



Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM

ADAIR COUNTY
BRIDGE REPLACEMENT

IA 25 over Middle River
 1.2 miles south of I-80

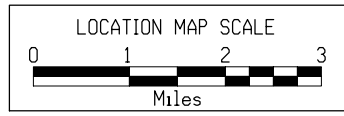
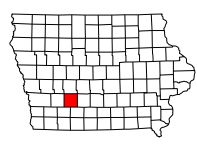
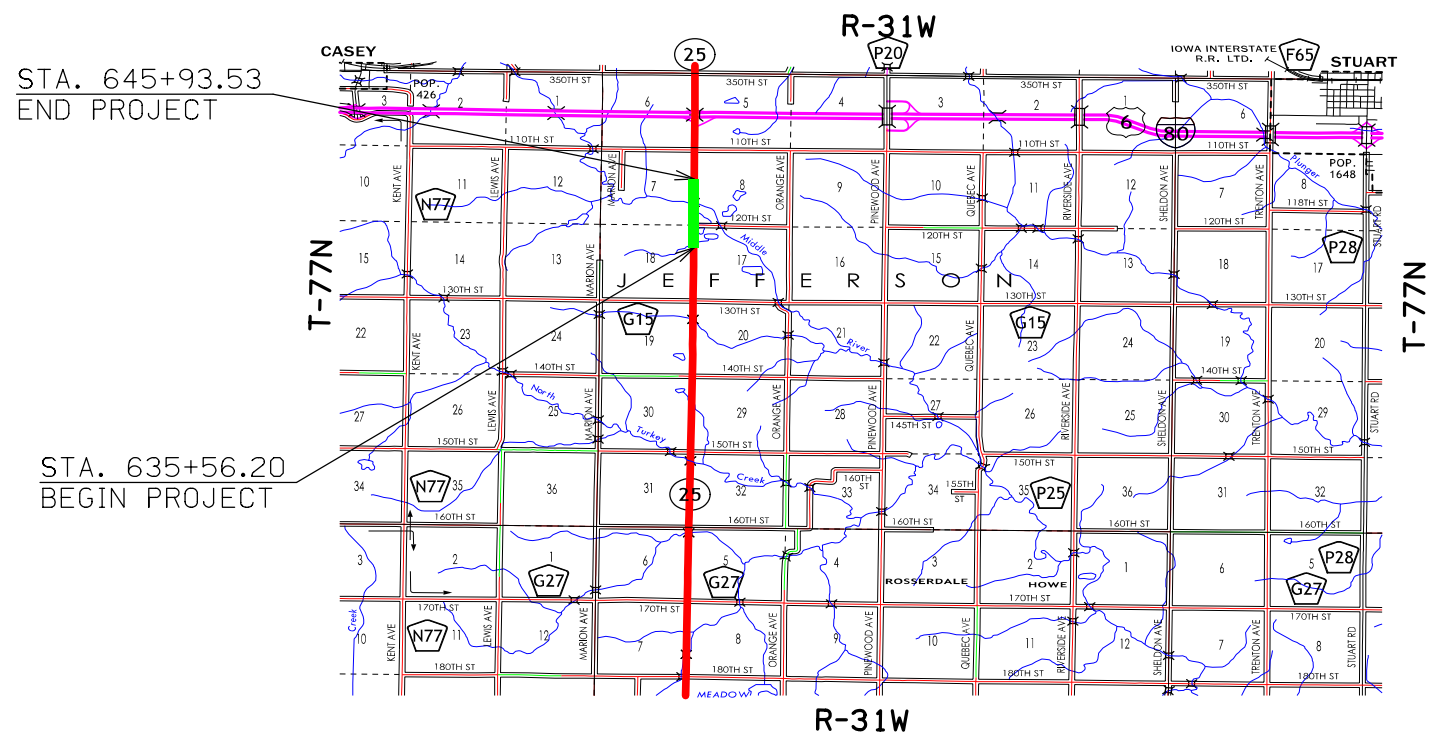
SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

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

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| REVISIONS | | TOTAL |
|-------------------------------|--|-------|
| PROJECT IDENTIFICATION NUMBER | | |
| 14-01-025-010 | | |
| PROJECT NUMBER | | |
| BRFN-025-3(29)--39-01 | | |
| R.O.W. PROJECT NUMBER | | |
| | | |
| | | |



| DESIGN DATA RURAL | | | |
|--------------------|-------|--------|--|
| 2019 AADT | 2,300 | V.P.D. | |
| 2039 AADT | 2,700 | V.P.D. | |
| 2039 DHV | 486 | V.P.H. | |
| TRUCKS | 18 | % | |
| Total Design ESALs | -- | | |

| INDEX OF SEALS | | |
|----------------|----------------|-------------------------|
| SHEET NO. | NAME | TYPE |
| A.1 | Shane E. Swope | Primary Signature Block |
| X | X | X |
| | | |
| | | |

PRELIMINARY PLANS

Subject to change by final design.

D5 PLAN - Date: 04/29/2016

FINAL PROJECT CONCEPT STATEMENT

IA 25 Bridge over Middle River 1.2 miles South of I-80

Adair County
BRFN-025-3(29)--39-01
PIN: 14-01-025-010
Maint. No.0169.5S025
FHWA No. 12980

Highway Division
Office of Design

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

December 19, 2014

Adair County
BRFN-025-3(29)--39-01
PIN: 14-01-025-010
Page 2

satisfy highway traffic requirements. The bridge widening in conjunction with bridge strengthening and bridge repair would not be cost effective. Additionally, the North Turkey Creek bridge (FHWA #12970), approximately 3.4 miles south of this bridge is also scheduled for replacement in FY 2019. This is a good opportunity to replace this bridge at the same time.



Bridge looking north

I. STUDY AREA

A. Project Description

This project involves the replacement of the IA 25 bridge (Maint. No 0169.5S025) over the Middle River, 1.2 miles south of I-80.

The two alternatives considered were:

1. Replace the existing bridge with a 224 ft. x 44 ft. pretensioned, prestressed concrete beam bridge, utilizing staged construction. A grade raise of 0.9 ft. is required. This grade raise will result in approximately 710 ft. of mainline reconstruction. The estimated cost of this alternative is \$2,083,600.
2. Replace the existing bridge with a 226 ft. 4 in. x 40 ft. pretensioned, prestressed concrete beam bridge, utilizing an off-site detour. A grade raise of 1.6 ft. is required. This grade raise will result in approximately 825 ft. of mainline reconstruction. The estimated cost of this alternative is \$1,654,200.

Alternative 2 is the preferred alternative due to lower construction cost. Additional right of way may be required. Traffic will be maintained by using an off-site detour.

B. Need for Project

This is a 150 ft. x 26 ft. steel beam bridge which was constructed in 1952 and overlaid in 1977. The deck, deck overlay, superstructure and substructure are all at the end of their service life and deteriorations are found in all the structural components. Joint replacements are needed. In addition, the structure was designed for H20 load and needs to be strengthened to HS20. Also, the bridge needs to be widened to 40 ft. to

C. Present Facility

The existing structure is a 150 ft. x 26 ft. I-beam bridge constructed in 1952.

IA 25 in the project area is 22 ft. wide PCC pavement with 6 ft. wide granular shoulders and 3:1 foreslopes, constructed in 1956. HMA resurfacing was accomplished in 1968, 1978 and 1997.

D. Traffic Estimates

The 2019 and 2039 average daily traffic estimates are 2,300 ADT with 17% trucks and 2,700 ADT with 18% trucks, respectively.

E. Sufficiency Ratings

IA 25 is classified as an "area development" route and a maintenance service level "C" road. The federal bridge sufficiency rating is 59.

F. Access Control

Access rights will not be acquired for this project.

G. Crash History

During the five-year study period from January 1, 2009 through December 31, 2013, there were no crashes at the project site.

II. PROJECT CONCEPT

A. Feasible Alternatives

Alternative #1 - Replace with a bridge, utilizing staged construction

Replace the existing 150 ft. x 26 ft. I-beam bridge with a 224 ft. x 44 ft. three span pretensioned, prestressed concrete beam bridge. The staging option will require a grade raise of 0.9 ft., resulting in approximately 710 ft. of mainline reconstruction.

The typical cross section adjacent to the bridge will consist of a 24 ft. roadway (28 ft. wide pavement) with 10 ft. effective shoulders (2 ft. outside pavement and 8 ft. granular) and 6:1/3:1 foreslopes. The pavement will be placed on 6 in. of granular subbase and 12 in. of special backfill.

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

In order to stage construct this bridge, the bridge will need to be constructed 4 ft. wider than the bridge shown in alternative 2, which utilizes an off-site detour. The grade raise required was necessary to allow the elevation of the low beams to be at or slightly above the elevation of the existing low beams. The stage construction alternative will require a 0.9 ft. grade raise which is slightly lower than shown in alternative 2. This is due to the shallower 3 ft. deep BTB beams that can be used with this non-standard bridge design. The bridge for alternative 2 was based upon a standard pretensioned, prestressed design which utilizes 3 ft. 9 in. deep C beams.

One lane of traffic in each direction will be maintained via staged construction utilizing temporary traffic signals. The proposed bridge could be constructed in two stages. The first stage requires the removal of 8.4 ft. of the existing bridge with a cut 4.6 ft. east of the centerline. A 15.3 ft. traffic lane could be utilized on the remainder of the existing bridge and a 14.1 ft. section of the proposed bridge would be constructed. Once the proposed section is built, traffic would be transferred to the new section and the remainder of the proposed bridge would be constructed. The width of the traffic lane in the second stage is 11.7 ft.

Steel sheet pile is proposed along the north and south abutment if the staging option is used. The new abutments are approximately 38 feet offset from the existing abutments. The vertical cut required for the new abutment will require temporary support.

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

Additional right of way may be required for this project.

| Bridge Items | <u>Estimated Costs</u> |
|------------------------------------|------------------------|
| New Bridge | \$ 857,200 |
| Bridge stage construction | 85,700 |
| Bridge Removal | 40,000 |
| Revetment | 66,000 |
| Erosion stone | 1,200 |
| Wing dike | 5,000 |
| Steel sheet pile for abutment | 64,000 |
| Mobilization - 10% | 111,900 |
| M & C - 15% | <u>184,700</u> |
| Bridge Costs | \$ 1,415,700 |
| | |
| Roadway Items | |
| Bridge Approaches | \$ 85,200 |
| Removal of Pavement | 7,000 |
| Pavement | 49,900 |
| Special Backfill | 10,500 |
| Granular subbase | 6,400 |
| Embankment in place | 17,800 |
| Excavation Class 13 Waste | 23,400 |
| Guardrail (Includes Removal) | 21,500 |
| Paved Shoulders for Guardrail | 22,400 |
| Class 10 for Guardrail Blisters | 12,000 |
| Bridge End Drains | 13,200 |
| Longitudinal subdrains and outlets | 7,400 |
| Temporary concrete barrier rail | 19,300 |
| Temporary traffic signals | 8,700 |
| Temporary floodlighting | 7,400 |
| Erosion Control | 5,000 |
| Wetland Mitigation | 50,000 |
| Traffic Control - 5% | 18,300 |
| Mobilization - 5% | 18,300 |
| Staging - 30% | 110,100 |

| | |
|----------------------|---------------------|
| M & C - 30% | 154,100 |
| Roadway costs | \$ 667,900 |
| Project Total | \$ 2,083,600 |

Alternative #2 - Replace with a bridge, using an off-site detour

Replace the existing 150 ft. x 26 ft. I-beam bridge with a 226 ft. 4 in. x 40 ft. three span pretensioned, prestressed concrete beam bridge.

The typical cross section adjacent to the bridge will consist of a 24 ft. roadway (28 ft. wide pavement) with 8 ft. effective shoulders (2 ft. outside pavement and 6 ft. granular) and 6:1/3:1 foreslopes. The pavement will be placed on 6 in. of granular subbase and 12 in. of special backfill.

The existing grade will need to be raised a minimum of 1.6 ft. which will require approximately 825 ft. of roadway reconstruction. Construct new bridge approaches. Replace the existing guardrail with new guardrail and pave the shoulders 20 ft. beyond the ends of the guardrail. Class 10 will be necessary to flatten the existing foreslopes and to construct the new guardrail blisters. Place class E revetment for slope protection under the bridge. Construct two bridge end drains on each end of the bridge.

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

Additional right of way may be required for this project.

Traffic will be maintained by an off-site detour.

| Bridge Items | <u>Estimated Costs</u> |
|---------------------|------------------------|
| New Bridge | \$ 792,600 |
| Bridge Removal | 40,000 |
| Revetment | 66,000 |
| Erosion Stone | 1,200 |
| Wing dike | 5,000 |
| Mobilization - 10% | 90,500 |
| M & C - 15% | 149,300 |
| Bridge Costs | \$ 1,144,600 |

| Roadway Items | |
|----------------------|-----------|
| Bridge Approaches | \$ 82,100 |
| Removal of Pavement | 8,700 |
| PCC Pavement | 66,100 |
| Special Backfill | 13,900 |

| | |
|------------------------------------|--------------------|
| Granular subbase | 8,500 |
| Embankment in place | 25,300 |
| Excavation Class 13 Waste | 25,600 |
| Guardrail (Includes Removal) | 21,500 |
| Paved Shoulders for Guardrail | 16,000 |
| Class 10 for Guardrail Blisters | 11,800 |
| Bridge End Drains | 13,200 |
| Longitudinal subdrains and outlets | 8,700 |
| Erosion Control | 5,000 |
| Wetland Mitigation | 50,000 |
| Traffic Control - 5% | 17,800 |
| Mobilization - 5% | 17,800 |
| M & C - 30% | 117,600 |
| Roadway costs | \$ 509,600 |
| Project Total | \$1,654,200 |

B. Detour Analysis

In alternative 1, there will be no off-site detour.

In alternative 2, IA 25 will be closed and an offsite detour will be utilized. It is anticipated the detour will be in place for approximately 120 days. At the junction of I-80 and IA 25, the detour would follow I-80 east seven miles. At the junction with County Road P28, the detour will turn south for approximately 12 miles to the junction with IA 92. The detour continues on IA 92, one additional mile south then turns west for seven miles to meet IA 25 in Greenfield. Out of distance travel is 14 miles. The total out-of-distance user cost is anticipated to be \$806,000. The cost for county road maintenance will be \$21,500 as calculated by the Gas Tax Method. Detour signing costs will be \$10,000. This detour will also serve the North Turkey Creek bridge replacement 3.4 miles south of this bridge (BRF-025-3(30)--39-01).

C. Recommendations

It is recommended that the present structure be replaced, as described in Alternative No. 2.

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.

ADAIR COUNTY IA 25



Bridge over Middle River
 1.2 miles south of I-80
 BRFN-025-3(29)--39-01

Bridge over N. Turkey Creek
 4.6 miles south of I-80
 BRFN-025-3(30)--39-01

Proposed
 detour

E. Accelerated Bridge Construction Analysis

An initial first stage accelerated bridge construction (ABC) rating score of 39 was calculated for this bridge. Typically in order to be considered a good candidate for accelerated bridge construction an ABC score greater than 50 is required. Therefore, based upon the first stage rating score this bridge will be dismissed from further ABC consideration.

F. ADA Accommodations

There are no bike paths or sidewalks adjacent to IA 25; therefore, no ADA accommodations are planned in conjunction with this project.

G. Special Considerations

This project will be constructed at the same time as the North Turkey Creek bridge replacement project (BRFN-25-3(30)--39-01) which is located approximately 3.4 miles to the south. The construction of both of these projects will use the same method of maintaining traffic which in this case will be an off-site detour.

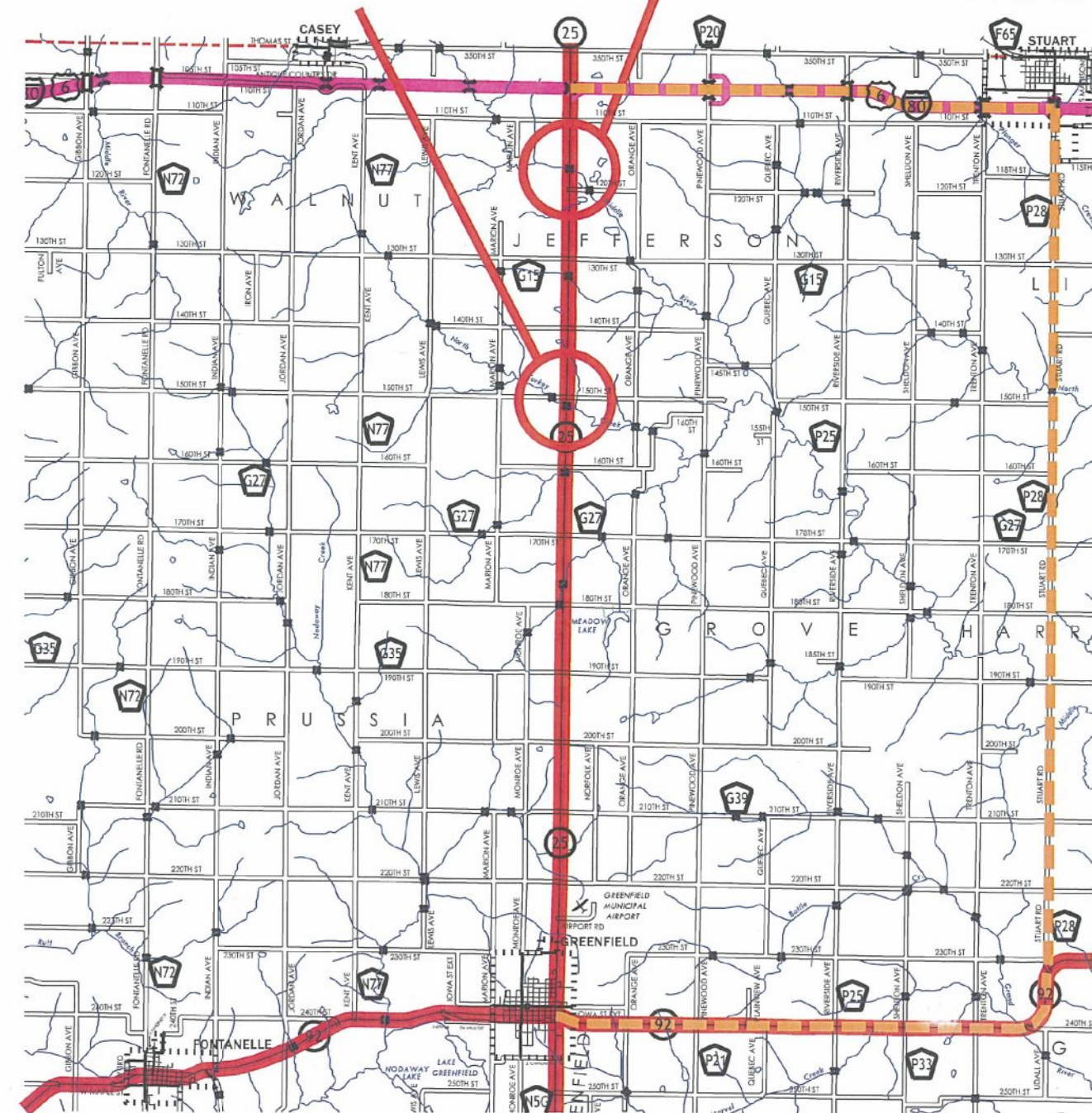
Additional right of way may be required for this project.

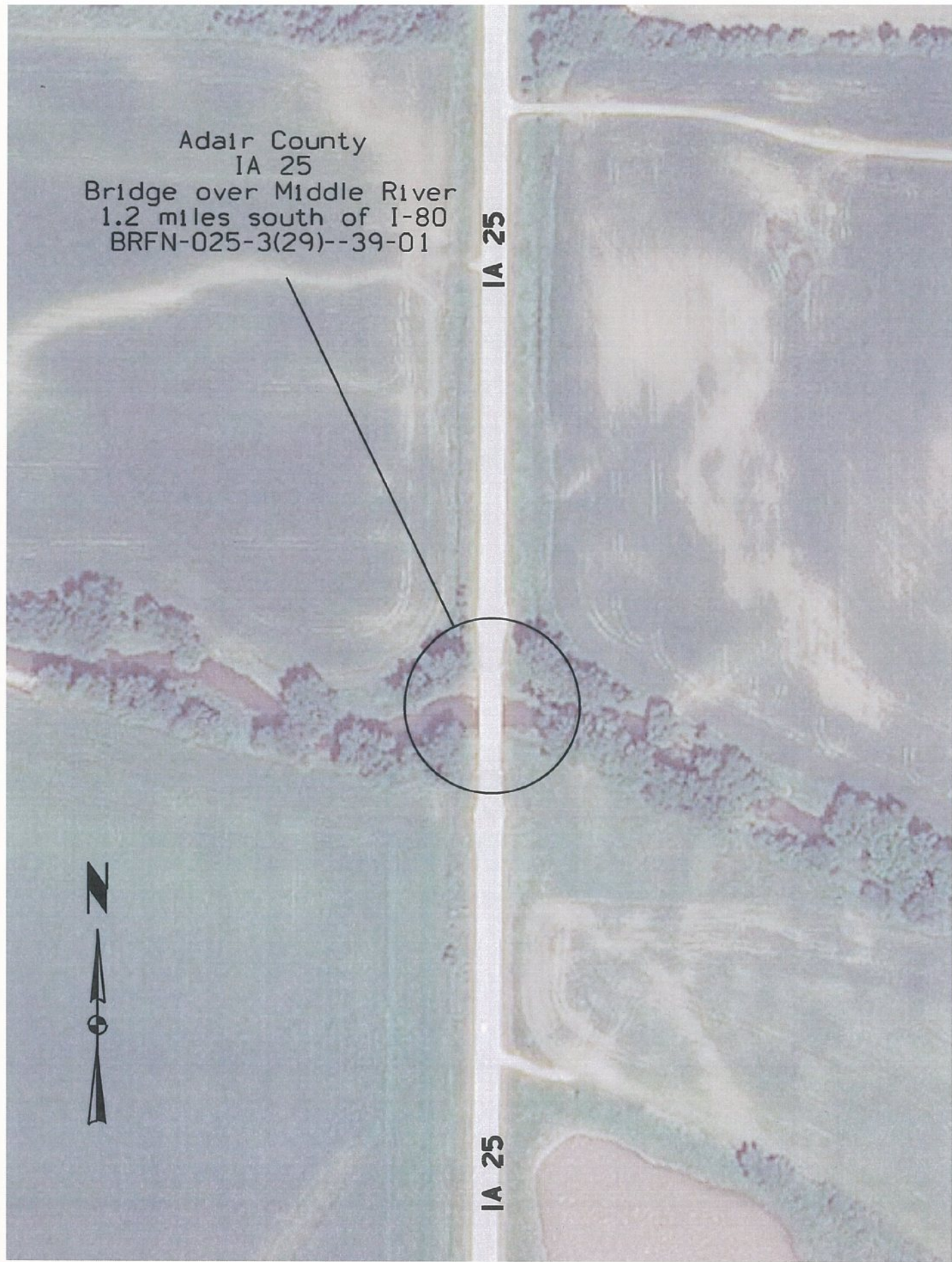
The Office of Location and Environment has reviewed this project and based on preliminary desktop observations, has determined that a Section 404 Permit will be required. It is expected that the work will be covered by Nationwide Permit 14.

H. Program Status

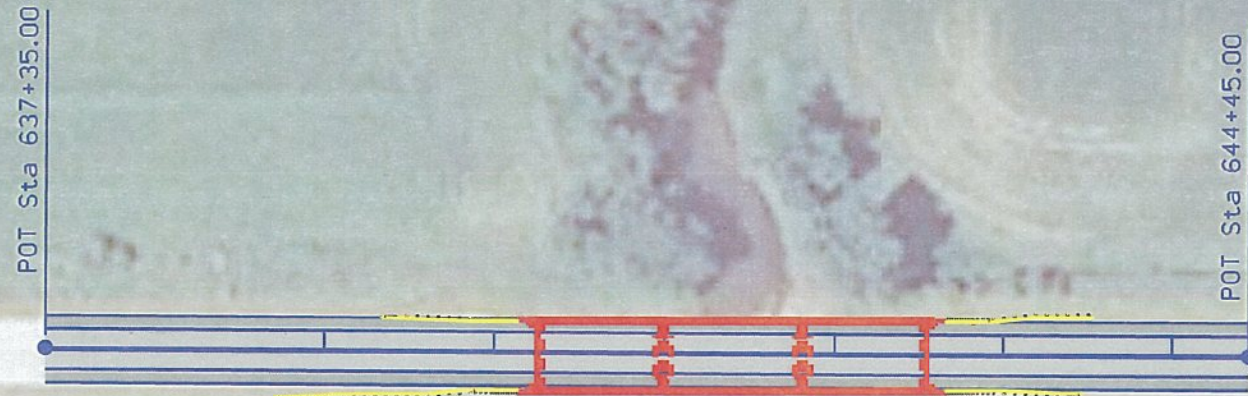
Site data has been developed by the Office of Design. This project is listed in the 2015-2019 Iowa Transportation Improvement Program, with \$1,100,000 programmed for replacement in FY 2019. Costs for this project may be eligible for bridge replacement funds. A schedule of events will be developed following approval of the Project Concept.

KKP: als

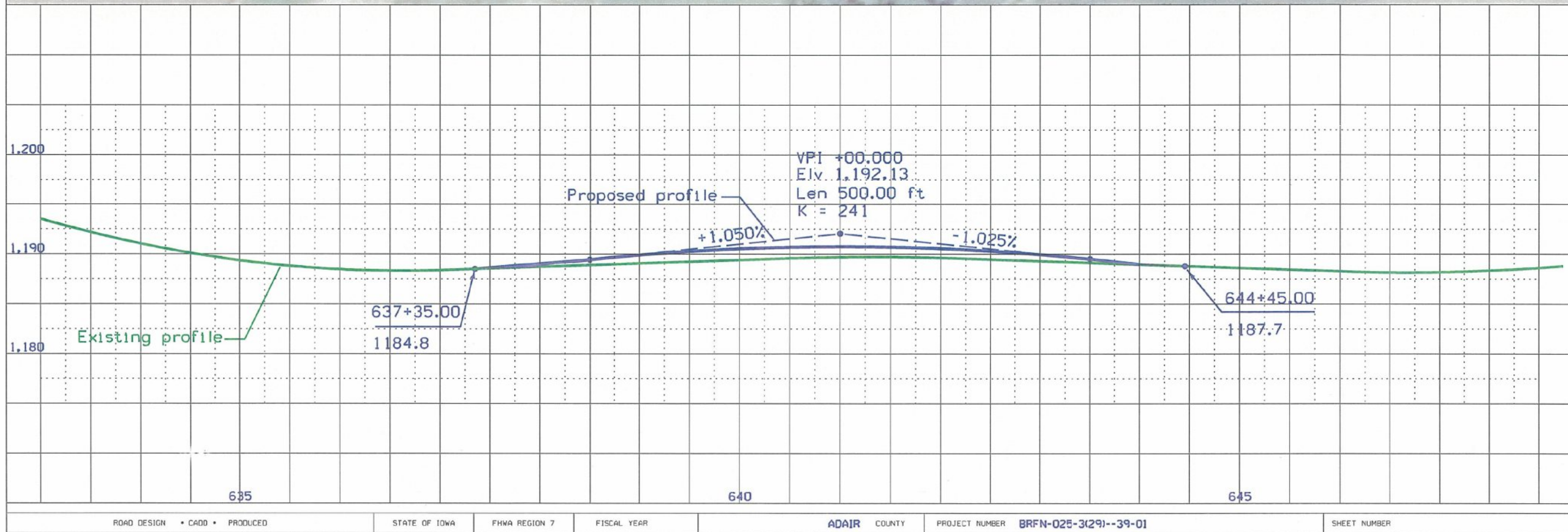




ALTERNATIVE 1 - STAGED OPTION. GRADE RAISE 0.9 FT.



Approximately 710 ft. IA 25 reconstruction



ROAD DESIGN • CADD • PRODUCED

STATE OF IOWA

FHWA REGION 7

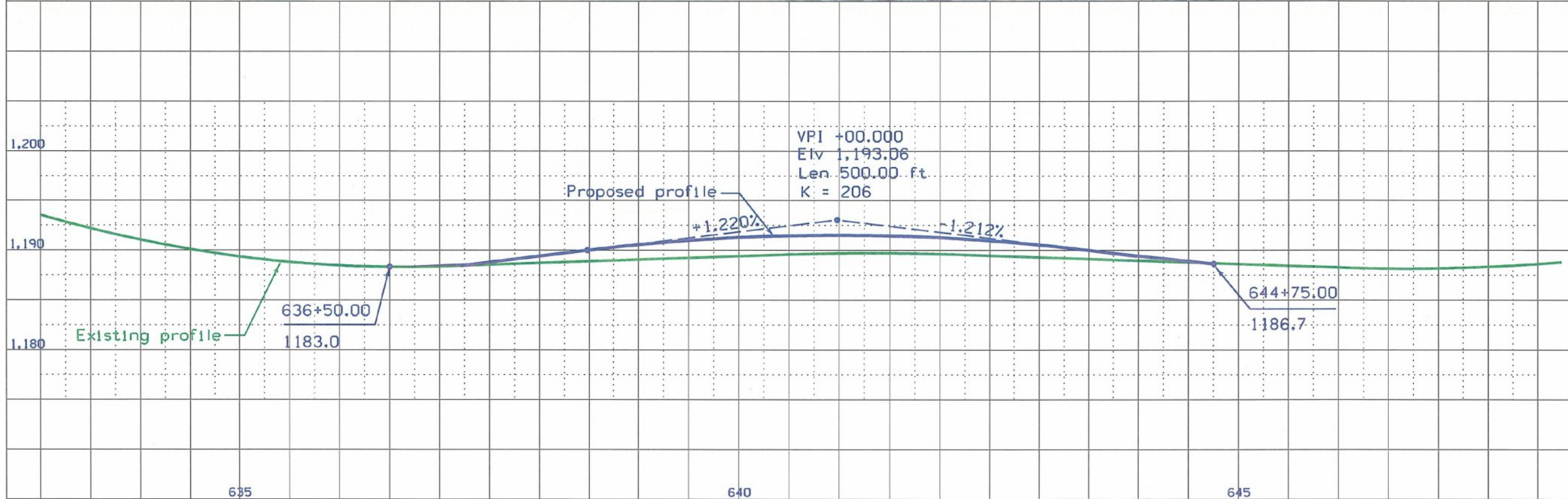
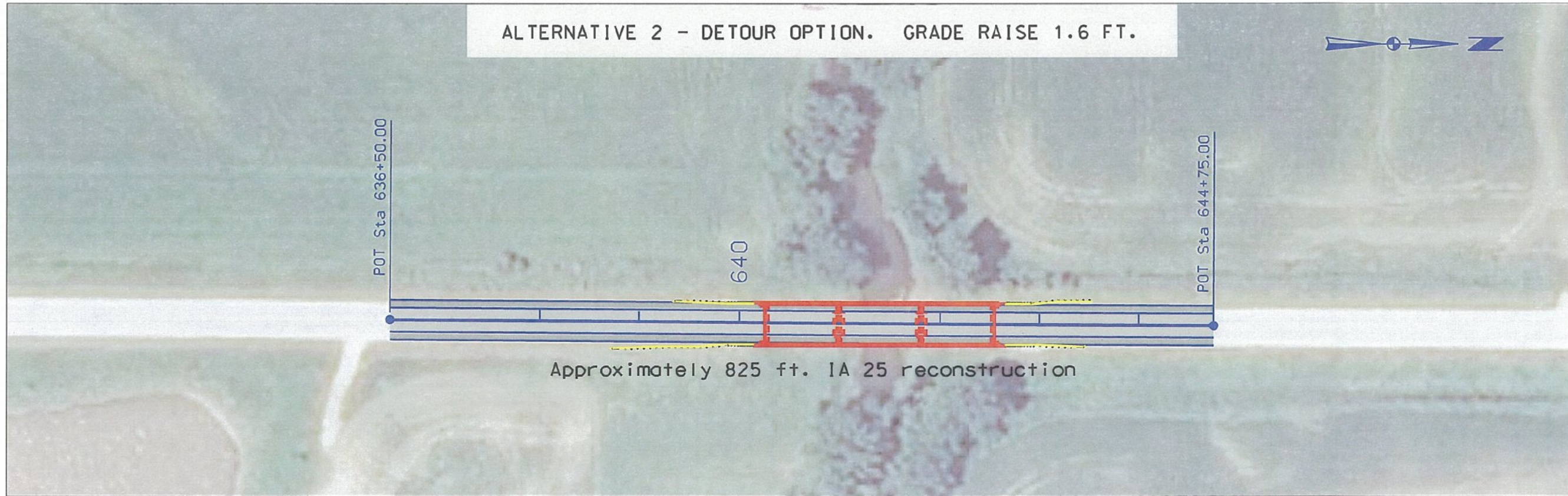
FISCAL YEAR

ADAIR COUNTY

PROJECT NUMBER BRFN-025-3(29)--39-01

SHEET NUMBER

ALTERNATIVE 2 - DETOUR OPTION. GRADE RAISE 1.6 FT.

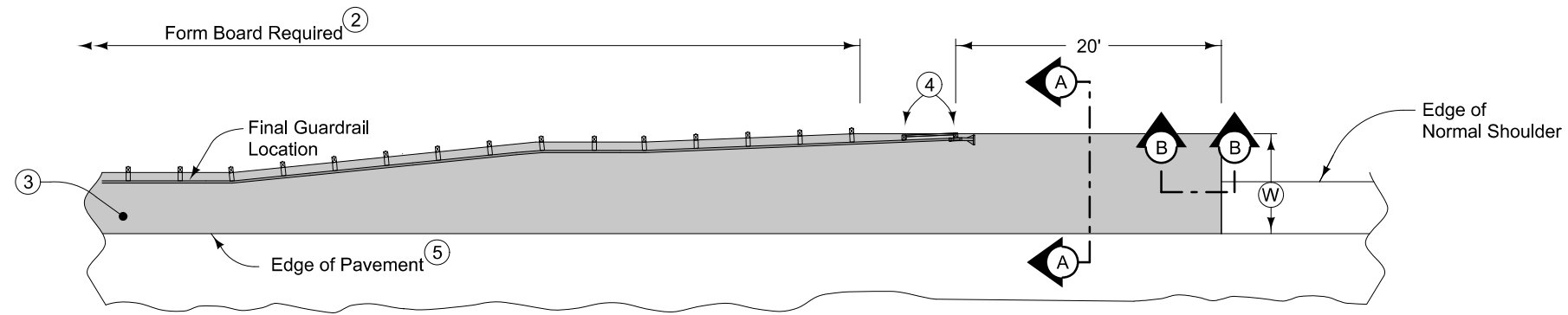


| | | | | | | | | | |
|-------------|------|----------|---------------|---------------|-------------|--------------|----------------|-----------------------|--------------|
| ROAD DESIGN | CADD | PRODUCED | STATE OF IOWA | FHWA REGION 7 | FISCAL YEAR | ADAIR COUNTY | PROJECT NUMBER | BRFN-025-3(29)--39-01 | SHEET NUMBER |
|-------------|------|----------|---------------|---------------|-------------|--------------|----------------|-----------------------|--------------|

| | | | | |
|--|---|--|-----------------------|---|
| Roadway | | | Submittal Date | |
| PIN Number | 14-01-025-010 | | Approval Date | |
| Project Number | BRFN-025-3(29)--39-01 | | | |
| District | District 4 | Assistant District Engineer | | |
| County | Adair (1) | Office Director | or | |
| Route | IA 25 | | | |
| Location | 1.2 miles south of Interstate 80 | | | |
| Work Type | | | | |
| Segment Manager | | | | |
| Designer | Schemmer Associates | | | |
| Design Manual Section 1C-1 | last update: 05-06-14 | | | |
| Rural Two-Lane Highways (Rural Arterials) | | | | |
| Design Element | Preferred | Acceptable | Project Values | |
| Design speed (mph) | 60 | 50 | 60 (55 Posted) | |
| Maximum superelevation rate (Refer to Section 2A.2) | 6% | 8% | NA | |
| Design lane width (ft) | 12 | 12 | 12 | |
| Full depth paved width (ft) | 14 | 12 | 14 | |
| Right turn lane (ft) | 12 | 10 | NA | |
| Climbing Lane (ft) | 12 | 12 | NA | |
| Left turn lane (ft) | 12 | 10 | NA | |
| Pavement cross-slope (on tangent sections) | Through lanes | 1.5% minimum, 2% maximum | | 2% |
| | Auxiliary and turn lanes | 3% maximum | | NA |
| | Crown break at centerline | 4% maximum | | NA |
| Shoulder cross-slope (on tangent sections) | 4% | Shoulder cross-slope cannot be less than the adjacent lane, 6% max for paved or granular shoulders, 8% max for earth shoulders | | 4% |
| Curb type (Refer to Section 3C.2) | Design speed = 50 or 55 mph | 6-inch sloped | | NA |
| | Design speed > 60 mph | 4-inch sloped | | NA |
| Foreslope (For fill areas greater than 40 ft, contact the Soils Design Section for assistance) | Adjacent to shoulder | 10:1 for 4' then 6:1 | | 10:1 for 4' then 6:1 |
| | Beyond standard ditch depth and design clear zone | 3.5:1 | | 3.5:1 |
| Backslope (For cut areas greater than 25 feet, contact the Soils Design Section for assistance with backslope benches) | Curbed roadways | 2% | | not steeper than 3:1 |
| | Other | 3:1 | | 2.5:1 |
| Transverse Slopes | w/ drainage structures | 8:1 | | 6:1 |
| | w/o drainage structures | 10:1 | | 6:1 |
| Ditches (Refer to Section 3G.1) | Outside ditch (depth x width) (ft) | 5 x 10 | | -- |
| | Bridge length < 200 ft | design lane widths + effective shoulder widths | | design lane widths + effective shoulder widths |
| Bridge width—new | Bridge length < 200 ft | design lane widths + effective shoulder widths | | design lane width + 4' right and left of the design lane widths |
| | Bridge length > 200 ft | design lane widths + no less than 2 ft left and right | | design lane widths + 2 ft offset left and right |
| Vertical clearance (ft) (above lanes, shoulders and 25 feet left and right of the center of railroad tracks) | Over primary | 16.5 | | 16 |
| | Over non-primary | 16.5 at interchange locations, 15 at all other locations | | 14 |
| | Over railroad | 23.3 | | 23.3 |
| Structural Capacity | Sign trusses and pedestrian bridges | 17.5 | | 17 |
| | Other | Contact Office of Bridges and Structures | | Contact Office of Bridges and Structures |
| Level of Service | B | | B | |

| | | | |
|--|--------------------------|--|--|
| Design year ADT = | | 2,700 | |
| Effective Shoulder Width and Type for Two-Lane Highways | | | |
| Preferred (values shown in feet) | | Acceptable (values shown in feet) | |
| | Rural Roadways | Urban Roadways | Project Values |
| Turn lanes with shoulders | 6 | 6 | Turn lanes with shoulders 6 0 NA |
| Turn lanes with curbs | 6 | See Section 3C.2 | Turn lanes with curbs 6 0 NA |
| Climbing Lanes | Effective Shoulder Width | Paved Width | Effective Shoulder Width Paved Width |
| | 6 | 4 | 4 0 |
| Two-Lane Highways | Effective Shoulder Width | Paved Width | Two-Lane Highways Effective Shoulder Width Paved Width |
| Routes where bicycles are to be accommodated | 10 | 10 | |
| On roadways approaching urban areas (due to increased bike traffic) | 10 | 10 | Design year ADT > 2000 vpd 8 2" |
| On all curves with a superelevation rate of 7.0% or greater | 10 | 10 | |
| On roadways with design year ADT > 5000 | 10 | 6 | Design year ADT between 400 - 2000 vpd 6 2" |
| On all other NHS | 10 | 4 | |
| On non-NHS routes with design year ADT > 3000 | 10 | 4 | |
| On non-NHS routes with design year ADT < 3000 | 8 | 2" | Design year ADT < 400 vpd 4 2" |
| *Requires safety edge-Refer to Section 3C.6 | | | |
| Curbs should be located beyond the outer edge of the effective shoulder width in rural areas | | | |
| Refer to Section 3C.2 for curb offsets in urban areas | | | |
| Notes: | | | |

| | | | | | | | | | | | | | | |
|--|---|--|------|------|------|------|---|-----|------|------|------|-----------------------|------|-----|
| Roadway Design Speed (mph) = | | 60 | | | | | | | | | | | | |
| Design Criteria for High Speed Roadways | | | | | | | | | | | | | | |
| Design Element | Design Speed, mph | Preferred Criteria | | | | | Acceptable Criteria | | | | | Project Values | | |
| | | 50 | 55 | 60 | 65 | 70 | 75 | 50 | 55 | 60 | 65 | | 70 | 75 |
| Stopping sight distance (ft) (Refer to Section 6D.1) | | 425 | 495 | 570 | 645 | 730 | 820 | 425 | 495 | 570 | 645 | 730 | 820 | 570 |
| Minimum horizontal curve radius (ft) (Refer to Sections 2A.2 and 2A.3) | Method 5 superelevation and side friction distribution $e_{sup} = 6%$ | 833 | 1060 | 1330 | 1660 | 2040 | 2500 | 833 | 1060 | 1330 | 1660 | 2040 | 2500 | NA |
| | $e_{sup} = 8%$ | -- | -- | -- | -- | -- | -- | 758 | 960 | 1200 | 1480 | 1810 | 2210 | NA |
| Minimum vertical curve length (ft) (Refer to Section 2B.1) | crest vertical curves | 150 | 165 | 180 | 195 | 210 | 225 | 150 | 165 | 180 | 195 | 210 | 225 | 180 |
| Minimum rate of vertical curvature (K) | roadways without fixed source lighting | 84 | 114 | 151 | 193 | 247 | 312 | 84 | 114 | 151 | 193 | 247 | 312 | 151 |
| | sag vertical curves | 96 | 115 | 136 | 157 | 181 | 206 | 96 | 115 | 136 | 157 | 181 | 206 | 136 |
| Maximum gradient (%) (Refer to Section 2B.1) | roadways with fixed-source lighting | 96 | 115 | 136 | 157 | 181 | 206 | 54 | 66 | 78 | 91 | 106 | 121 | NA |
| | Urban roadways | 4 | | 3 | | | 0.5% with a curb, 0.0% without a curb | | | | | 0.5 | | |
| Clear zone | Rural roadways | 4 | | 3 | | | 7 | 6 | 6 | -- | -- | -- | -- | 3 |
| | Interstates | 4 | | 3 | | | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 3 |
| | | See "Preferred Clear Zone" table in Section 1A.2 | | | | | See "Acceptable Clear Zone" table in Section 1A.2 | | | | | 30 | | |

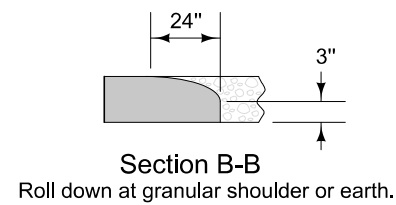
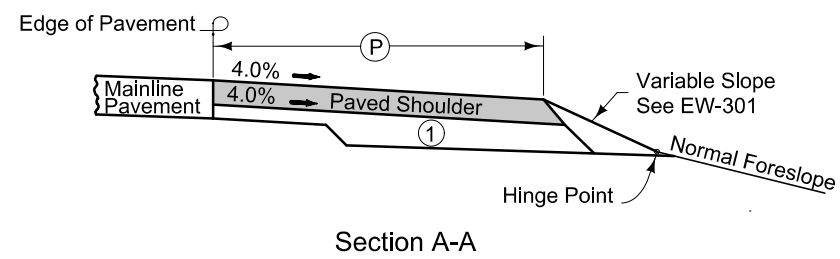
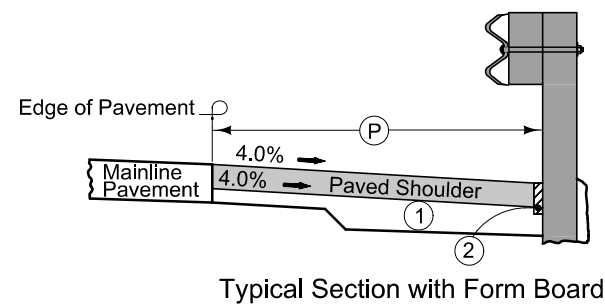


6" HMA Paved Shoulder at guardrail. 7" PCC may be substituted with the following jointing layout:

Match mainline pavement joint spacing. When mainline pavement is 8" or greater in thickness, place additional transverse 'C' joints in shoulder at mid-panel of the mainline pavement. Place longitudinal 'C' joint at W/2 from edge of mainline pavement when W is greater than 10' wide. Terminate longitudinal joint at transverse joint less than 10' in length.

Compaction of HMA is required to face of guardrail post. Hand compaction will be allowed under guardrail. Removal & reinstallation of guardrail will be allowed with no additional payment.

Refer to Shoulder tabulation (112-9) for quantities.



- ① 6" subgrade treatment.
- ② When guardrail posts are installed prior to construction of paved shoulder, nail 1" x 6" untreated form boards along the face of guardrail posts for the length shown. This board is to prevent shoulder material from contacting the sides of the posts and altering the function of the guardrail. Form board not required for final 2 posts.
- ③ Continue paved shoulder to existing paved shoulder or 20' beyond the end of guardrail.
- ④ Shoulder may be notched for final 2 posts or post sleeves may be installed through pavement.
- ⑤ 'KT-1' joint for PCC shoulder. 'B' joint for HMA shoulder.

PAVED SHOULDER AT GUARDRAIL

SURVEY SYMBOLS

- CUL Culvert
- LIN Miscellaneous Line
- x — FW Wire Fence
- SIGN SI Sign
- TP TPD Telephone Pedestal
- PPA Power Pole Co. 1
- PIP Pipe Culvert
- TOP Top of Bridge Pier
- BRG Bridge
- GDL Guard Rail Steel
- COS Square Bridge Pier Column
- ▲▲▲▲▲▲▲▲ RIP Rip-Rap
- EW Edge of Water
- ← DU Centerline Draw or Stream (Up)
- D Centerline Draw or Stream (Down)
- SP Stream Profile
- EP Edge of Paved Roads (ML or SR)
- SNP Unpaved Shoulder
- EG Edge of Gravel Road
- ENU Edge Unpaved Entrance & Parking
- ENT Centerline BL of Entrance
- T1 - TLA Underground Telephone Line Co. 1
- FO - FOA Underground Fiber Optic Co. 1
- TW Top of Water

UTILITY LEGEND

- East Central Iowa REC
- T1 - South Slope Telephone
- FO - South Slope Telephone

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 |

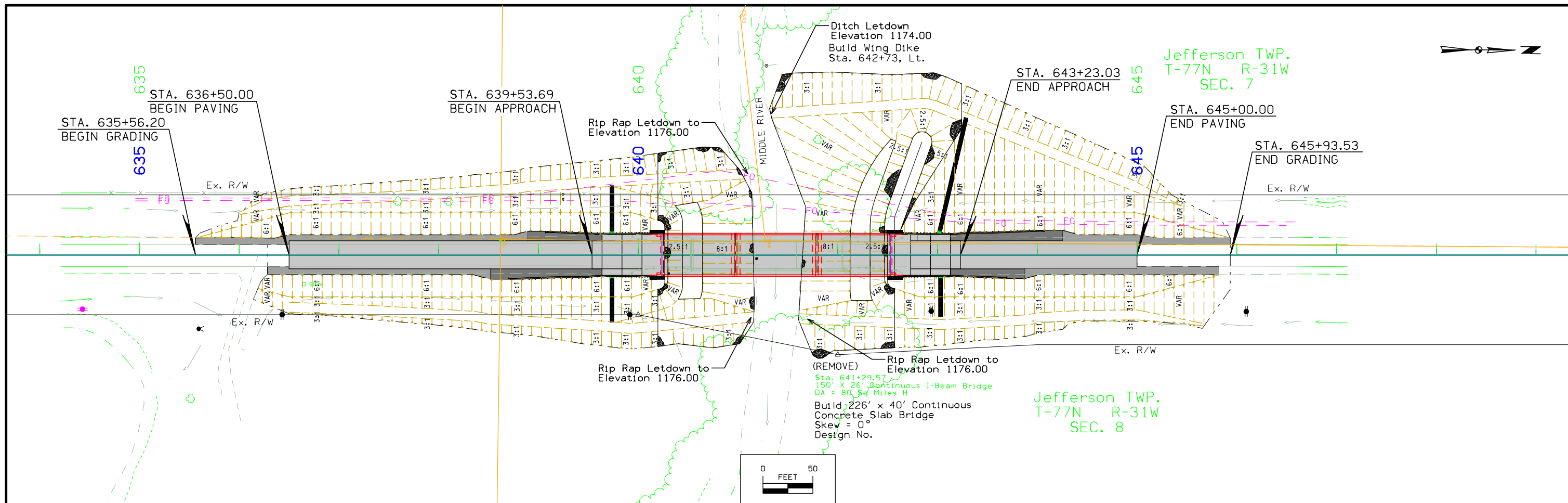
- Reference Point
- Station
- ▲ Section Corner
- — — — — Ground Line Intercept
- ▨ Saw Cut
- ▬ Guardrail
- Trench Drain
- HighTension Cable Guardrail
- ~ Sheet Pile
- ▨ Pavement Removal
- ▩ Clearing & Grubbing Area

RIGHT-OF-WAY LEGEND

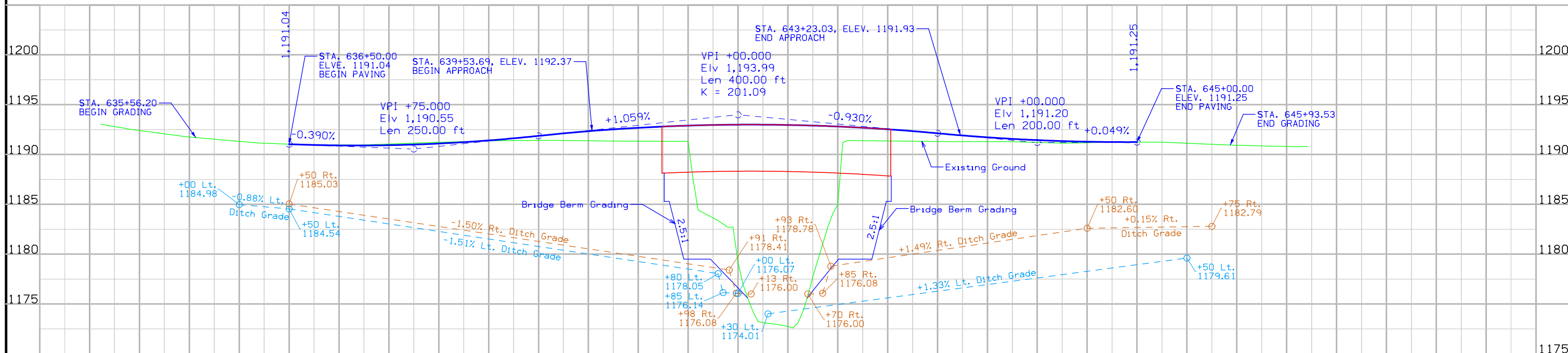
- ▲ Proposed Right-of-Way
- △ Existing Right of Way
- ▲ Existing and Proposed Right-of-Way
- ▲ Easement and Existing Right-of-Way
- Easement (Temporary)
- Easement
- C/A Access Control
- Property Line

PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

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



STA. 635+56.52 ← CLASS 10 SUIT CUT - 30% = 13,874 CY WASTE = 10,735 3,139 TOTAL FILL = 3,139 CY → STA. 645+93.53



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|----------|-----|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|
| 634 | 1,192.82 | 635 | 1,192.46 | 1,192.14 | 1,191.87 | 1,191.65 | 1,191.47 | 1,191.34 | 1,191.25 | 1,191.21 | 1,191.22 | 1,191.27 | 1,191.37 | 1,191.51 | 1,191.69 | 1,191.87 | 1,192.05 | 1,192.21 | 1,192.38 | 1,192.53 | 1,192.67 | 1,192.80 | 1,192.93 | 1,193.04 | 1,193.14 | 1,193.22 | 1,193.26 | 1,193.28 | 1,193.27 | 1,193.24 | 1,193.17 | 1,193.08 | 1,192.98 | 1,192.87 | 1,192.74 | 1,192.60 | 1,192.44 | 1,192.27 | 1,192.08 | 1,191.88 | 1,191.67 | 1,191.48 | 1,191.31 | 1,191.17 | 1,191.06 | 1,190.97 | 1,190.91 | 1,190.87 | 1,190.83 | 646 | 647 | 648 | 649 |
|-----|----------|-----|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|

Survey Information

Adair County
BRFN-025-3(29)--39-01
Middle River 1.2 Miles S of I-80
PIN 14-01-025-010
Sap-0846

General Information

Measurement units for this survey are US survey feet. This survey is for bridge @ Middle River on IA Hwy 25 in Adair County, 1.2 miles south of I-80. Project datum and control information is provided by Design Survey Office. This field survey will be supplemented with aerial photo survey.

Vertical Control

Vertical datum for this survey is NAVD88 (Computed using Geoid12A) GRS80 Ellipsoidal Height was computed at project Pts. 1 and 2 by conducting a six hour static observation. 6 NGS benchmarks were observed using 6 hour static sessions. Additional benchmarks were placed throughout the project using GNSS Base-Rover setups.

This survey observed 2 As built plan heights to compare with observed survey height:

BM # 500 IHC BM Inlet Hdwl 5' x 5' RCB this survey Elev. = 1232.79
= BM # 52 @ Sta. 448+61 AB Plans Proj # 898 Elev. = 1231.08 (Plan datum is not specified)

BM # 502 IHC BM Inlet Hdwl 4' x 4' RCB this survey Elev. = 1195.21
= BM # 70 @ Sta. 619+86.2 AB Plans Proj # 898 Elev. = 1193.65 (Plan datum is not specified)

This survey observed 6 NGS heights to compare with observed survey height:

Bench Mark Disk Inlet Hdwl 12' x 14' RCB this survey Elev. = 1221.85
= NGS BM Designation M 162 Elev. = 1221.93
(Datum NAVD88)

Bench Mark Disk Top Concrete Post this survey Elev. = 1284.53
= NGS BM Designation N 162 Elev. = 1284.53
(Datum NAVD88)

Bench Mark Disk Inlet Hdwl 2' x 2' RCB this survey Elev. = 1174.07
= NGS BM Designation P 103 Elev. = 1174.40
(Datum NAVD88)

Bench Mark Disk Top Concrete Post this survey Elev. = 1336.80
= NGS BM Designation P 162 Elev. = 1336.83
(Datum NAVD88)

Bench Mark Disk Inlet Hdwl 4' x 4' RCB this survey Elev. = 1230.37
= NGS BM Designation R 162 Elev. = 1230.40
(Datum NAVD88)

Bench Mark Disk Top Concrete Post this survey Elev. = 1336.33
= NGS BM Designation T 103 Elev. = 1336.42
(Datum NAVD88)

Survey elevation analysis compared to area NGS benchmarks NGS benchmark designated P 103 was not used in this analysis because the published elevation difference compared with observed survey elevation did not harmonize with the rest of the observed differences of the other NGS benchmarks. The observed differences between survey elevation and published elevation of the 5 NGS benchmarks used in this analysis range from 0 At NGS benchmark N 162 to survey elevation +0.09 ft. at NGS benchmark T 103. The average of the 5 benchmark differences is survey elevation +0.046 ft. Adding 0.046 ft. to survey elevations would better fit the 5 area benchmarks however the unadjusted survey elevations fit 3 of the 5 benchmarks within survey quality tolerances and therefore is assumed correct NAVD 88 elevation.

Horizontal Control

Horizontal Datum is NAD 83(2011) (EPOCH:2010.0000) relative to IaRTN reference stations. The project coordinate system is Iowa RCS Zone 7 (US Survey Feet). The horizontal control was established in the same static control survey as vertical control. Static observations were processed and adjusted to published IaRTN reference station positions. Reference station positions are tied to the national CORS system. Additional points were placed throughout the project using a GNSS Base-Rover setups relative to Pts. 1 and 2.

Alignment Information

IA Hwy 25

The alignment for this survey is a retrace of As-built Plans Project # 898. Survey stationing was equated to the plan at PI Sta. 435+03.7, and was run ahead with no equation throughout the survey.

Survey stationing relates to as built plan stationing as follows:

PI Sta. 435+03.7 This Survey
= PI Sta. 435+03.7 As-built Plans Project # 898

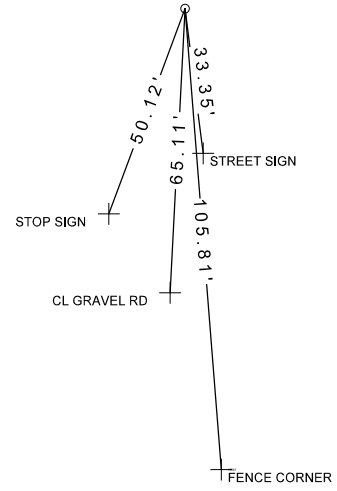
PI Sta. 515+05.87 This Survey
= PI Sta. 515+05.9 Ahead As-built Plans Project # 898

PI Sta. 678+22.20 This Survey
= PI Sta. 678+28.9 As-built Plans Project # 898

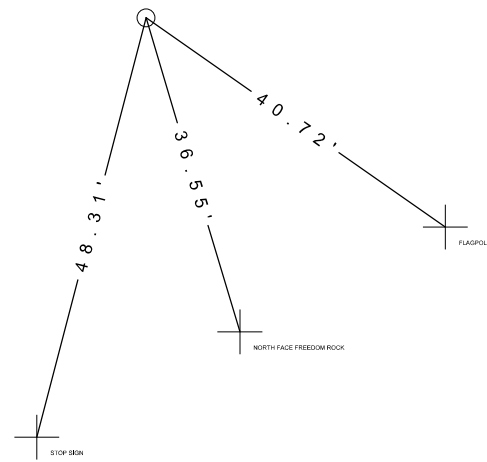
VERTICAL CONTROL

| Point | Station | Offset | Description | North | Elevation | Description |
|-------|-----------|-----------|--|-------------|-----------|--|
| 500 | 448+66.84 | -49.448 | BM # 52 STA. 448+61 AB PLANS FN PROJ. # 898 > FD. IHCBM INLET HDWL 5 X 5 RCB | 7228646.228 | 1232.790 | BM # 52 STA. 448+61 AB PLANS FN PROJ. # 898 > FD. IHCBM INLET HDWL 5 X 5 RCB |
| 501 | 461+10.38 | 13.788 | SE END BRG HANDRAIL @ NORTH TURKEY CREEK | 7229889.316 | 1209.471 | SE END BRG HANDRAIL @ NORTH TURKEY CREEK |
| 502 | 619+79.96 | -34.620 | BM # 70 STA. 619+86.2 AB PLANS FN PROJ. # 898 > FD. IHCBM INLET HDWL 4 X 4 RCB | 7245758.511 | 1195.206 | BM # 70 STA. 619+86.2 AB PLANS FN PROJ. # 898 > FD. IHCBM INLET HDWL 4 X 4 RCB |
| 503 | 640+50.21 | 14.330 | FD DOT PLUG SE END BRG WING @ MIDDLE RIVER | 7247829.002 | 1193.906 | FD DOT PLUG SE END BRG WING @ MIDDLE RIVER |
| 504 | 468+12.95 | -1035.607 | FD DISK NE END BRG STAMPED BM ELEV 1204.83 | 7230598.835 | 1206.565 | FD DISK NE END BRG STAMPED BM ELEV 1204.83 |

CP STA. 468+68.81, 53.06 Rt.
CP 1, Fd Feno Monument
N=7230647.468 E=17549655.223



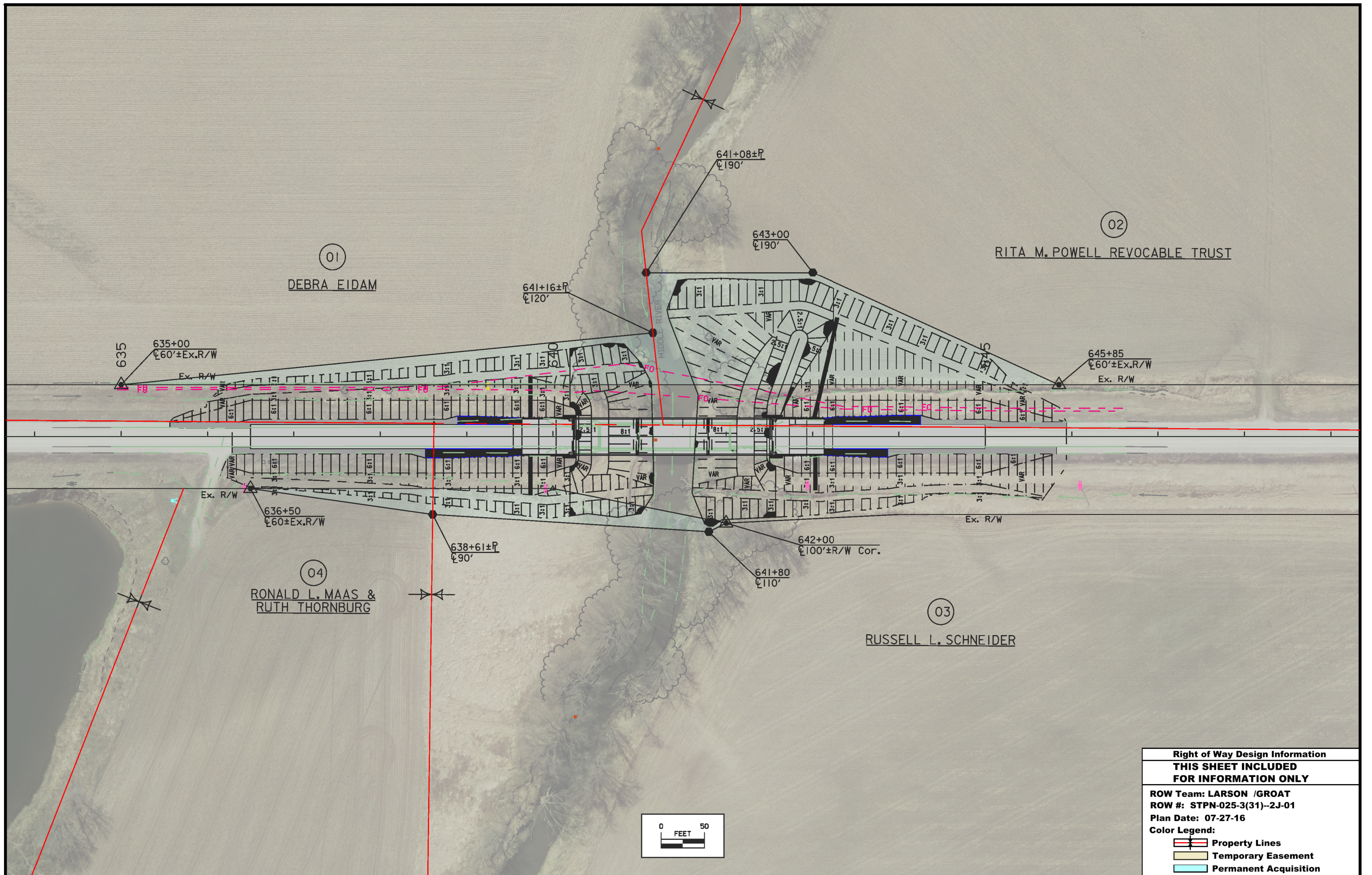
CP STA. 626+15.07, 56.48 Rt.
CP 2, Fd Feno Monument
N=7246394.131 E=17549625.691



Adair ROW: STPN-025-3(31)--2J-01
 Middle River 1.2 mi S of I-80

PIN 14-01-025-010

| PARCEL NO. | OWNER NAME | STATE | | COUNTY | | CITY | | BORROW | | | | TOTAL ACQ. |
|------------|--------------------------------------|-------|---------|--------|------|------|------|--------|------|------|------------|------------|
| | | FEE | EASE | FEE | EASE | FEE | EASE | EXCESS | FEE | T.E. | MITIGATION | |
| 1 | Debra Eidam - Fee | | 0.43 AC | | | | | | | | | |
| 2 | Rita M. Powell Revocable Trust - Fee | | 0.98 AC | | | | | | | | | |
| 3 | Russell L. Schneider - Fee | | 0.22 AC | | | | | | | | | |
| 4 | Ruth Thornburg - Fee | | 0.07 AC | | | | | | | | | |
| | Ronald L. Maas - Fee | | | | | | | | | | | |
| 4 Parcels | "TOTALS | 0 AC | 1.7 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 | | | |



| | |
|---|-----------------------|
| Right of Way Design Information | |
| THIS SHEET INCLUDED FOR INFORMATION ONLY | |
| ROW Team: LARSON /GROAT | |
| ROW #: STPN-025-3(31)-2J-01 | |
| Plan Date: 07-27-16 | |
| Color Legend: | |
| | Property Lines |
| | Temporary Easement |
| | Permanent Acquisition |

108-23A
08-01-08

TRAFFIC CONTROL PLAN

Iowa 25 shall be closed to through traffic for the duration of this project. The Contractor is Responsible for Installation and Removal of all Detour Signing.

Local access to all properties shall be maintained at all times during construction.

108-26A
08-01-08

STAGING NOTES

Iowa 25 will be closed to through traffic for the duration of this project. Construction will occur in a single stage. Detour signing shall be erected and maintained (as per Standard Road Plan TC-252) for the duration of the project, and removed by the contractor post construction.

**CROSS SECTION VIEW COLOR LEGEND
OF TRAFFIC CONTROL AND STAGING SHEETS**

| SHADING | Design Color No. | |
|--------------|------------------|---|
| Green, Light | (225) | Existing Pavement Shading |
| Gray, Light | (48) | Previously Constructed Pavement Shading |
| Gray, Med | (80) | Previously Constructed Granular Surface Shading |
| Blue, Light | (230) | Proposed Pavement Shading |
| Lavender | (9) | Temporary Pavement Shading |
| Brown, Med | (237) | Future Proposed Pavement Shading |

**CROSS SECTION VIEW PATTERN AND SYMBOL LEGEND
OF TRAFFIC CONTROL AND STAGING SHEETS**

| | | | |
|--|---------------------------|--|---------------------------------|
| | Pavement Removal | | Proposed Granular Shoulder |
| | Proposed Granular Subbase | | Temporary Shoulder |
| | Proposed Special Backfill | | Existing Shoulder Strengthening |
| | Temporary Barrier Rail | | Permanent Barrier Rail |
| | | | Channelizing Device |

PLAN VIEW COLOR LEGEND OF TRAFFIC CONTROL AND STAGING SHEETS

| LINEWORK | Design Color No. | |
|--------------|------------------|---|
| Green | (2) | Existing Topographic Features and Labels |
| Magenta | (5) | Pavement Marking Call Outs |
| Blue | (1) | Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation |
| Yellow | (4) | Pavement Markings, Yellow |
| Off White | (254) | Pavement Markings, White |
| Violet | (15) | Temporary barrier rail, Unpinned |
| Flush Orange | (228) | Temporary barrier rail, Pinned |

| SHADING | Design Color No. | |
|--------------------------|------------------|---|
| Green, Light | (225) | Existing Pavement Shading |
| Gray, Light | (48) | Previously Constructed Pavement Shading |
| Gray, Med | (80) | Proposed Granular Surface Shading |
| Gray, Med | (80) | Previously Constructed Granular Surface Shading |
| Blue, Light | (230) | Proposed Pavement Shading |
| Lavender | (9) | Temporary Pavement Shading |
| Brown, Light | (236) | Proposed Grading Limits Shading |
| Pink, Dark | (13) | Proposed MSE or CIP Wall Shading |
| Red | (3) | Proposed Bridge Shading and Sign Trusses |
| Black w/Gray, Light Fill | (0,48) | Previously Constructed Structure |

**PLAN VIEW PATTERN AND SYMBOL LEGEND
OF TRAFFIC CONTROL AND STAGING SHEETS**

| | | | |
|--|--------------------------|--|------------------------------|
| | Channelizing Device | | Crash Cushion (Temp or Perm) |
| | Drum | | Traffic Signal |
| | Temporary Lane Separator | | Flagger |
| | Tubular Marker | | Temporary Floodlighting |
| | Channelizer Marker | | Traffic Sign |
| | Concrete Barrier Marker | | Type III Barricade |
| | Delineator | | Type A Warning Light |
| | Temporary Barrier Rail | | Direction of Traffic |
| | Sand Barrel Layout | | Safety Closure |

NOTE: Device spacing according to Standard Road Plans unless specifically dimensioned.

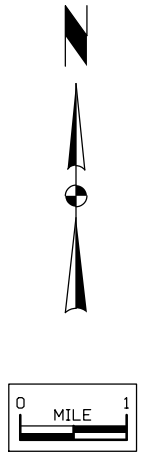
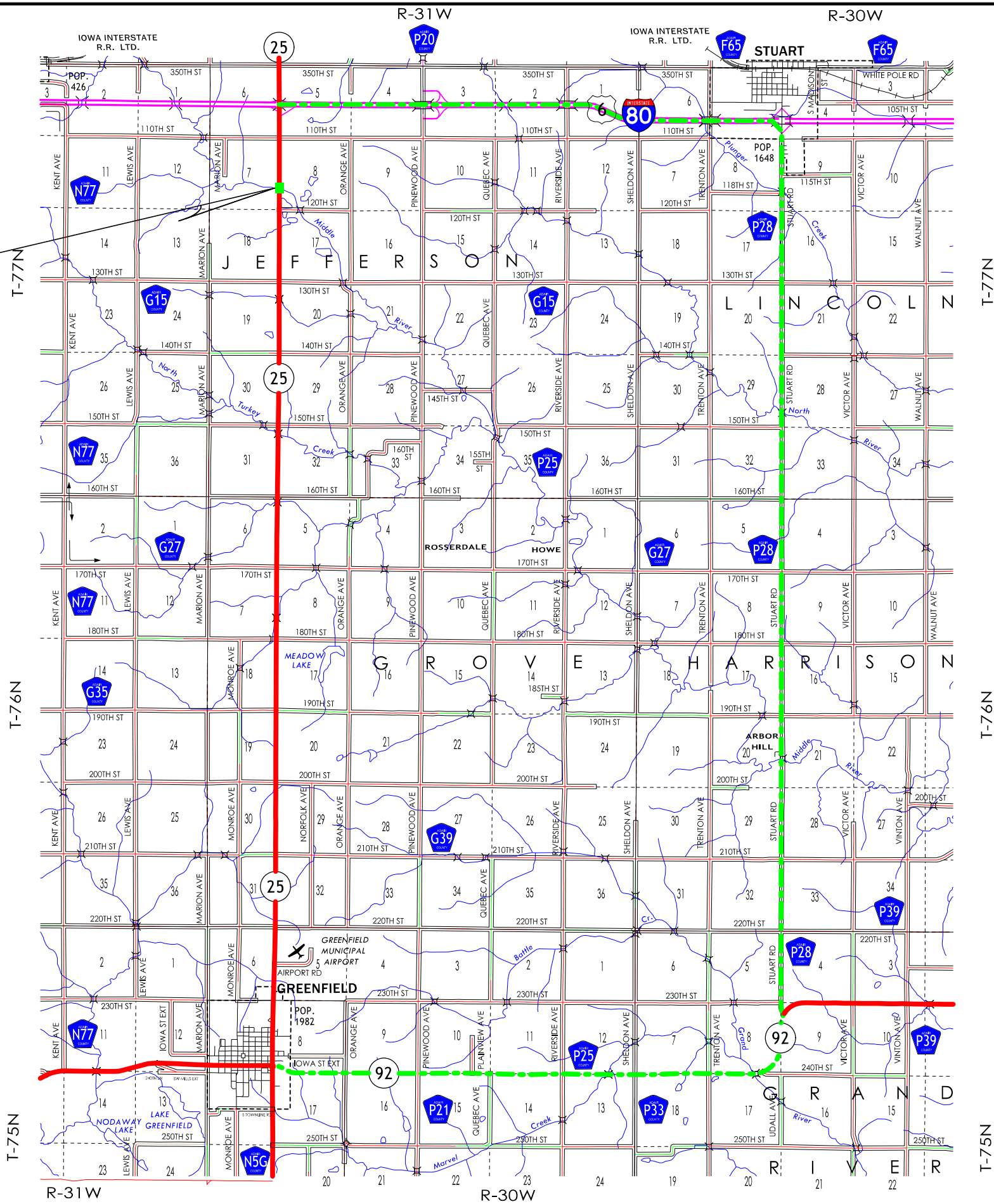
**TRAFFIC CONTROL
AND
STAGING
LEGEND AND SYMBOL
INFORMATION SHEET**

(COVERS SHEET SERIES J)

DETOUR LEGEND

- Detour Route
- Proposed Project

PROJECT LOCATION
BRIDGE NO.

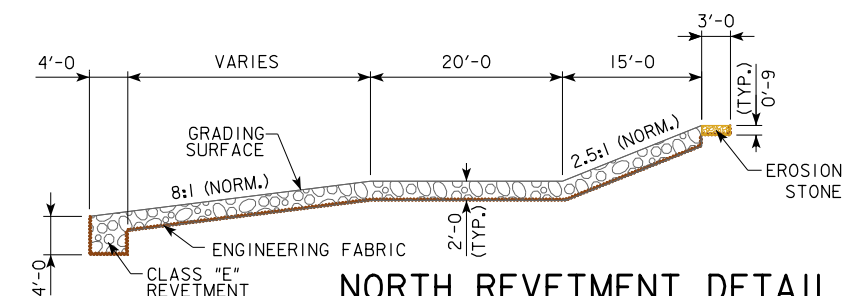
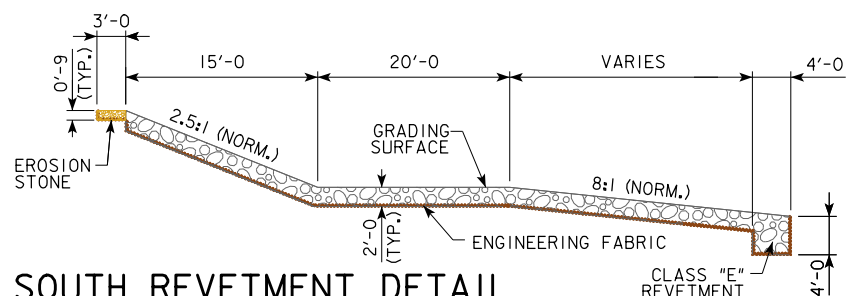


DETOUR NOTE:
THE CONTRACTOR IS RESPONSIBLE FOR THE
INSTALLATION & REMOVAL OF ALL DETOUR SIGNING.

DETOUR AND
TRAFFIC CONTROL

REVETMENT LOCATION TABLE

| POINT | SOUTH ABUTMENT | | | POINT | NORTH ABUTMENT | | |
|-------|----------------|-----------|---------|-------|----------------|-----------|---------|
| | STATION | OFFSET | ELEV. | | STATION | OFFSET | ELEV. |
| R1 | 640+19.69 | 34.45 RT | 1185.38 | R1 | 642+57.03 | 33.77 RT | 1185.30 |
| R2 | 640+19.69 | 91.77 RT | 1184.66 | R2 | 642+57.03 | 93.07 RT | 1186.28 |
| R3 | 640+40.00 | 89.06 RT | 1184.09 | R3 | 641+95.19 | 96.05 RT | 1186.96 |
| R4 | 640+75.00 | 93.26 RT | 1186.06 | R4 | 641+84.87 | 103.49 RT | 1187.25 |
| R5 | 641+01.62 | 88.96 RT | 1181.85 | R5 | 641+80.00 | 103.68 RT | 1187.35 |
| R6 | 641+15.65 | 67.22 RT | 1174.00 | R6 | 641+75.00 | 100.38 RT | 1186.30 |
| R7 | 641+16.40 | 44.92 RT | 1174.00 | R7 | 641+60.76 | 65.21 RT | 1174.00 |
| R8 | 641+13.86 | 61.94 LT | 1174.00 | R8 | 641+67.71 | 43.40 LT | 1174.00 |
| R9 | 641+01.92 | 84.87 LT | 1174.00 | R9 | 641+33.80 | 136.81 LT | 1174.00 |
| R10 | 640+82.16 | 107.14 LT | 1185.61 | R10 | 641+31.70 | 146.68 LT | 1174.00 |
| R11 | 640+64.97 | 108.06 LT | 1186.09 | R11 | 641+44.39 | 180.66 LT | 1184.80 |
| R12 | 640+19.69 | 101.69 LT | 1185.30 | R12 | 641+54.39 | 182.06 LT | 1185.44 |
| R13 | 640+19.69 | 34.45 LT | 1185.38 | R13 | 641+94.39 | 183.13 LT | 1185.74 |
| - | - | - | - | R14 | 642+54.39 | 180.53 LT | 1184.26 |
| - | - | - | - | R15 | 642+96.28 | 182.30 LT | 1184.42 |
| - | - | - | - | R16 | 643+08.22 | 178.43 LT | 1184.46 |
| - | - | - | - | R17 | 643+24.23 | 171.28 LT | 1184.48 |
| - | - | - | - | R18 | 643+24.23 | 126.41 LT | 1177.12 |
| - | - | - | - | R19 | 643+63.07 | 25.35 LT | 1185.30 |

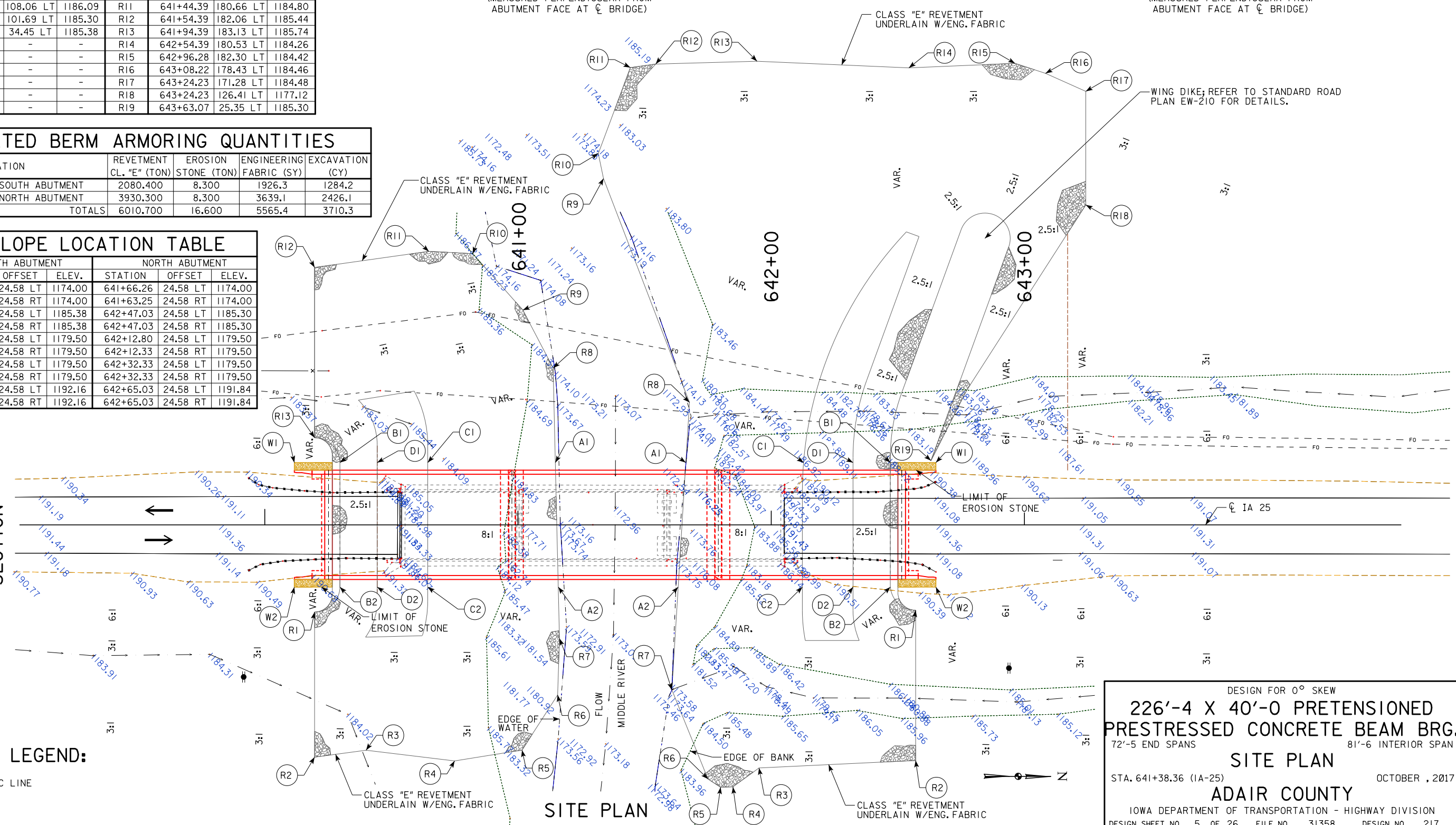
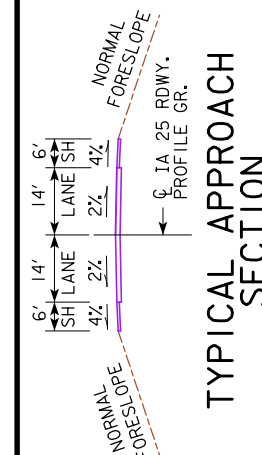


ESTIMATED BERM ARMORING QUANTITIES

| LOCATION | REVETMENT CL. "E" (TON) | EROSION STONE (TON) | ENGINEERING FABRIC (SY) | EXCAVATION (CY) |
|------------------------------|-------------------------|---------------------|-------------------------|-----------------|
| BERM LINING - SOUTH ABUTMENT | 2080.400 | 8.300 | 1926.3 | 1284.2 |
| BERM LINING - NORTH ABUTMENT | 3930.300 | 8.300 | 3639.1 | 2426.1 |
| TOTALS | 6010.700 | 16.600 | 5565.4 | 3710.3 |

BERM SLOPE LOCATION TABLE

| POINT | SOUTH ABUTMENT | | | NORTH ABUTMENT | | |
|-------|----------------|----------|---------|----------------|----------|---------|
| | STATION | OFFSET | ELEV. | STATION | OFFSET | ELEV. |
| A1 | 641+14.75 | 24.58 LT | 1174.00 | 641+66.26 | 24.58 LT | 1174.00 |
| A2 | 641+15.92 | 24.58 RT | 1174.00 | 641+63.25 | 24.58 RT | 1174.00 |
| B1 | 640+29.69 | 24.58 LT | 1185.38 | 642+47.03 | 24.58 LT | 1185.30 |
| B2 | 640+29.69 | 24.58 RT | 1185.38 | 642+47.03 | 24.58 RT | 1185.30 |
| C1 | 640+64.39 | 24.58 LT | 1179.50 | 642+12.80 | 24.58 LT | 1179.50 |
| C2 | 640+64.39 | 24.58 RT | 1179.50 | 642+12.33 | 24.58 RT | 1179.50 |
| D1 | 640+44.39 | 24.58 LT | 1179.50 | 642+32.33 | 24.58 LT | 1179.50 |
| D2 | 640+44.39 | 24.58 RT | 1179.50 | 642+32.33 | 24.58 RT | 1179.50 |
| W1 | 640+11.69 | 24.58 LT | 1192.16 | 642+65.03 | 24.58 LT | 1191.84 |
| W2 | 640+11.69 | 24.58 RT | 1192.16 | 642+65.03 | 24.58 RT | 1191.84 |



UTILITIES LEGEND:

- FO - BURIED FIBER OPTIC LINE
- - POWER POLES

DESIGN FOR 0° SKEW
226'-4 X 40'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRG.
 72'-5 END SPANS 81'-6 INTERIOR SPAN
SITE PLAN
 STA. 641+38.36 (IA-25) OCTOBER, 2017
ADAIR COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 5 OF 26 FILE NO. 31358 DESIGN NO. 217

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)
- Slope Dressing Only
- 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.

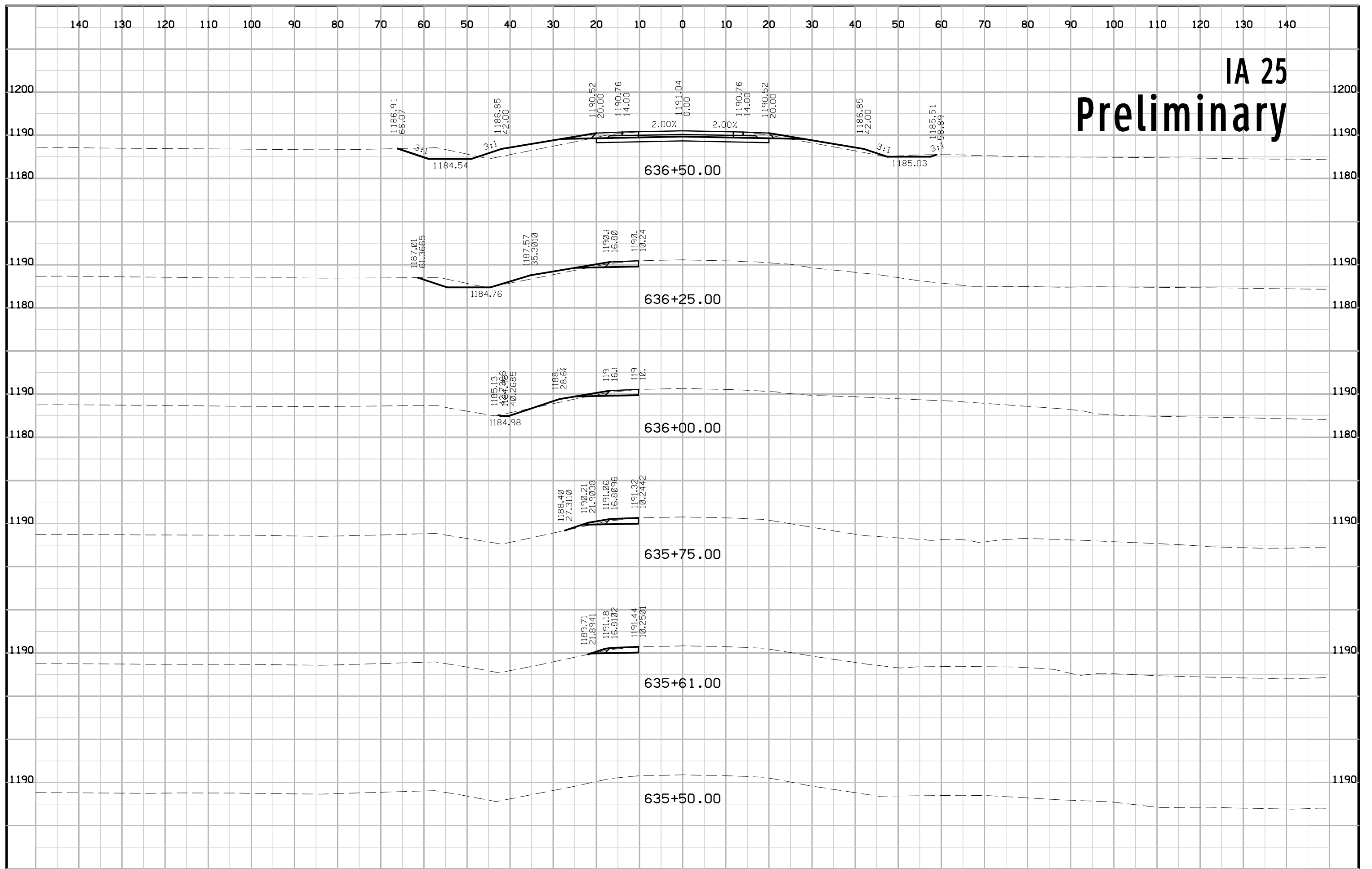
SYMBOL LEGEND OF CROSS SECTION SHEETS

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

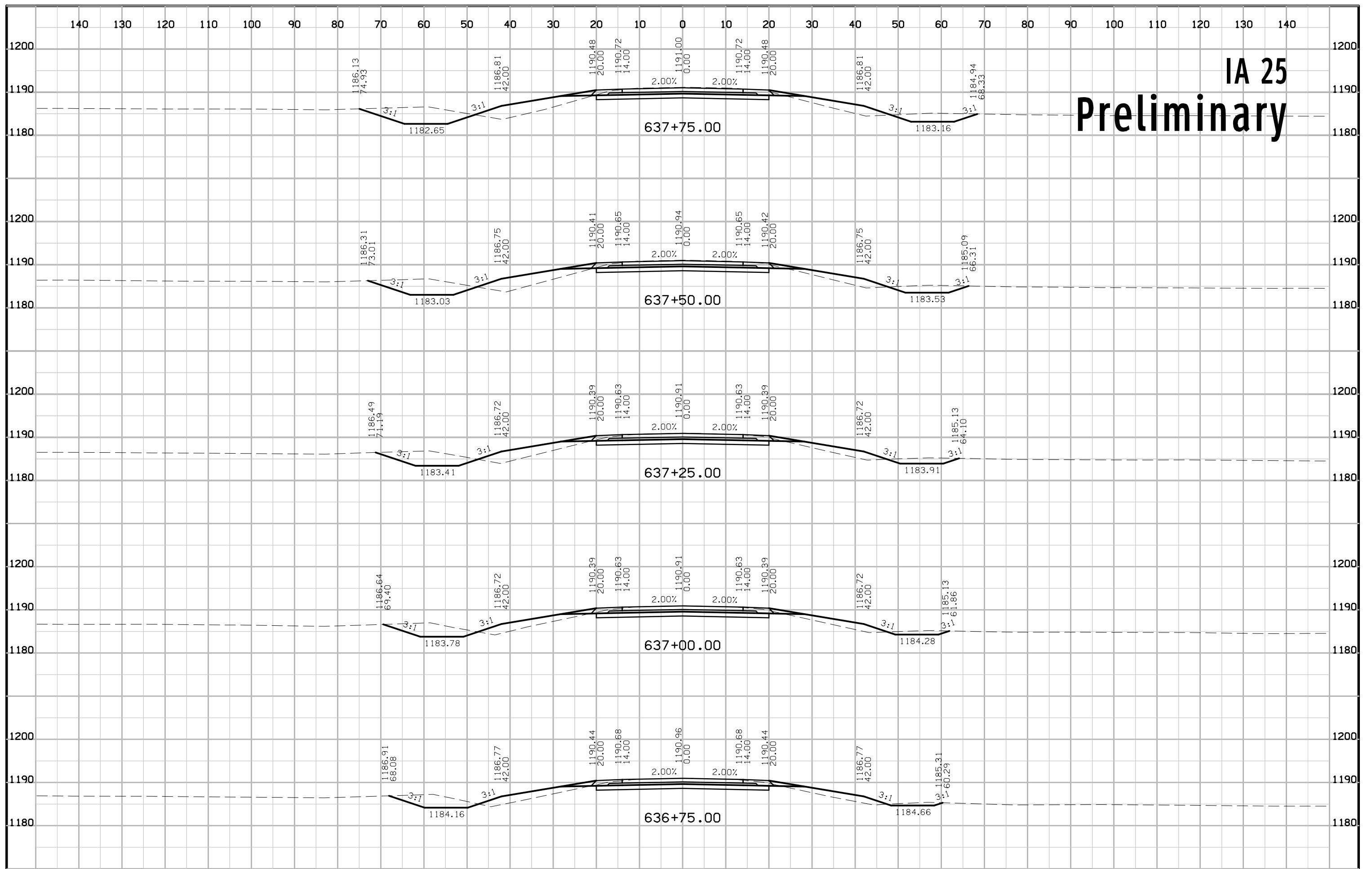
**CROSS SECTION
LEGEND AND SYMBOL
INFORMATION SHEET**

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

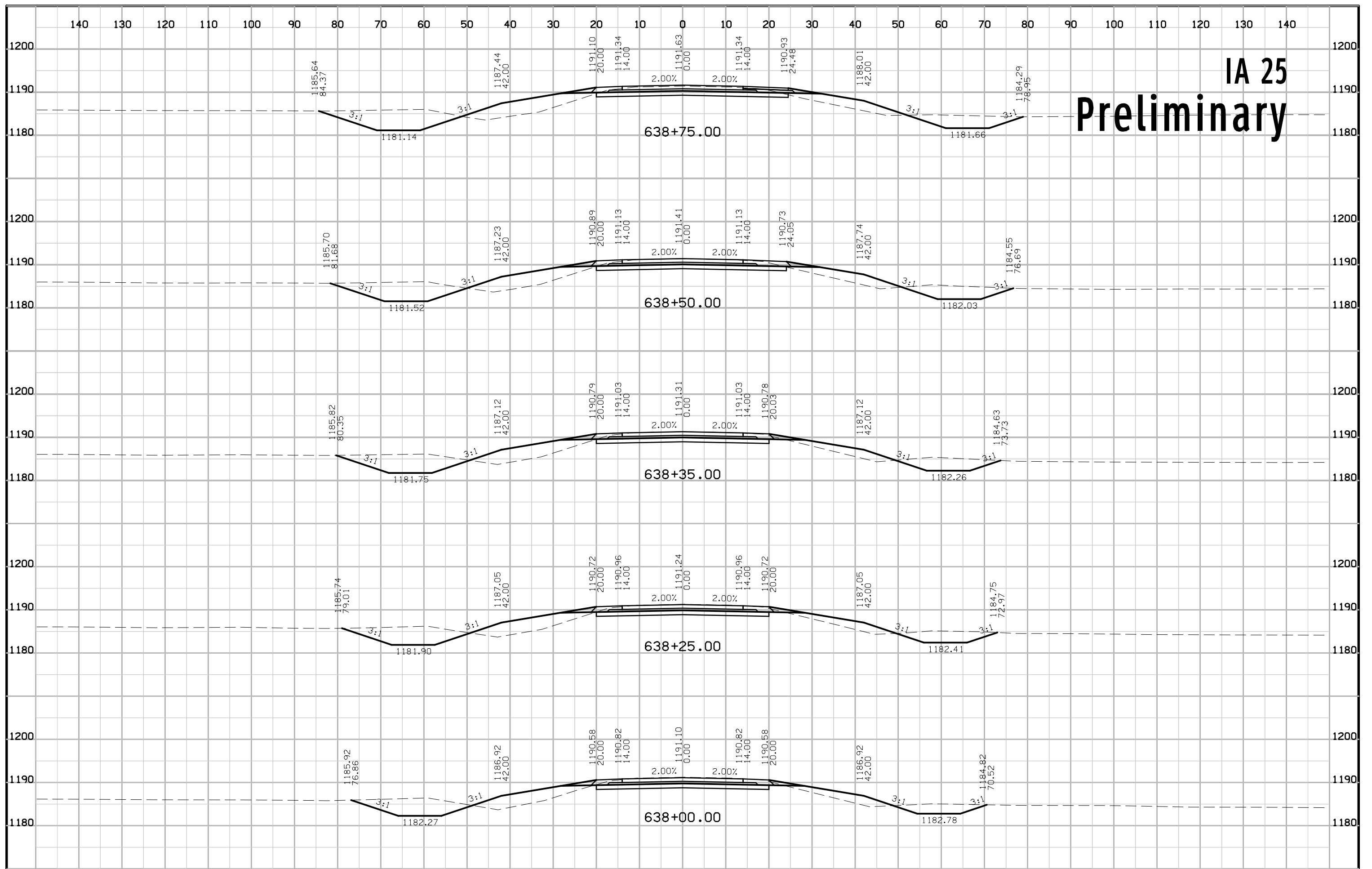
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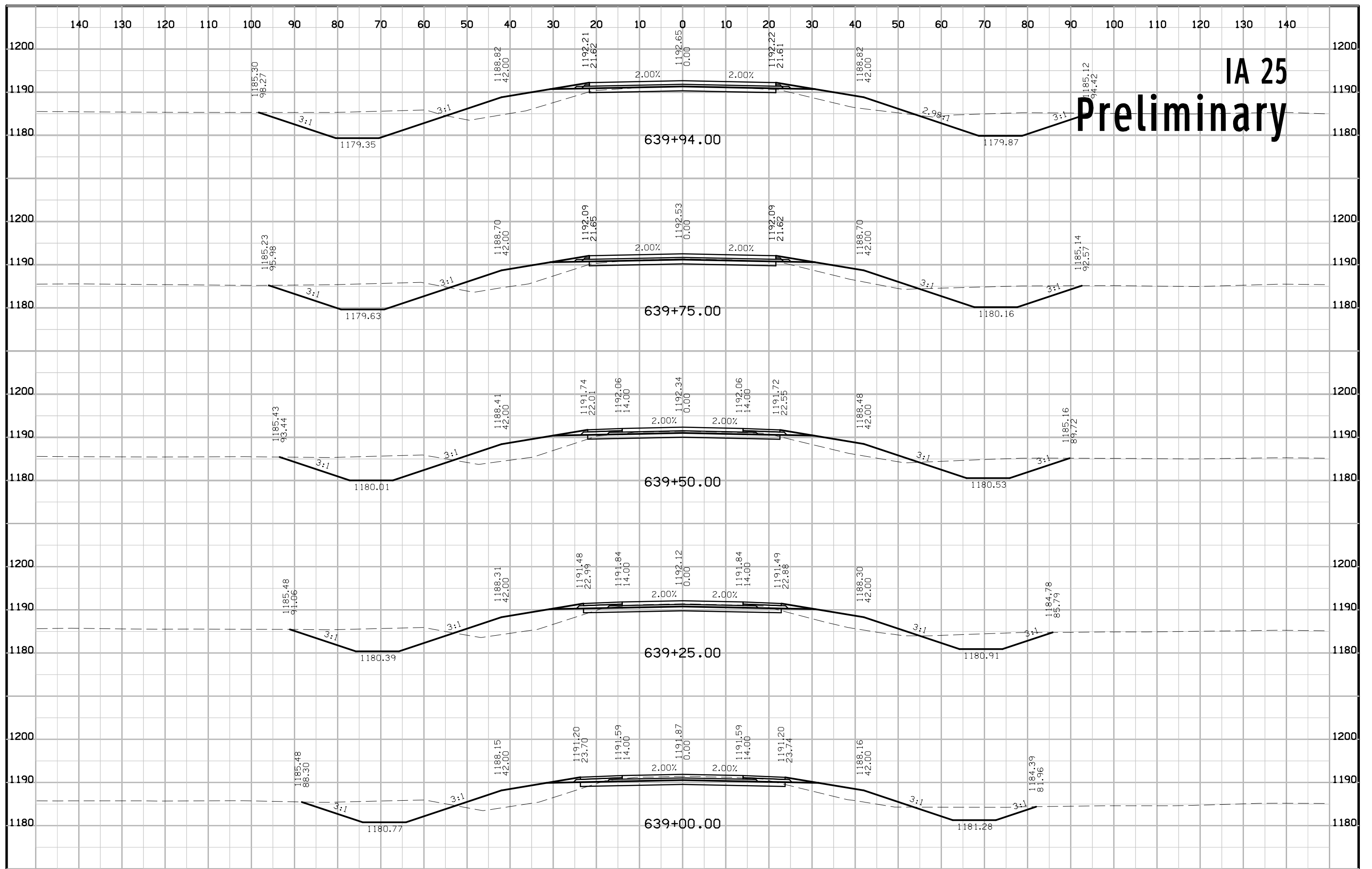
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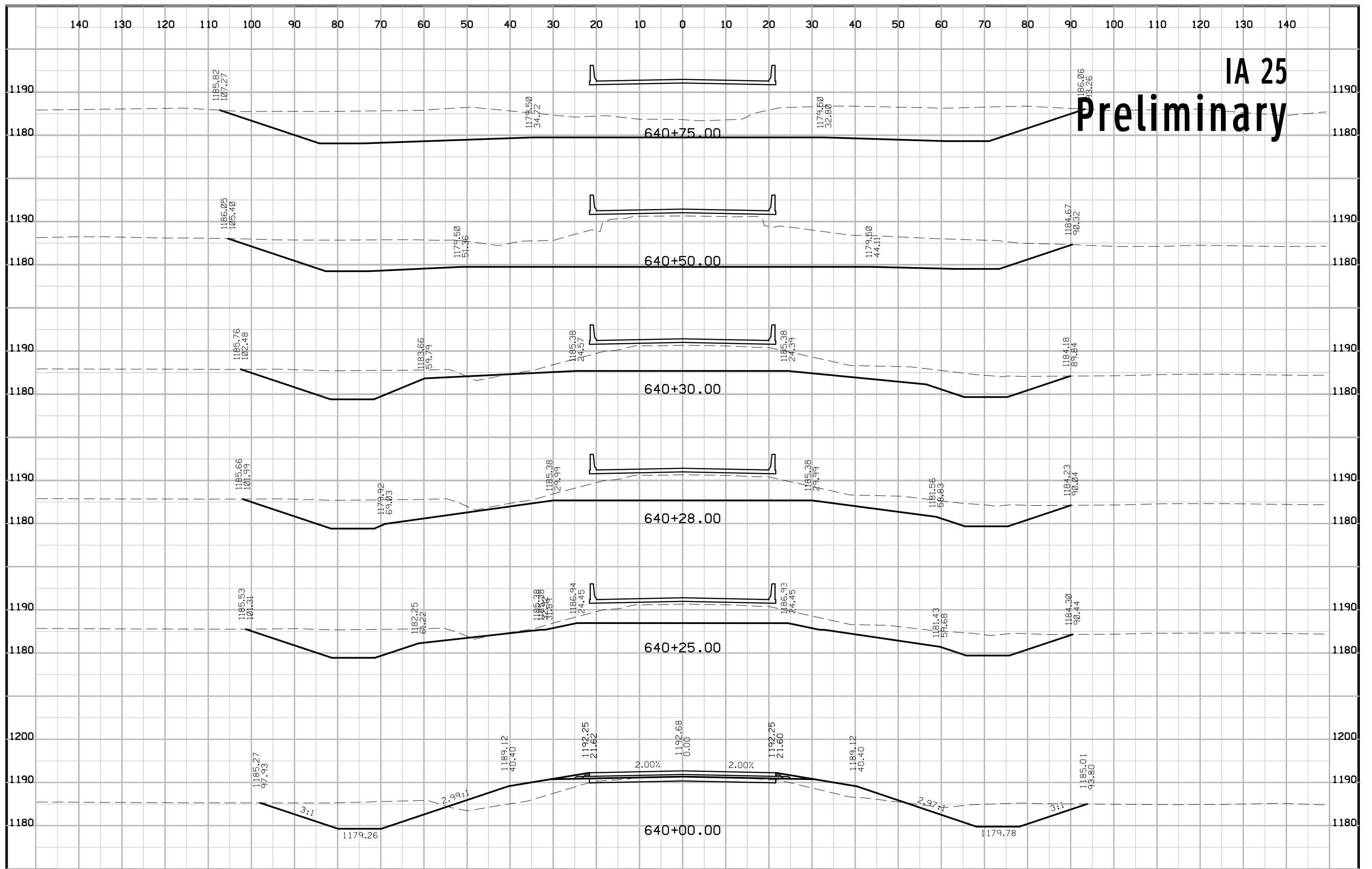
IA 25 Preliminary



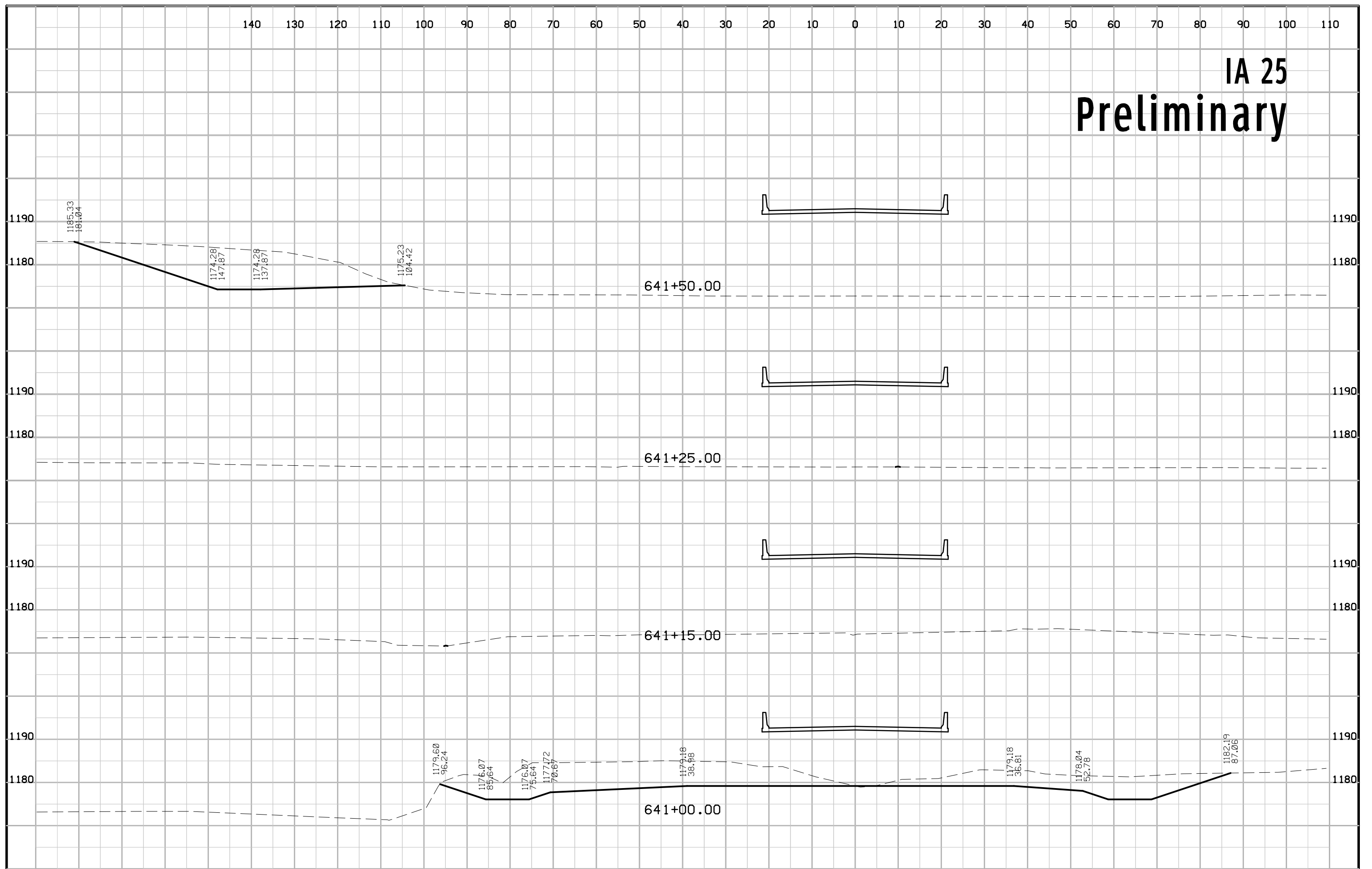
IA 25 Preliminary



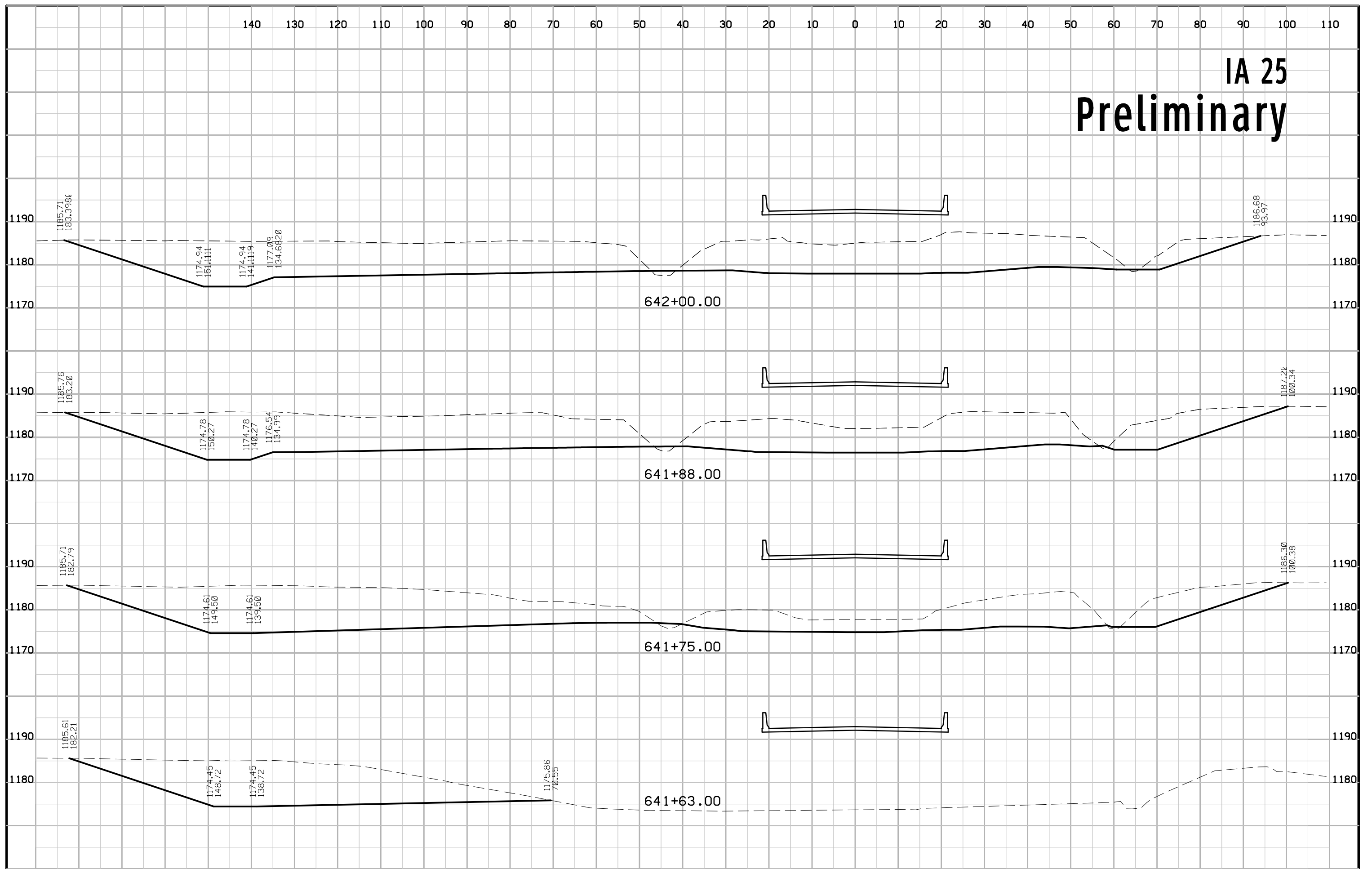
IA 25 Preliminary

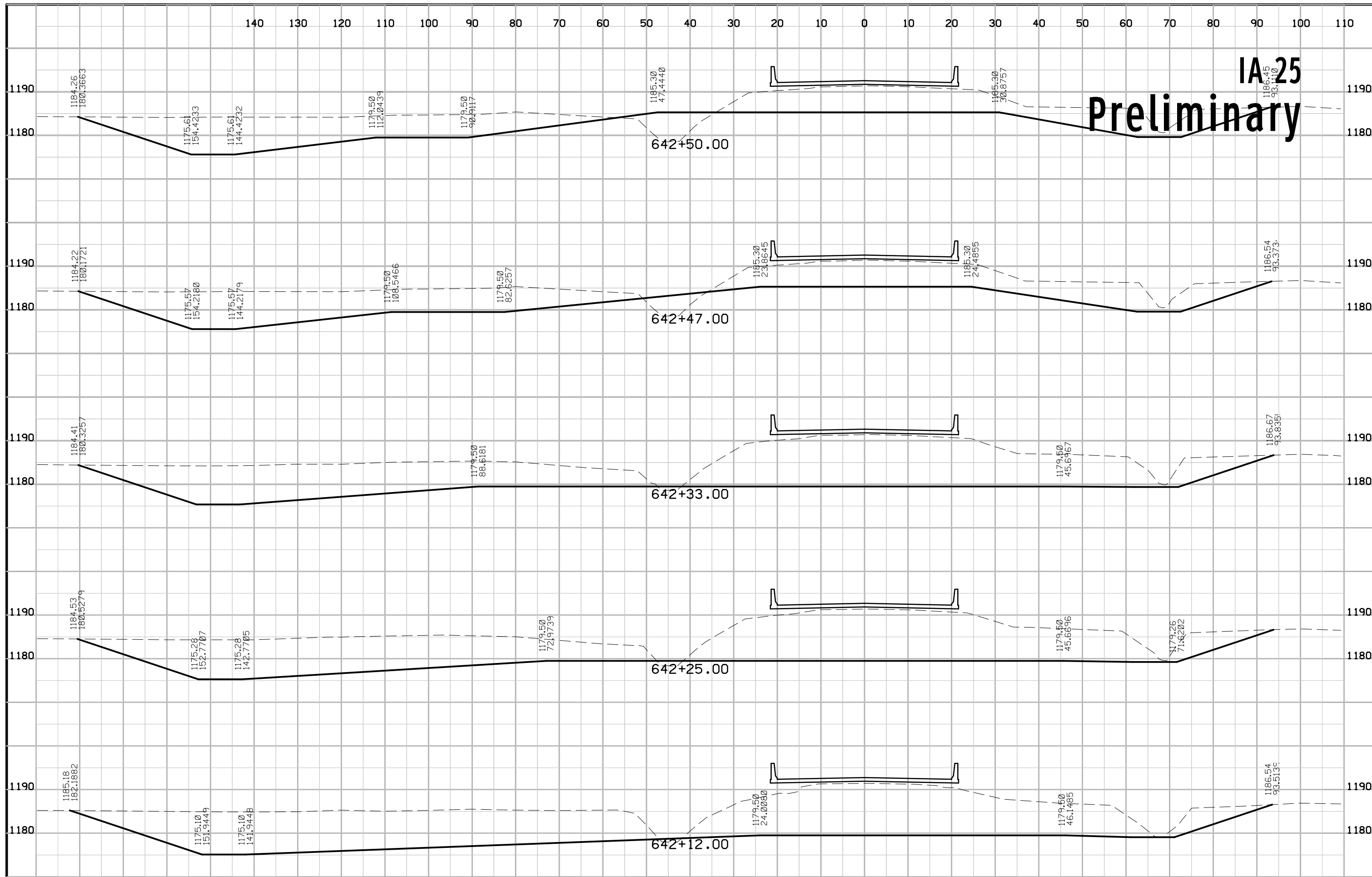


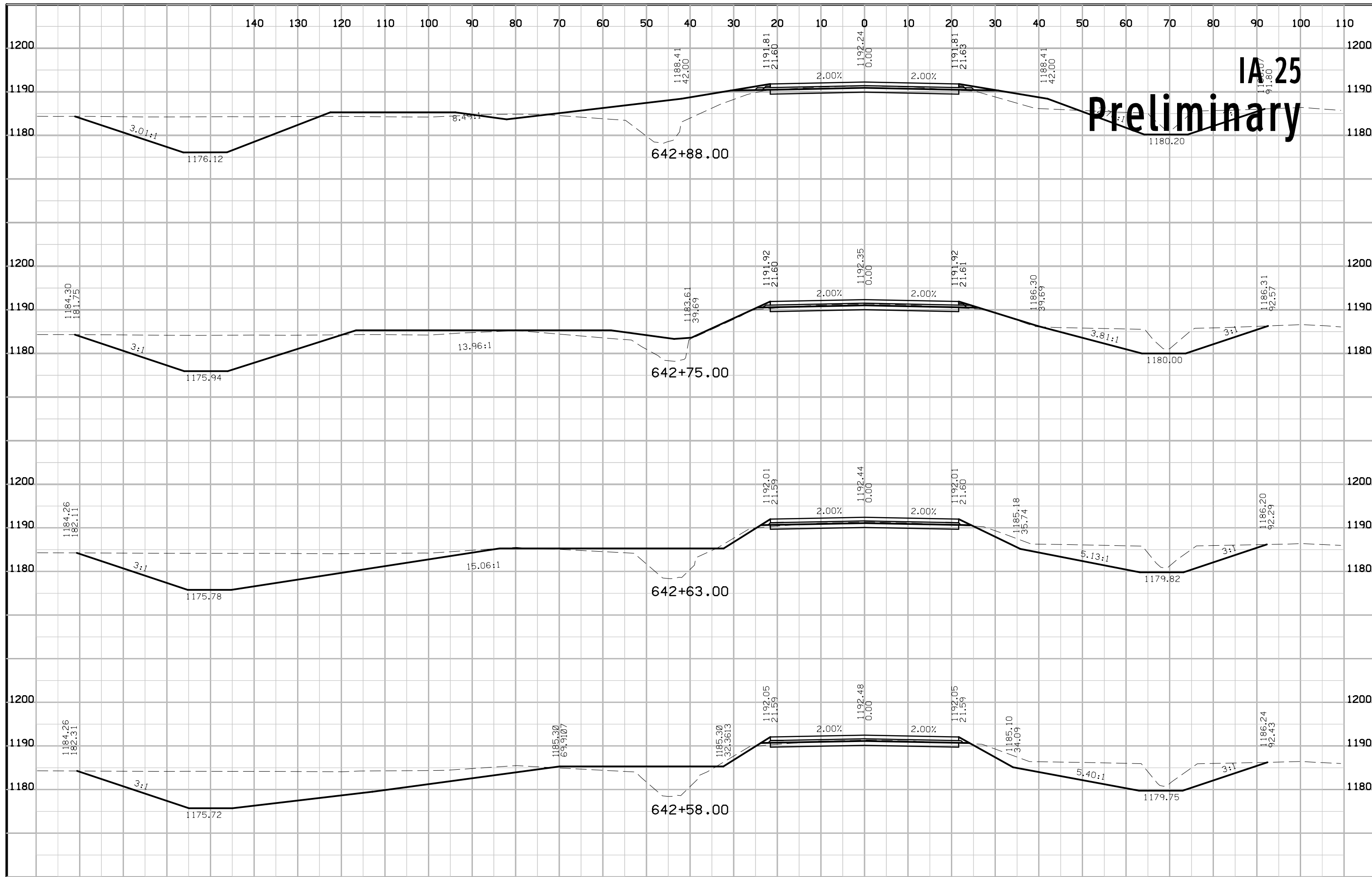
IA 25 Preliminary



IA 25 Preliminary

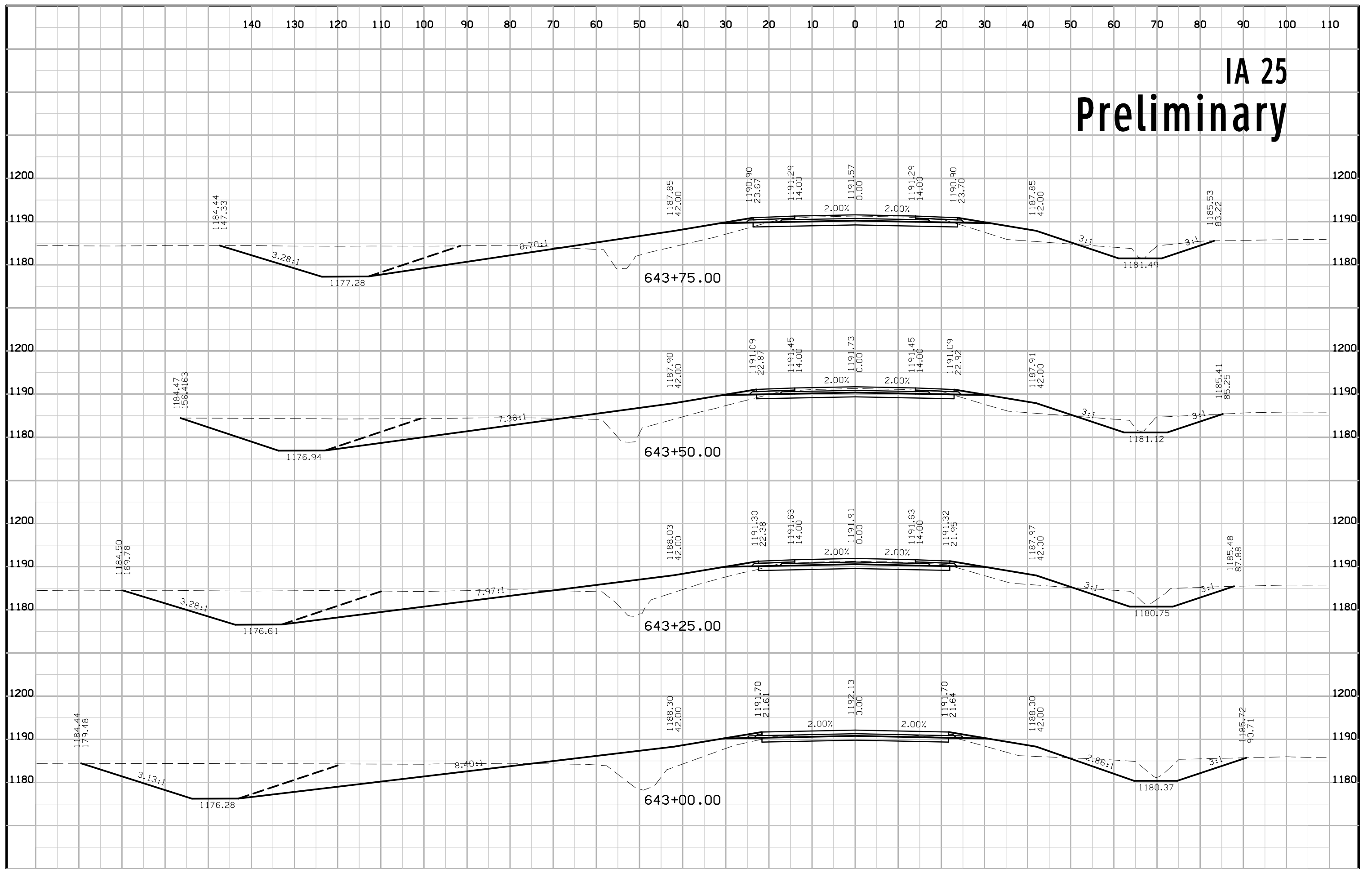






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IA 25 Preliminary

