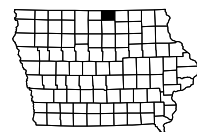


WORTH CO.

RCB CULVERT REPLACEMENT
BRFN-009-6(75)--39-98

LETTING DATE
10-19-2021



For Project Location Map
Refer to Sheet No. A.02

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 - 2	Typical Cross Sections and Details
C Sheets	Quantities and General Information
C.1	Project Description
C.1	Estimated Project Quantities
C.1	Standard Road Plans
D Sheets	Mainline Plan and Profile Sheets
* D.1	Plan & Profile Legend & Symbol Information Sheet
* D.2	IA 9
G Sheets	Survey Sheets
G.1 - 3	Reference Ties and Bench Marks
G.4	Horizontal Control Tab. & Super for all Alignments
J Sheets	Traffic Control and Staging Sheets
J.1	Traffic Control Plan Note
J.1	Staging Notes Stage
* J.2	Detour Route Map
V Sheets	Bridge and Culvert Situation Plans
* V.1 - 6	Culvert Situation Plans
W Sheets	Mainline Cross Sections
W.1	Cross Sections Legend & Symbol Information Sheet
W.2 - 4	Mainline Cross Sections
	* Color Plan Sheets



Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM WORTH COUNTY RCB CULVERT REPLACEMENT

IA 9 bridge over Beaver Creek 0.5 miles west of County Road S18

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	23
PROJECT IDENTIFICATION NUMBER	17-98-009-010
PROJECT NUMBER	BRFN-009-6(75)--39-98
R.O.W. PROJECT NUMBER	STPN-009-6(76)--2J-98

D4 PLAN - Date: June 22, 2021
D5 PLAN - Date: Oct 18, 2019

PRELIMINARY PLANS

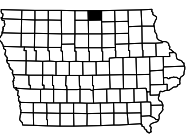
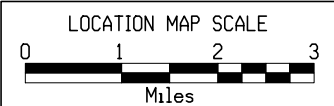
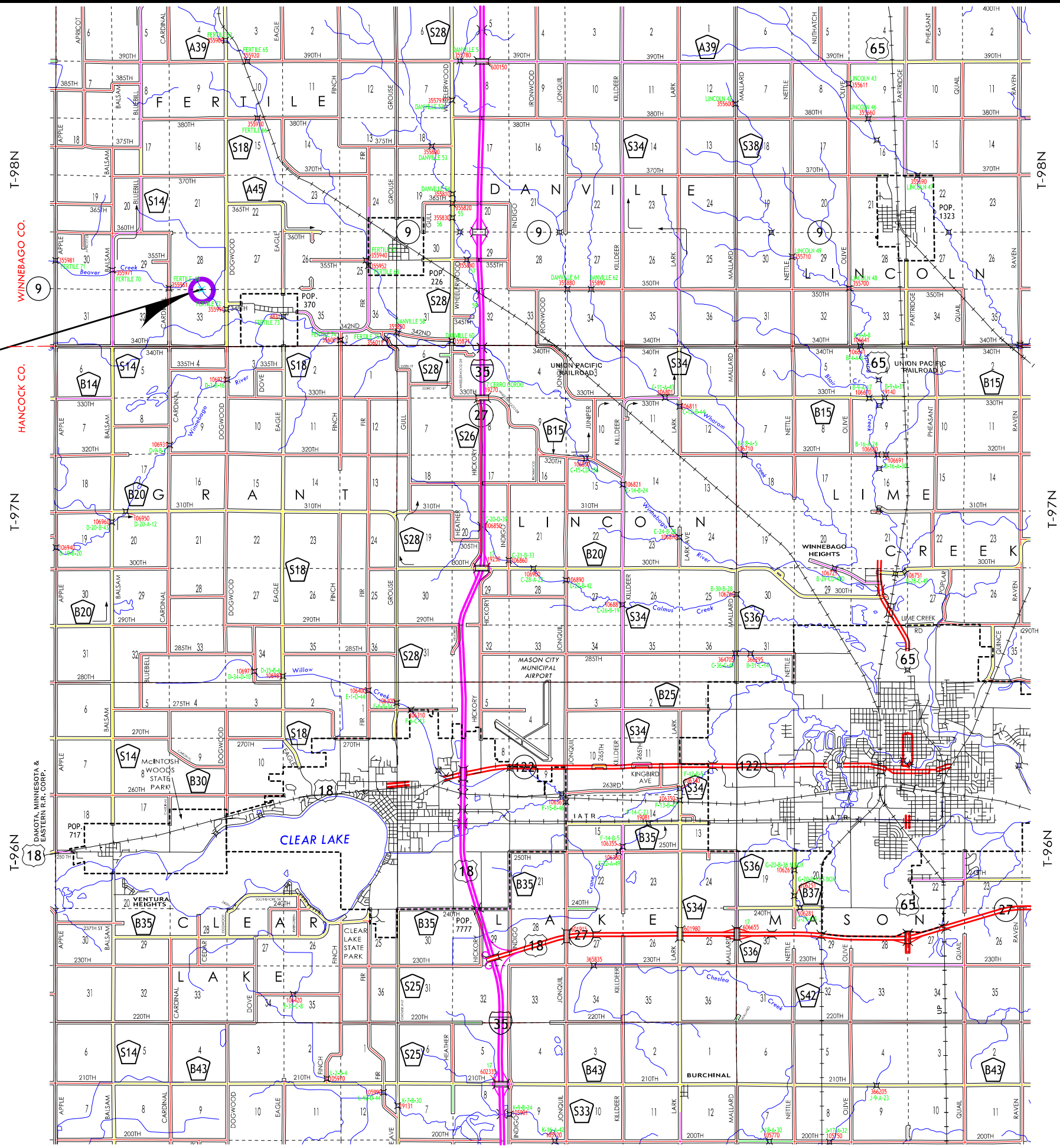
Subject to change by final design.

D3 PLAN - Date: July 3, 2019

DESIGN DATA RURAL			
2021 AADT	2,800	V.P.D.	
2041 AADT	3,100	V.P.D.	
2041 DHV	320	V.P.H.	
TRUCKS	17	%	
Total Design ESALs	--		

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

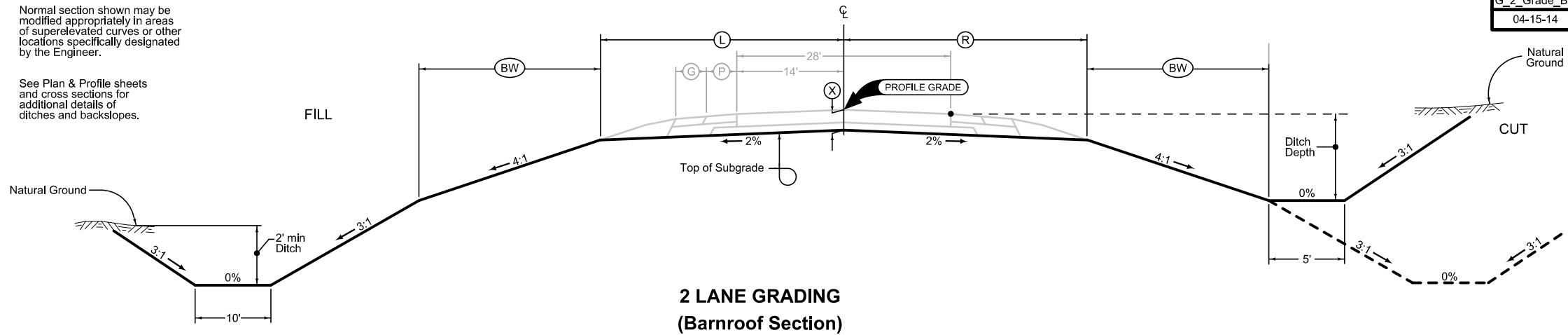
IA 9 BRIDGE REPLACEMENT
 STA.: 1786+32
 FHWA NO.: 54000
 MAINT. NO.: 9866.5S009
 Mile Post: 166.5



LOCATION			DIMENSIONS			
ROAD IDENTIFICATION	STATION TO STATION		Ⓐ	Ⓑ	Ⓒ	Ⓓ
			Feet	Feet	Inches	Feet
IA 9	1785+09.50	1787+64.50	27.09	27.09	15.5	14.91

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

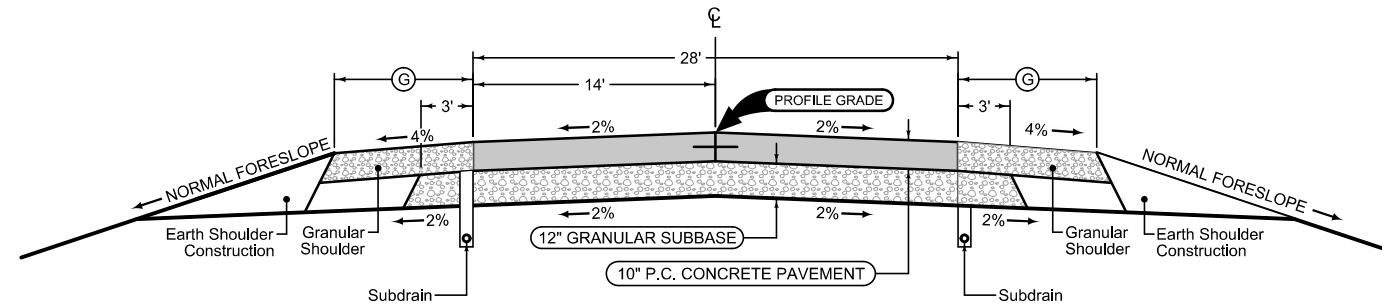
See Plan & Profile sheets and cross sections for additional details of ditches and backslopes.



G_2_Grade_BR
04-15-14

Granular Shoulder with Safety Edge

2_G_		Ⓞ
10-21-14		
STATION TO STATION		Feet
1785+09.50	1787+64.50	6



Granular Shoulder with Safety Edge

2_G_		Ⓞ
10-21-14		
STATION TO STATION		Feet
1785+09.50	1787+64.50	6

Mainline Jointing:
 Transverse joints: CD at 20' spacing
 Longitudinal joint: L-2

2P_	
10-19-10	
STATION TO STATION	
1785+09.50	1787+64.50

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

IA 9

PROJECT DESCRIPTION

100-1D
10-18-05

This project involves the replacement of the IA 9 bridge over Beaver Creek, 0.5 miles West of County Road S18 with a triple 10' x 12' RCB culvert.

**ESTIMATED ROADWAY QUANTITIES
(1 DIVISION PROJECT)**

100-0A
10-28-97

Item No.	Item Code	Item	Unit	Total	As Built Qty.

STANDARD ROAD PLANS

105-4
10-18-11

The following Standard Road Plans apply to construction work on this project.

Number	Date	Title
DR-303	10-17-17	Subdrains (Longitudinal)
DR-305	04-17-18	Subdrain Outlets (standard Subdrain, Pressure Release and Special)
EC-201	10-16-18	Silt Fence
EC-202	10-21-14	Floating Silt Curtain
EC-204	04-18-17	Perimeter and Slope Sediment Control Devices
EC-301	10-18-16	Rock Erosion Control (REC)
EW-101	10-17-17	Embankment and Rebuilding Embankments
EW-102	10-20-15	Allowable Placement of Unsuitable Soil in Embankments
PM-110	10-16-18	Line Types
PM-420	04-19-11	Two-Lane Roadway with no Turn Lanes (One-Way Stop Condition)
PV-101	10-16-18	Joints
TC-1	04-16-13	Work Not Affecting Traffic (Two-Lane or Multi-Lane)
TC-202	04-21-15	Work Within 15 ft of Traveled Way
TC-252	04-19-16	Routes Closed to Traffic

SURVEY SYMBOLS

- PC Curve Point
- PT Curve Point
- POT Tangent Point
- ▲ SCR Section Corner
- FENO FENO Monument
- ROW Right of Way Mark
- CP Control Point
- ▲ BM Bench Mark
- DTM Photogrammetry Elv Control Check
- WC Wild Card (Misc. Field Shot)
- PLG Location of General Photo
- CON Concrete or A/C Slab
- BL Topo Breakline
- D Centerline Draw or Stream (Down)
- C Centerline BL of Road (ML or SR)
- EP Edge of Paved Roads (ML or SR)
- SNP Unpaved Shoulder
- GR Ground Shot
- PIP Pipe Culvert
- PRO Profile Shot
- x — FW Wire Fence
- ENT Centerline BL of Entrance
- EW Edge of Water
- ← DU Centerline Draw or Stream (Up)
- FO — FO1D Fiber Optic Co. 1 - Quality D
- ⚡ PPA Power Pole C0. 1
- TPD Telephone Pedestal
- TW Top of Water
- SBR Size of Bridge

UTILITY LEGEND

Sub-Surface Utility Mapping Quality Level is in accordance with CI/ASCE 38-02 Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data.

Remark Abbreviations
 QLA Quality Level A Highest guideline quality level
 QLD Quality Level D Lowest guideline quality level

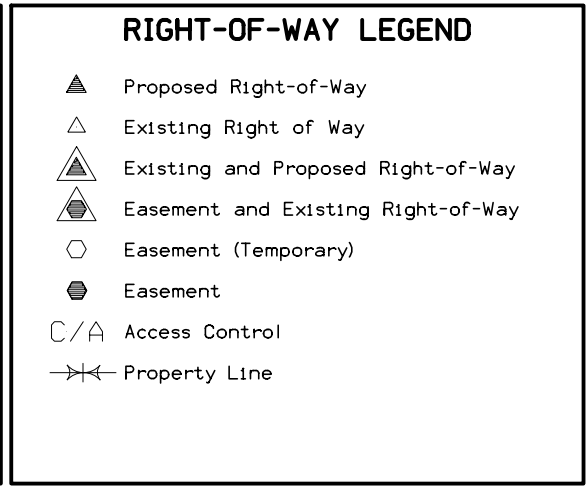
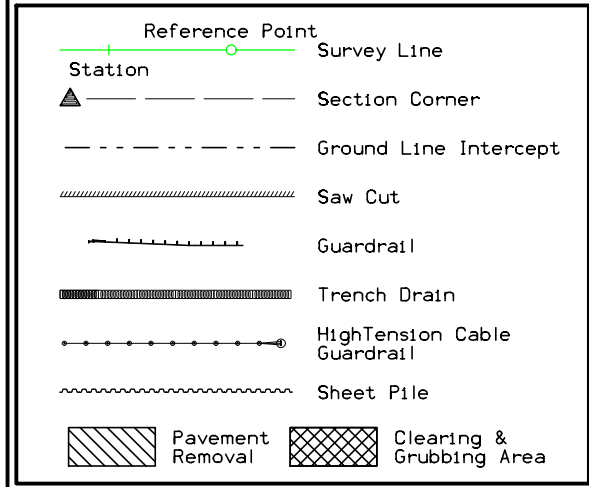
- FO — Winnebago Telephone (WCTA) - Quality D
 Neal Sletten
 641-592-6105
 NealSletten@WCTA.net
- ⚡ Prairie Energy Cooperative
 Ken Norem
 515-923-2654
 knorem@hancock.prlc.org

PLAN VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK	Design Color No.	Description
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

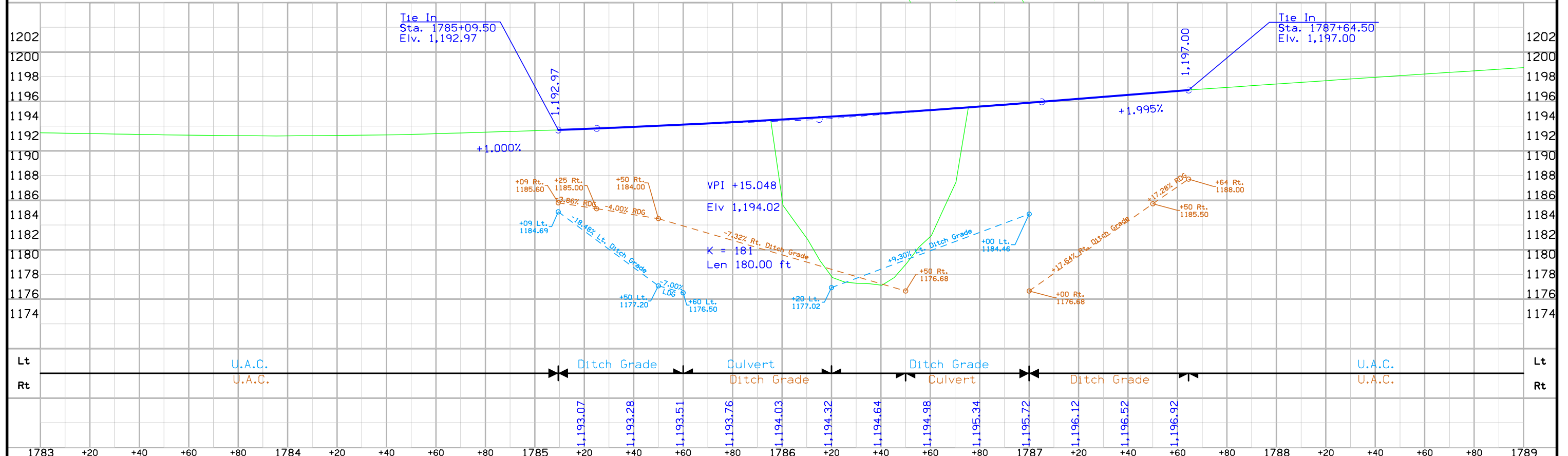
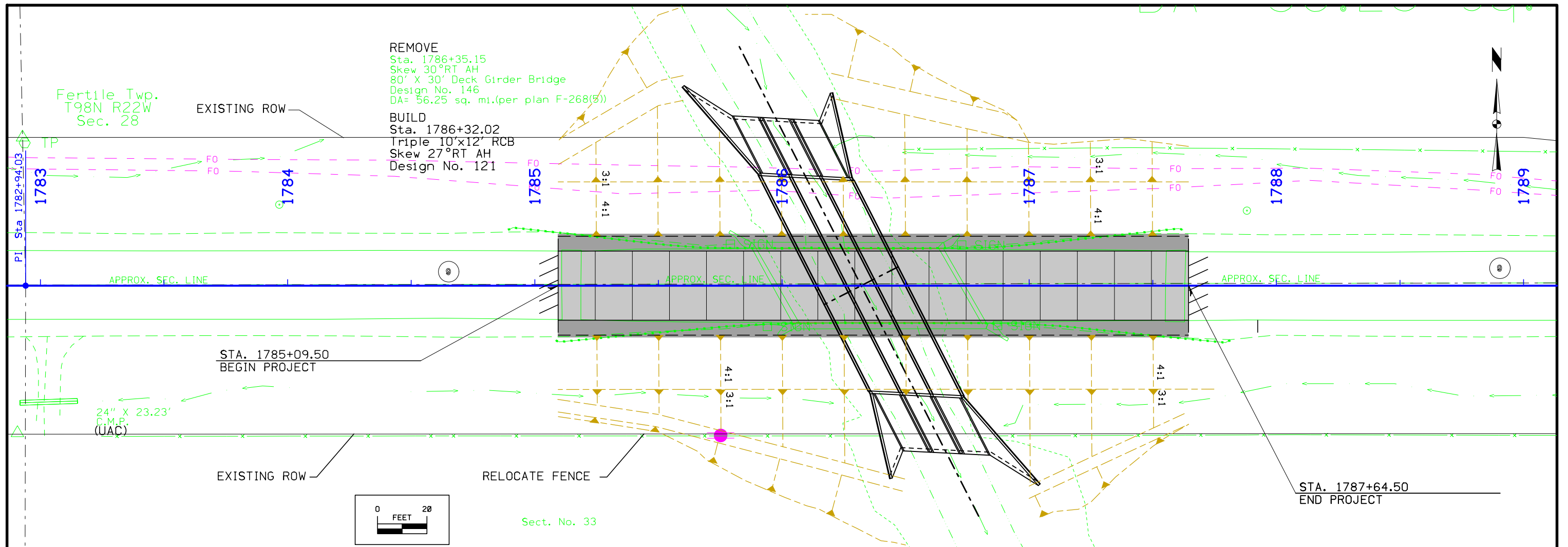
PROFILE VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK	Design Color No.	Description
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



PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

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



Survey Information

Worth County
BRFN-009-6(75)—39-98
Bridge-Unspecified
Beaver Creek 0.5 mi W of Co Rd S 18
PIN 17-98-009-010
Sap-0928

General Information

Measurement units for this survey are US survey feet. This survey is for proposed bridge replacement. 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 Geoid12B). GRS80 Ellipsoidal Height was computed at project Pts. CP1, CP2, Worth County 106, Worth County 107, Worth County 702, and USCGS & State 17-884 by conducting 2 concurrent 6-hour static observations. Additional benchmarks were placed throughout the project using a GNSS Base-Rover setup relative to Pt. CP1 and Pt. CP2. Two observations with a minimum of 4-hours between were collected and used in a weighted average.

This survey observed 3 local area county Control Monuments with published NAVD88 heights to compare to local ground control:

Worth County Control mark 106 has a published Elev. of 1263.39 (Geoid 03)
Survey Elev. = 1263.528 (Geoid 12b)

Worth County Control mark 702 has a published Elev. of 1216.63 (Geoid 03)
Survey Elev. = 1216.845 (Geoid 12b)

Worth County Control mark 107 has a published Elev. of 1234.57 (Geoid 03)
Survey Elev. = 1234.588 (Geoid 12b)

This survey observed 2 As-Built plan bench marks to compare to local ground control:

BM 131B Project F 268(5) As-built Paving Plan Elev.= 626.16
BM 501 This Survey Elev. = 1194.30

BM 132A Project F 268(5) As-built Paving Plan Elev.= 624.00
BM 503 This Survey Elev. = 1192.13

The average vertical difference is 568.135 to be applied to as-built plan elevations.

This survey established 2 local bench marks:

BM 500 Survey Elev. = 1187.83

BM 502 Survey Elev. = 1193.98

Horizontal Control

The project coordinate system for this survey is Iowa RCS Zone 2 (U.S. Survey Feet). This survey control is relative to IA RTN reference stations. IA RTN Reference Station coordinates are relative to the National Reference Station network datum: NAD83 (2011) for Epoch 2010.00 (2013 Adjustment). Coordinates were determined by conducting 2 concurrent 6-hour static observations. Additional control points were placed throughout the project using a GNSS Base-Rover setup relative to Pt. CP1 and Pt. CP2. Two observations with a minimum of 4-hours between were collected and used in a weighted average.

Alignment Information

The horizontal alignment for this survey is a retrace of As-built Plans No. F 268(5). Survey stationing was equated to the plan POT at STA 1809+38.1 and run back without equation throughout the survey.

Survey stationing relates to as built plan stationing as follows:

POT Sta. 1809+38.1 As-built Plan Project No. F 268(5)
Survey POT Sta. 1809+38.1

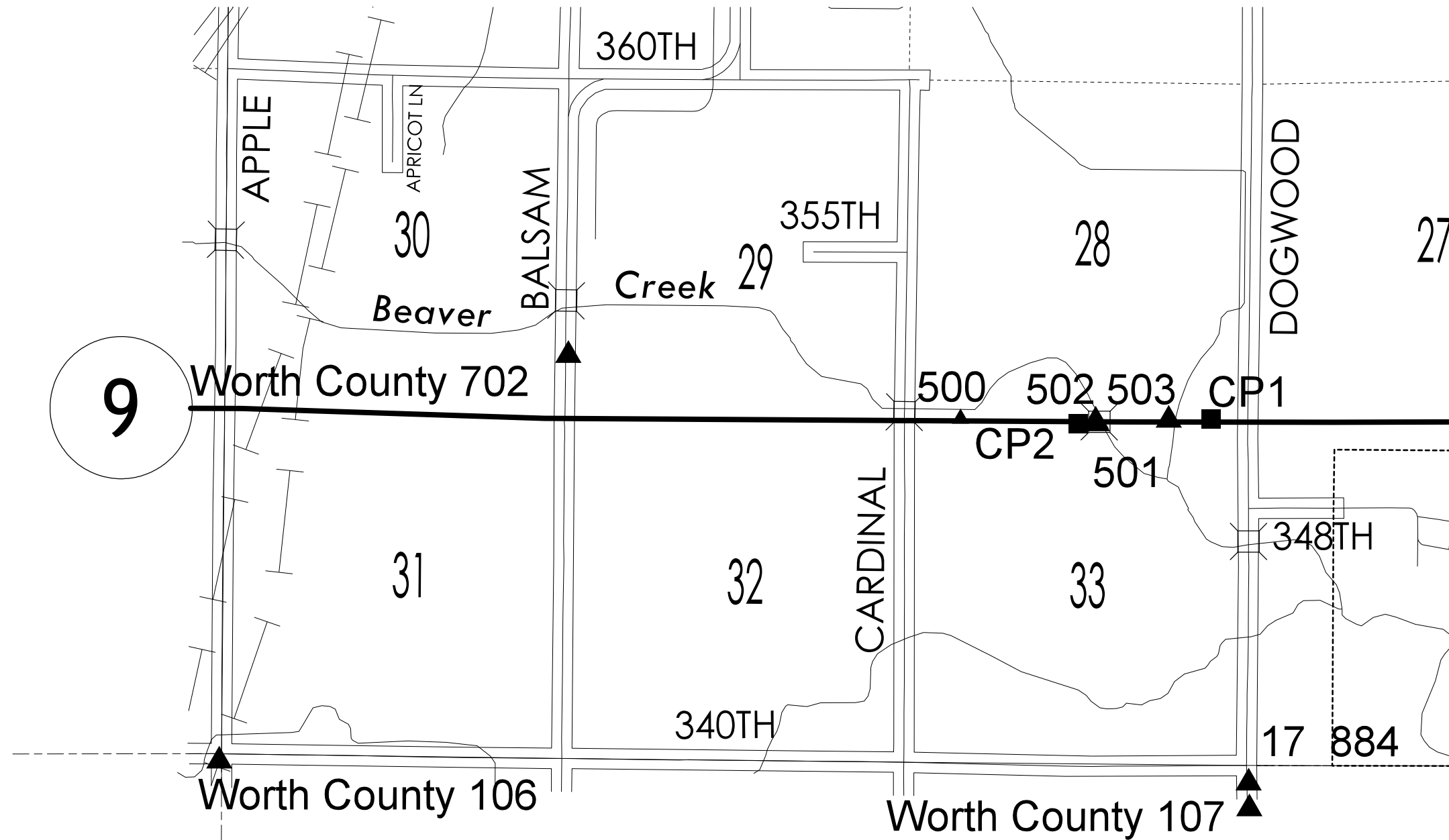
PI Sta. 1804+90.6 As-built Plan Project No. F 268(5)
Survey PI Sta. 1804+90.45

POT Sta. 1782+93.5 As-built Plan Project No. F 268(5)
Survey POT Sta. 1782+94.03

POT Sta. 1756+18.6 As-built Plan Project No. F 268(5)
Survey POT Sta. 1756+20.41

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 (2013 Adjustment)

VERT. DATUM: NAVD88

1a. Regional Coordinate System Zone 2

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) For EPOCH 2010.00 (2013 Adjustment)

VERT. DATUM: NAVD88

Ia. Regional Coordinate System Zone 2

Name: CP1

Description: SET FENO MONUMENT IS 18' W OF CL FLD ENT & 53' N OF CL STATE HWY 9 APPROX 570' W OF INTERSECTION STATE HWY 9 & DOGWOOD AVE (CO RD S-18)

Northing: 9838438.9218 Easting: 12316136.3568 Elevation: 1215.586

Name: CP2

Description: SET FENO MONUMENT IS 13' E OF CL FLD ENT & 27' S OF CL STATE HWY 9 APPROX 0.50 MI W OF INTERSECTION STATE HWY 9 & DOGWOOD AVE (CO RD S-18)

Northing: 9838365.5825 Easting: 12314079.4765 Elevation: 1191.437

Name: WORTH COUNTY 106

Description: FD NGS STYLE MON W/ACCESS COVER MONUMENT IS 105' S OF INTERSECTION APPLE AVE & 340TH ST & 35' W OF CL APPLE AVE

Northing: 9833149.4694 Easting: 12300779.4497 Elevation: 1263.528

Name: WORTH COUNTY 702

Description: FD USGS STANDARD BRASS TABLET STAMPED '9 SAN 1972' MON IS 1000' N OF INTERSECTION STATE HWY 9 & BALSAM AVE (CO RD S-14) 43' E OF CL S-14 & 45' N OF CL FLD ENT

Northing: 9839430.6111 Easting: 12306183.3142 Elevation: 1216.845

Name: WORTH COUNTY 107

Description: FD NGS STYLE MON W/ACCESS COVER MONUMENT IS 0.13 MI S OF INTERSECTION DOGWOOD AVE & 340TH ST IN BACKSLOPE OF EAST DITCH IN LINE WITH FENCE EAST

Northing: 9832409.5279 Easting: 12316724.1129 Elevation: 1234.588

Name: 17-884

Description: FD USC&GS&STATE CM W/ STANDARD BRASS TABLET STAMPED '17 884' MONUMENT IS 280' S OF INTERSECTION DOGWOOD AVE & 340TH ST IN EAST DITCH BOTTOM

Northing: 9832807.3899 Easting: 12316713.0087 Elevation: 1235.070

Name: 500

Description: FD IHC BRASS PLUG TOP CTR OUTLET HEADWALL 4'X4' RCB

Northing: 9838449.0844 Easting: 12312253.8153 Elevation: 1187.834

Name: 501

Description: FD SMALL CUT X TOP END SW WING FOUNDATION 80' X 30' DECK GIRDER BRIDGE A.B. PLAN ELEV=626.16

Northing: 9838371.0971 Easting: 12314363.0782 Elevation: 1194.296

Name: 502

Description: SET LARGE CUT X TOP NW WING FOUNDATION AT END HANDRAIL 80' X 30' DECK GIRDER BRIDGE

Northing: 9838411.7713 Easting: 12314345.9820 Elevation: 1193.977

Name: 503

Description: FD IHC BRASS PLUG TOP CTR INLET HEADWALL 6'X6'4" RCB A.B. PLAN ELEV=624.00

Northing: 9838425.6140 Easting: 12315476.7200 Elevation: 1192.132

108-26A
08-01-08

STAGING NOTES

Stage 1:
With traffic using detour, remove and replace bridge over Beaver Creek with RCB culvert.

Stage 2:
Reopen IA 9 to normal traffic pattern, using flaggers when needed.

108-23A
08-01-08

TRAFFIC CONTROL PLAN

1) While bridge is being removed and the RCB culvert and roadway are being installed, traffic shall be maintained via an off-site detour.

2) Detour signage to be installed, maintained, and removed by Iowa DOT District 2. Road closure signage and devices shall be furnished, installed, maintained and removed by Contractor. See sheet J.2 for proposed detour.

108-25
10-21-14

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
			No Travel Restrictions Expected									

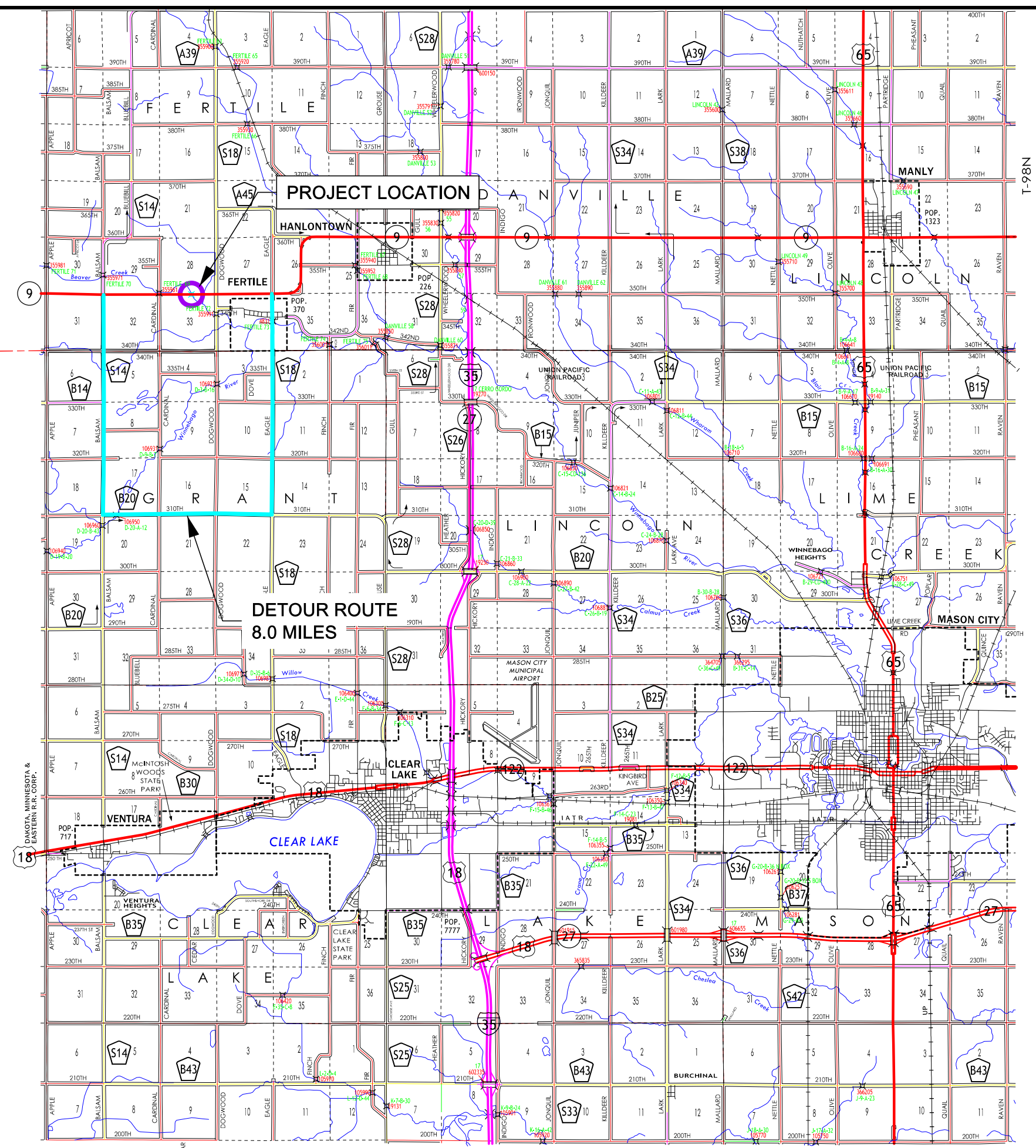
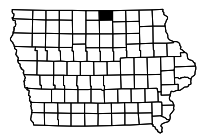
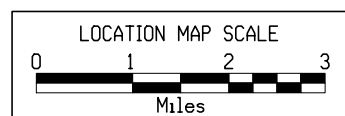
111-01
04-17-12

COORDINATED OPERATIONS

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

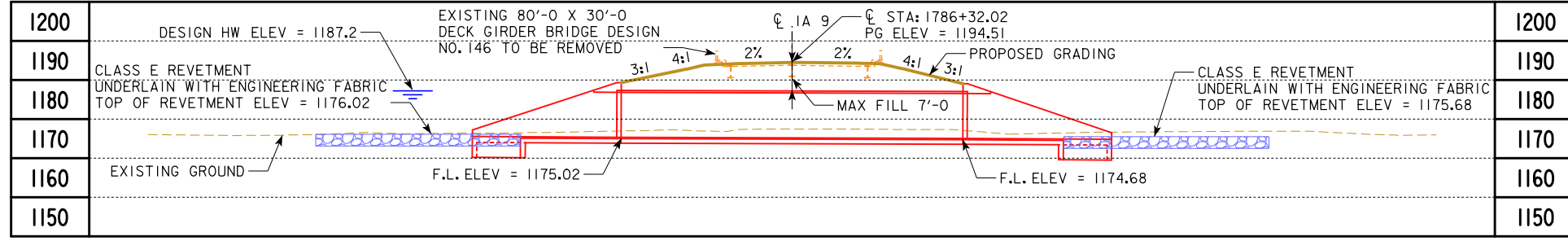
Project	Type of Work
None Provided	

— DETOUR ROUTE

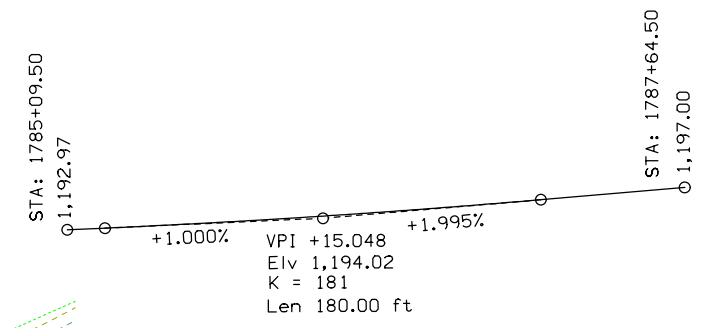


IA 9 Detour Route

BENCH MARK NO. 500 N:9838449.0844 E:12312253.8153 FD IHC PLUG TOP CTR OUTLET HEADWALL 4'X4' RCBC ELEV=1187.834



LONGITUDINAL SECTION ALONG CL CULVERT



PROPOSED PROFILE GRADE IA 9

NOTES:

- EXISTING 80'-0 x 30'-0 DECK GIRDER BRIDGE DESIGN NO. 146
- DRAINAGE THROUGH EXISTING CULVERT/CHANNEL MUST BE MAINTAINED THROUGHOUT CONSTRUCTION.
- FLOW LINE OF CULVERT NOMINALLY BURIED 1'-0.
- SEDIMENT REDUCTION WEDGES WILL BE NEEDED AT THE INLET OF THE CULVERT

HYDRAULIC DATA

DRAINAGE AREA = 54.2 SQ MI
 Q₅₀ = 2,070 CFS
 HW ELEV. = 1,187.2
 STREAM SLOPE = 3.25 FT./MI.
 Q₁₀₀ = 2450 CFS HW= 1187.8
 Q₅₀₀ = 3320 CFS HW= 1189.5

UTILITIES LEGEND:

- FO FIBER OPTIC LINE MEDIACOM
- E1 OVERHEAD ELECTRIC ALLIANT ENERGY
- T1 TELEPHONE LINE MUTUAL TELE CO OF MORNING SUN

LOCATION

IA9 OVER BEAVER CREEK
 T-98N R-22W
 SECTION 28 & 23
 FERTILE TOWNSHIP
 WORTH COUNTY
 FHWA NO. 54000
 BRIDGE MAINT. NO. 9866.5S009
 LATITUDE 43.269881°
 LONGITUDE -93.446822°

TRAFFIC ESTIMATE

2021 AADT	2800	V.P.D.
2041 AADT	3100	V.P.D.
2041 DHV	320	V.P.H.
TRUCKS	17	%

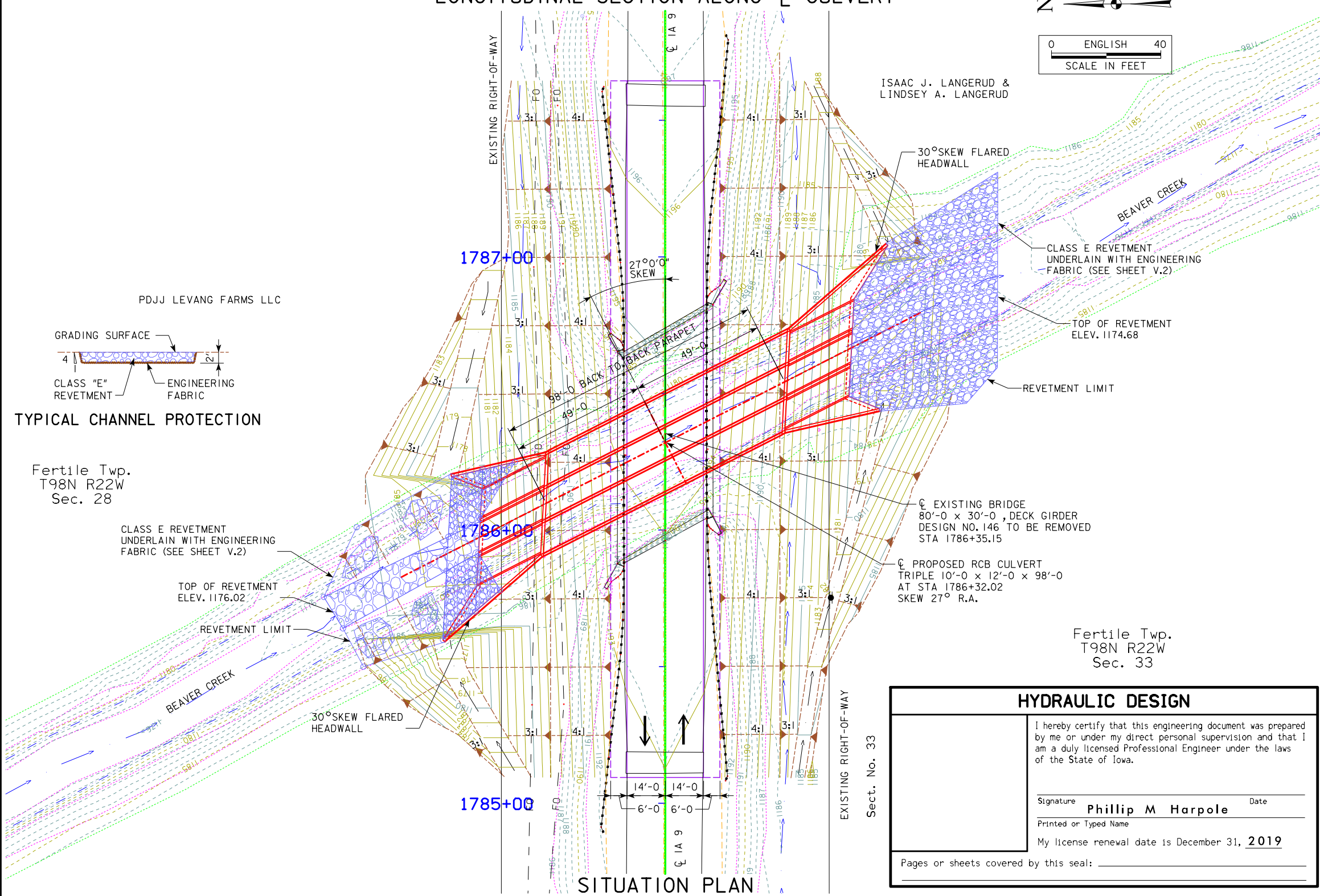
DESIGN FOR 27° SKEW R.A.
TRIPLE 10'-0 X 12'-0 X 98'-0
CAST IN PLACE RCBC CULVERT
SITUATION PLAN
 STATION 1786+32.02 JULY 2019
WORTH COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. OF 2 FILE NO. 31733 DESIGN NO. 121

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 Phillip M Harpole Date _____
 Printed or Typed Name
 My license renewal date is December 31, 2019

Pages or sheets covered by this seal: _____

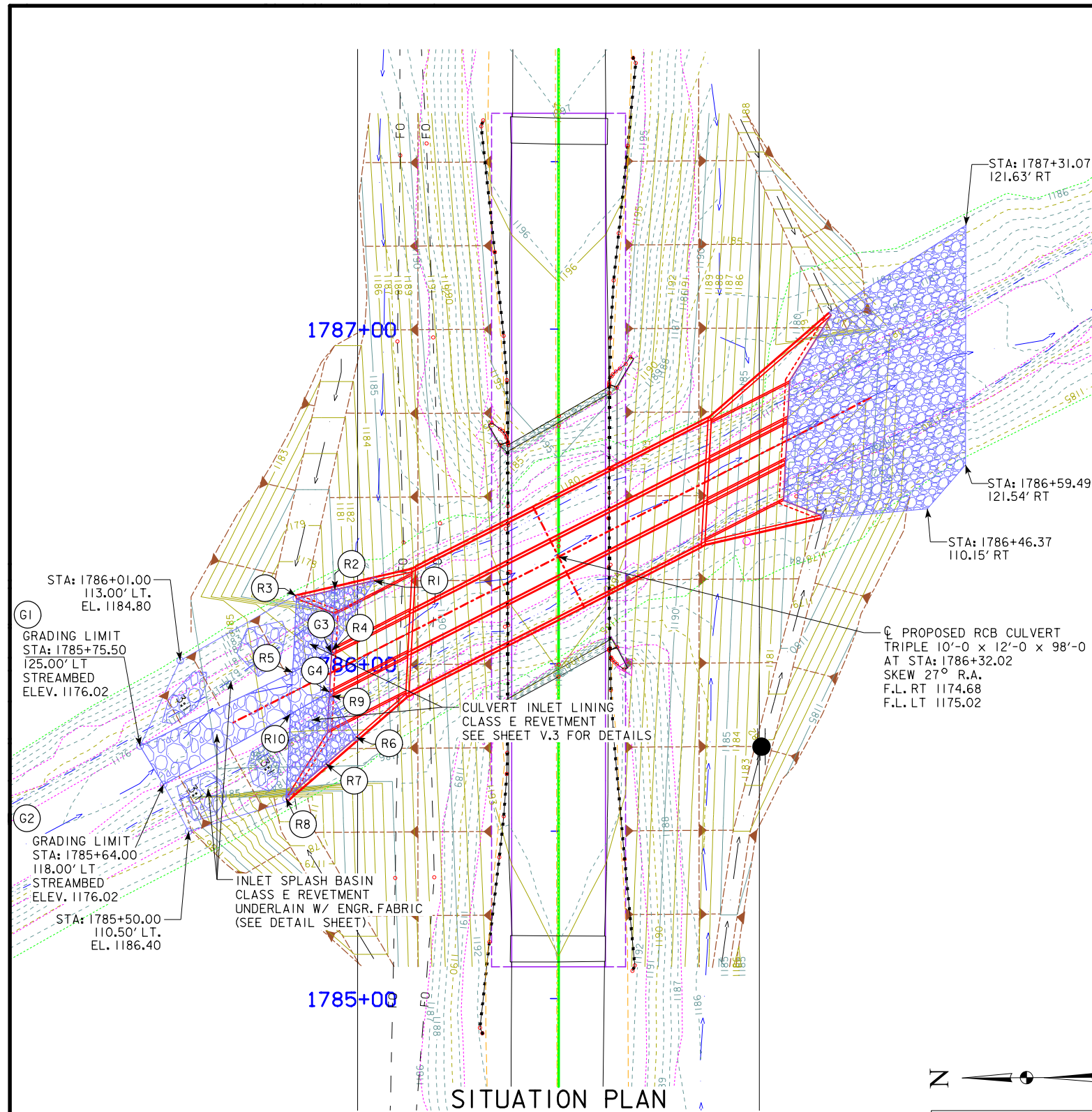


TYPICAL CHANNEL PROTECTION

PDJJ LEVANG FARMS LLC
 Fertile Twp.
 T98N R22W
 Sec. 28

Fertile Twp.
 T98N R22W
 Sec. 33

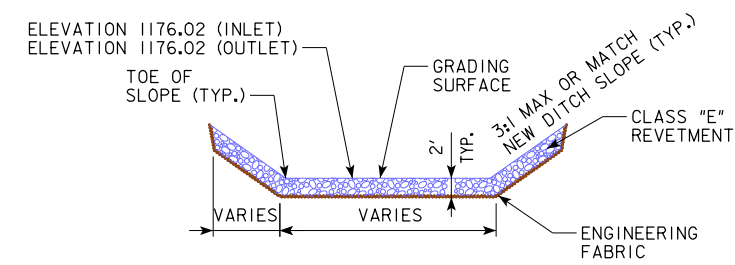
SITUATION PLAN



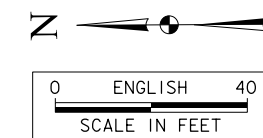
- CHANNEL GRADING CONTROL:**
- G1 TOE OF SLOPE OF SPLASH BASIN; BEGIN CHANNEL GRADING.
 - G2 TOE OF SLOPE OF SPLASH BASIN; BEGIN CHANNEL GRADING.
 - G3 STA: 1786+03.14, 67.80' LT., TOE OF SLOPE OF SPLASH BASIN; END CHANNEL GRADING, TOP OF REVETMENT EL. 1176.02
 - G4 STA: 1785+91.55, 68.40' LT., TOE OF SLOPE OF SPLASH BASIN; END CHANNEL GRADING, TOP OF REVETMENT EL. 1176.02

- REVETMENT LAYOUT:**
- R1 END CULVERT INLET LINING AT FACE WALL, RCB HDWL. STA: 1786+24.89, 55.10' LT., EL. 1176.02
 - R2 CULVERT INLET LINING, STA: 1786+22.19, 66.80' LT., EL. 1179.02
 - R3 BEGIN CULVERT INLET LINING, STA: 1786+19.55, 78.29' LT., EL. 1176.02
 - R4 CULVERT INLET LINING, STA: 1786+04.05, 67.75' LT., EL. 1176.02
 - R5 BEGIN CULVERT INLET LINING, STA: 1785+97.52, 79.44' LT., EL. 1176.02
 - R6 END CULVERT INLET LINING AT FACE WALL, RCB HDWL. STA: 1785+78.08, 60.47' LT., EL. 1176.02
 - R7 CULVERT INLET LINING, STA: 1785+70.24, 69.50' LT., EL. 1179.02
 - R8 BEGIN CULVERT INLET LINING, STA: 1785+59.85, 81.41' LT., EL. 1176.02
 - R9 CULVERT INLET LINING, STA: 1785+90.40, 67.73' LT., EL. 1176.02
 - R10 BEGIN CULVERT INLET LINING, STA: 1785+85.06, 80.09' LT., EL. 1176.02

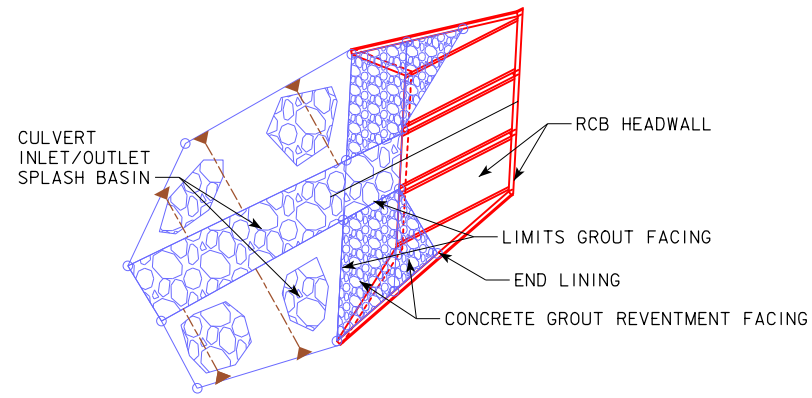
NOTE: ALL REVETMENT ELEVATIONS ARE TO TOP OF ROCK (GRADING SURFACE).



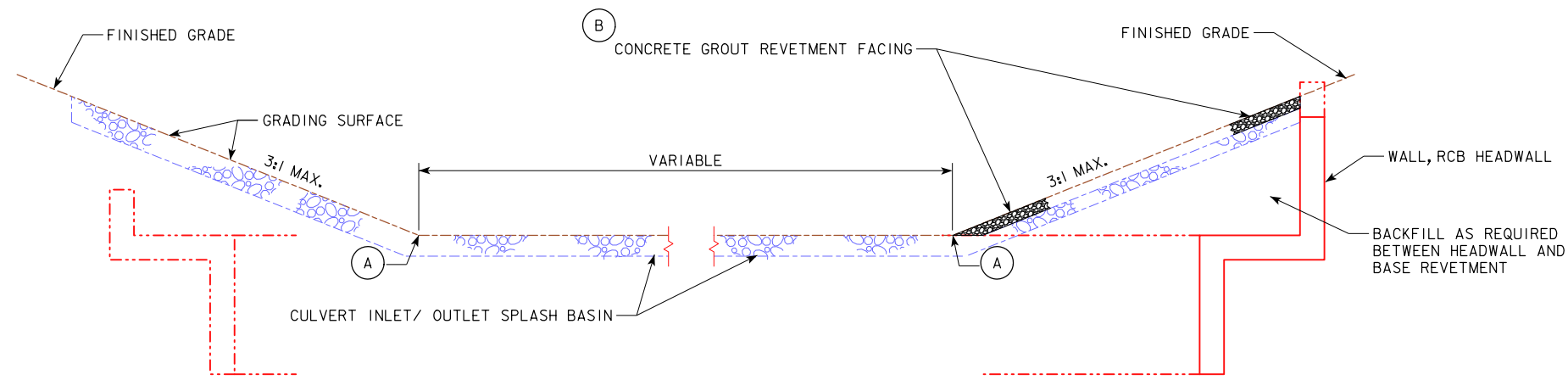
**CLASS E REVETMENT
INLET AND OUTLET SPLASH BASIN**



DESIGN FOR 27° SKEW R.A.
**TRIPLE 10'-0 X 12'-0 X 98'-0
 CAST IN PLACE RCB CULVERT**
SITUATION PLAN
 STATION 1786+32.02 JULY 2019
WORTH COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. ___ OF 2 FILE NO. 31733 DESIGN NO. 121



LINING PLAN ADJACENT TO HEADWALL



LINING ADJACENT TO HEADWALL

LINING WITHIN HEADWALL LIMITS

ESTIMATED REVENTMENT QUANTITIES				
LOCATION	REVENTMENT CL. "E" (TON)	CONCRETE GROUT (CY)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
INLET	368	16	349	213
OUTLET	413		426	258
TOTALS	781	16	775	471

SECTION THRU INLET/OUTLET LINING

- (A) TOE OF SPLASH BASIN
 - (B) CONCRETE GROUT FOR REVENTMENT FACING. THE PURPOSE OF THE GROUT IS TO FILL SURFACE VOIDS TO MINIMIZE SUBSTRATE FOR VEGETATIVE GROWTH. APPLY TO REVENTMENT SIDE AND END SLOPES WITHIN LIMITS OF RCB HEADWALL AS SHOWN.
- GROUT PENETRATION TTD 2/3 OF THE ROCK BLANKET DEPTH IS REQUIRED. FINISH THE GROUT SO THAT FACE STONES ARE LEFT EXPOSED FOR NO MORE THAN 3 IN.

DESIGN FOR 27° SKEW R.A.

TRIPLE 10'-0 X 12'-0 X 98'-0

CAST IN PLACE RCB CULVERT

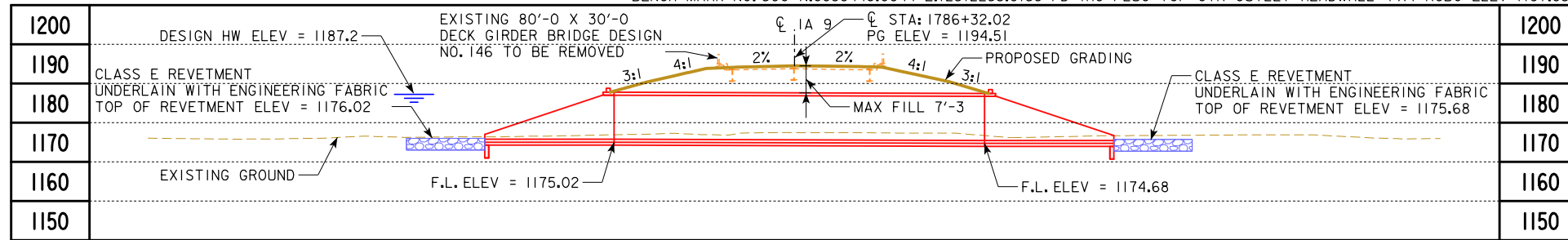
SITUATION PLAN

STATION 1786+32.02 JULY 2019

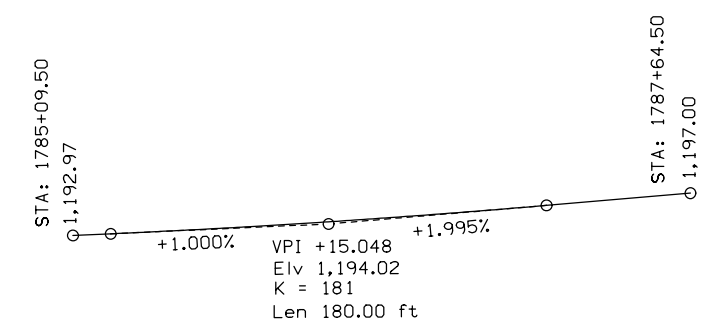
WORTH COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

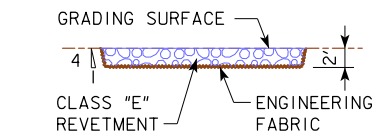
DESIGN SHEET NO. ____ OF 2 FILE NO. 31733 DESIGN NO. 121



LONGITUDINAL SECTION ALONG CL CULVERT



PROPOSED PROFILE GRADE IA 9



TYPICAL CHANNEL PROTECTION

NOTES:

- EXISTING 80'-0 x 30'-0 DECK GIRDER BRIDGE DESIGN NO. 146
- DRAINAGE THROUGH EXISTING CULVERT/CHANNEL MUST BE MAINTAINED THROUGHOUT CONSTRUCTION.
- FLOW LINE OF CULVERT NOMINALLY BURIED 1'-0.
- SEDIMENT REDUCTION WEDGES WILL BE NEEDED AT THE INLET OF THE CULVERT

HYDRAULIC DATA

DRAINAGE AREA = 54.2 SQ MI
 Q₅₀ = 2,070 CFS
 HW ELEV. = 1,187.2
 STREAM SLOPE = 3.25 FT./MI.
 Q₁₀₀ = 2450 CFS HW= 1187.9
 Q₅₀₀ = 3320 CFS HW= 1189.7

UTILITIES LEGEND:

- FO FIBER OPTIC LINE MEDIACOM
- E1 OVERHEAD ELECTRIC ALLIANT ENERGY
- T1 TELEPHONE LINE MUTUAL TELE CO OF MORNING SUN

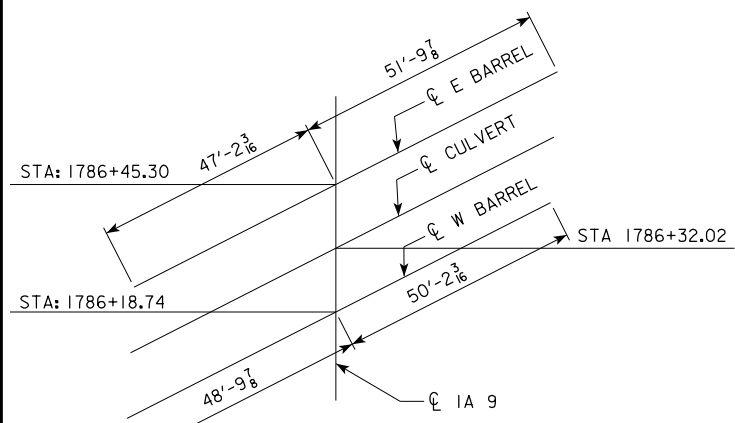
LOCATION

IA9 OVER BEAVER CREEK
 T-98N R-22W
 SECTION 28 & 23
 FERTILE TOWNSHIP
 WORTH COUNTY
 FHWA NO. 54000
 BRIDGE MAINT. NO. 9866.5S009
 LATITUDE 43.269881°
 LONGITUDE -93.446822°

TRAFFIC ESTIMATE

2021 AADT	2800	V.P.D.
2041 AADT	3100	V.P.D.
2041 DHV	320	V.P.H.
TRUCKS	17	%

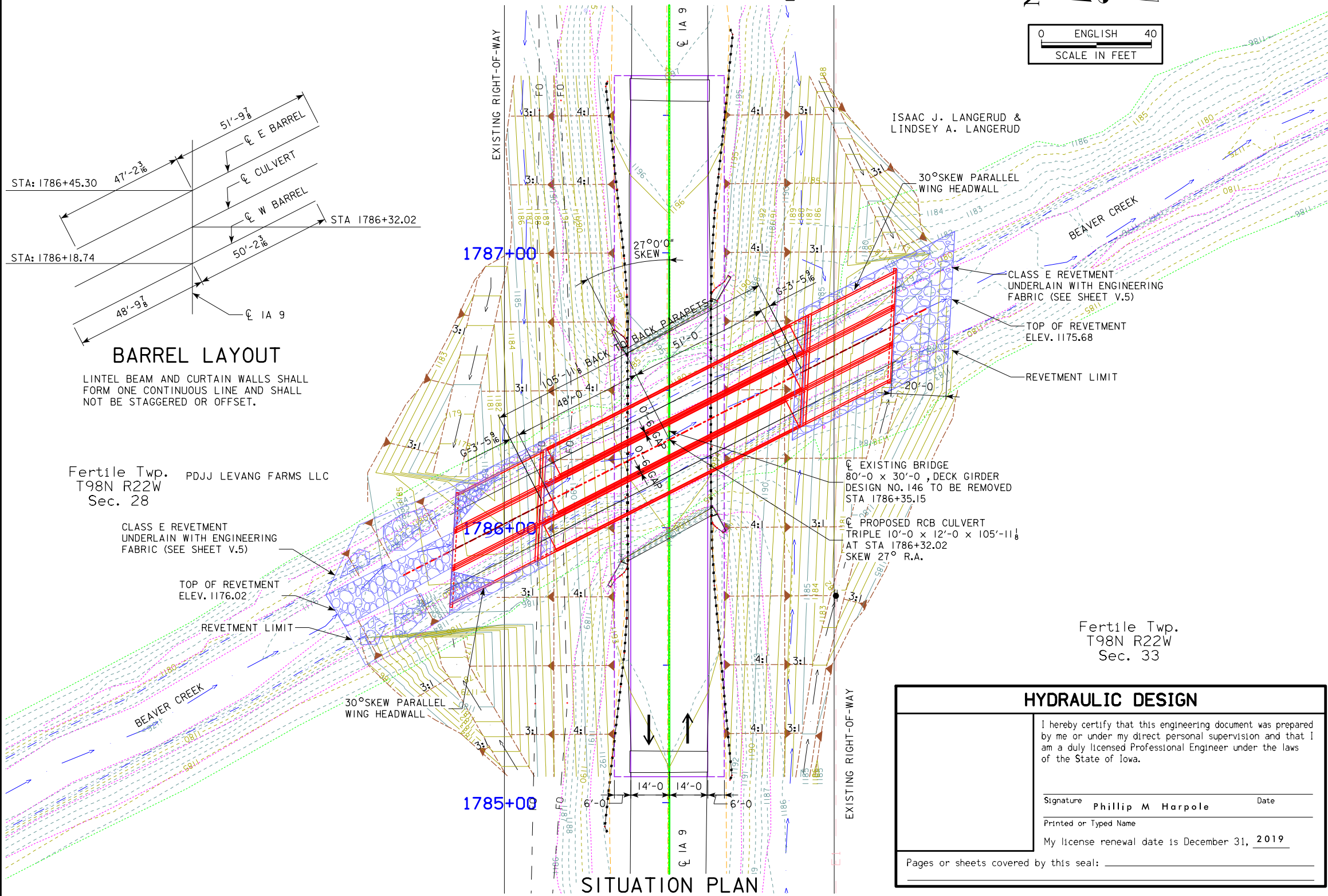
DESIGN FOR 27° SKEW R.A.
TRIPLE 10'-0 X 12'-0 X 105'-11 1/2
PRECAST RCBC CULVERT
SITUATION PLAN
 STATION 1786+32.02 JULY 2019
WORTH COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. OF 2 FILE NO. 31733 DESIGN NO. 121



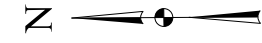
BARREL LAYOUT

LINTEL BEAM AND CURTAIN WALLS SHALL FORM ONE CONTINUOUS LINE AND SHALL NOT BE STAGGERED OR OFFSET.

Fertile Twp. PDJJ LEVANG FARMS LLC
 T98N R22W
 Sec. 28



SITUATION PLAN

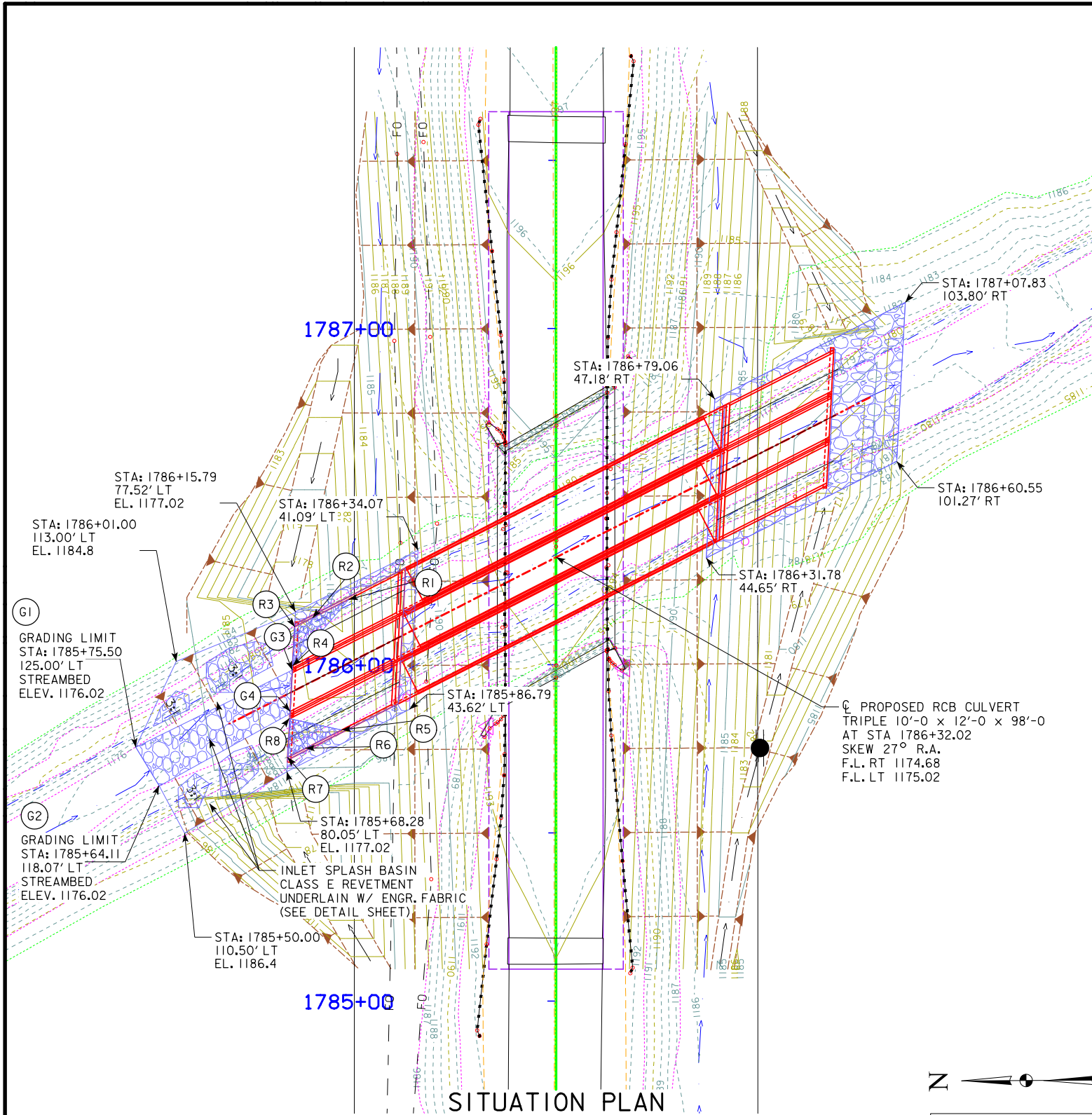


HYDRAULIC DESIGN

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 Phillip M Harpole Date
 Printed or Typed Name
 My license renewal date is December 31, 2019

Pages or sheets covered by this seal:



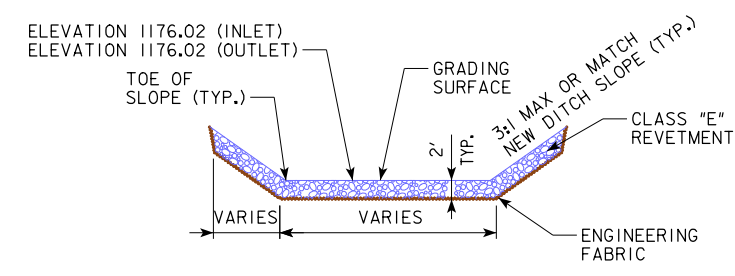
CHANNEL GRADING CONTROL:

- G1 TOE OF SLOPE OF SPLASH BASIN; BEGIN CHANNEL GRADING.
- G2 TOE OF SLOPE OF SPLASH BASIN; BEGIN CHANNEL GRADING.
- G3 STA: 1785+98.45, 78.45' LT., TOE OF SLOPE OF SPLASH BASIN; END CHANNEL GRADING, TOP OF REVETMENT EL. 1176.02
- G4 STA: 1785+86.15, 79.10' LT., TOE OF SLOPE OF SPLASH BASIN; END CHANNEL GRADING, TOP OF REVETMENT EL. 1176.02

REVETMENT LAYOUT:

- R1 END CULVERT INLET LINING AT FACE WALL, RCB HDWL. STA: 1786+19.48, 61.71' LT., EL. 1176.02
- R2 CULVERT INLET LINING, STA: 1786+14.04, 72.41' LT., EL. 1179.02
- R3 BEGIN CULVERT INLET LINING, STA: 1786+11.33, 77.76' LT., EL. 1176.02
- R4 CULVERT INLET LINING, STA: 1785+99.80, 78.38' LT., EL. 1176.02
- R5 BEGIN CULVERT INLET LINING, STA: 1785+80.65, 63.79' LT., EL. 1176.02
- R6 END CULVERT INLET LINING AT FACE WALL, RCB HDWL. STA: 1785+75.22, 74.48' LT., EL. 1179.02
- R7 CULVERT INLET LINING, STA: 1785+72.50, 79.83' LT., EL. 1176.02
- R8 BEGIN CULVERT INLET LINING, STA: 1785+84.03, 79.22' LT., EL. 1176.02

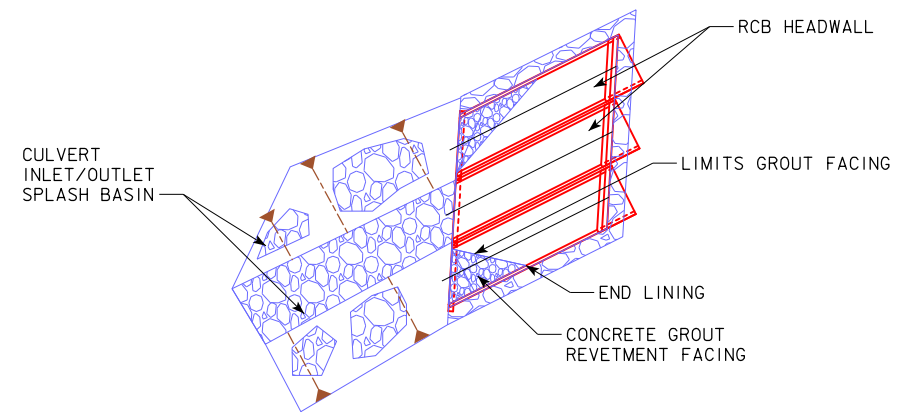
NOTE: ALL REVETMENT ELEVATIONS ARE TO TOP OF ROCK (GRADING SURFACE).



**CLASS E REVETMENT
INLET AND OUTLET SPLASH BASIN**

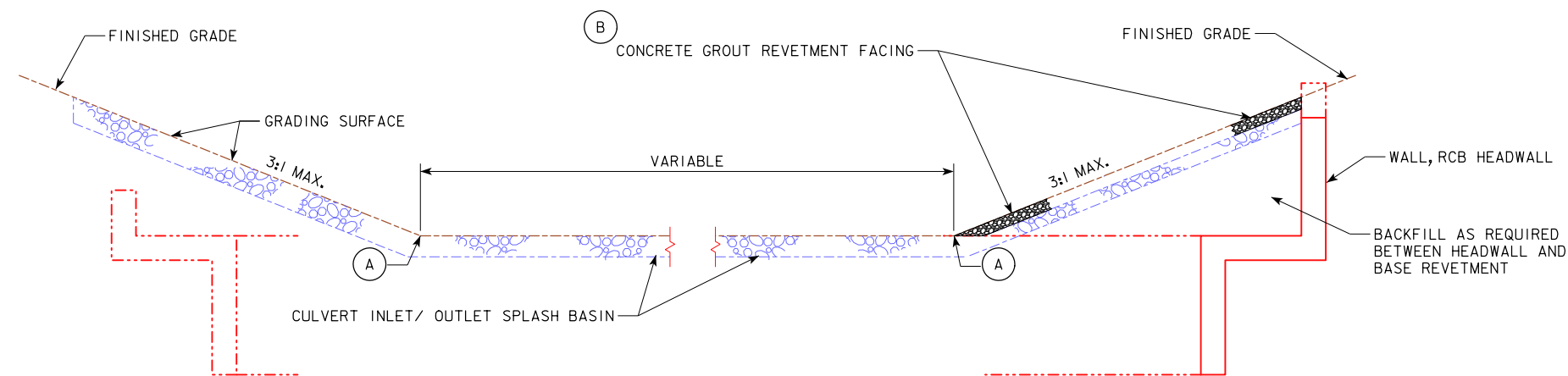
PROPOSED RCB CULVERT
TRIPLE 10'-0" X 12'-0" X 98'-0"
AT STA 1786+32.02
SKEW 27° R.A.
F.L. RT 1174.68
F.L. LT 1175.02

DESIGN FOR 27° SKEW R.A.
TRIPLE 10'-0" X 12'-0" X 105'-11"
PRECAST RCB CULVERT
SITUATION PLAN
 STATION 1786+32.02 JULY 2019
WORTH COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. ___ OF 2 FILE NO. 31733 DESIGN NO. 121



LINING PLAN ADJACENT TO HEADWALL

ESTIMATED REVETMENT QUANTITIES				
LOCATION	REVETMENT CL. "E" (TON)	CONCRETE GROUT (CY)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
INLET	286	5	321	134
OUTLET	158		186	98
TOTALS	444	5	507	232



LINING ADJACENT TO HEADWALL

LINING WITHIN HEADWALL LIMITS

SECTION THRU INLET/OUTLET LINING

- (A) TOE OF SPLASH BASIN
 - (B) CONCRETE GROUT FOR REVETMENT FACING. THE PURPOSE OF THE GROUT IS TO FILL SURFACE VOIDS TO MINIMIZE SUBSTRATE FOR VEGETATIVE GROWTH. APPLY TO REVETMENT SIDE AND END SLOPES WITHIN LIMITS OF RCB HEADWALL AS SHOWN.
- GROUT PENETRATION TTD 2/3 OF THE ROCK BLANKET DEPTH IS REQUIRED. FINISH THE GROUT SO THAT FACE STONES ARE LEFT EXPOSED FOR NO MORE THAN 3 IN.

DESIGN FOR 27° SKEW R.A.
TRIPLE 10'-0 X 12'-0 X 105'-11 1/8
PRECAST RCB CULVERT
SITUATION PLAN
 STATION 1786+32.02 JULY 2019
WORTH COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. ____ OF 2 FILE NO. 31733 DESIGN NO. 121

LINE STYLE LEGEND OF CROSS SECTION SHEETS (ROAD)

- - - - - - Existing Ground Line
- Proposed Template
- Proposed Topsoil Placement
- - - - - Additional Topsoil Removal
- Subgrade Treatment
- - - - - Granular Shoulder
- Pavement
- - - - - Existing Pipe\R/CB
- Proposed Pipe\R/CB
- Proposed Dike
- All Elements Associated with Proposed Entrances

LINE STYLE LEGEND OF CROSS SECTION SHEETS (SOILS)

- TS————— Topsoil (Class 10)
- SLOPE DRESSING — Slope Dressing Only
- CL 10————— Class 10 Materials
- SEL L0————— Select Loams And Clay-Loams
- SEL SA————— Select Sand
- UNS A————— Unsuitable Type A Disposal
- UNS B————— Unsuitable Type B Disposal
- UNS C————— Unsuitable Type C Disposal
- SHALE————— Shale
- WASTE————— Waste
- B&W LS————— Broken and Weathered Rock
- ROCK————— Solid Rock
- Boulders

Note: All layer lines and descriptions identify layers above the line.

Note: Vertical or near vertical lines connecting soil layers at edges of cross sections are only for the purpose of calculating template quantities and do not depict soil stratification.

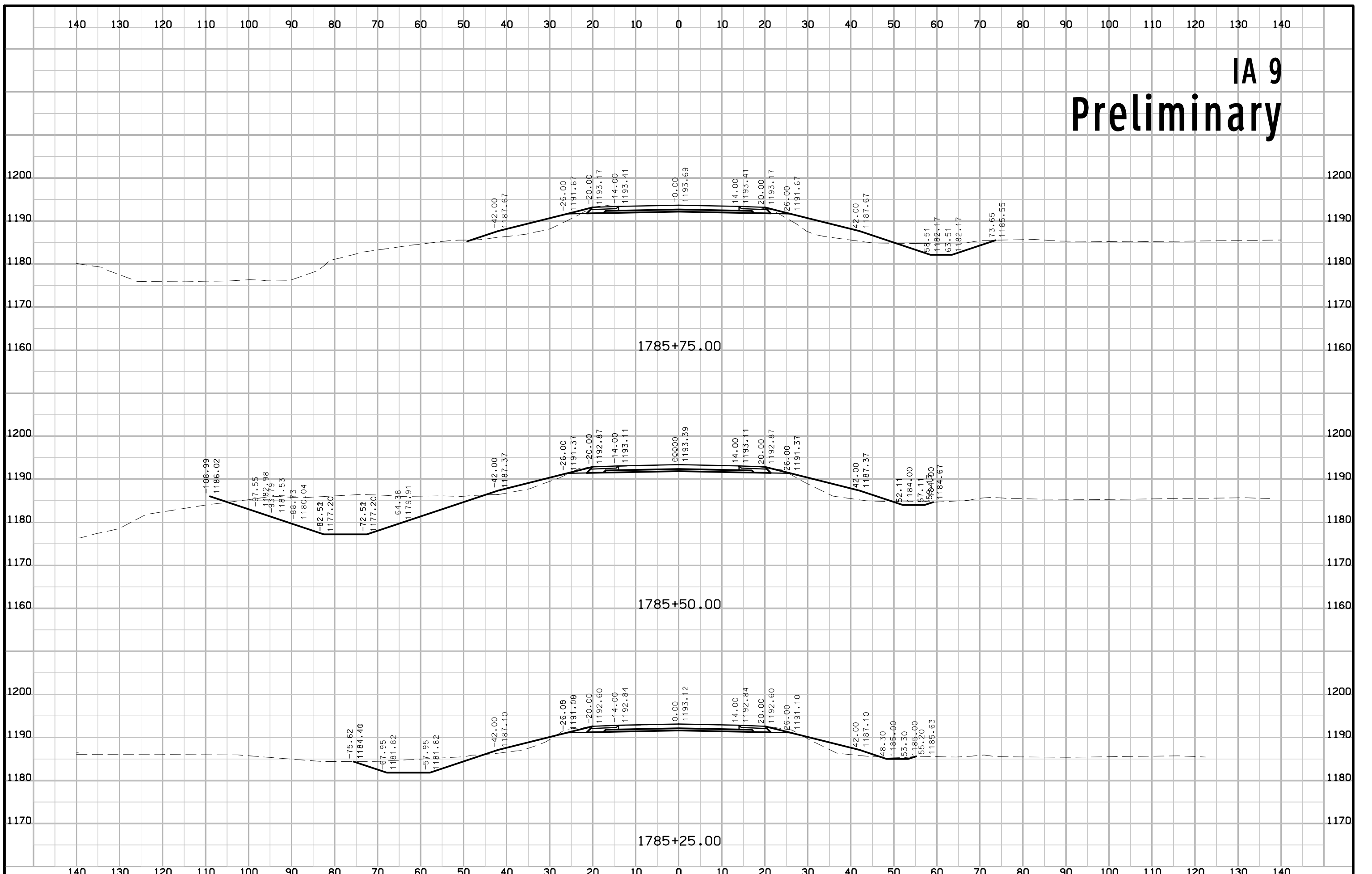
SYMBOL LEGEND OF CROSS SECTION SHEETS

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

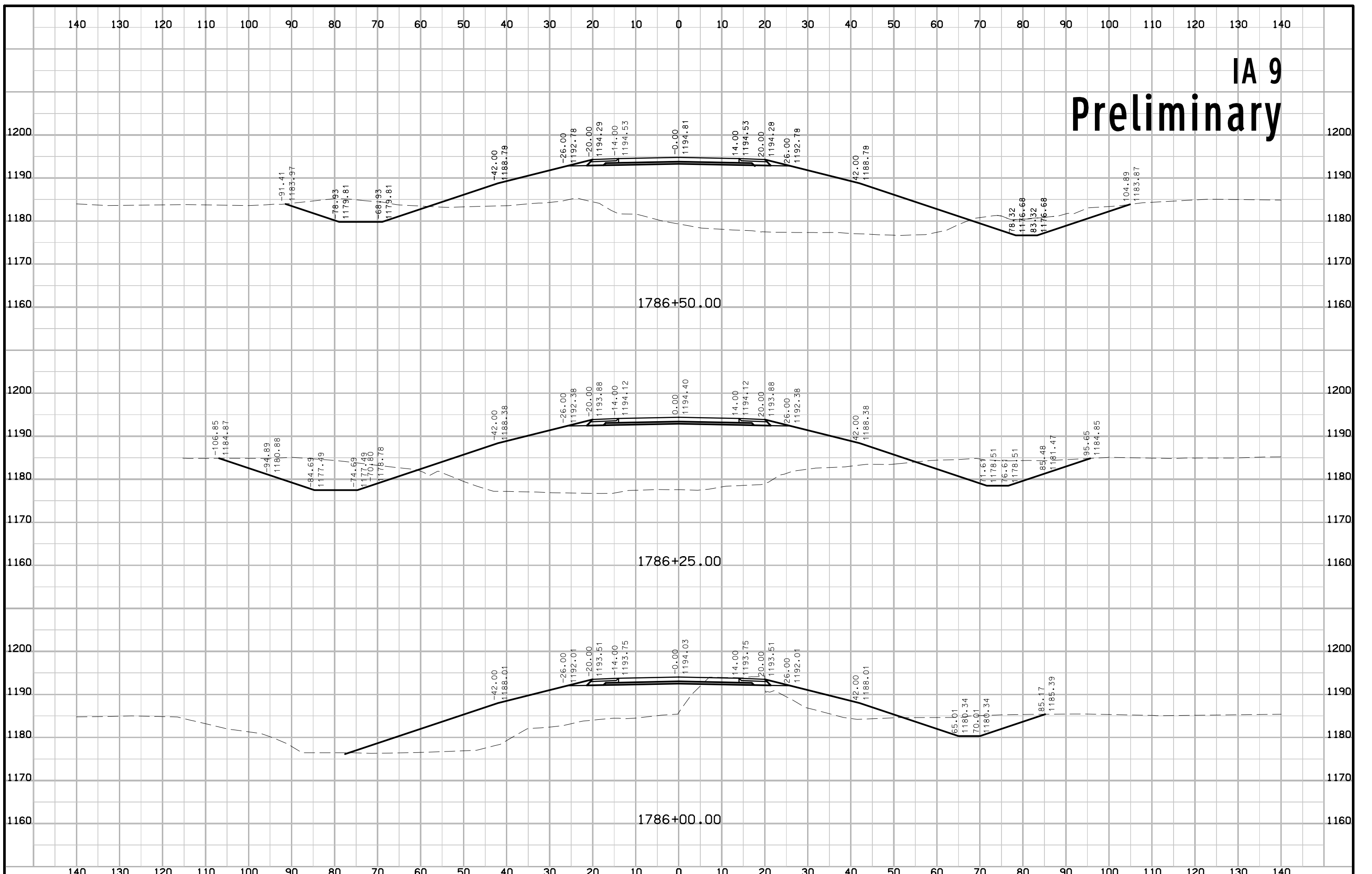
**CROSS SECTION
LEGEND AND SYMBOL
INFORMATION SHEET**

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

IA 9 Preliminary



IA 9 Preliminary



IA 9 Preliminary

