

JASPER CO.
RCB CULVERT REPLACEMENT - TWIN BOX
BRFN-006-4(175)--39-50
 LETTING DATE
 11-16-2021



Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM

JASPER COUNTY

RCB CULVERT REPLACEMENT - TWIN BOX

Ditch 0.2 mi E of Co Rd T12

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

16

PROJECT IDENTIFICATION NUMBER

17-50-006-010

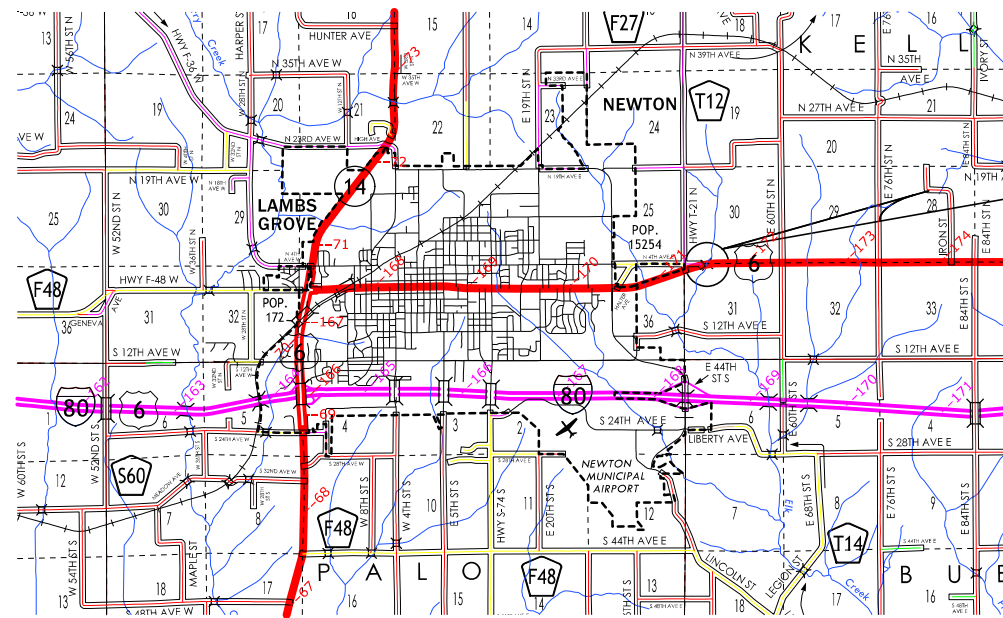
PROJECT NUMBER

BRFN-006-4(175)--39-50

R.O.W. PROJECT NUMBER

INDEX OF SHEETS

No.	DESCRIPTION
A Sheets	Title Sheets
* A.1	Title Sheet
B Sheets	Typical Cross Sections and Details
B.1 - 2	Typical Cross Sections and Details
D Sheets	Mainline Plan and Profile Sheets
* D.1	Plan & Profile Legend & Symbol Information Sheet
* D.2 - 3	US 6
G Sheets	Survey Sheets
* G.1 - 3	Reference Ties and Bench Marks
J Sheets	Traffic Control and Staging Sheets
J.1	Traffic Control Plan
* J.2	Detour Map
V Sheets	Bridge and Culvert Situation Plans
* V.1 - 2	Bridge and Culvert Situation Plans
W Sheets	Mainline Cross Sections
W.1 - 3	US 6
	* Color Plan Sheets



For Detour Route Refer to Sheet J.2.

DESIGN DATA RURAL

2021 AADT	3500	V.P.D.
2041 AADT	3700	V.P.D.
2041 DHV	390	V.P.H.
TRUCKS	5	%
Total Design ESALs	--	

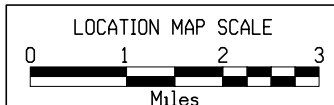
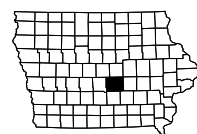
INDEX OF SEALS

SHEET NO.	NAME	TYPE
A.1	X	Primary Signature Block
X	X	X

PRELIMINARY PLANS

Subject to change by final design.

D5 PLAN - Date: 11-1-2019



FILE NO.

ENGLISH

DESIGN TEAM **Gustafson \ Smyth**

JASPER COUNTY

PROJECT NUMBER

BRFN-006-4(175)--39-50

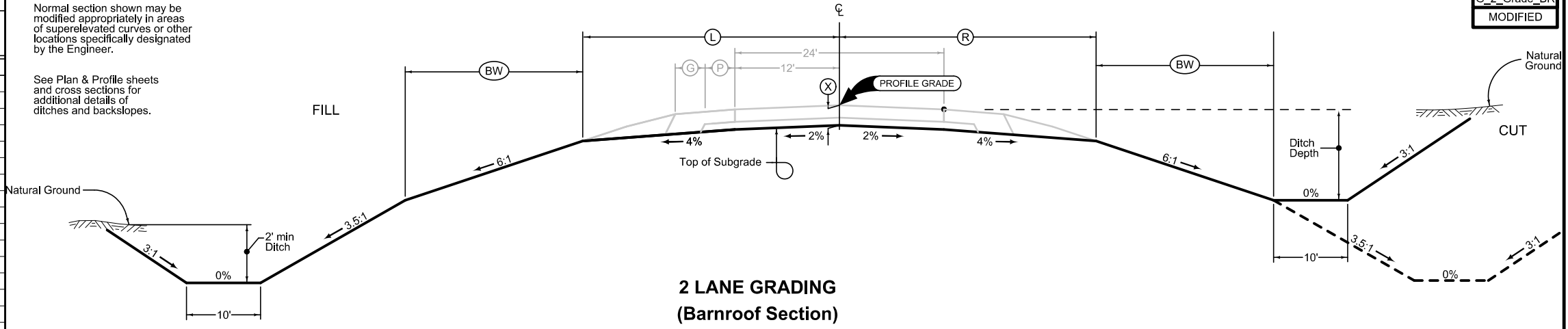
SHEET NUMBER

A.1

LOCATION		DIMENSIONS			
ROAD IDENTIFICATION	STATION TO STATION	(L)	(R)	(X)	(BW)
		Feet	Feet	Inches	Feet
US 6	1481+77.22 1483+52.08	31.0	31.0	15	7.0

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

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

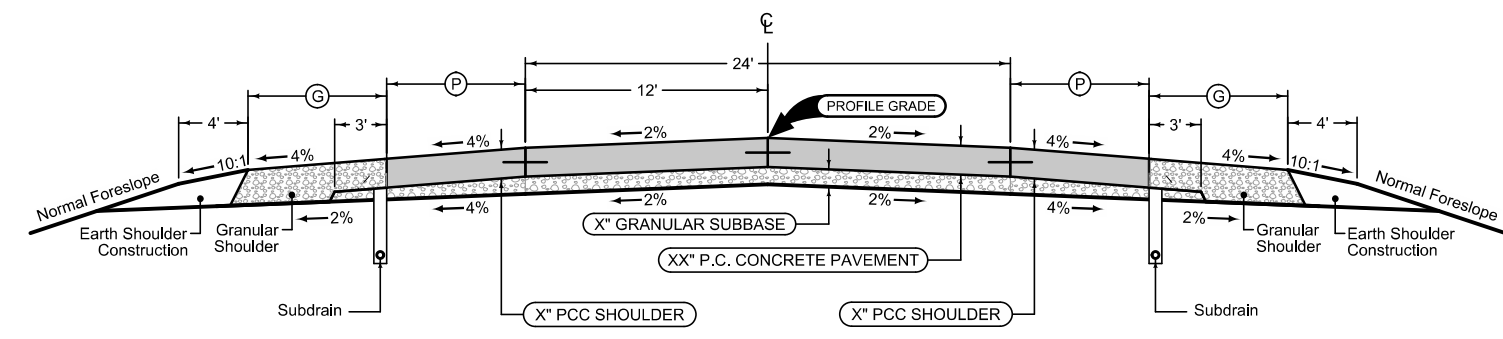


G_2_Grade_BR
MODIFIED

Full Depth PCC Shoulder

Shoulder Jointing:
Longitudinal joint: L-2 or KT-2
Transverse joints: C at 17' spacing

2_P_FullPCC_MODIFIED			
STATION TO STATION	(P)	(G)	
	Feet	Feet	
1481+77.22 1483+52.08	4	6	



Full Depth PCC Shoulder

Shoulder Jointing:
Longitudinal joint: L-2 or KT-2
Transverse joints: C at 17' spacing

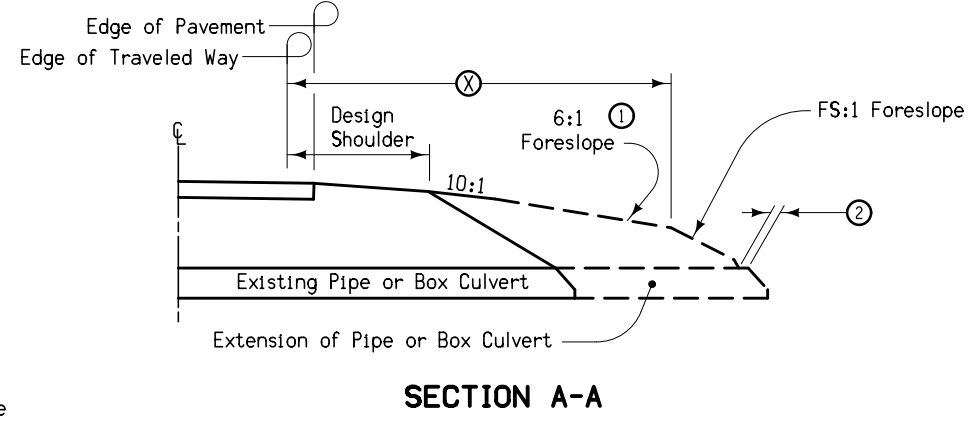
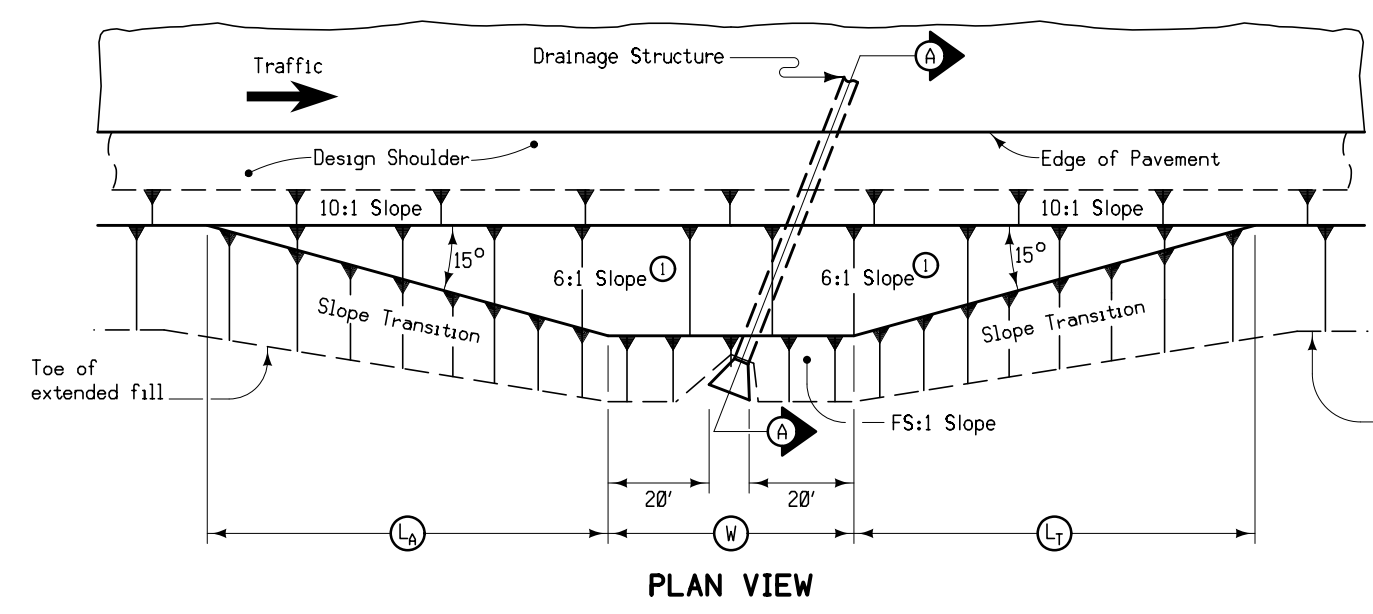
2_P_FullPCC_MODIFIED			
STATION TO STATION	(P)	(G)	
	Feet	Feet	
1481+77.22 1483+52.08	4	6	

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

2P_MODIFIED	
STATION TO STATION	
1481+77.22	1483+52.08

See Tab 100-24 or 100-25 for pavement quantities.
See Tab 112-9 for shoulder quantities.

US 6



- At locations where an extended or newly constructed drainage structure extends beyond the normal foreslope cover, flatten as indicated so as to cover the structure. Minimum earth cover is 6 inches.
- ① Slope may be flatter than 6:1.
 - ② 6 inch minimum for pipe installations or to top of headwall on RCB.
 - ③ At ϵ of road.
 - Ⓜ = Pipe or RCB opening width plus 20 feet each side.

STRUCTURE LOCATION		Ⓜ	L _A	L _T	X	FS
STATION ③	SIDE	Feet	Feet	Feet	Feet	

BARNROOF FORESLOPE AT SKEWED DRAINAGE STRUCTURE

SURVEY SYMBOLS

- BM Bench Mark
- SNP Unpaved Shoulder
- BL Topo Breakline
- EG Edge of Gravel Road
- C Centerline BL of Road (ML or SR)
- ENU Edge Unpaved Entrance & Parking
- ENT Centerline BL of Entrance
- SH Paved Shoulder
- EP Edge of Paved Roads (ML or SR)
- D Centerline Draw or Stream (Down)
- SIGN
- PIP Pipe Culvert
- SOP Size of Pipe or Culvert
- BNK Stream Bank
- GR Ground Shot
- GDL Guard Rail Steel
- BD Bridge Deck
- CON Concrete or A/C Slab
- BRG Bridge
- BCL Bridge Centerline
- LIN Miscellaneous Line
- TIL Tile Line
- OUT Tile Outlet
- FW Wire Fence
- ♂ FHD Fire Hydrants
- ⊙ WV Water Valve
- TP TPD Telephone Pedestal
- EW Edge of Water
- WL1D Water Line Co. 1 - Quality D
- PPA Power Pole Co. 1
- FO2D Fiber Optic Co. 2 - Quality D
- FO1D Fiber Optic Co. 1 - Quality D
- FO3D Fiber Optic Co. 3 - Quality D
- POT Tangent Point
- REF Reference Tie Point
- PI Tangent Point
- PT Curve Point
- PC Curve Point
- PRO Profile Shot
- BLS Bridge Low Steel
- DU Centerline Draw or Stream (Up)
- SBR Size of Bridge
- TW Top of Water

UTILITY LEGEND

- WL1D - Iowa Regional Utility - Quality D
- PPA - Alliant Energy
- FO2D - Windstream - Quality D
- FO1D - Aureon - Quality D
- FO3D - Grinnell - Quality D

PLAN VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK	Design Color No.	
Green	(2)	Existing Topographic Features and Labels
Blue	(1)	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Magenta	(5)	Existing Utilities
SHADING	Design Color No.	
Yellow	(4)	Highlight for Critical Notes or Features
Red	(3)	Delineates Restricted Areas
Lavender	(9)	Temporary Pavement Shading
Gray, Light	(48)	Proposed Pavement Shading
Gray, Med	(80)	Proposed Granular Shading
Gray, Dark	(112)	Proposed Grade and Pave Shading "In conjunction with a paving project"
Brown, Light	(236)	Grading Shading
Tan	(8)	Proposed Sidewalk Shading
Blue, Light	(230)	Proposed Sidewalk Landing Shading
Pink	(11)	Proposed Sidewalk Ramp Shading

PROFILE VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK	Design Color No.	
Green	(2)	Existing Ground Line Profile
Blue	(1)	Proposed Profile and Annotation
Magenta	(5)	Existing Utilities
Blue, Light	(230)	Proposed Ditch Grades, Left
Black	(0)	Proposed Ditch Grades, Median
Rust	(14)	Proposed Ditch Grades, Right

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

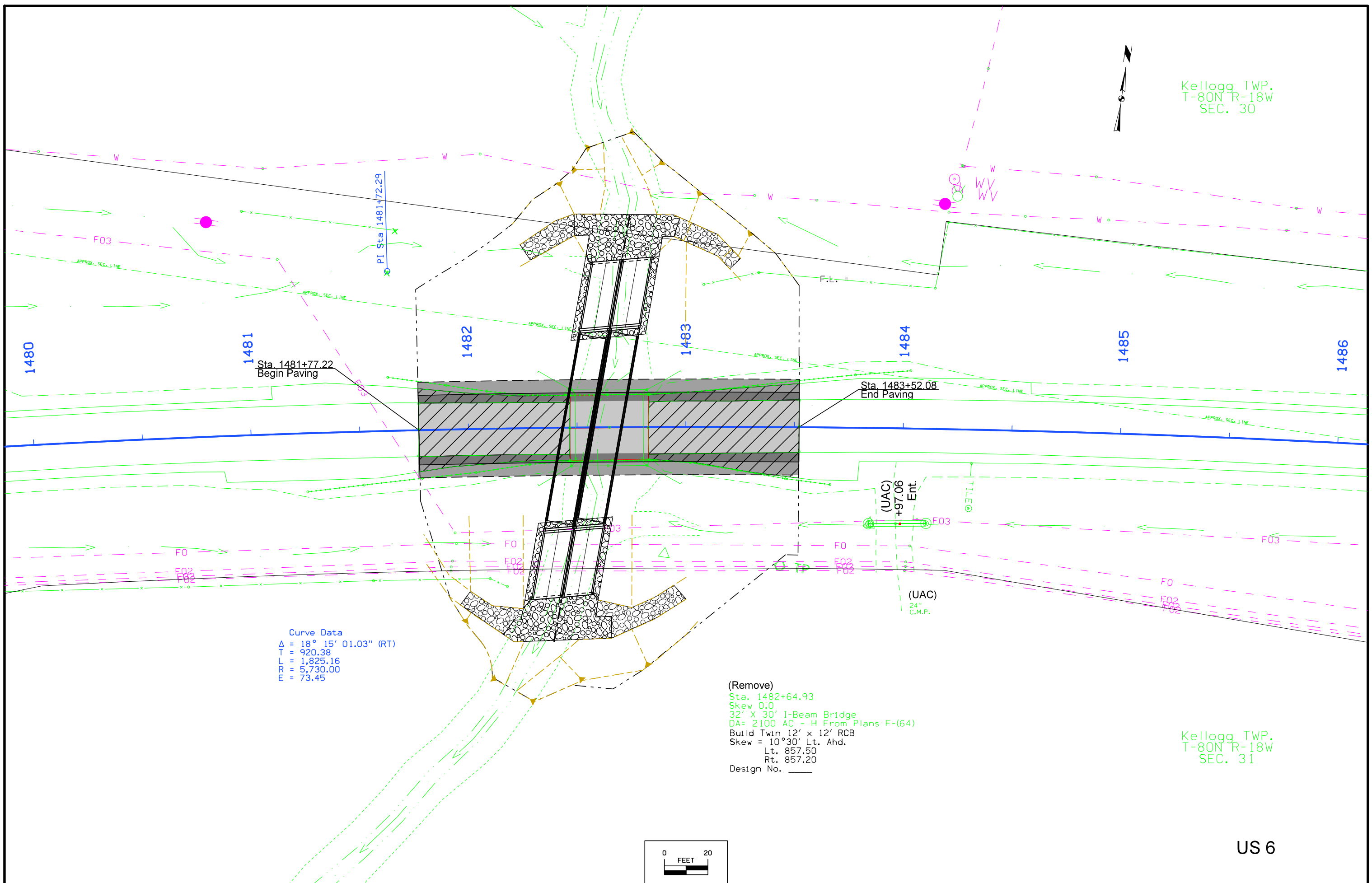
RIGHT-OF-WAY LEGEND

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

PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

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

Kellogg TWP.
T-80N R-18W
SEC. 30

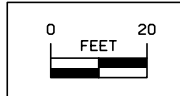


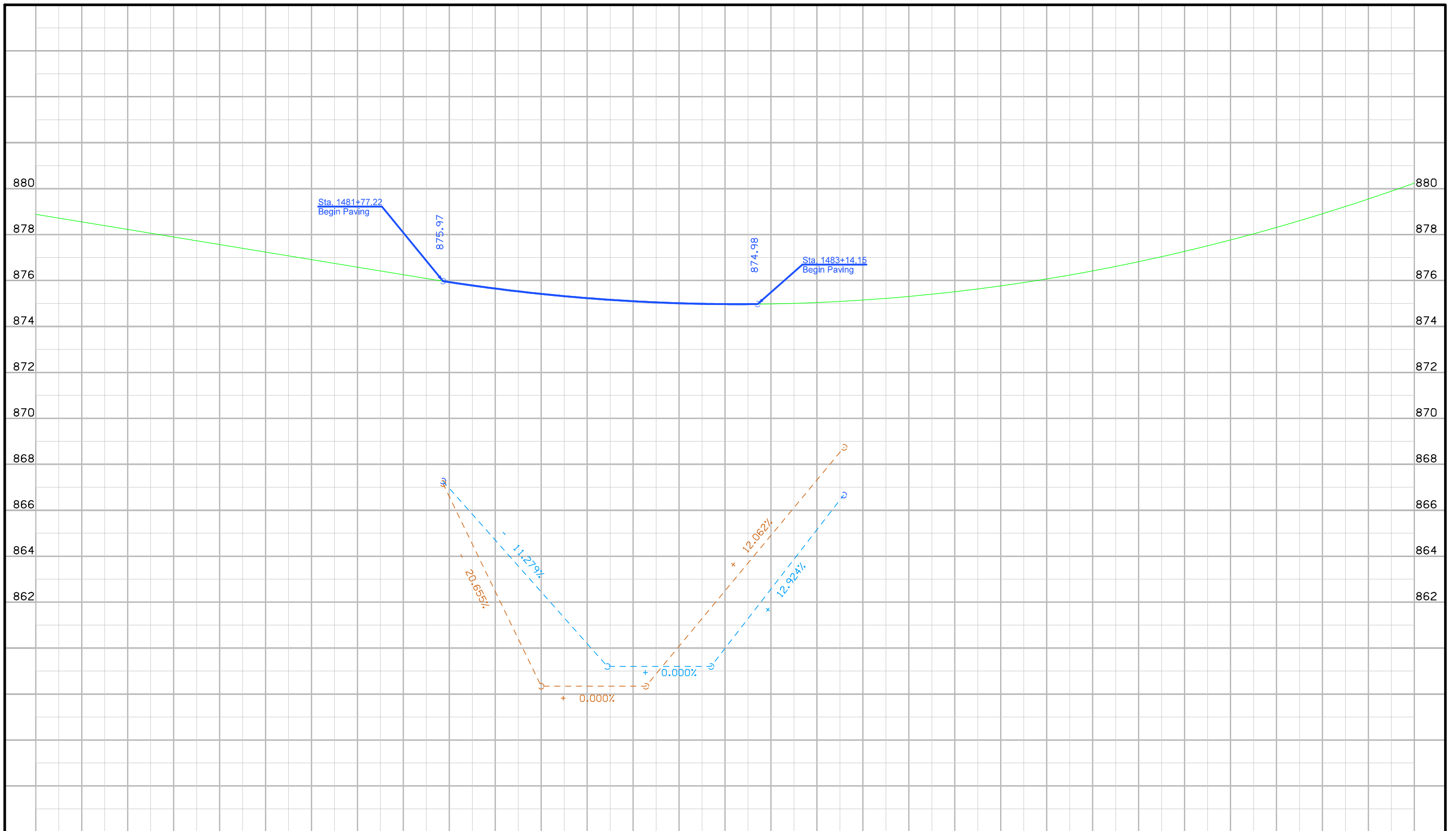
Curve Data
Δ = 18° 15' 01.03" (RT)
T = 920.38
L = 1,825.16
R = 5,730.00
E = 73.45

(Remove)
Sta. 1482+64.93
Skew 0.0
32' X 30' I-Beam Bridge
DA= 2100 AC - H From Plans F-(64)
Build Twin 12' x 12' RCB
Skew = 10°30' Lt. Ahd.
Lt. 857.50
Rt. 857.20
Design No. _____

Kellogg TWP.
T-80N R-18W
SEC. 31

US 6





Lt	UAC														Ditch Grade														UAC														Lt																			
Rt	UAC														Ditch Grade														UAC														Rt																			
1480	878.72	878.55	878.39	878.23	878.06	877.90	877.73	877.57	877.40	877.24	877.08	876.91	876.75	876.58	876.42	876.25	876.09	875.93	875.78	875.65	875.53	875.42	875.32	875.23	875.16	875.10	875.05	875.01	874.99	874.97	874.97	874.98	874.98	875.01	875.04	875.09	875.15	875.22	875.31	875.40	875.51	875.63	875.77	875.91	876.07	876.24	876.42	876.61	876.82	877.04	877.27	877.51	877.77	878.03	878.31	878.60	878.91	879.22	879.55	879.89	880.24	1486

Survey Information

County: Jasper
SAP 694.1
IaRCS Zone 9
PIN: 17-50-006-010
Project Number: BRFN-006-4(175)--39-50
Location: Ditch 0.2 mi E of Co Rd T12
Type of Work: Bridge-Unspecified
Project Directory: 5000601017

General Information

Measurement units for this survey are US survey feet. This survey is for proposed Bridge reconstruction 0.2mi E of Co Rd T12 on State Hwy 6. Project datum and control information is provided by Design Survey Office. This project is a Partial DTM with Photo control.

Vertical Control

Vertical datum for this survey is NAVD88 (Computed using Geoid12A). Benchmarks were placed throughout the project using post processed static observations relative to IaRTN Base Network. A minimum of 6hrs of data was simultaneously collected on each of these primary control points.

H05 is a Jasper County GPS Monument. It was checked only for horizontal and vertical tolerance. The difference of less than 0.10 ft. is within acceptable tolerance.

Horizontal Control

The project coordinate system for this survey is IaRCS Zone 09 (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.

H05 is a Jasper County GPS Monument. It was checked only for horizontal and vertical tolerance. The difference of less than 0.10 ft. is within acceptable tolerance.

Alignment Information

The horizontal alignment for this survey is a retrace of As-built Plans No. f-(64). Survey stationing was equated to the plan POT at STA 1462+82.29 and ran ahead without equation throughout the survey.

Survey stationing relates to as built plan stationing as follows:

POT STA.1462+82.29 Project No. F-(64)
Survey POT Sta.1462+82.29

PC STA. 1472+52 Project No. F-(64)
Survey PC STA 1472+51.92

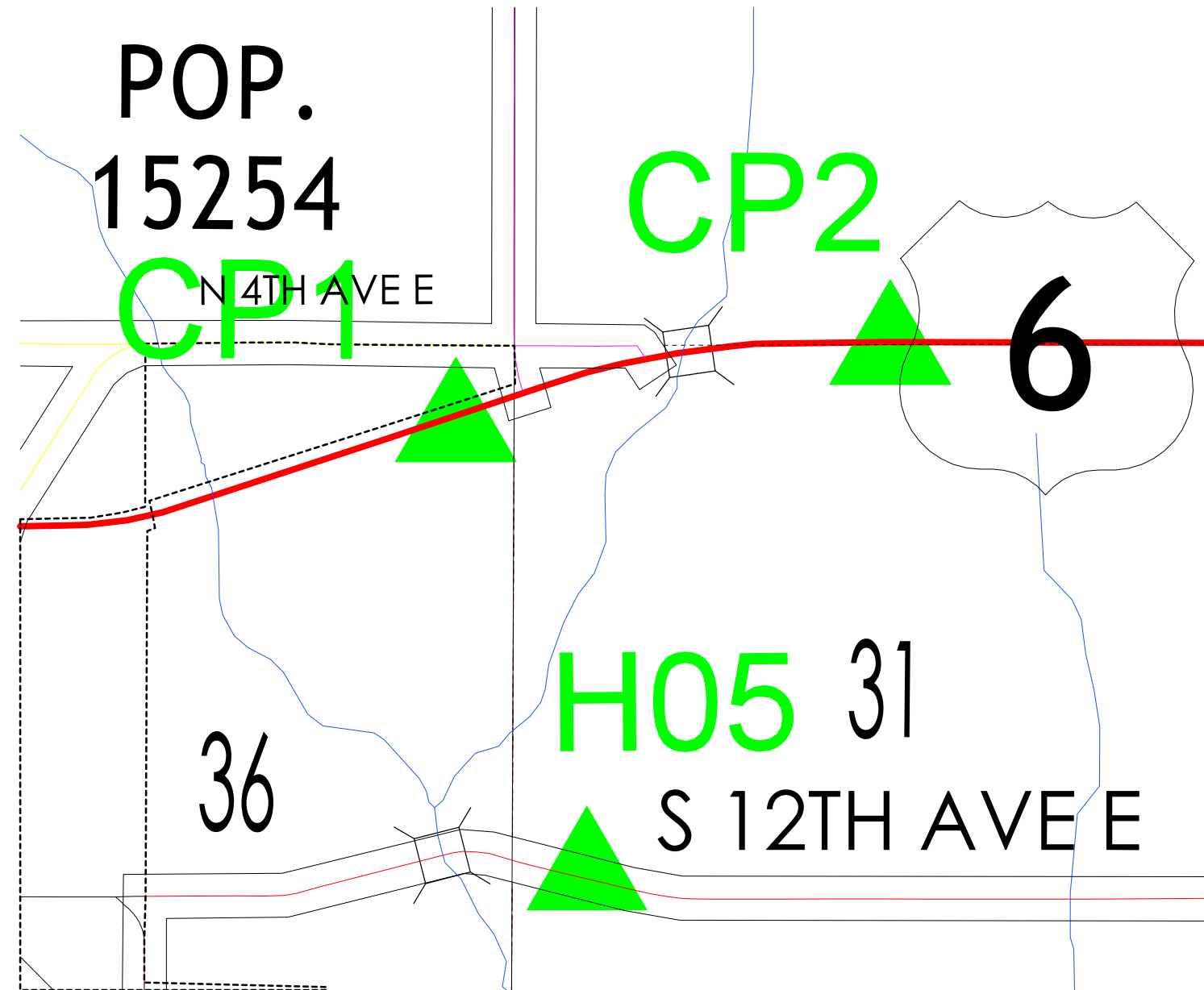
PI STA 1481+72.3 Project No. F-(64)
Survey PI STA 1481+72.29

PT STA 1490+77 Back = 1495+30.25 Ahead Project No. F-(64)
Survey PT STA 1490+77.08

PI STA 1501+95.2 Project No. F-(64)
Survey PI STA 1497+41.09

CONTROL POINT VICINITY MAP

This map is a guide to the vicinity of the primary project control points
Primary control is for use with RTK base stations and for RTN validation.
Future surveys will use primary project control to establish temporary
control as needed for construction or other surveying applications.



HORIZ. DATUM: NAD83(2011) EPOCH 2010.00

VERT. DATUM: NAVD88

1a. Regional Coordinate System Zone 9

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

HORIZONTAL AND VERTICAL PROJECT CONTROL COORDINATE LISTING

HORIZ. DATUM: NAD83(2011) EPOCH 2010.00

VERT. DATUM: NAVD88

Ia. Regional Coordinate System Zone 9

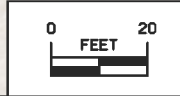
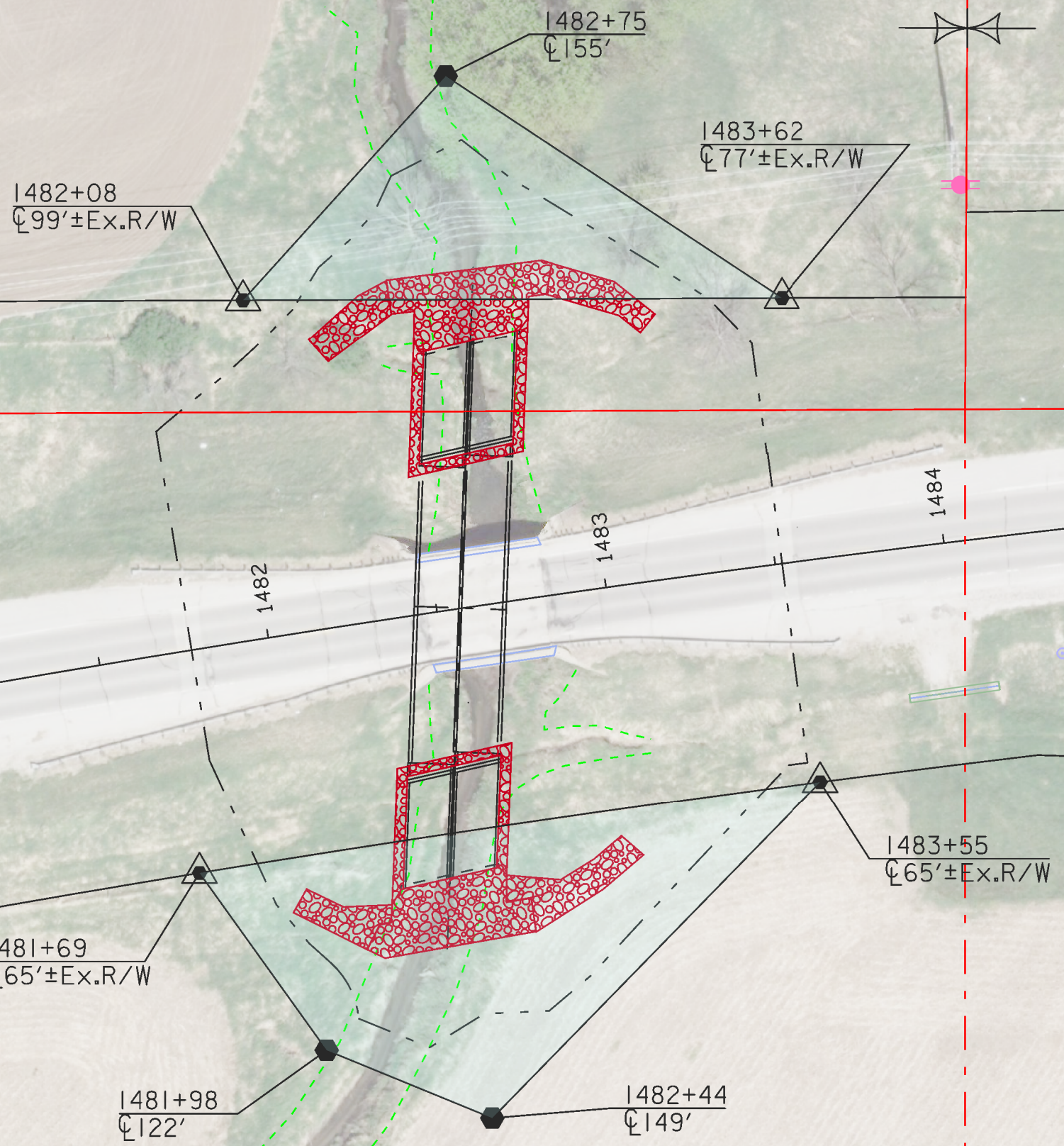
Point	Name	Northing	Easting	Elevation	Feature Definition
CP1	7728797.13	19449525.55	910.25	FENO MONUMENT WITH IDOT BRASS DISC 4IN BELOW GROUND 71.5FT RT OF CL HWY6 STA 1464+99.6	
CP2	7729350.60	19452634.94	927.55	BM 5/8IN RE-ROD 49.7FT S OF CL HWY6 AND 1708FT E OF CL BRG STA 1497+02	
H05	7725587.29	19450463.94	897.46	BM JASPER CO MONUMENT H05-2005 CAST IN PLACE CON MONUMENT WITH ALUM DISC	

Jasper	ROW: STPN-006-4(176)--2J-50			PIN	17-50-006-010														
	Ditch 0.2 mi E of Co Rd T12																		
			STATE		COUNTY		CITY			TEMP EASE	BORROW								
PARCEL NO.	OWNER NAME	FEE	EASE	FEE	EASE	FEE	EASE	EXCESS			FEE	T.E.	MITIGATION	OTHER	HOUSE	BUILDING(S)	A/C ONLY	TOTAL ACQ.	
1	Michael D Beukema - Fee		0.32 AC																
1 Parcel	"TOTALS	0 AC	0.32 AC	0 AC	0 AC	0 AC	0 AC	0 AC	0 AC	0 AC	0 AC	0 AC	0 AC	0 AC					
		0 SF		0 SF	0 SF	0 SF	0 SF	0 SF	0 SF	0 SF	0 SF	0 SF							

NO ACCESS RIGHTS ARE TO BE ACQUIRED ON THIS PROJECT.

①
MICHAEL D. BEUKEMA
& SUSAN K. BEUKEMA

①
MICHAEL D. BEUKEMA
& SUSAN K. BEUKEMA



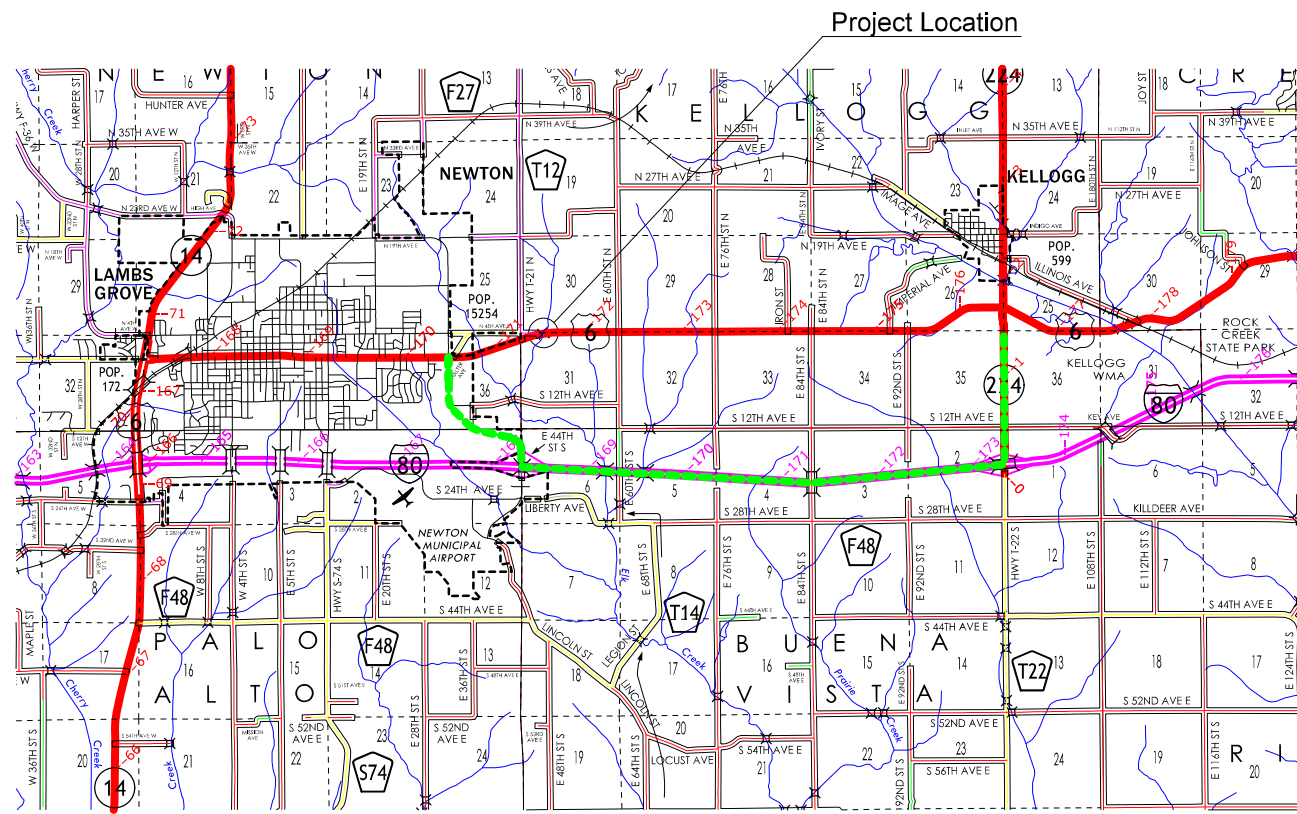
Right of Way Design Information	
THIS SHEET INCLUDED FOR INFORMATION ONLY	
ROW Team: CAGLE / LARSON	
ROW #: STPN-006-4(176)--2J-50	
Plan Date: 12/17/2019	
Color Legend:	
	Property Lines
	Temporary Easement
	Permanent Acquisition

511 TRAVEL RESTRICTIONS

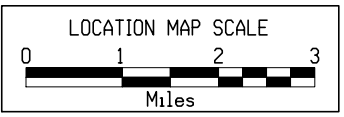
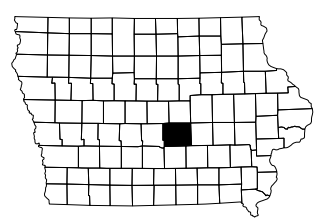
Route	Direction	County	Location Description	Feature Crossed	Object Type	Maint. Bridge No., Structure ID, or FHWA No.	Type of Restriction	Existing Measurement	Construction Measurement	Construction Measurement as Signed	Projected As Built Measurement	Remarks
US 6	Both	Jasper	No Restrictions Anticipated	None--Detour								

TRAFFIC CONTROL PLAN

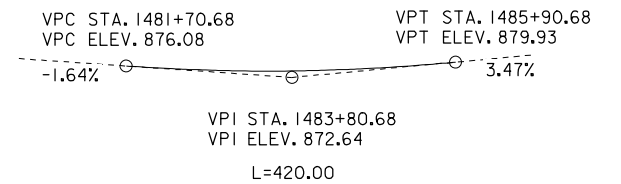
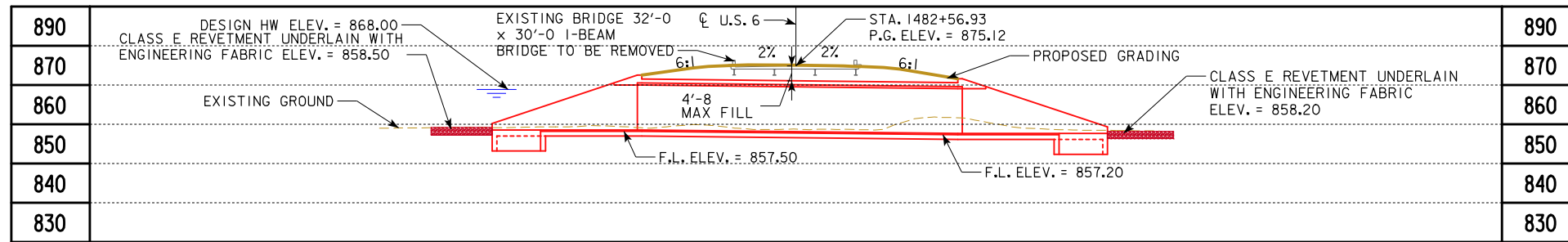
US 6 traffic shall be maintained at all times via an off-site detour. See Sheet J.2 for detour route.



Detour Route



IOWA DOT
 Detour Map
 Jasper County
 BRFN-006-4(175)--39-50
 Bridge Replacement



**PROPOSED PROFILE GRADE
U.S. 6**

NOTES:

- EXISTING 32'-0 x 30'-0 I-BEAM BRIDGE DESIGN NO. 350.
- DRAINAGE THROUGH EXISTING CULVERT/CHANNEL MUST BE MAINTAINED THROUGHOUT CONSTRUCTION.
- FLOW LINE OF CULVERT NOMINALLY BURIED 1.0 FOOT.
- BURIED AND OVERHEAD UTILITIES TO BE RELOCATED TEMPORARILY OR PERMANENTLY AS REQUIRED FOR CONSTRUCTION.

HYDRAULIC DATA

DRAINAGE AREA = 3.59 SQ.MI.
 $Q_{50} = 1,390$ CFS
 HW ELEV. = 868.00
 STREAM SLOPE = 27 FT./MI.
 $Q_{100} = 1720$ CFS HW ELEV. = 869.00
 $Q_{500} = 2300$ CFS HW ELEV. = 870.40

UTILITIES LEGEND:

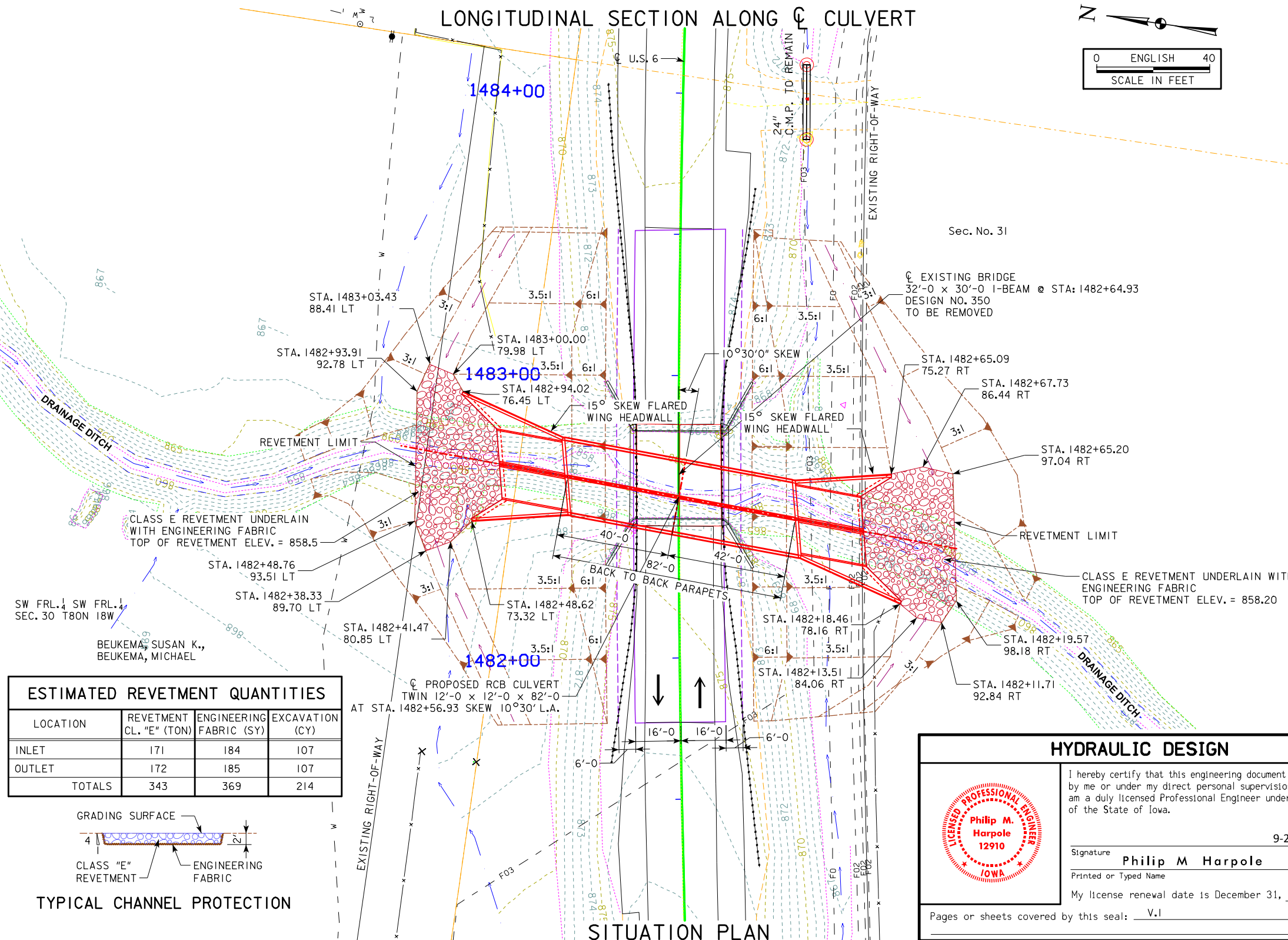
- F0 — FIBER OPTIC LINE AUREON NETWORK SERVICES
- F02 — FIBER OPTIC LINE WINDSTREAM COMMUNICATIONS
- F03 — FIBER OPTIC LINE GRINNELL MUTUAL REINSURANCE CO.
- W — WATER MAIN IOWA REGIONAL UTILITY ASSOC.

LOCATION

U.S. 6 BRIDGE OVER DITCH
 0.2 MI. E. CO. RD. T12
 T-80N R-18W
 SECTION 30
 KELLOGG TOWNSHIP
 JASPER COUNTY
 FHWA NO. ??
 BRIDGE MAINT. NO. 5071.6S006
 LATITUDE 41.702654°
 LONGITUDE -92.995390°

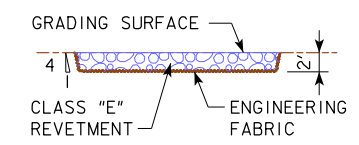
TRAFFIC ESTIMATE

2021 AADT	3500	V.P.D.
2041 AADT	3700	V.P.D.
2041 DHV	390	V.P.H.
TRUCKS	5	%



ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
INLET	171	184	107
OUTLET	172	185	107
TOTALS	343	369	214



TYPICAL CHANNEL PROTECTION

HYDRAULIC DESIGN

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

Signature: Philip M Harpole Date: 9-24-2019

Printed or Typed Name: Philip M Harpole

My license renewal date is December 31, 2019

Pages or sheets covered by this seal: V.I

DESIGN FOR 10°30' SKEW L.A.

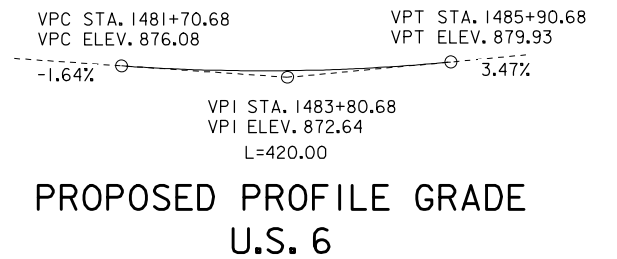
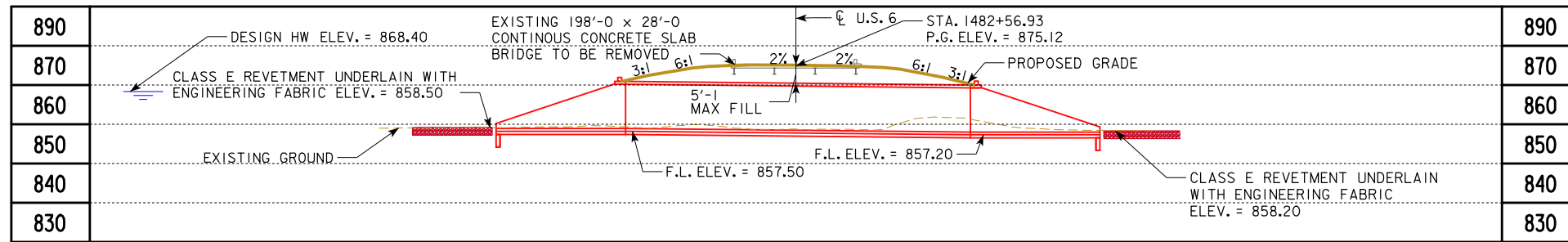
**TWIN 12'-0 X 12'-0 X 82'-0
CAST IN PLACE CONCRETE CULVERT**

SITUATION PLAN

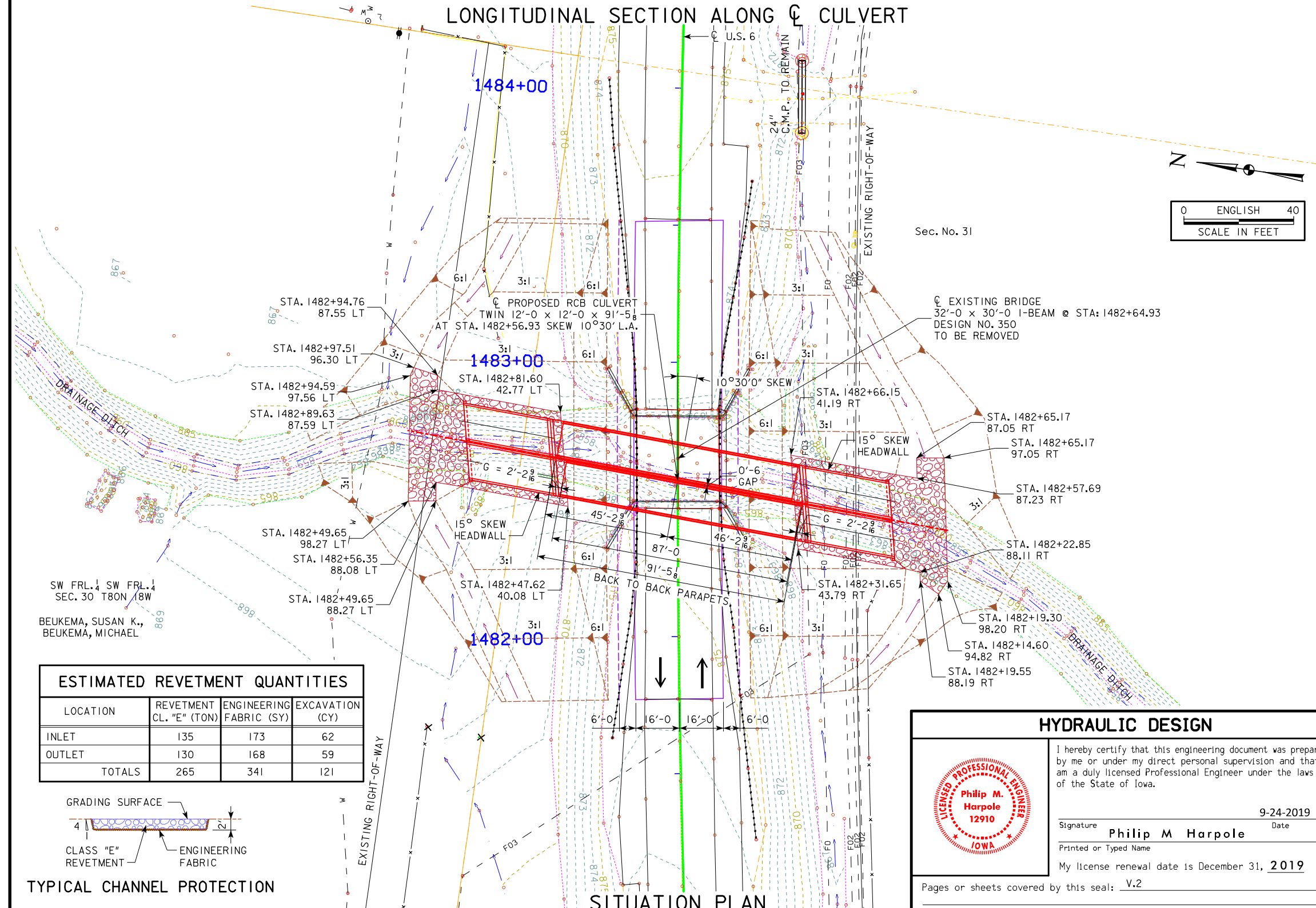
STATION 1482+56.93 SEPTEMBER 2019

JASPER COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 1 OF 2 FILE NO. ? DESIGN NO. ??



LONGITUDINAL SECTION ALONG CULVERT



NOTES:

- EXISTING 32'-0 x 30'-0 I-BEAM BRIDGE DESIGN NO. 350.
- DRAINAGE THROUGH EXISTING CULVERT/CHANNEL MUST BE MAINTAINED THROUGHOUT CONSTRUCTION.
- FLOW LINE OF CULVERT NOMINALLY BURIED 1.0 FOOT.
- BURIED AND OVERHEAD UTILITIES TO BE RELOCATED TEMPORARILY OR PERMANENTLY AS REQUIRED FOR CONSTRUCTION.

HYDRAULIC DATA

DRAINAGE AREA = 3.59 SQ.MI.
 Q₅₀ = 1,390 CFS
 HW ELEV. = 868.40
 STREAM SLOPE = 27 FT./MI.
 Q₁₀₀ = 1720 CFS HW ELEV. = 869.30
 Q₅₀₀ = 2300 CFS HW ELEV. = 870.90

UTILITIES LEGEND:

- FO - FIBER OPTIC LINE AUREON NETWORK SERVICES
- FO2 - FIBER OPTIC LINE WINDSTREAM COMMUNICATIONS
- FO3 - FIBER OPTIC LINE GRINNELL MUTUAL REINSURANCE CO.
- W - WATER MAIN IOWA REGIONAL UTILITY ASSOC.

LOCATION

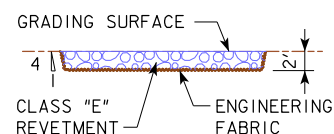
U.S. 6 BRIDGE OVER DITCH
 0.2 MI. E. CO. RD. T12
 T-80N R-18W
 SECTION 30
 KELLOGG TOWNSHIP
 JASPER COUNTY
 FHWA NO. ??
 BRIDGE MAINT. NO. 5071.6S006
 LATITUDE 41.702654°
 LONGITUDE -92.995390°

TRAFFIC ESTIMATE

2021 AADT	3500	V.P.D.
2041 AADT	3700	V.P.D.
2041 DHV	390	V.P.H.
TRUCKS	5	%

ESTIMATED REVETMENT QUANTITIES

LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
INLET	135	173	62
OUTLET	130	168	59
TOTALS	265	341	121



TYPICAL CHANNEL PROTECTION

HYDRAULIC DESIGN

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

Signature: Philip M Harpole Date: 9-24-2019

Printed or Typed Name: Philip M Harpole

My license renewal date is December 31, 2019

Pages or sheets covered by this seal: V.2

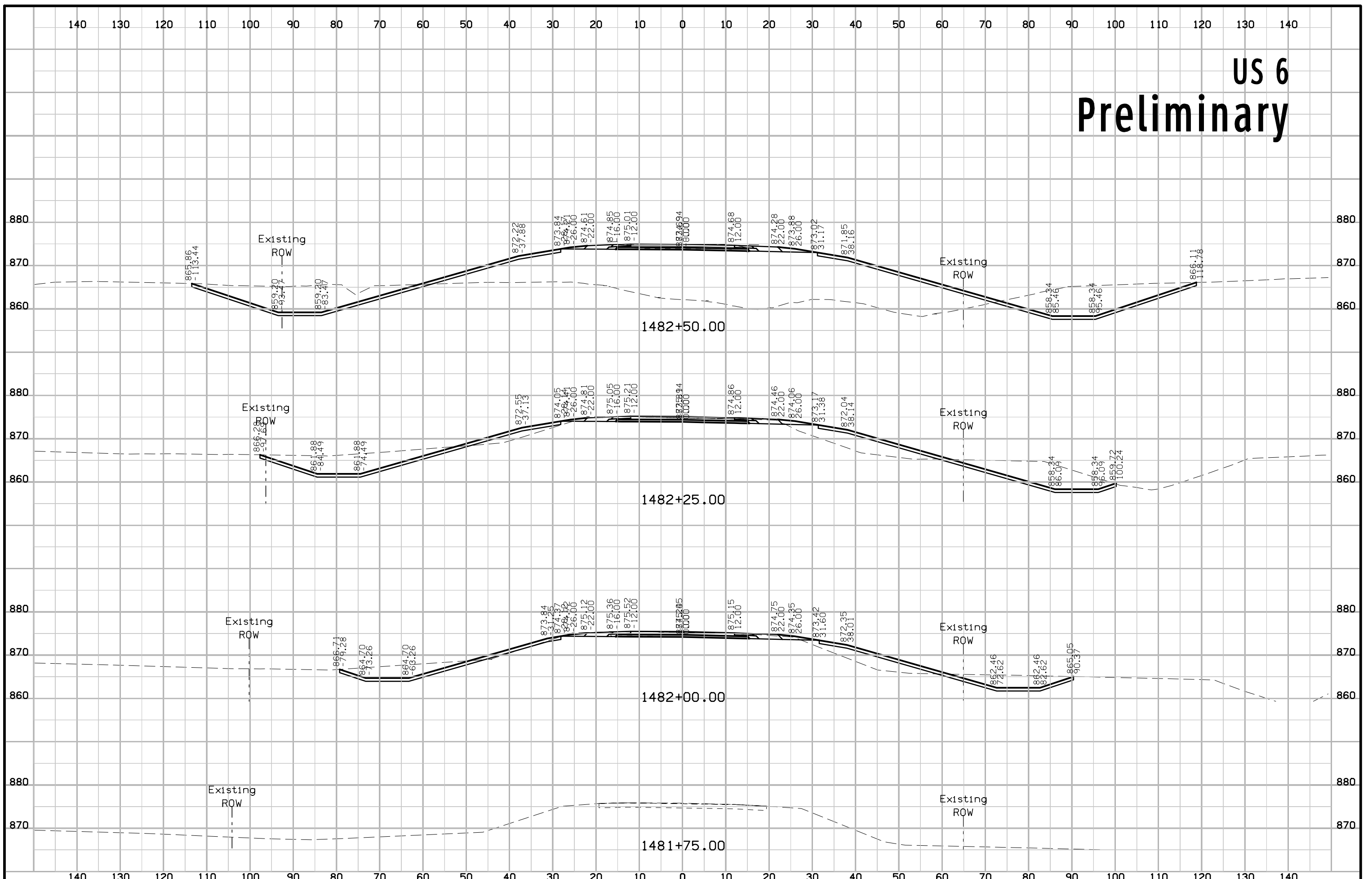
DESIGN FOR 10°30' SKEW L.A.

TWIN 12'-0 X 12'-0 X 91'-5
PRECAST CONCRETE CULVERT

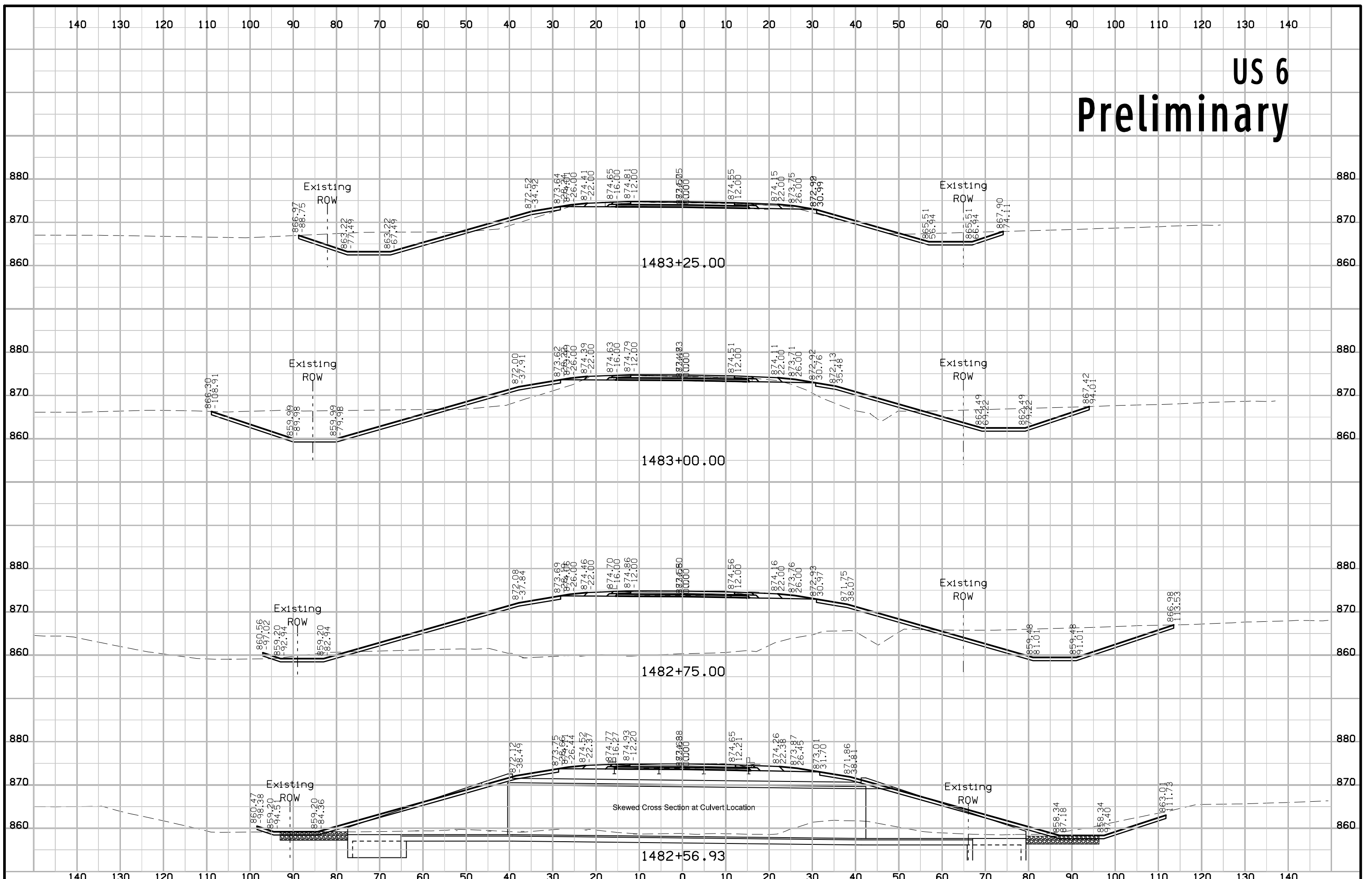
SITUATION PLAN
 STATION 1482+56.93 SEPTEMBER 2019
JASPER COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 2 OF 2 FILE NO. ? DESIGN NO. ??

US 6 Preliminary



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