LETTING DATE
Nov 21 2028

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

O'BRIEN COUNTY

INDEX OF SHEETS

No.	DESCRIPTION
A Sheets	Title Sheets
* A.1	Title Sheet
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* A.4 - A.13	Concept Statement
* A.14 - A.17	Design Criteria
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
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J Sheets	Traffic Control and Staging Sheets
J.1 - J.2	Traffic Control Plan, Staging Notes and Tabulations
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V Sheets	Bridge and Culvert Situation Plans
* V.1	Bridge and Culvert Situation Plan
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 - Single Box
Approx 0.2 mi W of Co Rd M22

SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

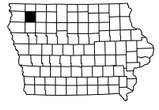
Value Engineering Saves. Refer to Article 1105.14 of the Specifications.

REVISIONS

	TOTAL
	39
PROJECT IDENTIFICATION NUMBER	
24-71-018-030	
PROJECT NUMBER	
BRF-018-2(149)--38-71	
R.O.W. PROJECT NUMBER	

Preliminary Earthwork

Cut	10,400	CY
Fill	2,770	CY
Balance	7,630	CY



US 18 DESIGN DATA RURAL			
2029	AADT	3800	V.P.D.
2049	AADT	4500	V.P.D.
20 --	DHV	–	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.

D2 PLAN - 10/31/2025

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

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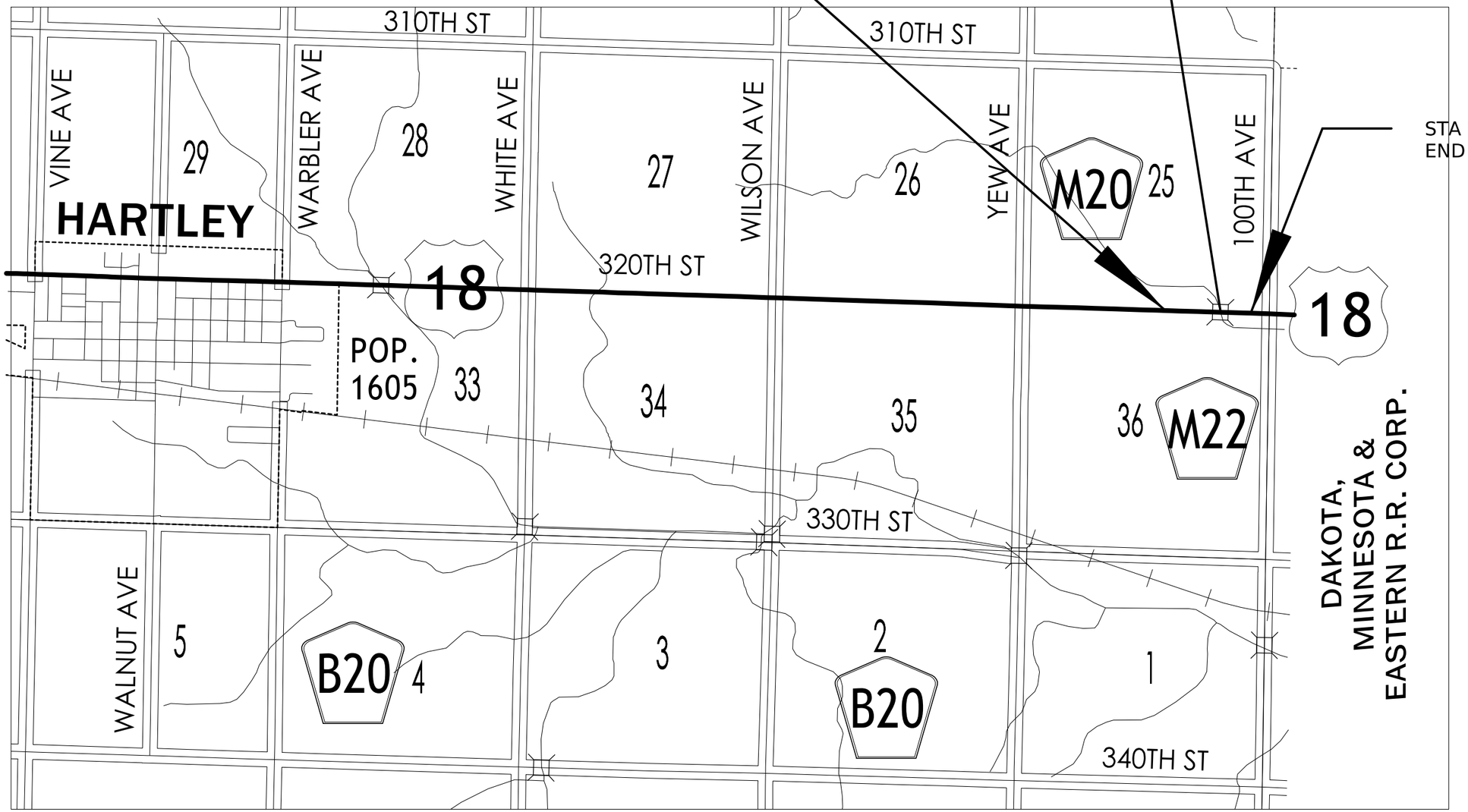
STA 1272+40.00
BEGIN CONSTRUCTION

STA 1274+80.65
PROJECT LOCATION

STA 1284+25.00
END CONSTRUCTION



LOCATION MAP SCALE
0 0.5 1
Mile

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

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FIELD EXAM CHECKLIST

1. General
   a. Schedule

2. Roadway
   a. Typical Sections / Pavement Recommendation
   b. Ditch Grading

4. Drainage
   a. Existing Drainage Patterns
   b. Proposed Culvert
   c. Subdrains

5. Geotech
   a. Boring Program
   b. Schedule

7. Construction Staging
   a. Detour Routes

8. Utility Coordination
   a. Mid-American
   b. Overhead Transmission
   c. Fiber Lines

9. ROW
   a. Anticipated Impacts

10. Cost Estimate
    a. Assumptions

11. Other Items
    a. NEPA Reevaluation
    b. Public Information Meeting (PIM)

IOWA DEPARTMENT OF TRANSPORTATION

TO OFFICE: District 3 **DATE:** May 9, 2025

ATTENTION: Shane Tymkowicz, P.E. **PROJECT:** O'Brien County
BRF-018-2(149)--38-71

FROM: Kyle Berg, P.E. PIN: 24-71-018-030

CONSULTANT: HNTB Corporation

SUBJECT: Project Concept Statement; (Final, D0)

This project involves the replacement of the US 18 culvert approximately 0.2 miles west of County Road M22.

A concept review was held on March 31, 2025. Those present included Luka Arroyo, Nicole Cuva, Todd Huju, Bethany Waltersdorf, John Bartholomew, Chelsea Duncan, Jim Ellis, Jeremy Harris, Tom Lovan, Dylan Pryor, Christine Schwienebart, Marc Solberg and Shane Tymkowicz from the Iowa DOT. Those present included David Green, Bruce Weng, John Puls, Jordan Zacny, Edward Sowder and Kyle Berg from HNTB Corporation.

The two alternatives considered were:

1. Replace the culvert and guardrail while maintaining the existing ditch grading. The estimated cost for this replacement is $972,000.

2. Replace the culvert and eliminate the existing guardrail by flattening the ditch foreslopes. The estimated cost for this replacement is $965,000.

Right-of-Way is anticipated to be required for both alternatives due to the culvert replacement. Alternative 2 would need additional Right-of-Way for the ditch grading. Traffic for both alternatives will be detoured due to the challenges of staging the culvert construction.

The preferred alternative is Alternative 2, constructing the proposed culvert and roadway improvements on the existing US 18 alignment. The estimated cost for this replacement is $965,000.

The revised Draft Project Concept Statement was sent out for review and comment with concerns to be resolved during the Concept Review Meeting on March 31, 2025. Comments received during the review period have been resolved.

This project is recommended for construction FY 2028.

cc: K. Nicholson, M. Nop, M. A. Swenson, W. Sorenson, C. Poole, D. Sprengeler, M. Dell, B. Bradley, M. Van Dyke, D. Blue, B. Worrel, J. Felix, J. Pottorff, M. Sadler, M. Carlson, C. Schwienebart, C. Brakke, J. Ellis, D. Stokes, E. Wright, J. Laaser-Web, N. Cuva, R. Harris, B. Smith, D. Heeren, S. Cook, R. Meyer, T. Huju, M. Thayer, J. Becker, S. Sturtz, A. Woods, J. S. Nelson, S. Majors, B. Hofer, K. Brink, S. Anderson, J. Bartholomew, N. Pohlen, D. Ta, G. Cagle, B. Hucker, A. Buss, D. Pryor, J. Klemme, C. Duncan, D. Newell, D. Phillips

FINAL PROJECT CONCEPT STATEMENT

US 18 culvert approximately 0.2 miles west of County Road M22

O'Brien County
BRF-018-2(149)--38-71
Project Code: 24-71-018-030
Maint. No. 7165.4S018
FHWA No. 700295

Highway Division
District 3

Kyle Berg, P.E.
kberg@hntb.com

May 9, 2025

I. STUDY AREA

A. Project Description

This project involves the replacement of the US 18 culvert approximately 0.2 miles west of County Road M22.

The two alternatives considered were:

1. Replace the culvert and guardrail while maintaining the existing ditch grading. The estimated cost for this replacement is $972,000.

2. Replace the culvert and eliminate the existing steel beam guardrail by flattening the ditch foreslopes. This alternative requires the acquisition of ROW for the additional grading. The estimated cost for this replacement is $965,000.

Both of these alternatives assume a full roadway closure of US 18 for the culvert replacement. A detour route will be utilized for the duration of the closure. See the detour map later in this document.

B. Need for Project

The existing structure is a twin 12'-0" x 5'-0" x 53'-0" reinforced concrete box culvert built in 1958. The culvert walls have vertical cracking and leaching and have spalls with exposed reinforcing steel. If the reinforcing steel is allowed to rust, significant section

loss could occur. The joints have extensive spalling and culvert settlement has caused the joints to open and allow fill to flow through the joints. Settlement is evident in the shoulders of the roadway above the culvert.

C. Present Facility

The existing structure is a twin 12'-0" x 5'-0" x 53'-0" reinforced concrete box culvert built in 1958. US 18 in the project area is a 24 ft. wide PCC pavement and 10 ft. wide PCC pavement shoulders. The foreslopes max up to 1.2:1 behind the guardrail. The roadway and shoulders were overlaid with 4" HMA in 2010.

Profile left (inlet)

Profile right (outlet)

Waterway upstream (right)

Waterway upstream (left)

D. Traffic Estimates

The 2029 construction year and 2049 design year average daily traffic estimates are 3,800 ADT with 20% trucks and 4,500 ADT with 20% trucks, respectively.

E. Sufficiency Ratings

US 18 is classified as a rural principal arterial. The federal bridge sufficiency rating is 70.9 for FHWA No.700295. The Bridge Condition Index is 45.5 and the Bridge Condition Rating is Fair.

F. Access Control

Access rights will not be acquired for this project.

G. Crash History

During the five-year study period from January 1, 2020, through December 31, 2024, there were 3 property damage only crashes on US 18/ 320th St between the junctions located east and west.

PCR value for this segment is listed as -0.382618 crash/mile/year for all crashes (negligible).

II. PROJECT CONCEPT

A. Feasible Alternatives

Alternative #1 - Replace the culvert while keeping the existing grading with guardrail protection.

The existing twin 12'-0" x 5'-0" x 53'-0" long culvert will be replaced with a standard 12'-0" x 6'-0" x 120'-0" reinforced concreted box (RCB) placed at a 45 degree right ahead skew. The flow line of the box will be buried 1' below the existing flow line in the channel. This will allow the bottom of the box to silt in and provide a natural bottom for fish passage.

The typical cross section adjacent to the culvert will consist of a 24' roadway (44' wide pavement) with 14' effective shoulders (2' outside pavement, 8' additional paved and 4' granular) and 6:1/1.2:1 foreslopes. Remove and replace 160' of pavement for culvert replacement.

The roadway will be reconstructed on the existing vertical and horizontal alignment. The existing ditches will need to be relocated to meet the inlet and outlet flowlines of the new RCB.

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

Right-of-Way acquisition will be required for the replacement of the culvert.

Traffic will be maintained by an off-site detour.

Bridge Items	
New Culvert	448,600
Removal of Existing Culvert	15,400
Mobilization – 10%	46,400
M & C – 20%	102,100
Bridge Costs	**$ 612,500**
Roadway Items	
Flooded Backfill	21,000
PCC Pavement (10")	66,500
Modified Subbase (12")	13,600
Removal of Pavement	8,900
Erosion Control	10,000
Wetland Mitigation	50,000
Removal of Steel Beam Guardrail	13,900
Steel Beam Guardrail	39,000

Steel Beam Guardrail Tangent End Terminal	13,000
Right of Way	1,000
Paved Shoulder at Guardrail	13,800
Traffic Control – 5%	12,500
Mobilization – 5%	12,500
Contingency – 30%	83,800
Roadway Costs	**$ 359,500**
Project Total	**$ 972,000**

Alternative #2 - Replace the culvert and flatten the ditch foreslopes to eliminate the existing steel beam guardrail.

The existing twin 12'-0" x 5'-0" x 53'-0" culvert will be replaced with a standard 12'-0" x 6'-0" x 120'-0" reinforced concreted box (RCB) placed at a 45 degree right ahead skew. The flow line of the box will be buried 1' below the existing flow line in the channel. This will allow the bottom of the box to silt in and provide a natural bottom for fish passage.

The typical cross section adjacent to the culvert will consist of a 24' roadway (44' wide pavement) with 14' effective shoulders (2' outside pavement, 8' additional paved and 4' granular) and 6:1/1.2:1 foreslopes. Remove and replace 160' of pavement for culvert replacement. Regrade the ditches with 4:1 foreslopes east of the proposed culvert to achieve proper clear zone so that guardrail protection isn't required. Remove the existing guardrail.

The roadway will be reconstructed on the existing vertical and horizontal alignment. The existing ditches will need to be relocated to meet the inlet and outlet flowlines of the new RCB.

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

Right-of-Way will be required for the replacement of the culvert and regrading of the ditch outside of the existing Right-of-Way.

Traffic will be maintained by an off-site detour.

Bridge Items	
New Culvert	448,600
Removal of Existing Culvert	15,400
Mobilization – 10%	46,400
M & C – 20%	102,100
Bridge Costs	**$ 612,500**

Roadway Items	
Class 10, Roadway and Borrow	18,600
Class 10, Waste	19,400
Flooded Backfill	20,100
PCC Pavement (10")	66,500
Modified Subbase (12")	13,600
Removal of Pavement	8,900
Removal of Steel Beam Guardrail	13,900
Seeding and Fertilizing	3,300
Erosion Control	20,000
Right of Way	10,200
Wetland Mitigation	50,000
Traffic Control – 5%	13,000
Mobilization – 5%	13,000
Contingency – 30%	82,000
Roadway Costs	**$ 352,500**
Project Total	**$ 965,000**

B. Detour Analysis

US 18 will be closed during construction, and an offsite detour will be utilized. It is anticipated the detour will be in place for approximately 70 days. The suggested detour route shall be in accordance with TC-252 and diverts traffic west of the town of Hartley as shown on the detour map shown later in this document. The route would direct traffic south on Vine/8th Avenue, east on 330th Street, south on Warbler Avenue, east on 340th Street, and north on 100th Avenue back to US 18. Out of distance travel is 4 miles. The total distance user cost is anticipated to be $275,300. The cost for county road maintenance will be $21,300 as calculated by the Gas Tax Method. Detour signing costs will be $10,000.

A detour was selected over staged construction due to the 45-degree skew of the existing culvert. In order to construct the culvert with square joints, a large section of the roadway would need to be removed. Accommodating traffic during this process would require the construction of a temporary off-alignment roadway, effectively adding an additional stage to the project. This would significantly increase both the duration and complexity of construction, making a full closure with an offsite detour the more efficient and cost-effective option.

C. Recommendations

It is recommended that the present structure be replaced, as described above in Alternative 2.

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 18. Therefore, no ADA accommodations are required on this project.

F. Special Considerations

This will not be a traffic critical project.

Waterway is not on a state water trail or paddling route.

Acquisition of ROW will be required for both alternatives due to the culvert replacement. Alternative 2 would need more Right-of-Way than Alternative 1 to accommodate ditch grading.

Upon selection of an alternative, Location and Environment Bureau should be engaged to review the project and determine Section 404 Permit requirements. Review for endangered species as Topeka Shiner mitigation may be required.

G. Program Status

This project is listed in the 2025-2029 Iowa Transportation Improvement Program with estimated cost of $1,300,000 in FY 2029. A preliminary schedule of events has been developed with a November 2028 letting.

Utility Contacts

COMMUNITY AGENCY
D.J. Weber
7129305593
tca@tcaexpress.net

City of Hartley
Jaron Benz
7129282240
jaron@tcaexpress.net

Osceola County Rural Water
Douglas Westerman
7127356795
orwsdoug@windstream.net

Windstream Communications
8002891901
LOCATE.DESK@WINDSTREAM.COM

Bridge Bureau Attachment for Concept Statement

Date: March 07, 2025
By: HNTB
Location: Stream 0.2 mi W of Co Rd M22

County: O'Brien County
Phase No.: BRF-018-2(149)--38-71
Project Code: 24-71-018-030

1. Regulatory/Coordination
   a. Iowa DNR Flood Plain permit = No
   b. Iowa DNR Sovereign Lands permit = No
   c. Local Record of Coordination = Yes
   d. Flood Insurance Study = Yes, Zone A, Panel 19141C0225C, December 17, 2020
   e. Drainage District = No
   f. Corps of Engineers Section 408 = No
   g. State Water Trail or Paddling Route = No
   h. Historic Structure = No
   i. Federally owned land in vicinity = No
   j. USGS or Iowa Flood Center (IFC) gage or sensor impacted? No
   k. Obstruction Evaluation/Airport Airspace Analysis per FAA website = No

2. Hydrologic/Hydraulic Analysis/RIDB Dataset
   a. Design discharge methodology = USGS 13-5086
   b. Hydraulic analysis done = Yes, Iowa DOT Culvert Program, post-survey
   c. If DA > 10 sq. mi. Riverine Infrastructure Database (RIDB) dataset is required with B1 submittal = No

3. Structure/Roadway Layout Considerations
   a. Option A: To remove the roadway rail barrier, more significant ditch grading that possibly extends outside of right-of-way (ROW) will be required to grade back to normal ditch width.
   b. Option B: Roadway rail barrier will be required to lessen the impact to existing conditions and ROW limits with the addition of the proposed box culvert.
   c. It is recommended that ditch slopes and depths are maintained due to a controlling high point or driveway in the northern ditch.
   d. Full culvert replacement with application of a 45° skew to better align crossing with natural channel.
   e. Roadway width expansion is anticipated.
   f. Roadway profile grade raise is not anticipated.
   g. Revetment at culvert outlet is not required due to velocities, but may be considered during later design stages due to outlet angle vs. downstream ditch.

4. Special construction issues

   a. Possible conflicts with existing fiber, cable and overhead electric located on the north side of the roadway.
   b. Possible conflicts with existing cable located on the south side of the roadway.
   c. Culvert is in a drainage district and will likely require coordination during design.
   d. HNTB consulted with the County Floodplain Staff and were directed that county permitting will not be required for this project, and that FEMA map revisions will not be required by the county.
   e. Stream may be regulated and require 404 permitting. Marc Solberg indicated during the concept review meeting that he would perform a site visit and report back with more information about potential mitigation requirements.
   f. HNTB consulted with the Iowa DNR and confirmed that a state floodplain permit is not required for rural project channel changes where the basin is smaller than 10 sq. mi.

5. Special survey = No

6. Aesthetic enhancements = No

7. Other

   a. The roadway will be closed during construction with traffic placed on an off-site detour.

Special Survey:

None

Field Visit Photos:

Upstream Face of Culvert

Downstream Face of Culvert

Upstream Channel from Roadway

Downstream Channel from Roadway

Inside Barrel Looking Downstream

FILE NO.	ENGLISH	DESIGN TEAM **Iowa DOT / HNTB**	**O'BRIEN** COUNTY	PROJECT NUMBER **BRF-018-2(149)--38-71**	SHEET NUMBER **A.12**

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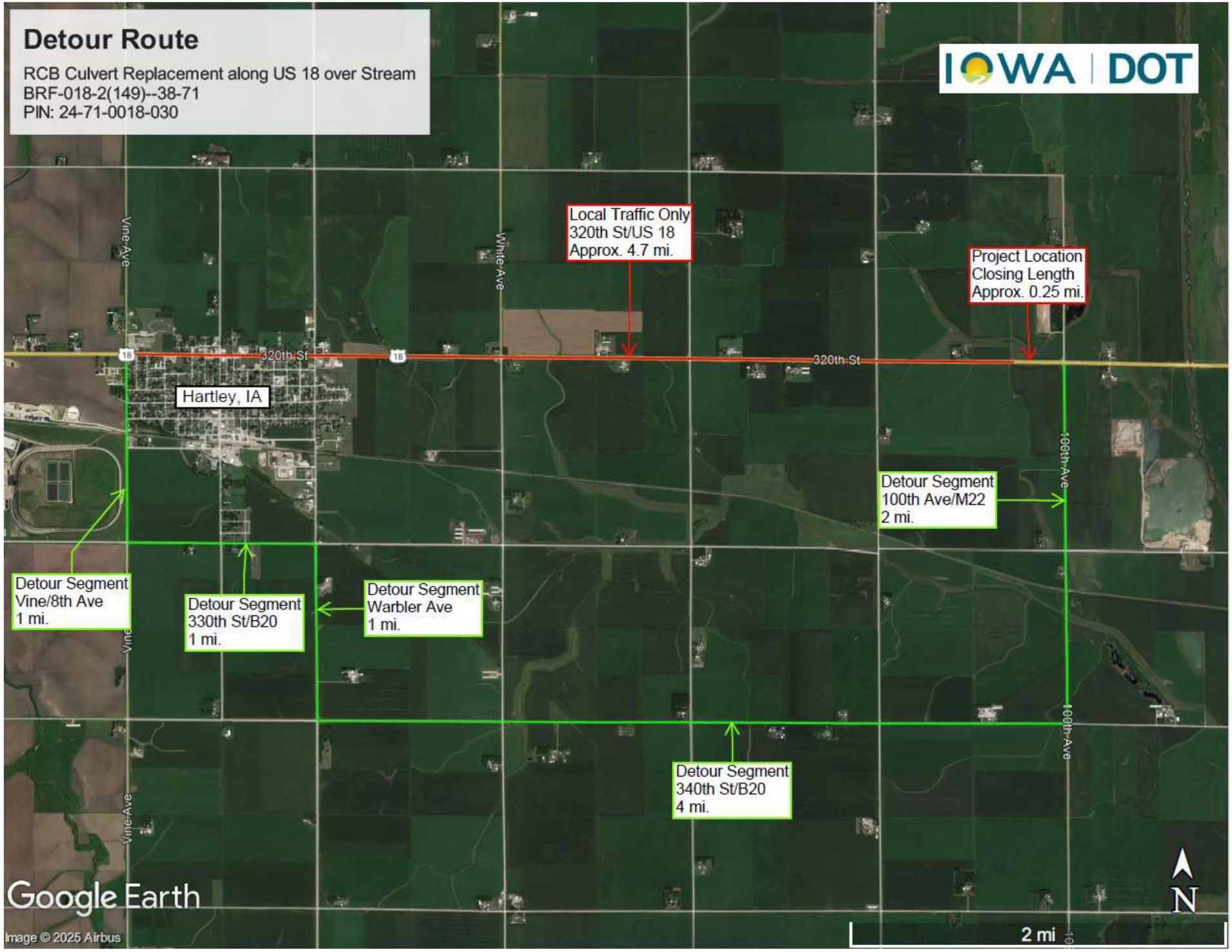
Detour Route

RCB Culvert Replacement along US 18 over Stream
BRF-018-2(149)--38-71
PIN: 24-71-0018-030

IOWA | DOT



FILE NO.	ENGLISH	DESIGN TEAM **Iowa DOT / HNTB**	**O'BRIEN** COUNTY	PROJECT NUMBER **BRF-018-2(149)--38-71**	SHEET NUMBER **A.13**

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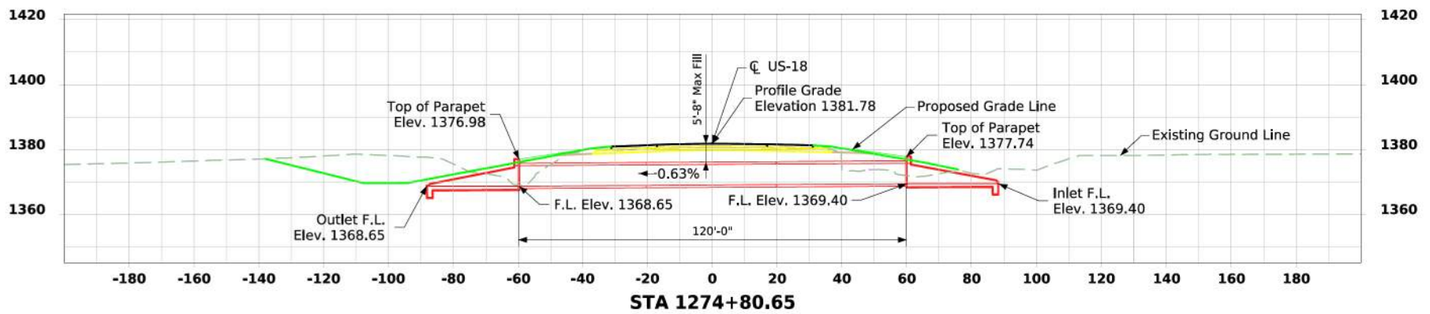
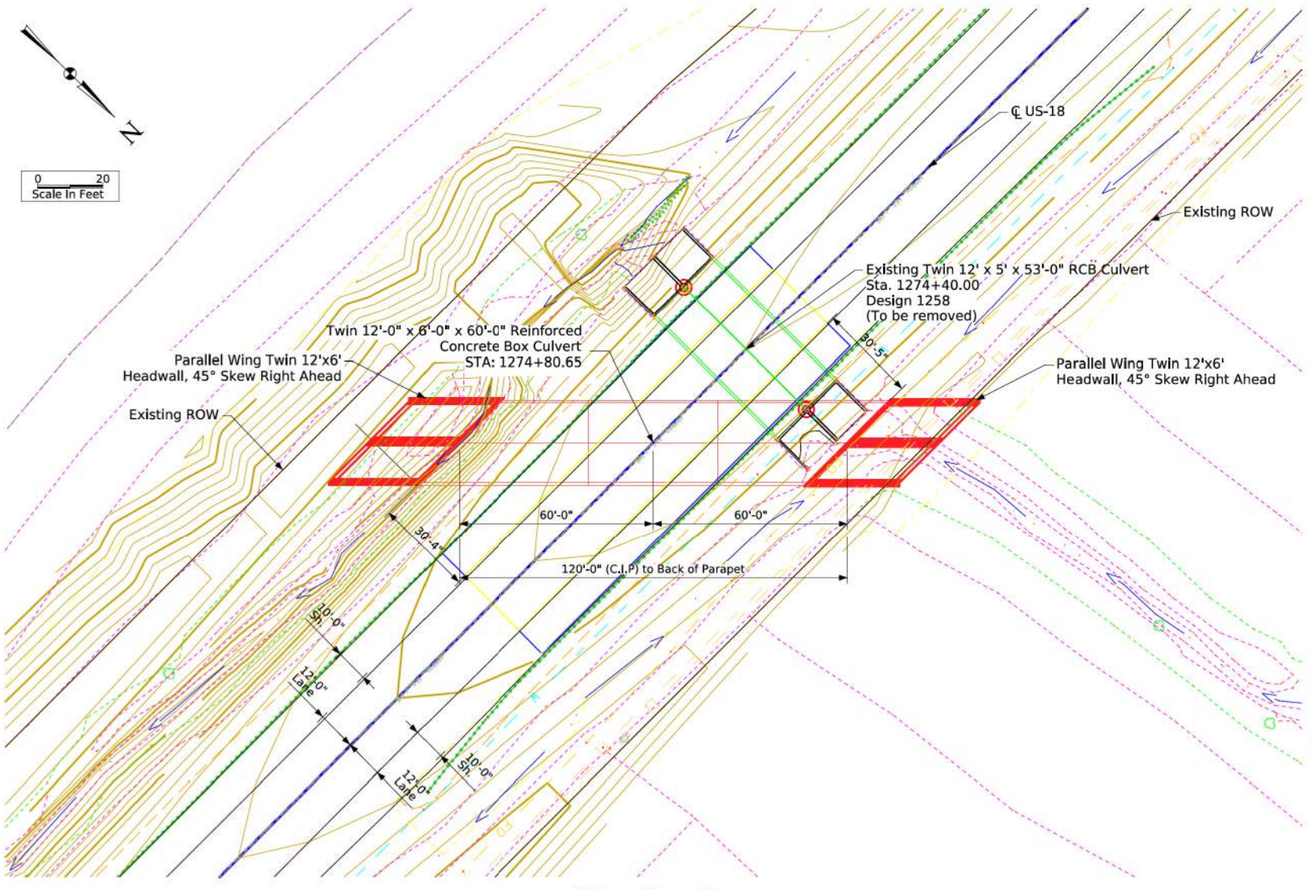


Longitudinal Section Along ℄ Culvert



Situation Plan

Design Notes

1. Design fill for this Precast culvert is 5.67'
2. Anticipated settlement is negligible.

Hydraulic Data

RIDB: Not Applicable
Drainage Area = 1587.2 Acres
Stream Slope = 34.8 Ft./Mi.
Q_{50} = 570 cfs
HW Elev. = 1376.69
Exit Velocity = 5.94 fps

Location

US-18 Over Stream
T-97N R-39W
Section 36
Hartley Township
O'Brien County
Asset ID No. 700295
Bridge Maint. No. 7165.6S018
Latitude 43.184239°
Longitude -95.391844°

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

Design For 45° Skew (R.A.)

Twin 12'-0" x 6'-0" x 120'-0" Reinforced Concrete Barrel Culvert

Situation Plan - CIP

STA. 1274+80.65 (US-18)
Turn-In Date: March 2025

O'Brien County
IOWA DEPARTMENT OF TRANSPORTATION
Design No. Design # Design Sheet No. 1 of 1 FHWA/Asset 700295

FILE NO. 98765	ENGLISH	DESIGN TEAM HNTB	O'Brien COUNTY	PROJECT NUMBER BRF-018-2(149)--38-71	SHEET NUMBER V.1

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FILE NO.	ENGLISH	DESIGN TEAM Iowa DOT / HNTB	O'BRIEN COUNTY	PROJECT NUMBER BRF-018-2(149)--38-71	SHEET NUMBER A.14

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Roadway	US 18			
PIN Number	24-71-018-030		**Submittal Date**	06/25/25
Project Number	BRF-018-2(149)--38-71			**Approval Date**
District	District 3	**Assistant District Engineer**	Shane Tymkowicz	
County	O'BRIEN		**or**	
Route	US 18	**Office Director**		
Location	US 18 culvert approximately 0.2 miles west County Road M22.			
Work Type	Culvert Replacement			
Segment Manager				
Designer	HNTB			

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	2%
	Auxiliary and turn lanes	3%	3% maximum	N/A
	Crown break at centerline	4%	4% maximum	4%
Shoulder cross-slope (on tangent sections)		4%	N/A	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	10:1 for 4' then 6:1
	Beyond standard ditch depth and design clear zone	3.5:1	3:1	3.5:1
	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	8:1
	w/o drainage structures	10:1	6:1	10:1
Ditches (Refer to Section 3G-1)	Outside ditch (depth x width) (ft)	5 x 10	--	5 x 10
Bridge width—new*	Bridge length ≤ 200 ft	design lane widths + effective shoulder widths	design lane widths + effective shoulder widths	N/A
	Bridge length > 200 ft	design lane widths + effective shoulder widths	design lane width + 4' right and left of the design lane widths	N/A
Bridge width—existing*		design lane widths + no less than 2 ft left and right	design lane widths + 2 ft. offset left and right	N/A
Vertical clearance (ft) (above lanes, shoulders and 25 feet left and right of the center of railroad tracks)	Over primary	16.5	16	N/A
	Over non-primary	16.5 at interchange locations, 15 at all other locations	14	N/A
	Over railroad	23.3	23.3	N/A
	Sign trusses and pedestrian bridges	17.5	17	N/A
Structural Capacity		Contact Office of Bridges and Structures	Contact Office of Bridges and Structures	N/A
Level of Service		B	B	N/A

*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 = 4500

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*	10
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

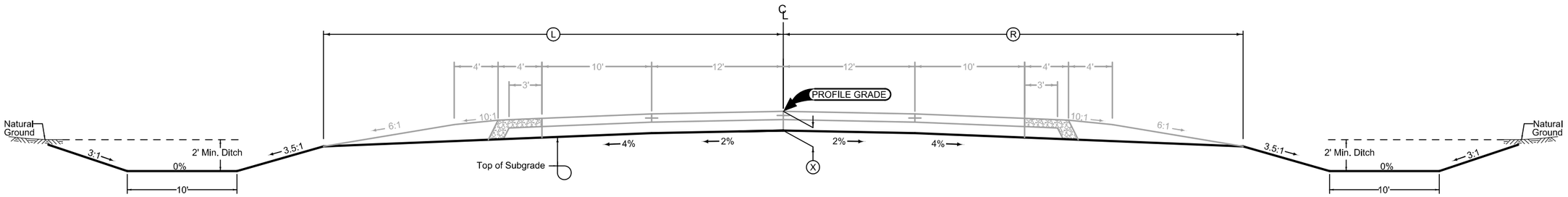
Notes:

Roadway Design Speed (mph) =	60

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	570
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	1330
		e_{max} = 8%	--	--	--	--	--	--	758	960	1200	1480	1810	2210	N/A
Minimum vertical curve length (ft) (Refer to Section 2B-1)			150	165	180	195	210	225	150	165	180	195	210	225	180
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	151
	sag vertical curves	roadways without fixed-source lighting	96	115	136	157	181	206	96	115	136	157	181	206	136
		roadways with fixed-source lighting	96	115	136	157	181	206	54	66	78	91	106	121	N/A
Minimum gradient (%)	(Refer to Section 2B-1)		0.5						0.3% with a curb, 0.0% without a curb						0.5
Maximum gradient (%)	(Refer to Section 2B-1)	Urban roadways	4		3				7	6	6	–	–	–	N/A
		Rural roadways							5	5	4	4	4	4	3
		Interstates							5	5	4	4	4	4	N/A
Clear zone			See "Preferred Clear Zone" table in Section 8A-2						See "Acceptable Clear Zone" table in Section 8A-2						40' 4:1

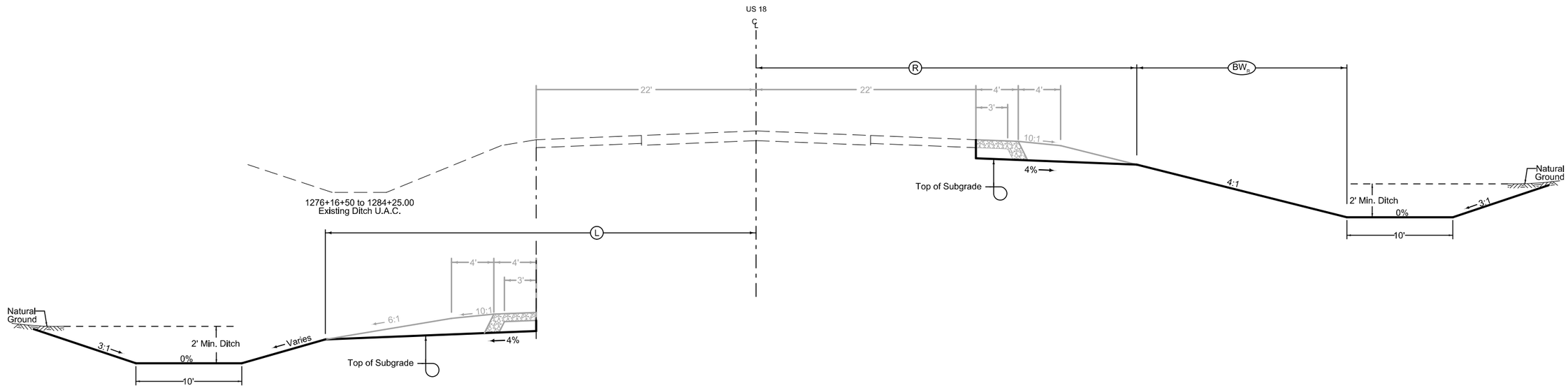


LOCATION			DIMENSIONS		
ROAD IDENTIFICATION	STATION TO STATION		(L) Feet	(R) Feet	(X) Inches
US 18 (ML018)	1274+00.00	1275+60.00	42.6	42.6	22

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.



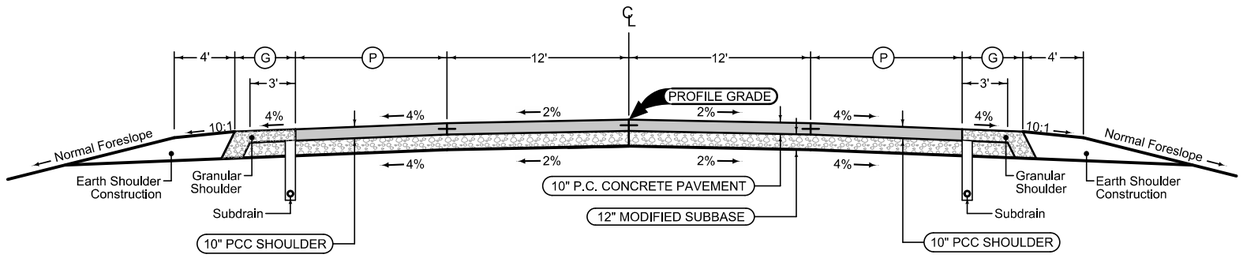
LOCATION			DIMENSIONS		
ROAD IDENTIFICATION	STATION TO STATION		(L) Feet	(R) Feet	(BW$_R$) Feet
US 18 (ML018)	1272+40.00	1274+00.00	39.8-42.6	39.8-42.6	2.2-0
US 18 (ML018)	1275+60.00	1276+15.65	42.6-39.8	42.6-36.2	0-31.8
US 18 (ML018)	1276+15.65	1283+75.00		36.2	31.8-22.4
US 18 (ML018)	1283+75.00	1284+25.00		36.2-33.4	22.4-10.7

US 18
MAINLINE GRADING

Full Depth PCC Combination Shoulder

Shoulder Jointing:
Longitudinal joint: BT-2, or L-2
Transverse joints: Match Mainline

2_C_FullPCC_ 04-15-25			
STATION TO STATION		(P) Feet	(G) Feet
1272+40.00	1274+00.00	0	4
1274+00.00	1275+60.00	10	4
1275+60.00	1276+16.50	0	4



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

2P_ 04-21-20	
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: Match Mainline

2_C_FullPCC_ 04-15-25			
STATION TO STATION		(P) Feet	(G) Feet
1272+40.00	1274+00.00	0	4
1274+00.00	1275+60.00	10	4
1275+60.00	1284+25.00	0	4

US 18
MAINLINE Pavement

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**

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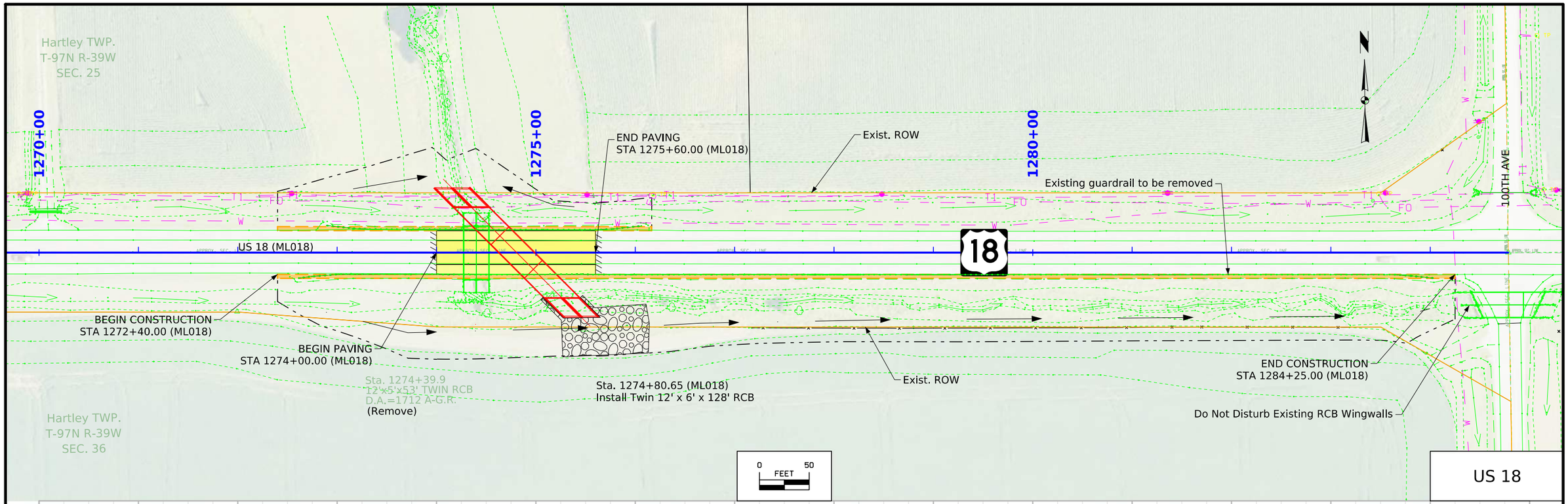

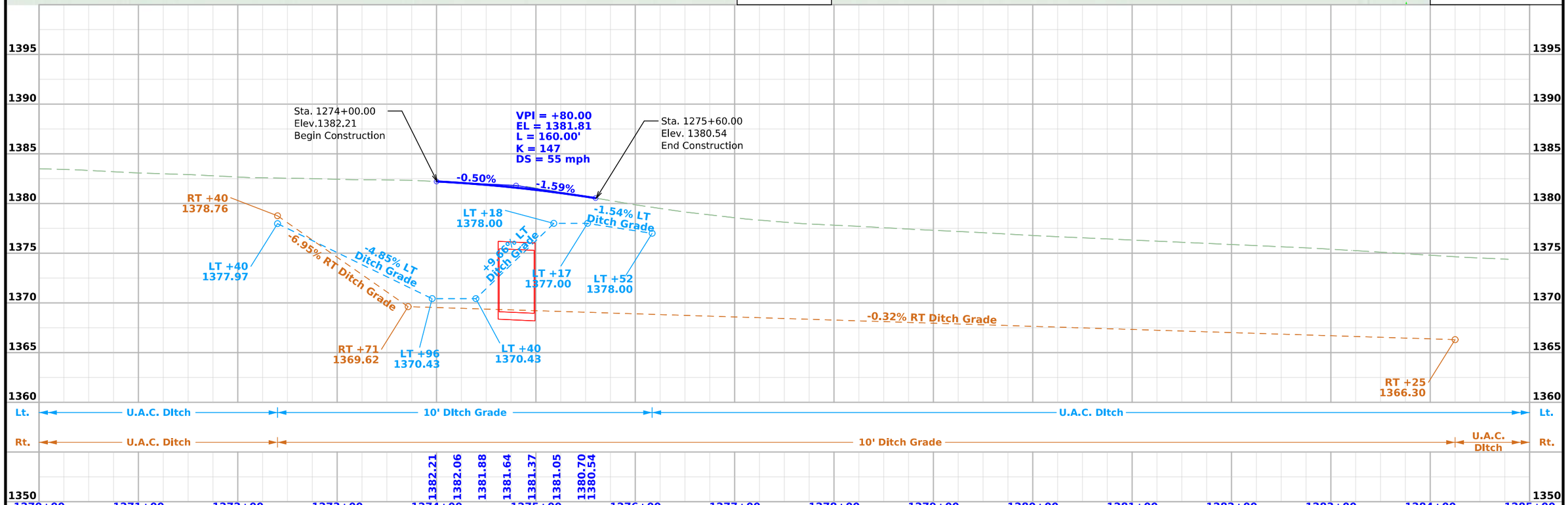

FILE NO.	ENGLISH	DESIGN TEAM **Iowa DOT / HNTB**	**O'BRIEN** COUNTY	PROJECT NUMBER **BRF-018-2(149)--38-71**	SHEET NUMBER **D.2**

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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															

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.

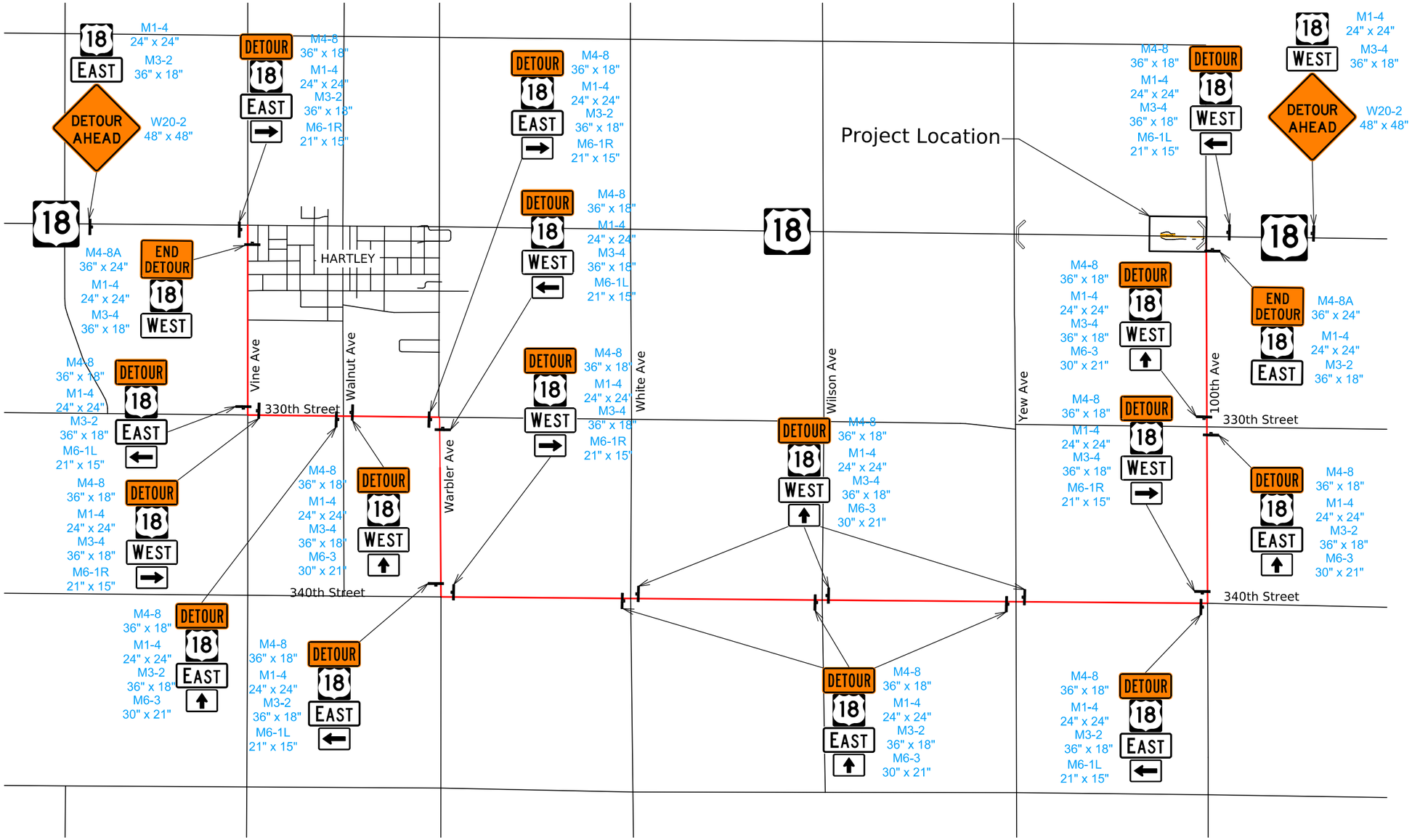
PDMS shall be used for 14 days prior to closing US 18.

111_01
10/14/22

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



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

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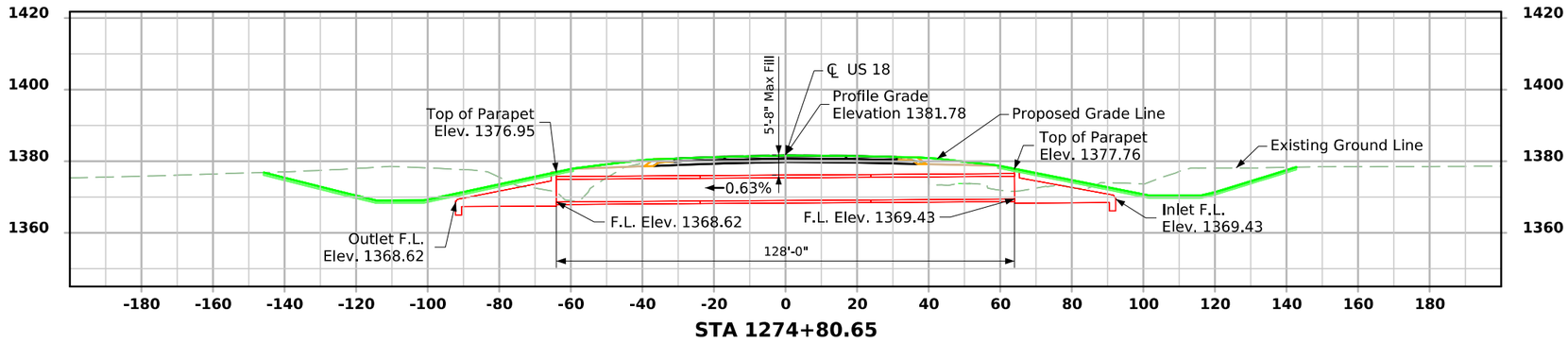
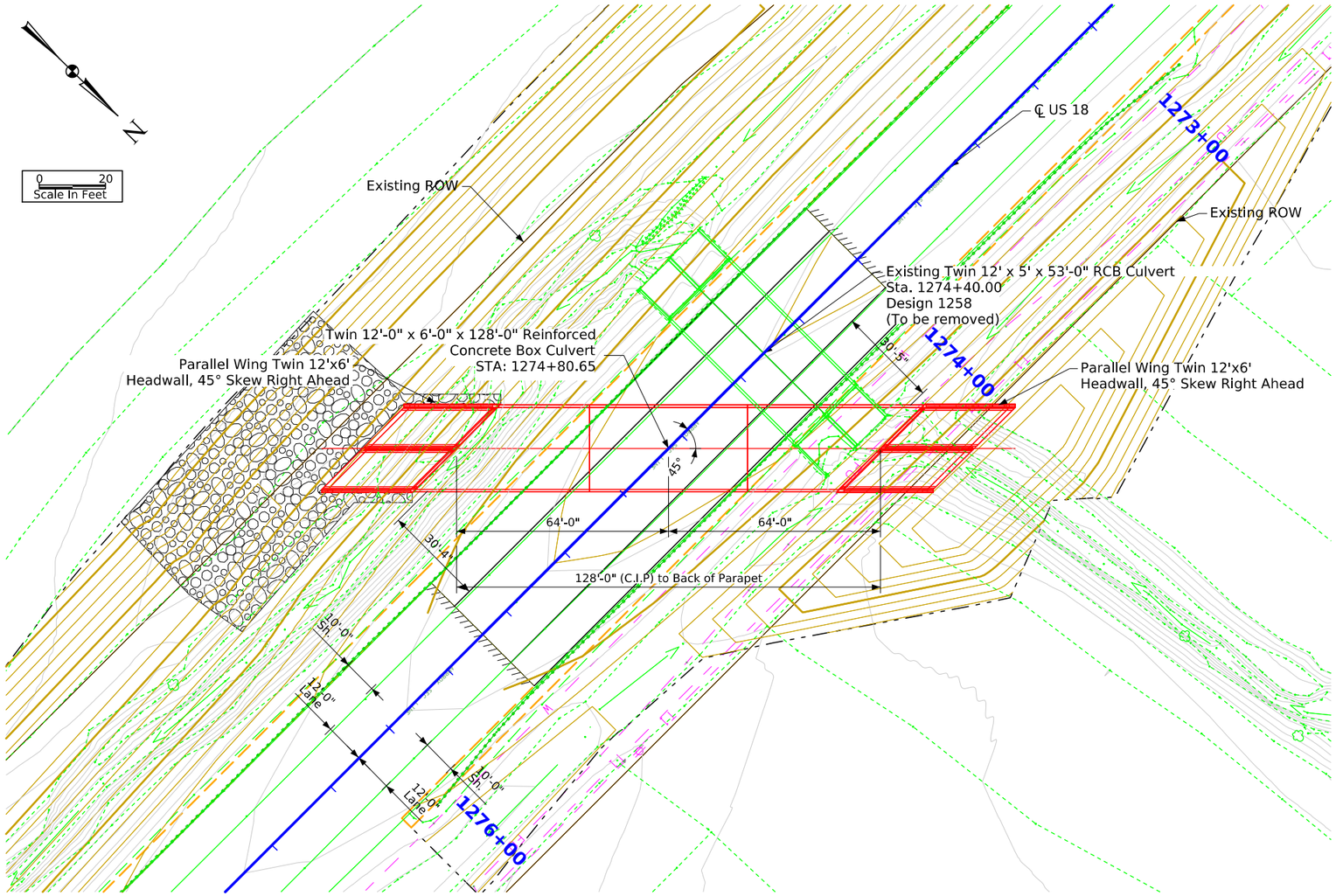


Longitudinal Section Along ℄ Culvert



Situation Plan

Design Notes

1. Design fill for this Precast culvert is 5.67'
2. Anticipated settlement is negligible.

Hydraulic Data

RIDB: Not Applicable
Drainage Area = 1587.2 Acres
Stream Slope = 34.8 Ft./Mi.
Q_{50} = 570 cfs
HW Elev. = 1376.69
Exit Velocity = 5.94 fps

Location

US 18 Over Stream
T-97N R-39W
Section 36
Hartley Township
O'Brien County
Asset ID No. 700295
Bridge Maint. No. 7165.6S018
Latitude 43.184239°
Longitude -95.391844°

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

Design For 45° Skew (R.A.)

Twin 12'-0" x 6'-0" x 128'-0" Reinforced Concrete Barrel Culvert

Situation Plan - CIP

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

O'Brien County
IOWA DEPARTMENT OF TRANSPORTATION

Design No. Design # Design Sheet No. 1 of 1 FHWA/Asset 700295

FILE NO. **98765**	ENGLISH	DESIGN TEAM **HNTB**	**O'Brien** COUNTY	PROJECT NUMBER **BRF-018-2(149)--38-71**	SHEET NUMBER V.1

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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**

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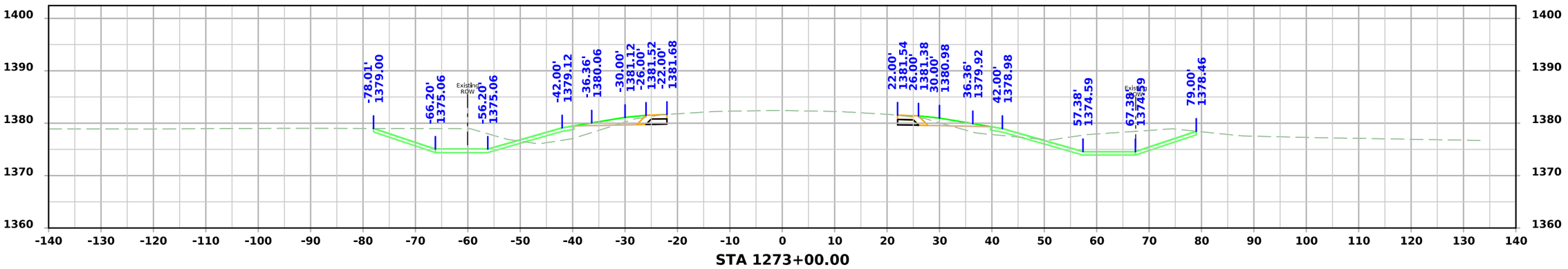
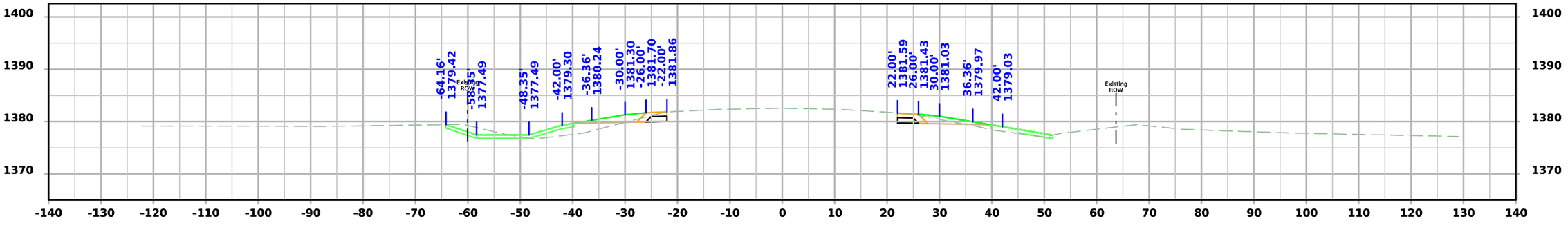
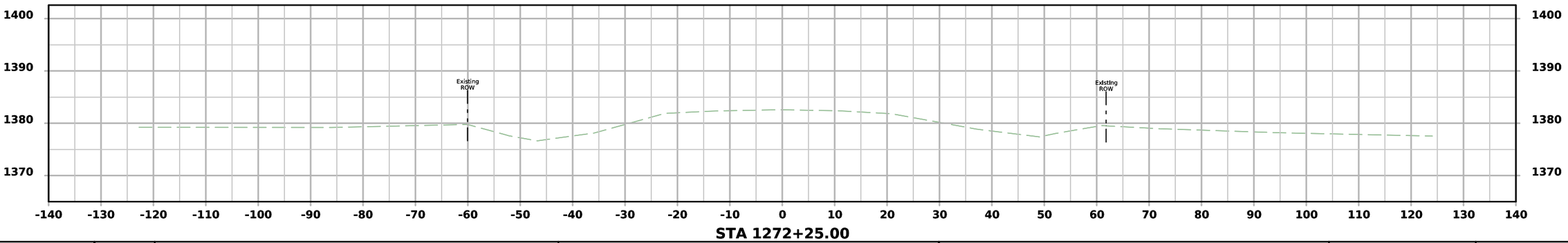
US 18



STA 1273+00.00



STA 1272+50.00



STA 1272+25.00

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

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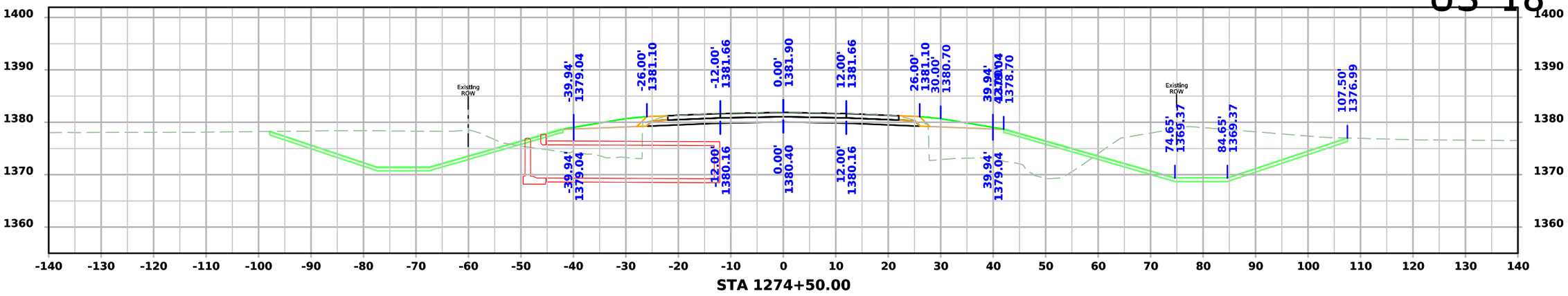
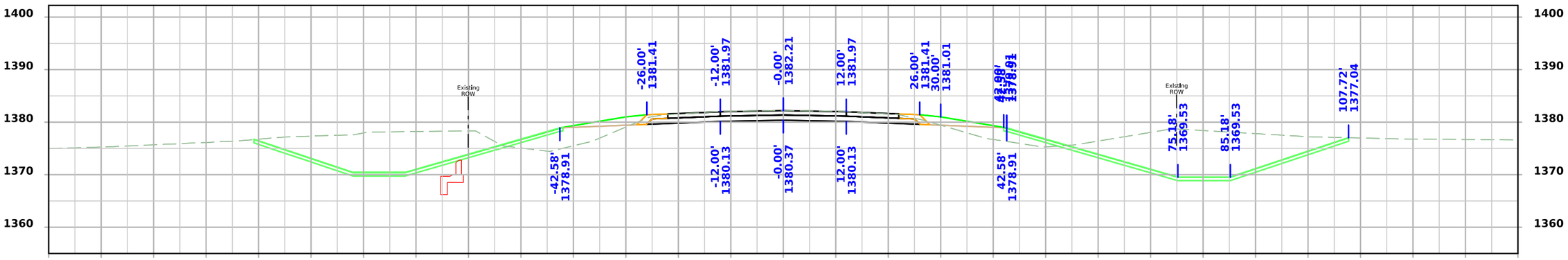
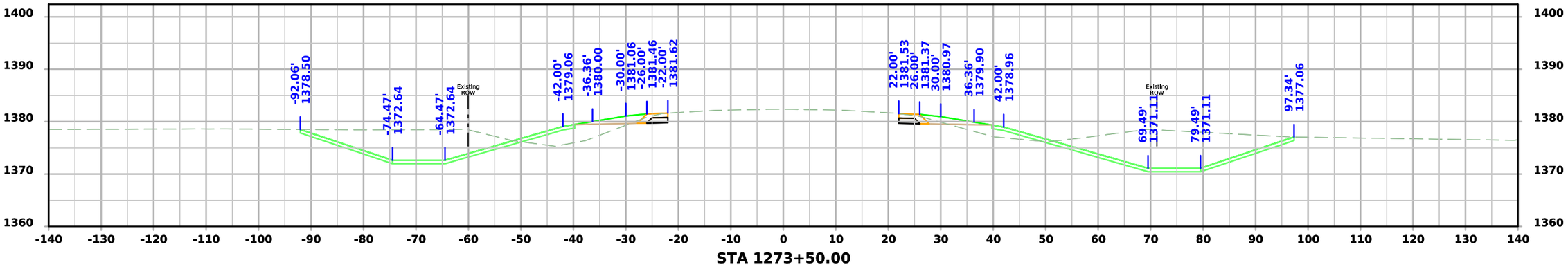
US 18



STA 1274+50.00



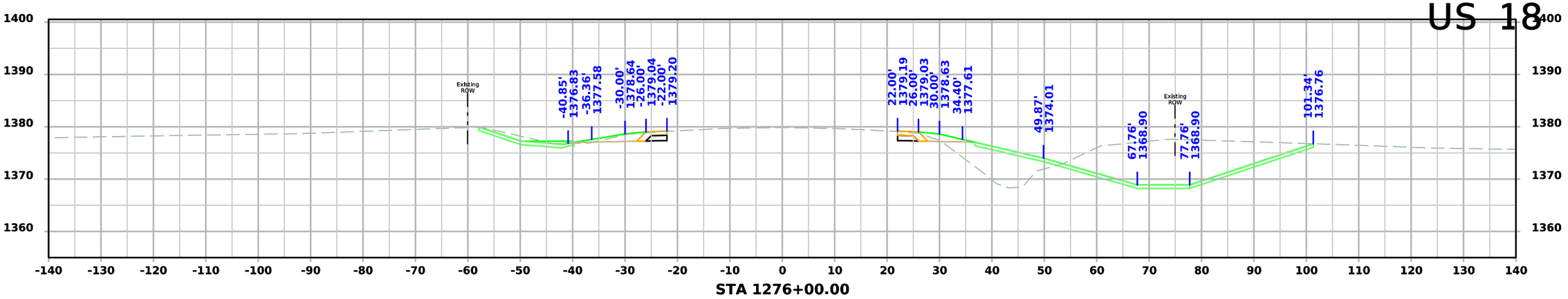
STA 1274+00.00

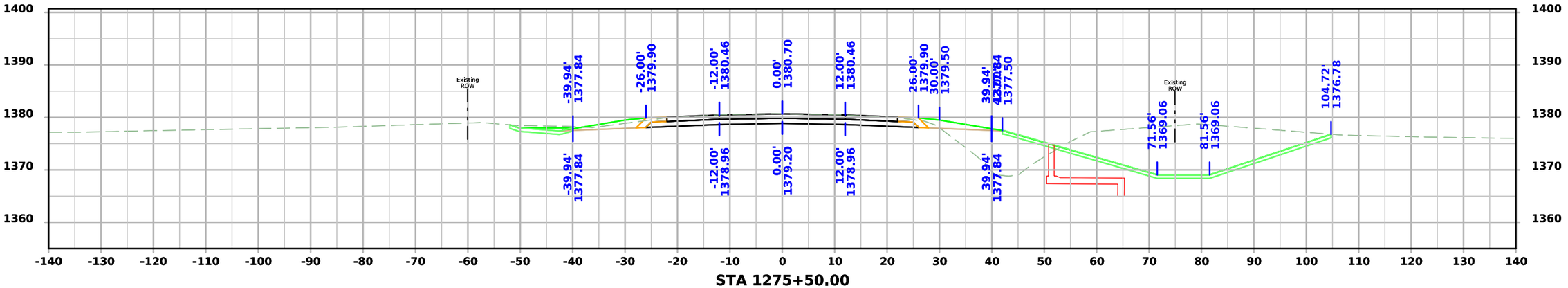


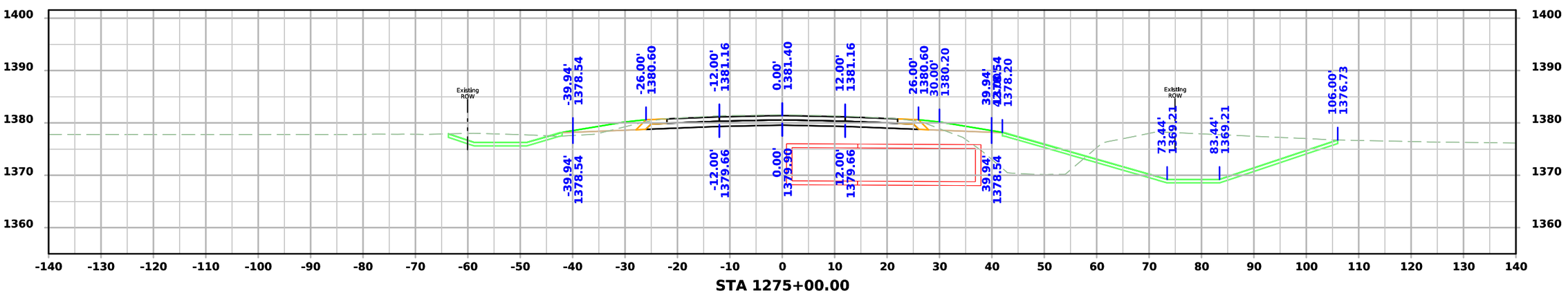
STA 1273+50.00

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

11:58:12 AM 10/17/2025 bcharipar pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\7101803024\Design\CADD_Files\Sheet_Files\SHT_W_7101847Z01.dgn







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

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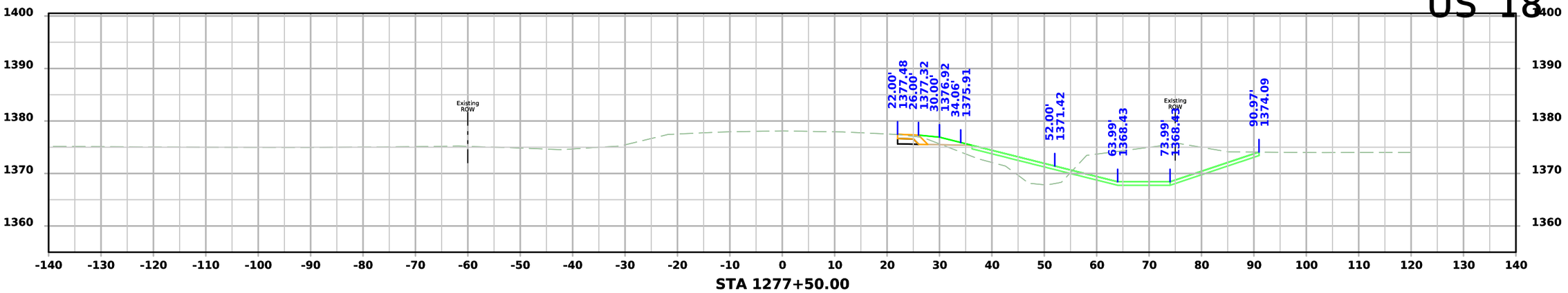
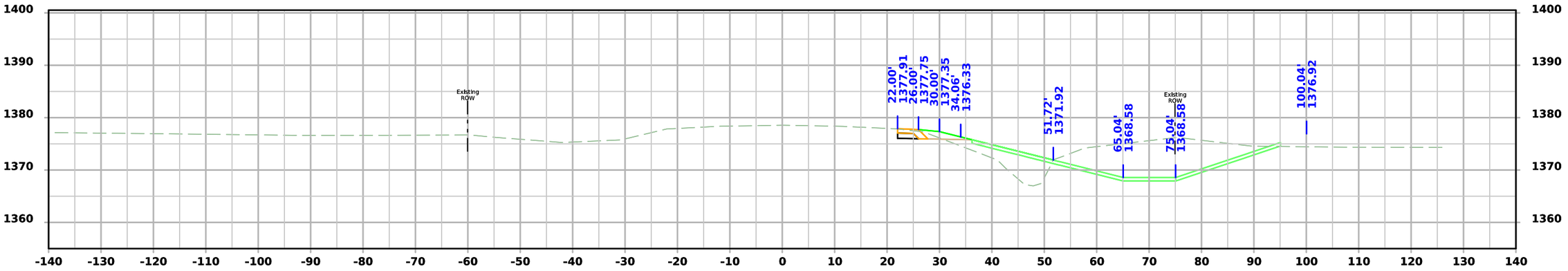


STA 1277+50.00



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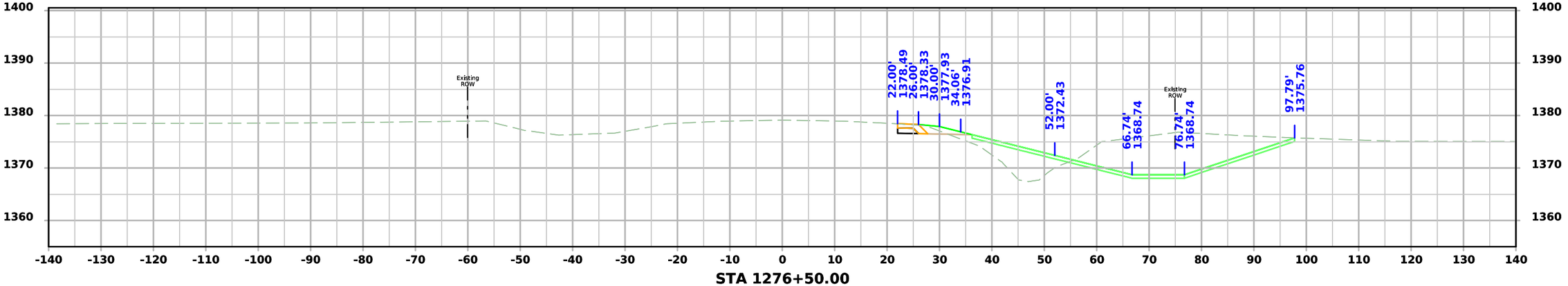
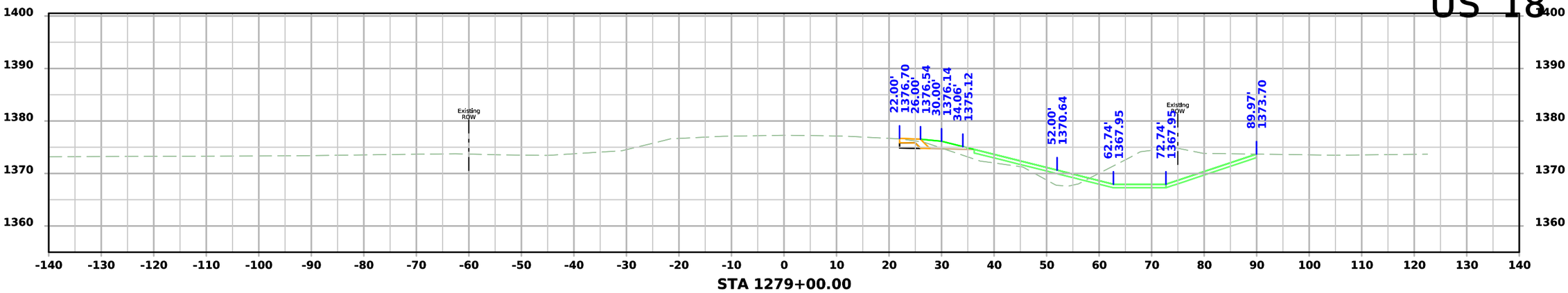
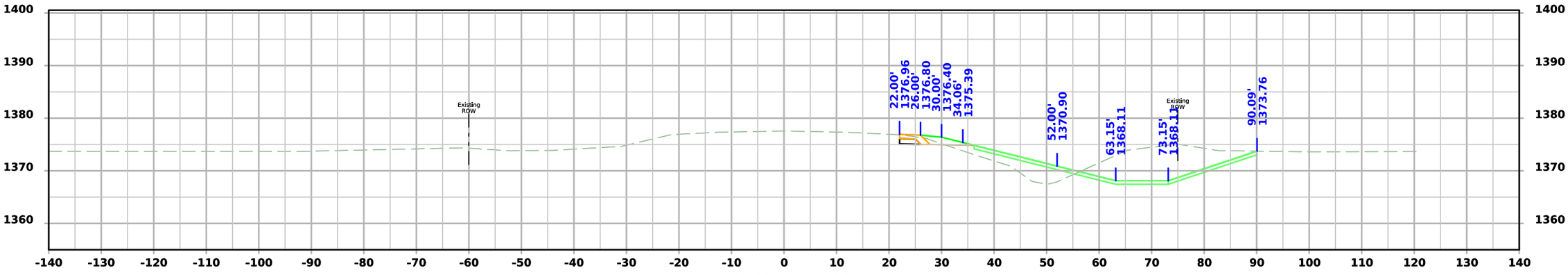


STA 1276+50.00

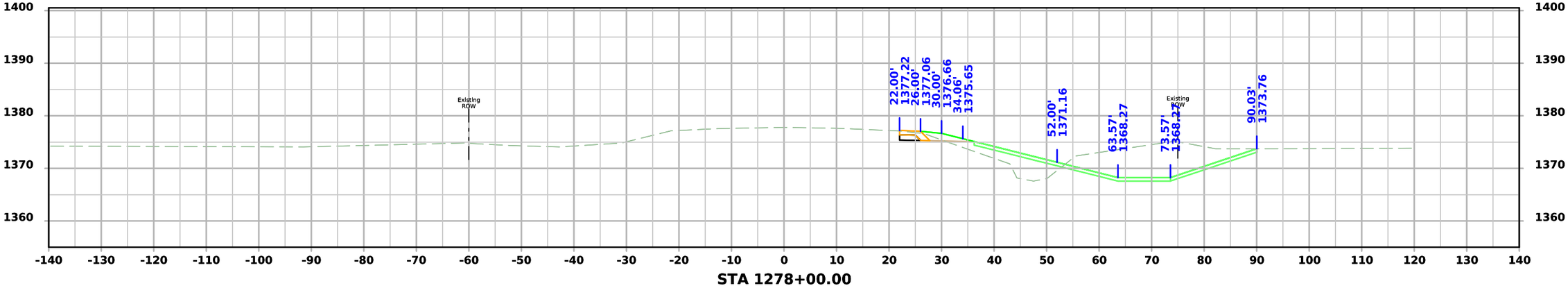
FILE NO.	ENGLISH	DESIGN TEAM Iowa DOT / HNTB	O'BRIEN COUNTY	PROJECT NUMBER BRF-018-2(149)--38-71	SHEET NUMBER W.5



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

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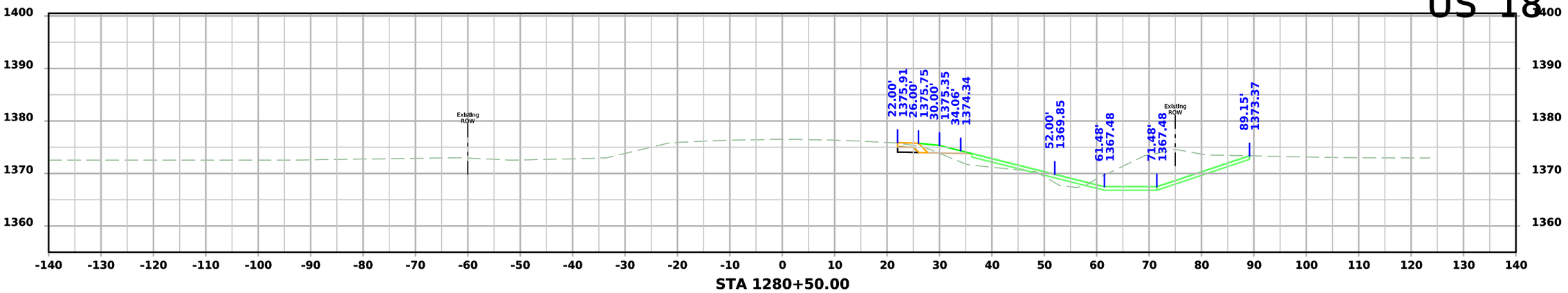
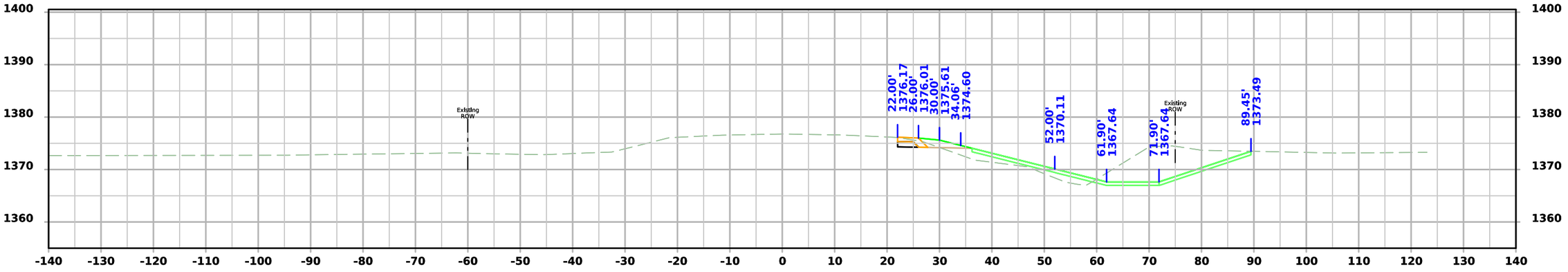
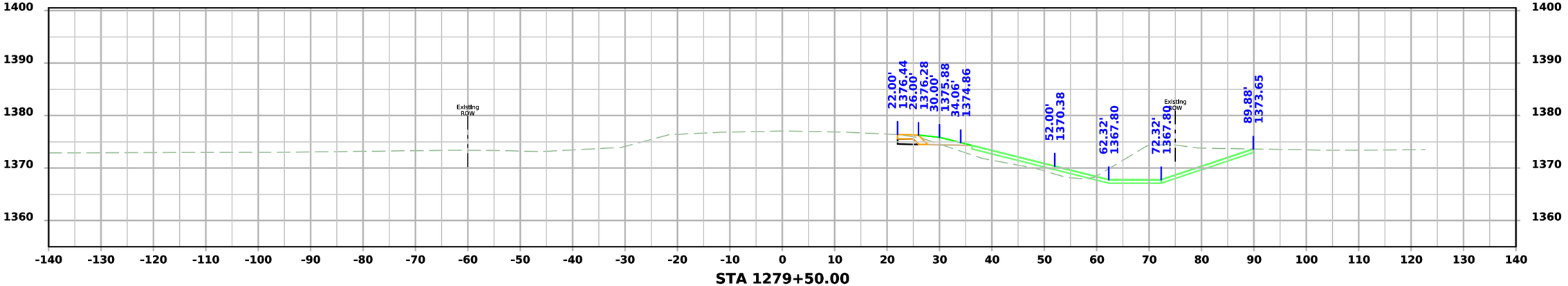


STA 1280+50.00

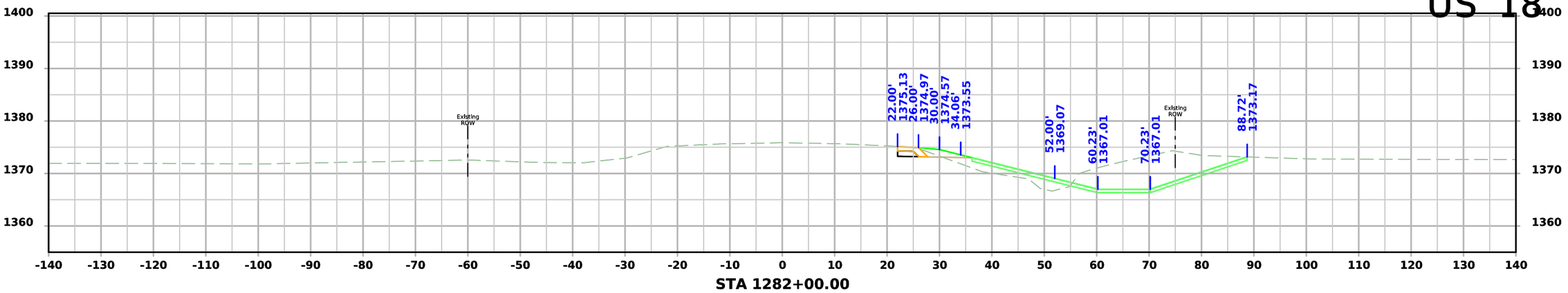


STA 1280+00.00

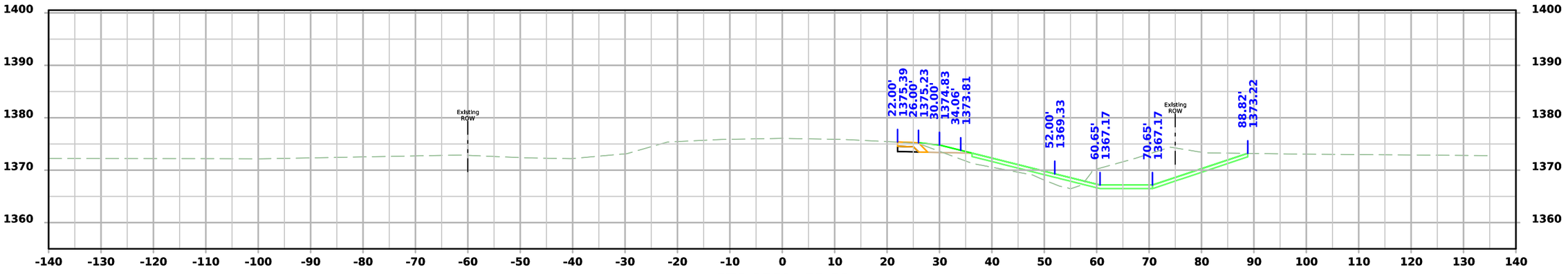


STA 1279+50.00

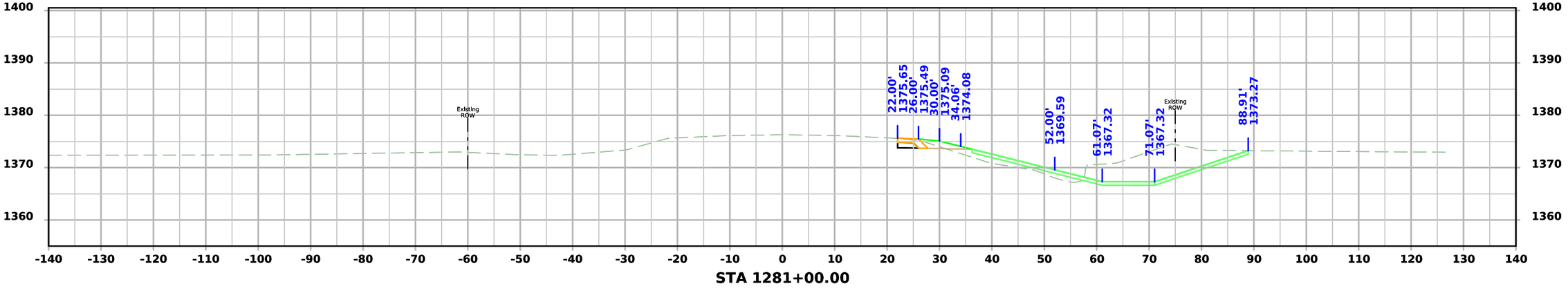
FILE NO.	ENGLISH	DESIGN TEAM Iowa DOT / HNTB	O'BRIEN COUNTY	PROJECT NUMBER BRF-018-2(149)--38-71	SHEET NUMBER W.7



STA 1282+00.00

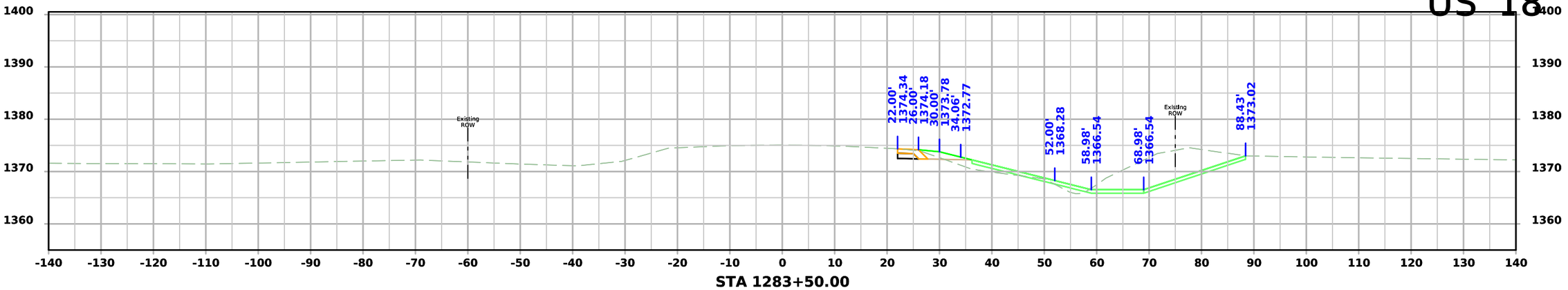


STA 1281+50.00

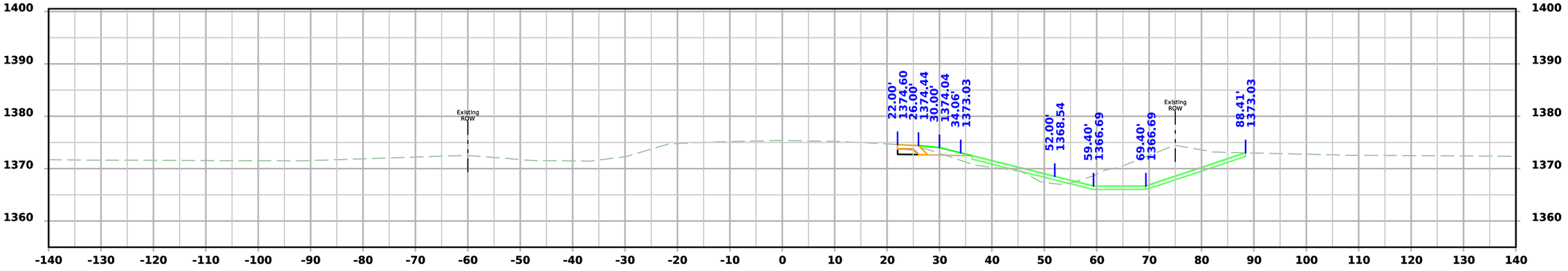


STA 1281+00.00

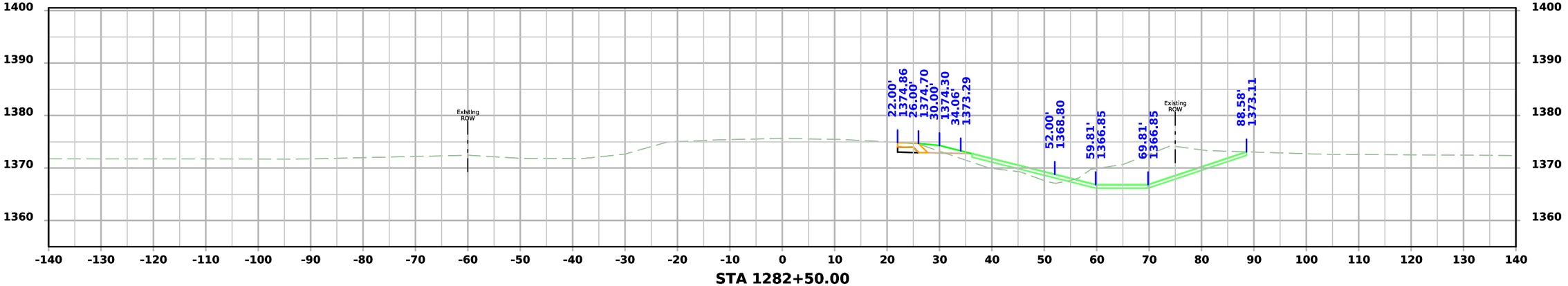
FILE NO.	ENGLISH	DESIGN TEAM Iowa DOT / HNTB	O'BRIEN COUNTY	PROJECT NUMBER BRF-018-2(149)--38-71	SHEET NUMBER W.8



STA 1283+50.00



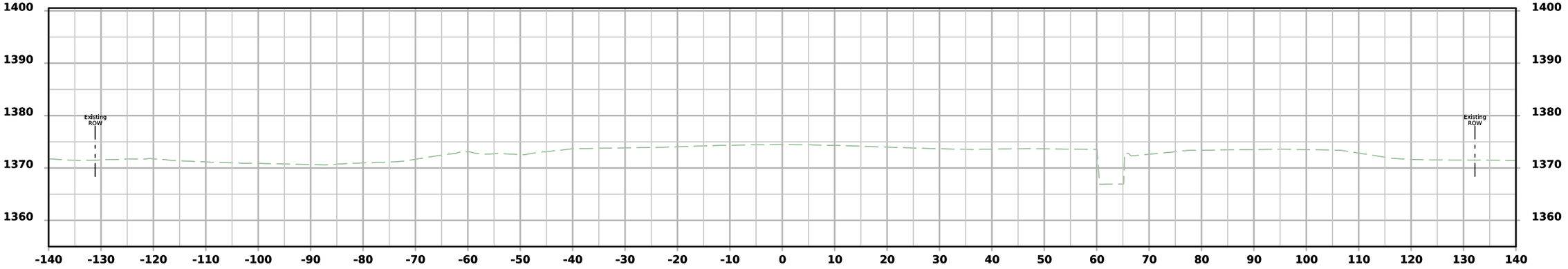
STA 1283+00.00



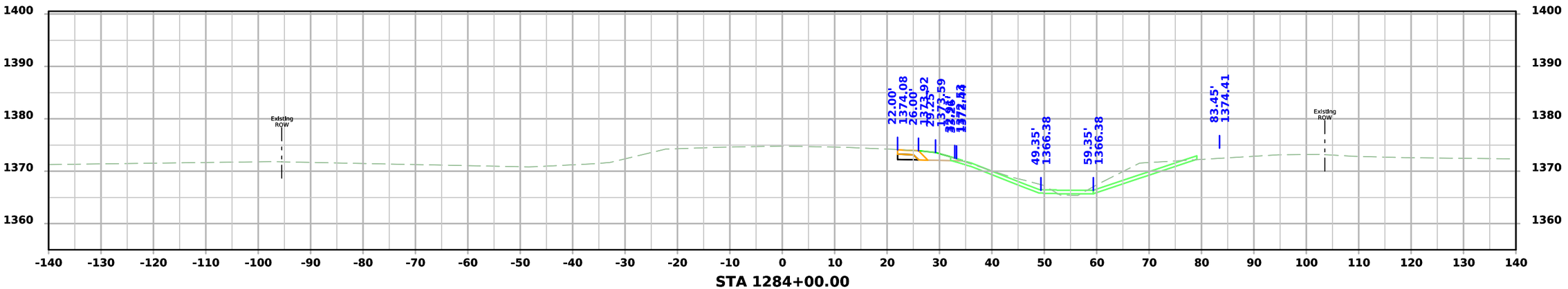
STA 1282+50.00

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

US 18



STA 1284+50.00



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

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