Appendix B
Planning Materials

B.1 - Estimated Safety Performance

B.2 - Purpose and Need Statement

B.1 - Estimated Safety Performance

I-270 NORTH ENVIRONMENTAL ASSESSMENT
Summary of Results for Predictive Safety Analysis by ISATe
Phase II Analysis - No-Build & Preferred Alternative (Mainline I-270)

Color Key: *Cell Requires User Input* / *Value Calculated by Formula*

Table 1: Summary of Crash Profile (crashes per year) for I-270 Mainline in Subarea 03 (Route 370 to McDonnell Blvd)

ALTERNATIVE	STUDY PERIOD (YEARS)	ESTIMATED NUMBER OF CRASHES BY SEVERITY DURING STUDY PERIOD (CRASHES)			ESTIMATED AVERAGE CRASH FREQUENCY DURING STUDY PERIOD (CRASHES/YEAR)			ESTIMATED NUMBER OF SEVERE AND TOTAL CRASHES DURING STUDY PERIOD (CRASHES)		DIFFERENCE FROM NO-BUILD							
										ESTIMATED NUMBER OF CRASHES[1] (CRASHES)				PERCENT DIFFERENCE[2] (PERCENT)			
		FATAL [K]	DISABLING [A]	OTHER [B + C + PDO]	FATAL [K]	DISABLING [A]	OTHER [B + C + PDO]	SEVERE [K + A]	TOTAL [K + A + B + C + PDO]	FATAL [K]	DISABLING [A]	SEVERE [K + A]	TOTAL	FATAL [K]	DISABLING [A]	SEVERE [K + A]	TOTAL
SUBAREAS 01-02: I-70 TO GIST ROAD									*Interchanges/Crossroads: I-70, St. Charles Rock Road/Route 180, Woodford Way Drive, Gist Road*								
No-Build	20	7.4	19.4	1161.0	0.4	1.0	58.1	26.8	1187.8	---	---	---	---	---	---	---	---
Preferred Alt. (#1)	20	5.8	15.3	986.8	0.3	0.8	49.3	21.1	1007.9	-1.6	-4.1	-5.7	-179.9	-21.62%	-21.13%	-21.27%	-15.15%
SUBAREAS 03: ROUTE 370 TO McDONNELL BOULEVARD									*Interchanges/Crossroads: Route 370, Missouri Bottom Road, McDonnell Boulevard*								
No-Build	20	13.0	34.7	2402.6	0.7	1.7	120.1	47.7	2450.3	---	---	---	---	---	---	---	---
Preferred Alt. (#1)	20	12.6	33.6	2189.4	0.6	1.7	109.5	46.2	2235.6	-0.4	-1.1	-1.5	-214.7	-3.08%	-3.17%	-3.14%	-8.76%
SUBAREAS 04-05HG: LINDBERGH BOULEVARD TO HANLEY/GRAHAM ROAD									*Interchanges/Crossroads: Lindbergh Boulevard/US 67, I-170, Hanley Road/Graham Road (west)*								
No-Build	20	11.1	30.1	2266.1	0.6	1.5	113.3	41.2	2307.3	---	---	---	---	---	---	---	---
Preferred Alt. (#1)	20	11.1	29.9	1850.4	0.6	1.5	92.5	41.0	1891.4	0.0	-0.2	-0.2	-415.9	0.00%	-0.66%	-0.49%	-18.03%
SUBAREAS 05HG-07: HANLEY/GRAHAM ROAD TO OLD HALLS FERRY ROAD									*Interchanges/Crossroads: Hanley Road/Graham Road (east), New Florissant Road/Route N, Washington Steet/Elizabeth Avenue, West Florissant Avenue, New Halls Ferry Road/Route AC, Old Halls Ferry Road*								
No-Build	20	21.1	57.3	4628.7	1.1	2.9	231.4	78.4	4707.1	---	---	---	---	---	---	---	---
Preferred Alt. (#1a)	20	20.1	53.8	3425.3	1.0	2.7	171.3	73.9	3499.2	-1.0	-3.5	-4.5	-1207.9	-4.74%	-6.11%	-5.74%	-25.66%
SUBAREAS 08: ROUTE 367									*Interchanges/Crossroads: Route 367/Lewis & Clark Boulevard*								
No-Build	20	4.9	13.2	1016.4	0.2	0.7	50.8	18.1	1034.5	---	---	---	---	---	---	---	---
Preferred Alt. (#1)	20	4.1	10.7	665.2	0.2	0.5	33.3	14.8	680.0	-0.8	-2.5	-3.3	-354.5	-16.33%	-18.94%	-18.23%	-34.27%
SUBAREAS 09: BELLEFONTAINE ROAD									*Interchanges/Crossroads: Bellefontaine Road*								
No-Build	20	3.5	9.3	564.4	0.2	0.5	28.2	12.8	577.2	---	---	---	---	---	---	---	---
Preferred Alt. (#1)	20	3.2	8.4	546.3	0.2	0.4	27.3	11.6	557.9	-0.3	-0.9	-1.2	-19.3	-8.57%	-9.68%	-9.37%	-3.34%
SUBAREAS 10: LILAC AVENUE									*Interchanges/Crossroads: Lilac Avenue/Lilac Drive*								
No-Build	20	2.2	5.9	398.1	0.1	0.3	19.9	8.1	406.2	---	---	---	---	---	---	---	---
Preferred Alt. (#1)	20	2.1	5.5	322.7	0.1	0.3	16.1	7.6	330.3	-0.1	-0.4	-0.5	-75.9	-4.55%	-6.78%	-6.17%	-18.69%
SUBAREAS 11: RIVERVIEW DRIVE									*Interchanges/Crossroads: Riverview Drive/Route H*								
No-Build	20	2.7	7.3	504.3	0.1	0.4	25.2	10.0	514.3	---	---	---	---	---	---	---	---
Preferred Alt. (#1)	20	2.7	7.0	406.7	0.1	0.4	20.3	9.7	416.4	0.0	-0.3	-0.3	-97.9	0.00%	-4.11%	-3.00%	-19.04%

[1]Difference in number of crashes is computed with respect to the ***No-Build*** scenario. ***Negative*** value indicates ***decrease*** and ***positive*** value indicates ***increase*** with respect to the ***No-Build*** scenario.
[2]Percent difference is computed with respect to the ***No-Build*** scenario. ***Negative*** value indicates ***decrease*** and ***positive*** value indicates ***increase*** with respect to the ***No-Build*** scenario.

B.2 - Purpose and Need Statement

Purpose and Need Statement

I-270 North Environmental Assessment
I-70 to the Chain of Rocks Bridge

Prepared for

Prepared October 21, 2013

Revised November 2016

CH2MHILL®

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SECTION 1

Introduction/Study History

This document presents the purpose and need for the Interstate 270 North Environmental Assessment (I-270 North EA) study. *Purpose and Need* refers to the transportation-related problems that a study is intended to address. The generation and evaluation of alternatives are conducted to develop the most appropriate solutions to the identified problems. Ultimately, the identification of a preferred alternative will be based, in part, on how well it satisfies the study's purpose and need.

In its very broadest sense, the goals and objectives associated with the I-270 corridor can be defined as follows:

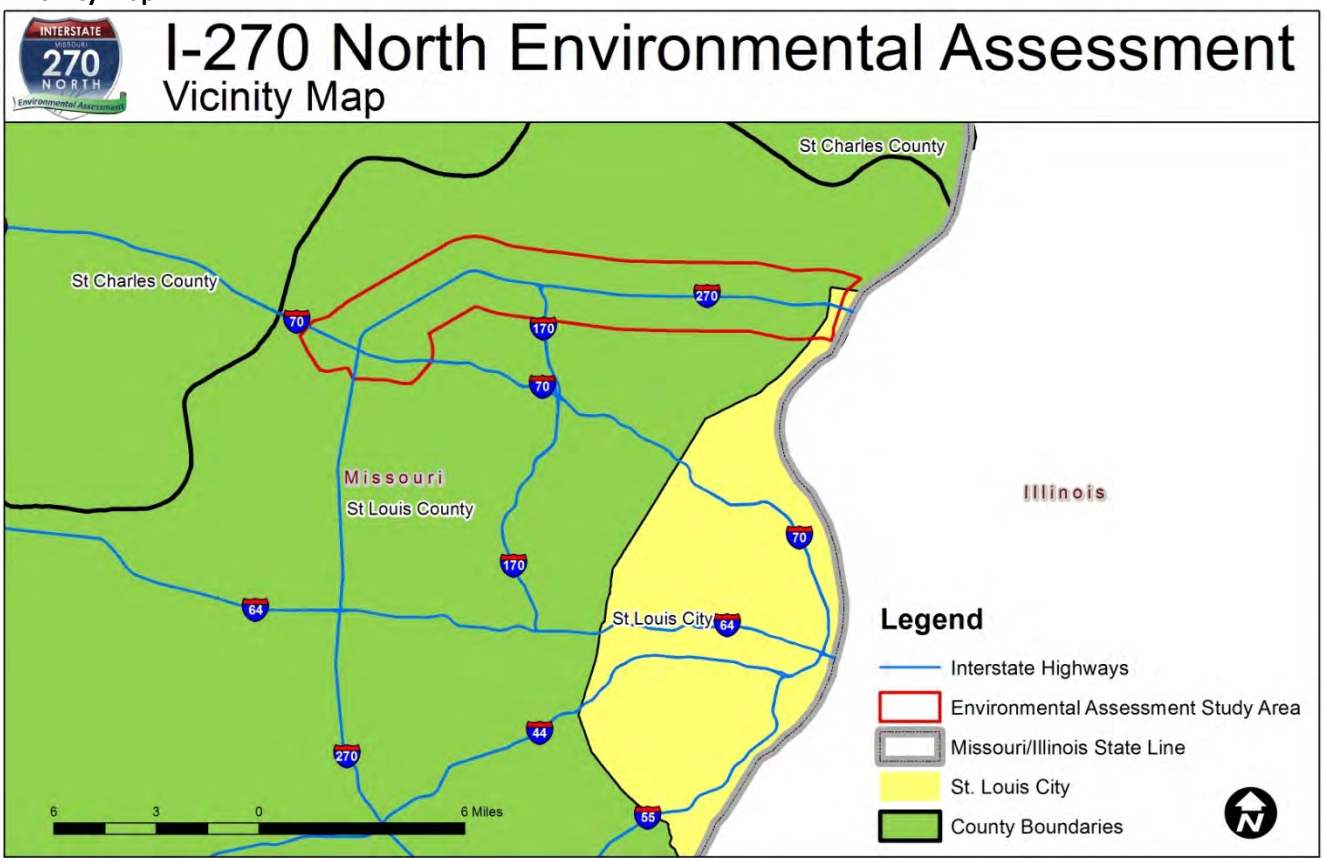
- Addressing the aging infrastructure along I-270
- Improving mobility and operations within the I-270 corridor
- Achieving accessibility consistent with the designated uses of I-270
- Improving safety within the I-270 corridor

The remainder of this document will examine these themes. **Section 1** introduces the many infrastructure elements that make up the study area. **Section 2** summarizes the specific elements that comprise the purpose and need. **Section 3** examines each of those elements in detail. These elements relate to one or more of the basic goals listed above. Further, these elements serve as the basis for the development of Performance Measures for the I-270 North EA study. The Performance Measures will be used in developing and evaluating alternatives. **Section 4** describes the study's logical termini and independent utility. **Section 5** provides a brief concluding summary of the study and the purpose and need.

1.1 Study Overview

The Missouri Department of Transportation (MoDOT), in cooperation with the Federal Highway Administration (FHWA), is preparing a Location Study and National Environmental Policy Act (NEPA) investigation for a portion of I-270 in northern St. Louis County, Missouri. This study will be referred to as the I-270 North EA study. The I-270 North EA study is a transportation study that will investigate and identify improvements to allow I-270 to fulfill its role as a major interstate artery within the area's transportation system. The study area starts at the I-70/I-270 interchange in Bridgeton and continues east along I-270 to the Mississippi River/Chain of Rocks Bridge. **Figure 1** depicts the vicinity of the study area for the I-270 North EA.

FIGURE 1
Vicinity Map



1.2 Study Background

In 2005, the Board of Directors of the region's Metropolitan Planning Organization, the East-West Gateway Council of Governments (EWG), adopted *Legacy 2030*, the long-range transportation plan for the Missouri-Illinois (Metropolitan St. Louis) region. The plan recommended a planning study of the I-270 corridor in north St. Louis County. *Legacy 2030* recognized increasing traffic volumes and crashes, aging and outdated infrastructure, increasing need for public transportation service, and the growing and important role that I-270 plays in the movement of goods and commuters.

In October 2012, MoDOT, in cooperation with EWG, completed a planning study of I-270 in North St. Louis County. Known as the *I-270 North Corridor Study* (NCS), this work examined the problems of the I-270 corridor and identified possible strategies to address those problems. This study serves as the foundation for the I-270 North EA. The NCS focused on the portion of I-270 between James S. McDonnell Blvd. (McDonnell) and MO 367/Lewis & Clark (MO 367) (see **Figure 2**) and identified existing operational, geometric, and safety concerns within the study area. The NCS identified a forecasted increase in traffic of approximately 20 to 25 percent by the year 2040.

The I-270 North Corridor Study serves as the foundation for the I-270 North Environmental Assessment. The objectives of the NCS were to:

1. Identify and define the transportation problems and needs along I-270.

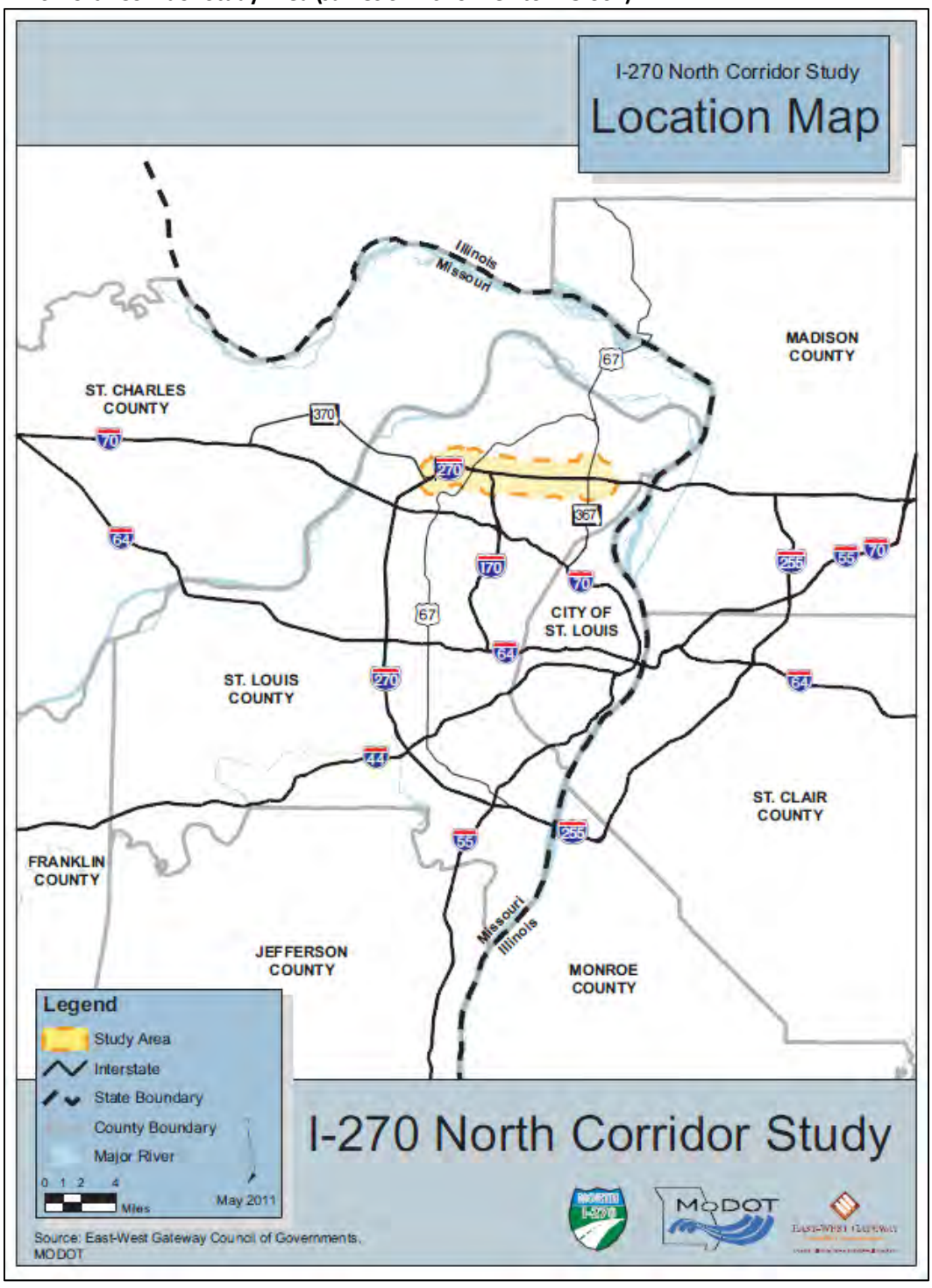
2. Develop system improvement solutions that were both practical and multimodal.

3. Enhance access for transit, bicycles, and pedestrians.

4. Recommend sets of both near- and long-term conceptual improvements for the corridor.

5. Partner with the communities of North St. Louis County to implement sound transportation improvements.

FIGURE 2
I-270 North Corridor Study Area (James S. McDonnell to MO 367)



The NCS concluded with near- and long-term concepts for further analysis and consideration. The near-term concepts included the addition of an auxiliary lane on east-bound (EB) I-270 between U.S. 67/Lindbergh Boulevard (Lindbergh) and Interstate 170 (I-170), restriping westbound (WB) I-270 at Lindbergh to improve lane configuration, and modifications along McDonnell.[1] The long-term concepts included widening I-270, a reconfigured two-way outer road system, a new one-way outer road system, and interchange

[1] The restriping of westbound I-270 at Lindbergh has been completed and modifications to McDonnell, as of October 2013, are pending.

reconfigurations at the Lindbergh and MO 367 interchanges. These concepts were intended to be carried forward for a more-detailed environmental evaluation in the near future under the NEPA process.

1.3 Study Area Description

The *North Corridor Study* included an extensive public and stakeholder outreach program. This program will be continued/expanded in the I-270 North EA study.

The study area for the I-270 North EA study has been expanded from the NCS limits to include the entire portion of I-270 between the I-70/I-270 interchange and the Chain of Rocks Bridge—a total distance of roughly 15 miles. For data collection purposes, the study width is roughly 1 mile beyond the interstate roadway elements, between the study limits. **Figure 3** depicts the expanded study area. As part of the study, a utility resources review was conducted for those areas most likely to be affected by an improved I-270. The study area for the utility resources review is also shown on **Figure 3**.

The study area for the I-270 North EA is located within the northern portion of St. Louis County. Known as North County, it encompasses numerous municipalities and unincorporated areas and the northern city limits of St. Louis. Specifically, the study area encompasses portions of the following municipalities:

Bellefontaine Neighbors
Berkeley
Champ
Black Jack
Bridgeton
Maryland Heights
Dellwood
Glasgow Village
Ferguson
Florissant
Hazelwood
City of St. Louis
Unincorporated St. Louis County
Spanish Lake
Castle Point
Calverton Park

According to tax map data, almost half of the land surrounding this portion of I-270 is residential, almost entirely single-family homes. Occupancy rates are high. Roughly two-thirds of the homes are owner-occupied. About half of the residents are minorities. The balance of the land surrounding this portion of I-270 is equally distributed amongst industrial, commercial, institutional, and agricultural/vacant, and transportation uses.

The residential neighborhoods vary widely throughout North County. From historic century homes to condominiums, many different housing options are available. The new housing market is also expanding into the available vacant lands. The socio-economic status and demographic profiles of the study area is also quite varied. Of particular concern are the potential Environmental Justice populations that may be affected. The NCS identified areas with high poverty rates and high percentage of elderly, persons with disabilities, and a sizable minority population, as well as a high percentage of zero-vehicle households. North County is home to many of St. Louis' largest corporations and employers, including Lambert St. Louis International Airport, which employs more than 11, 000 people. Other major regional employers include American Airlines, Boeing, Emerson, Ford, GKN, IBM, and UPS.

Healthcare is a leading edge industry in the study area. North County residents benefit from having two award-winning hospitals. The Christian Hospital is a 485-bed facility offering the full range of healthcare services and an array of medical and surgical specialties and employs more than 2,500 people. It is located in the northwestern quadrant of the I-270/MO 367 interchange. The SSM DePaul Health Center is a 450-bed, full-service acute care hospital. In 2002, it received the Malcolm Baldrige National Quality Award. In 2003, it celebrated its 175th anniversary. The facility is located in the northeast quadrant of the I-270/I-70 interchange.

Relative to transportation, North County is centrally located. It is minutes from downtown St. Louis, St. Charles County, West St. Louis County, and downtown Clayton. Earth City and Park 370 business parks are both located in North County. North County is also served by air, water, and rail. North County is home to Lambert International Airport. The Metrolink light rail service provides rapid access from North County to downtown St. Louis and to western Illinois. The Bi-State bus system also serves North County, with many

routes connecting to Metrolink stations. The ability to access public transportation is essential to those living along the corridor. Metro intends to build a new Transit Center and bus garage in North County (Pershall between West Florissant and New Halls Ferry). The Missouri and Mississippi rivers border North County, offering the option of barge transportation to area commerce. Norfolk and Western, Norfolk and Southern, Terminal, and St. Louis/Southwestern railroads also serve the region.

North County is home to eight accredited public school districts. Two major public schools are adjacent to I-270. McCluer High School is located between Route N/New Florissant Road (New Florissant) and Washington/Elizabeth. Hazelwood East High School is located in the northeast quadrant of the I-270/MO 367 interchange. North County also has excellent colleges, universities, and technical schools. St. Louis Community College at Florissant Valley offers a wide range of educational opportunities. The Florissant Valley campus is located at 3400 Pershall Road (Pershall).

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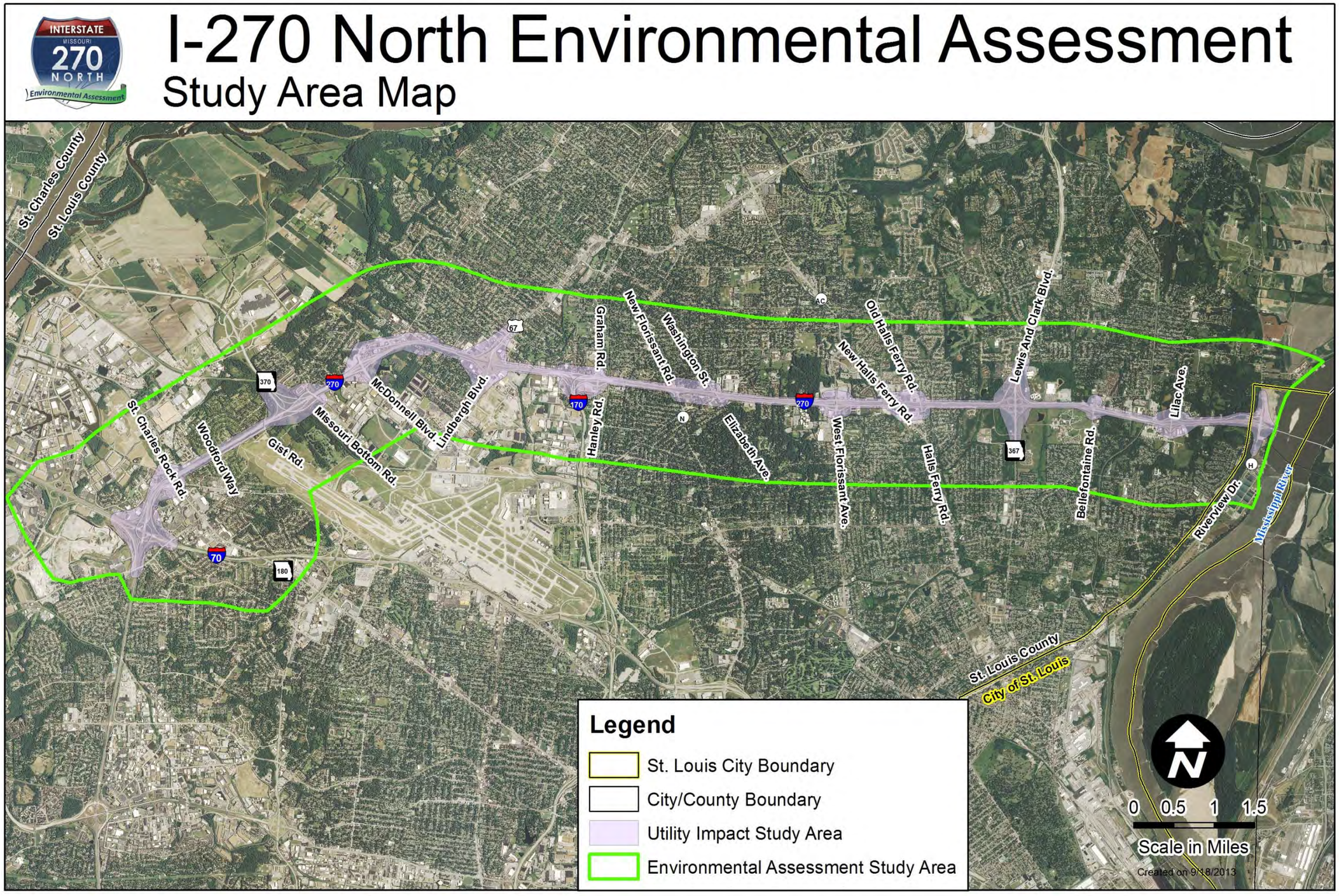
FIGURE 3
I-270 North EA Study Area



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1.4 Roadway Configuration

This section will summarize the major elements of I-270 within the study area. It is intended as an introduction; details are included in subsequent sections.

1.4.1 Mainline Corridor

According to the American Association of State Highway and Transportation Officials' (AASHTO) *A Policy on Geometric Design of Highways and Streets*, "designation of the basic number of lanes is fundamental to establishing the number and arrangement of lanes on a freeway. Consistency should be maintained in the number of lanes provided along any route of arterial character. Thus, the basic number of lanes is defined as a minimum number of lanes designated and maintained over a significant length of a route, irrespective of changes in traffic volume and lane-balance needs." The number of basic lanes throughout the I-270 North EA study area are defined in **Table 1**.

TABLE 1
Basic Lane Configuration along I-270 (from west to east)

From	To	Distance (miles)	Number of Basic Lanes Westbound	Number of Basic Lanes Eastbound	Total Number of Basic Lanes
West of I-70	East of St. Charles Rock Rd.	1.6	3	4	7
East of St. Charles Rock Rd.	West of Lindbergh	4.0	4	4	8
West of Lindbergh	West of Lilac	8.6	3	3	6
West of Lilac	Chain of Rocks Bridge	1.8	2	2	4

AASHTO's *A Policy on Geometric Design of Highways and Streets* defines an auxiliary lane as "the portion of the roadway adjoining the through lanes for speed change, turning, storage for turning, weaving, truck climbing, and other purposes that supplement through-traffic movement." The I-270 mainline has intermittent auxiliary lanes throughout the study area. Existing mainline and auxiliary lanes are 12 feet in width which satisfies MoDOT's lane width criteria per Engineering Policy Guide (EPG) 231.3. An auxiliary lane is defined by AASHTO as the portion of the roadway adjoining the traveled way for speed change, turning, weaving, and maneuvering of entering and leaving traffic. Auxiliary lanes are used to balance the traffic load and maintain a more uniform level of service on the highway.

The majority of I-270 consists of a 12-foot median with paved shoulders and a barrier separating the EB and WB lanes. Most of the outside shoulders are 10 feet wide, which satisfies MoDOT's preference of 10-foot shoulders on major roadways per EPG 231.4. The majority of the inside shoulders are 5 feet wide, which does not meet the 10-foot preference. One exception is within the I-170 interchange where the inside shoulders are 12 feet in width.

1.4.2 Crossroads and Pedestrian Facilities

There are numerous crossroads of I-270. **Table 2** summarizes each crossroad, including its functional classification, within the study area.

By and large, pedestrian facilities within the corridor are limited and disjoined. There are no sidewalks along MO 180/St. Charles Rock Road (St. Charles Rock Rd.), McDonnell, Lindbergh, North Hanley Road/Graham Road (Hanley/Graham), New Florissant, MO 367, and Route H/Riverview (Riverview). Most of these roads do have shoulders that are used by pedestrians. Disconnected sections of sidewalks exist along the remaining arterials. Most of the existing pedestrian facilities along these roadways do not meet with American's with Disabilities Act (ADA) standards.

TABLE 2
Major Crossroads (from West to East)

Crossroad	Interchange Type	Functional Classification
I-70	System Interchange	Interstate
St. Charles Rock Rd.	Service Interchange	Principal Arterial
Woodford Way Drive	Overpass	Minor Arterial
Gist Road	Overpass	Urban Collector
MO 370	System Interchange	Freeway
Missouri Bottom Road	Partial Interchange	Urban Collector
McDonnell Boulevard	Service Interchange	Principal Arterial
Lindbergh Boulevard	Service Interchange	Principal Arterial
I-170	System Interchange	Interstate
Hanley/Graham	Service Interchange	Principal Arterial
South Lafayette Street	Pedestrian overpass[2]	-
New Florissant Road	Service Interchange	Minor Arterial
McCluer High School	Pedestrian overpass	Scheduled for removal
Washington/Elizabeth	Service Interchange	North – Minor Arterial South -– Urban Collector
West Florissant Avenue	Service Interchange	Principal Arterial
New Halls Ferry Road	Service Interchange	Principal Arterial
Old Halls Ferry Road	Service Interchange	Minor Arterial
MO 367	Service Interchange	Freeway
Bellefontaine Road	Service Interchange	Minor Arterial
Lilac Avenue	Service Interchange	Urban Collector
Riverview Drive	Service Interchange	North – Principal Arterial South – Urban Collector

1.4.3 Interchanges

Within the 15-mile study area, there are 19 interchanges. MoDOT's Access Management Guidelines recommend a spacing of 2 to 3 miles between interchanges on major roadways in urban areas; currently, none of the interchange spacing in the corridor meets these guidelines. These interchanges are described in **Table 3**.

[2] This pedestrian overpass is scheduled to be removed in fiscal year 2015

TABLE 3
I-270 Study Area Interchange Descriptions

Interchange	Description
I-70/I-270 Interchange	Fully directional interstate to interstate (0.8 mile to St. Charles Rock Rd. interchange)
St. Charles Rock Rd. Interchange	Diamond interchange (1.7 miles to MO 370 interchange)
MO 370 Interchange	Fully directional interstate-to-interstate-type interchange (0.4 mile to Missouri Bottom)
Missouri Bottom Interchange	Partial diamond interchange (0.7 mile to McDonnell interchange)
McDonnell Interchange	Traditional full diamond (1.7 miles to Lindbergh interchange)
Lindbergh Interchange	Modified cloverleaf with WB collector-distributor (C-D) to separate weaving traffic from mainline I-270 (1.1 miles to I-170 interchange)
Lindbergh Interchange at Lynn Haven Lane/Taylor	Diamond interchange (0.3 mile from I-270 at Lindbergh interchange)
I-170 Interchange	Fully directional interstate-to-interstate (0.2 mile to Hanley/Graham interchange)
Hanley/Graham Interchange	Crossover slip ramps to Dunn Road (Dunn) for WB, diamond ramps for EB (1.0 mile to New Florissant interchange)
New Florissant Interchange	Crossover slip ramps to Dunn for WB, diamond ramps for EB (0.5 mile to Washington/Elizabeth interchange)
Washington/Elizabeth Interchange	Crossover slip ramps to Dunn for WB exit, no WB entrance, diamond ramps for EB (1.5 miles to West Florissant interchange)
West Florissant Interchange	Crossover slip ramps to Dunn for WB, diamond ramps for EB New Halls Ferry (0.7 mile to New Halls Ferry interchange)
New Halls Ferry Interchange	Crossover slip ramps to Dunn for WB, split-diamond interchange with Old Halls Ferry for EB (0.3 mile to Old Halls Ferry interchange)
Old Halls Ferry Interchange	Crossover slip ramps to Dunn for WB exit, no WB entrance, split-diamond interchange with New Halls Ferry) for EB exit (1.2 miles to MO 367 interchange)
MO 367 Interchange	Traditional Cloverleaf (1.0 mile to Bellefontaine)
MO 367 Interchange at Dunn	Partial diamond Interchange south of Dunn with slip ramps north of Dunn (0.6 mile of I-270)
Bellefontaine Interchange	Crossover slip ramps to Dunn for WB, diamond ramps for EB Bellefontaine (1.0 mile to Lilac interchange)
Lilac Interchange	Traditional full diamond (1.2 miles to Riverview interchange)
Riverview Interchange	Traditional full diamond

1.4.4 Outer Road System

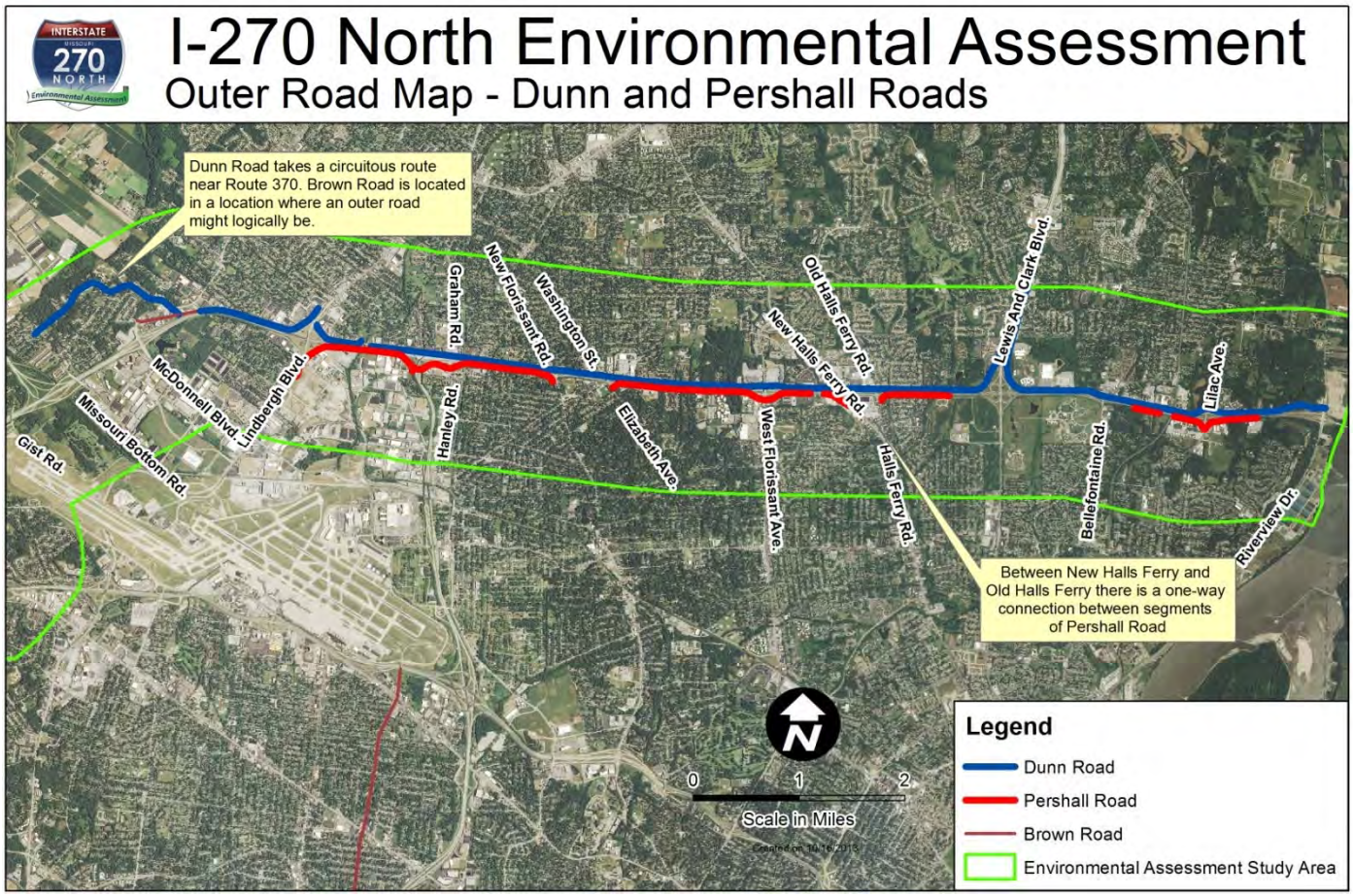
An important feature of the I-270 corridor is the outer road system that helps connect local roadways to I-270.

The northern outer road is a largely continuous two-way road known as Dunn Road (Dunn). It generally parallels I-270 from McDonnell to east of Riverview. The total length of Dunn adjacent to I-270 is 12.3 miles, covering roughly 80 percent of the study area. Dunn consists of one 12-foot lane in each direction of travel, with turn bays at intersections. The lanes at intersections are often less than 12 feet in width. Dunn provides access to private and commercial properties, including Christian Hospital Northeast and Hazelwood East High School. A number of the signalized at-grade intersections along Dunn do not adhere to MoDOT's Access Management Guidelines.

Most of the existing pedestrian facilities throughout the I-270 corridor do not meet ADA standards. Sidewalks consist of a number of discontinuous segments. In areas with no sidewalks, the shoulders are used to accommodate pedestrians. In other non-sidewalk locations, pedestrian use is evident through the existence of “cow paths” that have formed when pedestrians repeatedly travel through vegetated properties. Additionally, the majority of the sidewalks are set back from the edge of shoulder, providing no connection between the sidewalks and shoulders. Therefore, at these locations, the shoulders have to accommodate bus stops.

The southern outer road is a relatively non-continuous two-way road known as Pershall Road (Pershall). It generally parallels I-270 between Lindbergh and Riverview. The total length of Pershall is roughly 6.7 miles (44 percent of the study area). Pershall consists of one 12-foot lane in each direction with turn bays at various intersections. There is a one-way segment between New Halls Ferry and Old Halls Ferry Road (Old Halls Ferry). The two-way portions of the south outer road provide access to a number of private, commercial, and institutional properties such as St. Louis Community College – Florissant Valley. All entrances and public street connections to the south outer road are on the south side of the street. No direct access points are located between I-270 and the southern outer road. There is no sidewalk along either the north or south side of the southern outer road. The shoulders are used by pedestrians walk along the road and to access bus stops. In contrast to Dunn, slip ramps are not utilized to provide access to/from I-270. **Figure 4** shows the location of the outer roads.

FIGURE 4
Outer Road System – Dunn Road and Pershall Road



SECTION 2

Purpose Statement

The I-270 North EA is a transportation study that will investigate and identify improvements to allow I-270 to continue to serve its key role within the area's transportation system. The goals of the I-270 North EA are to:

- Address the aging infrastructure along I-270
- Improve mobility and operations within the I-270 corridor
- Achieve accessibility consistent with the designated uses of I-270
- Improve safety within the I-270 corridor

Within the context of these goals, several specific transportation problems have been identified. The specific transportation problems affecting the I-270 North EA study area include, in no particular order:

Major Element #1 – Deteriorating Infrastructure along I-270
The I-270 north corridor was originally constructed in the 1960s and is among the oldest freeways in the St. Louis area. Although isolated portions of the corridor have been reconstructed or widened, much of the corridor's infrastructure has outlived or is nearing the end of its service life.

Major Element #2 – Deteriorating Operation of the I-270 Freeway
According to MoDOT's EPG Section 232, "it is adequate for all roads in urban or suburban locations to accommodate the 20-year peak hour traffic at a level of service (LOS) of E and off-peak traffic at a LOS of D." Many segments of I-270 throughout the study corridor have existing and future LOSs that are below MoDOT's thresholds.

Major Element #3 – Inconsistent Interchange Operations
Three system interchanges and sixteen service interchanges are located on I-270 within the 15-mile study area. Travelers within the study area often encounter weaving distances that do not meet minimum spacing guidelines. Additionally, the interchange density through the study area makes it difficult to adhere to minimum decision sight distance guidelines for signage.

Major Element #4 – Inconsistent Outer Road System
Dunn and Pershall serve as north and south outer roads, respectively, to the I-270 mainline throughout most of the study area. The outer roads are used to distribute and collect traffic between local streets and freeway interchanges. Dunn and Pershall do not extend throughout the limits of the study. In addition, there are several gaps in Pershall at key locations, which limits the effectiveness of the outer road system to function as a collector and distributor of traffic between the freeway and local streets.

Major Element #5 – System Creates Safety Conflicts
According to crash data from MoDOT's Traffic Management System for the period between 2010 and 2014, there were 9,784 crashes within the study area long I-270, the outer roads, and interchange crossroads. This translates into approximately 5 crashes per day; a fatality every 2 months; someone injured every day. Congestion and weaving appear to be strongly linked to the crash environment.

Major Element #6 – Non-motorized Travel within Study Area is Difficult
I-270 creates a substantial barrier to non-motorized movements. Most of the existing pedestrian facilities within the study area do not meet current ADA standards and much of the existing sidewalks are discontinuous along the crossroads and outer roads or simply do not exist. As a result, the study area lacks connectivity along and across I-270 corridor for bikes and pedestrians.

Major Element #7 – Need to Accommodate Operations between Transit and Highway Users
Transit operations in northern St. Louis County (North County) are substantial. Metro, the St. Louis region's main transit agency, reports that during a typical month, roughly 20 percent of MetroBus boardings in Missouri occur on routes that primarily serve North St. Louis County. Access to transit and the ability for

transit to move efficiently through this corridor is very important to the residents and businesses located in north St. Louis County.

Major Element #8 – Difficult Pathways to Important Destinations
Urban environments pose challenges for motorists. This element examines the difficulties that are known to exist; specifically, those difficulties that affect sustainable development and access to opportunity. Specific transportation problems identified include the following:

- Unavailable movements
- Conflicting movements
- Physical constraints

Major Element #9 – Increasingly Inefficient Goods Movement
Freight comprises a large percentage of the traffic along I-270 within the study area. Freight traffic is also an important component in the local and regional economy. According to the NCS, approximately 17 percent of the roughly 90,000 to 141,000 vehicles that use I-270 daily are trucks; approximately 40 percent of the trucks are destined for local addresses in the St. Louis region. Key challenges facing commercial truck drivers in the St. Louis region include congestion, truck restrictions, access/connectivity, crashes, railroad grade crossings, and a lack of parking.

SECTION 3

Elements of the Purpose and Need

This section of the document will examine the context of the transportation problems that affect the I-270 corridor. As defined here, context refers to the overall nature, scope, and degree of how the transportation problems affect the existing corridor.

These transportation problems are often inter-related but will be discussed within the framework of the nine major elements.

The specific transportation problems that affect the I-270 North EA study include:

1. Deteriorating Infrastructure along I-270
2. Deteriorating Operation of the I-270 Freeway
3. Inconsistent Interchange Operations
4. Inconsistent Outer Road System
5. System Creates Safety Conflicts
6. Non-motorized Travel within Study Area is Difficult
7. Need to Accommodate Operations between Transit and Highway Users
8. Difficult Pathways to Important Destinations
9. Increasingly Inefficient Goods Movement

3.1 Major Element #1 – Deteriorating Infrastructure along I-270

I-270 is among the oldest freeways in the St. Louis area. The northern section of I-270 in Missouri was constructed in 1964. I-270 between I-70 and I-55 was formerly designated I-244, a western bypass of St. Louis. By the late 1970s, the entire beltway was integrated as part of I-270 for consistency. The last major construction project to widen I-270 occurred from 1995 to 1998.

Proper maintenance by MoDOT has allowed the I-270 facility to outlive its original design life. Currently, many sections of the I-270 corridor are aging and in need of repair resulting in the need for ongoing maintenance. The study team recognizes that the ongoing maintenance needs of the pavement, bridges, and other infrastructure are not a determining factor in evaluating alternatives. The specific elements that are in poor condition will require replacement/ maintenance regardless of the solution ultimately implemented. However, knowing the condition of the infrastructure will provide valuable data toward seeking solutions to modernize the freeway.

The following subsections describe the key deficiencies associated with the infrastructure within the I-270 study area.

3.1.1 Structurally Deficient Bridges

There are 57 bridges within the I-270 study area. A general condition assessment was conducted for these bridges[3]. Numerous deficiencies were identified, including:

- Thirteen structures are classified as deficient. These structures are shown in **Table 4**. It is anticipated that they will require major rehabilitation or replacement as a component of this study. Deck geometry and vertical clearance are the major causes of these deficiencies.
- Additionally, there are seven bridges with Structural Evaluations of 4 or 5 out of a possible 10. It is anticipated these structures will be classified as deficient within the next couple of inspection cycles (see **Table 4A**). These will likely require major rehabilitation or replacement as a component of this study.

[3] *The I-70/I-270 interchange was excluded from the analysis because these structures were built within the last 35 years and are known to still be in fairly good condition.*

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TABLE 4

I-270 Bridges Classified as Deficient

	Bridge No.	Feature Intersected	Year Built	Year Rebuilt	Length (ft)	Width (ft)	# of Lanes	Sufficiency	Structural Evaluation	Deficiency
1	A3764	I-70, I-270, Ramp I-270 WB	1982		1648	26.8	1	88		Functional
2	A3745	St. Charles Rock Rd.	1982		180	26.8	2	72		Functional
3	A0180	St. Charles Rock Rd.	1960	1996	185	42.0	3	71		Functional
4	A0180	St. Charles Rock Rd.	1960	1996	185	42.0	5	71		Functional
5	A0226	I-270, Ramp I-270 WB To Lindbergh	1960	1990	287	37.0	3	43	2	Structural
6	A0226	I-270, Ramp I-270 WB To Lindbergh	1960	1990	287	37.0	3	30	2	Structural
7	A3808	ORI-270	1978		251	25.0	1	89	6	Functional
8	L0745	New Florissant	1960		206	41.0	3	60	5	Structural
9	L0745	New Florissant	1960		206	41.0	3	57	5	Structural
10	A0223	New Halls Ferry	1961		230	45.0	3	72	5	Functional
11	A0223	New Halls Ferry	1961		230	45.0	3	71	5	Functional
12	J0513	Watkins Creek	1931	1961	37	Culvert	3	48	4	Structural
13	A0890	Mississippi River	1964		5411	58	4	48	4	Structural

TABLE 4A

I-270 Bridges with Low Structural Evaluations

	Bridge No.	Feature Intersected	Year Built	Year Rebuilt	Length (ft)	Width (ft)	# of Lanes	Sufficiency	Structural Evaluation	Deficiency
1	A4888	RP I-270 EB To MO 370 WB	1990		288	62.0	2	85	5	None
2	L0717	Coldwater Creek	1960	1979	120	114.0	4	80	4	None
3	A0210	Coldwater Creek	1960	2010	119	28.0	3	80	5	None
4	A0212	I-270 at Washington/Elizabeth	1960	1988	153	52.0	5	60	4	None
5	A0240	I-270 at Old Halls Ferry	1961	1988	131	52.0	4	66	5	None
6	A0221	I-270 at Lilac	1961		208	52.0	4	67	5	None
7	J0522	Watkins Creek	1931	1962	76	Culvert	2	68	5	None

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3.1.2 Deteriorated I-270 Pavement Conditions

MoDOT uses International Roughness Index (IRI) as a method for evaluating pavement condition ratings. IRI measures fluctuations in the longitudinal profile of a roadway (the pavement surface). Potential IRI values range from 0 to 300 with 0 representing a perfect roadway. According to the MoDOT EPG Section 144.5.3.1, an IRI value less than 100 represents a *good* pavement rating for major roads with speed limits greater than or equal to 50 miles per hour. In addition, EPG Section 144.5.5 states "Each district will tailor its pavement plans to maximize the number of miles of roads in good condition using the least amount of resources." **Table 5** below summarizes the IRI values for the I-270 mainline by direction.

TABLE 5
Average International Roughness Index Values by Segment

	Average IRI Value	
Segment Description	**Eastbound**	**Westbound**
I-70 to MO 370	103	119
MO 370 to McDonnell	113	113
McDonnell to Lindbergh	63	59
Lindbergh to I-170	75	72
Hanley/Graham to New Florissant	86	89
New Florissant to Washington/Elizabeth	50	71
Washington/Elizabeth to West Florissant	45	42
West Florissant to New Halls Ferry	45	52
New Halls Ferry to Old Halls Ferry	52	53
Old Halls Ferry to MO 367	87	76
MO 367 to Bellefontaine	85	96
Bellefontaine to Lilac	104	126
Lilac to Riverview	63	69
Riverview to Chain of Rocks Bridge	168	175

Due to proper maintenance, a majority of the pavement is in good condition. As noted in **Table 5**, the worst rated areas are between I-70 and McDonnell and between Bellefontaine Road (Bellefontaine) and the Chain of Rocks Bridge.

3.1.3 Other Infrastructure

In addition to pavement and bridges, the I-270 corridor is composed of many other elements. These include drainage, street lighting, traffic signals, signage, and other typical roadway features. As these features become unserviceable, they are routinely replaced. Consequently, the current condition of these features is often good.

3.1.3.1 Drainage

I-270 within the study corridor utilizes a combination of an enclosed drainage system and an open drainage system to manage stormwater runoff. The enclosed system consists of reinforced concrete pipe, and the open drainage system consists of both paved and sodded ditches. There are also many reinforced concrete box culverts within the study corridor. One such structure, the Watkins Creek box culvert, originally constructed in 1931 and rebuilt in 1961, has been noted to have structural deficiencies. In addition, portions

of the drainage system along the median barrier between McDonnell and I-170 have become blocked with a lime and cement mix and, therefore, aren't functioning as intended. Maintaining properly performing drainage infrastructure is important for a major mobility corridor such as I-270.

3.1.3.2 Lighting

All interchanges along I-270 within the study corridor are lit. The corridor lighting contains a number of different styles of lighting standards; including cobra heads, high mast, and roadway luminaires which requires multiple types of equipment to be kept by maintenance.

The lighting infrastructure is aging and has subsequent maintenance issues. For example, a number of lighting pull boxes have been buried under sediment or crushed, making it difficult to install new wire. Over time, the cable has been shortened when poles are damaged; making reconnections difficult due to the short wires. Several poles have been direct buried, rather than the standard anchor bolts on a concrete foundation used by current standards. These direct-bury poles are beginning to rust.

Lighting systems that maintain proper luminance[4] while keeping glare at a minimum is important for safety at major interchanges along I-270. Proper luminance helps drivers make the proper decisions when faced with complex situations. It is important to have a limited number of lighting standards for maintenance within the corridor and to replace the aged infrastructure in order to keep the lighting system operating.

3.1.3.3 Signals

The traffic signal controllers within the study corridor range in age from 1998 to 2010. Due to the age, some of the components may not have the capability of expansion if needed due to interchange updates and may need to be replaced to accommodate newer technologies. While the majority of the signal controllers within the study corridor are centrally controlled, some of the traffic signal controllers are stand alone and require upgrades to be interfaced with Intelligent Transportation System. Maintaining a modern, properly coordinated signalized intersection is important for areas that have issues with traffic operations and congestion.

3.1.3.4 Signs

Proper decision distance is a fundamental principle of interchange planning. Adhering to the minimum interchange spacing guidelines of one mile between interchanges generally provides sufficient decision distance to properly sign an interchange facility. Numerous interchanges within the study area do not adhere to the minimum spacing guidelines. One example of this is WB I-270 between New Halls Ferry and West Florissant. Weaving distance between the slip ramp entering I-270 and slip ramp exiting I-270 is less than 600 feet in length. This less than desirable decision distance is compounded by traffic operation issues related to the short weaving segment, making it difficult for non-local drivers to properly change lanes in time to exit the freeway. The corridor is complex. Substantial operational/safety improvements may be possible through state of the art sign design, placement, and materials.

3.2 Major Element #2 – Deteriorating Operation of I-270 Freeway

I-270 within the St. Louis metro area is predominately an eight-lane interstate facility with auxiliary lanes between interchanges. Beginning on the west end of the study area and progressing east, I-270 transitions from eight basic lanes to six lanes at Lindbergh and then to four lanes at Lilac.

[4] A measure of how much the light illuminates the surface.

During the NCS, the mainline I-270 operating conditions were analyzed using VISSIM[5] and HCS+[6]. Both analysis techniques used density as the metric to determine LOS. Density represents the freedom to maneuver within the traffic stream and the proximity to other vehicles. Density increases as flow increases up to the roadway's capacity. **Table 6** presents the basic freeway density ranges that correspond with LOS values in accordance with the *Highway Capacity Manual*. According to MoDOT's EPG Section 232, "it is adequate for all roads in urban or suburban locations to accommodate the 20-year peak hour traffic at a level of service (LOS) of E and off-peak traffic at a LOS of D." This minimum design criteria will be applied for the 30-year design period of this study.

TABLE 6
Freeway Level of Service Criteria

Level of Service	Basic Freeway Segment Density (pc/mi/ln)[a]
A	0 to 11
B	> 11 to 18
C	> 18 to 26
D	> 26 to 35
E	> 35 to 45
F	> 45

[a] pc/mi/ln = passenger cars per mile per lane

Traffic volumes used to evaluate existing conditions within the I-270 corridor were obtained from EWG and supplemented with traffic data collected by MoDOT. Additionally, traffic data from St. Louis County was utilized where applicable. **Table 7** presents the basic freeway LOS for the existing conditions.

[5] A microscopic multimodal traffic flow simulation software.

[6] Highway Capacity Software.

TABLE 7
Existing Freeway Level of Service (2013)

Section	Direction	Type	AM Peak Hour		PM Peak Hour	
			LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)
Between I-70 Off-Ramp and St. Charles Rock Rd. Off-Ramp	EB	Basic	C	20.4	C	20.8
Between St. Charles Rock Rd. Off-Ramp and I-70 On-Ramp	EB	Basic	B	11.6	B	13.5
I-70 On-Ramp	EB	Basic	B	14.6	B	17.0
Between St. Charles Rock Rd. On-Ramp and MO 370 Off-Ramp	EB	Basic	B	14.0	C	18.6
Between MO 370 Off-Ramp and MO 370 On-Ramp	EB	Basic	B	14.3	C	19.2
Between McDonnell. Ramps	EB	Basic	C	18.1	C	19.8
East of McDonnell.	EB	Basic	C	21.4	C	22.8
East of Hanley/Graham	EB	Basic	C	22.1	D	30.7
East of Washington/Elizabeth	EB	Basic	D	26.4	E	36.0
East of Old Halls Ferry Rd.	EB	Basic	B	17.8	C	23.8
Between MO 367 and Bellefontaine	EB	Basic	B	12.8	C	22.6
Between Bellefontaine Ramps	EB	Basic	A	9.4	B	16.9
Between Bellefontaine and Lilac	EB	Basic	B	13.1	C	19.5
Between Lilac Ramps	EB	Basic	B	14.9	C	22.6
Between Lilac and Riverview	EB	Basic	B	17.8	D	28.9
Between Riverview Ramps	EB	Basic	B	13.1	C	25.4
New Chain of Rocks Bridge	EB	Basic	B	15.3	D	29.0
New Chain of Rocks Bridge	WB	Basic	D	26.5	C	19.7
Between Riverview Ramps	WB	Basic	C	22.5	B	17.4
Between Riverview and Lilac	WB	Basic	C	25.6	C	23.8
Between Lilac Ramps	WB	Basic	C	22.6	C	22.6
Between Dunn Off-Ramp and On-Ramp at Bellefontaine	WB	Basic	B	16.6	B	14.3
Between Bellefontaine and MO 367	WB	Basic	B	17.5	B	15.8
West of MO 367	WB	Basic	D	26.9	C	23.5
West of West Florissant	WB	Basic	F	NOT	E	35.9
West of Lindbergh.	WB	Basic	D	29.8	D	26.3
Between McDonnell. Ramps	WB	Basic	D	26.7	C	24.3
Between MO 370 Off-Ramp and Missouri Bottom On-Ramp	WB	Basic	D	26.9	C	20.4
Missouri Bottom On-Ramp	WB	Basic	C	22.5	C	18.8
Between MO 370 On-Ramp and St. Charles Rock Rd./I-70 Off-	WB	Basic	C	25.8	C	21.7
Between I-70 Off-Ramp and St. Charles Rock Rd. On-Ramp	WB	Basic	C	19.2	B	16.9
Between St. Charles Rock Rd. On-Ramp and I-70 On-Ramp	WB	Basic	C	22.0	C	23.4
Between I-70 On-Ramp and Dorsett Rd. Off-Ramp	WB	Basic	D	27.6	D	29.5

Under existing conditions, many portions of the I-270 corridor experience operational issues and long delays during the AM and PM peak periods. These delays are in part due to lack of capacity along I-270 at critical locations, as well as the configuration and operation of the many tightly spaced interchanges. Often, delays along I-270 can be attributed to poor interchange operations further upstream along the interstate. Two such locations are poor weaving operations for WB travelers during the PM Peak at the MO 367 interchange and for EB travelers during the AM peak at the Washington-Elizabeth interchange. In both locations, poor interchange operations lead to heavy congestion and delay for miles downstream of the interchanges. Stakeholders have confirmed this consistent pattern of delays.

As displayed in **Table 7**, freeway level of service on I-270 is generally above minimum standards. The most important area of operational difficulty are the basic freeway lanes immediately west of West Florissant. These segments do not meet the EPG requirements for the existing conditions.

Future conditions are expected to deteriorate substantially over time. The NCS identified a forecasted increase in traffic of approximately 20 to 25 percent by the year 2040. Under those conditions numerous segments were expected to operate under minimum standards.

Note: Traffic model forecasts for the design year of 2040 will be reported in this section when the corresponding analysis has been completed. The previous narrative will be expanded to account for forecasted LOS deficiencies.

Since the original construction of the I-270 corridor, interstate standards have evolved resulting in a number of current freeway and interchange design guidelines that are not adhered to. These are contributing factors to deteriorated freeway operations. Among these design guidelines are lane balance, weaving conditions, and effective signing.

Lane balance is a guideline that serves to minimize the number of lane changes drivers on the freeway and ramps need to make. Adherence to lane balance maintains lane continuity in the basic number of lanes on the freeway. Lane balance guidelines are not met on some of the I-270 ramps providing access to or from I-70, MO 370, McDonnell, Lindbergh, Lilac, and are also not met on numerous slip ramps that provide access between I-270 and Dunn.

In order to provide sufficient weaving length, AASHTO's *A Policy on Geometric Design of Highways and Streets* provides recommended minimum distances between various ramp-pair combinations. These minimum distances are currently not attained within the I-270 study area, negatively influencing the operational performance of the outer-most basic freeway lane. Additional discussion of this contributing factor can be found in Major Element #3 – Inconsistent Interchange Operations.

Simplicity in signing of freeways and interchanges is also important. Factors that influence the difficulty to simply sign a freeway include providing minimum decision sight distance, providing single exit designs in lieu of more complicated dual exit designs, and achieving minimum interchange spacing. Additional discussion of these contributing factors can be found in Major Element #3 – Inconsistent Interchange Operations.

3.3 Major Element #3 – Inconsistent Interchange Operations

There are 19 interchanges located within the study area. A detailed description of these interchanges can be found in **Table 3**.

Configuring the corridor's interchanges in accordance with fundamental freeway and interchange guidelines such as achieving appropriate ramp spacing, providing adequate decision sight distance, eliminating weaving within interchanges along the freeway mainline, and providing freeway and interchange design are essential to achieving consistent, safe operation.

3.3.1 Poor Weaving within the Interchange System

Freeway traffic operations are constrained, in part, by interchange density and their corresponding weaving segments. According to AASHTO's *A Policy on Geometric Design of Highways and Streets*, "a general rule of

thumb for minimum interchange spacing is one mile for urban areas." Achieving this 1-mile minimum generally provides weaving distances that adequately accommodate lane changes. Eleven of the nineteen interchanges within the study fail to meet this spacing guidance, compounding the deterioration of traffic operations in the freeway basic lanes discussed in Major Element #2. Refer to **Table 3** for the interchanges and distances between interchanges. A LOS analysis was completed for weaving movements along the corridor. **Table 8** presents the merge and diverge LOS for the existing conditions.

TABLE 8
Merge and Diverge Level of Service (2013)

			AM Peak Hour			PM Peak Hour		
Section	**Direction**	**Type**	**LOS**	**Density (pc/mi/ln)**	**Avg. Speed (mph)**	**LOS**	**Density (pc/mi/ln)**	**Avg. Speed (mph)**
St. Charles Rock Rd. Off-Ramp	EB	Diverge	B	18.4	50.9	B	16.8	51.5
St. Charles Rock Rd. On-Ramp	EB	Merge	A	5.3	57.0	B	12.1	56.0
McDonnell On-Ramp	EB	Merge	B	18.9	54.7	B	19.9	54.3
SB Lindbergh Loop On-Ramp	EB	Merge	C	27.0	53.0	C	24.7	53.0
NB Lindbergh On-Ramp	EB	Merge	F	42.7	42.6	D	34.2	51.9
I-170 Off-Ramp	EB	Diverge	F	40.0	48.6	F	40.4	51.0
Hanley/Graham Off-Ramp	EB	Diverge	C	24.8	51.7	D	30.3	51.1
I-170 On-Ramp	EB	Merge	C	26.5	53.1	F	37.2	46.3
Hanley/Graham On-Ramp	EB	Merge	B	18.3	54.4	C	23.6	53.8
Washington/Elizabeth On-Ramp	EB	Merge	C	25.0	53.5	D	31.7	51.9
West Florissant Off-Ramp	EB	Diverge	C	27.2	51.2	D	33.2	51.0
MO 367 On-Ramp	EB	Merge	B	18.9	54.2	C	25.0	53.5
Bellefontaine Off-Ramp	EB	Diverge	C	23.4	51.3	D	34.4	50.6
Bellefontaine On-Ramp	EB	Merge	B	12.2	54.0	B	18.6	54.0
Lilac On-Ramp	EB	Merge	B	16.6	54.0	C	26.7	53.0
Riverview Off-Ramp	EB	Diverge	B	18.1	51.3	B	18.1	51.3
Riverview On-Ramp	EB	Merge	B	15.9	54.0	D	28.0	53.0
Riverview Off-Ramp	WB	Diverge	C	27.1	51.5	C	20.1	51.8
Riverview On-Ramp	WB	Merge	D	28.8	53.0	C	27.0	53.0
Lilac Off-Ramp	WB	Diverge	D	30.8	52.0	D	28.3	52.0
Dunn (Bellefontaine) On-Ramp	WB	Merge	B	19.1	54.0	B	18.0	54.0
MO 367 Off-Ramp	WB	Diverge	E	35.9	53.6	E	36.7	51.5
New Halls Ferry Off-Ramp	WB	Diverge	D	33.3	54.8	D	28.8	51.6
West Florissant On-Ramp	WB	Merge	F	39.9	45.4	D	33.2	50.9
Washington/Elizabeth Off-Ramp	WB	Diverge	F	37.1	54.1	D	32.2	51.9
New Florissant Off-Ramp	WB	Diverge	F	36.2	51.8	D	30.6	51.8
Hanley/Graham On-Ramp	WB	Merge	E	35.9	50.1	D	29.6	52.6
Lindbergh On-Ramp	WB	Merge	C	23.7	53.7	D	22.0	54.0
McDonnell Off-Ramp	WB	Diverge	D	32.6	51.2	D	28.9	51.4
MO 370 On-Ramp	WB	Merge	C	22.9	54.0	C	20.1	54.0
St. Charles Rock On-Ramp	WB	Merge	C	20.2	54.0	C	22.5	54.0

There are five locations in the AM peak hour and two in the PM peak hour that do not meet the EPG LOS requirements in the existing condition. These seven locations are all within 3 miles of the basic freeway section west of West Florissant that is failing in the existing condition. Three service interchanges and one system interchange are located within 3 miles in the westbound direction, and three service interchanges are located within 3 miles in the eastbound direction. The closely spaced weaving conditions created by these merge and diverge points compound the failing basic freeway LOS west of West Florissant.

The NCS predicted that weaving operations would deteriorate substantially in the future. In 2025, 23 weaving movements were predicted to be below LOS D. In 2040, 29 weaving movements were predicted to be below LOS D. *Note: Traffic model forecasts for the design year of 2040 will be reported in this section when the corresponding analysis has been completed. The previous narrative will be expanded to account for forecasted LOS deficiencies.*

3.3.2 Insufficient Ramp Spacing

In order to provide sufficient weaving length, AASHTO's *A Policy on Geometric Design of Highways and Streets* provides recommended minimum distances between various ramp-pair combinations. A summary of these minimum weaving distances can be found in **Table 9**.

TABLE 9
Recommended Minimum Ramp Terminal Spacing for Various Ramp-Pair Combinations

Upstream Ramp Terminal Type	Downstream Ramp Terminal Type	Recommended Minimum Distance (ft)	Comment
Entrance	Entrance	1000	--
Exit	Exit	1000	--
Exit	Entrance	400	--
System Interchange	Service Interchange	600	Turning Roadways
System Interchange	Service Interchange	2000	Weaving Section
Service Interchange	Service Interchange	1600	Weaving Section

Achieving appropriate distances for ramp spacing allows sufficient distance for lane changing in preparation for downstream exiting, allows for effective traffic volume distribution across lanes, provides space for weaving, provides sufficient space to effectively sign a corridor, and provides sufficient distance for profile development. The minimum distances presented in **Table 9** are not attained within the I-270 study area, negatively influencing the traffic operational performance of the freeway lanes.

3.3.3 Signing Challenges

Providing proper signing and sufficient decision sight distance in advance of exits is an important element of freeway and interchange design. Proper signing, or wayfinding, involves placing directional and informational signs that allow drivers to easily make decisions in order to continue traveling to their desired destinations. Wayfinding can also include pavement signing in advance of complex interchanges such that the driver knows well in advance that they are in the proper lane for the roadway they wish to travel to/on.

Decision sight distance represents the distance necessary for a driver to make a navigational decision. The more complicated the maneuver, the greater the amount of time that is required for drivers to make decisions. For this reason, decision sight distance is often longer than stopping sight distances, which are based on emergency situations such as suddenly having to stop. According to Table 3-3 of AASHTO's *A Policy on Geometric Design of Highways and Streets*, a decision sight distance of 1,280 feet is needed for freeways such as I-270 that have a 60 mph design speed. This minimum distance is not attained throughout the corridor, leading to deteriorated freeway traffic operations. One example is on westbound I-270 between

New Halls Ferry and West Florissant, where a weaving distance of only 630 feet is provided between an entrance ramp and exit ramp. This short weaving distance leads to operational difficulties along this stretch of I-270.

Additionally, the presence of dual exits at the I-270 at Lindbergh and I-270 at MO 367 interchanges presents a set of complicated decisions for drivers to effectively maneuver. Single exit design is preferred to dual exits because it simplifies signing and operations by minimizing the number of decisions required to properly navigate through an interchange.

3.3.4 Poor Operations along Crossroads within the Interchange System

The operations along the crossroads are also heavily influenced by the I-270 interchanges. In the NCS, the LOS at the intersections along the major cross roads of I-270 were evaluated. Output from VISSIM models were used. For intersections, LOS is directly related to control delay. LOS D is considered acceptable in urban areas for both freeways and arterial roadways. Under existing conditions, few major cross road deficiencies were found (only Lindbergh). Under the future traffic forecasts (with the committed network) increasing numbers of poorly operating intersections are expected. In 2025, four of the eight studied crossroads had intersection operations below LOS D. In 2040, seven of the eight studied crossroads had intersection operations below LOS D.

Note: Existing and future crossroad operational analysis has not been completed. Existing and traffic model forecasts for the design year of 2040 will be reported in this section when the corresponding analysis has been completed. The previous narrative will be expanded to account for forecasted LOS deficiencies.

3.4 Major Element #4 – Inconsistent Outer Road System

Dunn and Pershall serve as north and south outer roads, respectively, to the I-270 mainline throughout portions of the study. According to AASHTO's *A Policy on Geometric Design of Highways and Streets*, "frontage roads are used most frequently on freeways where their primary function is to distribute and collect traffic between local streets and freeway interchanges." Dunn and Pershall do not extend along the entire limits of the study. In addition, Pershall contains gaps in connectivity. The incompleteness of these outer roads in key locations limits their effectiveness.

Figure 4 (see Section 1.4.4) depicts the outer road system within the study area. The following subsections describe the key undesirable characteristics associated with the outer road system associated with the I-270 study area.

The outer road system has undesirable characteristics, specifically:

- Missing segments
- Two-way crossover slip ramps
- Limited backage roads

3.4.1 Outer Roads have Missing Segments

Dunn is a continuous, two-way outer road that generally runs parallel to I-270 from McDonnell to Riverview. However, there is no north outer road between I-70 and MO 370.

Pershall is an incomplete outer road to the south of I-270. The missing segments include the following:

- Between I-70 and Lindbergh (no outer road)
- Between New Florissant and Washington/Elizabeth (no outer road)
- Between Old Halls Ferry and MO 367 (no outer road)
- Between MO 367 and Riverview (no outer road)
- Between New Halls Ferry and Old Halls Ferry (one-way only)

3.4.2 The Outer Roads have Two-Way Crossover Slip Ramps

In addition to having missing segments in key locations, the outer road system also has elements that the traveling public describes as less than desirable.

An often discussed element on Dunn are the two-way crossover slip ramps. The majority of the WB I-270 entrance and exits east of I-170 take place using the two-way crossover slip ramps which contributes to safety and operational issues for the traveling public.

TABLE 10
Slip Ramps along I-270 and Dunn Road

Between Hanley/Graham and New Florissant
- Off-Ramp - On-Ramp
Between New Florissant and Washington/Elizabeth
- Off-Ramp only
Between Washington/Elizabeth and West Florissant
- Off-Ramp - On-Ramp
Between West Florissant and New Halls Ferry
- Off-Ramp - On-Ramp
Between New Halls Ferry and Old Halls Ferry
- Off-Ramp only
Between Old Halls Ferry and MO 367
- Off-Ramp only
Between MO 367 and Bellefontaine
- On-Ramp only
Between Bellefontaine and Lilac
- Off-Ramp only

Existing Dunn consists of two-way traffic, which requires interchange movements entering and exiting the interstate to cross head-on traffic travelling in the opposite direction. To enter WB I-270 from Dunn, the driver is required to use left-turn lanes and yield to oncoming traffic. In some locations, left-turn bays are provided to separate traffic waiting to enter the interstate from the outer road. For the I-270 off-ramp movements, Dunn traffic in both directions is required to stop at these slip ramp intersections while the exiting interstate traffic is free flowing. A number of channelizing islands divert the Dunn lanes to accommodate the ramp, and there are stop signs and stop bars along Dunn to indicate to drivers the stop condition. Due to their shallow angle of entry of the ramp Dunn, it is sometimes difficult to see ramp traffic at these conflict points. Moreover, the proximity of the crossover slip on-ramps to various signalized intersections between Dunn and the crossroads creates traffic operational and safety problems. The slip ramp locations are identified in **Table 10** and typical configurations are shown on **Figure 5**.

I-270 exit slip ramp (I-270 traffic is on the right). The sign at the slip ramp depicted below reads “Cross Traffic Does Not Stop. “

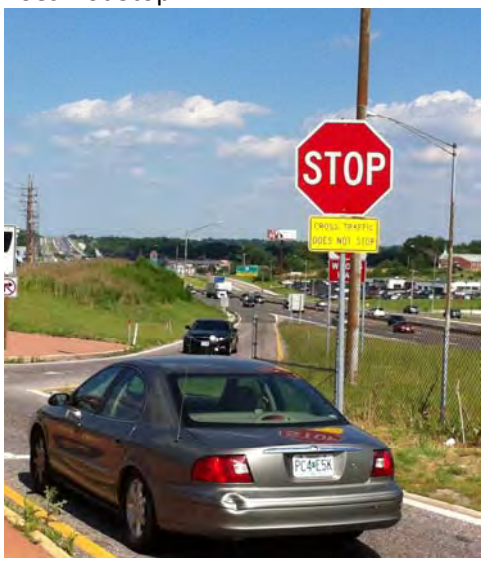
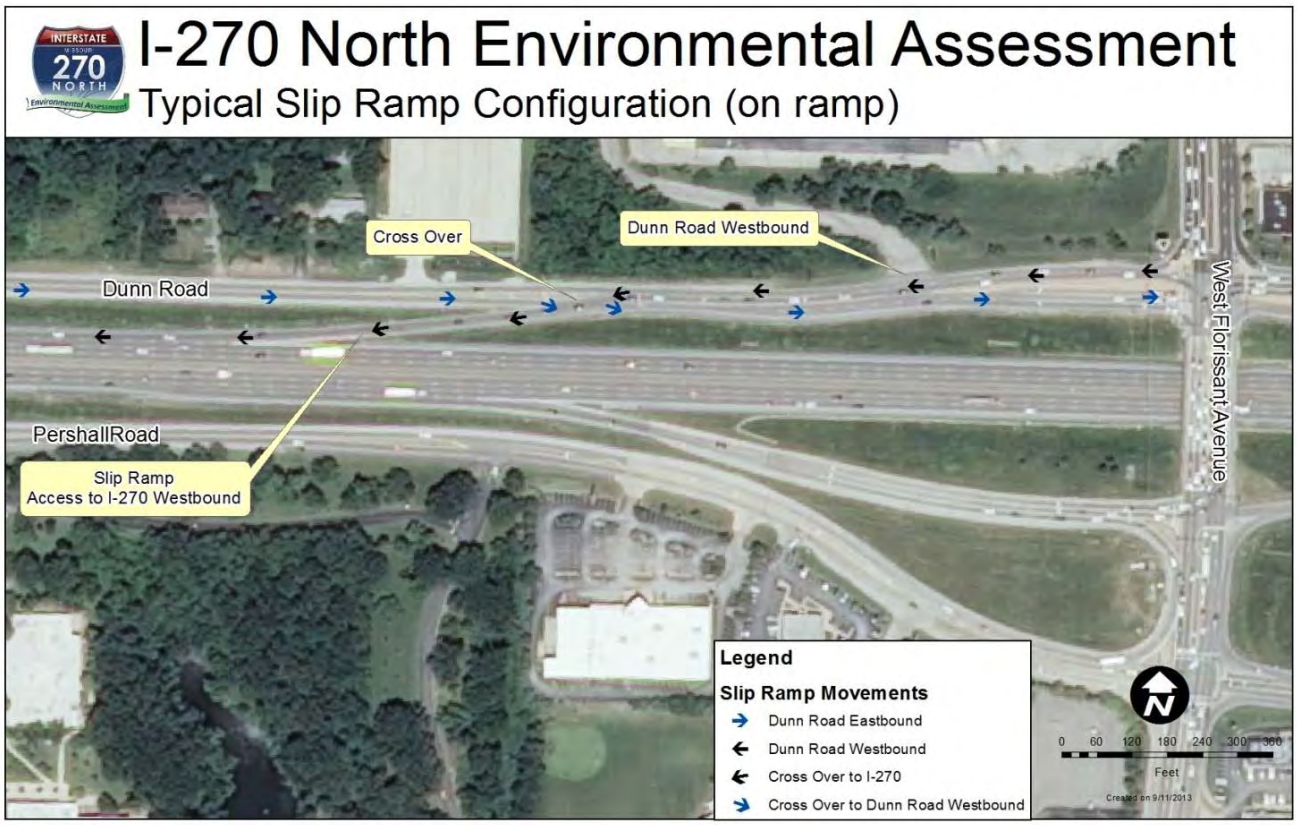
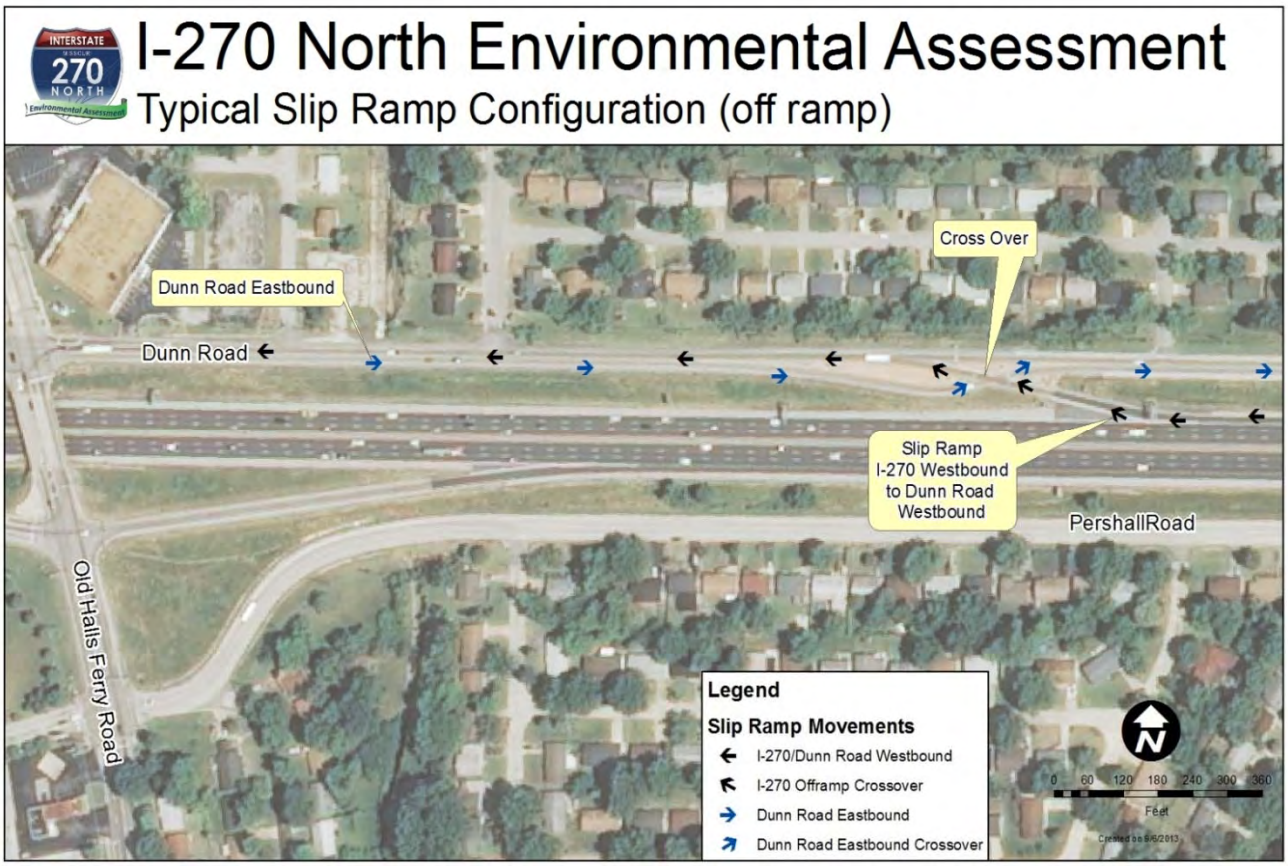


FIGURE 5
Typical Westbound Slip On-Ramp Configuration





3.4.3 Limited Backage Roads to Supplement the Outer Roads

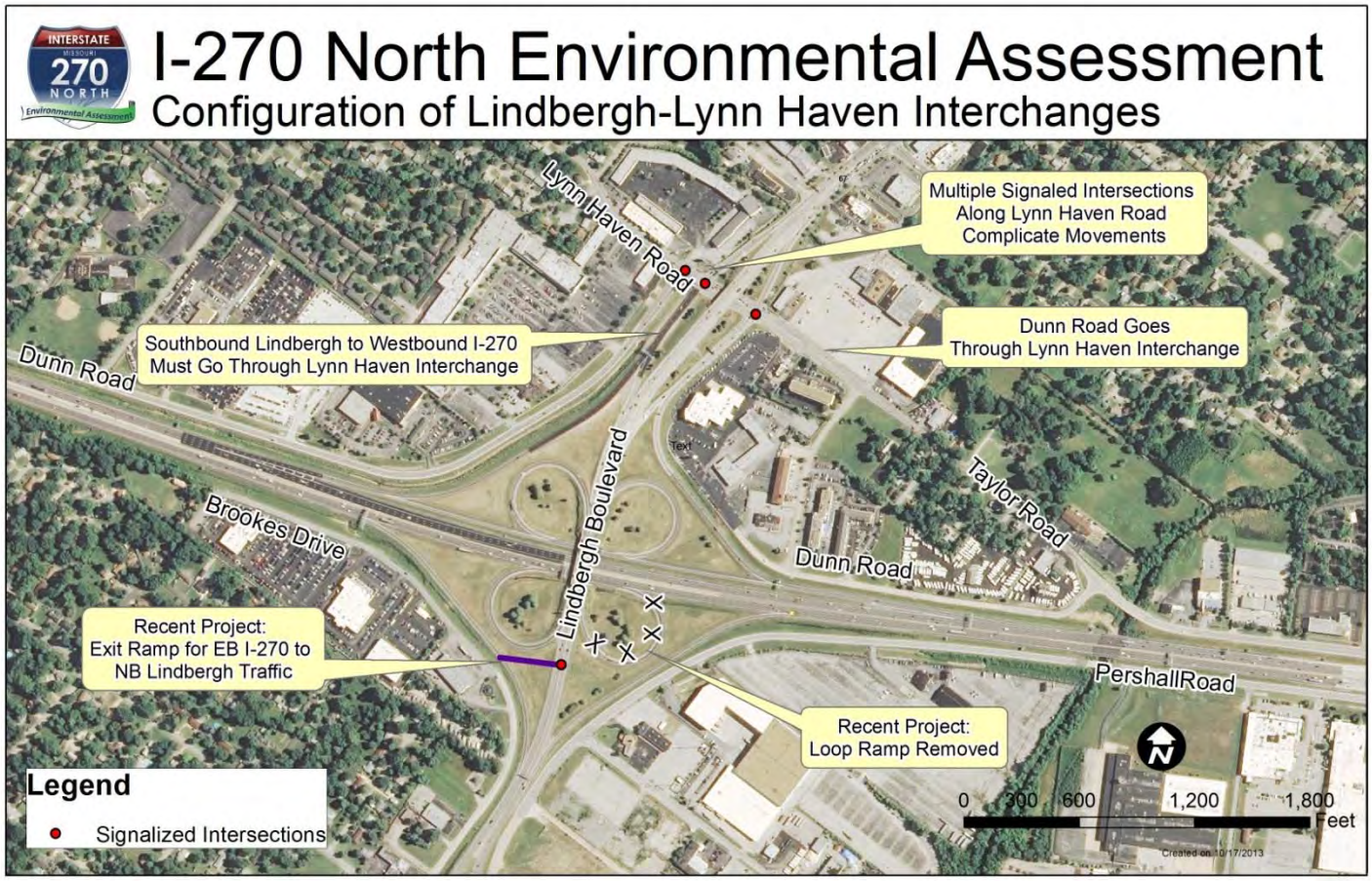
According to EPG 940.12, the presence of backage roads in combination with outer roads "provide alternative access to property and help remove turning traffic from the through traffic on a mainline road." The majority of the study corridor does not have backage roads or similar local roads in locations where the outer roads exist. As a result, portions of the local traffic that would use a backage road are distributed onto the outer roads or freeway.

One of the primary examples of this issue is connection of the northern outer road with Lindbergh. The outer road connects at a diamond interchange approximately 1,600 feet north of the I-270 interchange. Due to the proximity of the I-270/Lindbergh and the Lindbergh/Lynn Haven interchanges, several difficult traffic merges occur. These include:

- WB I-270 to northbound Lindbergh—This movement requires travel through both interchanges, including a traffic signal. This causes weaving issues with NB Lindbergh traffic wishing to access either the north outer road, Lynn Haven Lane (Lynn Haven), or Taylor Road (Taylor).
- WB I-270 to WB north outer road—This movement requires travel through the I-270 interchange, then travel through three tightly spaced traffic signals which includes a very short left-turn storage lane on Lynn Haven.
- SB Lindbergh to WB I-270—This movement requires travel through Lindbergh-Lynn Haven interchange to access WB I-270.

Figure 6 shows details of the connections of the I-270/Lindbergh and the Lindbergh/Taylor-Lynn Haven interchanges.

FIGURE 6
Configuration of Lindbergh-Lynn Haven Interchanges



Another related area of concern associated with the north outer road system is the numerous access points to adjacent land uses. Many of the intersections are tightly spaced and do not meet MoDOT's Access Management Guidelines. Additionally, driveway spacing at numerous locations and many corner clearances do not meet MoDOT's Access Management Guidelines.

The configuration issues associated with the south outer road system are somewhat less complex because, unlike Dunn, two-way crossover slip ramps do not exist on Pershall. Instead, traffic enters and exits the interstate via interchange ramps. This traditional configuration affects operations by creating another conflict point on the cross streets. This is exacerbated by corner clearances, intersection spacing, and driveway spacing that do not meet MoDOT's Access Management Guidelines.

These conditions result in degraded traffic operations and deteriorated safety for the traveling public.

3.5 Major Element #5 – System Creates Safety Conflicts

Safety is a significant transportation concern the public and stakeholders alike have expressed throughout the course of this study. This section will summarize some of the crash data that have been collected for the study area, providing insight into the current safety performance of the I-270 study area.

According to crash data obtained from MoDOT's Traffic Management System (TMS), for the 5-year period between 2010 and 2014, there were 9,784 crashes within the study area along I-270, the outer roads, and interchange crossroads.

Table 11 provides a breakdown of the crashes by location.

TABLE 11
Crash Distribution by Roadway (2010-2014)

Travelway	Fatal	Disabling Injury	Injury	Property Damage Only	Total
EB I-270	9	52	614	1835	2510
WB I-270	10	50	376	1059	1495
Dunn	0	10	240	696	946
Pershall	1	3	38	111	153
I-70/St. Charles Rock Rd.	0	13	147	370	530
MO 370	2	0	23	52	77
McDonnell	0	1	26	72	99
Lindbergh	2	14	210	717	943
I-170/Hanley/Graham	1	12	177	446	636
New Florissant	0	8	65	245	318
Washington/Elizabeth	0	2	49	139	190
West Florissant	0	21	159	450	630
New Halls Ferry	4	19	159	489	671
Old Halls Ferry	0	8	31	74	113
MO 367	0	7	47	131	185
Bellefontaine	0	6	41	106	153
Lilac	0	2	9	42	53
Riverview	0	1	21	60	82
Totals	**29**	**229**	**2,432**	**7,094**	**9,784**

These crashes translate to approximately five crashes per day and one fatality every 2 months. While this is an oversimplification (because crashes are random events that do not happen at regular frequencies), the numbers nevertheless paint a picture of the frequency of crashes within the study area.

3.5.1 Crash Severity

To help identify areas of safety concern, MoDOT uses a measuring tool called Severity Number. For roadway segments, Severity Number is equal to the sum of the number of fatal crashes multiplied by 9 and the number of disabling injury crashes multiplied by 6. A Severity Number of 27 or higher for a 2-mile segment of freeway, in the analysis period, triggers the need for detailed investigation of these freeway segments. These segments or locations are then further analyzed to determine the contributing factors for the crashes and how best to lessen them when feasible.

For the years 2012 through 2014, five segments of I-270 within the study area have recorded a Severity Number equal to or greater than 27. **Table 12** summarizes the roadway segments that meet MoDOT's threshold of 27 within the study corridor.

TABLE 12
High Severity Roadway Segments (2012 - 2014)

Route	Begin Log	End Log	Severity Number
I-270 EB	29.5 (West of West Florissant)	31.5 (West of MO367)	39
I-270 EB	30.5 (New Halls Ferry)	32.5 (East of MO 367)	36
I-270 WB	5.5 (West of New Halls Ferry)	7.5 (West of Washington/Elizabeth)	42
I-270 WB	6.5 (West of West Florissant)	8.5 (East of Hanley/Grahm)	42
I-270 WB	8.5 (East of Hanley/Grahm)	10.5 (West of Lindbergh)	27

For intersections, a Severity Number of 15 or higher, within the analysis period, signals concern based on MoDOT's measurement criteria. **Table 13** shows intersections along the outer roads that had a Severity Numbers equal to or greater than 15 between 2012 and 2014.

TABLE 13
Roadway Intersections with High Severity Numbers (2012 – 2014)

Intersection	Fatal	Disabling Injury	Minor Injury	PDO	Severity Rating
Dunn @ West Florissant	**0**	**3**	**12**	**97**	**18**
Pershall @ New Halls Ferry	**0**	**4**	**18**	**35**	**24**
St. Charles Rock Road @ Boenker Rd	**0**	**3**	**13**	**39**	**18**
Lindbergh Blvd @ Fee Fee Hills Dr	**0**	**4**	**2**	**14**	**24**

At the various public outreach events, residents have expressed concern about the safety at the intersections of West Florissant and Dunn and Pershall roads. This concern is validated in the table above. Contributing factors to poor safety performance at these intersections include steep vertical curves approaching the interchange from both the north and south; tightly spaced intersections, compounded by heavy traffic volumes; and the presence of a westbound slip ramp exiting I-270 that terminates at Dunn, less than 400 feet to the east of the West Florissant at Dunn intersection. According to the *Highway Capacity Manual*, signalized intersection spacing of 800 feet or more is desired for adjacent ramp terminals in diamond type interchanges. Compressed or tight diamonds can be implemented when spacing is less than 800 feet but there is a trade-off in traffic operational efficiency. The distance between the 3 intersections located within the I-270 at West Florissant interchange is less than 700 feet total with individual spacing much less than the minimum desired spacing of 800 feet. The deteriorated traffic efficiency at the West

Florissant intersection with Dunn is further compounded by the westbound slip ramp that terminates less than 400 feet east of the intersection.

The intersection of St. Charles Rock Rd and Boenker Road/Pennridge Drive, which is located just north and west of I-270, has a high percentage of left turn and rear end accidents. Contributing factors to the poor safety performance may include lack of exclusive left turn lanes along Boenker Road and Pennridge Drive, heavy traffic volumes, extended periods of congestion, and close proximity to the intersection with the southbound I-270 ramps. The intersection of Lindbergh Boulevard and Fee Fee Hills Drive, which is south of Pershall Road, has a high percentage of rear end and right angle accidents. Contributing factors to the poor safety performance may include the presence of dedicated U-turn movements combined with heavy traffic volumes, extended periods of congestion, and a slightly offset Aviator Drive on the east leg of the intersection.

3.5.2 Fatalities and Disabling Injuries

Because of their consequences, fatal and disabling crashes are reviewed more thoroughly than less severe crashes. Crash rates are defined by the number of crashes per hundred million vehicle miles traveled. **Table 14** summaries the 5-year average fatality rates and disabling injury rates within the study area by roadway.

TABLE 14
Five-Year Average Fatality and Disabling Injury Rates – I-270 Mainline and Outer Roads (2010 - 2014)

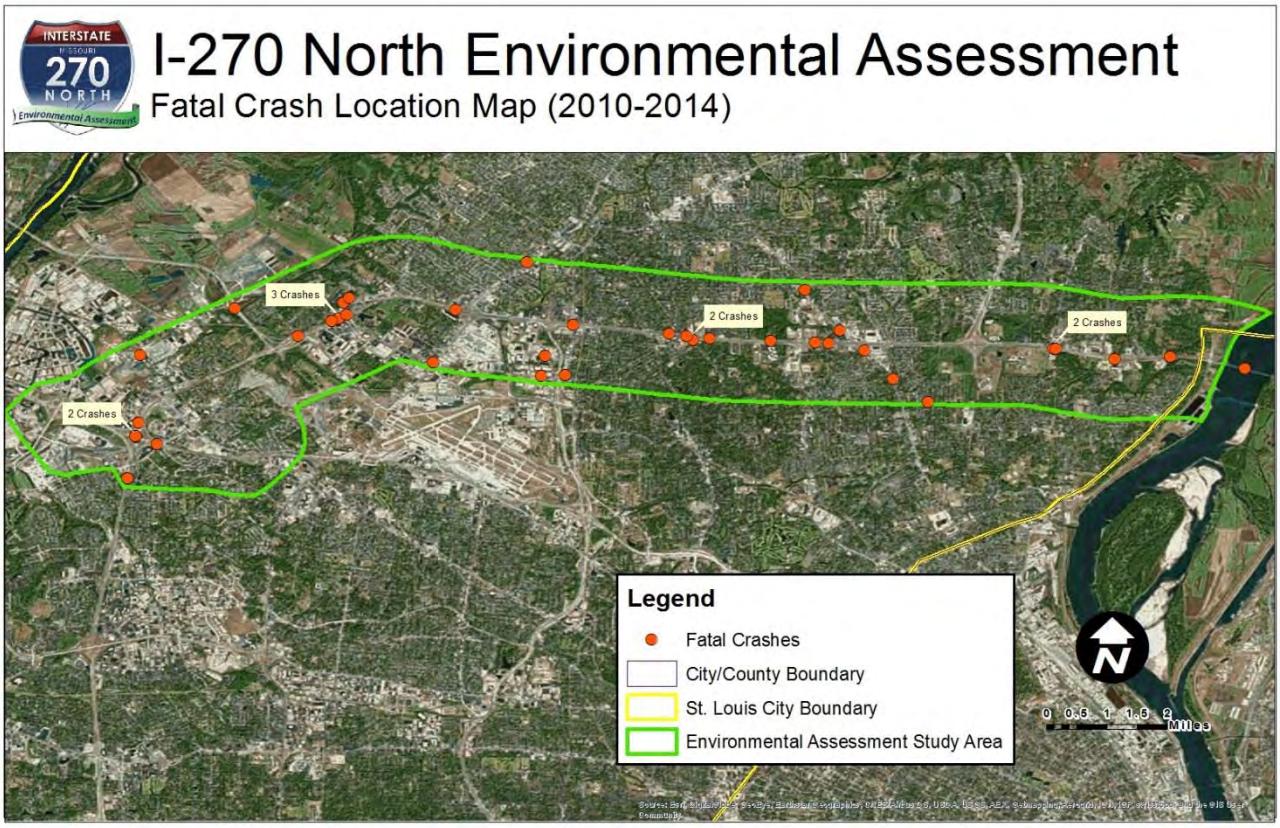
Roadway	Disabling Injury Rate	Fatality Rate
270 EB	2.97	0.51
270 WB	2.77	0.55
Dunn	7.34	0.00
Pershall	5.27	1.76

The overall fatality rate for I-270 eastbound and westbound within the study area during the period of time between 2010 and 2014 is 0.51 and 0.55, respectively. These values are roughly 90 percent higher than the average MoDOT freeway fatality rate of 0.27 in St. Louis County and 10 to 15 percent higher than the average MoDOT St. Louis District freeway fatality rate of 0.47 over the same period. The overall disability injury rate for I-270 eastbound and westbound within the study area during the period of time between 2010 and 2014 is 2.97 and 2.77, respectively. These values are roughly 10-30 percent higher than the average MoDOT St. Louis County freeway disability injury rate of 2.49 and the average MoDOT St. Louis District freeway disability injury rate of 2.33 over the same period.

Fatal and disabling crash rates on I-270, within the study area, are found to be higher than rates found on other freeways within the St. Louis metropolitan area.

Between 2010 and 2014, 29 fatalities have occurred along I-270. The locations of these fatalities are illustrated in **Figure 7**. Fatal crashes often have several contributing factors. Most of the fatalities along I-270 had contributing factors that are commonly called driver error. For example, 17 crashes involved vehicles exceeding the speed limits or driving too fast for the conditions, 8 involved alcohol use, and 4 involved driver inattention.

FIGURE 7
Fatality Map (2010-2014)



The most common contributing factors for fatalities along I-270, within the study corridor, are: drivers going too fast for the conditions; speeding; improper lane use; improper lane changes; and alcohol impairment.

3.5.3 I-270 Mainline Safety Analysis

Crash rates are another measure used by MoDOT to analyze corridor safety. Crash rates were calculated for 26 eastbound segments and 28 westbound segments for the period between 2010 and 2014. Rear-end and out-of-control crashes made up the majority of the total, consisting of 41 percent and 23 percent, respectively. The weighted eastbound crash rate[7] for the entire study area was 123 and the weighted westbound crash rate was 76. The frequency of crashes in the eastbound direction is roughly 40 percent higher than that of the westbound direction**. Table 15** shows the freeway segments with the five highest crash rates for each direction of travel.

TABLE 15
Highest Freeway Crash Rates by Direction of Travel (2010 – 2014)

Segment	From	To	Length (mi.)	Crash Rate
EB-7	Ramp 270EB to US67 SB	Ramp US67 NB to 270 EB	0.47	443.32
EB-19	Ramp 270 EB to MO367 SB	Ramp MO367 NB to 270 EB	0.46	297.46
EB-23	Ramp 270 EB to Lilac	Ramp Lilac to 270 EB	0.38	285.44
EB-5	Ramp 270 EB to James S McDonnell	Ramp James S McDonnell to 270 EB	0.45	245.41

[7] The weighted crash rates take into account the length of the segments that comprise the entire eastbound and westbound directions of this portion of I-270.

TABLE 15
Highest Freeway Crash Rates by Direction of Travel (2010 – 2014)

Segment	From	To	Length (mi.)	Crash Rate
EB-11	Ramp 270 EB to New Florissant-RT N	Ramp New Florissant - RT N to 270 EB	0.35	216.76
WB-21	Ramp MO 367 SB to 270 WB	Ramp 270 WB to MO 367 NB	0.52	234.05
WB-7	Ramp US67 SB to 270 WB	Ramp 270 WB to Taylor Rd	0.56	171.71
WB-5	Ramp James S McDonnell to 270 WB	Ramp 270 WB to James S McDonnell Blvd	0.45	155.01
WB-27	Ramp Riverview to 270 WB	Bridge over Mississippi River	0.42	138.19
WB-9	Ramp Dunn Road to 270 WB	Ramp 270 WB to Dunn Road	0.70	126.31

The St. Louis County average crash rate was 105.65 and MoDOT's St. Louis District average crash rate was 92.33 over the same period of time as the crash rates shown in **Table 15**. The values in **Table 15** range from 20 percent to 380 percent higher than the St. Louis and MoDOT benchmarks. All of the values shown in **Table 15** are located between exit and entrance ramps of major crossroads.

The highest crash rates in both directions of travel occur between the ramps serving I-270 and MO 367 and the ramps serving I-270 and US 67. The high crash rates at the I-270 and MO 367 interchange may be attributed to the high traffic volumes exceeded levels at which the safety performance of a full cloverleaf interchange begins to deteriorate. One contributing factor to this deterioration in safety performance is the short weaving distances provided between the loop ramps in a full cloverleaf interchange. A similar situation occurs at the I-270 interchange with Lindbergh but with a slight difference. The southeast quadrant of this interchange was reconstructed in 2011, eliminating the I-270 eastbound to Lindberg northbound loop ramp. Eastbound travelers now exit via a diagonal ramp in advance of the Lindbergh Interchange. Although the loop ramp has been eliminated in the southeast quadrant of the interchange, the loop ramp remains in the southwest quadrant of the interchange, providing the Lindbergh southbound to I-270 eastbound movement. Traffic utilizing this ramp enter onto I-270 must merge from the entrance lane into eastbound traffic in a relatively short distance resulting in frequent conflicts and crashes in this location.

Additionally, three of the interchange locations shown on **Table 15** do not adhere to lane balance guidelines, which increases the number of lane changes necessary to maneuver in those locations and may be a contributing factor to the high crash rates in these locations.

3.5.4 Outer Road Safety Analysis

Outer road crash rates were calculated for the period of time between 2010 and 2014. Rear-end and crashes involving left-turn movements make up 57 and 12 percent, respectively, of the crashes on the I-270 outer roads. Two-way travel, in combination with the numerous entrance and exit points along both Dunn and Pershall, results in and high number of conflict points and subsequent safety issues. The majority of these crashes are rear-end crashes in proximity to intersections. This situation is exacerbated on Dunn due to the slip ramps to and from I-270 and the close proximity of slip ramps coming off I-270 and the crossroad intersection. A breakdown of the crash rates is found in **Table 16.** The breakdown is quantified using 11 Dunn segments and 8 Pershall segments. These segments do not include major intersections.

TABLE 16
Outer Road Crash Rate by Segment (2010 – 2014)

Outer Road Segment	From	To	Length (mi)	Crash Rate
Dunn-1	Howdershell Rd.	Lindbergh/Lynn Haven Ln.	1.40	564.85

TABLE 16
Outer Road Crash Rate by Segment (2010 – 2014)

Outer Road Segment	From	To	Length (mi)	Crash Rate
Dunn-2	US 67 – Taylor	Graham Rd.	0.53	465.41
Dunn-3	Graham Rd	Route N	0.93	661.59
Dunn-4	Route N	Washington St.	0.51	984.96
Dunn-5	Washington St.	West Florissant	1.52	402.52
Dunn-6	West Florissant	New Halls Ferry	0.67	449.01
Dunn-7	RT AC-New Halls Ferry	Old Halls Ferry	0.36	963.95
Dunn-8	Old Halls Ferry	MO 367	1.63	140.39
Dunn-9	MO 367	Bellefontaine Rd.	1.44	435.49
Dunn-10	Bellefontaine Rd.	Lilac Ave	1.00	987.41
Dunn-11	Lilac Ave	Riverview Dr	1.01	419.50
Pershall-1	US 67 – Pershall Rd.	N Hanley Rd.	1.66	70.37
Pershall-2	N Hanley Rd.	RT N	1.05	210.81
Pershall-3	Elizabeth Ave.	W Florissant Ave.	1.46	219.48
Pershall-4	W Florissant Ave.	New Halls Ferry	0.87	347.60
Pershall-5	RT AC-New Halls Ferry	Old Halls Ferry	0.32	0.00
Pershall-6	Old Halls Ferry	End Outer Rd.	0.67	306.18
Pershall-7	Begin Outer Rd.	Lilac Ave	0.32	0.00
Pershall-8	Lilac Ave	End Outer Rd.	0.50	264.17

Dunn and Pershall are unique roadway types within the St. Louis area; therefore, average crash rates for similar type facilities were not available; there is no appropriate roadway type for comparison. The three segments with the highest rates are along Dunn from Route N to Washington St., from Route AC-New Halls Ferry to Old Halls Ferry, and from Bellefontaine Rd. to Lilac Ave. These three segments have crash rates in the 900s, with the next highest rate in the 600s.

3.5.5 Pedestrian Safety Analysis

There were 33 crashes involving pedestrians or bicyclists within the study area between 2010 and 2014, with 17 of the 33 crashes involved fatalities or disabling injuries. Overall, 16 of the 33 crashes occurred near an intersection that is part of an interchange system.

The largest number of pedestrian and bicycle involved crashes in one area was six within the Lindbergh Blvd interchange. These include two disabling injury and four minor injury crashes. The interchange does not have any dedicated bicycle or pedestrian facilities. The second largest number of pedestrian crashes in one area was three within the Washington/Elizabeth interchange. These include one fatal, one disabling injury, and one minor injury crash. The intersections within the interchange lack crosswalk markings.

The Bellefontaine and W Florissant Avenue interchanges each had two pedestrian or bicycle involved crashes each with one disabling injury and one minor injury crash. The W Florissant Ave interchange has gaps in sidewalks and crosswalk markings. Additionally, the Hanley/Graham interchange system had one

disabling injury. The N Hanley and Pershall intersection where the accident occurred lacks crosswalk markings. Lastly, the Old Halls Ferry and St. Charles Rock Road interchanges each had one minor injury crash. The St. Charles Rock Road intersection lacks curb cuts and crosswalk markings.

3.6 Major Element #6 – Non-motorized Travel within Study Area is Difficult

Non-motorized travel within the study area is difficult. It is difficult for pedestrians and bikes to travel along and across I-270. For pedestrians, a partial sidewalk network serves to connect the outer road system with the adjacent neighborhoods. The pedestrian system along the major crossroads is also incomplete. Pedestrian facilities in many areas of the corridor do not meet ADA requirements. For bicyclists, where shoulders exist, they are narrow. Using the travel lanes can be intimidating. Intersection crossings are sporadic and difficult to navigate.

The following subsections describe the key non-motorized travel deficiencies associated with the outer road system and the major crossroads within the I-270 study area.

3.6.1 Incomplete Pedestrian Access along the Outer Road System

Sidewalks along Dunn consist of a number of discontinuous segments. The majority of the sidewalks in place are setback from the edge of shoulder providing no connection to the shoulders. Bus stops are located in some of the areas with offset sidewalk or no sidewalk. As a result, the transit riders are using Dunn's shoulder as a place of refuge while they wait for the bus to arrive. Narrow shoulders providing the only service to accommodate pedestrian access to bus stops is a problem along the corridor.

There are no sidewalks along the road on either side of Pershall. The shoulders are being used to accommodate pedestrians.

3.6.2 Incomplete Pedestrian Resources at Major Crossroads

Public opinion strongly backs the notion that I-270 represents a significant barrier to non-motorized traffic, both along and across I-270. Pedestrians from adjacent neighborhoods headed for destinations along the outer road system use the major crossroads. Many of these destinations include transit stops and other uses that pedestrians commonly frequent. Stakeholders have identified crossing I-270 as a major issue for pedestrians and bicyclists, especially at the Lindbergh and 367 interchanges. As these are both system interchanges, traffic flows freely, and accommodating non-motorized travel becomes very difficult. Travel across I-270 at other crossroads has also been noted by stakeholders as an issue of concern.

In addition, the NCS identified a number of deficiencies at other major crossroads including lack of sidewalks, no marked crosswalks, lack of pedestrian signals, and pedestrian facilities that do not meet current ADA standards. The deficiencies identified by the NCS within the pedestrian crossroad system included:

Hanley/Graham: Sidewalk is missing on the west side of the Hanley/Graham underpass. There are no marked crosswalks at either of the I-270 EB ramps or the south outer road intersections.

New Florissant: There is no sidewalk on either side of the road along the New Florissant underpass. There are no marked crosswalks.

Washington/Elizabeth: There is a lack of ADA ramps at the south end of the sidewalk. There is no sidewalk on either side of Washington/Elizabeth between the EB I-270 ramps and Millbank Drive. There are few marked crosswalks.

West Florissant: The overpass over I-270 has sidewalks on both sides; however, the outer roads at this interchange do not have sidewalks.

New Halls Ferry: There is no sidewalk on either side of New Halls Ferry between the EB I-270 off-ramp and the south outer road. There are no marked crosswalks at the south outer road intersection.

For pedestrians and bicyclists, I-270 is seen as a substantial barrier

Old Halls Ferry: There is no sidewalk on the west side of the Old Halls Ferry underpass or between the EB I-270 on-ramp and the south outer road. There is no marked crosswalk on the north leg despite the presence of ramps in the islands for this movement.

Similar deficiencies exist throughout the rest of the study area. Additionally, pedestrian infrastructure—signals, marked crosswalks, and islands—is sporadic and limited.

3.6.3 Bicycle Travel is Difficult

The existing narrow and discontinuous shoulders within the study area make bicycle traffic very difficult. Stakeholders noted that most bicyclists use the sidewalks to the extent that they can. Using the travel lanes can be intimidating. In addition to a lack of infrastructure, high automobile traffic volumes and numerous turning movements make it difficult for bicyclists.

The Gateway Bike Plan[9] includes most of the study area's outer roads and crossroads on the overall bike network. None are configured as suggested in the plans.

3.7 Major Element #7 – Need to Accommodate Operations between Transit and Highway Users

Transit operations in northern St. Louis County (North County) are substantial. Metro, the St. Louis region's main transit agency, reports that during a typical month, roughly 20 percent of MetroBus boardings in Missouri occurs on routes that primarily serve North St. Louis County. Access to transit and the ability for transit to move efficiently through this corridor is very important to residents and businesses. Metro currently operates 14 routes dedicated to the north St. Louis County service area. In addition to the buses using the I-270 corridor, there are numerous bus stops. There are over 100 bus stops within the I-270 North EA study area.

[9] A collaborative effort between the Great Rivers Greenway District, Missouri Department of Transportation, East-West Gateway Council of Governments, Metro, numerous municipalities, St. Louis and St. Charles counties, City of St. Louis and Trailnet.

Metro also provides a paratransit service. Call-A-Ride provides curb-to-curb public transportation to both the general public and to persons with disabilities. This service uses wheelchair accessible vehicles. Most of the I-270 North EA study area falls within the Call-A-Ride service area.

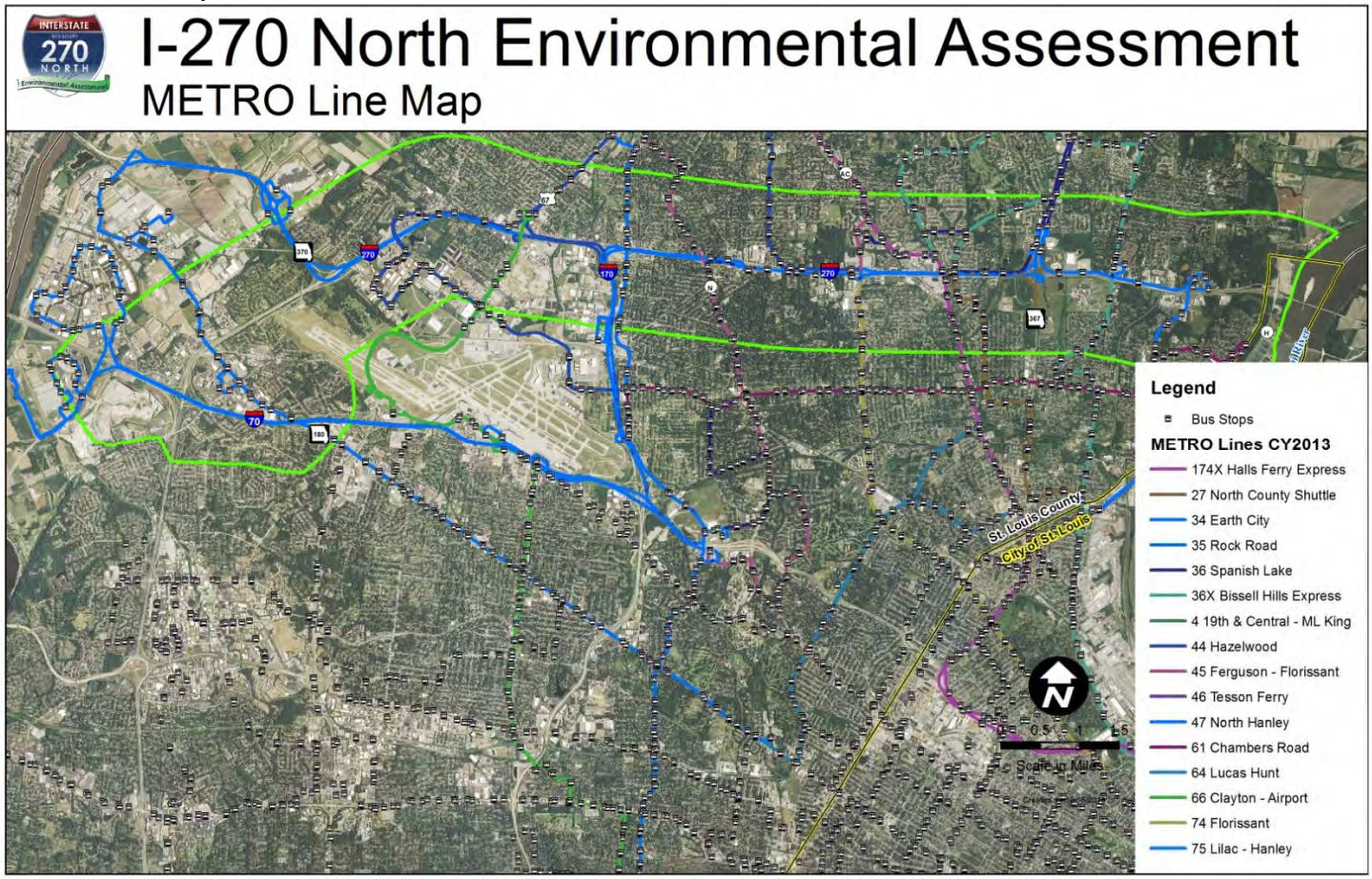
As transit is a very important mode of travel in North County, close coordination with Metro on their operations and future plans will add to the effectiveness of overall travel in this corridor. The following subsections describe the major areas of transit that affect the I-270 EA study area.

3.7.1 Transit Routes within the Study Area

According to Metro, transit ridership and demand in northern St. Louis County is high and growing. They also find it difficult to effectively serve the type of low-density residential neighborhoods that exist in North County. Potential customers often have to walk farther to access a bus stop, and vehicles must travel farther to pick up fewer riders. However, Metro believes that these communities are becoming increasingly more transit dependent, especially as older residents continue to age in place and fewer households own an automobile.

Metro adopts a hub-and-spoke strategy where neighborhood-serving collector routes converging on MetroLink Stations and MetroBus Transit Centers, where customers can then transfer to direct, high-frequency connections to regional employment centers and other high-demand destinations. Customers may need to transfer between routes, but overall travel time between origin and destination is often reduced. A new MetroBus Transit Center on Pershall is targeted for completion in summer 2015. Current transit data is shown on **Figure 8**.

FIGURE 8
METRO Line Map



Metro also currently operates 14 routes dedicated to the North County service area. How these route use I-270 are discussed as follows.

Feeder routes collect riders from lower-density residential neighborhoods and move them to transfer points, where they can catch express routes or other direct routes to high-demand destinations, such as Downtown St. Louis, Clayton, or a MetroLink Station. Among the feeder routes that directly affect I-270 include: #27 North County Shuttle, #36 Spanish Lake, #44 Hazelwood, #45 Ferguson-Florissant and #75 Lilac-Hanley.

Typical Bus Stop: No shelter, no crosswalk, no sidewalk

Corridor routes provide access to apartment complexes, jobs, shopping, schools, and other services that tend to be located along major arterials. The Corridor Routes that directly affect I-270 include #35 Rock Road, #47 North Hanley, and #74 Florissant.

Employer routes are designed to specifically service regional employment centers or other geographic job clusters. The #34 Earth City circulates between numerous job sites and crosses I-270 via I-70.

Express and limited-service routes meet consumer demand for rush-hour commuting with express bus service. In the study area these include: #36X Bissell Hills Express, #174X Halls Ferry Express, and #66 Clayton-Airport.

3.7.2 Transit Stops within the Study Area

In addition to the buses using the I-270 corridor, there are numerous bus stops. Numerous potential conflicts can occur between vehicles and transit users. Transit users get to the bus stops in several ways; some may walk, some may be dropped off from a taxi or private vehicle, some may use a bicycle. The transit users also congregate at the stops, which are very close to the road. Statistics regarding the magnitude of the bus stop crashes are difficult to collate because they are classified in various ways. The extent of the bus stations within the study area are shown on **Figure 8**.

3.8 Major Element #8 – Difficult Pathways to Important Destinations

Urban environments are often difficult for motorists to navigate. The anecdotal evidence for the difficulties associated with navigating the I-270 North corridor is voluminous. Many aspects of these difficulties are addressed within the standard transportation metrics discussed elsewhere in this purpose and need statement (such as those dealing with the study area's crash and mobility environment). Difficult access can also affect the business community. Increased economic development was identified as important by many of the communities during the I-270 NCS. Transportation planning can provide a positive influence on the economic vitality of a community.

This element examines the difficulties that are known to exist; specifically, those difficulties that affect sustainable development and access to opportunity.

3.8.1 Unavailable/Conflicting Movements and Physical Constraints to Access

Drivers are not able to make a number of movements between the I-270 mainline and the crossroads. This requires travelers to use alternate pathways, which may be inefficient and difficult to discern. Some of the unavailable movements include the following:

- **WB I-270 to Missouri Bottom:** Located between the MO 370 interchange and the McDonnell interchange, WB I-270 drivers cannot access Missouri Bottom.
- **Missouri Bottom to EB I-270:** Traffic from Missouri Bottom cannot access I-270 EB.
- **SB Lindbergh to I-270 WB:** To make this movement, drivers are required to exit at the Lynn Haven interchange and cross the local street to the on-ramp.
- **WB I-270 to NB Lindbergh:** Exiting WB I-270 to NB Lindbergh requires travelers to traverse along a Lindbergh exit ramp, through the Lynn Haven interchange, and continue on the entrance ramp onto NB Lindbergh.
- **I-170 to Graham/Hanley:** No direct access is provided to Hanley/Graham for travelers making the transition from I-170 NB onto I-270 EB.
- **WB between Old Halls Ferry and New Halls Ferry:** The south outer road is one-way between these points.

In addition to unavailable movements, there are unusual movements that result in driver uncertainty and corresponding traffic conflicts. These include the following:

- **Advance Exit for Westbound I-270 Travelers Heading to I-70:** Drivers looking to exit I-270 westbound for I-70, either eastbound or westbound, are required to exit prior to St. Charles Rock Road, one interchange upstream from the I-270 at I-70 system interchange.
- **Eastbound I-270 Exit for St. Charles Rock Road:** Drivers exiting for St. Charles Rock Road from EB I-270 must merge with WB I-70 traffic destined for St. Charles Rock Road prior to reaching the intersection.
- **Dunn Two-Way Crossover Slip Ramps:** The majority of the entrance and exit ramps for WB I-270 within the study area occur at two-way crossover slip ramps to/from Dunn. The severely skewed angles between the ramps and Dunn are observed to be contrary to driver expectation and lead to driver confusion. The proximity of the slip ramps to signalized intersections between Dunn and some crossroads negatively affects traffic operations and compounds traffic congestion. Also important to note that EB Dunn drivers cannot access WB I-270 at any of the slip ramps. **Figure 4** is an example of a WB I-270 slip on-ramp along Dunn at West Florissant.
- **Outer Road Terminals:** The existing outer road system is discontinuous, which limits access through these areas. Further discussion of the effects of this condition can be found in **Section 3.4**.
- **Twin Interchanges at Lindbergh and Lynn Haven:** Many of the movements in and out of the Lindbergh are contained within the diamond interchange at Taylor.

Other general physical constraints along the I-270 corridor include the following:

- **Lane Continuity:** Throughout the corridor, lanes add and drop at each interchange. The pattern is difficult to discern. This creates a situation where travelers are switching lanes continually. This increases the number of conflicts.
- **Right-of-Way:** The corridor has very few undeveloped parcels. As a result, any alternative requiring right-of-way acquisition will likely affect the community and be costly.
- **Acute Angles at Major Road Crossings:** Several of the major cross roads intersect I-270 at an acute (sharp) angle. The most notable skewed intersections are at Washington/Elizabeth, New Florissant, and Old Halls Ferry. These acute angles present challenges in traffic flow, safety, and configuring interchange ramps to/from I-270.

3.8.2 System Configuration Hinders Economic Growth Opportunities

Corridor communities, as well as individual stakeholders, have emphasized the importance of economic development and developing solutions that are consistent with encouraging economic vitality. This element is intended investigate how the existing transportation system can be reconfigured to create vibrant spaces[10]. Increased economic development was also identified as important by many of the communities during the NCS.

The following discussion outlines some of the elements that hinder areas adjacent to I-270 from developing vibrant spaces and the economic growth they foster.

Ease of Ingress/Egress: The ability to easily reach a place is key to making it a vibrant place. A successful location is easy to get to and get through; pathways are visible both from a distance and up close. They have a high parking turnover and, ideally, are convenient to public transit.

Visibility: In general, the adjacent communities are invisible from I-270 and the various interchanges. Signage provides the best way-finding option. Visibility from the outer roads is also important, but sight distances are limited along the existing outer roads. Vehicle speeds only allow the most distinct elements to be visible. There are very limited interior views. Store fronts tend to obscure other interesting adjacent destinations. The views are dominated by blank walls.

Walkability: As discussed in **Section 3.5**, pedestrian resources are fragmented. Pedestrians are forced to navigate large numbers of vehicles and numerous vehicle pathways. Vibrant streets are interesting and generally safe to walk.

Variety of Transportation Options: As discussed in **Section 3.6**, numerous transit routes and transit stops provide access to the study area. Transit provides convenient access to important destinations, such as the St. Louis Community College, and accommodating future growth of transit service will play a key role in encouraging economic growth.

Dominant Traffic Mode: While there are numerous pedestrians and transit users, the dominate mode is the car. Successful places balance the interests of all modes of transportation. Vehicles tend to hinder pedestrians from using and accessing available spaces.

Organization/Management: Successful areas have an organization, someone in charge of the space. As discussed throughout **Section 1.0**, numerous organizations are located with jurisdictional responsibility within the study area.

Stakeholders: Successful places have users/visitors who are invested in the space. They would be more likely to do selfless activities such as picking up litter or giving directions.

3.9 Major Element #9 – Increasingly Inefficient Goods Movement

Freight movement comprises a large percentage of the traffic along I-270. Freight traffic is also an important component in the local and regional economy. I-270 serves as a key component of the I-70/MO 370/I-270 freight corridor for both through and locally destined freight traffic. The St. Louis region has historically been a freight center, a gateway to the west, and major player in national and international freight movements. As part of the seventh largest highway system in the country, St. Louis acts as a bridge for

[10] Many approaches have been developed to investigate ways to improve community health. The approach used here borrows liberally from the Project for Public Spaces (PPS) approach for a successful place. In evaluating vibrant spaces, four key qualities typically exist—they are accessible, people are engaged in activities there, the space is comfortable and has a good image, and finally, it is a sociable place: one where people meet each other and take people when they come to visit. While transportation projects are uniquely suited to addressing accessibility, they can also positively affect the other qualities. The elements discussed in this section relate specifically to those elements that are, at least, somewhat affected by transportation planning.

freight activity between the east and west coast. I-270 also plays a significant role in supporting regional freight movements and economic activity and development.

According to the NCS, total traffic volumes for the segment of I-270 from I-70 to the Illinois State Line range from 90,000 to over 141,000 vehicles per day. Commercial vehicles are estimated to be 17.4 percent of that overall traffic. Approximately 60 percent of the truck traffic is just passing through the region without an origin or destination in the St. Louis region.

An Origin and Destination Study was conducted for the St. Louis area as part of the I-70 project (MoDOT, 2010). It identified the following six key challenges facing commercial truck drivers in the St. Louis region:

- Capacity/congestion
- Truck restrictions
- Access and connectivity
- Crashes
- Railroad grade crossings
- Lack of parking

The balance of this section will describe the challenges to freight traffic within the I-270 study area, focusing on local movements/deliveries.

Freight Congestion: Most deliveries within the St. Louis region occur between 4 a.m. and 3 p.m. FHWA defines freight congestion as any freight moving less than 55 miles per hour (mph). On an average week, the operating speed is less than 55 mph for 18 hours on EB I-270 and 8 hours on WB I-270 during the critical 4 a.m. to 3 p.m. timeframe. Lower operating speeds add to costs, which is ultimately passed on to consumers.

Truck Restrictions: In Missouri, trucks 8.5 feet wide, 14 feet high, 75 feet long, and weighing no more than 80,000 pounds are permitted to travel on the interstate without an oversize overweight (OSOW) permit. Roads and intersections that cannot accommodate these types of vehicles will negatively impact traffic operations. It is vital to adequately accommodate this traffic stream. Any new restriction on the OSOW level will impede the efficient movement of freight. Truck restrictions increase user costs and transportation costs to consumers.

Because I-270 carries a sizable proportion of OSOW loads moving across the country, designs should also give strong consideration to accommodating these larger trucks. The ability to accommodate OSOW loads vary widely within the study area. While most interchanges are able to accommodate most freight, other connections in residential and light business areas are less amenable (and largely impractical to upgrade). Focusing on areas that lead to industrial zones is probably most suitable when considering larger vehicles. Not only should accessibility be considered but also potential damage to the roadway from heavy trucks.

Parking: Lack of parking can be an issue for long-haul transportation movements using the interstate system. It is estimated that there are 150 parking truck parking spaces available at three locations along the northern portion of I-270. While it appears sufficient at this time, as federal regulations changing the driving hours allowed are implemented, the needed parking locations will also likely change.

Access/Connectivity: According to EWG, approximately 2,800 businesses are located within 1 mile of the corridor.

Most of these firms are light freight recipients typical of a commercial zone including retail stores, hospitals, medical offices, and business complexes. These facilities typically use smaller freight vehicles, such as a panel truck, or are serviced by the standard truck with 53-foot trailer (WB67 design vehicle). Areas of concern include interchange turning radii, roundabouts, and vertical clearances under I-270.

Manufacturing firms continue to have a strong presence in this corridor and immediately adjacent to it. These firms, such as Mallinckrodt and Boeing, will typically include products coming into the location and

value-added products leaving the location. Manufacturing firms, warehouses, and distribution centers are more likely to have trucks with OSOW permits accessing them routinely. Therefore, the interchanges leading to these locations will be the first to need turning radii and clearances sufficient to accommodate the 100-foot-long truck-trailer that is becoming commonplace in Missouri and the 150-foot-long truck-trailer that is used in several industries. The 100-foot truck trailer is currently permitted in Missouri to travel on any state road and transportation facilities that accommodate that vehicle are strongly encouraged in areas with known manufacturing/warehousing/distribution center locations.

Railroad Grade Crossings: Only two Class One railroads operate within or adjacent to the corridor—the Burlington Northern Santa Fe and the Norfolk Southern. There are no at-grade crossings.

Crashes: Truck crashes are much less likely (on a percentage basis) then with other vehicle types. As discussed in **Section 3.9**, roughly 1,200 truck crashes per year were recorded by the TMS (2008 through 2011). A separate truck survey over 2006 and 2011 found approximately 100 truck crashes per year. Overwhelmingly, these crashes are property damage only (72 percent), involve passing or rear-end operations (65 percent), and are located at interchanges or their associated ramps (72 percent).

Truck traffic along I-270 is high.

- Estimated maximum through truck traffic: 14,700 trucks per day
- Estimated maximum local truck traffic: 9,800 trucks per day

SECTION 4

Logical Termini and Independent Utility

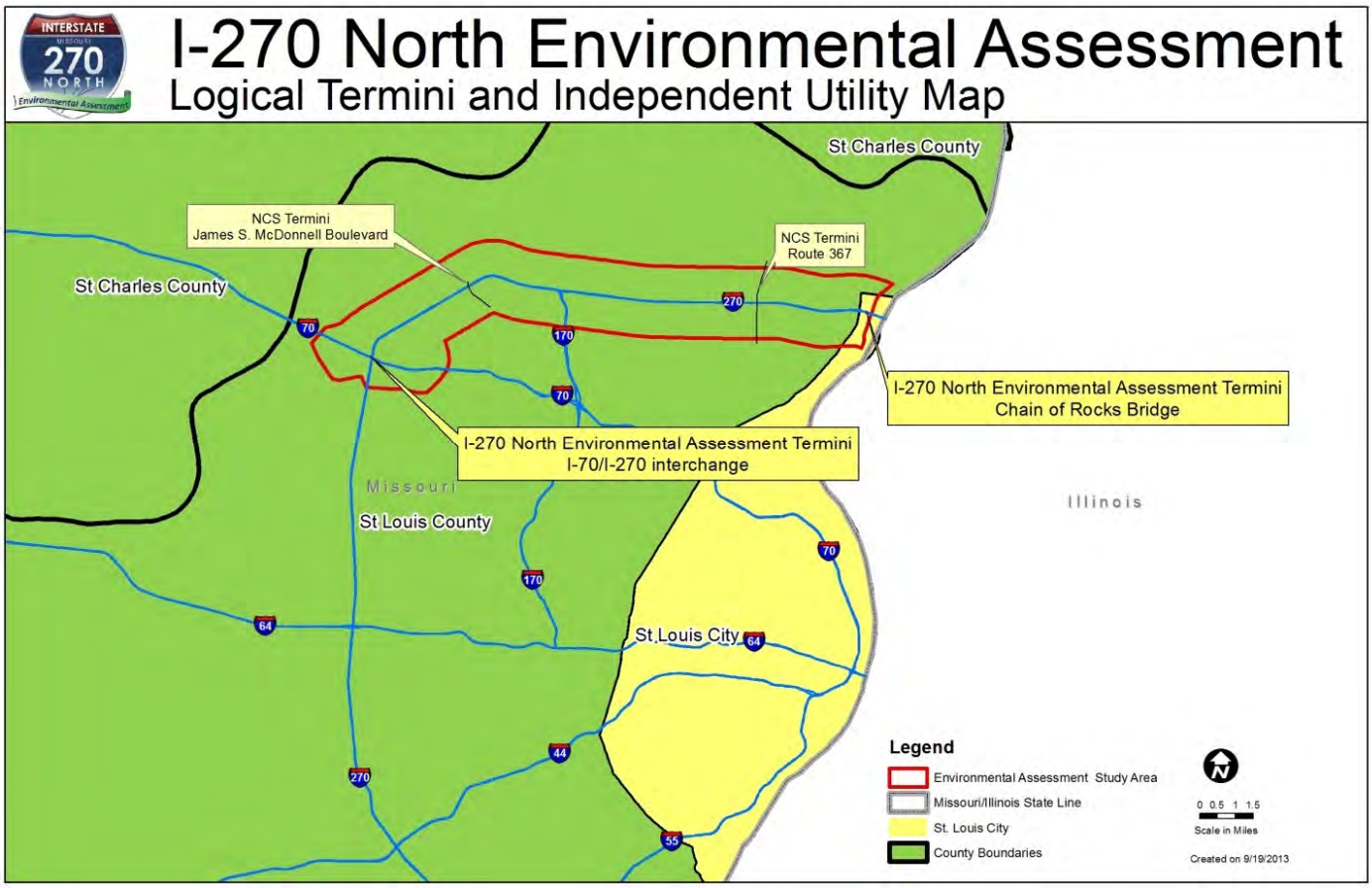
FHWA issues guidelines to assist transportation planners in designating logical termini for a study. In addition to being the rational end points for a transportation improvement, logical termini also serve as general geographical boundaries for a review of any environmental impacts triggered by the study. Logical termini are located within the study area and frequently are points of major traffic generation, especially intersecting roadways. This is because in most cases traffic generators determine the size and type of facility being proposed.

Based on these criteria, the logical termini for the I-270 North EA are:

- I-270 at the I-70 interchange
- I-270 at the Mississippi River/Chain of Rocks Bridge

These limits connect all of the essential movements associated with the northern part of the interstate system around St. Louis. This study began with the I-270 NCS. The NCS examined the problems of the I-270 corridor. Its study area extended from McDonnell to MO 367. One of the conclusions of the NCS was that it did not extend far enough to include all reasonably foreseeable solutions. As a result, the study area for the I-270 North EA was extended. See **Figure 9**.

FIGURE 9
Logical Termini and Independent Utility Map



In addition to being the rational end points for a transportation improvement, it also incorporates all of the general geographical boundaries needed for the review of environmental impacts triggered by the study.

Finally, because traffic generators affect the appropriate size and type of a facility, these limits include all of the points of major traffic generation.

The I-270 North EA also has independent utility. It will be able to function on its own, without further construction of an adjoining segment. It also does not preclude any current or future projects within the total study area from advancing once the study's findings have been approved by FHWA.

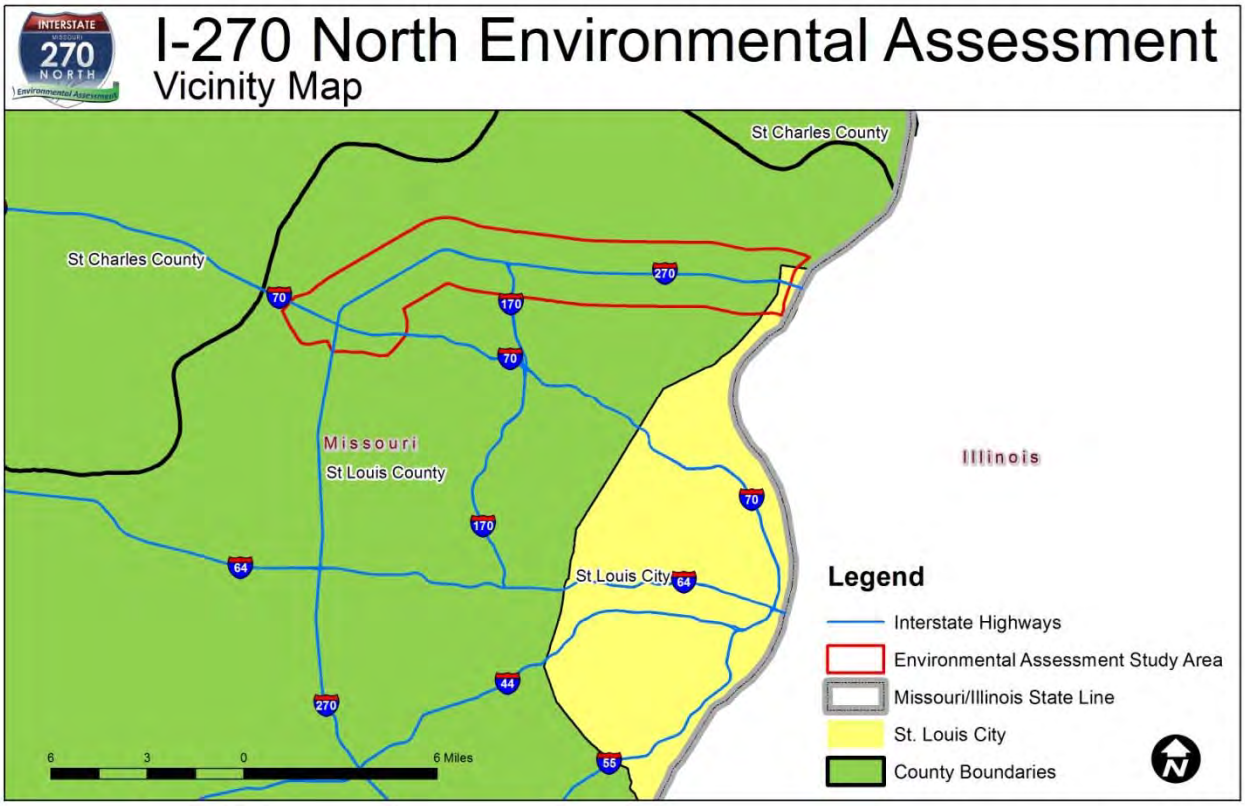
Multiple transportation improvements within the study area will almost certainly be identified, allowing projects of independent utility that improve the overall system to be built, but whose construction does not restrict or otherwise alter planning and construction of adjacent projects.

Finally, I-270 North EA does not restrict consideration of other reasonably foreseeable transportation improvements. The transportation problems and solutions are being evaluated in light of existing long-range transportation plans in order to minimize conflicts with the goals and improvements laid out in those plans. Solutions will be developed to allow for complementary improvements of connecting roadways as needed in the future.

SECTION 5

Conclusions

The I-270 North EA is a transportation study that will investigate and identify improvements to allow I-270 to continue to serve its key role within the area's transportation system. The study area starts at the I-70/I-270 interchange in Bridgeton and continues east along I-270 to the Mississippi River/Chain of Rocks Bridge.



This document presents the purpose and need for the I-270 North EA) study. *Purpose and Need* refers to the transportation-related problems that a study is intended to address. The generation and evaluation of alternatives are conducted to develop the most appropriate solution to the identified problems. Ultimately, the identification of a preferred alternative will be based, in part, on how well it satisfies the study's purpose and need.

In its very broadest sense, the goals associated with the I-270 corridor can be defined as follows:

- The need to maintain the aging infrastructure along I-270
- The need to improve mobility and operations within the I-270 corridor
- The need to achieve accessibility consistent with the designated uses of I-270
- The need to improve safety within the I-270 corridor

The study area for the I-270 North EA is contained within the northern portion of St. Louis County. Known as North County, it encompasses 14 municipalities, in addition to portions of unincorporated St. Louis County, as well as portions of the City of St. Louis. While much of the immediate highway corridor is commercial and industrial, roughly half of the land surrounding I-270 is residential, mostly single-family homes.
The socio-economic status and demographic profiles of the study area is quite varied. Potential Environmental Justice populations may exist. North County is home to many of St. Louis' largest corporations and employers, including Lambert St. Louis International Airport. Other major regional

employers include American Airlines, Boeing, Emerson, Ford, GKN, IBM, and UPS. Healthcare is also a leading industry in the study area. Two hospitals are located in the study area. Relative to transportation, North County is also served by air, water, and rail. In addition to Lambert International Airport, Metro has a large bus network operating in the study area. Metro also intends to build a new Transit Center and bus garage in North County (Pershall between West Florissant and New Halls Ferry). Two major public schools are adjacent to I-270 - McCluer High School and Hazelwood East High School. The campus of the St. Louis Community College at Florissant Valley is located in the study area.

The transportation problems affecting the I-270 North EA study area include the following major elements:

Major Element #1 – Deteriorating Infrastructure along I-270
The I-270 north corridor is among the oldest freeways in the St. Louis area. Although portions of the corridor have been reconstructed or widened, much of the corridor's infrastructure has outlived or is nearing its usable life.

Major Element #2 – Deteriorating Operation of the I-270 Freeway
Many segments of I-270 throughout the study corridor have existing and future LOSs that are below MoDOT's thresholds.

Major Element #3 – Inconsistent Interchange Operations
Nineteen interchanges are located on I-70 within the 15-mile study area. Many of the challenges that travelers experience are the result of the tight spacing of interchanges and the numerous, closely spaced weaving sections that result. Specific transportation problems identified include the following:

- Weaving operations within the I-270 interchanges are difficult
- Operations along the crossroads of I-270 are substandard
- Low operating speeds within some of the interchange movements

Major Element #4 – Inconsistent Outer Road System
Dunn and Pershall serve as north and south outer roads, respectively, to the I-270 mainline throughout most of the study area. These outer roads are used to distribute and collect traffic between local streets and freeway interchanges." Dunn and Pershall do not extend throughout the limits of the study. In addition, there are several gaps in Pershall at key locations, which limits the effectiveness of the outer road system to function of collector and distributor of traffic between the freeway and local streets.

Major Element #5 – System Creates Safety Conflicts
According to crash data from MoDOT's Traffic Management System for the period between 2010 and 2014, there were 9,784 crashes within the study area long I-270, the outer roads, and interchange crossroads. This translates into approximately five crashes per day; a fatality every other month. It is important that I-270 operates in a manner consistent with its mission and that traveler safety be considered.

Major Element #6 – Non-motorized Travel within Study Area is Difficult
I-270 creates a substantial barrier to non-motorized movements. Most of the existing pedestrian facilities within the study area do not meet current ADA standards, and much of the existing sidewalks are discontinuous along the crossroads and outer roads or simply do not exist. As a result, the study area lacks connectivity along and across I-270 corridor for bikes and pedestrians.

Major Element #7 – Need to Accommodate Operations between Transit and Highway Users
Transit operations in North County are substantial. Metro, the St. Louis region's main transit agency, reports that during a typical month, roughly 20 percent of MetroBus boardings in Missouri occur on routes that primarily serve North St. Louis County. Access to transit and the ability for transit to move efficiently through this corridor is very important to residents and businesses. Metro currently operates 14 routes dedicated to the North County service area and a new MetroBus Transit Center on Pershall is targeted for completion in summer 2015. As transit is a very important mode of travel in North County, close coordination with Metro on their operations and future plans will add to the effectiveness of overall travel in this corridor.

Major Element #8 – Difficult Pathways to Important Destinations

Urban environments pose challenges for motorists. This element examines the difficulties that are known to exist; specifically, those difficulties that affect sustainable development and access to opportunity. Specific transportation problems identified include the following:

- Unavailable movements
- Conflicting movements
- Physical constraints

Major Element #9 – Increasingly Inefficient Goods Movement

Much of the interstate, intrastate, and local freight movement in the St. Louis region utilizes the I-70 to MO 370 to I-270 corridor. Freight traffic is an important component in the local and regional economy. According to the NCS, approximately 17 percent of the roughly 90,000 to 141,000 vehicles that use I-270 daily are trucks; roughly 40 percent of the trucks are destined for local addresses in the St. Louis region. Key challenges facing commercial truck drivers in the St. Louis region include congestion, truck restrictions, access/connectivity, crashes, railroad grade crossings, and lack of parking.

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