

**WASHINGTON CO.**  
**RCB CULVERT REPLACEMENT - TWIN BOX**  
**BRFN-022-2(74)--39-92**  
 LETTING DATE 12/15/2020



**Highway Division**

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM  
**WASHINGTON COUNTY**  
 RCB CULVERT REPLACEMENT - TWIN BOX

IA 22 OVER BULGERS RUN 4.8 MI. E OF IA 1

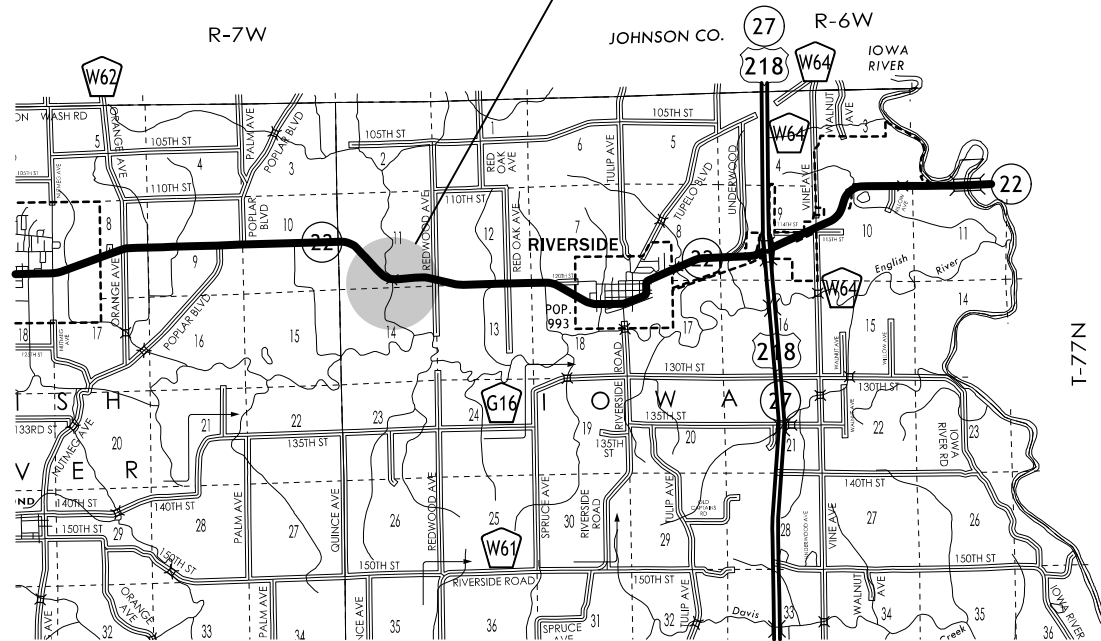
SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

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



STA. 350+26.50  
 FHWA 51740  
 MAINT. 9240.OS022  
 DESIGN 3534



**NO PROJECT LENGTH SUMMARY**

| DESIGN DATA RURAL |        |           |        |
|-------------------|--------|-----------|--------|
| 2021              | AADT   | 5300      | V.P.D. |
| 2041              | AADT   | 7300      | V.P.D. |
| 2041              | DHV    | 760       | V.P.H. |
|                   | TRUCKS | 10        | %      |
| Total             |        |           |        |
| Design            | ESALs  | 1,935,000 |        |

| INDEX OF SEALS |                 |                         |
|----------------|-----------------|-------------------------|
| SHEET NO.      | NAME            | TYPE                    |
| A.1            | Mark D. Rooney  | Primary Signature Block |
| V.1            | Brian Sandberg  | Hydraulic Design        |
| V.2            | Brian Sandberg  | Hydraulic Design        |
| Q.1            | Bhooshan Karnik | Geotechnical Design     |

**PRELIMINARY PLANS**

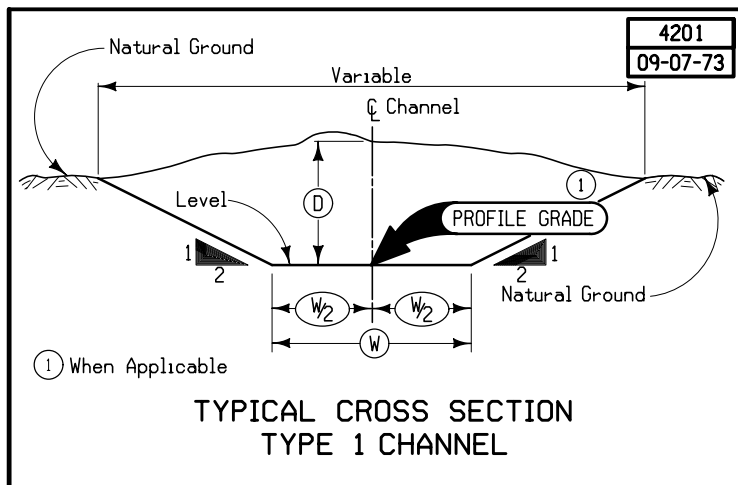
Subject to change by final design.

**D5 PLAN-Date: 11/9/2018**

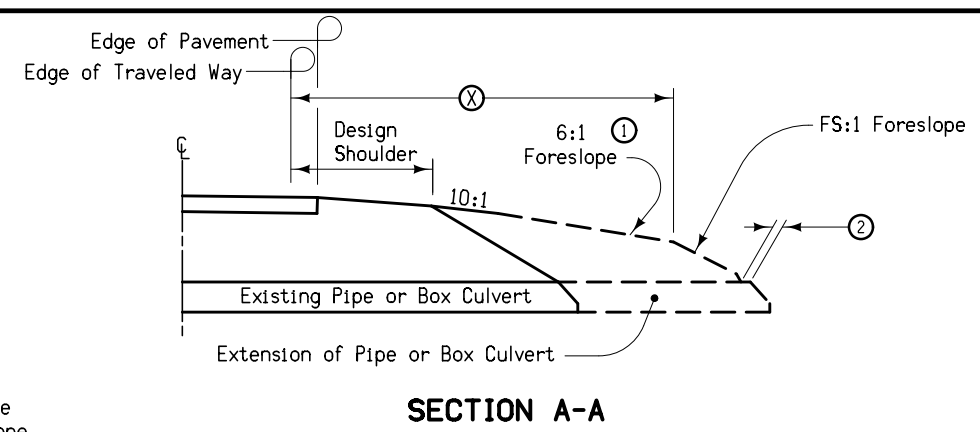
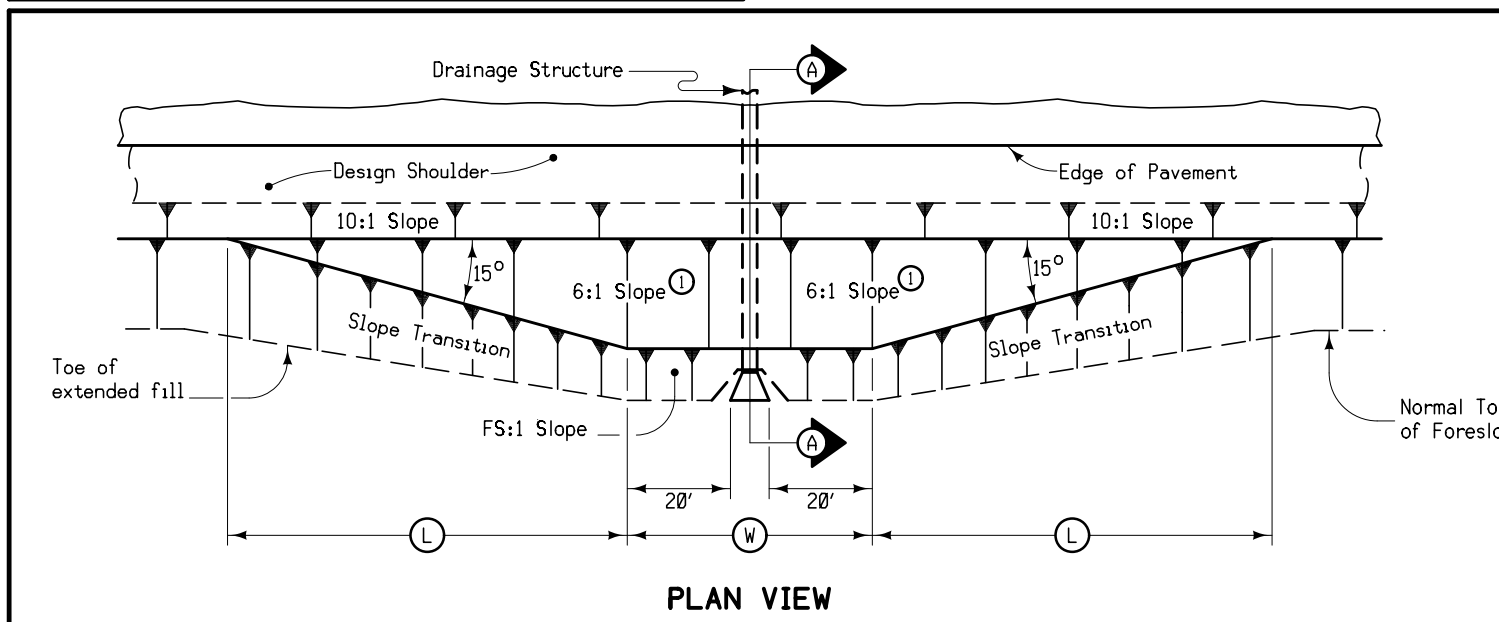
| INDEX OF SHEETS |  |
|-----------------|--|
| No.             | DESCRIPTION                                      |
| <b>A Sheets</b> | <b>Title Sheets</b>                              |
| A.1             | Title Sheet                                      |
| <b>B Sheets</b> | <b>Typical Cross Sections and Details</b>        |
| B.1 - 2         | Typical Cross Sections and Details               |
| <b>D Sheets</b> | <b>Mainline Plan and Profile Sheets</b>          |
| * D.1           | Plan & Profile Legend & Symbol Information Sheet |
| * D.2           | Highway 22 Plan                                  |
| * D.3           | Highway 22 Profile                               |
| <b>E Sheets</b> | <b>Channel Plan and Profile Sheets</b>           |
| * E.1           | Bulgurs Run Plan                                 |
| * E.2           | Bulgurs Run Profile                              |
| <b>G Sheets</b> | <b>Survey Sheets</b>                             |
| G.1             | Reference Ties and Bench Marks                   |
| G.2             | Control Point Vicinity Map                       |
| G.3             | Horizontal and Vertical Control                  |
| <b>J Sheets</b> | <b>Traffic Control and Staging Sheets</b>        |
| * J.1           | Detour Option 1                                  |
| * J.2           | Detour Option 2                                  |
| J.3             | Traffic Control Plan                             |
| <b>Q Sheets</b> | <b>Soils Sheets</b>                              |
| Q.1             | Soils Sheets Highway 22                          |
| <b>V Sheets</b> | <b>Bridge and Culvert Situation Plans</b>        |
| * V.1 - 2       | Bridge and Culvert Situation Plans               |
| <b>W Sheets</b> | <b>Mainline Cross Sections</b>                   |
| W.1 - 3         | Highway 22 Cross Sections                        |
| <b>X Sheets</b> | <b>Channel Cross Sections</b>                    |
| X.1 - 7         | Bulgurs Run Cross Sections                       |
|                 | * Color Plan Sheets                              |

| REVISIONS                     |       |
|-------------------------------|-------|
|                               | TOTAL |
|                               | 27    |
| PROJECT IDENTIFICATION NUMBER |       |
| 16-92-022-010                 |       |
| PROJECT NUMBER                |       |
| BRFN-022-2(74)--39-92         |       |
| R.O.W. PROJECT NUMBER         |       |
| STPN-022-2(75)--2J-92         |       |





| LOCATION   |      | WIDTH | DEPTH (Average) |
|------------|------|-------|-----------------|
| STATION    | SIDE | (W)   | (D)             |
| 1000+10.58 | N/A  | 10.5  | 10              |
| 1003+67.06 | N/A  | 7     | 10              |



| STRUCTURE LOCATION |      | (W)  | (L)  | (X)  | (FS) |
|--------------------|------|------|------|------|------|
| STATION            | SIDE | Feet | Feet | Feet |      |
| 350+34.46          | BOTH | 87   | 50   | 32   | 3:1  |
|                    |      |      |      |      |      |

4311  
04-18-17

- Notes:
- At locations where an extended or newly constructed drainage structure extends beyond the normal foreslope cover, flatten the foreslope as indicated so as to cover the structure. Minimum earth cover is 6".
  - ① Slope may be flatter than 6:1.
  - ② 6" Minimum for pipe installations or to top of headwall on R.C.B.
  - (W) = Pipe or R.C.B. opening width plus 20 feet each side.

**BARNROOF FORESLOPE  
AT DRAINAGE STRUCTURE**

**SURVEY SYMBOLS**

- ▲ BM Bench Mark
- FENO FENO Monument
- ▲ PCP Photo Control Point
- WC Wild Card (Misc. Field Shot)
- EP Edge of Paved Roads (ML or SR)
- SNP Unpaved Shoulder
- C Centerline BL of Road (ML or SR)
- ENP Edge Paved Entrance & Park Lot
- ENT Centerline BL of Entrance
- PIP Pipe Culvert
- SOP Size of Pipe or Culvert
- REF Reference Tie Point
- FO — F01D Fiber Optic Co. 1 - Quality D
- T1 — T11D Telephone Line Co. 1 - Quality D
- TV — T11D TV Cable Co. 1 - Quality D
- D Centerline Draw or Stream (Down)
- BL Topo Breakline
- PPA Power Pole Co. 1
- x— FW Wire Fence
- ROW Right of Way Mark
- BD Bridge Deck
- BRG Bridge
- CON Concrete or A/C Slab
- BCL Bridge Centerline
- TW Top of Water
- DTM Photogrammetry Elv Control Check
- EW Edge of Water
- GR Ground Shot
- BLS Bridge Low Steel
- PRO Profile Shot
- ▲ PI Tangent Point

**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 — Windstream Communications  
 Kelly Eggers  
 Engineer  
 101 West Madison  
 Mt. Pleasant, IA 52641  
 (319) 385-5004 Work  
 (319) 931-1372 Mobile  
 kelly.a.egggers@windstream.com

— TV — Mediacom Communications Corporation  
 Darwin Driscoll  
 Construction Specialist III  
 546 Southgate Ave  
 Iowa City, IA 52240  
 (845) 204-5742 Mobile  
 ddriscoll@mediacomcc.com

● Eastern Iowa Electric  
 Tom Quiram  
 PO Box 3003  
 Wilton, IA 52778  
 (563) 732-2211 Work  
 (563) 529-3709 Mobile  
 tquiram@easterniowa.com

**PLAN VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS**

| LINEWORK         | Design Color No. |  |
|------------------|------------------|--|
| Green            | (2)              | Existing Topographic Features and Labels                               |
| Blue             | (1)              | Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation    |
| Magenta          | (5)              | Existing Utilities   |
| SHADING          |                  |  |
| Design Color No. |                  |  |
| 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
- ▲ Section Corner
- Ground Line Intercept
- /// Saw Cut
- Guardrail
- Trench Drain
- HighTension Cable Guardrail
- ~ Sheet Pile
- ▨ Pavement Removal
- ▩ Clearing & Grubbing Area

**RIGHT-OF-WAY LEGEND**

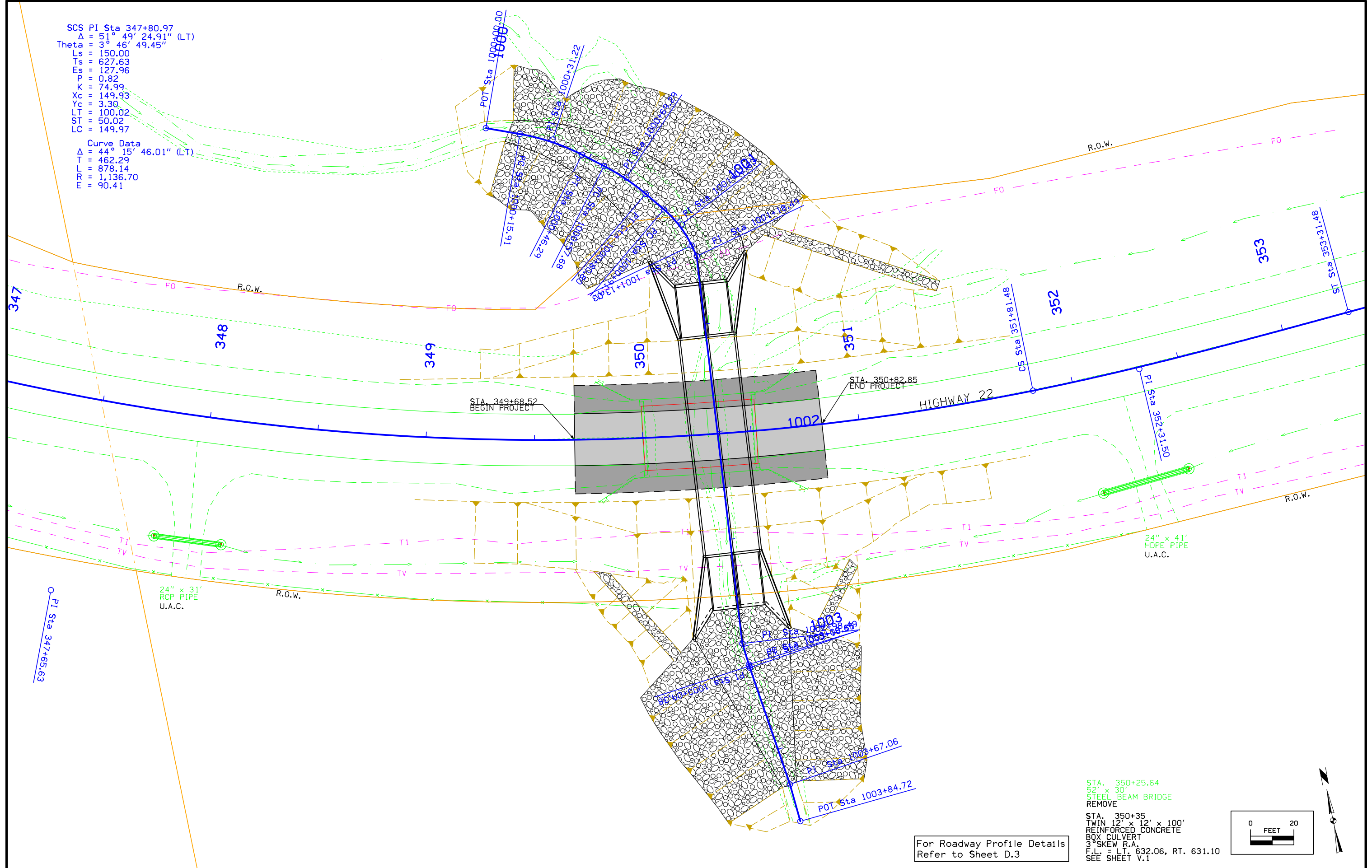
- ▲ Proposed Right-of-Way
- △ Existing Right of Way
- ▲ Existing and Proposed Right-of-Way
- ▲ Easement and Existing Right-of-Way
- Easement (Temporary)
- Easement
- C/A Access Control
- Property Line

**PLAN AND PROFILE**

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

SCS PI Sta 347+80.97  
 $\Delta = 51^\circ 49' 24.91''$  (LT)  
 Theta =  $3^\circ 46' 49.45''$   
 Ls = 150.00  
 Ts = 627.63  
 Es = 127.96  
 P = 0.82  
 K = 74.99  
 Xc = 149.93  
 Yc = 3.30  
 LT = 100.02  
 ST = 50.02  
 LC = 149.97

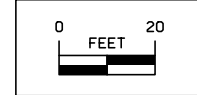
Curve Data  
 $\Delta = 44^\circ 15' 46.01''$  (LT)  
 T = 462.29  
 L = 878.14  
 R = 1,136.70  
 E = 90.41

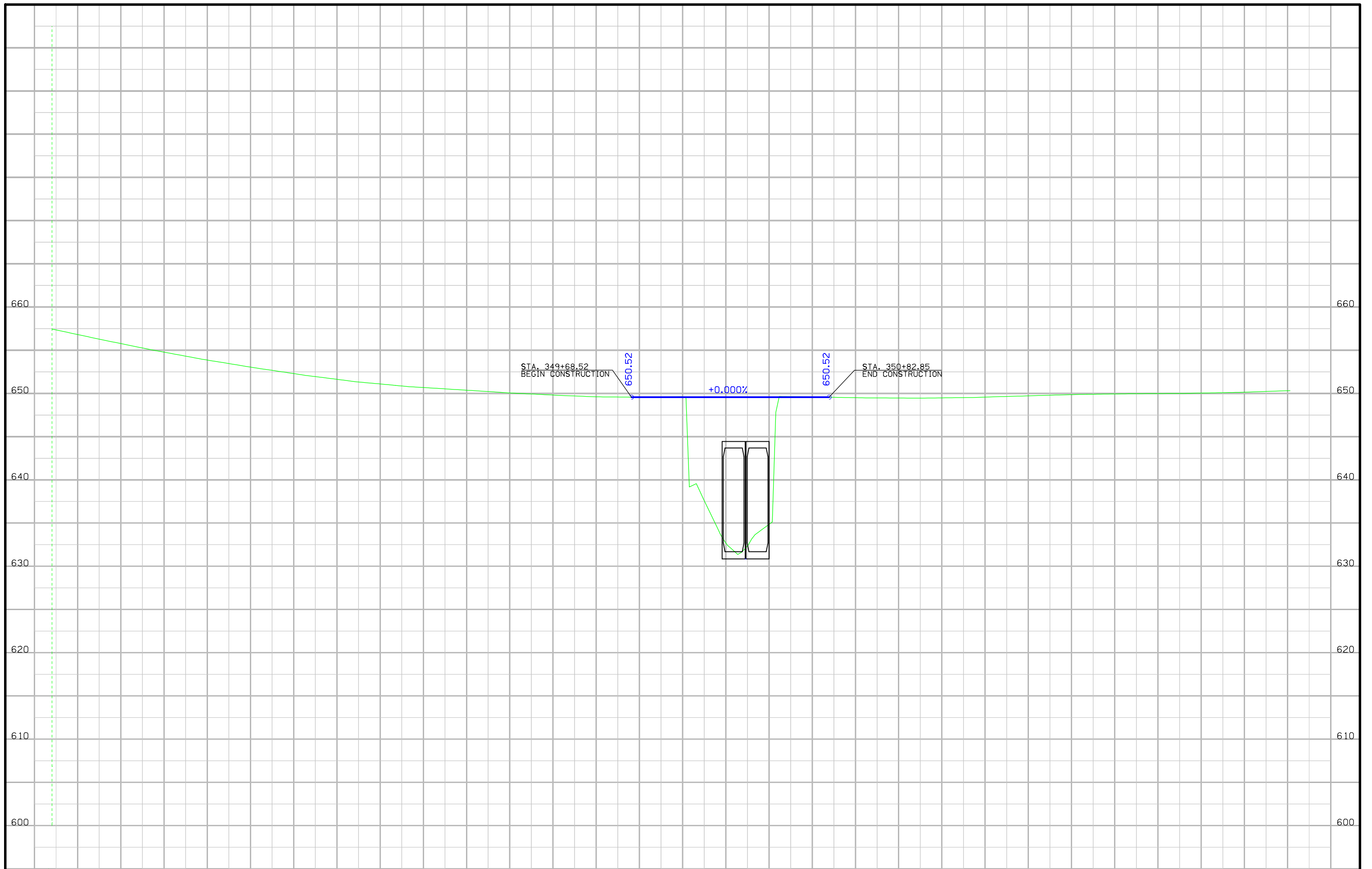


STA. 350+25.64  
 52' x 30'  
 STEEL BEAM BRIDGE  
 REMOVE

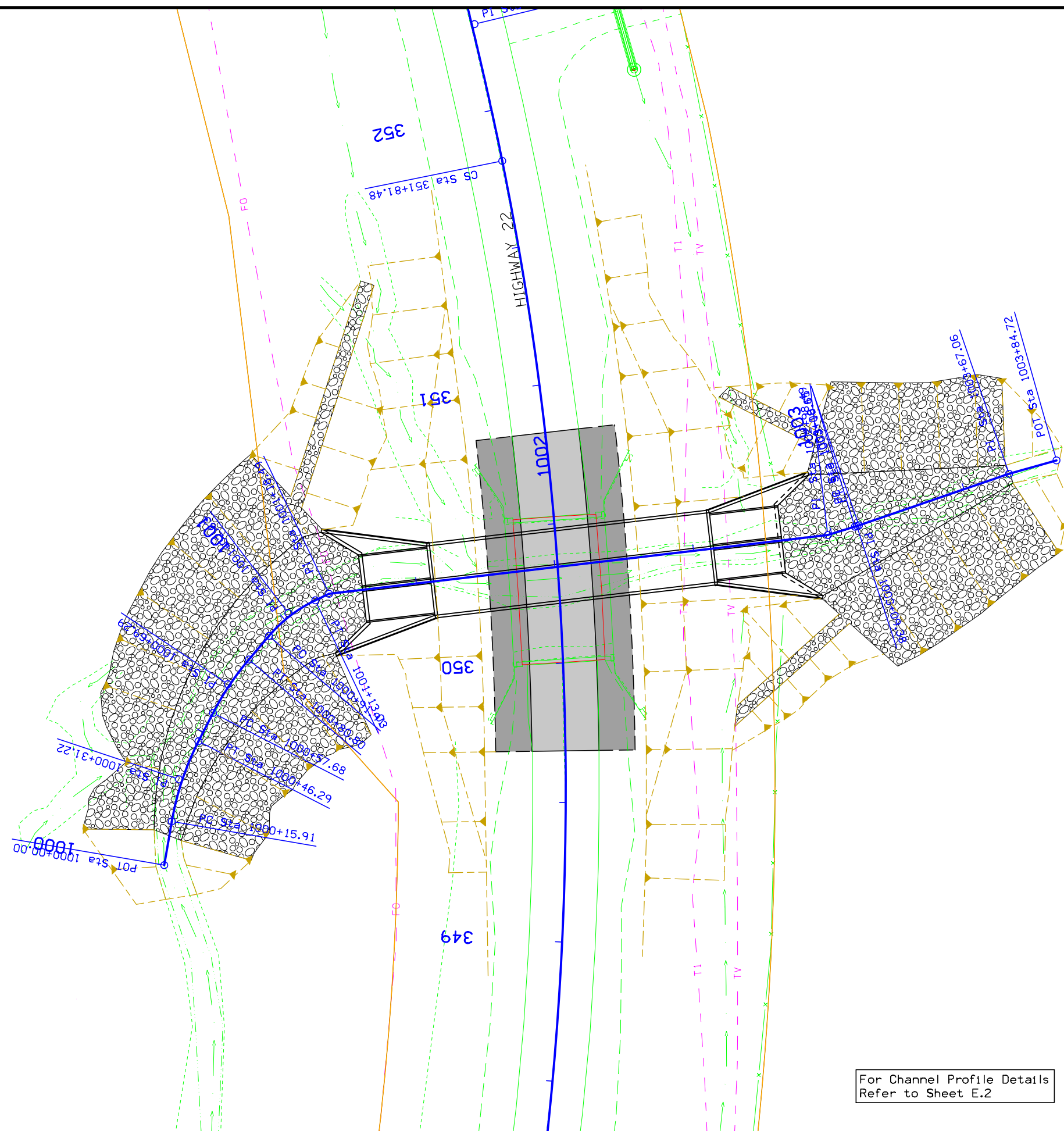
STA. 350+35  
 TWIN 12' x 12' x 100'  
 REINFORCED CONCRETE  
 BOX CULVERT  
 3° SKEW R.A.  
 F.L. = LT. 632.06, RT. 631.10  
 SEE SHEET V.1

For Roadway Profile Details  
 Refer to Sheet D.3

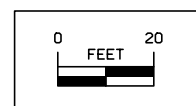


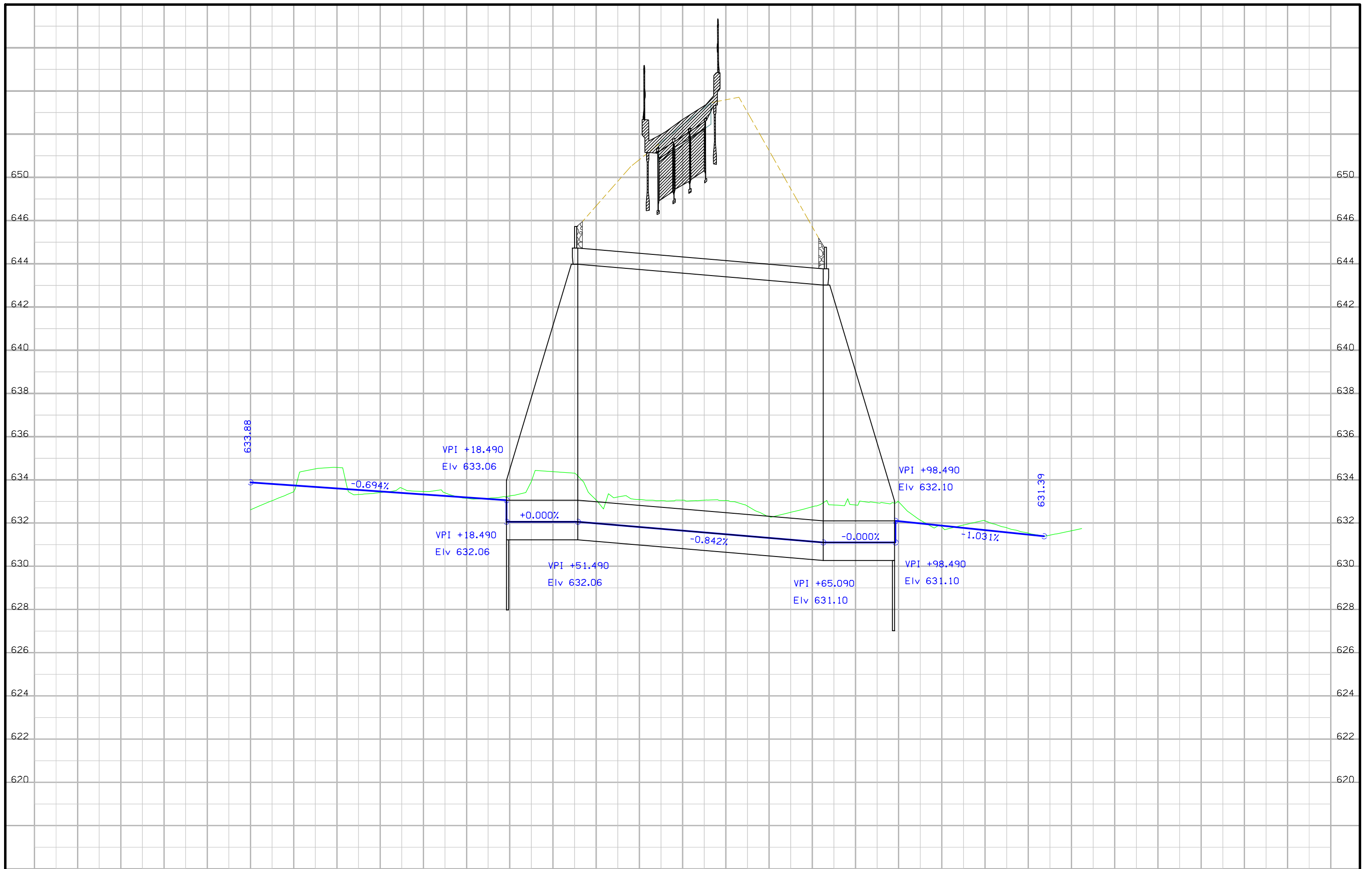






For Channel Profile Details  
Refer to Sheet E.2







## Survey Information

County: Washington  
 SAP 926  
 PIN: 16-92-022-010  
 Project Number: BRFN-022-2(74)--39-92  
 Location: Bulgers Run 4.8 mi E of IA 1  
 Type of Work: RCB Culvert Replacement - Twin Box  
 Project Directory: 9202201016

### General Information

Measurement units for this survey are US survey feet. This survey is for proposed replacement of the IA 22 bridge (Maint. No.9240.0S022) over Bulgers Run, 4.8 miles east of the junction of IA 1. Project datum and control information is provided by Design Survey Office. This project is a Partial DTM with Photo control. This survey request was for the IA 22 corridor only.

### 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 laRTN Base Network. A minimum of 6hrs of data was simultaneously collected on each of these primary control points.

Washington County Control Pt. 032 is checked for vertical tolerance. The vertical difference is about 0.1 ft.  
 Washington County Control Pt. 107 is checked for vertical tolerance. The vertical difference is about 0.1 ft.

### Horizontal Control

The project coordinate system for this survey is laRCS Zone 13 (U.S. Survey Feet). This survey control is relative to laRTN reference stations. laRTN Reference Station coordinates are relative to the National Reference Station network datum: NAD83 (2011) for Epoch 2010.00.

Washington County Control Pt. 032 is checked for horizontal tolerance. The horizontal difference is about 0.2 ft.  
 Washington County Control Pt. 107 is checked and horizontal tolerance. The horizontal difference is about 0.1 ft.

| Point Name | Northing   | Easting     | Elevation | Feature Definition   |
|------------|------------|-------------|-----------|--|
| 039        | 6850854.50 | 23555389.54 | 665.93    | FENO39 USGS DISC PROJ NO STPN-1-4(37)--2J-92.  |
| 107        | 6851766.44 | 23576327.58 | 729.02    | BM WASHINGTON CO. #107 MONUMENT. 30' E OF FIELD ENT TO THE S AND 50' SOUTH OF HWY 22.                        |
| 302        | 6849709.56 | 23580926.32 | 672.28    | FENO2 MONUMENT STAMPED #302. 59' S OF EP HWY 22, +/- STA 365+24.5, AND 1500' E OF C/L OF BRIDGE.             |
| 032        | 6850838.48 | 23593341.11 | 685.76    | BM WASHINGTON CO. #032 MONUMENT. 30' E OF TUPELO BLVD, 50' N OF DRIVE TO HOUSE #1153 ON N SIDE OF RIVERSIDE. |
| 301        | 6850167.10 | 23578581.07 | 687.69    | FENO1 MONUMENT STAMPED #301. 43' SW OF EP HWY 22, 10' SE OF C/L FIELD ENT., AND 960' W OF C/L OF BRIDGE.     |

### Alignment Information

The horizontal alignment for this survey is a retrace of As-built Plans F PROJ. NO. 484(2). Survey stationing was equated to the plan TS at STA 341+53.34 and run back and ahead without equation throughout the survey.

Survey stationing relates to as built plan stationing as follows:

TS STA 341+53.34 As-built Plans Project No. F-PROJ. NO. 484(2)  
 Survey TS STA 341+53.34

SC STA 343+03.34 As-built Plans Project No. F-PROJ. NO. 484(2)  
 Survey SC STA 343+03.34

CS STA 351+81.48 As-built Plans Project No. F-PROJ. NO. 484(2)  
 Survey CS STA 351+81.48

PI STA 347+80.9 As-built Plans Project No. F-PROJ. NO. 484(2)

CS STA 351+81.48 As-built Plans Project No. F-PROJ. NO. 484(2)  
 Survey CS STA 351+81.48

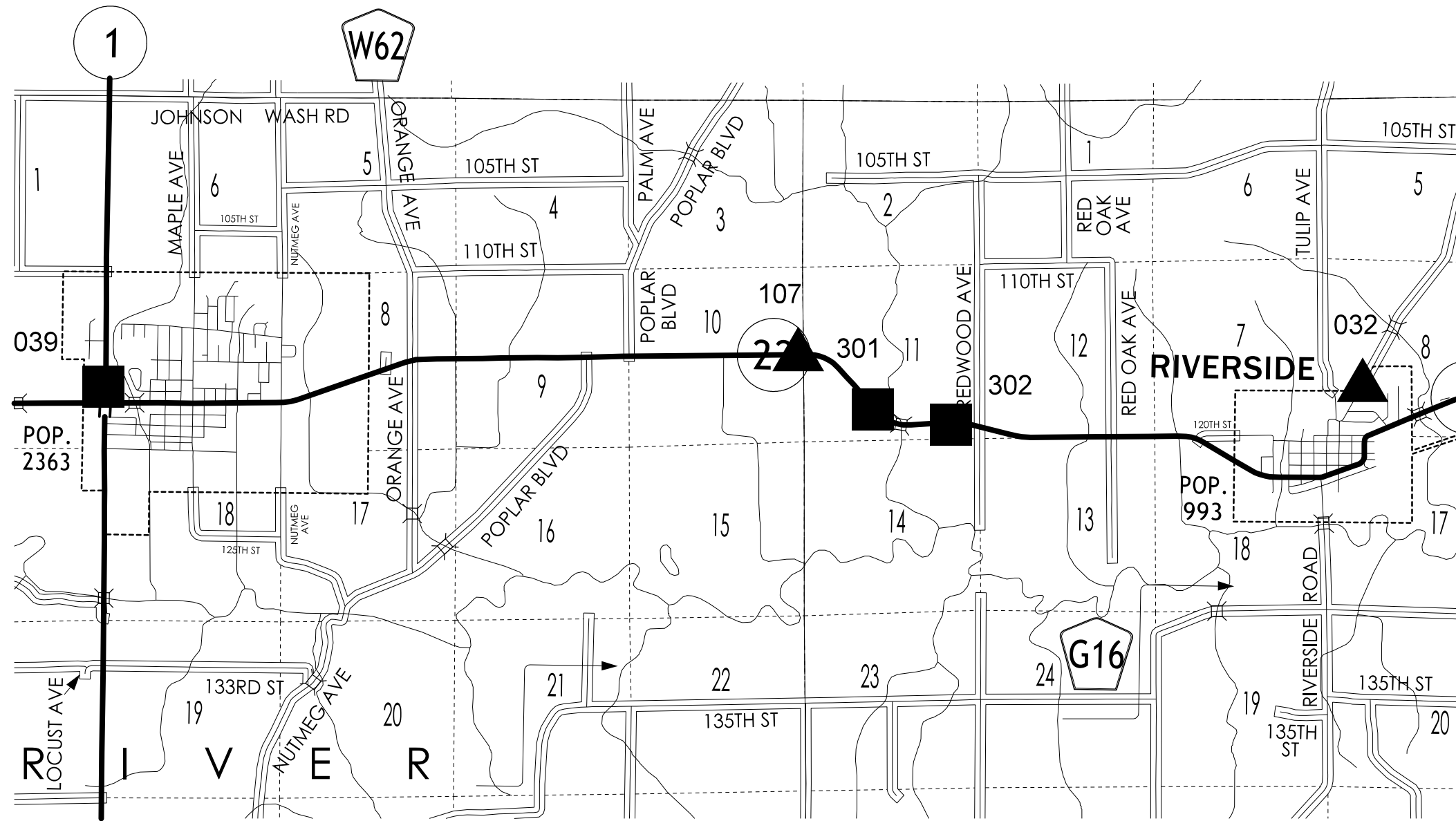
ST STA 353+31.48 As-built Plans Project No. F-PROJ. NO. 484(2)  
 Survey ST STA 353+31.48

PI STA 367+90.17 As-built Plans Project No. F-PROJ. NO. 484(2)  
 Survey PI STA 367+89.32

### 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.

R-7W



HORIZ. DATUM: NAD83(2011) EPOCH 2013.00

VERT. DATUM: NAVD88

1a. Regional Coordinate System Zone 13

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 2013.00

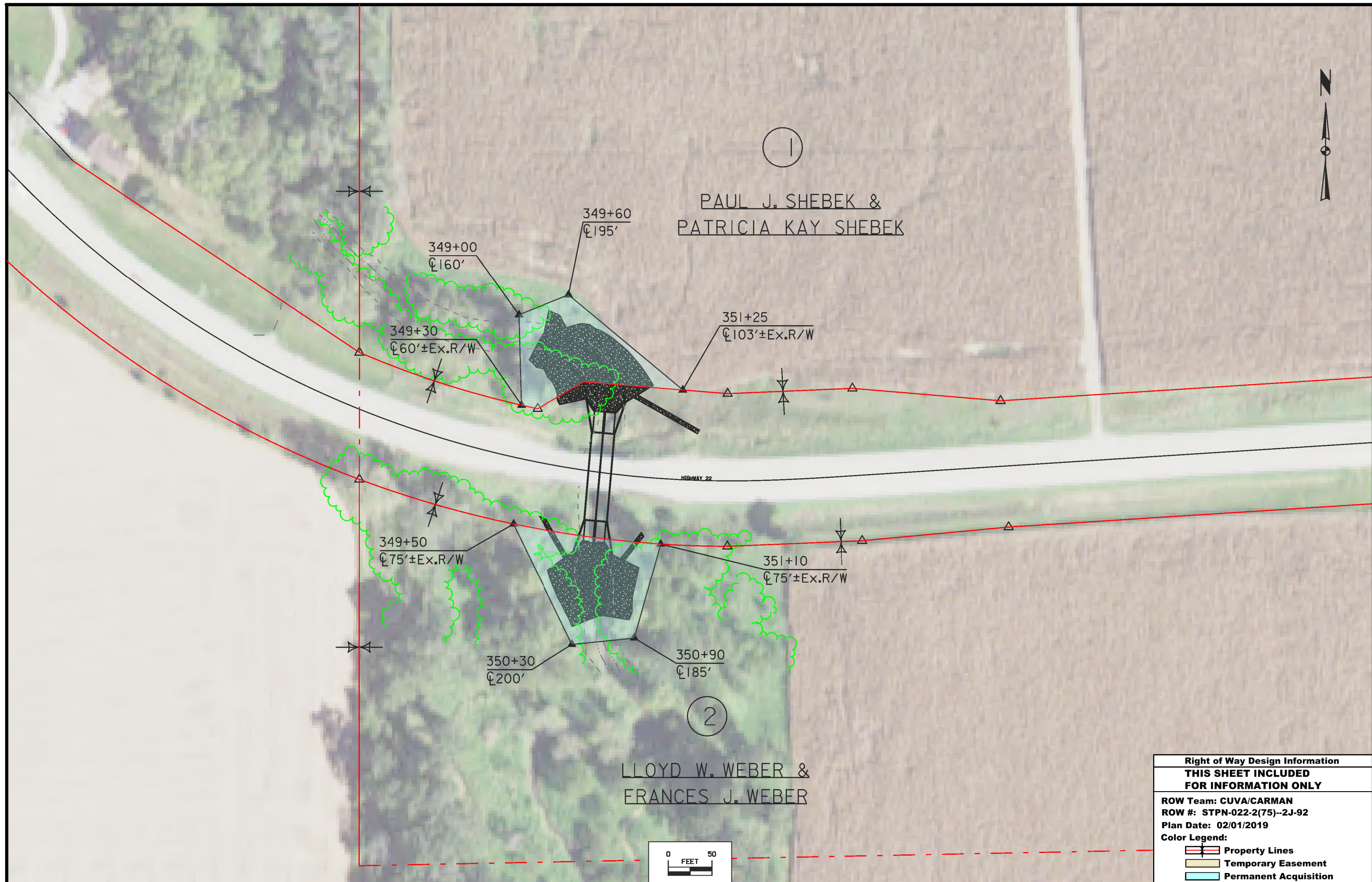
VERT. DATUM: NAVD88

Ia. Regional Coordinate System Zone 13

| Point Name     | Northing    | Easting | Elevation  | Feature Definition |
|----------------|-------------|---------|--|--------------------|
| 039 6850854.50 | 23555389.54 | 665.93  | FENO39 USGS DISC PROJ NO STPN-1-4(37)—2J-92.   |                    |
| 107 6851766.44 | 23576327.58 | 729.02  | BM WASHINGTON CO. #107 MONUMENT. 30' E OF FIELD ENT TO THE S AND 50' SOUTH OF HWY 22.                        |                    |
| 302 6849709.56 | 23580926.32 | 672.28  | FENO2 MONUMENT STAMPED #302. 59' S OF EP HWY 22, +/- STA 365+24.5, AND 1500' E OF C/L OF BRIDGE.             |                    |
| 032 6850838.48 | 23593341.11 | 685.76  | BM WASHINGTON CO. #032 MONUMENT. 30' E OF TUPELO BLVD, 50' N OF DRIVE TO HOUSE #1153 ON N SIDE OF RIVERSIDE. |                    |
| 301 6850167.10 | 23578581.07 | 687.69  | FENO1 MONUMENT STAMPED #301. 43' SW OF EP HWY 22, 10' SE OF C/L FIELD ENT., AND 960' W OF C/L OF BRIDGE.     |                    |

|            |                              |         |      |        |      |               |      |        |           |        |      |      |            |       |       |             |          |            |  |
|------------|------------------------------|---------|------|--------|------|---------------|------|--------|-----------|--------|------|------|------------|-------|-------|-------------|----------|------------|--|
| Washington | ROW: STPN-022-2(75)--2J-92   |         |      |        | PIN  | 16-92-022-010 |      |        |           |        |      |      |            |       |       |             |          |            |  |
|            | Bulgers Run 4.8 mi E of IA 1 |         |      |        |      |               |      |        |           |        |      |      |            |       |       |             |          |            |  |
|            |                              | 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          | PAUL J. SHEBEK - Fee         | .29 AC  |      |        |      |               |      |        |           |        |      |      |            |       |       |             |          |            |  |
| 2          | LLOYD W. WEBER - Fee         | .33 AC  |      |        |      |               |      |        |           |        |      |      |            |       |       |             |          |            |  |
| 2 Parcels  | "TOTALS                      | 0.62 AC | 0 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 | 0 SF | 0 SF       | 0 SF  |       |             |          |            |  |

NO ACCESS RIGHTS ARE TO BE ACQUIRED ON THIS PROJECT.



1

PAUL J. SHEBEK &  
PATRICIA KAY SHEBEK

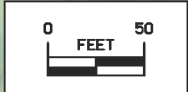
2

LLOYD W. WEBER &  
FRANCES J. WEBER

**Right of Way Design Information  
THIS SHEET INCLUDED  
FOR INFORMATION ONLY**

ROW Team: CUVA/CARMAN  
ROW #: STPN-022-2(75)--2J-92  
Plan Date: 02/01/2019

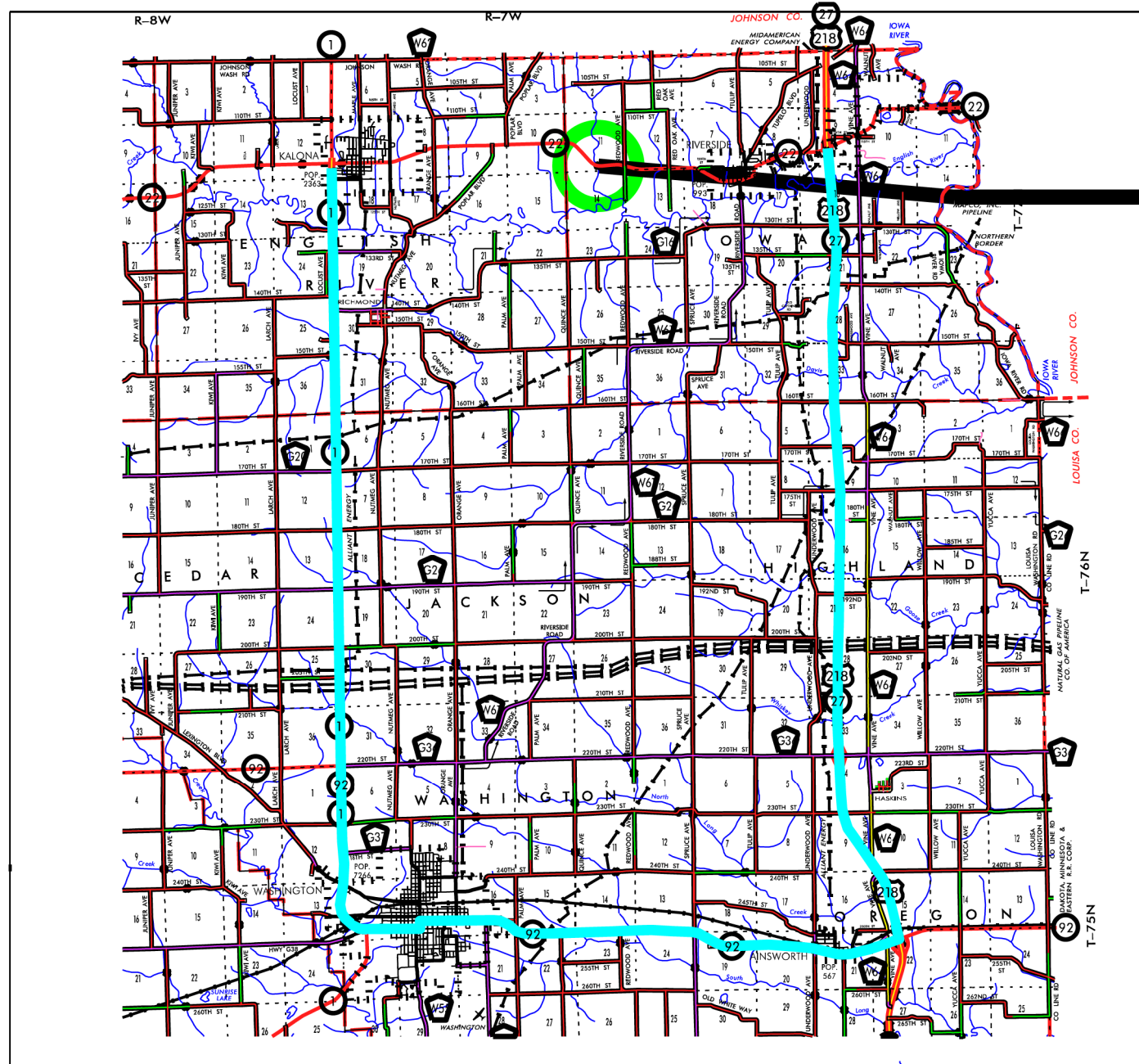
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- Property Lines
  - Temporary Easement
  - Permanent Acquisition





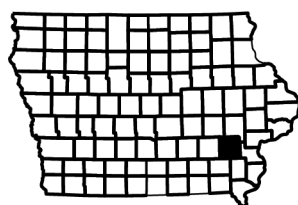
# DETOUR OPTION 1

## WASHINGTON COUNTY



STA 350+26.50  
FHWA 51740  
MAINT. 9240.0S022  
DESIGN 3534

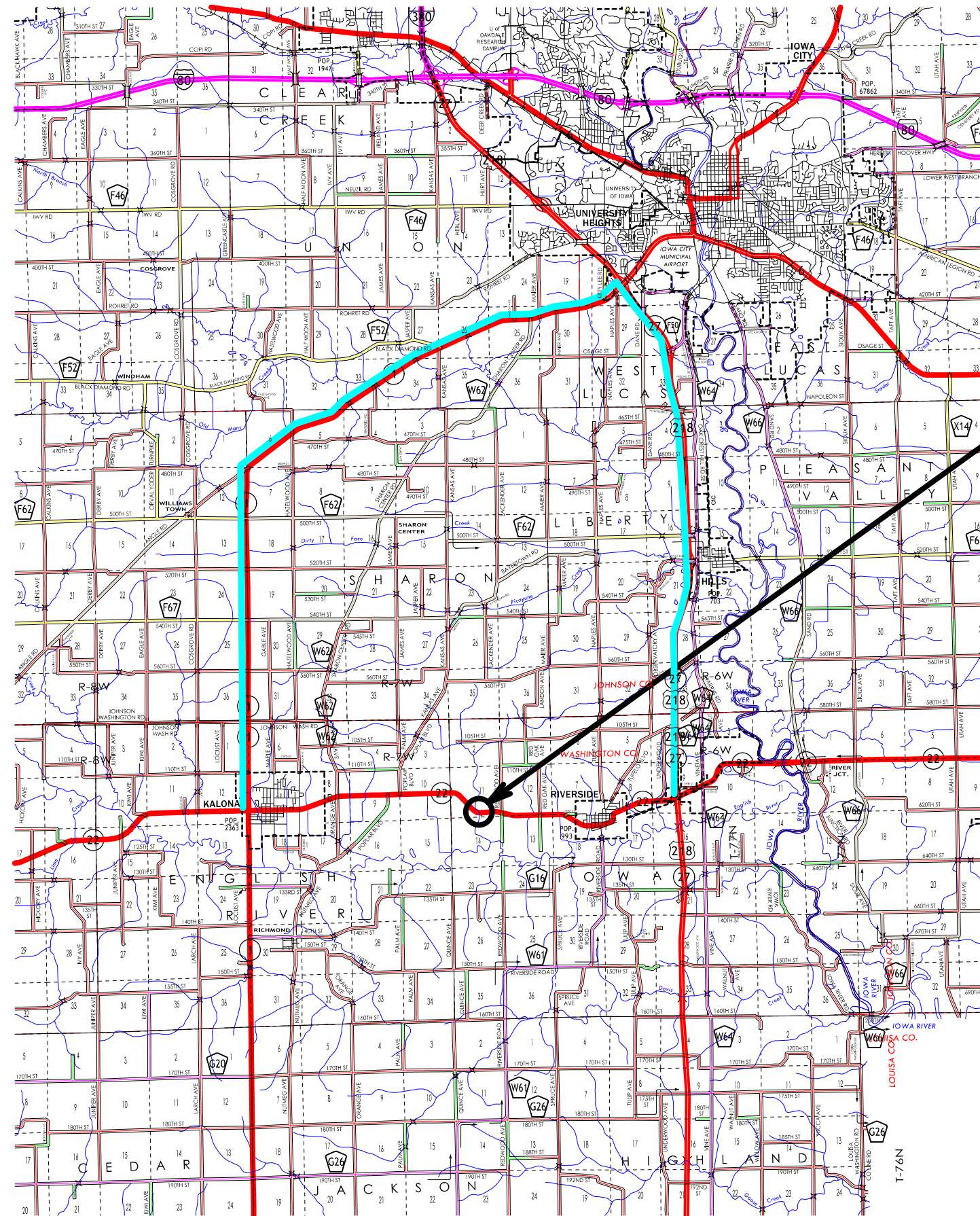
 Detour



ON IA 22, 4.8 MILES EAST OF JCT. IA. 1,  
BULGERS RUN  
BRFN-022-2(74)-39-92  
PIN: 16-92-022-010



# DETOUR OPTION 2



PROJECT LOCATION

DETOUR

108-23A  
08-01-08

### TRAFFIC CONTROL PLAN

IA 22 will be closed and an offsite detour will be utilized. It is anticipated the detour will be in place for approximately 14 days.  
Detour route will be chosen from the following two options:

**DETOUR OPTION 1**

The detour follows from the IA 22/IA 1 junction south on IA 1 to the south junction of IA 1/IA 92, then go east on IA 92 to the IA 92/IA 27/US 218 junction, then north on US 218 to the IA 27/US 218/IA 22 junction.

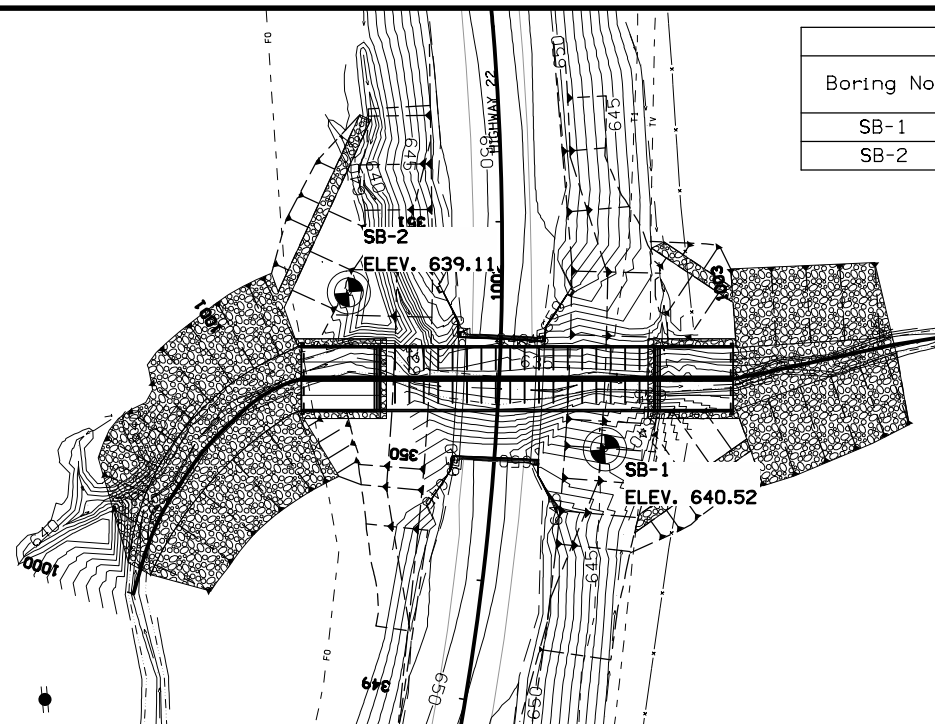
**DETOUR OPTION 2**

The detour follows from the IA22/IA 1 junction north on IA 1 to the junction of IA 1/IA 27, then go south on IA 27/US 218 to the IA 27/US 218/IA 22 junction.

108-25  
10-21-14

### 511 TRAVEL RESTRICTIONS

| Route | Direction | County | Location Description | Feature Crossed | Object Type | Maint. Bridge No.,<br>Structure ID,<br>or FHWA No. | Type of<br>Restriction | Existing<br>Measurement | Construction<br>Measurement | Construction<br>Measurement<br>as Signed | Projected<br>As Built<br>Measurement | Remarks |
|-------|-----------|--------|----------------------|-----------------|-------------|--|------------------------|-------------------------|-----------------------------|--|--------------------------------------|---------|
|       |           |        |                      |                 |             |  |                        |                         |                             |  |                                      |         |



| WATER LEVEL OBSERVATIONS (FT) |              |                |                 |                |
|-------------------------------|--------------|----------------|-----------------|----------------|
| Boring No.                    | Date Drilled | While Drilling | End of Drilling | After 24 Hours |
| SB-1                          | 07/12/2018   | 15'            | -               | -              |
| SB-2                          | 07/12/2018   | 10'            | -               | -              |

### GEOTECHNICAL DESIGN

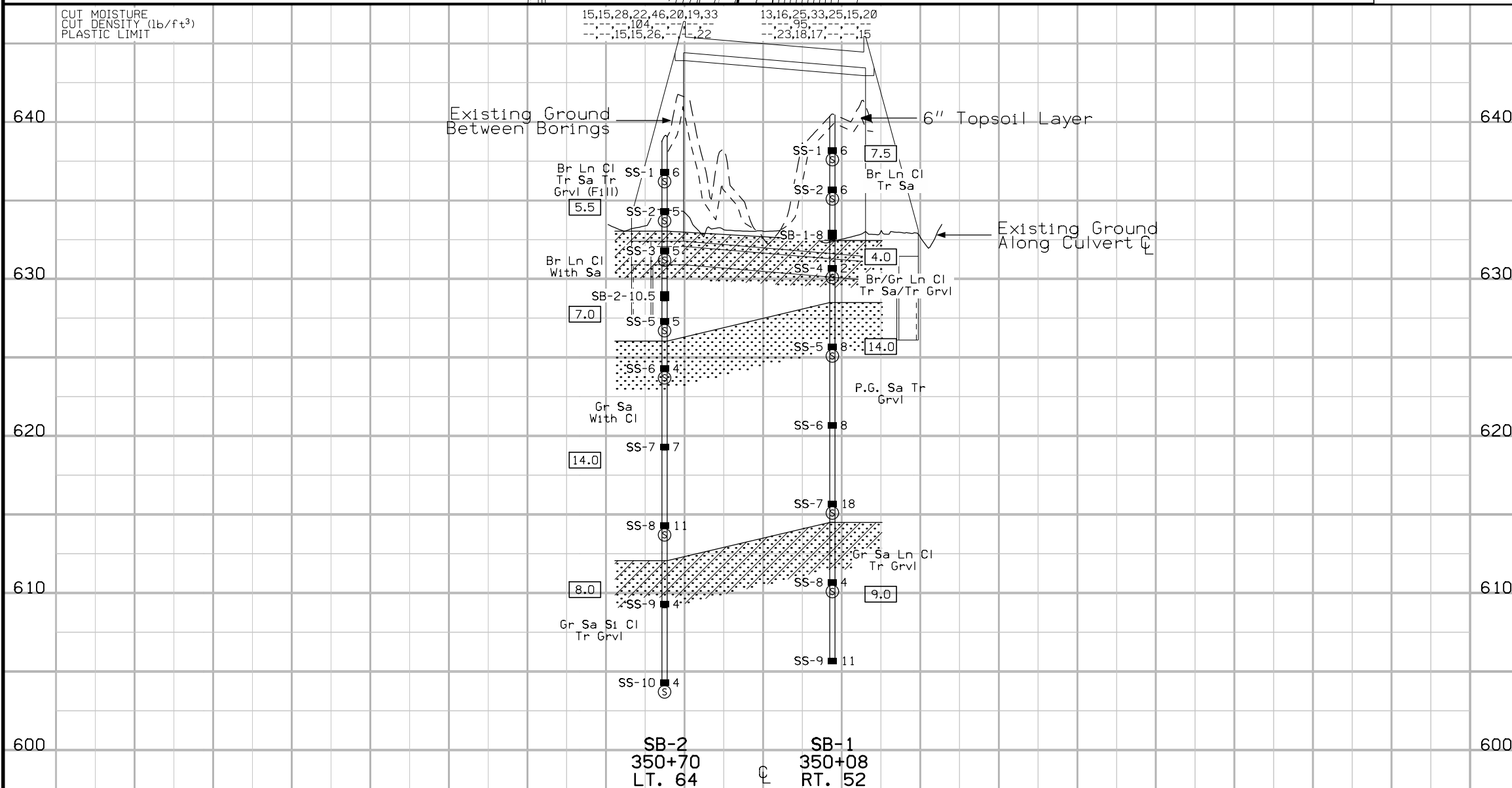


I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signature \_\_\_\_\_ Date \_\_\_\_\_  
 Bhooshan A. Karnik  
 Printed or Typed Name  
 My license renewal date is December 31, 2019.

Pages or sheets covered by this seal: **Q.1**

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.



### LOCATION

IA 22 OVER BULGERS RUN  
 T-77N R-7W  
 SECTION 11  
 IOWA TOWNSHIP  
 WASHINGTON COUNTY  
 FHWA NO. 51741  
 BRIDGE MAINT. NO. 9240.0S022  
 LATITUDE 41.483925°  
 LONGITUDE -91.626814°

### SHELBY TUBE CORE DATA

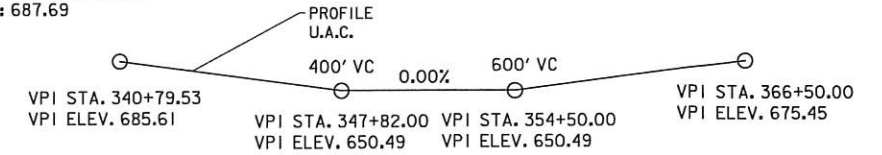
| CORE NO.                              | ST-3-8    | ST-4-10.5  |
|---------------------------------------|-----------|------------|
| DEPTH IN FEET                         | 6.0 - 8.0 | 8.5 - 10.5 |
| CLASSIFICATION (AASHTO)               | A-6 (20)  | A-6 (14)   |
| COEFF. CONSOL. (ft <sup>2</sup> /DAY) | -         | -          |
| TRIAxIAL COMPRESSION                  | UU        | UU         |
| COHESION - PSF                        | 900       | 1,060      |
| FRICTION ANGLE - DEGREES              | -         | -          |
| MOISTURE CONTENT %                    | 25        | 22         |
| DRY DENSITY - PCF                     | 95        | 104        |
| CU-CONSOLIDATED UNDRAINED             |           |            |
| UU-UNCONSOLIDATED UNDRAINED           |           |            |
| UC-UNCONFINED COMPRESSION (c=1/2 Qu)  |           |            |

| SOIL LAYER THICKNESS |            | ROCK CORE  |            | BLOW COUNT |               | LEGEND                  |  |
|----------------------|------------|------------|------------|------------|---------------|-------------------------|--|
| THICKNESS            | SAMPLE NO. | SAMPLE NO. | REC./REQ.  | SAMPLE NO. | NO. BLOWS     |                         |  |
| 13.0                 |            | R1         | 100/85     | SS2        | 5             |                         |  |
| -H <sub>2</sub> O-   | WATER      | ■          | SHELBY     | ■          | DIAMOND CORE  | SOIL REMEDIATION AREA   |  |
| -DRY-                | DRY        | ■          | BLOW COUNT | ■          | SAND          | LIMESTONE (L.S.)        |  |
| -d-                  | PLUGGED    | ■          | DENS. CORE | ■          | GRAVELLY SAND | BROKEN & WEATHERED L.S. |  |
| M                    | MOISTURE   | ⊙          | SAMPLE     | ⊙          | BOULDERS      | SANDSTONE               |  |
|                      |            |            |            |            |               | CLAY                    |  |
|                      |            |            |            |            |               | SANDY SOIL              |  |

DESIGN FOR 3° SKEW  
**TWIN 12' X 12' X 114' PRECAST REINFORCED CONCRETE BOX CULVERT**  
**SOIL PROFILE SHEET**  
 STATION 350+35 OCTOBER 2020  
**WASHINGTON COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO.    OF    FILE NO. 31634 DESIGN NO. 0120



BENCH MARK: 301  
 DESCRIPTION: FENO MONUMENT 43 FT. SW OF EP OF HWY 22, 10 FT. SE OF  $\phi$  FIELD ENT., AND 960 FT. W OF  $\phi$  OF BRIDGE.  
 NORTHING: 6850167.10  
 EASTING: 23578581.07  
 ELEV: 687.69



PROPOSED PROFILE GRADE ON IA-22 (NOT TO SCALE)

UTILITIES

- T1 - WINDSTREAM COMMUNICATIONS
- TV - MEDIACOM
- FO - WINDSTREAM COMMUNICATIONS

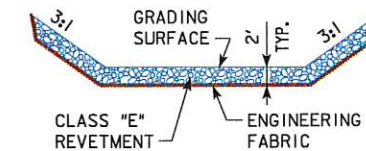
HYDRAULIC DATA

DRAINAGE AREA = 6.3 SQ. MI.  
 STREAM SLOPE = 5.3 FT./MI.

$Q_{50}$  = 2,860 CFS  
 HW ELEV. = 647.27

$Q_{100}$  = 3,400 CFS  
 HW ELEV. = 649.52

$Q_{OT}$  = 3,602 CFS  
 HW ELEV. = 650.49



TYP. CHANNEL SECTION AT OUTLET/INLET



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: *Brian Sandberg* Date: 10/10/18  
 Printed or Typed Name: Brian Sandberg

My license renewal date is December 31, 2019

Pages or sheets covered by this seal: V.1

DESIGN FOR 3° SKEW R.A.  
**TWIN 12' X 12' X 100' REINFORCED CONCRETE BOX CULVERT**  
**SITUATION PLAN**  
 STATION 350+35 SEPTEMBER 2018  
**WASHINGTON COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 1 OF 1 FILE NO. 31634 DESIGN NO. 0120

LOCATION

IA 22 OVER BULGERS RUN  
 T-77N R-7W  
 SECTION 11  
 IOWA TOWNSHIP  
 WASHINGTON COUNTY  
 FHWA NO. 51741  
 BRIDGE MAINT. NO. 9240.OS022  
 LATITUDE 41.483925°  
 LONGITUDE -91.626814°

TRAFFIC ESTIMATE

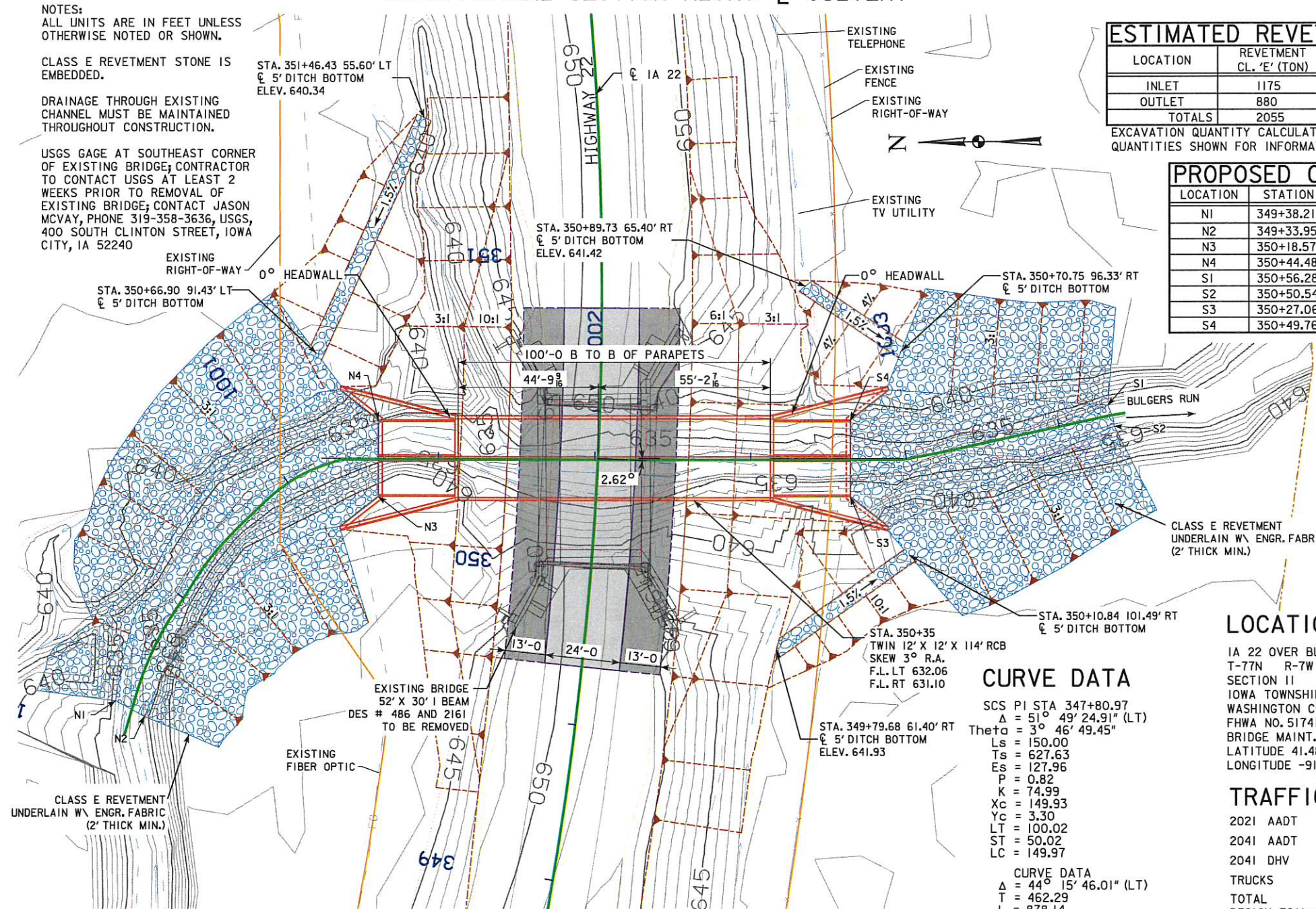
|              |           |        |
|--------------|-----------|--------|
| 2021 AADT    | 5,300     | V.P.D. |
| 2041 AADT    | 7,300     | V.P.D. |
| 2041 DHV     | 760       | V.P.H. |
| TRUCKS       | 10        | %      |
| TOTAL        |           |        |
| DESIGN ESALS | 1,935,000 |        |

CURVE DATA

SCS PI STA 347+80.97  
 $\Delta = 51^\circ 49' 24.91''$  (LT)  
 $\text{Theta} = 3^\circ 46' 49.45''$   
 $L_s = 150.00$   
 $T_s = 627.63$   
 $E_s = 127.96$   
 $P = 0.82$   
 $K = 74.99$   
 $X_c = 149.93$   
 $Y_c = 3.30$   
 $LT = 100.02$   
 $ST = 50.02$   
 $LC = 149.97$

CURVE DATA  
 $\Delta = 44^\circ 15' 46.01''$  (LT)  
 $T = 462.29$   
 $L = 878.14$   
 $R = 1,136.70$   
 $E = 90.41$

SITUATION PLAN



ESTIMATED REVETMENT QUANTITIES

| LOCATION | REVETMENT CL. 'E' (TON) | ENGINEERING FABRIC (SY) | EXCAVATION (CY) |
|----------|-------------------------|-------------------------|-----------------|
| INLET    | 1175                    | 1088                    | 726             |
| OUTLET   | 880                     | 815                     | 544             |
| TOTALS   | 2055                    | 1903                    | 1270            |

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE. QUANTITIES SHOWN FOR INFORMATION ONLY. SEE ROAD SHEETS.

PROPOSED CHANNEL DATA

| LOCATION | STATION   | OFFSET     | ELEVATION |
|----------|-----------|------------|-----------|
| N1       | 349+38.21 | 147.41' LT | 633.98    |
| N2       | 349+33.95 | 137.63' LT | 634.02    |
| N3       | 350+18.57 | 69.70' LT  | 633.06    |
| N4       | 350+44.48 | 70.89' RT  | 633.06    |
| S1       | 350+56.28 | 162.79' RT | 631.94    |
| S2       | 350+50.54 | 165.00' RT | 632.27    |
| S3       | 350+27.06 | 81.40' RT  | 632.10    |
| S4       | 350+49.76 | 80.36' RT  | 632.10    |

680  
670  
660  
650  
640  
630  
620

680  
670  
660  
650  
640  
630  
620

NOTES:  
 ALL UNITS ARE IN FEET UNLESS OTHERWISE NOTED OR SHOWN.

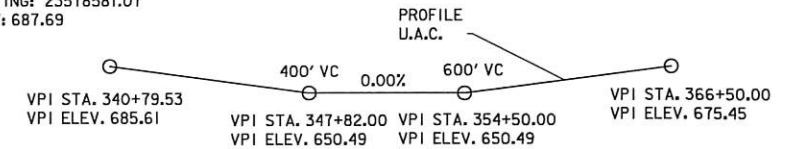
CLASS E REVETMENT STONE IS EMBEDDED.

DRAINAGE THROUGH EXISTING CHANNEL MUST BE MAINTAINED THROUGHOUT CONSTRUCTION.

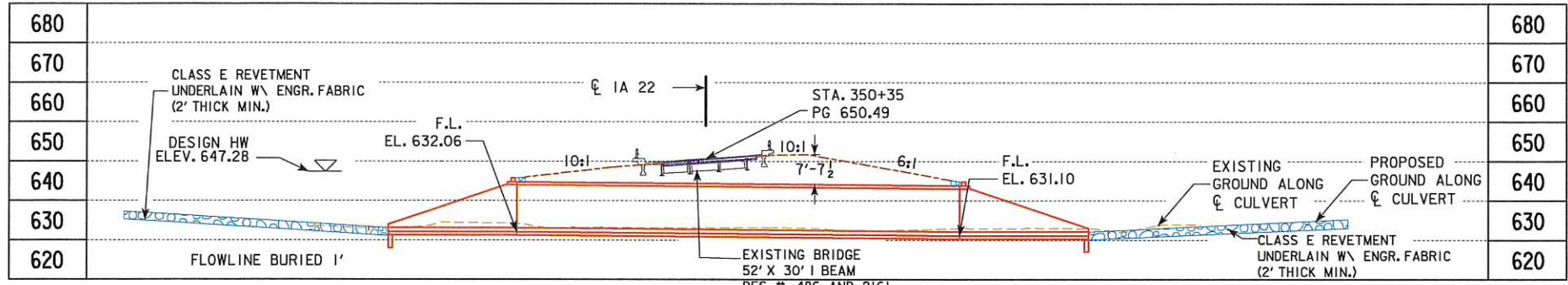
USGS GAGE AT SOUTHEAST CORNER OF EXISTING BRIDGE; CONTRACTOR TO CONTACT USGS AT LEAST 2 WEEKS PRIOR TO REMOVAL OF EXISTING BRIDGE; CONTACT JASON MCVAY, PHONE 319-358-3636, USGS, 400 SOUTH CLINTON STREET, IOWA CITY, IA 52240



BENCH MARK: 301  
 DESCRIPTION: FENO MONUMENT 43 FT. SW OF EP OF HWY 22, 10 FT. SE OF  $\phi$  FIELD ENT., AND 960 FT. W OF  $\phi$  OF BRIDGE.  
 NORTHING: 6850167.10  
 EASTING: 23578581.07  
 ELEV: 687.69



PROPOSED PROFILE GRADE ON IA-22  
 (NOT TO SCALE)



LONGITUDINAL SECTION ALONG  $\phi$  CULVERT

ESTIMATED REVETMENT QUANTITIES

| LOCATION | REVETMENT CL. 'E' (TON) | ENGINEERING FABRIC (SY) | EXCAVATION (CY) |
|----------|-------------------------|-------------------------|-----------------|
| INLET    | 1014                    | 939                     | 626             |
| OUTLET   | 736                     | 682                     | 455             |
| TOTALS   | 1750                    | 1621                    | 1081            |

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE. QUANTITIES SHOWN FOR INFORMATION ONLY. SEE ROAD SHEETS.

PROPOSED CHANNEL DATA

| LOCATION | STATION   | OFFSET     | ELEVATION |
|----------|-----------|------------|-----------|
| N1       | 349+38.21 | 147.41' LT | 633.98    |
| N2       | 349+33.95 | 137.63' LT | 634.02    |
| N3       | 350+16.53 | 81.69' LT  | 633.06    |
| N4       | 350+44.35 | 82.97' LT  | 633.06    |
| S1       | 350+56.28 | 162.79' RT | 631.94    |
| S2       | 350+50.54 | 165.00' RT | 632.27    |
| S3       | 350+26.79 | 98.02' RT  | 632.10    |
| S4       | 350+50.56 | 96.92' RT  | 632.10    |

UTILITIES

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- TV - MEDIACOM
- FO - WINDSTREAM COMMUNICATIONS

HYDRAULIC DATA

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 STREAM SLOPE = 5.3 FT./MI.  
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 HW ELEV. = 647.28  
 $Q_{100} = 3,400$  CFS  
 HW ELEV. = 649.62  
 $Q_{07} = 3,579$  CFS  
 HW ELEV. = 650.49

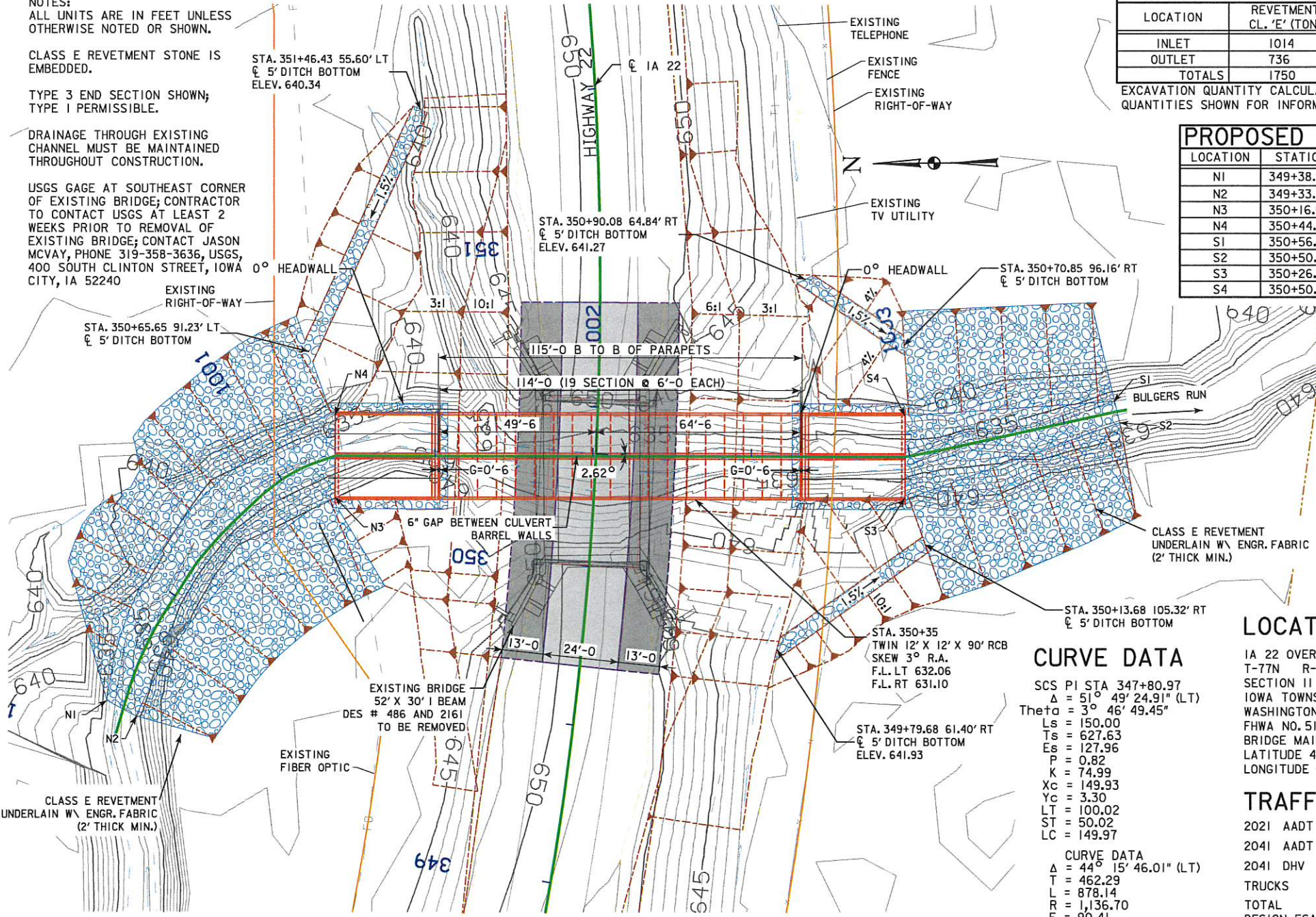
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CLASS E REVETMENT STONE IS EMBEDDED.

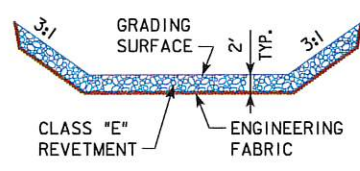
TYPE 3 END SECTION SHOWN; TYPE 1 PERMISSIBLE.

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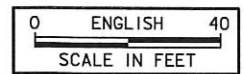
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SITUATION PLAN



TYP. CHANNEL SECTION AT OUTLET/INLET



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TRAFFIC ESTIMATE

|                    |           |        |
|--------------------|-----------|--------|
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| 2041 AADT          | 7,300     | V.P.D. |
| 2041 DHV           | 760       | V.P.H. |
| TRUCKS             | 10        | %      |
| TOTAL DESIGN ESALs | 1,935,000 |        |

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: *Brian Sandberg*  
 Printed or Typed Name: Brian Sandberg  
 Date: 10/10/18  
 My license renewal date is December 31, 2019.

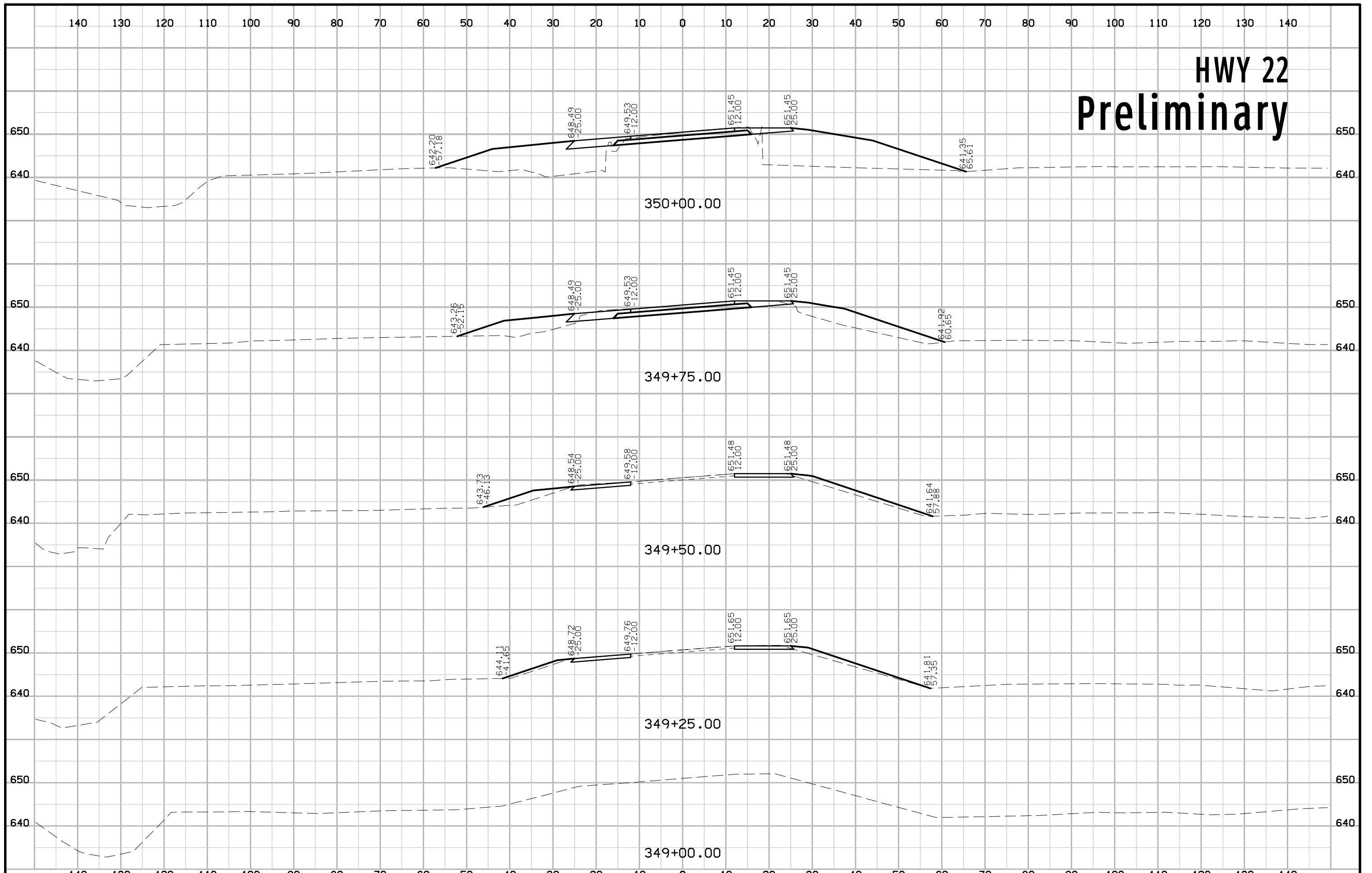
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DESIGN FOR 3° SKEW R.A.  
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 SITUATION PLAN  
 STATION 350+35 SEPTEMBER 2018  
 WASHINGTON COUNTY

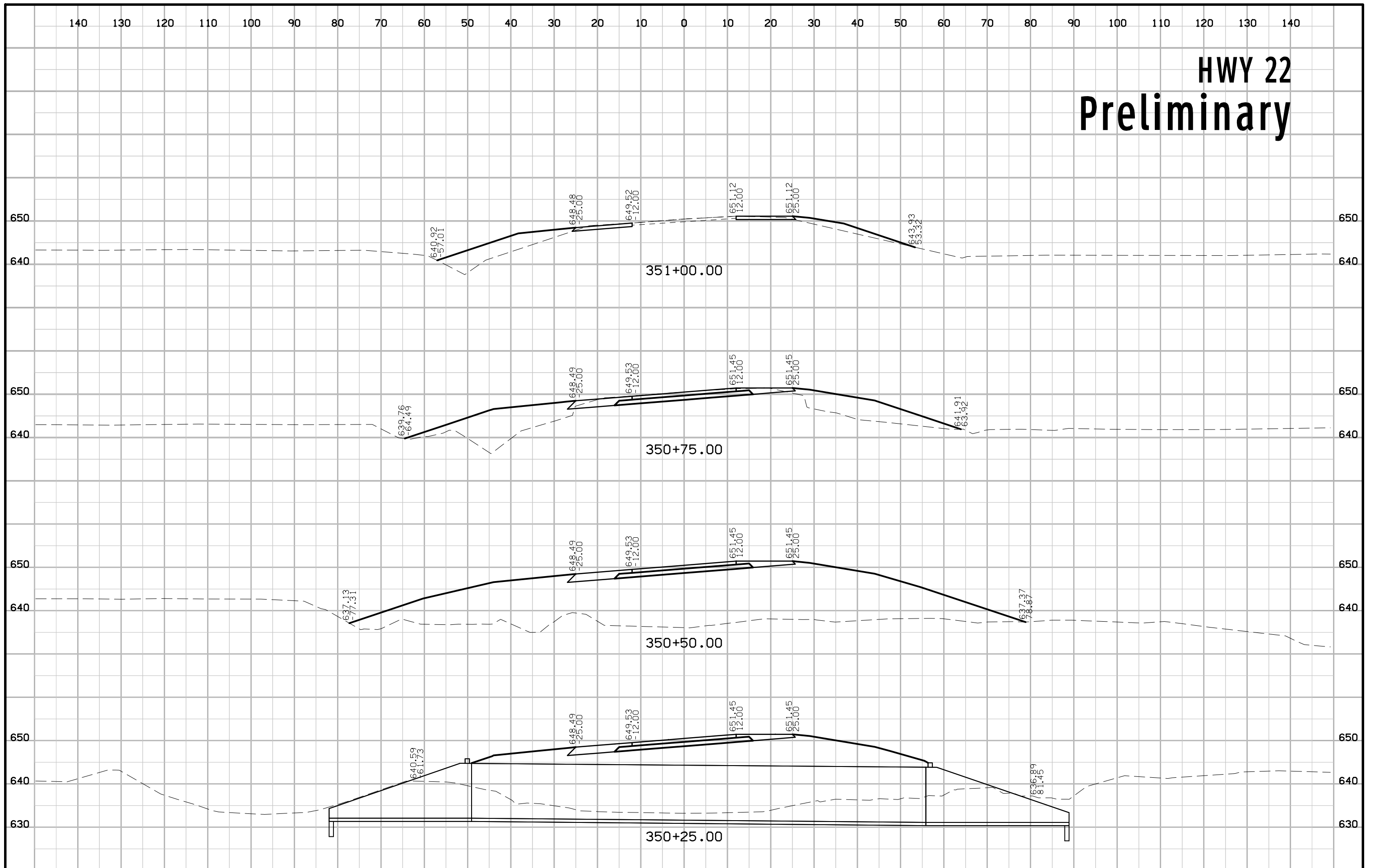
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 1 OF 1 FILE NO. 31634 DESIGN NO. 0120



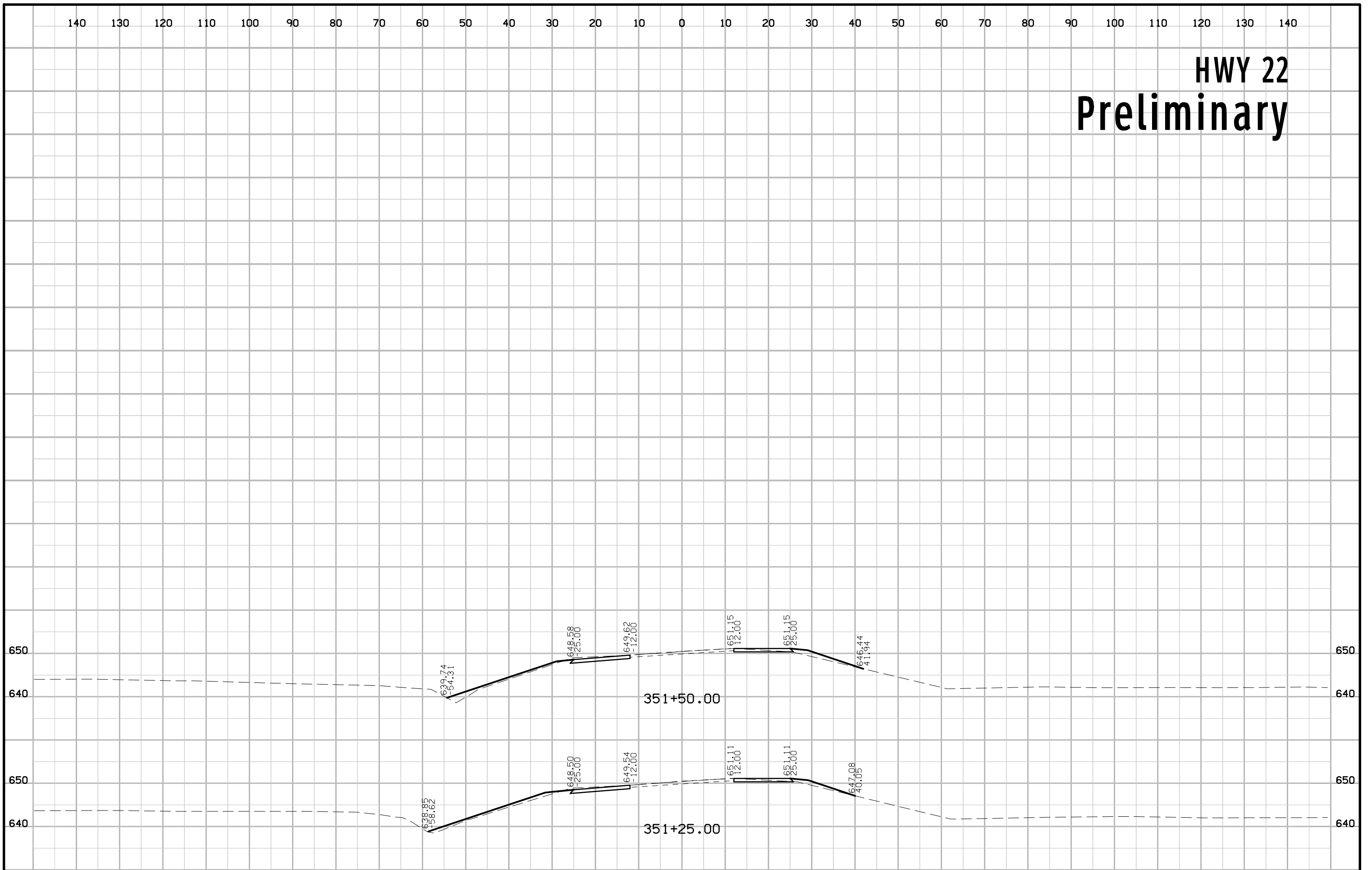
# HWY 22 Preliminary



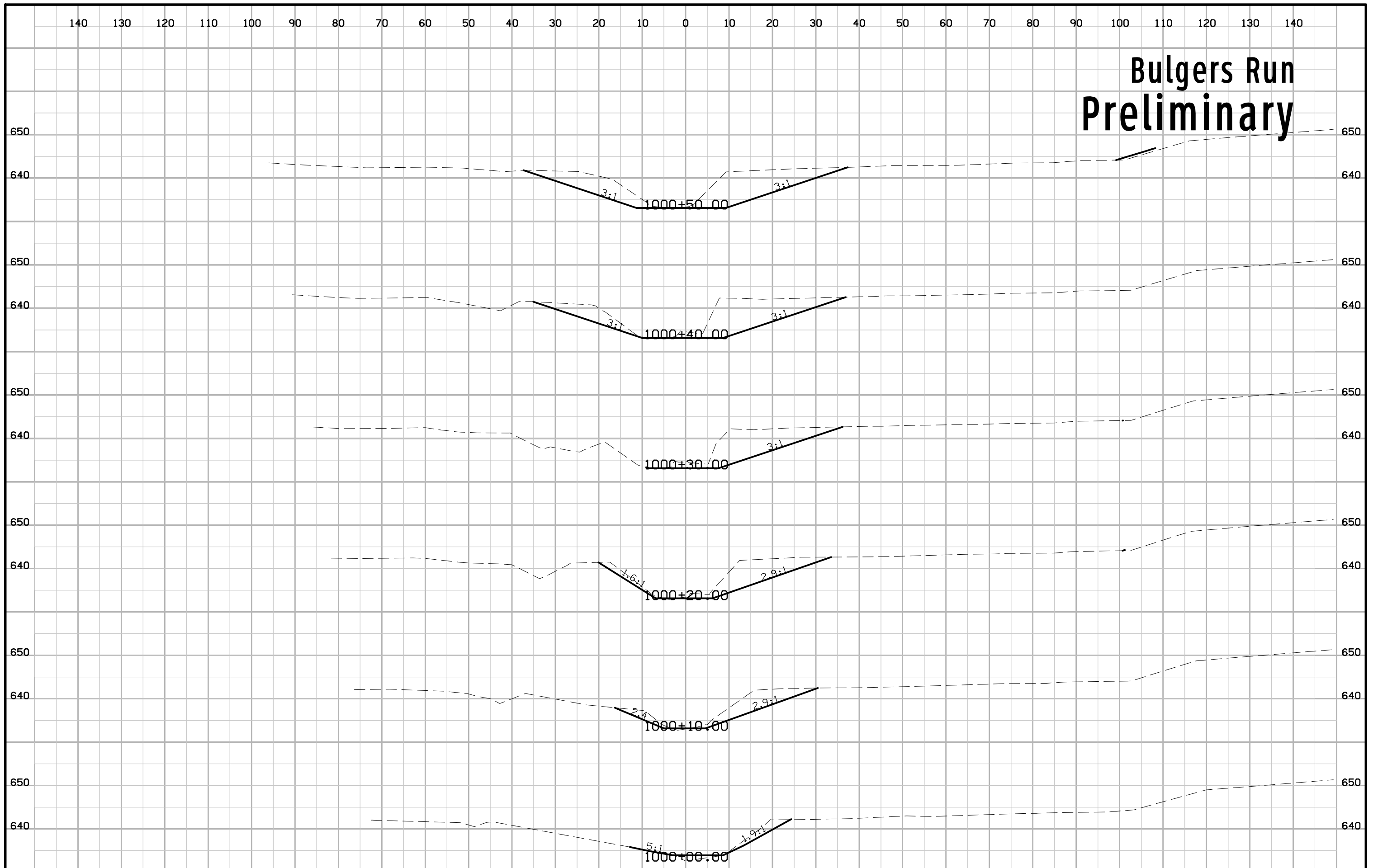
# HWY 22 Preliminary



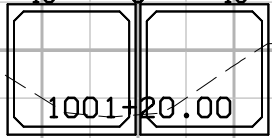
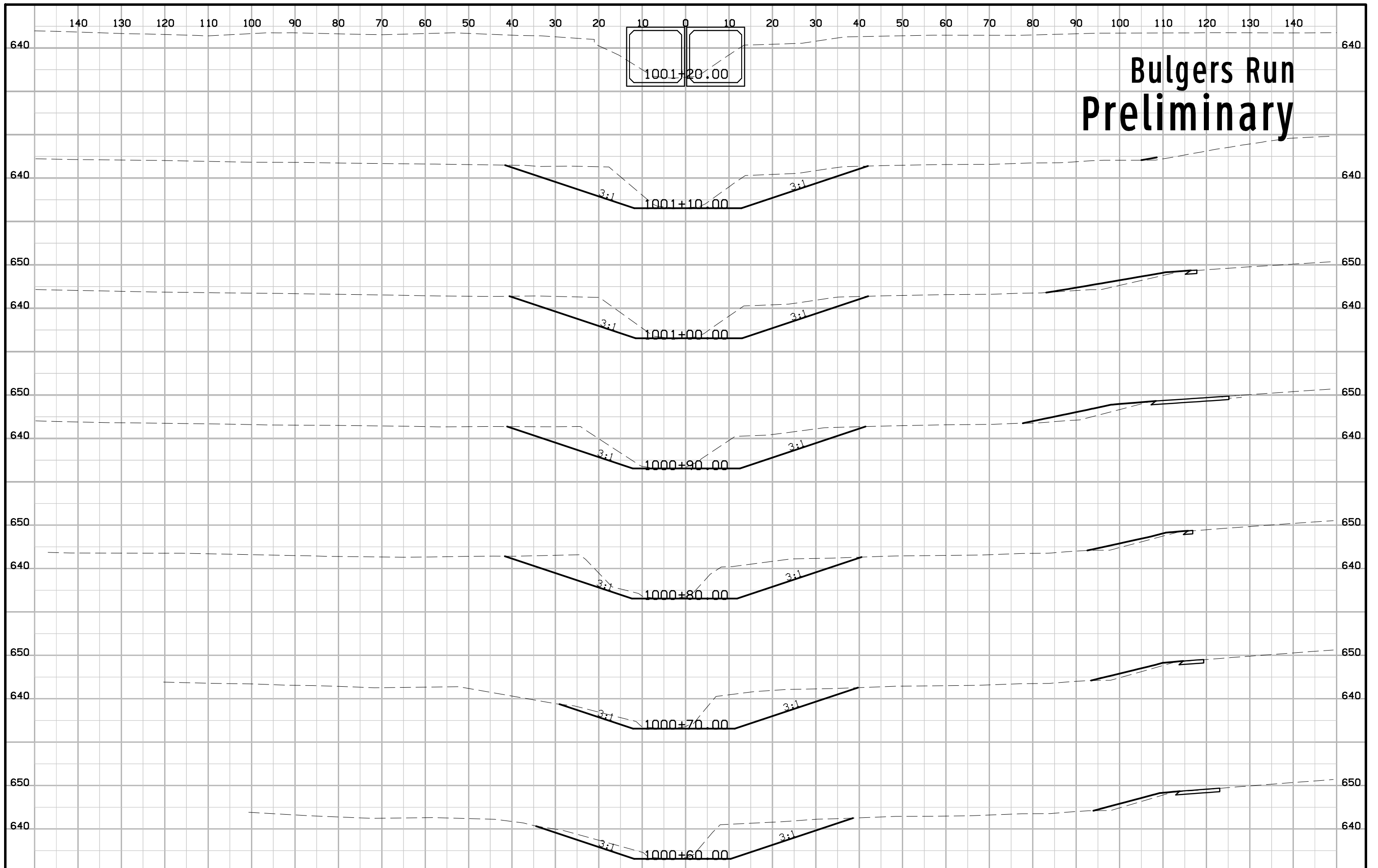
# HWY 22 Preliminary



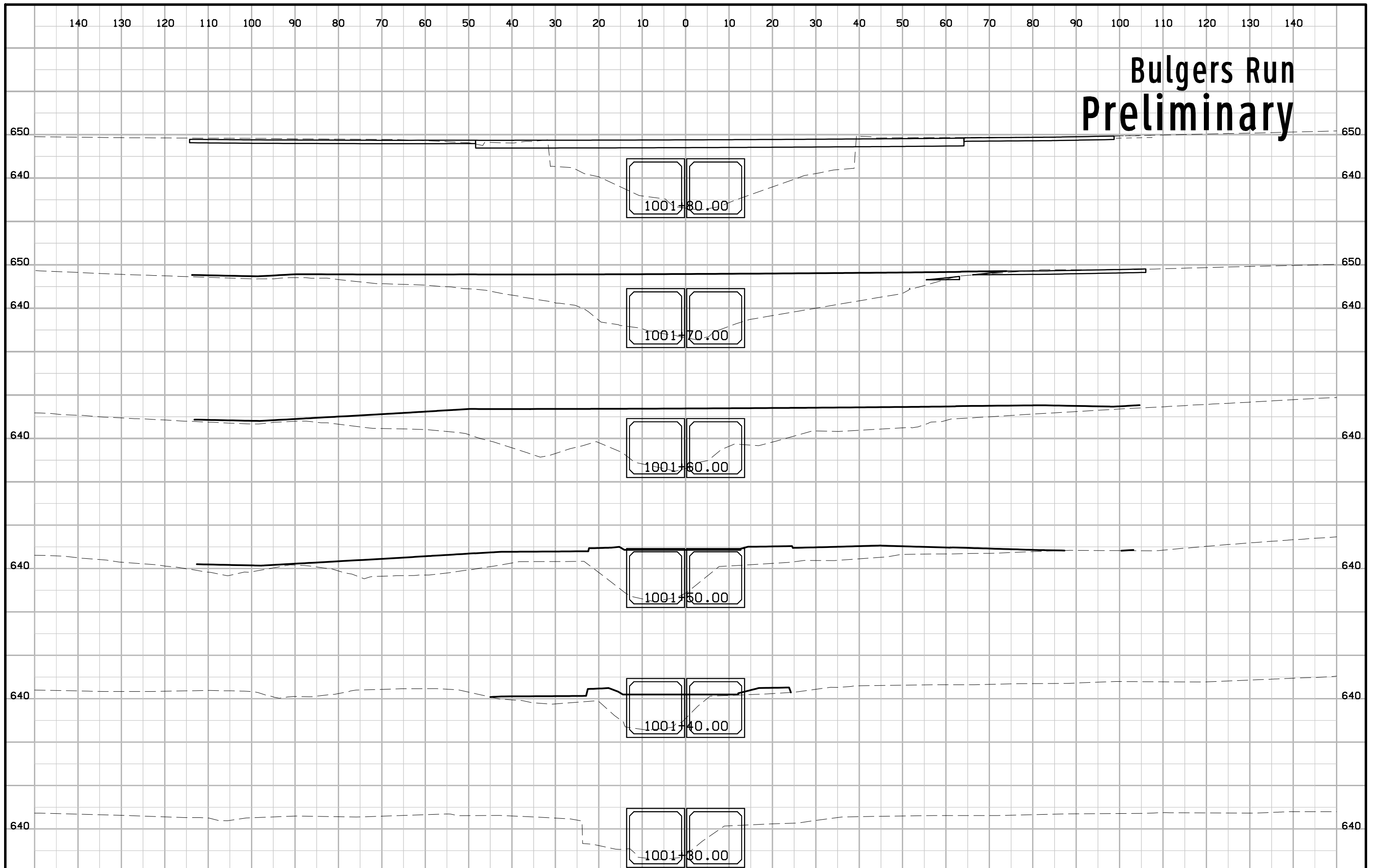
# Bulgers Run Preliminary



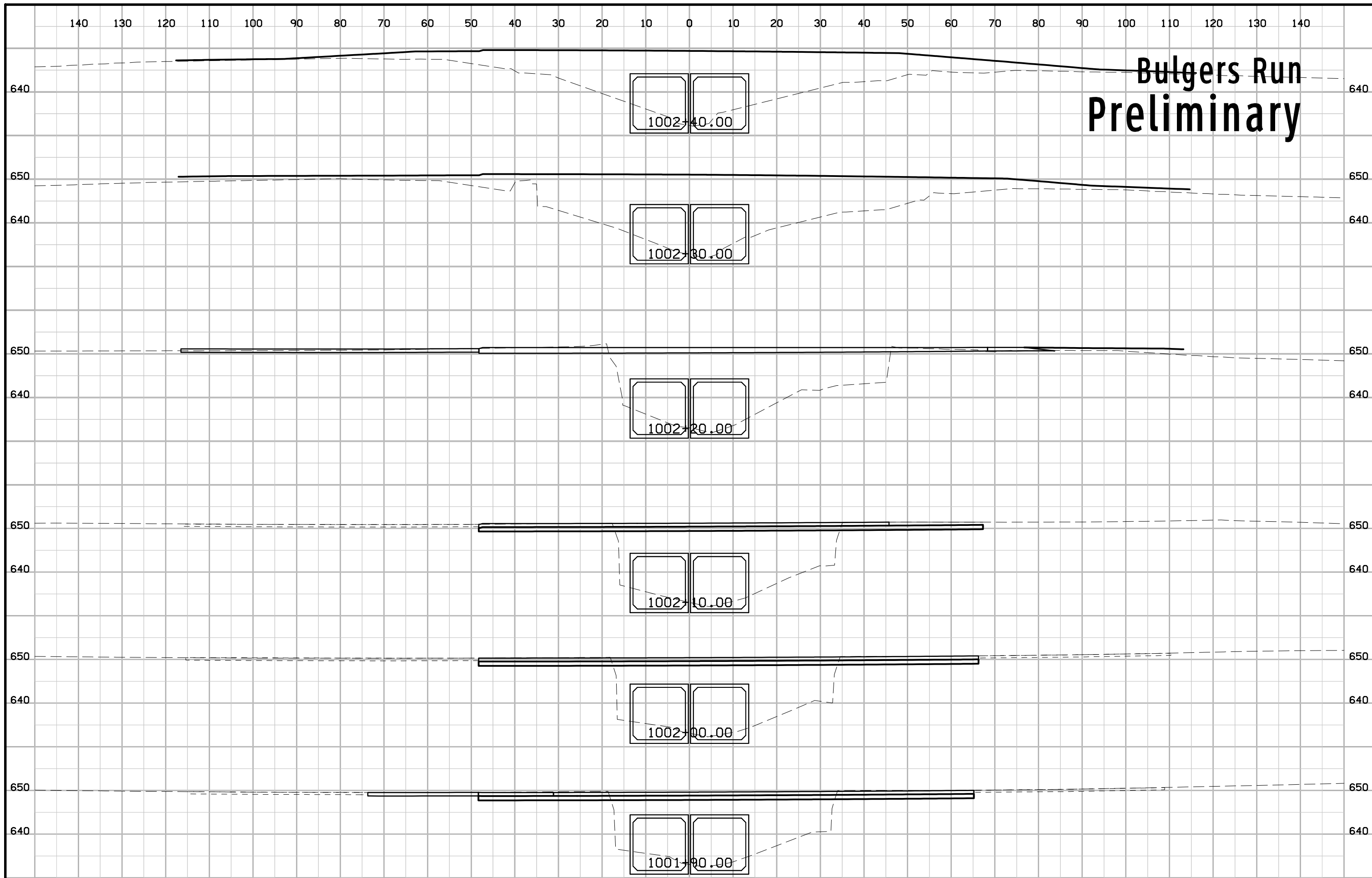
# Bulgers Run Preliminary



# Bulgers Run Preliminary

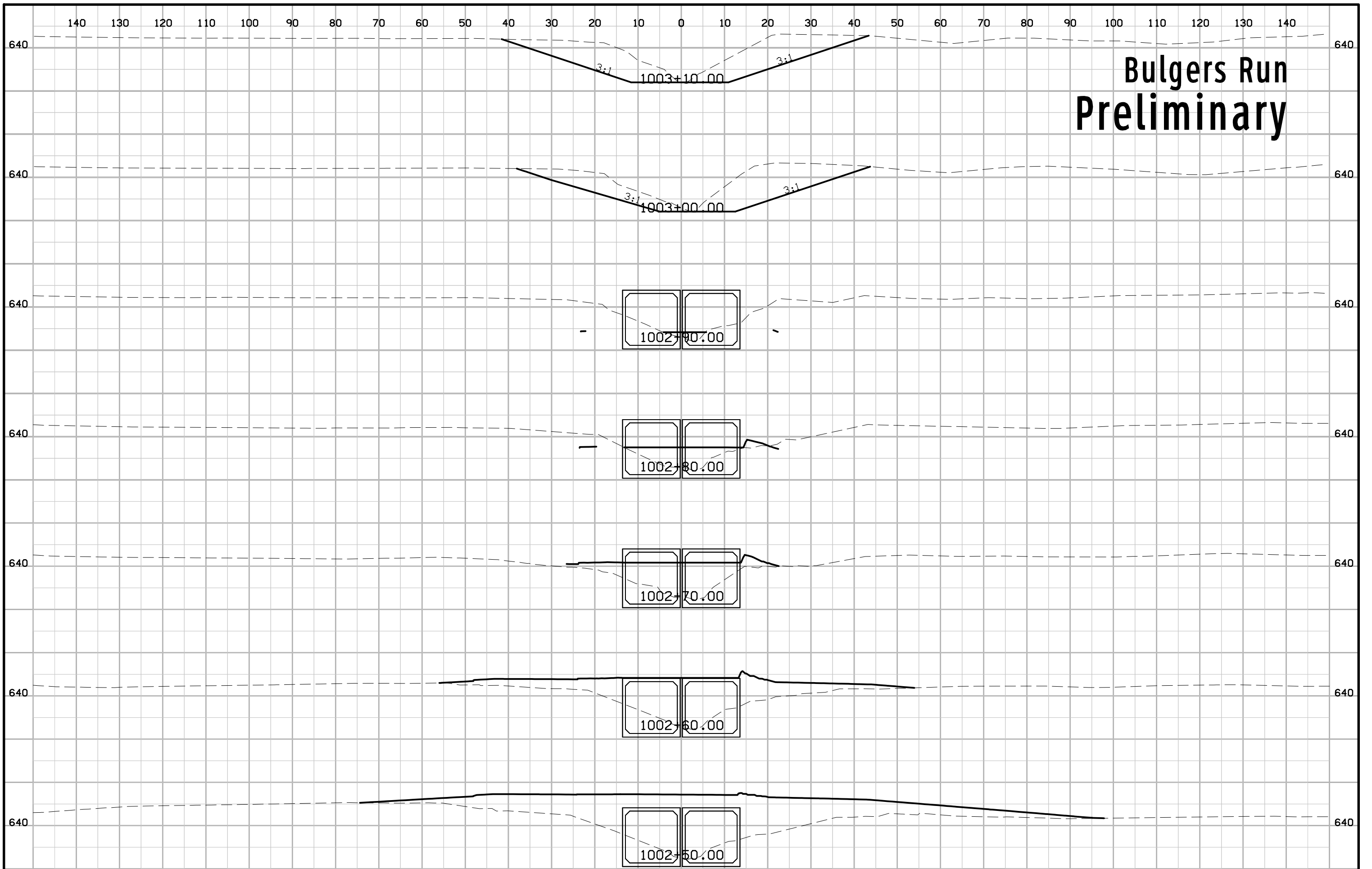




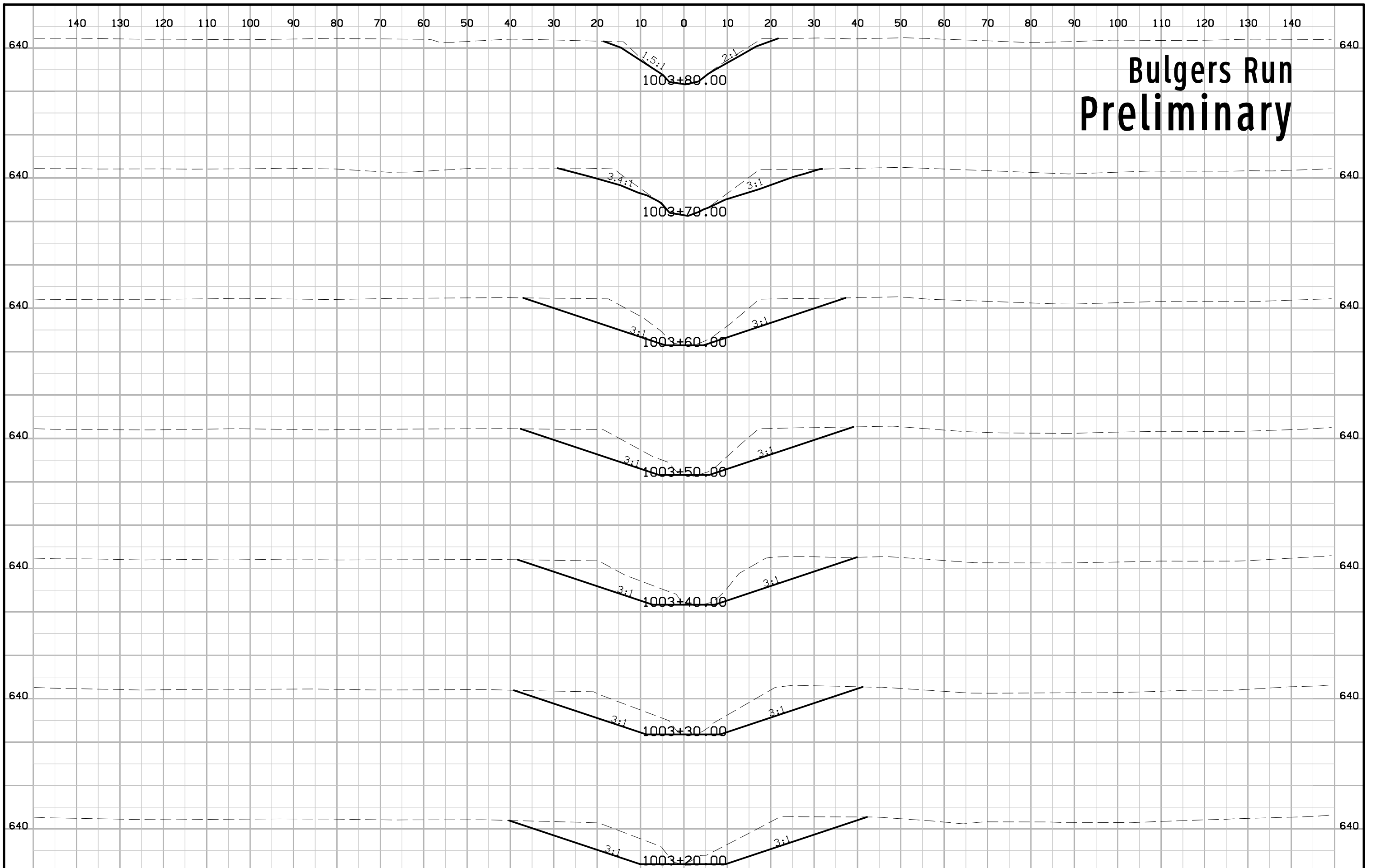


# Bulgers Run Preliminary

# Bulgers Run Preliminary



# Bulgers Run Preliminary



# Bulgers Run Preliminary

