LETTING DATE 12-20-2022

BRIDGE REPLACEMENT-PPCB
BRF-059-3(44)--38-78

POTTAWATTAMIE Co.

INDEX OF SHEETS	
No.	DESCRIPTION
A Sheets	**Title Sheets**
A.1	Title Sheet
A.1	Location Map Sheet
A.2 - 8	Design Concept
A.9 - 11	Design Criteria
B Sheets	**Typical Cross Sections and Details**
B.1 - 3	Typical Cross Sections and Details
D Sheets	**Mainline Plan and Profile Sheets**
* D.1	Plan & Profile Legend & Symbol Information Sheet
* D.2	US 59
G Sheets	**Survey Sheets**
G.1	Reference Ties and Bench Marks
G.2 - 3	Horizontal Control Tab. & Super for all Alignments
J Sheets	**Traffic Control and Staging Sheets**
J.1	Traffic Control Plan
W Sheets	**Mainline Cross Sections**
W.1 - 15	Mainline Cross Sections
	* Color Plan Sheets

IOWA DOT

Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM

POTTAWATTAMIE COUNTY

BRIDGE REPLACEMENT-PPCB

EAST BRANCH WEST NISHNABOTNA RIVER 1.0 MI S OF IA 83

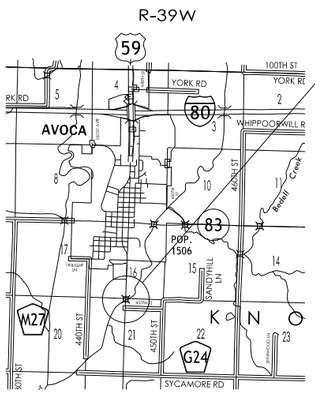
SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

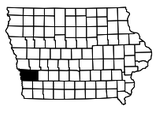
Value Engineering Saves. Refer to Article 1105.14 of the Specifications.

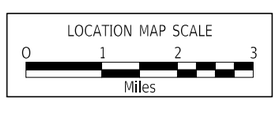
REVISIONS

TOTAL
--
PROJECT IDENTIFICATION NUMBER
18-78-059-010
PROJECT NUMBER
BRF-059-3(44)--38-78
R.O.W. PROJECT NUMBER
NHSN-059-3(45)--2R-78



Project Location
Ref Loc Sign 63.1
FHWA #43450





DESIGN DATA RURAL			
2023	AADT	2800	V.P.D.
2043	AADT	3100	V.P.D.
20 --	DHV	--	V.P.H.
TRUCKS		14	%
Total Design ESALs		--	

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

PRELIMINARY PLANS

Subject to change by final design.

D2/D3 PLAN – Date: 4–15–2021

FILE NO.	ENGLISH	DESIGN TEAM JIA \ DEWOLF	POTTAWATTAMIE COUNTY	PROJECT NUMBER BRF-059-3(44)--38-78	SHEET NUMBER A.1

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IOWA DEPARTMENT OF TRANSPORTATION

TO OFFICE:	District 4	**DATE:**	March 1, 2021
ATTENTION:	Scott Schram	**PROJECT:**	Pottawattamie County BRF-059-3(44)--38-78 PIN: 18-78-059-010
FROM:	John E. Bartholomew		
BUREAU:	Design		
SUBJECT:	Project Concept Statement; (Final Approval, D0)		

This project involves the replacement of the US 59 bridge (Maint. No.7863.1S059) over East Branch West Nishnabotna River.

A concept review was not held for this project.

It was determined to remove and replace the existing 288 ft x 26 ft continuous I-beam bridge with a 369 ft. x 44 ft. pretensioned prestressed concrete beam bridge, using staged construction.

This is the preferred alternative due to District 4's preference. The preliminary estimated project cost is **$4,483,800.** Additional right of way may be required. Traffic will be maintained by staged construction.

The Draft Project Concept Statement was sent out for review and comment with concerns to be resolved by Thursday, February 18, 2021. Comments received during the review period have been considered and resolved.

This project is recommended for construction in FY 2023. The Office of Design will coordinate plan preparation with assistance from the Office of Bridges and Structures.

JEB:jaa
Attach.
cc:

C. Purcell
S. J. Megivern
M. A. Swenson
S. Majors
B. Bradley
E. C. Wright
N. M. Miller
B. E. Azeltine
S. Anderson
K. K. Patel
D. R. Claman
M. E. Khoda
D. Mulholland
S. Mefford
R. Moraine
M. Solberg
FHWA

M. J. Kennerly
J. S. Nelson
R. A. Younie
K. Brink
J. W. Laaser-Webb
M. E. Ross
C. C. Poole
T. D. Crouch
D. Stokes
S. Godbold
J. Hauber
K. Olson
P. Schwarz
J. Garton
D. Redmond
S. Suhr

K. D. Nicholson
M. Nop
D. E. Sprengeler
D. L. Newell
W. A. Sorenson
A. A. Welch
B. Hofer
S. J. Gent
J. Selmer
J. Vortherms
A. Abu-Hawash
S. Neubauer
W .Mayberry
O. Lechnowsky
K. Shackelford
J. Woodcock

FINAL PROJECT CONCEPT STATEMENT

Highway 59 Bridge over E Branch W Nishnabotna River 1.0 Mi. S of IA 83.

Pottawattamie County
BRF-059-3(44)--38-78
PIN: 18-78-059-010
Maint. No. 7863.1S059
FHWA No. 43450

Highway Division
Design Bureau

John Bartholomew, P.E.
515-239-1540

March 1, 2021

I. STUDY AREA

A. Project Description

This project involves the replacement of the US 59 bridge (Maint. No. 7863.1S059) over East Branch West Nishnabotna River.

B. Need for Project

This is a 288 ft x 26 ft steel girder bridge was built in 1929. The superstructure was replaced in 1952, and an overlay was added in 1985 which is reaching the end of its service life. The bottom of the deck has spalls with exposed rebar and leaching cracks. The steel beams have severe rust. The substructure has cracking. Due to its condition, the bridge should be replaced.

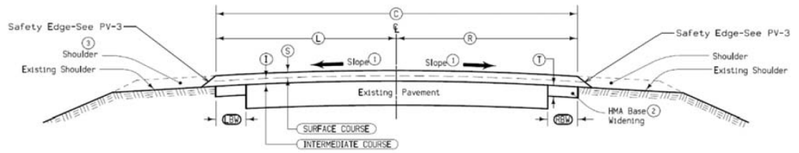
Looking North

Looking South

C. Present Facility

The existing structure is a 288 ft x 26 ft Continuous I-beam bridge constructed in 1929 with the superstructure being replaced in 1952.

U.S. 59 in the project area was originally constructed in 1952 with 22 ft. wide 8" PC8 pavement with 10 ft. wide granular shoulders and 3:1 foreslopes. In program year 2021 US 59 in the project area will receive a 3" HMA overlay and the roadway widened to 12 ft driving lanes and 2 ft paved shoulders with 7 ft. wide granular shoulders, (NHSX-059-3(46)--3H-78).



Location			S	I	C	L	R	T	Remarks
Road Identification	Station To Station		Inches	Inches	Feet	Feet	Feet	Inches	
US 59	360+25	607+70	1.5	1.5	28	14	14	8	
US 59	612+00	645+00	1.5	1.5	28	14	14	8	

D. Traffic Estimates

The 2023 construction year and 2043 design year average daily traffic estimates are 2800 ADT with 14 % trucks and 3100 ADT with 14 % trucks, respectively.

E. Sufficiency Ratings

US 59 is classified as "Area Development" route and is a maintenance service level "C" roadway. The federal bridge sufficiency rating is 70.9.

F. Access Control

Access rights will not be acquired for this project.

G. Crash History

During the five-year study period from January 1, 2015 through December 31, 2019, there were no crashes near the project location.

II. PROJECT CONCEPT

A. Feasible Alternative

Proposed Alternative - Replace with a 369 ft. x 44 ft. pretensioned prestressed concrete beam bridge

The existing 288 ft x 26 ft, Continuous I-beam bridge with a skew of 37 degrees will be replaced with a 3 span, 369 ft x 44 ft pretensioned prestressed concrete beam bridge with a skew of 30 degrees.

The typical cross section adjacent to the bridge will consist of a 24 ft roadway with 10 ft effective shoulders (6 ft outside pavement and 4 ft granular) and 3:1 foreslopes.

This bridge will be constructed on the existing vertical and horizontal alignment. 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. New bridge end drains will be constructed on both ends of the bridge. Both CMP culverts and flap gates on the north side will be replaced in kind.

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

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

One lane of traffic in each direction will be maintained via staged construction utilizing temporary traffic signals and temporary barrier rails. Stage 1 will have a 15 ft traffic lane and stage 2 will utilize an 11 ft traffic lane.

Bridge Items	Estimated Costs
New Bridge	$ 2,108,000
Bridge Removal	94,000
Cofferdam – 2 EA @ $50,000/EA	100,000
Revetment	150,000
Staging – 10%	245,000
Mobilization - 10%	270,000
M & C - 20%	593,000
Bridge Costs	**$ 3,560,000**

Roadway Items	
Bridge Approaches	$140,800
Removal of Pavement	5,200
Temporary Barrier Rail, Concrete	26,200
Removal of Concrete (Berm)	15,100
Modified Subbase	4,900
Excavation Class 10 Waste	90,900
Excavation Class 13 Waste	16,500
Guardrail (Includes Removal)	2,500
Paved Shoulders for Guardrail	3,600
Class 10 for Guardrail Blisters	11,600
Guardrail	10,100
Bridge End Drains	11,500
Clearing and Grubbing	6,700
Seeding and Fertilizing	2,500
Erosion Control	50,000
Wetland Mitigation	50,000
Right of Way	5,000
CMP Ditch Pipe Replacements	11,000
Flap Gate	13,000
Revetment, Ditches/Possible Concrete Flume Replacement	31,000
Traffic Control - 5%	46,200
Mobilization - 5%	46,200
M & C - 30%	277,100
Temporary Traffic Signals – 5%	46,200
Roadway costs	**$ 923,800**
Project Total	**$4,483,800**

B. Detour Analysis

There will be no off-site detour due to lengthy out of distance travel to the public.

Traffic will be maintained via staged construction with traffic reduced to one lane via the use of temporary traffic signals.

C. Recommendations

It is recommended that the present structure be removed and replaced.

D. Construction Sequence

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

E. ADA Accommodations

There are no bike paths or sidewalks adjacent to US 59; therefore, no ADA accommodations are planned in conjunction with this project.

F. Special Considerations

This will not be a traffic critical project.

The ABC Rating Score of 39 is less than the first stage filter threshold of 50, therefore this bridge will not be considered further as a candidate for ABC construction.

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

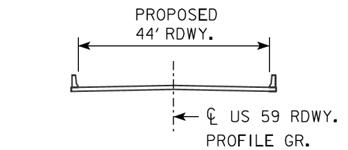
Right of Way may be required for this project.

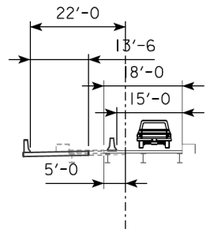
The Draft D00 has been reviewed by the NEPA Section for potential impacts. The resources below have been identified within a half-mile of the project area. It is recommended to avoid or minimize impacts to these resources. This information is based on a desktop review and is provided to aid in concept development. The NEPA review process and clearance will be based on further developments in design and the results of additional Location and Environment Bureau (LEB) desktop and field reviews. Contact the NEPA Section for additional information.

G. Program Status

Site data has been developed by the Design Bureau. This project is listed in the 2021-2025 Iowa Transportation Improvement Program, with $2,875,000 for replacement in FY 2023. Costs for this project may be eligible for bridge replacement funds. A schedule of events will be developed following approval of the Project Concept.

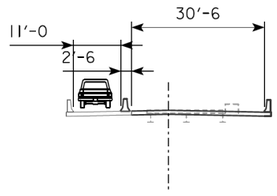
JEB:jaa



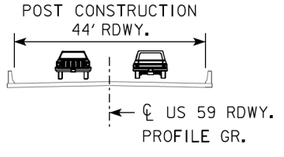


STAGE 1 TRAFFIC: 1 LANE AT 15′ WIDTH
STAGE 1 CONSTRUCT: 13′-6

NOTE: ACTUAL STAGING ORDER TO BE DETERMINED. THE BRIDGES ARE SYMMETRICAL, AND THE STAGING CONCEPT SHOULD WORK WITH EITHER SIDE CONSTRUCTED FIRST.



STAGE 2 TRAFFIC: 1 LANE AT 11′ WIDTH
STAGE 2 CONSTRUCT 30′-6

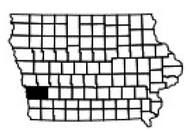


CONCEPT STAGING SKETCH
US 59 OVER E. BR. W. NISHNABOTNA

PGS 2-8-21

POTTAWATTAMIE COUNTY
U.S. 59, EAST BRANCH WEST NISHNABOTNA RIVER
1.0 MI S OF IA 83
BRF-059-3(44)--38-78
PIN: 18-78-059-010

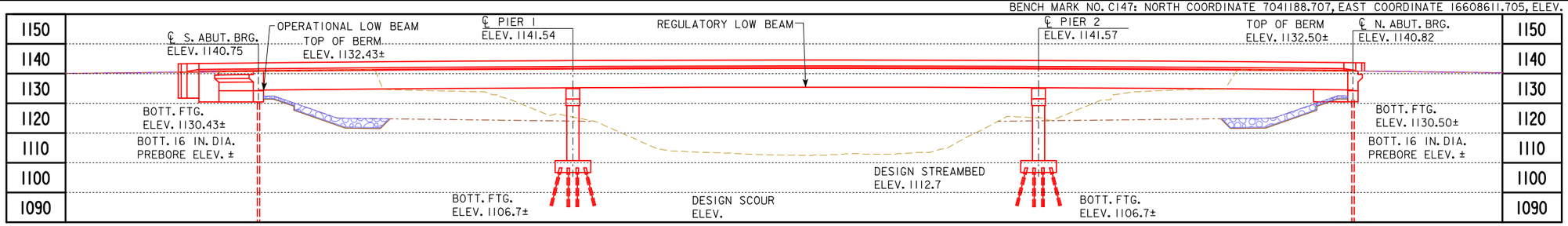
STA 609+85.95
FHWA NO. 43450
MAINT. 7863.1S059
DESIGN 4950



KNOX TWP
T-77N
SECTION 16 & 21

FILE NO.	ENGLISH	DESIGN TEAM JIA \ DEWOLF	POTTAWATTAMIE COUNTY	PROJECT NUMBER BRF-059-3(44)--38-78	SHEET NUMBER A.6	X

BENCH MARK NO. C147: NORTH COORDINATE 7041188.707, EAST COORDINATE 1660811.705, ELEV. 1129.384 CP NGS PID MJ0513



LONGITUDINAL SECTION ALONG ℄ APPROACH ROADWAY

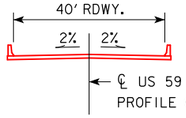
NOTES:

TOP OF BRIDGE DECK CROWN '0.03' BELOW PROFILE GRADE.

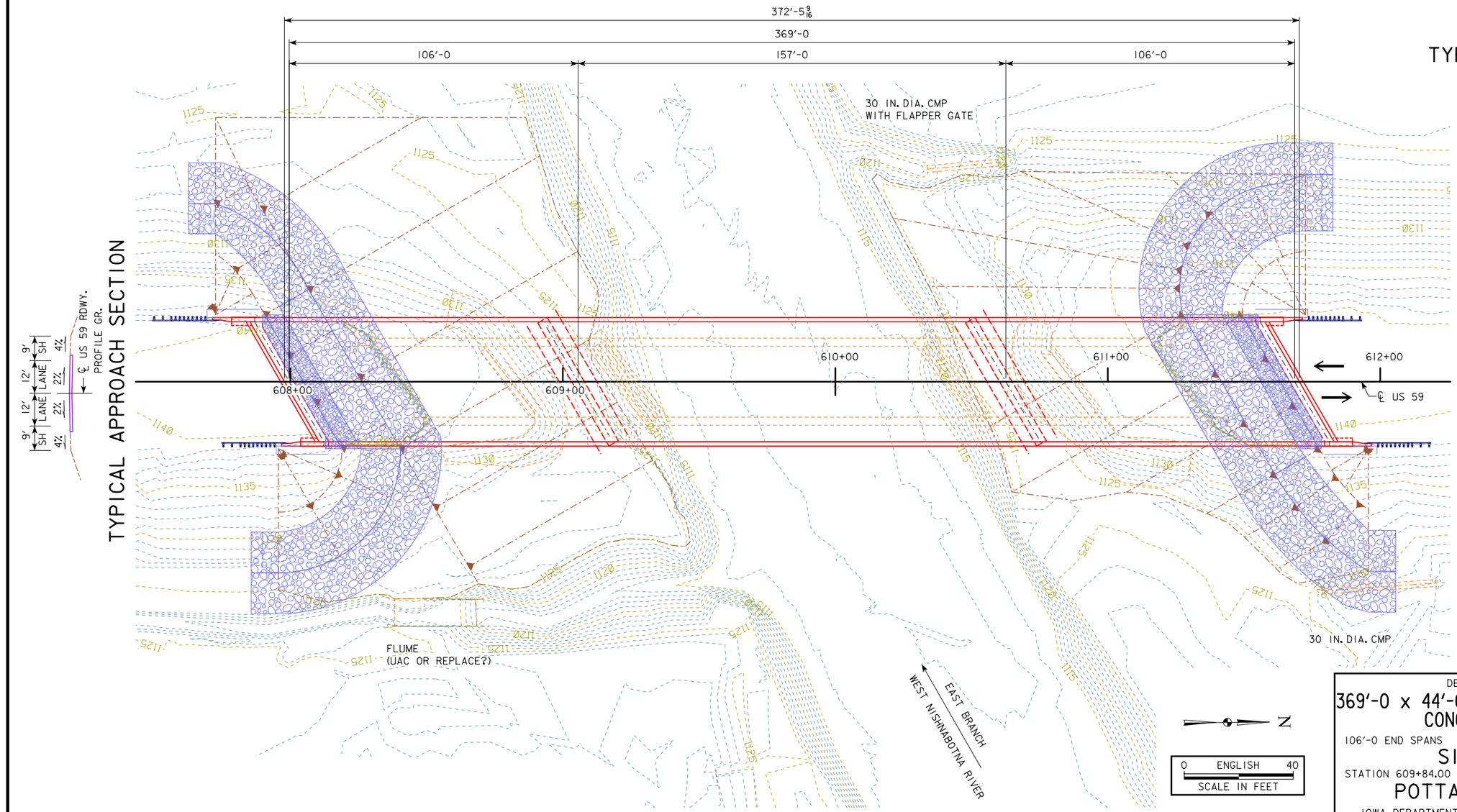
G1=+1.0954% G2=-1.1269%

VPI STA = 609+90.000
VPI ELEV = 1142.870
VC = 400.000'

PROPOSED PROFILE GRADE US59



TYPICAL BRIDGE SECTION



SITUATION PLAN

HYDRAULIC DATA

DRAINAGE AREA = 223 SQ. MI.
STREAM SLOPE = 4.2 FT./MI.
AVG. LOW WATER STAGE = 1114.7

Q_{25} = 14,700 CFS
STAGE = 1128.5

Q_{50} = 17,300 CFS
STAGE = 1129.2
REGULATORY LOW BEAM = 1135.2
BACKWATER = 0.4 FT.
AVG. BRIDGE VELOCITY = 7.2 FPS

Q_{100} = 20,200 CFS
STAGE = 1129.7
OPERATIONAL LOW BEAM = 1134.1
BACKWATER = 0.3 FT.

Q_{200} = 23,200 CFS
STAGE = 1130.0
CALCULATED DESIGN SCOUR = 1093.7

Q_{500} = 26,300 CFS
STAGE = 1130.4
CALCULATED CHECK SCOUR = 1092.8

Q OVERTOP= 11,300 CFS
ROADWAY OVERTOP ELEV. 1133.8
STA. 649+76

LOCATION

US 59 OVER EAST BRANCH
WEST NISHNABOTNA RIVER
T-77N R-39W
SECTION 16/21
KNOX TOWNSHIP
POTTAWATTAMIE COUNTY
FHWA NO. 43457
BRIDGE MAINT. NO. 7863.IS059
LATITUDE ??.123456°
LONGITUDE -??.123456°

CONCEPT

PRELIMINARY

DESIGN FOR 30° SKEW (R.A.)

369'-0 x 44'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE

106'-0 END SPANS (BTE BEAM TYPE) 157'-0 INTERIOR SPAN

SITUATION PLAN

STATION 609+84.00 (US 59) FEBRUARY 2021

POTTAWATTAMIE COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 1 FILE NO. ? DESIGN NO. ?

DESIGN TEAM | POTTAWATTAMIE COUNTY | PROJECT NUMBER BRF-059-3(44)--38-78 | SHEET NUMBER ??

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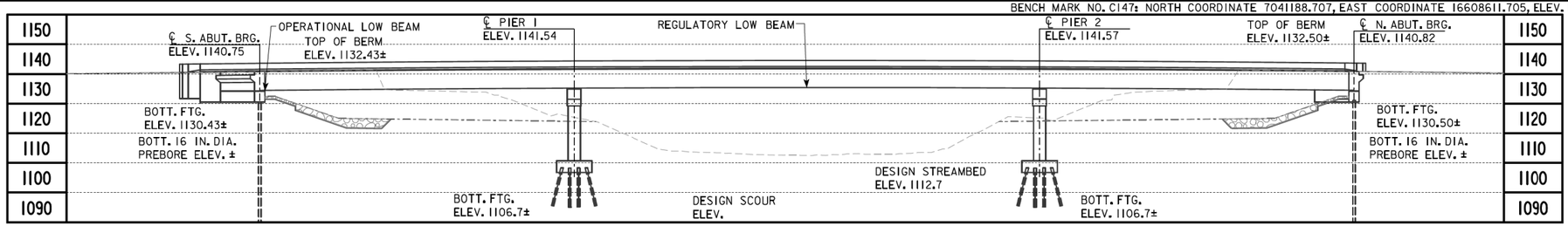
BENCH MARK NO. C147: NORTH COORDINATE 7041188.707, EAST COORDINATE 1660861 1.705, ELEV. 1129.384 CP NGS PID MJ0513



LONGITUDINAL SECTION ALONG ℄ APPROACH ROADWAY

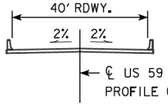
G1=+1.0954% G2=-1.1269%

VPI STA = 609+90.000
VPI ELEV = 1142.870
VC = 400.000'

PROPOSED PROFILE GRADE US59

NOTES:

TOP OF BRIDGE DECK CROWN '0.03' BELOW PROFILE GRADE.



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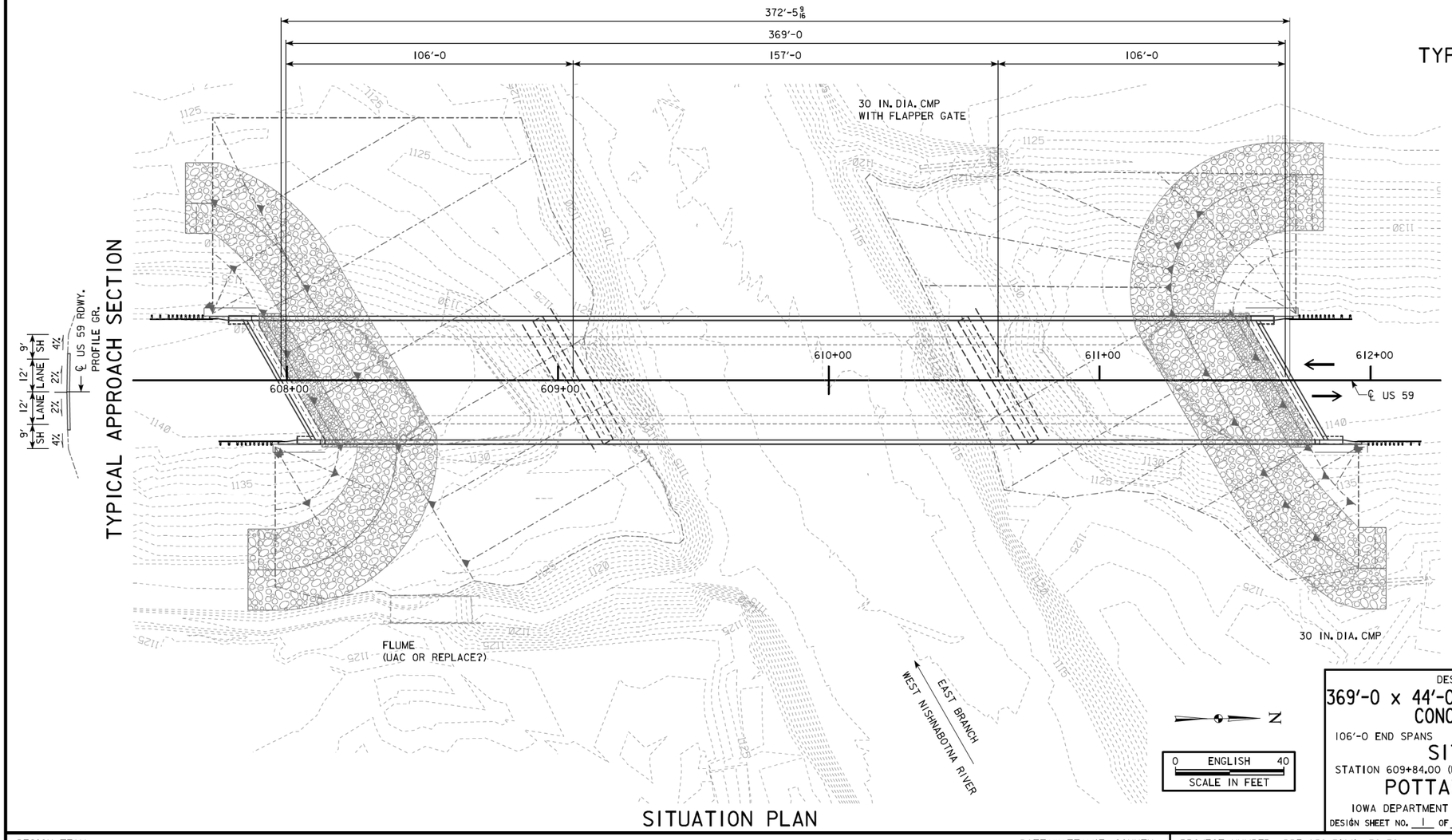

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BACKWATER = 0.3 FT.

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CALCULATED DESIGN SCOUR = 1093.7

Q_{500} = 26,300 CFS
STAGE = 1130.4
CALCULATED CHECK SCOUR = 1092.8

Q OVERTOP= 11,300 CFS
ROADWAY OVERTOP ELEV. 1133.8
STA. 649+76

LOCATION

US 59 OVER EAST BRANCH
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BRIDGE MAINT. NO. 7863.1S059
LATITUDE ??.123456°
LONGITUDE -??.123456°

CONCEPT
PRELIMINARY

DESIGN FOR 30° SKEW (R.A.)

369'-0 x 44'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE

106'-0 END SPANS (BTE BEAM TYPE) 157'-0 INTERIOR SPAN

SITUATION PLAN

STATION 609+84.00 (US 59) FEBRUARY 2021

POTTAWATTAMIE COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 1 FILE NO. ? DESIGN NO. ?

DESIGN TEAM	POTTAWATTAMIE COUNTY	PROJECT NUMBER BRF-059-3(44)--38-78	SHEET NUMBER ??

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FILE NO.	ENGLISH	DESIGN TEAM JIA \ DEWOLF	POTTAWATTAMIE COUNTY	PROJECT NUMBER BRF-059-3(44)--38-78	SHEET NUMBER A.7

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Bridge Bureau Attachment for Concept Statement

Date: November 4, 2020 (Revised 2-8-21)
By: Patricia G. Schwarz
Location: U.S. 59 over East Branch West Nishnabotna River

County: Pottawattamie
Project No.: BRF-059-3(44)- -38-78
Pin No.: 18-78-059-010

1. Regulatory/Coordination

- Iowa DNR Flood Plain permit = Yes
- Iowa DNR Sovereign Lands permit = No
- Local Record of Coordination = No
- Flood Insurance Study = Yes. Zone A Panel 19155C0350F, April 16, 2013
- Drainage District = No (Ref. State of Iowa wide GIS Shape file)
- Corps of Engineers Section 408 = No

2. Hydrologic/Hydraulic Analysis/RIDB Dataset

- Design discharges determined = Yes (USGS 13-5086)
- Hydraulic analysis done = Yes (GeoHECRAS Version 3.0.0.631)
- Riverine Infrastructure Database (RIDB) = Yes, an RIDB dataset has been developed, subject to finalizing. Dataset is located in RIDB PW folder. The RIDB network location is WestNishnabotnaR_EB_1.7.

3. Structure/Roadway Layout Considerations

- A roadway profile grade raise request is not anticipated.

4. Special survey = Survey is complete.

5. Aesthetic enhancements = No.

6. Maintenance of Traffic

The preferred option for maintenance of traffic determined by the Concept Team is staged construction.

- Single lane, Stage 1=15', Stage 2 = 11' width. The estimated structure cost increase is $568,000 over the detour option, due to additional bridge width required (cost does not include roadway items).
- Special construction issues (Staging option)
  - A staging sketch can be viewed at this link: US59ConceptStaging.pdf
  - The diaphragm pier removal cannot be staged. However, a roadway profile grade raise is not anticipated to clear the existing piers with deeper girders. Design 4950 raised the top of cap and added a block at each girder line. It appears to be possible to remove the blocks and/or raised portion of the pier.

Roadway				
PIN Number	18-78-059-010		**Submittal Date**	
Project Number	BRF-059-3(44)--38-78			**Approval Date**
District		**Assistant District Engineer**		
County	POTTAWATTAMIE		**or**	
Route	US 59	**Office Director**		
Location	EAST BRANCH WEST NISHNABOTNA RIVER 1.0 MI S OF IA 83			
Work Type	BRIDGE REPLACEMENT - PPCB			
Segment Manager	JIA			
Designer	DEWOLF			

Design Manual Section 1C-1
Last Updated: 04-29-19

Rural Two-Lane Highways (Rural Arterials)

Design Element		Preferred	Acceptable	Project Values
Design speed (mph)		60	50	60
Maximum superelevation rate (Refer to Section 2A-2)		6%	8%	N/A
Design lane width (ft)		12	12	12
Full depth paved width (ft)		12	12	12
Right turn lane (ft)		12	10	N/A
Climbing Lane (ft)		12	12	N/A
Left turn lane (ft)		12	10	N/A
Pavement cross-slope (on tangent sections)	Through lanes	2%	1.5% minimum, 2% maximum	N/A
	Auxiliary and turn lanes	3%	3% maximum	N/A
	Crown break at centerline	4%	4% maximum	N/A
Shoulder cross-slope (on tangent sections)		4%	Shoulder cross-slope cannot be less than the adjacent lane, 6% max for paved or granular shoulders, 8% max for earth shoulders	4%
Curb type (Refer to Section 3C-2)	Design speed = 50 or 55 mph	6-inch sloped	6-inch standard	N/A
	Design speed ≥ 60 mph	4-inch sloped	6-inch sloped	N/A
Foreslope (For fill areas greater than 40 ft, contact the Soils Design Section for assistance)	Adjacent to shoulder	10:1 for 4' then 6:1	3:1	3:1
	Beyond standard ditch depth and design clear zone	3.5:1	3:1	N/A
	Curbed roadways	2%	not steeper than 3:1	N/A
Backslope (For cut areas greater than 25 feet, contact the Soils Design Section for assistance with backslope benches.)		3:1	2.5:1	3:1
Transverse Slopes	w/ drainage structures	8:1	6:1	N/A
	w/o drainage structures	10:1	6:1	N/A
Ditches (Refer to Section 3G-1)	Outside ditch (depth x width) (ft)	5 x 10	--	N/A
Bridge width—new*	Bridge length ≤ 200 ft	design lane widths + effective shoulder widths	design lane widths + effective shoulder widths	44
	Bridge length > 200 ft	design lane widths + effective shoulder widths	design lane width + 4' right and left of the design lane widths	
Bridge width—existing*		design lane widths + no less than 2 ft left and right	design lane widths + 2 ft. offset left and right	
Vertical clearance (ft) (above lanes, shoulders and 25 feet left and right of the center of railroad tracks)	Over primary	16.5	16	
	Over non-primary	16.5 at interchange locations, 15 at all other locations	14	
	Over railroad	23.3	23.3	
	Sign trusses and pedestrian bridges	17.5	17	
Structural Capacity		Contact Office of Bridges and Structures	Contact Office of Bridges and Structures	
Level of Service		B	B	

*FHWA notification via email is required if acceptable critera is not met on the NHS system (No formal design exeption is required)

Design year ADT =	

Design Manual Section 1C-1
Last Updated: 04-29-19

Effective Shoulder Width and Type for Two-Lane Highways

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

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

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

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

Notes:

Roadway Design Speed (mph) =														

Design Manual Section 1C-1
Last Updated: 04-29-19

Design Criteria for High Speed Roadways

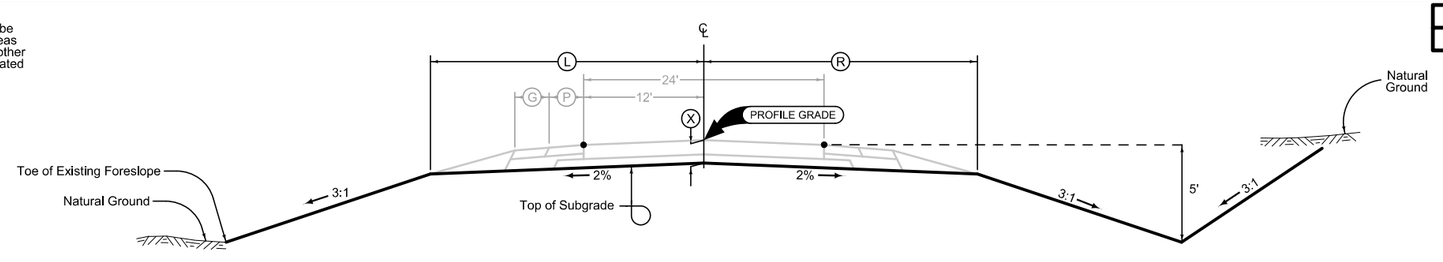
Design Element			Preferred Criteria Design Speed, mph						Acceptable Criteria Design Speed, mph						Project Values
			50	55	60	65	70	75	50	55	60	65	70	75	
Stopping sight distance (ft) (Refer to Section 6D-1)			425	495	570	645	730	820	425	495	570	645	730	820	
Minimum horizontal curve radius (ft) (Refer to Sections 2A-2 and 2A-3)	Method 5 superelevation and side friction distribution	e_{max} = 6%	833	1060	1330	1660	2040	2500	833	1060	1330	1660	2040	2500	
		e_{max} = 8%	--	--	--	--	--	--	758	960	1200	1480	1810	2210	
Minimum vertical curve length (ft) (Refer to Section 2B-1)			150	165	180	195	210	225	150	165	180	195	210	225	
Minimum rate of vertical curvature (K) (Refer to Section 2B-1)	crest vertical curves		84	114	151	193	247	312	84	114	151	193	247	312	235
	sag vertical curves	roadways without fixed-source lighting	96	115	136	157	181	206	96	115	136	157	181	206	
		roadways with fixed-source lighting	96	115	136	157	181	206	54	66	78	91	106	121	
Minimum gradient (%)	(Refer to Section 2B-1)		0.5						0.3% with a curb, 0.0% without a curb						1.10%
Maximum gradient (%)	(Refer to Section 2B-1)	Urban roadways	4		3				7	6	6	–	–	–	
		Rural roadways							5	5	4	4	4	4	1.11%
		Interstates							5	5	4	4	4	4	
Clear zone			See "Preferred Clear Zone" table in Section 8A-2						See "Acceptable Clear Zone" table in Section 8A-2						

LOCATION			DIMENSIONS					
ROAD IDENTIFICATION	STATION TO STATION		(L) Feet	(R) Feet	(X) Inches		BW Feet Lt.	BW Feet Rt.
US 59	606+20.00	608+09.93	26.87'	26.87'	XX			
US 59	611+58.39	613+50.00	26.87'	26.87'	XX			

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

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

Special

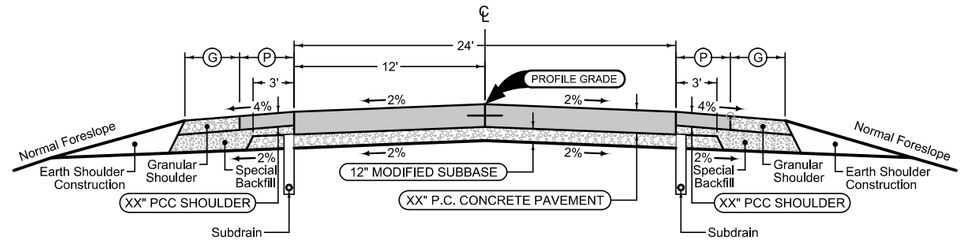


2 LANE GRADING

Combination Shoulder

Shoulder Jointing:
Longitudinal joint: BT-1 or BT-5
Transverse joint: C (match ML spacing)

		2_C_ 10-15-13	
STATION TO STATION		(P) Feet	(G) Feet
606+20.00	606+48.97	6'	4'
613+19.00	613+50.00	6'	4'



Combination Shoulder

Shoulder Jointing:
Longitudinal joint: BT-1 or BT-5
Transverse joint: C (match ML spacing)

		2_C_ 10-15-13	
STATION TO STATION		(P) Feet	(G) Feet
606+20.00	606+48.97	6'	4'
613+19.00	613+50.00	6'	4'

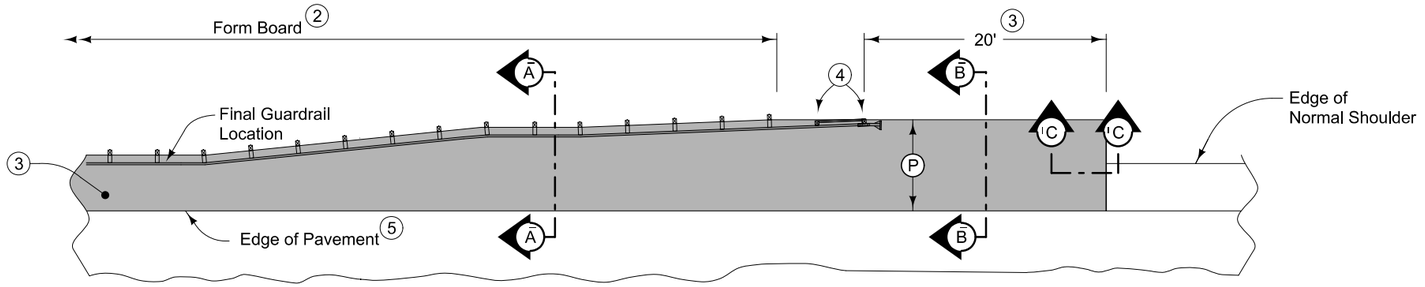
Mainline Jointing:
Transverse joints: CD at 17' spacing
Longitudinal joint: L-2

	2P_ 10-19-10
STATION TO STATION	
606+20.00	607+18.61
612+49.37	613+50.00

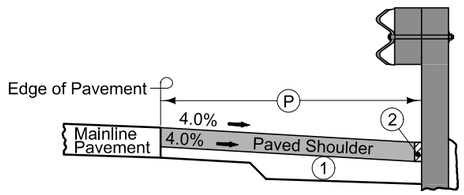
See Tab 100-24 or 100-25 for pavement quantities.

See Tab 112-9 for shoulder quantities.

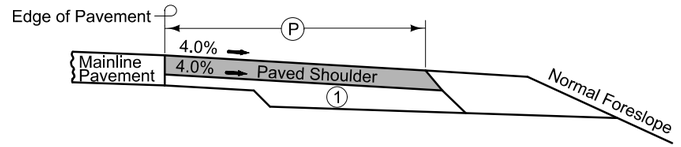
U.S. 59



PLAN VIEW

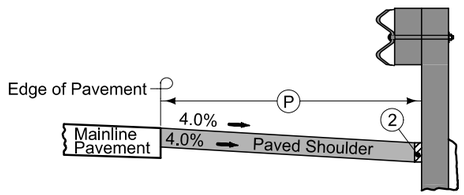


Section A-A

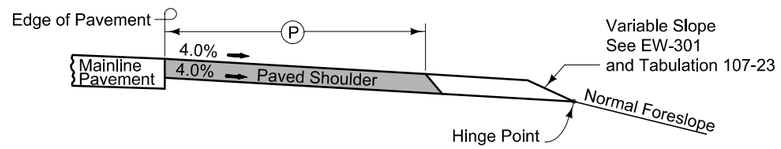


Section B-B

NEW CONSTRUCTION



Section A-A



Section B-B

EXISTING SHOULDER

DESIGNER INFO

7156
04-18-17

9" HMA Paved Shoulder at guardrail. 8" PCC may be substituted with the following jointing layout:

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

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

Refer to Tabulation 112-9 for shoulder quantities.

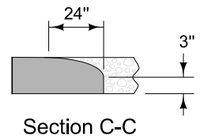
(1) For subgrade treatment, refer to other details in the plan.

(2) PCC option only: When guardrail posts are installed prior to construction of PCC paved shoulder, fasten form board to the face of guardrail posts for the length shown. Refer to note 4 for final 2 posts.

(3) Continue paved shoulder to existing paved shoulder or 20 feet beyond the center of the first post.

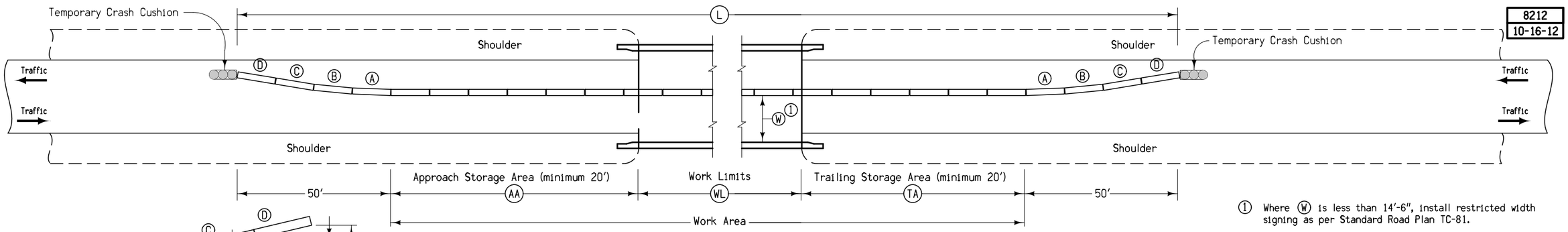
(4) Shoulder may be notched for final 2 posts or post sleeves may be installed through pavement. Do not drive posts through pavement.

(5) 'KT-1 joint for PCC shoulder.
'B' joint for HMA shoulder.

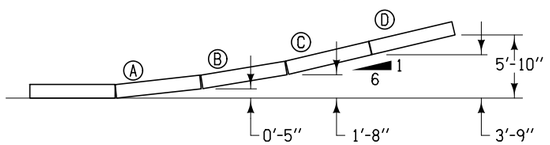


Section C-C
Roll down at granular shoulder or earth.

PAVED SHOULDER AT GUARDRAIL



1 Where W is less than 14'-6", install restricted width signing as per Standard Road Plan TC-81.



BARRIER OFFSETS FOR FLARE SECTIONS

Station	Side	AA	WL	TA	L	Anchored	W 1	Remarks
		Feet	Feet	Feet	Feet	X	Ft-Inches	

TEMPORARY CONCRETE BARRIER LAYOUT for Two-Way Traffic

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
- WH Water Hydrant (Rural)
- Septic Tank
- Cistern
- L.P. Gas Tank (No Footing)
- Underground Storage Tank
- Latrine
- Satellite TV Dish
- WHU Water Hook Up
- RT Radio Tower
- TA Tower Anchor
- Guardrail (Beam or Cable)
- GP Guard Post (one or two)
- Guard Post (over two)
- FP Filler Pipe
- GV Gas Valve
- WV Water Valve
- SL Speed Limit Sign
- MM Mile Marker Post
- SIGN Sign
- TCB Traffic Signal Control Box
- RRB Rail Road Signal Control Box
- TSB Telephone Switch Box
- EB Electric Box

UTILITY LEGEND

FO — AT&T
Lenny Vohs
1425 Oak Street
Kansas City, MO 64106
(816)275-4014
lv2121@att.com

FO2 — Windstream Communications
T2 — Jeff Hummel
708 Durant St.
Harlan, IA 51537
(712)755-5938
jeffery.s.hummel@windstream.com

FO3 — Walnut Communications
T3 — Terry McCarthy
510 Highland St.
Walnut, IA 51577
(712)784-4003
tmccarthy@walnutcommunications.com

FO4 — Farmers Mutual Telephone Company
Dennis Crawford
410 Broad Ave.
Stanton, IA 51573
(712)829-2111
dcrawford@fmtcnet.com

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.**	
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
- C/A Access Control
- Property Line

PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

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

FILE NO. -	ENGLISH	DESIGN TEAM JIA \ DEWOLF	POTTAWATTAMIE COUNTY	PROJECT NUMBER BRF-059-3(44)--38-78	SHEET NUMBER D.01

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28.1 C.M.P.

30" x 26.3 C.M.P.
W/ Flapper Gate

36" x 37.0 C.M.P.

30" x 42.0 C.M.P.

Sta. 603+76.52, 65.45 Rt.
12' x 30' Conc Slab Bridge
D.A.=124 A-H

Sta. 609+84.07
Skew 53° RT AH
288' x 26' I-Beam Bridge
D.A.=223 Sq Miles

0 FEET 50

VPI = +90.00
ELV = 1143.20
L = 520.00
K = 235

VHP = 609+89.35
ELV = 1141.76

+1.10%

-1.11%

VPC = 607+30.00
ELV = 1140.33

VPT = 612+50.00
ELV = 1140.32

+0.15% LDG

+0.40% LDG

LT +58
1123.14

LT +00
1123.35

LT +50
1123.55

1139.12 1139.17 1139.45 1139.72 1140.00 1140.27 1140.54 1140.78 1141.00 1141.19 1141.35 1141.48 1141.59 1141.67 1141.73 1141.76 1141.76 1141.73 1141.68 1141.61 1141.50 1141.37 1141.21 1141.03 1140.82 1140.58 1140.32 1140.04 1139.76 1139.48 1139.21

FILE NO. -	ENGLISH	DESIGN TEAM JIA \ DEWOLF	Pottawattamie COUNTY	PROJECT NUMBER BRF-059-3(44)--38-78	SHEET NUMBER D.2

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Pottawattamie County
BRF-059-3(44)--38-78
Location: East Branch West Nishnabotna River 1.0 mi S of IA 83 (Avoca)Type of Work: Bridge-Unspecified
Project Directory: 7805901018
PIN 18-78-059-010
Sap-0925.1

Party Personnel

Clayton Henningsen- Survey Party Chief
Jason Arn- Survey Party Chief
Paul Harry- Asst. Party Chief

Date(s) of Survey

Begin Date	10/28/2019
End Date	11/28/2019

General Information

Measurement units for this survey are US survey feet. This survey is for proposed bridge reconstruction or removal US 59 over east branch of the West Nishnabotna River. Project datum and control information is provided by Design Survey Office. This project is a partial field DTM with photo.

Vertical Control

Vertical datum for this survey is NAVD88 (Computed using Geoid12b). GRS80 Ellipsoidal Height was computed at project Pts. C147, H147, R146, and F150 RESET by doing concurrent 6 hour static observations. The project control is relative to nearby Iowa RTN Base Stations.

This survey observed 4 NGS GPS control with published NAVD88 heights to compare to local ground control:

NGS mark designated C 147 (PID MJ0513) has a published Elev. of 1129.39
Survey Elev. = 1129.384

NGS mark designated F 150 RESET (PID MJ0539) has a published Elev. of 1257.6
Survey Elev. = 1257.714

NGS mark designated H 147 (PID MJ0507) has a published Elev. of 1217.24
Survey Elev. = 1217.293

NGS mark designated R 146 (PID MJ0397) has a published Elev. of 1138.00
Survey Elev. = 1137.969

Horizontal Control

The project coordinate system for this survey is Iowa RCS Zone 6 (U.S. Survey Feet). This survey control is relative to IaRTN reference stations. IaRTN Reference Station coordinates are relative to the National Reference Station network datum: NAD83 (2011) for Epoch 2010.00. Coordinates were determined by conducting concurrent 6 hour static observations on Project Pts. C147, H147, R146, and F150 RESET.

Alignment Information

The horizontal alignment for this survey is a retrace of As-built Plans No. F-554(3). Survey stationing was equated to the plan PI at STA 584+83.0 and run ahead without equation throughout the survey.

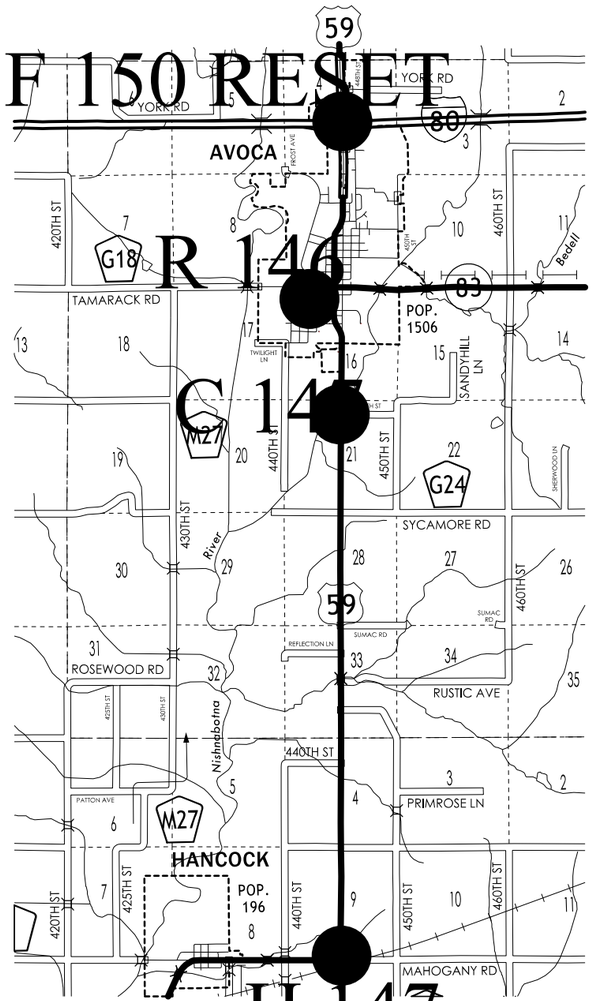
Survey stationing relates to as built plan stationing as follows:

PI Sta. 584+83.0 As-built Plans Project No. F-554(3)
Survey PI Sta. 584+83.0

PC Sta. 638+85.05 Project No. F-554(3)
Survey PC Sta. 638+82.67

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
Ia. Regional Coordinate System Zone 6

Coordinate listing from next sheet will be used with IaRTN 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

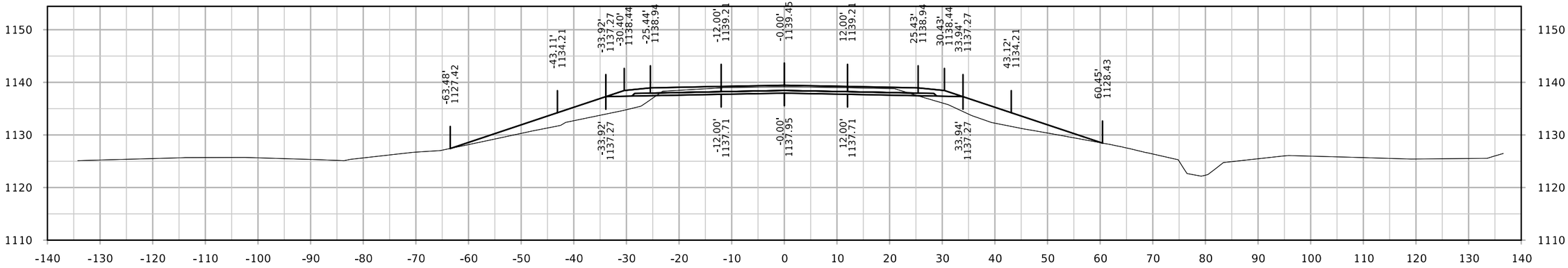
Ia. Regional Coordinate System Zone 6

Point Name	North Coordinate	East Coordinate	Elevation	Feature Code-Monument Description
F 150_RESET	7054938.778	16608734.350	1257.714	CP NGS PID MJ0539
C 147	7041188.707	16608611.705	1129.384	CP NGS PID MJ0513
H 147	7015792.334	16608699.286	1217.293	CP NGS PID MJ0507
R 146	7046604.111	16607193.827	1137.969	CP NGS PID MJ0397

108-23A
08-01-08

TRAFFIC CONTROL PLAN

Traffic shall be maintained during construction through staging using traffic signals and lane closure.



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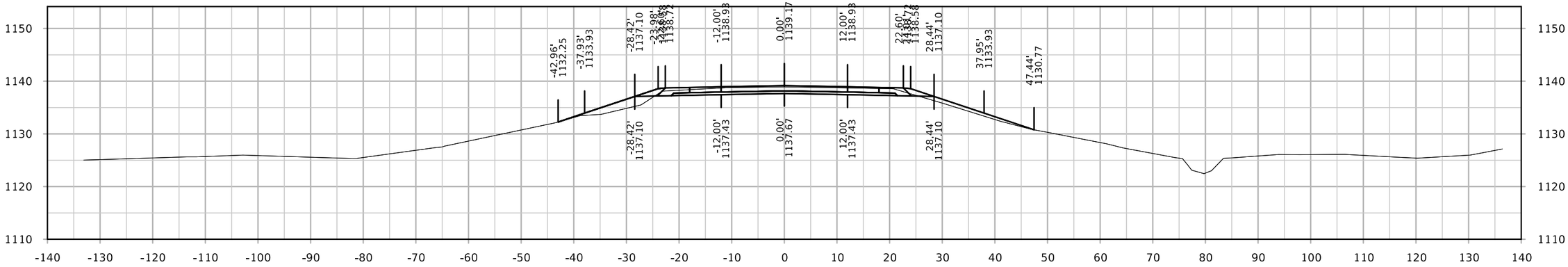

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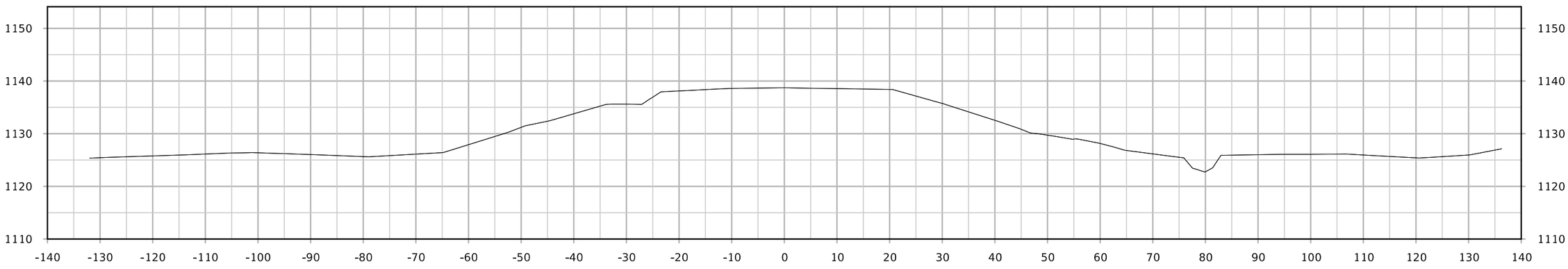

STA. 606+00.00

FILE NO. -	ENGLISH	DESIGN TEAM JIA \ DEWOLF	POTTAWATTAMIE COUNTY	PROJECT NUMBER BRF-059-3(44)--38-78	SHEET NUMBER W.1	

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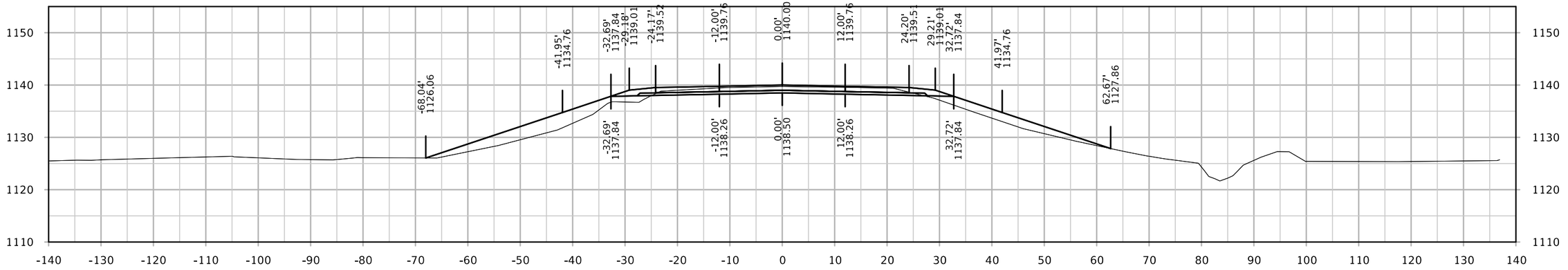
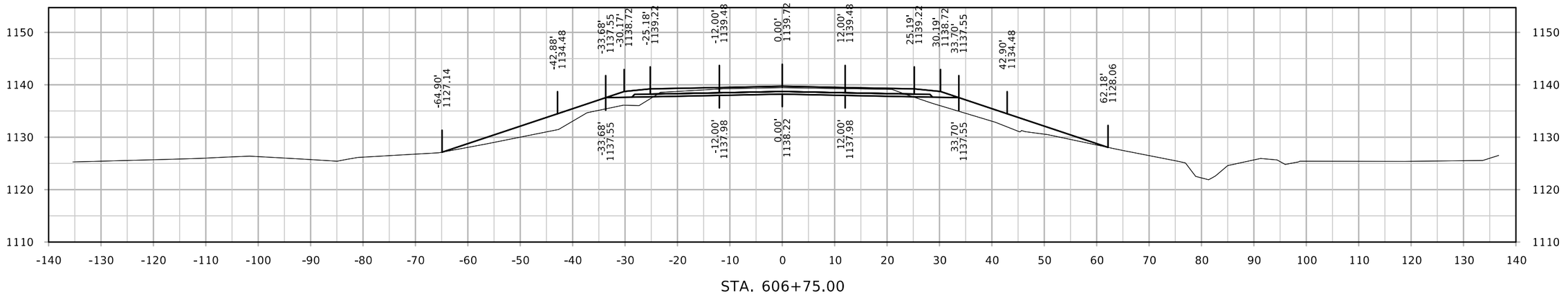


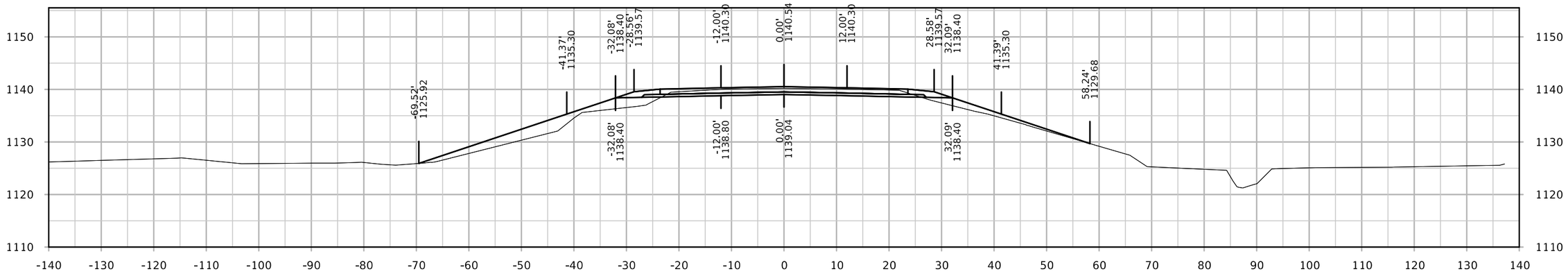
STA. 607+00.00



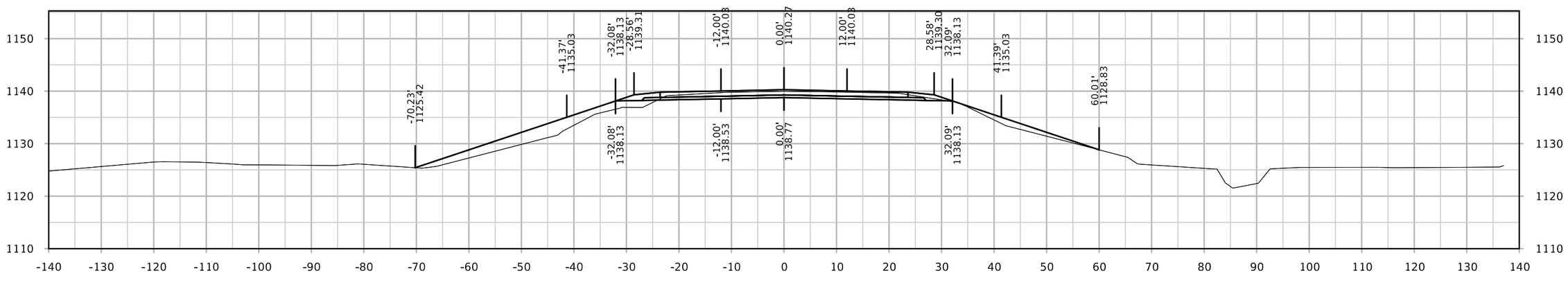
STA. 606+75.00

FILE NO. -	ENGLISH	DESIGN TEAM JIA \ DEWOLF	POTTAWATTAMIE COUNTY	PROJECT NUMBER BRF-059-3(44)--38-78	SHEET NUMBER W.2

2:34:10 PM 4/13/2021 adewolf pw:\\ntPwInt1.dot.int.lan:PWMain\Documents\Projects\7805901018\Design\CADD Files Connect\SHT\SHT_78059044_W01.dgn



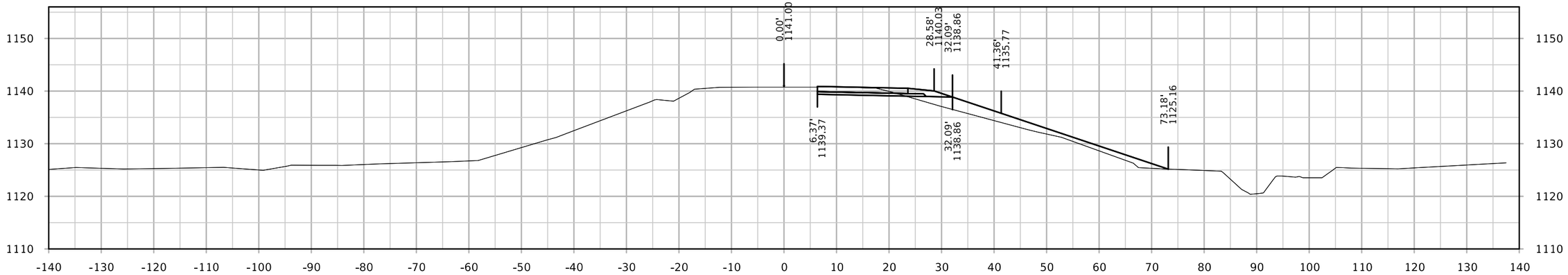
STA. 607+50.00



STA. 607+25.00

FILE NO. -	ENGLISH	DESIGN TEAM JIA \ DEWOLF	POTTAWATTAMIE COUNTY	PROJECT NUMBER BRF-059-3(44)--38-78	SHEET NUMBER W.3

2:34:12 PM 4/13/2021 adewolf pw:\\ntPwInt1.dot.int.lan:PWMain\Documents\Projects\7805901018\Design\CADD Files Connect\SHT\SHT_78059044_W01.dgn



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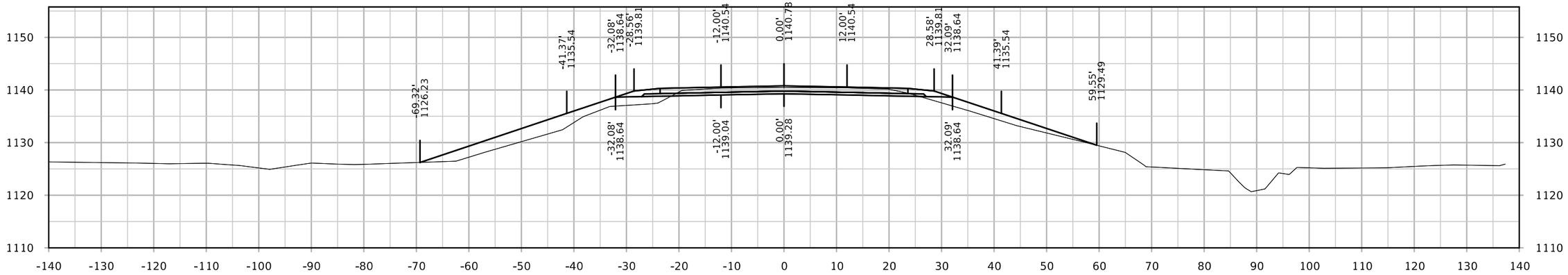
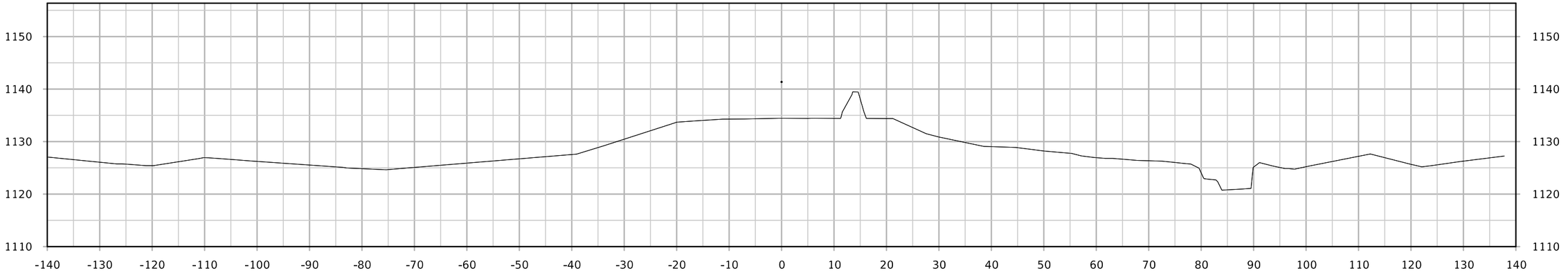


STA. 607+75.00

FILE NO. -	ENGLISH	DESIGN TEAM JIA \ DEWOLF	POTTAWATTAMIE COUNTY	PROJECT NUMBER BRF-059-3(44)--38-78	SHEET NUMBER W.4

2:34:14 PM 4/13/2021 adewolf pw:\\ntPwInt1.dot.int.lan:PWMain\Documents\Projects\7805901018\Design\CADD Files Connect\SHT\SHT_78059044_W01.dgn



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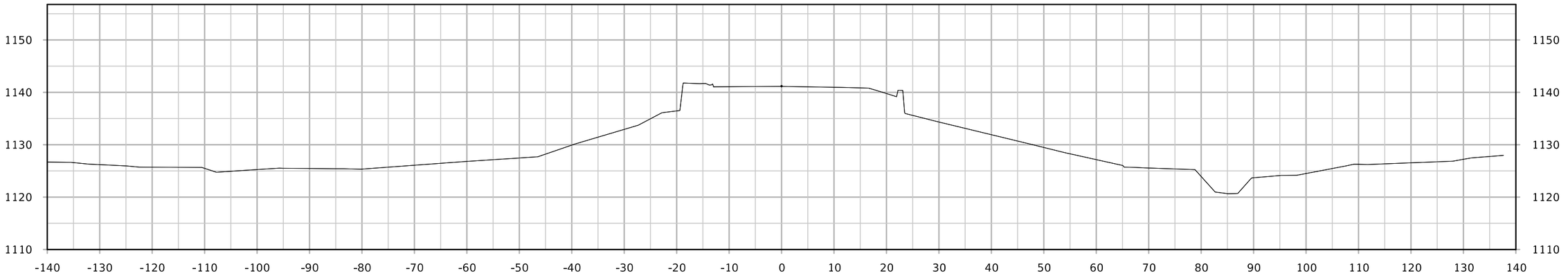
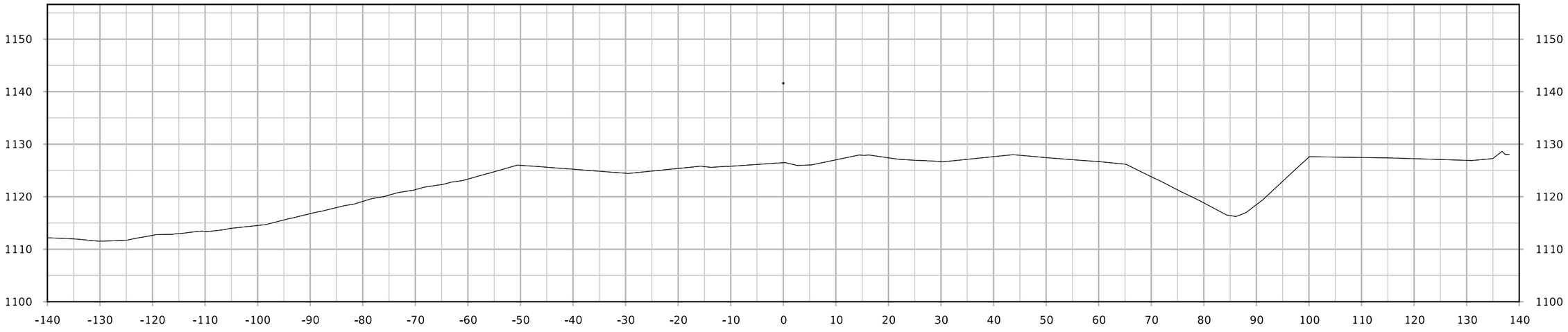


STA. 608+25.00

FILE NO. -	ENGLISH	DESIGN TEAM JIA \ DEWOLF	POTTAWATTAMIE COUNTY	PROJECT NUMBER BRF-059-3(44)--38-78	SHEET NUMBER W.5	

2:34:16 PM 4/13/2021 adewolf pw:\\ntPwInt1.dot.int.lan:PWMain\Documents\Projects\7805901018\Design\CADD Files Connect\SHT\SHT_78059044_W01.dgn



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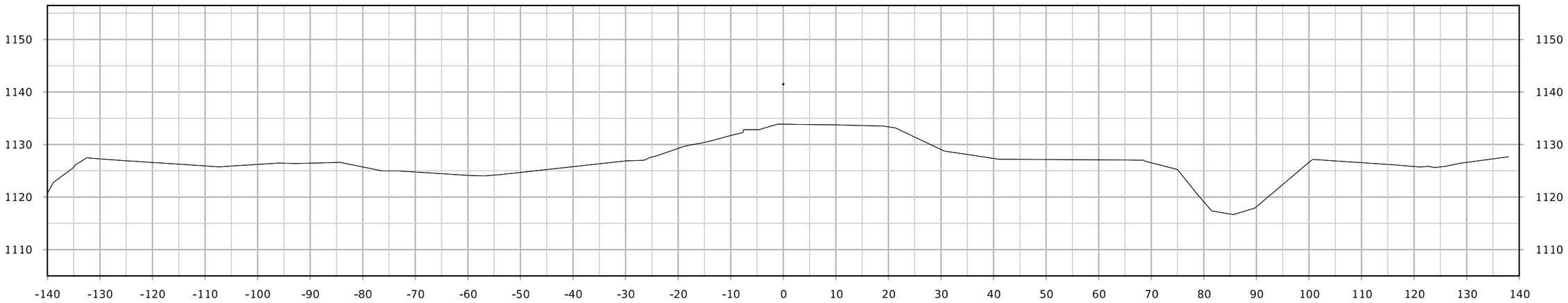

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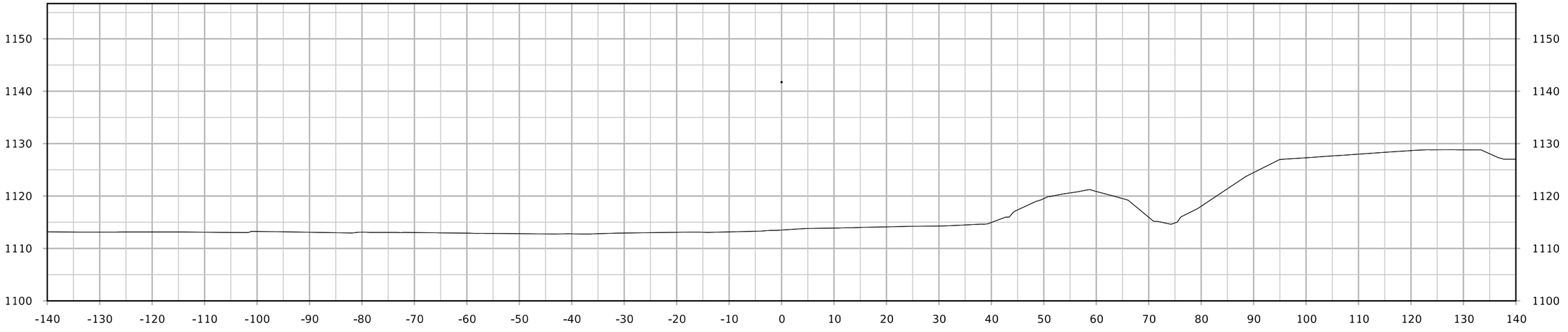
FILE NO. -	ENGLISH	DESIGN TEAM JIA \ DEWOLF	POTTAWATTAMIE COUNTY	PROJECT NUMBER BRF-059-3(44)--38-78	SHEET NUMBER W.6	

2:34:18 PM 4/13/2021 adewolf pw:\\ntPwInt1.dot.int.lan:PWMain\Documents\Projects\7805901018\Design\CADD Files Connect\SHT\SHT_78059044_W01.dgn



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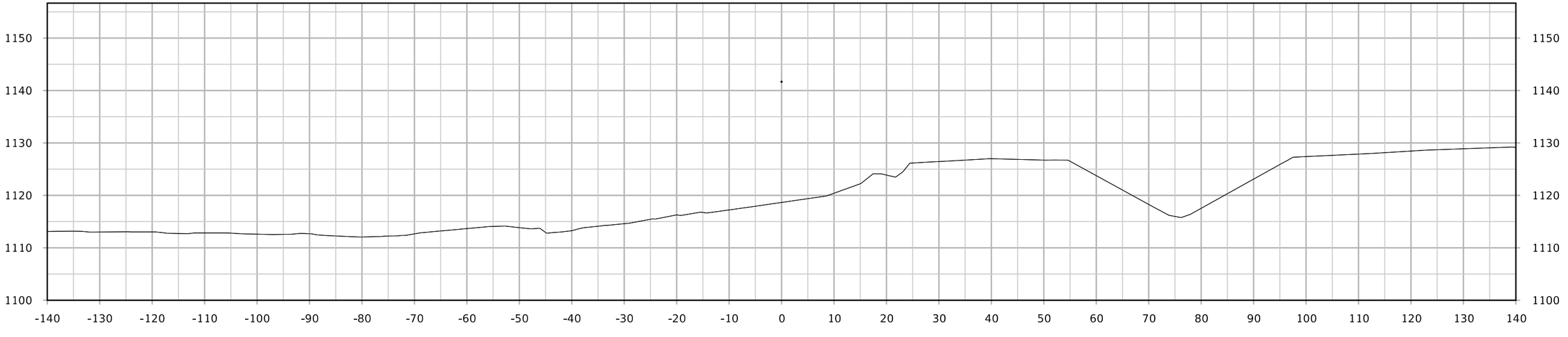

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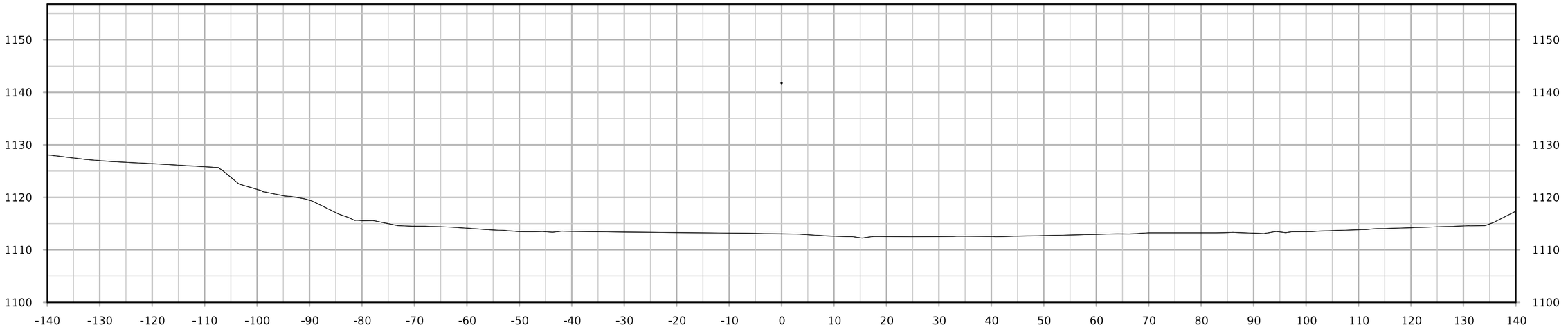
FILE NO. -	ENGLISH	DESIGN TEAM JIA \ DEWOLF	POTTAWATTAMIE COUNTY	PROJECT NUMBER BRF-059-3(44)--38-78	SHEET NUMBER W.7	

2:34:20 PM 4/13/2021 adewolf pw:\\ntPwInt1.dot.int.lan:PWMain\Documents\Projects\7805901018\Design\CADD Files Connect\SHT\SHT_78059044_W01.dgn



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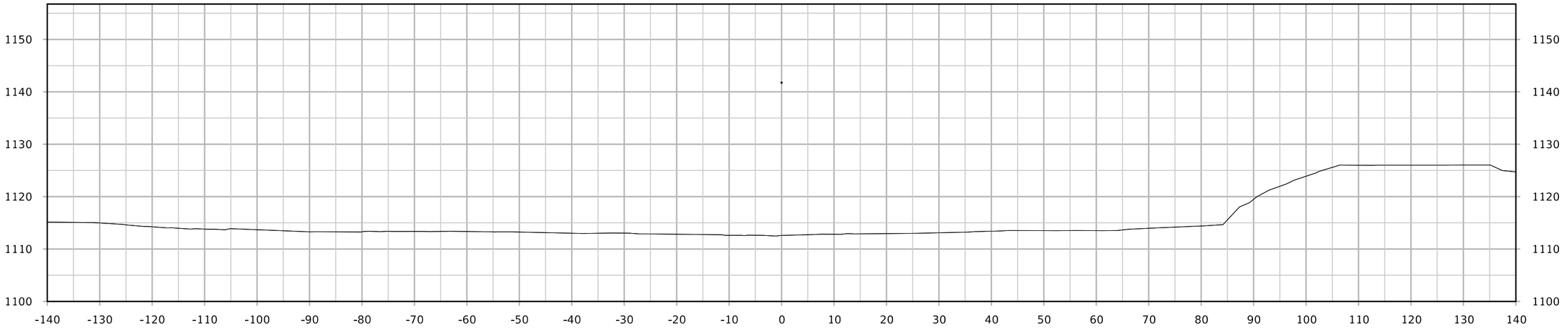
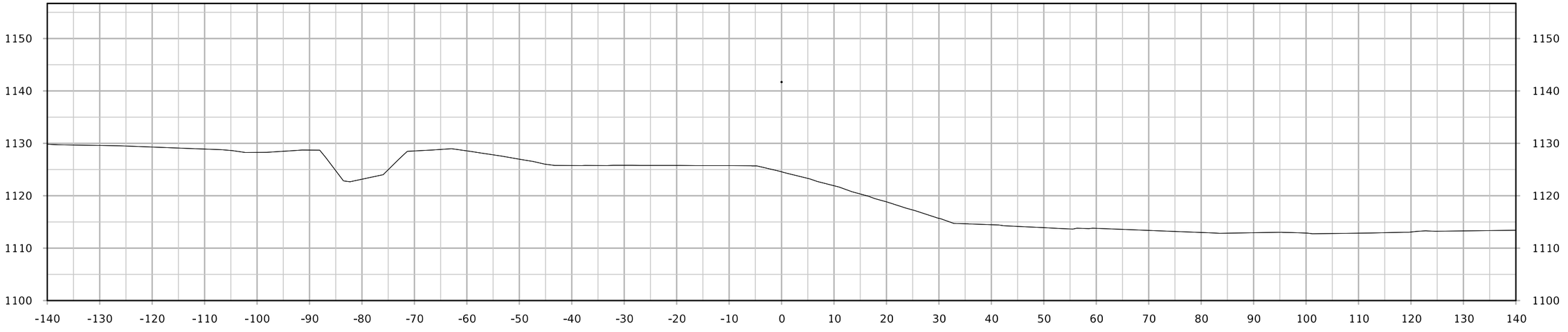


STA. 609+75.00

FILE NO. -	ENGLISH	DESIGN TEAM JIA \ DEWOLF	POTTAWATTAMIE COUNTY	PROJECT NUMBER BRF-059-3(44)--38-78	SHEET NUMBER W.8	

2:34:21 PM 4/13/2021 adewolf pw:\\ntPwInt1.dot.int.lan:PWMain\Documents\Projects\7805901018\Design\CADD Files Connect\SHT\SHT_78059044_W01.dgn



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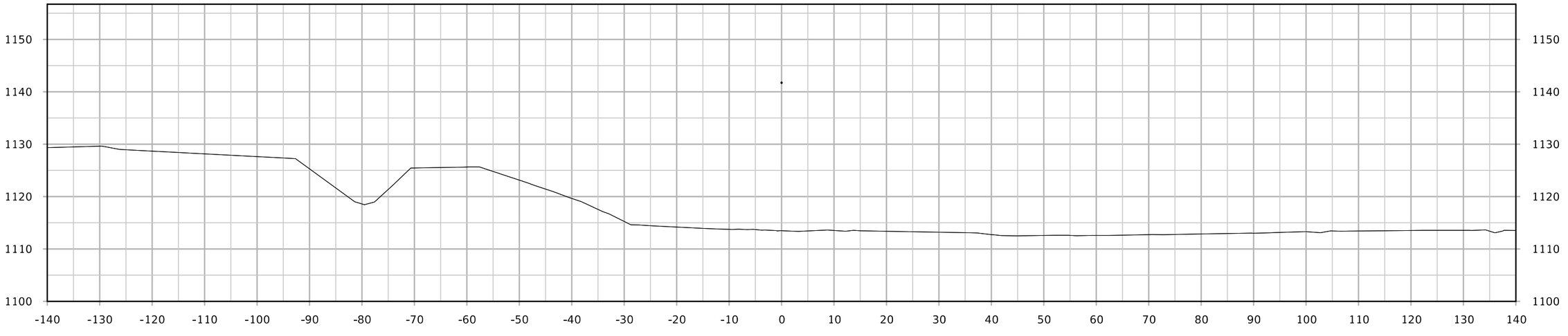

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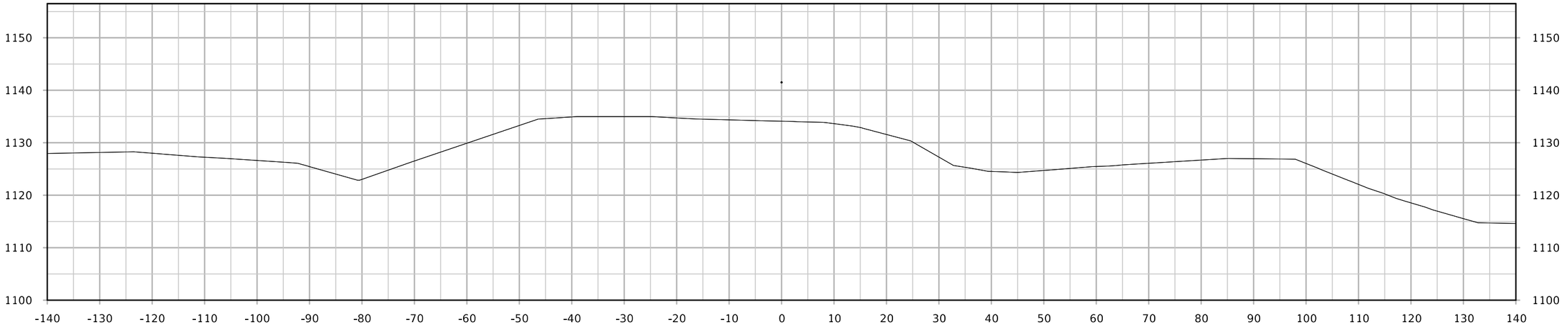

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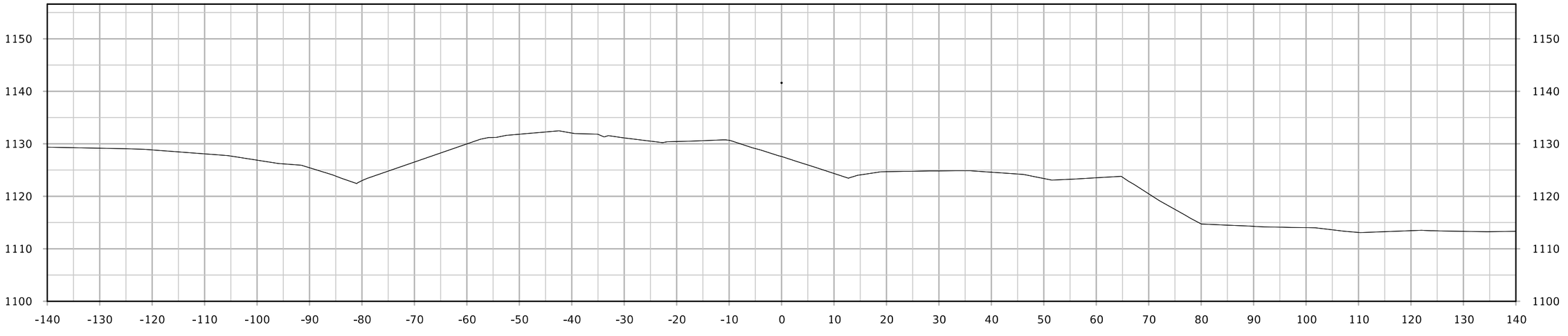

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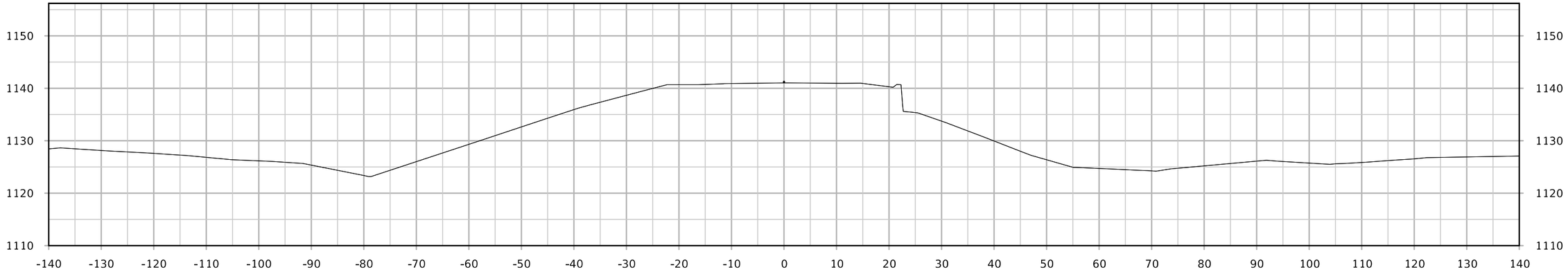

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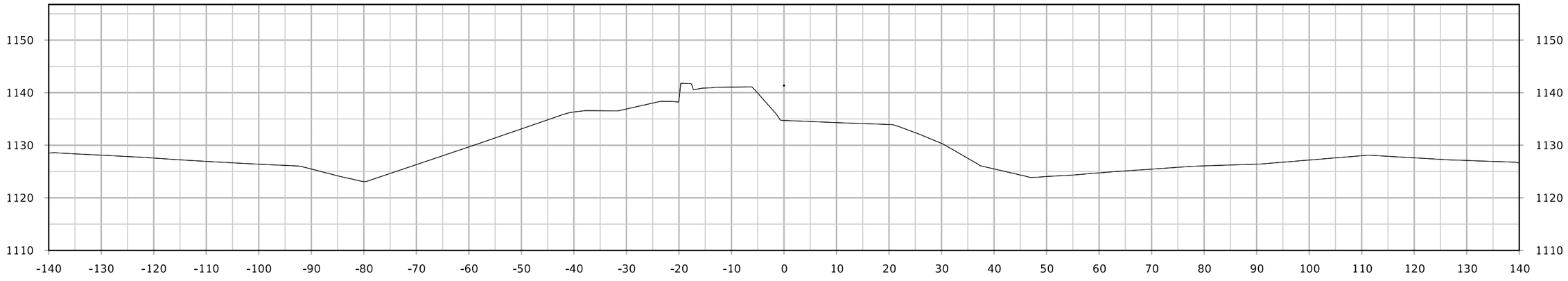

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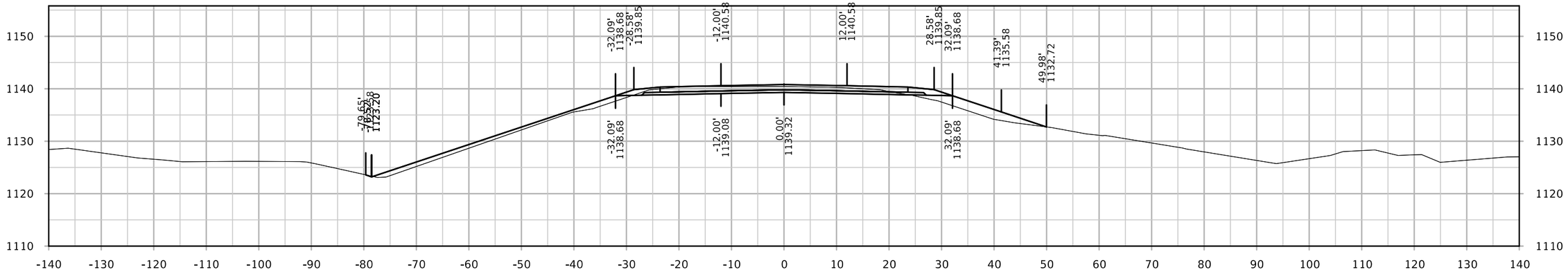

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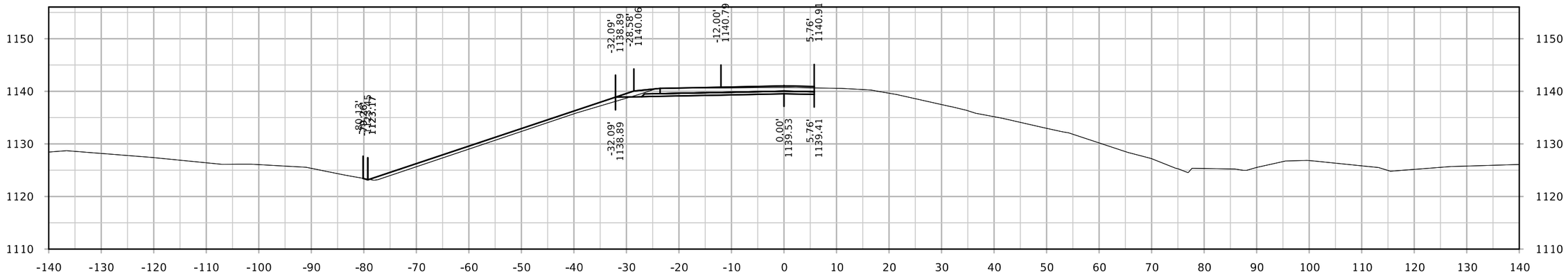

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FILE NO. -	ENGLISH	DESIGN TEAM JIA \ DEWOLF	POTTAWATTAMIE COUNTY	PROJECT NUMBER BRF-059-3(44)--38-78	SHEET NUMBER W.12

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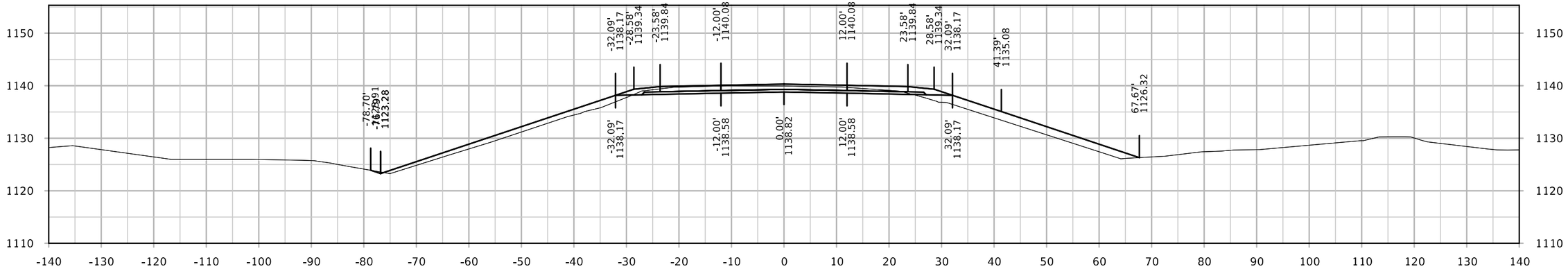

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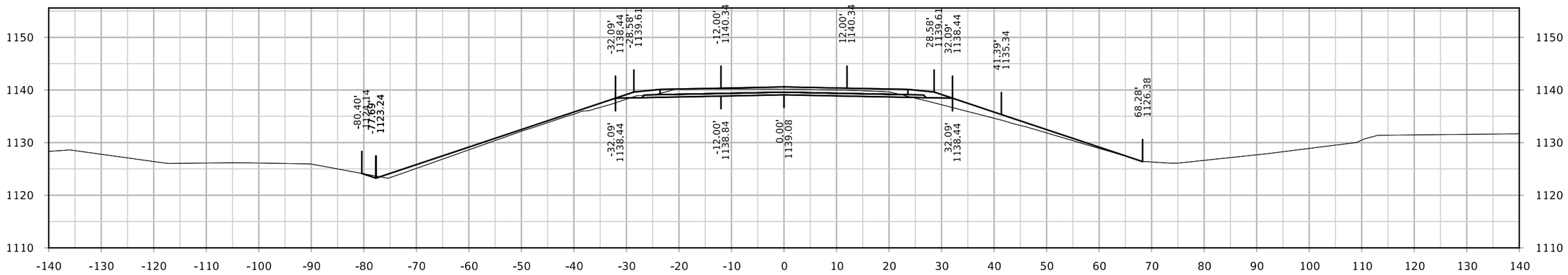

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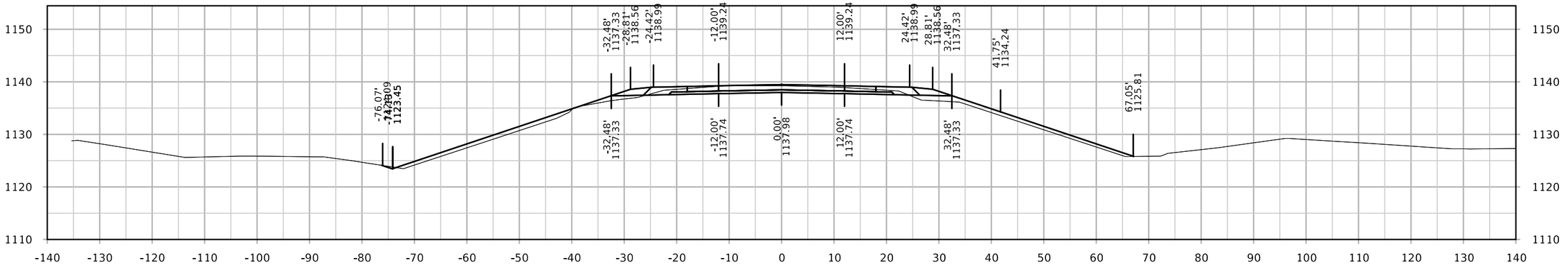
FILE NO. -	ENGLISH	DESIGN TEAM JIA \ DEWOLF	POTTAWATTAMIE COUNTY	PROJECT NUMBER BRF-059-3(44)--38-78	SHEET NUMBER W.13

2:34:31 PM 4/13/2021 adewolf pw:\\ntPwInt1.dot.int.lan:PWMain\Documents\Projects\7805901018\Design\CADD Files Connect\SHT\SHT_78059044_W01.dgn



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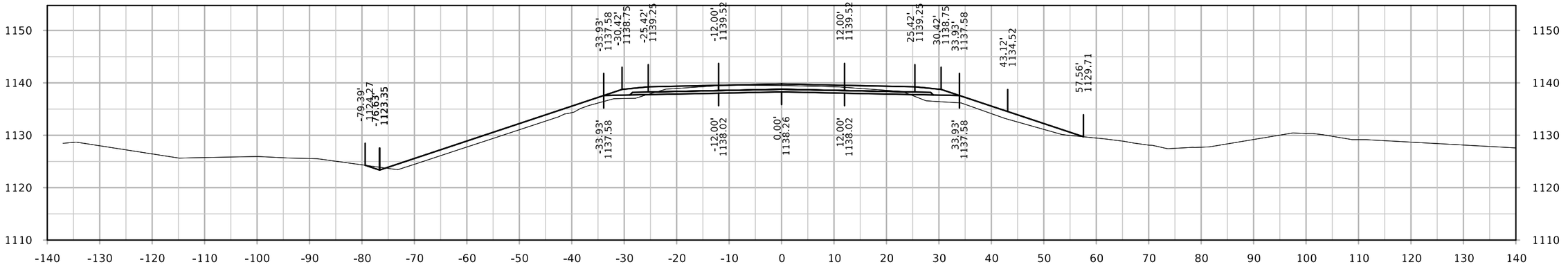

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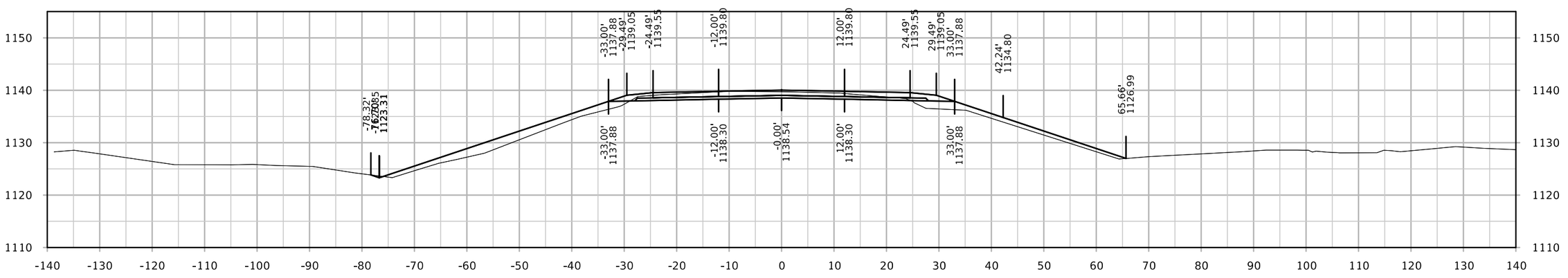

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FILE NO. -	ENGLISH	DESIGN TEAM JIA \ DEWOLF	POTTAWATTAMIE COUNTY	PROJECT NUMBER BRF-059-3(44)--38-78	SHEET NUMBER W.14

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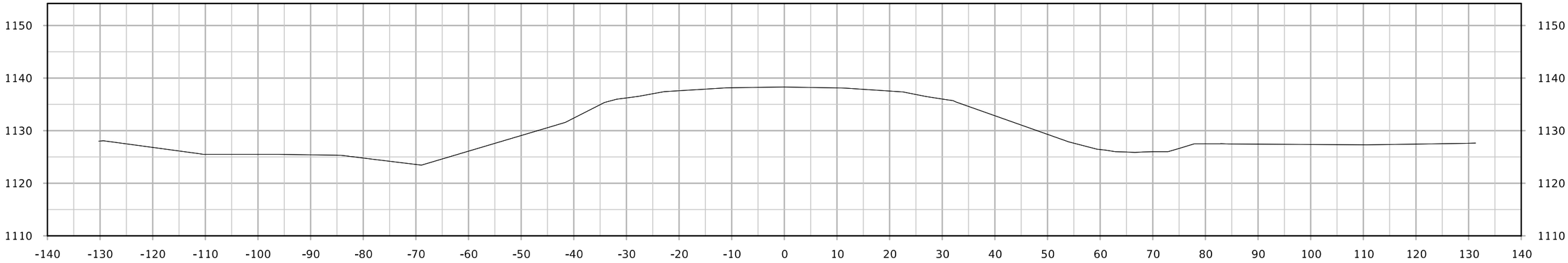

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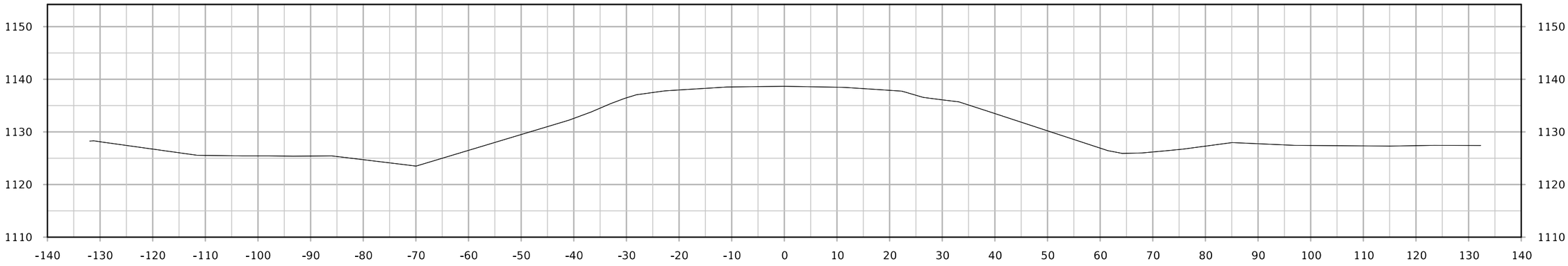

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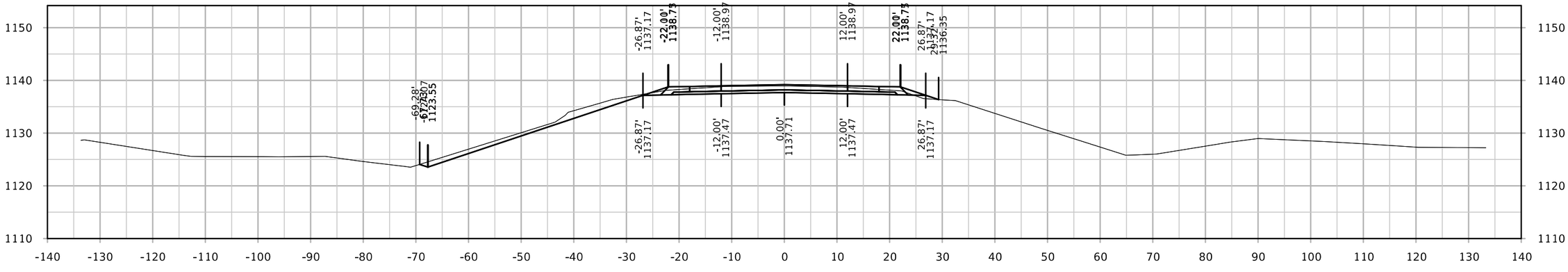

STA. 613+50.00

FILE NO. -	ENGLISH	DESIGN TEAM JIA \ DEWOLF	POTTAWATTAMIE COUNTY	PROJECT NUMBER BRF-059-3(44)--38-78	SHEET NUMBER W.15

2:34:36 PM 4/13/2021 adewolf pw:\\ntPwInt1.dot.int.lan:PWMain\Documents\Projects\7805901018\Design\CADD Files Connect\SHT\SHT_78059044_W01.dgn