

RCB CULVERT REPLACEMENT - SINGLE BOX  
 BRFN-015-3(16)--39-55  
 11-15-2022

KOSSUTH COUNTY - DESIGN NO. 123

**LEGEND**

INTERSTATE HIGHWAY	
PRIMARY HIGHWAY-DIVIDED	
PRIMARY HIGHWAY	
PORTLAND CEMENT CONCRETE ROAD	
ASPHALT ROAD	
BITUMINOUS ROAD	
GRAVEL ROAD	
EARTHEN ROAD	
INTERSTATE HIGHWAY	
UNITED STATES HIGHWAY	
STATE HIGHWAY	
COUNTY HIGHWAY	
RAILROAD	
PIPELINE	
AIRPORT	
HYDROLOGY	
BRIDGE	
STATE BOUNDARY	
COUNTY BOUNDARY	
CORPORATE BOUNDARY	
TOWNSHIP LINE	
SECTION LINE	
ROAD NAMES	
UNINCORPORATED PLACE	



PLANS OF PROPOSED IMPROVEMENTS ON THE  
**PRIMARY ROAD SYSTEM**  
 KOSSUTH COUNTY  
 RCB CULVERT REPLACEMENT - SINGLE BOX  
 IOWA 15 OVER LOTTS CREEK

THE IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.

ENGLISH STANDARD CULVERT PLANS		
STANDARD	ISSUED	REVISED
RCB G2-20	07-20	
RCB G3-20	07-20	
RCB 14-14-20	07-20	
PWH 0-1-20	07-20	
PWH 0-2-20	07-20	
PWH 0-3-20	07-20	
PWH 0-4-20	07-20	
PWH 0-6-20	07-20	

TOTAL SHEETS	21
PROJECT NUMBER	BRFN-015-3(16)--39-55
R.O.W. PROJECT NUMBER	
STPN-015-3(17)--25-55	
PROJECT IDENTIFICATION NUMBER	18-55-015-010

INDEX OF SHEETS	
NO.	DESCRIPTION
I	TITLE SHEET
2-3	DESIGN NO. 123
B.1	TYPICAL SECTION AND DETAILS
C.1	TABULATIONS
D.1-D.2	IOWA 15 PLAN AND PROFILE
G.1-G.3	SURVEY INFORMATION
J.1-J.2	TRAFFIC CONTROL
W.1-W.9	CROSS SECTION

H Sheets →

REVISIONS

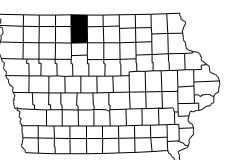
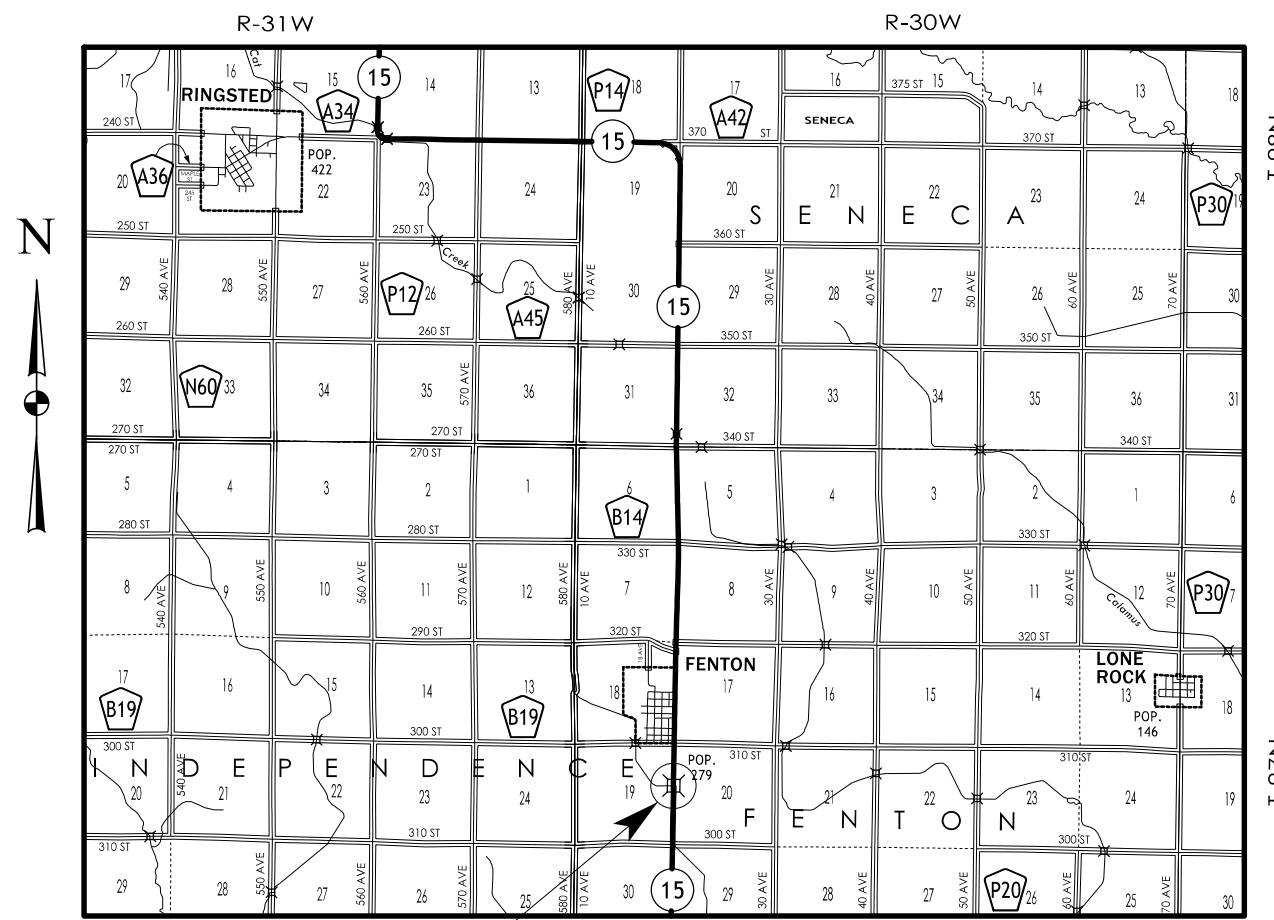
**IOWA ONE CALL**  
 1-800-292-8989  
 www.iowaonecall.com  
 811 Know what's below. Call before you dig.

REVISIONS TO THIS DESIGN PLAN AND/OR PROJECT SPECIFICATIONS SHOULD BE SUBMITTED BY \_\_\_\_\_

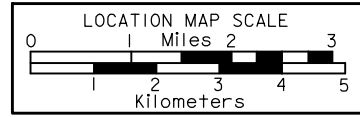
STANDARD ROAD PLANS
STANDARD ROAD PLANS ARE LISTED ON SHEET NUMBER _____

DESIGN DATA RURAL
2023 AADT 700 V.P.D.
2043 AADT 800 V.P.D.
2043 DHV 80 V.P.H.
TRUCKS 21 %
Total Design ESALS --

INDEX OF SEALS		
SHEET NO.	NAME	TYPE
I	CHRISTOPHER J. CRISWELL	STRUCTURAL DESIGN
I	STEVEN A. KLOCKE	HYDRAULIC DESIGN
B.1	CINDY A. SPENCER	ROADWAY DESIGN
P/C CULVERT STANDARDS	NORMAN L. MCDONALD	STRUCTURAL DESIGN
CULVERT STANDARDS	JAMES S. NELSON	STRUCTURAL DESIGN



DESIGN NO. 123 LOCATION MAP



PROJECT DIRECTORY NAME: 5501501018

**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.

**Steven A. Klocke** P16312  
 Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Printed Name: Steven A. Klocke  
 License renewal date is December 31, 2021

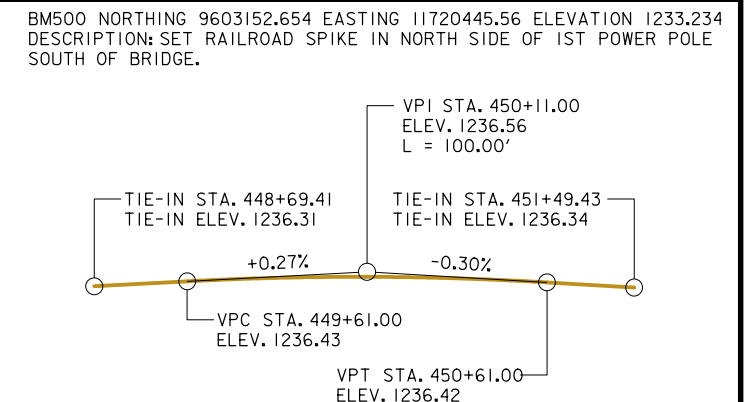
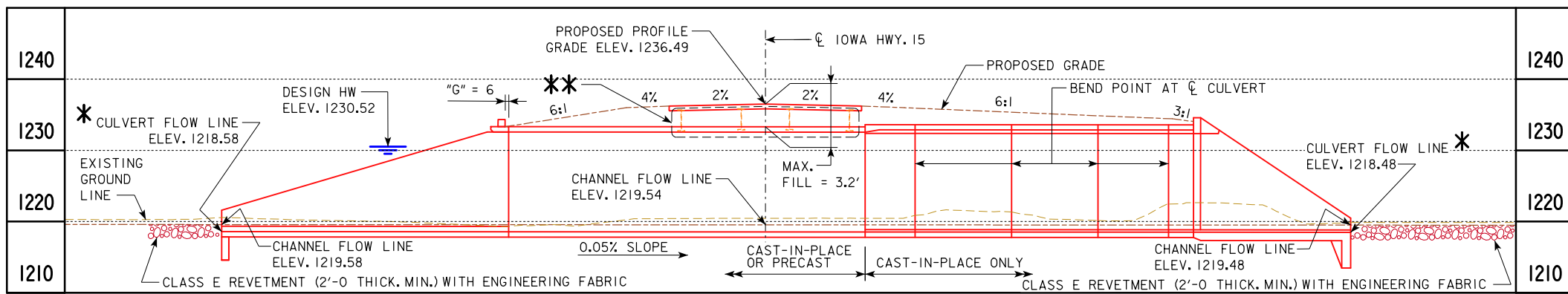
Pages or sheets covered by this seal: 2 & 3 (HYDRAULIC DATA, CHANNEL GRADING AND RETVEMENT)

**STRUCTURAL 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.

**Christopher J. Criswell** P14447  
 Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Printed Name: Christopher J. Criswell  
 License renewal date is December 31, 2021

Pages or sheets covered by this seal: SHEETS ? THRU ? OF ?



LONGITUDINAL SECTION ALONG CULVERT

PROPOSED PROFILE GRADE ON IOWA HIGHWAY 15

- \* CULVERT FLOW LINE BURIED 1.0 FEET BELOW CREEK BOTTOM.
- \*\* INSUFFICIENT VERTICAL CLEARANCE EXISTS FOR THE FLOWABLE MORTAR ALTERNATIVE FOR CONSTRUCTING REINFORCED CONCRETE BOX CULVERT UNDER EXISTING BRIDGE.
- \*\*\* TOTAL LENGTH OF CULVERT IS COMPRISED OF DOWNSTREAM SECTIONS WITH BENDS IN THE CAST-IN-PLACE BARREL AND THE UPSTREAM PORTION THAT CAN CONSTRUCTED WITH PRECAST SECTION.

TRAFFIC ESTIMATE

2023 AADT	700	V.P.D.
2043 AADT	800	V.P.D.
2043 DHV	80	V.P.H.
TRUCKS	21	%

HYDRAULIC DATA

DRAINAGE AREA = 5.8 SQ. MI.  
 STREAM SLOPE = 2.6 FT./MI.  
 DESIGN DISCHARGE,  $Q_{50}$  = 945 CFS  
 HW ELEV. = 1230.52 FT.  
 OUTLET VELOCITY = 6.50 FPS  
 DISCHARGE,  $Q_{100}$  = 1161 CFS  
 HW ELEV. = 1231.66 FT.  
 OUTLET VELOCITY = 7.40 FPS

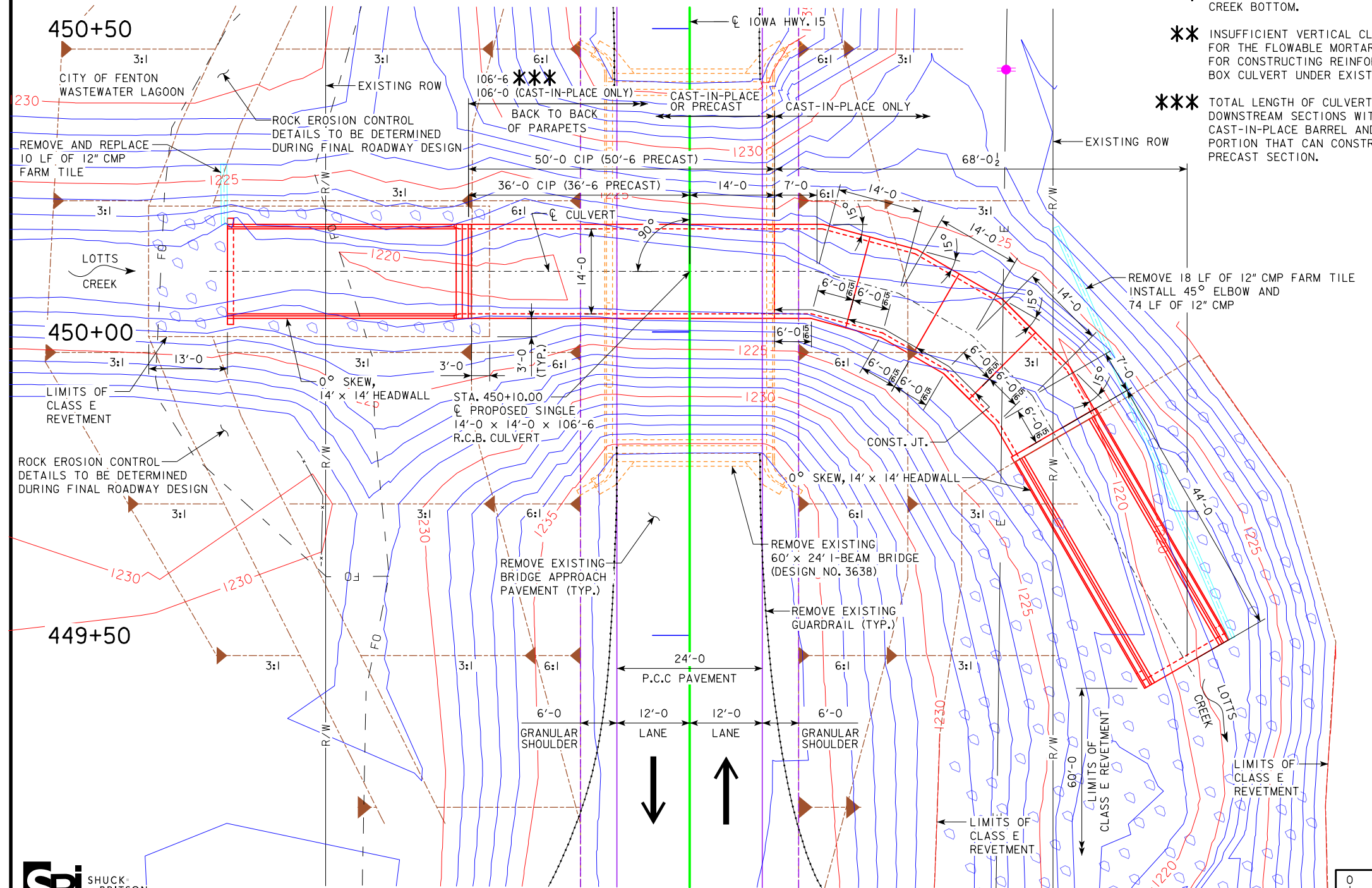
LOCATION

IOWA 15 OVER LOTTS CREEK  
 T-97N R-30W  
 SECTION 19 & 20  
 FENTON TOWNSHIP  
 KOSSUTH COUNTY  
 LATITUDE 43.206403°  
 LONGITUDE -94.423416°

UTILITY LEGEND

- FO-- FIBER OPTIC LINE
- E-- OVERHEAD ELECTRIC
- POWER POLE

UTILITIES SHOWN ON THIS SHEET ARE FOR INFORMATION ONLY, SEE ROAD DESIGN SHEETS FOR FINAL UTILITY INFORMATION.

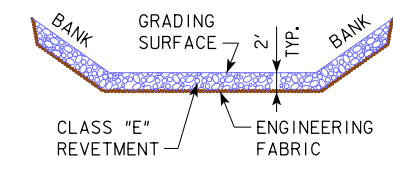


SITUATION PLAN

PRELIMINARY  
 DESIGN FOR 0° SKEW  
**SINGLE 14'-0 x 14'-0 x 106'-6**  
**R. C. B. CULVERT**  
 SITUATION PLAN  
 STATION 450+10.00 (IA 15) NOVEMBER 2020  
 KOSSUTH COUNTY  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 1 OF 2 FILE NO. 31711 DESIGN NO. 123

TYPICAL CHANNEL PROTECTION			
ESTIMATED REVETMENT QUANTITIES INCLUDED WITH ROAD PLANS			
LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
INLET	72	130	45
OUTLET	800	730	500
TOTALS	872	860	545

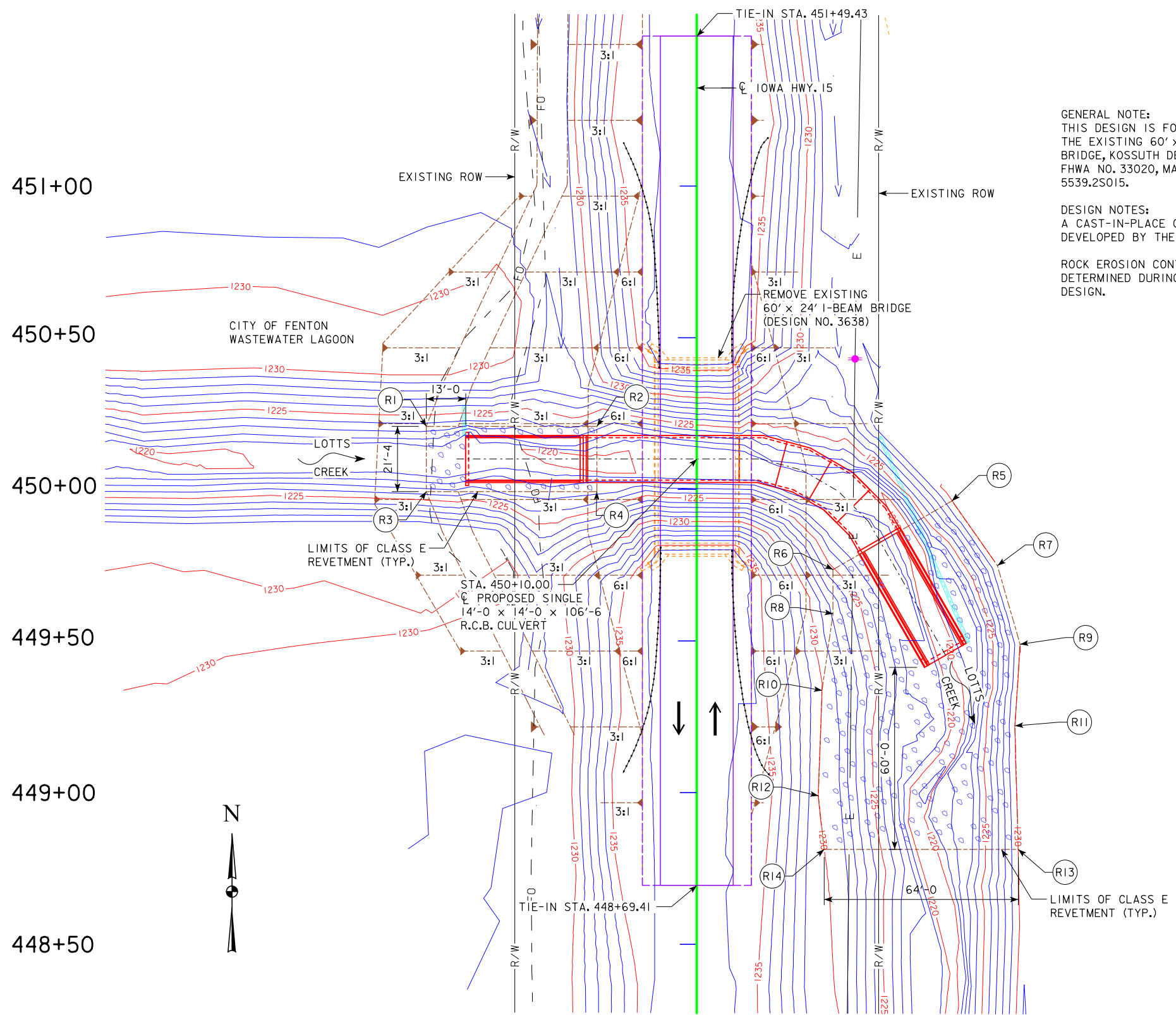
EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE. QUANTITIES SHOWN FOR INFORMATION ONLY. SEE ROAD SHEETS. REVETMENT ESTIMATED AT 1.6 TON/CY.



GENERAL NOTE:  
 THIS DESIGN IS FOR THE REPLACEMENT OF THE EXISTING 60' x 24' STEEL I-BEAM BRIDGE, KOSSUTH DESIGN NO. 3638, FHWA NO. 33020, MAINTENANCE NO. 5539.2S015.

DESIGN NOTES:  
 A CAST-IN-PLACE OPTION IS TO BE DEVELOPED BY THE FINAL DESIGNER.

ROCK EROSION CONTROL DETAILS TO BE DETERMINED DURING FINAL ROADWAY DESIGN.



SITE PLAN

REVETMENT LAYOUT:

- (R1) HWY. 15 450+20.75, 88.00' LT.
- (R2) HWY. 15 450+20.75, 33.00' LT.
- (R3) HWY. 15 449+99.25, 88.00' LT.
- (R4) HWY. 15 449+99.25, 33.00' LT.
- (R5) HWY. 15 449+96.15, 84.11' RT.
- (R6) HWY. 15 449+73.52, 44.91' RT.
- (R7) HWY. 15 449+74.87, 99.12' RT.
- (R8) HWY. 15 449+58.98, 44.90' RT.
- (R9) HWY. 15 449+48.93, 106.59' RT.
- (R10) HWY. 15 449+33.69, 41.29' RT.
- (R11) HWY. 15 449+22.05, 104.90' RT.
- (R12) HWY. 15 448+98.97, 44.05' RT.
- (R13) HWY. 15 448+81.28, 105.98' RT.
- (R14) HWY. 15 448+81.28, 41.98' RT.



PRELIMINARY  
 DESIGN FOR 0° SKEW  
**SINGLE 14'-0 x 14'-0 x 106'-6  
 R. C. B. CULVERT**  
 SITUATION PLAN - SITE  
 STATION 450+10.00 (1A 15) NOVEMBER 2020  
**KOSSUTH COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 2 OF 2 FILE NO. 31711 DESIGN NO. 123







**SURVEY SYMBOLS**

- PCP Photo Control Point
- C Centerline BL of Road (ML or SR)
- EP Edge of Paved Roads (ML or SR)
- SNP Unpaved Shoulder
- BL Topo Breakline
- GR Ground Shot
- CU Back of Curb
- GU Gutter In Front of Curb
- SIGN SI Sign
- PPA Power Pole Co. 1
- WC Wild Card (Misc. Field Shot)
- MIS Miscellaneous
- PIP Pipe Culvert
- PRO Profile Shot
- PLG Location of General Photo
- D Centerline Draw or Stream (Down)
- VS Channel Cross Section
- TW Top of Water
- GDL Guard Rail Steel
- ENU Edge Unpaved Entrance & Parking
- FW Wire Fence
- F FO1D Fiber Optic Co. 1 - Quality D
- FWD Wood Fence
- MH Utility Access (Manhole)
- UB Utility Box
- BD Bridge Deck
- BCL Bridge Centerline
- BRG Bridge
- BLS Bridge Low Steel
- TDC Tree Deciduous
- TEV Evergreen Tree
- SBR Size of Bridge
- ENT Centerline BL of Entrance
- BM Bench Mark
- CP Control Point

**UTILITY LEGEND**

Sub-Surface Utility Mapping Quality Level is in accordance with CI/ASCE 38-02 Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data.

**Remark Abbreviations**

- QLA Quality Level A Highest guideline quality level
- QLD Quality Level D Lowest guideline quality level

- F Fenton Cooperative Telephone - Quality D
- PPA Power Pole Alliant Energy

**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	

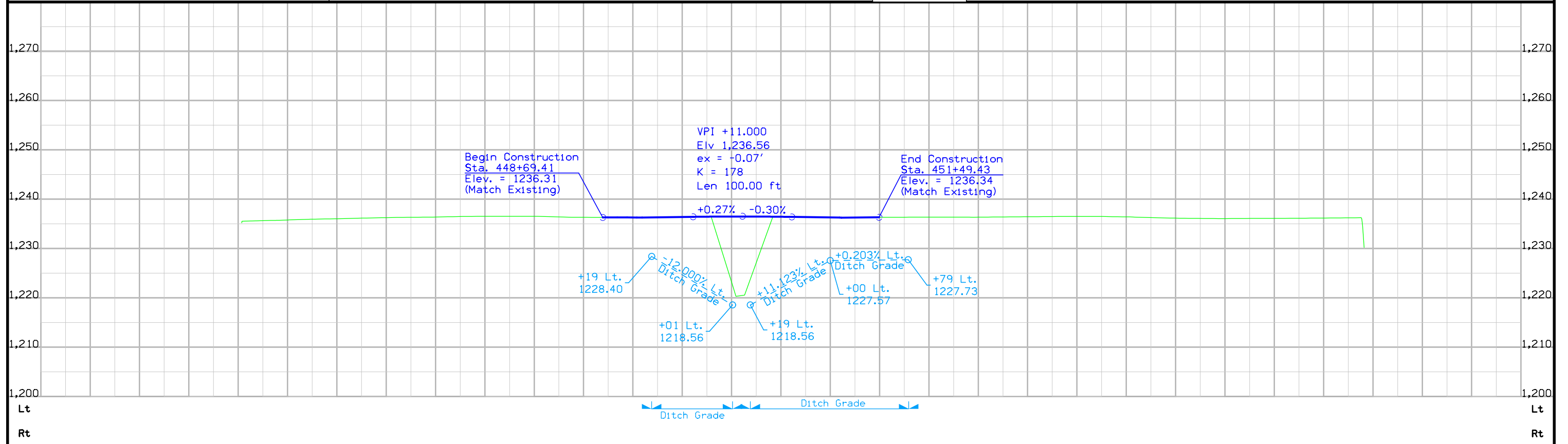
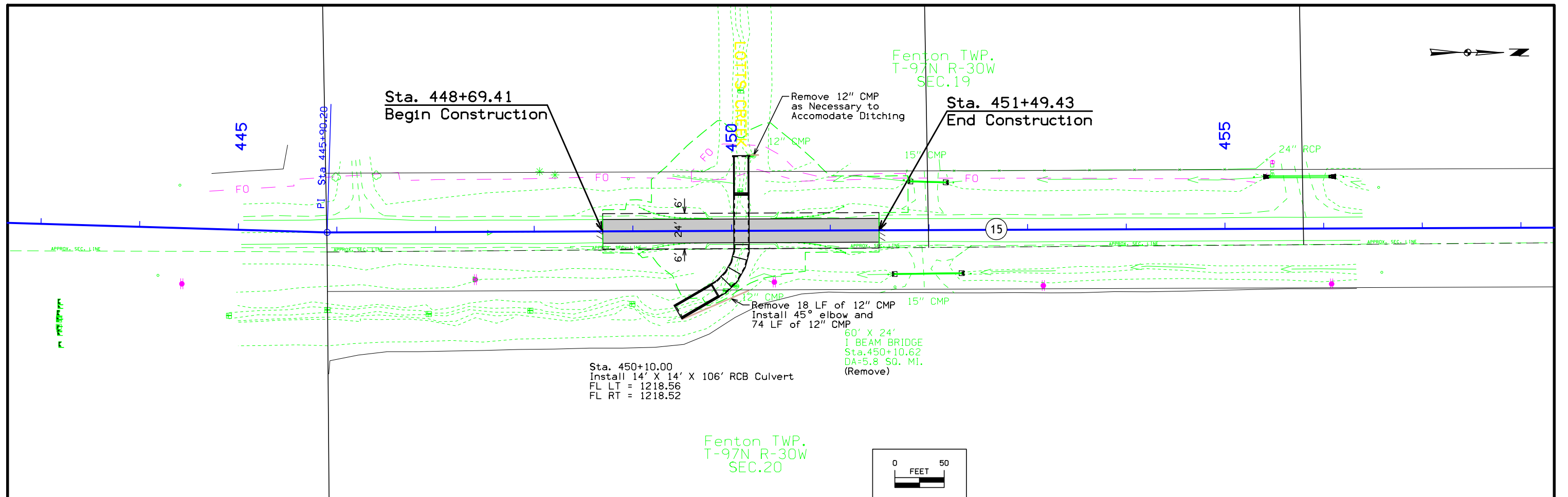
- Reference Point
- Station
- Survey Line
- Section Corner
- Ground Line Intercept
- Saw Cut
- Guardrail
- Trench Drain
- HighTension Cable Guardrail
- Sheet Pile
- Pavement Removal
- Clearing & Grubbing Area

**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**

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



443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458
FILE NO. 31711	ENGLISH	DESIGN TEAM	SNYDER AND ASSOCIATES, INC.			KOSSUTH COUNTY			PROJECT NUMBER	BRFN-015-3(16)--39-55			SHEET NUMBER	D.2	

## Survey Information

KOSSUTH County  
BRFN-015-3(16)--39-55  
Bridge Replacement Concept – HWY 15 Kossuth County  
PIN 18-55-015-010  
SAP-06581

### General Information

Measurement units for this survey are US survey feet. This survey is for the proposed bridge replacement on Iowa 15 over Lots Creek, just south of the City of Fenton. This project is a Full DTM survey. However, the survey collected is limited to the existing right-of-way and creek in the vicinity surrounding the existing bridge.

### Vertical Control

Vertical datum for this survey is relative to NAVD88, Geoid 12a.

Vertical positions were established by static observations and post processed using concurrent observations from the laRTN reference stations at Emmetsburg and Algona and Sioux City. A digital level loop was run from CP1 through the project benchmarks and returned to CP1. The loop error was allowable and the error was distributed proportionately among the project marks.

Averaged RTK observations were also collected on Kossuth County BM#17 and BM#29 with results shown below. Additional benchmarks were established with a digital level loop relative to CP1.

This survey observed two Kossuth County Control Monuments with published NAVD88 heights to compare to local ground control:

IDOT As-Built Plans 829A(1) Benchmark #17 has a published Elev. of 675.02  
Survey Elev. = 1243.26

IDOT As-Built Plans 829A(1) – Benchmark #29 has a published Elev. of 670.76  
Survey Elev. = 1238.57

No NGS Benchmarks are located with 2 miles of the project location.

### Horizontal Control

The project coordinate system is the Iowa Regional Coordinate System, Zone 1. Horizontal datum is NAD83 (2011) for Epoch 2010.00. The projection parameters for Zone 1 of the IaRCS is defined below:

Lambert Conformal Conic Projection North American Datum of 1983  
Origin Std. Parallel & Grid: 43°12'00"N  
Origin Central Meridian: 095°15'00"W  
Standard Parallel Scale: 1.000052  
False Northing: 9,600,000  
False Easting: 11,500,000

Coordinates were determined by averaging a minimum of three laRTN observations with appropriate time spans between. The horizontal standard deviation of these observations was less than 0.05' at 95% confidence level.

### Alignment Information

The horizontal alignment for this survey is a retrace of As-built Plans Project No. 829A(1). Survey stationing was equated to the plan PI at STA 445+90.20 and run back and ahead without equation throughout the survey.

Survey stationing relates to as built plan stationing as follows:

PI Sta. 419+46.0 As-built Plans Project No. 829A(1)  
Survey PI Sta. 419+45.56

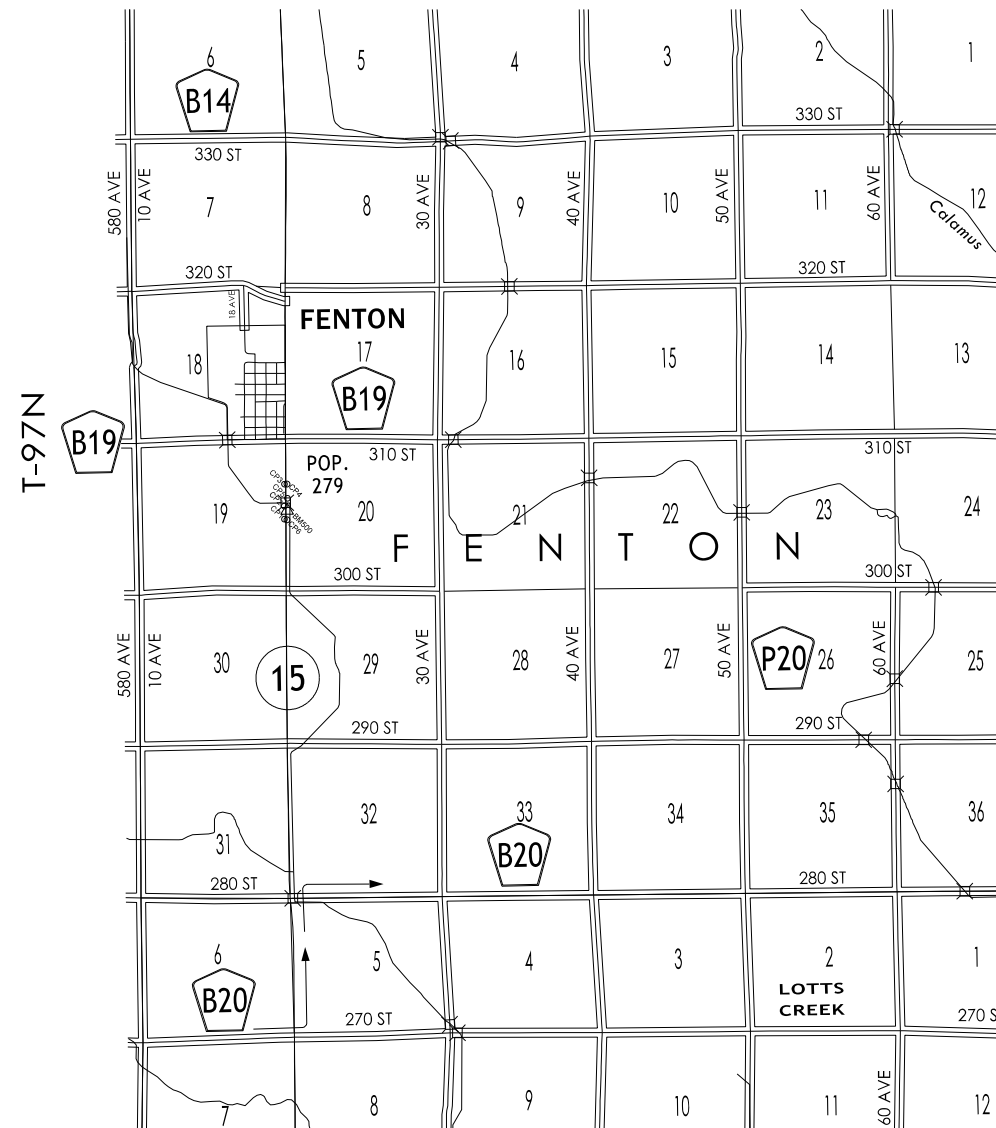
PI Sta. 445+90.2 As-built Plans Project No. 829A(1)  
Survey PI Sta. 445+90.20

PI Sta. 472+28.1 As-built Plans Project No. 829A(1)  
Survey PI Sta. 472+28.13



## 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 2010.00

VERT. DATUM: NAVD88

1a. Regional Coordinate System Zone 1

Coordinate listing from next sheet will be used with 1aRTN for monument  
 recovery. No other reference ties are given.

# HORIZONTAL AND VERTICAL PROJECT CONTROL COORDINATE LISTING

HORIZ. DATUM: NAD83(2011) EPOCH 2010.00

VERT. DATUM: NAVD88

Ia. Regional Coordinate System Zone 1

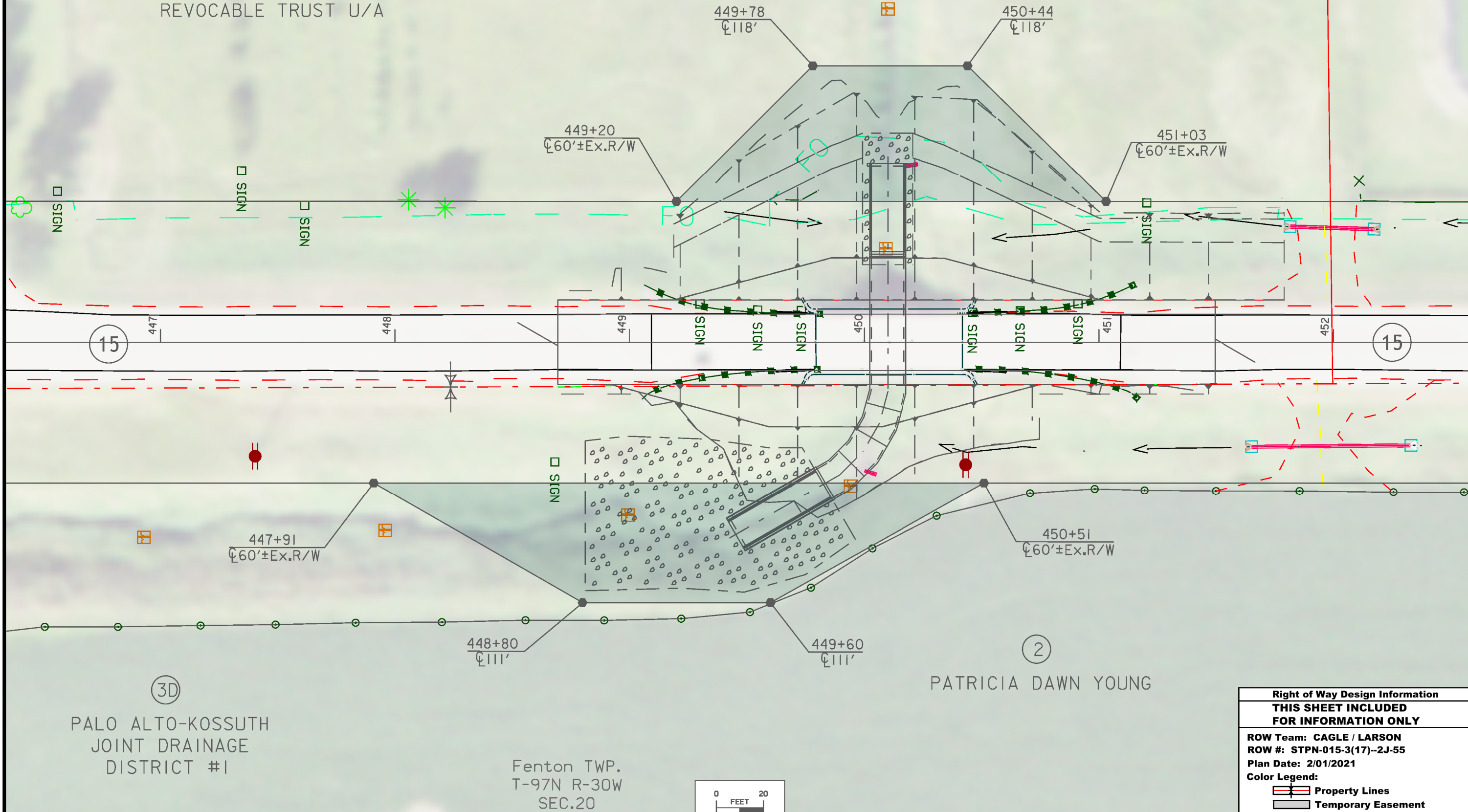
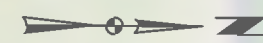
Point Name	Northing	Easting	Elevation	Feature Definition	Description
CP1	9602853.344	11720349.94	1229.510	CP	SET 1/2IN REBAR WITH RED PLASTIC CAP +/-35FT WEST OF HIGHWAY 15 ACROSS FROM 1ST POWER POLE SOUTH OF CEMETARY ENTRANCE.
CP2	9603307.801	11720343.43	1228.775	CP	SET 1/2IN REBAR WITH RED PLASTIC CAP +/-25FT WEST OF HIGHWAY 15 +/-90FT SOUTH OF END OF BRIDGE.
CP3	9604068.15	11720352.12	1230.209	CP	SET 1/2IN REBAR WITH RED PLASTIC CAP +/-25FT WEST OF HIGHWAY 15 +/-50FT NORTH OF DRIVE TO WASTEWATER POND.
CP4	9604071.379	11720438.26	1229.817	CP	SET 1/2IN REBAR WITH RED PLASTIC CAP +/-25FT EAST OF HIGHWAY 15 +/-50FT NORTH OF 3RD POWER POLE NORTH OF BRIDGE.
CP5	9603578.01	11720453.02	1227.664	CP	SET 1/2IN REBAR WITH RED PLASTIC CAP +/-30FT EAST OF HIGHWAY 15 +/-100FT NORTH OF END OF BRIDGE +/-5FT EAST OF CULTIVATION LIMIT.
CP6	9602831.031	11720441.33	1230.771	CP	SET 1/2IN REBAR WITH RED PLASTIC CAP +/-25FT EAST OF HIGHWAY 15 +/-20FT SOUTH OF 1ST POWER POLE SOUTH OF CEMETARY ENTRANCE.
BM500	9603152.654	11720445.56	1233.234	BM	SET RAILROAD SPIKE IN NORTH SIDE OF 1ST POWER POLE SOUTH OF BRIDGE.

NO ACCESS RIGHTS ARE TO BE ACQUIRED ON THIS PROJECT.

①  
LYNN DREYER  
REVOCABLE TRUST U/A

Fenton TWP.  
T-97N R-30W  
SEC.19

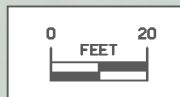
③D  
PALO ALTO-KOSSUTH  
JOINT DRAINAGE  
DISTRICT #1



③D  
PALO ALTO-KOSSUTH  
JOINT DRAINAGE  
DISTRICT #1

Fenton TWP.  
T-97N R-30W  
SEC.20

②  
PATRICIA DAWN YOUNG

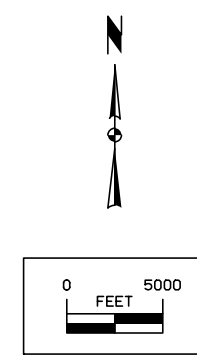
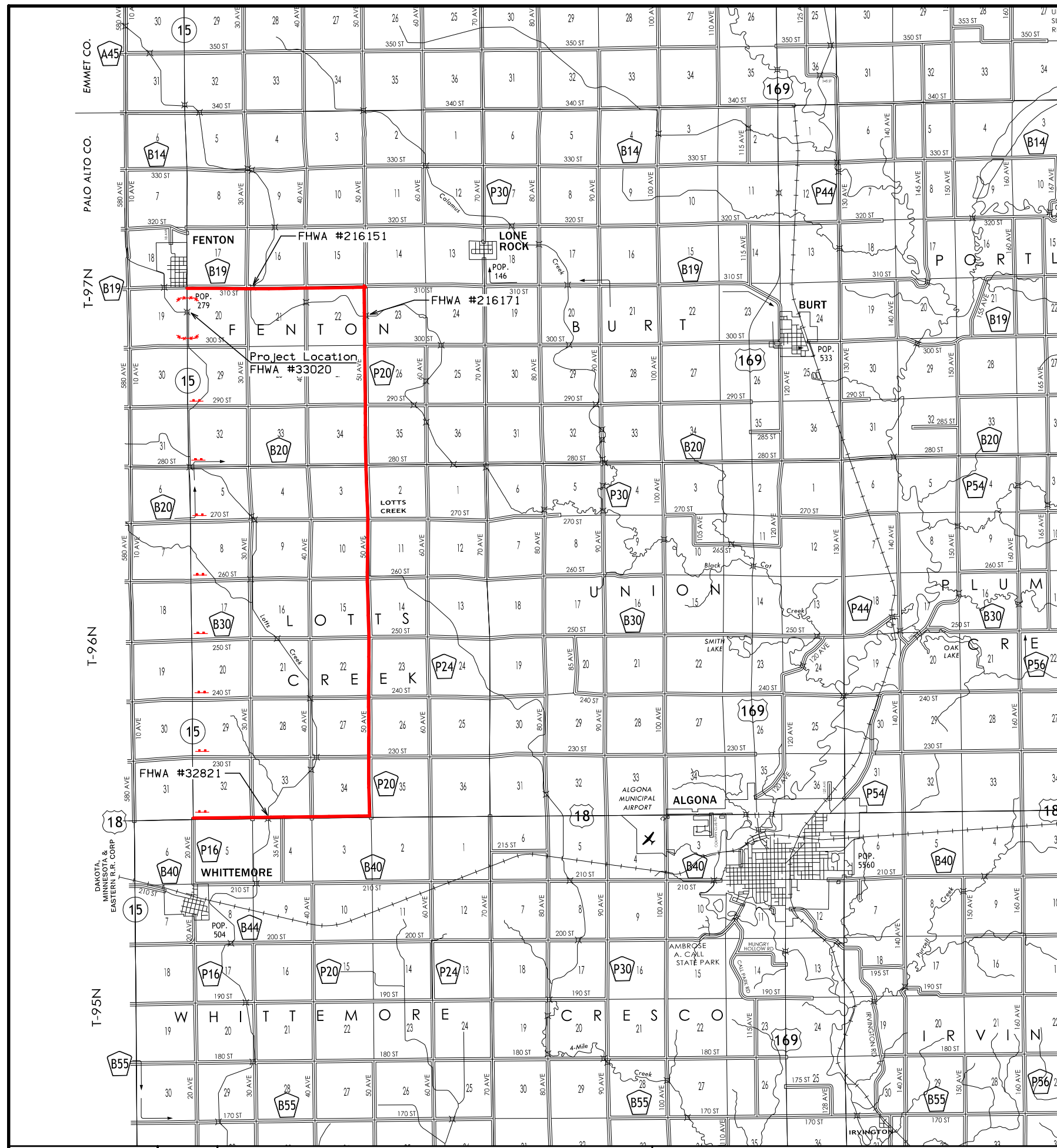


<b>Right of Way Design Information</b>	
<b>THIS SHEET INCLUDED FOR INFORMATION ONLY</b>	
ROW Team: CAGLE / LARSON	
ROW #: STPN-015-3(17)--2J-55	
Plan Date: 2/01/2021	
Color Legend:	
	Property Lines
	Temporary Easement
	Permanent Acquisition

108-23A  
08-01-08

### TRAFFIC CONTROL PLAN

1. Iowa 15 will be closed to traffic during construction. Traffic will be detoured as shown on Sheet J.2. All detour signage will be provided by District 2. The Contractor is responsible for safety closures per Tab. 108-13A.
2. Access to individual properties shall be maintained at all times.



LEGEND	
	DETOUR ROUTE
	HAZARD CLOSURE
	ROAD CLOSURE

**DETOUR ROUTE**

**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)**

- TOPSOIL ————— Topsoil (Class 10)
- 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
- BRK LS ————— Broken and Weathered Rock
- ROCK ————— Solid Rock
- BLDGS ————— 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.

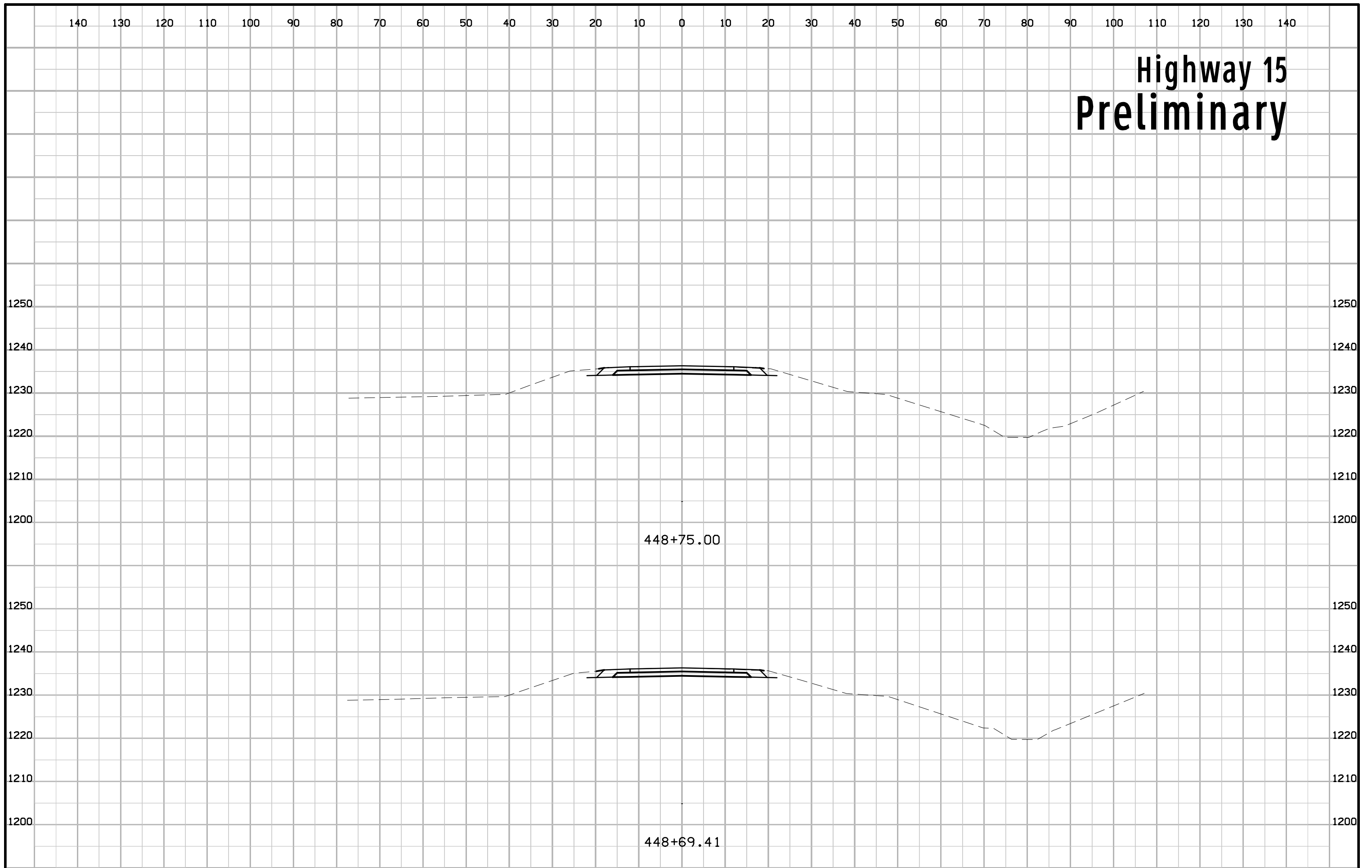
**SYMBOL LEGEND OF CROSS SECTION SHEETS**

- 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**

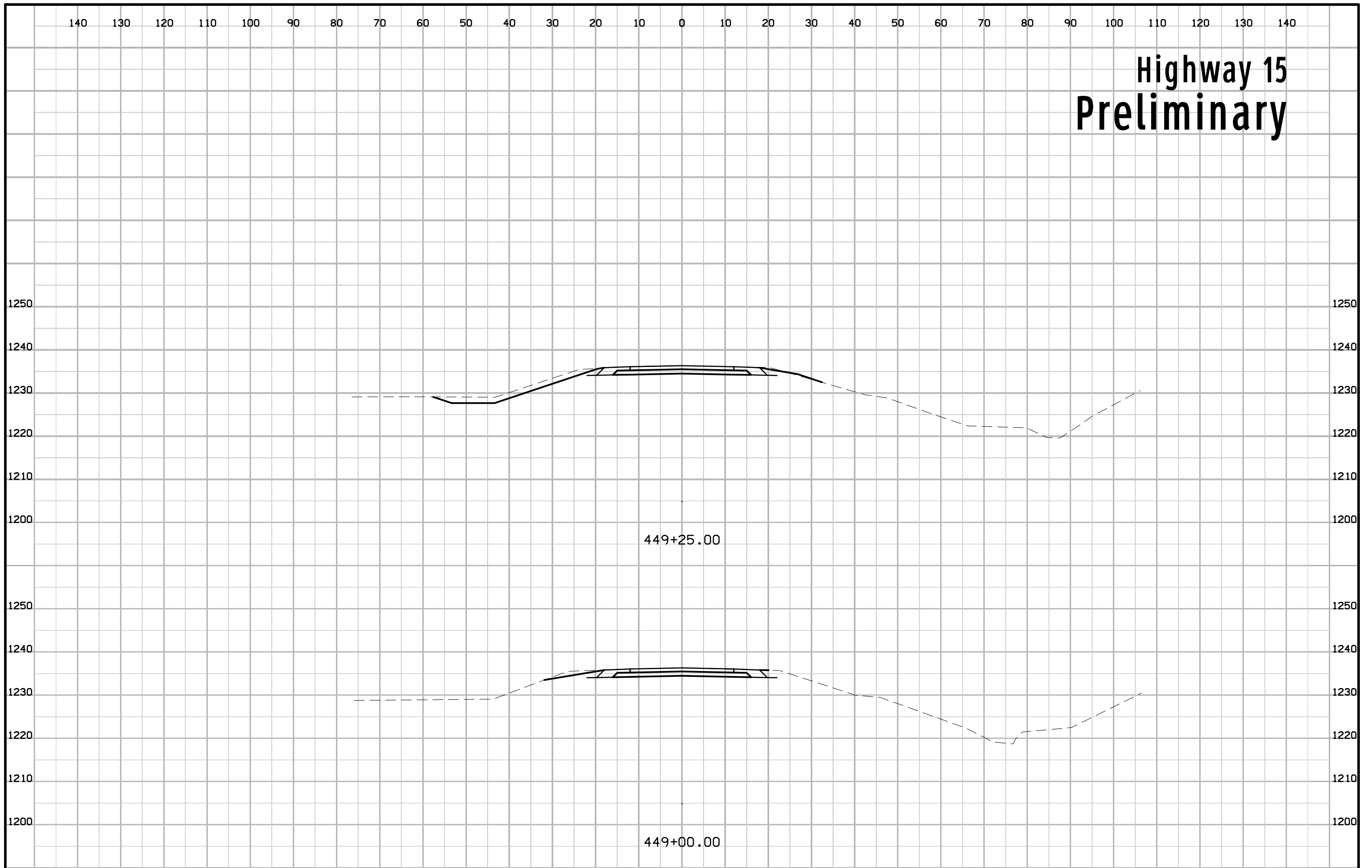
(COVERS SHEET SERIES W, X, Y, & Z)

# Highway 15 Preliminary

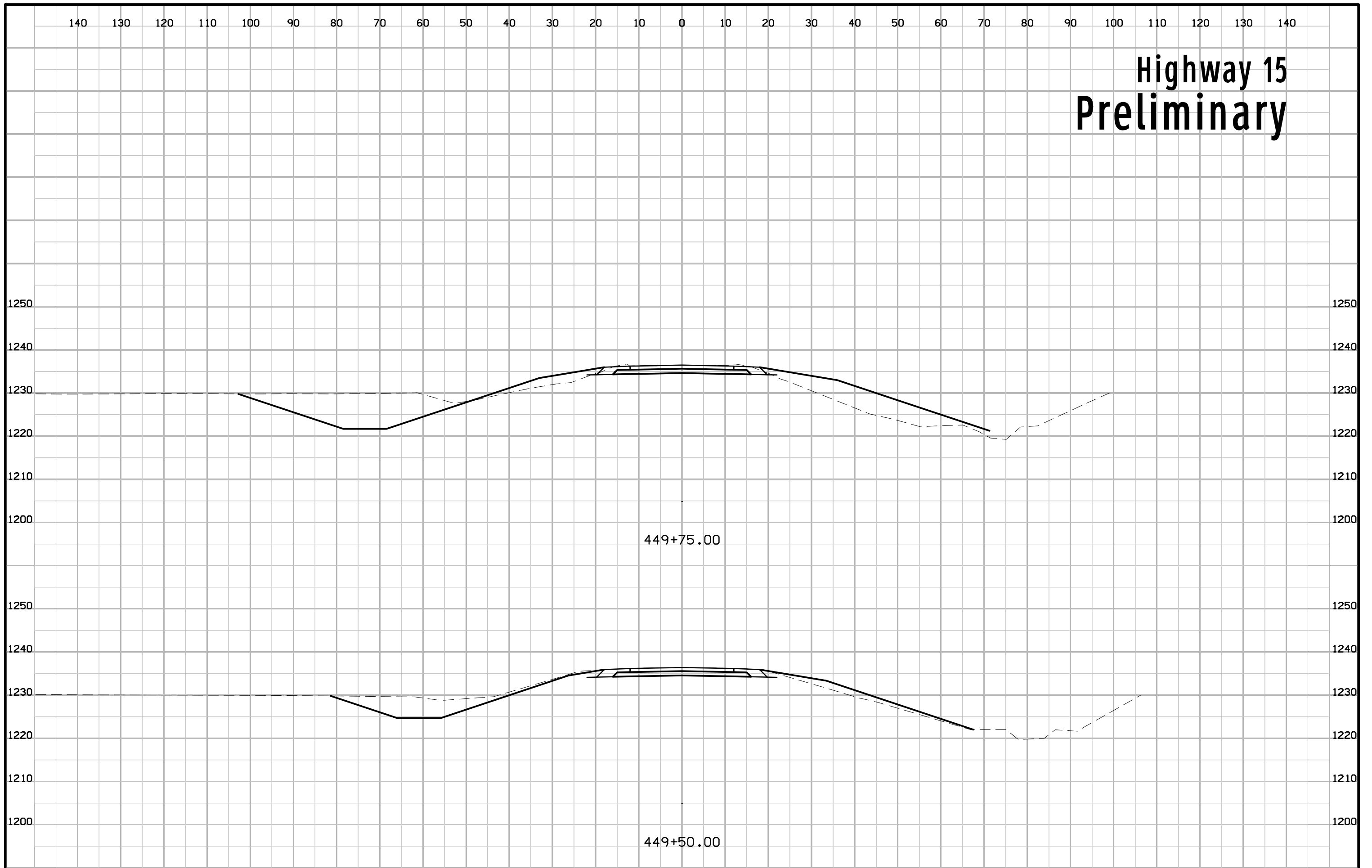




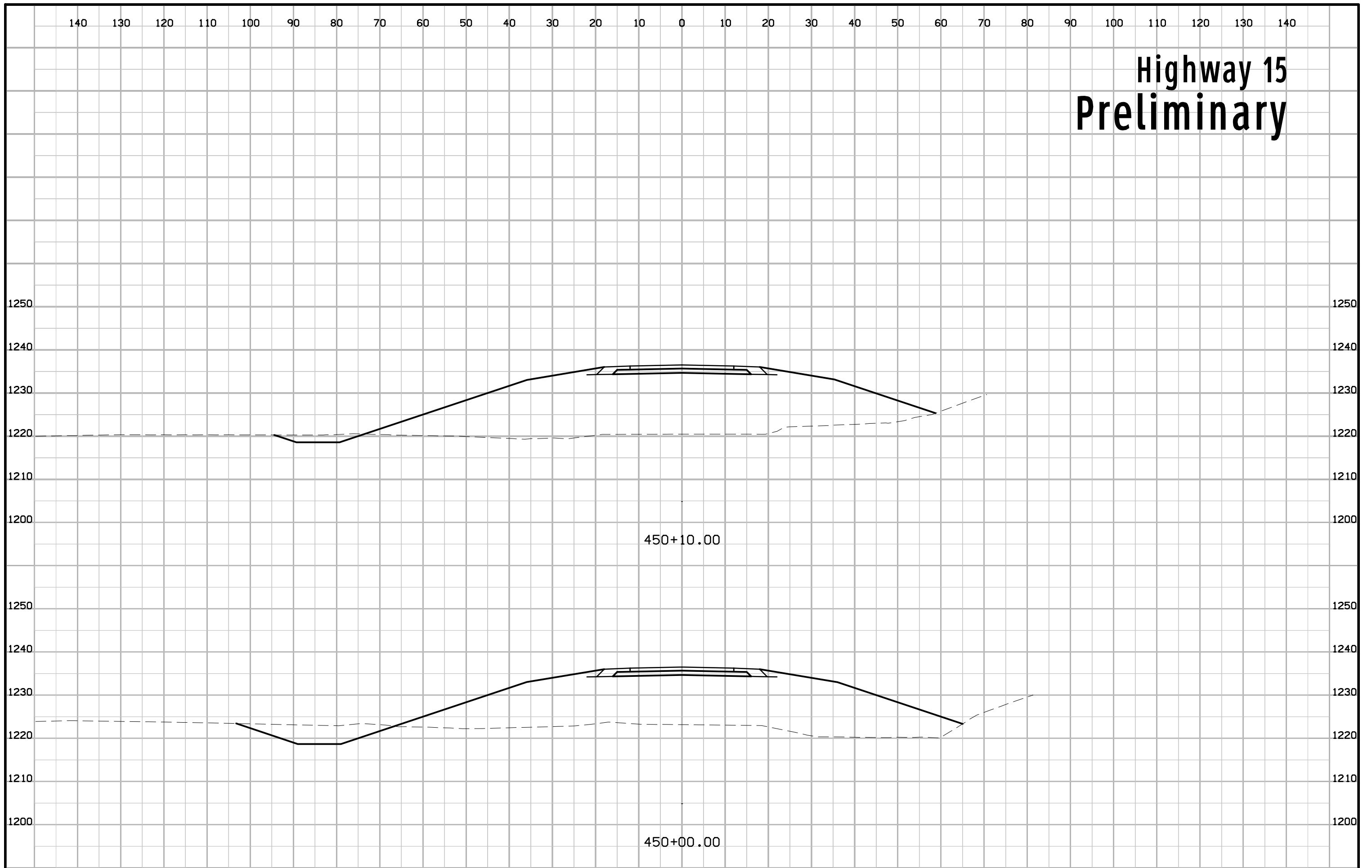
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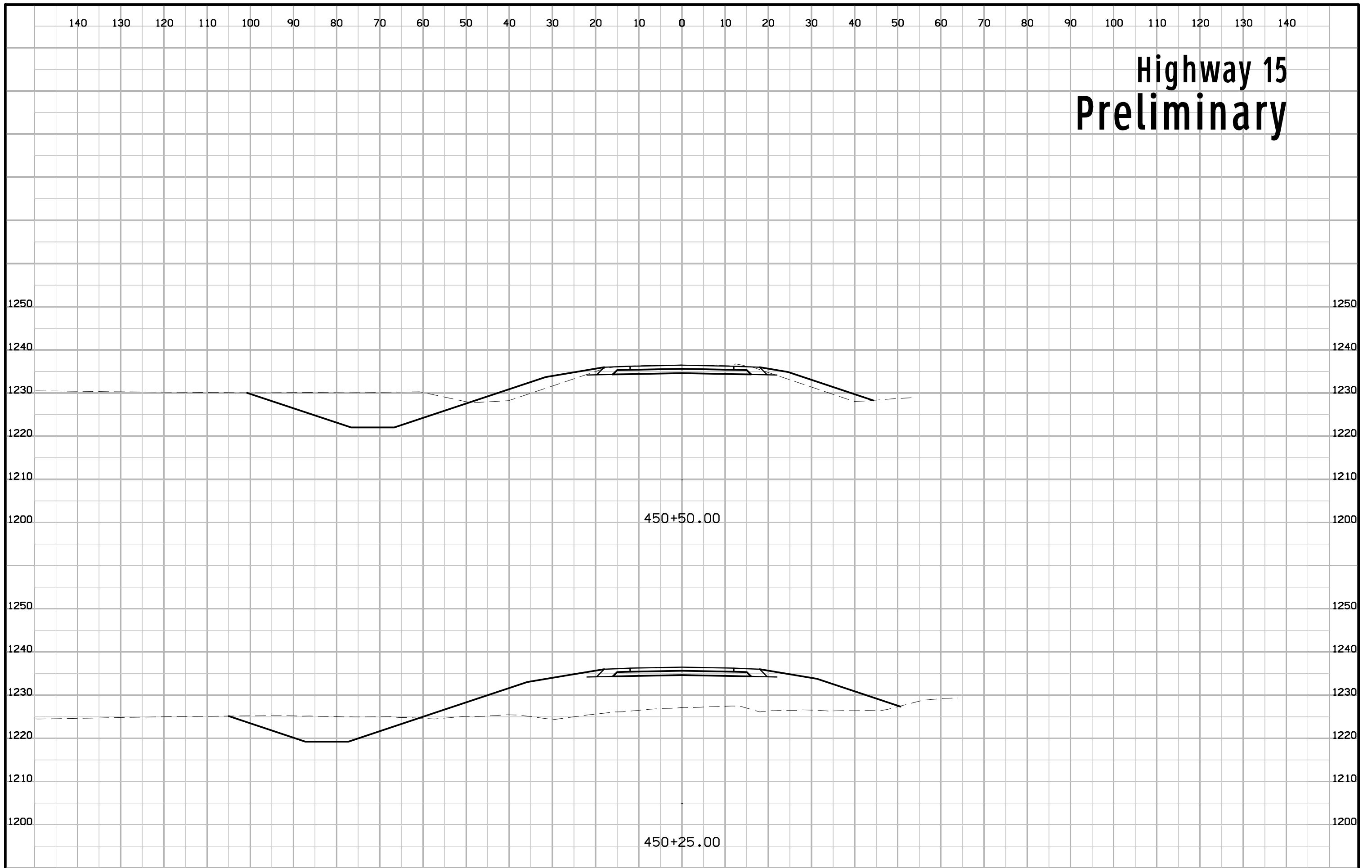
# Highway 15 Preliminary



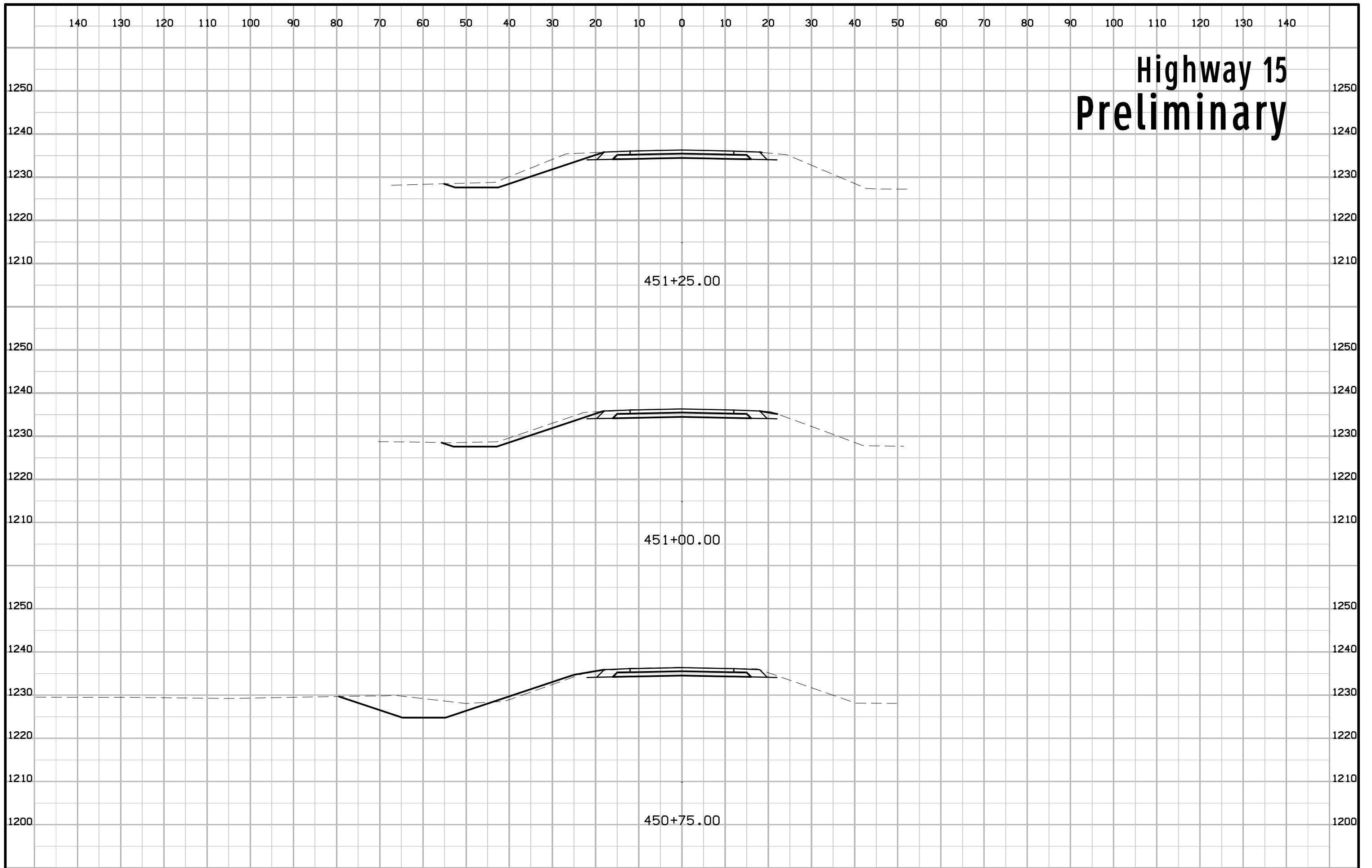
# Highway 15 Preliminary



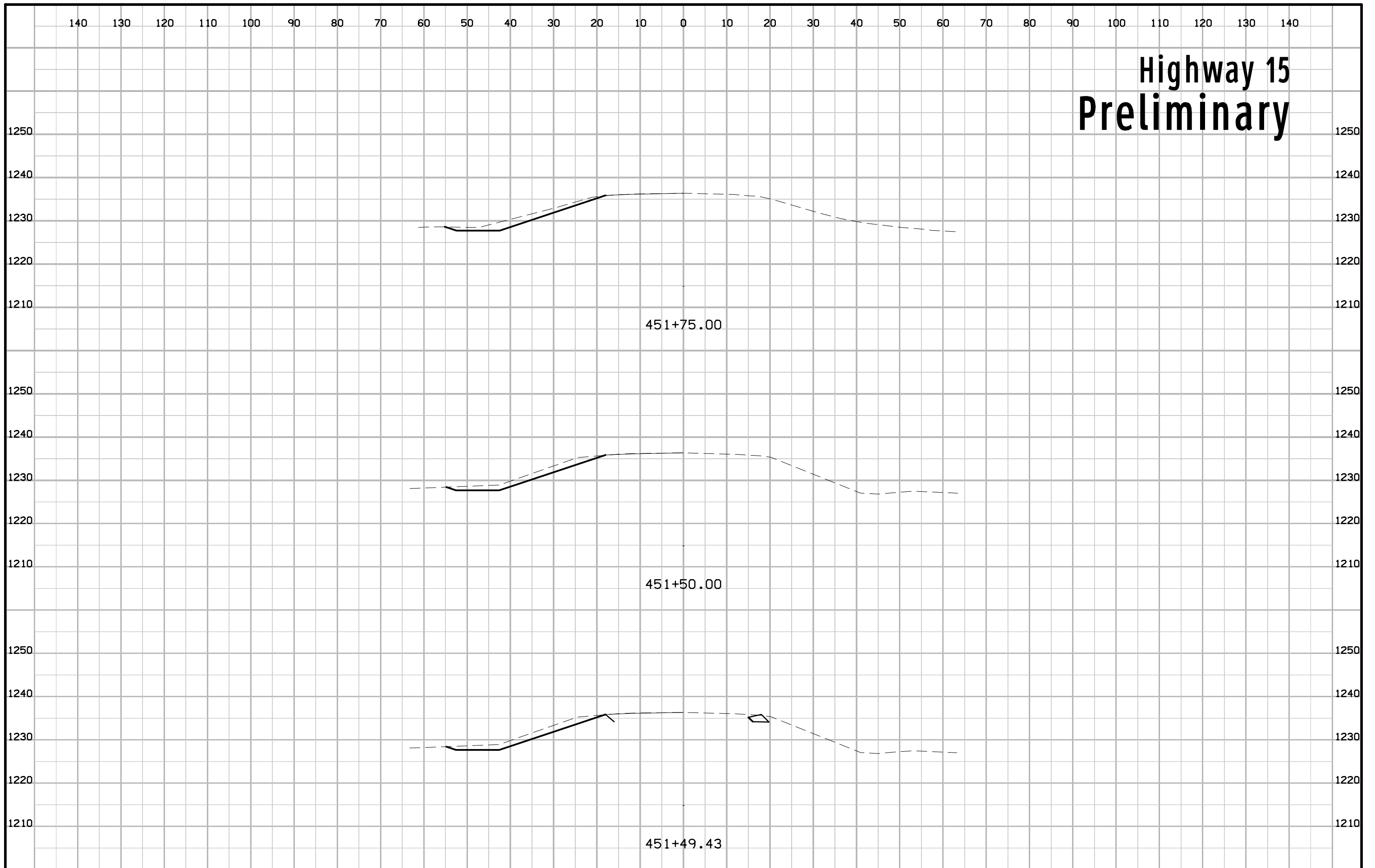
# Highway 15 Preliminary



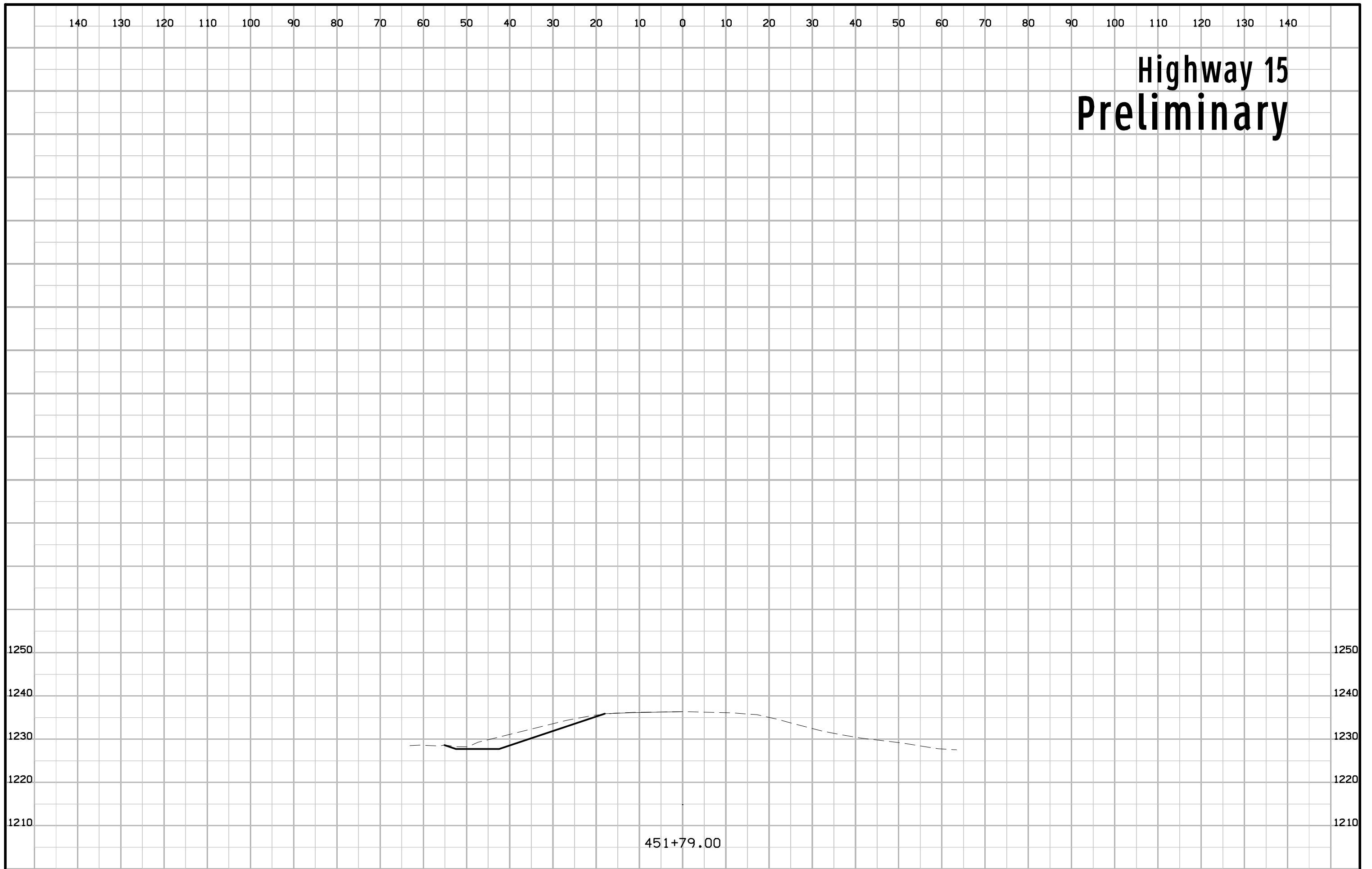
# Highway 15 Preliminary



# Highway 15 Preliminary



# Highway 15 Preliminary



451+79.00