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1.0 INTRODUCTION

Interstate 75 (I-75) is a major north-south transportation corridor through the Midwestern United States linking Ohio and Kentucky with Toledo, Ohio and Detroit, Michigan to the north, and Atlanta, Georgia and Miami, Florida to the south. I-75 is among the longest and busiest continuous interstate trade corridors on the continent, creating a 2,200-mile major trade corridor from Canada to the Port of Miami. According to the Federal Highway Administration (FHWA) estimates, I-75 is among the busiest trucking routes in North America, with truck traffic approaching six billion miles annually.

I-75 is one of Ohio's oldest interstate highways. Since its original construction in the 1950s, traffic has increased beyond what was originally envisioned. Trucks have become larger and heavier over the past four decades. Equally important is the substantial growth in truck traffic, with truck traffic accounting for 20 percent of the traffic volume.

I-75 within the Greater Cincinnati/Northern Kentucky region is a major thoroughfare for local and regional mobility (Exhibit 1). Locally, it connects to I-71, I-74 and US Route 50. The Brent Spence Bridge provides an interstate connection over the Ohio River and carries both I-71 and I-75 traffic. The bridge also facilitates local travel by providing access to downtown Cincinnati, Ohio and Covington, Kentucky. Safety, congestion and geometric problems exist on the structure and its approaches. The Brent Spence Bridge, which opened to traffic in 1963, was designed to carry 80,000 vehicles per day. Currently, 150,000 vehicles per day use the Brent Spence Bridge and traffic volumes are projected to increase to 200,000 vehicles per day in 2025.

The I-75 corridor within the Greater Cincinnati/Northern Kentucky region is experiencing problems, which threaten the overall efficiency and flexibility of this vital trade corridor. Areas of concern include, but are not limited to, growing demand and congestion, land use pressures, environmental concerns, adequate safety margins, and maintaining linkage in key mobility, trade, and national defense highways.

The I-75 corridor has been the subject of numerous planning and engineering studies over the years and is a strategic link in the region's and the nation's highway network. As such, the Ohio Department of Transportation (ODOT) and the Kentucky Transportation Cabinet (KYTC), in cooperation with the FHWA, are proposing to improve the operational characteristics of I-75 and the Brent Spence Bridge in the Greater Cincinnati/Northern Kentucky region through a major transportation project. The purpose of this project is to:

- improve traffic flow and level of service,
- improve safety,
- correct geometric deficiencies, and
- maintain links in key mobility, trade, and national defense transportation corridors.

2.0 PROJECT HISTORY

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) identified High Priority Corridors on the National Highway System (NHS). Among these corridors are I-75 from Toledo to Cincinnati and I-71 between Columbus and Cincinnati. The 2005 federal surface transportation legislation (Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users [SAFETEA-LU]), continued funding for the High Priority Corridors.

In response to ISTEA, ODOT completed a statewide transportation study and strategic plan, *Access Ohio* in 1993, which was updated in 2004. This document identified "Transportation Efficiency and Economic Advancement Corridors" also known as "macro corridors" throughout the state of Ohio. These corridors are defined as "highways with statewide significance that provide connectivity to population and employment centers in Ohio and the nation by accommodating desired movements of persons and goods". The I-75 corridor is included in the list of macro corridors.

In 1999, KYTC completed its current long-range multimodal transportation plan (Kentucky Transportation Cabinet, *Statewide Transportation Plan FY 1999 – 2018*, December 1999). The transportation plan consists of two basic components – the short range element, which is the Six-Year Transportation Plan, and the long-range element, which is a 14-year plan identifying highway corridor needs that have a relatively high priority.

Kentucky's Recommended Six-Year Transportation Plan FY 2005-2010 lists six "Mega-Projects" (projects that will cost or are in excess of \$1 billion). The I-71/I-75 Brent Spence Bridge Project is one of the six "Mega-Projects". The plan notes that I-71/I-75 Brent Spence Bridge "is the focal point for some of the heaviest traffic volumes in Kentucky", which not only provide a link between two major urban centers (Covington, Kentucky and Cincinnati, Ohio) but also connects the region to one of the nation's busiest airports, the Cincinnati/Northern Kentucky International Airport located in Boone County, Kentucky. FHWA's *Freight Facts and Figures 2004* reports that the Cincinnati/Northern Kentucky International Airport ranks 15th of the top 25 US airports based on landed weight of air cargo in 2002.

The Ohio-Kentucky-Indiana Regional Council of Governments (OKI) and the Miami Valley Regional Planning Commission (MVRPC), the Metropolitan Planning Organizations serving the I-75 corridor, formed a partnership in 2000 to undertake a transportation investment analysis of the section of the I-75 corridor from northern Kentucky to Piqua, Ohio to address the current and future transportation issues in the corridor. This analysis, known as the *North-South Transportation Initiative (2004)* was a traditional Major Investment Study (MIS) conducted as part of the merged National Environmental Policy Act (NEPA) process. One goal of this study was to identify strategies to ensure that the I-75 corridor remains effective and efficient at moving people and goods through the region. The study addressed major improvements to all existing modes of transportation and identified appropriate transportation alternatives that need to be incorporated into the Regional Transportation Plans. A preferred program of projects was defined based upon a thorough assessment of transportation needs and consensus of where the region wants to be.

The *North-South Transportation Initiative* recommended a number of capacity and safety improvements for the I-71 and I-75 corridor in Kentucky and I-75 in Ohio. The southern limit of the study area for this project was the I-71/I-75 Interchange in Kentucky. The northern limit was on I-75 north of Piqua, Ohio. A number of major replacements and rehabilitations were recommended for advancement into the NEPA Process as a part of the *North-South Transportation Initiative*. One key recommendation was the replacement or rehabilitation of the Brent Spence Bridge in order to provide for improved capacity, access, and safety in this portion of the corridor.

KYTC initiated an engineering feasibility study to investigate replacement options for the Brent Spence Bridge in 2003. The results of this study are documented in the *Brent Spence Bridge Feasibility and Constructability Study* (2005). The study area for this analysis began south of Kyles Lane in Kentucky and extended to the Western Hills Viaduct in Ohio. Concurrently, ODOT began evaluating a number of alternatives for improving segments of I-75 in Ohio, from the area north of the Western Hills Viaduct, to a point north of I-275.

Two projects north of the Brent Spence Bridge are also addressing issues recommended by the *North-South Transportation Initiative*, the Thru-the-Valley project (PID 76256) and the Mill Creek Expressway project (PID 76257). These two ODOT projects are being conducted as part of an overall program to improve I-75 and are being conducted so that preserving right-of-way and assuring that short term improvements made to the corridor build on each other and provide improved capacity.

3.0 STUDY AREA DESCRIPTION

The project study area is located along a 6.5-mile segment of I-75 within the Commonwealth of Kentucky and the State of Ohio. The study area is shown on Exhibit 2 and is 2.82 square miles in size. The southern limit of the project is 2,800 feet south of the midpoint of the Kyles Lane Interchange on I-71/I-75 in Fort Wright, south of Covington, Kentucky. The northern limit of the project is 1,500 feet north of the midpoint of the Western Hills Viaduct interchange on I-75 in Cincinnati, Ohio.

The eastern and western limits of the study area generally follow the existing alignment of I-75. From the south, the study area is a 1,500-foot wide corridor centered on I-75 northward towards the city of Covington. At Covington, the eastern and western study area boundaries widen and follow city streets as described below:

- Western project limits (from south to north):
 - At KY 5th Street in the city of Covington, the western boundary extends in the northwesterly direction across the Ohio River to US 50, approximately 1,000 feet west of the Freeman Avenue Interchange.
 - The western limit extends northerly parallel to Dalton Avenue to Hopkins Street.
 - The western limit extends westerly along Hopkins Street to the western limits of Union Terminal, where it then extends northerly along the western limits of Union Terminal to Kenner Street.

- The western limit follows easterly along Kenner Street to the intersection with Dalton Avenue.
- The western limit parallels Dalton Avenue to north of Findlay Street, where it follows in the northerly direction with a consistent 750-foot offset from the I-75 centerline.

- Eastern project limits (from south to north):
 - In the city of Covington, the eastern boundary follows Philadelphia Street to its intersection with KY 5th Street.
 - The eastern boundary follows KY 5th Street to its intersection with Main Street and then follows Main Street to the Ohio River.
 - The eastern boundary parallels the Clay Wade Bailey Bridge across the Ohio River to Pete Rose Way in the city of Cincinnati.
 - Through downtown Cincinnati, the eastern boundary follows OH 2nd Street and US 50 eastbound to approximately the I-71/US 50 interchange over Broadway Avenue, north on Broadway Avenue then westerly along OH 4th Street to Plum Street, then northward until it reaches West Court Street.
 - From West Court Street, the eastern boundary extends west to Linn Street, where it follows Linn Street to Central Parkway.
 - The eastern boundary extends north paralleling Central Parkway to Linn Street.
 - From Linn Street, the eastern boundary extends westerly to Bank Street.
 - From Bank Street, the eastern limits extend in the northerly direction with a consistent 750-foot offset from the I-75 centerline.

4.0 EXISTING TRANSPORTATION SYSTEM

Existing transportation facilities within the project study area include interstate highways, US routes, local roads, bus transit routes and hub locations, Ohio River water ports, freight rail lines, and bicycle routes. While passenger vehicle and truck freight modes are the most significant modes of transportation within the study area, each facility plays a role in mobility within the overall region. The following sections provide an overview of transportation facilities within the study area.

4.1 Roadways

4.1.1 I-75

Through the study area, the I-75 mainline varies between three and four lanes in each direction, with auxiliary lanes in certain locations. From the southern project terminus to KY 4th Street in Kentucky, I-71/I-75 northbound consists of three travel lanes. At KY 4th Street, a fourth travel lane is added to the northbound lanes, which continues into Ohio over the Brent Spence Bridge to the I-71/I-75 Interchange in Cincinnati. There are four southbound travel lanes between the Brent Spence Bridge and the southern project terminus.

I-75 has three interchanges in the Kentucky portion of the study area:

- Kyles Lane Interchange - This is a full movement diamond interchange at Kentucky mile post 189, which is the southern terminus of the study area.
- KY 12th Street/Pike Street Interchange – This is a full movement split diamond interchange that provides access to both Pike and KY 12th Streets.
- KY 4th Street/ KY 5th Street Interchange – This is a full movement interchange that provides access to the local road network in Covington. KY 4th Street provides one way westbound access to I-71/75 in both directions, while KY 5th Street provides the in-bound access to Covington.

In Ohio, between the I-71/I-75 Interchange and the northern project terminus, the number of travel lanes on I-75 varies from two to four with numerous entrance and exit ramps. From the I-71/I-75 interchange, there are two northbound lanes on I-75 with exit ramps to OH 5th Street in Cincinnati and to US 50 westbound.

In the vicinity of the Linn Street overpass, I-75 northbound becomes four lanes. A left hand exit is provided at Harrison Avenue (Western Hills Viaduct) via a short clover leaf ramp from I-75 northbound. Southbound I-75 access to Harrison Avenue is provided by a single right hand exit. Only Harrison Avenue (Western Hill Viaduct) westbound movements are provided from I-75 northbound and southbound at this interchange.

There are additional points of access to I-75 northbound from downtown Cincinnati, located at OH 4th Street, OH 6th Street, OH 9th Street, Ezzard Charles Drive, and Winchell Avenue, just north of Bank Street. There is no access to I-75 northbound from the collector distributor of OH 3rd Street. Access from I-71/US 50 (Fort Washington Way) south and westbound traffic to northbound I-75 acts as a collector distributor system which collects traffic from OH 4th Street, and OH 6th Street and includes an exit ramp to Ezzard Charles Drive prior to merging with I-75 northbound.

I-75 southbound, in Ohio, has four travel lanes at the northern limits of the study area in the vicinity of Harrison Avenue (Western Hills Viaduct). Access from I-75 southbound is available to Western Avenue, Ezzard Charles Drive, Freeman Avenue (US 50 westbound), and OH 7th Street exit. Additionally, a left hand exit carries traffic to OH 5th Street, OH 2nd Street, and I-71 northbound/US 50 eastbound at Fort Washington Way.

4.1.2 I-71

I-71 is merged with the I-75 mainline through Kentucky and over the Brent Spence Bridge. In Kentucky, the I-71 mainline varies between three and four lanes in each direction, with auxiliary lanes in certain locations along with the three interchanges described above.

At the north end of the Brent Spence Bridge in Ohio, the I-71/I-75 interchange provides full movements between the two interstate routes with I-71 heading to the northeast across Fort Washington Way while I-75 continues to the north. Fort Washington Way was reconstructed in 2000 to improve the capacity, congestion, and substandard geometry of this southernmost portion of I-71 in Ohio. The Ohio northbound portion of I-71 has exit ramps to/from OH 2nd Street and US 50 eastbound, and a connection from I-

75 southbound. The Ohio southbound portion of I-71 has exit ramps to/from US 50 westbound and OH 3rd Street, and connection to I-75 northbound.

4.1.3 US 50

US 50 is located in the Ohio portion of the study area and runs in a westerly/easterly direction paralleling the Ohio River. US 50 primarily consist of two lanes in each direction. The exception is where it transitions across the I-71/I-75 interchange area and where it reduces to a single lane in each direction. US 50 west of I-75 (westerly section) consists of a partial interchange at Freeman Avenue which provides access to US 50 in both directions from Freeman Avenue as well as an off ramp from US 50 eastbound to Freeman Avenue. The Freeman Avenue interchange provides access to I-75 northbound and from I-75 southbound via Freeman Avenue. This western section also contains a ramp to Linn Street from US 50 westbound and a ramp from Linn Street to US 50, eastbound. The western section of US 50 has connections going to I-75 southbound, OH 5th Street, I-71 northbound, and OH 2nd Street, with access from I-75 northbound and OH 6th Street.

US 50, east of I-75 (easterly section), is part of the Fort Washington Way system. The eastbound, easterly section includes ramp connections to/from I-71 northbound and OH 2nd Street. The westbound easterly section includes connections from I-71 southbound with connections to OH 3rd Street, I-71 southbound and I-75 northbound. The easterly section of US 50 also has connections with I-471 just east of the project limits.

4.1.4 Local Roads

Primary local roads within the study include Crescent Avenue and Main Street/Clay Wade Bailey Bridge in Covington. Primary local streets within the study area in Ohio include 2nd Street, 3rd Street, Elm Street, Mehring Way, Pete Rose Way, Central Avenue, Gest Street, Freeman Avenue, Winchell Avenue, Western Avenue, and Spring Grove Avenue.

4.2 Geometric Design Standards

Several of the existing design features of the I-71/I-75 corridor located in the Greater Cincinnati/Northern Kentucky area do not meet currently acceptable design criteria for interstate highways as defined by the American Association of State Highway and Transportation Officials (AASHTO), KYTC, and ODOT. This can be attributed to the age of the facilities, which were early interstate construction projects completed in the 1950s. Since that time, design standards for interstate highways have changed. As a result, the design of the I-71 and I-75 facilities at many locations within the study area do not meet current design standards for numerous features including lane widths, shoulder widths, horizontal and vertical clearances, and horizontal and vertical geometry. The operational design of the Brent Spence Bridge, with its reduced travel lane and shoulder widths, is the most frequently noted substandard feature; however, as described in Table 4-1, other structures (e.g. ramps) as well as at-grade highways do not meet currently acceptable design standards for an interstate facility. The design standard deficiencies at specific locations are described in greater detail in Appendix A.

Table 4-1: Design Deficiencies on I-71 and I-75 Within The Study Area

Location	Design Issues
Kyles Lane Interchange	Vertical grades for southbound entrance/exit ramps exceed design criteria.
I-71/I-75 (Kyles Lane Interchange to KY12 th Street Interchange)	One curve is constructed with an undesirable combination of vertical and horizontal geometry.
KY 12 th Street Interchange	Vertical clearances for several structures are less than the required clearances. Horizontal curve at the I-75 crossing over Pike Street does not meet current design criteria.
KY 9 th Street	Shoulder widths in this area are less than the minimum required width. Vertical clearances of two structures are less than the required clearances.
KY 5 th Street Interchange	Design inconsistencies in this area include design of vertical curves and associated limited stopping sight distances, horizontal curves with radii that do not meet current design criteria, vertical grade of the southbound exit ramp from I-75 to KY 5 th Street, and the length of the deceleration zone along the same ramp.
KY 4 th Street Interchange	The length of the acceleration ramp from KY 4 th Street to northbound I-75 is substantially shorter than the length required to meet design criteria.
Brent Spence Bridge - Kentucky Approaches	Lane widths, shoulder widths, and bridge widths are not consistent with the current design criteria.
Brent Spence Bridge	Lane widths, shoulder widths, and bridge widths are not consistent with the current design criteria.
Brent Spence Bridge - Ohio Approaches	Lane widths, shoulder widths, and vertical curve lengths and associated stopping sight distances are not consistent with the current design criteria.
I-71 Connector	Design inconsistencies on connector ramps include design of vertical curves and associated limited stopping sight distances, horizontal curves with radii that do not meet current design standards and vertical clearance over the railroad.
Fort Washington Way Connector	Horizontal curves on directional ramps do not meet current design criteria.
I-75 (Brent Spence Bridge to US 50 Expressway Interchange)	Deficiencies include vertical curves with limited sight distances, horizontal curves with reduced radii, vertical clearance (over railroad bridge), lane widths (bridges) and shoulder widths.
OH 4 th Street Ramps	Deficiencies include horizontal curves with reduced radii, reduced vertical clearances, and limited shoulder widths.
US 50 Expressway Interchange	Design inconsistencies include vertical curves with limited sight distances, horizontal curves with reduced radii; lane widths, shoulder widths; vertical clearances; and length of acceleration zone (entrance ramp from 6 th Street Expressway).
US 50-OH 5 th Street Connector	Design inconsistencies include a vertical curve with limited sight distance, a horizontal curve with reduced radii; shoulder widths; vertical clearances over roadways; and undesirable horizontal geometry (exit ramp on left side).

Table 4-1: Design Deficiencies on I-71 and I-75 Within The Study Area

Location	Design Issues
US 50 Expressway Interchange	Design inconsistencies include vertical curves with limited sight distances, horizontal curves with reduced radii; lane widths, shoulder widths; vertical clearances; and length of acceleration zone (entrance ramp from US 50 Expressway).
OH 7 th Street Ramp	Ramp to eastbound OH 7 th Street includes vertical curves with limited sight distance and reduced shoulder widths.
OH 7 th - OH 8 th Street Connector	Vertical clearances over I-75 do not meet required standard.
OH 9 th Street Connector	Vertical and horizontal clearances and shoulder widths do not meet current design standards.
OH 9 th Street Interchange	Vertical and horizontal alignments for ramps do not meet current design standards.
I-75 (OH 8 th Street to Linn Street)	Vertical and horizontal clearances and shoulder widths do not meet current design standards.
Western Avenue Interchange	Ramps do not meet design criteria for vertical curves and stopping sight distances; and shoulder widths. Southbound I-75 on ramp also does not meet criteria for vertical clearance and lane width.
I-75 Mainline (Linn Street to Gest Street)	Vertical clearance under Gest Street Ramp and pedestrian overpass do not meet minimum requirement. Horizontal clearance at Gest Street overpass is reduced because of bridge pier in median.
Gest Street Ramps	Vertical alignments and shoulder widths for ramps do not meet current design standards.
I-75 Mainline (Gest Street to Ezzard Charles Drive)	Vertical grades are below minimum desired grade; median shoulder widths are less than design standard.
Ezzard Charles Drive Overpass	Vertical clearance under overpass does not meet minimum requirement. Horizontal clearance at overpass is reduced because of bridge pier in median.
Winchell Avenue Ramps	Vertical alignments and shoulder widths for ramps do not meet current design standards
I-75 Mainline (Ezzard Charles Drive to Western Hills Viaduct)	Vertical clearances over Liberty and Bank Streets and Harrison Avenue do not meet minimum required clearance. Shoulder widths do not meet design criteria. Just south of the Bank Street overpass, vertical curve length does not meet minimum required length.
Western Hills Viaduct Interchange	Design inconsistencies include vertical curves with limited sight distances, horizontal curves with reduced radii; shoulder widths; vertical clearances over local roadways and interstate; limited length of acceleration zone for the northbound onramp; and left side exit ramp for I-75 northbound to Western Viaduct.
I-75 Mainline (North of Western Hills Viaduct Interchange)	Shoulder widths do not meet current design criteria.

4.2.1 Brent Spence Bridge

The Brent Spence Bridge was opened in 1963, as a double-deck truss structure designed to carry three 12-foot travel lanes in both directions over the Ohio River. In 1985, design deficiencies were added to the bridge to accommodate an additional travel lane on the bridge in each direction to add capacity for additional traffic volumes. The original safety curb on the bridge was retrofitted to New Jersey Barrier style barrier and the existing travel lanes were reduced in width to accommodate four 11-foot lanes with one-foot shoulders. In addition to the design deficiencies on the bridge, the approaches on either side are also characterized by design deficiencies, such as narrow travel lanes and reduced shoulder widths. The substandard lane widths and lack of shoulders result in unacceptable operational deficiencies and create potential safety hazards for motorists.

4.2.2 I-71/I-75 Mainline

Deficiencies identified along the I-71/I-75 mainline include reduced shoulder widths, restricted vertical and horizontal clearances for overhead structures and substandard vertical and horizontal curvature. In addition, the vertical grade of the facility is problematic at two locations. Between Kyles Lane and KY 12th Street in Covington, the vertical grade is approximately five percent. Six degrees vertical grade is the maximum desirable grade for an interstate facility. The second problem area exists between Gest Street and the Winchell Avenue crossing. At this location, the grade does not meet the minimum desired grade for an interstate highway.

4.2.3. Interchanges

The ramps at the majority of the interchanges along I-71/I-75 do not meet design criteria for several features including reduced vertical and horizontal curve lengths with associated reduced stopping sight distances; narrow travel lane and shoulder widths, steep grades, and substandard vertical clearances where the ramps are over other transportation facilities. There are two interchanges with left hand exit ramps (I-75 northbound to Western Hills Viaduct and I-75 southbound to the OH 5th-US 50 Connector eastbound and I-71 northbound).

4.3 Pavement Conditions

Pavement conditions for I-71, I-75, and US 50 within the study area were provided by KYTC Pavement Condition Evaluation Form for Interstates and Parkways (October 2005) and ODOT Pavement Condition Ratings (PCRs) (December 2004).

4.3.1 Kentucky

Table 4-2 summarizes the pavement data for I-75 in Kentucky. According to KYTC, a pavement condition evaluation ranking of 0 to 50 is considered very good. Only new, superior (or nearly new) pavements are likely to be smooth enough and distress free (sufficiently free of cracks and patches) to qualify for this category.

Table 4-2: I-75 Mainline in Kentucky

Direction	Begin Section	End Section	Length	PCE Value
Northbound	188.33	190.75	2.42 miles	43.5
Southbound	188.33	190.75	2.42 miles	48.2
Northbound	190.75	191.22	0.46 miles	7.5
Southbound	190.75	191.22	0.46 miles	16.2

The pavement in Section 188.334 to 190.754 was originally placed in 1994 and showed some signs of wheel-path cracking and joint deterioration according to an October 2005 visual inspection. No rutting was reported. The pavement in Section 190.754 to 191.222 was originally placed in 1992 with a 1.5 inch overlay in 2003. No signs of wheel-path cracking, joint deterioration raveling or rutting were reported according to an October 2005 visual inspection.

4.3.2 Ohio

Tables 4-3 and 4-4 summarize the pavement data for I-75 and I-71 in Ohio. According to ODOT Pavement Standards, a rating below 65 is deficient, a rating between 75 and 90 is good and a rating above 90 is very good. Pavement sections of I-75 and I-71 in Ohio were rated above 90.

Table 4-3: I-75 Mainline in Ohio

Direction	Begin Section	End Section	Length	PCE Value
Northbound	0.22	0.90	0.68	94
Southbound	0.22	0.90	0.68	94
Northbound	0.90	4.14	3.24	91
Southbound	0.90	4.14	3.24	92

Table 4-4: I-71 Mainline in Ohio

Direction	Begin Section	End Section	Length	PCE Value
Northbound	0.56	1.15	0.59	97
Southbound	0.56	1.15	0.59	97
Northbound	1.15	1.34	0.19	97
Southbound	1.15	1.34	0.19	97
Northbound	1.34	2.75	1.41	92
Southbound	1.34	2.75	1.41	95
Northbound	2.75	5.00	2.25	90
Southbound	2.75	5.00	2.25	95

Table 4-5 summarizes the pavement data for four sections of US 50 in Ohio. The ratings range from good (75 to 90) to very good (above 90).

Table 4-5: US 50 Mainline in Ohio

Direction	Begin Section	End Section	Length	PCE Value
Eastbound	19.26	19.80	0.54	78
Westbound	19.26	19.80	0.54	75
Eastbound	19.80	20.22	0.42	81
Westbound	19.80	20.22	0.42	76
Eastbound	20.22	20.76	0.54	87
Westbound	20.22	20.76	0.54	96
Eastbound	21.37	22.00	0.63	94
Westbound	21.37	22.00	0.63	96

4.4 Bridge Conditions

Bridge conditions are measured by a sufficiency rating as shown in the Tables 4-6 and 4-7. This rating is based on regular required inspections. It is used to distinguish eligibility for rehabilitation or replacement. A newly constructed bridge has a sufficiency rating of 100. A bridge with a rating less than 50 qualifies for replacement using federal bridge program funds. If a bridge requires immediate rehabilitation to remain open, has weight restrictions, or has been closed, then it is considered as structurally deficient (SD). If a bridge has deck geometry, load carrying capacity, clearance or approach alignments that are not consistent with design standards, then it is considered as functionally obsolete (FO). Tables 4-6 and 4-7 present data from KYTC and ODOT for bridges within the study area from Bridge Inventory and Bridge Inspection Reports.

4.4.1 Brent Spence Bridge

The 1998 National Bridge Inventory inspection gave the Brent Spence Bridge a Sufficiency Rating of 73 on a 100-point scale, but rated the bridge as being functionally obsolete because its design features are not consistent with its operational characteristics. A more recent inspection conducted in 2000 also found that the Brent Spence Bridge was functionally obsolete and that the Sufficiency Rating had dropped to 64.

In November 2002, a Fracture Critical Inspection of the Brent Spence Bridge was completed for KYTC, which included inspection of the Kentucky approach spans as well as the main spans over the Ohio River. The inspection noted few changes in the condition of the bridge based on a comparison of the inspection ratings for November 2002 inspection with the previous April 2001 inspection. The two inspection ratings vary with respect to deck condition, which received higher ratings in the November 2002 inspection; and the condition of the superstructure, which received lower ratings for four characteristics evaluated (stringers, girders and beams; trusses and inspection walk; bearing devices; and deflection/vibration under load).

Table 4-6: Kentucky Bridge Conditions

District	Prefix	County	Route	Bridge Number	Non-parallel/ Parallel	Sufficiency Rating	Number of Main Bridge Spans	Number of Approach Spans	Location	Mile Point	Description	Feature Crossed	Road Name	Maximum Bridge Span Length (feet)	Bridge Width (feet)	Bridge Length (feet)	Year Built	Functionally Obsolete/ Structurally Deficient	Last Inspection Date	Average Daily Traffic	Year of Average Daily Traffic Count
6	MP	59	75	B00038	N	87.6	3	0	Northbound Lane 0.4 Miles South of KY 5 th Street Interchange	190.75	3-50 feet RCDGS Widened w/PCIB's	KY 9 th Street in Covington	New Covington-Lexington	50	54.7	159	1-Sep-60	F	14-Jan-04	133602	1-Jan-03
6	MP	59	75	B00038	P	87.6	3	0	Southbound lane 0.4 Miles South of KY 5 th Street Interchange	190.75	3-50 feet RCDGS Widened w/PCIB's	KY 9 th Street in Covington	New Covington-Lexington	50	54.7	159	1-Sep-60	F	14-Jan-04	133602	1-Jan-03
6	MP	59	75	B00039	N	90.9	1	0	Southbound Exit Ramp at KY 5 th Street Interchange	191.19	1-30 feet RCDG (Ramp B-2)1-31 feet RCDG (5 th Street)	KY 5 th Street Interchange	New Covington-Lexington	31	37	63	1-Sep-63	-	14-Jan-04	133602	1-Jan-03
6	MP	59	75	B00040	N	61.0	1	4 3	Approach to Brent Spence Bridge	191.19	Steel IB (Multi Spans) See Bridge Drawing No. 1495	KY 3 rd - 4 th - 5 th Streets in Covington	New Covington-Lexington	75	30	118 7	1-Sep-63	F	30-Nov-05	133602	1-Jan-03
6	MP	59	75	B00041	N	-	1	5	Pedestrian Overpass KY 5 th Street Interchange	191.19	10.75-13.25-13.75 feet RC Steps and Landings; 87.5 feet Pre	Northbound I-75 Exit Ramp to KY 5 th Street	Pedestrian Overpass	86	29.8	149	1-Sep-68	-	14-Jan-04	20	1-Sep-88
6	MP	59	75	B00043	N	79.9	3	0	Northbound Lane 0.75 Miles Northeast of US 25 Overpass	188.33	3-50 feet RCDGS Widen w/PCIB's	Rivard Drive in Fort Wright	New Covington-Lexington	50	66.8	159	1-Sep-60	-	12-Jan-04	134981	1-Jan-03
6	MP	59	75	B00043	P	63.4	3	0	Southbound Lane 0.75 Miles Northeast of US 25 Overpass	188.33	3-50 feet RCDG's Widened w/PCIB's	Rivard Drive in Fort Wright	New Covington-Lexington	50	78.2	159	1-Sep-60	F	12-Jan-04	134981	1-Jan-03
6	MP	59	75	B00044	N	85.2	3	9	Northbound Lane 0.3 Miles North of Jefferson Street Overpass	190.52	1-40 and 8-53 feet RCDG-56-80-56 feet CONT RCDG Span	US25, KY1120, (11 th - 12 th - Lewis in Covington)	New Covington-Lexington	80	54.7	684	1-Sep-60	F	13-Jan-04	137312	1-Jan-04

Table 4-6: Kentucky Bridge Conditions

District	Prefix	County	Route	Bridge Number	Non-parallel/ Parallel	Sufficiency Rating	Number of Main Bridge Spans	Number of Approach Spans	Location	Mile Point	Description	Feature Crossed	Road Name	Maximum Bridge Span Length (feet)	Bridge Width (feet)	Bridge Length (feet)	Year Built	Functionally Obsolete/ Structurally Deficient	Last Inspection Date	Average Daily Traffic	Year of Average Daily Traffic Count
6	MP	59	75	B00044	P	85.2	3	9	Southbound Lane 0.3 Miles North of Jefferson Street Overpass	190.52	1-40 and 8-53 feet and 56-80-56 feet CONT RDCG Span	KY 11 th – 12 th Lewis in Covington	New Covington-Lexington	80	54.7	684	1-Sep-60	F	13-Jan-04	137312	1-Jan-04
6	MP	59	75	B00046	N	66.0	3	0	Brent Spence Bridge Over Ohio River	191.41	2-453 feet Anchor Arm Spans and 1-830.5 feet Main Span DBL. D	Ohio River	Covington-Cincinnati	831	92	1737	1-Sep-63	F	3-Oct-05	148614	1-Jan-03
6	MP	59	1072	B00047	N	89.3	4	0	0.2 Miles South of Junction US 25-42	1.39	50-75 feet - 75-50 feet CONT. RCDG Unit - 11 Degree 30	I-75	Kyle's Lane in Fort Wright	75	86	254	1-Sep-60	F	12-Jan-04	15908	1-Jan-03
6	MP	59	25	B00049	N	74.5	3	7	Clay Wade Bailey Bridge Over Ohio River	13.62	2-400,1-675 Trusses, 2-155 CONT WSP,2-130 CT.40-66-50 SSW	Ohio River	Covington-Cincinnati	675	42.5	2209	1-Sep-74	-	3-Oct-05	11545	1-Jan-04
6	MP	59	75	B00087	N	87.6	1	0	I-75 Northbound Exit East to KY 5 th Street	190.68	1-53 feet PC1B Span and 60 DEG Skew	Pike Street On-ramp to I-75 north	New Covington to Lexington – Ramp “G” over Ramp “Y”	53	26	80	1-Sep-93	F	13-Jan-04	133602	1-Jan-04
6	MP	59	75	B00088	N	86.5	3	0	At Junction of KY 9 th Street Covington to North	190.75	51-53-51 feet CONT PC1B Spans	KY 9 th ST (I-75 Northbound) Ramp “G”	New Covington to Lexington Ramp “G”, , I-75 Northbound to KY 5 th Street.	53	26	159	1-Sep-93	F	13-Jan-04	133602	1-Jan-03
6	MP	59	75	B00089	N	85.2	3	0	Pike Street to I-75 Northbound Over KY 9 th Street	190.57	53-53-50 feet CONT PC1B Spans	KY 9 th Street in Covington	New Covington to Lexington (Ramp “Y”, Pike Street	53	26	159	1-Sep-93	F	13-Jan-04	137312	1-Jan-03

Table 4-6: Kentucky Bridge Conditions

District	Prefix	County	Route	Bridge Number	Non-parallel/ Parallel	Sufficiency Rating	Number of Main Bridge Spans	Number of Approach Spans	Location	Mile Point	Description	Feature Crossed	Road Name	Maximum Bridge Span Length (feet)	Bridge Width (feet)	Bridge Length (feet)	Year Built	Functionally Obsolete/ Structurally Deficient	Last Inspection Date	Average Daily Traffic	Year of Average Daily Traffic Count
6	MP	59	75	B00090	N	87.6	3	0	I-75 Southbound Exit to Pike Street	190.75	51 -53- 51 feet CONT PC1B Spans	KY 9 th Street in Covington	New Covington to Lexington Ramp "C"	53	26	160	1-Sep-93	F	13-Jan-04	133602	1-Jan-03
6	RR	59	2374	RR0602	N	-	10	0	Approach to Clay Wade Bailey Bridge	0.33	Multi-Span Steel Girders- RR OH	CSX Railroad	KY 2374 (KY 3 rd Street)	1	34	150	1-Sep-30	-	18-Nov-05	8235	1-Dec-01
6	RR	59	25	RR0610	N	-	28	0	Main Street Between KY 4 th and 5 th Streets	0.01	Steel Girder	CSX Railroad Over Main Street in Covington	CSX Railroad Over Main Street in Covington	60	35	1700	1-Sep-30	-	18-Nov-05	3907	1-Sep-97

Notes:

Prefix – MP=Maintenance Project; RP=Rural Secondary Project; CR=County Road; RR=Railroad
 RCDG = Reinforced Concrete Deck Girder
 w/PCIB's = With Precast Concrete I-Beams
 WSP = Welded Steel Plate girder
 CONT RCDG = Continuous Reinforced Concrete Deck Girder
 CONT PCIB = Continuous Precast Concrete I-Beam

Table 4-7: Ohio Bridge Conditions

District	Structure File Number	County	Route	Straight Line Mileage	Special Designation	Feature Intersected*	Year Built	General Appraisal	Sufficiency Rating	Structurally Deficient/Functionally obsolete	Inspected Date	Deck Area (square feet)	Total Number of Spans	Maximum Span Length (feet)	Overall Length (feet)	Inspection Responsibility
08	3102971	HAM	00050	1976	-	Freeman Avenue	1966	7	088.0	FO	10/07/04	48,782	11	93	706	State
08	3103005	HAM	00050	1980	L	Nsrr;Csrr; Linn Street	1966	7	089.2	FO	10/08/04	41,474	9	149	795	State
08	3103064	HAM	00050	1980	R	Nsrr;Csrr; Linn Street	1966	7	092.0	FO	10/08/04	40,903	8	148	784	State
08	3103099	HAM	00050	2013	L	Gest Street; US 50*West Ramp	1963	7	079.0	FO	10/08/04	15,253	3	91	227	State
08	3103129	HAM	00050	2013	R	Gest Street	1963	7	079.0	FO	10/08/04	11,722	3	91	205	State
08	3103153	HAM	00050	2028	L	I-75;Ramp=I-75*S-US 50* East	1963	6	077.0	FO	10/21/04	42,442	6	111	524	State
08	3103161	HAM	00050	2028	M	I-75 Southbound and Ramp	2000	8	091.8		10/21/04	16,081	4	177	495	State
08	3103188	HAM	00050	2028	R	I-75*South	1963	7	093.0	FO	10/21/04	7,815	2	97	182	State
08	3103226	HAM	00050	2064	L	OH 3 rd Street	1999	8	088.3	-	12/06/04	26,049	6	143	758	State
08	3103234	HAM	00075	0023	R	I-71 Northbound OH 3 rd Street	2000	8	088.6	-	10/26/04	28,546	4	192	644	State
08	3103269	HAM	00071	0040	L	Central Avenue and OH 3 rd Street	2000	9	092.7	-	09/13/04	24,251	4	207	646	State
08	3103293	HAM	00050	2065	-	OH 3 rd Street and Central Avenue	2000	8	088.3	-	12/06/04	40,957	6	182	917	State
08	3105458	HAM	00075	0252	-	Western Hills Viaduct	1931 1978	7	066.0	FO	11/15/04	22,540	3	120	370	State
08	3105946	HAM	00071	0000	L	I-71*North; 3rr; I-75* North; 9usr;St	1963	5	064.0	FO	12/01/04	107,543	40	127	2,683	State
08	3105970	HAM	00071	0000	R	3rr;US 27;I-75;US 42	1963	5	062.0	FO	12/01/04	145,551	35	186	3,043	State
08	3106020	HAM	00071	0040	R	Central Avenue	2001	9	065.7	-	09/13/04	46,780	7	206	833	State
08	3106055	HAM	00071	0056	-	Plum Street Pedestrian Walk	2000	8	068.4	-	09/14/04	9,881	1	66		State
08	3106071	HAM	00071	0065	-	Elm Street	2000	9	087.8	-	09/14/04	7,922	2	84	171	State
08	3106195	HAM	00071	0073	-	Race Street	2000	9	087.8	-	09/14/04	18,245	2	84	171	State
08	3108791	HAM	00075	0022	L	Third Street; Csrr	1963	5	085.0	-	10/21/04	23,982	6	78	428	State
08	3108805	HAM	00075	0022	R	2rr;Th St *East; US 42;	1963	7	073.0	FO	10/21/04	42,722	14	117	1,187	State

Table 4-7: Ohio Bridge Conditions

District	Structure File Number	County	Route	Straight Line Mileage	Special Designation	Feature Intersected*	Year Built	General Appraisal	Sufficiency Rating	Structurally Deficient/Functionally obsolete	Inspected Date	Deck Area (square feet)	Total Number of Spans	Maximum Span Length (feet)	Overall Length (feet)	Inspection Responsibility
						US 50*East										
08	3108821	HAM	00075	0024	R	Central Avenue	2000	9	022.0	-	10/26/04	5,296	2	118	161	State
08	3108872	HAM	00075	0030	-	US 50 Eastbound; US 50 Eastbound To OH 2 nd Street	1998	8	093.0	-	10/25/04	8,697	3	70	265	State
08	3108945	HAM	00075	0070	-	OH 7 th Street*East	1963	7	090.0	FO	10/26/04	39,568	5	148	628	State
08	3109003	HAM	00075	0086	-	I-75*South Ramp; 9 th St*W	1963	5	065.0	FO	10/26/04	10,097	4	120	304	State
08	3109038	HAM	00075	0089	-	8 th St*W; 9 th St *W	1963	6	069.2	FO	10/26/04	22,518	5	121	535	State
08	3109062	HAM	00075	0087	W	Gest St Within Ir R/W	1963	8	096.0	-	10/26/04	8,611	4	73	245	State
08	3109097	HAM	00075	0105	-	Linn Street	1961	6	079.5	FO	10/28/04	37,911	7	85	426	State
08	3109127	HAM	00075	0125	-	Ramp=Freeman Ave*N-I-75*N	1961	7	075.0	FO	11/03/04	11,700	3	118	278	State
08	3109151	HAM	00075	0125	E	Pedestrian Crosswalk	1961	7	N/A	-	11/05/04	291	1	36	36	State
08	3109186	HAM	00075	0126	W	Rmp=(Western Ave*S)-I-75*S	1961	7	071.7		11/03/04	2,852	1	70	81	State
08	3109216	HAM	00075	0143	-	Ezzard Charles Drive*E	1961	7	094.0	FO	11/05/04	8,837	2	84	173	State
08	3109240	HAM	00075	0146	-	Ezzard Charles Drive *W	1961	7	094.0	FO	11/05/04	8,687	2	85	170	State
08	3109275	HAM	00075	0173	-	Liberty Street	1961	7	096.0	-	11/05/04	30,850	4	55	199	State
08	3109305	HAM	00075	0191	-	Findlay Street	1961	7	097.0	-	11/05/04	24,607	3	71	175	State
08	3109364	HAM	00075	0219	-	Bank Street	1961	7	098.0	-	11/08/04	28,460	4	51	189	State
08	3109399	HAM	00075	0240	L	Harrison Avenue	1961	7	098.0	-	11/08/04	13,713	3	65	160	State
08	3109429	HAM	00075	0240	R	Harrison Avenue	1961	8	098.0	-	11/08/04	17,567	3	64	160	State
08	3109453	HAM	00075	0249	W	Spring Grove Avenue	1963	7	096.0	-	11/08/04	6,760	3	108	221	State
08	3109488	HAM	00075	0253	W	Spring Grove Avenue	1963	7	097.0	-	11/08/04	6,211	3	105	203	State
08	3109518	HAM	00075	0261	R	Ramp=I-75*N-W. Hills Viaduct*W	1961	7	075.0	FO	11/15/04	6,243	3	104	204	State
08	3111644	HAM	00264	1636	R	I-75*S;Usr-Ir Ramp;US 50*E	1963	6	077.0	FO	12/16/04	21,550	6	107	516	State

Table 4-7: Ohio Bridge Conditions

District	Structure File Number	County	Route	Straight Line Mileage	Special Designation	Feature Intersected*	Year Built	General Appraisal	Sufficiency Rating	Structurally Deficient/Functionally obsolete	Inspected Date	Deck Area (square feet)	Total Number of Spans	Maximum Span Length (feet)	Overall Length (feet)	Inspection Responsibility
08	3111679	HAM	00264	1647	R	I-75*N ;Ramp=I-75*N-US 50*W	1963	6	077.0	FO	12/16/04	7,524	3	64	171	State
08	3111709	HAM	00264	1653	R	US 50*W;I-75*N Ramp	1963 1968	7	096.0	-	12/15/04	14,499	3	79	192	State

* Feature Intersected can be further defined and photographs available at www.dot.state.oh.us/sfn/

4.5 Transit Systems

Two major transit systems, Transit Authority of Northern Kentucky (TANK) and Southwest Ohio Regional Transit Authority (SORTA) provide service throughout the region.

4.5.1 Transit Authority of Northern Kentucky

TANK operates a traditional bus-only service with fixed local and express routes, primarily from Northern Kentucky cities and suburbs in Boone, Campbell and Kenton counties to downtown Cincinnati. Ridership is highest during weekday peak periods, but service on most routes is provided during off-peak periods on weekdays and weekends. Several TANK express routes operate along I-71/I-75 and use the Brent Spence Bridge. TANK also provides the Southbank Shuttle, which connects the downtowns and riverfronts of Cincinnati, Covington, Newport and Bellevue, along with special event service; a route between Cincinnati, Covington and the Cincinnati-Northern Kentucky International Airport; and Regional Area Mobility Program (RAMP), a paratransit service for persons with disabilities.

TANK is in the process of developing a long-range Transit Network Study to guide the potential growth in transit service in Northern Kentucky for the next several years. TANK's primary source of local operating funds are earnings taxes in Campbell and Kenton counties and general fund appropriations from Boone County.

4.5.2 Southwest Ohio Regional Transit Authority

SORTA operates Metro, a traditional bus-only service with fixed local and radial routes serving the city of Cincinnati, portions of Hamilton County and limited portions of Butler, Clermont and Warren counties. The Metro network is primarily radial, with most routes focusing on downtown Cincinnati, where Metro connects with TANK service. There is some crosstown service, most of which serve Cincinnati's Uptown district (University of Cincinnati and medical center area).

Metro currently operates a substantial amount of service on I-71 and I-75 but does not use the Brent Spence Bridge. Metro also operates special event service, the "Parking Meter" shuttle that connects the central riverfront with downtown Cincinnati, and Access (a paratransit service for persons with disabilities).

SORTA completed its MetroMoves growth plan in 2002. It is being implemented in modest increments due to funding limitations. The MetroMoves plan called for the development of a network of transit hubs, crosstown routes and commuter lines. SORTA's primary source of local funding is a city of Cincinnati earnings tax dedicated specifically to transit uses. There is no countywide transit funding in southwest Ohio.

Several recent planning studies identify potential passenger rail alignments in the study area. *The Central Area Loop Study* (1999) identifies shared right-of-way on the Clay Wade Bailey Bridge for the Central Loop Streetcar which is proposed to provide rail connections between the three riverfront cities. *The I-71 Corridor Transportation Study Preliminary Draft Environmental Impact Statement* (July 2003) calls for the addition of a light rail transit (LRT) exclusive bridge immediately east of the Clay Wade Bailey Bridge. The *Regional Rail System Plan* identified a shared roadway/LRT lane on the Clay Wade Bailey Bridge as a value engineering alternative to the new LRT exclusive bridge.

4.6 Railroads

Rail transportation is an important component to the multimodal transportation system in study area. Several of the existing rail lines parallel I-75. The existing rail lines in the study area include:

- CSX Transportation
- Norfolk Southern
- Indiana and Ohio (I&O)
- Amtrak (passenger rail)

According to the Ohio Rail Development Commission, more than 250 freight trains per day pass through or have destinations within the study area.

CSX Transportation and Norfolk Southern have classification and intermodal yards in the Queensgate area of Cincinnati. CSX Transportation's Queensgate Yard has the capacity for 4,000 rail cars, and is one of the busiest freight rail yards in the Midwest.

CSX Transportation and Norfolk Southern have lines that parallel I-75. Two other railroad, Amtrak and Indiana and Ohio have "trackage rights" over these rail lines. More than 90 trains per day use the tracks in this corridor. Even though the two major railroads are competitors, they have a special operating agreement that allows each railroad to use the other's tracks due the rail congestion issues in this corridor.

The amount of freight that rail has the ability to carry is substantial. One fully loaded train car carries the same load as three semi-trucks. Intermodal traffic has been the fastest growing market segment of the rail industry over the past 20 years. Intermodal is defined in this case as trailer-on-flatcar (TOFC) or container-on-flatcar (COFC). This segment of the market is anticipated to continue to grow (*Access Ohio*, ODOT, 1995). Norfolk Southern has recently opened a new intermodal facility in Sharonville. Additional rail traffic may require rail capacity expansion in the heavily congested I-75 rail corridor.

4.7 Airports

The Greater Cincinnati/Northern Kentucky International Airport (CVG) is located in close proximity to the study area. It is a national hub for Delta and its regional airline connection partner (Comair). There are three terminals within CVG. Terminal One is served by US Airways, Terminal Two is served by American Airlines and United, and Terminal Three is served by Delta, Delta's connection Comair, Air France, Northwest Airlines, and Continental. To accommodate these airlines CVG opened their third north-south runway in December 2005 after 14 years of planning, public involvement, and construction.

4.8 Water Transportation

Commerce on the Ohio River is carried out by barge/towboat combinations. Towboats pushing up to 15 barges carry cargo between river terminals (*Ohio Department of Transportation Fact Book*). Barge is the primary mover of goods produced in the Ohio-Kentucky-Indiana Regional Council of Governments (OKI) region for market areas between 500 and 700 miles away (*Freight Transportation Study*, 1996). Nearly 14 million tons of cargo was shipped through water ports in Cincinnati in 1999, ranking it third in the amount of cargo handled on the Ohio River (*Freight Transportation Study*, 1996). One River Port and one bulk facility are located in close proximity to the study

area. They handle coal, steel, iron ore, sand/gravel, fertilizers, chemicals, petroleum and grain.

4.9 Bicycle and Pedestrian Transportation

The Ohio-Kentucky-Indiana Regional Council of Governments (OKI) Regional Bicycle Plan, adopted in 1993 and amended in 2003, encouraged the development of bike paths, bike lanes, and shared use paths throughout the region. Bicycle racks have been installed on the entire SORTA fleet and are used extensively providing for an intermodal connection between bicycles and buses. There are portions of the regional network of shared use paths in the study area, which are summarized below.

- CSX/Western Corridor – This is an abandoned rail corridor, which provides connections to the Mill Creek Greenway Trail and the Ohio River Trail.
- Ohio River Trail – This is a network of trails along the Ohio River known collectively as the Ohio River Trail. Ultimately this network of trails will provide connections from the Central Riverfront Park west through Queensgate and ultimately the Western Riverfront Trail west along River Road to Fernbank Park in Cincinnati and Shawnee Lookout Park. Some of this route will be designated as part of the Ohio to Erie Trail. The Cincinnati end is currently in the Central Riverfront Park but connections continuing west as far as Anderson Ferry are anticipated.
- KY Route 8 Path – This is an existing shared road facility along KY Route 8. It crosses the Ohio River on the Clay Wade Bailey Bridge to provide an interstate bicycle connection to the Ohio River Trail.
- Ohio Bike Route “O” Ohio River Scenic Byway – This is a shared facility bike route and is proposed for integration into the Ohio River Scenic Byway. Within the study area it uses State Street, OH 8th Street, Linn Street, Central Avenue to Mehring Way to connect to the Ohio River Trail.
- 1976 Cincinnati Bikeway Plan – This plan identified additional shared use corridors on downtown surface streets. The east-west routes in the study area include one way pairs of OH 7th and 9th streets, OH 2nd and 3rd streets, and Mehring Way. Regional bicycle planners anticipate specific improvements for bicycle facilities in the Mehring Way corridor that will impact the Brent Spence Bridge study area.

5.0 TRAFFIC ANALYSIS

A traffic analysis was conducted for I-75, I-71, US 50, and local street intersections within the study area. In order to obtain a detailed understanding of traffic patterns within the study area, I-75, I-71, and US 50 were divided into mainline segments and interchange ramp merge and diverge points. A total of 47 signalized intersections and eight unsignalized intersections of the local roadway network were studied. The analysis determined AM and PM design hour volumes and levels of service (LOS) for existing (2005) and future conditions (2030).

5.1 Methodology

Traffic counts were collected in the study area on Tuesdays, Wednesdays and Thursdays during September, October and November 2005. Traffic data for the at-grade intersections were collected using turning movement counts, while ramp traffic was collected using portable machine counters. Mainline volumes were determined from the I-75 Thru the Valley (HAM-75-10.10 [PID 76256]) study and the I-75 Mill Creek Expressway (HAM-75-2.30 [PID 76257]) study and carried through the study area. Select spot counts on the I-75 mainline were also used as check counts. Raw counts were converted to design hour volumes using a factor of 1.056, which was also utilized in the two adjacent HAM-75 projects referenced above.

Levels of service were determined for freeway segments, interchange ramp merge and diverge points, 47 signalized intersections and eight unsignalized intersections within the study area using Highway Capacity Software (HCS) version, HCS2000™, Version 4.1d.

Travel time was determined during December 2005 by driving during peak AM hours (7:30 – 8:30) and peak PM hours (4:30 – 5:30). A total of 15 travel runs were recorded during December 7 and 8, 2005 peak hours. Appendix B provides further discussion on methods employed to conduct the travel time study.

5.2 Existing Conditions (2005)

5.2.1 Mainline Segment Analysis

The following tables present the results of the 2005 existing condition analyses performed on the mainline segments of I-75, I-71, and US 50 within the study area. Locations with a LOS D are likely to degrade to a LOS of E or F in the design year (2030).

Table 5-1: 2005 I-75 Northbound Mainline Segments

Segment		AM			PM		
From	To	Volume	LOS ¹	Density (pc/mi/ln) ²	Volume	LOS	Density (pc/mi/ln) ²
Kyles Lane Merge	West KY 12 th Street Diverge	5806	E	37.5	5092	D	29.7
West KY 12 th Street Diverge	West KY 5 th Street Diverge	5576	D	34.6	4596	C	25.8
West KY 5 th Street Diverge	Pike Street Merge	4964	D	28.6	4098	C	22.6
Pike Street Merge	West KY 4 th Street Merge	5866	E	38.3	4464	C	24.9
Brent Spence Bridge South	Brent Spence Bridge North	6964	D	30.9	5408	C	22.3
I-71 Diverge	West OH 5 th Street Diverge	3429	D	30.2	3616	D	32.9
West OH 5 th Street Diverge	US 50 Diverge	2845	C	23.6	3400	D	29.8
US 50 Diverge	I-71 Merge	2182	B	17.9	2771	C	22.9
I-71 Merge	West OH 9 th Street Merge	3862	B	15.9	5750	C	23.9
West OH 9 th Street Merge	Freeman Avenue Merge	4046	B	16.6	6621	D	28.6
Freeman Avenue Merge	Ezzard Charles Drive Merge	4599	C	18.9	7230	D	32.9

Table 5-1: 2005 I-75 Northbound Mainline Segments

Segment		AM			PM		
From	To	Volume	LOS ¹	Density	Volume	LOS	Density
				(pc/mi/ln) ²			(pc/mi/ln) ²
Ezzard Charles Drive Merge	Western Hills Viaduct Diverge	4689	C	19.3	7550	E	35.6
Western Hills Viaduct Diverge	Western Hills Viaduct/Bank Street Merge	4316	B	17.7	6783	D	29.7
North of Western Hills Viaduct Merge		5273	C	21.7	7611	E	36.2

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

* Capacity Exceeds HCS calculations

Table 5-2: 2005 I-75 Southbound Mainline Segments

Segment		AM			PM		
From	To	Volume	LOS	Density	Volume	LOS	Density
				(pc/mi/ln)			(pc/mi/ln)
North of Western Hills Viaduct		8304	E	44.3	5846	C	24.4
Western Hills Viaduct Merge	Findlay Street Diverge	9007	D	32.7	5642	C	18.5
Findlay Street Diverge	Ezzard Charles Drive Diverge	8372	F	*	5033	C	20.7
Ezzard Charles Drive Diverge	Freeman Avenue Diverge	7871	E	38.9	4842	C	19.9
Ezzard Charles Drive Merge	West OH 7 th Street Diverge	7314	D	33.6	4660	C	19.1
I-71 Diverge	West OH 9 th Street Merge	2959	C	24.7	2115	B	17.4
West OH 9 th Street Merge	US 50 Merge	3126	D	26.5	2569	C	21.1
US 50 Merge	I-71 Merge	3673	D	33.8	3230	D	27.7
Brent Spence Bridge North	Brent Spence Bridge South	5280	C	21.8	7156	D	32.3
West KY 5 th Street Diverge	Pike Street Diverge	4605	C	18.9	6429	D	27.5
Pike Street Diverge	West KY 4 th Street Merge	4324	B	17.8	5836	C	24.3
West KY 4 th Street Merge	West KY 12 th Street Merge	4718	C	19.4	6739	D	29.4
West KY 12 th Street Merge	Kyles Lane Diverge	5039	C	20.7	7277	D	33.3

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

* Capacity Exceeds HCS calculations

Table 5-3: 2005 I-71 Northbound Mainline Segments

Segment		AM			PM		
From	To	Volume	LOS ¹	Density	Volume	LOS ¹	Density
				(pc/mi/ln) ²			(pc/mi/ln) ²
South of OH West 2 nd Street Diverge		3535	D	31.4	1792	B	14.6
West OH 2 nd Street Diverge	I-75 Southbound/ US 50 Merge	2662	C	21.8	1498	B	12.2
East of I-75 Southbound/US 50 Merge		5855	C	24.3	4254	B	17.4

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

Table 5-4: 2005 I-71 Southbound Mainline Segments

Segment		AM			PM		
From	To	Volume	LOS ¹	Density	Volume	LOS ¹	Density
				(pc/mi/ln) ²			(pc/mi/ln) ²
East of I-75 Northbound Diverge		3746	B	15.3	5566	C	22.9

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

Table 5-5: 2005 US 50 Westbound Mainline Segments

Segment		AM			PM		
From	To	Volume	LOS ¹	Density	Volume	LOS ¹	Density
				(pc/mi/ln) ²			(pc/mi/ln) ²
I-75 Northbound	West OH 6 th Street Diverge	1743	A	7.0	2656	A	10.7
Gest Street Diverge	Dalton Avenue Diverge	1249	A	5.0	2454	A	9.9
Dalton Avenue Diverge	Freeman Avenue Merge	773	A	4.2	2246	B	12.1
West of Freeman Avenue Merge		955	A	5.1	2794	B	15.0

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

Table 5-6: 2005 US 50 Eastbound Mainline Segments

Segment		AM			PM		
From	To	Volume	LOS ¹	Density	Volume	LOS ¹	Density
				(pc/mi/ln) ²			(pc/mi/ln) ²
West of Freeman Avenue Diverge		3544	C	19.0	1115	A	6.0
Freeman Avenue Diverge	Freeman Avenue Merge	2851	C	23.2	938	A	7.6
Freeman Avenue Merge	Linn Street Merge	2920	B	15.7	1299	A	7.0
Linn Street Merge	West OH 5 th Street Diverge	3055	B	12.3	1935	A	7.8
West OH 5 th Street Diverge	I-75 Southbound Diverge	2548	C	20.6	1815	B	14.6

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

The AM design hour traffic on all three freeways in the study area occurs during the 7:30 to 8:30 period. The northbound and southbound lanes of I-75 north of the Brent Spence Bridge accommodate the highest volumes of traffic during the AM peak period. The northbound and southbound lanes of I-75 south of the Brent Spence Bridge accommodate more traffic during the PM peak period (4:30 to 5:30 PM). I-71 northbound and US 50 eastbound carry more traffic during the AM peak period, while I-71 southbound and US 50 westbound are more heavily traveled during the PM peak period. While no segments on I-71 or US 50 operate at LOS E or F, many segments on I-75 operate at LOS E or F, and several segments operate at LOS D.

5.2.2 Ramp-Freeway Junctions

Traffic congestion throughout the highway network is also due to the merge and diverge locations at interchanges along I-75, I-71, and US 50. The following tables present the results for the 2005 existing condition analyses performed on interchange ramps of I-75, I-71, and US 50 within the study area. Locations with a LOS D are likely to degrade to a LOS of E or F in the design year (2030).

The traffic analyses determined that numerous interchanges on I-75 in the northbound and southbound directions currently operate at LOS D, E, and F during both the AM and the PM peak hours. Additionally, I-71 interchange ramps in the study area operate at LOS D and E during the AM and PM peak hours. The majority of ramps along US 50 currently operate at LOS A, B, and C in both the AM and PM peak hours.

Table 5-7: 2005 I-75 Northbound Ramps

Ramp	Junction	AM		PM	
		LOS ¹	Density (pc/mi/ln) ²	LOS ¹	Density (pc/mi/ln) ²
Kyles Lane Entrance Ramp	Merge	E	36.0	D	30.3
West KY 12 th Street Exit Ramp	Diverge	E	36.5	D	33.7
West KY 5 th Street Exit Ramp	Diverge	E	35.8	D	31.2
Pike Street Entrance Ramp	Merge	E	35.1	C	26.0
West 4 th Street Entrance Ramp**	Add Lane	E	38.3 [U]	C	24.9 [U]
I-71 Northbound Exit Ramp**	Drop Lane	D	33.5 [R]	D	32.9 [D]
West OH 5 th Street Exit Ramp	Diverge	E	35.4	E	37.2
US 50 Exit Ramp	Diverge	E	35.6	E	35.4
I-71 Entrance Ramp**	Add Lane	B	17.9 [U]	C	24.4 [R]
West OH 9 th Street Entrance Ramp	Merge	B	14.4	C	20.4
Freeman Avenue Entrance Ramp	Merge	B	16.0	C	21.3
Ezzard Charles Drive Entrance Ramp	Merge	B	16.0	C	23.0
Western Hills Viaduct Exit Ramp	Diverge	C	20.8	E	35.3
Bank Street Entrance Ramp	Merge	B	18.9	C	24.4

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

* Failed capacity check for ramp or freeway (implies that the density exceeds the capacity of the facility)

** Values represent the result for the worst operating component of the ramp junction

[R] – Ramp operates the worst

[U] – Upstream freeway operates the worst

[D] – Downstream freeway operates the worst

Table 5-8: 2005 I-75 Southbound Ramps

Ramp	Junction	AM		PM	
		LOS ¹	Density (pc/mi/ln) ²	LOS ¹	Density (pc/mi/ln) ²
Western Hills Viaduct Exit Ramp	Diverge	F*	37.3	D	28.6
Western Hills Entrance/Findlay Street Exit	Weave	F*	44.4	C	25.3
Ezzard Charles Drive Exit Ramp	Diverge	F*	38.1	C	22.0
Freeman Avenue Exit Ramp	Diverge	F*	36.9	C	22.6
Ezzard Charles Drive Entrance/ West 7 th Street Exit	Weave	E	35.5	B	19.3
I-71/West OH 5 th Street Exit Ramp**	Drop Lane	C	25.8 [R]	C	19.2 [R]
West OH 9 th Street Entrance Ramp	Merge	D	30.4	C	25.2
US 50 Entrance Ramp	Merge	F*	35.9	D	31.8
I-71 Entrance Ramp**	Add Lane	D	33.8 [U]	E	39.1 [R]
West OH 5 th Street Exit Ramp	Diverge	D	29.5	E	37.8
Pike Street Exit Ramp	Diverge	C	22.9	D	32.4
West KY 4 th Street Entrance Ramp	Merge	B	15.8	B	19.5
West KY 12 th Street Entrance Ramp	Merge	B	19.8	C	26.4
Kyles Lane Exit Ramp	Diverge	C	26.6	E	38.3

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

* Failed capacity check for ramp or freeway (implies that the density exceeds the capacity of the facility)

** Values represent the result for the worst operating component of the ramp junction

[R] – Ramp operates the worst

[U] – Upstream freeway operates the worst

[D] – Downstream freeway operates the worst

Table 5-9: 2005 I-71 Northbound Ramps

Ramp	Junction	AM		PM	
		LOS ¹	Density (pc/mi/ln) ²	LOS ¹	Density (pc/mi/ln) ²
West OH 2 nd Street Exit Ramp	Diverge	E	35.2	B	18.1
I-75 Southbound Entrance Ramp**	Add Lane	D	26.7 [R]	C	22.4 [R]

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

** Values represent the result for the worst operating component of the ramp junction

[R] – Ramp operates the worst

[U] – Upstream freeway operates the worst

[D] – Downstream freeway operates the worst

Table 5-10: 2005 I-71 Southbound Ramps

Ramp	Junction	AM		PM	
		LOS ¹	Density (pc/mi/ln) ²	LOS ¹	Density (pc/mi/ln) ²
West OH 3 rd Street Entrance Ramp	Merge	B	16.1	E	36.4
I-75 Northbound/US 50 Exit Ramp**	Drop Lane	C	18.6 [R]	D	26.9 [D]

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

** Values represent the result for the worst operating component of the ramp junction

[R] – Ramp operates the worst

[U] – Upstream freeway operates the worst

[D] – Downstream freeway operates the worst

Table 5-11: 2005 US 50 Westbound Ramps

Ramp	Junction	AM		PM	
		LOS ¹	Density (pc/mi/ln) ²	LOS ¹	Density (pc/mi/ln) ²
I-75/I-71 Entrance Ramp**	Add Lane	B	12.7 [R]	B	14.8 [R]
Gest Street Exit Ramp	Diverge	B	13.3	B	15.8
Dalton Avenue Exit Ramp**	Drop Lane	A	7.8 [R]	B	12.1 [D]
Freeman Avenue Entrance Ramp	Merge	A	6.0	B	16.8

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

** Values represent the result for the worst operating component of the ramp junction

[R] – Ramp operates the worst

[U] – Upstream freeway operates the worst

[D] – Downstream freeway operates the worst

Table 5-12: 2005 US 50 Eastbound Ramps

Ramp	Junction	AM		PM	
		LOS ¹	Density (pc/mi/ln) ²	LOS ¹	Density (pc/mi/ln) ²
Freeman Avenue Exit Ramp**	Drop Lane	C	23.2 [D]	A	7.6 [D]
Freeman Avenue Entrance Ramp**	Add Lane	C	23.2 [U]	A	7.6 [U]
West OH 6 th Entrance/West 5 th Exit	Weave	B	16.2	B	10.7
I-75 Southbound Exit Ramp**	Drop Lane	D	29.3 [D]	B	17.0 [D]

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

** Values represent the result for the worst operating component of the ramp junction

[R] – Ramp operates the worst

[U] – Upstream freeway operates the worst

[D] – Downstream freeway operates the worst

5.2.3 Local Street At-Grade Intersections

Within the study area 47 signalized and eight unsignalized local street intersections were analyzed. Table 5-13 presents the intersections evaluated and the results obtained for each location. Locations with a LOS D are likely to degrade to a LOS of E or F in the design year (2030). The highlighting reflects the overall intersection level of service and not individual movements.

Table 5-13: 2005 Local Street Intersections

Intersection	Time Period	Eastbound		Westbound		Northbound		Southbound		Overall	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
West KY 4 th Street and Crescent Avenue (Stop Controlled)	AM	-	-	10.8	B	-	-	-	-	-	-
	PM	-	-	13.7	B	-	-	-	-	-	-
West 4 th Street and Philadelphia Street	AM	-	-	36.8	D	9.5	A	35.5	D	30.6	C
	PM	-	-	40.4	D	18.7	B	42.3	D	36.5	D
West KY 4 th Street and Bakewell Street	AM	-	-	14.1	B	14.3	B	14.4	B	14.2	B
	PM	-	-	16.1	B	15.9	B	15.7	B	16.1	B
West KY 4 th Street and Main Street	AM	-	-	17.8	B	17.9	B	12.7	B	17.0	B
	PM	-	-	20.9	C	15.3	B	21.1	C	20.5	C
West KY 5 th Street and Crescent (Stop Controlled)	AM	-	-	9.7	A	-	-	-	-	-	-
	PM	-	-	11.2	B	-	-	-	-	-	-
West KY 5 th Street and Philadelphia Street	AM	18.4	B	-	-	17.8	B	18.3	B	18.3	B
	PM	18.8	B	-	-	16.6	B	18.1	B	18.4	B
West KY 5 th Street and Bakewell Street (Stop Controlled)	AM	-	-	-	-	18.9	C	17.4	C	-	-
	PM	-	-	-	-	14.3	B	14.3	B	-	-
West KY 5 th Street and Main Street	AM	18.7	B	-	-	18.2	B	18.4	B	18.5	B
	PM	18.9	B	-	-	14.0	B	19.1	B	18.3	B
Pike Street and Bullock Street	AM	35.4	D	9.9	A	-	-	36.5	D	32.0	C
	PM	32.5	C	35.0	C	-	-	34.5	C	34.4	C
Pike Street and Jillians Way	AM	44.1	D	7.5	A	42.9	D	-	-	39.5	D
	PM	21.9	C	21.7	C	21.7	C	-	-	21.8	C
West KY 12 th Street and Bullock Street (Stop Controlled)	AM	10.6	B	11.2	B	-	-	10.7	B	10.8	B
	PM	9.6	A	13.0	B	-	-	11.5	B	11.8	B
West KY 12 th Street and Jillians Way (Stop Controlled)	AM	20.7	C	25.3	D	13.2	B	-	-	21.4	C
	PM	20.9	C	39.9	E	33.7	D	-	-	32.9	D
Kyles Lane and Dixie Highway	AM	187.6	F	178.5	F	181.8	F	21.0	C	181.4	F
	PM	118.8	F	118.1	F	124.3	F	21.7	C	119.6	F
I-75 Southbound Ramps and Kyles Lane	AM	-	-	21.9	C	14.0	B	22.0	C	18.7	B
	PM	-	-	52.4	D	44.8	D	56.7	E	50.9	D

Table 5-13: 2005 Local Street Intersections

Intersection	Time Period	Eastbound		Westbound		Northbound		Southbound		Overall	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
I-75 Northbound Ramps and Kyles Lane	AM	71.1	E	-	-	75.4	E	4.1	A	51.5	D
	PM	26.7	C	-	-	26.2	C	16.6	B	22.2	C
Highland Pike and Kyles Lane	AM	22.8	C	205.4	F	197.0	F	31.0	C	146.8	F
	PM	30.5	C	225.0	F	24.4	C	231.7	F	161.6	F
Bank Street and Dalton Avenue	AM	13.5	B	15.9	B	14.0	B	15.1	B	14.8	B
	PM	12.7	B	19.3	B	17.2	B	19.4	B	18.3	B
Bank Street and Winchell Avenue	AM	14.0	B	13.6	B	13.9	B	-	-	13.9	B
	PM	14.8	B	14.7	B	14.5	B	-	-	14.6	B
Central Avenue and Linn Street	AM	25.1	C	14.5	B	16.2	B	25.1	C	22.2	C
	PM	17.4	B	27.5	C	16.5	B	26.7	C	23.6	C
Bank Street and Linn Street (Stop Controlled)	AM	10.8	B	-	-	-	-	-	-	-	-
	PM	12.6	B	-	-	-	-	-	-	-	-
Findlay Street and Dalton Avenue	AM	16.5	B	19.4	B	19.0	B	11.4	B	15.6	B
	PM	19.5	B	21.0	C	20.0	C	10.9	B	16.1	B
Findlay Street and Western Avenue	AM	14.0	B	14.1	B	-	-	14.1	B	14.1	B
	PM	14.3	B	13.5	B	-	-	14.1	B	14.1	B
Findlay Street and Winchell Avenue	AM	14.1	B	13.2	B	13.9	B	-	-	13.9	B
	PM	14.2	B	13.6	B	14.3	B	-	-	14.2	B
West Liberty Street and Dalton Avenue	AM	13.8	B	14.9	B	13.9	B	15.4	B	14.9	B
	PM	14.6	B	16.3	B	14.7	B	16.6	B	15.9	B
West Liberty Street and Western Avenue	AM	14.3	B	14.5	B	-	-	14.2	B	14.3	B
	PM	13.9	B	14.3	B	-	-	14.5	B	14.3	B
West Liberty Street and Winchell Avenue	AM	14.9	B	13.8	B	14.8	B	-	-	14.6	B
	PM	14.0	B	15.3	B	15.0	B	-	-	14.9	B
West Liberty Street and Linn Street	AM	15.9	B	15.1	B	15.6	B	15.3	B	15.6	B
	PM	15.1	B	17.5	B	16.5	B	16.0	B	16.5	B
Ezzard Charles Drive Westbound and Western Avenue	AM	-	-	13.8	B	-	-	14.1	B	14.1	B
	PM	-	-	14.0	B	-	-	13.9	B	13.9	B

Table 5-13: 2005 Local Street Intersections

Intersection	Time Period	Eastbound		Westbound		Northbound		Southbound		Overall	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Ezzard Charles Drive Westbound and Winchell Avenue	AM	-	-	14.5	B	14.2	B	-	-	14.3	B
	PM	-	-	17.4	B	17.7	B	-	-	17.6	B
Ezzard Charles Drive Eastbound and Western Avenue	AM	15.7	B	-	-	-	-	15.6	B	15.6	B
	PM	13.9	B	-	-	-	-	14.1	B	14.1	B
Ezzard Charles Drive Eastbound and Winchell Avenue	AM	14.8	B	-	-	14.7	B	-	-	14.8	B
	PM	13.5	B	-	-	13.5	B	-	-	13.5	B
Ezzard Charles Drive and Linn Street	AM	13.6	B	11.8	B	13.3	B	12.9	B	13.2	B
	PM	12.7	B	13.7	B	13.4	B	12.9	B	13.3	B
Gest Street and Dalton Avenue	AM	15.9	B	15.8	B	16.1	B	16.0	B	16.0	B
	PM	17.7	B	17.5	B	13.5	B	17.8	B	17.0	B
Gest Street and Western Avenue	AM	15.0	B	14.9	B	-	-	15.1	B	15.0	B
	PM	15.4	B	14.5	B	-	-	15.0	B	15.1	B
Gest Street and Freeman Avenue	AM	17.5	B	27.6	C	26.9	C	27.0	C	25.8	C
	PM	16.7	B	28.3	C	26.1	C	26.3	C	24.1	C
Linn Street and Gest Street	AM	15.2	B	17.1	B	17.0	B	9.8	A	15.1	B
	PM	16.6	B	16.8	B	17.1	B	10.1	B	15.5	B
West Court Street and Linn Street (Stop Controlled)	AM	11.7	B	12.6	B	-	-	-	-	-	-
	PM	15.7	C	17.7	C	-	-	-	-	-	-
West OH 8 th Street and Dalton Avenue	AM	13.9	B	20.5	C	17.8	B	20.2	C	17.2	B
	PM	16.2	B	27.0	C	14.5	B	28.8	C	24.4	C
West OH 8 th Street and Freeman Avenue	AM	25.0	C	21.6	C	25.4	C	22.2	C	24.0	C
	PM	24.1	C	23.2	C	22.5	C	24.0	C	23.6	C
West OH 8 th Street and Linn Street	AM	22.7	C	19.8	B	21.5	C	20.9	C	22.0	C
	PM	22.8	C	22.7	C	20.0	B	23.2	C	22.4	C
West OH 6 th Street and Linn Street	AM	-	-	-	-	-	-	7.9	A	-	-
	PM	-	-	-	-	-	-	10.7	B	-	-
Dalton Avenue and Linn Street	AM	15.4	B	16.4	B	16.6	B	15.3	B	16.0	B
	PM	21.4	C	13.1	B	20.2	C	18.1	B	18.8	B

Table 5-13: 2005 Local Street Intersections

Intersection	Time Period	Eastbound		Westbound		Northbound		Southbound		Overall	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Central Avenue and West Court Street	AM	15.2	B	13.1	B	15.2	B	-	-	15.0	B
	PM	12.8	B	13.8	B	13.5	B	-	-	13.4	B
West OH 9 th Street and Central Avenue	AM	-	-	13.4	B	13.3	B	12.3	B	13.3	B
	PM	-	-	17.9	B	17.8	B	14.0	B	17.7	B
West OH 7 th Street and Central Avenue	AM	17.4	B	-	-	17.6	B	-	-	17.4	B
	PM	13.7	B	-	-	13.5	B	-	-	13.6	B
West OH 6 th Street and Central Avenue	AM	-	-	14.3	B	14.1	B	-	-	14.2	B
	PM	-	-	15.2	B	15.5	B	-	-	15.2	B
West OH 5 th Street and Central Avenue	AM	26.0	C	-	-	25.3	C	12.7	B	25.4	C
	PM	18.8	B	-	-	19.4	B	8.8	A	17.6	B
West OH 4 th Street and Central Avenue	AM	-	-	16.6	B	15.6	B	16.5	B	16.1	B
	PM	-	-	30.0	C	30.4	C	25.6	C	29.9	C
West OH 3 rd Street and Central Avenue	AM	37.2	D	38.0	D	30.5	C	36.9	D	37.2	D
	PM	35.4	D	37.4	D	36.5	D	35.4	D	36.6	D
West OH 4 th Street and Plum Street	AM	-	-	12.7	B	-	-	12.8	B	12.7	B
	PM	-	-	14.0	B	-	-	14.3	B	14.0	B
West OH 3 rd Street and Plum Street	AM	-	-	12.4	B	-	-	12.4	B	12.4	B
	PM	-	-	12.4	B	-	-	12.7	B	12.4	B
West OH 4 th Street and Elm Street	AM	-	-	13.9	B	13.9	B	-	-	13.9	B
	PM	-	-	16.2	B	16.5	B	-	-	16.3	B
West OH 3 rd Street and Elm Street	AM	-	-	14.1	B	14.2	B	-	-	14.1	B
	PM	-	-	14.4	B	14.5	B	-	-	14.4	B
West OH 2 nd Street and Elm Street	AM	14.5	B	-	-	14.8	B	-	-	14.5	B
	PM	13.8	B	-	-	13.5	B	-	-	13.7	B
West OH 3 rd Street and Clay Wade Bailey Bridge	AM	20.6	C	11.7	B	19.9	B	-	-	18.0	B
	PM	59.2	E	64.9	E	54.5	D	-	-	60.6	E

In general, most of the intersections in the study area currently operate at a LOS B and C. However, the intersections adjacent to the Kyles Lane Interchange at the southern end of the study area operate at a LOS F during both the AM and PM peak periods. Several intersections in Kentucky operate at a LOS D. The West 3rd Street and Central Avenue intersection in Cincinnati operates at a LOS D during both AM and PM peak

periods. The West 3rd Street and Clay Wade Bailey Bridge intersection in Cincinnati operates at LOS E during the PM peak hour.

5.3 Future Conditions (2030)

Year 2030 volumes were obtained using the OKI regional travel demand model assignments as a basis for applying a hybrid mix of the ratio and additive methods. The 2005 design hour volumes were adjusted to reflect the design hour volumes in Year 2030. For at-grade intersections, these volumes were then adjusted to maintain balanced flow through the respective corridors.

5.3.1 Mainline Segment Analysis

The following tables present the results of the 2030 future condition analyses performed on the mainline segments of I-75, I-71, and US 50 within the study area.

Table 5-14: 2030 I-75 Northbound Mainline Segments

Segment		AM			PM		
From	To	Volume	LOS ¹	Density (pc/mi/ln) ²	Volume	LOS ¹	Density (pc/mi/ln) ²
Kyles Lane Merge	West KY 12 th Street Diverge	7736	F	*	6434	F	*
West KY 12 th Street Diverge	West KY 5 th Street Diverge	7594	F	*	6011	E	40.5
West KY 5 th Street Diverge	Pike Street Merge	7001	F	*	5610	D	35.0
Pike Street Merge	West KY 4 th Street Merge	8008	F	*	6028	E	40.8
Brent Spence Bridge South	Brent Spence Bridge North	9253	F	*	6884	D	30.3
I-71 Diverge	West OH 5 th Street Diverge	5348	F	*	4628	F	*
West OH 5 th Street Diverge	US 50 Diverge	4460	F	*	4340	F	*
US 50 Diverge	I-71 Merge	3626	D	33.1	3737	D	34.9
I-71 Merge	West OH 9 th Street Merge	5996	C	25.1	6971	D	30.9
West OH 9 th Street Merge	Freeman Avenue Merge	6204	D	26.2	7610	E	36.2
Freeman Ave Merge	Ezzard Charles Drive Merge	6612	D	28.6	8156	E	42.3
Ezzard Charles Drive Merge	Western Hills Viaduct Diverge	6699	D	29.1	8,766	F	*
Western Hills Viaduct Diverge	Western Hills Viaduct/Bank Street Merge	6236	D	26.4	8,134	E	42.0
North of Western Hills Viaduct Merge		7104	D	31.9	8,850	F	*

LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

* Capacity Exceeds HCS calculations

Table 5-15: 2030 I-75 Southbound Mainline Segments

Segment		AM			PM		
From	To	Volume	LOS ¹	Density	Volume	LOS ¹	Density
				(pc/mi/ln) ²			(pc/mi/ln) ²
North of Western Hills Viaduct		9333	F	*	7688	E	36.9
Western Hills Viaduct Merge	Findlay Street Diverge	9985	E	40.2	7662	C	25.8
Findlay Street Diverge	Ezzard Charles Diverge	9345	F	*	7023	D	31.3
Ezzard Charles Drive Diverge	Freeman Avenue Diverge	8934	F	*	6763	D	29.5
Ezzard Charles Drive Merge	West OH 7 th Street Diverge	8516	F	*	6750	D	29.5
I-71 Diverge	West OH 9 th Street Merge	3951	E	39.2	3526	D	31.5
West OH 9 th Street Merge	US 50 Merge	4228	F	*	4124	E	43.5
US 50 Merge	I-71 Merge	4781	F	*	4904	F	*
Brent Spence Bridge North	Brent Spence Bridge South	6636	D	28.7	9114	F	*
West KY 5 th Street Diverge	Pike Street Diverge	6158	C	26.0	8641	F	*
Pike Street Diverge	West KY 4 th Street Merge	5821	C	24.3	8034	E	40.8
West KY 4 th Street Merge	West KY 12 th Street Merge	6199	D	26.2	9125	F	*
West KY 12 th Street Merge	Kyles Lane Diverge	6505	D	27.9	9671	F	*

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

Table 5-16: 2030 I-71 Northbound Mainline Segments

Segment		AM			PM		
From	To	Volume	LOS ¹	Density	Volume	LOS ¹	Density
				(pc/mi/ln) ²			(pc/mi/ln) ²
South of West OH 2 nd Street		3905	E	37.8	2256	C	18.4
West OH 2 nd Street Diverge	I-75 Southbound/ US 50 Merge	3097	D	26.0	1866	B	15.3
East of I-75 Southbound/US 50 Merge		6290	D	26.5	4621	C	18.9

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

Table 5-17: 2030 I-71 Southbound Mainline Segments

Segment		AM			PM		
From	To	Volume	LOS ¹	Density	Volume	LOS ¹	Density
				(pc/mi/ln) ²			(pc/mi/ln) ²
East of I-75 Northbound Diverge		4327	B	17.7	6086	C	25.4

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

Table 5-18: 2030 US 50 Westbound Mainline Segments

Segment		AM			PM		
From	To	Volume	LOS ¹	Density (pc/mi/ln) ²	Volume	LOS ¹	Density (pc/mi/ln) ²
I-75 Northbound	West OH 6 th Street Diverge	1961	A	7.9	2816	B	11.3
Gest Street Diverge	Dalton Avenue Diverge	1258	A	5.1	2574	A	10.4
Dalton Avenue Diverge	Freeman Avenue Merge	799	A	4.3	2302	B	12.4
West of Freeman Avenue Merge		960	A	5.2	2730	B	14.7

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

Table 5-19: 2030 US 50 Eastbound Mainline Segments

Segment		AM			PM		
From	To	Volume	LOS ¹	Density (pc/mi/ln) ²	Volume	LOS ¹	Density (pc/mi/ln) ²
West of Freeman Ave		3462	C	18.6	1110	A	6.0
Freeman Avenue Diverge	Freeman Avenue Merge	2906	C	23.7	972	A	7.8
Freeman Avenue Merge	Linn Street Merge	2965	B	15.9	1329	A	7.1
Linn Street Merge	West OH 5 th Street Diverge	3112	B	12.5	2088	A	8.4
West OH 5 th Street Diverge	I-75 Southbound Diverge	2563	C	20.7	1963	B	15.8

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

In 2030, it is projected that almost all of I-75 within the study area will operate at a LOS D, E or F in the AM and PM peak hours. The northbound lanes of I-71 will operate at LOS D and E during the AM peak. The I-71 southbound lanes during the AM and PM peak hours and the northbound lanes during the PM peak hours will operate at LOS B and C. Design hour volumes estimated for US 50 indicate that it will continue to operate at LOS A, B, and C.

5.3.2 Ramp-Freeway Junctions

The following tables present the results for the 2030 future condition analyses performed on interchange ramps of I-75, I-71, and US 50 within the study area.

Table 5-20: 2030 I-75 Northbound Ramps

Ramp	Junction	AM		PM	
		LOS ¹	Density (pc/mi/ln) ²	LOS ¹	Density (pc/mi/ln) ²
Kyles Lane Entrance Ramp	Merge	F*	45.9	F*	37.4
West KY 12 th Street Exit Ramp	Diverge	F*	43.4	F*	49.2
West KY 5 th Street Exit Ramp	Diverge	F*	43.1	F*	37.3
Pike Street Entrance Ramp	Merge	F*	46.9	F*	34.5

Table 5-20: 2030 I-75 Northbound Ramps

Ramp	Junction	AM		PM	
		LOS ¹	Density (pc/mi/ln) ²	LOS ¹	Density (pc/mi/ln) ²
West OH 4 th Street Entrance Ramp**	Add Lane	F*	[U]	E	40.8 [U]
I-71 Northbound Exit Ramp**	Drop Lane	F*	[U]	F*	[D]
West OH 5 th Street Exit Ramp	Diverge	F*	54.3	F*	47.2
US 50 Exit Ramp	Diverge	F*	45.8	F*	44.6
I-71 Entrance Ramp**	Add Lane	D	33.1 [U]	D	34.9 [U]
West OH 9 th Street Entrance Ramp	Merge	C	20.4	C	22.9
Freeman Avenue Entrance Ramp	Merge	C	20.4	F*	23.3
Ezzard Charles Drive Entrance Ramp	Merge	C	21.5	F*	24.7
Western Hills Viaduct Exit Ramp	Diverge	D	30.0	F*	39.8
Bank Street Entrance Ramp	Merge	C	23.1	F*	27.9

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

* Failed capacity check for ramp or freeway (implies that the density exceeds the capacity of the facility)

** Values represent the result for the worst operating component of the ramp junction

[R] – Ramp operates the worst

[U] – Upstream freeway operates the worst

[D] – Downstream freeway operates the worst

Table 5-21: 2030 I-75 Southbound Ramps

Ramp	Junction	AM		PM	
		LOS ¹	Density (pc/mi/ln) ²	LOS ¹	Density (pc/mi/ln) ²
Western Hills Viaduct Exit Ramp	Diverge	F*	41.5	E	35.8
Western Hills Entrance/Findlay Street Exit	Weave	F*	51.2	E	36.1
Ezzard Charles Drive Exit Ramp	Diverge	F*	41.8	D	31.0
Freeman Avenue Exit Ramp	Diverge	F*	40.8	D	30.4
Ezzard Charles Drive Entrance/West OH 7 th Street Exit	Weave	E	42.3	D	29.7
I-71/ West OH 5 th Street Exit Ramp**	Drop	E	39.2 [D]	D	31.5 [D]
West OH 9 th Street Entrance Ramp	Merge	F*	40.2	F*	39.0
US 50 Entrance Ramp	Merge	F*	45.8	F*	46.8
I-71 Entrance Ramp**	Add	F*	[D]	F*	[R]
West OH 5 th Street Exit Ramp	Diverge	D	34.2	F*	44.9
Pike Street Exit Ramp	Diverge	D	29.9	F*	42.1
West KY 4 th Street Entrance Ramp	Merge	B	19.0	F*	22.4
West KY 12 th Street Entrance Ramp	Merge	C	24.7	F*	33.6
Kyles Lane Exit Ramp	Diverge	D	32.7	F*	48.6

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

* Failed capacity check for ramp or freeway (implies that the density exceeds the capacity of the facility)

** Values represent the result for the worst operating component of the ramp junction

[R] – Ramp operates the worst

[U] – Upstream freeway operates the worst

[D] – Downstream freeway operates the worst

Table 5-22: 2030 I-71 Northbound Ramps

Ramp	Junction	AM		PM	
		LOS ¹	Density (pc/mi/ln) ²	LOS ¹	Density (pc/mi/ln) ²
West OH 2 nd Street Exit Ramp	Diverge	F*	38.9	C	22.6
I-75 Southbound Entrance Ramp**	Add Lane	D	26.7 [R]	C	22.4 [R]

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

* Failed capacity check for ramp or freeway (implies that the density exceeds the capacity of the facility)

** Values represent the result for the worst operating component of the ramp junction

[R] – Ramp operates the worst

[U] – Upstream freeway operates the worst

[D] – Downstream freeway operates the worst

Table 5-23: 2030 I-71 Southbound Ramps

Ramp	Junction	AM		PM	
		LOS ¹	Density (pc/mi/ln) ²	LOS ¹	Density (pc/mi/ln) ²
West OH 3 rd Street Entrance Ramp	Merge	B	18.3	F*	39
I-75 Northbound/US 50 Exit Ramp**	Drop Lane	C	21.3 [R]	D	32.5 [D]

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

* Failed capacity check for ramp or freeway (implies that the density exceeds the capacity of the facility)

** Values represent the result for the worst operating component of the ramp junction

[R] – Ramp operates the worst

[U] – Upstream freeway operates the worst

[D] – Downstream freeway operates the worst

Table 5-24: 2030 US 50 Westbound Ramps

Ramp	Junction	AM		PM	
		LOS ¹	Density (pc/mi/ln) ²	LOS ¹	Density (pc/mi/ln) ²
I-75/I-71 Entrance Ramp	Add	B	14.5	B	14.4 [R]
Gest Street Exit Ramp	Diverge	B	15.6	B	16.8
Dalton Avenue Exit Ramp**	Drop	A	7.5 [R]	B	12.4 [D]
Freeman Avenue Entrance Ramp	Merge	A	6.0	B	16.1

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

** Values represent the result for the worst operating component of the ramp junction

[R] – Ramp operates the worst

[U] – Upstream freeway operates the worst

[D] – Downstream freeway operates the worst

Table 5-25: 2030 US 50 Eastbound Ramps

Ramp	Junction	AM		PM	
		LOS ¹	Density (pc/mi/ln) ²	LOS ¹	Density (pc/mi/ln) ²
Freeman Avenue Exit Ramp	Drop	C	23.7 [D]	A	7.8 [D]
Freeman Avenue Entrance Ramp	Add Lane	C	23.7 [U]	A	7.8 [U]
West OH 6 th Entrance/ West OH 5 th Exit	Weave	B	16.7	B	12.0
I-75 Southbound Exit Ramp	Drop	D	29.3 [D]	B	17.0 [D]

¹ LOS = Level of Service

² pc/mi/ln = passenger car per mile per lane

** Values represent the result for the worst operating component of the ramp junction

[R] – Ramp operates the worst

[U] – Upstream freeway operates the worst

[D] – Downstream freeway operates the worst

Traffic analyses indicate that most of the ramp junctions on I-75 will degraded to a LOS F in 2030 during both the AM and PM peak hours. The I-71 northbound ramps during the AM peak and southbound ramps during the PM peak will operate at LOS D and F. The majority of design hour volumes estimated for US 50 westbound and eastbound ramps indicate that they will continue to operate at LOS A, B, and C.

5.3.3 Local Street At-Grade Intersections

Table 5-26 presents the future 2030 results obtained for each intersection location. The highlighting reflects the overall intersection level of service and not individual movements. Seven intersections in Kentucky will operate at a LOS F in 2030. One intersection in Ohio will operate at a LOS E in 2030.

Table 5-26: 2030 Brent Spence Bridge Study Area Intersections

Intersection	Time Period	Eastbound		Westbound		Northbound		Southbound		Overall	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
West KY 4 th Street and Crescent Avenue (Stop Controlled)	AM	-	-	12.5	B	-	-	-	-	-	-
	PM	-	-	12.9	B	-	-	-	-	-	-
West 4 th Street and Philadelphia Street	AM	-	-	63.2	E	10.1	B	59.4	E	52.6	D
	PM	-	-	59.0	E	22.4	C	60.1	E	52.4	D
West KY 4 th Street and Bakewell Street	AM	-	-	15.5	B	15.6	B	15.7	B	15.5	B
	PM	-	-	17.5	B	17.2	B	17.0	B	17.4	B
West KY 4 th Street and Main Street	AM	-	-	134.6	F	129.8	F	27.2	C	111.7	F
	PM	-	-	124.1	F	10.1	B	127.0	F	117.8	F
West KY 5 th Street and Crescent (Stop Controlled)	AM	-	-	9.5	A	-	-	-	-	-	-
	PM	-	-	11.0	B	-	-	-	-	-	-
West KY 5 th Street and Philadelphia Street	AM	18.4	B	-	-	18.3	B	19.1	B	18.5	B
	PM	17.5	B	-	-	15.0	B	17.3	B	17.0	B

Table 5-26: 2030 Brent Spence Bridge Study Area Intersections

Intersection	Time Period	Eastbound		Westbound		Northbound		Southbound		Overall	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
West KY 5 th Street and Bakewell Street (Stop Controlled)	AM	-	-	-	-	22.5	C	34.5	D	-	-
	PM	-	-	-	-	12.6	B	13.4	B	-	-
West KY 5 th Street and Main Street	AM	32.8	C	-	-	19.2	B	33.7	C	28.1	C
	PM	44.6	D	-	-	5.9	A	44.6	D	39.9	D
Pike Street and Bullock Street	AM	42.5	D	10.1	B	-	-	42.8	D	39.1	D
	PM	54.4	D	54.0	D	-	-	56.2	E	54.9	D
Pike Street and Jillians Way	AM	44.3	D	8.9	A	44.0	D	-	-	41.3	D
	PM	25.0	C	22.1	C	25.0	C	-	-	23.6	C
West KY 12 th Street and Bullock Street (Stop Controlled)	AM	125.0	F	18.5	C	-	-	20.3	C	70.0	F
	PM	12.6	B	14.8	B	-	-	16.1	C	15.2	C
West KY 12 th Street and Jillians Way (Stop Controlled)	AM	252.0	F	21.5	C	12.0	B	-	-	161.5	F
	PM	66.1	F	74.6	F	31.6	D	-	-	60.0	F
Kyles Lane and Dixie Highway	AM	340.5	F	241.7	F	344.3	F	25.4	C	316.9	F
	PM	214.4	F	215.6	F	212.5	F	24.9	C	212.3	F
I-75 Southbound Ramps and Kyles Lane	AM	-	-	22.1	C	14.2	B	21.8	C	18.6	B
	PM	-	-	62.8	E	38.4	D	57.8	E	52.2	D
I-75 Northbound Ramps and Kyles Lane	AM	65.8	E	-	-	62.2	E	4.3	A	43.2	D
	PM	24.6	C	-	-	25.4	C	17.3	B	21.6	C
Highland Pike and Kyles Lane	AM	24.0	C	208.5	F	207.2	F	85.7	F	163.4	F
	PM	273.0	F	237.9	F	17.7	B	270.0	F	188.3	F
Bank Street and Dalton Avenue	AM	13.5	B	16.1	B	14.0	B	15.9	B	15.3	B
	PM	10.3	B	24.3	C	21.1	C	24.0	C	22.6	C
Bank Street and Winchell Avenue	AM	13.9	B	13.6	B	14.0	B	-	-	13.9	B
	PM	15.0	B	15.1	B	15.1	B	-	-	15.1	B
Central Avenue and Linn Street	AM	28.4	C	13.3	B	20.2	C	27.7	C	24.1	C
	PM	15.7	B	29.7	C	18.8	B	29.9	C	24.9	C
Bank Street and Linn Street (Stop Controlled)	AM	11.8	B	-	-	-	-	-	-	-	-
	PM	14.0	B	-	-	-	-	-	-	-	-
Findlay Street and Dalton Avenue	AM	17.3	B	20.6	C	18.4	B	11.3	B	15.2	B
	PM	19.3	B	20.7	C	20.4	C	11.2	B	16.4	B
Findlay Street and Western Avenue	AM	14.0	B	14.2	B	-	-	13.9	B	14.0	B
	PM	14.4	B	13.5	B	-	-	14.1	B	14.1	B
Findlay Street and Winchell Avenue	AM	14.2	B	13.3	B	14.0	B	-	-	14.0	B
	PM	14.6	B	13.9	B	14.7	B	-	-	14.6	B
West Liberty Street and Dalton Avenue	AM	14.9	B	15.7	B	13.3	B	16.0	B	15.1	B
	PM	14.3	B	16.6	B	14.6	B	16.6	B	15.9	B
West Liberty Street and Western Avenue	AM	14.8	B	14.5	B	-	-	14.7	B	14.7	B
	PM	13.6	B	14.6	B	-	-	14.9	B	14.6	B
West Liberty Street and Winchell Avenue	AM	15.3	B	13.6	B	15.1	B	-	-	14.8	B
	PM	13.3	B	16.4	B	16.0	B	-	-	15.6	B
West Liberty Street and Linn Street	AM	16.3	B	15.2	B	16.3	B	15.7	B	16.0	B
	PM	14.5	B	17.6	B	17.4	B	17.3	B	17.0	B
Ezzard Charles Drive Westbound and Western Avenue	AM	-	-	14.0	B	-	-	13.8	B	13.8	B
	PM	-	-	14.4	B	-	-	14.3	B	14.3	B

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Table 5-26: 2030 Brent Spence Bridge Study Area Intersections

Intersection	Time Period	Eastbound		Westbound		Northbound		Southbound		Overall	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Ezzard Charles Drive Westbound and Winchell Avenue	AM	-	-	15.9	B	15.6	B	-	-	15.7	B
	PM	-	-	20.7	C	20.0	B	-	-	20.5	C
Ezzard Charles Drive Eastbound and Western Avenue	AM	14.6	B	-	-	-	-	14.1	B	14.2	B
	PM	14.4	B	-	-	-	-	14.6	B	14.6	B
Ezzard Charles Drive Eastbound and Winchell Avenue	AM	14.3	B	-	-	14.6	B	-	-	14.4	B
	PM	13.6	B	-	-	13.8	B	-	-	13.7	B
Ezzard Charles Drive and Linn Street	AM	13.3	B	12.2	B	13.8	B	12.7	B	13.2	B
	PM	12.8	B	14.4	B	14.7	B	13.2	B	14.0	B
Gest Street and Dalton Avenue	AM	16.8	B	16.4	B	16.3	B	16.3	B	16.4	B
	PM	17.5	B	17.3	B	13.8	B	17.8	B	17.0	B
Gest Street and Western Avenue	AM	15.4	B	15.4	B	-	-	15.3	B	15.3	B
	PM	15.2	B	14.3	B	-	-	15.3	B	15.0	B
Gest Street and Freeman Avenue	AM	23.3	C	40.2	D	36.0	D	40.0	D	37.4	D
	PM	15.3	B	26.6	C	26.5	C	26.2	C	23.2	C
Linn Street and Gest Street	AM	14.5	B	18.3	B	17.9	B	10.7	B	15.7	B
	PM	17.3	B	18.0	B	17.9	B	10.6	B	16.3	B
West Court Street and Linn Street (Stop Controlled)	AM	11.8	B	14.5	B	-	-	-	-	-	-
	PM	17.6	C	19.7	C	-	-	-	-	-	-
West OH 8 th Street and Dalton Avenue	AM	15.2	B	21.1	C	17.9	B	20.6	C	17.7	B
	PM	17.3	B	28.0	C	13.6	B	28.0	C	24.3	C
West OH 8 th Street and Freeman Avenue	AM	26.1	C	21.3	C	25.2	C	22.6	C	24.4	C
	PM	24.0	C	22.5	C	22.2	C	23.2	C	23.1	C
West OH 8 th Street and Linn Street	AM	25.9	C	17.0	B	26.1	C	24.4	C	24.4	C
	PM	22.0	C	22.9	C	21.5	C	22.8	C	22.5	C
West OH 6 th Street and Linn Street	AM	-	-	-	-	-	-	8.2	A	-	-
	PM	-	-	-	-	-	-	12.3	B	-	-
Dalton Avenue and Linn Street	AM	16.4	B	17.2	B	17.5	B	14.4	B	16.5	B
	PM	23.4	C	13.9	B	24.0	C	17.9	B	19.8	B
Central Avenue and West Court Street	AM	16.0	B	13.6	B	16.1	B	-	-	15.8	B
	PM	12.9	B	13.7	B	13.7	B	-	-	13.5	B
West OH 9 th Street and Central Avenue	AM	-	-	13.9	B	14.1	B	12.3	B	14.0	B
	PM	-	-	18.9	B	18.8	B	14.2	B	18.7	B
West OH 7 th Street and Central Avenue	AM	18.4	B	-	-	18.5	B	-	-	18.4	B
	PM	14.5	B	-	-	14.5	B	-	-	14.5	B
West OH 6 th Street and Central Avenue	AM	-	-	16.0	B	15.7	B	-	-	15.9	B
	PM	-	-	19.6	B	19.6	B	-	-	19.6	B
West OH 5 th Street and Central Avenue	AM	28.9	C	-	-	27.7	C	14.9	B	28.2	C
	PM	25.1	C	-	-	24.3	C	7.1	A	22.5	C
West OH 4 th Street and Central Avenue	AM	-	-	21.0	C	20.8	C	20.7	C	20.9	C
	PM	-	-	33.9	C	36.6	D	35.9	D	35.2	D
West OH 3 rd Street and Central Avenue	AM	38.7	D	37.2	D	37.4	D	37.6	D	37.7	D
	PM	68.8	E	67.3	E	62.6	E	68.5	E	66.3	E
West OH 4 th Street and Plum Street	AM	-	-	13.1	B	-	-	13.1	B	13.1	B
	PM	-	-	15.2	B	-	-	15.5	B	15.2	B

Table 5-26: 2030 Brent Spence Bridge Study Area Intersections

Intersection	Time Period	Eastbound		Westbound		Northbound		Southbound		Overall	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
West OH 3 rd Street and Plum Street	AM	-	-	12.6	B	-	-	12.4	B	12.6	B
	PM	-	-	13.6	B	-	-	13.3	B	13.6	B
West OH 4 th Street and Elm Street	AM	-	-	15.0	B	15.2	B	-	-	15.2	B
	PM	-	-	15.6	B	15.8	B	-	-	15.7	B
West OH 3 rd Street and Elm Street	AM	-	-	15.2	B	14.9	B	-	-	15.1	B
	PM	-	-	17.3	B	17.8	B	-	-	17.4	B
West OH 2 nd Street and Elm Street	AM	15.7	B	-	-	15.5	B	-	-	15.7	B
	PM	14.7	B	-	-	14.8	B	-	-	14.7	B
West OH 3 rd Street and Clay Wade Bailey Bridge	AM	23.1	C	16.7	B	23.0	C	-	-	21.0	C
	PM	30.3	C	31.2	C	30.5	C	-	-	30.8	C

5.4 Travel Time Study

In order to obtain an understanding of travel times within the study area, a travel time study was conducted in December 2005, along the I-75 mainline from the Kyles Lane Interchange, in Kentucky to the Western Hills Viaduct (Harrison Avenue exit), in Ohio. Travel times were also recorded between interchanges. The analysis determined average delays during peak hours within the study area. The travel time study is in Appendix B.

5.4.1 Peak AM Hours (7:30 – 8:30)

The average I-75 southbound speed during the AM peak was no more than 10 miles per hour (mph) below the posted speed limit of 55 mph. Some sections of the corridor were traveled at speeds higher than the 55 mph posted speed limit. During this time the test vehicle never went below five mph, so no delay was recorded. The cumulative average travel time from Western Hills Viaduct to the Kyles Lane diverge was 5.60 minutes. This compares to a cumulative travel time of 5.64 minutes assuming a constant speed of 55 mph.

The average I-75 northbound speed during the AM peak was approximately 29 mph from Kyles Lane in Kentucky to the Brent Spence Bridge; however, the travel speed increased markedly on the Ohio side of the river. More than 23 seconds of delay, on average, occurred between the Kyles Lane merge and West KY 12th Street. The cumulative average travel time from the Kyles Lane merge to Western Hills Viaduct was 9.47 minutes, almost four minutes greater than the southbound travel time along the same corridor during the AM peak. The cumulative travel time assuming a constant speed of 55 mph was 5.69 minutes, which was also almost four minutes less than the average.

The Cincinnati Central Business District (CBD) lies in the middle of the I-75 corridor. Intuitively, this suggests that during the AM peak when commuters are traveling to work, travel speeds would be less traveling northbound from Kyles Lane to just north of Brent Spence Bridge and would then increase in Ohio. It also could indicate that travel speeds would be less traveling southbound from Western Hills Viaduct to the Brent Spence Bridge and then might increase in Kentucky. In the case of the I-75 northbound traffic, this appears to be true. However, the I-75 southbound traffic seems to travel at high speeds throughout the corridor.

5.4.2 Peak PM Hours (4:30 – 5:30)

The average I-75 southbound speed during the PM peak was below the posted speed limit (55 mph) along the entire corridor. It was particularly slow between Ezzard Charles Drive and the I-71 merge where the average speeds in this area were below 20 mph. Two sections (Western Hills Viaduct to the Findlay Street Diverge and Ezzard Charles Drive to the Freeman Avenue Ramp) had average delays greater than 10 seconds, which means that the traffic stream was either stopped or moving at speeds below five mph for an average duration of 10 seconds. The cumulative average travel time from Western Hills Viaduct to the Kyles Lane diverge was 14.73 minutes, which was nine minutes greater than the southbound travel time along the same corridor during the AM peak. The cumulative travel time, assuming a constant speed of 55 mph, was 5.64 minutes, which was also more than nine minutes less than the average.

The average I-75 northbound speed during the PM peak was above the posted speed limit (55 mph) along the entire corridor except between West KY 5th Street and the Brent Spence Bridge in Kentucky. The cumulative average travel time from the Kyles Lane merge to the Western Hills Viaduct was 5.60 minutes, which was more than nine minutes less than the travel time in the southbound direction. This compares to a cumulative travel time of 5.69 minutes assuming a constant speed of 55 mph.

The CBD district lies in the middle of the I-75 corridor. During the PM peak, it would seem that traffic leaving the CBD would be heavier than traffic leaving the CBD due to commuters traveling home. However, the southbound traffic travels at speeds lower than the posted speed limit throughout the corridor and is slowest north of the Brent Spence Bridge. The northbound traffic travels above the posted speed limit throughout most of the corridor, only dropping below the posted speed limit south of the Brent Spence Bridge.

5.5 Travel Origin and Destination

An Origin Destination Study (OD) was completed during December 2005 to document and understand travel patterns and travel times of cars and trucks using the Brent Spence Bridge during morning, mid-afternoon, and evening peak periods. The OD study is in Appendix C. Five sites along I-75 (including the Brent Spence Bridge), I-71, US 50, and I-471 were monitored to investigate travel patterns within Greater Cincinnati area.

5.5.1 Travel Pattern

The OD study determined that of the cars using the Brent Spence Bridge approximately 40 percent were expected to be going to or coming from the other four study sites:

- I-71 at Oak Street overpass (approximately 20% to 25%);
- I-75 at Crescentville overpass (approximately 5% to 10%);
- I-471 at Daniel Beard Bridge (approximately 3% to 7%); and
- US 50 Ramps to/from I-71/I-75/I-471 (east of Daniel Beard Bridge, approximately 1% to 5%).

The remaining 60 percent of cars were going to, or coming from unknown locations.

The percentage of trucks remaining on the interstate/freeway system was higher than that of passenger vehicles. At least 70 percent of trucks using the Brent Spence Bridge were going to, or coming from the other four study sites:

- I-75 at Crescentville overpass (approximately 45% to 70%);
- I-71 at Oak Street overpass (approximately 20% to 30%);
- I-471 at Daniel Beard Bridge (approximately 1% to 8%); and
- US 50 Ramps (east of Daniel Beard Bridge, approximately 1% to 5%).

The remaining 30 percent of trucks were going to, or coming from unknown locations.

5.5.2 Travel Time

The longest of the OD pairs studied, Brent Spence Bridge and I-75 at the Crescentville overpass, ranged from 17 to 23 minutes. The average travel times were similar in both directions and were high during the morning and evening peak periods. Travel times were lower during the mid-afternoon (Appendix C). Average travel time for cars traveling between the Brent Spence Bridge and I-71 at Oak Street overpass ranged between 4.25 and 5.57 minutes. Travel time for cars between Brent Spence Bridge and Daniel Beard Bridge ranged between 5.30 and 8.25 minutes. Though the average travel time for cars traveling between Brent Spence Bridge and US 50 Ramps ranged between 2.92 and 4.43 minutes, the average travel time from Brent Spence Bridge to US 50 Ramps was 16.62 minutes during the morning peak period.

Trucks traveling between the Brent Spence Bridge and I-71 at Oak Street overpass had average travel times ranging from 4.45 to 5.58 minutes. Trucks traveling between the BSB and I-75 at Crescentville overpass had average travel times ranging from 18.18 to 23.75 minutes. Due to low volumes of trucks and/or low number of license plate matches, average travel time of trucks traveling between the Brent Spence Bridge and Daniel Beard Bridge, and between the Brent Spence Bridge and US 50 Ramps provided inconclusive results.

6.0 CRASH ANALYSIS

Crash data for the study area were provided by the KYTC Division of Traffic Operations Traffic Safety Data Service, and ODOT's Office of Roadway Safety and Mobility and Ohio Department of Public Safety. The data detail crashes occurring in the study area between 2001 and 2003. This information is presented in Appendix D – Safety Study (January 4, 2006).

6.1 Kentucky Transportation Cabinet Crash Reports

Crash reports from KYTC were analyzed to determine crash rates throughout the study area and to provide support for observations. Along the I-75 corridor within the study area, 676 accidents were logged between the years 2001 and 2003. The crash data in Appendix D show each accident for I-75 and include severity, location, date, time of day, weather condition, light condition, road condition, and accident type.

Along I-75, the crash severity rate (fatality accidents + injury accidents/total accidents) is 0.1953. Of the 676 total crashes, 349 of the accidents (51.6 percent) were attributed to rear-end type crashes; while another 219 (32.4 percent) were attributed to sideswipes.

Approximately 67.3 percent of the crashes occurred during daylight, and about 74.3 percent occurred on dry pavement. The data suggest that road and light conditions may not be large factors in influencing accidents since the majority of them took place during favorable situations.

Crash rates (accidents/100 million vehicle miles traveled) were also determined by the KYTC Division of Traffic Operations Traffic Safety Data Service. The overall crash rate for the I-71/I-75 corridor was found to be 130.363. The study area has a crash rate nearly 1.33 times higher than the average of 93 for the years 2000 to 2003 for similar types of roadways in Kentucky.

The Critical Rate Factor calculated by the KYTC Division of Traffic Operations Traffic Safety Data Service for this corridor was found to be 1.304. This number is nearly 7.67 times higher than the average of 0.17 in Kentucky for similar roadway types.

6.1.1 Kentucky Crash Data Observations

After reviewing the crash reports from KYTC and plotting the accidents in GIS, several observations were made about I-75 in the Kentucky portion of the study area.

I-75 Northbound Observations

- Approximately 56.4 percent of accidents that occurred on I-75 happened in the northbound lanes.
- There is a high concentration of single vehicle crashes near straight line mile (SLM) 189.7 on a curve.
- There is a high concentration of rear-end accidents at SLM 188.8 and 188.9 north of the Kyle's Lane Interchange.
- There is a high concentration of rear-end accidents at SLM 191.0 near the KY 12th Street/Pike Street Interchange.
- There is a high concentration of rear-end accidents at SLM 191.2 near the KY 5th Street Interchange.

I-75 Southbound Observations

- Approximately 53.6 percent of accidents that occurred on I-75 happened in the southbound lanes.
- There is a high concentration of rear-end accidents near the southbound KY 12th Street/Pike Street exit ramp.
- There is a high concentration of rear-end accidents near the KY 5th Street exit ramp from I-75 southbound.
- There is a high concentration of sideswipe accidents near the 5th Street exit ramp southbound.

The I-75 corridor through the study area within Kentucky has a crash rate higher than the statewide average. Additionally, the critical rate factor is over seven times higher than the statewide average. There are high concentrations of crashes at the KY 12th Street/Pike Street and 5th Street exits. Along I-75, more than half of the crashes are rear-end type accidents, which is an indicator of congestion already present along the corridor.

6.2. Ohio Department of Transportation Crash Reports

Traffic Crash data were obtained from ODOT's Office of Roadway Safety and Mobility for the study area, including I-75 from the Kentucky/Ohio border (SLM 0.0) to just north of the Western Hills Viaduct Interchange (SLM 2.9), and I-71 from the I-75 Interchange (SLM 0.32) to near Walnut Street (SLM 0.90). The data include ODOT's Highway Safety Program (HSP) High Crash Location Identification System (HCLIS), ODOT's list of Safety Hot Spots, a summary of crashes in the study area from ODOT and OH-1 reports for all crashes occurring between 2001 and 2003 within the study area.

6.2.1 Ohio Safety Hot Spots and Highway Safety Program Listings

Sections of I-71/I-75 on the HCLIS are shown in Table 6-1. This system is used to identify high hazard locations throughout Ohio. Many sections and interchanges located in the study area are on this list. Overall, four sections on I-75 and three sections on I-71 appear on the list. Three sections on I-75 in the Ohio portion of the study area rank in the top one hundred on the HCLIS list.

Table 6-1: Highway Safety Program Listings in the Study Area

Location	Begin Mile	End Mile	Location Type	HCLIS Rank
I-75 Corridor Segments and Interchanges	0.00	0.49	Section	22
	0.50	0.99	Section	28
	1.00	2.90	Section	36
	3.04	4.14	Section	170
I-71 Corridor Segments and Interchanges	0.00	0.29	Section	96
	0.30	0.59	Section	559
	0.60	1.10	Section	53

Source: ODOT Office of Roadway Safety and Mobility High Crash Location Identification System

Safety Hot Spots were identified using data from the Office of Roadway Safety and Mobility. The Hot Spot locations are based on the total number of accidents over a three year period in an area regardless of traffic volume and other factors. Ohio roadways are divided into two-mile segments, and the number of crashes is compared to a given frequency to establish if a hot spot exists. The entire study area in Ohio is included as a Safety Hot Spot. Table 6-2 lists the Safety Hot Spots in the Ohio portion of the study area.

Table 6-2: Safety Hot Spots

Location	Begin Mile	End Mile	Number of Crashes	Number Fatal	Number of Injuries
I-75 Corridor Segments	0.22	2.22	1005	4	239
	2.22	4.22	802	2	205
I-71 Corridor Segments	0.00	2.00	721	2	162

Source: ODOT Office of Roadway Safety and Mobility Safety Hot Spot List, 2001-2003

6.2.2 Ohio Congestion Rankings

One section of I-75 within the Ohio portion of the study area and two sections of I-71 are among the most congested in the state of Ohio. Congested areas are determined by calculating a roadway's volume to capacity ratio. Roadways with a ratio greater than

one are considered congested. The section of I-71 from SLM 0.48 to 0.50 is ranked third and one of the I-75 sections from SLM 0.71 to 0.90 is ranked second. Table 6-3 displays the congested highway sections within the study area.

Table 6-3: Congested Sections

Location	Begin Mile	End Mile	Rank
I-75 Corridor Segments	0.71	0.90	2
	1.35	17.47	31
I-71 Corridor Segments	0.00	0.22	62
	0.48	0.50	3
	1.15	1.34	4

Source: ODOT Office of Roadway Safety and Mobility Congestion List

6.3 Ohio Department of Public Safety (ODPS) Crash Reports

Crash reports from ODPS were analyzed to determine crash rates and to provide support for observations made throughout the study corridor. Along I-75 within the Ohio portion of the study area, 1,049 accidents were logged between the years 2001 and 2003 and 150 accidents were logged on I-71 in the study area during this same time period.

Along I-75, the crash severity rate (fatality accidents + injury accidents/total accidents) is 0.233. Of the 1,049 total crashes, 504 of the accidents (48 percent) were attributed to rear-end type crashes; while another 256 (25.3 percent) were attributed to sideswipes. Approximately 67.8 percent of the crashes occurred during daylight and about 69.4 percent occurred on dry pavement. The data suggest that road and light conditions may not be large factors in influencing accidents since the majority of them occurred during favorable situations.

Along I-71, the crash severity rate is 0.188. Of the accidents on I-71, 37.3 percent were rear-ends, 16.7 percent were sideswipe and 14.7 percent were fixed object crashes. Approximately 58 percent of the crashes that occurred along I-71 happened on dry pavement (approximately 40 percent on non-dry pavement), and approximately 54.7 percent occurred during daylight hours (approximately 45 percent during evening and night). These data suggest that road and light conditions are not a large factor in influencing accidents, since crashes were nearly evenly spread between favorable and non-favorable conditions (with the majority of accidents happening during daylight hours on dry pavement).

Crash rates (accidents/million vehicle miles traveled) were also determined for segments along the I-75 and I-71 corridors in the study area. Each corridor was divided into smaller segments. Based on 2002 Average Daily Traffic Volumes (ADT), crash rates were calculated for each segment and compared to the statewide average. Crash rates for each corridor were calculated with an ADT that used a weighted average of the ADTs throughout the corridors. These crash rates are shown in Table 6-4.

Table 6-4: Ohio Crash rates by segment.*

Location	Begin Mile	End Mile	Crash Rate
I-75 Corridor Segments	0.00	0.22	4.27
	0.22	0.41	5.90
	0.41	0.50	7.95
	0.50	0.63	8.30
	0.63	0.71	4.96
	0.71	0.86	2.42
	0.86	1.25	3.51
	1.25	1.43	3.10
	1.43	1.91	2.94
	1.91	2.52	2.55
	2.52	2.90	1.98
I-71 Corridor Segments	0.22	0.27	25.66
	0.27	0.48	6.27
	0.48	0.50	11.95
	0.50	0.90	1.85

*Intersection accidents are not included

The overall crash rates for all segments along both northbound and southbound I-75 were higher than the average crash rates for similar facilities in Ohio. The worst segment has a crash rate more than six times greater than the statewide average. Overall, the corridor has a crash rate of 3.54, which is more than two times greater than the Ohio statewide average rate of 1.338.

Along I-71, the crash rates for all of the segments are greater than the statewide average rates. The worst segment has a crash rate more than 19 times the statewide average. The overall crash rate for the corridor is 5.26 accidents per million vehicle miles traveled (acc/mvmt), which is nearly four times the statewide average rate of 1.338 acc/mvmt.

6.4 Ohio Crash Data Observations

After reviewing the crash reports from ODPS and plotting the accidents in GIS, several observations were made about the I-75 and I-71 corridors in the Ohio portion of the study area.

I-75 Northbound Observations

- Approximately, 44 percent of the accidents that occurred on I-75 happened in the northbound lanes.
- There is a high concentration of rear-end accidents at SLM 0.10 between the bridge and the I-71/I-75 Interchange.
- There is a high concentration of rear-end accidents at SLM 1.90 near the Findlay Street bridge.
- There is a high concentration of sideswipe accidents at SLM 0.20 near the I-71/I-75 Interchange.
- High concentrations of sideswipe crashes were observed at SLM 1.00 near the OH 9th Street entrance ramp.
- High concentrations of sideswipe crashes were observed at SLM 1.20 near the Gest Street entrance ramp.

- There is a high concentration of wet road conditions and fixed object accidents at SLM 1.30 on a curve near the ramp bridges for Gest Street
- There is a high concentration of wet road conditions and fixed object accidents at SLM 1.70 on a curve near the entrance ramp from Ezzard Charles.

I-75 Southbound Observations

- Approximately 56 percent of the accidents that occurred on I-75 happened in the southbound lanes.
- There is a high concentration of rear-end accidents at SLM 0.10 where I-75 and I-71 merge together.
- There is a high concentration of rear-end accidents at SLM 1.00 near the OH 9th Street exit ramp.
- There is a high concentration of wet road condition and rear-end accidents at SLM 1.50 near the Ezzard Charles exit.
- There is a high concentration of rear-end accidents at SLM 1.80 near the Western Hills Viaduct exit.
- There is a high concentration of fixed object accidents at SLM 1.40 near the exit for Ezzard Charles.
- There is a high concentration of sideswipe accidents on southbound I-75 at SLM 0.10 and 0.20 near the I-71/I-75 Interchange.
- There is a high concentration of sideswipe accidents near SLM 2.70 near the Western Hills Viaduct exit ramps.

I-71 Northbound Observations

- Approximately 57 percent of the accidents on I-71 were northbound.
- A high concentration of sideswipe crashes were observed near SLM 0.50, the area includes entrance traffic merging from US 50 SB and the OH 2nd Street exit.
- A high concentration of rear-end and sideswipe accidents were observed near SLM 0.80 between the Race Street and Vine Street bridges.

I-71 Southbound Observations

- A high concentration of fixed object crashes were observed near SLM 0.50 this area has merging traffic from 3rd Street and exit ramps to US 50 NB.
- There are high concentrations of rear-end accidents between SLM 0.70 and 0.80 between Elm Street and Vine Street.

Both the I-75 and I-71 corridors have been identified by ODOT as safety priorities. The entirety of both corridors (I-71 and I-75) in the study area appears on ODOT's Safety Hot Spot list. In addition, many segments on these corridors also appear on the HCLIS list. Most of the segment crash rates for individual years as well as overall exceed the Ohio statewide average rates. There are high concentrations of crashes near the I-71/I-75 Interchange. Congestion through the study area corridors are among the highest in Ohio. The segment on I-75 from SLM 0.71 to 0.90 ranked second and the segment on I-71 from SLM 0.48 to 0.50 ranked third in the state. Along I-75, almost half of the crashes are rear-end type accidents, which is an indicator of congestion already present along the corridor. As congestion continues to increase, the likelihood of additional accidents also increases.

7.0 NATURAL ENVIRONMENT

Natural resource information was gathered from the Kentucky State Nature Preserves Commission Natural Heritage Program (KSNCP), Commonwealth of Kentucky Department of Environmental and Public Protection Cabinet (KDEP), Kentucky Department of Fish and Wildlife Resources (KDFWR), Ohio Department of Natural Resources Division of Natural Areas and Preserves (ODNR), Ohio Environmental Protection Agency (OEPA), US Fish and Wildlife Service Reynoldsburg, Ohio ecological field office, and existing literature referencing the study area.

7.1 Wetlands

Potential wetland locations were obtained from KDFWR and ODNR Geographic Information Systems (GIS). Potential wetlands were identified in both Ohio and Kentucky and are shown on Exhibit 3.

The majority of wetlands are scattered throughout the Ohio portion of the study area. The wetlands are classified as open water bodies (i.e. ponds) and palustrine emergent (i.e. shallow marsh wetlands).

7.2 Streams and Rivers

The Ohio River is the major water resource within the study area. Smaller streams that may exist within the study area tend to drain to storm sewers that discharge outside the study area to either the Ohio River or the Licking River. These streams are low quality streams which have been modified by development within the study area and may be considered non-jurisdictional with the absence of hydric soils and ordinary high water mark. The locations of streams within the study area are shown on Exhibit 3.

The Ohio River is approximately 1,300 feet wide at the existing Brent Spence Bridge location. The normal pool elevation of the Ohio River in the area of the bridge is about 455 feet and the ordinary high water mark is approximately 468.5 feet

In the Northern Kentucky/Greater Cincinnati area, the Ohio River is used as a source of drinking water for over one million people in two states and is the site of increasingly intensive recreational use. Within the region, the Ohio River receives discharges from over 100 square miles of urban watershed, and other non-point sources associated with a major metropolitan area. The river's water quality, and its suitability for contact recreation in particular, is subject to rapid changes, particularly during and after precipitation events (Source: <http://www.orsanco.org/empact>, 2002).

There are no designated wild and scenic rivers, outstanding resource waters, high quality fishing streams or spawning areas in the study area.

7.3 Floodplains

Floodplains are located along the north and south banks of the Ohio River within the study area (Exhibit 3). The 100-year flood elevation is 498.5 feet. Approximately 168 acres of the 100-year floodplain are on the north side of the river and 12.5 acres of the 100-year floodplain are on the south side of the river.

7.4 Threatened and Endangered Species

7.4.1 State Listed Species

A preliminary literature search of the Kentucky State Nature Preserves Commission (KYSNPC) lists 32 plant and animal species as state endangered (17), threatened (8), or special concern (7) (Source: website <http://www.naturepreserves.ky.gov>, 2004). Nine of these species also receive federal protection. Those species not listed but receiving federal protection include two plants, one gastropod, 10 mussels, one insect, two fishes, three amphibians, one reptile, and three breeding birds (Table 7-1).

The Ohio Department of Natural Resources (ODNR) lists 13 plant and animal species as state endangered (5), threatened or potentially threatened (6), or special interest (2) (Source: ODOT North/South Initiative). Three species also receive federal protection.

**Table 7-1: State Listed Threatened and Endangered Species
 Within the Study Area**

County, State	Group	Common Name	Scientific Name	State Status
Kenton, KY	Plant	Stemless evening-primrose	<i>Oenothera triloba</i>	Threatened
Hamilton, OH	Plant	Riverbank Paspalum	<i>Paspalum fluitans</i>	Potentially Threatened
Hamilton, OH	Plant	Maypop	<i>Passiflora incarnate</i>	Threatened
Kenton, KY	Plant	Mock Orange	<i>Philadelphus inodorus</i>	Threatened
Hamilton, OH	Plant	Virginia Mallow	<i>Sida hermaphrodita</i>	Potentially Threatened
Hamilton, OH	Plant	Smooth Buttonweed	<i>Spermacoce glabra</i>	Potentially Threatened
Kenton, KY	Gastropods	Onyx Rocksnail	<i>Leptoxis praerosa</i>	Special Concern
Kenton, KY	Mussel	Elktoe	<i>Alasmidonta marginata</i>	Threatened
Kenton, KY	Mussel	Spectaclecase	<i>Cumberlandia monodonta</i>	Endangered
Hamilton, OH	Mussel	Butterfly	<i>Ellipsaria lineolata</i>	Endangered
Hamilton, OH	Mussel	Elephant-ear	<i>Elliptio crassidens crassidens</i>	Endangered
Kenton, KY	Mussel	Snuffbox	<i>Epioblasma triquetra</i>	Endangered
Kenton, KY	Mussel	Longsolid	<i>Fusconaia subrotunda subrotunda</i>	Special Concern
Kenton, KY	Mussel	Pocketbook	<i>Lampsilis ovata</i>	Endangered
Kenton, KY	Mussel	Creek Heelsplitter	<i>Lasmigona compressa</i>	Endangered
Hamilton, OH	Mussel	Threehorn Wartyback	<i>Obliquaria reflexa</i>	Threatened

**Table 7-1: State Listed Threatened and Endangered Species
 Within the Study Area**

County, State	Group	Common Name	Scientific Name	State Status
Kenton, KY	Mussel	Sheepnose	<i>Plethobasus cyphus</i>	Endangered
Hamilton, OH	Mussel	Ohio Pigtoe	<i>Pleurobema cordatum</i>	Endangered
Kenton, KY	Mussel	Pyramid Pigtoe	<i>Pleurobema rubrum</i>	Endangered
Kenton, KY	Mussel	Rabbitsfoot	<i>Quadrula cylindrica cylindrica</i>	Threatened
Hamilton, OH	Mussel	Monkeyface	<i>Quadrula metanevra</i>	Endangered
Kenton, KY	Mussel	Salamander Mussel	<i>Simpsonaias ambigua</i>	Threatened
Kenton, KY	Insect	Sixbanded longhorn beetle	<i>Simpsonaias ambigua</i>	Threatened
Hamilton, OH; Kenton, KY	Fishes	Lake Sturgeon	<i>Acipenser fulvescens</i>	Endangered
Kenton, KY	Fishes	Alligator Gar	<i>Atractosteus spatula</i>	Endangered
Hamilton, OH	Fishes	Mooneye	<i>Hiodon tergisus</i>	Special Interest
Hamilton, OH	Fishes	Burbot	<i>Lota lota</i>	Special Interest
Kenton, KY	Amphibians	Eastern Hellbender	<i>Cryptobranchus alleganiensis alleganiensis</i>	Special Concern
Kenton, KY	Amphibians	Redback Salamander	<i>Plethodon cinereus</i>	Special Concern
Kenton, KY	Amphibians	Northern Leopard Frog	<i>Rana pipiens</i>	Special Concern
Hamilton, OH; Kenton, KY	Reptiles	Kirtland's Snake	<i>Clonophis kirtlandii</i>	Threatened
Kenton, KY	Bird	Bachman's Sparrow	<i>Aimophila aestivalis</i>	Endangered
Kenton, KY	Bird	Bewick's Wren	<i>Thryomanes bewickii</i>	Special Concern
Kenton, KY	Bird	Barn Owl	<i>Tyto alba</i>	Special Concern

7.4.2 Federally listed Species

Ten federally endangered species, one federally threatened and one federal candidate species have ranges that include the study area (Table 7-2). Nine of the federally endangered species are mussels whose ranges include the Ohio River and its tributaries in Kentucky. These mussel species have been extirpated from the Ohio study area, and are likely extirpated from the Kentucky study area (KSNPC 2001). The other two federally endangered species whose ranges include the study area are the Indiana bat (*Myotis sodalis*) and running buffalo clover (*Trifolium stoloniferum*). The federally threatened bald eagle (*Haliaeetus leucocephalus*) has wintering sites in Hamilton County.

There are no documented populations of threatened and endangered species or critical

habitat within the study area. However, potential habitat characteristics for the Indiana bat, running buffalo clover, and freshwater mussels may exist within the study area. The potential presence of endangered mussel species in the Ohio River will require further specific mussel surveys to determine impacts to any species.

**Table 7-2: Federally Listed Threatened and Endangered Species
 Within the Study Area**

County	Group	Common Name	Scientific Name	Status
Hamilton Kenton	Mammal	Indiana Bat	<i>Myotis sodalis</i>	Endangered^
Hamilton Kenton	Plant	Running Buffalo Clover	<i>Trifolium Stoloniferum</i>	Endangered^*
Hamilton	Bird	Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened^
Kenton	Mussel	Purple Catspaw Pearlymussel	<i>Epioblasma o. obliquata</i>	Endangered*
Kenton	Mussel	Clubshell	<i>Pleurobema clava</i>	Endangered*
Kenton	Mussel	Fanshell	<i>Cyprogenia stegaria</i>	Endangered*
Kenton	Mussel	Northern Riffleshell	<i>Epioblasma torulosa rangiana</i>	Endangered*
Kenton	Mussel	Orange Pimpleback	<i>Plethobasus cooperianus</i>	Endangered*
Kenton	Mussel	Pink Mucket	<i>Lampsilis abrupta</i>	Endangered*
Kenton	Mussel	Ring Pink	<i>Obovaria retusa</i>	Endangered*
Kenton	Mussel	Rough Pigtoe	<i>Pleurobema plenum</i>	Endangered*
Kenton	Mussel	Sheepnose	<i>Plethobasus cyphus</i>	Candidate

^ Also listed threatened or endangered by ODNR

* Also listed threatened or endangered by KSNPC

7.5 Habitat

No unique terrestrial habitats were observed in the highly urbanized study area. The major terrestrial communities within the study area are small scattered scrub-shrub areas. These scrub-shrub habitats typically occurred in small, fragmented areas behind buildings, between buildings and road areas, or between urban areas and the Ohio River. The woody vegetation in these habitats generally consisted of honeysuckle (*Lonicera* sp.), amur honeysuckle (*Lonicera maackii*), tree-of-heaven (*Ailanthus altissima*), and other disturbance-tolerant species.

Aquatic habitat is limited within the study area to the Ohio River and is designated a warm water habitat by OEPA (OEPA 2002). Hamilton County, Ohio and Kenton County, Kentucky lie within the central lowlands physiographic province of the Ohio River (Source: www.fws.gov/orve/). This basin is the direct result of several glaciations, which covered most of the area depositing soils that are some of the richest agricultural land in the Ohio River watershed. The flat to slightly rolling topography has significantly altered the pre-glacial conditions and in some instances, buried pre-glacial streams that provide groundwater resources today (Source: www.fws.gov/orve/).

8.0 GEOTECHNICAL

8.1 Topography

The topography in the study area ranges from steep hillsides to level terrain. In Kentucky the topography is generally characterized by a severely to moderately

undulating terrain. Northern Kentucky, near the Ohio River, and north of the Ohio River in Ohio the terrain is generally characterized by a more gentle topography.

Beginning at Kyles Lane in Kentucky, existing site grades along the I-71/I-75 corridor generally range between 850 and 900 feet. Northward towards Covington and the Ohio River, the existing topography generally slopes downward to elevation 450 to 500 feet at the river. From the Kyles Lane Interchange to the KY 12th Street Interchange, the topography within the study area is relatively level along existing I-71/I-75, with moderately to steeply sloping hillsides and ridges adjacent to the interstate. From KY 12th Street to the Ohio River, the west side of the study area exhibits similar moderately to steeply sloping hillsides. The eastern side of the corridor is relatively level in comparison to the existing terrain along the western side of the corridor.

The existing grades from the Ohio River northward to the Western Hills Viaduct gradually slope upward from approximately elevation 450 feet adjacent to the Ohio River, to about elevation 550 feet near Western Hills Viaduct. The corridor area is relatively flat beyond the existing highway corridor.

8.2 Geology

The study area has been affected by major glaciations occurring during the Pleistocene Epoch. These glacial advances caused profound drainage changes and were responsible for the deposition of a variety of soils lying beneath the Covington/Cincinnati area. *The Brent Spence Bridge Replacement/rehabilitation Project Red Flag Summary Report* (2005) provides a detailed discussion of geotechnical issues as they relate to the project study area.

8.2.1 Kentucky Geology

In the Kentucky portion of the study area, soils consist of a gravelly zone topped by granular outwash deposits. Near-surface soils contain alluvial sediments, deposited by the floodwaters of both the Ohio and Licking rivers. Man has also affected soil conditions within the study area by placement of fill, construction of buildings, construction of marina and housing developments, demolition of structures, roadway grading, etc.

In the vicinity of Kyles Lane there are Illinoian age glacial soils, sometimes capped with windblown loessian silts, overlying residual clays provide a soil mantle of varying thickness on top of native bedrock. Near the Ohio River, there are valley basin sediments such as silty clays, sands, gravels, silty sands, and glacial and residual clays underlain by limestone and shale.

Ordovician bedrock underlies the study area and is composed of two major rock units. The Kope Formation is typically found from approximate elevations 510 to 690 feet. This formation is principally shale with relatively thin (four-inch to eight-inch) thick and well-spaced limestone interbeds. The overlying Maysville Formation is found from approximate elevations 690 to 800 feet. It is composed of limestone and shale, at times of equal proportions, but with limestone often predominating, with thicker (eight-inch to 22-inch) and more closely packed beds. The rock beds are highly fossiliferous and calcareous. The limestone distribution within the Maysville Formation often provides a formidable resistance to excavation efforts due to hardness, thickness of layers, and close packing of layers at some elevations.

There are no mapped coal mines within the study area. In this Northern Kentucky region solutioned limestone, or karst, sometimes develops in areas where limestone is the predominant bedrock formation. This region is within an area with limited to moderate potential for karst.

8.2.2 Ohio Geology

The study area geology north of the Ohio River generally consists predominantly of a combination of alluvium and outwash soils, with minor amount of lacustrine (lakebed) and glacial till deposits. Based on review of the published Quaternary Geology Map of Ohio (dated 1999), the western portion of the study area from the Ohio River to Western Hills Viaduct consists of recent alluvium and alluvial terraces deposited in present and former floodplains. The alluvial deposits ranged from silty clays, sands, gravels, and silty sands. The alluvium soils typically are encountered between about elevation 460 and 530 feet.

Along the eastern side of the study area, the predominant geology consists of Late Wisconsinian Age outwash soils from the Ohio River to approximately 1.5 miles north of the Ohio River. The outwash materials were deposited by meltwater in front of glacial ice in valley terraces or low plains. The outwash soils are generally granular, consisting predominantly of sands or sands and gravels. The approximate elevation of the outwash deposits range from about elevation 400 to 460 feet.

A zone of lacustrine (lakebed) deposits is generally positioned along the eastern side of the study area from about 1.5 miles north of the Ohio River to the Western Hills Viaduct. The water-deposited Illinoian Age soils are lake-bottom sediments consisting of clays and silts, and are often distinguished by their laminar depositional appearance. Occasionally, the lakebed deposits contain organics.

Approximately 1.5 miles north of the Ohio River along the eastern boundary of the study area there are minor amounts of Illinoian glacial till deposits. Till soils are typically comprised of an unsorted, unstratified conglomeration of silts, clays, sands, and gravels. The till profile often contains intermediate sand/silt seams and/or layers. The outwash and till deposits are often covered by a relatively thin loess layer.

Ordovician Age interlayered shale and limestone bedrock of the Eden Formation underlies the study area. Bedrock is generally encountered at elevations ranging from about 400 to 420 feet, and as high as about elevation 460 feet at the Western Hills Viaduct. Based on review of published and existing subsurface information, the bedrock surface is highly variable, with relatively drastic changes in depth over relatively short distances.

8.3 USDA Soil Survey Review

According to the US Department of Agriculture (USDA) Soil Survey for Boone, Campbell, and Kenton County, Kentucky, the soil types within the Kentucky portion of the study area are Urban Land (Ur) along the east side and Eden (EdE2), Faywood (FcD), and Rossmoyne (RsB) series on the west side. Soil types within the study area are shown on Exhibit 4. The urban land (Ur) is disturbed by cuts and fills and is underlain by alluvium and outwash deposits. The Eden (EdE2), Faywood (FcD) series

soils are formed of residual material weathered from calcareous shale and limestone and are generally silty clays with slow to moderately slow permeability. The Rossmoyne (RsB) series soils are silty loam and silty clays formed in loess and in glacial till. The permeability is slow in the fragipan. The shrink/swell potential of these soils varies from moderate to high with increasing depths.

According to the USDA Soil Survey for Hamilton County, Ohio, the soils within the Ohio portions of the study area belong to the Pate-Urban land (PhD) and urban land series of the Huntington (Uh), Elkinsville (UgB), Stonelick (Ux), and Martinsville (UmB) complexes. Other soil types within the vicinity of the project limits consist of urban land series of the Rossmoyne (RtB, RtC) complex. Soil types within the study area are shown on Exhibit 4. The Pate soil and Urban land (PhD) are intricately mixed and are located on the colluvial positions on the lower part of the hillsides in Ohio. The Pate soil has very slow permeability and moderate organic content. It has a high shrink-swell potential and is also considered highly corrosive to untreated steel. The Pate soils often make up parks, open space, lawns, and gardens, and are generally unsuited to use as a site for buildings and is subject to slippage.

The Urban land series soils in Ohio, are generally dark brown silty loams with moderate permeability and make up parks, open space, lawns, and gardens. The Elkinsville (UgB) and Martinsville (UmB) series soils have low strength and high frost action susceptibility, and are considered suitable for buildings and recreation areas. However, the Huntington (Uh), and Stonelick (Ux), soils are not generally suited for buildings. Closer to the Ohio River, the Huntington soils have a high water table and frost susceptibility. The Rossmoyne series (Rtb, Rtc) soils are silt to clay loams and are covered by streets, parking lots, buildings and other structures with moderate permeability above the fragipan. These soils are moderately well suited to use as a site for buildings and have high frost action susceptibility. Moreover, these soils are highly corrosive to uncoated steel and concrete.

8.4 Seismic Characteristics

Kenton County, Kentucky and Hamilton County, Ohio are located within a relatively "quiet" seismic area with regard to local seismic activity. The seismicity of the area is strongly controlled by the New Madrid fault zone in southeastern Missouri. According to the Ohio Geological Survey map of basement structures in Ohio, which indicates fault lines and tectonic zones, there are no mapped faults in the study area. There are no mapped faults which have experienced surface displacement due to seismic activity during the Holocene Epoch (past 11,000 years) within 100 miles of the project site. The closest mapped fault with such movement is the New Madrid Seismic Zone, which is about 200 miles southwest of the study area.

8.5 Landslides

Areas of the Greater Cincinnati/Northern Kentucky region are prone to slope movements and landslides. Numerous landslides have been reported and documented on the Kentucky portion of the study area. The landslides were typically observed to occur along the western side of the study area and near the southern limits from about Kyles Lane to about 1.5 miles north of Kyles Lane. Due to the hilly terrain in these areas, slope instability is common. Landslides typically occurred after heavy rain events or during extended periods of wet weather. The landslides generally occurred above the bedrock within the overburden soils, or along the soil/bedrock interface.

After the original construction of I-71/I-75 in Kentucky (between Kyles Lane and KY 12th Street) the outside northbound lane started to show signs of settlement and cracking. The distress was initial evidence of a landslide. The lane was closed for some time and eventually a large buttress embankment was built to stabilize the slope in this area. In this case, the roadway embankment was constructed on a substantial depth of colluvium, which in turn overlaid a sloping bedrock surface.

Few, if any, landslides have been reported along the eastern side of the corridor (nearer the Ohio River) in Kentucky, and in the entire study area in Ohio. In these relatively flat areas, the greatest potential for landslide or slope instability is adjacent to the Ohio River.

8.6 Soil Test Borings

Test borings performed in 1958 for the existing Brent Spence Bridge were reviewed and soil borings taken along the Ohio River banks indicated approximately 45 feet of sandy and clayey fill. The existing fill was underlain by medium stiff silty clay to a depth of about 66 feet below the existing grade. The cohesive alluvium was typically underlain by medium dense to very dense sandy outwash deposits with varying amounts of gravel to about 115 feet below the existing grade. Top of bedrock was determined to be at elevation 380 feet based on casing refusal during the soil borings.

Test borings were also performed within the Ohio River at the bridge location. These borings encountered granular soils with varying consistency and gravel content to the top of the bedrock surface. Bedrock surface was encountered at about 70 to 75 feet below the existing water surface, or at about elevation 370 feet. Rock coring was performed below the depth of auger refusal at the test boring locations. The bedrock consisted of interbedded gray shale and limestone, with the limestone occurring in one to nine-inch thick layers. Limestone comprised approximately 15 to 70 percent of the bedrock profile. Rock cores were generally extended about 10 to 30 feet below the auger refusal depths.

8.7 Geotechnical Design and Construction Considerations

The geotechnical aspects that will likely impact design and construction of a new bridge and roadway improvements within the study area are discussed in the following sections.

8.7.1 Bridge Structure Foundations

It is anticipated that a bridge structure would need to be supported on deep foundations since bedrock was generally encountered at depths in excess of 100 feet in the area of the existing Brent Spence Bridge. Deep foundations bearing on/in the existing bedrock may include driven steel piles or large diameter drilled shafts. Axial loads, seismic loads, and lateral loads, and constructability would need to be considered in determining if pile groups or large diameter shafts socketed into the underlying shale and limestone bedrock would be the foundation of choice. The deep foundations would need to be designed to provide not only adequate axial support, but also resistance to uplift and lateral forces. Deep foundations would also provide protection from vessel impact loads and scour associated with erodible soils along the Ohio River riverbed.

Support of a new bridge with a deep foundation system would be required regardless of the location that a bridge crosses the Ohio River. End bent support on both the Kentucky and Ohio sides would also likely be supported on deep foundations. Since the general subsurface profile (type of overburden and depth to bedrock) will be similar along the riverbank, construction of the new bridge to optimize geotechnical support capabilities would not play a major role in bridge location selection. A very detailed exploration of overburden soils and bedrock characteristics will determine the appropriate foundation type and its optimal performance.

8.7.2 Roadway Considerations

At-grade roadways can generally be constructed on suitable natural soils or new structural fill. It is anticipated that minimal cut/fill will be required if the I-71/I-75 roadway improvements generally follow the current interstate alignment. If the mainline is shifted significantly to the west in Kentucky, deeper cuts, including rock excavation should be anticipated. The Ordovician Age shale and limestone bedrock in the Greater Cincinnati region can generally be excavated with heavy-duty equipment.

Due existing development in the study area, the use of typical embankment fills for roadway construction will likely be limited. Mechanically Stabilized Earth (MSE) walls and/or cut walls may be considered to reduce the roadway impact area. In urban areas, due to space limitations, use of soil nail walls, cantilevered, and tieback walls may also be needed. Due to relatively large lateral loads associated with raised roadways, deep foundations are often required to provide adequate resistance to axial, lateral, and uplift forces.

In Kentucky, the largest impact to realignment of the existing roadway would be the amount of cut (soil and rock) and fill that would be required if the alignment is shifted significantly to the west of its' current location. Significant rock cuts should be anticipated if the alignment crosses through the hilly terrain to the west. Near the Ohio River in Kentucky, and on the Cincinnati side of the river, significant realignment of the I-71/I-75 mainline is limited due to existing interchange/tie-ins. Slight modifications to the alignment to either the west or the east will likely not have a significant impact on roadway construction. The presence of random fill, old structures, and moderately compressible overburden soils in some portions of the study area may warrant the need for ground modification. Various techniques for ground modification and/or improvement can be used and are anticipated.

8.7.3 Excavations

Excavations into soil and bedrock should be performed in accordance with applicable US Department of Occupational Safety and Health Organization (OSHA) requirements. Permanent slopes in soil should be 3H:1V or flatter. Steeper slopes can generally be attained in rock formations; however, the local rock formations are highly degradable and prone to erosion and/or raveling of surficial material. Vegetation should be established on soil slopes as soon as possible and rock faces should be protected where required. As a minimum, permanent slopes would need to be evaluated periodically to monitor the integrity of the slope face and look for any destabilizing aspects caused by erosion or movement.

Stability of excavated slopes will be an important consideration. Portions of the corridor may have colluvial soils (especially in the upland areas), which are prone to movement. The presence of groundwater and its impact on cut excavations and overall long-term stability of slopes is also an important consideration. The Ohio Riverbank has a history of shallow sloughing and flood events have an impact on their overall short-term and long-term stability. Rapid drawdown and its impact, especially on the riverbanks and where loess is exposed, is an important stability issue needing detailed investigation and analyses.

Excavation through the underlying unweathered gray shale and limestone bedrock, will involve additional effort. The presence of limestone layers, its thickness, and its distribution will impact the level of difficulty. Proper equipment (heavy-duty) to deal with rock breaking and removal will likely be required. Rock excavation methods may include the use of a large hydraulic trackhoe or dozer with a ripper tooth, hydraulic rock hammers or rock splitters, and/or pneumatic rock drills (air drills) or percussion machines. If deep rock cuts are necessary and/or thick limestone layers are encountered in the bedrock, rock removal by blasting techniques may be required.

9.0 SOCIAL ENVIRONMENT

9.1 Land Use

The study area follows the existing I-71/I-75 corridor through the cities of Park Hills, Fort Wright, and Covington, Kentucky; and Cincinnati, Ohio. The study area is urban in nature and consists of established residential neighborhoods and commercial properties. The primary land uses within the study area are commercial, industrial, residential, and institutional (Exhibit 5).

9.1.1 Zoning - Kentucky

The Kentucky portion of the study area is narrowly defined to the corridor immediately adjacent to I-71/I-75 with slightly larger extensions around the Kyles Lane Interchange. Zoning in the Fort Wright portion of the study area is residential on the southern side of I-71/75 at a density consistent with single family suburban style subdivisions. On the northern side of the interstate the zoning is professional office.

Zoning within the Covington portion of the study area varies. South of KY 5th Street the zoning is mostly residential. Exceptions to that include an area immediately east of I-71/75 and south of KY 5th Street that is zoned Recreation Open Space (ROS), a portion of which is occupied by Goebel Park. This area also has an Historic Preservation (HP) designation meaning it's subject to a Historic Preservation Overlay Zone. In the immediate vicinity of the I-71/75 Interchange with KY 12th Street, there is a concentration of General Commercial Zoning (GC) in the area just east of I-71/I-75 between Pike St and KY 12th Street. In the northern end of the study area closest to the Brent Spence Bridge, the zoning allows for highway commercial uses.

9.1.2 Zoning - Ohio

Zoning in the Ohio portion of the study area is primarily a mix of commercial and manufacturing zones. The largest single category is Manufacturing General (MG) which is the most permissive manufacturing zone in the Cincinnati City Zoning Code. This zone applies to almost the entire portion of the study area to the west of I-75. Along the

riverfront the zoning is, also a manufacturing zone with special provisions applicable to the riverfront area (RF-M). This zone too is very permissive and neither zone permits residential uses. A small area located to the immediate west of I-75 and north of the OH 6th Street Viaduct is zoned Commercial General, Auto Oriented (CG-A). This zone is broadly permissive regarding allowable development types; however, it does not permit residential uses.

To the east of I-75, at the southern end of the study area, the zoning is Downtown Development (DD). This district specifically governs the downtown area and the central riverfront. This zone is broadly permissive and it includes residential uses though it does preclude most manufacturing activities. Further north, in the West End neighborhood to the east of I-75, zoning is primarily made up of higher density residential districts with smaller neighborhood commercial areas mixed in.

9.2 Community Characteristics

There are several established neighborhoods within the study area in both Kentucky and Ohio (Exhibit 6). Many Covington and Cincinnati neighborhoods are cohesive communities with significant history and community infrastructure. There are several residential communities along the interstate corridor in the city of Covington. These include Kenton Hills, Lewisburg, and West Covington located west of I-71/I-75 and Peaselsburg, West Side, and Mainstrasse located east of I-71/I-75. In Cincinnati, these neighborhoods include Queensgate, West End, Fairview-Clifton Heights, and Camp Washington. With the exception of the I-71/I-75 Interstate itself and the Ohio River, no physical barriers exist between neighborhoods and the Central Business Districts within Cincinnati and Covington. The following are brief summaries of the neighborhoods within the study area.

Kenton Hills: Kenton Hills is located west of I-71/I-75 and has a park-like setting. This neighborhood includes the 700-acre Devou Park. The density of this neighborhood is less than 1,000 persons per square mile. Residents are predominately white and minorities comprise approximately three percent of the population. Median household income is \$38,281. Kenton Hills is a residential community known for its beautiful views of downtown Cincinnati.

Lewisburg: Lewisburg is located between DeVou Park and I-71/I-75 in the western part of Covington. The density of this neighborhood is less than 1,000 persons per square mile. Residents are predominately white and minorities comprise approximately six percent of the population. Median household income is \$36,250. It is a National Register historic district characterized by a mixture of older homes and is a pedestrian scale neighborhood that has retained a unique character. Lewisburg is a residential community known for its beautiful views of downtown Cincinnati.

West Covington: West Covington is located between the Ohio River and Devou Park on the westside of I-71/I-75. Residents are predominately white and minorities comprise approximately three percent of the population. Median household income is \$38,281. West Covington is a residential community known for its beautiful views of downtown Cincinnati.

Mainstrasse and West Side: The Mainstrasse/West Side neighborhoods are adjacent to each other in Covington. The density of these neighborhood ranges from 4,000 to

12,000 people per square mile. Higher densities are found in Mainstrasse and the northern section of West Side. Residents are predominately white and minorities comprise approximately 12 percent of the population. Median household income ranges from \$19,884 to \$25,618.

The Mainstrasse/West Side neighborhoods are National Register historic districts. Most of the homes were built by 1880 and include architectural styles ranging from Greek Revival to Queen Anne. The German heritage of MainStrasse is reflected in the over 800 buildings which encompass its National Register historic district. The MainStrasse commercial district is tourist-oriented and modeled after German Village in Columbus, Ohio, containing numerous specialty shops and restaurants.

Peaselburg: Peaselburg is located on the westside of Covington. Residents are predominately white and minorities comprise approximately 11.5 percent of the population. Median household income is \$30,565. This neighborhood has a mixture of race origins and churches of many denominations along with many businesses that include public and parochial schools, parks, grocery stores, corner pubs, the Boys and Girls Club and a variety of businesses.

Queensgate: The Queensgate neighborhood is not a typical residential community within the study area. The City of Cincinnati recognizes Queensgate as a 'neighborhood,' this designation does not necessarily represent a 'neighborhood' in terms of a cohesive, residential community. The southern portion of Queensgate is sparsely populated, with a density less than 1,000 people per square mile. It is heavily dominated by commercial buildings.

West End: The West End neighborhood is an urban residential community characterized by a mix of older homes, newer residential developments and multi-family dwellings. This neighborhood includes the Dayton Street, Betts-Longworth, and Laurel Homes National Register historic districts. The density of this neighborhood ranges from less than 1,000 to 20,000 people per square mile. Lower densities are found in the southern section of the West End, which is primarily commercial. Higher densities are found to the north of West Court Street within this neighborhood. The majority of the residents are minority and the median household income is \$15,104.

Fairview and Clifton Heights: The Fairview and Clifton Heights neighborhoods are located to the north of downtown Cincinnati. This community is a mixture of established neighborhoods, boutiques, restaurants, churches, hospitals, parks recreational facilities and universities. These neighborhoods are densely populated due to the student population. Many of the residences are apartment complexes and multifamily rental housing. Residents are predominately white and minorities comprise approximately 20 percent of the population. Median household income is \$53,104.

Camp Washington: Camp Washington is located to the north of downtown Cincinnati. This neighborhood contains both manufacturing and residential components. Kahn's meats and the Andrew Jergens Company are located in Camp Washington. The residential population is 1,506. Residents are predominately white and minorities comprise approximately 30 percent of the population. Median household income is \$23,352.

9.2.2 Population

Demographic data for the study area were obtained from the US Census Bureau. Census tract data were used to assess population conditions within the study area in both Kentucky and Ohio. There are 22 Census tracts within the study area, which are shown on Exhibit 7. Table 9-1 presents a summary of demographic information by county and city. Tables 9-2 and 9-3 present a summary of demographic data by Census tract.

Table 9-2 illustrates that population has decreased throughout the majority of the study area resulting in a net decrease between 1990 and 2000. Overall, the decline was more than 11 percent or approximately 5,200 persons. The percentage decline is more than the city of Cincinnati (9 percent decline) and Hamilton County (2.4 percent decline). In Kentucky, the city of Covington (0.2 percent increase) and Kenton County (6.6 percent increase) have both seen population growth.

Employment data for the study area are shown in Table 9-3. Within the study area, the largest employment sector is Educational and Health Services and is consistent with the region. The unemployment rate for the cities of Covington and Cincinnati are higher at 6.2 percent and 7.3 percent, respectively. The large majority of the Census tracts in Cincinnati are above these averages, while unemployment in Covington is mixed.

Commuting trends within the study area are shown in Table 9-4. According to the Census data, more than 23 percent of Cincinnati households do not own a car, while Covington is only slightly lower with 22 percent. On average, 35 percent of all households within the study area do not own a car. The majority of employees within the study area use their automobile to travel to their place of work. As shown in Table 9-4, the percent of workers that use public transportation in the study area is higher in Cincinnati than Covington.

Table 9-1: Demographic Information By City/County (2000)

Location	2000 Population	Percent Population White	Percent Population Minority	Median Age	Number of Households	Median Household Income
Kentucky						
Kenton County	151,464	94	6	34	59,444	\$43,906
Fort Mitchell	8,089	96.9	3.1	36	3,530	\$46,335
Fort Wright	5,681	97.3	2.7	39	2,430	\$52,394
Park Hills	2,977	96.6	3.4	37	1,382	\$42,227
Covington	43,370	87	13	33	18,257	\$30,735
Ohio						
Hamilton County	845,303	72.9	27.1	35	346,790	\$40,964
Cincinnati	331,285	52.5	47.5	32	148,095	\$29,493

Table 9-2: Demographic Information By Census Tract

Census Tract	Population 1990	Population 2000	Percent Change	Median Age	Number of Households	Median Household Income
Kentucky						
064800	3,485	3,364	-3.47	36	1,500	\$46,563
065200	3,699	4,125	11.52	42	1,795	\$47,586
064900	3,341	2,991	-10.48	37	1,393	\$41,992
065100	3,985	3,594	-9.81	26	1,465	\$25,054
061600	1,684	1,420	-15.68	32	592	\$36,250
065000	4,166	4,015	-3.62	33	1,608	\$30,565
060700	2,405	1,964	-18.34	34	901	\$25,618
060300	1,963	1,809	-7.85	33	886	\$19,884
063800	3,088	3,080	-0.26	35	1,405	\$38,281
067000	-	3,253	-	39	1,800	\$25,591
Ohio						
000100	13	641	4830.77	26	2	\$0.00
000400	763	1,114	46.00	43	818	\$12,260
000600	853	550	-35.52	41	374	\$35,278
000200	1,378	1,335	-3.12	32	593	\$15,938
000302	2,630	963	-63.38	19	384	\$7,969
000800	277	547	97.47	31	250	\$30,625
000301	2,664	1,232	-53.75	21	574	\$6,748
001400	641	663	3.43	27	252	\$26,964
001500	3,017	2,261	-25.06	35	1,087	\$7,311
001600	2,312	1,712	-25.95	27	803	\$8,175
002800	1,763	1,506	-14.58	31	502	\$23,352
002700	1,658	1,685	1.63	27	860	\$30,446

Table 9-3: Study Area Employment

Census Tract	Agriculture	Construction	Manufacturing	Wholesale Trade	Retail Trade	Transportation/ Warehousing/ Utilities	Information	Fire/Insurance/Real Estate	Professional/ Scientific/Managem ent/ Administrative/ Waste Management Services	Educational/ Health/ Social Services	Arts/ Entertainment/ Recreation/ Accommodations/Fo od Services	Other Services	Public Administration	Unemployment
Kentucky														
064800	0.00%	3.18%	10.54%	3.68%	14.05%	8.40%	5.10%	8.07%	12.84%	15.70%	8.34%	4.06%	6.04%	1.46%
065200	0.00%	6.33%	7.57%	4.19%	10.86%	6.33%	3.59%	10.16%	13.30%	21.62%	5.13%	4.24%	6.68%	1.47%
064900	0.95%	4.43%	10.20%	3.92%	9.36%	6.27%	2.91%	11.32%	11.04%	20.45%	9.69%	6.44%	3.03%	1.49%
065100	0.22%	5.11%	12.31%	6.62%	15.19%	7.27%	1.94%	8.50%	9.00%	11.66%	9.79%	4.54%	7.85%	10.33%
061600	0.00%	9.52%	16.62%	5.26%	6.82%	4.12%	3.13%	15.34%	6.96%	12.50%	12.36%	4.12%	3.27%	7.61%
065000	0.76%	9.07%	17.45%	4.63%	11.89%	6.79%	1.41%	6.03%	4.80%	19.20%	10.36%	4.04%	3.57%	7.12%
060700	0.66%	8.93%	12.35%	5.13%	9.69%	6.93%	0.66%	5.32%	9.21%	14.06%	17.57%	4.56%	4.94%	8.27%
060300	1.50%	4.63%	14.00%	2.38%	19.88%	2.75%	1.75%	1.13%	7.00%	10.25%	29.38%	2.75%	2.63%	7.19%
063800	0.91%	6.62%	12.85%	4.93%	12.72%	7.85%	4.93%	8.70%	7.85%	10.97%	9.93%	3.11%	8.63%	2.41%
067000	0.48%	6.06%	10.74%	3.10%	10.05%	8.81%	4.75%	7.50%	14.59%	14.52%	10.46%	4.20%	4.75%	8.27%
Ohio														
000100	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
000400	0.00%	6.34%	5.63%	2.82%	3.76%	10.09%	3.05%	11.50%	23.24%	14.79%	8.22%	5.63%	4.93%	18.86%
000600	0.00%	1.53%	4.86%	5.37%	3.32%	6.65%	9.72%	13.81%	22.51%	16.62%	7.16%	3.07%	5.37%	11.34%
000200	0.00%	7.65%	5.46%	0.00%	11.48%	9.02%	1.64%	6.28%	11.48%	19.40%	17.76%	8.20%	1.64%	19.03%
000302	0.00%	0.00%	23.20%	0.00%	18.40%	0.00%	16.80%	5.60%	5.60%	12.80%	6.40%	6.40%	4.80%	38.12%
000800	0.00%	4.18%	15.97%	7.98%	3.42%	13.69%	2.66%	10.27%	1.52%	19.39%	11.41%	9.51%	0.00%	8.68%
000301	0.00%	0.00%	7.69%	0.00%	2.83%	6.88%	0.00%	2.43%	24.70%	30.77%	15.79%	0.00%	8.91%	27.35%
001400	0.00%	6.70%	12.95%	0.00%	9.82%	4.91%	0.00%	3.57%	14.73%	26.34%	11.16%	6.70%	3.13%	11.46%
001500	0.00%	4.62%	11.04%	3.82%	7.63%	11.65%	2.81%	6.22%	8.84%	19.68%	11.65%	3.41%	8.63%	24.77%
001600	0.00%	5.92%	10.14%	2.25%	11.83%	5.35%	0.00%	0.00%	26.20%	11.83%	21.69%	4.79%	0.00%	30.53%
002800	0.00%	18.25%	10.66%	3.08%	15.88%	2.37%	0.00%	1.66%	6.87%	13.51%	18.01%	2.84%	6.87%	13.52%
002700	0.00%	2.10%	9.19%	4.54%	9.41%	2.33%	3.88%	4.21%	13.73%	29.01%	16.28%	4.21%	1.11%	7.57%

Table 9-4: Commuting Trends Within The Study Area

Census Tract	Total Employed	Car, Truck, Or Van	Drive Alone	Carpool	Public Transportation	Walk	Other Means	Work At Home
Kentucky								
064800	1,786	93.67%	88.58%	5.10%	1.85%	0.95%	1.29%	2.24%
065200	1,999	92.90%	86.99%	5.90%	3.55%	1.25%	0.95%	1.35%
064900	1,773	87.31%	75.69%	11.62%	4.51%	1.92%	0.68%	5.58%
065100	1,346	87.52%	72.07%	15.45%	7.13%	0.97%	1.26%	3.12%
061600	704	90.34%	64.49%	25.85%	5.82%	0.85%	2.27%	0.71%
065000	1,684	89.67%	75.83%	13.84%	5.52%	3.03%	0.53%	1.25%
060700	1,015	71.82%	55.76%	16.06%	14.98%	10.05%	2.56%	0.59%
060300	778	72.11%	48.20%	23.91%	6.68%	17.10%	1.80%	2.31%
063800	1,506	92.83%	79.75%	13.08%	5.64%	0.80%	0.00%	0.73%
067000	1,439	77.35%	67.48%	9.87%	12.37%	7.99%	0.83%	1.46%
Ohio								
000100	12	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%
000400	426	40.85%	31.69%	9.15%	16.67%	36.85%	0.00%	5.63%
000600	391	30.43%	28.90%	1.53%	6.91%	57.03%	0.00%	5.63%
000200	366	50.55%	48.63%	1.91%	36.89%	12.57%	0.00%	0.00%
000302	125	63.20%	63.20%	0.00%	10.40%	20.00%	0.00%	6.40%
000800	263	68.06%	58.56%	9.51%	18.63%	9.89%	0.00%	3.42%
000301	233	24.89%	14.16%	10.73%	57.08%	18.03%	0.00%	0.00%
001400	218	57.80%	35.78%	22.02%	38.99%	0.00%	0.00%	3.21%
001500	455	56.70%	49.67%	7.03%	31.21%	9.45%	1.54%	1.10%
001600	341	47.51%	18.77%	28.74%	27.86%	23.17%	0.00%	1.47%
002800	422	83.18%	53.55%	29.62%	3.79%	12.09%	0.00%	0.95%
002700	866	72.52%	59.82%	12.70%	7.27%	16.97%	1.85%	1.39%

9.2.1 Environmental Justice

Executive Order 12898 (*Federal actions to Address Environmental Justice in Minority Populations and Low Income Populations*, issued February 11, 1994) requires federal agencies to identify and address disproportionately high and adverse health and environmental effects including the interrelated social and economic effects of programs, policies and activities on minority and low income populations. Low income is defined as household income at or below the Department of Health and Human Services poverty guidelines. The 2000 poverty level for an individual is \$8,794. Minority is defined as a person who is Black, Hispanic, Asian American, American Indian, or Alaskan Native.

Low-income and minority populations are found within the study area in both Covington and Cincinnati. Table 9-5 and Exhibits 8 and 9 present an overview of minority and low income populations within the study area.

Table 9-5: Low Income and Minority Populations

Census Tract	Total Population 2000	Minority Population 2000	Minority Percent of Total Population	Low Income Population 2000	Low Income Percent of Total Population
Kentucky					
064800	3,364	125	3.72	233	6.93
065200	4,125	172	4.17	159	3.85
064900	2,991	121	4.05	158	5.28
065100	3,594	1,031	28.69	1,242	34.56
061600	1,420	91	6.41	279	19.65
065000	4,015	513	12.78	626	15.59
060700	1,964	345	17.57	420	21.38
060300	1,809	287	15.87	798	44.11
063800	3,080	103	3.34	244	7.92
067000	3,253	632	19.43	521	16.02
Ohio					
000100	641	497	77.54	32	4.99
000400	1,114	718	64.45	472	42.37
000600	550	167	30.36	88	16.00
000200	1,335	1,323	99.10	540	40.45
000302	963	919	95.43	657	68.22
000800	547	397	72.58	152	27.79
000301	1,232	1,229	99.76	884	71.75
001400	663	602	90.80	190	28.66
001500	2,261	2,196	97.13	1,268	56.08
001600	1,712	1,540	89.95	1,101	64.31
002800	1,506	470	31.21	473	31.41
002700	1,685	489	29.02	367	21.78

The Kentucky portion of the study area has moderate levels of low-income and minority populations. In general, the population is predominately white, approximately 85 percent, with a median household income range of \$19,000 to \$47,000 (Tables 9-1 and 9-2). One Census tract 065100, which includes Peaselburg has the highest minority population in this portion of the study area. Census tracts 065100 (Peaselburg) and

060300 (Mainstrasse) have the highest low income populations in the Kentucky portion of the study area.

The city of Cincinnati has several Census tracts of densely populated minority and low-income areas. The areas east of the existing interstate corridor in Cincinnati are diverse relative to both income and ethnicity. Some Census tracts represent poverty levels as high as 70 percent. These areas are located east of the northern part of the study area. Similarly, some tracts in the northeast part of the study area represent minority levels of 90-100 percent. High minority areas are located immediately adjacent to the existing I-75 corridor in the West End neighborhood of Cincinnati.

Several significant federally assisted Housing and Urban Development (HUD) projects exist in the study area, including the multi-million dollar redevelopment initiative known as HOPE VI located in the West End neighborhood of Cincinnati.

9.3 Community Services and Facilities

Community services and facilities within the study area include parks, schools, hospitals, police stations, fire stations, libraries, cemeteries, government buildings, entertainment and religious institutions. These resources are presented and summarized in Table 9-6 and shown on Exhibit 10.

Table 9-6: Community Facilities Within the Study Area

Kentucky		
Attraction	Location	Description
1. Garden of Hope	699 Edgecliff Road, Covington	Recreation of the Garden Tomb in Jerusalem
Churches/Religious	Location	Description
2. St. John's Catholic Church	627 Pike Street, Covington	Catholic Church
Nursing Home	Location	Description
3. Baptist Life Communities	800 Highland Avenue, Covington	Nursing Home
Recreation	Location	Description
4. Kenney Shields Park	West KY 9 th and Philadelphia, Covington	Small neighborhood corner lot with playground equipment - Owned by the city of Covington
5. Neighborhood Pool	West KY 8 th and Dalton Avenue, Covington	Neighborhood pool - Owned by the city of Covington
6. Devou Park/Golf Course/Overlook	1344 Audubon Road, Covington	700-acre park and golf course - Owned by the city of Covington
7. Goebel Park/Mainstrasse Village District	KY 6 th Street Area of Covington	Park area and surrounding retail and restaurants - Owned by city of Covington
8. Neighborhood Park	West KY 11 th and Hermes Avenue, Covington	Owned by the city of Covington
School	Location	Description
9. Notre Dame Academy	1699 Hilton Drive, Park Hills	Parochial College Prep High School - 594 female students
10. Prince of Peace Catholic School	625 Pike Street, Covington	Parochial Grade School - Grades K - 8

Table 9-6: Community Facilities Within the Study Area

Ohio		
Attraction	Location	Description
11. Paul Brown Stadium	One Paul Brown Stadium	Pro Football Facility – Home of NFL Cincinnati Bengals
12. National Underground Railroad Freedom Center	50 East Freedom Way, Cincinnati	Museum
13. Great American Ball Park	100 Main Street, Cincinnati	Pro Baseball Facility – Home of MLB Cincinnati Reds
14. US Bank Arena	100 Broadway, Cincinnati	Multi-purpose facility
15. Cinergy Center	525 Elm Street, Cincinnati	Convention and Exhibition Facility
16. Cincinnati Fire Museum	315 West Court Street, Cincinnati	Museum
17. Geier Research and Collections Museum	760 West OH 5 th Street, Cincinnati	Museum
18. Union Terminal *	1301 Western Avenue, Cincinnati	Omnimax Theatre, Museum Center, Children's Museum, Natural History Museum, Amtrak
Churches/Religious	Location	Description
19. York Street United Methodist	816 York Street, Cincinnati	Methodist Church
20. Plum Street Temple*	726 Plum Street, Cincinnati	Jewish Temple
St. Peter in Chains Cathedral *	325 West OH 8 th Street, Cincinnati	Catholic Church
22. Jarriel Baptist Church	Wesley and Court Street, Cincinnati	Baptist Church
Fire Station	Location	Description
23. Fire House - Company 14	OH 5 th and Central, Cincinnati	Fire House
24. Fire House - Company 29, Ladder 29	564 West Liberty at Linn Street Cincinnati	Fire House
Government Building	Location	Description
25. City Hall *	801 Plum Street, Cincinnati	Offices of Mayor, City Manager, City Council, etc.
26. Jail - Hamilton County Queensgate Facility	516 Linn Street, Cincinnati	Correctional Facility
Library	Location	Description
27. Public Library of Cincinnati and Hamilton County	805 Ezzard Charles Drive, Cincinnati	Public Library
28. Lloyd Library and Museum	917 Plum Street, Cincinnati	Botanical, Medical, Pharmaceutical and Scientific books
Utilities	Location	Description
29. CGandE Substation	West Pete Rose Way at Mehring Way, Cincinnati	

Table 9-6: Community Facilities Within the Study Area

Ohio		
Public Agency	Location	Description
30. Cincinnati Job Corp Center	1409 Western Avenue, Cincinnati	Training Facility and Dorms
Post Office	Location	Description
31. Main Post Office - Dalton Avenue	1623 Dalton Avenue, Cincinnati	Post Office Facility
32. Post Office Branch	Dalton Avenue and Gest Street, Cincinnati	Post Office Facility-Mid City Carrier Unit
Recreation	Location	Description
33. Lincoln Park - Union Terminal	Freeman Avenue and Ezzard Charles Drive, Cincinnati	Owned by the city of Cincinnati - Operated by Cincinnati Park Board - Greenspace
34. Park at Derrick Turnbow and Linn Street	1525 Linn Street, Cincinnati	Behind apartment buildings and a strip shopping center - Owned by the city of Cincinnati
35. Dyer Park	Baymiller Street and Bank Street, Cincinnati	Ball Field, Pool and Playground - Owned by the city of Cincinnati - Operated by Cincinnati Recreation Commission
36. Lincoln Community Center	1027 Linn Street, Cincinnati	Pool, playground, tennis court, basketball courts -Owned by the city of Cincinnati - Operated by Cincinnati Recreation Commission
37. Queensgate Playground and Ballfields	707 West Court Street, Cincinnati	Playground and ballfields – Owned by the city of Cincinnati - Operated by Cincinnati Recreation Commission
School	Location	Description
38. St. Joseph's Catholic School	805 Ezzard Charles Drive, Cincinnati	Parochial Elementary School
39. Cincinnati Hamilton County Community Action Agency	880 West Court Street, Cincinnati	Theodore M. Berry Head Start Program
40. Lafayette Bloom B-O-T Accelerated Middle	1941 Baymiller Street, Cincinnati	Cincinnati Public School - Grades 6-8
41. Heberle Elementary	2015 Freeman Avenue, Cincinnati	Cincinnati Public School - Preschool - 8
TV/Radio Station	Location	Description
42. WXIX - TV	635 West 7 th Street, Cincinnati	Network TV Station

*Listed on the National Register of Historic Places

9.4 Development Trends

9.4.1 Kentucky

Portions of three cities, Park Hills, Fort Wright, and Covington, are located within the study area in Kentucky. The Northern Kentucky Area Planning Commission (NKAPC) manages the planning for Kenton County. The NKAPC developed an *Area Wide Comprehensive Plan (2001)* for all of Kenton County, which includes Park Hills, Fort

Wright, and Covington. The plan is generalized in nature and with respect to the study area. It reflects the status quo, with no significant changes in land-use foreseen. The site of a former drive-in movie theater located in the northeast quadrant of the Kyles Lane Interchange does have potential for additional development. The plan designates this area for commercial office uses which is consistent with other land uses in the area, and also with the current zoning.

In addition to the *Area Wide Comprehensive Plan*, a variety of more targeted plans relative to the study area exist. Several of these are what are known as Chapter 99 Plans, which refers to Chapter 99 of the Kentucky Revised Statutes (KRS). Chapter 99 Plans are in effect urban renewal plans. Once adopted, they confer on the city the option of using eminent domain to acquire and redevelop property, much as an Urban Renewal Plan does in Ohio. The pertinent plans are listed and briefly discussed below.

- *West Riverfront Development Plan (Updated in 1998)*
This Chapter 99 plan pertains to the area along Covington's riverfront south of the floodwall and extends east to the Clay Wade Bailey Bridge, south to KY 5th Street, and west to Crescent Avenue. The plan calls for improvements to West KY 4th Street in the area approaching the entrance ramps to I-71/I-75 including the Brent Spence Bridge. With respect to land use, it presumes continuation of the current pattern of highway oriented commercial land uses currently found clustered around the I-75 KY 4th Street/KY 5th Street Interchange. The plan does not identify any substantial change in land use or the acquisition of property for redevelopment. This plan additionally calls for a number of streetscape improvements and improvements for pedestrian circulation within its defined study area.

- *12th Street Corridor Redevelopment Plan (2004)*
This Chapter 99 plan was completed recently to compliment plans by KYTC to widen and improve KY 12th Street west from I-71/I-75 to the KY 12th Street Bridge over the Licking River to Newport. A small two block portion of this corridor is within the project study area. Any proposed widening may require the acquisition and removal of a number of buildings along KY 12th Street.

The plan calls for streetscape and pedestrian improvements along the corridor in conjunction with the State's anticipated street widening. A gateway treatment is also planned at the intersection of KY 12th Street and Jillian's Way.

- *St. Elizabeth's Proposal (current year)*
While no formal plan or proposal currently exists, the city of Covington is currently pursuing negotiations that may result in the construction of a medical facility on now vacant land located adjacent to and east of I-71/I-75 in an area of excess right of way at the base of the "cut in the hill." A proposal has been developed to construct a two lane access road extending south from KY 12th Street paralleling I-71/I-75 to provide access to this site. This access road would intersect with KY 12th Street a short distance east of the southbound exit ramp from I-71/I-75 to KY 12th Street.

- *Bavarian Brewery Redevelopment Plan (1996)*
This Chapter 99 plan laid the ground work for redevelopment of a site located east of I-71/I-75 between Pike Street and KY 12th Street. This redevelopment has already taken place resulting in the conversion of the former brewery building into Jillian's, an entertainment venue that now occupies a portion of the former brewery structure.
- *Lewisburg Neighborhood Development Plan (1994)*
This plan pertains to the area included in the Lewisburg Historic District which is located west of I-71/I-75. This plan does not envision any substantial change in this area; it is more oriented towards enhancing historic preservation in the area.

9.4.2 Ohio

The most recent citywide land use plan in effect in the city of Cincinnati is the *Cincinnati Coordinated City Plan* completed in 1981, 24 years ago. The *Coordinated City Plan* was generalized in nature, establishing general goals and policies on a city wide basis and identifying particular areas of interest that merited further investigation and study.

Since its completion, the *Coordinated City Plan* has fallen into disuse. The city of Cincinnati is divided into 52 officially designated neighborhoods and it became city policy to develop specific neighborhood plans for particular areas of the city rather than to rely on the city wide plan as the foundation for policy decisions. The *Coordinated City Plan* is no longer considered an official policy guidance document for the city of Cincinnati.

Within the study area all or portions of several officially designated neighborhoods are found. Various plans and studies exist pertaining to each of these areas, some more current than others. The more significant and recent of these are listed below and the significance of each is briefly discussed.

- *The Hamilton County/Cincinnati Central Riverfront Urban Design Master Plan (2000)*.
More commonly known as the *Banks Plan*, this plan defines in detail the type of redevelopment the city of Cincinnati hopes to achieve on its Central Riverfront, particularly in the area located between the new Paul Brown Stadium (football) on the western riverfront and the Great American Ballpark (baseball) on the eastern riverfront. In place for five years, this plan is still considered the official policy of Hamilton County and Cincinnati.

The *Banks Plan* calls for substantial new mixed use development to be located immediately south of Fort Washington Way (I-71) to be built on top of a series of parking garages yet to be constructed to serve the parking needs of the two stadiums and the downtown area. Also incorporated into this plan was a multimodal transportation facility that has been constructed and which anticipated the future construction of a light rail transportation system in the Cincinnati region.

The mixture of land uses anticipated in the *Banks Plan* included residential, modest amounts of retail and office and other entertainment venues. To date,

the execution of the Banks Plan has been stymied by funding difficulties. Most importantly, financing has yet to be secured for construction of the parking garages upon which other development would be constructed.

The reconstruction of Fort Washington Way and the local street system surrounding it is inherently connected to the redevelopment proposed in the *Banks Plan*.

- *The West End Comprehensive Plan (2003)*.
This plan was developed in 2003 by the West End Community Council. The West End is a largely low income and minority neighborhood that lies primarily to the east of I-75 northwest of downtown Cincinnati. The West End includes a wide variety of land uses, historic buildings and more recent redevelopment. In general, The West End is a residential neighborhood. Currently, two very substantial federally funded Hope VI housing redevelopment projects are being completed. Combined, the Laurel Homes and Lincoln Court projects represent a new investment of \$155 million, with over 1,000 new residential units and 130 rehabbed residential units.

The *West End Comprehensive Plan* identifies several areas where the potential exists for redevelopment. Some of those lie within the study area, in particular along Ezzard Charles Drive and to the west of Linn Street.

- *The Queensgate South Urban Renewal Plan (1995)*
This plan encompasses all of the riverfront land in the study area located to the west of I-75. The plan identifies several potential redevelopment sites, one of which is located in the study area. This 17.21 acre site is a former junkyard at the corner of Gest Street and Mehring Way, located west and north of Longworth Hall. At the time, it was seen as a potential site for relocating produce businesses being displaced by the construction of Paul Brown Stadium. While that use is now unlikely, redevelopment of the site is in the early stages with environmental cleanup and remediation currently now underway and expected to take several years. The future use is yet to be determined.

Environmental contamination on the site would probably have made location of a produce business there impractical, however, once cleaned the site is practical for industrial or office redevelopment. A smaller 2.75 acre site at Rose Street and Pete Rose Way was also identified in this study as being under utilized and having redevelopment potential.

It is worth noting that among the other strategies considered in this plan for promoting redevelopment in the area was to relocate a portion of Mehring Way slightly south and west onto land occupied by inactive rail sidings to facilitate aggregation of a larger redevelopment site.

- *The Queensgate South Industrial Cluster Area Economic and Market Study (1989)*
This Market Study preceded the above referenced Urban Renewal Plan. Its purpose was to identify in general terms land areas in the Queensgate south area that were underutilized and held redevelopment potential. Its purpose was

also to explore some of the potential land uses that might be practical at that location. This study became the foundation for further action and represents an ongoing city policy to promote land redevelopment for business uses in the riverfront area located to the west of I-75.

- *Cincinnati 2000 Plan Review Committee (1992)*
Poster update of previous *Cincinnati 2000 Plan*, which set the stage for the Banks Plan. This plan also laid out the expansion of the Cincinnati Convention Center now nearing completion.
- *Cincinnati 2000 Plan (1986)*
Plan for the Central Business District and Central Riverfront, now replaced by the *Banks Plan*.
- *Cincinnati Riverfront Study (1981)*
Produced by the Riverfront Advisory Council, encompassed the full riverfront within city boundaries.

10.0 CULTURAL RESOURCES

10.1 Historic Resources

Historic resources within the study area include individual residential, commercial, institutional, religious, and industrial buildings and districts. Exhibit 11 shows the locations of historic properties and districts within the study area.

10.1.1 Kentucky

There are two National Register of Historic Places (NRHP) properties within the study area, the Bavarian Brewing Company and Kenny's Crossing (Table 10-1). Portions of six NRHP districts are also located within the study area (Table 10-2). These districts are located on both the east and west sides of I-75 and are dominated by residential buildings.

10.1.2 Ohio

Fifteen individual properties are listed on the NRHP within the study area (Table 10-1). Two properties, Union Terminal and Plum Street Temple are also designated as a National Historic Landmarks. The Court Street Firehouse, Saint Peter-in-Chains Cathedral, Plum Street Temple and Cincinnati City Hall are also listed as local landmarks.

Nine NRHP districts are entirely or partially within the study area (Table 10-2). These nine districts and the Cincinnati Union Terminal are also identified as local historic districts. The districts are comprised of commercial buildings or buildings now undergoing conversion from commercial to residential uses. These districts are concentrated east of I-75 where they encompass large tracts within downtown Cincinnati.

Table 10-1: NRHP Listed Resources Within the Study Area

Property	Address
Kentucky	
Bavarian Brewing Company	522 West 12 th Street
Kenny's Crossing	1001 Highway Avenue
Ohio	
B and O Freight Terminal (Long Worth Hall)	700 Pete Rose Way
Carew Tower	West 5 th Street and Fountain Square
Lombardy Apartment Building	318-326 West 4 th Street
Derby, H.W. Building	300 West 4 th Street
Hooper Building	139-151 West 4 th Street
St Peter-in-Chains Cathedral	325 West 8 th Street
John Church Company Building	14-16 East Fourth Street
Cincinnati City Hall	801 Plum Street
Plum Street Temple	726 Plum Street
Goodall Building	324 West 9 th Street
Court Street Firehouse	311 West Court Street
Cincinnati Union Terminal	1301 Western Avenue
Our Lady of Mercy High School	1409 Western Avenue
Ohio National Guard Armory	1437-1439 Western Avenue
Police Station Number 5	1024-1026 York Street

Table 10-2: Historic Districts Within the Study Area

District	NRHP Status	Local Historic District
Kentucky		
Fort Mitchell Heights	Listed	N/A
Lewisburg	Listed	N/A
East Lewisburg	Eligible	N/A
Bavarian Brewing Company	Listed	N/A
West Side Neighborhood	Listed	N/A
West Side/ Mainstrasse	Listed	N/A
Ohio		
West Fourth Street	Listed	Yes
West Fourth Street Amended	Listed	Yes
Ninth Street	Listed	Yes
Betts-Longworth	Listed	Yes
Laurel Homes	Listed	Yes
Dayton Street	Listed	Yes
East Fourth Street	Listed	Yes
Lytle Park	Listed	Yes
Main and Third Street Cluster	Listed	Yes

10.2 Archaeological Resources

There are six recorded archaeological sites within the study area. Five sites are listed in the Ohio Archaeological Inventory (OAI) and one site is listed in Kentucky's OSA files within the study area (Table 10-3).

Table 10-3: Recorded Archaeological Sites Within the Study Area

Site	Description
15Ke122	Historic Scatter
33Ha1 (Cincinnati Tablet Mound)	Prehistoric Earthen Mound Early Woodland Period
33Ha113	Prehistoric Mound
33Ha311 (Seventh Street Mound)	Prehistoric Mound Middle Woodland Period
33Ha312 (Richmond Street Mound)	Prehistoric Mound Woodland Period
Cincinnati and White Water Canal	Historic Canal Early to Mid-19 th Century

10.2.1 Kentucky

There is one recorded archaeological site (15Ke122) within the Kentucky portion of the study area. This site is historic scatter with associated features.

10.2.2 Ohio

Five of the archaeological sites recorded within the study area are located in Ohio. Four of the sites are prehistoric and were disturbed in the historic period. The sites are 33Ha1 Cincinnati Tablet Mound, 33Ha113, 33Ha311 Seventh Street Mound, and 33Ha312 Richmond Street Mound. All of the sites yielded lithics, ceramics, floral and faunal remains.

Several historic archaeological sites are known to exist within the Ohio portion of the study area. The most prominent of these is the Cincinnati and White Water Canal. The canal was already abandoned between Cincinnati and Valley Junction, Ohio, when it was purchased in 1863 by the Cincinnati and Indiana Railroad Company. The Cincinnati and Indiana Railroad used the existing canal bed to construct a new rail bed. Today, the canal tow path and bed are just north of Longworth Hall between 2nd and 3rd streets.

Historic maps illustrating the study area show increasingly dense commercial and industrial buildup of the areas northeast of existing I-75 and the Brent Spence Bridge approach lanes between 1815 and 1908. Buildings dating to 1840 still exist in this portion of the study area. Based on excavations conducted elsewhere in the urban core of Cincinnati and along its riverfront, it is likely that building remnants and intact features such as privies, cisterns, and wells remain. During recent construction of Paul Brown Stadium and Fort Washington Way, numerous foundations and shaft features were observed.

11.0 HAZARDOUS MATERIALS

Federal and state agencies databases were reviewed to obtain hazardous materials information. A review of the US Environmental Protection Agency (EPA) Envirofacts Data Warehouse information resulted in the identification of 25 records for hazardous waste generators located within the study area. Underground Storage Tank (UST) data was obtained from two sources. The Kentucky Division of Waste Management (KDWM) maintains the UST database for the Commonwealth of Kentucky.

There is a concentration of USTs in Kentucky, adjacent to the southern bridge landing area. One hazardous waste site specifically related to the Brent Spence Bridge is due to a previous painting operation. Sandblasting grit was not properly controlled and resulted in lead contamination in the soil below the bridge in Kentucky. KYTC is currently taking actions to remediate this site.

Data for Ohio USTs were obtained from the Ohio Bureau of Underground Storage Tank Regulations (BUSTR), which is housed in the State Fire Marshal's Office of the Ohio Department of Commerce. The data identified 121 USTs within the study area, 91 in Kentucky and 30 in Ohio. Locations of the hazardous waste generators and USTs are presented on Exhibit 12.

Landfill locations were also researched during the environmental review process. The KDWM website was reviewed for the presence of any current or historically operated landfills in Kenton County. According to the list of Permitted Solid Waste Landfills, there are none present in Kenton County. The OEPA Division of Solid and Infectious Waste Management website was accessed for information pertaining to possible landfills currently or historically operated landfills in the study area. According to several sources on the website, no landfills are located within the Ohio portion of the study area.

12.0 AIR QUALITY

In 1990, Congress approved the Clean Air Act Amendments (CAAA) to address the nations growing major air pollution problems. The CAAA established the National Ambient Air Quality Standards for five pollutants: ozone, particulate matter, sulfur dioxide, nitrous oxides, and carbon monoxide. The CAAA also explained how the United States Environmental Protection Agency (USEPA) designates non-attainment areas for ozone, carbon monoxide, and fine particulate matter (PM_{2.5}) and how areas are to be classified depending on the severity of the air pollution problem. These pollutants are components of vehicle emissions thus transportation projects are required to conform to meet 8-hour ozone standards.

As of December 2004, USEPA designated Hamilton County, Ohio and Kenton County, Kentucky as non-attainment for fine particulate matter (PM_{2.5}). Additionally, Hamilton County, Ohio and Kenton County, Kentucky are designated eight-hour non-attainment. Plans and programs required to meet new interim conformity requirements of eight-hour ozone standard will to be finalized by June 2007. In June 2005, the one-hour ozone standard was revoked. Air quality analysis is ongoing within Hamilton and Kenton counties to determine how intensive and to what degree the plan and its programs will need to be in order to reach eight-hour attainment (Source: www.oki.org).

13.0 REVIEW OF RELATED STUDIES

A number of recently completed study efforts were undertaken within all, or portions of the current study area for the Brent Spence Bridge Rehabilitation/Reconstruction Project. An overview of these studies is presented:

- *North South Transportation Initiative (2004)*
In 2000, the Ohio-Kentucky-Indiana Regional Council of Governments (OKI) and the Miami Valley Regional Planning Commission (MVRPC) undertook a major planning effort, known as the *North South Transportation Initiative* (Initiative), to study the multi-modal transportation system of their regions. The Initiative evaluated the transportation system along a 125-mile stretch of I-75 and the surrounding area spanning from Northern Kentucky, through Cincinnati and Dayton to Piqua, Ohio.

The result of this process is a preferred program of transportation projects to be considered for inclusion in the long-range planning efforts of the Ohio Department of Transportation (ODOT), Kentucky Transportation Cabinet (KYTC), MVRPC and OKI. Some of the preferred projects from this study are already underway including the Brent Spence Bridge Rehabilitation/Replacement Study (HAM-71/75 0.00/0.22 – KYTC Project Item Number 6-17), Mill Creek Expressway (HAM-75-2.30) and Thru the Valley (HAM-75-10.10) projects.

- *The Feasibility and Constructability Study of the Replacement/Rehabilitation of the Brent Spence Bridge (2005)*
This study was contracted in 2003 by KYTC and overseen by a Bi-State Management Team that included ODOT, and the Federal Highway Administration (FHWA) offices from both states. The scope of this study included an analysis of restricting trucks on the bridge, analysis of constructing a new crossing near Anderson Ferry, field testing critical truss members to determine fatigue life and developing concepts for five and seven lane Ohio River crossings in the immediate vicinity of the current structure.

This study recommended a series of potential feasible build alternatives for replacement and/or rehabilitation of the Brent Spence Bridge structure and improvement to its approaches and surrounding transportation system. Neighborhood and environmental impacts, geotechnical reviews and traffic data were all considered in the development of the recommended alternatives.

- *The Mill Creek Expressway Project (current study)*
ODOT is currently examining transportation options for the improvement of I-75 and its surrounding transportation system north of the Brent Spence Bridge Rehabilitation/Replacement study area.

The study area for this project includes I-75 interchanges at Hopple Street, I-74, Mitchell Avenue, State Route 562 (The Norwood Lateral) and Towne Street as well as the I-74 interchange at Colerain Avenue.

The Mill Creek Expressway project was initiated to evaluate alternatives that will improve traffic flow, enhance safety and minimize impacts to adjacent property owners and communities within the study area.

- *The Central Area Loop Study (1999)*
The *Central Area Loop Study* was commissioned by OKI in 1999. The study area included the downtown Central Business Districts for the cities of Cincinnati, Covington and Newport. The purpose of this study was to investigate the feasibility of providing a connection between the three cities and to improve the east/west flow of traffic in the KY 4th and KY 5th street corridor between I-71/I-75 and I-471 in Kentucky.
- *The I-71 Corridor Transportation Study (1997)*
This was a Major Investment Study for the I-71 Corridor Study, which was commissioned by OKI in 1997. As part of this project, a Technical Memorandum was developed (The I-71/I-75 Brent Spence Bridge Traffic Management Plan). This effort identified a series of recommended existing alternate routes for Brent Spence Bridge traffic.
- *The I-71/I-75 Brent Spence Bridge Scoping Study (1998)*
In 1998, OKI developed the *I-71/75 Brent Spence Bridge Scoping Study* as part of the larger I-71/I-75 Corridor Transportation Study. This study looked at several conceptual alternatives, including five build and one no-build alternative for the replacement and rehabilitation of the Brent Spence Bridge structure.
- *MetroMoves Regional Transit Plan/Regional Light Rail Plan (2002)*
The Regional Light Rail Plan includes several proposed local and commuter passenger corridors within southwestern Ohio and northern Kentucky, including the Brent Spence Bridge Rehabilitation/Replacement study area. Construction of the first operable segment is estimated at approximately \$800 million. This plan was completed for \$8 million at approximately 30 percent design. It was not completed due to a lack of funding. Exhibits 13 through 15 show the commuter rail, light rail, and streetcar services this plan proposed.
- *OKI 2030 Regional Transportation Plan 2004 Update (2004)*
The *OKI Regional Transportation Plan* is updated approximately every four years. The latest update was completed in 2004. The plan addresses current and future transportation needs through the year 2030. It was developed in response to FHWA and Clean Air Act requirements to mitigate congestion, address air quality, and other environmental, social and financial issues. It is the outline for the region's transportation projects for the next 25 years.
- *Western Hamilton County Corridor Study (current study)*
This is a Major Investment Study, which shares a border with the Brent Spence Bridge Rehabilitation/Replacement Study. It includes nearly all of Hamilton County west of I-75, and east of the Indiana border. The study will focus on improving mobility and safety for residents, commuters and freight traffic. The study area is purposefully large and will assess many individual corridors.

- *Uptown Transportation Study (current study)*

This study is examining transportation infrastructure needs within the Cincinnati neighborhoods of Avondale, Clifton, Clifton Heights, Corryville, East Walnut Hills, Evanston, Fairview/University Heights, Mount Auburn, North Avondale and Walnut Hills. The Uptown area includes the University of Cincinnati, the Cincinnati Zoo and Botanical Garden, USEPA offices and a number of major hospital and medical facilities in the region. A major component of this study is examining access to I-71 and other major roadways within the area.

