD BAF
DESIGN CK.		DETAIL CK.		QUAN. CK.	CADD CK.

Std. Base File: br104c.dgn
Plotted By: CAM
Plot Location: $UNIT$
File: Bridge Stds.dgn
Plot Date: 12/8/2021 5:46:52 PM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54–87 KA–6088–01	2022	27	77



EXISTING FRAMING PLAN

(See "Auxiliary Structural Steel Details" sheet for additional information regarding new diaphragms)

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NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

BR. NO. 54–87–190.69(113) WB STA. 86 + 40.15

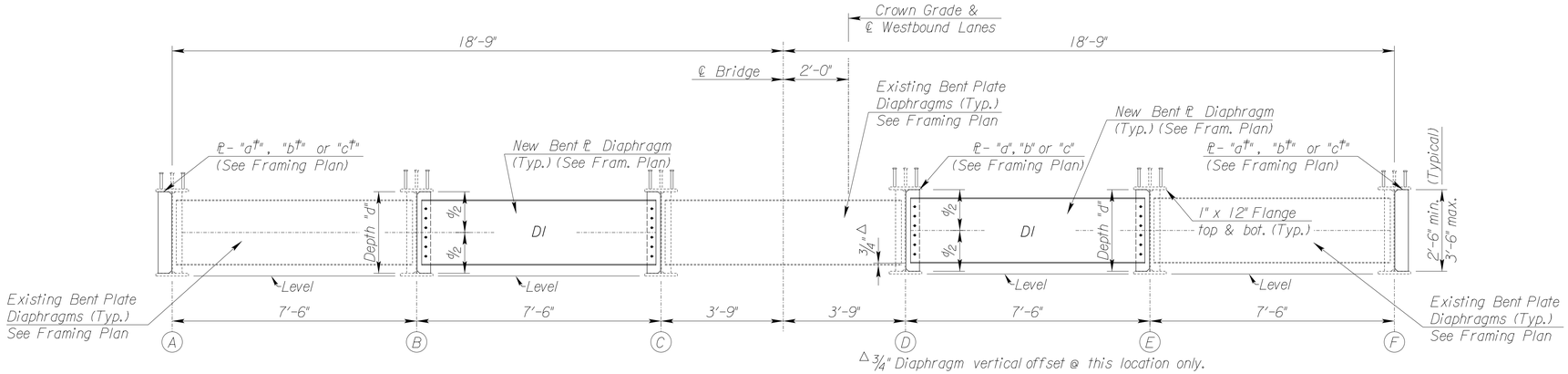
FRAMING PLAN

WESTBOUND US–54 OVER K–251 HIGHWAY

PROJ. NO. 54–87 KA–6088–01 SEDGWICK CO.

SHEET NO. OF		SCALE		APP'D	
DESIGNED	GEM	DETAILED	GWM	QUANTITIES	CADD GWM
DESIGN CK.		DETAIL CK.		QUAN. CK.	CADD CK.

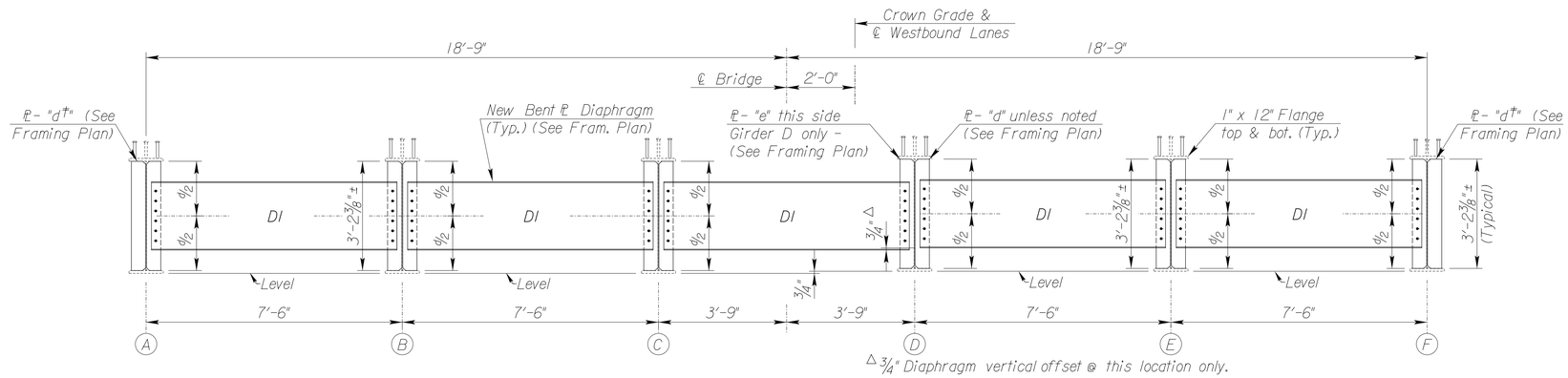
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54–87 KA–6088–01	2022	28	77



SECTION SHOWING NEW STEEL DIAPHRAGMS OPPOSITE EXISTING

(Looking Ahead on Station)

NOTE: Bolt holes in one side of the new diaphragms shall be field drilled thru the new stiffeners. Contractor may elect to field drill holes in the new stiffeners in lieu of the new diaphragms.



SECTION SHOWING ROW OF NEW STEEL DIAPHRAGMS

(Looking Ahead on Station)

(See "Auxiliary Structural Steel Details" sheet for additional information regarding new diaphragms)

SUMMARY OF QUANTITIES	
	Structural Steel
	ASTM A709 Gr. 36 (Lbs.)
Intermediate Stiffeners	2,250
Diaphragms	10,540
Totals	12,790
Welded Stud Shear Connectors	3,780 Each

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NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

BR. NO. 54–87–190.69(113) WB STA. 86 + 40.15

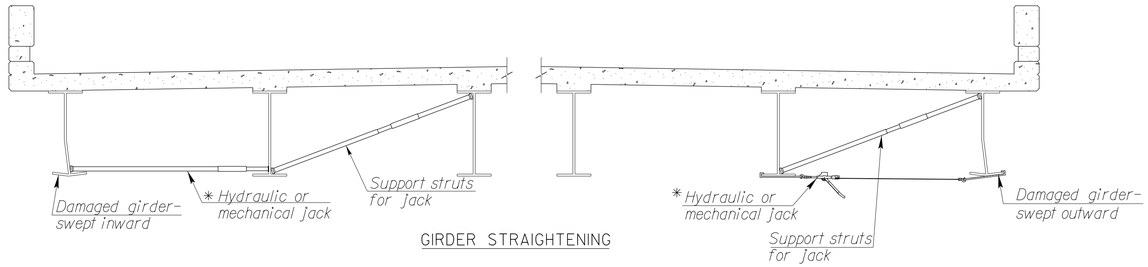
STRUCTURAL STEEL DETAILS

WESTBOUND US–54 OVER K–251 HIGHWAY

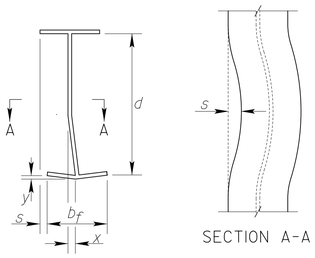
PROJ. NO. 54–87 KA–6088–01 SEDGWICK CO.

SHEET NO. OF		SCALE		APP'D			
DESIGNED	GEM	DETAILED	GWM	QUANTITIES		CADD	GWM
DESIGN CK.		DETAIL CK.		QUAN. CK.		CADD CK.	

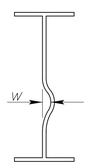
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54–87 KA–6088–01	2022	29	77



GIRDER STRAIGHTENING



SECTION A-A



REPAIR TOLERANCES

* The jacking force is limited to restraining against counter productive movement during the heating cycle. Apply only that force which produces a maximum deflection, in the cool or unheated steel, of:

$\Delta\ max = \frac{1}{(b_f/2)}\left(\frac{L}{140}\right)^2$ for 36 ksi steel, or $\frac{1}{(b_f/2)}\left(\frac{L}{120}\right)^2$ for 50 ksi steel,

where Δ max, b_f, and L are in inches.

- Do not increase the jacking force until the steel has cooled to 250° F between heats.

d = original depth of web

b_f = original width of flange

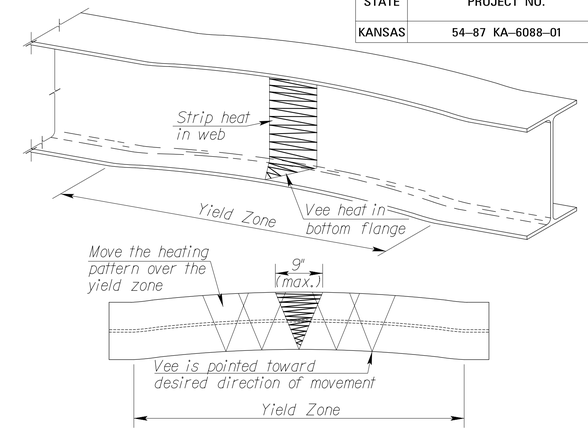
x = final displacement of web ≤ maximum of $\left(\frac{d}{100}, 1/4''\right)$

y = final displacement of edge of flange ≤ 1/4"

w = maximum final local deformation in web ≤ 1/4"

s = sweep of flange from original edge of flange ≤ 1/2" over 20 feet

L = The distance between supports, for lateral displacements the distance between the cross frame or diaphragms in place during heat straightening.



PLAN OF BOTTOM FLANGE

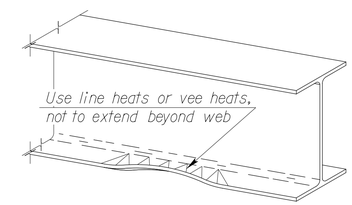
WEAK AXIS DEFORMATION

Notes:

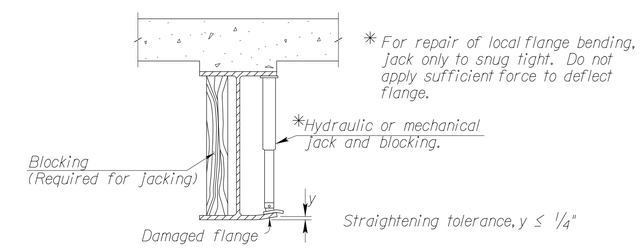
Do not heat steel above 1100° F.

Do not reheat the same area before the steel cools to 250° F.

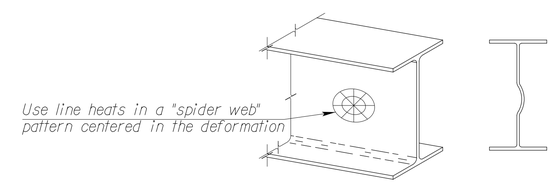
Allow the steel to cool to 250° F without using water to aid in cooling.



LOCAL FLANGE DEFORMATION

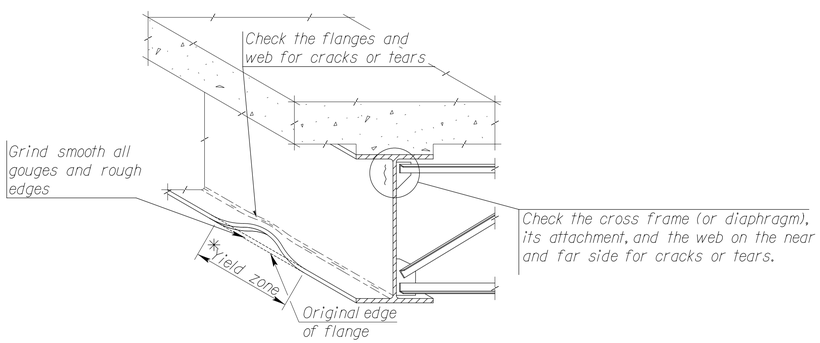


LOCAL FLANGE DAMAGE



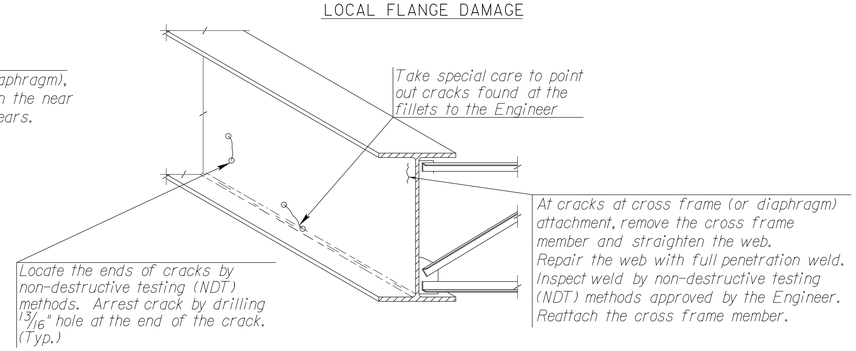
LOCAL WEB DEFORMATION

Note: Other heating patterns may be approved by the Engineer.



TYPICAL GIRDER IMPACT

*The yield zone is the section of the member in which the plastic deformation resulting from the impact has strained the steel past the elastic limit. Determined by visual inspection, noting where the curvature sharply increases.



WEB CRACKS

SEQUENCE OF WORK AT EACH LOCATION:

1) Remove cross frames (or diaphragms) as required for subsequent work.
2) Straighten member
3) Repair local web and flange damage.
4) Drill out ends of cracks.
5) Re-attach existing diaphragms that have been removed.
7) Grind out gouges and rough edges.
8) Inspect for previously unnoticed cracks and tears.
9) See KDOT Specifications

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

BR. NO. 54–87–190.69(113) WB STA. 86 + 40.15

STRUCTURAL STEEL REPAIR DETAILS

WESTBOUND US–54 OVER K–251 HIGHWAY

PROJ. NO. 54–87 KA–6088–01 SEDGWICK CO.

SHEET NO.	OF	SCALE		APP'D			
DESIGNED	GEM	DETAILED	GWM	QUANTITIES		CADD	GWM
DESIGN CK.		DETAIL CK.		QUAN. CK.		CADD CK.	

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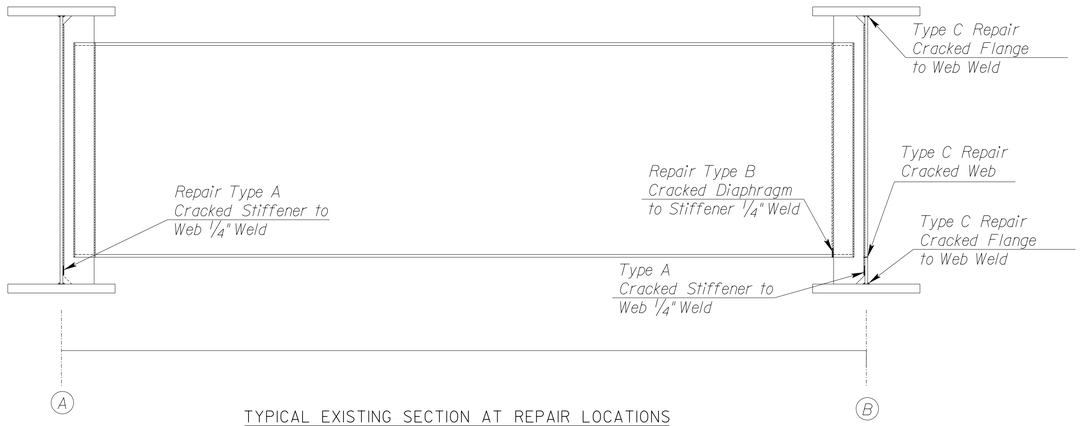
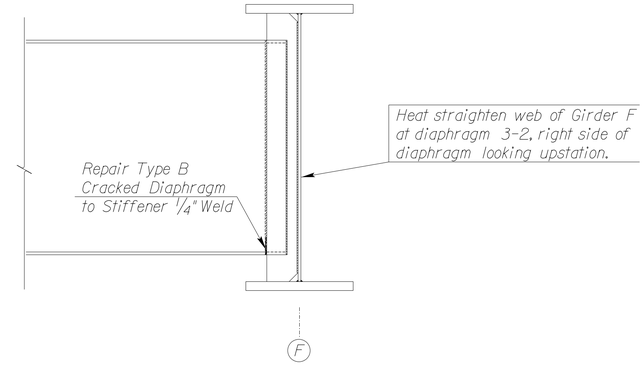
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54–87 KA–6088–01	2022	30	77



TYPICAL EXISTING SECTION AT REPAIR LOCATIONS
(Diaphragms 2-1, 3-1 and 3-2)



TYPICAL EXISTING SECTION AT REPAIR LOCATIONS
(Diaphragms 2-1 and 3-2)

GENERAL NOTES

TYPE A REPAIR - Repair of existing fillet welds that connect the stiffener to the web, use the following methods;

1) If the crack is less than 1/2" in length, remove weld and crack for 1/2", prime & paint. Blast clean and grind existing fillet weld to create a profile which is uniform in appearance.

2) If the crack is greater than 1/2" in length, remove weld and crack and replace weld to within 1/2" of top. Blast clean and grind existing fillet weld to create a profile which is uniform in appearance.

TYPE B REPAIR - Repair of existing fillet welds that connect the stiffener to the diaphragm to, use the following methods;

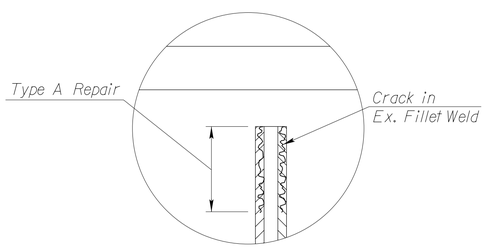
1) Remove cracked weld and replace weld to within 1/4" of edge of the diaphagm. Blast clean and grind existing fillet weld to create a profile which is uniform in appearance.

2) Straighten any bent portions of the diaphagms before repairing the weld.

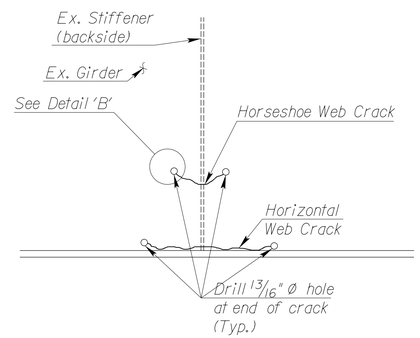
TYPE C REPAIR - Repair cracks in the web and web to flange welds cracks by the follow method;

1) Locating the ends of the cracks with liquid dye penetrant or and other approved method.

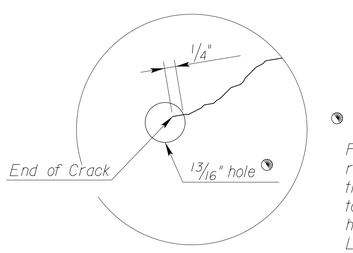
2) Drill a 13/16" hole at the ends of the crack to arrest crack growth.



DETAIL A



TYPICAL EXISTING SECTION AT REPAIR LOCATION
(Girder B - Diaphragm 3-2)



DETAIL B

For Type C Repairs require drilled holes that conflict with web to flange weld, reduce hole to 1/2" diameter. Locate crack end by using liquid dye penetrant.

SUMMARY OF QUANTITIES
(Bridge Repair)

	Unit	Br. No. 113	ID No.
Bridge Repair (Type A)	Each	4	1
Bridge Repair (Type B)	Each	3	2
Bridge Repair (Type C)	Each	3	3
Heat Straightening (Location)	Each	2	4

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION
BR. NO. 54–87–190.69(113) WB STA. 86 + 40.15

STRUCTURAL STEEL REPAIR DETAILS

WESTBOUND US–54 OVER K–251 HIGHWAY

PROJ. NO. 54–87 KA–6088–01 SEDGWICK CO.

SHEET NO.	OF	SCALE		APP'D			
DESIGNED	GEM	DETAILED	GWM	QUANTITIES		CADD	GWM
DESIGN CK.		DETAIL CK.		QUAN. CK.		CADD CK.	

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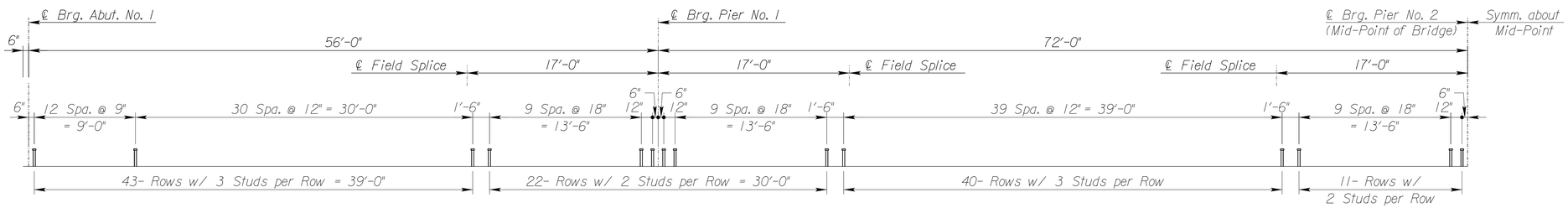
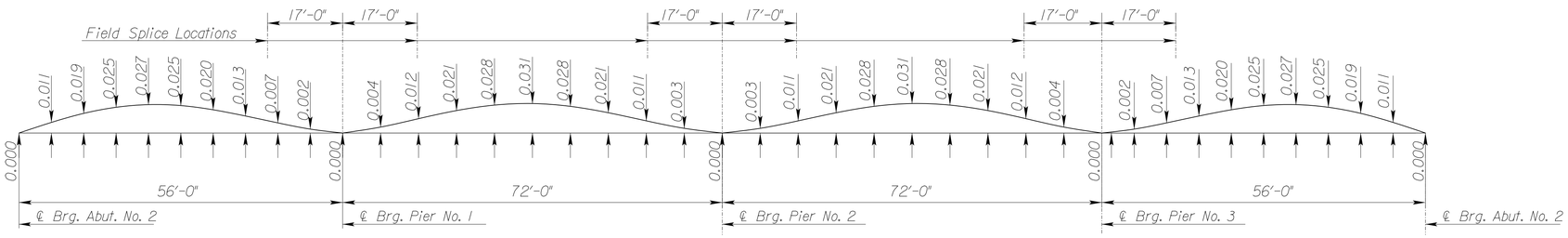
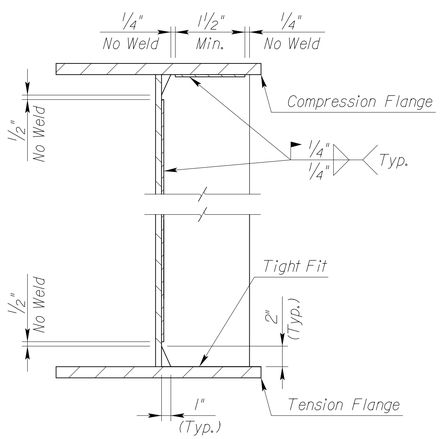
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54–87 KA–6088–01	2022	31	77



STUD SHEAR CONNECTOR SPACING



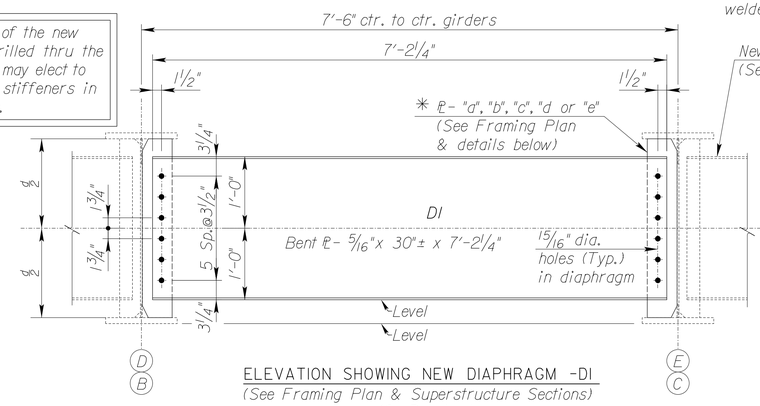
CONCRETE DEAD LOAD CAMBER DIAGRAM



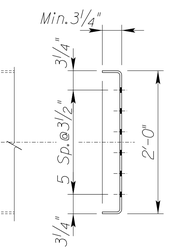
INTERMEDIATE STIFFENER DETAIL

NOTE: Bolt holes in one side of the new diaphragms shall be field drilled thru the new stiffeners. Contractor may elect to field drill holes in the new stiffeners in lieu of the new diaphragms.

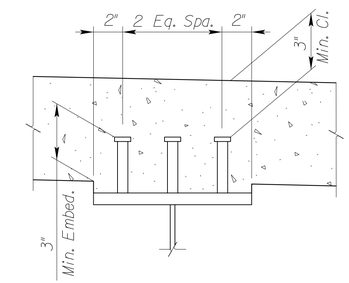
* New stiffeners are to be placed perpendicular to the top flange of existing girders and welded as shown.



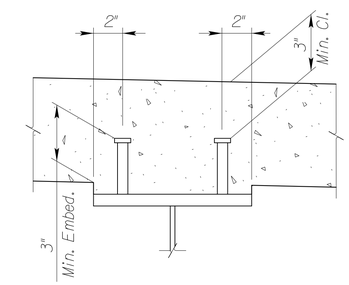
ELEVATION SHOWING NEW DIAPHRAGM -DI
(See Framing Plan & Superstructure Sections)
46- Required



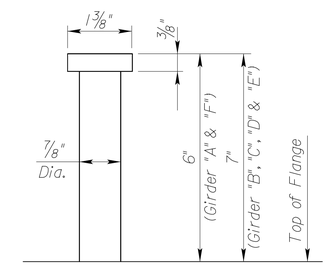
SECTION THRU NEW DIAPHRAGM



SECTION SHOWING THREE STUDS PER ROW

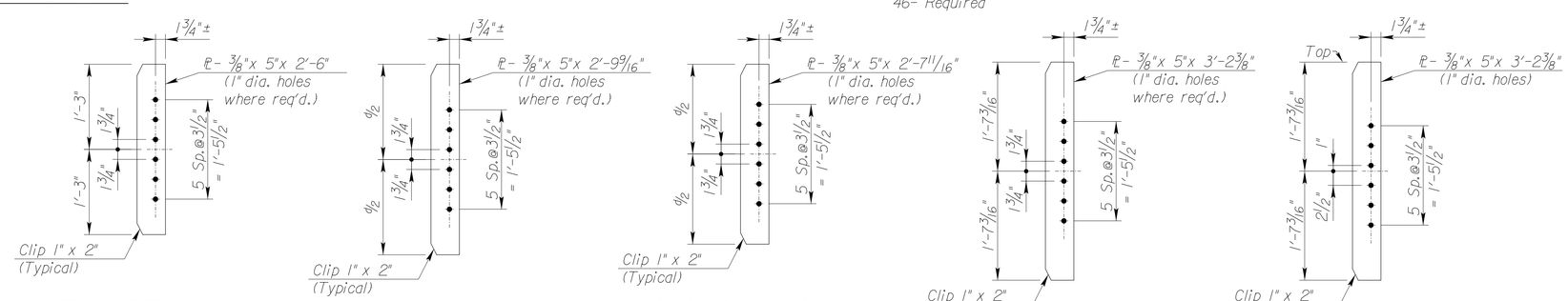


SECTION SHOWING TWO STUDS PER ROW



STUD SHEAR CONNECTOR DETAIL

Note: Dimensions of headed stud anchor may vary slightly from those shown.



DETAIL- STIFFENER ℄ "a"
(8- Required)

DETAIL- STIFFENER ℄ "a†"
(4- Required)

DETAIL- STIFFENER ℄ "b"
(8- Required)

DETAIL- STIFFENER ℄ "b†"
4- Required)

DETAIL- STIFFENER ℄ "c"
(16- Required)

DETAIL- STIFFENER ℄ "c†"
(8- Required)

DETAIL- STIFFENER ℄ "d"
(54- Required)

DETAIL- STIFFENER ℄ "d†"
(12- Required)

DETAIL- STIFFENER ℄ "e"
(6- Required)

† NOTE: Holes not required in stiffeners designated thus †

SUMMARY OF QUANTITIES	
Welded Stud Shear Connector (6")	1,260 each
Welded Stud Shear Connector (7")	2,520 each

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION
BR. NO. 54–87–190.69(113) WB STA. 86 + 40.15

AUXILIARY STRUCTURAL STEEL DETAILS

WESTBOUND US–54 OVER K–251 HIGHWAY

PROJ. NO. 54–87 KA–6088–01 SEDGWICK CO.

SHEET NO.	OF	SCALE		APP'D			
DESIGNED	GEM	DETAILED	GWM	QUANTITIES		CADD	GWM
DESIGN CK.		DETAIL CK.		QUAN. CK.		CADD CK.	

12/8/2021
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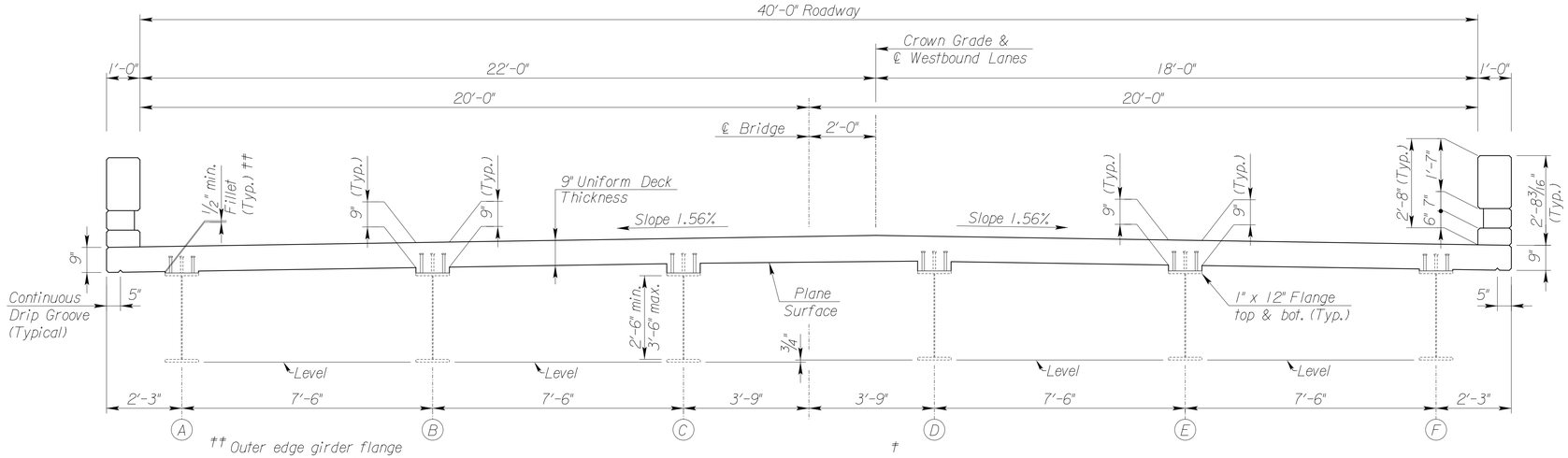
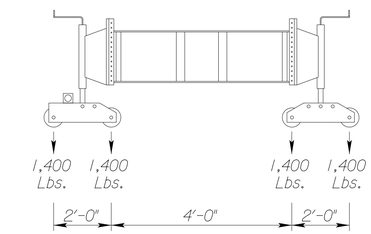
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54–87 KA–6088–01	2022	32	77

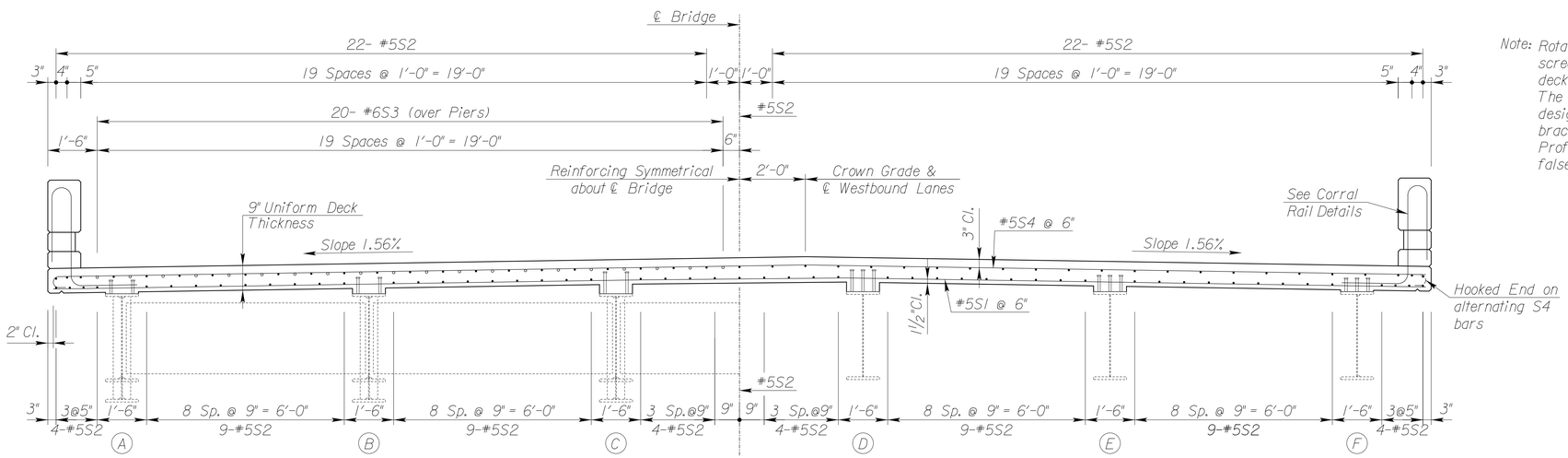


SECTION SHOWING NEW DECK
(Looking Ahead on Station)



ASSUMED FINISHING MACHINE VALUES LOADING DIAGRAM

Note: Rotation (maximum = 1°) in the exterior girder was calculated assuming screed wheel loads as shown and placed 3" beyond the outside of the deck. The maximum overhang bracket spacing was assumed at 2.0 ft. The actual screed loadings or bracket spacing will be reflected in the design calculations for a torsional analysis of the exterior girder and bracing. The design calculations shall bear the seal of a licensed Professional Engineer. Submit accourding to KDOT Specifications for falsework and formwork.



SECTION NEAR PIERS

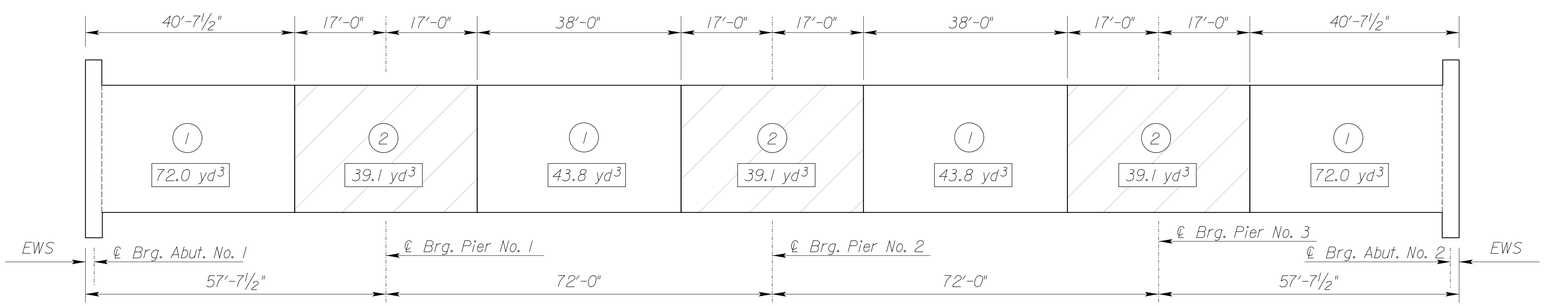
SECTION SHOWING NEW DECK REINFORCING
(Looking Ahead on Station)

SECTION NEAR MID-SPAN

CONCRETE PLACING SEQUENCE

Segmental, combined or continuous pours are allowed by an approved alternate placing sequence. Any discontinuous pour must stop at a construction joint short of a pier.

The Contractor may place the corral rail continuously from one end of the bridge to the other.



DECK POURING SEQUENCE

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

BR. NO. 54–87–190.69(113) WB STA. 86 + 40.15

SUPERSTRUCTURE DETAILS

WESTBOUND US–54 OVER K–251 HIGHWAY

PROJ. NO. 54–87 KA–6088–01 SEDGWICK CO.

SHEET NO.	OF	SCALE		APP'D			
DESIGNED	KEM	DETAILED	GWM	QUANTITIES		CADD	GWM
DESIGN CK.	YSC	DETAIL CK.	MEM	QUAN. CK.		CADD CK.	MEM

12-8-2021
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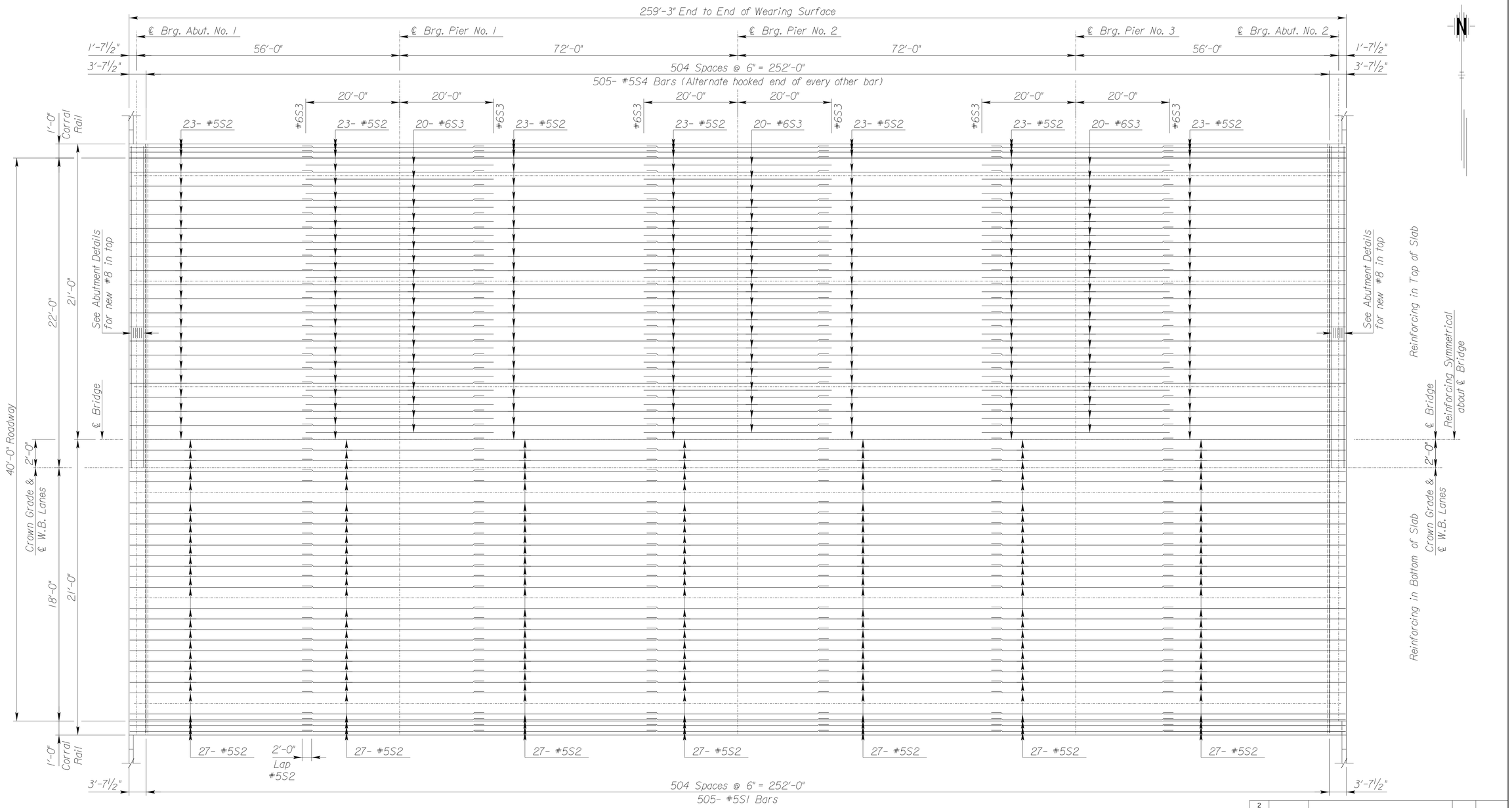
$FILES

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54–87 KA–6088–01	2022	33	77



PLAN - REINFORCING IN DECK SLAB

(See "Section thru Deck" for spacing of longitudinal reinforcing)

12/8/2021
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$FILE$

NO.	DATE	REVISIONS	BY	APP'D
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

BR. NO. 54–87–190.69(113) WB STA. 86 + 40.15

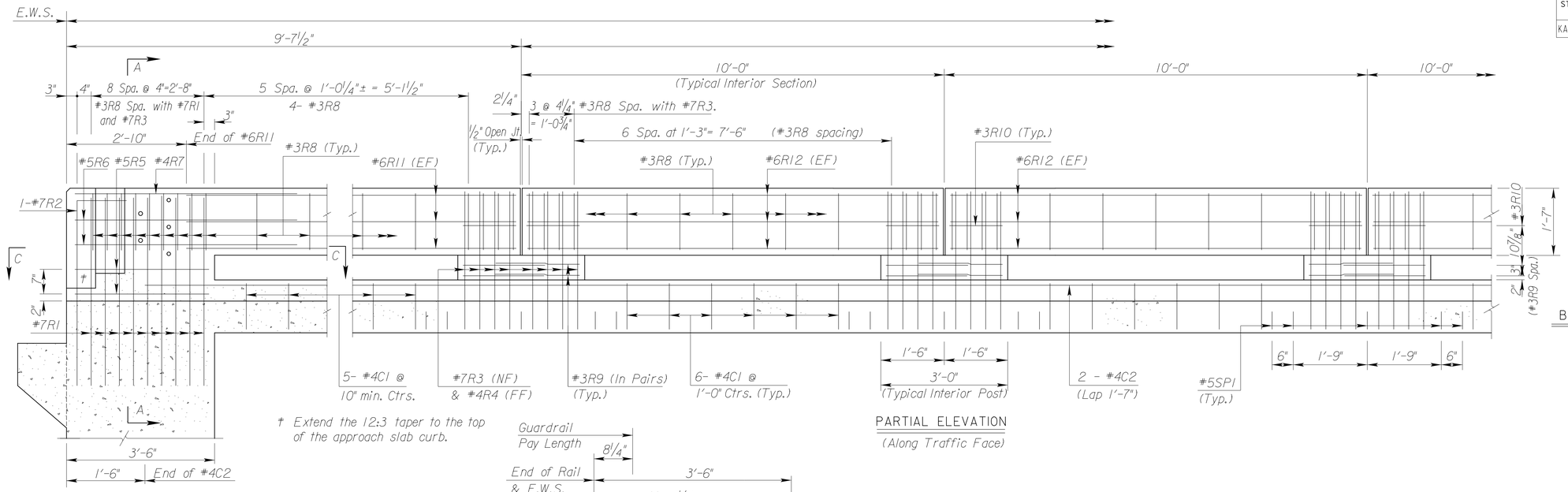
SUPERSTRUCTURE DETAILS

WESTBOUND US–54 OVER K–251 HIGHWAY

PROJ. NO. 54–87 KA–6088–01 SEDGWICK CO.

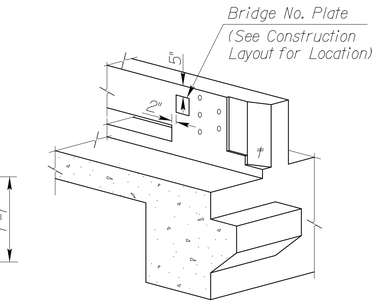
SHEET NO.	OF	SCALE		APP'D			
DESIGNED	KEM	DETAILED	GWM	QUANTITIES		CADD	GWM
DESIGN CK.	YSC	DETAIL CK.	MEM	QUAN. CK.		CADD CK.	

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	34	77

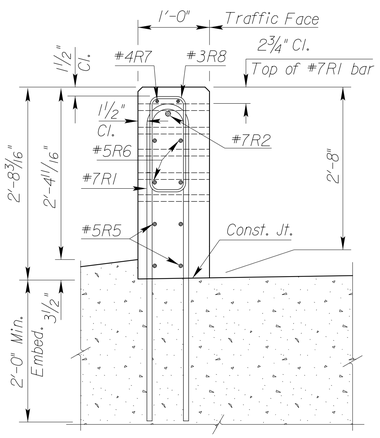


† Extend the 12:3 taper to the top of the approach slab curb.

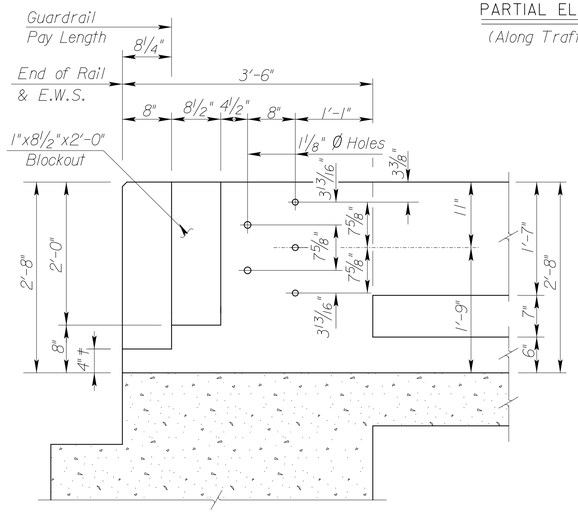
PARTIAL ELEVATION
(Along Traffic Face)



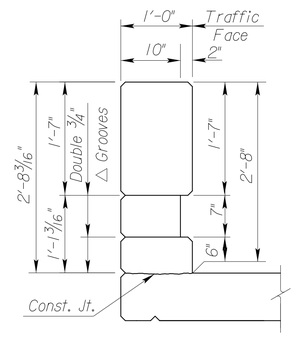
BRIDGE NUMBER PLATE PLACEMENT DETAIL



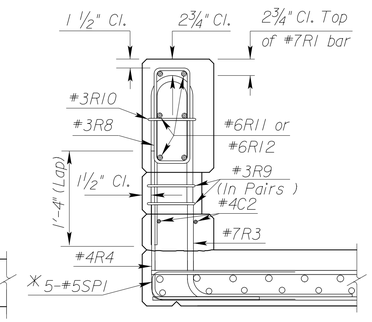
SECTION A-A



ELEVATION
(Dimensions at traffic face of rail.)

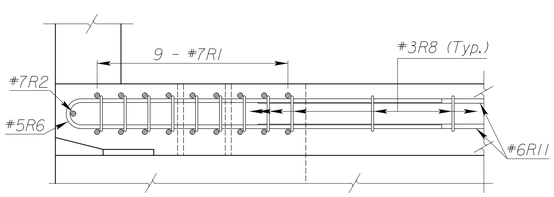


TYPICAL INTERIOR POST

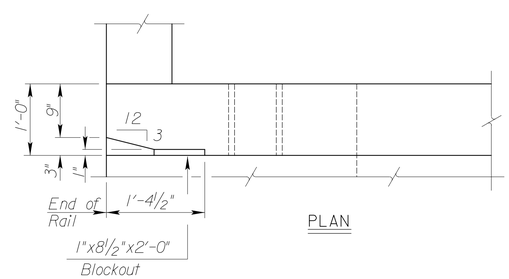


SECTION THRU POSTS

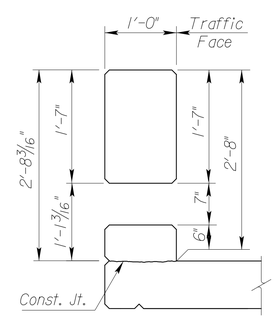
✳ The hook may be canted to provide clearance and/or fit between reinforcing.



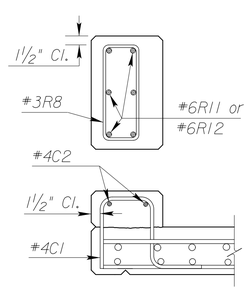
SECTION C-C



PLAN



TYPICAL SECTION BETWEEN POSTS



TYPICAL SECTION BETWEEN POSTS

NO.	DATE	REVISIONS	BY	APP'D
3				
2	1/30/2012	Clarify C2 Termination	JPJ	TLF
1	6-30-05	Current Release		

KANSAS DEPARTMENT OF TRANSPORTATION
BR. NO. 54-87-190.69(113) WB STA. 86 + 40.15

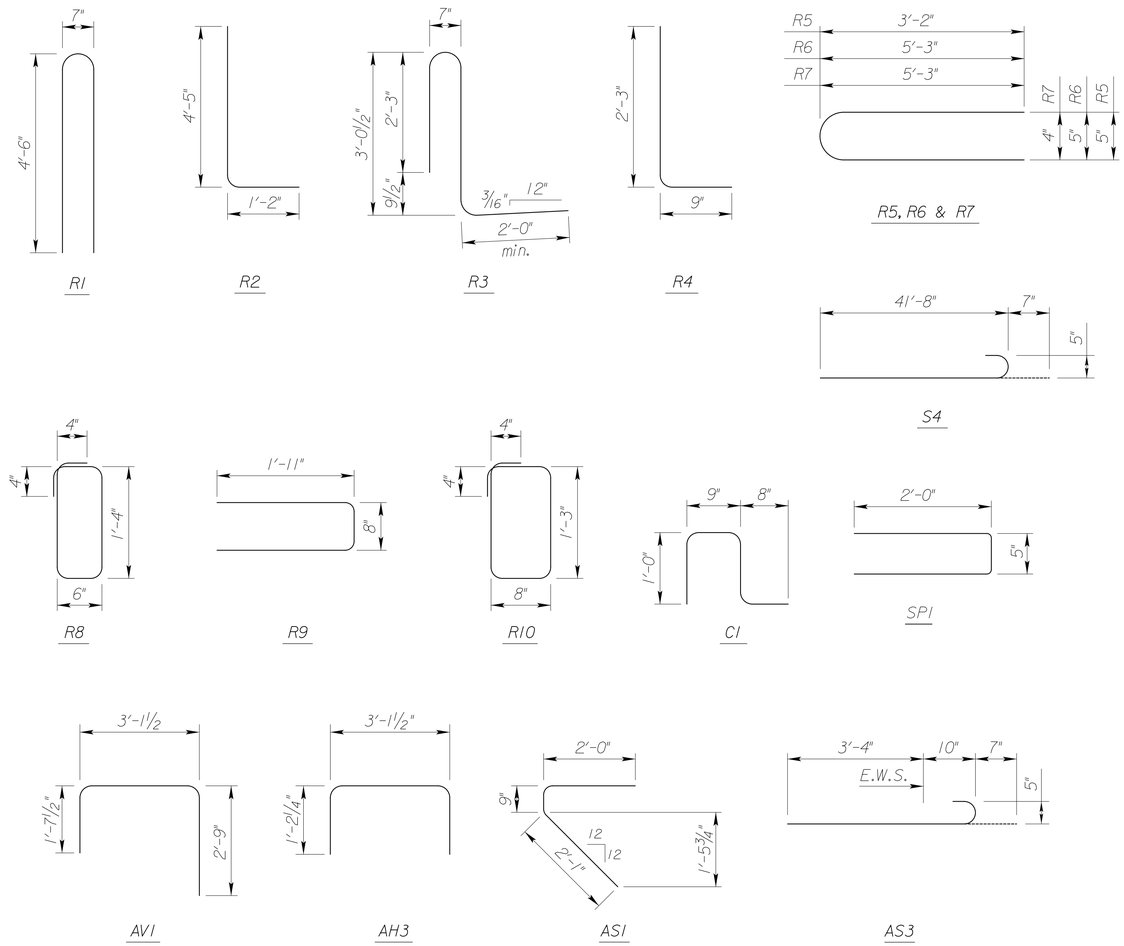
32" KANSAS CORRAL RAIL
(With Curb)

PROJ. NO. 54-87 KA-6088-01 SEDGWICK CO.

SHEET NO. OF	SCALE	APP'D	
DESIGNED	DETAILED	QUANTITIES	CADD
DESIGN CK.	DETAIL CK.	QUAN. CK.	CADD CK.

Std. Base File: br182d.dgn
Plotted By: CAM
Plot Location: $UNIT$
File: Superstructure Details.dgn
Plot Date: 12/8/2021 5:48:56 PM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	35	77



BENDING DIAGRAMS

(All dimensions are out to out of bars.)

BILL OF REINFORCING STEEL
Epoxy Coated - Grade 60

	Straight Bars				Bent Bars			
	Mark	Size	Number	Length	Mark	Size	Number	Length
Abutments	AH2	#8	14	41'-8"	AV1	#6	78	7'-6"
	AH1	#6	16	41'-8"	AS3	#5	74	4'-9"
	AS2	#4	2	40'-8"	AH3	#4	16	5'-6"
					AS1	#4	74	4'-10"
Deck	S3	#6	120	40'-0"	S4	#5	505	42'-3"
	S1	#5	505	41'-8"	LS1	#6	1	13'-7"
	S2	#5	686	38'-9"	LS2	#6	4	7'-3"
					LS3	#3	4	9'-7"
Rails	R11	#6	24	6'-8"	R1	#7	36	9'-3"
	R12	#6	288	9'-8"	R2	#7	4	5'-7"
					R3	#7	400	7'-5"
	C2	#4	32	33'-6"				
					R5	#5	8	6'-6"
					R6	#5	8	10'-8"
					SP1	#5	250	4'-5"
					R4	#4	400	3'-0"
					R7	#4	4	10'-8"
					C1	#4	308	3'-5"
					R8	#3	692	4'-4"
					R9	#3	200	4'-6"
					R10	#3	100	4'-6"

SUMMARY OF QUANTITIES

Concrete Grade 4.0 (AE) (SW) †	400.3	Cu. Yds.
Reinforcing Steel (Grade 60) (Epoxy Coated)	99,760	Lbs.
Bridge Deck Grooving	1,037	Sq. Yds.

† Includes 51.4 Cu. Yds. for Abutments
Includes 9.3 Cu. Yds. for Fillets

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION
BR. NO. 54-87-190.69(113) WB STA. 86 + 40.15

BILL OF REINFORCING STEEL
AND
BENDING DIAGRAMS

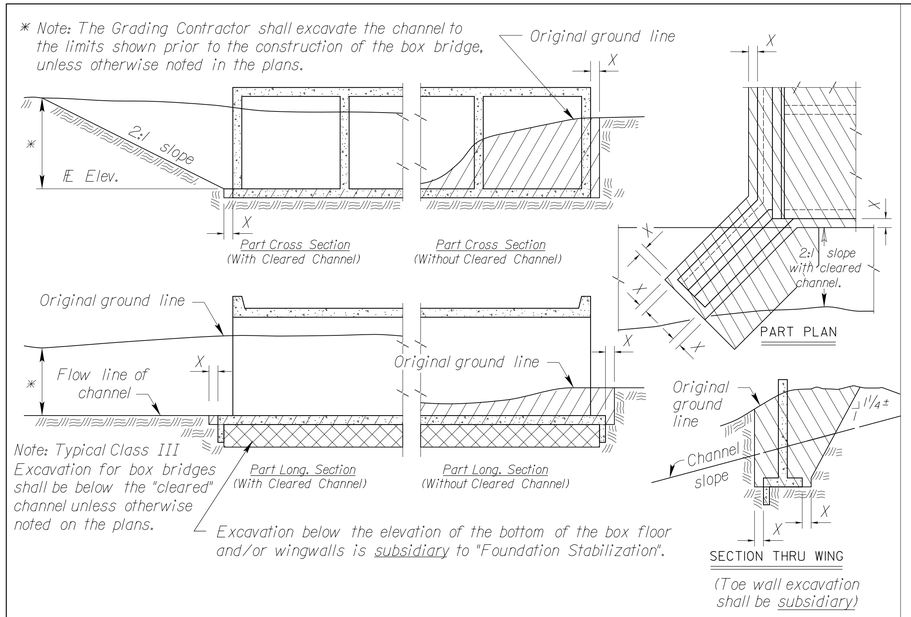
PROJ. NO. 54-87 KA-6088-01 SEDGWICK CO.

SHEET NO. OF		SCALE		APP'D	
DESIGNED	DRT	DETAILED	DRT	QUANTITIES	CADD RCJ
DESIGN CK.		DETAIL CK.		QUAN. CK.	CADD CK.

Plot 4
Longest Span Length = 56'
Total No. of Spans = 3
Railing Type = Corral
Roadway Width = 32'
Skew and Direction = 0
Loading = HL-93
Irfd\br522.dgn

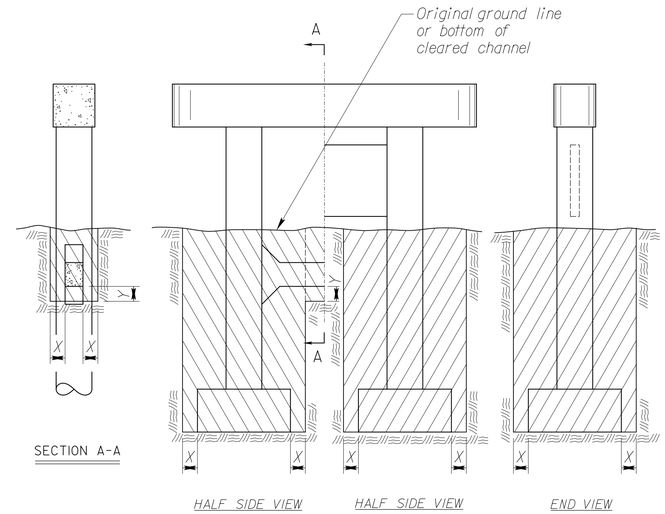
Plotted By: CAM
Plot Location: $UNIT$
File: Superstructue Details.dgn
Plot Date: 12/8/2021 5:48:56 PM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	36	77



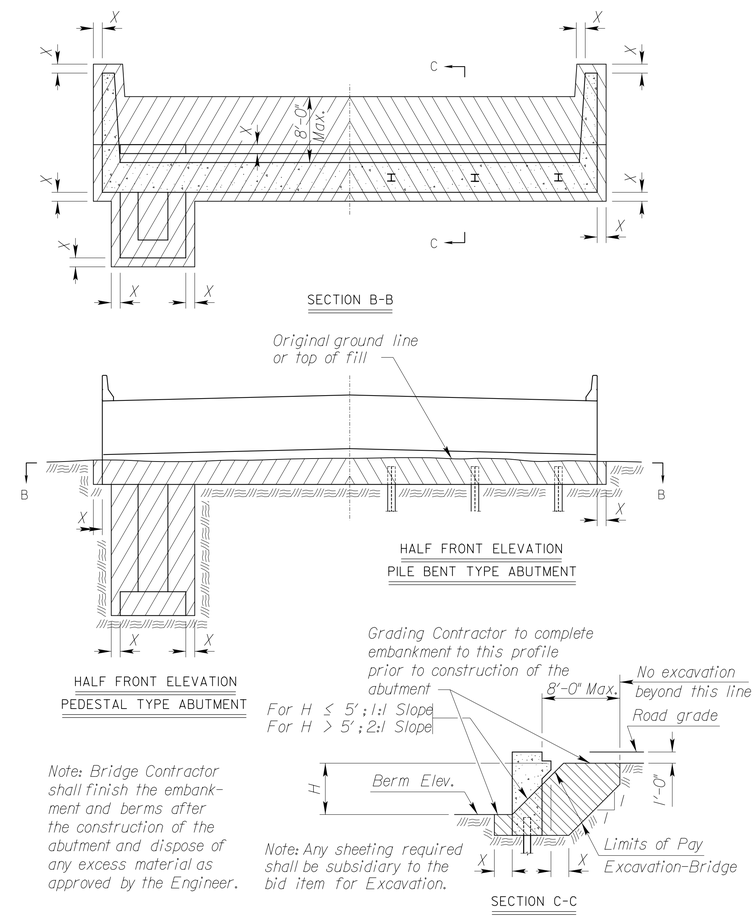
EXCAVATION DETAILS FOR REINFORCED CONCRETE BOX CULVERT

Note: Excavation for culverts less than bridge length and the additional excavation for "Embedded Structures" shall not be paid for as Class III Excavation, but shall be subsidiary to Grade 4.0 Concrete.



EXCAVATION DETAILS FOR TYPICAL PIERS

See detail when rock or shale (rock) is encountered. ⊕

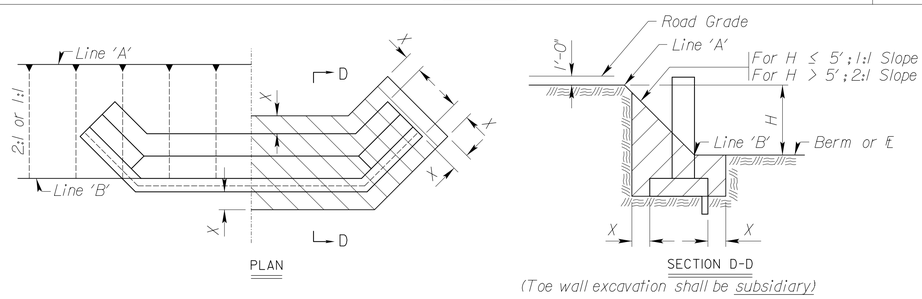


Note: Bridge Contractor shall finish the embankment and berms after the construction of the abutment and dispose of any excess material as approved by the Engineer.

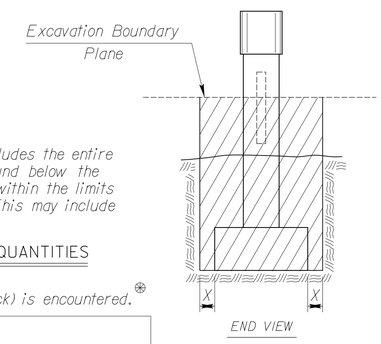
Note: Any sheeting required shall be subsidiary to the bid item for Excavation.

EXCAVATION DETAILS FOR TYPICAL ABUTMENTS

See detail when rock or shale (rock) is encountered. ⊕



EXCAVATION DETAILS FOR ABUTMENTS WITH FLARED WINGWALLS



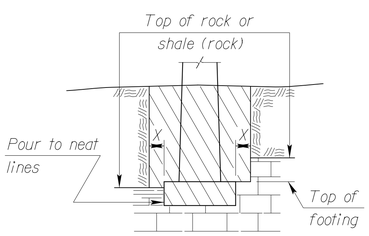
Note: Class II Excavation includes the entire volume of whatever nature found below the "Excavation Boundary Plane", within the limits specified for measurement. This may include water or air.

CLASS II EXCAVATION QUANTITIES

See detail when rock or shale (rock) is encountered. ⊕

Note: All bridge excavation shall be computed on the basis of the cross-hatch areas and boundary lines indicated on this sheet and the Excavation Boundary Plane on the Construction Layout.

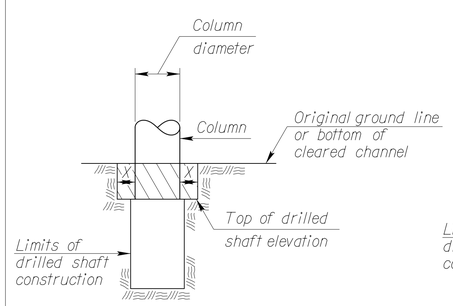
Sides of trenches in hard or compacted soil including embankments shall be shored, sheeted, braced or otherwise supported when the trench is more than 5 feet in depth and 8 feet or more in length. In lieu of the shoring, the sides of the trench above the 5 foot level may be sloped to preclude collapse. The slope for average soils shall be 1:1. If the angle of repose of the soil is less, flatter slopes shall be required.

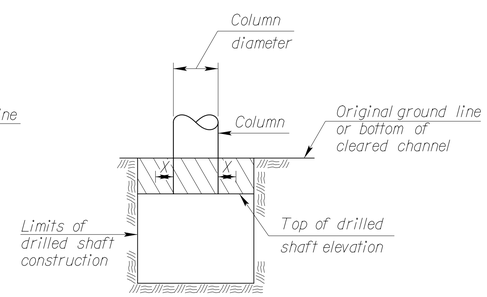


⊕ EXCAVATION DETAIL FOR FOOTINGS IN ROCK OR SHALE (ROCK)

(Piers and Abutments)

Note: Excavation below top of rock, hard shale or below top of footing, whichever is lower, shall be to neat lines of the concrete construction.





Note: Whenever the limits of the drilled shaft construction are greater than the Column Diameter + 2X, the limits of Class I, II or III Excavation shall be the limits of the drilled shaft construction. (See Detail B)

DRILLED SHAFT DETAILS

Dimension "X" shall be 2'-0" unless indicated otherwise on the general plans.

Dimension "Y" shall be 1'-6" unless indicated otherwise on the general plans.

NO.	DATE	REVISIONS	BY	APP'D
7				
6	8-15-12	Embeddement Excavation Subsidiary	JPJ	TLF
5	5-15-12	Revised Wing Excavation	JPJ	TLF
4	3-3-10	Revised Wing Excavation	JPJ	TLF
3	10-16-06	Revised "Foundation Stab." Note	JPJ	KFH
2	10-19-04	Concrete - Class to Grade	RAM	KFH
1	4-10-02	Added "Foundation Stab." Note	RAM	KFH

KANSAS DEPARTMENT OF TRANSPORTATION

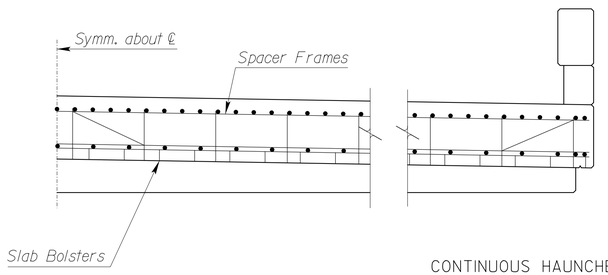
BRIDGE EXCAVATION (LRFD)

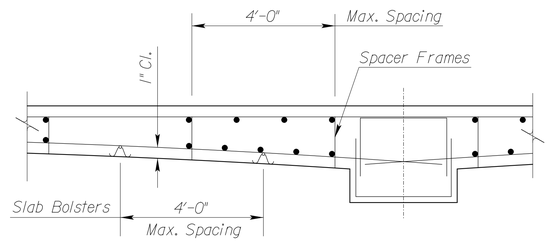
BRIOOB

FHWA APPROVAL		4/17/10 APP'D		TERRY L. FLECK
DESIGNED	DETAILED	RDR	QUANTITIES	CADD
DESIGN CK.	DETAIL CK.	LRR	QUAN. CK.	CADD CK.

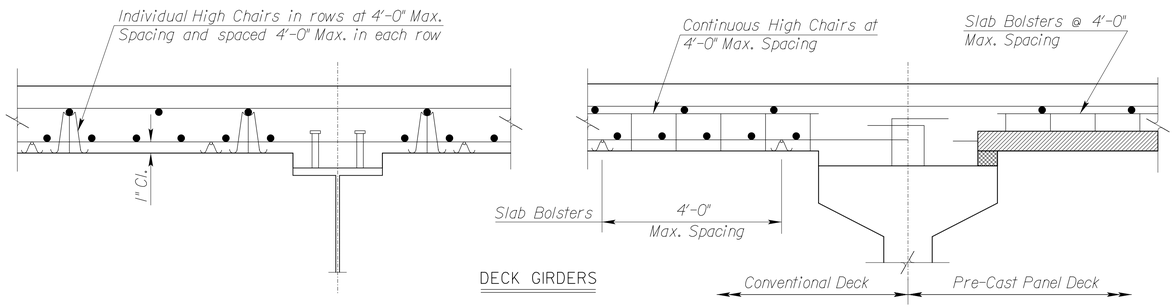
Std. Base File: br100.dgn
Plotted By: CAM
Plot Location: $UNIT$
File: Bridge Stds.dgn
Plot Date: 12/8/2021 5:48:56 PM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	37	77

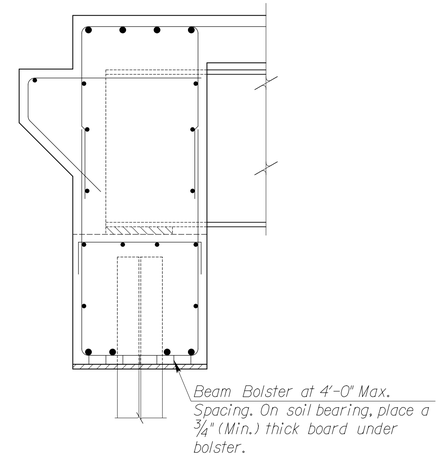




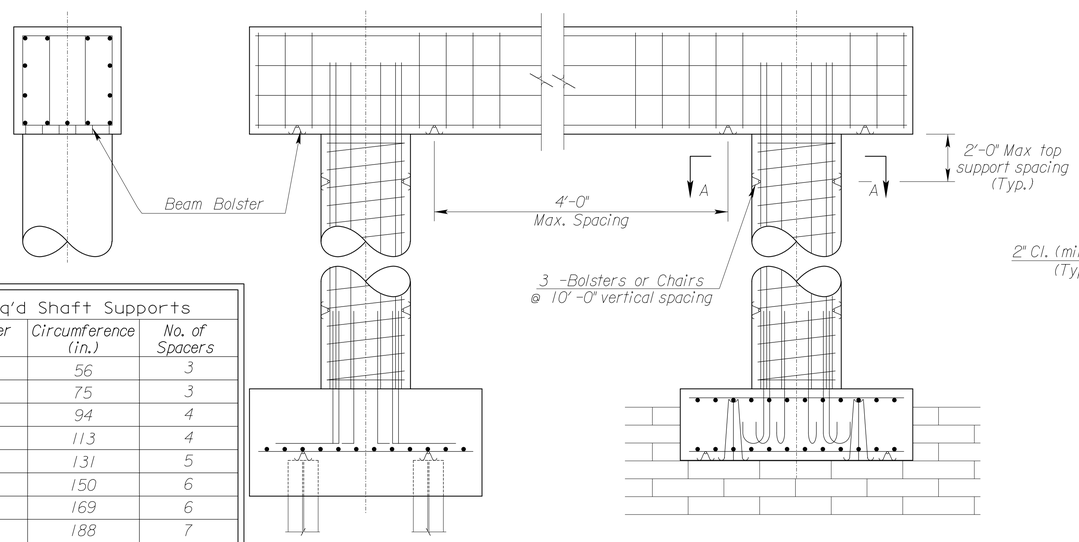
CONTINUOUS HAUNCHED SLAB



DECK GIRDERS

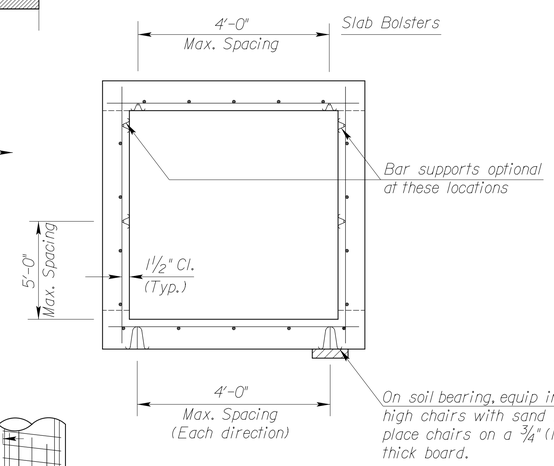


ABUTMENT

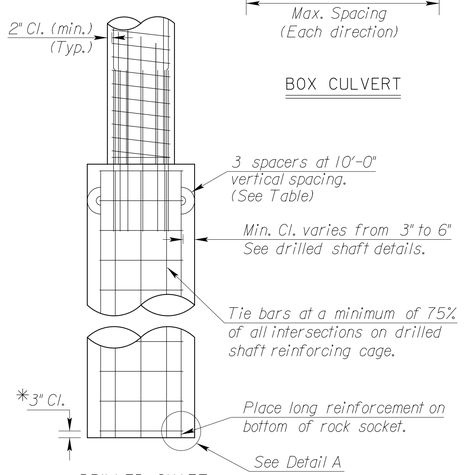


PIER

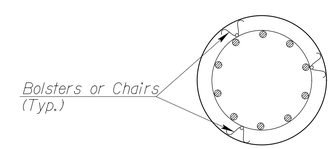
Req'd Shaft Supports		
Diameter (in.)	Circumference (in.)	No. of Spacers
18	56	3
24	75	3
30	94	4
36	113	4
42	131	5
48	150	6
54	169	6
60	188	7
66	207	7
72	226	8
78	244	9
84	263	9
90	282	10
96	301	11
102	320	11
108	339	12



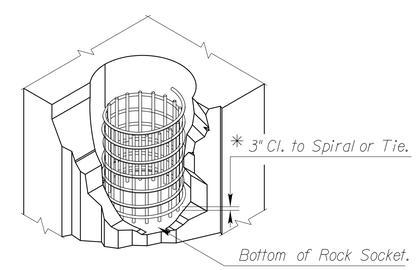
BOX CULVERT



DRILLED SHAFT



SECTION A-A



DETAIL A

* Note: Longitudinal reinforcing steel is placed on the bottom of the rock socket. Maintain 3" clearance from the bottom of rock socket to the first spiral or tie bar.

GENERAL NOTES

Reference is made to the latest edition of the CRSI "Manual of Standard Practice" for recommended industry practices concerning reinforcing steel.

Use only the following types of bar supports:

1) Wire Bar Supports:

a) Epoxy coated reinforcing: Class 1 Protection
b) Non-epoxy coated reinforcing: Class 1, 2, or 3 Protection

2) Plastic Bar Supports

3) Supplementary bars

When securing epoxy coated reinforcement, use tie wires or metal clips that are epoxy or plastic coated.

Do not weld reinforcing steel to bar supports or to other reinforcing steel. Shop weld spacer frames for haunched slabs.

Tie bars at all intersections around the perimeter of each mat and at not less than 2'-0" centers or at every intersection, whichever is greater.

Where more than one length of bar support is required, lap the end legs so they are locked or tied together.

Use proper height supports to maintain the distance between the reinforcing and the formed surface or the top surface of deck slabs within 1/4" of that indicated on the plans.

Spacings shown are maximums. Use sufficient supports, as determined by the Engineer, to retain the reinforcing steel in position.

Construct any platforms, required for the support of workers and/or equipment during concrete placement, directly on the forms and not on the reinforcing steel.

Designs and arrangements of Supports or Spacers other than as shown on this sheet, may be used with the permission of the Engineer.

NO.	DATE	REVISIONS	BY	APP'D
5	11-10-10	Column Bar Supports Req'd	JPJ	TLF
4	12-01-05	Drilled Shaft Spiral Steel Placement	JPJ	KFH
3	8-21-00	Added Pre-Cast Panel Detail	RAM	KFH
2	12-20-99	Added Haunched Slab Bolsters	RAM	KFH
1	12-09-99	Revised Drilled Shaft Clearance	RAM	KFH

KANSAS DEPARTMENT OF TRANSPORTATION

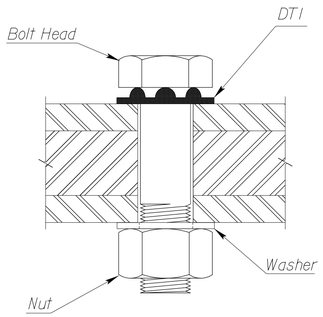
SUPPORTS AND SPACERS FOR REINFORCING STEEL

BRI20

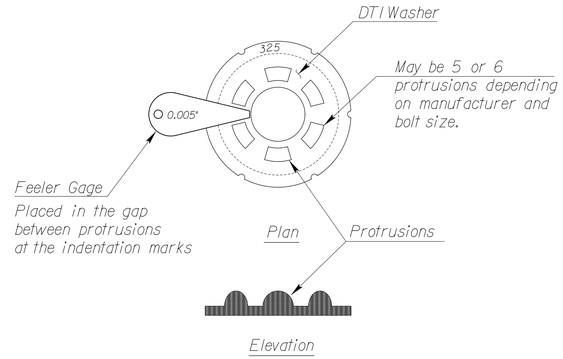
FHWA APPROVAL		11-17-10	APP'D	Terry L. Fleck	
DESIGNED	RAM	DETAILED	RAA	QUANTITIES	CADD RAA
DESIGN CK.	LRR	DETAIL CK.	RAM	QUAN.CK.	CADD CK. RAM

Std. Base File: bri20.dgn
Plotted By: CAM
Plot Location:
File: Bridge Stds.dgn
Plot Date: 12/8/2021 5:48:57 PM

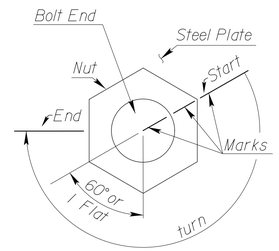
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	38	77



TYPICAL BOLT AND DIRECT TENSION INDICATOR (DTI)

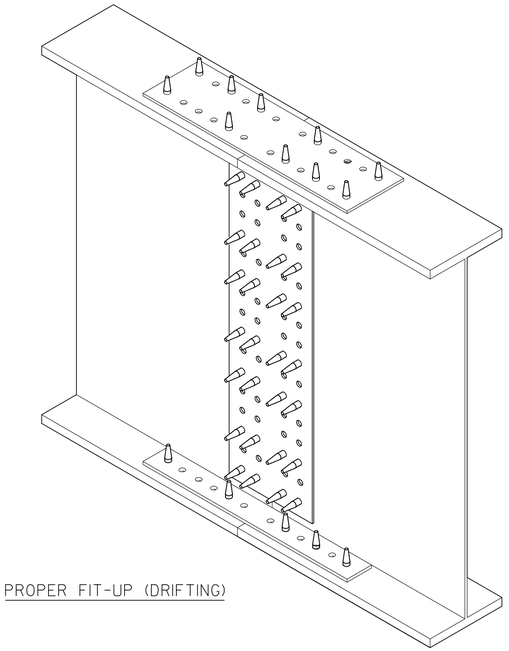


TYPICAL DIRECT TENSION INDICATOR (DTI)



REQUIRED MARKING DETAIL

(shows calibrated turn = 3½ flats from snug tight condition). Example only, calibrated turn may be more or less than shown.



PROPER FIT-UP (DRIFTING)

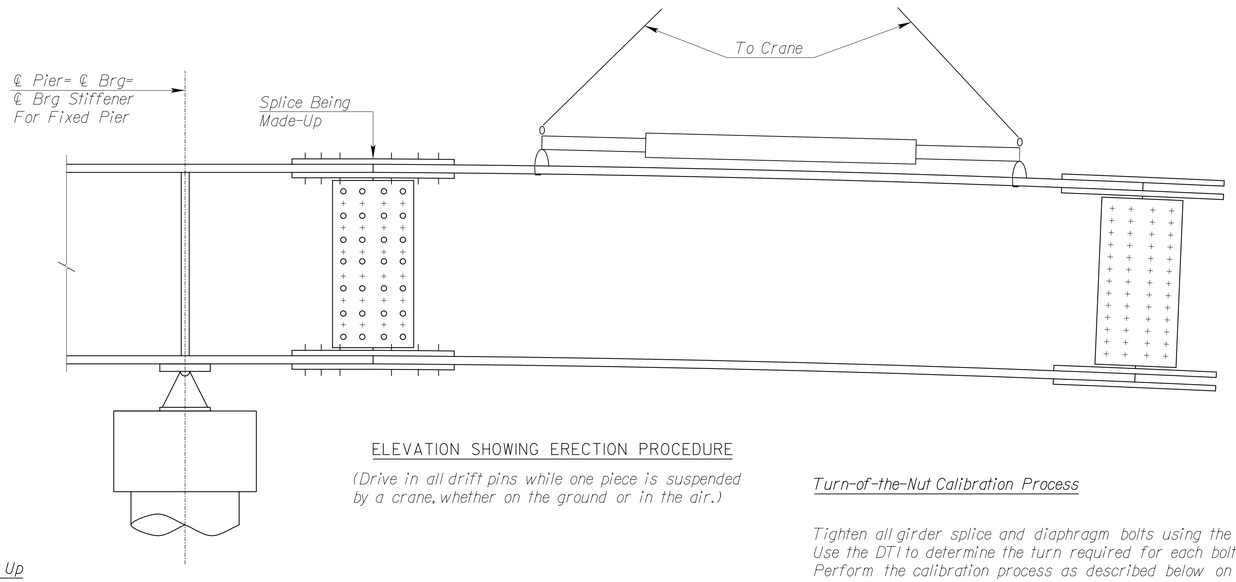
Production Bolt Tightening

1. Install bolts and tighten to "snug tight" in a pattern, starting at the center of the splice and working toward the edge. On large girders this may have to be done twice, as the center bolts will become loose as plates are "ironed out". This step is important because typically, any variation in results during production bolting is the result of a change in the materials, lubricant or equipment used to take the bolts to a "snug tight" condition during the calibration process.

2. Mark all of the bolts, nuts and the plate as shown in the marking detail. Mark the socket with a start and stop point. The stop point corresponds to the target rotation determined earlier.

3. Align the start mark on the socket with the line on the plate. While the bolt is being backed up, turn the nut until the stop mark on the socket lines up with the start mark on the plate.

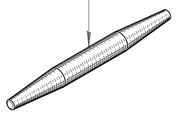
4. Repeat with all bolts of the same length in the splice.



ELEVATION SHOWING ERECTION PROCEDURE

(Drive in all drift pins while one piece is suspended by a crane, whether on the ground or in the air.)

Drift Pin Diameter = Hole Diameter
Hole Ø = 15/16" for girder splice
Hole Ø = 13/16" for X-frame or diaphragm connection.



DRIFT PIN

Acceptance and Rejection of Bolts

1. The Engineer will check all bolts with a feeler gage.

2. All nuts must be turned at least the target rotation beyond "snug tight".

3. All DTI's must have at least 3 refusals of the 0.005" gage.

4. If all gaps refuse the 0.005" gage, and the nut, plate and bolt are not marked, reject the bolt.

5. If all gaps refuse the 0.005" gage, and the turned element has not been rotated more than 45° beyond the calibrated turn, accept the bolt.

6. If all gaps refuse the 0.005" gage, and the turned element has been rotated more than 45° beyond the calibrated turn, reject the bolt.

For additonal information see the structural steel section of the Bridge Construction Manual.

Suggested Impact wrench models:
CP 611
IR 2940
Cleco WS2110
ATP 1011/1040
Norbar PT1500

Fit Up

During the fit up, install drift pins in all corner bolt holes, plus 25 percent of the bolt holes (as a min.), evenly distributed throughout the splice. Fill at least 25 percent of the bolt holes with high strength bolts. Fully tighten these bolts by the calibrated turn-of-the-nut method before removing any drift pins or moving the members. These bolts may be either erection bolts or production bolts. Erection bolts are used during fit up, to compress the plies of the splice to achieve a snug condition. Erection bolts are the property of the Contractor and do not remain in the bridge permanently. Erection bolts must be A325, and can be reused. Erection bolts are required when the abutting plates are of different thickness and no fill plate is provided. This situation usually results in a slight bending of the splice plates. If erection bolts are not used, the DTI's may fully compress before the plates are in firm contact. This would be cause for rejecting the splice. Clearly mark the erection bolts so that they are not left in the splice.

Erection

Two independent crews will survey the bearing seat elevations. The Engineer will verify that the results of those surveys show that the bearing seat elevations are within ± ¼ inch of the plan elevations before erection begins. Use the blocking diagram, as shown on the shop drawings, when erecting the beams/girders on the ground. Do not lift the assembled pieces into position until at least 25 percent of the holes are filled with fully tightened bolts. Locate the centerline of the bearing stiffener with the centerline of bearing device. Secure the beams/girders to the top of the pier cap prior to placement of the bearing device anchor bolts.

Turn-of-the-Nut Calibration Process

Tighten all girder splice and diaphragm bolts using the calibrated turn-of-the-nut method. Use the DTI to determine the turn required for each bolt diameter & length. Perform the calibration process as described below on the actual beam splice or using 3 plies of steel plate with the same thickness as the actual splice.

1. Bring at least 25 percent of the bolts in the splice to a "snug-tight-condition". "Snug tight condition" is defined as (with all plies in firm contact) "the full effort of a man on a spud wrench". Usually a smaller impact gun (½" drive) is used to snug the splice and a larger impact gun (1" drive) is used for final tigntening. This is preferred over the use of a spud wrench. Production bolting and calibration must use the same tools and lubricating procedures. If an impact wrench is used to "iron the plates" and snug the bolts for calibration, then an impact wrench must be used during the snugging process during production bolting.

2. See "Required Marking Detail" (choose a bolt at the center of the splice and recheck snug on adjacent bolts)
   a. Mark the outside of the socket at one of the corners.
   b. Mark the bolt, plate, and nut at a corner with a start line.
   c. Align the mark on the socket with the start mark on the bolt end.
   d. While holding a backup wrench on the head of the bolt, turn the nut ½ turn (3 flats).
   e. Record the number of refusals.
   f. If all of the gaps refuse, go to another bolt and turn the nut 2 flats (1/3 turn).
   g. If there are fewer than 3 refusals turn the nut an additional ¼ of a flat (15 degrees).
   h. Repeat step g, turning the nut 1/3 of a flat or less each time, until all of the gaps refuse the feeler gage. Record the amount required to cause all of the gaps to refuse the feeler gage. This is the target rotation.

3. Repeat this process for each bolt diameter and length.

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1	04/25/05	Current Release	RAM	KFH

KANSAS DEPARTMENT OF TRANSPORTATION

STEEL ERECTION, FIT-UP AND BOLTING PROCEDURE

SHEET NO. OF	SCALE	APP'D	
DESIGNED	DETAILED	QUANTITIES	CADD
DESIGN CK.	DETAIL CK.	QUAN. CK.	CADD CK.

Plotted By: CAM | Plot Location: $UNIT$
File: Bridge Stds.dgn
Plot Date: 12/8/2021 5:48:57 PM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	39	77

DRAINAGE STRUCTURES

STATION	SIDE	SIZE	TYPE	Gr. 4.0 CONC. (Cu.Yds.)	REINF. STEEL (LBS.)	CROSS ROAD PIPES (CSP) 18"	CROSS ROAD PIPES (RCP) 36"	SLOTTED DRAIN (CSP) 18"	STORM SEWER PIPES	END SECTIONS (RC) TYPE I LT.	END SECTIONS (RC) TYPE I LT.	END SECTIONS (RC) TYPE I (RCHE) LT.	END SECTIONS (RC) TYPE I (RCHE) RT.	END SECTIONS (CS) TYPE I LT.	END SECTIONS (CS) TYPE I RT.	END SECTIONS (CS) TYPE III LT.	END SECTIONS (CS) TYPE III RT.	END SECTIONS (CS) TYPE IV LT.	END SECTIONS (CS) TYPE IV RT.	END SECTIONS (CS) TYPE IV Slope	REMARKS
70+00 to 73+10	℄	18" (CMP)	Cross Road Pipe			85		225										1	1		Place in median to drain from east to west
101+25 TO 103+75	℄	18" (CMP)	Cross Road Pipe			70		255											1		Place in median to drain from west to east
			Totals			155'		480'										1	2		

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

SUMMARY OF DRAINAGE STRUCTURES

~~RD049~~

FHWA APPROVAL	5-28-08	APP'D. James O. Brewer	
DESIGNED	DETAILED	QUANTITIES	TRACED B.N.B.
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK. S.W.K.

Drawn By : CAM
File : summary of quantities.dgn
Plotted : 12/8/2021 5:48:58 PM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	40	77

Removal of Existing Structure†† (For Information Only)

Sta. 86+40.15 - Bridge No. 54-87-190.69(113)
Remove existing bridge rail, concrete deck and designated portions of both abutments.

Sta. 87+82.78, 24' Lt. - Remove existing concrete flume inlet and concrete slope drain.

Sta. 87+82.78, 64' Lt. - Remove existing concrete flume inlet and concrete slope drain.

Sta. 105+90, 19' Lt. - Remove traffic sign and post.

†† Any structure or item not specifically listed that interferes with new construction shall be removed. This work is subsidiary to the bid item Removal of Existing Structures.

GUARDRAIL, STEEL PLATE (MGS)

STATION	SIDE	QUANTITY (Lin. Ft.)	Alt. #1 (MGS-SRT) (Each)	Alt. #1 (MGS-FLEAT) (Each)
Sta. 87+69.09 to Sta. 90+22.09	Rt.	212.5	1	1
Sta. 87+69.09 to Sta. 88+84.55	Rt.	75.0	1	1
TOTAL		287.5	2	2

GUARDRAIL, REMOVAL AND RECONSTRUCTION OF STEEL PLATE

STATION	SIDE	QUANTITY (Lin. Ft.)		
Sta. 87+69.09 to Sta. 88+24.69	Lt.	55.6		
Sta. 87+69.09 to Sta. 88+12.19	Lt.	43.1		
TOTAL		98.7		

Ø GUARDRAIL, REMOVAL OF STEEL PLATE

STATION	SIDE	QUANTITY (Lin. Ft.)		
Sta. 87+69.09 to Sta. 90+22.09	Rt.	253.1		
Sta. 87+69.09 to Sta. 88+84.55	Rt.	115.6		
TOTAL		368.7		

ØStockpile on the right of way for removal by KDOT forces.

CONCRETE PAVEMENT (11" UNIF.)(AE)(NRDJ)

Sta. to Sta.	Quantity (Sq. Yds.)
Sta. 84+28.53 to Sta. 84+77.53	217.8
Sta. 88+02.78 to Sta. 88+51.78	217.8
Total	436

CONCRETE PAVEMENT (11" UNIF.)(AE)(BR. APP.)

Sta. to Sta.	Quantity (Sq. Yds.)
Sta. 84+77.53 to Sta. 85+10.53	148.1
Sta. 87+69.78 to Sta. 88+02.78	148.1
Total	296.2

NOTE: Concrete pavement thickness has been increased to compensate for the grade transition and material losses from removal. Any additional concrete required beyond the nominal pavement thickness is subsidiary to that bid item.

BRIDGE APPROACH SLAB FOOTING

Sta. to Sta.	Quantity (Cu. Yds.)
Sta. 84+77.53 to Sta. 85+10.53	23.7
Sta. 87+69.78 to Sta. 88+02.78	23.7
Total	47.4

FLUME INLET (CONCRETE)

Sta., Offset	Quantity (Each)
Sta. 87+82.78, 24' Lt.	1
Sta. 87+82.78, 64' Lt.	1
Total	2

SLOPE DRAIN (CONCRETE)

Sta., Offset	Quantity (Lin. Ft.)
Sta. 87+82.78, 24' Lt.	8
Sta. 87+82.78, 64' Lt.	8
Total	16

RECAPITULATION OF ROAD QUANTITIES

ITEM	QUANTITY	UNIT
Contractor Construction Staking	L.S.	Lump Sum
Field Office and Laboratory (Type C)	1	Each
Mobilization	L.S.	Lump Sum
Mobilization (DBE)	L.S.	Lump Sum
Removal of Existing Structures	L.S.	Lump Sum
Foundation Stabilization (Set Price)	1	Cu. Yd.
Concrete for Seal Course (Set Price)	1	Cu. Yd.
Curing Environment	L.S.	Lump Sum
Clearing & Grubbing	L.S.	Lump Sum
Common Excavation	1,177	Cu. Yd.
Common Excavation (Contractor Furnished)	1,569	Cu. Yd.
Rock Excavation	1,221	Cu. Yd.
Compaction of Earthwork (Type A) (MR-5-5)	1,177	Cu. Yd.
Water (Grading) (Set Price)	1	MGal
Slotted Drain (18")	480	Lin. Ft.
Cross Road Pipe (18")(CSP)	155	Lin. Ft.
End Section (18")(CS)(Type IV)	3	Each
Guardrail, Steel Plate (MGS)	287.5	Lin. Ft.
Guardrail, End Terminal (MGS-SRT)(Alt. #1)	2	Each
Guardrail, End Terminal (MGS-FLEAT)(Alt. #2)	2	Each
Guardrail, Removal and Reconstruction of Steel Plate	98.7	Lin. Ft.
Guardrail, Removal of Steel Plate	368.7	Lin. Ft.
Concrete Pavement (11" Unif.)(AE)(NRDJ)	436	Sq. Yd.
Concrete Pavement (11" Unif.)(AE)(Br. App.)	296	Sq. Yd.
Bridge Approach Slab Footing	47.4	Cu. Yd.
Flume Inlet (Concrete)	2	Each
Slope Drain (Concrete)	16	Each
Temporary Surfacing Material (Aggregate)(Set Price)	1	Tons

For Bridge Quantities See Sheet No. 19.
For Summary of Drainage Structures See Sheet No. 39.
For Surfacing Quantities See Sheet No. 41.
For Temporary Project Water Pollution Control Quantities See Sheet No. 42.
For Seeding Quantities See Sheet No. 49.
For Permanent Signing Quantities See Sheet No. 56
For Permanent Pavement Marking Quantites See Sheet No. 62
For Traffic Control Quantites See Sheet No. 77.

EARTHWORK

STATION to STATION	EXCAVATION					COMPACTION			THROUGH CUTS NOT SUBGRADED			✳ EMBANKMENT (CU.YDS.)		⚠PLACE. SELECT SOIL CU.YDS.
	⚠⚠COMMON		ROCK†		CONTR. FURN. CU.YDS.	TYPE AA MR-5-5 CU.YDS.	TYPE A MR-5-5 CU.YDS.		COMM. CU.YDS.	TYPE AA CU.YDS.	TYPE A CU.YDS.	INITIAL CONSOL.	SETTLE-MENT	
	CU.YDS.	VMF	CU.YDS.	VMF										
Sta. 67+88.1 to Sta. 75+51.3	549	0.75	493		732		549							
Sta. 98+26.7 to Sta. 105+90.0	535	0.75	525		713		535							
Sta. 84+28.53 to Sta. 91+27.1	93	0.75	203		124		93							
TOTALS	1,177		1,221		1,569		1,177							

†Ex. mainline concrete pavement and crossover asphalt, to be wasted.

⚠⚠ To be wasted. All common excavation is temporary fill for crossovers and guard rail.

✳ Subsidiary (see General Note).

⚠ See General note.

NO.	DATE	REVISIONS	BY	APP'D
2	1-14-08	Rem. Drainage Structure summary	S.W.K.	J.O.B.
1	1-9-91	Detailed on CADD	R.J.S	J.O.B.

KANSAS DEPARTMENT OF TRANSPORTATION

SUMMARY OF QUANTITIES

~~RD050~~

FHWA APPROVAL	5-28-08	APP'D. James O. Brewer	
DESIGNED	DETAILED	QUANTITIES	TRACED B.N.B.
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK. S.W.K.

Drawn By : CAM Plotted : 12/8/2021 5:48:58 PM
File : summary of quantities.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	41	77

GENERAL NOTE:

~~On surfacing projects, the 6" of Compaction Type AA, shown for the center portion on the roadbed, is for the purpose of restoring the original Compaction Type AA which may have been lost since grading operations. The exact locations of this Compaction Type AA, which will be required, is to be determined by the Engineer at the time of construction. This work shall be paid under the bid item "Compaction of Earthwork (Type AA) (MR-)".~~

~~Over all structures, unless otherwise directed by the Engineer, where the top of the hubguard is level with or above the finished shoulder grade, the earth cover over the structure slab shall be removed and backfilled with _____ material as directed by the Engineer. The removal of this material will be subsidiary.~~

~~The _____ material used to backfill over the structure shall be paid for at the prices shown in the contract.~~

The earth shoulders shall be compacted full depth (TypeA -MR 5-5) except, when ordered by the Engineer, the top 3" shall be left uncompacted for seeding.

~~All side roads and house entrances shall be surfaced with _____ to the R/W line as indicated on the detail. All side roads and house entrances with existing asphalt surface shall be surfaced with _____ at least to the R/W line or to the end of construction, as directed by the Engineer. Each mailbox turnout (ON PROJECTS WHERE STABILIZED SHOULDERS ARE NOT SPECIFIED) shall be surfaced with _____ to the limits shown on the detail.~~

~~Surfacing material (SA- _____) shall be used for surfacing house entrances and side roads (_____ C.Y./SQ. YD.) beyond the limits of the asphalt surface to the limits of construction as determined by the Engineer.~~

~~The thickness of side road and entrance surfacing may be increased to the same thickness as the stabilized shoulder within the approximate limits of the shoulder.~~

~~On projects which specify both asphalt base and surface course materials, side roads, house entrances and mailbox turnouts may be surfaced with both materials at the contractors option, with the approval of the Engineer.~~

~~Quantities for aggregate for shoulders, AS-1, are calculated on the basis of 150 lbs. per cu. ft.~~ Quantities for stabilized base course, AB-3, are calculated on the basis of 156 lbs. per cu. ft. Weight/cu. ft. includes moisture allowed by specification.

The base course shall be constructed to the plan thickness as shown.

Thicknesses indicated for all construction which is paid for on a weight or volume basis are approximate and may vary to correct for unevenness in the foundations or for other normal unevenness encountered in placement operations.

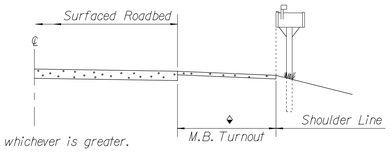
A tack coat of SS-1HP shall be provided between each lift of all base courses and surface courses and under the first lift of base or surface courses when they are placed on an existing asphalt, brick, or concrete surface, when so ordered by the Engineer and at the rate designated by him. Quantities are included for these tacks calculated at the rate of 0.05 gal./sq. yd.

Asphalt Material quantities are calculated on the basis of 8.328 lbs. per gal.

Shoulder rumble strips will not be constructed as part of this project.

SUMMARY OF QUANTITIES

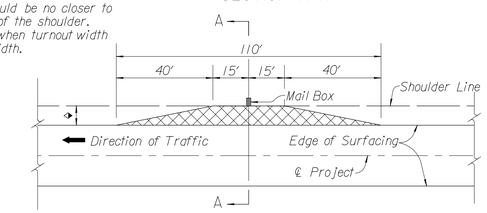
ITEM	Tons
HMA- Commercial Grade (Class A)	
Sta. 67+88.1 to Sta. 75+51.3	964.8
Sta. 98+26.7 to Sta. 105+90.0	1,027.9
Totals	1,993



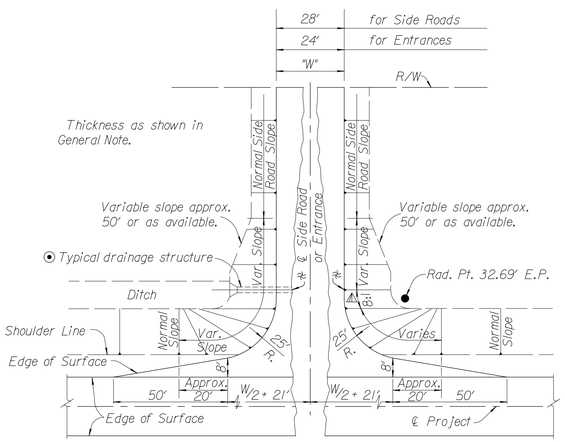
◆ Width shall be 8' or shoulder width, whichever is greater.

SECTION A-A

Note: The face of Mail Box should be no closer to the roadway than the edge of the shoulder. Align with edge of turnout when turnout width is greater than shoulder width.



DETAIL FOR SURFACING OF MAIL BOX TURNOUTS



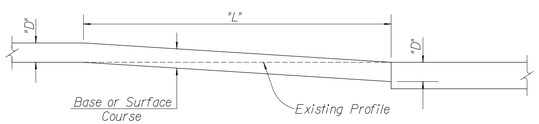
WITH DRAINAGE STRUCTURE MOUND ENTRANCE OR SIDE ROAD

DETAIL FOR SURFACING OF SIDE ROADS & HOUSE ENTRANCES

⚠ 8:1 Slope at the appropriate clear zone shall apply to all mound entrances and mound side roads to 10' fill height. Normal Slope (but not steeper than 6:1) for over 10' fill height.

⊙ Normal Slope (but not steeper than 6:1) at approximate ℄ Structure or appropriate clear zone width.

* On side roads and entrances which slope toward the highway, a low point approx. 6" deep shall be constructed to divert surface drainage into the highway ditch, unless otherwise shown on the plans.



TYPICAL PROFILE AT GRADE CONTROL POINTS

The Contractor shall cut the subgrade in accordance with this profile at all grade control points, i.e.; existing pavements, grade bridges and R.R. crossings, also at changes in thickness of base or surface courses. Corresponding dimensions of "D" and "L" shall be as given in the table below.

The work of cutting the subgrade and disposing of excess excavated material shall be subsidiary to other items in the contract.

TABLE OF DIMENSIONS

D	L	D	L	D	L	D	L	D	L	D	L
1"	25'	3"	75'	5"	125'	7"	175'	9"	225'	11"	275'
2"	50'	4"	100'	6"	150'	8"	200'	10"	250'	12"	300'

RATES OF APPLICATION

RATE	UNIT	ITEM
145	lb/ft³	HMA Commercial Grade (Class A)

† Computed at the rate of

†† Computed at the rate of

RECAPITULATION OF QUANTITIES

ITEM	TOTAL	UNIT
HMA Commercial Grade (Class A)	† 2,152	Tons
Field Office and Laboratory (Type A)	1	Each

† Includes 8% for contingencies.

NO.	DATE	REVISIONS	BY	APP'D
12	1-10-07	Changed bituminous to asphalt	S.W.K.	J.O.B.
11	8-30-06	Changed tack type/rate	S.W.K.	J.O.B.
10	3-24-05	Revised compaction, tack type/rate	S.W.K.	J.O.B.
9	6-12-02	Added low point off shoulder.	S.W.K.	J.O.B.

KANSAS DEPARTMENT OF TRANSPORTATION

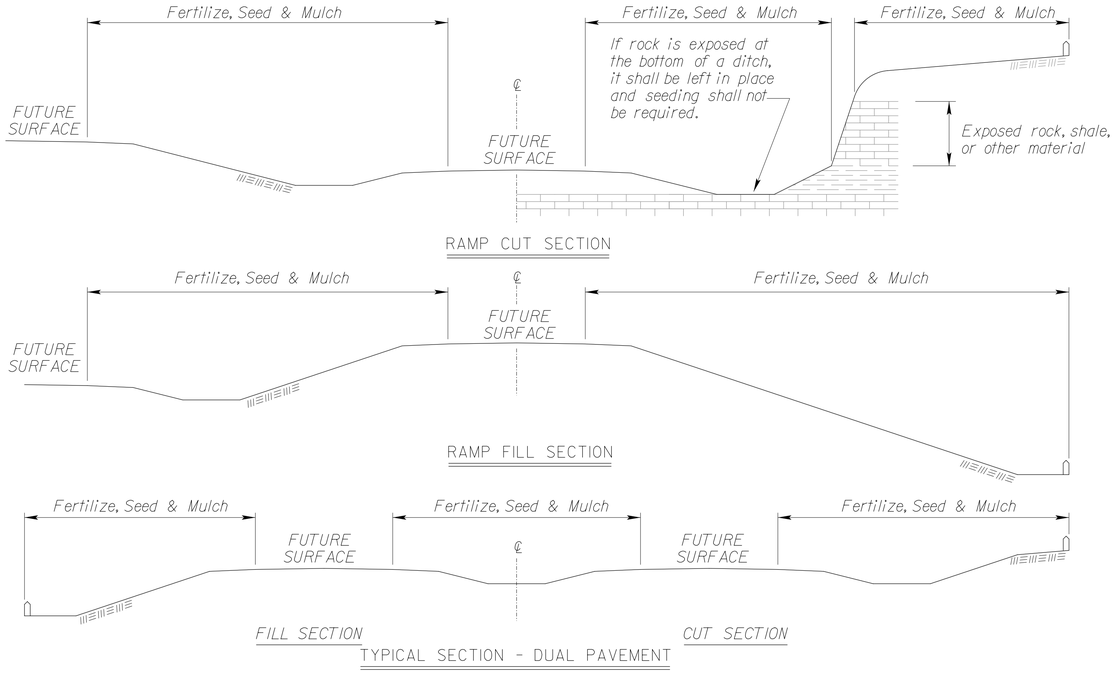
SUMMARY OF QUANTITIES (Surfacing)

~~RD051~~

FHWA APPROVAL	9-06-06	APP'D. James O. Brewer	
DESIGNED	DETAILED	QUANTITIES	TRACED Bowser
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK. Hecht

Drawn By : CAM
File : Surfacing Quantities.dgn
Plotted : 12/8/2021 5:48:58 PM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	42	77



FERTILIZER: A ratio and application rate that equals or exceeds the required minimum rate per acre of N, P_2O_5, K_2O listed in Summary of Quantities will be acceptable.

* - N = Nitrogen Rate of Application
** - P_2O_5 = Phosphorous Rate of Application
*** - K_2O = Potassium Rate of Application

The Contractor will be required to finish areas of excavation, borrow and embankment in accordance with the specifications. Areas that require installation or construction of temporary water pollution control items will be finished in reasonable close conformity to the alignment, grade and cross section shown on the plans or as established by the Engineer.

CLT = Construction Limit Tract. This area is defined by the entire disturbed area of the project that requires seeding and erosion control measures to be placed. Any impervious areas (i.e. pavement, gravel, riprap, etc.) shall not be included in this measurement.

Slope = Defined by the area of the project that requires Class 1 erosion control material to be placed. This area shall be seeded using the Soil Erosion Mix prior to placement of the material. Drilling seed is preferred, however, broadcasting is acceptable if drilling is not possible.

Channel = Defined by the area of the project that requires Class 2 erosion control material to be placed. This area shall be seeded using the Soil Erosion Mix prior to placement of the material. Drilling seed is preferred, however, broadcasting is acceptable if drilling is not possible.

GENERAL NOTES

The entire disturbed area, excepting the paved or surfaced areas, steep rocky slopes and areas of undisturbed native sod or other desirable vegetation shall be fertilized (limed when required), seeded, and mulched. Soil preparation shall conform to the Standard Specifications.

Temporary seeding shall be done during any time of the year that the soil can be cultivated. After the temporary seeding has been completed on the entire project, permanent seeding shall be done during the normal seeding season.

MULCHING: Mulch shall be spread uniformly over all disturbed areas and punched in the soil, unless otherwise noted on the plans. The rate of application per acre, thickness in place, for the mulching materials is generally as follows:

1¾ - 2¼ Tons per Acre = 1½" loose depth spread uniformly over acre.

Agricultural products, such as native prairie hay, used for mulching and erosion control practices, excluding wood based mulch, shall meet the North American Weed Free Forage Standards.
Other vegetative mulches are acceptable only with the Engineer's concurrence.

The above rate is a guide. It will be at the discretion of the Engineer to determine what rate is sufficient for adequate protection of newly seeded areas.

NOTE: Fertilizer required for the bid item "Erosion Control (Class 1) (Type C)" is subsidiary to other items of the Contract.

SUMMARY OF SEEDING / EROSION CONTROL QUANTITIES

P.L.S. RATE/ ACRE		ACRES		BID ITEM	QUANTITY	UNIT
CLT	SL/CH	CLT	SL/CH			
150				Temporary Fertilizer (15 - 30 - 15)	*	LB
20				Temporary Seed (Canada Wildrye)		LB
45				Temporary Seed (Grain Oats)		LB
45				Temporary Seed (Sterile Wheatgrass)		LB
	109.9		0.005	Soil Erosion Mix	0.5	LB
				Erosion Control (Class 1, Type C)	22	SQ YD
				Erosion Control (Class 2, Type F)		SQ YD
				Sediment Removal (Set Price)	1	CU YD
				Synthetic Sediment Barrier		LF
				Temporary Berm (Set Price)	1	LF
				Temporary Ditch Check (Rock)		CU YD
				Temporary Inlet Sediment Barrier		EACH
				Temporary Slope Drain		LF
				Temporary Stream Crossing		EACH
				Biodegraddable Log (9")		LF
				Biodegradable Log (12")		LF
				Biodegradable Log (20")	600	LF
				Filter Sock (12")		LF
				Filter Sock (18")	600	LF
				Geotextile (Erosion Control)		SQ YD
				Silt Fence		LF
				SWPPP Design †		LS
				SWPPP Inspection †		EACH
				Water Pollution Control Manager †		EACH
900 lbs / acre				Mulch Tacking Slurry		LB
2 tons / acre				Mulching		TON
				Water (Erosion Control) (Set Price)	1	MGAL

NOTE: Projects less than 1 acre shall be bid as "Seeding" by the lump sum. See Permanent Seeding Summary of Seeding Quantities sheet LA850 for further details.

Geotextile (Erosion Control) shall be removed prior to placement of permanent slope protection.

Regreen and Quick Guard are the approved sterile wheatgrass products.

† If the total disturbed area of the project, not just the seeding area, is 1 acre or more, then these bid items must be included.

**** List size of material.

The amount of mulch and mulch tacking slurry in the bid quantities is estimated. (Acres of Seeding X 1.5 X 2 Tons/Acre). The estimated quantity includes mulching associated with both temporary and permanent seeding operations. The total mulch and mulch tacking slurry required shall be determined in the field. The bid item for mulching and mulch tacking slurry shall be paid for according to the Standard Specifications.

Quantities for all erosion control items are estimated to give full flexibility for compliance with the NPDES permit. Final quantities will be determined in the field.

SOIL EROSION MIX

PLS RATE	NAME	QTY (lb)
0.5	Blue Grama Grass Seed (Lovington)	0.0023
4.5	Buffalograss Seed (Treated)	0.0205
45	Perennial Ryegrass Seed	0.2045
2.6	Prairie Junegrass Seed	0.0118
6.3	Side Oats Grama Grass Seed (El Reno)	0.0286
45	Tall Fescue (Endophyte Free)	0.2045
6	Western Wheatgrass Seed (Barton)	0.0273
109.9	Total (lb)	0.50

The Soil Erosion Mix is to be placed under the Class 1 and/or Class 2 erosion control material.

The Soil Erosion Mix consists of the Shoulder Area of the Permanent Seed Mix used on the project.

NO.	DATE	REVISIONS	BY	APP'D
3	08/03/20	Added Note	MRD	ML
2	12/01/17	Revised Standard	MRD	SHS
1	06/01/17	Revised Standard	MRD	SHS

KANSAS DEPARTMENT OF TRANSPORTATION

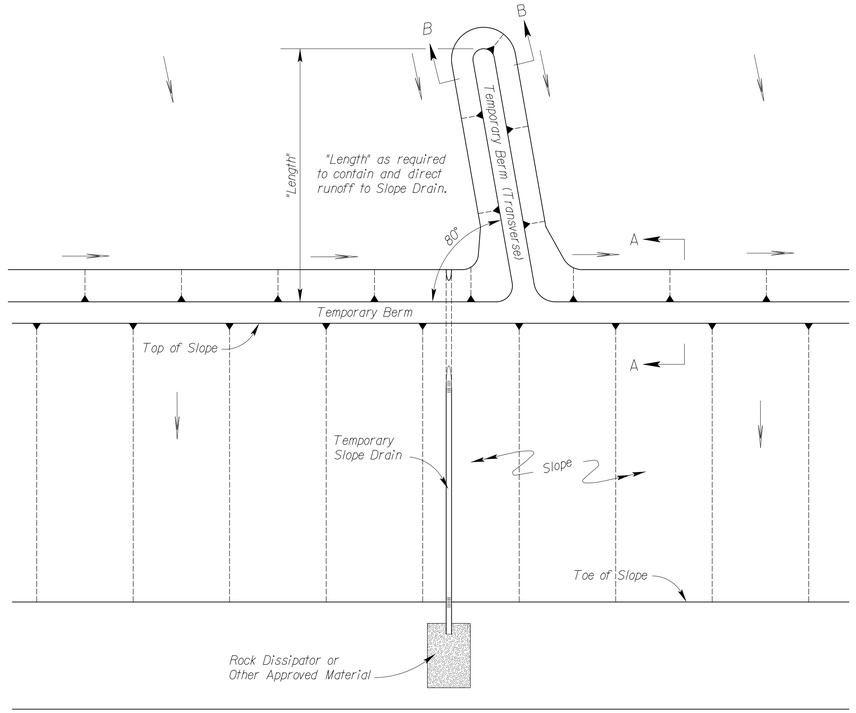
TEMPORARY EROSION AND POLLUTION CONTROL

LA852A

FHWA APPROVAL		1/26/2018	APP'D		Scott H. Shields
DESIGNED	MRD	DETAILED	MRD	QUANTITIES	CADD
DESIGN CK.	SHS	DETAIL CK.	SHS	QUAN.CK.	CADD CK.

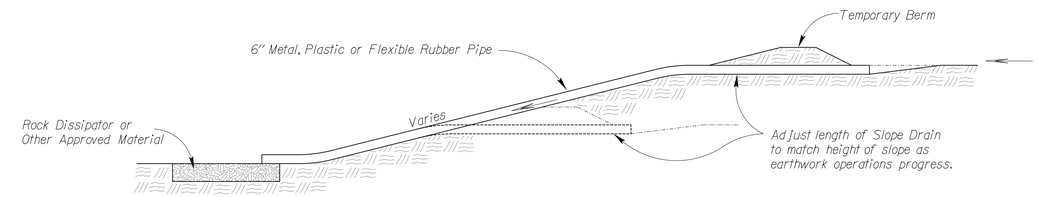
Std. Base File:
Plotted By: CAM
Plot Location: $UNIT$
File: Erosion Stds.dgn
Plot Date: 12/8/2021 5:48:59 PM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	43	77



TYPICAL PLAN VIEW OF TEMPORARY BERM AND TEMPORARY SLOPE DRAIN

NO SCALE



TYPICAL PROFILE OF TEMPORARY SLOPE DRAIN

NO SCALE

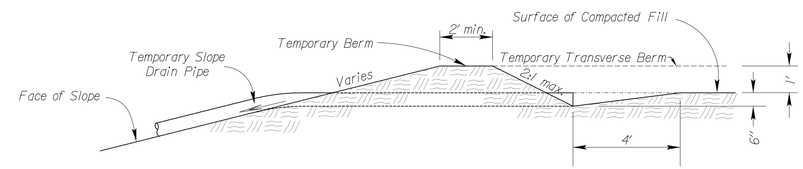
NOTES:

1) Temporary Slope Drain and Temporary Berm may be used on either project foreslopes or project backslopes.

2) Discharge of Slope Drains shall be into stabilized ditch or area, or into Sediment Basin.

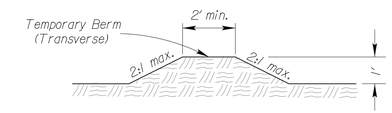
3) Pipe shall be secured in place as approved by Engineer.

4) Temporary Berms 2,000 feet and under shall be bid by Set Price.



SECTION A-A

NO SCALE

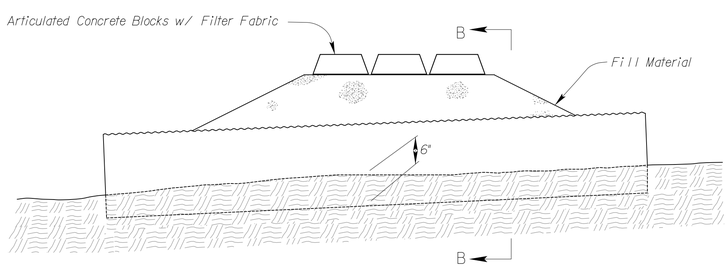


SECTION B-B

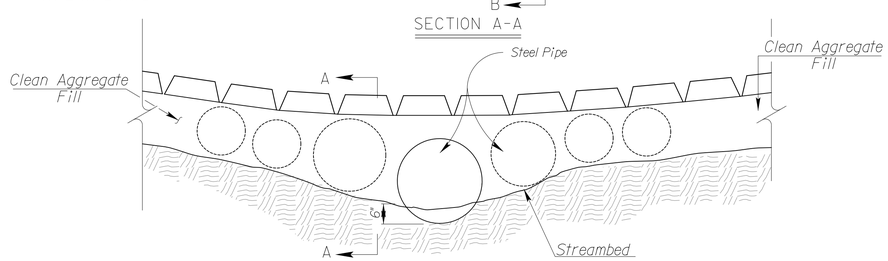
NO SCALE

TYPICAL PROFILE OF TEMPORARY BERM

NO SCALE



SECTION A-A



SECTION B-B

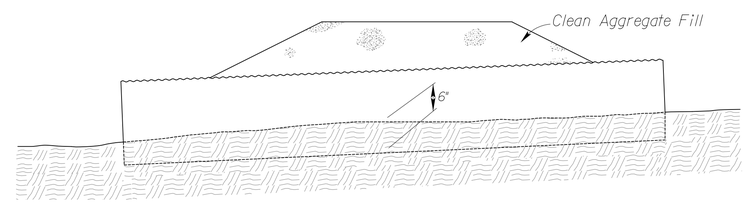
TEMPORARY STREAM CROSSING (ARTICULATED CONCRETE BLOCKS)

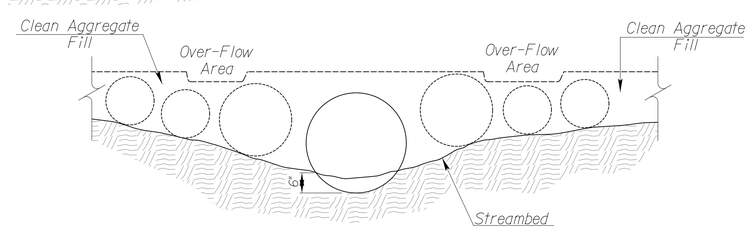
NO SCALE

Pipe size may vary

Place 1 pipe buried 6" into stream bottom, in the lowest point of the channel to allow the passage of aquatic organisms, with additional pipes placed along the remainder of the stream channel bottom such that ordinary high water (OHW) flows designated in the Contract Documents shall flow through the pipes without overtopping the crossing.

See KDOT Specifications for more information





SECTION B-B

TEMPORARY STREAM CROSSING (AGGREGATE)

NO SCALE

Pipe size may vary

Place 1 pipe buried 6" into stream bottom, in the lowest point of the channel to allow the passage of aquatic organisms, with additional pipes placed along the remainder of the stream channel bottom such that ordinary high water (OHW) flows designated in the Contract Documents shall flow through the pipes without overtopping the crossing.

See KDOT Specifications for more information

NO.	DATE	REVISIONS	BY	APP'D
3	6/11/13	Revised Standard	MRM	SHS
2	11/01/10	Revised Standard	MRM	SHS
1	10/15/10	Revised Standard	WCL	RDR

KANSAS DEPARTMENT OF TRANSPORTATION

TEMPORARY EROSION AND POLLUTION CONTROL

TEMPORARY SLOPE DRAIN

TEMPORARY STREAM CROSSING (AGGREGATE)

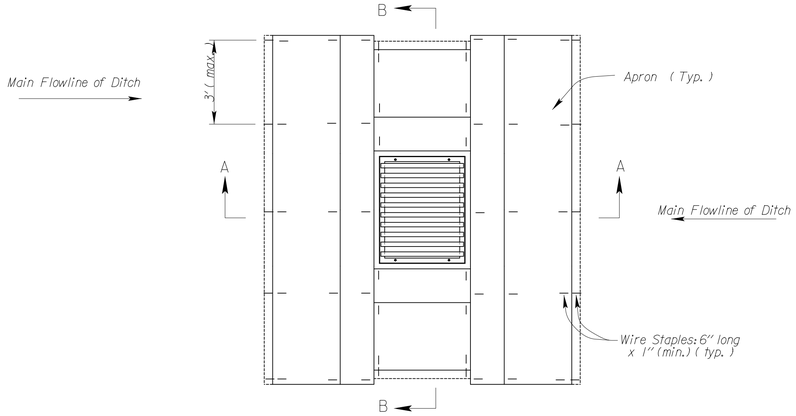
TEMP. STREAM CROSS. (ARTC. CONC. BLOCKS)

LA852B

FHWA APPROVAL	11/08/2010	APP'D	Scott H. Shields
DESIGNED MRM	DETAILED	QUANTITIES	CADD
DESIGN CK. SHS	DETAIL CK.	QUAN.CK.	CADD CK.

Std. Base File:
Plotted By: CAM
Plot Location: $UNIT$
File: Erosion Stds.dgn
Plot Date: 12/8/2021 5:48:59 PM

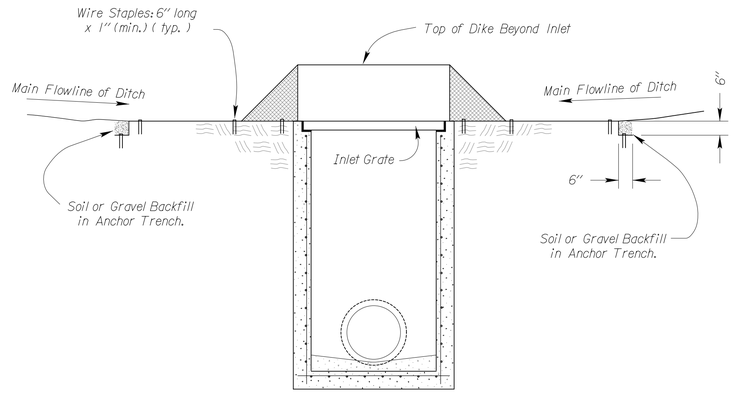
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	44	77



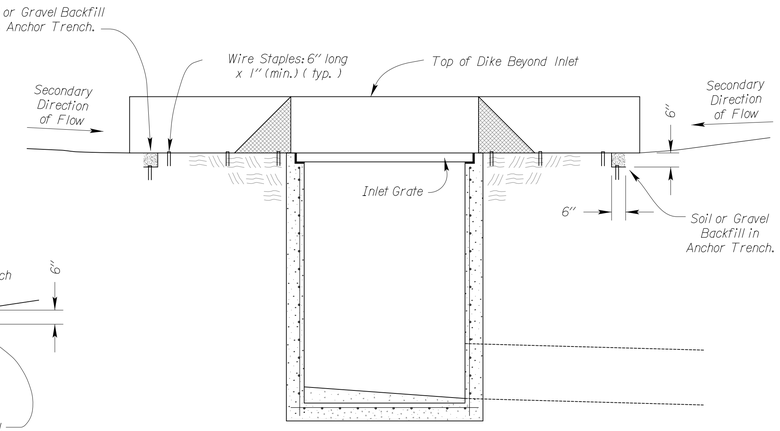
PLAN

TEMPORARY INLET SEDIMENT BARRIER
(TRIANGULAR SILT DIKE METHOD)

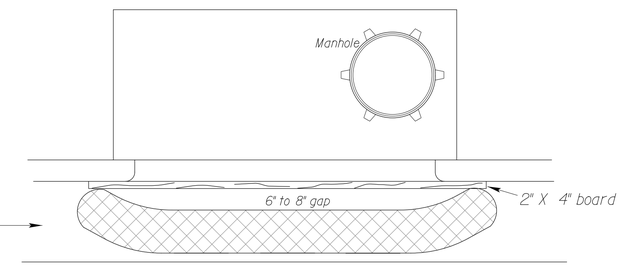
NO SCALE



SECTION A - A



SECTION B - B

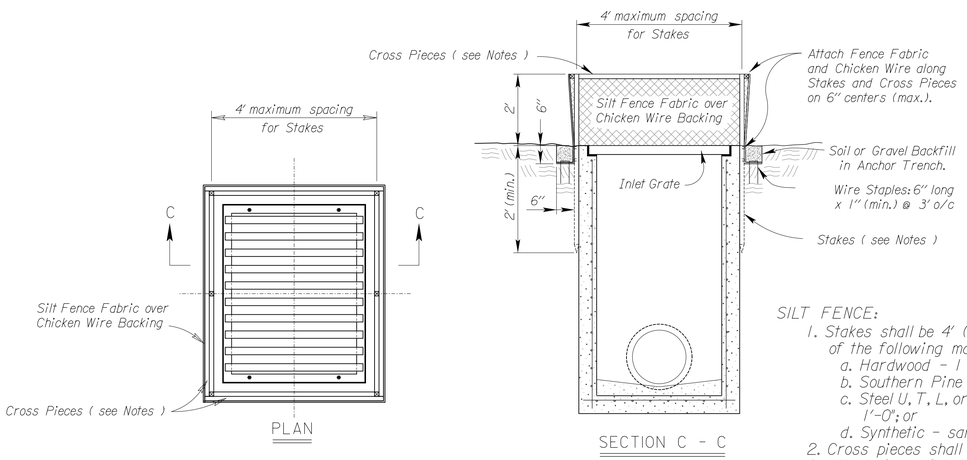


Bags = synthetic net (3mm mesh) or burlap bags

Rock = approximately 1" to 2" diameter

CURB INLET PROTECTION

1. If multiple gravel bags are required, place them in such a way that no gaps are evident.
2. Height of bags (8" minimum diameter) must not be above top of curb.
3. Alternative products may be used other than gravel bags such as the "Gutter Buddy". Products must be approved by the Engineer.
4. Curb inlet protection will be measured and paid for as Filter Sock.



PLAN

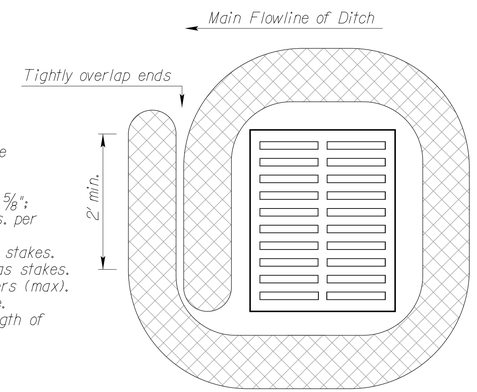
SECTION C - C

TEMPORARY INLET SEDIMENT BARRIER
(SILT FENCE METHOD)

NO SCALE

SILT FENCE:

1. Stakes shall be 4' (min.) long and of one of the following materials:
   a. Hardwood - 1 3/16" x 1 3/16";
   b. Southern Pine (No. 2) - 2 5/8" x 2 5/8";
   c. Steel U.T.L. or C Section - .95 lbs. per 1'-0"; or
   d. Synthetic - same strength as wood stakes.
2. Cross pieces shall be of same material as stakes.
3. Attach fence fabric securely on 6" centers (max).
4. Use of high flow material is acceptable.
5. Refer to plan sheets to estimate the length of silt fence required.



Note: 25% of log shall be keyed into ground during installation.

Stake every 4'

Drop inlet use
1'-6" TO 1'-8" diameter log

BIODEGRADABLE LOG/FILTER SOCK
DROP INLET PROTECTION

Material Requirements
Use 100% shredded mulch or other non-compost biodegradable material as fill for logs.
No compost or fines.
No hay or straw.
Do not use material which prohibits water infiltration.
Log Mesh: Use mesh with 1/4" openings or larger. Mesh must allow water infiltration but also hold fill material in place.

NO.	DATE	REVISIONS	BY	APP'D
3	9/26/19	Changed Direction of Main Flowline of Ditch Arrow	MRD	SHS
2	3/10/15	Revised Standard	RA	SHS
1	6/01/13	Revised Standard	MRM	SHS

KANSAS DEPARTMENT OF TRANSPORTATION

TEMPORARY EROSION AND POLLUTION CONTROL

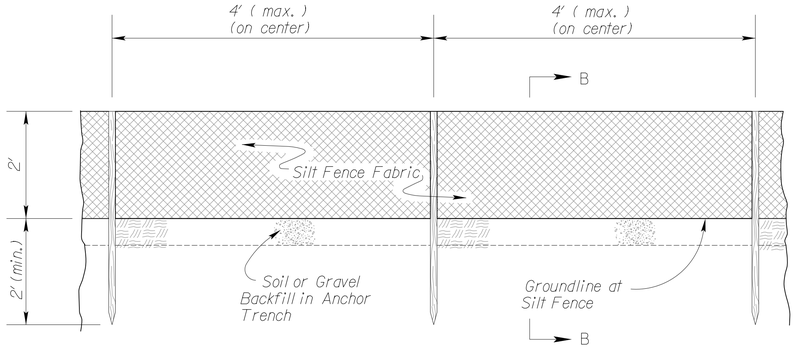
TEMP. INLET SEDIMENT BARRIER (SILT FENCE)
TEMP. INLET SEDIMENT BARRIER (T.S.D.)
CURB INLET PROTECTION
DROP INLET PROTECTION

LA852C

FHWA APPROVAL		3/10/2015		APP'D		Scott H. Shields	
DESIGNED	RA	DETAILED	RA	QUANTITIES		CADD	
DESIGN CK.	SHS	DETAIL CK.	SHS	QUAN.CK.		CADD CK.	

Std. Base File:
Plotted By: CAM
Plot Location: $UNIT$
File: Erosion Stds.dgn
Plot Date: 12/8/2021 5:49:00 PM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	45	77



TYPICAL ELEVATION

SILT FENCE BARRIER

NO SCALE

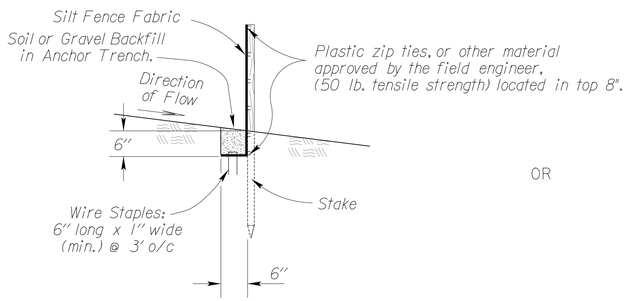
INSTALLATION NOTES

SILT FENCE:

1. Stakes shall be 4' (min.) long and of one of the following materials:
   a. Hardwood - 1 3/16" x 1 3/16";
   b. Southern Pine (No. 2) - 2 5/8" x 2 5/8";
   c. Steel U, T, L, or C Section - .95 lbs. per 1'-0"; or
   d. Synthetic - same strength as wood stakes.
2. Attach fence fabric with 3 zip ties within the top 8" of the fence Alternate attachment methods may be approved by the Engineer on a performance basis.
3. Use of high flow material is acceptable.
4. Refer to plan sheets to estimate the length of silt fence required.

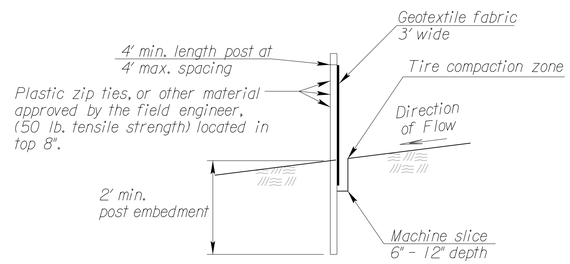
BIODEGRADABLE LOG OR FILTER SOCK

1. Place biodegradable logs or filter sock tightly together minimum overlap of 18".
2. Wood stakes shall be 2" x 2" (nom.).
3. Refer to plan sheets to estimate length of biodegradable log and filter sock required.
4. Each log or sock (except compost filter socks) should be keyed into the ground at a minimum of 25% of its height. Compost filter socks should be placed on smooth prepared ground with no gaps between the sock and soil.
5. Length of stakes should be 2 times the height of the log at a minimum with minimum ground embedment equal to the height of the log / sock.



SECTION B-B

OR



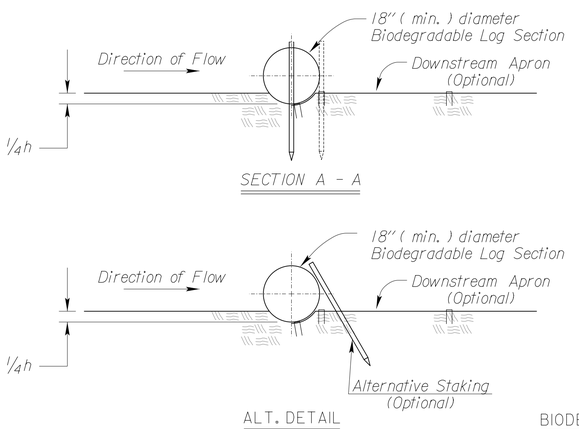
SECTION B-B

Biodegradable Log or Filter Sock Slope Interruptions

		PRODUCT		
		9" Sediment Log or 8" Filter Sock (ft)	12" Sediment Log or 12" Filter Sock (ft)	20" Sediment Log or 18" Filter Sock (ft)
Slope Gradient	≤4H:1V	40	60	80
	3H:1V	30	45	60

Deviations should be approved by the Field Engineer.

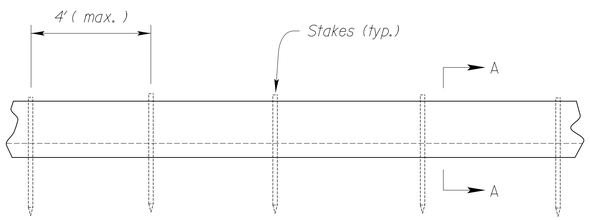
	BIODEGRADABLE LOG MATERIAL	
	LOW FLOW	HIGH FLOW
9"	Straw/Compost	Excelsior / Wood Chips / Coconut Fiber
12"	Straw/Compost	Excelsior / Wood Chips / Coconut Fiber
18"-20"	Straw/Compost	Excelsior / Wood Chips / Coconut Fiber



SECTION A - A

ALT. DETAIL

OPTIONAL



TYPICAL ELEVATION

BIODEGRADABLE LOG SLOPE INTERRUPTIONS

OR Filter Sock

GENERAL NOTES

1) Slope interruptions shall be placed along contour lines, with a short section turned upgrade at each end of the barrier.

2) The maximum length of the slope interruptions shall not exceed 250 feet, and the barrier ends need to be staggered.

3) Interruptions damaged by Contractor's negligence, including improper maintenance or lack of maintenance, shall be repaired immediately by Contractor at no additional cost to KDOT.

4) Agricultural products, such as native prairie hay, used for mulching and erosion control practices, excluding wood based mulch, shall meet the North American Weed Free Forage Standards.

NO.	DATE	REVISIONS	BY	APP'D
3	6/28/16	Revised Standard	RA	SHS
2	3/01/15	Revised Standard	RA	SHS
1	6/01/13	Revised Standard	MRM	SHS

KANSAS DEPARTMENT OF TRANSPORTATION

TEMPORARY EROSION AND POLLUTION CONTROL

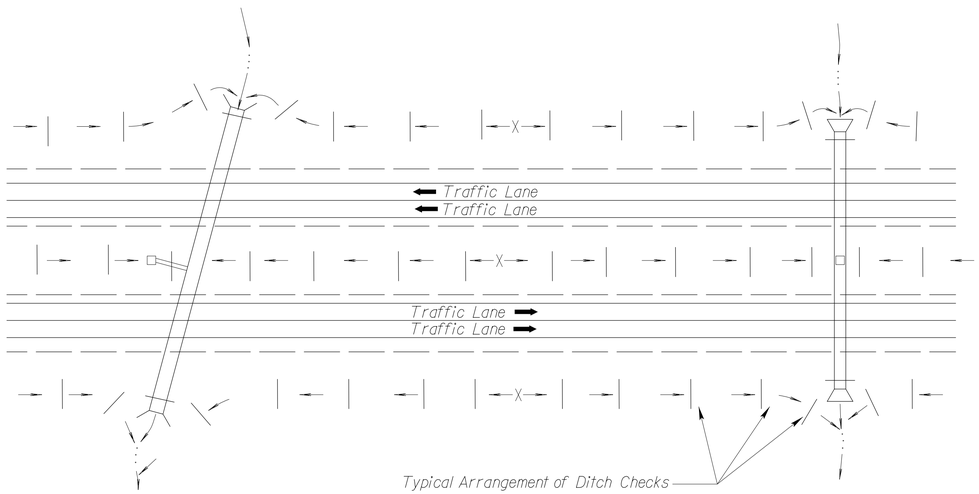
SLOPE INTERRUPTIONS
BIODEGRADABLE LOG / SILT FENCE

LA852D

FHWA APPROVAL		9/14/2016	APP'D		Scott H. Shields
DESIGNED	SHS	DETAILED RA	QUANTITIES		CADD
DESIGN CK.	SHS	DETAIL CK.	QUAN.CK.		CADD CK.

Std. Base File:
Plotted By: CAM
Plot Location: $UNIT$
File: Erosion Stds.dgn
Plot Date: 12/8/2021 5:49:00 PM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	46	77



TYPICAL DITCH CHECK LAYOUT PLAN

NO SCALE

20" BIOLOG CHECK SPACING	
DITCH ℄ SLOPE (%)	SPACING INTERVAL (FEET)
1.0	125
2.0	60
3.0	40
4.0	30
5.0	25
NOTE: Use this spacing for all except Rock Ditch Checks.	

18" FILTER SOCK CHECK SPACING	
DITCH ℄ SLOPE (%)	SPACING INTERVAL (FEET)
1.0	110
2.0	55
3.0	35
4.0	25
5.0	20
NOTE: Use this spacing for all except Rock Ditch Checks.	

GENERAL NOTES

1) The choice of ditch check methods is at the option of the Contractor.

2) Use only rock checks in situations where the ditch slope is 6 percent or greater.

2) Ditch checks damaged by Contractor's negligence, including improper maintenance or lack of maintenance, shall be repaired by Contractor at no extra cost to KDOT.

Std. Base File:
Plotted By: CAM
Plot Location: $UNIT$
File: Erosion Stds.dgn
Plot Date: 12/8/2021 5:49:00 PM

NO.	DATE	REVISIONS	BY	APP'D
3	8/10/16	Revised Standard	RAA	SHS
2	6/28/16	Revised Standard	RAA	SHS
1	6/01/13	Revised Standard	MRM	SHS

KANSAS DEPARTMENT OF TRANSPORTATION

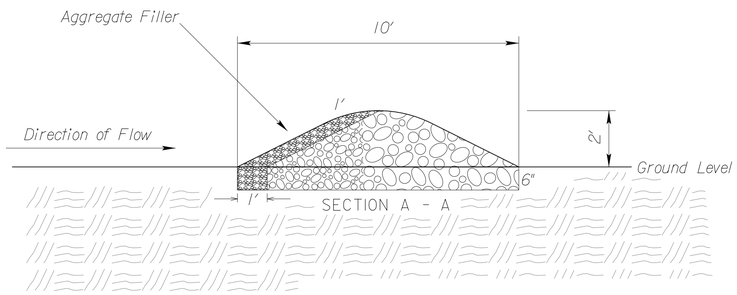
TEMPORARY EROSION AND POLLUTION CONTROL

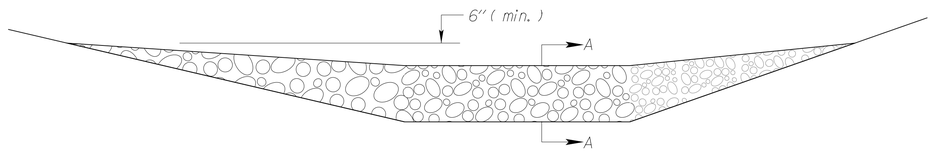
DITCH CHECKS

LA852E

FHWA APPROVAL			9/14/2016	APP'D		Scott H. Shields	
DESIGNED	SHS	DETAILED	RAA	QUANTITIES		CADD	RAA
DESIGN CK.	SHS	DETAIL CK.	SHS	QUAN.CK.		CADD CK.	SHS

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	47	77





TYPICAL ELEVATION

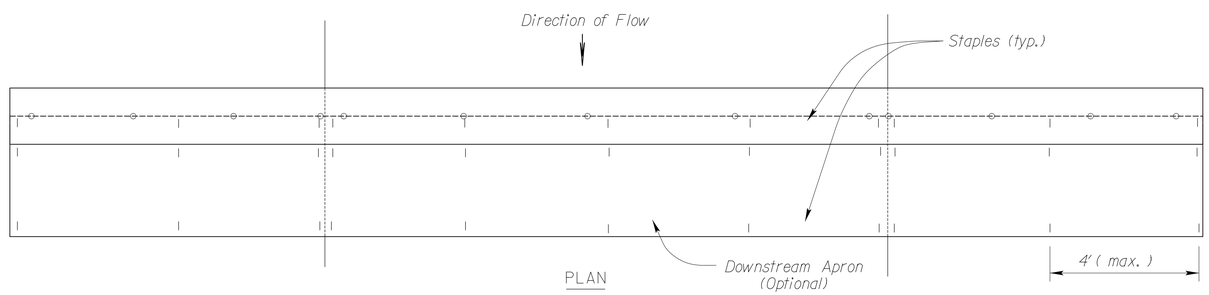
ROCK DITCH CHECK

NO SCALE

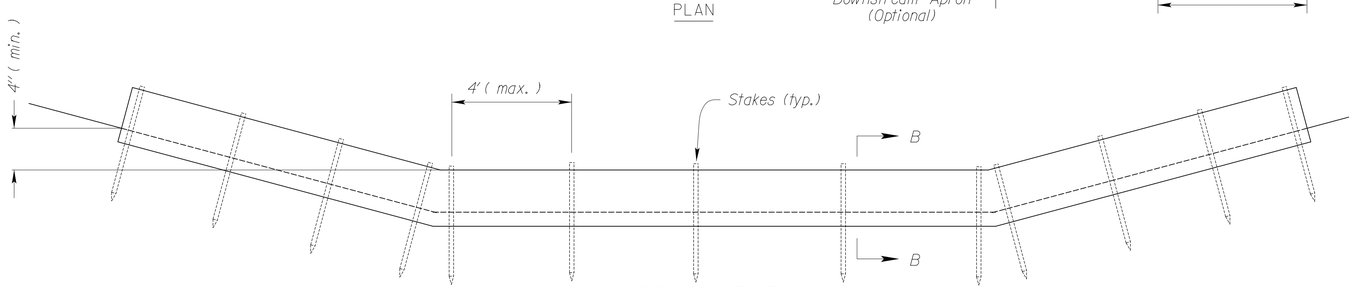
TEMPORARY ROCK DITCH CHECK SPACING	
DITCH ℄ SLOPE (%)	SPACING INTERVAL (FEET)
5.0	60
6.0	50
7.0	43
8.0	36
9.0	33
10.0	29
NOTE: Use this spacing for Rock Ditch Checks only.	

ROCK DITCH CHECK NOTES

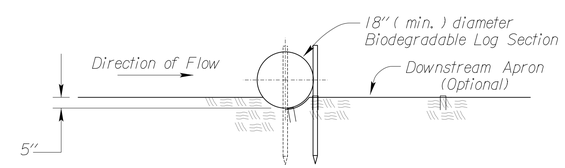
1. Rock shall be clean aggregate, D50-6" and aggregate filler.
2. Place rock in such manner that water will flow over, not around ditch check.
3. Do not use rock ditch checks in clear zone.
4. Excavation: The ditch area shall be reshaped to fill any eroded areas. Prior to placement of the rock, the ditch shall be excavated to the dimensions of the Rock Ditch Check and to a minimum depth of 6" (150mm). After placement of the rock, backfill and compact any over-excavated soil to ditch grade. This work shall be subsidiary to the bid item Temporary Ditch Check (Rock).
5. Aggregate excavated on site may be used as an alternate to the 6" rock, if approved by the Engineer.
6. The Engineer may approve the use of larger aggregates for the downstream portion of the check when conditions warrant their use.
7. When the use of larger rock is approved, D50-6" rock will be placed between the larger aggregate and the aggregate filler.
8. Aggregate filler will be placed on the upstream face of the ditch check. Aggregate filler will comply with Filter Course Type I, Division 1114.



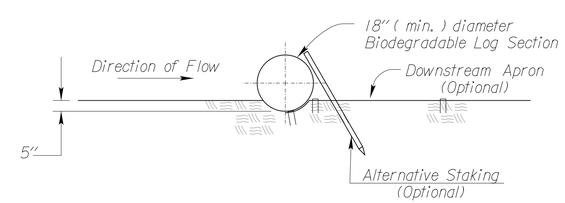
PLAN



TYPICAL ELEVATION



SECTION B - B



ALT. DETAIL
OPTIONAL

BIODEGRADABLE LOG DITCH CHECK

OR Filter Sock Ditch Check

NO SCALE

BIODEGRADABLE LOG DITCH CHECK NOTES

1. Use as many biodegradable log sections as necessary to ensure water does not flow around end of ditch check.
2. Overlap sections a minimum of 18".
3. Stakes shall be wood or steel according to Section 2114 of the Standard Specifications. Length of stakes shall be a minimum of 2 x the diameter of the log.
4. Use Erosion Control (Class 1) (Type C) as the downstream apron when required.
5. A downstream apron is required when directed by the Engineer. Apron material will be paid at the contract unit price.
6. Each log or sock (except compost filter socks) should be keyed into the ground at a minimum of 25% of its height. Compost filter socks should be placed on smooth prepared ground with no gaps between the sock and soil.

NO.	DATE	REVISIONS	BY	APP'D
3	11/19/20	Revised Standard	MRD	ML
2	8/10/16	Revised Standard	RAA	SHS
1	10/21/15	Revised Standard	RAA	SHS

KANSAS DEPARTMENT OF TRANSPORTATION

TEMPORARY EROSION AND POLLUTION CONTROL

ROCK DITCH CHECKS

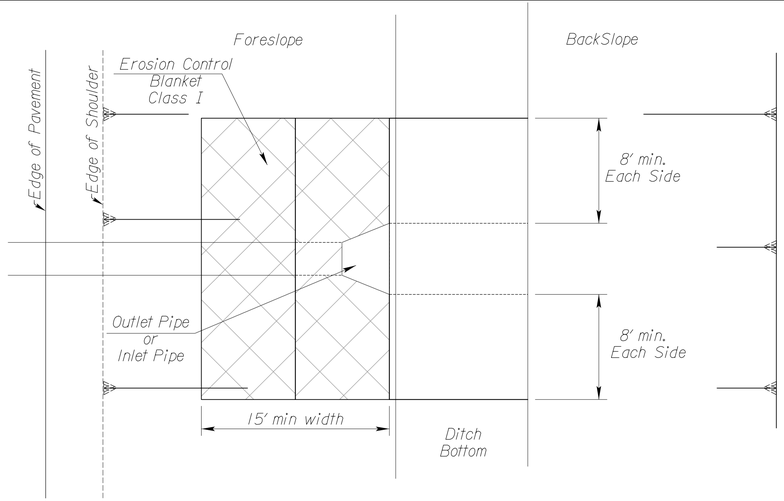
BIODEGRADABLE LOG DITCH CHECKS

LA852G

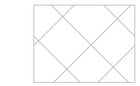
FHWA APPROVAL		11/19/2020		APP'D		Mervin Lare	
DESIGNED	ML	DETAILED	DK	QUANTITIES		CADD	RAA
DESIGN CK.	ML	DETAIL CK.	ML	QUAN.CK.		CADD CK.	RAA

Std. Base File: la852g.dgn
Plotted By: CAM
Plot Location: $UNIT$
File: Erosion Stds.dgn
Plot Date: 12/8/2021 5:49:00 PM

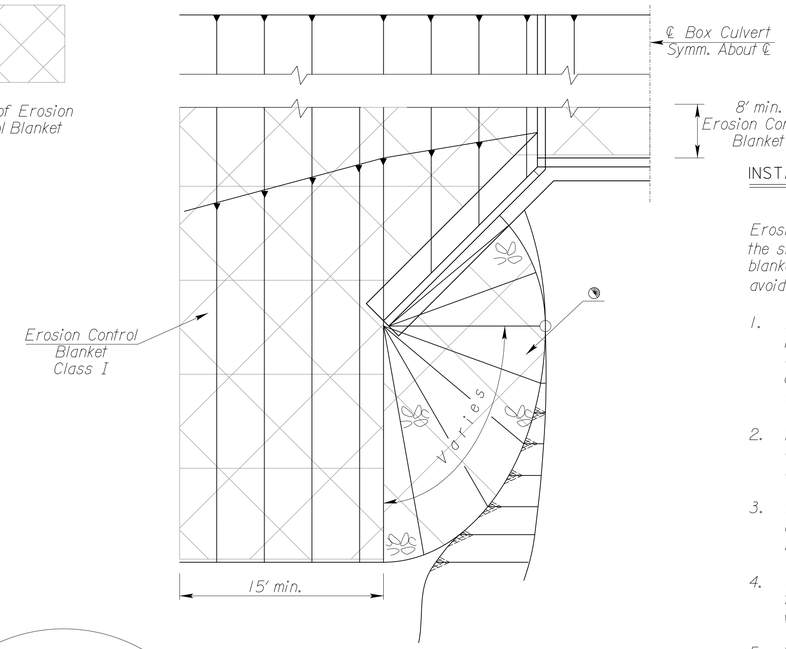
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	48	77



PARTIAL PLAN PIPE



Limits of Erosion Control Blanket



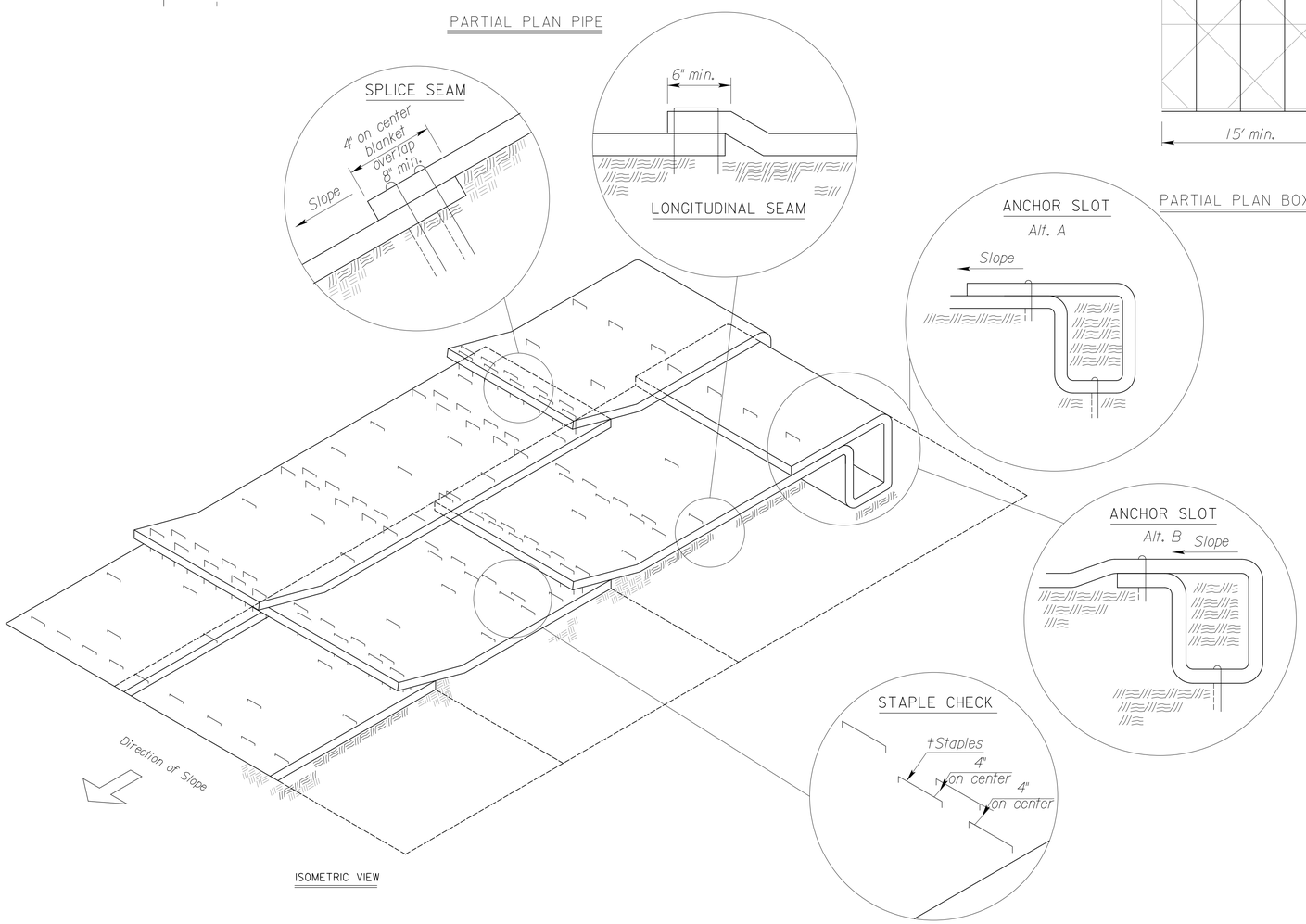
PARTIAL PLAN BOX CULVERT

◔ Erosion Control Class I may be omitted if the area is immediately covered by permanent slope protection (where directed by the plans).

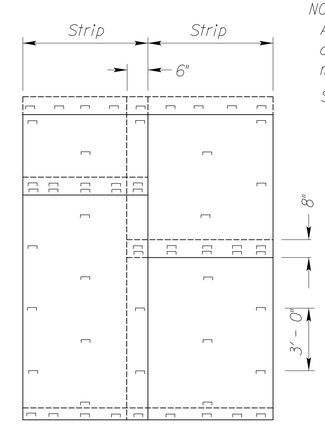
INSTALLATION DETAILS FOR EROSION CONTROL CLASS I

Erosion Control Blankets shall be laid loosely in the direction of the slope, beginning at the bottom of the slope. In order for blanket to be in contact with the soil, lay blanket loosely, avoiding stretching.

1. ANCHOR SLOTS: The top of the blanket should be "slotted in" at the top of the slope and anchored in place with anchors 6 inches apart. The slots should be 6 inches wide x 6 inches deep with the blanket anchored in the bottom of the slot, then backfilled, tamped and seeded.
2. LONGITUDINAL SEAMS: The edges of the blanket should overlap each other a minimum of 6 inches, with anchors catching the edges of both blankets.
3. SPLICE SEAM: When splices are necessary, overlapend a minimum of 8 inches in direction of water flow. Stagger splice seams.
4. TERMINAL FOLD: The bottom edge of the blanket shall be turned under a minimum of 4 inches, then anchored in place with anchors 9 inches apart.
5. TYPICAL ANCHORS: Anchor design shall be as recommended by the manufacturer.
6. STAPLE CHECK: †Establish Staples in 2 rows 4" on center apart. Staple Checks - shall be 30' apart.



ISOMETRIC VIEW



PLAN VIEW - ANCHORING DIAGRAM

NOTE:
Agricultural products, such as native prairie hay, used for mulching and erosion control practices, excluding wood based mulch, shall meet the North American Weed Free Forage Standards.

Single post ring and shank staple is acceptable.

NO.	DATE	REVISIONS	BY	APP'D
4	3/01/15	Revised Standard	RAA	SHS
3	2/23/15	Revised Standard	RAA	SHS
2	9/15/14	Revised Standard	MRM	SHS
1	9/10/07	Revised Standard	MRM	SHS

KANSAS DEPARTMENT OF TRANSPORTATION

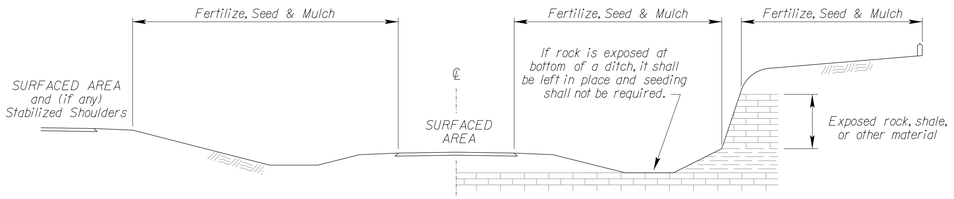
INSTALLATION DETAIL
EROSION CONTROL CLASS I
SLOPE PROTECTION

LA855

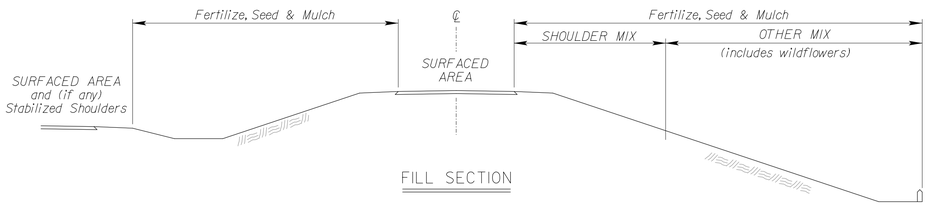
FHWA APPROVAL		3/10/2015	APP'D	Scott H. Shields	
DESIGNED	RAA	DETAILED RAA	QUANTITIES	CADD	RAA
DESIGN CK.		DETAIL CK.	QUAN.CK.	CADD CK.	RAA

Std. Base File: la855.dgn
Plotted By: CAM
Plot Location: $UNIT$
File: Erosion Stds.dgn
Plot Date: 12/8/2021 5:49:01 PM

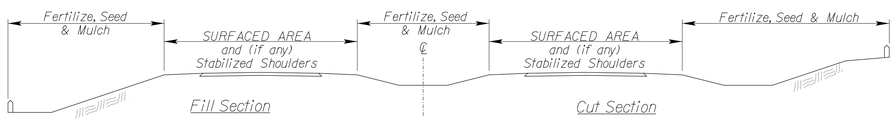
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	49	77



CUT SECTION



FILL SECTION



TYPICAL SECTION - DUAL PAVEMENT

GRASS & WILDFLOWER SEEDING SEASONS

COOL SEASON GRASSES	WARM SEASON GRASSES & WILDFLOWERS
February 15 thru April 20 August 15 thru September 30	November 15 thru June 1
SPECIES	SPECIES
Bluegrasses	Bermuda Grass
Brome Grasses	Big Bluestem
Canada Wildrye	Blue Grama
Fescues	Buffalo Grass
Prairie Junegrass	Indiangrass
Ryegrasses	Little Bluestem
Sterile Wheatgrass	Sand Bluestem
Tall Dropseed	Sand Dropseed
Western Wheatgrass	Sand Lovegrass
	Side Oats Grama
	Switchgrass
	Wildflower Mixes

When the area to be seeded is 1 acre or more, if Cool Season grasses are mixed with Warm Season grasses, seed the area during the Warm Season.

When the area to be seeded is less than 1 acre, seed the area any time of the year.

SODDING SEASONS

COOL SEASON GRASSES	WARM SEASON GRASSES
March 1 thru April 15 September 1 thru November 15	May 15 thru September 1
SPECIES	SPECIES
Bluegrass Sod	Buffalo Grass Sod
Fescue Sod	

If the soil is workable, the Engineer may allow placement of sod between November 15 and March 1. If sod is placed during this time, maintain the sod until 20 days after the beginning of the spring sodding season.

GENERAL NOTES

The entire disturbed area, excepting the paved or surfaced areas, steep rocky slopes and areas of undisturbed native sod or other desirable vegetation shall be fertilized (limed when required), seeded and mulched. Soil preparation shall conform to the Standard Specifications except as noted below.

All borrow areas shown on the plans are to be fertilized, seeded, and mulched. However, operation in borrow areas where crops are growing may be omitted when requested by the owner.

If temporary cover has provided stable slopes with no erosion, seed the permanent grasses into the existing cover. If there has been erosion that requires repair prior to seeding, then it may be necessary to regrade the area, resulting in bare ground.

FERTILIZER: A ratio and application rate that equals or exceeds the required minimum rate per acre of N, P_2O_5, K_2O listed in Summary of Seeding Quantities will be acceptable.

MULCHING: Mulch shall be spread uniformly over all disturbed areas and punched in the soil, unless otherwise noted on the plans. The rate of application per acre, thickness in place, for the mulching material is generally as follows:

1¾ - 2¼ Tons per Acre = 1½" loose depth spread uniformly over acre.

Agricultural products, such as native prairie hay, used for mulching and erosion control practices, excluding wood based mulch, shall meet the North American Weed Free Forage Standards.

Other vegetative mulches are acceptable only with the Engineer's concurrence.

The above rate is a guide. It will be at the discretion of the Engineer to determine what rate is sufficient for adequate protection of newly seeded areas.

NATIVE WILDFLOWER MIX 1

PLS RATE	NAME	QTY (lb)
0.3	Butterfly Milkweed	
0.3	Common Milkweed	
0.3	Black Eyed Susan	
0.5	Blanket Flower	
0.5	False Sunflower	
0.5	Lance-Leaf Coreopsis	
0.2	Maximilian Sunflower	
0.1	New England Aster	
0.2	Pinnate Prairie Coneflower	
0.2	Plains Coreopsis	
0.3	Purple Coneflower	
0.3	Upright Prairie Coneflower	
0.3	Dames Rocket	
0.3	Lemon Mint	
0.2	Pitcher Sage	
0.2	Wild Bergamot	
1.0	Illinois Bundleflower	
0.2	Common Evening Primrose	
0.1	Hoary Verbena	
0.8	Purple Prairie Clover	
0.3	Roundhead Lespedeza	
3.0	Showy Partridge Pea	
0.2	White Prairie Clover	
10.3	Total (lb)	

NATIVE WILDFLOWER MIX 2

PLS RATE	NAME	QTY (lb)
0.3	Butterfly Milkweed	
0.3	Black Eyed Susan	
0.5	Black Sampson Coneflower	
1.0	Blanket Flower	
0.2	Maximilian Sunflower	
0.2	Plains Coreopsis	
0.2	Upright Prairie Coneflower	
0.2	Western Yarrow	
0.3	Lemon Mint	
0.4	Pitcher Sage	
1.5	Illinois Bundleflower	
0.2	Common Evening Primrose	
1.0	Blue Wild Indigo	
0.4	Leadplant	
0.4	Purple Prairie Clover	
0.3	White Prairie Clover	
7.4	Total (lb)	

Package and deliver the wildflower seed separately from the grass seed mix. Package and deliver the Tall Drop Seed separately from the grass seed and the wildflower mix. Place the grass seed (except Tall Drop Seed) in the large seed box and drill (cover) seed 1/8" - 1/4". Place the wildflower seed in a separate seed box and drill (cover) seed 1/16" maximum. Place the Tall Drop Seed in a separate (third) seed box and place the seed (using the seed drill) on the soil surface.

OPTION: Broadcast Tall Drop Seed on the soil surface.

SUMMARY OF SEEDING QUANTITIES

P.L.S. RATE/ACRE SHLDR	P.L.S. RATE/ACRE OTHER			ACRES SHLDR	ACRES OTHER			BID ITEM	QUANTITY	UNIT
200				0.95				Fertilizer (13-13-13)		LB
	80							Fertilizer (16-20-0)		LB
	2							Seed (Big Bluestem Grass) (Kaw)		LB
0.5				0.95				Seed (Blue Grama Grass) (Lovington)		LB
4.5				0.95				Seed (Buffalograss) (Treated)		LB
	10							Seed (Canada Wildrye Grass)		LB
	2							Seed (Indiangrass) (Osage)		LB
	2							Seed (Little Bluestem Grass) (Aldous)		LB
45				0.95				Seed (Perennial Ryegrass)		LB
2.6				0.95				Seed (Prairie Junegrass)		LB
6.3	6.3			0.95				Seed (Side Oats Grama Grass) (El Reno)		LB
	10							Seed (Sterile Wheatgrass) (Regreen/Quick Guard)		LB
	1							Seed (Switchgrass) (Blackwell)		LB
	0.5							Seed (Tall Drop)		LB
45				0.95				Seed (Tall Fescue) (Endophyte Free)		LB
6	4			0.95				Seed (Western Wheatgrass) (Barton)		LB
								Seeding	Lump Sum	L.S.
								Mulching *		

SHLDR = Seeded with the Shoulder Mix. Typically 15 feet for 2-lane roads and 30 feet for 4-lane roads. Includes outside roadsides, turfed portions of shoulders, and turfed portion of the median.

OTHER = Seeded with the "Other" Mix. Designated as all other turf areas, except the Shoulder. Usually includes a Native Wildflower Mix.

NOTE: Projects less than 1 acre shall be bid as "Seeding" by the lump sum. All disturbed areas shall be seeded, fertilized and mulched at the listed rate per acre. The acres are estimated.

Refer to the Standard Specifications, Division 900, Section 904 'Seeding', and Section 907 'Sodding', for the seeding and sodding seasons.

** See LA852A for mulching quantity. The quantity of mulch is estimated (Acres of Seeding X 1.5 X 2 Tons/Acre). The total mulch required shall be determined in the field. The bid item for mulching shall be paid for according to the Standard Specifications.*

NO.	DATE	REVISIONS	BY	APP'D
2	11/25/20	Updated Seeding / Sodding Periods Charts	MRD	ML
1	08/03/20	Revised Standard	MRD	SHS

KANSAS DEPARTMENT OF TRANSPORTATION

PERMANENT SEEDING
SUMMARY OF SEEDING QUANTITIES

LA850

FHWA APPROVAL	05/06/2019	APP'D	Mervin Lare
DESIGNED MRD	DETAILED MRD	QUANTITIES	CADD
DESIGN CK.	DETAIL CK.	QUAN.CK.	CADD CK.

Std. Base File:
Plotted By: CAM
Plot Location: $UNIT$
File: LA850 Seeding.dgn
Plot Date: 12/8/2021 5:49:01 PM

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	50	77

SYMBOL KEY

- REMOVE SIGN
- REMOVE POST
- REMOVE FOOTING
- REMOVE SIGN & POST
- REMOVE POST & FOOTING
- REMOVE SIGN, POST, & FOOTING
- MOUNT ON WOOD POST IN CONCRETE FOOTING
- MOUNT ON WOOD POST IN SOIL
- MOUNT ON STEEL BEAM BREAKAWAY POST
- MOUNT ON STEEL U-POST
- MOUNT ON PSST POST
- MOUNT ON EXISTING POST
- MOUNT ON VERTICAL SUPPORT
- SHOULDER MOUNTED INSTALLATION
- OFFSET MOUNTED INSTALLATION
- EXISTING SIGN
- EXISTING SIGN TO BE OVERLAID
- SIGN IS NOT PART OF PROJECT
- TYPE 'A' DELINEATOR (RIGID)
- TYPE 'A' DELINEATOR (RIGID) (BK-BK)
- TYPE 'B' DELINEATOR (RIGID)
- TYPE 'A' DELINEATOR (FLEXIBLE)
- TYPE 'A' DELINEATOR (FLEXIBLE) (BK-BK)
- TYPE 'B' DELINEATOR (FLEXIBLE)
- TYPE 2 OBJECT MARKER
- TYPE 3 OBJECT MARKER
- TYPE 3 OBJECT MARKER (BK-BK)

GENERAL NOTES

In order to expedite the completion of the project for traffic service, the signing and delineator work shall be sequenced with any other contract work such that the phases of construction may proceed and be completed at the same time.

New signs erected on the project which are in conflict with existing signing are to be completely covered until the existing signs are removed or the new signing is applicable. The existing signs that are being replaced, removed, or do not follow the current MUTCD signing standards are to be removed when the project is completed or as determined by the Engineer.

The Contractor shall exercise caution at all times when installing sign supports in and around areas where utilities exist, either underground or overhead, and will be held responsible for any damage incurred to the system. The installation of sign supports shall include the excavation, drilling, or driving the support footing and the erection of the sign support. The contractor shall exercise caution when working around any existing signs that are to remain and will be held responsible for any damage to the signs, supports, or footings. The Contractor shall exercise care when working around shrubbery while removing or installing signs or sign supports.

An existing sign post installation shall be plumb and the compaction of the backfill soil shall comply with the specifications after the removal and resetting of a sign, the removal and replacement of a sign, or the installation of a new sign.

The Contractor shall provide mounting bolts that are of a length that does not extend more than a nominal 1 inch beyond the sign post. The Contractor shall not make any field modifications to the mounting bolt prior to or after the sign is installed.

Specific service (LOGO) signs that are to be removed shall have the business logo plaques removed and transported to location determined by KDOT, at which time the plaques become the property of KDOT. The Contractor will be assessed a replacement cost for any damage to a business logo plaque prior to the plaque becoming the property of KDOT.

The materials and fabrication for signing and delineation work shall conform to the Standard Specifications for State Road and Bridge Construction (2015 edition) and Special Provisions.

INDEX OF SHEETS

50 SIGNING INDEX, SYMBOLS, & GENERAL NOTES
POST SPACING & SIGN ANGLE DETAILS
51 HEIGHT & LATERAL DISTANCE FOR ERECTION
POSITIONING, DESIGN, & MOUNTING OF DELINEATORS
52-54 POSITIONING, DESIGN, & MOUNTING FOR OBJECT MARKERS (TYPE 2 & 3)
POSITIONING FOR CHEVRON (W1-8) SIGNS
PLAN SHEETS (INSTALLATIONS)
PLAN SHEETS (REMOVALS)
QUANTITIES SHEETS (INSTALLATIONS)
55 QUANTITIES SHEET (DELINEATORS & OBJECT MARKERS)
SUMMARY SHEET (INSTALLATIONS & REMOVALS)
SUMMARY SHEET (REMOVAL & RESET)
56 RECAPITULATION SHEET
57-58 STANDARD STRUCTURAL SIGN SUPPORTS (WOOD & STEEL POSTS)
MOUNTING OF SIGNS ON WOOD POSTS
MOUNTING OF FLAT SHEET SIGNS ON STEEL I-BEAM POSTS
MOUNTING OF REINFORCED PANEL SIGNS ON I-BEAM POSTS
59 DETAILS FOR FLAT SHEET SIGN BLANKS
DETAILS FOR PROCESSED SIGNS
DETAILS FOR REINFORCED PANELS
DETAILS FOR GUIDE SIGN LEGEND
DETAILS FOR GUIDE SIGNS
60 DETAILED SIGN SPECIFICATIONS

NO.	DATE	REVISIONS	BY	APP'D
2	10/01/19	Changed symbols, notes, & index	D.D.G.	E.W.N.
1	7/23/10	Changed General Notes and Spec Book Date	D.D.G.	D.B.

KANSAS DEPARTMENT OF TRANSPORTATION

SIGNING SYMBOL KEY
GENERAL NOTES
AND INDEX

TE402 7/1/03

FHWA APPROVAL		10/01/2019	APP'D	Steven A. Buckley	
DESIGNED	D.D.G.	DETAILED	W.S.B.	QUANTITIES	TRACED
DESIGN CK.	S.A.B.	DETAIL CK.	D.D.G.	QUAN. CK.	TRACE CK.

KDOT Graphics Certified 12-17-2019

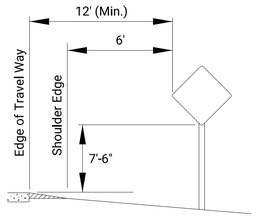
KDOT Graphics Certified

Sheet No. 50

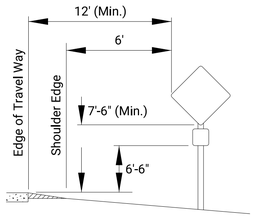
Plotted : 12/8/2021 5:49:02 PM
$$KDOTGRP$$

Drawn By : CAM
File : Permanent Signs.dgn

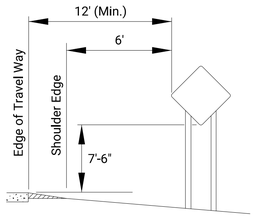
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	51	77



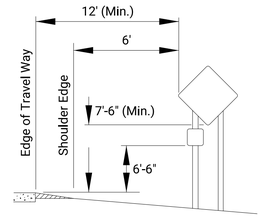
ONE POST



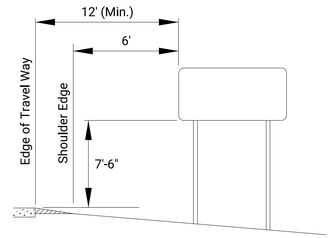
ONE POST WITH SUPPLEMENTAL SIGN



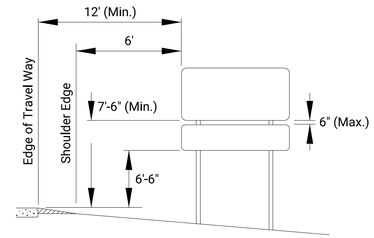
TWO POSTS



TWO POSTS WITH SUPPLEMENTAL SIGN

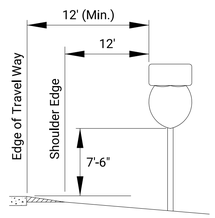


MULTIPLE POSTS

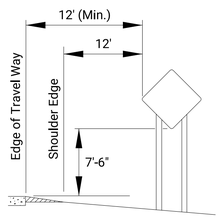


MULTIPLE POSTS WITH SUPPLEMENTAL SIGN

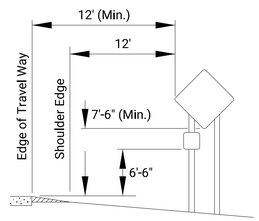
RAMPS AND EXPRESSWAY INTERSECTIONS



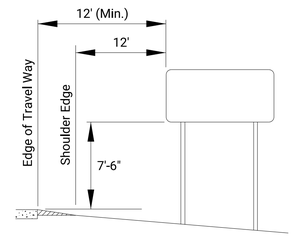
ONE POST



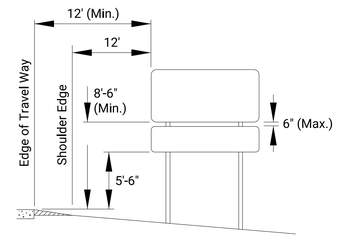
TWO POSTS



TWO POSTS WITH SUPPLEMENTAL SIGN

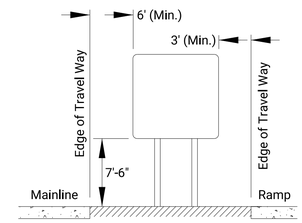


MULTIPLE POSTS

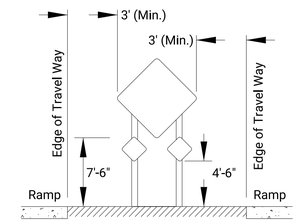


MULTIPLE POSTS WITH SUPPLEMENTAL SIGN

MAINLINE - SHOULDER MOUNT

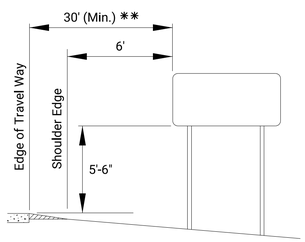


MAINLINE/RAMP

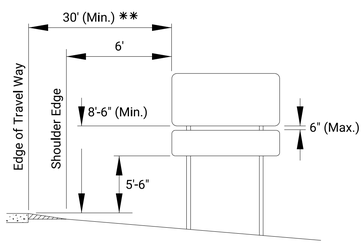


RAMP/RAMP

HIGHWAY GORES



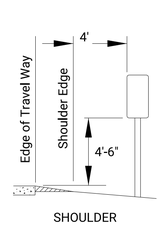
MULTIPLE POSTS



MULTIPLE POSTS WITH SUPPLEMENTAL SIGN

** 60' Max.

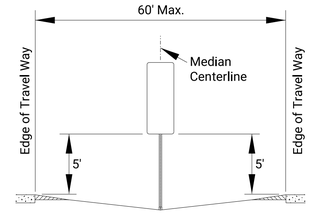
MAINLINE - OFFSET MOUNT



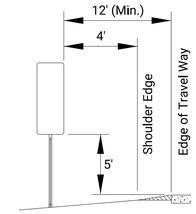
SHOULDER

Post Sizes:
D10-1: 2 Lb/Ft "U" Post
D10-2: 2 Lb/Ft "U" Post
D10-3: 3 Lb/Ft "U" Post

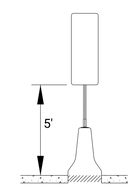
MILE POSTS



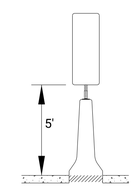
MEDIAN WIDTH
60' OR LESS
(SOIL)



MEDIAN WIDTH
GREATER THAN 60'
(SOIL)



32" BARRIER

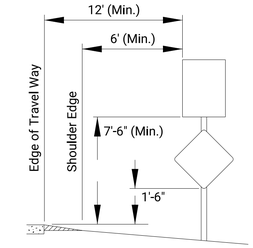


51" BARRIER

Post Size (Soil): 2" PSST Post with Footing

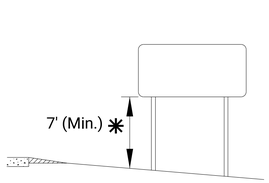
Post Size (Barrier): 1 3/4" PSST Post

INTERMEDIATE REFERENCE MARKERS

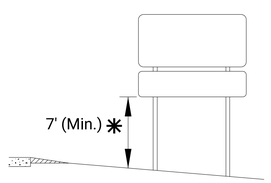


TYPICAL

ADOPT A HIGHWAY



PRIMARY SIGN



PRIMARY SIGN WITH SUPPLEMENTAL SIGN

*NOTE: Measured from the nearest point between the sign and the groundline.

GROUND CLEARANCE FOR STEEL BEAM POSTS

The "Edge of Travel Way" is the edge line or the edge of driving lane.

The outer edge of the mainline sign shall be a minimum of 10' from the right of way line. The outer edge of the ramp sign shall not extend beyond the right of way line.

A minimum lateral clearance of 6' from pavement edge where lateral offsets are limited may be used.

When signs are behind guard rail, the near edge of the sign shall not extend beyond the back side of the guard rail and the nearest sign post shall be a minimum of 5' from the face of the guard rail. Shoulder mounted signs shall not be located between 100' in advance of and 50' beyond the nose of the guard rail.

The gore sign shall be installed in the paved gore area. The edges of the gore sign shall not extend beyond the shoulder edge. The minimum distance from the centerline of the posts to the back of the paved gore area is 2'.

Both the mounting height and ground clearance minimum dimensions are to be met for steel beam post installations.

NOTES

Signs may be moved laterally or longitudinally if it will improve visibility of the sign or other signs or if it will protect the sign more.

The maximum allowable longitudinal adjustments are:
- Advance guide: 1320'
- Supplemental guide: 1320'
- Motorist service: 1320'
- Exit direction: 100'
- Mileage: 2640'
- Merge: 50'
- Mainline signs within an interchange: 50'
- Milepost or intermediate reference marker: 50'
- Ramp: 50'

If any sign with a distance or mileage is longitudinally adjusted, the distance or mileage shall be checked and modified as needed.

The minimum spacing between signs are:
- Mainline guide sign to mainline guide sign: 800'.
- Mainline guide sign to regulatory, warning, route marker sign: 400'.
- Ramp sign to ramp sign: 100'.

NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION

MOUNTING HEIGHT & LATERAL OFFSET FOR FREEWAYS AND EXPRESSWAYS

TE406 10/01/19

FHWA APPROVAL			10/01/2019	APP'D	Eric W. Nichol		
DESIGNED	D.D.G.	DETAILED	D.D.G.	QUANTITIES		TRACED	
DESIGN CK.	E.W.N.	DETAIL CK.	E.W.N.	QUAN. CK.		TRACE CK.	

KDOT Graphics Certified 12-17-2019

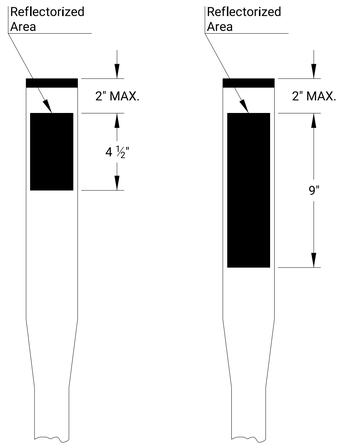
KDOT Graphics Certified

Sheet No. 51

Plotted : 12/8/2021 5:49:03 PM
$$KDOTGRPS$$

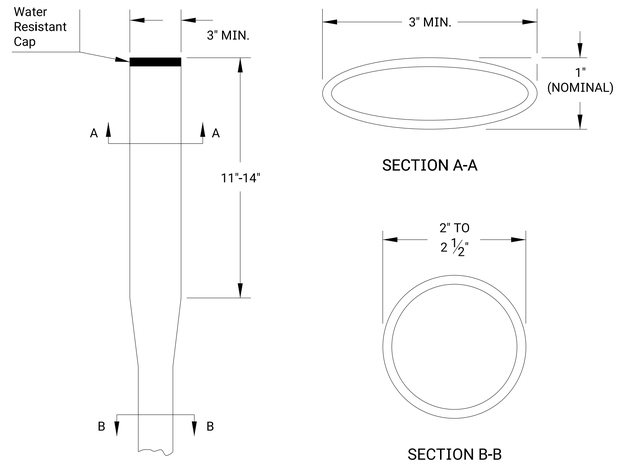
Drawn By : CAM
File : Permanent Signs.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	52	77

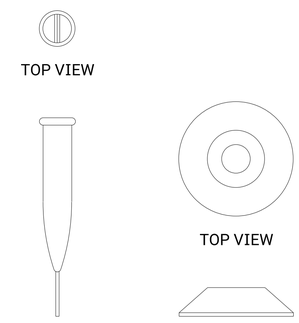


TYPE "A" TYPE "B"

REFLECTORIZED AREA POSITIONING



FLEXIBLE DELINEATOR POST DETAILS



TYPE I TYPE III

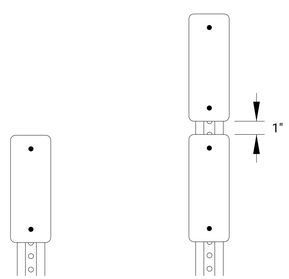
ANCHORING DEVICES

FLEXIBLE POST DELINEATOR INSTALLATION

GENERAL NOTE:
See the "Design Details for Positioning of Delineators" standard and/or plan sheets for the delineator spacing, type, and color. The delineators shall be covered with Type XI High Intensity white or yellow retrorelective sheeting.

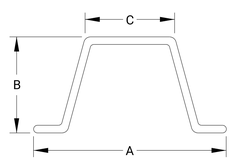
FLEXIBLE POST DELINEATORS:
The total length of the flexible delineator post shall be determined by the contractor, as per location and anchoring device. The reflectorized area for flexible delineators shall be a minimum of 3" in width.

STEEL POST DELINEATORS:
See flat sheet sign blank standard sheets for the 3" x 8" delineators details.



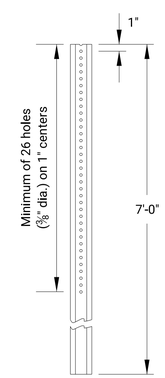
TYPE "A" TYPE "B"

TYPICAL DELINEATOR ASSEMBLY

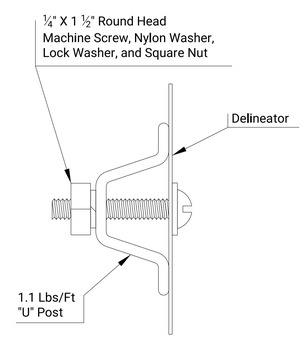


DIMENSIONS	
A	2 1/16
B	7/8
C	13/16

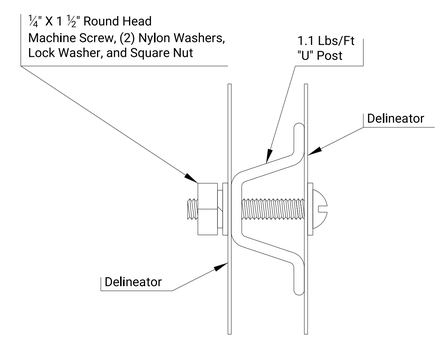
(Dimensions are nominal)



PUNCHING DETAILS



MOUNTING DETAILS (TYPICAL)



MOUNTING DETAILS (BACK TO BACK)

STEEL POST DELINEATOR INSTALLATION

All dimensions are in inches unless otherwise noted.
See standard plan sheet TE590 for detailed specifications.

NO.	DATE	REVISIONS	BY	APP'D
2	10/01/19	Changed drawings and notes	D.D.G.	E.W.N.
1	7/23/10	Changed Sheeting Type	D.D.G.	D.B.

KANSAS DEPARTMENT OF TRANSPORTATION

DELINEATOR DESIGN DETAILS
STEEL POST MOUNT &
FLEXIBLE POST MOUNT

TE412 7/1/03

FHWA APPROVAL		10/01/2019	APP'D	Steven A. Buckley	
DESIGNED	D.D.G.	DETAILED	W.S.B.	QUANTITIES	TRACED
DESIGN CK.	S.A.B.	DETAIL CK.	D.D.G.	QUAN. CK.	TRACE CK.

KDOT Graphics Certified 12-17-2019

KDOT Graphics Certified

Sheet No. 52

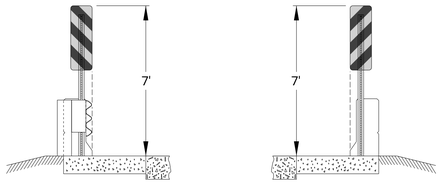
Plotted : 12/8/2021 5:49:03 PM
$$KDOTGRP$$

Drawn By : CAM
File : Permanent Signs.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	53	77

WITH GUARDRAIL WITHOUT GUARDRAIL

SHOULDER WIDTH 6 FEET OR GREATER (TYPE 2 OBJECT MARKER)

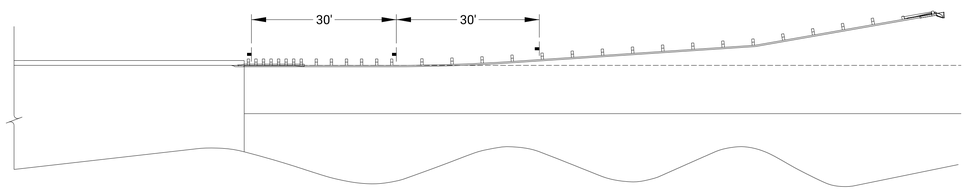


WITH GUARDRAIL WITHOUT GUARDRAIL

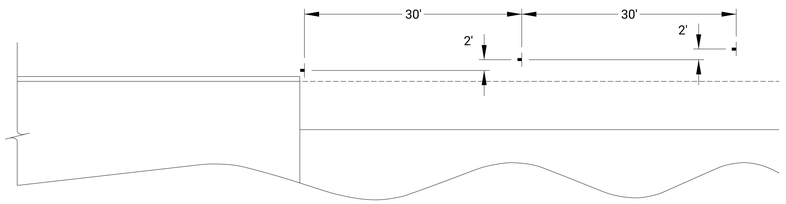
SHOULDER WIDTH LESS THAN 6 FEET (TYPE 3 OBJECT MARKER)

NOTE:
The longitudinal location of the object markers from the structure end shall be a maximum spacing of 42".

END OF STRUCTURE

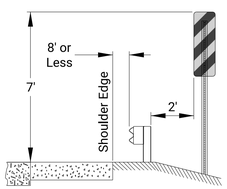


LONGITUDINAL PLACEMENT

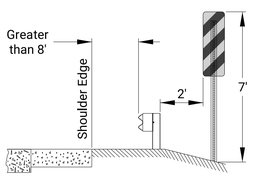


LONGITUDINAL PLACEMENT

NOTE:
The lateral offset is measured from the centerline of the object markers.

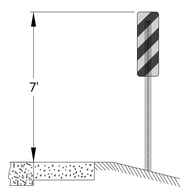


GUARDRAIL 8' OR LESS FROM SHOULDER EDGE



GUARDRAIL GREATER THAN 8' FROM SHOULDER EDGE

STRUCTURE APPROACH GUARDRAIL WITHOUT MARKERS



STRUCTURE APPROACH WITHOUT GUARDRAIL

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

DESIGN DETAILS FOR
OBJECT MARKERS (TYPE 2 & 3)
FOR STRUCTURES WITH PARAPETS

TE415 10/01/19

FHWA APPROVAL			10/01/2019	APP'D	Eric W. Nichol		
DESIGNED	D.D.G.	DETAILED	D.D.G.	QUANTITIES		TRACED	
DESIGN CK.	E.W.N.	DETAIL CK.	E.W.N.	QUAN. CK.		TRACE CK.	

KDOT Graphics Certified 12-17-2019

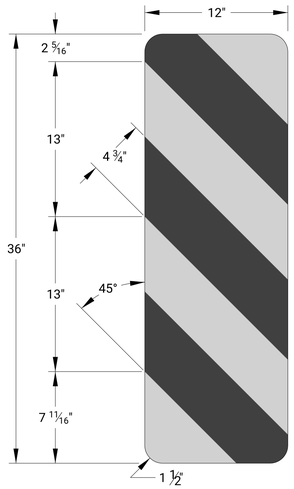
KDOT Graphics Certified

Sheet No. 53

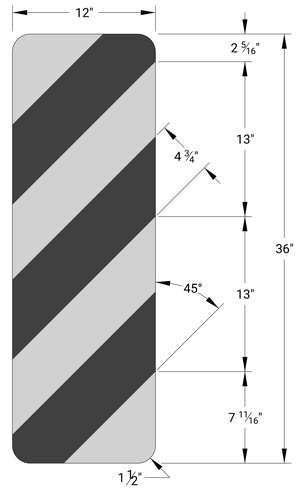
Plotted : 12/8/2021 5:49:03 PM
$$KDOTGRP$$

Drawn By : CAM
File : Permanent Signs.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	54	77

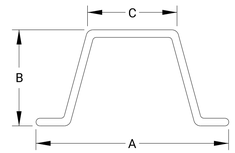


OM3-L



OM3-R

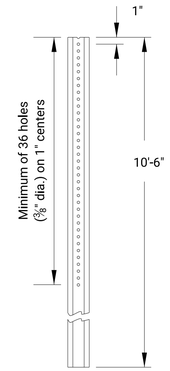
COLORS:
Yellow Background (Reflective)
Black Stripes (Non-reflective)



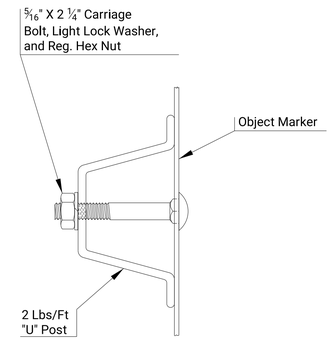
DIMENSIONS	
A	3 1/8
B	1 17/32
C	1 1/4

(Dimensions are nominal)

2 lb/ft "U" POST



PUNCHING DETAILS

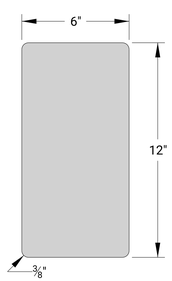


MOUNTING DETAILS

TYPE 3 OBJECT MARKER

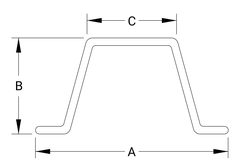
GENERAL NOTE:
See flat sheet sign blank standard sheets for the 6" x 12" and 12" x 36" sign blank details.

The object markers shall be covered with Type XI High Intensity yellow retrorelective sheeting.



OM2

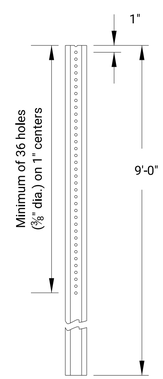
COLOR:
Yellow Background (Reflective)



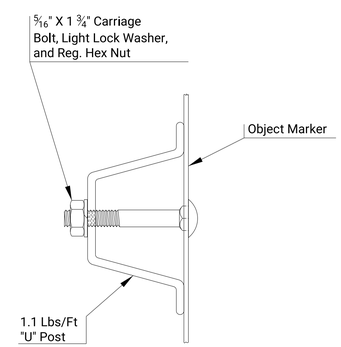
DIMENSIONS	
A	2 1/16
B	7/8
C	13/16

(Dimensions are nominal)

DELINEATOR POST
(1.1 lb/ft "U" Post)



PUNCHING DETAILS



MOUNTING DETAILS

TYPE 2 OBJECT MARKER

All dimensions are in inches unless otherwise noted.
See standard plan sheet TE590 for detailed specifications.

NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION
DESIGN DETAILS
FOR OBJECT MARKERS
TYPE 2 AND TYPE 3

TE416 10/01/19

FHWA APPROVAL		10/01/2019	APP'D	Eric W. Nichol	
DESIGNED	D.D.G.	DETAILED	D.D.G.	QUANTITIES	TRACED
DESIGN CK.	E.W.N.	DETAIL CK.	E.W.N.	QUAN. CK.	TRACE CK.

KDOT Graphics Certified 12-17-2019

KDOT Graphics Certified

Sheet No. 54

Plotted : 12/8/2021 5:49:04 PM
$$KDOTGRP$$

Drawn By : CAM
File : Permanent Signs.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	55	77

QUANTITIES SHEET

DELINEATORS AND OBJECT MARKERS

			RIGID DELINEATORS												FLEXIBLE DELINEATORS												OBJECT MARKERS				
			TYPE 'A'								TYPE 'B'				TYPE 'A'								TYPE 'B'				TYPE 2	TYPE 3			
			WHITE		WHITE (BACK TO BACK)		YELLOW		YELLOW (BACK TO BACK)		WHITE		YELLOW		WHITE		WHITE (BACK TO BACK)		YELLOW		YELLOW (BACK TO BACK)		WHITE		YELLOW			LEFT	RIGHT	CENTER	BACK TO BACK
BEGINNING STATION	ENDING STATION	LOCATION DESCRIPTION	'U' POST	BRACKET MOUNT	'U' POST	BRACKET MOUNT	'U' POST	BRACKET MOUNT	'U' POST	BRACKET MOUNT	'U' POST	BRACKET MOUNT	'U' POST	BRACKET MOUNT	TYPE I ANCHOR	TYPE III ANCHOR	TYPE I ANCHOR	TYPE III ANCHOR	TYPE I ANCHOR	TYPE III ANCHOR	TYPE I ANCHOR	TYPE III ANCHOR	TYPE I ANCHOR	TYPE III ANCHOR	TYPE I ANCHOR	TYPE III ANCHOR	'U' POST	'U' POST	'U' POST	'U' POST	'U' POST
87+70	87+70	Bridge (113) Lt. & Rt. Railing																									2				

NO.	DATE	REVISIONS	BY	APP'D
1	10/01/19	Added delineator & object marker types	D.D.G.	E.W.N.

KANSAS DEPARTMENT OF TRANSPORTATION

QUANTITIES SHEET
DELINEATORS & OBJECT MARKERS

TE436 7/1/03

FHWA APPROVAL		10/01/2019	APP'D	Steven A. Buckley	
DESIGNED	D.D.G.	DETAILED	K.D.S.	QUANTITIES	TRACED
DESIGN CK.	S.A.B.	DETAIL CK.	D.D.G.	QUAN. CK.	TRACE CK.

KDOT Graphics Certified 12-17-2019

KDOT Graphics Certified

Sheet No. 55

Plotted : 12/8/2021 5:49:04 PM
$$KDOTGRPS$$

Drawn By : CAM
File : Permanent Signs.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	56	77

RECAPITULATION OF SIGNING & DELINEATION BID ITEMS

BID ITEMS	APPROXIMATE QUANTITIES		UNITS
SIGN (FLAT SHEET) (HIGH PERFORMANCE)	◔ 4		SQUARE FOOT
SIGN (REINFORCED PANEL) (HIGH PERFORMANCE)			SQUARE FOOT
SIGN (OVERLAY) (HIGH PERFORMANCE)			SQUARE FOOT
SIGN POST (4" x 6" WOOD) (FLAT SHEET SIGN)	12		LINEAR FOOT
SIGN POST (4" x 6" WOOD) (REINFORCED PANEL SIGN)			LINEAR FOOT
SIGN POST (2 LB/FT "U" STEEL)			LINEAR FOOT
SIGN POST (3 LB/FT "U" STEEL)			LINEAR FOOT
SIGN POST (1-3/4" PERFORATED SQUARE STEEL TUBE)			LINEAR FOOT
SIGN POST (2" PERFORATED SQUARE STEEL TUBE)			LINEAR FOOT
SIGN POST (2-1/4" PERFORATED SQUARE STEEL TUBE)			LINEAR FOOT
SIGN POST (2-1/2" PERFORATED SQUARE STEEL TUBE)			LINEAR FOOT
SIGN POST (4" X 6" STRUCTURAL STEEL)			LINEAR FOOT
SIGN POST (3 I 2.25 ALUMINUM)			LINEAR FOOT
	A36	A572(ALT)	
SIGN POST (W6X9 STEEL BEAM)			LINEAR FOOT
SIGN POST (W10X12 STEEL BEAM)			LINEAR FOOT
SIGN POST (W10X22 STEEL BEAM)			LINEAR FOOT
SIGN POST STUB WITH BREAKAWAY BASE PLATE (W6X9)			EACH
SIGN POST STUB WITH BREAKAWAY BASE PLATE (W10X12)			EACH
SIGN POST STUB WITH BREAKAWAY BASE PLATE (W10X22)			EACH
SIGN POST BREAKAWAY BASE PLATE (W6X9)			EACH
SIGN POST BREAKAWAY BASE PLATE (W10X12)			EACH
SIGN POST BREAKAWAY BASE PLATE (W10X22)			EACH
SIGN POST FOOTING (24" Dia. CONCRETE)(STEEL BEAM POST)			LINEAR FOOT
SIGN POST FOOTING (30" Dia. CONCRETE)(STEEL BEAM POST)			LINEAR FOOT
SIGN POST FOOTING (18" Dia. CONCRETE)(WOOD POST)			LINEAR FOOT
SIGN POST FOOTING (1-3/4" PERFORATED SQUARE STEEL TUBE)			EACH
SIGN POST FOOTING (2" PERFORATED SQUARE STEEL TUBE)			EACH
SIGN POST FOOTING (2-1/4" PERFORATED SQUARE STEEL TUBE)			EACH
SIGN POST FOOTING (2-1/2" PERFORATED SQUARE STEEL TUBE)			EACH
SIGNING OBJECT MARKER (TYPE 2)	✱✱ 2		EACH
SIGNING OBJECT MARKER (TYPE 3)			EACH
SIGNING DELINEATOR (TYPE A)(WHITE RIGID, "U" POST)			EACH
SIGNING DELINEATOR (TYPE A)(YELLOW RIGID, "U" POST)			EACH
SIGNING DELINEATOR (TYPE B)(WHITE RIGID, "U" POST)			EACH
SIGNING DELINEATOR (TYPE B)(YELLOW RIGID, "U" POST)			EACH
SIGNING DELINEATOR (TYPE A)(WHITE FLEXIBLE)(TYPE I ANCHOR)			EACH
SIGNING DELINEATOR (TYPE A)(YELLOW FLEXIBLE)(TYPE I ANCHOR)			EACH
SIGNING DELINEATOR (TYPE B)(WHITE FLEXIBLE)(TYPE I ANCHOR)			EACH
SIGNING DELINEATOR (TYPE B)(YELLOW FLEXIBLE)(TYPE I ANCHOR)			EACH
SIGNING DELINEATOR (TYPE A)(WHITE FLEXIBLE)(TYPE 3 ANCHOR)			EACH
SIGNING DELINEATOR (TYPE A)(YELLOW FLEXIBLE)(TYPE 3 ANCHOR)			EACH
SIGNING DELINEATOR (TYPE B)(WHITE FLEXIBLE)(TYPE 3 ANCHOR)			EACH
SIGNING DELINEATOR (TYPE B)(YELLOW FLEXIBLE)(TYPE 3 ANCHOR)			EACH

BID ITEMS	APPROXIMATE QUANTITIES	UNITS

◔ R3-4 sign mounted on wood post, Sta. 103+93, Lt at west edge of the permanent crossover.
✱✱ OM-2 markers mounted on steel posts at east end of Bridge No. 113.

Note:
The contract bid for steel beam posts, stub posts, base plates, and footings will be based on A36 Grade steel quantities. When furnishing the A572 Grade alternate steel, the payment will be based on the equivalent A36 steel unit prices in the contract.

NO.	DATE	REVISIONS	BY	APP'D
2	10/01/19	Removed PSST coupler and changed the tables	D.D.G.	E.W.N.
1	7/23/10	Changed Bid Items as per Spec Book (2007)	D.D.G.	D.B.

KANSAS DEPARTMENT OF TRANSPORTATION
RECAPITULATION OF
SIGNING & DELINEATION
BID ITEMS

TE450 7/1/03

FHWA APPROVAL			10/01/2019	APP'D	Steven A. Buckley		
DESIGNED	D.D.G.	DETAILED	K.D.S.	QUANTITIES		TRACED	
DESIGN CK.	S.A.B.	DETAIL CK.	D.D.G.	QUAN. CK.		TRACE CK.	

KDOT Graphics Certified 12-17-2019

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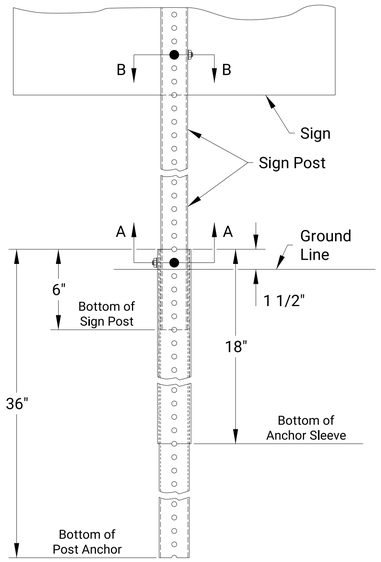
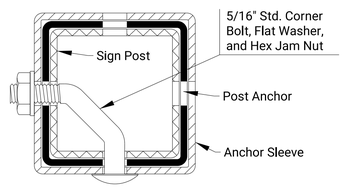
File : Permanent Signs.dgn

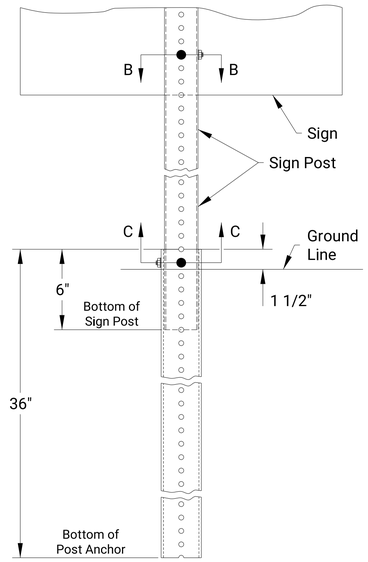
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	57	77

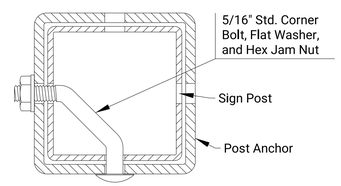




SECTION A-A

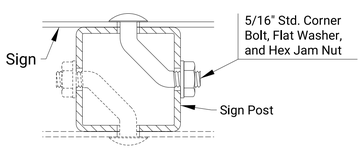
1 ¾", 2", OR 2 ¼" PSST SIGN POST





SECTION C-C

2 ½" PSST SIGN POST



SECTION B-B

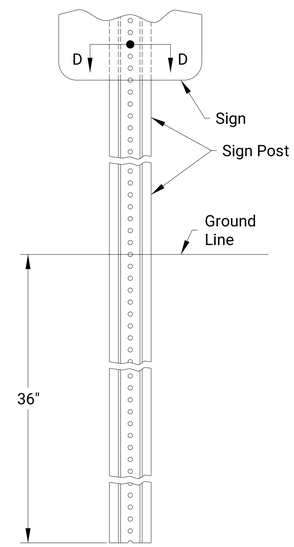
MATERIALS TABLE FOR SIGN POST AND FOOTING		
SIGN POST 12 GA. OR 14 GA.	FOOTING	
	POST ANCHOR	ANCHOR SLEEVE
1 ¾" X 1 ¾"	2" X 2" X 12 GA.	2 ¼" X 2 ¼" X 12 GA.
2" X 2"	2 ¼" X 2 ¼" X 12 GA.	2 ½" X 2 ½" X 12 GA.
2 ¼" X 2 ¼"	2 ½" X 2 ½" X 12 GA.	3" X 3" X 7 GA.
2 ½" X 2 ½"	3" X 3" X 7 GA.	Not Required

NOTE: 14 ga. posts must meet a certified minimum yield strength of 60,000 p.s.i.

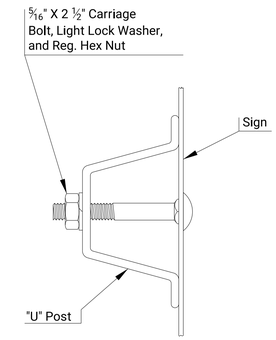
INSTALLATION PROCEDURES

1. Plumb and drive post anchor into the ground 18", if anchor sleeve is required, or to the specified height above the ground line.
2. Install anchor sleeve (if required) on the post anchor and align the first holes above the ground line. Plumb and drive post anchor with anchor sleeve into the ground to the specified height above the ground line.
3. Install sign post into the post anchor.

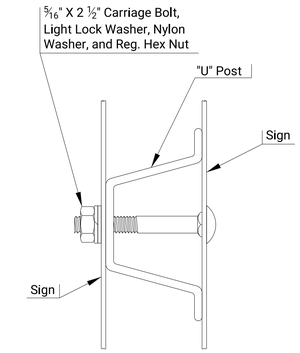
PERFORATED SQUARE STEEL TUBE POST (PSST)



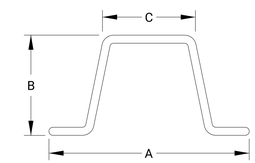
TYPICAL



SECTION D-D
(TYPICAL)



SECTION D-D
(BACK TO BACK)



DIM.	2 LBS/FT	3 LBS/FT
A	3 1/8 "	3 1/2 "
B	1 17/32 "	1 3/4 "
C	1 1/4 "	1 5/8 "

(Dimensions are nominal)

"U" POST

STEEL "U" POST

NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION

DETAILS FOR PERFORATED SQUARE STEEL TUBE POSTS (PSST) AND STEEL "U" POSTS

TE466 10/01/19

FHWA APPROVAL			10/01/2019	APP'D	Eric W.Nichol		
DESIGNED	D.D.G.	DETAILED	D.D.G.	QUANTITIES		TRACED	
DESIGN CK.	E.W.N.	DETAIL CK.	E.W.N.	QUAN. CK.		TRACE CK.	

KDOT Graphics Certified 12-17-2019

Sheet No. 57

KDOT Graphics Certified

Plotted : 12/8/2021 5:49:05 PM
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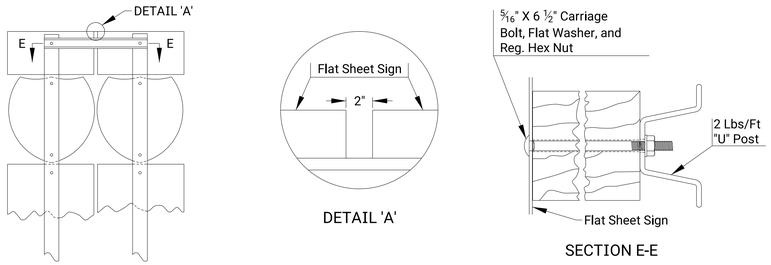
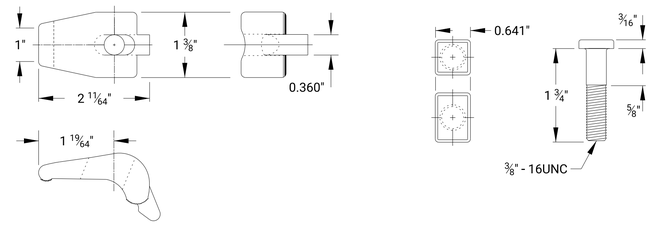
Drawn By : CAM
File : Permanent Signs.dgn

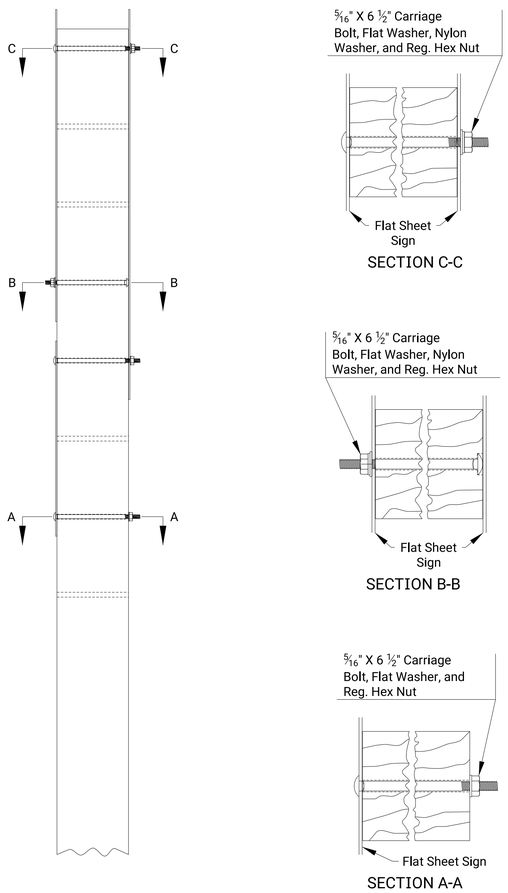
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	58	77



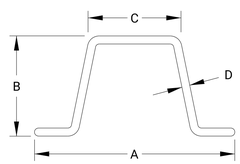
ROUTE MARKER ASSEMBLIES ATTACHMENT



ALUMINUM POST CLIP AND POST CLIP BOLT



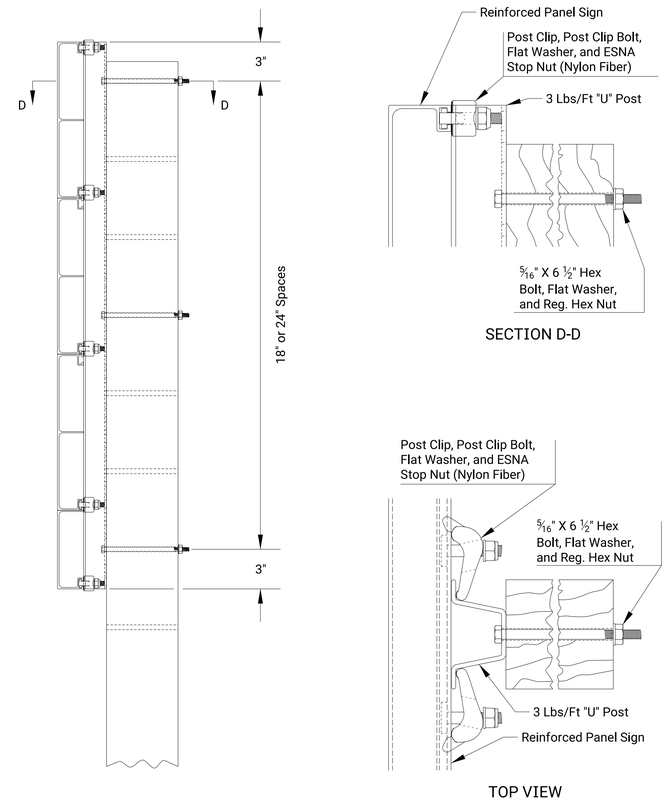
TYPICAL MOUNTING OF FLAT SHEET SIGNS



DIM.	2 LBS/FT	3 LBS/FT
A	3 1/8 "	3 1/2 "
B	1 17/32 "	1 3/4 "
C	1 1/4 "	1 5/8 "
D	1/8 "	9/64 "

(DIMENSIONS ARE NOMINAL)

"U" POST



TYPICAL MOUNTING OF REINFORCED PANEL SIGNS

NOTES:

The top of the post shall not extend above the top of the sign.

When signs are mounted back to back, the signs shall be mounted at their prescribed height. In general installations, the bottom holes of the signs should be aligned. In order to prevent having to drill holes in the signs or posts, the sign on the back should be raised and positioned such that the holes are aligned. When a sign is mounted on the back of the R1-1 (Stop) sign, that sign is to be centered vertically on the R1-1 sign. When a sign is mounted on the back of the R1-2 (Yield) sign, the top holes of the signs should be aligned.

The primary sign and supplemental sign are to be mounted at their prescribed height, but under no circumstances shall the signs overlap each other. If the primary sign cannot be mounted without overlapping, then it shall be raised above the supplemental sign.

Any additional mounting holes, either through the sign or post, shall be drilled by the contractor. All holes drilled in the post shall be treated with a perservative. All holes drilled in the sign shall be free of any defects and the sheeting around the hole shall not be damaged.

A nylon washer shall be placed against the sheeting when a nut is to be tightened against the sign face.

The 3 lb/ft steel "U" post used for reinforced panel sign installations is to be included in the bid item 'SIGN POST (4" x 6" WOOD) (REINFORCED PANEL SIGN)'.

When the 2 lb/ft steel "U" post is used for the route marker assemblies attachment, it shall be subsidiary to the bid item 'SIGN POST (4" x 6" WOOD) (FLAT SHEET SIGN)'.

The aluminum post clip bolt may have a rectangular head if the smaller dimension is equal to the square head dimension.

All dimensions are in inches

NO.	DATE	REVISIONS	BY	APP'D
1	10/01/19	Revised drawings and notes	D.D.G.	E.W.N.

KANSAS DEPARTMENT OF TRANSPORTATION

DETAILS FOR MOUNTING SIGNS ON WOOD POSTS

FLAT SHEET AND REINFORCED PANEL

TE481 7/1/03

FHWA APPROVAL		10/01/2019	APP'D	Steven A. Buckley	
DESIGNED	D.D.G.	DETAILED	A.A.D.	QUANTITIES	TRACED
DESIGN CK.	S.A.B.	DETAIL CK.	D.D.G.	QUAN. CK.	TRACE CK.

KDOT Graphics Certified 12-17-2019

KDOT Graphics Certified

Sheet No. 58

Plotted : 12/8/2021 5:49:05 PM
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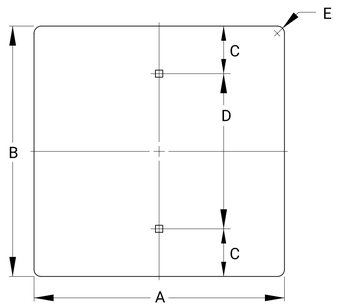
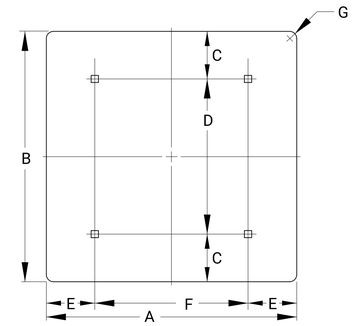
Drawn By : CAM
File : Permanent Signs.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	59	77





	SIGN SIZE	A	B	C	D	E	T	AREA
1	3 X 8	3	8	1	6	3/8	0.040	0.17
1	6 X 12	6	12	3	6	3/8	0.063	0.50
	12 X 6	12	6	1 1/2	3	3/4	0.063	0.50
	12 X 9	12	9	1 1/2	6	1 1/2	0.063	0.75
	12 X 18	12	18	3	12	1 1/2	0.063	1.50
	12 X 24	12	24	3	18	1 1/2	0.080	2.00
	12 X 36	12	36	6	24	1 1/2	0.080	3.00
	12 X 48	12	48	6	36	1 1/2	0.080	4.00
	18 X 6	18	6	1 1/2	3	1 1/2	0.063	0.75
	18 X 18	18	18	3	12	1 1/2	0.063	2.25
	18 X 30	18	24	3	24	1 1/2	0.080	3.75
	18 X 36	18	24	6	24	1 1/2	0.080	4.50
	18 X 42	18	24	6	30	1 1/2	0.080	5.25
	18 X 48	18	24	6	36	1 1/2	0.080	6.00
	21 X 15	21	15	1 1/2	12	1 1/2	0.080	2.19
	24 X 6	24	6	1 1/2	3	1 1/2	0.080	1.00
	24 X 12	24	12	3	6	1 1/2	0.080	2.00
	24 X 18	24	18	3	12	1 1/2	0.080	3.00
	24 X 24	24	24	3	18	1 1/2	0.080	4.00
	24 X 30	24	30	3	24	1 1/2	0.080	5.00
	24 X 36	24	36	6	24	1 1/2	0.080	6.00
	30 X 12	30	12	3	6	1 7/8	0.080	2.50
	30 X 15	30	15	1 1/2	12	1 7/8	0.080	3.13
	30 X 18	30	18	3	12	1 7/8	0.080	3.75
	30 X 21	30	21	1 1/2	18	1 1/2	0.080	4.38
	30 X 24	30	24	3	18	1 7/8	0.080	5.00
	30 X 30	30	30	3	24	1 7/8	0.080	6.25
	30 X 36	30	36	6	24	1 7/8	0.080	7.50
	36 X 12	36	12	3	6	1 1/2	0.080	3.00
	36 X 18	36	18	3	12	1 1/2	0.080	4.50
	36 X 24	36	24	3	18	1 1/2	0.080	6.00
	36 X 30	36	30	3	24	2 1/4	0.080	7.50
	36 X 36	36	36	6	24	2 1/4	0.080	9.00
3	45 X 36	45	36	3	30	2 1/4	0.100	11.25

	SIGN SIZE	A	B	C	D	E	F	G	T	AREA
	36 X 12	36	12	3	6	3	30	1 1/2	0.080	3.00
	36 X 30	36	30	3	24	3	30	2 1/4	0.080	7.50
	36 X 48	36	48	9	30	6	24	0	0.100	12.00
	36 X 60	36	60	12	36	6	24	0	0.100	15.00
2	36 X 72	36	72	6	60	6	24	0	0.100	18.00
	42 X 12	48	12	3	6	6	30	1 1/2	0.080	3.50
	42 X 18	48	18	3	12	6	30	1 1/2	0.080	5.25
	42 X 24	48	24	6	12	6	30	1 7/8	0.080	7.00
	42 X 36	48	36	6	24	6	30	0	0.100	10.50
	48 X 12	48	12	3	6	9	30	1 1/2	0.080	4.00
	48 X 18	48	18	3	12	9	30	1 1/2	0.080	6.00
	48 X 24	48	24	6	12	9	30	1 7/8	0.080	8.00
	48 X 30	48	30	6	18	9	30	0	0.100	10.00
	48 X 36	48	36	6	24	9	30	0	0.100	12.00
	48 X 42	48	42	6	30	9	30	0	0.100	14.00
	48 X 48	48	48	9	30	9	30	0	0.100	16.00
	48 X 60	48	60	12	36	9	30	0	0.100	20.00
2	48 X 72	48	72	6	60	9	30	0	0.100	24.00
2	48 X 96	48	96	12	72	9	30	0	0.100	32.00
	60 X 12	60	12	3	6	12	36	0	0.100	5.00

SIGN SIZE	A	B	C	D	E	F	G	T	AREA
60 X 18	60	18	3	12	12	36	0	0.100	7.50
60 X 24	60	24	6	12	12	36	0	0.100	10.00
60 X 30	60	30	6	18	12	36	0	0.100	12.50
60 X 36	60	36	6	24	12	36	0	0.100	15.00
60 X 42	60	42	6	30	12	36	0	0.100	17.50
60 X 48	60	48	9	30	12	36	0	0.100	20.00
72 X 12	72	12	3	6	15	42	0	0.100	6.00
72 X 18	72	18	3	12	15	42	0	0.100	9.00
72 X 24	72	24	6	12	15	42	0	0.100	12.00
72 X 30	72	30	6	18	15	36	0	0.100	15.00
72 X 36	72	36	6	24	15	42	0	0.100	18.00
72 X 42	72	42	6	30	15	42	0	0.100	21.00
72 X 48	72	48	9	30	15	42	0	0.100	24.00
84 X 12	84	18	3	6	18	48	0	0.100	7.00
84 X 18	84	18	3	12	18	48	0	0.100	10.50
84 X 24	84	24	6	12	18	48	0	0.100	14.00
84 X 30	84	30	6	18	18	48	0	0.100	17.50
84 X 36	84	36	6	24	18	48	0	0.100	21.00
84 X 42	84	42	6	30	18	48	0	0.100	24.50
84 X 48	84	48	9	30	18	48	0	0.100	28.00

NOTE:
All holes are 3/8" square, unless otherwise noted.

The dimension "T" is the thickness of the aluminum blank.

1 Holes shall be 5/16" diameter.

2 Dimension "D" requires a center hole.

3 Additional hole 12" below top hole.

All dimensions are in inches.

NO.	DATE	REVISIONS	BY	APP'D
1	10/01/19	Update sign blank details and dimensions	D.D.G.	E.W.N.

KANSAS DEPARTMENT OF TRANSPORTATION

SIGN BLANK DETAILS FOR FLAT SHEET SIGNS

TE506 7/1/03

FHWA APPROVAL		10/01/2019	APP'D	Steven A. Buckley	
DESIGNED	D.D.G.	DETAILED	A.A.D.	QUANTITIES	TRACED
DESIGN CK.	S.A.B.	DETAIL CK.	D.D.G.	QUAN. CK.	TRACE CK.

KDOT Graphics Certified 12-17-2019

KDOT Graphics Certified

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Drawn By : CAM
File : Permanent Signs.dgn

DETAILED SPECIFICATIONS FOR FLAT SHEET SIGNS

ALL NEW FLAT SHEET SIGN BLANKS SHALL BE OF THE ALUMINUM ALLOY AND THICKNESS SHOWN ON THE FLAT SHEET BLANK DETAIL SHEETS.

FLAT SHEET BLANKS SHALL BE USED FOR SIGNS THAT ARE LESS THAN OR EQUAL TO 7'-0" IN LENGTH AND/OR LESS THAN OR EQUAL TO 4'-0" IN HEIGHT. FLAT SHEET BLANKS SHALL ALSO BE USED FOR SIGNS THAT ARE 4'-0" IN LENGTH AND LESS THAN OR EQUAL TO 8'-0" IN HEIGHT.

THE DESIGN DETAILS FOR SIGNS (COLOR, LETTER HEIGHT, AND LETTER SERIES) SHALL BE AS SHOWN IN THE 'STANDARD HIGHWAY SIGNS' MANUAL (2004 EDITION), UNLESS OTHER DETAILS ARE SHOWN IN THE PLANS.

ALL SIGN FACES WITH BLUE, GREEN, RED, YELLOW, FLUORESCENT YELLOW GREEN, BROWN, OR WHITE BACKGROUND SHALL BE COVERED WITH TYPE IV HIGH INTENSITY RETROREFLECTIVE SHEETING.

THE TYPE OF ADHESIVE USED FOR RETROREFLECTIVE SHEETING OR LETTERING FILM SHALL BE HEAT ACTIVATED OR PRESSURE SENSITIVE.

THE SIGN FACES SHALL BE DIRECT SCREEN PROCESS, REVERSE SCREEN PROCESS, OR DIRECT APPLIED LEGEND.

DETAILED SPECIFICATIONS FOR STRUCTURAL EXTRUDED PANEL SIGNS

ALL NEW REINFORCED SIGN PANELS SHALL BE OF THE FABRICATION, ALUMINUM ALLOY, AND THICKNESS SHOWN ON THE REINFORCED PANEL DETAIL SHEETS. IF EXTRUSHEET FABRICATED SIGN PANELS ARE USED, THEY SHALL BE OF THE LENGTH, WIDTH AND IN THE POSITION SHOWN. IF EXTRUSHEET FABRICATED PANEL DIMENSIONS ARE NOT SHOWN, A LINE OF LEGEND SHOULD BE PLACED ENTIRELY ON ONE PANEL. IF EXTRUDED FABRICATED SIGN PANELS ARE USED, EITHER 1'-0" OR 6" PANELS SHALL BE USED. THE 1'-0" PANELS SHALL BE USED ONLY AT THE TOP OR BOTTOM OF SIGNS.

REINFORCED PANELS SHALL BE USED FOR SIGNS THAT ARE GREATER THAN 7'-0" IN LENGTH OR GREATER THAN 4'-0" IN HEIGHT.

ALL SIGN FACES SHALL BE COVERED WITH TYPE IV HIGH INTENSITY RETROREFLECTIVE SHEETING.

THE RETROREFLECTIVE SHEETING USED FOR THE DIRECT APPLIED LEGEND, AND DIRECT APPLIED BORDERS SHALL BE TYPE IV HIGH INTENSITY RETROREFLECTIVE SHEETING.

THE TYPE OF ADHESIVE USED FOR RETROREFLECTIVE SHEETING OR LETTERING FILM SHALL BE HEAT ACTIVATED OR PRESSURE SENSITIVE.

LETTERS AND NUMBERS ON REINFORCED PANEL SIGNS ARE MODIFIED SERIES "E" UNLESS OTHERWISE SHOWN.

SPACING TABLE DIMENSIONS ARE IN INCHES.

NO.	DATE	REVISIONS	BY	APP'D
1	7/23/10	Changed Notes and Sheeting Type	D.D.G.	D.B.

KANSAS DEPARTMENT OF TRANSPORTATION

DETAILS SPECIFICATIONS
FOR REINFORCED SIGN PANELS
AND FLAT SHEET SIGNS

TE590 7/1/03

FHWA APPROVAL		7/23/2010	APP'D	Steven A. Buckley	
DESIGNED	D.D.G.	DETAILED	K.D.S.	QUANTITIES	TRACED
DESIGN CK.	S.A.B.	DETAIL CK.	D.D.G.	QUAN. CK.	TRACE CK.

KDOT Graphics Certified 10-04-2010

KDOT Graphics Certified

Sheet No. 60

Drawn By : CAM
File : Permanent Signs.dgn
Plotted : 12/8/2021 5:49:06 PM
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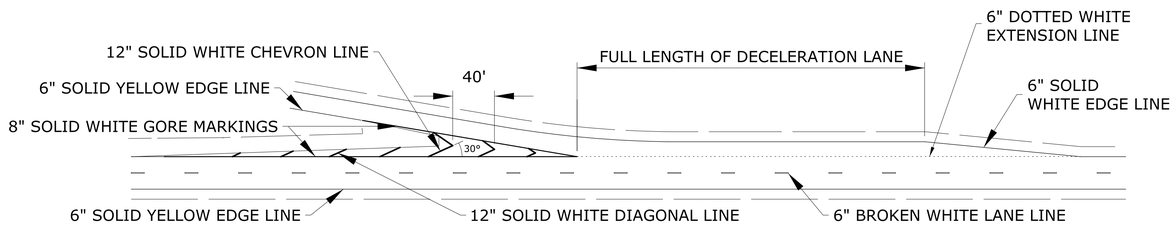
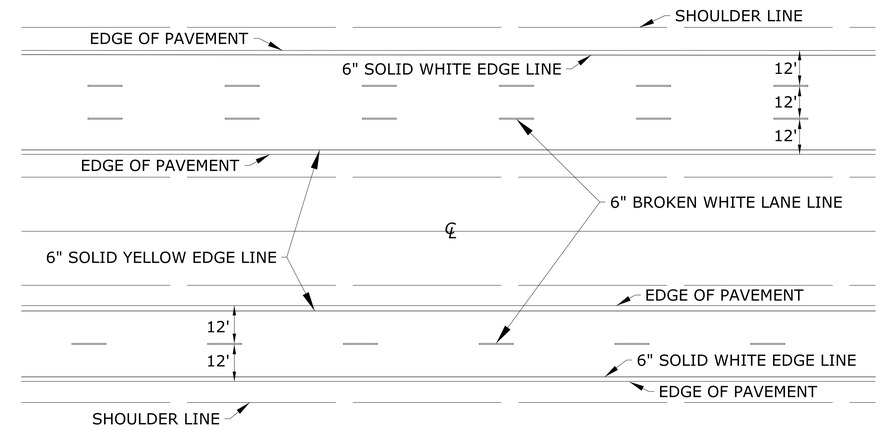
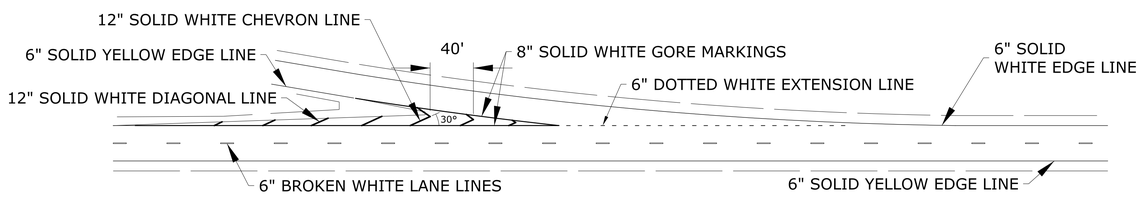
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	61	77



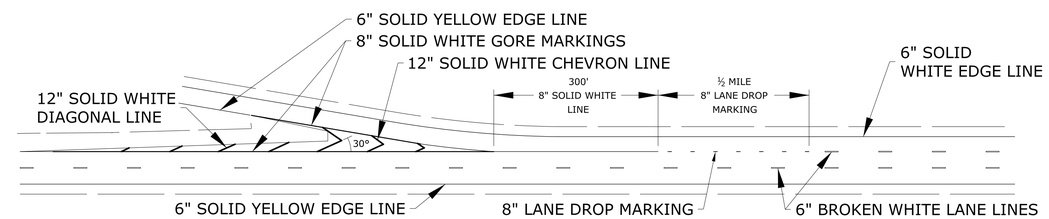
TYPICAL DECELERATION EXIT RAMP



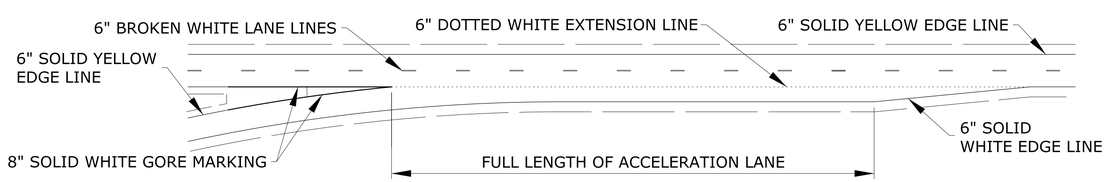
TYPICAL LANE LINE AND EDGE LINE MARKINGS
FOR FOUR LANE AND SIX LANE DIVIDED HIGHWAYS



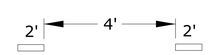
TYPICAL TAPERED EXIT RAMP



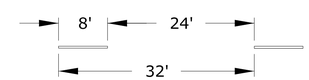
TYPICAL LANE DROP



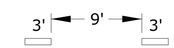
TYPICAL ACCELERATION RAMP



TYPICAL SPACING
FOR DOTTED EXTENSION
LINES, UNLESS OTHERWISE
NOTED ON PLANS.



TYPICAL SPACING
FOR BROKEN LINES
UNLESS OTHERWISE
NOTED ON PLANS.



TYPICAL SPACING
FOR LANE DROP.
UNLESS OTHERWISE
NOTED ON PLANS.

NOTE:
LONGITUDINAL PAVEMENT MARKING LINES SHALL BE OFFSET A MINIMUM OF 2" FROM LONGITUDINAL PAVEMENT JOINTS.

NOTE:
AT RAMP TERMINALS WITH CROSS-ROADS, WRAP 6" EDGE LINES AROUND RADII.

NOTE:
ON NON I, US, AND K ROUTES, 4" EDGE LINES MAY BE INSTALLED.
6" EDGE LINES ARE NOT REQUIRED ON NON I, US, AND K ROUTES.

NO.	DATE	REVISIONS	BY	APP'D
2	5/25/12	Dotted Extension Lines and Lane Drop Lines	B.A.H.	B.D.G.
1	7/26/05	New FHWA Approval Date	J.F.F.	B.D.G.

KANSAS DEPARTMENT OF TRANSPORTATION

TYPICAL PAVEMENT
MARKING DETAILS FOR
MULTI-LANE DIVIDED
ROADWAYS

TE307

FHWA APPROVAL			5/25/2012	APP'D	Brian D. Gower		
DESIGNED	J.F.F.	DETAILED	J.F.F.	QUANTITIES		TRACED	
DESIGN CK.	B.D.G.	DETAIL CK.	B.D.G.	QUAN. CK.		TRACE CK.	

Drawn By : CAM
File : Permanent Pavement Marking.dgn
Plotted : 12/8/2021 5:49:06 PM
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STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	62	77

SUMMARY OF PAVEMENT MARKINGS

LOCATION	4" Solid WHITE Edge Line	6" Solid WHITE Edge Line	6" Broken WHITE Lane Line	6" Broken WHITE Lane Line (PCP)	6" Dotted WHITE Extension Line	6" Broken WHITE Lane Drop Line	6" Solid WHITE Lane Line	8" Broken WHITE Lane Drop Line	8" Solid WHITE Gore Line	8" Dotted WHITE Extension Line	12" Solid WHITE Diagonal Line	12" Solid WHITE Chevron Line	12" Solid WHITE Type I Crosswalk Line	24" Solid WHITE Type II Crosswalk Line	24" Solid WHITE Stop Line	4" Solid YELLOW Edge Line	4" Solid YELLOW Double Line	4" Solid YELLOW Line	4" Broken YELLOW Line	6" Solid YELLOW Edge Line	12" Solid YELLOW Diagonal Line
Sta. 57+00 to Sta. 100+00, EB		4,300		4,300																4,300	
Sta. 65+00 to Sta. 123+50, WB		5,850		5,850																5,850	
Sta. 95+00 to 97+50, WB K-251 Gore									250												
Sta. 97+50 to 100+50, WB Aux. Lane									300												
Sta. 100+50 to 115+50, WB Aux. Lane					1,500																
TOTALS		10,150		2,544	500				550											10,150	

RECAPITULATION OF QUANTITIES

ITEMS	TOTAL	UNITS
PAVEMENT MARKING (MULTI-COMPONENT)(WHITE)(4")		FT
PAVEMENT MARKING (MULTI-COMPONENT)(WHITE)(6")	10,650	FT
PAVEMENT MARKING (MULTI-COMPONENT)(WHITE)(8")	550	FT
PAVEMENT MARKING (MULTI-COMPONENT)(WHITE)(12")		FT
PAVEMENT MARKING (MULTI-COMPONENT)(YELLOW)(4")		FT
PAVEMENT MARKING (MULTI-COMPONENT)(YELLOW)(6")	10,150	FT
PAVEMENT MARKING (MULTI-COMPONENT)(YELLOW)(12")		FT
PAVEMENT MARKING (THERMOPLASTIC)(WHITE)(4")		FT
PAVEMENT MARKING (THERMOPLASTIC)(WHITE)(6")		FT
PAVEMENT MARKING (THERMOPLASTIC)(WHITE)(8")		FT
PAVEMENT MARKING (THERMOPLASTIC)(WHITE)(12")		FT
PAVEMENT MARKING (THERMOPLASTIC)(YELLOW)(4")		FT
PAVEMENT MARKING (THERMOPLASTIC)(YELLOW)(6")		FT
PAVEMENT MARKING (THERMOPLASTIC)(YELLOW)(12")		FT
PAVEMENT MARKING (EPOXY)(WHITE)(4")		FT
PAVEMENT MARKING (EPOXY)(WHITE)(6")		FT
PAVEMENT MARKING (EPOXY)(WHITE)(8")		FT
PAVEMENT MARKING (EPOXY)(WHITE)(12")		FT
PAVEMENT MARKING (EPOXY)(YELLOW)(4")		FT
PAVEMENT MARKING (EPOXY)(YELLOW)(6")		FT
PAVEMENT MARKING (EPOXY)(YELLOW)(12")		FT
PAVEMENT MARKING (INTERSECTION GRADE)(WHITE)(12")		FT
PAVEMENT MARKING (INTERSECTION GRADE)(WHITE)(24")		FT
PAVEMENT MARKING (INTERSECTION GRADE)(YELLOW)(12")		FT
PAVEMENT MARKING SYMBOL (INTERSECTION GRADE)(WHITE)( )		EACH
PAVEMENT MARKING SYMBOL (INTERSECTION GRADE)(WHITE)( )		EACH
PAVEMENT MARKING SYMBOL (INTERSECTION GRADE)(WHITE)( )		EACH
PAVEMENT MARKING SYMBOL (INTERSECTION GRADE)(WHITE)( )		EACH
PAVEMENT MARKING SYMBOL (INTERSECTION GRADE)(WHITE)( )		EACH
PAVEMENT MARKING SYMBOL (INTERSECTION GRADE)(US-SHIELD)( )		EACH
PAVEMENT MARKING SYMBOL (INTERSECTION GRADE)(K-SHIELD)( )		EACH
PAVEMENT MARKING SYMBOL (INTERSECTION GRADE)(I-SHIELD)( )		EACH
PAVEMENT MARKING (PATTERNED COLD PLASTIC)(WHITE)(6")	2,544	FT
PAVEMENT MARKING (PATTERNED COLD PLASTIC)(WHITE)(8")		FT
PAVEMENT MARKING (PATTERNED COLD PLASTIC)(WHITE)(12")		FT
PAVEMENT MARKING REMOVAL	19,254	FT

SUMMARY OF WORD & SYMBOL MARKINGS

LOCATION							STOP	ONLY	X-ING	SCHOOL	70	435	24	400	18						
TOTALS																					

NOTE:
WORDS & SYMBOLS SHALL CONFORM TO THE LATEST EDITION OF "STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS" PRINTED BY THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION.

PRIOR TO COMMENCEMENT OF PAVEMENT MARKING WORK THE ENGINEER WILL ESTABLISH THE LIMITS FOR "NO PASSING" ZONES. THESE LIMITS SHALL BE USED FOR THE LOCATION OF "NO PASSING" LINES AND FOR THE COMPUTATION OF ACTUAL MARKING QUANTITIES FOR THIS LINE TYPE.

NOTE: FOR SPECIFIC PAVEMENT MARKING DETAILS AND DIMENSIONS SEE PLAN SHEETS

NOTE: ALL TOTALS REFLECT ACTUAL QUANTITY OF PAVEMENT MARKING MATERIALS REQUIRED.

NO.	DATE	REVISIONS	BY	APP'D
2	5/25/12	Added Line Types, Symbols, and Shields	B.A.H.	B.D.G.
1	7/26/05	New FHWA Approval Date	J.F.F.	B.D.G.

KANSAS DEPARTMENT OF TRANSPORTATION

SUMMARY AND RECAPITULATION OF PAVEMENT MARKING QUANTITIES

TE311

FHWA APPROVAL			5/25/2012	APP'D	Brian D. Gower		
DESIGNED	J.F.F.	DETAILED	J.F.F.	QUANTITIES		TRACED	
DESIGN CK.	B.D.G.	DETAIL CK.	B.D.G.	QUAN. CK.		TRACE CK.	

Drawn By : CAM
File : Permanent Pavement Marking.dgn
Plotted : 12/8/2021 5:49:07 PM
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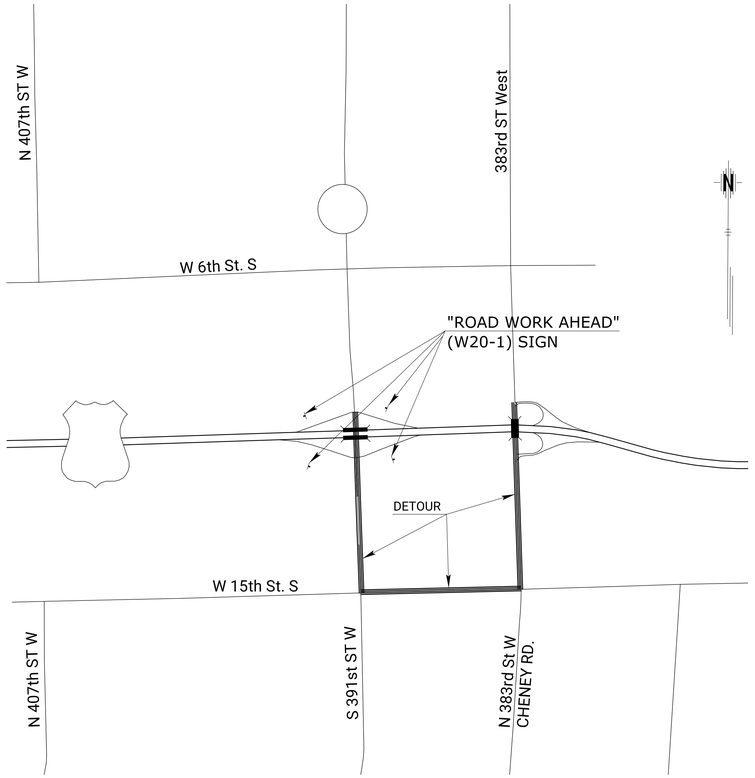
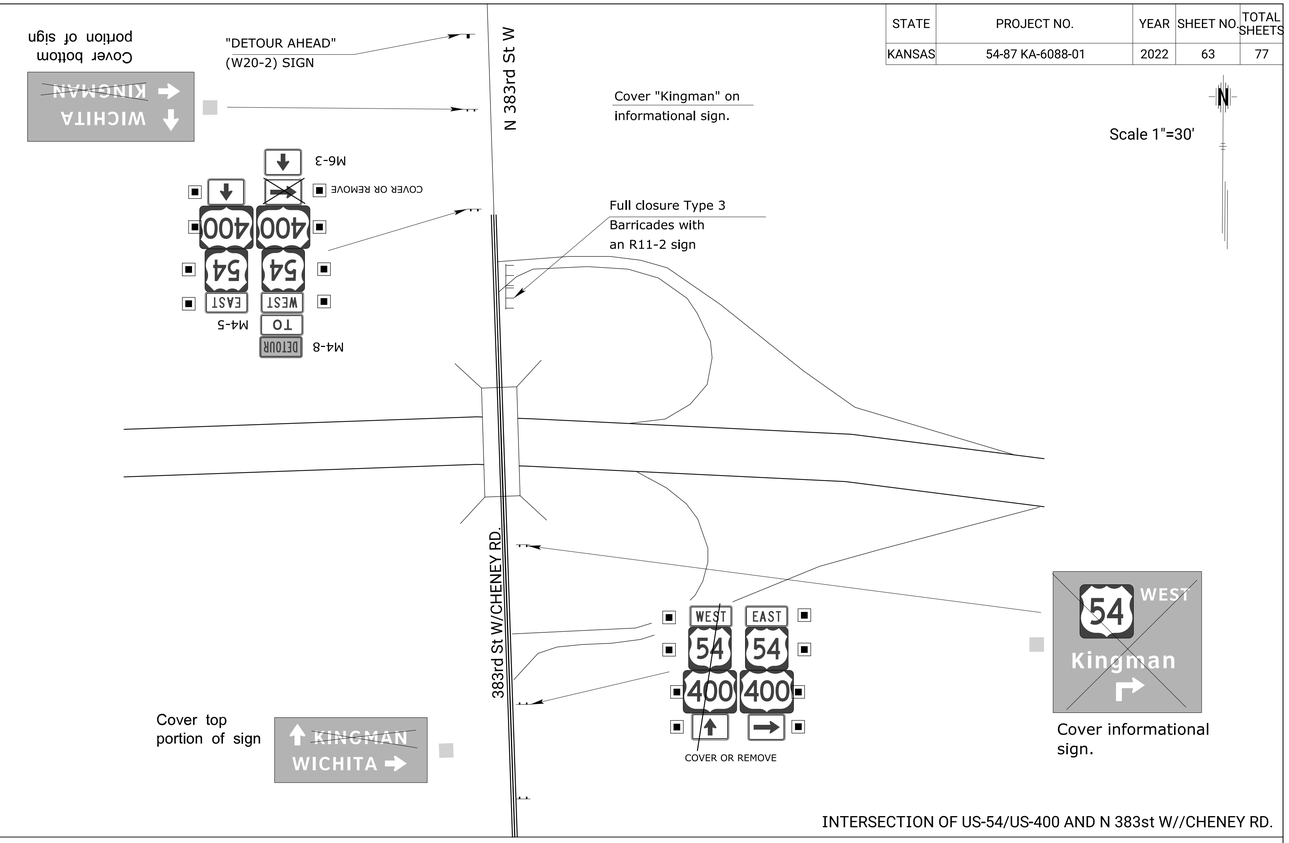
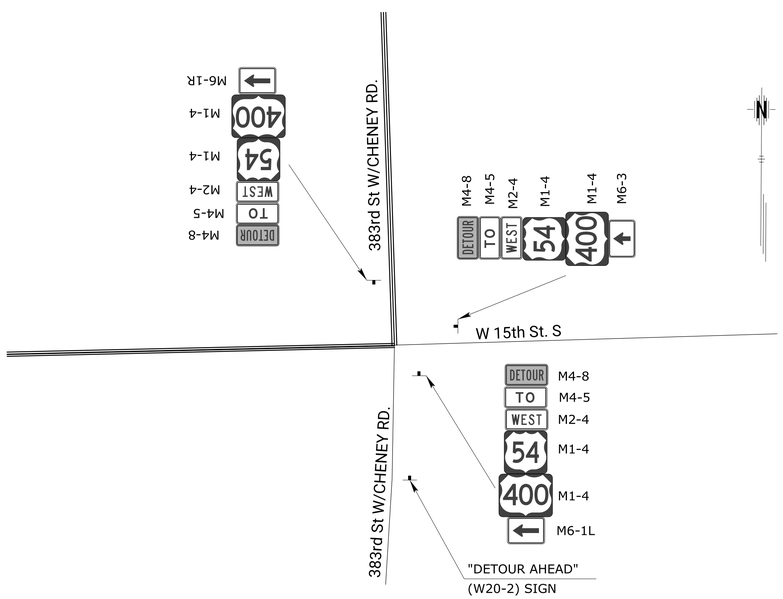
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	63	77



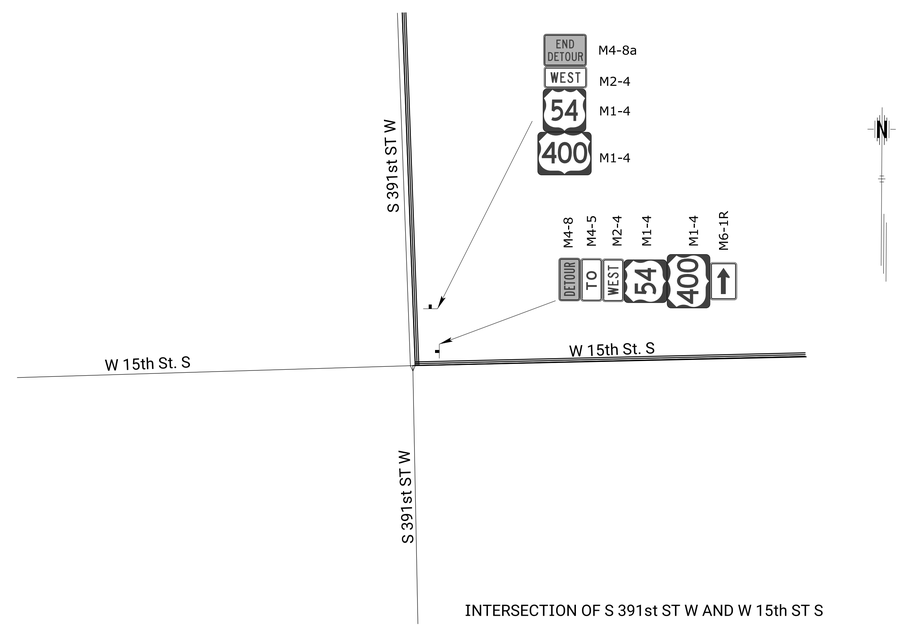
WESTBOUND ON-RAMP DETOUR FOR US-54/US-400 AND N 383st W//CHENEY RD. INTERCHANGE



INTERSECTION OF US-54/US-400 AND N 383st W//CHENEY RD.



INTERSECTION OF W 15th ST S AND N 383st W/CHENEY RD.



INTERSECTION OF S 391st ST W AND W 15th ST S

NOT TO SCALE

- ○ TYPE A LOW INTENSITY WARNING LIGHT
- ⊔ TYPE III BARRICADES
- ▣ EXISTING

NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION

DETOUR FOR WESTBOUND
RAMP AT N 383st W

KDOT Graphics Certified 11-20-2021

KDOT Graphics Certified

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	64	77

CONSTRUCTION SEQUENCE

Phase 1: Contractor shall install temporary crossovers and the temporary guardrail installations.

Phase 2: Switch westbound traffic to the crossovers and construct the bridge redeck and pavement approaches.

Phase 3: Place westbound traffic on the mainline pavement and remove the temporary crossovers and temporary guardrail installations.

GENERAL NOTES

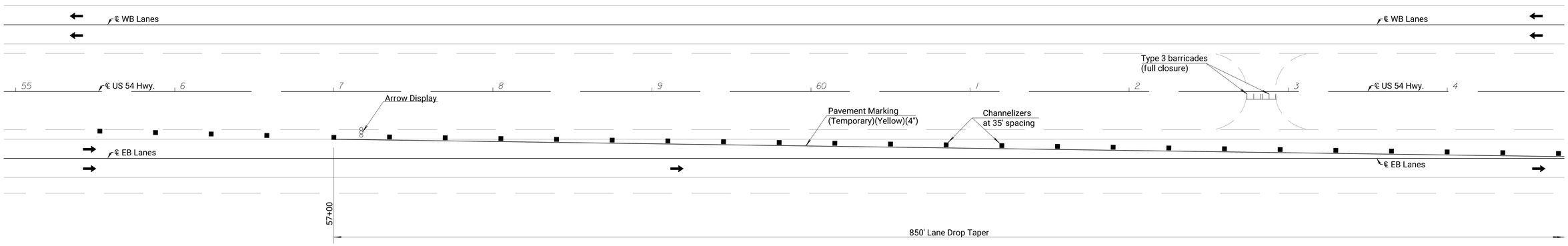
Contractor shall install signs and devices in accordance with Standards TE 740 and TE 744. Additional "ROAD WORK AHEAD" (W20-1) signs shall placed at the top of each exit and entrance ramp.

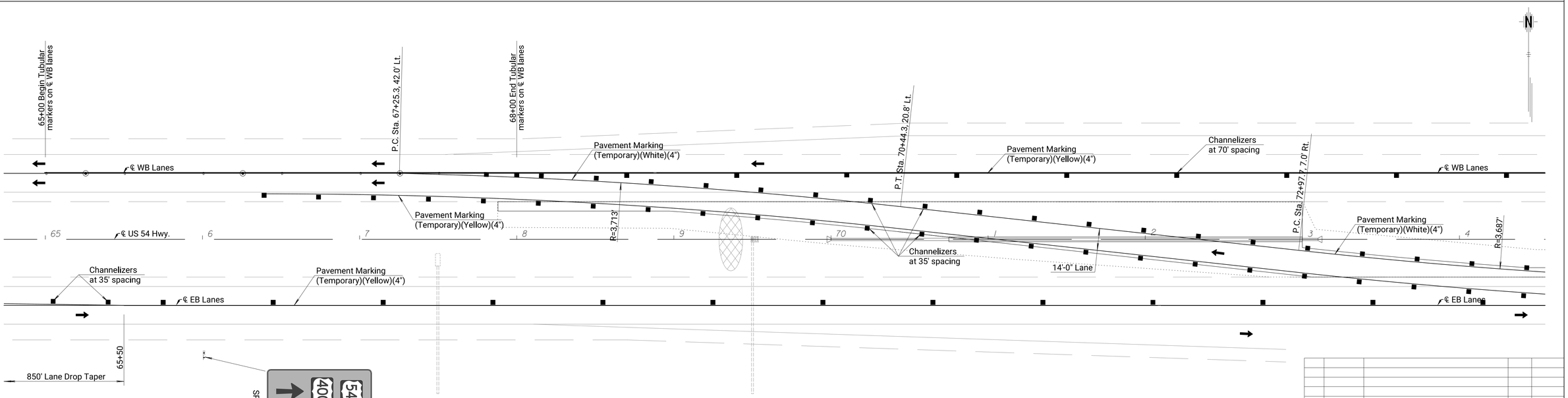
Signs for constructing the crossovers shall follow Standard TE 744 for a lane drop.

When there is work overhead on K-251, lane drops may be placed on northbound K-251 as needed using Standard TE 744. Traffic on southbund K-251 shall be placed in one lane in accordance with TE 744 and shifted as needed.

The westbound ramp detour on 383rd St W/CHENEY Rd. shall be in place before traffic is switched to the crossovers.

Scale 1"=30'





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NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION

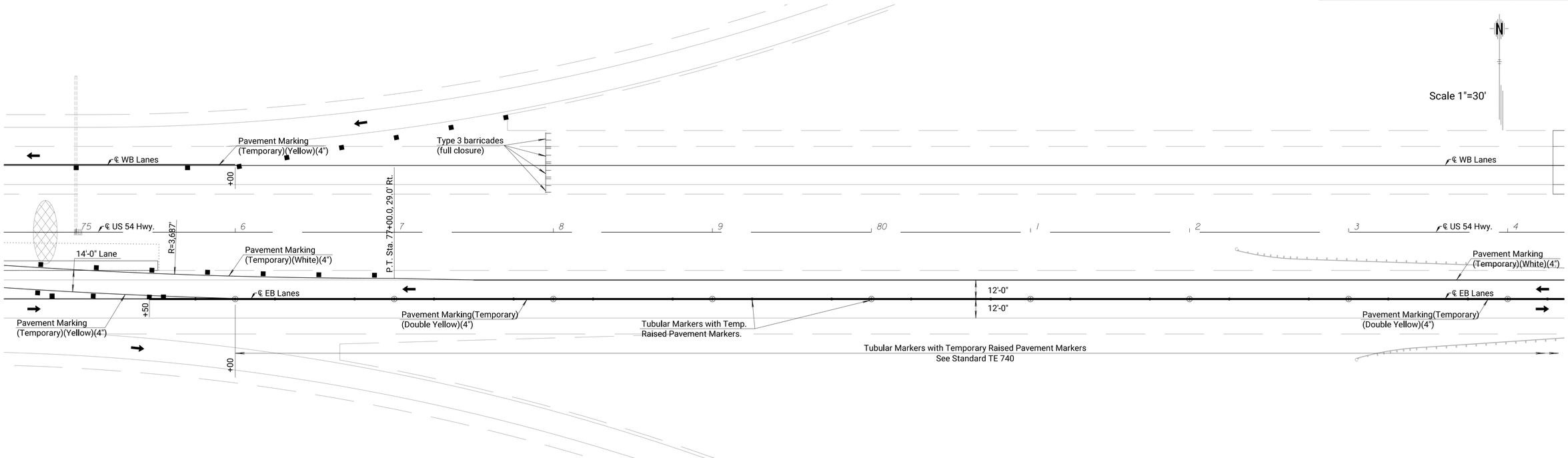
TRAFFIC CONTROL LAYOUT

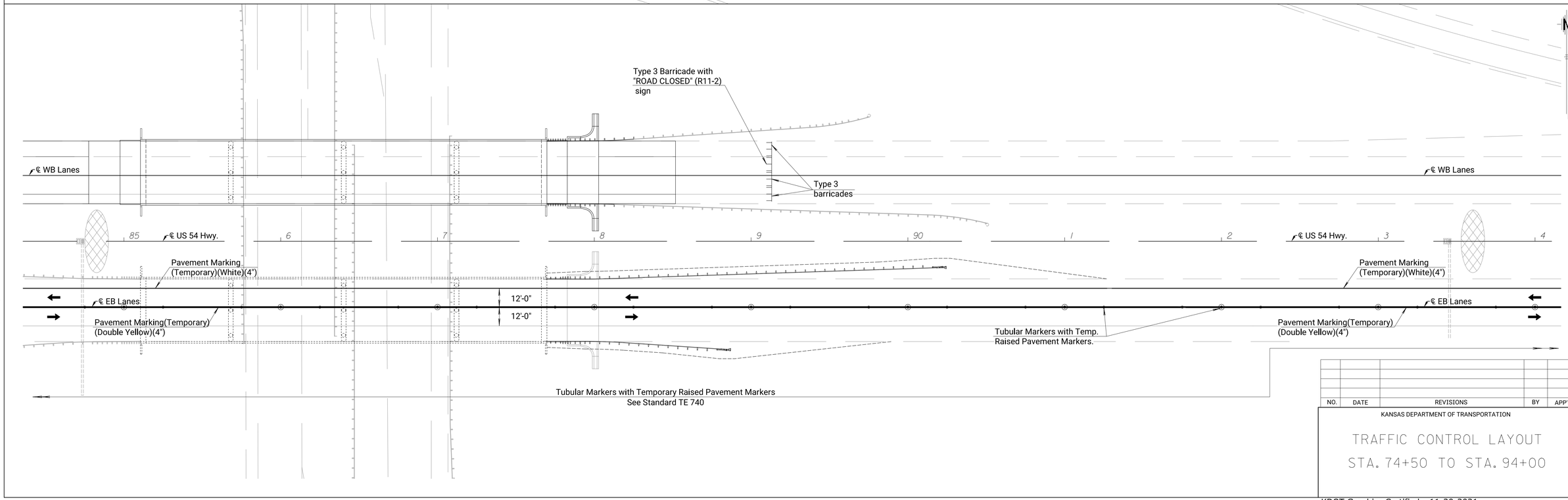
STA. 55+00 TO STA. 74+50

KDOT Graphics Certified 11-20-2021

KDOT Graphics Certified

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	65	77





NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL LAYOUT

STA. 74+50 TO STA. 94+00

KDOT Graphics Certified 11-20-2021

KDOT Graphics Certified

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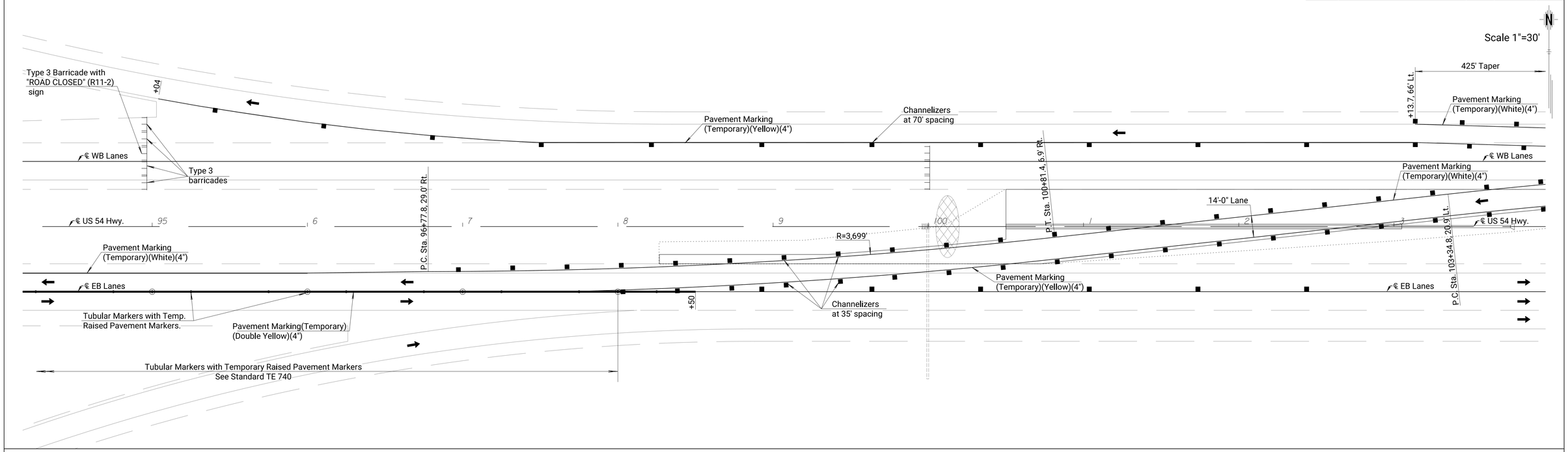
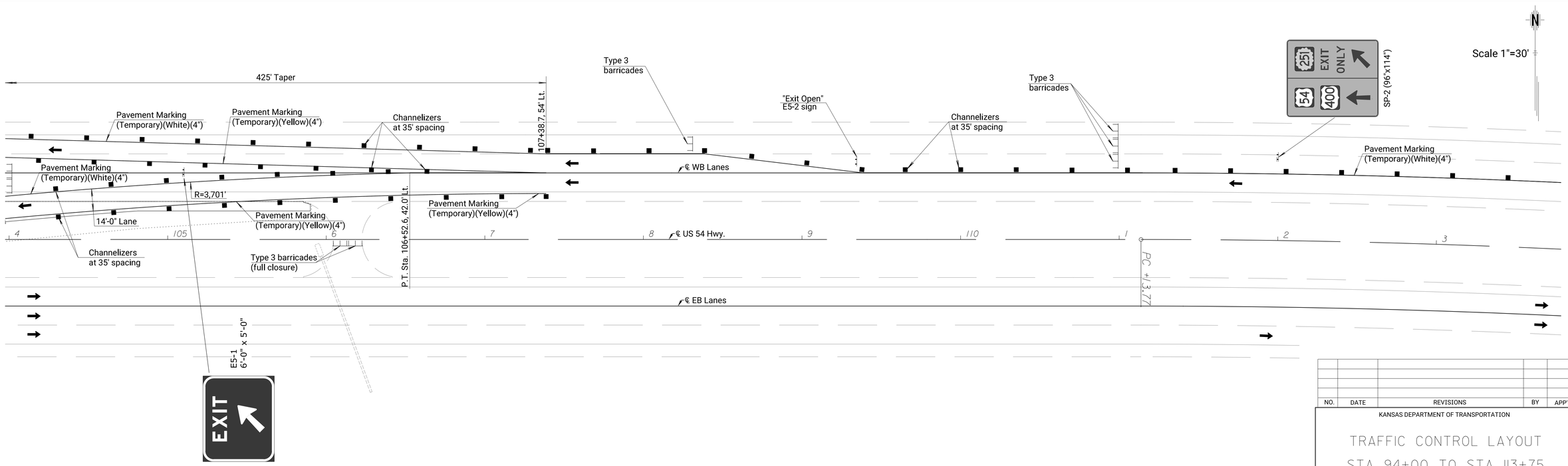
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	66	77





NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL LAYOUT

STA. 94+00 TO STA. 113+75

KDOT Graphics Certified 11-20-2021

KDOT Graphics Certified

12/8/2021
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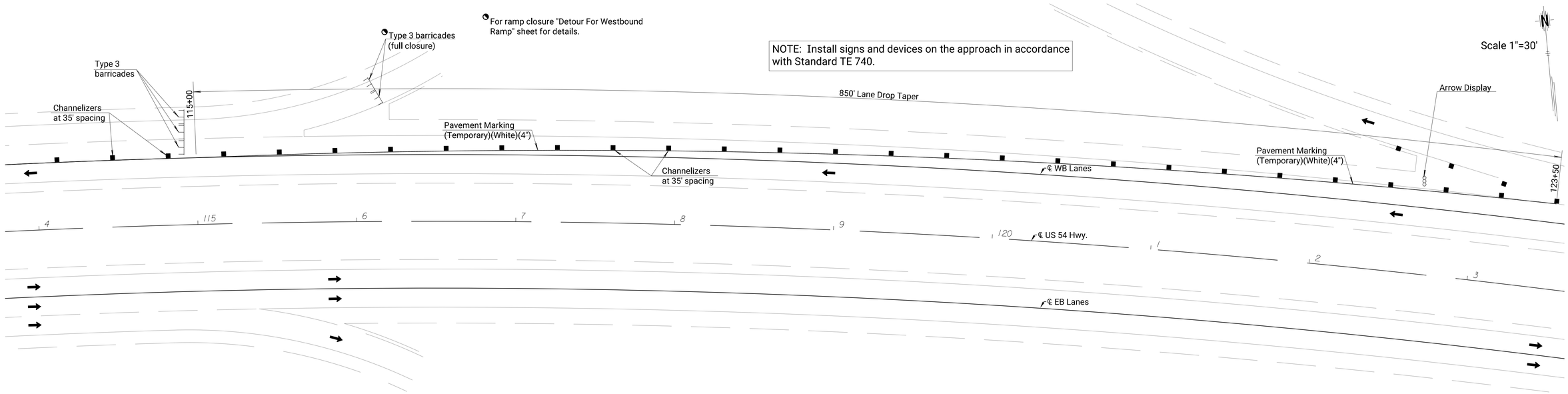
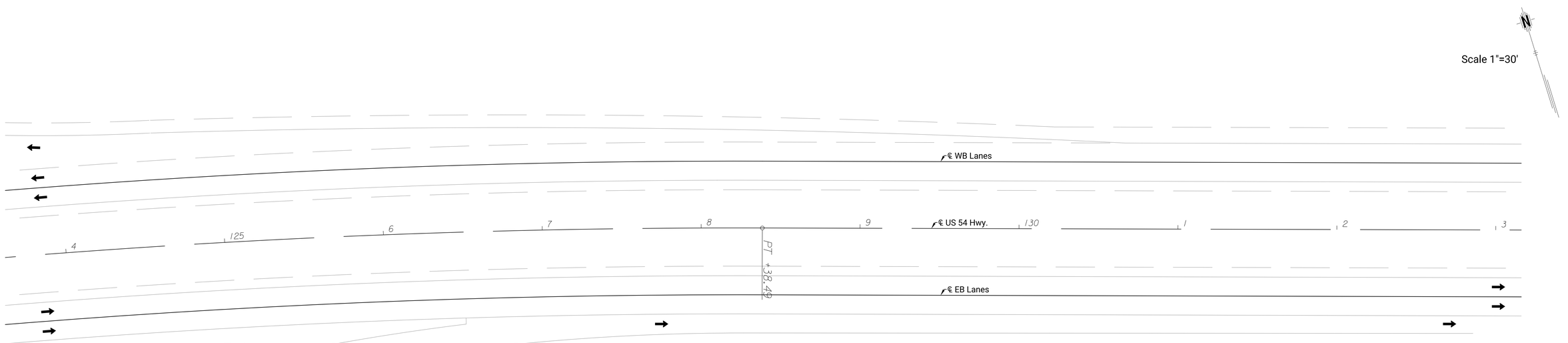
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	67	77



NOTE: Install signs and devices on the approach in accordance with Standard TE 740.



NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL LAYOUT

STA. 113+75 TO STA. 133+00

KDOT Graphics Certified 11-20-2021

KDOT Graphics Certified

Sheet No. 67

12/8/2021
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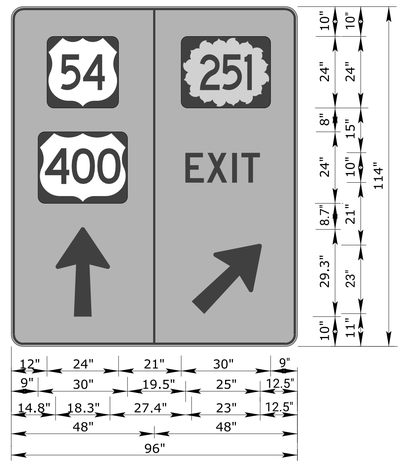
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54–87 KA–6088–01	2022	68	77

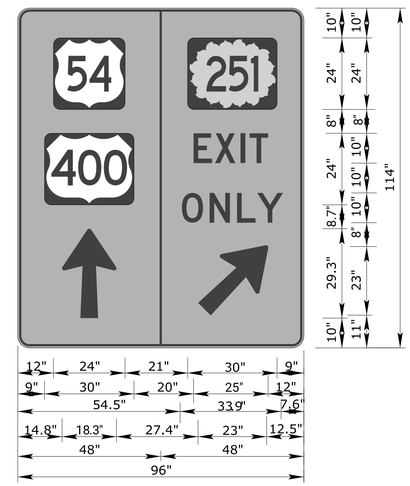
SP-1 (96"x114")



1.5" Radius, 0.6" Border, 0.4" Indent, Black on Orange
"EXIT", D 2K
Table of letter and object lefts

54	251			
12"	57"			
400	E	X	I	T
9"	58.5"	65.7"	74.2"	77.3"
↑	↗			
14.8"	60.5"			

SP-2 (96"x114")



1.5" Radius, 0.6" Border, 0.4" Indent, Black on Orange
"EXIT", D 2K, "ONLY", D 2K
Table of letter and object lefts

54	251			
12"	57"			
400	E	X	I	T
9"	58.5"	65.7"	74.2"	77.3"
O	N	L	Y	
54.5"	65.7"	74.2"	77.3"	
↑	↗			
14.8"	60.5"			

Colors
Legend - Black (Non-reflective)
Background - Orange (Reflective)

Special work zone signs signs shall
be black lettering on an orange background.

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

SPECIAL WORK ZONE SIGNS

PROJ. NO. 54-87 KA-6088-01 SEDGWICK CO.

SHEET NO. OF	SCALE	APP'D	
DESIGNED	DETAILED CAM	QUANTITIES	CADD DIB
DESIGN CK.	DETAIL CK.	QUAN. CK.	CADD CK.

KDOT Graphics Certified 11-04-2021

KDOT Graphics Certified

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STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	69	77

1) Design Speed: Those items delegated to temporary traffic control should be designed and installed using the posted/legal speed of the roadway prior to work starting.

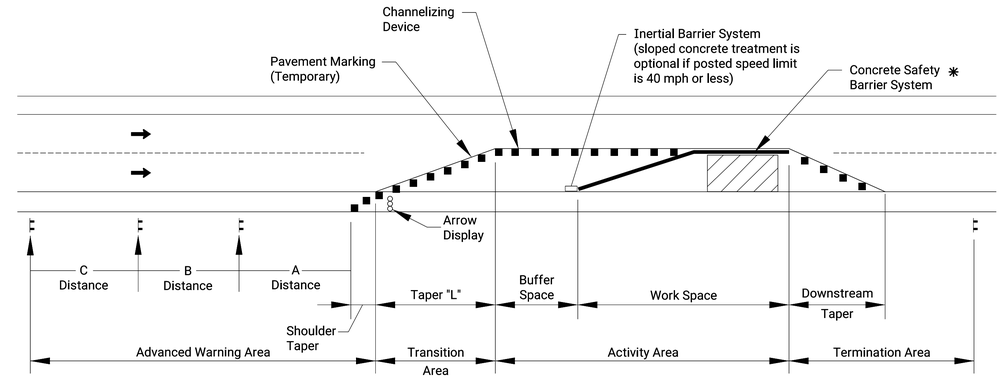
2) Minimum Lane Width: Lane widths shall be a minimum of 11' (measured between centerlines of pavement markings) or as shown on the plans, or as directed by the engineer. A lane width less than 11' may require restricted roadway width signing.

3) Consideration should be made to separate pedestrian and, if needed, bicycle movements from both work site activity and vehicular traffic. Unless a reasonable safe route that does not involve crossing the roadway can be provided, pedestrians should be appropriately directed with advance signing that encourages them to cross to the opposite side of the roadway. In urban and suburban areas with high vehicular traffic volumes, these signs should be placed at intersections (rather than midblock locations) so that pedestrians are not confronted with midblock work sites that will induce them to attempt skirting the work site or making a midblock crossing.

4) When existing pedestrian facilities are disrupted, closed, or relocated, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility.

5) When the driving surface open to traffic is milled or is a temporary surface made of loose material, or when directed by the engineer a W8-15 (Grooved Pavement) or W8-7 (Loose Gravel) sign shall be used on mainline approaches. This sign should be placed a "C" distance after the W20-1 (Road Work Ahead) sign. A W8-15p motorcycle plaque shall be used to supplement the W8-15 or W8-7 signs. All signs shall be displayed as long as the condition is present.

6) Alternative temporary rumble strip options may be available. Please contact the Temporary Traffic Control Unit for more information at 785-296-1179 or 785-296-1183.



TYPICAL WORK ZONE COMPONENTS

✳ When concrete barrier system is used, portable channelizing devices are not needed along the tangent barrier section.

Minimum advance warning sign spacing (in feet):

SPEED (MPH) ✳	*A*	*B*	*C*
URBAN (40 MPH OR LOWER)	*100*	*100*	*100*
URBAN (45 MPH OR HIGHER)	*350*	*350*	*350*
RURAL (55 MPH OR LOWER)	*500*	*500*	*500*
RURAL (60 MPH OR HIGHER)	*750*	*750*	*750*
EXPRESSWAY/FREEWAY	*1000*	*1500*	*2640*

✳ Posted speed prior to work starting

The minimum spacing between signs shall be no less than 100', unless directed by the engineer.

The spacing between any signs may be increased beyond the minimum values in the table above as approved by the engineer in order to maximize visibility.

Taper Formulas:

$L = WS$ for speeds of 45 MPH or more

$L = WS^2/60$ for speeds of 40 MPH or less

Where: L = Minimum length of taper in feet
S = Numericial value of posted speed prior to work starting in MPH
W = Width in offset feet

Shifting Taper=1/2 L
Shoulder Taper=1/3 L

Channelizer Placement:

(1) The spacing between devices in transition area (taper) should not exceed a distance in feet equal to 1/2 the posted speed limit in mph prior to work starting.

(2) The spacing between devices in the advanced warning area and the activity area should not exceed a distance in feet equal to two times the posted speed limit in mph prior to work starting.

(3) Channelizing devices shall be placed for optimum visibility, normally at right angles to the traffic flow.

(4) Place directional indicator barricades in series to direct traffic onto the new path. The arrow sign should not be visible to opposing traffic.

(5) Alternating diagonal orange and white striping must slope downward in the direction traffic is expected to pass.

Buffer Space

SPEED (MPH) ✳	*20*	*25*	*30*	*35*	*40*	*45*	*50*	*55*	*60*	*65*	*70*	*75*
LENGTH (ft)	*115*	*155*	*200*	*250*	*305*	*360*	*425*	*495*	*570*	*645*	*730*	*820*

✳ Posted speed prior to work starting

Neither work activity nor storage of equipment, vehicles, or material should occur in the buffer space. When a protection vehicle is placed in advance of the work space, only the space upstream of the vehicle constitutes the buffer space.

If temporary concrete safety barrier system is used to separate approaching traffic from the work space, the barrier system shall be considered part of the activity area. A full lane width should be available throughout the length of the buffer space. See typical work zone components above.

NO.	DATE	REVISIONS	BY	APP'D
3				
2	03/13/18	W8-15p usage changed to Shall	R.W.B.	E.G.K.
1	08/18/15	Channelizer spacing info	R.W.B.	K.E.

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL
GENERAL NOTES

TE700

FHWA APPROVAL			03/13/18	APP'D Eric Kocher	
DESIGNED B.A.H.	DETAILED R.W.B			QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.			QUAN. CK.	TRACE CK.

KDOT Graphics Certified 03-13-2018

KDOT Graphics Certified

Sheet No. 69

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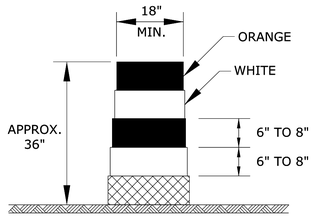
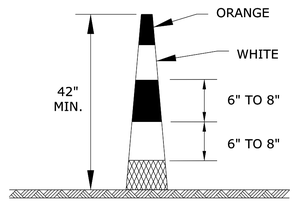
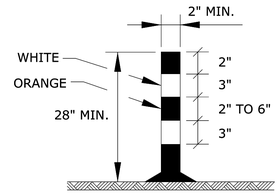
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	70	77



DRUM

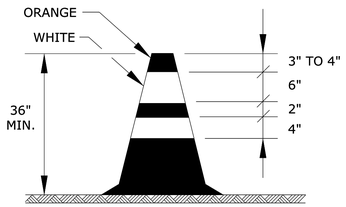


CONICAL DELINEATOR

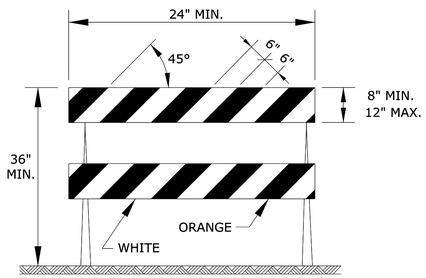


TUBULAR MARKER

Striping as shown for up to 42".

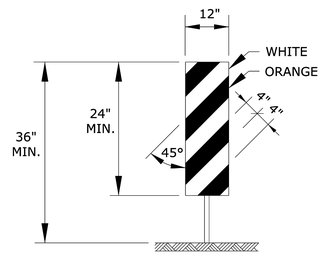


TRAFFIC CONE



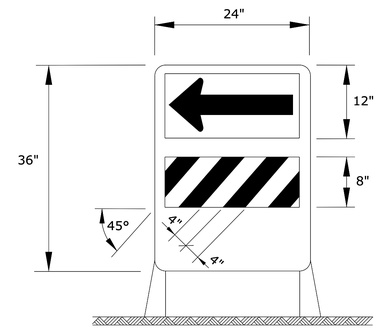
TYPE 2 BARRICADE

For rails less than 36" long, 4" wide stripes may be used.
All stripes shall slope downward to the traffic side for channelization.



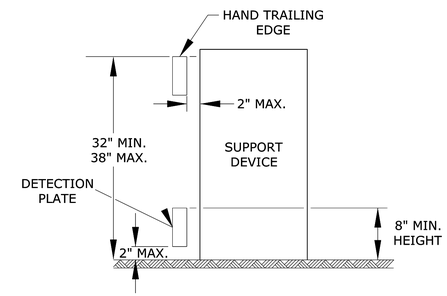
VERTICAL PANEL

The stripes shall slope downward to the traffic side for channelization.



DIRECTION INDICATOR BARRICADE

The stripes shall slope downward in the direction traffic is to pass.
The direction indicator barricade shall be used in series to direct the motorist into the intended lane of travel.



PEDESTRIAN CHANNELIZER

1. Support device shall not project beyond the detection plate into the pathway.
2. Hand trailing edges and detection plates are optional for continuous walls.
3. Interconnect pedestrian channelizers to prevent displacement and to provide continuous guidance through or around work.
4. Alternate pathways shall be firm, stable, and slip resistant.
5. Treat height differentials > 1/2" in the surfaces of alternate paths with a firm, stable, and slip resistant temporary ramp having a slope of 12:1 or flatter and having a width equal to the alternate path.
6. Use alternating orange/white on interconnected devices.

ITEM	LOCATION	Cross-overs	Shoofly Diversions	Tangents	Tapers	Ramps	Head to Head	Object Identifier	Lead-in Devices	Gores
PORTABLE										
	Drums	Yes	Yes	Yes	Yes	Yes	(1)	Yes	Yes	Yes
	Conical Delineators	Yes	Yes	Yes	Yes	Yes	(1)	Yes	Yes	Yes
	Vertical Panels	(2)	(2)	(2)	(2)	(2)	(1,2)	YES	(2)	(2)
	Direction Indicator Barricade	NO	NO	NO	Yes	NO	NO	NO	NO	NO
	Type 2 Barricade	(2)	(2)	(2)	(2)	NO	NO	Yes	NO	NO
	Traffic Cones	NO	NO	(4)	(4)	(4)	NO	(4)	(4)	(4)
FIXED										
	Tubular Markers	(3)	(3)	(3)	NO	(3)	Yes	NO	Yes	Yes
	Vertical Panels	(3)	(3)	(3)	(3)	(3)	(3)	Yes	(2,3)	(2)

(1) Not allowed on centerline delineation along freeways or expressways.
(2) The stripes shall slope downward to the traffic side for channelization.
(3) May be used upon the approval of the engineer.
(4) Daytime operations only.

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL
CHANNELIZING DEVICES

TE702

FHWA APPROVAL	06/01/15	APP'D	Kristina Ericksen
DESIGNED L.E.R.	DETAILED R.W.B.	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN. CK.	TRACE CK.

KDOT Graphics Certified 06-01-2015

KDOT Graphics Certified

Sheet No. 70

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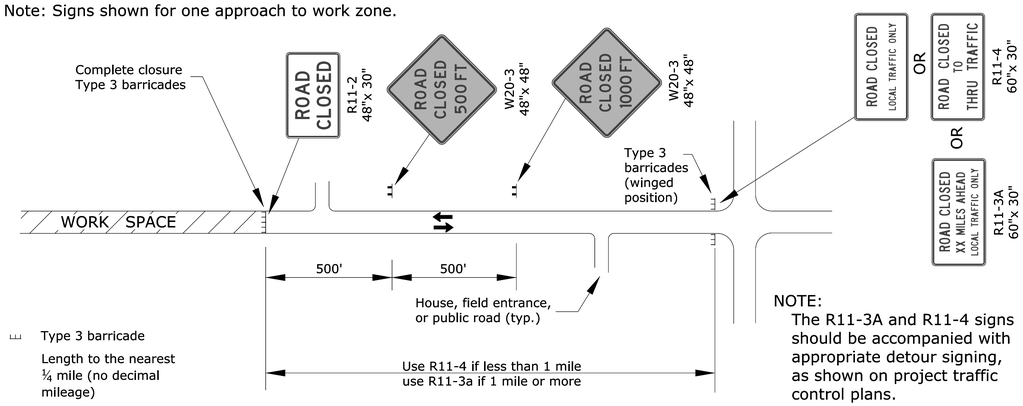
File : Traffic Control Standards.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	71	77

Note: Signs shown for one approach to work zone.



NOTE:
The R11-3A and R11-4 signs should be accompanied with appropriate detour signing, as shown on project traffic control plans.

FIGURE 1: TYPICAL SIGNING FOR ROAD CLOSURE (MAINLINE OR SIDE ROAD)

Note: Sign shown for one approach to intersection (work zone).

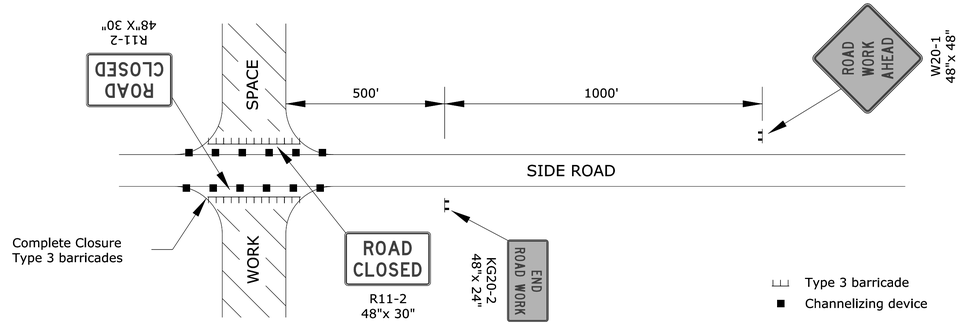


FIGURE 2: TYPICAL SIGNING FOR SIDE ROAD OPEN

Note: Signs shown for one approach to work zone.

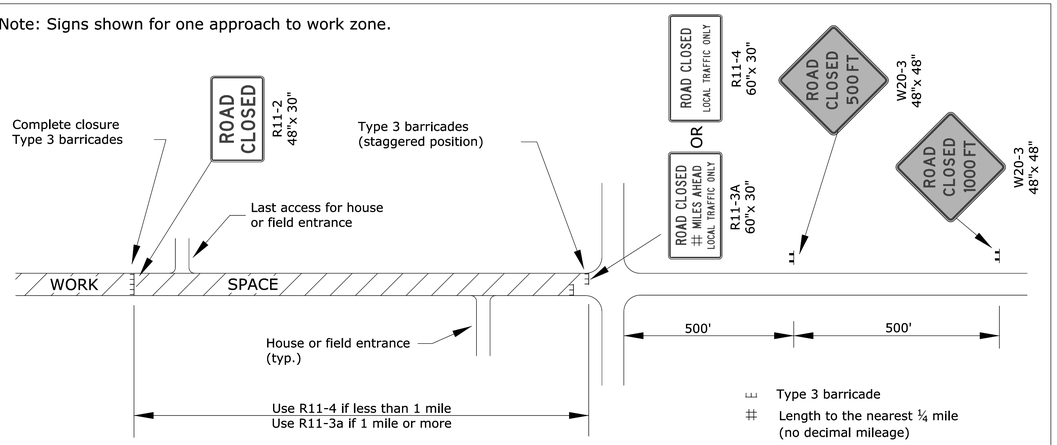


FIGURE 3: TYPICAL SIGNING FOR ROAD CLOSURE - LOCAL TRAFFIC ACCESS

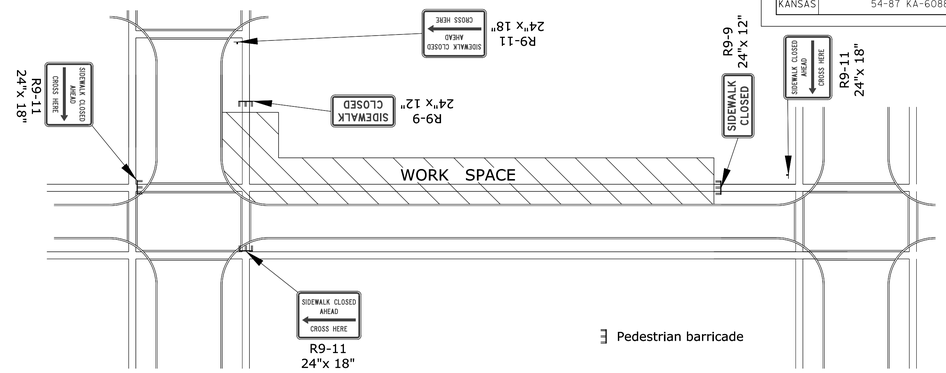
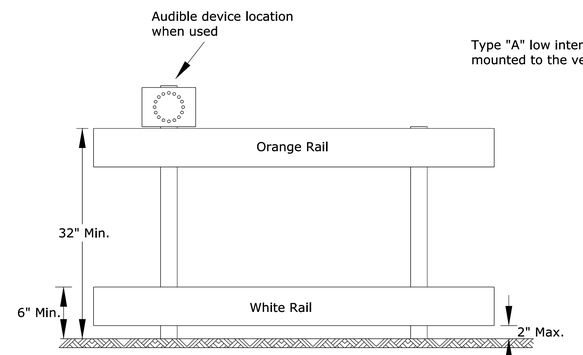
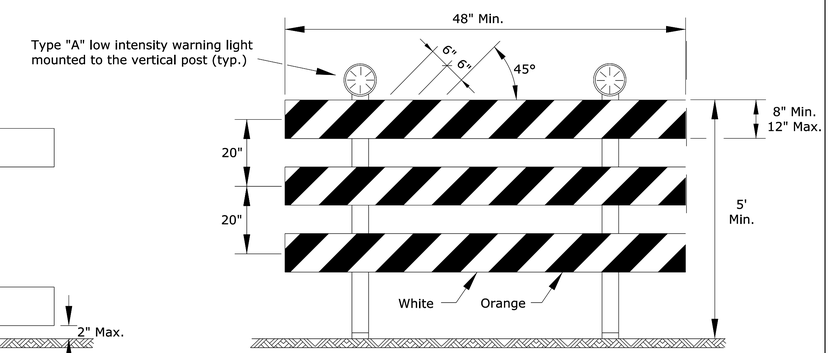


FIGURE 4: TYPICAL SIGNING FOR SIDEWALK CLOSED WITH OPPOSITE SIDEWALK AVAILABLE



DETECTABLE BARRICADE

1. Support device shall not project beyond the detection plate into the pathway.
2. Barricades shall be used to close the entire width of the pathway.
3. Do not use warning lights on pedestrian barricades.
4. Do not use warning lights on audible devices.



TYPE 3 BARRICADE WITH LIGHTS

Approved signs mounted on Type 3 barricades should not cover more than 50% of the top two rails or 33% of the total area of the three rails.

When barricades are placed end-to-end or staggered, a Type "A" low intensity warning light shall be mounted to the vertical post near each outside corner of the end barricades.

ROAD CLOSED GENERAL NOTES

As shown in Figure 1, at the point where thru traffic must detour and local traffic can proceed to the location where the roadway is completely closed, the R11-3a (ROAD CLOSED # MILES AHEAD LOCAL TRAFFIC ONLY) or R11-4 (ROAD CLOSED LOCAL TRAFFIC ONLY or ROAD CLOSED TO THRU TRAFFIC) sign shall be used with Type 3 barricades (winged position), placed on the shoulders of roadway.

As shown in Figure 3, when local traffic must be allowed access into the work zone, Type 3 barricades shall be longitudinally staggered to maintain the appearance of a closed roadway. A second line of end-to-end Type 3 barricades shall be placed just beyond the last access point in the work zone, to completely close the roadway.

The R11-4 (ROAD CLOSED TO THRU TRAFFIC or ROAD CLOSED LOCAL TRAFFIC ONLY) sign shall be used when the distance to the point of complete closure of the roadway is less than 1 mile.

The R11-3a (ROAD CLOSED # MILES AHEAD LOCAL TRAFFIC ONLY) sign shall be used when the distance to the point of complete closure of the roadway is 1 mile or greater.

The words "BRIDGE OUT" (or BRIDGE CLOSED) may be substituted for the words "ROAD CLOSED" on the R11-3a or R11-4 sign where applicable.

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL CLOSURES

TE704

FHWA APPROVAL		06/01/15	APP'D	Kristina Ericksen			
DESIGNED	B.A.H.	DETAILED	R.W.B.	QUANTITIES		TRACED	
DESIGN CK.		DETAIL CK.		QUAN. CK.		TRACE CK.	

KDOT Graphics Certified 06-01-2015

Sheet No. 71

KDOT Graphics Certified

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File : Traffic Control Standards.dgn
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STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	72	77

SIGN LAYOUT INFORMATION

KG20-2

Std. Size Expwy/Freeway
6" C 48"x 24"

KG20-5

Std. Size Expwy/Freeway
6" C 48"x 24"

KM4-20

Std. Size 3" C 24"x 6"

Expwy/Freeway 6" C 48"x 12"

W7-3a

Mileage to be Determined by the Engineer.

W8-15

Std. Size Expwy/Freeway
8" D 48"x 48"

W8-7

Std. Size Expwy/Freeway
8" D 48"x 48"

W8-15p

Std. Size Expwy/Freeway
30"x 24"

W8-17

Std. Size Expwy/Freeway
48"x 48"

W8-11

Std. Size Expwy/Freeway
8" D 48"x 48"

W8-17P
(Optional)

Std. Size Expwy/Freeway
30"x 24"

SP-01
(Special Sign)

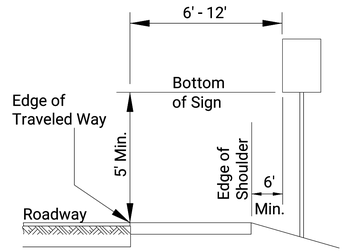
Std. Size 6" C

Expwy/Freeway 10" D

SP-02
(Special Sign)

Std. Size		Expwy/Freeway	
Uppercase:	6" C	Uppercase:	10" D
Lowercase:	4.5" C	Lowercase:	8" D

All city names and street names on special signs and destination signs must have upper and lower case letters.

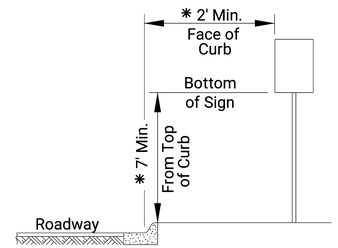


RURAL

1) Ground-mounted signs shall be mounted at a minimum height of 5' measured from the bottom of sign to the near edge of the pavement.

2) Large signs having an area exceeding 50 square feet installed on multiple breakaway posts shall be mounted a minimum of 7' above the ground.

3) The height of the secondary sign mounted below another sign may be 4' measured from the bottom of the sign to the near edge of the pavement. Signs shall not overlap each other.



URBAN

1) Signs shall be mounted at a minimum height of 7' measured from the bottom of sign to the near edge of the pavement.

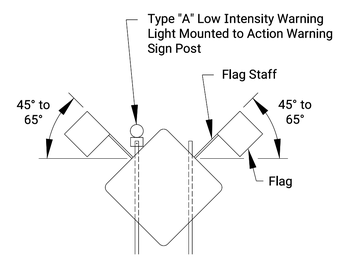
2) Neither portable nor permanent sign supports should be located on sidewalks or areas designated for pedestrian or bicycle traffic.

3) Signs mounted lower than 7' should not project more than 4" into pedestrian facilities.

4) The height from of the secondary sign mounted below another sign may be 6' measured from the bottom of sign to the near edge of the pavement. Signs shall not overlap each other.

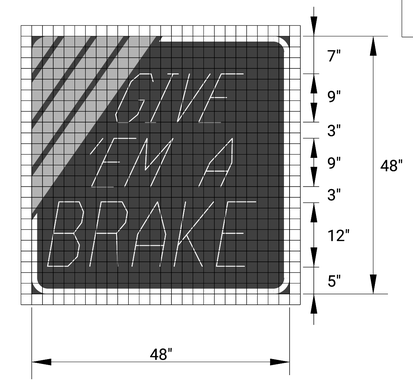
5) Large signs having an area exceeding 50 square feet installed on multiple breakaway posts shall be mounted a minimum of 7' above the ground.

✱ 6) Pedestrian detour signing shall be a minimum of 2' measured from the top of the pedestrian pathway to the bottom of the sign and shall not protrude into the walkway nor shall it project beyond the back of curb.



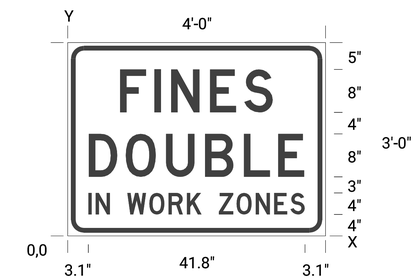
When the sign width is equal to or greater than 9', three or more wood posts may be used with a minimum of 4' between the centerline of each post. All signs less than 9' in width shall use a maximum of two wood posts.

In the case of hitting rock when driving posts
1. Shift the sign location. Do not violate minimum sign spacing.
2. With the engineer's approval, use acceptable alternative sign stands.



KI-104a

Sign Number	GIVE EM A BRAKE
Width x Height	4'-0" x 4'-0"
Border Width	1.0"
Corner Radius	4.0"
Stripe Width	3.0"
Mounting	Ground
Background	Type: Non-Reflective
	Color: Black
Legend/Border	Type: Reflective
	Color: White
Legend Font	Dutch 801 Roman SWC 25 Degree Slant
Stripes	Type: Reflective
	Color: Orange



KI-105a

Sign Number	FINES DOUBLE
Width x Height	4'-0" x 3'-0"
Border Width	0.9"
Corner Radius	3.0"
Mounting	Ground
Background	Type: Reflective
	Color: White
Legend/Border	Type: Non-Reflective
	Color: Black

Dimensions in inches

Spacings are to start of next letter

LETTER SPACINGS

Y FONT																	HT LEN
23.0 D		F	I	N	E	S											8.0
	9.7	6.4	3.2	7.3	6.4	5.4	9.7										28.6
11.0 D		D	O	U	B	L	E										8.0
	3.9	6.9	7.5	7.3	7.3	6.4	4.9	3.9									40.3
4.0 D		I	N		W	O	R	K		Z	O	N	E	S			4.0
	3.1	1.6	2.7	3.2	4.3	3.8	3.6	2.8	3.2	3.4	3.8	3.6	3.2	2.7	3.1		41.8

Notes:

Typically, there are two sets of informational signs installed per project: one for each direction of traffic.

Install signs a minimum of 500' in advance of the road work ahead sign. The engineer may designate a more appropriate location if conditions dictate.

The informational signs are not to interfere with the traffic control signs for the project.

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL
SIGN INFORMATION

TE710

FHWA APPROVAL		06/01/15	APP'D	Kristina Pyle	
DESIGNED	R.W.B.	DETAILED	R.W.B.	QUANTITIES	TRACED
DESIGN CK.		DETAIL CK.		QUAN. CK.	TRACE CK.

KDOT Graphics Certified 03-29-2018

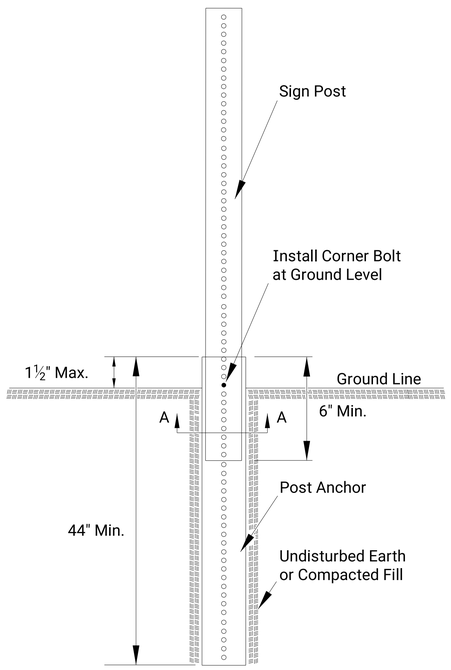
KDOT Graphics Certified

Sheet No. 72

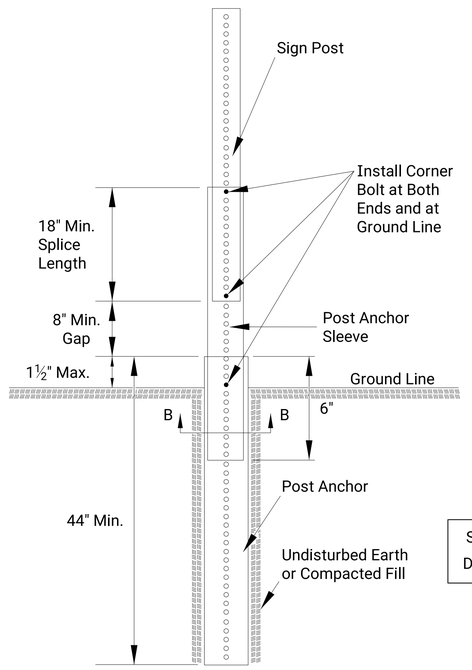
Drawn By : CAM
File : Traffic Control Standards.dgn
Plotted : 12/8/2021 5:49:13 PM
$$KDOTGRP$$

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	73	77

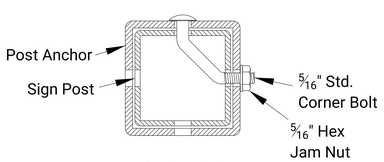
PERFORATED SQUARE STEEL TUBE (P.S.S.T.) POST SETUP



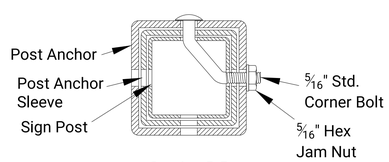
P.S.S.T. Detail



Telescoping P.S.S.T. Detail



Section A-A

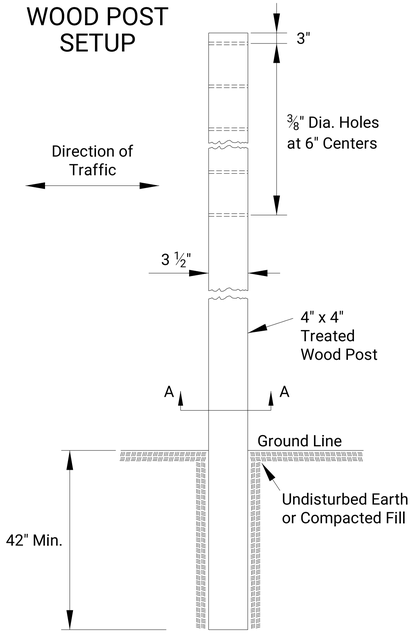


Section B-B

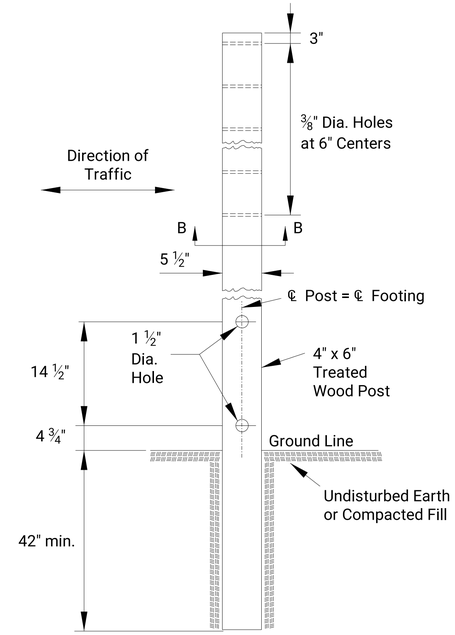
Details for 2", 2 ¼", or 2 ½" sign posts

Place bolts in the same corner along each sign post.

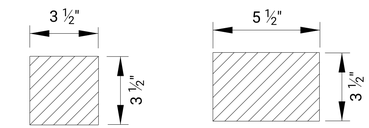
WOOD POST SETUP



Side Elevation
4" x 4" Wood Post in Soil

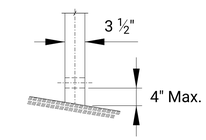


Side Elevation
4" x 6" Wood Post in Soil



Section A-A

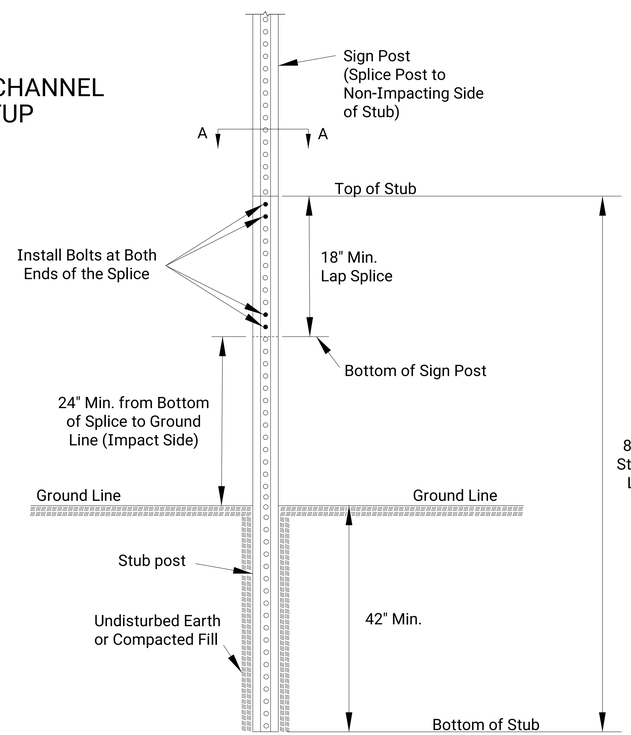
Section B-B



Front Elevation

See TE710 for Additional Details and Requirements

3 LB/F U-CHANNEL SETUP

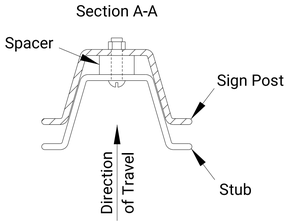


Notes:

Place two bolts at both ends of the splice through the holes nearest the ends of the splice.

Use manufacturer recommended spacers over the bolts between the spliced pieces of U-Channel.

Section A-A



NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SIGN POSTS

TE712

FHWA APPROVAL			06/01/15	APP'D	Kristina Pyle		
DESIGNED	B.A.H.	DETAILED	R.W.B.	QUANTITIES		TRACED	
DESIGN CK.		DETAIL CK.		QUAN. CK.		TRACE CK.	

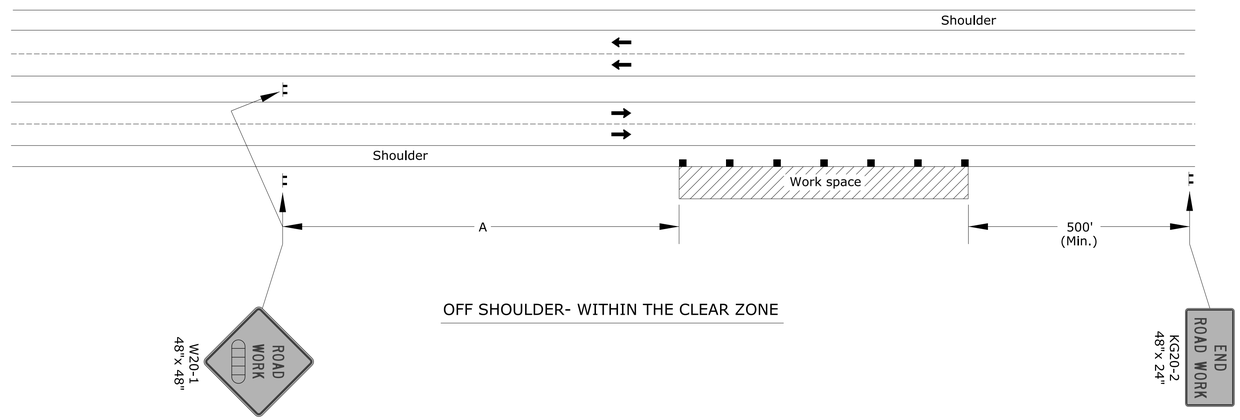
KDOT Graphics Certified 03-29-2018

KDOT Graphics Certified

Sheet No. 73

Drawn By : CAM
File : Traffic Control Standards.dgn
Plotted : 12/8/2021 5:49:13 PM
$$KDOTGRP$$

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	74	77



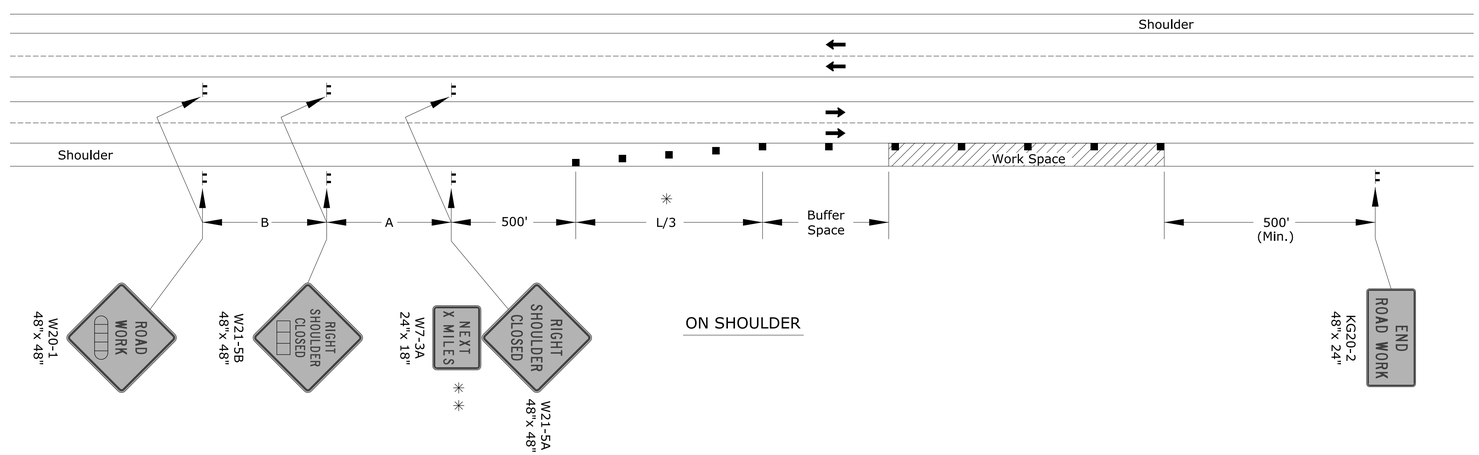
OFF SHOULDER- WITHIN THE CLEAR ZONE

Notes:

For work in the median, install signs and channelizing devices for each direction of traffic according to the applicable typical drawing.

No traffic control is required if the work space is located outside of the clear zone.

For operations of 60 minutes or less, all signs and channelizing devices may be eliminated if a vehicle with a high-intensity rotating, flashing, oscillating, or strobe light is used.



ON SHOULDER

✳ Omit taper if paved shoulder is less than 8' wide.

✳✳ Eliminate W7-3A if shoulder is closed for less than 2 miles.

X Length to the nearest whole mile
■ Channelizing device
Ahead, 1500 ft, or 1 mile
Ahead, 1000 ft, 1500 ft or ½ mile

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL
SHOULDER WORK
DIVIDED HIGHWAY

TE722

FHWA APPROVAL		06/01/15	APP'D	Kristina Ericksen	
DESIGNED	L.E.R.	DETAILED R.W.B.	QUANTITIES		TRACED
DESIGN CK.		DETAIL CK.	QUAN. CK.		TRACE CK.

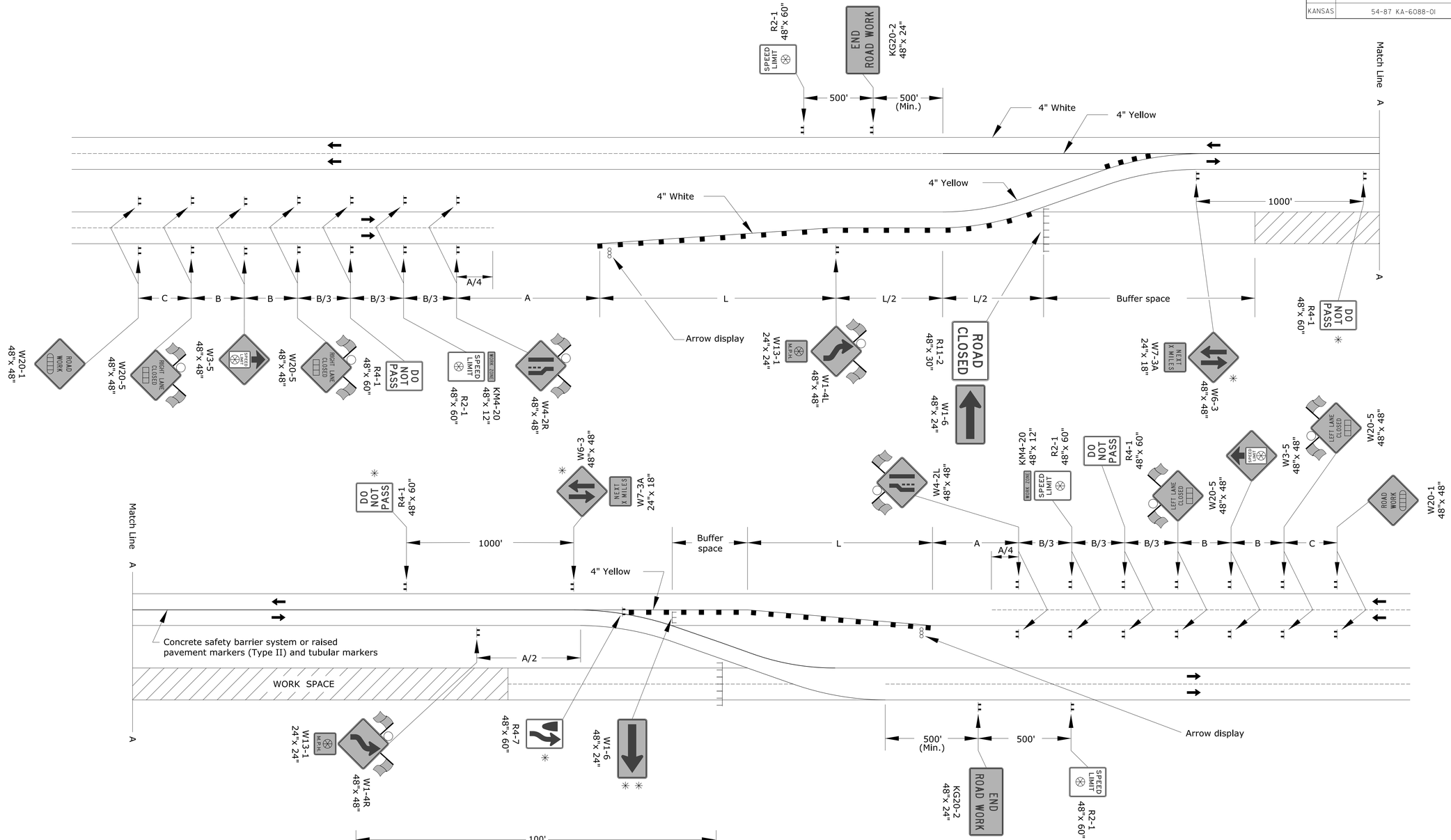
KDOT Graphics Certified 06-01-2015

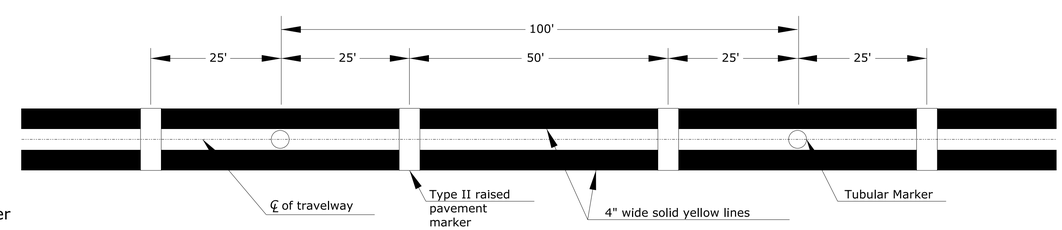
KDOT Graphics Certified

Sheet No. 74

Drawn By : CAM
File : Traffic Control Standards.dgn
Plotted : 12/8/2021 5:49:14 PM
$$KDOTGRP$$

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	75	77





Centerline Treatment for two-lane, two-way traffic on normally divided roadways. Tubular markers and temporary raised pavement markers (Type II).

- Type 3 barricades
- X Length to the nearest whole mile
- ■ Channelizing device
- Ahead, 1500 ft, or 1 mile
- Ahead, 1000 ft, 1500 ft, or ½ mile
- ⊗ Speed to be determined by the Engineer
- ○ Type "A" low intensity warning light

The W6-3 & R4-1 sign combination may be required at additional locations along the project. The spacing between these locations shall be a maximum of 1 mile. The W7-3A sign should be mounted with the W6-3 sign at 2 mile increments on a project of 4 miles or longer.

✳ Sign to be eliminated if concrete safety barrier system is used.

✳✳ Barricade to be eliminated and sign W1-6 to be mounted on skids if concrete safety barrier system is used.

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL
DIVIDED HIGHWAY
CROSSOVER FROM LEFT LANE

TE740

FHWA APPROVAL		06/01/15	APP'D	Kristina Ericksen			
DESIGNED	B.A.H.	DETAILED	R.W.B.	QUANTITIES		TRACED	
DESIGN CK.		DETAIL CK.		QUAN. CK.		TRACE CK.	

KDOT Graphics Certified 02-01-2016

KDOT Graphics Certified

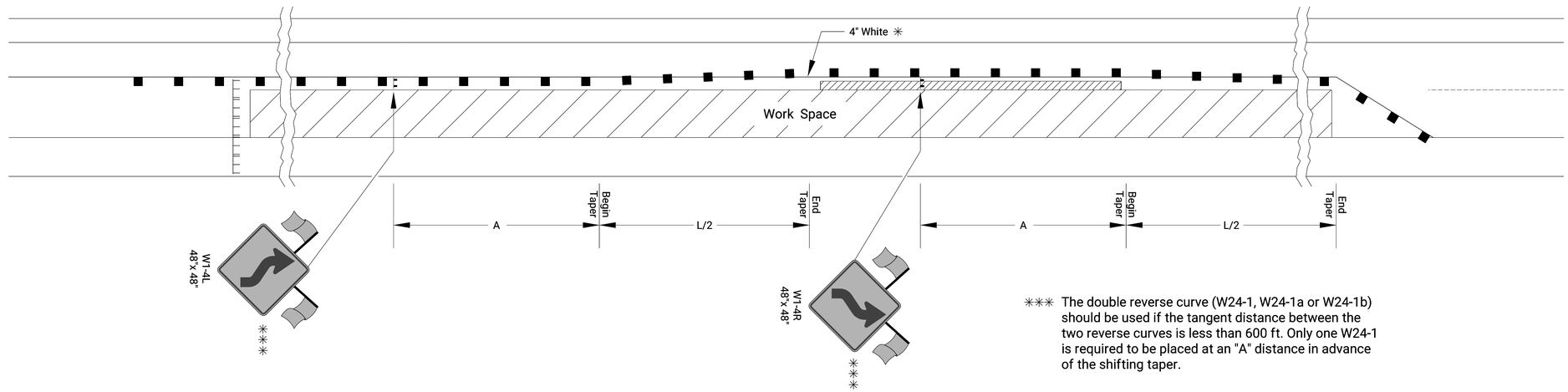
Sheet No. 75

Drawn By : CAM
File : Traffic Control Standards.dgn
Plotted : 12/8/2021 5:49:14 PM
$$KDOTGRP$$

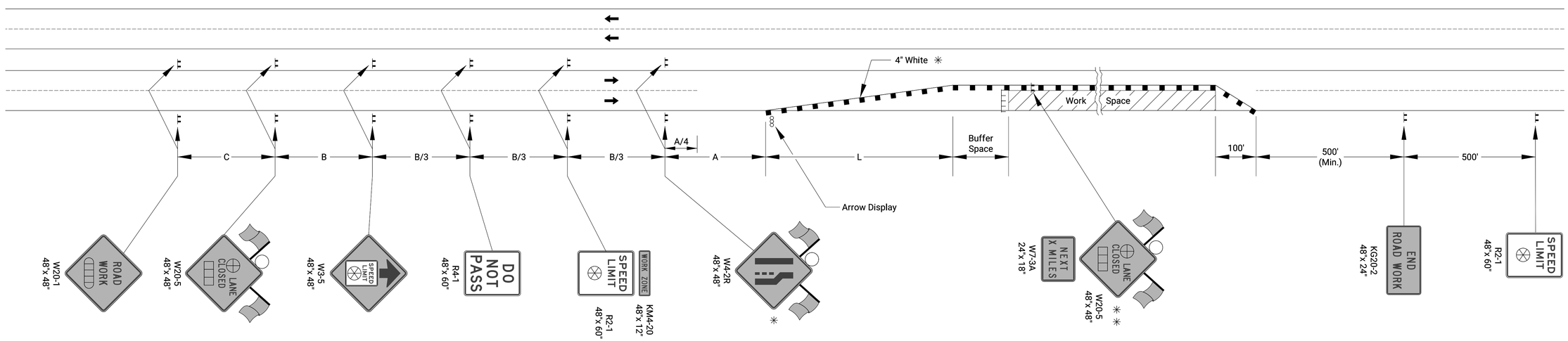
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	76	77

SHIFTING TAPER DETAIL

Add signs and devices as shown for work inside a closed lane that extends near to (or into) the open traffic lane.



✳✳✳ The double reverse curve (W24-1, W24-1a or W24-1b) should be used if the tangent distance between the two reverse curves is less than 600 ft. Only one W24-1 is required to be placed at an "A" distance in advance of the shifting taper.



- Type 3 Barricades
- X Length to the Nearest Whole Mile
- ■ Channelizing Device
- Ahead, 1500 ft, or 1 mile
- Ahead, 1000 ft, 1500 ft, or ½ mile
- ⊕ Right or Left
- ⊗ Speed to be determined by the Engineer
- ○ Type "A" Low Intensity Warning Light

✳ For left lane closures use W4-2L and yellow edge line along channelizing devices.

✳✳ The W20-5 (⊕Lane Closed) and W7-3A (Next X Miles) signs should be placed at 2 mile increments on a project of 4 miles or longer.

Left-side signs shall be omitted for a four-lane undivided highway.

One flagger should be stationed within each multi-lane roadway activity area where work is in a closed lane adjacent to traffic and not separated by a concrete safety barrier system.

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1	03/13/18	W24-1 usage changed to Should	R.W.B.	E.G.K.

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL
LANE CLOSURE ON MULTI LANE HWY

TE744

FHWA APPROVAL		03/13/18	APP'D	Eric Kocher	
DESIGNED	B.A.H.	DETAILED	R.W.B.	QUANTITIES	TRACED
DESIGN CK.		DETAIL CK.		QUAN. CK.	TRACE CK.

KDOT Graphics Certified 03-29-2018

KDOT Graphics Certified

Sheet No. 76

Drawn By : CAM
File : Traffic Control Standards.dgn
Plotted : 12/8/2021 5:49:14 PM
$$KDOTGRP$$

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	54-87 KA-6088-01	2022	77	77

Summary Of Traffic Control Devices (Each)

Work Zone Sign (Special)		
Sign No.	16.25 Sq.Ft. & Less	16.26 Sq.Ft. & Over
SP-1		1
SP-2		1
		2

Summary Of Traffic Control Devices (Each Per Day)

✳ Quantity Most Used On The Project At Any One Time

Work Zone Signs ✳			
Sign No.	Size - Sq.Ft.		
	0-9.25	9.26-16.25	16.26 & Over
W20-7		2	
W20-1		12	
W20-2		2	
W20-5		8	
W3-5		8	
R4-1		10	
R2-1		12	
W4-2R		8	
W4-2L		8	
W13-1		2	
W1-4R		4	
W1-4L		8	
W6-3		2	
W7-3A		2	
W1-6		3	
R11-2		5	
R4-7		1	
KM4-20	8		
KG20-2	4		
M4-5	5		
M4-8	5		
M4-8a	1		
M2-4	5		
M1-4	10		
M6-1R	2		
M6-1L	1		
M6-3	2		
KI-104a		2	
KI-105a		2	
E5-1			1
Total	43	101	1

Barricades ✳		Channelizing Devices ✳		
Type 3 (4' To 12')	Pedestrian	Fixed	Portable	Pedestrian
26		30	368	

Lighted Devices ✳	
Work Zone Warning Light (Type "A" Low Intensity)	32
Work Zone Warning Light (Red Type "B" High Intensity)	
Arrow Display	4
Portable Changeable Message Sign	

Recapitulation Of Quantities		
Item	Quantity	Unit
Work Zone Signs (O To 9.25 Sq.Ft.)	8,390	Each Per Day
Work Zone Signs (9.26 To 16.25 Sq.Ft.)	19,700	Each Per Day
Work Zone Signs (16.26 Sq.Ft. & Over)	200	Each Per Day
Work Zone Barricades (Type 3 - 4' To 12')	5,070	Each Per Day
Work Zone Barricades (Pedestrian)		Each Per Day
Channelizer (Fixed)	5,850	Each Per Day
Channelizer (Portable)	71,760	Each Per Day
Channelizer (Pedestrian)		Each Per Day
Work Zone Warning Light (Type "A" Low Intensity)	6,240	Each Per Day
Work Zone Warning Light (Red Type "B" High Intensity)		Each Per Day
Arrow Display	780	Each Per Day
Portable Changeable Message Sign		Each Per Day
Pavement Marking (Temporary)		
4" Solid (Type I)	228.6	Sta./Line
4" Solid (Type II)		Sta./Line
4" Broken (8.0') (Type I)		Sta./Line
4" Broken (8.0') (Type II)		Sta./Line
4" Broken (3.0') (Type I)		Sta./Line
4" Broken (3.0') (Type II)		Sta./Line
4" Dotted Extension (Type I)		Sta./Line
4" Dotted Extension (Type II)		Sta./Line
Solid (Line Masking Tape)		Sta./Line
Broken (Line Masking Tape)	5.6	Sta./Line
Symbol (Type I)		Each
Symbol (Type II)		Each
Flexible Raised Pavement Marker (4" Broken (8.0'))		Sta./Line
Flexible Raised Pavement Marker (4" Broken (3.0'))		Sta./Line
Pavement Marking Removal	5,060	Lin. Ft.
Work Zone Sign (Special) (16.25 Sq. Ft. & Less)		Each
Work Zone Sign (Special) (16.26 Sq. Ft. & More)	2	Each
Rigid Raised Pavement Marker (Type I)		Each
Rigid Raised Pavement Marker (Type II)	62	Each
Traffic Signal Installation (Temporary)		Lump Sum
Traffic Control (Initial Set Up)	Lump Sum	Lump Sum
Traffic Control		Lump Sum
Flagger (Set Price)	1	Hour

NO.	DATE	REVISIONS	BY	APP'D
3				
2				
1				

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL
SUMMARY OF DEVICES
RECAPITULATION OF QUANTITIES

TE795

FHWA APPROVAL		06/01/15	APP'D	Kristina Ericksen	
DESIGNED	B.A.H.	DETAILED	R.W.B.	QUANTITIES	TRACED
DESIGN CK.		DETAIL CK.		QUAN. CK.	TRACE CK.

KDOT Graphics Certified 12-08-2021

KDOT Graphics Certified

Sheet No. 77

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File : Traffic Control Quantites.dgn
Plotted : 12/8/2021 5:49:16 PM
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