

IOWA DEPARTMENT OF TRANSPORTATION

TO OFFICE: District 6 **DATE:** January 13, 2017
ATTENTION: Jim Schnoebelen **PROJECT:** Linn County
FROM: Kevin K. Patel BRFN-151-3(162)--39-57
OFFICE: Design PIN: 16-57-151-020
SUBJECT: Project Concept Statement; (Final Approval, D0)

This project involves the replacement of the northbound U.S. 151 bridge over Crabapple Creek (Maint. No. 5740.8R151), 2.9 miles north of the north junction of IA 13.

A concept review was held on November 10, 2016. Those present included Tom Storey, Steve Flockhart, Ken Yanna, Doug McDonald, and Roger Walton from the District 6 Office; Curt Smejkal from the Office of Bridges and Structures; Srinath Reddy Annu from Traffic and Safety and Kevin Patel and Jason Choate from the Office of Design.

The existing bridge will be replaced with a 100' x 40' continuous concrete slab bridge. Traffic will be maintained via median crossovers with a temporary lane separator system allowing right in/right out movements at all accesses between the crossovers. Total cost for this project is estimated at \$2,573,800.

It appears that no right of way will be required for this project.

The Draft Project Concept Statement was sent out for review and comment with concerns to be resolved by Thursday, January 12, 2017. Comments received during the review period have been considered and resolved.

This project is recommended for construction in FY 2021. The Office of Design will coordinate plan preparation with assistance from the Office of Bridges and Structures.

KKP: jmc		
C. Purcell	M. J. Kennerly	K. D. Nicholson
D. L. Maifield	S. J. Megivern	N. L. McDonald
G. A. Novey	M. A. Swenson	R. A. Younie
D. R. Tebben	K. Brink	D. L. Newell
J. W. Laaser-Webb	W. A. Sorenson	D. E. Sprengeler
E. C. Wright	M. E. Ross	A. A. Welch
N. M. Miller	C. C. Poole	M. J. Sankey
B. E. Azeltine	B. D. Hofer	T. D. Crouch
S. J. Gent	S. Anderson	P. C. Keen
M. Masteller	J. Selmer	B. Smith
D. R. Claman	J. Hauber	A. Abu-Hawash
M. E. Khoda	K. Olson	N. M. Abuissa
V. A. Brewer	C. L. Cutler	M. J. Donovan
S. W. Flockhart	D. McDonald	M. Sloppy
M. K. Solberg	T. M. Storey	J. J. Tjaden
R. R. Walton	K. A. Yanna	FHWA

FINAL PROJECT CONCEPT STATEMENT

U.S. 151 - Northbound Bridge over Crabapple Creek, 2.9 Miles North of the North Junction of IA 13

Linn County
BRFN-151-3(162)--39-57
PIN: 16-57-151-020
Maint. No.5740.8R151
FHWA No. 33540

Highway Division
Office of Design

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

January 13, 2017

I. STUDY AREA

A. Project Description

This project involves the replacement of the northbound U.S. 151 bridge over Crabapple Creek (Maint. No. 5740.8R151), 2.9 miles north of the north junction of IA 13.

The existing bridge will be replaced with a 100' x 40' continuous concrete slab bridge. Traffic will be maintained via median crossovers with a temporary lane separator system allowing only right in/right out movements at all accesses between the crossovers. Total cost for this project is estimated at \$2,573,800.

B. Need for Project

This is a 63' long by 30' concrete slab bridge which was built in 1961. The bridge is considered functionally obsolete as the bridge is located within the transition of a horizontal curve; however, it appears the bridge deck was designed and built with normal crown. The bridge was designed for live loads below current standards. The deck was overlaid in 1980 and the overlay is at the end of its useful service life. The top and bottom of the deck have several hollow areas and leaching transverse cracks; therefore, this bridge should be replaced.



Looking East



Under the bridge on the North Side

C. Present Facility

U.S. 151 is a four lane roadway. The existing northbound structure is a 63' x 30' continuous concrete slab bridge constructed in 1961. The adjacent pavement is a 24' wide, 10"-7"-10" PCC, with 1.5:1 foreslopes constructed in 1930. The foreslopes within the project area have since been flattened. HMA resurfacing was accomplished in 1965, 1990, and 2003. The shoulders west of the bridge are 10' wide paved outside and 6' wide paved inside. East of the bridge, the shoulders are 10' wide partially paved (6' paved and 4' granular) and 6' wide partially paved (4' paved and 2' granular).

The southbound road and bridge was constructed in 1991 providing a variable width median.

D. Traffic Estimates

The 2021 construction year and 2041 design year average daily traffic estimates are 16,800 ADT with 13% trucks and 23,100 ADT with 13% trucks, respectively.

E. Sufficiency Ratings

U.S. 151 is classified as a “Commercial and Industrial” route and is a maintenance service level “B” road. The northbound federal bridge sufficiency rating is 73.3.

F. Access Control

Access rights will not be acquired for this project.

G. Crash History

During the five-year study period from January 1, 2011 through December 31, 2015, there were 11 total crashes, which includes 2 minor injury crashes, 2 possible injury crashes and 7 property damage only crashes.

II. PROJECT CONCEPT

A. Recommended Alternative

The existing northbound 63' x 30', continuous concrete slab bridge will be replaced with a 3 span, 100' x 40', continuous concrete slab bridge.

The typical cross section adjacent to the northbound bridge will consist of a 24 ft. wide roadway (26 ft. wide pavement) with 10 ft. effective outside shoulders (2 ft. outside pavement, 4 ft. additional paved and 4 ft. granular). The inside shoulders will be 6 ft. wide (4 ft. paved and 2 ft. granular).

The existing bridge is located within a transition of a horizontal curve; however, the bridge was constructed with normal crown. The existing horizontal curve of the northbound lanes has a radius of 1,348 feet. The preferred minimum radius is 2,040 feet. A larger radius of 2,700 feet will be used in conjunction with a superelevation rate of 6% in order to keep a uniform cross slope on the new bridge.

The existing grade will need to be raised a minimum of 1-2 ft. in order to match the elevation of the southbound bridge which, combined with the reconstruction of the horizontal curve will require approximately 1870 ft. of roadway reconstruction. There is also approximately 1,080 feet of an orphan pavement section that the District would like to reconstruct on the west end of the project. This results in a total reconstruction length of approximately 2950 ft.

New bridge approaches will be constructed. The existing guardrail will be replaced with new guardrail and the shoulders will be paved 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. Class E revetment will be placed under the bridge for slope protection. A new bridge end drain will be constructed on northeast end of the bridge.

There is a field/farm entrance approximately 700 feet west of the bridge and a quarry entrance 900 feet east of the bridge, both on the south side of U.S. 151 that the contractor will have to maintain access to during construction.

An old quarry (pond) and berm is located in the southeast quadrant approximately 50 feet from centerline of the northbound lanes. The new design should strive to minimize impacts to the quarry (pond) and berm.

There is articulating block mat (ABM) that will need to be removed under the existing bridge.

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

It appears that no right of way will be required for this project.

Traffic will be maintained by utilizing one lane median crossovers. Temporary lane separator devices will be installed at public road and residential driveways within the two way – two lane operation to limit access to right in/ right out only. Temporary lane separator devices will also be installed outside the median crossovers to require any necessary U-turns to be made at the intersection of US 151/Hindman Road. to the west and the intersection of US 151/Stone Road. to the east. These temporary lane separator devices will be installed at two locations west of the west crossover and at one location east of the east crossover.

The guardrail on the existing westbound bridge will need to accommodate the two way -two lane traffic. This will require the removal of the existing bull nose median guardrail and installing new guardrail on the trailing end of the southbound bridge. The trailing end guardrail on the southbound bridge will be removed at the completion of the project. New guardrail will replace the existing guardrail on the northeast quadrant.

Bridge Items	<u>Estimated Costs</u>
New Bridge	\$ 400,000
Bridge Removal	15,600
Erosion Stone	3,000
Revetment	28,800
Mobilization - 10%	44,800
M & C - 20%	<u>98,500</u>
Bridge Costs	\$ 590,700

Roadway Items	
Bridge Approaches	\$77,500
Removal of Pavement	53,700
PCC Pavement	391,500
Special Backfill	66,200
Modified Subbase	124,400
Granular Shoulder	19,700
Paved Shoulders	153,200
Embankment in place, contractor furnished	55,500
Excavation Class 13 Waste	25,200
Guardrail (Includes Removal)	51,500
Paved Shoulders for Guardrail	21,000
Class 10 for Guardrail Blisters	21,800
Subdrains (Includes Removal and Outlets)	65,900
Median- One Lane Crossovers	253,200
Bridge End Drains	3,000
Removal of articulating block matting (ABM)	1,000

Temporary lane separator system	14,800
Clearing and Grubbing	500
Seeding and Fertilizing	2,800
Erosion Control	50,000
Wetland Mitigation	50,000
Traffic Control - 5%	75,100
Mobilization - 5%	75,100
M & C - 20%	<u>330,500</u>
Roadway costs	\$ 1,983,100
Project Total	\$2,573,800

B. Detour Analysis

There will be no off-site detour. Traffic will be maintained via two median one lane crossovers.

C. Recommendations

It is recommended that the present structure be replaced as described above.

D. Construction Sequence

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

E. ADA Accommodations

There are no bike paths or sidewalks adjacent to U.S. 151; therefore, no ADA accommodations are planned in conjunction with this project.

F. Special Considerations

The ABC Rating Score of 33 is less than the first stage filter threshold of 50, therefore this bridge will not be considered for accelerated bridge construction.

No bike path or sidewalk will be required as part of this project.

It appears that no right of way will be required for this project.

Linn County
BRFN-151-3(162)--39-57
PIN: 16-57-151-020
Page 6

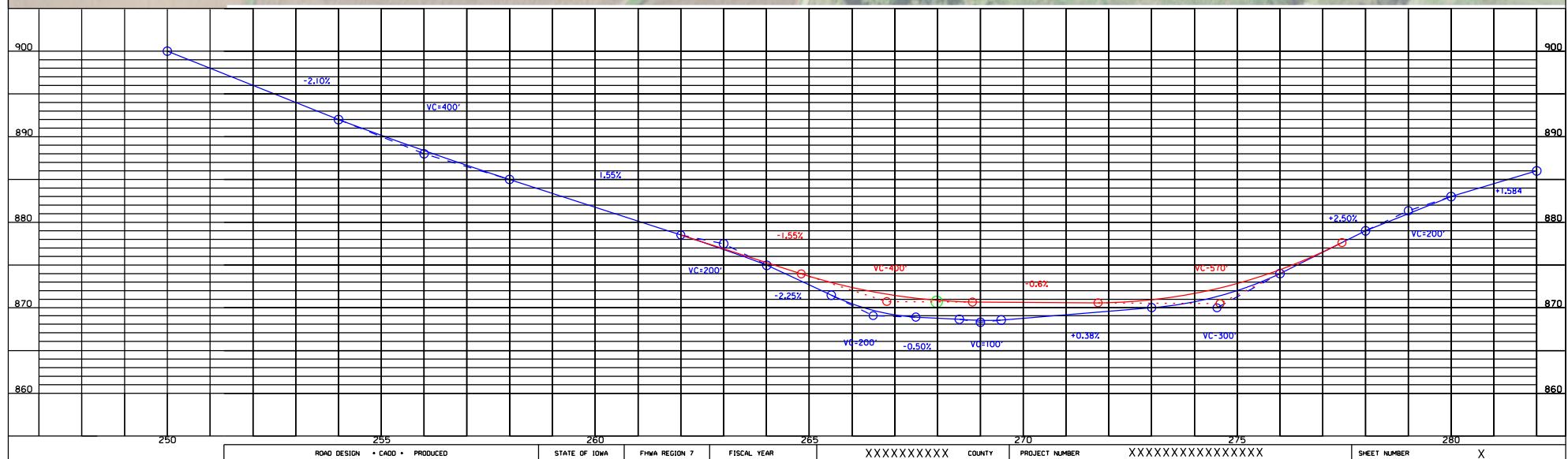
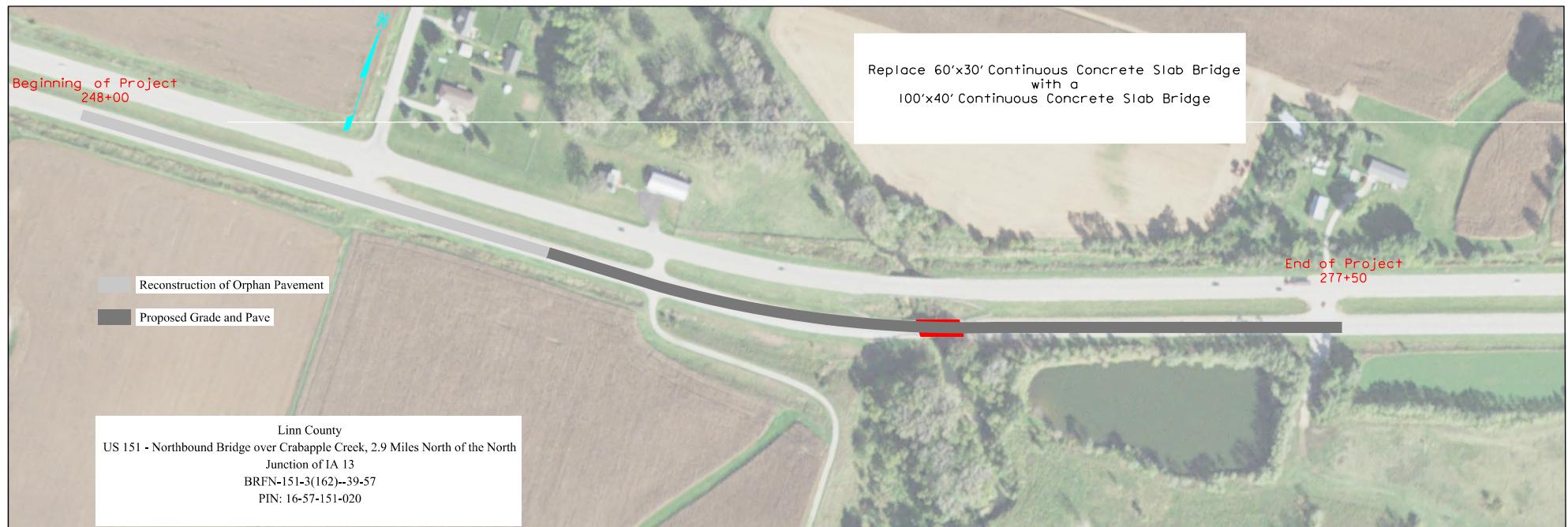
A listing of the existing utilities present within the project limits are shown in attachment A.

The Office of Location and Environment has reviewed this project and based on preliminary desktop observations, has determined that a Section 404 Permit will be required. It is expected that the work will be covered by Nationwide Permit 14.

F. Program Status

Site data has been developed by the Office of Design. This project is listed in the 2017-2021 Iowa Transportation Improvement Program, with \$2,000,000 for replacement in FY 2021. A schedule of events will be developed following approval of the Project Concept.

KKP: jmc





Google earth

Attachment A

**Linn Co.
US 151 – Crabapple Creek
MP. 40.80
BRFN-151-3(162)—39-57
Marion Twp. Sec. 36 (NE)**

Flockhart, Steven

From: ia@occinc.com
Sent: Thursday, December 08, 2016 10:19 AM
To: Flockhart, Steven
Subject: Design Information Results for Ticket # 551605379

(ANE) ALLIANT ENERGY
Contact Name : Jason Hogan
Contact Phone: 3192861315
Contact Email: locate_IPL@alliantenergy.com

(LCR) LINN COUNTY REC
Contact Name : Kevin Stucker
Contact Phone: 3193771587
Contact Email: nunemaker@linncountyrec.com

(ME4) MEDIACOM
Contact Name : Joe Ernster
Contact Phone: 3193959699
Contact Email: jernster@mediacomcc.com

(MUI) WINSTREAM COMMUNICATIONS
Contact Name : Stephen Kness
Contact Phone: 8002891901
Contact Email: LOCATE.DESK@WINDSTREAM.COM

(SCI) SPRINGVILLE COOP TELEPHONE
Contact Name : Todd Mcwherter
Contact Phone: 3198546107
Contact Email: springvl@netins.net

LINN Co.

BRIDGE REPLACEMENT - CCS
BRFN-151-3(162)--39-57

LETTING DATE
10/18/2022

INDEX OF SHEETS	
No.	DESCRIPTION
A Sheets	Title Sheets Title Sheet Location Map Sheet
A.1	
A.2	
B Sheets	Typical Cross Sections and Details Typical Cross Sections and Details
B.1 - 4	
D Sheets	Mainline Plan and Profile Sheets Plan & Profile Legend & Symbol Information Sheet US Highway 151
* D.1	
* D.2 - 5	
G Sheets	Survey Sheets Reference Ties and Bench Marks Horizontal Control Tab. & Super for all Alignments
G.1 - 2	
* G.3 - 4	
J Sheets	Traffic Control and Staging Sheets Traffic Control & Staging Legend & Symbol Info. Sheet On-Site Detour Route Staging and Traffic Control Sheets
* J.1	
* J.2 - 3	
* J.4 - 13	
V Sheets	Bridge and Culvert Situation Plans Bridge Situation Plan
* V.1	
W Sheets	Mainline Cross Sections Cross Sections Legend & Symbol Information Sheet US Highway 151 Cross Sections
W.1	
W.2 - 33	
	* Color Plan Sheets



Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE
PRIMARY ROAD SYSTEM
LINN COUNTY
BRIDGE REPLACEMENT - CCS

CRABAPPLE CREEK 2.9 MILES NORTH OF
 THE NORTH JUNCTION OF IA13 (NB)

SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

Value Engineering Saves. Refer to Article 1105.14 of the Specifications.



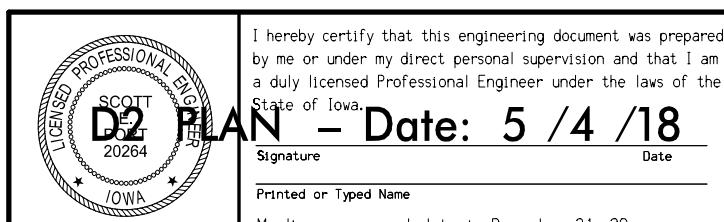
MILEAGE SUMMARY			
Div.	Location	Lin. Ft.	Miles
	U.S. Highway 151 NORTHBOUND Sta. 6248+92.23 to Sta. 6294+22.90	4530.67	0.86
	Deduct Bridge at Sta. 6267+72.00	100.00	0.02
	Total Length of Roadway	4430.67	0.84
	Total Length Bridge	100.00	0.02
	Total Length of Project	4530.67	0.86

For Project Location Map
 Refer to Sheet No. A.2

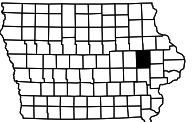
EARTHWORK SUMMARY		
Cut	11,590.7	CY
Fill +30%	6,767.0	CY
Waste	4,823.7	CY

DESIGN DATA RURAL		
US 151	101-4	
2021 AADT	16,800	V.P.D.
2041 AADT	23,100	V.P.D.
20 DHV		V.P.H.
TRUCKS	13	%
Total Design ESALs		

INDEX OF SEALS		
SHEET NO.	NAME	TYPE
A.1	SCOTT E. PORT	Primary Signature Block
V.1	TIMOTHY J. SHEETS	Hydraulic Design



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.
D2 PLAN - Date: 5/4/18
 Signature _____ Date _____
 Printed or Typed Name _____
 My license renewal date is December 31, 20 _____.
 Pages or sheets covered by this seal: _____



FILE NO.

ENGLISH

DESIGN TEAM SCHRODER\JEO CONSULTING GROUP, INC.

3:08:57 PM 6/28/2018 aschlader pw:\projectwise.dot.int.lan\PWMain\Documents\Projects\5715102016\Design\SHT_57151162Z10_A01.sht

LINN COUNTY

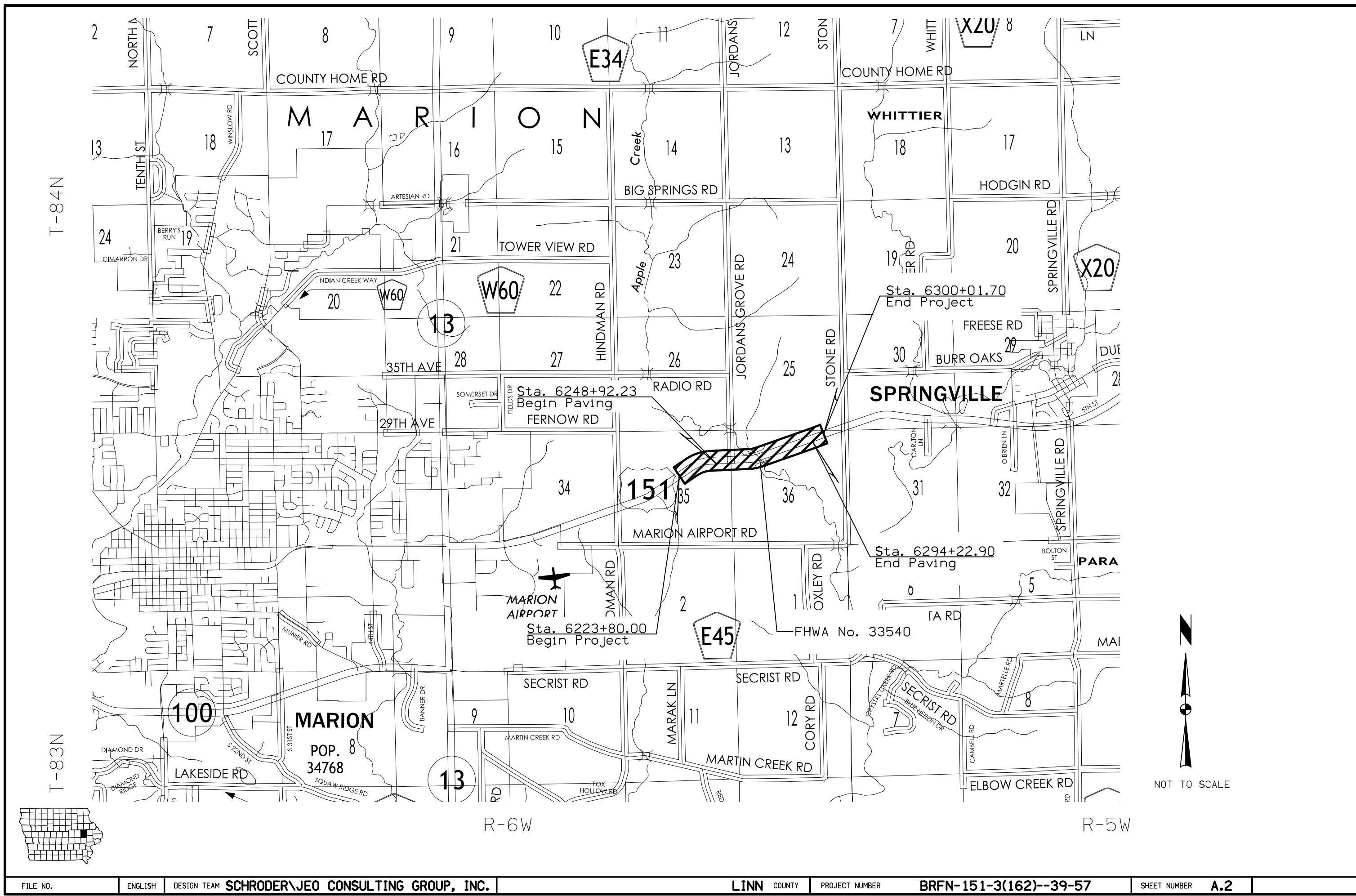
PROJECT NUMBER

BRFN-151-3(162)--39-57

SHEET NUMBER **A.1**

TOTAL
62

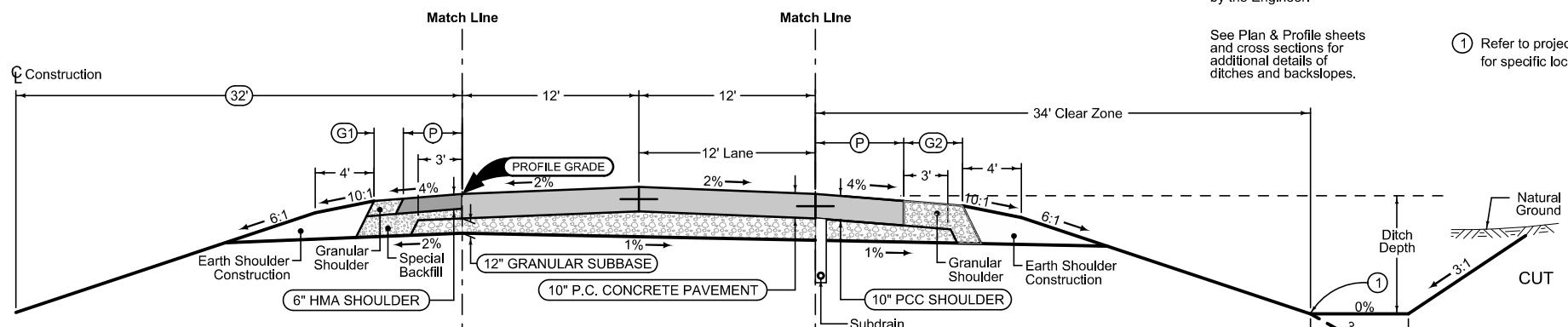
PROJECT IDENTIFICATION NUMBER	
16-57-151-020	
PROJECT NUMBER	
BRFN-151-3(162)--39-57	
R.O.W. PROJECT NUMBER	



Combination Left Shoulder

Shoulder Jointing:
Longitudinal joint: B

4_C_ 10-15-13				
Direction of Travel	BEGIN STATION	END STATION	(G) Feet	(P) Feet
NB	6248+92.23	6250+89.42	2	4
NB	6253+59.42	6265+96.09	2	4
NB	6268+67.96	6294+22.90	2	4



① Refer to project plan and cross sections for specific location of foreslope change.

Combination Right Shoulder

Shoulder Jointing:
Longitudinal joint: L-2 or KT-2
Transverse joints: C at 20' spacing

4_C_ 10-15-13				
Direction of Travel	BEGIN STATION	END STATION	(P) Feet	(G2) Feet
NB	6248+92.23	6266+21.94	6	4
NB	6268+67.96	6294+22.90	6	4

*PAVEMENT AND SUBBASE THICKNESS AND TYPE TO BE DETERMINED BY IOWA DOT.

Auxiliary Lane Granular Shoulder

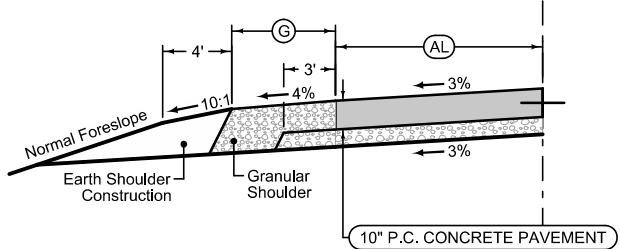
Longitudinal joint: L or KT
Transverse joint: Match Mainline

4_AL_Shldr_G_ 10-19-10				
(G) Feet	6	6		

4_AuxLane_PCC_ 10-18-16				
Direction of Travel	BEGIN STATION	END STATION	(AL) Feet	
NB	6250+89.42	6252+09.42	0-12	
NB	6252+09.42	6253+59.42	12	

Note: Refer to Detail 7154A on Sheet B.2 for Paved Shoulder Detail at Turn Lanes.

*PAVEMENT AND SUBBASE THICKNESS AND TYPE TO BE DETERMINED BY IOWA DOT.



Paved Shoulder at Guardrail

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

4_P_Guard_ 10-17-17				
Direction of Travel	BEGIN STATION	END STATION	(P) Feet	
NB	6265+96.09	6267+08.25	*Var.	

* Refer to Detail 7156 for paved shoulder width at guardrail.



Paved Shoulder at Guardrail

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

4_P_Guard_ 10-17-17				
Direction of Travel	BEGIN STATION	END STATION	(P2) Feet	
NB	6266+21.94	6267+33.07	*Var.	

* Refer to Detail 7156 for paved shoulder width at guardrail.

Refer to Tab. 100-24 for Pavement Quantities

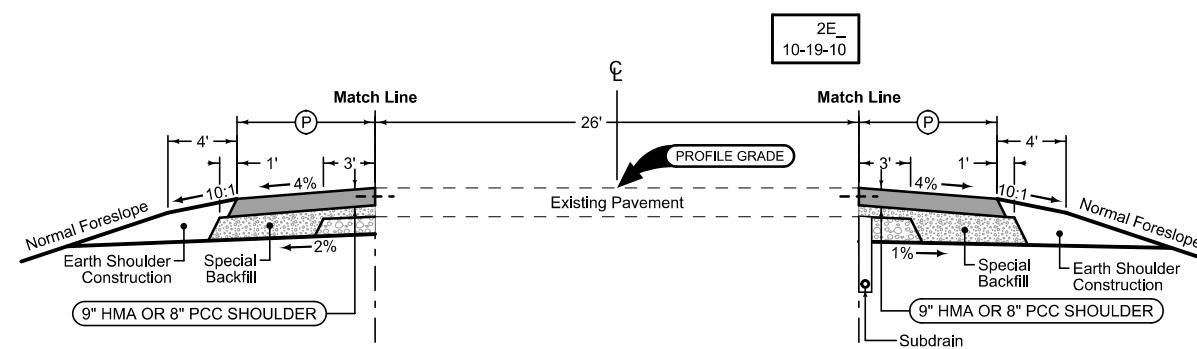
Refer to Tab. 112-9 for Shoulder Quantities

Paved Shoulder at Guardrail

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

4_P_Guard_10-17-17			
Direction of Travel	BEGIN STATION	END STATION	(P) Feet
SB	6268+05.31	6269+01.83	*Var.

* Refer to Detail 7156 for paved shoulder width at guardrail.



Paved Shoulder at Guardrail

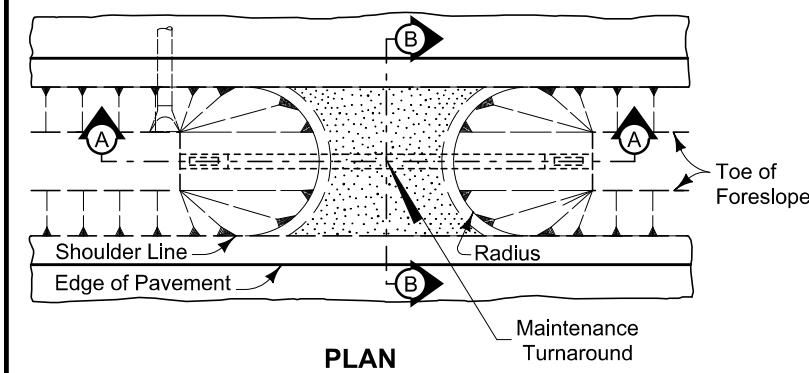
PCC Shoulder Jointing:
Longitudinal joint: BT-1 or BT-5
Transverse joints: C at mainline spacing
HMA Shoulder Jointing
Longitudinal joint: B

4_P_Guard_10-17-17			
Direction of Travel	BEGIN STATION	END STATION	(P) Feet
SB	6268+26.38	6268+93.45	*Var.

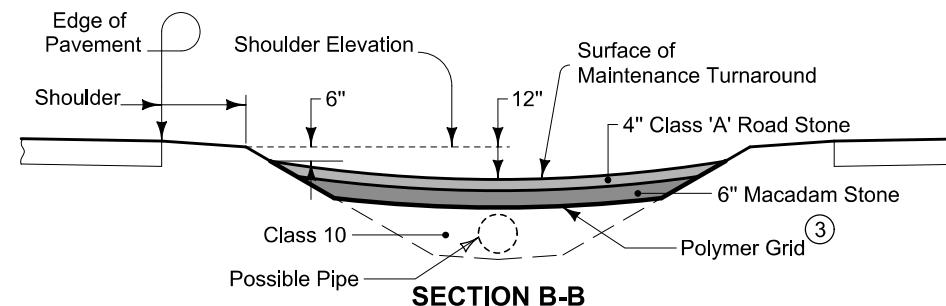
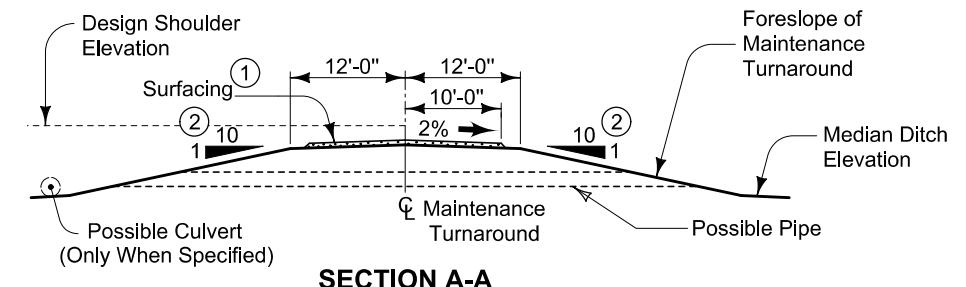
* Refer to Detail 7156 for paved shoulder width at guardrail.

Refer to Tab. 100-24 for Pavement Quantities
Refer to Tab. 112-9 for Shoulder Quantities

SOUTHBOUND US HIGHWAY 151

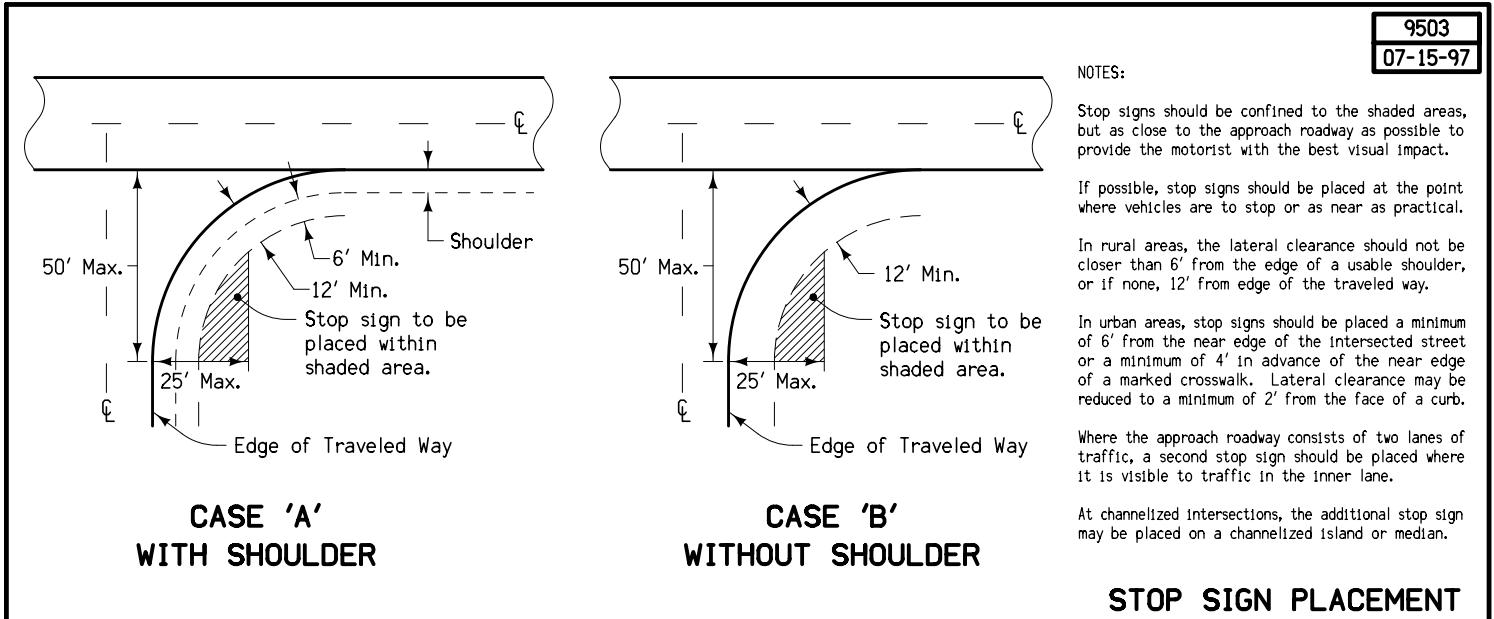
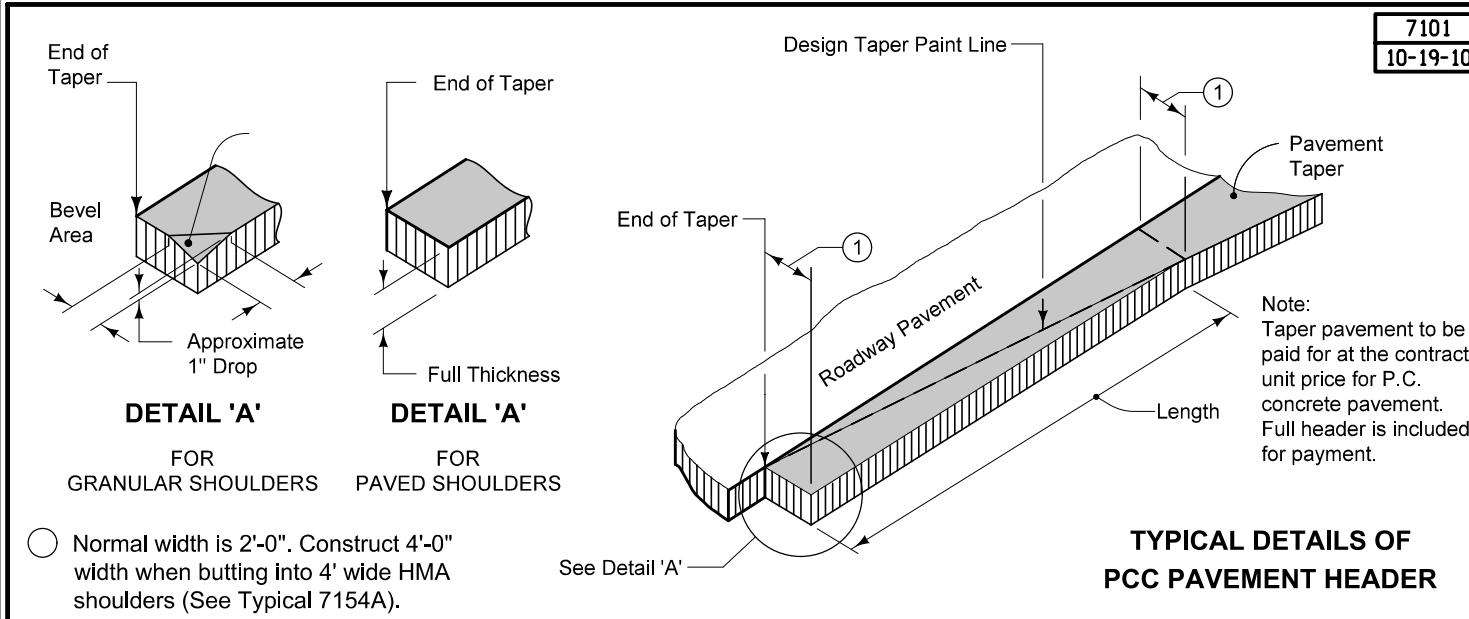
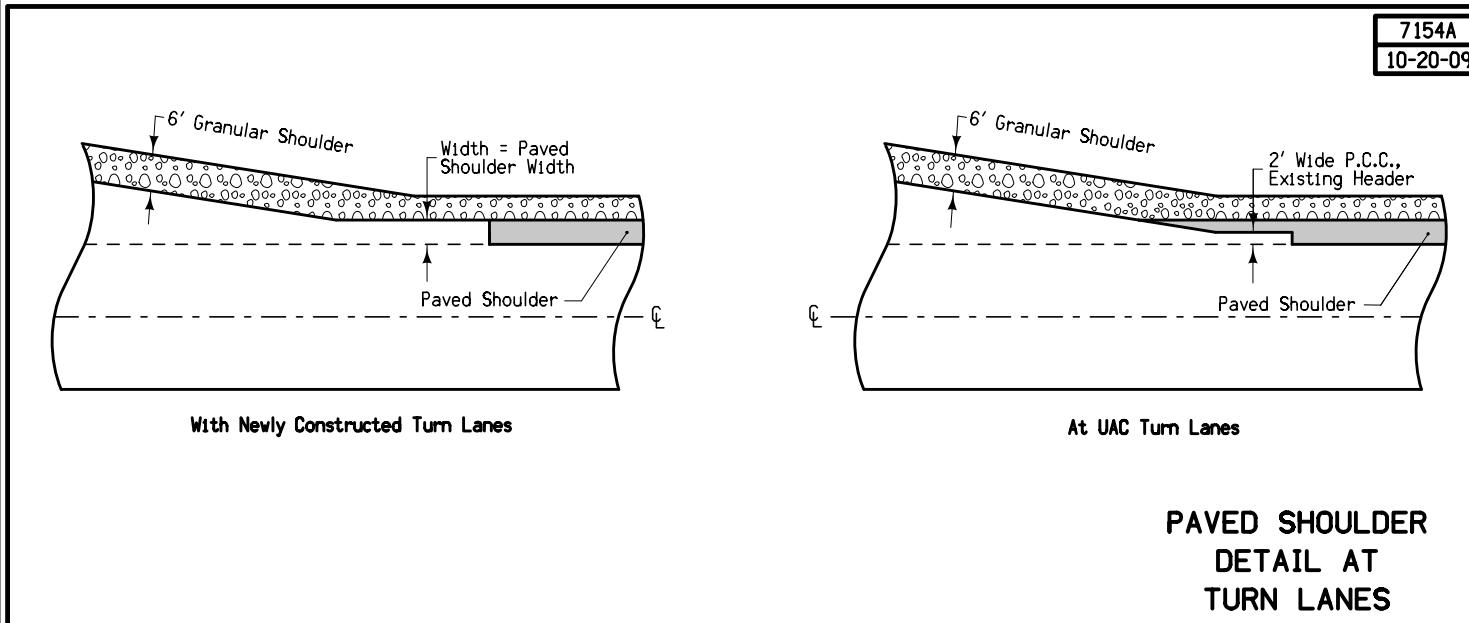


- ① Surfacing quantities based on a 6 inch layer of Macadam Stone base and a 4 inch layer of Class 'A' Road Stone. Apply surfacing as directed by the Engineer.
- ② Construct 8:1 foreslope when drainage pipe is incorporated into the maintenance turnaround.
- ③ Install Polymer Grid between Class 10 and stone material.
- ④ See Standard Road Plan DR-212.



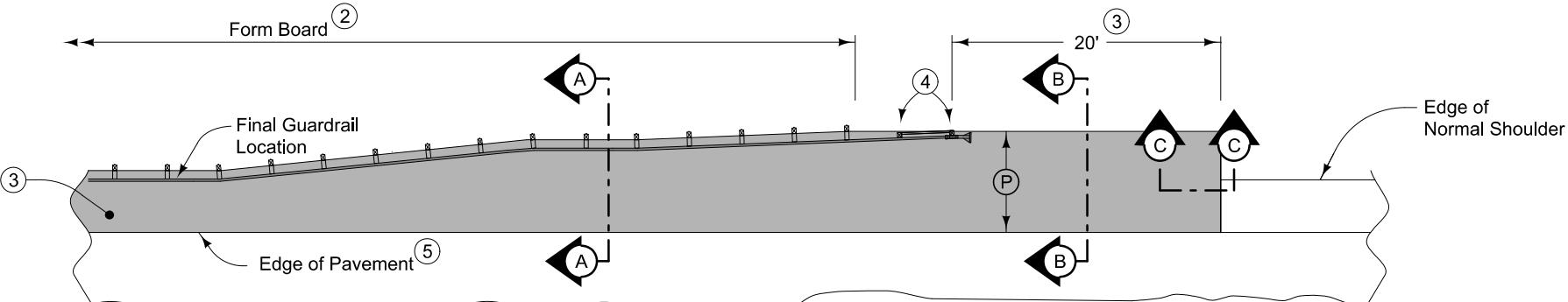
MAINTENANCE TURNAROUND

Location		Class 'A' Road Stone	Macadam Stone	Polymer Grid	Class 10	Pipe Length	Beveled Pipe & Guard(4)	Radius	Remarks
Road Identification	Station	TONS	TONS	SY	CY	LF	EACH	FT	

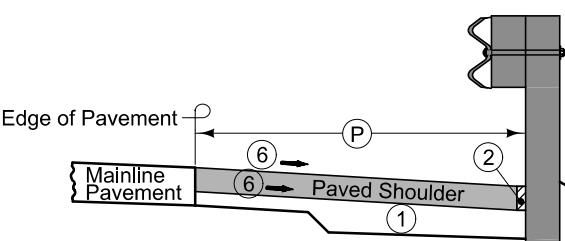


DESIGNER
INFO

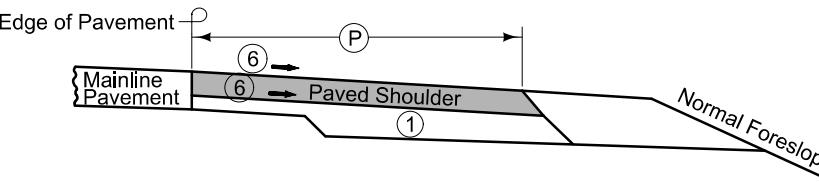
7156
MODIFIED



PLAN VIEW

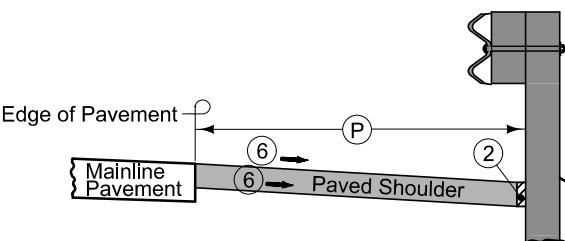


Section A-A

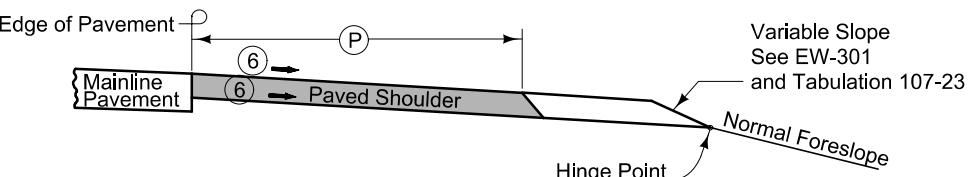


Section B-B

NEW CONSTRUCTION

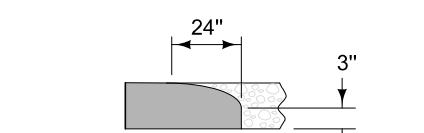


Section A-A



Section B-B

EXISTING SHOULDER



Section C-C
Roll down at granular shoulder or earth.

PAVED SHOULDER AT GUARDRAIL

SURVEY SYMBOLS

	Interstate Highway Symbol
	U.S. Highway Symbol
	Iowa Highway Symbol
	County Road Highway Symbol
	Evergreen Tree
	Deciduous Tree
	Fruit Tree
	Shrub (Bushes)
	Timber
	Hedge
	Stump
	Swamp
	Rock Outcrop
	Broken Concrete
	Revetment (Rip Rap)
	Cemetery
	Grave
	Cave
	Sink Hole
	Board Fence
	Chain Link or Security Fence
	Wire Fence
	Terrace
	Earth Dam or Dike (Existing)
	Earth Dam or Dike (Proposed)
	Tile Outlet
	Edge of Water
	Existing Drainage
	Proposed Drainage
	Right of Way Rail or Lot Corner
	Concrete Monument
	Well
	Windmill
	Beehive Intake
	Existing Intake
	Proposed Intake
	Existing Utility Access (Manhole)
	Proposed Utility Access (Manhole)
	Fire Hydrant
	Water Hydrant (Rural)

UTILITY LEGEND

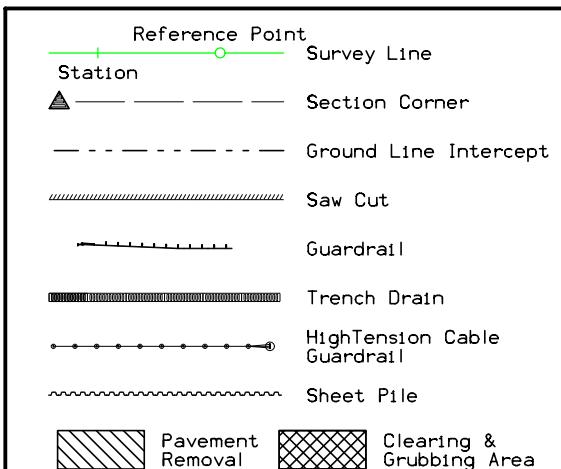
	SPRINGVILLE COOP Contact Name : Todd McWherter Contact Phone: 319-854-6107 Contact Email: spvtech@netins.net
	ALLIANT ENERGY - ELECTRIC Contact Name : Debi Reynolds Contact Phone: 319-286-1302 Contact Email: DeborahReynolds@alliantenergy.com
	Cistern
	L.P. Gas Tank (No Footing)
	Underground Storage Tank
	Latrine
	Luminaire
	Traffic Signal
	Traffic Signal with Luminaire
	Telephone Pedestal
	Television Pedestal
	Telephone Pole
	Telephone Pole (Second Company)
	Telephone Pole (Third Company)
	Telephone Pole (Fourth Company)
	Telephone Pole (Fifth Company)
	Power Pole
	Power Pole (Second Company)
	Power Pole (Third Company)
	Power Pole (Fourth Company)
	Power Pole (Fifth Company)
	Electrical Highline Tower (Metal or Concrete)
	Telephone Riser Pole
	Power Riser Pole
	Telegraph Pole
	Satellite TV Dish
	Water Hook Up
	Radio Tower
	Tower Anchor
	Guardrail (Beam or Cable)
	Guard Post (one or two)
	Guard Post (over two)
	Filler Pipe
	Gas Valve
	Water Valve
	Speed Limit Sign
	Mailbox
	Sign
	Traffic Signal Control Box
	Rail Road Signal Control Box
	Telephone Switch Box
	Electric Box

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 "In conjunction with a paving project"
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

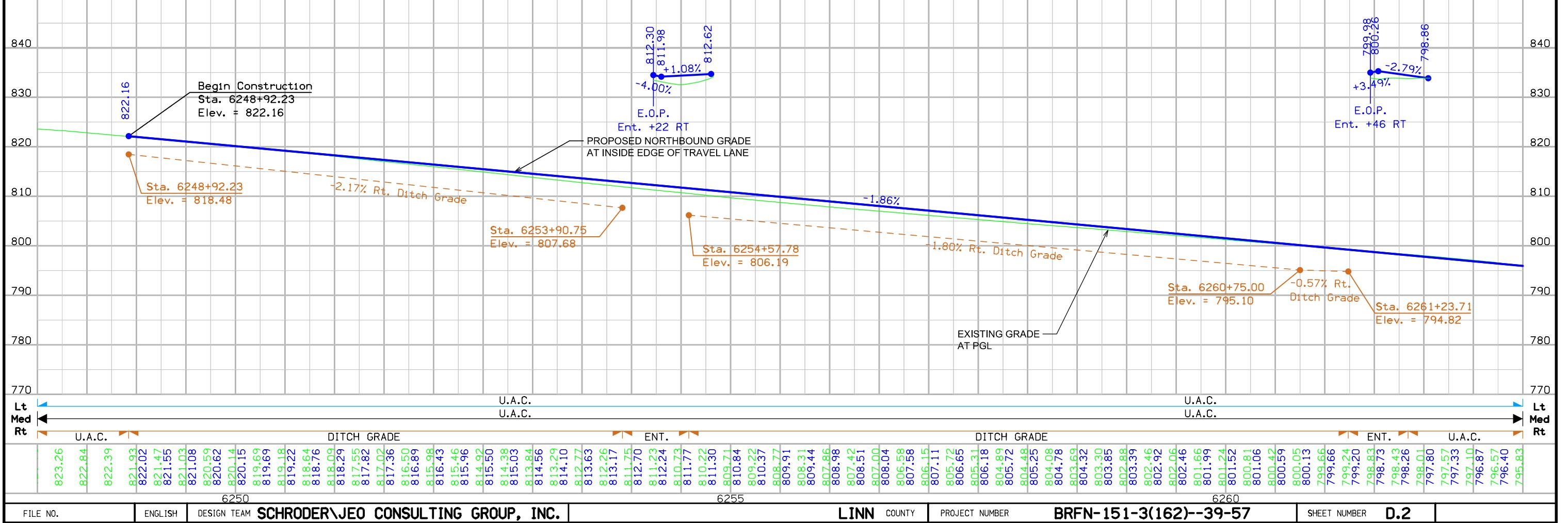
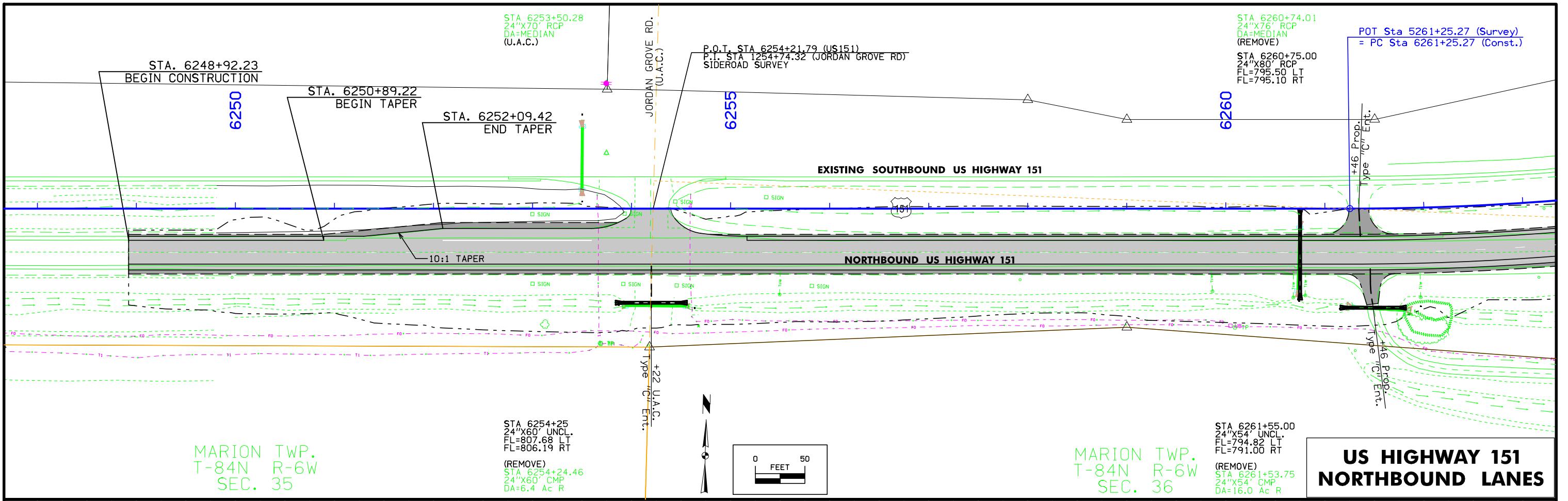


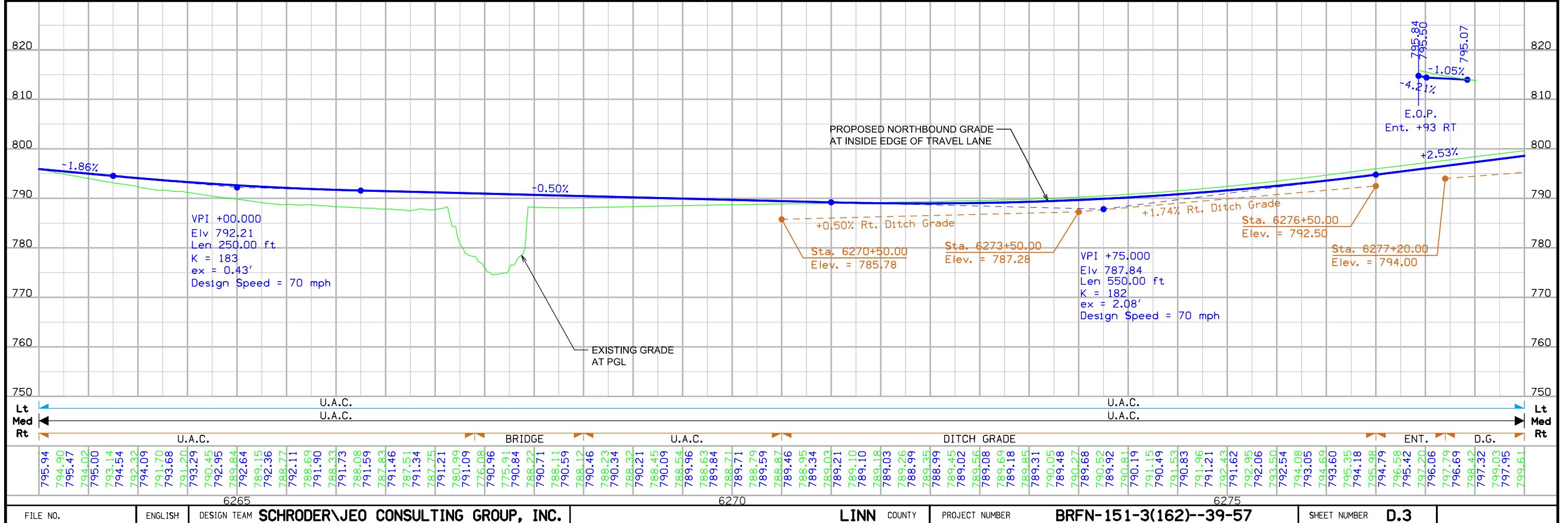
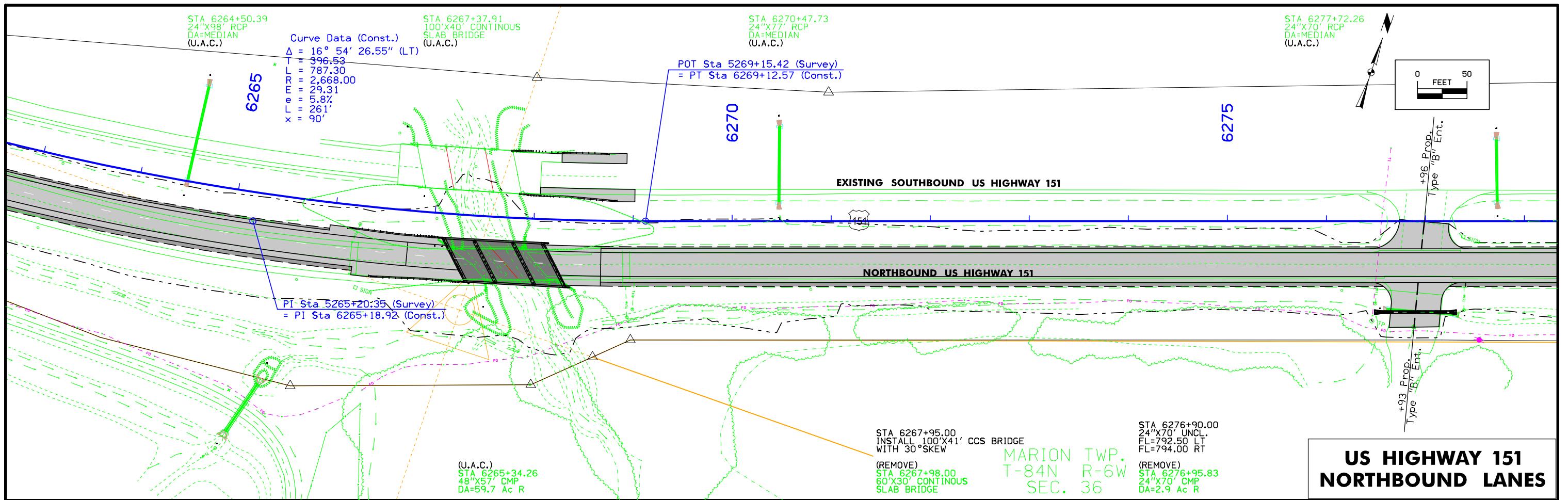
RIGHT-OF-WAY LEGEND

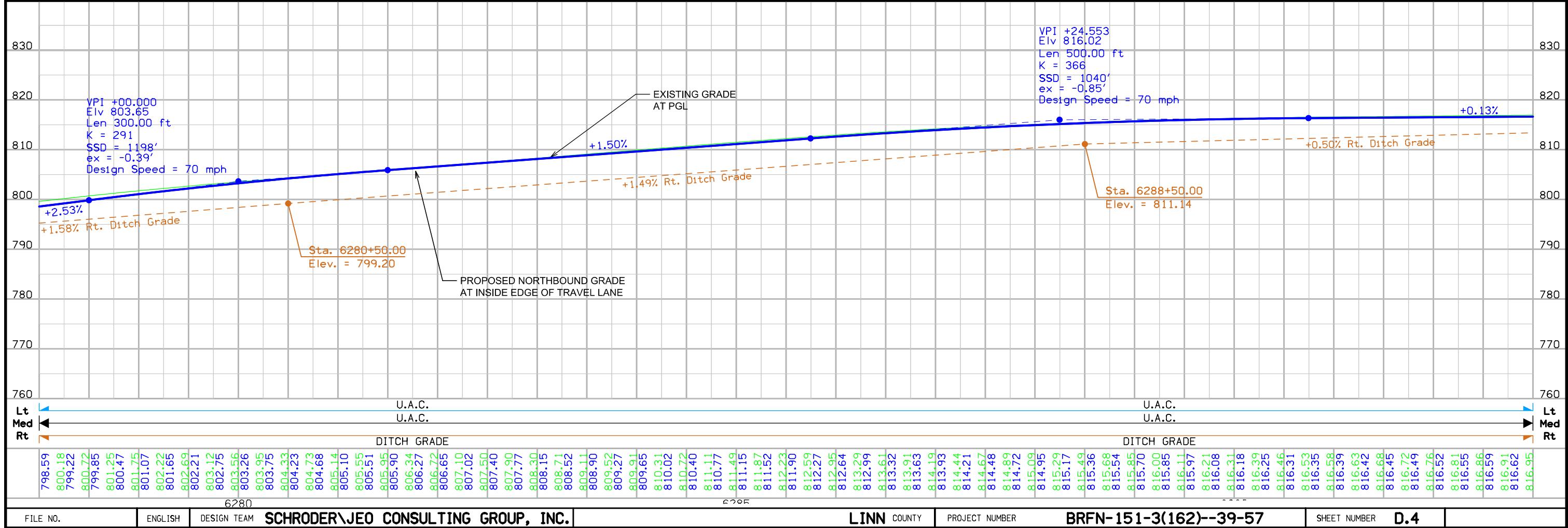
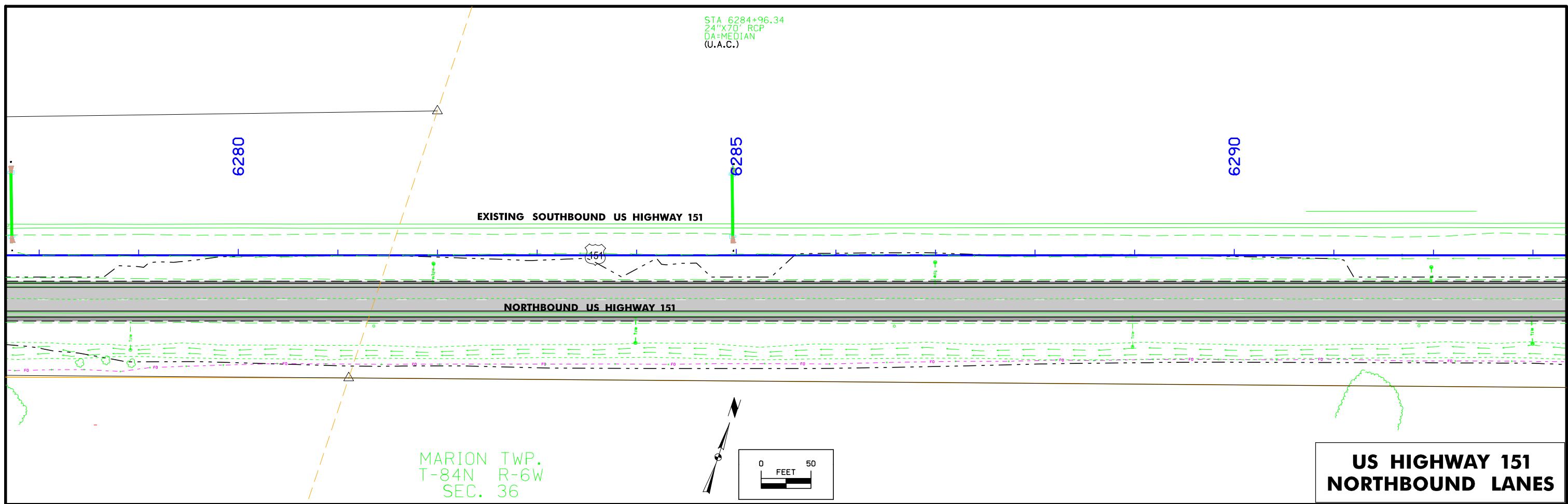
	Proposed Right-of-Way
	Existing Right of Way
	Existing and Proposed Right-of-Way
	Easement and Existing Right-of-Way
	Easement (Temporary)
	Easement
	Access Control
	Property Line

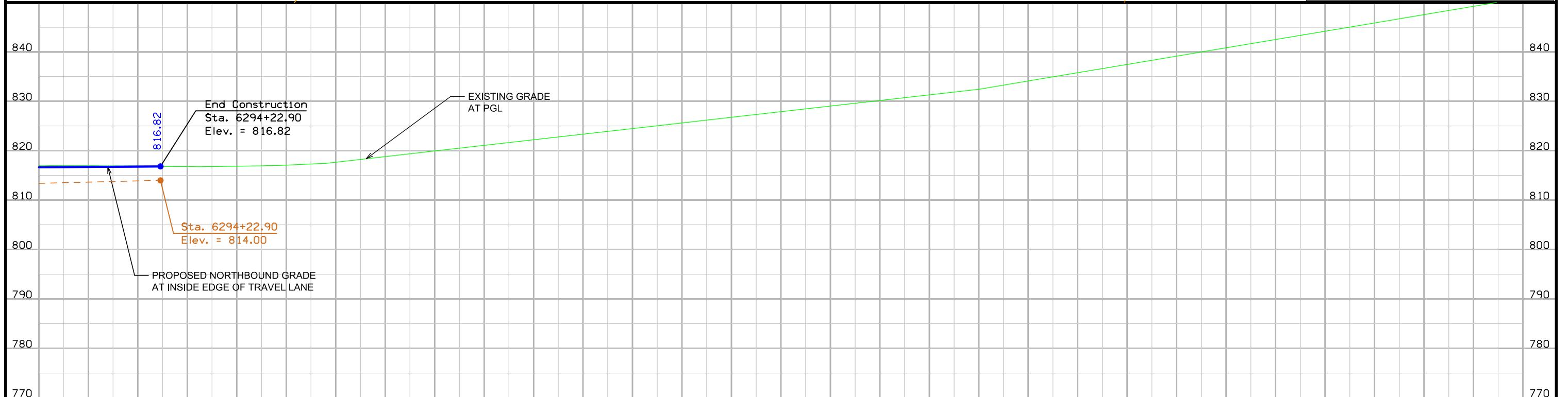
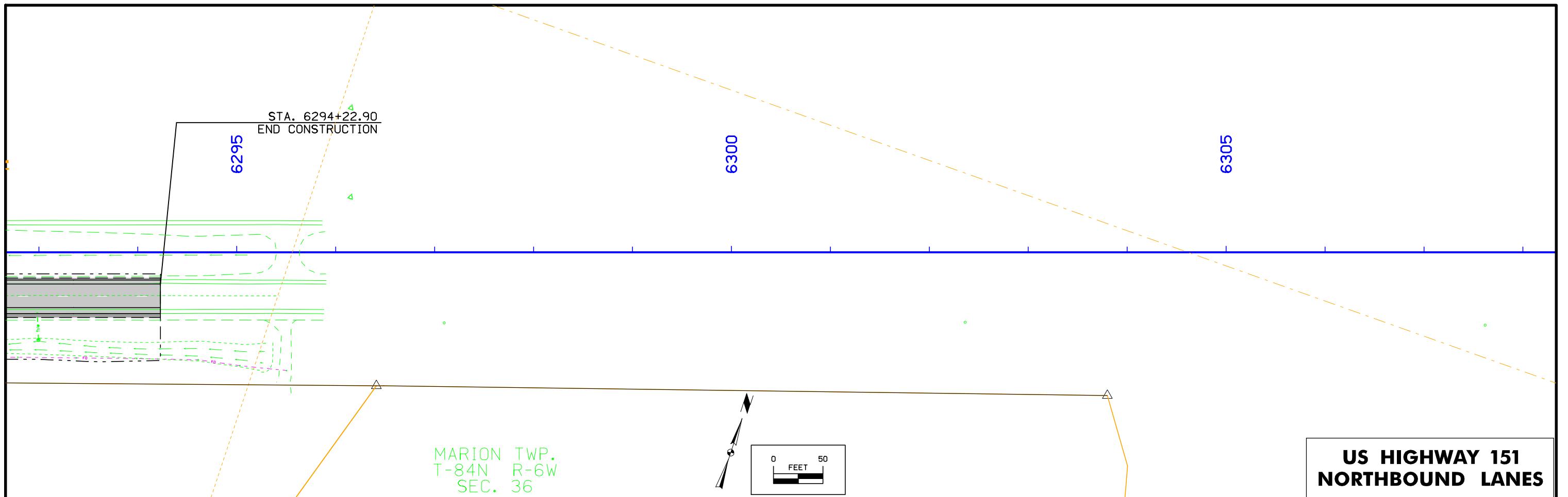
PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

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









Lt	U.A.C.	U.A.C.	Rt
Med	←	→	DITCH GRADE
816.65			
816.67			
816.69			
816.97			
816.72			
816.95			
816.76			
816.91			
816.79			
816.82			
816.78			
816.79			
816.86			
816.95			
817.07			
817.31			
816.20			
816.83			
817.45			
818.08			
818.70			
819.33			
819.95			
820.57			
821.20			
821.82			
822.45			
823.07			
823.70			
824.32			
824.94			
825.57			
826.19			
826.82			
827.44			
828.06			
828.69			
829.31			
829.94			
830.56			
831.19			
831.81			
832.43			
833.27			
834.11			
834.95			
835.78			
836.62			
837.46			
838.30			
839.14			
839.98			
840.82			
841.66			
842.50			
843.34			
844.18			
845.02			
845.86			
846.70			
847.54			
848.38			
849.22			
850.06			
850.90			

Survey Information

Linn County
BRFN-151-3(162)-39-57
US 151 over Crabapple Creek
PIN 16-57-151-020
Sap-625.1

General Information

Measurement units for this survey are US survey feet. This survey is for proposed Bridge reconstruction and reconstruction of US 151 over Crabapple Creek. Project datum and control information is provided by Design Survey Office. This project is a Partial DTM with Photo control.

Vertical Control

Vertical datum for this survey is NAVD88. As instructed by Norm Miller, PLS, Survey Manager for Iowa DOT Design Office, we held the provided elevation of point 1 814.406. Additional elevations and benchmarks were established with a double run closed level loop relative with point 1. The loop error met 3rd Order accuracy and the level run was adjusted by least squares method using the software program LevProc.

This survey observed 2 Control Monuments with GPS derived NAVD88 heights to compare to local ground control:

Control Point 3 has a GPS Elev. of 857.056
Leveled Elev. = 857.098

Control Point 5240 has a GPS Elev. of 827.425
Leveled Elev. = 827.406

This survey observed 3 As-Built plan bench marks to compare to local ground control:

BM 501 BM A pdf STA 5267+35 20 FT RT Elev. 788.95
Survey Elev. = 799.589

BM 502 BM A pdf STA 5267+30 35 FT Elev. 793.62
Survey Elev. = 793.258

BM 503 BM A pdf STA 5267+33 70 FT Elev. 791.71
Survey Elev. = 791.356

Horizontal Control

The project coordinate system is IaRCS Zone 10 as provided by the Design Survey Office. The RTN position of reference station Marion was held and multiple 3-minute observations were done on the three-provided control point 1, 3 and PI5240 the maximum standard deviation of our observations was 0.020. With a maximum difference in coordinates of 0.033' in easting on point 3. Additional secondary control points were established by averaging multiple 3-minute observations.

Alignment Information

The horizontal alignment for this survey is a retrace of the Construction centerline of Plans No. F-151-3(79)-20-57. Survey stationing was equated to the plan PI at STA 5240+05.97 and run back and ahead without equation throughout the survey.

Survey stationing relates to as built plan stationing as follows:

TS Sta. 5234+12.93 Const. CL Project No. F-151-3(79)-20-57
Survey TS Sta. 5234+12.92

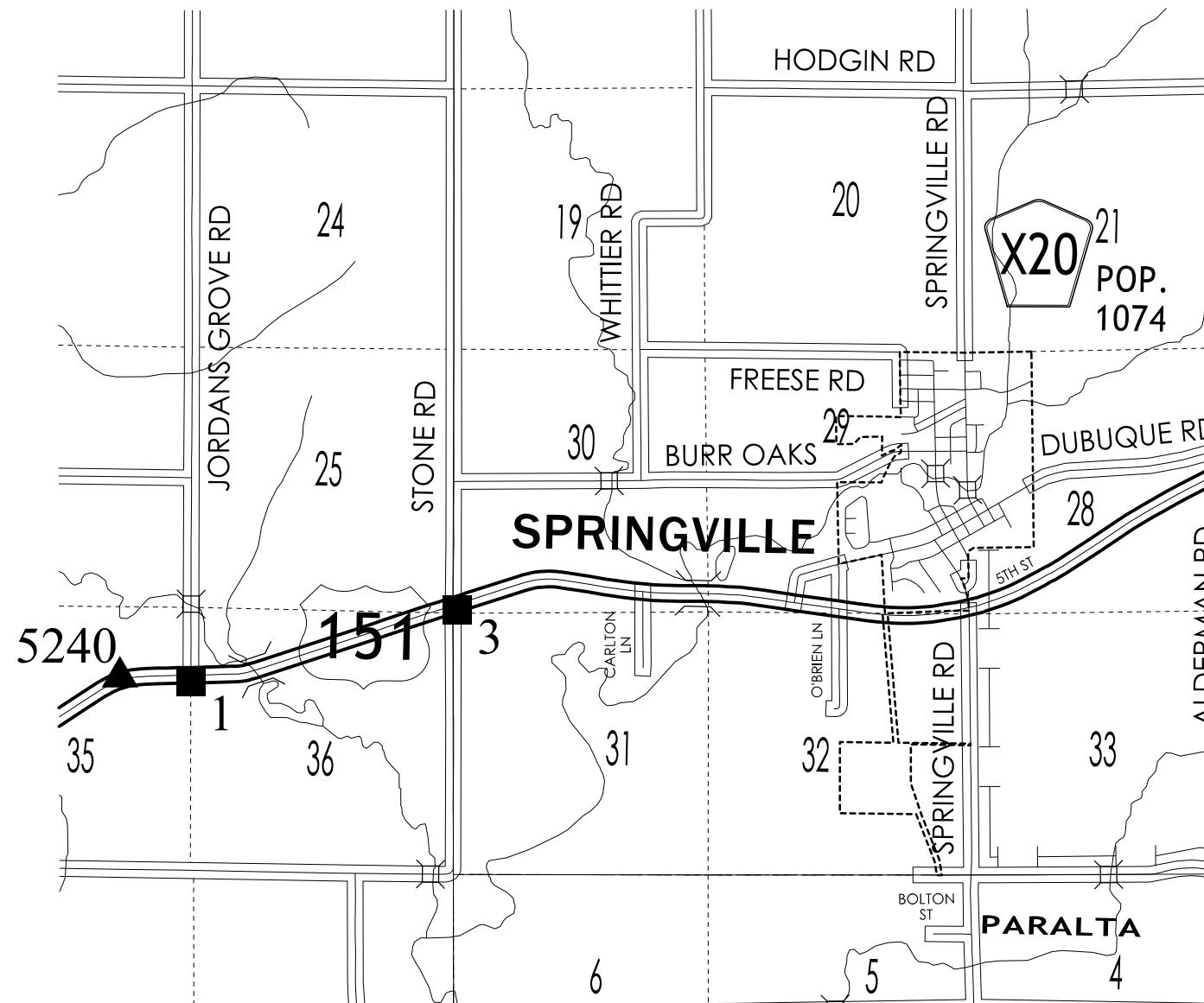
PI Sta. 5240+05.97 Const. CL Project No. F-151-3(79)-20-57
Survey PI Sta. 5240+05.97

ST Sta. 5245+73.89 Const. CL Project No. F-151-3(79)-20-57
Survey ST Sta. 5245+73.89

PI Sta. 5265+21.76 Const. CL Project No. F-151-3(79)-20-57
Survey PI Sta. 5265+21.80

CONTROL POINT VICINITY MAP

This map is a guide to the vicinity of the primary project control points. Primary control is for use with RTK base stations and for RTN validation. Future surveys will use primary project control to establish temporary control as needed for construction or other surveying applications.

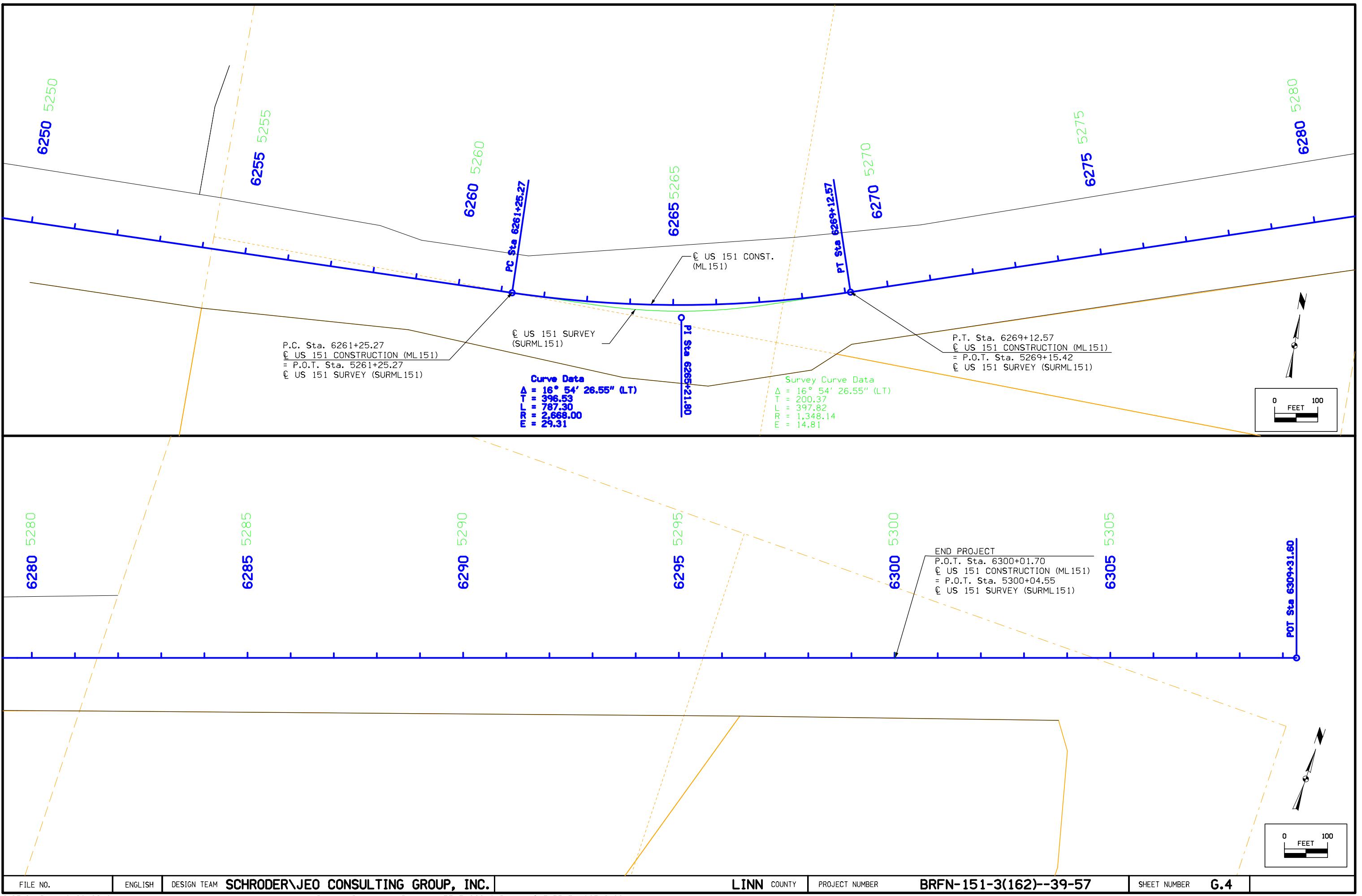


HORIZ. DATUM: NAD83(2011) EPOCH 2013.00

VERT. DATUM: NAVD88

Ia. Regional Coordinate System Zone 10

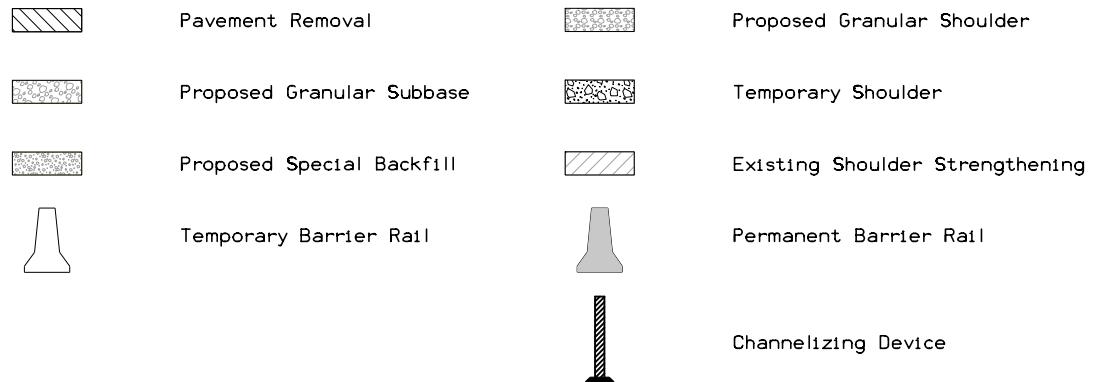
Coordinate listing from next sheet will be used with IaRTN for monument recovery. No other reference ties are given.



**CROSS SECTION VIEW COLOR LEGEND
OF TRAFFIC CONTROL AND STAGING SHEETS**

SHADING	Design Color No.
Green, Light	(225) Existing Pavement Shading
Gray, Light	(48) Previously Constructed Pavement Shading
Gray, Med	(80) Previously Constructed Granular Surface Shading
Blue, Light	(230) Proposed Pavement Shading
Lavender	(9) Temporary Pavement Shading
Brown, Med	(237) Future Proposed Pavement Shading

**CROSS SECTION VIEW PATTERN AND SYMBOL LEGEND
OF TRAFFIC CONTROL AND STAGING SHEETS**



PLAN VIEW COLOR LEGEND OF TRAFFIC CONTROL AND STAGING SHEETS

LINEWORK	Design Color No.	
Green	(2)	Existing Topographic Features and Labels
Magenta	(5)	Pavement Marking Call Outs
Blue	(1)	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Yellow	(4)	Pavement Markings, Yellow
Off White	(254)	Pavement Markings, White
Violet	(15)	Temporary barrier rail, Unpinned
Flush Orange	(228)	Temporary barrier rail, Pinned

SHADING	Design Color No.	
Green, Light	(225)	Existing Pavement Shading
Gray, Light	(48)	Previously Constructed Pavement Shading
Gray, Med	(80)	Proposed Granular Surface Shading
Gray, Med	(80)	Previously Constructed Granular Surface Shading
Blue, Light	(230)	Proposed Pavement Shading
Lavender	(9)	Temporary Pavement Shading
Brown, Light	(236)	Proposed Grading Limits Shading
Pink, Dark	(13)	Proposed MSE or CIP Wall Shading
Red	(3)	Proposed Bridge Shading and Sign Trusses
Black w/Gray, (0,48)		Previously Constructed Structure
Light Fill		

**PLAN VIEW PATTERN AND SYMBOL LEGEND
OF TRAFFIC CONTROL AND STAGING SHEETS**

●	Channelizing Device		Crash Cushion (Temp or Perm)
×	Drum		Traffic Signal
◻	Temporary Lane Separator		Flagger
◆	Tubular Marker		Temporary Floodlighting
◆	Channelizer Marker		Traffic Sign
△	Concrete Barrier Marker		Type III Barricade
⌚	Delineator		Type A Warning Light
=====	Temporary Barrier Rail		Direction of Traffic
=====	Pavement Removal		Safety Closure
=====	Sand Barrel Layout		Lane Identification

NOTE: Device spacing according to Standard Road Plans unless specifically dimensioned.

**TRAFFIC CONTROL
AND
STAGING
LEGEND AND SYMBOL
INFORMATION SHEET**

(COVERS SHEET SERIES J)

DETOUR NOTES

As a part of the U.S. Highway 151 bridge replacement over Crabapple Creek, the eastbound lanes of U.S. Highway 151 will be closed during construction and a detour as shown on J.2 and J.3 will be used. The detour is for all adjacent access points within the limits of the project. All traffic entering the limits will be reduced to right hand turns only. The detour will route the traffic to the nearest U-turn location.

Refer to Traffic Control Plan for additional information.

The bid item for Traffic Control will be considered full compensation for installing, covering and uncovering signs required for the detour. It is the Contractor's responsibility to set up, cover, uncover, and maintain all signs along the detour routes.

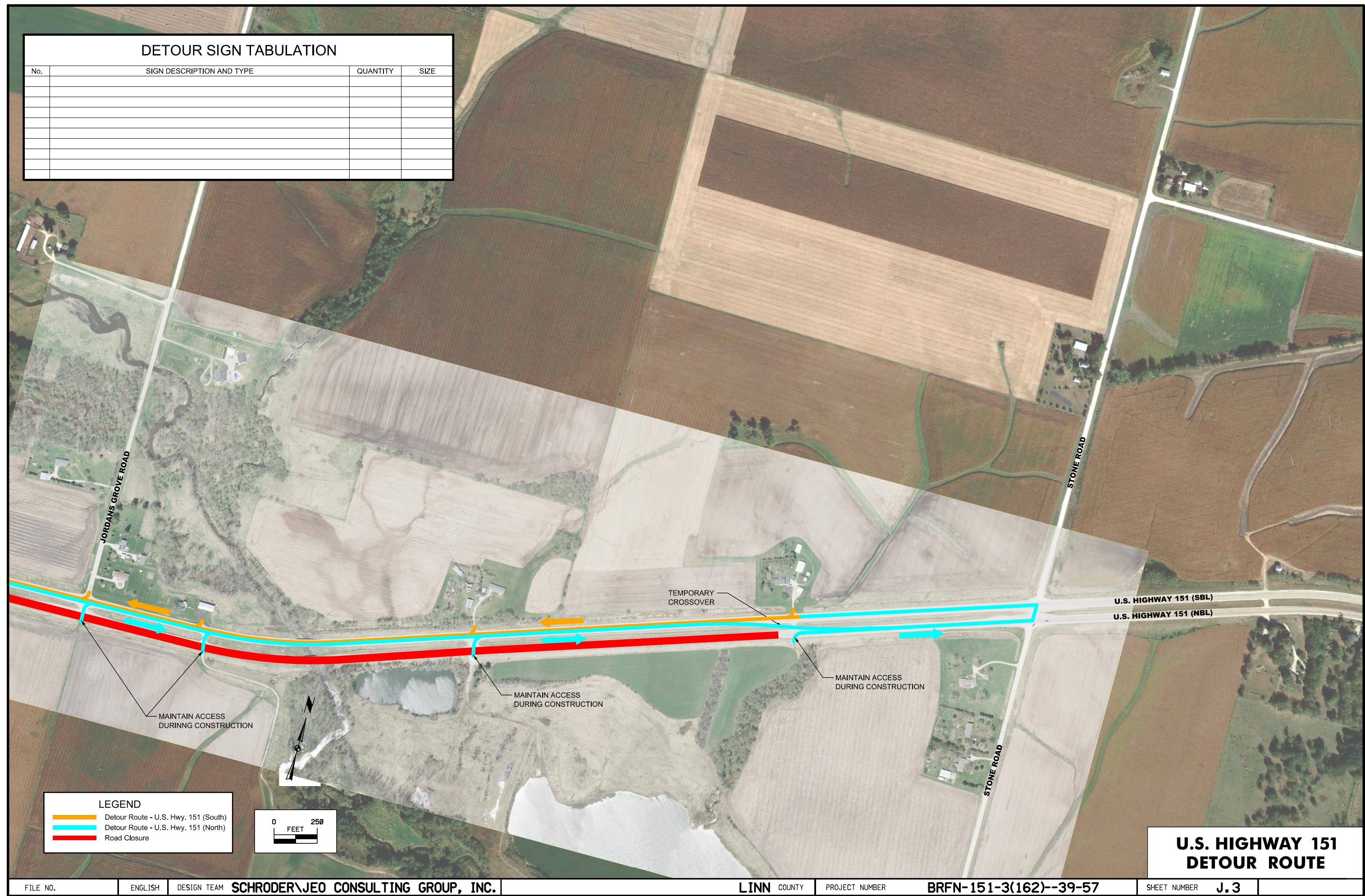
DETOUR SIGN TABULATION

No.	SIGN DESCRIPTION AND TYPE	QUANTITY	SIZE

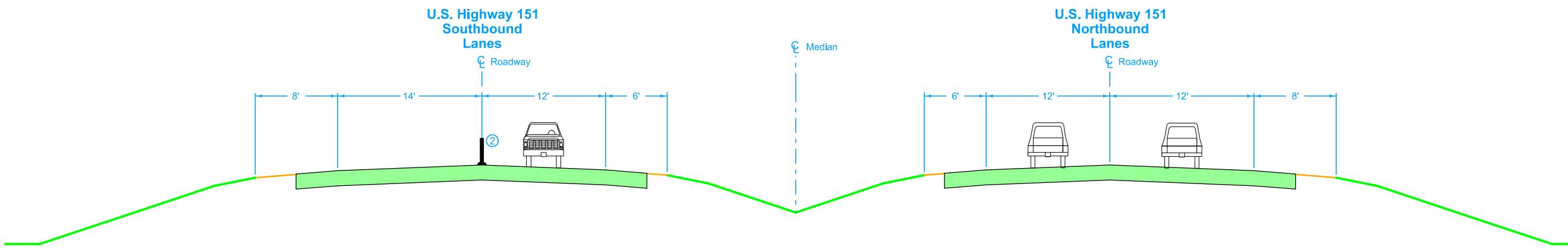


DETOUR SIGN TABULATION

No.	SIGN DESCRIPTION AND TYPE	QUANTITY	SIZE



U.S. 151
Stage 1



STAGE 1

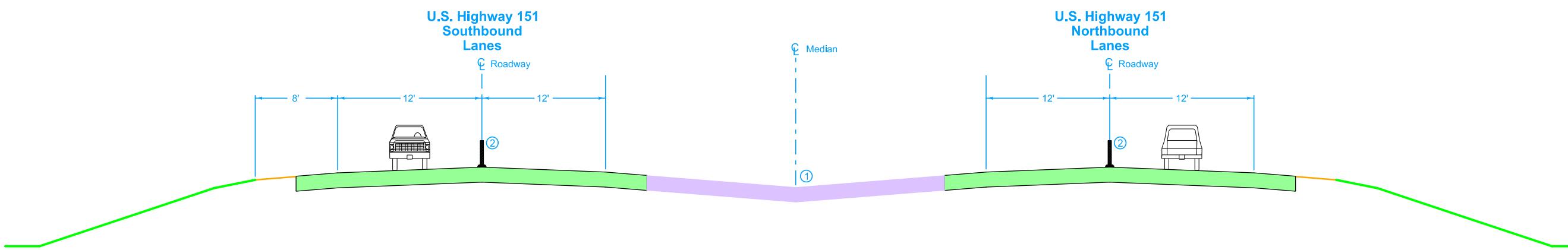
Sta. 6265+00.00 to Sta. 6270+00.00

**Guardrail and Temporary Crash Cushion Installation on Outside Lane of Southbound Bridge
Traffic on Existing Inside Lane for Southbound Traffic**

Notes:

- ① Install Outside Guardrail for Southbound Traffic. Install Outside Temp. Guardrail and Crash Cushion for Trailing Side of Southbound Bridge.
- ② 42" Channelizers
- ③ Refer to Standard Road Plan TC-418

U.S. 151
Stage 2



STAGE 2

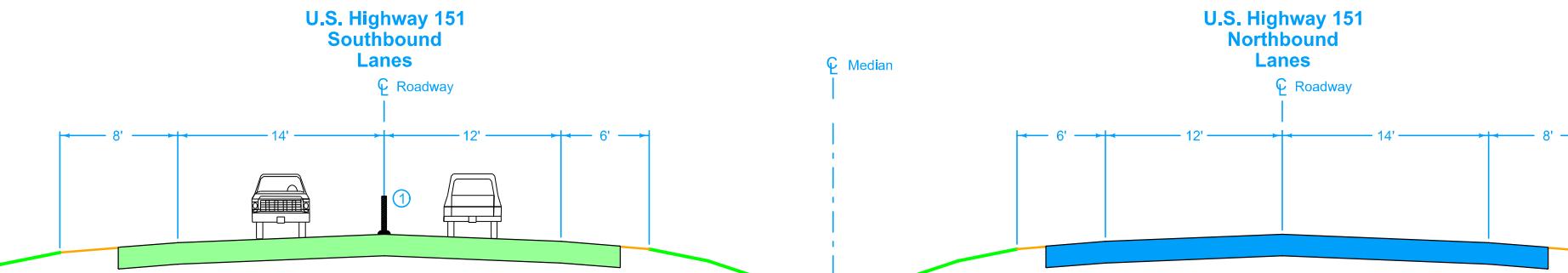
Sta. 6215+00.00 to Sta. 6300+00.00

**Installation of Temporary Median Crossover and Guardrail Installation on Southbound Bridge
Traffic on Existing Outside Lanes**

Notes:

- ① Temporary Cross Over and Temporary Guardrail Construction
- ② 42" Channelizers
- ③ Refer to Standard Road Plan TC-418

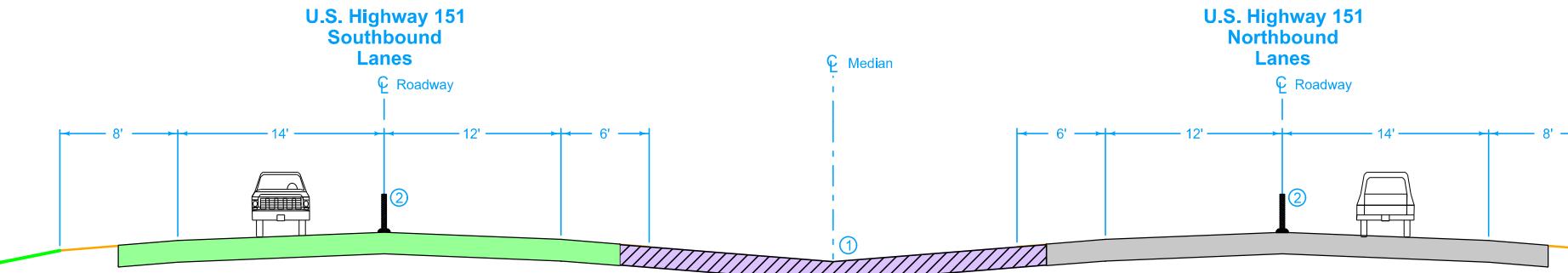
U.S. 151
Stage 3



STAGE 3
Sta. 6248+92.23 to Sta. 6300+00.00
Proposed Northbound Paving Construction and Bridge Replacement
Two-Way Traffic on Southbound Lanes

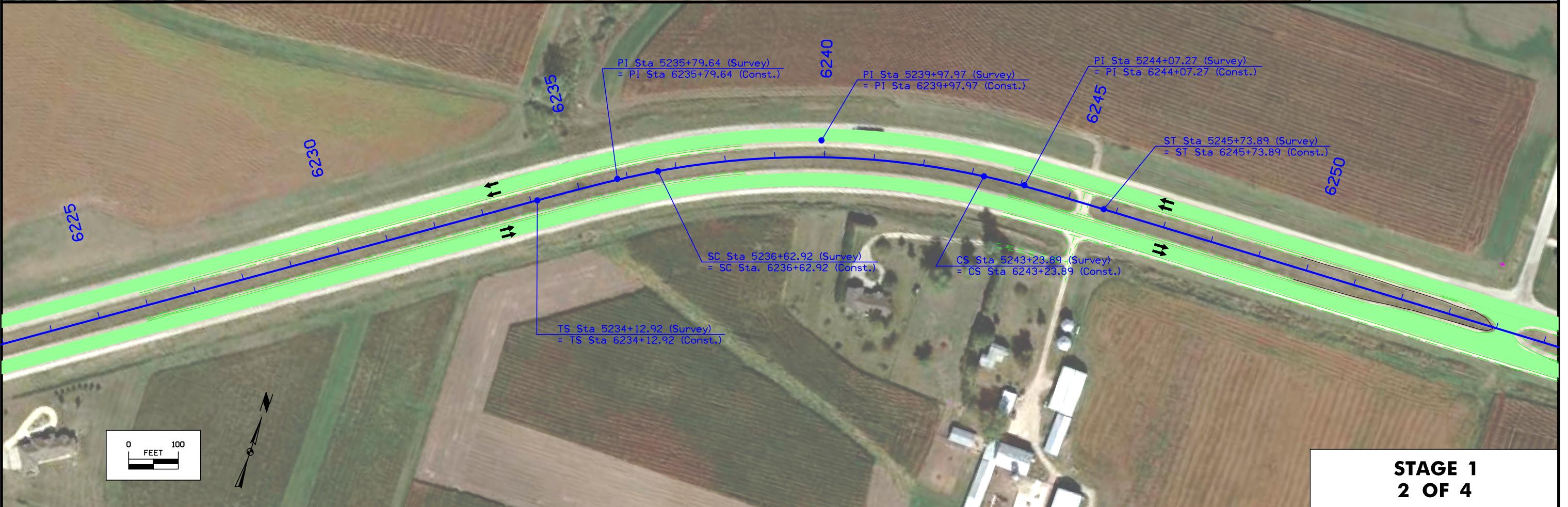
- Notes:
① Temporary Lane Separator System
② Refer to Standard Road Plan TC-61

U.S. 151
Stage 4

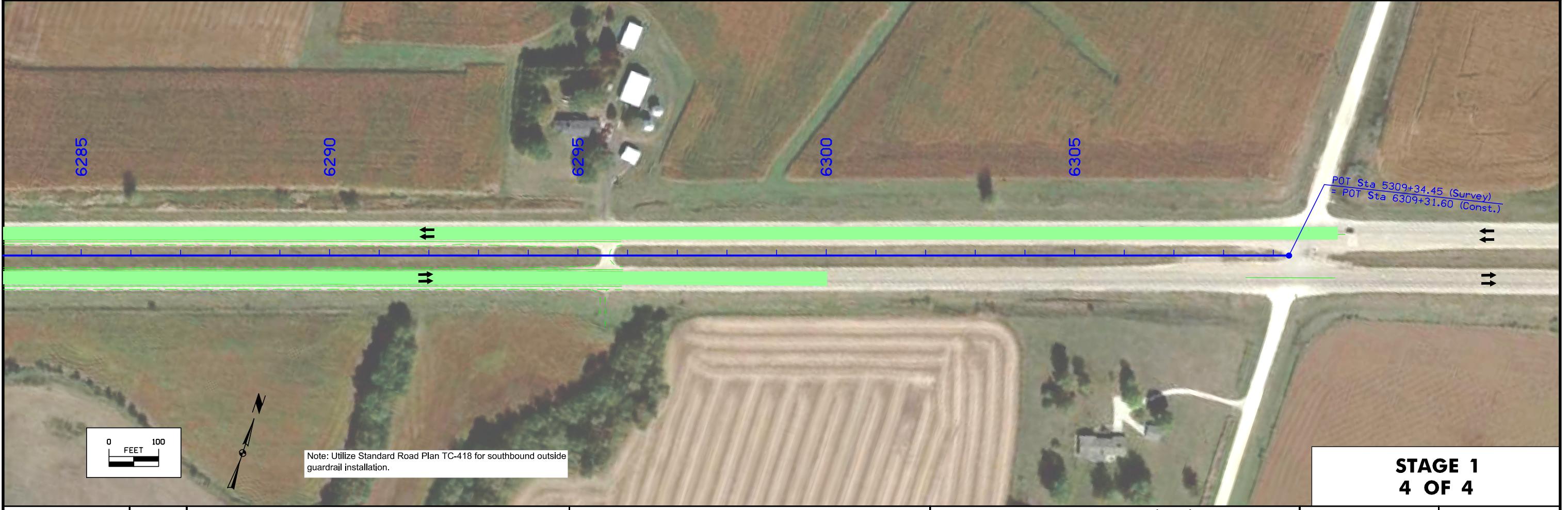
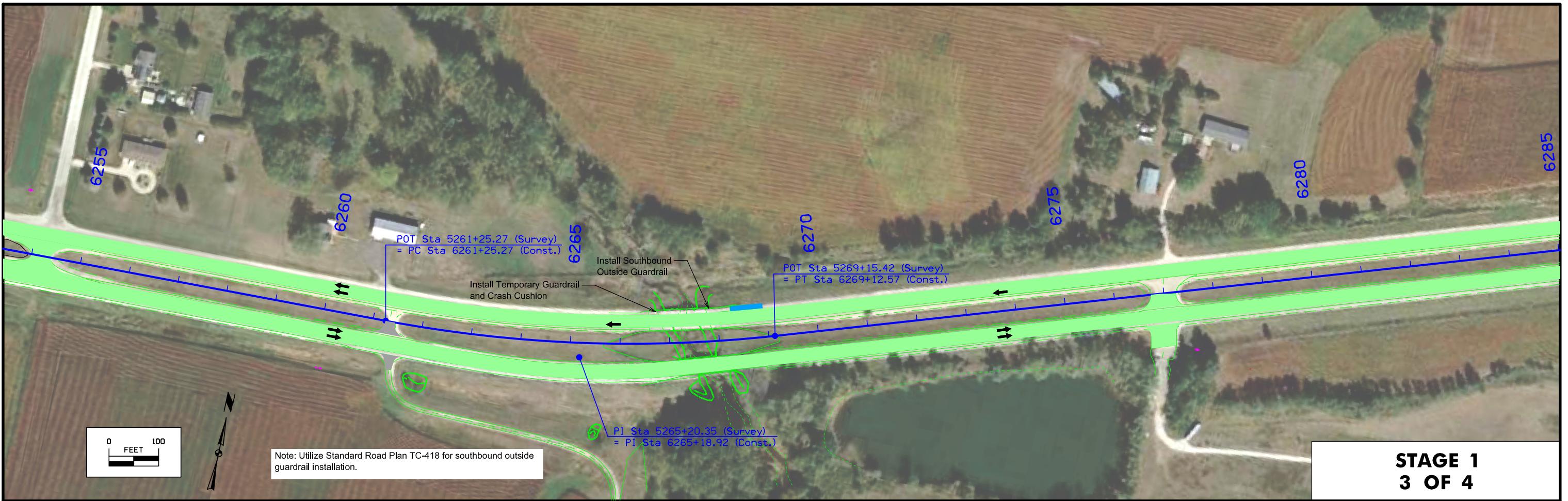


STAGE 4
Sta. 6215+00.00 to Sta. 6300+00.00
Removal of Temporary Median Crossover and Temporary Guardrail at Bridge
Traffic on Outside Lanes

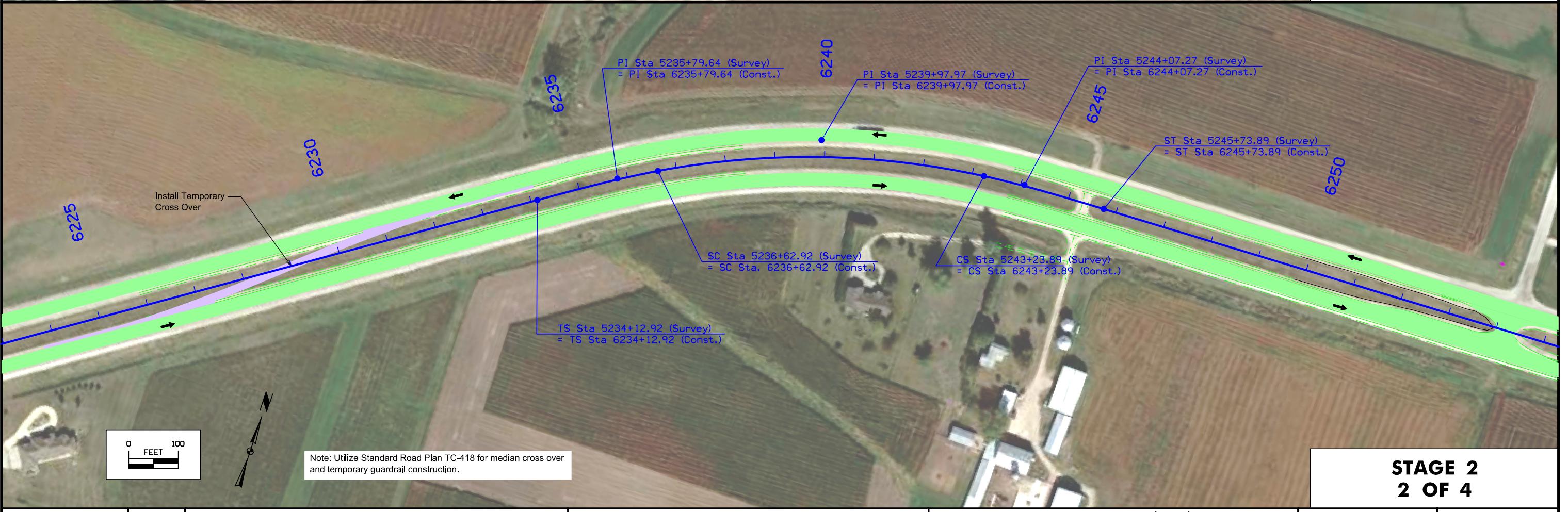
- Notes:
① Remove Temporary Cross Over and Install Inside Guardrail for Southbound Bridge
② 42" Channelizers
③ Refer to Standard Road Plan TC-418

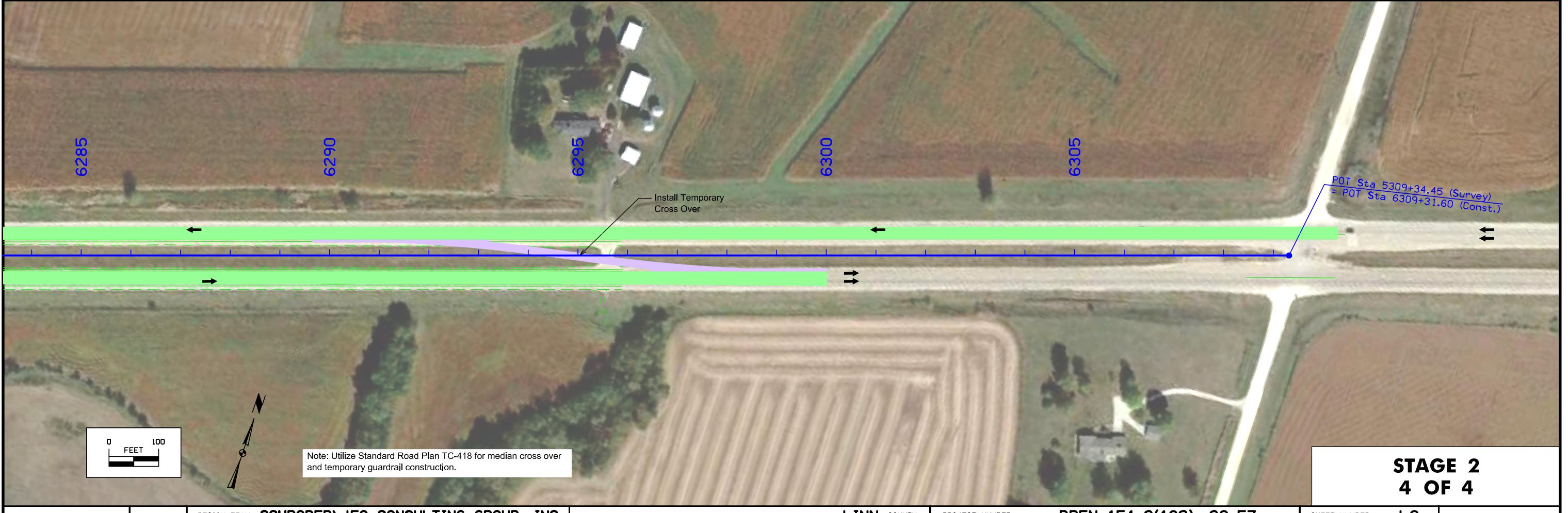
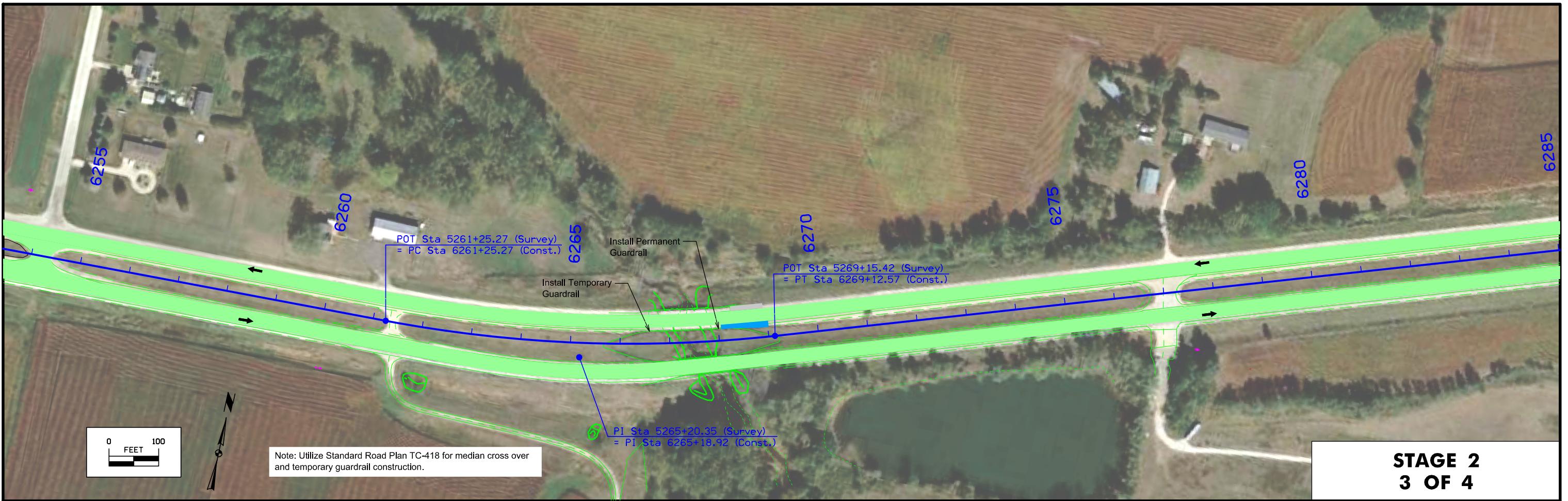


FILE NO.	ENGLISH	DESIGN TEAM	SCHRODER\JEO CONSULTING GROUP, INC.	LINN COUNTY	PROJECT NUMBER	BRFN-151-3(162)--39-57	SHEET NUMBER	J.6
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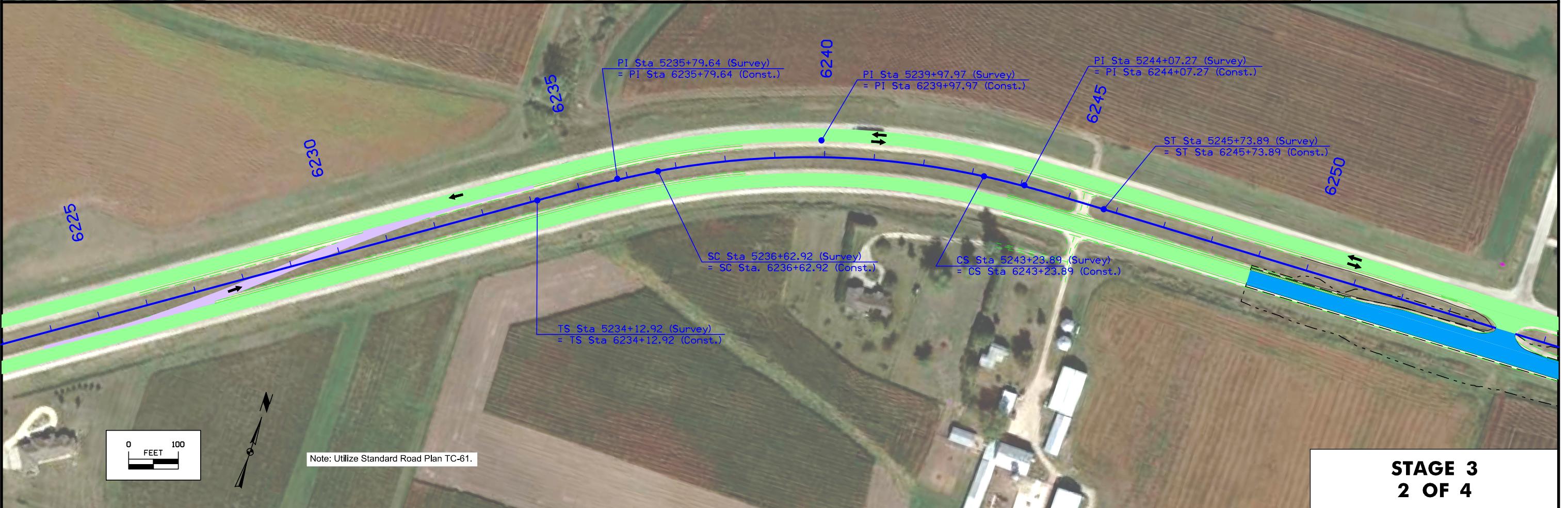


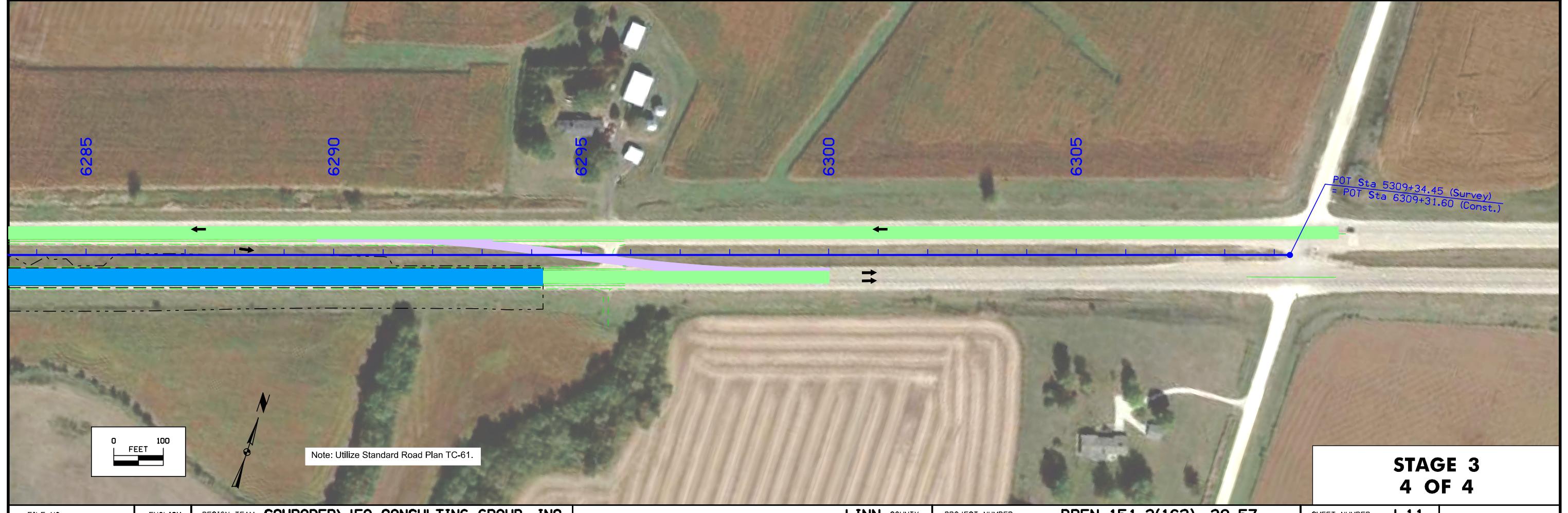
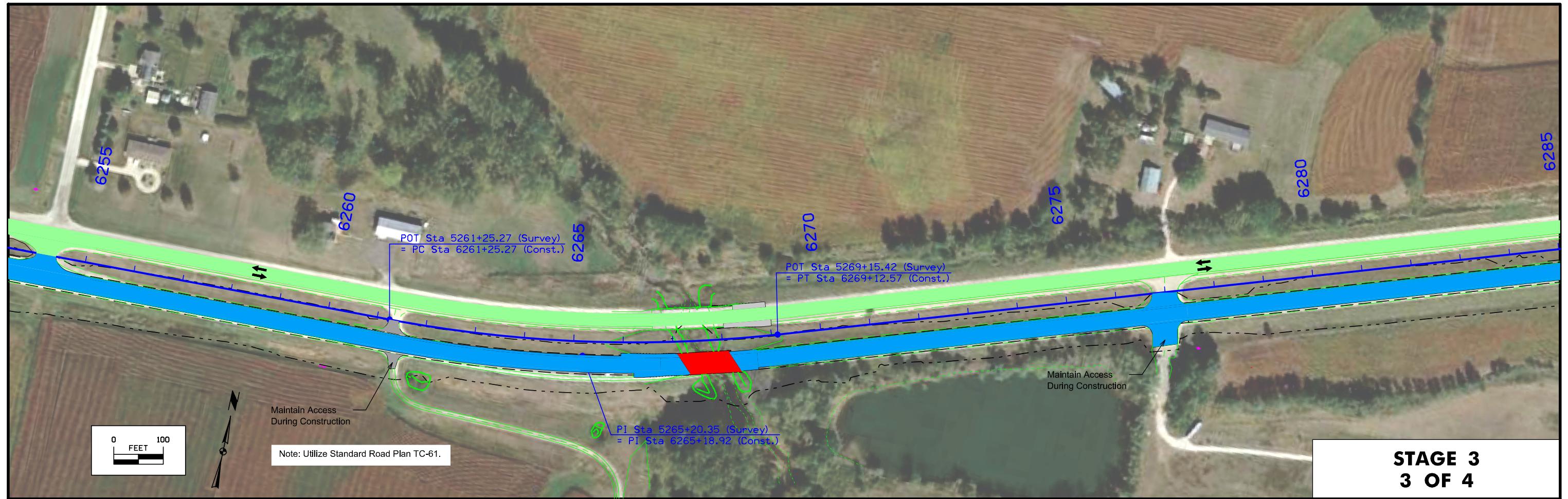
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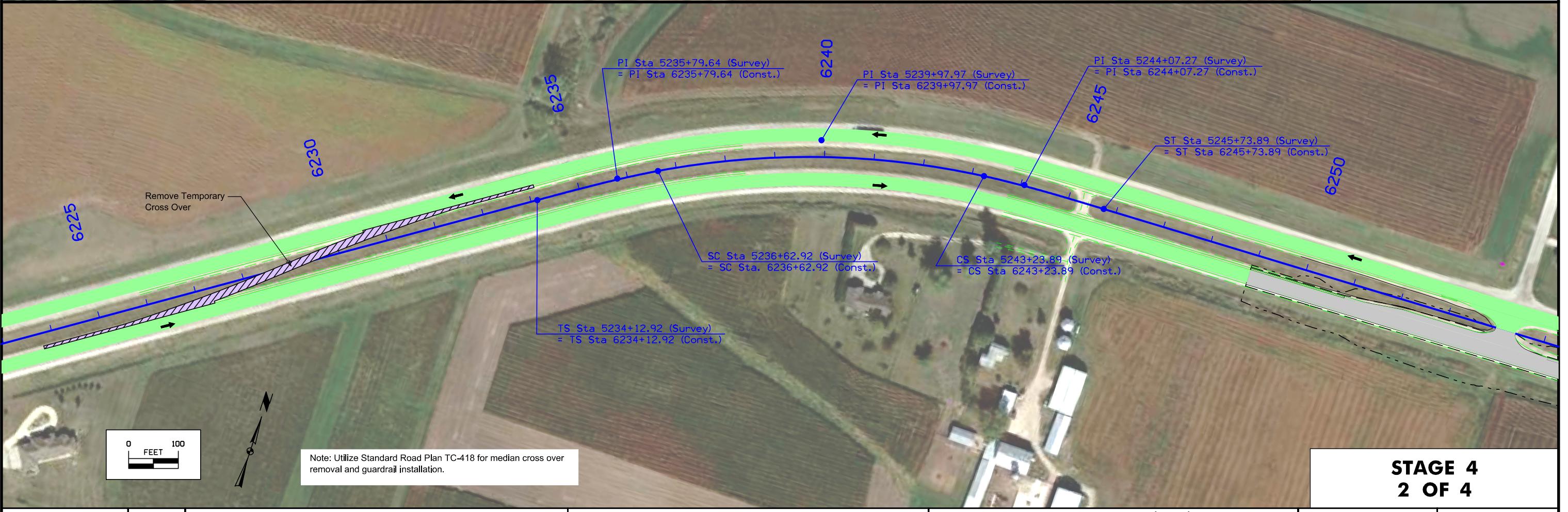
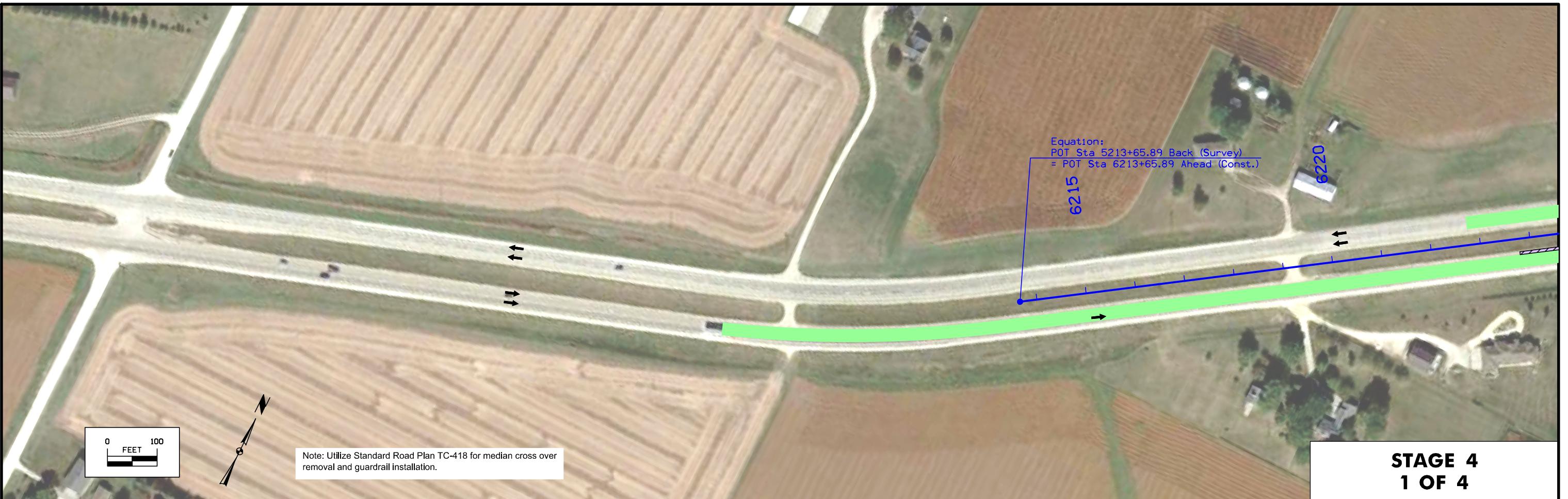


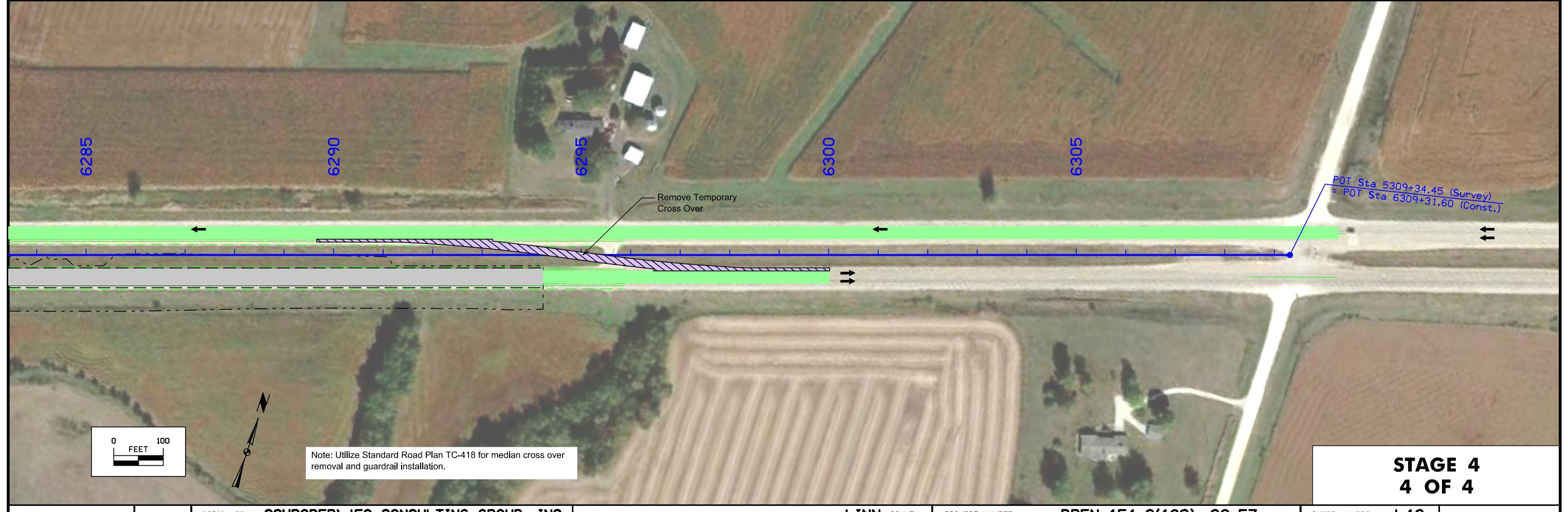
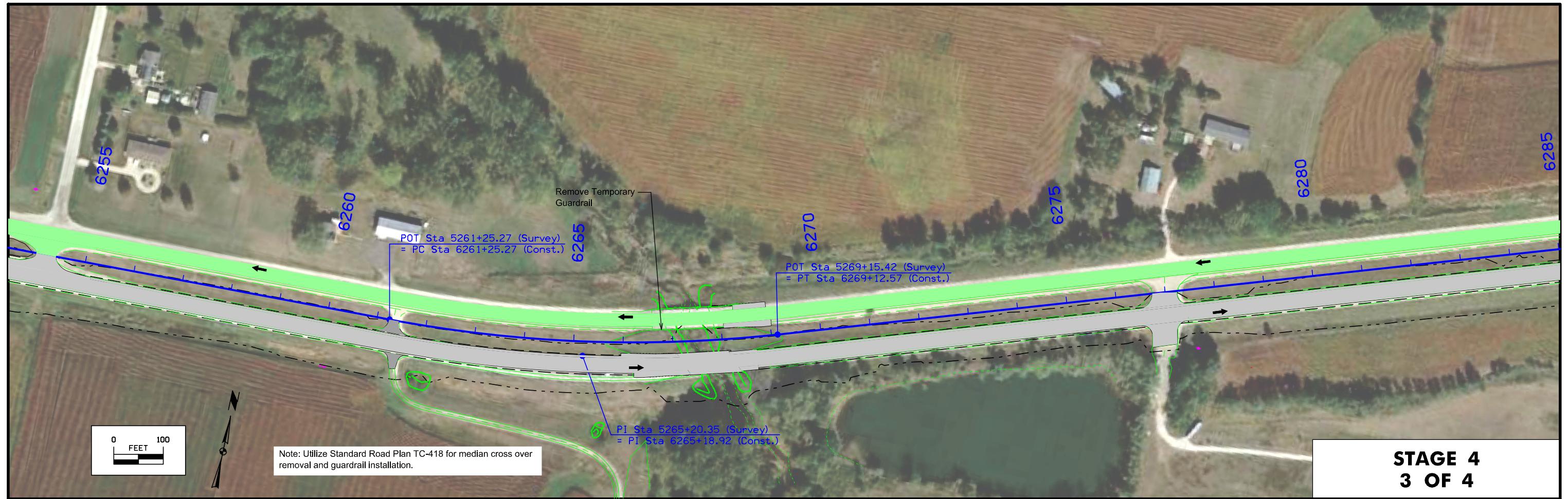
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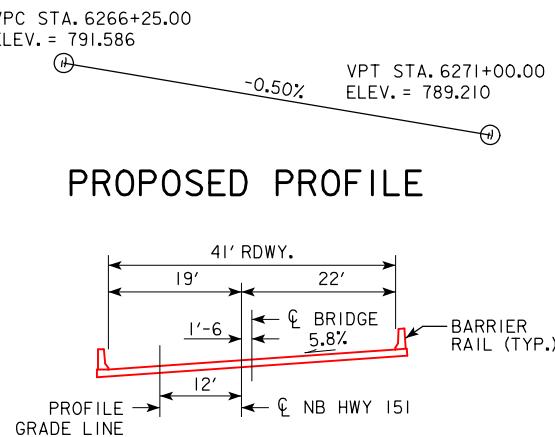
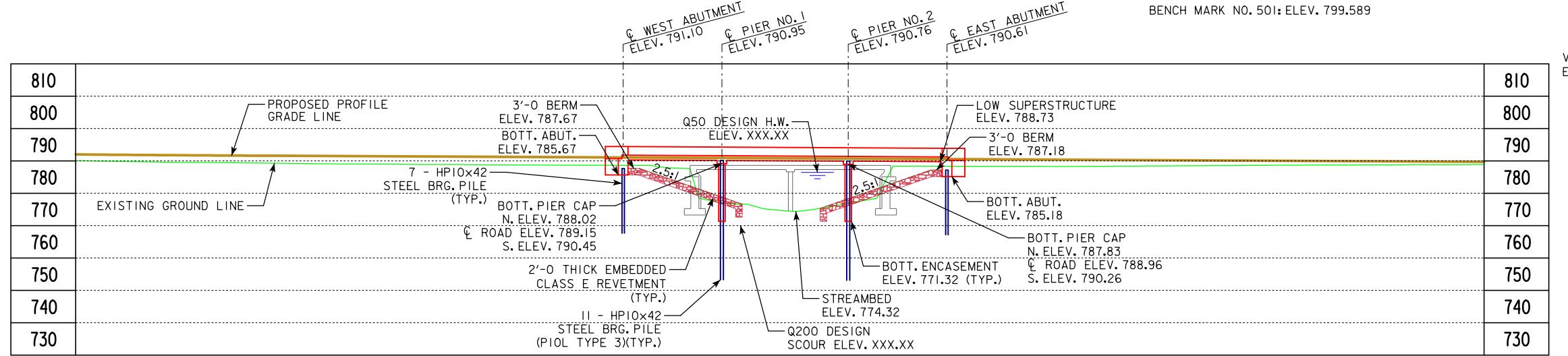


FILE NO.	ENGLISH	DESIGN TEAM	SCHRODER\JEO CONSULTING GROUP, INC.	LINN COUNTY	PROJECT NUMBER	BRFN-151-3(162)--39-57	SHEET NUMBER	J.11
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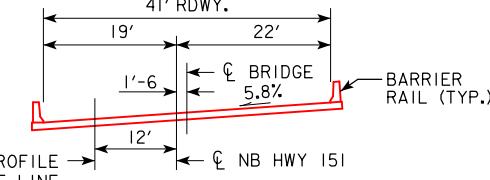




FILE NO.	ENGLISH	DESIGN TEAM	SCHRODER\JEO CONSULTING GROUP, INC.	LINN COUNTY	PROJECT NUMBER	BRFN-151-3(162)--39-57	SHEET NUMBER	J.13
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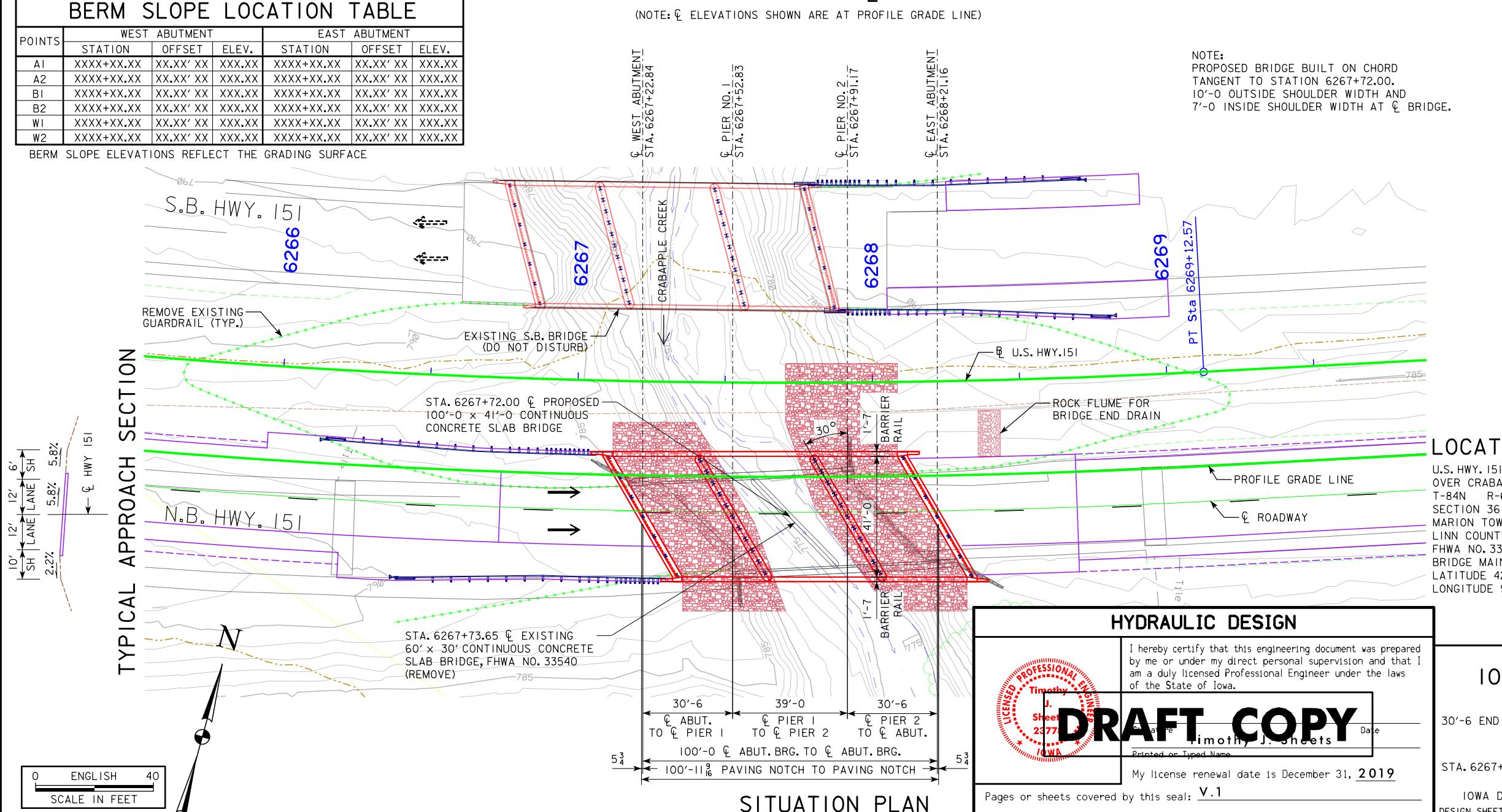
PROPOSED PROFILE



TYPICAL BRIDGE SECTION AT C BRIDGE

BERM SLOPE LOCATION TABLE						
POINTS	WEST ABUTMENT		EAST ABUTMENT			
	STATION	OFFSET	ELEV.	STATION	OFFSET	ELEV.
A1	XXXX+XX.XX	XX.XX' XX	XXX.XX	XX.XX' XX	XXX.XX	XXX.XX
A2	XXXX+XX.XX	XX.XX' XX	XXX.XX	XXXX+XX.XX	XX.XX' XX	XXX.XX
B1	XXXX+XX.XX	XX.XX' XX	XXX.XX	XXXX+XX.XX	XX.XX' XX	XXX.XX
B2	XXXX+XX.XX	XX.XX' XX	XXX.XX	XXXX+XX.XX	XX.XX' XX	XXX.XX
W1	XXXX+XX.XX	XX.XX' XX	XXX.XX	XXXX+XX.XX	XX.XX' XX	XXX.XX
W2	XXXX+XX.XX	XX.XX' XX	XXX.XX	XXXX+XX.XX	XX.XX' XX	XXX.XX

BERM SLOPE ELEVATIONS REFLECT THE GRADING SURFACE



HYDRAULIC DATA

DRAINAGE AREA = 13.5 SQ. MI.
STREAM SLOPE = ???.? FT./MI.
AVG. LOW WATER STAGE = ????.?
 Q_{50} = 2,840 CFS
STAGE = ????.?
FREEBOARD = ????.?
BACKWATER = ?.? FT.
AVG. BRIDGE VELOCITY = ?.? FPS

Q_{100} = 3,380 CFS
STAGE = ????.?
BACKWATER = ?.? FT.
 Q_{200} = 3,810 CFS
STAGE = ????.?
CALCULATED DESIGN SCOUR = ????.?
 Q_{500} = 4,450 CFS
STAGE = ????.?
AVG. BRIDGE VELOCITY = ?.? FPS
CALCULATED CHECK SCOUR = ????.?

ROADWAY OVERTOP ????.?
STA. ???+??

EXTREME HW STAGE = UNKNOWN
DATE = UNKNOWN

UTILITIES LEGEND

FIBER OPTIC — FO —

TRAFFIC ESTIMATE

2021 AADT	16,800	V.P.D.
2043 AADT	23,100	V.P.D.
2043 DHV	—	V.P.H.
TRUCKS	—	%
TOTAL DESIGN ESALs	—	

DESIGN FOR 30° SKEW (R.A.)
100'-0" X 41'-0" CONTINUOUS CONCRETE SLAB BRIDGE
39'-0" INTERIOR SPAN
SITUATION PLAN
STA. 6267+72.00 MAY 2018
Linn County IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. ____ OF ____ FILE NO. ____ DESIGN NO. ____

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)
- SLOPE DRESSING — Slope Dressing Only
- 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
- BOULDERS — 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

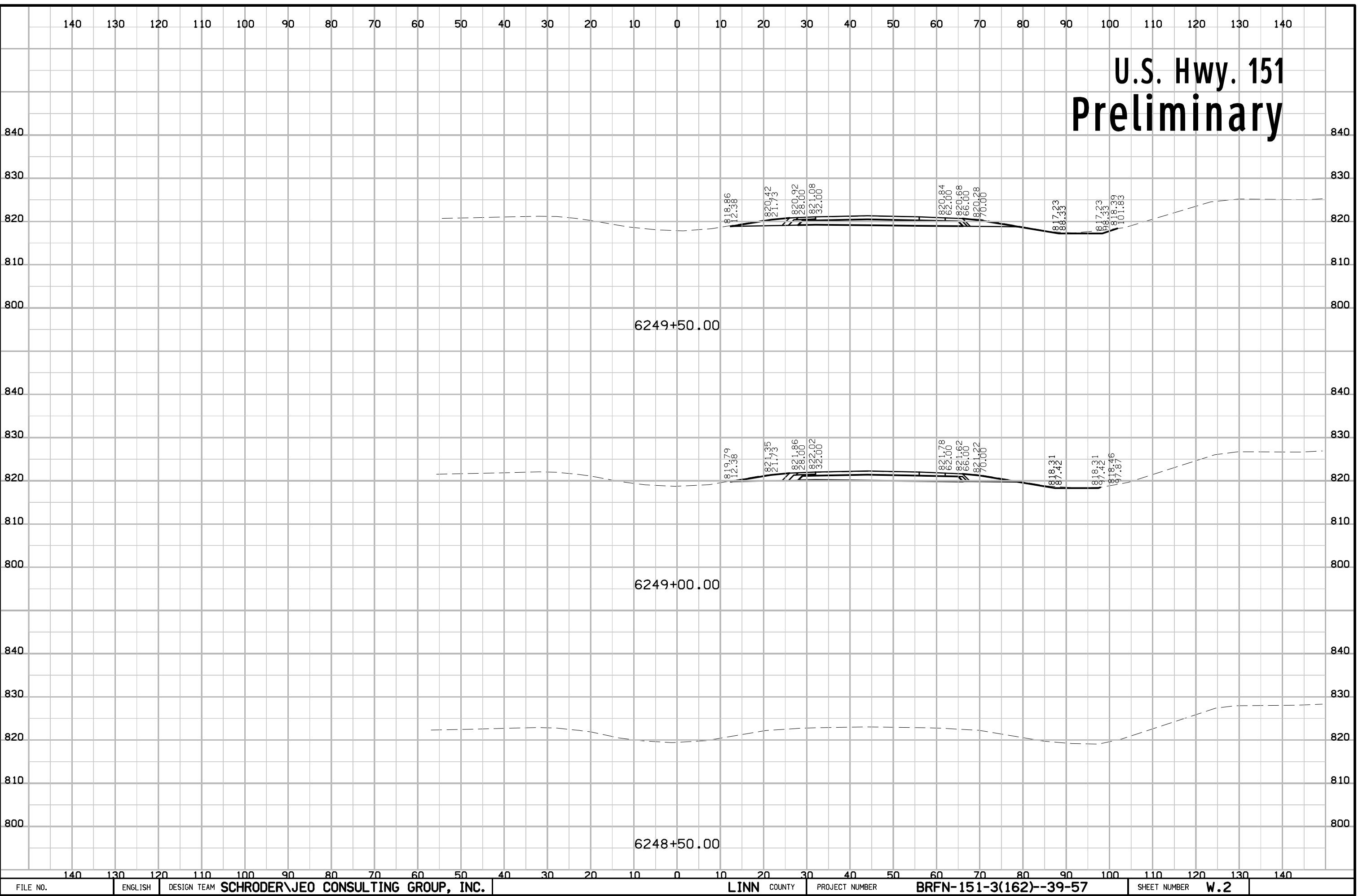
-  Existing Right-of-Way Limit
-  Proposed Right-of-Way Limit
-  Temporary Right-of-Way Limit

CROSS SECTION LEGEND AND SYMBOL INFORMATION SHEET

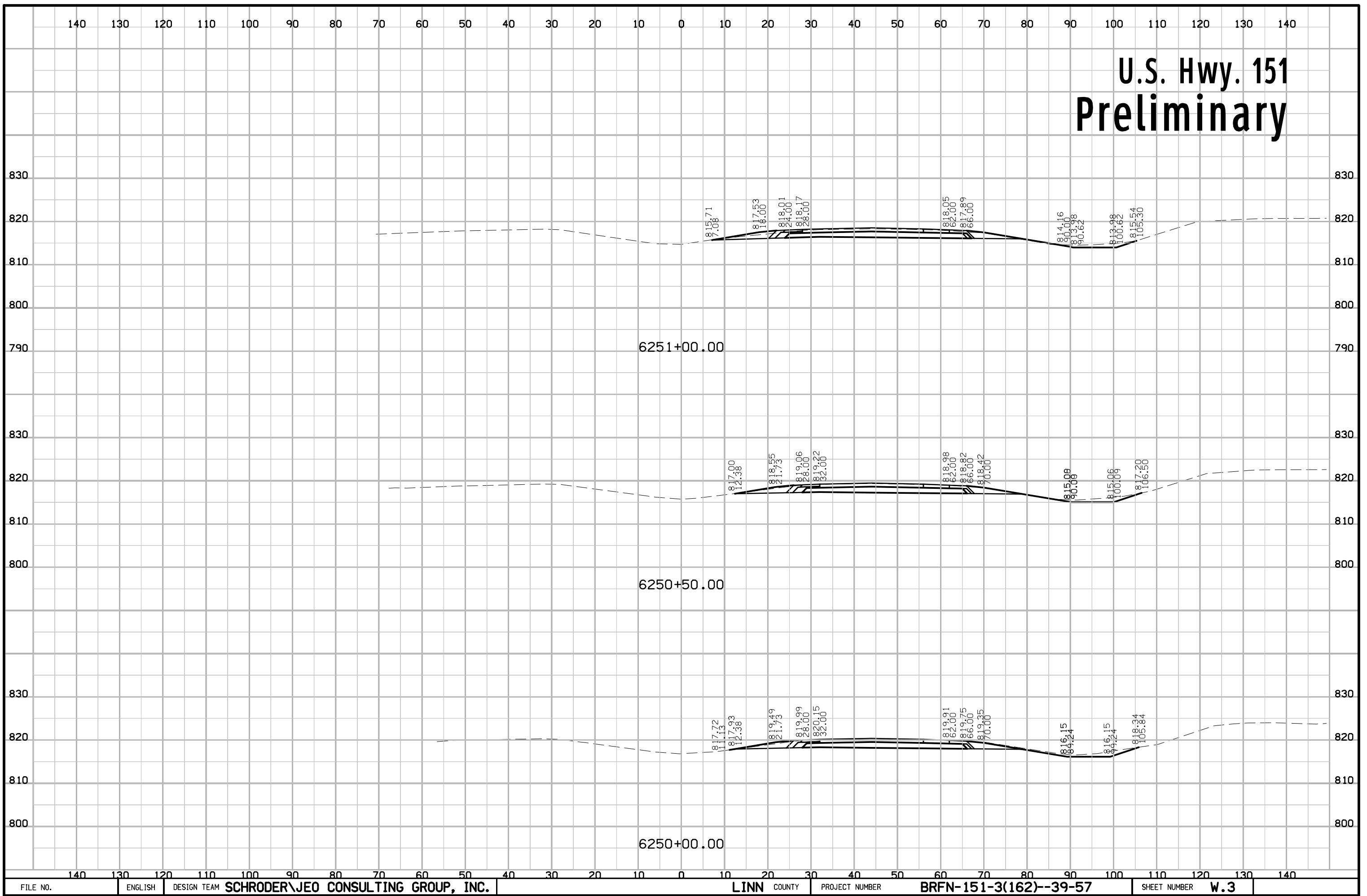
(COVERS SHEET SERIES W, X, Y, & Z)

FILE NO.	ENGLISH	DESIGN TEAM SCHRODER\JEO CONSULTING GROUP, INC.	LINN COUNTY	PROJECT NUMBER BRFN-151-3(162)-39-57	SHEET NUMBER W.1
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**U.S. Hwy. 151
Preliminary**

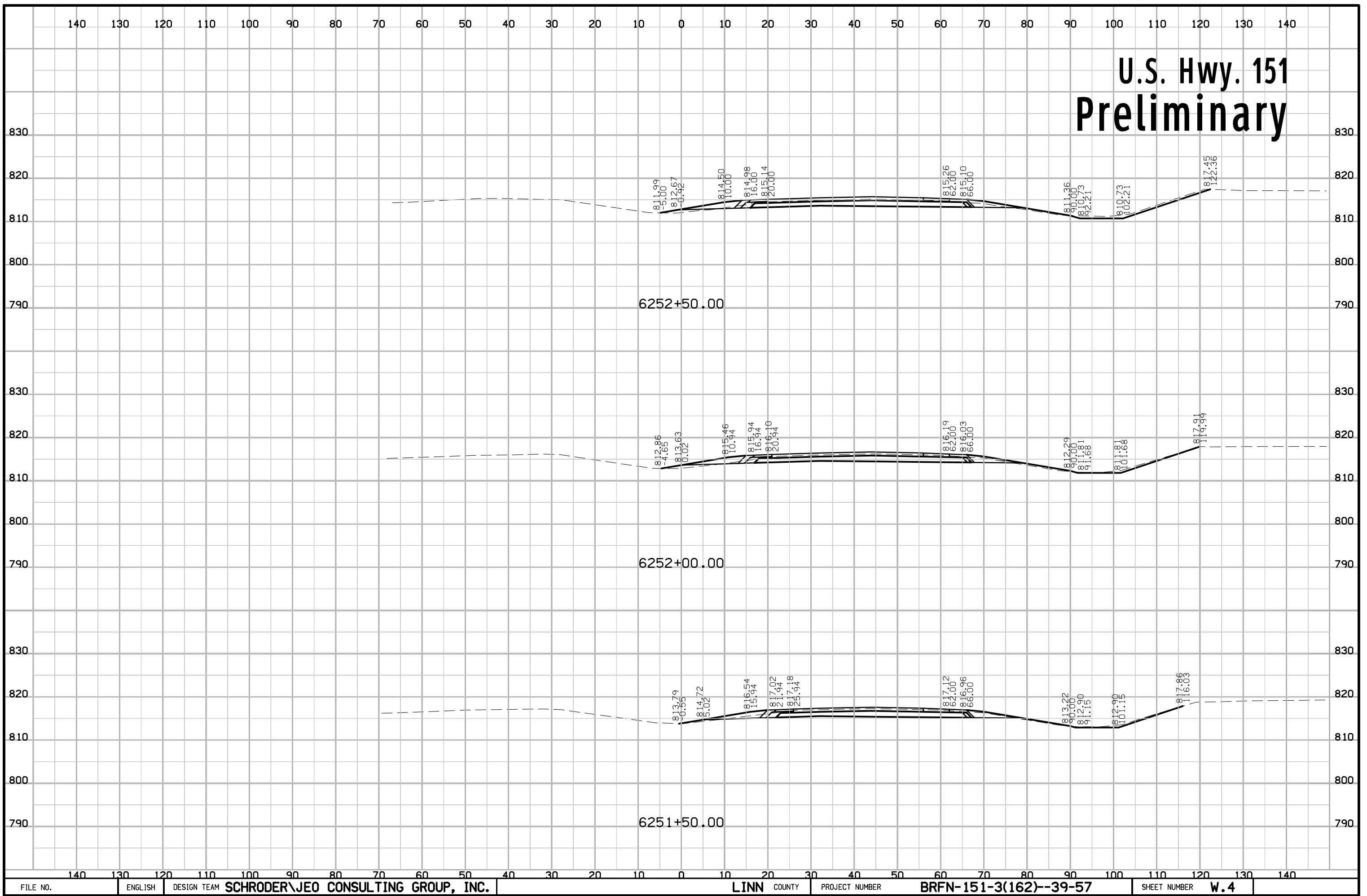


U.S. Hwy. 151
Preliminary



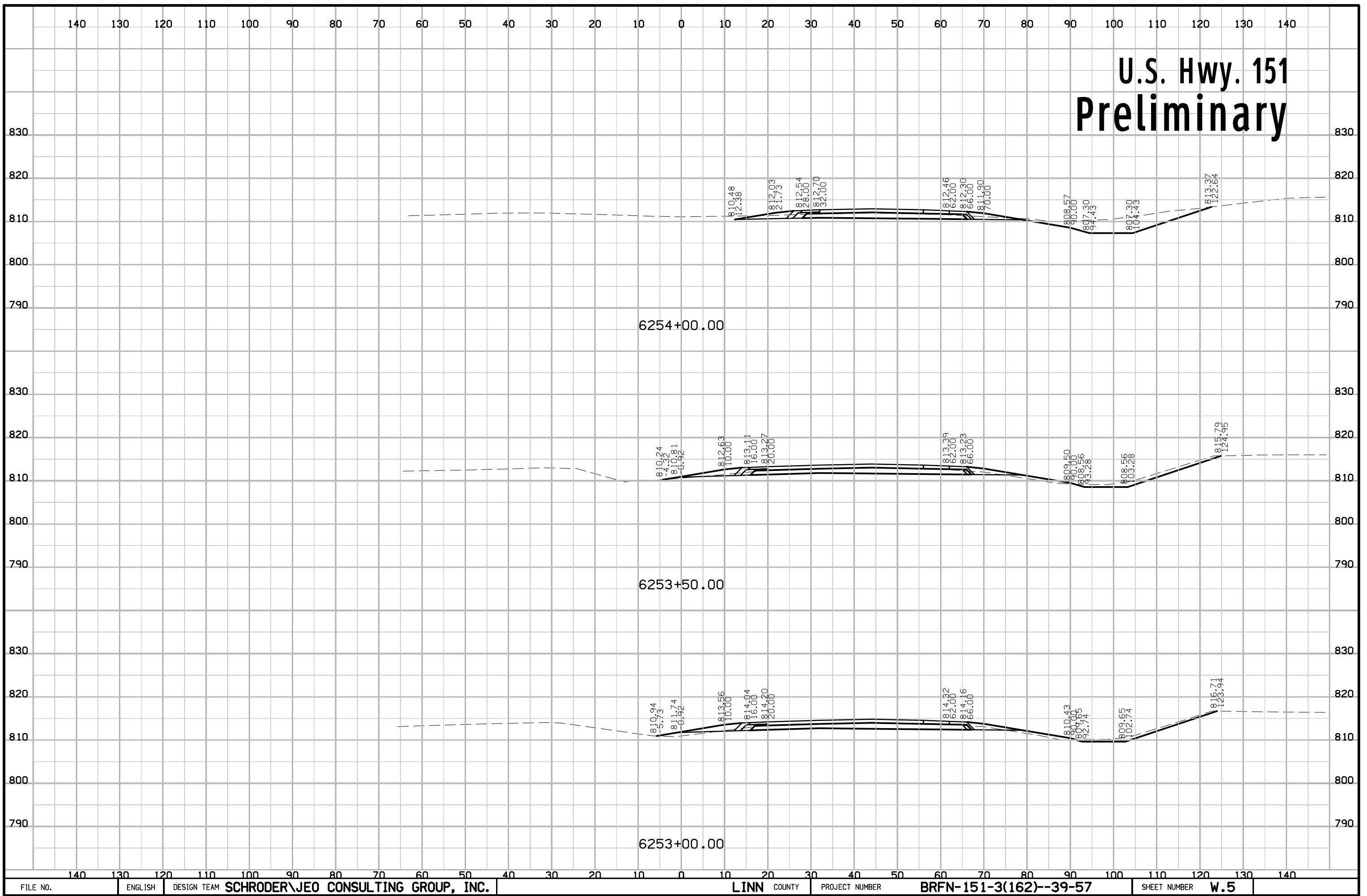
U.S. Hwy. 151

Preliminary



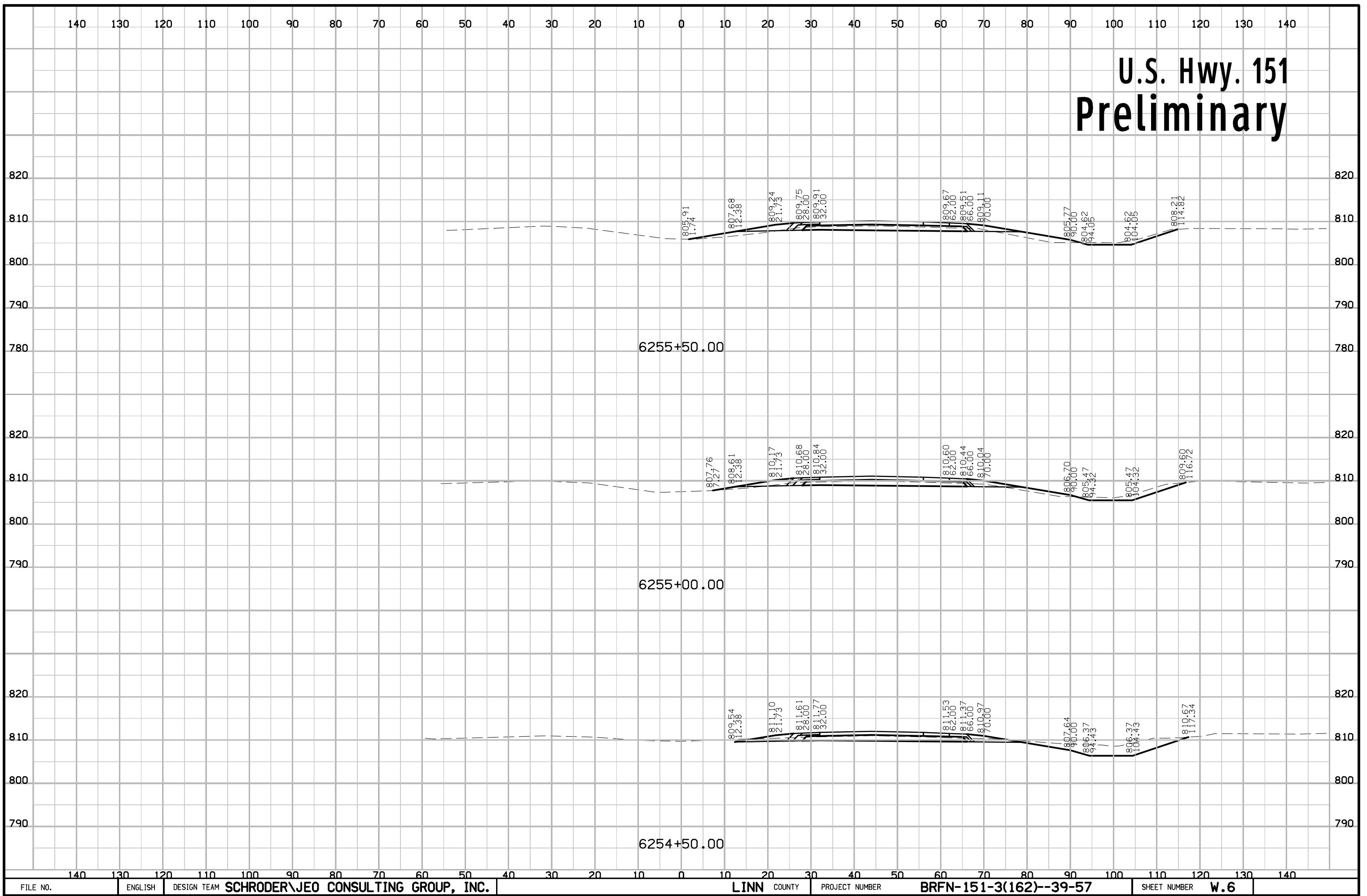
U.S. Hwy. 151

Preliminary



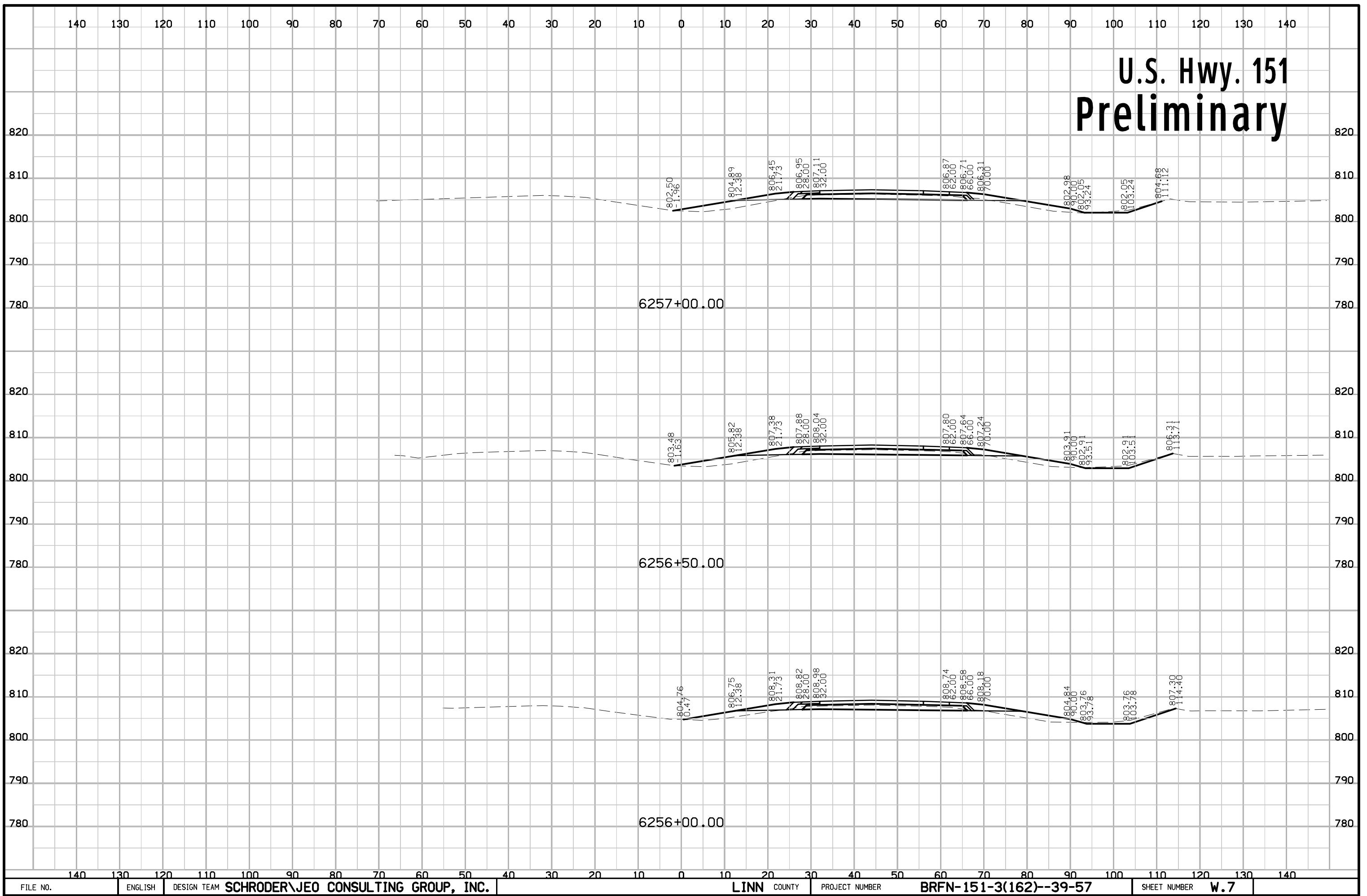
U.S. Hwy. 151

Preliminary



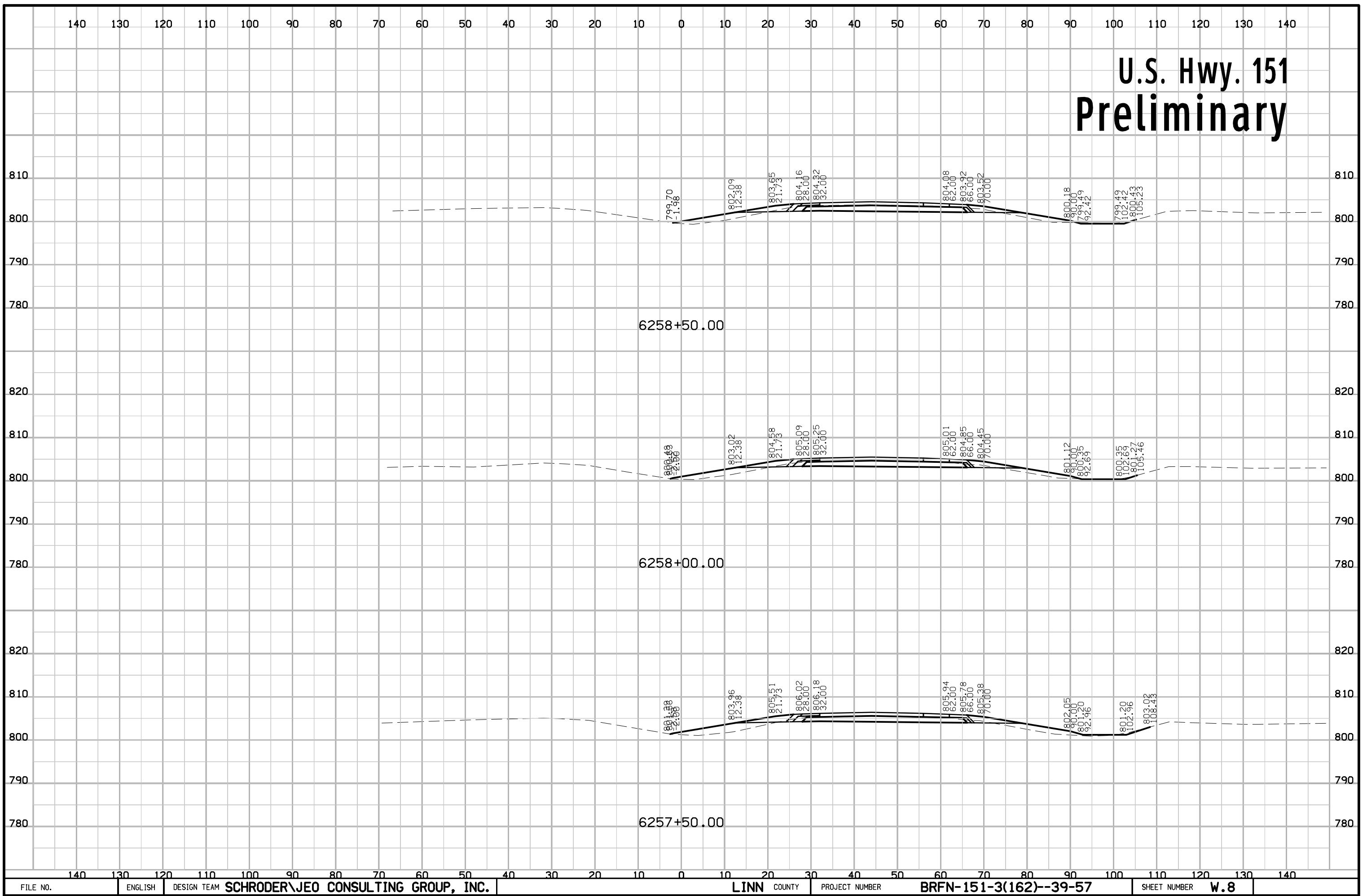
FILE NO.	ENGLISH	DESIGN TEAM	SCHRODER\JEO CONSULTING GROUP, INC.	LINN COUNTY	PROJECT NUMBER	BRFN-151-3(162)-39-57	SHEET NUMBER	W.6
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U.S. Hwy. 151
Preliminary



U.S. Hwy. 151

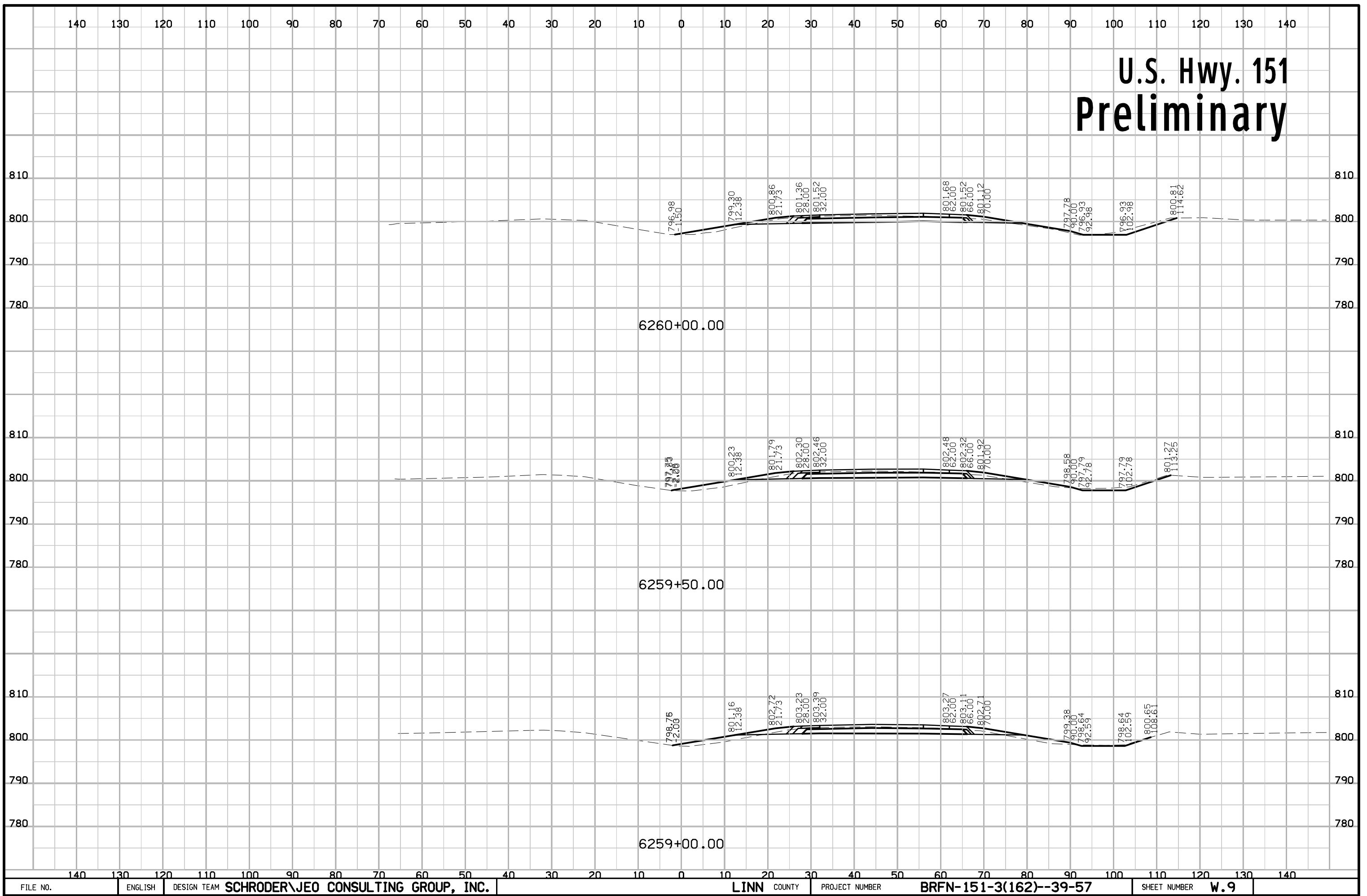
Preliminary



FILE NO.	ENGLISH	DESIGN TEAM	SCHRODER\JEO CONSULTING GROUP, INC.	LINN COUNTY	PROJECT NUMBER	BRFN-151-3(162)-39-57	SHEET NUMBER	W.8
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U.S. Hwy. 151

Preliminary



FILE NO.	ENGLISH	DESIGN TEAM	SCHRODER\JEO CONSULTING GROUP, INC.	LINN COUNTY	PROJECT NUMBER	BRFN-151-3(162)-39-57	SHEET NUMBER	W.9
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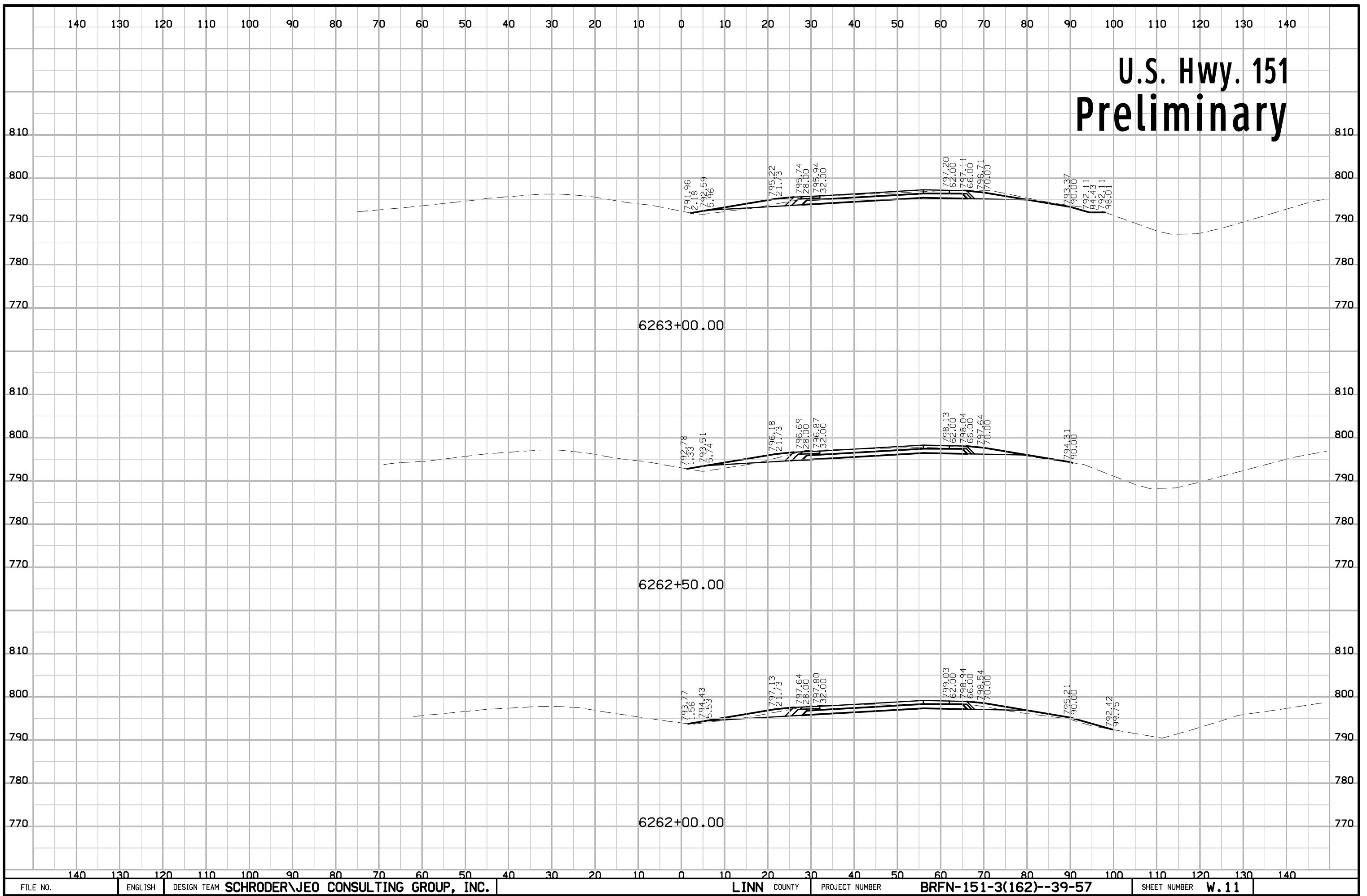
U.S. Hwy. 151

Preliminary



U.S. Hwy. 151

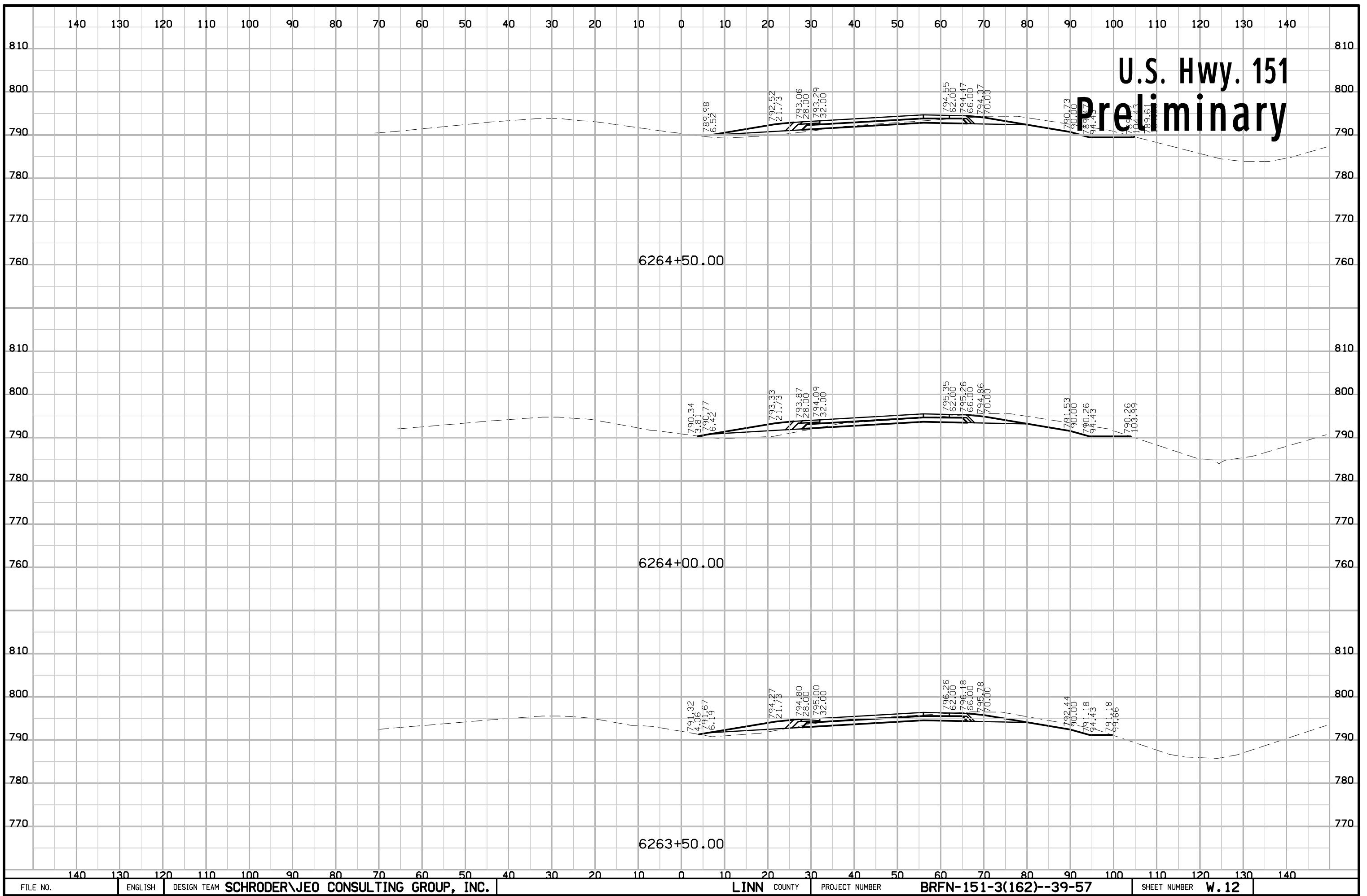
Preliminary



FILE NO.	ENGLISH	DESIGN TEAM	SCHRODER\JEO CONSULTING GROUP, INC.	LINN COUNTY	PROJECT NUMBER	BRFN-151-3(162)-39-57	SHEET NUMBER	W.11
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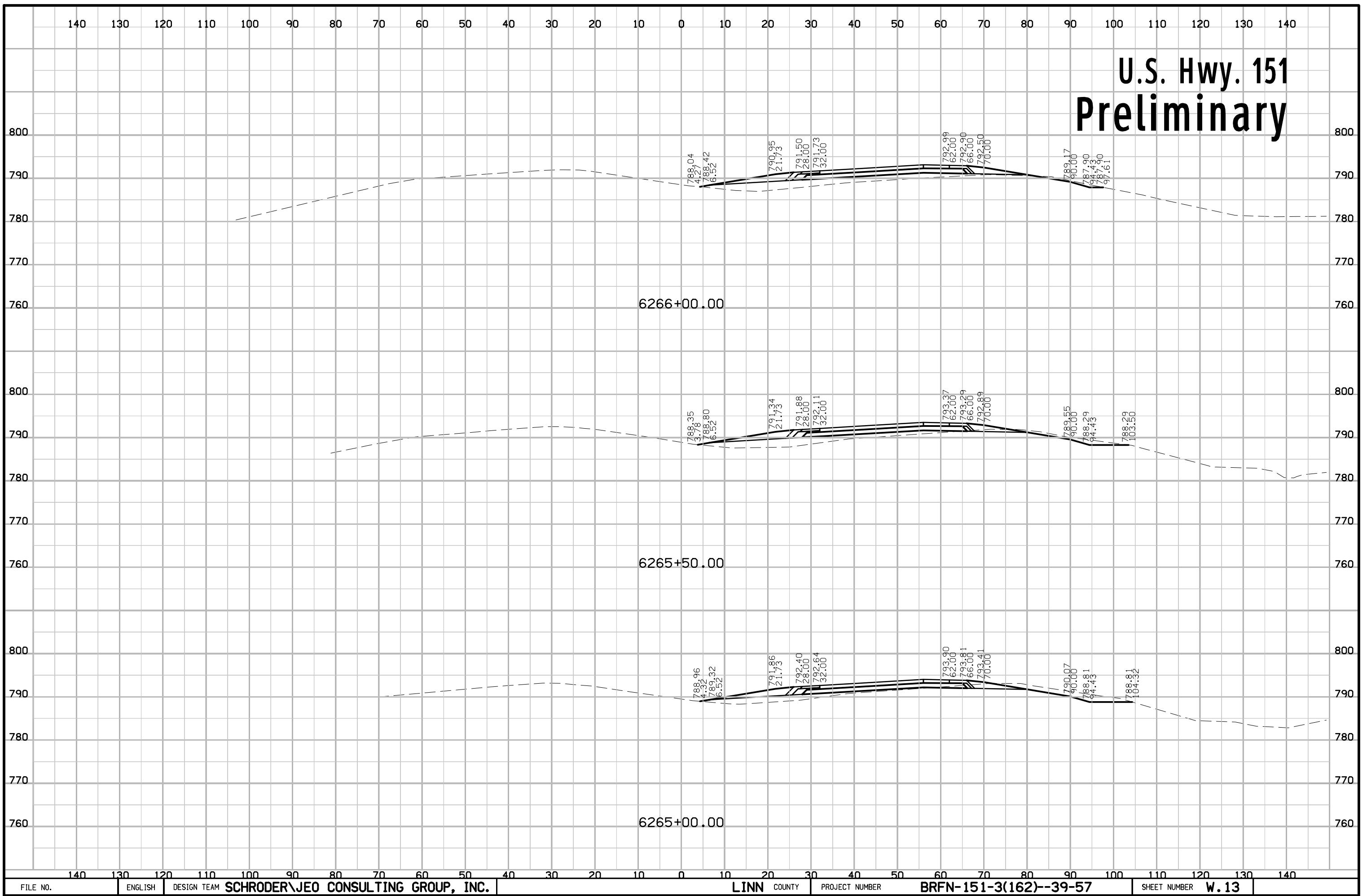
U.S. Hwy. 151

Preliminary



U.S. Hwy. 151

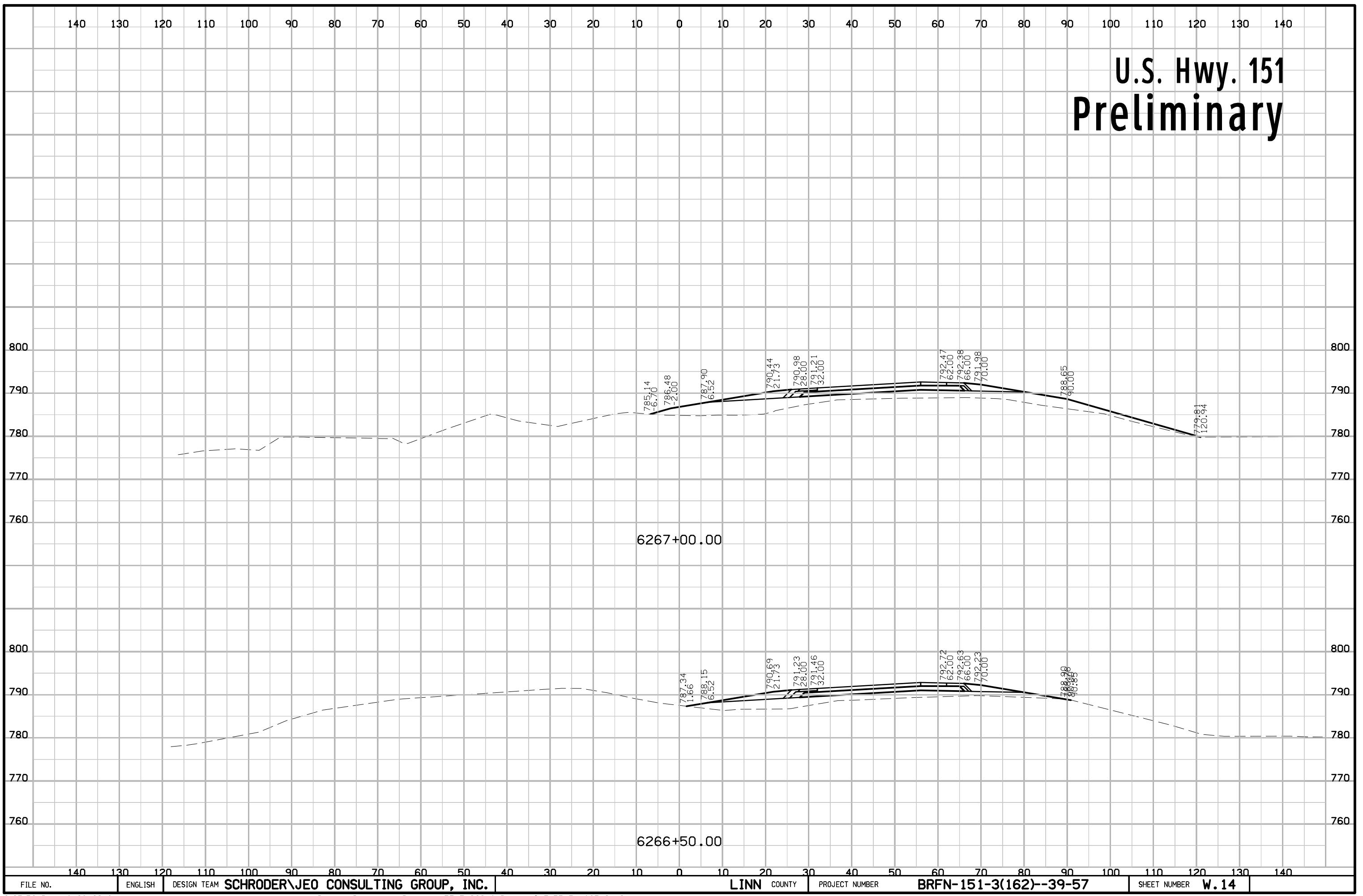
Preliminary



FILE NO.	ENGLISH	DESIGN TEAM	SCHRODER\JEO CONSULTING GROUP, INC.	LINN COUNTY	PROJECT NUMBER	BRFN-151-3(162)-39-57	SHEET NUMBER	W.13
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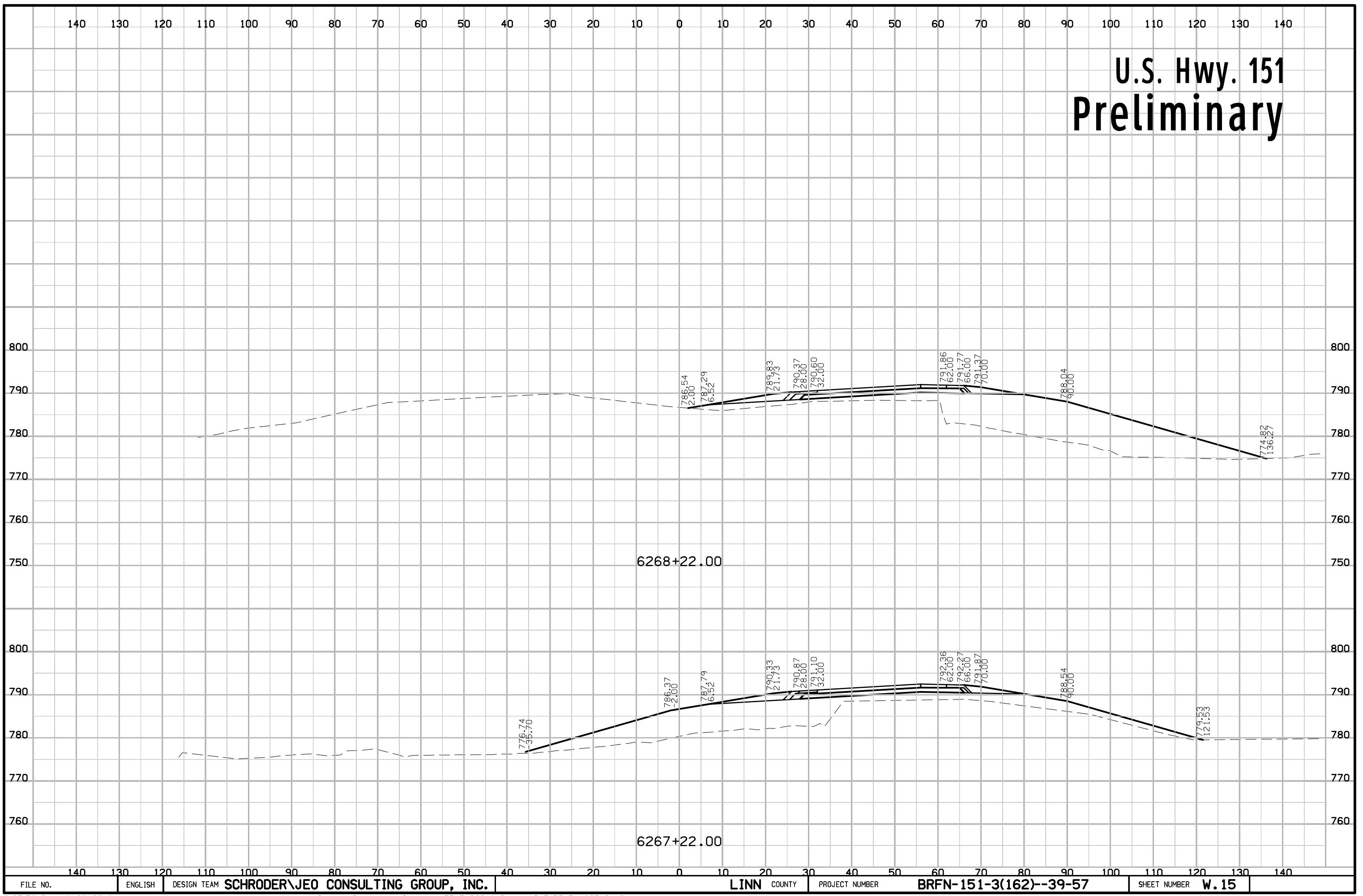
U.S. Hwy. 151

Preliminary



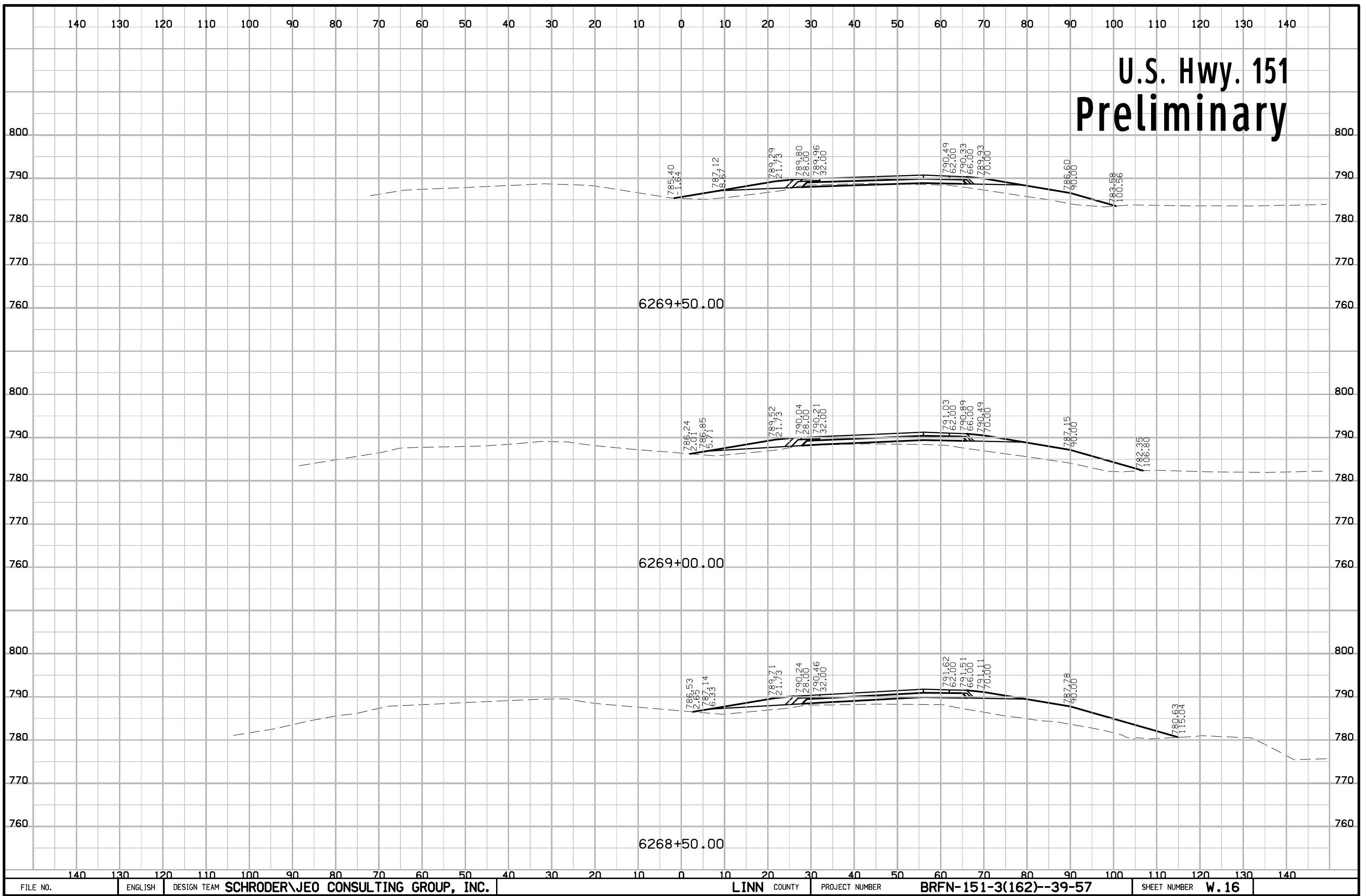
U.S. Hwy. 151

Preliminary



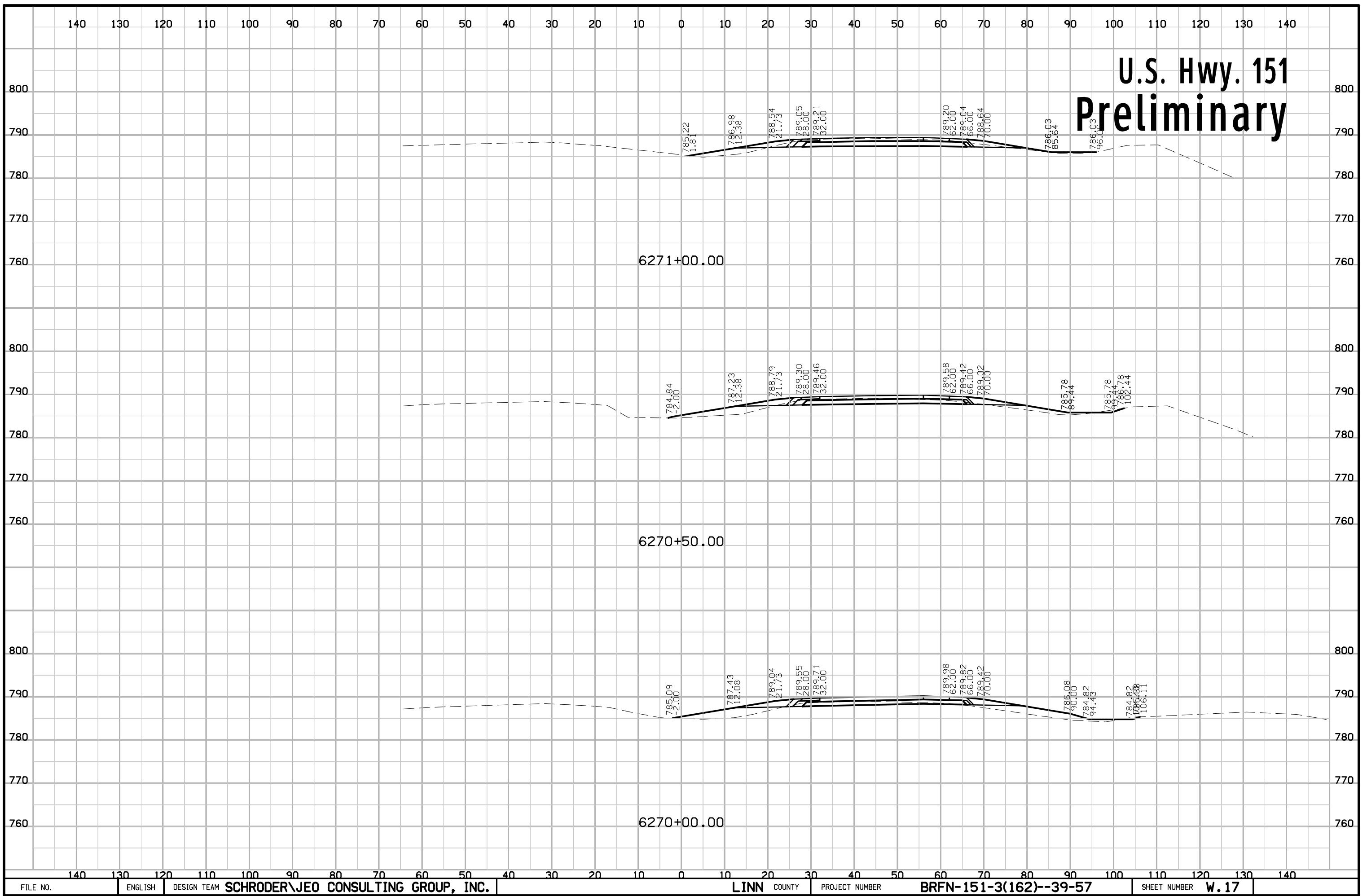
U.S. Hwy. 151

Preliminary



FILE NO.	ENGLISH	DESIGN TEAM	SCHRODER\JEO CONSULTING GROUP, INC.	LINN COUNTY	PROJECT NUMBER	BRFN-151-3(162)-39-57	SHEET NUMBER	W. 16
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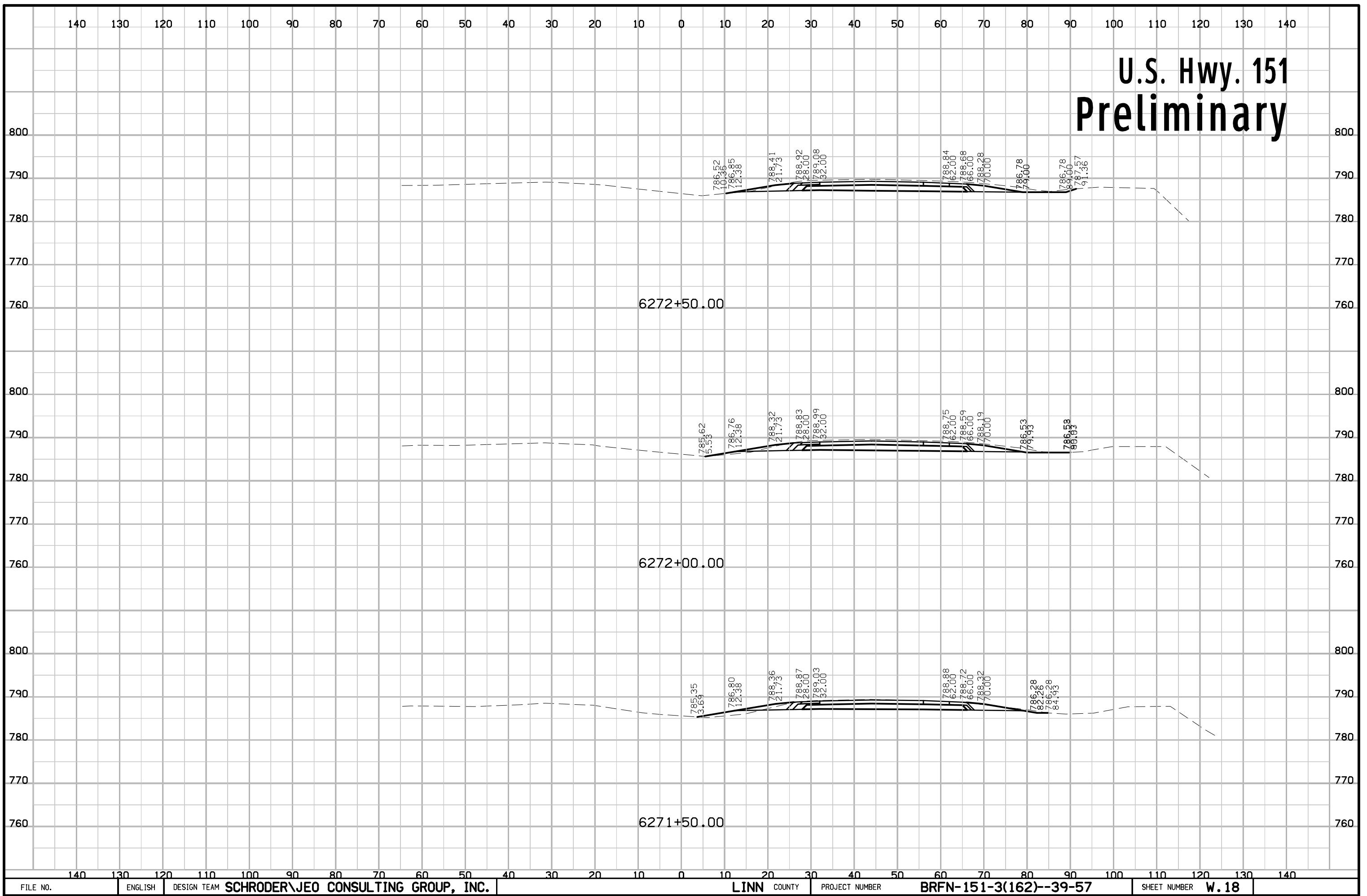
**U.S. Hwy. 151
Preliminary**



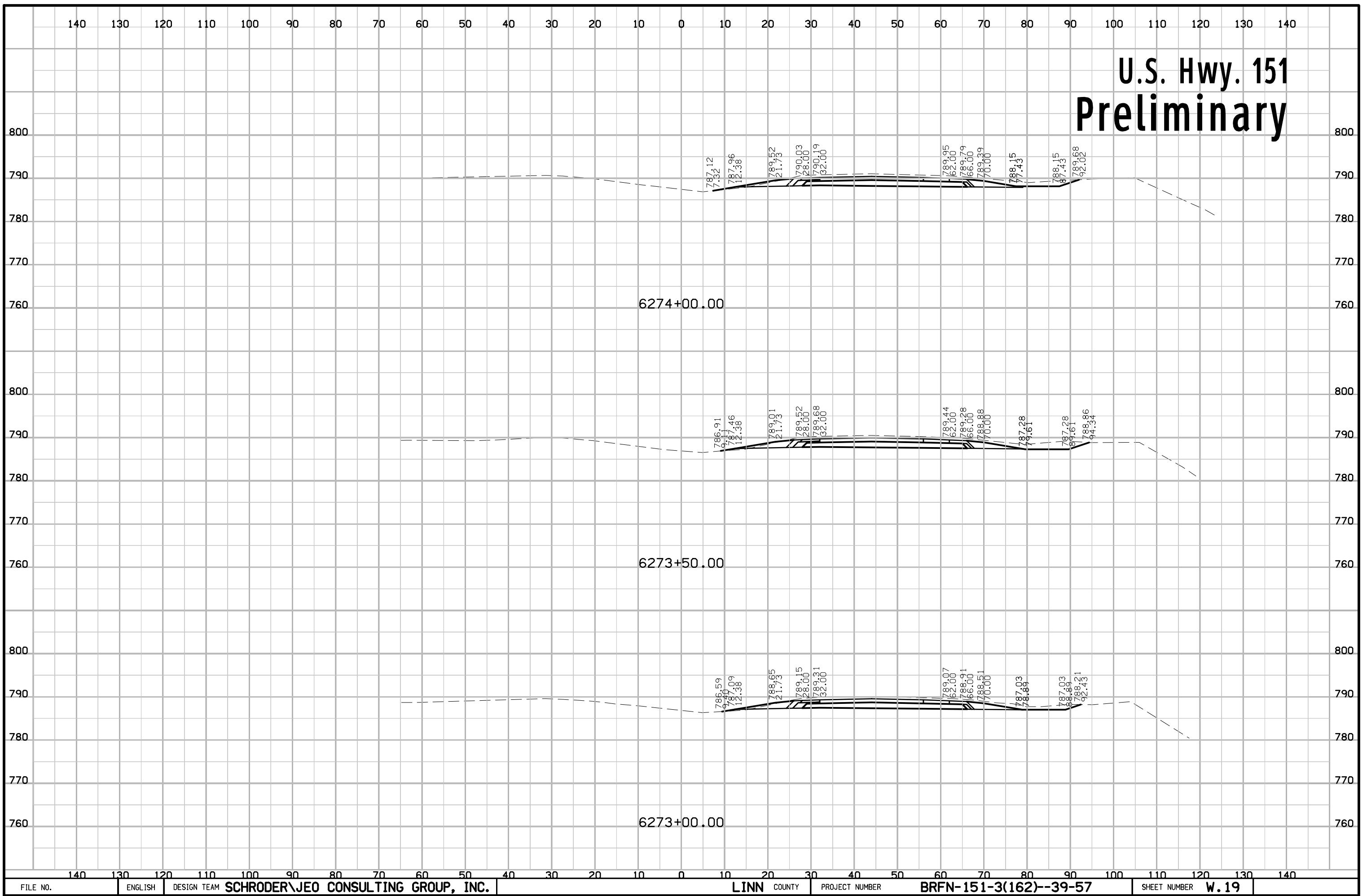
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U.S. Hwy. 151

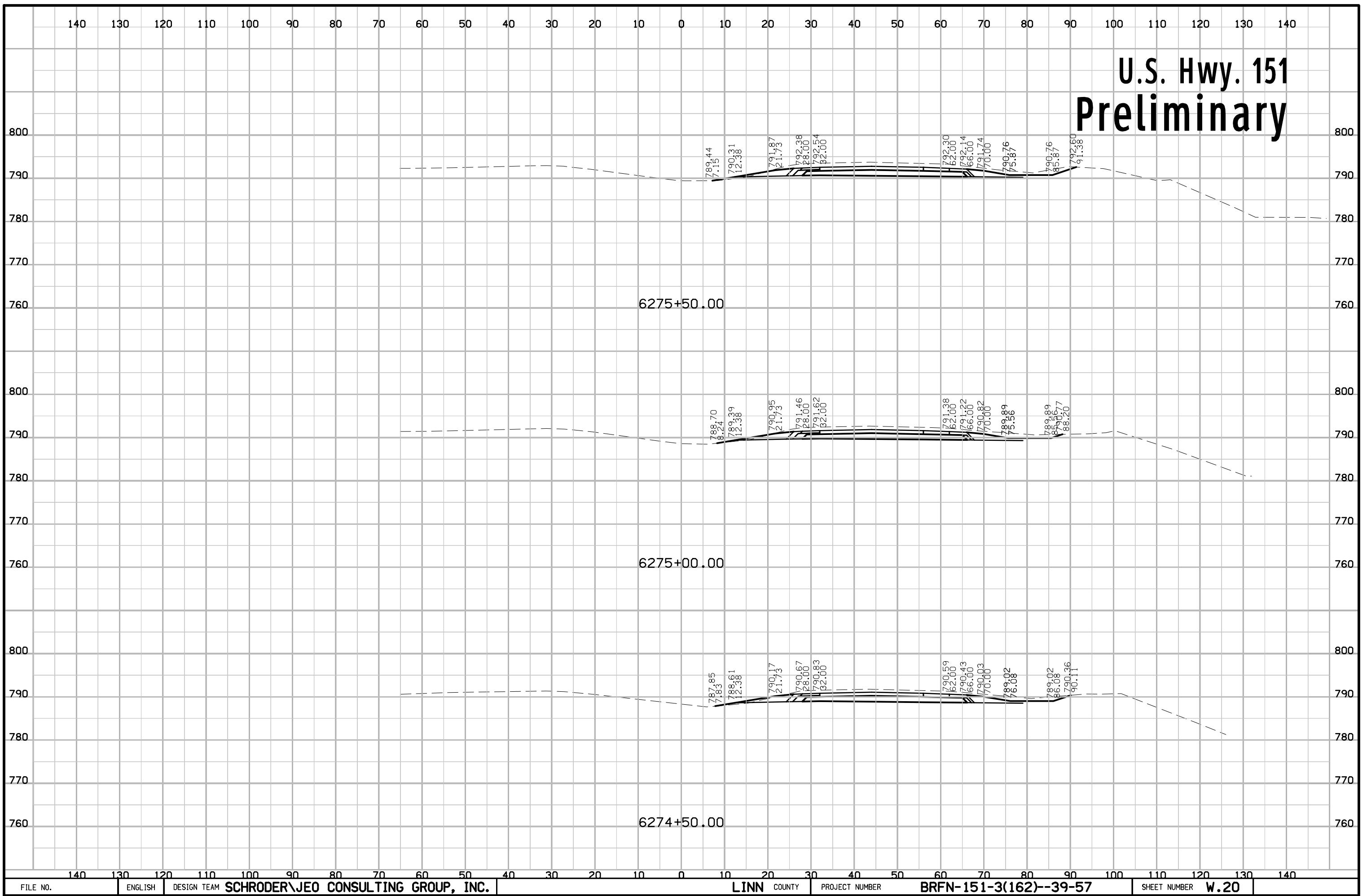
Preliminary



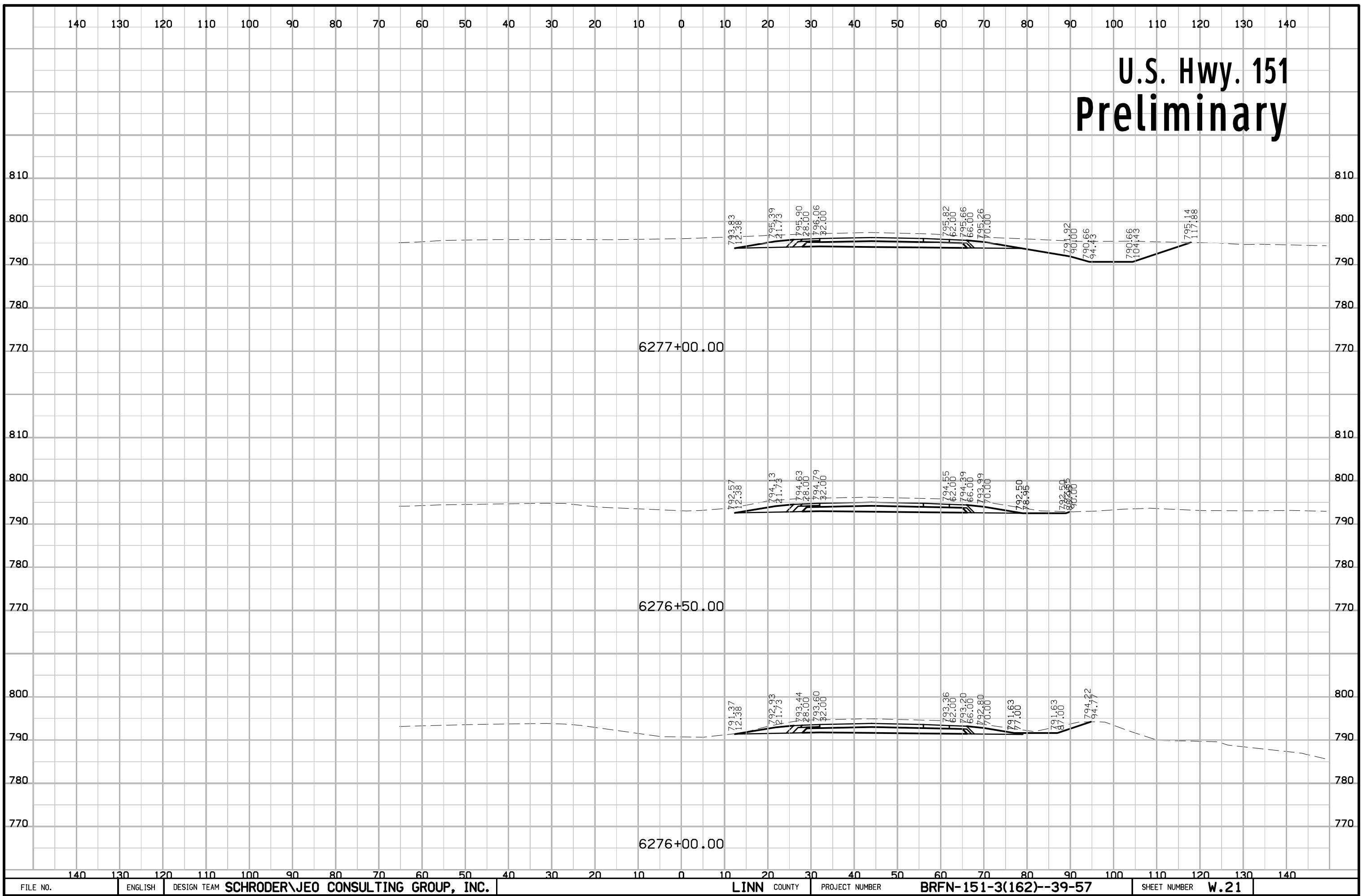
**U.S. Hwy. 151
Preliminary**



**U.S. Hwy. 151
Preliminary**

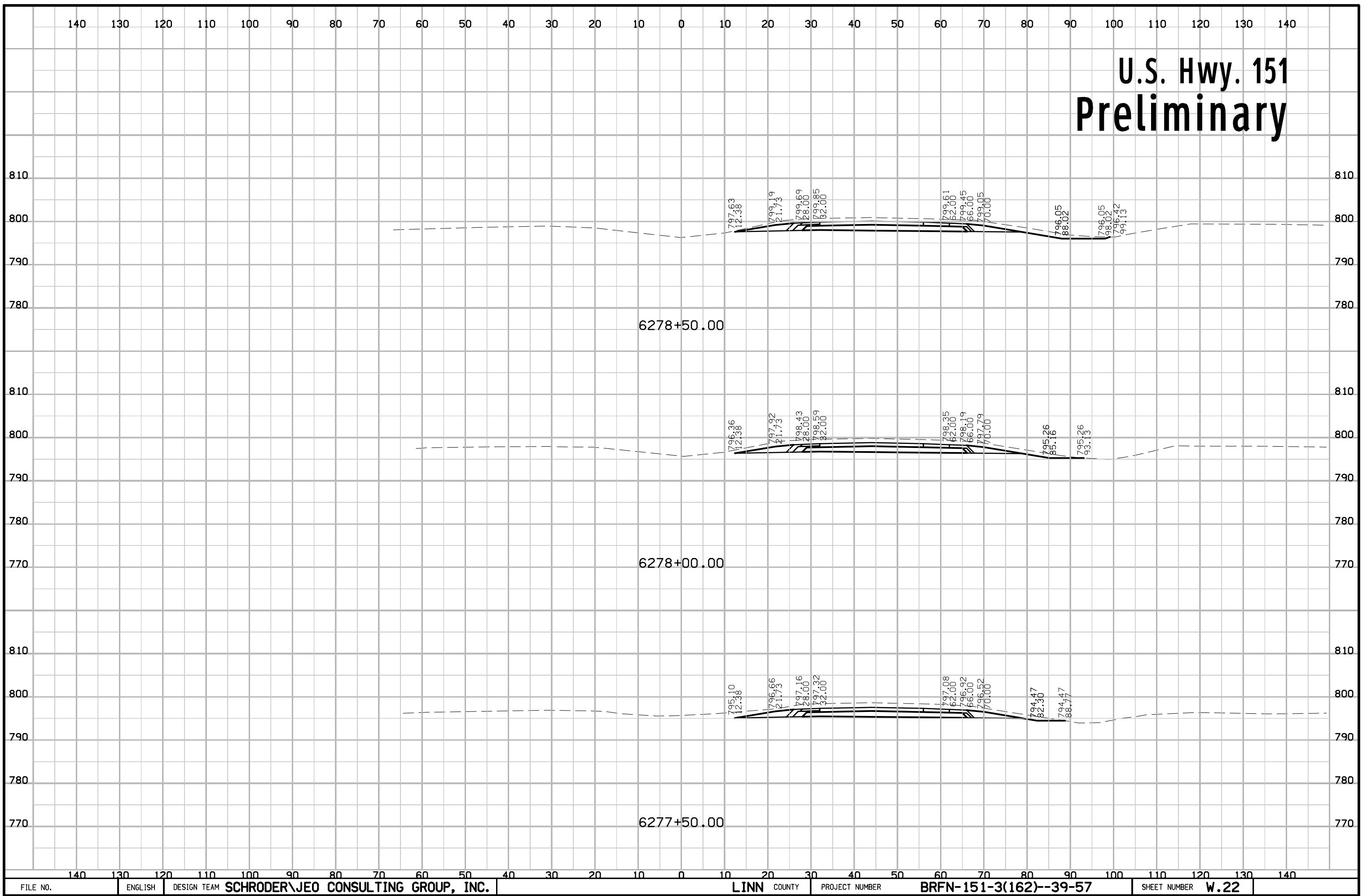


**U.S. Hwy. 151
Preliminary**



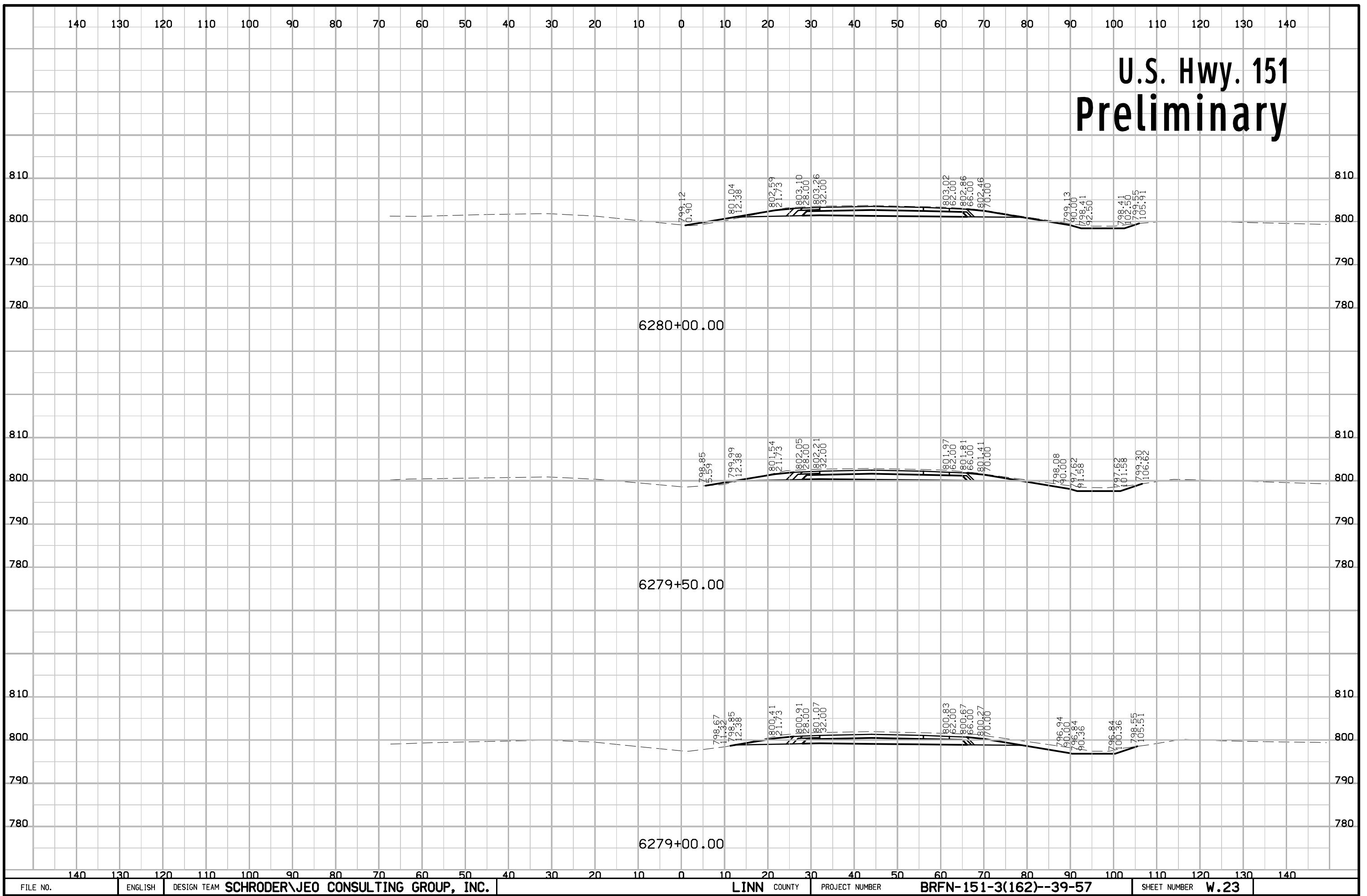
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**U.S. Hwy. 151
Preliminary**



U.S. Hwy. 151

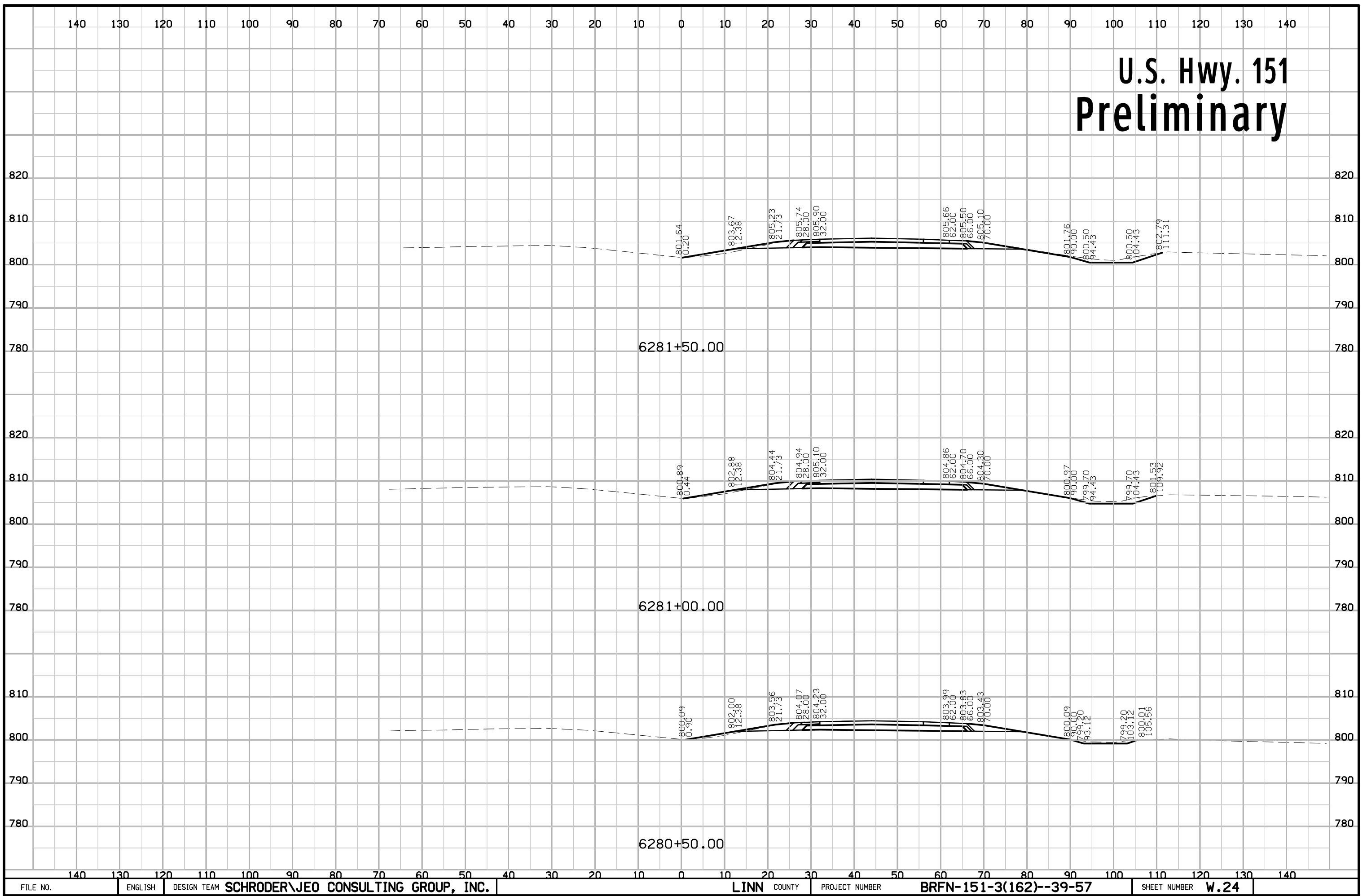
Preliminary



FILE NO.	ENGLISH	DESIGN TEAM	SCHRODER\JEO CONSULTING GROUP, INC.	LINN COUNTY	PROJECT NUMBER	BRFN-151-3(162)-39-57	SHEET NUMBER	W.23
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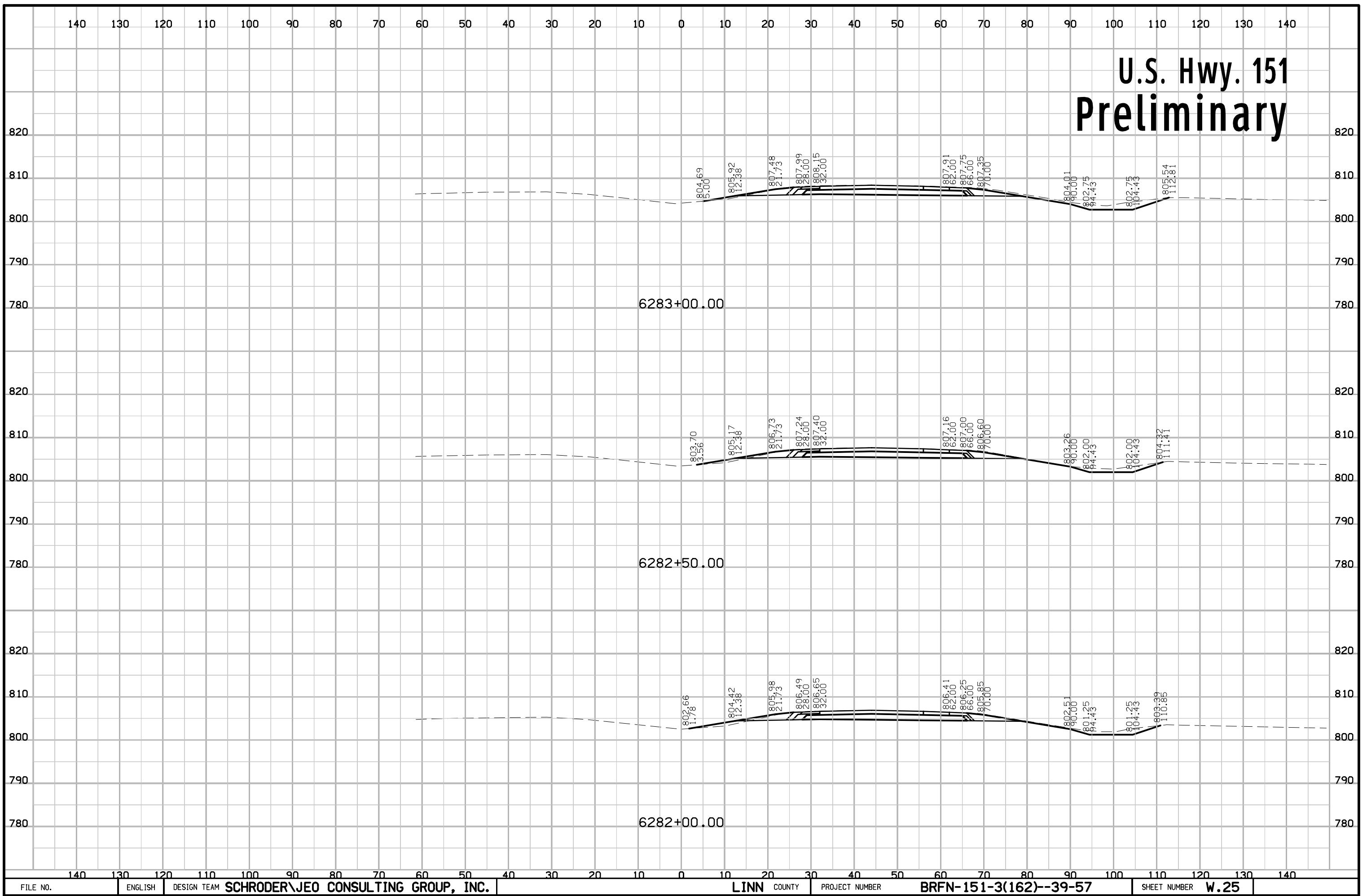
U.S. Hwy. 151

Preliminary

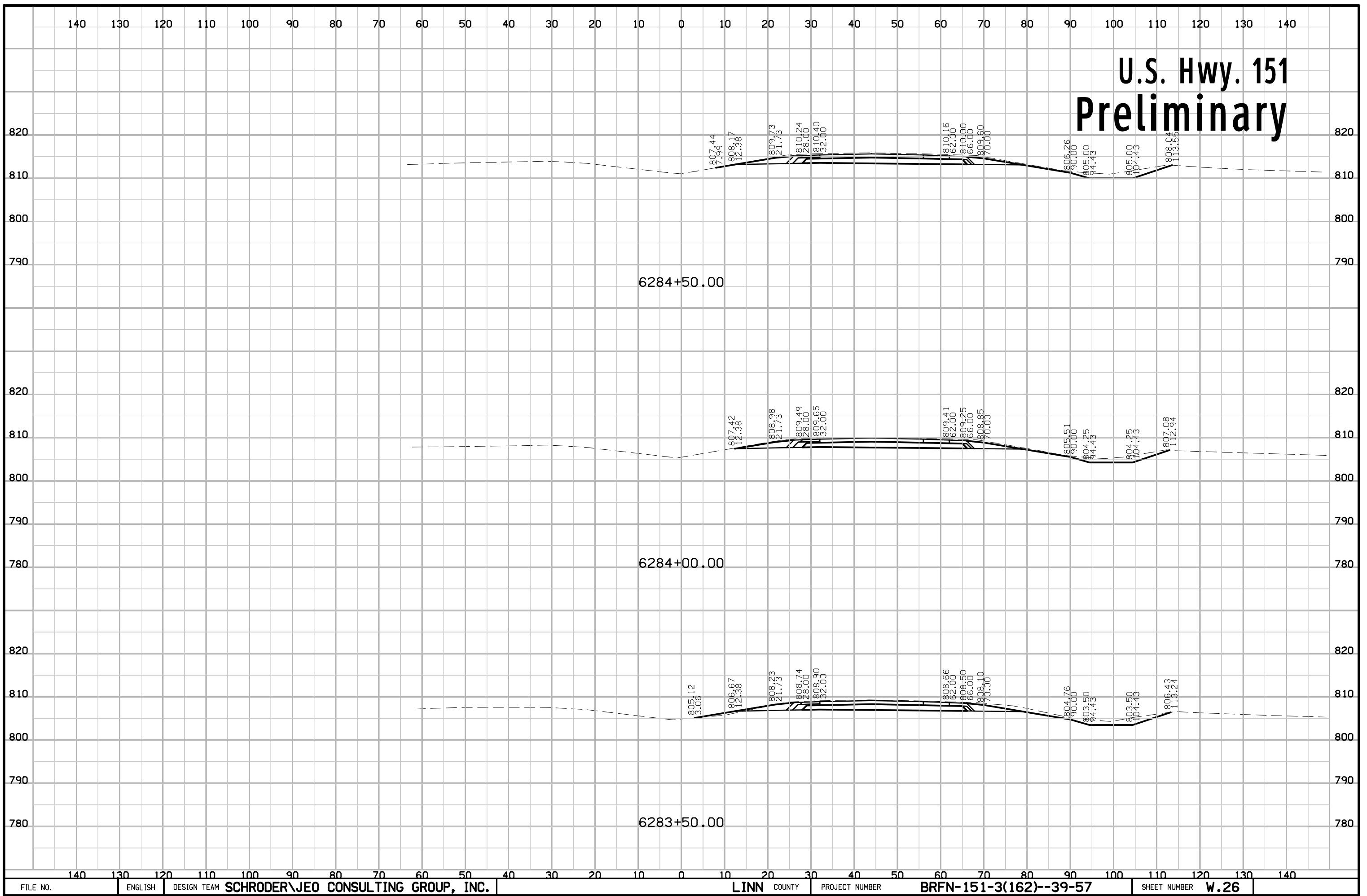


U.S. Hwy. 151

Preliminary



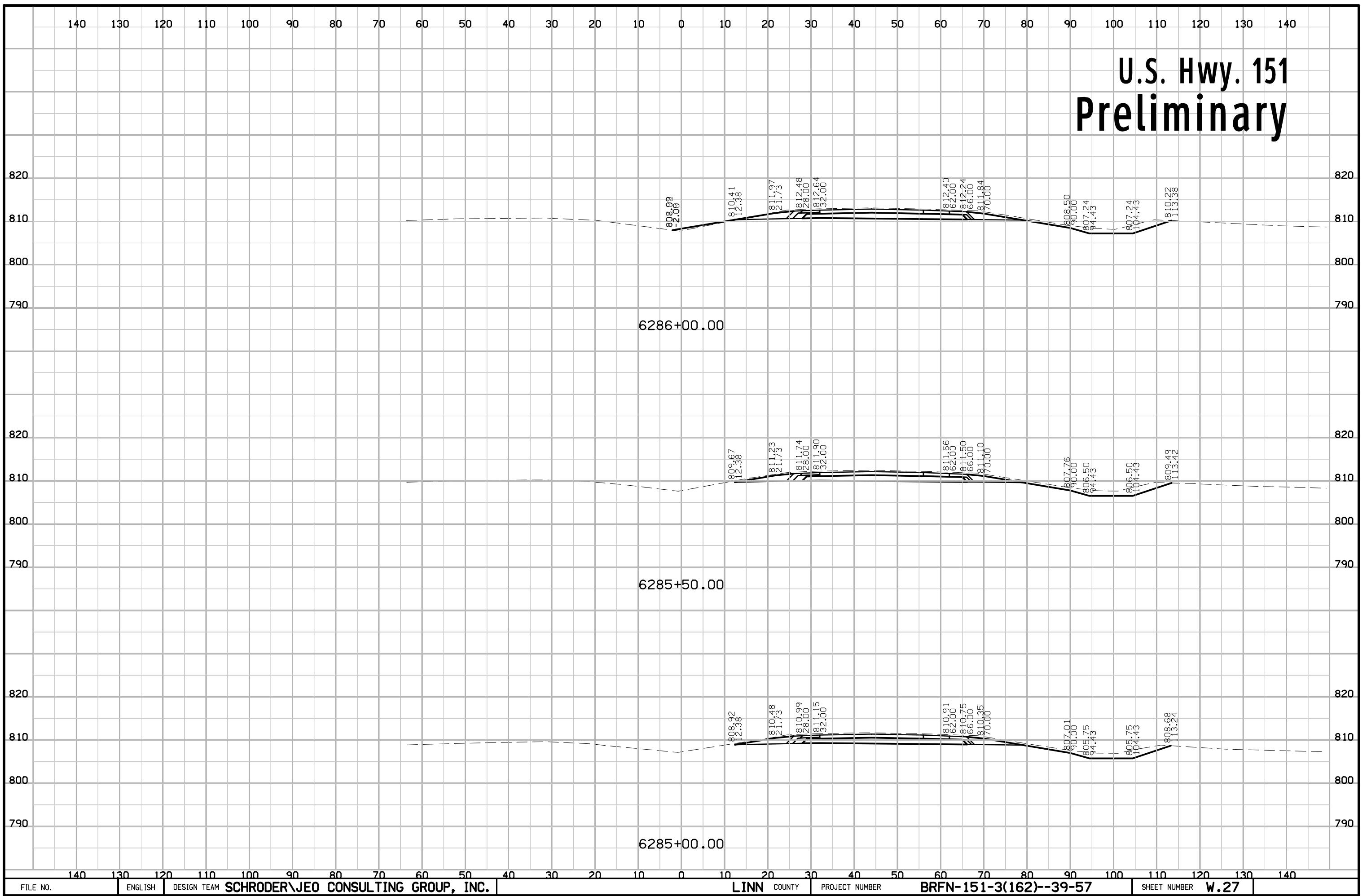
U.S. Hwy. 151
Preliminary



FILE NO.	ENGLISH	DESIGN TEAM	SCHRODER\JEO CONSULTING GROUP, INC.	LINN COUNTY	PROJECT NUMBER	BRFN-151-3(162)-39-57	SHEET NUMBER	W.26
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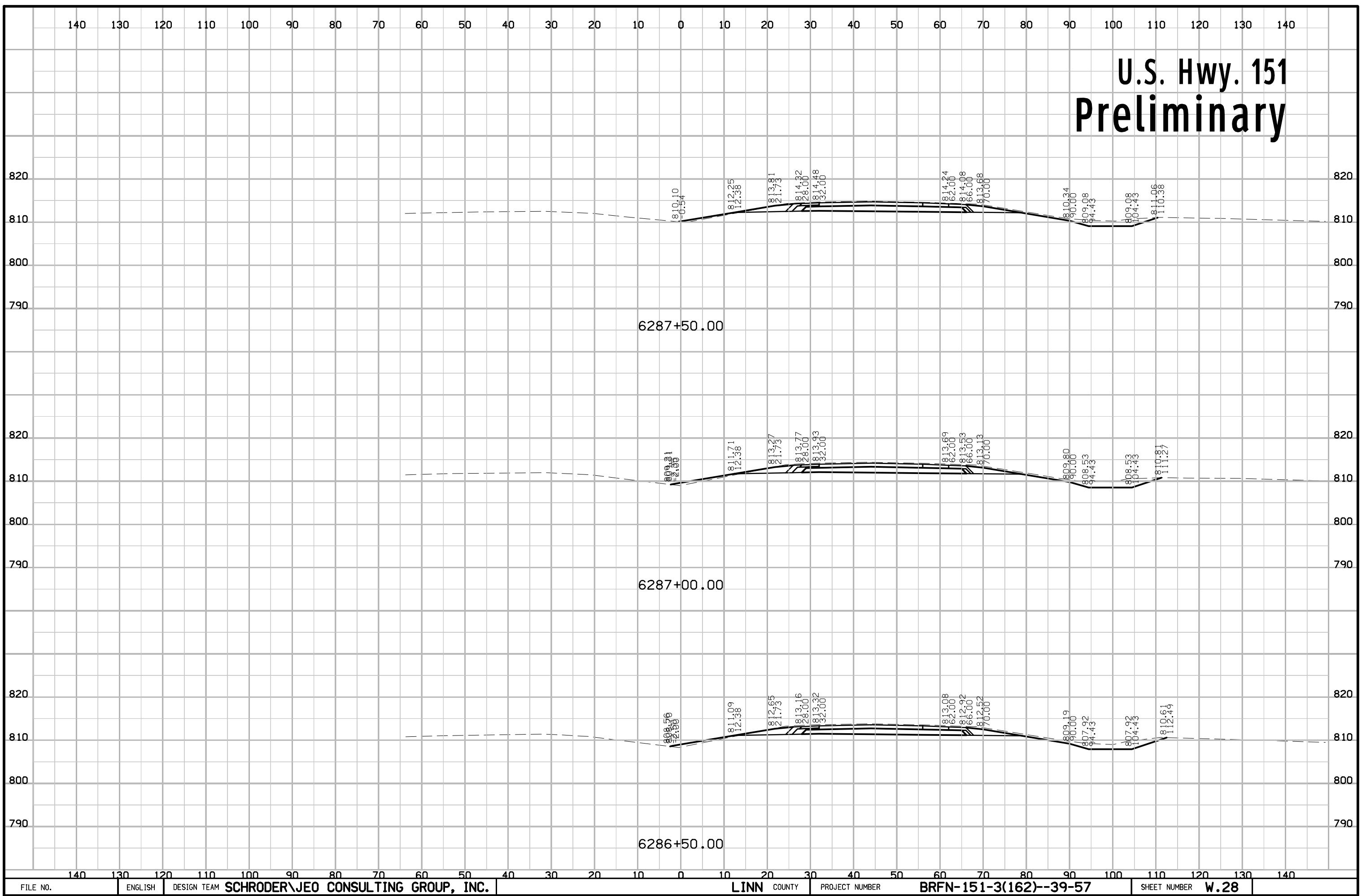
U.S. Hwy. 151

Preliminary



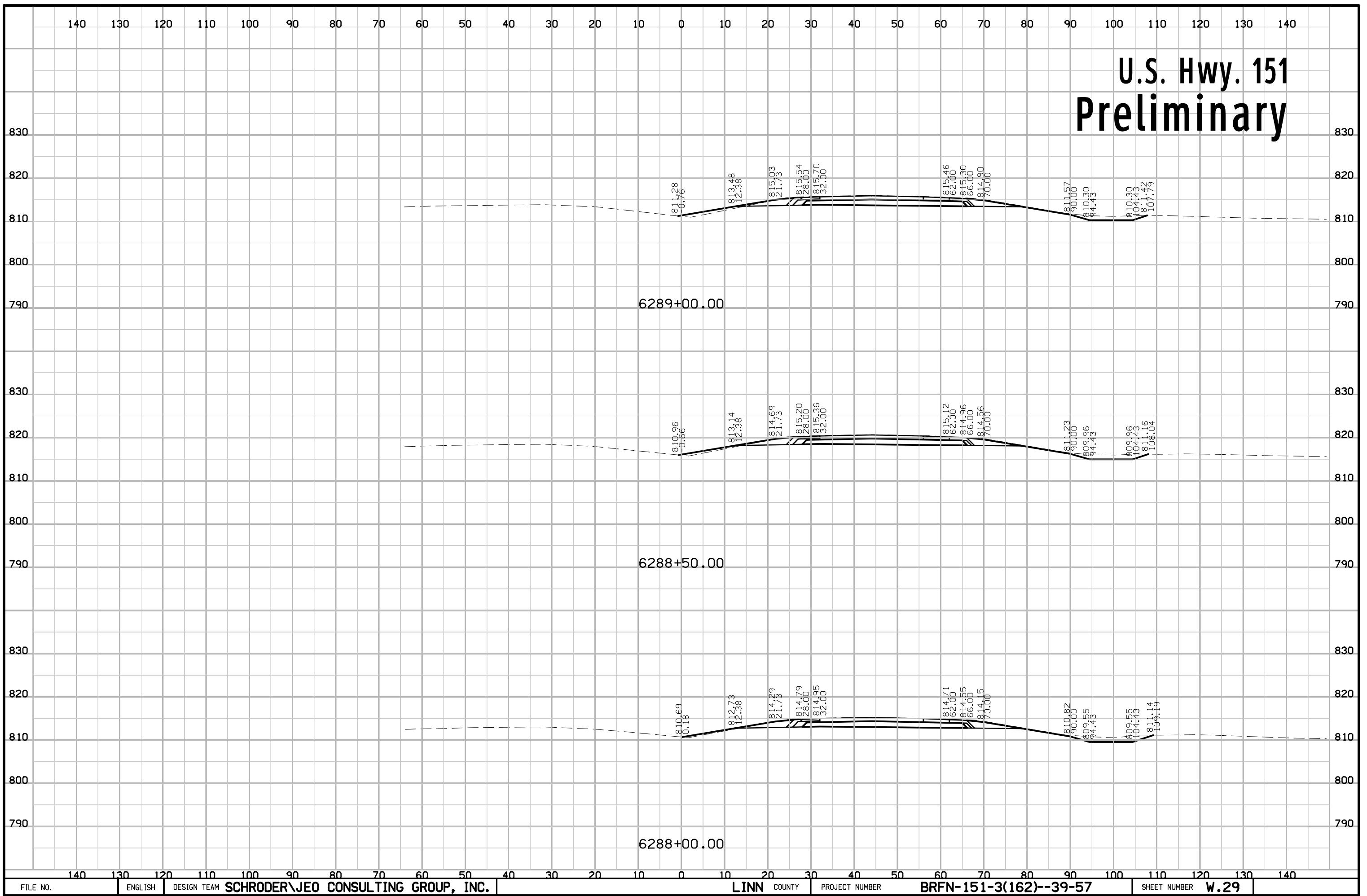
U.S. Hwy. 151

Preliminary



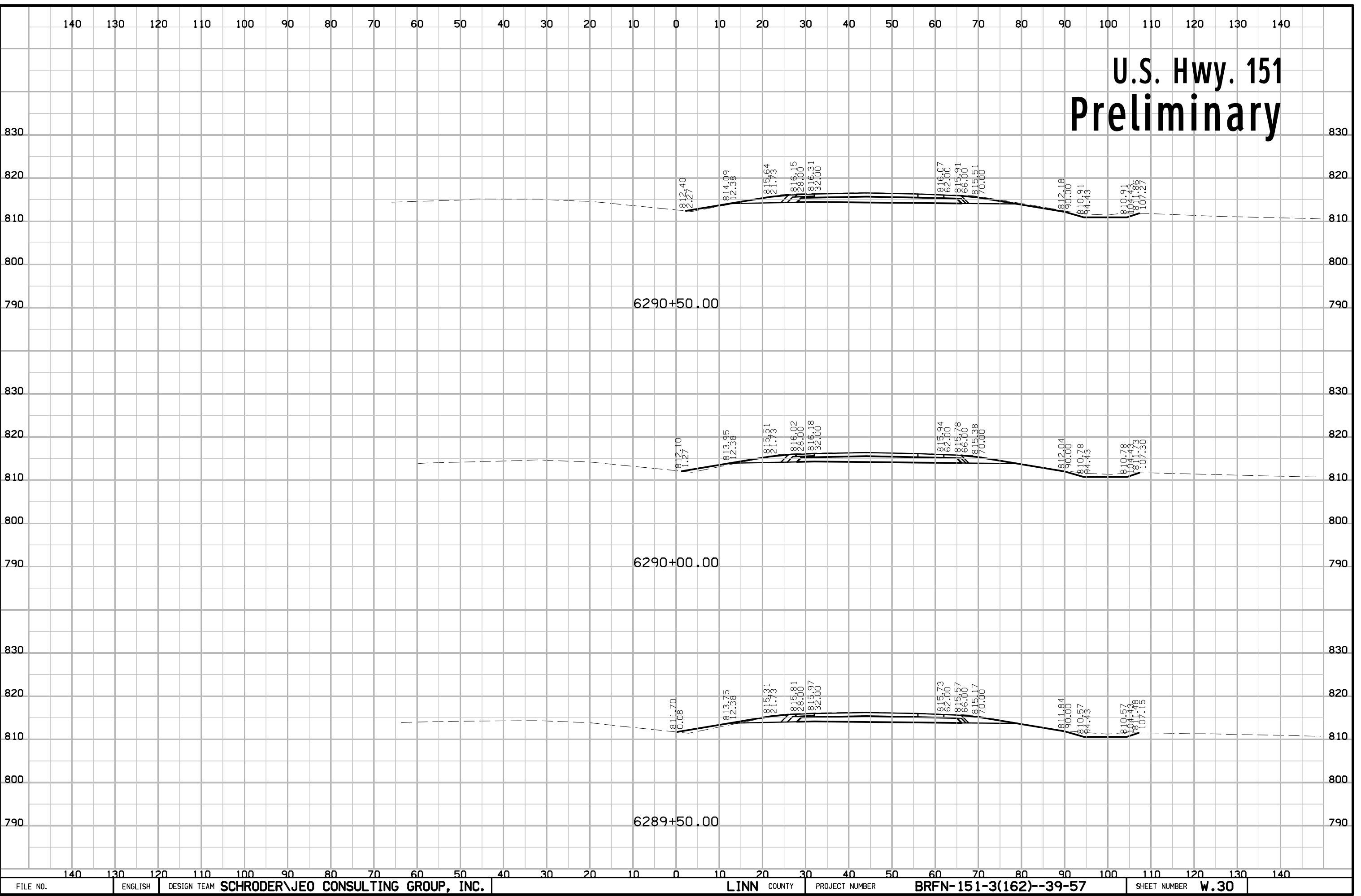
U.S. Hwy. 151

Preliminary



U.S. Hwy. 151

Preliminary



**U.S. Hwy. 151
Preliminary**

6292+00.00

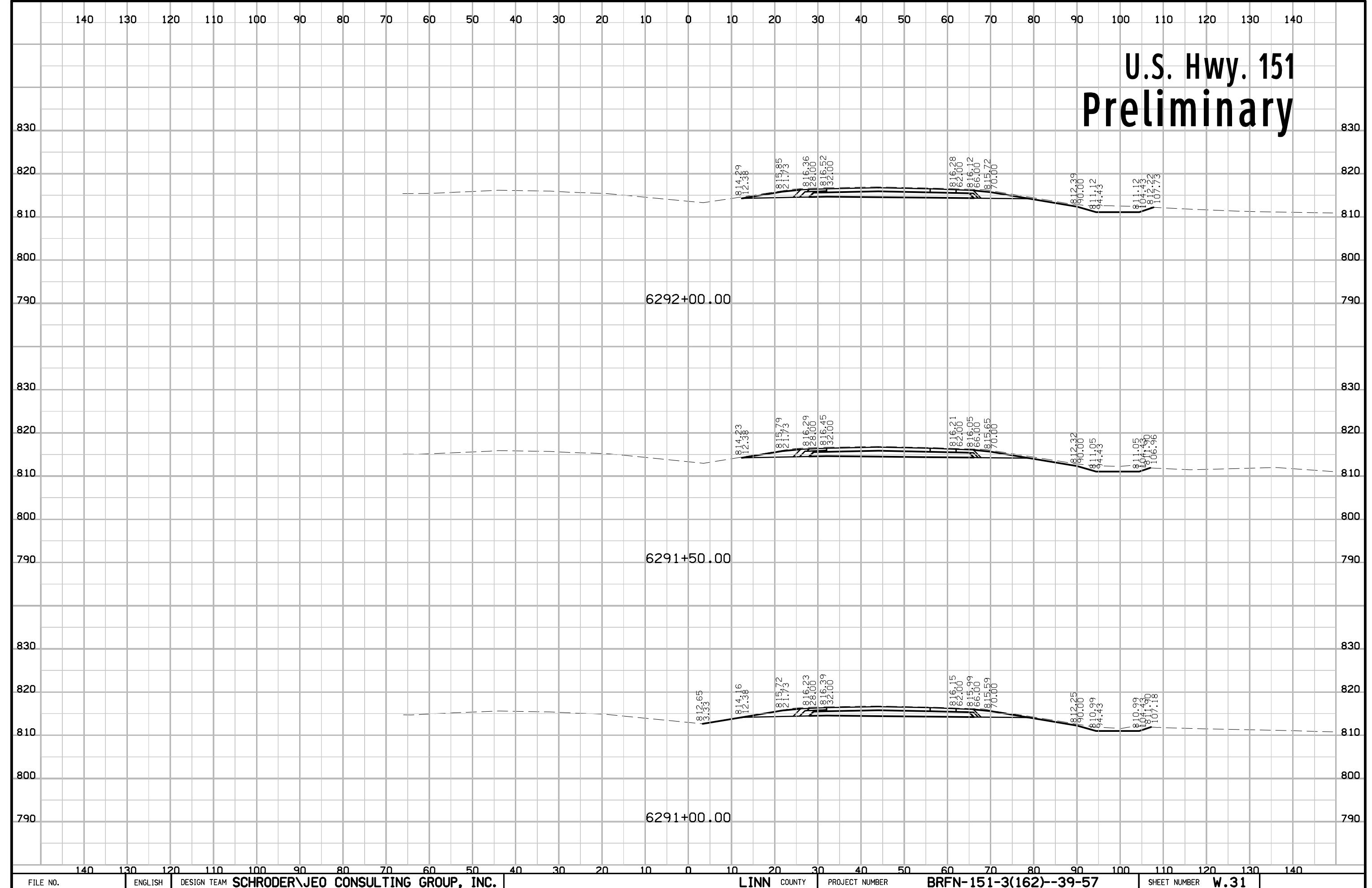
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812.38
815.73
816.36
816.52
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816.00
815.65
816.00

6291+50.00

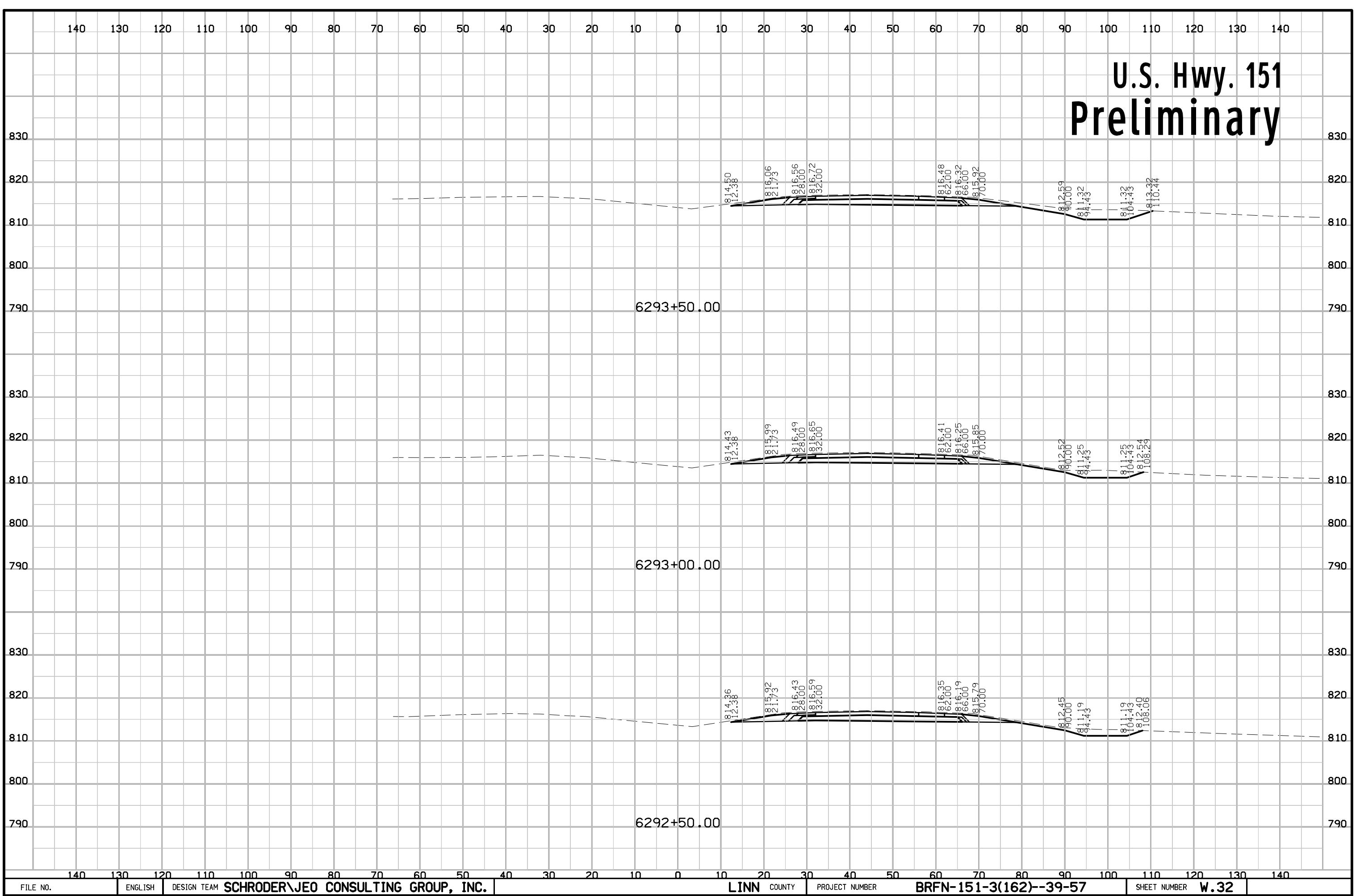
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816.29
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815.72
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816.00
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816.00

6291+00.00

814.16
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815.59
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815.99
816.00
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U.S. Hwy. 151
Preliminary



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