STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	1	44
STP-C523(001)				

STATE OF KANSAS

DEPARTMENT OF TRANSPORTATION
PLAN AND PROFILE OF PROPOSED
48 C-5230-01

FEDERAL AID PROJECT

KINGMAN COUNTY

GRADING
SURFACING (ASPHALT)
BRIDGE
SEEDING

C1212

INDEX OF SHEETS

1	TITLE SHEET
2	TYPICAL SECTIONS
3	PLAN & PROFILE
4-8	GUARDRAIL DETAILS
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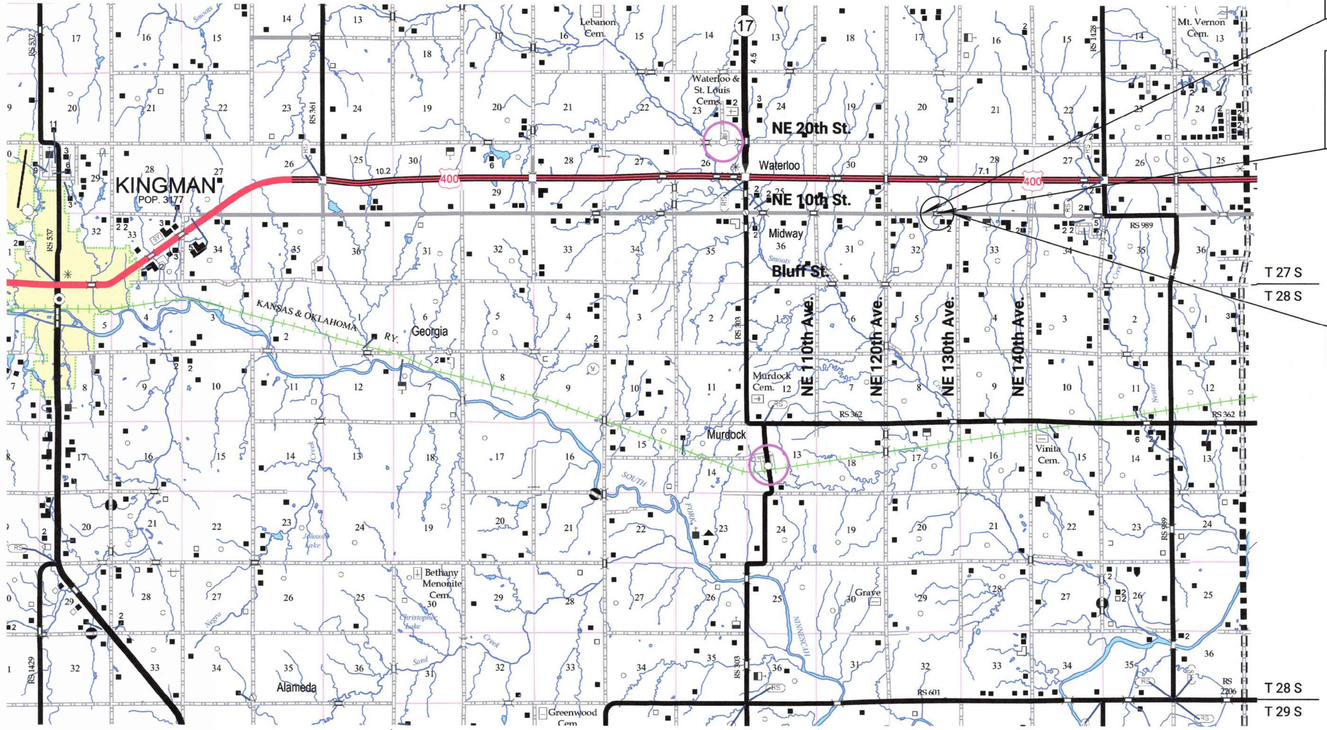
22	SUPPORTS AND SPACERS
23	SUMMARY OF QUANTITIES
24	SUMMARY OF QUANTITIES-SURFACING
25-33	TEMPORARY EROSION & POLLUTION CONTROL
34	SEEDING
35-40	TRAFFIC CONTROL
41-44	CROSS SECTIONS



Sta. 48+26.34 BEGIN
KDOT Project 48 C-5230-01

Sta. 50+00.00 Const.
Br. No. 000480759806220 (FF.7-6.0)
40' Steel Beam Span (WBMS) Bridge
(29'-6" Roadway)
Erection Category A

Sta. 51+73.65 END
KDOT Project 48 C-5230-01

No Scale

DESIGN DESIGNATION

AADT (2021)	100
AADT (2045)	127
DHV	
D	
T	
V	55 mph
C of A	
Clear Zone	8 ft

CONVENTIONAL SIGNS

COUNTY LINE		CENTER LINE OF PROJECT	50 1
CITY LIMITS		TERRACE	
STATE OR NATIONAL LINE		CULVERTS	
TOWNSHIP, SECTION or GRANT LINE		DROP INLET & STORM SEWER	
PROPERTY LINE		ACCESS CONTROL	
HIGHWAY FENCE		POWER POLE	
EXISTING FENCE		TELEPHONE POLE	
GUARDRAIL		MARSH	
CONSTRUCTION LIMITS		HEDGE	
RIGHT OF WAY LINE		TREES	
TRAVELED WAY		PROFILE ELEVATION	1728.18
RAILROADS		STREAM or CREEK	

GROSS LENGTH OF PROJECT	347.31	FT.	
EXCEPTIONS	NONE		
ADDITIONS	NONE		
NET LENGTH OF PROJECT	347.31	FT.	0.066 MILES
NET LENGTH OF BRIDGES	40.00	FT.	0.008 MILES
NET LENGTH OF ROAD	307.31	FT.	0.058 MILES

This project will be closed to traffic during construction.

RECOM. FOR APPROVAL-DATE
Rhonda Cranendorf 7-9-24
LOCAL PUBLIC OFFICIAL

Approved: Jul 16, 2024
Date
By M. Shirley
State Transportation Engineer

By: Dawn McPherson
Assistant Chief, Bureau of Local Projects

KANSAS DEPARTMENT OF TRANSPORTATION

JOSHUA A. DILASA LICENSED 25983 7-17-2024 KANSAS PROFESSIONAL ENGINEER

KIRKHAM MICHAEL
217 N. Douglas, ELLSWORTH, KANSAS 67439
(785) 472-3163 FAX (785) 472-3817

DATE | BY
SURVEY
CADD TECHNICIAN
DESIGNERS
SQUAD

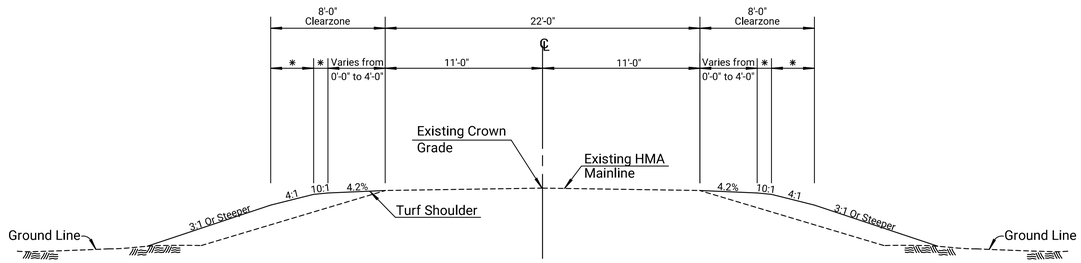
Plotted by : rsnow 9-JUL-2024 18:07
File : Title Sheet.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	2	44

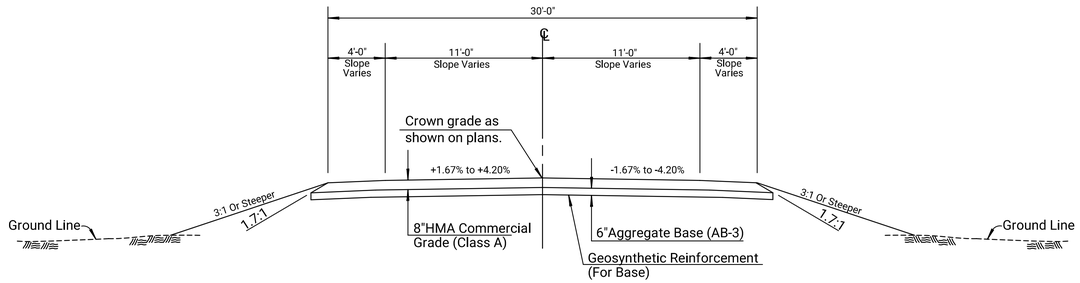
Note: Dimensions and slopes shown are for standard slopes and fills. See plan and cross-sections for variations.

Note: Intersection of all slope lines shall be softened and rounded for pleasing appearance.

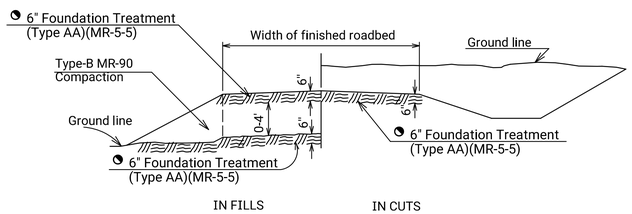
✱Varies.



GRADING SECTION ONLY
Sta. 48+26.34 to 49+60.00
Sta. 50+40.00 to 51+73.65



GRADING & SURFACING SECTION
Sta. 49+60.00 to 49+80.00
Sta. 50+20.00 to 50+40.00



◔ - Compaction of this material shall be subsidiary.

ALL EMBANKMENT SHALL BE COMPACTED EXCEPT DITCHPLUGS AND WASTE BERMS.

FOUNDATION TREATMENT
AND
COMPACTION OF EARTHWORK

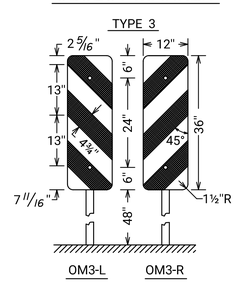
GENERAL NOTES

All signs shown on the plans, and other signs furnished and installed by the LPA with their own forces and funds will be installed in conformance with the Manual on Uniform Traffic Control Devices (latest edition).

LPA to furnish all easements and additional right of way (unless otherwise noted).

Public and private utility facilities will be adjusted by others as needed to fit the new construction unless noted otherwise on the plans or in the proposal.

OBJECT MARKER



All Sign, Fastener, and Post materials must meet the requirements of the latest edition of the KDOT Standard Specifications for State Road and Bridge Construction.

Install Object Markers Type OM3-(R)(L) at each corner of all span bridges and when indicated on the plans at box structures. Install with the inside edge of the marker in line with the inside clearance line of the structure.

SUMMARY OF OBJECT MARKERS AND SIGNS

STATION TO STATION	SIDE	TYPE OF STRUCT.	TYPE OF SIGN	OBJECT MARKER TYPE	OBJECT MARKER NO.	REMARKS
SW Quad	Rt.	Brdg.	OM3-R	OM3-R	1	ø
NW Quad	Lt.	Brdg.	OM3-L	OM3-L	1	ø
SE Quad	Rt.	Brdg.	OM3-L	OM3-L	1	ø
NE Quad	Lt.	Brdg.	OM3-R	OM3-R	1	ø
øAs you face bridge end from approach						
✱Back-to-Back [Sign(s) on Both Sides of Post]						

TYPICAL SECTION
GRADING & SURFACING

Guide to designer: Use this sheet when subgrading in rock or shale is not required.
See Soils and Geology Reports for additional plan notes.

Plotted by : rsnow 9-JUL-2024 18:08
File : 48 C523001_rts01.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	3	44

UTILITIES

Telephone	Cox	620-259-6499
Telephone	ATT	800-778-9140
Power	Evergy	316-213-6355

SCALE

PLAN: Lat. & Long. 50' 0 50' 100'

PROFILE: Horiz. same as above

Vert. 5 0

Horizontal Project Datum: KRCS Zone 16 Wichita for Project Coordinates.

Vertical Datum: North American Vertical Datum NAVD 88 (Geiod 18)

DATUM BENCHMARK NAVD 88

BASE 1 is the datum benchmark. BASE 1 is a 5/8" rebar located 2596.54 feet west of the intersection of Northeast 10th Street and Northeast 130th Avenue in Kingman County and is 32.3feet south of the centerline of northeast 10th street.

BASE 1 Elevation = 1358.58651 feet

BASE 1 WGS 84 Coordinates:
Latitude = 37°39'40.40564" N
Longitude = 97°53'25.85407" W
Ellipsoid Height = 1358.58651 feet

The Contractor shall remove the existing 35' Concrete T-Beam (RDGS) Bridge with concrete abutment & added steel beams and Concrete Cast-in-Place deck. (30' roadway). Contractor to salvage guardrail in good condition and stockpile on site. After all guardrail has been stockpiled, contact Kingman County to coordinate when guardrail can be picked up by the County. Contractor will load guardrail onto County trucks. All other items of the existing structure shall become property of the Contractor and be removed from the site. This work is included in the bid item, "Removal of Existing Structures", Lump Sum.

All Saw Cuts should be full depth and will be considered Subsidiary to other items of the contract.

Power lines shall be covered during construction when it is needed. The Contractor shall contact Evergy at least one week prior to construction work that needs the lines covered.

The Contractor shall excavate the channel at the bridge site to the limits shown prior to construction of the bridge.

The Contractor shall complete the Embankment as shown on the bridge excavation sheet prior to the driving of the abutment piling.

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.

Borrow areas provided by the Contractor shall be approved by the Engineer as to the suitability of the material and location. Special care shall be taken in this approval to minimize the increase of siltation and turbidity of streams, lakes and reservoirs and to avoid interference with the movement of migratory fish. Areas which, in the opinion of the Engineer, may leave an unsightly appearance will not be approved.

All borrow area locations shall be submitted to for clearance from the Kansas Historical Society and the Kansas Department of Wildlife and Parks, prior to any excavation.

It shall be the responsibility of the Contractor to restore, seed and/or complete other operations noted in the agreement with the landowner, approved by the Engineer, on all disturbed areas used to provide borrow areas for Common Excavation (Contractor Furnished).

The County shall be responsible for temporary and permanent fencing.

The County shall be responsible for all pavement marking striping.

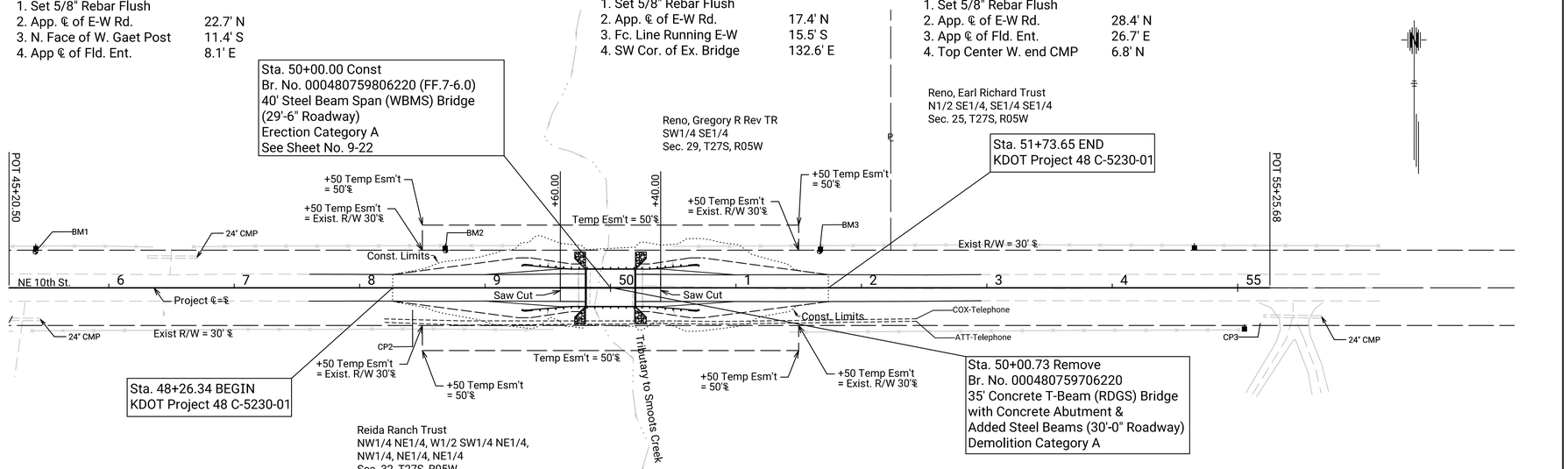
DATE | BY | REFERENCES NOTED | REFERENCES CHECKED

Plotted by: rsnow 9-JUL-2024 18:08
File : 48 C523001_rpp-01.dgn

CP #1
22.76' Rt. of ℄ Sta.45+23.08
N = 361,835.93 E = 17,387,575.05
1. Set 5/8" Rebar Flush
2. App. ℄ of E-W Rd. 22.7' N
3. N. Face of W. Gaet Post 11.4' S
4. App ℄ of Fld. Ent. 8.1' E

CP #2
18.05' Rt. of ℄ Sta. 48+42.12
N = 361,839.73 E = 17,387,894.1
1. Set 5/8" Rebar Flush
2. App. ℄ of E-W Rd. 17.4' N
3. Fc. Line Running E-W 15.5' S
4. SW Cor. of Ex. Bridge 132.6' E

CP #3
28.51' Rt. of ℄ 55+17.94
N = 361,827.33 E = 17,388,569.89
1. Set 5/8" Rebar Flush
2. App. ℄ of E-W Rd. 28.4' N
3. App ℄ of Fld. Ent. 26.7' E
4. Top Center W. end CMP 6.8' N



S1/4 Sec. 29, T27S, R5W
N = 361,860.51 E = 17,386,939.13
1. Fd. 5/8" Rebar/Cap
2. In ℄ of E-W Paved Rd.
3. MAG Nail in Top of Cor. Fc. Post 34.6' S
4. MAG Nail in E. Face of PP 32.6' N
5. MAG Nail in W. Face of Fc. Post 44.8' NE

SE Cor. Sec. 29, T27S, R5W
N = 361,852.85 E = 17,389,617.80
1. Fd. 5/8" Rebar/ Cap
2. In App. ℄ of E-W Paved Rd.
3. App. ℄ of Rd. to the S. 3.5' E
4. Large Spk. in W. Face of PP 67.7' NW
5. Spk./Wshr. in S. Face of PP 89.4' WNW
6. Spk./Wshr. in S. Face of PP 75.1' ENE

Center Cor. Sec. 29, T27S, R5W
N = 364,482.05 E = 17,386,961.77
1. Fd. 5/8" Rebar/Cap
2. NW Cor. of Inlet Lid 188.5' E
3. MAG Nail in Top of Fc. Corner 161.2' S
4. S. Edge of Shoulder 3.4' N
5. 1/2" Rebar in Center of Median 22.1' S

E1/4 Cor. Sec. 29, T27S, R5W
N = 364,467.20 E = 17,389,658.09
1. Fd. 5/8" Rebar/Cap @ 30 ft. OS S of Cor.
2. S. Edge of Shoulder 17.6' N
3. Top Center of R/W Marker 122.1' N
4. S. Face of Steel Gas Marker Post 132.3' NE
5. N. Face of Steel Gas Marker Post 147.5' SE
6. Top Center of R/W Marker 137.4' S

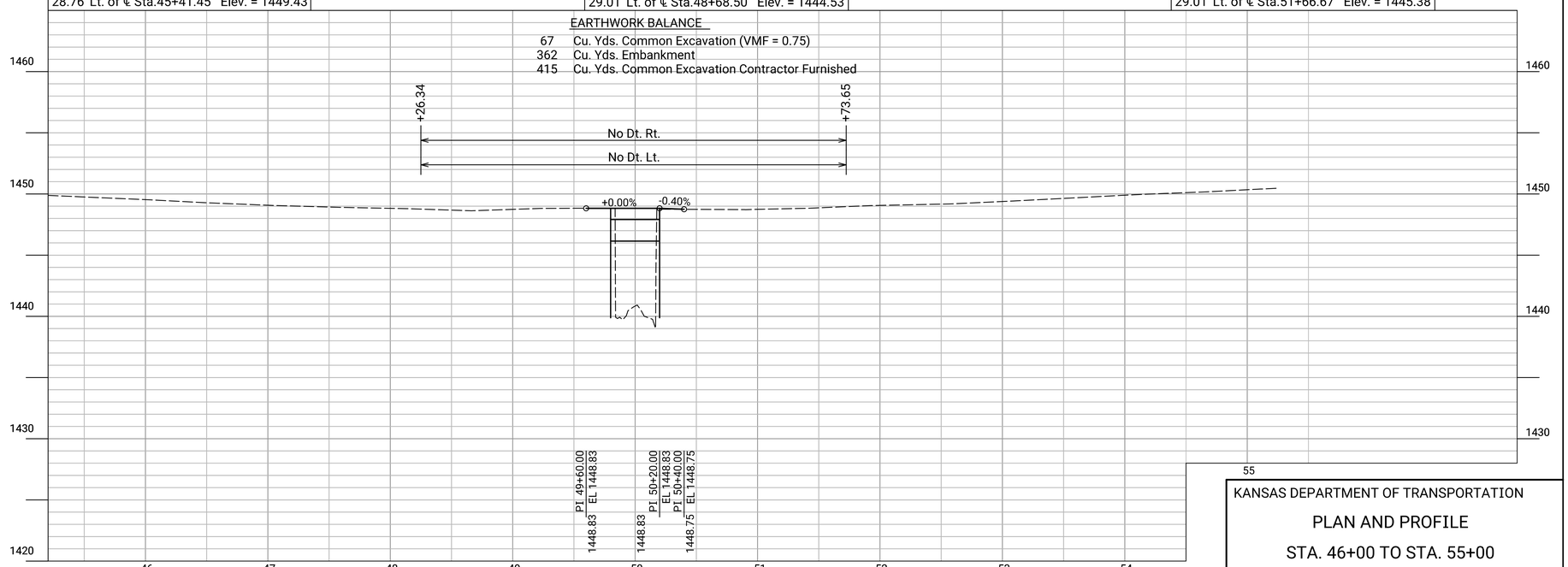
BM #1: Top of Driven "T" Post 2' S. PP.
28.76' Lt. of ℄ Sta.45+41.45 Elev. = 1449.43

BM #2: Top of Driven "T" Post 1' S. PP.
29.01' Lt. of ℄ Sta.48+68.50 Elev. = 1444.53

BM #3: Top of Driven "T" Post 1' S. PP.
29.01' Lt. of ℄ Sta.51+66.67 Elev. = 1445.38

EARTHWORK BALANCE

67	Cu. Yds. Common Excavation (VMF = 0.75)
362	Cu. Yds. Embankment
415	Cu. Yds. Common Excavation Contractor Furnished



KANSAS DEPARTMENT OF TRANSPORTATION

PLAN AND PROFILE

STA. 46+00 TO STA. 55+00

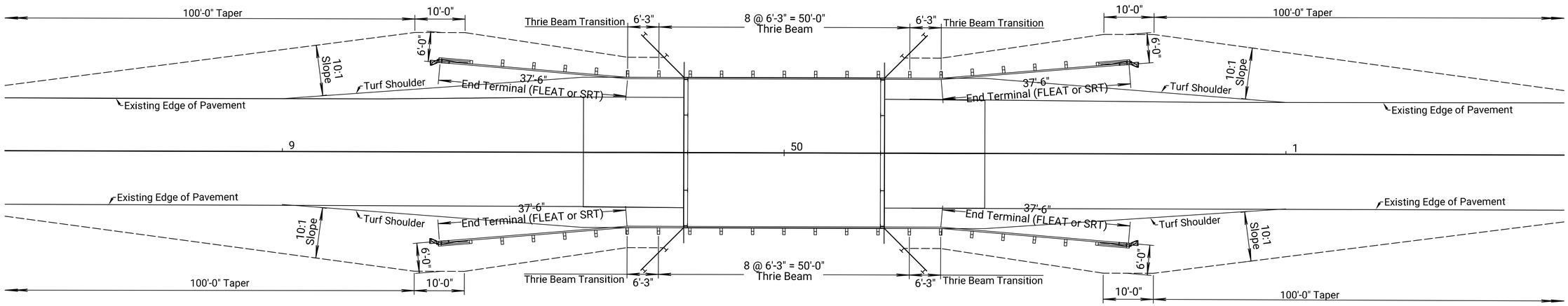
STATE	PROJECT N0.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	4	44

The Contractor shall provide shop drawings to attach thrie beam guardrail posts to the concrete deck. Guardrail posts shall be steel and shall be bolted to the concrete deck. Blocks will not be required between the steel posts and the thrie beam guardrail across the bridge. Blocks are required for the thrie beam transition and the end terminals. The guardrail shall meet NCHRP 350 TL-2 requirements. All labor, materials, and incidentals necessary to install the guardrail shall be subsidiary to the bid item "Guardrail, Steel Plate".

SUMMARY OF STEEL PLATE GUARDRAIL

Location	Side	Thrie Beam Guardrail Lin. Ft.	Thrie Beam Guardrail Transition Lin. Ft.	Total Pay Length Lin. Ft.	Gd. Rail End Term. (SRT) Alt. #1 Each	Gd. Rail End Term. (FLEAT) Alt. #2 Each
SW Quad.	Rt		6'-3"	6'-3"	1	1
NW Quad.	Lt		6'-3"	6'-3"	1	1
Bridge	Rt	50'-0"		50'-0"		
Bridge	Lt	50'-0"		50'-0"		
SE Quad.	Rt		6'-3"	6'-3"	1	1
NE Quad.	Lt		6'-3"	6'-3"	1	1
TOTAL				125'-0"	4	4

SCALE
PLAN: Lat. & Long. 10' 0 10' 20'



GENERAL NOTES

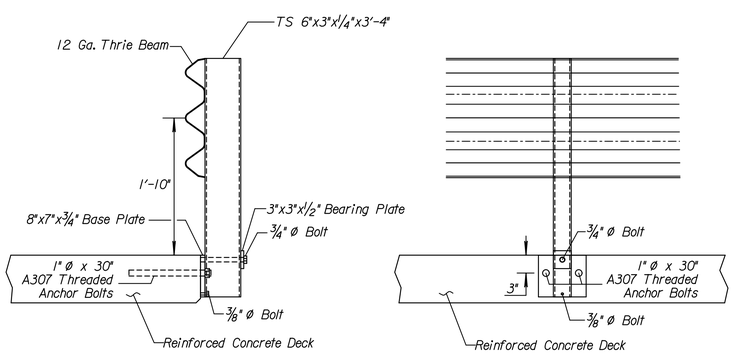
Galvanize all steel parts after fabrication.

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 the permanent traffic.

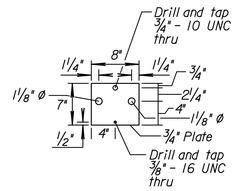
Use galvanized 12 gauge steel rail elements unless otherwise noted. Use galvanized anchor bolts and post rail fittings, see Standard Specifications. Supply guard rail parts that are interchangeable with similar parts regardless of source of manufacturer.

The Contractor shall provide shop drawings to install thrie beam guardrail on the outside bridge slabs. Guardrail posts shall be steel and shall be bolted to the outside bridge slabs. Blocks will not be required between the steel posts and the thrie beam guardrail across the bridge. Blocks are required for the thrie beam transition and the end terminals. The guardrail shall meet NCHRP 350 TL-2 requirements. All labor, materials, and incidentals necessary to install the guardrail shall be subsidiary to the bid item "Guardrail, Steel Plate".

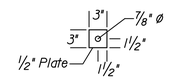
Note: Guardrail located off of the bridge is shown with wood posts. The contractor has the option of providing either standard wood or steel posts. See Standard Drawing RD611 for details.



CONNECTION DETAILS



BASE PLATE



BEARING PLATE

GUARDRAIL LAYOUT

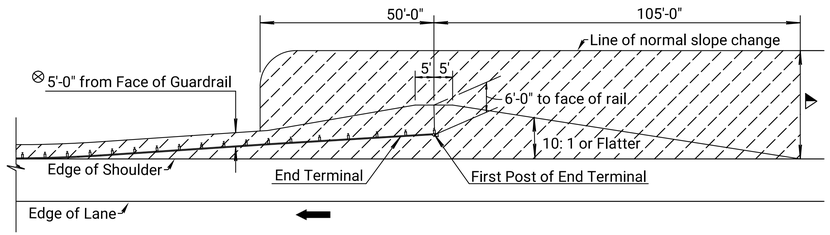
DATE
BY
REFERENCES NOTED
REFERENCES CHECKED

Plotted by : rsnow 9-JUL-2024 18:08
File : 48 C523001_Guardrail Layout.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.



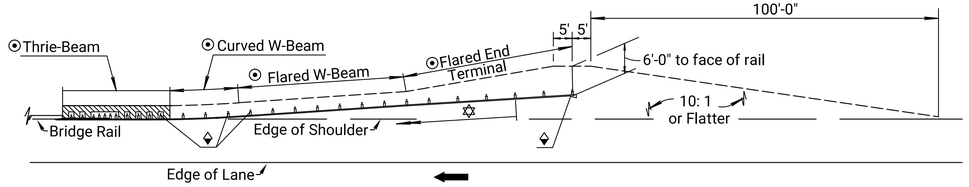
Keep Area Free of Stockpiled Material, Equipment, or Other Obstacles, Such as Temporary Signs, Regardless of Crash Worthiness. This Clear Area Extends 105 Feet in Advance of and 50 Feet behind the First Post of the Guardrail End Terminal and Then, in Order to Maintain Full Post Spacing, Continues 5 Feet 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

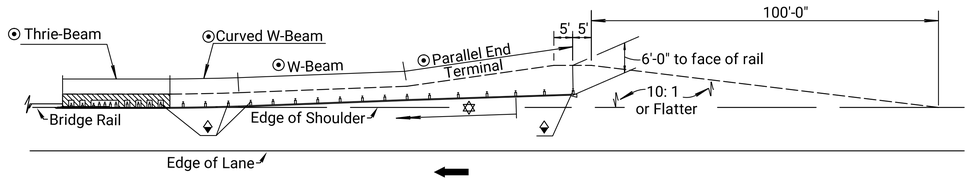
FLARED GUARDRAIL DETAIL

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	48 C-5230-01	2024	5	44

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.

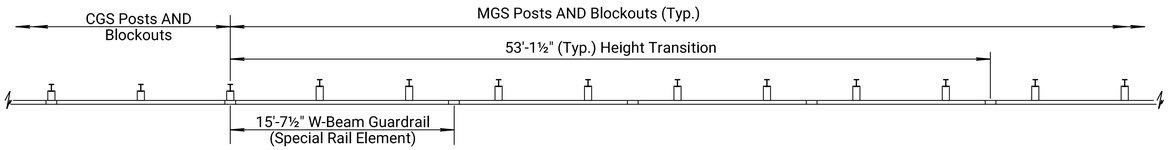
Lap w-beam and thrie-beam guardrail splices, in the direction of permanent traffic, even where temporary traffic may be carried in the opposite direction of the final traffic configuration. Lap end terminal splices per the Manufacturer's Installation Manual in the direction of permanent traffic, even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

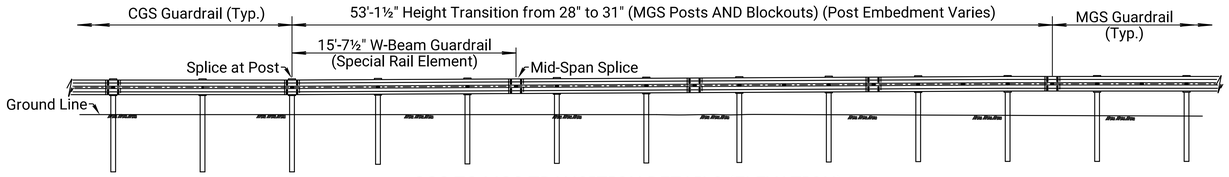
Where pavement with a thickness less than or equal to 8" is encountered during installation, use the details shown on KDOT's 'Guardrail Post Details' Standard Drawings to provide openings in the pavement for the guardrail posts. Where pavement with a thickness greater than 8" or geologic rock is encountered 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.

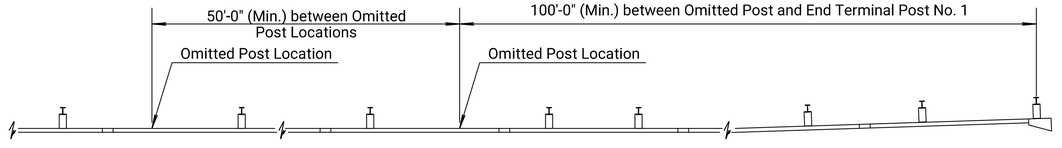
All work and materials required for guardrail end terminal installations are paid for under the bid item for the selected guardrail end terminal. See the table on this sheet for the appropriate end terminal bid item information.



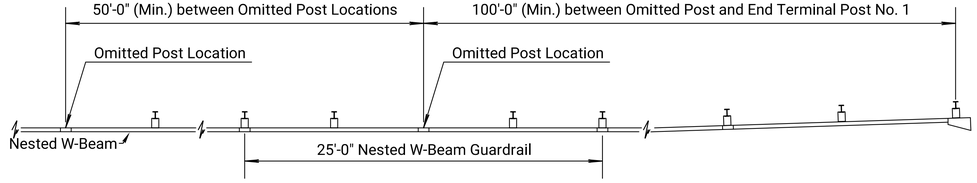
CGS TO MGS TRANSITION DETAILS (PLAN)



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	Valtir	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	Valtir	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	Valtir	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
02	09-05-18	ADD. OMITTED POST AND TRANS. DETAILS	A.L.R.	T.T.R.
01	06-05-18	INITIAL RELEASE	A.L.R.	T.T.R.

KANSAS DEPARTMENT OF TRANSPORTATION

GUARDRAIL AUXILIARY DETAILS

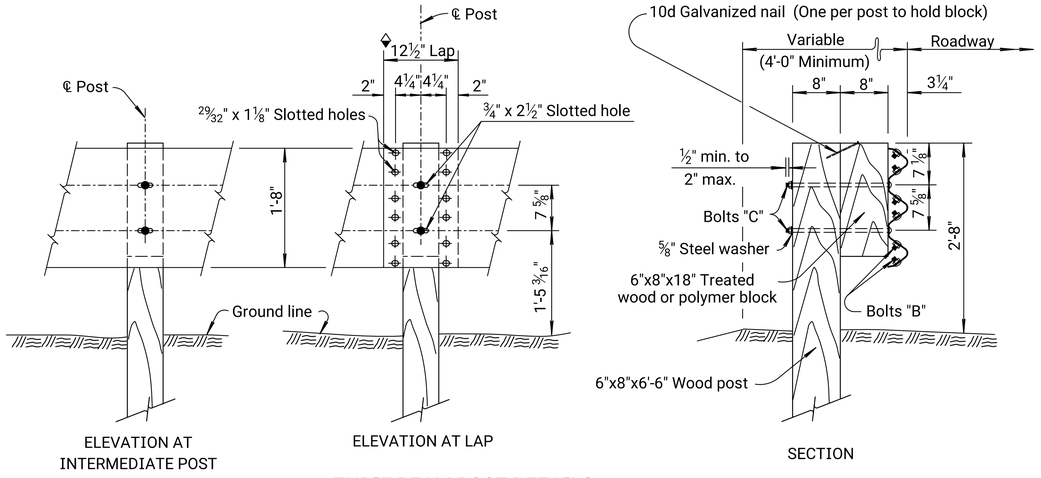
RD606

FHWA APPROVAL		09-25-18	APP'D.	Scott W. King
DESIGNED	DETAILED		QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.		QUAN.CK.	TRACE CK.

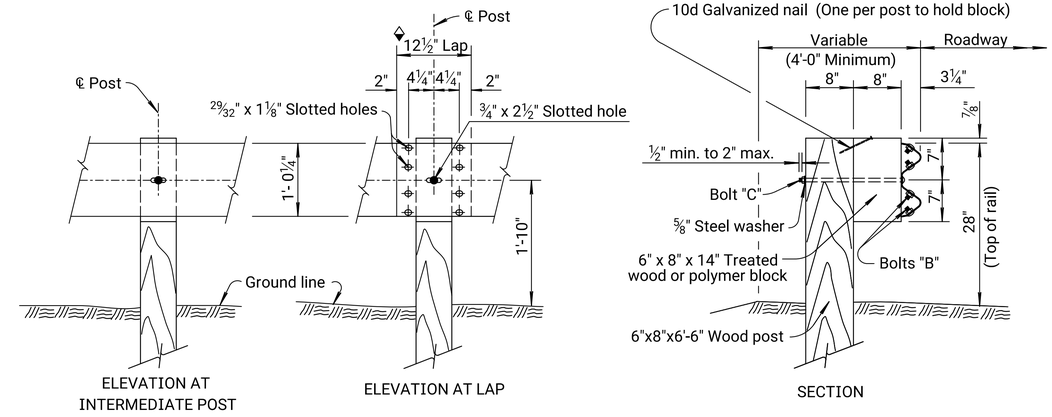
Plotted by : rsnow 9-JUL-2024 18:09
File : rd606.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	6	44

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.

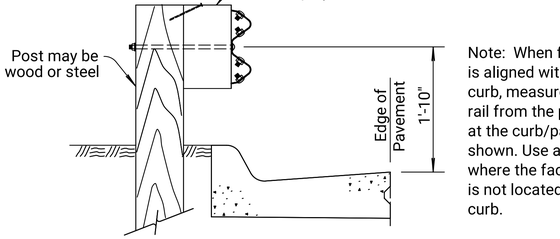


THRIE BEAM POST DETAILS



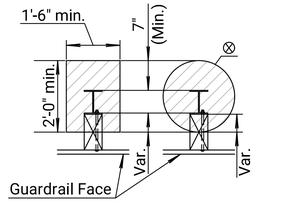
W-BEAM POST DETAILS

♦ 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.



DETAIL OF PLACEMENT AT CURB

Note: When face of guardrail is aligned with the face of a curb, measure the height of rail from the pavement surface at the curb/pavement joint as shown. Use a laydown type curb where the face of the guardrail is not located at the face of the curb.



POSTS IN PAVEMENT PLAN
(ALTERNATE GEOMETRIES)
Applies to All Wood and All Steel Posts
(Steel Posts Shown)

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

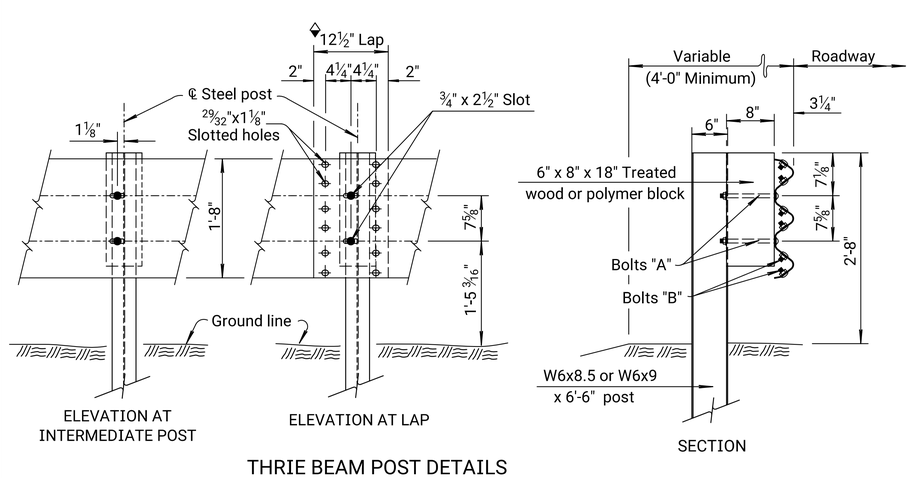
⊗ Diameter may vary from 1'-6" (min.) to 2'-0".

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.

WOOD POSTS

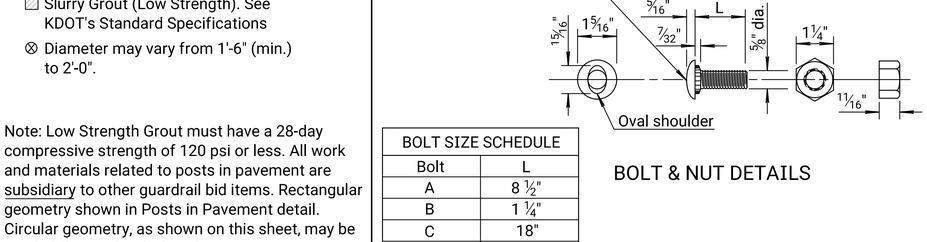
GENERAL NOTES (Wood Posts)

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. Use S4S rectangular posts and wood blocks, see standard specifications. Use only one post/blockout type within guardrail run, this excludes the the guardrail end terminals. 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 and prevents installation of a full length post. Contractor must obtain Engineer approval prior to cutting post shorter than 6'-6". Approved polymer blockouts may be substituted for wood blockouts. Only one type of blockout is permitted on each guardrail installation. This excludes the guardrail end terminals unless certified by the manufacturer. 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. Where guardrail posts are installed in pavement, form openings in the pavement for the guardrail posts.



THRIE BEAM POST DETAILS

♦ 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.



W-BEAM POST DETAILS

STEEL POSTS

GENERAL NOTES (Steel Posts)

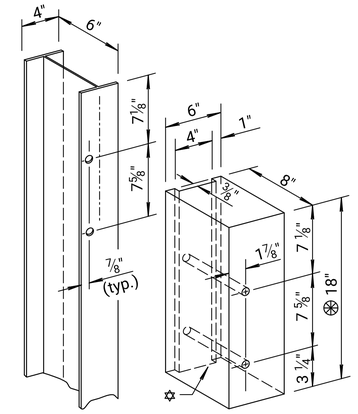
Use grade of steel for steel posts that meets the requirements of the standard specifications. Hot dip galvanize the posts after fabrication, see standard specifications. Use only one post/blockout type within guardrail run, this excludes the guardrail end terminals. For wood/polymer blockout requriements see standard specifications. Approved polymer blockouts may be substituted for wood blockouts. Only one type of blockout is permitted on each guardrail installation. This excludes the guardrail end terminals. 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 and prevents installation of a full length post. Contractor must obtain Engineer approval prior to cutting post shorter than 6'-6" except as allowed on Standard Drawing RD617. 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. Where guardrail posts are installed in pavement, form openings in the pavement for the guardrail posts.

BOLT SIZE SCHEDULE	
Bolt	L
A	8 ½"
B	1 ¼"
C	18"

BOLT & NUT DETAILS

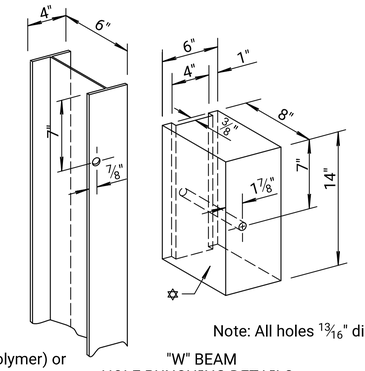
Galvanize all bolts, nuts, and washers in accordance with the KDOT's Standard Specifications.

See Standard Drawing RD613 for Thrie-Beam Transition Section Details.



Note: All holes 13/16" dia.

THRIE BEAM
HOLE PUNCHING DETAILS



Note: All holes 13/16" dia.

✡ Non-Metallic (Polymer) or Treated Wood Block

"W" BEAM
HOLE PUNCHING DETAILS

NO.	DATE	REVISIONS	BY	APP'D
13	09-05-18	Added Det., Post In Pavement	A.L.R.	T.T.R.
12	12-14-10	Revised notes, 28" w-be	S.W.K.	J.O.B.
11	06-30-04	Remove steel blockout and notes	S.W.K.	J.O.B.

KANSAS DEPARTMENT OF TRANSPORTATION

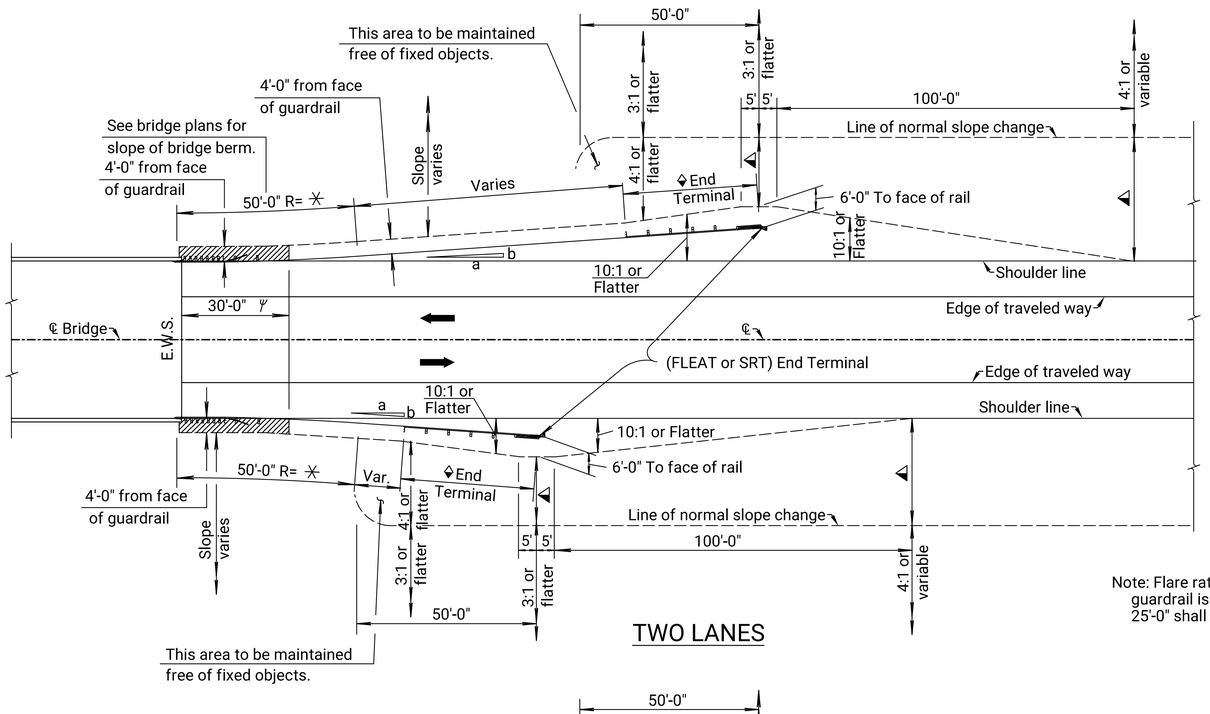
GUARDRAIL POST DETAILS

RD611

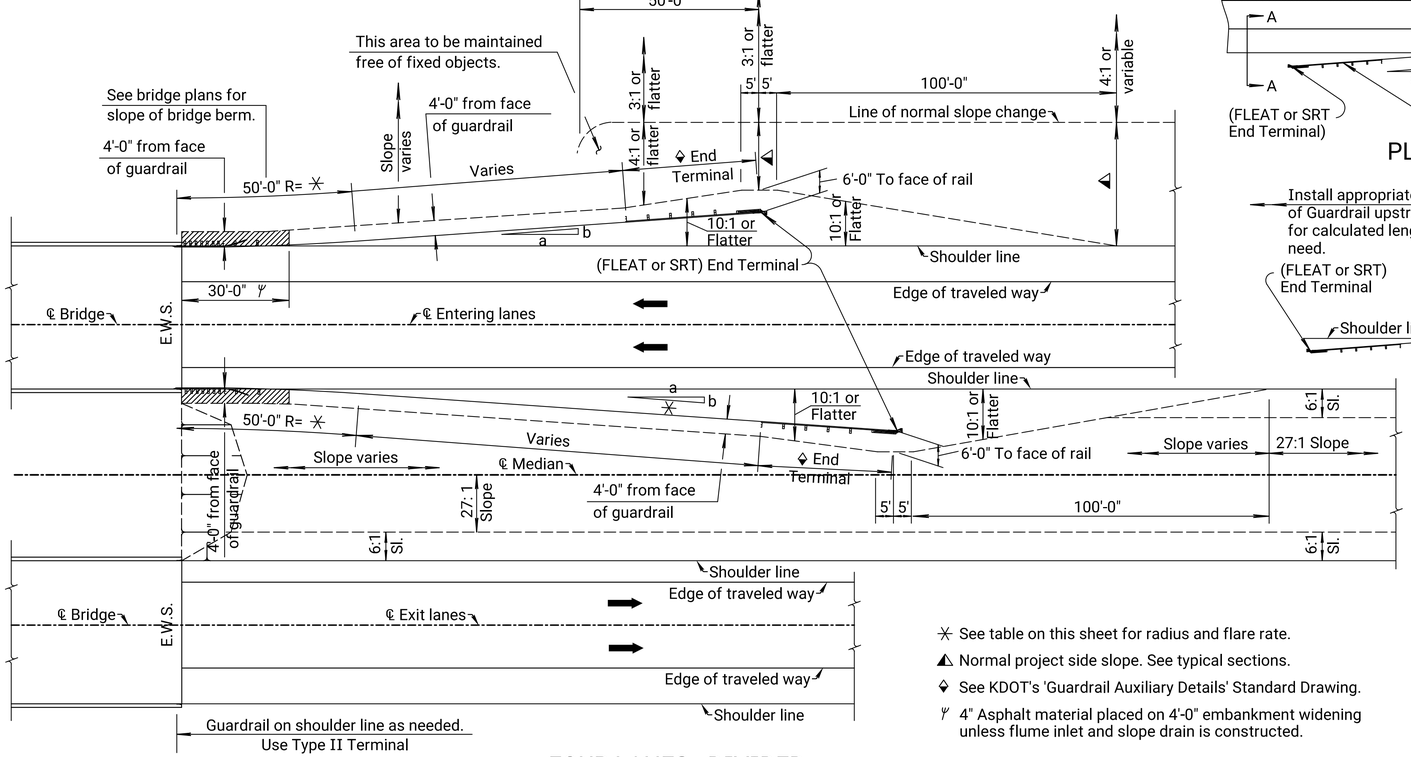
FHWA APPROVAL		09-25-18	APP'D.	Scott. W. King
DESIGNED	DETAILED		QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.		QUAN.CK.	TRACE CK.

Plotted by : rsnow 9-JUL-2024 18:09
File : rd611.dgn

Notes to Designer: Guardrail length of need shall be determined in accordance with the AASHTO Roadside Design Guide using
L_1= 25' for flare rate of a:b and L_1=12.5' for flare rate of 2a:b for a typical installation as shown on this sheet.
This sheet shall be used when the flared guardrail design for typical layout shown (FLEAT or SRT) is selected.
Material for asphalt widening shall be included in the plan quantities.



TWO LANES



FOUR LANES - DIVIDED

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'

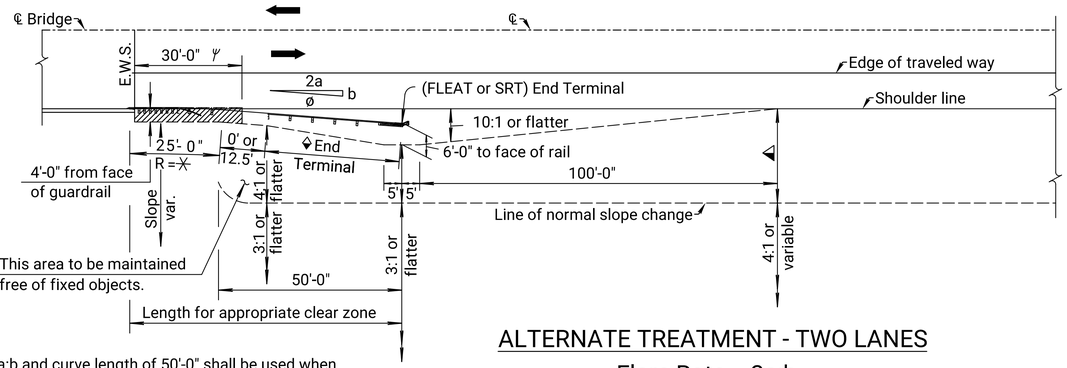
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	7	44

GENERAL NOTE

For guardrail and rubrail sections, details, and general notes see KDOT's 'W-Beam with Rubrail Bridge Approach Transition Details' Standard Drawings. For post details see KDOT's 'Guardrai Post Details' Standard Drawings

The ratio of a:b may be specified as zero for long runs of guardrail in high fill areas.

Widening, slopes & transition for Four Lane will be similar to that shown on two lane detail.

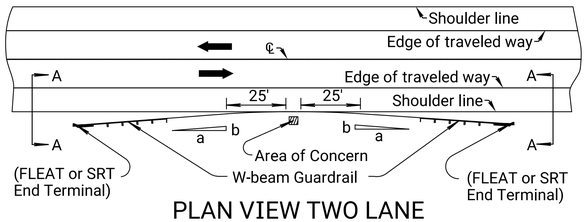


ALTERNATE TREATMENT - TWO LANES

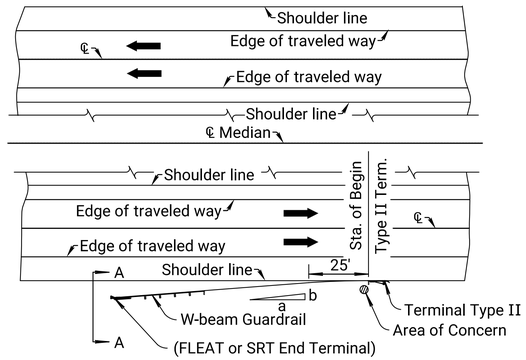
Flare Rate = 2a:b

(GUARDRAIL LENGTHS OF 62.5' AND 75')

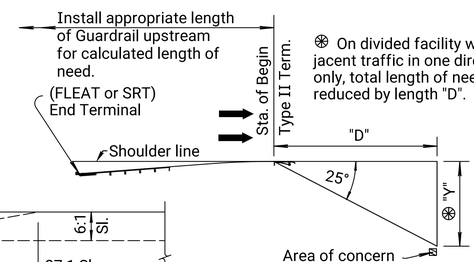
Note: Flare rate of a:b and curve length of 50'-0" shall be used when guardrail is beyond shy line, flare rate of 2a:b and curve length of 25'-0" shall be used when guardrail is located inside the shy line.



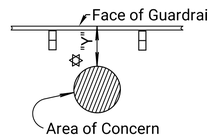
PLAN VIEW TWO LANE



PLAN VIEW FOUR LANE



✻ On divided facility with adjacent traffic in one direction only, total length of need may reduced by length "D".



ENLARGEMENT - AREA OF CONCERN

✡ Guardrail shall be nested and post spacing reduced to one half of normal spacing when "Y" is less than 5'. Ridid barrier shall be used when "Y" is less than 3'-3".

DETAILS OF GUARDRAIL PROTECTION AT ROADSIDE OBSTACLE

⚹ See table on this sheet for radius and flare rate.

◭ Normal project side slope. See typical sections.

⧫ See KDOT's 'Guardrail Auxiliary Details' Standard Drawing.

ᛘ 4" Asphalt material placed on 4'-0" embankment widening unless flume inlet and slope drain is constructed.

NO.	DATE	REVISIONS	BY	APP'D
08	06-05-18	Removed Flare-beyond-the-Flare	A.L.R.	T.T.R.
07	05-15-17	Removed X-LITE	A.L.R.	S.W.K.
06	07-02-09	Added roadside obstacle details	S.W.K.	J.O.B.

KANSAS DEPARTMENT OF TRANSPORTATION

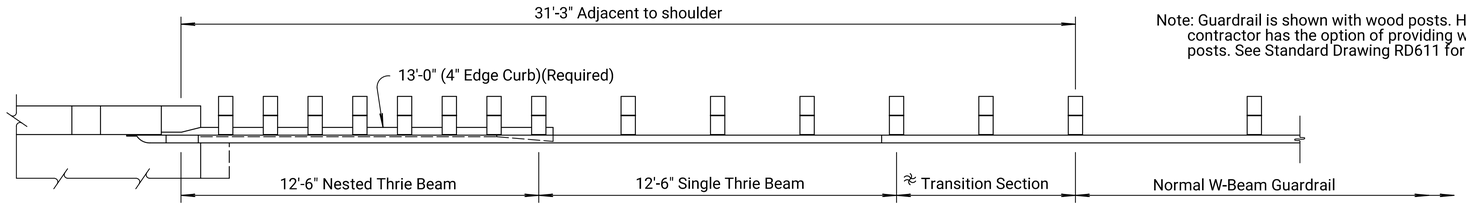
W-BEAM WITH RUBRAIL BRIDGE APPROACH TRANSITION TYPICAL ALIGNMENTS (FLARED)

RD615A

FHWA APPROVAL	06-19-18	APP'D.	Scott W. King
DESIGNED	DETAILED	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK.

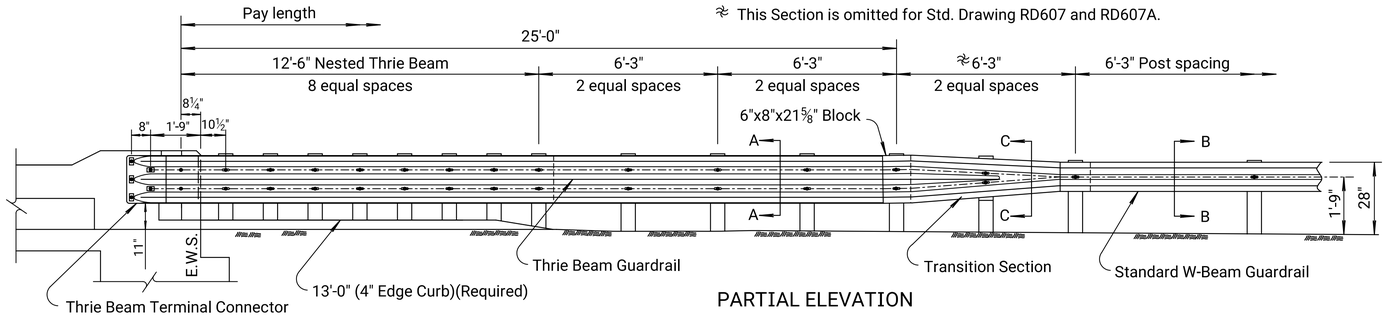
Plotted by : rsnow 9-JUL-2024 18:09
File : rd615a.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	8	44



Note: Guardrail is shown with wood posts. However the contractor has the option of providing wood or steel posts. See Standard Drawing RD611 for details.

PARTIAL PLAN



This Section is omitted for Std. Drawing RD607 and RD607A.

PARTIAL ELEVATION

GENERAL NOTE

Use galvanized 12 gauge steel rail elements unless otherwise noted. Use galvanized anchor bolts and post rail fittings, see Standard Specifications. Supply guard rail parts that are interchangeable with similar parts regardless of source or manufacturer.

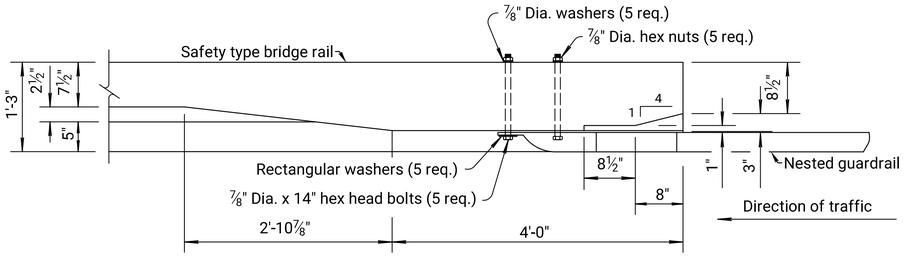
Fabricate Terminal Connector from 10 gauge steel, see standard specification. The connector has the same section as thrie beam guardrail Terminal connector is subsidiary to the bid item "Steel Plate Guardrail".

Shop 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.

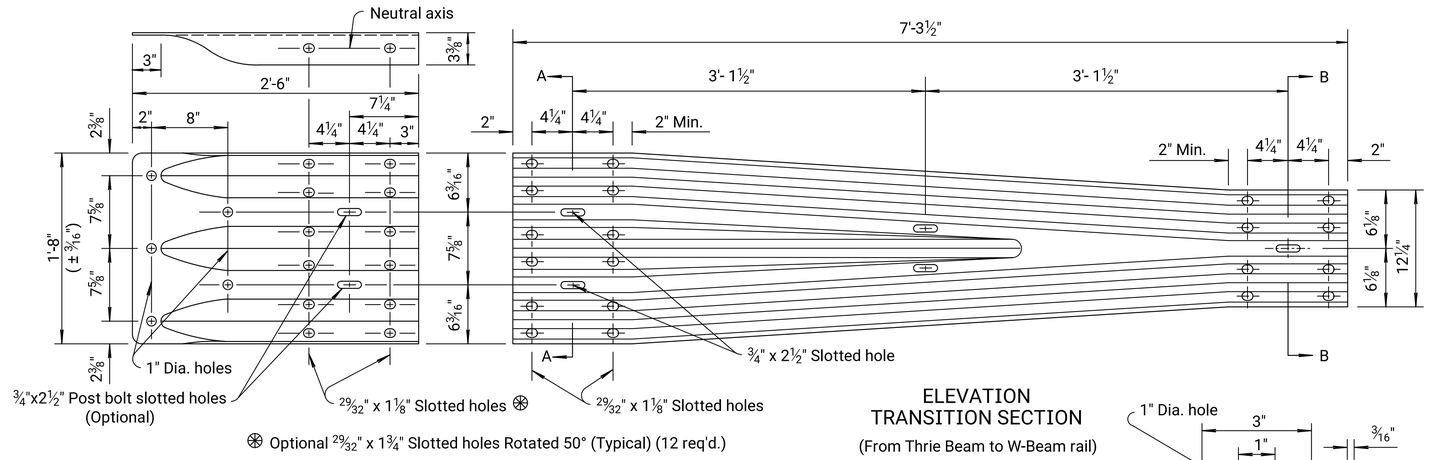
Bridge to guardrail transition consists of 1- 25'-0" Thrie beam with 1- 12'-6" Thrie beam section nested in back of 25'-0" section (see layout), & 1- Thrie beam to W-beam Asymmetrical transition section. Use associated hardware with post spacing shown. Use w-beam guardrail with 6'-3" post spacing with rail furnished in 12'-6" or 25'-0" sections.

All material and work required for this installation are paid under the bid item "Steel Plate Guardrail".



PLAN VIEW

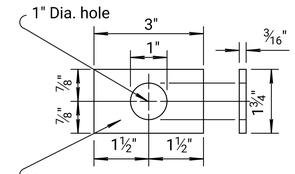
GUARDRAIL ATTACHMENT
TO SAFETY SHAPE BRIDGE RAIL



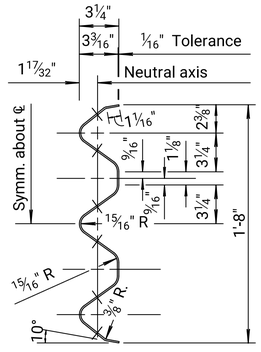
⊛ Optional 29/32" x 1¾" Slotted holes Rotated 50° (Typical) (12 req'd.)

TERMINAL CONNECTOR

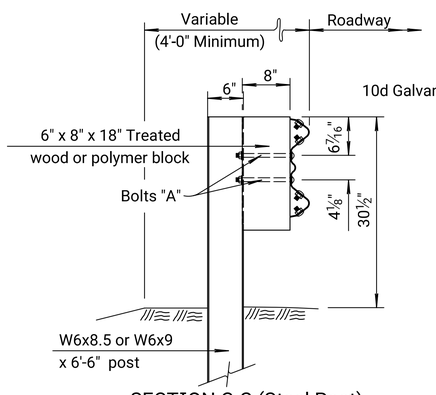
ELEVATION
TRANSITION SECTION
(From Thrie Beam to W-Beam rail)



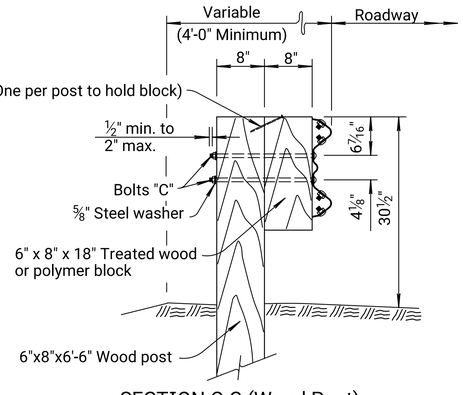
RECTANGULAR WASHER
(Other approved washer may be used.)



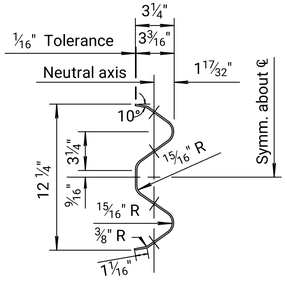
SECTION A-A THRU RAIL ELEMENT
TYPICAL THRIE BEAM



SECTION C-C (Steel Post)



SECTION C-C (Wood Post)



SECTION B-B THRU RAIL ELEMENT
TYPICAL W-BEAM

NO.	DATE	REVISIONS	BY	APP'D
13	12-06-10	Rev. Sec. C-C, notes & 28" rail height	S.W.K.	J.O.B.
12	07-02-09	Rev. Safety Shape Br. Rail detail	S.W.K.	J.O.B.
11	01-05-04	Added 4" Edge Curb, revised note	S.W.K.	J.O.B.

KANSAS DEPARTMENT OF TRANSPORTATION

DETAILS OF THRIE BEAM GUARDRAIL TRANSITION

RD613

FHWA APPROVAL	01-11-11	APP'D.	James O. Brewer
DESIGNED	DETAILED	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK.

Plotted by : rsnow 9-JUL-2024 18:09
File : rd613.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	9	44

SUMMARY OF QUANTITIES

Item / Location	Excavation Class I Cu. Yds.	Excavation Class II Cu. Yds.	Concrete (Grade 4.0)(AE)(SW) Cu. Yds.	Reinforcing Steel (Grade 60) (Epoxy Coated) Lbs.	✱ Piles (Steel) (HP12x53) Lin. Ft.	Slope Protection (Riprap Stone) Cu. Yds.	Cast Steel Pile Points Each	Contractor Furnished PDA Each	◔ Piles (Corrugated Metal Sheet) Sq. Ft.	Structural Steel AASHTO (M270) (Grade 50WT2) Lbs.	Structural Steel ASTM (A709) (Grade 50W) Lbs.	Structural Steel ASTM (A709) (Grade 50) Lbs.
Abutment 1	5	5			283	12	9	1	672			
Abutment 2	5	5			283	13	9	1	672			
Substr. Total												
Superstr. Total			35.2	5,467						23,360	6,089	7,637
Total	10	10	35.2	5,470	† 566	25	18	2	1,344	23,360	6,089	7,637

✱ NOTE: Only steel pile HP12x53 shall be used on this project.

† Summary of Piling
Abutment 1: 4 @ 41' - 1 @ 51' for use with the PDA Abutment, 4 @ 17' Wings
Abutment 2: 4 @ 41' - 1 @ 51' for use with the PDA Abutment, 4 @ 17' Wings

◔ Corrugated metal sheet pile quantity calculated based on 14' long piles.

SUMMARY OF STEEL QUANTITIES

Item / Location	Structural Steel AASHTO (M270) (Grade 50WT2) Lbs.	Structural Steel ASTM (A709) (Grade 50W) Lbs.	Structural Steel ASTM (A709) (Grade 50) Lbs.
Beams	23,360		
Diaphragms		4,970	
Stiffeners (At Diaphragms)		1,119	
Pile Caps			3,286
Stiffeners (At Pile Caps)			196
End Plates			1,584
Gusset Plates (At End Plates)			123
Wing Caps			240
Whalers			2,208
Total	23,360	6,089	7,637

INDEX OF BRIDGE DRAWINGS

Sheet No.	Drawing
9	General Notes and Quantities
10	Contour Map
11	Construction Layout
12	Engineering Geology
13	Abutments Details
14	Framing Plan
15	Beam Details
16	Steel Erection
17	Slab Details
18	Typical Bridge Section
19	Bill of Reinforcing and Bending Diagrams
	Standards
20	Bridge Excavation
21	Standard Pile Details
22	Supports and Spacers for Reinforcing Steel

GENERAL NOTES

EMBANKMENT: Complete the embankment at the abutments as shown on the Bridge Excavation sheet prior to driving the abutment piling.

BRIDGE EXCAVATION: Elevation 1442.50 shall designate the Excavation Boundary Plane of Class I and Class II Excavation; Class I above the plane, Class II below the plane. See the Bridge Excavation sheet for the limits of pay excavation.

BACKFILL COMPACTION: Compact backfill at the abutments.

PILING SPLICE LOCATION: Weld testing criteria for Abutments 1 and 2 will follow the "Standard Pile Details" Sheet (BR110).

PILING: Drive all piling to penetrate or bear in the weathered shale bedrock. Driving shall stop when in the opinion of the Engineer additional driving may damage the piling. Drive all piling to the Pile Driving Formula Load of:

Abutment No. 1	50 Tons
Abutment No. 2	50 Tons

As a minimum drive each pile to the load and penetration, but in no case shall the pile be driven to more than 110% of Pile Driving Formula Driving Load. At any location where problems are experienced, pile damage is suspected, or the Pile Driving Formula Load occurs significantly above the design pile tip elevation, the Engineer may request that the Pile Driving Analyzer (PDA) equipment be used.

CONTRACTOR FURNISHED PDA: Use the Pile Driving Analyzer equipment at the locations shown on the Construction Layout. Use Pile Driving Analyzer equipment and methods compliant with KDOT Special Provisions. The piling shall remain in place as permanent piling. Drive the piling to the resistance value (Strength I divided by Phi).

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

ERECTION PLANS: This is a Category A Structure. Submit detailed Erection Plans to the Field Engineer per KDOT Specifications. A Licensed Professional Engineer is not required.

DEMOLITION PLANS: This is a Category A Demolition. Submit detailed Demolition Plans to the Field Engineer per KDOT Specifications. No Demolition work will begin without approved Demolition Plans. A Licensed Professional Engineer is not required.

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

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

CONCRETE: Superstructure concrete is bid as Concrete (Grade 4.0)(AE)(SW). Bevel all exposed edges of all concrete with a ¾ inch triangular molding, except where noted on the plans. Construction joints are optional, but if used, place only at locations approved by the Engineer.

CONSTRUCTION LOADS: Limited traffic is permitted on the new one-course deck 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.

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

TEMPERATURE: The design temperature for all dimensions is 60° F.

DIMENSIONS: All dimensions shown on the design plans are horizontal dimensions unless otherwise noted. Make necessary allowances for roadway grade and cross slope.

STEEL SHEET PILING: Structural steel for sheet piling shall meet ASTM A328 (Gr. 36 min.). Cold bent shapes are acceptable. Corner connections are subsidiary to the bid item "Piles (Corrugated Metal Sheet)". Welded or mechanical piling splices are allowed with the Engineer's approval. Submit a sheet pile plan and calculations to the Engineer for approval. Include plan details of materials, size and location of the sheet piling. Submit the plan at the pre-construction conference. Drive all sheet piling at or below the pile tip elevation shown on the plans. Variation in the sheet pile alignment may be allowed with the approval of the Engineer. Use only "tamping" compaction equipment within five feet of the sheet piling. Painting of the steel sheet piling is not required. See KDOT Specifications. Sheet piling shall be galvanized and a minimum 7 gauge thickness.

DESIGN DATA

DESIGN SPECIFICATIONS:
AASHTO Specifications, 2017 Edition and latest interim Specifications. Load and Resistance Factor Design.

CONSTRUCTION SPECIFICATIONS:
Kansas Department of Transportation, Standard Specifications for State Road and Bridge Construction, 2015 Version.

DESIGN LOADING:
Live Load - HL-93

UNIT STRESSES:

Concrete (Grade 4.0)(AE)(SW)	f'c =	4 ksi
Epoxy Coated Reinforcing Steel (Grade 60)	fy =	60 ksi
Structural Steel (M270)(Grade 50WT2)	Fy =	50 ksi
Structural Steel (A709)(Grade 50W)	Fy =	50 ksi
Structural Steel (A709)(Grade 50)	Fy =	50 ksi

LRFD DESIGN PILE LOAD:

Design Loading (Tons/Pile)	Strength I	Service I	Phi
Abutment 1	50	29	0.65
Abutment 2	50	29	0.65

LRFR RATING FACTORS

Design Load / Rating Level	Inventory	Operating
HL-93 Loading	1.10	1.43
2011 Manual for Bridge Evaluation		

NO.	DATE	REVISIONS	BY	APP'D
6	4/7/14	Current Release	JPJ	CER

Br. No. 000480759806220 Sta. 50+00.00

GENERAL NOTES AND QUANTITIES
~~COMMON ITEMS~~

Proj. 48 C-5230-01 Kingman Co.

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

Std. Base File: br301.dgn
Plotted By: rsnow
Plot Location:
File: 48 C523001-BrD_Quant & Gen Notes.dgn
Plot Date: 9-JUL-2024 18:09

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	10	44

UTILITIES

Telephone	Cox	620-259-6499
Telephone	ATT	800-778-9140
Power	Evergy	316-213-6355

CP #1
22.76' Rt. of ℄ Sta.45+23.08
N = 361,835.93 E = 17,387,575.05
1. Set 5/8" Rebar Flush
2. App. ℄ of E-W Rd. 22.7' N
3. N. Face of W. Gaet Post 11.4' S
4. App ℄ of Fld. Ent. 8.1' E

CP #2
18.05' Rt. of ℄ Sta. 48+42.12
N = 361839.73 E = 17,387,894.1
1. Set 5/8" Rebar Flush
2. App. ℄ of E-W Rd. 17.4' N
3. Fc. Line Running E-W 15.5' S
4. SW Cor. of Ex. Bridge 132.6' E

CP #3
28.51' Rt. of ℄ 55+17.94
N = 361,827.33 E = 17,388,569.89
1. Set 5/8" Rebar Flush
2. App. ℄ of E-W Rd. 28.4' N
3. App ℄ of Fld. Ent. 26.7' E
4. Top Center W. end CMP 6.8' N

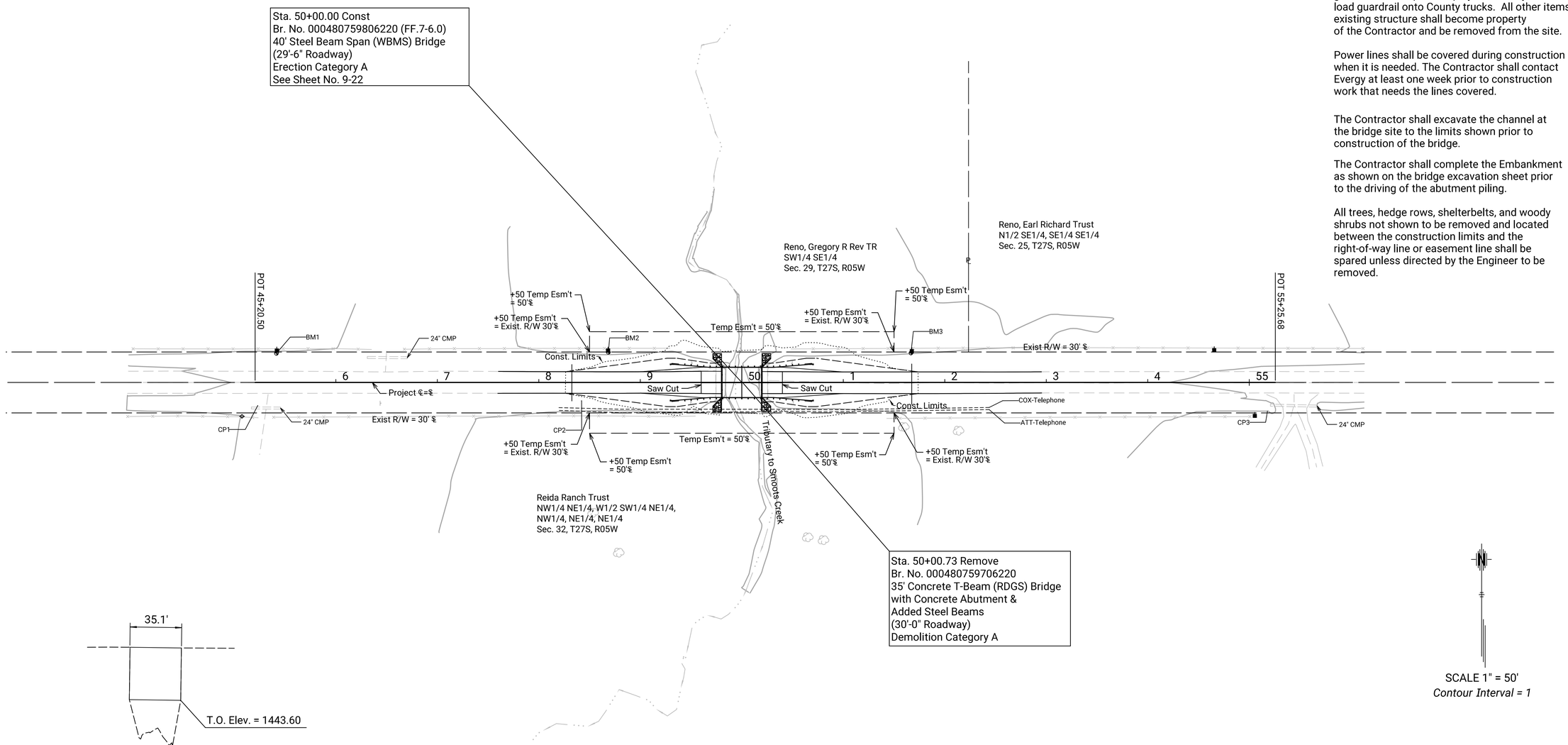
The Contractor shall remove the existing 35' Concrete T-Beam (RDGS) Bridge with concrete abutment & added steel beams and Concrete Cast-in-Place deck. (30' roadway). Contractor to salvage guardrail in good condition and stockpile on site. After all guardrail has been stockpiled, contact Kingman County to coordinate when guardrail can be picked up by the County. Contractor will load guardrail onto County trucks. All other items of the existing structure shall become property of the Contractor and be removed from the site.

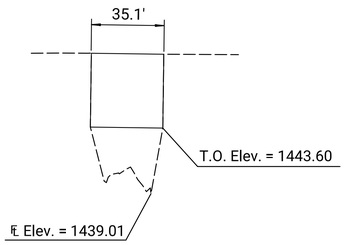
Power lines shall be covered during construction when it is needed. The Contractor shall contact Evergy at least one week prior to construction work that needs the lines covered.

The Contractor shall excavate the channel at the bridge site to the limits shown prior to construction of the bridge.

The Contractor shall complete the Embankment as shown on the bridge excavation sheet prior to the driving of the abutment piling.

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.





Existing Waterway Opening
130 Sq. Ft.

SCALE 1" = 50'
Contour Interval = 1

BM #1: Top of Driven "T" Post 2' S. PP.
28.76' Lt. of ℄ Sta. 45+41.45 Elev. = 1449.43

BM #2: Top of Driven "T" Post 1' S. PP.
29.01' Lt. of ℄ Sta. 48+68.50 Elev. = 1444.53

BM #3: Top of Driven "T" Post 1' S. PP.
29.01' Lt. of ℄ Sta. 51+66.67 Elev. = 1445.38

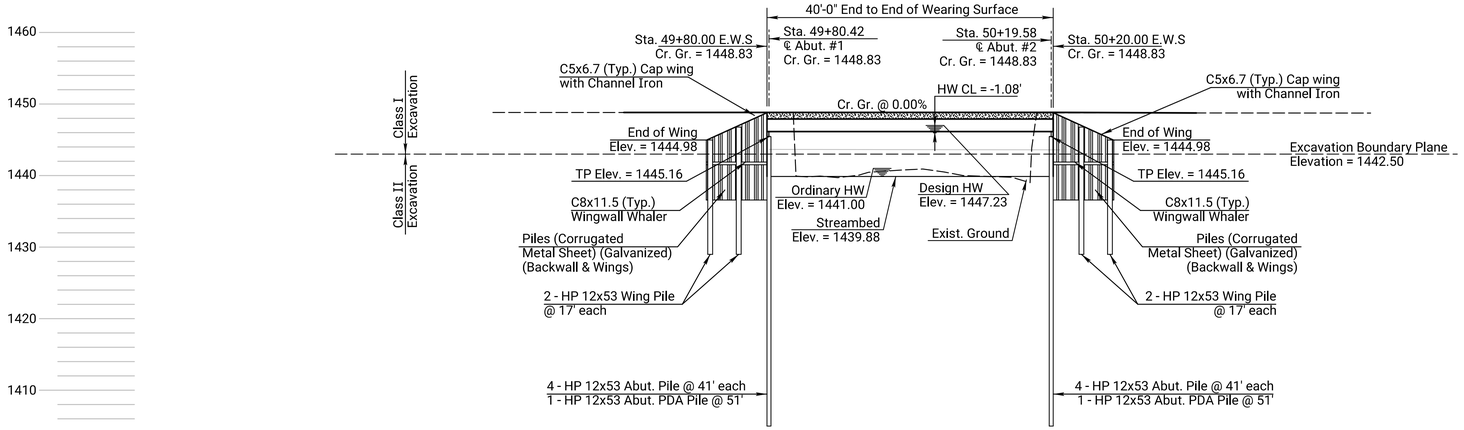
Br. No. 000480759806220 Sta. 50+00.00

CONTOUR MAP
NE 10th St. over Tributary to Smoots Creek

Proj. 48 C-5230-01 Kingman Co.

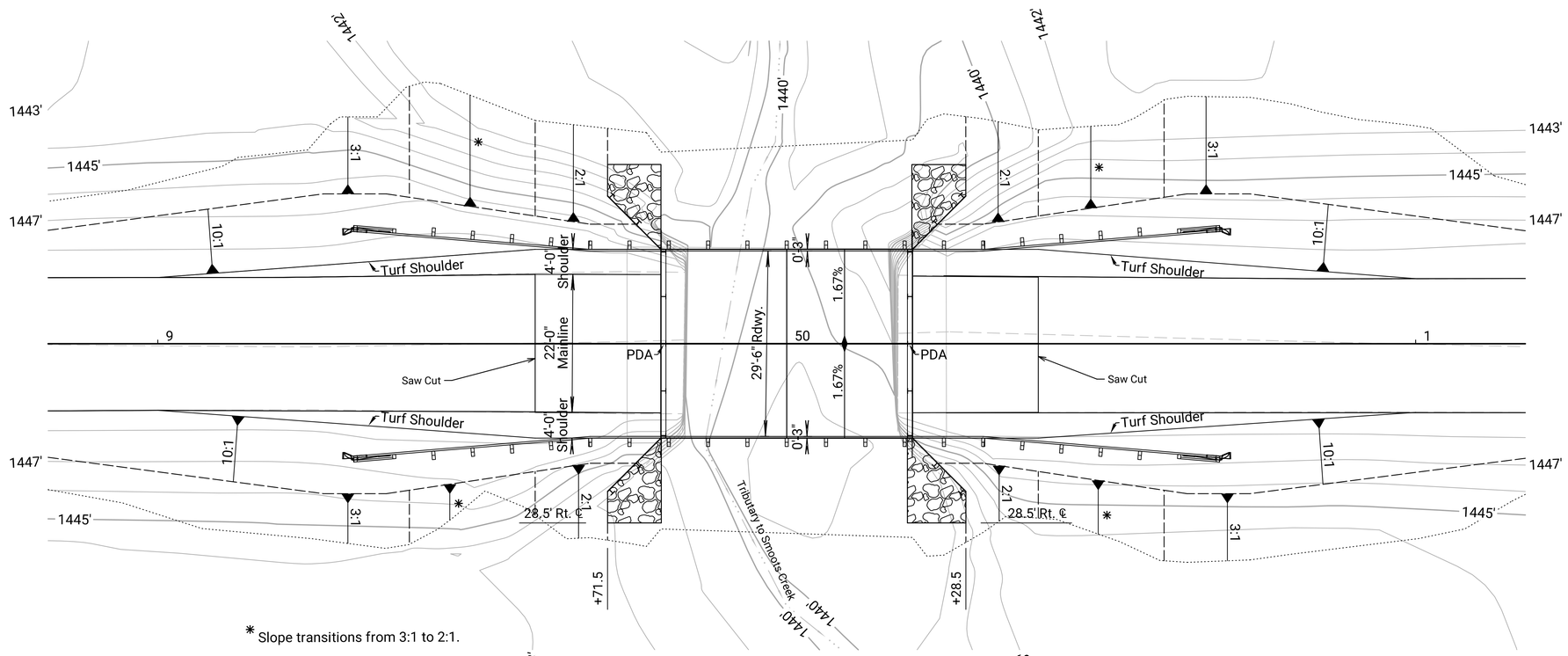
Plotted by: rsnow 9-JUL-2024 18:10
File: 48 C523001_Contour.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	11	44



ELEVATION

40' Single Span
Steel Beam Bridge
(29'-6" Roadway)



* Slope transitions from 3:1 to 2:1.

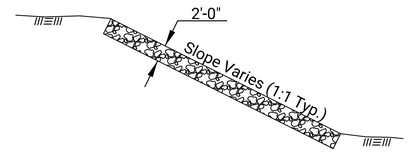
BM #1: Top of Driven "T" Post 2' S. PP.
28.76' Lt. of ℄ Sta.45+41.45 Elev. = 1449.43

BM #2: Top of Driven "T" Post 1' S. PP.
29.01' Lt. of ℄ Sta.48+68.50 Elev. = 1444.53

BM #3: Top of Driven "T" Post 1' S. PP.
29.01' Lt. of ℄ Sta.51+66.67 Elev. = 1445.38

DRAINAGE DATA:

Drainage Area	5.9	Sq. Mi.
Design Frequency	10	Yr.
Design Discharge (Q_{10})	1730	cfs
Design Velocity @ (Q_{10})	7.3	fps
Design High Water Elevation	1447.23	Ft.
Design Backwater	-1.67	Ft.
Design Backwater Elevation	1447.40	Ft.
Overtopping Elevation (Sta. 48+66)	1448.62	Ft.
Overtopping Discharge	2300	cfs
Overtopping Frequency	20	Yr.
Discharge @ (Q_{100})	4180	cfs
Backwater @ (Q_{100})	-0.03	Ft.
Backwater Elevation @ (Q_{100})	1449.99	Ft.
Historic Highwater Elevation	NA	Ft.
Ordinary Highwater Elevation	1441.00	Ft.
Total Waterway Provided	238	Sq. Ft.
Design Waterway Provided	238	Sq. Ft.
Estimated Ordinary Highwater Discharge	7	cfs



TYPICAL SLOPE PROTECTION

TYPICAL SLOPE PROTECTION

SLOPE PROTECTION (Riprap Stone): Place Slope Protection (Riprap Stone) to the limits and thickness shown on the plans or as directed by the Engineer. Use Riprap Stone Classified as Light 200 Pounds.

1" = 10'

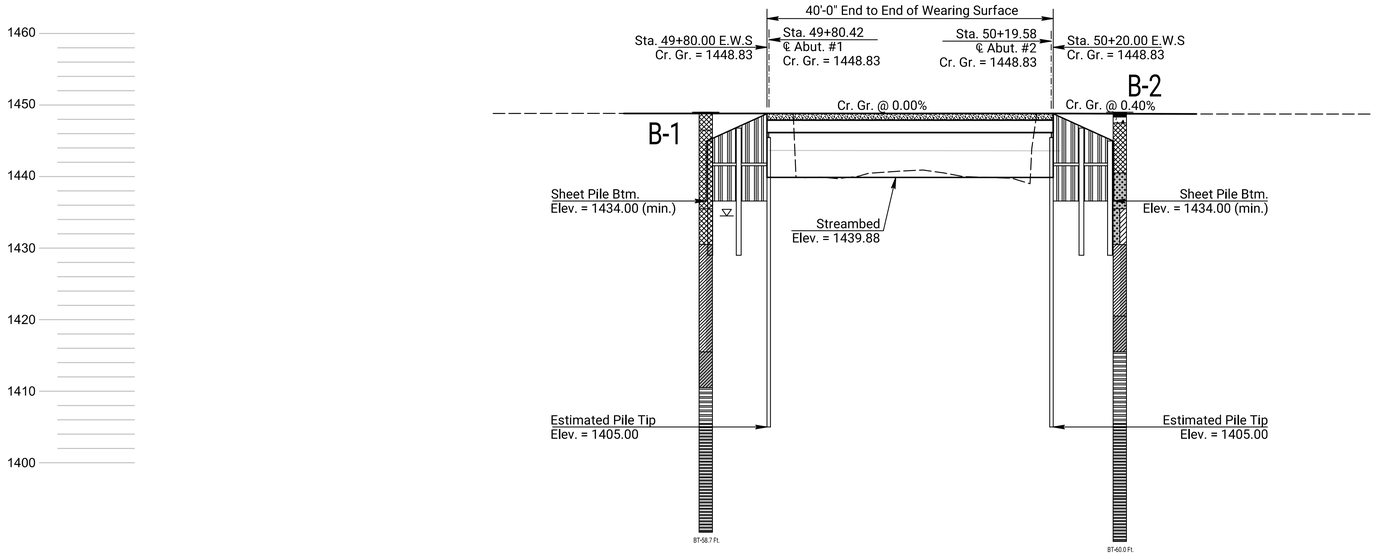
Br. No. 000480759806220 Sta. 50+00.00

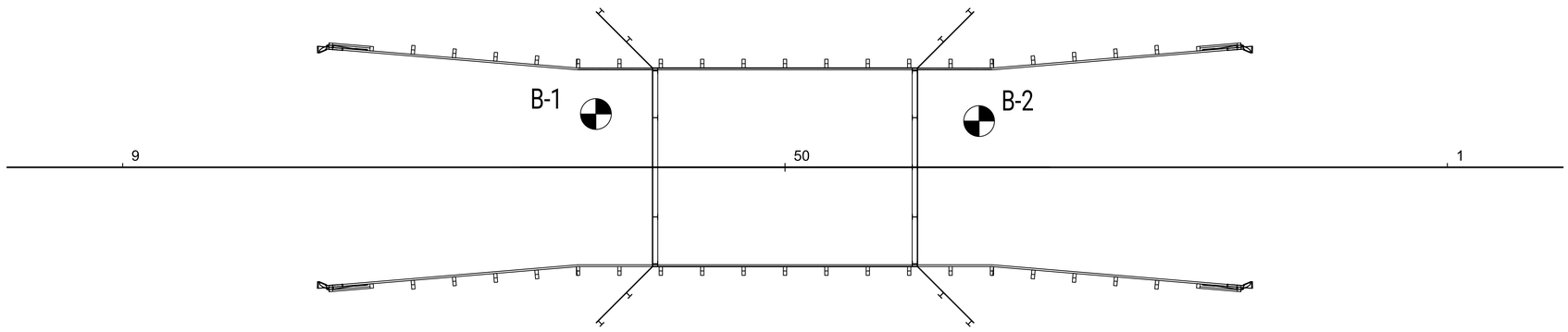
CONSTRUCTION LAYOUT
NE 10th St. over Tributary to Smoots Creek

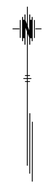
Proj. 48 C-5230-01 Kingman Co.

Plotted by : rsnow 9-JUL-2024 18:10
File : 48 C523001_Construction Layout.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	12	44







1" = 10'

Water Level Reading at time of drilling.

Fill | Lean Clay with Sand | Sandy Lean Clay | Highly Weathered Shale | Moderately Weathered Shale

Asphalt | Concrete | Well-graded Sand | Well-graded Sand with Clay

Br. No. 000480759806220 Sta. 50+00.00

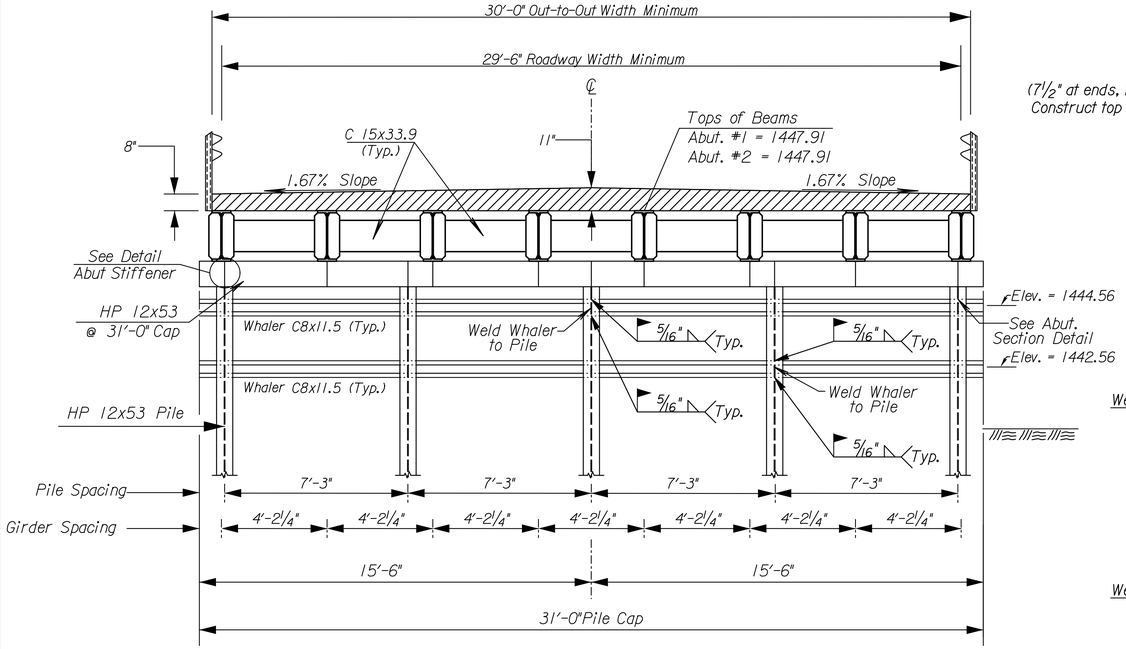
GEOLOGY SHEET
NE 10th St. over Tributary to Smoots Creek

Proj. 48 C-5230-01 Kingman Co.

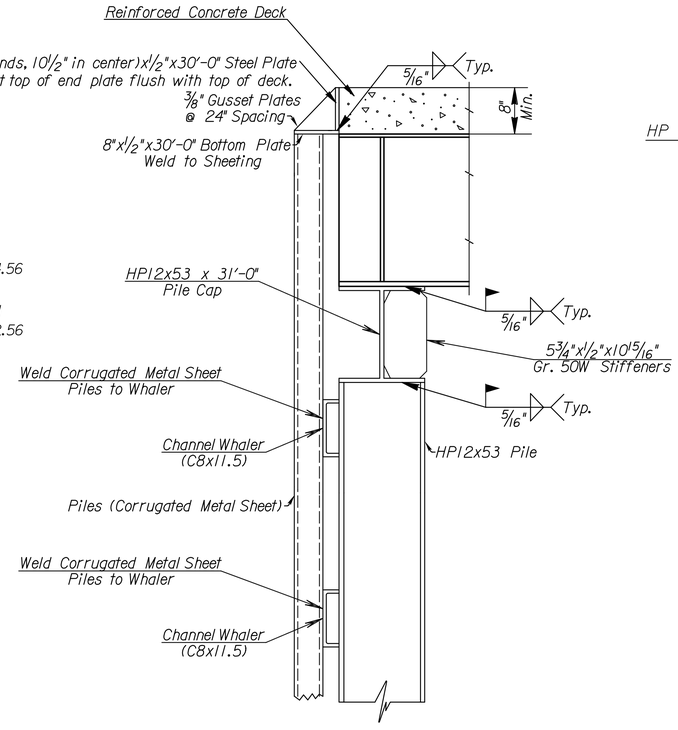
Plotted by: rsnow 9-JUL-2024 18:10
File :48 C523001_Geology Sheet.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	13	44

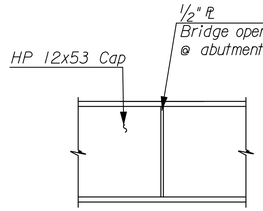
DATE	BY	REFERENCES NOTED	REFERENCES CHECKED



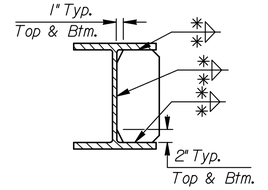
ABUTMENT SECTION
(Along ℄ of Abutment)



SECTION AT ABUTMENT

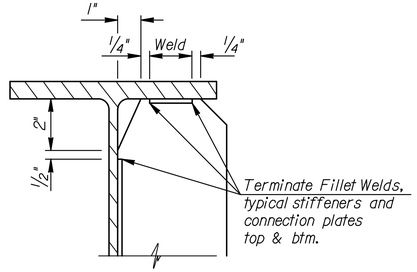


✱Refer to the table of "Minimum Fillet Weld Sizes" shown on this sheet.



DETAIL ABUT STIFFENERS

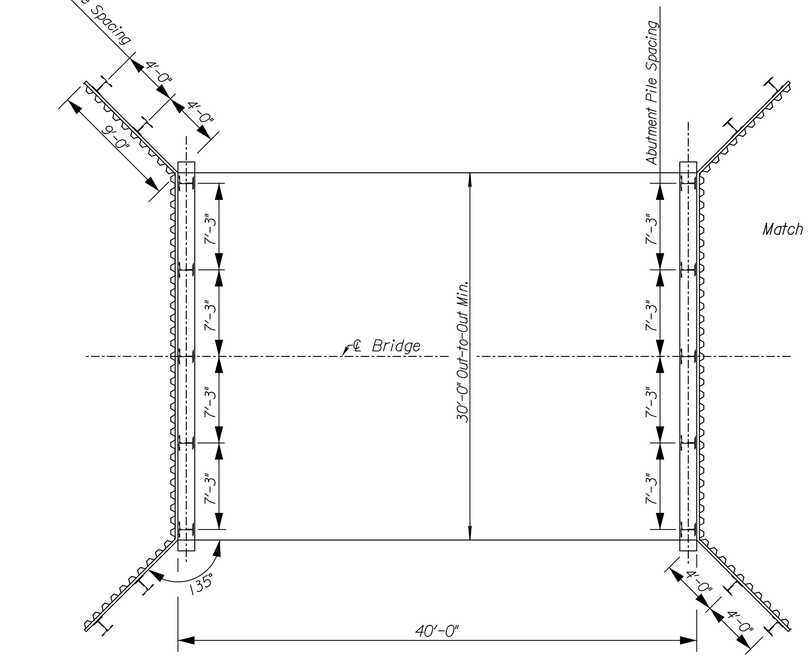
Stiffeners shall be placed on the bridge opening side of the abutment. Stiffeners to be placed perpendicular to centerline of abutment. Stiffener spacing varies and shall be placed at centerline of piles and beams. The outer abutment stiffener will be for both the outer pile and outer beam.



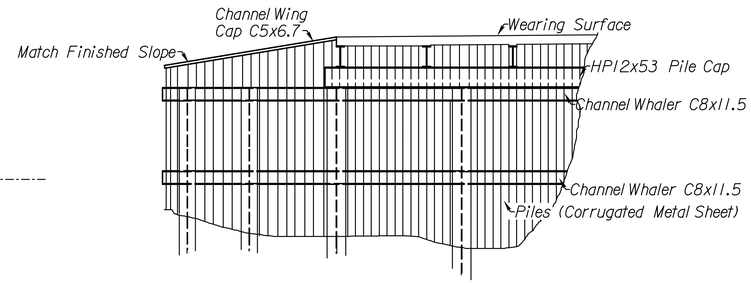
WELD DETAIL

MINIMUM FILLET WELD SIZES	
Material thickness of thicker part joined	*Minimum size of fillet weld*
To 7/8" inclusive	*1/4"*
Over 7/8"	*3/8"*

Note: Minimum fillet weld size need not exceed the thickness of the thinner part joined.



PLAN VIEW



Each wingwall shall be constructed with HP12x53 piles (17' each).
Wingwall top shall be sloped to match finished grade.
The wingwall top shall be capped with channel iron C5x6.7.

Wingwalls and backwalls shall be interlocking galvanized 7 ga. corrugated metal sheet piling driven to a minimum elevation of 1434.00. The abutment and wingwall sheet piling shall be tight against the whaler supports. The sheet piling shall be welded to the whalers, end plates and wing caps.

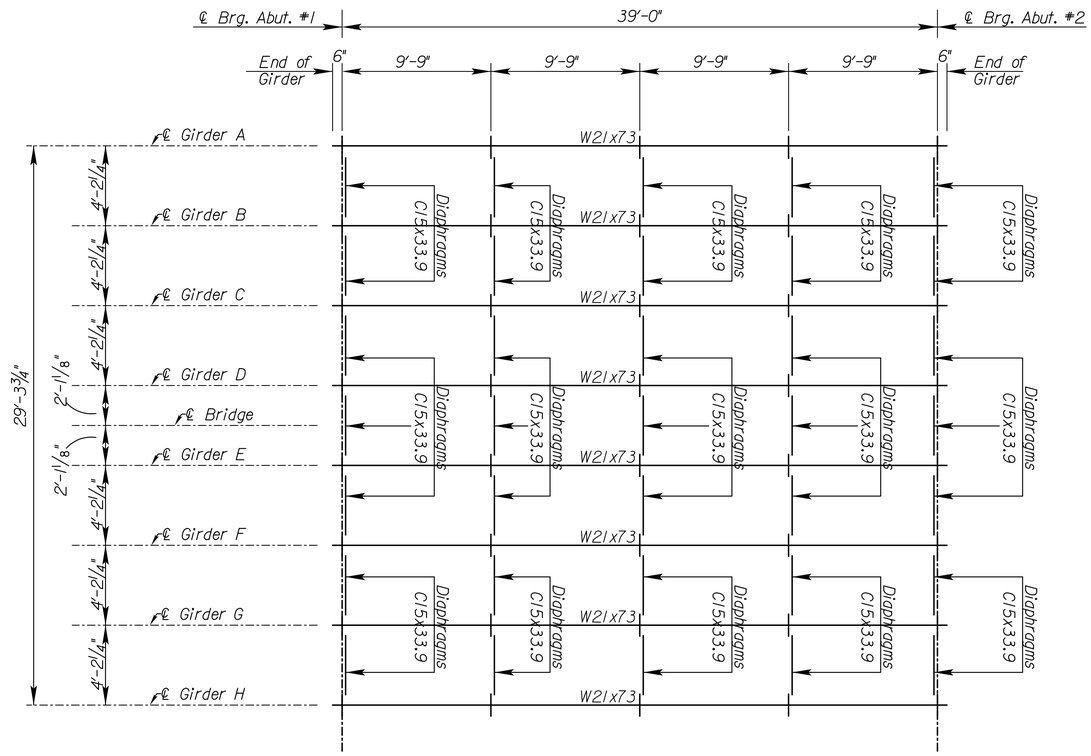
Br. No. 000480759806220 Sta. 50+00.00

ABUTMENT DETAILS

Proj. 48 C-5230-01 Kingman Co.

Plotted by : rsnow 9-JUL-2024 18:10
File : 48 C523001-Br1_Abutment Details.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	14	44



No Scale

FRAMING PLAN

STRUCTURAL STEEL NOTES

STRUCTURAL STEEL: The rolled girders shall meet AASHTO M270 (Gr. 50WT2) requirements. All other structural steel shall meet ASTM A709 (Gr. 50W), unless noted otherwise.

PAINTING: Blast clean all surfaces of all weathering steel, including all contact surfaces of bolted connections, to meet SSPC-SP6 Specifications (latest Revision). Blast clean to meet SSPC-SP10 Specifications and prime coat the embedded portion of the girders, including the top flanges in accordance with KDOT Specifications.

TOUCH-UP: Prepare and paint all small areas of damaged paint (1 yd^2 or less), requiring touchup, with an approved organic zinc primer.

BOLTED CONNECTIONS: Secondary Member Connections: Use 3/4 inch diameter heavy hex structural bolts for the secondary member connections. Use 13/16 inch diameter bolt holes. Oversized and/or slotted holes, as specified in the KDOT Specifications, may be used in only one of the two members connected and must be shown in the approved shop drawings. Oversized and/or slotted holes may require additional standard hardened washers or plate washers. Report to the Engineer prior to any required field reaming that will remove more than 1/4 inch of material from one ply of the connected parts.

Use Direct Tension Indicators (DTIs) 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 F3125 A325, Type 3, and KDOT Specifications unless otherwise noted. 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". The number of bolts is shown for the convenience of the Contractor.

ERECTION ELEVATION CHECKS: Present verification to the Engineer that the elevations at the bearings match plan elevation (± 1/4") before any connection is fully tightened.

WELDING: Material, Fabrication and Construction shall conform to KDOT Specifications. On the shop drawings, show a code or symbol in the tail of the weld symbol that refers to an approved, pre-qualified weld procedure.

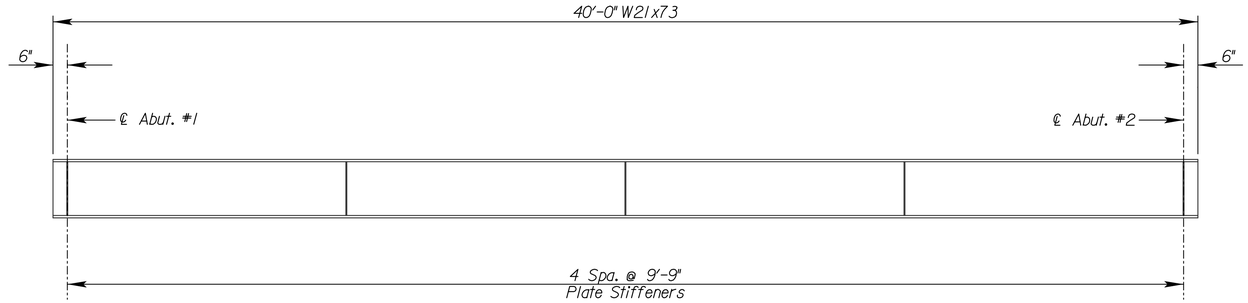
Br. No. 000480759806220 Sta. 50+00.00

FRAMING PLAN

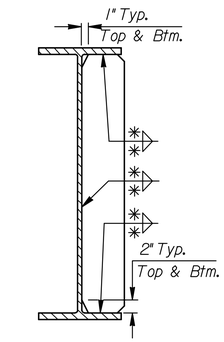
Proj. 48 C-5230-01 Kingman Co.

Plot Location:
Plotted By: rsnow
File: 48 C523001-Br2_Framing Plan.dgn
Plot Date: 9-JUL-2024 18:10

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	15	44

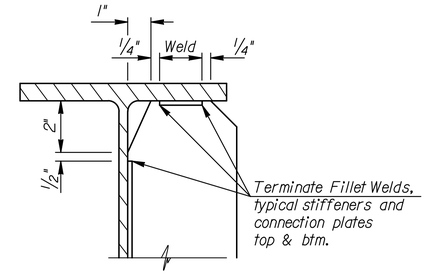


BEAM ELEVATION



STIFFENERS

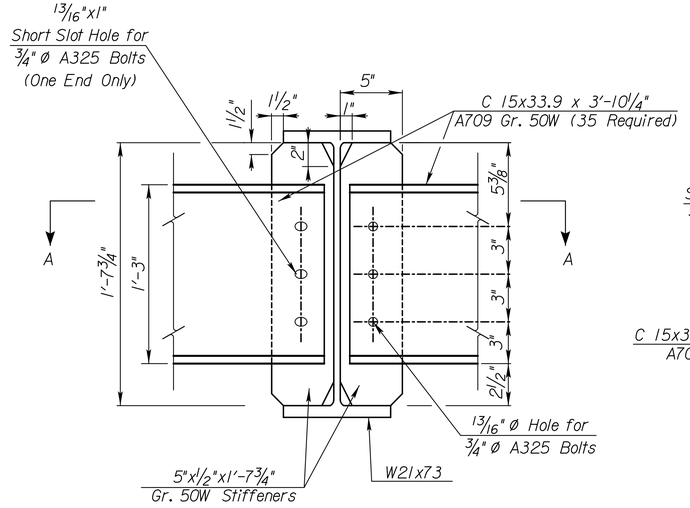
*Refer to the table of "Minimum Fillet Weld Sizes" shown on this sheet.



WELD DETAIL

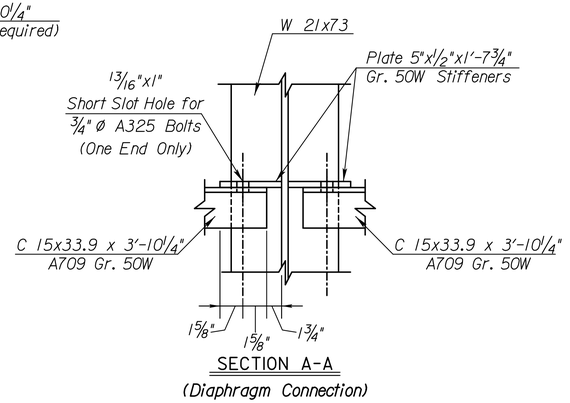
MINIMUM FILLET WELD SIZES	
Material thickness of thicker part joined	Minimum size of fillet weld
To 7/8" inclusive	1/4"
Over 7/8"	3/8"

Note: Minimum fillet weld size need not exceed the thickness of the thinner part joined.

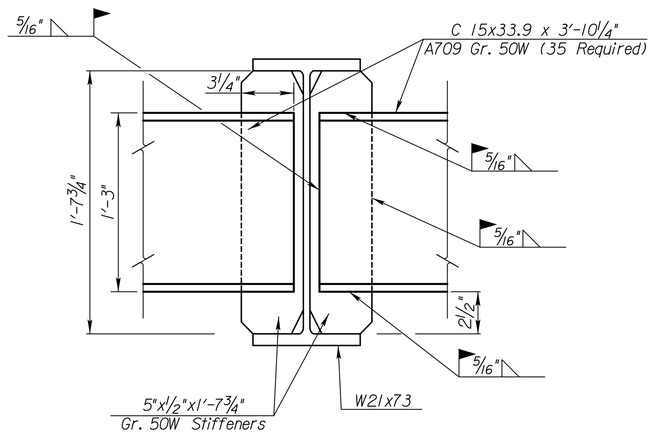


DIAPHRAGM CONNECTION DETAIL
ABUTMENT, PIER, AND INTERMEDIATE

Fasteners for Diaphragm plate connections shall be 3/4" Ø x 2 1/4" high-strength steel bolts ASTM F3125 A325 (Type 3) with DTI Washers. (Total = 3 bolts/connection)



SECTION A-A
(Diaphragm Connection)



OPTIONAL WELDED CONNECTION DETAIL

OPTIONAL CONNECTIONS: Connect beam diaphragm connections with high strength bolted connections or welded connections at the option of the Contractor. Include details of the proposed connections in the shop drawings. If welded connections are used, all welds shall be 5/16" fillet welds. The structural steel quantities shown on the plans are based on bolted connections. The structural steel pay quantity will be the quantity shown on the plans regardless of the type of connection used or of any approved modifications.

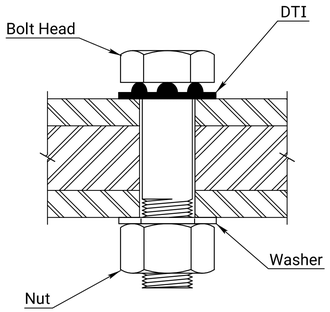
Br. No. 000480759806220 Sta. 50+00.00

BEAM DETAILS

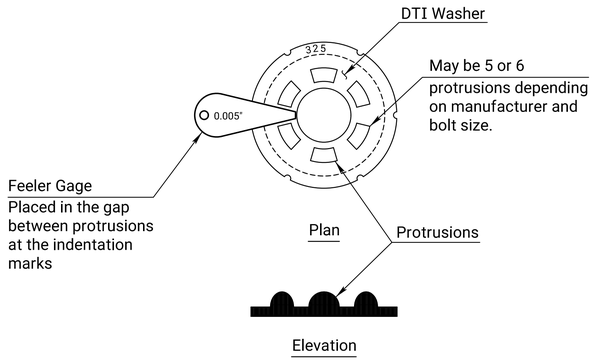
Proj. 48 C-5230-01 Kingman Co.

Plotted By: rsnow Plot Location:
File: 48 C523001-Br3_Beam Details.dgn
Plot Date: 9-JUL-2024 18:11

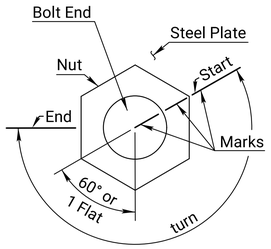
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	16	44



TYPICAL BOLT AND
DIRECT TENSION INDICATOR (DTI)

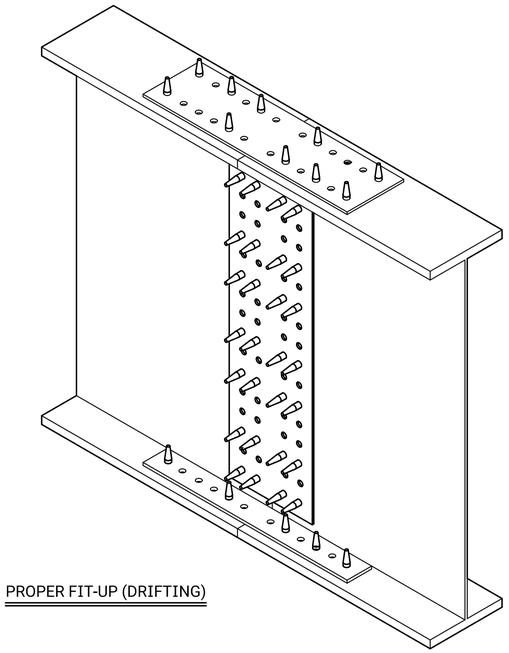


TYPICAL DIRECT TENSION INDICATOR (DTI)

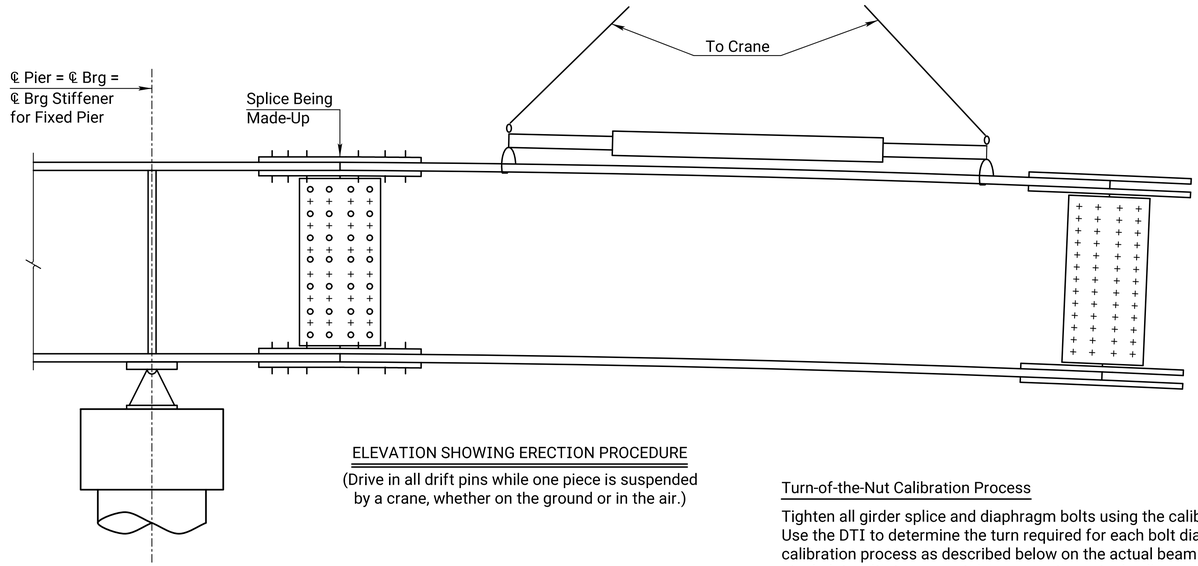


REQUIRED MARKING DETAIL

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



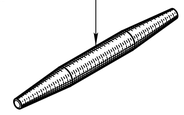
PROPER FIT-UP (DRIFTING)



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

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 tightening. 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 1/2 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 1/4 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.

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.

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 additional 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

NO.	DATE	REVISIONS	BY	APP'D
03				
02				
01	04-25-05	Current Release	R.A.M.	K.F.H.

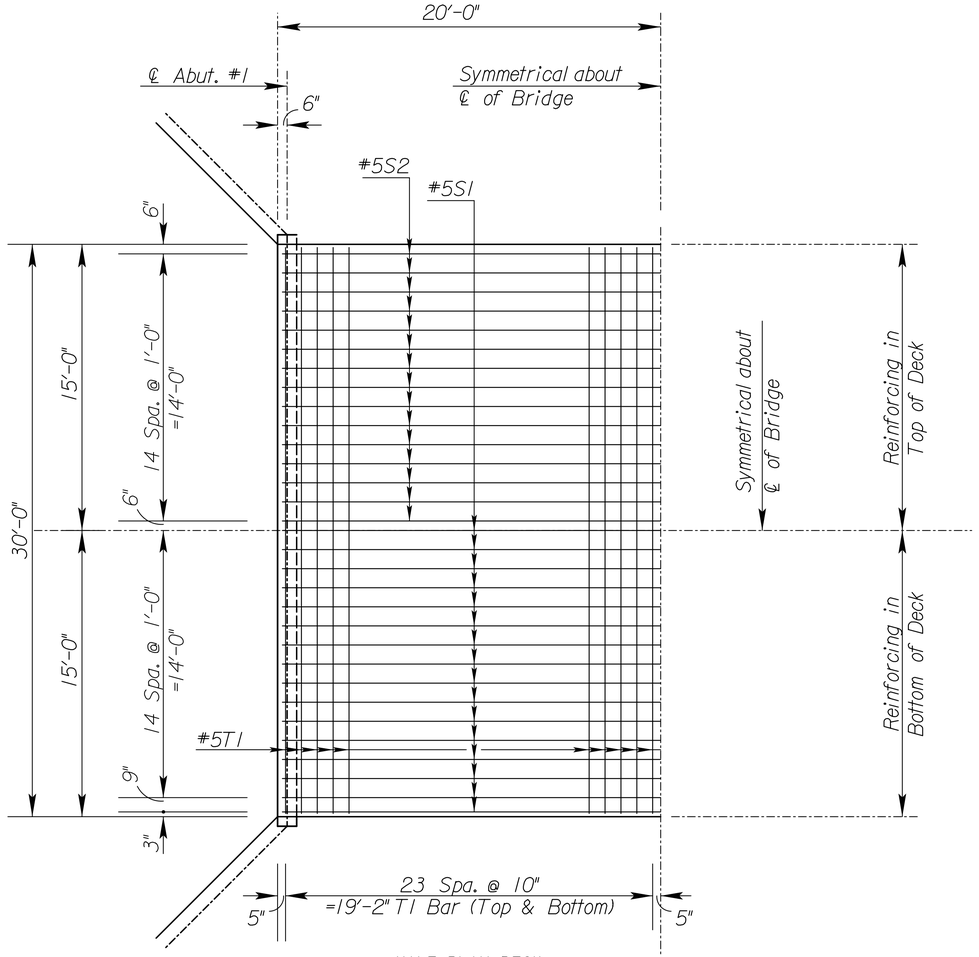
KANSAS DEPARTMENT OF TRANSPORTATION

STEEL ERECTION, FIT-UP
AND BOLTING PROCEDURE

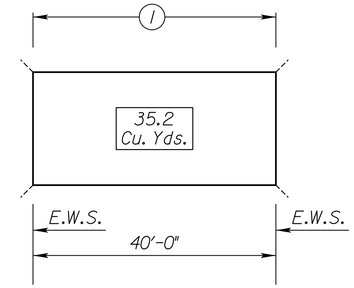
DESIGNED	DETAILED	QUANTITIES	CADD
DESIGN CK.	DETAIL CK.	QUAN.CK.	CADD CK.

Plotted by: rsnow 9-JUL-2024 18:11
File: br210.dgn

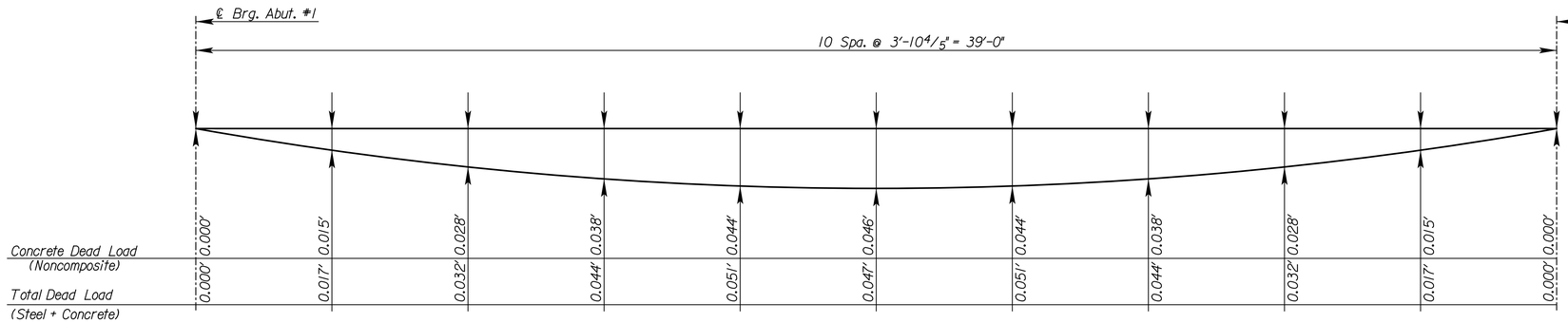
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	17	44



HALF PLAN DECK



CONCRETE PLACING SEQUENCE



DEAD LOAD DEFLECTIONS

$Es = 29 \times 10^3$ ksi
$Ec = 3.6 \times 10^3$ ksi

DEFLECTION AND CAMBER NOTES

"Concrete Dead Load" ordinates represent the amount of deflection due to the slab placement (8" Min.) and rails.

"Total Dead Load" ordinates represents the total deflection, which is the sum of the steel deflections and the concrete dead load deflections.

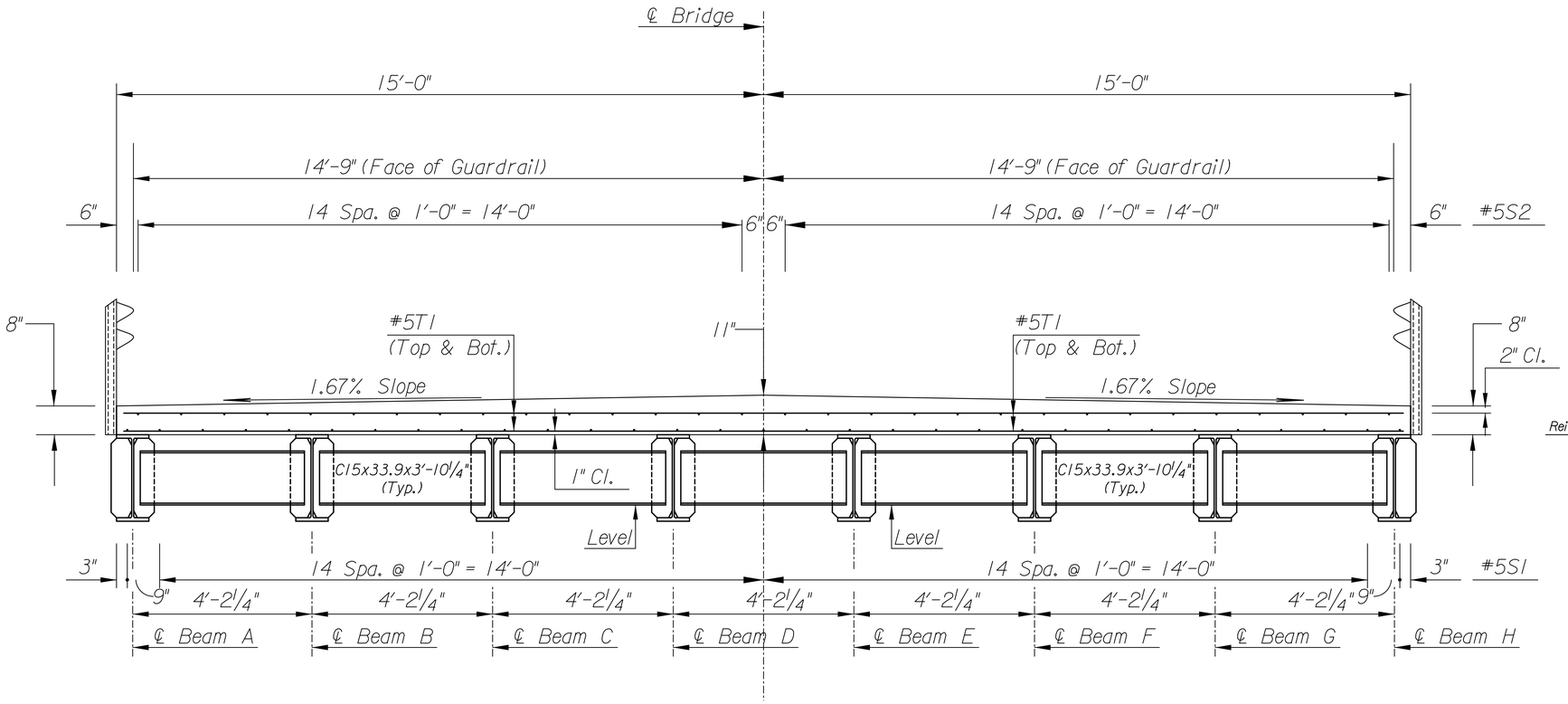
Br. No. 000480759806220 Sta. 50+00.00

SLAB DETAILS

Proj. 48 C-5230-01 Kingman Co.

Plotted By: rsnow | Plot Location:
File: 48 C52300I-Br4_Slab Details.dgn
Plot Date: 9-JUL-2024 18:11

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	18	44

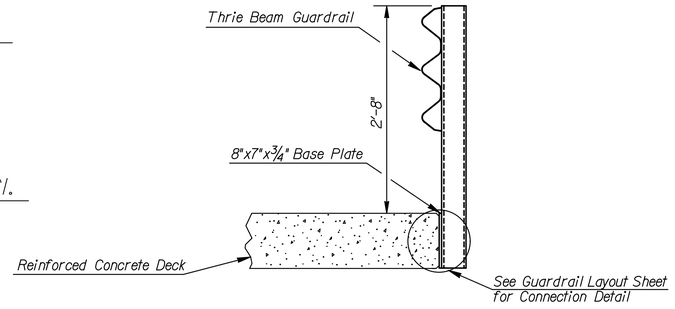


HALF SECTION AT ABUTMENT

HALF SECTION AT MIDSPAN

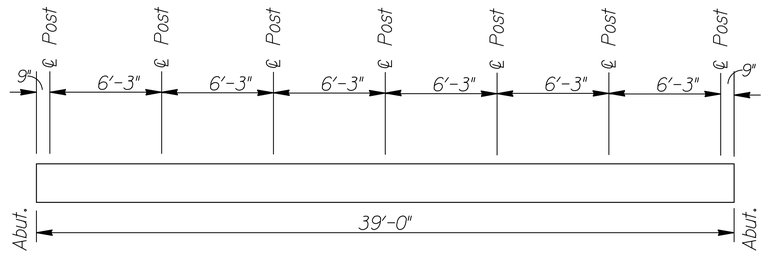
TYPICAL SECTION

(Perpindicular to ℄ Roadway)



BRIDGERAIL LINE POST SECTION

Note: The Contractor shall provide shop drawings to install thrie beam guardrail on the outside bridge slabs. Guardrail posts shall be steel and shall be bolted to the outside bridge slabs. Blocks will not be required between the steel posts and the thrie beam guardrail across the bridge. Blocks are required for the thrie beam transition and the end terminals. The guardrail shall meet NCHRP 350 TL-2 requirements. All labor, materials, and incidentals necessary to install the guardrail shall be subsidiary to the bid item "Guardrail, Steel Plate". See Sheet No. 4 for connection details.



GUARDRAIL POST SPACING

Dimensions shown at outside face of bridge slab.

Plotted By: rsnow
Plot Location:
File: 48 C523001-Br5_Bridge Details.dgn
Plot Date: 9-JUL-2024 18:11

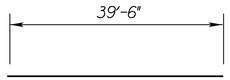
Br. No. 000480759806220 Sta. 50+00.00

TYPICAL SLAB SECTION

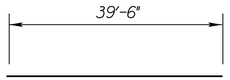
Proj. 48 C-5230-01 Kingman Co.

REVISED PLANS

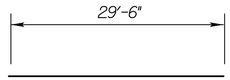
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	19	44



S1



S2



T1

BILL OF REINFORCING STEEL
(Grade 60)

	Straight Bars				Bent Bars			
	Mark	Size	Number	Length	Mark	Size	Number	Length
SUBSTRUCTURE (NON-EPOXY COATED)								
SUPERSTRUCTURE (EPOXY COATED)	S1	#5	31	39'-6"				
	S2	#5	30	39'-6"				
	T1	#5	96	29'-6"				

* See Bending Diagrams

BENDING DIAGRAMS

All dimensions are out to out of bars.

NO.	DATE	REVISIONS	BY	APP'D
1	4-12-93	Current Release		

Br. No. 000480759806220 Sta. 50+00.00

BILL OF REINFORCING STEEL
AND BENDING DIAGRAMS

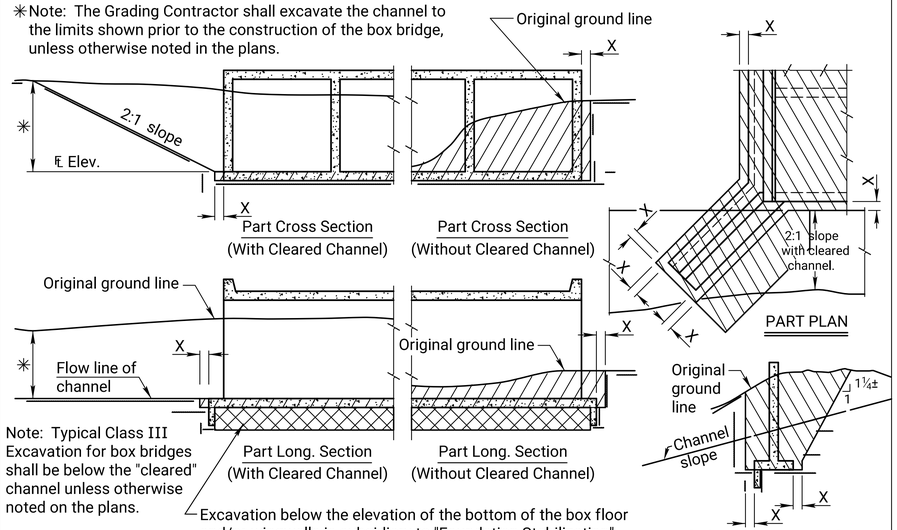
Proj. 48 C-5230-01 Kingman Co.

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

Std. Base File: br18lg.dgn
Plotted By: rsnow
Plot Location:
File: 48 C523001-Br6_Reinforcing Steel.dgn
Plot Date: 9-JUL-2024 18:11

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	20	44

✳Note: The Grading Contractor shall excavate the channel to the limits shown prior to the construction of the box bridge, unless otherwise noted in the plans.

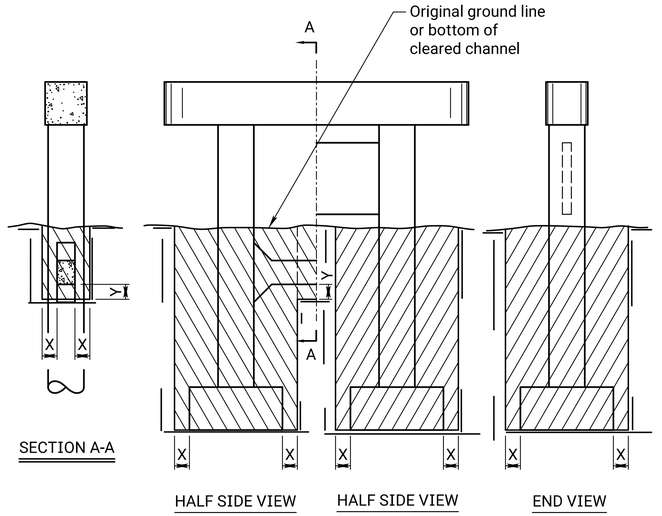


Note: Typical Class III Excavation for box bridges shall be below the "cleared" channel unless otherwise noted on the plans.

Excavation below the elevation of the bottom of the box floor and/or wingwalls is subsidiary to "Foundation Stabilization".

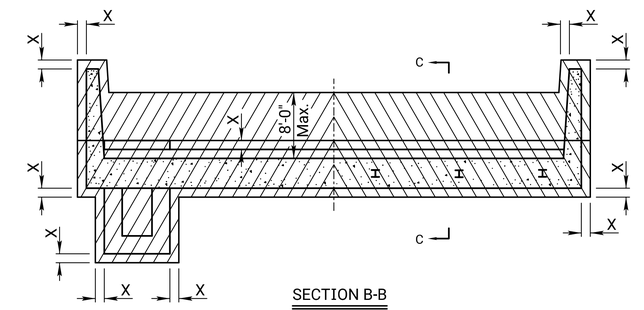
EXCAVATION DETAILS FOR REINFORCED CONCRETE BOX CULVERT

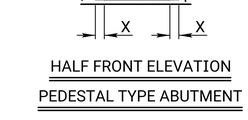
Note: Excavation for culverts less than bridge length and the additional excavation for "Embedded Structures" shall not be paid for as Class III Excavation, but shall be subsidiary to Grade 4.0 Concrete.



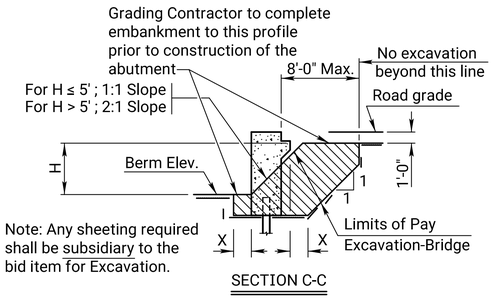
EXCAVATION DETAILS FOR TYPICAL PIERS

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





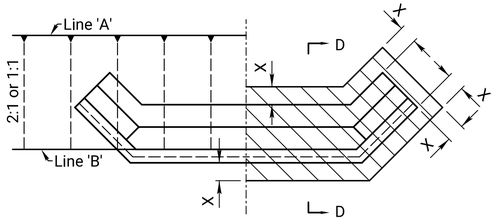
Note: Bridge Contractor shall finish the embankment and berms after the construction of the abutment and dispose of any excess material as approved by the Engineer.

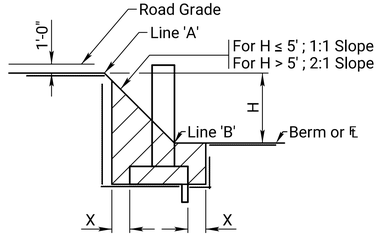


Note: Any sheeting required shall be subsidiary to the bid item for Excavation.

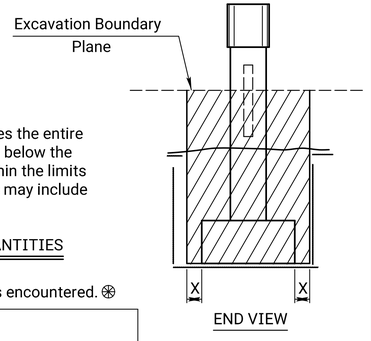
EXCAVATION DETAILS FOR TYPICAL ABUTMENTS

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





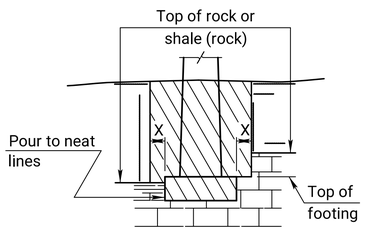
EXCAVATION DETAILS FOR ABUTMENTS WITH FLARED WINGWALLS



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

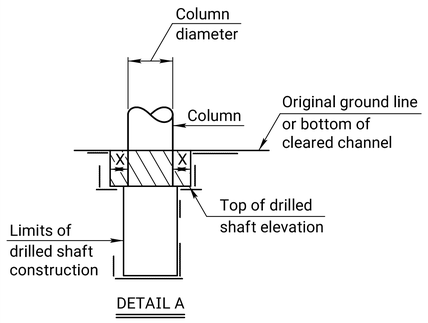
See detail when rock or shale (rock) is encountered. ⊛



⊛ 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.



DRILLED SHAFT DETAILS

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)

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.

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
06	08-15-12	Embedment Excavation Subsidiary	J.P.J.	T.L.F.
05	05-15-12	Revised Wing Excavation	J.P.J.	T.L.F.
04	03-03-10	Revised Wing Excavation	J.P.J.	T.L.F.

KANSAS DEPARTMENT OF TRANSPORTATION

BRIDGE EXCAVATION (LRFD)

BR100B

FHWA APPROVAL		04-17-10	APP'D.	Terry L. Fleck
DESIGNED	DETAILED	R.D.R.	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	L.R.R.	QUAN.CK.	TRACE CK.

Plotted by : rsnow 9-JUL-2024 18:12
File : br100b.dgn

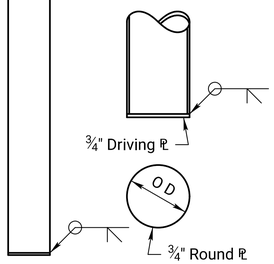
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	21	44

O D 10¾" T. = ††
O D 12¾" T. = ††
O D 14" T. = ††

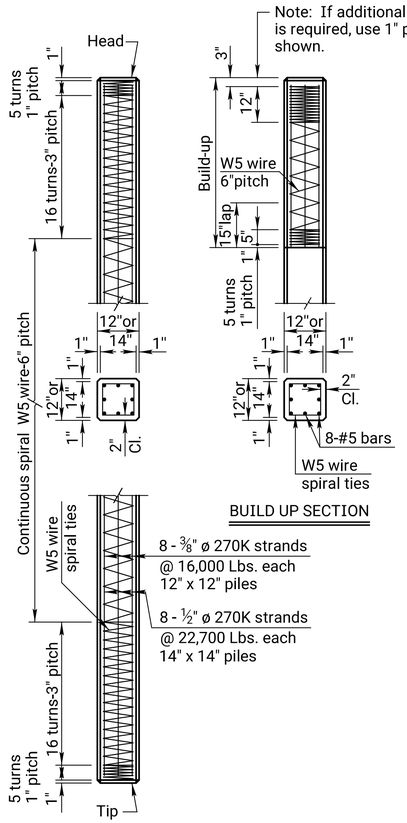
†† See the Geology Report or "Summary of Quanities" for Pipe Pile wall thickness

Note:
Pile shall be driven with a steel head having a projecting ring fitting inside the pipe. Clearance between ring and pipe should be ¼".

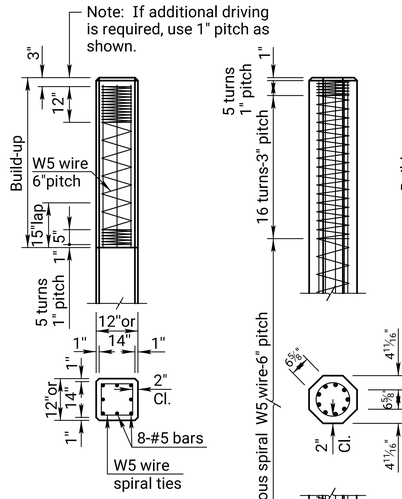
Note:
Pile pipe may be spiral welded, longitudinal welded, or seamless steel pipe.



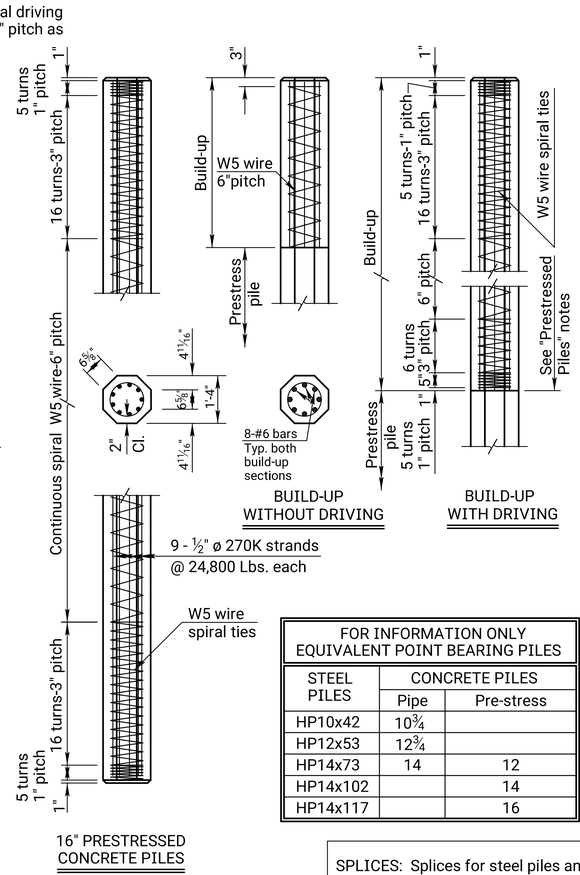
PLAIN ROUND
CAST-IN-PLACE CONCRETE PILES



12" OR 14"
PRESTRESSED
CONCRETE PILES



BUILD UP SECTION



16" PRESTRESSED
CONCRETE PILES

BUILD-UP
WITHOUT DRIVING

BUILD-UP
WITH DRIVING

FOR INFORMATION ONLY EQUIVALENT POINT BEARING PILES		
STEEL PILES	CONCRETE PILES	
	Pipe	Pre-stress
HP10x42	10¾	
HP12x53	12¾	
HP14x73	14	12
HP14x102		14
HP14x117		16

GENERAL NOTES

PRESTRESSED PILES: Fabricate prestressed concrete pile splices in accordance with the Manufacturer's recommendations subject to the approval of the Engineer.

Method of attachment of pile to build-up may be by any of the methods given in the notes on "Alternate Methods." If mild reinforcing steel is used for attachment, the area shall be no less than that used in the build-up.

ALTERNATE METHODS: Method of attachment of a pile to build-up may be by any of the following methods:

1. Cut off at least 2'-0" of pile and expose a minimum of 2'-0" of strands.
2. Cast 8-#6, or 8-#5 bars (equally spaced) into pile head. All bars shall extend into pile head and project from pile head a minimum of 2'-0".
3. Drill 8 holes in pile head (equally spaced) for installation of 8 grouted dowel bars of same size and length as in 2.
4. Provide cored holes for bars as in 3.

No bars or strands are to extend from head of pile or build-up into footing or pile cap unless approved by the Engineer.

TEST PILES: Drive test piles where called for on the bridge plans. The test piles located within the limits of the substructure will become a part of the bridge pile system.

DRIVING FORMULA: Driving formula shall conform to the Standard Specifications.

MEASUREMENT AND PAYMENT: Measurement and payment for all piles shall comply with the Standard Specifications.

REINFORCEMENT: Use reinforcing steel conforming to ASTM A615, Grade 60. Hoops and spirals may be either plain or deformed bars.

PRESTRESSING STEEL: Use uncoated seven-wire low relaxation prestressing strand conforming to ASTM A416, Gr. 270.

STEEL PILE: Steel pile shall conform to the requirements of the Standard Specifications.

PILE POINTS: Pile points shall conform to the dimensions shown and to requirements of the Standard Specifications.

SPECIFICATIONS: Standard Specifications for State Road and Bridge Construction as currently used by the Kansas Department of Transportation.

CONCRETE: Concrete for cast-in-place shall be f'c = 3,500 PSI. Concrete for prestressed shall be f'c = 5,000 PSI.

WELDING: All field welding shall meet the requirements of the Standard Specifications.

Use only Shielded Metal Arch Welding SMAW (stick welding) for pile splices.

Use only low hydrogen E7018, 7016, or 7015 series welding rod (electrode) for all welding applications during pile splicing.

New electrodes are to be purchased for each KDOT project. The electrodes shall arrive on the project in factory hermetically sealed containers, opened and labeled with indelible ink in front of the engineer. The label shall include the current date and the project number. If the container seal is questionable or shows signs of damage the electrode is to be dried in an oven at least one hour at a temperature of 700°F to 800°F.

Upon removal from intact hermetically sealed factory packaging or the drying oven the electrode is to be placed in a storage oven with a minimum temperature of 250°F.

When electrodes are removed from the hermetically sealed container or storage oven and exposed to the atmosphere for less than 4 hours place into the storage oven for at least 4 hours before removing for use.

If electrode is exposed to the atmosphere for 4 hours or more (or 9 hours for moisture resistant electrodes designated with an R in their labeling) then electrode can be dried in a drying oven at a temperature of 450°F to 550°F.

If the electrode is exposed to the atmosphere for 4 hours or more a second time or the rod becomes wet discard rod.

CAST-IN-PLACE SHELLS: Steel shells for cast-in-place concrete piles shall conform to the requirements of the Standard Specifications.

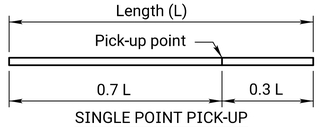
All piles driven without a mandrel shall be of the minimum thicknesses shown. Piles driven with a mandrel shall be of sufficient strength and thickness to withstand driving without injury and to resist harmful distortion and/or buckling due to soil pressure after the mandrel is removed.

Remove, replace or correct to the satisfaction of the Engineer improperly driven, broken or otherwise defective pipe piles. Otherwise drive an additional pile at no extra cost.

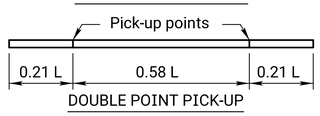
The Contractor shall maintain a light suitable for visual inspection of the pile on the job at all times prior to and during the filling of the pipe.

PAINT: All paint shall comply with the Standard Specifications, or as specified on the plans.

MILL TEST REPORTS: Steel piles test reports and steel shell test reports shall comply with the Standard Specifications.



SINGLE POINT PICK-UP



DOUBLE POINT PICK-UP

PICK-UP POINTS FOR PRESTRESSED PILING

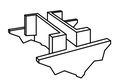
Max. length - 55' single point pick-up
Max. length - 80' double point pick-up

Note: Piles shall be marked at Pick-up points to indicate proper points for attaching handling lines.

Outside Flange

Inside Flange

SHELL PILE POINT



H-Pile Point

CAST STEEL PILE POINT

The pile point shall be a one-piece unit of cast steel. Weld pile points in accordance with manufacturer's recommendations to each steel pile before driving.

Weld Symbology Definition

Use grinder to bevel edges of splice as shown in weld symbology and drawing. In addition to bevels, produce clean, bare, and shiny surfaces at and around the splice welding location.

Lay full penetration root weld from beveled side of splice.

Back gouge root weld from side opposite of root welding application making sure to remove all foreign materials, porous steel, and inclusions from root weld. Finish welding the non beveled side of the splice.

Finish welding beveled side of the splice while removing slag, foreign materials, porous steel, and inclusions in between welding passes, use of a grinder may be needed.

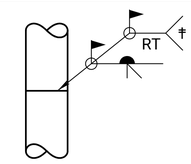
Verify that enough filler metal has been correctly placed in all weld locations to obtain a flush or convex surface with no concavity produced upon completion of the final welds.

SPLICES: Splices for steel piles and shell piling shall be in accordance with details shown on this sheet and the Standard Specifications.

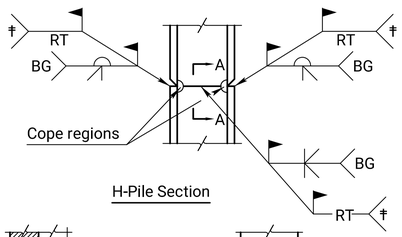
For integral pile bent abutments and piers, if a pile splice is required, do not locate the pile splice within a region extending 2'-0" above and 10'-0" below the bottom of the concrete web wall. For abutments, locate the pile splice at least 10'-0" below top of fill.

With the approval of the Engineer, one splice per bent may be allowed in the region described above without testing. If additional splices are anticipated, based on the geology, the Contractor prior to driving, will locate the splice so that the splice will not fall within the regions described above.

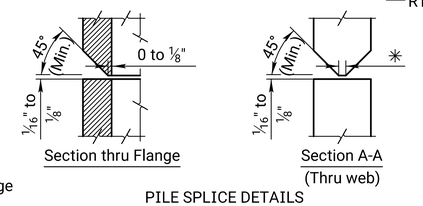
† For integral pile bent abutments and piers, if a splice is located within the regions described above, then the Contractor will test the welds by Radiograph (RT) test methods. Repair and retest any welds not passing the test(s). Each weld tested will have written confirmation of results. Report these results to the Engineer. This work is not paid for directly, but is subsidiary to "Piles".



Pipe Section



H-Pile Section



✳ Minimum as required by welding process.

BG = Backgouge

PILE SPLICE DETAILS

NO.	DATE	REVISIONS	BY	APP'D
04	08-16-18	Add splice web section, clarify note	M.L.L.	J.P.J.
03	09-15-15	Clarify Notes	J.P.J.	C.E.R.
02	06-18-12	Clarify f'c, rod type, use and weld	J.P.J.	T.L.F.

KANSAS DEPARTMENT OF TRANSPORTATION

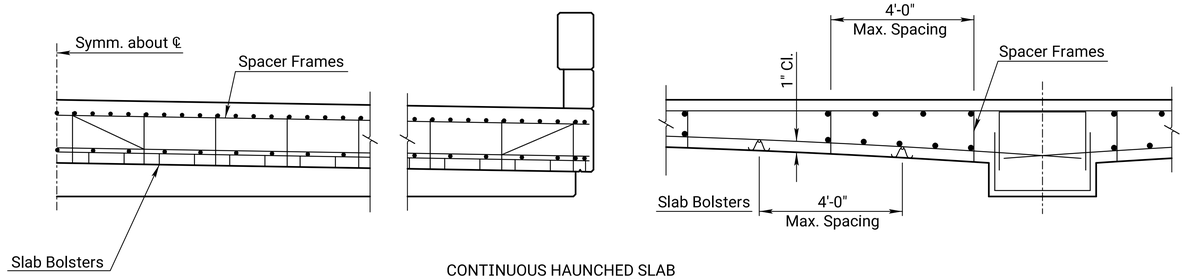
STANDARD PILE DETAILS

BR110

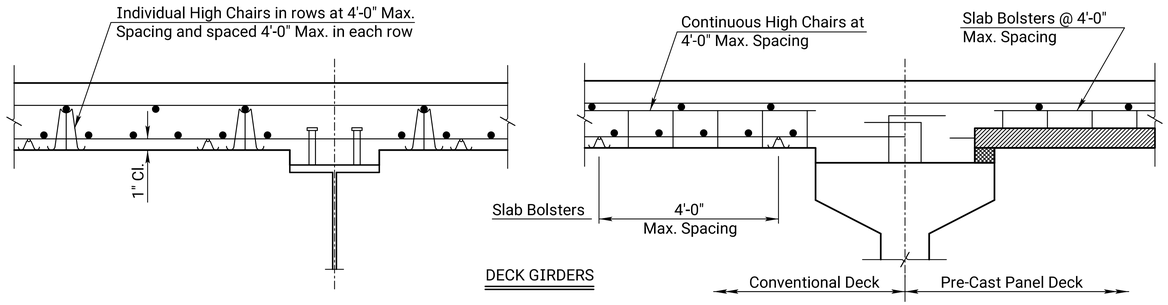
FHWA APPROVAL		10-04-12	APP'D.		Terry L. Fleck
DESIGNED	J.P.J.	DETAILED	QUANTITIES	TRACED	R.A.A.
DESIGN CK.		DETAIL CK.	QUAN.CK.	TRACE CK.	

Plotted by : rsnow 9-JUL-2024 18:12
File : br110.dgn

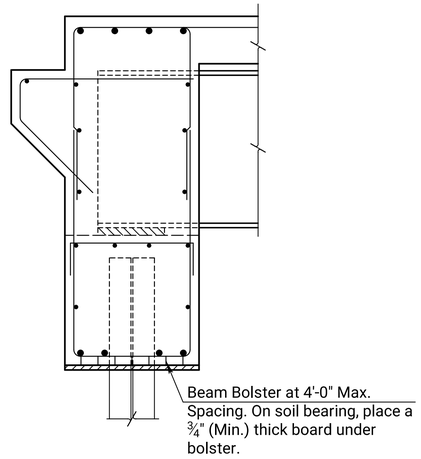
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	22	44



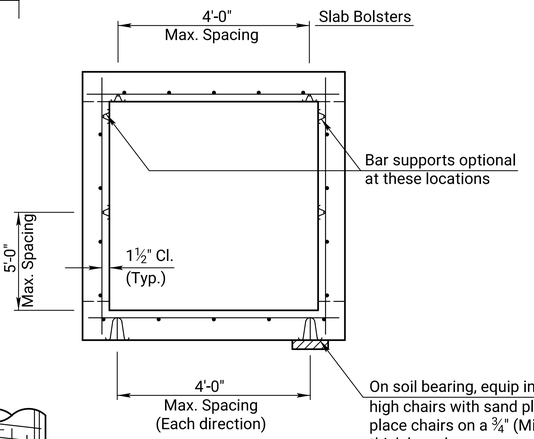
CONTINUOUS HAUNCHED SLAB



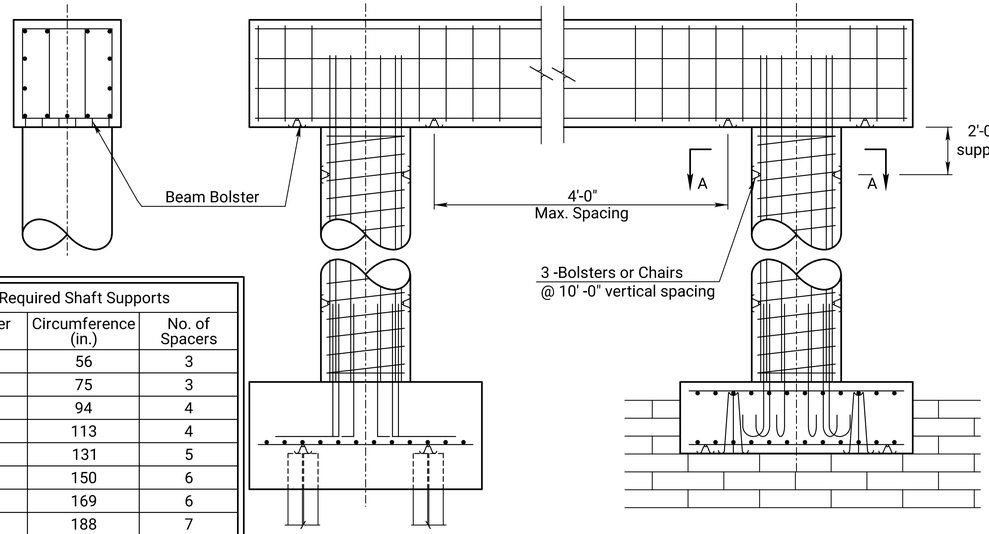
DECK GIRDERS



ABUTMENT

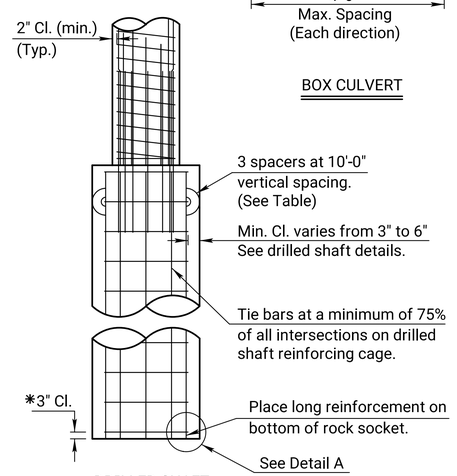


BOX CULVERT

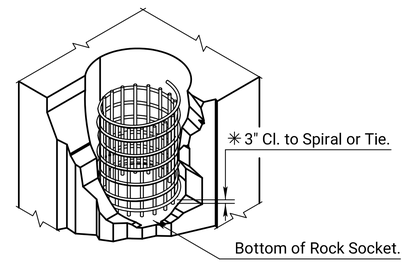


PIER

Required 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

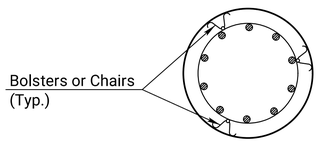


DRILLED SHAFT



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.



SECTION A-A

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 ¼" 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
05	11-10-10	Column Bar Supports Required	J.P.J.	T.L.F.
04	12-01-05	Drilled Shaft Spiral Steel Placement	J.P.J.	K.F.H.
03	08-21-00	Added Pre-Cast Panel Detail	R.A.M.	K.F.H.

KANSAS DEPARTMENT OF TRANSPORTATION

SUPPORTS AND SPACERS FOR REINFORCING STEEL

BR120

FHWA APPROVAL		11-17-10	APP'D.		Terry L. Fleck
DESIGNED	R.A.M.	DETAILED	R.A.A.	QUANTITIES	TRACED R.A.A.
DESIGN CK.	L.R.R.	DETAIL CK.	R.A.M.	QUAN.CK.	TRACE CK. R.A.M.

Plotted by : rsnow 9-JUL-2024 18:12
File : br120.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	23	44

EARTHWORK

STATION to STATION	EXCAVATION					COMPACTION			NOT SUBGRADED THROUGH CUTS			⚹ EMBANKMENT (CU.YDS.)		◭ PLACE. SELECT SOIL CU.YDS.
	COMMON		ROCK		CONTR. FURN. CU.YDS.	TYPE AA MR- CU.YDS.	TYPE B MR-90 CU.YDS.		COMM. CU.YDS.	TYPE AA CU.YDS.		INITIAL CONSOL.	SETTLE- MENT	
	CU.YDS.	VMF	CU.YDS.	VMF										
48+26.34 to 51+73.65	67	0.75			415		362							
TOTALS	67				415		362							

⚹ Subsidiary (see General Note). ◭ See General note.

⁎⁎ REMOVAL OF EXISTING STRUCTURES

STATION	LOCATION	DESCRIPTION
50+00.73	℄	35' Concrete T-Beam Bridge with Concrete Abutment & Added Steel Beams (30'-0" Roadway)

⁎⁎ FOR INFORMATION ONLY

RECAPITULATION OF BRIDGE QUANTITIES

BRIDGE NUMBER	STATION	SEE SHEET NO.
000480759806220	50+00.00	9

RECAPITULATION OF ROAD QUANTITIES

ITEM	QUANTITY	UNIT
Curing Environment	1	Each
Contractor Construction Staking	Lump Sum	L.S.
Field Office & Laboratory (Type C)	1	Each
Mobilization	Lump Sum	L.S.
Mobilization (DBE)	Lump Sum	L.S.
Removal of Existing Structures	1	L.S.
Concrete for Seal Course (Set Price)	1	Cu. Yd.
Clearing & Grubbing	Lump Sum	L.S.
Common Excavation (Rural Small)	67	Cu. Yds.
Common Excavation (Contractor Furnished)	415	Cu. Yds.
Compaction of Earthwork (Type B) (MR-90)	362	Cu. Yds.
Water (Grading) (Set Price)	1	M. Gal.
Guardrail, Steel Plate	125	Lin. Ft.
Guardrail End Terminal (SRT) Alt. #1	4	Each
Guardrail End Terminal (FLEAT) Alt. #2	4	Each
Temporary Surfacing Material (Aggregate) (Set Price)	1	Cu. Yd.
Signing Object Marker (Type 3)	4	Each
Foundation Stabilization (Set Price)	1	Cu. Yd.

For Summary of Signing Object Markers, See Sheet No. 2
For Summary of Guardrail See Sheet No. 4
For Summary of Surfacing Quantities See Sheet No. 24
For Temp. Erosion & Pollution Control Quantities See Sheet No. 25
For Seeding Quantities See Sheet No. 34
For Traffic Control Plan & Quantities See Sheet No. 40

NO.	DATE	REVISIONS	BY	APP'D
02	01-14-08	Rem. Drainage Structure summary	S.W.K.	J.O.B.
01	01-09-91	Detailed on CADD	R.J.S.	J.O.B.

KANSAS DEPARTMENT OF TRANSPORTATION

SUMMARY OF QUANTITIES

RD050

FHWA APPROVAL	05-28-08	APP'D.	James O. Brewer
DESIGNED	DETAILED	QUANTITIES	TRACED B.N.B.
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK. S.W.K.

Plotted by: rsnow 9-JUL-2024 18:12
File : rd050.dgn

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 (Type -MR) 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.

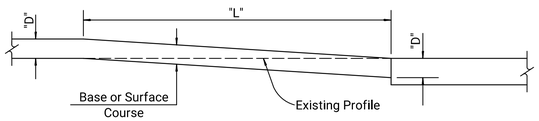
The base course shall be constructed to the plan thickness as shown.

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 0.06 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.



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'

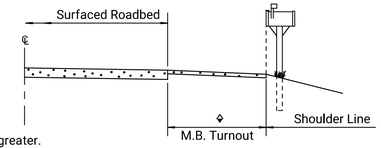
SUMMARY OF QUANTITIES					
ITEM	STA. 49+60.00 TO 49+80.00	STA. 50+20.00 TO 50+40.00		TOTAL	UNIT
HMA-Commerical Grade (Class A)	30.2	30.2		60.4	TONS
Aggregate Base (AB-3)(6")	72.1	72.1		144.2	Sq. Yds.

RATES OF APPLICATION				
RATE	UNIT	ITEM		
145 †	Lbs/Cu Ft	HMA - Commercial Grade (Class A)		

† Total Mix Wt. of Aggregate and Asphalt

RECAPITULATION OF QUANTITIES					
ITEM				TOTAL	UNIT
HMA Commercial Grade (Class A)				60	Tons
Aggregate Base (AB-3)(6")				144	Sq. Yds.

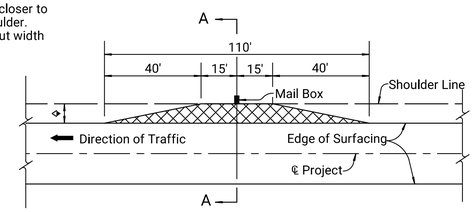
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	24	44



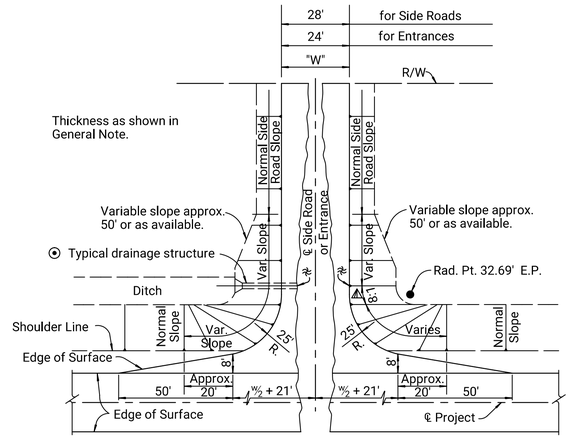
◆ Width shall be 8' or shoulder width, whichever is greater.

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 high-way ditch, unless otherwise shown on the plans.

NO.	DATE	REVISIONS	BY	APP'D
12	01-10-07	Changed bituminous to asphalt	S.W.K.	J.O.B.
11	08-30-06	Changed tack type/rate	S.W.K.	J.O.B.
10	03-24-05	Revised compaction, tack type/rate	S.W.K.	J.O.B.

KANSAS DEPARTMENT OF TRANSPORTATION

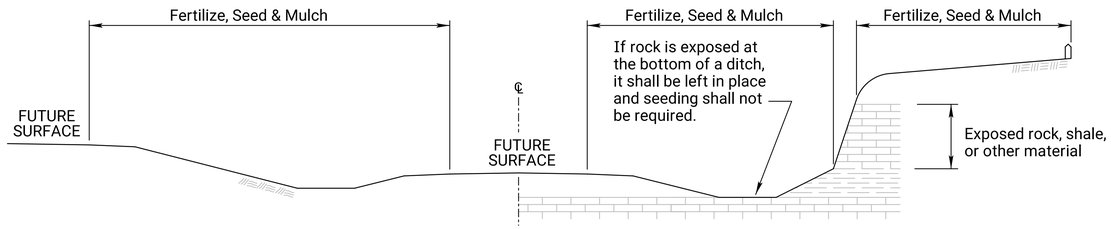
SUMMARY OF QUANTITIES (Surfacing)

~~RD051~~

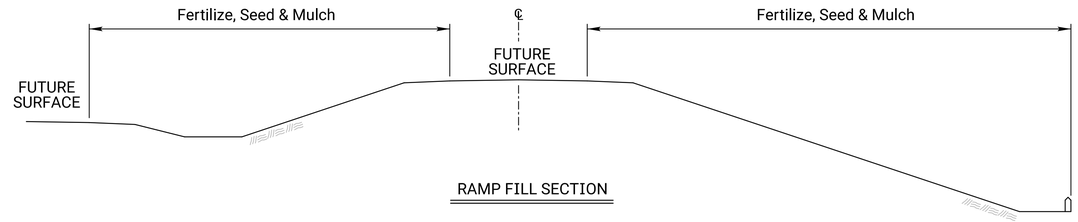
FHWA APPROVAL	09-06-06	APP'D.	James O. Brewer
DESIGNED	DETAILED	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK.

Plotted by: rsnow 9-JUL-2024 18:12
File : rd051_Summary of Surfacing Quantities.dgn

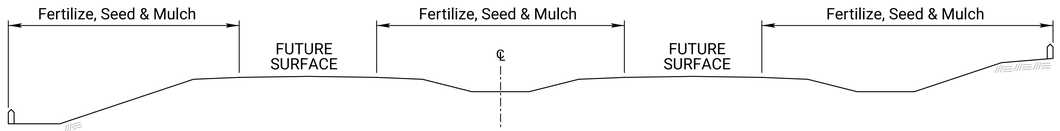
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	25	44



RAMP CUT SECTION



RAMP FILL SECTION



TYPICAL SECTION - DUAL PAVEMENT

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.

SUMMARY OF SEEDING / EROSION CONTROL QUANTITIES

P.L.S. RATE/ ACRE		ACRES		BID ITEM	QUANTITY	UNIT
CLT	SL/CH	CLT	SL/CH			
	250		0.10	Temporary Fertilizer (13 - 13 - 13)	25	LB
				Temporary Seed (Canada Wildrye)		LB
				Temporary Seed (Grain Oats)		LB
				Temporary Seed (Sterile Wheatgrass)		LB
	108.5		0.10	Soil Erosion Mix	10.9	LB
				Erosion Control (Class 1, Type D)	498	SQ YD
				Erosion Control (Class 2, Type Y)		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 Sediment Basin		CU YD
				Temporary Slope Drain		LF
				Temporary Stream Crossing		EACH
				Biodegradable Log (9")		LF
				Biodegradable Log (12")		LF
				Biodegradable Log (20")		LF
				Filter Sock (✱✱✱✱)		LF
				Geotextile (Erosion Control)	500	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	SEED (BLUE GRAMA GRASS) (LOVINGTON)	0.05
4.5	SEED (BUFFALO GRASS) (TREATED)	0.45
45	SEED (RYEGRASS) (PERENNIAL)	4.50
0.5	SEED (DROPSEED GRASS) (SAND)	0.05
7	SEED (SIDE OATS GRAMA) (EL RENO)	0.70
45	SEED (FESCUE) (TALL) (ENDOPHYTE-FREE)	4.50
6	SEED (WESTERN WHEATGRASS) (BARTON)	0.60
108.5	Total (lb)	10.85

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.

Note: Fertilizer for Soil Erosion Mix is included and shown on the Summary of Seeding/Erosion Control chart above.

NO.	DATE	REVISIONS	BY	APP'D
03	08-03-20	Added Note	M.R.D.	M.L.
02	12-01-17	Revised Standard	M.R.D.	S.H.S.
01	06-01-17	Revised Standard	M.R.D.	S.H.S.

KANSAS DEPARTMENT OF TRANSPORTATION

TEMPORARY EROSION AND POLLUTION CONTROL

LA852A

FHWA APPROVAL		01-26-18	APP'D.	Scott H. Shields	
DESIGNED	M.R.D.	DETAILED	M.R.D.	QUANTITIES	TRACED
DESIGN CK.	S.H.S.	DETAIL CK.	S.H.S.	QUAN.CK.	TRACE CK.

Plotted by : rsnow 9-JUL-2024 18:12
File : la852a.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	26	44

EROSION CONTROL- CLASS 1, TYPE D

STATION TO STATION	SIDE	LENGTH	WIDTH	SQ YARD
48+26.34 TO 49+80.00	LT	153.7	7.6	129.8
48+26.34 TO 49+80.06	RT	153.7	5.3	90.5
50+19.91 TO 51+73.65	LT	153.7	9.5	162.2
50+19.20 TO 51+73.65	RT	154.5	6.7	115.0
TOTAL EROSION CONTROL (CLASS 1, TYPE D) =				497.5

Plotted by : rsnow 9-JUL-2024 18:13
File : la852a-ec.dgn

NO.	DATE	REVISIONS	BY	APP'D

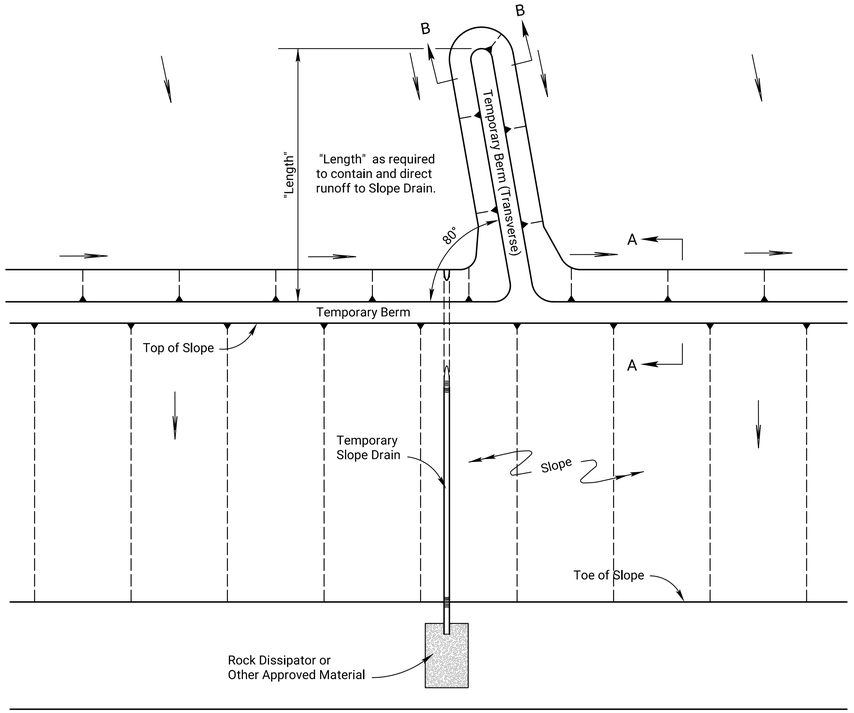
KANSAS DEPARTMENT OF TRANSPORTATION

EROSION CONTROL
SEEDING-SODDING

LA852A-EC

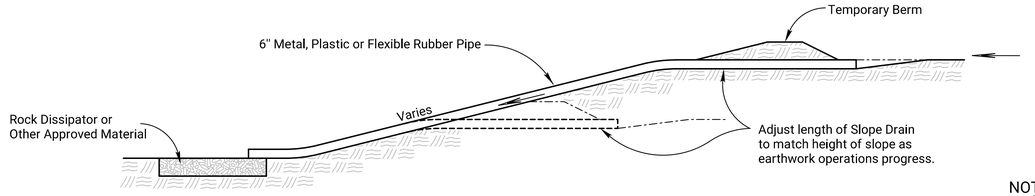
FHWA APPROVAL		APP'D.	Scott H. Shields
DESIGNED M.R.M.	DETAILED M.R.M.	QUANTITIES	TRACED M.R.M.
DESIGN CK. S.H.S.	DETAIL CK. S.H.S.	QUAN.CK.	TRACE CK. S.H.S.

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	27	44



TYPICAL PLAN VIEW OF TEMPORARY BERM AND TEMPORARY SLOPE DRAIN

NO SCALE



TYPICAL PROFILE OF TEMPORARY SLOPE DRAIN

NO SCALE

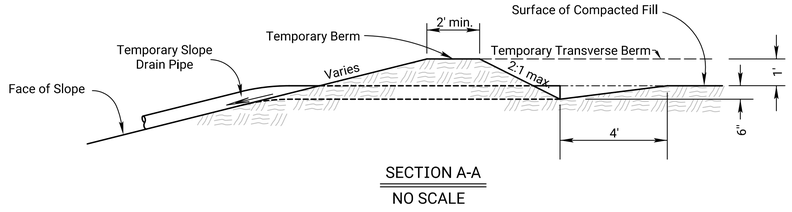
NOTES:

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.

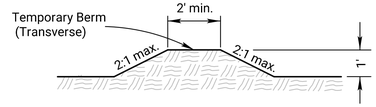
3) Pipe shall be secured in place as approved by Engineer.

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



SECTION A-A

NO SCALE

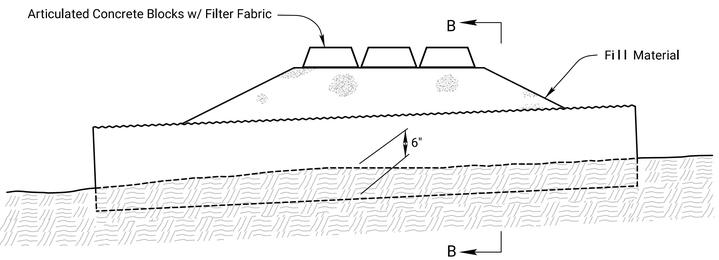


SECTION B-B

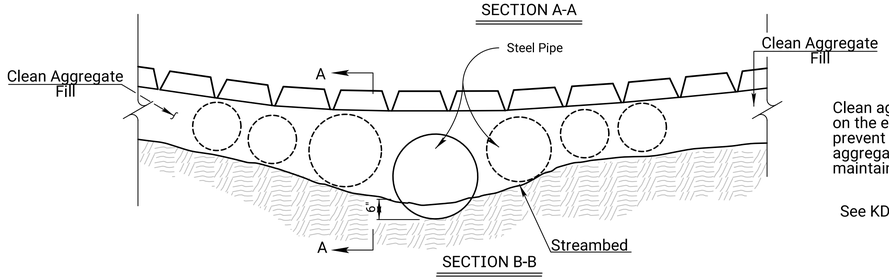
NO SCALE

TYPICAL PROFILE OF TEMPORARY BERM

NO SCALE



SECTION A-A



SECTION B-B

TEMPORARY STREAM CROSSING (ARTICULATED CONCRETE BLOCKS)

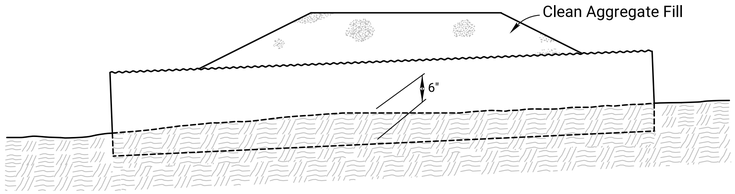
NO SCALE

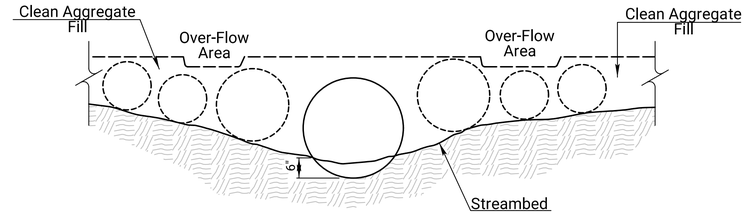
Pipe size may vary.

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.

Clean aggregate fill will extend a minimum of 50' on the entrance and exit side of the crossing to prevent tracking. The aggregate shall be clean aggregate and a minimum of 6" thick and will be maintained through the use of 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.

Clean aggregate fill will extend a minimum of 50' on the entrance and exit side of the crossing to prevent tracking. The aggregate shall be clean aggregate and a minimum of 6" thick and will be maintained through the use of the crossing.

See KDOT Specifications for more information.

NO.	DATE	REVISIONS	BY	APP'D
03	01-21-22	Temp Stream Crossing - Clean Aggregate Fill Note Added	M.R.D.	M.L.
02	08-24-21	Temp Stream Crossing - Clean Aggregate Fill Note Added	M.R.D.	M.L.
01	06-11-13	Revised Standard	M.R.M.	S.H.S.

KANSAS DEPARTMENT OF TRANSPORTATION

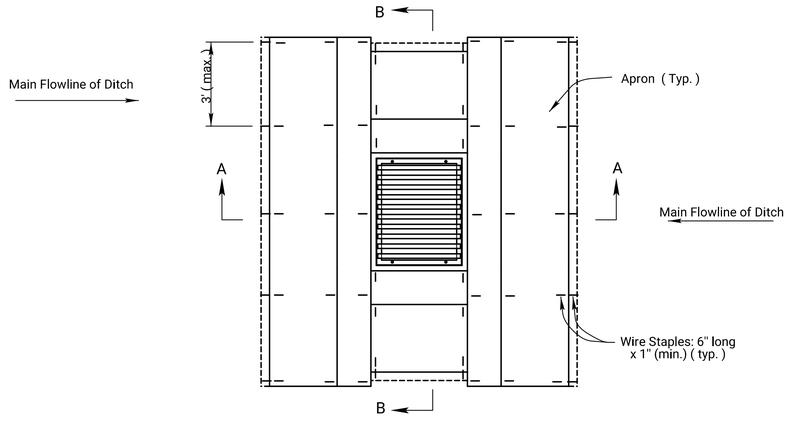
TEMPORARY EROSION AND POLLUTION CONTROL TEMPORARY SLOPE DRAIN, TEMPORARY STREAM CROSSING (AGGREGATE)

LA852B

FHWA APPROVAL	01-21-22	APP'D.	Mervin Lare
DESIGNED	DETAILED	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK.

Plotted by : rsnow 9-JUL-2024 18:13
File : la852b.dgn

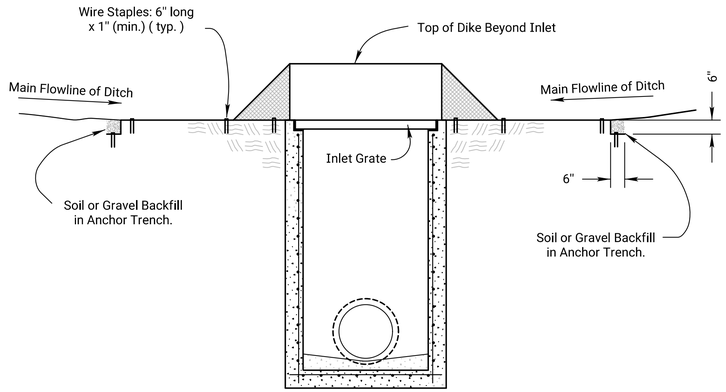
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	28	44



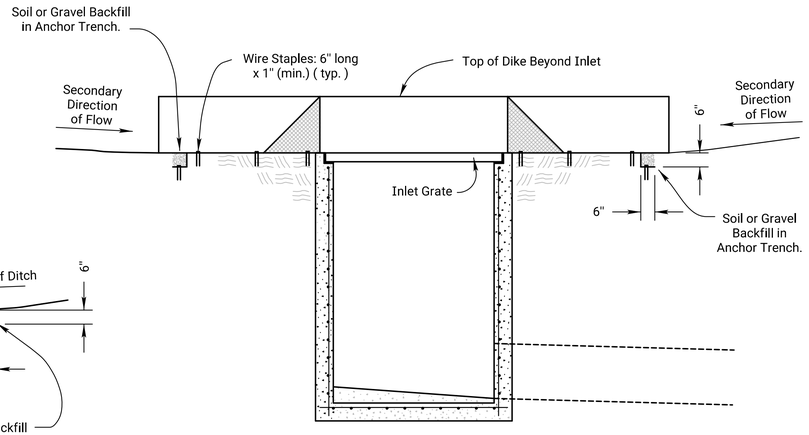
PLAN

TEMPORARY I NLET SEDI MENT BARRI ER
(TRI ANGULAR SI LT DI KE METHOD)

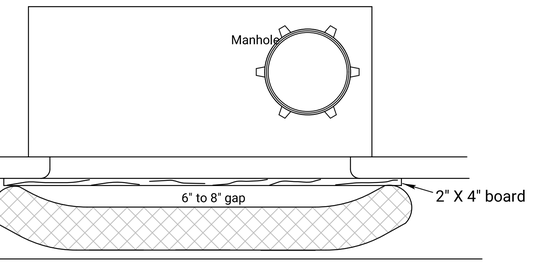
NO SCALE



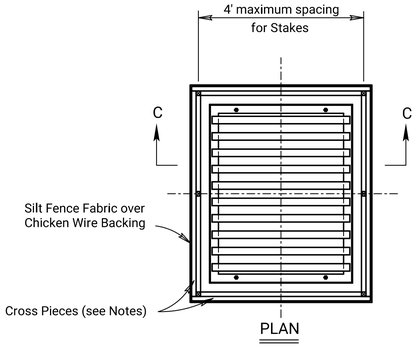
SECTION A - A



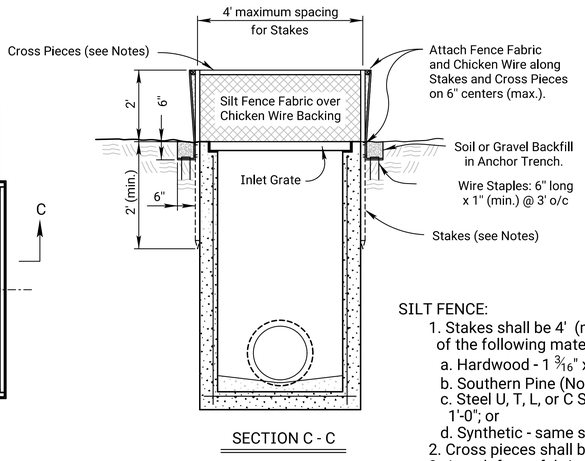
SECTION B - B



CURB INLET PROTECTION



PLAN



SECTION C - C

TEMPORARY I NLET SEDI MENT BARRI ER
(SI LT FENCE METHOD)

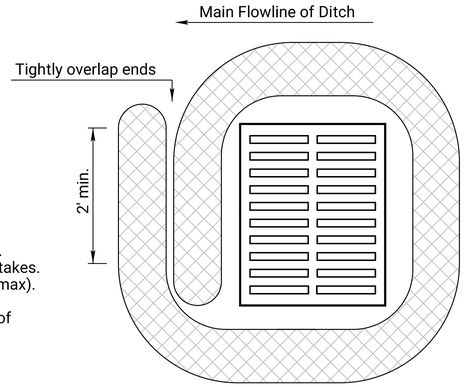
NO SCALE

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.

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

Rock = approximately 1" to 2" diameter



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

BIODEGRADABLE LOG/FILTER SOCK
DROP INLET PROTECTION

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

Stake every 4'

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.

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 ¼" openings or larger. Mesh must allow water infiltration but also hold fill material in place.

NO.	DATE	REVISIONS	BY	APP'D
03	09-26-19	Changed Direction of Main Flowline of Ditch Arrow	M.R.D.	S.H.S.
02	03-10-15	Revised Standard	R.A.	S.H.S.
01	06-01-13	Revised Standard	M.R.M.	S.H.S.

KANSAS DEPARTMENT OF TRANSPORTATION

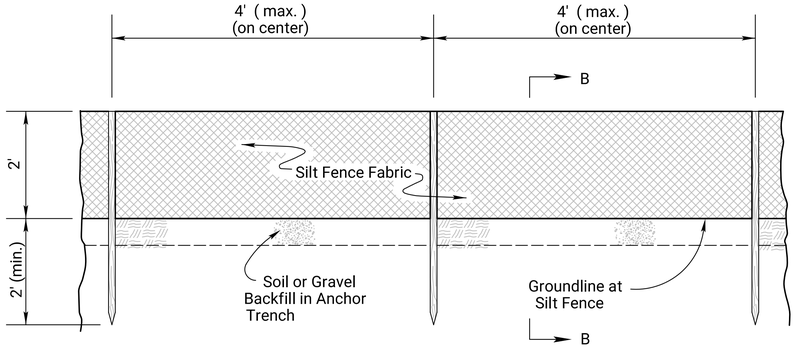
TEMPORARY EROSION AND POLLUTION CONTROL, TEMPORARY INLET SEDIMENT BARRIER (SILT FENCE) TEMP. INLET SEDIMENT BARRIER (T.S.D.)

LA852C

FHWA APPROVAL			03-10-15	APP'D.		Scott H. Shields	
DESIGNED	R.A.	DETAILED	R.A.	QUANTITIES		TRACED	
DESIGN CK.	S.H.S.	DETAIL CK.	S.H.S.	QUAN.CK.		TRACE CK.	

Plotted by : rsnow 9-JUL-2024 18:13
File : la852c.dgn

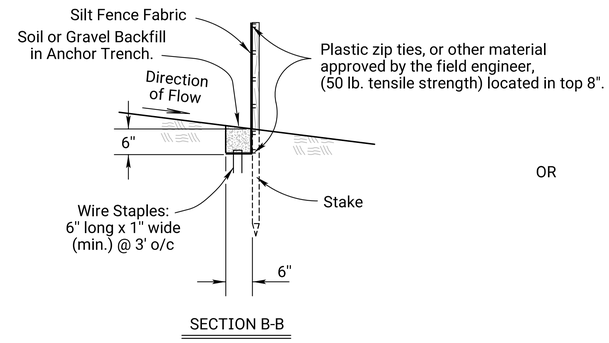
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	29	44



TYPICAL ELEVATION

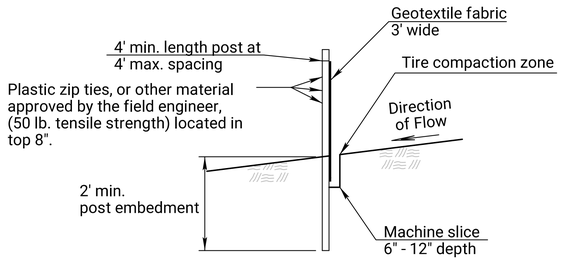
SILT FENCE BARRIER

NO SCALE

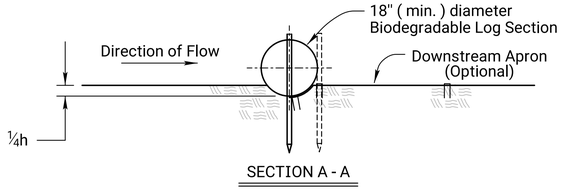


SECTION B-B

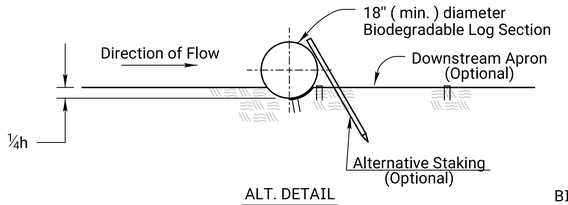
OR



SECTION B-B

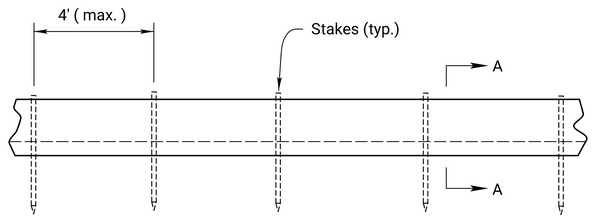


SECTION A - A



ALT. DETAIL

OPTIONAL



TYPICAL ELEVATION

BIODEGRADABLE LOG SLOPE INTERRUPTIONS

OR Filter Sock

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 aperformance 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.

Biodegradable Log or Filter Sock Slope Interruptions

Slope Gradient	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)
	≤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

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
03	06-28-16	Revised Standard	R.A.	S.H.S.
02	03-01-15	Revised Standard	R.A.	S.H.S.
01	06-01-13	Revised Standard	M.R.M.	S.H.S.

KANSAS DEPARTMENT OF TRANSPORTATION

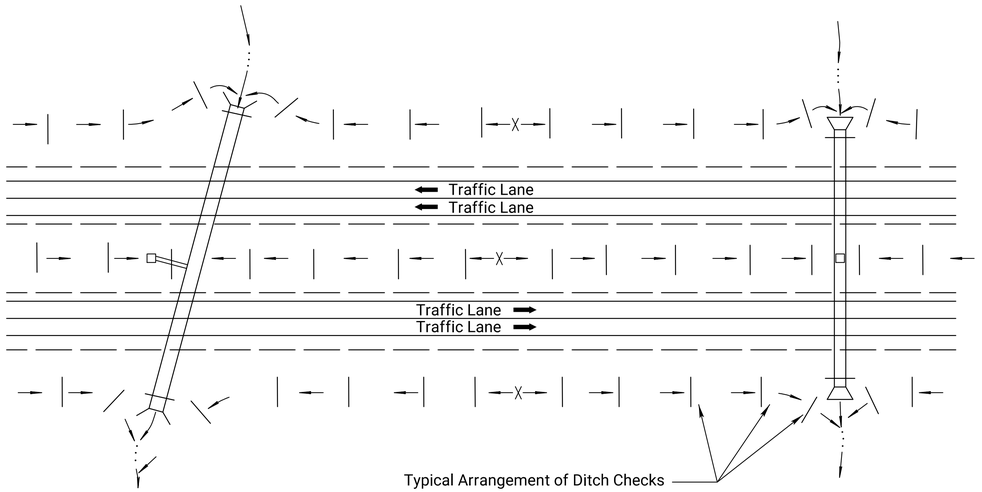
TEMPORARY EROSION AND POLLUTION CONTROL SLOPE INTERRUPTIONS BIODEGRADABLE LOG / SILT FENCE

LA852D

FHWA APPROVAL		09-14-16	APP'D.	Scott H. Shields	
DESIGNED	S.H.S.	DETAILED R.A.	QUANTITIES	TRACED	
DESIGN CK.	S.H.S.	DETAIL CK.	QUAN.CK.	TRACE CK.	

Plotted by : rsnow 9-JUL-2024 18:13
File : la852d.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	30	44



Typical Arrangement of Ditch Checks

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.

NO.	DATE	REVISIONS	BY	APP'D
03	08-10-16	Revised Standard	R.A.A.	S.H.S.
02	06-28-16	Revised Standard	R.A.A.	S.H.S.
01	06-01-13	Revised Standard	M.R.M.	S.H.S.

KANSAS DEPARTMENT OF TRANSPORTATION

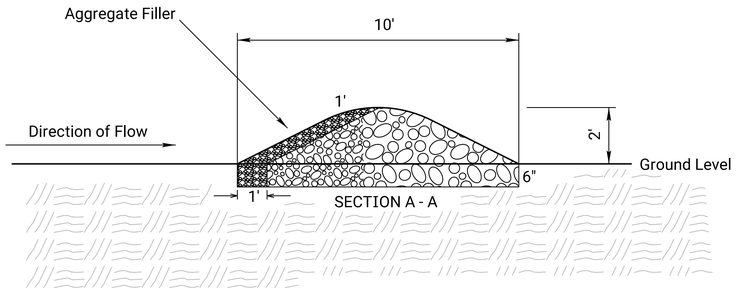
TEMPORARY EROSION AND POLLUTION CONTROL DITCH CHECKS

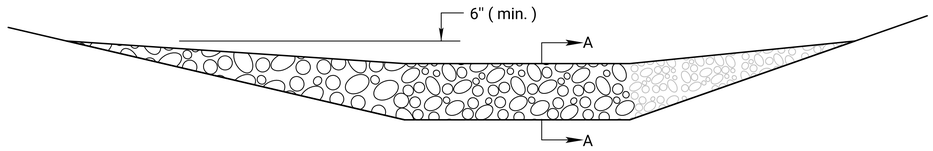
LA852E

FHWA APPROVAL			09-14-16	APP'D.		Scott H. Shields	
DESIGNED	S.H.S.	DETAILED	R.A.A.	QUANTITIES		TRACED	R.A.A.
DESIGN CK.	S.H.S.	DETAIL CK.	S.H.S.	QUAN.CK.		TRACE CK.	S.H.S.

Plotted by : rsnow 9-JUL-2024 18:13
File : la852e.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	31	44





TYPICAL ELEVATION

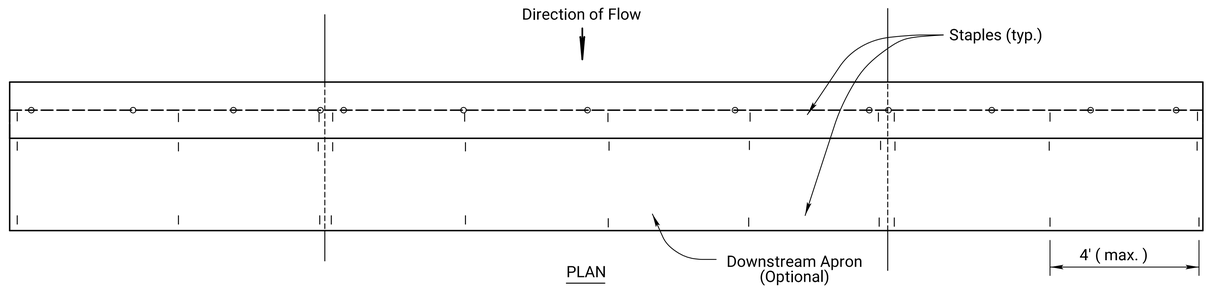
ROCK DITCH CHECK

NO SCALE

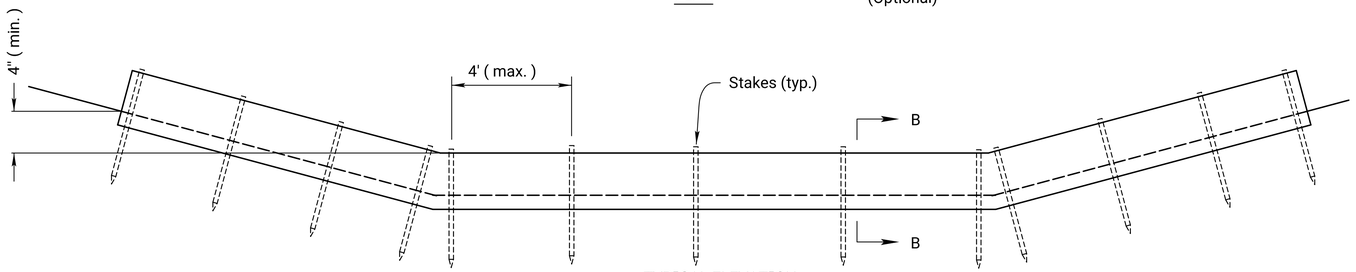
TEMPORARY ROCK DITCH CHECK SPACING	
DITCH ℄ SLOPE (%)	SPACING INTERVAL (FEET)
5.0	60
6.0	50
7.0	43
8.0	36
9.0	33
10.0	29
NOTE: Use this spacing for Rock Ditch Checks only.	

ROCK DITCH CHECK NOTES

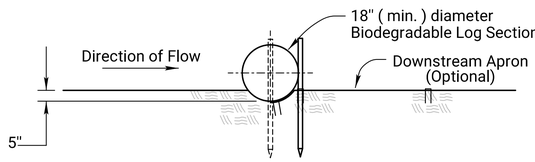
1. Rock shall be clean aggregate, D50-6" and aggregate filler.
2. Place rock in such manner that water will flow over, not around ditch check.
3. Do not use rock ditch checks in clear zone.
4. Excavation: The ditch area shall be reshaped to fill any eroded areas. Prior to placement of the rock, the ditch 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.



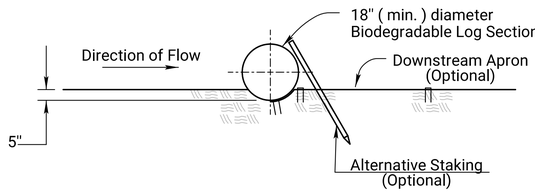
PLAN



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
03	11-19-20	Revised Standard	M.R.D.	M.L.
02	08-10-16	Revised Standard	R.A.A.	S.H.S.
01	10-21-15	Revised Standard	R.A.A.	S.H.S.

KANSAS DEPARTMENT OF TRANSPORTATION

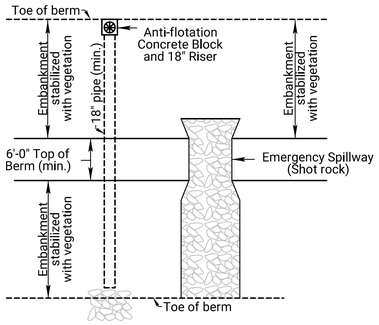
TEMPORARY EROSION AND POLLUTION CONTROL ROCK DITCH CHECKS BIODEGRADABLE LOG DITCH CHECKS

LA852G

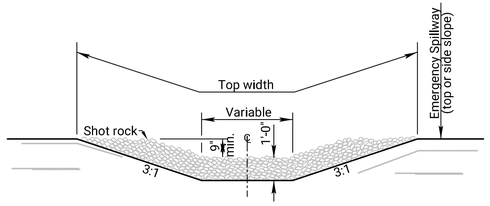
FHWA APPROVAL			11-19-20	APP'D.		Mervin Lare	
DESIGNED	M.L.	DETAILED	D.K.	QUANTITIES		TRACED	R.A.A.
DESIGN CK.	M.L.	DETAIL CK.	M.L.	QUAN.CK.		TRACE CK.	R.A.A.

Plotted by : rsnow 9-JUL-2024 18:13
File : la852g.dgn

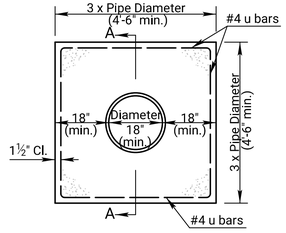
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	32	44



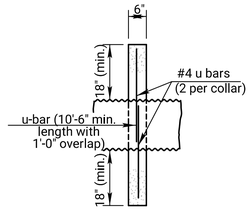
SEDIMENT STORAGE BASIN (PLAN)



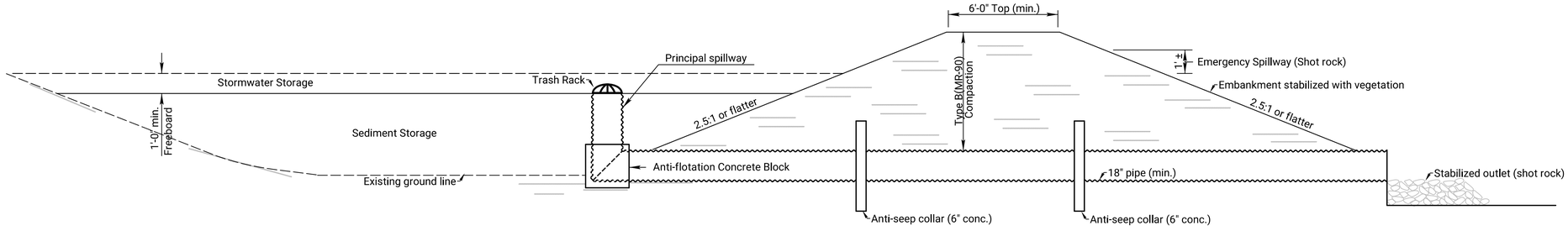
CROSS SECTION (EMERGENCY SPILLWAY)



CONCRETE ANTI-SEEP COLLAR



SECTION A-A



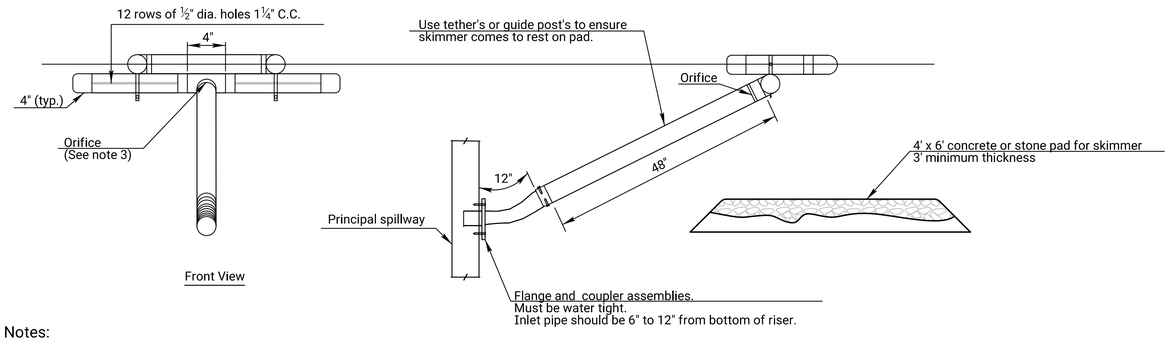
SEDIMENT STORAGE BASIN (ELEVATION)

NOTES:

1) Temporary Sediment Basins shall be constructed at locations as directed by the Engineer or as approved in the SWPPP Schedule. All work and materials necessary, including but not limited to, the fill material, compaction, drainage pipes, aggregates and all other incidentals necessary to construct the basin, shall be paid as "Temporary Sediment Basin".

2) Lengths and top dimensions shall be determined in the field by the Engineer.

3) Skimmer dewatering device required and must be used reguardless the size of the drainage area.



Notes:

1. All P.V.C. pipes are to be schedule 40.
2. HDPE flexible drain pipes is to be attached to the pond outlet structure with water-tight connections.
3. The orifice shall be sized of to provide drawdown time to 2 to 5 days and approved by the engineer.
4. Other skimmer designs maybe used that dewaters from the surface at a controlled rate. The design must be approved by the engineer.

SKIMMER DEWATERING DEVICE

SEDIMENT STORAGE BASIN LOCATIONS

STATION TO STATION	SIDE	REQUIRED STORAGE CAPACITY

NO.	DATE	REVISIONS	BY	APP'D
02	09-03-13	Added Skimmer Dewatering Device	M.R.M.	S.H.S.
01	07-17-13	Revised Standard	M.R.M.	S.H.S.

KANSAS DEPARTMENT OF TRANSPORTATION

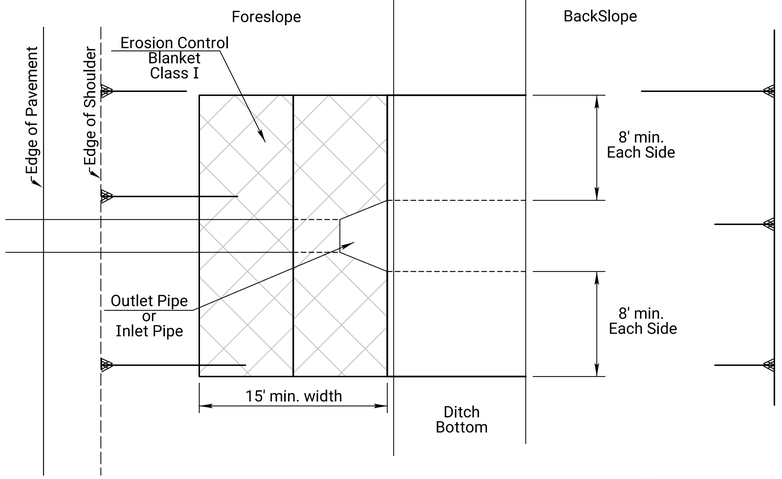
TEMPORARY EROSION AND POLLUTION CONTROL SEDIMENT STORAGE BASIN

LA852H

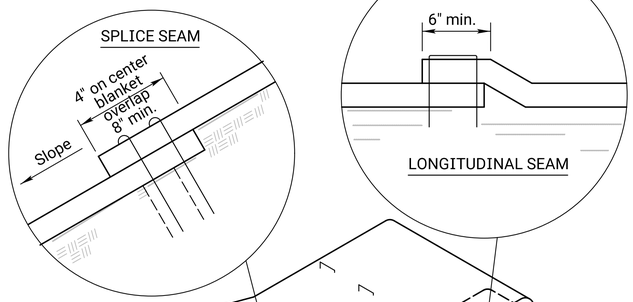
FHWA APPROVAL		09-24-13	APP'D.		
DESIGNED	B.B.	DETAILED	B.B.	QUANTITIES	TRACED B.B.
DESIGN CK.	S.H.S.	DETAIL CK.	S.H.S.	QUAN.CK.	TRACE CK. S.H.S.

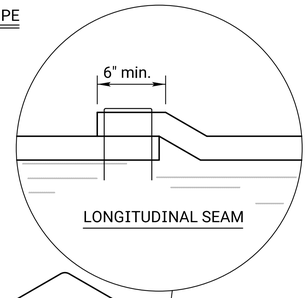
Plotted by : rsnow 9-JUL-2024 18:14
File : la852h.dgn

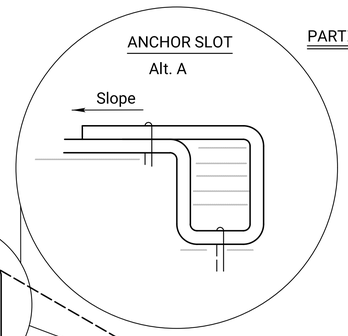
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	33	44

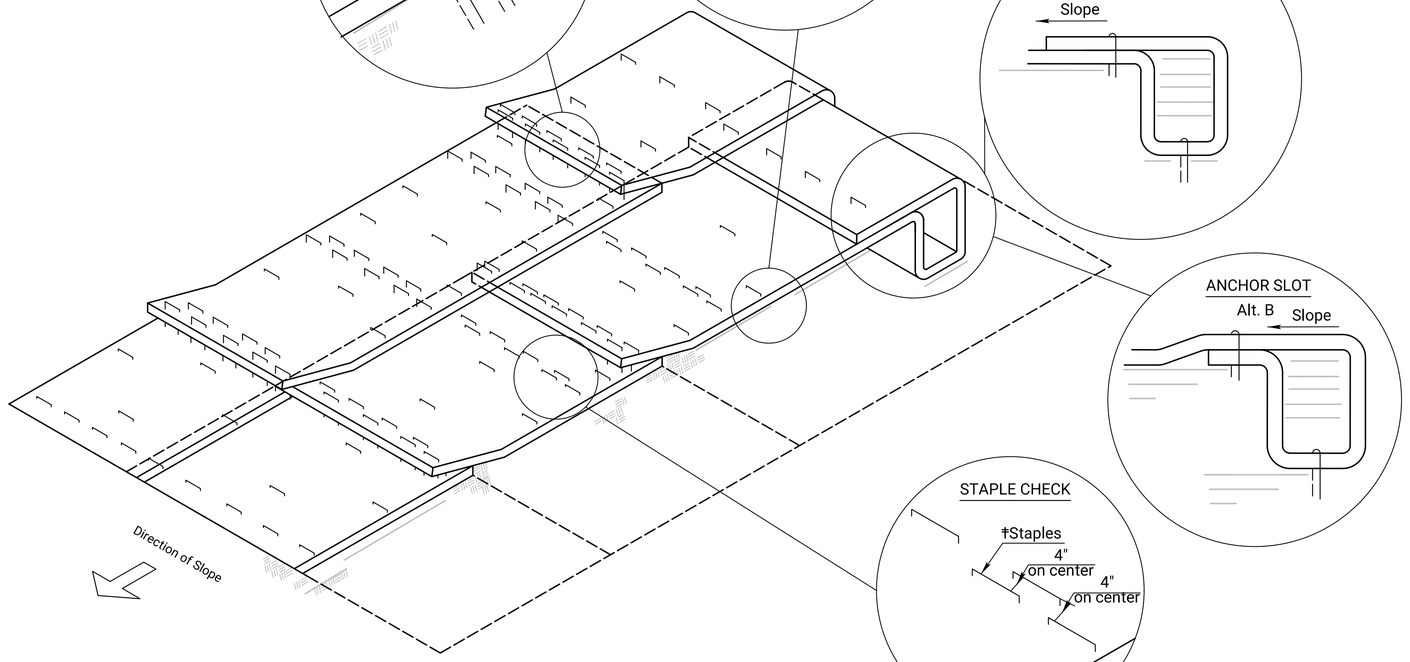


PARTIAL PLAN PIPE

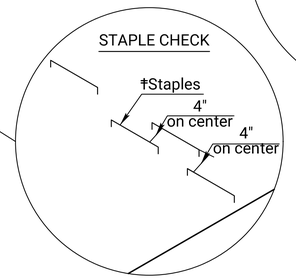


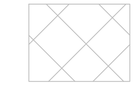




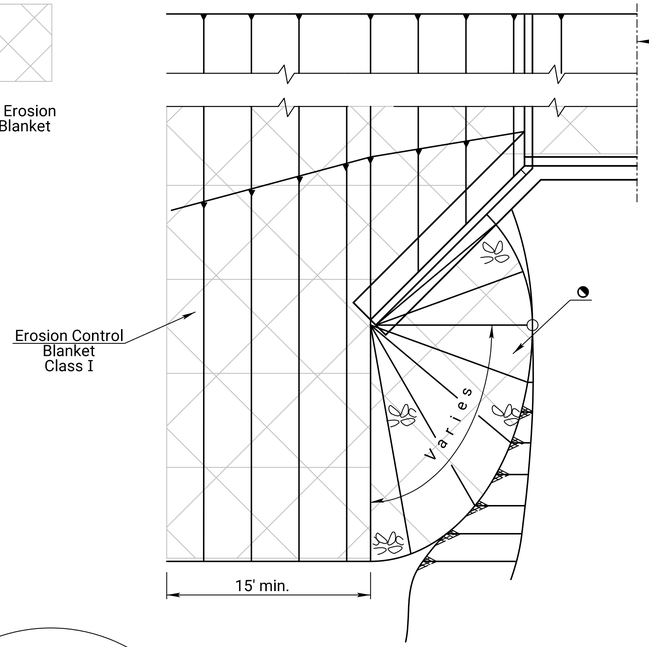


ISOMETRIC VIEW





Limits of Erosion Control Blanket



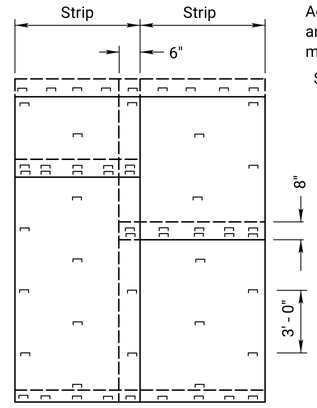
PARTIAL PLAN BOX CULVERT

◔ 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 1

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, overlap end 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.



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
04	03-01-15	Revised Standard	R.A.A.	S.H.S.
03	02-23-15	Revised Standard	R.A.A.	S.H.S.
02	09-15-14	Revised Standard	M.R.M.	S.H.S.

KANSAS DEPARTMENT OF TRANSPORTATION

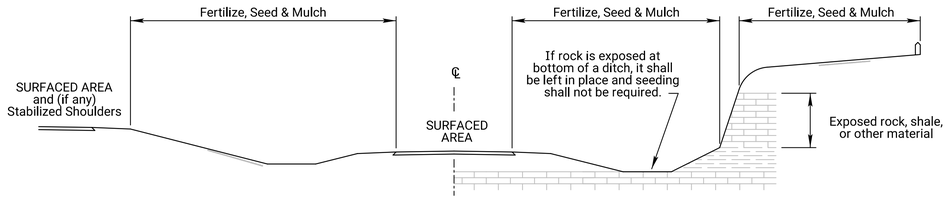
INSTALLATION DETAIL EROSION CONTROL CLASS 1 SLOPE PROTECTION

LA855

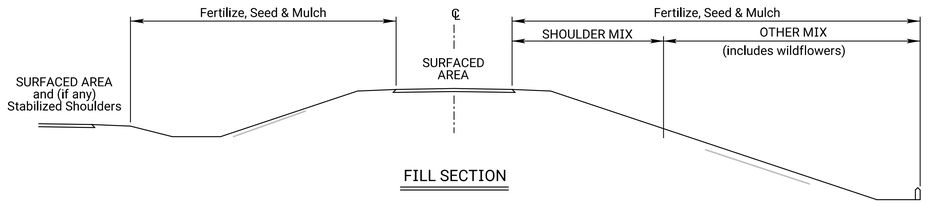
FHWA APPROVAL			03-10-15	APP'D.		Scott H. Shields	
DESIGNED	R.A.A.	DETAILED	R.A.A.	QUANTITIES		TRACED	R.A.A.
DESIGN CK.		DETAIL CK.		QUAN.CK.		TRACE CK.	R.A.A.

Plotted by : rsnow 9-JUL-2024 18:14
File : la855.dgn

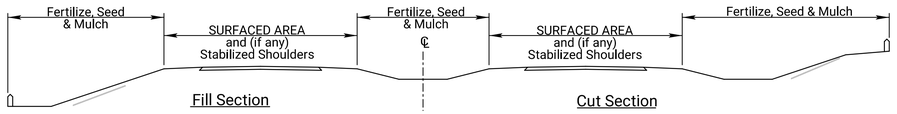
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	34	44



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:

$1\frac{3}{4}$ - $2\frac{1}{4}$ Tons per Acre = $1\frac{1}{2}$" 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.

When seeding is less than 1 acre, temporary and permanent seeding shall be combined and seeded at the same time.

There is no seasonal restriction when seeding projects less than one acre.

NATIVE WILDFLOWER MIX 1

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

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 ⅛" -¼". Place the wildflower seed in a separate seed box and drill (cover) seed $\frac{1}{16}$" 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
								See LA 852A for Soil Erosion Mix to be used as Permanent Seeding		
								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
02	11-25-20	Updated Seeding / Sodding Periods Charts	M.R.D.	M.L.
01	08-03-20	Revised Standard	M.R.D.	S.H.S.

KANSAS DEPARTMENT OF TRANSPORTATION

PERMANENT SEEDING SUMMARY OF SEEDING QUANTITIES

LA850

FHWA APPROVAL	05-06-19	APP'D.	Mervin Lare
DESIGNED	DETAILED	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN.CK.	TRACE CK.

Plotted by : rsnow 9-JUL-2024 18:14
File : la850.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	35	44

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.

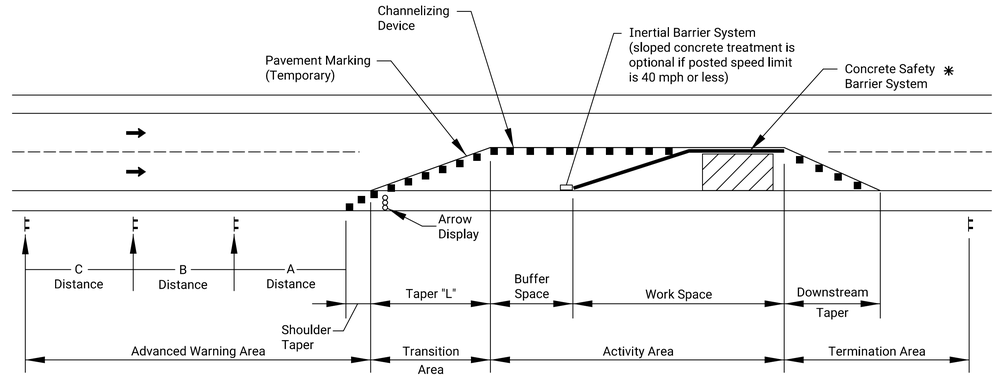
2) Minimum Lane Width: Lane widths shall be a minimum of 11' (measured between centerlines of pavement markings) or as shown on the plans, or as directed by the engineer. A lane width less than 11' may require restricted roadway width signing.

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
02	03-13-18	W8-15p usage changed to Shall	R.W.B.	E.K.G.
01	08-18-15	Channelizer spacing info	R.W.B.	K.E.

KANSAS DEPARTMENT OF TRANSPORTATION

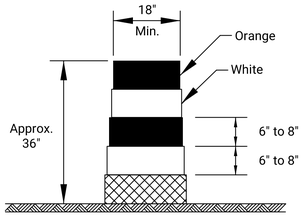
TRAFFIC CONTROL GENERAL NOTES

TE700

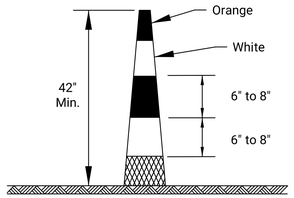
FHWA APPROVAL		03-13-18	APP'D.		Eric Kocher
DESIGNED	B.A.H.	DETAILED R.W.B.	QUANTITIES	TRACED	
DESIGN CK.		DETAIL CK.	QUAN.CK.	TRACE CK.	

Plotted by : rsnow 9-JUL-2024 18:14
File : te700.dgn

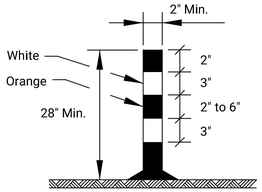
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	36	44



DRUM

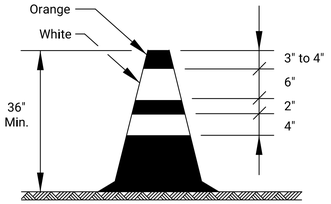


CONICAL
DELINEATOR

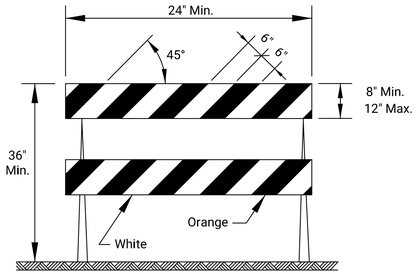


TUBULAR MARKER

Striping as shown for up to 42".

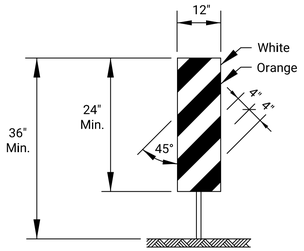


TRAFFIC CONE



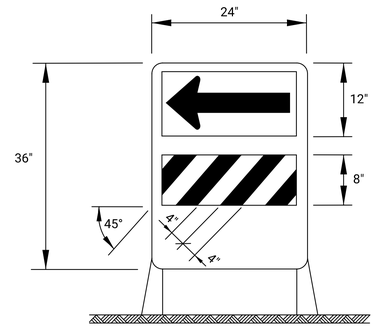
TYPE 2 BARRICADE

For rails less than 36" long, 4" wide stripes may be used. All stripes shall slope downward to the traffic side for channelization.



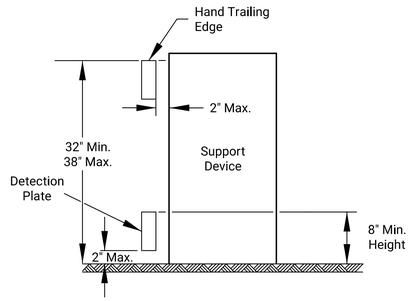
VERTICAL PANEL

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

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL CHANNELIZING DEVICES

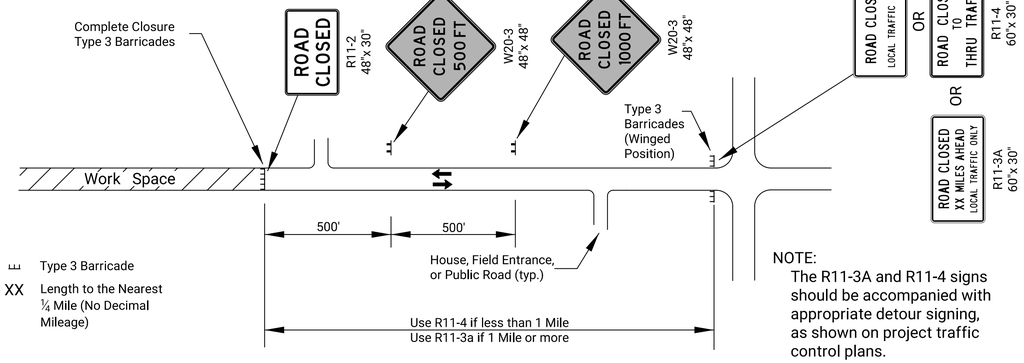
TE702

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.	

Plotted by : rsnow 9-JUL-2024 18:14
File : te702.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	37	44

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).

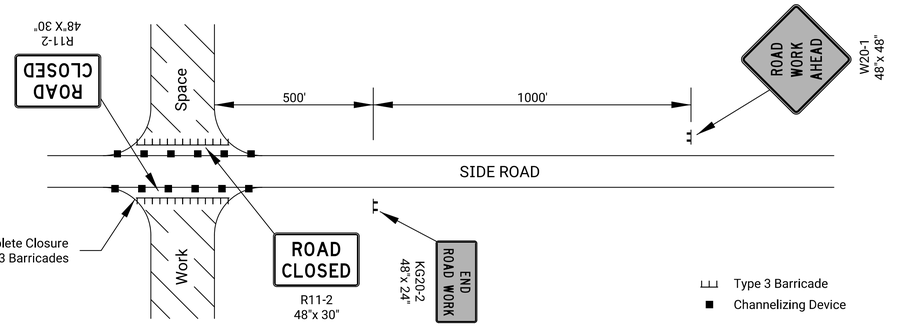


FIGURE 2: TYPICAL SIGNING FOR SIDE ROAD OPEN

Note: Signs shown for one approach to work zone.

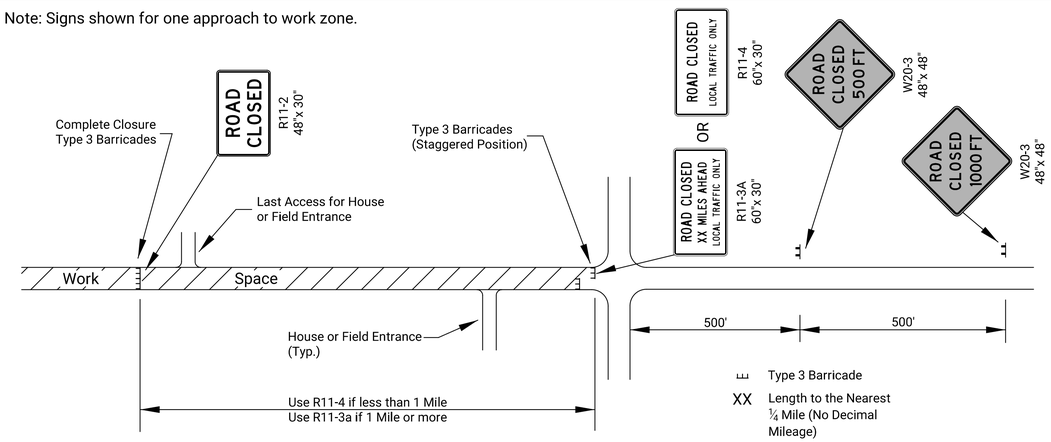


FIGURE 3: TYPICAL SIGNING FOR ROAD CLOSURE - LOCAL TRAFFIC ACCESS

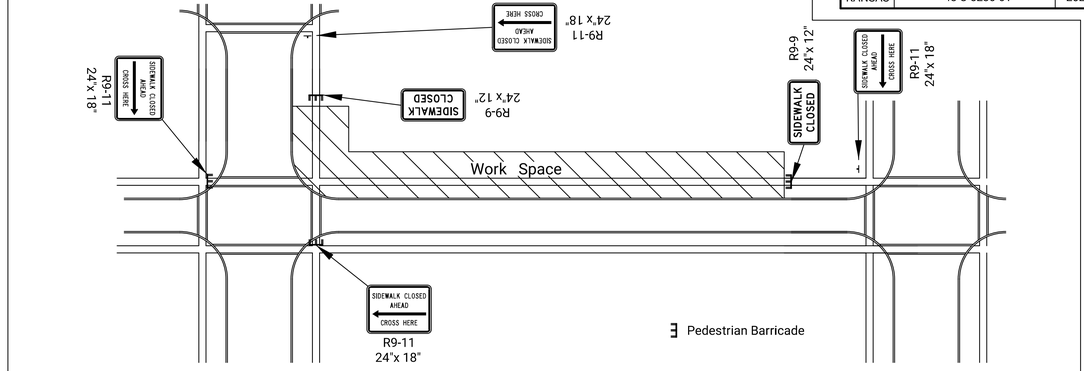
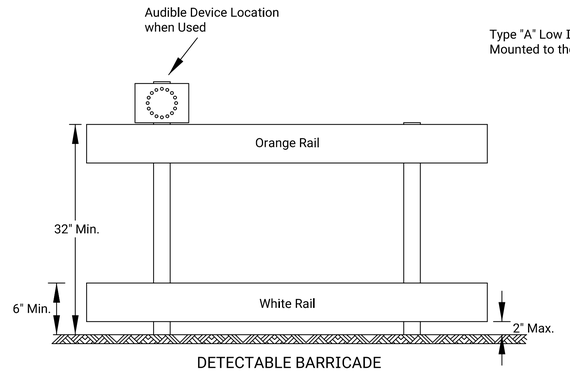
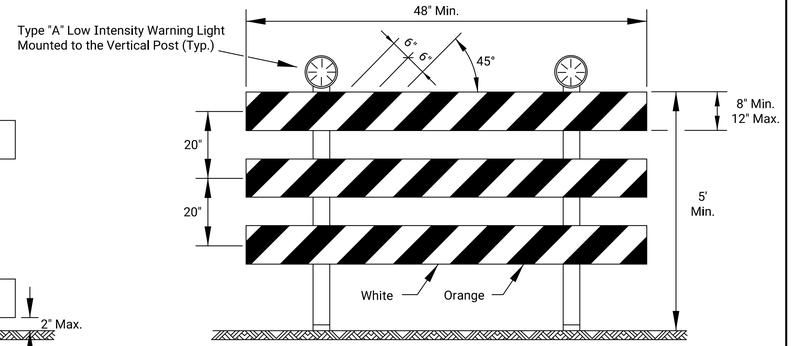


FIGURE 4: TYPICAL SIGNING FOR SIDEWALK CLOSED WITH OPPOSITE SIDEWALK AVAILABLE



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

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.	

Plotted by : rsnow 9-JUL-2024 18:15
File : te704.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	38	44

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

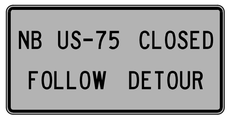
Std. Size Expwy/Freeway
48"x 48"

W8-11

Std. Size Expwy/Freeway
8" D
48"x 48"

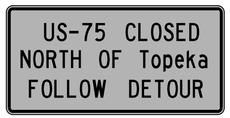
W8-17P
(Optional)

Std. Size Expwy/Freeway
30"x 24"



SP-01
(Special Sign)

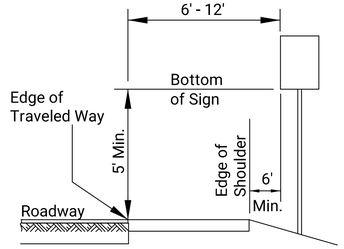
Std. Size: 6" C
Expwy/Freeway: 10" D



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.

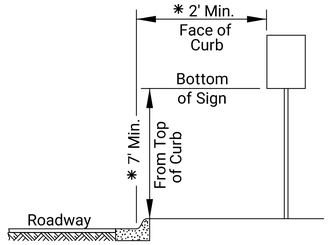


RURAL

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.

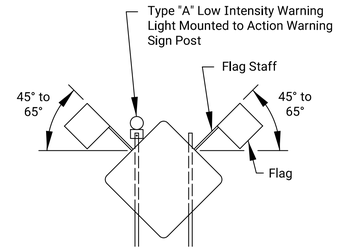
2) Neither portable nor permanent sign supports should be located on sidewalks or areas designated for pedestrian or bicycle traffic.

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.

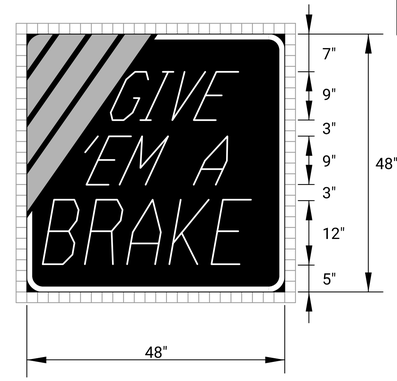
5) Large signs having an area exceeding 50 square feet installed on multiple breakaway posts shall be mounted a minimum of 7' above the ground.

✱ 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.



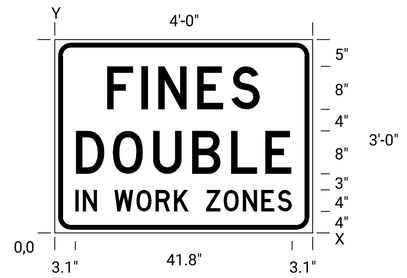
When the sign width is equal to or greater than 9', three or more wood posts may be used with a minimum of 4' between the centerline of each post. All signs less than 9' in width shall use a maximum of two wood posts.

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

Y FONT	LETTER SPACINGS															HT LEN
23.0 D	X	F	I	N	E	S	X									8.0
	9.7	6.4	3.2	7.3	6.4	5.4	9.7									28.6
11.0 D	X	D	O	U	B	L	E	X								8.0
	3.9	6.9	7.5	7.3	7.3	6.4	4.9	3.9								40.3
4.0 D	X	I	N	X	W	O	R	K	X	Z	O	N	E	S	X	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

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SIGN INFORMATION

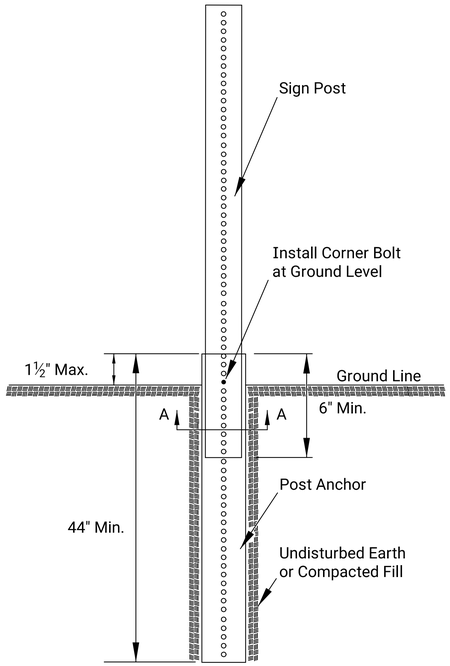
TE710

FHWA APPROVAL		06-01-15	APP'D.	Kristina Ericksen	
DESIGNED	R.W.B.	DETAILED R.W.B.	QUANTITIES	TRACED	
DESIGN CK.		DETAIL CK.	QUAN.CK.	TRACE CK.	

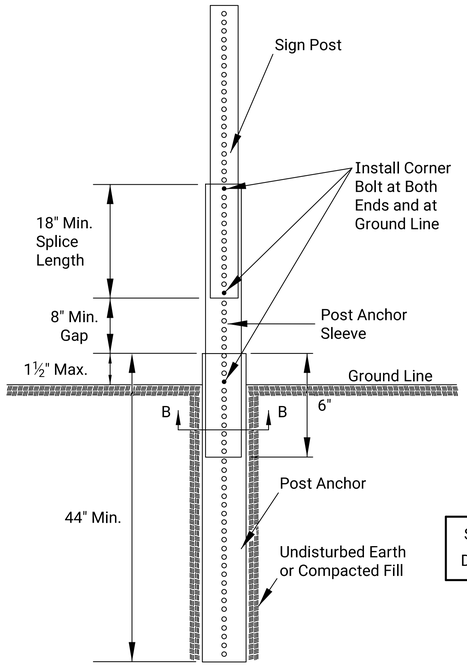
Plotted by: rsnow 9-JUL-2024 18:15
File : te710.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	39	44

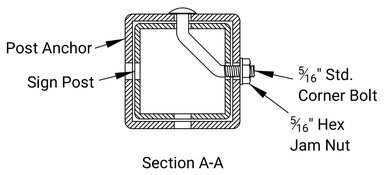
PERFORATED SQUARE STEEL TUBE (P.S.S.T.) POST SETUP



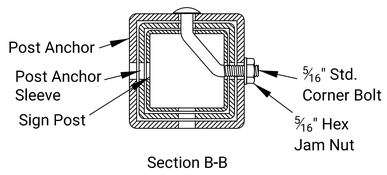
P.S.S.T. Detail



Telescoping P.S.S.T. Detail



Section A-A

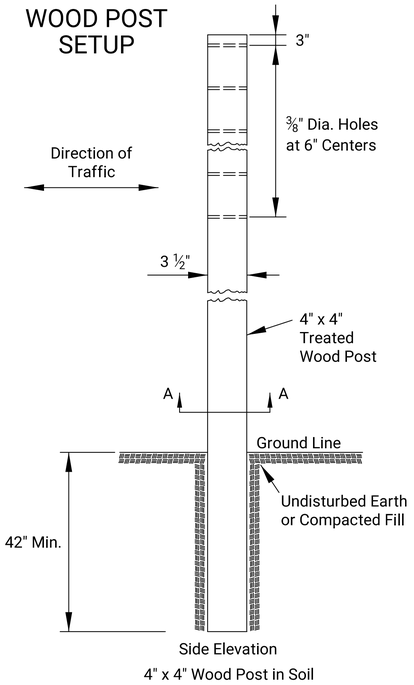


Section B-B

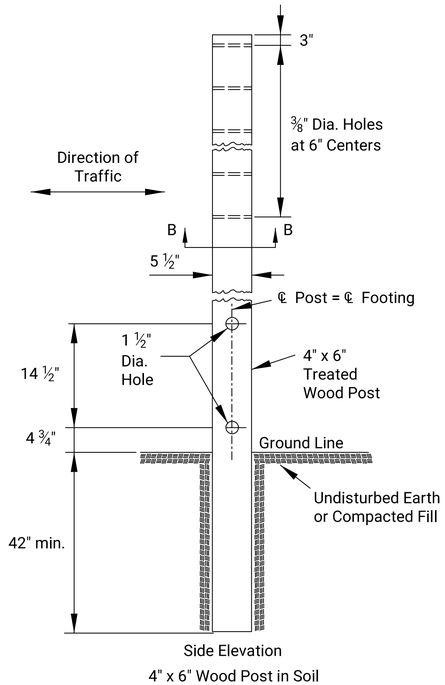
Details for 2", 2 ¼", or 2 ½" sign posts

Place bolts in the same corner along each sign post.

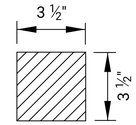
WOOD POST SETUP



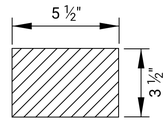
Side Elevation
4" x 4" Wood Post in Soil



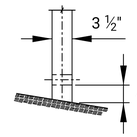
Side Elevation
4" x 6" Wood Post in Soil



Section A-A



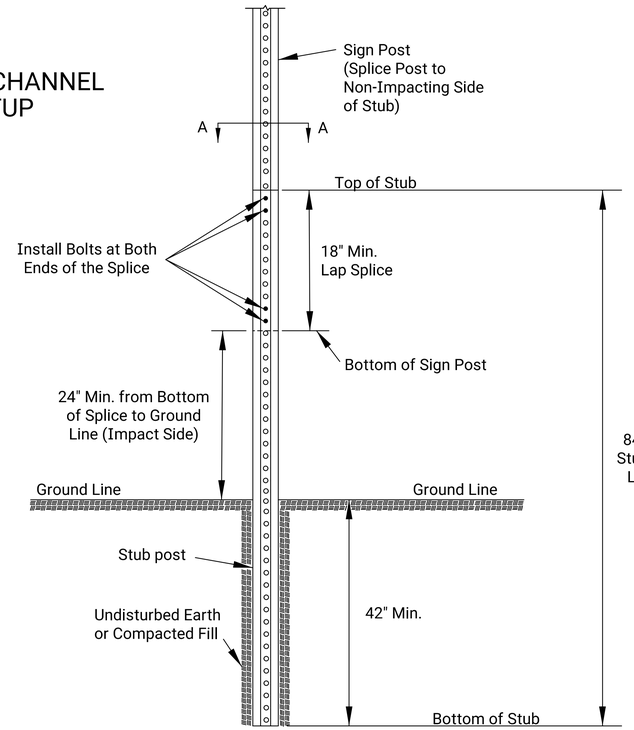
Section B-B



Front Elevation

See TE710 for Additional Details and Requirements

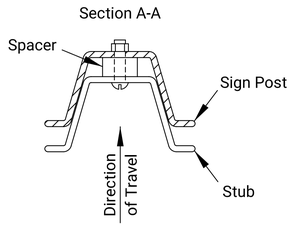
3 LB/F U-CHANNEL SETUP



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.



NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL SIGN POSTS

TE712

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.

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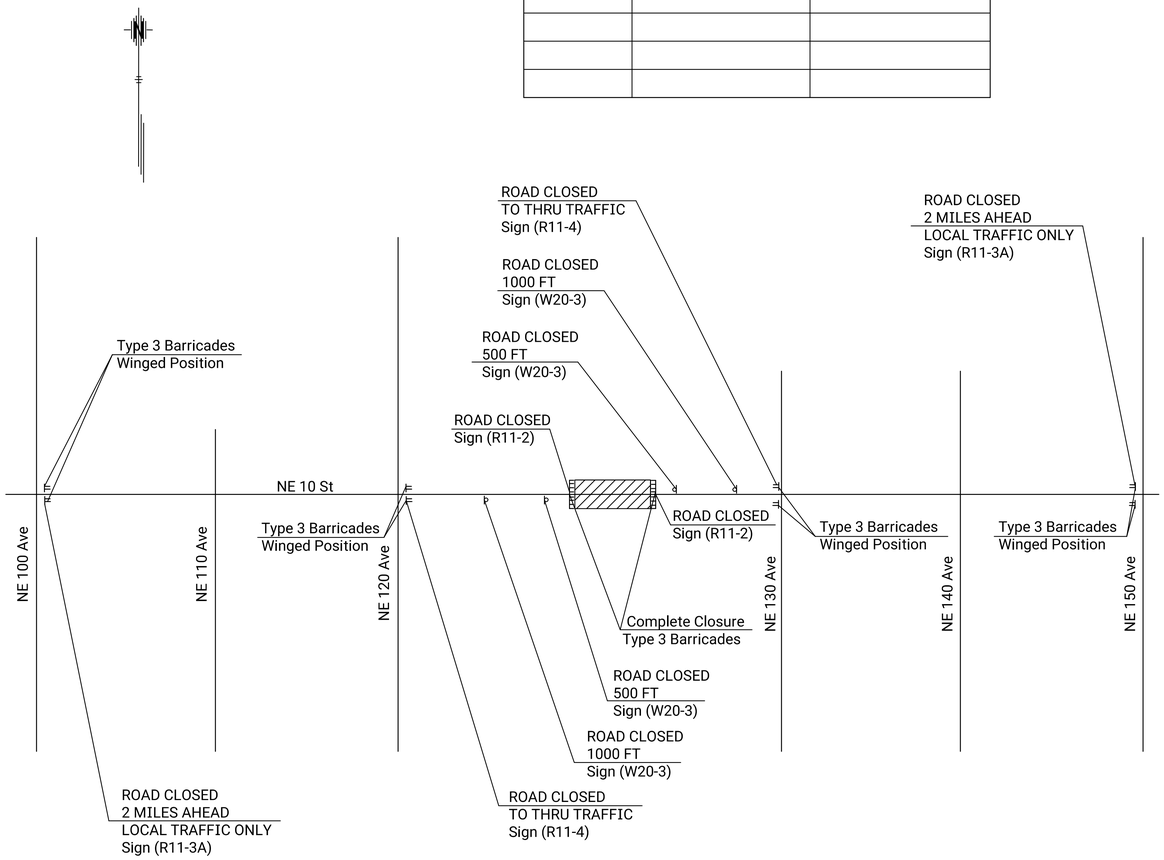
File : te712.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	40	44

SUMMARY OF TRAFFIC CONTROL DEVICES (EACH)

Work Zone Sign (Special)		
Sign No.	16.25 Sq.Ft. & Less	16.26 Sq.Ft. & Over



BRIDGE TRAFFIC CONTROL

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		1	
R11-2		2	
R11-3A		2	
R11-4		2	
W20-3		4	

Barricades ✳	
Type 3 (4' to 12')	Pedestrian
14	

Channelizing Devices ✳		
Fixed	Portable	Pedestrian

Lighted Devices ✳	
Work Zone Warning Light (Type "A" Low Intensity)	12
Work Zone Warning Light (Red Type "B" High Intensity)	
Arrow Display	
Portable Changeable Message Sign	

Recapitulation of Quantities		
Item	Quantity	Unit
Work Zone Signs (0 to 9.25 Sq.Ft.)		Each Per Day
Work Zone Signs (9.26 to 16.25 Sq.Ft.)		Each Per Day
Work Zone Signs (16.26 Sq.Ft. & Over)		Each Per Day
Work Zone Barricades (Type 3 - 4' to 12')		Each Per Day
Work Zone Barricades (Pedestrian)		Each Per Day
Channelizer (Fixed)		Each Per Day
Channelizer (Portable)		Each Per Day
Channelizer (Pedestrian)		Each Per Day
Work Zone Warning Light (Type "A" Low Intensity)		Each Per Day
Work Zone Warning Light (Red Type "B" High Intensity)		Each Per Day
Arrow Display		Each Per Day
Portable Changeable Message Sign		Each Per Day
Pavement Marking (Temporary)		
4" Solid (Type I)		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)		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		Lin. Ft.
Work Zone Sign (Special) (16.25 Sq. Ft. & Less)		Each
Work Zone Sign (Special) (16.26 Sq. Ft. & More)		Each
Rigid Raised Pavement Marker (Type I)		Each
Rigid Raised Pavement Marker (Type II)		Each
Traffic Signal Installation (Temporary)		Lump Sum
Traffic Control (Initial Set Up)		Lump Sum
Traffic Control	Lump Sum	Lump Sum
Flagger (Set Price)	1	Hour

NO.	DATE	REVISIONS	BY	APP'D

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.

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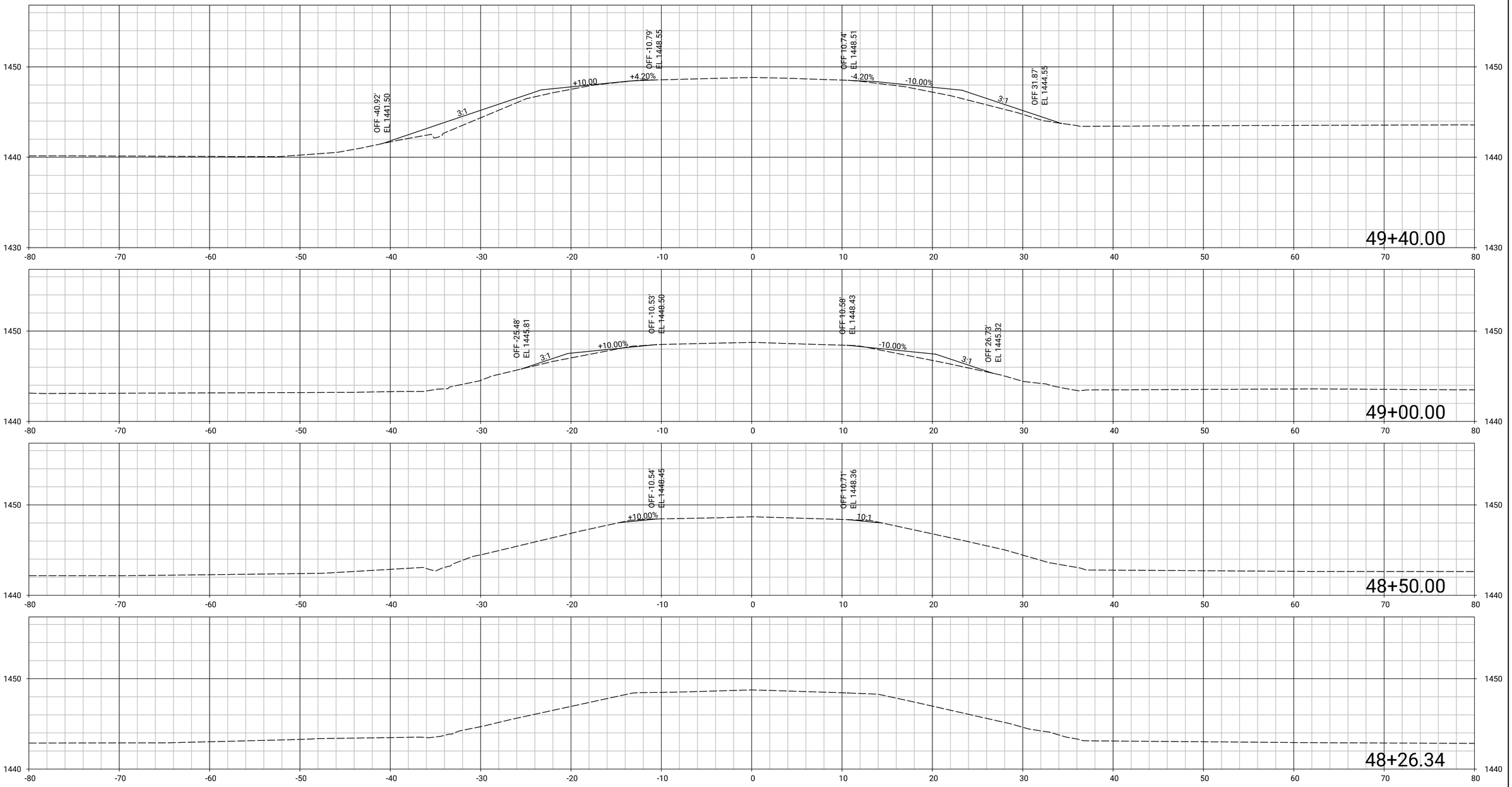
File : te795.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	41	44

DATE	BY	REFERENCES NOTED
		REFERENCES CHECKED



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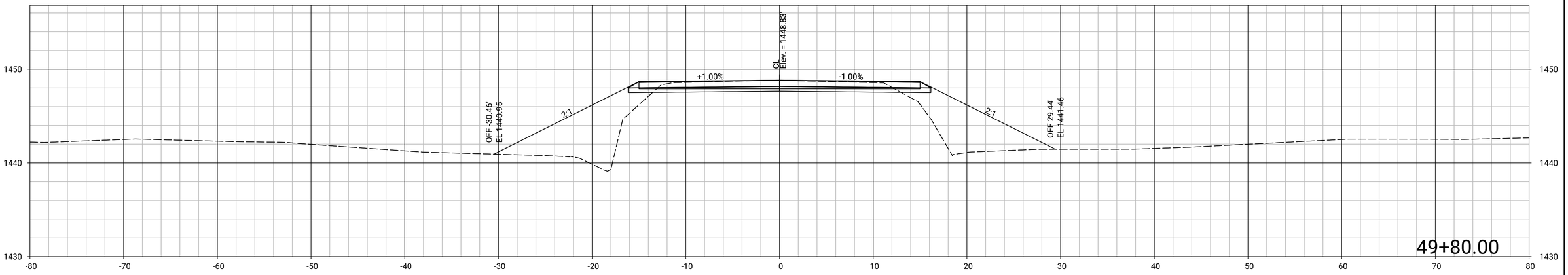
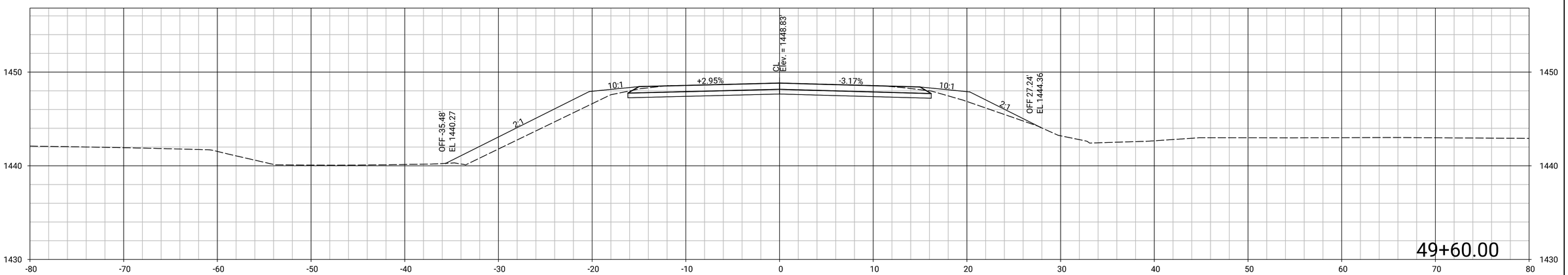
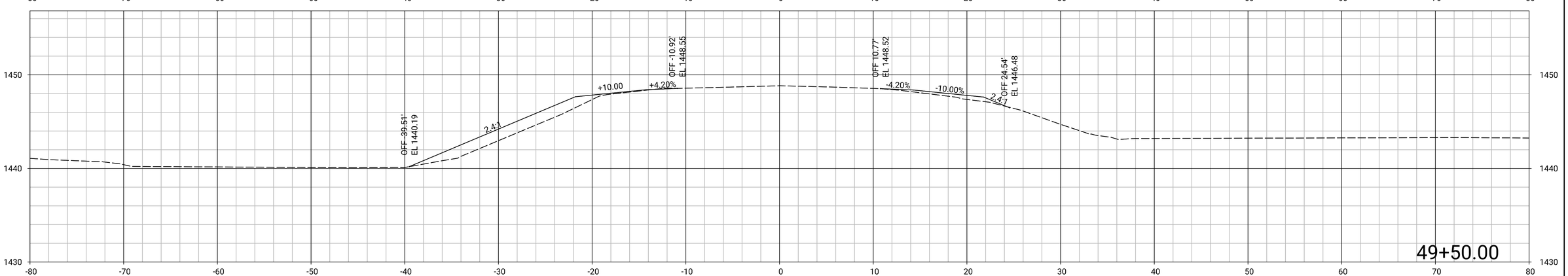
File : 48 C523001_rxs-01.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	42	44

DATE	BY	
		REFERENCES NOTED
		REFERENCES CHECKED







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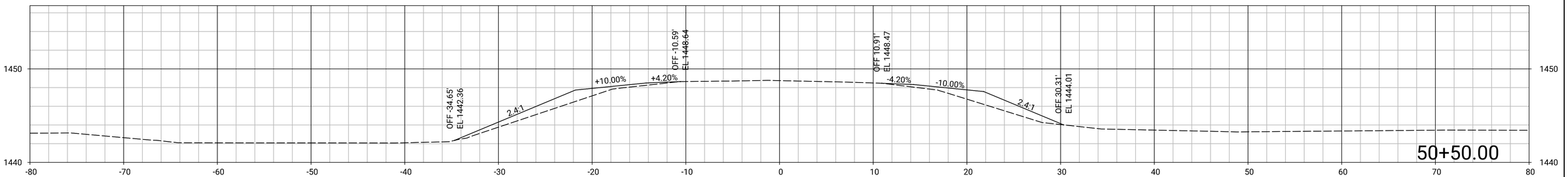
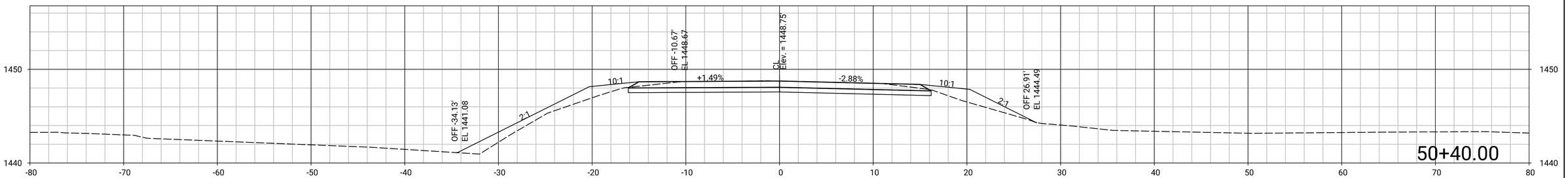
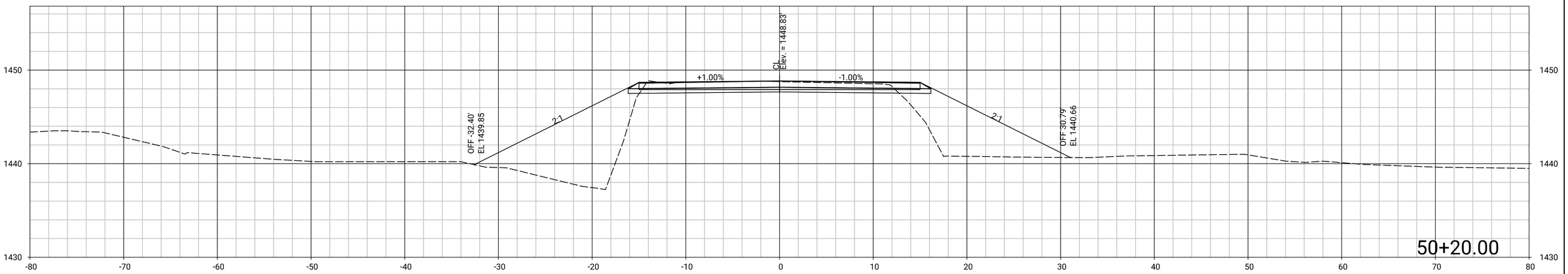
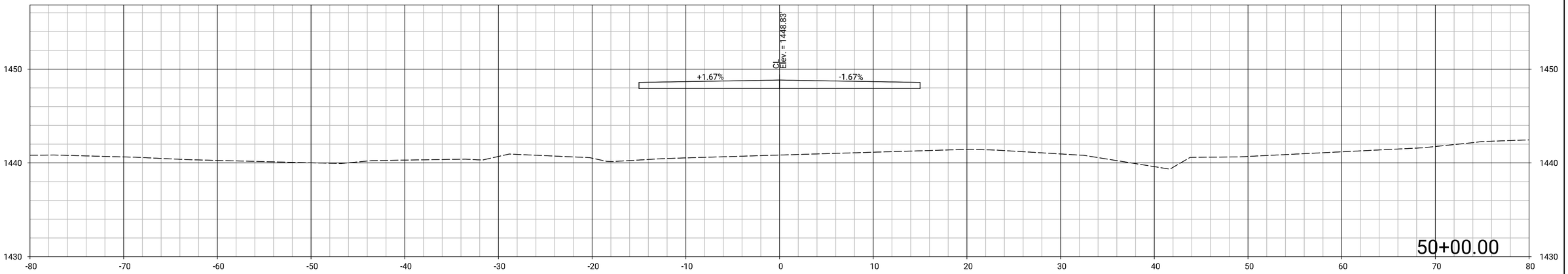
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	43	44

DATE	BY	REFERENCES NOTED
		REFERENCES CHECKED









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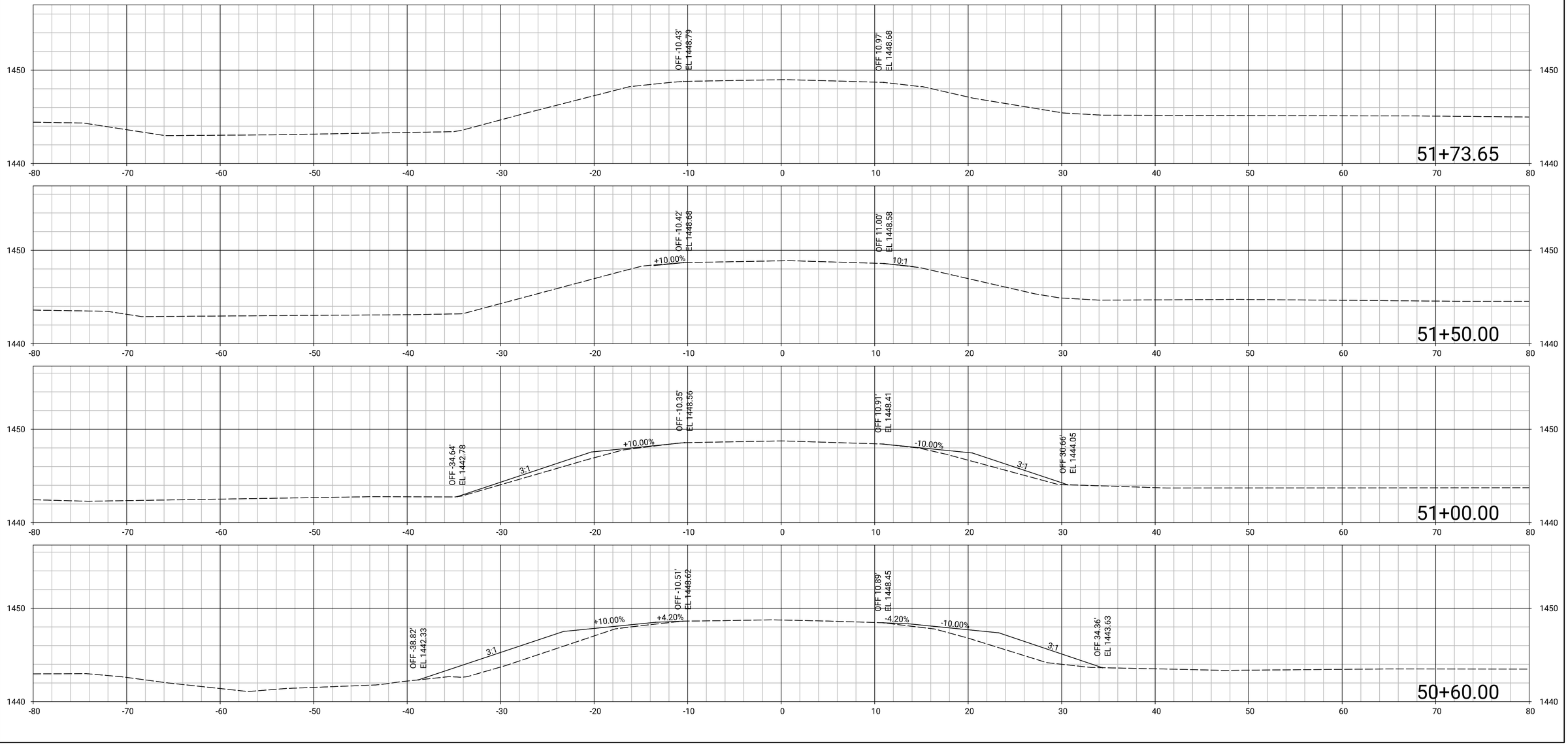
File : 48 C523001_rxs-01.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	48 C-5230-01	2024	44	44

DATE	BY	
		REFERENCES NOTED
		REFERENCES CHECKED



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