

RCB CULVERT REPLACEMENT - TWIN BOX
BRFN-039-2(18)--39-81

SAC CO.

LETTING DATE
01-18-2023



Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM

SAC COUNTY

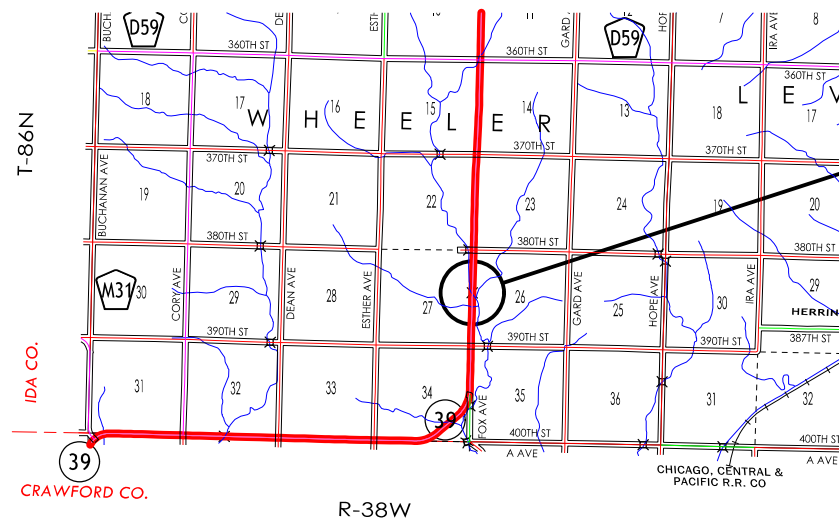
RCB CULVERT REPLACEMENT - TWIN BOX

IA 39 OVER PORTER CREEK 2.4 MI S OF CO RD D59

SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

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



Project Location
Sta. 1081+60

REVISIONS

TOTAL

18

PROJECT IDENTIFICATION NUMBER

16-81-039-010

PROJECT NUMBER

BRFN-039-2(18)--39-81

R.O.W. PROJECT NUMBER

STPN-039-2(19)--2J-81

INDEX OF SHEETS

No.	DESCRIPTION
A Sheets	Title Sheets
* A.1	Title Sheet
B Sheets	Typical Cross Sections and Details
B.1	Typical Cross Sections and Details
C Sheets	Quantities and General Information
C.1	Project Description
C.1	Estimated Project Quantities
C.1	Standard Road Plans
D Sheets	Mainline Plan and Profile Sheets
* D.1	Plan & Profile Legend & Symbol Information Sheet
* D.2 - 3	IA 39
G Sheets	Survey Sheets
G.1	Survey Information
G.2	Control Point Vicinity Map
G.3	Horiz. And Vert. Project Control Coordinate Listing
G.4	Alignment and Curve Data
J Sheets	Traffic Control and Staging Sheets
J.1	Traffic Control Plan and Staging Notes
V Sheets	Bridge and Culvert Situation Plans
* V.1 - 2	Bridge Situation Plans
W Sheets	Mainline Cross Sections
W.1	Cross Sections Legend & Symbol Information Sheet
W.2 - 5	Mainline Cross Sections
	* Color Plan Sheets

DESIGN DATA RURAL			
2021 AADT	2,900	V.P.D.	
2041 AADT	3,100	V.P.D.	
20-- DHV	--	V.P.H.	
TRUCKS	22	%	
Total			
Design ESALs	4,400,000		

INDEX OF SEALS		
SHEET NO.	NAME	TYPE
A.1	Taylor R. Theulen	Primary Signature Block

PRELIMINARY PLANS

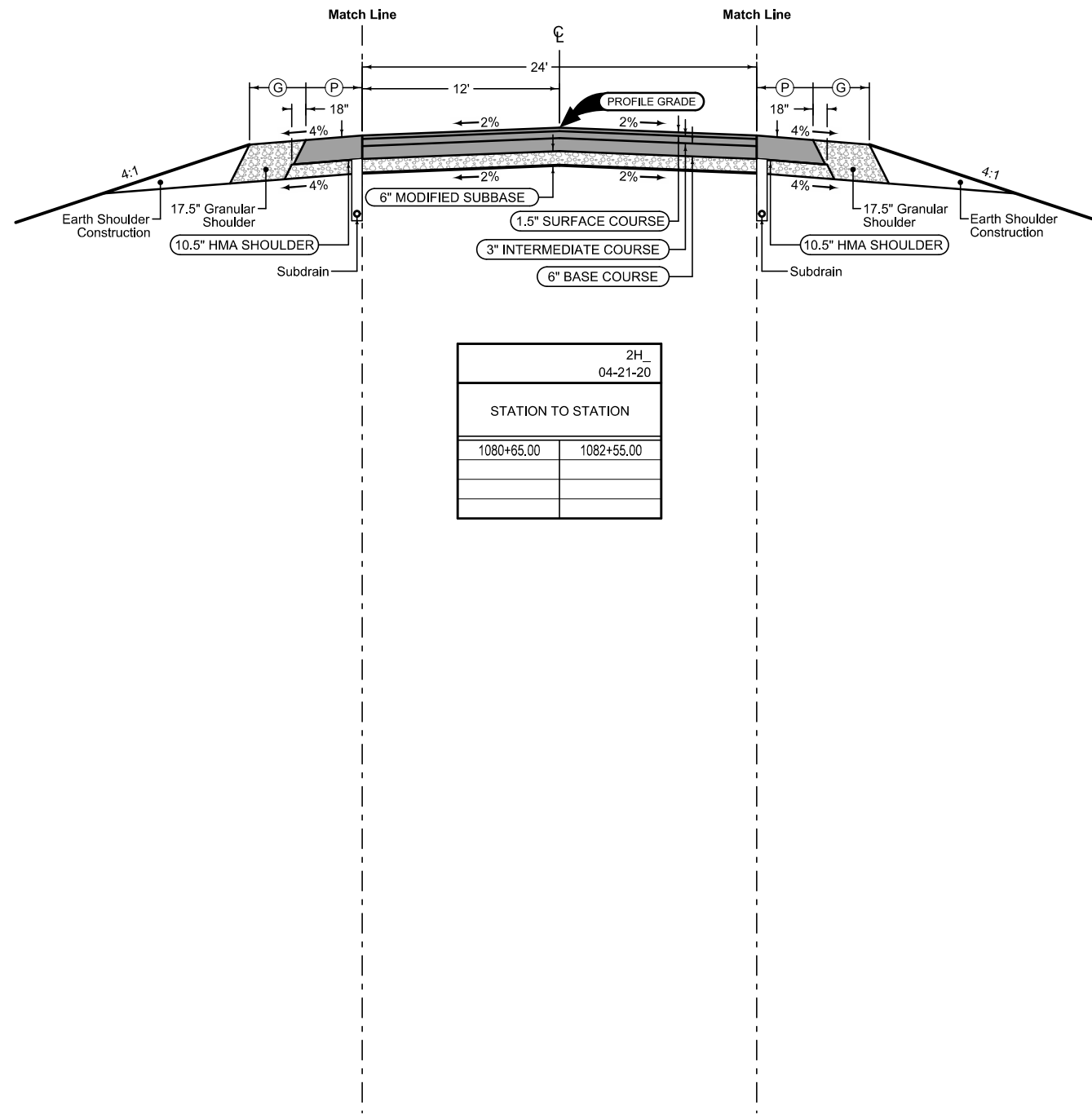
Subject to change by final design.

D5 PLAN - Date: 05/29/2020

Combination Shoulder

Shoulder Jointing:
Longitudinal joint: B

STATION TO STATION		2_C_ 04-21-20	
		(P) Feet	(G) Feet
1080+65.00	1082+55.00	4	4



STATION TO STATION		2H_ 04-21-20	
		(P) Feet	(G) Feet
1080+65.00	1082+55.00		

Combination Shoulder

Shoulder Jointing:
Longitudinal joint: B

STATION TO STATION		2_C_ 04-21-20	
		(P) Feet	(G) Feet
1080+65.00	1082+55.00	4	4

SURVEY SYMBOLS

- BCL Bridge Centerline
- BD Bridge Deck
- BRG Bridge
- - - - - C Centerline BL of Road (ML or SR)
- CP Control Point
- ENP Edge Paved Entrance & Park Lot
- - - - - ENT Centerline BL of Entrance
- - - - - ENU Edge Unpaved Entrance & Parking
- GDL Guard Rail Steel
- LIN Miscellaneous Line
- ▲ PI Tangent Point
- POT Point on Tangent
- SBR Size of Bridge
- ▲ SCR Section Corner
- - - - - SNP Unpaved Shoulder

UTILITY LEGEND

No utilities information was collected for this project. There is a pipe running along the outside edge of the east wheel guard of the bridge which was electronically located which could have a utility inside.

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

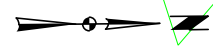
RIGHT-OF-WAY LEGEND

- ▲ Proposed Right-of-Way
- △ Existing Right of Way
- ▲ Existing and Proposed Right-of-Way
- ▲ Easement and Existing Right-of-Way
- Easement (Temporary)
- Easement
- C/A Access Control
- Property Line

PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

(COVERS SHEET SERIES D)

Wheeler TWP.
T-86N R-38W
SEC. 27



1079

1080

1081

1082

1083

1084

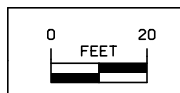
IA 39

Sta. 1080+65.00
Begin Construction

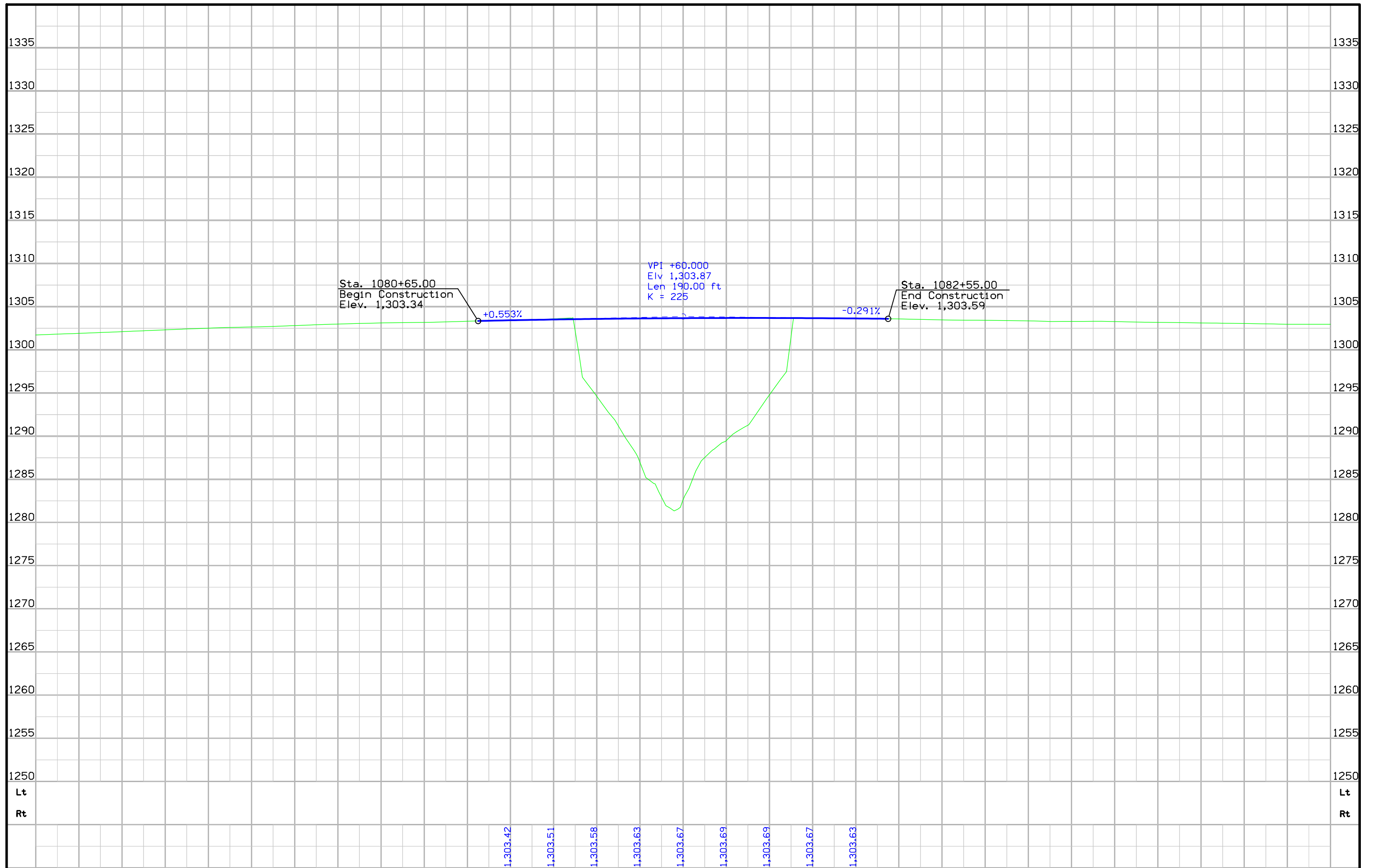
TWIN 12' X 10' X 140'-0"
REINFORCED CONCRETE BOX CULVERT

Sta. 1082+55.00
End Construction

Wheeler TWP.
T-86N R-38W
SEC. 26



IA 39



Sta. 1080+65.00
Begin Construction
Elev. 1,303.34

VPI +60.00
Elev 1,303.87
Len 190.00 ft
K = 225

Sta. 1082+55.00
End Construction
Elev. 1,303.59

Survey Information

SAC County
BRFN-039-2(18)--39-81
HIGHWAY 39 OVER PORTER CREEK
PIN 00-00-000-000
Sap-000

Party Personnel

Matt Fouts- Surveyor/PLS
Brandon Wood- Survey Technician
Ethan Fangmeier- Survey Technician
Nick Hollatz- Survey Technician
Wade Gjersvik- Survey Technician
Patrick Barber- Survey Senior Technician

Date(s) of Survey

Begin Date 11/25/2019
End Date 12/04/2019

General Information

Measurement units for this survey are US survey feet. This survey is for Preliminary/Engineering for the proposed bridge replacement on Iowa Highway 39 over Porter Creek and 0.4 miles south of 380th Street. This project is a Full Field Survey.

Vertical Control

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

Vertical positions were established by static observations and post processed using concurrent observations from the IaRTN Sac City and Denison reference stations. Static observations were also collected on NGS Monument DP4454 with results shown below. Additional benchmarks were established with a standard level loop relative to CP2.

DP4454 (NGS Second Order Class I) has a published Elev. Of 1285.66
Survey Elev. = 1285.57

Horizontal Control

The project coordinate system is the Iowa Regional Coordinate System, Zone 4. Horizontal datum is NAD83 (2011) for Epoch 2010.00. The projection parameters for Zone 4 of the IaRCS is defined below:

Lambert Conformal Conic Projection North American Datum of 1983
Origin Lat: 42°32'00"N
Origin Central Meridian: 94°50'00"W
Central Meridian Scale: 1.000045
False Northing: 8,600,000
False Easting: 14,500,000

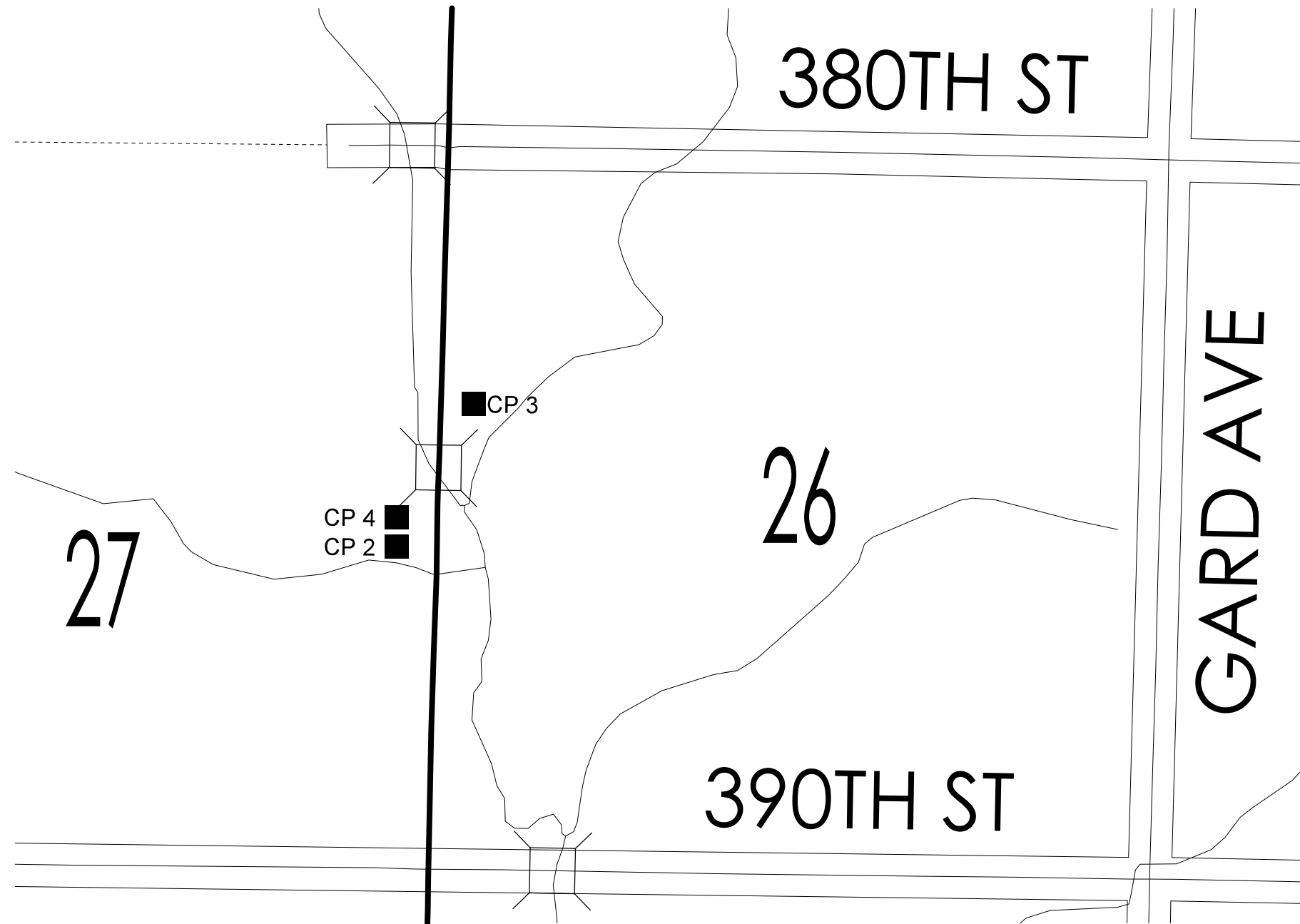
Horizontal positions for site control were established by static observations and post processed using concurrent observations from the IaRTN Sac City and Denison reference stations

Alignment Information

The horizontal alignment for this survey is a retrace of As-built Plans No. F-412(5). Survey stationing was equated to the plan at STA 1076+72.3 and run back and ahead without equation throughout the survey.

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 4

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 4

Point Name	Northing	Easting	Elevation	Feature Definition	Description
CP2	8490435.08	14388231.80	1298.08	CP/BM	5/8" REBAR NORTH END OF THE SECOND FIELD DRIVE SOUTH OF BRIDGE AND WEST OF HIGHWAY 39
CP3	8491450.38	14388292.70	1302.86	CP/BM	5/8" REBAR EAST OF HIGHWAY 39 IN LINE WITH MILE MARKER 19
CP4	8490780.80	14388233.41	1302.04	CP/BM	5/8" REBAR NORTH END OF FIRST FIELD DRIVE SOUTH OF BRIDGE AND WEST OF HIGHWAY 39

ALIGNMENT COORDINATES

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)
C1	IA 39	1077+60.00	8490526.68	14388260.32															
C2	IA 39	1085+60.00	8491326.64	14388268.61															

Sac	ROW: STPN-039-2(19)--2J-81			PIN	16-81-039-010														
	Porter Creek 2.4 mi S of Co Rd D59																		
		STATE		COUNTY		CITY			TEMP EASE	BORROW									
PARCEL NO.	OWNER NAME	FEE	EASE	FEE	EASE	FEE	EASE	EXCESS			FEE	T.E.	MITIGATION	OTHER	HOUSE	BUILDING(S)	A/C ONLY	TOTAL ACQ.	
1S	Reese Johnson - Fee		0.16 AC																
2	Zane Johnson - Fee		0.11 AC																
2 Parcels	"TOTALS	0 AC	0.27 AC	0 AC	0 AC	0 AC	0 AC	0 AC			0 AC	0 AC	0 AC						
		0 SF		0 SF	0 SF	0 SF	0 SF	0 SF			0 SF								

NO ACCESS RIGHTS ARE TO BE ACQUIRED ON THIS PROJECT.



15
REESE & ROSIE JOHNSON

Wheeler TWP.
T-86N R-38W
SEC. 27

1080+00
±65'±Ex.R/W

1081+54
±80'

1081+78
±122'

1082+74
±122'

1082+89
±69'±Ex.R/W

1079

1080

1081

1082

1083

1084

39

39

1080+32
±73'±Ex.R/W

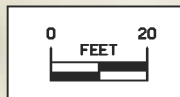
1081+64
±79'±Ex.R/W

1080+60
±126'

1081+37
±126'

Wheeler TWP.
T-86N R-38W
SEC. 26

2
ZANE & CAROL JOHNSON



Right of Way Design Information
THIS SHEET INCLUDED
FOR INFORMATION ONLY

ROW Team: CAGLE / LARSON
ROW #: STPN-039-2(19)--2J-81
Plan Date: 3-01-2021

- Color Legend:
- Property Lines
 - Temporary Easement
 - Permanent Acquisition

511 TRAVEL RESTRICTIONS

Route	Direction	County	Location Description	Feature Crossed	Object Type	Maint. Bridge No., Structure ID, or FHWA No.	Type of Restriction	Existing Measurement	Construction Measurement	Construction Measurement as Signed	Projected As Built Measurement	Remarks
			None anticipated									

108-23A
08-01-08

TRAFFIC CONTROL PLAN

Contractor shall give Iowa DOT 14 days notice prior to the start of the detour. Detour signs will be placed by others.

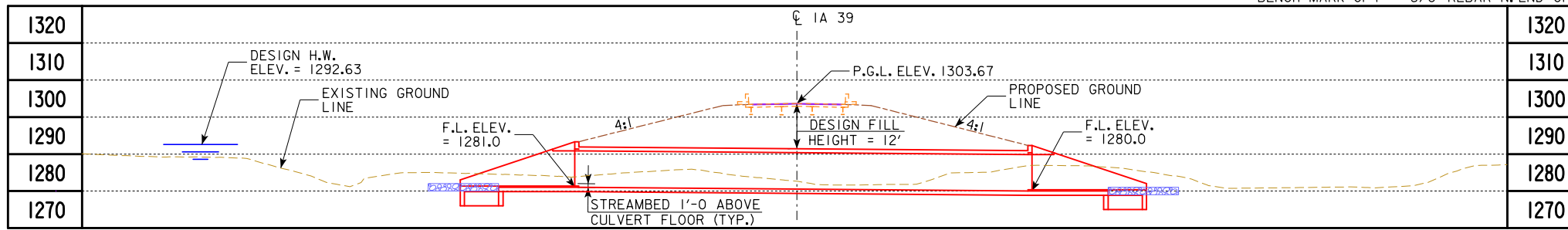
IA 39 Detour - County Road M35 north to County Road D59, then east to IA 39.

111-01
04-17-12

COORDINATED OPERATIONS

Other work in progress during the same period of time will include the construction of the projects listed. Coordinate operations with those of other contractors working within the same area.

Project	Type of Work
None provided	



LONGITUDINAL SECTION ALONG CULVERT

HYDRAULIC DATA

DRAINAGE AREA = 4,269 ACRES
 Q₅₀ = 1,936 CFS
 HW ELEV. = 1292.63
 STREAM SLOPE = 27.1 FT./MI.

+0.553% -0.291%
 VPI STA = 1081+60 VC = 190'
 VPI ELEV = 1303.87
PROPOSED PROFILE
GRADE IA 39

HYDRAULIC DESIGN

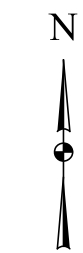
I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Mark D. Werner 5/21/2020
 Signature Date

Mark D. Werner
 Printed or Typed Name

My license renewal date is December 31, 2021

Pages or sheets covered by this seal: V.1



- NOTES:
- ALL UNITS ARE IN FEET UNLESS NOTED OTHERWISE.
 - DRAINAGE WILL NEED TO BYPASS CULVERT DURING CONSTRUCTION.
 - FLOWLINE ELEVATION AT CULVERT FLOOR. HYDRAULIC ANALYSIS ASSUMES STREAMBED 1'-0 ABOVE CULVERT FLOOR.
 - THE NEED FOR CAMBER AND BELL JOINTS TO BE DETERMINED AFTER REVIEW OF SOILS REPORT.
 - ROADWAY WILL BE CLOSED TO TRAFFIC DURING CULVERT CONSTRUCTION.

UTILITY LEGEND
 NO KNOWN UTILITIES

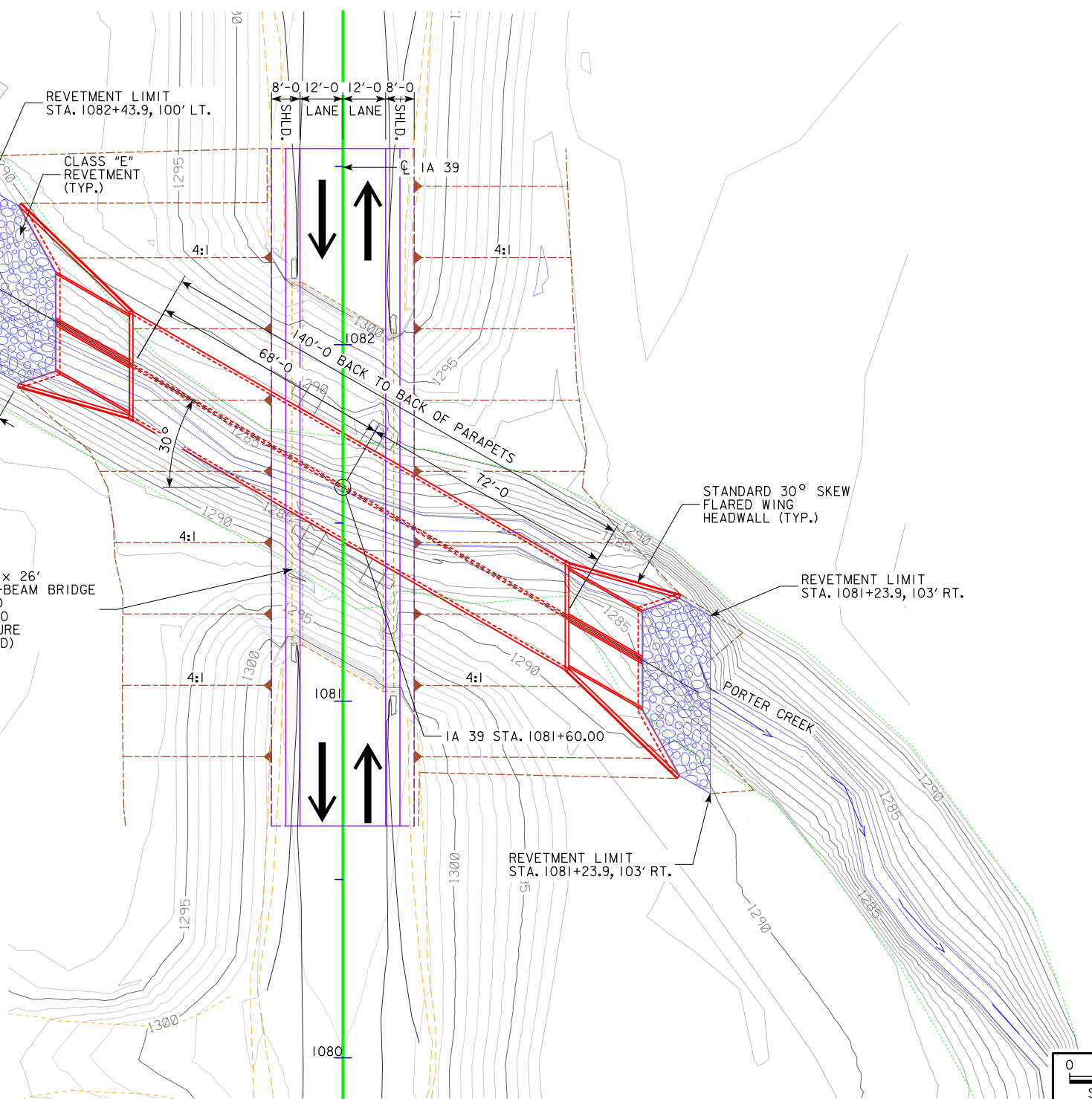
LOCATION		TRAFFIC ESTIMATE	
IA 39 OVER PORTER CREEK	2021 AADT	2,900	V.P.D.
T-86N R-38W	2041 AADT	3,100	V.P.D.
SECTION 26 & 27	TRUCKS	22	%
WHEELER TOWNSHIP	TOTAL		
SAC COUNTY	DESIGN ESALS	4,400,000	
FHWA NO. 46701			
BRIDGE MAINT. NO. 8118.9S039			
LATITUDE 42.233306°			
LONGITUDE -95.245886°			

TYPICAL CHANNEL PROTECTION

ESTIMATED REVETMENT QUANTITIES INCLUDED WITH ROAD PLANS

LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
INLET	90	125	65
OUTLET	90	125	65
TOTALS	180	250	130

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE. QUANTITIES SHOWN FOR INFORMATION ONLY. SEE ROAD SHEETS.

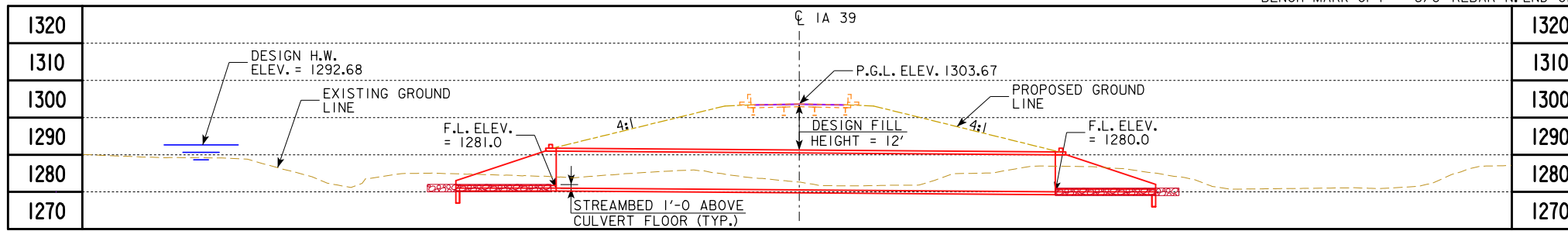


SITUATION PLAN



DESIGN FOR 30° SKEW (L.A.)
TWIN 12' X 10' X 140'-0 REINFORCED CONCRETE BOX CULVERT

SITUATION PLAN
 STATION 1081+60 MAY 2020
SAC COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 1 OF 2 FILE NO. 31433 DESIGN NO. 120



LONGITUDINAL SECTION ALONG CULVERT

HYDRAULIC DATA

DRAINAGE AREA = 4,269 ACRES
 Q₅₀ = 1,936 CFS
 HW ELEV. = 1292.68
 STREAM SLOPE = 27.1 FT./MI.

+0.553% -0.291%
 VPI STA = 1081+60 VC = 190'
 VPI ELEV = 1303.87
PROPOSED PROFILE
GRADE IA 39

HYDRAULIC DESIGN

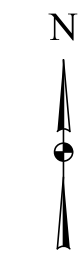
I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Mark D. Werner 5/21/2020
 Signature Date

Printed or Typed Name **Mark D. Werner**

My license renewal date is December 31, 2021

Pages or sheets covered by this seal: V.2



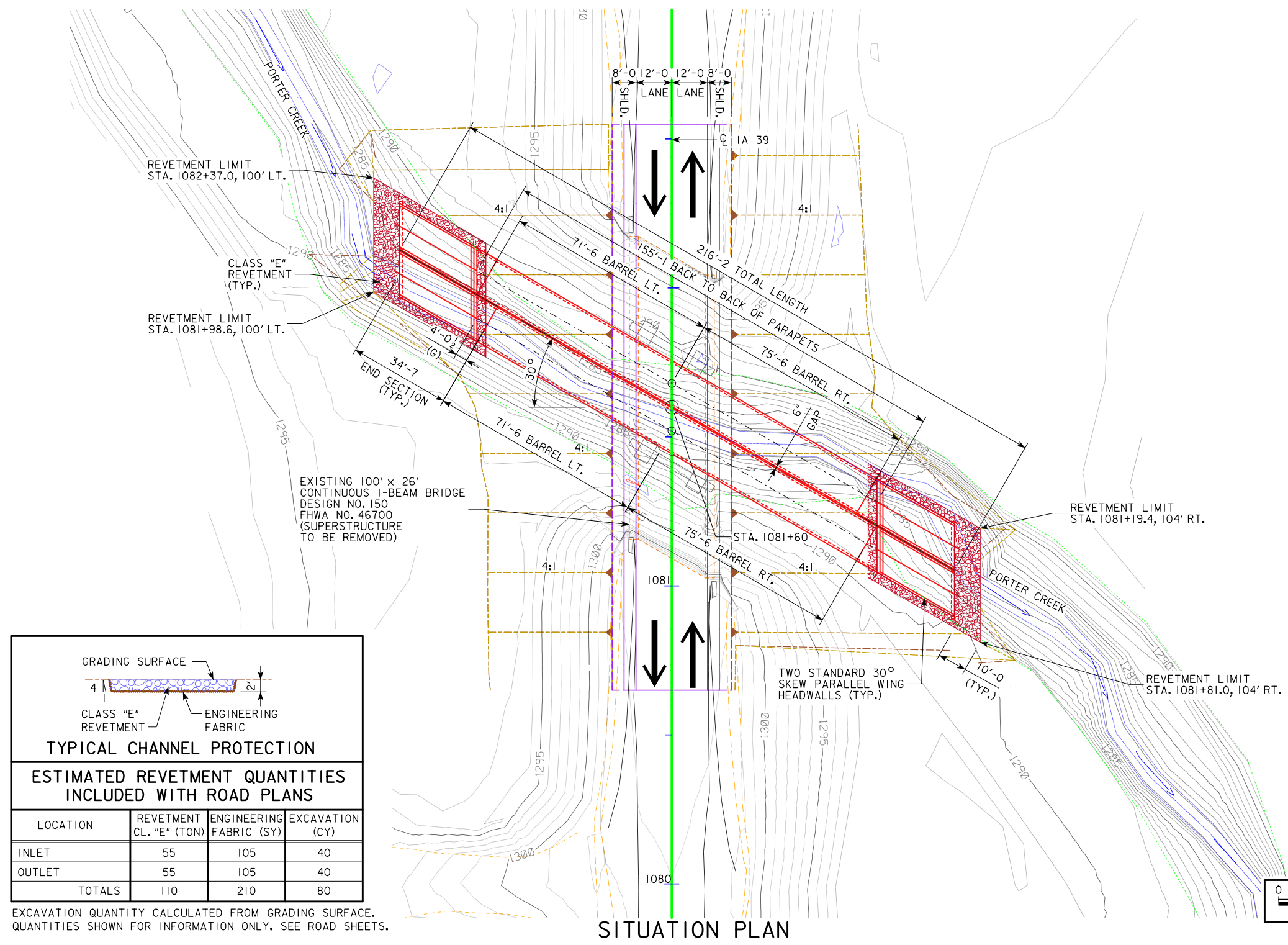
- NOTES:
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 - FLOWLINE ELEVATION AT CULVERT FLOOR. HYDRAULIC ANALYSIS ASSUMES STREAMBED 1'-0" ABOVE CULVERT FLOOR.
 - THE NEED FOR CAMBER AND BELL JOINTS TO BE DETERMINED AFTER REVIEW OF SOILS REPORT.
 - ROADWAY WILL BE CLOSED TO TRAFFIC DURING CULVERT CONSTRUCTION.

UTILITY LEGEND
 NO KNOWN UTILITIES

LOCATION	TRAFFIC ESTIMATE
IA 39 OVER PORTER CREEK	2021 AADT <u>2,900</u> V.P.D.
T-86N R-38W	
SECTION 26 & 27	2041 AADT <u>3,100</u> V.P.D.
WHEELER TOWNSHIP	
SAC COUNTY	TRUCKS <u>22</u> %
FHWA NO. 46701	TOTAL
BRIDGE MAINT. NO. 8118.9S039	DESIGN ESALS <u>4,400,000</u>
LATITUDE 42.233306°	
LONGITUDE -95.245886°	

DESIGN FOR 30° SKEW (L.A.)
TWIN 12' X 10' X 155'-1 PRECAST CONCRETE BOX CULVERT

SITUATION PLAN
 STATION 1081+60 MAY 2020
SAC COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 2 OF 2 FILE NO. 31433 DESIGN NO. 120



TYPICAL CHANNEL PROTECTION

ESTIMATED REVETMENT QUANTITIES INCLUDED WITH ROAD PLANS

LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
INLET	55	105	40
OUTLET	55	105	40
TOTALS	110	210	80

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE. QUANTITIES SHOWN FOR INFORMATION ONLY. SEE ROAD SHEETS.

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\R/CB
- ===== Proposed Pipe\R/CB
- ===== Proposed Dike
- ===== All Elements Associated with Proposed Entrances

LINE STYLE LEGEND OF CROSS SECTION SHEETS (SOILS)

- Topsoil (Class 10)
- Slope Dressing Only
- Class 10 Materials
- Select Loams And Clay-Loams
- Select Sand
- Unsuitable Type A Disposal
- Unsuitable Type B Disposal
- Unsuitable Type C Disposal
- Shale
- Waste
- Broken and Weathered Rock
- Solid Rock
- 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.

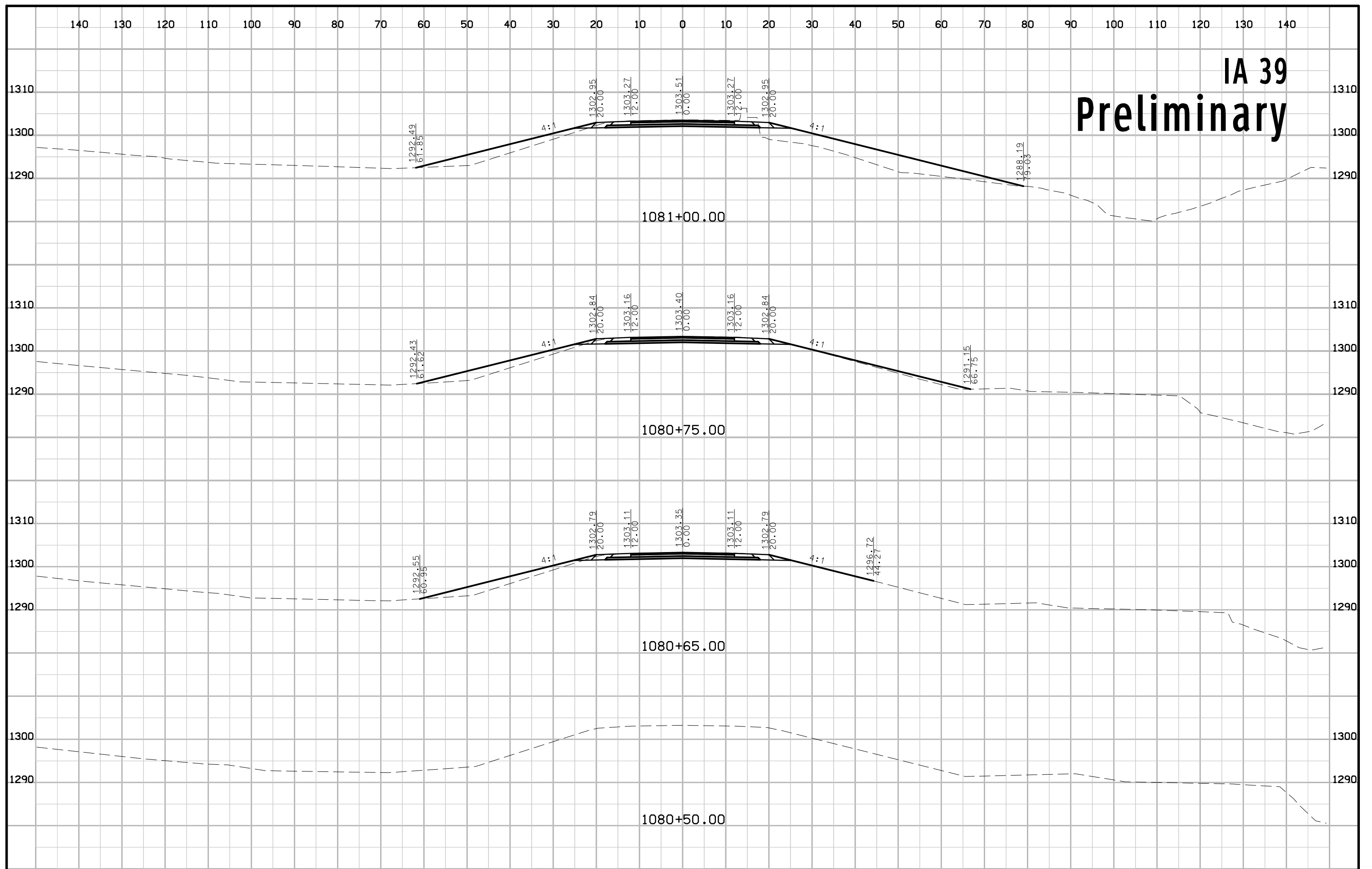
SYMBOL LEGEND OF CROSS SECTION SHEETS

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

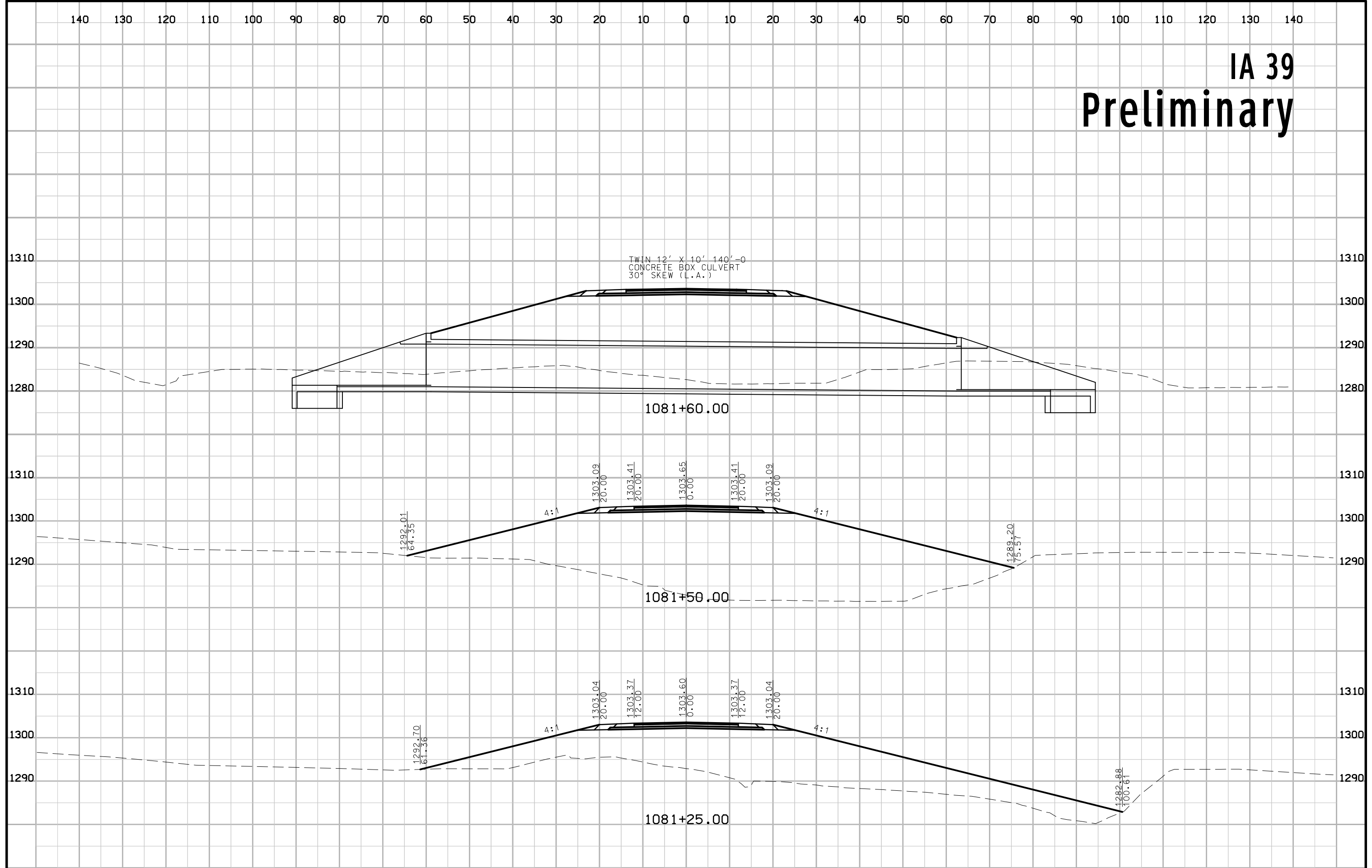
**CROSS SECTION
LEGEND AND SYMBOL
INFORMATION SHEET**

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

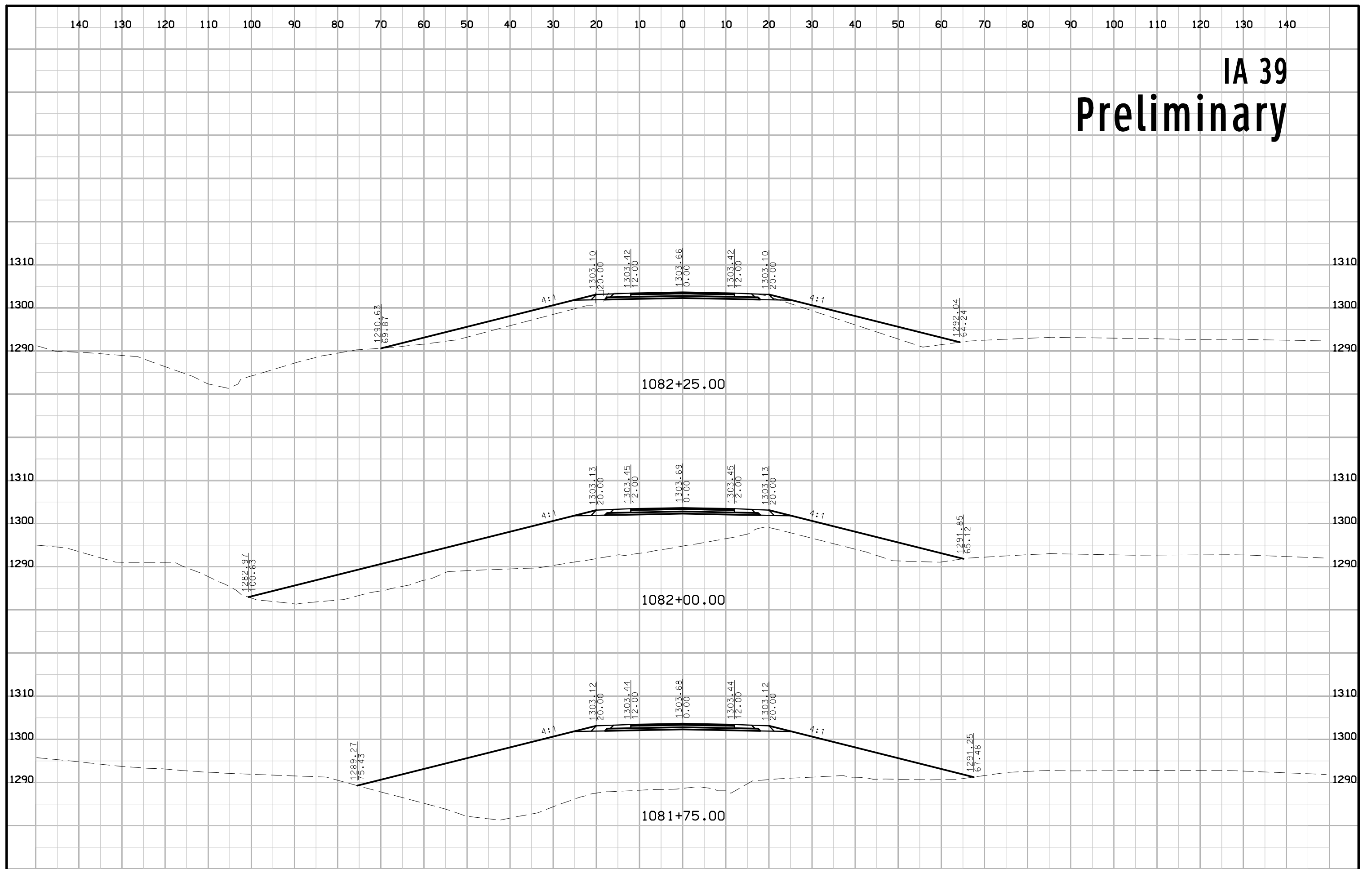
IA 39 Preliminary



IA 39 Preliminary



IA 39 Preliminary



IA 39 Preliminary

