

requirements and two lanes of travel in each direction are maintained at all times during bridge replacement. Reconstruction and widening of I-80 between the US 6/US 169 and R16 interchanges will accommodate a future six-lane facility consistent with the current I-80 Planning and Environmental Linkages (PEL) study.

Widening I-80 also requires reconstruction of the Old Portland Road bridge and associated approaches to accommodate the future I-80 typical section which includes three 12 ft. wide lanes and 12 ft. wide shoulders in each direction and a minimum 82 ft. wide median. Old Portland Road is located approximately 2.0 miles east of US 6/US 169. The four-span, pre-stressed concrete beam structure is 236 ft. long with a 28 ft. clear roadway width.

Five alternatives were developed which include replacement of the I-80 bridges over South Raccoon River and North Raccoon River and reconstruction of the Old Portland Road bridge over I-80. The alternatives were developed to identify feasible bridge replacement alternatives that also widen I-80 from the US 6/US 169 interchange in De Soto to the Co Rd R16 interchange without significant impacts to the interchanges and accommodate a future six-lane facility along I-80.

Alternative 1 is the preferred alternative to replace bridges at South Raccoon River and North Raccoon River with consideration of future needs, flood mitigation, and environmental and social implications.

PROJECT DATA

ROUTE: I-80 from US 6/US169 Interchange in De Soto to Co Rd R16 Interchange
LIMITS: MP 110.10 to MP 113.30 LENGTH: 3.2 miles
PLANNING CLASSIFICATION: Interstate
MAINTENANCE SERVICE LEVEL: A
TRAFFIC: 2020 --- 38,000 ADT with 24% trucks
 2050 --- 61,200 ADT with 26% trucks
PRESENT PAVEMENT TYPE: PCC
PRESENT PAVEMENT WIDTH: 26 ft. (24 ft. effective lane width)
PRESENT SHOULDER WIDTH: 6 ft. inside, 8 ft. outside (10 ft. effective shoulder width)
PRESENT SHOULDER TYPE: HMA

MAINLINE PAVEMENT HISTORY

MP 110.10 to 110.95
ORIGINAL PAVEMENT: 26 ft. wide, 11.5 in. thick PCC
YEAR CONSTRUCTED: 1989

MP 110.95 to 113.30
ORIGINAL PAVEMENT: 26 ft. wide, 11.5 in. thick PCC
YEAR CONSTRUCTED: 1989 RESURFACED: 2000, 4 in. thick HMA

BRIDGES

There are two (2) existing dual mainline bridges and one (1) overhead bridge located within the project limits.

Mainline Bridge No. 1 – Eastbound I-80 Bridge over the South Raccoon River

Maintenance Number 2511.6R080, FHWA 22300, 408 ft. x 30 ft. continuous welded girder bridge, Station 723+41.50, MP 111.6, Design Number 865. This bridge was constructed in 1966 and has a sufficiency rating of 59.1.

Mainline Bridge No. 2 – Westbound I-80 Bridge over the South Raccoon River

Maintenance Number 2511.6L080, FHWA 22310, 408 ft. x 30 ft. continuous welded girder bridge, Station 723+41.50, MP 111.6, Design Number 865. This bridge was constructed in 1966 and has a sufficiency rating of 64.5.

Mainline Bridge No. 3 – Eastbound I-80 Bridge over the North Raccoon River

Maintenance Number 2512.4R080, FHWA 22330, 523 ft. x 30 ft. Continuous welded girder bridge, Station 771+00.81, MP 112.4, Design Number 965. This bridge was constructed in 1966 and has a sufficiency rating of 66.4.

Mainline Bridge No. 4 – Westbound I-80 Bridge over the North Raccoon River

Maintenance Number 2512.4L080, FHWA 22340, 523 ft. x 30 ft. Continuous welded girder bridge, Station 771+00.81, MP 112.4, Design Number 965. This bridge was constructed in 1966 and has a sufficiency rating of 66.6.

Overhead Bridge No.1 – Old Portland Road over I-80

Maintenance Number 2512.2O080, FHWA 22320, 240 ft. x 28 ft. pre-stressed concrete beam bridge, Station 752+87.40, MP 112.2 Design Number 565, Vertical Clearance 16 ft. 7 in. This bridge was constructed in 1966 and has a sufficiency rating of 84.6.

EXISTING CONDITIONS

The existing segment of I-80 from the US 6/US 169 Interchange in De Soto to the Co Rd R16 Interchange (MP 110.10 to 113.30) is a rural 4-lane divided freeway with 14 ft. (12 ft. effective) outside lanes, 12 ft. inside lanes, 8 ft. (10 ft. effective) outside shoulders, 6 ft. inside shoulders and a 50 ft. median. The facility was initially constructed on the current alignment in 1966 with 8 in. PCC travel lanes and 4 in. HMA shoulders. Reconstruction occurred in 1989 on the existing alignment with 11.5 in. PCC travel lanes on 6 in. min. granular subbase and 8 in. HMA shoulders on 6 in. special backfill. The eastbound section from milepost 110.95 to 113.30 was resurfaced in 2000 with 4 in. HMA. Shoulders along I-80 westbound were reconstructed in 2013 with 8 in. HMA. New cable guardrail, steel guardrail, and overhead bridge pier protection barrier rail was also installed along both I-80 eastbound and westbound in 2013.



I-80 Dallas County

One horizontal curve is located within the project limits immediately east of the North Raccoon River bridges. The existing curve is 1,347 ft. long with a 7,640 ft. radius and an approximate superelevation rate of 3.1% which meets current criteria for the proposed 75 mph design speed. Curve length is approximately eighteen times the proposed design speed and less than the desirable length of thirty times the design speed for Interstates, but more than minimum fifteen times the design speed for full access controlled roadways.

Two of the four sag vertical curves within the project limits possess K values less than the preferred value of 206 for the proposed 75 mph design speed. The existing sag curve at the South Raccoon River bridges has a K value of 200 which is greater than a K value of 181 for 70 mph. The existing sag curve immediately east of the North Raccoon River bridges has a K value of 151 which is between the 60 mph value of 136 and the 65 mph value of 157.

Mainline I-80 bridges over South Raccoon River are four-span continuous steel girder structures with 12 ft. lanes and 3 ft. shoulders constructed in 1966 with PCC overlays in 1985. Abutments are stub concrete supported on steel H piling and the single-column concrete cantilever piers are supported on steel H piling or founded on rock.



I-80 Westbound at South Raccoon River

Upstream of the bridges, the South Raccoon River watershed area is approximately 1,112 sq. mi. The stream is reasonably straight for 100 ft. upstream then bends to a skew of approximately 50 degrees to the northeast. The upstream east bend has experienced significant erosion and recent bendway weirs, longitudinal rock, and toe rock counter measures have been employed to stabilize the bank and build a serviceable floodplain bench. A high water mark at elevation 875.2 on the eastbound bridge southwest abutment maskwall indicates the flood of 1993 was more than 2 ft. above the abutment seat. A high water mark at elevation 874.8 on the westbound bridge Girder 2 web indicates the flood of 1993 was 0.9 ft. above the bottom flange of the girder.

Mainline I-80 bridges over North Raccoon River are five-span continuous steel girder structures with 12 ft. lanes and 3 ft. shoulders constructed in 1966 with PCC overlays in 1980 (I-80 eastbound) and 1985 (I-80 westbound). Abutments are stub concrete supported on steel H piling and the single-column concrete cantilever piers are supported on rock.



I-80 Eastbound at North Raccoon River

Upstream of the bridges, the North Raccoon River watershed area is approximately 2,290 sq. mi. The stream is reasonably straight along a skew of 40 degrees to the northwest. Erosion of banks upstream are not threatening the existing bridges, but there appears to be sedimentation in the center of the stream downstream of the bridges. A high water mark on the eastbound bridge Girder 2, Span 5, indicates that the flood of 1993 was 1.25 ft. above the bottom flange of the girder. A high water mark on the westbound bridge Girder 5, Span 2, indicates the flood of 1993 was 1.33 ft. above the bottom flange of the girder.

The bridges are in similar condition with varying degrees of deterioration, primarily on the superstructures. The bridges have experienced deck spalling; hairline cracking, spalling, and collision damage in rails; and deterioration of curbs with cracking, spalling, and exposed reinforcing. Bridge approach slabs have settled up to 2 in. in some cases and have experienced several asphalt concrete overlays over the years to mitigate the settlement. Steel girder bearings have moderate rust and abutments show signs of spalling and exposed reinforcing. Bridges piers have hairline cracking with minor spalling.

CRASH HISTORY

During the five year period between January 1, 2012 and December 31, 2016, I-80 segments within the project limits experienced 123 reported crashes with 0 fatalities, 0 major injuries, 7 minor injuries, 10 possible/unknown injuries, and 106 property damage only incidents.

The segment of I-80 between the US 6/US 169 and Co Rd R16 interchange ramps had 98 crash incidents with 54 crashes were reported as non-collision or single vehicle occurrences. The highest ranking major cause of crashes was collision with animals with 24 incidents, swerving evasive action with 18 incidents, driving too fast with 9 incidents, ran off road – right with 9 incidents, and ran off road – left with 9 incidents. The crash rate for this section of roadway is 70.8 crashes per hundred million vehicle miles traveled, which is greater than the statewide average of 50 crashes per hundred million vehicle miles traveled.

A total of 9 crashes were reported along I-80 from the US 6/US 169 interchange ramps to the mainline. Of these incidents, 7 were reported as non-collision or single vehicle occurrences. The highest ranking major cause of crashes was collision with animals with 5 incidents, and swerving/evasive action with 2 incidents. The crash rate for this section of roadway is 147.6 crashes per hundred million vehicle miles traveled, which is greater than the statewide average of 50 crashes per hundred million vehicle miles traveled.

A total of 16 crashes were reported along I-80 from the Co Rd R16 interchange ramps to the mainline. Of these incidents, 9 were reported as non-collision or single vehicle occurrences. The highest ranking major cause of crashes was collision with animals with 9 incidents. The crash rate for this section of roadway is 201.9 crashes per hundred million vehicle miles traveled, which is greater than the statewide average of 50 crashes per hundred million vehicle miles traveled.

SUMMARY OF ALTERNATIVES

Five alternatives were developed which include replacement of the I-80 bridges over South Raccoon River and North Raccoon River and reconstruction of the Old Portland Road bridge over I-80. The alternatives were developed to identify feasible bridge replacement alternatives which include improvements that will accommodate a future six-lane facility along I-80 generally consistent with the current I-80 PEL study and the Guiding Principles that steered the development of the study:

1. Balance Mobility and Access
2. Design for future needs, considering emerging technologies
3. “Right-Size” Interstate 80
4. Consider environmental and social implications
5. Consider practical transportation modes
6. Build on past efforts
7. Engage stakeholders
8. Develop an implementation plan

1. Alternative 1 (Widen I-80 South to construct new I-80 eastbound and westbound lanes)

Widen I-80 to the south by constructing the new eastbound lanes and South Raccoon River and North Raccoon River bridges on a new alignment while maintaining eastbound traffic on existing lanes during construction. Westbound lanes and bridges will be reconstructed by shifting westbound traffic to existing eastbound lanes and eastbound traffic to the new eastbound lanes. Following construction of westbound lanes and bridges, westbound traffic will be shifted to new westbound lanes and existing eastbound lanes and bridges will be removed. Two lanes of traffic along I-80 will be maintained during construction.

2. Alternative 2 (Widen I-80 North to construct new I-80 westbound and eastbound lanes)

Widen I-80 to the north by constructing the new westbound lanes and South Raccoon River and North Raccoon River bridges on a new alignment while maintaining westbound traffic on existing lanes during construction. Eastbound lanes and bridges would be reconstructed by shifting eastbound traffic to existing westbound lanes and westbound traffic to the new westbound lanes. Following construction of eastbound lanes and bridges, eastbound traffic would be shifted to new eastbound lanes and existing westbound lanes and bridges would be removed. Two lanes of traffic along I-80 will be maintained during construction.

3. Alternative 3 (Widen I-80 South to construct only new I-80 eastbound lanes)

Widen I-80 to the south by constructing the new eastbound lanes 66 ft. wide and South Raccoon River and North Raccoon River bridges 60 ft. wide on a new alignment while maintaining eastbound traffic on existing lanes during construction. Following construction of new eastbound lanes and bridges, eastbound traffic would be shifted to new eastbound lanes and existing eastbound lanes and bridges would be removed. Existing westbound lanes and bridges would be maintained until a later date and be reconstructed as part of another project. The new 66 ft. wide eastbound lanes would provide extra width for a future interim, or staging, condition with both eastbound and westbound traffic placed on the new eastbound lanes when westbound lanes and bridges are taken out of service and reconstructed. Two lanes of traffic along I-80 will be maintained during construction.

4. Alternative 4 (Widen I-80 North to construct only new I-80 westbound lanes)

Widen I-80 to the north by constructing the new westbound lanes 66 ft. wide and South Raccoon River and North Raccoon River bridges 60 ft. wide on a new alignment while maintaining westbound traffic on existing lanes during construction. Following construction of new westbound lanes and bridges, westbound traffic would be shifted to new westbound lanes and existing westbound lanes and bridges would be removed. Existing eastbound lanes and bridges would be maintained until a later date and be reconstructed as part of another project. The new 66 ft. wide westbound lanes would provide extra width for a future interim, or staging, condition with both westbound and eastbound traffic placed on the new westbound lanes when eastbound lanes and bridges are taken out of service and reconstructed. Two lanes of traffic along I-80 would be maintained during construction.

5. Alternative 5 (Widen I-80 on existing centerline to construct new lanes)

Widen I-80 to the south and north by stage constructing the I-80 eastbound and westbound lanes and South Raccoon River and North Raccoon River bridges while maintaining traffic on existing lanes during construction. Inside shoulders would be improved to shift traffic on both I-80 eastbound lanes and westbound lanes while staged construction of new pavement and bridges occurs outside of each set of lanes. Following construction of the outside portion of eastbound and westbound pavements and bridges, traffic would be shifted to remove existing lanes and construct remaining portion of new pavements and bridges. Two lanes of traffic along I-80 would be maintained during construction.

FEASIBLE ALTERNATIVES

Alternatives 1, 2, and 5 were deemed feasible. **Alternative 1** is the preferred alternative to replace bridges at South Raccoon River and North Raccoon River with consideration of future needs, flood mitigation, and environmental and social implications.

Alternative 1 (Widen I-80 South to construct new I-80 eastbound and westbound lanes)

The existing segment of I-80 from US 6/US 169 Interchange in De Soto to Co Rd R16 Interchange is a rural 4-lane divided freeway with 14 ft. (12 ft. effective) outside lanes, 12 ft. inside lanes, 8 ft. (10 ft. effective) outside shoulders, 6 ft. inside shoulders and a 50 ft. median. The proposed roadway typical cross section will consist of two 12 ft. lanes, 12 ft. outside paved shoulders and 6 ft. inside paved shoulders with a 10:1 ledge for 4 ft., 6:1 foreslopes to the clear zone limits, and 3.5:1 foreslopes beyond clear zone limits. The new pavement may consist of 12 in. PCC on 6 in. granular subbase and 12 in. special backfill with the final pavement determination during preliminary design. The proposed roadway typical section will be constructed to accommodate the future six-lane facility on I-80.

The existing horizontal alignment for the westbound lanes will be used for the proposed westbound lanes. The vertical alignment will be constructed to meet current 75 mph design speeds and correct the K value deficiencies for the sag vertical curves within the project limits. The exception is the existing sag curve immediately east of the North Raccoon River bridges. This vertical curve has a K value of 151, which is between the 60 mph value of 136 and the 65 mph value of 157, and is not being reconstructed as part of this concept. Pavement reconstruction for the westbound lanes is approximately 6,000 ft. The eastbound lanes will be constructed on a new alignment, paralleling the new westbound lanes to provide a future 86 ft. wide median to accommodate the future six-lane facility. Length of construction for the eastbound lanes is approximately 11,000 ft.

The existing 408 ft. x 30 ft. eastbound and westbound continuous welded girder bridges over South Raccoon River will be replaced with two 466 ft. x 60 ft. pre-tensioned pre-stressed concrete beam bridges with two 117 ft. interior spans, 116 ft. end spans, and standard BTC or BTD beams. The existing 523 ft. x 30 ft. eastbound and westbound continuous welded girder bridges over North Raccoon River will be replaced with two 10° skewed 568 ft. x 60 ft. pre-tensioned pre-stressed concrete beam bridges with three 117 ft.

interior spans, 116 ft. and 101 ft. end spans, and standard BTC or BTD beams. Final bridge configurations will be determined during preliminary design.

The bridges will meet the Iowa DNR requirements for backwater and freeboard for replacement bridges and road embankments, as well as the desired level of service. Iowa DNR backwater requirements for the Q100 shall be lesser of either the Q100 backwater for the existing bridge and road embankment or 1.0 ft. Iowa DNR freeboard requirements shall be 3.0 ft. or more between the Q50 elevation and the low superstructure horizontal bridge member at the center of the stream. Desired level of service is the edge of shoulder being a minimum of 1.0 ft. above the Q100 elevation, or approximately the Q200 elevation. Construction of I-80 eastbound will meet the desired level of service. Additional construction of I-80 westbound and the Exit 113 entrance ramp to I-80 westbound would be necessary to meet the desired level of service. A “no-rise” to the Q100 elevation for the North Raccoon River will be obtained.

Eastbound bridges will be constructed first along with a majority of the I-80 eastbound roadway grading to maintain existing traffic and keep the Old Portland Road bridge open to the extent practical. Following completion of grading, bridge construction, and potential soil settlement durations, I-80 eastbound paving will be completed.

Ramp construction will take place on the eastbound Exit 113 ramp to Co Rd R16 along with eastbound connections from the existing roadway to new eastbound lanes. The ramp may see closures during construction. During eastbound Exit 113 ramp closures, eastbound traffic will be detoured to Exit 110 US 6/US 169 or Exit 117 Co Rd R22.

Old Portland Road bridge will be closed during I-80 eastbound grading and paving activities and for demolition of the existing structure and construction of the proposed south abutment and pier. During bridge closure the minimum out of distance traveled is 0.3 mi. and the maximum out of distance traveled is 10.9 mi., according to the I-80 Planning Study – Evaluation of Overhead Structure (May 2016). The 10.9 mi. is the longest maximum out of distance traveled along the study limits. Eastbound motorists accessing Old Portland Road south of I-80 will continue to use Exit 110 ramp to US 169 south to 360th Street and then east to Old Portland Road. Westbound motorists will continue to use Exit 113 ramp to Co Rd R16 south to 360th Street and then west to Old Portland Road. Eastbound and westbound motorists accessing Old Portland Road north of I-80 will be directed to use Exit 110 ramps to US 169 north to 323rd Place, then east to Old Portland Road.

Temporary median crossovers will be constructed during proposed I-80 eastbound paving activities to shift westbound traffic from the existing westbound lanes to the existing eastbound lanes. Nighttime lane closures may be required to construct the median crossovers. Once the new eastbound lanes and westbound crossovers are in place, the eastbound traffic will be shifted first, followed by westbound traffic.

With westbound traffic shifted to the existing eastbound lanes, the new westbound bridges can be constructed along with grading and paving of the new westbound lanes. The Old Portland Road bridge north abutment and pier will also be constructed at this time. Once

westbound traffic is shifted to the new westbound lanes, the existing eastbound lanes will be removed and the Old Portland Road bridge center pier, superstructure, and bridge approaches will be constructed. The proposed Old Portland Road bridge over I-80 will include an 8° 13' skewed 331 ft. x 30 ft. pre-tensioned pre-stressed concrete beam bridge with two 117 ft. interior spans, 46 ft. and 51 ft. end spans, and standard BTC beams.

Two lanes of traffic along I-80 will be maintained during construction and additional ROW will be required for this project.

ALTERNATIVE 1 BRIDGE ITEMS

	Amount
I-80 EB SOUTH RACCOON BRIDGE	
Remove Bridge South Raccoon River	\$102,816
New Bridge South Raccoon River	\$3,112,200
Cofferdam	\$75,000
Revetment	\$100,000
Mobilization (10%)	\$339,002
Base Cost	\$3,729,018
Miscellaneous & Contingency (15%)	\$559,353
Inflation (4.5%)	\$394,637
I-80 EB SOUTH RACCOON BRIDGE TOTAL:	\$4,683,008
I-80 EB NORTH RACCOON BRIDGE	
Remove Bridge North Raccoon River	\$131,292
New Bridge North Raccoon River	\$3,789,240
Cofferdam	\$100,000
Revetment	\$100,000
Mobilization (10%)	\$412,053
Base Cost	\$4,532,585
Miscellaneous & Contingency (15%)	\$679,888
Inflation (4.5%)	\$479,678
I-80 EB NORTH RACCOON BRIDGE TOTAL:	\$5,692,151
I-80 WB SOUTH RACCOON BRIDGE	
Remove Bridge South Raccoon River	\$102,816
New Bridge South Raccoon River	\$3,112,200
Cofferdam	\$75,000
Revetment	\$100,000
Mobilization (10%)	\$339,002
Base Cost	\$3,729,018
Miscellaneous & Contingency (15%)	\$559,353
Inflation (4.5%)	\$605,373
I-80 WB SOUTH RACCOON BRIDGE TOTAL:	\$4,893,743

I-80 WB NORTH RACCOON BRIDGE

Remove Bridge North Raccoon River	\$131,292
New Bridge North Raccoon River	\$3,789,240
Cofferdam	\$100,000
Revetment	\$100,000
Mobilization (10%)	\$412,053
Base Cost	\$4,532,585

Miscellaneous & Contingency (15%)	\$679,888
Inflation (4.5%)	\$735,825

I-80 WB NORTH RACCOON BRIDGE TOTAL: \$5,948,298

OLD PORTLAND ROAD BRIDGE

Remove Bridge	\$54,110
New Bridge	\$1,152,900
Mobilization (10%)	\$120,701
Base Cost	\$1,327,711

Miscellaneous & Contingency (15%)	\$199,157
Inflation (4.5%)	\$212,178

OLD PORTLAND ROAD BRIDGE TOTAL: \$1,739,046

ALTERNATIVE 1 BRIDGE TOTAL: \$22,956,245

ALTERNATIVE 1 ROADWAY ITEMS

	Amount
Clear and Grubb	\$212,000
Special Backfill	\$722,960
Embankment Contractor Furnish	\$1,350,000
Excavation Roadway and Borrow	\$268,750
Excavation Waste	\$525,000
Compaction with Moisture Control	\$75,000
Granular Subbase	\$615,225
Polymer Grid Subgrade Stabilizer	\$369,135
PCC Paved Shoulders	\$822,900
Earth Shoulder Construction	\$93,000
Bridge Approaches	\$574,000
PCC Pavement	\$3,250,000
Detour Pavement	\$200,000
Granular Surface	\$43,260
Concrete Roadway Pipe Aprons	\$57,200
Concrete Roadway Pipe Culverts	\$438,750
Longitudinal Subdrains and Outlets	\$217,000
Remove Concrete Roadway Pipes	\$51,625

Remove Steel Beam Guardrail	\$10,350
Remove Cable Guardrail	\$25,000
Remove Pavement	\$510,860
Steel Beam Guardrail	\$42,000
Steel Beam Guardrail Transition Sections	\$32,000
Steel Beam Guardrail Anchors	\$4,000
Steel Beam Guardrail End Terminals	\$40,000
Temporary Barrier Rail	\$160,000
Temporary Crash Cushions	\$3,800
Signing	\$104,418
Lighting	\$106,507
Erosion Control	\$183,028
Traffic Control	\$652,226
Mobilization	\$652,226
Base Cost	\$12,412,220
Miscellaneous & Contingency (30%)	\$3,723,666
Inflation (4.5%)	\$2,129,369
ALTERNATIVE 1 ROADWAY TOTAL:	\$18,265,255
ALTERNATIVE 1 PROJECT TOTAL:	\$41,221,500

Alternative 2 (Widen I-80 North to construct new I-80 westbound and eastbound lanes)

Alternative 2 is similar to Alternative 1 with the exception that widening for the proposed typical roadway cross section would occur north of the current corridor. The westbound lanes would be constructed on a new alignment and the existing horizontal alignment for the eastbound lanes would be used for the proposed eastbound lanes. The vertical alignment would be constructed with a similar approach as Alternative 1. Length of construction limits would be similar to Alternative 1.

Existing bridges at South Raccoon River and North Raccoon River would be replaced with similar structures described in Alternative 1. The project would meet the same Iowa DNR requirements for backwater and freeboard for replacement bridges and road embankments and desired level of service as described in Alternative 1.

The westbound bridges would be constructed first along with a majority of the I-80 westbound roadway grading to maintain existing traffic and keep Old Portland Road bridge open to the extent practical. Following completion of grading, bridge construction, and I-80 westbound paving would be completed.

Ramp construction would also take place on the westbound Exit 113 entrance ramp from Co Rd R16 along with westbound connections from the existing roadway to the new westbound lanes. The westbound Exit 113 entrance ramp may see closures during construction. During the westbound Exit 113 entrance ramp closures, westbound traffic from Co Rd R16 would be detoured to the Exit 110 entrance ramp from US 169.

Old Portland Road bridge would be closed during final I-80 westbound grading and paving activities and for demolition of the existing structure and construction of the proposed north abutment and pier. During Old Portland Road bridge closure, traffic would experience similar detour routes as Alternative 1.

Temporary median crossovers would be constructed during proposed I-80 westbound paving activities to shift eastbound traffic from the existing eastbound lanes to the existing westbound lanes. Nighttime lane closures may be required to construct the median crossovers. Once the new westbound lanes and crossovers are in place, the westbound traffic would be shifted first, followed by eastbound traffic.

With eastbound traffic shifted to the existing westbound lanes, the new eastbound bridges can be constructed along with the new eastbound lanes and a median crossover to shift eastbound traffic to the new eastbound lanes. The Old Portland Road bridge south abutment and pier would also be constructed at this time. Once eastbound traffic is shifted to the new eastbound lanes, the existing westbound lanes would be removed and the Old Portland Road bridge center pier, superstructure, and bridge approaches would be constructed.

Two lanes of traffic along I-80 would be maintained during construction and additional ROW would be required for this project.

Construction costs for Alternative 2 are similar to construction costs anticipated for Alternative 1, although contractor furnished embankment would be far less if existing material excavated is suitable for new embankment.

Alternative 5 (Widen I-80 on existing centerline to construct new lanes)

Alternative 5 would include a similar proposed typical section for the corridor as other alternatives to accommodate the future six-lane facility on I-80 with the exception that widening for the proposed typical roadway cross section would occur along the existing centerline. The vertical alignment would be constructed with a similar approach as Alternative 1 and Alternative 2. Length of construction limits would be similar to Alternative 1 and Alternative 2.

Existing bridges at South Raccoon River and North Raccoon River would be replaced with similar structures described in Alternative 1. The project would meet the same Iowa DNR requirements for backwater and freeboard for replacement bridges and road embankments and desired level of service as described in Alternative 1.

Demolition of the existing Old Portland Road bridge would occur first to allow construction of the new north and south abutments and piers and mainline widening. The outside portion of the eastbound and westbound bridges and roadways would be constructed first along the mainline to allow two lanes of travel in each direction in the subsequent stage. Traffic would be shifted out to the newly constructed outside portions of bridges and roadways to allow completion of construction through the middle portion of the project corridor, including the Old Portland Road bridge center pier, superstructure, and bridge approaches.

Alternative 5 would experience similar detours, nighttime construction, and ramp closures as other alternatives, although construction of Alternative 5 is considered to be more challenging due staged construction of bridges and additional staging for roadways.

Two lanes of traffic along I-80 would be maintained during construction and additional ROW would be required for this project.

Construction costs for Alternative 5 are similar to construction costs anticipated for Alternative 1 and Alternative 2, although the more challenging construction staging of Alternative 5 could influence increased construction costs.

SPECIAL CONSIDERATIONS

Determination of the preferred alternative was largely influenced by many of the special considerations along the corridor.

Early environmental screening activities were conducted to identify environmental resources. The windshield survey and desktop research resulted in an inventory of resources and potential impacts within the corridor. Limits of screening activities were approximately 11 miles and extended beyond the project and NEPA evaluation limits to adjacent west and east interchanges near MP 106.50 and MP 117.16.

Iowa DNR maintains the 52-acre Two Rivers Access wildlife management area (WMA) in the area of the confluence of South Raccoon River and North Raccoon River. The WMA boundary includes areas both north and south of I-80. Impacts would likely result from bridge replacements at the rivers and the widening of I-80. It is possible the WMA could be a Section 4(f) property and require the development of a Section 4(f) document.

U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) mapping along the entire corridor indicates relatively small wetland areas associated with the Raccoon River tributaries. The largest wetland areas are located at the crossings of South Raccoon River and North Raccoon River.

There are approximately twelve (12) stream crossings within the limits of the screening activities. The two largest crossings are the I-80 bridges over South Raccoon River and North Raccoon River within the current project limits. The remaining crossings are unnamed tributaries within the Raccoon River watershed. There is also a large surface water impoundment in the northwest quadrant of the I-80 and Co Rd R16 interchange.

Floodplains are associated with the two primary stream crossings. Area along South Raccoon River is identified as Special Flood Hazard Area (SFHA) Zone A floodplain. Area along North Raccoon River is identified as a SFHA Zone AE floodplain with a regulatory floodway. The floodplains and floodway are located on both the north and south side of I-80 making avoidance impossible. Preliminary Q100 FIS peak discharges for the project locations are 35,300 cfs and 24,000 cfs for North Raccoon River and South Raccoon River, respectively. Gage analysis shows the Q100 peak discharges estimated to be approximately

34,600 cfs and 43,350 cfs for the North Raccoon River and South Raccoon River, respectively. The angle at which South Raccoon River enters North Raccoon River may currently be increasing flood elevations upstream of the North Raccoon River bridges.

The Iowa Veterans Cemetery is located in the southeast quadrant of the I-80 and Co Rd R16 interchange. This cemetery is the first state-owned and operated veteran's cemetery in the state and serves the Iowa veteran population.

Additional ROW will be required for this project.

FUNDS PROGRAMMED

This proposed project is shown in the 2018-2022 Iowa Transportation Improvement Program with total funds listed at \$36,025,000 throughout FY 2019 to FY 2022.

	FY 2019	FY 2020	FY 2021	FY 2022
Bridge Replacement		\$10,621,000		\$12,782,000
Grade and Pave				\$11,412,000
Lighting				\$160,000
Right-of-Way	\$50,000			
Traffic Signs				\$1,000,000

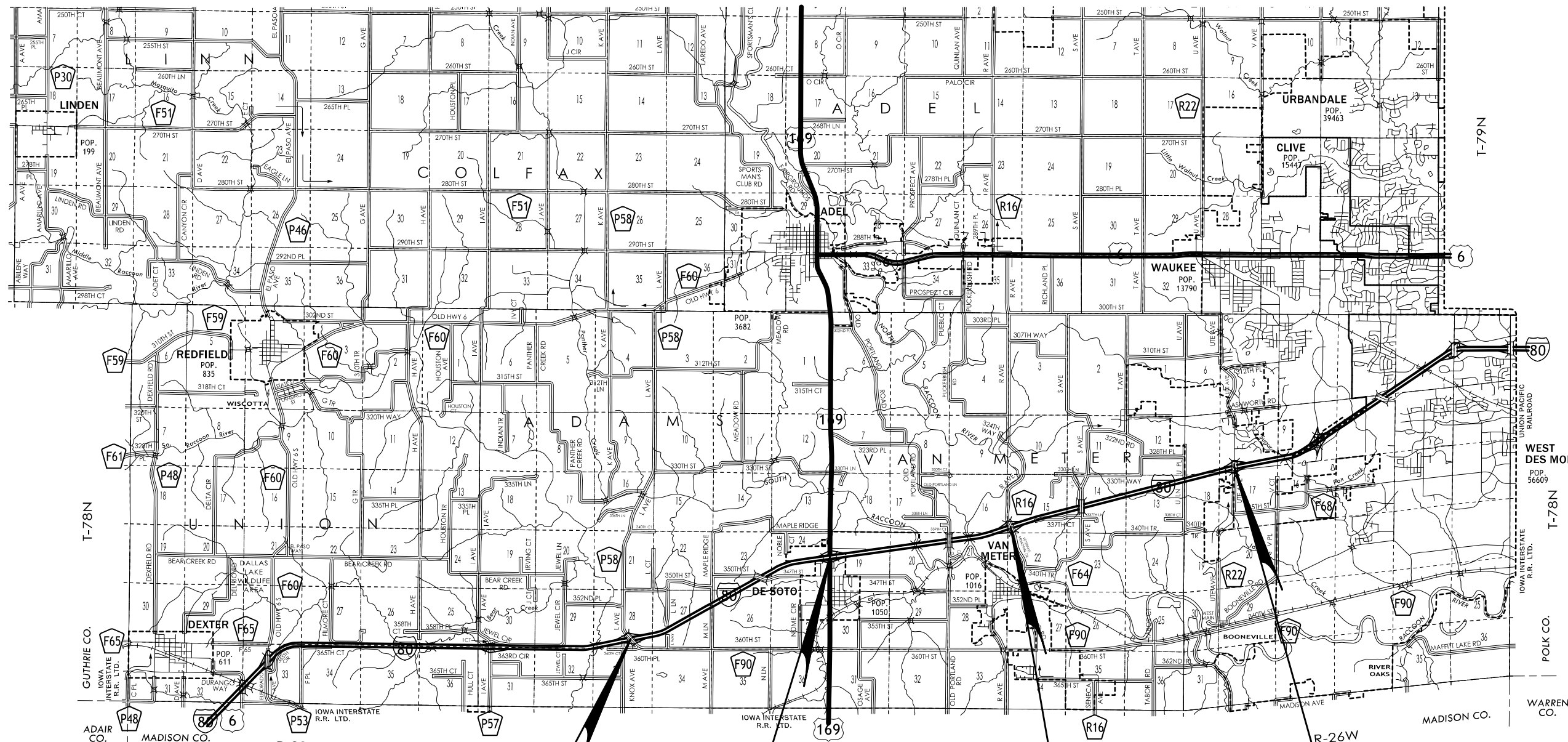
RECOMMENDATION

Alternative 1 is the preferred alternative to replace bridges at South Raccoon River and North Raccoon River with consideration of future needs, flood mitigation, and environmental and social implications.

Concept Review participants recommend a modification to the distribution of funds to program necessary FY 2020 funds for I-80 eastbound grading activities and construction of I-80 eastbound bridges at South Raccoon River and North Raccoon River. This recommendation also includes programming the necessary FY 2021 funds for I-80 eastbound paving activities and FY 2022 funds for I-80 westbound grading and paving; construction of westbound bridges at South Raccoon River and North Raccoon River; and reconstruction of the Old Portland Road bridge over I-80.

A schedule of events for plan development will be determined following approval of the Project Concept.

HRG
Attachments

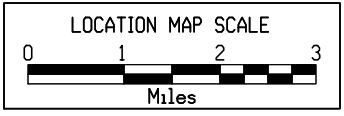
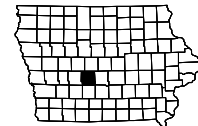


STA 453+50.00
 BEGIN ENVIRONMENTAL SCREENING
 MP 106.50

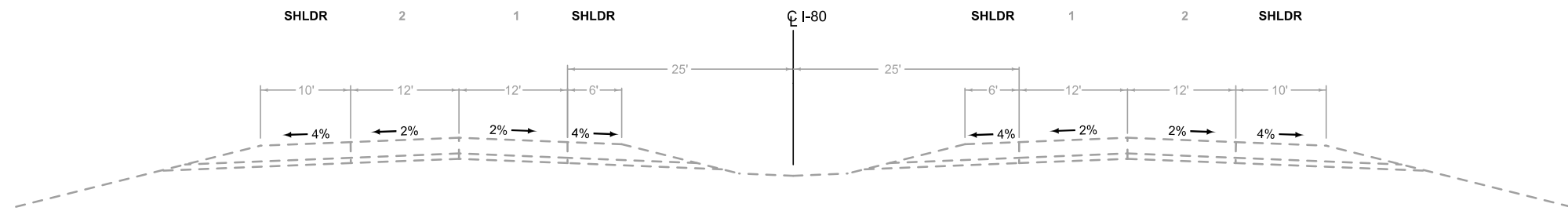
STA 643+50.00
 BEGIN PROJECT
 BEGIN NEPA EVALUATION
 MP 110.10

STA 812+50.00
 END PROJECT
 END NEPA EVALUATION
 MP 113.30

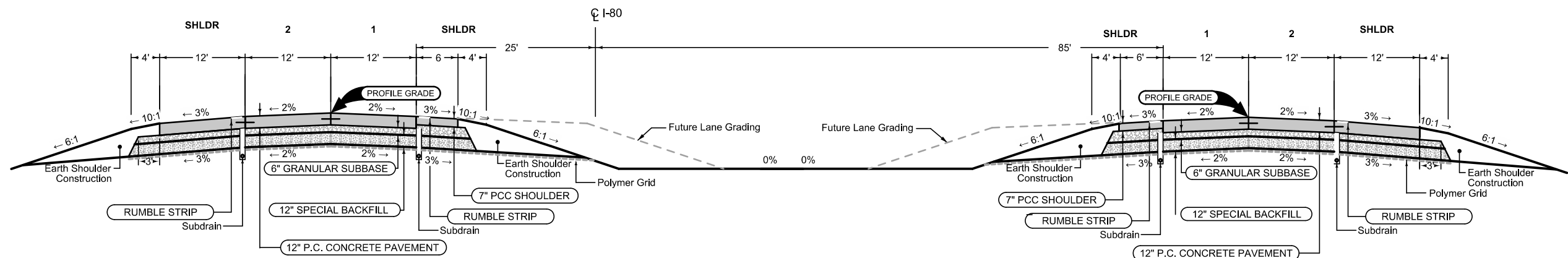
STA 1016+50.00
 END ENVIRONMENTAL SCREENING
 MP 117.16



DALLAS COUNTY



I-80 EXISTING TYPICAL SECTION

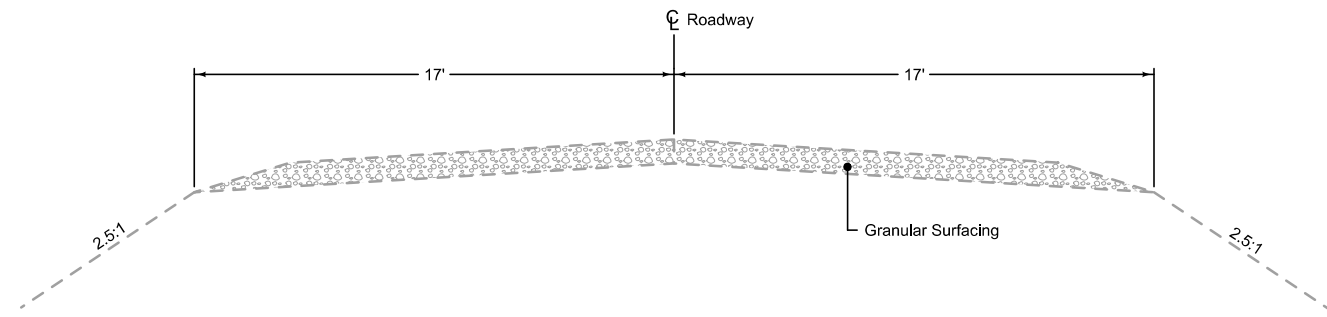


I-80 PROPOSED TYPICAL SECTION

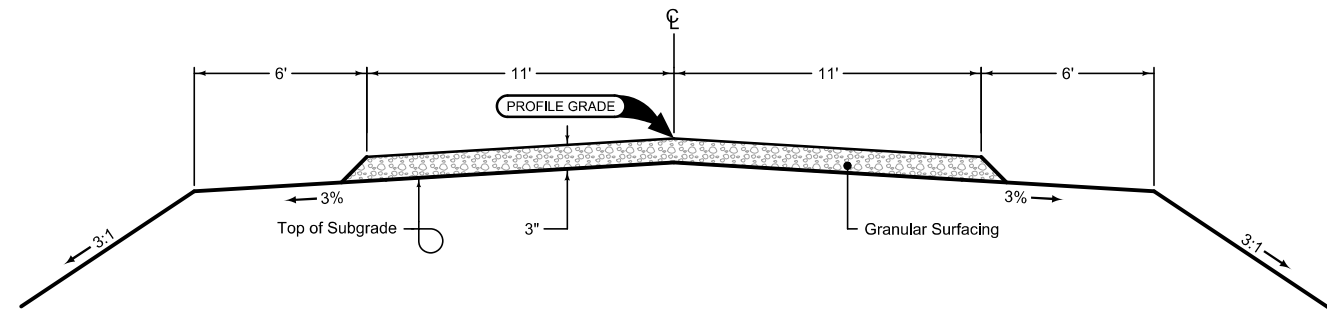


I-80 PROPOSED TYPICAL BRIDGE SECTION

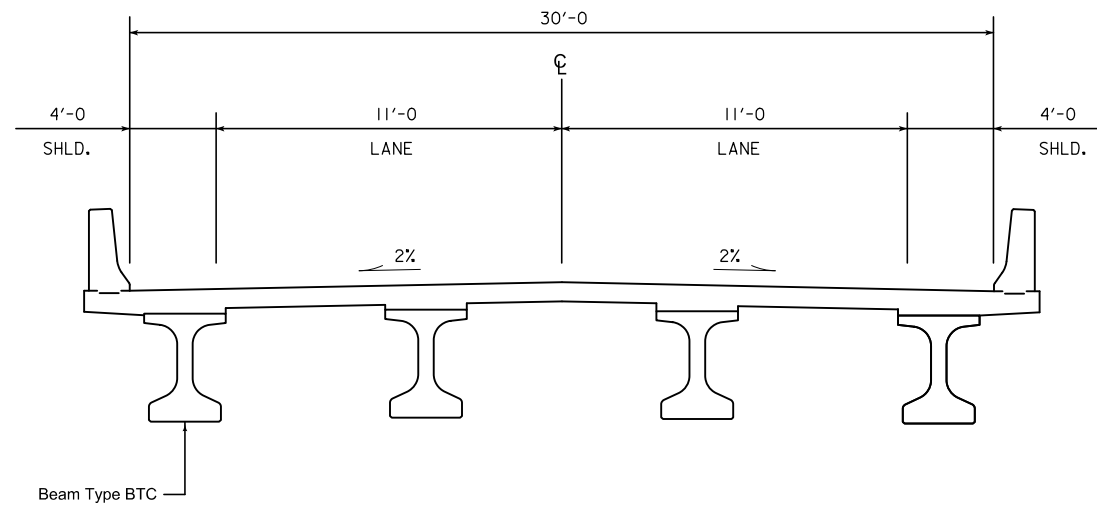
ALTERNATIVE 1



OLD PORTLAND ROAD EXISTING TYPICAL SECTION

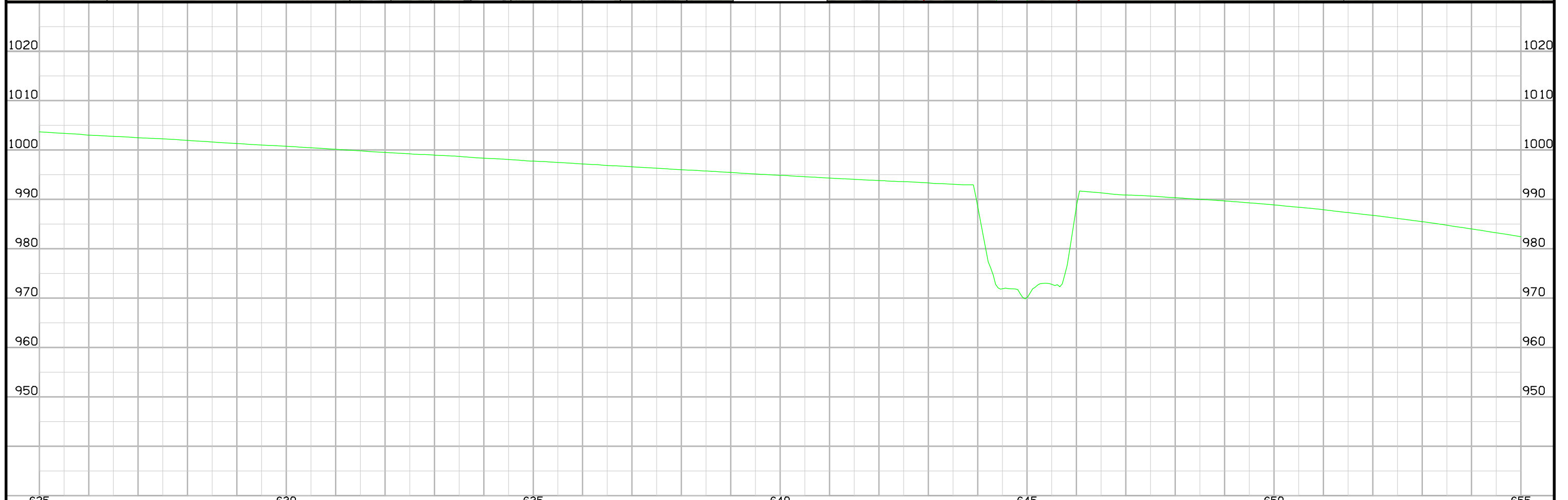
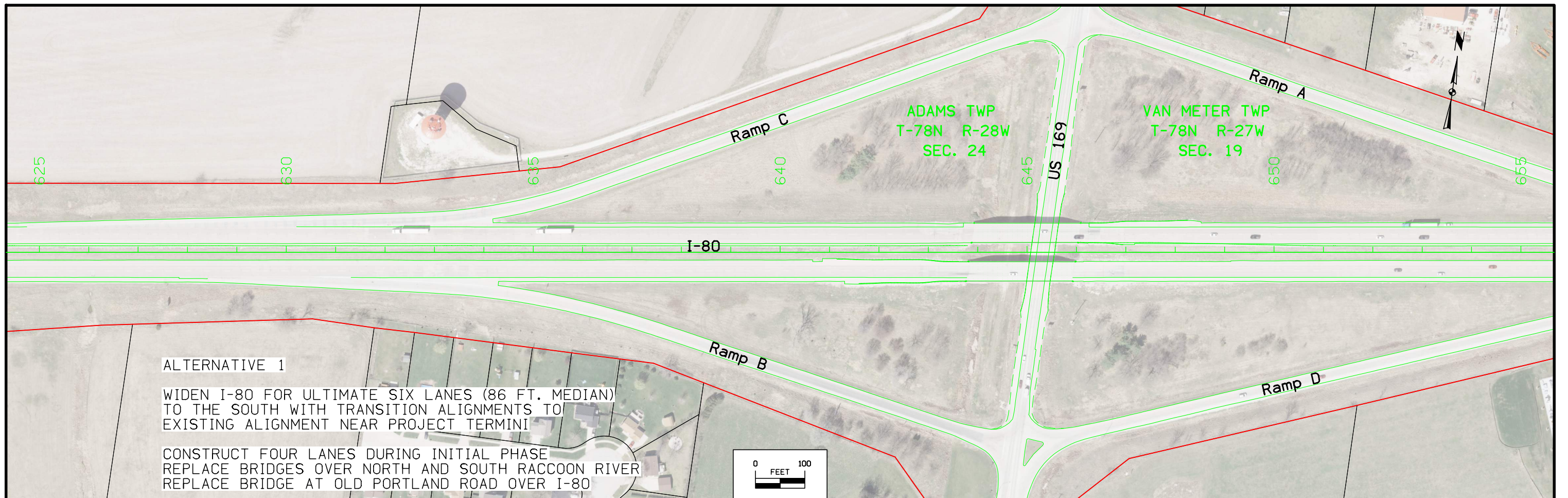


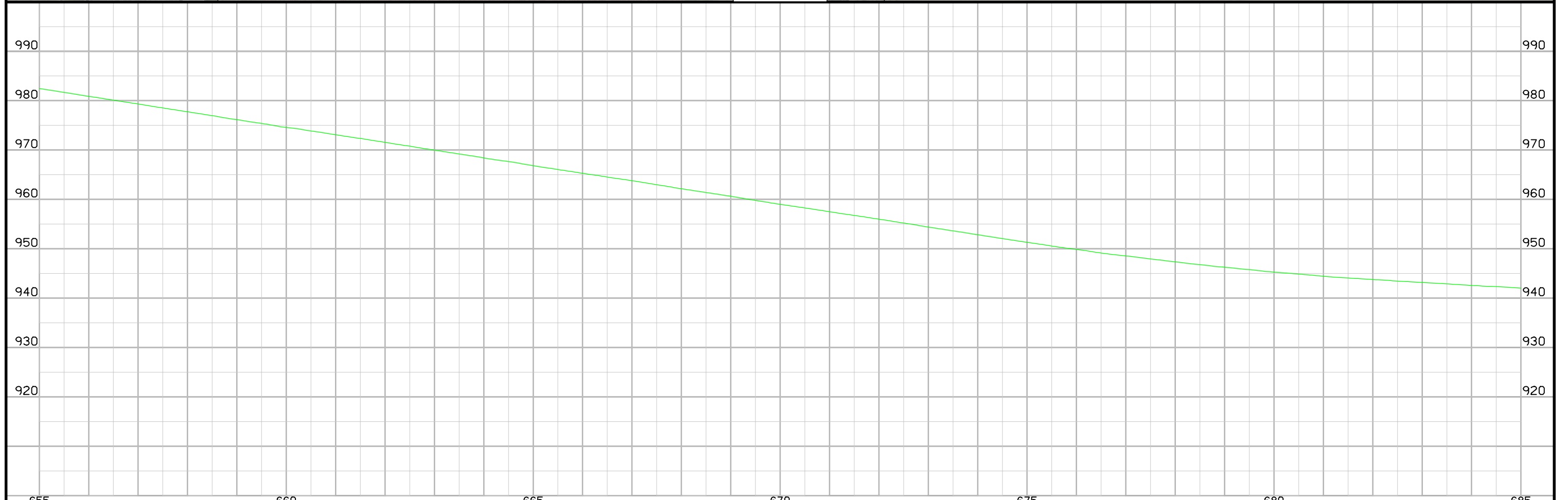
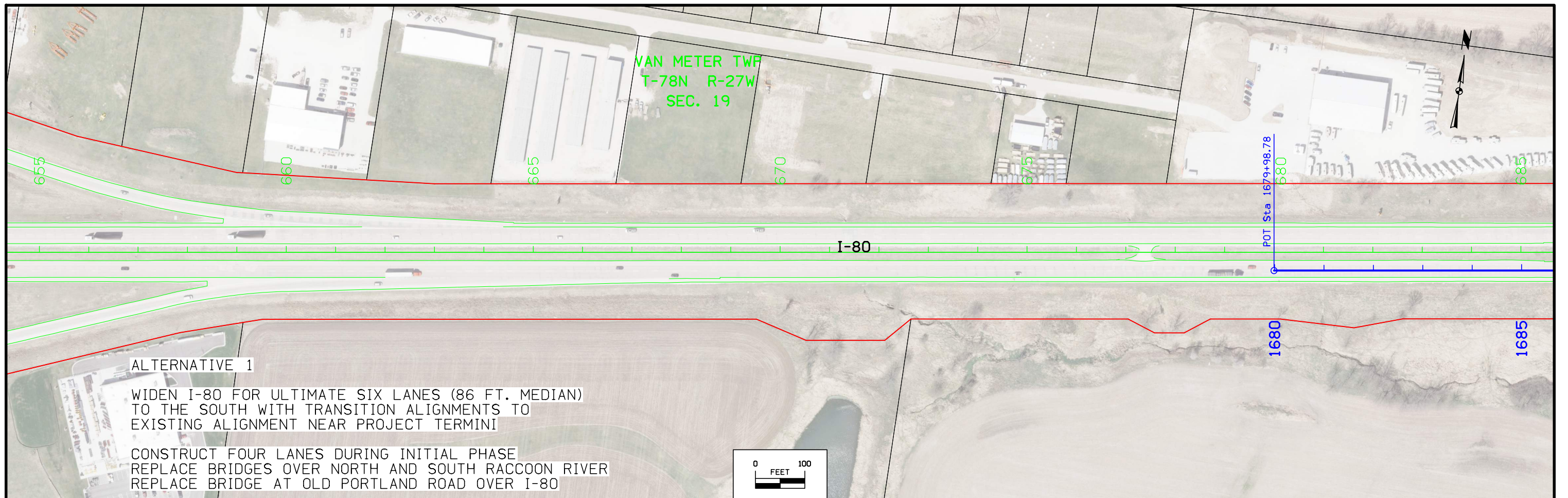
OLD PORTLAND ROAD PROPOSED TYPICAL SECTION

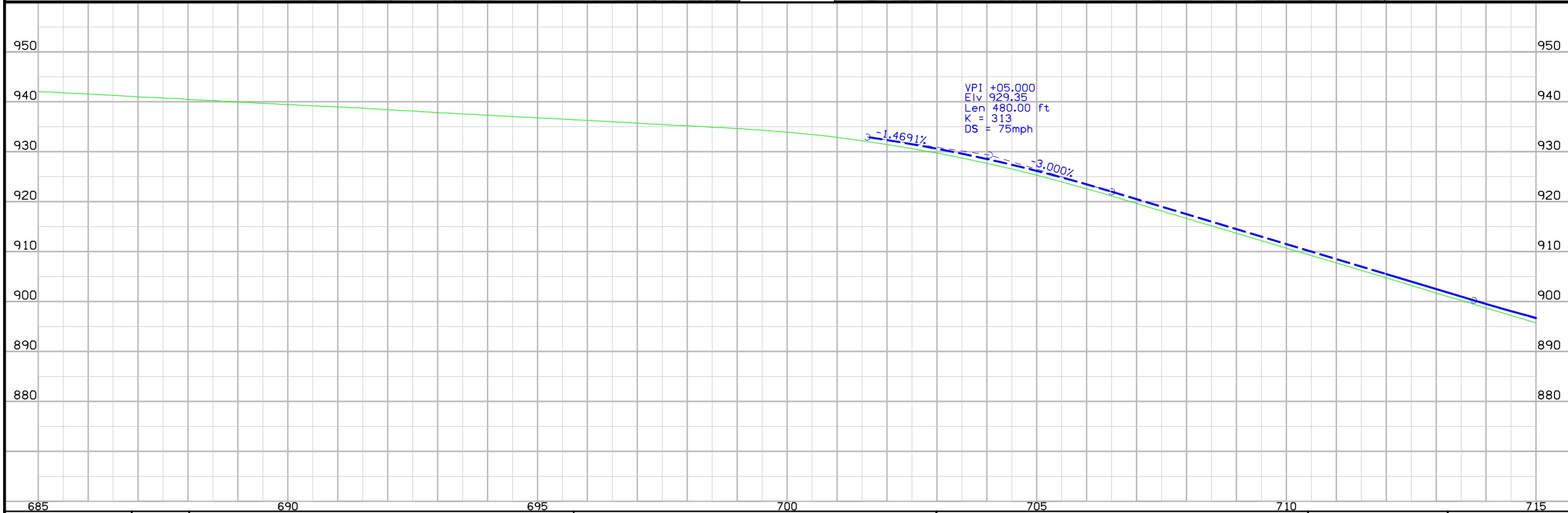
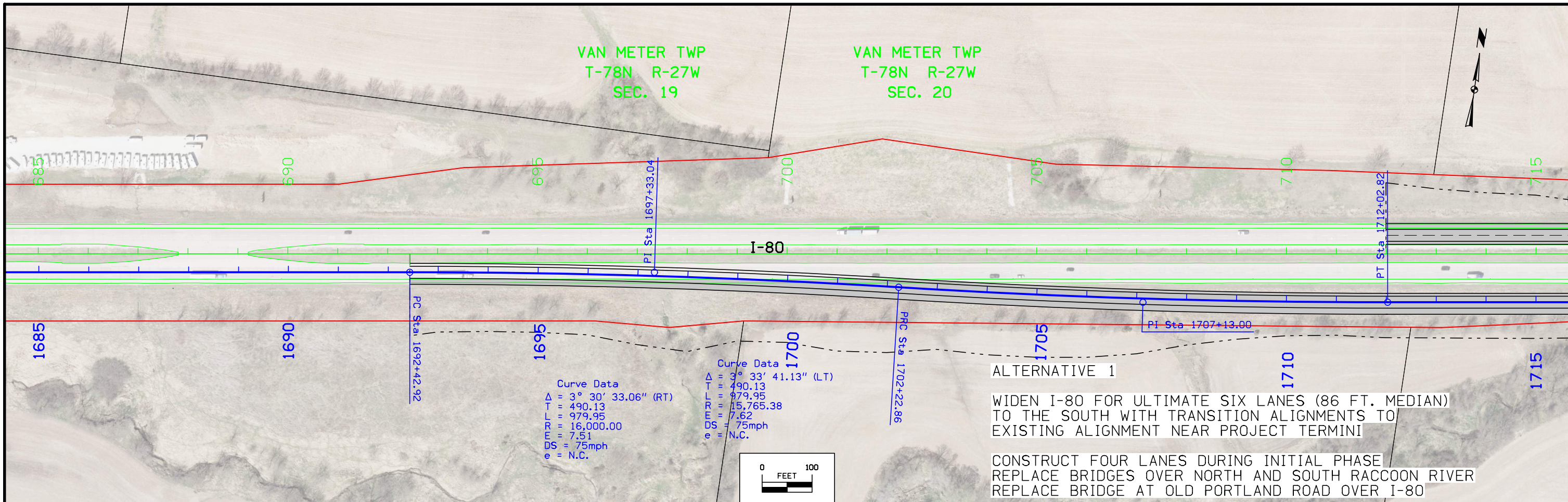


OLD PORTLAND ROAD TYPICAL BRIDGE SECTION

ALTERNATIVE 1





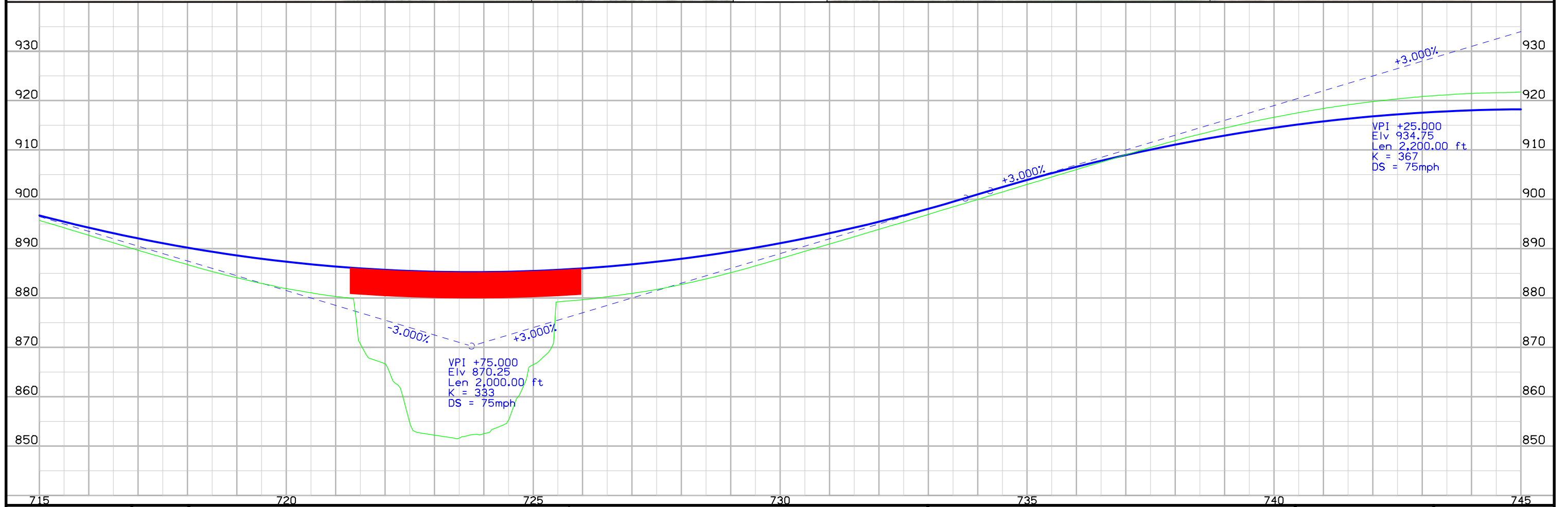
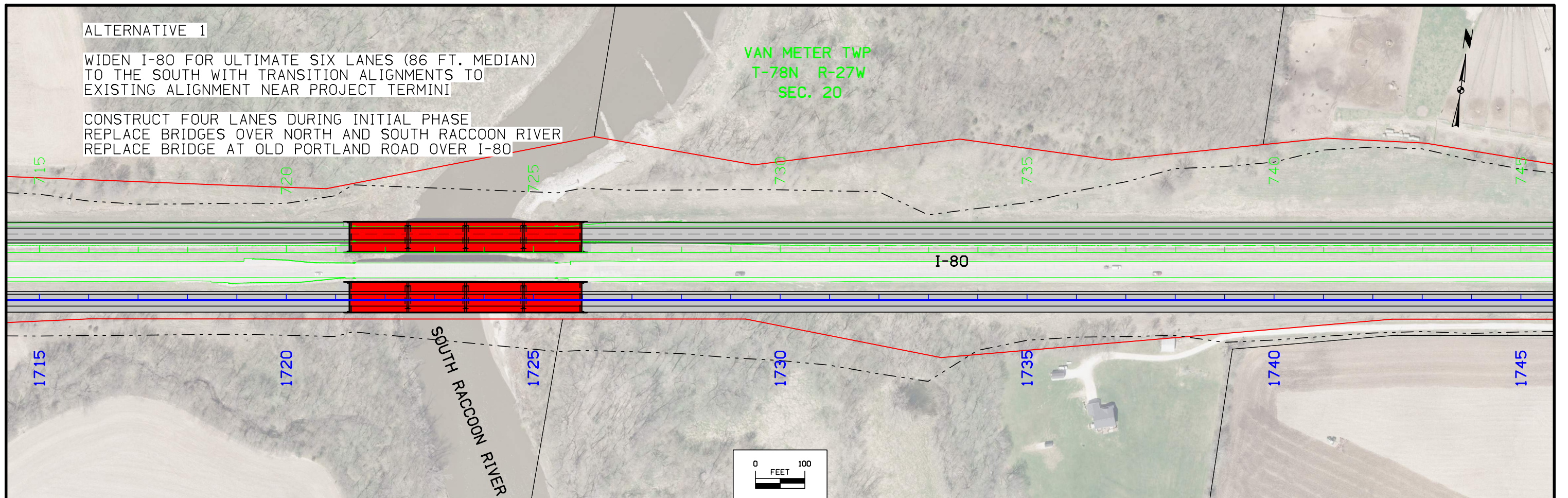


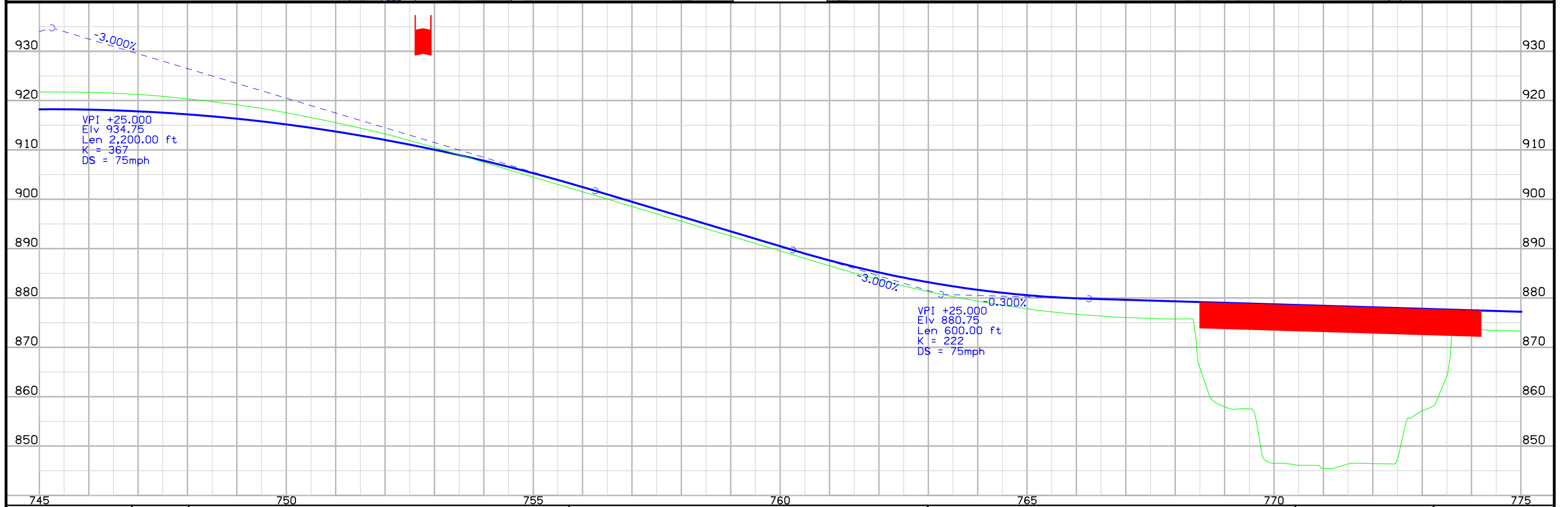
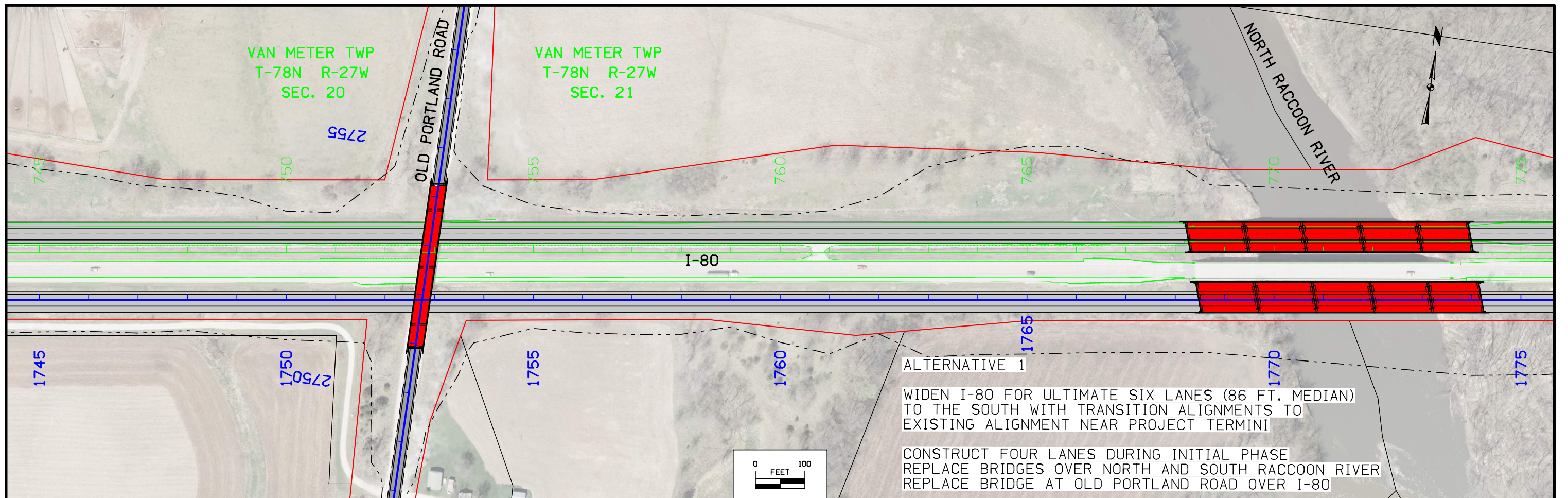
ALTERNATIVE 1

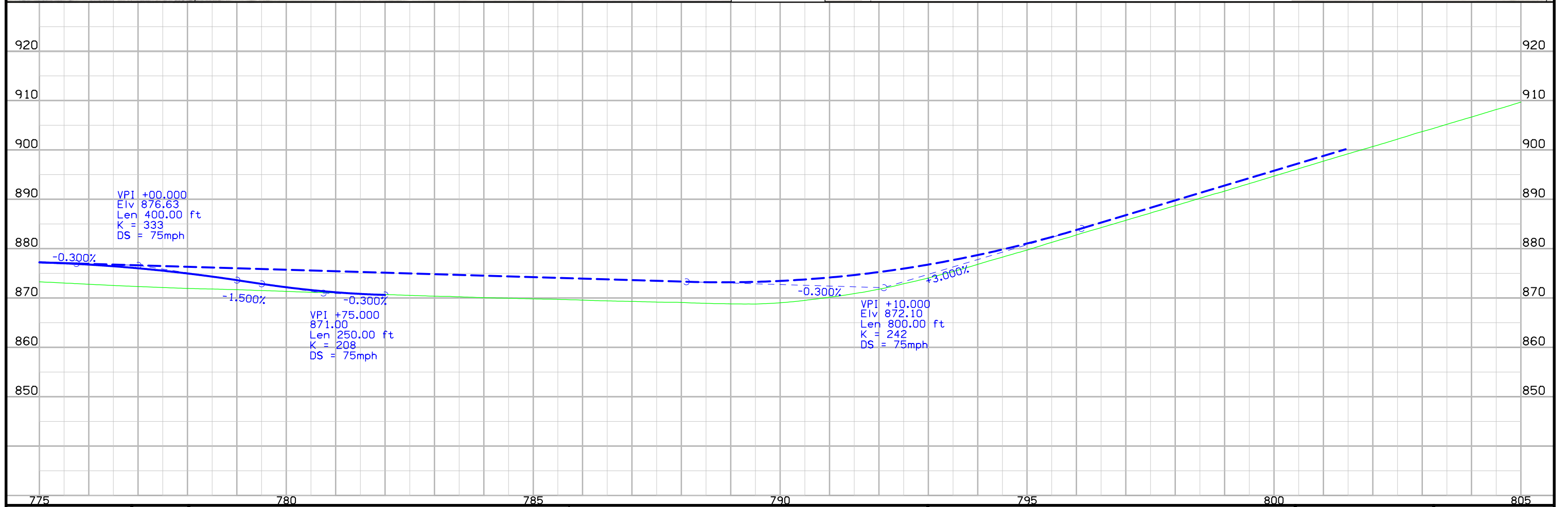
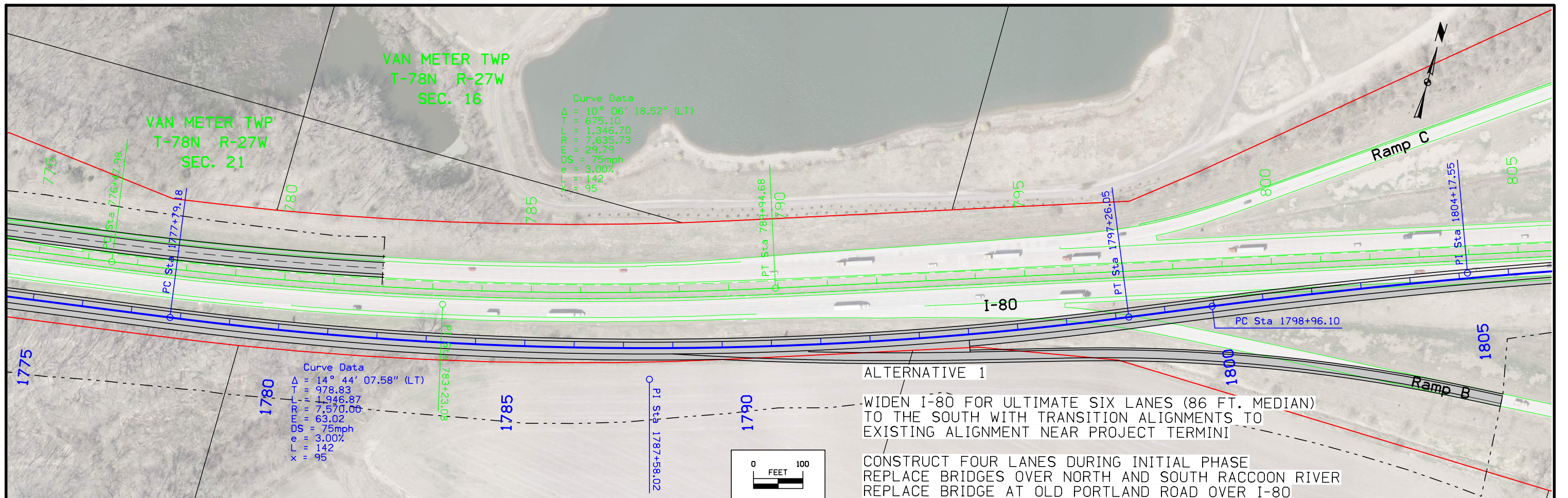
WIDEN I-80 FOR ULTIMATE SIX LANES (86 FT. MEDIAN)
TO THE SOUTH WITH TRANSITION ALIGNMENTS TO
EXISTING ALIGNMENT NEAR PROJECT TERMINI

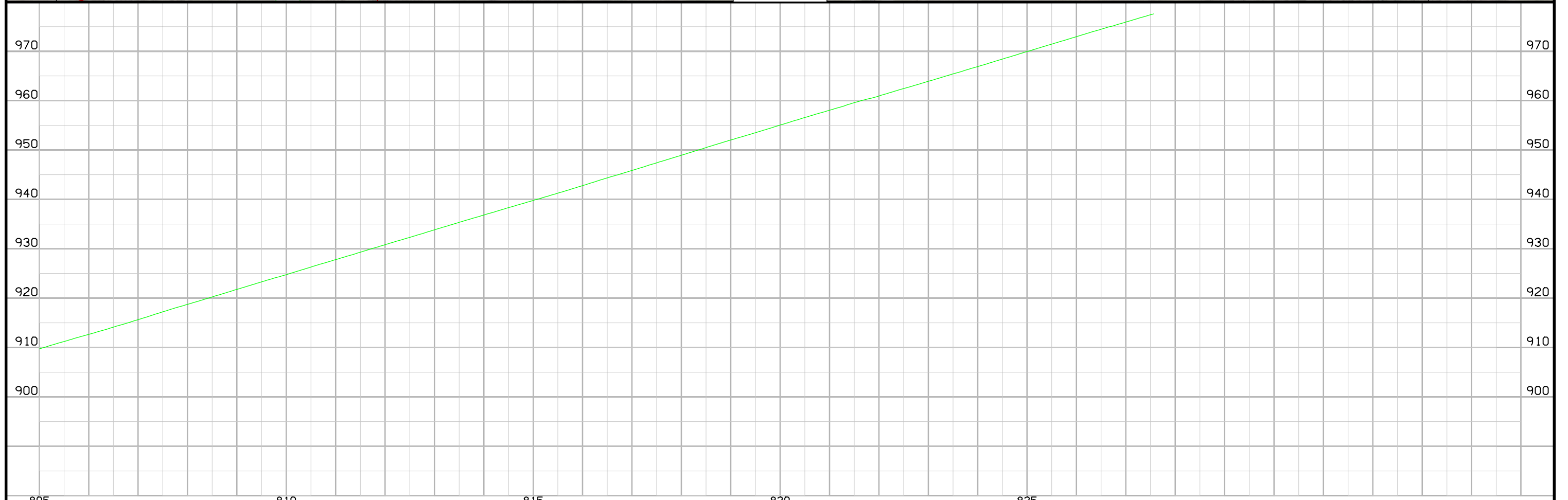
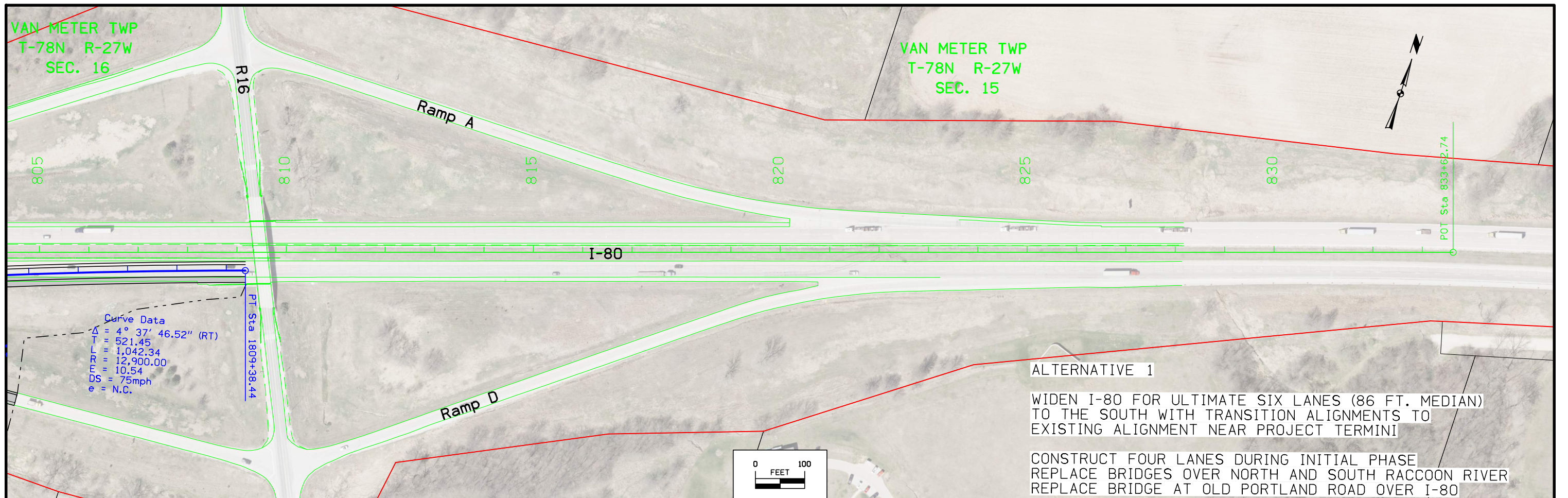
CONSTRUCT FOUR LANES DURING INITIAL PHASE
REPLACE BRIDGES OVER NORTH AND SOUTH RACCOON RIVER
REPLACE BRIDGE AT OLD PORTLAND ROAD OVER I-80

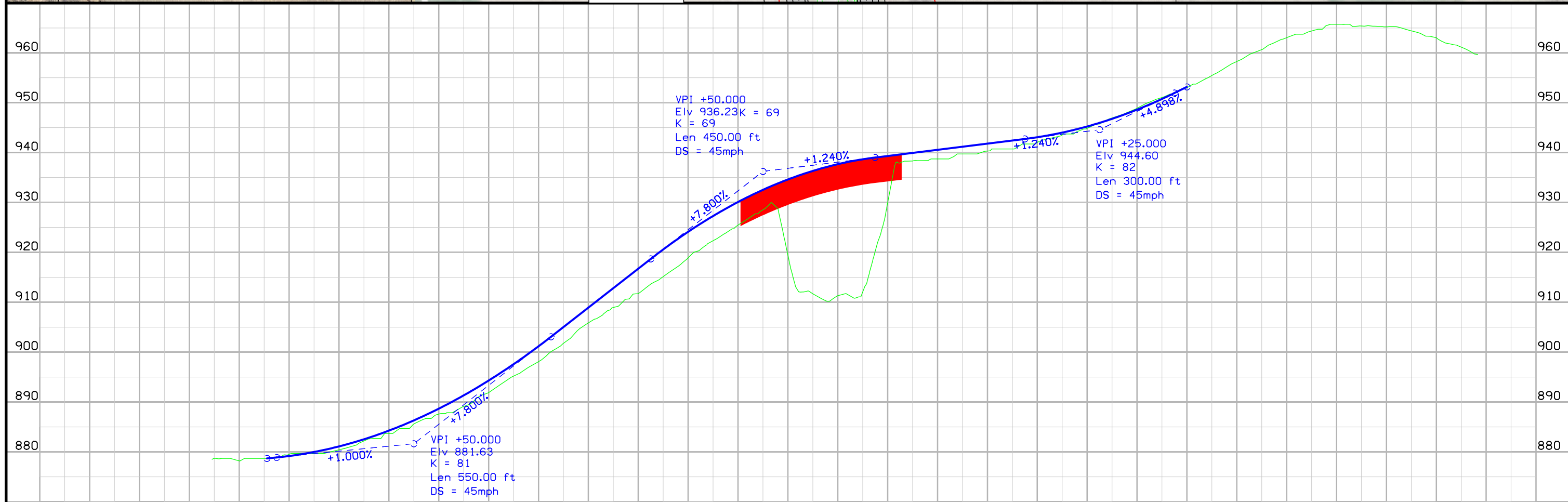
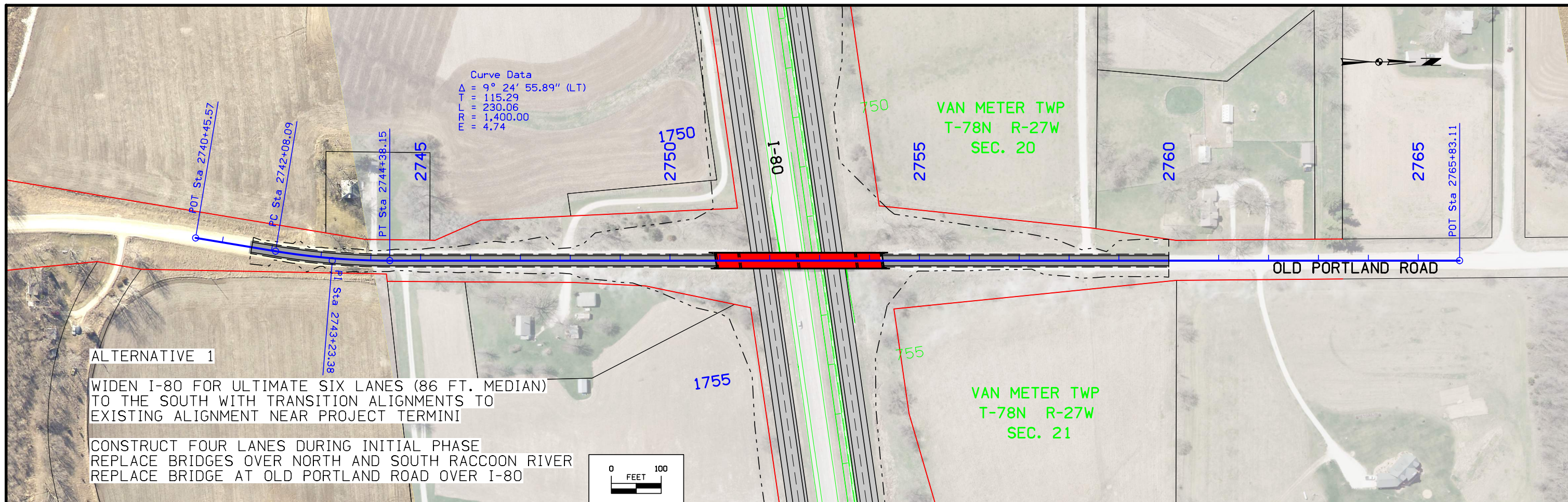
VAN METER TWP
T-78N R-27W
SEC. 20

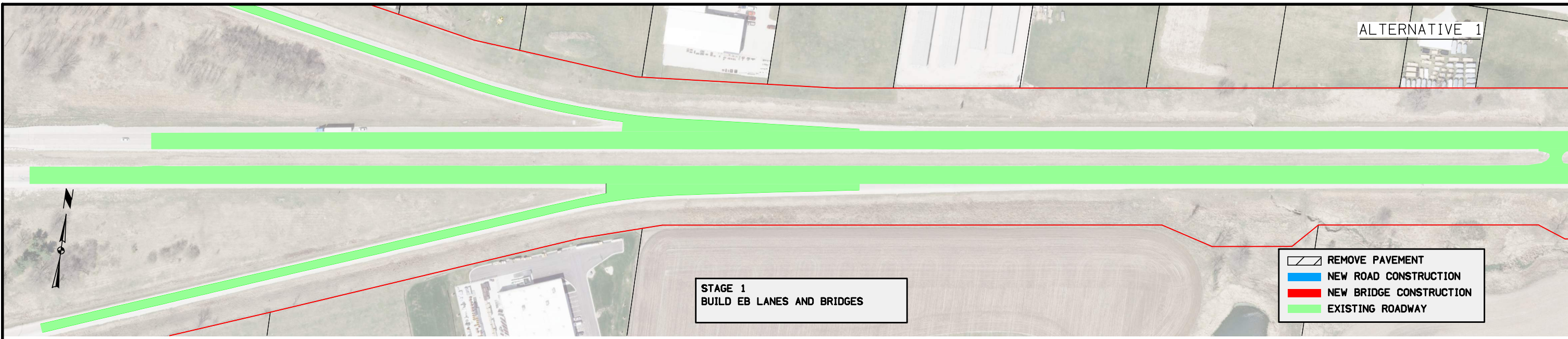







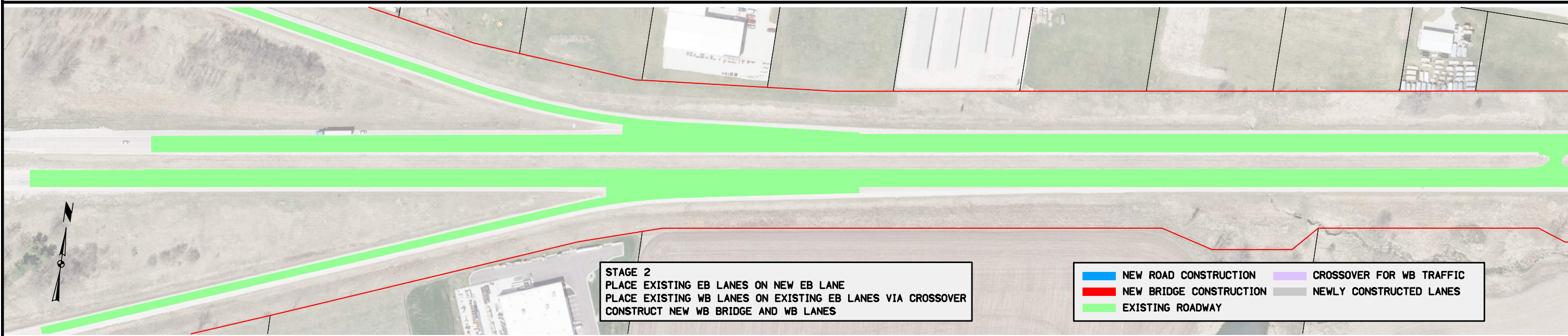











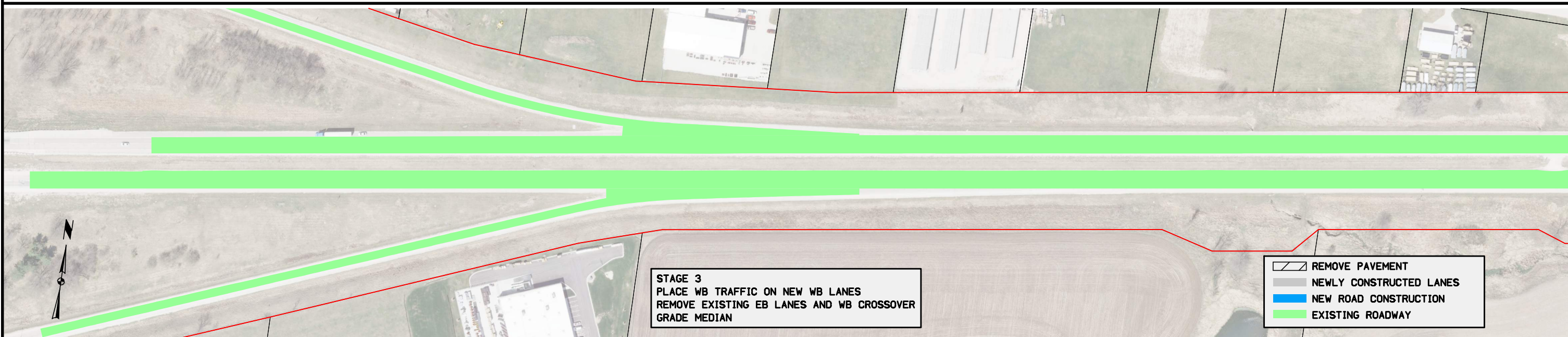
STAGE 1
BUILD EB LANES AND BRIDGES

-  REMOVE PAVEMENT
-  NEW ROAD CONSTRUCTION
-  NEW BRIDGE CONSTRUCTION
-  EXISTING ROADWAY



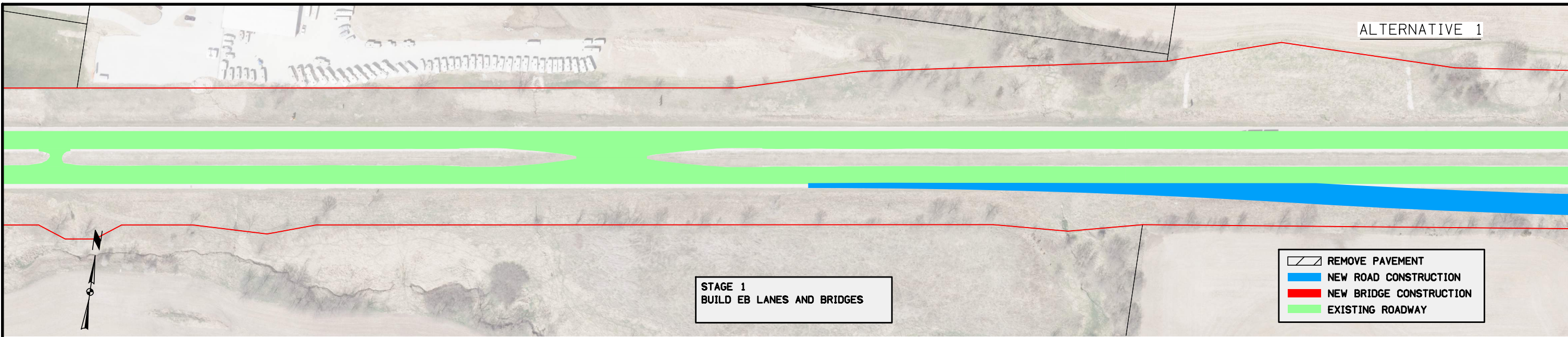
STAGE 2
 PLACE EXISTING EB LANES ON NEW EB LANE
 PLACE EXISTING WB LANES ON EXISTING EB LANES VIA CROSSOVER
 CONSTRUCT NEW WB BRIDGE AND WB LANES

-  NEW ROAD CONSTRUCTION
-  NEW BRIDGE CONSTRUCTION
-  EXISTING ROADWAY
-  CROSSOVER FOR WB TRAFFIC
-  NEWLY CONSTRUCTED LANES



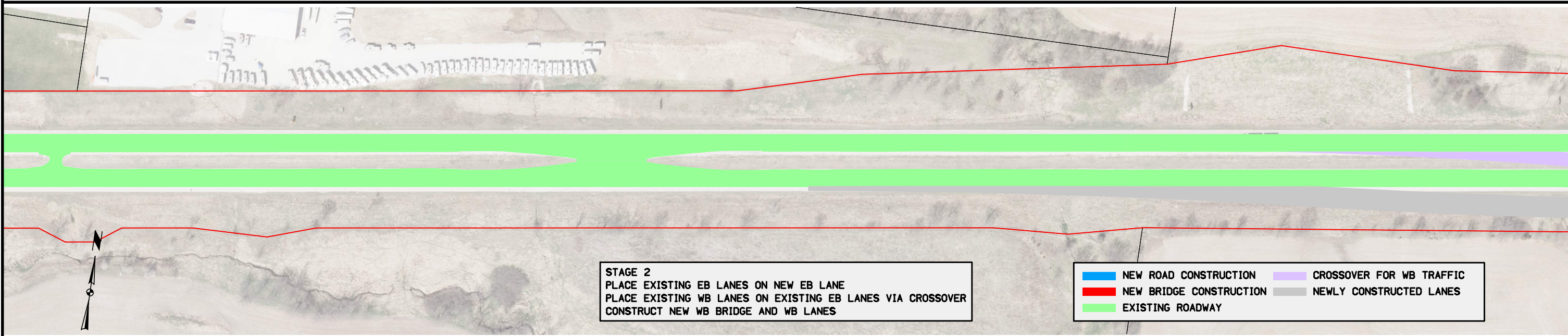
STAGE 3
 PLACE WB TRAFFIC ON NEW WB LANES
 REMOVE EXISTING EB LANES AND WB CROSSOVER
 GRADE MEDIAN

-  REMOVE PAVEMENT
-  NEWLY CONSTRUCTED LANES
-  NEW ROAD CONSTRUCTION
-  EXISTING ROADWAY



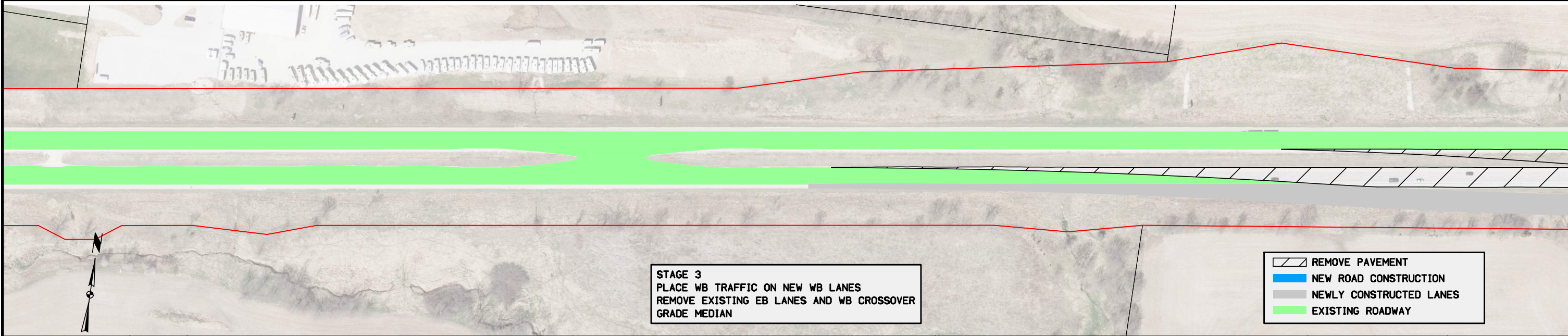
STAGE 1
 BUILD EB LANES AND BRIDGES

- REMOVE PAVEMENT
- NEW ROAD CONSTRUCTION
- NEW BRIDGE CONSTRUCTION
- EXISTING ROADWAY



STAGE 2
 PLACE EXISTING EB LANES ON NEW EB LANE
 PLACE EXISTING WB LANES ON EXISTING EB LANES VIA CROSSOVER
 CONSTRUCT NEW WB BRIDGE AND WB LANES

- NEW ROAD CONSTRUCTION
- NEW BRIDGE CONSTRUCTION
- EXISTING ROADWAY
- CROSSOVER FOR WB TRAFFIC
- NEWLY CONSTRUCTED LANES



STAGE 3
 PLACE WB TRAFFIC ON NEW WB LANES
 REMOVE EXISTING EB LANES AND WB CROSSOVER
 GRADE MEDIAN

- REMOVE PAVEMENT
- NEW ROAD CONSTRUCTION
- NEWLY CONSTRUCTED LANES
- EXISTING ROADWAY



SOUTH RACCOON RIVER

STAGE 1
BUILD EB LANES AND BRIDGES

	REMOVE PAVEMENT
	NEW ROAD CONSTRUCTION
	NEW BRIDGE CONSTRUCTION
	EXISTING ROADWAY



SOUTH RACCOON RIVER

STAGE 2
PLACE EXISTING EB LANES ON NEW EB LANE
PLACE EXISTING WB LANES ON EXISTING EB LANES VIA CROSSOVER
CONSTRUCT NEW WB BRIDGE AND WB LANES

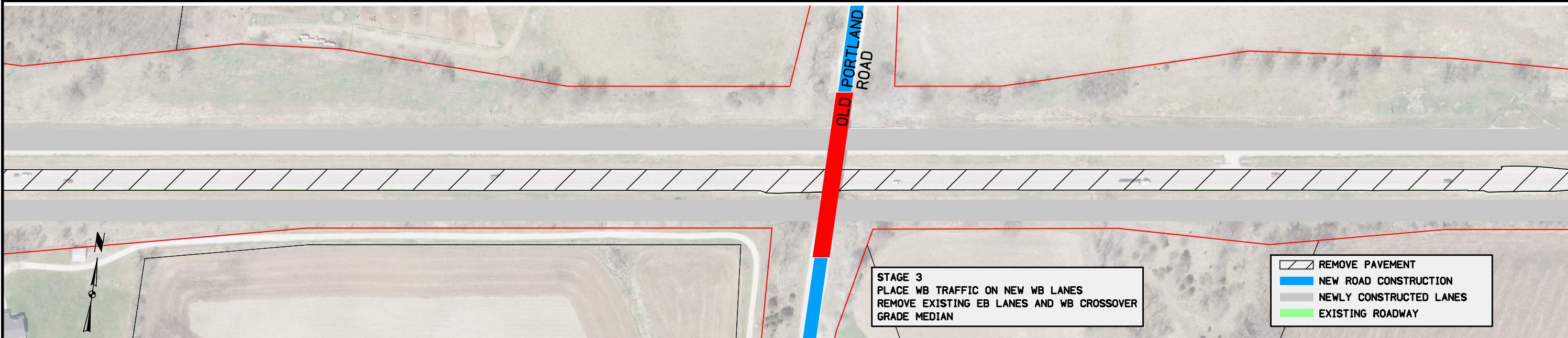
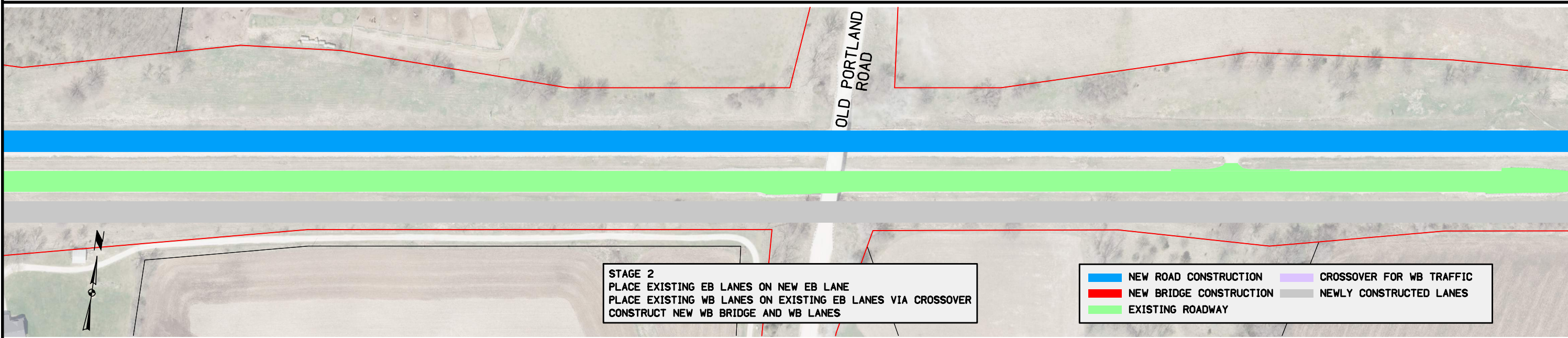
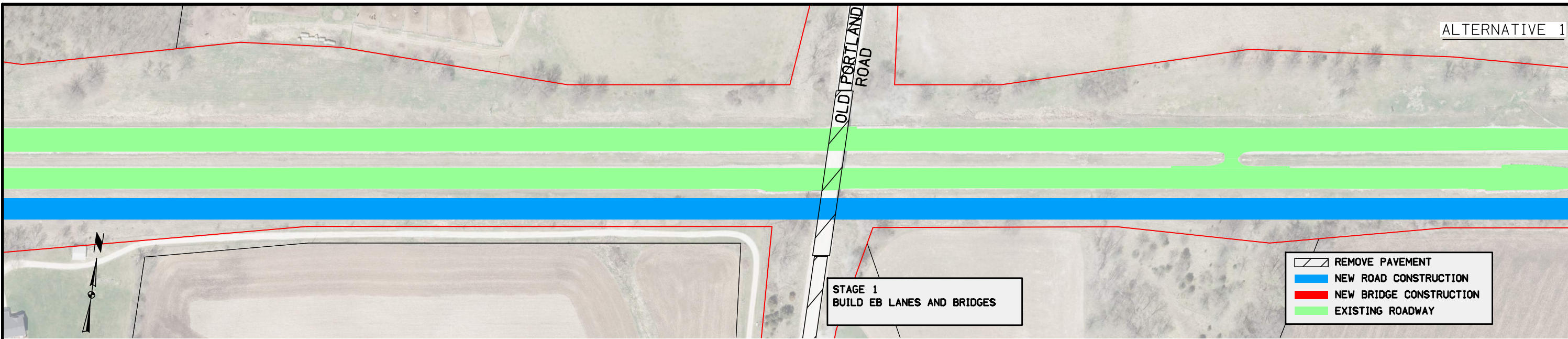
	NEW ROAD CONSTRUCTION		CROSSOVER FOR WB TRAFFIC
	NEW BRIDGE CONSTRUCTION		NEWLY CONSTRUCTED LANES
	EXISTING ROADWAY		

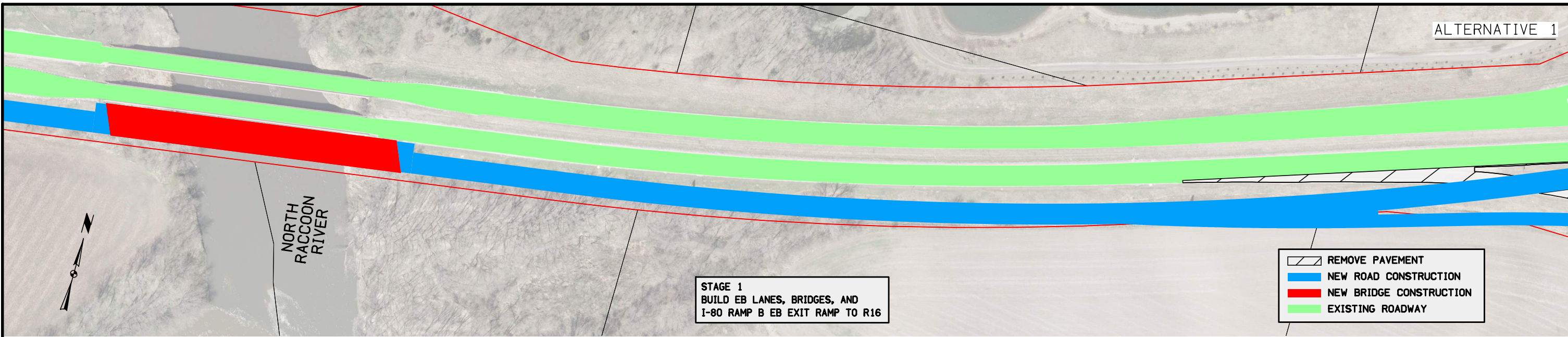


SOUTH RACCOON RIVER

STAGE 3
PLACE WB TRAFFIC ON NEW WB LANES
REMOVE EXISTING EB LANES AND WB CROSSOVER
GRADE MEDIAN

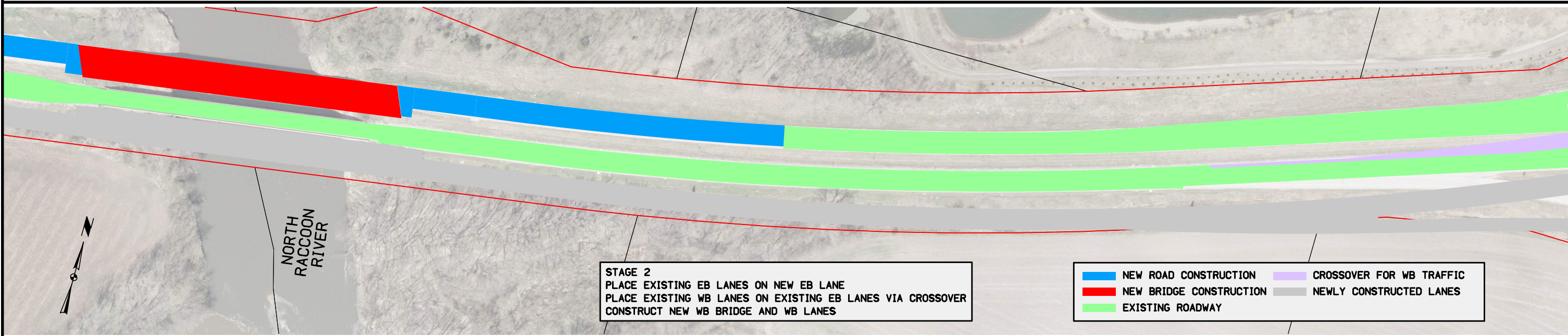
	REMOVE PAVEMENT
	NEW ROAD CONSTRUCTION
	NEWLY CONSTRUCTED LANES
	EXISTING ROADWAY





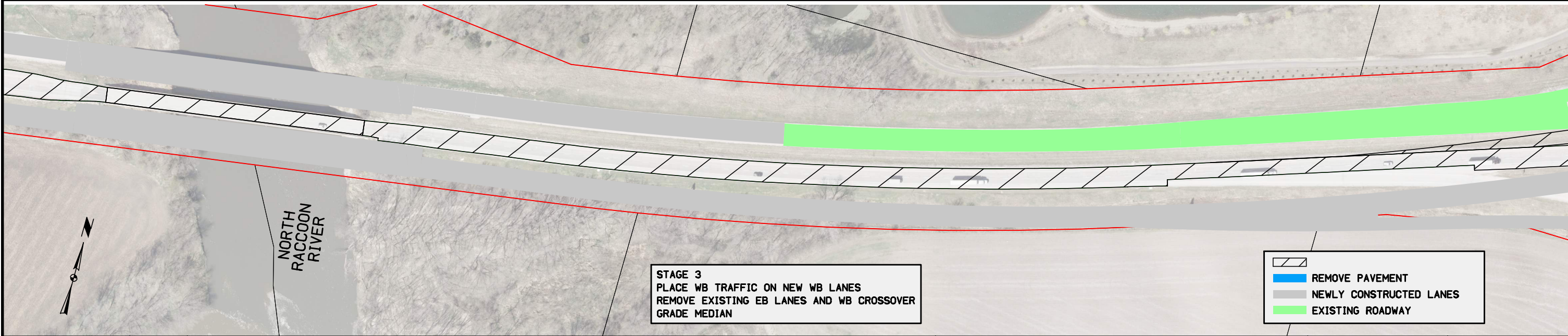
STAGE 1
 BUILD EB LANES, BRIDGES, AND
 I-80 RAMP B EB EXIT RAMP TO R16

- REMOVE PAVEMENT
- NEW ROAD CONSTRUCTION
- NEW BRIDGE CONSTRUCTION
- EXISTING ROADWAY



STAGE 2
 PLACE EXISTING EB LANES ON NEW EB LANE
 PLACE EXISTING WB LANES ON EXISTING EB LANES VIA CROSSOVER
 CONSTRUCT NEW WB BRIDGE AND WB LANES

- NEW ROAD CONSTRUCTION
- NEW BRIDGE CONSTRUCTION
- EXISTING ROADWAY
- CROSSOVER FOR WB TRAFFIC
- NEWLY CONSTRUCTED LANES



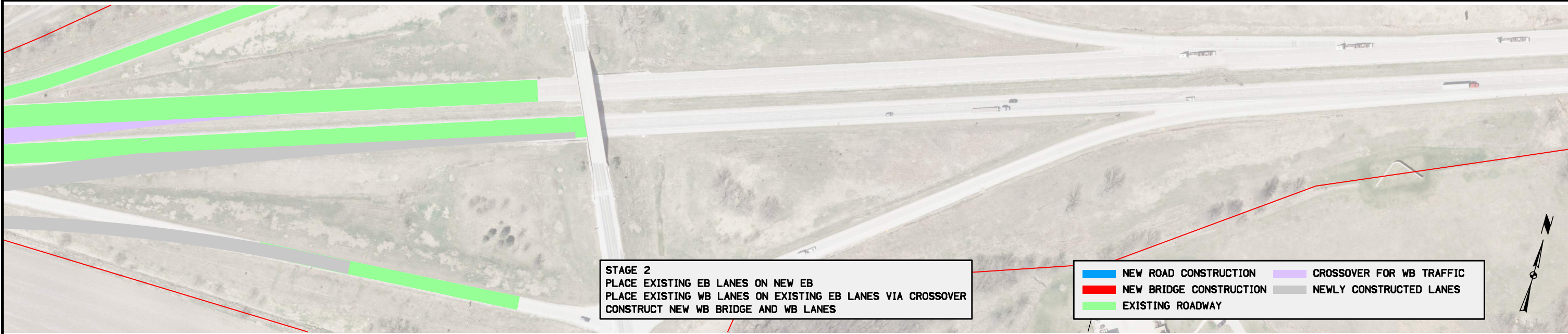
STAGE 3
 PLACE WB TRAFFIC ON NEW WB LANES
 REMOVE EXISTING EB LANES AND WB CROSSOVER
 GRADE MEDIAN

- REMOVE PAVEMENT
- NEWLY CONSTRUCTED LANES
- EXISTING ROADWAY



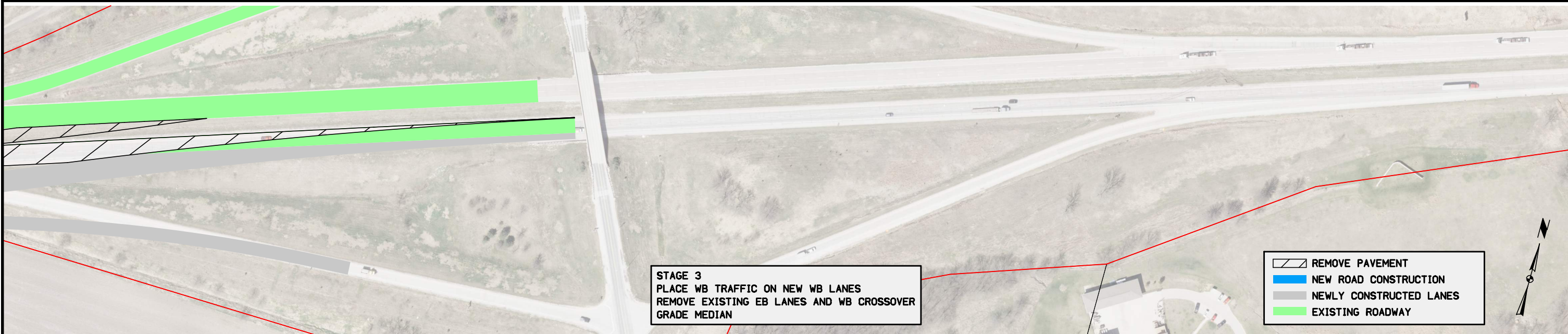
STAGE 1
 BUILD EB LANES, BRIDGES, AND
 I-80 RAMP B EB EXIT RAMP TO R16

- REMOVE PAVEMENT
- NEW ROAD CONSTRUCTION
- NEW BRIDGE CONSTRUCTION
- EXISTING ROADWAY



STAGE 2
 PLACE EXISTING EB LANES ON NEW EB
 PLACE EXISTING WB LANES ON EXISTING EB LANES VIA CROSSOVER
 CONSTRUCT NEW WB BRIDGE AND WB LANES

- NEW ROAD CONSTRUCTION
- NEW BRIDGE CONSTRUCTION
- EXISTING ROADWAY
- CROSSOVER FOR WB TRAFFIC
- NEWLY CONSTRUCTED LANES



STAGE 3
 PLACE WB TRAFFIC ON NEW WB LANES
 REMOVE EXISTING EB LANES AND WB CROSSOVER
 GRADE MEDIAN

- REMOVE PAVEMENT
- NEW ROAD CONSTRUCTION
- NEWLY CONSTRUCTED LANES
- EXISTING ROADWAY