MEMORANDUM

Missouri Department of Transportation

DATE: January 16, 2024

TO: Paula Gough, P.E.
District Engineer

CC: Jenn Becker, P.E.
Design Liaison Engineer

FROM: Brian Untiedt, P.E.
Transportation Project Manager

SUBJECT: Northeast District - Design
US 61, Routes K & V to Creech Lane & Old Highway 61, Lincoln County
Elimination of existing at-grade crossings with the construction of a new full-access controlled interchange.
Job No. NE0004
Conceptual Study Report

PROJECT PURPOSE AND NEED:

The Missouri Department of Transportation's (MoDOT) US 61, in Lincoln County, is part of the 563-mile-long Avenue of the Saints, providing access between St. Paul, Minnesota and St. Louis, Missouri. With the increased truck traffic and general growth in average daily traffic (ADT), there has been a noticeable increase in crashes on the portion of US 61 in Lincoln County, Missouri. To reduce crashes along the US 61 corridor, several at-grade crossings have been, or are planned to be, closed, or replaced with full-access controlled interchanges. Improvements to the US 61/ Routes K & V and US 61/ Old Alexandria (Creech Lane) intersections were identified as a Tier II project on the 2021 & 2022 Missouri High-Priority Unfunded Needs Assessment to increase economic growth and improve safety.

The intersections of US 61/ Routes K & V and US 61/ Creech Lane and Old Highway 61 are currently at-grade median crossovers. The crossovers are equipped with dedicated northbound and southbound left turn lanes on US 61. Additionally, in 2018, safety in this area was further enhanced with northbound and southbound right turn lanes on US 61 at the Routes K & V intersection. However, high-severity, right angle/ turning class crashes have continued to occur at these intersections. See Attachment A.

Project NE0004 proposes the elimination of two (2) existing at-grade crossings at Routes K & V and Creech Lane/ Old Highway 61 and the construction of a new, full-access controlled interchange that will increase capacity for economic growth and improve the safety of motorists utilizing these US 61 crossings in Lincoln County, approximately 7 miles north of Troy, MO. This project will separate the high-speed traffic on US 61 from the low speed turning movements to access Routes K & V, Creech Lane, and Old Highway 61 from US 61, thereby reducing the potential for future angle and/or high-severity crashes. This interchange will carry traffic over US

61 with a grade-separation structure and will include on and off ramps connecting to the northbound and southbound lanes of US 61. The existing outer road network will be expanded to connect Routes K & V, Creech Lane, and Old Highway 61 to the new interchange. A new interchange, providing safe access to and from US 61, with outer road connections to frontage properties will promote development opportunities to increase economic growth in the area.

☒ Major Route ☐ Minor Route

DESIGN TRAFFIC US 61 north of Route K
ADT (Const.) = 21,921 (2026)
ADT (Design- MoDOT Transportation Planning Study) = 26,433 (2036)
ADT (Design- Olsson Traffic Study) = 30,529 (2047)
DHV = 7.24%
D = 56.0% / 44.0%
% Trucks = 26.21%
Design (Posted) Speed= 65 MPH

DESIGN TRAFFIC US 61 south of Route K
ADT (Const.) = 22,998 (2026)
ADT (Design- MoDOT Transportation Planning Study) = 27,584 (2036)
ADT (Design- Olsson Traffic Study) = 33,253 (2047)
DHV = 7.78%
D = 51.4% / 48.6%
% Trucks = 26.62%
Design (Posted) Speed= 65 MPH

DESIGN TRAFFIC Route K
ADT (Const.) = 788 (2026)
ADT (Design- MoDOT Transportation Planning Study) = 962 (2036)
ADT (Design- Olsson Traffic Study) = 1,535 (2047)
DHV = 12.36%
D = 50.3% / 49.7%
% Trucks = 12.50%
Design (Posted) Speed= 55 MPH

DESIGN TRAFFIC Route V
ADT (Const.) = 816 (2026)
ADT (Design- MoDOT Transportation Planning Study) = 866 (2036)
ADT (Design- Olsson Traffic Study) = 2,163 (2047)
DHV = 9.94%
D = 50.3% / 49.7%
% Trucks = 26.65%
Design (Posted) Speed= 55 MPH

See Attachment B- Design Traffic Report by MoDOT- Transportation Planning

See Attachment C- Traffic Study Report by Olsson

EXISTING FACILITIES

US 61

Feature	Existing	Standard	Proposed
Functional Classification	**Other Freeway/ Expressway**		**Maintain**
Posted Speed Limit	**65 mph**		**Maintain**
Number of Lanes	**4-lane divided**		**Maintain**
Lane Width(s)	**12'**	**12'**	**Maintain**
Median Width/Type	**Width Varies 66'-110'**		**Maintain**
Outside Shoulder Width	**8'**	**4'-10'**	**Maintain**
Inside Shoulder Width	**4'**	**4'**	**Maintain**
Auxiliary Lanes Length/Width	**N/A**	**N/A**	**N/A**
Pavement Type	**PCC/ HMA**		**Alternate Pavement**

Routes K & V

Feature	Existing	Standard	Proposed
Functional Classification	**Route K- Minor Collector Route V- Major Collector**		**Maintain**
Posted Speed Limit	**55 mph**		**Maintain**
Number of Lanes	**2**		**Maintain**
Lane Width(s)	**10'**	**12'**	**12'**
Median Width/Type	**N/A**		**N/A**
Shoulder Width	**4'**	**4'**	**Maintain**
Pavement Type	**HMA**		**Optional Pavement**

Outer Roads

Feature	Existing	Standard	Proposed
Functional Classification	**Local**		**Maintain**
Posted Speed Limit	**N/A**		**45 mph**
Number of Lanes	**2**		**Maintain**
Lane Width(s)	**10'**	**12'**	**12'**
Median Width/Type	**N/A**		**N/A**
Shoulder Width	**4'**	**4'**	**Maintain**
Pavement Type	**HMA/Oil/Chip**		**Optional Pavement**

EXISTING BRIDGES

Bridge No.	Location	Type	Length	Width	Year Built	Condition Ratings		
						Deck	Super	Sub
N/A								

RIGHT-OF-WAY

US 61
Right-of-Way (ROW): Existing min. width: 421 ft. Proposed min. width: 500+/- ft.
Existing ROW Type: Controlled Access
Proposed ROW Type: No Right of Access

Route K
Right-of-Way (ROW): Existing min. width: 70 ft. Proposed min. width: 70 ft.
Existing ROW Type: Normal
Proposed ROW Type: Normal

Route V
Right-of-Way (ROW): Existing min. width: 70 ft. Proposed min. width: 70 ft.
Existing ROW Type: Normal
Proposed ROW Type: Normal

Outer Roads
Right-of-Way (ROW): Existing min. width: N/A ft. Proposed min. width: N/A ft.
Existing ROW Type: Normal
Proposed ROW Type: Fully Controlled Access/ Normal Access

Required Right-of-Way anticipated: ☐ None ☒ Yes ☐ Undetermined
Easements anticipated: ☐ None ☒ Temporary ☒ Permanent ☒ Utility ☐ Other

REASONABLE/PREFERRED DESIGN ALTERNATIVES

Two (2) potential interchange locations have been identified for further evaluation through the conceptual stage of the design process. Conceptual Alternatives 1-3 utilize the north interchange location, placing the grade-separation structure slightly to the north of the existing intersection of US 61 with Routes K & V. Conceptual Alternative 4 utilizes the south interchange location, placing the grade-separation structure approximately 2130' north of the intersection of US 61 with Creech Lane/ Old Highway 61 and 3150' south of US 61 with Route K/ V crossover. The distance between the existing US 61/ MO 47 interchange (located south of the US 61/ Routes K &V intersection) in Troy, MO and the planned US 61/ Routes B & E interchange (located north of the US 61/ Routes K &V intersection) is 10.2 miles. The north US 61/ Routes K & V interchange location is approximately 7.0 miles north of the US 61/ MO 47 interchange, while the south US 61/ Routes K & V interchange location more evenly splits the distance between the adjacent existing and planned interchanges, at 6.3 miles north of the US 61/ MO 47 interchange. Additionally, the south interchange location more closely adheres to the MoDOT Engineering Policy Guide (EPG) for future urban interchange spacing at 2-3 miles and rural interchange spacing at 5 miles. Each interchange location is detailed further within the conceptual alternative discussions below. See Attachment D for NE0004 interchange location options and adjacent US 61 existing and planned interchanges.

While the north and south conceptual interchange location alternatives are only separated by 3350 feet, adverse travel for motorists originating from, or destined for, the established residential and commercial areas within the project vicinity should be considered.

Currently, 70.2% (AM peak) and 71.2% (PM peak) of traffic utilizing the Creech Lane/ Old Highway 61 median crossover and US 61 access points travels to/ from the south on US 61. By closing the median crossover and access to US 61 at Creech Lane/ Old Highway 61, and constructing an interchange at the north location, motorists traveling to/ from the south will experience 4.2 miles of adverse travel when considering a round trip. The south conceptual interchange location only introduces 1.5 miles of adverse travel for the same trip. Creech Lane and Old Highway 61 motorists traveling to/ from the north will not encounter any adverse travel with either the north or south conceptual interchange location. Southbound traffic originating from Old Highway 61 already has a connection to southbound US 61 approximately 3.55 miles to the south and will likely opt to use that access point over choosing adverse travel to either the north or south conceptual interchange locations.

Currently, 14.4% (AM peak) and 3.8% (PM peak) of traffic utilizing the Routes K & V median crossover and US 61 access points travels to/ from the north on US 61. By closing the median crossover and access to US 61 at Routes K & V, and constructing an interchange at the south location, motorists traveling to/ from the north will experience 2.4 miles of adverse travel when considering a round trip. Routes K & V motorists traveling to/ from the south will not encounter any adverse travel with the south conceptual interchange location. By placing the new interchange at the north location, near the

existing US 61 at Route K & V intersection, northbound and southbound motorists originating from Routes K & V will not encounter any adverse travel.

Both the north and south conceptual interchange locations introduce some adverse travel for motorists. However, the traffic percentage utilizing the Creech Lane/ Old Highway 61 median crossover and access points to US 61 for travel to/ from the south is significantly higher than the traffic percentage utilizing the Routes K & V median crossover and access points to US 61 for travel to/ from the north. There is also a significant difference in traffic volumes between these two crossover locations, due to the higher density of residential and commercial development that is established in the vicinity of Creech Lane and Old Highway 61. See Attachment C- Traffic Study Report. When turning movement volumes of Routes K & V motorists traveling to/ from the north are compared to turning movements volumes of Creech Lane and Old Highway 61 motorists traveling to/ from the south, the impact of the north conceptual interchange location on adverse travel is substantially greater than the impact of the south conceptual interchange location on adverse travel. This analysis of adverse travel impacts favors placing the new interchange at the south location.

The median width at the existing US 61/ Routes K & V crossover is 110' from the inside edge of mainline US 61 southbound pavement to the inside edge of mainline US 61 northbound pavement. The typical median width along US 61 is 60'-66', which achieves 30' of clear zone in each direction on US 61. The additional median width at the Routes K & V location requires the grade-separation structure for the interchange to be longer and, consequently, more expensive. To mitigate this additional project cost, detailed analysis was conducted on each conceptual alternative to weigh the effect on project costs to shift the lanes of US 61 in to utilize the median width. To accomplish the lane shift, new pavement would be constructed adjacent to the existing passing (inside) lanes, to be used as the new passing lanes, the existing passing lanes would function as the new driving lanes, and the existing driving lanes would be utilized as proposed ramp acceleration/ deceleration lanes. While this strategy would reduce the required length and cost of the grade-separation structure; ultimately, the cost savings realized by the shorter grade-separation structure were negated by the costs associated with re-configuring US 61 to utilize the median width. Shifting the mainline lanes of US 61 into the median is not recommended. The roadway conceptual alternatives contained in this report do not incorporate shifting the US 61 pavement into the median. See Attachment E for Build-in-Median analysis and discussion for all conceptual alternatives.

Expansion of the West Outer Road (Alexandria Crossing), on the west side of US 61, to Route K will require extending the existing facility approximately 0.75 miles from just north of Meadowlark Lane to Route K near the Dream Hollow Road intersection. This outer road will allow for the removal of several heavily used, at-grade approaches along the southbound lanes of US 61, including Route K, the west approach of Creech Lane and entrances for Champion Precast, and Complete Mobile Home. Pavement cores of the existing outer road pavement will determine the appropriate future treatment.

Expansion of the East Outer Road (Old US Hwy 61), on the east side of US 61, to Route V will require extending the existing facility approximately 0.75 miles. This extension will allow for the removal of two (2) residential property access points along the northbound lanes of US 61, as well as the existing Route V and Old Highway 61 approaches to US 61. There are segments of the existing East Outer Road pavements that appear to be in poor condition. Pavement cores of the existing outer road pavement will determine the appropriate future treatment.

Conceptual Alternatives 1-3, at the north interchange location, will require the extension of the East Outer Road and the West Outer Road to the north of the interchange to eliminate the private access points to US 61 within or immediately adjacent to the new interchange ramp acceleration and deceleration lanes and tapers. This portion of roadway improvement was not included as a requirement in the original project goals. However, combining traffic in the speed change lanes with low-speed traffic at private access points presents a significant risk of high-severity crashes. These are the type of crashes targeted for elimination with this interchange project, so it is not desired to create a similar hazard at a different location within the project limits. Removing these access points from the decision area where speed adjustments associated with entering and exiting the high-speed facility occur, will enhance the overall safety of the project. The West Outer Road will require extension of an additional 0.5 miles to the north of Routes K & V to connect commercial and private entrances and eliminate one (1) additional access point to US 61 southbound lanes. The East Outer Road will require extension of an additional 0.6 miles to the north of Routes K & V to tie in the commercial and residential entrances and eliminate five (5) access points to US 61 northbound lanes. The Conceptual Alternative 4 configuration does not require the extension of the outer roads farther north than Routes K & V.

Intersection control options within the project limits were analyzed, incorporating future commercial, recreational, and residential developments in the project vicinity, to ensure sufficient level of service (LOS) in 2047 (design year-Olsson Report). Stop-controlled intersection control at the ramp terminals and outer road intersections was deemed insufficient for LOS in the design year. The outer road intersections near Creech Lane have an acceptable level of service with stop-control. Signalized intersections and roundabouts intersection control have acceptable LOS in the design year. Roundabouts are preferred over standard signalized intersections due to the initial installation and future maintenance costs of the traffic signal equipment. There are several roundabouts already functioning in MoDOT's Northeast District, yielding a large percentage of drivers who are already familiar with how to navigate and maneuver in roundabouts. See Attachment C for intersection control LOS analysis.

The existing terrain, in the vicinity of the proposed outer roads, is relatively flat between Routes K & V and Creech Lane/ Old Highway 61; therefore, the only significant vertical alignment changes will be to gain enough elevation to meet the new profile (crossing US 61), which is elevated to achieve the required vertical clearance between existing US 61 travel lanes and the grade-separation structure.

During the 1970's expansion of US 61 from a 2-lane highway to a 4-lane divided highway, right-of-way was acquired for the construction of a future interchange at the US 61 and Route K & V

intersection. However, additional right-of-way acquisition will be required to construct a new interchange to current standards and provide safe outer road connectivity, primarily on the east side of US 61.

Standard roadway lighting will be included in the project to enhance the safety of the new interchange and roundabouts.

Guardrail will enhance the safety of the elevated roadway (crossing US 61), protecting errant vehicles from entering the US 61 corridor.

<u>Conceptual Alternative 1:</u> Four-leg Roundabouts at Existing US 61/ Routes K & V Intersection (North Location)

See Attachment F for Conceptual Alternative 1 layout.

Conceptual Alternative 1 replaces two (2) current US 61 at-grade crossover intersections with a new full-access controlled interchange slightly to the north of the existing Routes K & V intersection location. The existing US 61 at-grade crossovers at Routes K & V and at Creech Lane/ Old Highway 61 will be closed with the construction of this interchange. The grade-separation structure is placed to the north to facilitate maintenance of traffic during construction. The existing median at this location is wider than the typical median section, measuring 110' from inside edge of southbound pavement to inside edge of northbound pavement. A roundabout on each side of the bridge connects the ramps and two of the four outer road connections.

The northbound on-ramp pairs with the northbound off-ramp as a single approach to the east roundabout and loops to pass underneath the grade-separation structure for northbound acceleration. The southbound on-ramp pairs with the southbound off-ramp as one approach to the west roundabout and loops to pass underneath the grade-separation structure for southbound acceleration. The northbound and southbound on-ramps at this interchange connect to extended acceleration lanes to accommodate motorists needing to increase speed from the 25-mph loop ramp speed to 65 mph before merging onto the mainline lanes of US 61. This layout minimizes additional right-of-way acquisition and possible utility impacts while more closely adhering to access management guidelines. These savings, however, are diminished by requiring longer bridge spans over the expanded northbound and southbound lanes of US 61.

By pairing the one-way southbound ramps as a single approach to the west roundabout, and likewise, pairing the one-way northbound ramps as a single approach to the east roundabout, these roundabouts will require less circumference and, therefore, be smaller and less expensive to construct. The remaining outer road connections will tie in farther outside of the interchange limits. These connections are spaced 550' to 650' from the roundabouts; however, they still do not meet access management guidelines of 1300' for spacing between the access point and the interchange. To meet access management guidelines, expansive right-of-way acquisition (including several residential and commercial properties) would be required, existing cultural

resources would be impacted, and multiple existing topographical feature impacts would need to be mitigated.

Additional right-of-way was purchased during a past project for the construction of a future interchange at this location; however, the amount of property purchased was based on the standard diamond interchange layout at the time. The interchange design options, ramp and outer road spacing and layouts have changed since the right-of-way was purchased. This interchange layout will require more area than was anticipated at the time of the additional right-of-way purchase.

This conceptual alternative layout introduces a connectivity issue for motorists traveling through the area on the outer roads, not accessing US 61. These motorists will not cross directly over Route K or Route V to continue travel on the outer road. Instead, motorists will need to access the rest of the outer road via travel through a roundabout. These outer road connections violate driver expectations as their path forward will not be immediately clear and could cause some confusion amongst motorists who are unfamiliar with the area. Conceptual Alternative #2 addresses this outer road connectivity issue.

Conceptual Alternative 2: Five-leg Roundabouts at Existing Routes US 61/ K & V Intersection (North Location)

See Attachment G for Conceptual Alternative 2 layout.

Conceptual Alternative 2 also replaces two (2) current US 61 at-grade crossover intersections with a new full-access controlled interchange slightly to the north of the existing Routes K & V intersection location. The existing US 61 at-grade crossovers at Routes K & V and at Creech Lane/ Old Highway 61 will be closed with the construction of this interchange. This layout discussion is the same as Conceptual Alternative 1; however, it resolves the issue of motorist confusion regarding through outer road connectivity. By having both of the West Outer Road connections tie to the west roundabout, and both of the East Outer Road connections tie to the east roundabout, the motorists will be able to see their route ahead and continue, as expected, along the outer roads.

This alternative requires more right-of-way acquisition than the amount required for Conceptual Alternative 1.

Conceptual Alternative 3: Six-leg Roundabouts at Existing US 61/ Routes K & V Intersection (North Location)

See Attachment H for Conceptual Alternative 3 layout.

Conceptual Alternative 3 also replaces two (2) current US 61 at-grade crossover intersections with a new full-access controlled interchange slightly to the north of the existing Routes K & V intersection location. The existing US 61 at-grade crossovers at Routes K & V and at Creech Lane/ Old Highway 61 will be closed with the construction of this interchange. This layout

discussion is the same as Conceptual Alternative 2; however, it eliminates the loop on-ramps. By eliminating the loop ramps, the acceleration lanes lengths can be reduced from the lengths in Conceptual Alternatives 1 & 2, as most of the acceleration up to mainline US 61 speed can be accomplished within the ramp length. The elimination of the loop ramps also reduces the number of lanes passing underneath the grade-separation structure, which reduces the length and cost of the grade-separation structure.

<u>Conceptual Alternative 4:</u> Five-leg Roundabouts north of Existing US 61/ Creech Lane/ Old Highway 61 Intersection (South Location)

See Attachment I for Conceptual Alternative 4 layout.

Conceptual Alternative 4 replaces the two (2) current US 61 at-grade intersections with Routes K & V and Creech Lane/ Old Highway 61 approximately 2130' north of the existing US 61/ Creech Lane & Old Highway 61 crossover intersection location. The existing US 61 at-grade crossovers at Routes K & V and at Creech Lane/ Old Highway 61 will be closed with the construction of this interchange. This layout discussion is the same as Conceptual Alternative 3; however, by placing the interchange at this south location, adverse travel is reduced for southbound motorists who originate from the existing residential and commercial developments already established in the Creech Lane/ Old US 61 area.

This conceptual alternative places the interchange where the US 61 median width is 66'. The narrower median at this location yields the shortest grade-separation structure length of all alternates being evaluated.

More earthwork will be required to construct this conceptual alternative than Conceptual Alternatives 1-3, due to the existing topography in the vicinity of the south interchange location. The difference in elevation between the existing US 61 lanes and the surrounding land is higher than for the conceptual alternates at the north interchange location. The amount of fill material needed for the crossing (grade-separated) roadway to meet the vertical clearance requirements above the US 61 lanes will be substantially more than for the alternates at the north interchange location.

<u>BRIDGE DESIGNS</u>

In accordance with EPG 231.8, a bridge width of 32' with 16" safety barrier curbs will allow one-12' eastbound through lane, one- 12' westbound through lane, and 4' shoulders.

Bridge Design 1: This bridge design corresponds with Roadway Conceptual Alternatives 1 & 2 at the north interchange location. It consists of a 326 foot long, two-span NU-78 Girder bridge on integral end bents and a concrete multi-column intermediate bent. The intermediate bent will be placed in the center of the 110' median. The bridge skew is approximately 16°. The bridge width will be 32'-0" face to face between barrier curbs and 34'-8" out to out.

Estimated Cost: $2.5 million

Bridge Design 2: This bridge design corresponds with Roadway Conceptual Alternatives 1 & 2 at the north interchange location. It consists of a 326 foot long, two-span 72" steel web plate girder bridge on integral end bents and a concrete multi-column intermediate bent. The intermediate bent will be placed in the center of the 110' median. The bridge skew is approximately 16°. The bridge width will be 32'-0" face to face between barrier curbs and 34'-8" out to out.

Estimated Cost: $4.0 million

Bridge Design 3: This bridge design corresponds with Roadway Conceptual Alternative 3 at the north interchange location. It consists of a 300 foot long, two-span NU-78 Girder bridge on integral end bents and a concrete multi-column intermediate bent. The intermediate bent will be placed in the center of the 110' median. The bridge skew is approximately 16°. The bridge width will be 32'-0" face to face between barrier curbs and 34'-8" out to out.

Estimated Cost: $2.3 million

Bridge Design 4: This bridge design corresponds with Roadway Conceptual Alternative 3 at the north interchange location. It consists of a 300 foot long, two-span 66" steel web plate girder bridge on integral end bents and a concrete multi-column intermediate bent. The intermediate bent will be placed in the center of the 110' median. The bridge skew is approximately 16°. The bridge width will be 32'-0" face to face between barrier curbs and 34'-8" out to out.

Estimated Cost: $3.6 million

Bridge Design 5: This bridge design corresponds with Roadway Conceptual Alternative 4 at the south interchange location. It consists of a 244 foot long, two-span NU-63 Girder bridge on integral end bents and a concrete multi-column intermediate bent. The intermediate bent will be placed in the center of the 66' median. This bridge has no skew. The bridge width will be 32'-0" face to face between barrier curbs and 34'-8" out to out.

Estimated Cost: $1.7 million

Bridge Design 6: This bridge design corresponds with Roadway Conceptual Alternative 4 at the south interchange location. It consists of a 244 foot long, two-span 54" steel web plate girder bridge on integral end bents and a concrete multi-column intermediate bent. The intermediate bent will be placed in the center of the 66' median. This bridge has no skew. The bridge width will be 32'-0" face to face between barrier curbs and 34'-8" out to out.

Estimated Cost: $2.5 million

Bridge Design Recommendation: MoDOT reported a recent increase in structural damage resulting from oversized loads passing underneath and striking the grade-separation structures along the US 61 corridor. If bridge costs between steel girder bridges and concrete girder bridges are comparable, MoDOT prefers steel girder bridges over concrete girder bridges, as there are more options for structural repair with steel girders than concrete girders. The recent MoDOT bid tabulation data shows that concrete girder bridges have been substantially less expensive to construct when compared to steel girder bridges. The concrete girder bridge designs are recommended.

Conceptual Alternative Cost Estimate Comparison:

	Conceptual Alternative 1	Conceptual Alternative 2	Conceptual Alternative 3	Conceptual Alternative 4
Bridge	$2,500,000	$2,500,000	$2,300,000	$1,700,000
Grading/ Drainage	$7,212,000	$9,073,000	$7,273,000	$8,557,000
Base/ Pavement	$6,670,000	$6,729,000	$6,642,000	$6,010,000
Miscellaneous (20% G/D/B/P+ barrier wall)	$3,250,400	$3,584,400	$3,000,000	$3,049,400
Contract Estimate	$19,632,400	$21,886,400	$19,215,000	$19,316,400
Construction Contingency (2%)	$392,648	$437,728	$384,300	$386,328
Construction Cost Subtotal	$20,025,048	$22,324,128	$19,599,300	$19,702,728
Utilities	$211,200	$254,400	$259,200	$182,400
Construction Cost Total	$20,236,248	$22,578,528	$19,858,500	$19,885,128
Right-of-Way	$967,000	$1,217,000	$1,242,000	$1,102,000
Right-of-Way Incidentals (10% RW cost)	$96,700	$121,700	$124,200	$110,200
Preliminary & Construction Engineering (17%)	$3,404,258	$3,795,102	$3,331,881	$3,349,464
Engineering Total	$3,500,958	$3,916,802	$3,456,081	$3,459,664
Project Total	**$24,704,206**	**$27,712,330**	**$24,556,581**	**$24,446,792**

CONSTRUCTION IMPACTS

Construction of the NE0004 interchange could occur concurrently with MoDOT project number NE0144, an interchange at the intersection of US 61 with Routes B & E, located approximately 3.2 miles north of the subject project. Collaboration between designers and contractors for the two projects will be required to eliminate concurrent closures of the Routes K, V, B and E access points to US 61 and ensure both projects are constructed and function cohesively.

The closure of US 61 access from Route V will require northbound state route detour on Routes V, W, & B. The adverse travel length of this detour is 12 miles. The southbound state route detour for Route V will be on Routes V, W, & 47. The adverse travel length of this detour is 14 miles. Prior to construction of the K & V interchange, the US 61 /Route 47 interchange will be newly reconstructed and open to handle increased traffic volume created by this detour. Old Highway 61 connects directly to US 61 approximately 3.55 miles to the south. A closure of access at the north end of Old Highway 61 does not require a detour. Route K and Creech Lane do not have connectivity to any state routes other than US 61. See Attachment J for Detour Map.

At the north interchange location, the grade-separation structure of the new interchange will be placed slightly to the north of the existing Routes K & V at-grade intersection with US 61, to maintain access to / from US 61 for most of the construction timeline. Existing Routes K & V will be realigned to meet the new interchange. Outer roads, Old Highway 61 (east) and Alexandria Crossing (west), will be extended prior to changes in access to US 61 from Routes K & V. The newly constructed outer road extensions will be utilized to maintain traffic during required construction tie-in work between the new interchange and existing Routes K & V.

At the south interchange location, the grade-separation structure of the new interchange will be placed approximately 0.4 miles north of the existing Creech Lane at-grade intersection with US 61, to maintain access to / from US 61 for most of the construction timeline. Outer roads, Old Highway 61 (east) and Alexandria Crossing (west), will be extended prior to changes in access to US 61 from Routes K & V, Creech Lane and Old Highway 61. The newly constructed outer road extensions will be utilized to maintain traffic during required construction tie-in work. Existing Routes K & V will access the new interchange via outer roads.

Once the interchange construction is complete, fully operational, and open to traffic, the at-grade median crossings at Routes K & V and Creech Lane/ Old Highway 61 will be removed, and the US 61 median drainage will be restored. The elimination of these two (2) at-grade crossings falls in accordance with MoDOT's overall safety initiative for the US 61 corridor.

Disposition of Existing Route: The existing routes will be absorbed into the new interchange layout.

CRASH HISTORY ANALYSIS AND PROPOSED SAFETY ENHANCEMENTS

Project Accident Rate – 121.226 for US 61 southbound, 89.864 for US 61 northbound
59 Crashes occurred within the project limits between 2018 and 2022. The MoDOT accident classes were primarily angle/ turning crashes and rear end crashes that do not appear to have any direct correlation to roadway geometrics, lighting, sight distances or pavement conditions. See Attachment A- MoDOT Transportation Management System (TMS) Crash History Report.

5-year Statewide rate for a similar class of roadway – 124.18

The existing US 61 and Creech Lane/ Old Highway 61 intersection is listed as a high-severity intersection in MoDOT's TMS database within the project limits in 2015, 2017 and 2020.

The Safety Assessment for Every Roadway (SAFER) Document has been developed by MoDOT to facilitate safety discussions on project teams and ensure that safety measures are incorporated into all projects. The topics below will continue to be discussed by the project team as the design progresses; however, some safety enhancement measures have already been identified and planned for incorporation into the project.

Access Management: The purpose of this interchange project is to improve safety of access to US 61, over the at-grade median crossovers currently in place at the Routes K & V and Creech Lane/ Old Highway 61 intersections and increase economic growth. However, to balance access and mobility, an additional interchange location, approximately 3300' to the south of the existing Routes K & V intersection, has been added to the conceptual alternatives. This southern alternative provides the same safety of access as the north interchange location, but also reduces the adverse travel for southbound motorists originating from, and the northbound motorists destined for, the established residential and commercial properties in the Creech Lane/ Old Highway 61 area.

Current interchange spacing requirements include 2-3 miles for current and projected urban locations. Acknowledging the recent high growth rate of urban developments in Lincoln County along the US 61 corridor, the Route K & V to Creech Lane/ Old Highway 61 area is expected to develop into an urban area, especially once a full-access controlled interchange is introduced to the area. The conceptual alternative locations fit the approximated spacing between the planned US 61/ Routes B & E interchange and the current interchange at US 61 and MO 47. Additionally, the at-grade crossing spacing guidelines for a roadway of this type is 0.5 mile- 1.0 mile. This interchange project location fits the access management interchange spacing guidelines and eliminates two (2) crossovers within the project area.

This interchange project closely aligns with access management goals by eliminating access points from directly connecting to the high-speed US 61 facility. The expansion and enhanced connectivity of the outer road network with this project allows for several private and commercial properties to access US 61 via lower speed outer roads and ultimately the full-access controlled interchange.

Roadway Alignment: The existing horizontal roadway alignment features of US 61, Routes K & V, Creech Lane, and Old Highway 61 meet MoDOT standards. There are no known existing sight distance issues. The proposed interchange will not change the alignment of US 61. Depending on the conceptual alternative selected, Routes K & V and/ or the outer roads may be realigned with standard horizontal curves, connected to the interchange with roundabouts, which will be designed to ensure proper sight distance is achieved for each roundabout approach.

Roadway Visibility: There is currently no roadway lighting at the US 61/ K & V crossover or the US 61/ Old Highway 61 & Creech Lane crossover. Standard interchange and roundabout lighting will be incorporated into the project.

Roadway Surface: The proposed roadway typical sections for the different routes within this project will adhere to the MoDOT Engineering Policy Guide for standard travel lane and shoulder widths and types.

Intersection/ Interchange Design: The proposed improvements incorporate a new, full-access controlled, interchange to replace the existing at-grade median crossovers at the US 61 and Routes K & V intersection and at the US 61 and Creech Lane/ Old Highway 61 intersections. The interchange includes a grade-separation structure, enhanced with a roundabout on each side to facilitate traffic maneuvers to multiple different roadways in a reduced footprint. By utilizing roundabouts, the number of conflict points at a standard intersection is reduced from 32 to just 8 (depending on the number of approaches to the roundabout). There are currently no pedestrian facilities present, nor evidence of heavy pedestrian use, in the project vicinity; however, as the project progresses through the public involvement stage, the need for pedestrian facilities will be reassessed.

Roadside: The US 61 corridor will incorporate a 30' clear zone. Routes K & V, as well as the outer roads clear zones will be 20' unless roadway geometrics require additional clear zone width. The roadway sideslopes are planned to be 4H:1V or flatter; however, if tying the proposed improvements to existing features dictates sideslopes steeper than 3H:1V or if obstacles cannot be relocated, safety devices will be included to shield any steep sideslopes or obstacles within the clear zone.

There is no existing guardrail present along US 61, Routes K & V, Creech Lane, or Old Highway 61 in the project vicinity. The proposed improvements will include guardrail connections on all four bridge quadrants and where steep sidelopes or permanent obstacles are unavoidable in the clear zone. A permanent concrete traffic barrier wall will be utilized between the outer roads and US 61 ramps or mainline lanes where clear zones are restricted due to right-of way acquisition complexities.

Single- strand, low tension, guard cable installation may be necessary in the median of US 61 where the existing Routes K & V and Creech Lane/ Old Highway 61 crossovers are being removed. Historically, motorists have attempted to continue using old crossover locations, in lieu of safer access points added to the roadway network, as a shortcut even after the pavement has been removed and the median has been re-graded to facilitate drainage.

Vulnerable Roadway Users: The project team has not identified any vulnerable roadway users that are unique to this project; however, there is a motorcycle sales commercial establishment within the project limits. The use of roundabouts with this project will be favorable among motorcycle riders, due to the reduced number of conflict points over traditional intersections. The design will also consider the needs of elderly motorists and any other users identified as the project progresses through the public involvement portion of the project.

Transportation Systems Management and Operations (TSMO): The project team has not identified any operational improvement needs related to the performance of the existing transportation system that would achieve the desired project goals. The goal for this project

is focused primarily on improving the safety of access to US 61 over maximizing the capacity of the current transportation facility.

Other Considerations: The primary crashes highlighted in the crash data at the US 61 and Routes K & V intersection and the US 61 and Creech Lane/ Old Highway 61 intersection are high-severity, right- angle crashes which plague at-grade, low-speed turning access points to high-speed facilities. An interchange to replace these at-grade intersections will resolve the primary type of crashes occurring in this area.

The existing US 61 and Creech Lane/ Old Highway 61 intersection is listed as a high-severity intersection in MoDOT's TMS database within the project limits in 2015, 2017 and 2020.

The south interchange location is more suitable than the north interchange location from an incident management perspective, due to the limited access points on US 61 to the south of this project location.

UTILITIES IMPACTS

Ameren Electric Utility has overhead electric sub-transmission and 3-phase distribution lines running along the east side of US 61 that will conflict with the improvements throughout the project limits. Additionally, there are three large, pole-mounted transformers with capacitors on platform located on the east side of US 61 at the south end of the project limits that conflict with the planned East Outer Road improvements. The required adjustment to these facilities is considered high impact/priority level.

Ameren Electric Utility also has an underground electric line running from the east side of US 61 (south of Route V) toward the west, under the US 61 pavement. This utility will be impacted by the addition of the East Outer Road and/or northbound ramps. Additionally, Ameren Electric has an overhead 3-phase distribution line running along the west side of US 61 that will conflict with proposed West Outer Road and/or southbound ramps. The required adjustment to these facilities is considered medium impact/priority level.

The overhead power utility has been relocated to run parallel to the expanded existing right-of-way lines in the Route K & V intersection area. The proposed interchange layouts will reduce utility relocations where possible; however, some relocation may still be necessary to achieve a safe outer road alignment and meet clear zone requirements. Additionally, some pole heights may require adjustment as the elevations required to achieve the grade separation may dictate final utility layout.

Lumen-National Communication Utility has a buried fiber backbone located in the median and the utility corridor on the east side of US 61. The fiber line running in the median may be impacted by the median pier for the grade-separation structure and installation of the bullnose guardrail system, depending on the exact location of the line within the median. The fiber line running in the east utility corridor of US 61 may be impacted by the East Outer Road and/or northbound ramp

improvements. The required adjustment to these facilities is considered medium impact/priority level.

Brightspeed Communication Utility has buried copper/fiber lines possibly located within the utility corridors along US 61 throughout the project limits. The required adjustment to these facilities is considered low impact/priority level.

Windstream Communication Utility has buried copper/fiber lines possibly located within the utility corridors along US 61, Route K, Route V, and Dream Hollow Road. The required adjustment to these facilities is considered low impact/priority level.

Charter-Spectrum Communication Utility has buried copper/fiber lines possibly located within the utility corridors along US 61 throughout the project limits. The required adjustment to these facilities is considered low impact/priority level.

Reimbursement eligibility is currently undetermined. The utilities mentioned above may be installed within a utility corridor. At the conclusion of the conceptual stage, a full survey of right-of-way and easements will be conducted to determine which utilities are eligible for reimbursement.

☐ Master Agreement:
☐ Project Specific Agreement:

MULTIMODAL IMPACTS

RAILROAD:

☐ Existing Agreement
☐ Job Special Provision

- AIRPORTS:

☒ FAA Criteria Tool

No impacts.

ENVIRONMENTAL SUMMARY

- ENVIRONMENTAL CLASSIFICATION:
  - ☐ CE
  - ☒ CE2 (Anticipated)
  - ☒ Public Hearing/Public Meeting: Date to be determined.
  - ☒ Noise Assessment:
  - ☒ Section 4(f): Available references indicate no public lands within the project limits.

  - ☐ Section 6(f):
  - ☒ Threatened and Endangered Species: Unknown. Tree clearing will be included in the project.
  - ☐ 404 Permit:
  - ☐ 408 Permit:
  - ☒ Section 106: Morris Cemetery is located 0.25 mile to the west of US 61 on Route K. Old Morris Cemetery is located 0.25 mile to the west of US 61 and approximately 0.25 mile south of Route K. No impacts to these cemetery properties are anticipated.
  - ☒ Floodplain Management (No Rise Cert.): Indian Nest Hollow Stream is marked as a blue-line stream on the USGS 7.5-minute quadrangle map. This stream could potentially be impacted by the proposed East Outer Road improvements.
  - ☐ Water Quality:
  - ☒ Hazardous Material: Unknown. No hazardous waste sites apparent within the project area.
  - ☐ FEMA Buyout:
  - ☐ Other:

  The community will benefit in safety and associated economic returns from the improved facility. No negative impacts to any minority or disadvantaged populations will occur because of this project. Temporary travel delay impacts may be caused by the construction of this project.

BIKE AND PEDESTRIAN FACILITIES

- ☒ Existing Facilities: None
- ☒ Determination of Responsibility: MoDOT ☒ Yes ☐ No
- ☒ Transition Plan Facility: None
- ☒ Proposed Scope: None. No bicycle/ pedestrian facilities will be provided with the project.

ROADSIDE SAFETY

☒ Existing Guardrail or Guard cable: None
☐ Updating Guardrail or Guard Cable (Non-standard, MASH, LON, etc.)
☒ Clear Zone: 30' clear zone width from US 61 edges of pavement, 20' clear zone width from Routes K & V and outer road edges of pavement.

Guardrail with crashworthy end terminals will be attached to all four quadrants of the grade-separation structure.

A permanent concrete traffic barrier wall will be utilized between the outer roads and US 61 ramps or mainline lanes where clear zones are restricted due to right-of way acquisition complexities.

ESTIMATED PROJECT DELIVERY SCHEDULE MILESTONES

☒ Approved Conceptual Study Report: December 15, 2023
☒ Approved Preliminary Plan: July 15, 2024
☒ Public Hearing: August 2024
☒ Commission Design Approval: November 2024
☒ Approved Right-of-Way Plans: December 15, 2024
☒ Plans, Specifications and Estimate: April 15, 2026
☒ Letting Date: June 19, 2026

COMMENTS AND RECOMMENDATIONS

The recommended course of action for this project is Conceptual Alternative 4. This alternative meets the project goals of eliminating at-grade median crossovers and enhancing the safety of accessing US 61 with a grade-separated, full- access controlled interchange. Additionally, Conceptual Alternative 4 provides safe access to and from US 61, with outer road connections to frontage properties that will promote development opportunities to increase economic growth in the area. Conceptual Alternative 4 has the shortest grade-separation structure length and lowest overall estimated project cost of all the conceptual alternatives evaluated. In addition, this is the only alternative that addresses the reduction of adverse travel for southbound motorists departing, and northbound motorists destined for, the established residential and commercial developments in the US 61 & Old Highway 61/ Creech Lane vicinity.

Brian Untiedt

Brian Untiedt, P.E.
Transportation Project Manager
January 16, 2024

Toshia M. Drebes

Toshia Drebes, P.E.
Senior Transportation Engineer
Klingner and Associates, P.C.
January 16, 2024

Design Liaison Engineer's Comments and Recommendation:
Strong analysis to support the chosen alternative. Recommend approval. - JLB 2/8/24

Attachments:
Attachment A- TMS Crash History Report
Attachment B- Design Traffic Report
Attachment C- Traffic Study Report
Attachment D- Interchange Location Exhibit
Attachment E- Build-in-Median Analysis and Discussion
Attachment F- Conceptual Alternative 1 Layout
Attachment G- Conceptual Alternative 2 Layout
Attachment H- Conceptual Alternative 3 Layout
Attachment I- Conceptual Alternative 4 Layout
Attachment J- Detour Map

Approved by: Paula Gough 2024.03.06 13:17:21 -06'00'
Paula Gough, P.E.
Northeast District Engineer
January 16, 2024

cc: Construction and Materials Division
Traffic Division

ATTACHMENT A

MODOT TRANSPORTATION MANAGEMENT SYSTEM- CRASH HISTORY REPORT

OFFSET	TRAVEL WAY ID	DESIGNATION	TRAVEL WAY NAME	DIRECTION	BEGIN LOG	END LOG	BEGIN DISTRICT	END DISTRICT	BEGIN COUNTY	END COUNTY	COUNTY BEGIN LOG	COUNTY END LOG	BEGIN DESCRIPTION	END DESCRIPTION
	11	US	61	S	114	115.6	2	2	LINCOLN	LINCOLN	9.86	11.46	.308 mile(s) after PVT DONOVAN LN E	.094 mile(s) after CRD CREECH LN E

TYPE	2018	2019	2020	2021	2022	TOTAL
FATAL	0	0	0	0	0	0
SERIOUS INJURY	0	1	0	0	1	2
MINOR INJURY	2	2	2	0	2	8
PROPERTY DAMAGE ONLY	3	4	6	3	6	22
TOTAL	5	7	8	3	9	32
AADT	8884	9089	8307	9362	9747	

5 Year Statewide Rate

TYPE	2018	2019	2020	2021	2022	Rate Level
CRASH RATE	96.37	131.88	164.9	54.87	158.11	
STATE RATE-US	112.48	114.05	111.54	109.69	107.06	ROUTE DESG
STATE RATE-EXPRESSWAY	128.91	130.28	125.55	120.72	115.44	ROADWAY TYPE

TYPE	2018	2019	2020	2021	2022	TOTAL
ANIMAL DRAWN VEH OR RIDDEN ANIMAL	0	0	0	0	0	0
ANIMAL NOT DEER/DOG/FARM ANIMAL	0	0	0	0	0	0
ANIMAL OTHER THAN DEER	0	0	0	0	0	0
AVOIDING	0	0	0	0	0	0
BACKING	0	0	0	0	0	0
CHANGING LANE	0	0	0	0	0	0
CROSS MEDIAN	0	0	0	0	0	0
DEBRIS	0	0	2	0	1	3
DEER	0	1	0	0	0	1
DOG	0	0	0	0	0	0
DUAL LEFTS COLLIDE	0	0	0	0	0	0
DUAL RIGHTS COLLIDE	0	0	0	0	0	0
FARM ANIMAL	0	0	0	0	0	0
FIXED OBJECT	0	0	0	0	0	0
HEAD ON	0	0	0	0	0	0
JACKKNIFE	0	0	0	0	0	0
LEFT TURN	0	0	0	0	0	0
LEFT TURN RIGHT ANGLE COLLISION	0	0	1	0	2	3
OTHER	0	1	1	0	0	2
OUT OF CONTROL	0	0	0	0	2	2
PARKING OR PARKED CAR	0	0	0	0	0	0
PASSING	1	1	0	0	1	3
PEDALCYCLE	0	0	0	0	0	0
PEDESTRIAN	0	0	0	0	0	0
REAR END	2	1	3	3	2	11
RIGHT ANGLE	2	3	1	0	1	7
RIGHT TURN	0	0	0	0	0	0
RIGHT TURN RIGHT ANGLE COLLISION	0	0	0	0	0	0
SIDESWIPE	0	0	0	0	0	0
TOWED UNIT DISCONNECTS	0	0	0	0	0	0
U - TURN	0	0	0	0	0	0
WRONG WAY ON DIVIDED HIGHWAY	0	0	0	0	0	0
TOTAL	5	7	8	3	9	32

OFFSET	TRAVEL WAY ID	DESIGNATION	TRAVEL WAY NAME	DIRECTION	BEGIN LOG	END LOG	BEGIN DISTRICT	END DISTRICT	BEGIN COUNTY	END COUNTY	COUNTY BEGIN LOG	COUNTY END LOG	BEGIN DESCRIPTION	END DESCRIPTION
	7773	US	61	N	278.4	280	2	2	LINCOLN	LINCOLN	13.492	15.092	.139 mile(s) before CRD CREECH LN E	.457 mile(s) after RT V E

TYPE	2018	2019	2020	2021	2022	TOTAL
FATAL	0	0	0	0	0	0
SERIOUS INJURY	0	1	0	1	0	2
MINOR INJURY	2	1	0	1	0	4
PROPERTY DAMAGE ONLY	3	5	2	3	8	21
TOTAL	5	7	2	5	8	27
AADT	9896	10124	9253	10429	10932	

5 Year Statewide Rate

TYPE	2018	2019	2020	2021	2022	Rate Level
CRASH RATE	86.52	118.39	37.01	82.09	125.31	
STATE RATE-US	112.48	114.05	111.54	109.69	107.06	ROUTE DESG
STATE RATE-EXPRESSWAY	128.91	130.28	125.55	120.72	115.44	ROADWAY TYPE

TYPE	2018	2019	2020	2021	2022	TOTAL
ANIMAL DRAWN VEH OR RIDDEN ANIMAL	0	0	0	0	0	0
ANIMAL NOT DEER/DOG/FARM ANIMAL	0	0	0	0	0	0
ANIMAL OTHER THAN DEER	0	0	0	0	0	0
AVOIDING	0	0	0	0	0	0
BACKING	0	1	0	0	0	1
CHANGING LANE	0	0	0	0	0	0
CROSS MEDIAN	0	0	0	0	0	0
DEBRIS	0	0	0	0	0	0
DEER	0	0	0	1	0	1
DOG	0	0	0	0	0	0
DUAL LEFTS COLLIDE	0	0	0	0	0	0
DUAL RIGHTS COLLIDE	0	0	0	0	0	0
FARM ANIMAL	0	0	0	0	0	0
FIXED OBJECT	0	0	1	0	0	1
HEAD ON	0	0	0	0	0	0
JACKKNIFE	0	0	0	0	0	0
LEFT TURN	0	1	0	0	0	1
LEFT TURN RIGHT ANGLE COLLISION	0	1	0	0	0	1
OTHER	0	0	0	0	0	0
OUT OF CONTROL	2	1	0	0	2	5
PARKING OR PARKED CAR	0	0	0	0	0	0
PASSING	0	1	1	0	2	4
PEDALCYCLE	0	0	0	0	0	0
PEDESTRIAN	0	0	0	0	0	0
REAR END	2	0	0	0	2	4
RIGHT ANGLE	1	2	0	4	2	9
RIGHT TURN	0	0	0	0	0	0
RIGHT TURN RIGHT ANGLE COLLISION	0	0	0	0	0	0
SIDESWIPE	0	0	0	0	0	0
TOWED UNIT DISCONNECTS	0	0	0	0	0	0
U - TURN	0	0	0	0	0	0
WRONG WAY ON DIVIDED HIGHWAY	0	0	0	0	0	0
TOTAL	5	7	2	5	8	27

OFFSET	TRAVEL WAY ID	DESIGNATION	TRAVEL WAY NAME	DIRECTION	BEGIN LOG	END LOG	BEGIN DISTRICT	END DISTRICT	BEGIN COUNTY	END COUNTY	COUNTY BEGIN LOG	COUNTY END LOG	BEGIN DESCRIPTION	END DESCRIPTION
	11	US	61	S	114.504	114.504	2	2	LINCOLN	LINCOLN	10.364	10.364	RT K E	RT K E

TYPE	2018	2019	2020	2021	2022	TOTAL
FATAL	0	0	0	0	0	0
SERIOUS INJURY	0	0	0	0	0	0
MINOR INJURY	1	0	0	0	1	2
PROPERTY DAMAGE ONLY	1	2	2	1	2	8
TOTAL	2	2	2	1	3	10
AADT	8663	8853	8123	9158	9504	

1 Year Statewide Rate

TYPE	2018	2019	2020	2021	2022	Rate Level
CRASH RATE	0.63	0.62	0.67	0.3	0.86	
STATE RATE	0.21	0.33	0.33	0.3	0.24	

TYPE	2018	2019	2020	2021	2022	TOTAL
ANIMAL DRAWN VEH OR RIDDEN ANIMAL	0	0	0	0	0	0
ANIMAL NOT DEER/DOG/FARM ANIMAL	0	0	0	0	0	0
ANIMAL OTHER THAN DEER	0	0	0	0	0	0
AVOIDING	0	0	0	0	0	0
BACKING	0	0	0	0	0	0
CHANGING LANE	0	0	0	0	0	0
CROSS MEDIAN	0	0	0	0	0	0
DEBRIS	0	0	0	0	0	0
DEER	0	0	0	0	0	0
DOG	0	0	0	0	0	0
DUAL LEFTS COLLIDE	0	0	0	0	0	0
DUAL RIGHTS COLLIDE	0	0	0	0	0	0
FARM ANIMAL	0	0	0	0	0	0
FIXED OBJECT	0	0	0	0	0	0
HEAD ON	0	0	0	0	0	0
JACKKNIFE	0	0	0	0	0	0
LEFT TURN	0	0	0	0	0	0
LEFT TURN RIGHT ANGLE COLLISION	0	0	1	0	1	2
OTHER	0	0	0	0	0	0
OUT OF CONTROL	0	0	0	0	0	0
PARKING OR PARKED CAR	0	0	0	0	0	0
PASSING	0	1	0	0	1	2
PEDALCYCLE	0	0	0	0	0	0
PEDESTRIAN	0	0	0	0	0	0
REAR END	1	1	1	1	1	5
RIGHT ANGLE	1	0	0	0	0	1
RIGHT TURN	0	0	0	0	0	0
RIGHT TURN RIGHT ANGLE COLLISION	0	0	0	0	0	0
SIDESWIPE	0	0	0	0	0	0
TOWED UNIT DISCONNECTS	0	0	0	0	0	0
U - TURN	0	0	0	0	0	0
WRONG WAY ON DIVIDED HIGHWAY	0	0	0	0	0	0
TOTAL	2	2	2	1	3	10

OFFSET	TRAVEL WAY ID	DESIGNATION	TRAVEL WAY NAME	DIRECTION	BEGIN LOG	END LOG	BEGIN DISTRICT	END DISTRICT	BEGIN COUNTY	END COUNTY	COUNTY BEGIN LOG	COUNTY END LOG	BEGIN DESCRIPTION	END DESCRIPTION
	11	US	61	S	115.506	115.506	2	2	LINCOLN	LINCOLN	11.366	11.366	CRD CREECH LN E	CRD CREECH LN E

TYPE	2018	2019	2020	2021	2022	TOTAL
FATAL	0	0	0	0	0	0
SERIOUS INJURY	0	2	0	0	1	3
MINOR INJURY	2	2	1	1	0	6
PROPERTY DAMAGE ONLY	1	3	0	2	3	9
TOTAL	3	7	1	3	4	18
AADT	19101	19541	17861	20129	21032	

1 Year Statewide Rate

TYPE	2018	2019	2020	2021	2022	Rate Level
CRASH RATE	0.43	0.98	0.15	0.41	0.52	
STATE RATE	0.34	0.2	0.22	0.21	0.26	

TYPE	2018	2019	2020	2021	2022	TOTAL
ANIMAL DRAWN VEH OR RIDDEN ANIMAL	0	0	0	0	0	0
ANIMAL NOT DEER/DOG/FARM ANIMAL	0	0	0	0	0	0
ANIMAL OTHER THAN DEER	0	0	0	0	0	0
AVOIDING	0	0	0	0	0	0
BACKING	0	1	0	0	0	1
CHANGING LANE	0	0	0	0	0	0
CROSS MEDIAN	0	0	0	0	0	0
DEBRIS	0	0	0	0	0	0
DEER	0	0	0	0	0	0
DOG	0	0	0	0	0	0
DUAL LEFTS COLLIDE	0	0	0	0	0	0
DUAL RIGHTS COLLIDE	0	0	0	0	0	0
FARM ANIMAL	0	0	0	0	0	0
FIXED OBJECT	0	0	0	0	0	0
HEAD ON	0	0	0	0	0	0
JACKKNIFE	0	0	0	0	0	0
LEFT TURN	0	0	0	0	0	0
LEFT TURN RIGHT ANGLE COLLISION	0	0	0	0	1	1
OTHER	0	1	0	0	0	1
OUT OF CONTROL	0	0	0	0	0	0
PARKING OR PARKED CAR	0	0	0	0	0	0
PASSING	0	0	0	0	0	0
PEDALCYCLE	0	0	0	0	0	0
PEDESTRIAN	0	0	0	0	0	0
REAR END	1	0	0	0	0	1
RIGHT ANGLE	2	5	1	3	3	14
RIGHT TURN	0	0	0	0	0	0
RIGHT TURN RIGHT ANGLE COLLISION	0	0	0	0	0	0
SIDESWIPE	0	0	0	0	0	0
TOWED UNIT DISCONNECTS	0	0	0	0	0	0
U - TURN	0	0	0	0	0	0
WRONG WAY ON DIVIDED HIGHWAY	0	0	0	0	0	0
TOTAL	3	7	1	3	4	18

County	Travelway	Log	Crash Class	Date	Severity Rating	Image #	Intersection #	Light Cond	Road Surf Cond	Weather Cond	Travelway Id	Day of Week	Time	PROP_DMG_IND	TRANSACTION_ID	OBJECT_ID	At Location Street
LINCOLN	RT V E	0.029	OUT OF CONTROL	11/9/2018	PROPERTY DAMAGE ONLY	3180032842	155766	DARK W/ STREET LIGHTS OFF	ICE	FREEZING	6867	FRI	2145	MODOT	20789393	191899144	RT K (EJ)
LINCOLN	RT V E	0.029	OUT OF CONTROL	7/26/2022	PROPERTY DAMAGE ONLY	3220018991	155766	DAYLIGHT	WET	CLOUDY	6867	TUE	1335		42816661	224499493	US 61
LINCOLN	RT V E	0.037	REAR END	9/4/2022	PROPERTY DAMAGE ONLY	3220021817	155766	DAYLIGHT	DRY	CLOUDY	6867	SUN	808		42827282	224527548	RT K (EJ)
LINCOLN	RT K E	2.289	LEFT TURN RIGHT ANGLE COLLISION	2/7/2019	MINOR INJURY	2190011828	155766	DAYLIGHT	WET	CLOUDY	6881	THU	1225		20373821	190996124	US 61
LINCOLN	US 61 N	279.538	FIXED OBJECT	7/18/2020	PROPERTY DAMAGE ONLY	3200017257	155766	DARK W/ STREET LIGHTS OFF	DRY	CLEAR	7773	SAT	2304	MODOT	49653676	233705332	RT V
LINCOLN	US 61 N	279.543	OUT OF CONTROL	11/9/2018	PROPERTY DAMAGE ONLY	0180043373	155766	DARK W/ STREET LIGHTS OFF	ICE	FREEZING	7773	FRI	1907	MODOT	49613099	233581140	RT V
LINCOLN	US 61 N	279.545	RIGHT ANGLE	1/1/2021	SERIOUS INJURY	0210010003	155766	DARK W/ STREET LIGHTS OFF	DRY	CLOUDY	7773	FRI	120		49655804	233710788	RT V
LINCOLN	RT K E	2.273	REAR END	7/30/2020	PROPERTY DAMAGE ONLY	3200018174	155762	DAYLIGHT	WET	RAIN	6881	THU	830		27284560	202678722	US 61
LINCOLN	RT K E	2.279	REAR END	2/12/2018	PROPERTY DAMAGE ONLY	3180004871	155762	DARK W/ STREET LIGHTS OFF	ICE	CLEAR	6881	MON	625		15958888	186205980	US 61
LINCOLN	RT K E	2.285	REAR END	4/5/2021	PROPERTY DAMAGE ONLY	3210008920	155762	DAYLIGHT	DRY	CLEAR	6881	MON	1215		29399616	206322646	US 61
LINCOLN	RT K E	2.29	PASSING	12/19/2022	PROPERTY DAMAGE ONLY	3220032881	155762	DAYLIGHT	DRY	CLEAR	6881	MON	1620		46721383	229534944	US 61
LINCOLN	RT K E	2.292	REAR END	6/8/2022	MINOR INJURY	2220046055	155762	DAYLIGHT	WET	CLOUDY	6881	WED	749		42573320	223907656	RT K (WJ)
LINCOLN	US 61 S	114.502	REAR END	1/11/2019	PROPERTY DAMAGE ONLY	0190012233	155762	DARK W/ STREET LIGHTS OFF	SNOW	SNOW	11	FRI	1715		25423697	199025820	RT K
LINCOLN	US 61 S	114.504	PASSING	8/30/2019	PROPERTY DAMAGE ONLY	0190038865	155762	DARK - UNKNOWN	DRY	CLEAR	11	FRI	0		25425886	199032871	RT V
LINCOLN	US 61 S	114.504	RIGHT ANGLE	5/26/2018	MINOR INJURY	3180013415	155762	DAYLIGHT	DRY	CLEAR	11	SAT	1018		25420013	199014880	RT K
LINCOLN	US 61 S	114.504	LEFT TURN RIGHT ANGLE COLLISION	11/30/2022	PROPERTY DAMAGE ONLY	3220030969	155762	DAYLIGHT	DRY	CLEAR	11	WED	1120		46580915	229205263	RT K
LINCOLN	US 61 S	114.513	LEFT TURN RIGHT ANGLE COLLISION	6/22/2020	PROPERTY DAMAGE ONLY	3200014514	155762	DAYLIGHT	DRY	CLEAR	11	MON	1020		25882177	200434524	RT V

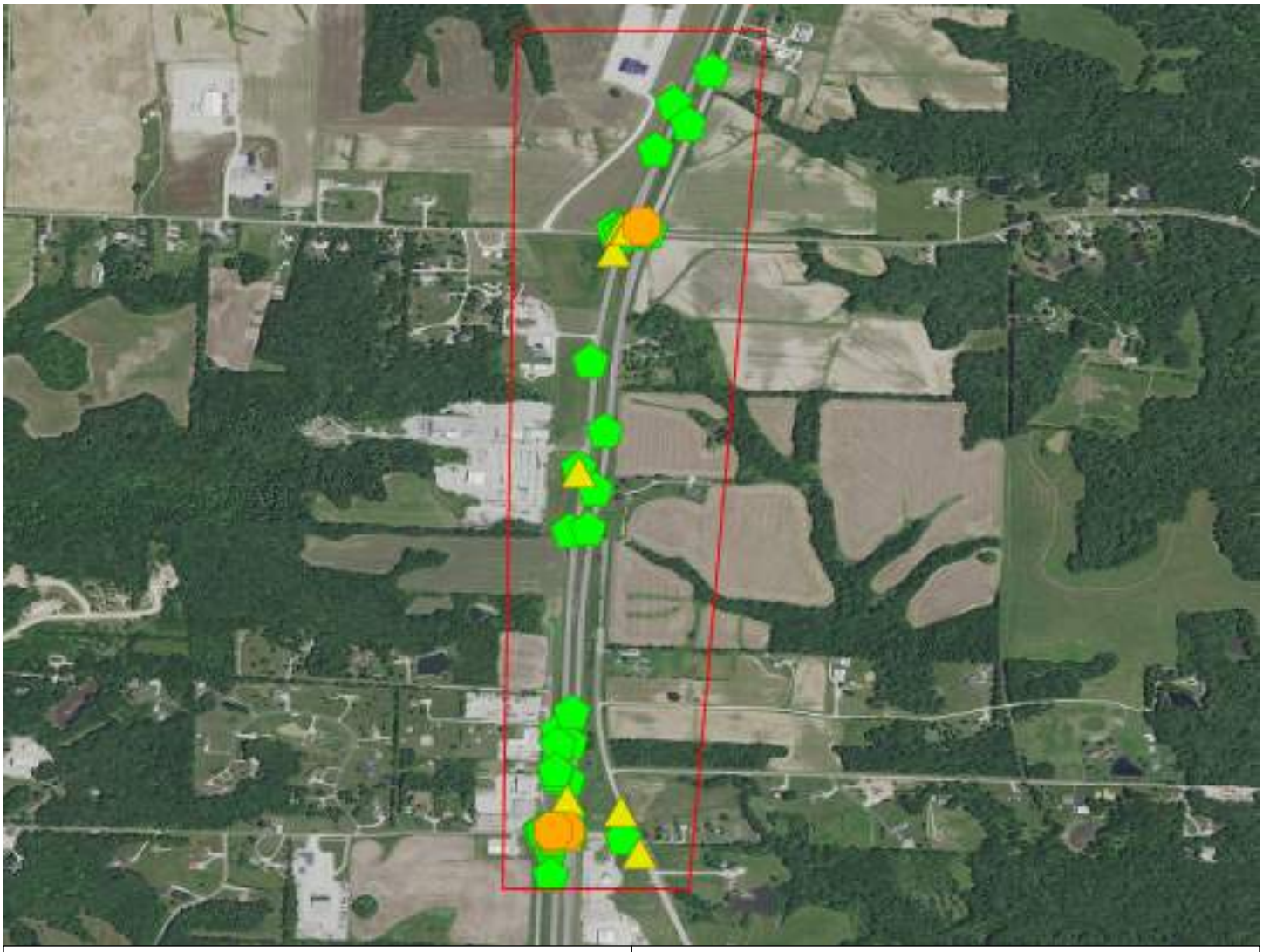
County	Travelway	Log	Crash Class	Date	Severity Rating	Image #	Intersection #	Light Cond	Road Surf Cond	Weather Cond	Travelway Id	Day of Week	Time	PROP_DMG_IND	TRANSACTION_ID	OBJECT_ID	At Location Street
LINCOLN	CRD CREECH LN E	0.004	BACKING	9/20/2019	PROPERTY DAMAGE ONLY	3190025353	158982	DAYLIGHT	DRY	CLEAR	961654	FRI	1715		16371391	187052937	US 61
LINCOLN	US 61 S	115.506	RIGHT ANGLE	1/9/2018	MINOR INJURY	3180001375	158986	DARK W/ STREET LIGHTS OFF	DRY	CLEAR	11	TUE	1755		25418080	199009102	CRD CREECH LN
LINCOLN	US 61 S	115.506	LEFT TURN RIGHT ANGLE COLLISION	7/19/2022	PROPERTY DAMAGE ONLY	3220018360	158986	DAYLIGHT	DRY	CLEAR	11	TUE	1507		42668775	224135801	CRD CREECH LN
LINCOLN	US 61 S	115.506	RIGHT ANGLE	10/7/2022	SERIOUS INJURY	3220025109	158986	DAYLIGHT	DRY	CLEAR	11	FRI	1113		44805579	226987387	CRD CREECH LN
LINCOLN	US 61 S	115.506	RIGHT ANGLE	12/10/2020	MINOR INJURY	3200031607	158986	DAYLIGHT	DRY	CLOUDY	11	THU	1542		27275844	202658625	CRD CREECH LN
LINCOLN	US 61 S	115.506	RIGHT ANGLE	4/20/2019	MINOR INJURY	3190010374	158986	DAYLIGHT	DRY	CLEAR	11	SAT	1043		25438575	199078212	CRD CREECH LN
LINCOLN	US 61 S	115.506	RIGHT ANGLE	11/8/2019	MINOR INJURY	3190030595	158986	DAYLIGHT	DRY	CLEAR	11	FRI	1645		25441576	199086938	CRD CREECH LN
LINCOLN	US 61 S	115.511	RIGHT ANGLE	1/23/2019	SERIOUS INJURY	3190002231	158986	DARK W/ STREET LIGHTS ON	DRY	CLEAR	11	WED	2130	MODOT	25437316	199074516	CRD CREECH LANE
LINCOLN	US 61 S	115.519	REAR END	7/17/2018	PROPERTY DAMAGE ONLY	3180018642	158986	DAYLIGHT	DRY	CLEAR	11	TUE	1125		25420797	199017179	CRD CREECH LN
LINCOLN	US 61 S	115.529	OTHER	1/23/2019	PROPERTY DAMAGE ONLY	3190002230	158986	DARK W/ STREET LIGHTS ON	DRY	CLEAR	11	WED	2127		25437315	199074514	CRD CREECH LANE
LINCOLN	US 61 N	278.535	RIGHT ANGLE	3/17/2021	MINOR INJURY	3210007556	158982	DAYLIGHT	WET	CLOUDY	7773	WED	1610		49667263	233746737	CRD CREECH LN
LINCOLN	US 61 N	278.539	RIGHT ANGLE	10/11/2018	MINOR INJURY	3180027789	158982	DAYLIGHT	DRY	CLEAR	7773	THU	730		49624998	233618368	CRD CREECH LANE
LINCOLN	US 61 N	278.539	RIGHT ANGLE	12/17/2019	PROPERTY DAMAGE ONLY	3190035018	158982	DARK W/ STREET LIGHTS OFF	DRY	CLEAR	7773	TUE	1750		49642439	233671069	CRD CREECH LANE
LINCOLN	US 61 N	278.539	RIGHT ANGLE	7/11/2019	SERIOUS INJURY	3190018547	158982	DARK W/ STREET LIGHTS OFF	DRY	CLEAR	7773	THU	2347		49640199	233665181	CRD CREECH LANE
LINCOLN	US 61 N	278.539	RIGHT ANGLE	3/22/2021	PROPERTY DAMAGE ONLY	0210011126	158982	DAYLIGHT	DRY	CLEAR	7773	MON	1455		49655879	233711003	CRD CREECH LN
LINCOLN	US 61 N	278.539	RIGHT ANGLE	1/18/2021	PROPERTY DAMAGE ONLY	3210002039	158982	DAYLIGHT	DRY	CLEAR	7773	MON	1420		49666459	233744561	CRD CREECH LN
LINCOLN	US 61 N	278.539	RIGHT ANGLE	11/10/2022	PROPERTY DAMAGE ONLY	2220099544	158982	DAYLIGHT	DRY	CLEAR	7773	THU	1729		49679990	233785343	CRD CREECH LN
LINCOLN	US 61 N	278.539	RIGHT ANGLE	11/3/2022	PROPERTY DAMAGE ONLY	3220028410	158982	DAYLIGHT	DRY	CLEAR	7773	THU	1710		49684792	233798648	CRD CREECH LANE

MoDOT Safety Data Zone Crash Tool

This PDF generated on December 26, 2023.

NOTE: The crash data contained in this PDF may not be as current as the date of this PDF.

2018-2022 TMS Crash Map



Crash Totals		Personal Injury Totals	
Fatal Crashes	0	Fatalities	0
Serious Injury Crashes	4	Serious Injuries	5
Minor Injury Crashes	14	Minor Injuries	22
PDO Crashes	48		
Total Crashes	66		

Unknown

Prop Damage Only

Minor Injury

Disabling Injury

Fatal

MEMORANDUM ATTACHMENT B

Missouri Department of Transportation
Transportation Planning
105 West Capitol Avenue

TO: Brian Untiedt, NE-DE

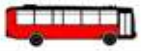
FROM: Jennifer Prenger
Senior Transportation Planner

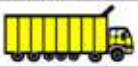
DATE: July 5, 2023

SUBJECT: Design Traffic
US 61/RTs K & V, Lincoln County
Job No. JNE0004

We are providing estimates of average daily traffic for the above project as requested. Directional Distributions are listed as either a North/South or East/West ratio. Routes that have experienced negative or stagnant growth will be given an assumed growth rate of 0.5% and denoted with (A). Routes that have experienced positive growth will have their future AADT determined by the trend line calculated from actual counts.

	US 61-N/O K	US61-S/O K	RT K	RT V
AADT (2022)	19,942	21,032	728	805
Construction Year (2026)	21,921	22,998	788	816
Design Year (2036)	26,433	27,584	962	866
Directional Distribution	56.0% / 44.0%	51.4% / 48.6%	50.3% / 49.7%	50.3% / 49.7%
Peak Hour	7.24%	7.78%	12.36%	9.94%
Percent Trucks	26.21%	26.62%	12.50%	26.65%
Growth Rate	1.89%	1.83%	2.02%	0.60%
BUS (%)	451 (7%)	595 (8%)	21 (18%)	19 (8%)
2D (%)	2688 (39%)	1885 (26%)	79 (66%)	59 (26%)
SU 3 (%)		387 (5%)		12 (5%)
SU 4+ (%)		38 (1%)		1 (1%)
ST4- (%)	3790 (55%)	657 (9%)	20 (16%)	21 (9%)
ST 5 (%)		3267 (44%)		102 (44%)
ST 6+ (%)		83 (1%)		3 (1%)
MT 5- (%)		96 (1%)		3 (1%)
MT 6 (%)		23 (0%)		1 (0%)
MT 7+ (%)		310 (4%)		10 (4%)
TOTAL	**6,929**	**7,343**	**120**	**231**

Class 1 Motorcycles	
Class 2 Passenger cars	
	
	
	
Class 3 Four tire, single unit	
	
	
Class 4 Buses	
	
	
Class 5 Two axle, six tire, single unit	
	
	
Class 6 Three axle, single unit	
	
	

Class 7 Four or more axle, single unit	
	
	
Class 8 Four or less axle, single trailer	
	
	
Class 9 5-Axle tractor semitrailer	
	
Class 10 Six or more axle, single trailer	
	
Class 11 Five or less axle, multi trailer	
Class 12 Six axle, multi-trailer	
	
Class 13 Seven or more axle, multi-trailer	
	
	
	

Missouri Department of Transportation

Transportation Planning

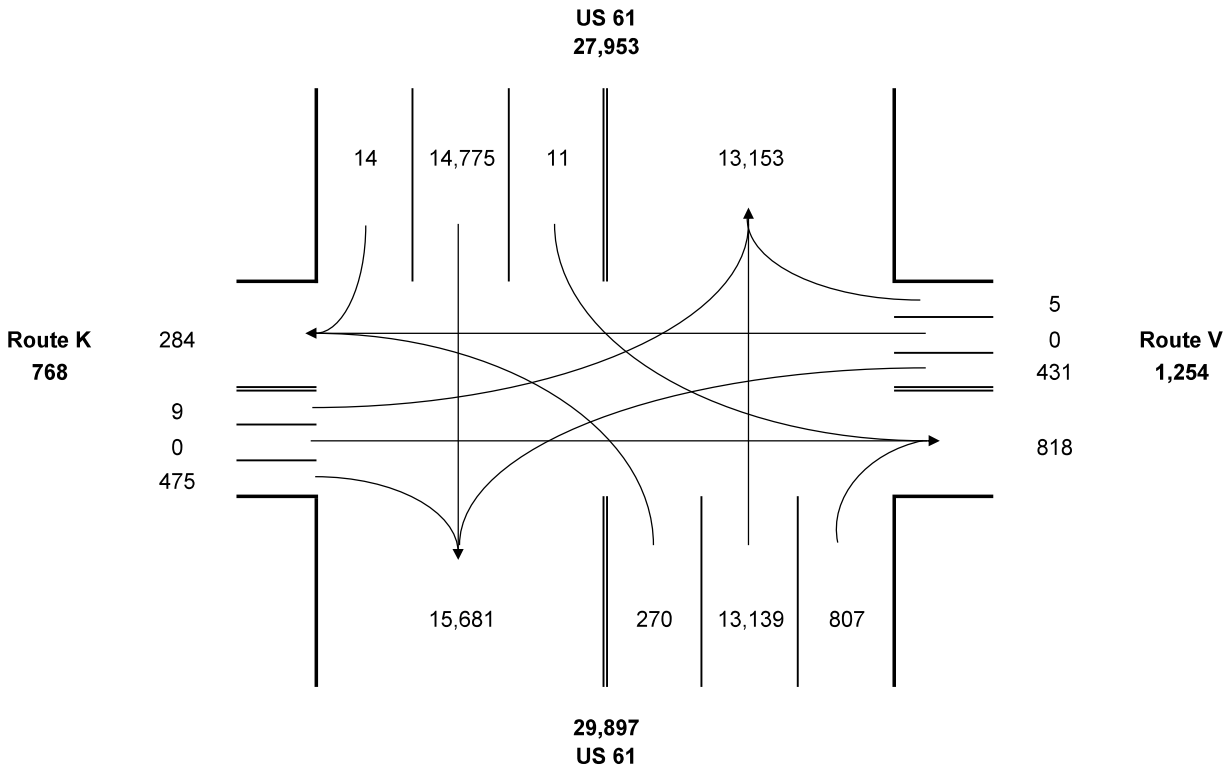
Turning Movement Diagram and Summary

US 61/ RTs K & V
Lincoln County, MO

Station Location: **US 61/ RTs K & V** Date: **July 2023**

Base Year: 2022 Construction Year: 2026 Design Year: 2036

	Base 2022	Const. 2026	Design 2036
North to West	11	12	14
North to South	11,147	12,253	14,775
North to East	8	9	11
East to North	4	4	5
East to West	0	0	0
East to South	401	407	431
South to East	615	673	807
South to North	10,018	10,954	13,139
South to West	206	225	270
West to South	359	389	475
West to East	0	0	0
West to North	7	7	9



Comments:


US 61 N/O Int
In
Total
Out
9,335
18,594
9,259
Right
Thru
Left
9
9,319
7
RT K
Out
199
Left
3
Total
364
Thru
0
In
165
Right
162
6
Right
549
In
0
Thru
1,124
Total
543
Left
575
Out
RT V
190
9,250
568
Left
Thru
Right
10,024
20,032
10,008
Out
Total
In
US 61 S/O Int

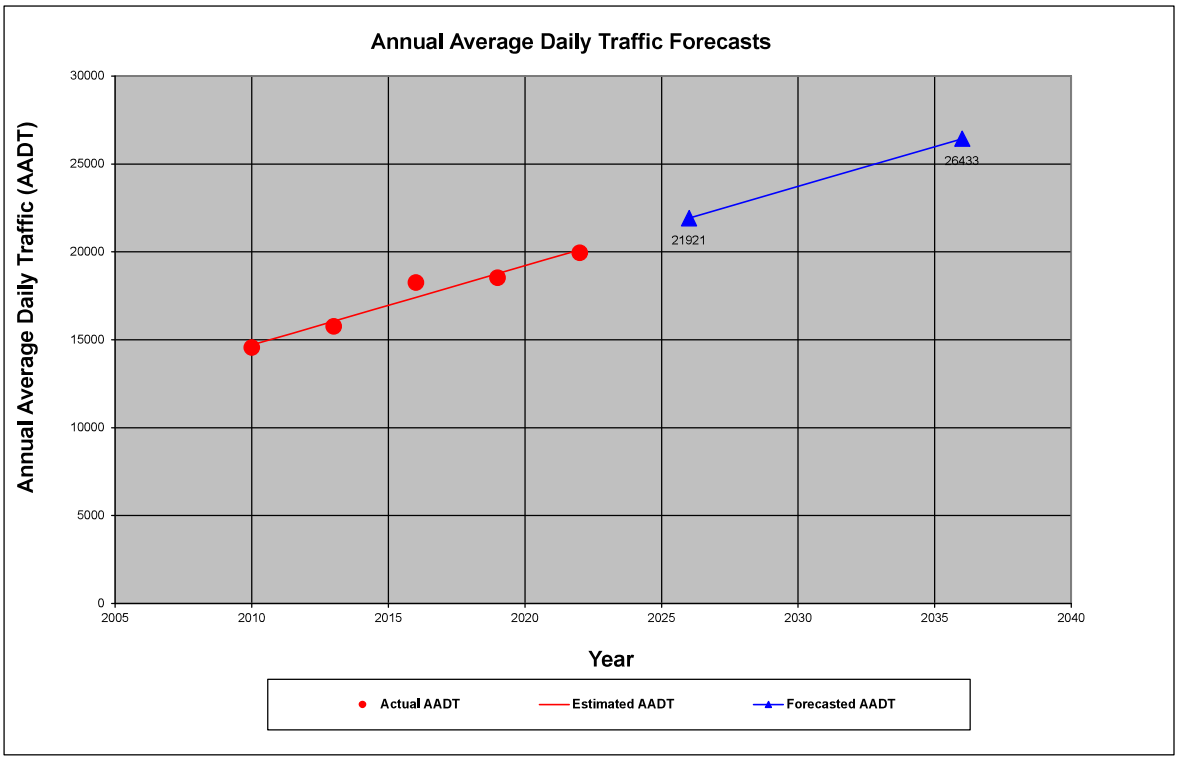
Missouri Department of Transportation, Transportation Planning
Traffic Forecasts

Job Information		Observation Number	Actual Year	Actual AADT	Estimated AADT
District:	NE	1	2010	14556	14701
County:	Lincoln	2	2013	15763	16055
Route:	61-N/O K	3	2016	18254	17409
Job Number:	JNE0004	4	2019	18528	18762
Construction Year:	2026	5	2022	19942	20116
Design Year:	2036	6			
Construction AADT:	21921	7			
Desgin AADT:	26433	8			
		9			
		10			
	Construction Year and Estimated AADT:		2026		21921
	Design Year and Estimated AADT:		2036		26433

Estimated Annual Compound Growth Rate from Construction Year to Design Year: 1.0189

Date: **7/5/2023**
Time: **1:47 PM**

Note: **Use a minimum of 4 data points for regression.**
Use a maximum of 10 data points for regression.
Enter the actual year from lowest to highest.
Enter AADT for each year.



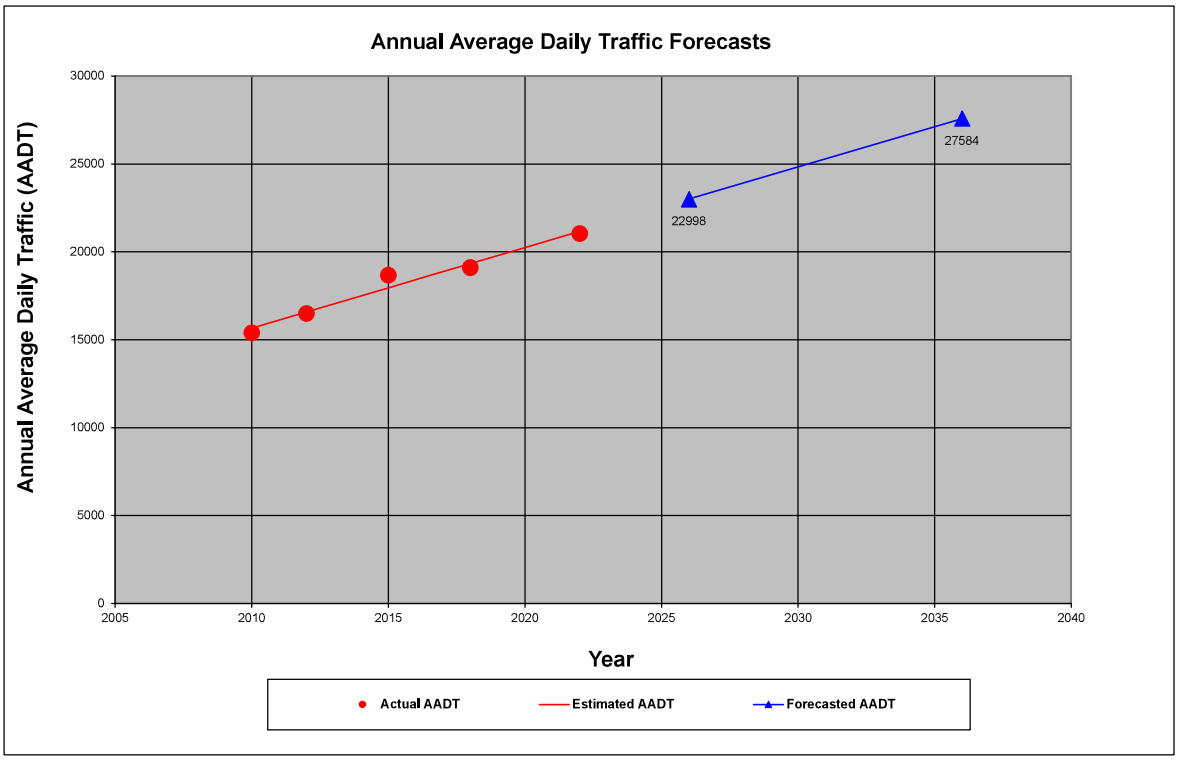
Missouri Department of Transportation, Transportation Planning
Traffic Forecasts

Job Information		Observation Number	Actual Year	Actual AADT	Estimated AADT
District:	NE	1	2010	15389	15661
County:	Lincoln	2	2012	16496	16579
Route:	61-S/O K	3	2015	18670	17954
Job Number:	JNE0004	4	2018	19101	19330
Construction Year:	2026	5	2022	21032	21164
Design Year:	2036	6			
Construction AADT:	22998	7			
Desgin AADT:	27584	8			
		9			
		10			
	Construction Year and Estimated AADT:		2026		22998
	Design Year and Estimated AADT:		2036		27584

Estimated Annual Compound Growth Rate from Construction Year to Design Year: 1.0183

Date: **7/5/2023**
Time: **1:47 PM**

Note: **Use a minimum of 4 data points for regression.**
Use a maximum of 10 data points for regression.
Enter the actual year from lowest to highest.
Enter AADT for each year.



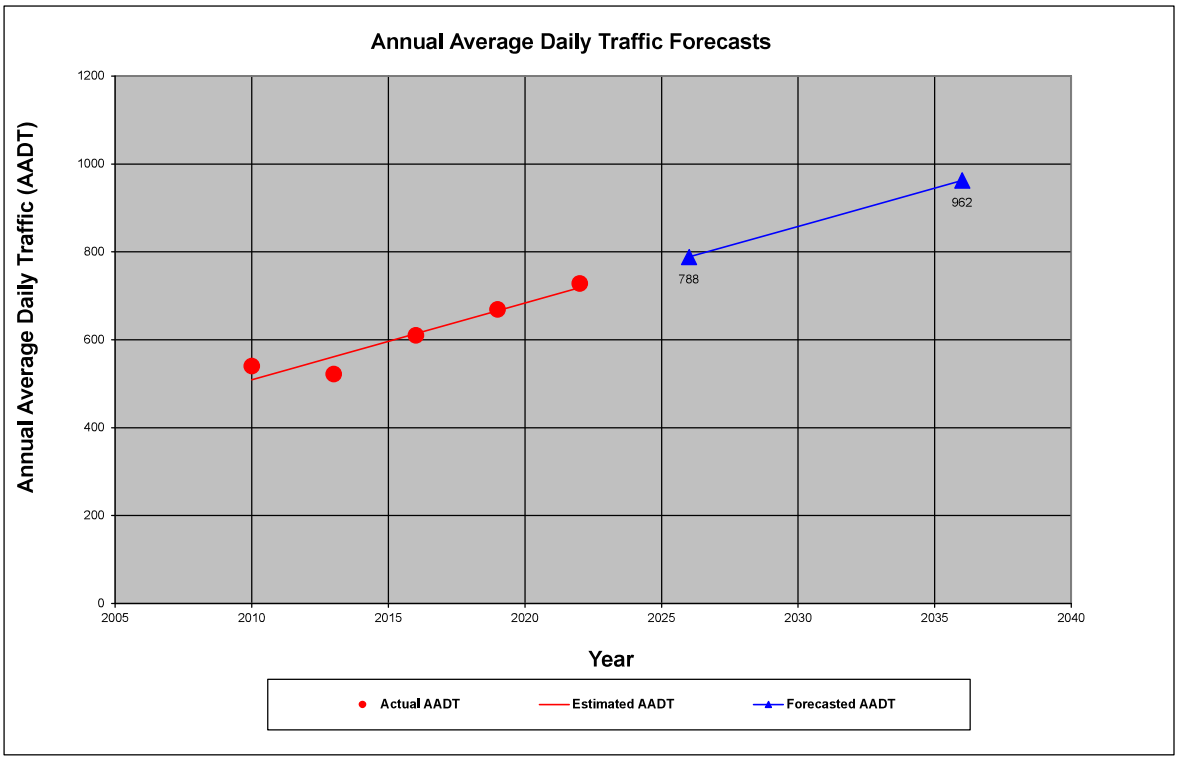
Missouri Department of Transportation, Transportation Planning
Traffic Forecasts

Job Information		Observation Number	Actual Year	Actual AADT	Estimated AADT
District:	NE	1	2010	540	509
County:	Lincoln	2	2013	522	562
Route:	K	3	2016	610	614
Job Number:	JNE0004	4	2019	669	666
Construction Year:	2026	5	2022	728	718
Design Year:	2036	6			
Construction AADT:	788	7			
Desgin AADT:	962	8			
		9			
		10			
Construction Year and Estimated AADT:			2026		788
Design Year and Estimated AADT:			2036		962

Estimated Annual Compound Growth Rate from Construction Year to Design Year: 1.0202

Date: **7/5/2023**
Time: **1:47 PM**

Note:
Use a minimum of 4 data points for regression.
Use a maximum of 10 data points for regression.
Enter the actual year from lowest to highest.
Enter AADT for each year.



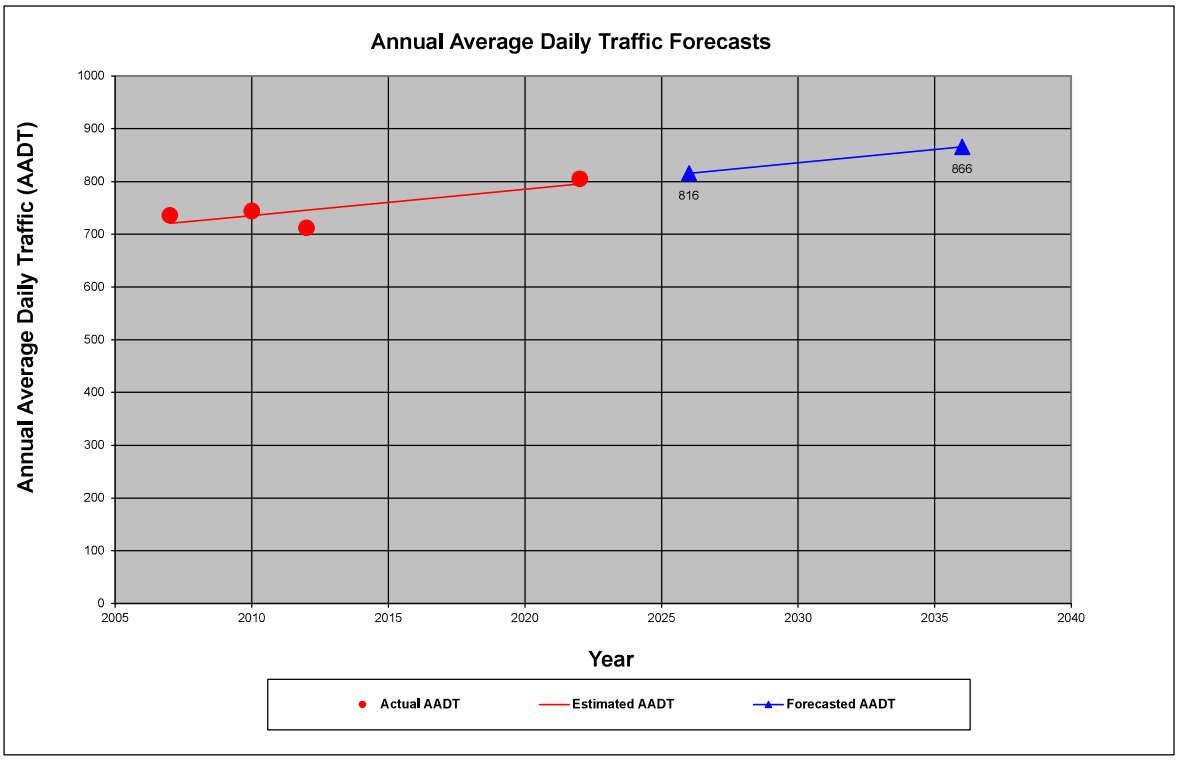
Missouri Department of Transportation, Transportation Planning
Traffic Forecasts

	Job Information	Observation Number	Actual Year	Actual AADT	Estimated AADT
District:	NE	1	2007	736	720
County:	Lincoln	2	2010	744	735
Route:	V	3	2012	712	745
Job Number:	JNE0004	4	2022	805	796
Construction Year:	2026	5			
Design Year:	2036	6			
Construction AADT:	816	7			
Desgin AADT:	866	8			
		9			
		10			
	Construction Year and Estimated AADT:		2026		816
	Design Year and Estimated AADT:		2036		866

Estimated Annual Compound Growth Rate from Construction Year to Design Year: 1.0060

Date: **7/5/2023**
Time: **1:47 PM**

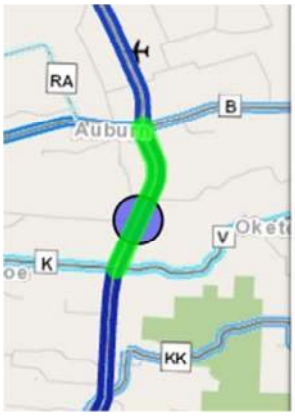
Note:
Use a minimum of 4 data points for regression.
Use a maximum of 10 data points for regression.
Enter the actual year from lowest to highest.
Enter AADT for each year.



US 61 N (Year: 2022)

Name	Quantity
AADT	11166
AAWDT	11200
MOTORCYCLE VOLUME	205
PASSENGER CAR VOLUME	4213
PU/PANEL TRUCK VOLUME	3748
BUS VOLUME	205
SINGLE UNIT TRUCK VOLUME	1168
COMB SEMI TRAILER VOLUME	1627

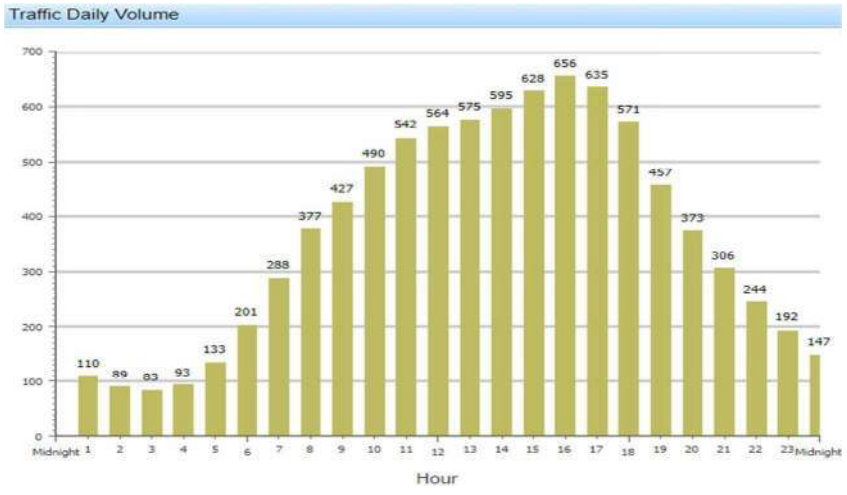
Show Traffic Daily Volume
Note:Volumes represent one direction only.
Select other direction to see opposing volumes.



US 61 S (Year: 2022)

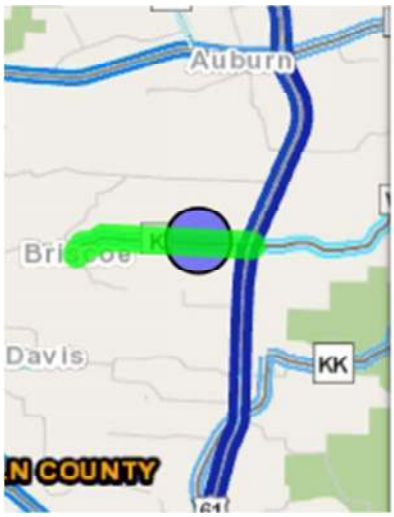
Name	Quantity
AADT	8776
AAWDT	8803
MOTORCYCLE VOLUME	124
PASSENGER CAR VOLUME	3318
PU/PANEL TRUCK VOLUME	3106
BUS VOLUME	135
SINGLE UNIT TRUCK VOLUME	860
COMB SEMI TRAILER VOLUME	1232

Show Traffic Daily Volume
Note:Volumes represent one direction only.
Select other direction to see opposing volumes.



RT K E (Year: 2022)

Name	Quantity
AADT	366
AAWDT	386
MOTORCYCLE VOLUME	1
PASSENGER CAR VOLUME	182
PU/PANEL TRUCK VOLUME	130
BUS VOLUME	9
SINGLE UNIT TRUCK VOLUME	36
COMB SEMI TRAILER VOLUME	7
PEAK HOUR VOLUME AM	41
PEAK HOUR VOLUME PM	47



RT K W (Year: 2022)

Name	Quantity
AADT	362
AAWDT	382
MOTORCYCLE VOLUME	3
PASSENGER CAR VOLUME	193
PU/PANEL TRUCK VOLUME	127
BUS VOLUME	7
SINGLE UNIT TRUCK VOLUME	24
COMB SEMI TRAILER VOLUME	8
PEAK HOUR VOLUME AM	26
PEAK HOUR VOLUME PM	43

5. Summary

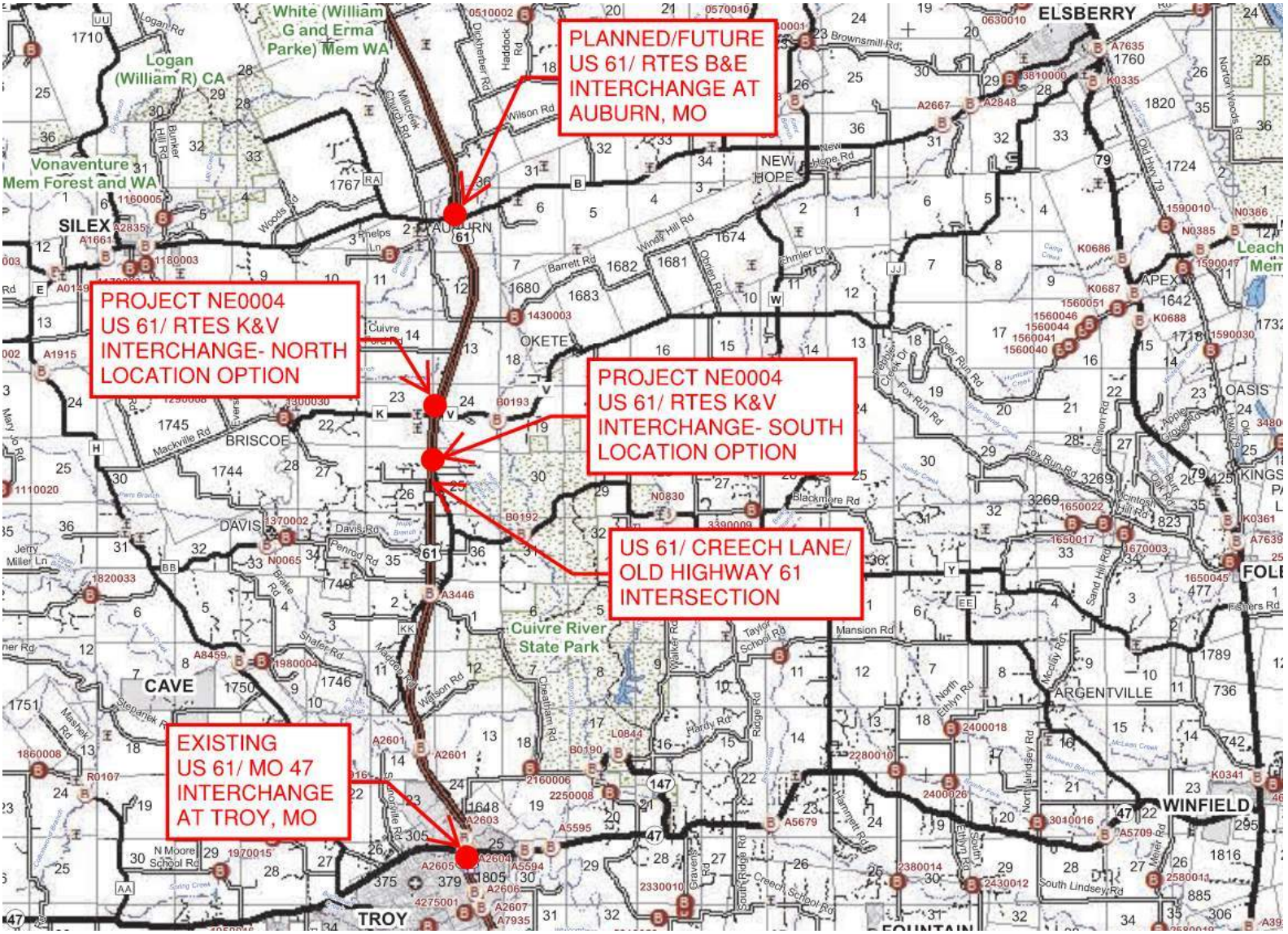
Based on this analysis, Alternative 1-4 are all expected to operate acceptably into the future year 2047 condition with comparable operational results. Alternative 5 is also expected to operate acceptably with the addition of traffic signals at the ramp terminals. An overall summary of all alternatives is provided in **Table 4** below.

Table 4 – Comparison of Alternatives

Alt.	Traffic Observations (2047)	Additional Considerations
1	Roundabout operations are good. Intersection delay = 7.5 sec Max queue = 130' Max v/c = 0.58	Pros: • 4-leg roundabout meets typical driver expectations • Smaller roundabout footprint Cons: • Partial clover on-ramps may lead to speed differentials along US-61 • Longer travel distance to/from Creech Lane • Increased spacing between ramps & outer roads would be preferred from access management and property value impacts perspective.
2	Roundabout operations are good. Intersection delay = 8.2 sec Max queue = 140' Max v/c = 0.60	Pros: • Improved access management • Smaller roundabout footprint Cons: • Less-typical 5-leg roundabout layout • Partial clover on-ramps may lead to speed differentials along US-61 • Longer travel distance to/from Creech Lane
3	Roundabout operations are good. Intersection delay = 8.5 sec Max queue = 84' Max v/c = 0.45	Pros: • Directional highway merge/diverge ramps • Improved access management Cons: • Less typical 6-leg roundabout layout • Larger roundabout footprint • Longer travel distance to/from Creech Lane
4	Roundabout operations are good. Intersection delay = 7.5 sec Max queue = 91' Max v/c = 0.45	Pros: • Improved travel distance for through trips along Creech Lane • Equal distance between both closed intersections • Improved access management Cons: • Likely adds lane miles and travel distance for MoDOT Route K/V • Larger roundabout footprint
5	Operations are poor as stop-controlled ramp terminals. Signalized ramps are expected to operate acceptably. Outer road intersections have increased delay. Intersection delay = 27.5 sec Max queue = 288' Max v/c = 1.07	Pros: • Directional highway merge/diverge ramps Cons: • Likely require signalization of ramp terminals • More ROW acquisition or poor access spacing • Longer travel distance to/from Creech Lane
General	Stop-controlled outer roads such as Creech Lane are expected to operate acceptably as minor-street stop control or all-way stop. Turn lane warrant results described in Section 3.3 should be confirmed via traffic study, as they are dependent upon development site layout.	

ATTACHMENT D

INTERCHANGE LOCATION EXHIBIT



N
W E
S

GENERAL HIGHWAY MAP
LINCOLN COUNTY
Prepared by MoDOT
Transportation Planning Division

County No. 57 NE District

Scale
0 1 2 3 4 Miles

Revised - February 2022

ATTACHMENT E

BUILD IN MEDIAN ANALYSIS & DISCUSSION

Typical new interchange construction requires the incorporation of additional speed change lanes to allow vehicles entering and leaving the highway to make speed adjustments. At the US 61/ Routes K & V north interchange location, the median width could be reduced by changing how the additional lanes are incorporated. By constructing the additional lanes adjacent to the existing passing (inside) lanes, instead of building the additional lanes adjacent to the existing driving (outside) lanes, which is the standard approach, US 61 could be reconfigured to reduce the overall required length and cost of the grade-separation structure.

<u>Conceptual Alternative 1:</u> Four-leg Roundabouts at Existing US 61/ Routes K & V Intersection (North Location)

See attachment F for Conceptual Alternative 1 layout.

Option 1- Maintain existing US 61 typical section/ configuration.
110' existing median width remains.

No US 61 mainline pavement modifications. Acceleration lanes and outside shoulder originating from the loop on-ramps are constructed adjacent to the existing driving lanes (existing US 61 outside shoulders are removed in the acceleration lane construction area).

Interchange Bridge= 326' L x 34.67' W

Work item	Quantity	Cost	Comments
Bridge	11,302.42 SF	**$4,520,968**	@$400/SF
Roadway			
Pavement/shoulder removal	3936 SY	$23,616	@$6/SY
New US 61 pavement	3484 SY	$418,080	@$120/SY
New US 61 shoulder	2615 SY	$196,125	@$75/SY
New US 61 base	6099 SY	$60,990	@$10/ SY
	Road Subtotal	**$698,811**	
	Total with Bridge	**$5,219,779**	

A pavement resurfacing course is not necessary because US 61 mainline pavement is not being shifted.

Option 2A- Reduce existing US 61 typical section/ configuration- build new passing lanes in median- Mainline pavement transition to achieve additional lane occurs <u>between off ramp and on ramp gore areas</u>.
Median width narrows by 24'.

Acceleration lanes and outside shoulder originating from the loop on-ramps utilize the existing US 61 driving lanes. New lanes are built in the median adjacent to the existing US 61 passing lanes to function as the new passing lanes.

Interchange Bridge= 300' L x 34.67' W

Work item	Quantity	Cost	Comments
Bridge	10,401 SF	**$4,160,400**	@$400/SF
Roadway			
Pavement/shoulder removal	5252 SY	$31,512	@$6/SY
New US 61 pavement	5594 SY	$671,280	@$120/SY
New US 61 shoulder	2329 SY	$174,675	@$75/SY
New US 61 base	7923 SY	$79,230	@$10/ SY
	Road Subtotal	**$956,697**	
	Total with Bridge	**$5,117,097**	
3" HMA Resurfacing	25131 SY	$402,096	@$16/SY
	TOTAL	**$5,519,193**	

Safety Concerns:
1. Southbound drivers will still see pavement continuing ahead (Ramp 4 acceleration lane) and could try to continue in a straight line utilizing the "new" outside shoulder (existing driving lane) as a driving lane. The driver could then collide with vehicles entering US 61 from the Ramp 4 loop ramp. The same situation occurs on the northbound lanes with the Ramp 1 acceleration lane.

2. Introducing multiple additional horizontal curves to achieve an additional inside lane to a portion of roadway that already has horizontal curves to the south, could result in increased crashes.

3. Adding an interchange with ramps leaving and entering US 61, in combination with shifting of mainline pavement toward the new lane in the median over a short distance is a lot for drivers to navigate. Forcing drivers to make several decisions over a short distance, while traveling at 65 mph could result in an increase in crashes.

4. Dropping the acceleration lane requires shifting the driving lane laterally to the left into the existing passing lane (remove existing outside shoulder and use existing driving lane as the new outside shoulder). Then, traffic is shifted back over onto the existing driving lanes. Drivers may continue to follow the original traffic paths instead of shifting over, because they will still be able to see the pavement ahead to do so.

Comments:
Achieving and losing the extra median lanes south of the interchange is a smoother transition due to the existing horizontal curvature of US 61. Single tangent curves can be utilized instead of the reverse curves required to shift lanes in an existing tangent section.

The pavement transitions are estimated based on horizontal alignment tie-ins only. The amount of pavement required to transition the pavement may be increased as vertical alignment and superelevation tie-ins are assessed.

If shifting the driving and passing lanes toward the median is preferred, an HMA overlay is recommended for all US 61 lanes and shoulders within the transition areas. Historically, vehicles have tended to continue to follow old pavement joints and scarified pavement lines resulting from old pavement marking lines that have been removed with the lane shift. A resurfacing course would eliminate any remnants of the old travel paths.

Option 2B- Reduce existing US 61 typical section/ configuration- build new passing lanes in median- Mainline pavement transition to achieve additional lane occurs <u>outside of the off-ramp and on-ramp gore areas</u>.
Median width narrows by 24'.

Acceleration lanes and outside shoulder originating from the loop on-ramps utilize the existing US 61 driving lanes. New lanes are built in the median adjacent to the existing US 61 passing lanes to function as the new passing lanes.

This option was investigated to look at moving the US 61 lane transitions to occur outside of the Ramp 2/4 and Ramp 3/1 gore areas. By moving this transition, Safety Concern #3 in Option 2A is slightly reduced.

Interchange Bridge= 300' L x 34.67' W

Work item	Quantity	Cost	Comments
Bridge	10,401 SF	**$4,160,400**	@$400/SF
Roadway			
Pavement/shoulder removal	9667 SY	$58,002	@$6/SY
New US 61 pavement	11,079 SY	$1,329,480	@$120/SY
New US 61 shoulder	4277 SY	$320,775	@$75/SY
New US 61 base	15,356 SY	$153,560	@$10/ SY
	Road Subtotal	**$1,861,817**	
	Total with Bridge	**$6,022,217**	
3" HMA Resurfacing	46,268 SY	$740,288	@$16/SY
	TOTAL	**$6,762,505**	

Safety Concerns:
1. The existing driving lane becomes the deceleration lane to exit US 61 onto Ramp 2 and Ramp 3. Drivers could be unexpectedly forced to exit the highway by not navigating the pavement transition out of the existing driving lane.

2. Introducing multiple additional horizontal curves to achieve an additional inside lane to a portion of roadway that already has horizontal curves to the south, could result in increased crashes.

3. Dropping the acceleration lane requires shifting the driving lane laterally to the left into the existing passing lane (remove existing outside shoulder and use existing driving lane as the shoulder). Then, traffic is shifted back over onto the existing driving lanes. Drivers may continue to follow the original traffic paths instead of shifting over, because they will still be able to see the pavement ahead to maintain their current lane/ path.

Comments:
Achieving and losing the extra median lanes south of the interchange is a smoother transition due to the existing horizontal curvature of US 61. Single tangent curves can be utilized instead of the reverse curves required to shift lanes in an existing tangent section.

The pavement transitions are estimated based on horizontal alignment tie-ins only. The amount of pavement required to transition the pavement may be increased as vertical alignment and superelevation tie-ins are assessed.

If shifting the driving and passing lanes toward the median is preferred, an HMA overlay is recommended for all US 61 lanes and shoulders within the transition areas. Historically, vehicles have tended to continue to follow old pavement joints and scarified pavement lines resulting from old pavement marking lines that have been removed with the lane shift. A resurfacing course would eliminate any remnants of the old travel paths.

<u>Conceptual Alternative 2:</u> Five-leg Roundabouts at Existing Routes US 61/ K & V Intersection (North Location)

See attachment G for Conceptual Alternative 2 layout.

This alternative could incorporate the build-in-median concept in the same way as Conceptual Alternative 1. See Conceptual Alternative 1 discussion and Conceptual Alternative 1 cost comparisons.

<u>Conceptual Alternative 3:</u> Six-leg Roundabouts at Existing US 61/ Routes K & V Intersection (North Location)

See attachment H for Conceptual Alternative 3 layout.

This alternative could incorporate the build-in-median concept similar to Conceptual Alternatives 1 & 2. See Conceptual Alternative 1 discussion and Conceptual Alternative 3 cost comparisons below.

Option 1- Maintain existing US 61 typical section/ configuration.
Median width remains at 110'.

No US 61 mainline pavement modifications. Acceleration lanes and outside shoulder are constructed adjacent to the existing driving lanes (existing US 61 outside shoulders are removed in the acceleration lane construction area). Ramp 1-4 acceleration/ deceleration lanes occur outside of bridge limits.

Interchange Bridge= 300’ L x 34.67’ W

Work item	Quantity	Cost	Comments
Bridge	10,401 SF	**$4,160,400**	@$400/SF
Roadway			
Pavement/shoulder removal	2082 SY	$12,490	@$6/SY
	Road Subtotal	**$12,490**	
	Total with Bridge	**$4,172,890**	

A pavement resurfacing course is not necessary because US 61 mainline pavement is not being shifted.

Option 2- Reduce existing US 61 typical section/ configuration- build new passing lanes in median- Mainline pavement transition to achieve additional lane occurs between the off-ramp and on-ramp gore areas.
Median width narrows by 24’.

US 61 transitions to a narrower typical section between the north ramp gores and the grade-separation structure and then transitions back to the wider (current) typical section between the grade-separation structure and the south ramp gores. Acceleration lanes and outside shoulder are constructed adjacent to the existing driving lanes (existing US 61 outside shoulders are removed in the acceleration lane construction area). Ramp 1-4 acceleration/ deceleration lanes occur outside of bridge limits.

Interchange Bridge= 276.42’ L x 34.67’ W

Work item	Quantity	Cost	Comments
Bridge	9583.48 SF	**$3,833,393**	@$400/SF
Roadway			
Pavement/shoulder removal	5211 SY	$31,266	@$6/SY
New US 61 pavement	1930 SY	$231,600	@$120/SY
New US 61 shoulder	1204 SY	$90,300	@$75/SY
New US 61 base	3134 SY	$31,340	@$10/ SY
	Road Subtotal	**$384,506**	
	Total with Bridge	**$4,217,899**	
3” HMA Resurfacing	11,230 SY	$179,680	@$16/SY
	TOTAL	**$4,397,579**	

Safety Concerns:
1. Southbound drivers will still see pavement continuing ahead and could try to continue in a straight line utilizing the “new” outside shoulder (existing driving lane) as a driving lane.

2. Introducing multiple additional horizontal curves to achieve an additional inside lane to a portion of roadway that already has horizontal curves to the south, could result in increased crashes.

3. Adding an interchange with ramps leaving and entering US 61, in combination with shifting of mainline pavement toward the new lane in the median over a short distance is a lot for drivers to navigate. Forcing drivers to make several decisions over a short distance, while traveling at 65 mph could result in an increase in crashes.

Comments:
Achieving and losing the extra median lanes south of the interchange is a smoother transition due to the existing horizontal curvature of US 61. Single tangent curves can be utilized instead of the reverse curves required to shift lanes in an existing tangent section.

The pavement transitions are estimated based on horizontal alignment tie-ins only. The amount of pavement required to transition the pavement may be increased as vertical alignment and superelevation tie-ins are assessed.

If shifting the driving and passing lanes toward the median is preferred, an HMA overlay is recommended for all US 61 lanes and shoulders within the transition areas. Historically, vehicles have tended to continue to follow old pavement joints and scarified pavement lines resulting from old pavement marking lines that have been removed with the lane shift. A resurfacing course would eliminate any remnants of the old travel paths.

<u>Conceptual Alternative 4:</u> Five-leg Roundabouts north of Existing US 61/ Creech Lane/ Old Highway 61 Intersection (South Location)

See attachment I for Conceptual Alternative 4 layout.

Conceptual Alternative 4 places the interchange where the US 61 median width is 66'. Unlike Conceptual Alternatives 1-3, this alternative location does not allow for new US 61 lanes to be built in the median to shorten the bridge and reduce bridge costs. However, the narrower median at this location already yields the shortest grade separation structure length of all alternates being evaluated.

<u>Build-in-median Recommendation:</u>

By transitioning the mainline US 61 pavement to utilize a portion of the wider existing median and shorten the bridge, the project cost savings from a shorter bridge are overtaken by the costs of the additional US 61 pavement required, in addition to introducing some potential safety concerns. Shifting US 61 mainline pavement into the median is not recommended.

ALTERNATIVE 1- NORTH LOCATION
4-LEG ROUNDABOUTS

ATTACHMENT F

US 61

ROUTE V

ROUTE K

CREECH LANE

OLD HWY 61

ALTERNATIVE 2- NORTH LOCATION
5-LEG ROUNDABOUTS

ATTACHMENT G

US 61

ROUTE K

ROUTE V

CREECH LANE

OLD HWY 61

ALTERNATIVE 3- NORTH LOCATION
6-LEG ROUNDABOUTS

ATTACHMENT H

US 61

ROUTE K

ROUTE V

CREECH LANE

OLD HWY 61

ALTERNATIVE 4- SOUTH LOCATION
5-LEG ROUNDABOUTS

ATTACHMENT I

US 61

ROUTE V

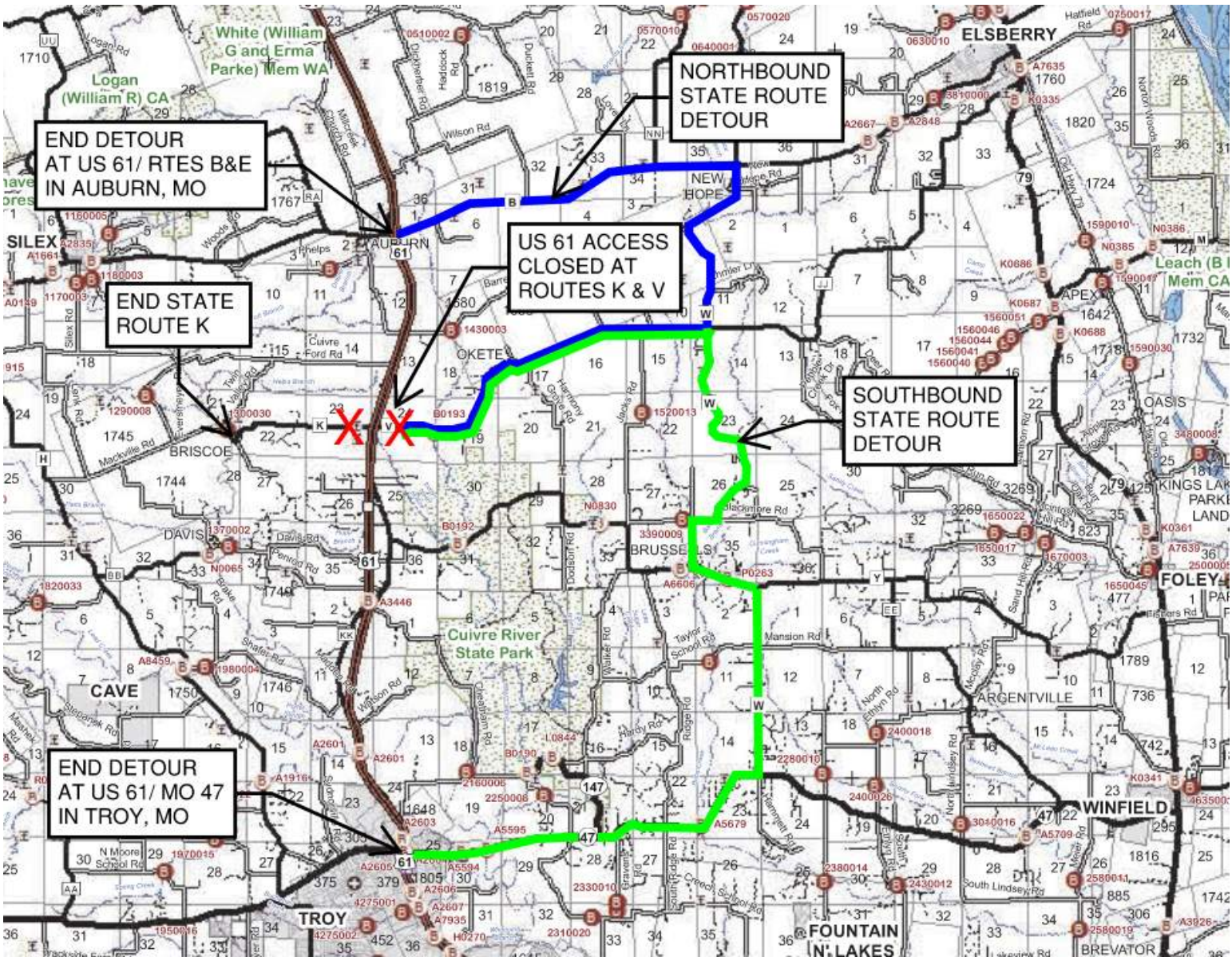
ROUTE K

CREECH LANE

OLD HWY 61

ATTACHMENT J

DETOUR MAP



GENERAL HIGHWAY MAP
LINCOLN COUNTY

Prepared by MoDOT
Transportation Planning Division

County No. 57 NE District

Scale
0 1 2 3 4 Miles

Revised - February 2022