

BRIDGE - UNSPECIFIED
 BRF-169-8(57)--38-55
 LETTING DATE
 12/20/2016

KOSSUTH CO.

PRODUCTION SCHEDULE		
EVENT	Proposed Date	Completed Date
D-1 Survey	04-14-2014	01-14-2013
D-2 Field Exam	08-14-2014	09-24-2014
D-3 To Prelim. Culverts	09-15-2014	
B-1 Structures Layout	12-15-2014	
D-5 To Right of Way	02-16-2015	
D-4 Design Plans to Bridge	08-23-2016	



Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM KOSSUTH COUNTY BRIDGE - UNSPECIFIED

Over Mud Creek 0.3 miles S. of Co. Rd. A-40

SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

Value Engineering Saves. Refer to Article 1105.15 of the Specifications.

NO MILEAGE SUMMARY



REVISIONS

TOTAL

34

PROJECT IDENTIFICATION NUMBER

13-55-169-010

PROJECT NUMBER

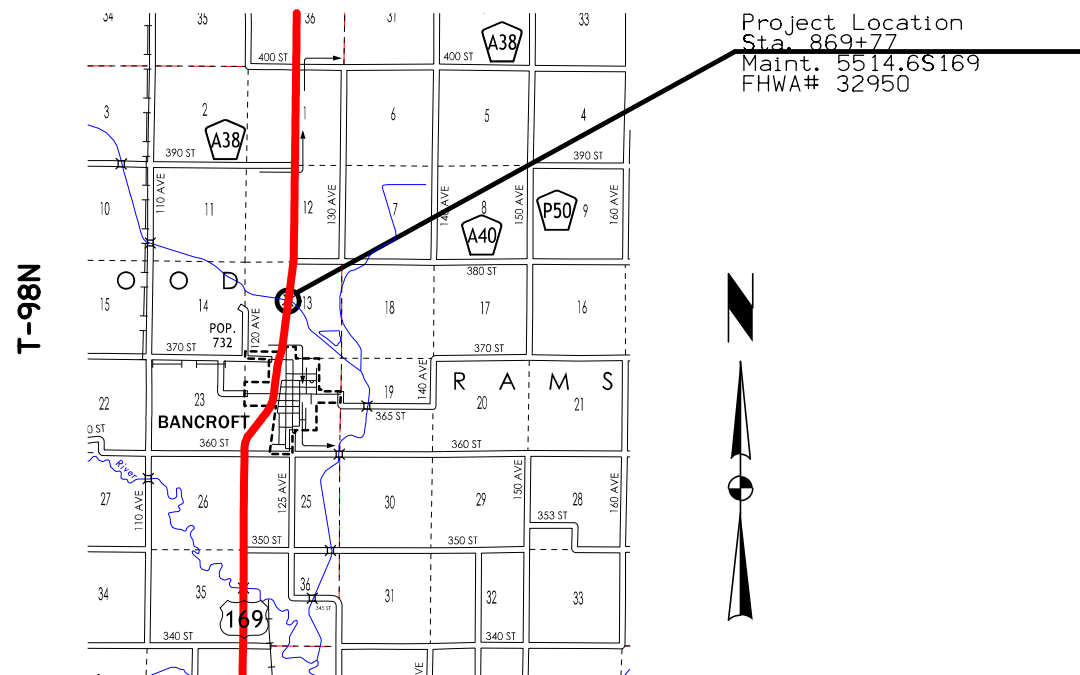
BRF-169-8(57)--38-55

R.O.W. PROJECT NUMBER

NHSN-169-8(58)--2R-55

INDEX OF SHEETS

No.	DESCRIPTION
A Sheets	Title Sheets
A.1	Title Sheet
A.1	Location Map Sheet
A.2 - 11	Approved Final Concept
A.12	Field Exam Questions
B Sheets	Typical Cross Sections and Details
B.1 - 3	Typical Cross Sections and Details
D Sheets	Mainline Plan and Profile Sheets
* D.1	Plan & Profile Legend & Symbol Information Sheet
* D.2	US 169
G Sheets	Survey Sheets
G.1 - 2	Reference Ties and Bench Marks
G.3 - 4	Horizontal Control Tab. & Super for all Alignments
V Sheets	Bridge and Culvert Situation Plans
V.1	D2 Preliminary Bridge TS&L
W Sheets	Mainline Cross Sections
W.1	Cross Sections Legend & Symbol Information Sheet
W.2 - 13	Mainline Cross Sections
	* Color Plan Sheets



Roadway Cut = 2944
Roadway Fill = 5136
Embankment in Place = 2192

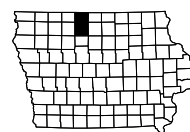
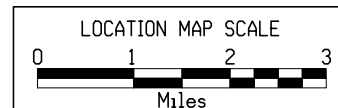
DESIGN DATA RURAL			
2017 AADT	1577	V.P.D.	
2037 AADT	1703	V.P.D.	
2037 DHV	176	V.P.H.	
TRUCKS	22	%	
Total Design ESALs	--		

INDEX OF SEALS		
SHEET NO.	NAME	TYPE
A.1	Paul W. Flattery	Primary Signature Block
X	X	X

PRELIMINARY PLANS

Subject to change by final design.

D2 PLAN - Date: 9-24-2014



IOWA DEPARTMENT OF TRANSPORTATION

TO OFFICE: District 2
DATE: December 9, 2013
ATTENTION: E. Jon Ranney
PROJECT: Kossuth County
BRF-169-8(57)--38-55
FROM: Kevin K. Patel
PIN: 13-55-169-010
OFFICE: Design
SUBJECT: Project Concept Statement; (Final Approval, D0)

This project involves the replacement of the U.S. 169 bridge (Maint No.5514.6S169) over Mud Creek, 0.3 miles south the junction of County Road A-40.

A concept review was held on October 24, 2013. Those present included Nick Humpal and Kevin Smith from the District 2 Office; Patricia Schwarz from the Office of Bridges and Structures; Lindsay Edgar from the Office of Location and Environment and Kevin Patel and Jean Borton from the Office of Design. The two alternatives considered were:

1. Replace the bridge with a single span 105 ft. x 44 ft. pretensioned prestressed concrete beam bridge, raise the grade approximately 2.9 ft. and replace approximately 1,060 ft. of pavement for \$1,292,800.
2. Replace the bridge with a three span 150 ft. x 44 ft. concrete slab bridge, raise the grade approximately 1 ft. and replace approximately 815 ft. of pavement for \$1,354,400.

Alternative 1 is the preferred alternative as the single span beam bridge eliminates the need for piers as required with the three span slab bridge. The beam bridge also has long term future maintenance advantages.

The Draft Project Concept Statement was sent out for review and comment with concerns to be resolved by Thursday, December 5, 2013. Comments received during the review period have been considered and resolved.

This project is recommended for construction in FY 2017. The Office of Bridges and Structures will coordinate plan preparation with assistance from the Office of Design.

KKP: jmb
Attach.

cc:

J. F. Adam	J. R. Selmer	M. J. Kennerly
K. D. Nicholson	D. L. Maifield	R. L. Stanley
M. D. Masteller	B. R. Smith	A. A. Welch
N. M. Miller	C. C. Poole	N. L. McDonald
G. A. Novey	D. R. Claman	P. Lu
B. C. Worrel	J. S. McClain	M. A. Swenson
J. W. Smith	M. J. Sankey	R. A. Younie
S. P. Anderson	Z. T. Bitting	D. R. Tebben
B. D. Hofer	D. D. Matulac	D. L. Newell
B. E. Azeltine	M. E. Khoda	S. J. Gent
T. D. Crouch	J.W. Laaser-Webb	W.A. Sorenson
D. E. Sprengeler	E. C. Wright	D. L. Little
D. L. Roeber	K. L. Rostad	N. J. Humpal
M. R. Callahan	P. Hjelmstad	D. Wiebke
L. B. Edgar	B. J. Dolan	L. C. Funnell
FHWA	M. E. Ross	

FINAL PROJECT CONCEPT STATEMENT

U.S. 169 Bridge over Mud Creek,
0.3 miles south of the Junction of County Road A-40

Kossuth County
BRF-169-8(57)--38-55
PIN: 13-55-169-010
Maint. No. 5514.6S169
FHWA No. 32950

Highway Division
Office of Design

Kevin K. Patel, P.E.
515-239-1540

December 9, 2013

Kossuth County
BRF-169-8(57)--38-55
PIN: 13-55-169-010
Page 2

age, size, and condition of the structure, bridge repairing would not be an economical and practical option, the structure should be replaced.



Looking South



Looking North

I. STUDY AREA

A. Project Description

This project involves the replacement of the U.S. 169 bridge (Maint. No 5514.6S169) over Mud Creek, 0.3 miles south of the junction of County Road A-40.

The two alternatives considered were:

1. Replace the bridge with a single span 105 ft. x 44 ft. pretensioned prestressed concrete beam bridge, raise the grade approximately 2.9 ft. and replace approximately 1,060 ft. of pavement for \$1,292,800.
2. Replace the bridge with a triple span 150 ft. x 44 ft. concrete slab bridge, raise the grade approximately 1 ft. and replace approximately 815 ft. of pavement for \$1,354,400.

Alternative 1 is the preferred alternative as the single span beam bridge eliminates the need for piers as required with the three span slab bridge. The beam bridge also has long term future maintenance advantages.

B. Need for Project

The bridge is classified as structural deficient due to the poor condition of the substructure. The near abutment wall is cracked and tipped. Hollow areas with heavy leaching were found at both abutments. The bearings have severe rusting. Both the top and bottom of the deck have a few transverse and longitudinal cracks. Spalls were found at several beams and severe leaching was seen at beam ends. Provided with the

C. Present Facility

This is a 41 ft. x 44 ft. one span concrete tee beam bridge which was constructed in 1928 and widened in 1962. The deck is overlaid in 1984.

U.S. 169 in the project area is 24 ft. wide PCC pavement with 10 ft. wide granular shoulders and 3:1 foreslopes, constructed in 1959. HMA resurfacing was accomplished in 1990. HMA widening to a 28 ft. roadway with 4 ft. granular shoulders and resurfacing was accomplished in 2011.

D. Traffic Estimates

The 2017 and 2037 average daily traffic estimates are 1,600 ADT with 20% trucks and 1,700 ADT with 22% trucks, respectively.

E. Sufficiency Ratings

U.S. 169 is classified as an area development route and is a maintenance service level "C" road. U.S. 169 is on the national highway system (NHS). The federal bridge sufficiency rating is 71.6.

F. Access Control

Access rights will not be acquired for this project.

G. Crash History

During the five-year study period from January 1, 2008 through December 31, 2012, there were no crashes that involved the bridge.

II. PROJECT CONCEPT

A. Feasible Alternatives

Alternative #1 - Replace with a Pretension Prestressed Concrete Beam Bridge

Replace the existing 40 ft. x 44 ft., concrete deck girder/pretensioned prestressed concrete beam bridge with a single span 105 ft. x 44 ft., pretensioned prestressed concrete beam bridge.

The typical cross section adjacent to the bridge will consist of a 24 ft. roadway (28 ft. wide pavement) with 10 ft. effective shoulders (2 ft. outside pavement, 2 ft. additional paved and 8 ft. granular) and 6:1/3:1 foreslopes.

The existing bridge will need to be raised a minimum of 2.9 ft. in order to place the low beam one foot above the top of the adjacent levees. This will require approximately 1,060 ft. of roadway reconstruction.

Construct new bridge approaches and install new guardrail. Pave the shoulders 20 ft. beyond the ends of the guardrail. Class 10 will be necessary to flatten the existing foreslopes and to construct the new guardrail blisters. Three of the four entrances at the ends of the bridge will be relocated to avoid the new longer guardrail installation. The entrance in the southeast quadrant will be closed as access to this property is provided by another entrance to the south.

Place class E revetment for slope protection under the bridge. Construct two bridge end drains on the south end of the bridge.

Apply erosion control and rural seeding and fertilizing to all disturbed areas.

It appears that right of way will be required for this project.

Traffic will be maintained by an off-site detour.

Bridge Items	<u>Estimated Costs</u>
New Bridge	\$ 432,900
Bridge Removal	20,200
Revetment	89,200
Mobilization - 10%	54,200
M & C - 20%	<u>119,300</u>
Bridge Costs	\$ 715,800

Roadway Items	
Bridge Approaches	\$36,000
PCC Pavement	156,200
Modified Subbase	39,800
Removal of Pavement	20,100
Granular Shoulder	5,000
Paved Shoulder	7,400
Class 10 Roadway and Borrow	30,700
Excavation Class 13 Waste	10,400
Guardrail (Includes Removal)	22,900
Paved Shoulders for Guardrail	17,800
Class 10 for Guardrail Blisters	14,200
Bridge End Drains	5,700
Granular Surfacing for Entrances	1,300
Entrance Pipes	6,400
Longitudinal Subdrain and Outlets	14,100
Seeding and Fertilizing	1,500
Erosion Control	5,000
Traffic Control - 5%	19,700
Mobilization - 5%	19,700
Right of Way	10,000
M & C - 30%	<u>133,100</u>
Roadway costs	\$ 577,000

Project Total **\$1,292,800**

Alternative #2 - Replace with a Concrete Slab Bridge

Replace the existing 40 ft. x 44 ft., concrete deck girder/pretensioned prestressed concrete beam bridge with a three span 150 ft. x 44 ft. continuous concrete slab bridge.

This alternative is similar to Alternative 1; however, the existing grade will need to be raised one foot. This will require approximately 815 ft. of roadway reconstruction to allow the bottom of the bridge deck to be one foot above the adjacent levees.

Bridge Items	<u>Estimated Costs</u>
New Concrete Slab Bridge	\$ 541,200
Bridge Removal	40,400
Revetment, Fabric and Excavation	86,600
Mobilization - 10%	66,800
M & C - 20%	<u>147,000</u>
Bridge Costs	\$ 882,000

Roadway Items	
Bridge Approaches	\$36,000
PCC Pavement	120,100
Modified Subbase	30,600
Removal of Pavement	16,900
Granular Shoulder	3,800
Paved Shoulder	5,100
Class 10 Roadway and Borrow	13,700
Excavation Class 13 Waste	9,100
Guardrail (Includes Removal)	22,900
Paved Shoulders for Guardrail	17,800
Class 10 for Guardrail Blisters	14,200
Bridge End Drains	5,700
Granular Surfacing for Entrances	1,300
Entrance Pipes	6,400
Longitudinal Subdrain and Outlets	11,200
Seeding and Fertilizing	1,500
Erosion Control	5,000
Traffic Control - 5%	16,100
Mobilization - 5%	16,100
Right of Way	10,000
M & C - 30%	<u>109,000</u>
Roadway costs	\$472,400

Project Total **\$1,354,400**

B. Detour Analysis

U.S. 169 will be closed and an offsite detour will be utilized. It is anticipated the detour will be in place for approximately 180 days. The detour would follow A-42 west to P-30, north to A-38, then east to US 169. Out of distance travel is approximately 9 miles. The total distance user cost is anticipated to be \$680,000. The cost for county road maintenance will be \$24,200 as calculated by the Gas Tax Method. Detour signing costs will be \$10,000.

C. Recommendations

It is recommended that the present structure be with a one span 105 ft. x 44 ft., pretensioned prestressed concrete beam bridge as described in Alternative No. 1.

D. Construction Sequence

It is anticipated that all work on this project will be awarded to one prime contractor. The Office of Bridges and Structures will coordinate the plan preparation with assistance from the Office of Design.

E. Special Considerations

Mudd Creek is the Main Open Ditch of Drainage District #4. Coordination and review of all improvements will need to be reviewed by the County.

Additional survey will be required to locate all drainage structures adjacent to the bridge in all four quadrants.

It appears that some of the utilities in the area will need to be relocated and these utilities appear to be within our ROW.

There are no bike paths or sidewalks adjacent to this project; therefore no ADA accommodations are planned in conjunction with this project.

Right of Way will be required for this project.

The Office of Location and Environment is currently reviewing this project. Based on a desktop review and observations during the concept field exam, this project will require a 404 permit.

The Office of Cultural Resources has recommended a phase I archaeological investigation may be necessary depending on ROW needs.

F. Program Status

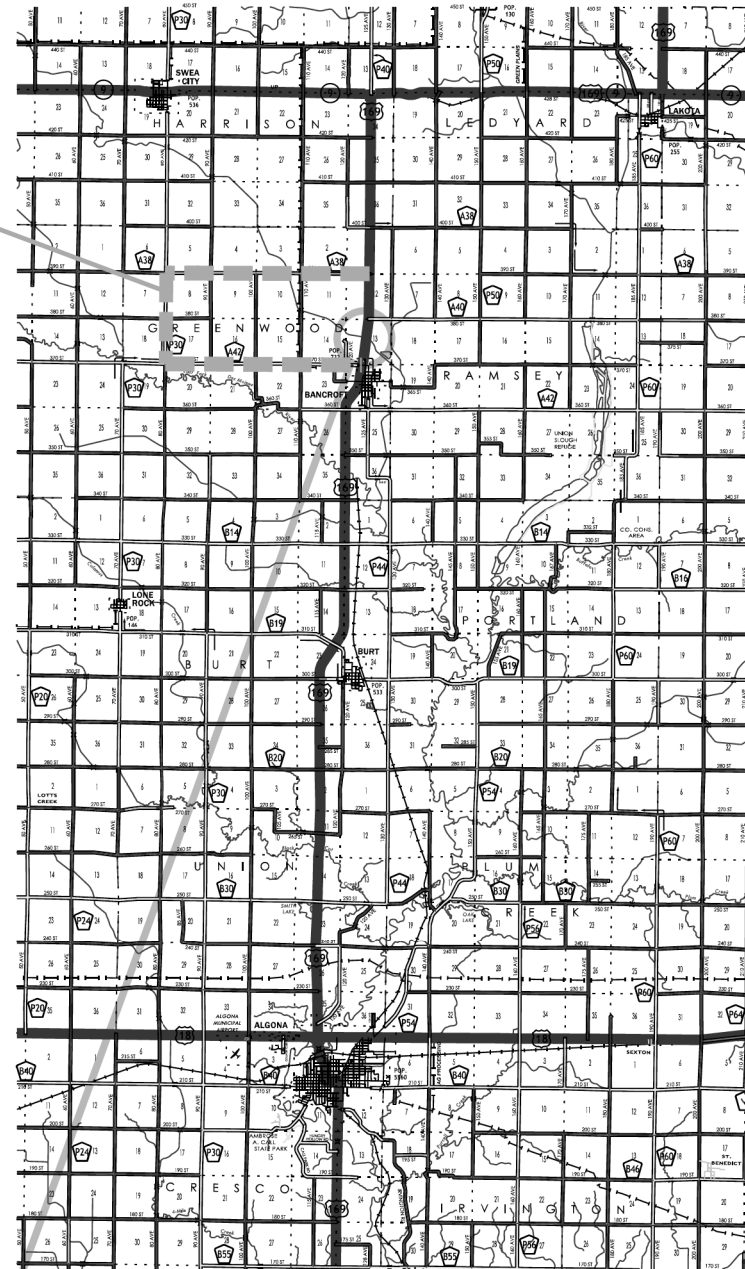
Site data has been developed by the Office of Design. This project is listed in the 2014-2018 Iowa Transportation Improvement Program, with \$770,000 for replacement in FY 2017. Costs for this project may be eligible for bridge replacement funds. A schedule of events will be developed following approval of the Project Concept.

KKP: jmb

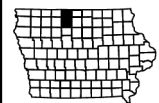
Kossuth County

Greenwood Twp. Sec. 13
T-98N R-29W

DETOUR



Maint. 5514.6S169
FHWA 32950
40'x24' Concrete Deck
Girder Bridge



KOSSUTH COUNTY
GREENFIELD TOWNSHIP
T98N R29W
SEC. 13

BEGIN STA. 864+95
ELEV. 591.35

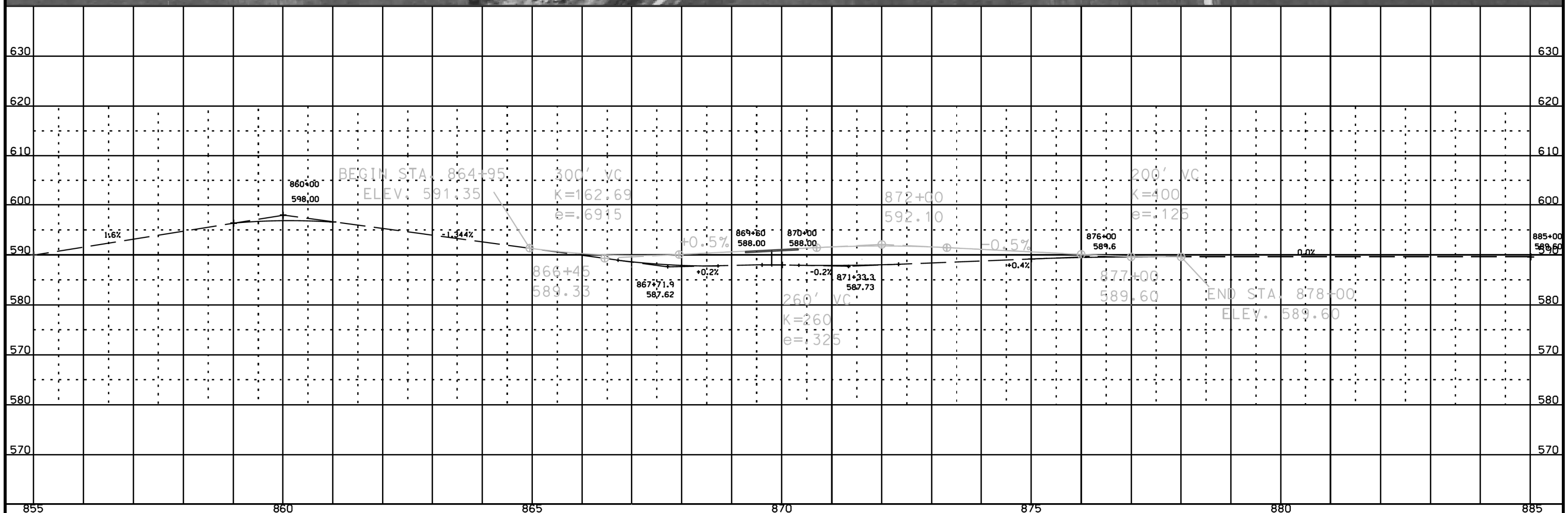
CLOSE

NEW 105' X 44' PPCB BRIDGE

END STA. 878+00
ELEV. 589.60



ALTERNATIVE NO. 1



KOSSUTH COUNTY
GREENFIELD TOWNSHIP
T98N R29W
SEC. 13

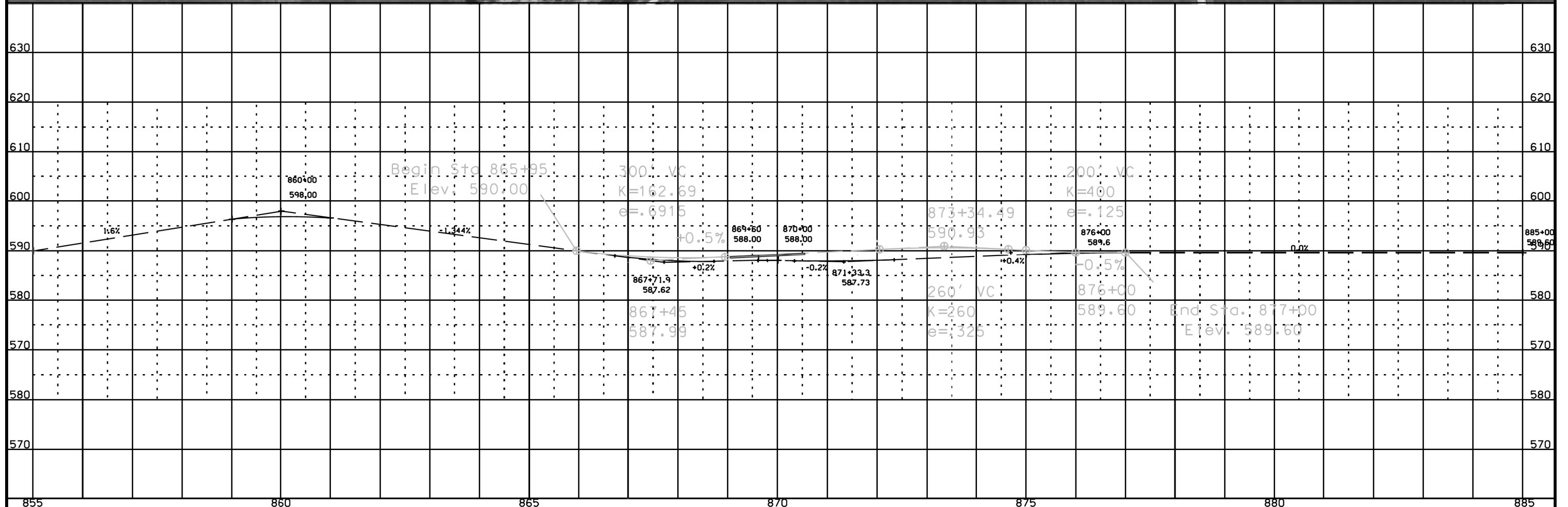
BEGIN STA. 865+95
ELEV. 590.00

CLOSE

NEW 150' X 44' CONTINUOUS
CONCRETE SLAB BRIDGE

END STA. 877+00
ELEV. 589.60

ALTERNATIVE NO. 2



Roadway			
PIN Number	13-55-169-010	Submittal Date	
Project Number	BRF-169-8(57)--38-55	Approval Date	
District	District 2	Assistant District Engineer	Dave Little
County	Kossuth (55)	or	
Route	US 169	Office Director	Jon Ranney
Location	Over Mud Creek 0.3 Miles South of Co. Rd. A-40		
Work Type	Bridge - Unspecified		
Segment Manager	Paul Flattery		
Designer	John Buttolph		

Design Manual Section 1C-1 last update: 05-06-14		Rural Two-Lane Highways (Rural Arterials)		
Design Element		Preferred	Acceptable	Project Values
Design speed (mph)		60	50	60
Maximum superelevation rate (Refer to Section 2A-2)		6%	8%	6%
Design lane width (ft)		12	12	12
Full depth paved width (ft)		14	12	14
Right turn lane (ft)		12	10	N/A
Climbing Lane (ft)		12	12	N/A
Left turn lane (ft)		12	10	N/A
Pavement cross-slope (on tangent sections)	Through lanes	2%	1.5% minimum, 2% maximum	2%
	Auxiliary and turn lanes	3%	3% maximum	N/A
	Crown break at centerline	4%	4% maximum	4%
Shoulder cross-slope (on tangent sections)		4%	Shoulder cross-slope cannot be less than the adjacent lane, 6% max for paved or granular shoulders, 8% max for earth shoulders	4%
Curb type (Refer to Section 3C-2)	Design speed = 50 or 55 mph	6-inch sloped	6-inch standard	N/A
	Design speed ≥ 60 mph	4-inch sloped	6-inch sloped	4-Inch Sloped
Foreslope (For fill areas greater than 40 ft, contact the Soils Design Section for assistance)	Adjacent to shoulder	10:1 for 4' then 6:1	3:1	6:1
	Beyond standard ditch depth and design clear zone	3.5:1	3:1	3.5:1
	Curbed roadways	2%	not steeper than 3:1	2%
Backslope (For cut areas greater than 25 feet, contact the Soils Design Section for assistance with backslope benches.)		3:1	2.5:1	3:1
Transverse Slopes	w/ drainage structures	8:1	6:1	8:1
	w/o drainage structures	10:1	6:1	10:1
Ditches (Refer to Section 3G-1)	Outside ditch (depth x width) (ft)	5 x 10	--	Ditch Grades x 10
Bridge width—new	Bridge length ≤ 200 ft	design lane widths + effective shoulder widths	design lane widths + effective shoulder widths	Design Lane widths +
	Bridge length > 200 ft	design lane widths + effective shoulder widths	design lane width + 4' right and left of the design lane widths	N/A
Bridge width—existing		design lane widths + no less than 2 ft left and right	design lane widths + 2 ft. offset left and right	N/A
Vertical clearance (ft) (above lanes, shoulders and 25 feet left and right of the center of railroad tracks)	Over primary	16.5	16	N/A
	Over non-primary	16.5 at interchange locations, 15 at all other locations	14	N/A
	Over railroad	23.3	23.3	N/A
	Sign trusses and pedestrian bridges	17.5	17	N/A
Structural Capacity		Contact Office of Bridges and Structures	Contact Office of Bridges and Structures	
Level of Service		B	B	B

Rural Two-Lane Highways (Rural Arterials)

Roadway Design Speed (mph) = 60		Design Criteria for High Speed Roadways												Project Values		
Design Element		Preferred Criteria						Acceptable Criteria								
		Design Speed, mph						Design Speed, mph								
		50	55	60	65	70	75	50	55	60	65	70	75			
Stopping sight distance (ft) (Refer to Section 6D-1)		425	495	570	645	730	820	425	495	570	645	730	820	570		
Minimum horizontal curve radius (ft) (Refer to Sections 2A-2 and 2A-3)	Method 5 superelevation and side friction distribution	e _{max} = 6%		833	1060	1330	1660	2040	2500	833	1060	1330	1660	2040	2500	N/A
		e _{max} = 8%		--	--	--	--	--	--	758	960	1200	1480	1810	2210	N/A
Minimum vertical curve length (ft) (Refer to Section 2B-1)		150	165	180	195	210	225	150	165	180	195	210	225	200		
Minimum rate of vertical curvature (K) (Refer to Section 2B-1)	crest vertical curves	roadways without fixed source lighting		84	114	151	193	247	312	84	114	151	193	247	312	151
		roadways with fixed-source lighting		96	115	136	157	181	206	96	115	136	157	181	206	136
Minimum gradient (%) (Refer to Section 2B-1)		0.5						0.3% with a curb, 0.0% without a curb						0.4		
Maximum gradient (%) (Refer to Section 2B-1)	Urban roadways	4		3				7	6	6	--	--	--	Ditch Grad		
	Rural roadways	4		3				5	5	4	4	4	4	1.32		
	Interstates	4		3				5	5	4	4	4	4	N/A		
Clear zone		See "Preferred Clear Zone" table in Section 8A-2						See "Acceptable Clear Zone" table in Section 8A-2						30		

Rural Two-Lane Highways (Rural Arterials)

Design year ADT = 1577					
Design Manual Section <u>1C-1</u> last update: 05-06-14		Effective Shoulder Width and Type for Two-Lane Highways			
Preferred (values shown in feet)			Acceptable (values shown in feet)		
	Rural Roadways	Urban Roadways		Rural Roadways	Urban Roadways
Turn lanes with shoulders	6	6	Turn lanes with shoulders	6	0
Turn lanes with curbs	6	See Section <u>3C-2</u>	Turn lanes with curbs	6	0
	Effective Shoulder Width	Paved Width		Effective Shoulder Width	Paved Width
Climbing Lanes	6	4	Climbing Lanes	4	0
Two-Lane Highways	Effective Shoulder Width	Paved Width	Two-Lane Highways	Effective Shoulder Width	Paved Width
Routes where bicycles are to be accommodated	10	10	Design year ADT > 2000 vpd	8	2*
On roadways approaching urban areas (due to increased bike traffic)	10	10			
On all curves with a superelevation rate of 7.0% or greater	10	10			
On roadways with design year ADT > 5000	10	6	Design year ADT between 400 - 2000 vpd	6	2*
On all other NHS	10	4			
On non-NHS routes with design year ADT > 3000	10	4	Design year ADT < 400 vpd	4	2*
On non-NHS routes with design year ADT < 3000	8	2*			

*Requires safety edge-Refer to Section 3C-6

Curbs should be located beyond the outer edge of the effective shoulder width in rural areas

Refer to Section 3C-2 for curb offsets in urban areas

Notes:

Safety Edge required due to 2' paved width.

All project values selected are based on the Dec. 9, 2013 Approved Concept.

Are any of the following needed?

- Contractor or designated borrow area adjacent to the site?
- Field laboratory?
- Construction survey?
- Remove and reinstall signs?
 - Does the district maintenance crew want to handle this? Or do they prefer the contractor handle it?

District have a defined off site detour for this project?

Will clearing and grubbing be handled by area or by unit? If by unit, District to provide count.

Does the Entrances on the West side of US 169 required for the property owners? Does Drainage District?

Drainage into Drainage Ditch, is there a outlet elevation that can be used?

Any special features not shown on plan?

Do any of the utilities need relocated (power/telephone poles) either permanently or temporarily for construction?

Speed limit?

Speed limit during construction?

Is sight distance a problem?

Disposition of existing structure, guardrail, signs, etc. (to become property of contractor or deliver to maintenance garage?)

Are there any special events which need to be noted in the plan? Or is there a contact person who could provide this information closer to letting the project?

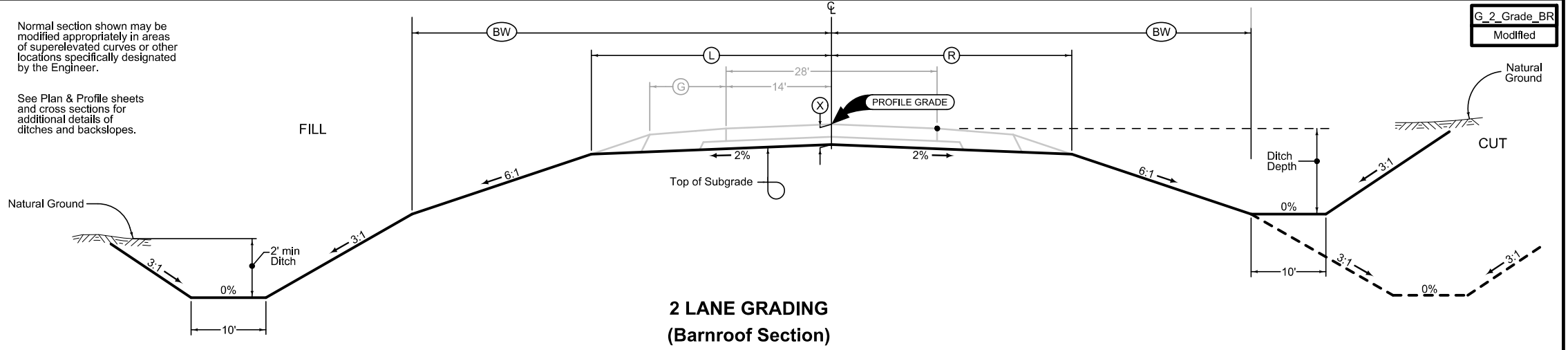
Note condition of existing culverts.

Note existing guardrail lengths.

LOCATION		DIMENSIONS				
ROAD IDENTIFICATION	STATION TO STATION		(L)	(R)	(X)	(BW)
			Feet	Feet	Inches	Feet
US 169	862+50	874+00	33.41	33.41	22	42

Normal section shown may be modified appropriately in areas of super-elevated curves or other locations specifically designated by the Engineer.

See Plan & Profile sheets and cross sections for additional details of ditches and backslopes.



**2 LANE GRADING
(Barnroof Section)**

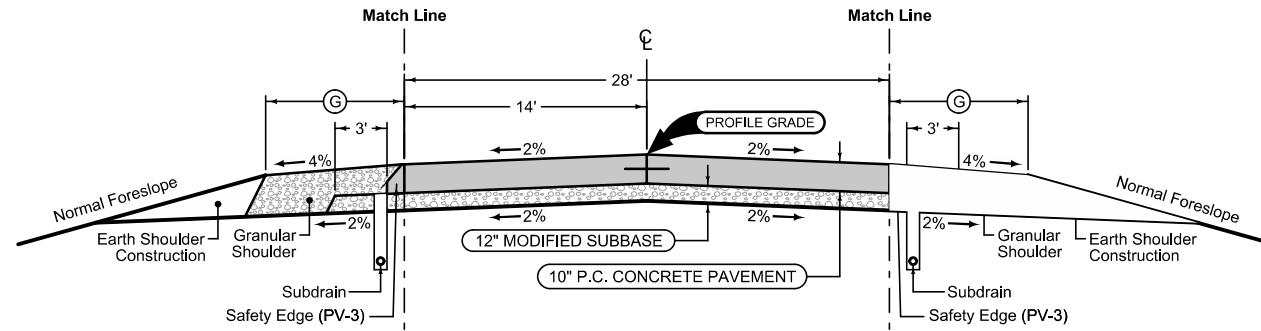
G_2_Grade_BR
Modified

Granular Shoulder with Safety Edge

2_G_		Feet
10-21-14		
STATION TO STATION		8
862+50.0	868+19.6	
871+61.4	874+00.0	

Granular Shoulder with Safety Edge

2_G_		Feet
10-21-14		
STATION TO STATION		8
862+50.0	867+94.6	
971.36.4	874+00.0	



Mainline Jointing:
 Transverse joints: CD at 20' spacing
 Longitudinal joint: L-2

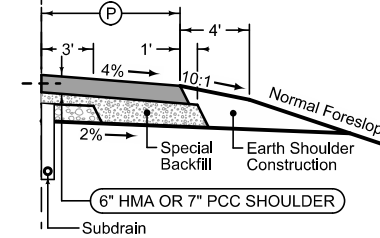
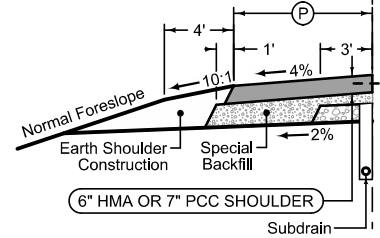
2P_	
10-19-10	
STATION TO STATION	
862+50.0	874+00.0

Paved Shoulder at Guardrail

PCC Shoulder Jointing:
 Longitudinal joint: BT-1 or BT-5
 Transverse joints: C at 20' spacing
 HMA Shoulder Jointing:
 Longitudinal joint: B

2_P_Guard_		Feet
10-21-14		
STATION TO STATION		(1)
868+19.6	869+05.5	
870+70.5	871+61.4	

(1) See Typ. 7156 and Tab. 112-9 for additional details.



Paved Shoulder at Guardrail

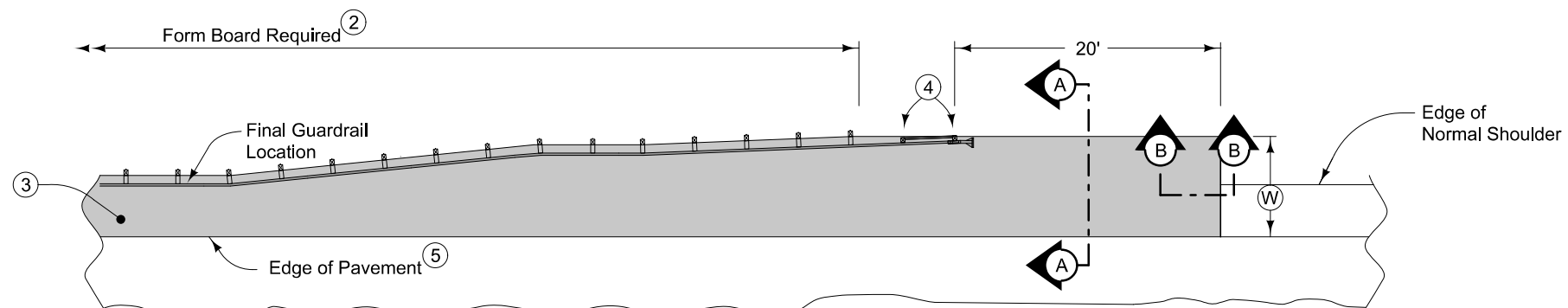
PCC Shoulder Jointing:
 Longitudinal joint: BT-1 or BT-5
 Transverse joints: C at 20' spacing
 HMA Shoulder Jointing:
 Longitudinal joint: B

2_P_Guard_		Feet
10-21-14		
STATION TO STATION		(1)
867+94.6	869+05.5	
871+36.4	871+61.4	

(1) See Typ. 7156 and Tab. 112-9 for additional details.

See Tab 100-24 or 100-25 for pavement quantities.
 See Tab 112-9 for shoulder quantities.

ROADWAY IDENTIFICATION

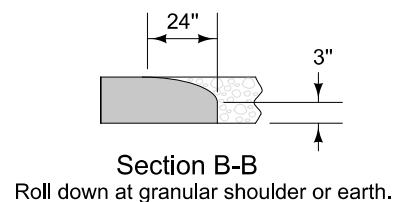
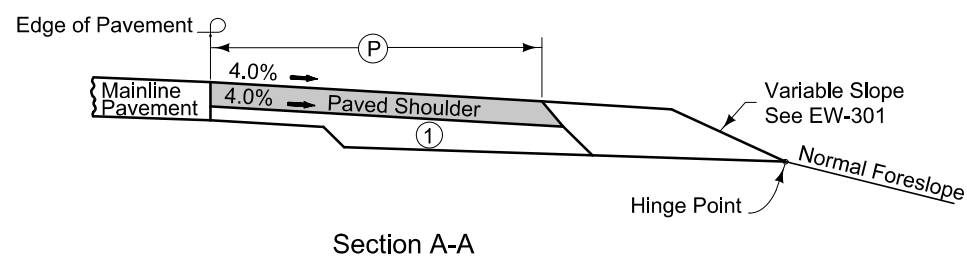
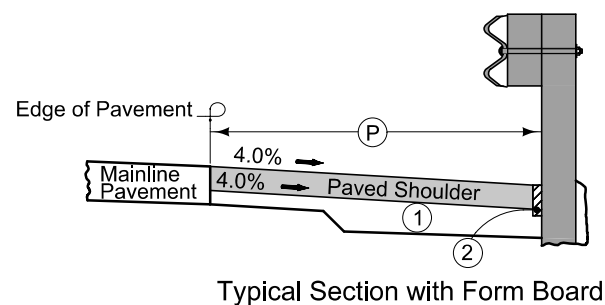


6" HMA Paved Shoulder at guardrail. 7" PCC may be substituted with the following jointing layout:

Match mainline pavement joint spacing. When mainline pavement is 8" or greater in thickness, place additional transverse 'C' joints in shoulder at mid-panel of the mainline pavement. Place longitudinal 'C' joint at W/2 from edge of mainline pavement when W is greater than 10' wide. Terminate longitudinal joint at transverse joint less than 10' in length.

Compaction of HMA is required to face of guardrail post. Hand compaction will be allowed under guardrail. Removal & reinstallation of guardrail will be allowed with no additional payment.

Refer to Shoulder tabulation (112-9) for quantities.



- ① 6" subgrade treatment.
- ② When guardrail posts are installed prior to construction of paved shoulder, nail 1" x 6" untreated form boards along the face of guardrail posts for the length shown. This board is to prevent shoulder material from contacting the sides of the posts and altering the function of the guardrail. Form board not required for final 2 posts.
- ③ Continue paved shoulder to existing paved shoulder or 20' beyond the end of guardrail.
- ④ Shoulder may be notched for final 2 posts or post sleeves may be installed through pavement.
- ⑤ 'KT-1' joint for PCC shoulder.
'B' joint for HMA shoulder.

PAVED SHOULDER AT GUARDRAIL

SURVEY SYMBOLS

- BRG Bridge
- x — FW Wire Fence
- PPA Power Pole Co. 1
- UB Utility Box
- LIN Miscellaneous Line
- GDL Guard Rail Steel
- SIGN SI Sign
- PIP Pipe Culvert
- T1le — TIL Tile Line
- OUT Tile Outlet
- EW Edge of Water
- DU Centerline Draw or Stream (Up)
- RIP Rip-Rap
- BNK Stream Bank
- CON Concrete or A/C Slab
- D Centerline Draw or Stream (Down)
- SP Stream Profile
- SNP Unpaved Shoulder
- ENU Edge Unpaved Entrance & Parking
- ENT Centerline BL of Entrance
- EP Edge of Paved Roads (ML or SR)
- F0 — FOA Underground Fiber Optic Co. 1
- T1 — TLA Underground Telephone Line Co. 1
- BD Bridge Deck
- TW Top of Water
- BLS Bridge Low Steel
- BCL Bridge Centerline
- SBR Size of Bridge
- SOP Size of Pipe or Culvert

UTILITY LEGEND

- F0 — Heartland Telecom Hickory Tech (QLD)
- T1 — Mediacom (QLD)
- City of Bancroft

PLAN VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK		Design Color No.	
Green	(2)	█	Existing Topographic Features and Labels
Blue	(1)	█	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Magenta	(5)	█	Existing Utilities
SHADING		Design Color No.	
Yellow	(4)	█	Highlight for Critical Notes or Features
Red	(3)	▨	Delineates Restricted Areas
Lavender	(9)	█	Temporary Pavement Shading
Gray, Light	(48)	█	Proposed Pavement Shading
Gray, Med	(80)	█	Proposed Granular Shading
Gray, Dark	(112)	█	Proposed Grade and Pave Shading
Brown, Light	(236)	█	Grading Shading
Tan	(8)	█	Proposed Sidewalk Shading
Blue, Light	(230)	█	Proposed Sidewalk Landing Shading
Pink	(11)	█	Proposed Sidewalk Ramp Shading

PROFILE VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK		Design Color No.	
Green	(2)	█	Existing Ground Line Profile
Blue	(1)	█	Proposed Profile and Annotation
Magenta	(5)	█	Existing Utilities
Blue, Light	(230)	█	Proposed Ditch Grades, Left
Black	(0)	█	Proposed Ditch Grades, Median
Rust	(14)	█	Proposed Ditch Grades, Right

CONVENTIONAL SIGNS

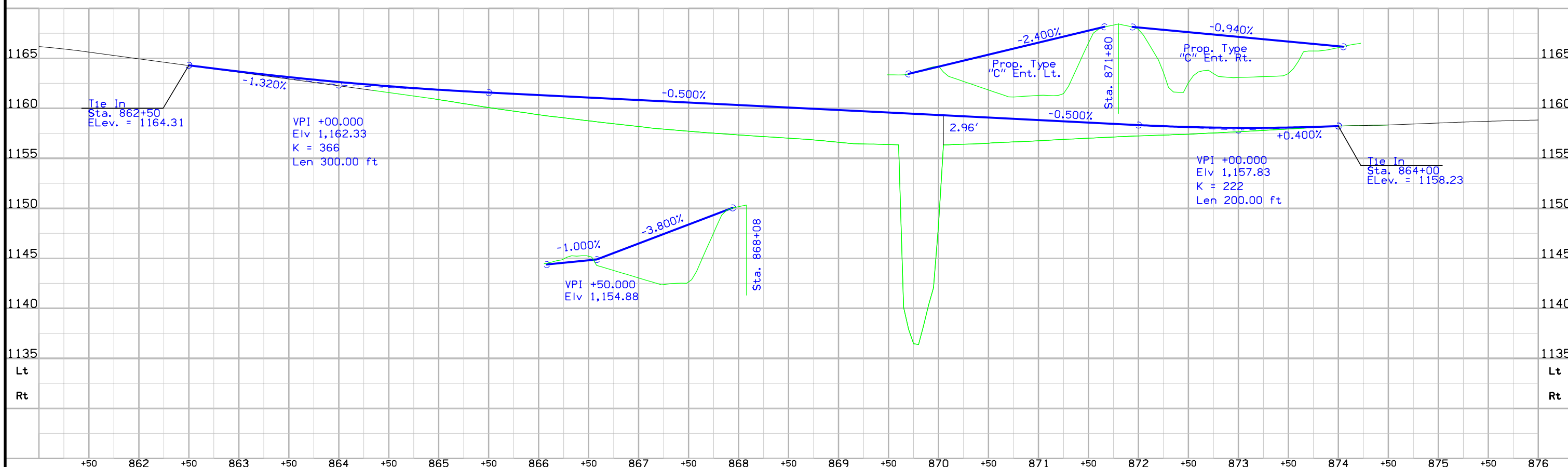
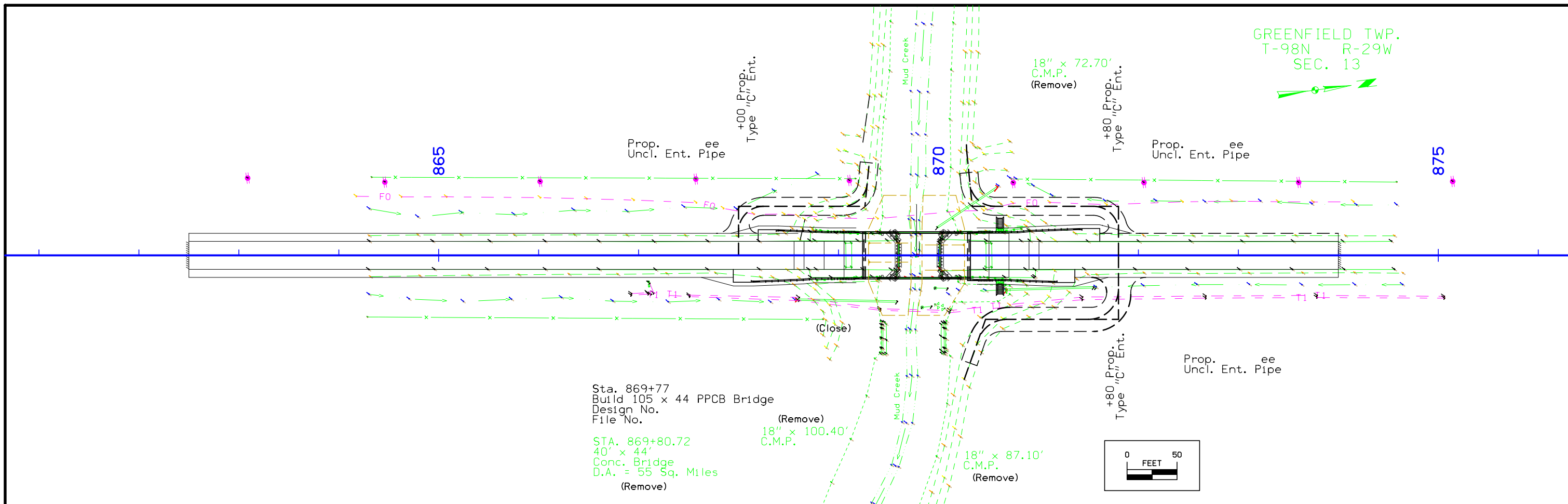
- Reference Point
- Station
- ▲ Section Corner
- Ground Line Intercept
- /// Saw Cut
- Guardrail
- ▨ Clearing & Grubbing Area
- ▨ Pavement Removal

RIGHT-OF-WAY LEGEND

- ▲ Proposed Right-of-Way
- ▲ Existing and Proposed Right-of-Way
- ▲ Easement and Existing Right-of-Way
- Borrow
- Easement (Temporary)
- Easement
- X Excess
- A/C Access Control

PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

(COVERS SHEET SERIES D, E, F, & K)



Survey Information

General Information

Measurement units for this survey are US survey feet. This survey is for proposed Bridge reconstruction along US Highway 169 over Mud Creek. Project datum and control information is provided by Design Survey Office. This project is a Full DTM without Photo control.

Vertical Control

Project ellipsoidal height was established at Pt. 1 by averaging a minimum of five la RTN RTK observations with 1 hour or greater time span between each observation. NAVD88 height was computed at Pt. 1 using Geoid 09. The relative network error of height observations was less than 0.02 ft. at 95% confidence level. Additional benchmarks were placed throughout the project using a GNSS Base-Rover setup at Pt. 1. A minimum of three observations were collected with 1 hour or greater time span between each observation. The local error of these observations relative to Pt. 1 was less than 0.01 ft. at 95% confidence level.

This survey observed 1 NGS Control Monument with published NAVD88 height to compare with observed survey height: Mark K1 is located 5.5 miles south of the project.
 NGS 1st. order class II mark designated K1 published height = 1152.30
 laRTN NAVD88 height computed using Geoid 09 = 1152.24
 The relative network error of the height observations was less than 0.02 ft. at 95% confidence level.

This survey also observed 1 Kossuth County Control Monument with published NAVD88 height to compare with observed survey height: Mark 528 is located 5.5 miles north of the project.
 Kossuth County Control mark GPS 528 published height = 1157.89
 laRTN NAVD88 height computed using Geoid 09 = 1157.89
 The relative network error of the height observations was less than 0.03 ft. at 95% confidence level

Horizontal Control

The project coordinate system is modified Iowa State Plane North Zone (U.S. Survey Feet) scaled around Pt. 1 at 3942468.178 N, 4730566.203 E, 1162.056 Height. Horizontal datum is NAD83(1996CORS) (Epoch 2002.00). Project coordinates were established at Pt. 1 by averaging a minimum of five la RTN RTK observations with 1 hour or greater time span between each observation. The relative network error of observations was less than 0.02 ft. at 95% confidence level. Additional control points were placed throughout the project using a GNSS Base-Rover setup at Pt. 1. A minimum of three observations were collected with 1 hour or greater time span between each observation. The local error of these observations relative to Pt. 1 was less than 0.02ft. at 95% confidence level.

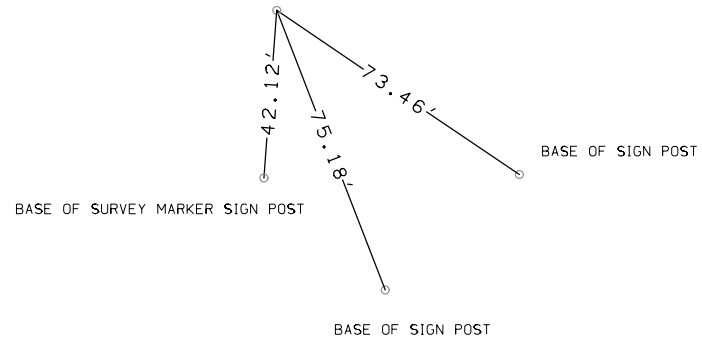
1/Combined Scale Factor of project (State plane grid modified to ground) = 1.00004225

The 1/Combined Scale Factor scaled at Pt. 1 will be used for GPS/GNSS stakeout and location survey in the Project Coordinate system. A scale factor of 1 will be used for total station stakeout and location survey in the Project Coordinate system.

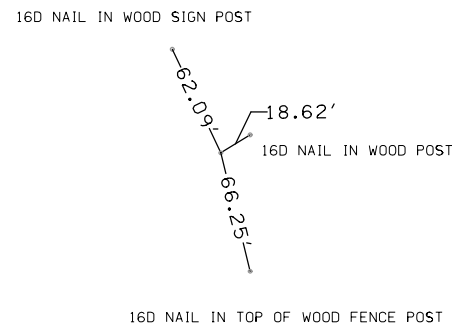
VERTICAL CONTROL

Point	North	East	Elevation	Station	Offset	Feature	Description
1	3942468.178	4730566.203	1162.056	Off Chain	Off Chain	CP	SET FENO TYPE MONUMENT
500	3940226.151	4730249.052	1158.423	870+22.04	23.744	BM	FD CUT SQUARE NE SIDE BRIDGE WING

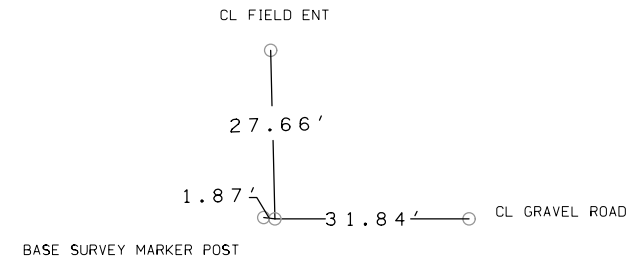
C.P. OFF CHAIN
 C.P. K1, FD NGS MONUMENT
 N= 3910833.121, E= 4728986.173



C.P. OFF CHAIN
 C.P. 1, SET FENO TYPE MONUMENT
 N= 3942468.178, E= 4730566.203



C.P. OFF CHAIN
 C.P. 528, FD COUNTY GPS MONUMENT
 N= 3970303.461, E= 4733394.683



ALIGNMENT COORDINATES

101-16
10-20-09

Name	Location	Point on Tangent			Begin Spiral			Begin Curve			Simple Curve PI or Master PI of SCS			End Curve			End Spiral		
		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates	
			Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)
	US169																		
BP1		849+79.00	3,938,203.35	4,729,961.21															
100		859+79.00	3,939,194.94	4,730,090.58															
104		880+00.00	3,941,198.96	4,730,352.02															
	ENT@868+00 Lt.																		
ENT8681		100+00.00	3,940,009.05	4,730,196.78															
ENT8682							100+24.00	3,940,012.15	4,730,172.99	100+49.00	3,940,015.38	4,730,148.20	100+63.27	3,940,040.17	4,730,151.43				
ENT8683							101+42.03	3,940,118.27	4,730,161.62	101+64.69	3,940,140.75	4,730,164.55	101+78.85	3,940,145.86	4,730,142.47				
ENT8684		102+09.68	3,940,152.81	4,730,112.43															
	ENT@871+80 Lt.																		
ENTL8711		300+00.00	3,940,385.85	4,730,245.94															
ENTL8712							300+24.00	3,940,388.96	4,730,222.14	300+49.00	3,940,392.19	4,730,197.35	300+63.27	3,940,367.40	4,730,194.12				
ENTL8713							301+61.96	3,940,269.54	4,730,181.35	301+84.56	3,940,247.13	4,730,178.43	301+98.71	3,940,247.79	4,730,155.84				
ENTL8714		302+31.38	3,940,248.73	4,730,123.18															
	ENT@871+80 Rt.																		
ENTR8711		200+00.00	3,940,385.85	4,730,245.94															
ENTR8712							200+34.00	3,940,381.45	4,730,279.66	200+64.00	3,940,377.57	4,730,309.40	200+81.12	3,940,347.83	4,730,305.52				
ENTR8713							201+62.92	3,940,266.72	4,730,294.94	201+84.11	3,940,245.71	4,730,292.20	201+99.82	3,940,236.10	4,730,311.09				
ENTR8714		202+42.28	3,940,216.85	4,730,348.94															

LINE STYLE LEGEND OF CROSS SECTION SHEETS (ROAD)

- - - - - - Existing Ground Line
- Proposed Template
- Proposed Topsoil Placement
- - - - - Additional Topsoil Removal
- Subgrade Treatment
- - - - - Granular Shoulder
- Pavement
- - - - - Existing Pipe\RCB
- Proposed Pipe\RCB
- Proposed Dike
- All Elements Associated with Proposed Entrances

LINE STYLE LEGEND OF CROSS SECTION SHEETS (SOILS)

- TS——— Topsoil (Class 10)
- TS A——— Topsoil (Type A Disposal)
- TS B——— Topsoil (Type B Disposal)
- TS C——— Topsoil (Type C Disposal)
- CL 10——— Class 10 Materials
- SEL LO——— Select Loams And Clay-Loams
- SEL SA——— Select Sand
- UNS A——— Unsuitable Type A Disposal
- UNS B——— Unsuitable Type B Disposal
- UNS C——— Unsuitable Type C Disposal
- SHALE——— Shale
- WASTE——— Waste
- B&W LS——— Broken and Weathered Rock
- ROCK——— Solid Rock
- BLDRS——— Boulders

Note: All layer lines and descriptions identify layers above the line.

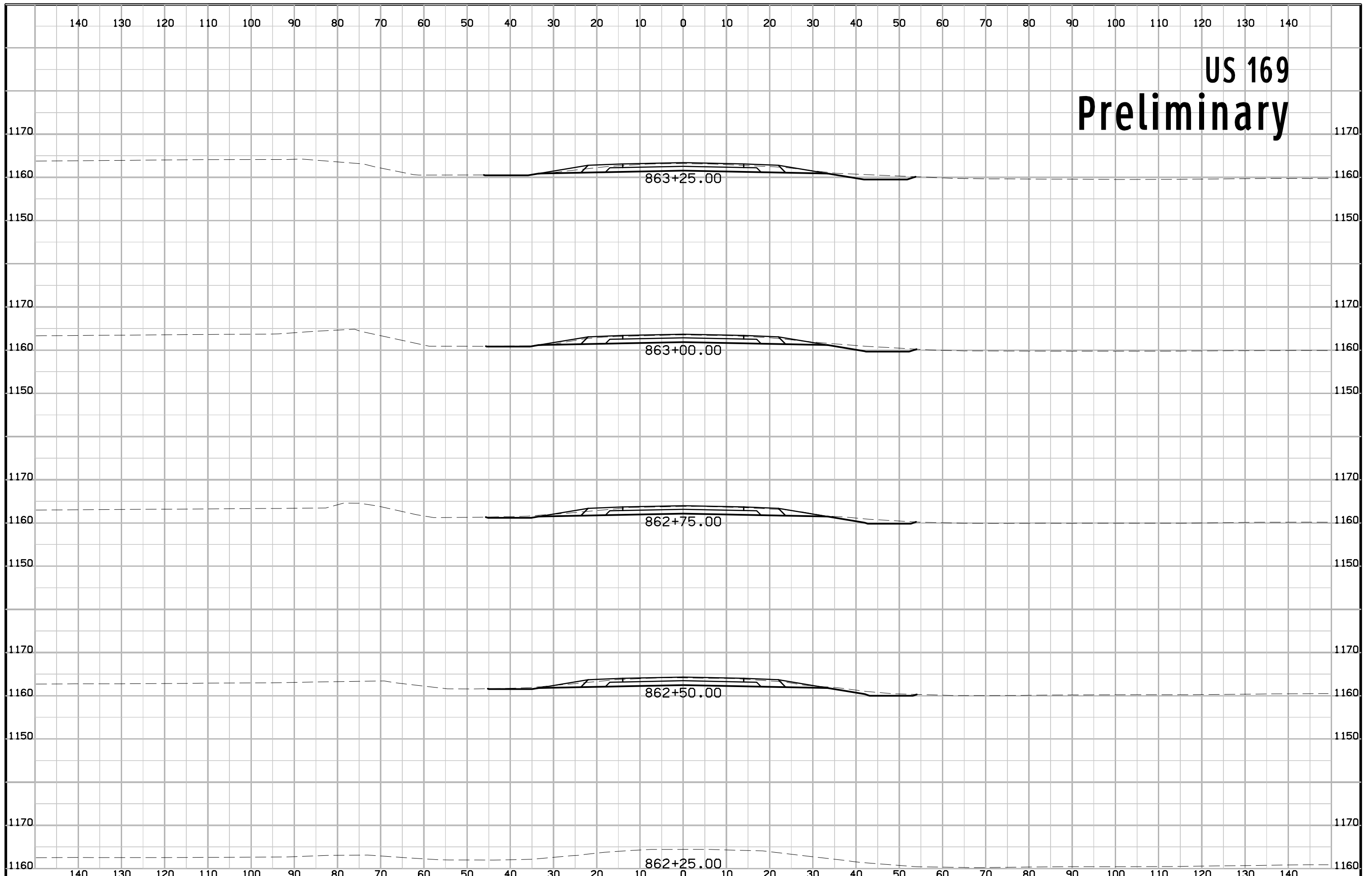
Note: Vertical or near vertical lines connecting soil layers at edges of cross sections are only for the purpose of calculating template quantities and do not depict soil stratification.

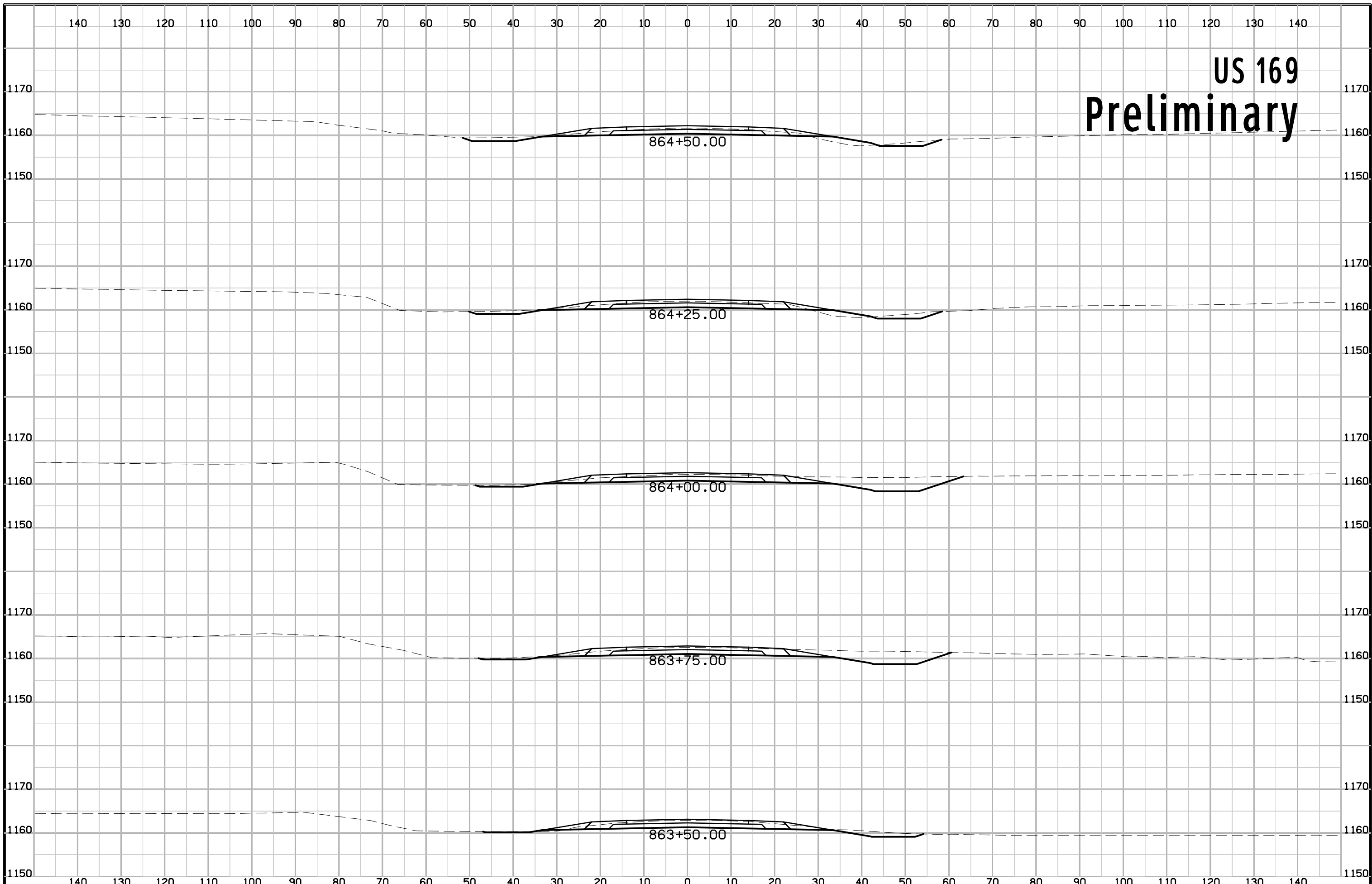
SYMBOL LEGEND OF CROSS SECTION SHEETS

- Existing
ROW
|
Existing Right-of-Way Limit
- Proposed
ROW
|
Proposed Right-of-Way Limit
- Temporary
ROW
|
Temporary Right-of-Way Limit

**CROSS SECTION
LEGEND AND SYMBOL
INFORMATION SHEET
(COVERS SHEET SERIES W, X, Y, & Z)**

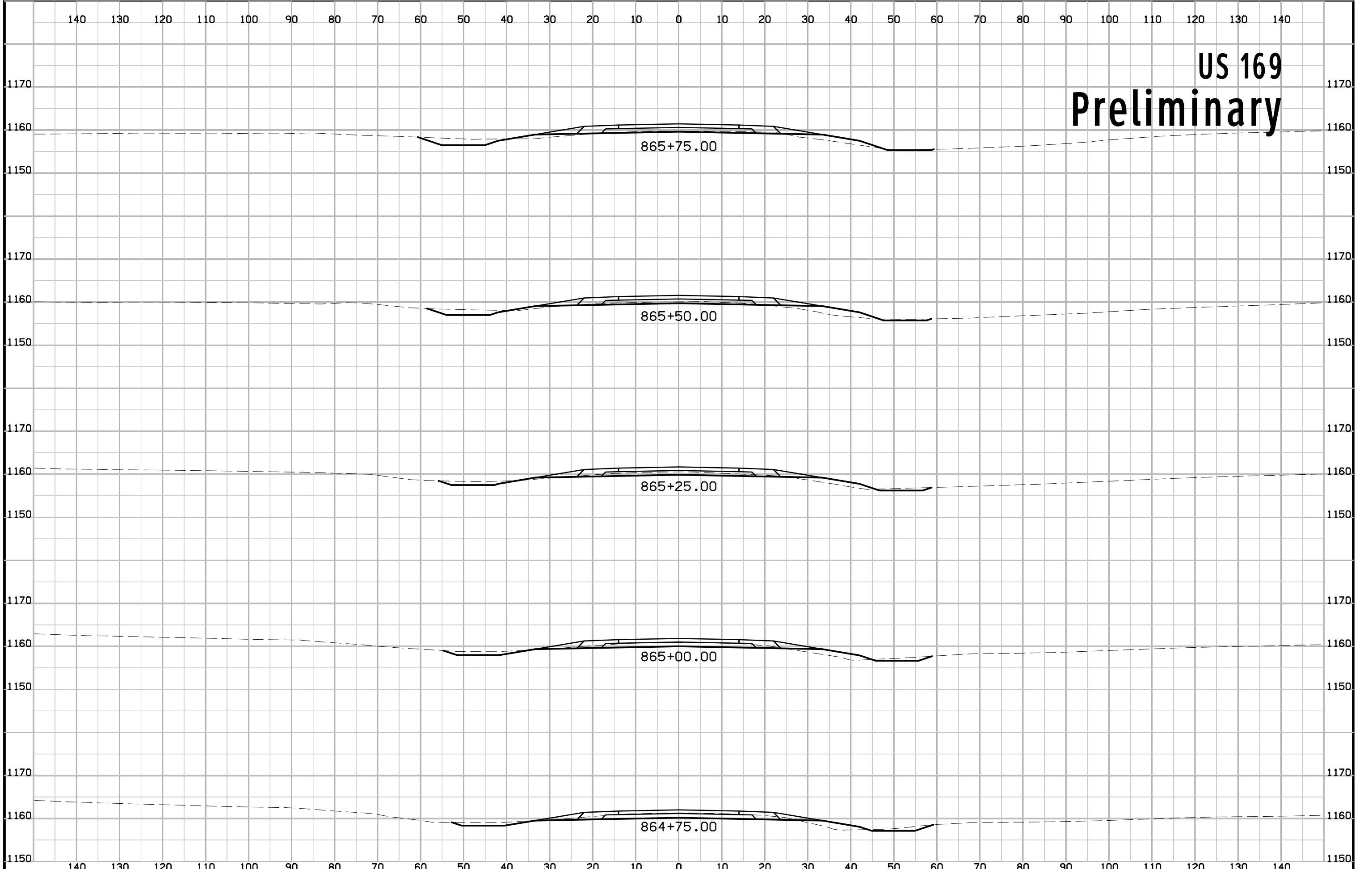
US 169 Preliminary



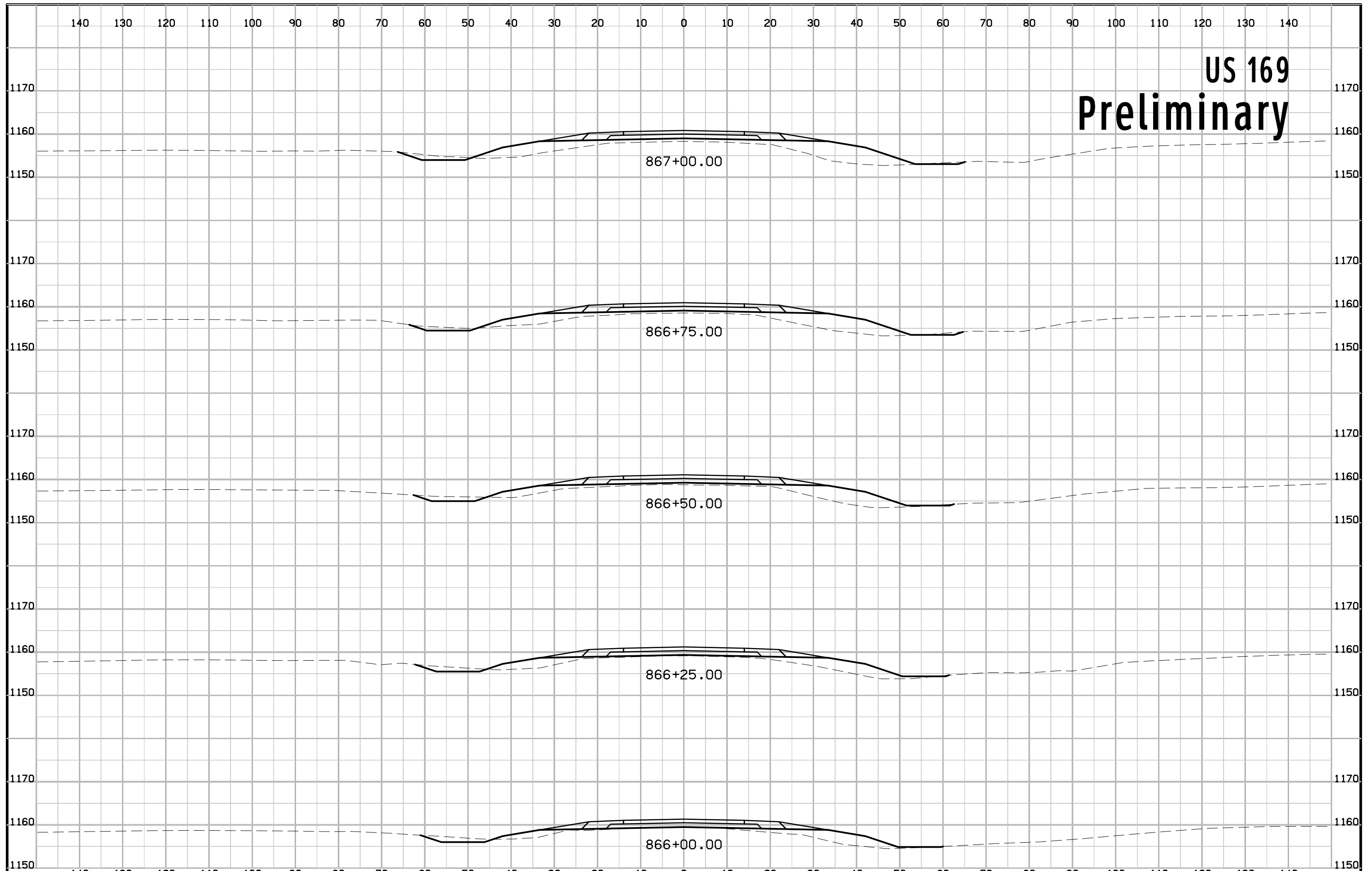


US 169
Preliminary

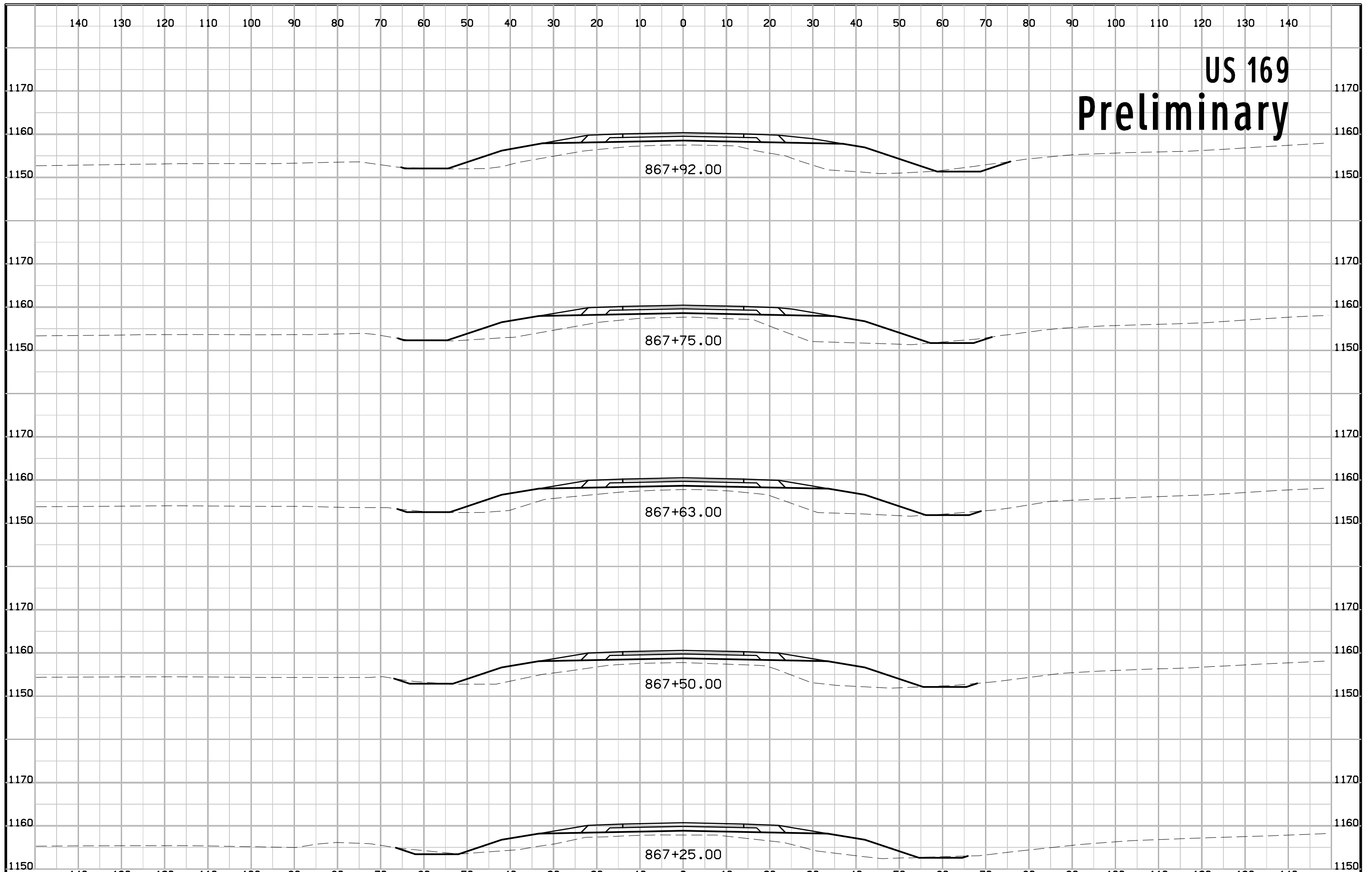
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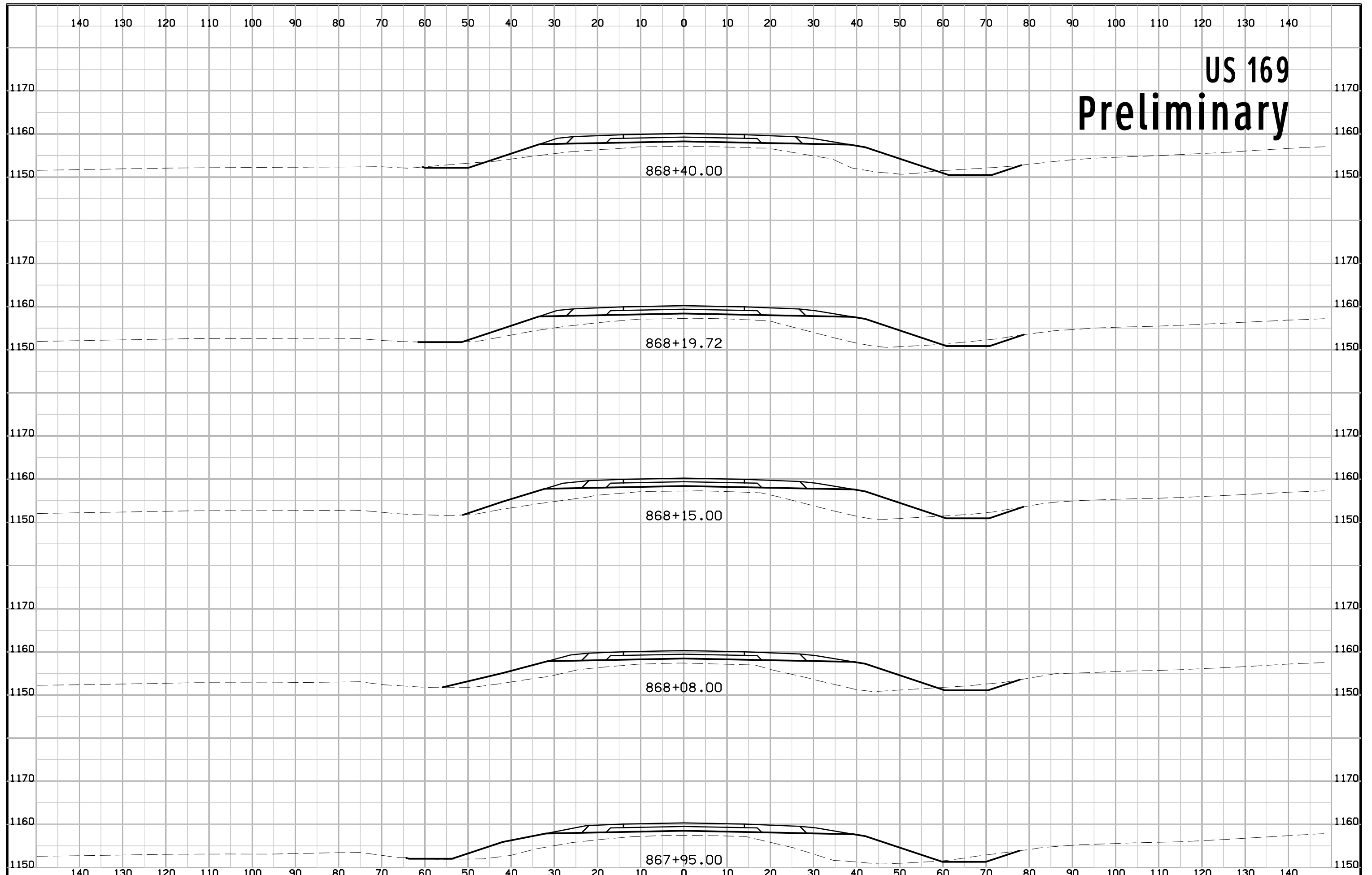
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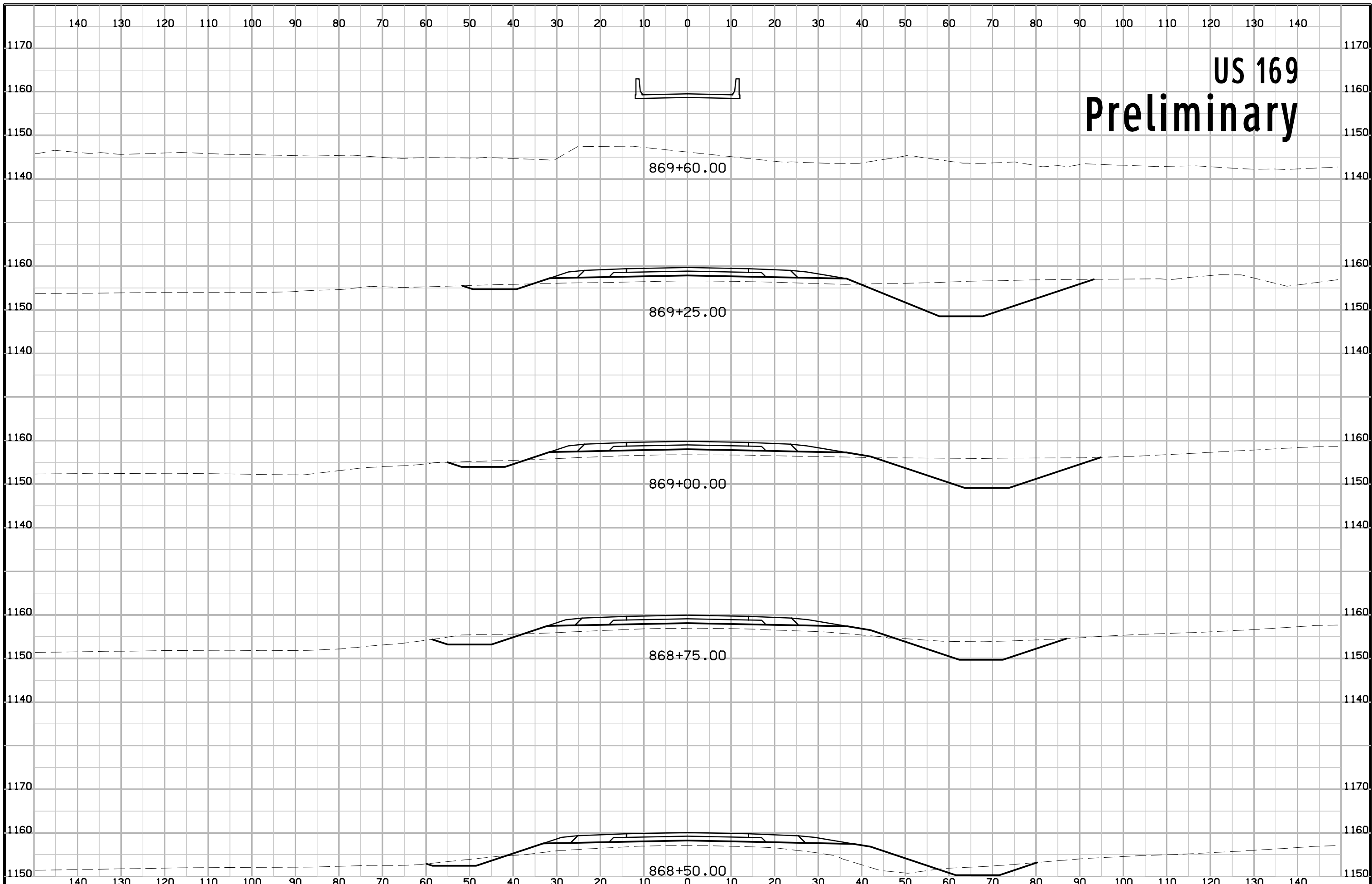


US 169 Preliminary



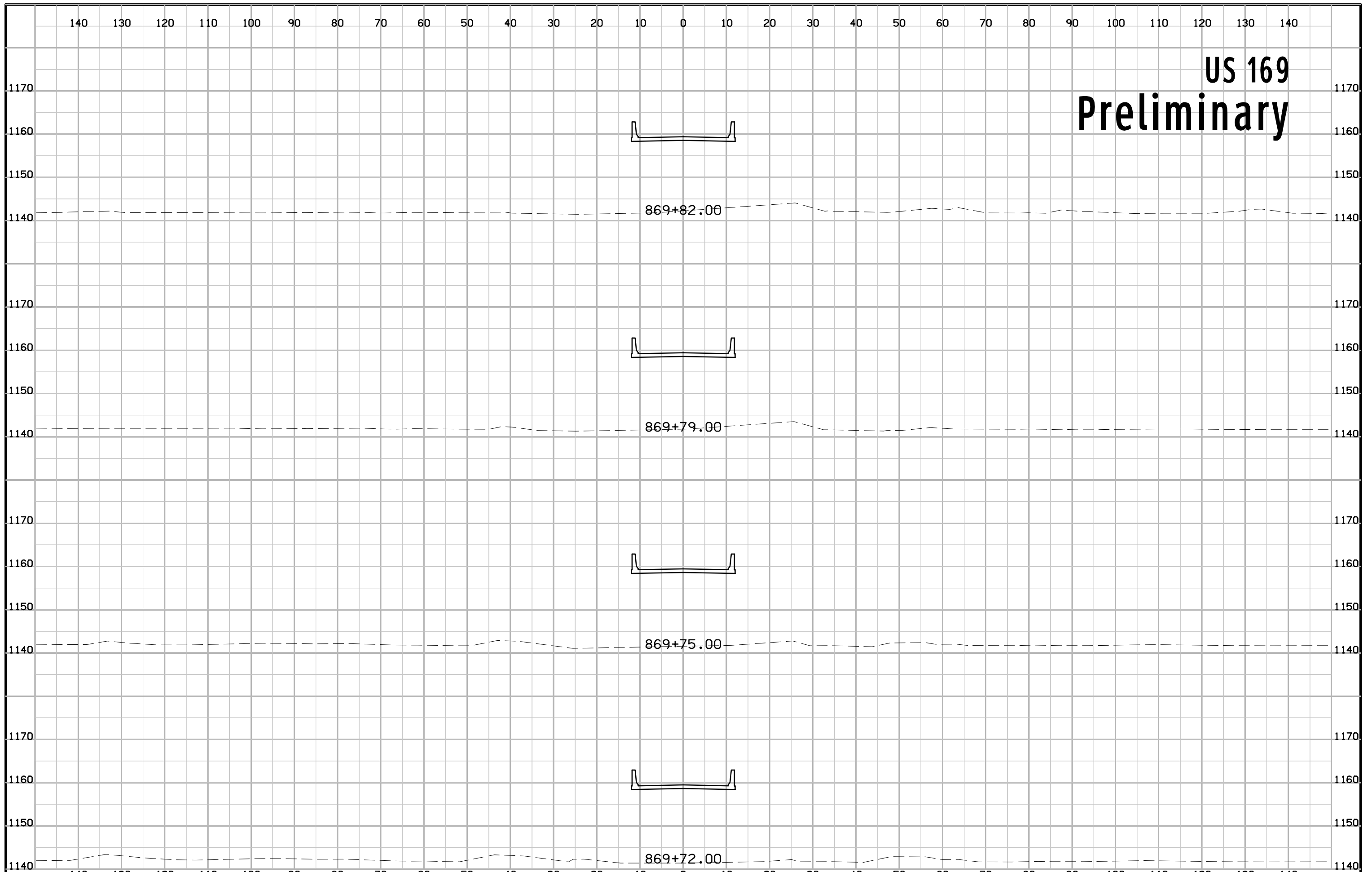
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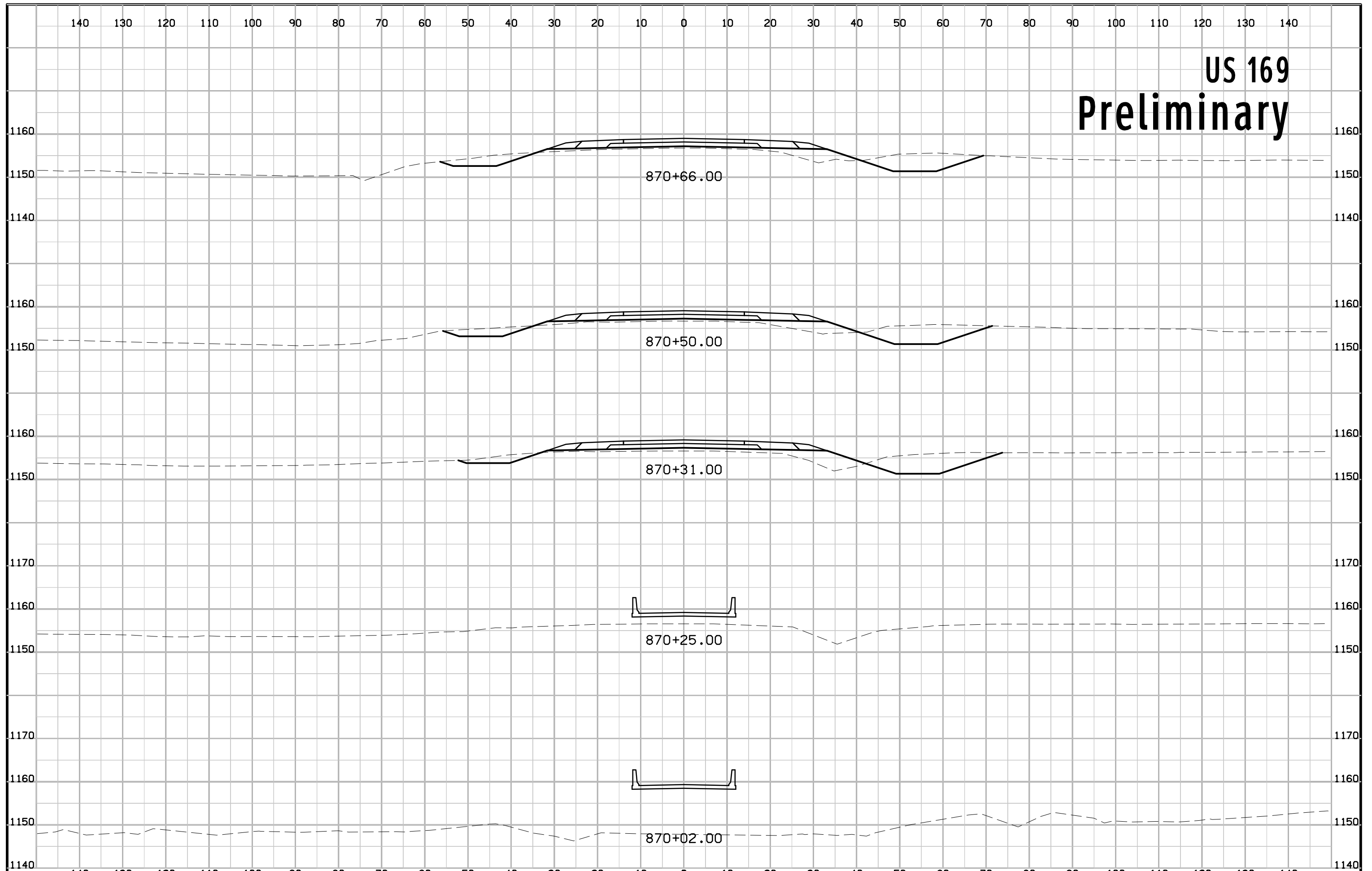


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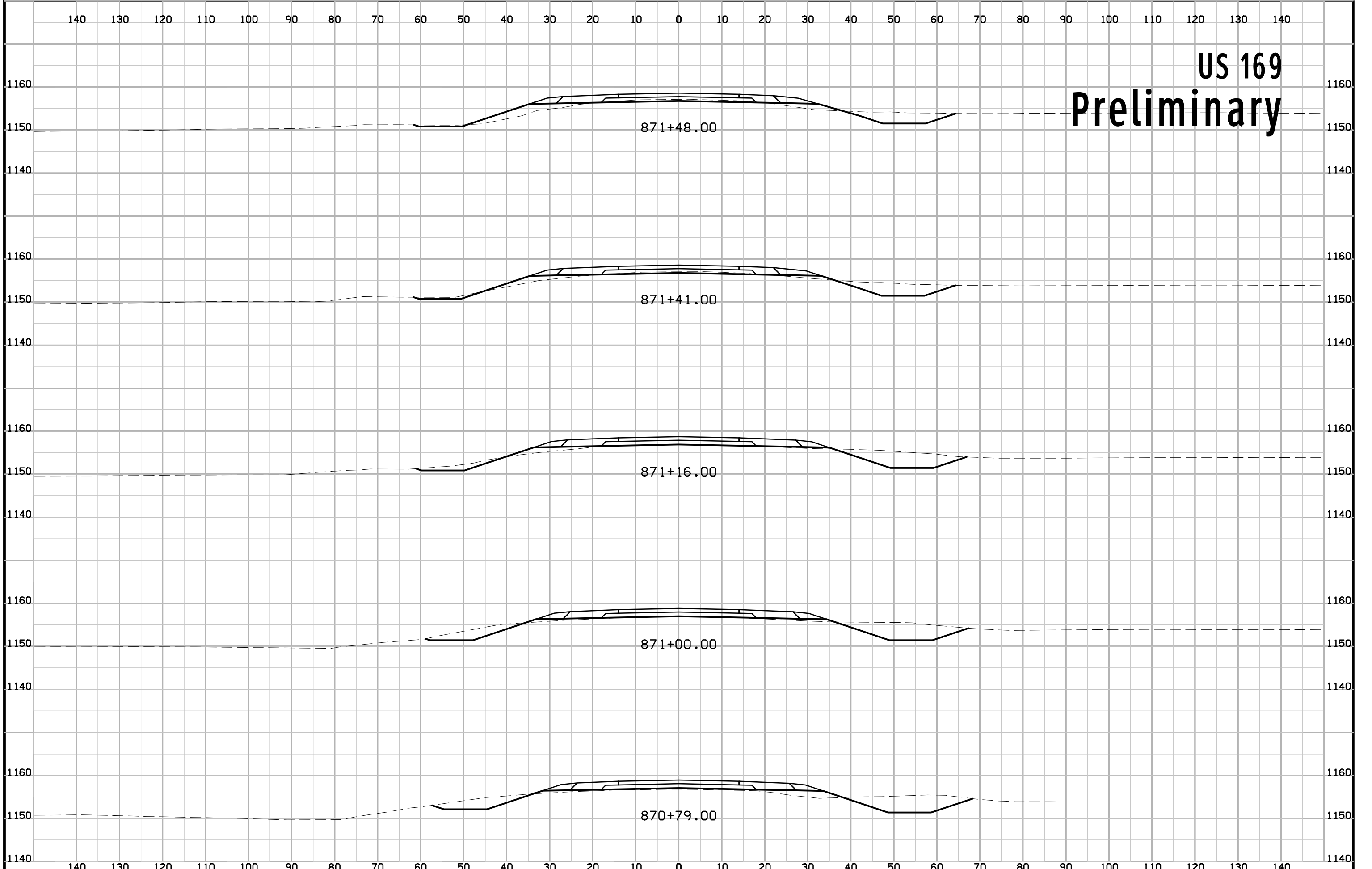
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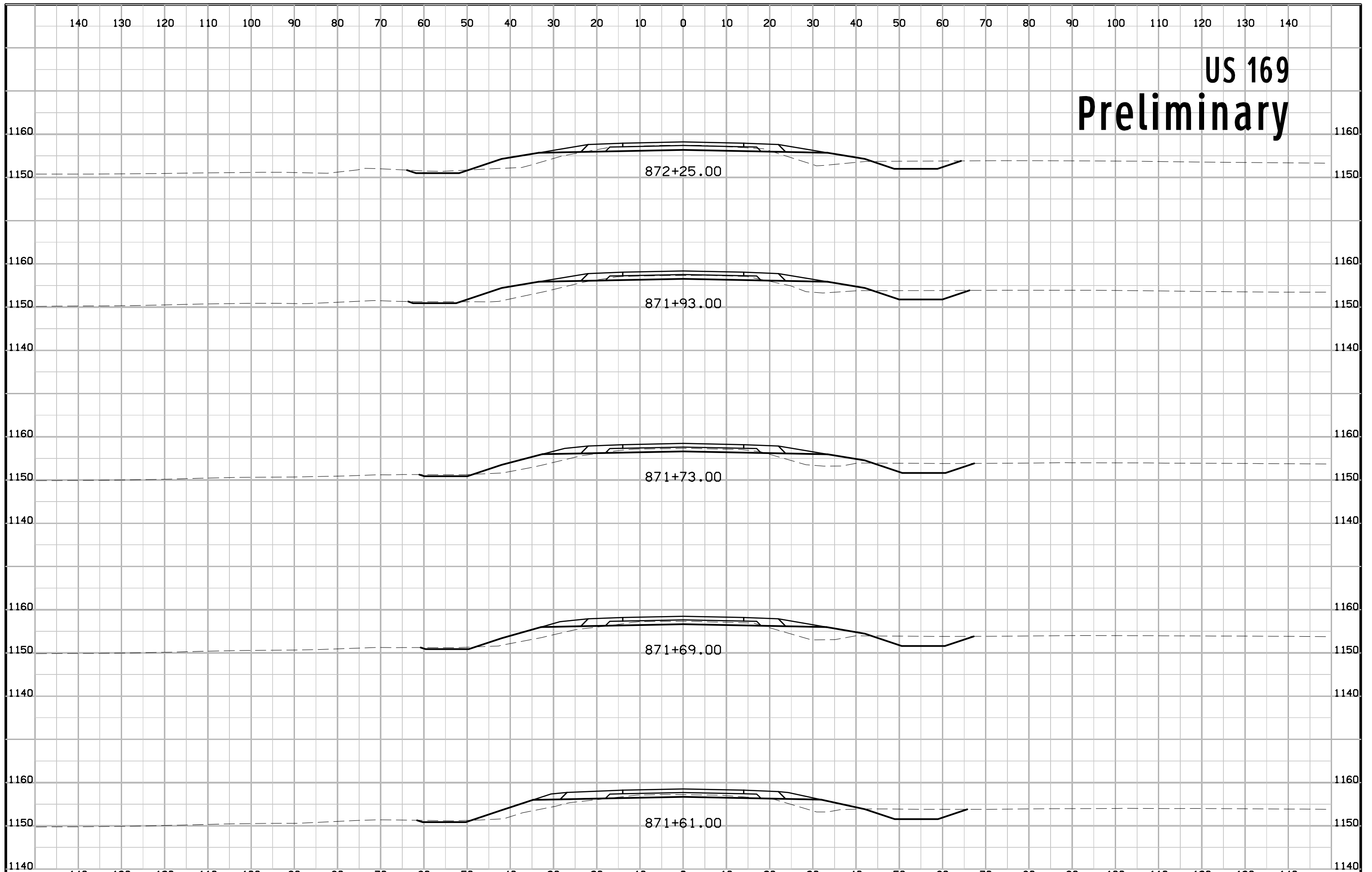
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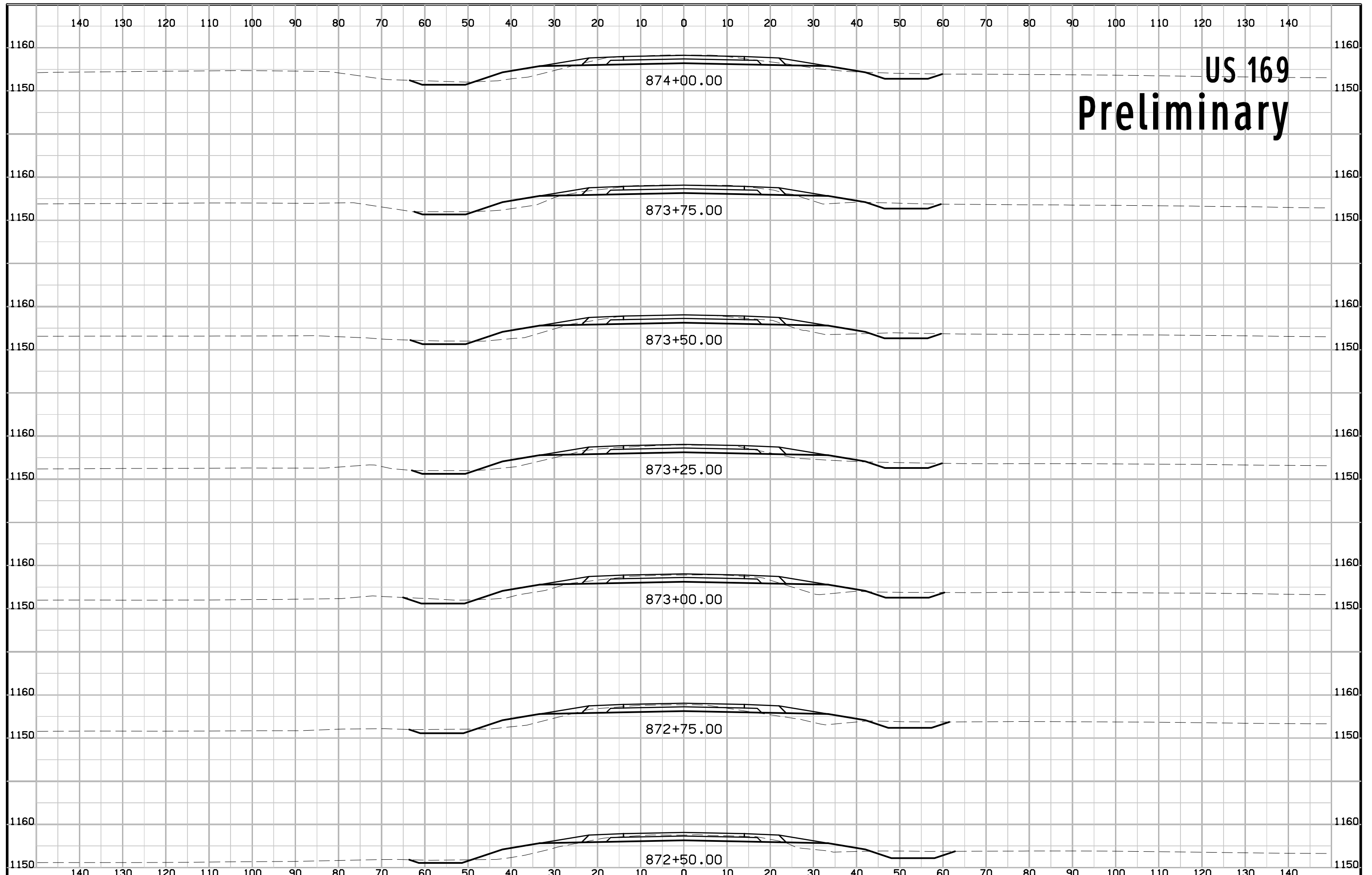


US 169 Preliminary



US 169 Preliminary





**US 169
Preliminary**