Route N Environmental Assessment

Prepared for

Missouri Department of Transportation

January 2020

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Acronyms and Abbreviations

µg/m^3	microgram(s) per cubic meter
AADT	annual average daily traffic
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
ADT	average daily traffic
APE	area of potential effects
BMP	best management practice
CAG	Community Advisory Group
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
dBA	A-weighted decibel
DHP	David Hoekel Parkway
DO	dissolved oxygen
EA	Environmental Assessment
EJ	Environmental Justice
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Federal Endangered Species Act
EWG	East-West Gateway
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FI	Fatal Injury
FIRM	Flood Insurance Rate Map
GIS	geographic information system
HOA	Home Owners Association
HSM	Highway Safety Manual
I	Interstate
IPaC	Information Planning and Consultation
ITS	Intelligent Transportation Systems
LOMR	Letter of Map Revision
LOS	Level of Service

1	LWCF	Land and Water Conservation Fund
2	MDC	Missouri Department of Conservation
3	MDNR	Missouri Department of Natural Resources
4	MFA	multi-factor authentication
5	MoDOT	Missouri Department of Transportation
6	MPH	miles per hour
7	MRLC	Multi-Resolution Land Characteristics Consortium
8	MSA	Metropolitan Statistical Area
9	MSAT	mobile source air toxics
10	NAAQS	National Ambient Air Quality Standards
11	NAC	Noise Abatement Criteria
12	NATA	National-Scale Air Toxics Assessment
13	NAVD88	North American Vertical Datum of 1988
14	NB	No Build
15	NEPA	National Environmental Policy Act
16	NHPA	National Historic Preservation Act
17	NLCD	National Land Cover Database
18	NO_2	nitrogen dioxide
19	NPDES	National Pollutant Discharge Elimination System
20	NPL	National Priorities List
21	NRCS	Natural Resources Conservation Service
22	NRHP	National Registry of Historic Places
23	O_3	ozone
24	OATS	Operating Above the Standard
25	PDO	Property Damage Only
26	PM	particulate matter
27	PM_{10}	particulate matter less than 10 microns in aerodynamic diameter
28	$PM_{2.5}$	particulate matter less than 2.5 microns in aerodynamic diameter
29	ppb	parts per billion
30	ppm	parts per million
31	RCB	reinforced concrete box
32	RCRA	Resource Conservation and Recovery Act
33	SCAT	St. Charles Area Transit
34	SEMA	State Emergency Management Agency
35	SHPO	State Historic Preservation Office

1	SO_2	sulfur dioxide
2	SWPPP	Stormwater Pollution Prevention Plan
3	TAG	Technical Advisory Group
4	TCIG	Transportation Corridor Improvement Group
5	TDM	Travel Demand Management
6	TIP	Transportation Improvement Plan
7	TMDL	total maximum daily load
8	TS4	transportation separate storm sewer system
9	TSM	Transportation System Management
10	U.S.C.	United States Code
11	USACE	U.S. Army Corps of Engineers
12	USFWS	U.S. Fish and Wildlife Service
13	UST	underground storage tank

SECTION 1

Purpose and Need

This section presents the Purpose and Need for the Route N Environmental Assessment (EA). *Purpose and Need* refers to the transportation-related problems that a proposed project is intended to address. Creating and evaluating alternatives are necessary processes to arrive at the most appropriate solutions to the identified problems. In the final analysis, the Tentative Preferred Alternative will be based on how well it meets the study's Purpose and Need and will take into account a number of factors including environmental impacts, engineering, and resource agency and stakeholder input.

Both figures and exhibits are included in this section to graphically depict the purpose and need. Figures appear in the text while large-scale graphics are presented on the exhibits in **Appendix A**.

1.1 Study Overview

1.1.1 Study Sponsors

The Missouri Department of Transportation's (MoDOT's) St. Louis District, in cooperation with the Federal Highway Administration (FHWA) and St. Charles County, is conducting an EA along Route N in western St. Charles County. This area is known locally as the Route N study corridor. This EA is intended to assess the issues and needs of the Route N study corridor and determine the best approach to address them. The study area, from a regional perspective, is shown on **Figure 1-1**. The study area is generally located between the South Point Prairie Road/Jackson Road intersection and the existing I-64/Route 364 interchange (see **Figure 1-2** on **page 1-3**).

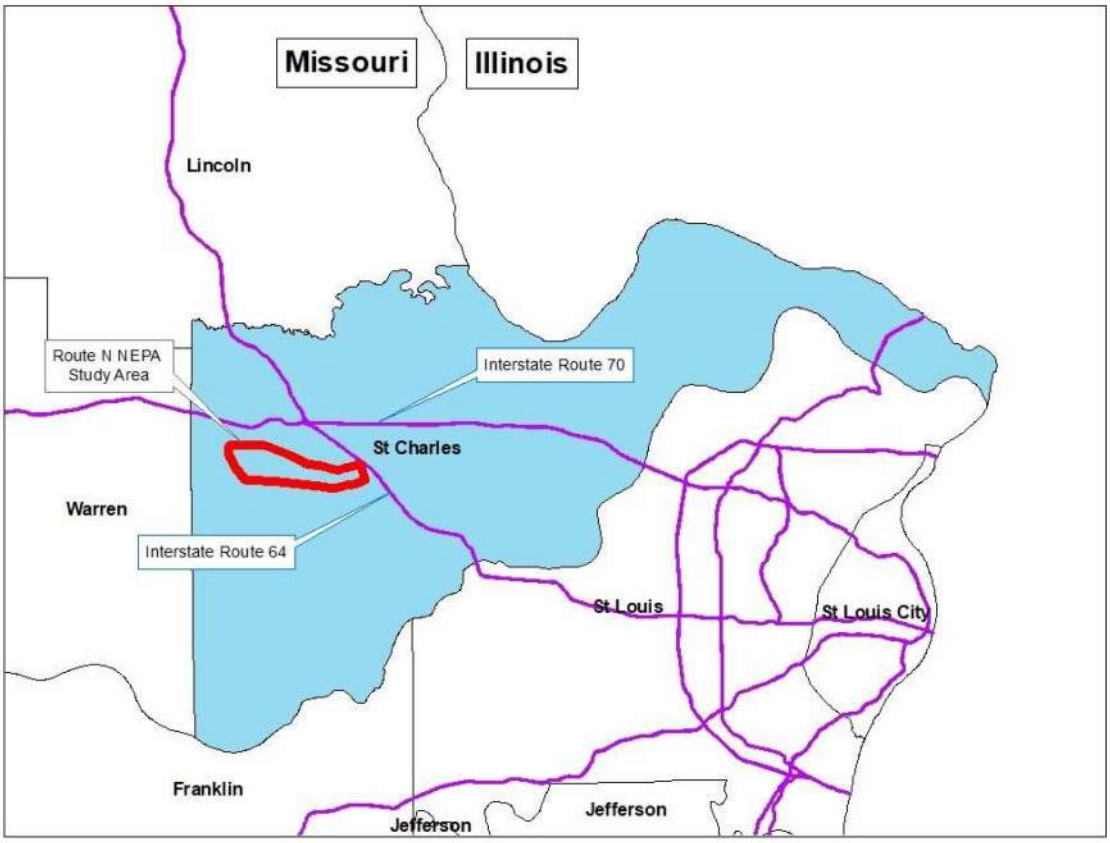

Figure 1-1. Route N Study Area

The route is also part of the St. Charles County Thoroughfare Plan (a component of the St. Charles County Master Plan) and forms a primary connection between several communities including O'Fallon, Lake St. Louis, and Wentzville. The area also includes large portions of unincorporated areas of St. Charles County. **Figure 1-2** is an overview of the proposed study area, along with the road names and locations that are used in this EA.

1.1.2 Framework of Work

The Route N EA is being processed under the provisions of the National Environmental Policy Act (NEPA). NEPA establishes a national environmental policy and provides a framework for environmental planning and decision-making by Federal agencies. NEPA directs Federal agencies, when planning projects or issuing permits, to conduct environmental reviews to consider the potential impacts on the environment by their proposed actions. Federal actions are typically defined as funding or permitting.

NEPA requires that the policies, regulations, and laws of the Federal Government are interpreted and administered in accordance with its environmental protection goals. This includes working cooperatively with all applicable/interested Federal and state agencies. This coordinated review process includes input from the public, as well as from other agencies, to ensure that all environmental issues are addressed.

As the lead Federal agency FHWA is committed and required by NEPA to consider avoiding, minimizing, and/or mitigating potential impacts to the social and natural environment when considering approval of proposed transportation projects. In addition to evaluating the potential environmental effects, FHWA must also consider the transportation needs of the public in reaching a decision that is in the best overall public interest. The FHWA NEPA study development process is an approach to balanced transportation decision-making that considers those potential impacts. It is FHWA policy (23 Code of Federal Regulations [CFR] § 771.105) that:

- Compliance with all applicable environmental requirements will be reflected in the environmental document required by this regulation
- Alternative courses of action will be evaluated, and decisions be made in the best overall public interest based upon a balanced consideration of the need for safe and efficient transportation; of the social, economic, and environmental impacts of the proposed transportation improvement; and of national, state, and local environmental protection goals
- Public involvement and a systematic interdisciplinary approach are essential parts of the development process for proposed actions
- Measures necessary to mitigate adverse impacts are incorporated into the action

The EA is a concise public document intended to document compliance with NEPA and provide sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement or a Finding of No Significant Impact.

1.1.3 Study Goal

MoDOT's intent for this EA is to investigate a safe and efficient corridor. Route N is identified as a Minor Route in the MoDOT's State System Classification. The growth of St. Charles County has caused an increase in local traffic on Route N and has also increased the extent that regional traffic uses Route N. The goal of the Route N EA is to investigate how to accommodate these traffic streams.

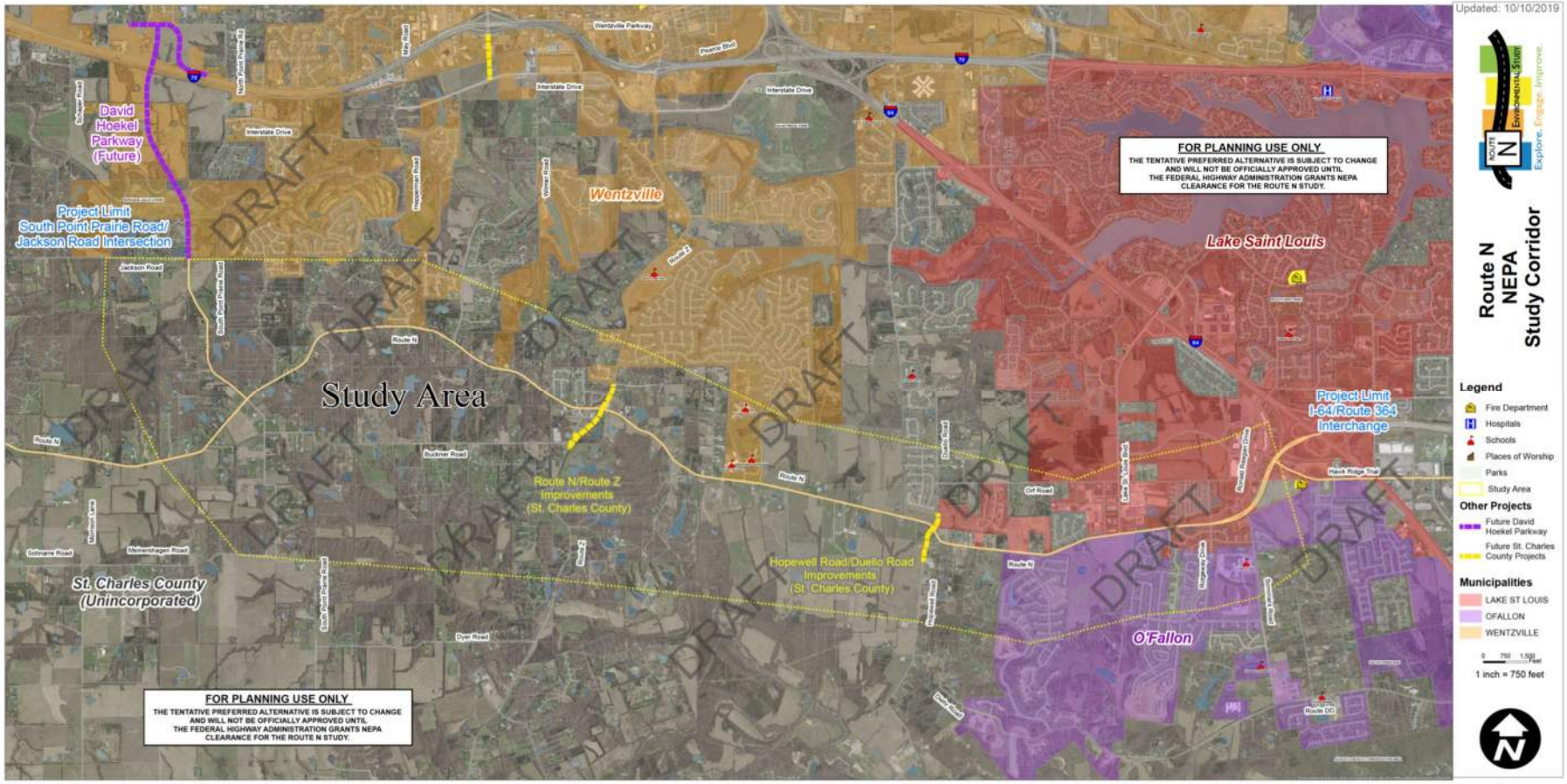

Figure 1-2. Study Area Map

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1.2 Study Background

1.2.1 Summary of St. Charles County

According to St. Charles County's Master Plan (ENVISION 2030), St. Charles County is Missouri's third-most populous county with approximately 400,000 residents. It also has Missouri's third largest economy, accounting for 6.8 percent of the state's economy. At $75,603, the median household income is the highest in the state.

ENVISION 2030 describes the County's growth as following a "typical suburban pattern with car-dependent development." Employment and shopping areas are isolated from residential development, further complicating travel needs. Increasing trip lengths contribute to congestion, higher travel times, more fuel consumption, and greater air pollution. The Transportation Appendix of the Master Plan reports that "many residents … feel overwhelmed by greater traffic volumes, higher speeds, higher fuel prices, and cut-through traffic. These trends are likely to continue." The change in urbanized area over time is shown on **Figure 1-3**. The growth of this portion of St. Charles County increases the pressure that local and regional traffic exerts on the transportation network. Route N also contributes to enhanced connectivity of current and future major roadways connecting interstates and major arterials.

1.2.2 Existing Route N Description

At the far eastern end of the corridor, Route N is a four-lane divided roadway with signalized intersections at Hawk Ridge Trail and Sommers Road/Ronald Reagan Drive. West of this location, Route N transitions to a three-lane roadway, as two lanes with a center turn lane, with an at-grade intersection at Ridgeway Drive and a signalized intersection at Lake St. Louis Boulevard.

West of Lake St. Louis Boulevard, Route N transitions to a two-lane roadway to the intersection with South Point Prairie Road. One additional signalized intersection is at Perry Cate Boulevard. The intersection of Route N with Route Z is a highly skewed intersection with an X-type configuration rather than a cross. Right turns occur via turn-offs prior to the main intersection minimizing the number of turning movements at the four-way stop sign at the main intersection. The primary intersections west of Route Z include Wilmer Road, Hepperman Road, and South Point Prairie Road. The distance between the I-64/Route 364 interchange and the South Point Prairie Road/Jackson Road intersection is approximately 8 miles. **Figure 1-2** shows the locations of these crossroads.

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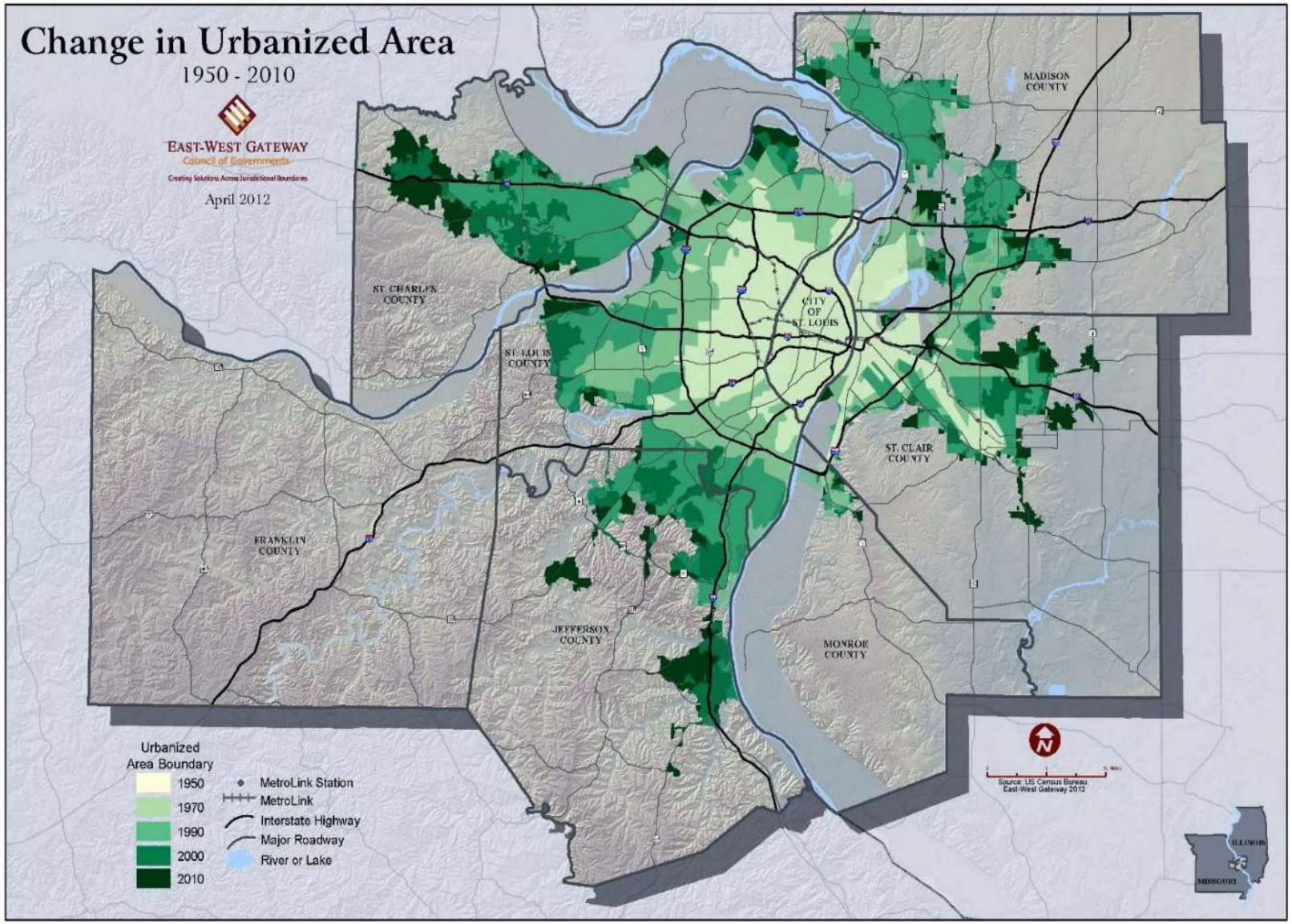

Figure 1-3. Change in Urbanized Area

1.2.3 Summary of Other Key Area Roadways

Interstates near the study area include I-64 to the east and I-70 to the north. Major roadways that intersect with Route N within the study area, from east to west, include Hawk Ridge Trail, Sommers Road/Ronald Reagan Drive, Lake St. Louis Boulevard, Hopewell Road, Duello Road, Perry Cate Boulevard, Route Z, Wilmer Road, Hepperman Road, and South Point Prairie Road. Key intersections in or near the Route N study area are listed in **Table 1-3** on page 1-14.

1.2.4 Summary of Population and Employment Growth

Population and employment growth are expected to continue in St. Charles County. Using population projections from the East-West Gateway Council of Government (East-West Gateway), the region's MPO, economic and demographic variables were estimated for St. Charles County between 2016 and 2045. By 2045, the population of St. Charles County is expected to increase by 12.4 percent, which is estimated as 48,388 additional people. The total projected population in 2045 is estimated at 439,298 people. This population growth will further stress the existing transportation system, including Route N.

Employment is also expected to increase. Between 2016 and 2045, total employment in St. Charles County is expected to increase by 9.4 percent to 219,441 jobs. Trips related to these 18,889 additional jobs will also stress the existing transportation system, including Route N.

1.2.5 Summary of Existing and Future Land Use

Currently, the primary land use type within the study area is low-density residential. This land use category allows for single-family residences at a density of one to four dwelling units per acre. The single-family residences are normally detached units and have central water distribution and sanitary sewers. Lot sizes in these areas can vary from approximately 10,000 square feet to 43,000 square feet. Clustering development is encouraged. Supporting and complementary uses, including open space and recreation, schools, places of worship, and other public or civic uses, are also appropriate in this category. Senior housing is appropriate if compatible with the surrounding area.

The St. Charles County Future Land Use Plan, a component of the St. Charles County Master Plan, provides a framework for future development through 2030. The study area is within the Urban Service Area. New urban residential neighborhoods, with supporting businesses and services, will be directed into this area that is generally contiguous with existing development.

Activity centers are places designed to be somewhat pedestrian-oriented, with high quality design and cohesive site development, and with a mix of complementary uses such as retail services and higher density housing. Activity centers range from small retail services near housing—Neighborhood Business Centers, to Mixed-Use Commercial Activity Centers, and larger Community/Regional Activity Centers. Within the Route N study area, a Community/Regional Activity Center is identified at the Route N/Route Z intersection and a Mixed-Use Commercial Activity Center is identified for the Hopewell Road/Duello Road intersection.

Based on St. Charles County estimates, the development within the County will approximate the usage listed in the Master Plan in 2030. For example, its estimated that 75,788 acres will be residential in nature; the Future Land Use Plan depicts 114,906 acres in residential use. Consequently, the County estimates that approximately two-thirds of the Future Land Use Plan's residential stock will be in place by 2030. Commercial land uses are expected to be 90 percent in place by 2030 and 33 percent of Industrial land uses will be in place by 2030.

1.2.6 Related Projects

In response to the growth occurring in St. Charles County, numerous transportation projects are underway. These improvements include:

- **Route N/Route Z Intersection** – This project involves a reconfiguration of the intersection of Route Z at Route N. Due to considerable existing traffic delays at the intersection, MoDOT was able to acquire federal funds through East-West Gateway to reconstruct this intersection. The original plan was to replace the unconventional split dual intersections with a pair of roundabouts in a "dogbone" configuration. The final configuration realigns Route Z from the south of Route N to align with Route Z to the north of Route N creating a more traditional intersection configuration by eliminating the split dual intersection. The intersection will also be signalized.
- **Hopewell Road/Duello Road Intersection** – The project is meant to widen, straighten and, otherwise improve the existing Duello and Hopewell Roads. Curb and gutter, enclosed drainage, bridge improvements, and a sidewalk are included as part of the project.
- **Route N/ Perry Cate Boulevard Intersection** – This intersection was recently signalized as a St. Charles County project.
- **Interstate Drive** – When completed, Interstate Drive will serve as a south outer road along I-70 from I-64 to the DHP. It is being constructed in several sections.
- **David Hoekel Parkway Phase 2** – This City of Wentzville project began in 2018. This portion of the DHP project consists of the construction of a relocated northern I-70 outer road and the new David Hoekel Parkway interchange at I-70. Northern outer roads and ramp construction occurred throughout 2018 and 2019. Coordination with Wentzville estimates that the interchange and bridge over the railroad will be complete in spring 2021.
- **David Hoekel Parkway Corridor Preservation** – To the north, the DHP would provide a new connection between I-70 and US 61, in Wentzville. The David Hoekel Parkway EA is complete and the Access Justification Report is in the final stages of approval. Funding has been identified to begin corridor preservation activities.
- **David Hoekel Parkway Project #5** – The southern DHP interchange connection to South Point Prairie Road (and the Route N EA western terminus) is a St. Charles County project. This project is known as David Hoekel Parkway Project #5 and is underway. The project will extend Interstate Drive west and South Point Prairie Road north to meet the City of Wentzville's new David Hoekel Parkway interchange at I-70. Construction is expected to be completed by the end of 2020.

1.3 Purpose and Need Summary

The purpose or goal of the Route N EA is to investigate and identify improvements intended to develop a safe and efficient corridor between the South Point Prairie Road/Jackson Road intersection and the I-64/Route 364 interchange.

Within the context of this purpose, two specific transportation problems, or Need Elements have been identified. The specific transportation problems affecting the portion of St. Charles County that includes Route N are:

- ***Need to Improve Access and Connectivity*** **– The Route N corridor continues to handle higher volumes of traffic desiring access to important study area resources and efficient travel through the corridor.** In this portion of St. Charles County, non-interstate travel between I-64 and I-70 requires using minor collectors or local roads. These roadways do not meet current design standards for the high volumes of traffic they carry. Roadway curvature (sharp turns) and profile (rolling hills) inhibit mobility and narrow lanes and minimal shoulders offer little margin for error. As traffic volumes continue to increase, providing safe and efficient access to important local resources is a priority. Providing for travel through the study corridor on a roadway that meets modern design standards for the traffic they carry is also a priority.

- ***Need to Reduce Congestion and Delays*** **– The number of vehicles on the Route N corridor exceeds the capacity of the existing roadway. Congestion and mobility is worsened by the number and spacing of uncontrolled and over capacity intersections and driveways**. Route N was not designed and constructed to accommodate the high volumes of traffic currently on the roadway. Congestion and delays along Route N are worsened by the number and spacing of access points, including numerous intersections and driveways that operate over capacity. Of the 14 main intersections along Route N and Buckner Road, 6 operated at Level of Service F in 2018 (LOS; defined in **Section 1.5.2.2**). Under the No Build scenario, eight of these intersections will operate at LOS F by the design year[1] of 2045.

The identification of a Tentative Preferred Alternative will be based on how well the alternative satisfies the study's Purpose and Need, in addition to consideration of environmental, engineering, resource agency input, stakeholder input, and other factors.

Secondary objectives were also established. These objectives were intended, in part, to differentiate the Reasonable Alternatives and eventually to identify the Tentative Preferred Alternative. The secondary objectives are to:

- Improve safety for the traveling public
- Accommodate bicycles and pedestrians
- Take existing planning documents into consideration
- Provide route options and circulation to existing and future land uses

The following sections examine the context of the transportation problems that affect the Route N corridor. As defined herein, context refers to the overall nature, scope, and degree of how the transportation problems affect the corridor.

These transportation problems are often interrelated but will be discussed within the framework of these elements.

1.4 Purpose and Need Elements

The traffic analyses that underly the purpose and need elements are discussed in the Traffic Analysis Technical Memorandum contained in **Appendix C**.

1.4.1 Element 1 – Need to Improve Access and Connectivity

Accessibility is the quality of travel within the roadway network at the community level. It focuses on the ability to reach destinations along with measures of travel time, travel cost, travel options, comfort, and risk. The goal is to increase the overall capability of the transportation system while not compromising efficiency and ease of access. In this portion of St. Charles County, non-interstate travel between I-64 and I-70 requires using minor collectors or local roads. These roadways do not meet current design standards for the high volumes of traffic they carry. Poor roadway curvature (sharp turns) and profile (rolling hills) inhibit mobility and narrow lanes and minimal shoulders offer little margin for error. As traffic volumes continue to increase, providing efficient access to important study area resources such as schools, subdivisions, churches, and businesses is a priority. Providing for vehicles desiring to travel within the study corridor on a roadway that meets modern design standards for the high volumes of traffic they carry and providing facilities along the roadway for non-motorized users to experience improved accessibility are priorities.

[1] Projects are planned and designed to meet the future anticipated needs and characteristics of a certain year. This is referred to as the design year.

The purpose of a roadway network is to connect places. Theoretically, a roadway network connects every place in a community to every other place in the community. But, depending on the design of the network, the quality of those connections will vary. The quality of connections—the "Connectivity" of the roadway network—influences the accessibility of potential destinations in a community and has important implications for travel choices, emergency access, and, more generally quality of life.

Traffic currently using Route N is primarily destined for the numerous homes, businesses, churches, and schools along the existing route. With the development of the DHP/I-70 interchange, the future Route N will also need to accommodate travelers desiring to travel beyond the study corridor. The ability to provide connectivity by allowing safe and efficient movement of traffic within and through the Route N study corridor will be important.

Providing increased numbers of connections has pros and cons, requiring a balance. Typically, increasing network connectivity will:

- Decrease traffic on arterial streets – Providing more pathways eliminates the need to only use arterials. This, however, can raise levels of through traffic on those pathways.
- Provide for continuous and more direct routes – This can facilitate travel by non-motorized modes and more efficient transit service.
- Provide greater emergency vehicle access – This reduces response time and provides multiple routes for evacuations or detours.

The specific needs of improved access and connectivity within the Route N study area are further defined below.

1.4.1.1 Provide Safe and Efficient Access to/from Important Study Area Resources

Existing Route N serves many important study area resources including schools, churches, subdivisions, and businesses that generate high volumes of traffic. The eastern portion of the study area is dominated by businesses and subdivisions. The western portion of the study area contains several churches and schools in addition to large subdivisions and businesses. As growth continues along the Route N corridor, providing safe and efficient access to these important resources is important.

Schools and churches along existing Route N, from east to the west, include:

- Liberty High School
- Immanuel Lutheran Church and School
- Boone Trail Elementary School
- Wentzville South Middle School
- Timberland High School
- St. Gianna Catholic Church
- Westlake Church of Christ

At least 15 subdivisions currently exist along this portion of Route N. One large subdivision, Stone Meadows, has over 1,500 homes. The larger subdivisions along Route N east of Route Z, from east to west include:

- Legends at the Pointe
- Sommers Landing
- Saratoga
- Briar Chase
- Shady Creek
- Wyndgate
- Wyndemere Estates
- Manors at Glen Brook
- Brookfield Crossing
- Wyndstone
- Stone Meadow

Subdivisions along Route N west of Route Z, from east to west include:

- Castlegate Estates

- Providence Pointe
- Wilmer Valley
- West Hampton Woods

Exhibit 3-7 depicts many of the important land uses discussed in the text, including the distribution of residential subdivisions.

1.4.1.2 Provide Roadway Design and Features that Meet Appropriate Standards

In the western portion of the Route N study area, South Point Prairie Road and Route N are narrow, two-lane roadways with minimal shoulders. This provides drivers and bicyclists with little margin for error. Worsening this situation are segments of roadway with challenging curvature (sharp turns) and profile (rolling hills). Further safety concerns include lack of sight distance for drivers to perceive conflicts on the roadway ahead, which may include oncoming vehicles or vehicles slowing or stopped waiting to complete a turn onto another roadway or driveway.

In the eastern portion of the study area, these conditions are magnified by higher traffic volumes and more frequent roadway intersections and driveway entrances. As development continues along the Route N corridor east of Route Z, vehicle and user demand continues to grow with corresponding increases in traffic volumes. The design and features of the roadway have not been upgraded or improved to meet modern standards that would be consistent with the higher current and future traffic volumes along the corridor.

Providing a roadway design that meets appropriate standards, affects connectivity in the following ways:

- Allows for adequate emergency vehicle access.
- Allows for improved and safe bike/ped use.
- Allows for efficient over-size vehicle operation.

The design of the transportation system plays an important role in ensuring that travelers can reach these everyday destinations. At the regional level, efficient roadways affect access to jobs, education, and healthcare opportunities. The U.S. Department of Transportation identifies some ways design affects connectivity:

1. The two-lane configuration and lack of shoulders throughout most of the Route N corridor presents challenges related to emergency vehicles. Drivers of other vehicles have no space available to pull over to allow emergency vehicles to pass. This creates a dangerous situation where emergency vehicles must cross over into the opposing lane of travel to pass other vehicles on the roadway. Lack of site distance in some areas of the corridor increases the severity of this hazard.
2. Improving local pedestrian and bicycle infrastructure and parking, particularly at key access points to neighborhood destinations. This might include pedestrian crossings on busy main roads, public transportation stops and stations, sidewalks throughout shopping centers, and paths that provide safe access to schools.
3. Managing the transportation system to reduce travel times to destinations through measures such as improved incident response, public transportation signal prioritization, and congestion management.

1.4.1.3 Improve Connectivity in the Study Area

The ability to connect to everyday destinations is critical. A connected transportation network plays an important role in ensuring that travelers can reach these destinations efficiently. At the regional level, efficient roadway networks affect access to jobs, education, and healthcare opportunities.

Numerous crossroads intersect with existing Route N, creating a network that requires a large number of traffic streams to use Route N to reach their destinations. Key roadways that add traffic to Route N

include Hawk Ridge Trail, Lake St. Louis Boulevard, Hopewell Road, Duello Road, Perry Cate Boulevard, Route Z, Wilmer Road, Hepperman Road, and South Point Prairie Road.

Many of the crossroads mentioned also provide access to large residential subdivisions that concentrate access onto Route N. Maintaining access to Route N is critically important in providing these residents a connected network to access their homes, jobs, schools, and churches. Additionally, emergency medical service, police, and other municipal service providers have been strong supporters of greater connectivity. Without a connected network of crossroads, an emergency that closes Route N or an intersection with Route N greatly affects travelers' ability to reach their destinations.

Maintaining and/or having the ability to maintain a connected transportation network for all users is important to the effective movement of travelers within and through the Route N corridor.

1.4.2 Element 2 – Need to Reduce Congestion and Delays

The number of vehicles using the Route N corridor exceeds the capacity of the existing roadway and intersections. Congestion and delay are worsened by the number and spacing of uncontrolled and over-capacity intersections and driveways.

1.4.2.1 Existing and Future Traffic Volumes Along Route N

Currently, Route Z serves as the nominal boundary between the rural and suburban portions of St. Charles County. As such, the portion of Route N between I-64 and Route Z is classified as a Minor Arterial. Minor Arterials are projected to handle a higher traffic load—an average daily traffic (ADT) of 7,500 to 20,000 vehicles. West of Route Z, Route N is classified as a Rural Major Collector, projected to handle between 2,500 to 7,500 ADT.

The functional classification of the roadways in the vicinity are listed in **Table 1-1**.

Table 1-1. Roadway Functional Classifications

Road	Functional Classification
Route N – I-64 to Route Z	Minor Arterial
Route Z	
Route N – Route Z to South Point Prairie Road	Major Collector
Hawk Ridge Trail	
Sommers Road/Ronal Reagan Drive	
Lake St. Louis Boulevard	
Duello Road	
Perry Cate Boulevard	
Hepperman Road (North of Route N)	
Interstate Drive [1]	
Hopewell Road	Minor Collector
Wilmer Road	
South Point Prairie Road (North of Route N)	
Buckner Road	Local Street

[1] Interstate Drive parallels I-70 to the south. It is currently not a continuous route between Duello Road and the DHP. The only segment not already constructed, or currently under construction, is the segment between South Point Prairie Road and Hepperman Road. This remaining segment is expected to be bid in the summer of 2020 with construction completion in 2021.

According to the St. Charles County Master Plan, ENVISION 2030, much of the growth in the County can be attributed to it being located in a path of westward development within the I-70 and I-64 corridors. The plan states: "Residential development has been supported by an abundance of relatively inexpensive land, expanding utilities, the availability of relatively inexpensive gasoline and a good roadway network. St. Charles County's population has seen slight growth as far fewer undeveloped tracts of land are available." As a result, safe and efficient access is needed to-and-from a number of major employment and activity centers to housing located in west St. Charles County. The change in urbanized area is shown on **Figure 1-3**.

The FHWA and Federal Transit Administration approved the regional travel demand forecasting model. This model was developed and is maintained by the region's MPO, East-West Gateway Council of Governments. The model was used to evaluate the projected traffic for the Route N EA. The baseline travel demand model used East-West Gateway's assumed land use and roadway network with St. Charles County's fiscally constrained roadway projects added. This model was used to develop design year traffic volumes (year 2045) with and without the construction of improvements along Route N between the South Point Prairie Road/Jackson Road intersection and the I-64/Route 364 interchange. **Table 1-2** lists the 2018 current daily volumes and the 2045 design year estimated daily volumes along Route N.

Level of Service on two-lane roadways is measured by all vehicles entering an intersection. **Table 1-5** on page 1-15 presents the intersection Levels of Service.

St. Charles County also maintains a transportation model that assumes more aggressive land use assumptions and includes unfunded transportation improvements. While this model is not federally recognized or approved, assumptions from the model were used to perform a sensitivity analysis to determine if future traffic volumes would result in differences in the roadway design elements such as number of through lanes and intersection sizing. The sensitivity analysis showed no difference in roadway/intersection sizing requirements.

While two traffic model scenarios were investigated, all traffic and safety analysis in this EA uses the results of the baseline travel demand model using East-West Gateway's assumed land use and roadway network with St. Charles County's fiscally constrained roadway projects added.

Table 1-2. 2018 Current and 2045 No Build Route N Daily Volumes

Crossroad	2018 Daily Volume	2045 No Build Daily Volume
Hawk Ridge Trail	24,750	32,950
Sommers Road/Ronald Reagan Drive	20,150	26,100
Red Baron Drive/Ridgeway Drive	19,700	23,800
Lake St. Louis Boulevard	16,200	20,450
Wyndgate Ridge Drive	15,100	19,350
Hopewell Road/Duello Road	13,200	19,550
Perry Cate Boulevard	10,700	16,600
Route Z	7,300	14,150
Wilmer Road	6,150	11,800
Hepperman Road	N/A	10,600
South Point Prairie Road	3,050	7,700

N/A = not available

Arterial roadway Level of Service (LOS) is calculated by intersection operations and is discussed in Section 1.5.2.2.

1.4.2.2 Provide Adequate Operation at the Study's Key Intersections and Major Driveways

Six intersections currently operate at LOS F in 2018. By the design year of 2045, under the No Build Alternative, eight intersections will operate at LOS F.

Route N was not designed and constructed to accommodate the high volumes of traffic currently on the roadway. Congestion and mobility are worsened by the number and spacing of access points.

Level of Service (LOS) is a qualitative measure used to describe the operational conditions within a traffic stream. According to the Highway Capacity Manual, signalized intersection LOS is defined in terms of a weighted average control delay. Control delay quantifies the travel time that a vehicle experiences when traveling through an intersection. It is also a surrogate measure for driver discomfort and fuel consumption. Using A to F letter grades, LOS F represents the worst level of operation. For signalized intersections operating at LOS F, vehicles are forced to wait through multiple traffic signal cycles to pass through the intersection.

Key Intersections

The at-grade roadway intersections in the study area are primarily controlled with stop signs in two-way configuration. The only existing four-way stop configuration is at Route Z. Existing signalized intersections are limited to four locations:

- Hawk Ridge Trail
- Sommers Road/Ronald Reagan Drive
- Lake St. Louis Boulevard (2017)
- Perry Cate Boulevard (2017)

One other signalized intersection is planned. Currently, design is underway to realign and signalize the Route N intersection with Route Z. Preliminary plans have been approved by MoDOT. Environmental clearances are complete and a public hearing was held on October 30, 2019. The realignment of the Hopewell Road and Duello Road intersection is also being planned as a St. Charles County project. The design plans are nearly complete. Right-of-way acquisition is on hold to prioritize other projects with imminent deadlines.

Numerous driveways also connect directly to Route N and the other connecting roadways. Increasingly, these roadway intersections and driveway entrances create bottlenecks due to the number of vehicles turning onto, or off, Route N. Problems associated with this network of intersections include increasing existing traffic congestion, with operational problems and safety deficiencies projected to worsen.

The traffic analysis determined the key Intersections that control traffic flow in the study area, as listed in **Table 1-3**.

Table 1-3. Key Intersections

	Location	Type
1	Route N at Hawks Ridge Trail	Signalized
2	Route N at Sommers Road	Signalized
3	Route N at Red Baron Drive	Two-Way Stop
4	Route N at Lake St. Louis Boulevard	Signalized
5	Route N at Wyndgate Ridge Drive	Two-Way Stop

Table 1-3. Key Intersections

	Location	Type
6	Route N at Hopewell Road	Two-Way Stop
7	Route N at Duello Road	Two-Way Stop
8	Route N at Perry Cate Boulevard	Signalized
9	Route N at Route Z	Four-Way Stop
10	Route N at Wilmer Road	Two-Way Stop
11	Route N at Hepperman Road	Two-Way Stop
12	Route N at South Point Prairie Road	Two-Way Stop
13	South Point Prairie Road at Jackson Road	Two-Way Stop
14	Buckner Road at Route Z	Two-Way Stop
15	Buckner Road at South Point Prairie Road	Two-Way Stop

An important and unusual intersection is the Route N/Route Z intersection. Currently, the Route N/ Route Z intersection is in a "X" configuration that provides right turn movements from Route N and left turn movements from Route Z in advance of the very skewed 20-degree angle intersection of the two roadways (see **Figure 1-4**). Concerns with lengthy peak period back-ups, difficulties in making turning movements, and safety concerns with the skewed intersection angle of the roadways were common themes in comments from stakeholder interviews, the Community Advisory Group, and the first Public Information Meeting. St. Charles County is currently designing plans to construct improvements to this intersection to signalize the intersection, provide a more standard configuration, and provide better intersection operations.

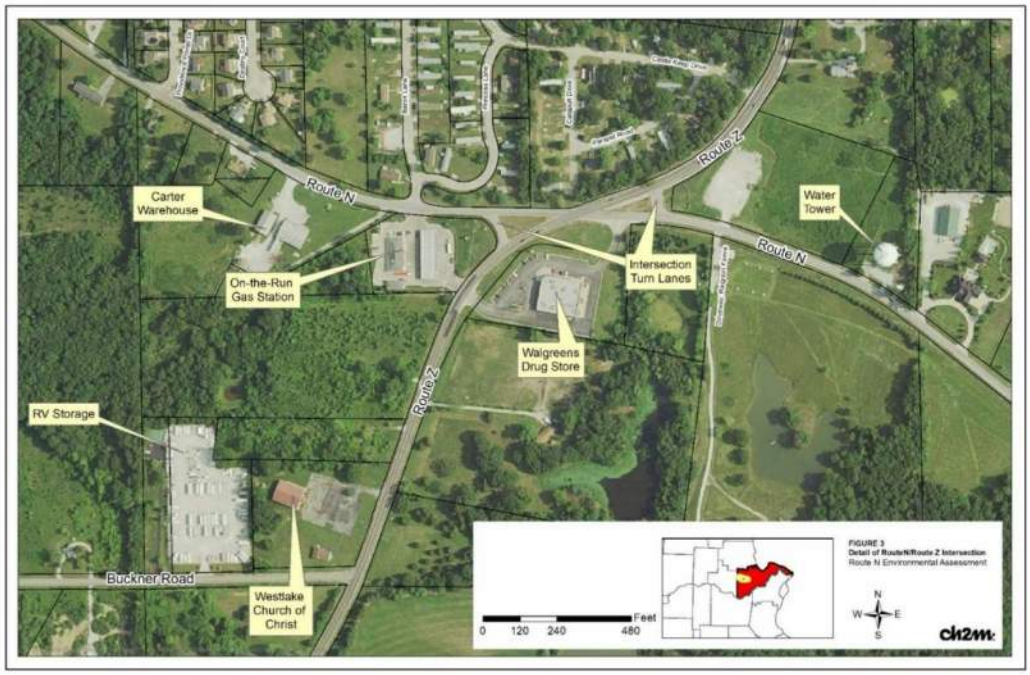

Figure 1-4. Route N/Route Z Intersection

Key Intersection Operations

LOS for two-lane roadways is measured by average delay of all vehicles entering an intersection. To understand the operations at the key intersections in the study area, a Highway Capacity Manual analysis, using SYNCHRO software, was employed to determine the LOS for both the existing and future no build conditions. The characteristics of the LOS letter grades for intersections are summarized in **Table 1-4**.

Table 1-4. Intersection Level of Service

LOS	Signalized Intersection (seconds)	Unsignalized Intersection (seconds)
A	≤10	≤10
B	10 – 20	10 – 15
C	20 – 35	15 – 25
D	35 – 55	25 – 35
E	55 – 80	35 – 50
F	>80	>50

The MoDOT Engineering Policy Guide (Category 232 Facility Selection) stipulates typical LOS targets. Rural roadways typically target LOS D or better during peak periods and LOS C or better during off-peak periods. In urban areas, roadways typically target LOS E or better during peak periods and LOS D or better during off-peak periods.

Traffic analyses are based on the highest hourly volume within the morning and evening peak periods of the day, commonly known as the AM and PM peak hours. Roadways should ideally be designed to adequately serve the peak hour traffic volume in the peak direction of flow. Since most traffic traveling one-way during the morning peak is traveling the opposite way during the evening peak periods, both sides of a facility must generally be designed to accommodate the peak directional flow during the peak hour.

As the volume flowing through the intersection increases, the LOS will degrade. Existing intersection LOS classifications for the key intersections are provided in **Table 1-5.** Six of the 14 key intersections operate at a LOS F in either the AM, PM, or both AM and PM peak periods under existing conditions (2018). These are depicted in orange in **Table 1-5**. The average delay per vehicle is also provided. The intersections with LOS F are generally the result of the high volumes of vehicles through the intersection and the high volumes of vehicles making left or right turns at the intersection.

Based on the traffic analysis, 8 of the 14 key intersections will operate at a LOS F in 2045 under the No Build scenario. It should be noted that signals alone are not sufficient to resolve the capacity issues as long as Route N is two lanes. They will help the issue (as is shown with improved operations in the No Build versus Existing), but do not solve it. Widening the corridor (as proposed in this study) will further improve operations.

Table 1-5. Route N Intersection LOS Existing and 2045 Future No Build

Intersection	2018 Existing (AM)		2018 Existing (PM)		2045 FNB (AM)		2045 FNB (PM)	
	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS
Route N & Hawk Ridge Trail[2]	56.5	E	49.4	D	96.4	F	109.3	F

Table 1-5. Route N Intersection LOS Existing and 2045 Future No Build

Intersection	2018 Existing (AM)		2018 Existing (PM)		2045 FNB (AM)		2045 FNB (PM)	
	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS
Route N & Sommers Rd	102.9	F	46.3	D	156.6	F	56.1	E
Route N & Red Baron Dr	>120[3]	F[3]	76.4[3]	F[3]	>120[3]	F[3]	>120[3]	F[3]
Route N & Lake St. Louis Blvd	21.7	C	27.0	C	72.8	E	53.9	D
Route N & Wyndgate Ridge Dr	58.5[3]	F[3]	>120[3]	F[3]	>120[3]	F[3]	>120[3]	F[3]
Route N & Hopewell Rd	104.9[3]	F[3]	38.4[3]	E[3]	80.4	F	31.1	C
Route N & Duello Rd[4]	>120[3]	F[3]	52.3[3]	F[3]	-	-	-	-
Route N & Perry Cate Blvd[2]	17.5	B	14.7	B	22.4	C	12.7	B
Route N & Route Z[4]	59.9	F	61.3	F	56.6	E	37.4	D
Route N & Wilmer Rd	21.6[3]	C[3]	18.5[3]	C[3]	>120[3]	F[3]	>120[3]	F[3]
Route N & S Point Prairie Rd	12.0[3]	B[3]	11.8[3]	B[3]	>120[3]	F[3]	>120[3]	F[3]
S Point Prairie Rd & Jackson Rd	9.0[3]	A[3]	9.6[3]	A[3]	26.3[3]	D[3]	21.0[3]	C
Buckner Rd & Route Z	11.4[3]	B[3]	14.5[3]	B[3]	>120[3]	F[3]	79.2[3]	F[3]
Buckner Rd & S Point Prairie Rd	8.6[3]	A[3]	8.5[3]	A[3]	9.9[3]	A[3]	9.7[3]	A[3]

[1] Intersection delay (seconds per vehicle)

[2] Operations based on HCM 2000

[3] Two-way stop controlled

[4] Future-No Build (FNB) scenario realigns intersection and adds signalization

The complete SYNCHRO modeling reports are available in the Project Record.

Key Driveways

Congestion is also worsened by back-ups caused by existing key (major) driveways. The number of driveways is increasing as new commercial and residential facilities are developed. An example is at the Immanuel Lutheran Church and School at 632 Highway N, Wentzville; see **Figure 1-5**.

The current key driveways are listed in **Table 1-6**. Additionally, the study area contains a substantial number of minor driveways, mostly to existing single-family houses. These locations stand out regarding the effects on vehicular mobility because they cause substantial traffic bottlenecks.

Figure 1-5. View of Driveway at Immanuel Lutheran Church

Table 1-6. Key Driveways

Location	Type
Entrance to Briarchase Subdivision	South at Route N
Entrance to Glenbrook Subdivision	North at Route N
Entrance to Saratoga Homes at Welsh Drive	North at Route N
Entrance to Wyndgate Ridge Subdivision	North at Route N
Carter Pet Hospital	North at Route N
SCC Fire Station #2	South at Route N
Hopewell Baptist Church	South at Route N
Sports Barn	North at Route N
Immanuel Lutheran Church	South at Route N
St. Gianna Catholic Church	At Boone Elementary School Road
County Landing Lane	At Sommers Landing
Curtis/Dehart Offset Drives	At Equestrian Center
Liberty High School at Sommers Road	North Drive
Seal St. Louis Compound	At South Pointe Prairie Road
Westlake Church at Buckner Road	Near Route Z Intersection
Liberty High School at Sommers Road	South Drive
Woodbridge Creek/Morgan Meadow	Offset Drives at Route N
Offset Farm Drives at Forrester Drive	Offset Drives at Route N
Drives at Water Tower	North at Route N

The key driveways create operational challenges differently than at roadway intersections. The operational challenges are focused primarily on turning onto and off of Route N as opposed to through movements. In addition, while intersection operational issues are focused on the AM and PM peak hours during weekdays, key driveways cause operational issues at varying times of day and may occur on the weekends as well. For example, schools will have “peak periods” just before school starts and right after school ends. Businesses and residential entrances will generate turning movements throughout the day and do not normally have a “peak period of travel.” Finally, churches generate large turning movements surrounding the beginning and ending of church services.

1.4.2.3 Provide Access Management Opportunities Along Route N

Conflict points are locations where vehicle paths cross. Traffic conflict points along a roadway include where turning vehicle pathways merge, diverge, or cross due to turning movements and other movements along the roadway. Primary conflict points are at intersections and driveway entrances. The number and spacing of access points also impacts traffic operations and safety on the roadway.

As the area adjacent to and nearby Route N develops, traffic volumes and access points will continue to increase, especially at the eastern portion of the study area. Under current conditions, many users report extended delays waiting to turn onto and off of Route N from subdivisions, driveways, schools, and churches during peak traffic periods. Gaps in traffic are often not available to safely turn. This

condition also occurs on the western end of the study area but to a lesser degree. Lack of turn lanes on Route N also results in conflicts between vehicles waiting to turn off Route N and vehicles continuing along Route N in both directions.

While it is difficult to quantify, travelers report highly unreliable travel times on Route N, particularly due to the number and spacing of access points. With volumes increasing, unusually high turning movements at the numerous access points can result in substantial delays and differences in travel time. The lack of predictability for traffic movement through the corridor adversely affects the quality of life for users in the corridor, making it difficult to make decisions about when to travel.

1.5 Secondary Study Objectives

The study alternatives were also evaluated for how well they achieved the following secondary study objectives:

- Improve safety for the traveling public
- Accommodate bicycles and pedestrians
- Take existing planning documents into consideration
- Provide route options and circulation to existing and future land uses

1.5.1 Improving Safety for the Travelling Public

Vehicle crashes are a traditional safety issue with crash risks increasing as traffic volumes increase. Crashes within the Route N study area are affected by roadway conditions and vehicle operations and have exceeded state averages for 4 of the last 5 years. With increasing traffic volumes, roadway factors such as lack of shoulders and lack of modern design increase risk of crashes and impede mobility. These risks are elevated by longer periods of congestion.

1.5.1.1 Existing Route N Crashes

Crash data for the 5-year period between 2013 and 2017 was obtained from MoDOT's Traffic Management System and analyzed to provide insight into the current safety performance of the Route N study corridor.

Crash data obtained for the 5-year period between 2013 and 2017 shows 599 crashes recorded along Route N between South Point Prairie Road and Hawk Ridge Trail (just west of the I-64/Route 364 interchange). These crashes include those attributed to intersections along Route N as well as the roadway segments between intersections along Route N. Additionally, four crashes were recorded along South Point Prairie Road between Jackson Road and South Point Prairie Road (excluding the crashes attributed to the Route N intersection, which are already reported with Route N crashes.)

Table 1-7 shows the breakdown of crashes by roadway by year over the 5-year period. As shown, 2016 had the highest total crashes with 145 crashes corridor-wide while 2014 had the lowest crashes with 102 crashes corridor-wide.

Table 1-7. Existing Crashes by Year

Roadway	2013	2014	2015	2016	2017	Total
Route N (South Point Prairie to Hawk Ridge Trail)	104	101	127	145	122	599
S Point Prairie Rd (Jackson to Route N)	0	1	1	0	2	4
TOTAL	**104**	**102**	**128**	**145**	**124**	**603**

Table 1-8 provides the breakdown of crashes by roadway and severity.

Table 1-8. Existing Crashes by Roadway and Severity

Roadway	Property Damage Only	Minor Injury	Serious Injury	Fatal	Total
Route N (South Point Prairie to Hawk Ridge Trail)	481	107	9	2	599
S Point Prairie Rd (Jackson to Route N)	3	1	0	0	4
TOTAL	**484**	**108**	**9**	**2**	**603**

Table 1-9 shows the breakdown of crashes by severity by year along Route N (South Point Prairie to Hawk Ridge Trail) and South Point Prairie Road (Jackson to Route N).

Table 1-9. Existing Crashes by Severity and Year

	2013	2014	2015	2016	2017	Total Crashes	Average Annual Crashes
Property Damage Only	80	87	104	121	92	484	97
Minor Injury	21	13	23	22	29	108	22
Serious Injury	2	1	1	2	3	9	2
Fatal	1	1	0	0	0	2	0
TOTAL	**104**	**102**	**128**	**145**	**124**	**603**	**121**

In addition to the number of crashes and the crash severity, these crashes are tabulated and compared to similar routes statewide. Crash rates are defined by the number of crashes per hundred million vehicle miles traveled. As shown in **Table 1-10**, the crash rates along Route N exceed the statewide average for 4 of the past 5 years.

Table 1-10. Route N Crashes and Crash Rates by Year

Crash Data for 2013 to 2017

Roadway	2013	2014	2015	2016	2017
Route N – Number of Crashes *Total Crashes Including Intersections*	104	101	127	145	122
Route N – Crash Rate[1]	253.52	243.61	223.28	277.39	177.70
Statewide Average Crash Rate[1]	212.52	211.21	214.49	221.29	*Not Available*

[1] *Crash rates shown are the number of crashes per hundred million vehicle miles traveled.*

The reduced crash rate for 2017 has not been attributed to a specific cause. However, it is notable that the intersections of Lake St. Louis Boulevard and Perry Cate Boulevard were signalized during 2017.

Analyzing the types of crashes along a corridor can help to point to the more prominent issues of the roadway. The crash types along Route N over the most recent 5 years of available data are summarized in **Table 1-11.**

Table 1-11. Crash Classification Summary
Crash Data for 2013 to 2017

Type	Number of Crashes	Percent of Crashes
Avoiding	5	0.8 percent
Backing	1	0.2 percent
Changing Lane	7	1.2 percent
Deer	10	1.7 percent
Dog	1	0.2 percent
Fixed Object	2	0.3 percent
Head On	19	3.2 percent
Left Turn	28	4.7 percent
Left Turn Right Angle Collision	32	5.3 percent
Other	5	0.8 percent
Out of Control	67	11.2 percent
Passing	28	4.7 percent
Pedestrian	1	0.2 percent
Rear End	350	58.4 percent
Right Angle	25	4.2 percent
Right Turn	1	0.2 percent
Right Turn Right Angle Collision	1	0.2 percent
Sideswipe	5	0.8 percent
U-Turn	11	1.8 percent
Total	**599**	

The prevailing crash types from **Table 1-11** are rear end crashes (58 percent), out of control (11 percent), and left turn related crashes (10 percent). Rear end crashes often occur because of high traffic volumes or limited sight distance. This is consistent with increasing periods of congestion and areas of the Route N corridor having very limited sight distance. A number of stakeholder comments have specifically discussed the limited sight distance at the intersections of Duello Road and Hopewell Road. Forty-two reported crashes occurred at this "S" curve from 2013 to 2017; 29 were rear end crashes and 7 were out-of-control crashes. St. Charles County is currently designing intersection improvements at this location to eliminate the staggered intersections of both roads and combine them into one intersection.

Out-of-control crashes can be attributed to horizontal and vertical curves, pavement conditions, or limited sight distance. These crashes are often mitigated through improved roadway geometry and/or the addition of roadway shoulders and other roadway features that provide greater margin for driver error. Left turn related crashes are often mitigated with shared or dedicated turn lanes, signalization, turning restrictions, or right in/right out only.

Fatal and disabling crashes are reviewed more thoroughly than less severe crashes. Between 2013 and 2017, two fatalities and nine serious injury crashes occurred along the portion of Route N within the study corridor.

The two fatal crashes occurred at the following locations with the following contributing circumstances:

- The first fatal crash occurred in 2013, 0.3 mile east of Perry Cate Boulevard. The crash occurred during dry, dark conditions in which a vehicle crossed the centerline and hit oncoming traffic. Probable contributing circumstances included alcohol.
- The second fatal crash occurred in 2014, 0.2 mile west of Lake St. Louis Boulevard. The crash occurred in the eastbound direction during wet conditions in which the driver failed to notice stopped traffic and swerved into oncoming traffic in order to avoid a stopped vehicle, resulting in a head on collision with a motorcycle traveling westbound.

The nine serious injury crashes can be attributed to the following contributing circumstances:

- Of the nine serious injuries that occurred along the corridor, five were run-off-the-road fixed object crashes, one was avoiding, one was a left turn right angle collision, one was a right angle, and one was classified as other. Out of control and avoiding crash types can be attributed to congestion and lack of adequate shoulders along the existing corridor.
- Five of the serious injury crashes occurred at intersections along the corridor.
- Seven of the nine crashes occurred during daylight with clear or cloudy conditions, while four of the nine crashes occurred along curves.

The fatal and serious injury crash locations are shown in **Figure 1.6**.

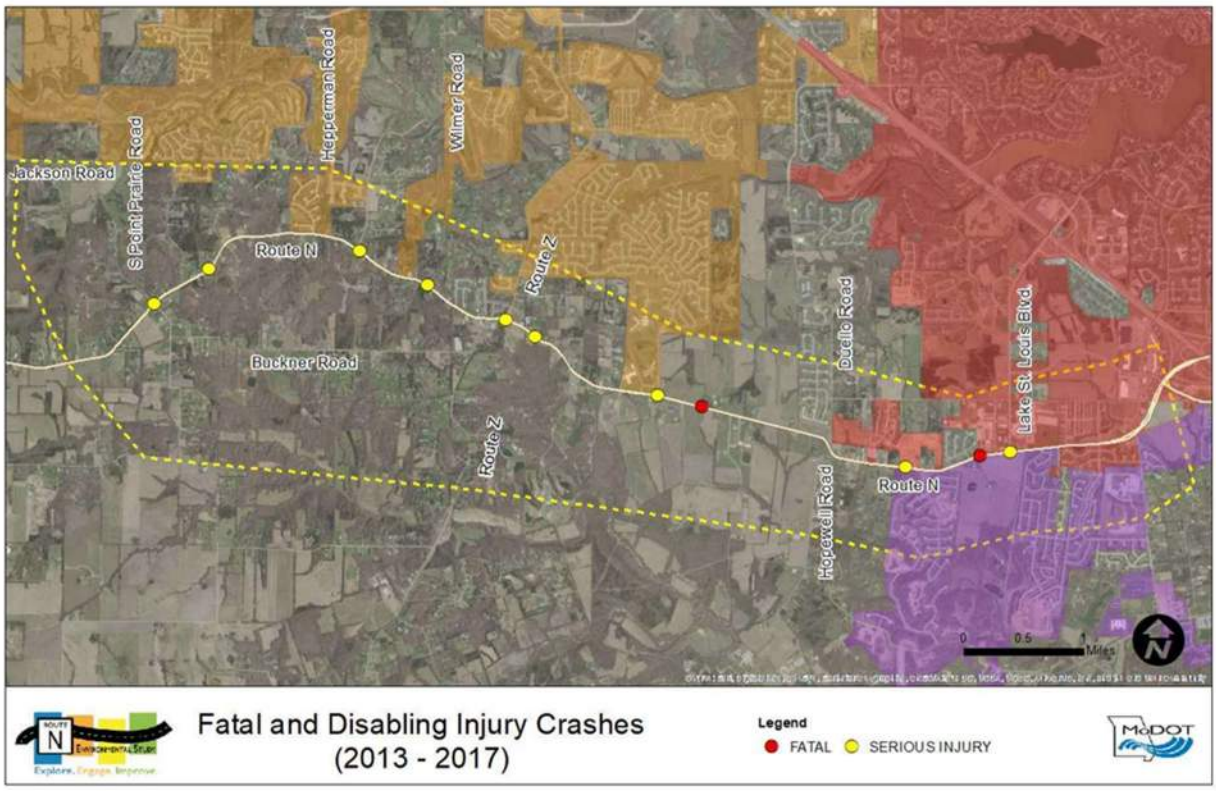

Figure 1.6. Fatal and Serious Injury Crash Locations in Existing Route N

1.5.1.2 Highway Safety Manual Analysis of Existing Route N

The Highway Safety Manual (HSM) provides methodology and guidance for quantitatively estimating crash frequency and crash severity for a variety of roadway types and locations. Readily available HSM analysis spreadsheet tools were utilized to estimate crash frequencies for the existing Route N corridor for comparison to the crash data obtained for the period of 2013 to 2017.

HSM spreadsheet tools for Urban Suburban Arterials and Rural Two-Lane Roads were utilized for the analysis. Calibration factors from the *Missouri Highway Safety Manual Recalibration (2018)* were applied to adjust the estimated crash frequencies for Missouri-specific driver behaviors, crash reports, and other factors that may account for difference in crash frequencies in different jurisdictions. Historical crash data were incorporated into the analysis providing both predicted crashes and expected crashes as outputs. The **predicted crashe**s represent the anticipated safety performance of the roadway based on the performance of roadways in Missouri with similar configuration and traffic volumes. The **expected crashes** represent the estimated safety performance of the roadway based on the configuration, traffic volumes, and the recent 5-year crash history observed in the corridor. The comparison of predicted and expected crashes provides insight into the safety performance of the existing configuration.

The predicted and expected crash frequencies for the Route N Existing 2018 HSM analysis are listed in **Table 1-12**.

Table 1-12. Existing 2018 HSM Analysis

Existing 2018 HSM Analysis		**Annual Crash Frequency, *crashes/year***		
Roadway	**Description of Analysis Limits**	**Predicted Total Crashes/Year**	**Expected Total Crashes/Year**	**Expected - Predicted**
Route N	S. Point Prairie Road to Route Z	6.9	5.7	-1.2
Route N	Route Z to Hopewell/Duello	25.8	26.8	1.0
Route N	Hopewell/Duello to Hawk Ridge Trail	38.0	35.6	-2.4
S. Point Prairie Road	Jackson Road to Route N	1.2	1.3	0.1
TOTAL		**71.9**	**69.4**	**-2.7**

Within the limitations of the HSM analysis tools, the comparison of predicted and expected crashes allows insight into the general safety performance of the corridor. A positive value generally indicates that the roadway is performing worse than what would be anticipated based on the configuration and the traffic volumes, a negative value generally indicates that the roadway is performing better than would be anticipated. As shown above, all portions of the corridor are generally performing in the range of what would be anticipated for a similar roadway in Missouri based on traffic volumes and roadway characteristics including frequent access points, minimal shoulders, and traffic congestion. Based on the quantitative safety analysis, the existing corridor does not present safety issues that would be considered disproportionate to similar roadways in Missouri.

1.5.2 Accommodating Bicycles and Pedestrians

Currently, options for pedestrians and bicyclists to cross and/or ride on or parallel to the roadways in the Route N study area are limited due to the roadway geometry and safety concerns. Based on stakeholder interviews and comments, there is support for expanding bicycle and pedestrian facilities in the area. Sidewalks are provided along many newer subdivision streets, while older roads may or may not have sidewalks. Narrow shoulders along Route N make bicycle/pedestrian travel a safety concern. Crossing Route N and other arterials, even at intersections, is also a safety concern.

MoDOT's Engineering Policy Guide has guidance for accommodating bicyclists on state routes. According to the guide, "The design and installation of bicycle facilities is to be considered on all MoDOT improvement projects beginning at the planning stage." County and local pedestrian and bicycle master plans exist but do not mandate comprehensive facilities. The City of Wentzville Parks and Recreation Department has an Open Space Master Plan (2004) and St. Charles County has a Trails and Greenways Development Plan (2018). Both have location and design specifications. In the immediate vicinity of the Route N EA study area, very few bike/ped facilities exist or are planned. There is a small segment of trail adjacent to the Hawk Ridge Park; which is unaffected by any of the alternatives. The other potential bike/ped facility in the vicinity of the Route N EA study area are associated with the David Hoekel Parkway. **Figure 1-7** shows how the DHP would accommodate bicycles and pedestrians. Coordination will be needed for project success. Coordination between DHP and Route N will be required to ensure that the facilities are complementary.

A component of the Purpose and Need for this study is to coordinate with these planned and possible bicycle and pedestrian facilities to offer multimodal options to users as part of an improvement project.

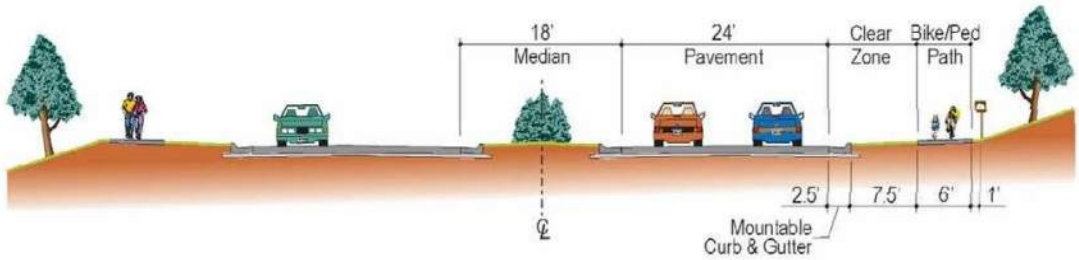

Figure 1-7. Typical Section of the David Hoekel Parkway
Source: DHP EA, 2014

1.5.3 Consideration of Existing Planning Documents During Decision-Making

According to the St. Charles County Master Plan, the result of the continuing in-migration of population has a direct correlation to land use planning. This is especially true regarding the allocation of areas to accommodate future residential development. St. Charles County underwent rapid population growth between 1950 and 2000—approximately 853 percent. The initial incoming populations settled along the I-70 corridor, then also along the Route 94 corridor in "leap-frog" patterns. The most noticeable population growth was within the area bounded by I-70, I-64, and the Missouri River. Sizeable population increases also were recorded within various census tracts south of I-70 between the cities of St. Charles and Lake Saint Louis. Between 2000 and 2010, the County overall grew by 27 percent.

Many planning studies affect the Route N study. The recent studies are organized into transportation planning and land use planning and discussed further in the Appendices of this Purpose and Need document (**Appendix C**)**.** Relative to the Improvement of Route N, the Transportation Improvement Plan (TIP) focuses on the DHP. The overall David Hoekel Parkway corridor will provide a direct connection to I-70 (with the City of Wentzville's interchange project) and to Route 364 at Route N. This project will be built to anticipate future widening of the DHP. The configuration of Route N is also in the TIP as a NEPA study. This document is a culmination of that planning.

Land use development and regulation is typically a local government responsibility. Regional, state, and federal entities have specific jurisdiction that affects development. For example, because Route N is a state-maintained road, MoDOT has the responsibility for approving access to the roadway.

The Route N corridor and the entirety of western St. Charles County is developing rapidly. These developments have caused the traffic demands at the heart of this study. Investigation of the study area

has identified subdivision configurations that rely almost entirely on Route N with relatively few access points aside from Route N. Adjacent subdivisions often do not connect to each other, forcing vehicles to go to Route N for short trips to visit neighborhoods in adjacent subdivisions. More importantly, this limited secondary mobility is a safety issue. If Route N is closed, residents have few options, if any, for leaving their subdivision.

1.5.4 Improving Route Options and Circulation

While it is not the principal purpose of Route N to carry truck traffic, it is important to ensure that any proposed new work be designed/constructed to accommodate trucking and freight traffic through the area if needed to provide for incident management between I-70 and I-64. Failure to plan for events will negatively affect the community. Conversely, creating a corridor that becomes a preferred pathway for I-70 to I-64 traffic will also have negative community impacts.

Passenger vehicles make up the vast majority of users of the roadways in the Route N study area; however, they are not the only users, and other users need to be considered. At the same time, regionally, walking and biking are increasingly becoming a substitute to passenger vehicle trips to work and errands, in addition to their traditional recreational use.

Any comprehensive roadway improvements should also accommodate and coordinate with planned and proposed transit facilities in the study area. The only transit provider in the Route N study corridor is Operating Above the Standard (OATS) Transit, which is a rural public transportation provider covering 87 Missouri counties that offers shared-ride, demand-response, and door-to-door services.

Other transit providers in the region include the Metro and St. Charles Area Transit (SCAT). Metro is the Greater St. Louis Metropolitan mass transit system. The system includes MetroLink, the region's light rail system; MetroBus, the region's bus system; and Metro Call-A-Ride, a paratransit van system serving the needs of the disabled and elderly. No MetroLink or MetroBus routes currently serve the Route N study area; however, MetroBus plans to include a new fixed bus trunk line along the I-70 corridor to Wentzville in the future. SCAT consists of five bus routes that provide transportation to various locations within the City of St. Charles as well as to the Metrolink North Hanley Station. No SCAT routes currently serve the Route N study area.

In addition, the East West Gateway Council of Governments published a report in 2007 for St. Charles County that discusses future plans for local cities, such as Wentzville, to develop a city bus system like SCAT for their own areas that could serve local city transit needs and tie into the proposed MetroBus trunk line on I-70 to provide regional connectivity. This would provide the Wentzville area the opportunity to be part of a linked transit system for St. Charles County. Nevertheless, any proposed improvements on Route N should avoid irreversible impediments to future transit.

Several public and private schools exist along Route N and the nearby area, and Route N is part of the schools' bus routes. It is important to ensure that any proposed work be designed and constructed to accommodate transit-type vehicles.

1.6 Logical Termini

FHWA issues guidelines to assist transportation planners in designating study limits for an evaluation. In addition to establishing rational end points for a transportation improvement, the study limits should also serve as general geographical boundaries for a review of environmental impacts. Based on these criteria, the study limits for the Route N EA are:

- Western terminus: South Point Prairie Road/Jackson Road intersection
- Eastern terminus: I-64/Route 364 interchange

These limits connect the essential movements associated with the roadways of western St. Charles County. Multiple transportation improvements can be considered as individual projects as long as the improvements have independent utility. A project that has independent utility is considered usable and reasonable even if no additional transportation improvements in the area are made. This will allow for a schedule that does not restrict or otherwise alter planning and construction of adjacent projects.

Finally, the Route N EA neither restricts nor prevents consideration of other reasonably foreseeable transportation improvements. The transportation problems and solutions are being evaluated to minimize conflicts with the improvements laid out in long-range plans. Solutions will be developed to allow for complementary improvements of connecting roadways as needed in the future.

1.6.1 Western Terminus – South Point Prairie Road/Jackson Road Intersection

The intersection of South Point Prairie Road and Jackson Road is the western terminus of the Route N Study. This intersection also serves as the southern terminus of the David Hoekel Parkway. The DHP is a project sponsored by the City of Wentzville. It will be a new roadway in western Wentzville and will provide a new connection between Interstate (I)-70 and US 61. Beginning just south of I-70 at South Point Prairie Road and Jackson Road, the DHP travels north with an interchange at I-70. From I-70, the DHP extends east through parts of Wentzville and ends near Mette Road and Route P in Flint Hill. The southern terminus of the DHP serves as the western terminus of the Route N EA.

1.6.2 Eastern Terminus – I-64/Route 364 Interchange

Route 364, also known as the Page Avenue Extension, is a 20-mile divided highway between I-270 in Maryland Heights and I-64 in Lake Saint Louis. Phase 1 of the Page Avenue Extension opened in 2003. The last segment, Phase III, was completed in 2014. At I-64, Route 364 transitions from a divided, four-lane highway to Route N. The eastern terminus of the Route N EA is the I-64/Route 364 interchange.

SECTION 2

Alternatives

This section examines the development and evaluation of the study's alternatives. The alternative development process began with identifying a wide range of initial alternatives that could potentially address the transportation needs established by the study. These initial alternatives are called *Conceptual Alternatives*. The Conceptual Alternatives were developed in accordance with principles of appropriate design standards with consideration of existing planning goals, public engagement, potential environmental impacts, and engineering judgment. **Section 2.1** presents the Conceptual Alternatives.

The primary screening tool used to evaluate the Conceptual Alternatives was an analysis of how well they could satisfy the study's Purpose and Need. **Section 2.2** presents the metrics used in the Purpose and Need screening of the Conceptual Alternatives. Those that are determined to meet the study's Purpose and Need are referred to as *Reasonable Alternatives.* The screening of the Conceptual Alternatives is presented in **Section 2.3**.

The Reasonable Alternatives were further developed and refined based on more detailed engineering analysis and known constraints. This allowed for the establishment of preliminary study footprints and, in turn, for detailed impact assessments, cost estimates, and traffic evaluations. The specifications for of the Reasonable Alternatives is presented in **Section 2.4**.

The Reasonable Alternative that best accomplishes the Purpose and Need for the proposed action while avoiding, minimizing, or mitigating the impacts to the social and natural environment is identified as the *Tentative Preferred Alternative*. The Tentative Preferred Alternative is discussed in **Section 2.5**.

Both figures and exhibits are included in this section to graphically depict the alternatives. Figures appear in the text while large-scale graphics are presented on the exhibits in **Appendix A**.

The overall process of alternative development and evaluation is shown on **Figure 2-1**.

2.1 Conceptual Alternatives

This section of the EA will describe:

- How and why Conceptual Alternatives were selected for detailed study
- How MoDOT and FHWA evaluated conceptual alternatives
- Why alternatives were eliminated from further consideration

Based on the study's Purpose and Need, logical termini, and study area, a range of Conceptual Alternatives was developed. The Conceptual Alternatives represent the initial alternatives that could potentially address the transportation needs established by the study. These alternatives are depicted on **Figures 2-2** through **2-7**.

Each of the Conceptual Alternatives were developed to a comparable level of detail to enable a fair and reasonable comparison. Decisions were made based on their ability to satisfy the study's Purpose and Need. This evaluation is included in **Table 2-1**.

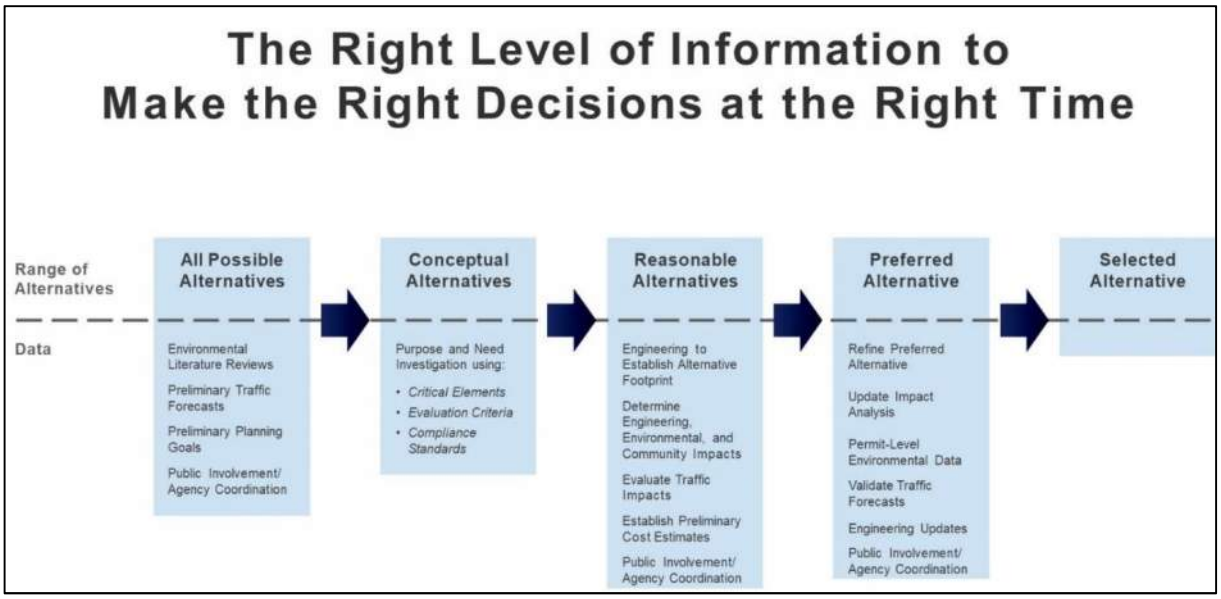

Figure 2-1. Overall Process of Alternative Development and Evaluation

2.1.1 No Build Alternative: No New Build Elements

The No Build Alternative is always carried through NEPA evaluations. If no alternatives can be found that minimally satisfy a study's purpose and need, the Tentative Preferred Alternative would be the No Build Alternative. The No Build Alternative assumes no improvements outside of routine maintenance.

2.1.2 TSM/TDM Alternative: No Additional Capacity

Transportation System Management (TSM) strategies are generally used to maximize the efficiency of operations of the existing roadway system rather than increasing capacity. Examples of TSM strategies include ramp metering, implementing Intelligent Transportation Systems, and enhanced transit service.

Travel Demand Management (TDM) measures are implemented to manage the travel demand component of the transportation system. The main focus is to reduce or maintain the level of vehicular traffic occurring during peak periods and to reduce the use of single occupant automobiles. Examples of TDM measures include reduction of the use of motor vehicles, shifting the use of motor vehicles to off-peak periods, encouraging ride-share and transit use, and telecommuting.

No viable TSM or TDM solution is practical for the Route N study.

2.1.3 Improve Existing Alternative: Improve Along Existing Corridor

This configuration would improve Route N following its existing alignment; except between Hepperman Road and South Point Prairie Road (**Figure 2-2**). Along most of the corridor, the improvements would be constructed adjacent to the existing roadway, typically constructing the roadway either to the north or south of existing Route N. It is important to note that due to upgrading the alignment to a 45-miles per hour (MPH) design speed, it will not be possible to re-use most of the existing Route N pavement. However, portions of the existing Route N right-of-way can be used. The transition segment from Route N to South Point Prairie Road will use a new alignment starting at Hepperman Road. At this point, the alternative travels on new alignment westward through open terrain. It will cross Penny Royal Lane and transition to South Point Prairie Road, and then north to Jackson Road.

2.1.4 Buckner Road Alternative: Improve Corridor Using Buckner Road

This configuration would improve Route N along its existing alignment between the eastern termini and a point approximately 800 feet west of Route Z. From this point, the alignment travels south and connects to Buckner Road (**Figure 2-3**). To complete the Route N/Route Z intersection, a connection will be constructed behind the existing Westlake Church of Christ and a Recreational Vehicle Storage Lot. The alignment will then use an improved version of Buckner Road to South Point Prairie Road. This connection will remove the existing right-angle curves on Buckner Road and the sharp turn on South Point Prairie. From this point, the alignment will use an improved version of South Point Prairie Road north to Jackson Road.

2.1.5 Near South Alternative: New Alignment to the Near South of the Existing Alignment

This configuration would improve Route N along its existing alignment between the eastern terminus to approximately the Hopewell Road/Duello Road intersection (**Figure 2-4**). From this point, the alignment travels south and approximately parallel to existing Route N (approximately 1,000 to 1,500 feet south of Route N). It then travels north along South Point Prairie Road from the intersection of existing Route N at South Prairie Road to Jackson Road.

2.1.6 Far South Alternative: New Alignment to the Far South of the Existing Alignment

This configuration would improve Route N along its existing alignment between the eastern terminus to approximately the Hopewell Road/Duello Road intersection (**Figure 2-5**). From this point, the alignment travels south of existing Route N. The alignment will be approximately 1 mile (5,280 feet) south of Route N at its intersection with Route Z. It then travels north along South Point Prairie Road to Jackson Road.

2.1.7 Wilmer/Interstate Alternative: Realign Corridor using Wilmer Road and Interstate Drive

This configuration would improve Route N along its existing alignment to the Wilmer Road intersection. From there, it will follow/improve Wilmer Road to Interstate Drive (**Figure 2-6**). It will then follow Interstate Drive to the DHP.

2.1.8 Route Z/Interstate Alternative: Realign Corridor using Route Z and Interstate Drive

This configuration would improve Route N along its existing alignment until the Route Z intersection. From there, it will follow/improve Route Z to Interstate Drive (**Figure 2-7**). It will then follow Interstate Drive to the DHP.

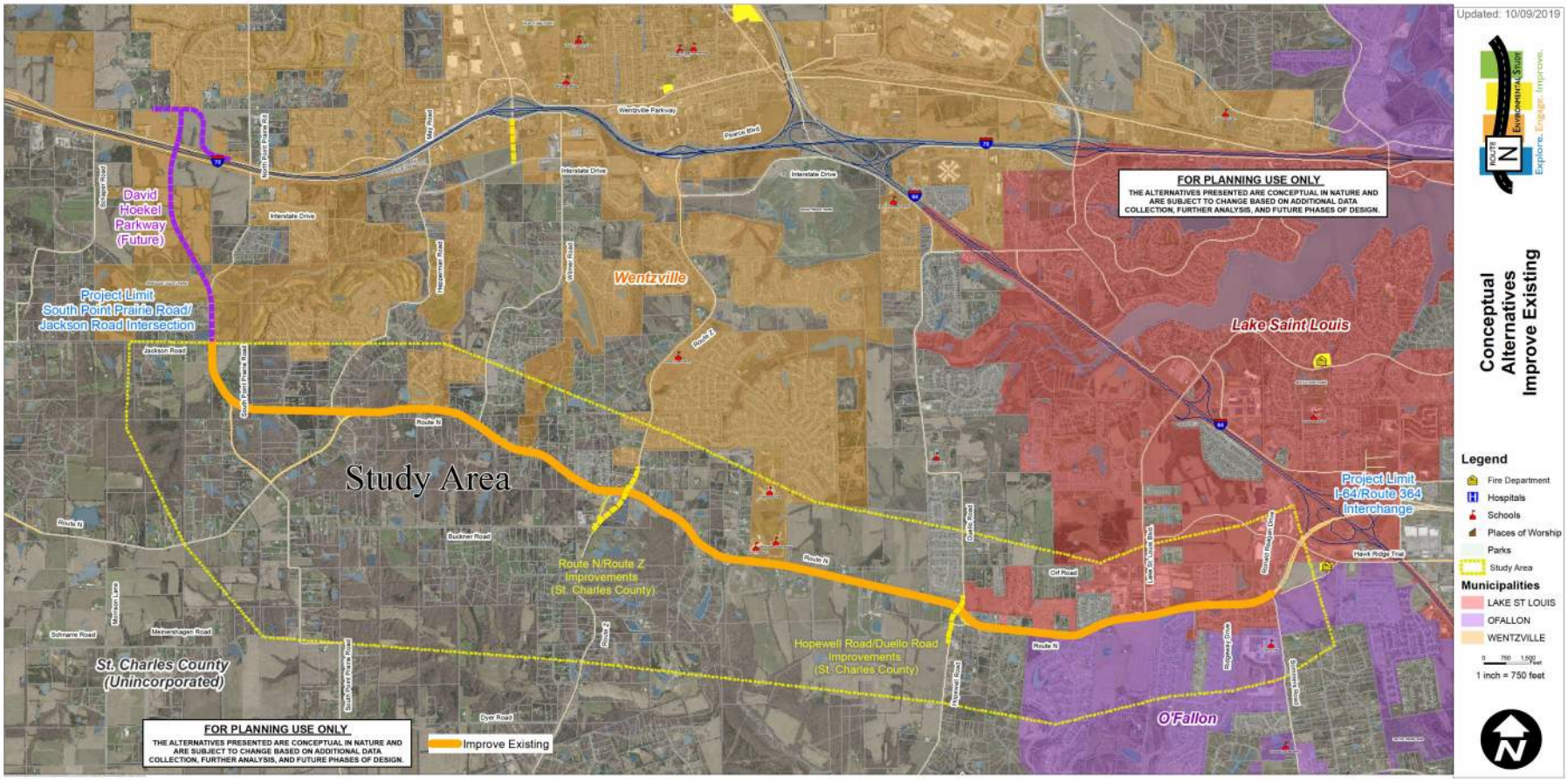

Figure 2-2. Improve Existing Conceptual Alternative

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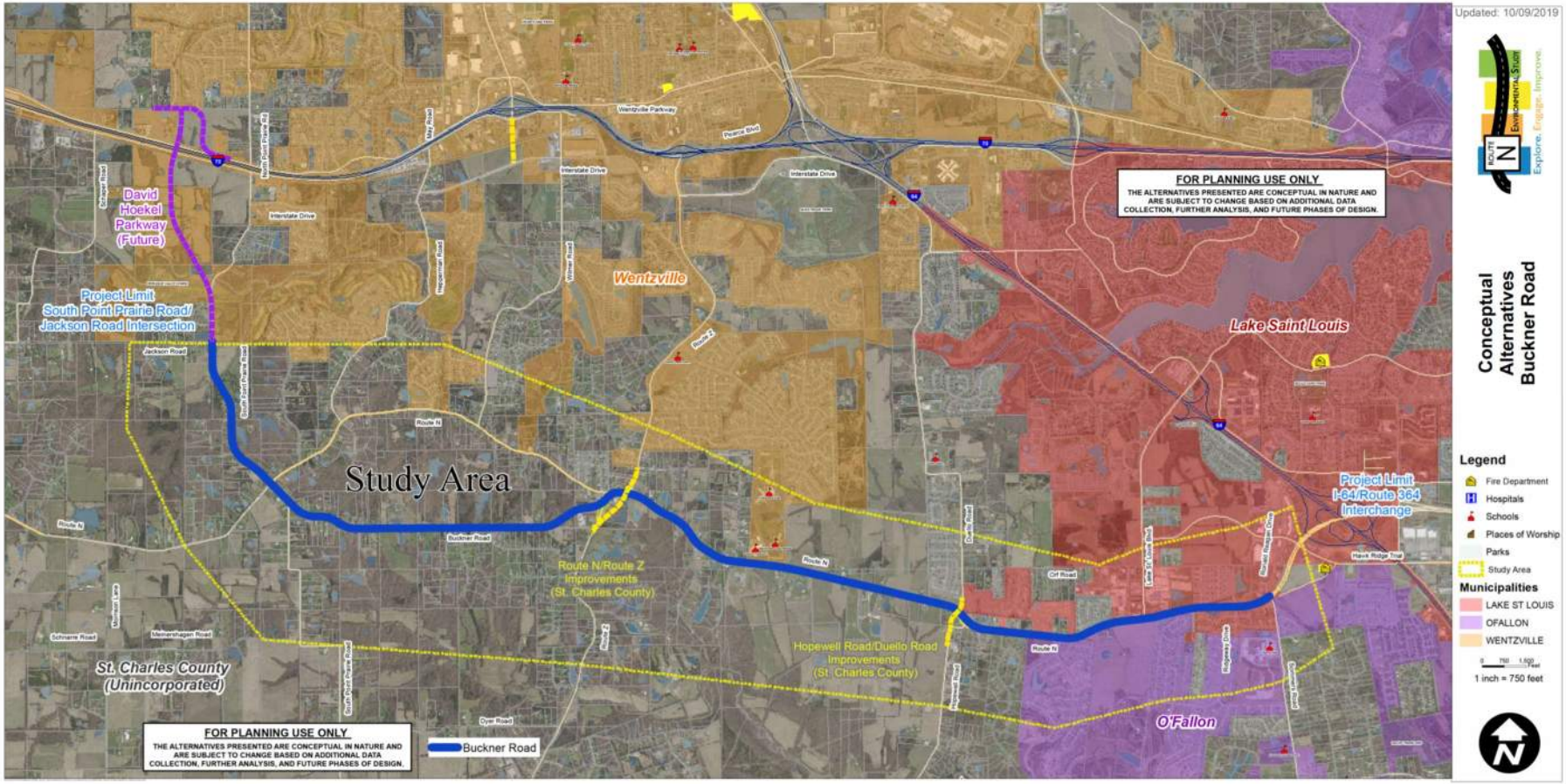

Figure 2-3. Buckner Road Conceptual Alternative

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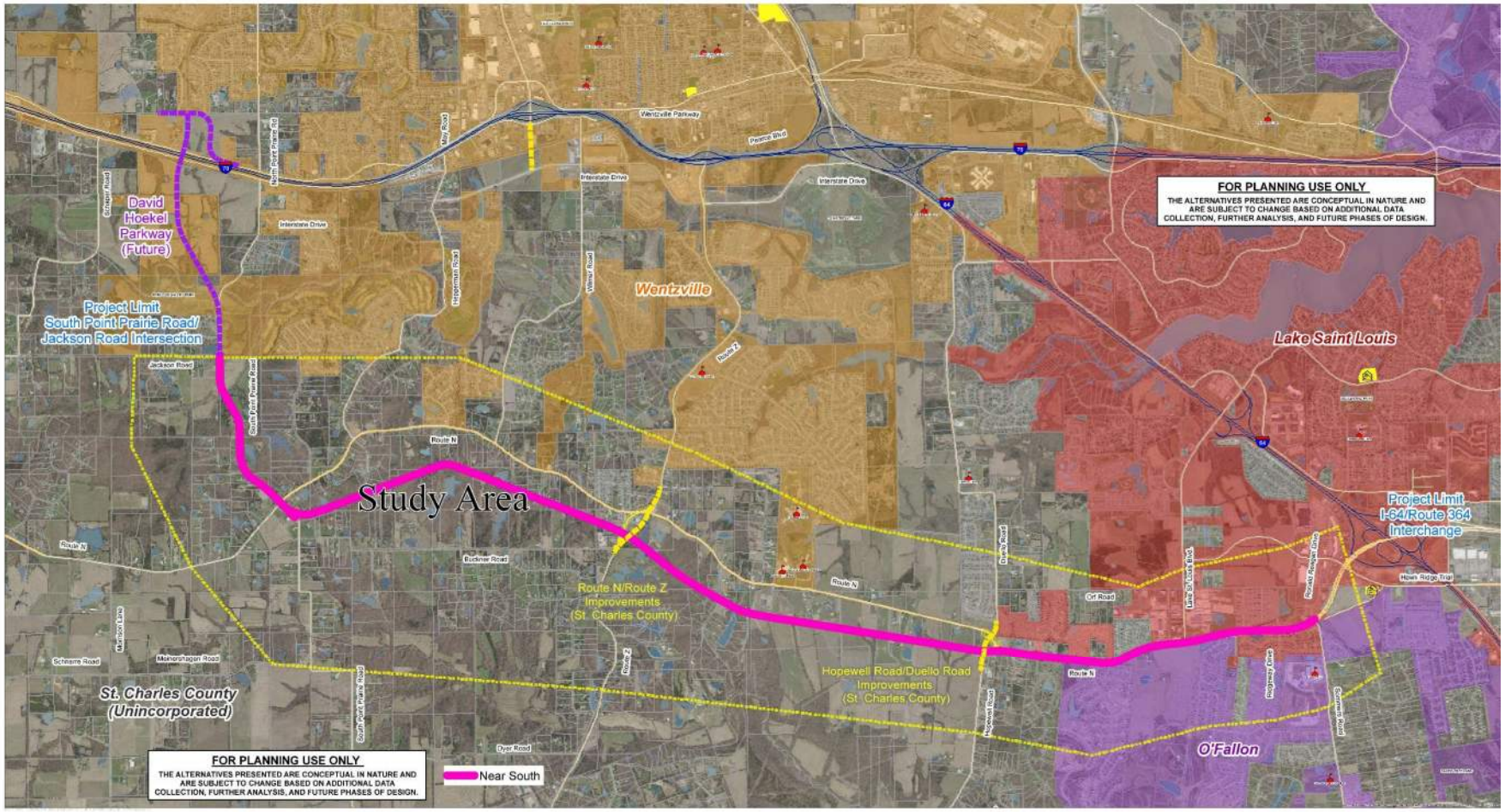

Figure 2-4. Near South Conceptual Alternative

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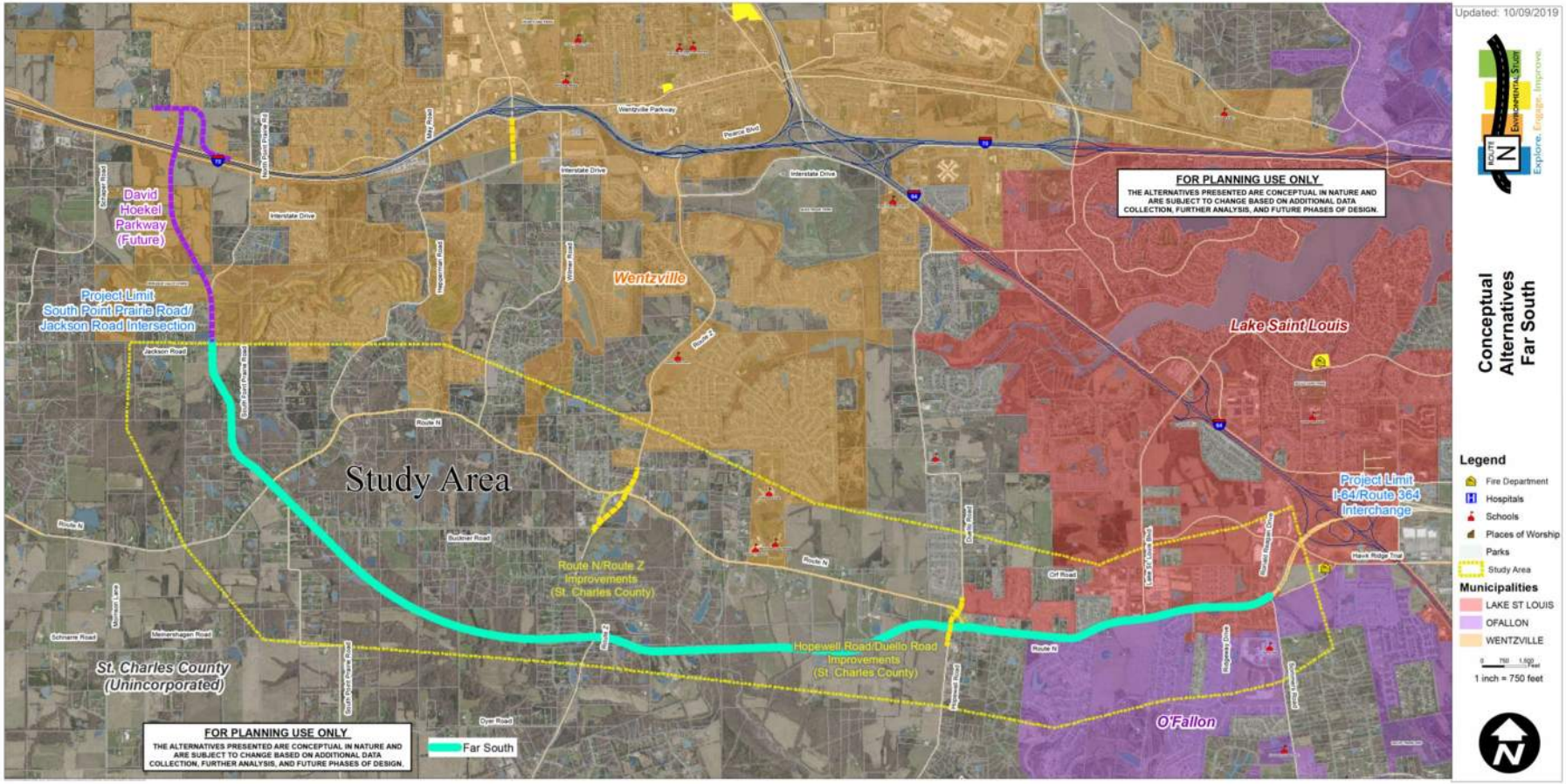

Figure 2-5. Far South Conceptual Alternative

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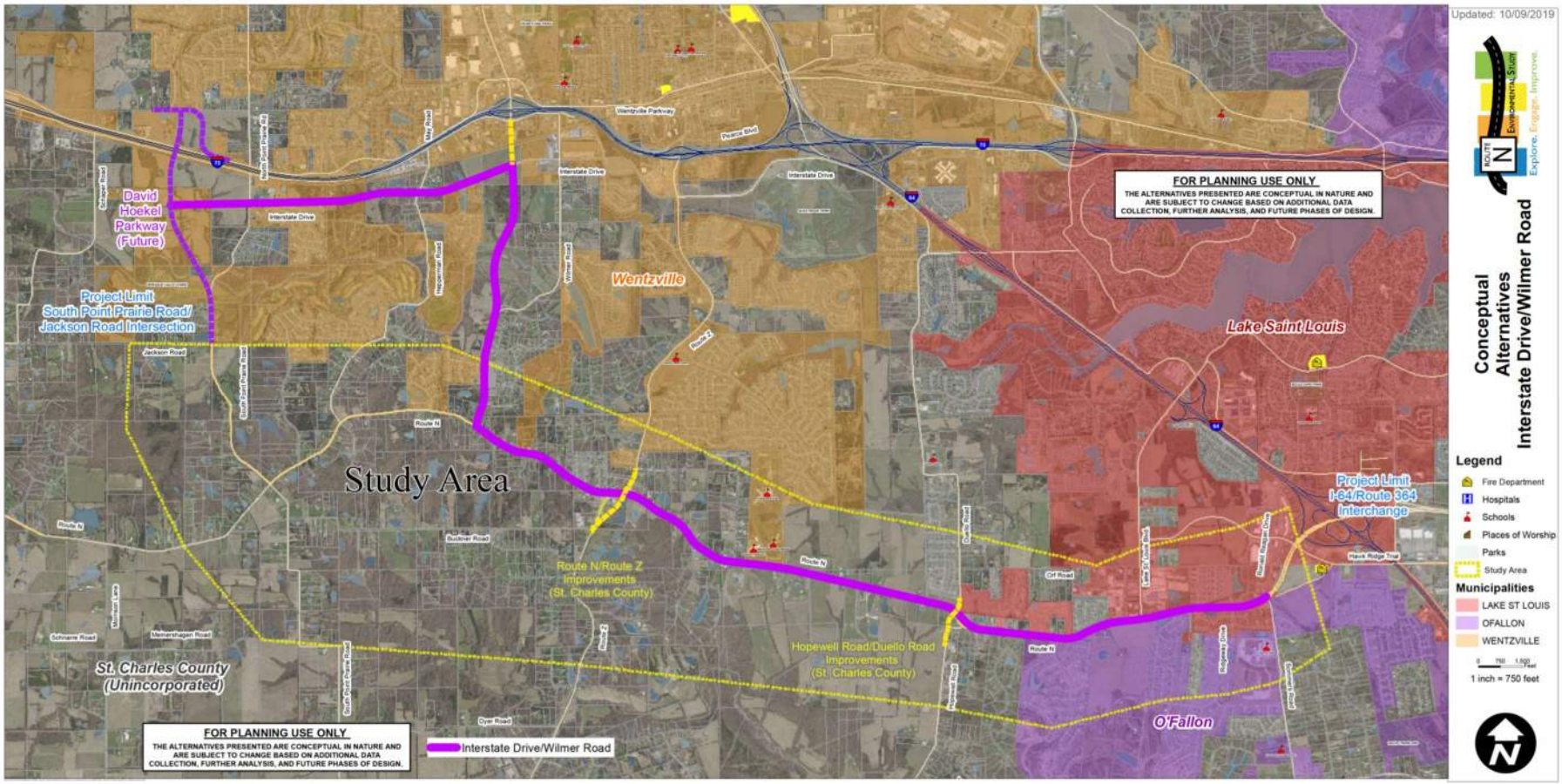

Figure 2-6. Wilmer/Interstate Conceptual Alternative

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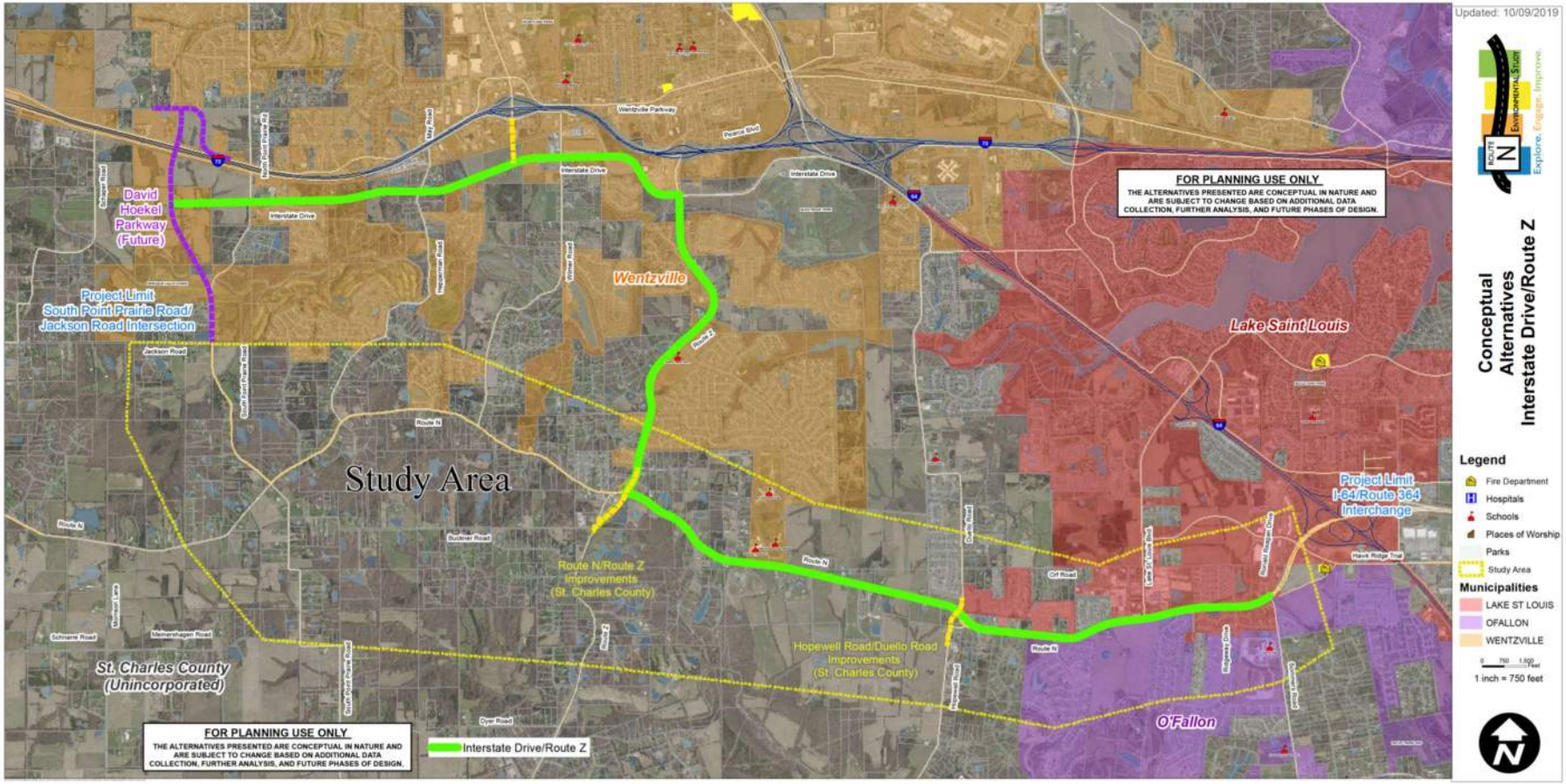

Figure 2-7. Route Z/Interstate Conceptual Alternative

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2.2 Purpose and Need Screening Metrics

To determine the Conceptual Alternatives to advance for further study, a Purpose and Need screening was conducted.

The screening criteria presented were used to determine how well each Conceptual Alternative satisfies the Purpose and Need. Only those Conceptual Alternatives that mainly satisfy each element of the Purpose and Need were considered a Reasonable Alternative. Identification of the Tentative Preferred Alternative is based on how well it satisfied the study's Purpose and Need in addition to consideration of environmental, engineering, resource agency input, stakeholder input, and other factors. To determine the potential for each alternative to meet the study Purpose and Need, screening criteria and standards are developed.

Due to the complications of separating effects and the similarity of the alternatives, the evaluation of the conceptual alternatives is necessarily complicated. For each Purpose and Need element, *Screening Evaluation Criteria* are used to define the important pieces of the Purpose and Need elements that the Conceptual Alternatives are meant to satisfy.

From there, the *Standards*—when the Screening Evaluation Criteria can be said to achieve that part of the Purpose and Need—are defined. Standards ask specific questions as to what must be accomplished by a Conceptual Alternative to satisfy the Evaluation Criteria.

Finally, a *Decision Key* is developed. The Decision Key asks, in yes/no format, whether the Conceptual Alternative meets the Standards and Evaluation Criteria for each of the Purpose and Need elements.

The progression is as follows:

PURPOSE AND NEED ELEMENT → EVALUATION CRITERIA → STANDARDS → DECISION KEY

In this case, a yes/no format was used to document the performance measures that define how well an alternative succeeds at accomplishing the Evaluation Criteria. **Table 2-1** presents a summary of the major elements of the Purpose and Need, the Evaluation Criteria, Standards, and Decision Keys. Each of the steps are discussed in this section.

2.2.1 Purpose and Need Element: Need to Improve Access and Connectivity

The capacity of most of the roadways within the Route N study corridor between I-64 and I-70 has been exceeded. These roads provide access to urbanizing areas but were designed for lower volumes of rural traffic. Therefore, they are no longer able to efficiently accommodate the increased traffic volumes resulting from the high level of growth in the Route N corridor.

Three criteria are associated with this element:

- **Evaluation Criterion 1A**: Provide Safe and Efficient Access to/from Important Study Area Resources
  - **Standard**: Can the alternative provide improved access to/from key Route N destinations and major traffic generators?
    - **Decision Key:**

      Yes – Alternative provides improved access to key destinations and major Route N traffic generators

      No – Alternative does not provide improved access to key destinations and/or underserves major Route N traffic generators

- **Evaluation Criterion 1B:** Provide Roadway Design and Features that Meet Appropriate Standards
  - **Standard**: Can the alternative meet design standards for the appropriate roadway classification(s)?
    - **Decision Key:**

      Yes – Alternative can be designed to be consistent with future Route N roadway type and traffic volumes consistent with planned land uses

      No – Alternative would result in future Route N traffic on incompatible roadways/roadway types and/or through existing or planned land uses that are not intended for future Route N traffic
- **Evaluation Criterion 1C**: Improve Connectivity in the Study Area
  - **Standard**: Can the alternative improve connectivity in the Route N Corridor?
    - **Decision Key:**

      Yes – Alternative accommodates trips between study termini and focuses connectivity improvements near the existing corridor

      No – Alternative results in inefficient movement of traffic between study termini and/or does not improve connectivity for trips remaining on existing Route N

2.2.2 Purpose and Need Element: Need to Reduce Congestion and Delays

Congestion and mobility are worsened by numerous uncontrolled and over-capacity intersections and driveways. Three criteria are associated with this element:

- **Evaluation Criterion 2A:** Provide Adequate Capacity along Route N
  - **Standard**: Does the alternative provide capacity that exceeds the forecasted traffic demand along Route N?
    - **Decision Key:**

      Yes – Alternative provides sufficient capacity for traffic using existing and future Route N and does not adversely affect other area roadways

      No – Alternative does not provide sufficient capacity for traffic using existing Route N and/or adversely affects other area roadways
- **Evaluation Criterion 2B:** Provide Adequate Operation at the Study's Key Intersections and Major Driveways
  - **Standard**: Does the alternative offer the opportunity to provide peak hour LOS D (rural sections) or LOS E (urban sections) or better at key Route N intersections and improved operations at major driveways?
    - **Decision Key**:

      Yes – Alternative improves/accommodates efficient operation at existing and future Route N key intersections and major driveways

      No – Alternative does not improve/accommodate efficient operations at existing and future Route N key intersections and major driveways

- **Evaluation Criterion 2C:** Provide Access Management Opportunities along Route N
  - **Standard**: Does the alternative offer the opportunity to manage the number and spacing of access points along Route N?
    - **Decision Key**:

      Yes – Alternative provides opportunities to manage the number and spacing of access points along Route N

      No – Alternative provides limited, if any, opportunities to manage the number and spacing of access points along Route N

Table 2-1. Draft Conceptual Alternatives Evaluation Matrix[1]

Purpose and Need Element	Evaluation Criteria	Standards	Decision Key (Yes/No)	Conceptual Alternatives						
				No Build	**Improve Existing**	**Buckner Road**	**Near South**	**Far South**	**Wilmer Road/ Interstate Drive**	**Route Z/ Interstate Drive**
Purpose and Need Element #1 – Need to Improve Access and Connectivity	A) Provide safe and efficient access to/from important study area resources	Can the alternative provide improved access to/from key Route N destinations and major traffic generators?	Yes – Alternative provides improved access to key destinations and major Route N traffic generators No – Alternative does not provide improved access to key destinations and/or underserves major Route N traffic generators	No	Yes	Yes	No (Does not provide improved access to destinations west of Hopewell/Duello)	No (Does not provide improved access to destinations west of Hopewell/Duello and underserves traffic generators north of Route N)	No (Underserves traffic generators west of Wilmer Road and south of Route N)	No (Does not provide improved access to destinations west of Route Z and underserves traffic generators west of Route Z and south of Route N)
	B) Provide roadway design and features that meet appropriate standards	Can the alternative meet design standards for the appropriate roadway classification(s)?	Yes – Alternative can be designed to be consistent with future Route N roadway type and traffic volumes consistent with planned land uses No – Alternative would result in future Route N traffic on incompatible roadways/roadway types and/or through existing or planned land uses that are not intended for future Route N traffic	No	Yes	Yes	Yes	Yes	No (Interstate Drive and Wilmer Road design, road way type, and planned land uses are not consistent with carrying Route N traffic)	No (Interstate Drive and Route Z design, roadway type, and planned land uses are not consistent with carrying Route N traffic)
	C) Improve connectivity in the study area	Can the alternative improve connectivity in the Route N Corridor?	Yes – Alternative accommodates trips between study termini and focuses connectivity improvements near to the existing corridor. No – Alternative results in inefficient movement of traffic between study termini and/or does not improve connectivity for trips remaining on existing Route N	No	Yes	Yes	Yes	No (Distance from existing Route N results in inefficient operations on existing Route N)	No (Inefficient movement of traffic between study termini due to required turns)	No (Inefficient movement of traffic between study termini due to required turns)
Purpose and Need Element #2 – Need to Reduce Congestion and Delays	A) Provide adequate capacity along Route N	Does the alternative provide capacity that exceeds the forecasted traffic demand along Route N?	Yes – Alternative provides sufficient capacity for traffic using existing and future Route N and does not adversely affect other area roadways No – Alternative does not provide sufficient capacity for traffic using existing Route N and/or adversely affects other area roadways	No	Yes	Yes	Yes	No (Does not improve traffic flow on existing Route N given distance from existing Route N)	No (Adversely affects Interstate Drive and Wilmer Road)	No (Adversely affects Interstate Drive and Route Z)
	B) Provide adequate operation at the study's key intersections and major driveways	Does the alternative offer the opportunity to provide peak hour LOS D (rural sections) or LOS E (urban sections) or better at key Route N intersections and improved operations at major driveways?	Yes – Alternative improves/accommodates efficient operation at existing and future Route N key intersections and major driveways No – Alternative does not improve/accommodate efficient operations at existing and future Route N key intersections and major driveways	No	Yes	Yes	Yes	No (Does not improve operations for existing intersections and driveways given distance from existing Route N)	Yes	No (Does not improve key intersections and driveways west of Route Z)
	C) Provide access management opportunities along Route N	Does the alternative offer the opportunity to manage the number and spacing of access points along Route N?	Yes – Alternative provides opportunities to manage the number and spacing of access points along Route N [2] No – Alternative provides limited, if any, opportunities to manage the number and spacing of access points along Route N	No	No (Limited opportunities for access management)	No (Limited opportunities for access management)	Yes[2]	Yes[2]	No (Limited opportunities for access management)	No (Limited opportunities for access management)
Number (%) of Purpose and Need Elements Met				**0/6 (0%)**	**5/6 (83%)**	**5/6 (83%)**	**5/6 (83%)**	**2/6 (33%)**	**1/6(17%)**	**0/6 (0%)**
Reasonable Alternative?				**Yes (By Rule)**	**Yes**	**Yes**	**Yes**	**No**	**No**	**No**

[1] See Sections 2.2 and 2.3 for the quantitative supporting materials for the evaluation criteria and standards.

[2] Assumes that MoDOT will purchase access rights when acquiring right-of-way.

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2.3 Purpose and Need Screening Results

This section summarizes how well the Conceptual Alternatives satisfy the study's Purpose and Need.

2.3.1 Evaluation Criterion 1A: Provide Safe and Efficient Access to/from Important Study Area Resources

This criterion focuses on improving access to existing Route N destinations and traffic generators. Traffic generators are those locations from which many trips will begin and/or end. Examples of traffic generators are schools, churches, gas stations, and commercial businesses. The Improve Existing and Buckner Road Alternatives follow the existing alignment very closely. Consequently, these alternatives have a high probability to continue to provide adequate access to important current destinations. In addition, the roadway improvements can be expected to improve access.

The following alternatives satisfy this criterion:

- Improve Existing Alternative
- Buckner Road Alternative

The following alternatives do not satisfy this criterion:

- No Build Alternative – Does not provide any improvements
- Near South Alternative – Does not improve access to destinations west of Hopewell/Duello
- Far South Alternative – Does not improve access to destinations west of Hopewell/Duello and underserves traffic generators north of Route N
- Wilmer/Interstate Alternative – Underserves traffic generators west of Wilmer Road and south of Route N
- Route Z/Interstate Alternative – Does not improve access to destinations west of Route Z and underserves traffic generators west of Route Z and south of Route N

2.3.2 Evaluation Criterion 1B: Provide Roadway Design and Features that Meet Appropriate Standards

This criterion focuses on improving Route N geometrics, conditions, and features on Route N, or its replacement. The Improve Existing Alternative follows existing Route N up to Hepperman Road. Consequently, it has a high probability to improve Route N conditions. The Buckner Road and Near South Alternatives create a large portion of new alignment whose configuration can meet new design standards. Existing portions of Route N that do not follow the existing alignment will become a local road. In this case, local road refers to that portion of a road which is no longer on the state system. Instead, it becomes a St. Charles County or community road. The conditions along Buckner Road will not prevent its development in accordance with design standards. The other alternatives use much lesser portions of Route N.

The following alternatives satisfy this criterion:

- Improve Existing Alternative
- Buckner Road Alternative
- Near South Alternative
- Far South Alternative

The following alternatives do not satisfy this criterion:

- No Build Alternative – Does not improve Route N

- Wilmer/Interstate Alternative – Interstate Drive and Wilmer Road design, roadway type, and planned land uses are not consistent with carrying Route N traffic
- Route Z/Interstate Drive Alternative – Interstate Drive and Route Z design, roadway type, and planned land uses are not consistent with carrying Route N traffic

2.3.3 Evaluation Criterion 1C: Improve Connectivity in the Study Area

This criterion focuses on establishing roadway characteristics to balance the pros and cons of connectivity. One important focus was on the ability to efficiently move from study terminus to study terminus. Another important focus was evaluating where the connectivity improvements occur. The Improve Existing, Buckner Road, and Near South Alternatives use a corridor very close to the existing alignment. These alignments will permit use of road with characteristics that could allow for the efficient movement of traffic.

The traffic analyses that underly the evaluation criteria are discussed in **Section 1.5**. The entire Traffic Analysis Technical Memorandum is contained in **Appendix C**.

The following alternatives satisfy this criterion:

- Improve Existing Alternative
- Buckner Road Alternative
- Near South Alternative

The following alternatives do not satisfy this criterion:

- No Build Alternative – Provides no improvements
- Far South Alternative – Distance from existing Route N results in inefficient operational improvements on existing Route N
- Wilmer/Interstate Alternative – Inefficient movement of traffic between study termini due to required turns
- Route Z/Interstate Alternative – Inefficient movement of traffic between study termini due to required turns

2.3.4 Evaluation Criterion 2A: Provide Adequate Capacity Along Route N

This criterion focuses on providing capacity that meets the forecasted traffic demand along Route N for the design year of 2045. Projects are planned and designed to meet the future, anticipated needs and characteristics of a certain year. This is referred to as the *design year*. Specifically, it focuses on increasing capacity on Route N without adversely affecting other study area roadways.

The following alternatives satisfy this criterion:

- Improve Existing Alternative
- Buckner Road Alternative
- Near South Alternative

The following alternatives do not satisfy this criterion:

- No Build Alternative – Does not improve traffic flow
- Far South Alternative – Does not improve traffic flow on existing Route N given distance from existing Route N
- Wilmer/Interstate Alternative – Adversely affects Interstate Drive and Wilmer Road
- Route Z/Interstate Alternative – Adversely affects Interstate Drive and Route Z

2.3.5 Evaluation Criterion 2B: Provide Adequate Operation at the Study's Key Intersections and Major Driveways

This criterion focuses on improving operations at most key existing intersections and driveways. Specifically, whether the alternative can provide peak hour LOS D (rural sections) or LOS E (urban sections), or better.

The following alternatives satisfy this criterion:

- Improve Existing Alternative
- Buckner Road Alternative
- Near South Alternative
- Wilmer/Interstate Alternative

The following alternatives do not satisfy this criterion:

- No Build Alternative – Does not improve existing intersections and driveways
- Far South Alternative – Does not improve operations for existing intersections and driveways given distance from existing Route N
- Route Z/Interstate Alternative – Does not improve key intersections and driveways west of Route Z

2.3.6 Evaluation Criterion 2C: Provide Access Management Opportunities along Route N

This criterion focuses on the opportunity to manage the number and spacing of access points along Route N. Specifically, these alternatives provide the opportunity to control and/or reduce the number of access points along Route N.

The following alternatives satisfy this criterion:

- Near South Alternative
- Far South Alternative

These off-alignment alternatives provide the opportunity to follow MoDOT's access management guidelines on Route N without the need to remove or retrofit existing access points. Should the guidelines not be enforced on a relocated Route N, the access management improvements may not be realized.

The following alternatives do not satisfy this criterion:

- No Build Alternative – Provides no access management opportunities
- Improve Existing Alternative – Provides limited opportunities for access management due to following existing Route N alignment
- Buckner Road Alternative – Provides limited opportunities for access management due to large amount of existing Route N alignment followed
- Wilmer/Interstate Alternative – Provides limited opportunities for access management due to large amount of existing Route N alignment followed

Based on the analysis of how well the Conceptual Alternatives satisfy the study's Purpose and Need, the following alternatives were selected for further evaluation:

Improve Existing Alternative
Improve Along Existing Corridor

Buckner Road Alternative
Improve Corridor Using Buckner Road

Near South Alternative
New Alignment to the Near South of the Existing Road

- Route Z/Interstate Alternative – Provides limited opportunities for access management due to large amount of existing Route N alignment followed

2.3.7 Evaluation Results and Alternatives for Further Consideration (Reasonable Alternatives)

This evaluation can be summarized as follows:

- No Build Alternative: Yes on 0 out of 6 Evaluation Criteria (0 percent)
- Improve Existing Alternative: Yes on 5 out of 6 Evaluation Criteria (83 percent)
- Buckner Road Alternative: Yes on 5 out of 6 Evaluation Criteria (83 percent)
- Near South Alternative Yes on 5 out of 6 Evaluation Criteria (83 percent)
- Far South Alternative: Yes on 2 out of 6 Evaluation Criteria (33 percent)
- Wilmer/Interstate Drive Alternative: Yes on 1 out of 6 Evaluation Criteria (17 percent)
- Route Z/Interstate Drive Alternative: Yes on 0 out of 6 Evaluation Criteria (0 percent)

The decision key for advancing a Conceptual Alternative to a Reasonable Alternative is that it meets all or a majority of the six Evaluation Criteria and satisfies a majority of each Purpose and Need element. The three alternatives that were advanced are summarized as follows:

- **Improve Existing Alternative**: Improve along Existing Corridor – This configuration will improve Route N along its existing alignment except between Hepperman Road and South Point Prairie Road. Along most of the corridor, the improvements would be constructed adjacent to the existing roadway, typically constructing the roadway either to the north, or south, of existing Route N. It is important to note that due to upgrading the alignment to a 45 MPH design speed, it will not be possible to re-use most of the existing Route N pavement; however, it will be able to use portions of the existing Route N right-of-way. Along the bulk of the corridor, the improvements will be constructed along the existing roadway, typically by working on one side of the road while maintaining traffic on the other side. The transition from Route N to South Point Prairie Road will follow a new alignment starting at Hepperman Road. It will cross Penny Royal Lane just north of 1829 Penny Royal Lane and will transition to South Point Prairie just north of 1756 South Point Prairie Road and then north to Jackson Road.

- **Buckner Road Alternative**: Improve Corridor Using Buckner Road – This configuration will improve Route N along its existing alignment between the eastern termini and a point approximately 400 feet west of Ebert Lane. From this point, the alignment travels south and connects to Buckner Road. To complete the Route N/Route Z intersection, a connection will be constructed behind the existing Westlake Church of Christ and a recreational vehicle storage lot. The alignment will use an improved version of Buckner Road to South Point Prairie Road. This connection will remove the existing right-angle curves on Buckner Road and the sharp turn on South Point Prairie. From this point, the alignment will use an improved version of South Point Prairie Road north to Jackson Road.

- **Near South Alternative**: New Alignment to the Near South of the Existing Corridor – This configuration will Improve Route N along its existing alignment between the eastern termini to approximately the Hopewell Road/Duello Road intersection. From this point, the alignment travels south and approximately parallel to existing Route N (approximately 1,000 to 1,500 feet south of Route N). It then travels north along South Point Prairie Road from the intersection of existing Route N at South Prairie Road to Jackson Road.

This evaluation was developed by the study team and coordinated with the study's stakeholders. This included the following events:

- Workshops and presentations to MoDOT technical staff and senior management

- In-person meetings with the Transportation Corridor Improvement Group (TCIG) comprised of MoDOT, St. Charles County, and East-West Gateway Council of Governments (local Metropolitan Planning Organization)
- FHWA review of Purpose and Need and public information meeting handouts and boards (courtesy review copy to the FHWA)
- Agenda item at the Community Advisory Group meeting
- Agenda item at the Technical Advisory Group meeting
- Focus item (Station) at Public Involvement Meeting 2
- Agency collaboration packages for Purpose and Need, Reasonable Alternatives, and the Tentative Preferred Alternative

Section 4 of this EA discusses the study's outreach efforts.

2.4 Specifications of the Reasonable Alternatives

The Reasonable Alternatives were further developed and refined based on more detailed engineering analysis and known constraints. This allowed for the establishment of preliminary study footprints. Once the footprints are established, detailed impact assessments, cost estimates, and traffic evaluations were developed. The Reasonable Alternatives were refined based on more detailed design studies. These refinements allowed further avoidance and minimization of environmental impacts, and the optimization of engineering design.

2.4.1 Design Standards

Key design standards used for the design of Route N alternatives included:

- **Roadway Configuration**
  - Six-12-foot lanes from Route 364 to Sommers Road
  - Four-12-foot lanes from Sommers Road to:
    - Hepperman Road under the Improve Existing Alternative
    - Route N/South Point Prairie intersection on a new alignment starting at Route N/Route Z intersection under the Buckner Road Alternative
    - Route N/South Point Prairie intersection on a new alignment starting at Hopewell/Duello intersection under the Near South Alternative
  - Two-12-foot lanes from:
    - Hepperman Road to Jackson Road under the Improve Existing Alternative
    - Route N/South Point Prairie intersection to Jackson Road under the Buckner Road Alternative
    - Route N/South Point Prairie intersection to Jackson Road under the Near South Alternative
  - Paved 10-foot shoulders on both sides of corridor
  - Sixteen-foot center median/turn lane
  - Five-foot sidewalks on both sides of corridor
- **Stormwater System**
  - Enclosed drainage (curb and gutter) from Route 364 to Route Z

- Open drainage (drainage ditch) from Route Z to Jackson Road

- **Other Alignment Details**
  - Maximum Grade (vertical alignment): 5 percent
  - Minimum Curve Radius (horizontal alignment): 711 feet
  - Design Speed: 45 MPH

- **Signalized Intersections**

Depending on the Reasonable Alternative, up to ten additional signalized intersections will be required. Some, like the intersections of Route N with Route Z and with Hopewell Road/Duello Road are being realigned as part of separate projects by Saint Charles County. For the three Reasonable Alternatives, the following existing intersections will need to be signalized by the design year 2045:

Improve Existing	Buckner Road	Near South
1. Ridgeway Drive	1. Ridgeway Drive	1. Ridgeway Drive
2. Wyndgate Ridge Dr.	2. Wyndgate Ridge Dr.	2. Wyndgate Ridge Dr.
3. Hopewell/Duello	3. Hopewell/Duello	3. Hopewell/Duello
4. Route Z	4. Route Z	4. Duello at New Route N
5. Route Z at Buckner	5. Existing Route N	5. Route Z
6. Wilmer Road	6. SPP at New Route N	6. Route Z at New Route N
7. Hepperman Road	7. S. Point Prairie Rd	7. Route Z at Buckner
8. S. Point Prairie Rd	8. Jackson Road	8. SPP at New Route N
9. SPP at New Route N		9. S. Point Prairie Rd
10. Jackson Road		10. Jackson Road

- **Typical Cross Sections**

The application of the current design standards results in a typical section that is 137 feet wide in the segments with enclosed drainage from the I-64/Route 364 interchange to Route Z and 186 feet wide in the segments with open drainage from Route Z to the South Point Prairie Road/ Jackson Road intersection. The open drainage footprints are wider, in most cases, because of the hilly terrain along those portions of the Route N corridor. **Figure 2-8a** depicts the typical cross sections for the four 12-foot lanes from Sommers Road to Hepperman Road.

Figure 2-8b depicts the cross section for the two 12-foot lane configuration. Traffic modeling shows the need for only two 12-foot lanes where Route N study meets the DHP. However, the Reasonable Alternatives depict a preserved corridor for 4 lanes, for impact assessments.

Using these typical cross sections allows for consistency in the evaluation of alternatives.

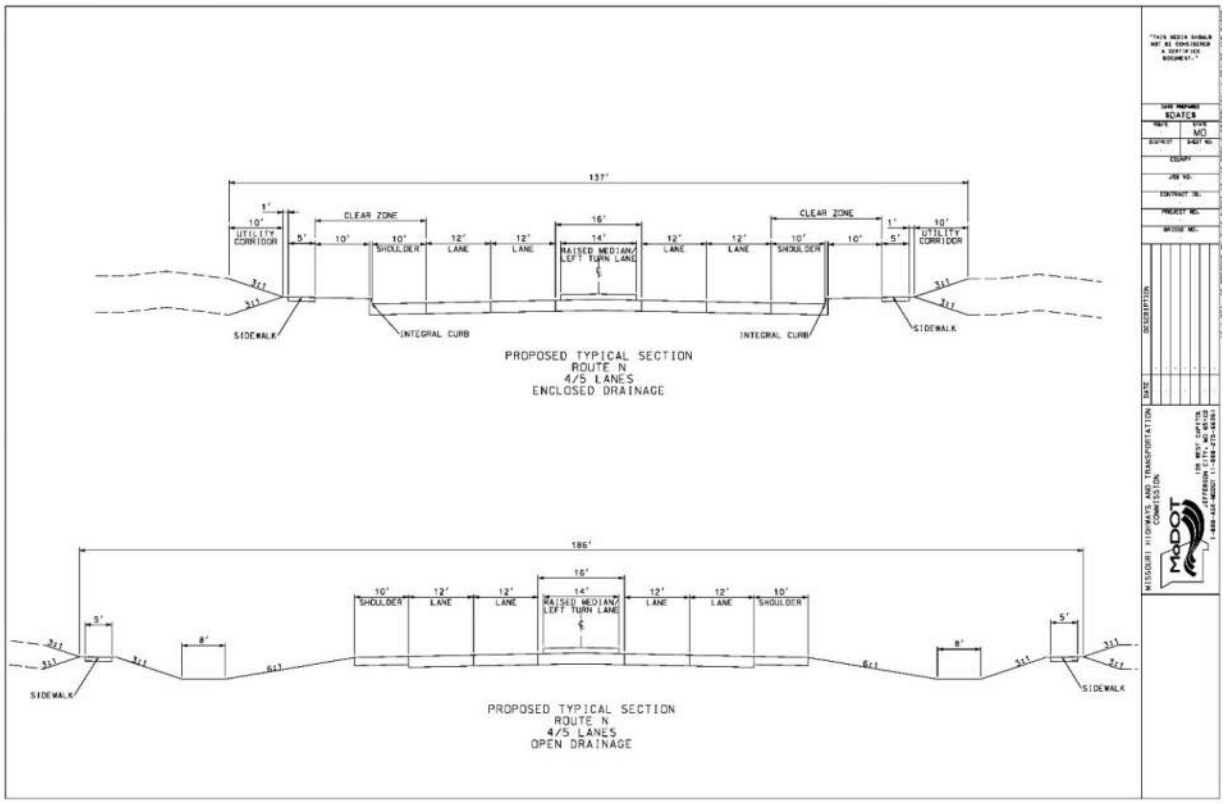

Figure 2-8a. Typical Cross Sections (4/5 Lanes)

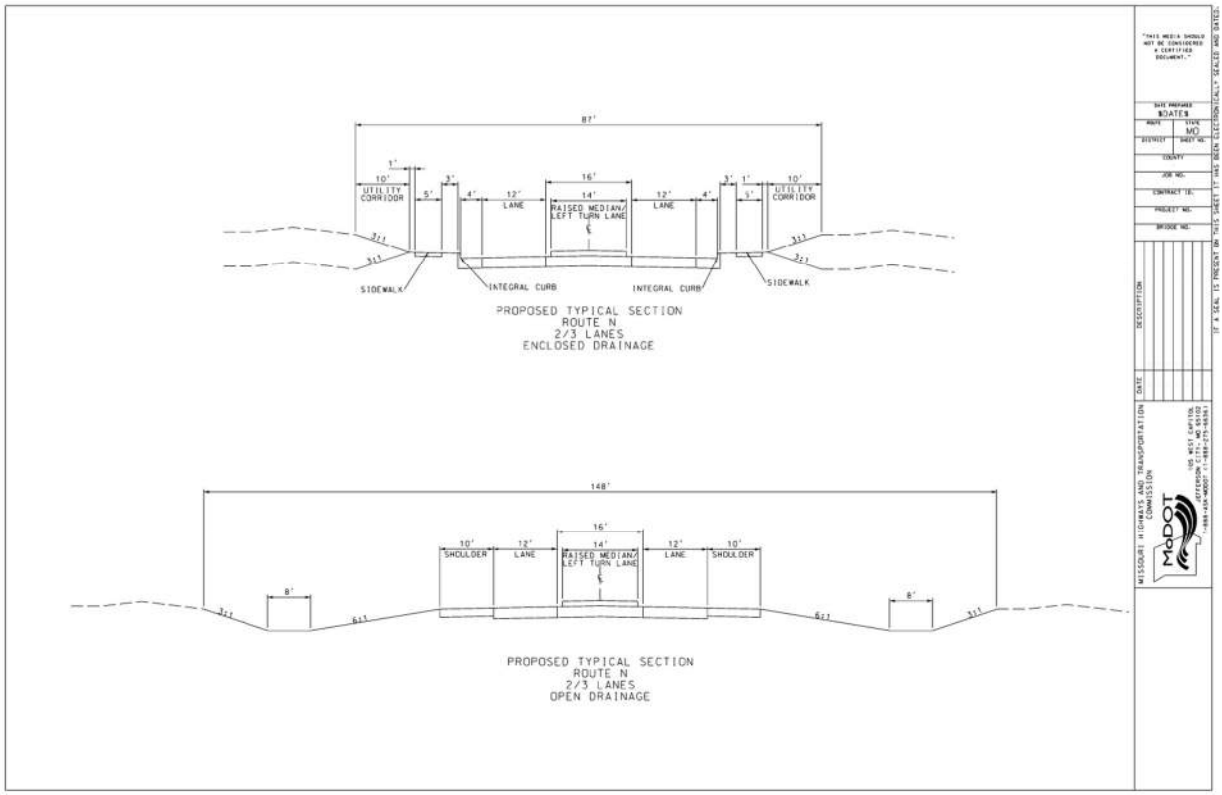

Figure 2-8b. Typical Cross Sections (2/3 Lanes)

2.4.2 Access Management

This section summarizes the Access Management evaluation conducted for the Reasonable Alternatives. The complete technical analysis is contained in **Appendix C**.

MoDOT's access management guidelines are intended to balance the needs of adjacent and competing land uses. Also, the guidelines balance safe and efficient operation of a roadway as part of a larger network of roads. Thus, guidelines were developed to address proper spacing of public road intersections, traffic signals, and driveways. As traffic increases on a roadway the need for access management becomes more crucial. The two primary approaches to access management that could be used on the future Route N corridor are a Two-Way Left-Turn Lane (TWLTL) or a raised median.

TWLTLs are limited by speed limits, driveway spacing and traffic volumes. Beyond specified limits raised medians should be considered for their safety advantages. Raised medians with adequate spaced median openings safely allow turning traffic. Median openings can be full openings, allowing all turns in all directions, or directional openings, allowing only certain turns to be made.

The technical analysis completed two separate 2045 peak hour traffic forecasts using East-West Gateway's (EWG) model and a 4-lane Route N in the study area. Scenario 1 used EWG's land use assumptions and included St. Charles County committed (fiscally constrained) projects. Scenario 2 used St. Charles County's land use assumptions and priority projects (more than just the committed projects included in Scenario 1). Scenario 2 generally resulted in greater traffic volumes on the east end of the corridor and lower volumes on the west end of the corridor.

All analysis of traffic and safety

In general, TWLTLs on five-lane facilities (two lanes in each direction with a center TWLTL) should not be used where annual average daily traffic (AADT) is greater than 28,000. AADTs are expected to exceed 28,000 east of Wyndgate Ridge Drive using Scenario 1 volumes and generally east of Route Z using Scenario 2 volumes.

Based on this, the following access management configures are being used for the Reasonable Alternatives:

- The recommendations given Scenario 1 are increased access control with a raised median should be considered between Wyndgate Ridge Drive and Red Baron Drive, where AADTs exceed 28,000. East of Red Baron Drive, access is already controlled with a depressed median and therefore no further modifications would be necessary. West of Wyndgate Ridge Drive, a five-lane facility including a TWLTL could be effective at maintaining efficient traffic flow while allowing full access to businesses and residences. The design criteria for the study includes a 45-MPH speed on Route N, which complies with MoDOT's Engineering Policy Guide guidelines for TWLTLs.
- The recommendations for Scenario 2 traffic volumes are that additional access control should be considered from Route Z to Red Baron Drive, where estimated daily volumes mostly exceed 28,000. A raised median with strategically placed median openings could be a more effective and safer access management strategy because of the high volumes. The intersection operations west of Red Baron Drive would be degraded slightly from the traffic analysis in this instance because of diversions and an increase in the number of U-turns. However, any degradations would be expected to be minimal and operations would still be expected to fall within the acceptable LOS limits.

2.4.3 Construction Phasing

This section summarizes the construction phasing evaluation conducted for the Reasonable Alternatives. The complete technical analysis is contained in **Appendix C**.

MoDOT will be responsible for updating/amending the phasing and implementation document to reflect projects resulting from this EA. Construction will be phased, and the Transportation Improvement Program and Statewide Transportation Improvement Program will be revised accordingly as specific phases are funded, designed, and constructed.

Funding constraints, now and in the foreseeable future, necessitate that a project of this size and cost be constructed in multiple phases over time with cooperation from local and state entities. Four phases are proposed, with Phases 2 and 3 having sub-phases a and b:

- Phase 1 extends from the I-64/Route 364 interchange to the Hopewell/Duello intersection. Along with improvements to the mainline corridor, upgrades will be constructed at the following intersections: Hawk Ridge Trail, Ronald Reagan Drive/Sommers Road, and Lake St. Louis Boulevard. On the portions of the alignment that deviate from the existing alignment the profile grade should match the existing as close as possible to minimize the effects of the proposed side slopes on the existing roadway. This phase will be the most challenging from a traffic control standpoint due to the high volume of vehicles.

- Phase 2 extends from the Hopewell/Duello intersection to the intersection with Route Z. This phase will be constructed in two stages. The proposed alignment does not stay to one side of the existing roadway only; it changes halfway through the corridor. This shift of alignment is needed to avoid existing structures and comply with design criteria. During the first stage two lanes would be constructed in either the eastbound or westbound direction whichever are not in conflict with the existing pavement. Once these lanes are completed, traffic will be shifted over to the new lanes with the center and remaining lanes then being constructed. It will be challenging to stage the areas where the proposed alignment crosses over the existing roadway.

- Phase 3 extends from the intersection of Route N and Route Z to existing Buckner Road, and ends just north of the existing Route N/South Point Prairie intersections. The proposed roadway is recommended to be built in three stages. The first stage will consist of constructing the two eastbound lanes. In the second stage, the center lane and two westbound lanes will be constructed. The third stage will include constructing the areas where the proposed alignment crosses the existing alignment of Buckner Road. The proposed vertical alignment shall match, within reason, the existing grade to allow the construction of the tie-ins to be completed in short durations.

- Phase 4 begins at the intersection of Existing Route N and South Point Prairie Road and ends at Jackson Road. The improvements along this corridor include the replacement of the bridge over Sams Creek. The alignment of the proposed improvements of Phase 4 follow along the existing alignment of South Point Prairie except in areas where the existing curve radii do not meet the design criteria. Due to improvement of the curve radii the corridor cannot be simply widened to one side. This corridor will be built in stages constructing one directional lane and the center turn lane in one stage, then the third lane in a second stage. During the first stage of construction the existing roadway for South Point Prairie Road will be utilized to carry traffic. As with previous stages, the elevations will need to match closely to the existing grade in areas where the proposed alignment crosses over the existing.

The advantage that the Tentative Preferred Alternative, discussed in **Section 2.5**, has over the other Reasonable Alternatives is the ability to establish multiple phases of independent utility. This allows each phase to be constructed without causing a burden on the next and negatively affecting operations of the overall corridor without the full build. Due to the high traffic volumes, the biggest challenge during construction will be during Phases 1 and 2. Although negative operational impacts during construction are unavoidable, attention to constructability during all phases of design can reduce these impacts.

2.4.4 Traffic Safety

The HSM provides methodology and guidance for quantitatively estimating crash frequency and crash severity for a variety of roadway types and locations. Readily available HSM analysis tools were utilized to estimate crash frequencies for the No Build Alternative and the Reasonable Alternatives. A common roadway network was analyzed for the 2045 traffic analysis year using the traffic volumes for the corresponding configuration.

HSM spreadsheet tools for Urban Suburban Arterials, Rural Multilane Roads, and Rural Two-Lane Roads were utilized for the analysis. Each spreadsheet tool uses varying equations that are particular to roadway type (rural or urban) and number of lanes (two, four, etc.) to analyze estimated safety performance and calculate the results. Due to varying roadway characteristics and the specificity of each analysis tool, different spreadsheet tools were utilized for different extents in the analysis. While the analysis approach and limits were maintained as consist as practicable among the three Reasonable Alternatives, the No Build configuration varies due to the lack of improvements and lack of additional lanes that are present in the Reasonable Alternatives. Because of these factors, combining results and directly comparing analysis results across varying spreadsheet tools must be done with caution.

Calibration factors from the *Missouri Highway Safety Manual Recalibration (2018)* were applied to adjust the estimated crash frequencies for Missouri-specific driver behaviors, crash report, and other factors that may account for difference in crash frequencies in different jurisdictions. Calibration factors are specific to each spreadsheet tool, roadway configuration, and intersection type. Calibration factors provide the opportunity to incorporate local data to improve estimated crash frequencies for individual agencies. Historical crash data were not incorporated into the HSM analysis for the Alternatives and No Build condition. As such, the results of the analysis are referred to as predicted crash frequency and represent the anticipated crash performance of roadways with similar configuration and traffic volumes.

In order to provide the best available comparison of results across the three Reasonable Alternatives and No Build configuration, a common roadway network was analyzed for all scenarios. The common network included the following, as applicable to each configuration:

- All new roadway segments and proposed roadway improvements along the identified Reasonable Alternatives
- Any portions of the existing roadway network that would remain intact and unimproved including the following:
  - Route N from South Pointe Prairie Road to Hawk Ridge Trail
  - South Point Prairie Road from Jackson Road to Buckner Road
  - Buckner Road from South Pointe Prairie Road to Route Z
  - Route Z from Route N to Buckner Road

The predicted crash frequencies for HSM analysis for the No Build configuration and the three Reasonable Alternatives in the 2045 design traffic year are shown on **Figure 2-9** for the referenced network segments and the extents.

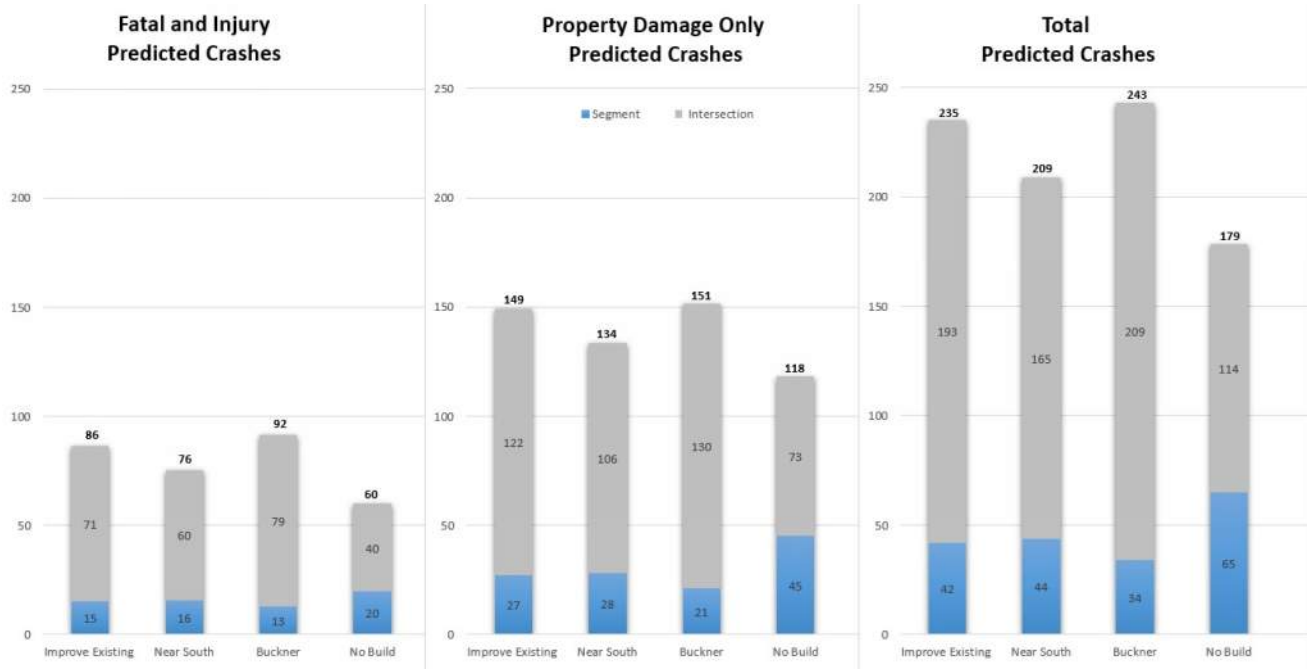

Figure 2-9. Predicted Crashes by Alternative

The HSM predictive crash analysis results generally indicate that the safety performance of the three Reasonable Alternatives is similar with the Near South Alternative estimated to perform better than Improve Existing alternative and Buckner Alternative in total crashes and crashes by severity. The Buckner Alternative is estimated to perform better than the Improve Existing Alternative and Near South Alternative within the roadway segments (between intersections), while the Near South Alternative is estimated to perform better than the Improve Existing Alternative and the Buckner Alternative through intersections.

Multiple factors contribute to the apparent variation in crash performance in addition to the previously noted limitations in combining and comparing results across multiple analysis tools. The difference in predicted annual crash frequencies may be attributed to numerous aspects of the configurations that influence safety and application of the HSM spreadsheet tools including the following:

- For the Improve Existing Alternative, the existing high number of intersections, driveways, and entrances remain. These frequent access points result in greater overall crash risk even though this alternative does not increase the amount of roadway in the overall roadway network.
- In the Buckner Alternative, the majority of traffic—for a portion of the corridor—is pulled from existing Route N to an improved alignment which has fewer intersections and fewer driveway/ entrances on the improved roadway. Although similar to Improve Existing in overall configuration, the new alignment results in additional centerline miles and additional intersections in the overall network being analyzed. The additional roadway and intersections can contribute to the slightly higher overall crash risk.
- In the Near South Alternative, the majority of traffic is pulled from existing Route N to a new alignment that has minimal intersections and minimal driveway/entrances on the improved roadway. The reduced number of intersections and access points on the higher volume improved roadway reduces overall crash risk even though additional roadway is being added to the overall roadway network.

Comparing the HSM predictive crash analysis results for the three Reasonable Alternatives to the No Build configuration indicates that each of the alternatives to roadway network is estimated to increase

in crashes compared to the No Build roadway configuration. The difference in predicted annual crash frequencies may be attributed to numerous aspects of the configurations that influence safety and application of the HSM spreadsheet tools including the following:

- Due to varying roadway characteristics and the specificity of each analysis tool, different spreadsheet tools were utilized for different extents in the analysis. While the analysis approach and limits were maintained as consist as practicable among the three Reasonable Alternatives, the No Build configuration varies on account of the lack of improvements and lack of additional lanes present in the Reasonable Alternatives. Because of these factors, combining results and directly comparing analysis results across varying spreadsheet tools must be done with caution.
- The additional traffic volume capacity of the Reasonable Alternatives results in higher traffic volumes. Crash risk increases as total vehicle miles traveled increase.
- The additional traffic volume capacity of the Reasonable Alternatives results in reduced congestion.
  - Crash risk for Property Damage Only (PDO) crashes typically decreases with reduced congestion as congestion related rear-end crashes is reduced as additional through lanes, turn lanes, and shoulders provide space for passing or avoidance of vehicles maneuvering to turn on and off the roadway.
  - Crash risk for certain Fatal Injury (FI) crashes decreases as additional through lanes, turn lanes, and shoulders provide for passing and avoidance maneuvers and increase separation from roadside obstructions.
  - Crash risk for other FI crashes increases due to increased average speeds. Crash severity increases as speed increases.
- The addition of traffic signals at intersections often results in substantially increased intersection related crashes.

During future design phases of the project, consideration may be given to the following design features that could reduce predicted crashes. Safety benefits must be weighed against the full context of impacts to traffic operations and community, social, and environmental factors:

- Innovative intersection design configurations often reduce the number of conflict points and predicted intersection crashes.
- Median restrictions (raised or depressed median configurations) reduce turning conflicts between controlled intersections often reducing predicted crashes.

2.5 Tentative Preferred Alternative

Based on the study's Purpose and Need, logical termini, study area, and the analysis of the impacts of the Reasonable Alternatives, a Tentative Preferred Alternative was selected.

2.5.1 Identification of the Tentative Preferred Alternative

The Buckner Road Alternative best addresses the identified purpose and needs of the study, connects at the logical termini, minimizes many negative impacts, and provides substantial positive impacts.

The Tentative Preferred Alternative is depicted on **Figure 2-9**. Important distinguishing features associated with the Buckner Road Alternative include:

- Engineering
  - Buckner Road bypasses areas with difficult to improve curves and crests, as compared to Near South and Improve Existing.

  - Buckner Road maintains the existing Route N/Route Z intersection. Near South would result in two closely spaced signalized intersections along Route Z.
  - Buckner Road will require fewer signalized intersections along Route N.
  - Buckner Road will have fewer intersections operating at LOS E.
  - Buckner Road will have fewer driveway openings.
  - Buckner Road minimizes the use of new alignment. Using the existing corridor was a stakeholder priority.
  - Buckner Road/Near South are roughly equivalent in cost and less than Improve Existing.
  - Buckner Road/Near South have roughly equivalent building displacements and fewer than Improve Existing.
- Environmental
  - Buckner Road requires approximately 40 acres less right-of-way than Near South and roughly equivalent to Improve Existing.
  - Buckner Road minimizes farmstead and woodland bisections.
  - Buckner Road impacts fewer potential habitat for endangered species.
  - Buckner Road crosses fewer streams.
  - Buckner Road impacts fewer acres of wetlands.
- Community
  - Buckner Road avoids displacement of St. Charles County Ambulance District.
  - Buckner Road avoids displacement of a cell tower.
  - Buckner Road is more consistent with existing St. Charles County Planning goals.
  - Buckner Road/Improve Existing minimize potential for uncontrolled suburban sprawl. Buckner Road/Near South roughly equivalent in at-grade intersections, fewer than Improve Existing.
  - Near South would create three parallel roads within ¾ of a mile (west of Route Z).

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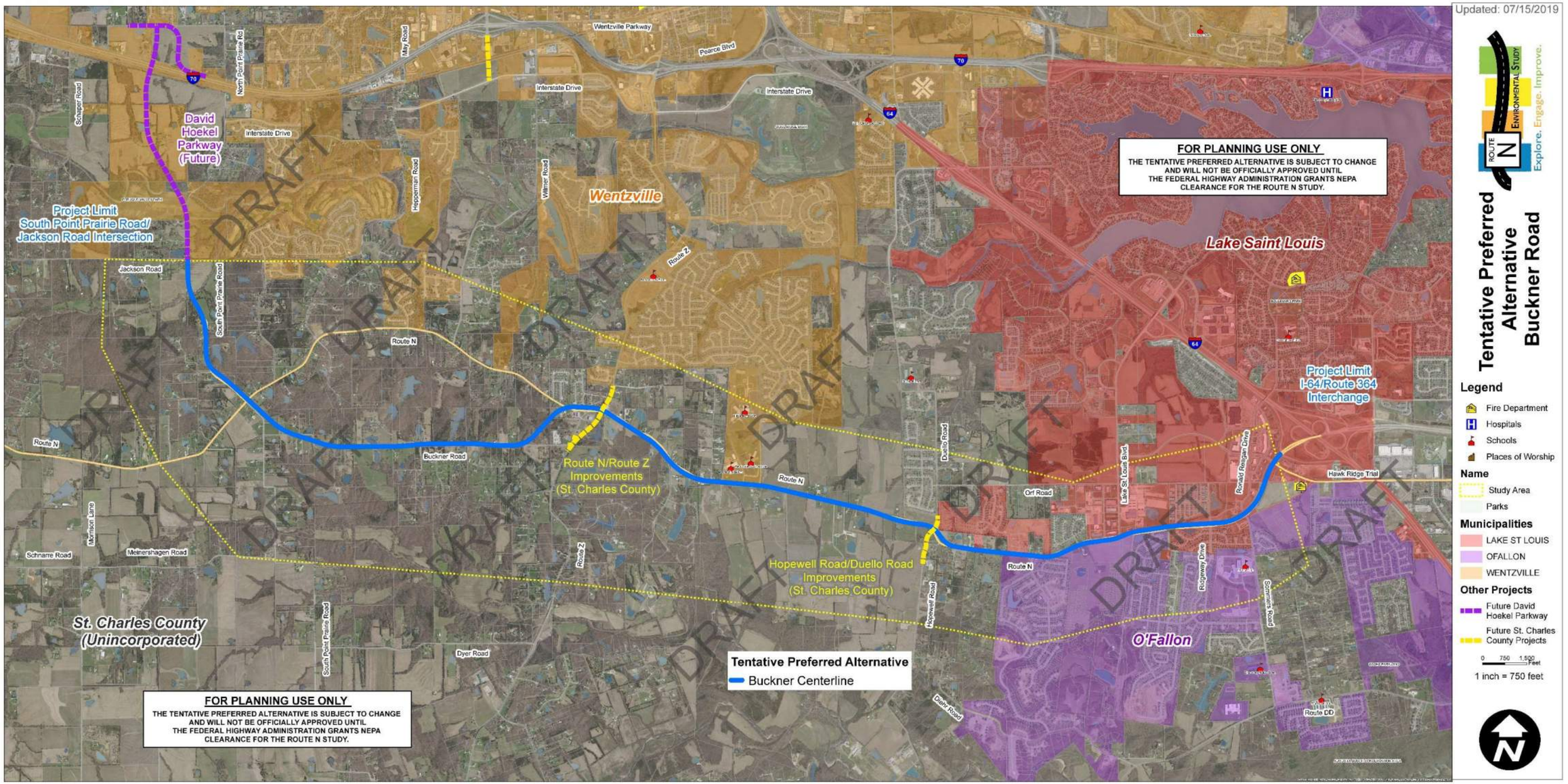

Figure 2- 10. Tentative Preferred Alternative – Buckner Road Alternative

1

SECTION 3

Affected Environment and Impacts

This section provides a description of the regulatory framework, affected environment, impacts associated with the Reasonable Alternatives and the Tentative Preferred Alternative, and proposed minimization/mitigation and environmental commitments.

The discussion is organized by each resource of concern within the study area. The specific categories described are consistent with FHWA's Guidance for Preparing and Processing Environmental and Section 4(f) Documents (TA 6640.8A, October 30, 1987). The resources are organized as follows:

- **Environmental/Pollution Impacts**
  - Air Quality
  - Hazardous Materials
  - Noise
  - Visual Resources
  - Water Quality
- **Natural Habitat Impacts**
  - Terrestrial Habitats
  - Geological Resources
  - Endangered and Threatened Species
- **Community/Socioeconomic Impacts**
  - Demographics
  - Environmental Justice
  - Land Use
  - Secondary and Cumulative Impacts
  - Socioeconomics
  - Travel Patterns
- **Aquatic Habitat Impacts**
  - Floodplains
  - Streams and Watersheds
  - Wetlands
- **Impacts to the Human Environment**
  - Cultural Resources
  - Section 6(f)
  - Section 4(f)
  - Farmlands
  - Construction Considerations
  - Right of Way and Relocations
  - Hydraulics

Both figures and exhibits are included in this section to graphically depict the affected environment and impacts. Figures appear in the text while large-scale graphics are presented in exhibits in **Appendix A**.

MoDOT shall ensure that if revisions to the design or construction result in changes in impacts that were not evaluated in this document, the NEPA document will be reevaluated to ensure the determinations and commitments remain valid.

3.1 Environmental/Pollution Impacts

Under the Pollution Prevention Act of 1990, Congress established a national policy that pollution should be prevented or reduced at the source whenever feasible; any pollution that cannot be prevented should be recycled; and any pollution that cannot be prevented or recycled should be disposed of, as a last resort, in an environmentally safe manner.

Section 3.1 addresses the impacts associated with environmental pollution topics, including:

- Air Quality
- Hazardous Materials
- Noise
- Visual Resources

3.1.1 Air Quality

Pollution is a general term that refers to one or more chemical substances that degrade the quality of the atmosphere. Individual air pollutants degrade the atmosphere by reducing visibility. They can also damage property, reduce the productivity or resistance to disease of crops or natural vegetation, or reduce human or animal respiratory health.

3.1.1.1 Regulatory Background and Standards

Transportation can contribute to all of the nation's regulated air pollutants. Transportation conformity, as required under the Clean Air Act, ensures that federally funded or approved transportation plans, programs, and projects conform to the air quality objectives established in state implementation plans. MoDOT implements the conformity regulation in nonattainment and maintenance areas.

The Clean Air Act, as amended by the Clean Air Act Amendments of 1990, and other rules and regulations, such as the Control of Hazardous Air Pollutants from Mobile Sources rule promulgated by the U.S. Environmental Protection Agency (EPA), specifies environmental policies and regulations to promote and ensure acceptable air quality. These policies and regulations were adopted in the Final Conformity Rule (40 CFR Parts 51 and 93). EPA delegates authority to the Missouri Department of Natural Resources (MDNR) for monitoring and enforcing air quality regulations in Missouri. MDNR developed the Missouri State Implementation Plan to ensure conformity with the rule.

The Clean Air Act defines conformity as the following:

> *"Conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards (NAAQS) and achieving expeditious attainment of such standards; and that such activities* (that is, approved transportation plans, programs, and projects in the state) *will not:*
>
> - *Cause or contribute to any new violation of any NAAQS in any area;*
> - *Increase the frequency or severity of any existing violation of any NAAQS in any area; or*
> - *Delay timely attainment of any NAAQS or any required interim emission reductions or other milestones in any area."*

EPA established the NAAQS for the following major air pollutants, which are known as criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM) (PM less than 10 and 2.5 microns in aerodynamic diameter [PM_{10} and $PM_{2.5}$]), sulfur dioxide (SO_2), and lead. The "primary" standards have been established to protect the public health. The "secondary" standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare. Air quality in Missouri is defined with respect to conformity with the NAAQS. MDNR has adopted the standards for the criteria pollutants listed in **Table 3-1** in its air quality program.

Table 3-1. Criteria Pollutant Emission Standards

Pollutant	Period	Primary Standard	Secondary Standard
O_3	8-hour	0.070 parts per million (ppm)	0.070 ppm
CO	1-hour 8-hour	35 ppm 9 ppm	None None
SO_2	24-hour 1-Year 1-hour	0.14 ppm 0.03 ppm 75 parts per billion (ppb)	None None None
NO_2	Annual 1-hour	53 ppb 100 ppb	53 ppb None
PM_{10}	24-hour	150 micrograms per cubic meter ($\mu g/m^3$)	150 $\mu g/m^3$
$PM_{2.5}$	Annual 24-hour	12 $\mu g/m^3$ 35 $\mu g/m^3$	12 $\mu g/m^3$ 35 $\mu g/m^3$
Lead	3-month Quarterly	0.15 $\mu g/m^3$ 1.5 $\mu g/m^3$	0.15 $\mu g/m^3$ 1.5 µg/m3

Source: MDNR, Missouri 10 CSR 10-6.010 Ambient Air Quality Standards, updated April 21, 2016. http://www.dnr.mo.gov/env/esp/aqm/standard.htm

3.1.1.2 Attainment Status

EPA uses the term *attainment area* to describe those areas where air quality meets health standards for particular airborne pollutants. This study area is located in a non-attainment area for ozone.

MDNR monitors ozone across the state during the ozone season, which begins March 1 and ends October 31. Ground-level ozone develops when pollution from vehicles, businesses, and power plants combine. Sunlight and warm temperatures expedite the process, so ozone usually is a greater problem during the late spring, summer, and early fall. Exposure to ground-level ozone can contribute to health and environmental problems. Ground-level ozone is an irritant that damages lung tissue and aggravates respiratory disease. Ozone can trigger a variety of health problems. Those most susceptible to ozone include children, the elderly, and individuals with pre-existing respiratory problems. Children are at increased risk from exposure to ground-level ozone because their lungs are still developing. Healthy adults can experience problems breathing, especially those who exercise or work outdoors.

3.1.1.3 Mobile Source Air Toxics

In addition to the criteria pollutants, EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners), and stationary sources (e.g., factories or refineries).

Mobile source air toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted into the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

EPA identified the following seven compounds from mobile sources that are among the national and regional-scale cancer risk drivers: benzene, acrolein, formaldehyde, 1,3-butadiene, diesel exhaust, naphthalene, and polycyclic organic matter. While FHWA considers these the priority MSATs, the list is

subject to change and may be adjusted in consideration of future EPA rules. MSATs were included in the construction phase analysis for NEPA purposes.

In accordance with the FHWA Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA (March 2012), an MSAT analysis may be required for projects with sensitive land uses within 500 feet of the study area and create infrastructure/traffic changes that will negatively impact those land uses. This study is expected to have no meaningful impact on traffic volumes or vehicle mix. To determine this the analysis focused on the portion of the study area that will remain in its existing configuration (Hawk Ridge Road to Route Z). In the design year (2045), the Build Alternatives are expected to have volumes approximately 30 percent higher than the No Build Alternative. This corresponds to approximately 6,400 vehicles per day. Since this study is not expected to have a meaningful potential for MSAT effects, the Route N EA does not require an MSAT analysis.

3.1.1.4 Project-Level Particulate Matter Hot-Spot Conformity Determination

Within PM non-attainment or maintenance areas, as part of the NEPA process, a transportation project sponsor must determine if proposed major transportation project would be considered a "project of air quality concern." A project of air quality concern usually involves either large traffic volumes and/or significant diesel traffic (i.e., bridge, bus, or rail terminals). If a project were deemed a project of concern, such a major transportation facility would require a project-level PM hot-spot conformity determination.

The Route N EA is not a project of air quality concern. The threshold design year ADTs of 125,000 (10,000 of which must be diesel trucks) is not met in the study area. Consequently, a project-level PM hot-spot conformity determination is not necessary.

3.1.1.5 Air Quality Impacts – No Build Alternative Impacts

With the existing facility, traffic volume increases over time are small. Consequently, the No Build Alternative is not expected to contribute substantially increased emissions that would lower air quality.

3.1.1.6 Air Quality Impacts – Build Alternatives Impact Summary

The Build Alternatives are not expected to result in substantial new users. The Build Alternatives are expected to have volumes approximately 30 percent higher than the No Build Alternative. This corresponds to approximately 6,400 vehicles per day. Related to air quality, the differences among the Reasonable Alternatives are minimal. Consequently, the Build Alternatives are not expected to contribute to substantially increased emissions that would lower air quality.

Moreover, EPA regulations for vehicle engines and fuels will cause emissions to decline over the next several decades. Based on regulations now in effect, an analysis of national trends with EPA's MOVES2014 model forecasts a combined reduction of over 90 percent in the total annual emissions rate from 2010 to 2050, while vehicle-miles of travel are projected to increase by over 45 percent (Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents, FHWA, October 12, 2016).

Construction activities may result in short-term impacts on air quality, including direct emissions from construction equipment and trucks, fugitive dust emissions from site demolition and earthwork, and increased emissions from motor vehicles and haul trucks on local streets. These topics are discussed in **Section 3.5.5**.

3.1.2 Hazardous Materials

Hazardous materials, defined in various ways under a number of regulatory programs, are dangerous or potentially harmful to human health or the environment when not managed properly. Hazardous materials may be generated from specific industrial or manufacturing processes or from commercial businesses. Solid wastes comprise a broad range of materials that include garbage, refuse, sludge,

non-hazardous industrial waste, municipal wastes, and hazardous waste. Hazardous materials can be solid, liquid, or gas.

3.1.2.1 Hazardous Materials – Regulatory Background and Standards

Hazardous materials and wastes fall under the following regulatory programs:

- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) governs cleanup of contaminated sites. These sites have been reported to the EPA by states, municipalities, private companies, and private persons, pursuant to Section 103 of CERCLA. Sites evaluated under CERCLA that pose serious threats to human health and the environment are placed on the National Priorities List (NPL) and are commonly referred to as Superfund sites.
- Resource Conservation and Recovery Act (RCRA) governs hazardous wastes and handlers of hazardous wastes subject to reporting requirements (Threshold Planning Quantities) under Sections 311, 312, and 313 of the Superfund Amendment and Reauthorization Act. These sites generate, transport, store, treat, and/or dispose of hazardous waste as defined by RCRA.
- Emergency Response Notification System is a national database published by EPA that lists sites where reported releases of hazardous materials and petroleum have occurred.
- Other federal and state programs. MDNR also maintains databases in accordance with federal regulations that provide information on facilities with underground storage tanks (USTs), leaking underground storage tanks, spills reported under MDNR's Environmental Emergency Response Section, and dry-cleaning facilities.

3.1.2.2 Hazardous Materials – Affected Environment

To identify the current environmental conditions within the Route N study area, a database search was conducted by EDR, Inc. The databases searched conform to the ASTM International Standard E 1527-00 and included the appropriate federal and state databases.

This was cross-referenced with MDNR's Environmental Site Tracking and Research Tool (E-Start). As part of the Department's mission, it regulates the management of hazardous waste, oversees the cleanup of contamination, regulates the operation of underground tanks, and oversees removal and cleanup of petroleum storage tanks. Two primary data sets are contained within E-Start:

- Regulatory petroleum and Hazardous Substances Storage Tank Facilities – This data set provides status information for regulated petroleum and hazardous substance storage tanks, this includes facilities with an active release, activity and use limitations, administrative and No Further Action Closures, and operating facilities with no known releases.
- Hazardous Substance Investigation and Substance Storage Tank Facilities – This data set provides status information for active, long-term stewardship, environmental notice, and completed sites from the Hazardous Waste Program's Superfund Section, Federal Facilities Section, Permits Section, and Brownfields/Voluntary Cleanup Program.

In addition to the database search, field reconnaissance was conducted within the corridors identified by the Reasonable Alternatives to verify the database information retrieved and to identify any other properties of potential environmental concern. A copy of the Hazardous Material Site Inventory is available upon request.

Using this information, the potential facilities of concern were identified. To assess these facilities, the best professional judgment standard was used. Best professional judgment means the highest quality technical opinion developed after consideration of all reasonable available and pertinent data or information that forms the basis for one's recommendation(s). The assessment of potential facilities of

concern focused on (1) the contaminants that could be present, (2) the toxicity and mobility of these contaminants, and (3) geological factors that could influence the migration of possible contaminants.

Based on a review of the Hazardous Material Site Inventory and field reconnaissance, 18 sites were identified that have database entries or operate fields where a potential for environmental concern exists. These were considered further for the necessity of additional investigation. The complete Inventory is contained in **Appendix D**. The locations are shown on **Exhibit 3-1 (Appendix A)**.

3.1.2.3 Hazardous Materials – No Build Alternative Impact Summary

The No Build Alternative will have no additional impacts on these sites. No new right-of-way will be required; therefore, no new encroachments will occur. Maintenance of existing bridges, culverts, and parking areas will continue and could potentially affect these sites.

3.1.2.4 Hazardous Materials – Build Alternative Impact Summary

Relative to hazardous material impacts, there are no discernable differences among the Reasonable Alternatives.

Among the nine sites emerging from the database review and field reconnaissance, two are recommended for Phase I Environmental Site Assessments. The two sites are located in the southwestern quadrant of the Route N/Route Z intersection:

- The Mobile on the Run #1619 gas station is located at 42 Highway N West (Site #3 on **Exhibit 3-1).** This site was identified in UST (underground storage tank), SPILLS, AST (aboveground storage tanks), EDR Hist Auto, NPDES (Permitted Facility Listing), RCRA NonGen/NLR (RCRA non-generators or no longer regulated), FINDS, ECHO, UIC (underground injection wells). A spill was reported in 2004 at this facility. The facility operated as a Handler, non-generator of hazardous waste in 2005, and as a historical small quantity generator of hazardous waste, codes D001 and D018 in 1996. Consequently, this site has a high risk for a release to soil or groundwater.
- A portion of the property identified as the MFA Exchange is identified as adjacent to the Mobile on the Run #1619 gas station (Site #4 on **Exhibit 3-1)**. The address is located outside of the study area, however, there is a feed store located at the indicated location, so it has been included here. The MFA Exchange was included in the SSTS (Fungicide and Rodenticide Act, section 7) as repackaging the following herbicides: BICEP, LARIAT, LASSO, BROADSTRIKE, BICEP II , TOUCHDOWN, STEEL, SQUADRON, FULL TIME, GLYPHOMAS PLUS, GLYPHOMAX PLUS, PROWL 3.3 EC, KEYSTONE, PENDIMAX 3.3, DURANGO, ROUNDUP Power Max and DEGREE XTRA. Consequently, this site has a high risk for a release to soil or groundwater.

MoDOT shall ensure that, prior to construction, Phase I Environmental Site Assessments are conducted at these locations, as appropriate. Additionally, those portions of these sites where planned construction will occur should be included in the Phase I Environmental Site Assessment.

The potential that the remainder of the identified facilities will adversely impact the study area is low to medium. The identified facilities are the type of facilities that have a potential for soil or groundwater impacts. The assessment of potential risk is based on professional judgement, past site practices, and available records. This is by nature a qualitative assessment. **Table 3-2** summarizes the decision-making associated with the other sites emerging from the database review and field reconnaissance.

Table 3-2. Non-Phase I Determination Summary

Site Number	Name	Type	Determination
5	Petro Mart # 74 (300 East Pierce Boulevard)	Gas station/UST and a reported spill	E-Start ST 0021705: Operating UST with no known releases

Table 3-2. Non-Phase I Determination Summary

Site Number	Name	Type	Determination
7	QuikTrip #669 (8334 Route N)	Gas station/UST	E-Start ST 0021737: Operating UST with no known releases
13	Jiffy Lube (6207 Ronald Reagan Drive)	Car maintenance facility	No EDR/E-Start record for a suspect operation
14	Dobbs Tire and Auto (873 Robert Raymond Drive)	Car maintenance facility	No EDR/E-Start record for a suspect operation
15	Firestone (8025 Hawk Ridge Trail)	Car maintenance facility	No EDR/E-Start record for a suspect operation
17	Wal-Mart gas station (6100 Ronald Reagan Drive)	Gas station/UST	No EDR/E-Start record for a suspect operation
19	ZX gas station (I-64/Highway N)	Gas station/UST	No EDR/E-Start record for a suspect operation

MoDOT shall ensure that its construction inspector direct the contractor to cease work at the suspect site if regulated solid or hazardous wastes are found during construction. The construction inspector shall contact the appropriate environmental specialist to discuss options for remediation. The environmental specialist, the construction office, and the contractor will develop a plan for sampling, remediation, and continuation of project construction. Independent consulting, analytical, and remediation services will be contracted if necessary. MDNR and EPA will be contacted for coordination and approval of required activities.

MoDOT shall ensure that all needed demolition notices, abatements notices, and project notifications to MDNR will be submitted prior to beginning demolition activities. Asbestos-containing material and demolition debris will be disposed of according to state and federal regulations.

3.1.3 Noise

Noise is typically defined as unwanted sound. Noise and sound are physically the same, but the difference is in the opinion of the receiver. A sound is created by a source that has induced vibrations in the air. The vibration creates alternating bands of relatively dense and sparse particles of air, spreading outward in all directions from the source—much like ripples after a stone is thrown into a pool of water. The result of the air movement is sound waves that radiate in all directions and may be reflected and scattered.

3.1.3.1 Noise – Regulatory Background and Standards

The Route N EA is a Type I project that requires a noise analysis. Type I projects include the physical alteration of a highway such that the topography between the traffic noise sources and noise receptors is altered, potentially affecting the traffic noise environment. FHWA procedures for highway noise analysis and abatement are contained in 23 CFR 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise.* FHWA has given MoDOT flexibility in implementing this noise standard. The MoDOT Noise policy describes the approach for the implementation of 23 CFR 772.

The evaluation of traffic-noise impacts involves the following steps:

- Identification of existing activities and developed lands that may be affected by traffic noise
- Prediction of traffic-noise levels with and without construction of the proposed project
- Determination of existing noise levels
- Determination of traffic-noise impacts

- Evaluation of the feasibility and reasonableness of noise abatement measures

A copy of the Traffic Noise Report is available in the Project Record.

Noise abatement is considered when a traffic noise impact is predicted. Traffic noise impacts occur when the predicted existing or future highway traffic noise levels approach or exceed the Noise Abatement Criteria (NAC), or when predicted existing or future highway traffic noise levels substantially exceed the existing highway traffic noise level, even though the predicted level may not exceed the NAC. The term "approach" is considered to be one A-weighted decibel (dBA) less than the appropriate NAC. Consequently, a sensitive noise receptor is considered affected if the noise level is predicted to be 66 dBA or higher for exterior areas of residential land uses. MoDOT defines a "substantial increase" as an increase of 15 dBA or more above the existing noise level.

FHWA has determined NAC for different land uses (i.e., activity categories) as described in **Table 3-3**. For the purpose of traffic noise analysis, the use of a property located adjacent to a transportation improvement is classified according to the human activities that occur or are expected to occur within the property boundaries. Noise abatement is considered when a traffic noise impact is predicted.

Table 3-3. Noise Abatement Criteria

Activity Category	dB(A) Leq(h)	dB(A) L10(h)	Description of Land Use Activity Category
A	57 (Exterior)	60 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	67 (Exterior)	70 (Exterior)	Residential
C	67 (Exterior)	70 (Exterior)	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreational areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52 (Interior)	55 (Interior)	Auditoriums, daycare centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E	72 (Exterior)	75 (Exterior)	Hotels, motels, offices, restaurant/bars, and other developed lands, properties, or activities not included in A-D or F
F	N/A	N/A	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical) and warehousing
G	N/A	N/A	Undeveloped lands that are not permitted

The Traffic Noise Model (TNM 2.5) was used to determine existing and future noise levels. When a traffic-noise impact is predicted, noise abatement is considered. The criteria for abatement includes its feasibility and its reasonableness. These factors are discussed in **Sections 3.1.3.4** and **3.1.3.5**.

3.1.3.2 Noise Sensitive Land Uses

Noise sensitive land uses are existing activities and developed lands that may be affected by traffic noise. For the noise analysis, a study area of approximately 500 feet beyond the footprints of the Reasonable Alternatives was established. Within that area, a total of 603 noise sensitive land uses were identified. All of the land uses are considered to be an Activity Category B or C (exterior areas of single-

family and multi-family domiciles and exterior areas of non-residential land uses, respectively). In both cases, the NAC is 67 dBA.

3.1.3.3 Determination of Existing and Future Noise Levels

Modeling of Existing and Future (2045) conditions was conducted for all noise sensitive land uses. Using the TNM 2.5 traffic noise model, peak noise conditions were predicted for the No Build condition (2019 and 2045) and for the Reasonable Alternatives (2045).

The roadway configuration and terrain were developed from the preliminary engineering developed for the study. The locations of the noise sensitive land uses was developed from the St. Charles County geographic information system (GIS) data. The traffic data was taken from traffic counts and the study's traffic modeling. The alternative's peak noise hour was assumed to be one-tenth of the ADT. Based on observations, the vehicle distribution used in the modeling was 90 percent cars, 8 percent medium trucks, and 2 percent heavy trucks. Speeds used the posted speed limits.

3.1.3.4 Traffic Noise Impacts

Due to the relatively low volumes and speeds, few locations approach or exceed the Noise Abatement Criteria. The noise levels predicted for the Reasonable Alternatives are very similar. **Table 3-4** summarizes the traffic noise levels and the number of impacted receptors. **Exhibit 3-2**, located in the **Appendix A**, depicts the location of the impacted noise receptors.

Table 3-4. Predicted Existing/Future Peak-Hour Noise Levels (in dBA)

Alternative	Existing (2019) Noise Levels (dBA)	Future (2045) Noise Levels (dBA)	Number of Traffic Noise Impacts
Existing – 2019	35.5 – 69.9	--	3
Existing – 2045	--	36.8 – 69.9	13
Improve Existing	36.1 – 69.1	37.0 – 69.3	11
Buckner Road	41.0 – 74.3	41.4 – 75.1	10
Near South	41.0 – 74.0	41.4 – 74.3	10

3.1.3.5 Barrier Analysis- Feasibility

For the receptors that would experience a traffic noise impact, a barrier analysis was conducted. To be recommended for further consideration, a barrier must be both feasible and reasonable. MoDOT requires at least a 5-dBA insertion loss for a minimum of two first-row, impacted receivers for noise abatement to be considered feasible.

For reasons of safety (primarily wind load and clear space concerns), a noise wall's height is limited to 20 feet. This criterion alone cannot be used to consider noise abatement unreasonable.

The noise analysis identified the first-row receivers and evaluated if a 20-foot noise barrier could achieve a 5-dBA insertion loss for the impacted first row receivers.

The summary of the feasibility analysis is contained in **Table 3-5**. Barriers in the vicinity of the Route N/ Route Z intersection were able to achieve the minimum feasibility requirements. The feasible barriers will be examined further, for reasonableness.

Table 3-5. Feasibility Summary for Future Peak-Hour Noise Conditions

Barrier Areas	Improve Existing Alternative	Buckner Alternative	Near South Alternative
	Feasible?	Feasible?	Feasible?
South Point Prairie	No	N/A	N/A
Buckner	N/A	No	N/A
Route Z (N)	**Yes**	**Yes**	N/A
Route Z (S)	No	N/A	N/A
Perry Cate (S)	No	No	No
Hopewell	No	No	No
Wyndmere	No	No	No
Wyndgate	No	No	No

N/A = No Traffic Impact
No = Not Feasible
Yes = Feasible

Under the Improve Existing Alternative a traffic noise impact among the front row receptors in the vicinity of Castlegate Mobile Home Park is predicted. The Castlegate Mobile Home Park is located on the north side of Route N at the Route Z intersection. Using a 20-foot high barrier, insertion losses of over 5 dBA is expected for several receptors. Consequently, a noise barrier at this location is **feasible**.

Under the Buckner Alternative a traffic noise impact amongst the front row receptors in the vicinity of Castlegate Mobile Home Park is predicted. Using a 20-foot high barrier, insertion losses of over 5 dBA are expected for several receptors. Consequently, a noise barrier at this location is **feasible**.

Under the Near south Alternative, traffic noise impacts at the Castlegate Mobile Home Park are not expected.

Exhibit 3 shows the distribution of traffic noise impacts associated with the Buckner Alternative. The analysis was broken into the following barrier areas.

Noise Barrier Analysis

Noise conditions were modeled with TNM to determine future conditions. A total of 602 modeling receptors were included in the model.

Traffic noise levels approaching or exceeding the NAC (in 2045) are predicted to occur at the following number of residences:

- Alternative Improve Existing: 11
- Alternative Buckner: 14
- Alternative Near South: 10

Barriers in the vicinity of the Route N/ Route Z intersection were able to achieve the minimum feasibility requirements. This applies to both the Improve Existing and Buckner Alternatives.

Therefore, a barrier optimization process was undertaken. The results of the effort concluded that no noise barriers were reasonable.

3.1.3.6 Barrier Analysis- Reasonability

For the receptors that could achieve the feasibility standard, barrier analysis was continued to investigate reasonableness. To be recommended for further consideration, a barrier must be both feasible and reasonable. MoDOT requires that noise barriers not exceed 1,300 square feet per benefitted receptor to be considered reasonable. A minimum reduction of 7 dBA for 100 percent of benefitted, first-row receptors is also required.

The reasonableness noise analysis identified the first-row receivers and evaluated if a 20-foot noise barrier could achieve a 7-dBA insertion loss for first row receivers. If first row receivers could achieve the 7-dBA goal, the barrier would

be optimized to determine if the 1,300-square-foot limit could be achieved. The summary of the reasonableness analysis is contained in **Table 3-6**.

Under the Improve Existing Alternative, many but not all of the first-row receptors will achieve the Design Goal of 7 dBA of insertion loss with a 20-foot maximum noise barrier. Therefore, a noise barrier is Not Reasonable.

Under the Buckner Alternative, all of the first-row receptors will achieve the Design Goal of 7 dBA of insertion loss with a 20-foot maximum noise barrier. Therefore, a barrier optimization process was undertaken. A 18,888-square-foot barrier (roughly 1,582 long and 12-feet tall) would result in 12 receptors receiving at least 7 dBA. This is all of the first-row receptors and one second row receptor. This results in a size per benefited receptor of 1,574 square feet. Consequently, a noise barrier is not reasonable.

Table 3-6. Reasonableness Summary for Route N/Route Z Intersection (N)

Alternative	First Row Receivers with 20-foot Noise Barriers and 7 dBA IL	Optimum Barrier Area (SF)	Square Feet of Barrier per Receptor w/ 7-dBA Insertion Loss	Is a Noise Barrier Reasonable?
Improve Existing	8 of 12 (67%)	N/A	NA	No
Buckner	11 of 11 (100%)	18,888	1,574 square feet	No

Several issues are associated with the inability to design a reasonable and feasible noise barrier. First, most of the impacted receptors are individual single-family residences making the noise abatement requirement for benefiting two first-row impacted receivers unattainable. Second, most impacted receptors use driveways to access Route N. Maintaining the openings for driveways reduces a noise barrier's effectiveness. Finally, many of the receptors closest to Route N are acquisitions. Since there is no second row of houses in most cases, this creates gaps that makes achieving the design goals difficult.

3.1.4 Visual Resources

The methodology for the analysis of visual resources is governed by the FHWA Guidelines for the Visual Impact Assessment of Highway Projects (2015) and the American Society of Landscape Architects visual assessment guidelines. Field investigations and photographic analysis were the primary techniques used to assess visual resources. The analysis focused on viewers and the visual resources that appear within their viewshed or angle of view.

The visual analysis of an environment is composed of two sections. First, the study area setting is discussed. This includes evaluating the regional landscape, the landscape units, and the study viewsheds. Second, the existing visual resources, viewer groups, and viewer responses are examined.

This section describes the existing visual resources and impacts that result from the construction, operation, and maintenance of the study area. This section also describes the type and quality of sensitive viewers located near the study area. Visual resource impacts are identified as they relate to potentially sensitive viewpoints.

3.1.4.1 Visual Resources – Important Terms

The criteria used to determine visual quality ratings are vividness, intactness, and unity. None of these criteria are individually equal to the visual quality and all three criteria must rate high to indicate high visual quality.

- Vividness is the visual power of the landscape components as they combine to form distinctive visual patterns.

- Intactness is the visual integrity of the landscape, natural or human-made, and its freedom from encroaching elements.
- Unity is the ability of the landscape's individual visual elements to combine in a coherent manner.

Visual impact is a function of the viewer's response to the visual environment. Following are the two primary groups of viewers for roadway/bridge projects:

- Viewers who use the facility (driver views while on the road)
- People who have a view of Route N from an adjacent viewpoint (property owner views of the road)

3.1.4.2 Visual Resource Impacts

The visual landscape is a combination of various factors, including landform, land cover, vegetation, and human-made developments. For this EA, the landform is generally flat with the exception of the area west of Route Z and the area surrounding the four creeks found within the study area. The land cover varies depending on the location within the study area. The vegetation in the study area is sporadic. The human-made developments vary greatly throughout the study area. The blocky nature of urban development tends to limit views.

The visual impacts of an improvement project can be varied because the areas are visually distinct. The study area can be divided into several landscape units or "outdoor rooms" containing similar visual characteristics. The boundaries of these landscape units occur where there is a change in the visual character of the area. The two main determinations of the visual boundaries of these landscape units are topography and landscape components. Topography is the relief or the terrain of an area. Landscape components are anything located above the surface of an area such as vegetation, streams, buildings, and roads.

Overall, the analysis examined landscape units. These were determined through the review of Digital Elevation Models, recent aerial photography, and onsite surveys. The landscape units and a summary of the analysis are presented.

Developed Route N – Between Hopewell Road and the eastern terminus at the I-64/Route 364 interchange, the landscape unit includes commercial and residential uses. The commercial uses are typical roadside operations in strip or stand-alone units. The residential uses are increasingly modern subdivisions. Built over the last 20 years, these subdivisions feature curvilinear roadways, on-street and off-street parking, and sidewalks. Subdivisions near Route N vary in density from one unit per three or more acres to five units per acre. For example, the Manors at Glen Brook contain three units per acre while Brairchase #1 contains five units per acre. Subdivisions in the study area often feature landscaping and vegetative screening, which contributes to the visual character of the Route N corridor. Most of the subdivisions have standard at-grade intersections at Route N to provide access to the homeowners. This type of development is replacing the older pattern of single-family homes fronting directly on Route N; see **Figure 3-1**.

Figure 3-1. Typical Views within the Developed Portion of Route N

Within this area, the Reasonable Alternatives will convert the existing roadway by widening along its existing alignment. Widening will not be a uniform widening, but rather vary from side to side about the center line as needed to satisfy the study's design criteria and avoid impacts to corridor resources (e.g., homes, businesses, environmental features). All of the Reasonable Alternatives will follow the same alignment in this section of the Route N corridor. Consequently, the visual impacts will be identical across all of the Reasonable Alternatives. Impacts will include limited disruption to some of the landscaping and vegetation. The roadway will be converted to the four-lane configuration similar to what exists at the eastern terminus.

Rural Route N and South Point Prairie – Between Hopewell Road and the western terminus, this landscape unit includes irregularly spaced single-family homes, farmsteads, and sporadic woodlands. **Figure 3-2** shows the typical roadway section for Route N west of Hopewell Road. The South Point Prairie segment is noticeably more wooded and less inhabited. The commercial uses are typical roadside operations in strip or stand-alone units. An exception is the Route N/Route Z intersection where larger commercial uses exist.

Figure 3-2. Typical Views along the Rural Portion of Route N

Within this area, the visual impacts will vary amongst the Reasonable Alternatives. Under the Improve Existing Alternative, the existing alignment will be largely maintained, resulting in numerous displacements of existing residences. The connection between Route N and South Point Prairie Road will be along new alignment, through existing woodlands.

Under the Buckner Road Alternative, the existing rural two-lane Buckner Road will be converted to a modern four-lane roadway. This will change the character of the area. The transitions from existing Route N and South Point Prairie will follow new alignment. This will also change some views.

Under the Near South Alternative, the extensive use of new alignment will affect both existing Route N views as well as the views along the new alignment. For existing Route N views, the Near South Alternative will create areas where land uses will be surrounded by multiple roadways, which will change the views. Along the new alignment, land uses that are currently rural will be converted to a more suburban character.

Overall, the impacts to the visual environment are expected to be limited and site specific. The most common and persistent view changes can be summarized as:

- Improve Existing Alternative: Largely maintains existing views
- Buckner Road Alternative: Changes a rural/low volume/uncluttered road to a more suburban/high volume/cluttered configuration
- Near South Alternative: Places a suburban/high volume/cluttered configuration in an area where roads don't exist

3.2 Natural Habitat Impacts

Habitats are natural environments composed of both living organisms and physical components that function together as an ecological unit. This section addresses various elements of the natural environment.

3.2.1 Terrestrial Habitats

Terrestrial habitats are ones that are found on land, such as forests, grasslands, and deserts. Terrestrial habitats also include man-made habitats, like farms, towns, and cities. Man-made habitats (land uses) are discussed in **Section 3.3.3**. Habitats that are under the earth, such as caves and mines, are discussed in **Section 3.2.2**.

Section 3.2 addresses the impacts associated with natural habit topics, including:

- Terrestrial Habitat
- Geology
- Endangered Species

3.2.1.1 Affected Environment

Exhibit 3-3, located in the **Appendix A**, depicts the terrestrial habitats within the study area. The terrestrial habitat assessment started with the Multi-Resolution Land Characteristics Consortium (MRLC) National Land Cover Database (NLCD). The MRLC is a group of federal agencies that coordinate and generate consistent and relevant land cover information at the national scale for a wide variety of environmental, land management, and modeling applications. The NLCD provides nationwide land cover data based on a modified Anderson Level II classification system.

An onsite assessment of the study area was conducted during the growing season of 2018. The assessment included a wetland determination (see **Section 3.4.3**) and the establishment/updating of habitat boundaries. Using this framework, the following habitats[2] were established:

- **Open Water (NLCD 11)** – Non-vegetated river channels, chutes and ponds.

[2] Another way to depict impacts to terrestrial areas is described in Sections 3.3.3 (land use) and 3.3.4 (secondary/cumulative impacts).

- **Developed (NLCD 21 – 25)** – Areas that are predominantly artificial in nature (e.g., urban areas, large farmsteads, industrial complexes and roadways). This category includes open space, low-, medium- and high- density development. The open space component is most often in common mixed grasses, forbs, and/or shrubs along the roadways.
- **Deciduous Forest (NLCD 41)** – This forest includes all forested areas having a predominance of trees that lose their leaves at the end of the frost-free season or at the beginning of a dry season. In most parts of the United States, these would be the hardwoods such as oak (Quercus), maple (Acer), or hickory (Carya), and the "soft" hardwoods, such as aspen (*Populis tremuloides*).
- **Evergreen Forest (NLCD 42)** – This forest includes areas in which the trees are predominantly those which remain green throughout the year. Both coniferous and broad-leaved evergreens are included in this category.
- **Mixed Forest (NLCD 43)** – This forest land includes areas where both evergreen and deciduous trees are growing. Neither type are dominant.
- **Scrub/Shrub (NCLD 52)** – Areas dominated by shrubs; less than 5 meters (approximately 15 feet) tall with shrub canopy typically greater than 20 percent of total vegetation. This class includes true shrubs, young trees in an early successional stage, or trees stunted from environmental conditions.
- **Grassland/Herbaceous (NLCD 71)** – Areas dominated by graminoid or herbaceous vegetation, generally greater than 80 percent of total vegetation. These areas are not subject to intensive management such as tilling but can be used for grazing.
- **Pasture/Hay (NLCD 81)** – Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20 percent of total vegetation.
- **Cultivated Crops (NLCD 82)** – Areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops, such as orchards and vineyards. Crop vegetation accounts for greater than 20 percent of total vegetation. This class also includes all land being actively tilled.

In the general study area, the largest land uses are pasture, developed land, and woodlands. Typical row crops, most recently soybean, are becoming rarer. The farm infrastructure still exists. Forested habitat can be rather fragmented. The balance of the habitat types are small and fragmented. **Table 3-7** presents the estimated distribution of terrestrial habitats within the Build Reasonable Alternative corridors.

Table 3-7. Terrestrial Habitat within the Reasonable Alternatives

Terrestrial Habitat	Improve Existing (acres)	Buckner Road (acres)	Near South (acres)
Open Water (NLCD 11)–	1	<1	<1
Developed (NLCD 21 – 25)	112	120	89
Deciduous Forest (NLCD 41)	29	22	82
Evergreen Forest (NLCD 42)	2	<1	1
Mixed Forest (NLCD 43)	27	15	27
Scrub/Shrub (NLCD 52)	1	<1	1
Grassland/Herbaceous (NLCD 71)	1	<1	<1
Pasture/Hay (NLCD 81)	38	59	45

Table 3-7. Terrestrial Habitat within the Reasonable Alternatives

Cultivated Crops (NLCD 82)	12	12	27
Totals	**223**	**228**	**272**

3.2.1.2 Terrestrial Habitat Impacts

Using the NLCD, terrestrial habitat encroachments were estimated. The size of the area needed to build and maintain the alternatives (not including the area already within the existing roadway right-of-way) varies from 221 acres for the Improve Existing Alternative, 226 acres for the Buckner Road (Buckner Road Alternative) Alternative, and 272 acres for the Near South Alternative.

For decision-making purposes, it should be noted that:

- Improve Existing and Buckner Road Alternatives will impact approximately 50 percent developed (artificial) areas. The Near South Alternative has a larger portion of an off-alignment footprint. Consequently, only about one-third is developed.
- Improve Existing Alternative impacts the highest concentration of developed areas along the Route N corridor. Additionally, a relatively large woodland area is bisected where the alignment connects to South Point Prairie Road. The Improve Existing Alternative bisects only one farmstead.
- Buckner Road Alternative impacts the least total woodlands. Farmstead bisection (two) and forest bisection are minimal.
- Near South Alternative impacts substantially more high-quality woodlands and farmland. It was estimated that the Near South Alternative will bisect many more farmsteads (eight) identified in the St. Charles County Land Use Plan.

3.2.2 Geology

The geotechnical data available for the Route N study are summarized from the available data from MDNR, the Natural Resources Conservation Service (NRCS), and Missouri Geological Survey.

3.2.2.1 Surficial Geology

The study area is resting on glacial drift consisting of sands, silts and clays. Underlying the glacial drift are residuum soils generally weathered from the upper portions of the Warsaw Shales. Based on well logs from the area, the thickness of the overburden materials is highly variable, ranging from 10 to 80 feet.

The topmost bedrock unit in the area has been mapped as the Mississippian-age Warsaw Formation through the main study area, which generally consists of shale. This material is underlain by the Burlington-Keokuk Limestone Formation, which predominately consists of limestone with varying layers of chert and is the predominant bedrock material on the north and south sides of the study area.

3.2.2.2 Surface Soils

The topography of the area of is highly variable with slopes ranging from 2 to 20 percent. Based on the NRCS soil survey, the predominant deposits are the Keswick and Armster Loams, which are generally comprised of silt with increasing clay content with depth. Higher quantities of sand are generally present in the loam soils located in the lower alluvial areas.

3.2.2.3 Hydrogeology

A prevailing generally east-west trending ridge runs through the center of the study area with drainages sloping down to the north toward Peruque Creek and south toward Little Dardenne Creek and Dardenne

Creek. Groundwater in the area is reported to be between 80 to 130 feet below the existing grades; however, perched water tables are known to exist at or above the soil-rock interface.

3.2.2.4 Seismic Hazards

The study area is in a region of moderate potential for seismic ground motions associated with the New Madrid Seismic Zone. The active faults in the New Madrid Seismic Zone are poorly understood because they are not visible at the surface and limited event records. Seismic hazards introduce risk of structure damage, landslides, settlements, and liquefaction. The Missouri Geological Survey has identified a series of isolated locations on the north and south ends of the subject area that have an elevated risk of seismic impact. Most of these areas are in the lower portions of the alluvial valleys where higher concentrations of sand are present that could liquefy during a seismic event. No faulting was mapped in the study area; however, a series of faults were noted to the west of the study area as part of the Foristell Fault and Fold Zone.

3.2.2.5 Mines and Sink Holes

MDNR keeps a record of sinkholes reported to the program or shown on U.S. Geological Survey topographic maps. Based on a review of these documents, one mapped sinkhole is located approximately 1,000 feet south of Route N due east of Eastgate Drive (in the Wyndgate subdivision on the eastern end of the Route N corridor, as shown on **Exhibit 3-4** in **Appendix A**)**.** No other records of sinkholes were noted in the study area. Though several limestone quarries are located in the region, mining in the study area is relatively limited to near surface clay mines predominantly located near the western portions of the study area.

3.2.2.6 Expected Geological Impacts

Based on the evaluation of available data, no substantial differences relative to geological resources are expected between the Reasonable Alternatives.

No known sinkholes are expected to be encountered by the construction of any of the Reasonable Alternatives.

3.2.3 Endangered Species

This section summarizes the laws and programs associated with the conservation of threatened and endangered plants and animals and the habitats in which they are found. These laws and programs seek to assure the continued existence of listed species.

3.2.3.1 **Affected Environment**

According to the Information Planning and Consultation (IPaC) package from the U.S. Fish and Wildlife Service (USFWS), the following species have been identified as those that may occur or could potentially be affected by activities in proximity of Route N:

- Gray bat (*Myotis grisescens*), Indiana bat (*Myotis soalis*) and northern long-eared bat (*Myotis septentrionalis*)—These bats hibernate during winter months in caves and mines. During the summer months, the Indiana and northern long-eared bats roost and raise young under the bark of trees in wooded areas, often in riparian forests and upland forests near perennial streams. Gray bats roost in caves during the summer and hibernate in caves during the winter.
- The decurrent false aster is a threatened plant species. According to the USFWS, it is a perennial plant found in moist, sandy floodplains and prairie wetlands in the disturbed alluvial soils of the Mississippi and Illinois River floodplains. Although not very tolerant to prolonged flooding, this plant relies on periodic flooding to scour away other plants that compete for the same habitat. Its historical range includes Missouri and Illinois.

The IPaC package is included in **Appendix E**.

The Route N study is also within the geographic range of nesting bald eagles in Missouri. Bald Eagles (*Haliaeetus leucocephalus*) may nest near streams or water bodies in the study area. Nests are large and fairly easy to identify. While no longer listed as endangered, eagles continue to be protected by the federal government under the Bald and Golden Eagle Protection Act. Bald Eagles are also protected under the Migratory Bird Treaty Act, making it illegal to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird, except under the terms of a valid federal permit. Migratory bird species protected by the Migratory Bird Treaty Act are listed in 50 CFR 10.13.

The State of Missouri also maintains endangered species legislation. The state Endangered Species Act and the Missouri Wildlife Code protect state listed species. The Missouri Department of Conservation (MDC) is the administrative, regulatory, and enforcement agency for state sensitive species. Coordination with MDC yielded a Heritage Report (see **Appendix E**). The Project Location and/or Species Recommendations included this section:

> *"Indiana bats (Myotis sodalis, federal- and state-listed endangered) and Northern long-eared bats (Myotis septentrionalis, federal-listed threatened) may occur near the study area. Both of these species of bats hibernate during winter months in caves and mines. During the summer months, they roost and raise young under the bark of trees in wooded areas, often in riparian forests and upland forests near perennial streams. During project activities, avoid degrading stream quality and where possible leave snags standing and preserve mature forest canopy. Do not enter caves known to harbor Indiana bats or Northern long-eared bats, especially from September to April. If any trees need to be removed for your project, please contact the U.S. Fish and Wildlife Service (Ecological Services, 101 Park Deville Drive, Suite A, Columbia, Missouri 65203-0007; Phone 573-234-2132 ext. 100 for Ecological Services) for further coordination under the Endangered Species Act."*

Missouri also tracks the status of approximately 1,036 plant and animal species that are considered rare in the state. No impacts to state-listed species are expected. The species list for St. Charles County is included in **Appendix E**.

3.2.3.2 Endangered Species Impacts

Agency coordination yielded no records of state or federally listed endangered species within 1 mile of the study area. Field investigations did not identify a significant potential for the presence of state or federally listed species. The MDC Heritage Database (April 2019) and Missouri Speleological Survey Cave Database (April 2019) were also used to screen for potential impact to federal and state listed species as well as caves and mines. The Heritage Database shows a record for the Indiana bat approximately 0.8 miles south of the study area near the eastern terminus (mist net, summer record).

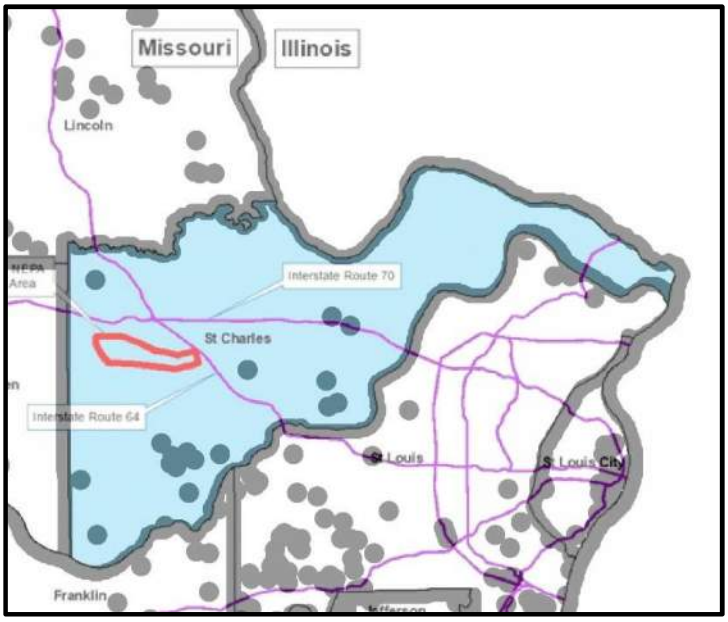

Figure 3-3. Cave Distribution in St. Charles County (Missouri Speleological Survey)

No Build Alternative Summary – The No-Build Alternative will not impact threatened or endangered species, directly or indirectly.

Build Alternatives Summary – The study area does not contain any known populations of listed species or critical habitat for listed species.

Although there are no known nearby caves (Missouri Speleological Survey Cave Database, April 2019) and no nearby records for gray bat (MDC Heritage Database, October 2019), a determination of "may affect, not likely to adversely affect" determination for gray bat is anticipated due to the clearing of mature trees along riparian corridors within the project area. Gray bats are known to forage along wooded riparian corridors miles from their cave roosts. See **Figure 3-3**.

A no effect determination is expected for the decurrent false aster. There are no nearby records and no suitable habitat for this species in the study area.

All of the Build Alternatives will result in the removal of trees, that could potentially affect the Indiana bat and the Northern long-eared bat. The differences between the Reasonable Alternatives in regard to tree removal can be seen on **Exhibit 3-3** (located in **Appendix A**). **Table 3-5** identifies the total terrestrial habitat encroachments. All of the Reasonable Alternatives have areas of tree clearing that may be beyond the scope of the Range-wide Programmatic Consultation for Indiana and Northern Long-eared Bat (PA). The PA is between USFWS and FHWA in order to streamline consultation for projects that may affect Indiana and Northern long-eared bats. Generally, if the suitable bat summer habitat trees to be removed for the project are entirely within 100-feet of an existing road or railroad then the project likely qualifies for a "not likely to adversely affect" determination under the PA. However, if suitable bat summer habitat trees are being removed between 100 and 300 feet of an existing road or railroad, then the project qualifies for a "likely to adversely affect" determination under the PA. Mitigation is likely required for the acreage of suitable habitat removed between 100 and 300 feet to offset adverse effects to the bats. Clearing suitable summer habitat beyond 300 feet from an existing road or railroad is outside the scope of the PA and requires separate consultation. A negative presence/absence survey (acoustic or mist-netting) results in a "not likely to adversely affect" determination with no mitigation necessary.

The breakdown of potential tree clearing in regard to the PA limits is shown in **Table 3-8**. **Exhibit 3-5** (located in **Appendix A**) presents an annotated view of the potential tree clearing.

Table 3-8. Potential Tree Clearing and the Range-wide Programmatic Consultation for Indiana and Northern Long-eared Bats

Alternative	Total Project Related Clearing	Within 100-Feet of an Existing Road	Between 100-and 300 Feet	Beyond 300-Feet
Improve Existing Alternative	58 acres	25 acres	14 acres	19 acres
Buckner Road Alternative	37 acres	25 acres	8 acres	4 acres
Near South Alternative	110 acres	23 acres	4 acres	83 acres

The Improve Existing Alternative will bisect a relatively large woodlot where the corridor goes off-alignment to connect to South Point Prairie Road. The total clearance of woodlands within this alternative is expected to be 58 acres. Twenty-five acres will be within 100-feet of existing roads. The new alignment portion of the alignment is largely beyond 300-feet of existing Route N (19 acres). The remainder of the new alignment and isolated woodlands adjacent to this alternative between 100 feet and 300 feet of existing roads is estimated to be 14 acres.

The Buckner Road Alternative will largely impact woodlands along their peripheries. The total clearance of woodlands for this alternative is expected to be 37 acres. Three portions of the alignment impact woodland beyond 100 feet of existing roads. Each of these areas are approximately four acres in extent.

One area is between Route N and Buckner Road as the alternative transitions between those roads. This area is beyond 300 feet of existing roads. The remainder of the clearing will be between 100 feet and 300 feet of existing roads (estimated to be eight acres). The other locations are along Buckner Road and along South Point Prairie Road.

The Near South Alternative impacts substantially more woodland. The total clearance of woodlands is expected to be 110 acres for this alternative. This alternative will bisect several intact woodlots beyond the 300-foot buffer. The total woodland beyond the 300-foot buffer of existing roads is estimated to be 83 acres. A small four-acre block is located within 100 and 300 feet.

To facilitate the processing of the programmatic agreement a presence/absence survey will be conducted prior to construction for the three portions of the Tentative Preferred Alternative that impact woodlands beyond 100 feet of existing roads. Assuming the survey produces a no-bat conclusion, a Not Likely to Adversely Affect determination is expected.

3.2.3.3 Mitigation Measures and Environmental Commitments

FHWA is the lead federal agency for this study. MoDOT is the designated non-federal representative for FHWA for completing coordination for compliance with Section 7 of the ESA and with the Missouri Endangered Species Act. Consultation will be complete prior to construction or before any federal funds are obligated.

Prior to construction, MoDOT shall conduct a presence/absence survey for federally listed bats species for the Tentative Preferred Alternative. MoDOT will use the results of the survey to make final effects determinations and consult with USFWS and MDC. Tree clearing will not occur prior to the completion of consultation with USFWS and MDC.

3.3 Community/Socioeconomic Impacts

The Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of NEPA point out that the human environment is to be interpreted comprehensively. It should include the natural and physical environment and the relationship of people with that environment. Agencies must assess direct, indirect, or cumulative impacts including impacts to aesthetic, historic, cultural, economic, social, or health effects. The CEQ regulations also contain provisions where economic or social and natural or physical environmental effects are interrelated. Consequently, NEPA documents discuss/disclose the effects on the human environment. This section describes the community and socioeconomic composition of the Route N study area.

Section 3.3 addresses the socioeconomic impacts to the community, including:

- Demographics
- Environmental Justice
- Land Use and Zoning
- Secondary and Cumulative Impacts
- Travel Patterns

3.3.1 Demographics

Demographics are the quantifiable characteristics of a population. This subsection summarizes the county demographic data from the St. Charles County Master Plan and presents the Census data for the Census Tracts in the Route N study area.

3.3.1.1 Demographics in St. Charles County

St. Charles County is the third largest county in the state of Missouri. St. Charles County is in the western portion of the St. Louis Metropolitan Statistical Area (MSA). This MSA has an estimated 2010 population

of 2,812,896. The 2010 population of St. Charles County has eclipsed the population of St. Louis City. St. Charles County has been the fastest growing county in the metropolitan area for three decades. Development is predicted to remain at a substantial pace within St. Charles County for the foreseeable future. While the St. Louis MSA increased by 9 percent in population between 1990 and 2010, St. Charles County population increased by 69 percent during the same time period. The county had an official population of 360,485 in the 2010 Census of Population. Three communities lie within the study area and are among the fastest growing. **Figure 3-4** shows the communities within the Route N Study Area. Between 2000 and 2010, the population for these communities in the study area increased as follows:

- Wentzville grew from 6,896 to 29,070 (322 percent increase)
- O'Fallon grew from 46,169 to 79,329 (72 percent increase)
- Lake St. Louis grew from 10,169 to 14,545 (43 percent increase)

A large portion of the study area is an unincorporated part of St. Charles County. This area also grew in population from 93,406 in 2000 to 94,516 in 2010.

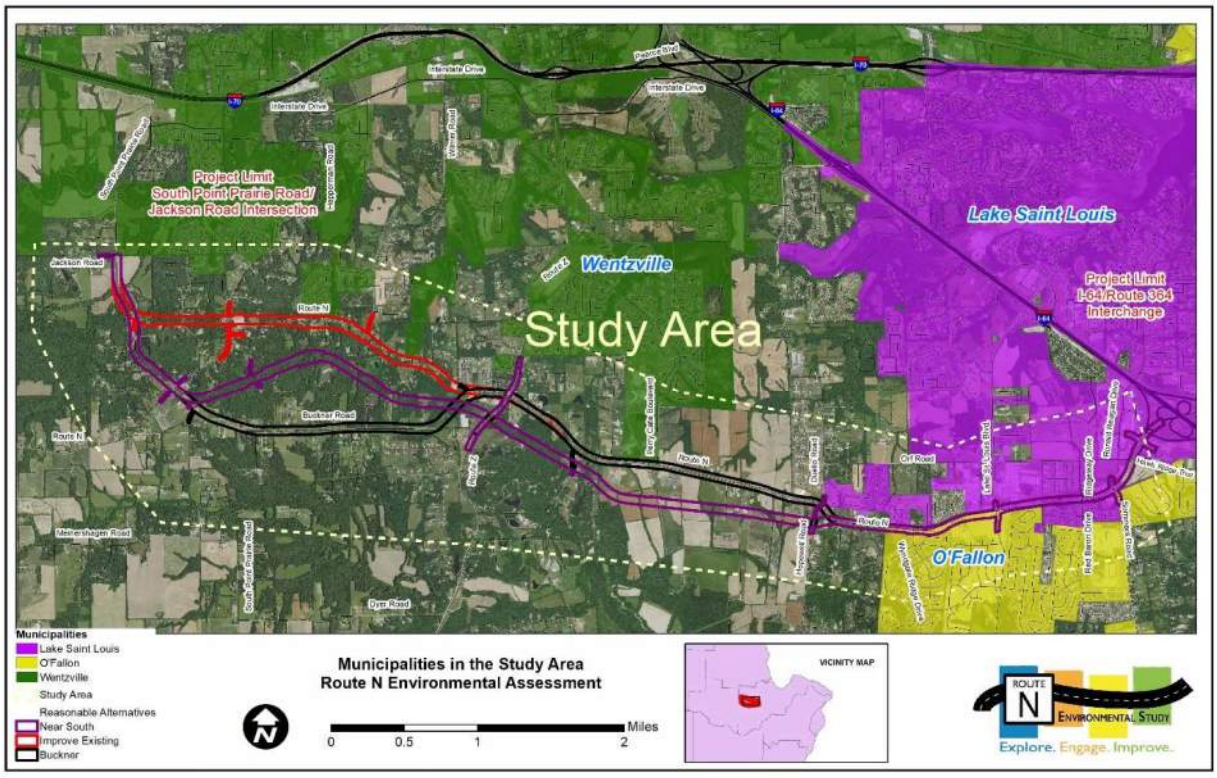

Figure 3-4. Municipalities within the Study Area

According to 2010 Census estimates, St. Charles County has an average household size of 2.64 persons and an average family size of 3.11 persons. The population of St. Charles County is relatively young with an estimated median age of 35.4. Approximately 11.2 percent of the population is 65 years of age or older.

The racial makeup of the county was 91.3 percent White, 4.4 percent African American, 0.3 percent Native American, 2.3 percent Asian, 0.1 percent Pacific Islander, and 1.6 percent from two or more races. Hispanic or Latino made up 2.5 percent of the population (1.8 percent Mexican, 0.2 percent Puerto Rican, 0.1 percent Cuban, 0.7 percent Other).

The median income for a household in the county was $71,458, and the median income for a family was $64,415. The per capita income (total income per resident) for the county was $23,592. Four percent of the population and 2.80 percent of families were below the poverty line. Out of the total people living in poverty, 4.90 percent are under the age of 18 and 5.10 percent are 65 or older.

3.3.1.2 Demographics in the Study Area

Figure 3-5 and **Exhibit 3-6** (in **Appendix A)** show the Census Tracts associated with Route N study area from the 2013 to 2017 American Community Survey 5-Year Estimates. The demographics are summarized in **Table 3-9**.

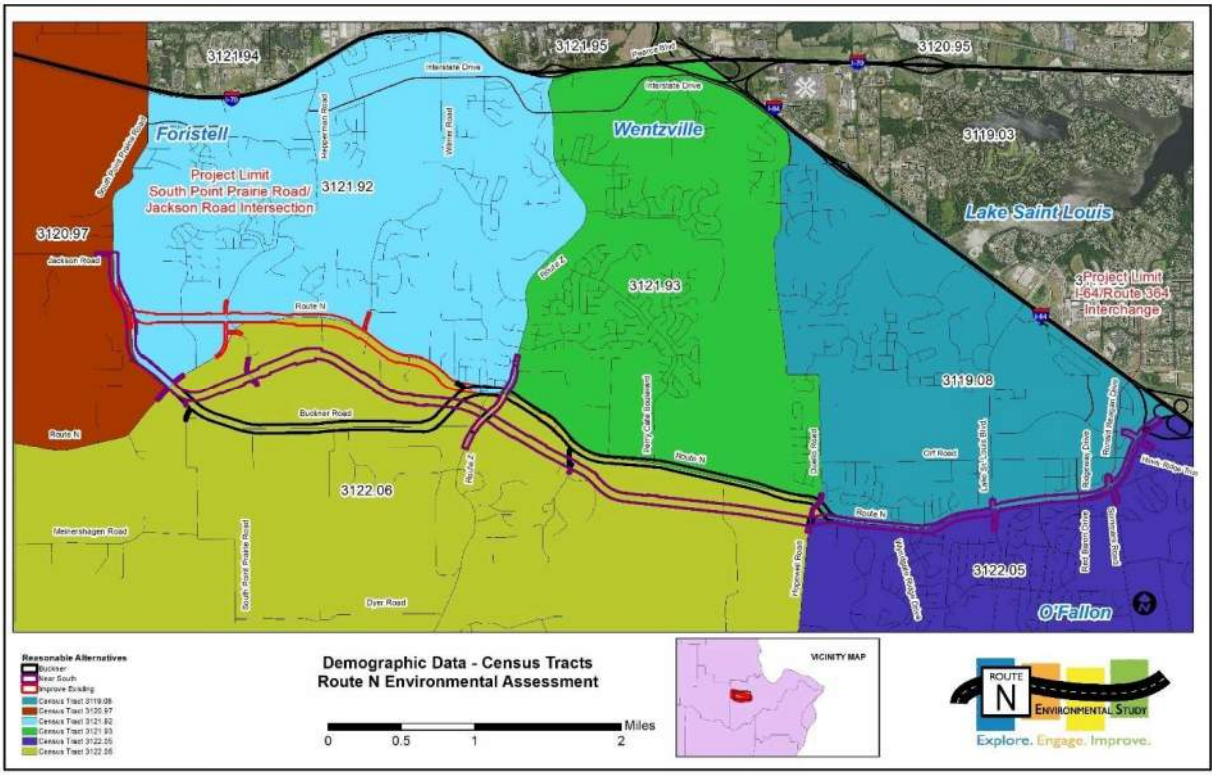

Figure 3-5. Demographic Data - Census Tracts

Table 3-9. Demographic Data – Census Tracts

Tract	Total Population	Percent Employed	White/Black/Other Percentage of Population
3119.08	3,305	45	93/3/4
3120.97	8,831	54	96/1/3
3121.92	4,754	54	93/2/5
3121.93	7,532	53	95/4/1
3122.05	11,077	51	91/5/4
3122.06	4,262	60	99/1</1<

3.3.1.3 Demographics Impacts

This Route N study area intersects six census tracts. Due to the densities being relatively low, only one census tract has more than one block group (3122.06).

The improvement of Route N is included in regional and county planning. Consequently, changes to predicted demographic trends are not expected. On the other hand, achieving the County's goals for development and community health may be hindered without improvements to the Route N corridor. For example, without implementing measures that would accomplish the study's Purpose and Need, achieving the County's land use goals for its Urban Service Area would be difficult. Proper development and transportation systems within the Urban Service Area will facilitate the extension of services and avoid inefficient use of land (unbalanced and poorly distributed land uses leading to higher infrastructure costs). **Section 3.3.3** further discusses land use planning.

St. Charles County has been investigating population projections into the future. The St. Charles County Master Plan uses the cohort survival method to determine population. This technique considers the age-sex distribution of the population as well as the influence of mortality, fertility, and migration. The projection for 2010 in the Envision 2020 Master Plan was 368,542, which was about 2 percent over the decennial 2010 census count of 360,485. The difference from projected to actual can largely be attributed to not foreseeing the economic downturn that occurred (2008) after the projections were done, which resulted in less in-migration.

3.3.2 Environmental Justice

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, signed on February 11, 1994, requires federal agencies to take appropriate and necessary steps to identify and address disproportionately high and adverse human health or environmental effects of their actions on minority and low-income communities or populations. EO 12898 seeks to ensure that the proposed transportation activity will do the following:

- Avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations
- Ensure the full and fair participation by all potentially affected communities in the transportation decision-making process
- Prevent the denial of, reduction in, or substantial delay of, the receipt of benefits by minority and low-income populations

According to FHWA Order 6640.23A, an adverse effect is determined as the totality of significant individual or cumulative human health or environmental effects. It also includes the interrelated issues of social and economic effects. Among these include:

- Bodily impairment
- Infirmity
- Illness or death
- Air, noise, and water pollution
- Soil contamination
- Destruction of human-made resources
- Destruction of natural resources
- Diminution of aesthetic values
- Disruption of community cohesion or vitality
- Disruption of the availability of services

- Noise and vibration
- Adverse employment effects
- Displacements
- Increased traffic congestion
- Isolation, exclusion or separation of minority or low-income individuals

3.3.2.1 Minority Populations

Minority populations are classified by the U.S. Census Bureau as belonging to one of the following groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black (not of Hispanic Origin); and Hispanic. Minority populations, according to the CEQ guidelines, should be identified where either: (1) the minority population of the affected area exceeds 50 percent; or (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

The percentage of minorities in the vicinity of the study area is very small. Within St. Charles County, 8.7 percent of the population is minority. Within the Census Tracts the minority populations vary between 1 and 9 percent. The outlier is Census Tract 3122.05. This tract includes multi-family/clustered subdivisions in O'Fallon. In the development of the Reasonable Alternatives, every effort was made to minimize displacements. For instance, closed drainage systems are being used to reduce the proposed project footprint. The Reasonable Alternatives are identical in this area. No evidence of minority populations within the footprint of the Reasonable Alternatives has been uncovered.

3.3.2.2 Low-income Populations

Low-income populations are identified where individuals have incomes below the U.S. Department of Health and Human Services poverty guidelines. A low-income population is either a group of low-income individuals living in proximity to one another or a set of individuals who share common conditions of environmental exposure or effect.

The American Community Survey (ACS-2013-2017 American Community Survey 5-Year Estimates) produces population, demographic, and housing unit estimates. The Census Bureau's Population Estimates Program develops and disseminates the official estimates of the population for the nation, states, counties, cities, and towns. The ACS data are presented in **Table 3-10**.

Table 3-10. ACS Poverty Data by Census Tract

Tract	Number of Families in Poverty	Percent of Families in Poverty	Percent of All People in Poverty
3119.08	918	2.8	3.1
3120.97	2,501	3.6	3.3
3121.92	1,354	3.3	2.7
3121.93	1,866	2.0	4.3
3122.05	2,840	9.8	10.6
3122.06	1,204	1.7	1.9

Overall, the poverty rate of families within St. Charles County is 2.8 percent. For the population as a whole, the poverty rate is 4.0 percent. Again, the outlier is Census Tract 3122.05, which includes multi-family/clustered subdivisions in O'Fallon. The Reasonable Alternatives follow the same alignment and are identical in all aspects through this area. Every effort was made to minimize displacements relative

to Environmental Justice related impacts. For example, closed drainage systems are used to reduce the project footprint.

Figure 3-6 shows the expected displacements within Census Tract 3122.05. Eight residential displacements are expected, in addition to the commercial operations (Bright Star Academy and Plaza Tire Service). The costs of each of these structures is in the vicinity of $200,000, and therefore they are unlikely to be occupied by impoverished residents[3].

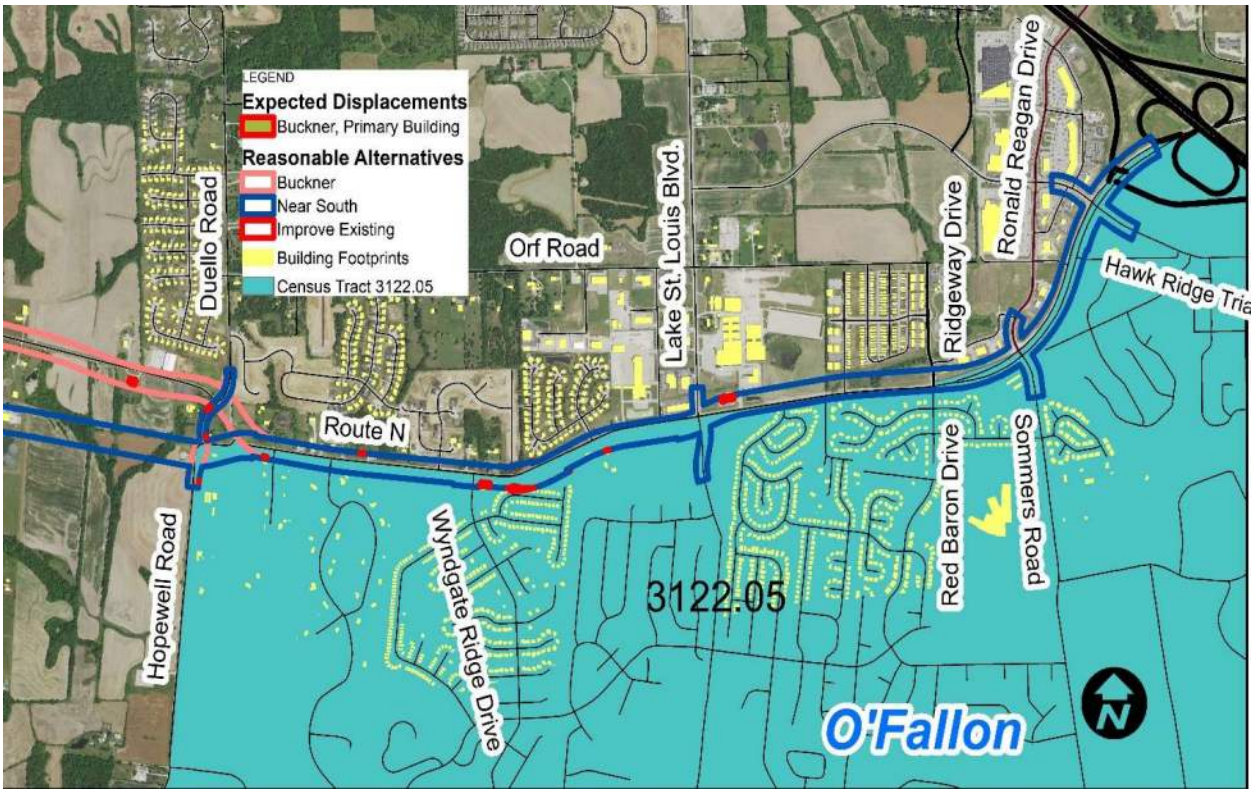

Figure 3-6. Expected displacements within Census Tract 3122.05

Figure 3-7 shows the location of the Castle Gate Mobile Home Park. This subdivision is in the northwest quadrant of the Route Z/Route N intersection (Census Tract 3121.92). This park has a maximum capacity of 200 units. It includes off-street parking and a small recreational area. The Castle Gate Mobile Home Park is potentially a low-income community. Using the Reasonable Alternative footprints, the Buckner Road and Improve Existing Alternatives would each displace 13 of the existing homes. The Near South Alternative is off-alignment at this point, but still displaces two homes (located west of Route Z and north of Route N). Under all scenarios there is adequate space within the Mobile Home Park to relocate the homes within the park.

Additionally, the footprint is considered a worst-case scenario. As discussed in **Section 2.4.1**, the design standards result in a typical section that is 137 feet wide in the segments with enclosed drainage from the I-64 to Route Z and 186 feet wide in the segments with open drainage from Route Z to Jackson Road. Using these typical cross sections allows for consistency in the evaluation of alternatives. However, this scenario incorporates none of the flexibility and cost/benefit analysis that the final design will be afforded. Consequently, it is possible that the displacements will be reduced.

[3] According to the St. Louis Business Journal, the residents in Missouri need an annual income of $44,283 to afford the median priced home ($189,900). This seems in line with a standard calculation of cost. The InvestingAnswers mortgage calculator yields an annual cost of $11,448. ValuePenguin reports that the average homeowners policy in O'Fallon in $2,353. The SmartAsset Tax Calculator calculates a County property tax bill of $2,640. These three expenses combined would comprise 66 percent of the income of a family of four in poverty.

Another factor to consider is the beneficial impacts that the design elements may provide. The installation of paved sidewalks will enhance pedestrian mobility along and across Route N. This will provide safer access to the commercial and business operations in the area. Paved shoulders will improve bicycle operations and allow for emergency vehicles to navigate through the intersection. Depending on the final design, the turn lanes may also benefit the community by allowing easier and safer ingress and egress.

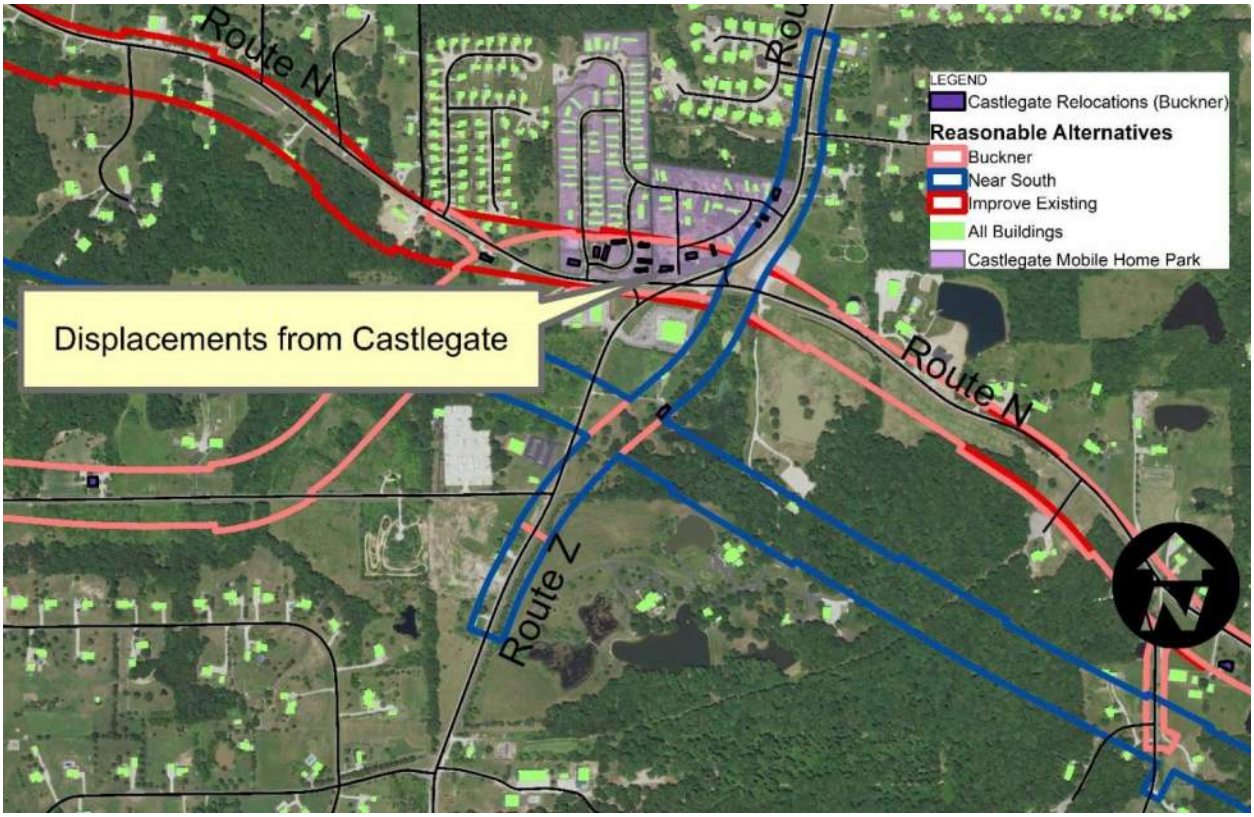

Figure 3-7. Expected Castlegate Relocations

In addition to relocation impacts, traffic noise impacts are expected amongst the Reasonable Alternatives. The noise analysis is discussed in **Section 3.1.3**. Noise conditions were modeled to determine existing and future conditions. A total of 602 receptors were modeled. Traffic noise impacts (traffic noise levels approaching or exceeding the Noise Abatement Criteria) are predicted to occur at the following number of residences:

- Alternative Improve Existing: 11
- Alternative Buckner: 14
- Alternative Near South: 10

One of the areas with traffic noise impacts were in the vicinity of the Route N/Route Z intersection. This applies to both the Improve Existing and Buckner Alternatives. A barrier optimization process was undertaken because of the impacts. The results of the effort concluded that no noise barriers were feasible but not reasonable.

3.3.2.3 EJSCREEN Evaluation

EJSCREEN is an environmental justice mapping and screening tool that provides EPA with a nationally consistent dataset and approach for combining environmental and demographic indicators. EJSCREEN users choose a geographic area; the tool then provides demographic and environmental information for that area. EJSCREEN includes:

- **Demographic Indicators:** EJSCREEN uses six demographic factors as an indicator of a community's potential susceptibility to the factors associated with Environmental Justice. EJSCREEN has been designed in the context of EPA's EJ policies, including EPA's Final Guidance on Considering Environmental Justice During the Development of an Action (EPA, 2010). EJSCREEN uses demographic information that is obtained from the U.S. Census Bureau's ACS. The 2018 version of EJSCREEN includes 2012-2016 ACS 5-year summary file data, which is based on 2014 Census boundaries. The demographic indicators include:
- Percent Low-Income: The percent of a block group's population in households where the household income is less than or equal to twice the federal "poverty level."
- Percent Minority: The percent of individuals in a block group who list their racial status as a race other than white alone and/or list their ethnicity as Hispanic or Latino, that is, all people other than non-Hispanic white-alone individuals. The word "alone" in this case indicates that the person is of a single race, not multiracial.
- Less than high school education: Percent of people age 25 or older in a block group whose education is short of a high school diploma.
- Linguistic isolation: Percent of people in a block group living in linguistically isolated households. A household in which all members age 14 years and over speak a non-English language and also speak English less than "very well" (have difficulty with English) is linguistically isolated.
- Individuals under age 5: Percent of people in a block group under the age of 5.
- Individuals over age 64: Percent of people in a block group over the age of 64.
- **EJ indexes**: Eleven EJ Indexes in EJSCREEN reflect the 11 environmental indicators:
  - National-Scale Air Toxics Assessment (NATA) respiratory hazard index
  - Proximity to NPL sites
  - Proximity to Risk Management Plan sites
  - Traffic proximity and volume
  - Proximity to hazardous waste facilities
  - NATA diesel PM
  - NATA air toxics cancer risk
  - Ozone
  - Lead paint indicator
  - Particulate matter
  - Wastewater Dischargers Indicator (stream proximity and toxic concentration)

- **EJSCREEN Output:** The key output from EJSCREEN is a standard printed report that describes a selected location. The analysis can focus on a single Census "block group." A block group is an area defined by the Census Bureau that usually has in the range of 600-3,000 people living in it. The analysis can also aggregate portions of the block groups, weighted by population, to create a representative set of data for a study area.

Percentiles are a way to see how local residents compare to everyone else in the United States. Instead of showing numbers out of context, EJSCREEN allows comparison of a community to the rest of the state, EPA Region 7, and the nation, by using percentiles. The national percentile is what percent of the U.S. population has an equal or lower value, meaning less potential for exposure/risk/ proximity to certain facilities, or a lower percent minority. Percentiles over 50 are the default setting for further scrutiny.

Appendix F contains the EJSCREEN reports for the seven Block Groups that intersect the study area and for the polygon that encompasses the Route N study area. **Table 3-11** shows the Demographic Indicators for the Route N study area.

EJSCREEN uses percentiles – A percentile is a relative term, telling you how you have done in comparison to the others. A percentile of 80 means that you scored equivalent to or better than 80 percent of the units in the dataset.

For example, if your EJSCREEN results indicate that an area is 48 percent minority and is at the 69th national percentile, this means that 48 percent of the area's population is minority, and that is an equal or higher percentile minority than where 69 percent of the U.S. population lives.

Percentiles over 50 are the default setting for further scrutiny.

Table 3-11. EJSCREEN Results

Demographic Indicators	Route N Value	State Average	Percentile in State	EPA Region Average	Percentile in EPA Region	USA Average	Percentile in USA
Demographic Index	13%	27%	19	26%	23	36%	14
Minority Population	9%	20%	44	19%	43	38%	21
Low Income Population	17%	35%	21	32%	24	34%	25
Linguistically Isolated Population	0%	1%	72	2%	66	4%	44
Population with Less than High School Education	5%	11%	25	10%	32	13%	26
Population under 5 years of age	8%	6%	72	6%	69	6%	70
Population over 64 years of age	8%	15%	18	15%	20	14%	25

Based on this analysis, minority or low-income populations were not indicated. Two secondary EJ factors had percentiles above 50. While linguistically isolated populations are extremely low, it still ranks above

the percentiles of the state and EPA Region 5. Populations under 5 years of age also ranks above the state, regional, and national benchmarks.

Among the 11 EJ Indexes, six exceed the Missouri benchmark (i.e., proximity to NPL sites, traffic proximity and volume, NATA diesel PM, ozone, particulate matter, wastewater dischargers indicator). This is more a factor of being near a large industrial city than an indication of the presence of an EJ population.

3.3.2.4 Environmental Justice Impact Summary

Environmental Justice requires federal agencies to identify and address disproportionately high impacts on minority and low-income communities.

Relative to minority populations, the percentage of minorities in the vicinity of the study area is very small. However, one census tract had levels slightly higher than the St. Charles County average. This tract (3122.05) includes multi-family/clustered subdivisions in O'Fallon. No evidence of minority populations within the footprint of the Reasonable Alternatives has been uncovered.

Relative to low-income populations, the Castlegate Mobile Home Park is potentially a low-income community. Given that the existing units can be relocated onsite and the overall environment will be improved, a disproportionate impact is not expected.

Based on the above discussion and analysis, the Reasonable Alternatives will not cause disproportionately high and adverse effects on any minority or low-income populations in accordance with the provisions of E.O. 12898 and FHWA Order 6640.23. No further EJ analysis is required.

3.3.3 Existing and Future Land Use

Land use and zoning patterns influence transportation systems, and vice versa. Roads, trails, and transit systems provide vital transportation services to homes, businesses, schools, and other developed lands. In turn, developed land creates transportation demand that requires transportation service.

Land use is the development of land into uses like commercial, residences, schools, and parks. Agencies with jurisdiction over the land can create land use plans for future land use types, locations, and densities.

This section describes the existing and future land uses within the Route N study area.

3.3.3.1 Existing Land Use

The identification of land uses within the Route N study area plan is dynamic because there are several classification systems that can be used. Also, the corridor, and St. Charles County as a whole, is undergoing substantial development as agricultural land transitions to residential and other uses

The size of the area needed to build and maintain the alternatives, (not including the area already within the existing road right-of-way), varies from 223 to 272 acres. According to the land use designations contained in the St. Charles County Tax Map Parcel dataset, most of the affected land is in residential and agricultural use. This dataset identified the dominant land use for each tax map parcel. The acquisition estimates are summarized and presented in **Table 3-12** and on **Exhibit 3-7**. Since the dataset contains approximately 20 land uses, it is necessary to organize the land uses into groupings to make the nature of the study more understandable.

Table 3-12. Route N Land Use Summary (St. Charles County Tax Parcel Data)

	Improve Existing (acres)	Buckner Road (acres)	Near South (acres)
Residential	98	77	76
Agriculture	101	128	173
Commercial	11	11	6
Industrial	<1	<1	0
Institutional	12	12	17
Total Expected Acquisition	**223**	**228**	**272**

Relative to the number of affected parcels, the Improve Existing Alternative affects 309 parcels, the Buckner Road Alternative affects 297 parcels, and the Near South Alternative affects 239 parcels. Based on tax parcel data, between 45 and 63 percent of Reasonable Alternatives are agricultural. The methodology appears to over-estimate the actual amount of land in agricultural use. Field reviews show residential uses in many agricultural tax parcels. The trend is toward more residential uses, which may also affect the depiction. Residential land uses are the next most prevalent type. This is dominated by single-family homes.

The traditional pattern of homes fronting on Route N is giving way to subdivisions with an internal road system connecting the subdivision to Route N. Small amounts of commercial property, mostly strip takings along the existing roadways, are needed for construction of the Reasonable Alternatives. The two commercial displacements are Bright Start Academy and Plaza Tire Service. The Reasonable Alternatives are identical in this area. Virtually no industrial uses are affected. Institutional land uses are a group that includes important community resources. In the Route N study area that means:

- **Churches,** such as Hopewell Baptist Church, Immanuel Lutheran Church, St. Gianna Catholic Church, Wentzville Church of God, Westlake Church of Christ, and the Hopewell Church of God. All of the Reasonable Alternatives are expected to displace the Wentzville Church of God. **Figure 3-8** shows the church and the short distance from existing Route N and the curve at Hopewell Road. These factors cause the expected displacement.

Figure 3-8. Wentzville Church of God

- **Schools,** such as Boone Trail Elementary School, Wentzville South Middle School, Immanuel Lutheran Church School, and Liberty High School. Land acquisition will be minimal strip takings. The improvement of the Route N corridor is expected to improve operations at the schools. School bus operations at the schools are seen by the public as a major annoyance/problem.
- **Government Operations,** such as the St. Charles County Ambulance District facility and the cell tower located at the Hopewell intersection with Route N. The Near South Alternative will displace both of these resources (**Figure 3-9)**.
- **Public Recreational Areas** are extremely limited in the study area. Hawk Ridge Park is located on the outer edge of the study area (8392 Orf Road, Lake St Louis), unaffected by any Conceptual or Reasonable Alternative. Some mapping programs depict an area on the north side of Buckner Road as "Berry Park". Property searches and Coordination with community leaders were conducted to confirm that there are no public recreational resources in this area. These areas are included in **Exhibit 3-3**.

Another way to depict land use was described in **Section 3.2.1** (Terrestrial Habitats). The NLCD identifies land use for each 30-by-30-foot raster, as determined through satellite analysis. This allows for developed land and natural habitat to be depicted. For instance, buildings on a property can be depicted as developed, while the grasslands around it can be accounted for. Using this technique, approximately 50 percent of the Improve Existing and Buckner Road Alternatives are developed. The Near South Alternative is approximately one-third developed land. The balance is comprised of approximately equivalent portions of woodlands and grasslands/pasture/crops.

3.3.3.2 Future Land Use Planning

The St. Charles County Future Land Use Plan provides a framework for future development through 2025. **Figure 3-10** shows the land use plan for the study area. The primary land use type within the study area is low-density residential. This land use category allows for single-family residences at a density of one to four dwelling units per acre. The single-family residences are normally detached units and have urban services (central water distribution and sanitary sewers). Lot sizes in these areas can vary from approximately 10,000 to 43,000 square feet. Clustering development is encouraged. Supporting and complementary uses, including open space and recreation, schools, places of worship, and other public or civic uses are also appropriate in this category. Senior housing is appropriate if compatible with the surrounding area.

Figure 3-9. St. Charles County Ambulance District

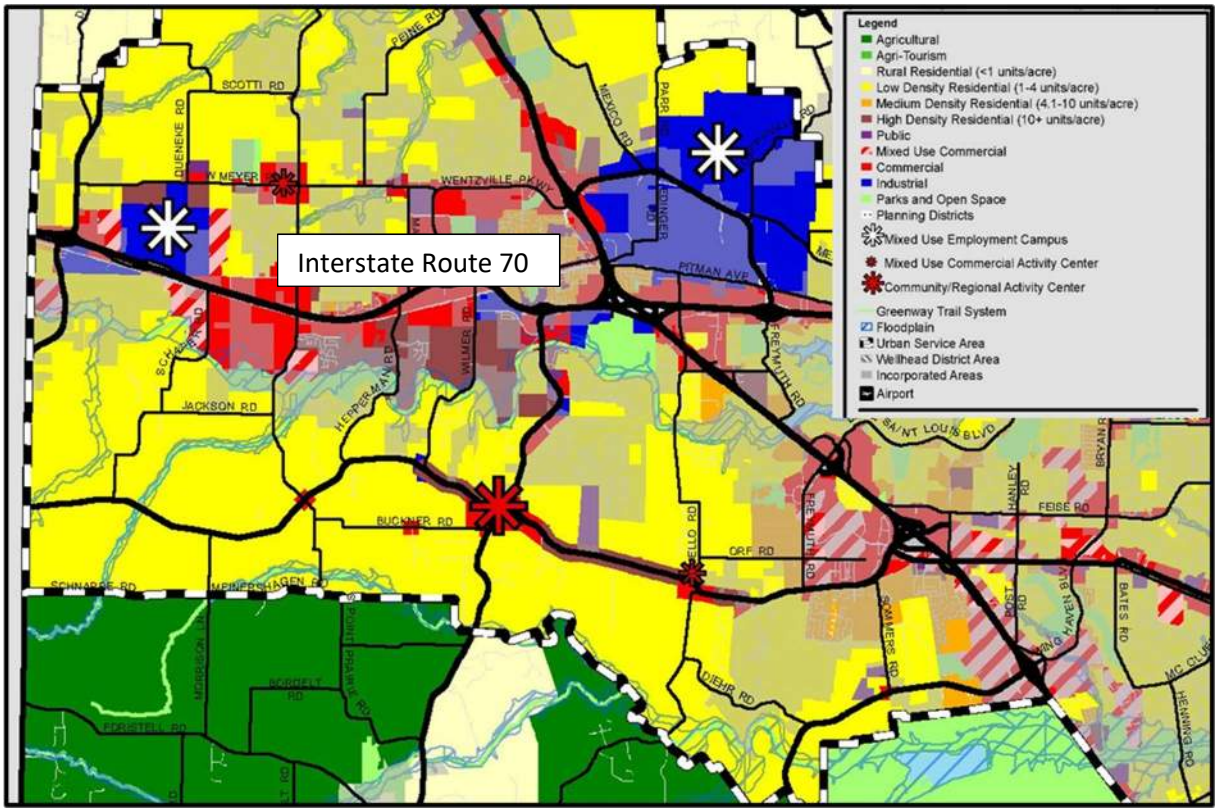

Figure 3-10. Land Use Plan for St. Charles County

Concepts (Vision, Goals and Strategy statements) behind the 2025 Future Land Use Plan that are important to the Route N study include:

- **Development within the Urban Service Area** – The study area is within the Urban Service Area. It is expected that most urban development should and will occur within this area. New urban residential neighborhoods, with supporting businesses and services, will be directed into this area that is generally consistent with existing development. Development within the Urban Service Area will facilitate economical extension and avoid incompatible use of land.
- **Utilization of activity centers –** Activity centers are places designed to be somewhat pedestrian-oriented, with high quality design and cohesive site development, and with a mix of complementary uses such as retail services and higher density housing. A is a Regional Activity Center is located at the intersection of Route N and Route Z. The Regional Activity Center is the largest kind of activity center. Smaller activity centers are called Community Activity Centers. Within the study area, the land immediately adjacent to the Hopewell Road/Duello Road N intersection is a Community Activity Center.
- **Connected transportation system** – The plan promotes land use patterns in the Urban Service Area that are conducive to supporting a variety of transportation alternatives and mobility in the county. St. Charles County's "Proposed Ten-Year Transportation Improvement Program" addresses necessary transportation improvements, including the improvement of Route N, so that the roadway network will be connected, efficient, and sufficient to provide for the future roadway needs of the county.
- **Flexibility in land use categories** – The Future Land Use Plan does not predetermine specific land uses or densities for given parcels of land. Instead, it illustrates general categories with preferred character types and policies and criteria to describe the interest in creating a mix of uses and compatible densities within new neighborhoods. This allows more creative and efficient use of land according to this plan's goals and strategies.

3.3.3.3 Land Use Impacts

An analysis was conducted to evaluate how the alternatives may affect the St. Charles County Land Use Plan. The evaluation focused on how well the alternatives provide for efficient movements, adequate roads, reductions in traffic in residential areas. The Reasonable Alternatives are expected to have the following impacts:

- The size of the area needed to build and maintain the alternatives, not including the area already within the existing road right-of-way, ranges from 221 acres for the Improve Existing Alternative, 226 for the Buckner Road Alternative, and 272 acres for the Near South Alternative.
- All of the Reasonable Alternatives are expected to displace the Wentzville Church of God.
- Near South Alternative will displace the St. Charles County Ambulance District facility and the cell tower located at the Route N/Hopewell Road intersection.
- Improve Existing Alternative will largely maintain existing movements, roadways, and traffic in residential areas.
- Buckner Road Alternative is expected to provide for efficient movements and adequate roadways. It will also relocate traffic to the low-density residential areas along Buckner Road.
- Near South Alternative is expected to provide for efficient movements and adequate roadways. It will also relocate traffic to the agricultural and low-density residential areas, where a road does not exist.

- Since the reconfiguration of the Route N corridor is incorporated into the regional and county planning documents, the No Build Alternative may hinder the achievement of the underlying goals for development and community health.

3.3.4 Secondary and Cumulative Resources

Direct effects are caused by a project and occur at the same time and place.

Indirect (secondary) effects are caused by a project but occurring later in time or are farther removed in distance than direct effects. These impacts include changes in land use attributable to the project such as induced growth and impacts on environmental resources that occur as a result of the study's influence on land use.

A cumulative impact, according to 40 CFR 1580.7, is defined as, "The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions." According to FHWA, a cumulative impact includes the total effect on a natural resource, ecosystem, or human community, and the total of all impacts to a particular resource that have occurred, are occurring, and would likely occur as a result of past, present, and future activities or actions of federal, non-federal, public, and private entities.

3.3.4.1 Secondary and Cumulative Resources – Affected Environment

The first step in the process for evaluating secondary and cumulative impacts is to identify the sensitive resources to be analyzed for effects. These resources include those that are directly affected by the improvement of Route N, those affected by the secondary development that is associated with the study, and those resources that are particularly susceptible to cumulative effects. Not all impacts tend to "accumulate"—that is, similar impacts from more than one project do not always add together and create a greater impact. Other resources may experience a minimal impact from each individual action, but when impacts from several actions are summed cumulatively, they may experience greater effects.

Sensitive resources were identified using the environmental information collected during the study, as well as public and agency scoping comments received. These interrelated resources include:

- Induced Development of Greenfields – Many stakeholders have expressed the concern that a reasonably foreseeable consequence of the improvement of the existing roadway will be the non-rural development in the corridor. As discussed previously, the stated purpose of the study is not the development of the corridor.
- Degradation of Desirable Rurality – Throughout the public involvement process, the rural nature of the existing corridor was cited as a community asset worthy of protection. Beyond the direct impacts, degradation could possibly occur elsewhere.
- Reduction of Farmland – Within the study area, agriculture is diminishing. It is anticipated that there will be some direct, but manageable, impacts. It is reasonable to investigate if areas in the Area of Influence might also be affected.

The Area of Influence is the spatial coverage within which to investigate secondary and cumulative impacts. Using the National Cooperative Highway Research Program Report 466, the analysis for indirect effects uses a 1-mile Area of Influence. The northern and eastern boundaries are formed by I-70 and I-64; see **Figure 3-11**.

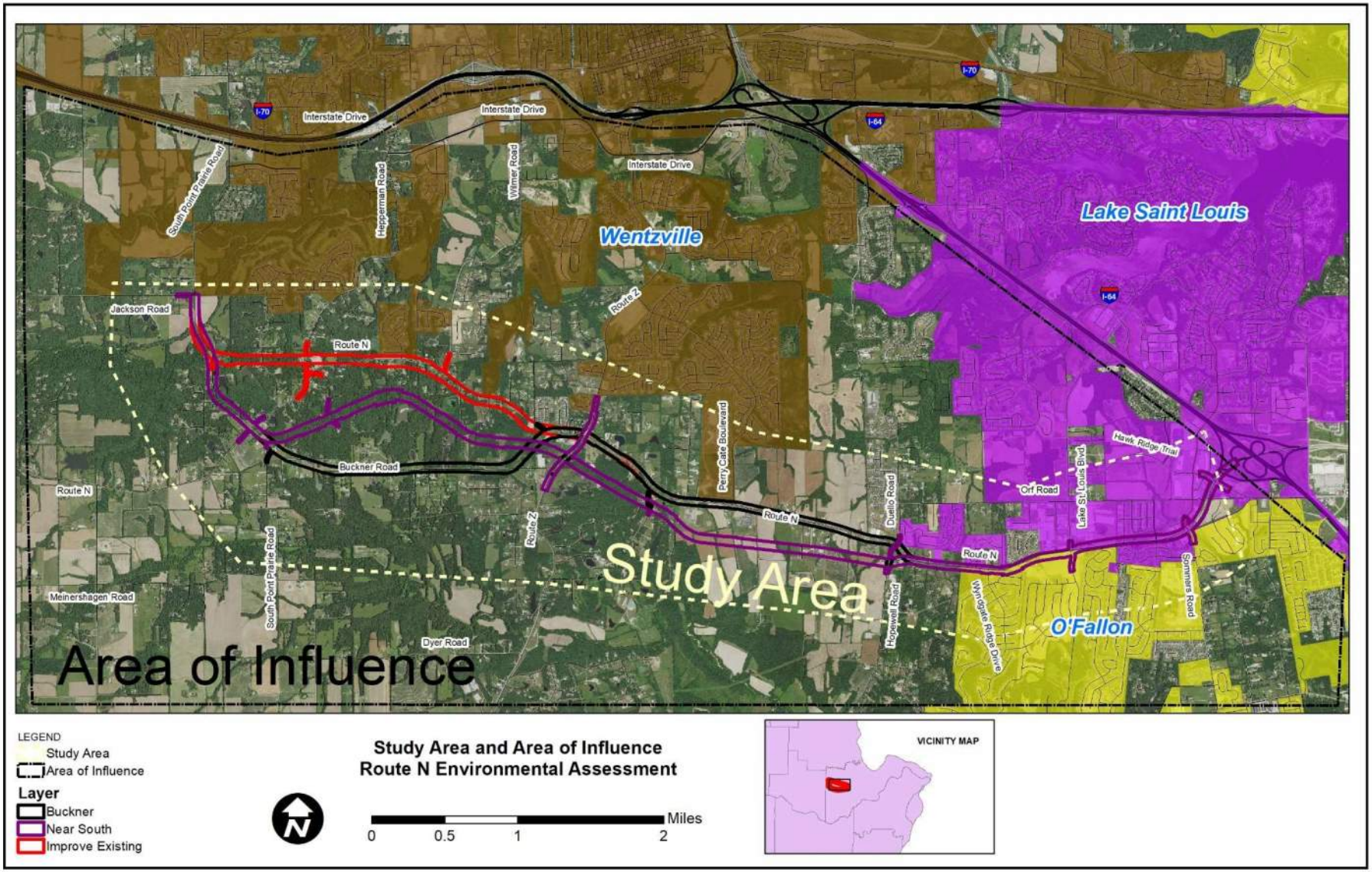

Figure 3-11. Area of Influence

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3.3.4.2 Secondary and Cumulative Impacts – Impacts

Overall, no significant negative secondary or cumulative effects are anticipated as a result of the implementation of the Route N Study. This conclusion was based on evaluating how the alternatives conform to the region's planning process. This section will focus on the impacts associated with the St. Charles County Future Land Use Plan, the St. Charles County Thoroughfare Plan (a component of the St. Charles County Master Plan), the East-West Gateway's regional long-range transportation plan, Connected 2045, and the St. Charles County TIP. An overview of the transportation planning affecting the study area is presented in **Appendix C**.

St. Charles County Future Land Use Plan. An important component of the Future Land Use Plan is the preservation of agriculture. The development of St. Charles County with non-rural land uses may be reasonably assumed to reduce the extent of farmland, induce the development of greenfields and degrade the desirable nature of the visual environment. The incorporated portions within the Area of Influence are already completely developed. The unincorporated portions are under the jurisdiction of St. Charles County. As discussed previously, the St. Charles County Future Land Use Plan recommends residential uses adjacent to the Reasonable Alternatives; see **Figure 3-10**. However, land south of Meinershagen Road is proposed to remain agriculture, including agro-tourism.

St. Charles County designates agriculture for the area in the southwestern and western portions of the planning area outside of the Urban Service Area. The vast majority of this land is dedicated to farming and agriculture. Agricultural operations typically require very large parcels of land. Scattered areas of residences on large lots are also located here. These residences rely on individual wells and septic systems, and open space usually is owned privately. Agriculture depends on soil capabilities and requires some basic utility services. Agricultural operations should have access to minor county roads. Agriculture is permitted in floodplains and geologic hazard areas, subject to state and county regulations. Residential uses not associated with agricultural or farming operations should have minimum lot sizes of five acres. However, this type of development is not encouraged.

St. Charles County developed an Agri-Tourism Land Use Plan to: (1) preserve a cultural asset of vast significance in southwestern St. Charles County, (2) protect and preserve scenic vistas and rural landscapes, (3) aid in the continuing expansion of tourism and economic development within this portion of St. Charles County, (4) protect and preserve agricultural lands within this scenic area, (5) assist with the promotion of historical preservation in the area, (6) provide for non-residential and nonagricultural development in the area which is both buffered and non-obtrusive, and (7) provide for the protection and enhancement of natural resources along area roadways.

Relative to secondary and cumulative impacts, the Reasonable Alternatives will facilitate the residential components of the land use plan. This will be confined to the immediate vicinity of the Route N corridor. As shown on **Figure 3-10**, Route N is primary east-west thoroughfare through the residential area planned for south of I-70. Impacts to the Agricultural areas south of Meinershagen Road will be protected by the land use measures implemented by St. Charles County. In the short-term, the Near South Alternative will directly bisect/convert the most farmsteads. This will make the eventual conversion of the adjoining lands to residential and other non-rural land uses more likely. In addition to coherence with the Land Use Plan, other planning initiatives affect the secondary and cumulative impacts.

Another focus of a land use plan is the establishment of Urban Service Areas. The analysis of Reasonable Alternatives focused on how the alternatives affect Urban Service Areas, Activity Centers, and Mixed-Use Commercial Activity Centers. The Improve Existing Alternative will improve the existing configuration. The Buckner Road Alternative is the configuration depicted in the St. Charles County Thoroughfare Plan (a component of the St. Charles County Master Plan). The Near South Alternative will bypass the Route N/Route Z Regional Activity Center.

St. Charles County Thoroughfare Plan. The purpose of the Thoroughfare Plan (a component of the St. Charles County Master Plan) is to guide both the public and private sectors of the County and the various municipalities in future decisions involving thoroughfares. The secondary/cumulative evaluation focused on how well the alternatives provide for efficient movements, adequate roads, reductions in traffic in residential areas.

- Improve Existing Alternative will largely maintain existing movements, roadways, and traffic in residential areas.
- Buckner Road Alternative is expected to provide for efficient movements and adequate roadways. It will also relocate traffic to the low-density residential areas along Buckner Road. The need to improve Buckner Road Alternative is depicted in the St. Charles County Thoroughfare Plan.
- Near South Alternative is expected to provide for efficient movements and adequate roadways. It will also relocate traffic to the agricultural and low-density residential areas, where a road does not exist.

The St. Charles County Thoroughfare Plan identifies extensions of local roads to existing Route N to provide additional connectivity. The Near South Alternative, because it is south of existing Route N, could necessitate further extensions of these roadways. The Buckner Alternative could also face this pressure. Nevertheless, the additional impact of these potential extension(s) are expected to be minor and are explicitly a local responsibility outside the scope of the Route N Study.

Connected 2045. Connected2045 is the long-range transportation plan for the St. Louis region. It guides transportation decision-making in the region over a 30-year time horizon. Based on the East-West Gateway's Connected 2045 Transportation Plan, the secondary/cumulative evaluation focused on compliance with the plan's Investment Plan.

- Improve Existing Alternative will improve the existing Regional Roadway Network
- Buckner Road Alternative will modify the land use development pattern of Buckner Road and Route N but will fundamentally maintain the network configuration
- Near South Alternative will fundamentally change the roadway network by changing the development potential of existing agricultural land

St. Charles County TIP. The TIP provides funding for projects within St. Charles County. The County's transportation sales tax is used for road improvements that enhance mobility and safety on local roads. Based on the St. Charles County TIP, the secondary/cumulative evaluation focused on impacts to the TIP projects in the vicinity of Route N (17-017, 018 and 019). Project 17-017 seeks assistance in funding land and easement acquisition that are vital to the construction of Wentzville Parkway South Phase 1 as well as David Hoekel Parkway Phase 2. Project 17-018 will provide a direct connection to I-70 with the City of Wentzville's interchange project. Project 17-019 involves the reconstruction of a portion of Hepperman Road.

None of the alternatives are expected to affect these projects.

3.3.5 Travel Pattern Impacts

The reconfiguration of the Route N corridor will affect traffic patterns. Based on traffic analysis, the following travel pattern impacts were revealed:

- The Improve Existing Alternative will create the shortest corridor that most closely maintains the existing configuration. A total of nine signalized intersections will be required. Ninety-two driveways will require reconfiguration and 39 intersections will be modified. Ten additional signalized intersections will be required.

- The reconfiguration of the Route N corridor under the Buckner Road Alternative will require fewer minor road intersections but also places Route N traffic onto Buckner Road. In all, 73 driveways will require reconfiguration and 29 intersections will be modified. A total of eight additional signalized intersections will be required.
- Under the Near South Alternative, fewer minor road intersections will be required. Much of the alternative does not make use of existing right-of-way. In all, 37 driveways will require reconfiguration and 27 intersections will be modified. Ten additional signalized intersections will be required.

Currently, six intersections operate at LOS F (very poor) during the AM peak hour and four currently operate at LOS F during the PM peak hour. In 2045, under the No Build Alternative, eight intersections in the AM and six in the PM will operate at LOS F.

Under the Reasonable Alternatives, intersection operations will be markedly improved with no intersections operating at LOS F in either the AM peak hour or PM peak hour. The complete traffic analysis is available in the Project Record.

3.4 Aquatic Habitat Impacts

Section 3.4 addresses impacts to aquatic resources, including:

- Floodplains
- Streams and Watersheds
- Wetlands
- Groundwater
- Drinking Water
- Hydraulics

Limited aquatic areas are located within the Route N study area. This section addresses the various topics associated with water: surface water; groundwater; and flood water all apply to this study.

3.4.1 Floodplains

Figure 3-12 shows the Federal Emergency Management Agency (FEMA) 100-year floodplain for the Route N study area.

The proposed alignment for Route N directly impacts two FEMA stream crossings: Sams Creek and Oday Creek. Sams Creek is a tributary to Peruque Creek and Oday Creek is a tributary to Dardenne Creek. The effective information for the two streams is included in the FEMA Flood Insurance study Number 29183CV001B, dated January 20, 2016. Both creek crossings are located within the FEMA mapped floodway and flood zone AE.

All of the Reasonable Alternative alignments are identical at the stream crossings. Thus, the hydraulic impacts will be identical.

The effective FEMA Flood Insurance Rate Map (FIRM) for St. Charles County, Missouri, and incorporated areas, Panel No. 29183C0195G, dated January 20, 2016, shows the special flood hazard area for Sams Creek through the study area. The existing crossing across Sams creek is via the South Pointe Prairie Road bridge. Based on the FIRM, the existing road and the bridge are located entirely within the approximately 400-feet wide floodway. The current hydraulic model received from Missouri State Emergency Management Agency (SEMA) shows that the existing bridge is a 30-feet wide, 80-feet long, single span bridge with a low chord elevation of 592.4 feet North American Vertical Datum of 1988 (NAVD88). A 100-year flow of 9,600 cubic feet per second flows through the stream. The model output shows that the bridge and roadway overtop during the 100-year storm event.

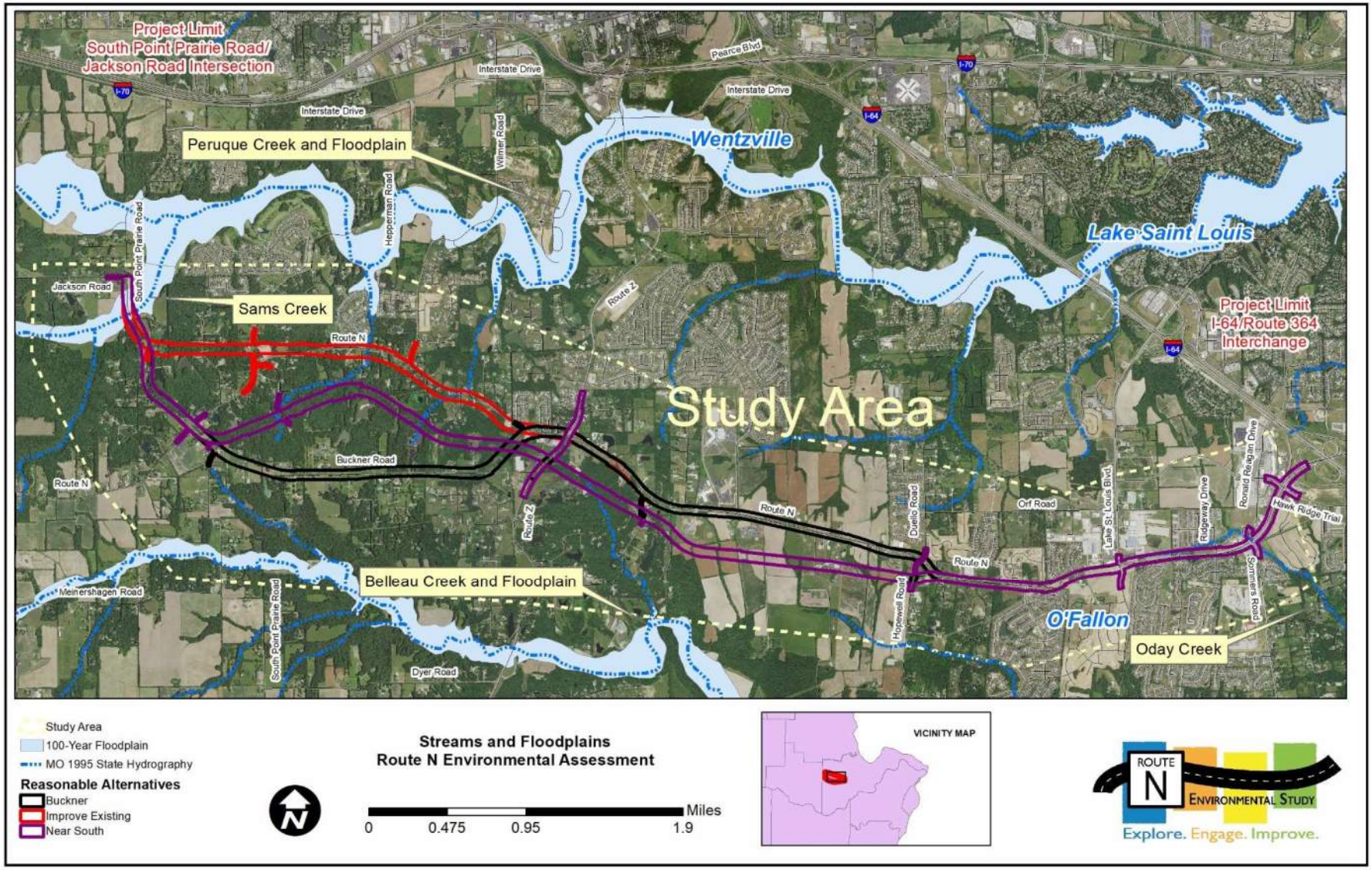

Figure 3-12. Streams and Floodplains

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The effective FEMA FIRM for St. Charles County, Missouri, and incorporated areas, Panel No. 29183C0220G, dated January 20, 2016, shows the special flood hazard area for Oday Creek through the study area. Oday Creek is located across the intersection of Route N and the Sommers Road where roadway widening is proposed. Based on the current hydraulic model received from USACE, the stream crosses the Route N at Sommers Road via dual 7-feet by 7-feet reinforced concrete box (RCB) that outfalls to an open channel mapped as floodway in the southeast quadrant of the intersection. The 100-year flow across the dual boxes is 1,118 cubic feet per second.

Section 3.4.6 (Hydraulics) discusses the regulatory processes associated with minimizing construction impacts in the floodway/floodplain and reducing disturbances to the Waters of the United States. The section discusses the need for a floodplain development permit, a Letter of Map Revision (LOMR), and a no-rise certificate. It was concluded that Reasonable Alternatives would not be expected to result in incompatible floodplain development.

3.4.2 Streams and Watersheds

The study area lies within two watersheds. None of the waterways are listed as an Outstanding National or State Resource Water.

Peruque Creek and Dardenne Creek are identified on the 303(d) Impaired Waters list, as described in **Section 3.4.4.1**.

Direct stream impacts will be limited to a tributary of the Peruque Creek. The existing Sam's Creek crossing will need to be replaced or improved. South Point Prairie Road currently has a perpendicular crossing of the 1,000-foot-wide floodplain. The Reasonable Alternatives will cross the floodplain in the same location. The stream is 16 feet wide at the crossing. The footprint of the Reasonable Alternatives is 330 feet at this location.

Water quality impacts could include increased sediments to stormwater due to runoff from erodible material exposed during construction. Stormwater runoff is addressed by MoDOT's Sediment and Erosion Control Program, which would be included within the contract specifications to address temporary erosion and sedimentation during construction. MoDOT's best management practices (BMPs) reduce impacts to the aquatic environment to minimal levels. BMPs cover most activities needed to restore the construction area to an acceptable condition. This includes cleanup, shaping, replacing topsoil, and establishing vegetative cover on all disturbed bare areas, as appropriate. MoDOT currently holds a general transportation separate storm sewer system (TS4) permit. MoDOT will adhere to the conditions of the TS4 permit applicable at the time of construction.

The proposed improvements will result in the disturbance of more than 1 acre of total land area. Accordingly, it is subject to the requirement for a National Pollutant Discharge Elimination System (NPDES) permit for stormwater discharges from the construction sites. Requirements applicable to such a permit will be followed, including the preparation of a Stormwater Pollution Prevention Plan (SWPPP). Such a plan will identify potential sources of pollution that may reasonably be expected to affect the quality of stormwater discharges from the construction site. It will also describe and ensure the implementation of practices that will be used to reduce the pollutants in discharges associated with construction site activity. Finally, it will ensure compliance with the terms of the permit.

3.4.3 Wetlands

The term "wetlands" means those areas that are inundated by surface water or groundwater with a frequency sufficient to support a prevalence of vegetation that requires saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds. They provide diverse and sometimes specialized habitats for aquatic and terrestrial wildlife and plants.

Wetlands are regulated under a number of federal and state laws and policies. Executive Order 11990 requires a finding that there is no practicable alternative to construction in wetlands and that the selected alternative includes all practicable measures to minimize harm to wetlands that may result. Wetlands within the study area are regulated by the St. Louis District of USACE under the Clean Water Act through permitting activities prior to the start of construction. These regulations also include mitigation (replacement) for impacted wetlands and streams.

Initial wetland investigations began with a review of county soil survey maps and National Wetland Inventory maps to determine the locations of potential wetland sites. Then the study area was surveyed to determine the presence of plant species, the soil type, and the presence of water at or near the surface. Areas that met the conditions for wetlands were mapped on aerial photography; see **Exhibit 3-8** in **Appendix A**. Methodologies used follow protocols outlined by the Regional Supplement to the USACE Wetland Delineation Manual: Midwest Region (Version 2.0) (USACE, 2010) and the USACE Wetland Delineation Manual (Environmental Laboratory, 1987).

Within the 6,871-acre initial study area, a total of 198 wetland sites totaling approximately 170 acres were found in the National Wetland Inventory (USFWS, 2019). Most of these wetland sites are associated with emergent wetlands adjacent to other waters.

Using the impact footprints for the Reasonable Alternatives, the expected wetland impacts are estimated to be 0.7 acre for the Improve Existing Alternative, 1.1 acres for the Buckner Road Alternative, and 1.4 acres for the Near South Alternative.

In all cases, a finding of no practical alternative will be necessary for waterway permitting purposes. This requirement is also important in the evaluation of alternatives regarding satisfying the study's Purpose and Need.

3.4.4 Water Quality and Stormwater Management

Existing surface water conditions would continue under the No Build Alternative. For all of the Build Alternatives, sediment generation is the impact of concern for surface water quality. Sediment loads in rivers, streams, and wetlands can have an impact on drinking water quality and on aquatic animals by limiting oxygen absorption and covering eggs. Thus, erosion and the resulting sediment are regulated and involve BMPs to control adverse impacts.

3.4.4.1 Water Quality and Stormwater Management – Affected Environment

The study area lies within the Upper Dardenne Creek and the Headwaters Peruque Creek watersheds. Peruque Creek and Dardenne Creek are identified on the 303(d) Impaired Waters list. Peruque Creek was listed for impairment due to dissolved oxygen (DO) and aquatic macroinvertebrate bioassessments. Dardenne Creek was listed for impairment due to DO and e. coli bacteria (Source – Urban Runoff/Storm Sewers). Beneficial uses of the creeks include irrigation, livestock/wildlife watering, fishing, boating, swimming, fish consumption, and protection of aquatic life. The impairments triggered the need for a total maximum daily load (TMDL) report for the water body. Both the TMDL and Implementation Plans were approved by EPA on October 18, 2018. A TMDL report sets the pollutant reduction goal necessary to improve state-listed impaired waters. None of the waterways in the study area are listed as an Outstanding National or State Resource Water.

The Existing Stormwater Management System primarily consists of an open drainage system along the entire corridor with a small enclosed section near Wyndgate Ridge. Driveway and roadway culverts are located along the entire corridor. Several roadway culverts are located west of Route Z for tributaries of Peruque Creek. East of Route Z, the existing roadway is located along the top of the drainage basin and therefore has minimal roadway culverts. One culvert is located near Boone Trail Elementary and another at Sommers Road. The open drainage system is well maintained through the majority of the corridor with open driveway culverts and relief in the roadway ditches.

3.4.4.2 Water Quality and Stormwater Management

Two main stormwater management systems were analyzed for the Reasonable Alternatives. These include open drainage systems and enclosed drainage systems. An open drainage system uses swales and open channels to convey stormwater. Closed drainage systems use pipes, culverts, and manholes to convey stormwater. Photos of both types are shown on **Figure 3-13**.

Table 3-13 presents a comparison of the pros and cons of these drainage systems.

Table 3-13. Benefits of Open and Closed Drainage Systems

Open Drainage Systems	Closed Drainage Systems
Aquifer recharge and environmental protection	Contains water on road en route to a catch basin
Solution to Pollution is Dilution - open systems allow increased residency of water to breakdown pollutants	Less surface area dedicated to conveying water
Less Maintenance Costs	May reduce erosion by limiting contact with erosive soils
Inspections are easier to perform as they are not buried	Conveyance systems reduce leakage in areas of denser development
Wicks the water off of the roadway (prevents overuse of deicing chemicals)	

Figure 3-13. Photos of Typical Open and Closed Drainage Systems

The Improve Existing Alternative and Buckner Road Alternative are proposed to have open drainage west of the Route Z intersection and enclosed drainage east of the Route Z intersection. The Near South Alternative is proposed to have open drainage west of Hopewell Road and enclosed drainage east of the Hopewell Road.

3.4.4.3 Stormwater System Alternatives

Improve Existing Alternative west of Route Z is located farther north than the other two alternatives. Consequently, this alternative is located farther down in the Peruque Creek watershed and requires more (and/or larger) roadway culverts west of Route Z than the other two Reasonable Alternatives.

Between Route Z and Hopewell Road, the Improve Existing Alternative is proposed at the top of the watershed and therefore does not require roadway culverts. East of Hopewell Road, the Improve Existing Alternative shifts south of the natural highpoint and therefore likely would require improvements to the existing culvert at Sommers Road, which drains into Little Dardenne Creek (all three alternatives require the same culvert improvements east of Hopewell Road). Both the Improve Existing Alternative and the Buckner Road Alternative propose the same amount of enclosed drainage, which is greater than what is required for the Near South Alternative. The Improve Existing Alternative may require more driveway culverts than the other two Reasonable Alternatives.

Near South Alternative west of Route Z is located between the other two alternatives. Consequently, this alternative requires fewer culverts than the Improve Existing Alternative and more culverts than Buckner Road Alternative west of Route Z (Peruque Creek watershed). Between Route Z and Hopewell Road, the Near South Alternative is farther south than the other two alternatives and is located within the Little Dardenne Creek watershed, therefore requiring culverts through this section. Similar to the other two alternatives, east of Hopewell Road, the Near South Alternative shifts south of the natural highpoint and therefore likely will require improvements to the existing culvert at Sommers Road, which drains into Little Dardenne Creek (all three alternatives require the same culvert improvements east of Hopewell Road). This alternative is proposed to have the least amount of enclosed drainage and the fewest amounts of driveway culverts. However, this alternative will require the greatest amount of roadway culverts, but of smaller sizes, than the Improve Existing Alternative west of Route Z.

Buckner Road Alternative west of Route Z is located farther south than the other two alternatives, and therefore is closer to the natural high point. This alternative requires fewer culverts than the other two alternatives west of Route Z (Peruque Creek watershed). Between Route Z and Hopewell Road, the Buckner Road Alternative (same alignment as the Improve Existing Alternative) is proposed at the top of the watershed, therefore not requiring roadway culverts. Similar to the other two Reasonable Alternatives, east of Hopewell Road, the Buckner Road Alternative shifts south of the natural highpoint and therefore likely will require improvements to the existing culvert at Sommers Road, which drains into Little Dardenne Creek (all three alternatives require the same culvert improvements east of Hopewell Road). Both the Buckner Road Alternative and the Improve Existing Alternative propose the same amount of enclosed drainage, which is greater than that required for the Near South Alternative. The Buckner Road Alternative may require slightly fewer driveway culverts than the Improve Existing Alternative, but more than the Near South Alternative.

3.4.4.4 Water Quality – Impacts

Water quality impacts could include increased sediments to stormwater due to runoff from erodible material exposed during construction. Stormwater runoff is addressed by MoDOT's Sediment and Erosion Control Program, which would be included within the contract specifications to address temporary erosion and sedimentation during construction.

Due to its location within the Peruque Creek and the Dardenne Creek watersheds, the Buckner Road Alternative is preferred for reducing roadway culverts and impacts to the watershed. However, the Near South Alternative may be slightly less costly due to having the least amount of enclosed drainage.

MoDOT's BMPs reduce impacts to the aquatic environment to minimal levels. BMPs cover most activities needed to restore the construction area to an acceptable condition. This would include cleanup, shaping, replacing topsoil, and establishing vegetative cover on all disturbed bare areas, as appropriate. The methods for stormwater management, during and after construction, will be in accordance with the MoDOT's Standard Specifications Book for Highway Construction (2018) and the study's NPDES permit.

Any project that involves discharge of dredge or fill into waters of the U.S. requires a Section 404 permit from USACE. MoDOT will obtain authorization by an appropriate Section 404 permit prior to construction.

3.4.5 Groundwater and Drinking Water

The study area is resting on glacial drift consisting of sands, silts, and clays. Underlying the glacial drift are residuum soils generally weathered from the upper portions of the Warsaw Shales. Based on well logs from the area, the thickness of the overburden materials is highly variable ranging from 10 to 80 feet.

3.4.5.1 Hydrogeology

A prevailing generally east-west trending ridge runs through the center of the subject area with drainages sloping down to the north toward Peruque Creek and south toward the Little Dardenne and Dardenne Creeks. Groundwater in the area is reported to be between 80 to 130 feet below the existing grade; however, perched water tables are known to exist at or above the soil-rock interface.

3.4.5.2 Karst Formations

Karst is the term referring to areas with caves and sinkholes and has the potential for groundwater recharge. The MDNR sinkhole data base depicts a single sink hole in the Route N study area. This resource is located between the established Wyndgate Village and the emerging Lombardo Home of Saint Louis subdivisions, as shown on **Exhibit 3-9** in **Appendix A**. No known sinkholes are expected to be encountered by the Reasonable Alternatives.

3.4.5.3 Sole-Source Aquifers

No sole-source aquifers are within 200 feet of the Reasonable Alternatives.

3.4.5.4 Public Water Supplies

Nearly all of the study area is served by Public Water Supply District No. 2, as shown on **Exhibit 3-9** in **Appendix A**, which claims to be the largest water district in the State of Missouri serving a population of about 75,000 people. Their service area encompasses over 400 square miles and includes the communities of Lake St. Louis, Defiance, New Melle, Augusta, Dardenne Prairie, and Dutzow, as well as parts of O'Fallon, Weldon Spring, Foristell, Innsbrook, and unincorporated St. Charles and Warren Counties. The source of drinking water is from 10 underground wells. Water is also purchased from the St. Louis City Public Water System.

According to the District's Master Plan, the existing 16-inch water main along Highway N will be upgraded to a new 24-inch water main west to Duello Road. Phase 1 of the project will replace the 16-inch main from Welsh Drive west of Sommers Road to the District's Highway N Booster Pump Station west of Stag Industrial Boulevard (just west of Lake St. Louis Boulevard). Construction has been completed with only final restoration remaining.

Another Water District facility in the study area is a water tower located at 25 East Route N. None of the alternatives affect this structure.

3.4.5.5 Other Well Information

Exhibit 3-4 in **Appendix A** also depicts wells that are certified by the State of Missouri in accordance with state statute. The parent dataset is the Wellhead Information Management System database that is maintained by MDNR, Division of Geology and Land Survey, Geological Survey Program, and Wellhead Protection Section. The database contains information about well location, well ownership, well completion dates, well construction, well yield, static water level, and borehole stratigraphy as provided by well drillers, as required by state statute. As is common state-wide, this type of small local use well is

prolific in the study area. Utility coordination will account for these resources as part of the construction process.

3.4.5.6 Other Groundwater Considerations

MDNR GIS data show major water users in the vicinity of the study area. A well near the Goellner Farm at 235 Buckner Road and the water tower at 25 East Route N are within the study area but are not impacted by the Reasonable Alternatives. This dataset was intended to provide information required for current and future requirements for water usage throughout the state.

Parts of the Foristell Fault and Fold Zone are located in the vicinity of the study area; see **Exhibit 3-4** in **Appendix A**.

3.4.6 Hydraulics

This section examines the resources associated with the hydraulic analysis, summarizes the applicable regulations, and outlines the associated environmental commitments.

3.4.6.1 Hydraulic Impacts

The National Flood Insurance Program and FEMA are tasked with minimizing construction impacts in the floodway and floodplain and reducing disturbances to the Waters of the United States. The construction of the Route N will need to comply with the Missouri State Emergency Management Agency no-rise requirement. This prohibits any measurable rise in water surface elevations for the 100-year flood condition. The FHWA policies and procedures for the location and hydraulic design of highway encroachments on flood plains (23 CFR 650A) will also need to be completed.

The proposed alignment for Route N directly impacts two FEMA stream crossings: Sams Creek and Oday Creek. **Figure 3-14** shows the FEMA 100-year floodplain for the Route N study area in the vicinity of the Sams Creek crossing and Oday Creek crossing.

The Reasonable Alternatives are identical in these locations; consequently, the impacts will be identical and limited.

The No Build Alternative would not involve any improvements in the floodplain or regulatory floodway. Consequently, no adverse impacts would be expected.

3.4.6.2 Hydraulic Analysis

In Missouri, SEMA issues floodplain development permits for projects undertaken by the State of Missouri. All construction projects need to obtain a "No-Rise" certificate.[4]

St. Charles County's floodplain development ordinance is intended to protect life and property, reduce disaster impacts, and qualify for federal disaster assistance. It also allows County property owners to participate in the National Flood Insurance Program. St. Charles County requires floodplain development permits for practically all construction, improvements, demolition, or earthmoving within any area defined by the 2016 Flood Insurance Rate Maps and Studies as floodway fringe, density floodway, or floodway. The ordinance is administered by the St. Charles County Planning and Zoning Division.

[4] https://sema.dps.mo.gov/programs/floodplain/documents/no-rise-certification.pdf

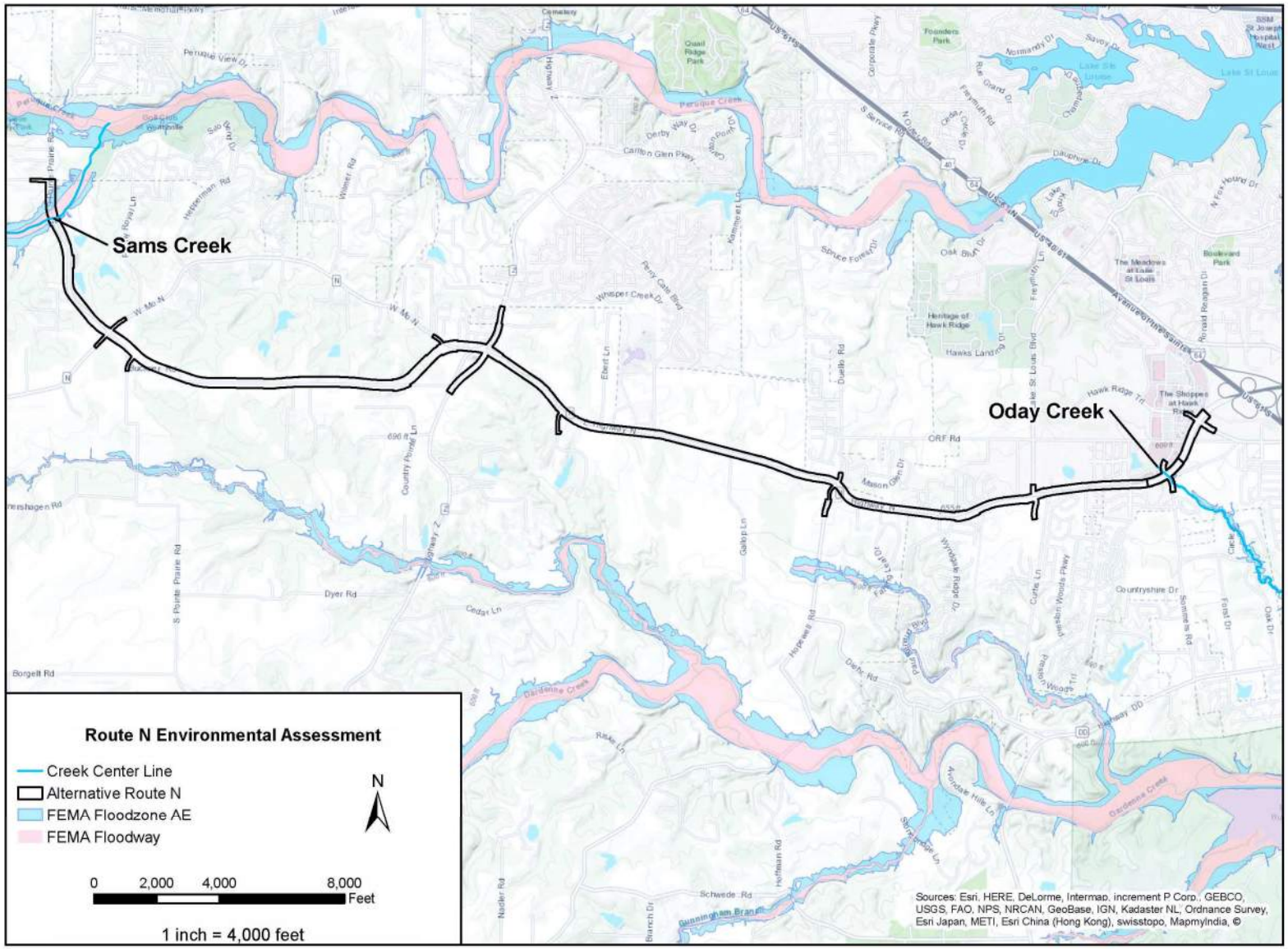

Figure 3-14. FEMA 100-year Floodplain Near Sams and Oday Creeks

1

The hydraulic analysis for Sams Creek and Oday Creek was completed using HEC-RAS version 5.0.7 and the results presented adhere to the stated requirements.

Sams Creek

The existing model for Sams Creek was obtained from SEMA in HEC-2 format. The model was converted to HECRAS and the results were compared to the HEC-2 model results. The model results conformed to the HEC2 model output within reasonable level of accuracy. Thus, the HECRAS model was used to develop the alternative analysis.

In the modeled design shown in **Figure 3-15**, the South Pointe Prairie Road alignment is replaced with the Route N alignment and elevated above the 100-year water surface elevation. The length of the bridge crossing over Sams Creek is increased to pass the 100-year flood. The modeled bridge configuration included a total length of 550-feet with seven spans and 75 feet width. The low chord was set at an elevation of 596 feet NAVD88 to provide at least 2 feet of freeboard from the base flood elevation of 593.8 feet NAVD88.

The hydraulic analysis and results show a no change in floodway and no-rise in base flood elevations for the Sams Creek in alternative design. Consequently, acquiring a no-rise certificate is feasible with the modeled configuration.

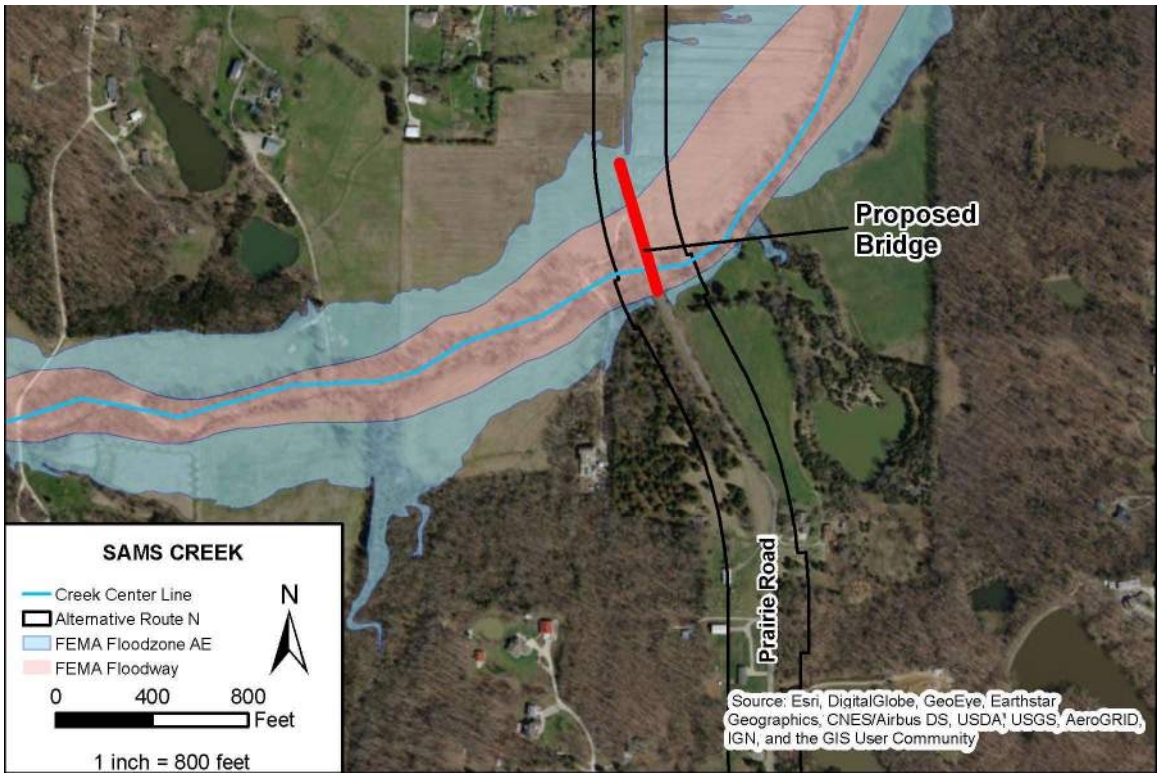

Figure 3-15. Sams Creek Crossing Modeled Design

Oday Creek

The existing model for Dardenne Creek and tributaries was obtained from USACE, where Oday Creek is a tributary to Dardenne Creek. Oday Creek was extracted from the complete network model and downstream boundary condition was set to match the water surface elevation as calculated in the overall Dardenne Creek network model. The Oday Creek model (truncated) was used to complete the hydraulic analysis.

In the modeled design, the widening of Sommers Road will extend into the FEMA mapped floodway at the outfall of the existing dual 7-feet by 7-feet reinforced concrete box (RCB) culvert. An extension of

the dual RCBs is required to convey the design flow to the limits of the proposed Somers Road widening. A 245-foot extension was modeled with a dual 8-feet by 7-feet RCB at the existing slope of 0.007 foot per foot, as shown on **Figure 3-16**. The creek flow is conveyed without increase to the base flood elevations; however, because the improvement impact the mapped floodway, a Letter of Map Revision (LOMR) will be required. A LOMR is FEMA's official modification to an effective FIRM.

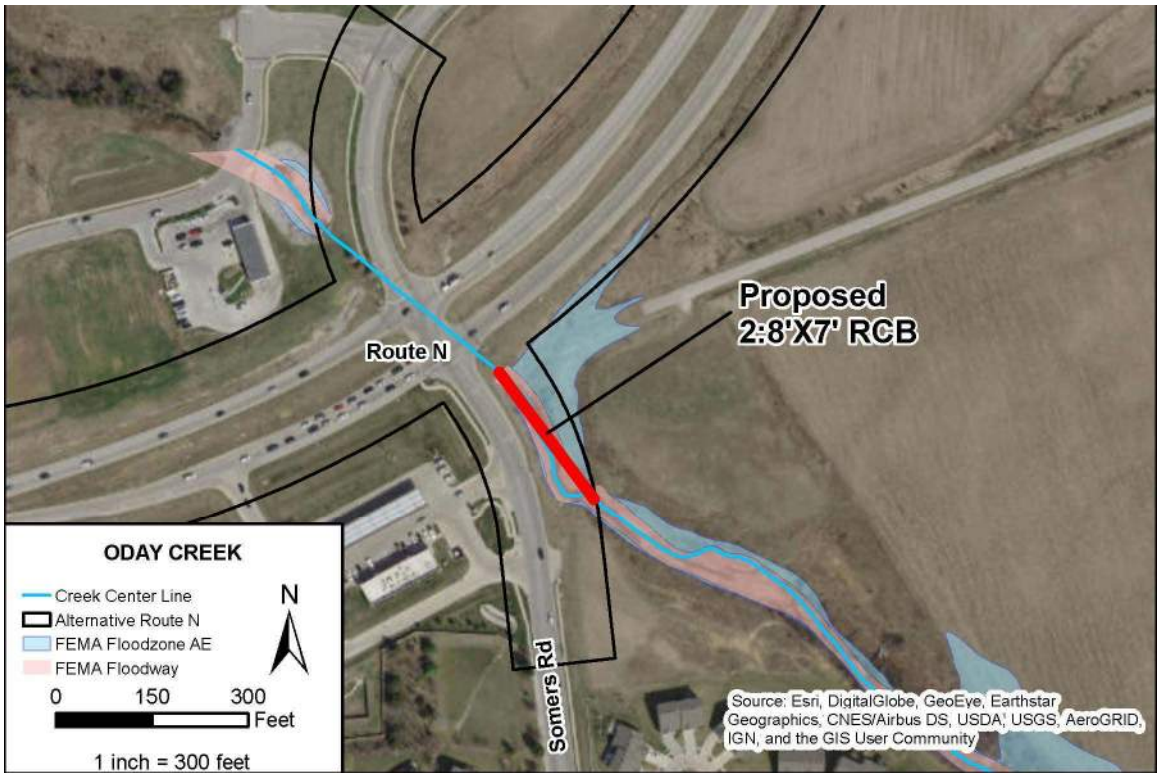

Figure 3-16. Oday Creek Crossing Modeled Design

3.4.6.3 FEMA Buyout Properties

No FEMA buyout properties are within the study limits.

3.4.7 Aquatic Habitat Mitigation

MoDOT shall ensure that the project will operate under the provisions of the current Missouri State Operating Permit. This general permit is issued by MDNR for MoDOT construction and maintenance projects statewide.

MoDOT shall ensure that appropriate erosion and sediment control BMPs will be implemented. Selection and incorporation of these BMPs shall consider the type of work activity undertaken and site conditions, such as soils, topography, and seasonal rainfall. MoDOT will ensure that its SWPPP is implemented to prevent or minimize adverse impacts to streams, water courses, lakes, ponds, or other impoundments within and adjacent to the study area.

MoDOT shall adhere to the TS4 permit applicable at the time of construction.

MoDOT shall ensure that, should a floodplain encroachment occur, a floodplain development permit will be acquired. The FHWA policies and procedures for the location and hydraulic design of highway encroachments on flood plains (23 CFR 650A) will also need to be completed.

MoDOT shall ensure that, should impacts to streams or wetlands occur with this project, the proper Section 404 permit would be acquired prior to construction.

MoDOT will ensure that, in accordance with the NPDES requirements of the Clean Water Act, MoDOT will operate under the provisions of the current Missouri State Operating Permit.

MoDOT will ensure that appropriate erosion and sediment control BMPs will be implemented. Selection and incorporation of these BMPs will consider the type of work activity undertaken and site conditions, such as soils, topography, and seasonal rainfall. MoDOT will ensure that its SWPPP is implemented to prevent or minimize adverse impacts to streams, water courses, lakes, ponds, or other impoundments within and adjacent to the study area.

MoDOT will conduct an engineering analysis for the Tentative Preferred Alternative prior to submission of the floodplain development permit application to SEMA. The contractor will obtain a floodplain development permit and "no-rise" certification for Sams Creek. MoDOT will prepare a LOMR the culvert extension for Oday Creek within 6 months of the project completion.

3.5 Impacts to the Human Environment

The human environment is all the of the man-made factors, processes, and conditions in which we live. This section covers resources associated with the human environment.

3.5.1 Cultural Resources

According the National Preservation Institute, the term "cultural resource" is not defined in NEPA. However, NEPA does require that agencies consider the effects of their actions on all aspects of the human environment. Humans relate to their environment through their culture. Important elements of the human/cultural environment are preserved to retain a community's sense of history. Therefore, the term "cultural resources" has come to encompass all physical evidence of past human behavior.

3.5.1.1 Cultural Resources —Regulatory Background and Standards

Federal approvals associated with the Route N EA are subject to compliance with the National Historic Preservation Act (NHPA) and its implementing regulations (36 CFR 800). NHPA Section 106 requires that the federal agency responsible for an undertaking, the FHWA for this study, consider the effects of its actions on historic properties.

A historic property (or historic resource/site) is defined in the NHPA (54 United States Code [U.S.C.] 30030) as any "prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on, the National Register of Historic Places (NRHP) including artifacts, records, and material remains related to such a property or resource."

Section 106 regulations require consultation with the State Historic Preservation Office (SHPO) and other consulting parties (those persons with interests in historic properties). Consulting parties typically include Native American tribes, the federal Advisory Council on Historic Preservation (ACHP), local governments with jurisdiction over the area, those with a legal or economic interest in the study, and those with a demonstrated interest in the study or historic properties. These entities are provided opportunities to consult on the proposed project. Consulting is "the process of seeking, discussing and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process." This includes consulting to determine if there are any historic properties and if so, what the project effects on them would be. This may result in a determination of adverse effect. If the agency officials, SHPO, and ACHP agree on how the adverse effect will be resolved, they develop a Memorandum of Agreement or Programmatic Agreement, which will stipulate the measures to be taken to avoid, minimize, or mitigate the adverse effect.

Section 4(f) of the Department of Transportation Act of 1966 protects publicly owned land of a public park, recreational area, or wildlife and waterfowl refuge of national, state, or local significance or land of a historic site of national, state, or local significance. As noted in 23 CFR 774.3, a transportation project

approved by FHWA may not cause anything beyond a minor (*de minimis*) impact to a Section 4(f) property unless there is no feasible and prudent avoidance alternative and all possible planning to minimize harm is conducted. **Section 3.5.2** contains the details of the Section 4(f) analysis.

A series of evaluations are used to investigate cultural resources. The evaluations start with an Archival Review of the overall study Area (an area of nearly 7,000 acres). Next, a Phase I Architectural Study is conducted for the area associated with the Reasonable Alternatives. Finally, a Phase I Archaeological Survey is conducted. In accordance with MoDOT policy, the archaeological field survey was completed for the area within 300 feet of the footprints of the Tentative Preferred Alternative.

3.5.1.2 Resources Identified during the Archival Review

Conclusions from the Archival Review are described in this section.

The chance for intact prehistoric archaeological resources to be present in the vicinity of Route N is moderate. The waterways, Peruque Creek to the north, and Little Dardenne Creek to the south, would be likely locations for prehistoric sites. Most of the previously recorded sites have been identified near these waterways. These creeks would have attracted the earliest prehistoric groups and could have been used throughout prehistory.

Twelve historical archaeological sites have been identified within the study area (**Figure 3-17**). The archival review suggests that sites dating from the 1790s to the present could exist within this area. Most of the early Spanish land grants are near the creeks. Although some of these properties were acquired for land speculation, others were occupied, and mills were established near the creeks. Route N is near the location of the Boonslick Trail that provided access to the salt licks in the middle of the state and later became one of the main thoroughfares leading west.

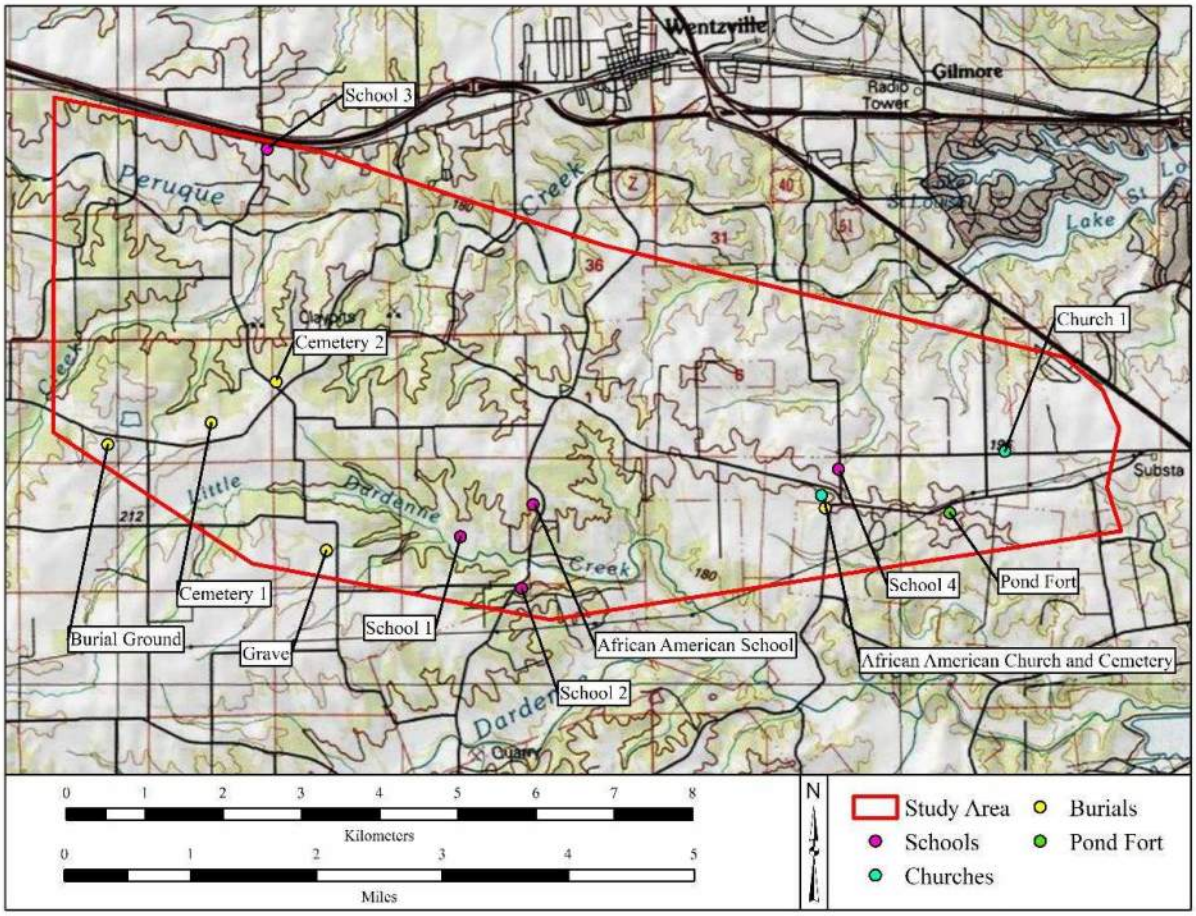

Figure 3-17. Locations of Burials, Churches, and Schools

Farms, inns, stores, and taverns sprang up along this trail after 1805. Remnants of the original trail could still exist and would be a historic resource because of this trail's importance to early transportation and commerce. Other possible resources that could exist within the study area include the following property types:

- Pond Fort may still exist in this area. This fort was important during the War of 1812 as a place for the local militia to meet and as a refuge for residents during a raid.
- The remains of five schools on the historic atlases exist in the area. Excavation of these schools could expose artifacts reflecting the lives of the school students in this once rural area of St. Charles County. Privy pits would be associated with the schools, however, previous excavations of a school resulted in the recovery of a number of pit features whose function were uncertain but could have been associated with other social activities conducted at this location (Machiran et al., 2014).
- Two churches are shown on the historic atlases within this area. This includes an image of a church shown only on the 1875 map. By 1905, an African American Church is indicated on Route Z and this church continues to exist. Both churches may have privy vaults, cisterns, and pit features associated with other social activities. Artifacts from these features could provide insights into the congregations and their social activities.
- At least four burial grounds and one grave were identified within the study area on historical atlases. These appear on only one historical atlas and are not shown after that time. These sites include a cemetery associated with the African American church. It is unknown if the other earlier church identified on the 1875 map had a burial ground associated with it. Overall, it is uncertain if these four, or five if the 1875 church had a burial ground, grave yards are still marked with headstones or if the stones have been removed and the graves forgotten. Regardless, human remains at these locations likely have been not been moved and they still exist beneath the ground.

No historic properties, districts, structures, places, or landscapes on the NRHP have been identified within the study area. It is possible that buildings associated with a historical farmstead may still exist. It is speculated that portions of Pond Fort may still exist now incorporated into a modern building (Myers, 2006). These will need to be evaluated to determine whether they are eligible for the NRHP. A total of eight bridges and two culverts exist within the Route N Study Area (MoDOT, 2019). None of these are listed on the NRHP and all of them are exempt from the Section 106 and Section 4(f) requirements by the Program Comment Exemption (Federal Register, 2012).

The Section 106 Process

Step 1: Initiate the process—Includes identifying the Lead SHPO and potential consulting parties.

Step 2: Identification of historic properties—archival review and the field surveys for architecture and archaeology.

Step 3: Assess effects of the project on historic properties using the criteria of adverse effects.

Step 4: Resolve adverse effects—through consultation identify appropriate mitigation measures, develop and execute an agreement document for the project.

3.5.1.3 Resources Identified during the Architectural Survey

The architectural study resulted in the evaluation of 483 property parcels. These parcels were defined using ArcGIS 10.6.1 to identify parcel boundaries that intersected the area of potential effects (APE). The St. Charles County property parcel data and APE shapefile were provided and were unaltered for the architectural study.

The following is the designation of the parcels within the APE:

- P – Parcels in the APE containing buildings outside the APE (21)
- V – Vacant Properties (109)
- PL – Parking Lots (5)

- S – Structures (1)
- R – Roads (8)
- M – Modern properties constructed after 1978 (274)
- H – Properties constructed before 1979 (63)
- C – Cemeteries (2)

Summary of Parcels Designated P, V, PL, S, R, and M – A total of 21 properties are "P" designated properties in the APE. This indicates that a portion of parcel is in the APE, but none of the associated buildings; therefore, these properties will not be impacted by the current project. All 109 parcels with the "V" designation have no buildings, structures, landscapes or objects, and no concreted or asphalted parking lots on the premises. The five parking lots designated "PL" have concreted or asphalted areas for parking, these are not eligible for the NRHP. One structure with an "S" designation, a modern water tower (S130), was present in the APE. It appears to be a modern structure and is not of unique design is not eligible for the NRHP. Eight parcels designated "R" contained paved or gravel roads that are not eligible for the NRHP.

A total of 274 modern "M" cultural resources were located. One of these (M017) was a geodesic dome built in 1999. Due to its recent date of construction, and because better examples of geodesic domes exist in Missouri, it unlikely to have exceptional significance to be eligible under criteria consideration G. (Karen Daniels, personal communication, August 13, 2019). No other modern properties were eligible for the NRHP.

Summary of Cemeteries (C) – Two cemeteries were present in the APE. The cemetery located on parcel C394 appears to be a small family cemetery. The cemetery located on Parcel C192 is associated with the Hopewell Missionary Baptist Church of Wentzville.

Summary of Bridges and Culverts – A list of bridges within the study area was provided by Karen Daniels, Senior Historic Preservation Specialist, Historic Preservation Section, MoDOT (MoDOT, 2019). A total of eight bridges and two culverts were present within the Route N Study Area; however, only one of these bridges was present within the APE. The bridge present in the APE was a non-state bridge constructed in 1988 along Point Prairie Road across Sams Creek. It is 97 feet long and is a double tee beam constructed of prestressed concrete. It is exempt from the Section 106 requirements by the Program Comment Exemption (Federal Register, 2012). No bridges or culverts listed in the NRHP and no historic bridges or culverts were identified during the current survey.

Summary of Historic Parcels (H) – Historic parcels comprised 63 of the parcels within the APE consisting of three properties dating between 1875 and 1934 and the remaining 56 dating between 1940 and 1979. The oldest building in the APE, H054, dates to 1875. It is a residence, with an extended hall and parlor, in relatively good condition; however, it has undergone renovations on the exterior and interior (personal Communication with the owner, July 2019) and there is an addition on the south side of the building. Further, the building does not possess any unique stylistic characteristics. For these reasons H054 is not eligible for the NRHP. One residence was built in 1934, H081. The property is in good condition, but is covered with modern vinyl siding, has vinyl replacement windows, and an addition with solar panels on the west side. The alterations to this building and lack of unique characteristics make it ineligible for the NRHP. Two farmsteads were present in the APE. Parcels H164 (at least one building dating to 1952) and H170 (at least one building dating to 1898) are farmsteads with multiple buildings that could not be fully evaluated from the road. Further evaluation of these two properties is planned during the archaeological survey phase of this project.

Also present in the APE is Castlegate Estates, a mobile home park established in 1970. The development is a mixture of modern (M121-122) additions and the original, older subdivision (H123-125). None of the mobile homes nor the subdivision itself possess any distinguishing characteristics that would make them eligible for the NRHP under either Criteria A, B, or C. Further, the late date of the establishment of the older subdivision and the intermixing of older mobile homes with more recent models would make it

ineligible as a NRHP district. The remainder of the properties (n=52), that date between 1940 and 1979, consist of non-descript ranch, split level, and other vernacular types of houses. Many of these have modern siding, additions, and replacement windows, and none possess unique stylistic elements and are therefore not eligible for the NRHP.

In short, the only NRHP resources that were identified during the architectural survey were the two cemeteries identified within the study area:

- The cemetery located on parcel C394 appears to be a small family cemetery. It is located on 2030 South Point Prairie Road.
- The cemetery located on Parcel C192 is associated with the Hopewell Missionary Baptist Church of Wentzville (1140 East Route N).

These two NRHP resources are shown on **Exhibit 4-1** and **Exhibit 3-7**. The cemetery located on parcel C394 is also labeled on **Figure 3-17** (Cemetery 2).

3.5.1.4 Resources Identified during the Archaeological Survey

Following the selection of the Tentative Preferred Alternative (Buckner Alternative), an archaeological survey was conducted.

On-the-ground surveys were conducted on the properties were property owner permission was granted. Within 300 feet of the Tentative Preferred Alternative, a total of 237 tax map parcels exist. After two rounds of permission letters, 125 parcels were available for survey. This encompassed a majority of the land area associated with the Tentative Preferred Alternative.

A MoDOT-approved field research approach was used to locate important environmental features. For the most part, field research is non-intrusive. However, archaeological shovel testing in which an approximately 12- by 12- by 12-inch hole is dug with a hand shovel every 50 to 100 feet wherever vegetation or ground cover obscures the surface soil. Dirt from the shovel test is examined for artifacts and then immediately returned to its original location with the sod placed back on top of the hole.

No NRHP resources were identified within 300 feet of the Tentative Preferred Alternative footprint.

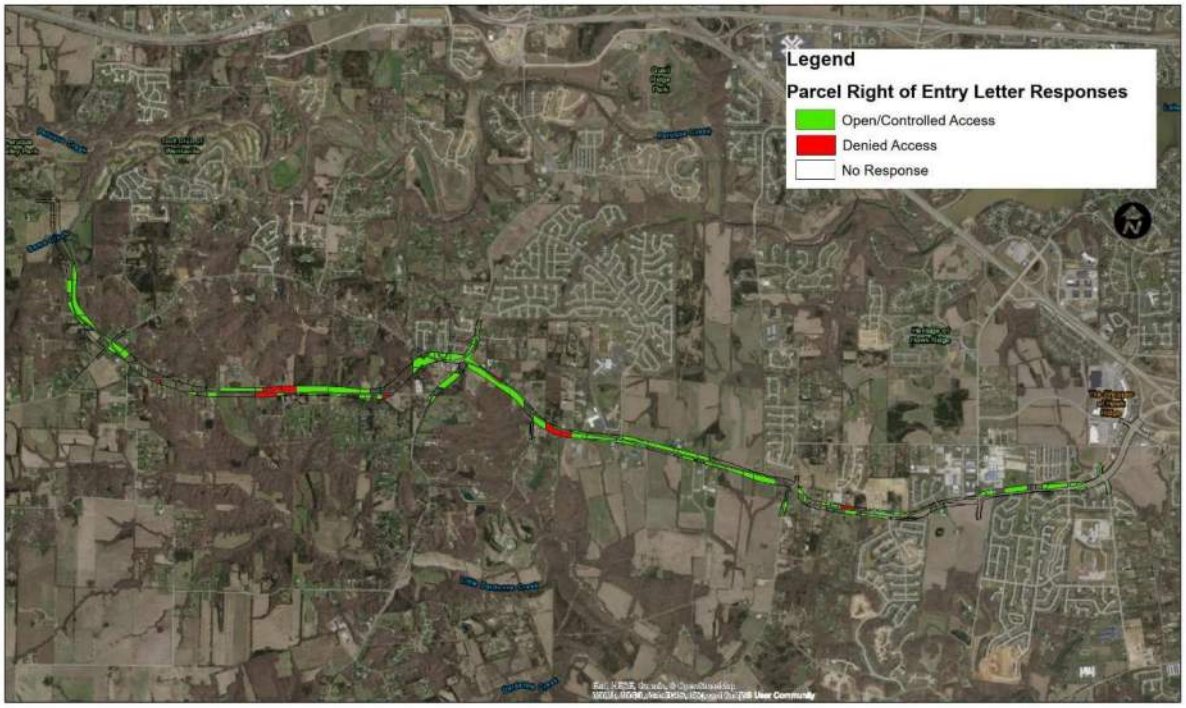

Figure 3-18. Archaeological Survey Permission Map

3.5.1.5 Section 106 Impacts/SHPO Coordination

The only NRHP resources within the APE are the two cemeteries discussed in **Section 3.5.1.3**. All of the Reasonable Alternatives had the potential to impact the cemetery associated with the Hopewell Missionary Baptist Church of Wentzville (1140 East Route N). The Buckner and Near South Alternatives had the potential to impact the cemetery at 2030 South Point Prairie Road. All for the Reasonable Alternatives were modified to avoid impacts to these cemeteries.

The Phase I architectural survey concluded that none of the architectural resources in the vicinity of the Reasonable Alternatives are eligible for the NRHP.

The Phase I archaeological survey concluded that no archaeological resources (eligible of the NRHP) were found within 300 feet of the footprint of the Tentative Preferred Alternative.

These results were coordinated with the SHPO formally and informally. The formal submission of the architectural survey report was sent on November 29, 2019. Comments are expected in early 2020. The planned submission timing for the archaeological survey report is in early 2020.

Using the "Phased" Section 106 process, MoDOT will complete the Section 106 process. During the FONSI stage of project development, the SHPO review comments will be addressed along with any decision-making changes that the SHPO review precipitates. During the Right-of-Way acquisition stage of project development, the completion of the archaeological survey (for the areas where property owner permission was not obtainable) will be conducted. Both of these tasks are included with the Environmental Commitments listed in **Section 5**.

3.5.2 Section 4 (f)

A Section 4(f) property is any publicly owned land of a public park, recreational area, or wildlife and waterfowl refuge of national, state, or local significance or land of an historic site of national, state, or local significance.

3.5.2.1 Section 4(f) – Regulatory Framework

As noted in 23 CFR 774.3, a transportation project approved by FHWA may not cause anything beyond a minor (*de minimis)* impact to a Section 4(f) property unless the following are determined:

- No feasible and prudent avoidance alternative, as defined in 23 CFR 774.17, to the use of the property; and
- The action includes all possible planning, as defined in 23 CFR 774.17, to minimize harm to the property resulting from such use.

If it is determined that an action would result in the "use" of a Section 4(f) resource, then the lead federal agency, in this case FHWA, is required to prepare a Section 4(f) evaluation.

3.5.2.2 Section 4(f) – Affected Environment

Parks and Recreation Section 4(f) Resources Identified within Study Area

Based on field investigations and records reviews, no Parks and Recreation Section 4(f) resources are present within the study area. The nearest resource is the Peruque Valley Park. Administered by the City of Wentzville, it is located on South Point Prairie Road, about 1,500 feet north of the western Route N study terminus. The location of Peruque Valley Park is shown on **Exhibit 3-7** in **Appendix A**.

The EA for the DHP identifies Peruque Valley Park as a Section 4(f) resource. Although the DHP's Selected Alternative would pass through the eastern edge of Peruque Valley Park, the land has a corridor dedicated specifically for the DHP Selected Alternative alignment. As such, no conversion of existing park use to transportation use will take place, and thus no Section 4(f) impact.

Historic Section 4(f) Resources Identified within Study Area

For purposes of Section 4(f), a historic site is significant only if it is on or eligible for the NRHP. For historic properties, the official with jurisdiction is the SHPO. The ACHP will also be invited to comment on the study with regard to impacts to historic sites. If the ACHP so chooses, it will also be considered an official with jurisdiction over that resource. Historic properties are also subject to review pursuant to Section 106 of the NHPA. The Section 106 regulations define a consultation process that includes consultation with the SHPO and other consulting parties to identify any historic properties within the study's APE, determining whether the proposed project will have an adverse effect on any historic properties, and resolving and mitigating any adverse effects on those resources.

Section 3.5.1.5 summarizes the NRHP eligible resources in the study area, the avoidance measures employed, and the tasks that will be conducted to complete the Section 106 coordination process.

3.5.2.3 Section 4(f) Impacts and Environmental Commitments

No Section 4(f) resources are expected to be affected by the Reasonable Alternatives and therefore there are no specific Section 4(f) environmental commitments for the Route N study.

3.5.3 Section 6(f)

Section 6(f) is intended to protect parks and other recreational resources from conversion to other uses. The Section 6(f) park conversion process applies to those state, county, or local recreational resources that have received funding through the Land and Water Conservation Fund (LWCF) Act. The National Park Service makes the ultimate decision on whether to approve a conversion of land that has received funding under the LWCF Act.

Section 6(f) of the LWCF Act (codified at 16 U.S.C. 460-4 et seq) states that:

> *"No property acquired or developed with assistance under this section shall, without the approval of the Secretary [of the Interior], be converted to other than public outdoor recreation uses. The*

Secretary shall approve such conversion only if he finds it to be in accord with the then existing comprehensive statewide outdoor recreation plan and lonely upon such conditions as he deems necessary to assure the substitution of other recreation properties of at least equal fair market value and of reasonably equivalent usefulness and location."

No LWCF funds were used in the vicinity of the Route N. No impacts will occur.

3.5.4 Farmland Impacts

The NRCS classifies farmland that is prime or of statewide importance. Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is available for these uses. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent.

In some areas, land that does not meet the criteria for prime farmland is considered to be "farmland of statewide importance" for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate state agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable.

The Farmland Protection Policy Act requires federally funded projects to be coordinated with the NRCS. The coordination will determine whether agricultural resources and support services are significantly affected by the project. **Appendix G** contains the Farmland Protection Policy Act coordination package.

3.5.4.1 Farmland—Affected Environment

Determining the extent of farmland within the study area was investigated several ways:

- According to the St. Charles County zoning map, the amount of land zoned as agricultural varies from 101 to 174 acres. The Improve Existing Alternative acres impacts 101 acres, the Buckner Road Alternative impacts 128 acres and the Near South Alternative impacts 174 acres.
- Using the St. Charles County GIS data on current land uses, a slightly larger amount of farmland is depicted. The Improve Existing Alternative impacts 107 acres, the Buckner Road Alternative impacts 136 acres, and the Near South Alternative impacts 176 acres.
- Terrestrial habitat were evaluated based on the MRLC's NLCD; see **Section 3.2.1**. Based on that analysis, the total area in Pasture/Hay (NLCD 81) and Cultivated Crops (NLCD 82) totals 48 acres for the Improve Existing Alternative, 69 acres for the Buckner Road Alternative, and 72 acres for the Near South Alternative.
- A very small amount of impacted land is composed of soils identified with Prime Farmland. The Improve Existing Alternative acres impacts 12 acres, the Buckner Road Alternative impacts 7 acres, and the Near South Alternative impacts 14 acres.

3.5.4.2 Farmland—Impacts

The Farmland Conversion Impact Rating (under the Farmland Protection Policy Act) was completed for the Reasonable Alternatives. The assessment consists of two parts, with a total 260 points possible; 100 points are assigned by the NRCS. These results will be reported in the Final Environmental Assessment (**Appendix G**). The remaining 160 points are determined by the study team, based on a series of

questions that evaluate the nature of the affected farmland. The alternatives received the following scores:

- Improve Existing Alternative: 41
- Buckner Road Alternative: 41
- Near South Alternative: 42

For project sites where the total points equal or exceed 160, the NRCS will require the consideration of actions that would reduce adverse impacts. These would include alternative sites, modifications or other mitigation). With the low scores obtained in the first part of the assessment, it is extremely unlikely that an adverse effect to farmland, under the Farmland Protection Policy Act.

The alternatives were also assessed for the extent that they would change the farming landscape via the bisection of farmsteads. Due to the nature of modern farming, the impact of bisections is a case-by-case situation; however, the Near South Alternative had a large number of bisections compared to the other alternatives. **Exhibit 3-9** in **Appendix A** depicts this condition.

3.5.4.3 Farmland—Mitigation/Environmental Commitments

The selection of the Tentative Preferred Alternative was based, in part, on the benign affect it will have on the farmland community. Using the Buckner Road Alternative will allow for access from both existing Route N and Buckner Road for farm equipment which will minimize impacts. The Tentative Preferred Alternative will also minimize the bisection of farmsteads.

It is anticipated that the greatest impact to the farming community will be the potential for construction-related disruptions to farm operations. To mitigate this, MoDOT's project development process is dedicated to maintaining an open dialog with stakeholders, including the farm community, in order to understand their needs and arriving at design solutions that will allow critical farm operations during construction.

3.5.5 Construction Costs and Impacts

This section focuses on the cost and impacts associated with the construction process.

3.5.5.1 Construction Costs

A 2019 planning level cost estimate was prepared for each of the Reasonable Alternatives and is presented in **Table 3-14**. These cost estimates will be updated as the alternatives are further refined.

Table 3-14. Route N Cost Estimate Summary (Reasonable Alternatives)

Alternative	Right of Way	Construction	Total
Improve Existing	$74,200,000	$93,000,000	$167,200,000
Buckner Road	$68,500,000	$84,000,000	$152,500,000
Near South	$58,500,000	$88,000,000	$146,500,000

Construction cost is another area where the impacts of the Improve Existing Alternative are counter-intuitive. In order to satisfy the horizontal and vertical alignment limitations, the Improve Existing Alternative cannot simply widen the existing road. This creates a much wider cross-section and increases the impacts within developed areas.

3.5.5.2 Construction Impacts

Construction activities may result in short-term impacts on air quality, including direct emissions from construction equipment and trucks, fugitive dust emissions from site demolition and earthwork, and

increased emissions from motor vehicles and haul trucks on local streets. These impacts would be temporary and localized to the area of construction and its immediate vicinity. Fugitive dust, suspended particulates, and emissions could occur during ground excavation, material handling and storage, movement of equipment at the site, and transport of material to and from the site. Fugitive dust could be a problem during periods of intense activity and would be aggravated by windy and/or dry weather conditions. The amount of emissions would depend on the type and number of equipment used. Contractors will be required to comply with all applicable local, state, and federal air pollution regulations.

MoDOT shall ensure that contractors control fugitive dust to prevent it from migrating off the limits of the project corridor.

Standard MoDOT operating procedures associated with air quality include steps to minimize emissions from construction. Controlling construction emissions requires the development of a construction mitigation plan for implementation during construction. This construction mitigation plan will adhere to current MoDOT standards.

MoDOT shall ensure that details of utility disposition are determined during project design. Agreements with utilities shall be negotiated and executed prior to seeking project federal authorization for construction. MoDOT's utility engineers and representatives of the various utilities shall plan the details of individual utility adjustments on a case-by-case basis.

MoDOT shall include standard specifications in the construction contract requiring all contractors to comply with every applicable local, state, and federal laws and regulations relating to noise levels permissible within and adjacent to the project construction site.

MoDOT shall ensure that the construction contract includes a Traffic Management Plan to provide response to temporary disruptions in travel patterns and travel time**.** A Traffic Management Plan will be developed during project design as part of the final design activities.

3.5.5.3 Construction and Maintenance of Traffic

Relative to construction and vehicular operation during construction, all of the alternatives will use standard MoDOT operating procedures. The main difference is the extent that the alternatives rehabilitate the existing alignment. When the existing roadway is improved in place, construction equipment and activities will be in proximity to traffic, requiring diligent safety measures. Further, the maintenance of traffic plan will be required to often alter flows as the proposed project develops. Drivers will be confronted with new pathways often.

The Improve Existing Alternative would require work along the existing alignment for nearly all of the corridor. However, it is important to note that in order to satisfy the horizontal and vertical alignment design standards for a posted 45 MPH speed, this alternative would not simply widen the existing road. West of Route Z, the Improve Existing Alternative's improvements to Route N would not make use of any of the existing Route N pavement and new alignment will diverge from the existing roadway. East of Route Z, the Improve Existing Alternative would make use of existing Route N pavement for approximately 1.35 miles (out of a total of approximately 5 miles). The far western portion of the Improve Existing Alternative deviates from the existing alignment where Route N merges into South Point Prairie Road. This results in approximately one mile of new alignment.

The Buckner Road Alternative would improve Route N using Buckner Road, between the Route N/Route Z intersection and South Point Prairie Road. This removes construction from approximately 2 miles of Route N. Of course, it places that construction on existing Buckner Road. Also, as with the Improve Existing Alternative, the Buckner Road Alternative east of Route Z would make use of existing Route N pavement for approximately 1.35 miles (out of a total of approximately 5 miles).

The Near South Alternative would use a new alignment between Hopewell Road and South Point Prairie Road (approximately five miles). This is expected to substantially expediate construction.

3.5.5.4 Utility Impacts

The Near South Alternative would require the displacement of the cell tower at Hopewell Road. The estimated cost of the cell tower, in 2020 dollars, is $1.84 million. No other extraordinary utility impacts are expected from any of the Reasonable Alternatives.

3.5.6 Right-of-Way/Property Acquisition

The size of the area needed to build and maintained the alternatives, not including the area already within the existing roadway right-of-way, varies from 221 to 272 acres. According to the St. Charles County tax parcel data, most of the affected land is in residential and agricultural use. The acquisition estimates are presented in **Table 3-15**. **Exhibit 3-7** in **Appendix A** depicts the various commercial and institutional land uses. **Exhibit 3-10** depicts of the parcel acquisitions and building displacements for the Reasonable Alternatives.

Table 3-15. Route N Footprint Summary (Reasonable Alternatives)

	Improve Existing (acres)	Buckner Road (acres)	Near South (acres)
Residential	99	77	76
Agriculture	101	128	173
Commercial	11	11	6
Industrial	<1	<1	<0
Institutional	12	12	17
Total Expected Acquisition	**223**	**228**	**272**

The Reasonable Alternatives will also require the acquisition of structures. Using St. Charles County Building data and MoDOT right-of-way staff's quality assurance checking, the number of building acquisitions needed to build the alternatives was estimated; see **Table 3-16**.

The Improve Existing Alternative is expected to displace 138 structures. Residences are expected to represent 76 of these structures; 58 are secondary buildings (sheds, barns, garages). Commercial and institutional uses both are expected (three commercial building displacements, one institutional displacement). These include:

- Bright Start Academy, a private educational facility for children at 1000 Wyndgate Ridge Drive
- Plaza Tire Service located at 8625 Route N, Lake St. Louis
- Carter Pet Hospital at 9925 Route N, Lake St. Louis
- Wentzville Church of God at 9970 Route N, Lake St. Louis

The Buckner Road Alternative is expected to displace 108 structures. Residences are expected to represent 58 of these structures; 46 are secondary buildings (such as sheds, barns, or garages), 4 are commercial buildings, and 1 is an institutional use:

- Bright Start Academy, a private educational facility for children at 1000 Wyndgate Ridge Drive
- Plaza Tire Service located at 8625 Route N, Lake St. Louis
- Carter Pet Hospital at 9925 Route N, Lake St. Louis
- Wentzville Church of God at 9970 Route N, Lake St. Louis

- Stanley Warehouses at 58 West Route N, near Route Z intersection

The Near South Alternative is expected to displace 80 structures. Residences are expected to represent 46 of these structures; 28 are secondary buildings (such as sheds, barns, or garages). Commercial and institutional uses both are expected (four commercial building displacements, two institutional displacements), in addition to a cell tower on Hopewell Road.

- Bright Start Academy, a private educational facility for children at 1000 Wyndgate Ridge Drive
- Plaza Tire Service located at 8625 Route N, Lake St. Louis
- Carter Pet Hospital at 9925 Route N, Lake St. Louis
- Wentzville Church of God at 9970 Route N, Lake St. Louis
- St. Charles County Ambulance district facility at the Hopewell Road intersection (9978 Route N)
- Cell tower on Hopewell Road

Table 3-16. Route N Building Acquisition (Reasonable Alternatives)

	Improve Existing (number)	Buckner Road (number)	Near South (number)
Residences	76	57	46
Secondary Buildings	58	46	28
Commercial Buildings	3	4	3
Institutional Buildings	2	1	2
Cell Tower	0	0	1
Total Expected Acquisition	**138**	**108**	**80**

Table 3-17 outlines the full displacements and partial takes for each of the Reasonable Alternatives.

Table 3-17. Route N Full Displacements and Partial Takes (Reasonable Alternatives)

	Improve Existing (number)	Buckner Road (number)	Near South (number)
Full Displacements	71	49	46
Partial Takes	238	248	193

During the continued development of the project, every effort will be made to minimize acquisitions and displacements. For instance, closed drainage systems are being used to reduce the project footprint. It is expected that many of the displacements could be avoided by revisions during the final design process. Typical techniques include narrowing the footprint by using retaining walls, modified slopes, and other mechanically stabilized soil techniques.

MoDOT will ensure that the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, be carried out without discrimination based on race, color, national origin, religion, and age and in compliance with Title VI (the Civil Rights Act of 1964), the President's EO on Environmental Justice, and the Americans with Disabilities Act. In accordance with the Uniform Act and the states' relocation programs, fair market compensation will be provided to property owners who are affected by this project.

SECTION 4

Public Involvement and Agency Collaboration

Recognizing the value that stakeholders bring to the transportation planning process, the study team employed several tools to ensure a variety of opportunities for public involvement were available throughout the development of the Route N EA. Additionally, the Stakeholder and Public Involvement Plan was guided by both NEPA requirements for public involvement and MoDOT's public involvement policies.

The approach to this EA helped assess the needs and issues of the Route N corridor, as well as the impacts and overall effectiveness of potential alternatives to address those needs. Stakeholder and public involvement were critical to this approach and helped build awareness and understanding of the Route N EA. It also played an important role in providing input into an outcome that reflects an interdisciplinary, collaborative process and includes input from the various people and groups with a stake in the EA. This section outlines the techniques and tools used to exchange information and gather feedback.

A large-scale annotated depiction of the Tentative Preferred Alternative is contained in **Exhibit 4-1** in **Appendix A**.

4.1 Stakeholder Interviews/Briefings

At the onset of the Route N EA, the public involvement team scheduled and conducted interviews with key stakeholders to seek input on:

- How they use Route N
- Why they use Route N
- Issues with existing Route N
- How they get news information
- How they wish to be engaged
- Their willingness to serve on the study's Community Advisory Group (**Section 4.2**)
- If they were willing to share any email lists so that further outreach to stakeholders could occur
- What outreach methods would be successful

The stakeholders interviewed included homeowners' associations, emergency responders, school officials, chambers of commerce, parks department, and business owners. These stakeholders were identified in collaboration with MoDOT. A total of 19 one-on-one interviews were conducted in person or via phone. At the end of each interview the stakeholders were asked if they would be willing to serve on the study's Community Advisory Group (CAG). Details of the CAG and their meetings are provided in **Section 4.2**.

The purpose of the interviews was to ensure that the public had input into the final preparation of the study's Purpose and Need. The issues most cited by the interviewees included:

- Lack of shoulders on the rural section of Route N
- Lack of left turn lanes, especially at the schools and subdivisions
- Bottleneck and configuration issues at the Route N/Route Z intersection
- Lengthy traffic backups during the morning and evening rush hours
- Rapid residential growth
- Desire to maintain a rural feel
- Bends in road create blind spots

The full list of interviewees and interview forms are available in the Project Record.

4.2 Community Advisory Group

To further engage the public in the development of the Purpose and Need and eventually, study alternatives, a CAG was established. CAG members represented various study area constituencies including residents, chambers of commerce, emergency responders, schools, and other community stakeholders. The CAG was a means of directly engaging a wide-range of stakeholders to gain valuable community input, identify and address local concerns, and build public interest and involvement in the EA's decision-making process. The CAG was carefully selected to ensure a wide range of viewpoints were represented and recognized. This method allowed stakeholders of varying viewpoints to have the opportunity to understand other's positions and perspectives. This ensured that stakeholders of varying opinions were given an opportunity to understand other's positions and perspectives.

All four CAG meetings were conducted in, or near, the Route N corridor. Conducting meetings in the Route N Corridor was strategically planned to give the CAG convenient access to attend. Each CAG meeting had a formal agenda with goals and objectives. Meeting notes were prepared and circulated to the CAG members after each meeting. All CAG meetings included key MoDOT staff to assist in answering questions. The meetings were facilitated by the consultant project manager.

At the onset, the CAG was informed that their role was to advise MoDOT through varying stages of study development. A total of four CAG meetings were conducted:

- CAG Meeting 1 was conducted on November 8, 2018. After introducing the study and study limits, a structured group exercise was conducted to determine the issues of greatest importance to the CAG members. The primary issues identified by the CAG were very similar to those of the stakeholders interviewed previously. Issues identified were the lack of shoulders on rural sections, lack of left turns lanes particularly at schools, lack of break in traffic for entering or exiting the roadway, bottleneck and configuration issues, and rapid residential growth in parts of the corridor. One element that the CAG raised that was not included in the stakeholder interviews was the desire to provide bicycle and pedestrian accommodations along Route N.
- CAG Meeting 2 was conducted on December 12, 2018. This meeting focused on a review of the first CAG meeting and first Public Information Meeting (see **Section 4.5**), review of the study's Purpose and Need, presentation and review of the Conceptual Alternatives, general updates related to environmental and engineering analyses, next steps, and a question and answer session.
- CAG Meeting 3 was conducted on February 11, 2019. This meeting focused on the screening of the Conceptual Alternatives down to the study's Reasonable Alternatives. The meeting included a review of the Conceptual Alternatives, a review of the study's Purpose and Need, screening for the Conceptual Alternatives to the Reasonable Alternatives, traffic model updates, next steps, and a question and answer session.
- The final CAG meeting was conducted on November 14, 2019. This meeting focused on decision-making in identifying the study's Tentative Preferred Alternative. This meeting included a walk-through of the Tentative Preferred Alternative, a review of the positive and negative impacts of the Reasonable Alternative evaluation, next steps, and a question and answer session.

CAG membership and detailed CAG meeting minutes are available in the Project Record.

4.3 Technical Advisory Group

The Technical Advisory Group (TAG) was organized around the affected jurisdictions, support agencies, and regional partners. The TAG included staff from various divisions within MoDOT such as traffic, construction, and maintenance; and staff of St. Charles County, City of Lake St. Louis, City of Wentzville, and City of O'Fallon.

The purpose of the TAG was to coordinate with technical staff on the development of the study's Purpose and Need, development of alternatives, and screening of alternatives.

Three TAG meetings were conducted near the Route N corridor during the course of the study. Study team members facilitated the meetings, and provided staff members, meeting agendas, presentations, and supporting materials. Meeting summaries were prepared and submitted to MoDOT for review and approval before distribution to the TAG. Email updates were sent to the TAG between meetings, as needed.

TAG Meeting 1 was conducted on December 10, 2018. It focused on the study details, the role of the TAG, recaps of CAG meeting #1 and Public Information Meeting #1, review of the Purpose and Need, review of the Conceptual Alternatives, engineering and environmental updates, next steps, and a question/discussion session. Study team members facilitated a group exercise using maps of Conceptual Alternatives to solicit comments from TAG members. The TAG provided comments on each of the Conceptual Alternatives as well as comments related to other projects in western St. Charles County.

TAG Meeting 2 was conducted on February 7, 2019. This meeting focused on Purpose and Need screening of the Conceptual Alternatives to determine the Reasonable Alternatives. The meeting provided a study description, limits of the study, and the TAG's role of advising MoDOT on the study needs, analysis, and alternatives. The TAG reviewed the Purpose and Need screening matrix and the decision-making process that was used to determine which of the Conceptual Alternatives moved forward as Reasonable Alternatives. Study team members facilitated a group discussion on the screening and identification of the Reasonable Alternatives followed. The meeting concluded with an update on the status of the traffic modeling and traffic projections.

The final TAG meeting was conducted on November 20, 2019. This final meeting reviewed the study's purpose, the Conceptual Alternatives and Reasonable Alternatives, and the decision-making in identifying the study's Tentative Preferred Alternative. The meeting concluded with a question and answer session.

4.4 Elected Officials Briefings

Early coordination and continuous communication with elected officials was accomplished through two elected official's briefings. The briefings were conducted prior to Public Information Meetings 1 and 2 (**Section 4.5**).

Figure 4-1. First elected official's briefing

A letter introducing the study and inviting the recipients to the first elected officials briefing was sent to all identified elected officials for St. Charles County, the City of O'Fallon, the City of Lake St. Louis, and the City of Wentzville. The study team conducted the first briefing with elected officials prior to the Public Informational Meeting on November 13, 2018. **Figure 4-1** shows elected officials being guided through the public meeting boards. The purpose of this briefing was to inform and educate officials about the study's purpose and need, to review the study timeline, to solicit input related to issues affecting Route N, and to answer questions. Five elected officials, or representatives of elected officials, attended the briefing.

The second elected officials briefing presented and discussed the Conceptual Alternatives, the Purpose and Need screening of the Conceptual Alternatives, and the Reasonable Alternatives. Attendees included five city and county officials, or representatives from their offices.

4.5 Public Involvement Meetings

Public meetings are an important opportunity for direct involvement with a broader audience. At these meetings, study team members were available to discuss, explain, and help participants understand the information presented. Two public informational meetings have been conducted to date for the study.

4.5.1 Public Information Meeting 1

The first public meeting was conducted on November 13, 2018, from 4:00 PM to 6:00 PM, at the Liberty High School lobby in Lake St. Louis.

The meeting was publicized on the Route N EA website at http://routenstudy.com/ and was promoted on MoDOT's social media pages and website. MoDOT sent a press advisory to all regional media outlets, and St. Charles County promoted the meeting in their email newsletter. A newsletter announcing the meeting was sent to more than 240 individuals who live or work near the study corridor or subscribed online to be part of the study master mailing list. A flyer announcement was distributed via email to more than 400 area residents.

The meeting addressed why the study was being conducted, the study schedule, the basics of NEPA, and solicited input on what was important to stakeholders. Informational display boards and aerial maps were available for review throughout the meeting and posted to the study website following the meeting. The public was invited to discuss the study with MoDOT staff and the study team. **Figure 4-2** shows stakeholders discussing issues affecting Route N on a map of the study corridor.

Figure 4-2. Public Information Meeting 1

Meeting attendees were encouraged to provide their feedback during the event by filling out a hard copy of the comment form, or by completing the online version of the comment form on the tablets provided. Seventy stakeholders attended the first public meeting, citing lack of shoulders, lack of left turn lanes, lack of right turn lanes, and school zones as the major issues affecting the corridor. Based on comment forms submitted by attendees, alignment suggestions were the most frequently mentioned topic.

4.5.2 Public Information Meeting 2

The second public informational meeting for the Route N Study was held on Thursday, February 21, 2019, from 4:00 PM to 6:00 PM, at the Liberty High School lobby, in Lake St. Louis, Missouri.

The meeting was publicized on the Route N EA website at http://routenstudy.com/ and was promoted on MoDOT's social media pages and website. MoDOT sent a press advisory to regional media outlets and the public meeting was covered by the following:

- Boone Country Connection
- CBS Channel 4 News, KMOV
- FOX Channel 2 News, KTVI
- Lincoln County Journal

- Mid Rivers News Magazine

A newsletter announcing the meeting was sent to more than 300 individuals who live or work near the study area or subscribed online to be part of the study master mailing list. A flyer announcement was also distributed via email to more than 600 area residents.

More than 130 people attended the meeting. The meeting provided a study overview, presented Conceptual Alternatives, presented Reasonable Alternatives, and also discussed the evaluation and screening process. Informational display boards and aerial maps were available for review throughout the meeting and posted to the study website following the meeting.

Figure 4-3. Public Information Meeting 2

Meeting attendees were encouraged to provide their feedback during the event by filling out a hard copy of the comment form, or by completing the online version of the comment form on the tablets provided. The public was invited to discuss the study with MoDOT staff and the study team. **Figure 4-3** shows stakeholders providing feedback on iPads provided by the study team.

4.5.3 Public Hearing

The study's public hearing will be conducted after FHWA approval of the EA.

4.6 Presentations

Over the course of the study, presentations to community and civic groups, business groups, and other interested groups or organizations were used to introduce the study, provide study updates, and obtain public input. Such presentations were given upon request.

On January 17, 2019, the first presentation provided an update of the Route N EA to representatives of the following home owners associations (HOAs): Heritage Hawk Ridge, Hawk Ridge on the Green, Estates of Hawk Ridge, Mason Glen, Summers Landing, and Oak Bluff Preserve subdivisions.

A second presentation was given on April 3, 2019, to the New Melle Lake HOA.

On November 21, 2019, a second presentation was given to the HOAs listed above. This presentation focused on the study's progress, the Conceptual Alternatives and Reasonable Alternatives, and the decision-making in identifying the study's Tentative Preferred Alternative.

In addition, MoDOT and study team staff conducted a site visit with the trustees of the New Melle Lake HOA on April 16, 2019, to review the subdivision layout and discuss the potential impacts of the Near South Alternative to this subdivision.

4.7 Outreach and Informational Materials

Informational materials have been developed and updated throughout the study and are updated as needed. These include the following:

- A fact sheet was written and designed for distribution at the CAG meetings, elected official's briefings, presentations, and study meetings.

- The public involvement team wrote, designed, and distributed study newsletters. Two newsletters were provided, one before each of the two-public meetings. A final newsletter will be provided prior to the Public Hearing. The newsletters were distributed to stakeholders on the study mailing list via email and regular mail. PDF files of all newsletters were posted to the study website.
- The study website is a tool for both public outreach and involvement. The website is located at www.routenstudy.com and includes general study information, contact data, technical documents, and information on how residents can be involved. It serves as a centralized information portal for learning about the study, getting updates, providing input, and downloading public meeting displays and other study materials.
- The study mailing list includes the identified key stakeholders, CAG members, elected officials, and coordinating agencies. Anyone who attends a stakeholder meeting or signs up for mailings through the study website is added to the master mailing list.
- MoDOT's telephone number is provided to the public to comment and ask questions about the Route N EA: 1-888-ASK-MODOT (1-888-275-6636).
- The study team's media strategy is to create and distribute press advisories to announce the informational public meetings and the public hearing.
- Study information is available on MoDOT's Facebook page and Twitter account and is emailed using a mass email service.

4.8 MetroQuest Surveys

The study team conducted a survey utilizing MetroQuest software to obtain input from stakeholders, residents, motorists, and others on improvements they want to see along the corridor. This public involvement software guided participants through the process of learning about the study and providing feedback. The survey obtained public input on why they use the route, when they use it, and prioritizing the issues with the roadway they would like the study team to address. It also asked respondents which trade-offs they most valued, and to rate the Reasonable Alternatives. This survey provided valuable information to the study team and helped in the selection of the Tentative Preferred Alternative.

Over 3,000 stakeholders accessed and completed the MetroQuest survey. Based on the survey, stakeholders tended to favor the following:

- Wider shoulders and sidewalks over lower right-of-way impacts
- Open drainage and a rural feel over enclosed drainage and lower right-of-way impacts
- Direct access to all driveways (no raised medians) over reducing vehicle conflicts

The rating of Reasonable Alternatives resulted in all three receiving similar ratings of approximately 3.3 out of a maximum of 5.0.

The survey was accessible through the study website and compatible with devices such as laptop/desktop computers, mobile phones, and tablets to ensure multiple participation options. The survey was promoted via email blasts, press releases, MoDOT's social media pages, and digital roadside message boards. The East West Gateway Council of Governments and St. Charles County were also promoters of the MetroQuest survey.

4.9 Agency Collaboration Plan

The Agency Collaboration Plan is intended to define the process by which the study team communicates information about the Route N EA to the interested federal and non-federal governmental agencies.

The FHWA will provide funding for this study. Consequently, the Missouri Division of the FHWA serves as the lead agency for the study. MoDOT, as the direct recipient of federal funds for the study, is a co-lead agency.

The Agency Collaboration Plan includes two types of agencies:

1. Cooperating agencies, which are those federal agencies that the lead agency specifically requests to participate in the environmental evaluation process for the study. FHWA's NEPA regulations (23 CFR 771.111(d)) require that federal agencies with jurisdiction by law (such as permitting or land transfer authority) be invited to be cooperating agencies for an EA. USACE St. Louis District agreed to be a Cooperating Agency for the Route N EA study.
2. Interested agencies, which are those federal and non-federal governmental agencies that may have an interest in the study because of their jurisdictional authority, special expertise, local knowledge and/or statewide interest. The definition of "governmental" was broadened to include an organization with an official mandate. Based on these criteria, the study team identified 17 interested agencies. Any organization that could not satisfy the criteria as an agency but is interested in the study, is included in the study as a general stakeholder. Collaboration with these groups has been coordinated through information packages that coincide with study milestones. The Environmental Protection Agency, the Missouri Department of Natural Resources, and the Missouri Department of Conservation agreed to be interested agencies for the Route N EA. The Federal Aviation Administration, while not formally agreeing to be an interested agency, did provide comments related to air space impacts.

In April 2019, agency collaboration packages 1 and 2 were distributed to the cooperating and all 17 agencies asked to serve as interested agencies for the Route N EA. Among the materials provided to the agencies were the Fact Sheet, the Purpose and Need Statement, an annotated study area map, logical termini, Conceptual Alternatives, screening of the Conceptual Alternatives, the Reasonable Alternatives, and public involvement efforts for the proposed project. One-on-one coordination with the cooperating and interested agencies continues.

The third collaboration package will be sent to all cooperating and all 17 interested agencies in early 2020. This collaboration package will detail the decision-making to identify the Tentative Preferred Alternative for the Route N EA. This collaboration package will include the Reasonable Alternatives Evaluation Technical Memorandum, public involvement summaries, and the full versions of the Conceptual Alternatives, Reasonable Alternatives, and Tentative Preferred Alternative.

The interested and cooperating agencies will be included in the distribution of the NEPA document, comprising the fourth and final collaboration point. Agency collaboration feedback is contained in **Section 4.12**.

4.10 Other Direct Agency Coordination

As mentioned above, agencies have jurisdiction under the law. Direct coordination with these agencies was conducted beyond the limits of the agency collaboration discussed above. Direct coordination was also conducted with a group of regional gatekeepers and project funders identified as the Transportation Corridor Improvement Group (TCIG). The following agencies participated in the TCIG:

- St. Charles County
- East-West Gateway Council of Governments

The role of the TCIG is to inform MoDOT and the study team of their agency's priorities related to Route N and to provide feedback at key milestones in the study. To date, the TCIG played an active role in review and comment of the following:

- Study Purpose and Need
- Conceptual Alternatives
- Screening of the Conceptual Alternatives
- Identification of the Tentative Preferred Alternative

As the study progresses, the TCIG will continue to play an active role in advising MoDOT through review and comment on this EA and participation at the public hearing. Other agency collaboration feedback is contained in **Section 4.12**.

4.11 Tribal Coordination

Coordination with Native American Tribes is conducted by the FHWA. A letter of invitation to be a Section 106 consulting party was sent to 17 tribes that have previously expressed interests in MoDOT projects in this area. Early identification of tribal concerns will allow FHWA and MoDOT to consider ways to avoid and minimize potential impacts to Tribal resources and/or cultural practices as study planning, and alternatives are developed and refined.

An EA introduction letter and tribal coordination packages were sent to all 17 tribes for review and comment. The introduction letter, sent in September 2018, provided general study details and an invitation to be a Section 106 consulting party. The Section 106 consultation process is discussed in **Section 3.5.1**. The tribal coordination packages, sent in April 2019, were similar to those sent to the cooperating and interested agencies.

As of December 2019, three tribal responses have been received from the Sac and Fox Nation of Missouri in Kansas and Nebraska, the Miami Tribe of Oklahoma, and the Ponca Tribe of Oklahoma. The Sac and Fox Nation of Missouri in Kansas and Nebraska and Miami Tribe of Oklahoma did not have any substantive comments/concerns. The Ponca Tribe of Oklahoma stated that "*The Ponca Tribe of Oklahoma anticipates reviewing and commenting on the planned Route N Improvements in St. Charles County, MO; MoDOT Job No. J6S3342*."

4.12 Substantive Comments

Throughout the public involvement process, substantive comments were collected and addressed, as appropriate to the nature and format of the comments. This section lists the substantive comments and a summary of the study's responses:

a) Desire to maintain rural context of the roadway – *This common desire was included into the project development process through the secondary project objectives of accommodating bikes/pedestrians and taking existing planning goals into consideration.*

b) Route N is used an as alternative route if there are issues on I-70 – *This is a common observation that was acknowledged in the project approach. The Route N's traffic studies were inconclusive on the magnitude of this phenomenon.*

c) Hopewell/Duello intersection is a major issue along the existing corridor – *The realignment of this intersection is current project being sponsored by St. Charles County.*

d) Existing Route is not wide enough for the traffic – *Agreed, modern MoDOT typical cross-sections are a comment of the project development process.*

e) The Route N/Route Z intersection is a major concern - *The reconfiguration and signalization of this intersection is a current project being sponsored by St. Charles County.*

f) Large subdivisions have been built along Route N and the infrastructure has not kept up – *Acknowledged, Purpose and Need element #1 is the need to improve Access and Connectivity.*

g) Traffic during the school hours is heavy – *This observation is a component of the Study's traffic analysis.*

h) Consideration of roundabouts on Route N – *While not a component of existing or future projects, the final design of the Route N project can evaluate alternatives of based on MoDOT's Value Engineering processes.*

i) Access is a concern for emergency responses - *Access to important study area resources are an explicit evaluation criterion for the study's purpose and need.*

j) Desire for bike/ped facilities and landscaping separate from the roadway – *This is relatively common desire was included into the project development process through the secondary project objective of accommodating bikes/pedestrians.*

k) This would seem more like the Route 364 extension plan – *The Route N alternatives are fundamentally different then the Route 364 extension. There will be no interchanges, no frontage roads to prevent direct access to Route N, and major intersections will be controlled with signals.*

l) The use of the EWG traffic model and the St. Charles County model need proper coordination – *The technical analysis completed two separate 2045 peak hour traffic forecasts using East-West Gateway's (EWG) model and a 4-lane Route N in the study area. Scenario 1 used EWG's land use assumptions and included St. Charles County committed (fiscally constrained) projects. Scenario 2 used St. Charles County's land use assumptions and priority projects (more than just the committed projects included in Scenario 1). Scenario 2 generally resulted in greater traffic volumes.*

m) Coordination with SOS (Shoulders for Safety) organization – *The SOS was included in the study's Community Advisory Group (CAG).*

n) Effect on the St. Charles County Ambulance District Building - *Near South Alternative will require the displacement of the existing building and the nearby cell tower.*

o) Shelf life on this EA document – *After 3 years, a determination of whether anything changed affecting Preferred Alternative would be required.*

p) Timeframe to start construction – *There is no funding for design and construction. It will most likely take at least 2 years to design and a minimum of 4-5 years for construction.*

q) Relationship between EA/FONSI and EWG Long Range Plan – *The Route N project needs to be on the fiscally constrained Long-Range Plan.*

r) Naming of new roads - *Likely Route N would move to a new alignment and "Old Route N" would go back to St. Charles County.*

s) Concerns about existing and future traffic – *This common concern is a central element of the project development plan.*

t) Concerns about existing and future residential concerns – *This common concern is a central element of the project development plan.*

u) Concerns regarding meeting format - *Missouri citizens expect and demand an active voice in the location and design of transportation facilities. They recognize the important role transportation has in their life as well as the life of their community. Existing transportation facilities and in particular transportation improvements, have a direct impact on the social, economic and environmental resources of the community. As a result, MoDOT values the input the public provides on transportation improvements and has established various methods to gather it.*

v) Land acquisition concerns - *MoDOT will ensure that the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, be carried out without discrimination based on race, color, national origin, religion, and age and in compliance with Title VI (the Civil Rights Act of*

1964), the President's EO on Environmental Justice, and the Americans with Disabilities Act. In accordance with the Uniform Act and the states' relocation programs, fair market compensation will be provided to property owners who are affected by this project.

w) The USEPA provided the following comments:

- Overall, the Improve Existing Alternative appears to represent an overall positive except for the off- alignment section. Have roundabouts been considered.
- Overall, the Buckner Alternative appears to represent the least environmental impact. However, the transition of the existing land uses along Buckner were mentioned.
- The Near South Alternative is the most impactful and should not be considered the Least Environmentally Damaging Practicable Alternative (LEDPA).

x) The U.S. Army Corps of Engineers provided comments about the following:

- Applicability of Section 404 of the Clean Water Act, as well as the Water Quality Certification provisions of Section 401.
- Appearance that the Near South Alternative will have the greatest amount of potential impacts to waters of the U.S.
- Applicability of the Threatened and Endangered Species provisions of Section 7 of the ESA as well as Section 106 of the NHPA.

y) The Missouri Federal Assistance Clearing House had no comments or recommendations.

The comment summaries from the various public involvement events are available in the **Project Record**.

SECTION 5

Environmental Commitments

MoDOT as the lead agency for this study is responsible for all regulatory commitments, whether or not specifically delineated herein, after construction limits are determined. Federal authorization for construction shall not be granted until the necessary regulatory obligations have been satisfactorily completed.

1. MoDOT shall ensure that if revisions to the design or construction result in changes in impacts that were not evaluated in this document, the NEPA document will be re-evaluated to ensure the determinations and commitments remain valid. **(General – Section 3.0)**

2. MoDOT shall ensure that, prior to construction, Phase 1 Environmental Site Assessments are conducted, as appropriate. Additionally, those portions where planned construction will occur should be included in the Phase 1 Environmental Site Assessment. **(Hazardous Materials – Section 3.1.2)**

3. MoDOT shall ensure that its construction inspector direct the contractor to cease work at the suspect site if regulated solid or hazardous wastes are found during construction. The construction inspector shall contact the appropriate environmental specialist to discuss options for remediation. The environmental specialist, the construction office, and the contractor shall develop a plan for sampling, remediation, and continuation of project construction. Independent consulting, analytical, and remediation services will be contracted if necessary. MDNR and EPA shall be contacted for coordination and approval of required activities. **(Hazardous Materials – Section 3.1.2)**

4. MoDOT shall ensure that all needed demolition notices, abatements notices, and project notifications to MDNR will be submitted, prior to beginning demolition activities. Asbestos-containing material and demolition debris will be disposed of according to state and federal regulations. **(Hazardous Materials – Section 3.1.2)**

5. FHWA is the lead federal agency for this project. MoDOT is the designated non-federal representative for FHWA for completing coordination for compliance with Section 7 of the ESA and with the Missouri Endangered Species Act. Consultation will be complete prior to construction or before any federal funds are obligated.

   Prior to construction, MoDOT shall conduct a presence/absence survey for federally listed bats species for the Tentative Preferred Alternative. MoDOT will use the results of the survey to make final effects determinations and consult with USFWS and MDC. Tree clearing will not occur prior to the completion of consultation with USFWS and MDC. **(Endangered Species – Section 3.2.3)**

6. MoDOT shall ensure that the project will operate under the provisions of the current Missouri State Operating Permit. This general permit is issued by MDNR for MoDOT construction and maintenance projects statewide. (**Aquatic Habitat Impacts – Section 3.4.7**)

7. MoDOT shall ensure that appropriate erosion and sediment control BMPs will be implemented. Selection and incorporation of these BMPs shall consider the type of work activity undertaken and site conditions, such as soils, topography, and seasonal rainfall. MoDOT will ensure that its SWPPP is implemented to prevent or minimize adverse impacts to streams, water courses, lakes, ponds, or other impoundments within and adjacent to the study area. (**Aquatic Habitat Impacts – Section 3.4.7**)

8. MoDOT shall adhere to the TS4 permit applicable at the time of construction. (**Aquatic Habitat Impacts – Section 3.4.7**)

9. MoDOT shall ensure that, should a floodplain encroachment occur, a floodplain development permit will be acquired. The FHWA policies and procedures for the location and hydraulic design of highway encroachments on flood plains (23 CFR 650A) will also need to be completed." (**Aquatic Habitat Impacts – Section 3.4.7**)
10. MoDOT shall ensure that, should impacts to streams or wetlands occur with this project, the appropriate Section 404 permit would be acquired prior to construction. (**Aquatic Habitat Impacts – Section 3.4.7**)
11. MoDOT shall ensure that, in accordance with the NPDES requirements of the Clean Water Act, MoDOT will operate under the provisions of the current Missouri State Operating Permit. (**Aquatic Habitat Impacts – Section 3.4.7**)
12. MoDOT shall ensure that appropriate erosion and sediment control BMPs will be implemented. Selection and incorporation of these BMPs will consider the type of work activity undertaken and site conditions, such as soils, topography, and seasonal rainfall. MoDOT will ensure that its SWPPP is implemented to prevent or minimize adverse impacts to streams, water courses, lakes, ponds, or other impoundments within and adjacent to the study area. (**Aquatic Habitat Impacts – Section 3.4.7**)
13. MoDOT shall conduct an engineering analysis for the Tentative Preferred Alternative prior to submission of the floodplain development permit application to SEMA. The contractor will obtain a floodplain development permit and "no-rise" certification for Sams Creek. MoDOT will prepare a LOMR for the culvert extension for Oday Creek within 6 months of the project completion. (**Aquatic Habitat Impacts – Section 3.4.7**)
14. MoDOT shall complete the Section 106 process using the "Phased" Section 106 process. During the FONSI stage of project development, the SHPO review comments will be addressed along with any decision-making changes that the SHPO review precipitates. During the Right-of-Way acquisition stage of project development, the completion of the archaeological survey (for the areas where property owner permission was not obtainable) will be conducted. (**Cultural Resources – Section 3.5.1**)
15. MoDOT shall ensure that details of utility disposition are determined during project design. Agreements with utilities shall be negotiated and executed prior to seeking project federal authorization for construction. MoDOT's utility engineers and representatives of the various utilities shall plan the details of individual utility adjustments on a case-by-case basis. **(Construction – Section 3.5.5)**
16. MoDOT shall ensure that contractors control fugitive dust to prevent it from migrating off the limits of the project corridor. **(Construction – Section 3.5.5)**
17. MoDOT shall include standard specifications in the construction contract requiring all contractors to comply with every applicable local, state, and federal laws and regulations relating to noise levels permissible within and adjacent to the project construction site. (**Construction – Section 3.5.5)**
18. MoDOT shall ensure that careful refueling practices are employed to limit spills of gasoline and diesel fuels. **(Construction – Section 3.5.5)**
19. MoDOT shall ensure that the construction contract includes a Traffic Management Plan to provide response to temporary disruptions in travel patterns and travel time**.** A Traffic Management Plan will be developed during project design as part of the final design activities. (**Construction – Section 3.5.5)**
20. MoDOT shall ensure that the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, be carried out without discrimination based on race, color, national

origin, religion, and age and in compliance with Title VI (the Civil Rights Act of 1964), the President's Executive Order on Environmental Justice, and the Americans with Disabilities Act. In accordance with the Uniform Act and the states' relocation programs, fair market compensation shall be provided to property owners who are affected by this project. **(Right-of-Way/Property Acquisition – Section 3.5.6)**

21. MoDOT shall provide the Ponca Tribe of Oklahoma the opportunity to comment on the Route N Improvements during Agency Collaboration Point #3. **(Tribal Coordination – Section 4.11)**

22. Prior to construction, MoDOT will complete a Transportation Management Plan to evaluate construction impacts and to ensure that there are no unreasonable/adverse disruptions. Reasonable notification of any detours will be provided to the public. **(Construction and maintenance of Traffic – Section 3.5.5.3)**

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