

KIPDA

REGIONAL FREIGHT MOBILITY STUDY

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INTRODUCTION

The Regional Freight Mobility Study is being undertaken by the Kentuckiana Regional Planning and Development Agency (KIPDA) to better integrate freight mobility issues, policies and projects into the regional transportation planning process.

The Regional Freight Mobility Study is being developed to supplement and support KIPDA’s Metropolitan Transportation Plan (MTP) update in 2019 – known as Connecting Kentuckiana. Connecting Kentuckiana serves as a regional platform to guide investment in a sustainable multimodal transportation system through 2040. The plan focuses on finding the best ways to connect people to places, people to people, and goods to market.

WHAT IS KIPDA?

The Kentuckiana Regional Planning and Development Agency (KIPDA) is the federally designated Metropolitan Planning Organization (MPO) charged with planning and coordinating public-sector transportation investment in Jefferson, Bullitt, and Oldham counties in Kentucky, and in Clark, and Floyd counties in Indiana. The study area is the Louisville/Jefferson County KY-IN Metropolitan Planning Area (MPA).

REGIONAL FREIGHT MOBILITY STUDY

The Regional Freight Mobility Study is an effort to better incorporate freight mobility issues into transportation planning and decision-making. The study blends data, analysis, and stakeholder input to identify needs in the transportation infrastructure network and strategies to improve freight accessibility. While the study focuses on the freight industry, it balances freight and community needs in a holistic manner with attention to freight mobility in the context of all modes of transportation.

Ultimately, the Freight Mobility Study will:

- Evaluate the current and forecasted multimodal freight conditions;
- Identify freight mobility issues, needs and trends; and
- Identify and prioritize potential policies and freight mobility related concerns and issues.



Figure 1: The Study will balance livability and freight mobility

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FREIGHT PROFILE



FREIGHT PROFILE

Before planning for the future needs of the freight system, it is important to understand how the system operates and the role it plays in the regional economy. This chapter outlines:

- Public and private stakeholder roles and the overall freight policy framework
- The importance of freight to the regional economy
- Key regional freight infrastructure assets
- Long-term freight goals and performance measures

FREIGHT SYSTEM ACTORS

Fundamentally, freight is a multijurisdictional activity. Therefore, it is important to understand how the various agencies' roles and interactivity relate to private freight operations and market dynamics. Complicating things further, freight moves on infrastructure owned and maintained by both the public and private sectors. Increasingly, freight is moved on conveyances which are not owned or operated by the goods' shipper or receiver. Often these shipments are arranged by third-party logistics providers (3PLs), who often broker shipments across the globe without any real tie to the goods they are conveying.



Figure 2: Freight Process: Shippers, Carriers and Receivers (Source: FHWA)

PRIVATE SECTOR

There are three basic actors involved in operating a supply chain: a shipper, a carrier and a receiver. The process starts with a shipper who has materials ready to transport. The carrier provides transportation from the shipper to the receiver. The receiver is the recipient of the goods. However, depending on a good's position within the larger supply chain, shippers may also be receivers and receivers can be shippers as well.¹

SHIPPERS

Generally, shippers include all points of a supply chain, except for the final receiver (the customer). For example, raw materials are shipped to a manufacturer. The manufacturers' finished goods are shipped to a distribution center, then to a retail store.

Carriers

Carriers move goods between functions in the supply chain. Carriers are multimodal. In the KIPDA region, carriers include trucks, railroads, barges, air cargo operators, passenger airlines (belly freight) and pipeline operators.

Receivers

Receivers include all points of a supply chain, except for the initial shipper. Manufacturers receive raw materials. Distribution centers receive finished goods from manufacturers. Ultimately, retail stores receive goods to be sold to the final consumer.

¹FHWA, *A Guidebook for Engaging the Private Sector in Freight Transportation Planning*, 2010.

LOGISTICS PROVIDERS

The logistics industry is focused on moving materials and products between the various activity centers within a supply chain. The industry is focused on “delivering the right product from the right origin to the right destination, with the right quality and quantity, at the right schedule and price.” There are three major categories of logistical firms:²

Freight Forwarder

An entity whose business it is to prepare shipping and customs documents for international shipments.

Freight Broker

An entity whose business is to act as an agent on behalf of a shipper. A freight broker frequently consolidates shipments from several shippers and coordinates booking reservations.

Third-party Logistics (3PL) Provider

A specialist in logistics who may provide a variety of transportation, warehousing, and logistics-related services to buyers and/or sellers.

PUBLIC SECTOR FREIGHT PARTNERS

There are many public agencies that oversee some aspect of freight mobility in the KIPDA Metropolitan Planning Area (MPA). With so many agencies, collaboration is key to the success of the region’s freight industry and to the resolution of any freight-related challenges in the transportation network. This section focuses specifically on how KIPDA fits within a larger policy context and its potential role in implementing the region’s freight future. Appendix A has a complete listing of freight-related public agencies and their role in the KIPDA MPA.

FEDERAL FREIGHT POLICY

In 2012, the Moving Ahead for Progress in the 21st Century Act (MAP-21) made several changes to federal transportation policy, including the formalization of freight planning at the state and federal levels. Subsequently in 2015, Fixing America’s Surface Transportation (FAST) Act established national multimodal freight goals, freight multimodal and highway networks, and a federal freight funding program.

National Highway Freight Program

This newly created funding formula program allocated \$1.2 billion annually to states to undertake freight planning, operational, and construction improvements. However, states must complete a FAST Act-compliant state freight plan to receive freight formula funds.

STATE FREIGHT POLICY

INDOT and KYTC recently completed updates to their respective statewide freight plans to align with the new FAST Act requirements.

Indiana Multimodal Freight Plan

In 2018, the Indiana Multimodal Freight Plan update examined impacts to the movement of goods on Indiana’s highways, railroads, waterways, and air cargo system.

Kentucky Freight Plan

The Kentucky Freight Plan was designed to be a supplemental document to the state’s Long-Range Statewide Transportation Plan (LRSTP). The plan outlines a collaborative, continuing process that documents freight assets and needs, and identifies various implementation strategies and initiatives

REGIONAL FREIGHT POLICY - KIPDA

As the region’s designated Metropolitan Planning Organization (MPO), KIPDA is responsible for transportation planning, programming, and coordination efforts in the Louisville/Jefferson County KY-IN Metropolitan Planning Area (MPA). KIPDA’s role as a regional facilitator will be key to the successful implementation of the Regional Freight Mobility Study.

MPO Freight Planning Requirements

While the FAST Act does not require MPOs to complete freight plans, the law does set forth two freight-related requirements for MPOs like KIPDA. These include making progress towards meeting the federal freight performance measure called Truck Travel Time Reliability. In addition, the Act requires MPOs to provide input in the designation of the “last mile” Critical Urban Freight Corridors.

²FHWA, *Freight Glossary* (<https://ops.fhwa.dot.gov/freight/fpd/glossary/index.htm>), Accessed on 9/20/2018.

LOCAL GOVERNMENTS

Local and county governments (including Metro in Louisville) have a significant impact on freight mobility through control of last mile roadway connections, management of roadway access points, and provision of economic development incentives. Local governments also have control and authority over land use, typically through subdivision ordinances and zoning codes.

TRANSIT AUTHORITIES

The Transit Authority of River City (TARC), the only public transit agency in the KIPDA region, is key to supporting the workforce needs of the logistics industry. Workforce availability is a major concern for the industry and often a factor in selecting sites for new or expanded investments.

MULTIJURISDICTIONAL PARTNERSHIPS

The Mid-America Freight Coalition (MAFC) is a coalition of Midwestern states focused on improving the regional economy by enhancing freight mobility. The coalition consists of 10 state Departments of Transportation (including INDOT and KYTC). Similarly, the Institute for Trade and Transportation Studies (ITTS) is another freight focused organization, representing nine primarily Southern states, including Kentucky. In the past, KIPDA staff have been involved with both organizations.

ADVISORY GROUPS

Conexus Indiana is a private-sector group of university, automotive, manufacturing, trucking, and development representatives that focuses on improving the advanced manufacturing and logistics markets in Indiana. In addition to its statewide logistics council, Conexus has a local logistics council that includes the Jeffersonville, Indiana area. KYTC's Kentucky Freight Advisory Committee for Transportation serves a similar role in the Commonwealth of Kentucky.

MULTIMODAL GOVERNANCE

Each of the five freight modes of transportation are governed by federal regulations, statewide agencies, and regional and local governments. This section and Appendix A detail how various agencies interact with the multimodal freight system.

Aviation

The region's airports are governed locally by their respective airport authorities. Airports are regulated by their respective state DOTs and the Federal Aviation Administration (FAA). Additionally, airports that receive international flights are overseen by the U.S. Customs and Border Protection (CBP).

Highway

The Federal Highway Administration (FHWA) coordinates highway transportation programs in cooperation with states and other partners. State DOTs are responsible for developing, constructing and maintaining their state's transportation system. In terms of freight, this means investing in highway (and aviation) infrastructure that supports freight mobility and connectivity. KIPDA undertakes the regional transportation planning process and programs federally funded projects in the Kentuckiana region.

Maritime

Inland waterway routes are governed by the US Army Corps of Engineers, US Maritime Administration, US Coast Guard, Kentucky Water Transportation Advisory Board, Ports of Indiana and local port authorities. A brief description of each agency's roles in the KIPDA region are described in Appendix A. Kentucky Department of Natural Resources and KYTC also have responsibilities on the river, however they do not have direct freight-related roles.

Pipeline

Pipelines are another privately owned and operated freight mode. They are regulated at the federal level by the Pipeline and Hazardous Materials Safety Administration (PHMSA). Pipelines which do not cross state lines are regulated by Kentucky Public Service Commission (PSC) or the Indiana Utility Regulatory Commission (IURC).

Rail

The region's railroads are privately owned. Therefore, operational decisions, such as service locations, shipping rates and schedules are made by the railroads themselves within a regulatory framework provided by the Federal Railroad Administration and Surface Transportation Board.

FREIGHT GOALS AND PERFORMANCE MEASURES

The Regional Freight Mobility Study supplements and supports the long-term vision and goals of Connecting Kentuckiana, as well the Kentucky and Indiana State Freight Plans. Connecting Kentuckiana sets forth a regional transportation vision for a multimodal system that is:

- Efficient and productive;
- Recognizes the various needs of transportation users;
- Recognizes opportunities and benefits associated with advancing innovative strategies; and
- Fosters expanded modal choices.

FREIGHT MOBILITY SUB-GOALS

- Create a responsive, resilient, and secure regional freight system;
- Improve safety and livability for freight system users and impacted communities;
- Utilize technology and innovation to improve the ability of the freight system to serve the region and mitigate negative externalities;
- Partner with the public and private sectors to develop freight solutions;
- Maintain a state of good repair of the KIPDA Freight Network; and
- Improve mobility for freight users and the logistical industry workforce.

FREIGHT PLANNING GOALS

To support this vision, Connecting Kentuckiana established a freight-related goal to "Ensure the timely and efficient movement of freight within, departing, and entering the region." This goal also aligns with state and federal freight goals (See Figure 4).

DEEPER DIVE: FREIGHT PLANNING SUB-GOALS

KIPDA established a Freight Study Group (FSG)³ to help guide the development of the Study. The first task undertaken by the FSG was to define freight planning sub-goals to support the broader Connecting Kentuckiana freight goal and to frame the Regional Freight Mobility Study. These goals are listed in Figure 3.

Figure 3: Freight Mobility Sub-Goals

³The Freight Study Group includes members of KIPDA's Transportation Policy Committee (TPC), Transportation Technical Coordinating Committee (TTCC), and the Regional Transportation Council (RTC).



Figure 4: Summary and Linkage between the Freight Mobility Sub-Goals, Connecting Kentuckiana, State, and Federal Freight Goals

FREIGHT PERFORMANCE MEASURES

KIPDA has two freight-related performance measures in the Performance Management Plan (PMP). These two measures connect KIPDA's freight planning and programming activities to the goals of Connecting Kentuckiana, the INDOT/KYTC Freight Plans, and MAP-21/FAST Acts. The measures allow KIPDA to track freight system performance and identify future trends and potential challenges.

- Maintain or improve Level of Service on roadway miles included on the KIPDA Freight Network through 2040; and
- By 2040, reduce by 10% the number of locations on the KIPDA Freight Network and within 1 mile of identified clusters of freight distributors where roadway geometry contributes to delay or hinders freight truck access to and from destinations.

FEDERAL FREIGHT PERFORMANCE MEASURES

MAP-21 required FHWA to establish a series of performance measures for the Interstate Highway System. In January 2017, FHWA finalized a rule requiring states and MPOs to measure and set targets related to the Truck Travel Time Reliability Index (TTTR) of the Interstate Highway System. In partnership with the MPOs, KYTC and INDOT are currently setting targets and working through the process of regularly reporting TTTR calculations to FHWA.

STATE FREIGHT PERFORMANCE MEASURES

The INDOT and KYTC Statewide Freight Plans identify several freight-related performance measures that could be implemented in their respective states. Both states have focused on implementing the federal TTTR target requirements. Indiana has also implemented a performance measure for truck-involved fatalities.

POTENTIAL ADDITIONAL PERFORMANCE MEASURES

While not formally included in KIPDA's PMP, the following performance measures are suggested for consideration in on-going planning and implementation efforts. Performance measures are not "grades," and they should measure something within KIPDA's span of control. , The performance measures in Figure 5 are identified to support the study's freight planning sub-goals. Some of these performance measures are closely related to existing performance measures in the PMP.

Create a responsive, resilient and secure regional freight system;



- KIPDA Freight Network Resiliency Index (Detour Time)
- Incident clearance rate on the KIPDA Freight Network

Improve safety and livability for freight system users and impacted communities;



- CMV Crash Rate
- CMV Movement Relative Impact on EJ Communities

Utilize technology and innovation to improve the ability of the freight system to serve the region and mitigate negative externalities;



- Emission Reduction
- Freight impact on environmental justice communities (GIS buffer)

Utilize technology and innovation to improve the ability of the freight system to serve the region and mitigate negative externalities;



- Not applicable. However, number of private meetings or comments recieved on a project or plan can be an indicator to track future progression

Maintain a state of good repair of the KIPDA Freight Network



- Pavement Ratings
- Bridge Ratings

Improve mobility for freight users and the logistical industry workforce.



- Freight Network LOS or V/C ration
- Transit service to freight clusters

Figure 5: Freight Mobility Study Sub-Goals and Performance Measures

REGIONAL ECONOMY

An important aspect of the KIPDA MPA's freight story is how the freight industry impacts and supports the economy. Not only does freight provide the supplies that businesses and individuals need to thrive, but the logistics industry itself is a major driver of the region's economy.

FREIGHT'S IMPACT ON THE ECONOMY

The region's economy is dependent on freight-related and supported industries. Over 43 percent of the region's \$57.2 Billion Gross Domestic Product (GDP) was generated by the manufacturing, trade and transportation industries in 2016. As the region's GDP continues to grow, the impact of freight-dependent industries will also continue to drive the economy.

EMPLOYMENT

Within the KIPDA MPA, the second highest employment sector is manufacturing (72,797). Freight dependent industries that drive regional productivity and are responsible for 35 percent of the region's employment (218,936 jobs). Over the next five years, these sectors are expected to produce 14 percent of the region's new jobs (See Figure 7).⁴ Additionally, the region's manufacturing employment is 20 percent higher than the national average.⁵

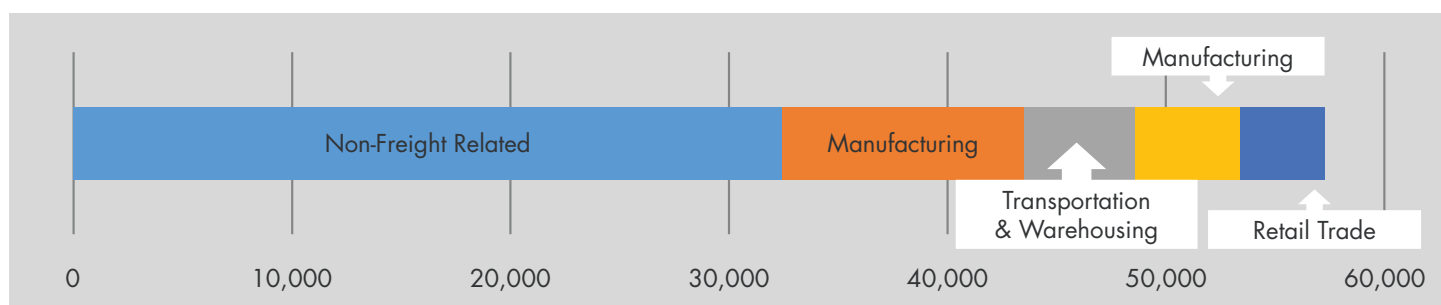


Figure 6: KIPDA Regional Gross Domestic Product (Source: University of Kentucky CEDIK)

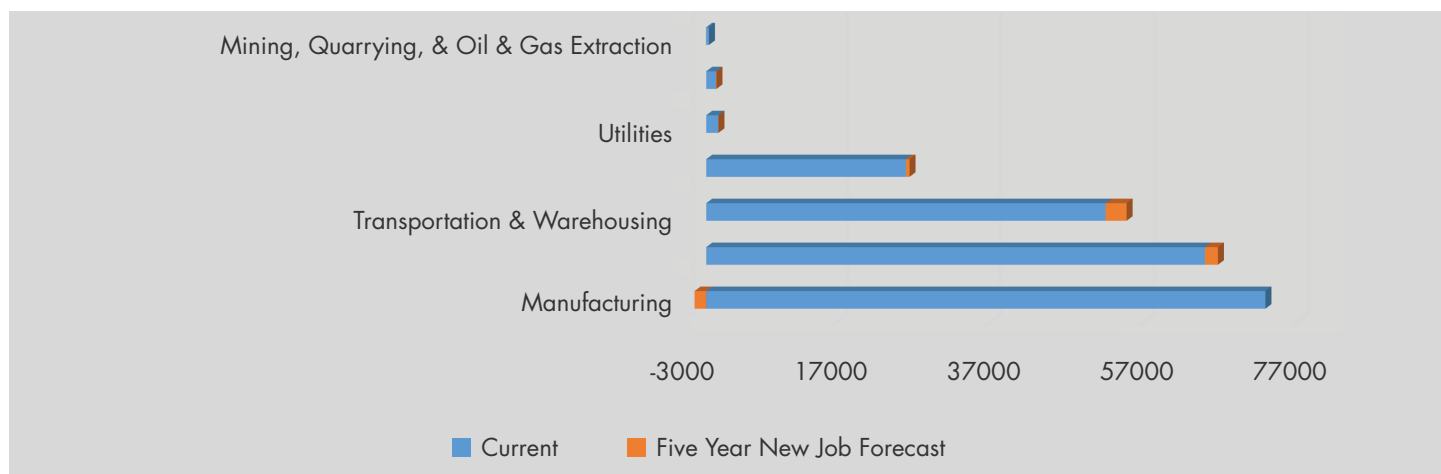


Figure 7: Freight Dependent Industry Job Growth (Source: University of Kentucky CEDIK)

⁴University of Kentucky – Community & Economic Development Initiative of Kentucky, KIPDA MPO: Economic Overview, 2018.

⁵Jefferson Riverport, Advantages (<https://www.jeffersonriverport.com/advantages/workforce>), Accessed 9/20/2018.

LOCATION QUOTIENT

Location quotients (LQs) are a useful way to identify regional industrial clusters that are more productive than the national average. Theoretically, industries with a LQ greater than one attract new dollars to the regional economies by providing goods to other parts of the country. A LQ under one represents an industry that imports that good or service from another region. The KIPDA MPA's LQs are listed in Table 1. Transportation/warehousing and manufacturing are two of the largest industries that bring new dollars into the regional economy.

SUPPORTING THE REGIONAL ECONOMY

While certain industries – manufacturing, mining, etc. – are more dependent on goods movement than others, the freight industry supports every sector of the region's economy. Table 2 highlights how freight delivers the goods for each regional industry.

AIR CARGO AS A JOB CATALYST

UPS WorldPort serves as a catalyst for logistics employment not only in the region but throughout Central Kentucky. The global air cargo hub also provides the KIDPA MPA un-paralleled access to the global marketplace. This has prompted many businesses to locate in the MPA and provides economic developers an important asset to bring new business to the MPA.

FREIGHT FLOWS

More than 120 million tons of freight traverses the region's infrastructure each year. The volumes and value of freight moved in the KIPDA region, its related economic and quality of life impacts, and public perceptions regarding freight movement are important considerations for the development of this study. The following sections illustrate key aspects of the region's freight flows using FHWA's Freight Analysis Framework (FAF). This analysis is derived from the last U.S. Economic Census which occurred in 2012.

INDUSTRY	LQ
Transportation and Warehousing	1.96
Finance and Insurance	1.46
Manufacturing	1.41
Administrative and Support and Waste Management	1.1
Wholesale Trade	1.06
Other Services (except Public Administration)	1.03
Accommodation and Food Services	0.98
Retail Trade	0.97
Health Care and Social Assistance	0.94
Construction	0.87
Management of Companies and Enterprises	0.87
Real Estate and Rental and Leasing	0.86
Arts, Entertainment, and Recreation	0.84
Professional, Scientific, and Technical Services	0.78
Information	0.76
Educational Services	0.76
Public Administration	0.64
Utilities	0.47
Agriculture, Forestry, Fishing and Hunting	0.14
Mining, Quarrying, and Oil and Gas Extraction	0.13

Table 1: 2016 KIPDA Region's Location Quotients
(Source: University of Kentucky CEDIK)

The FAF is used to analyze freight and commodity flows. The KIPDA region is represented by two FAF geographical zones. One is the "Louisville KY-IN (minus Indiana)" and the "Rest of Indiana" which represents not only Jeffersonville but all other areas in Indiana, except Indianapolis and the Chicago region.

Due to these constraints, this study will utilize the Louisville FAF zone to represent the entire region. While overall numbers may be depressed, overall flow patterns should remain unchanged.

	INDUSTRY IMPACT	FREIGHT DEPENDENCY
Hospitality/ Tourism	<ul style="list-style-type: none"> • \$1 billion annual economic impact • 1 million convention delegates • 6th largest convention center in the US 	<ul style="list-style-type: none"> • Daily shipments by delivery trucks • Larger trucks used for refuse removal
Mining	<ul style="list-style-type: none"> • Mined materials used in the production of concrete, asphalt and crushed aggregates • Gravel and limestone are exported 	<ul style="list-style-type: none"> • Supply to local and regional markets • Weight restricted routes impact deliveries
Construction	<ul style="list-style-type: none"> • Many hotel, restaurant and other tourist related projects • Bullitt County growth in warehouse construction 	<ul style="list-style-type: none"> • Trucks deliver materials to sites • Large trucks are often used no matter the location (downtown vs greenfield)
Manufacturing	<ul style="list-style-type: none"> • Two large Ford Plants, Louisville Slugger bats, American Printing House for the Blind, GE Appliances, major distilleries, JB Swift's pork processing plants and microprocessor manufacturers 	<ul style="list-style-type: none"> • Reliable transportation is key to supplying the region's industries • Manufacturing is closely tied to the availability of the Ohio River, dedicated intermodal yards and UPS WorldPort
Wholesale/ Retail Trade	<ul style="list-style-type: none"> • Many intermodal transfer points in the region • Distribution centers throughout the region for major retail and grocery stores • Retail growth in regional malls and storefronts 	<ul style="list-style-type: none"> • Wholesale trade industry uses all five freight modes to deliver their goods • Large trucks deliver goods to distribution centers • The retail sector requires periodic truck shipments to maintain their in-store inventory
Transportation, Warehousing and Utilities	<ul style="list-style-type: none"> • Very strong logistics and distribution sector • Local utilities provide water, sanitary services, power and fuel 	<ul style="list-style-type: none"> • Reliance on the region's multimodal freight network to maintain a competitive advantage • Utilities use freight to move chemicals, refuse and fuel to generate electricity
Services	<ul style="list-style-type: none"> • Region is home to many higher educational facilities and has become a regional healthcare center 	<ul style="list-style-type: none"> • Require delivery of office-related goods • Institutions like hospitals and universities generate significant amounts of freight
Government	<ul style="list-style-type: none"> • Various government agencies are housed throughout the region 	<ul style="list-style-type: none"> • Very similar to offices. However hospitals and the post office generate significant freight

Table 2: Economic Reliance on Freight

TOP TEN TRADING PARTNERS

Table 3 represents the top ten trading partners by mode. This figure is calculated by using total tonnage flows – originating and/or ending in the region.

GOODS TRANSPORTED

The national transportation system moves more than 54 million tons of freight daily. This equates to about 63 tons per person annually. By 2040, FHWA estimates that the total national tonnage will increase

by 40 percent.⁶ Within the region, 2040 tonnage growth is closer to 50 percent.

Commodity movement is described in terms of tonnage and value. In terms of weight, the highest commodities moved are gravel, coal, and similar aggregated-type commodities. By value: motor vehicles, pharmaceuticals and electronics top the list. Table 4 highlights current and future commodity movement by mode.

	AIR	MULTIMODAL	PIPELINES	RAIL	TRUCK	WATER
1	Chicago	Pittsburgh	West Virginia	Northern NJ	Louisville	West Virginia
2	San Francisco	Los Angeles	Chicago	WV	Rural KY	Louisville
3	Los Angeles	West Virginia	NW Indiana	Rural OH	Indiana	Rural KY
4	New York City	Norfolk	Fort Wayne	Rural KY	Nashville	Rural OH
5	Northern NJ	Savannah	Cleveland	Louisville	Indianapolis	Cincinnati
6	Detroit	San Francisco	Dayton	Pittsburgh	Detroit	Indiana
7	Philadelphia	New Mexico	Rural KY	Detroit	Norfolk	Covington
8	Houston	Seattle	Rural Ohio	Rural GA	Northern NJ	Negligible
9	Boston	Charleston	East St. Louis	Buffalo	Chicago	Negligible
10	Atlanta	Chicago	Columbus	Los Angeles	New Orleans	Negligible

Table 3: KIPDA's Top Ten Trading Partners by Weight (Source: FHWA)

⁶USDOT, National Freight Strategic Plan, 2015.

	WEIGHT (KILOTONS)	VALUE (MILLIONS)						
	2012	2040	Change	% Change	2012	2040	Change	% Change
Truck	73,560	103,831	30,271	41%	\$144,950	\$243,612	\$98,662	68%
Rail	7,547	13,309	5,762	76%	\$4,507	\$10,048	\$5,541	123%
Water	18,556	24,400	5,844	31%	\$2,697	\$3,415	\$718	27%
Air	512	1,498	986	193%	\$66,744	\$241,939	\$175,195	262%
Pipeline	16,863	31,503	14,640	87%	\$4,781	\$7,522	\$2,741	57%

Table 4: 2012 and 2040 Commodity Moves by Mode (Source: FHWA Freight Analysis Framework)

FREIGHT SYSTEM INFRASTRUCTURE

All five freight modes are present in the five county KIPDA MPA region – air, water, highway/truck, rail and pipeline. While this results in significant pass-through freight traffic, the complete multimodal system allows the region’s freight users to select the most efficient mode – or combination of modes – to ship their goods. Often freight mode choice decisions are a factor of location, type of commodity, price of shipment, and connections to other modes (see Figure 8). Key assets include:

Key Interstates

Interstate connections through the region include:

- I-64 from Norfolk, VA through Louisville to St. Louis, MO
- I-65 from the Chicago area through Louisville to Mobile, AL
- I-71 connecting I-65 in Louisville to I-75 in Northern Kentucky
- Two regional loop routes - I-264 (Henry Watterson Expressway / Shawnee Expressway) and I-265/KY-841 (Gene Snyder Freeway in Kentucky)/ I-265/IN-265 (in Indiana)

Key Bridges

Several bridges over the Ohio River connect Kentucky to Indiana and provide access for travel through the region. These bridges include:

- I-64 Sherman Minton Bridge from New Albany, IN to Louisville, KY
- The George Rogers Clark (2nd Street Bridge) carrying US 31 from Jeffersonville, IN to downtown Louisville, KY
- Two I-65 bridges, the John F. Kennedy Memorial Bridge carrying I-65 north and the Abraham Lincoln Bridge carrying I-65 south
- The Lewis and Clark Bridge carrying KY-841/ IN-265 from Louisville, KY to Utica, IN
- Railroad bridges - the Kentucky & Indiana Terminal Railroad Bridge carrying the Norfolk Southern railroad over the Ohio River near the Falls of the Ohio and the Louisville and Indiana Railroad Bridge (Fourteenth Street Bridge) carrying CSX (among others) over the Ohio River.

Key Rail

There are connections with two Class I railroads, CSX and Norfolk Southern (NS), as well as with the Class II railroad Paducah and Louisville Railway and Class III railroads R.J. Corman Railroad Group and the Louisville and Indiana Railroad. Rail classification yards are near the Louisville International Airport and near Shelbyville, KY.

Key Pipeline

Key pipelines include those operated by Atmos Energy, Louisville Gas & Electric, Marathon, Mid-Valley Pipeline, Texas Gas, Valero, and Vectren. They carry gasoline, jet fuel, other petrochemicals and natural gas for home heating.

Key River

- Waterborne connections include: Ohio River and the Louisville and Portland Canal and the McAlpine lock and dam system. Additionally, the Port of Indiana – Jeffersonville and the Louisville & Jefferson County Riverport
- Authority provide key multimodal connectivity to the highway and rail modes.

Key Air

Louisville International Airport, and to some degree Bowman Field and the Clark County airport, provide key air freight connections and movements.

ROADWAYS

Outside of a few commodities, most freight trips begin and end by truck. Therefore, developing an efficient, reliable, resilient, and safe multimodal freight system of the future relies on a fundamental understanding of the existing highway system and its operations. Several of the region's roadways are included in the federal, state, and regional freight networks described above, including I-64, I-65, I-71, and the circumferential roadways I-264 and I-265. Table 5 outlines the various federal and state highway networks. Each play an important role in the KIPDA Freight Network (see Figure 9).

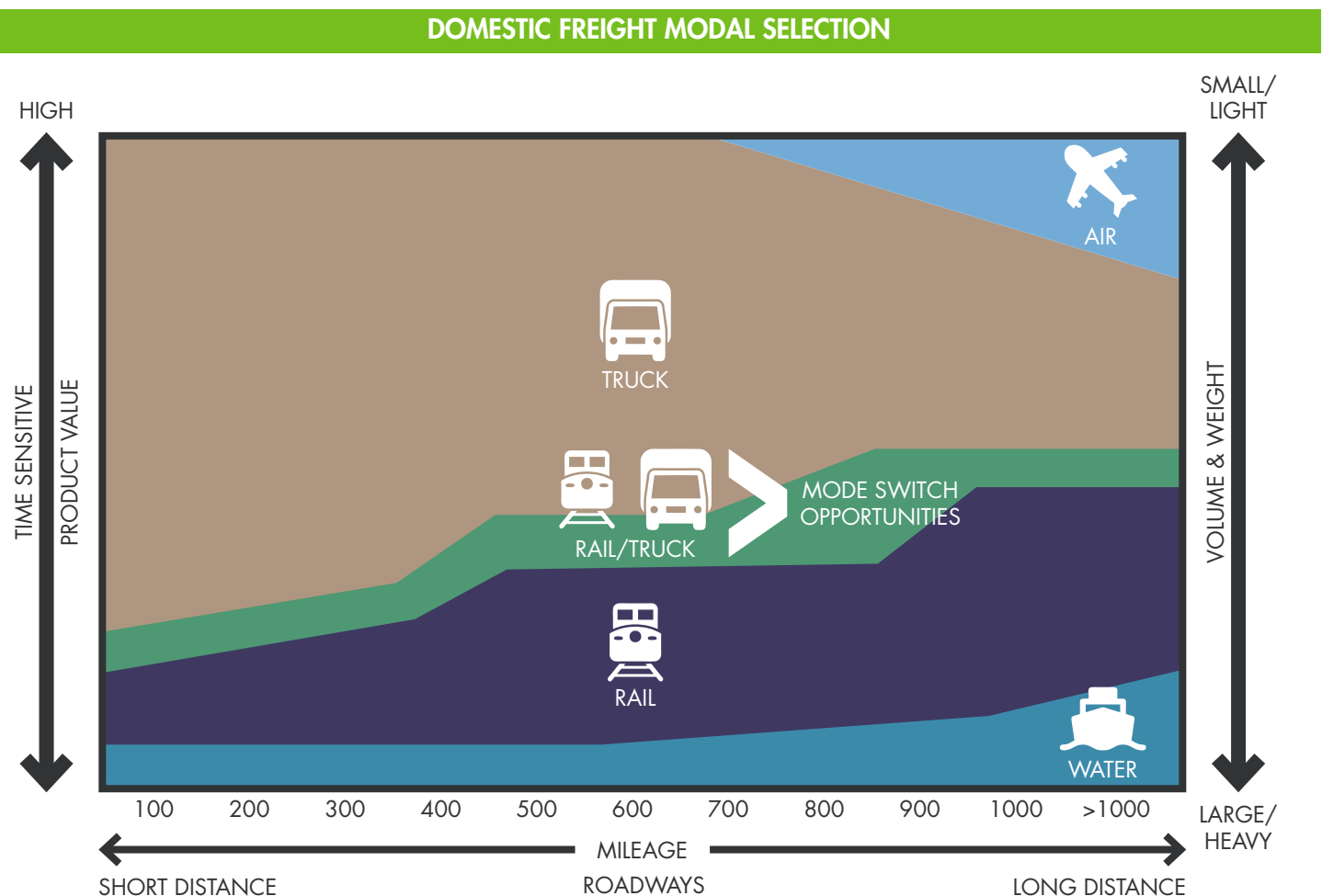


Figure 8: Factors in Freight Mode Split (Source: KYTC Freight Plan)

FEDERAL NETWORKS	
National Highway Freight Network	The FAST Act created the National Highway Freight Network (NHFN) to strategically direct federal resources towards improved performance of the highway freight system. The NHFN system is a tiered system, which ranges from national corridors to last mile freight connections, known as Critical Urban Freight Corridors (CUFCs).
NHS Intermodal Connectors	NHS Intermodal Connectors serve the region's multimodal facilities like: <ul style="list-style-type: none"> • Bells Lane Petroleum/Chemical Pipeline • KY 2056 from I-264 W to the Louisville – Ohio River Floodwall • UPS WorldPort/Louisville International Airport • Grade Lane (I-264 to UPS WorldPort - Feeder Truck Entrance), FS 8879 (I-264 to Facility) • Norfolk Southern Intermodal – Louisville • Newburg Road (I-264 to Bishop), Bishop Lane (Newburg to Jennings), Jennings Lane (Bishop to Facility)
DOD Strategic Highway Network	The Department of Defense's (DoD) Strategic Highway Network (STRAHNET) identifies roadways critical to the nation's defense and the deployment of military assets. Due to the region's proximity to Fort Knox and many other installations outside the area such as Crane Naval Surface Warfare Center near Bloomington, Fort Campbell in western Kentucky, and the Bluegrass Army Depot near Lexington, the region's entire Interstate Highway System is part of the network.
STATE FREIGHT NETWORKS	
KYTC - Kentucky Freight Highway Network	In 2016, KYTC developed a new performance-based project selection process for the Kentucky Highway Plan. An initial step of this process was to develop a network that identifies Kentucky's freight corridors, which was then used as part of the statewide investment strategy.
KYTC - Coal Haul Highway System	KYTC's annual Coal Haul Highway System report is used by the Department of Local Government to help determine the distribution of coal severance tax revenue. This fund helps communities impacted by the production of coal provide basic services to its residents. While there are some coal haul routes in the KIPDA MPO region, historically its communities do not receive funding from the program.
INDOT - Commerce Corridors	In 2003, INDOT developed a series of Commerce Corridors. These corridors were defined as a part of recognized system of highways that: (1) directly facilitates intrastate, interstate, or international commerce and travel, (2) enhances economic vitality and international competitiveness, or (3) provides service to all parts of Indiana and the U.S.
REGIONAL FREIGHT NETWORK	
KIPDA Freight Network	KIPDA developed a two-tiered freight network. Tier I serves as the backbone to the regional freight system. It includes the NHFN, Kentucky Highway Freight Network routes that are within one-mile of a major freight cluster, and additional roadways that have significant truck utilization (more than 1,000 Truck AADT and 10 percent truck traffic utilization) based on FAF 4 data. Tier II provides network connectivity between Tier I and the clusters that represent freight generators and destinations.

Table 5: Highway Freight Networks

KIPDA FREIGHT CLUSTERS AND NETWORK

To support the creation of the regional freight network, KIPDA developed a set of freight-related clusters. These clusters represent likely regional freight generators and destinations (see Figure 9).

Freight Clusters (Generators)

Created using KYTC's Major Freight Users Inventory for Kentucky and from InfoUSA data for Indiana. A cluster was created when there were 5 or more facilities within 0.5 miles of each other. All points with 5 facilities within 0.5 miles of each other were buffered by the 0.5 mile to create clusters.

High Density Shopping Clusters (Destinations)

Using InfoUSA data, high density shopping clusters were created when 40 or more retail services were within 0.25 miles of each other.

High Employment Clusters (Destinations)

High density employment clusters were created when 1,000 or more employees were located within 0.25 miles of each other.

Freight Clusters

There are 19 identified freight clusters in the five county KIPDA MPA. One of them, #9, is technically outside the MPA boundary. There are 12 in Jefferson County, Kentucky, three in Clark County, Indiana, two in Floyd County, Indiana, and one each in Bullitt County, and Shelby County, Kentucky. (For discussion purposes, the Shelby County cluster was included since it is important to the auto industry.)

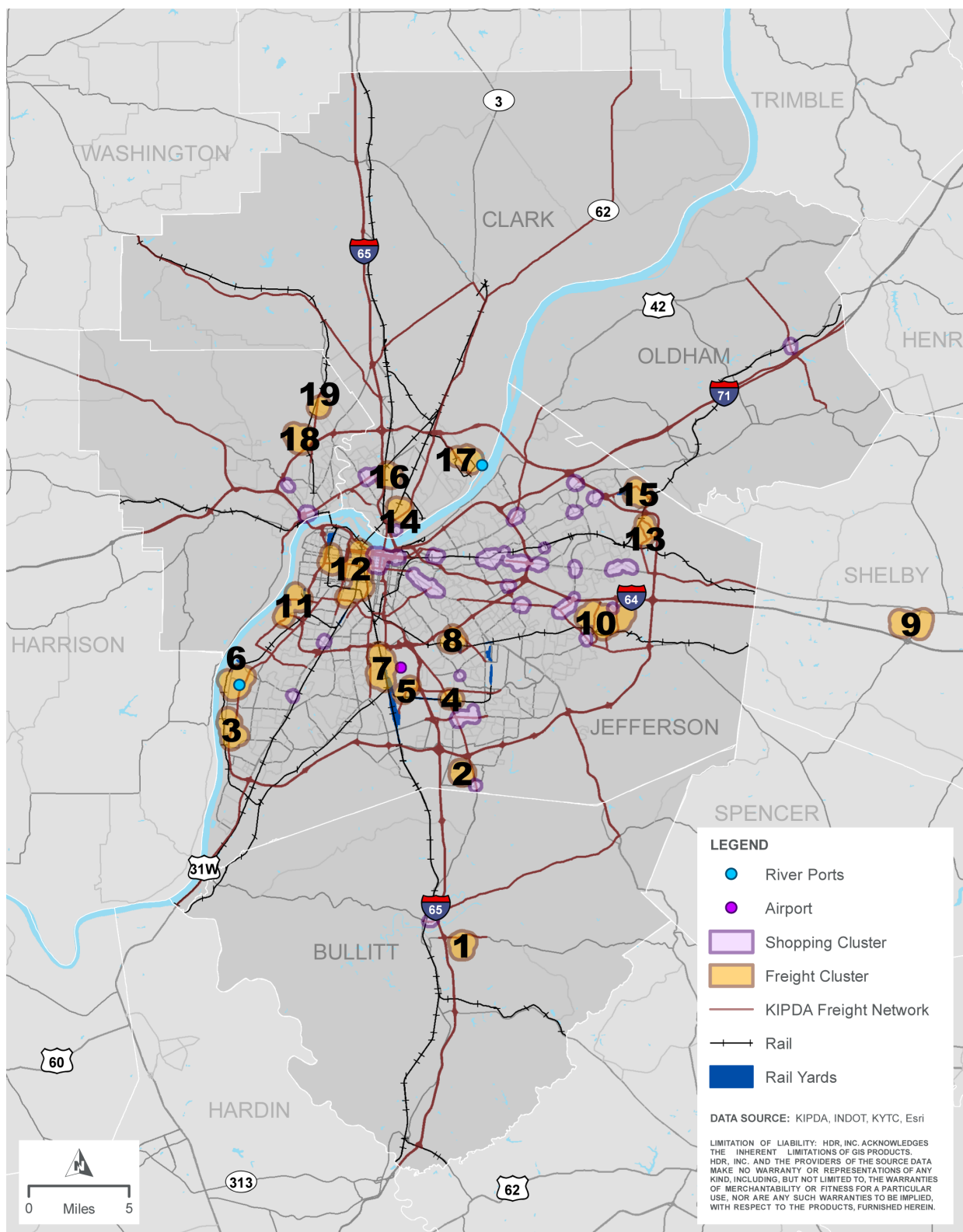
These clusters represent more than 33 million square feet of building and warehouse or manufacturing space, and account for more than 61,000 jobs in the region. Many are either located near interstates or other major highways, rail lines, or near the Ohio River.

Many of the freight clusters focus on manufacturing – e.g., automotive, bourbon, and appliance production; while others focus on logistics and distribution – including the UPS WorldPort at Louisville International Airport. Figure 9 shows the location of freight clusters relative to the KIPDA Freight Network and Table 6 details the activities within each respective cluster.

Freight Network

The two-tiered KIPDA Freight Network was developed using a combination of national freight resources and the freight clusters outlined above. Tier I was developed from the National Highway Freight Network. Additional roadways were included based on truck utilization (more than 1,000 Truck AADT and 10 percent truck traffic) and the Kentucky Highway Freight Network routes that were within a one-mile buffer of a freight cluster.

Tier II provides network connectivity between Tier I and the clusters that represent freight generators and destinations. Because Indiana does not have a formal "freight network," roadways within a one-mile buffer of their freight clusters are included in Tier II.



KIPDA REGIONAL FREIGHT MOBILITY STUDY
FREIGHT NETWORK

Figure 9: Freight Network

FREIGHT CLUSTER	NAME	GENERAL LOCATION	INTERSECTION	BUSINESSES	SF OF SPACE	# OF JOBS
1	Shepherdsville Distribution Center	Shepherdsville, Bullitt County	I-65 & Cedar Grove Road	Chegg, APL Logistics, Alliance Entertainment, Genco Reynolds, Gordon Food Services, Amazon, Magna Seating	1,734,700	1,660
2	Commerce Crossing Business Park	South Louisville, Jefferson County	I-65/I-265 & Old Preston Highway	Clark Material Handling, Electronic Arts, Orr Corporation, A Arnold World Class Relocation, Arvato Digital Services	982,428	373
3	Trade Port Drive Area & Foreign Trade Zone	South west Louisville, Jefferson County	Greenbelt Highway, Cane Run Road, Trade Port Drive	Parker Hannifin Corporation, eBay, Algood Foods, Dynacraft, Millard Refrigerated Services, River City Distributing	2,217,922	2,341
4	Tower Road & Preston Highway	South central Louisville, Jefferson County	Preston Highway, Tower Road	Caldwell Tanks, Cardinal Aluminum, Precision Metal Works	302,000	417
5	UPS' Grade Lane Facility near Ford	South central Louisville/ airport area, Jefferson County	Grade Lane/ Fern Valley Road at I-65, rail lines	UPS, Ford Plant	930,250	898
6	Louisville River Port Area	South west Louisville, Jefferson County	Intermodal Drive, Cane Run Road, Greenbelt Highway	Balfour Co., Bostik, Inc., Kentucky Trailer, MISA Metal Fabricating, Zeon Chemicals, Collective Brands, Electri-Tech Services, Henkel, Hanna Andersson, Yokohama Tire	2,832,941	1,661
7	West Airport Area	South central Louisville / west airport area, Jefferson County	Crittenden Lane, Strawberry Lane, Woodlawn Avenue	RC Canada Dry Bottling, Cardinal Manufacturing, Nuplex Resins, Cardinal Kitchens, Dawn Food Products, Wire Crafters, O'Neal Steel, Strong Hold Products, BAE Systems, Raytheon, Brown-Forman Cooperage	3,147,013	2,183
8	Robards Lane/ Bishop Lane Area	South central Louisville/ just south of Watterson Expressway, Jefferson County	Robards Lane, Bishop Lane, I-265, rail lines	Derby Industries LLC, Gateway Press, Inc., Kentucky Assoc. of Electric Co-Op, Louisville Tile, United Mail Sorting, USPS	1,149,510	1,041
9	Shelby County Industrial Area	I-64 @ KY 55, Shelbyville, Shelby County	I-64, KY 55/ Taylorsville Road, Isaac Shelby Drive, rail lines	Stanley / Black & Decker Corporation, Cenvo, Ohio Valley Aluminum, Roll Forming Corporation, Shelby Industries, Omega Plastics, Process Machinery, MSC/Barnes Distribution, Bekaert Corp.	1,664,500	1,281
10	Bluegrass Industrial Park/ Jeffersontown Industrial Park	East central Louisville/ Jefferson County, near Jeffersontown	I-64, Blankenbaker Parkway, Hurstbourne Parkway, Plantside Drive	Jones Plastic & Engineering Inc., Berry Plastics, Blendex Co, Louisville Bedding, Lyons Co., Southern Standard Cartons, Winston Products, rev-A-Shelf, RC Bigelow, ProLift Industrial Equipment, White Castle Distributing	2,612,106	3,074

Table 6: Freight Cluster Details (Source: KIPDA)⁷

⁷Created using the best data available to KIPDA at the time of publishing.

FREIGHT CLUSTER	NAME	GENERAL LOCATION	INTERSECTION	BUSINESSES	SF OF SPACE	# OF JOBS
11	Rubbertown Industrial Area	West Louisville, near the Ohio River, Jefferson County,	I-264/ Shawnee Expressway, Bells Lane, Algonquin Parkway, Ohio River	Rohm & Haas Co, DuPont, Zeon Chemicals, Lubrizol, Polyone Corp., Chevron Lubricants, Arkema	5,314,657	877
12	West Louisville / Portland Industrial Areas	Central west & north west Louisville, Portland, Jefferson County	Broadway, I-64, I-264/ Shawnee Expressway, 9th Street, rail lines	Caudill Seed and Warehouse Company, Stry-Lenkoff Co., Atlas Machine & Supply, Brown-Forman, National Tobacco, Louisville Tin & Stove Co., PPG Automotive Finishes, VG Reed & Sons	5,889,098	3,070
13	East Louisville Industrial Area	Central east Louisville, Middletown, Jefferson County	Stanley Gault Parkway, Nelson Miller Parkway, I-265/ Gene Snyder Freeway	Siemens Rail Automation, Zenith Logistics / Kroger Distribution, Faurecia Interiors, Linak US, Inc.	2,068,810	1,935
14	America Place at River Ridge Industrial Park	Southern Indiana, Jeffersonville,	I-65, 10th Street, 1st Ave, 2nd Ave, 3rd Ave, 4th Ave., rail lines	Blitz Manufacturing, Southern Indiana Plastics, Inc., Alterc-Aluminum Technologies, Kitchen Kompact, Harland Clarke	200,000	No data available
15	Westport Road Industrial Area	Northeast Louisville, Jefferson County	I-71, I-265, Westport Road, Brownsboro Road	Deco Paper Products, Dana Corporation, K-I Sash & Door, Co, ConAgra Foods, Dakkota Integrated Systems, LLC, Westport Axle Corp.	1,147,520	978
16	Hamburg Pike Industrial Area	Southern Indiana, Jeffersonville	I-65, Hamburg Pike, Charlestown New Albany Pike, US 31	Formwood Industries, Heritage Hardwoods of KY, Dallas Group-America, Flow International Corp., Easy Rest, Flexible Materials, Inc.	280,000	No data available
17	Port of Indiana - Jeffersonville	Southern Indiana, Jeffersonville	Utica Pike, Port Road, I-65, I-265, Snyder Freeway, Ohio River	Chemtrusion, Kastle Metal Processing, Ohio River Metal Service, Roll Forming Corp., Steel Dynamics Flat Roll Div., FedEx Ground	240,000	No data available
18	Green Valley Road Industrial Area	West - southern Indiana, New Albany, Floyd County	Green Valley Road, Hausfeldt Lane, Grant Line Road, I-265	Clarks Snacks, Custom Plywood Inc., Discount Labels, Inc., Kennametal Conforma Clad, Inc., Beach Mold & Toll, Inc., Technidyne Corp., VT Industries	360,000	No data available
19	Grant Line Road / Security Parkway Industrial Area	West - southern Indiana, New Albany, Floyd County, I	Security Parkway, Grant Line Road, I-265	Meilink Safe., Co., Hitachi Cable America, Inc., Fire King Security Group	120,000	40,000
Totals					33,193,455	61,789

Table 6: Freight Cluster Details (Source: KIPDA)

Environmental Justice Areas

Historically, the negative impacts of transportation decisions has disproportionately impacted marginalized and under-represented communities. KIPDA and their regional partners advocate for greater equity in transportation decision-making through their Environmental Justice policies outlined in their Environmental Justice Resource Document. Using KIPDA's established methodologies, Figure 10 shows how the current freight system and activities relate to under-represented communities identified in the larger KIPDA policy.

OTHER KEY HIGHWAY FACILITIES

Truck freight requires facilities to support the regulatory and physiological needs of drivers. Historically, these facilities have been provided by the public and private sectors – rest areas and truck stops. As the federal government has implemented electronic log-book requirements and tighter hours-of-service requirements, the demand for truck parking has increased. For example, the rest areas north of Louisville on I-65 often exceed their truck parking capacity.

Additionally, the Kentucky and Indiana State Police agencies are charged with enforcing state and federal motor carrier regulations. These activities include truck scales (some featuring Weight-in-Motion technology) and inspection facilities along major interstates in the region.

MARITIME

The KIPDA MPA is home to two public riverports – the Port of Indiana - Jeffersonville and Louisville & Jefferson County Riverport Authority. These two riverports provide year-round multimodal connectivity with the Ohio River via barge, truck, train, and pipeline. Once loaded on barges, bulk materials, chemicals, grains and minerals are shipped to the ports of New Orleans, Louisiana, and Mobile, Alabama for shipments overseas.⁸

BARGE CARRIERS

The region is home to American Commercial Barge Lines (ACBL), the largest barge carrier in the US, which is headquartered in Jeffersonville, IN

PORT OF INDIANA – JEFFERSONVILLE

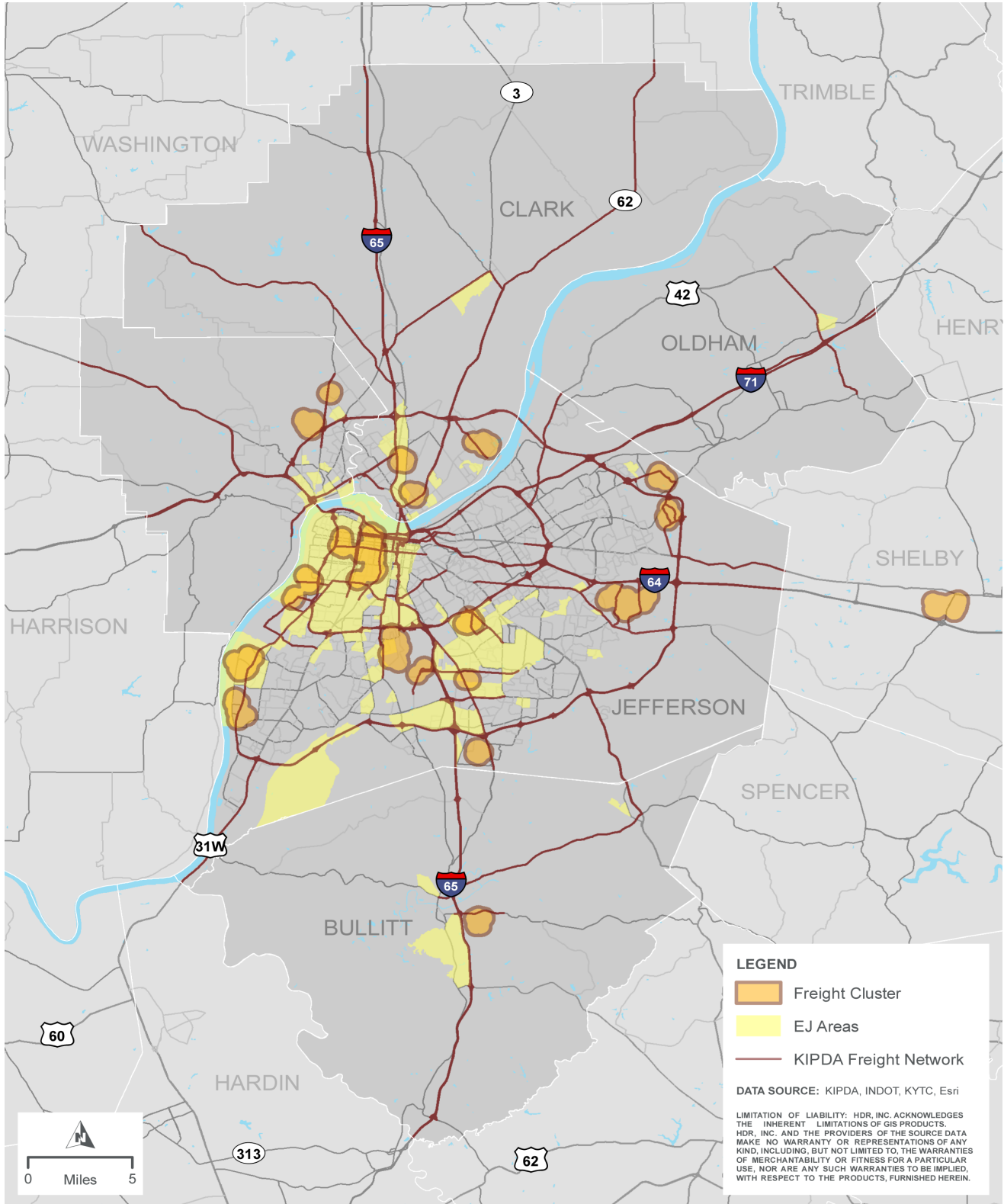
The Port of Indiana – Jeffersonville provides multimodal connectivity between road, rail and the Ohio River. Major commodities transferred at this facility include corn, fertilizer, salt, wire rod, soybeans, steel, liquid asphalt, pig iron, and heavy lift cargo. In addition, the facility houses 27 businesses onsite, the majority of which are steel related – including processing, roll forming, and galvanizing.

The Port reports that more than 1,000 barges, 250,000 trucks, and 16,000 railcars pass through the port annually. The port has significant rail assets (including a near dock rail yard), and has a direct connection to CSX (via the Louisville & Indiana Railroad) and Norfolk Southern Railroads. The facility relies on the new I-265 bridge, I-64, I-65, and I-71 for highway connectivity. The port has long-term plans to connect to the River Ridge Commerce Center via a new road and rail corridor. When this expansion is complete, that 6,000 acre commerce center will have direct access to the Ohio River.

Heavy Haul Route

The purpose of the Heavy Haul Transportation Corridor (HHTC) in Clark County is to provide connectivity for transporting heavy loads between the River Ridge Commerce Center and the Ports of Indiana via the interchange at State Road 265/Old Salem Road.

⁸Kentucky Transportation Cabinet. Kentucky Riverport Improvement Project. January 22, 2008.



KIPDA REGIONAL FREIGHT MOBILITY STUDY ENVIRONMENTAL JUSTICE AREAS

Figure 10: Environmental Justice Areas

In December 2016, the first stage of the roadway was completed between S.R. 265 and S.R. 62 through the River Ridge Commerce Center. Phase II is currently being designed and will soon be undergoing right-of-way acquisition. Construction is scheduled to begin in 2019 and be completed in 2020.⁹

LOUISVILLE & JEFFERSON COUNTY RIVERPORT AUTHORITY

Louisville & Jefferson County Riverport Authority is a planned industrial community on the Ohio River on the west side of Louisville. The port is home to companies engaged in manufacturing or distribution. It is one of the few inland industrial/port sites in the nation with single-line haul by three railroads: CSX, Norfolk Southern and Paducah & Louisville. It was established in the mid-1970s and has developed over several decades in multiple phases. Today, it is home to over 120 companies employing more than 6,500 people on sites spread over 2,000 acres of developed area. The port has a cargo dock, barge fleeting area, and ground storage. It is the site of U.S. Foreign-Trade Zone No. 29 and is minutes from the UPS WorldPort at Louisville International Airport.

FREIGHT PARTNERSHIP AT WORK

Recognizing the importance of the Heavy Haul Route to the region's economy; IEDC, INDOT, Port of Indiana, KIPDA, Clark County, Jeffersonville Redevelopment Commission and the River Ridge Development Authority all have partnered to fund and develop the route.

AIR CARGO

The Louisville International Airport (SDF) serves as the major commercial airport in the KIDPA region. Bowman Field in Louisville and Clark County Regional Airport in Sellersburg, IN serve as relievers for SDF. While SDF serves passenger airline flights, it is most known for its air cargo and for being a major hub for UPS. In 2016, 2.4 million metric tons of freight moved through SDF, making it the third busiest air cargo airport in North America and 7th in the world.

Between 2006 and 2016, air cargo shipments increased by 22.9 percent. Air cargo carriers and nearby logistics companies benefit from SDF's central location in the U.S. and direct access to the Interstate System via I-65 and I-264. In addition to UPS, SDF also hosts smaller operations for both FedEx and DHL.

UPS WORLDPORT

Most of the air cargo volume at SDF can be attributed to UPS's global air cargo hub. This facility known as UPS WorldPort handles over 2 million packages daily. The 5.2 million square-foot facility is the largest automated package handling facility in the world. More than 300 UPS flights arrive and depart from SDF daily.

UPS first built an air cargo hub at SDF in 1980. In 1999, UPS invested \$1 billion to double the facility's capacity. When it opened in 2002, the expanded facility was rebranded as WorldPort. Four years later, UPS expanded the facility again to its current capacity of 416,000 packages per hour.

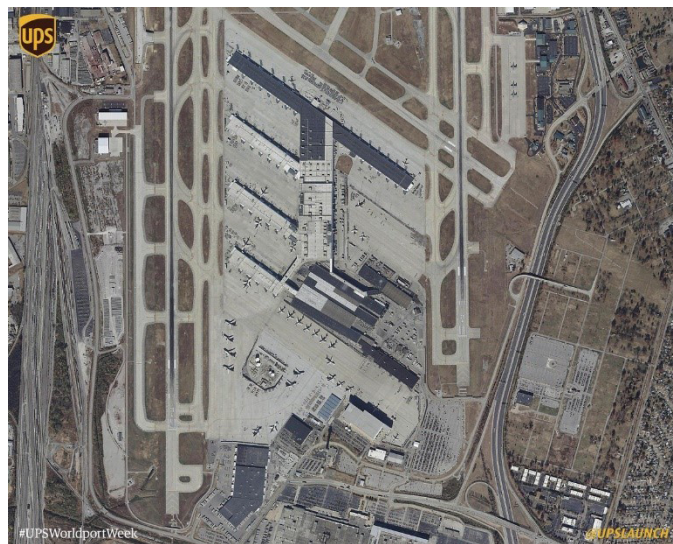


Figure 11: UPS WorldPort (Source: UPS)

⁹<https://www.in.gov/indot/3689.htm>

PIPELINES

Due to security concerns, limited information is publicly available regarding pipelines. However, the U.S. Department of Energy provides state level information which showcases the KIPDA MPA's position as a maritime mode transfer point for crude oil. The region is also bisected by pipelines that convey petroleum products, petrochemicals and natural gas.

SUPPORTING UPS WORLDPORT

UPS uses barges to deliver jet fuel to a terminal on the Ohio River. From the terminal, the fuel is transported by pipeline to their WorldPort facility at Louisville International Airport. In 2012, UPS shipped over \$300 million in fuel by barge and pipeline to support their air operations.¹⁰

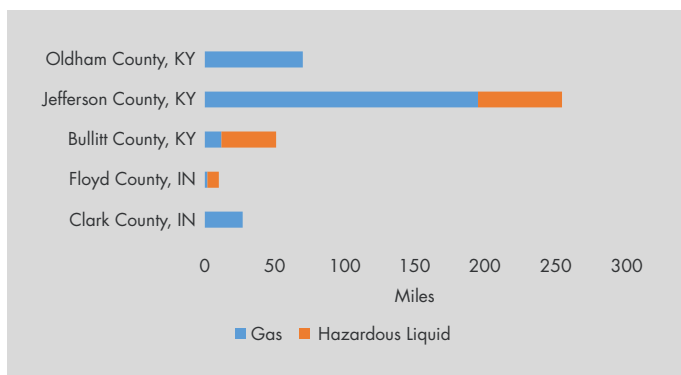


Figure 12: Pipeline Mileage by County

RAIL

Railroads are categorized into three classes based on their operating revenue. Class I railroads have an operating revenue of \$467 million or more. In the KIPDA MPA, Norfolk Southern and CSX are Class I railroads. Class II railroads are commonly referred to as "Regional Railroads." They have revenues between \$37.4 million and \$467 million. The Paducah and Louisville Railway (PAL) is the only regional railroad in the KIPDA region. A Class III railroad, also known as a short line railroad, is a carrier with yearly operating revenues under \$37.4 million. In the MPA, these include the Louisville and Indiana Railroad Company and the R.J. Corman Railroad Group.

In addition, the Louisville & Jefferson County Riverport Authority has its own railroad that moves coke, coal, bulk, and metal shipments between the port and the Paducah and Louisville Railroad and CSX lines.

RAILROAD INTERMODAL FACILITIES

The KIPDA MPA is home to three intermodal shipping container yards. The CSX-Osbourne Intermodal Facility and the Norfolk Southern Buechel Intermodal Facility serve exclusive users. Norfolk Southern has an additional facility that services Appliance Park, home to GE Appliances.

In addition to these three container facilities, the MPA is home to several non-containerized intermodal yards. These facilities include automotive manufacturing, grain elevators and transload facilities. Within the region there are these major facilities:

Total Distribution Services Automotive/CSX

This rail yard primarily serves the Kentucky Truck Plant in Louisville. Ford takes finished pick-up trucks produced at the Kentucky Truck Plant and uses special railcars for shipment out of the region.

Shelbyville Automotive/Norfolk Southern

This rail yard organizes loaded automotive rail cars into unit trains bound for different parts of the country.

Consolidated Grain & Barge/LIRC

Consolidated Grain has two grain and fertilizer terminals with transfer operations primarily to the Louisville and Indiana Railroad Company. One is in Jeffersonville, IN and the other is in Louisville, KY. Each facility has rail to truck, truck to rail and can also transfer from river transload and includes storage.

MARTTS – Mid American Truck Transfer System/PAL

A truck to rail transload facility served by the Paducah and Louisville Railway in Louisville.

¹⁰https://louisvilleky.gov/sites/default/files/economic_development/pdf_files/beam_infrastructure_rpmt_small.pdf

Norfolk Southern Independent Bulk Transfer Terminal

A truck to rail bulk transfer/transload facility served by the railroad in Louisville. This is an independent operator but on railroad property.

Norfolk Southern Thoroughbred Bulk Terminal

A truck to rail transload facility served by the railroad in Louisville that takes containers and other commodities from truck to rail and rail to truck. These facilities have onsite personnel, security, truck scales and wash, inventory management and support. This facility is owned and operated by Norfolk Southern.

TRANSFLO/CSX

A truck to rail transload facility served by the CSX railroad in Louisville that takes containers and other commodities from truck to rail and rail to truck. Like Norfolk Southern, these facilities typically have onsite personnel, security, truck scales and wash, inventory management and support. This facility is owned and operated by CSX.

Jeffersonville/ Dutch Lane Transfer Yard/LIRC

A cross dock, storage and transload facility for truck to rail and rail to truck, owned by the Louisville and Indiana Railroad Company in Jeffersonville, IN. The facility specialized in plastics and building materials, including lumber, shingles, and brick.

Tanco Clark Maritime/LIRC

A bulk liquid storage, drumming and blending facility accommodating rail, truck and barge modes in Jeffersonville, owned by Louisville and Indiana Railroad Company.

Watco Terminal and Port Services

This is a terminal and port services facility with a warehouse, and numerous cranes to facilitate truck to rail and rail to truck transfer for the steel, paper, aluminum and merchandise sectors. The facility is owned by the Watco Companies and serviced by the LIRC.

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EXISTING/FUTURE FREIGHT CONDITIONS



EXISTING/FUTURE FREIGHT CONDITIONS

This chapter builds on the Freight Profile and provides additional details about the current and expected future conditions of the freight system in the KIPDA

MPO region. It provides more detailed information on the infrastructure, flows, operating conditions, and impediments to freight movement in the region.

FREIGHT RELATED LAND USES

This section expands on the existing data related to the freight clusters identified in Chapter 1, discusses the major sources and destinations for freight in the MPO region, and also considers land-use type as it relates to the clusters.

FREIGHT CLUSTERS

To identify the major freight activity centers in the MPO region, KIPDA collected data on freight shippers and receivers as well as several major carriers. The data includes information on the largest operations such as UPS, Ford, and GE in Jefferson County. It also includes information on operations such as Amazon in Bullitt County and Zenith Logistics (Kroger Distribution Center) in Eastern Jefferson County as well as smaller companies such as Idemitsu Lubricants along Port Road in Jeffersonville and Beach Mold & Tool in New Albany. The data was used to identify clusters of freight related companies, where many truck trips will start and end. A cluster was defined as an area where there were five or more freight related facilities within one-half mile of each other. The points defined in this way were buffered by the one-half mile to create the clusters.

Some companies were not able to be documented due to data limitations; however, many of these companies locate in or near areas where there are existing freight clusters due to zoning and infrastructure needs. This includes carriers (trucking firms), such as M & M Cartage, Usher Transport, Mercer Transportation, and Sodrel Truck Lines (among many others) that were not part of the dataset, but are near existing clusters. It also includes many shippers and receivers. There are new developments and companies that are coming on-line and the clusters will change and grow over time, but in general the clusters provide a good idea of the freight hotspots in the region.

The current map of Freight Clusters is shown on Figure 9 in Chapter 1. The largest geographical cluster (12) is just west of downtown Louisville, with three others south along the Ohio River (3, 6, and 11). There are five that are in south central Jefferson County straddling I-65 and near the airport. The three clusters in eastern Jefferson County include the Bluegrass Industrial Park (10) and newly developing areas along I-265. There is one location in Bullitt County, two in Floyd County, and three in Clark County. There is also one area outside of the KIPDA boundary in Shelby County. It is important to note that there are some important new industrial areas that were not picked up by the data analysis due to the date of the data source.

Two examples of these include the Renaissance Park area south of Outer Loop and just west of I-65 and the US 62 corridor north of SR-265 in Jeffersonville, which includes the River Ridge Commerce Center. The non-highway freight activity tied to airports (5 and 7), inland waterway ports (6 and 17), and railroads (various) was also generally captured by the freight cluster map.

SHOPPING CLUSTERS

Retail establishments tend to be important destinations for truck movements. Shopping clusters were identified using InfoUSA data about retail establishments in the MPO region. A shopping cluster was defined as an area where 40 or more retail establishments were located within 0.25 miles of each other. The cluster was created using a 0.25 mile buffer from the identified points. As shown on Figure 9, the shopping clusters are generally scattered around the region, but many of them are located between downtown Louisville and I-265 in the east. The shopping clusters were used with the freight clusters to determine key freight trip generation and attraction areas.

FUTURE GROWTH AREAS

Based on recent trends and county initiatives, many of the new and growing freight generation areas are likely to be along the I-65 corridor in Bullitt County, I-64 corridor in Shelby County, near the airport in Jefferson County, and in southeastern Clark County, Indiana. An industrial area is also planned for Oldham County along I-71.

In Bullitt County, the Economic Development Authority is promoting nine “shovel ready” industrial sites

along I-65, which would add to the recent industrial development in the corridor. In Shelby County, there are large areas near the Simpsonville and KY 55 interchanges that have been zoned for industrial development and several new developments have come on-line there in the last five years. In Clark County, the River Ridge Development Authority industrial area on IN 62 north of IN 265 has grown extensively in the past five years and has more room to grow. In Jefferson County, locations such as the Renaissance Industrial Park south of the airport have grown substantially in the last few years and that area is also expected to attract more new development. In Oldham County, an area has been designated and zoned for industrial development in the vicinity of the proposed new Lagrange Parkway interchange.

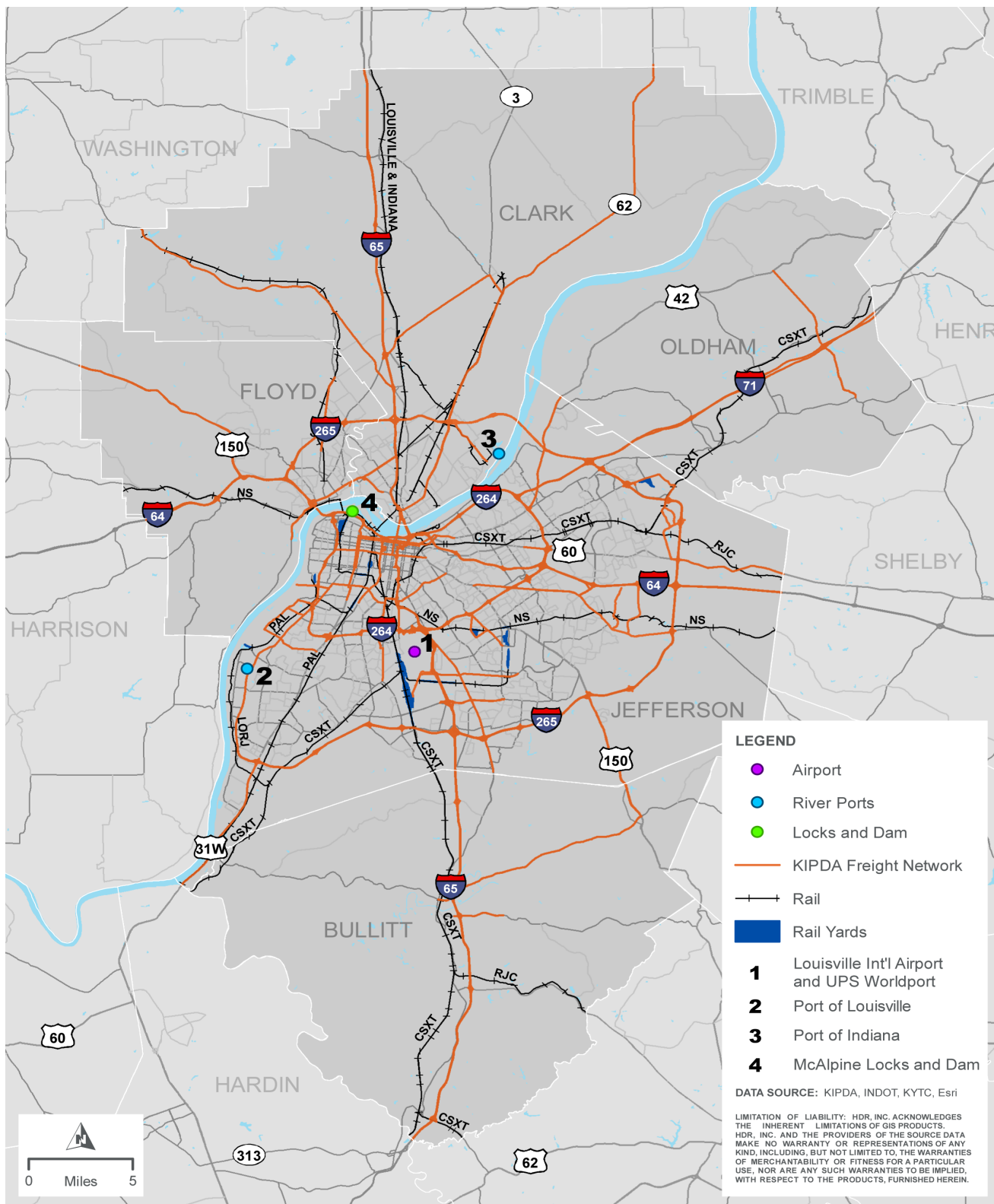
Many of these areas are near the edge of the MPA, which will affect infrastructure needs, workforce accessibility, and spin-off development issues. Future shopping areas also appear to be pushing toward the urban edge, though there continue to be efforts to encourage new development and redevelopment in the urban core. In general, the freight needs (both origins and destinations) appear to be continuing to decentralize, which could require additional infrastructure investment in these outlying areas.

FREIGHT NETWORKS & FACILITIES

HIGHWAY

Several major interstate highways and freeways form the backbone of the Louisville highway system. I-65 runs north-south, I-64 runs east-west, and I-71 begins in Louisville and heads northeast toward Cincinnati. I-264 is an inner loop highway serving urban Jefferson County. Finally, I-265, IN-265, and KY-841 start at US-31W in the southwest and run in a counterclockwise loop that ends at I-64 in New Albany, IN. These highways include two new tolled crossings of the Ohio River, I-65 in downtown Louisville and I-265 connecting Prospect, Kentucky with Utica, Indiana.

KIPDA has designated a freight network that includes these freeways as well as other non-freeway segments that are critical for regional connectivity as well as accessing airports, ports, high-density freight clusters, and other specific locations. For example, Newburg Road and Fern Valley Road in southern Jefferson County were both included because they connect the interstate system with GE Appliance Park. Another example is the inclusion of Port Road in eastern Clark County because it provides access to the Port of Indiana and the many nearby freight-related businesses.



KIPDA REGIONAL FREIGHT MOBILITY STUDY FREIGHT NETWORK

Figure 13: Freight Network

The facilities included in the KIPDA Freight Network range from two-lane local roads to multi-lane interstate highways, but all of the roadways are important to moving freight in and through the region. The KIPDA Freight Network is presented in Figure 13.

RAIL

The railroad network is also shown in Figure 13. There are two Class I railroads in the region, CSX and Norfolk Southern (NS). The Class II railroad Paducah and Louisville (P&L) has lines in the western part of the region. The Class III railroads include Louisville and Indiana (LIRC), RJ Corman (RJCC), MG Railroad (MGR), and Southern Indiana Railway (SIND) and there is a Louisville Riverport (LORJ) railroad line along the Ohio River in the west. As discussed in the Freight Profile section, there are several rail-truck intermodal facilities in the region as well.

WATERWAY

The Ohio River is the waterway “network”. There are two inland water ports in the region as shown on Figure 13. The Port of Indiana is located upstream from Louisville on the Indiana side of the river. The Louisville & Jefferson County Riverport Authority is located downstream from Louisville on the Kentucky side of the river. There are also several shipping terminals upstream from Louisville on both sides of the river. The McAlpine Lock and Dam is located just downstream from downtown Louisville and allows river traffic to move between the two pool levels on either side of the dam.

AIR

Air cargo in the region primarily moves through the Louisville International Airport (Standiford Field or SDF). The UPS Worldport facility, through which UPS air express packages are processed, is located at SDF. Worldport is the largest package handling facility in the world, processing approximately two million packages a day through much of the year. This volume doubles during the peak shipping season. More than 300 UPS cargo flights arrive and depart from SDF each day. SDF also serves other smaller air cargo operations in the region including regional Fed-Ex service.

Several freight modes and intermodal connections are present in the area surrounding SDF. As shown in Figure 14, the UPS Worldport, Ford Assembly Plant (for the Escape), several rail facilities, and several important truck routes all connect in this area.



Figure 14: UPS Worldport, Ford, Rail Yards, and Highway Connections

EXISTING & FUTURE FREIGHT SYSTEM FLOWS

There are several major freight flows to/from and through the region that use the networks described previously.

HIGHWAY

The largest truck flows in the region are focused on the interstates, particularly I-65, I-265, and I-71 as illustrated on Figure 15. The volumes on major portions of these highways range from just under 10,000 trucks per day to over 20,000 trucks per day. These high volumes are driven in part by through truck traffic. As shown on the map, the volume of trucks using the new northeastern Ohio River crossing is relatively modest. The volume of trucks on I-265 and I-264 in the west is also lower than on many of the other freeways.

In the future, it is expected that truck traffic will grow substantially nationally and in the MPO region. In particular, growth is expected on the major interstate corridors such as I-65 and I-71. Locally, truck traffic is expected to continue to increase as warehousing and industrial development grows. The growth areas discussed previously will see some of the largest local truck traffic increases.

RAIL

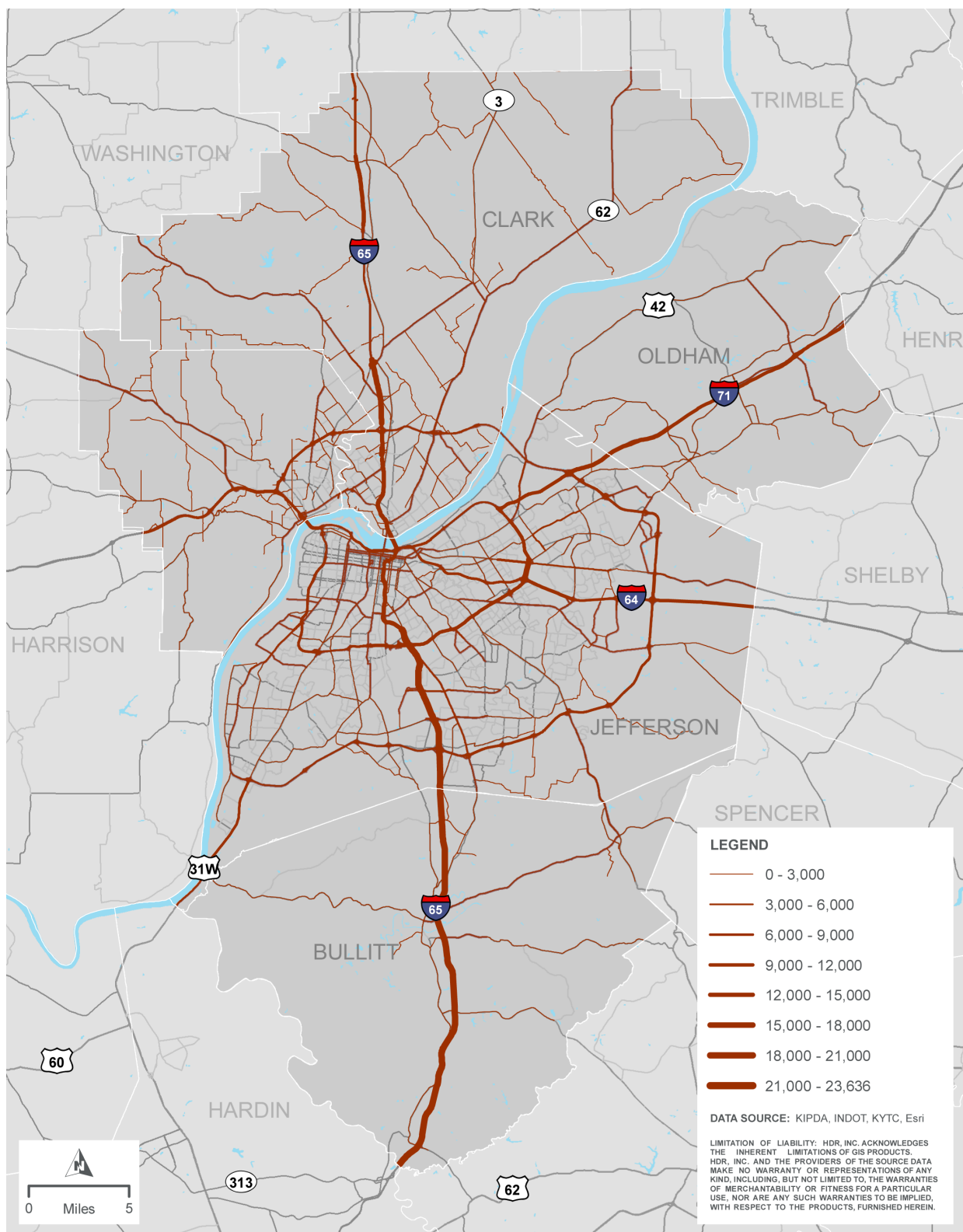
As private and competing companies, railroads do not share their detailed flow and operations data. However, based on the Federal Railroad Administration (FRA) grade-crossing data, it appears that the CSX mainline running east into Oldham County has track speeds of 25 to 30 mph and carries 15 to 20 trains per day (refer to Figure 13). To the south, going into Bullitt County, the CSX mainline has speeds of up to 60 mph, with 15 to 20 trains per day. The Norfolk Southern line running east into Shelby County has maximum speeds of up to 45 mph with 20 trains or more per day. The P&L in southwestern Jefferson County has maximum speeds of up to 35 mph and carries approximately 10 trains per day. The LIRC in Indiana carries under 10 trains per day and has a maximum speed of up to 49 mph.

These are general estimates based on the published data, but they provide order of magnitude information about the rail operations in the area.

The future growth of rail traffic in the region is not known, but it is expected that Louisville will follow national trends in this area, which shows increasing rail volumes especially in the intermodal and automotive industries, but decreasing volumes for certain aggregates (e.g. coal). Also, as warehousing and industrial growth occurs, local origin-destination freight rail activity will likely grow or at least remain stable.

WATERWAY AND AIR

Please refer to the Freight Profile for information on the existing flows for these two modes. In the future, the air cargo market is expected to increase; however, it is not clear how much of that growth will be captured by UPS and SDF. Historically, UPS has captured a sizeable portion of the growth and it is important to the region that this continue. Commercial traffic on the inland waterways is relatively stable. There is a lot of available capacity on the inland waterway system and there is some upside potential related to the improved reliability offered by the construction of the Olmstead Lock.



**KIPDA REGIONAL FREIGHT MOBILITY STUDY
TRUCK VOLUMES - AADTT**



Figure 15: Truck Volumes - AADTT

FREIGHT SYSTEM IMPEDIMENTS PART 1

One of the major objectives of this study is to identify and quantify impediments to freight movements within and through the MPO region. This will allow regional decision-makers to prioritize projects that would address these key freight needs. Many of these impediments are focused on the highway system; however, where possible other impediments have been identified. The impediments include items such as insufficient bridge clearance, weight restrictions, and problematic at-grade railroad crossings.

ASSIGNING IMPEDANCE LEVELS

Each identified impediment was rated with a 1 through 3 rating, with Level 1 impedances being of the greatest concern. The objective was to rate them based on the potential impact they would have on major freight movements. Level 1 impedances are on the KIPDA Freight Network and are inside a freight or shopping cluster. A Level 2 impedance location is either on the KIPDA Freight Network and outside the freight/shopping clusters or on a functionally classified roadway¹¹ and inside one of the clusters. Level 3 impedances are a lower level of concern and are on the functionally classified network and outside the clusters. The criteria are shown graphically in Table 7.

Geographic information system (GIS) layers with information about highway system elements such as bridges, highways, and rail crossings were obtained from various agencies, including KIPDA, KYTC, INDOT, and the FRA. This data was used to highlight major freight impediments on the highway system around the region.

BRIDGE CONDITION

According to the National Bridge Inventory data from KYTC and INDOT, there are approximately 1,160 highway bridges in the MPO region. Of these, 85 had a condition rating of “Poor” based on a good, fair, poor rating system. However, on a more detailed examination, only 74 of these ratings were relevant due to the many new bridges constructed and opened to traffic in the region over the last few years. An additional 16 bridges are on local roads that are not critical to the movement of freight.

As shown in Table 8, there are 58 poor condition bridges that are either on the KIPDA freight network or the functionally classified highway network. 47 of these bridges are in Kentucky, including all eight of the Level 1 Impedance bridges. A little over half of the bridges received an impedance rating of Level 3, indicating that they are on a classified highway, but outside of the most significant freight areas. Figure 16 shows the locations of the 58 bridges that received an impedance rating. All eight of the Level 1 bridge condition impedances are in Jefferson County. Three are the major structures on I-64 between downtown and the riverfront; two are on I-64 where it crosses the middle fork of Beargrass Creek; one is the Brownsboro Road bridge over I-264, and the final one is on Grade Lane where it crosses the Northern Ditch near the Ford Plant. All eight of these bridges are very important to the freight system.

	INSIDE FREIGHT/ SHOPPING CLUSTER	OUTSIDE FREIGHT/ SHOPPING CLUSTER
On KIPDA Freight Network (within 100’ of centerline)	1	2
On functionally classified network (within 100’ of centerline)	2	3

Table 7: Assigning Impedance Levels

¹¹The functionally classified network includes all roads of collector level and above as defined by KIPDA.

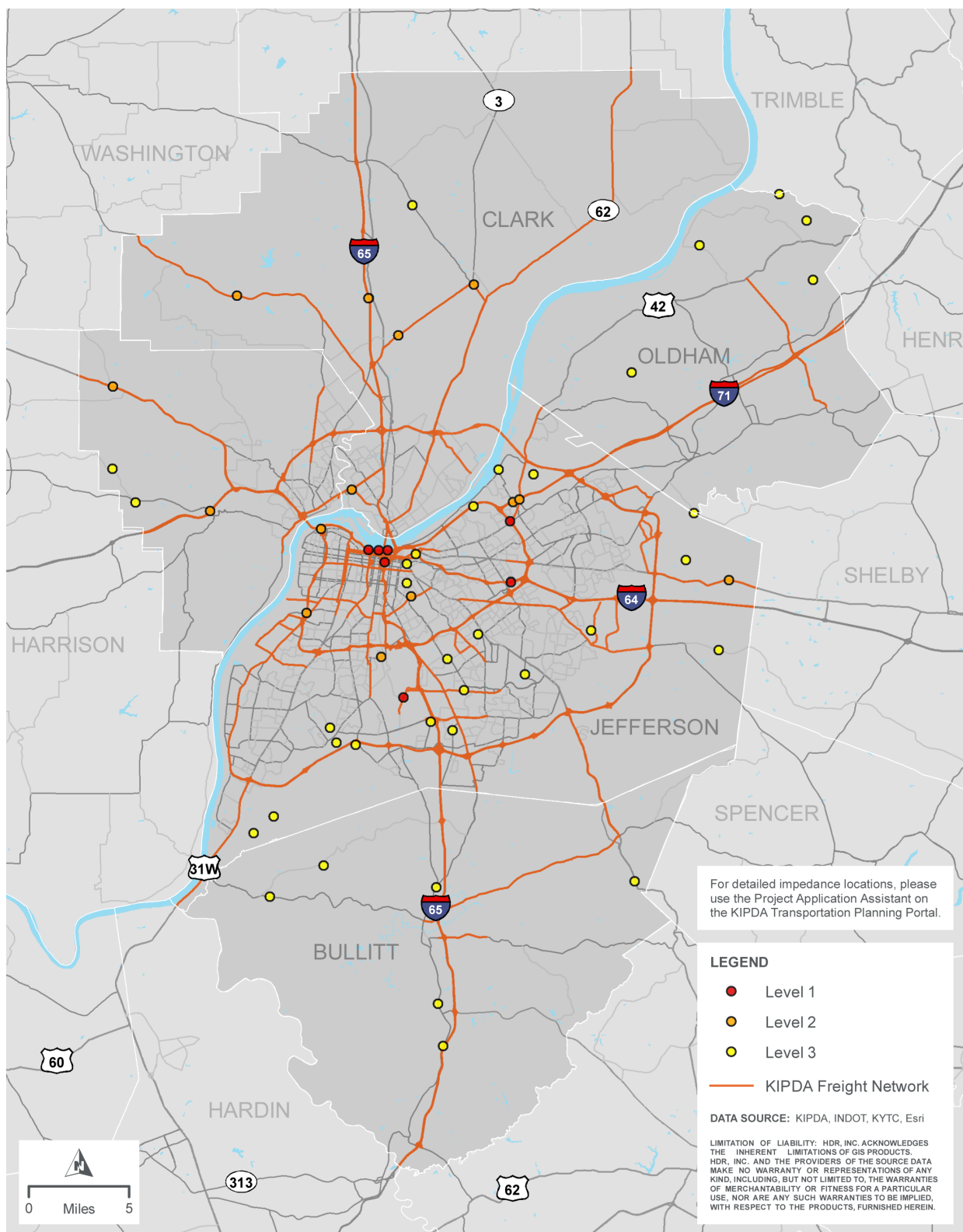


Figure 16: Impedances - Bridge Condition

IMPEDANCE LEVEL	KIPDA REGION	INDIANA	KENTUCKY
1	8	0	8
2	15	8	7
3	35	3	32
Total	58	11	47

Table 8: Bridge Condition Impedance Ratings

BRIDGE CLEARANCE

The 1,160 highway bridges were assessed to determine whether they presented vertical clearance issues for trucks. The required clearance for bridges is typically 14.6 to 16.6 feet depending on the functional classification and other factors. For this impedance determination, all bridges that did not provide at least 16 feet of vertical clearance were identified as potential freight impedances. Low clearance bridges can present major barriers to highway freight movement. Bridges that have been recently replaced were excluded from the list.

Just under 100 bridges in the MPO region have reported clearances of less than 16 feet over a highway that is functionally classified and/or on the KIPDA freight network. As shown in Table 9 and Figure 18, 74 of these are in Kentucky and 24 are in Indiana. 12 of the 98 bridges were rated as Level 1 impedances because they were bridges over

IMPEDANCE LEVEL	KIPDA REGION	INDIANA	KENTUCKY
1	12	2	10
2	45	11	34
3	41	11	30
Total	98	24	74

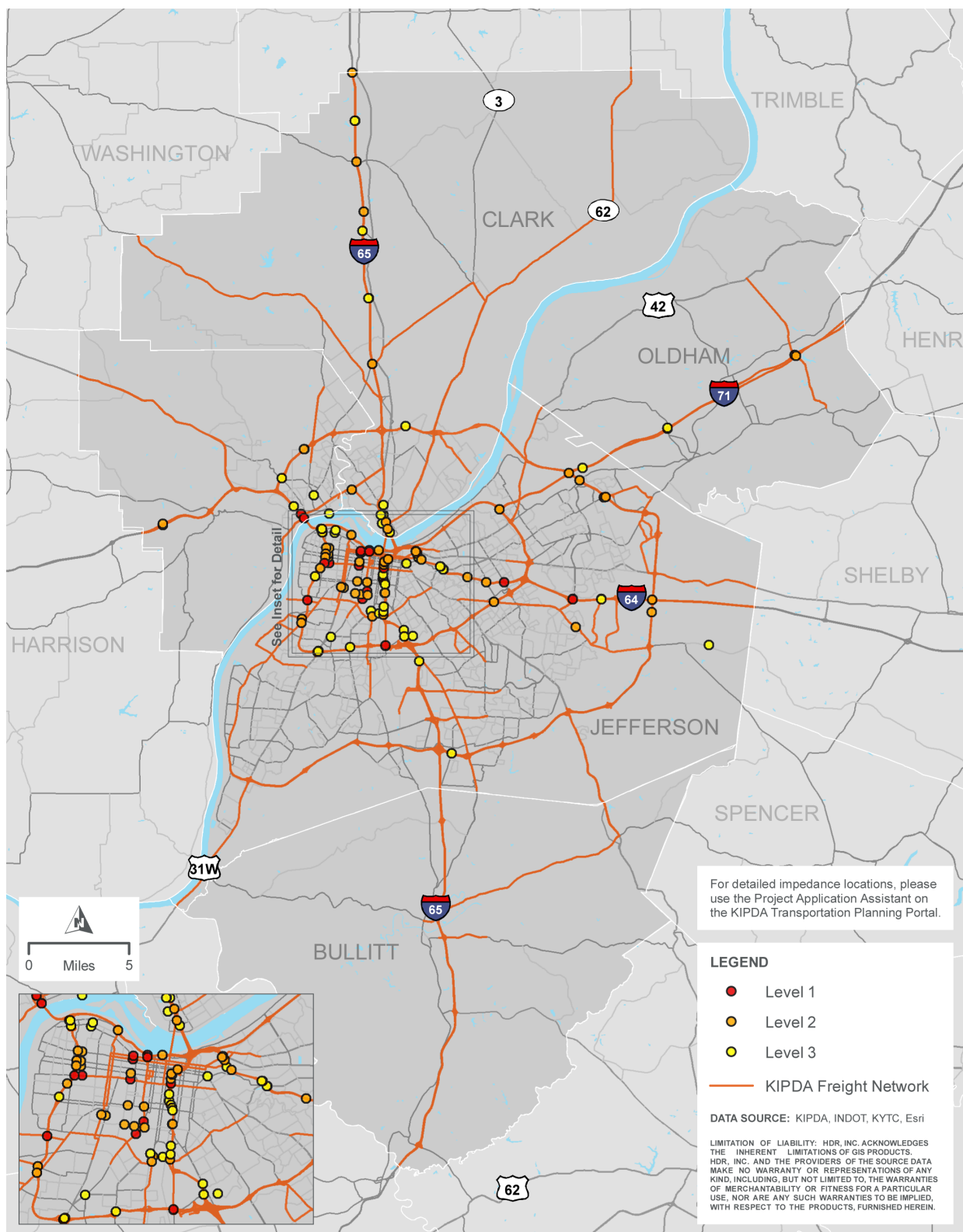
Table 9: Highway Bridge Clearance Impedance Ratings

the KIPDA Freight Network and within a freight or shopping cluster.

Most of the 12 Level 1 clearance impedance locations are along the Interstates or at interchanges, with the lowest reported Level 1 clearance (14.2 feet) at the I-64 westbound on-ramp from E. Spring Street in New Albany. In fact, the bridge appears to have damage due to an impact (Figure 17). The lowest reported clearance of all Level 2 bridges was 14 feet at the I-265 crossing of Mt Tabor Road in Indiana. The east side bridge at this location also showed damage. The lowest reported bridge clearance for Level 3 was 13.6 feet where Warnock Street passes under I-65 near the University of Louisville. This bridge also shows apparent impact damage.



Figure 17: Bridge over I-64 EB On-Ramp



KIPDA REGIONAL FREIGHT MOBILITY STUDY

IMPEDANCES: BRIDGE CLEARANCE HIGHWAY AND RAIL BRIDGES

Figure 18: Impedances - Bridge Clearance

RAILROAD BRIDGE CLEARANCE

To evaluate railroad bridges that cross over highways, the FRA rail grade crossing database was examined to identify bridge over highway locations. This data was not always accurate, but it gave a reasonable starting point for the evaluation. Bridges were then assessed using street view photography to determine whether they presented vertical clearance issues. This included looking for low clearance signage, markings on the bridges, or other indications that the bridge clearance was an issue.

Using this method, 36 railroad bridge clearance issue locations were identified as shown in Table 10. The majority (32 of 36) are in Kentucky, including seven Level 1 impedances. The seven locations include three on West Broadway (two are side by side), two just west of downtown, and two south on 7th Street. Figure 18 shows the railroad bridge clearance impedances with the highway bridge clearance impedances.

There are many other bridges scattered around the region that present problems for trucks, including two on 3rd Street south of Eastern Parkway that are known to be a major truck crash problem. Several other locations corresponded to truck crash problem areas as well.

IMPEDANCE LEVEL	KIPDA REGION	INDIANA	KENTUCKY
1	7	0	7
2	14	0	14
3	15	4	11
Total	36	4	32

Table 10: Railroad Bridge Clearance (Over Highway) Impedance Ratings

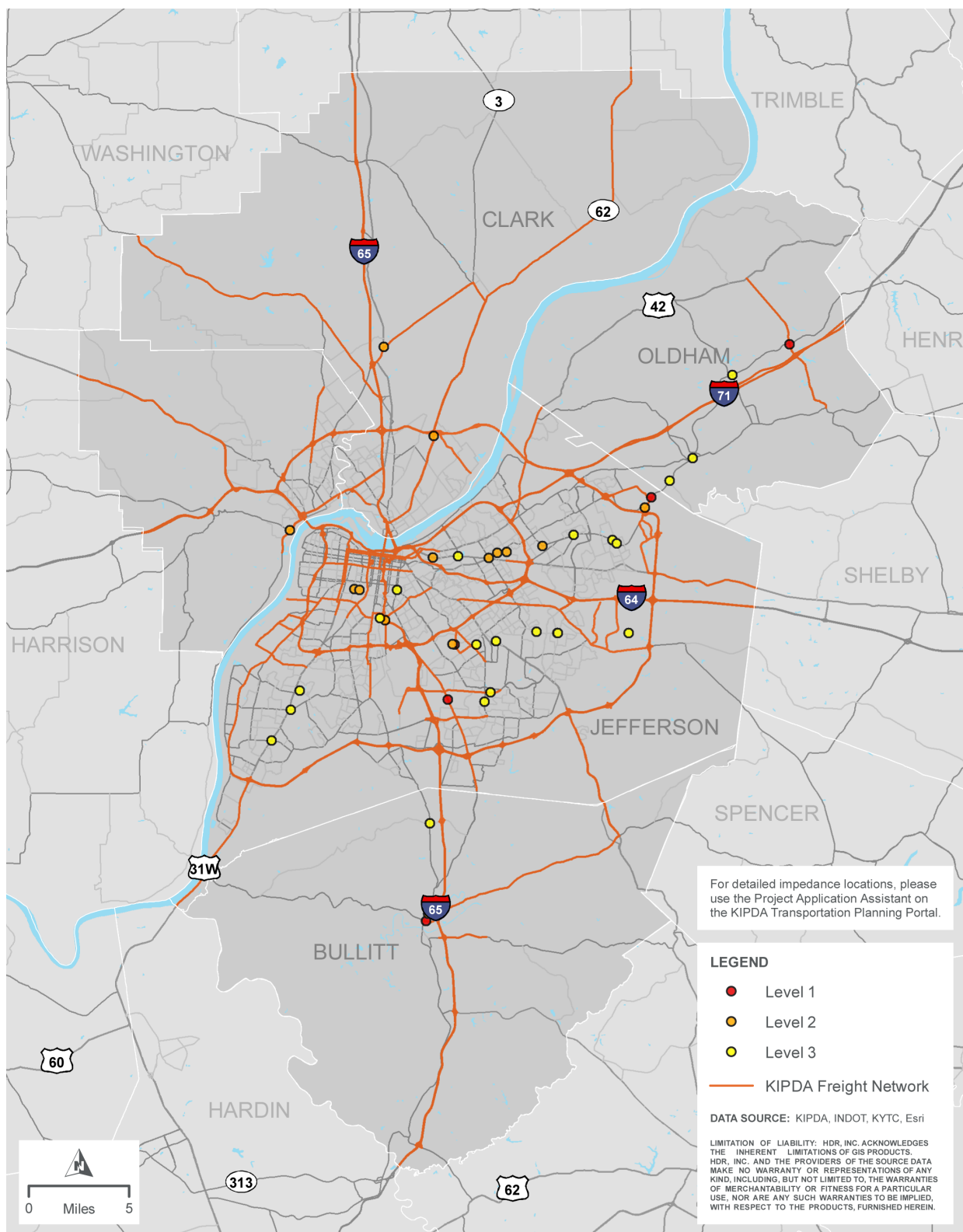
RAILROAD CROSSING CAPACITY IMPEDANCES

Railroad crossings were evaluated in two ways. The first was a high-level assessment of the capacity conflict between highway traffic and rail traffic. The second was a high-level safety assessment. The two approaches work together to identify some similar and some different crossings as causing freight impedances. The capacity assessment used the cross product of the total daily highway traffic and the total daily train volume using the crossing. If the cross-product exceeded 100,000 then the crossing was labeled as an impedance and it was rated based on the highway type and location. There were 40 locations that were identified as rail crossing capacity impedances using this method as shown in Table 11.

Figure 19 highlights the rail crossing capacity impedances. There are five Level 1 impedances using this measure. They include the crossings at KY 53 in downtown LaGrange, Westport Road (near SR-146), Preston Highway (CSX service to the GE plant), Jennings Lane in the Bishop Lane industrial area, and the E. 4th Street crossing in Shepherdsville. There are many additional Level 2 impedances such as the crossing of US-62 in Indiana near the IN-265 interchange (near Port Road) and the Chamberlain Lane crossing near Old Lagrange Road (serving the Ford Plant area). These crossing capacity impedance locations are places where trucks incur delay due to at-grade crossings, and the removal of these impedances could facilitate the faster movement of freight in the region.

IMPEDANCE LEVEL	KIPDA REGION	INDIANA	KENTUCKY
1	5	0	5
2	14	3	11
3	21	0	21
Total	40	3	37

Table 11: Railroad Crossing Capacity Impedance Ratings



KIPDA REGIONAL FREIGHT MOBILITY STUDY
IMPEDANCES: AT-GRADE RAIL CROSSINGS
HIGH CAPACITY CROSSINGS

Figure 19: Impedances - At-Grade Rail Crossings

RAILROAD CROSSING – SAFETY IMPEDANCES

The planning level safety assessment for the rail crossings used the same cross product approach, but then used a factor for the crossing protection. The general equation is known as the New Hampshire Hazard Index Rating. The factor that was used was 0.1 for automatic gates and 1 for no automatic gates. This reduced the cross product by 90% if gates were present. A threshold of 20,000 was used for this analysis, resulting in 27 crossings being selected as safety impedances as shown in Table 12 and Figure 21. The two Level 1 rail-crossing safety impedances are located at the 1st Avenue (KY 53) crossing in Lagrange and at E. 4th Street (KY 44) in Shepherdsville. These two locations were both Level 1 rail crossing capacity and safety impedance locations. Overall, there were 11 crossings that were both safety and capacity impedances.

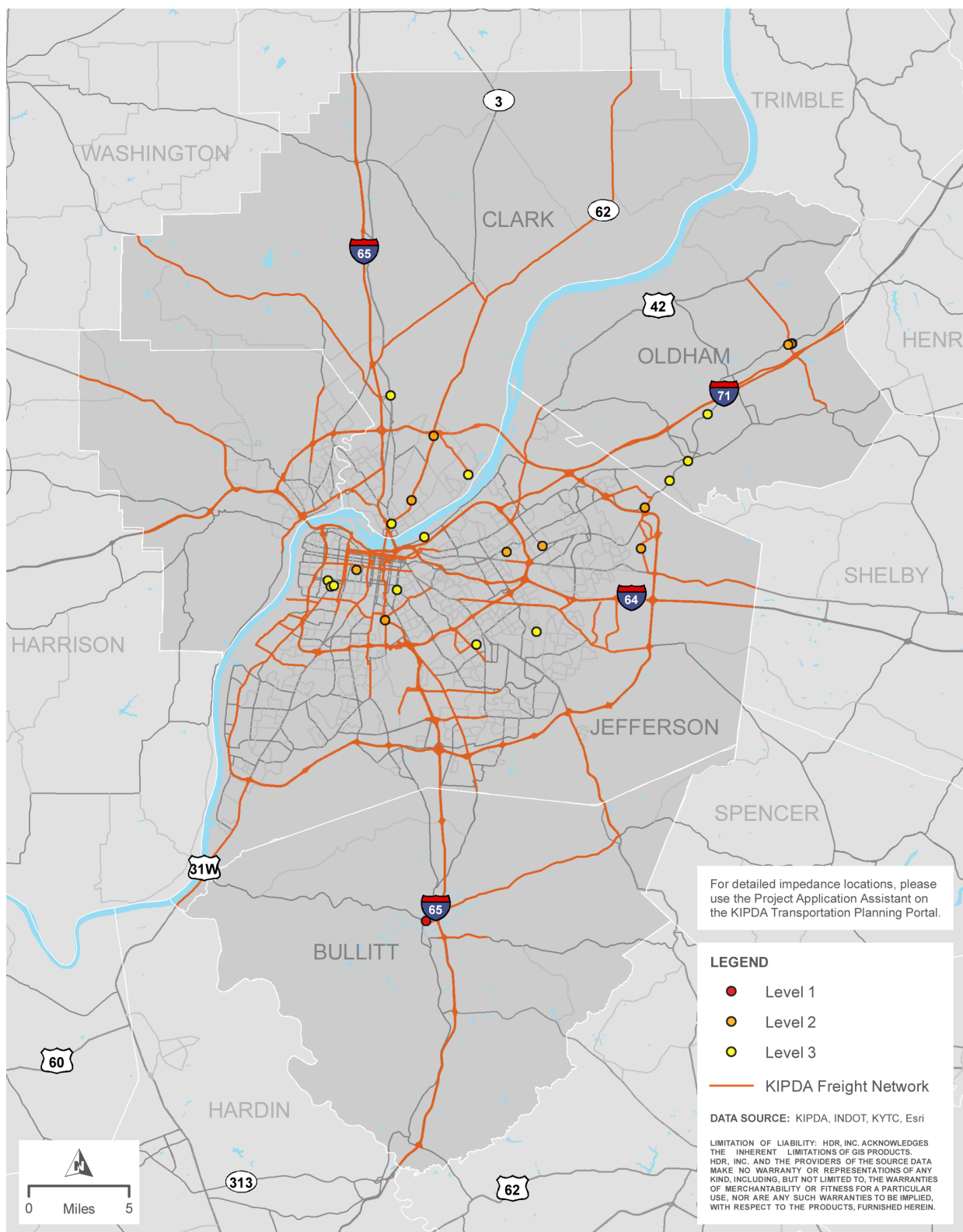
There were four safety locations that were manually labeled as impedances. Three of these involve locations where the CSX mainline runs down Main Street in LaGrange, KY. The fourth was the crossing of KY-329 next to KY-146 in Crestwood, where the tracks are elevated enough that trucks with their long wheel-bases get stuck on the tracks creating a major safety hazard (Figure 20). This location is an impedance for both rail and truck freight.



Figure 20: KY-329 At-Grade Rail Crossing in Crestwood, KY

IMPEDANCE LEVEL	KIPDA REGION	INDIANA	KENTUCKY
1	2	0	2
2	11	2	9
3	14	3	11
Total	27	5	22

Table 12: Railroad Crossing Capacity Impedance Ratings



KIPDA REGIONAL FREIGHT MOBILITY STUDY
IMPEDANCES: AT-GRADE RAIL CROSSINGS
HAZARDOUS CROSSINGS

Figure 21: Impedances - At-Grade Rail Crossings

ROAD WEIGHT CLASS IMPEDANCES

In Kentucky, all state-maintained highways have designated weight limits ranging from 44,000 pounds lbs up to 80,000 lbs gross vehicle weight. Highways that are not designated as 80,000 lbs. facilities are labeled in this study as potential freight impedances. Figure 22 shows the highways that have lower weight designations. Based on highway type and location, they have been designated as Level

1 through 3 impedances. The Level 1 impedances include Watterson Trail/Ruckriegel Parkway in Jeffersontown, Old Henry Road just west of I-265, and KY-480 in Bullitt County. These are all KIPDA Freight Network routes and important industrial areas, and the presence of weight limits on these highways is an impedance to truck freight movement. Level 2 and 3 impedances in the MPO region include Rockford Lane in southwestern Jefferson County, which is also on the KIPDA Freight Network.

FREIGHT SYSTEM IMPEDIMENTS PART 2 AND FREIGHT SYSTEM PERFORMANCE

This section presents data on the freight system safety and operational performance. These measures are also used to identify impediments, but they differ somewhat from the prior impediment discussion in that they are more closely tied to system performance outcomes.

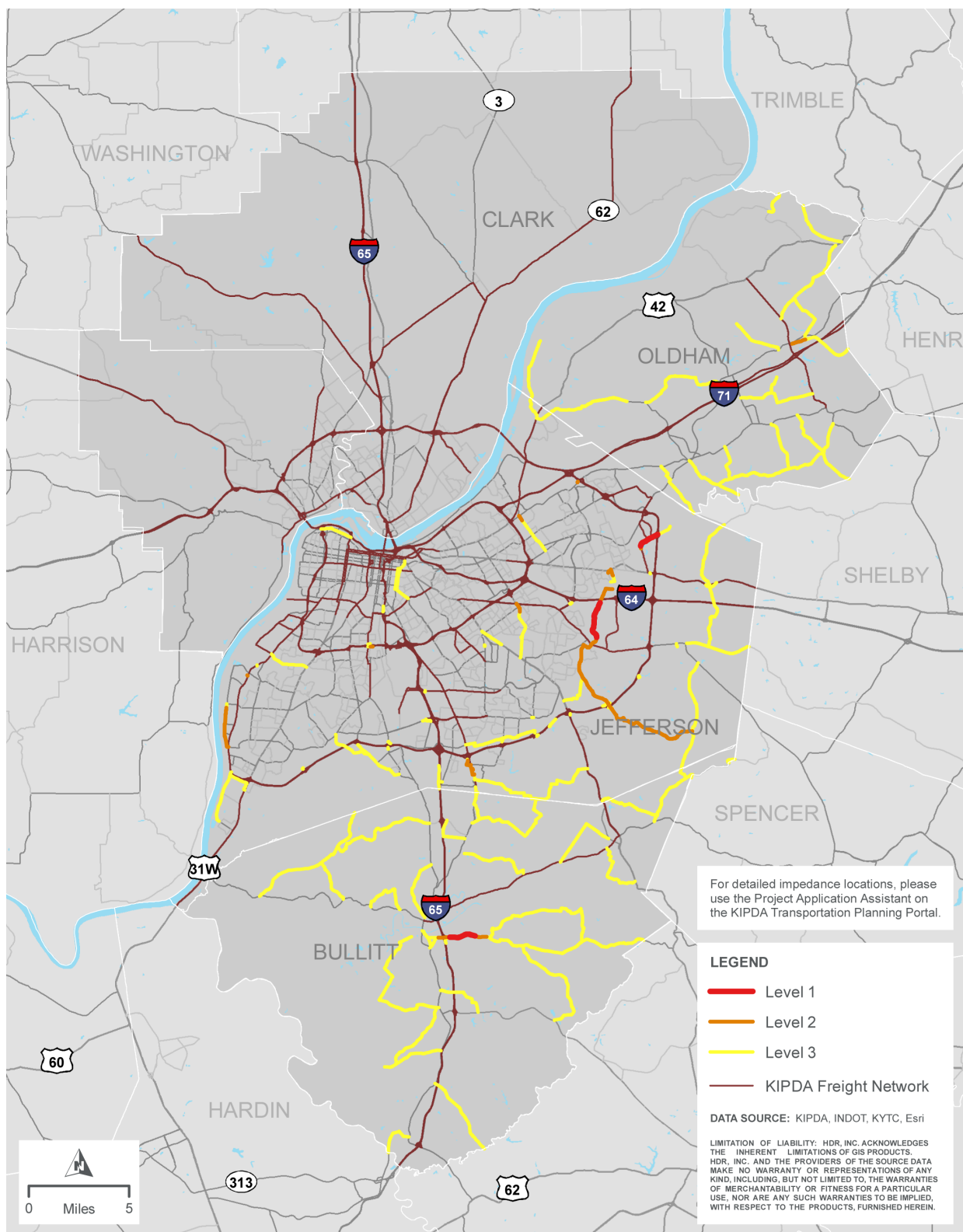
COMMERCIAL VEHICLE CRASH LOCATIONS

A safety analysis was performed to determine where commercial vehicle crashes were of greatest concern. The analysis methodology was designed to be consistent with the system-wide all-vehicle crash analysis completed by KIPDA for the entire region. It involved four separate analyses for Interchanges, Freeway Segments, Intersections, and State and Local Highway segments. For each of these facility types, crashes were assigned to specific facilities to yield a total number of crashes for interchanges and intersections and a number of crashes per mile for freeway and highway segments. Thresholds were then set to identify the high crash frequency locations. These locations were then evaluated based on crash rate and crash severity, yielding a total of three rankings for each of the facilities that met the minimum threshold for crashes. The summation of the three scores was used to rank the locations with the lowest number (highest ranking) being first.

INTERCHANGES

Nearly 90 interchanges were evaluated in the KIPDA region. Some closely spaced interchanges were grouped because they function together from an operational and safety perspective. The interchanges related to the new bridges over the Ohio River were excluded from the analysis due to the substantial recent changes that were made, which limited the usefulness of the historical crash data in these areas. Based on the crash frequency data, a threshold of 50 commercial vehicle crashes over the last 10 years was set as the threshold for the interchange crash analysis. There were 22 interchanges in Kentucky and 4 in Indiana that met the threshold as shown in Figure 23. These locations were ranked by crash rate and severity resulting in the final rankings shown in Table 13.

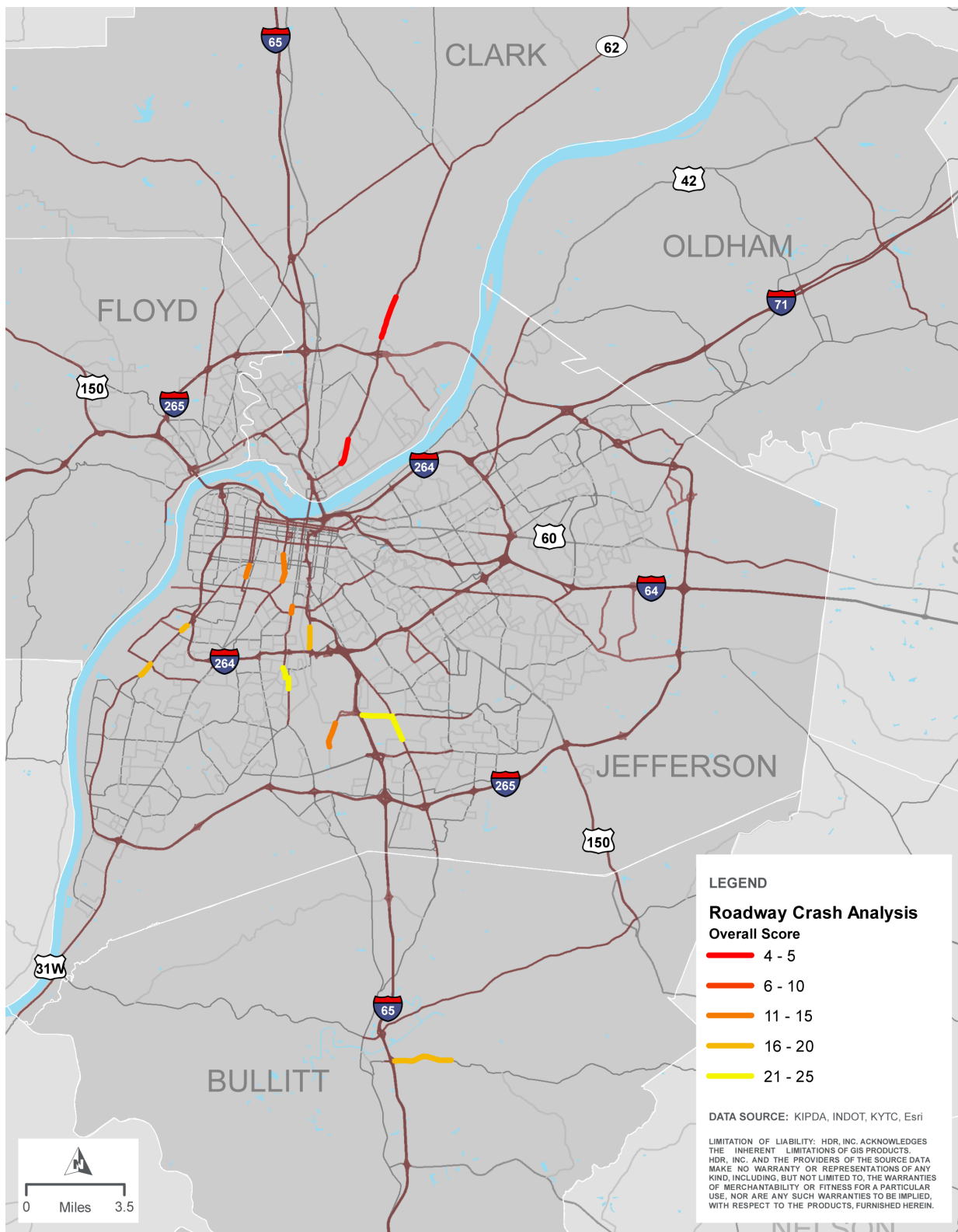
In Indiana, the I-65 Memphis/Blue Lick Road interchange in the north was at the top of the list. It had the highest number of truck crashes. It has both Loves and Pilot truck plazas, and many of the crashes were related to trucks using these truck plaza areas. A detailed analysis would be needed to determine how public highway improvements could address the crash issues at this location.



KIPDA REGIONAL FREIGHT MOBILITY STUDY

IMPEDANCES: WEIGHT LIMIT < 80,000 LBS

Figure 22: Impedances - Weight Limit < 80,000 Lbs



KIPDA REGIONAL FREIGHT MOBILITY STUDY
ROADWAY CRASH ANALYSIS
OVERALL SCORES

Figure 23: Interchange Crash Analysis

One location that did not show up on the interchange list in Indiana, which was mentioned frequently during stakeholder discussions, was the recently reconstructed IN-265/E. 10th Street/Port Road interchange (Figure 24). This interchange has three new roundabouts, including one on the south side with two three-lane approaches. Stakeholders stated that trucks have a difficult time navigating the interchange due to tight radii and confusing signage. A review of the data shows a cluster of crashes at the southern roundabout; however, given that the interchange has only been open a short time, a long-term analysis was not possible. Regardless, this location appears to be worthy of monitoring for safety issues.



Figure 24: IN-62 Roundabout in Jeffersonville, IN

RANKINGS							
KENTUCKY	ID	Name	Crash Frequency	Crash Rate	Severity Index	Overall Score	
	47	I-64 & I-264	6	8	2	16	
	83	I-71 & I-265	2	3	12	17	
	24	I-65 & I-264 (Preston, Airport, & Crit.)	1	1	20	22	
	73	I-71 & I-264	11	4	9	24	
	12	I-65 & I-265	4	16	4	24	
	25	I-264 & Poplar Level Rd	4	2	19	25	
	45	I-65 & St. Catherine St	16	5	5	26	
	28	I-65 & Crittenden Dr	12	9	8	29	
	3	I-65 and KY 480 (Cedar Grove Rd)	7	13	10	30	
	17	I-64 & Fern Valley Rd	3	10	18	31	
	15	I-65 & Outer Loop	8	17	7	32	
	18	I-65 & Grade Lane / Preston Hwy	9	20	3	32	
	40	I-64 & Hurstbourne Pkwy	15	7	15	37	
	26	I-264 & Newburg Rd	10	6	21	37	
	58	I-64 & 9th Street	19	12	6	37	
	31	I-65 & Warnock St / Eastern Pkwy	14	14	13	41	
	2	I-65 & KY 245 (Clermont Rd)	23	23	1	47	
	39	I-64 & I-265	18	19	11	48	
	4	I-65 & KY 44	12	21	17	50	
	30	I-264 & Bardstown Rd	19	15	16	50	
	5	I-65 & Brooks Hill Rd	16	22	14	52	
	56	I-64 & Story Ave / Mellwood Ave	22	11	22	55	
	48	I-65 & 1st St / Brook St (at Jacob St)	19	18	23	60	
	INDIANA	98	I-65 & Blue Lick Road	1	1	2	4
		87	I-65 & Veteran's Pkwy	2	2	3	7
96		I-65 & Indiana Ave (SR 311)	4	3	1	8	
92		I-65 & I-265	3	4	4	11	

Table 13: Interchange Commercial Vehicle Crash Rankings

The top five interchanges in Kentucky were all system interchanges. Several of these are locations that stakeholders called out as areas of concern for trucks. The I-64 and I-264 interchange was ranked first due in part to three fatal crashes at that interchange over the last 10 years, which gave it a high severity rating. The I-65 and I-264 interchange near the airport (including the connecting interchanges) was the top ranked interchange for commercial vehicle crash frequency and rate in Kentucky. The I-65 and KY 245 interchange was ranked highest for severity, with three fatal crashes over the last 10 years at this rural interchange location.

FREEWAY SEGMENTS

The freeway segments in the region that are part of the KIPDA Freight Network were evaluated (excluding interchange crashes) to identify high crash frequency locations using crashes per mile. Based on the data, a minimum threshold of 25 crashes per mile over the last 10 years was used. There were 29 segments that met the threshold. The segments were then ranked for crash rate and severity, yielding the results shown in Table 14 and Figure 25.

In Indiana, two of the longer stretches of I-65 in central and northern Clark County received the top ranking. In Kentucky, the top three segments and 6 of the top 8 were also on I-65. Of the six locations, five are in Jefferson County with locations from near downtown south to I-265. One segment is in Bullitt County. This location is a short crash “hot spot” in Shepherdsville between the KY 480 and KY 44 interchanges.

INTERSECTIONS

The intersection analysis considered major intersections on the KIPDA Freight Network (e.g. intersections between the KIPDA Freight Network and functionally classified highways). This assessment considered only intersections that experienced 10 or more crashes in the last 10 years. Using this threshold, 23 intersections in Kentucky and 4 in Indiana were identified as critical commercial vehicle crash intersections. These intersections are listed in Table 15 and shown in Figure 26.

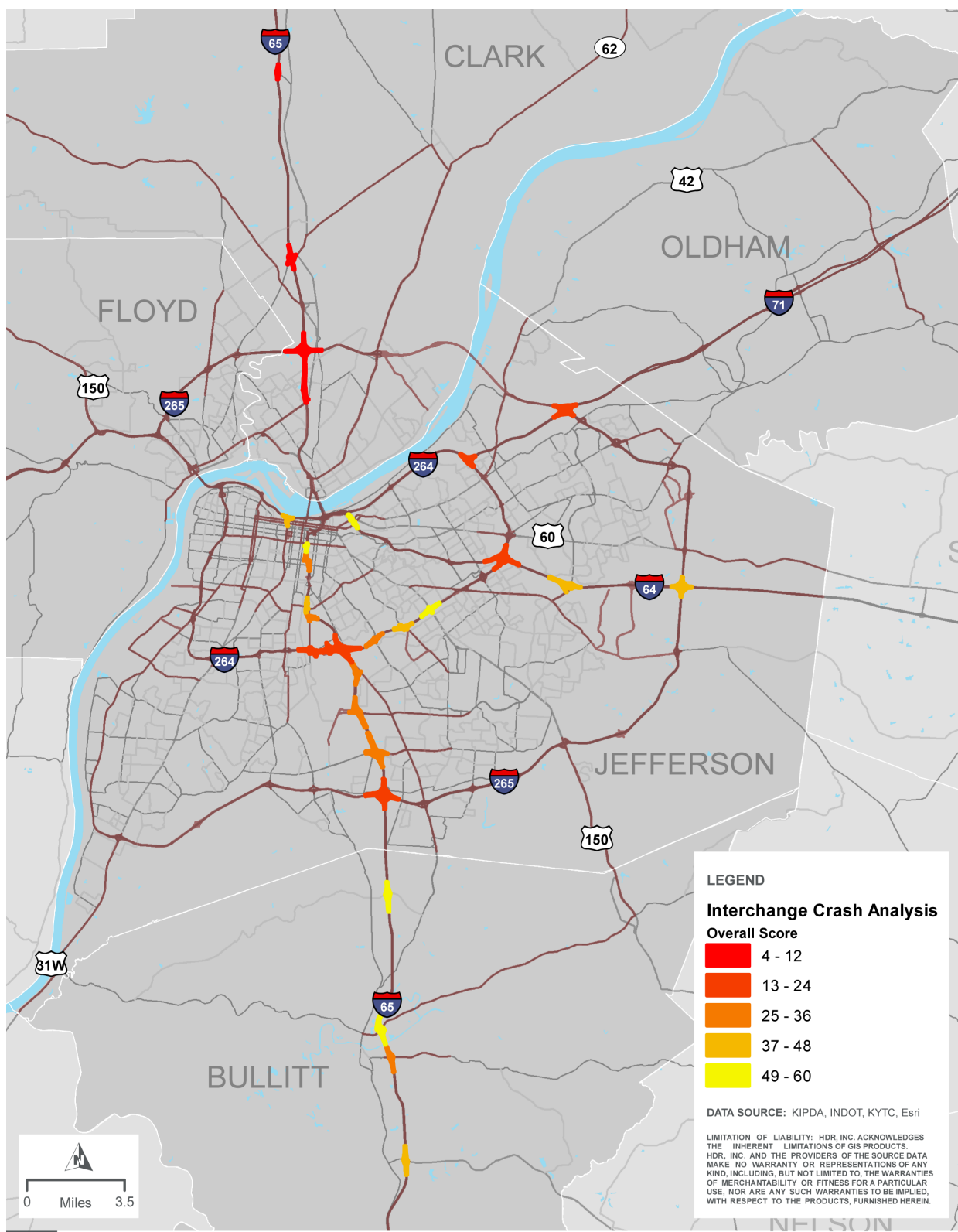
Two of the highest ranked intersections in Kentucky are at 3rd Street and Eastern Parkway and 3rd Street

and Winkler Avenue, where there is a railroad bridge with insufficient clearance (as noted in that impedance layer). The intersection of E. 4th Street and the Adam Shepherd Parkway in Bullitt County near the KY 44 Interchange was also ranked as a major issue. The top listed intersection in Indiana is at IN-62 and Utica Sellersburg Road, near the IN-62 interchange on IN-265, and the access point to the major industrial/warehouse area to the north on IN-62.

A review of these intersection lists shows that many of them are important intersections along heavily used truck routes. Improvements to these intersections could hold benefits for the movement of freight in the region – especially for local access and egress in the first and last mile of travel.

RANKINGS						
KENTUCKY	ID	Name	Crash Frequency	Crash Rate	Severity Index	Overall Score
	10	I-65	1	1	7	9
	16	I-65	3	6	2	11
	75	I-65	5	4	8	17
	3	Hendry Watterson Exwy	2	7	11	20
	77	I-65	7	13	4	24
	7	I-65	8	10	9	27
	17	Hendry Watterson Exwy	6	3	18	27
	76	I-65	4	2	23	29
	12	I-64	9	9	16	34
	62	I-64	10	5	21	36
	63	I-64	12	8	20	40
	1	I-71	19	17	5	41
	82	I-71	20	18	3	41
	6	Hendry Watterson Exwy	25	16	1	42
	18	Hendry Watterson Exwy	11	12	23	46
	79	I-65	13	22	13	48
	53	Hendry Watterson Exwy	14	15	22	51
	81	I-71	18	14	19	51
	14	I-65	21	24	6	51
	78	I-65	16	23	14	53
	9	I-65	15	21	17	53
	52	Hendry Watterson Exwy	24	20	9	53
	15	Hendry Watterson Exwy	17	25	11	53
	39	Gene Snyder Freeway	22	11	23	56
66	I-64	23	19	15	57	
INDIANA	72	I-65	1	2	3	6
	71	I-65	4	1	2	7
	69	I-64	3	4	1	8
	25	I-65	2	3	4	9

Table 14: Freeway Segment Commercial Vehicle Crash Rankings



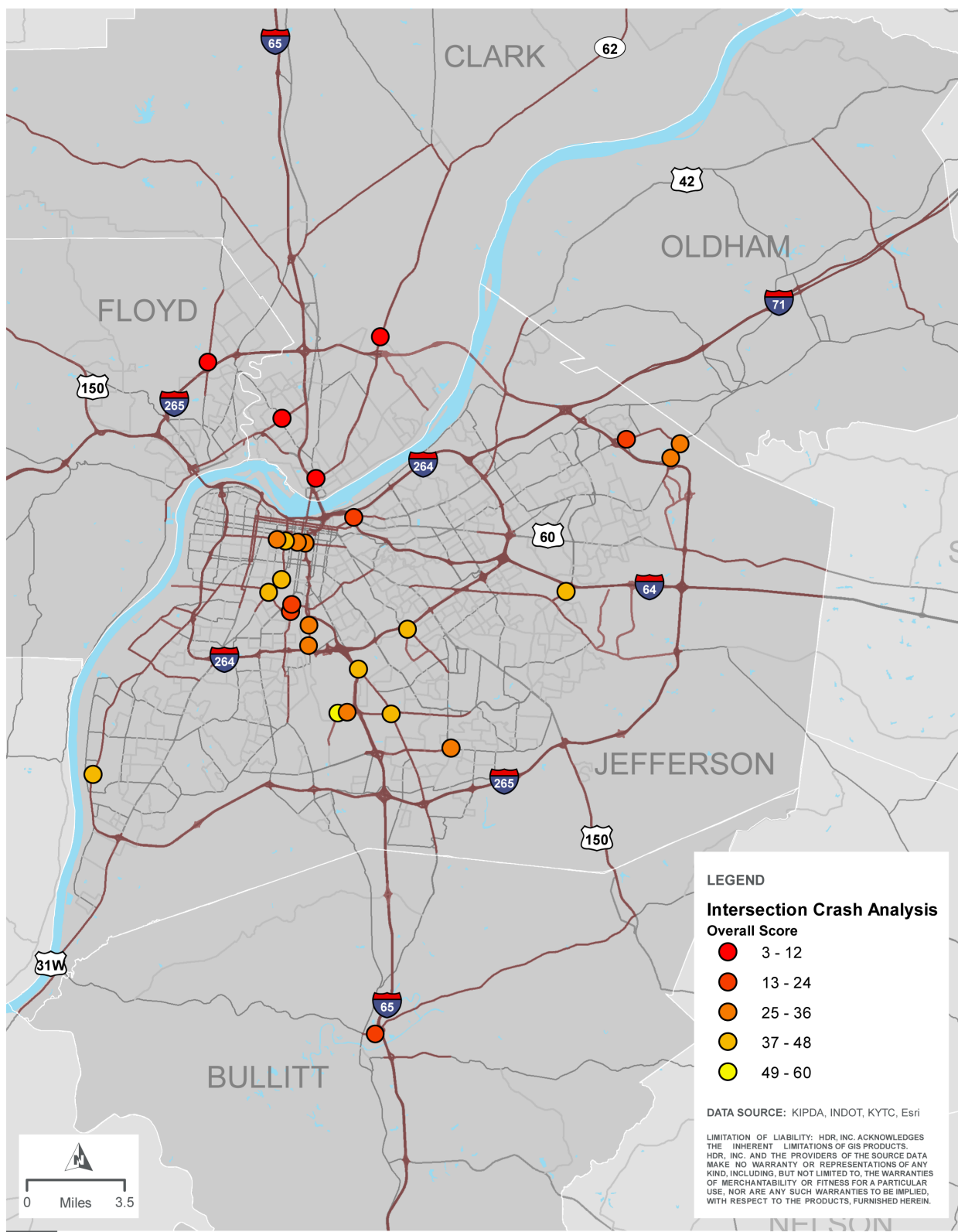
KIPDA FREIGHT PLAN
INTERCHANGE CRASH ANALYSIS
OVERALL SCORES

Figure 25: Freeway Crash Analysis

RANKINGS

	ID	Name	Crash Frequency	Crash Rate	Severity Index	Overall Score
KENTUCKY	101	S 3rd St & Eastern Pkwy	1	1	15	17
	1	E 4th St & Adam Shepherd Pkwy	7	5	8	20
	93	S 3rd St & Winkler Ave	2	2	16	20
	410	Chamberlain Ln & Westport Rd	7	13	1	21
	265	Frankfort Ave & Story Ave	4	3	16	23
	317	Lagrange Rd & Westport Rd	7	4	16	27
	175	S 4th St & W Broadway	6	8	13	27
	70	Crittenden Dr & Park Blvd	3	11	16	30
	172	S 1st St & W Broadway	16	12	3	31
	39	Fern Valley Rd & Worldport Way	11	16	6	33
	181	S 12th St & W Broadway	22	7	4	33
	86	Crittenden Dr & KFEC Gate4 Dr	11	6	16	33
	31	Outer Loop & Shepherdsville Rd	16	14	5	35
	313	Factory Ln & Lagrange Rd	11	9	16	36
	53	Grade Ln & Preston Hwy	7	22	8	37
	116	Bluegrass Pkwy & S Hurstbourne Pkwy	5	19	14	38
	22	Greenbelt Hwy & Trade Port Dr	20	18	2	40
	83	Bishop Ln & Newburg Rd	11	23	6	40
	114	S 7th St & Algonquin Pkwy	16	10	16	42
	180	W Broadway & S Roy Wilkins Ave	16	17	11	44
	396	Fern Valley Rd & Preston Hwy	11	21	12	44
	136	S 7th St & W Hill St	20	15	10	45
	37	Fern Valley Rd & Grade Ln	22	20	16	58
INDIANA	345	IN-62 E & Utica Sellersburg Rd	1	1	1	3
	338	Grant Line Rd & Hausfeldt Ln	2	2	4	8
	326	Blackiston Mill Rd / Lewis & Clark Pkwy	4	3	2	9
	288	E 10th St & Spring St	3	4	3	10

Table 15: Intersection Commercial Vehicle Crash Rankings



KIPDA REGIONAL FREIGHT MOBILITY STUDY
INTERSECTION CRASH ANALYSIS
OVERALL SCORES

Figure 26: Intersection Crash Analysis

ROADWAY SEGMENTS

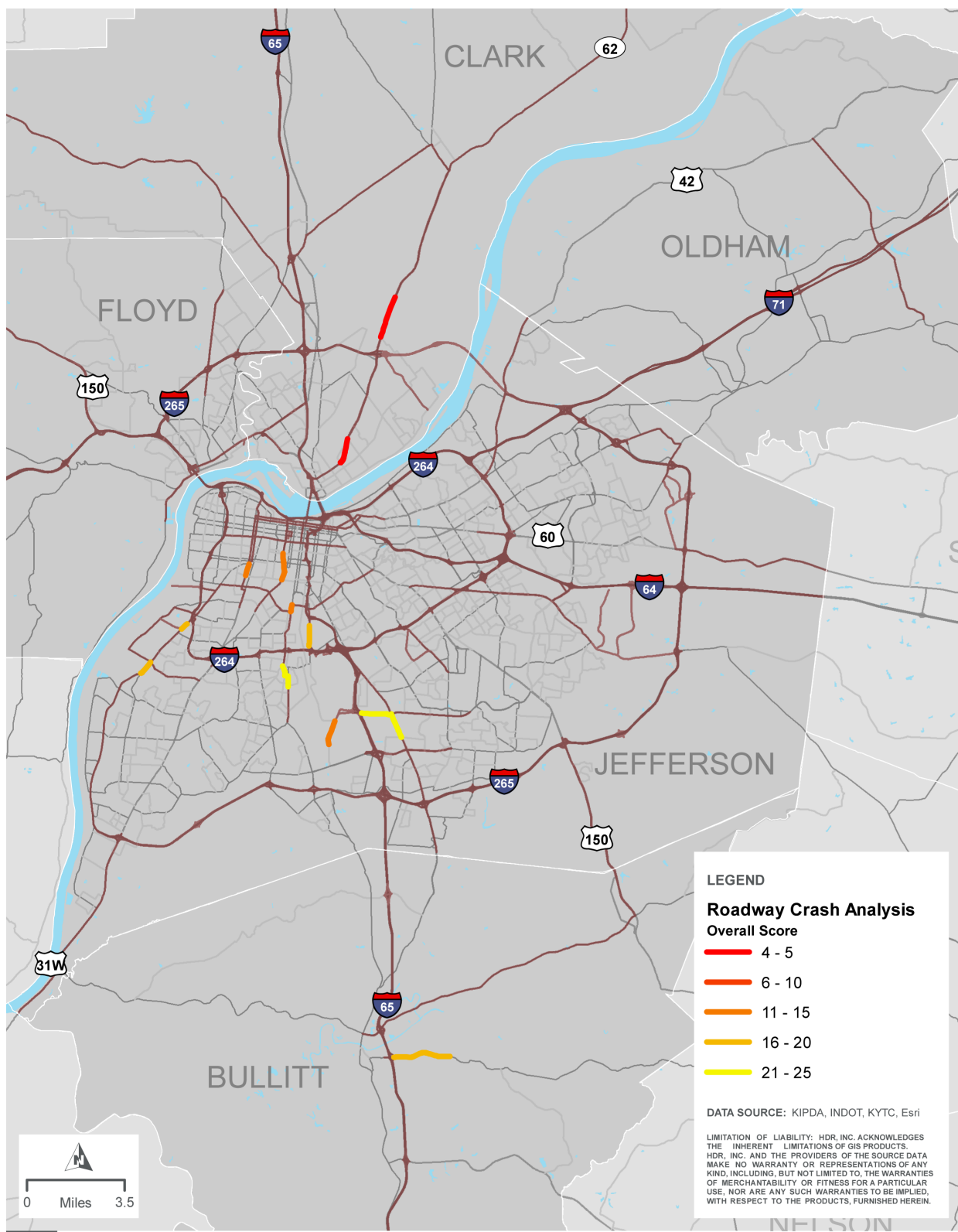
The crash analysis for roadway segments focused on the KIPDA freight network highways. Ten total commercial vehicle crashes in the last 10 years and at least 7 crashes per mile were used as the thresholds for this analysis. This resulted in 13 total segments being examined and ranked (11 in Kentucky and 2 in Indiana). The results are presented in Table 16 and mapped in Figure 27.

In Kentucky, the highest ranked segment is 3rd Street between Eastern Parkway and Winkler Avenue, with many fixed object (likely bridge/wall) crashes. The highest crash rate segment (crashes per 100 million vehicle miles - MVM) is on 22nd Street from

Wilson Avenue south to Algonquin Parkway; most of the crashes are near the Norfolk Southern railroad bridge, which was identified as a railroad bridge impedance to truck traffic. Grade Lane also made the list with crashes all along the identified length. E. 10th Street was identified as the main commercial crash rate highway in Indiana – both a section in the south toward I-65 (a four-lane undivided section) and one to the north of IN-265 that serves the industrial area to the north.

RANKINGS						
KENTUCKY	ID	Name	Crash Frequency	Crash Rate	Severity Index	Overall Score
	359	S 3rd St	1	2	9	12
	137	S 22nd St	2	1	10	13
	190	Grade Lane	7	5	2	14
	366	S 9th St	4	4	7	15
	113	Cane Run Road	3	9	4	16
	109	Cane Run Road	6	10	3	19
	12	Crittenden Road	8	6	6	20
	120	Cedar Grove Road	9	3	8	20
	307	Preston Highway	10	11	1	22
	268	Southside Drive	11	7	4	22
	182	Fern Valley Road	5	8	10	23
IN	157	E 10th St	1	1	2	4
	154	E 10th St	2	2	1	5

Table 16: Roadway Segment Commercial Vehicle Crash Rankings



KIPDA REGIONAL FREIGHT MOBILITY STUDY
ROADWAY CRASH ANALYSIS
OVERALL SCORES

Figure 27: Roadway Crash Analysis

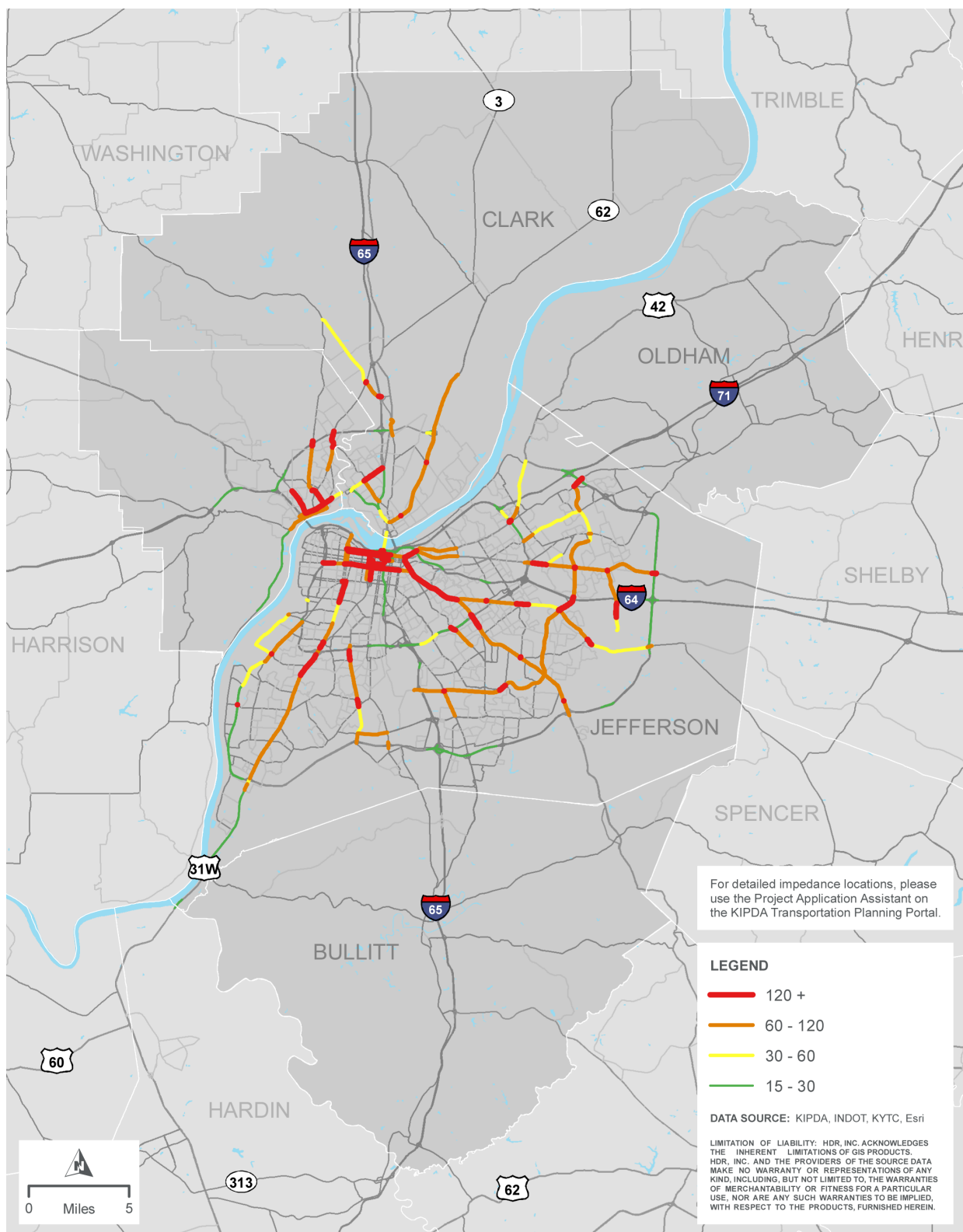
DELAY AND TRAVEL TIME RELIABILITY

The final element of the existing conditions and performance assessment was to examine the U.S. Department of Transportation sponsored National Performance Management Research Data Set (NPMRDS) and determine where there are major commercial vehicle delays and reliability issues. The NPMRDS data provides detailed commercial vehicle speed information for the National Highway System (NHS). The data is available to evaluate and identify where there are frequent delays relative to average speeds and how the worst hours of the year compare to the median hour (to evaluate reliability).

For delays, the difference between the observed speeds and the free-flow speed (when there is little traffic on the road) was compared for a one-year time period for each analysis segment for which there is data. The results of this analysis highlighted locations where the speeds tend to be much lower than the free-flow speeds. The results of the analysis are shown in Figure 28. The map shows there is considerably more delay per mile on the arterial and collector street system than on the interstate system.

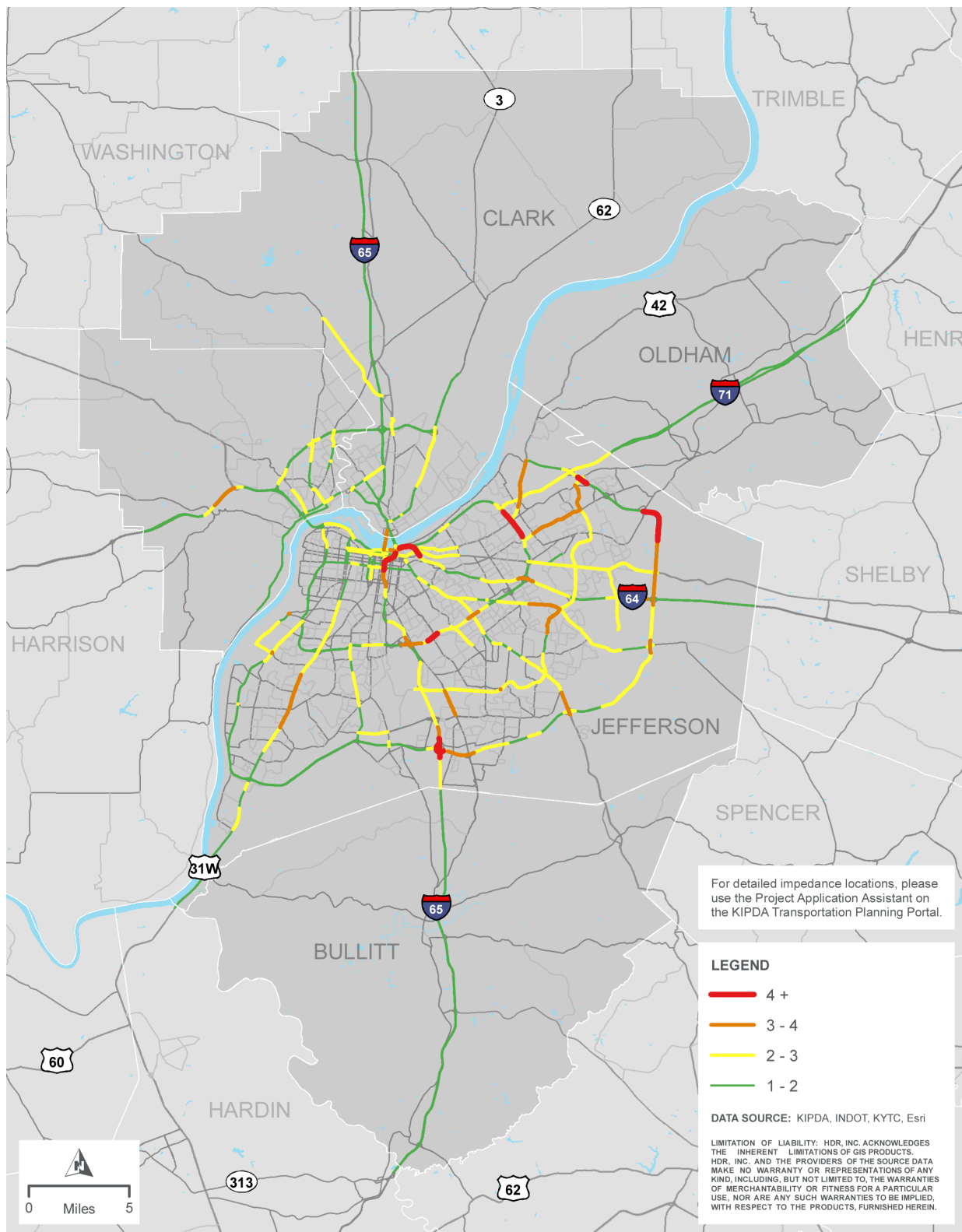
The interstates appear to function well and not cause large amounts of delay over the course of the year (this analysis accounts for all time periods, including off-peak times). This interstate result is consistent with what stakeholders and trucking firms indicated as well. (Please note that not all ramps are in the data set, so some freeway ramps may cause delay that is not able to be accounted for.)

The truck travel time reliability assessment is shown in Figure 29. It compares the 95th percentile travel times with the 50th percentile travel times. The resulting ratio of the 95% to 50th percentiles is higher for areas with poor reliability. A value of 3.0 for example, would indicate that the 95th percentile travel time is three times as long as the median or 50th percentile travel time. The result is a map that shows where the worst delays happen when there are serious incidents or weather events. This map shows some specific locations around the region where the system is not as reliable. Given that average delays are not very high, several of the peak congestion spots show up on this figure such as the I-65/I-265 interchange, I-265 approaching I-71, and portions of I-64 and I-65 in downtown.



KIPDA REGIONAL FREIGHT MOBILITY STUDY
TRUCK DELAY IN SECONDS PER MILE
 MAXIMUM VALUES, 2017

Figure 28: Truck Delay in Seconds per Mile



KIPDA REGIONAL FREIGHT MOBILITY STUDY
TRUCK TRAVEL TIME RELIABILITY (TTTR)
 MAXIMUM VALUES, 2017

Figure 29: Truck Travel Time Reliability (TTTR)

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FREIGHT NEEDS & RECOMMENDATIONS



FREIGHT NEEDS & RECOMMENDATIONS

The KIPDA Metropolitan Planning Area (MPA) serves as a national crossroads for freight. As such, the region's multimodal freight system is a major catalyst for the economy. To capitalize on this success, the region must not only support goods movement but also fully integrate freight into the needs of the community.

The following chapter outlines an assessment of future freight transportation issues, needs, and recommendations to help guide planning efforts. The issues and needs are identified from data and analysis

presented in Chapters 1 and 2, and input received from freight stakeholders and the FSG participants.

Chapter 3 is organized into twelve overarching issues areas. Each issue is described with a list of regionally specific needs and a short discussion explaining how those needs effect freight movement in the KIPDA MPA. Each issue area concludes with recommendations KIPDA and/or local governments can take to address those specific needs.

SAFETY

- Bridge Clearances: Bridge strikes due to inadequate horizontal and/or vertical clearance
- Aging Facilities: Aging system to system interchanges, intersections, and segments present the largest commercial vehicle safety challenges.
- Railroad Grade Crossings: Train lengths, frequency, and speeds have recently increased in the region, resulting in needed highway-grade crossing safety improvements at certain locations.

Ensuring the safety of all road users is a prime concern of agencies associated with the planning and operation of the highway network. The Existing Conditions chapter identified 22 interchanges in Kentucky and 4 interchanges in Indiana that have high commercial vehicle crash locations (over 50 commercial vehicle crashes in a 10-year period).

Other crash analyses identified crash locations across the KIPDA geographic area associated with intersections, freeway segments, and roadway segments. Crashes, including bridge strikes, result in severe and long-lasting congestion and the accumulation of high capital costs in repairs and response to crashes. Detailed discussion of the crash analysis can be found in Chapter 2. The key takeaways include:

Freeway Interchanges

Stakeholders identified lane reductions near downtown Louisville and aging system-to-system interchanges as significant issues. Aging interchanges present both design and capacity issues – for example, the I-65/I-264 interchange near UPS WorldPort – and safety issues such as truck rollovers on tight ramp radii and crashes in “hospital curve” near downtown on I-65.

Freeway Segments

Portions of I-65 in Indiana and Kentucky received the highest ranking based on severity and frequency of commercial vehicle crashes.

Intersections

Highest commercial crash rates are on heavily traveled corridors.

Road Segments

Areas with the highest safety concerns had heavy freight volumes due to a segment's location near the interstate system.

Stakeholders expressed concerns about the continued lengthening and increased speeds of trains traversing the region on the Norfolk Southern (NS) and CSX rail corridors. Freight/passenger vehicle safety at railroad crossings could be impacted by increased train traffic in the region. Grade crossing crashes are largely

a function of train and vehicle volumes (exposure) and the level of crossing protection. For example, a heavily travelled crossing without crossing gates is likely to have a higher crash rate, than a crossing equipped with gates.

This study has identified two Level 1 rail-crossing safety impedances which are located at the 1st Avenue (KY 53) crossing in LaGrange and at E. 4th Street (KY 44) in Shepherdsville (see pages 44-45). What makes these two crossings unique is not the grade crossing itself, but the slow speeds at which trains traverse the communities at these locations and the lack of alternative routes.

For instance, within LaGrange city limits, the locomotive has a speed restriction of 5 M.P.H. The resulting queues on KY 53 not only serve as a freight bottleneck, but also create safety issues as traffic tries to recover from the delays, with no better alternative route, especially for freight. In Shepherdsville, the tracks cross a section of roadway with a two way left turn lane (TWLTL) in an industrial area along KY 44, creating delay issues while the train crosses the area. Across the MPA, there were 11 crossings in the study area that were both safety and capacity impedances.

In addition to safety concerns, roadway delays near grade crossings have anecdotally increased due to the use of longer unit trains. The region has experience addressing this issue. About eight years ago, delays at the grade crossing on Chamberlain Lane near I-265 resulted in signage being placed on

the Gene Snyder Freeway (I-265) that actively warns truck drivers not to exit to Chamberlain Lane to reach the Ford Truck Plant when the crossing is blocked.

RECOMMENDATIONS

- Continued maintenance and expansion of the KIPDA Freight Impedance Geodatabase.
- Use information developed for the geodatabase to drive funding decisions and applications.
- During future iterations of the Connecting Kentuckiana plan, integrate the passenger and freight crash analyses as one overall effort.

A major component of the KIPDA Regional Freight Study was the development of a quantitatively based freight impedance geodatabase. This database will be invaluable to supporting not only the KIPDA project selection process, but future discretionary grant and Highway Safety Improvement Program (HSIP) applications. The database itself should be maintained and expanded as new data becomes available.

Furthermore, the methodology behind the roadway commercial vehicle crash analysis was intentionally designed to align with KIPDA's larger Connecting Kentuckiana safety analysis effort. During future iterations of the plan, it would be beneficial for these two processes to be combine as a single look at regional safety.

CONGESTION AND RELIABILITY

- Congestion/reliability issues on the some of the surface street arterial network.
- The availability of intermodal container yards is limited in the area, which compels some shippers to drayage containers from Chicago.

According to the American Transportation Research Institute (ATRI) in 2016, the U.S. trucking industry experienced nearly 1.2 billion hours of delay on the National Highway System because of traffic congestion, which incurred an additional cost of \$74.5 billion for the trucking industry.¹² A key takeaway from this study's impedance analysis (see

¹²American Transportation Research Institute, "Cost of Congestion to the Trucking Industry: 2018 Update," page 6.

Chapter 2) is that freight congestion and reliability issues are considerably more prevalent on the region's arterial and collector street network than on the interstate system. This is largely due to the recent investment in larger interstate projects, like the Kennedy Interchange. However, the Gene Snyder Freeway did exhibit some truck travel time reliability issues in Chapter 2's analysis.

On the local street network, congestion takes place near interstate interchanges and at aging intersections, where the design geometry might not be optimal for its current utilization. The analysis identified congestion related issues on Bardstown Road, Broadway, and Market Street in Louisville, Spring Street in New Albany, and along portions of Dixie Highway.

RECOMMENDATIONS

- KIPDA and their regional partners should use the KIPDA Freight Impedance Geodatabase to help prioritize and ultimately fund freight projects

- Many large projects will take years to implement – due to funding and project development timelines. Pursuing low/cost high value projects over the short-term, while developing large long-term projects will be key to improving freight system performance and stakeholder buy-in to organizational freight planning activities.

As discussed in Chapter 1, freight dependent businesses account for 40 percent of the region's economy. As such, congestion and reliability issues can directly impact the economy. It will be important to use the Freight Impedance Geodatabase to prioritize and address freight improvements. Based on crash analysis and stakeholder feedback, system-to-system interchanges emerged as a needed improvement to the interstate system. However, most freight mobility issues in the data appeared on the region's arterial network. Because of this, the region should develop a two-pronged approach to improving freight mobility: (1) Focus on low cost/high value solutions, while (2) pursuing discretionary grant opportunities for the larger more regionally significant projects.

STATE OF GOOD REPAIR

- Pavement impacts from increased truck movement.
- Pavement and bridge restrictions.
- Harmonization of Oversize Overweight (OSOW) regulations.
- Frequent construction impacts on freight movement.
- Better communication of construction and incidents with the trucking community.
- Prioritization and resolution of key existing freight movement impedances related to maintenance.

highways compromise efficient freight movement in several ways including:

- Poorly maintained infrastructure can result in truck restrictions, such as reduced truck weight limits on roads and bridges.
- Constant road work and measures to rehabilitate infrastructure can cause delays to freight movement and reduce travel time reliability.
- Road work and infrastructure impediments can cause truck drivers to find circuitous detour routes, which can have negative travel time and community impacts.

Safe, efficient, and timely freight movement relies upon infrastructure, such as pavements and structures, to be in a state of good repair. With the high proportion of goods delivered on roads via trucks, the condition and management of the road network is critical to ensuring the region's residents and businesses receive the goods they need. Poor physical conditions on

These issues not only reduce the efficiency of trucking, but also increase transportation costs, putting freight dependent industries in the region at a disadvantage compared to their competitors elsewhere. Other impacts include truck drivers avoiding bottlenecks associated with road work and taking inappropriate diversion routes that negatively impact communities.

Stakeholders recognized that the freight infrastructure that supports freight movement today must be maintained, where necessary rehabilitated or demolished and rebuilt, and sometimes improved with capacity enhancements, to ensure long term benefits are available for future freight users. Unfortunately this may result in negative short term impacts to freight fluidity. But elements of these impacts can be mitigated through a range of solutions such as improved communication with the freight industry, innovative construction methods that reduce the need for lengthy lane closures and timing of construction activity that avoids peak travel times.

HARMONIZATION OF OVERSIZE AND OVERWEIGHT REGULATIONS

Regulations exist to limit truck dimensions including length, width, and height. Weight limitations also protect the condition and structural integrity of highway infrastructure. However, some freight does not lend itself to these legal dimensions. Examples include wind turbine blades, power generating equipment, large construction equipment, and prefabricated homes. To facilitate such movements, public agencies employ a permit system.

This system aims to control oversize and overweight movements to ensure these movements do not damage infrastructure or impede or cause a safety risk to other road users. Permit systems may place several restrictions on these types of movements, including the route taken, time of day the load traverses along the highway, and what escorts and other infrastructure protection may be necessary. It also allows the

controlling highway agency to mitigate or avoid potential issues.

However, each state has its own administrative process associated with the permit system and the rules and regulations it follows. The various states' regulations and processes are typically not aligned, resulting in extra cost and administrative burdens on companies seeking oversize and overweight movements, especially frequently occurring ones.

RECOMMENDATIONS

- KIPDA and their regional partners should continue to develop data sources that capture information related to the state of good repair of the KIPDA Freight Network.
- Improve incident-related information to the freight community. Specifically, the expansion of TRIMARC Notify Every Truck (NET) into Indiana.

While the Freight Impedance Database does a thorough job identifying safety and freight mobility issues, data availability to track the state of good repair on the KIPDA Freight Network was limited. As INDOT, KYTC and KIPDA continue to move towards actively managing transportation assets, this will be a key data point to collect on a regional basis.

In Chapter 2, certain segments of the Interstate System were identified as having resiliency issues – effectively there is not a detour solution with an equivalent capacity for a long term closure on many of these routes. While alternative routing planning will be important to solving this challenge, over the short term it will be important to improve communication with the freight community. Specifically, a member of the Freight Study Group recommended that the TRIMARC Notify Every Truck (NET) service area be extended into Indiana. This group effectively communicates real-time information about construction and incidents to the trucking community in Kentucky.

TECHNOLOGY & TRUCK PARKING

- Inadequate dedicated truck parking areas to pre-position for delivery, especially in and immediately adjacent to urban areas.
- Parking capacity at rest areas and commercial truck stops outside of urban areas does not currently meet demand.
- Occurrence of unauthorized parking near manufacturing facilities.
- Recent changes in federal law (Hours of Service, Electronic Logging Devices) require more available parking and information sharing about parking locations.

This study identified truck parking as a regional need from stakeholder outreach and from a windshield survey of key areas. While many truck trips begin and/or end in a metropolitan area, these areas often feature little or no truck parking capacity – even near large freight activity centers. As a result, many truck drivers deliberately give up potential driving hours and revenue to stage an hour or two outside of an urban area to avoid parking in an unsafe area due to insufficient parking opportunities.

However, public and privately provided parking outside of urban areas – generally – does not fulfill current truck parking demands. This often leads to trucks being parked in undesignated areas, like on interchange ramps or on city streets near delivery points, such as the case near the Ford Truck Plant entrance on Chamberlain Lane in eastern Jefferson County.

Furthermore, in 2017, Federal Motor Carrier Safety Administration (FMCSA) required truck drivers to replace their paper logbooks with electronic logging devices (ELD). These ELDs are required to ensure compliance with Hours of Service requirements. However, the shift to electronic devices also removed a small time buffer that truck drivers used previously to find parking.

Truck parking was identified as a major issue by the KIPDA region's public and private sectors. On the Interstate System, this issue is clearly visible with trucks parked on the ramps of overprescribed rest areas on I-64, I-65, and I-71. On the local network, trucks frequently use two-way left hand turn lanes (i.e. the middle of the road) to stage outside of major manufacturing facilities.

RECOMMENDATIONS

- KIPDA, INDOT, and KYTC should explore how innovative solutions identified in the KIPDA Freight Design Guide could be implemented in the MPA.

KIPDA and its jurisdictions should explore the truck parking innovations documented in the KIPDA Freight Design Guide. The guide includes solutions for Interstate parking, local pre-positioning needs, and an overview of a multistate effort to share truck parking availability information sharing with truck drivers through the Mid America Association of State Transportation Officials' Truck Parking Information Management System (TPIMS).

TECHNOLOGY

- Data sharing to improve planning and freight movement.
- A data sharing framework between the public and private sectors and between agencies within the public sector.
- Not all freight impedances recognized by current real-time truck routing and general GPS mapping applications.
- Coordinating the development of alternative fuels distribution and fueling facilities.
- Planning and design to prepare for Connected and Automated Vehicles (CAVs).

During outreach for this study, public and private stakeholders focused on the role of technology and its impact on the freight industry. All five freight transportation modes use technology to execute their day-to-day operational processes. For example, technology informs route decisions and freight mode choice and helps minimize shipping costs by strategically planning truck drivers' fuel stops.

Making better use of technology is critical to improved decision-making and operational efficiency for both public agencies and the private freight sector. Improved real-time wayfinding, GPS maps, and freight-focused Intelligent Transportation Systems (ITS) solutions can help truck drivers avoid low bridges, weight restricted facilities, and neighborhood streets not conducive to large trucks. However, this public sector infrastructure data often is not fully integrated into commercially available GPS and routing software platforms or applications. Technology can also help public agencies improve planning and decision-making by capturing freight and truck specific data elements that otherwise would not be collected.

Additionally, I-65 has been designated an alternative fuel corridor by the Federal Highway Administration (FHWA). As alternative fuels become more prevalent, regional stakeholders should ensure that fueling facilities exist near heavy freight corridors.

Over the long-term, freight-related CAVs could dramatically change how truck trips take place (i.e. truck platoons) within the region. Freight CAVs will compete with passenger CAVs for curb space. As freight CAVs evolve, it will be important to plan for their integration into the operations of the highway system and the community, otherwise increased vehicle miles of travel and increased night time truck activity could dramatically impact the region.

RECOMMENDATIONS

- Use the KIPDA Freight Design Guide to educate local jurisdictions on the likely impacts of CAVs – like curb management.
- KIPDA could work with regional partners to educate and coordinate the development of alternative fueling locations across the MPA.

Freight planning entails a certain level of planning for an uncertain future. What impact will freight CAVs have on the region? While this is an unanswerable question, KIPDA can help educate local jurisdictions on the likely impacts – curb space management (i.e. balancing deliveries and CAV passenger traffic), truck platooning, etc. The KIPDA Freight Design Guide offers guidance for local agencies on these issues as they plan projects. Similarly, KIPDA could play a role in educating and coordinating the development of alternative fuels distribution and fueling facilities on major freight corridors.

Over the short term, KIPDA could reach out to commercial truck routing and GPS mapping services and information providers in the public sector, and offer the recently completed freight impedance database to improve these systems. This will require significant coordination, data sharing agreements, and frameworks. However, the effort could significantly reduce bridge strikes and other physical impacts to infrastructure and neighborhoods.

RESILIENCY AND SECURITY

- Maintenance and improvements are needed on many Ohio River lock and dams (downstream from the KIPDA MPA), as several have outlasted their design life.
- Highway incident management issues – no adequate detours on some interstate corridors and prolonged delays with incidents, especially those involving commercial vehicles.

The ability of the KIPDA freight system to absorb, respond to, and recover from adverse events is critical for the continued success of the regional economy. While the new Ohio River Bridges provide significant redundancy for routes across the Ohio River, stakeholders identified significant resiliency issues related to the Ohio River's navigation system and also identified vulnerable portions of the highway system.

Local stakeholders and the Kentucky Freight Plan identified the Ohio River's aging lock and dam system as a possible threat to the region's freight resiliency. Prolonged closures of any portion of the up and down stream inland waterways could have an impact on the region's economy. Not only is the KIPDA MPA home to the country's largest barge company, American Commercial Barge Lines, the Ohio River facilitates the movement of steel products to automotive manufacturers and delivers jet fuel via barge and pipeline to UPS WorldPort.

The FSG identified two Interstate Highway segments that do not currently have an alternative route of equivalent capacity to direct freight traffic around a closure, those included segments of I-71 in Oldham County and I-65 in Bullitt County. KYTC and their regional partners have actively taken steps to help alleviate this issue. For example, KYTC works with local police in Oldham County and the City of LaGrange to direct traffic off the interstate and to an appropriate route when there is an incident on I-71. Similarly, Highway 61 in Bullitt County has been rebuilt as a four lane route and designed to serve as an alternate for I-65.

While building or expanding an alternative route is not always possible, technology (i.e. information sharing) and agency coordination can help alleviate some of the impacts from road closures. While short closures are largely inconvenient for users, longer closures present a significant challenge for the region's economy and companies that rely on the interstates to ship and receive supplies.

RECOMMENDATIONS

- KIPDA and its transportation partners should undertake an interstate alternative routing study.
- ITS solutions should continue to be explored and implemented to share information with drivers and to improve overall roadway operations.
- Continued dialog with the MARAD and U.S. Coast Guard regarding resiliency on the Ohio River

KIPDA, INDOT and KYTC should collaboratively explore alternative route planning for corridors in the KIPDA MPA. Particular attention should be paid to those corridors without a reasonable long-term detour. Often the solution for these particular corridors is to detour through truck movements onto another interstate – outside of the region. More locally, ITS solutions should continue to be explored and implemented throughout the region to give drivers real time traffic information and to enhance the overall operation of existing facilities.

E-COMMERCE/AIR CARGO

- Challenges related to increased long-term freight movement in/out of UPS WorldPort and Louisville International Airport
- Higher demand for curb-side delivery space in urban areas, residential buildings, and neighborhoods.
- Urban design issues associated with accommodating increased volumes of delivery vehicles on residential streets due to growth in home deliveries.

According to Chapter 1: Freight Profile, e-commerce sales accounts for nine percent of all retail sales. In the past five years, this percentage of total sales has nearly doubled. Historically, retail goods have been distributed between regional warehouses and shopping centers via heavy trucks. As e-commerce's market share continues to grow, these heavier vehicles will be replaced by parcel, courier, and personal vehicles making more frequent deliveries to residential areas and buildings. As a result, "freight" vehicle miles of travel may increase and residential streets are expected to accommodate more trucks and vans.

Directly related to e-commerce is growth within the air cargo industry. Shippers wanting quick access into the global distribution system often locate near hubs such as UPS WorldPort. During the study's outreach, UPS estimated that over 250 companies have located in the region for quick access to global markets through WorldPort. As resulting truck volumes continue to increase, the safety and reliability issues related to the aging interchanges servicing WorldPort may become more significant (see Safety Page 62).

RECOMMENDATIONS

- The region should focus on maintaining and improving the road network around UPS WorldPort and the Louisville International Airport.
- Pursue low cost/high value projects to make near term improvements, while pursuing larger projects like interchange replacements.

Goods that move by air cargo are generally light weight, high value, time sensitive, and/or highly perishable. Freight bottlenecks and infrastructure conditions can directly impact the competitiveness of the region. As such, the KIPDA region must focus on maintaining the road network around the UPS WorldPort and Louisville International Airport. While large improvements can be costly (i.e. I-65/I-264 and I-64/I-265 interchanges), the region should focus on low cost/high value projects (i.e. lane changes, signal timing, etc.) that could have an impact on freight today, as those larger solutions are pursued further in the future.

At the neighborhood level, e-commerce's effect on curb space and the built environment can be mitigated through improved building, zoning, subdivision, and roadway standards. While these decisions are outside of KIPDA's authority, the organization could continue the conversation with local jurisdictions using tools like the KIPDA Freight Design Guide.

WORKFORCE MOBILITY

- Development of manufacturing facilities and warehouses does not always consider public transit availability for workers with unreliable or no personal vehicle to get to work.
- Work hours of manufacturing and warehousing jobs often do not line up with traditional transit service hours.
- Nationwide shortage of truck drivers, barge captains, railroad engineers, and logistics/manufacturing workers creates a concern for productivity as freight demand continues to increase.

During the development of Chapter 2: Existing Conditions Report, freight cluster analysis showed that most new logistics and distribution facilities are being built outside of the Gene Snyder Freeway and in the suburban/exurban KIPDA counties on green-field development sites, away from large residential areas and TARC bus routes (for more details see page 34).

While these facilities are efficiently located for freight movement, their location and low-density development patterns are difficult to serve by traditional transit services for freight sector employees to utilize to get to work. The distance to these locations makes it difficult and expensive to connect to existing transit lines. To address this critically needed connection to jobs, TARC began a circulator-type bus service to the Jefferson Riverport area in November 2017, named Route 20. The circulator serves as feeder service to Route 18, one of the main frequent routes in the system. Route 20 is funded through a Congestion Mitigation and Air Quality (CMAQ) grant, but TARC must secure funding to continue the operation when the grant expires in 2020.

Attracting and retaining employees is also a concern as freight demand grows. In 2017 and 2018, the American Transportation Research Institute (ATRI) – the independent research arm of the American Trucking Association – rated the truck driver shortage

the number one issue in trucking. As the economy and freight truck demand continues to grow, the trucking industry is concerned that the supply of available and qualified (CDL, insurable, substance free) truck drivers will continue to not meet demand. Today, ATRI estimates that shortfall to be 48,000 drivers nationally. By 2025, that number is expected to grow to 175,000.¹³

Chapter 1: Freight Profile identified that freight accounts for 40 percent of the KIPDA MPA's economy and provides 3 out of 10 jobs in the area. While a smaller percentage of those jobs are truck drivers, trucks convey over 60 percent of the region's goods movement. The resulting shortage of trucks could produce future challenges to the region's industries and businesses that rely on truck transportation.

The inland waterway and railroad industries are also susceptible to workforce constraints and have many similarities with the trucking workforce, including an aging and retiring workforce and the challenge and cost of attracting new employees. Workforce issues have the potential to impact the capacity of the water and railroad systems and increase costs.

RECOMMENDATIONS

- Continue building transit planning capacity to help address multimodal connection to freight sector jobs in suburban industrial locations.
- Explore innovative solutions like micro-transit/mobility-as-a-service vendors to solve workforce mobility challenges.

While KIPDA does not have a formal role in workforce development, the organization is uniquely positioned to advocate for workforce related transit considerations during the economic development and transit planning processes.

While transit is one consideration for site selectors, local economic development professionals should

¹³American Transportation Research Institute, "American Critical Issues in the Trucking Industry," 2017

be engaged in the transit planning process. This will help ensure that future targeted development areas are served by transit.

Similarly, the transit planning process should explore how traditional shuttles and new solutions like micro-transit/mobility-as-a-service vendors might be further

utilized to account for the challenges that exist in serving individual buildings in large freight developments with transit. In other regions, these shuttles have been funded through transit grants (Minneapolis, MN), local governments (Groveport, Ohio), or the businesses (Plainfield, Indiana) themselves.

PARTNERSHIPS

- Capitalize on freight stakeholder interest in a continuing dialog established during the freight study.
- Build a partnership between MPO, local governments, and railroad operators to address at-grade rail crossing issues.

The Freight Study Group identified their willingness to continue working with KIPDA on future freight planning efforts. Partnership and collaboration between public agencies and the freight industry is critical to balancing freight and community needs in a holistic manner. By maintaining dialogue and communication with the freight industry, public agencies are better informed about freight activity and can accommodate the specific needs of the freight industry in policies and projects. On the other hand, public agencies also need to continually inform the freight industry about changes that may impact or influence their operations. Sharing of data and information provides better informed outcomes and results, across all levels of public agencies, communities, and the freight sector.

Railroads should also be incorporated into any partnership and discussion activities. Their needs and considerations are different than those of the trucking community as they typically own and maintain their infrastructure and operate services upon that infrastructure. U.S. freight railroads are privately owned and operated as for-profit corporations. It is recognized that some consequences of railroad operations include noise and traffic queues associated with at-grade rail crossings.

RECOMMENDATIONS

At the final Freight Study Group meeting, the attendees were informally polled on their interest to continue their work as a Freight Advisory Committee (FAC) for the KIPDA MPA. The response was significantly in favor of continuing this work.

As such, KIPDA should adopt a FAC. The group could provide feedback on project selection criteria and future freight planning efforts. The FAC could serve as the official venue for the information sharing events described earlier concerning freight funding.

LIVABILITY

- Continued identification and mitigation of the negative impacts of freight.
- Integration of livability and freight growth to mitigate conflict points between freight vehicles and other modes such as passenger vehicles, pedestrians, and bicyclists.

Stakeholders expressed concerns about the overall impact of diesel emissions, noise, and safety conflicts on the health of communities near freight centers and heavily-traveled corridors. While neighborhoods should not be designed for large truck movement, freight and the built environment should be planned and constructed in a manner that results in truly functional and livable communities.

RECOMMENDATIONS

- Provide expertise and assistance to local governments as they retrofit or rehabilitate areas with freight needs.

Improving regional livability is tied to the connection between the transportation system and land use. Improvements must be tailored to each community's context. The KIPDA Freight Design Guide explores several ways to integrate freight in different land use circumstances. Similarly, the National Association of City Transportation Officials (NACTO), National Highway Cooperative Research Program (NCHRP), American Planning Association (APA), and the Institute of Transportation Engineers (ITE) have all issued guidance for best practices of how to integrate freight into neighborhoods. Using these tools, KIPDA and their jurisdictions could begin requiring (or suggesting) that when areas with freight needs are developed, that they also be retrofitted to improve freight integration.

CONNECTING TRANSPORTATION AND LAND USE

- Consider freight transportation needs in local land planning guidance and zoning.

Public and private stakeholders identified that coordination between transportation and land use decisions are important to building a productive freight industry and overall quality-of-life for the region's residents.

While KIPDA has no formal role in land use planning and decision-making, it is important to recognize the relationship between land use and transportation. The location of new logistics and distribution facilities in exurban areas creates workforce mobility challenges. Similarly, these locations are often physically located away from delivery locations in residential, office, and shopping centers, resulting in increased truck Vehicle Miles of Travel (VMT). While these locations

offer quick access to high speed highway corridors, the distance added between population centers and the facilities create otherwise un-needed miles travelled to the roadway network.

On the other end, there are also issues accommodating goods deliveries to shops, restaurants, offices, hotels and residencies in urban areas. This leaves drivers to navigate the urban network with pedestrians, cyclists, and other vehicles and to compete for on-street parking and loading or unloading areas. To meet tight delivery windows, trucks often park illegally and accept the cost of parking tickets as a cost of doing business.

Coordinating land use planning and transportation needs will be key to growing freight areas, like the Port of Indiana – Jeffersonville. During outreach efforts, the Port expressed concerns over future traffic conflicts between truck and residential/retail traffic.

RECOMMENDATIONS

- Widely distribute the KIPDA Freight Design Guide.
- Develop educational opportunities based on the recommendations detailed in the Design Guide.

FREIGHT FUNDING

- Insufficient multimodal and/or dedicated freight funding to meet anticipated demands on transportation infrastructure.
- Future funding uncertainty to maintain and operate all facilities on the KIPDA freight network at today's performance levels.
- Project sponsors unaware of or unable to prepare for freight-related competitive grant opportunities.

In recent years, KIPDA, INDOT, and KYTC have made significant investments, like the Louisville-Southern Indiana Ohio River Bridges Project, to improve the region's highway network. Similarly, private sector companies, including UPS WorldPort and the region's railroads, have expanded their facilities locally. While these improvements have enhanced the region's multimodal system, challenges still exist.

Specifically, the Freight Study Group (FSG) for the KIPDA Regional Freight Study identified that aging infrastructure continues to negatively affect all freight modes and a lack of adequate funding for maintenance and improvements continues to be a concern for public and private sector freight stakeholders.

At the federal level, highway funding continues to be stagnant. While the FAST Act created dedicated freight funding programs, the overall total federal dollars available to states remained the same. The last federal gasoline tax increase happened in

While KIPDA does not have land use authority, it can use the recently completed KIPDA Freight Design Guide to inform local jurisdictions on methods to improve how land use and transportation interaction takes place. In addition, KIPDA could facilitate the inclusion of the topic at Indiana or Kentucky Chapter(s) of the American Planning Association meetings.

1993. Since then, inflation has reduced the overall purchasing power of federal funding (see Figure 10). As a result, Indiana and Kentucky have increased state funding levels through fuel tax increases (Indiana) and tolling (Indiana/Kentucky) respectively.

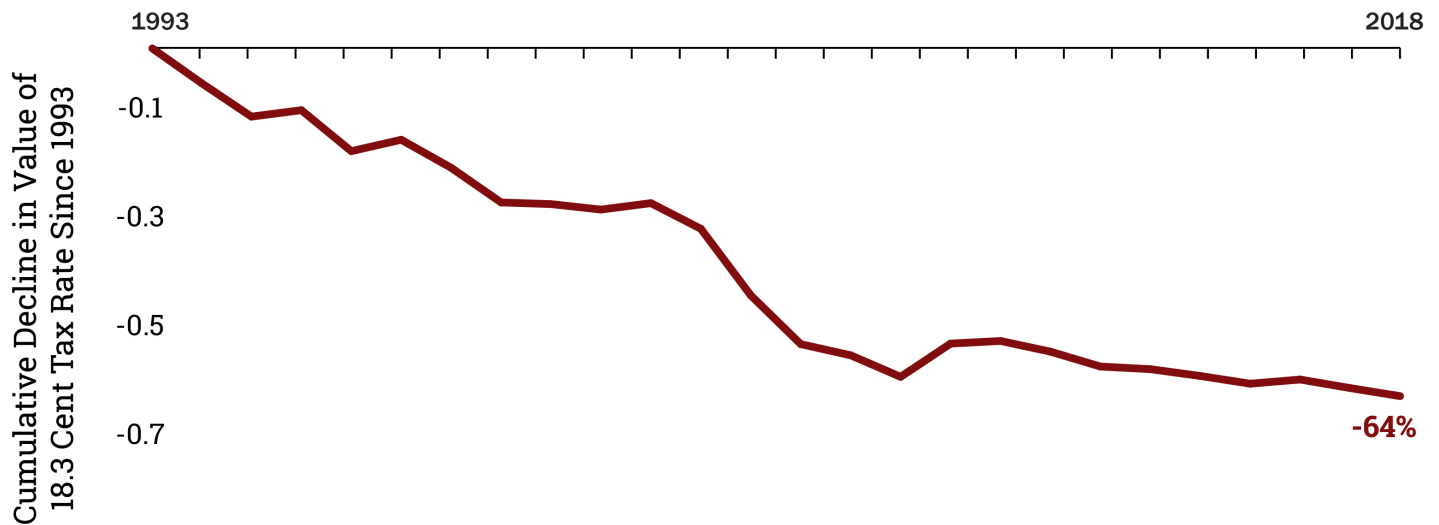
The Kentucky State Freight Plan, FSG and maritime stakeholders also highlighted underinvestment in the lock and dam systems that sustain navigable water conditions on the Ohio River. Any major failure of the system could have a significant impact on the region's supply chains and transportation service providers.

RECOMMENDATIONS

- KIPDA can serve as a regional conveyor for information sharing between jurisdictions, elected officials, and the FAC.
- KIPDA could provide expertise and assistance to their local partners interested in pursuing discretionary grant opportunities.

While KIPDA does not have the authority to raise funding directly, there are several strategies which could be employed to help position the region for increase freight funding. KIPDA can serve as a regional convener for a larger freight funding conversation. For example, KIPDA could hold a series of Freight Advisory Council "information-sharing" events which would focus on the need for increased freight funding (see Page 70 for more details about the FAC). These events would connect KIPDA's Congressional Delegation, freight stakeholders, and

Purchasing Power of Federal Gas Tax Rate Has Fallen by Nearly Two-Thirds Because of Inflation and Fuel-Efficiency Gains



Source: Institute on Taxation and Economic Policy (ITEP) analysis of data from the Federal Highway Administration (FHWA), Energy Information Administration (EIA), and Congressional Budget Office (CBO).

Figure 30: Effective reduction of the federal gas tax rate due to inflation and fuel efficiency (Source: ITEP)¹⁴

local jurisdictions. This would allow the Delegation to learn more about the local freight industry and its needs, while informing stakeholders on current legislative constraints and potential opportunities.

On the federal level, significant freight-related funding has been made available through various discretionary grant programs (i.e. BUILD and INFRA).

However, these programs are highly competitive and the grant application itself can be overwhelming for agencies not accustomed to undertaking sophisticated benefit-cost analyses. KIPDA is in a unique position to serve as a subject matter expert to guide local governments through the process. In addition, KIPDA could lead a multijurisdictional grant application to support a regionally significant freight project.

¹⁴Institute on Taxation and Economic Policy, *An Unhappy Anniversary: Federal Gas Tax Reaches 25 Years of Stagnation* (<https://itep.org/an-unhappy-anniversary-federal-gas-tax-reaches-25-years-of-stagnation/>), accessed on 1/8/2019.

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APPENDIX A: PUBLIC SECTOR FREIGHT ACTORS



AVIATION

US Customs and Border Protection	The agency is charged with overseeing the nation's points of entry to ensure that freight and passenger crossings are made in accordance with federal law. Within the context of the KIPDA region, CBP has designated SDF as the only facility where flights with an international origin may land (except in an emergency). To support the large air cargo volume generated at SDF, CBP has placed significant inspection services at the airport.
Federal Aviation Administration	The federal agency which has the largest impact on the KIPDA region's aviation system is the Federal Aviation Administration (FAA). The FAA regulates all civilian aviation with a central focus on safety. Relevant activities undertaken by the FAA include: overseeing air traffic control, noise and environmental regulations, aircraft and unmanned aircraft system registration and safety regulations. The FAA oversees the Airport & Airway Trust Fund which awards federal funding for airport construction and safety through the Airport Improvement Program (AIP) in partnership with state DOTs.
Kentucky Department of Aviation	Housed with KYTC, the Kentucky Department of Aviation is charged with developing the Statewide Aviation System Plan and administering state and federal funding (AIP) for airport maintenance and expansion projects. This planning/programming process closely mirrors the federally required LRTP and STIP surface transportation planning process for highways. While, INDOT has similar responsibilities, there currently are no Indiana-based air cargo facilities located within the KIPDA region.
Louisville Regional Airport Authority	Kentucky law established the Louisville Regional Airport Authority (LRAA) as an autonomous municipal corporation. The LRAA functions as a self-contained government entity with its own police, fire and public works departments. While, the authority receives limited funding from FAA's AIP program, LRAA is largely self-funded through a series of user fees.

HIGHWAY

Federal Highway Administration	The Federal Highway Administration (FHWA) coordinates highway transportation programs in cooperation with states and other partners. Major program areas include the Federal-Aid Highway Program, which provides Federal financial assistance to the states to construct and improve the roads and bridges. FHWA's Highway Office of Freight Management (HOFM) promotes the deployment of technology and the adoption of State DOT/MPO best practices to facilitate the smooth flow of goods on the transportation system and across our borders.
Federal Motor Carrier Safety Administration	The Federal Motor Carrier Safety Administration (FMCSA) regulates the motor carrier industry through the enforcement of the Federal Motor Carrier Safety Regulations Act (FMCSR). Standards overseen by the FMCSA include driver qualification, hours-of-service requirements, inspection and maintenance of the vehicles, and hazardous materials transportation.
National Highway Traffic Safety Administration	The National Highway Traffic Safety Administration (NHTSA) sets and enforces safety performance standards for motor vehicles and equipment, and funds local highway safety programs. The agency regulates fuel economy standards, safety features, and is focused on reducing distracted/drunken driving.

INDOT/KYTC	Each state's Department of Transportation (DOT) – the Indiana Department of Transportation (INDOT) in Indiana and the Kentucky Transportation Cabinet (KYTC) in Kentucky - is responsible for developing, construction and maintaining their state's respective transportation system. In terms of freight, this means investing in highway (and aviation) infrastructure that supports freight mobility and connectivity. Additionally, each state is responsible for developing their federally required state freight, rail, aviation and long range plans.
Indiana Finance Authority	The Indiana Finance Authority (IFA) was created to oversee state issued debt and to provide flexibility for investment within the state. The agency is authorized to issue revenue bonds for lease agreements with agencies like INDOT. Recent freight related IFA projects include the Indiana Toll Road lease and the Ohio River Bridges in the KIDPA region.
Kentucky Public Transportation Infrastructure Authority	The Kentucky Public Transportation Infrastructure Authority (KPTIA) is an independent political subdivision that is charged with overseeing significant transportation projects and assisting with the operation, financing, and management of those projects. Currently, the Authority is engaged in overseeing a single project, the Ohio River Bridges.
State Police	Indiana and Kentucky have parallel state police agencies that enforce traffic laws and secure the highway system. This includes the enforcement of state and federal commercial vehicle regulations.
Kentuckiana Regional Planning and Development Agency	The Kentuckiana Regional Planning and Development Agency (KIPDA) serves as the Metropolitan Planning Organization (MPO) for the Louisville/Jefferson County KY-IN urbanized area. A Metropolitan Planning Organization (MPO) is defined in federal law as the designated local decision-making body that is responsible for carrying out the metropolitan transportation planning process. KIPDA is responsible for coordinating regional transportation investments and facilitating the regional freight discussion.
MARITIME	
U.S. Army Corps of Engineers	The US Army Corps of Engineers' (USACE) Louisville District owns and operates the locks and dams on the Ohio River and maintains its commercial inland navigation channels. Additionally, the Water Resources Reform and Development Act of 2014 (WRRDA) authorizes the USACE to undertake key civil works missions, including navigation, flood risk management, and environmental restoration.
US Coast Guard	The US Coast Guard's (USCG) Eighth District is charged with providing law enforcement, security, emergency response and navigation support for the Ohio River
Maritime Administration	USDOT's Maritime Administration (MARAD) is primarily charged with maintaining the United States' Merchant Marine. In addition, MARAD is charged with promoting the use of the waterway system and its seamless integration as part of the nation's multimodal system. Most recently, creating the Maritime Highway Program (see pages 24-26 for more details about the Marine Highway Program).

Water Transportation Advisory Board	<p>The Water Transportation Advisory Board (WTAB), was created to advise the executive and legislative branches of state government on water transportation issues. The WTAB's seven gubernatorial appointees have three main functions:</p> <ul style="list-style-type: none"> • Waterway Advisor: The WTAB recommends potential activities to increase the economic impact of Kentucky's ports and waterways • Riverport Marketing Trust Fund: The WTAB provides input on the program's priorities, evaluates applications and ultimately recommends to grant riverports funding under this program focused on assisting riverport marketing initiatives. • Riverport Financial Assistance Trust Fund: The WTAB makes recommendations on the programs priorities and ultimately which projects get funded through the program
Louisville-Jefferson County Riverport Authority	<p>This authority is charged with providing oversight on riverport development activities, as well as conduct day-to-day riverport business. Locally, the Louisville-Jefferson County Riverport Authority has developed over 2,000 acres along the Ohio River. Today the Riverport supports 120 companies and over 6,500 jobs.</p>
Ports of Indiana - Jeffersonville	<p>The State of Indiana created the Ports of Indiana as both a political subdivision but also a corporation. The quasi-governmental agency oversees Indiana's three ports on Lake Michigan and the Ohio River. Specific to the KIPDA region, the Ports oversee the Jeffersonville Ohio River port.</p>
PIPELINE	
Pipeline and Hazardous Materials Safety Administration	<p>The Pipeline and Hazardous Materials Safety Administration (PHMSA) regulates hazardous liquid and gas pipeline transport in the U.S. Federal regulations include minimum standards for safety in design, construction, inspection, testing, operation, and maintenance of pipelines. States are certified by PHMSA to inspect and enforce pipeline safety regulations for intrastate pipeline operators. In Kentucky, the Pipeline Safety Branch of the Kentucky Public Service Commission (PSC) performs this inspection and enforcement. In Indiana, the Indiana Utility Regulatory Commission fulfills this role.</p>
Federal Energy Regulatory Commission	<p>The Federal Energy Regulatory Commission (FERC) is a federal agency that regulates the interstate transmission of electricity, natural gas, and oil. It reviews proposals to build (or abandon) liquefied natural gas (LNG) terminals and interstate natural gas pipelines.</p>
Kentucky Public Service Commission	<p>The Kentucky Public Service Commission (PSC) enforces federal and state pipeline safety laws and regulations for intrastate natural gas transmission pipelines. The PSC has jurisdiction over 32 intrastate pipeline operators in Kentucky.</p>
Indiana Utility Regulatory Commission	<p>The Indiana Utility Regulatory Commission (IURC) is responsible for regulating electric, natural gas, telecommunications, steam, water and sewer utilities. Its Pipeline Safety Division receives its federal authority from the USDOT to conduct inspections, investigate incidents, and enforce federal safety regulations and state statutes and rules.</p>

RAIL

Federal Railroad Administration	The Federal Railroad Administration (FRA) is responsible for ensuring the safety of the U.S. passenger and freight rail operations and infrastructure by promoting safe, efficient and accessible rail transportation. To carry out this responsibility FRA writes and enforces rail safety regulations; consolidates government support of rail transportation activities; administers financial assistance programs; and conducts research and development in support of improved railroad safety and efficiency and national transportation policy.
Surface Transportation Board	The Surface Transportation Board (STB) is an independent adjudicatory and economic regulatory body housed within the USDOT. The STB rules on cases which involve issues like railroad rates and service issues, rail restructuring transactions, labor matters, data collection, abandonments, and operational oversight.
INDOT/KYTC	In addition to their highway responsibilities the Indiana Department of Transportation (INDOT) and Kentucky Transportation Cabinet (KYTC) are responsible for regulating intra-state rail companies. These are generally Class II and III railroads.

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