

WOODBURY CO. BRIDGE REPLACEMENT - STEEL GIRDER
 LETTING DATE **8-18-2015**
BRF-020-1(105)--38-97

PRODUCTION SCHEDULE

| EVENT | Proposed Date | Completed Date |
|----------------------------|---------------|----------------|
| D-1 Survey | 1-11-2013 | 2-11-2013 |
| D-2 Field Exam | 2-08-2013 | 6-27-2013 |
| D-3 To Prelim. Culverts | 2-22-2013 | ? |
| B-1 Structures Layout | 3-22-2013 | ? |
| D-5 To Right of Way | 4-05-2013 | ? |
| D-4 Design Plans to Bridge | 4-21-2015 | ? |



Iowa Department of Transportation

Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM
WOODBURY COUNTY
 BRIDGE REPLACEMENT - STEEL GIRDER

US 20 over Elliot Creek 6 miles W. of IA 140 (EBL)

SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

Value Engineering Saves. Refer to Article 1105.15 of the Specifications.

NO MILEAGE SUMMARY



REVISIONS

TOTAL

27

PROJECT IDENTIFICATION NUMBER

13-97-020-010

PROJECT NUMBER

BRF-020-1(105)--38-97

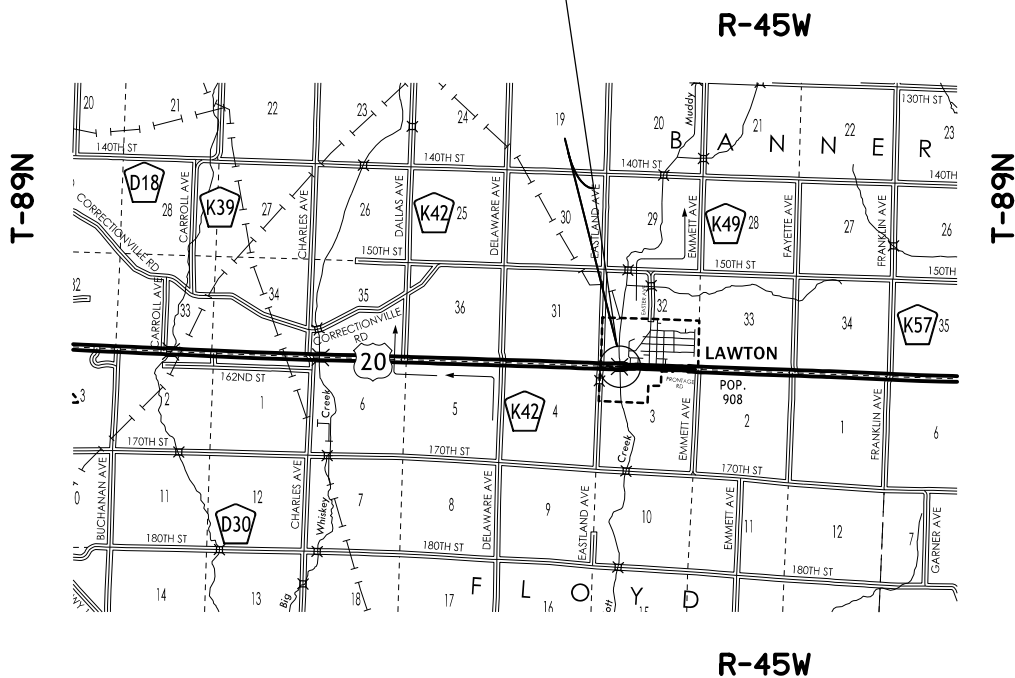
R.O.W. PROJECT NUMBER

NHSN-020-1(136)--2R-97

INDEX OF SHEETS

| No. | DESCRIPTION |
|------------------|--|
| A Sheets | Title Sheets |
| A.1 | Title Sheet |
| A.2 - 9 | Concept Letter |
| A.10 - 11 | Project Documentation |
| A.12 | Field Exam Questions |
| B Sheets | Typical Cross Sections and Details |
| B.1 - 2 | Typical Cross Sections and Details |
| CS Sheets | Soils Tabulations |
| CS.1 | Soils Tabulations |
| D Sheets | Mainline Plan and Profile Sheets |
| * D.1 | Plan & Profile Legend & Symbol Information Sheet |
| * D.2 | US 20 |
| G Sheets | Survey Sheets |
| G.1 - 2 | Reference Ties and Bench Marks |
| V Sheets | Bridge and Culvert Situation Plans |
| V.1 | US 20 EBL Bridge Situation Plans |
| W Sheets | Mainline Cross Sections |
| W.1 | Cross Sections Legend & Symbol Information Sheet |
| W.2 - 9 | Mainline Cross Sections |
| | * Color Plan Sheets |

Project Location
 Sta. 804+15.1, 56.6' Rt.
 FHWA# 52890
 Maint.# 9712.1R020



Westbound Lane
DESIGN DATA RURAL

| | | |
|--------------|-------|--------|
| 2016 AADT | 10600 | V.P.D. |
| 2036 AADT | 15600 | V.P.D. |
| 2036 DHV | 1610 | V.P.H. |
| TRUCKS | 11 % | |
| Total | | |
| Design ESALs | | |

Eastbound Lane
DESIGN DATA RURAL

| | | |
|--------------|-------|--------|
| 2016 AADT | 8800 | V.P.D. |
| 2036 AADT | 13000 | V.P.D. |
| 2036 DHV | 1340 | V.P.H. |
| TRUCKS | 11 % | |
| Total | | |
| Design ESALs | -- | |

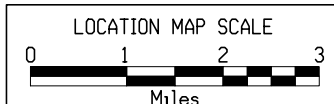
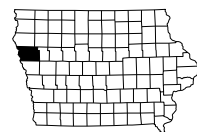
INDEX OF SEALS

| SHEET NO. | NAME | TYPE |
|-----------|------------------|-------------------------|
| A.1 | Paul W. Flattery | Primary Signature Block |
| X | X | X |
| | | |
| | | |
| | | |

PRELIMINARY PLANS

Subject to change by final design.

D2 PLAN - Date: 6-27-2013



ENGLISH IOWA DOT

DESIGN TEAM **Flattery\Buttolph**

WOODBURY COUNTY

PROJECT NUMBER

BRF-020-1(105)--38-97

SHEET NUMBER

A.1

FINAL PROJECT CONCEPT STATEMENT

U.S. 20 Eastbound Bridge over Elliott Creek
6.0 miles west of IA 140

Woodbury County
Proj. #BRF-020-1(105)--38-97
PIN: 13-97-020-010
Maint. No. 9712.1R020
FHWA No. 52890

Highway Division
Office of Design

Kevin K. Patel, P.E.
515-239-1540

January 22, 2013

Woodbury County
Project #BRF-020-1(105)--38-97
PIN: 13-97-020-010
Page 2

replacement in conjunction with bridge widening and structural strengthening will not be an economical option. Therefore the bridge should be replaced.



Eastbound bridge facing west



Facing east - urban section transition to rural

I. STUDY AREA

A. Project Description

This project involves the replacement of the eastbound U.S. 20 bridge (Maint. No 9712.1R020) over Elliott Creek.

The alternatives considered were:

1. Replace existing bridge with a 180 ft. x 40 ft. rolled steel beam bridge on existing horizontal alignment and new vertical alignment. The total cost of this alternative is estimated to be \$1,621,700.
2. Replace existing bridge with a 180 ft. x 40 ft. rolled steel beam bridge on new horizontal and vertical alignment. The total cost of this alternative is estimated to be \$2,004,800.

Alternative 1 is the preferred alternative as it minimizes reconstruction to the mainline roadway and therefore results in a lower project cost. Additional right of way will not be required. Traffic will be maintained by crossovers and two-lane-two-way traffic in the westbound lanes.

B. Need for Project

The existing eastbound bridge is a 150' x 28' continuous concrete tee beam bridge was constructed in 1960 and overlaid in 1981. The bridge is classified as functional obsolete due to the narrow deck width. Additionally, the bridge was originally designed for H20 loading and needs to be strengthened to HS20 to satisfy the highway traffic requirement. The deck

C. Present Facility

The existing eastbound structure is a 150 ft. x 28 ft. continuous concrete girder bridge bridge constructed in 1960.

U.S. Highway 20 in the project area is a divided 4 lane roadway west of the bridge and becomes a 5 lane section east of the bridge. Eastbound pavement west of the bridge is 24 ft. wide PCC with 10 ft. outside and 6 ft. inside granular shoulders and 3:1 foreslopes, constructed in 1964. HMA resurfacing was accomplished on the eastbound lanes in 1998. The westbound bridge was replaced in 2006.

D. Traffic Estimates

The 2016 construction year and 2036 design year average daily traffic estimates are 10,600 ADT with 11% trucks and 15,600 ADT with 11% trucks, respectively.

E. Sufficiency Ratings

U.S. 20 is classified as a Commercial and Industrial route and is a maintenance service level "B" road with a sufficiency rating of 92. The federal bridge sufficiency rating is 70.

F. Access Control

Access rights will not be acquired for this project.

G. Crash History

During the five-year study period from January 1, 2007 through December 31, 2011, there were no crashes involving the eastbound bridge.

II. PROJECT CONCEPT

A. Alternative #1 - Replace existing eastbound bridge with a 180 ft. x 40 ft. Rolled Steel Beam Bridge, on existing horizontal alignment and new vertical alignment

The typical cross section adjacent to the west side of the bridge will consist of a 24 ft. wide roadway (28 ft. wide pavement) with 10 ft. effective outside shoulder (2 ft. outside pavement, 8 ft. granular) and 6 ft. wide effective inside shoulder (2 ft. outside pavement and 4 ft. granular). On the east side of the bridge, a paved median will be developed after the bridge guardrail installation, as the cross section is transitioning from a rural section to an urban section. Future U.S. 20 construction indicates a proposed 5 lane section thru the town of Lawton.

The new eastbound 180 ft. x 40 ft. rolled steel beam bridge will be constructed on the existing horizontal alignment. The vertical alignment will be raised to be similar to the existing westbound profile. This elevation change will require approximately 575 ft. of reconstruction west of the bridge and 280 ft. of reconstruction east of the bridge. Construct new bridge approaches.

Replace the existing guardrail on both the eastbound and westbound bridges with new guardrail and pave the shoulders 20 ft. beyond the end of the guardrail. Class 10 will be necessary to flatten the existing foreslopes and construct the new guardrail blisters. Place class E revetment for slope protection under the bridge. Construct bridge end drains on each end of the bridge.

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

It appears that no right of way will be required for this project.

Traffic will be maintained using one lane median crossover at approximate station 789+00 and two-lane-two-way traffic in the westbound lanes. The median crossover east of the bridge will use the existing paved median between the bridge and the first side road intersection. A temporary crash cushion will be installed on the west side of the westbound bridge while it is accommodating eastbound traffic.

| Bridge Items | <u>Estimated Costs</u> |
|---------------------|------------------------|
| New Bridge | \$ 709,000 |
| Bridge Removal | 33,000 |
| Revetment | 20,000 |
| Mobilization - 10% | 76,200 |
| M & C - 15% | <u>125,700</u> |
| Bridge Costs | \$ 963,900 |

Roadway Items

| | |
|-----------------------------------|-------------------|
| Median crossover, 1 lane | \$ 86,400 |
| Removal of Pavement | 13,200 |
| Bridge Approaches | 77,300 |
| PCC Pavement | 98,400 |
| Special Backfill | 20,400 |
| Granular Shoulder | 6,800 |
| Class 10 Roadway and Borrow | 9,200 |
| Guardrail (Includes Removal) | 35,600 |
| Paved Shoulders for Guardrail | 18,400 |
| Class 10 for Guardrail Blisters | 19,800 |
| Bridge End Drains | 5,800 |
| Longitudinal subdrain and outlets | 5,400 |
| Seeding and Fertilizing | 5,000 |
| Erosion Control | 5,000 |
| Wetland Mitigation | 50,000 |
| Temporary floodlighting | 5,900 |
| Temporary crash cushion | 1,400 |
| Traffic Control - 5% | 23,200 |
| Mobilization - 5% | 23,200 |
| M & C - 30% | <u>153,100</u> |
| Roadway costs | \$ 663,500 |

Project Total **\$1,627,400**

B. Alternative #2 - Replace existing eastbound bridge with a 180 ft. x 40 ft. Rolled Steel Beam Bridge, on new horizontal and vertical alignment

The typical cross section adjacent to the west side of the eastbound bridge will consist of a 24 ft. wide roadway (28 ft. wide pavement) with a 10 ft. effective outside shoulder (2 ft. outside pavement, 8 ft. granular) and 6 ft. wide effective inside shoulder (2 ft. outside pavement and 4 ft. granular). On the east side of the bridge, there will be a paved median as the cross section is transitioning from a rural section to an urban section. Future U.S. 20 construction indicates a proposed 5 lane section thru the town of Lawton.

The new 180 ft. x 40 ft. rolled steel beam eastbound bridge will be constructed on a new horizontal alignment designed with reverse curves west of the bridge to bring the bridges to a parallel alignment (40 ft. centerline to centerline). The vertical alignment will be raised to be similar to the existing westbound profile. The alignment changes, both horizontal and vertical, will require approximately 1200 ft. west of the bridge and 815 ft. east of the bridge to be reconstructed. Construct new bridge approaches.

Permanent crash cushions will be installed on the median side of the bridges (approach and trailing side). A standard guardrail installation will be used on the outside of the approach side of both the eastbound and westbound bridges. This requires pavement of the shoulders 20 ft. beyond the end of the guardrail and Class 10 to construct the new guardrail blisters. Place class E revetment for slope protection under the bridge. Construct bridge end drains on each end of the bridge.

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

It appears that no right of way will be required for this project.

Traffic will be maintained using one lane median crossover at approximately station 789+00 and two-lane-two-way traffic in the westbound lanes. The eastbound traffic will cross back to eastbound lanes at the existing intersection with West Creek Lane. A temporary crash cushion will be installed on the west side of the westbound bridge while it is accommodating eastbound traffic.

| Bridge Items | <u>Estimated Costs</u> |
|---------------------|------------------------|
| New Bridge | \$ 709,000 |
| Bridge Removal | 33,000 |
| Revetment | 20,000 |
| Mobilization - 10% | 76,200 |
| M & C - 15% | <u>125,700</u> |
| Bridge Costs | \$ 963,900 |

| Roadway Items | |
|--|-----------|
| Median crossover, 1 lane | \$ 86,400 |
| Removal of Pavement | 36,400 |
| Bridge Approaches | 77,300 |
| PCC Pavement | 295,000 |
| Special Backfill | 54,900 |
| Granular Shoulder | 17,000 |
| Class 10 Roadway and Borrow | 10,600 |
| Guardrail (Includes Removal) | 18,900 |
| Paved Shoulders for Guardrail | 9,200 |
| Class 10 for Guardrail Blisters | 9,900 |
| Bridge End Drains | 5,800 |
| Longitudinal subdrain and outlets | 11,700 |
| Seeding and Fertilizing | 5,000 |
| Permanent crash cushion (includes spare parts kit) | 32,400 |
| Erosion Control | 5,000 |
| Wetland Mitigation | 50,000 |
| Temporary floodlighting | 5,900 |
| Temporary crash cushion | 1,400 |

| | |
|----------------------|---------------------|
| Traffic Control - 5% | 36,600 |
| Mobilization - 5% | 36,600 |
| M & C - 30% | <u>241,800</u> |
| Roadway costs | \$ 1,047,800 |
| Project Total | \$ 2,011,700 |

B. Detour Analysis

There will be no off-site detour. Traffic will be maintained via one-lane median crossovers and two-lane-two-way traffic in the westbound lanes. A crossover will be constructed at approximate station 789+00 and eastbound traffic will return to the eastbound lanes using the paved median area east of the bridge.

C. Recommendations

It is recommended that the present structure be replaced as described in Alternative 1.

D. Construction Sequence

It is anticipated that all work on this project will be awarded to one prime contractor. The Office of Bridges and Structures will coordinate the plan preparation with assistance from the Office of Design.

E. Special Considerations

Right of Way will not be required for this project.

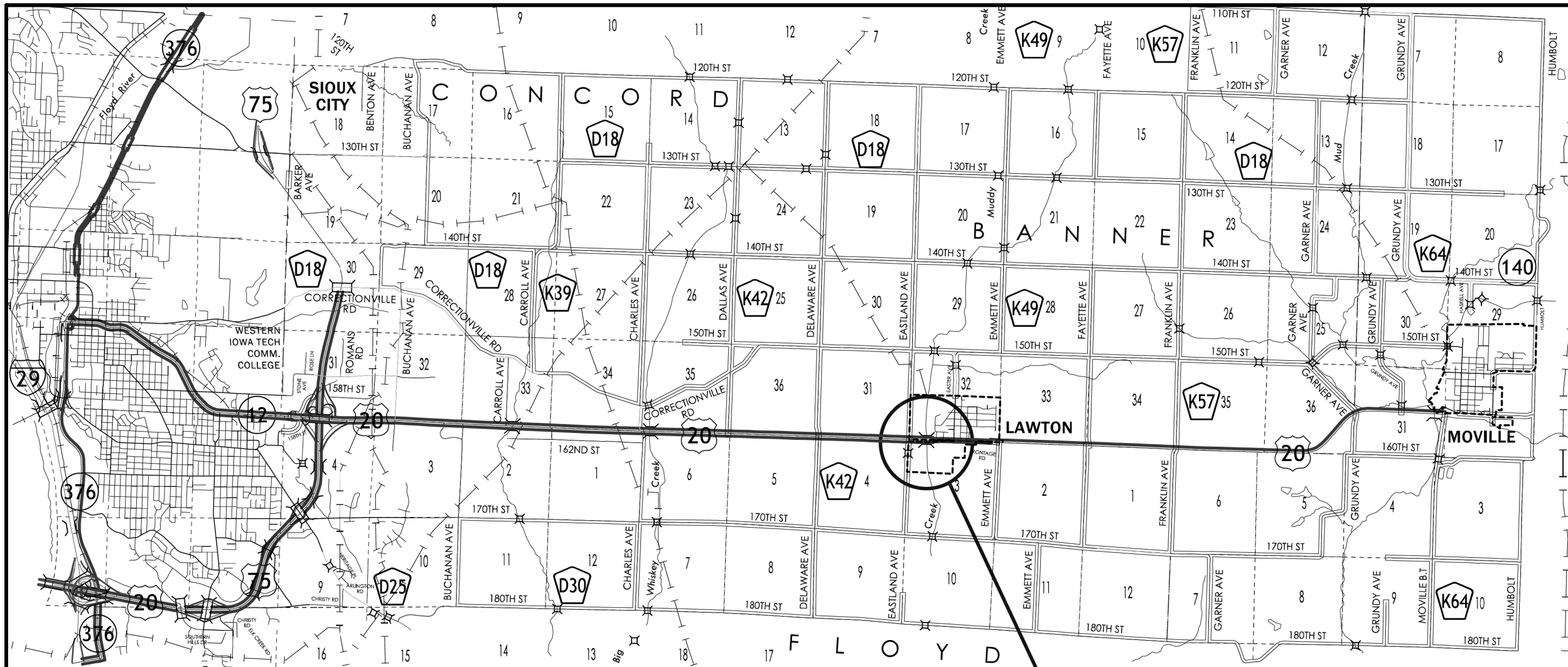
The Office of Location and Environment has reviewed this project and based on preliminary, has determined that a Section 404 Permit will be required. It is expected that the work will be covered by Nationwide Permit 14. This project is clear for endangered species as well.

There are no sidewalks adjacent to U.S. 20 in the project area; therefore, no ADA work is planned in conjunction with this project.

F. Program Status

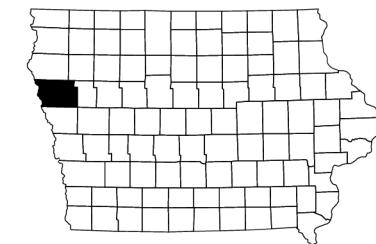
Site data has been developed by the Office of Design. This project is listed in the 2013-2017 Iowa Transportation Improvement Program, with \$1,099,000 programed for replacement in FY 2016. Costs for this project may be eligible for bridge replacement funds. A schedule of events will be developed following approval of the Project Concept.

KKP: als



WOODBURY CO.

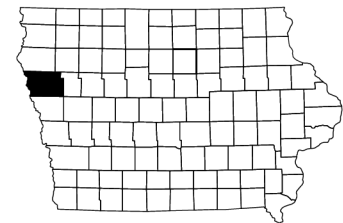
U.S. 20 Eastbound Bridge
 over Elliot Creek
 6 miles west of IA140
 T-89 N - R44W
 Section 32 Banner Township
 Section 3 Floyd Township





LAWTON

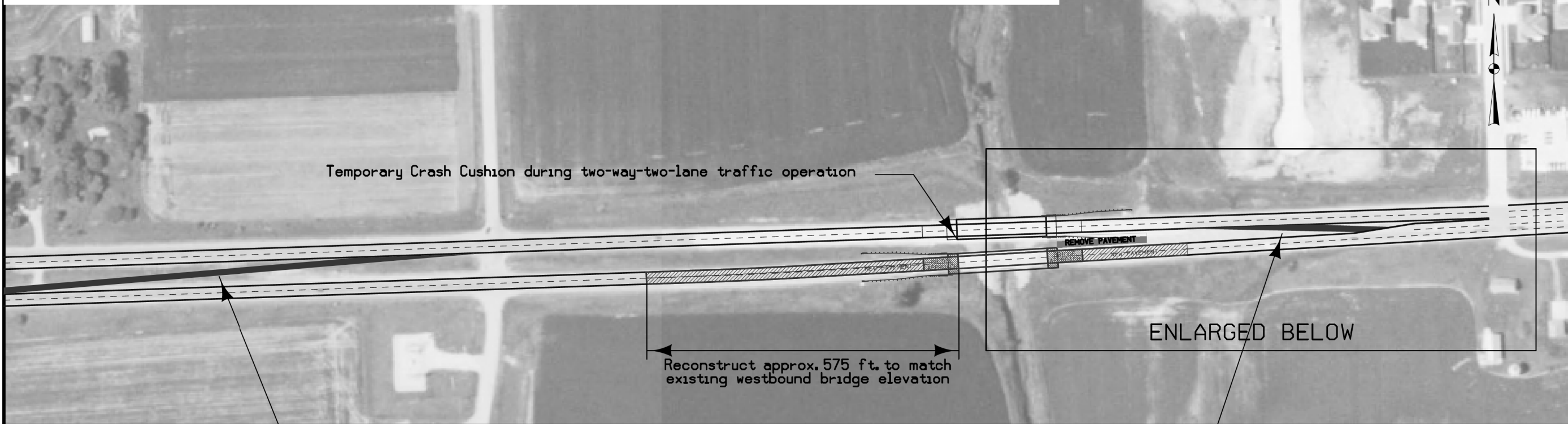
WOODBURY CO.



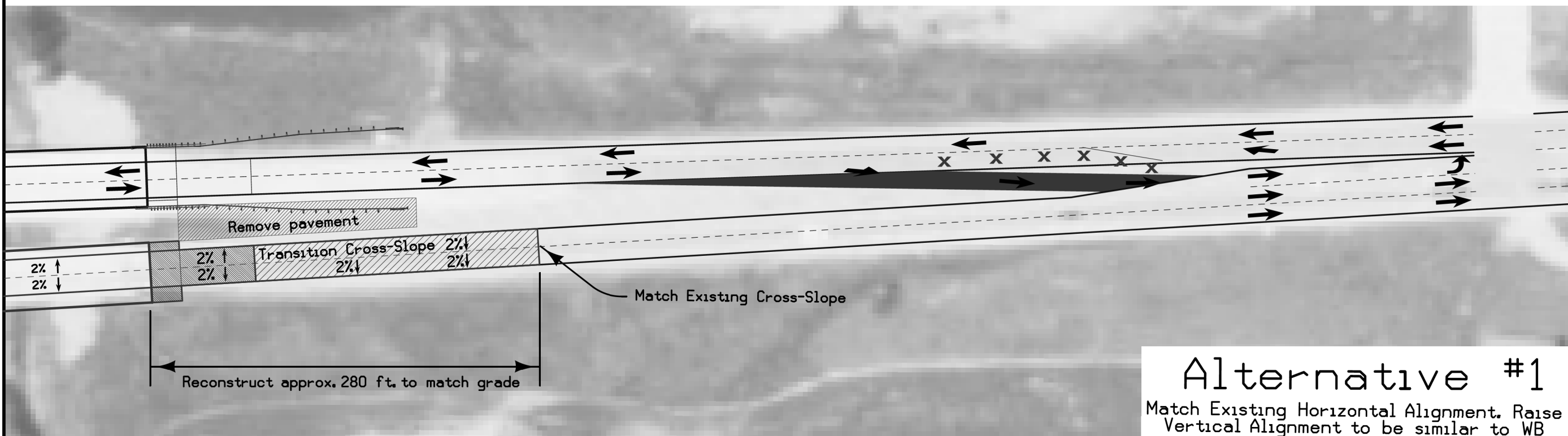
U.S. 20 Eastbound Bridge
over Elliot Creek
6 mi. west of IA140
BRF-020-1(105)--38-97
PIN: 13-97-020-010

Maint. #9712.1R020 FHWA #52890

Woodbury Co. US 20 Eastbound Bridge over Elliott Creek
 BRF-020-1(105)--38-97 Maint. #9712.1R020 FHWA #52890



Crossovers at approx. Sta. 789+00 and 810+60



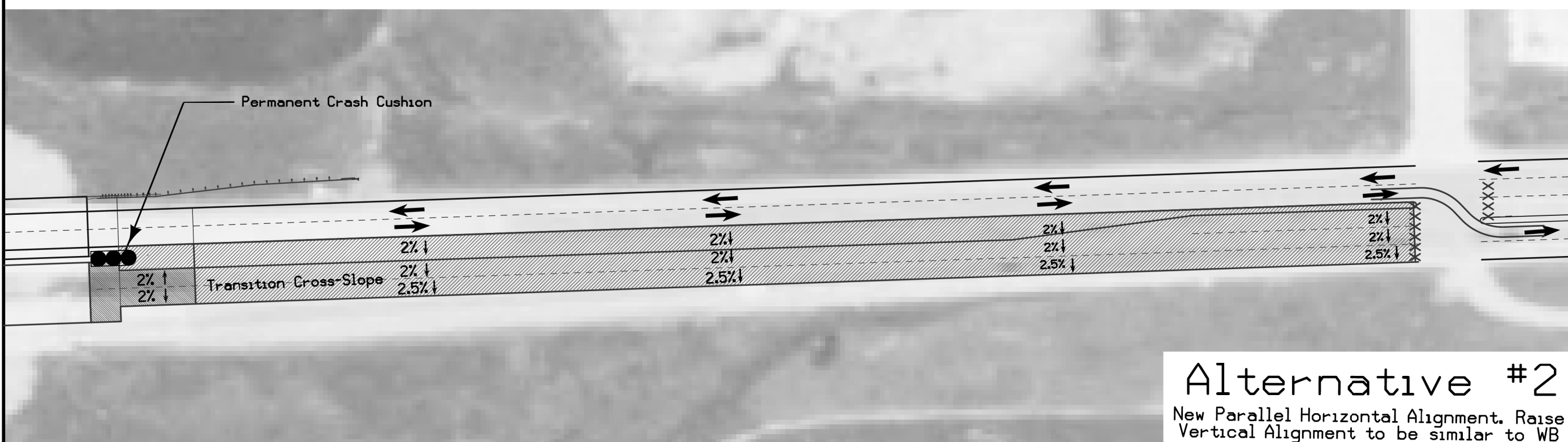
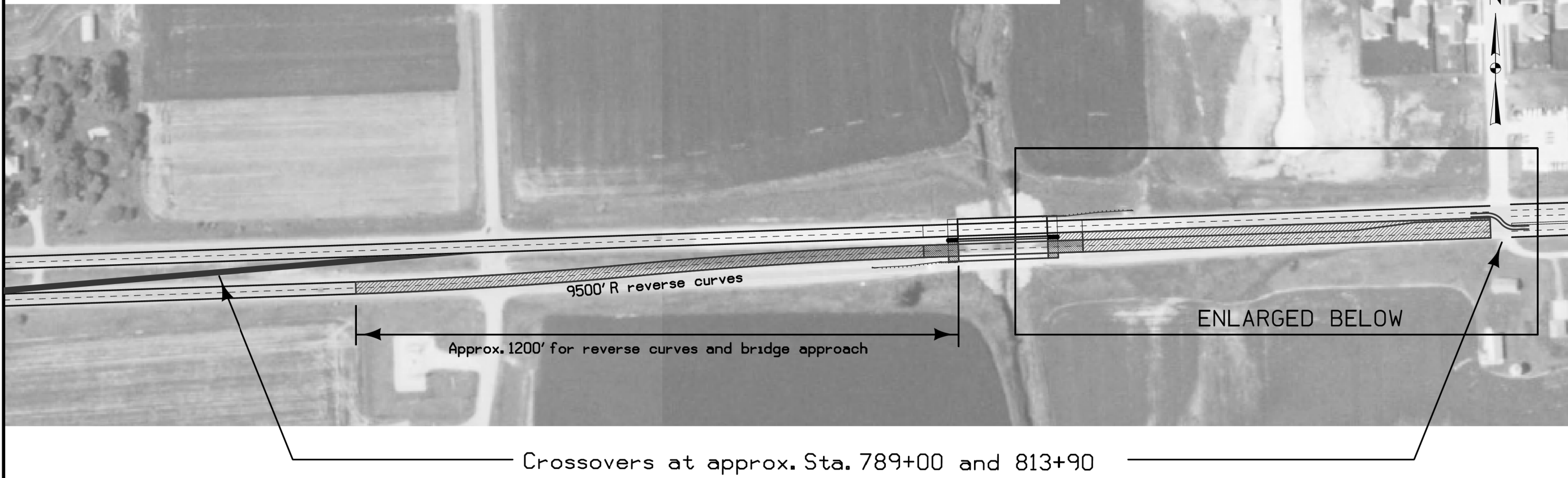
Alternative #1
 Match Existing Horizontal Alignment. Raise
 Vertical Alignment to be similar to WB

| | | | | | |
|---------|----------|-------------|--------|----------------|--------------|
| ENGLISH | IOWA DOT | DESIGN TEAM | COUNTY | PROJECT NUMBER | SHEET NUMBER |
|---------|----------|-------------|--------|----------------|--------------|

| | | | | | |
|------------|------------|----------|---------|--|--|
| SYSTEMTIME | SYSTEMDATE | USERNAME | DGNSPEC | | |
|------------|------------|----------|---------|--|--|

| | | | | | | | |
|---------|----------|-------------|-----------------|----------------|-----------------------|--------------|-----|
| ENGLISH | IOWA DOT | DESIGN TEAM | WOODBURY COUNTY | PROJECT NUMBER | BRF-020-1(105)--38-97 | SHEET NUMBER | A.8 |
|---------|----------|-------------|-----------------|----------------|-----------------------|--------------|-----|

Woodbury Co. US 20 Eastbound Bridge over Elliott Creek
 BRF-020-1(105)--38-97 Maint. #9712.1R020 FHWA #52890



| Last Updated 6/13/2012 | | Acceptable Values | Preferred Values | Project Values | Comments |
|--|---|---|--|---|--|
| Last Updated 6/13/2012 | | Acceptable Design Criteria Based Upon Roadway Type (requires approval according to Section 1C-8) | | Preferred Design Criteria Based Upon Roadway Type | |
| Design Element | Roadway Type | | Roadway Type | | |
| | Expressways/ Freeways | Transitional Facilities | | | |
| design speed (mph) | Cannot be less than the posted speed limit | | 5 miles above the posted speed limit | | 60 |
| full depth paved width (ft) | outside lane | 12 | match rural | | 12 |
| | inside lane(s) | 12 | | | |
| design lane width (ft) | 12 | | 12 | | 12 |
| auxiliary-lane width (ft) (includes turn lanes) | 10 | | 12 | | NA |
| parking-lane width (ft) | | | | | NA |
| pavement cross-slope (%) | 1.5% minimum, 3% maximum | | 2%, However, when adjacent lanes slope in the same direction, increase slope by 0.5% per lane up to 3% | | 2% |
| effective shoulder width and type (see Section 3C-4) | See Shoulder Tables | | Discuss at PMT | | 10' Effective outside, 6' effective inside |
| shoulder cross-slope (%) | not less than the adjacent lane, 2 to 6% for paved, 4 to 6% for granular, 6 to 8% for earth | | 4 | | 4% |
| foreslope (see Roadway Typical Cross Sections) | adjacent to shoulder | 3:1 | 2% toward curb | | 6:1 |
| | beyond standard ditch depth and design clearzone | 3:1 | match urban | | 3:1 |
| | Curbed roadways | 4% for 12' behind curbs, then not steeper than 3:1 | 4% toward roadway for 12', then not steeper than 4:1 | | NA |
| normal outside ditch (depth x width) (ft) | -- | | 5 x 10 | | 5 x 10 |
| normal median ditch depth (ft) | 3' minimum | | -- | | |
| normal median width (ft) (if applicable) | no barrier: 50 barrier: 10 | | -- | | Variable |
| Backslope (For cut areas greater than 25 feet, contact the Soils Design Section for assistance with backslope benches.) | 2.5:1 | | 4:1 | | |
| bridge width—new (ft) | design lane widths + effective shoulder widths | | design lane widths + effective shoulder widths or curb to curb street width | | 40 ft. |
| bridge width—for Use as Constructed bridges (ft) | design lane widths + 2 ft offset each side | | | | |
| transverse slopes | w/ drainage structures | 6:1 | 8:1 | | |
| | w/o drainage structures at sideroads | 6:1 | 10:1 6:1 | | |
| Vertical clearance (ft) (above lanes & shoulders)(see Section 8A-2) | Over primary | 16 | 16.5 | | |
| | over non-primary | 14 | 16.5 at interchange locations, 15 at all other locations | | |
| | over railroad | 23.3 | 23.3 | | |
| | sign truss | 17 | 17.5 | | |
| Structural Capacity | Contact Office of Bridges and Structures | | -- | | |
| Level of Service | B for Rural, C for Urban | | -- | | |

| last update: 6/13/2012 | | Acceptable Values | Preferred Values | Project Values | Comments |
|---|--|--|---|----------------|-------------------------------|
| last update: 6/13/2012 | | Acceptable Design Criteria Based Upon Design Speed (requires approval according to Section 1C-8) | Preferred Design Criteria Based Upon Design Speed | | |
| Design Element | Design Speed, mph (Acceptable design speed is equal to posted speed limit and a minimum of 70mph for Interstates) | Design Speed, mph (Preferred design speed is 5mph over posted speed limit and a minimum of 70mph for Interstates) | | | |
| | 60 | 60 | 60 | | |
| Stopping sight distance (ft) (see Section 6D-1) | 570 | 570 | UAC | | |
| Minimum horizontal curve radius (ft) | e _{max} = 4% | -- | -- | UAC | |
| | e _{max} = 6% | 1330 | 1330 | UAC | |
| | e _{max} = 8% | 1200 | | UAC | |
| Minimum vertical curve length (ft) | 180 | 180 | 180 | | |
| Minimum rate of vertical curvature (K) | crest | 151 | 245 | >245 | |
| | sag | 136 | 136 | >136 | |
| Minimum gradient (%) | 0.3% with a curb, 0.0% without a curb | | 0.5 | 0.13% | similar to westbound |
| Maximum gradient (%) on ramps | Upgrades | 5 | 4% | NA | |
| | Downgrades | Equal to the maximum upgrade gradient. In special cases, may be 2% greater but in no case greater than 8% | | | |
| Maximum gradient (%) on roadways other than ramps | 4 | | 3 | 3% | |
| Clearzone | See "Acceptable Clear Zone" table in Section 8A-2 | | See "Preferred Clear Zone" table in Section 8A-2 | | 30' acceptable, 46' preferred |
| Curb type | 4" Sloped is maximum height for interstate routes | | 4" Sloped is maximum height for interstate routes, 6" Sloped for all other routes | | NA |
| | 6" Sloped for all other routes | | | | NA |

Acceptable Shoulder widths for Expressways / Freeways (values shown in feet)

| Auxiliary Lanes (includes turn lanes) | 4 | | | | |
|---------------------------------------|--------------------|-------|--------------------|-------|--|
| | Outside | | Median Side | | |
| | Effective Shoulder | Paved | Effective Shoulder | Paved | |
| Expressways / Freeways | 8 | 0 | 4 | 4 | 10' effective outside (2' paved), 6' effective inside (2' paved) |

Preferred Effective Shoulder widths for Expressways / Freeways (values shown in feet)

| Auxiliary Lanes (includes turn lanes) | 6 | | | | |
|---|--------------------|------------------|--------------------|------------|--|
| Expressways / Freeways | Outside | | Median Side | | |
| | Effective Shoulder | Paved | Effective Shoulder | Paved | |
| Any route with a designated bike trail | 10 | full width | 6 | full width | |
| On all curves with a radius of 954.93' or less | 10 | full width | 6 | full width | |
| On roadways approaching urban areas (due to increased bike traffic) | 10 | full width | 6 | full width | |
| On roadways with an existing ADT > 10000 | 10 | 6 | 6 | full width | 10' effective outside (2' paved), 6' effective inside (2' paved) |
| On all other NHS | 10 | 4 | 6 | 4 | |
| On non-NHS routes with an existing ADT > 3000 | 10 | 4 | 6 | 4 | |
| On non-NHS routes with an existing ADT < 3000 | 10 | See Section 3C-4 | 6 | 4 | |

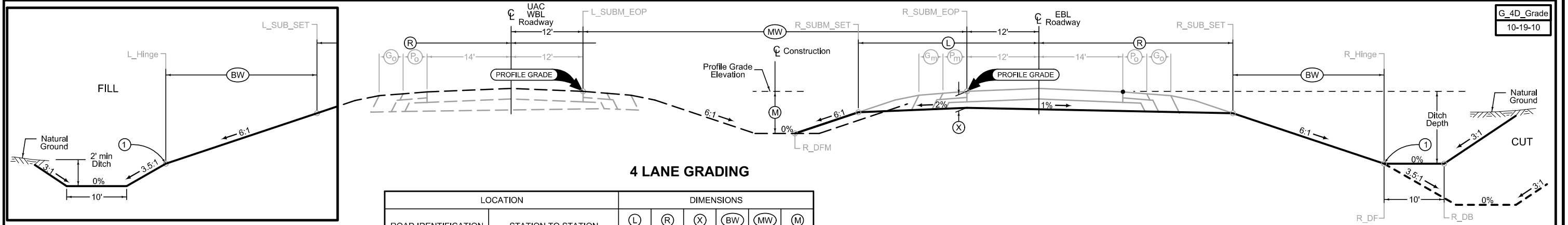
Field Exam Checklist

- Are any of the following needed:
 - Contractor or designated Borrow area adjacent to the site?
 - Field Laboratory?
 - Construction Survey?
 - Removal and Reinstall Signs? Does the district maintenance crew want to handle this? Or do they prefer the Contractor handle it?
- Clearing and Grubbing by area or by unit? If by unit, District to provide count.
- Duration of the project?
- Are there existing drainage problems?
- Are there areas adjacent to the project where additional ditching needs done?
- Is special erosion control needed (riprap, silt ditches, silt dikes, etc.)?
- Tile lines? Location?
- Note existing subdrain outlets for Soils Design.
- Note any special features not shown on plan.
- Note condition of existing culverts.
- Note existing guardrail lengths and number of posts.
- Do any of the utilities need relocated (power/telephone poles) either permanently or temporarily for construction? Lights on bridge to be replaced?
- Speed limit
- Speed Limit during construction?
- Is sight distance a problem?

- Disposition of existing structure, guardrail, signs, etc...(213-1 or the District Office)?
- Any patching need done in the area or do the construction limits need extended? Is the District going to provide locations of patches by milepost?
- Are there any historical items within the project?
- Are there any endangered species within the area?
- Are there any Wetland Impacts or any other Environmental issues?
- Are there any special events which need to be noted in the plan? Or is there a contact person who could provide this information closer to letting the project?
- Are there any entrances within the project limits that have not been previously identified?
- Are there any areas of snow drifting problems?

W:\Projects\9702001011\Design\DOCS\Field Exam Checklist.doc

W:\Projects\9702001011\Design\DOCS\Field Exam Checklist.doc



4 LANE GRADING

| LOCATION | | DIMENSIONS | | | | | | |
|---------------------|--------------------|------------|-----------|-------------|------------|------------|-----------|--|
| ROAD IDENTIFICATION | STATION TO STATION | L Feet | R Feet | X Inches | BW Feet | MW Feet | M Feet | |
| EBL | 1798+00 EBL | 30.64 | 32.08 | 10 | 12.88 | ② | UAC | |
| EBL | Skip Bridge EBL | 1808+50 | 30.64 | 32.08 | 10 | 12.88 | ② UAC | |
| | | | | | | | | |
| | | | | | | | | |

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

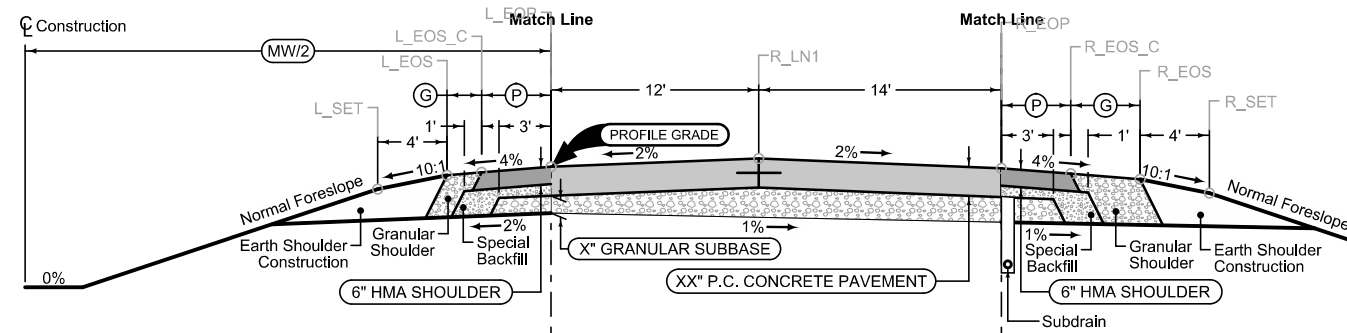
See Plan & Profile sheets and cross sections for additional details of ditches and backslopes.

- ① Refer to project plan and cross sections for specific location of foreslope change.
- ② MW is EBL to WBL edge of slab distance. See D & G sheets for WBL Geometric's.

Combination Shoulder

Shoulder Jointing:
Longitudinal joint: B

| | | 4_C_ 10-19-10 | | |
|---------------------|---------------|------------------|----------|----------|
| Direction of Travel | BEGIN STATION | END STATION | (P) Feet | (G) Feet |
| EBL | 1798+00 | EBL | 4 | 2 |
| | Skip Bridge | | | |
| EBL | EBL | 1808+50 | 4 | 2 |



Section shown in the direction of traffic.

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

| | | 4DP_ 10-19-10 | | |
|---------------------|---------------|------------------|-----------|--|
| Direction of Travel | BEGIN STATION | END STATION | (MW) Feet | |
| EBL | 1798+00 | EBL | 4 | |
| | Skip Bridge | | | |
| EBL | EBL | 1808+50 | 4 | |

Combination Shoulder

Shoulder Jointing:
Longitudinal joint: B

| | | 4_C_ 10-19-10 | | |
|---------------------|---------------|------------------|----------|----------|
| Direction of Travel | BEGIN STATION | END STATION | (P) Feet | (G) Feet |
| EBL | 1798+00 | EBL | 4 | 2 |
| | Skip Bridge | | | |
| EBL | EBL | 1808+50 | 4 | 2 |

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

ROADWAY IDENTIFICATION

SURVEY SYMBOLS

- SIGN SL Speed Limit Sign
- TP TPD Telephone Pedestal
- SIGN SI Sign
- LUM Luminaire
- PPA Power Pole Co. 1
- MM Mile Marker Post
- IN Storm Sewer Intake
- OUT Tile Outlet
- INB Storm Sewer Beehive Intake
- UB Utility Box
- COS Square Bridge Pier Column
- SP Stream Profile
- TW Top of Water
- LIN Miscellaneous Line
- GDL Guard Rail Steel
- BRG Bridge
- x FW Wire Fence
- Tile TIL Tile Line
- TOP Top of Bridge Pier
- EP Edge of Paved Roads (ML or SR)
- SH Paved Shoulder
- CU Back of Curb
- GU Gutter In Front of Curb
- D Centerline Draw or Stream (Down)
- SNP Unpaved Shoulder
- DU Centerline Draw or Stream (Up)
- DIK Centerline of Dike or Dam
- BNK Stream Bank
- EW Edge of Water
- RIP Rip-Rap
- CON Concrete or A/C Slab
- F0 FOA Underground Fiber Optic Co. 1
- F02 FOB Underground Fiber Optic Co. 2
- F03 FOC Underground Fiber Optic Co. 3
- PIP Pipe Culvert
- St.S. STA Storm Sewer Line Co. 1

UTILITY LEGEND

- MidAmerican Energy
- St.S. Iowa DOT (QLA At Intakes\Manholes)
- F0 Century Link (QLD)
- F02 Iowa Network Services (QLD)
- F03 Western Iowa Telephone COOP (QLD)

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 | |

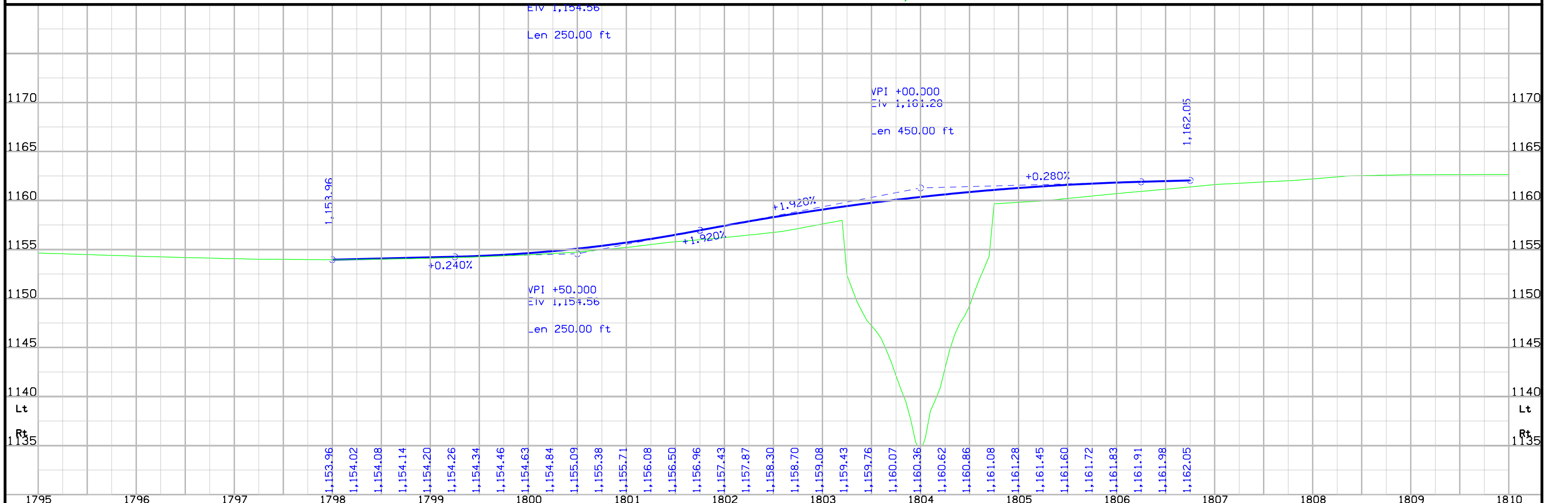
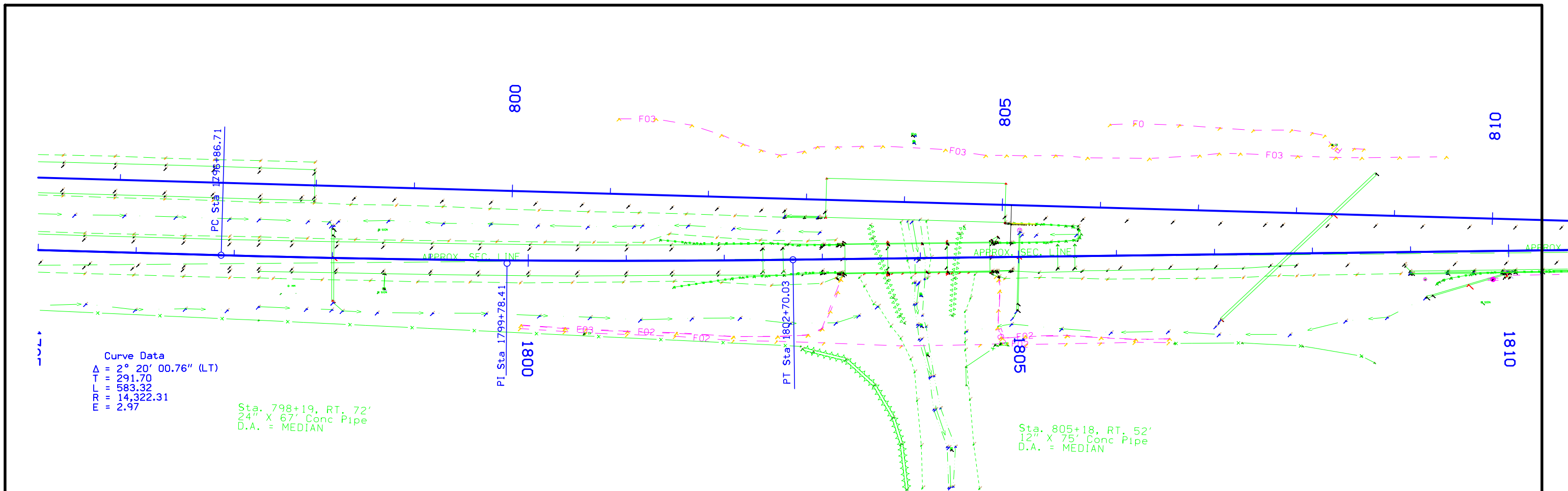
- Reference Point
- Station
- Survey Line
- Section Corner
- Ground Line Intercept
- Saw Cut
- Guardrail
- Trench Drain
- High Tension Cable Guardrail
- Sheet Pile
- Pavement Removal
- Clearing & Grubbing Area

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)



Survey Information

General Information

Measurement units for this survey are US survey feet. This survey is for proposed reconstruction of eastbound US 20 bridge over Elliot Creek in Lawton. Project datum and control information is provided by Design Survey Office. All vertical and horizontal control is from previous survey work along US 20 corridor.

Vertical Control

Vertical datum for this survey is relative to NAVD88. A 3-wire level loop was run from BM #511 (NGS BM 97) through the project to BM # 558 NGS # 29 RS(G997). The loop error met 3rd Order accuracy and the error was distributed proportionately among the project bench marks.

BM # 500 EL =1302.757 FT THIS SURVEY =
NGS #97-511 EL = 1302.757 FT

BM # 514 EL =1153.76 FT THIS SURVEY=
BM # 75 EL =1153.35 FT FN PROJ. 2(1) ASBUILT PLAN

BM # 558 EL =1378.28 FT THIS SURVEY=
NGS # 29RS(G997) EL = 1378.28 FT

Horizontal Control

GENERAL INFORMATION FOR GPS PROJECT : NHS-20-1(77)--19-97
STATE PLANE COORDINATE ZONE 1401 (IOWA North LAMBERT)
STATE PLANE COORDINATES HELD AT POINT G025
AVERAGE PROJECT LATITUDE = 42 28 2.18766
RESULTING RADIUS = 6364550.702 (METERS)
MEAN PROJECT ELEVATION = 380.000 (METERS)
SEA LEVEL FACTOR = 0.999940298
AVERAGE PROJECT SCALE FACTOR = 0.999951747
COMBINED FACTOR (GRID) = 0.999892048
1 / GRID = 1.000107964
VERTICAL DATUM = NAVD 88 <-> HORIZONTAL DATUM = NAD 83 (1996)

Local Project Plane Coordinate Conversion Equation:

- a. Local Project Coord y = [(State Plane y - hold point y) 1/grid factor] + hold point y
- b. Local Project Coord x = [(State Plane x - hold point x) 1/grid factor] + hold point x

US Survey Ft. units

| POINT | STATE PLANE COORD(Y) | STATE PLANE COORD(X) | POINT SCALE FACTOR | LOCAL PROJECT PLANE COORD(Y) | LOCAL PROJECT PLANE COORD(X) | ESTIMATED GPS DERIVED ORTHOMETRIC HEIGHT |
|-------|----------------------|----------------------|--------------------|------------------------------|------------------------------|--|
| G014 | 3647713.30 | 4194761.71 | 0.99995099 | 3647713.38 | 4194759.60 | 1152.19 |
| G015 | 3647737.52 | 4198295.34 | 0.99995097 | 3647737.60 | 4198293.62 | 1229.46 |

Alignment Information

The horizontal WBL alignment for this survey is a retrace of As-built Plans No. F Project No. 2(10). Survey stationing was related to the plan PI at 710+43.60 and run back and ahead without station equations.

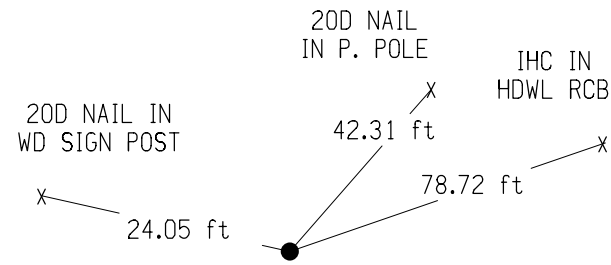
EBL Alignment was developed by District ROW and used for design survey alignment.

VERTICAL CONTROL

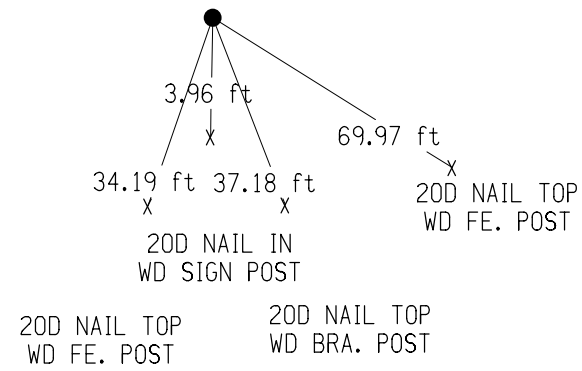
NOTE: STATIONING RELATES TO EAST BOUND LANE CENTERLINE

| Point | North | East | Elevation | Station | Offset | Feature | Description |
|-------|-------------|-------------|-----------|---------|--------|---------|----------------------|
| 514 | 3647877.323 | 4194676.304 | 1153.760 | 793+54 | -134 | BM | IHC-INLET-8-X-6-RCB |
| 515 | 3647707.048 | 4195635.471 | 1160.606 | 803+18 | 15 | BM | IHC-SW-COR-S.-BRIDGE |
| 516 | 3647791.239 | 4195795.243 | 1162.639 | 804+78 | -69 | BM | IHC-NE-COR-N.-BRIDGE |
| 517 | 3647763.768 | 4197432.569 | 1198.401 | 821+13 | -60 | BM | RR-SPK-N.SIDE-P.POLE |

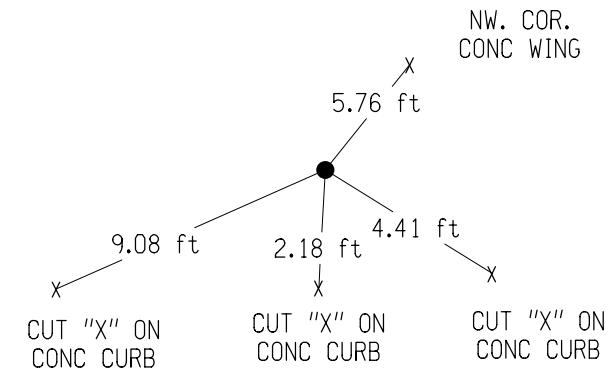
101.06 LT of STA 793+27.23 EBL
 IRON PIN
 CP #205
 XC(E)=4194648.751, YC(N)=3647845.267



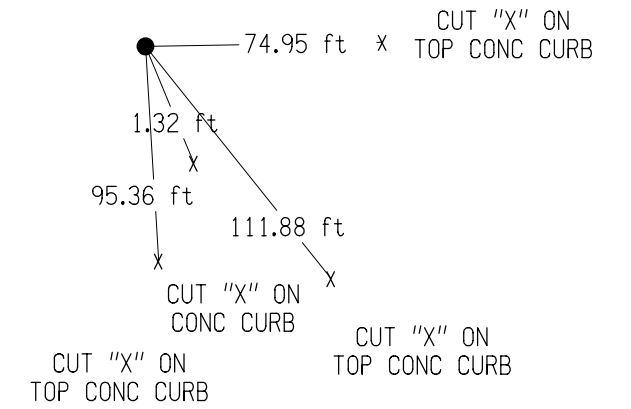
26.68 RT of STA 794+42.84 EBL
 #5 REBAR
 GPS POINT G014
 XC(E)=4194759.600, YC(N)=3647713.380



76.85 LT of STA 803+13.11 EBL
 IRON PIN
 CP #206
 XC(E)=4195630.259, YC(N)=3647798.603



66.88 LT of STA 819+79.24 EBL
 SET IRON PIN
 CP #207
 XC(E)=4197298.901, YC(N)=3647775.876



| | | | | | |
|------|---------------|---------------|---------------|---------------|------|
| 1170 | ☐ W. ABUT. | ☐ PIER #1 | ☐ PIER #2 | ☐ E. ABUT. | 1170 |
| 1160 | ELEV. 1159.34 | ELEV. 1160.07 | ELEV. 1160.88 | ELEV. 1161.36 | 1160 |
| 1150 | | | | | 1150 |
| 1140 | | | | | 1140 |
| 1130 | | | | | 1130 |
| 1120 | | | | | 1120 |

Sta. 804+11.55 WBL
180' X 40'
ROLLED STEEL GIRDER
D.A. = 35.3 SQ MILES
DESIGN #106
U.A.C.

Sta. 1803+97.2 EBL
150' X 28'
CONT. CONC. GIRDER
D.A. = 35.3 SQ MILES
DESIGN #1458
REMOVE

1.920% 0.280%

PI STA 1804+00.00 VC = 450'
PI ELEV 1161.28

PROPOSED PROFILE GRADE ON U.S. 20

PROFILE GRADE LINE (PGL) IS AT INSIDE EDGE OF LANES.
TOP OF BRIDGE DECK AT ☐ ROADWAY IS .21' ABOVE THE PROFILE GRADE TO ACCOUNT FOR DECK CROSS SLOPE AND PARABOLIC CROWN.

TRAFFIC ESTIMATE

20?? A.A.D.T. = ? VPD
20?? A.A.D.T. = ? VPD
20?? D.H.V. = ? VPH
% TRUCKS = ? %
TOTAL DESIGN ESAL's = ?

UTILITIES LEGEND:

F02 IOWA NETWORK SERVICES
F03 WESTERN IOWA TELEPHONE COOP

HYDRAULIC DATA

DRAINAGE AREA= 35.3 MI²
STREAM SLOPE= 8.20 FT./MI.

Q₅₀= 7,271 CFS
NATURAL STAGE= 1151.35
MAXIMUM BACKWATER= 0.41'
AVG. BRIDGE VELOCITY= ? FT/SEC

Q₁₀₀= 8,708 CFS
NATURAL STAGE= 1151.63
MAXIMUM BACKWATER= 0.53'

Q₂₀₀= 9,955 CFS
NATURAL STAGE = 1152.66
CALCULATED DESIGN SCOUR= ?

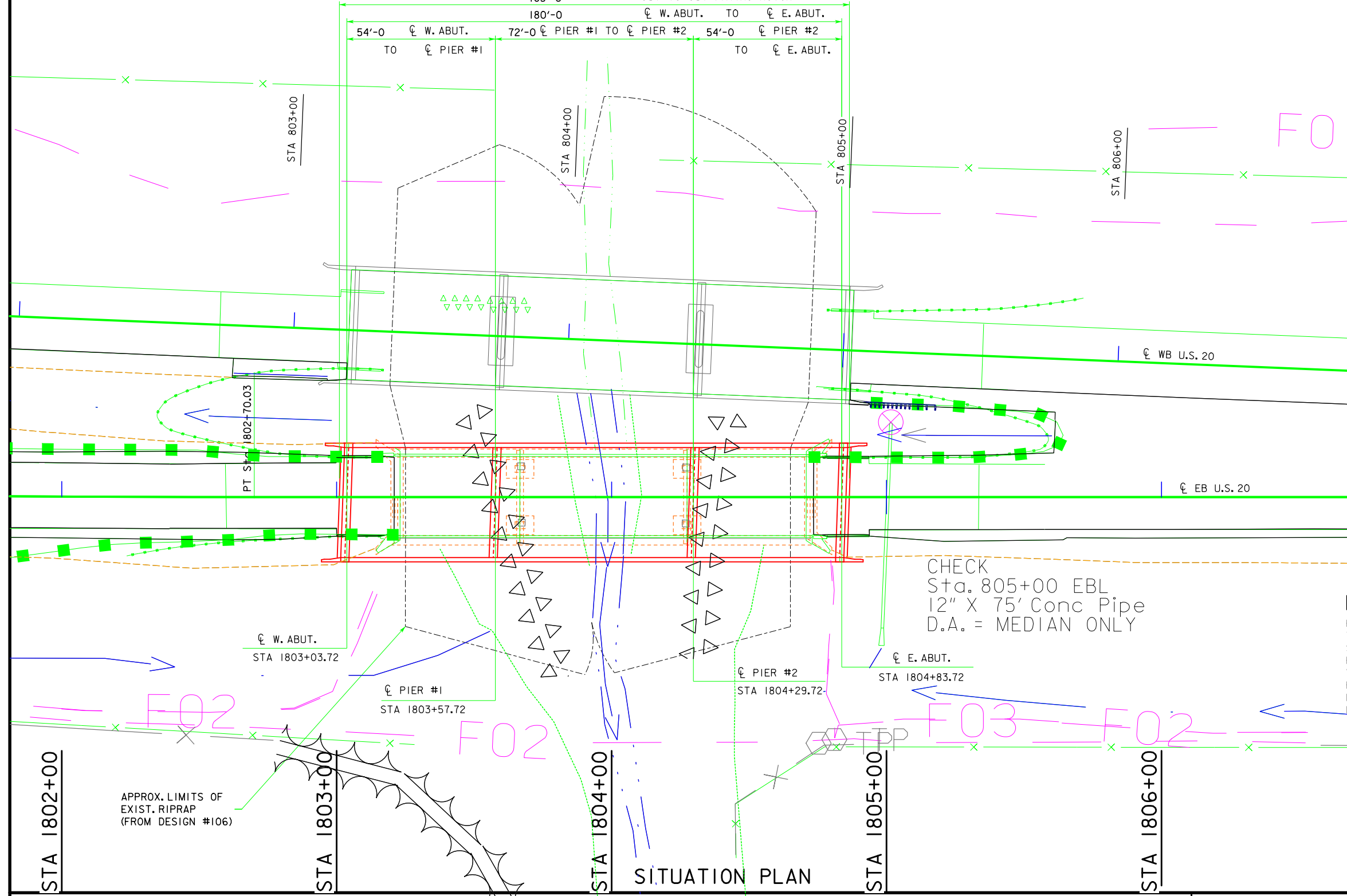
Q₅₀₀= 12,040 CFS
NATURAL STAGE= 1153.45
CALCULATED CHECK SCOUR= ?

EXTREME HW STAGE= ?
DATE= ?
AVG. LOW WATER STAGE= 1135.7

LONGITUDINAL SECTION ALONG ☐ ROADWAY

185'-6" OUT TO OUT PAVING NOTCH

180'-0" ☐ W. ABUT. TO ☐ E. ABUT.
54'-0" TO ☐ PIER #1 72'-0" ☐ PIER #1 TO ☐ PIER #2 54'-0" TO ☐ PIER #2 TO ☐ E. ABUT.



LOCATION

EB U.S. 20 OVER ELLIOTT CREEK
T-88/89N R-45W
SECTION 3/32
FLOYD/BANNER TOWNSHIP
WOODBURY COUNTY
BRIDGE MAINT. NO. 9712.1R020
LATITUDE ?
LONGITUDE ?



PRELIMINARY

DESIGN FOR 2° LA SKEW

180'-0 X 40' ROLLED STEEL BEAM BRIDGE

54'-0 END SPANS 72'-0 CENTER SPAN

SITUATION PLAN

STATION: 1803+93.72

WOODBURY COUNTY

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

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\RCB
- Proposed Pipe\RCB
- Proposed Dike
- All Elements Associated with Proposed Entrances

LINE STYLE LEGEND OF CROSS SECTION SHEETS (SOILS)

- TS——— Topsoil (Class 10)
- TS A——— Topsoil (Type A Disposal)
- TS B——— Topsoil (Type B Disposal)
- TS C——— Topsoil (Type C Disposal)
- CL 10——— Class 10 Materials
- SEL LO——— 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
- BLDRS——— Boulders

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

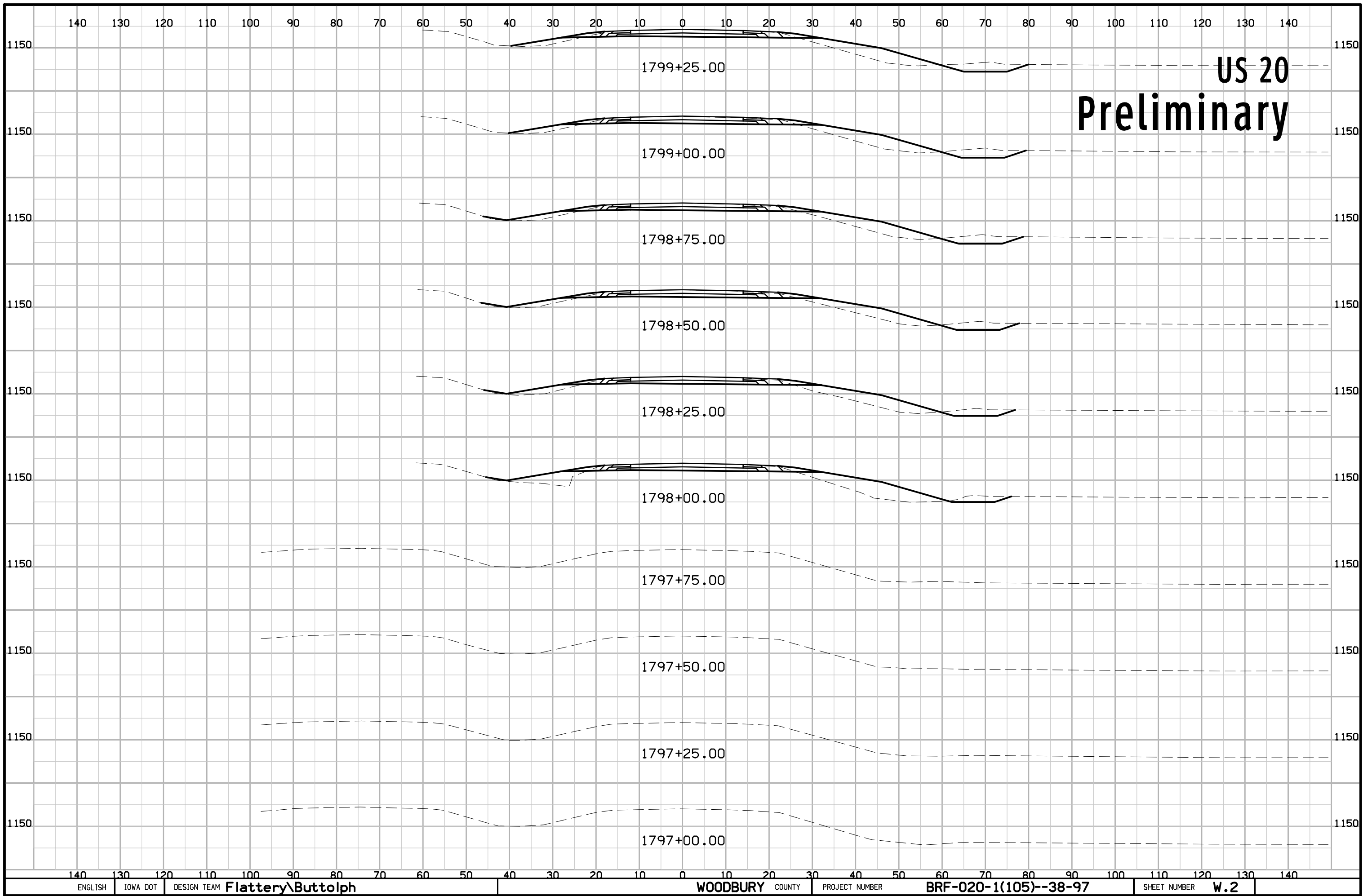
Note: Vertical or near vertical lines connecting soil layers at edges of cross sections are only for the purpose of calculating template quantities and do not depict soil stratification.

SYMBOL LEGEND OF CROSS SECTION SHEETS

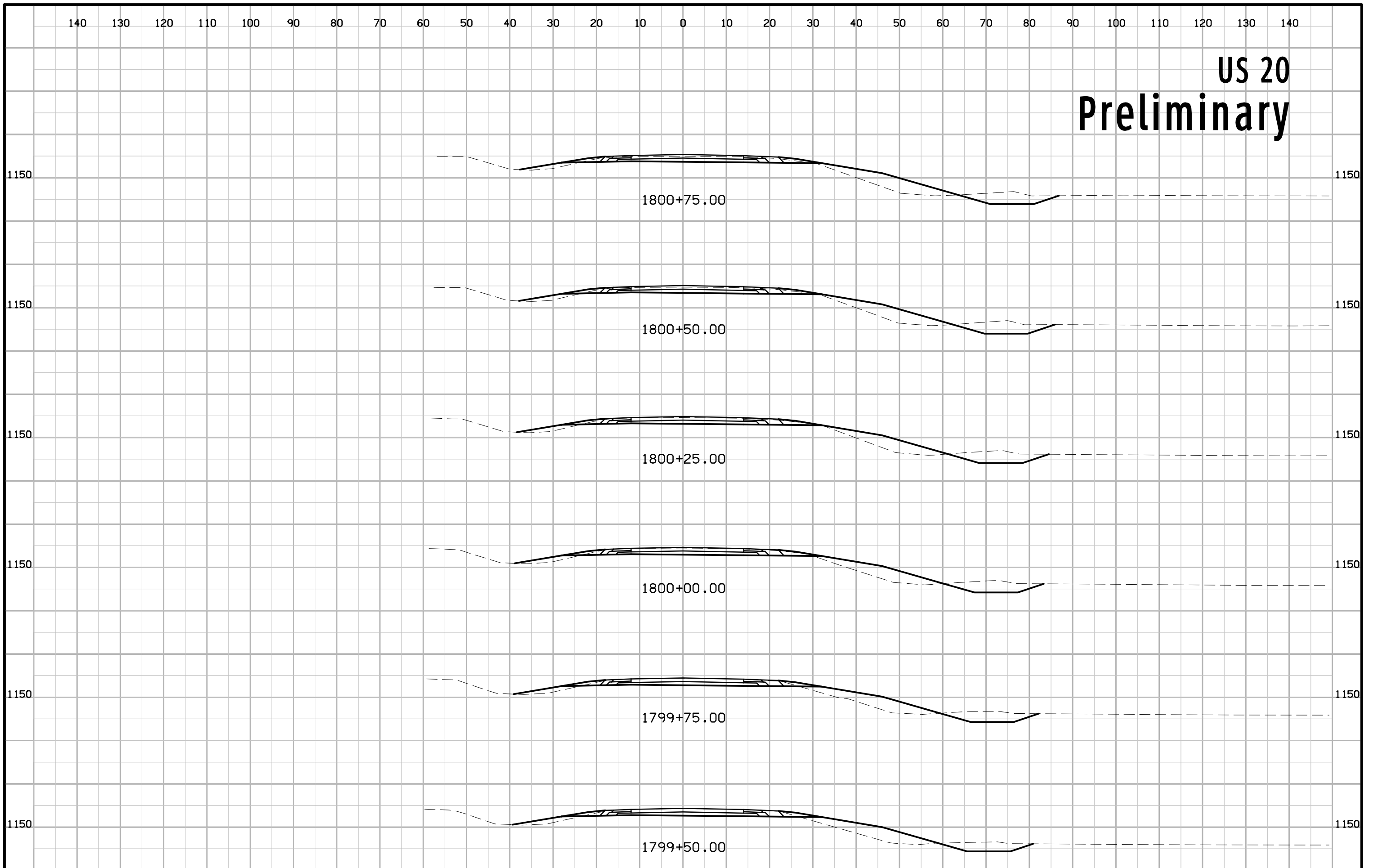
- Existing ROW
|
Existing Right-of-Way Limit
- Proposed ROW
|
Proposed Right-of-Way Limit
- Temporary ROW
|
Temporary Right-of-Way Limit

**CROSS SECTION
LEGEND AND SYMBOL
INFORMATION SHEET**

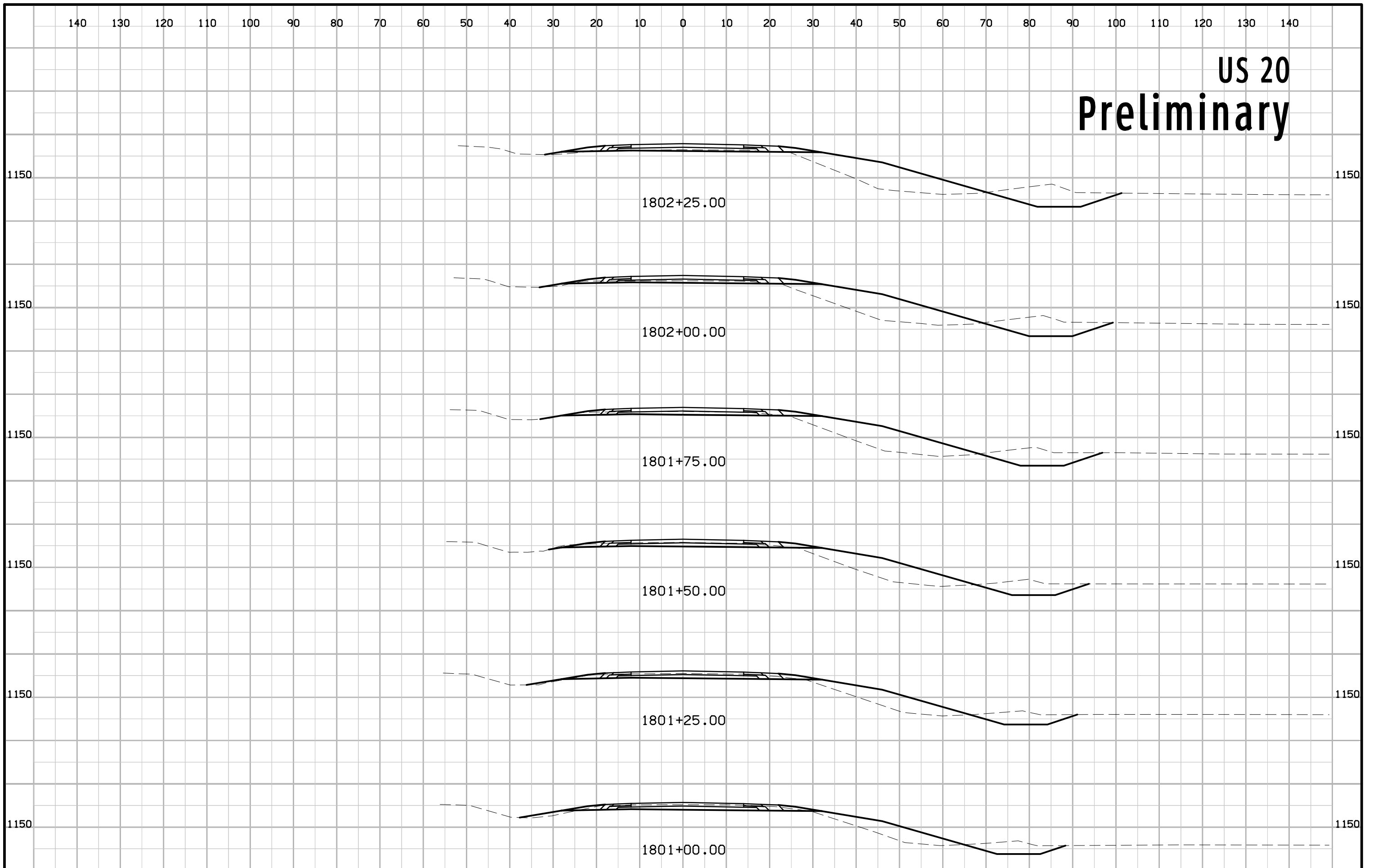
(COVERS SHEET SERIES W, X, Y, & Z)



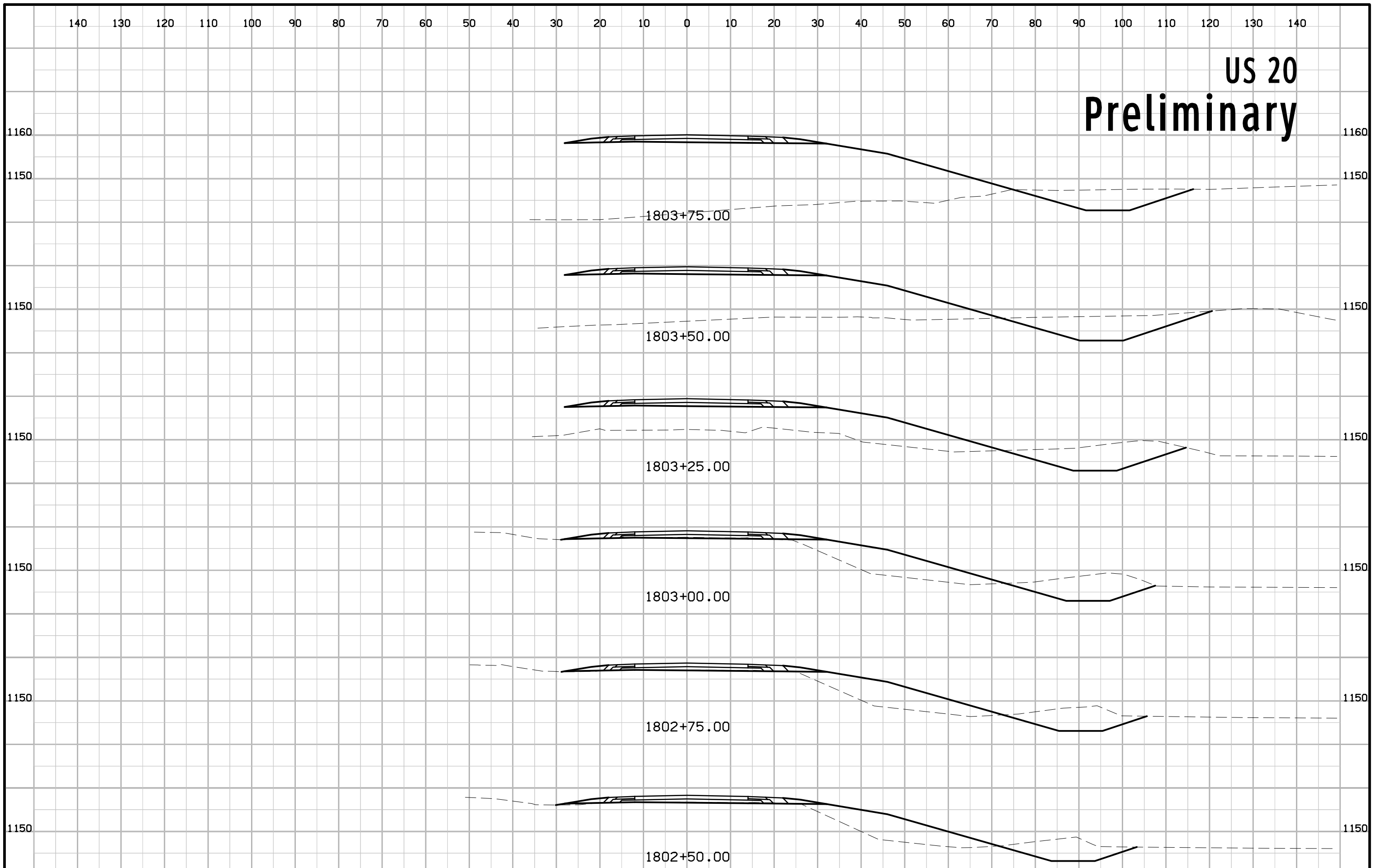
US 20 Preliminary

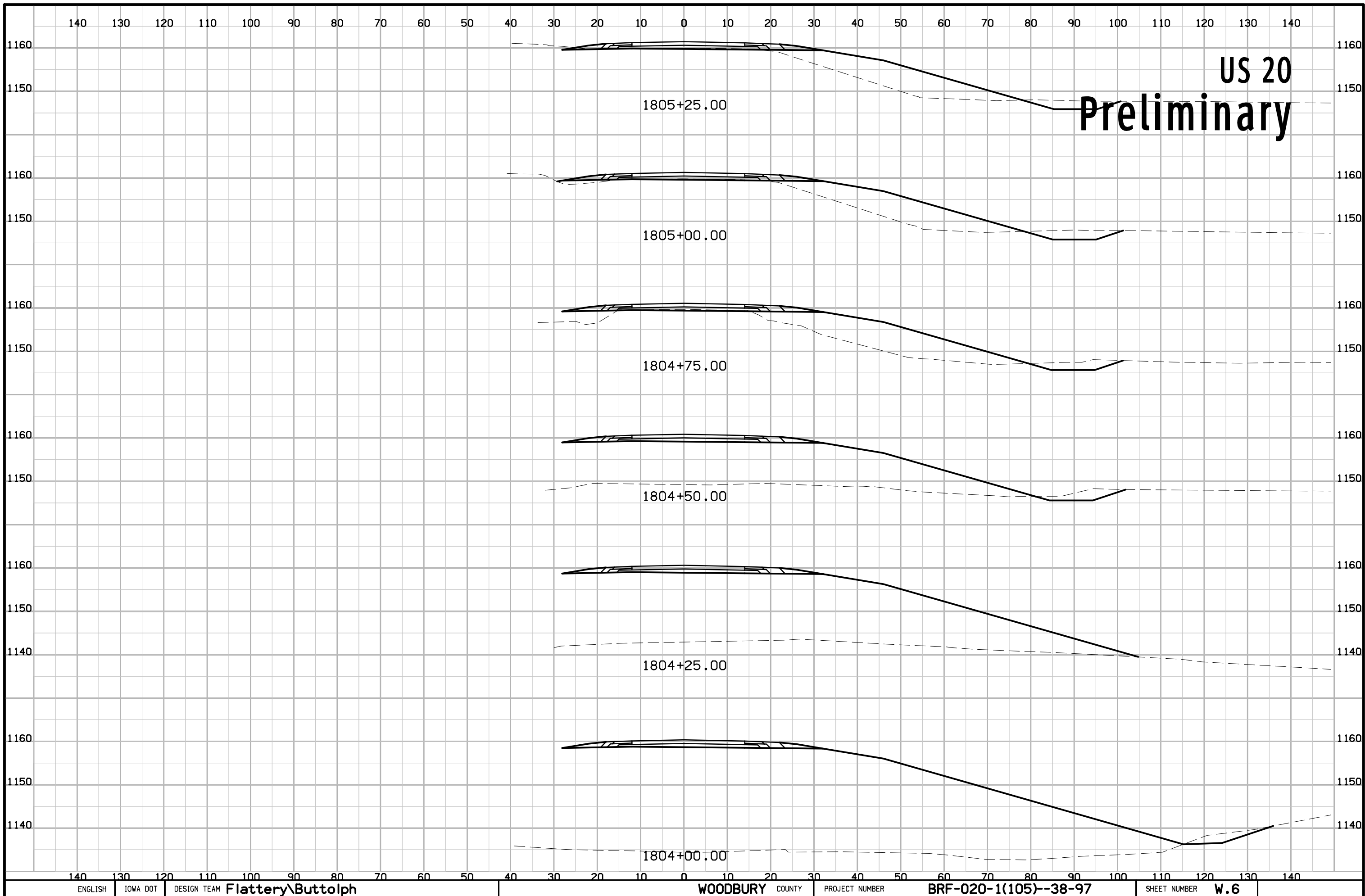


US 20 Preliminary

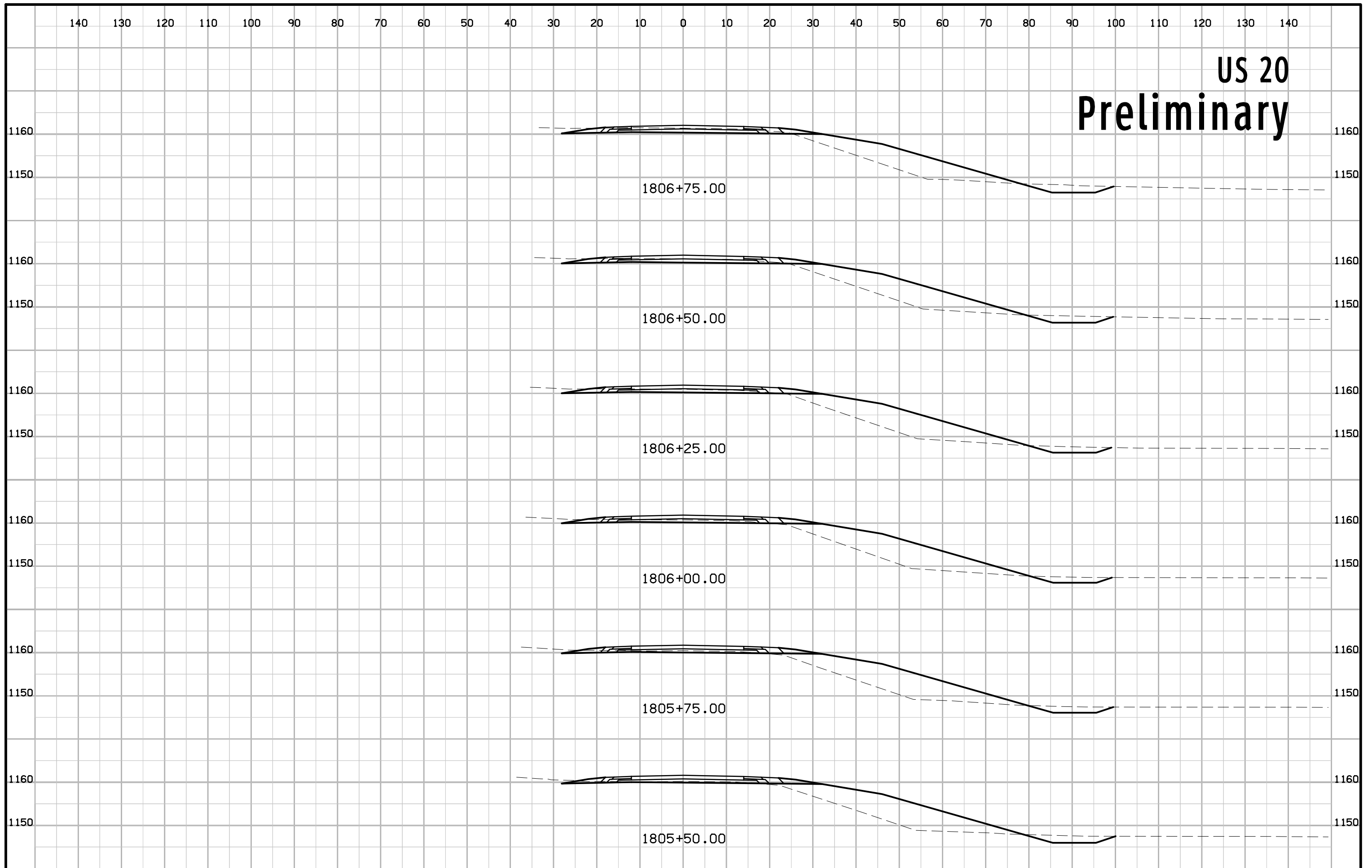


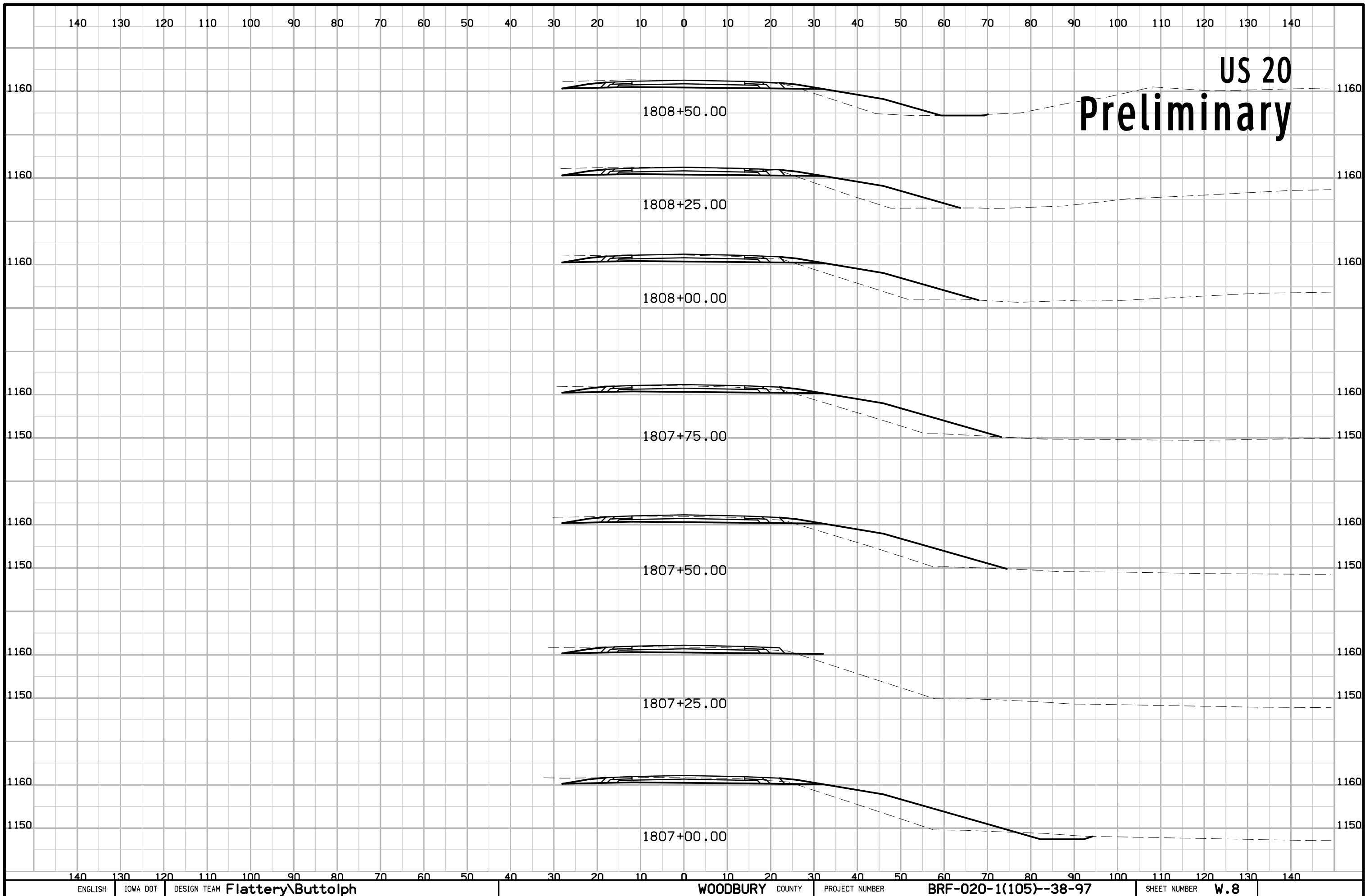
US 20 Preliminary





US 20 Preliminary





US 20 Preliminary

