RCB Culvert Replacement - Twin Box
BRF-018-2(149)--38-71

LETTING DATE
Nov 21 2028

O'BRIEN COUNTY

INDEX OF SHEETS

No.	DESCRIPTION
A Sheets	Title Sheets
* A.1	Title Sheet
A.2	Location Map Sheet
B Sheets	Typical Cross Sections and Details
* B.1 - B.2	Typical Cross Sections and Details
D Sheets	Mainline Plan and Profile Sheets
* D.1	Plan & Profile Legend & Symbol Information Sheet
* D.2	US 18 Plan & Profile Sheets
G Sheets	Survey Sheets
* G.1 - G.3	Reference Ties and Bench Marks
G.4	Horizontal Control Tab. and Super
J Sheets	Traffic Control and Staging Sheets
J.1 - J.2	Traffic Control Plan, Staging Notes and Tabulations
* J.3	Detour Map
V Sheets	Bridge and Culvert Situation Plans
* V.1-V.2	Bridge and Culvert Situation Plans
W Sheets	Mainline Cross Sections
* W.1	Cross Section Legend & Symbol Information Sheet
* W.2 - W.10	US 18 Cross Sections

* Color Plan Sheets

IOWA DOT

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM
O'BRIEN COUNTY
RCB Culvert Replacement - Twin Box
Approx 0.2 mi W of Co Rd M22

SCALES: As Noted

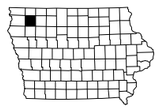
Refer to the Proposal Form for list of applicable specifications.

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

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

REVISIONS

	TOTAL
	25
PROJECT IDENTIFICATION NUMBER	
24-71-018-030	
PROJECT NUMBER	
BRF-018-2(149)--38-71	
R.O.W. PROJECT NUMBER	
NHSN-018-2(150)--2R-71	



US 18
DESIGN DATA RURAL

2029	AADT	3800	V.P.D.
2049	AADT	4500	V.P.D.
2049	DHV	470	V.P.H.
TRUCKS		20	%
Total Design ESALs		–	

INDEX OF SEALS

SHEET NO.	NAME	TYPE	BID QUANTITY SHEETS
A.1	X	Primary Signature Block	X

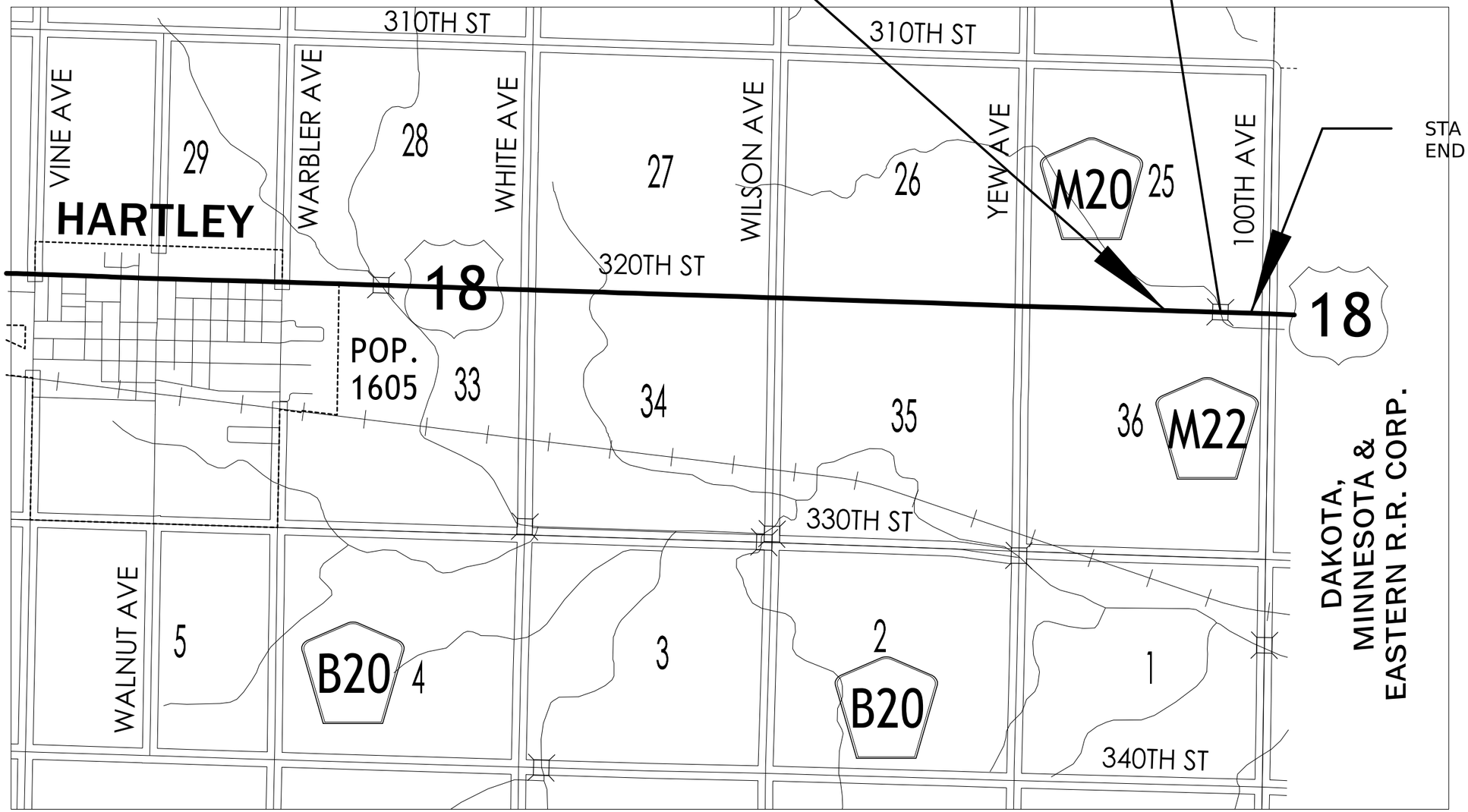
PRELIMINARY PLANS

Subject to change by final design.

D5 PLAN - 12/27/2025

FILE NO.	ENGLISH	DESIGN TEAM **Iowa DOT / HNTB**	**O'BRIEN** COUNTY	PROJECT NUMBER **BRF-018-2(149)--38-71**	SHEET NUMBER **A.1**

3:26:40 PM 12/17/2025 hplumb pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\7101803024\Design\CADD_Files\Sheet_Files\SHT_A_71017149Z01.dgn

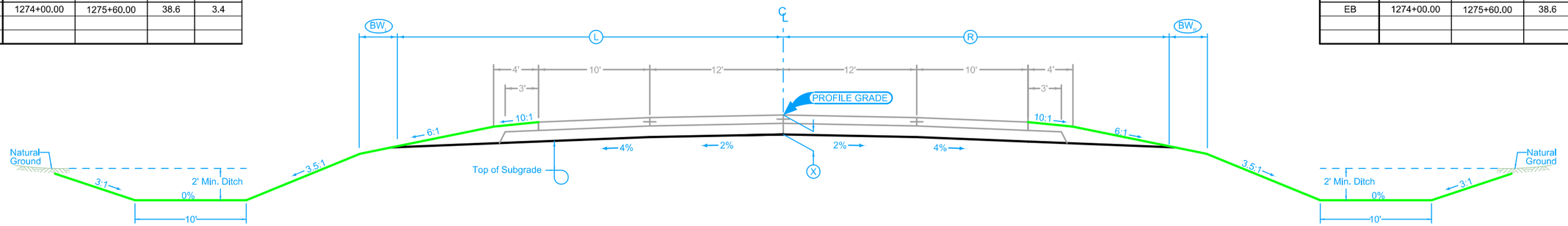


FILE NO.	ENGLISH	DESIGN TEAM **Iowa DOT / HNTB**	**O'BRIEN** COUNTY	PROJECT NUMBER **BRF-018-2(149)--38-71**	SHEET NUMBER **A.2**

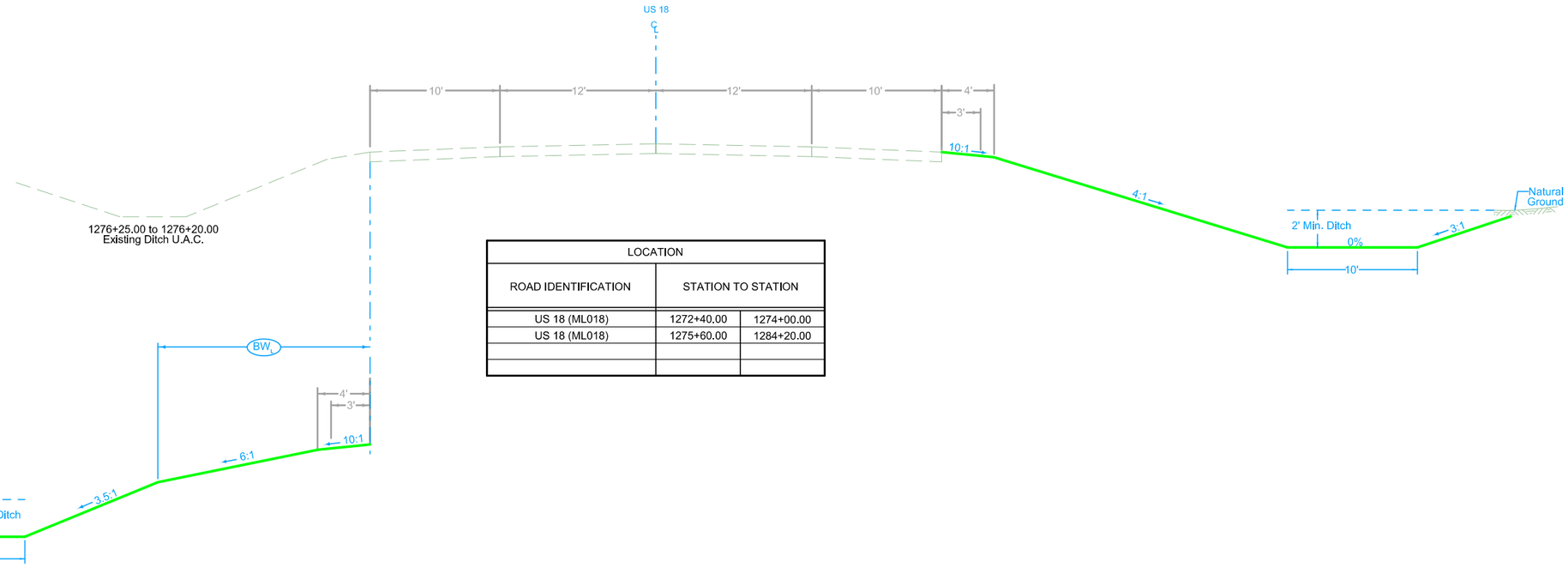
3:26:40 PM 12/17/2025 hplumb pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\7101803024\Design\CADD_Files\Sheet_Files\SHT_A_71017149Z01.dgn

LOCATION			DIMENSIONS	
Direction of Travel	BEGIN STATION	END STATION	(L) Feet	(BW_L) Feet
WB	1274+00.00	1275+60.00	38.6	3.4

LOCATION			DIMENSIONS	
Direction of Travel	BEGIN STATION	END STATION	(R) Feet	(BW_R) Feet
EB	1274+00.00	1275+60.00	38.6	3.4



LOCATION			DIMENSIONS
ROAD IDENTIFICATION	STATION TO STATION		(X) Inches
US 18 (ML018)	1274+00.00	1275+60.00	22



LOCATION		
ROAD IDENTIFICATION	STATION TO STATION	
US 18 (ML018)	1272+40.00	1274+00.00
US 18 (ML018)	1275+60.00	1284+20.00

LOCATION			DIMENSIONS
Direction of Travel	BEGIN STATION	END STATION	(BW_L) Feet
WB	1272+40.00	1274+00.00	40.0

Section view is in the direction of stationing.

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

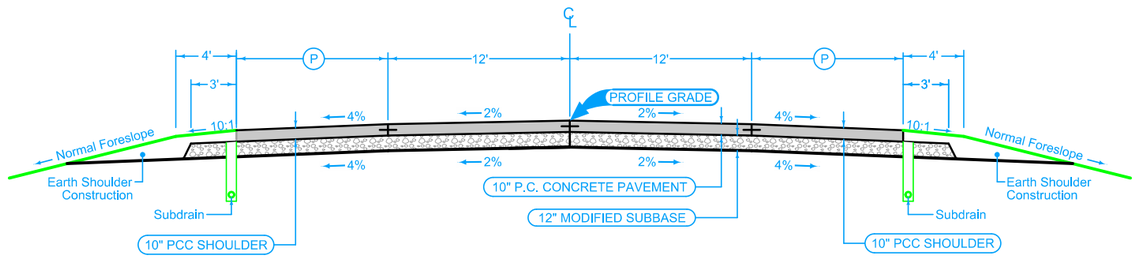
See plan & profile sheets and cross sections for additional details of ditches and backslopes.

US 18
MAINLINE GRADING

Full Depth PCC Combination Shoulder

Shoulder Jointing:
Longitudinal joint: BT-2, or L-2
Transverse joints: CD at 15' Spacing (Match Mainline)

STATION TO STATION		(P) Feet
1274+00.00	1275+60.00	10



Mainline Jointing:
Longitudinal joint: L-2
Transverse joints: CD at 15' spacing

STATION TO STATION	
1274+00.00	1275+60.00

Full Depth PCC Combination Shoulder

Shoulder Jointing:
Longitudinal joint: BT-2, or L-2
Transverse joints: CD at 15' Spacing (Match Mainline)

STATION TO STATION		(P) Feet
1274+00.00	1275+60.00	10

US 18
MAINLINE PAVING

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)
- Tile Outlet
- Edge of Water
- Existing Drainage
- Right of Way Rail or Lot Corner
- Concrete Monument
- Well
- Windmill
- Beehive Intake
- Existing Intake
- Existing Utility Access (Manhole)
- Fire Hydrant
- WH Water Hydrant (Rural)
- 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

PPA, City of Hartley
Jaren Benz
(712) 928-2240
jaron@tcaexpress.net

T1 — TL1D, Windstream Communications - Quality D
(800) 289-1901
LOCATE.DESK@WINDSTREAM.COM

F0 — F01D1, The Community Agency - Quality D
D.J. Weber
(712) 930-5593
tca@tcaexpress.net

F02 — WL1D1, Osceola Rural Water - Quality D
Douglas Westerman
(712) 735-6795
orwsdoug@windstream.net

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
Yellow	(4)	Proposed Pavement Shading
Orange	(6)	Proposed Granular Shading
Orange	(70)	Proposed Shoulder Granular Shading
Yellow	(68)	Proposed Shoulder Paved Full Depth Shading
Yellow	(132)	Proposed Shoulder Paved Partial Depth Shading
Gray, Dark	(112)	Proposed Grade and Pave Shading "In conjunction with a paving project"
Brown, Light	(236)	Grading Shading
Orange, Light	(134)	Proposed Granular Entrance Shading
Yellow	(220)	Proposed Paved Entrance Shading
Tan	(8)	Proposed Sidewalk Shading
Blue, Light	(230)	Proposed Sidewalk Landing Shading
Pink	(11)	Proposed Sidewalk Ramp Shading
Green, Light	(225)	Existing Pavement Shading
Red	(3)	Proposed Structure Shading
Red	(3)	Delineates Restricted Areas

PROFILE VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK	Design Color No.	
Green	(10)	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

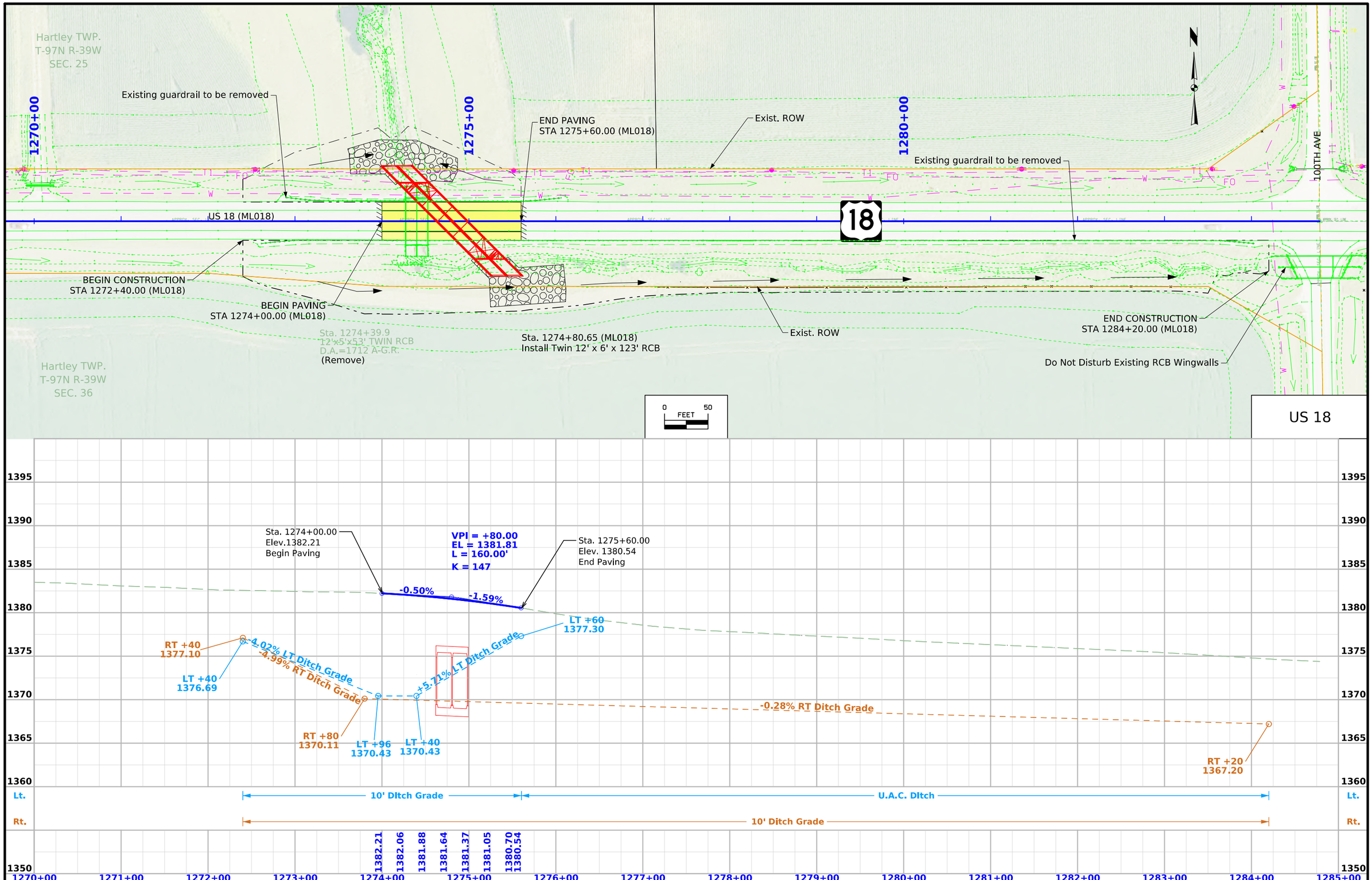
- Proposed Right-of-Way
- Existing Right of Way
- Existing and Proposed Right-of-Way
- Easement and Existing Right-of-Way
- Easement (Temporary)
- Easement
- C/A Access Control
- Property Line

PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

(COVERS SHEET SERIES D)

FILE NO.	ENGLISH	DESIGN TEAM **Iowa DOT / HNTB**	**O'BRIEN** COUNTY	PROJECT NUMBER **BRF-018-2(149)--38-71**	SHEET NUMBER **D.1**

3:27:02 PM 12/17/2025 hplumb pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\7101803024\Design\CADD_Files\Sheet_Files\SHT_D_7101847Z01.dgn



FILE NO.	ENGLISH	DESIGN TEAM **Iowa DOT / HNTB**	**O'BRIEN** COUNTY	PROJECT NUMBER **BRF-018-2(149)--38-71**	SHEET NUMBER **D.2**

8:30:20 AM 12/18/2025 hplumb pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\7101803024\Design\CADD_Files\Sheet_Files\SHT_D_7101847Z01.dgn

SURVEY INDEX

County: O'Brien
PIN: 24-71-018-030
Project Number: BRF-018-2(149)--38-71
Location: US18 0.2 Miles West of Co. RD M22
Type of Work: Box Culvert
Project Directory: 7101803024

Survey Personnel

Daniel Duncan – Survey Party Chief

Date(s) of Survey

Begin Date	10/08/2024
End Date	12/19/2024

General Information

This survey is for US Hwy 18 Box Culvert located 0.2 miles West of County Road M22. This project is a Full Field DTM survey.

Utility Information

For logging data and other utility details see Utility Survey and Ownership Report in the Utility folder of the PrelimSurvey project directory.

Project Control

Coordinates were determined for primary project control points by conducting concurrent six-hour static observations. Post processing is constrained to nearby Iowa Real Time Network reference stations. For additional details of the control survey, contact the Preliminary Survey department.

PROJECT DATUM: NAD83(2011) for EPOCH 2010.00 (IaRTN 2019 ADJUSTMENT)
COORDINATE SYSTEM: IOWA REGIONAL COORDINATE SYSTEM ZONE 01 (U.S. SURVEY FOOT)
VERTICAL DATUM: NAVD88
GEOID MODEL: 2018u3

Alignment Information

The horizontal alignment for U.S. Hwy 18 this survey is a retrace of As-built Plans No. F-43(13) Grading PCC Paving & PCC widening US18, FN-18-2(23)-21-71 US18 Sheldon East to Clay Co Line ACC Resurfacing, and P-259AB US18 O'Brien CL to US71 Grading, PCC Pave. Survey stationing was held at the plan POT at Sta. 1284+78.40 and carried back without equation and carried ahead from the equation at 1284+78.40 throughout the survey.

Survey stationing relates to as built plan stationing as follows:

PI Sta. 1179+42.80 As-built Plans Project No. FN-18-2(23)-21-71
Survey PI Sta. 1179+41.60

PI Sta. 1232+11.90 As-built Plans Project No. FN-18-2(23)-21-71
Survey PI Sta. 1232+11.40

POT Sta. 1284+78.40 As-built Plans Project No. FN-18-2(23)-21-71
Survey POT Sta. 1284+78.40

PI Sta. 3+75.00 As-built Plans Project No. F-18-7(24)—20-19
Survey PI Sta. 3+74.90

POT Sta. 53+94.60 As-built Plans Project No. P-259AB
Survey POT Sta. 53+94.03

The horizontal alignment for O'Brien Co. Rte. M-22 this survey is a retrace of As-built Plans No. FN-18-2(23)-21-71. Survey stationing was equated to the plan PI at Sta. 84+74.40 and carried back without equation throughout the survey.

Survey stationing relates to as built plan stationing as follows:

PI Sta. 58+47.73
Survey PI Sta. 58+47.73

PI Sta. 84+74.40 As-built Plans Project No. FN-18-2(23)-21-71
Survey PI Sta. 84+74.40 Co. Rte. M-22 = Survey POT Sta. 1284+78.40 U.S. Hwy. 18

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) for EPOCH 2010.00 (IaRTN 2019 Adjustment) - Iowa RCS Zone 01 (U.S. Survey Foot)

VERT. DATUM: NAVD88 - Geoid Model: 2018u3

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) for EPOCH 2010.00 (IaRTN 2019 Adjustment)
Ia. Regional Coordinate System Zone 01 (U.S. Survey Foot)
VERT. DATUM: NAVD88
Geoid Model: 2018u3

Point Name	Northing	Easting	Elevation	Code-Description
21001	9594170.37	11465022.02	1363.17	CP FND IDOT FENO MONUMENT STAMPED 21001 10 IN BELOW GRADE
710180649	9594253.10	11459487.50	1398.49	CP FND IDOT ROW RAIL 2 IN ABOVE GRADE SET DIMPLE IN BALL
710180656	9594173.23	11463083.67	1373.12	CP FND IDOT 4X4 CONC MON 3 IN BELOW GRADE SET DIMPLE IN REBAR
Y17	9587890.67	11463063.17	1377.63	CP FND NGS SECOND ORDER CLASS 0 BENCH MARK AS DESCRIBED IN GOOD CONDITION

ALIGNMENT COORDINATES

Line No.	Name	Location	Point on Tangent Station	Point on Tangent Y Northing	Point on Tangent X Easting	Begin Spiral Station	Begin Spiral Y Northing	Begin Spiral X Easting	Begin Curve Station	Begin Curve Y Northing	Begin Curve X Easting	Simple Curve PI or Master PI Station	Simple Curve PI or Master PI Y Northing	Simple Curve PI or Master PI X Easting	End Curve Station	End Curve Y Northing	End Curve X Easting	End Spiral Station	End Spiral Y Northing	End Spiral X Easting
1.0		ML018	1232+11.51	9594330.088	11457900.113															
2.0		ML018	1284+78.51	9594273.683	11463166.806															

NO ACCESS RIGHTS ARE TO BE ACQUIRED ON THIS PROJECT.

FILE NO.	ENGLISH	DESIGN TEAM	IOWA DOT * OFFICE OF ROW	COUNTY	PROJECT NUMBER	SHEET NUMBER	

1

DMJ Pete Corporation

Hartley TWP.
T-97N R-39W
SEC. 25

1273+78.00
℄ 117.00' LT

1274+37.00
℄ 117.00' LT

1275+57.00
℄ 60.05' LT± EX R/W

Existing guardrail to be removed

1272+26.00
℄ 60.07' LT± EX R/W

END PAVING
STA 1275+60.00 (ML018)

Exist. ROW

1270+00

1275+00

1280+00

Existing guardrail to be removed

100TH AVE

US 18 (ML018)

BEGIN CONSTRUCTION
STA 1272+40.00 (ML018)

BEGIN PAVING
STA 1274+00.00 (ML018)

1271+89.00
℄ 59.93' RT

(Remove)

Sta. 1274+39.9
12'x5'x53' TWIN RCB
D.A.=1712 A-G.R.

1273+82.00
℄ 115.00' RT

Sta. 1274+80.65 (ML018)
Install Twin 12' x 6' x 123' RCB

Exist. ROW

END CONSTRUCTION
STA 1284+20.00 (ML018)

Do Not Disturb Existing RCB Wingwalls

1277+29.00
℄ 93.00' RT

1283+77.00
℄ 90.29' RT±EX R/W

1275+60.00
℄ 113.00' RT

2

Tentinger Family Revocable Trust

0 50
FEET

Right of Way Design Information
THIS SHEET INCLUDED
FOR INFORMATION ONLY

ROW Team: Fredrickson / Hinrichsen
ROW #: NHSN-018-2(150)–2R-71
Plan Date: 5/29/2026
Color Legend:
Property Lines
Temporary Easement
Permanent Acquisition
Permanent Acquisition County
Permanent Acquisition City

FILE NO.	ENGLISH	DESIGN TEAM Iowa DOT / HNTB	O'BRIEN COUNTY	PROJECT NUMBER BRF-018-2(149)--38-71	SHEET NUMBER H.1	

10:13:21 AM 5/27/2026 thinric pw:\\NTPwint1.dot.int.lan:PWMain\Documents\Projects\7101803024\ROW\ROW_71018150.dgn

108_23A
8/15/22

TRAFFIC CONTROL PLAN

Traffic control for this project shall be in accordance with Iowa DOT Standard Road Plans and the following J Sheets. For additional information, refer to Part 6 of the Manual on Uniform Traffic Control Devices, Iowa DOT Standard Road Plan TC Series and the current Standard Specifications.

US 18 shall be closed during construction of this project. Traffic will be detoured as shown on Sheet J.3.

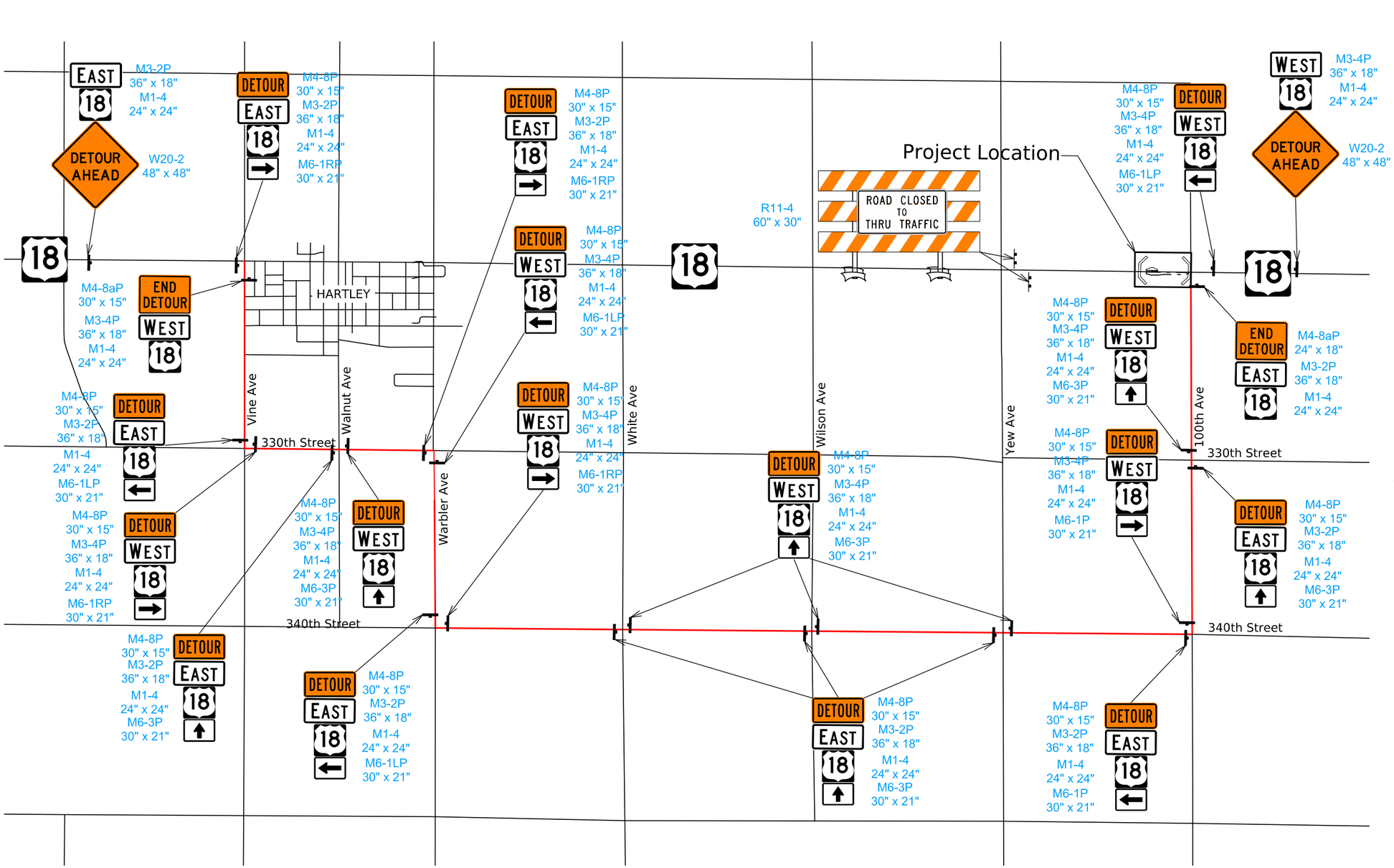
Portable Dynamic Message Signs (PDMS) shall be provided and installed by the Contractor. Locations and messages shall be coordinated with the Engineer.

PDMS shall be used for 14 days prior to closing US 18.

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.	



DETOUR MAP

Note: Install detour signage prior to closure of US 18.

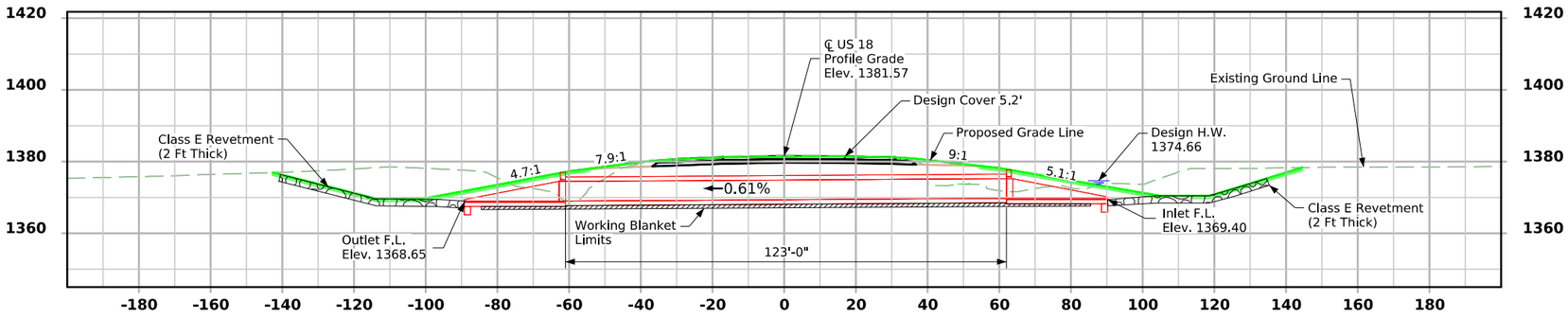
NTS

US 18 Detour

FILE NO.	ENGLISH	DESIGN TEAM **Iowa DOT / HNTB**	**O'BRIEN** COUNTY	PROJECT NUMBER **BRF-018-2(149)--38-71**	SHEET NUMBER **J.3**

3:27:25 PM 12/17/2025 hplumb pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\7101803024\Design\CADD_Files\Sheet_Files\SHT_J_7101847Z01.dgn

Control Point:710180656,CP FND IDOT 4X4 CONC MON 3 IN BELOW GRADE SET DIMPLE IN REBAR, N. 9594173.231, E. 11463083.665, Elev. 1373.116



STA 1274+80.65

Longitudinal Section Along ℄ Culvert

General Notes:

This design is for the replacement of an existing Twin 12'x5'x53' RCB Culvert.
O'Brien County Design No.0129

Design Notes

1. Design fill for this C.I.P. culvert is 5.2'
2. Anticipated settlement is negligible.
3. Permanent acquisition is required.
4. Density used for Class E quantity calculation is 1.5 Tons/CY.
5. Revetment is proposed at the culverts inlet and outlet due to erosion concerns and steep approach ditch grades.

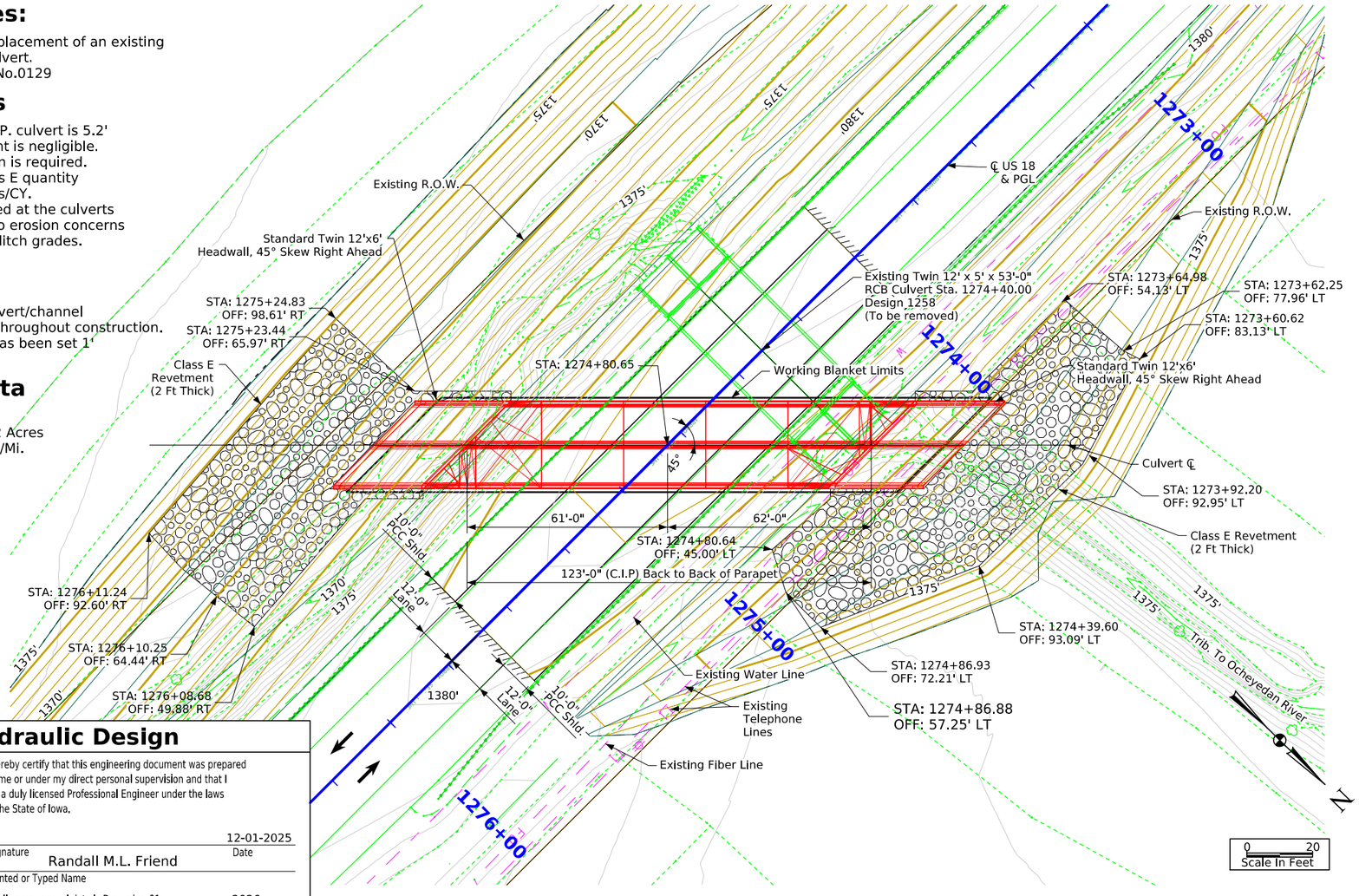
Plan Notes:

1. Drainage through culvert/channel must be maintained throughout construction.
2. Flow Line of culvert has been set 1' below streambed.

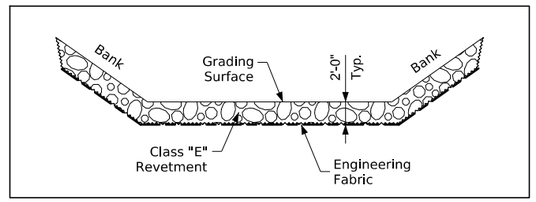
Hydraulic Data

RIDB: Not Applicable
Drainage Area = 1587.2 Acres
Stream Slope = 34.8 Ft./Mi.
Q_{50} = 570 cfs
HW Elev. = 1374.66
Exit Velocity = 5.52 fps

Q_{100} = 710 cfs
HW Elev. = 1375.33
Exit Velocity = 6.23 fps



Situation Plan



Typical Channel Protection

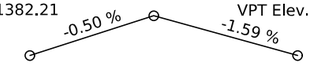
Estimated Revetment Quantities Included With Road Plans

Location	Revetment Class "E" (Ton)	Engineering Fabric (SY)	CL. 13 Channel Excavation (CY)
Inlet	436	436	291
Outlet	396	396	264
Totals	832	832	555

Excavation quantity calculated from grading surface. Excavation quantity is for embedded revetment core out only, and does not include excavation to the grading surface. Excavation quantity to the grading surface is determined by Road Design and included in the Road Plans. Quantities shown for information only. See Road Sheets.

VPC Sta. = 1274+00.00
VPC Elev. = 1382.21

VPT Sta. = 1275+60.00
VPT Elev. = 1380.54



VPI Sta. = 1274+80.00
VPI Elev. = 1381.81
VC = 160'

Proposed Profile Grade US 18

Location

US 18 Over Trib. to Ocheyedan Ri.
T-97N R-39W
Section 36
Hartley Township
O'Brien County
Asset ID No. 700296
Bridge Maint. No. 7165.6S018
Latitude 43.184239°
Longitude -95.391844°

Traffic Estimate

2029 AADT 3800 V.P.D.
2049 AADT 4500 V.P.D.
TRUCKS 20 %

Utilities Note:

Utilities shown on this sheet are for information only.See Road Design sheets for utility information.

General Utility Symbols:

E - Electric Line
G - Gas Line
SAN. - Sanitary Sewer
T - Telephone Line
W - Water Line
FO - Fiber Optic Line
GHP - Gas High Pressure
ST S - Storm Sewer
TV - TV
- Power Poles

Hydraulic Design

LICENSED PROFESSIONAL ENGINEER
Randall M.L. Friend
P28452
IOWA

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.

12-01-2025
Signature Date
Randall M.L. Friend
Printed or Typed Name
My license renewal date is December 31, 2026

Pages or sheets covered by this seal: P28452
V.1 and V.2

Design For 45° Skew (R.A.)

Twin 12'-0" x 6'-0" x 123'-0" Reinforced Concrete Box Culvert

Situation Plan - CIP

STA. 1274+80.65 (US 18)
Turn-in Date: December 2025

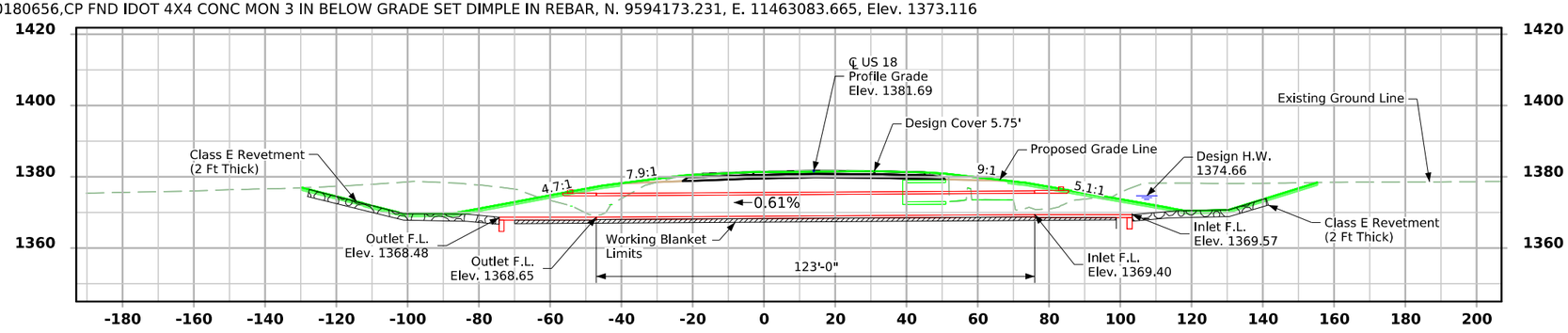
O'Brien County
IOWA DEPARTMENT OF TRANSPORTATION

Design No. 0129 Design Sheet No. 1 of 2 FHWA/Asset 700296

FILE NO. 32878	ENGLISH	DESIGN TEAM HNTB	O'Brien COUNTY	PROJECT NUMBER BRF-018-2(149)--38-71	SHEET NUMBER V.1

2:51:44 PM 12/17/2025 hplumb pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\7101803024\Bridge\(149)_Bridge-Unspecified\SHT_71018149_HNTB_700296_0129_CIP_Z01.dgn

Control Point:710180656,CP FND IDOT 4X4 CONC MON 3 IN BELOW GRADE SET DIMPLE IN REBAR, N. 9594173.231, E. 11463083.665, Elev. 1373.116



STA 1274+80.65

Longitudinal Section Along ℄ Culvert

General Notes:

This design is for the replacement of an existing Twin 12'x5'x53' RCB Culvert.
O'Brien County Design No.0129

Design Notes

1. Design fill for this P.C. culvert is 5.75'
2. Anticipated settlement is negligible.
3. Permanent acquisition is required.
4. Density used for Class E quantity calculation is 1.5 Tons/CY.
5. Revetment is proposed at the culvert inlet and outlet due to erosion concerns and steep approach ditch grades.

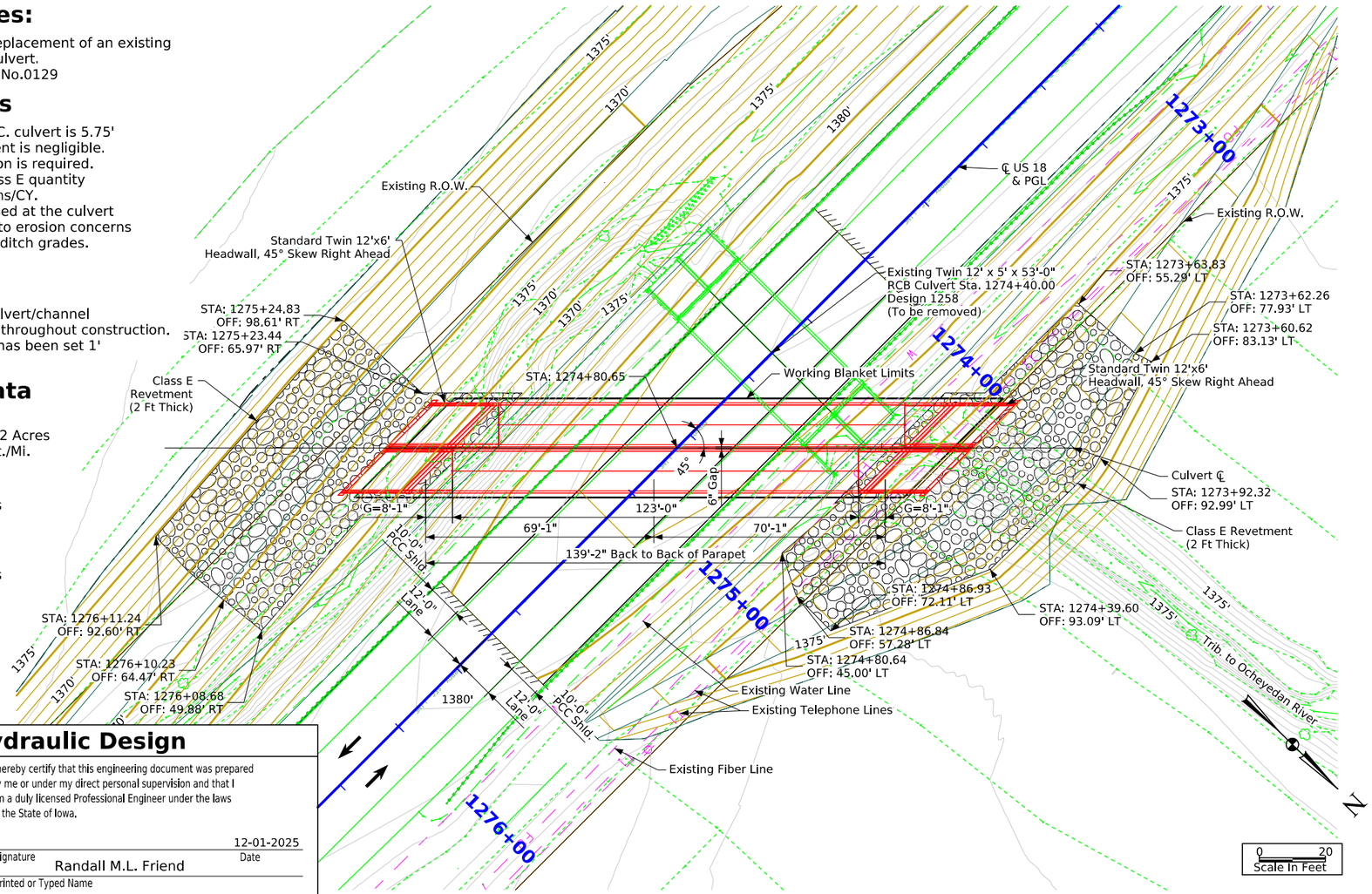
Plan Notes:

1. Drainage through culvert/channel must be maintained throughout construction.
2. Flow Line of culvert has been set 1' below streambed.

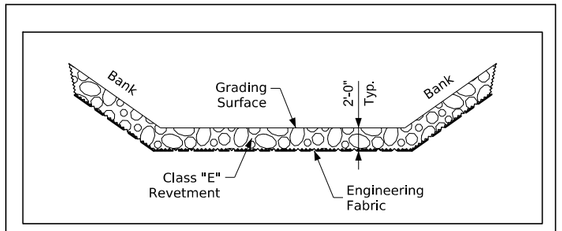
Hydraulic Data

RIDB: Not Applicable
Drainage Area = 1587.2 Acres
Stream Slope = 34.8 Ft./Mi.
Q_{50} = 570 cfs
HW Elev. = 1374.66
Exit Velocity = 5.52 fps

Q_{100} = 710 cfs
HW Elev. = 1375.33
Exit Velocity = 6.23 fps



Situation Plan



Typical Channel Protection

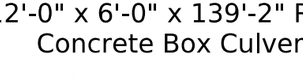
Estimated Revetment Quantities Included With Road Plans

Location	Revetment Class "E" (Ton)	Engineering Fabric (SY)	CL. 13 Channel Excavation (CY)
Inlet	453	453	302
Outlet	416	416	277
Totals	868	869	579

Excavation quantity calculated from grading surface. Excavation quantity is for embedded revetment core out only, and does not include excavation to the grading surface. Excavation quantity to the grading surface is determined by Road Design and included in the Road Plans. Quantities shown for information only. See Road Sheets.

VPT Sta. = 1274+00.00
VPT Elev. = 1382.21

VPT Sta. = 1275+60.00
VPT Elev. = 1380.54



VPI Sta. = 1274+80.00
VPI Elev. = 1381.81
VC = 160'

Proposed Profile Grade US 18

Location

US 18 Over Trib. to Ocheyedan Ri.
T-97N R-39W
Section 36
Hartley Township
O'Brien County
Asset ID No. 700296
Bridge Maint. No. 7165.6S018
Latitude 43.184239°
Longitude -95.391844°

Traffic Estimate

2029 AADT	3800 V.P.D.
2049 AADT	4500 V.P.D.
TRUCKS	20 %

Utilities Note:

Utilities shown on this sheet are for information only.See Road Design sheets for utility information.

General Utility Symbols:

E - Electric Line
G - Gas Line
SAN. - Sanitary Sewer
T - Telephone Line
W - Water Line
FO - Fiber Optic Line
GHP - Gas High Pressure
ST S - Storm Sewer
TV - TV
- Power Poles

Hydraulic Design

LICENSED PROFESSIONAL ENGINEER
Randall M.L. Friend
P28452
IOWA

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.

Signature — Date: 12-01-2025
Randall M.L. Friend
Printed or Typed Name
My license renewal date is December 31, 2026

Pages or sheets covered by this seal: P28452
V.1 and V.2

Design For 45° Skew (R.A.)

Twin 12'-0" x 6'-0" x 139'-2" Reinforced Concrete Box Culvert

Situation Plan - PC

STA. 1274+80.65 (US 18)
Turn-in Date: December 2025

O'Brien County
IOWA DEPARTMENT OF TRANSPORTATION

Design No. 0129 | Design Sheet No. 2 of 2 | FHWA/Asset 700296

FILE NO. 32878	ENGLISH	DESIGN TEAM HNTB	O'Brien COUNTY	PROJECT NUMBER BRF-018-2(149)--38-71	SHEET NUMBER V.2

2:51:51 PM 12/17/2025 hplumb pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\7101803024\Bridge\(149)_Bridge-Unspecified\SHT_71018149_HNTB_700296_0129_PC_Z01.dgn

CROSS SECTION VIEW COLOR LEGEND

Design Color No.	Feature
Aggregate	
(64)	Choke Stone
(42)	Engineering Fabric
(8)	Flooded Backfill
(92)	Macadam Stone
(20)	Modified
(12)	Plowing Shaping
(14)	Porous Backfill
(8)	Revetment Class A
(6)	Revetment Class B
(62)	Revetment Class C
(188)	Revetment Class D
(28)	Revetment Class E
(12)	Shoulder Special Backfill
(12)	Special Backfill
(20)	Subbase
(20)	Subbase Lower
(20)	Subbase Upper
(118)	Subgrade Treatment
Asphalt	
(207)	HMA Base Course
(207)	HMA Interim Course
(207)	HMA Surface Course
Concrete	
(0)	Barrier Concrete
(0)	Barrier Concrete Footing
(0)	Curb Gutter
(48)	Flowable Mortar
(0)	Median Concrete
(0)	PCC Pavement
(0)	Sidewalk
Shoulder	
(209)	Shoulder HMA
(0)	Shoulder PCC
(6)	Shoulder Granular
Existing	
(0)	Existing Pavement
Structural	
(112)	Noise Wall
(112)	Noise Wall Footing
(112)	Retaining Wall Back
(112)	Retaining Wall Back Excavate
(112)	Retaining Wall Face
(112)	Retaining Wall Front Excavate
(112)	Retaining Wall Front Footing
(112)	Retaining Wall MSE Gutter
(112)	Retaining Wall Reinforced Earth
Grading	
(8)	Behind Curb Cut
(6)	Granular
(13)	Granular Back Fill
(48)	Rock Undercut
(8)	Shoulder Earth Fill
(2)	Side Slopes
(226)	Side Slopes Dressing
Substrata	
(128)	Boulder Substrata
(48)	Broken Weathered Substrata
(3)	Core Out Substrata
(203)	Existing Pavement Substrata
(6)	Loam Substrata
(80)	Rock Substrata
(4)	Select Sand Substrata
(3)	Shale Substrata
(10)	Topsoil Substrata
Unsuitable / Waste	
(3)	Unsuitable Type A
(13)	Unsuitable Type B
(11)	Unsuitable Type C
(3)	Waste

NOTES:

Text

NOTES:

Text

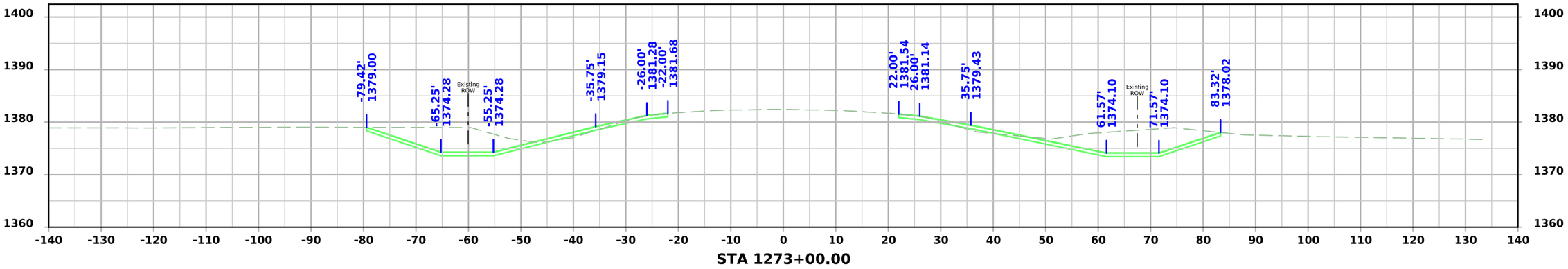
CROSS SECTIONS
LEGEND AND INFORMATION SHEET

(COVERS SHEET SERIES W)

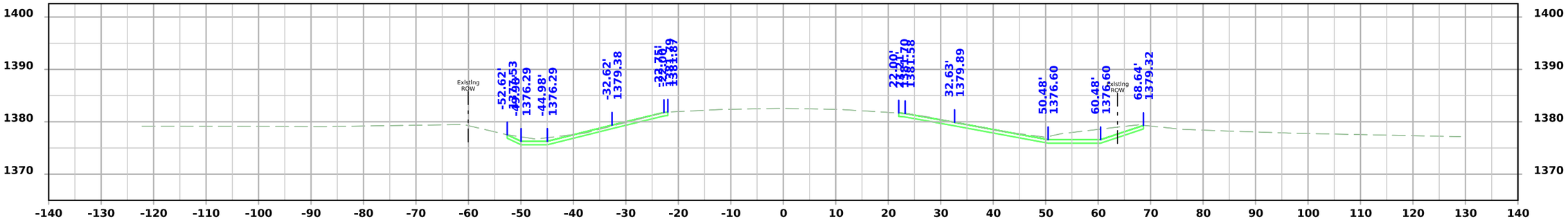
FILE NO.	ENGLISH	DESIGN TEAM **Iowa DOT / HNTB**	**O'BRIEN** COUNTY	PROJECT NUMBER **BRF-018-2(149)--38-71**	SHEET NUMBER **W.1**

3:27:34 PM 12/17/2025 hplumb pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\7101803024\Design\CADD_Files\Sheet_Files\SHT_W_7101847Z01.dgn

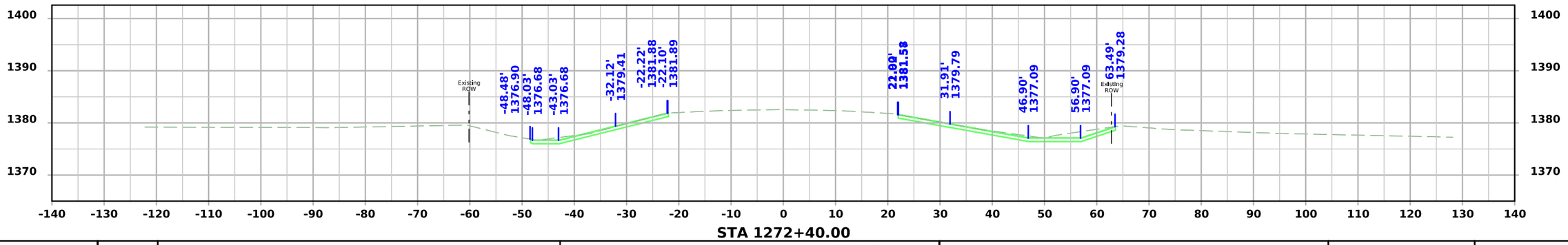
US 18



STA 1273+00.00



STA 1272+50.00

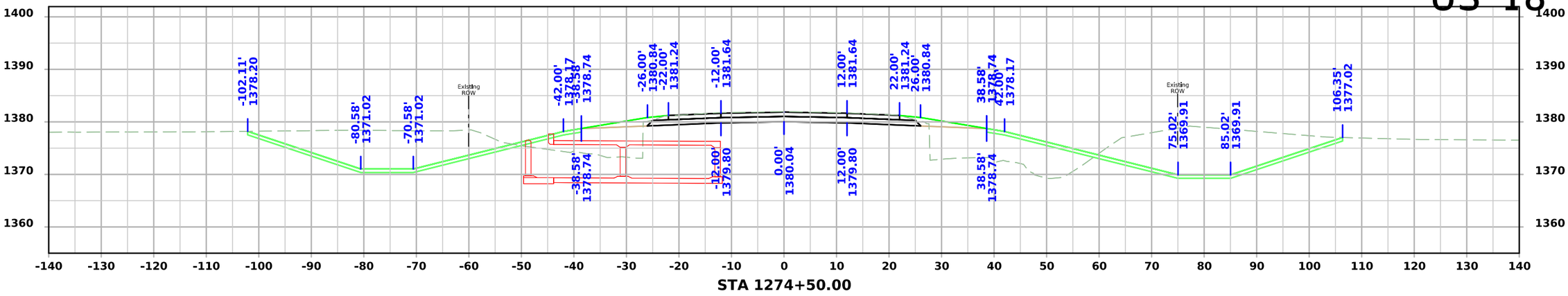


STA 1272+40.00

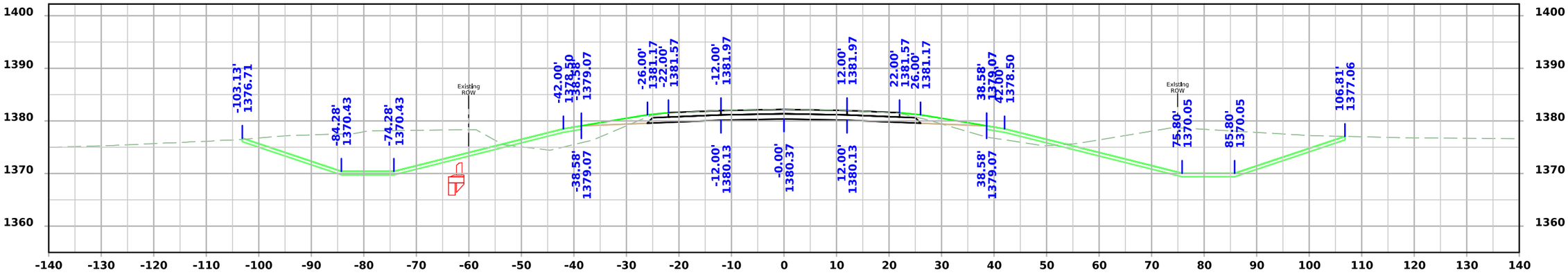
FILE NO.	ENGLISH	DESIGN TEAM **Iowa DOT / HNTB**	**O'BRIEN** COUNTY	PROJECT NUMBER **BRF-018-2(149)--38-71**	SHEET NUMBER **W.2**

3:27:35 PM 12/17/2025 hplumb pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\7101803024\Design\CADD_Files\Sheet_Files\SHT_W_7101847Z01.dgn

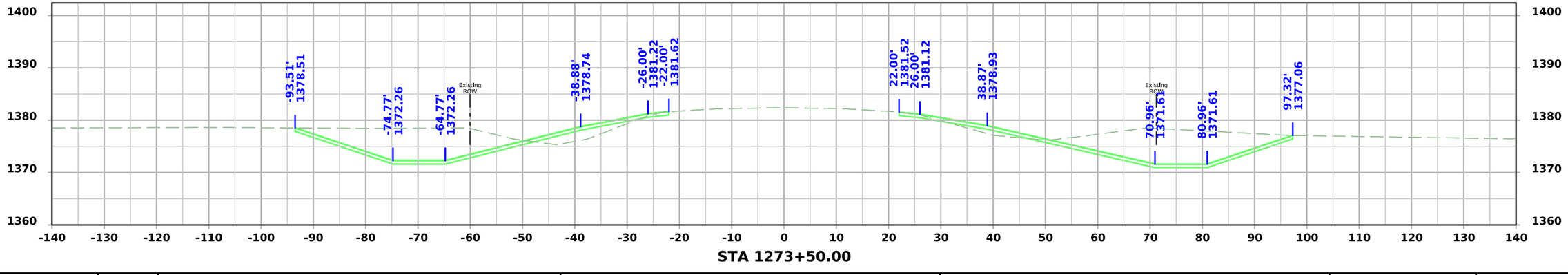
US 18



STA 1274+50.00



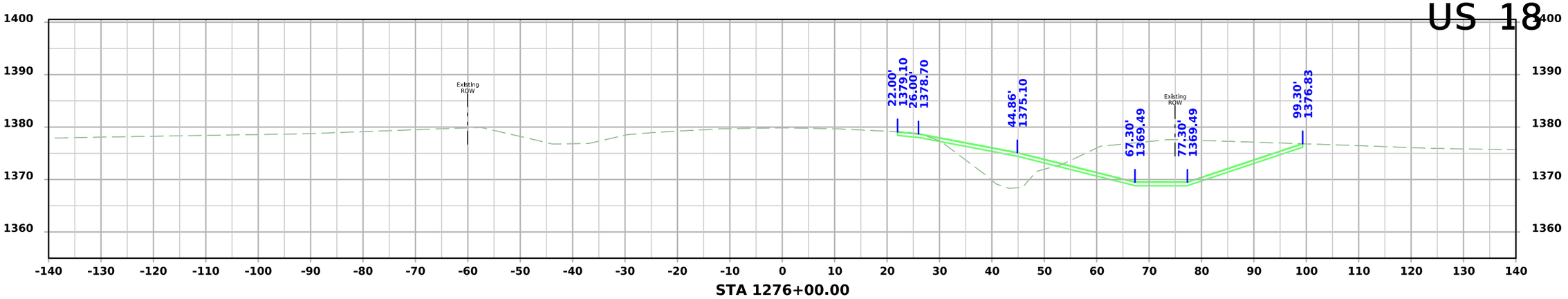
STA 1274+00.00



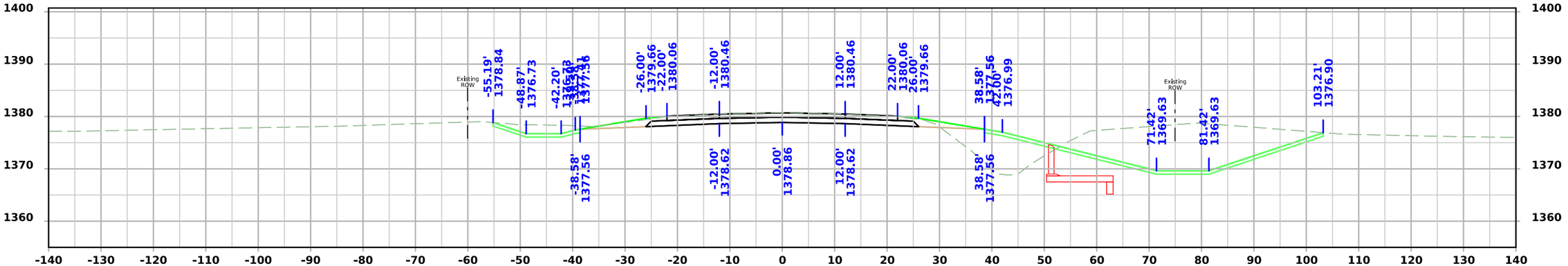
STA 1273+50.00

FILE NO.	ENGLISH	DESIGN TEAM **Iowa DOT / HNTB**	**O'BRIEN** COUNTY	PROJECT NUMBER **BRF-018-2(149)--38-71**	SHEET NUMBER **W.3**

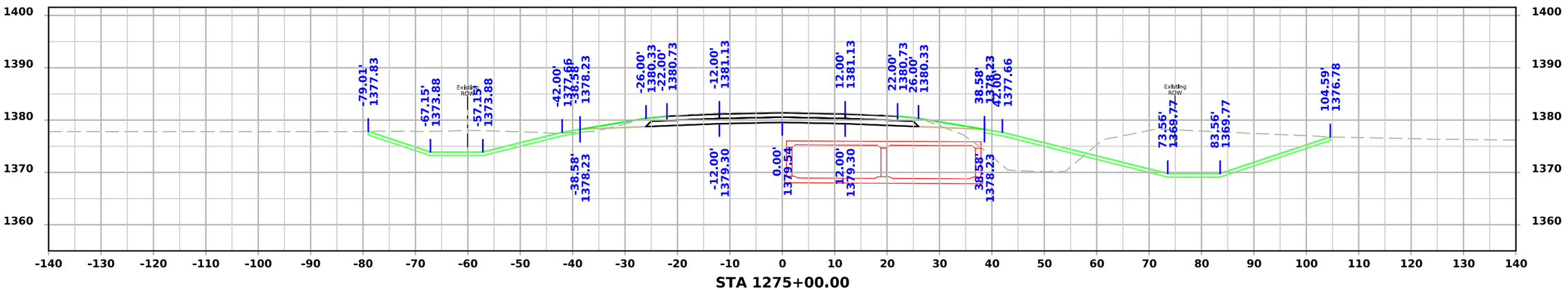
3:27:36 PM 12/17/2025 hplumb pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\7101803024\Design\CADD_Files\Sheet_Files\SHT_W_7101847Z01.dgn



STA 1276+00.00



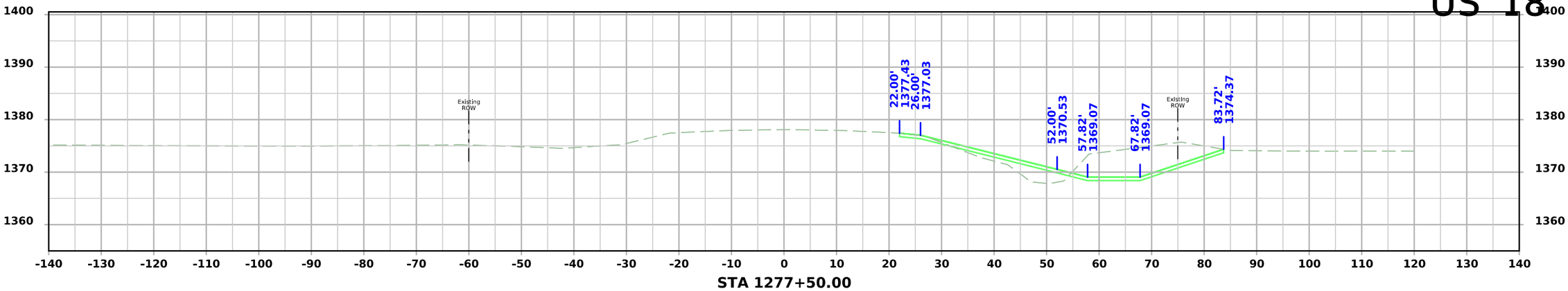
STA 1275+50.00



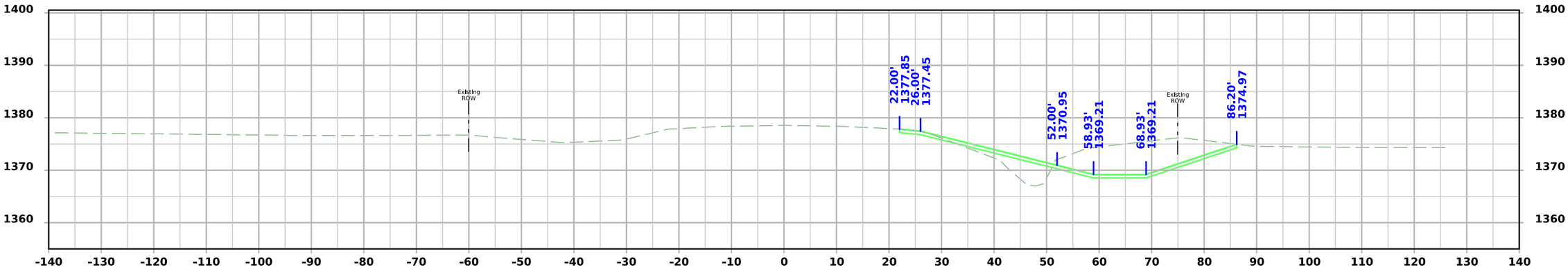
STA 1275+00.00

FILE NO.	ENGLISH	DESIGN TEAM **Iowa DOT / HNTB**	**O'BRIEN** COUNTY	PROJECT NUMBER **BRF-018-2(149)--38-71**	SHEET NUMBER **W.4**

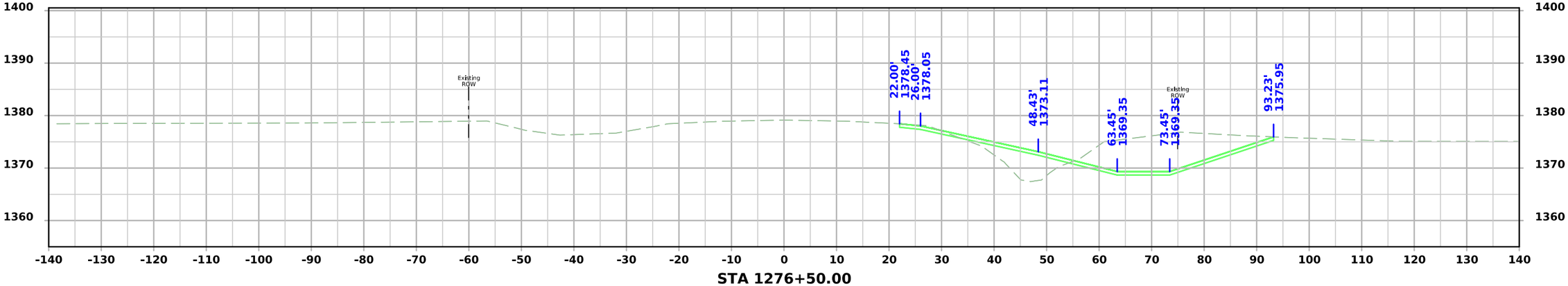
3:27:38 PM 12/17/2025 hplumb pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\7101803024\Design\CADD_Files\Sheet_Files\SHT_W_7101847Z01.dgn



STA 1277+50.00



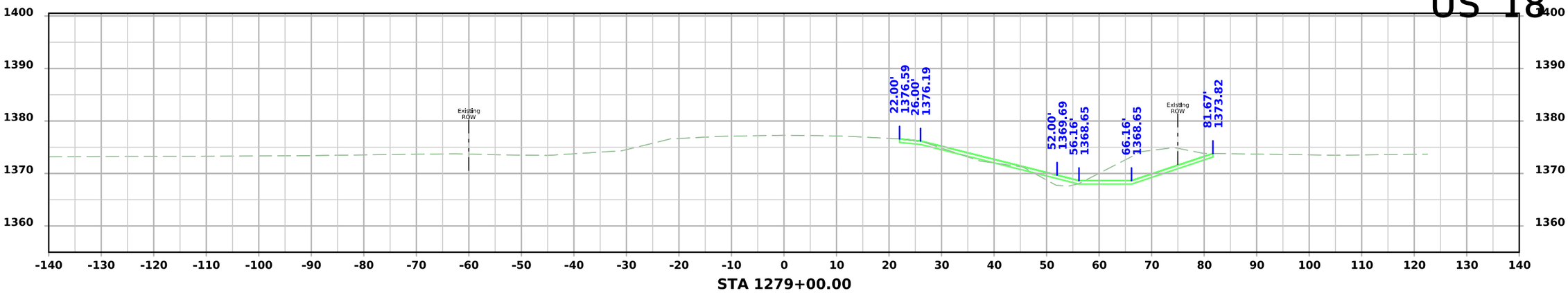
STA 1277+00.00



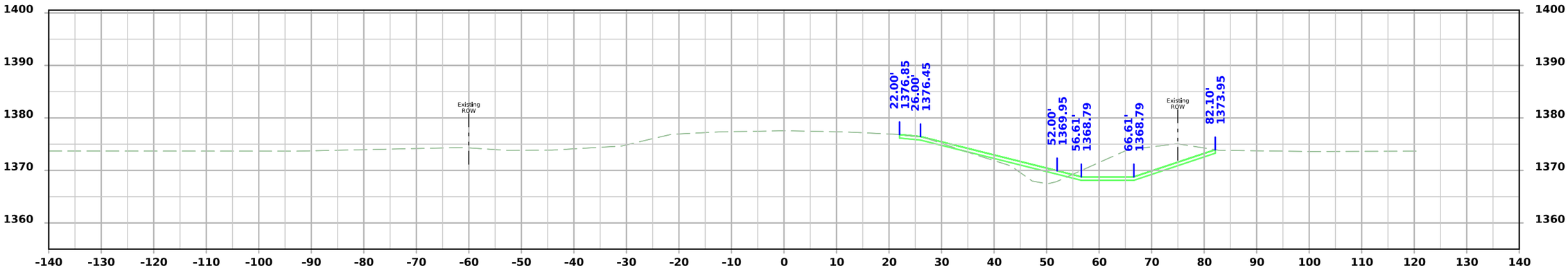
STA 1276+50.00

FILE NO.	ENGLISH	DESIGN TEAM **Iowa DOT / HNTB**	**O'BRIEN** COUNTY	PROJECT NUMBER **BRF-018-2(149)--38-71**	SHEET NUMBER **W.5**

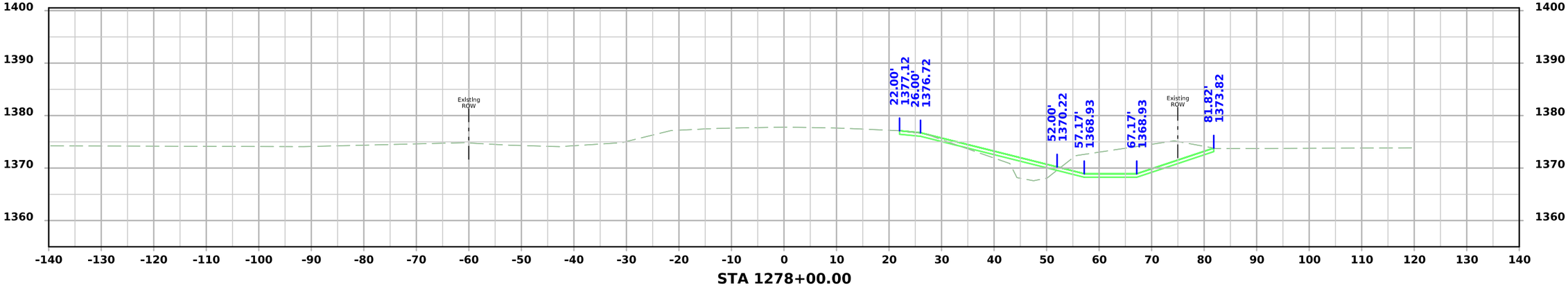
3:27:39 PM 12/17/2025 hplumb pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\7101803024\Design\CADD_Files\Sheet_Files\SHT_W_7101847Z01.dgn



STA 1279+00.00

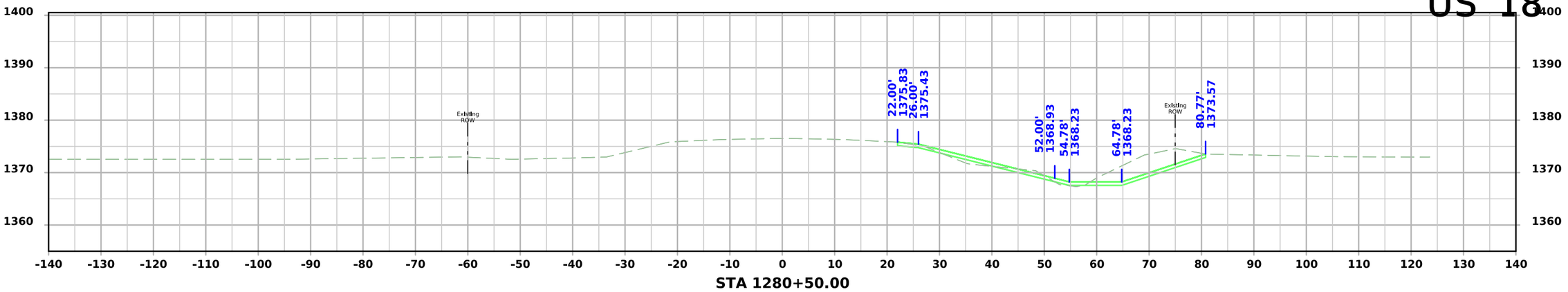


STA 1278+50.00

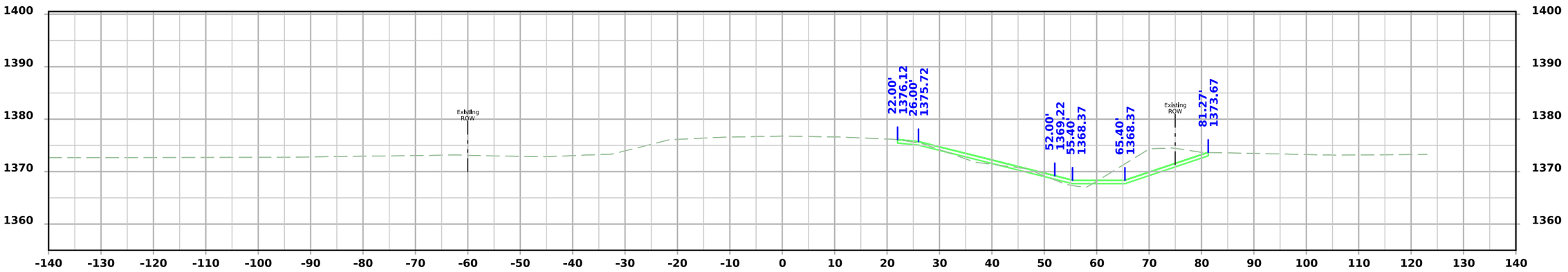


STA 1278+00.00

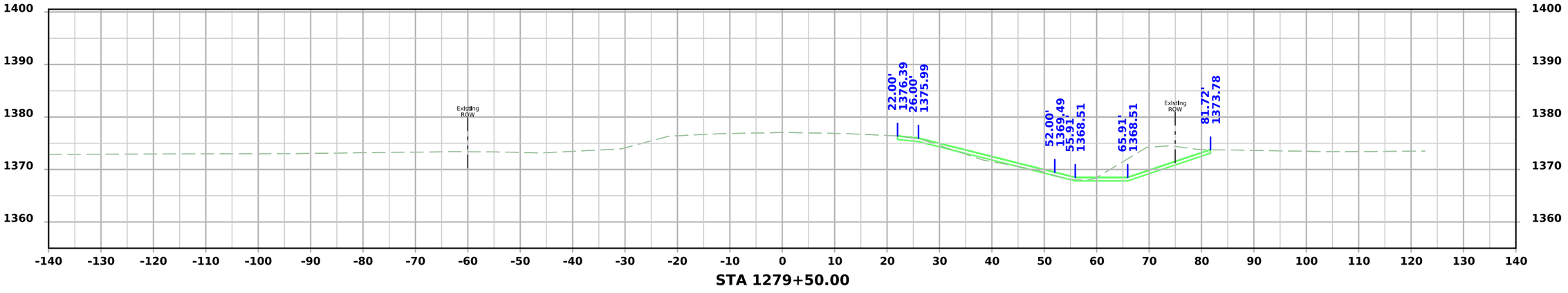
FILE NO.	ENGLISH	DESIGN TEAM **Iowa DOT / HNTB**	**O'BRIEN** COUNTY	PROJECT NUMBER **BRF-018-2(149)--38-71**	SHEET NUMBER **W.6**



STA 1280+50.00



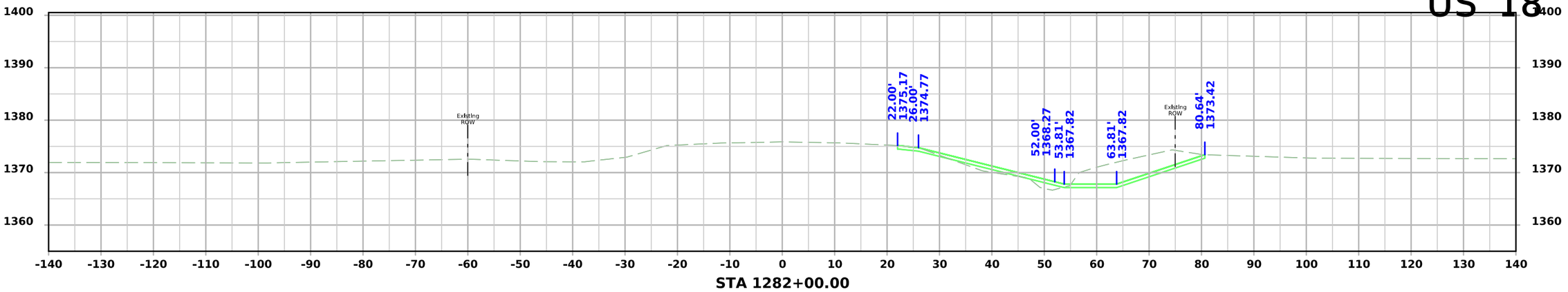
STA 1280+00.00



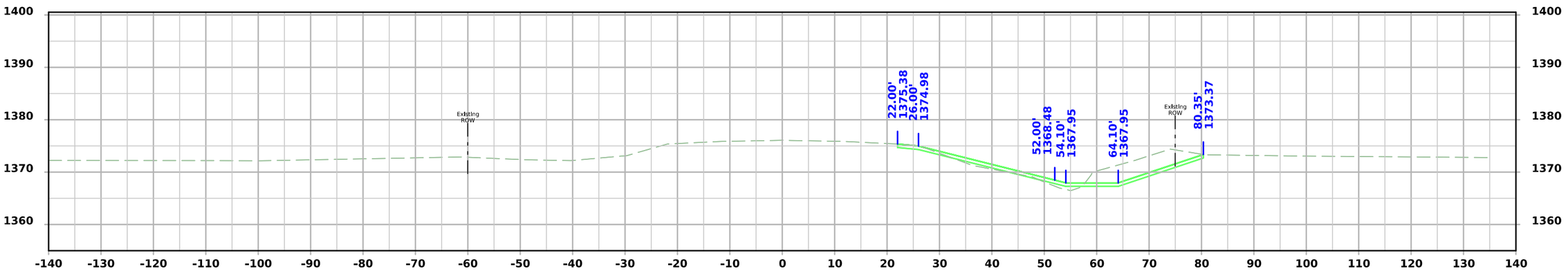
STA 1279+50.00

FILE NO.	ENGLISH	DESIGN TEAM **Iowa DOT / HNTB**	**O'BRIEN** COUNTY	PROJECT NUMBER **BRF-018-2(149)--38-71**	SHEET NUMBER **W.7**

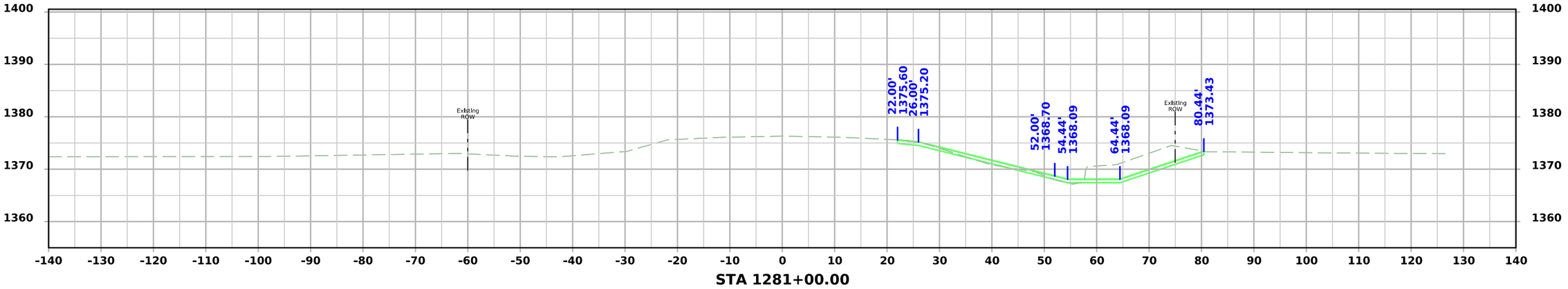
3:27:40 PM 12/17/2025 hplumb pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\7101803024\Design\CADD_Files\Sheet_Files\SHT_W_7101847Z01.dgn



STA 1282+00.00



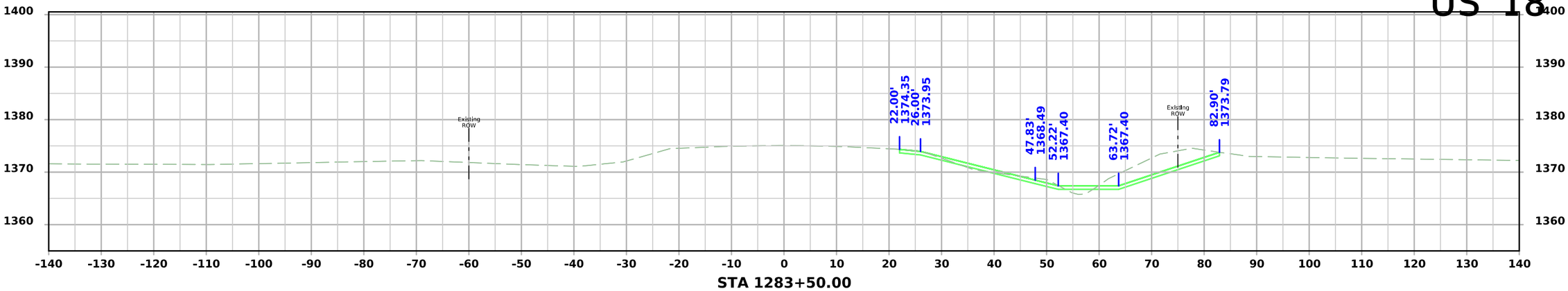
STA 1281+50.00



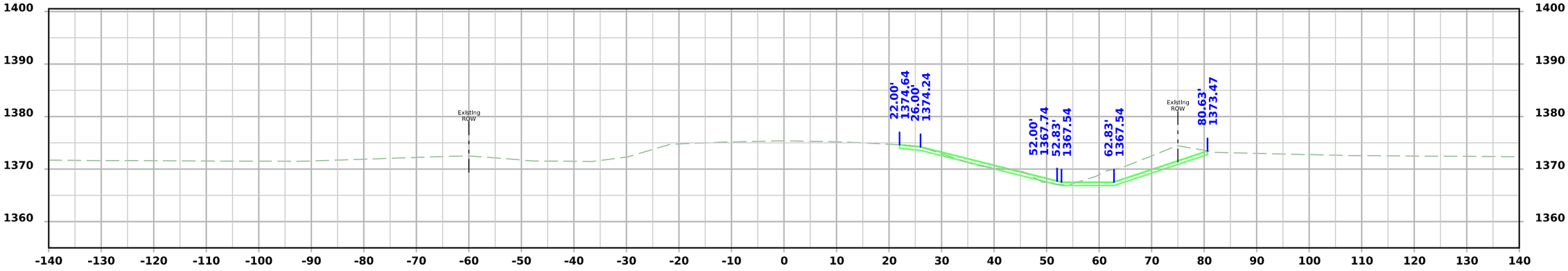
STA 1281+00.00

FILE NO.	ENGLISH	DESIGN TEAM **Iowa DOT / HNTB**	**O'BRIEN** COUNTY	PROJECT NUMBER **BRF-018-2(149)--38-71**	SHEET NUMBER **W.8**

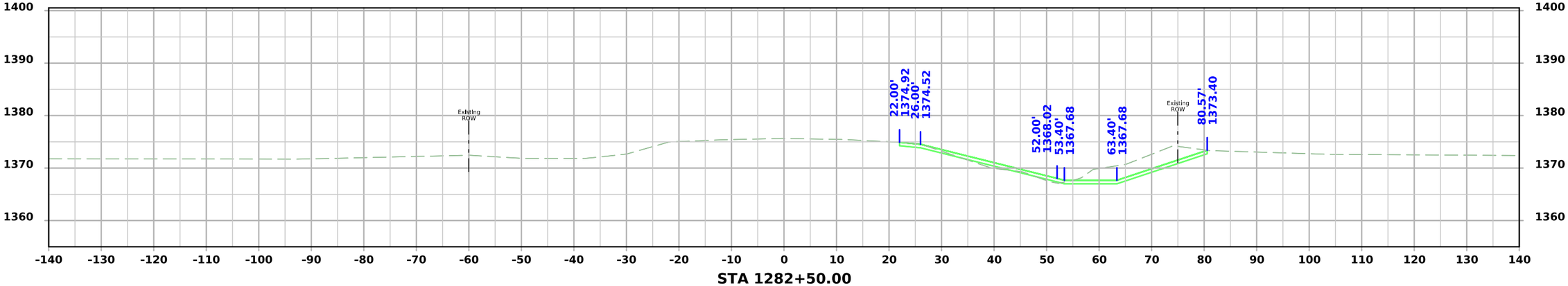
3:27:41 PM 12/17/2025 hplumb pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\7101803024\Design\CADD_Files\Sheet_Files\SHT_W_7101847Z01.dgn



STA 1283+50.00



STA 1283+00.00

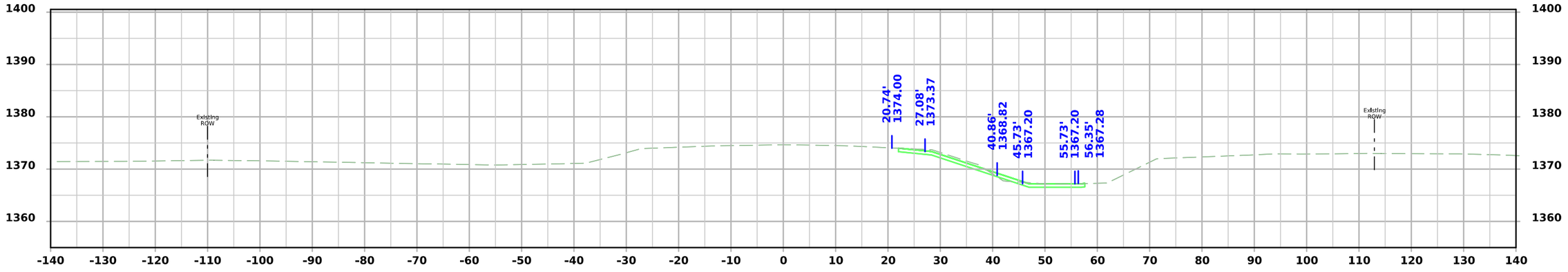


STA 1282+50.00

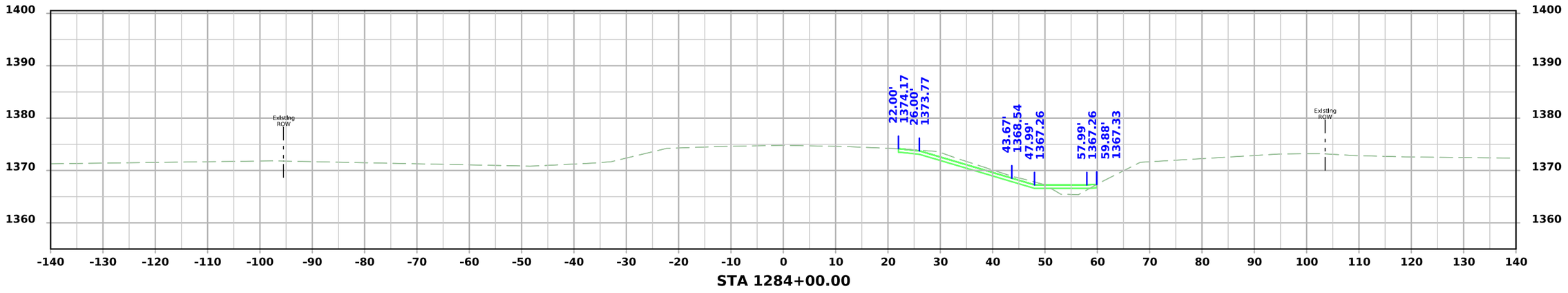
FILE NO.	ENGLISH	DESIGN TEAM **Iowa DOT / HNTB**	**O'BRIEN** COUNTY	PROJECT NUMBER **BRF-018-2(149)--38-71**	SHEET NUMBER **W.9**

3:27:42 PM 12/17/2025 hplumb pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\7101803024\Design\CADD_Files\Sheet_Files\SHT_W_7101847Z01.dgn

US 18



STA 1284+20.00



STA 1284+00.00

FILE NO.	ENGLISH	DESIGN TEAM **Iowa DOT / HNTB**	**O'BRIEN** COUNTY	PROJECT NUMBER **BRF-018-2(149)--38-71**	SHEET NUMBER **W.10**

3:27:43 PM 12/17/2025 hplumb pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\7101803024\Design\CADD_Files\Sheet_Files\SHT_W_7101847Z01.dgn