FUTURE 64 COMMUNITY TRANSPORTATION TOGETHER

KINGSHIGHWAY TO JEFFERSON

PLANNING AND ENVIRONMENTAL LINKAGES STUDY

Prepared for:

MoDOT

Prepared by:

HDR

The Missouri Department of Transportation anticipates incorporating recommendations made as part of the Planning and Environmental Linkages study into future National Environmental Policy Act studies, per Title 23 of the US Code, Part 168.

June 2023

U.S. Department of Transportation
Federal Highway Administration

Missouri Division
10/17/2023

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Mr. Ed Hassinger, P.E.
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Subject: Future64 Planning and Environment Linkages Study

Dear Ed Hassinger:

This letter is to acknowledge the completion of the Future64 Planning Study and Planning and Environment Linkages (PEL) Questionnaire undertaken by The Missouri Department of Transportation (MoDOT), in partnership with the City of St. Louis and the Federal Highway Administration (FHWA). This planning study was undertaken in a manner consistent with planning guidance (23 CFR 450).

The strengths of this planning study include a comprehensive investigation and identification of the transportation problems and environmental concerns in the study area, as well as the strategies and reasonable alternatives for improvements. In addition, the public involvement and agency coordination process undertaken for the study was valuable, though additional public involvement and agency coordination will likely be necessary as projects proceed through the National Environmental Policy Act (NEPA) process.

The completed PEL Questionnaire provides an effective summary of the work completed and the information that will be needed for a project to enter the NEPA process. At that time, it may be necessary, depending on the circumstances, for FHWA to meet with MoDOT to determine the scope and level of NEPA documentation needed.

We appreciated the opportunity to comment on and actively participate in the development of this planning study and report. If you have any questions, please feel free to contact Taylor Peters, Environmental Specialist, at (573) 638-2621 or by email at taylor.peters@dot.gov.

Sincerely,

Lauren Paulwell

Lauren Paulwell
Acting Program Team Leader
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Acknowledgments

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Contents

Appendices

Figures

Tables

Acronyms

ADA	Americans with Disabilities Act
AASHTO	American Association of State Highway and Transportation Officials
BCA	benefit cost analysis
BIP	Bridge Investment Program
BLTS	bicycle level-of-traffic stress
BTGP	Boyle Ave., Tower Grove Ave., and Papin St./Vandeventer Ave.
CAA	Clean Air Act
CAG	Community Advisory Group
CFR	Code of Federal Regulations
CE2	Categorical Exclusion
CMAQ	Congestion Mitigation and Air Quality Improvement
EPA	United States Environmental Protection Agency
ESA	Environmental Site Assessment
EWGCOG	East-West Gateway Council of Governments
FHWA	Federal Highway Administration
FWS	United States Fish and Wildlife Service
FY	fiscal year
GRG	Great Rivers Greenway
I-64	Interstate 64
INFRA	Infrastructure for Rebuilding America
LOS	level of service
MG	Market St., Grand Blvd., and Compton Ave.
Metro	Metro Transit
MoDOT	Missouri Department of Transportation
MPDG	Multimodal Project Discretionary Grant
MPO	Metropolitan Planning Organization
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NOFO	Notice of Funding Opportunity
NRHP	National Register of Historic Places
PCE	Programmatic Categorical Exclusion
PEL	Planning and Environmental Linkages
PMT	Project Management Team
RAISE	Rebuilding American Infrastructure with Sustainability and Equity
RCP	Reconnecting Communities Pilot
SHPO	State Historic Preservation Officer
SS4A	Safe Streets and Roads for All
STP	Surface Transportation Program
TAG	Technical Advisory Group
TAP	Transportation Alternatives Program
USDOT	United States Department of Transportation
vph	vehicles per hour

1 Introduction

In partnership with the FHWA and the City of St. Louis, MoDOT conducted a PEL study process to evaluate the needs of I-64 and adjacent local transportation infrastructure and determine improvements between Kingshighway Blvd. and Jefferson Ave. This Future64 PEL study documents the transportation issues and environmental concerns in the I-64 corridor and provides project recommendations for consideration during subsequent corridor development phases. A PEL study process was selected to bring together the local agency partners and stakeholders to collaborate and build consensus on a range of multimodal improvements.

1.1 Project Background

I-64 through the City of St. Louis was originally a local route known as the "Red Feather Expressway," which began at the intersection of Skinker Blvd. and Clayton Ave. and continued east to the intersection of Market St. and Vandeventer Ave. Construction of the expressway began in the early 1930s and was completed in 1937. After its opening, a series of projects expanded the highway farther east to the current interchange with Market St. During this same period, a western expansion of the expressway was constructed through St. Louis County, known as the Daniel Boone Highway. In 1959, the western terminus of the "Red Feather Expressway" was connected to the Daniel Boone section and was known as Route 40.

Construction continued into the 1980s as traffic volume increased with the completion of the westbound viaduct. In 1987, the FHWA designated the portion of Route 40 as I-64, between I-270 and I-44.

No major projects occurred on I-64 between the late 1980s and mid-2000s. In the mid-2000s, MoDOT began updating I-64 between I-270 and Kingshighway Blvd. to accommodate higher speeds and larger traffic volumes. Compton Ave. Bridge was replaced in 2005, east of Kingshighway Blvd. In the following decade, MoDOT upgraded I-64 at the Poplar St. Bridge, Sixth St., and Jefferson Ave. interchanges. Major growth in what is known as the Cortex Innovation District necessitated bridge replacements at Taylor Ave., Newstead Ave., Tower Grove Ave., and Boyle Ave. starting in 2012. Concurrent with the bridge replacement projects, the eastbound I-64 off-ramp to Tower Grove Ave. and the westbound I-64 on-ramp from Boyle Ave. were added to the corridor. Besides the improvements mentioned, most of I-64 from Kingshighway Blvd. to Jefferson Ave. is the original infrastructure constructed between the 1930s and 1980s.

1.2 Study Area

The project study area was split into two categories, Tier 1 and Tier 2. The Tier 1 study area refers only to the portion of the I-64 corridor from the western limit of Kingshighway Blvd. to the eastern limit of Jefferson Ave., a distance of 2.7 miles. It is specific to the interstate system contained within MoDOT right-of-way. Tier 2 extends north and south of the Tier 1 limits to include the cross streets and multimodal facilities that are part of the transportation system

between Forest Park Ave. to the north and Route 100 (Chouteau Ave./Manchester Ave.) to the south. Figure 1 depicts the limits of both Tier 1 and Tier 2.

Figure 1. Study Area Map

1.3 Purpose of a PEL Study Process

A PEL study is a planning-level process designed to guide analysis and decision-making for improving a transportation corridor or subarea. It helps identify and examine critical infrastructure needs, and social and environmental issues associated with the transportation systems that should be addressed in the National Environmental Policy Act (NEPA) process, define improvements, provide recommendations, and help guide projects into subsequent development steps. The PEL process is integral to making the NEPA process more efficient and effective and helps streamline the advancement of the recommended projects.

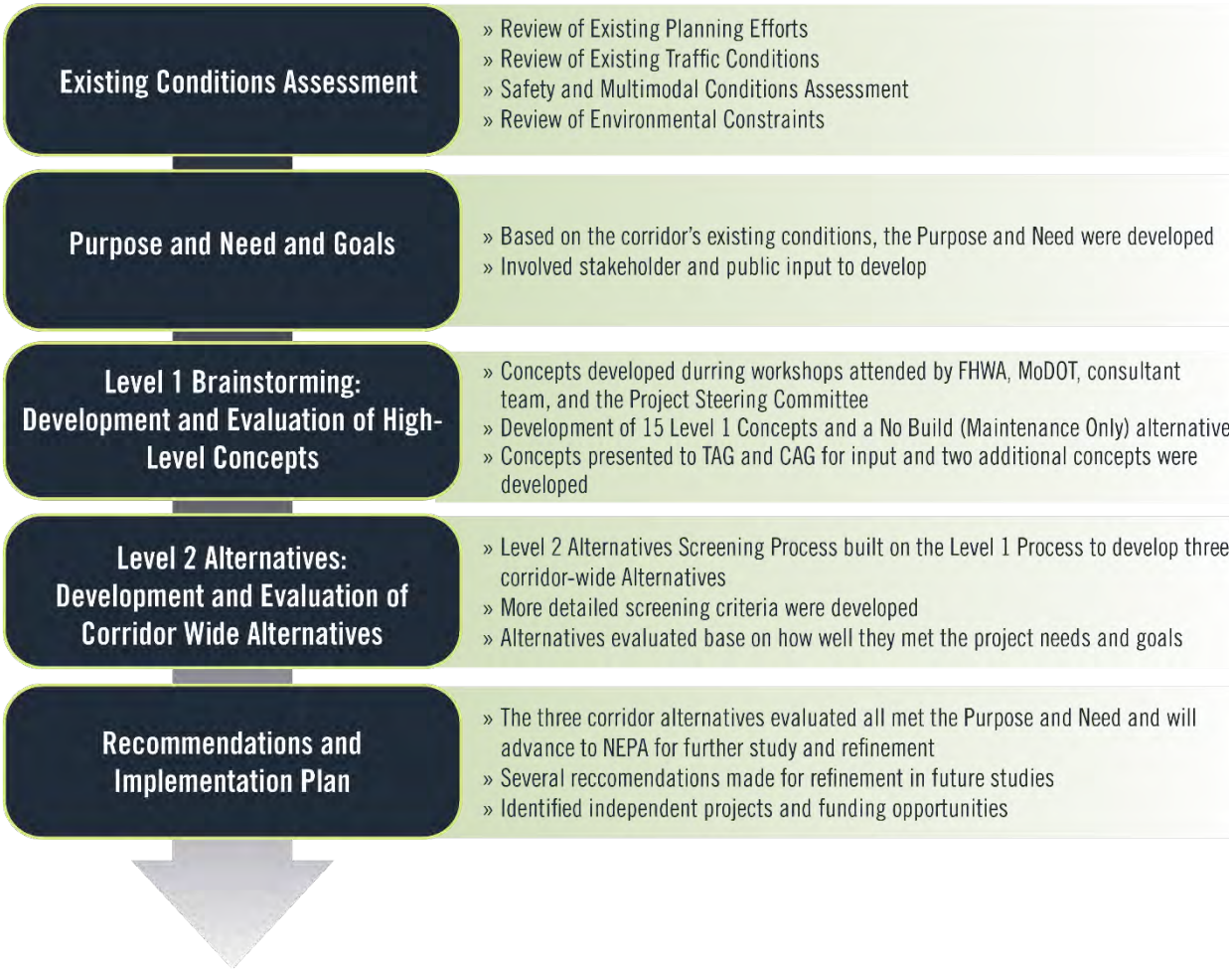
NEPA requires that any project considered a federal action, including those that receive funding from the Federal Aid Highway Program, undergo a study process to assess a proposed action's environmental, social, and economic effects; this includes projects that receive federal funding or require federal permits. Council on Environmental Quality regulations 40 Code of Federal Regulation (CFR) §§ 1500-1508 define Federal Actions and address the basic decision-making framework and provisions established in NEPA.

When complete, a PEL study process links transportation planning to environmental issues, resulting in planning products and analyses that can be carried forward into the NEPA process. The results and documentation prepared for the Future64 PEL study will be incorporated by reference into future projects developed under NEPA, incorporating results of transportation planning studies as part of the overall project development process, consistent with NEPA and its

implementing regulations, pursuant to the statutory conditions in 23 U.S.C. 168(d) and FHWA regulations 23 CFR 450.212 (a)-(c) and 450.318 (a)-(d).

The Future64 PEL study process generally consists of five primary steps identified in Figure 2. The process involved two-way engagement between the study team and the interested stakeholders, including the public, property owners, resource agencies, and local government partners. Stakeholders are engaged throughout the process to draw their ideas and suggestions, develop support, and ultimately reach a consensus on the study's recommendations. Information about the planning process used to develop the PEL study is also available in the FHWA PEL Questionnaire in Appendix A.

Figure 2. Future64 PEL Process



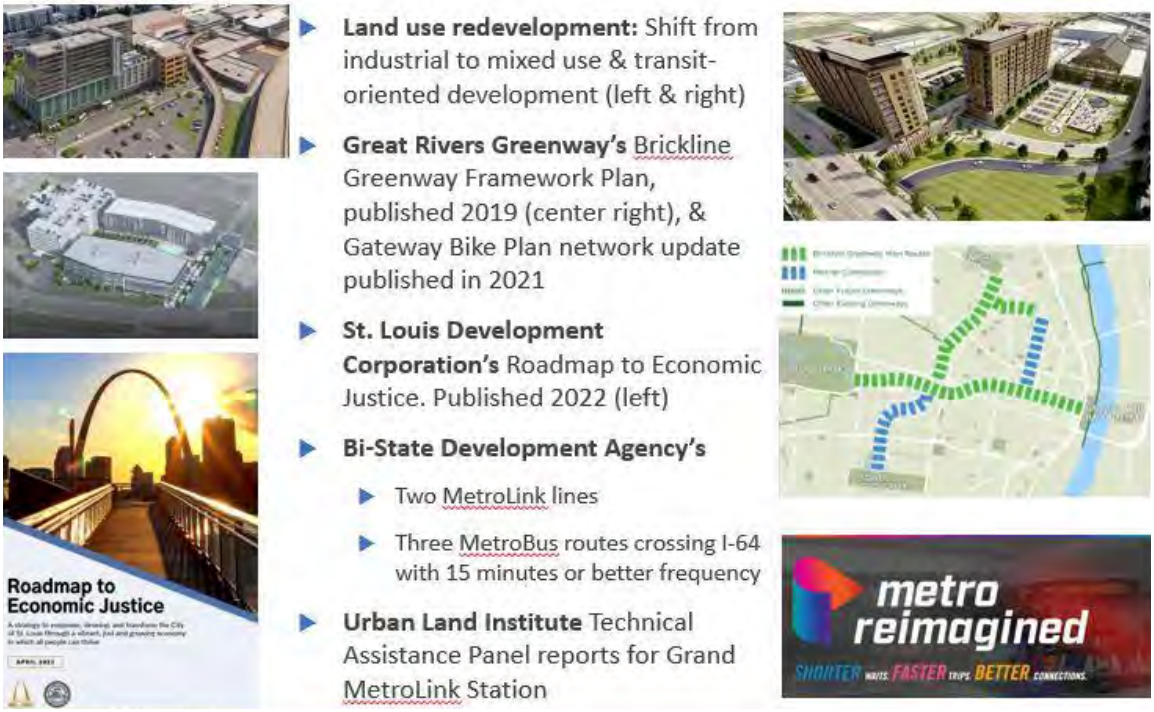
1.3.1 Why use PEL for Future64?

Much of the infrastructure is still the same as initially constructed between 1930 and 1980; it has faced challenges in keeping up with changing transportation needs and the current and future growth demand. Over the span of 50 years, what is now I-64 and its ramps were directly

connected to the local City of St. Louis street grid. The result is that the roadways function together as a system in the study area.

The PEL process was used for Future64 to achieve a holistic approach to corridor planning to meet MoDOT and local needs. MoDOT's initial needs for the study began as a plan for asset management along the corridor. Local needs were identified through stakeholder coordination efforts and a review of local plans, as shown in Figure 3.

Figure 3. Local Needs and Visions



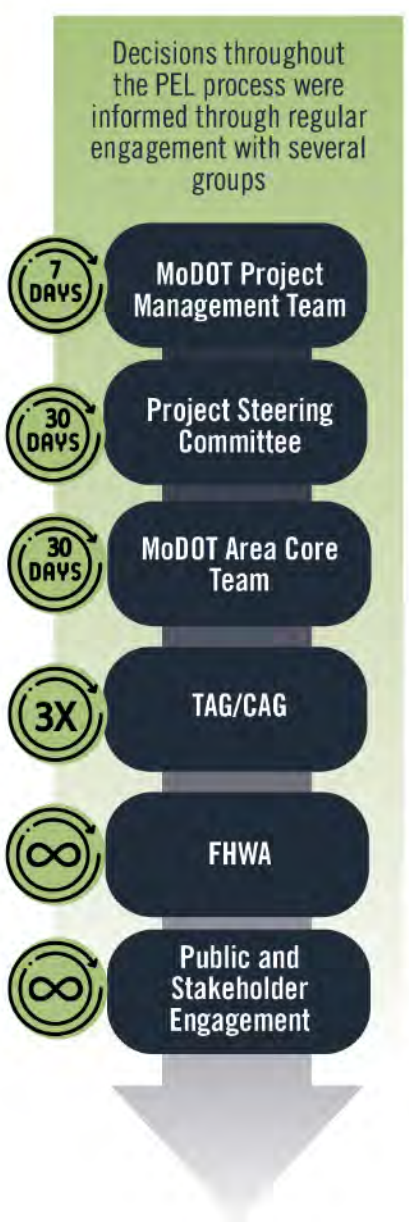
The PEL process includes the flexibility to look at a number of needs and develop and evaluate alternatives based on the combination of MoDOT and local needs and goals. A key focus of this PEL study is to address immediate asset management needs in the corridor while capitalizing on the opportunity to examine the corridor holistically. The intended outcome is to develop an actionable plan for near-term and long-term improvements by addressing transportation issues in a corridor or a specific location.

1.4 Project Partners and Decision-making Structure

MoDOT created a Project Management Team (PMT) to manage the day-to-day activities of the project. Additionally, due to how I-64 connects to the City of St. Louis' street grid, Metro's transit service, and Great Rivers Greenway (GRG) planned improvements for the Brickline Greenway, local partners also asked for input and help to guide the study, which came in the form of a Project Steering Committee. These groups met regularly throughout the study to provide direction and oversight, build consensus, work through challenges, and provide input to

the decision-making process. Figure 4 shows how these groups were integrated into the decision-making process.

Figure 4. Decision-making Process



MoDOT Project Management Team. This group was composed of MoDOT District staff, including co-project managers, one from the design group, and one from the planning group. It included MoDOT's Area Engineer, who represents MoDOT within the City of St. Louis, the District's Communication Specialist, and representatives from MoDOT's Central office, including the Design Liaison and two members from the environmental and historic preservation section of

Design. This group managed the day-to-day activity of the study and met regularly with the consultant team, project partners, elected officials, stakeholders, and members of the public.

Project Steering Committee. This group comprised the PMT and one to two representatives from the City of St. Louis, Metro, GRG, and East-West Gateway Council of Governments (EWGCOG). This group met monthly to discuss the study process, provide input and guidance, and address challenges or questions brought forward by the study team.

MoDOT Area Core Team. This group comprised the PMT, Steering Committee, and an expanded group into other MoDOT departments, including all aspects of MoDOT's project delivery, operations, and maintenance. Added to this group were representatives of FHWA to allow for coordination. This group also met monthly and established another touch point to accomplish much of the same items during the Steering Committee meetings.

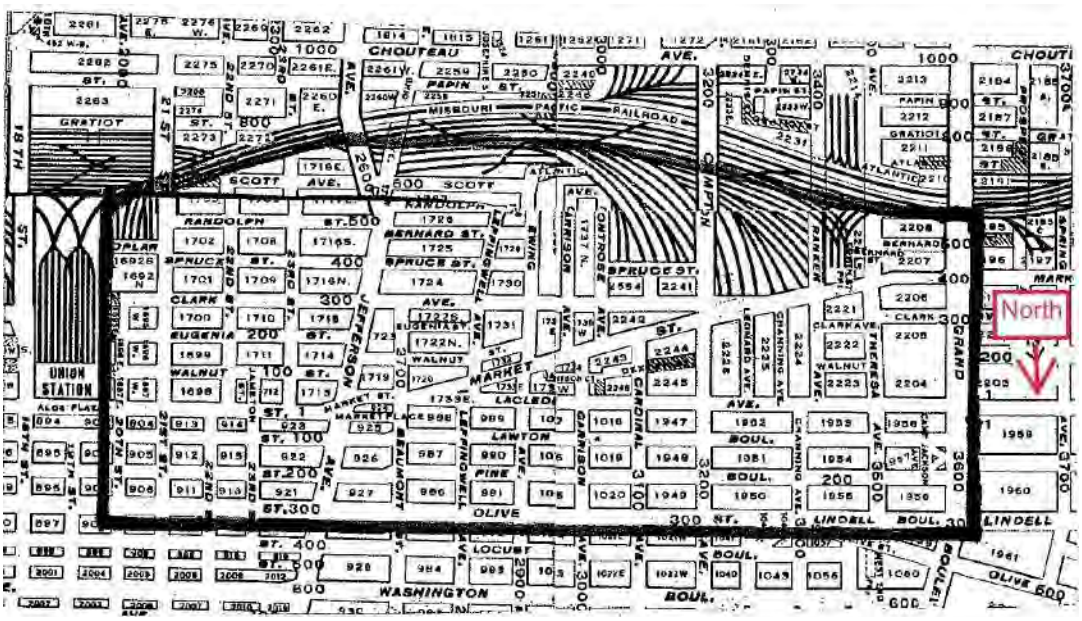
Decisions during the study were made through a process that involved the PMT, Project Steering Committee, and Core Team but also included guidance from FHWA and input from public and stakeholder engagement. Figure 4 illustrates the decision-making structure that led to the study milestones and how interaction with the public and FHWA was a key part of that process.

Records of public involvement, stakeholder engagement, and agency coordination are located in Appendix B.

1.5 Historical Context

I-64 through the City of St. Louis was originally a local route known as the "Red Feather Expressway," which began at the intersection of Skinker Blvd. and Clayton Ave. and continued east to the intersection of Market St. and Vandeventer Ave. Construction of the expressway began in the early 1930s and was completed in 1937. After its opening, a series of projects expanded the highway farther east to the current interchange with Market St. During this same period, a western expansion of the expressway was constructed through St. Louis County, known as the Daniel Boone Highway. In 1959, the western terminus of the "Red Feather Expressway" was connected to the Daniel Boone section and was known as Route 40, splitting the Mill Creek Valley area and disrupting the local street grid. The addition of the highway was part of a larger 450-acre urban renewal project that displaced the largest African American neighborhood in Missouri and the heart of black St. Louis with 20,000 people, 800 businesses, 40 churches, schools, a baseball stadium, and other community institutions. Figure 5 shows the street grid of the Mill Creek Valley area between Grand Blvd. and 20th St. prior to the construction of Route 40. Figure 6 is an aerial image of Route 40 under construction.

Figure 5. Mill Creek Valley Area Prior to the Construction of Route 40



Source: Mill Creek Valley: A Soul of St. Louis by Ron Fagerstrom. Published 2000.

Figure 6. Aerial View of Mill Creek Valley Area Under Construction in 1965

Source: [Aerial View of Mill Creek Valley from Olive and Vandeventer east. 1 September 1965. | Missouri Historical Society (mohistory.org)]

Construction continued into the 1980s as traffic volume increased with the completion of the westbound viaduct. In 1987, the FHWA designated the portion of Route 40 as I-64, between I-270 and I-44.

No major projects occurred on I-64 between the late 1980s and mid-2000s. In the mid-2000s, MoDOT began updating I-64 between I-270 and Kingshighway Blvd. to accommodate higher speeds and larger traffic volumes. Compton Ave. Bridge was replaced in 2005, east of Kingshighway Blvd. In the following decade, MoDOT upgraded I-64 at the Poplar St. Bridge, Sixth St., and Jefferson Ave. interchanges. Major growth in what is known as the Cortex Innovation District necessitated bridge replacements at Taylor Ave., Newstead Ave., Tower Grove Ave., and Boyle Ave. starting in 2012. Concurrent with the bridge replacement projects, the eastbound I-64 off-ramp to Tower Grove Ave. and the westbound I-64 on-ramp from Boyle Ave. were added to the corridor. Besides the improvements mentioned, most of I-64 from Kingshighway Blvd. to Jefferson Ave. is the original infrastructure constructed between the 1930s and 1980s.

1.6 Existing Planning Efforts

The study team reviewed 32 existing planning documents, including reports, plans, and studies, to assess the area's existing and ongoing planning efforts. Efforts include improvements to corridor infrastructure and operations, not just for vehicles but also for bicyclists, pedestrians, and transit, and plans to accommodate and encourage both urban and economic growth to ensure social and environmental equity in implementing new projects. These planning efforts are divided into the following categories: environmental and social, urban development, economic development and land use, multimodal systems, and infrastructure. A list of these planning efforts is provided in Table 1. More information on the goals, objectives, and key recommendations for each document can be found in the Review of Existing Planning Efforts Technical Report in Appendix M.

Table 1. Existing Planning Efforts Review

Efforts	Existing Planning Documents
Environmental and Social	Ecological Approach to Infrastructure Development For The East-West Gateway, 2019
	Environmental Racism in St. Louis, 2019
	Forest Park Southeast Revitalization Plan, 1999
	I-64 – Route 40 Corridor, City of St. Louis And St. Louis County, Final Environmental Impact Statement, 2005

Efforts	Existing Planning Documents
Urban Development, Economic Development, and Land Use	Cortex West Redevelopment Plan, 2005
	Design Downtown STL Master Plan, 2020
	St. Louis Midtown 353 Redevelopment Plan, 2016
	2020 Vision: An Equitable Economic Development Framework For St. Louis, Fall 2020
	Strategic Land Use Plan Of The St. Louis Comprehensive Plan, 2005
	STL 2030 Jobs Plan, 2021
	Cortex 353 & Cortex Tif Ordinances, 2005 & 2010
	Central West End Form-Based District, 2012
	Forest Park Southeast Form-Based District, 2018:
	Parks And Open Space Plan, 2004:
	St. Louis Midtown 353 Redevelopment Plan, 2016
Multimodal Systems	Gateway Bike Plan, 2011
	Gateway Bike Plan Update For The City of St. Louis, 2021
	Brickline Greenway Framework Plan, 2019
	Grand MetroLink Station Technical Assistance Report, 2012
	Downtown St. Louis Transportation Study, 2018:
	City of St. Louis Americans with Disabilities Act Transition Plan, 2020 (Draft)
	Trailnet 2020 Crash Report, 2021
	Grand MetroLink Station, Connecting People To Transit And Development Opportunities, 2021
	Metro Reimagined, 2018
	St. Louis Rapid Connector Transit Study, 2014
	Central Corridor Transit Access Study, 2014:
	Moving Transit Forward: St. Louis' Long Range Transit Plan, 2008
Infrastructure	Transportation Improvement Program Fiscal Years 2022-2025, 2021
	Connected2045 Update, 2019
	Access Justification Report, Interstate 64 Access Modifications At Jefferson Ave., 2018
	I-64 Access Justification Report – Addendum No. 3, 2010
	Northside-Southside MetroLink Corridor Study, 2018

2 Existing Conditions

2.1 Existing Transportation System

The existing transportation system within the Tier 1 and Tier 2 study areas consists of the I-64 mainline, local roadways, bridges, interchanges, and intersections, along with rail, transit, bicycle, and pedestrian facilities. While the focus of this study is I-64, the area is more complex; it is a multimodal system providing essential access to destinations serving a variety of uses. The following sections describe the existing multimodal system within the Tier 1 and Tier 2 study area.

I-64 faces several systematic traffic challenges that affect how people move through the region, city, and corridor. Figure 7 illustrates the types of trips people take to and from the study area. Ease of access to these destinations makes corridor operations integral for the community. Details on how the study team collected and analyzed existing conditions data and specific data analysis and information for the following sections can be found in the Existing Traffic, Safety & Multimodal Conditions Technical Report in Appendix L and the Existing Conditions Report in Appendix K.

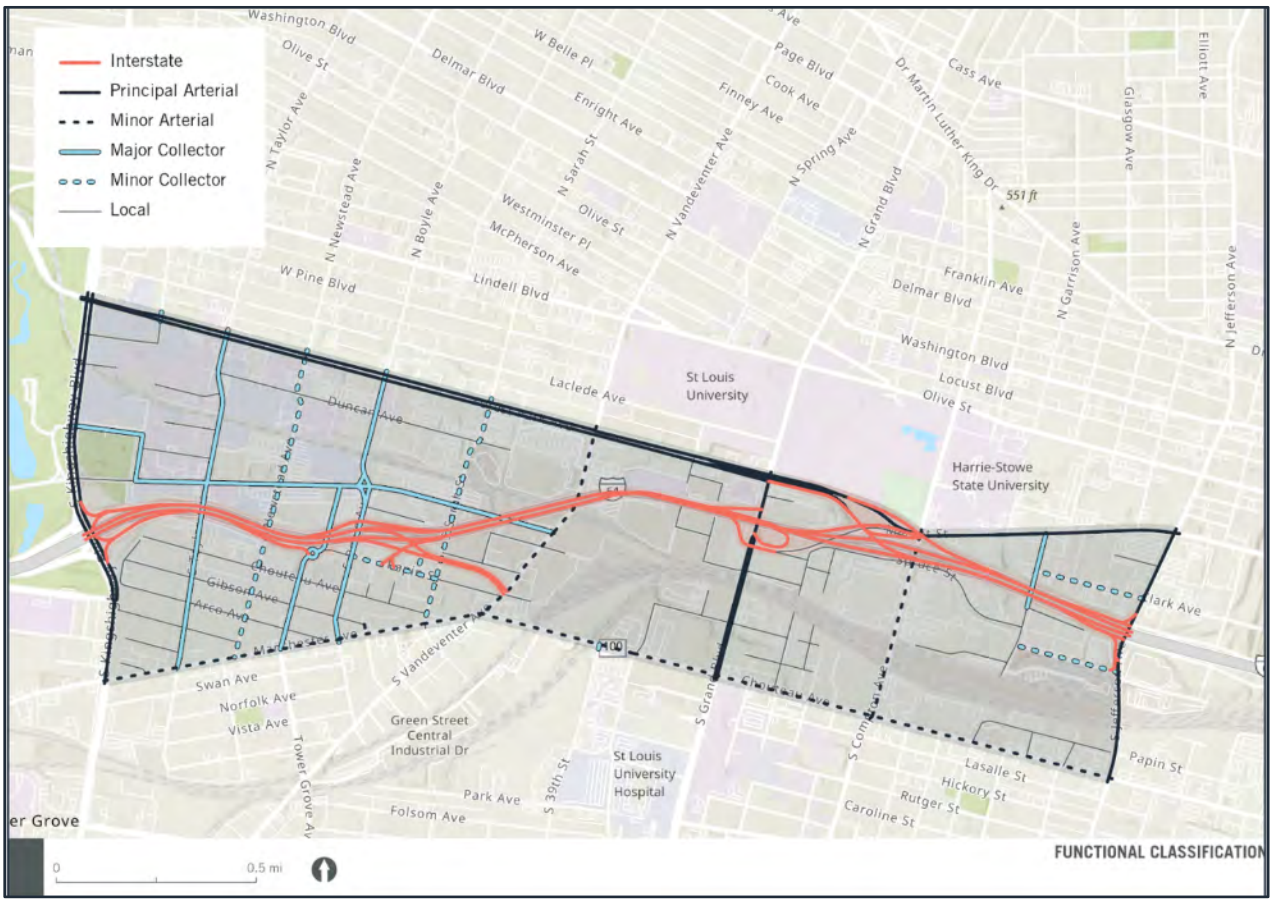
Figure 7. Distribution of Trip Purpose

2.1.1 Roadway Facilities

2.1.1.1 Roadway Network

To better understand the road network within the study area, the functional classification of the roadways was reviewed. The functional classification of roadways defines the nature of the movement of vehicles through a network of roads. The hierarchy of roadways ranges from interstate highways, which are limited access roadways with high speeds and can accommodate a high volume of vehicles, to local neighborhood roads that allow for a level of access but can only accommodate low speeds and low traffic volumes. The functional classifications for the roadways within the study area are shown in Figure 8.

Figure 8. Roadway Classification

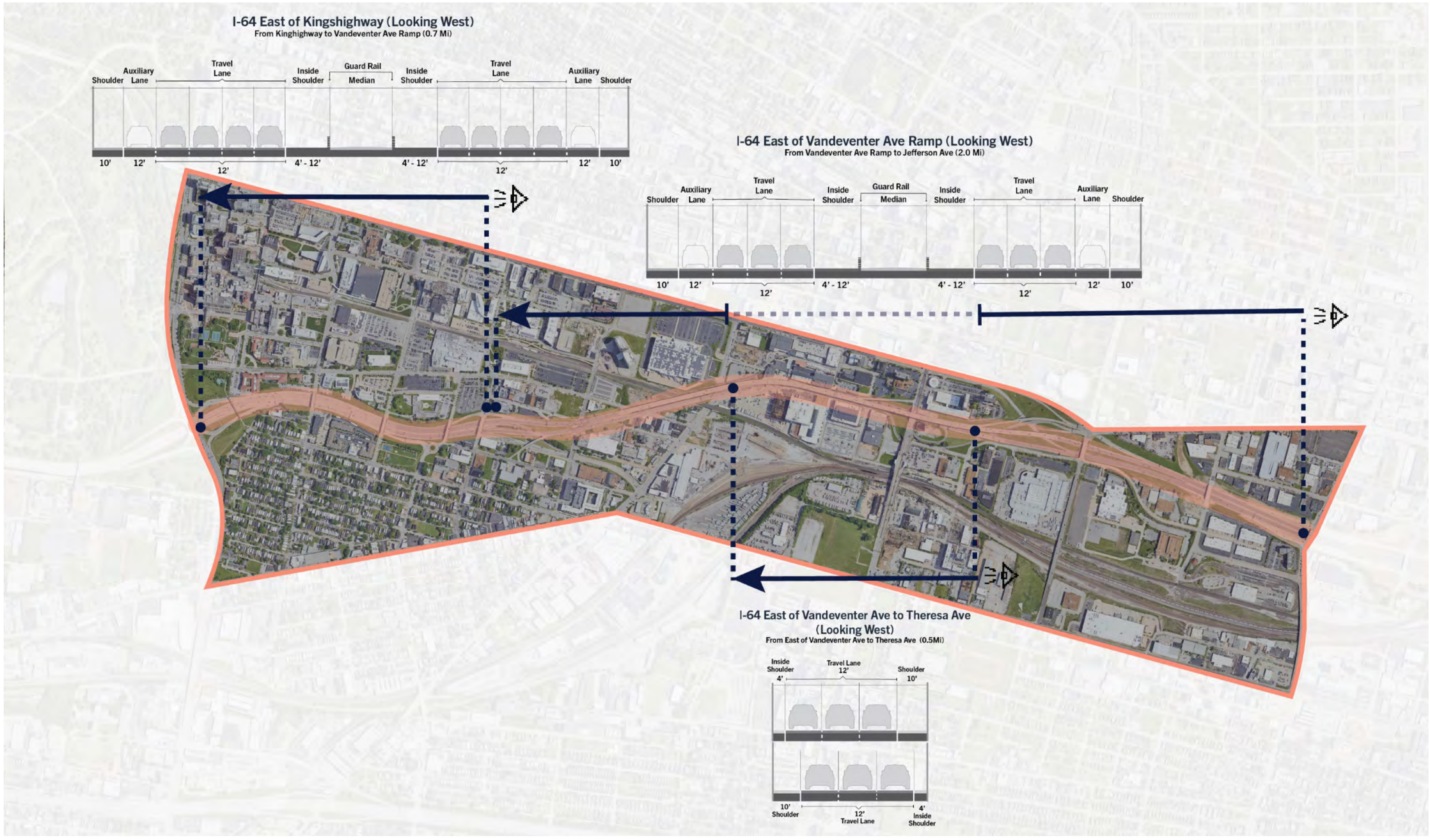


2.1.1.2 I-64 Typical Sections

Generally, I-64 consists of three lanes in each direction throughout the eastern portion of the Tier 1 study area. I-64 expands to four lanes in each direction, generally near Boyle Ave., continuing west beyond the study area (the additional lanes are attributable to the on- and off-ramps associated with Vandeventer Ave.).

The typical section of I-64 has 12-foot lanes. Generally, there are continuous inside and outside shoulders. The inside shoulder varies in width from 4 to 12 feet but generally is 6 to 8 feet wide in most locations. The outside shoulders are consistently 10 feet wide. In general, the ramps to and from I-64 vary in width from 12 to 20 feet. Figure 9 shows the typical sections for I-64 within the Tier 1 study area.

Figure 9. I-64 Typical Sections



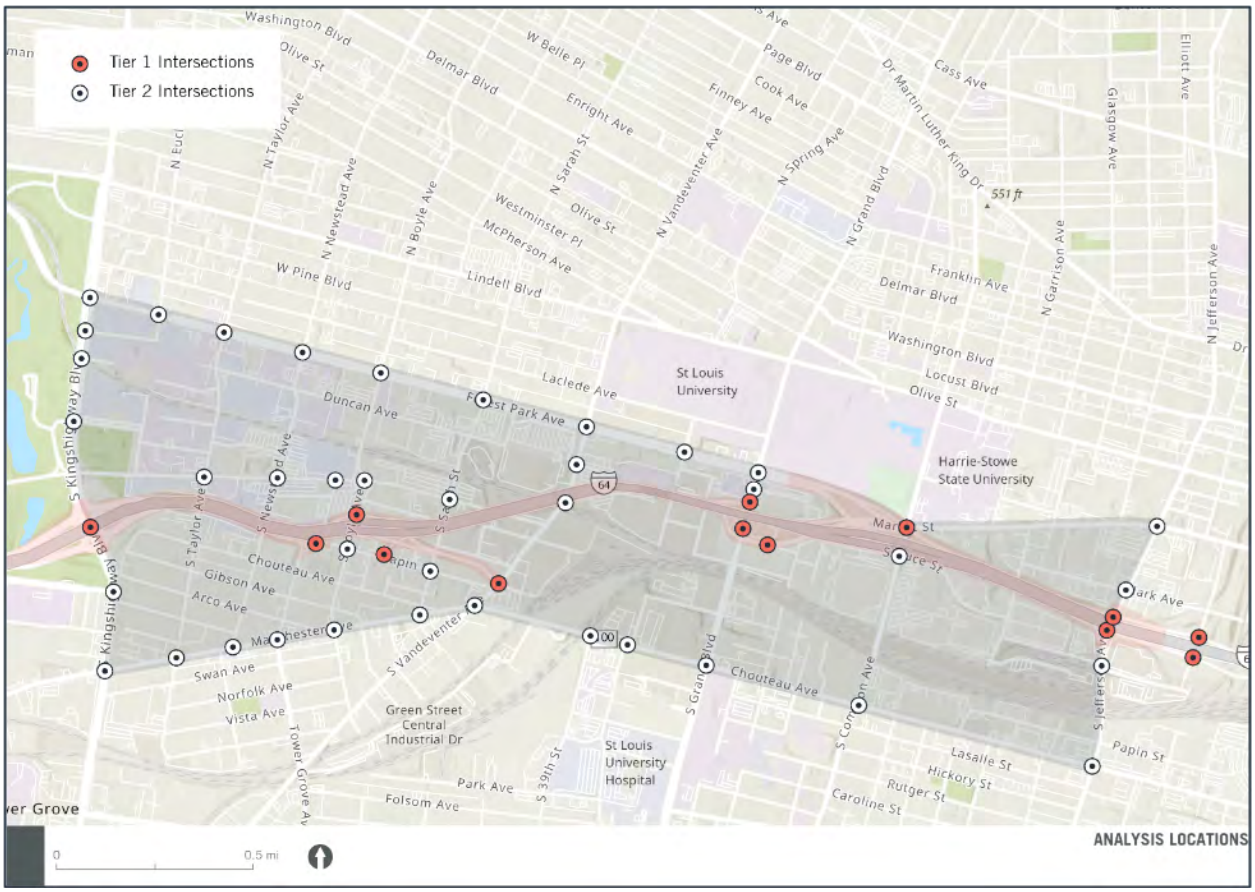
2.1.1.3 Intersections

Within the study area, 52 intersections were included for analysis. Forty-four are signalized, eight are unsignalized, and 13 are I-64 ramp terminals within the Tier 1 study area. The remaining intersections located in the Tier 2 study area are critical intersections regarding operations along the City of St. Louis Street grid system. Figure 10 shows the location of intersections included for analysis within the Tier 1 and Tier 2 study areas.

- Tier 1:
  - I-64 & Kingshighway Blvd. (ramp terminals)
  - I-64 & Boyle Ave. (ramp terminal)
  - I-64 & Tower Grove Ave./Papin St. (roundabout ramp terminal)
  - Papin St. & I-64 on-ramps (ramp terminal)
  - I-64 Ramps/Papin St. & Vandeventer Ave. (ramp terminal)
  - WB I-64 On-ramp & Grand Blvd. (ramp terminal)
  - EB I-64 Off-ramp & Grand Blvd. (ramp terminal)
  - EB I-64 Off-ramp/Market St. & Compton Ave. (ramp terminal)
  - WB I-64 Off-ramp & Forest Park Ave. (ramp terminal)
  - I-64 Ramps & Jefferson Ave. (ramp terminals)
  - I-64 Ramps & 22nd St. (ramp terminals)
- Tier 2:
  - Kingshighway Blvd. & Forest Park Ave.
  - Kingshighway Blvd. & Parkview Pl.
  - Kingshighway Blvd. & Children's Pl.
  - Kingshighway Blvd. & Barnes-Jewish Hospital Plz.
  - Kingshighway Blvd. & Oakland Ave.
  - Kingshighway Blvd. & Rte. 100 (Chouteau Ave./Manchester Ave.)
  - Forest Park Ave. & Euclid Ave.
  - Forest Park Ave. & Taylor Ave.
  - Forest Park Ave. & Newstead Ave.
  - Forest Park Ave. & Boyle Ave.
  - Forest Park Ave. & Sarah St.
  - Forest Park Ave. & Vandeventer Ave.
  - Forest Park Ave. & Spring Ave.
  - Forest Park Ave. & Grand Blvd
  - Clayton Ave. & Taylor Ave.
  - Clayton Ave. & Newstead Ave.
  - Clayton Ave. & Tower Grove Ave.
  - Clayton Ave. & Boyle Ave.
  - Clayton Ave. & Sarah St.

- Papin St. & Boyle Ave.
- Papin St. & Sarah St.
- Rte. 100 (Chouteau Ave./Manchester Ave.) & Taylor Ave.
- Rte. 100 (Chouteau Ave./Manchester Ave.) & Newstead Ave.
- Rte. 100 (Chouteau Ave./Manchester Ave.) & Tower Grove Ave.
- Rte. 100 (Chouteau Ave./Manchester Ave.) & Boyle Ave.
- Rte. 100 (Chouteau Ave./Manchester Ave.) & Sarah St.
- Rte. 100 (Chouteau Ave./Manchester Ave.) & Vandeventer Ave.
- Vandeventer Ave. & Market St.
- Vandeventer Ave. & IKEA Way/Foundry Way
- Rte. 100 (Chouteau Ave./Manchester Ave.) & S 39th St.
- Rte. 100 (Chouteau Ave./Manchester Ave.) & Spring Ave.
- Rte. 100 (Chouteau Ave./Manchester Ave.) & Grand Blvd.
- Rte. 100 (Chouteau Ave./Manchester Ave.) & Compton Ave.
- Rte. 100 (Chouteau Ave./Manchester Ave.) & Jefferson Ave.
- Grand Blvd. & Council Plz.
- Market St. & Bernard St.
- Compton Ave. & Spruce St.
- Jefferson Ave. & Scott Ave.
- Jefferson Ave. & Clark Ave.
- Jefferson Ave. & Market St.

Figure 10. Critical Intersections in the Study Area



2.1.1.4 Interchanges

There are six interchanges located within the Tier 1 study area. The interchanges on I-64 are described in Table 2, along with more information on interchange access, spacing conditions, and analysis. Figure 11 shows the location of the interchange crossings and other crossroad facilities.

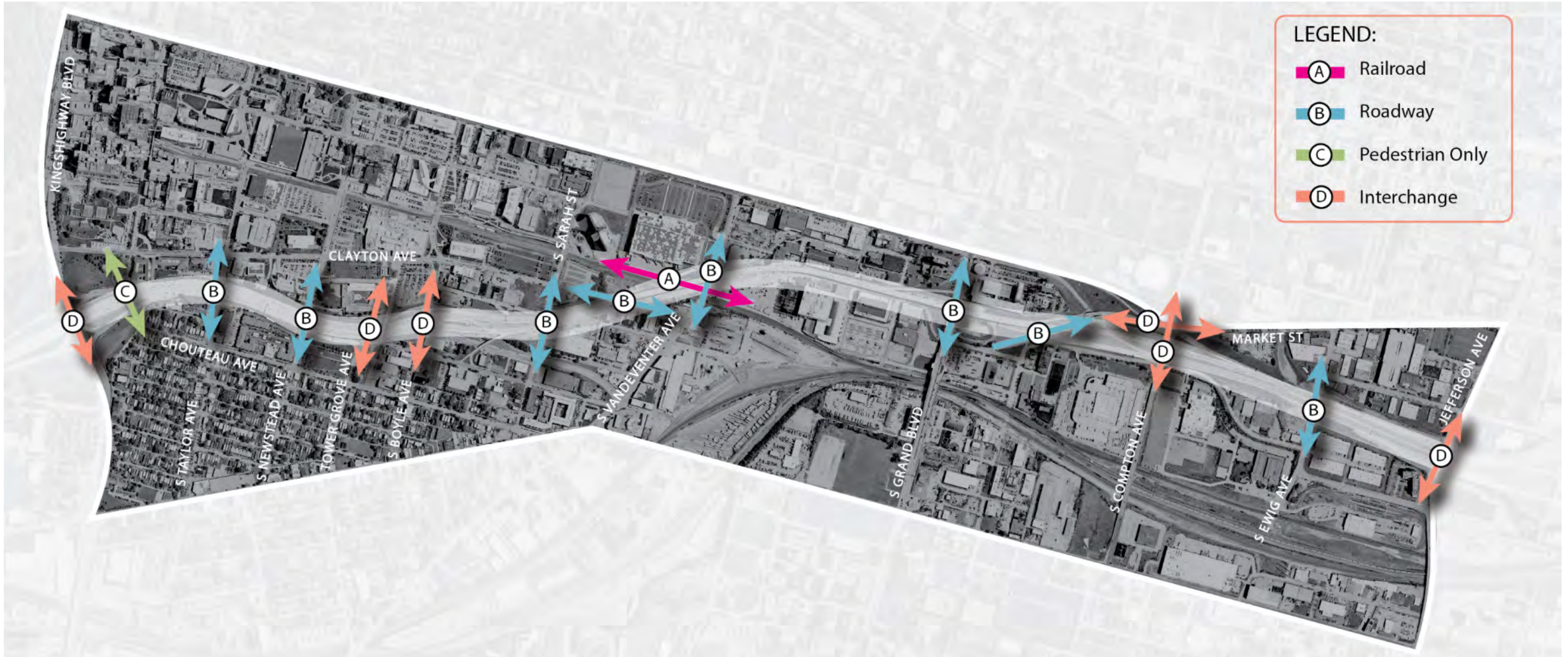
Table 2. I-64 Study Area Interchange Descriptions

Interchange	Description
Kingshighway Blvd.	Single point urban interchange. Beginning of Tier 1 study area. Full access. (0.6 miles to Boyle Ave./Papin St./Tower Grove Ave. interchange)
Tower Grove Ave./Boyle Ave./Papin St.	Tower Grove Ave. provides a single eastbound exit. Boyle Ave. provides a westbound I-64 exit ramp to Boyle Ave. and a westbound I-64 entrance ramp from Boyle Ave. Papin St. provides an entrance ramp to eastbound I-64. Combined, these three routes within 0.15 miles of each other provide full access to I-64. (1.0 mile to Grand Blvd. interchange)

Interchange	Description
Vandeventer Ave.	Partial interchange. Eastbound I-64 exit ramp to Vandeventer Ave. and westbound I-64 entrance ramp from Vandeventer Ave. The entrance ramp is a left entrance. This exit/entrance was one of the original beginnings of the expressway. Ramps are located within the Tower Grove Ave./Boyle Ave./Papin St. interchanges. The exit ramp for Vandeventer Ave. is 0.25 miles from the end of Kingshighway Blvd., merging from the continuous auxiliary lane. (1.0 mile to Grand Blvd. interchange)
Grand Blvd./Forest Park Ave.	Directly from Grand Blvd., there is a westbound I-64 entrance ramp and an eastbound I-64 exit ramp. Forest Park Ave. provides access through a westbound I-64 exit ramp and an eastbound I-64 entrance ramp. Forest Park Ave. has a direct connection to Grand Blvd. and, when combined, provides complete access to I-64. (0.4 miles to Market St./Compton Ave. interchange)
Bernard St./Compton Ave./Market St.	Partial interchange. Ramps grade separated from I-64 mainline and ramps servicing Forest Park Ave. Eastbound I-64 exit ramp to Bernard St./Market St. located west of Grand Blvd. I-64 entrance ramp from Market St. (0.6 miles to Jefferson Ave. interchange)
Jefferson Ave.	A split diamond interchange with 22nd St. provides full access to I-64. Slip ramps. End of the Tier 1 study area.

Note: Full Access means the interchange provides access for all on and off movements from the adjacent roadway system. Partial Access means the interchange provides access to some on or off movements from the adjacent roadway system but not all.

Figure 11. Crossroad Facilities



2.1.1.5 Crossroad Facilities

Non-interchange crossings include roadways, railroads, and pedestrian facilities that cross I-64. MoDOT owns only the crossroad facilities within the MoDOT right-of-way. The remaining facilities outside the right-of-way are owned and maintained by the City of St. Louis, except for the railroad crossing owned by Metro. A complete list of these crossroads can be found in Table 3.

Table 3. Crossroad Facilities to I-64 (From East to West)

Crossroad	Crossing Description	Functional Classification	Vertical Clearance
Kingshighway Blvd.	Service Interchange Overpass	Principal Arterial	15'6"
Chouteau Ave./Clayton Ave.	Pedestrian Overpass	Pedestrian Only	17'7"
Taylor Ave.	Overpass	Major Collector	15'6"
Newstead Ave.	Overpass	Minor Collector	15'6"
Tower Grove Ave.	Service Interchange Overpass	Major Collector	15'11" minimum clearance on-ramp
Boyle Ave.	Service Interchange Overpass	Major Collector	15'9"
Sarah St.	Underpass	Minor Collector	15'6"
Clayton Ave.	Underpass	Major Collector	26'6"
Metro Tracks	Underpass	Railroad	22'1"
Vandeventer Ave.	Underpass	Minor Arterial	19'0"
Grand Blvd.	Underpass	Principal Arterial	18'10"
Market St. eastbound	Underpass	Principal Arterial	18'0"
Market St.	Service Interchange Overpass	Principal Arterial	21'3"
Compton Ave.	Service Interchange Overpass	Minor Arterial	15'11"
Ewing Ave.	Overpass	Major Collector	16'5"
Jefferson Ave.	Service Interchange Overpass	Principal Arterial	16'7"

2.1.2 Bicycle and Pedestrian Facilities

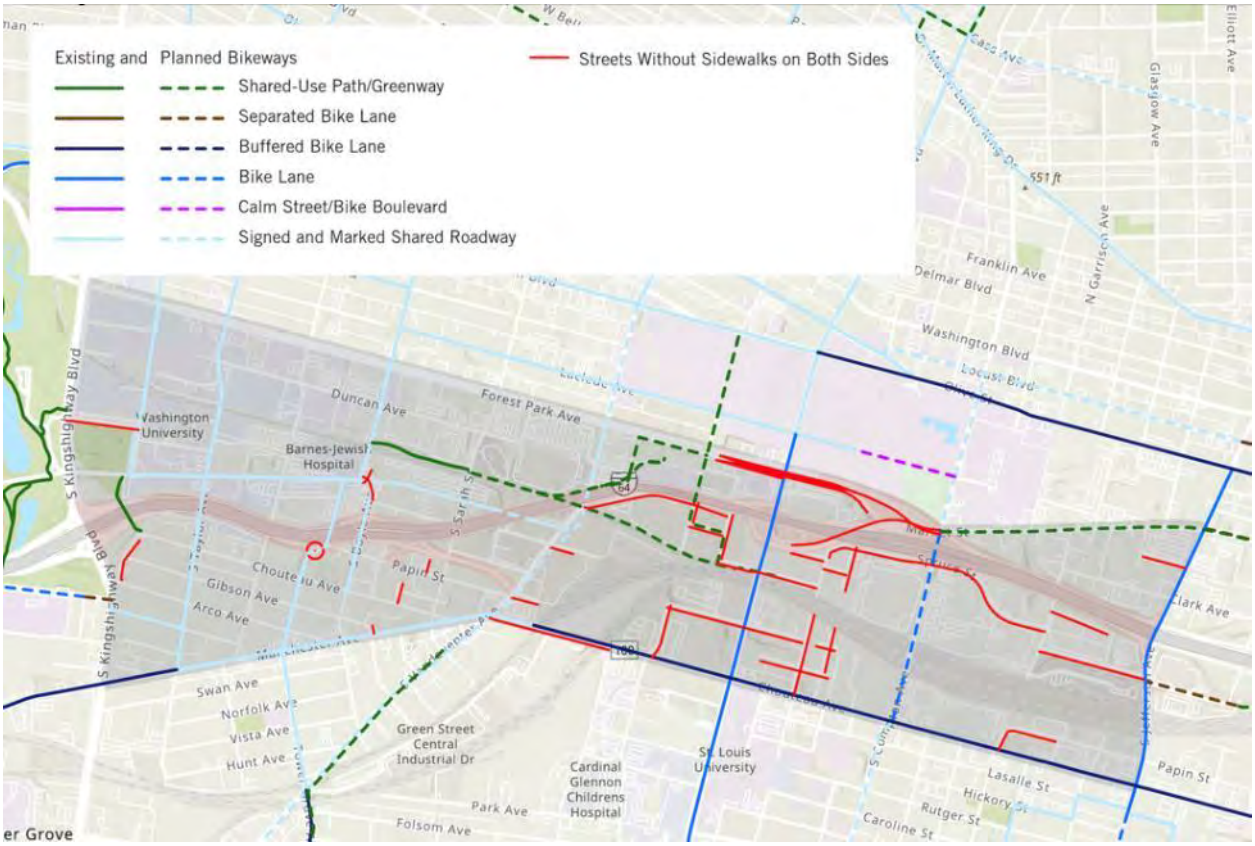
There are approximately seven miles of existing on-street bikeways and shared-use paths in the Tier 2 study area, as shown in Table 4. The majority of these facilities (3.8 miles, 54%) have shared lane markings and directional wayfinding signs. These bikeways are typically located on local and collector streets, such as Taylor Ave., Clayton Ave., and Tower Grove Ave., but can also be found on Manchester Ave., a minor arterial. There are nearly three miles of standard and buffered bike lanes in the study area, located on Manchester Ave., Chouteau Ave., Grand Blvd., and Jefferson Ave. The 0.4 miles of shared-use paths consist of two individual paths—the short section of the Brickline Greenway between Boyle Ave. and Sarah St., and the bicycle and pedestrian bridge over I-64 connecting Chouteau Ave. to the intersection of Clayton Ave. and Euclid Ave.

Table 4. Existing Bicycle Facilities by Facility Type

Facility Type	Existing Miles	Percent of All Existing Facilities
Signed and Marked Shared Roadway	3.82	54%
Standard Bike Lane	1.19	17%
Buffered Bike Lane	1.69	24%
Shared-Use Path	0.40	5%
Total	7.10	100%

The existing network of bicycle facilities in the study area reflects the iterative process of facility and network development in the City of St. Louis. Existing and planned bicycle facilities are shown in Figure 12.

Figure 12. Existing and Planned Bicycle Facilities



Some bicycle and pedestrian facility projects are currently underway; the Great River Greenway, for example, is in the planning stages for the Brickline Greenway, which will provide an east-west alignment through the Tier 2 study area, ultimately connecting Forest Park to Downtown St. Louis and Gateway National Park.

Concrete sidewalks exist on practically all city surface streets within the Tier 2 limits and provide connectivity on nearly all the surface streets, overpasses, and underpasses crossing I-64. All the I-64 north-south overpass bridges from Kingshighway Blvd. to Jefferson Ave. have been recently

reconstructed and include a sidewalk on both sides of the street either behind a six-inch curb or with concrete barrier separation. Surface street crossings underneath I-64 have sidewalks.

2.1.3 Transit System

The Tier 2 study area has traditionally been served by one transit district, Metro Transit (Metro). Metro, an enterprise of the Bi-State Development Agency, was created through a compact between the States of Missouri and Illinois, ratified by the United States Congress in 1949. Metro operations are supported by passenger fares, sales taxes from St. Louis City and County, with funding from the St. Clair County Transit District, and federal and state grants. Metro owns and operates the St. Louis Metropolitan region's public transportation system, which includes MetroLink, the region's light rail system; MetroBus, the region's bus system; and Metro Call-A-Ride, the region's paratransit system. All three services—MetroLink, MetroBus, and Metro Call-A-Ride—operate in the study area.

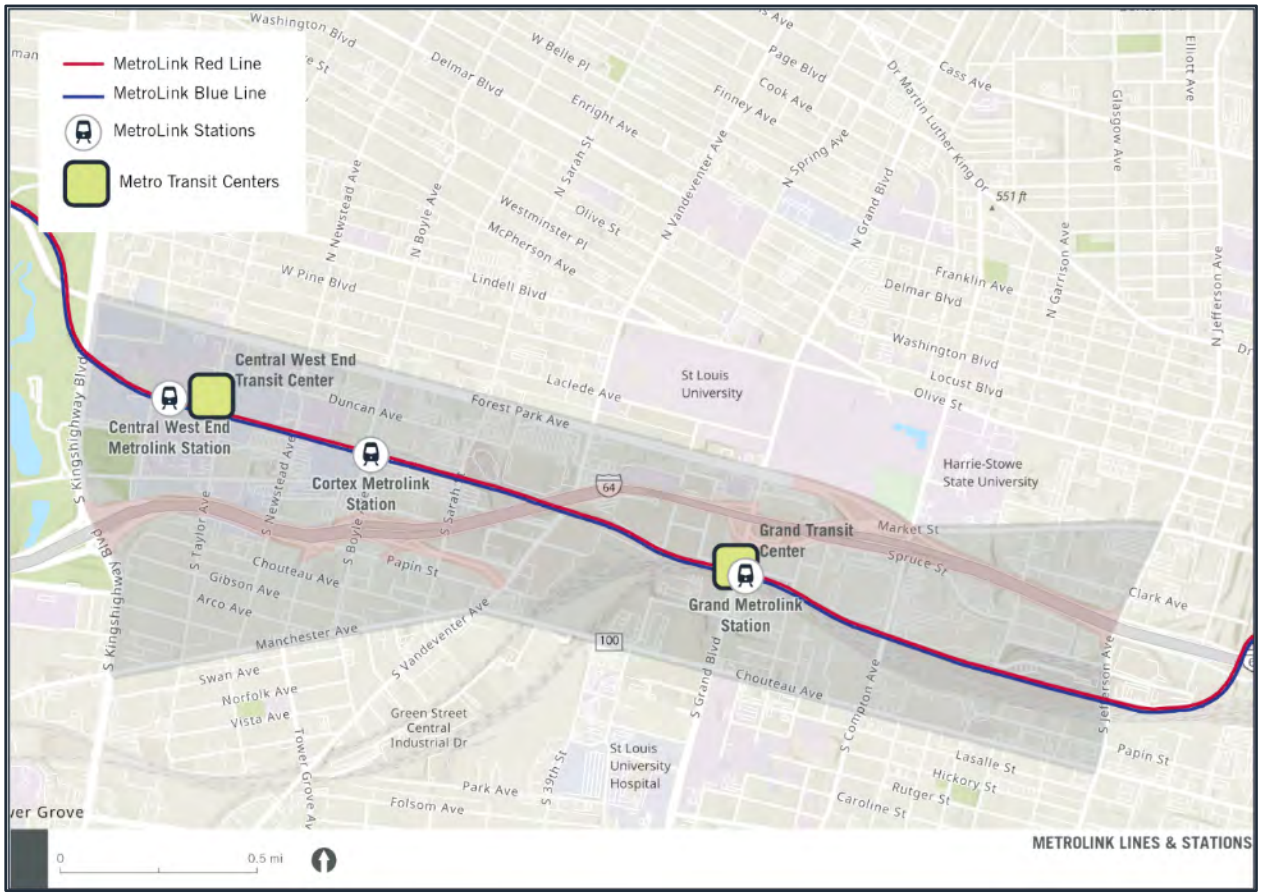
2.1.3.1 MetroLink

MetroLink currently operates two light rail lines (Red Line and Blue Line) with 38 stations (27 in Missouri and 11 in Illinois), as summarized in Table 5**.** The study area has two light rail lines and three light rail stations (see Figure 13). The Red Line and Blue Line service all three MetroLink stations in the study area—Grand, Cortex, and Central West End.

Table 5. MetroLink Routes in the Study Area

Route Name	Start Point	End Point	Headway (minutes)
Red Line	Lambert Airport	Shiloh-Scott	15-20
Blue Line	Shrewsbury	Fairview Heights	15-20

Figure 13. MetroLink Stops and Service within the Tier 2 Study Area



2.1.3.2 MetroBus

MetroBus currently operates 59 routes, with 47 serving Missouri and 12 in Illinois. There are 11 MetroBus routes with 64 stops within the study area (see Figure 14). Route details are provided in Table 6.

Figure 14. MetroBus Stops and Routes within the Tier 2 Study Area

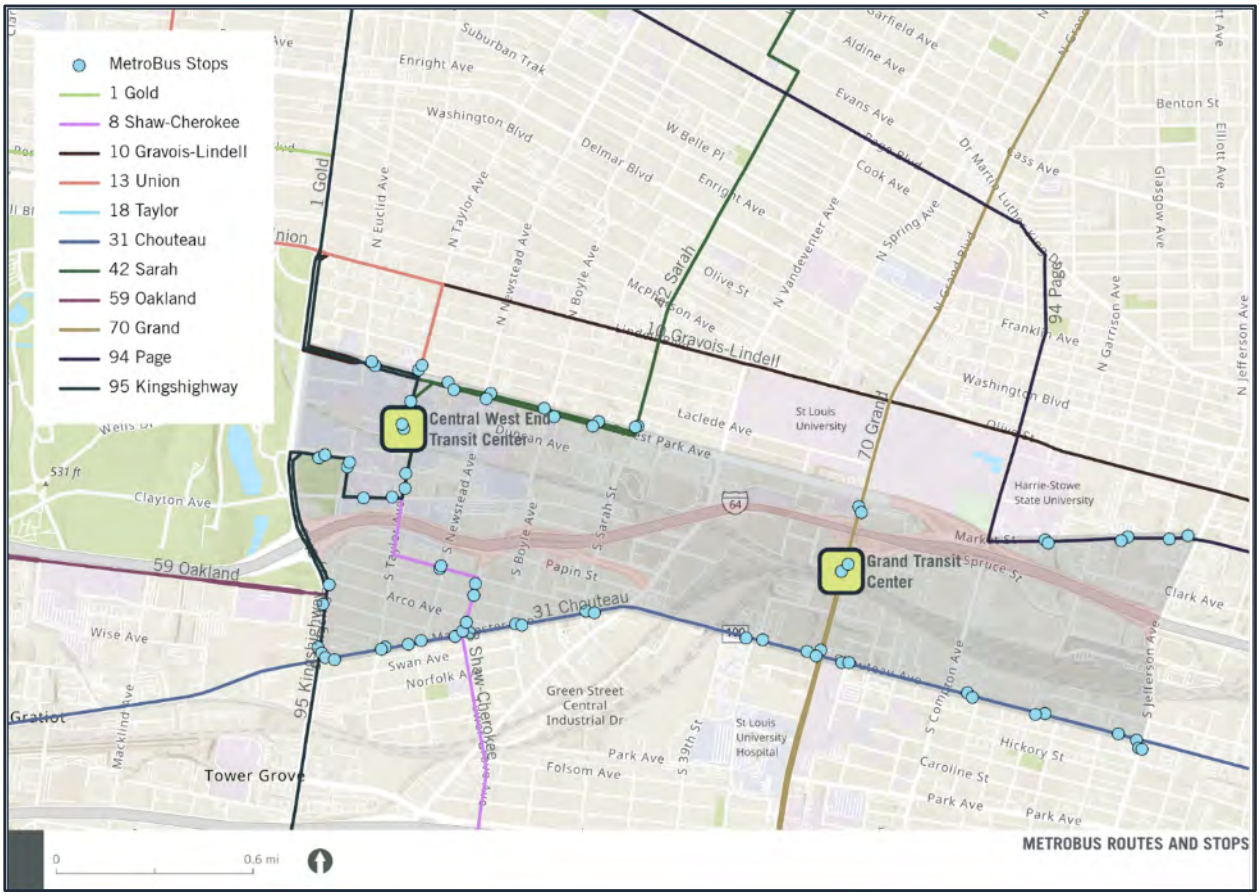


Table 6. MetroBus Routes within the Tier 2 Study Area

Route No.	Route Name	Start Point	End Point	Headway (mins)
1	Gold	Mallinckrodt Center	Central West End Transit Center	60
8	Shaw-Cherokee	Catalan Transit Center	Central West End Transit Center	60
10	Gravois-Lindell	Hampton-Gravois Transit Center	Lindell & Grand	30
13	Union	Central West End Transit Center	Union and West Florissant	60
18	Taylor	Central West End Transit Center	O'Fallon Park Rec Center	60
31	Chouteau	Maplewood Transit Center	Civic Center Transit Center	60
42	Sarah	Central West End Transit Center	West Florissant & Fair	60
59	Oakland	Highland Terrace & Richmond Center	Central West End Transit Center	60
70	Grand	Loughborough Commons	Broadway-Taylor Transit Center	20
94	Page	Lackland & Altom Center	Civic Center Transit Center	30
95	Kingshighway	Hampton-Gravois Transit Center	Broadway-Taylor Transit Center	20

2.2 Existing Community Conditions

Investment in improvements along I-64 has the potential to create a positive social impact beyond the economic impact of construction spending and opportunities for real estate development. The study team completed a Community Assessment to better understand the corridor's economic and social conditions. The following section highlights key findings from the Community Assessment and documentation of the effort, including the Community Assessment Baseline Memorandum in Appendix G.

For the Community Assessment, a broader study area (not inclusive of the Tier 2 study area) was established that incorporates several neighborhoods north and south of the I-64 study area. Figure 15 shows the Community Assessment study area. Table 7 shows key community metrics for the City of St. Louis, the Community Assessment study area, and the Tier 2 study area.

Figure 15. Community Assessment Study Area

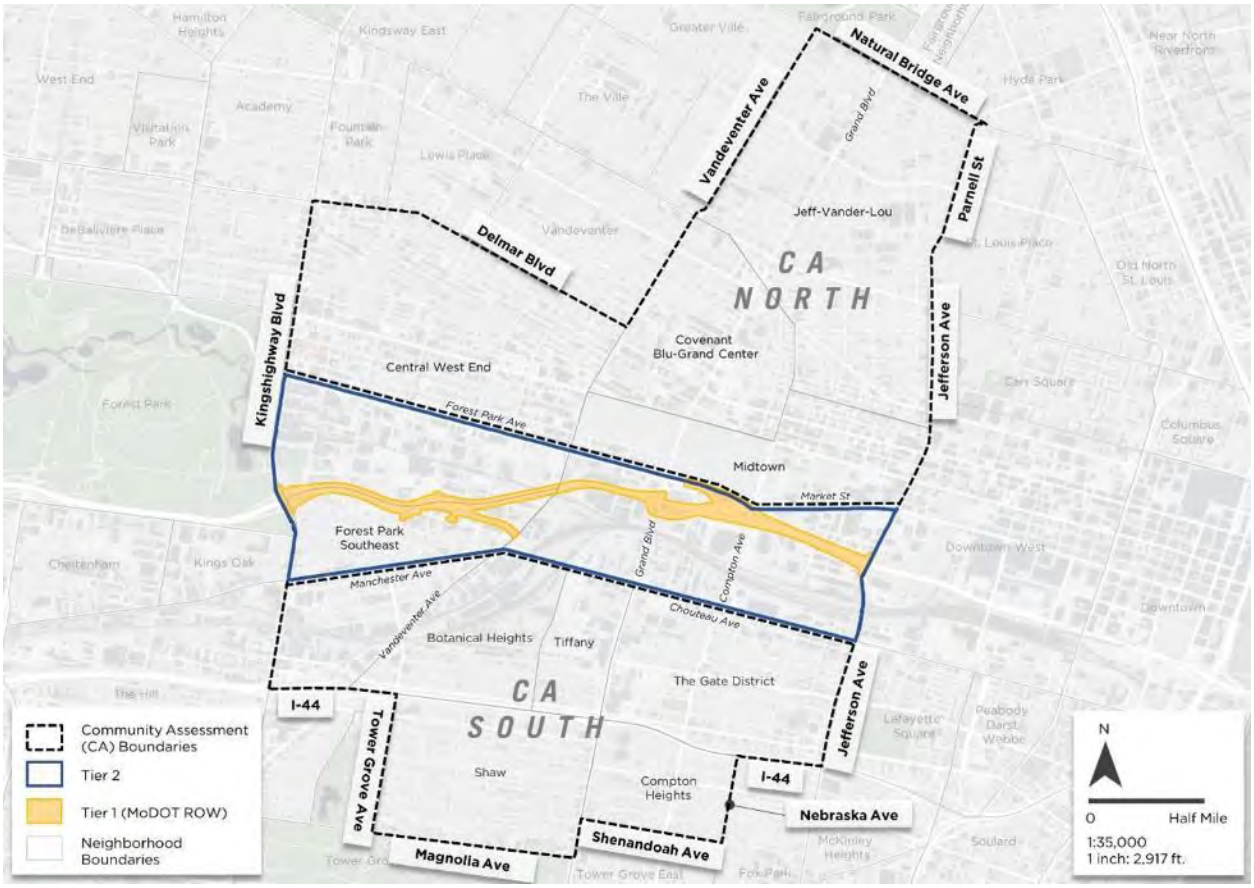


Table 7. Community Assessment Key Metrics

Key Metrics	City of St. Louis	Community Assessment Study Area	Tier 2 Study Area
Population	309,000	42,100	4,300
Employment	249,000	57,600	26,900
Population Growth (2010-2021)	-3.2%	3.3%	18.7%

Key Metrics	City of St. Louis	Community Assessment Study Area	Tier 2 Study Area
Median Household Income	$48,000	$49,300	$37,700
Total Households	176,000	24,300	2,500

Commute Trends: 95% of workers within the Community Assessment study area commute from outside the area; 89% of residents within the Community Assessment study area work outside the area; 99% of workers within the Tier 2 study area commute from outside the area.

2.2.1 Regional Anchors

The Community Assessment study area and Tier 2 study area contain nine regional economic anchors:

- BJC Healthcare
- Washington University School of Medicine
- SSM Health St. Louis Hospital
- Cortex Innovation Community
- Grand Center
- St. Louis University
- IKEA
- City Foundry
- Harris-Stowe State University

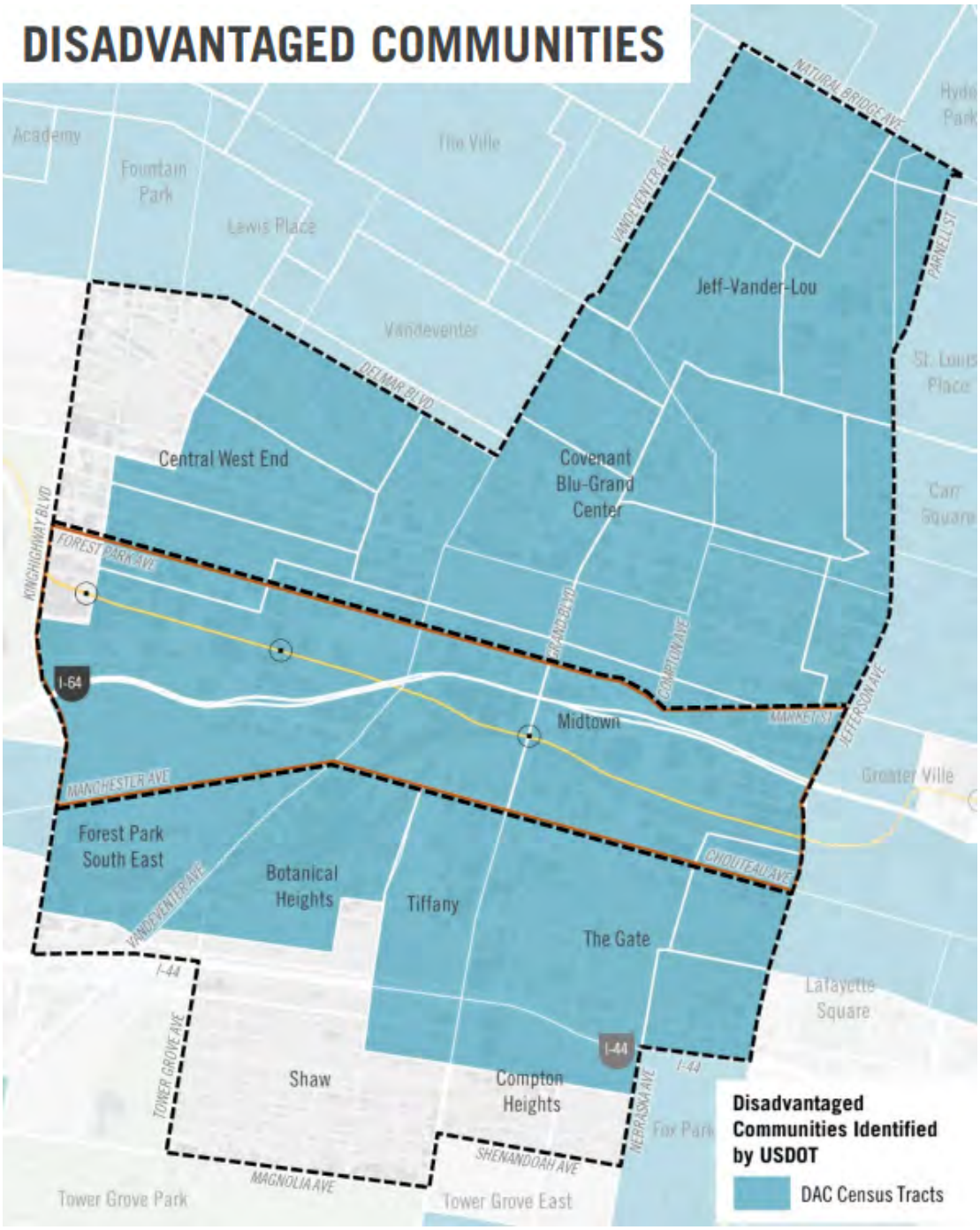
These anchors are important to the local and regional economy, generating substantial economic activity, including employment, education, entertainment, and retail. These anchors also produce a substantial number of trips due to commuting and visits from customers, students, and patients. Future housing development will create more opportunities for commuters to walk and bike to work.

The project developed an assessment to evaluate transportation equity within the Community Assessment study area. The assessment included identifying disadvantaged communities, a vulnerability index, and a housing and transportation affordability index.

2.2.2 Disadvantages Communities

Except for portions of Shaw, Compton Heights, and Central West End, the entire Community Assessment study area consists of the U.S. Department of Transportation designated disadvantaged communities (see Figure 16).

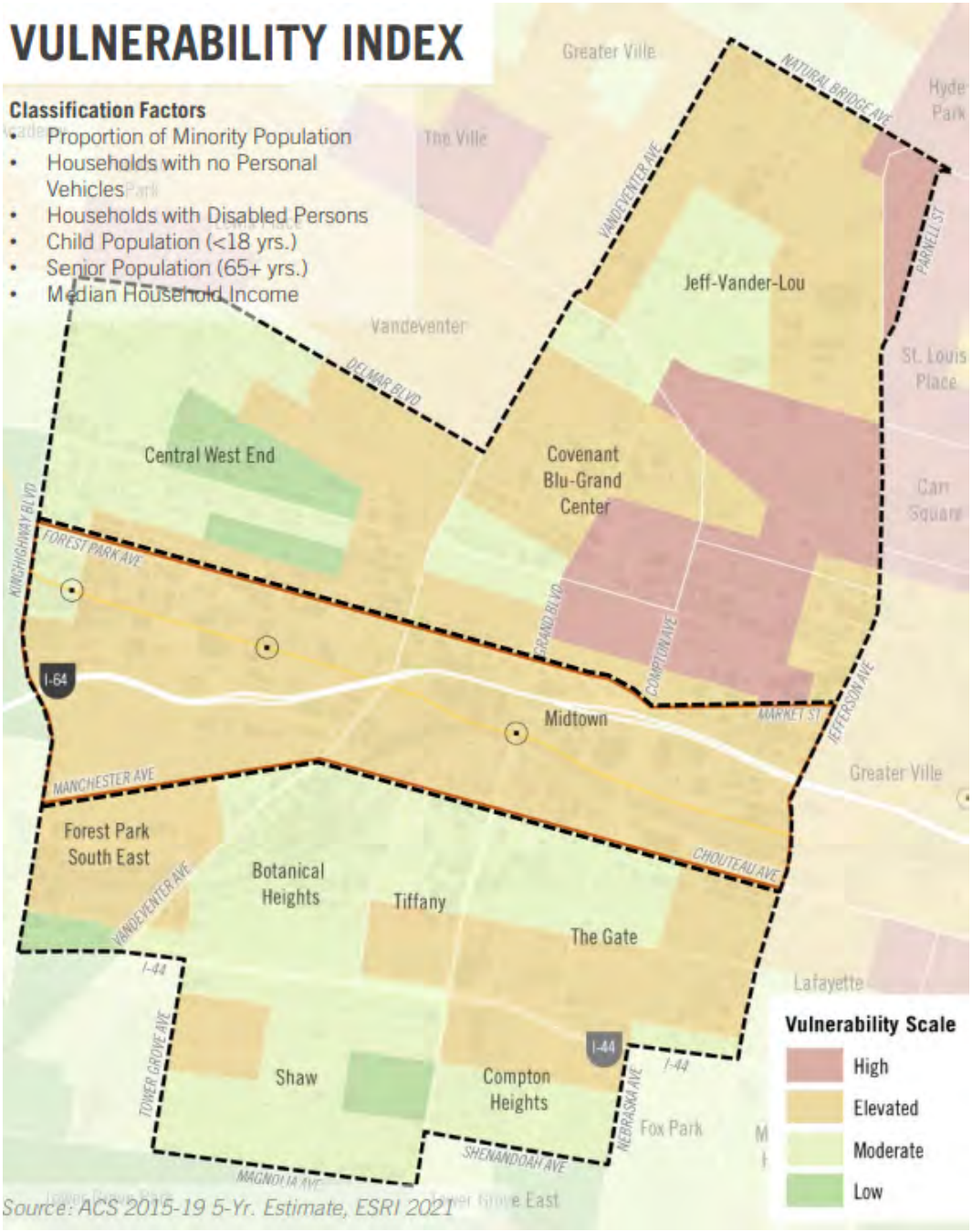
Figure 16. Disadvantaged Communities



2.2.3 Vulnerability Index

The composite map was created from data representing populations that have historically been under-represented in transportation improvements or have a higher dependence on public investments in transportation because of their income, age, or disability. The Covenant Blu Grand Center area has a high vulnerability scale score (see Figure 17).

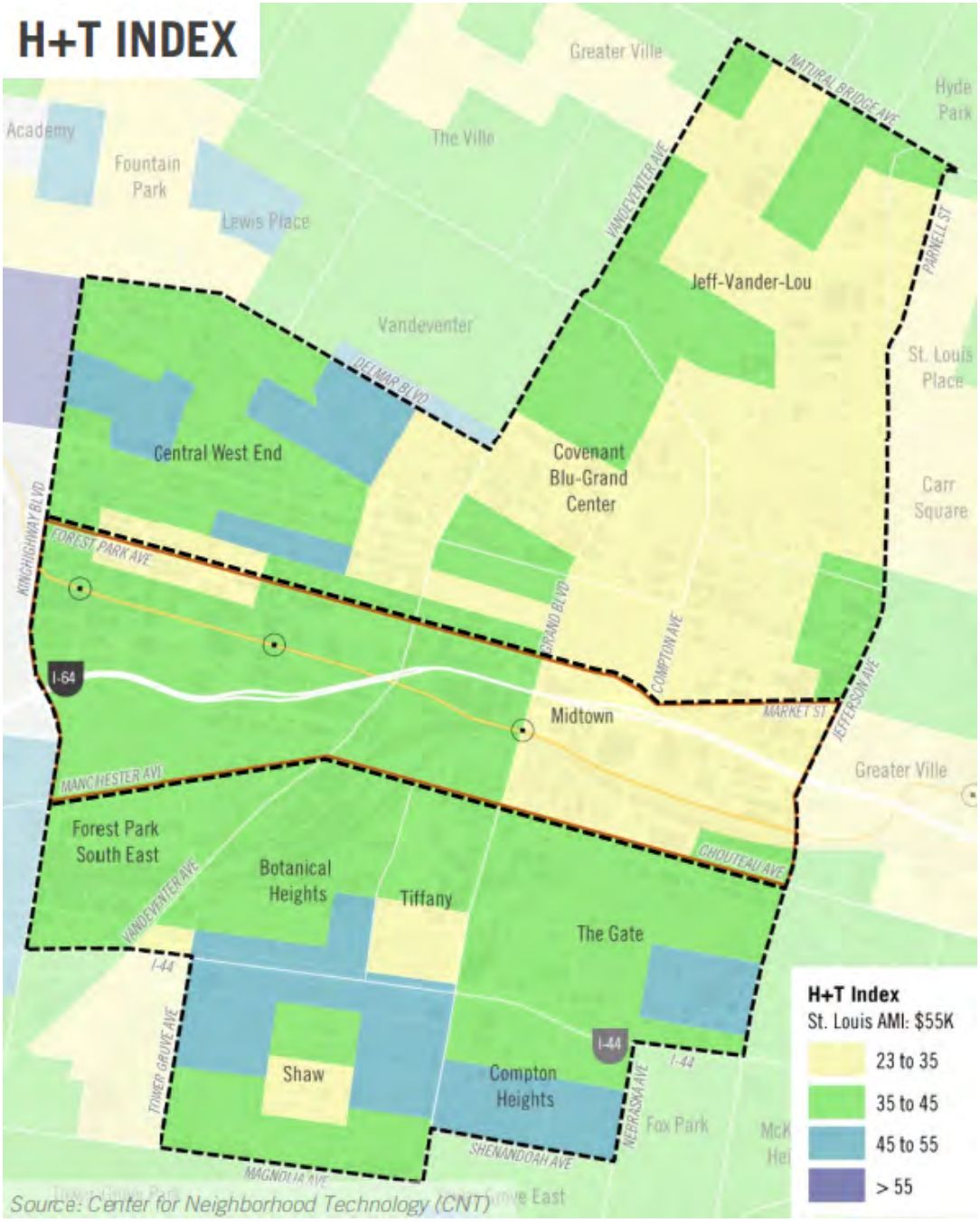
Figure 17. Vulnerability Index



2.2.4 Housing and Transportation Affordability Index

Given the higher housing costs and population density in Central West End and neighborhoods south of the Tier 2 study area, there is a higher number of cost-burdened households in these areas compared to areas around Covenant Blu Grand Center and Jeff-Vander-Lou (see Figure 18).

Figure 18. House and Transportation Affordability Index



3 Purpose and Need Statement and Other Project Goals

Based on the corridor's existing conditions, the study team developed a Purpose and Need statement for the project. The needs are the key problems and the causes of those problems that MoDOT seeks to address with transportation improvements on I-64 between Kingshighway Blvd. and Jefferson Ave.

A properly drafted Purpose and Need statement should lead to consideration of the reasonable alternatives to the proposed action, consistent with NEPA's requirements.

The needs are used to screen reasonable alternatives. The draft statement was shared at the May 2022 Public Meeting and at the May 2022 Community and Technical Advisory Group meetings. The feedback at those meetings provided support for the Purpose and Need as well as additional non-transportation community and stakeholder desires, which became the additional project goals. The project goals provide additional guidance for assessing alternatives based on stakeholder and community input.

The needs for the project are the following. Section 3.2 further describes the project needs.

1. Increase safety for all users.
2. Improve transportation system with intuitive navigation to, from, and across I-64.
3. Reduce the barrier effect of I-64 for bicycle, pedestrian, and transit users.
4. Optimize bridge maintenance by improving structural conditions to maintain a good state of repair.
5. Maintain Interstate function, operations, and capacity for the future.

3.1 Purpose

The purpose of the reasonable transportation improvements on I-64 between Kingshighway Blvd. and Jefferson Ave. is to renew and modify the transportation system to have safe and reliable facilities for all users that improve access to destinations and support community vitality for the long term.

3.2 Needs

3.2.1 Increase Safety for All Users

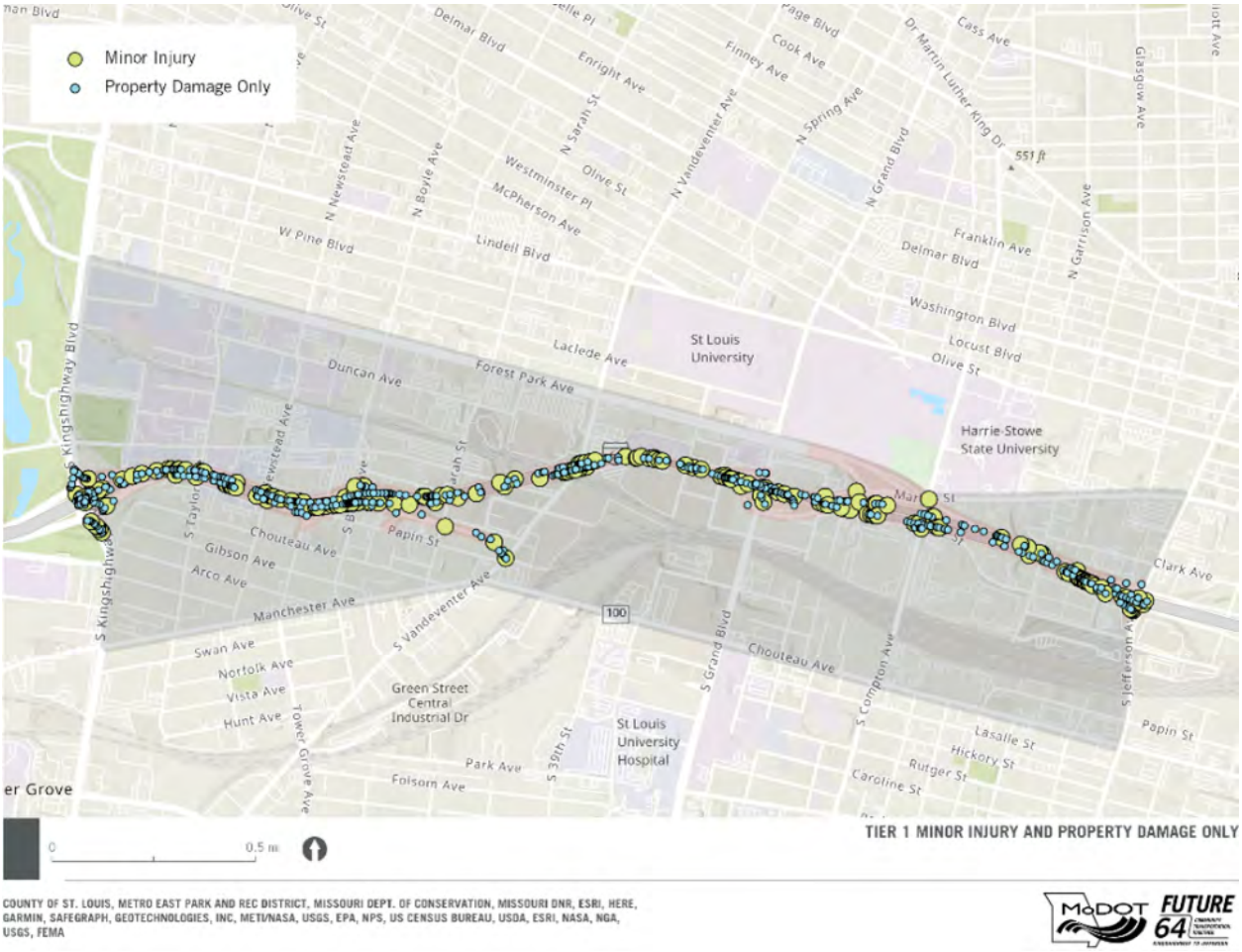
3.2.1.1 Provide Safe Regional Vehicular Movements

3.2.1.1.1 Improve Mainline Safety

Between 2016 and 2020, 1,300 crashes occurred in the Tier 1 study area, with the most common crash type being rear-ended (39%) or out-of-control (25%), likely due to high speeds. Property damage only (75%) was the most common crash severity, followed by minor injury (23%), suspected serious/disability injury (2%), and fatal (0.2%). Figure 19 and Figure 20 show the location of crashes by crash severity.

Figure 19. Tier 1 Fatal and Serious Crashes – 2016 to 2020

Figure 20. Tier 1 Minor Injury and Property Damage Crashes – 2016 to 2020



3.2.1.1.2 Provide adequate spacing between interchanges

Four sections of I-64 between interchanges within the project limits have a substandard spacing of less than 1 mile between them, which increases the risk of crashes due to short distances for merging and exiting vehicles. Locations include Kingshighway Blvd. to Boyle Ave./Papin St./Tower Grove Ave., Grand Blvd. to Market St./Compton Ave., Bernard St./Compton Ave./Market St. to Jefferson Ave., and Forest Park Ave. to Jefferson Ave.

3.2.1.1.3 Reduce vehicular conflict points and improve access to MoDOT's right-of-way

Between 2016 and 2020, 2,966 crashes occurred in the Tier 2 study area, with the most common crash type being rear-ended (33%) and passing crashes (15%). Property damage only (74%) was the most common crash severity, followed by minor injury (24%), suspected serious/ disabling injury (1%), and fatal (0.1%). Figure 21 and Figure 22 show the location of crashes by crash severity.

Figure 21. Tier 2 Fatal and Serious Crashes - 2016 to 2020

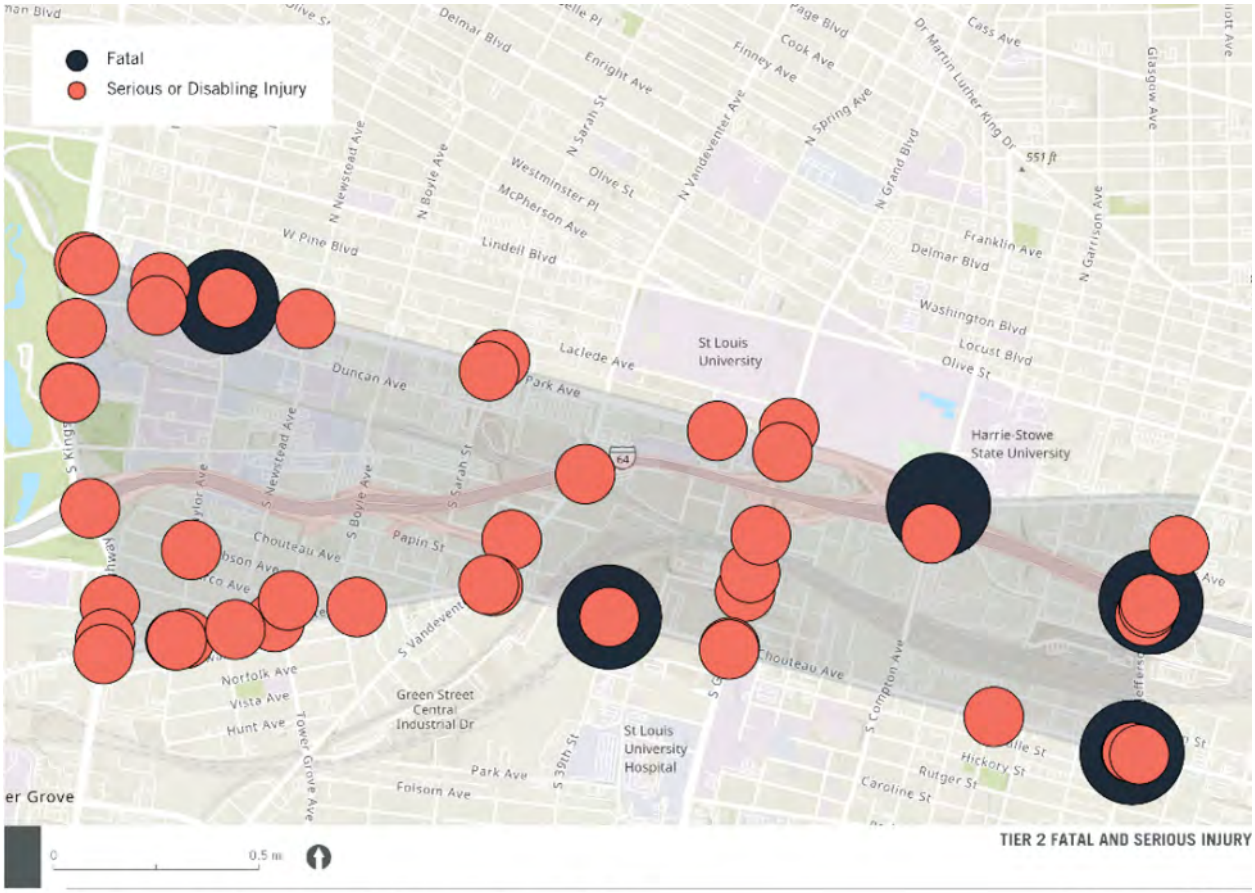


Figure 22. Tier 2 Minor Injury and Property Damage Crashes - 2016 to 2020

Severe crash hot spots, locations of high crash frequency and severity, include I-64 between Grand Blvd. and Vandeventer Ave., Grand Blvd. near Chouteau Ave., Chouteau Ave. at Theresa Ave., Chouteau Ave. at Compton Ave., and Jefferson Ave. near I-64.

Property damage-only crash hot spots include Grand Blvd. near I-64 and Vandeventer Ave. near Papin St. and the I-64 ramps.

A higher-than-expected crash frequency is experienced along Jefferson Ave., Grand Blvd., Vandeventer Ave., Kingshighway Blvd., and at I-64 ramp intersections. Figure 23 shows the roadways with higher-than-expected crash frequency. Comparatively high crash frequency locations include:

- I-64 & Jefferson Ave.
- I-64 & Grand Blvd.
- I-64 & Vandeventer Ave.
- I-64 & Kingshighway Blvd.
- Chouteau Ave. & Jefferson Ave.
- Forest Park Ave. & Grand Blvd.
- Grand Blvd. & Chouteau Ave.
- Chouteau Ave. & Vandeventer Ave.

- Kingshighway Blvd. & Forest Park Ave.
- Kingshighway Blvd. & Hospital Drive.
- Chouteau Ave. & Kingshighway Blvd.

Figure 23. Critical Crash Rates Compared to Statewide Average Critical Crash Rate

3.2.1.1.4 Address substandard roadway geometry

Addressing substandard roadway geometry, which contributes to increased crash likelihood, including the following:

- Westbound I-64 has 2.7 miles of inside shoulder, less than the standard of 10 feet
- Eastbound I-64 has 2.4 miles of inside shoulder, less than the standard 10 feet
- Six curves located on I-64, and 10 curves on ramps with substandard stopping sight distance
- Five ramps with acceleration or deceleration lengths below the AASHTO Green Book (7th Edition, 2018) recommendation
- Seven curves located on I-64, and 17 curves on ramps with superelevation that do not meet the posted speed

- Seven vertical curves located on I-64 and 11 curves on ramps are substandard for the posted speed

3.2.1.2 Accommodate safe and comfortable trips for pedestrians and bikes and other road users across the I-64 corridor

3.2.1.2.1 Reduce bicycle and pedestrian conflict points and increase safety for non-automobile users

Within the study area, there were four crashes in the Tier 1 study area and 119 crashes in the Tier 2 study area between 2016 and 2020 involving a pedestrian or bicyclist, with 90% of those crashes resulting in injury (108 crashes) or fatality (2 crashes). Crashes involving bicyclists and pedestrians are observed at high frequencies at the following locations:

- Kingshighway Blvd., adjacent to the BJC campus and Forest Park Ave.
- Kingshighway Blvd. and I-64 interchange
- Forest Park Ave. at intersections with Grand Blvd., Sarah St., and Taylor Ave.
- Grand Blvd. between I-64 and Chouteau Ave., near the Metro transit station

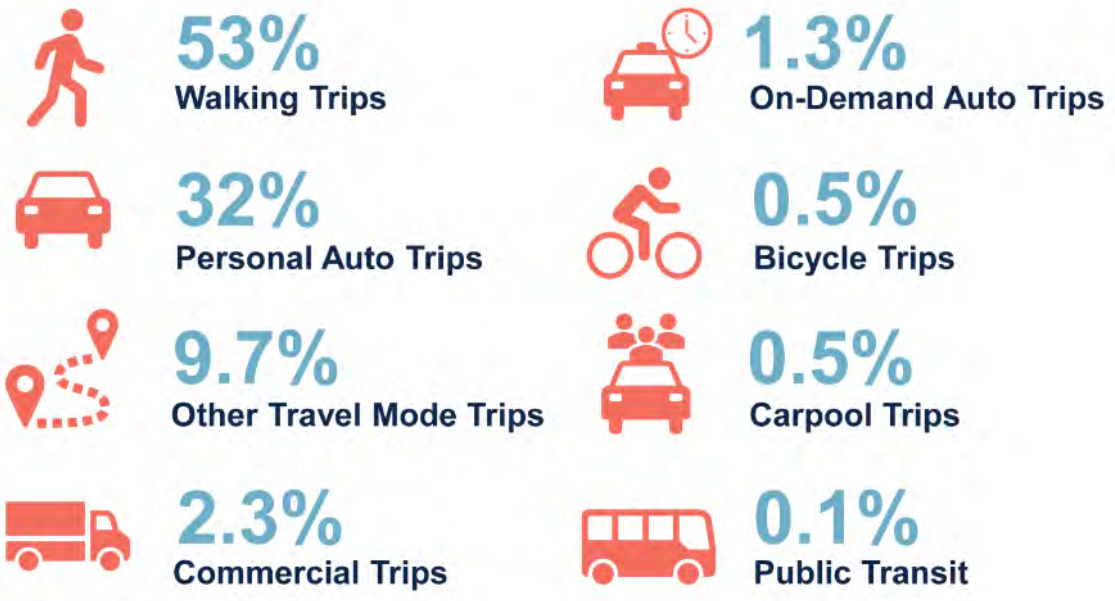
3.2.1.2.2 Improve all sidewalks, driveways, and ramps to meet ADA standards

Sidewalks and driveways on the crossroad facilities do not meet current Americans with Disabilities (ADA) standards as described in MoDOT's ADA Transition Plan. The most common elements that are not ADA compliant are the cross slopes of the sidewalks at the driveway entrances and exits and the locations of the push buttons at intersection crossings.

3.2.1.2.3 Improve bicycle and pedestrian safety through improvements to connectivity and comfort

There is high demand for pedestrian infrastructure, as walking trips make up 53 percent of all trips that begin and end in the Tier 2 study area (see Figure 24).

Figure 24. Modal Distribution of Trips Originating and Ending Within the Study



Note: All numbers are rounded to the nearest 0.1%

Existing dedicated bikeways like bicycle lanes, buffered bicycle lanes, and shared-use paths lack connectivity and coverage across the study area. The lack of dedicated bikeways at I-64 interchanges and crossings, limited street connectivity, and high-stress arterial roadways like Compton Ave., Forest Park Ave., Kingshighway Blvd., Market St., and Vandeventer Ave. create barriers for bicycle travel.

Some corridors, like Forest Park Ave. (from Grand Ave. to Compton Ave.), lack pedestrian facilities. Other arterial corridors like Kingshighway Blvd., Vandeventer Ave., and Market St. are characterized by higher stress levels for pedestrian travel despite the presence of sidewalks, due to higher motor vehicle travel speeds and minimal separation from motor vehicle traffic.

Bicycle Level-of-Traffic Stress (BLTS) provides an intuitive framework to categorize roadways based on the level of stress, or conversely level of comfort, for people bicycling. The methodology uses geometric and traffic characteristics of a given roadway to assign a level-of-traffic stress ranging from 1 to 4, where 1 represents the lowest stress, and 4 represents the highest stress. Figure 25 summarizes the BLTS within the Tier 2 study area. These categories are detailed in Table 8. Figure 26 shows the BLTS ratings for roadways within the Tier 2 study area. More information on the BLTS analysis can be found in the Existing Traffic, Safety & Multimodal Conditions Technical Report in Appendix L.

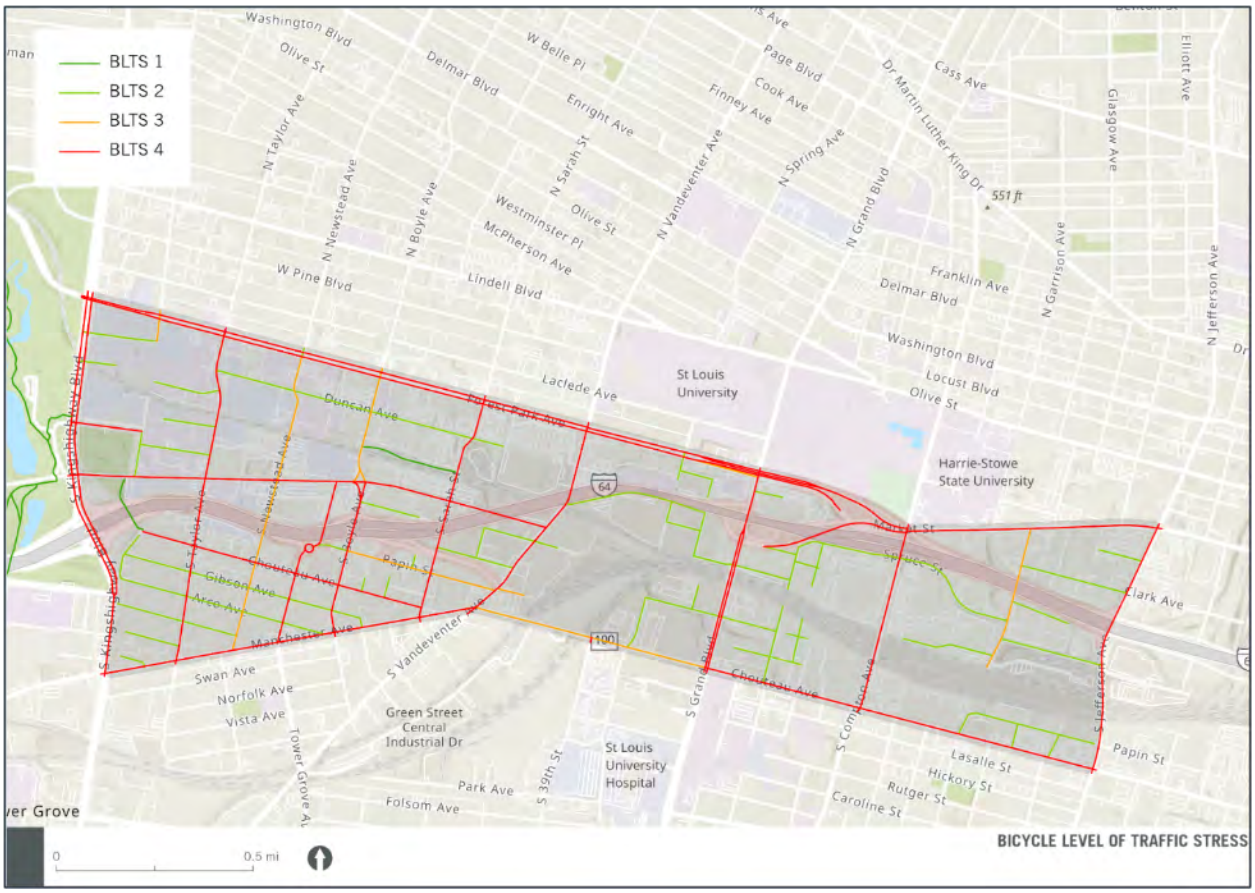
Figure 25. Bicycle Level of Stress in the Tier 2 Study Area

Table 8. Bicycle Level-of-Traffic Stress Categories

BLTS Rating	Target Bicycle User Type	Description
1	All Ages and Abilities	Presenting little traffic stress, demands little attention from cyclists, and is attractive enough for a relaxing bike ride. Suitable for almost all cyclists, including children trained to cross intersections safely. On links, cyclists are either physically separated from traffic, are in an exclusive bicycling zone next to a slow traffic stream with no more than one lane per direction, or are on a shared road where they interact with only occasional motor vehicles (as opposed to a stream of traffic) with a low-speed differential. Where cyclists ride alongside a parking lane, they have ample operating space outside the zone into which car doors are opened. Intersections are easy to approach and cross.

BLTS Rating	Target Bicycle User Type	Description
2	Interested but Concerned (Mainstream Adults)	Presenting little traffic stress and therefore suitable to most adult cyclists but demanding more attention than might be expected from children. On links, cyclists are either physically separated from traffic, are in an exclusive bicycling zone next to a well-confined traffic stream with adequate clearance from a parking lane, or are on a shared road where they interact with only occasional motor vehicles (as opposed to a stream of traffic) with a low-speed differential. Where a bike lane lies between a through lane and a right-turn lane, it is configured to give cyclists unambiguous priority where cars cross the bike lane and to keep car speed in the right-turn lane comparable to bicycling speeds. Crossings are not difficult for most adults.
3	Enthused and Confident (Adult Commuters)	More traffic stress than LTS 2, yet markedly less than the stress of integrating with multilane traffic, and therefore welcome to many people currently riding bikes in American cities. Offering cyclists either an exclusive riding zone (lane) next to moderate-speed traffic or shared lane son streets that are not multilane and have moderately low speed. Crossings may be longer or across higher-speed roads than allowed by LTS 2 but are still considered acceptably safe to most adult pedestrians.
4	Strong and Fearless (Long-Distance Recreational Bicyclists)	A level of stress beyond LTS3, featuring streets and facilities which few adults would feel is acceptable to bicycle.

Figure 26. Bicycle Level-of-Traffic Stress Ratings



3.2.2 Improve Transportation System with Intuitive Navigation

3.2.2.1 Accommodate access to current and future regional employment and entertainment destinations

The study area is centrally located within the city's resurgent Central Corridor, stretching from the Gateway Arch in Downtown St. Louis to Forest Park, two of the region's most iconic civic spaces. The Central Corridor is responsible for approximately 150,000 jobs, or 60 percent of the jobs in the City of St. Louis, and is home to or provides access to many of the region's sports, retail, dining, arts, and recreational destinations.

3.2.2.2 Improve connections from interstate to the local network providing easier navigation

The study area includes six interchanges within a distance of 2.7 miles. Of the existing six interchanges, four are full interchanges, and two are partial interchanges that do not offer full access to or from I-64. These interchanges connect to 12 different roadways creating a confusing situation for users attempting to enter or exit I-64.

Partial access interchanges do not provide intuitive access to and from the highway at the same location and occur at the following cross streets: Tower Grove Ave., Boyle Ave., Papin St., Vandeventer Ave., Grand Blvd., Bernard St./Compton Ave./Market St., and Forest Park Ave.

3.2.3 Reduce the Barrier Effect of I-64 for Bicycle, Pedestrian, and Transit Users

3.2.3.1 Support by stakeholders

The majority of interviewed stakeholders and attendees at the first public meeting indicated that reducing barriers was their top priority for this project to address.

3.2.3.2 Support implementation of bicycle and pedestrian network improvements, including GRG's Brickline Greenway, St. Louis City network, and other system linkages

Opportunities exist for this project to connect three segments of the Brickline Greenway, which are currently in various stages of development: (1) Mill Creek Valley segment along Market St. from 20th St. to Compton Ave., (2) the Fairground Park to Grand Metro segment along Grand Blvd. and Spring Ave., and (3) Central West End to Grand Metro segment that will parallel the MetroLink light rail line. All three of these are at least partially located within the study area and, when complete, would serve as significant low-stress corridors for active transportation.

Opportunities exist for this project to support the Gateway Bike Plan Update as well as the St. Louis City network improvements, including Tower Grove Connector (Tower Grove Ave. at Magnolia to Vandeventer Ave./Sarah St. and expansion from Vandeventer Ave./Sarah St. to Sarah St./Forest Park Ave.), Compton Ave. Bridge cycle track, and for a connection between Grand Metrolink Station and Harris-Stowe State University. Figure 27 shows the Brickline Greenway corridors.

Figure 27. Brickline Greenway Routes

Source: Great Rivers Greenway (https://greatriversgreenway.org/brickline/project-process/)

3.2.3.3 Support convenient access to transit and other community destinations

3.2.3.3.1 Accommodate the planned north side/south side high-capacity transit expansion line

The potential northside-southside high-capacity transit route has been studied for location along the eastern boundary of the study area, along Jefferson Ave. Interchange access and MoDOT facilities should not inhibit operations or station access.

3.2.3.3.2 Accommodate transit-dependent population

A substantial transit-dependent population lives in or near the eastern portion of the Tier 2 study area (see Figure 28). While the study area is served by two MetroLink lines, three transit stations, eleven MetroBus routes, and 64 stops, coverage area gaps limit access to employment, retail/services, residential, and other destinations. In some circumstances, the lack of efficient or safe access to transit discourages people from utilizing transit.

The pedestrian transit connectivity analysis revealed that low pedestrian connectivity areas are generally confined to the eastern portion of the study area bound by Vandeventer Ave., Chouteau Ave., Jefferson Ave., and I-64. Poor street connectivity, limited pedestrian accessways, and linear barriers like railroad tracks restrict pedestrian movement and routing choices.

The bicycle transit connectivity analysis revealed that the largest cluster of low bicycle connectivity scores is located in the industrial area between I-64 and Chouteau Ave., from Vandeventer Ave. east to Compton Ave. Bicycle connectivity is severely limited in this area by large industrial parcels, a fractured street grid, and linear barriers like I-64 and the rail yard.

Figure 28. Transit-Dependent Population

3.2.4 Optimize Bridge Maintenance by Improving Structural Conditions

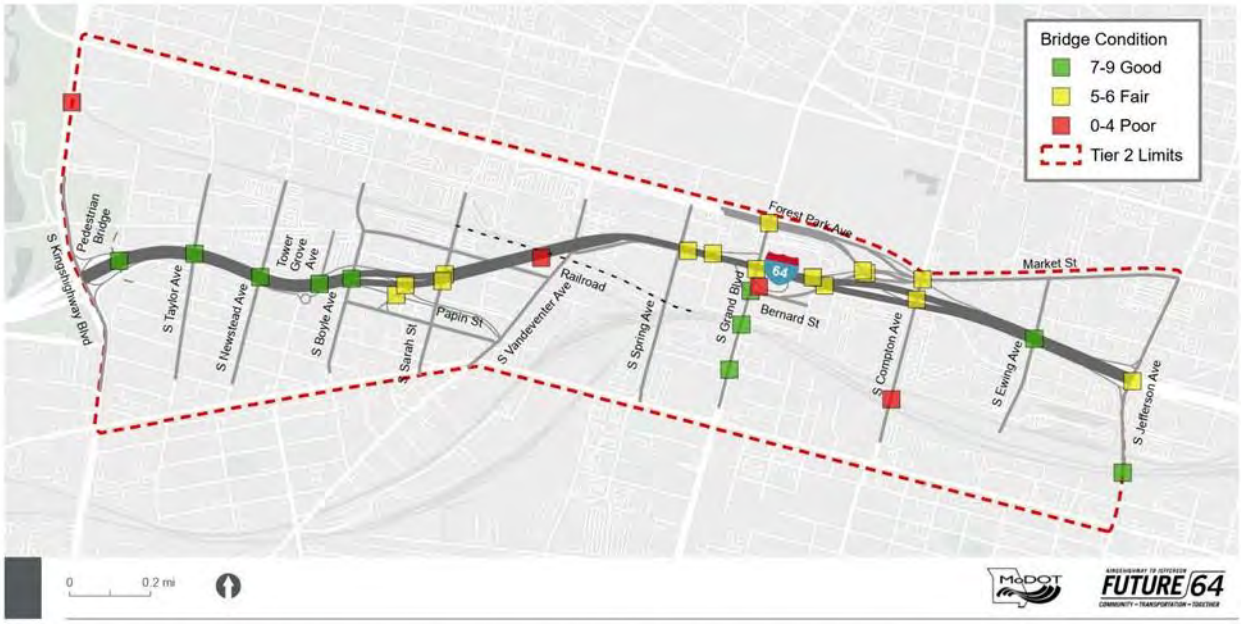
3.2.4.1 Structure Repair and Maintenance

There are 22 bridges, including overpasses, I-64 mainline structures, ramp structures, and one pedestrian overpass. Two bridges are rated as poor, and six more are structurally considered fair. However, due to the year they were constructed, these bridges have various components that do not meet current design standards, such as clearance and barrier height. Figure 29 depicts the structural ratings for existing bridges in the project area.

3.2.4.2 Best use of public investment

Minimizing MoDOT's long-term maintenance needs will make the best use of public investment in the corridor by reducing the number of structures or square footage of bridge deck to be maintained.

Figure 29. Structural Ratings for Existing Bridges



3.2.5 Maintain Interstate Function, Operations, and Capacity for the Future

3.2.5.1 Maintain capacity

Recent highway reconstruction and expansion west of Kingshighway has more clearly defined the capacity of I-64 for years to come. The urban redevelopment happening east of Kingshighway and existing development near I-64 constrains the potential for capacity changes. Transportation Systems Management and Operations (TSMO) and Transportation Demand Management are currently lacking and would provide additional tools for maximizing existing roadway capacity to manage changes in traffic pressure. Given the physical constraints, cost of highway expansion, and limited level-of-traffic pressure, options for accommodating increased traffic growth are limited. Thus, the I-64 mainline will need to maintain function, operations, and capacity for the foreseeable future, and other options for mitigating traffic will need to be explored.

Areas for monitoring operations and exploring improvement options that currently experience traffic pressure for motorists of level of service E or worse include:

- I-64 and Kingshighway Blvd. (AM Peak Hour)
- I-64 and Boyle Ave. (AM Peak Hour)
- I-64 and Grand Blvd. (AM Peak Hour)
- I-64 westbound between the Kingshighway Blvd. off- and on-ramps (PM Peak Hour)
- Kingshighway Blvd. westbound on-ramp acceleration lane (PM Peak Hour)
- Along I-64 westbound, west of Kingshighway Blvd. (PM Peak Hour)

3.2.5.2 Support freight movements

Freight movements are an important feature of the I-64 corridor, supporting large retailers in the study area like IKEA, intermodal freight facilities such as cargo transfer between trucks and railroads, major delivery truck operators like FedEx or UPS, and maintaining through movements that support the larger region.

3.3 Goals

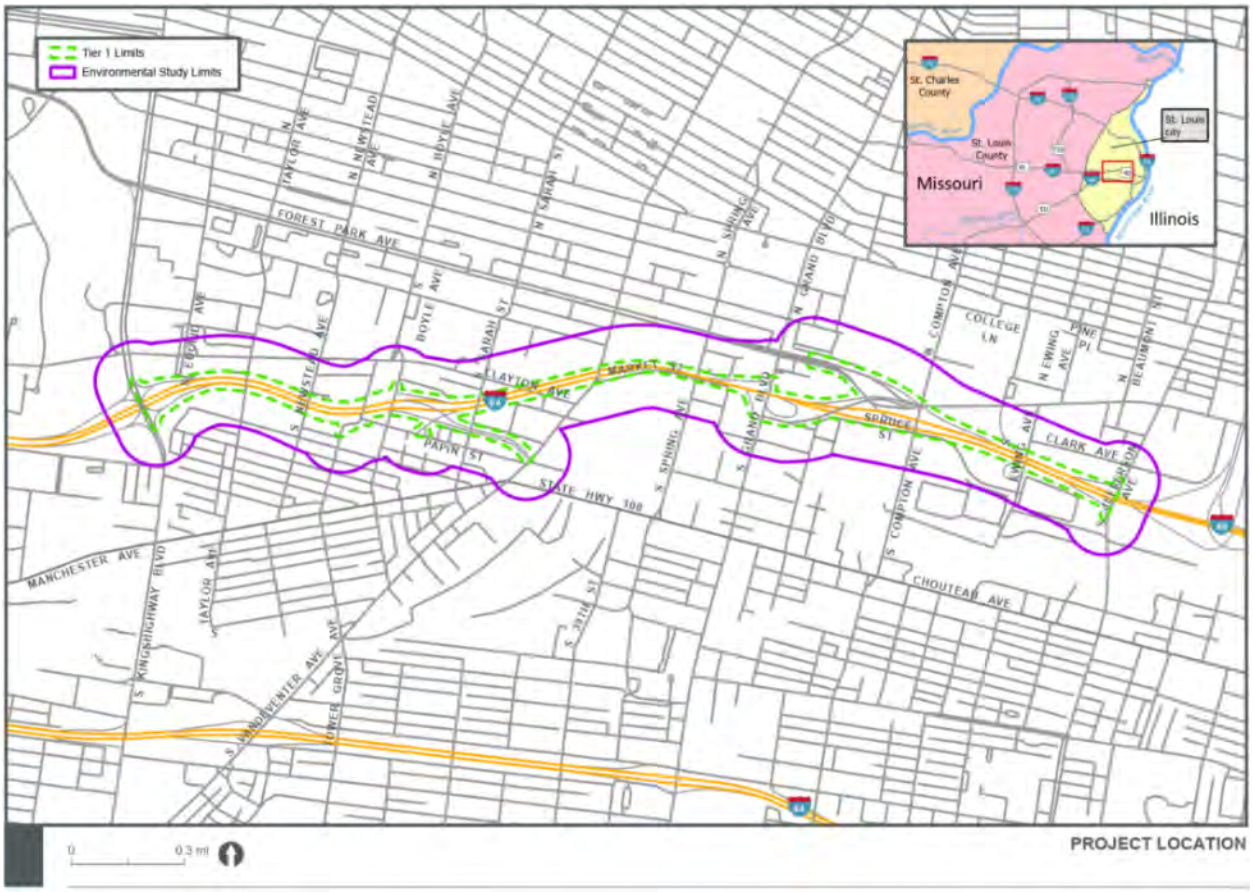
Project outcomes beyond the transportation issues identified in the project purpose are included in the Purpose and Need statement as goals. The goals help balance environmental, transportation, and other community values.

- Right-size I-64 to reuse available space to benefit the community.
- Support improved land use near transit stations and trails.
- Improve equitable outcomes for disadvantaged communities.
- Coordinate with regional partners to enhance the local transportation network.
- Integrate bicycle and pedestrian facility design best practices into project designs.
- Consolidate access points from interstate to local system.
- Invest in projects that provide good cost-benefit improvements.
- Integrate ecology best practices into project designs and right-of-way use.
- Integrate improved aesthetics and visual environment into project designs.

4 Environmental Resources

This section describes the environmental resource constraints, related NEPA considerations, and schedule considerations for subsequent NEPA analysis. Unless noted otherwise, an Environmental study area was used to assess each resource (see Figure 30). The Environmental study area boundary was set at 500 feet from the Tier 1 study area to account for potential direct impacts, such as ground disturbance, land conversion, and proximity impacts, such as noise. Future projects may cause impacts on environmental resources identified in the Environmental study area. The section also includes recommendations for environmental analysis and documentation during the subsequent NEPA phase for the recommended projects. The Environmental Constraints Technical Report in Appendix J provides a complete assessment of existing conditions for these environmental resources.

Figure 30. Environmental Study Area



4.1 Land Use and Zoning

As shown in Figure 31, zoning within the study area is a mix of residential, commercial, business, industrial, and unrestricted uses. However, zoning districts do not imply the current land use. A current land use map shown in Figure 32 is a more accurate depiction of the land uses in the area.

Figure 31. Current Zoning

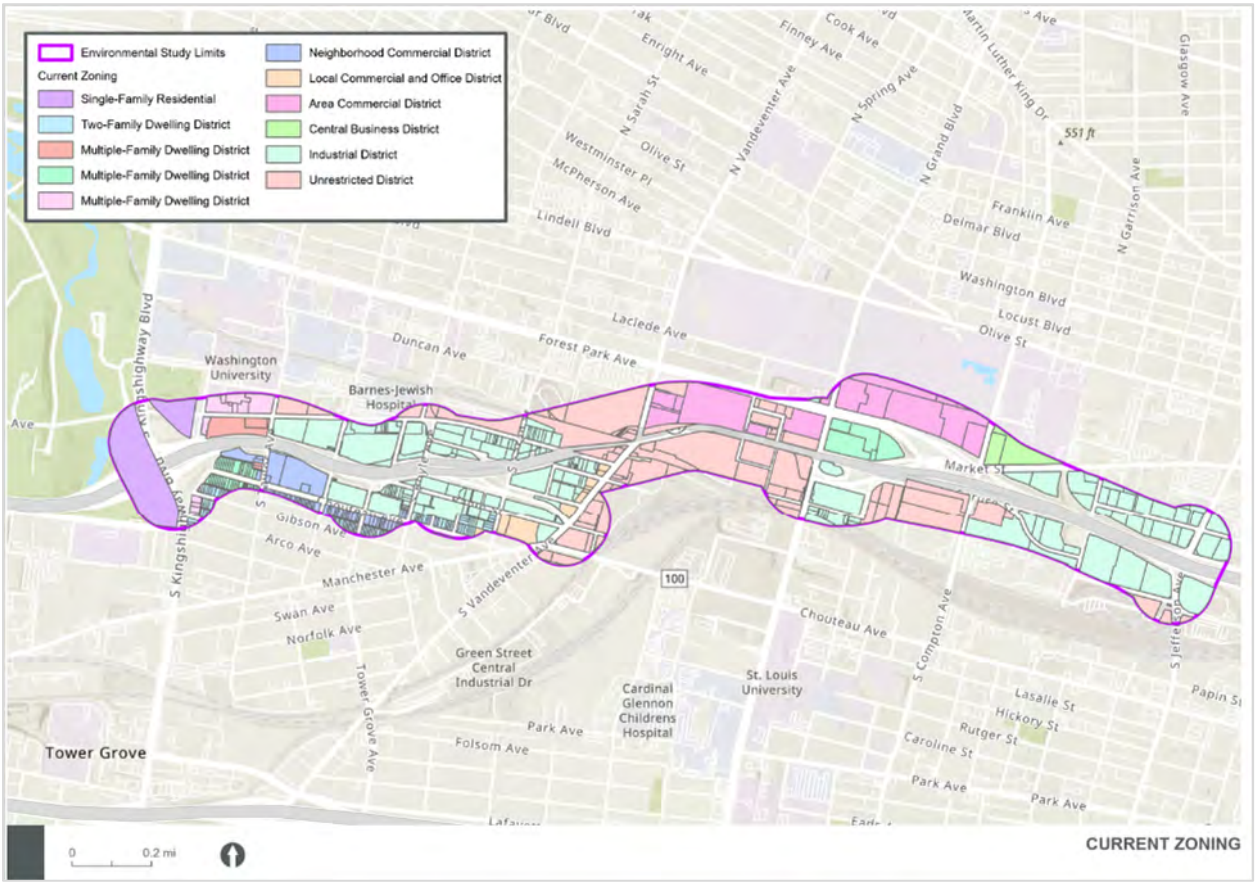
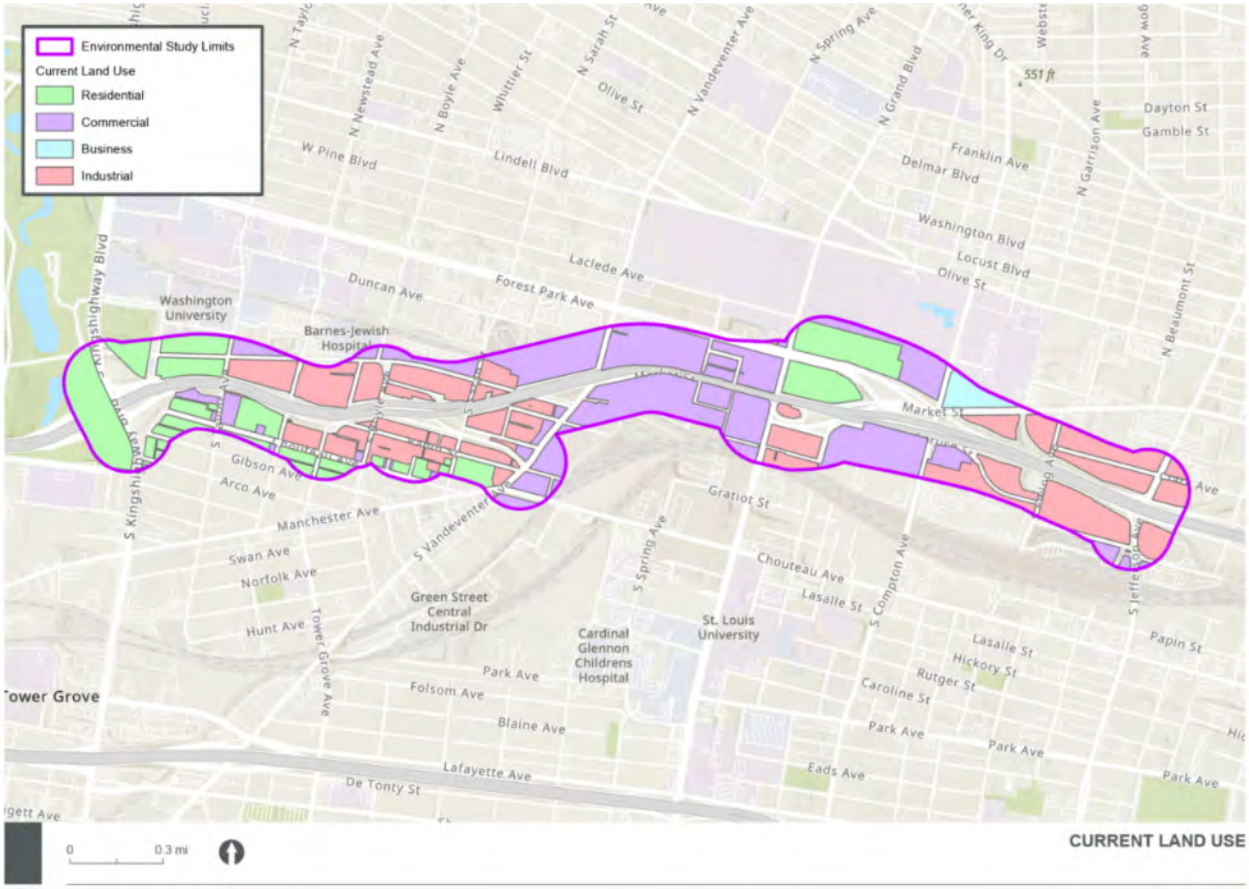
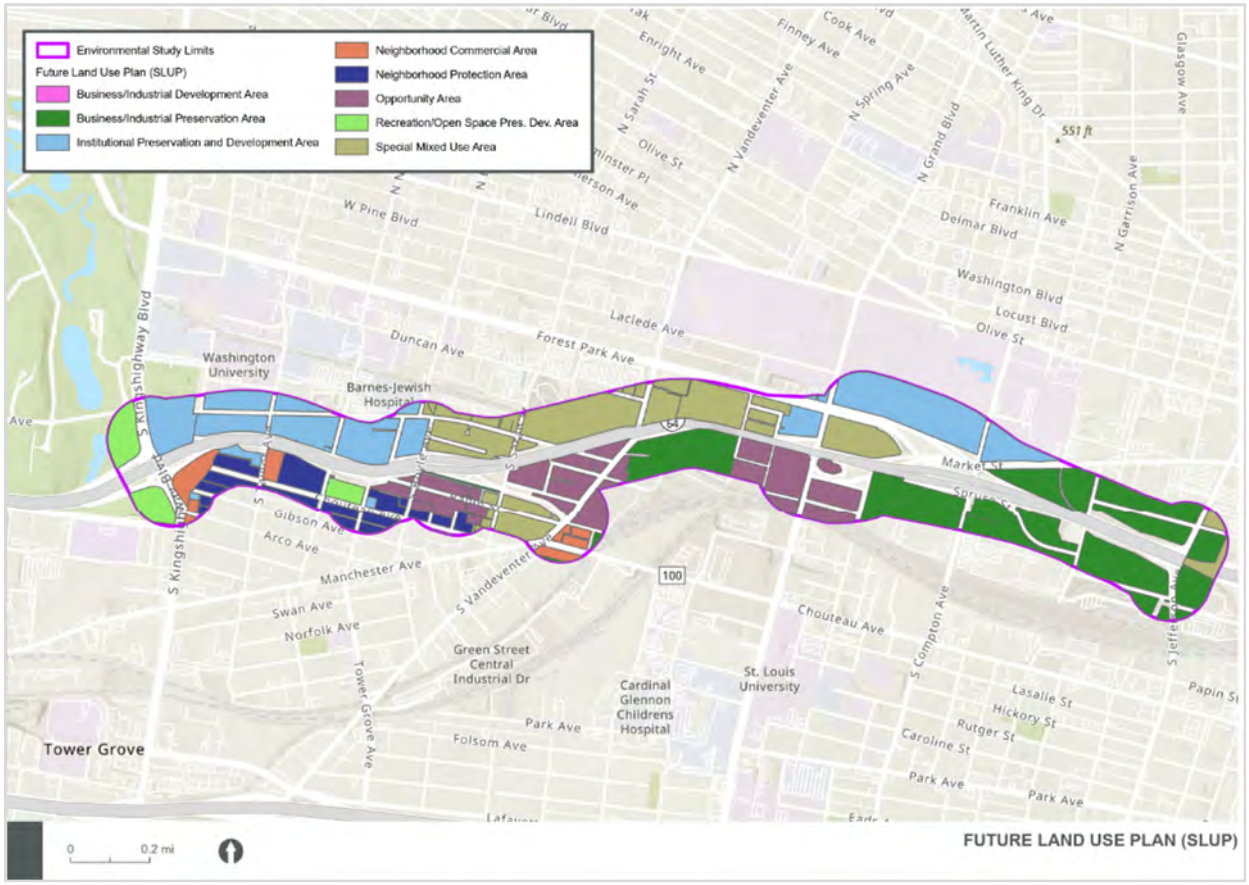


Figure 32. Current Land Use



The Strategic Land Use Plan (City of St. Louis 2005) divided the future land use plan into zones of preservation, development, and specific areas for improvement. Areas of preservation are meant to promote existing land use, while development areas have flexibility in preserving the land use through in-kind redevelopment or modifying land use through a different kind of development. Opportunity areas are key underutilized locations where land use is in transition. Figure 33 shows future land use zones.

Figure 33. Future Land Use Plan



NEPA Considerations

During the NEPA process, the land use impact analysis will assess the degree of use based on the compatibility of the proposed actions with current and planned land use and zoning. Continued coordination with local agencies, including the City of St. Louis, will help determine the compatibility of proposed actions with local plans.

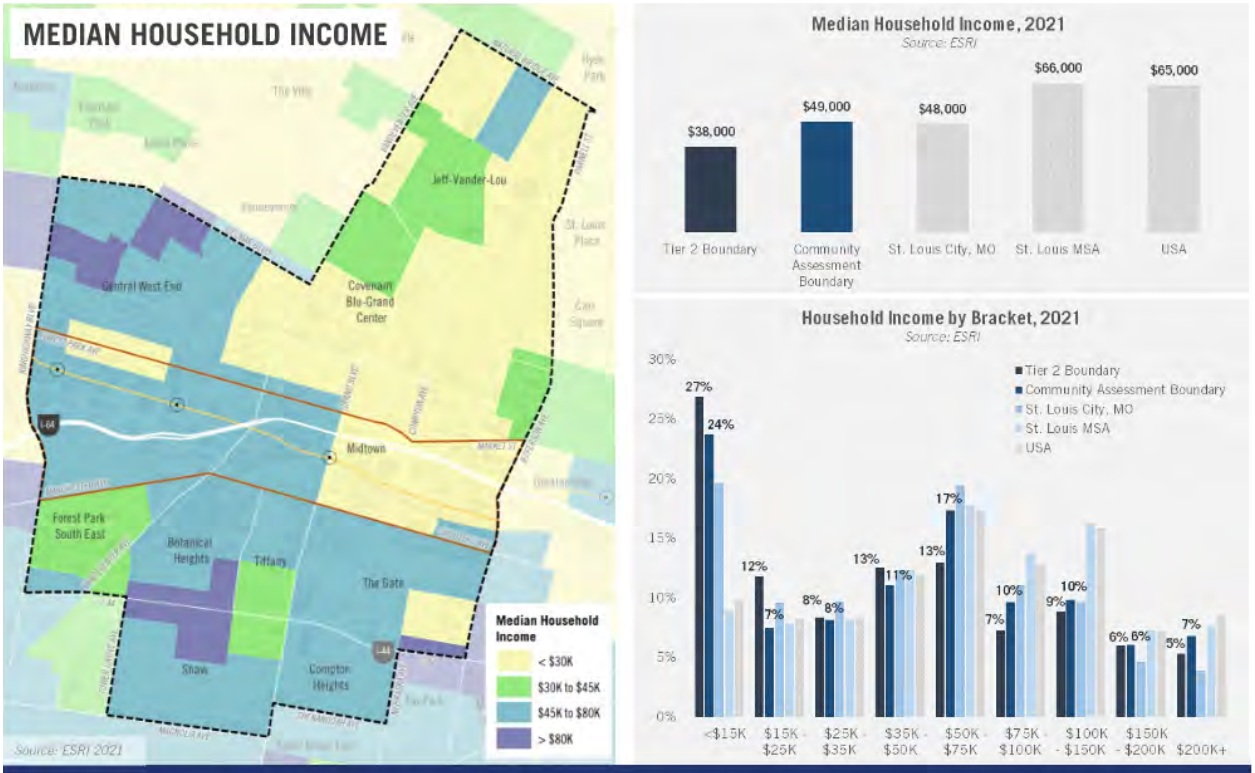
4.2 Socioeconomic Conditions and Environmental Justice

Socioeconomic resources can include access to jobs, neighborhood connectivity that can enhance the marketability of redevelopment sites within the Future64 study area, and improved access to regional multimodal transportation networks, including transit, greenways, and bicycle and pedestrian infrastructure. Understanding these social and market benefits in combination with the broader economic impacts that support community goals toward equity, environmental sustainability, and quality of place and life is important. Given the complexity of this resource, it was documented in the Community Assessment Baseline Memorandum in Appendix G. Section 2.2, Existing Community Conditions, further describes the Community Assessment Baseline Memorandum.

Environmental Justice at FHWA means identifying and addressing disproportionately high and adverse effects of the agency's programs, policies, and activities on minority and low-income populations to achieve an equitable distribution of benefits and burdens. Preliminary analysis of low-income and minority communities identified the following:

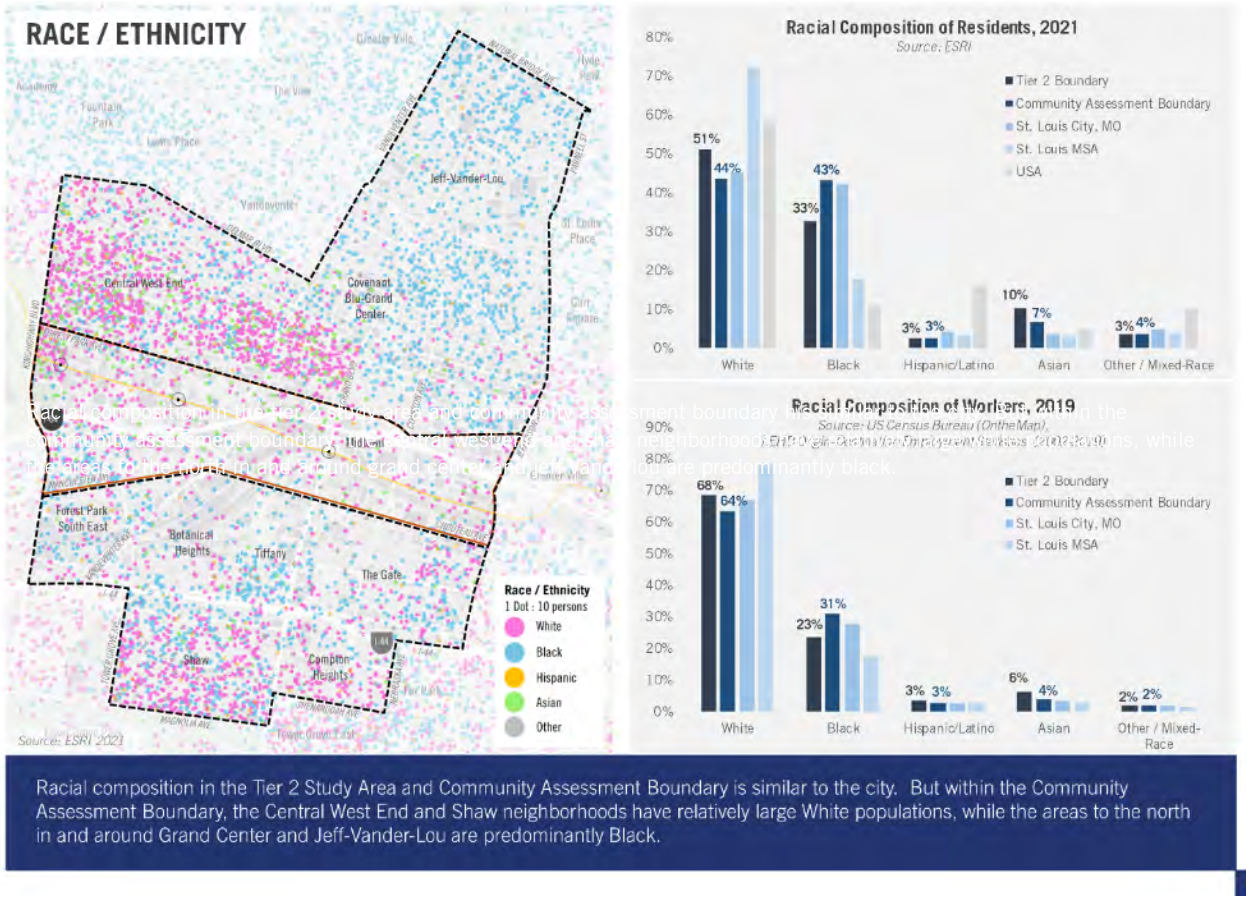
- Low-income Communities: Median income is slightly higher within the Community Assessment study area, but there are block groups with incomes below $30,000, which can be attributed to the large student population of St. Louis University and Harris-Stowe State University, shown in Figure 34. Household poverty varies throughout the Community Assessment study area; however, there are significantly higher concentrations around Covenant Blue-Grand Center and Jeff Vander-Lou Neighborhoods.
- Minority Communities: Racial composition in the Community Assessment study area and within the Tier 2 limits is similar to that of the City of St. Louis. Figure 35 shows that most Community Assessment study area residents are white near the I-64 right-of-way. However, the percentage of minority populations increases in the northern community of Jeff-Vander-Lou.

Figure 34. Household Income



While households in the areas south of the Tier 2 Study Area and just north in Central West End generally have incomes comparable to, or above, the regional median, households living in the areas to the north and northeast generally have incomes below $30,000. This can be attributed to the large student population and weaker market conditions in Jeff-Vander-Lou.

Figure 35. Race/Ethnicity



NEPA Considerations

For any project with the potential for high and adverse impacts on environmental justice populations, coordination should be initiated with affected populations and agencies early in the project. Early coordination should identify targeted outreach methods, opportunities, impacts, and mitigation measures to reduce schedule delays.

4.3 Air Quality

The Clean Air Act (CAA) requires the United States Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS). The EPA then tracks levels of carbon monoxide, lead, particulate matter, ozone, nitrogen dioxide, and sulfur dioxide, which are compared to the NAAQS; this determines an area's attainment status. All nonattainment areas, or areas that exceed air quality thresholds, are subject to a provision in CAA §176I known as transportation conformity.

As of January 27, 2021, the City of St. Louis has been in nonattainment for eight-hour ozone since 2018. No other pollutants are in nonattainment. The study area is in a nonattainment area for ozone. Therefore, the conformity requirements of the CAA apply. Any improvements resulting from this PEL study process are subject to regional and local conformity requirements.

NEPA Considerations

During future NEPA processes, local air quality analysis is needed to assess whether future ozone conditions may cause an exceedance of the NAAQS. If so, mitigation will be required. Future

transportation improvements would be included in a fiscally constrained metropolitan transportation plan and a Transportation Improvement Program.

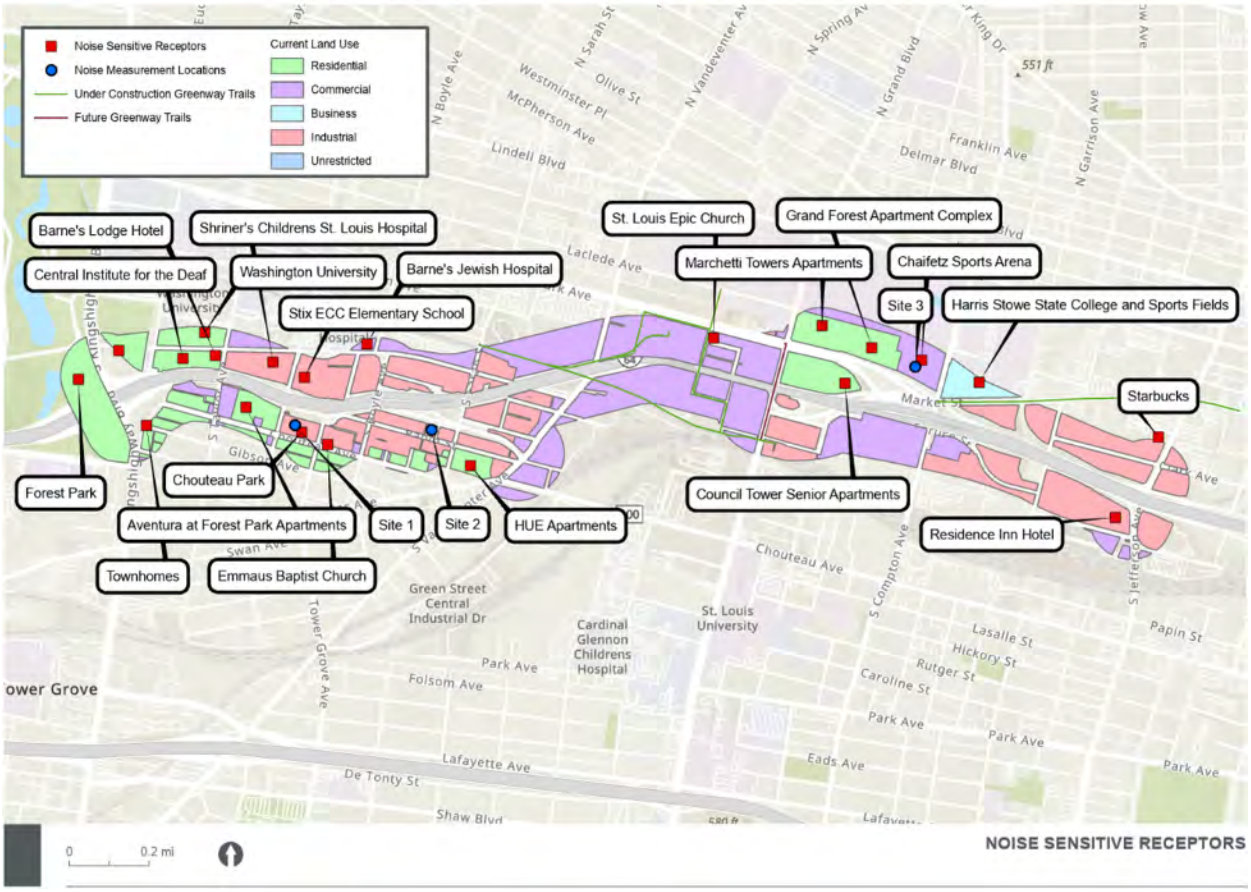
4.4 Noise

The project team identified 21 noise-sensitive receptors within the Environmental study area (see Figure 36). Most of these receptors are on either end of the study area; a few are in the central part of the study area. The receptors are single- and multi-family residences, schools, medical facilities, restaurants, churches, parks, and trails.

NEPA Considerations

A noise analysis will be required during NEPA if future projects qualify as a Type 1 project per MoDOT's Noise Policy (Engineering Policy Guide 127.13). Alternatively, if projects do not qualify as Type 1, it is recommended that MoDOT includes the public in discussions on noise in case third-party stakeholders want to fund noise abatement projects.

Figure 36. Noise-Sensitive Receptors



4.5 Cultural Resources

The State Historic Preservation Officer (SHPO) database documented eight National Register of Historic Places (NRHP)-listed built environment resources, and three NRHP-listed historic districts are within or overlapping the Environmental study area (see Figure 37). There have been three architectural surveys in the study area. City of St. Louis parcel data listed 262 buildings in

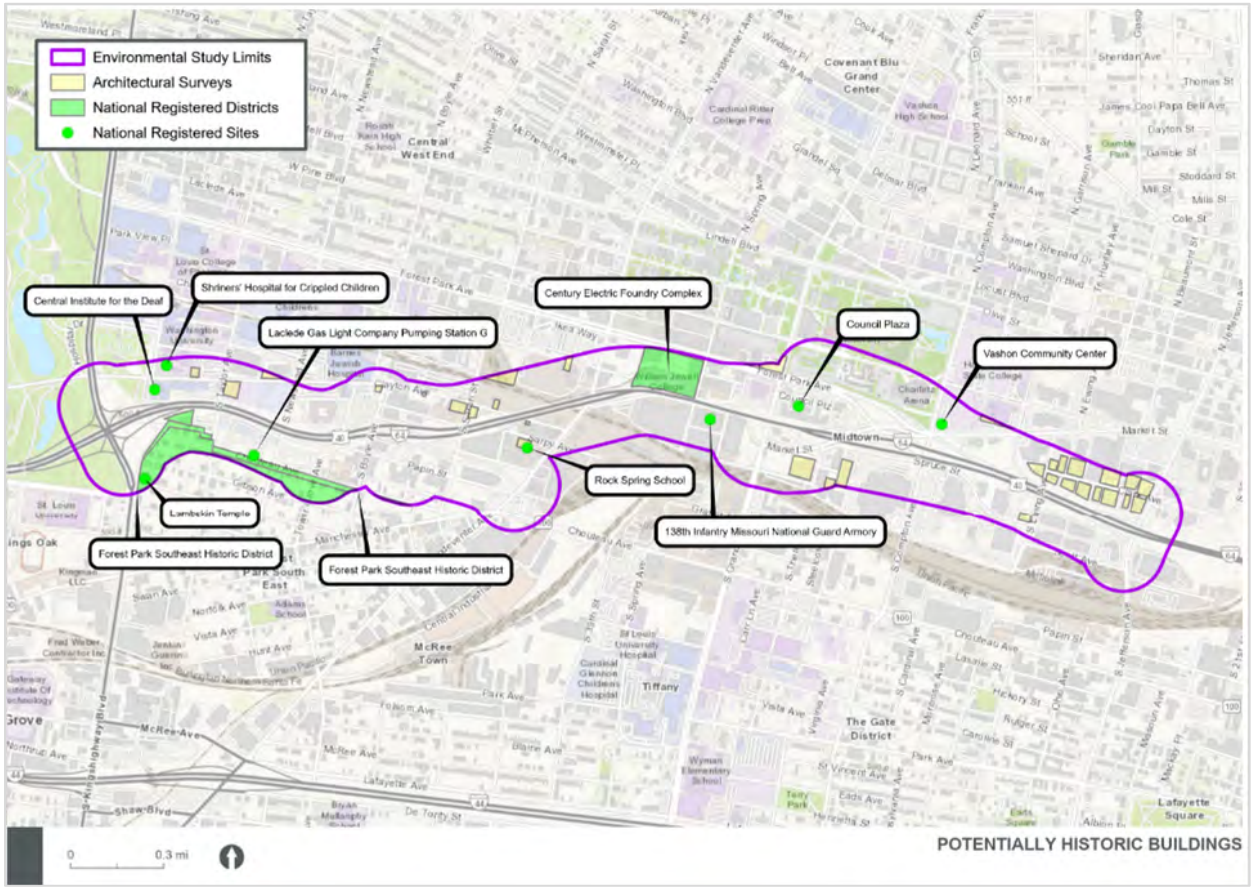
the study area built before 1973. Based on MoDOT guidelines, these buildings are potentially historic.

A review of the Missouri Department of Natural Resources Archaeology Viewer revealed that five previously identified historic archaeological sites are within or overlap the Environmental study area. Records indicate 12 cultural resource surveys have been conducted in the Environmental study area. The location of archaeological sites is not disclosed to the public or disclosed in this report.

NEPA Considerations

Each individual project developed within the Environmental study area will require Section 106 compliance if a federal action occurs.

Figure 37. National Register of Historic Places – Listed Resources



4.6 Hazardous Materials

There are four active underground storage tanks and nine active or long-term hazardous sites in the Environmental study area. MoDOT must consider the potential impacts on these sites and any associated remedial action at the sites that could result from the construction of future projects in the study area.

NEPA Considerations

During NEPA, MoDOT would complete a Phase 1 Environmental Site Assessment (ESA). A Phase 1 ESA survey identifies current and historical land use and potentially contaminated sites.

Remedial action may be necessary if future projects within the Environmental study area impact identified contaminated sites.

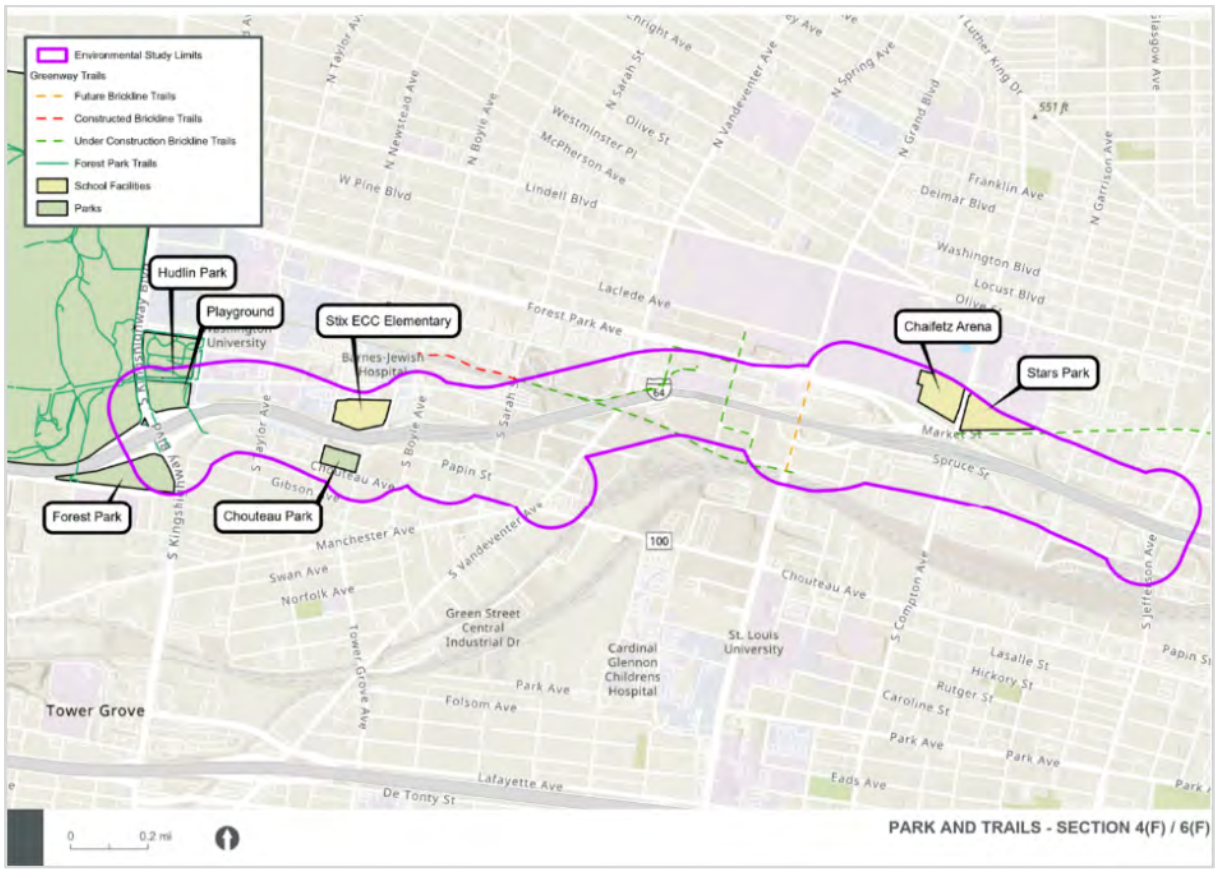
4.7 Parks and Recreation

There are three parks, three school facilities, and a public trail system in the Environmental study area (see Figure 38). Parks and recreation lands are public assets protected from transportation project impacts under Section 4(f) of the USDOT Act of 1966. Some public parks and recreation lands can receive grants from the Land and Water Conservation Act fund for development, which designates further protection under Section 6(f) of the Act. Forest Park is subject to Section 6(f); impacts to all park and recreation properties should be avoided if possible.

NEPA Considerations

If future improvements to I-64 inhibit access or require a new right-of-way or an easement from parks, school facilities, or trails, the Section 4(f) or 6(f) processes would be required, as applicable. MoDOT would coordinate with the owners of parks and playgrounds and the GRG on the Brickline Greenway, which crosses I-64 at several locations.

Figure 38. Parks, Schools, and Trails



4.8 Visual Environments

The viewshed of I-64 has a moderate to high visual impact on the public within the Environmental study area. The raised highway and bridges along the I-64 corridor represent the highest impact. I-64 also offers a particular viewshed of the cityscape not found elsewhere.

Noise walls may also be considered in areas where the viewshed to the highway is determined to have a negative impact.

NEPA Considerations

Depending on the class of action, an assessment of visual impacts may be required during NEPA. FHWA's *Guidelines for the Visual Impact Assessment of Highway Projects* document provides guidance for assessing a place's existing visual context and determining impacts or benefits from a potential project.

4.9 Floodplains

There are no flood zones in the study area. The nearest floodplain is associated with the Mississippi River and is located 1.76 miles east of the study area.

NEPA Considerations

Without floodways in the study area, no agency coordination or permits would be required for future transportation projects. MoDOT would not need to consider any impacts on this resource.

4.10 Water Quality

There are no waterways in the study area. However, within the Schoenberger Creek-Mississippi and River des Peres sub-watersheds are three impaired streams—Engelholm Creek, Rivers des Peres, and the Mississippi River. Engleholm Creek and River des Peres flow north to south along the western edge of Forest Park, outside the Environmental study area. Engelholm Creek and Rivers des Peres are impaired for Escherichia Coli (E. coli), while portions of the Mississippi River are impaired for Mercury and Polychlorinated Biphenyls. These creeks eventually merge into the River des Peres drainage channel that finally reaches the Mississippi River. Along the three impaired streams are several National Pollutant Discharge Elimination System locations. There are no water quality monitoring stations within 4.3 miles of the study area. Stormwater runoff within the Environmental study area will reach the Mississippi River. MoDOT's stormwater discharges are authorized by a Transportation Separate Storm Sewer System (TS4) Permit issued by Missouri Department of Natural Resources. This permit requires MoDOT to develop, implement, and enforce a Stormwater Management Program. The program identified best management practices, including scenarios with stormwater runoff into impaired streams.

NEPA Considerations

It is recommended that during future NEPA processes, MoDOT consider implementing permanent stormwater best management practices, which focus on treating the impairment issues of the nearby streams. If the land disturbance of a project is greater than an acre, a stormwater pollution prevention plan would be required to meet regulatory requirements and water quality concerns for the Mississippi River.

4.11 Wetlands and Waters of the U.S.

The Environmental study area has no wetlands or Waters of the United States on the United States Geological Survey topographic, National Hydrologic Datasets, or National Wetland Inventory maps. However, several roadside ditches or swales were identified. A field survey would be necessary to confirm these as wetlands and determine if they may be waters of the U.S.

NEPA Considerations

As future projects are outlined, MoDOT would conduct a field survey to determine if there are features that were not present on National Hydrologic Datasets or National Wetland Inventory mapping.

4.12 Terrestrial Habitat and Ecological Significance

Much of the Environmental study area has been developed for residential and commercial land uses, leading to the loss, alteration, or fragmentation of natural habitats. The entire Environmental study area is being developed at low to high intensities, with less than 1 percent of open spaces throughout. These open spaces include Hudlin Park, Chouteau Park, Stix ECC Elementary School playground, and Forest Park. Habitat fragmentation limits the ecological benefits of open spaces to birds, small mammals, and insects. Larger mammals adapted to urban environments, such as deer, coyotes, opossums, and raccoons, may also utilize these open spaces. As these areas are primarily landscaped and maintained to some extent, high-disturbance tolerant plants, including many introduced plants, likely dominate the vegetation. These introduced plants generally offer little forage value to wildlife, especially threatened and endangered species.

NEPA Considerations

Due to the current land uses and high levels of development in the study area, impacts on natural habitat communities associated with future projects in the study area would be relatively minor. During future projects, MoDOT may consider native landscaping within underutilized areas to add vital habitat and help create an ecological corridor through the city for wildlife.

4.13 Threatened and Endangered Species

Since the publishing of the Environmental Constraints Report (Appendix J), the United States Fish and Wildlife Service (FWS) Information Planning and Consultation was updated, and it currently lists the federally and state-endangered Indiana bat and federally proposed endangered Tricolored bat, as well as the candidate species Monarch butterfly, as possibly occurring in the study area (Project Code: 2023-0060918, accessed March 27, 2023). Since the Monarch butterfly is a candidate species, it does not require consultation with FWS under Section 7 of the ESA. However, consideration for minimizing potential impacts on the species and its habitat is encouraged. The Missouri Department of Conservation Natural Heritage Program does not list any federally-listed species near the project. However, it does list state-endangered and/or Missouri Species/Natural Communities of Conservation Concern within a mile of the project (accessed May 2, 2023). Both species of bats hibernate during winter months in caves and mines, called a hibernaculum. During the summer, they roost and raise young under the bark of trees in wooded areas (often riparian forests and upland forests near perennial streams). According to the MDNR GeoSTRAT database, up to 28 caves along the Mississippi River are within the Granite City (IL) and Cahokia (IL) USGS quadrangles. It is unknown if these hibernacula are known wintering sites for the protected bat species. A lack of trees within the urbanized study area and connectivity to established woodlands outside the study area makes future transportation projects unlikely to impact either species negatively.

NEPA Considerations

It is unlikely that any mitigation will be required due to the lack of habitat for the species noted. Coordination would occur with FWS and the Missouri Department of Conservation on potential

impacts on threatened and endangered species. It is recommended that MoDOT look for signs of bats roosting on bridges that are within 1,000 feet of suitable summer habitat. As established in Section 4.12, considerations could be made to plant native flora, such as milkweed, in underutilized spaces to support species such as Monarch butterflies.

4.14 Summary of NEPA Considerations

Table 9 summarizes NEPA considerations for the resources discussed in this document.

Table 9. Resource Recommendations

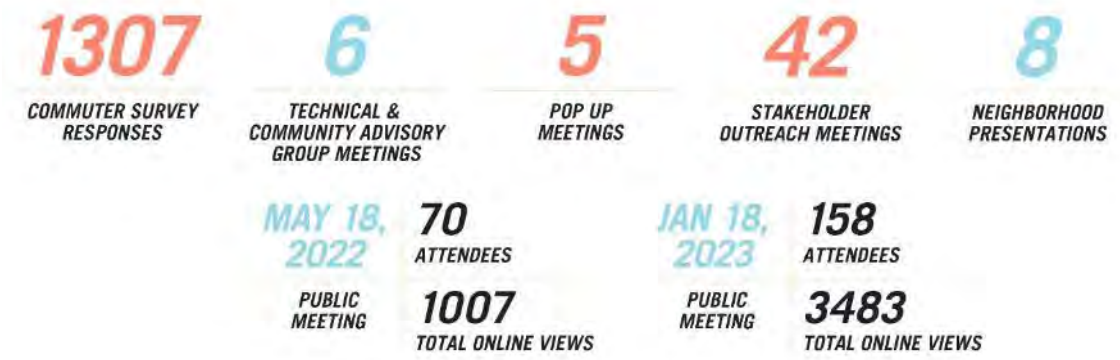
Resource	NEPA Considerations
Land Use and Zoning	During the NEPA process, the land use impact analysis will assess the degree of use based on the compatibility of the proposed actions with current and planned land use and zoning. Continued coordination with local agencies, including the City of St. Louis, will help determine the compatibility of proposed actions with local plans.
Socioeconomic Conditions and Environmental Justice	For any project with the potential for high and adverse impacts on environmental justice populations, coordination should be initiated with affected populations and agencies early in the project. Early coordination should identify targeted outreach methods, opportunities, impacts, and mitigation measures to reduce schedule delays.
Air Quality	During future NEPA processes, local air quality analysis is needed to assess whether future ozone conditions may cause an exceedance of the NAAQS. If so, mitigation will be required. Future transportation improvements would be included in a fiscally constrained metropolitan transportation plan and a Transportation Improvement Program.
Noise	A noise analysis will be required during NEPA if future projects qualify as a Type 1 project per MoDOT's Noise Policy (Engineering Policy Guide 127.13). Alternatively, if projects do not qualify as Type 1, it is recommended that MoDOT includes the public in discussions on noise in case third-party stakeholders want to fund noise abatement projects.
Cultural Resources	Each individual project developed within the Environmental study area will require Section 106 compliance if a federal action occurs.
Hazardous Materials	During NEPA, MoDOT would complete a Phase 1 ESA. A Phase 1 ESA survey identifies current and historical land use and potentially contaminated sites. If future projects within the Environmental study area impact identified contaminated sites, remedial action may be necessary.
Parks and Recreation	If future improvements to I-64 inhibit access or require a new right-of-way or an easement from parks, school facilities, or trails, the Section 4(f) or 6(f) processes would be required, as applicable. MoDOT would coordinate with the owners of parks and playgrounds and the GRG on the Brickline Greenway, which crosses I-64 at several locations.
Visual Environments	Depending on the class of action, an assessment of visual impacts may be required during NEPA. FHWA's Guidelines for the Visual Impact Assessment of Highway Projects document provides guidance for assessing a place's existing visual context and determining impacts or benefits from a potential project.
Floodplains	As no floodways are in the study area, no agency coordination or permits would be required for future transportation projects. MoDOT would not need to consider any impacts on this resource.

Resource	NEPA Considerations
Water Quality	It is recommended that during future NEPA processes, MoDOT consider implementing permanent stormwater best management practices, which focus on treating the impairment issues of the nearby streams. If the land disturbance of a project is greater than an acre, a stormwater pollution prevention plan would be required to meet regulatory requirements and water quality concerns for the Mississippi River.
Wetlands and WOUS	As future projects are outlined, MoDOT would conduct a field survey to determine if there are features that were not present on National Hydrologic Datasets or National Wetland Inventory mapping.
Terrestrial Habitat and Ecological Significance	Due to the current land uses and high levels of development in the study area, impacts on natural habitat communities associated with future projects in the study area would be relatively minor. During future projects, MoDOT may consider native landscaping within underutilized areas to add vital habitat and help create an ecological corridor through the city for wildlife.
Threatened and Endangered Species	It is unlikely that any mitigation will be required because of the lack of habitat for the species noted. Coordination would occur with FWS and the Missouri Department of Conservation on potential impacts on threatened and endangered species. It is recommended that MoDOT look for signs of bats roosting on bridges that are within 1,000 feet of suitable summer habitat. As established in Section 4.12, considerations could be made to plant native flora, such as milkweed, in underutilized spaces to support species such as Monarch butterflies.

5 Public and Stakeholder Engagement and Agency Coordination

A comprehensive stakeholder, public, and agency involvement plan was created and customized for the Future64 PEL. The strategies in the plan obtained feedback from various groups and communities through a series of stakeholder interviews, community and technical meetings, a survey, in-person and virtual public meetings, elected official briefings, and business outreach. Providing an equitable public engagement effort was a focus of the study and included a focus on meeting people where they are instead of relying on the public having to go out of their way. Presenting at neighborhood meetings, holding pop-up events near community assets, and providing information during other public events in the community were tools used to give the community an opportunity to provide input. Figure 39 provides a graphic summary of the number of touchpoints with stakeholders and the public.

Figure 39. Stakeholder Involvement and Public Engagement Summary



The plan was designed to obtain key input and comments at each critical phase or step of the study process.

- Review of existing planning efforts and existing conditions
- Goals and Purpose and Need
- Development and evaluation of concepts, Level 1 Concepts Development
- Development and evaluation of corridor-wide alternatives, Level 2 Screening Process
- Recommendations and implementation plan

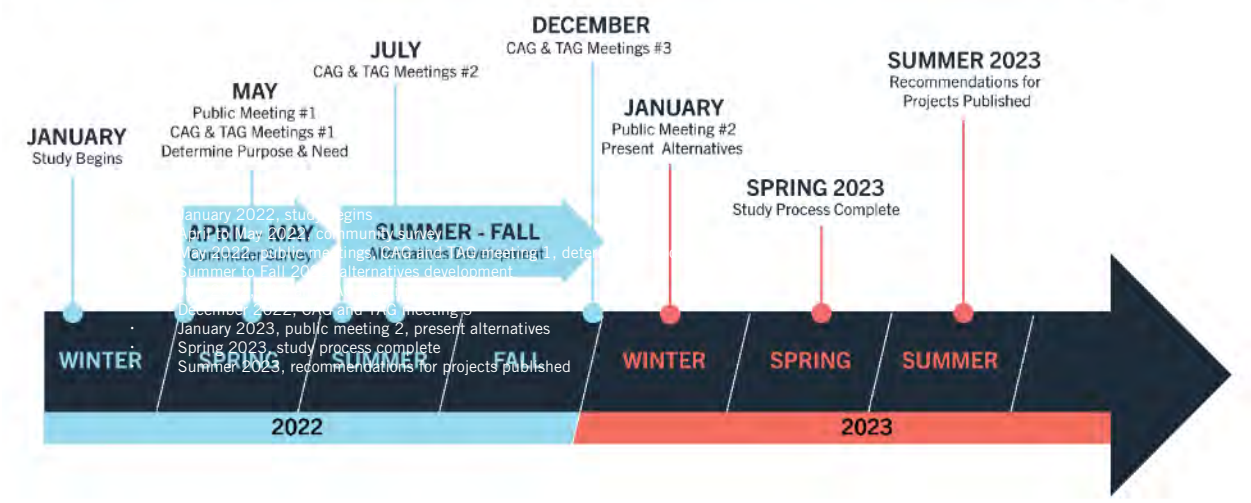
The Public Engagement and Communication Summary Report is included in Appendix B. It describes the strategies used and summarizes the comments received through each public involvement tool described in this section. Table 10 lists the Stakeholder and Public Engagement activities described in this section.

Table 10. Public and Stakeholder Engagement Event Dates

Type	Group	Date
Stakeholder	City of St. Louis Mayor Briefing #1	February 11, 2022
Public	Commuter Survey	April 18 to May 25, 2022
Stakeholder	Elected Officials Briefing #1	May 5, 2022
Stakeholder	CAG	May 10, 2022
Stakeholder	TAG	May 11, 2022
Public	Public Open House #1	May 18, 2022 (in person) May 18 through May 30, 2022 (online)
Public	Groovin' on the Greenway	July 20, 2022
Stakeholder	Additional Stakeholder Meeting #1	July 22, 2022
Stakeholder	CAG	July 28, 2022
Stakeholder	TAG	July 28, 2022
Stakeholder	Additional Stakeholder Meeting #2	August 2, 2022
Public	Steinburg Open House	October 8, 2022
Stakeholder	CAG	December 14, 2022
Stakeholder	TAG	December 14, 2022
Public	Business Meet and Greet	December 15, 2023
Stakeholder	City of St. Louis Mayor Briefing #2	January 12, 2023
Stakeholder	Elected Officials Briefing #2	January 13, 2023
Public	Public Open House #2	January 18, 2023 (in person) January 18 through February 1, 2023 (online)
Stakeholder	City of St. Louis, Various Departments	March 30, 2023

Figure 40 shows when key stakeholder involvement and public engagement events occurred in the study process.

Figure 40. Public and Stakeholder Engagement Timeline



5.1 Stakeholder Involvement

The study involved stakeholders in one-on-one, small, and large group meetings. Keeping key stakeholders aware, involved, and updated was critical to the engagement and communication efforts—the following section details how key stakeholders and elected officials were involved during the study. A list of all stakeholders can be found in Appendix B.

5.1.1 Community and Technical Advisory Groups

A critical method for engaging project stakeholders during the PEL study was through advisory groups. Each group was created to solicit feedback from community leaders, relevant stakeholders, and technical experts.

Three CAG and TAG meetings were conducted during the PEL study. The first meeting was a hybrid (virtual and in-person) format to allow maximum participation. The purpose of this initial meeting was to familiarize members with the study and receive their feedback on the draft Purpose and Need. The second meeting was virtual. Attendees viewed potential concepts for I-64, Market St., Grand Blvd. and Boyle Ave., Tower Grove Ave., and Papin St. and provided feedback. At the third meeting, members were presented with three alternatives and asked to discuss the benefits and impacts of each one. Maps and handouts were available to attendees to provide additional feedback during the discussions. The CAG and TAG rosters and minutes from Meetings 1, 2, and 3 are in Appendix B.

5.1.2 Elected Officials Briefings

Elected officials' briefings were held before each round of public engagement. Invitations were emailed to representatives of the St. Louis Board of Aldermen, whose wards are adjacent to the study area, and to state and federal government officials whose districts or representation covers the Future64 study area.

The following materials are in Appendix B: a list of elected officials, an invitation to the first elected officials briefing, materials from the first elected officials briefing, an invitation to the second elected official briefing, and materials from the second elected officials briefing.

5.1.3 City of St. Louis Mayor Briefings

In addition to the two elected officials' briefings, two meetings were held with St. Louis Mayor Tishaura Jones' staff. The purpose of these meetings was to share project updates and obtain feedback.

Materials shared during the Mayor's briefing and minutes are in Appendix B.

5.1.4 Stakeholder Interviews

Initial stakeholder outreach was conducted with elected officials and key stakeholders in the Future64 corridor. Virtual and phone interviews occurred during the first three months of the study. During this period, 29 stakeholders were interviewed individually or in groups. Stakeholders were encouraged to participate in the study by attending advisory groups and promoting public meetings. A list of stakeholders and stakeholder interview summaries are in Appendix B.

5.1.5 Extended Business Outreach

Additional business stakeholder interviews were scheduled in late 2022 to introduce the study and provide updates. This extended business outreach took place virtually. Eight stakeholder interviews were completed during this period. A list of stakeholders and summaries from eight extended business outreach interviews can be found in Appendix B.

5.1.6 Additional Stakeholder Engagement

Additional stakeholder meetings were scheduled during the summer of 2022 to broaden stakeholder outreach. Study team members met with representatives from SSM Health, Saint Louis University Hospital, and Saint Louis University. Minutes from these meetings can be found in Appendix B.

5.2 Public Engagement

Engaging the public was a critical component of the study process. Public members were invited to engage in the PEL study, learn about the project and share their input. This section details the public engagement that occurred during the study.

Among the things the project team heard from the public was the need to reduce the barrier effect of I-64 to fit the community better and to create access benefitting a diversity of people. Other public input noted the importance of different modes of transportation and the need to coordinate with regional partners to enhance the local transportation network that supports people walking, biking, and taking public transit. The project team used the information gathered during our public outreach to develop the Purpose and Need and add project goals as secondary screening criteria. This allowed the study team to filter out new ideas for ramp designs inconsistent with the public's identified needs.

5.2.1 Commuter Survey

A commuter study was developed and administered to learn respondents' commuting patterns to destinations, their reasons for traveling to the corridor, and how they navigate the study area. The survey also analyzed commuters' attitudes toward existing travel modes. This data helped MoDOT and its consultants better understand traveler behavior to improve the study corridor for the increasing number of drivers, pedestrians, and cyclists.

The commuter survey was conducted online and with a street team of two to four people. The team spent six days outside various locations administering the survey on iPads to willing participants. To others, they distributed handouts with the QR code for them to take the survey at a later time. One thousand three hundred seven (1,307) people took the commuter survey. Respondents' results can be found in the Commuter Survey Summary in Appendix B.

5.2.2 May 2022 Public Meetings

The first Future64 public open house meeting was held at the study area's City Foundry STL food hall. The event featured technical-informational boards, a study video, a feedback activity focused on Purpose and Need, a mapping exercise, and a comment area. Study team members were stationed throughout the room and available to speak with attendees. Comment forms could be completed on paper or an iPad. People could also leave their comments at the various activities throughout the open house. Seventy people attended the May open house, and two comments were received.

A virtual public meeting was created that mirrored the information from the in-person meeting to encourage additional participation. Visitors to the online meeting could provide comments for 12 days. The virtual public meeting generated 1,007 total views and 593 unique visits.

Two press releases introducing the study and announcing the in-person and online public meetings were distributed to local media outlets to promote public involvement. Additionally, email blasts announcing the meetings were sent to approximately 470 recipients. Commuters were shown a QR code during pop-up events to access the virtual public meeting. The public meeting comment summary report can be found in Appendix B. It includes the comments received during this period from public meeting outreach efforts, informational boards, and comment analysis.

5.2.3 January 2023 Public Meetings

The PEL study's second and final round of public meetings was held at the COLLAB Workspace in the Cortex District. This public meeting featured informational boards, a study video, strip maps of the study area, and a comment area. Study team members were available to answer questions and guide attendees through the materials throughout the meeting. Comments could be filled out on a paper comment form, on an iPad, or by scanning a QR code. A total of 158 people attended the public meeting and 49 completed comment forms.

There was also a virtual public meeting at www.future64virtualmeeting.com. This self-guided online meeting included visuals, graphics, and information similar to what was shown at the in-person meeting. The virtual public meeting included a page for participants to add comments and a page to send questions directly to study team members, with that capability remaining open for 15 days. The virtual public meeting generated 3,485 total views and 2,875 unique views.

This round of public meetings was advertised through several outlets, including e-message boards on the I-64 interstate, email news blasts, press releases and advisories, the Future64 website, MoDOT social media (Facebook, Twitter), and community partners' website and social media posts.

Two hundred thirty-two (232) comment forms were submitted during the comment period. The public meeting comment summary in Appendix B compiles the comments received during this period with the outreach efforts, informational boards, and comment analysis.

5.2.4 Community Outreach and Events

5.2.4.1 Neighborhood Meetings

The study team contacted various neighborhood associations and community organizers to meet communities where they already gather. The study team attended eight neighborhood meetings in and around the project footprint. These meetings provided an opportunity to introduce the Future64 study and process. During each presentation, information was shared through PowerPoint presentations and handouts. Interested community members were invited to provide their email addresses to receive project updates. A list of the neighborhood presentations attended and presentation slides are in Appendix B.

5.2.4.2 Youth Engagement

To gain a broader perspective on the project, an intentional effort was made to reach and engage youth to learn about how they travel the corridor, where they go outside of school, and if they have concerns. Partnering with the St. Louis Science Center and their Youth Exploring Science

program participants, the team conducted a presentation related to information examined in the study as well as engineering and urban planning careers. The program engages high schoolers interested in science, technology, engineering, art, and mathematics careers, some of which align with opportunities within the study. The study team also collected emails to inform the students about the study.

5.2.4.3 Pop-up Events

To meet the community where they are, 12 pop-up events were held at different stages of the study to share information and gather community feedback in well-traveled corridor areas. The first round of pop-ups in April 2022 focused on getting people to take the commuter survey highlighted earlier in this report.

Other rounds of pop-up events focused on public meetings. In May 2022, three pop-up events were held to drive people to the virtual public meeting. Another three pop-up events occurred in January 2023 to promote the second virtual public meeting. During these pop-ups, outreach team members distributed a version of the Project Fact Sheet and encouraged people to go online and take the self-guided meeting tour and complete a comment form.

Table 11 summarizes a list of the pop-up dates and locations.

Table 11. Pop-up Events, Dates, and Locations

Date	Location
4/19/22	Manchester between Taylor and Boyle
4/20/22	City Foundry (3730 Foundry Way)
4/21/22	Venture Café (4240 Duncan Ave. #200)
4/26/22	Cortex MetroLink Station
4/27/22	Forest Park Ave between Vandeventer and Spring
4/28/22	Forest Park Ave between Euclid and Taylor
5/20/22	Chouteau Park
5/24/22	Grand MetroLink Station
5/25/22	BJC MetroLink Station
1/28/23	Cortex
1/30/23	Grand MetroLink Station
2/01/23	Central West End MetroLink Station

5.2.4.4 Groovin' on the Greenway

The study team collaborated with project partner GRG, the St. Louis region's greenway agency, to highlight what is happening in the Central Corridor of the City of St. Louis. The study team co-hosted an Open House and Groovin' on the Greenway event at the City Foundry STL.

The community was invited to the event for music and movement. Attendees could review and weigh in on the Brickline Greenway design, which will travel through the study area from Sarah St. to Grand MetroLink. The study team provided updates on the study's progress. More information about GRG and Brickline Greenway can be found at www.bricklinegreenway.org.

5.2.4.5 Steinberg Open House

Forest Park Forever gave participants an idea of what Steinberg Rink and Pavilion could be as a year-round destination. The study team had a table to distribute project information at this "Steinberg Reimagined" event that attracted more than 750 attendees. More information about this event and the project can be found at www.forestparkforever.org/steinberg.

5.2.4.6 Business Meet and Greet

The study team contacted 302 businesses within the study area, inviting them to the Midtown Corridor Business Meet and Greet. It was important to connect with businesses in the corridor and understand how they and their customers interact with the highway, their growth plans, and their feelings about potential impacts. The Meet and Greet was held at ZACK. At the event, business and property owners were informed about the project, and staff members were available to answer questions. The Meet and Greet invitation and the radius of businesses that were sent invitations are located in Appendix B.

5.2.5 Input into The Process

Among the things the project team heard from the public was the need to reduce the barrier effect of I-64 to fit the community better and to create access benefitting a diversity of people. The project team also heard about the importance of different modes of transportation and the need to coordinate with regional partners to enhance the local transportation network that supports people walking, biking, and taking public transit.

The project team used the information gathered during our public outreach to develop the Purpose and Need and add project goals as secondary screening criteria. This allowed the study team to filter out ideas and designs inconsistent with the needs and goals that the public identified.

5.2.6 Communication Materials

5.2.6.1 Branding

Embedded in the project messaging was the branding for the project. This included the creation of a logo (see Figure 41), color scheme, and tagline "Community. Transportation. Together. Kingshighway to Jefferson." Together these elements convey the importance of public engagement and emphasize MoDOT's desire to collaborate with the community. The Future64 brand book is in Appendix B.

5.2.6.2 Website

A project website was developed and housed at www.Future64.com as a public outreach and engagement tool. The website served as a central information source for learning about the project, getting updates, downloading public meeting displays, and other project documents. It went live on April 14, 2022. By February 5, 2023, 32,424 people had visited the site.

Figure 41. Future64 Study Logo

5.2.6.3 Videos

A short video was produced at the beginning of the Future64 study to introduce the study, explain what a PEL is, why it is needed for this corridor, and what will happen during the planning process (see Figure 42). Besides being shown at various events, the video was available on the website.

A second video was produced to promote the second public meeting in December 2022. The video highlighted the importance of attending the second public meeting and providing feedback on the proposed options. The video shared how the study team arrived at its alternatives and addressed issues revealed through outreach and other stakeholder feedback.

The videos were made available on MoDOT's St. Louis YouTube account: The first video can be viewed here, and the second one here.

Figure 42. Screen capture of the web-hosted video

5.2.6.4 Fact Sheets/Fliers

A Purpose and Need flier and Fact Sheet were produced and made available on the project website. Additionally, these materials were distributed to stakeholders and at neighborhood meetings, public meetings, and pop-up events. A copy of the Purpose and Need flier and several versions of the Fact Sheet can be found in Appendix B.

5.3 Agency Coordination

The study team coordinated with resource agencies and tribes twice during the project to provide input and solicit feedback. Two collaboration letters were sent to the following agencies and tribes:

- Federal Agencies
  - Federal Emergency Management Agency
  - Federal Transit Administration

    - National Park Service
    - U.S. Army Corps of Engineers, St. Louis District
    - U.S. Department of Agriculture, Natural Resources Conservation Service
    - U.S. Fish and Wildlife Service
    - U.S. Environmental Protection Agency
- State Agencies
    - Department of Economic Development
    - Department of Health and Senior Services
    - Federal Assistance Clearinghouse
    - State Historic Preservation Officer
    - State Emergency Management Agency
    - Department of Natural Resources
    - Department of Conservation
- North American Tribes
    - Kickapoo Tribe of Oklahoma
    - Absentee Shawnee Tribe of Oklahoma
    - Eastern Shawnee Tribe of Oklahoma
    - Iowa Tribe of Kansas & Nebraska
    - Kaw Nation
    - Kickapoo Tribe in Kansas
    - Kickapoo Tribe in Oklahoma
    - Miami Tribe of Oklahoma
    - Osage Nation
    - Ponca Tribe of Nebraska
    - Ponca Tribe of Indians of Oklahoma
    - Sac and Fox Nation of Missouri
    - Sac and Fox Nation
    - Quapaw Nation
    - Sac and Fox Tribe of the Mississippi in Iowa

In August 2022, the study team sent a collaboration letter to federal and state agencies and tribes. The letter's purpose was to provide a study overview and request input or feedback from the recipients regarding the project in general, the Purpose and Need, or the five technical reports and memoranda made available for review. The agencies and tribes were asked for input, comments, or feedback. The U.S. Department of Agriculture responded that they had no comments at the time, and no other input was received from the agencies or tribes.

In February 2023, a second letter was sent to the same list of agencies and tribes to provide a project update, the alternatives screening process, attachments of the alternatives considered, alternatives screening documentation reports, and a summary of the results of the environmental screen. Five agencies replied. Their responses are summarized in Table 12.

Table 12. Summary of Agency Responses from Alternatives Considered and Environmental Screen

Agency Name	Summary of Response
National Park Service	If there are any LWCF-encumbered sites within Missouri that will be impacted by MoDOT projects, the Missouri Department of Natural Resources should be consulted with and provided the opportunity to comment.
Federal Assistance Clearinghouse	None of the agencies involved in the review had comments or recommendations to offer at this time.
Department of Health and Senior Services	General Comments • Need for all elements to be heavily scrutinized with accessibility in mind. • Desire for the safety of Vulnerable Road Users to be the primary measurement of success. • Need for additional treatments and crossings at the Grand MetroLink connection. • Desire for the Grand Bus Lanes to be included in all alternatives. • Good to see many elements aimed towards making it safer and easier for Vulnerable Road Users in the alternatives. • Need to size Vulnerable Road User Infrastructure for safety. • Desire for intersection safety with Vulnerable Rod Users. • Specific consideration and design needed should Grand and Forest Park be brought to an at-grade intersection. Comments on Specific Alternatives • Alternative #1: The western interchange best balances overall project costs with automobile capacity and pedestrian and bike traffic needs. A parallel bike facility on Tower Grove Ave is a great idea regardless of the alternative selected. • Alternative #2: The Grand Blvd. bus lanes and double shared-use paths in the east interchange area are top priorities. As well as the overall traffic calming of the roundabout and Theresa traffic lights. • Alternative #3: Bicycle and pedestrian improvements on Tower Grove Ave. are not as beneficial as those for Alternatives #1 and #2. Pedestrian safety should be a focus at the Theresa Ave. roundabout. The proposed signal at Theresa Ave. and Forest Park Ave. will help to calm traffic before it gets to a potential at-grade intersection at Forest Park Ave. and Grand Blvd.
Department of Natural Resources	The department provided input on the following topics: Karst Topography, Wells, Public Land, Conservation Opportunity Areas, Water Protection, Sensitive Waters, Permitting Obligations, Land Disturbance Requirements, Demolition and Construction Waste Management, Air Pollution, and Historic Preservation.
State Historic Preservation Officer	Concurs with the description of the undertaking's potential impacts and recommended actions for future project stages.

6 Alternatives Evaluation

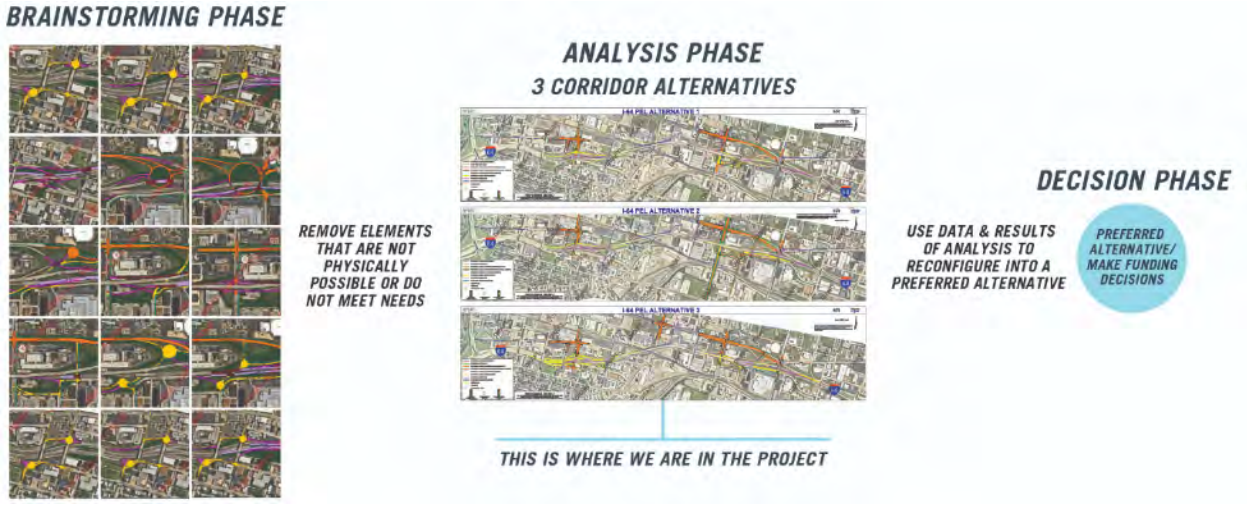
6.1 Overall Process

The alternatives development and evaluation process identified and evaluated a broad range of reasonable improvements for the I-64 corridor that recognizes the complexity of the existing interstate system, local roadways, multimodal facilities, and context surrounding the social, physical, and natural environment. The process included developing evaluation criteria based on the Purpose and Need and other project goals described in Section 3, Purpose and Need Statement and Other Project Goals, developing a range of improvements, and evaluating the concepts and alternatives through a two-level process (see Figure 43). The implementation plan recommends the next steps in the process.

Figure 43. Alternatives Evaluation Process

The results of each level of the alternatives evaluation describe why specific concepts or corridor alternatives were carried forward and why others were not and will streamline the alternatives analysis process for implementing future projects in the corridor. Figure 44 shows the process for the two alternative evaluation levels completed. The brainstorming phase is described as Level 1, and the analysis phase is described as Level 2. The decision phase will occur during the next step of corridor planning as individual projects are determined.

Figure 44. Level 1 and Level 2 Evaluation



Appendices C and D present the technical detail, evaluation criteria, and evaluation results for the Level 1 and Level 2 screenings. Appendices E and F include the traffic operations evaluation and community benefits assessment supporting the results presented in this section. The alternatives evaluation process included input from the Project Steering Committee, stakeholders, and the public.

6.2 No Build (Maintenance Only) Alternative

The No Build (Maintenance Only) alternative does not include any transportation improvements outside of activities to maintain I-64 in a state of good repair other than the completion of the Jefferson Ave./22nd St. interchange improvements (reflected in the Existing Conditions) and Compton Ave. Bridge replacement by the City of St. Louis. The six interchanges between Kingshighway Blvd. and Jefferson Ave./22nd St. would remain in place with their existing spacing – ramp merge, diverge, and weave distances would all remain as reflected in the Existing Conditions. The area's intersections would remain as currently configured with the same means of traffic control.

MoDOT maintains 13 existing bridges along the corridor scheduled for repair or replacement. The No Build (Maintenance Only) alternative includes replacing or rehabilitating these 13 structures. Improvements would be in-kind and only include enhancements needed to bring the structures into compliance with the accepted safety standards at the time of construction.

For multimodal uses, proposed improvements identified by MoDOT, the City of St. Louis, or the GRG to the pedestrian and bicycle network in the study area were assumed to be in place in the No Build (Maintenance Only) alternative. These committed and likely improvements consist of new segments of the Brickline Greenway, the Tower Grove-Cortex Connector, the Compton Ave. Cycle Track, and the Spring Ave. overpass. Approximately 12 miles of bike/pedway projects are

committed to or likely to be completed by 2050 and are reflected in the No Build (Maintenance Only) alternative.

6.3 Level 1 Concepts Development and Screening (Brainstorm Phase) Summary

6.3.1 Overview

During the Level 1 Concepts Development and Screening Process, the study team developed a wide range of possible concepts to improve I-64 between Kingshighway Blvd. and Jefferson Ave. based on the project Purpose and Need statement. A set of criteria was developed, and each concept was qualitatively screened to determine how well it addressed the Purpose and Need. The result was a set of concept recommendations and the most promising concepts that will be used to develop three distinct corridor-wide alternatives for more detailed evaluation in the Level 2 Alternative Screening Process.

6.3.2 Criteria

Two criteria were developed for each of the five project needs. Those criteria were reviewed and revised based on feedback from the Project Steering Committee. Revisions included the addition of a criterion to identify "Other Challenges to Implementation" related to each concept, which was included to consider fatal flaws outside of the Purpose and Need and environmental resource impacts.

The Level 1 criteria are listed in Table 13. Each criterion is documented in Appendix C.

Table 13. Level 1 Criteria

Category	Criteria
Increase safety for all users	• Regional Vehicular Through Movements: Does the concept improve safety on the I-64 mainline, ramps, or ramp terminals? Does the concept improve safety within the local road network within the study area? Does the improvement address identified crash hot spots? • Bike/Ped: Does the concept improve safety for walking, biking, or transit users across I-64 and throughout the study area?
Improve transportation system with intuitive navigation to, from, and across I-64	• I-64 Access: Does the concept maintain or provide access to current and known future destinations? • Interstate/Local Network: Does the concept provide logical access to the perpendicular street grid and provide for all traffic movements (on and off in both directions)?
Reduce the barrier effect of I-64 for bicycle, pedestrian, and transit users	• Support Other Entities Bike/Ped Plans: Does the concept facilitate connectivity for transit users and people walking and biking across I-64 and within the study area? • Transit Access/Effectiveness: Does the concept facilitate transit access and connectivity to other non-motorized modes or operations?

Category	Criteria
Optimize bridge maintenance by improving structural conditions to maintain a good state of repair	• Structure Repair: How much additional structural repair (not part of a reconfiguration) is necessary to extend all MoDOT bridges' life span to 2050? • Reduce Structures: Does the alternative reduce the number of MoDOT Maintained structures?
Maintain Interstate function, operations, and capacity for the future	• Capacity: Does the concept maintain capacity on the I-64 mainline, ramps, or ramp terminals? • Freight: Does the alternative potentially facilitate freight movements and improve maneuverability along, to, and from I-64?
Other Challenges to Implementation	Does the alternative impact resources that make the concept extremely challenging to approve or construct?

6.3.3 Concept Development

Initial concepts were developed through Innovation Brainstorm workshops attended by FHWA, MoDOT, the consultant team, and members of the Project Steering Committee. There were 26 participants in the Interchange, Intersection, and TSMO workshop on March 31, 2022. There were 28 participants in the Urban Mobility and Sustainability workshop on April 1, 2022. These workshops generated several ideas. A similar group participated in a June 28, 2022, workshop to refine the initial ideas and develop a range of concepts. The broad group of innovative thinkers from outside the study team with different areas of expertise helped expand the potential range of concepts.

The study team took the workshop concepts and developed 15 Level 1 Concepts. The concepts focused on the two major interchange complexes on the corridor:

- Four concepts for Boyle Ave., Tower Grove Ave., and Vandeventer Ave. on the west
- Eleven concepts for Market St., Grand Blvd., and Compton Ave. on the east

6.3.4 Screening

The study team evaluated the 15 concepts and the No Build (Maintenance Only) alternative against the screening criteria and presented the draft screening results for discussion with MoDOT and the FHWA Missouri Division office on July 20, 2022. Based on that discussion, the screening results were updated.

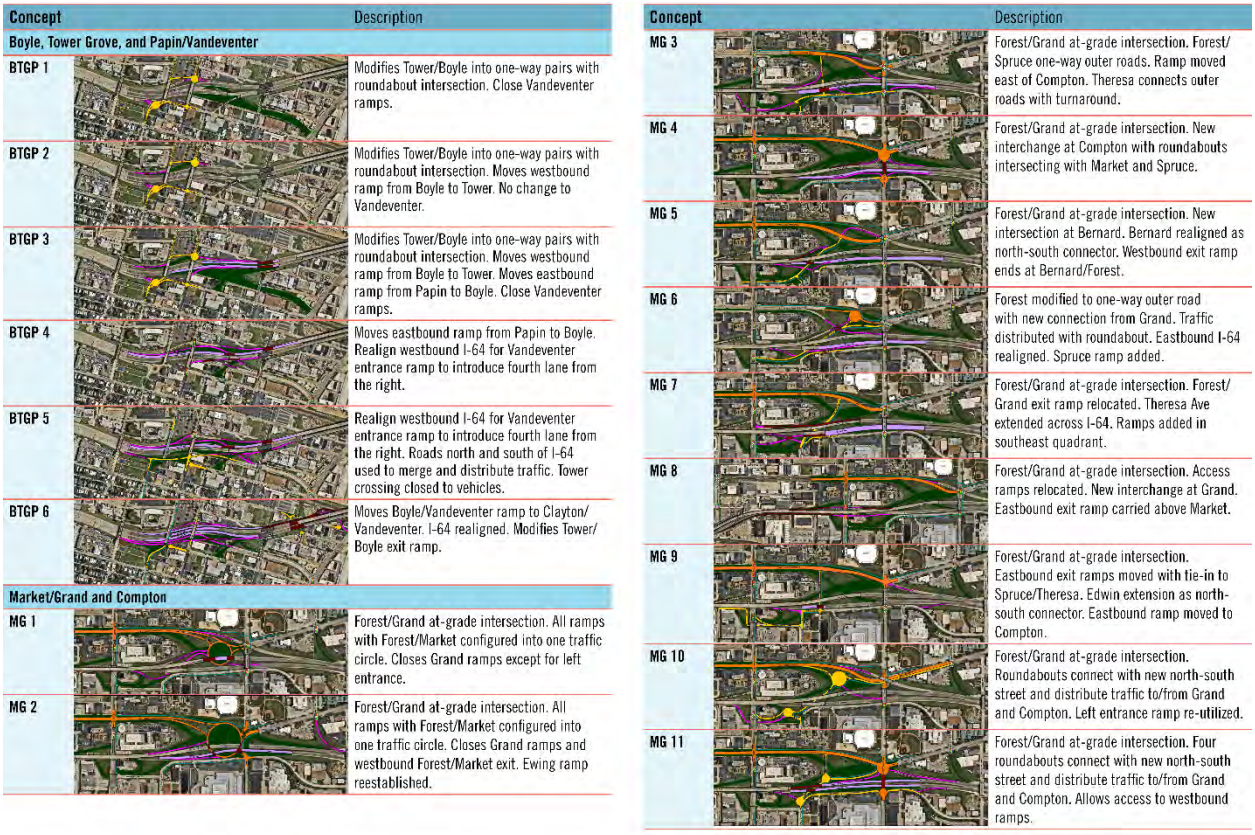
The concepts were then presented to the CAG and TAG, who met separately on July 28, 2022. Based on the feedback from the CAG and TAG discussions, two additional concepts were added for the Boyle Ave., Tower Grove Ave., and Vandeventer Ave. interchange areas. The CAG and TAG also provided suggestions for improving the existing concepts, which were considered in developing the Level 2 alternatives.

Figure 45 shows and describes the 17 concepts screened during Level 1 and summarizes the results of the Level 1 screening. The determination and rationale for the concepts, plus the No Build (Maintenance Only) alternative, are shown in Table 14 and Table 15. The determination "Carry Forward" indicates that the concept was evaluated in the Level 2 Alternative Screening.

The determination "Do Not Carry Forward" indicates that a concept or alternative was "reasonable but not recommended" so it would not be further analyzed in the PEL process. However, that concept or alternative could still be revisited during the NEPA phase if there were changes to regulatory requirements, physical changes in the corridor, changes to the Purpose and

Need or project goals or other changes that would suggest the concept or alternative might add value to a preferred alternative. These "reasonable but not recommended" concepts and alternatives will be made available for public comment during the NEPA scoping phase to help determine if they require additional analysis.

Figure 45. Level 1 Concepts Development



Concept	Description
Boyle, Tower Grove, and Papin/Vandeventer	
BTGP 1	Modifies Tower/Boyle into one-way pairs with roundabout intersection. Close Vandeventer ramps.
BTGP 2	Modifies Tower/Boyle into one-way pairs with roundabout intersection. Moves westbound ramp from Boyle to Tower. No change to Vandeventer.
BTGP 3	Modifies Tower/Boyle into one-way pairs with roundabout intersection. Moves westbound ramp from Boyle to Tower. Moves eastbound ramp from Papin to Boyle. Close Vandeventer ramps.
BTGP 4	Moves eastbound ramp from Papin to Boyle. Realign westbound I-64 for Vandeventer entrance ramp to introduce fourth lane from the right.
BTGP 5	Realign westbound I-64 for Vandeventer entrance ramp to introduce fourth lane from the right. Roads north and south of I-64 used to merge and distribute traffic. Tower crossing closed to vehicles.
BTGP 6	Moves Boyle/Vandeventer ramp to Clayton/ Vandeventer. I-64 realigned. Modifies Tower/ Boyle exit ramp.
Market/Grand and Compton	
MG 1	Forest/Grand at-grade intersection. All ramps with Forest/Market configured into one traffic circle. Closes Grand ramps except for left entrance.
MG 2	Forest/Grand at-grade intersection. All ramps with Forest/Market configured into one traffic circle. Closes Grand ramps and westbound Forest/Market exit. Ewing ramp reestablished.

Concept	Description
MG 3	Forest/Grand at-grade intersection. Forest/ Spruce one-way outer roads. Ramp moved east of Compton. Theresa connects outer roads with turnaround.
MG 4	Forest/Grand at-grade intersection. New interchange at Compton with roundabouts intersecting with Market and Spruce.
MG 5	Forest/Grand at-grade intersection. New intersection at Bernard. Bernard realigned as north-south connector. Westbound exit ramp ends at Bernard/Forest.
MG 6	Forest modified to one-way outer road with new connection from Grand. Traffic distributed with roundabout. Eastbound I-64 realigned. Spruce ramp added.
MG 7	Forest/Grand at-grade intersection. Forest/ Grand exit ramp relocated. Theresa Ave extended across I-64. Ramps added in southeast quadrant.
MG 8	Forest/Grand at-grade intersection. Access ramps relocated. New interchange at Grand. Eastbound exit ramp carried above Market.
MG 9	Forest/Grand at-grade intersection. Eastbound exit ramps moved with tie-in to Spruce/Theresa. Edwin extension as north-south connector. Eastbound ramp moved to Compton.
MG 10	Forest/Grand at-grade intersection. Roundabouts connect with new north-south street and distribute traffic to/from Grand and Compton. Left entrance ramp re-utilized.
MG 11	Forest/Grand at-grade intersection. Four roundabouts connect with new north-south street and distribute traffic to/from Grand and Compton. Allows access to westbound ramps.

The study team developed a matrix to show the Level 1 screening results. The Level 1 screening matrix is too large to include in the body of this report and is located in Appendix C, Level 1 Concept Development, Screening Process, and Results Technical Report. Figure 46, a screenshot of Appendix C's Level 1 screening results matrix, is included here as a visual reference.

Figure 46. Level 1 Screening Matrix

Table 1. Level 1 Concept Screening Results

NEED	1. Increase safety for all users		2. Improve transportation system with intuitive navigation to, from, and across I-64		3. Reduce the barrier effect of I-64 for bicycle, pedestrian, and transit users		4. Optimize bridge maintenance by improving structural conditions to maintain a good state of repair		5. Maintain Interstate function, operations, and capacity for the future		
CRITERIA	Regional Vehicular Through Movements	Bike/Ped	I-64 Access	Interstate / Local Network interface	Support other entities bike/ped plans	Transit Access/Effectiveness	Structure Repair	Reduce Structures	Capacity	Freight	Other Challenges to Implementation
Concepts											
BTGP_No Build	Low	Low	Medium	High	Low	Medium	Low	Low	Medium	Medium	High
BTGP_Concept 1	High	High	Low	Medium	Medium	High	Medium	High	Low	Low	High
BTGP_Concept 2	Low	Medium	High	High	Medium	High	Low	Low	Medium	Medium	High
BTGP_Concept 3	Low	High	Low	High	Medium	High	High	Medium	Low	Low	High
BTGP_Concept 4	Medium	Medium	High	High	Medium	Medium	Medium	Low	Medium	High	Low
BTGP_Concept 5	Medium	High	Medium	Low	High	High	Medium	Low	High	High	Low
BTGP_Concept 6	Medium	High	Medium	Medium	Medium	Medium	Medium	Low	High	High	Low
MG_No Build	Low	Low	Medium	Low	Low	Low	Low	Low	Medium	Medium	High
MG_Concept 1	Medium	Medium	Medium	Low	Medium	Medium	Low	Medium	Medium	Low	High
MG_Concept 2	Medium	Medium	Low	Low	Medium	Medium	Medium	Low	Medium	Low	High
MG_Concept 3	Medium	High	Low	Medium	Medium	Medium	Medium	Medium	Medium	Medium	High
MG_Concept 4	Medium	Medium	Low	High	Medium	Medium	High	High	Medium	Medium	High
MG_Concept 5	High	High	Low	High	High	Medium	Medium	Medium	High	Medium	High
MG_Concept 6	Low	Medium	Low	Low	High	High	Medium	Medium	Medium	Medium	High
MG_Concept 7	Medium	Medium	Medium	Medium	High	Medium	Low	Low	Medium	High	High
MG_Concept 8	Medium	Low	High	High	Low	Low	Medium	Low	Medium	High	Low
MG_Concept 9	Medium	Medium	Medium	Low	Medium	Medium	Medium	High	Medium	Medium	High
MG_Concept 10	Low	Medium	Medium	Low	High	Medium	Low	Medium	Medium	Medium	High
MG_Concept 11	Medium	Medium	Low	Medium	High	High	High	Low	Medium	Medium	No

In some cases, a concept was not carried forward, but an element of that concept was incorporated into one of the Level 2 Alternatives. These considerations and others for Level 2

evaluation are noted for each concept. The Level 1 Concepts Development, including figures and screening rationale, is provided in greater detail in Appendix C's Level 1 Concept Development, Screening Process, and Results Technical Report.

Table 14. West Interchange Area Concept Rationale

Concept	Determination	Rationale
BTGP Concept 1	Do Not Carry Forward	Scored low for the Purpose and Need criteria: ▪ Improve Transportation System with Intuitive Navigation To, From, and Across I-64 (I-64 Access) ▪ Maintain Interstate Function, Operations, and Capacity for the Future (Capacity And Freight)
BTGP Concept 2	Do Not Carry Forward	Scored low for the Purpose and Need criteria: ▪ Increase Safety for All Users (Regional Vehicular Through Movements). In Level 2 evaluation, consider the existing configuration of the Vandeventer Ave. and Boyle Ave./Tower Grove Ave. ramps as part of an alternative.
BTGP Concept 3	Do Not Carry Forward	Scored low for the Purpose and Need criteria: ▪ Increase Safety for All Users (Regional Vehicular Through Movements) ▪ Improve Transportation System with Intuitive Navigation To, From, and Across I-64 (I-64 Access) ▪ Maintain Interstate Function, Operations, and Capacity for the Future (Capacity and Freight). In Level 2, elements to consider carrying forward include: ▪ Extended westbound exit ramp. ▪ Relocation of eastbound on-ramp from Papin St. to Boyle Ave.
BTGP Concept 4	Carry Forward	Scored high for the Purpose and Need criteria: ▪ Improve Transportation System with Intuitive Navigation To, From, and Across I-64 (I-64 Access and Interstate/Local Network Interface) ▪ Maintain Interstate Function, Operations, and Capacity for the Future (Freight) In Level 2, consider additional bicycle and pedestrian enhancements for crossings at Sarah St. and Tower Grove Ave.
BTGP Concept 5	Carry Forward	Scored high for the Purpose and Need criteria: ▪ Increase Safety for All Users (Bike/Ped) ▪ Reduce the Barrier Effect of I-64 for Bicycle, Pedestrian, and Transit Users (Support Other Entities Bicycle/Pedestrian Plans and Transit Access/Effectiveness) ▪ Maintain Interstate Function, Operations, and Capacity for the Future (Capacity and Freight) In Level 2 evaluation, concerns to be addressed may include: ▪ Modifications to allow for additional turn lane(s) on Boyle Ave. ▪ Grade separation or signalization for bicycle and pedestrian crossing of eastbound ramp traffic south of I-64

Concept	Determination	Rationale
BTGP Concept 6	Do Not Carry Forward	Scored low for the criterion: ▪ Other Challenges to Implementation; and Medium for several Purpose and Need criteria. In Level 2 evaluation, consider a Clayton Ave. to Sarpy Ave. bicycle and pedestrian connection with an alternative that does not require a new I-64 mainline bridge.

BTGP = Boyle Ave., Tower Grove Ave., and Papin St./Vandeventer Ave.

Table 15. East Interchange Area Concept Rationale

Concept Name	Determination	Rationale
MG Concept 1	Do Not Carry Forward	Scored low for the Purpose and Need criteria: ▪ Improve Transportation System With Intuitive Navigation To, From, and Across I-64 (Interstate/Local Network Interface) ▪ Maintain Interstate Function, Operations, and Capacity for the Future (Freight) In Level 2 evaluation, consider an alternative with the conversion to an at-grade intersection at Forest Park Ave. and Grand Blvd.
MG Concept 2	Do Not Carry Forward	Scored low for the Purpose and Need criteria: ▪ Improve Transportation System with Intuitive Navigation To, From, and Across I-64 (I-64 Access and Interstate/Local Network Interface) ▪ Maintain Interstate Function, Operations, and Capacity for the Future (Freight)
MG Concept 3	Carry forward and combine Concepts 3, 5, and 9	Scored high for the Purpose and Need criterion: ▪ Increase Safety For All Users (Bike/Ped). Scored low for the Purpose and Need criterion: ▪ Improve Transportation System With Intuitive Navigation To, From, and Across I-64 (I-64 Access); and Medium for the others. In the Level 2 evaluation, concerns to be addressed with a combined concept include the following: ▪ Introduces an eastbound on-ramp in closer proximity to Jefferson Ave. interchange ▪ Possibility to extend Theresa Ave. connection over or under the railroad to the south
MG Concept 4	Do Not Carry Forward	Scored low for the Purpose and Need criterion: ▪ Improve Transportation System with Intuitive Navigation To, From, and Across I-64 (I-64 Access).

Concept Name	Determination	Rationale
MG Concept 5	Carry forward and combine Concepts 3, 5, and 9	Scored high for the Purpose and Need criteria: ▪ Increase Safety for All Users (Regional Vehicular Through Movements and Bike/Ped) ▪ Improve Transportation System with Intuitive Navigation To, From, and Across I-64 (I-64 Access) ▪ Reduce Barrier Effect of I-64 for Bicycle, Pedestrian, and Transit Users (Support Other Entities Bike/Ped Plans) ▪ Maintain Interstate Function, Operations, and Capacity for the Future (Capacity) In Level 2 evaluation, concerns to be addressed with combined concept include: ▪ Reconfigure westbound I-64 off-ramp to Forest Park Ave. ▪ Intersection spacing on Theresa Ave. between Spruce St. and eastbound I-64 on-ramp
MG Concept 6	Do Not Carry Forward	Scored low for the Purpose and Need criteria: ▪ Increase Safety For All Users (Regional Vehicular Through Movements) ▪ Improve Transportation System with Intuitive Navigation To, From, and Across I-64 (I-64 Access and Interstate/Local Network Interface)
MG Concept 7	Carry Forward	Scored high for the Purpose and Need criteria: ▪ Reduce the Barrier Effect of I-64 for Bicycle, Pedestrian, and Transit Users (Support Other Entities Bike/Ped Plans) ▪ Maintain Interstate Function, Operations, and Capacity for the Future (Freight)
MG Concept 8	Carry Forward	Scored high for the Purpose and Need criteria: ▪ Improve Transportation System with Intuitive Navigation To, From, and Across I-64 (I-64 Access and Interstate/Local Network Interface) ▪ Maintain Interstate Function, Operations, and Capacity for the Future (Freight) In Level 2 evaluation, concerns to be addressed may include: ▪ Consider adding a new north-south connection from Theresa Ave. to and across Forest Park Ave. ▪ Reconfiguration of the eastbound I-64 off-ramp at Grand Blvd. Market St. west of Grand Blvd. would need to be vacated to accommodate the eastbound I-64 off-ramp substructure to Grand Blvd., which was determined not to be a viable solution. Consider revising the concept to carry forward the ramp configuration in the northern quadrants. The southern quadrants could be revised to a non-typical folded diamond configuration where both ramps are placed in the southeast quadrant and have access to Grand Blvd. via a local road. Potential conflicts with planned improvements by GRG for a new greenway crossing at Spring St.

Concept Name	Determination	Rationale
MG Concept 9	Carry forward and Combine Concepts 3, 5, and 9	Scored medium for most of the Purpose and Need criteria. Scored low for the Purpose and Need criterion: ▪ Improve Transportation System with Intuitive Navigation To, From, and Across I-64 (Interstate/Local Network Interface). In Level 2 evaluation, concerns to be addressed may include: ▪ Bringing westbound ramp to grade at Market St. reduces space for queueing and reduces bicycle/pedestrian comfort on Compton Ave. ▪ Introduces an eastbound on-ramp in closer proximity to Jefferson Ave. interchange ▪ Introduces local street crossing of Theresa Ave. over railroad tracks to the south of the corridor
MG Concept 10	Do Not Carry Forward	Scored low for the criteria: ▪ Increase Safety for All Users (Regional Vehicular Through Movements) ▪ Improve Transportation System with Intuitive Navigation To, From, and Across I-64 (Interstate/Local Network Interface)
MG Concept 11	Do Not Carry Forward	Scored low for the Purpose and Need criterion: ▪ Improve Transportation System with Intuitive Navigation To, From, and Across I-64 (I-64 Access)

MG = Market St., Grand Blvd., and Compton Ave.

6.4 Level 2 Alternatives Development and Screening (Analysis Phase) Summary

6.4.1 Overview

The Level 2 Alternatives Screening Process built upon findings from the Level 1 Concepts Development Screening Process to develop three corridor-wide alternatives and combine the most promising elements of the Level 1 Concepts. The results of the Level 2 evaluation are a set of recommendations discussed in Section 8 Implementation Plan.

6.4.2 Criteria

The study team developed more detailed screening criteria and applied a process using quantitative analysis to assess how well the alternatives met the project needs – as well as qualitative and quantitative analyses to assess how well they addressed the project goals. The Purpose and Need criteria categories remain the same as the Level 1 Concepts Development. The Other Challenges to Implementation criterion was revised to Environmental Resources and Social and Built Environment criteria to account for impacts rather than reasonability or feasibility. The project goals were also utilized as criteria for this evaluation. The Level 2 criteria for the environmental resources, social and built environment, and project goals are listed in Table 16. Each criterion is documented in Appendix D. Cost estimate methodology and bridge rehabilitation and replacement estimates are located in Appendix H and I.

Table 16. Level 2 Criteria in Addition to Purpose and Need

Criteria
Environmental Resources: Does the alternative impact environmental resources?
Social and Built Environment: Does the alternative impact social and built resources?
Right-size I-64 to reduce the highway footprint and reuse the space to benefit the community: ▪ Does the alternative reduce the acreage of footprint of the I-64 right-of-way, interchanges, and ramps? ▪ How much released land is viable for redevelopment (acres)?
Support opportunities to repurpose excess highway right-of-way: ▪ Does the alternative reduce the acreage of footprint of the I-64 right-of-way, interchanges, and ramps? ▪ How much released land is viable for redevelopment (acres)?
Support improved land use near transit stations and trails: Does the alternative support transit and trail-oriented development?
Improve Equitable Outcomes: Protect Community Assets: Does this alternative impact any community assets? **Improve Equitable Outcomes**: Improve Quality of Life: Does this alternative contribute to an improved quality of life for local residents and workers? **Improve Equitable Outcomes**: Improved Access to Underserved Communities: Does the alternative improve access to underserved communities?
Coordinate with regional partners to enhance the connectivity, safety, and comfort of the local transportation network with a focus on multimodal: Does the alternative create opportunities to allow for coordinated enhancements in connectivity, safety, and comfort of travel by regional transportation and service delivery partners?
Integrate bicycle and pedestrian facility design best practices in the design of projects: Are the proposed bicycle and pedestrian facility designs considered best practices?
Consolidate access points from interstate to local system: Does the alternative consolidate access points from I-64 to the local system?
Invest in projects that provide good cost-benefit improvements: Does the alternative have a good cost-benefit?
Allow for opportunities to integrate best practices for green infrastructure, native plants, and stormwater best management into the design of transportation projects and use of right-of-way: Does the alternative provide opportunities for green infrastructure, native plantings, and stormwater management?
Allow for opportunities to improve beautification, placemaking, and making infrastructure inviting into the design of transportation projects: Does the alternative provide opportunities to improve beautification, placemaking, and inviting infrastructure?

6.4.3 Alternatives Development

The study team reviewed the Level 1 Concepts Development results, which analyzed the 17 concepts. Concepts 4 and 5 were recommended to move forward from the western interchange complex. Concepts 7, 8, and 9 (a combination of elements from 3, 5, and 9) were recommended to move forward from the eastern interchange complex. Based on the Level 1 analysis, individual elements of the other concepts provided a benefit that also carried into the Level 2 Alternatives.

The study team combined the primary elements of the "carried forward" concepts into three alternatives and made modifications to improve the Level 1 Concepts Development findings. Alternatives were also refined to meet the Level 2 Design Criteria for geometrics. While the Level

1 Concepts were developed separately for the western and eastern interchange areas, the Level 2 Alternatives considered corridor-wide improvements to assess how individual improvements perform within the corridor when combined, necessitating piecing the interchange improvements together to create the three corridor alternatives for Level 2.

Due to traffic operations between the two interchange locations being independent, there was the flexibility to create corridor-wide alternatives. This flexibility also allowed the Level 2 analysis to test various elements to determine if there was a fatal flaw, allowing the study team to see any differences in the operations and safety measures. The primary interchange complexes for the corridor-wide alternatives are shown in Figures 47 through 52. Appendix D contains a text description and figures showing the full corridor for each alternative.

Alternative 1 is shown in Figure 47 and Figure 48. Key features of this alternative are the following:

- Consolidates access at Grand Blvd.
- Lengthens auxiliary ramps on I-64
- Creates a new north-south connection on Theresa Ave.

Alternative 2 is shown in Figure 49 and Figure 50. Key features of this alternative are the following:

- Creates a new eastbound on-ramp from Boyle Ave.
- Creates bus-only lanes on Grand Blvd. between Choteau Ave. and Forest Park Ave.
- Builds a new Theresa Ave. bridge over railroad tracks

Alternative 3 is shown in Figure 51 and Figure 52. Key features of this alternative are the following:

- Consolidates the Vandeventer Ave. and Tower Grove Ave. off-ramps from I-64
- Creates a new eastbound on-ramp to I-64 from Vandeventer Ave.
- Removes left-hand entrance ramps at Boyle Ave./Papin Ave./Tower Grove Ave. and Grand Blvd./Market St./Bernard St. interchanges

Figure 47. Corridor-wide Alternative #1: West Interchange

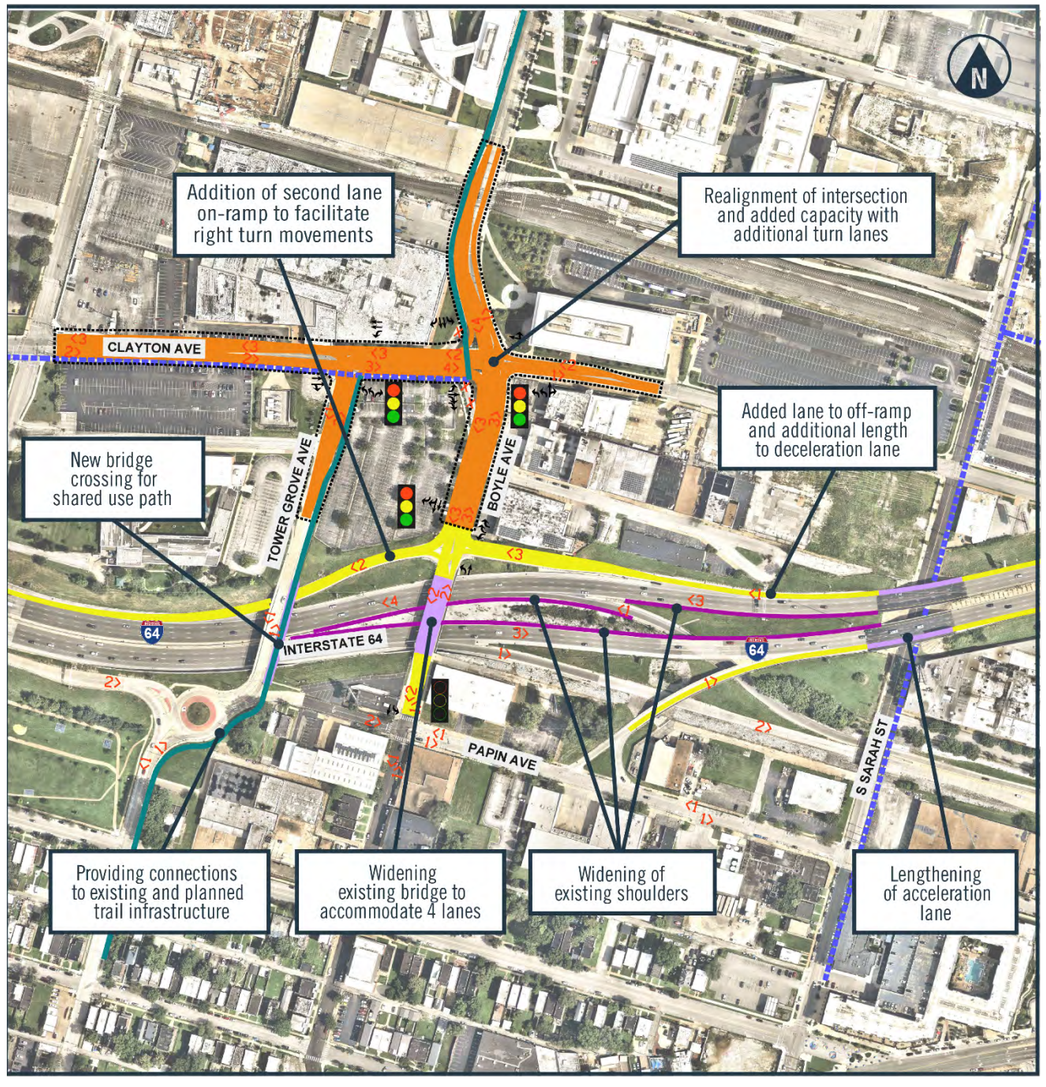


Figure 48. Corridor-wide Alternative #1: East Interchange

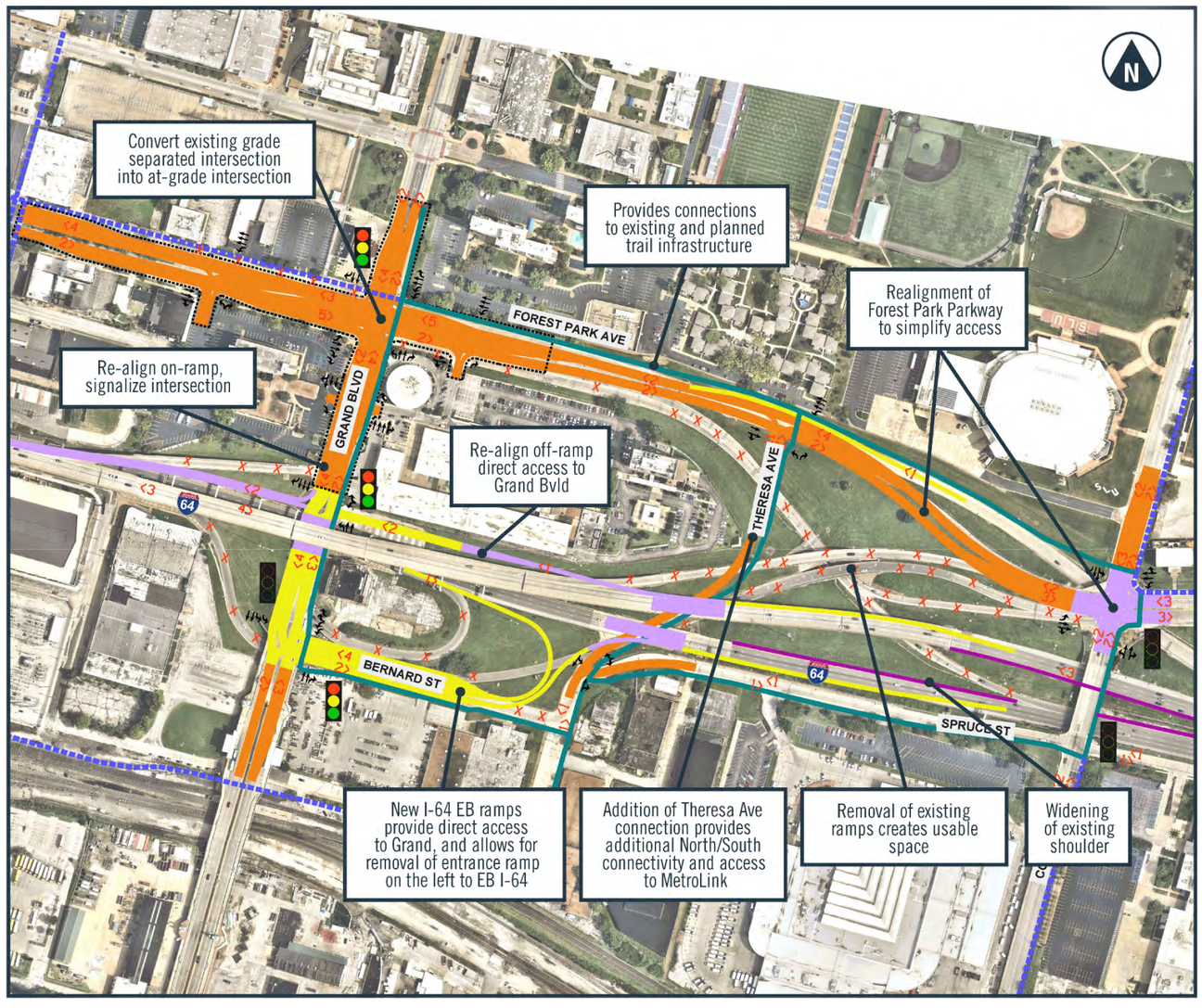


Figure 49. Corridor-wide Alternative #2: West Interchange

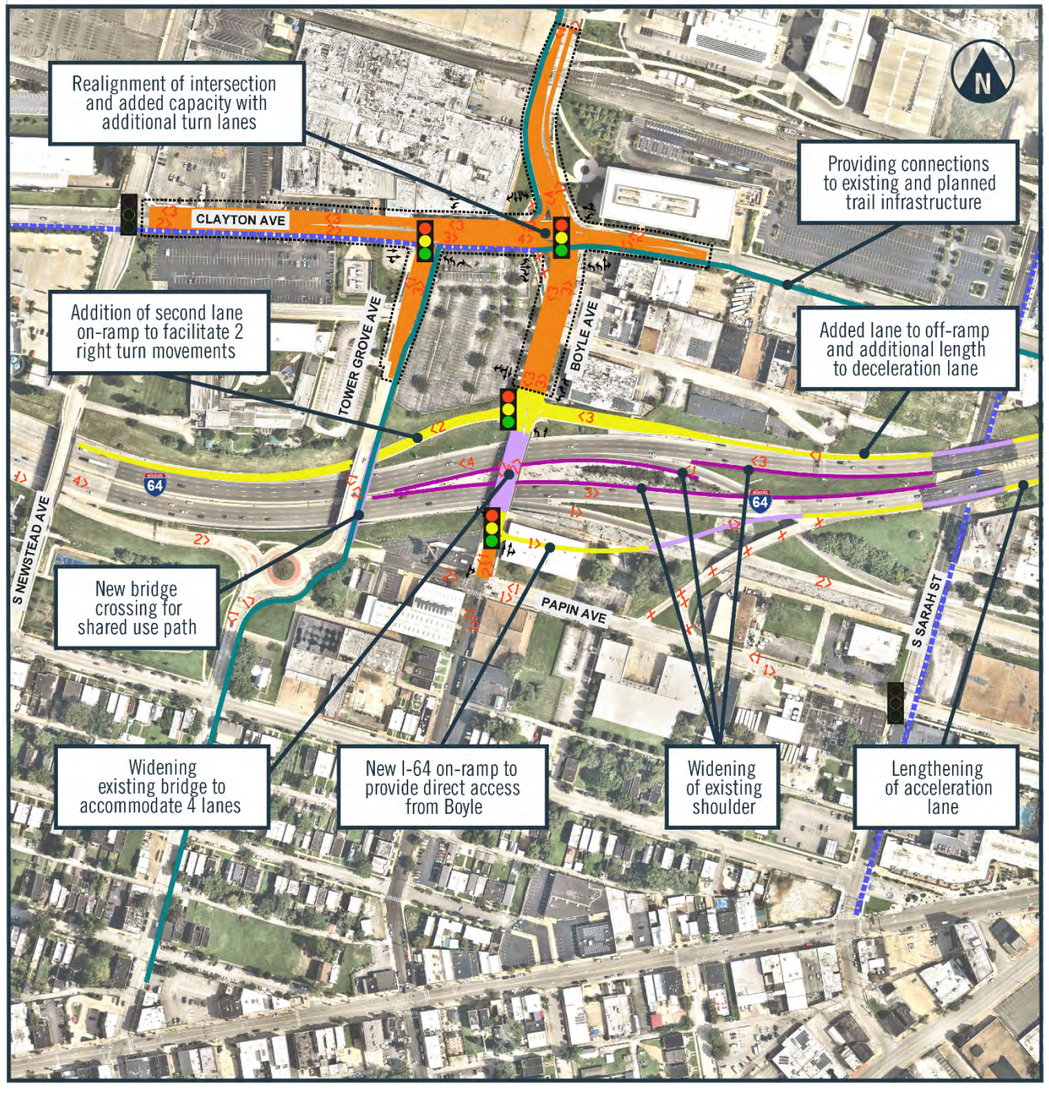


Figure 50. Corridor-wide Alternative #2: East Interchange

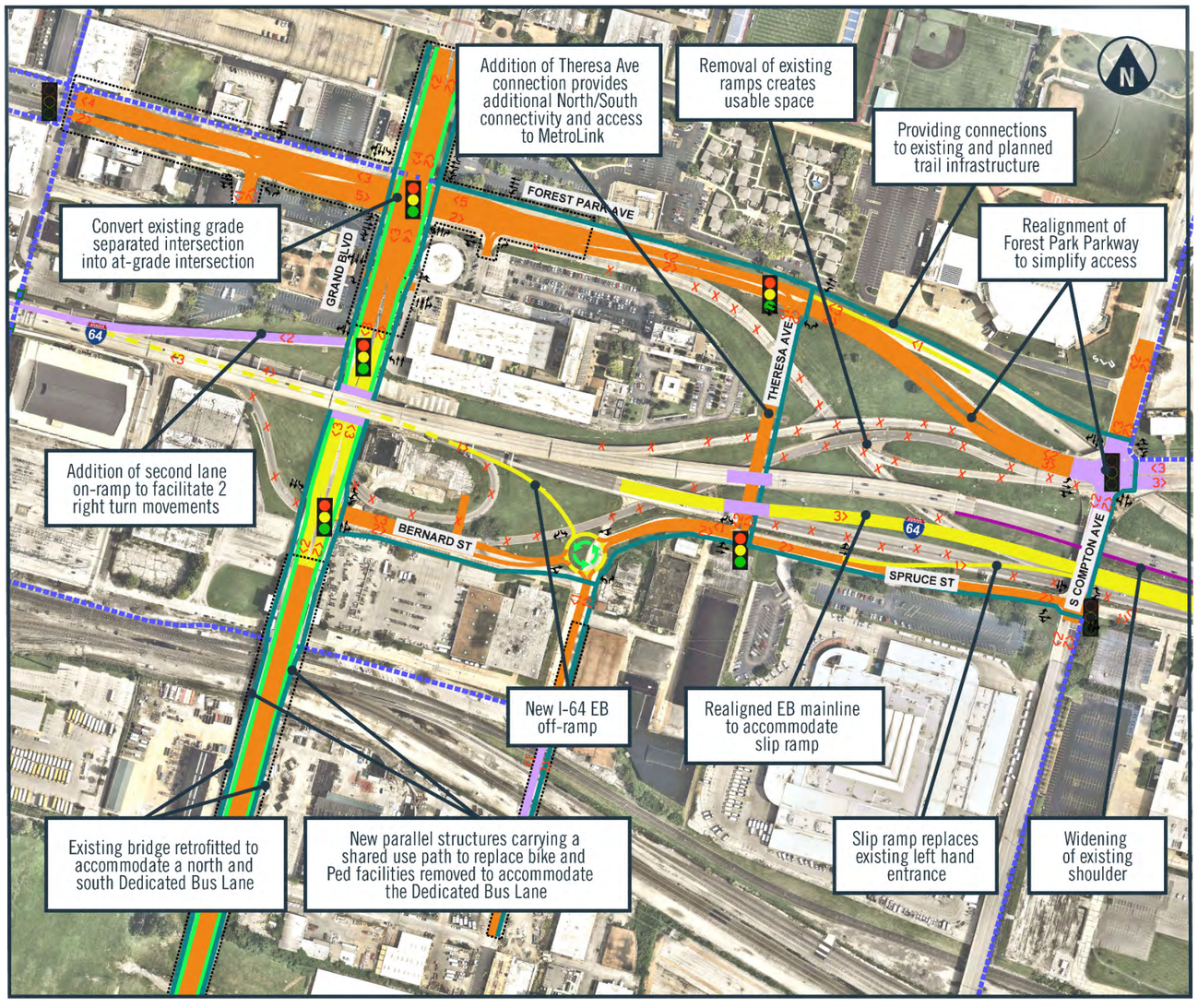


Figure 51. Corridor-wide Alternative #3: West Interchange

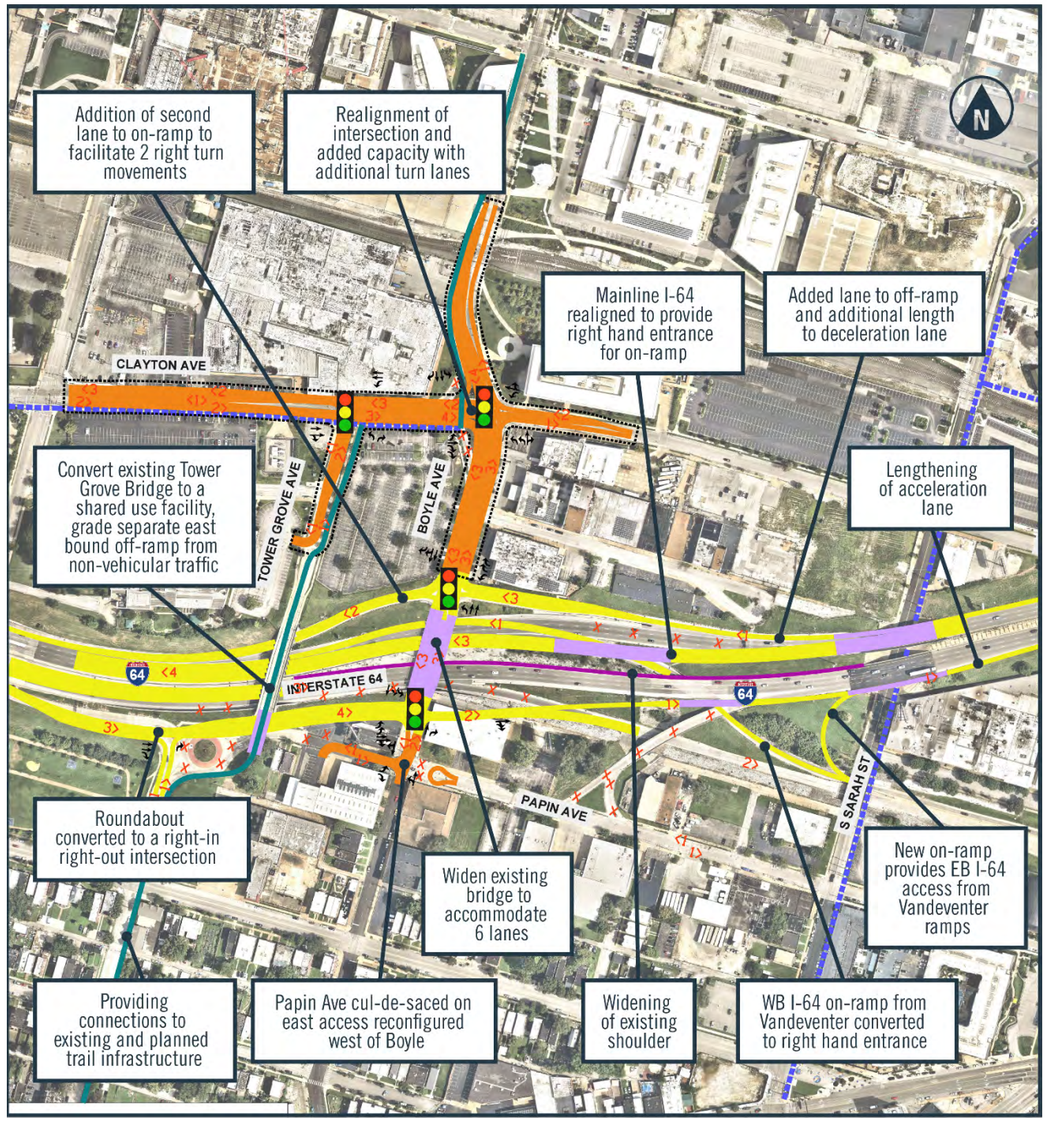
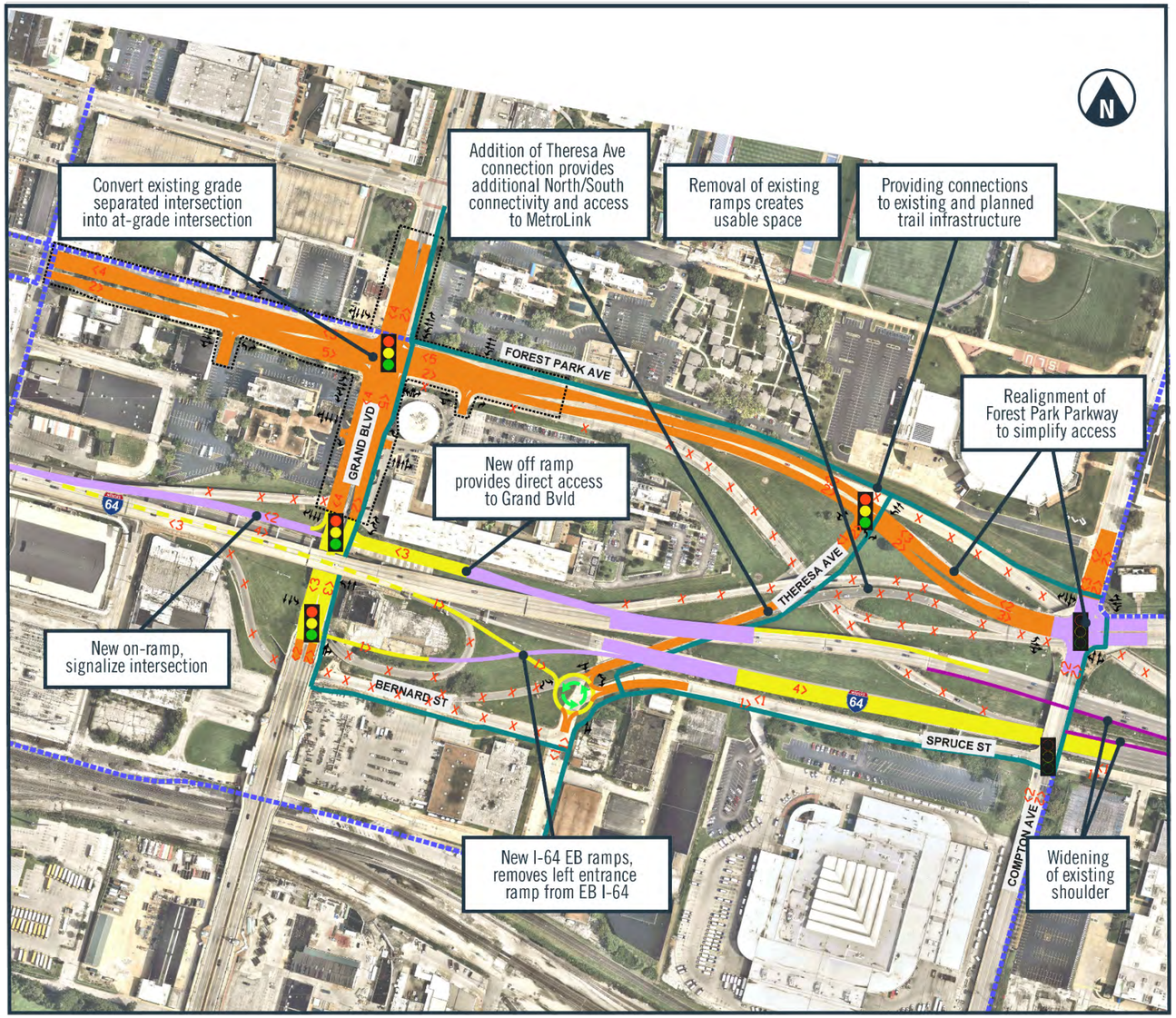


Figure 52. Corridor-wide Alternative #3: East Interchange



6.4.4 Screening

The three alternatives were analyzed against the criteria to understand how well they achieve the project's needs and goals. While some alternatives performed better than others in certain areas, all three Build Alternatives met the Purpose and Need and are considered reasonable alternatives to advance toward NEPA for further study and refinement. Recommendations for refinement or further study needed on elements of the three corridor alternatives are presented in the Implementation chapter of the Future64 PEL report.

6.4.4.1 Level 2 Alternatives Purpose and Need Screening Results

Table 17 summarizes the results of the Level 2 alternatives Purpose and Need evaluation against the No Build Alternative (Maintenance Only). The study team developed a more detailed matrix to show the Level 2 screening results. The rationale for the High/Best, Moderate, and Least/Low ratings are provided in Appendix E. Appendix E provides the rationale for the purpose and need-based screening for each Level 2 alternative and the No Build Alternative.

Table 17. Level 2 Purpose and Need Screening Results Summary

Needs	Criteria	No Build	Alternative #1	Alternative #2	Alternative #3
Increase Safety for All Users	Regional Vehicular Movements	✖	○	○	✓
	Bicycle and Pedestrian Movements	○	○	○	✓
Improve Transportation with Intuitive Navigation To, From, and Across I-64	I-64 Access	✖	○	○	○
	Interstate and Local Network Interface	✖	✓	○	✓
Reduce the Barrier Effect on Bicycle, Pedestrian, and Transit Users	Support Other Entities' Bicycle and Pedestrian Plans	✖	○	✓	✓
	Transit Access and Effectiveness	✖	✖	✓	✖
Optimize Bridge Maintenance by Improving Structural Conditions to Maintain a Good State of Repair	Structure Repair	✖	○	○	○
	Reduce Structures	✖	✖	✖	✖

Needs	Criteria	No Build	Alternative #1	Alternative #2	Alternative #3
Maintain Interstate Function, operations, and Capacity for the Future	Capacity	✖	✖	✓	✓
	Freight	✖	○	○	○
Environmental Resource Protection	Environmental Resources	✖	○	○	○
	Social and Built Environment	○	○	○	○

Key: ✖ Low/Least ○ Moderate ✓ High/Best

Table 18 summarizes the results of the Level 2 goals screening for each corridor-wide alternative and the No Build (Maintenance Only) alternative. The study team developed a more detailed matrix to show the Level 2 screening results. The rationale for the High/Best, Moderate, and Least/Low ratings are provided in Appendix E. Appendix E provides the rationale for the goals-based screening for each Level 2 alternative and the No Build Alternative.

Table 18. Level 2 Goals Screening Results Summary

Criteria	No Build	Alternative #1	Alternative #2	Alternative #3
Right-size I-64	✖	○	○	✓
Support Improved Land Use Near Transit Stations and Trails	✖	○	○	✓
Protect Community Assets	✖	○	✖	✓
Improve Quality of Life	✖	○	✖	✓
Improve Access to Underserved Communities	✖	○	✖	✓
Coordinate to Enhance Local Transportation Network	○	○	✓	○
Bicycle and Pedestrian Best Management Practices	○	○	○	✓
Consolidate access points from Interstate to Local System	✖	○	○	✓
Cost-Benefit	✖	○	○	✓
Integrate Ecology Best Practices into Design and Right-of-Way	✖	✓	○	○
Integrate Improved Aesthetics into Project Designs	✖	○	✓	○

Key: ✖ Low/Least ○ Moderate ✓ High/Best

7 Implementation Plan

The Level 2 Alternatives analysis and screening results show that the three corridor alternatives evaluated all met the Purpose and Need and were considered reasonable alternatives to advance towards NEPA for further study and refinement. However, each alternative's strengths and weaknesses were discovered through the analysis performed and public engagement efforts that informed the screening of these alternatives.

As projects move towards NEPA, the following recommendations should serve as a guide for refining the alternatives to better meet the needs and goals established for the study. These recommendations are explained in more detail throughout Sections 7.1 and 7.2.

- West Interchange
  - Coordinate with the City of St. Louis to identify capacity needs and acceptable operational thresholds at the intersections of Clayton Ave. with Boyle Ave. and Tower Grove Ave.
  - Provide better and more intuitive access to eastbound I-64 by relocating the existing on-ramp from Papin St. to Boyle Ave. and consider adding another eastbound on-ramp from Vandeventer Ave.
  - Retain the existing left-hand entrance configuration at the westbound I-64 on-ramp from Vandeventer Ave.
- East Interchange
  - Coordinate with stakeholders on the alignment to extend Theresa Ave. northward across I-64 to connect with Forest Park Ave.
  - Coordinate with the City of St. Louis, rail owners, and other stakeholders to promote a grade-separated southern extension of Theresa Ave. across the railroad tracks.
  - Coordinate with the City of St. Louis to identify capacity needs and acceptable operational thresholds at the intersection of Grand Ave. with Forest Park Ave., based upon the proposed reconfiguration to a traditional at-grade intersection.
  - Coordinate with the City of St. Louis, Metro, and stakeholders to determine if there is support to pursue enhanced bus service (dedicated bus-only lanes) along the 70 Grand MetroBus line between Chouteau Ave. and Forest Park Ave. A decision from the region is needed before MoDOT advances planning and design to replace the Grand Blvd. Bridge over eastbound I-64 to determine bridge width and cross-section if the region pursues enhanced bus service along Grand Ave.
  - Reconfigure the eastbound I-64 off-ramp terminal at Grand St. to a roundabout, providing direct access to Theresa Ave., Spruce St., and Bernard St.
  - Continue to evaluate options for the eastbound I-64 on-ramp at Grand St., particularly regarding providing access to the Metro facility located along Spruce St. just west of Compton Ave.
  - Based upon the ultimate alignment decisions made for other facilities in the area, continue to evaluate whether the existing westbound I-64 off-ramp to Grand Ave. and Forest Park Ave. can be eliminated and replaced by a tight diamond ramp directly at Grand Ave. on the north side of I-64 (Alternative #3).

7.1 West Interchange Refinement of Reasonable Alternative Recommendations

7.1.1 Capacity and Footprint for Clayton Ave. Intersections (Local Network)

These intersections are on the local network owned and maintained by the City of St. Louis. The intersections are configured to meet MoDOT requirements for traffic operations in all three Build Alternatives (#1, #2, and #3). In future phases, planning and coordination are needed with the City of St. Louis and stakeholders to determine capacity needs at the intersections to determine if a lower LOS is acceptable. This may reduce the intersections' footprint by reducing lanes at the intersections. Due to the proximity of the I-64 westbound off-ramp to the Boyle Ave. intersection, the priority for MoDOT will be to avoid operational issues northbound on Boyle Ave. resulting from the intersection of Boyle Ave. and Clayton Ave.

7.1.2 Location/Configuration of Eastbound I-64 Access

In Alternative #2, the eastbound I-64 on-ramp is relocated from Papin St. to Boyle Ave. to consolidate and provide more intuitive access to and from I-64. In Alternative #3, the eastbound I-64 on-ramp is relocated to Boyle Ave. Additional right-of-way will be needed for the improvements shown in these alternatives, including one commercial property relocation.

An additional eastbound I-64 on-ramp is added from the existing connection that serves I-64 access westbound from Vandeventer Ave., improving access from Vandeventer Ave. This furthers the intuitive access provided in the area and improves operations and expected safety. The additional eastbound I-64 on-ramp from Vandeventer Ave. diverts some traffic originating along Forest Park Ave. away from the heavily traveled intersection with Grand Blvd. All three Build Alternatives at the East Interchange show the elimination of the existing eastbound I-64 access from Forest Park Ave. It is recommended that both the eastbound I-64 on-ramp from Boyle Ave. and Vandeventer Ave. be included in the refined alternatives carried forward for further project development.

7.1.3 Location/Configuration of Westbound I-64 Ramp from Vandeventer Ave.

In Alternatives #1 and #2, the existing westbound I-64 on-ramp from Vandeventer Ave. was used in place utilizing the left-hand entrance adding a lane to westbound I-64. In Alternative #3, the ramp was reconfigured to remove the left-hand entrance and replace it with a configuration that meets current design standards by placing it on the right-hand side of westbound I-64. Traffic analysis showed that the ramp and interstate functioned comparably in all three alternatives, regardless of whether it was a left or right-sided entry. While there may be some safety benefit to the configuration in Alternative #3 due to driver expectations, there are no differences in the Crash Modification Factors used for the safety analysis. Due to the estimated cost and impacts to traffic and safety for the maintenance of traffic needed to construct the new ramp configuration in Alternative #3, it is recommended to utilize the existing configuration for this ramp.

7.2 East Interchange Refinement of Reasonable Alternative Recommendations

7.2.1 Alignment for Theresa Ave. Extension to the North Across I-64

The extension of Theresa Ave. across I-64 was included in all three of the Build Alternatives. It showed many benefits in addressing the established project needs and goals and is widely

supported by stakeholders and the public. In each of the alternatives, the alignment of the extension was configured slightly differently. In Alternatives #1 and #3, the north extension is aligned with Theresa Ave. to the south, providing more intuitive navigation. Alternatives #1 and #2 are also closely aligned with the existing underpass for the Market St. ramp and require no additional improvements to I-64 to provide space for this underpass. In Alternative #1 and #2, the configuration offered the most potential for released land or excess right-of-way; however, Alternative #2 would require potential bridge work on I-64 to allow space for the extension, which runs directly north and south. While Alternative #3 had less released land, it showed the greatest potential for development/redevelopment opportunities within the northeast and southeast quadrants. The benefits and impacts of the alignment will need to be further evaluated with stakeholders. This extension of Theresa Ave. would likely be relinquished to the City of St. Louis upon completion of construction.

7.2.2 Theresa Ave. Extension to the South (Local Network)

Theresa Ave. is part of the local network owned and maintained by the City of St. Louis. In Alternative #2, an extension of Theresa Ave. to the south with a grade separation at the railroad track crossing was included to connect Forest Park Ave. on the north to Chouteau Ave. on the south. Theresa Ave. would provide an alternate north-south route to Grand Blvd. for local traffic, bicycles, and pedestrians, improving access to the MetroLink station. This improvement showed a wide range of benefits addressing many of the established project needs and goals; this included improving land use near transit stations and trails. This enhancement was also widely supported by the public. Planning and coordination with the City of St. Louis, rail owners (Metro, BNSF Railway, Union Pacific Railroad, and the Terminal Railroad Association), and stakeholders are needed in future phases. It is recommended that this connection be considered in refining all alternatives if supported by local agencies and stakeholders.

7.2.3 Capacity and Footprint for Grand Ave. and Forest Park Ave. Intersection (Local Network)

This intersection is on the local network owned and maintained by the City of St. Louis. The existing grade-separated intersection was configured as a traditional at-grade intersection in all three Build Alternatives (#1, #2, and #3). The City of St. Louis strongly desires to improve this intersection and bring it to grade to improve safety for vehicles and pedestrians, which aligns with the Future64 Purpose and Need. In late 2022, the city was preparing to submit an application to EWGCOG for its annual competitive federal funding program to plan and design for intersection improvements. Due to the ongoing Future64 study, the city decided to delay its application a year to allow for further coordination with MoDOT and other local agencies, including Great Rivers Greenway, and stakeholders such as St. Louis University. The major items requiring additional coordination are the capacity needs at the intersection and pedestrian/bicycle facilities through the intersection.

Currently, the intersection is configured to meet MoDOT requirements for traffic operations in the alternatives. Planning and coordination are needed with the City of St. Louis and stakeholders in future phases to determine capacity needs at the intersection and if a lower LOS is acceptable. It is worth noting that there are physical limitations at this intersection regarding available space to accommodate vehicular traffic, bicycle, and pedestrian traffic. Through this coordination, the intersection footprint may be reduced, and an evaluation of bicycle and pedestrian crossings configuration can be advanced.

Due to the proximity of the off-ramps from I-64 across all three of the Build Alternatives, as well as the existing eastbound I-64 off-ramp in the No Build (Maintenance Only), a priority for MoDOT will be to avoid operations issues northbound on Grand Ave. resulting from the intersection of Grand Ave. and Forest Park Ave.

7.2.4 Dedicated Bus-Only Lanes on Grand Ave. (Local Network)

In Alternative #2, dedicated bus-only lanes were added to northbound and southbound Grand Ave. between Chouteau Ave. to Forest Park Ave. The majority of Grand Ave. within these limits is owned and maintained by the City of St. Louis. This improvement requires the reconfiguration of the existing bicycle and pedestrian facilities along Grand Ave. to create space for these additional lanes. On the Grand Ave. viaduct over the railroad tracks, new structures would be needed to carry bicycles and pedestrians across the railroad track and were shown on both sides of Grand Ave. in Alternative #2. While there was considerable support for this improvement by the public, the full benefits were not evaluated by this study due to the concept only being analyzed within the study limits. In future phases, additional planning and coordination are needed with the City of St. Louis, Metro, and stakeholders to determine if there is support to pursue transit planning to enhance bus service on the 70 Grand MetroBus line.

Before MoDOT advances planning and design to replace the Grand Blvd. Bridge over eastbound I-64, a decision needs to be made about the bridge size and cross sections that could be affected should the region pursue enhanced bus service along Grand Ave.

7.2.5 Location/Configuration of Eastbound I-64 Access to/from Grand Ave.

The configurations of the on- and off-ramps to and from I-64 at Grand Ave. vary across all three Build Alternatives. They need further evaluation with refinements recommended in this section related to the Theresa Ave. extension. Additional recommended refinements include the following:

- Configure the eastbound I-64 off-ramp to connect to a roundabout allowing for connections to Grand Ave. from Theresa Ave., Spruce St., and reconstructed Bernard St. This increases connectivity and allows the area in the southeast quadrant of I-64 and Grand Ave. to maintain access to the roadway network. This refinement would also eliminate out-of-direction travel (Alternative #3) and potential impacts on emergency services for SSM Health St. Louis University Hospital.
- Re-evaluate the eastbound I-64 on-ramp connections across all three of the Build Alternatives, including additional coordination with Metro related to their facility's operations with an entrance off Spruce St. just west of Compton Ave. While the eastbound I-64 on-ramp configured as a slip ramp from the conversion of Spruce St. to one-way traffic performs well related to traffic operations and safety, it limits access to and from Metro's facility due to the one-way traffic. Evaluating changes to their entrance location, ability to transition to one-way travel only east of their entrance, or ability to provide counter-flow separated traffic should be coordinated with Metro and the City of St. Louis.

7.2.6 Location/Configuration of Westbound I-64 Access to Grand Ave. and Forest Park Ave.

The westbound I-64 off-ramp to Grand Ave. and Forest Park Ave. varies across all three Build Alternatives. The configuration needs to be further evaluated with this section's recommended refinements related to the existing eastbound I-64 access from Papin Ave. remaining in place, the Theresa Ave. extension, and the eastbound I-64 access at Grand Ave. to determine if the eastbound I-64 off-ramp can be configured as shown in Alternative #3. This configuration eliminates the existing westbound I-64 exit ramp to Forest Park Ave. (utilized in Alternatives #1 and #2). It provides access directly to Grand Ave. in a tight diamond configuration on the north side of I-64. Eliminating the westbound off-ramp to Forest Park Ave. would offer safety improvements along Forest Park Ave. for vehicles, pedestrians, and cyclists by reducing traffic and merging high-speed traffic onto a local street. It would also eliminate the bridge structure at the Market St./Forest Park Ave. intersection with Compton Ave.

7.3 Partnering on Local Network Projects

The Future64 PEL study developed a steering committee to coordinate with local agencies that would likely be involved in project planning and implementation due to their current or planned projects within the study area. These agencies included the City of St. Louis, Metro, GRG, and EWGCOG. These agencies' goals were considered during the development of the study and should continue to be considered when MoDOT's I-64 corridor improvements are further developed. Certain partner agency projects or enhancements within the study area could potentially be designed and constructed in conjunction with MoDOT's I-64 corridor improvements. For example, the City of St. Louis desires to improve the Forest Park Ave. and Grand Blvd. intersection. This improvement is included in each of the Build Alternatives for this study. While it has ties to the overall interchange improvements near Grand Blvd., it also has independent utility. These partner agency projects can potentially improve mobility in and around the corridor and may result in cost efficiencies if constructed in conjunction with other I-64 improvements. Partner agencies would most likely be expected to provide resources to support the projects' additional analysis, design, and construction.

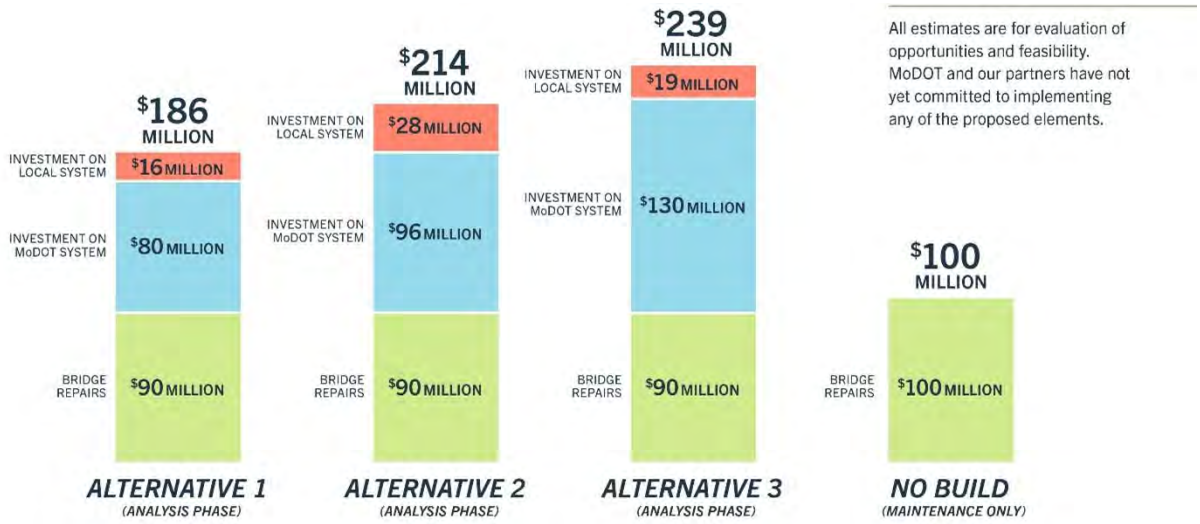
7.4 Potential Projects

The potential projects that have been identified include both Early Action Bridge Projects to improve the condition of the bridges in the corridor, and projects within the Build Alternatives that have independent utility, meaning they:

- Address an identified project need
- Connect logical termini
- Stand-alone without forcing other improvements or restricting consideration of other reasonably foreseeable transportation improvements

Due to complexities and available funding, improvements to the I-64 corridor will likely not be implemented as one corridor-wide project. Figure 53 shows the estimated costs for fully implementing the alternatives considered in this study.

Figure 53. Estimated Costs



While there is the desire to implement the Future64 improvements mostly as entire interchange improvements to either the west interchange or east interchange as one larger project, there are smaller projects with independent utility that can be advanced sooner due to lower funding levels needed for implementation. This allows flexibility for implementing improvements and can likely benefit the region sooner than if the improvements were delayed to secure funding for a single large project.

Table 19 lists each of the potential projects and assesses the ability of each to meet the five previously stated needs identified for the Future64 project. Preliminary costs have also been identified, which are provided in Table 20, broken out by costs that would be incurred directly by MoDOT and costs that will require funding partnerships with local agencies.

Table 19. Assessment of Ability to Meet Project Needs

Potential Project from Level 2 Alternatives	Increase Safety for All Users	Provide Intuitive Navigation	Reduce Barrier Effect	Improve Bridge Conditions	Maintain Interstate Function
Early Action Bridge Project	✓	n/a	n/a	✓	✓
West Interchange, Project A – Improvements to I-64 WB Ramps at Boyle Ave; Improvements to Clayton Ave Intersections with Tower Grove Ave and Boyle Ave	✓	✓	n/a	✓	✓
West Interchange, Project B – I-64 Inside Shoulder Improvements	✓	n/a	n/a	n/a	✓
West Interchange, Project C – Tower Grove Bridge Multimodal Improvements	✓	n/a	✓	n/a	n/a
West Interchange, Project D – Full West Interchange Improvements	✓	✓	✓	✓	✓
East Interchange, Project E – I-64 Inside Shoulder Improvements	✓	n/a	n/a	n/a	✓
East Interchange, Project F – Forest Park Ave and Grand Ave Intersection Improvements	✓	✓	✓	✓	n/a

Potential Project from Level 2 Alternatives	Increase Safety for All Users	Provide Intuitive Navigation	Reduce Barrier Effect	Improve Bridge Conditions	Maintain Interstate Function
East Interchange, Project G – Theresa Ave Extension to South with Grade-Separated Railroad Crossing	✓	✓	✓	n/a	n/a
East Interchange, Project H – Bus-Only Lanes, Bicycle and Pedestrian Expansion on Grand Blvd.	✓	n/a	✓	n/a	n/a
East Interchange, Project I – Full East Interchange Improvements	✓	✓	✓	✓	✓

Source: Level 2 Alternative Cost Estimates

Table 20. Estimated Project Costs in 2022 Dollars

Potential Project from Level 2 Alts.	Alternative 1, MoDOT System	Alternative 1, Local Network	Alternative 2, MoDOT System	Alternative 2, Local Network	Alternative 3, MoDOT System	Alternative 3, Local Network
Early Action Bridge Project	$90.5	n/a	$90.5	n/a	$90.5	n/a
West Interchange, Project A – Improvements to I-64 WB Ramps at Boyle Ave; Improvements to Clayton Ave Intersections with Tower Grove Ave and Boyle Ave	$19.7M	$4.8M	$19.7M	$6.2M	$20.4M	$4.8M
West Interchange, Project B – I-64 Inside Shoulder Improvements	$1.0M	n/a	$1.0M	n/a	$0.7M	n/a
West Interchange, Project C – Tower Grove Bridge Multimodal Improvements	1.6 M	n/a	1.6M	n/a	n/a	n/a
West Interchange, Project D – Full West Interchange Improvements	$24.0M	$6.1M	$20.2M	$6.2M	$63.3M	$6.1M
East Interchange, Project E – I-64 Inside Shoulder Improvements	$2.0M	n/a	$0.8M	n/a	$2.1M	n/a

Potential Project from Level 2 Alts.	Alternative 1, MoDOT System	Alternative 1, Local Network	Alternative 2, MoDOT System	Alternative 2, Local Network	Alternative 3, MoDOT System	Alternative 3, Local Network
East Interchange, Project F – Forest Park Ave and Grand Ave Intersection Improvements	n/a	$9.2M	n/a	$10.1M	n/a	$9.2M
East Interchange, Project G – Theresa Ave Extension to South with Grade-Separated Railroad Crossing	n/a	n/a	n/a	$7.8M	n/a	n/a
East Interchange, Project H – Bus-Only Lanes, Bicycle and Pedestrian Expansion on Grand Blvd	n/a	n/a	$2.0M	11.4M	n/a	n/a
East Interchange, Project I – Full East Interchange Improvements	$58.7M	$11.1M	$62.1M	$34.3M	$69.3M	$14.3M

Source: Level 2 Alternative Screening Process and Results Technical Report

Each of the projects listed in Table 20 are further described in the sections below, including additional discussion regarding which of the identified project needs it meets. Although a recommendation is made for each project about what type of NEPA clearance is expected, FHWA will be responsible for making a final determination on NEPA Class of Action. In addition, even though some projects may be locally funded, a NEPA recommendation is still provided in case federal funding is sought to support the project.

Identified project goals would be further considered during project development utilizing the results of this study and the PEL Questionnaire located in Appendix A. For the larger projects that include advancement of the entire interchange improvement shown in the Build Alternatives at either the west or east interchange, the information on how the project goals are met is included in the Level 2 Alternative Screening Process and Results technical report. Ultimately the results of this study and the PEL Questionnaire will be utilized for all projects as they advance into NEPA and design.

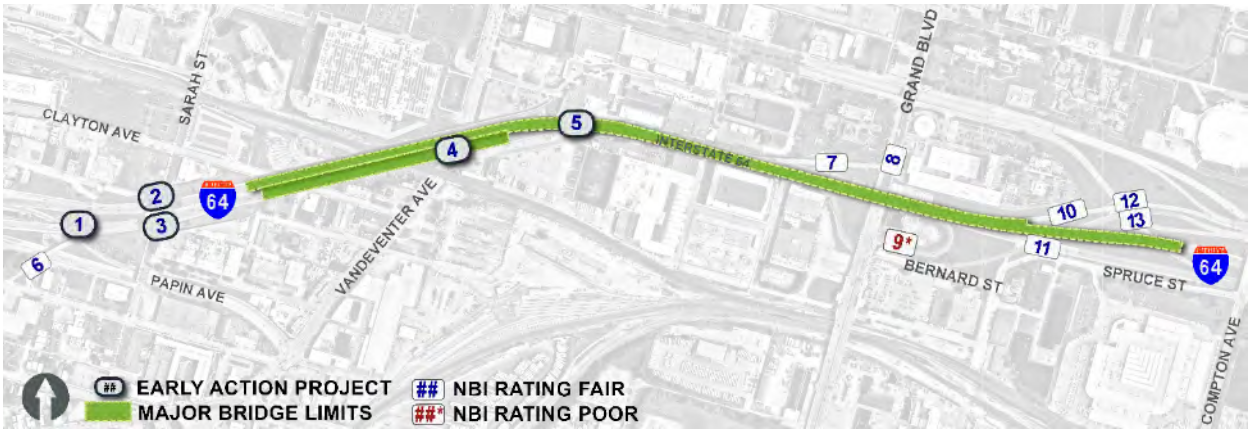
Each project also includes information to support a likely NEPA classification that will determine the level of further environmental study necessary to obtain the required clearances from FHWA to implement a project.

7.4.1 Early Action Bridge Improvement Projects

There are 13 bridges within the study area scheduled for repair or replacement within the next 20 years. As part of the study, bridge rehabilitation and replacement scope and costs were evaluated with MoDOT to extend the life of the existing bridges past the year 2050. While some bridges within the corridor would no longer be needed when at least one build alternative is implemented, five bridges are unaffected regardless of which build alternative is advanced

towards implementation. These five bridges are considered Early Action Projects and can undergo scheduled maintenance or replacement without being affected by the advancement of the alternatives (see Figure 54).

Figure 54. Bridge Asset Management – Early Action Bridge Projects



These Early Action Bridge Projects (1-5) may require some future widening with the advancement of the Build Alternatives to construct the connections of new or improved entrance or exit ramps; it will not preclude the rehabilitation projects. The lone exception is the I-64 eastbound bridge over Vandeventer Ave. (L0667), which is anticipated to require replacement. During the conceptual phases of this bridge replacement project, the advancement of the I-64 eastbound on-ramps from Boyle Ave. and Vandeventer Ave. from the Build Alternatives should be considered. A listing of the recommended improvement for each Early Action Project and estimated construction cost is shown in Table 21.

Table 21. Early Action Bridge Project Costs

Early Action Bridges	Recommended Improvement	Estimated Cost (2022 Dollars)
1) EB I-64 over WB I-64 On-Ramp from Vandeventer Ave. (L0669)	25-Year Rehab	$920,000
2) WB I-64 over Sarah St. (A3651)	25-Year Rehab	$750,000
3) EB I-64 over Sarah St (A3893)	25-Year Rehab	$480,000
4) EB I-64 over Vandeventer Ave. (L0667)	Replacement	$44,000,000
5) WB I-64 over Vandeventer Ave. (A3594)	25-Year Rehab	$44,400,000

Source: No Action Bridge Cost Estimates

While these bridge improvement projects can progress immediately, more information is provided in the Corridor Project Phasing section.

Each Early Action Project meets the identified project needs, as shown in Table 22.

Table 22. Early Action Bridge Project – Assessment of Ability to Meet Project Needs

Increase Safety for All Users	Intuitive Navigation	Reduce Barrier Effect	Improve Bridge Conditions	Maintain Interstate Function
✓	n/a	n/a	✓	✓

Source: Level 2 Alternative Screening Process and Results Technical Report

Each Early Action Project is anticipated to be classified as a Programmatic Categorical Exclusion (PCE) since the bridges will be rehabilitated or replaced along their current alignment. However, if the project exceeds any PCE thresholds, such as the closure of I-64 that results in major traffic disruptions, it could be elevated to a Categorical Exclusion (CE2). Impacts on the human and natural environment would be minor and consistent with other bridge asset management projects by MoDOT.

7.4.2 West Interchange Projects

Project A: I-64 Westbound Ramps at Boyle Ave. and Clayton Ave. Intersections with Tower Grove Ave. and Boyle Ave.

This project includes the following improvements:

- Westbound I-64 on-ramp is widened to two lanes.
- Westbound I-64 off-ramp deceleration lane is lengthened, and the ramp is widened to allow for an additional right-turn lane.
- The Boyle Ave. overpass is widened from the westbound I-64 ramp intersection to Papin St., including the bridge carrying Boyle Ave. over I-64 (A8052). Alternatives #1 and #2 widened to carry four lanes, and Alternative #3 widened to carry six lanes.
- Improvements to the local road network by adding capacity to Clayton Ave. intersections with Tower Grove Ave. and Boyle Ave. bicycle and pedestrian facilities that are separated from traffic are added to Tower Grove and Boyle Ave. Alternative #2 includes additional pedestrian facilities extending down Clayton Ave. to Vandeventer Ave. and Sarpy Ave.

Table 23 provides the estimated engineering and construction cost across the three Build Alternatives. Additionally, the cost is shown broken down between improvements to the MoDOT system and the local street network.

Table 23. Project A – Costs in 2022 Dollars

MoDOT and Local Network	Alternative #1	Alternative #2	Alternative #3
MoDOT System	$19,700,000	$19,700,000	$20,400,000
Local Network	$4,800,000	$6,200,000	$4,800,000

Source: Level 2 Alternative Cost Estimates

Table 24 assesses this project's ability to meet the identified project needs.

Table 24. Project A – Assessment of Ability to Meet Project Needs

Increase Safety for All Users	Intuitive Navigation	Reduce Barrier Effect	Improve Bridge Conditions	Maintain Interstate Function
✓	✓	n/a	✓	✓

Source: Level 2 Alternative Screening Process and Results Technical Report

The NEPA classification for this project is anticipated to be a CE2 because of the increased capacity of the interstate ramps and the likely need for some minor right-of-way. There is also the unlikely potential for negative impacts on the human or natural environment. Surveys may be required to confirm that noise-sensitive receptors, cultural resources, hazardous materials, and section 4(f) properties near the project would not be impacted. Such resources include the Stix ECC Elementary School, Barnes-Jewish Hospital, and Chouteau Park.

Project B: I-64 Inside Shoulder Improvements near West Interchange

This project includes the following improvements:

- Widening of the I-64 westbound and eastbound inside shoulder to ten feet from approximately Tower Grove Ave. to the Sarah St. Bridge.
- Widening of the inside shoulder on the I-64 westbound on-ramp from Vandeventer Ave is only included in Alternatives #1 and #2. Relocation of the entrance ramp in Alternative #3 shoulder widening for this portion is not needed and would be accounted for on the relocation of the mainline lanes.

Table 25 provides the estimated engineering and construction cost across the three Build Alternatives. Additionally, the cost is shown broken down between improvements to the MoDOT system and the local street network.

Table 25. Project B – Costs in 2022 Dollars

MoDOT and Local Network	Alternative #1	Alternative #2	Alternative #3
MoDOT System	$1,000,000	$1,000,000	$700,000
Local Network	n/a	n/a	n/a

Source: Level 2 Alternative Cost Estimates

Table 26 assesses this project's ability to meet the identified project needs.

Table 26. Project B – Assessment of Ability to Meet Project Needs

Increase Safety for All Users	Intuitive Navigation	Reduce Barrier Effect	Improve Bridge Conditions	Maintain Interstate Function
✓	n/a	n/a	n/a	✓

Source: Level 2 Alternative Screening Process and Results Technical Report

It is anticipated that this project would classify as PCE because it has very limited to no impacts on the human or natural environment and does not exceed thresholds set in the Programmatic Agreement between FHWA and MoDOT.

Project C: Tower Grove Bridge Multimodal Improvements

This project improves the multimodal facilities across I-64 along Tower Grove Ave. Bridge. This may include widening the existing bridge or adding a stand-alone bridge to provide either a shared-use path or cycle track separated from traffic, as shown in Alternatives #1 and #2.

Table 27 provides the estimated engineering and construction cost across the three Build Alternatives. Additionally, the cost is shown broken down between improvements to the MoDOT system and the local street network.

Table 27. Project B – Costs in 2022 Dollars

MoDOT and Local Network	Alternative #1	Alternative #2	Alternative #3
MoDOT System	$1,600,000	$1,600,000	n/a
Local Network	n/a	n/a	n/a

Source: Level 2 Alternative Cost Estimates

Table 28 assesses this project's ability to meet the identified project needs.

Table 28. Project B – Assessment of Ability to Meet Project Needs

Increase Safety for All Users	Intuitive Navigation	Reduce Barrier Effect	Improve Bridge Conditions	Maintain Interstate Function
✓	N/A	✓	N/A	N/A

Source: Level 2 Alternative Screening Process and Results Technical Report

It is anticipated that this project would classify as PCE because it has very limited to no impacts on the human or natural environment and does not exceed thresholds set in the Programmatic Agreement between FHWA and MoDOT.

Project D: Entire Interchange improvements at the West Interchange

This project includes the advancement of all improvements included in Build Alternatives #1, #2, and #3 for the west interchange as described in the Level 2 Alternative Screening Process Report.

Table 29 provides the estimated engineering and construction cost across the three Build Alternatives. Additionally, the cost is shown broken down between improvements to the MoDOT system and the local street network.

Table 29. Project D – Costs in 2022 Dollars

MoDOT and Local Network	Alternative #1	Alternative #2	Alternative #3
MoDOT System	$24,000,000	$20,200,000	$63,300,000
Local Network	$6,100,000	$6,200,000	$6,100,000

Source: Level 2 Alternative Cost Estimates

Table 30 assesses this project's ability to meet the identified project needs.

Table 30. Project D – Assessment of Ability to Meet Project Needs

Increase Safety for All Users	Intuitive Navigation	Reduce Barrier Effect	Improve Bridge Conditions	Maintain Interstate Function
✓	✓	✓	✓	✓

Source: Level 2 Alternative Screening Process and Results Technical Report

The NEPA classification for this project is anticipated to be a CE2 due to exceeding the PCE threshold of adding lanes and capacity to the ramps and the need for some minor right-of-way and potential for displacements. It is expected to remain a CE2 because of the unlikely potential for impacts on the human or natural environment. Surveys may be required to confirm that noise-sensitive receptors, cultural resources, wetlands, hazardous materials, and section 4(f) properties near the project would not be impacted. Such resources include the Stix ECC Elementary School, Shriners Hospital for Children, Barnes-Jewish Hospital, an active hazardous waste site at 4100-4146 Clayton Rd., Chouteau Park, NRHP-listed buildings (Rock Spring School, Central Institute for the Deaf, and Laclede Gas Light Company Pumping Station G), several potentially historic buildings, and roadside ditch wetlands between I-64 westbound on-ramp eastbound off-ramp to Vandeventer Ave. Additionally, this project will require FHWA approval of an Access Justification Report (AJR) due to the change in the configuration of access on I-64. Final approval of the AJR also requires the approval of the NEPA document.

7.4.3 East Interchange Projects

Project E: I-64 Inside Shoulder Improvements near East Interchange

This project includes the following improvements:

- Widening of the inside shoulder on I-64 eastbound from west of Compton Ave. to just east of Ewing Ave. There is less shoulder widening in Alternative #2 due to the realignment of the eastbound I-64 mainline.
- Widening of the inside shoulder on the I-64 westbound from west of Compton Ave. to just east of Ewing Ave.

Table 31 provides the estimated engineering and construction cost across the three Build Alternatives. Additionally, the cost is shown broken down between improvements to the MoDOT system and the local street network.

Table 31. Project E – Costs in 2022 Dollars

MoDOT and Local Network	Alternative #1	Alternative #2	Alternative #3
MoDOT System	$2,000,000	$800,000	$2,100,000
Local Network	n/a	n/a	n/a

Source: Level 2 Alternative Cost Estimates

Table 32 assesses this project's ability to meet the identified project needs.

Table 32. Project E – Assessment of Ability to Meet Project Needs

Increase Safety for All Users	Intuitive Navigation	Reduce Barrier Effect	Improve Bridge Conditions	Maintain Interstate Function
✓	n/a	n/a	n/a	✓

Source: Level 2 Alternative Screening Process and Results Technical Report

It is anticipated that this project would classify as PCE because it has very limited to no impacts on the human or natural environment and does not exceed thresholds set in the Programmatic Agreement between FHWA and MoDOT.

Project F: Forest Park Ave. and Grand Blvd. Intersection (Local Network)

This project includes the following improvements to the local road network:

- Reconstruction of the Forest Park Ave. and Grand Blvd. intersection as an at-grade intersection.
- Bicycle and pedestrian facilities separated from traffic are added to Grand Blvd., as well as improved crossings through the intersection. Alternative #2 includes extra roadway width needed to accommodate a bus-only lane.

As discussed in the section Advancement of Corridor Alternatives, close coordination is needed between the City of St. Louis and MoDOT as this project moves forward into NEPA and design to allow for this project to have independent utility.

Table 33 provides the estimated engineering and construction cost across the three Build Alternatives. Additionally, the cost is shown broken down between improvements to the MoDOT system and the local street network.

Table 33. Project F – Costs in 2022 Dollars

MoDOT and Local Network	Alternative #1	Alternative #2	Alternative #3
MoDOT System	n/a	n/a	n/a
Local Network	$9,200,000	$10,100,000	$9,200,000

Source: Level 2 Alternative Cost Estimates

Table 34 assesses this project's ability to meet the identified project needs.

Table 34. Project F – Assessment of Ability to Meet Project Needs

Increase Safety for All Users	Intuitive Navigation	Reduce Barrier Effect	Improve Bridge Conditions	Maintain Interstate Function
✓	✓	✓	✓	n/a

Source: Level 2 Alternative Screening Process and Results Technical Report

It is anticipated that this project would classify as PCE because it has very limited to no impacts on the human or natural environment and does not exceed thresholds set in the Programmatic Agreement between FHWA and MoDOT.

Project G: Theresa Avenue Extension South with Grade-Separated Railroad Crossing (Local Network)

This project includes the following improvements to the local road network:

- Construction of a grade-separated crossing over the railroad tracks to allow Theresa Ave. to connect the two existing segments of Theresa Ave. that are currently separated by the railroad tracks

This project can be done independently of the Theresa Ave. extension to the north shown in each of the Build Alternatives.

Table 35 provides the estimated cost that includes engineering and construction across the three Build Alternatives. Additionally, the cost is shown broken down between improvements to the MoDOT system and the local street network.

Table 35. Project G – Costs in 2022 Dollars

MoDOT and Local Network	Alternative #1	Alternative #2	Alternative #3
MoDOT System	n/a	n/a	n/a
Local Network	n/a	$7,800,000	n/a

Source: Level 2 Alternative Cost Estimates

Table 36 assesses this project's ability to meet the identified project needs.

Table 36. Project G – Assessment of Ability to Meet Project Needs

Increase Safety for All Users	Intuitive Navigation	Reduce Barrier Effect	Improve Bridge Conditions	Maintain Interstate Function
✓	✓	✓	n/a	n/a

Source: Level 2 Alternative Screening Process and Results Technical Report

It is anticipated that this project would classify as PCE because it has very limited to no impacts on the human or natural environment and does not exceed thresholds set in the Programmatic Agreement between FHWA and MoDOT. Known resources which may be impacted and require additional survey include several potentially historic buildings surrounding Theresa Ave. The project may require additional environmental survey since the project extends outside the limits of this study which stop at the railroad.

Project H: Bus-Only Lanes, Bicycle and Pedestrian Expansion on Grand (Local Network)

This project includes the following improvements to the local road network:

- Addition of bus-only lanes along Grand Ave. between Forest Park Ave. and Route 100/Chouteau Ave.
- A widened bridge carrying Grand Ave. over EB I-64.
- Relocation of the existing bridge safety barrier on the Grand Ave. viaduct bridge over the railroad tracts to utilize the existing bridge deck currently used for pedestrians for the added bus-only lanes.

- Construction of new pedestrian and bicycle facilities that are separated from traffic within the limits of the bus-only lanes. This likely involves new stand-alone bridge structures that run parallel on each side of Grand Ave.

This project will need to coordinate with Project F at Grand Ave. and Forest Park Ave.

Table 37 provides the estimated cost that includes engineering and construction across the three Build Alternatives. Additionally, the cost is shown broken down between improvements to the MoDOT system and the local street network.

Table 37. Project H – Costs in 2022 Dollars

MoDOT and Local Network	Alternative #1	Alternative #2	Alternative #3
MoDOT System	n/a	$2,000,000	n/a
Local Network	n/a	$11,400,000	n/a

Source: Level 2 Alternative Cost Estimates

Table 38 assesses this project's ability to meet the identified project needs.

Table 38. Project H – Assessment of Ability to Meet Project Needs

Increase Safety for All Users	Intuitive Navigation	Reduce Barrier Effect	Improve Bridge Conditions	Maintain Interstate Function
✓	n/a	✓	n/a	n/a

Source: Level 2 Alternative Screening Process and Results Technical Report

It is anticipated that this project would classify as PCE because it has very limited to no impacts on the human or natural environment and does not exceed thresholds set in the Programmatic Agreement between FHWA and MoDOT. The project may require a survey of cultural resources and section 4(f) resources close to the project to confirm they would not be impacted.

Project I: Entire Interchange Improvements at the East Interchange

This project includes the advancement of all improvements included in Build Alternatives #1, #2, and #3 for the east interchange as described in the Level 2 Alternative Screening Process Report.

Table 39 provides the estimated engineering and construction cost across the three Build Alternatives. Additionally, the cost is shown broken down between improvements to the MoDOT system and the local street network.

Table 39. Project I – Costs in 2022 Dollars

MoDOT and Local Network	Alternative #1	Alternative #2	Alternative #3
MoDOT System	$58,700,000	$62,100,000	$69,300,000
Local Network	$11,100,000	$34,300,000	$14,300,000

Source: Level 2 Alternative Cost Estimates

Table 40 assesses this project's ability to meet the identified project needs.

Table 40. Project I – Assessment of Ability to Meet Project Needs

Increase Safety for All Users	Intuitive Navigation	Reduce Barrier Effect	Improve Bridge Conditions	Maintain Interstate Function
✓	✓	✓	✓	✓

Source: Level 2 Alternative Screening Process and Results Technical Report

The NEPA classification for this project is anticipated to be a CE2 due to exceeding the PCE threshold of adding lanes and capacity to the ramps and the need for some minor right-of-way and potential for displacements. It is expected to remain a CE2 because of the unlikely potential for impacts on the human or natural environment. Surveys may be required to confirm that noise-sensitive receptors, cultural resources, wetlands, hazardous materials, and section 4(f) properties near the project would not be impacted. Noise-sensitive receptors include the St. Louis Epic Church, Marchetti Towers Apartments, Grand Forest Apartment Complex, Council Tower Senior Apartments, Chaifetz Arena, and Harris-Stowe State University Sports Fields. Historic resources include the NRHP historic district Century Electric Foundry Complex, NRHP sites (138th Infantry Missouri National Guard Armory, Council Plaza, and Vashon Community Center), and several potentially historic buildings. Roadside ditch wetlands are located near the I-64 eastbound off-ramp to Grand Blvd. and Forest Park Ave./Market St. interchange. Additionally, this project will require FHWA approval of an AJR due to the change in the configuration of access on I-64. Final approval of the AJR also requires the approval of the NEPA document.

7.5 Corridor Project Phasing

The genesis of the Future64 PEL study for MoDOT was the need to address the condition of the bridge structures within the study limits while potentially creating a new vision for the corridor and modernizing the infrastructure. As discussed earlier, 13 MoDOT bridges within the study area are scheduled for repair or replacement within the next 20 years. Five of the 13 bridges are included as Early Action Projects because they are unaffected by the advancement of the Build Alternatives (see Figure 55). The Build Alternatives influence the remaining eight bridges; six of these bridges are eliminated regardless of which alternative is considered.

Figure 55. Bridge Asset Management Projects Subject to Alternatives Selection

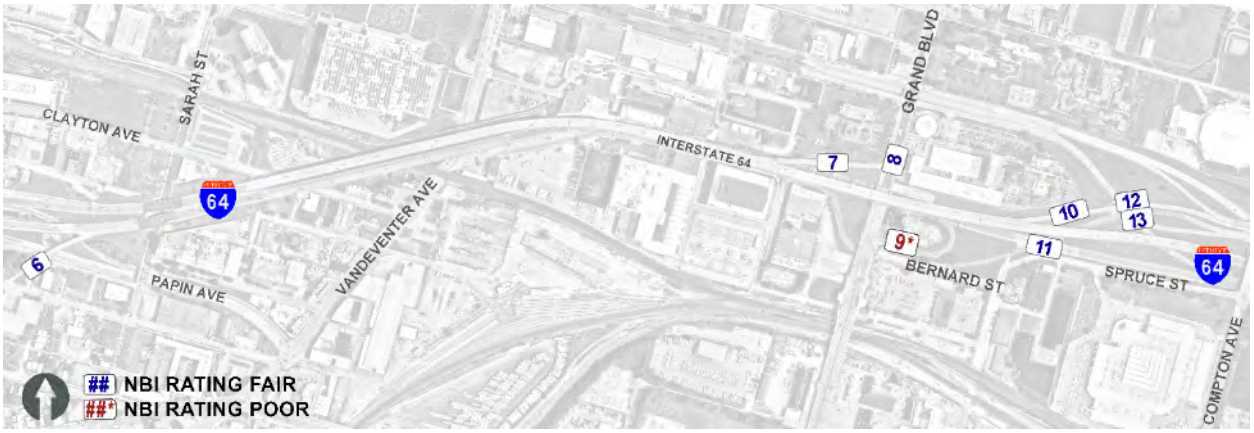


Table 41 shows how each bridge is affected by the alternatives; if the alternative could eliminate the bridge, an "X" is shown.

Table 41. Bridge Asset Management Projects Subject to Alternatives Selection

Bridge	Alternative #1	Alternative #2	Alternative #3
6) EB I-64 on-ramp from Papin St. over EB I-64 ramp to Vandeventer Ave. (A3735)		X	X
7) WB I-64 on-ramp from Grand Ave. (A3740)	X	X	X
8) Grand Ave. over I-64 (L0638)	X	X	X
9) EB I-64 loop off-ramp to Grand Ave. (A0549)	X	X	X
10) WB I-64 on-ramp from Market St. (A3741)	X	X	X
11) EB I-64 over off-ramp to Market St. (A0832)		X	
12) WB I-64 on-ramp from Market St. over Forest Park Ave. (A3636)	X	X	X
13) EB I-64 off-ramp to Market St. over Forest Park Ave. (A0835)	X	X	X

The anticipated maintenance schedule for these bridges primarily drives the project development timeline and phasing. MoDOT's ability to implement the interchange improvements before incurring maintenance costs allows this funding to be directed toward the interchanges.

Based on recent bridge inspections and discussions with the MoDOT District Bridge Engineer, schedules show which fiscal year (FY) the maintenance is due and the scope of the maintenance needed. For the Future64 PEL study, only bridge rehabilitations that extend life past the year 2050 were considered.

Two different schedules were prepared, one assumes the earliest action possible (see Table 42), and the other is a deferred maintenance schedule (see Table 43). Each schedule shows which FY the maintenance needed to occur and the extent of the repairs, whether to extend the life an additional 25 or 50 years or replace the bridge extending the life for over 75 years. The earliest action schedule provides some overall construction cost savings, while the deferred maintenance schedule offers flexibility for advancing the Build Alternatives and available funding levels.

Table 42. Bridge Maintenance Schedule – Earliest Actions Possible (2022 Dollars)

FY	EB I-64 On-Ramp from Papin over EB I-64 Ramp to Vandeventer (A3735)	WB I-64 On-Ramp from Grand (A3740)	Grand over I-64 (L0638)	EB I-64 Loop Off-Ramp to Grand (A0549)	WB I-64 On-Ramp from Market (A3741)	EB I-64 over Market (A0832)	WB I-64 On-Ramp from Market over Forest Park Pkwy (A3636)	EB I-64 Off-Ramp to Market over Forest Park Pkwy (A0835)	Cumulative Total
2023					[A] $200K	[A] $900K			$1.1M
2024									$1.1M
2025									$1.1M
2026			[A] $2.2M	[C] $700K			[A] $400K		$4.4M
2027									$4.4M
2028									$4.4M
2029	[B] $1.5M								$5.9M
2030								[C] $2.5M	$8.4M
2031									$8.4M
2032									$8.4M
2033									$8.4M
2034									$8.4M
2035		[A] $300K							$8.7M
2036									$8.7M
2037									$8.7M
2038									$8.7M
2039									$8.7M
2040									$8.7M

Note: [A] 25-Year Rehab Cost, [B] 50-Year Rehab Cost, [C] Replacement Cost
Source: No Action Bridge Cost Estimates

Table 43. Bridge Maintenance Schedule – Deferred Actions (2022 Dollars)

FY	EB I-64 On-Ramp from Papin over EB I-64 Ramp to Vandevente (A3735)	WB I-64 On-Ramp from Grand (A3740)	Grand over I-64 (L0638)	EB I-64 Loop Off-Ramp to Grand (A0549)	WB I-64 On-Ramp from Market (A3741)	EB I-64 over Market (A0832)	WB I-64 On-Ramp from Market over Forest Park Pkwy (A3636)	EB I-64 Off-Ramp to Market over Forest Park Pkwy (A0835)	Cumulative Total
2023									--
2024									--
2025									--
2026				[C] $700K			[A] $400K		$1.1M
2027									$1.1M
2028									$1.1M
2029	[B] $1.5M								$2.6M
2030		[A] $300K				[C] $5.2M		[C] $2.5M	$10.6M
2031									$10.6M
2032									$10.6M
2033									$10.6M
2034									$10.6M
2035			[C] $6.3M						$16.9M
2036									$16.9M
2037									$16.9M
2038									$16.9M
2039									$16.9M
2040					[C] $400K				$17.7M

Note: [A] 25-Year Rehab Cost, [B] 50-Year Rehab Cost, [C] Replacement Cost
Source: No Action Bridge Cost Estimates

The earliest action maintenance schedule shows an overall savings of approximately $9 million (as of 2022) between 2023 and 2040. However, the deferred maintenance schedule shows that costs remain at approximately $1 million until 2029, compared to only 2026 for the earliest action schedule. This extra time would allow further project development and funding to be determined before investing greater sums of money on bridges that may ultimately be eliminated.

Most of these bridges, seven of eight, are located within the area of the east interchange Build Alternatives. These seven bridges would not exceed a cost of $1 million until 2030, utilizing the deferred maintenance schedule. The lone bridge from the west interchange, which carries the eastbound I-64 on-ramp from Papin Ave. over the eastbound off-ramp to Vandeventer Ave., is due for maintenance in 2029 using the same schedule.

Advancement of the Build Alternatives to implementation would need to occur in 2029 for the West interchange and 2030 for the East interchange to avoid costly expenditures on bridges that may ultimately be eliminated.

7.6 Funding Opportunities

To advance projects resulting from this study, funding still needs to be determined, whether that be from MoDOT's formula funding mechanisms or other programs such as USDOT Discretionary Grants funded by the 2021 Infrastructure Investment and Jobs Act, also known as the Bipartisan Infrastructure Law. Additionally, federal programs through the local Metropolitan Planning Organization (MPO) and Cost Share programs can be utilized to help fund the projects on the local roadway network through local agencies such as the City of St. Louis or GRG.

Table 44 provides a high-level overview of the programs available outside of MoDOT's normal formula funding programs and traditional funding programs through EWGCOG that could be utilized to obtain project funding.

Table 44. Non-Traditional Funding Program Summary

Program	Funding Levels	Award Size	Federal Cost Share	Eligibility	BCA Required	Remarks
RAISE (2023)	$1.5B	$5M - $25M	80%+	State & Local	Yes	Benefits for Areas of Persistent Poverty
INFRA (2023)	$1.55B	Large >$100M Small <$100M	80%	State & Local	Yes	Maximum of 60% of total cost; Benefits for Areas of Persistent Poverty
SS4A (2022)	$195M	$5M - $100M	50%	State & Local	No	Benefits for Areas of Persistent Poverty
RCP (2022)	$1B	$5M - $30M	80%	State, MPO, & Local	No	Benefits for Areas of Persistent Poverty
BIP (2022)	$2.36B	Large <$50M Small >$2.5M	Large 50% Small 80%	State & Local	Yes	Maximum of 60% of total cost; Benefits for Areas of Persistent Poverty

Source: USDOT 2023 RAISE NOFO

The following sections provide more detail on each of these funding programs and identify which projects identified in the Section 8 Implementation Plan could qualify for each type of funding. Information related to the USDOT Grant programs is based on the most recent Notice of Funding Opportunity (NOFO) for each grant type. All current USDOT programs require projects to show alignment with their mission and priorities, including equity, climate and sustainability, quality job creation and economic strength, and global competitiveness.

7.6.1 Rebuilding American Infrastructure with Sustainability and Equity (RAISE)

The RAISE grant program awards funding on a competitive basis for surface transportation projects that will improve:

- Safety
- Environmental sustainability
- Quality of life
- Mobility and community connectivity

- Economic competitiveness and opportunity, including tourism
- State of good repair
- Partnership and collaboration
- Innovation

The Future64 study has compiled data and performed analysis that would directly align with many of the criteria used for this competitive grant; however, a benefit cost analysis (BCA) would also need to be performed (for capital grants). Additionally, the project is located within census tracts that are areas of persistent poverty which qualifies for a special set aside from USDOT of $35M and is eligible for the federal cost share to exceed 80 percent. Table 45 is a synopsis of information related to eligibility, funding levels, and award size.

Table 45. 2023 RAISE Information (Capital Only)

Funding Levels	Award Size	Federal Cost Share	Eligibility	BCA Required	Remarks
$1.5B	$5M - $25M	80%+	State & Local	Yes	Benefits for Areas of Persistent Poverty

Source: USDOT 2023 RAISE NOFO

7.6.2 Infrastructure for Rebuilding America (INFRA)

The INFRA grant program is part of the Multimodal Project Discretionary Grant (MPDG) program, which provides federal financial assistance to projects or a group of projects which have national or regional significance as well as to projects that improve and expand the surface transportation infrastructure in rural areas. Eligible projects include highway and bridge, intercity passenger rail, railway-highway grade separation, wildlife crossings, public transportation, marine highway, and freight and multimodal projects.

USDOT awards funding on a competitive basis to projects that consider:

- Environmental justice, especially as it relates to the consequences of climate change or other pollutants
- Support the creation of good-paying jobs, including union and labor workforce programs
- Innovation

The INFRA program targets 40% of total funding levels towards low-income communities, disadvantaged communities, communities underserved by affordable transportation, or overburdened communities.

The Future64 study has compiled some data and performed analysis that would align the criteria for this competitive grant; however, additional work related to climate change is needed, and a BCA would also need to be performed. Table 46 is a synopsis of information related to eligibility, funding levels, and award size.

Table 46. 2023 INFRA Information

Funding Levels	Award Size	Federal Cost Share	Eligibility	BCA Required	Remarks
$1.55B	Large >$100M Small <$100M	80%	State & Local	Yes	Maximum of 60% of the total cost benefits for Areas of Persistent Poverty

Source: USDOT 2023 MPDG NOFO

7.6.3 Safe Streets and Roads for All (SS4A)

The SS4A program has two classifications of grants. Action Plan Grants are used to develop a comprehensive safety action plan. Implementation Grants are focused on projects that implement strategies or are consistent with the objectives of an existing safety action plan. EWGCOG was awarded a 2022 SS4A grant to develop an Action Plan for the St. Louis Region. Upon completion and adoption of that plan, it could be utilized to apply for an Implementation Grant to pursue projects resulting from the Future64 study. USDOT awards funding on a competitive basis to projects that demonstrate engagement with a variety of public and private stakeholders and seek to adopt innovative technologies and strategies to accomplish the following objectives:

- Promote safety
- Employ low-cost, high-impact strategies to improve safety over a wide geographic area
- Ensure equitable investments in the safety needs of underserved communities
- Incorporate evidenced-based projects and strategies

Table 47 is a synopsis of information related to eligibility, funding levels, and award size.

Table 47. 2022 SS4A Information (Implementation Only)

Funding Levels	Award Size	Federal Cost Share	Eligibility	BCA Required	Remarks
$195M	$5M - $100M	50%	State & Local	No	Benefits for Areas of Persistent Poverty

Source: USDOT 2022 SS4A NOFO

7.6.4 Reconnecting Communities Pilot (RCP)

The RCP program provides funding for planning and capital construction projects to address infrastructure barriers, restore community connectivity, and improve people's lives. Projects can include high-quality public transportation, infrastructure removal, pedestrian walkways and overpasses, capping and lids, linear parks and trails, as well as complete street conversions.

As with the other programs, the RCP program aligns with the Department's goals; however, this program has a specific emphasis on the USDOT's Equity Strategic Goal to reduce inequities across the transportation system and the communities they affect. This includes redressing the legacy of harm caused by transportation infrastructure, including displacement, while supporting

multimodal access to daily quality life destinations like jobs, healthcare, grocery stores, schools, recreation, and places of worship.

The Future64 study has compiled detailed data and performed an analysis that would align with the priorities of this program. Table 48 is a synopsis of information related to eligibility, funding levels, and award size.

Table 48. 2022 Reconnecting Communities Pilot Information (Capital Only)

Funding Levels	Award Size	Federal Cost Share	Eligibility	BCA Required	Remarks
$1B	$5M - $30M	80%	State, MPO, & Local	No	Benefits for Areas of Persistent Poverty

Source: USDOT 2022 RCP NOFO

7.6.5 Bridge Investment Program (BIP)

The BIP grant program is divided into two different capital project categories: large bridge projects with costs greater than $100M and bridge projects with costs less than $100M. The goal of this program is to improve the safety, efficiency, and reliability of the movement of people and freight over bridges. Special consideration is given to the number of total person miles traveled over bridges at risk of falling into poor condition within the next three years and bridges that do not meet current geometric design standards or load requirements.

There is an emphasis on the sponsoring agency being able to move projects into construction quickly within 18 months of obligation of funds and projects that have completed the NEPA phase. For the large bridge category, applying for a multiyear agreement is preferred.

The Early Action Bridge Projects for the mainline I-64 bridges over Vandeventer Ave., particularly eastbound I-64, which is already in poor condition, would be eligible for this program.

Table 49 is a synopsis of information related to eligibility, funding levels, and award size.

Table 49. 2022 BIP Information (Capital Only)

Funding Levels	Award Size	Federal Cost Share	Eligibility	BCA Required	Remarks
$2.36B	Large - <$50M Small >$2.5M	Large – 50% Small – 80%	State & Local	Yes	Maximum of 60% of total cost benefits for Areas of Persistent Poverty

7.6.6 MoDOT Cost Share and Governor's Cost Share Program

Several projects identified will involve improvements to the local transportation network, which is owned and operated by the City of St. Louis. These improvements are expected to require participation either in part or whole from the city, including project development and construction. Traditional federal funding sources for these projects include the various programs awarded by EWGCOG that could be utilized. These programs include Transportation Alternatives

Program (TAP), Congestion Mitigation and Air Quality Improvement (CMAQ), and Surface Transportation Program (STP). However, two cost-sharing programs are available when a project sponsor is willing to partner with MoDOT. The City of St. Louis was successfully awarded cost share funds for the recent improvements along I-64 as part of the Jefferson Ave. and 22nd St. interchange project. The MoDOT and Governor's Cost Share programs provide special consideration to projects demonstrating economic development.

7.6.7 Implementation Plan Projects and Funding Sources

The projects presented in the implementation plan qualify for many of the possible federal funding and cost-sharing programs available. Table 50 is a summary table of the projects identified and their eligibility across the programs.

Table 50. Project Funding Matrix

Project	RAISE	INFRA	SS4A	RCP	BIP	COST SHARE	STP	CMAQ	TAP
A) I-64 WB Ramps at Boyle and Clayton Ave. Intersections with Tower Grove and Boyle						✓	✓	✓	
B) I-64 Inside Shoulder Improvements near West Interchange									
C) Tower Grove Bridge Multimodal Improvements	✓	✓	✓	✓		✓	✓	✓	✓
D) Entire Interchange Improvements at West Interchange	✓	✓	✓	✓		✓	✓	✓	✓
E) I-64 Inside Shoulder Improvements near East Interchange									
F) Forest Park Ave. and Grand Blvd. Intersection	✓			✓		✓	✓		
G) Theresa Ave. extension south with grade-separated railroad crossing	✓	✓		✓		✓	✓	✓	
H) Bus-Only Lanes, Bicycle, and Pedestrian Expansion on Grand Blvd.	✓	✓	✓	✓		✓	✓	✓	✓
I) Entire Interchange Improvement at East Interchange	✓	✓	✓	✓		✓	✓	✓	✓
J) EB I-64 over Vandeventer Ave. (L0667)					✓				
K) WB I-64 over Vandeventer Ave. (A3594)					✓				

Appendix A:
FHWA Planning and Environmental Linkages Questionnaire

Appendix B:
Stakeholder Outreach, Public Engagement, and Agency Coordination Summary Report

Appendix C:
Level 1 Concept Development, Screening Process, and Results Technical Report

Appendix D:
Level 2 Alternatives Screening Process and Results Technical Report

Appendix E:
Level 2 Alternatives Screening Matrix

Appendix F:
Traffic Safety and Multimodal Alternatives Analysis Memorandum

Appendix G:
Community Assessment Baseline

Appendix H:
Cost Estimating Technical Memorandum

Appendix I:
Bridge Rehabilitation and Replacement Estimates

Appendix J:
Environmental Constraints

Appendix K:
Existing Conditions Report

Appendix L:
Existing Traffic, Safety & Multimodal Conditions Technical Report

Appendix M:
Review of Existing Planning Efforts Report

Appendix N:
Project Sheets