8 Opportunities

The 2014 State Freight Plan included extensive stakeholder outreach in order to identify key strengths, weaknesses, opportunities, and threats across the modes (Table 17). Most of these issues are still relevant for the 2017 update, particularly related to the highlighted modal weaknesses below. For the 2018 update, outreach included engagement with public stakeholders along with targeted industry discussions. MPOs and district staff provided input on facilities and areas with freight mobility issues via interactive GIS maps. The Ports of Indiana, Indianapolis International Airport Authority, and INDOT modal experts also provided information for and review of the freight plan. Lastly, communities, businesses, and economic development professionals throughout the State participated in meetings to discuss supply chain issues and how they pertain to the Indiana freight network. While the outreach for this update was not as extensive as the 2014 plan, the input helped supplement data analysis efforts and provided practical implications of freight concerns. The focus of this chapter is to build upon known weaknesses and identify key freight-related opportunities. Potential steps INDOT and partner agencies can take to capitalize on opportunities are also listed.

Table 17. Summary of 2014 Freight Plan Outreach Identified Weaknesses

	√ = yes × = no * = partially
HIGHWAY	**APPLICABLE IN 2017?**
Bottlenecks or traffic congestion – North-west Indiana; South Bend to Indianapolis; Indianapolis; and Jeffersonville/New Albany	√
No Interstate access to Southwest Indiana	√
No Interstate/highway access to Southwest Indiana Port	√
Lack of adequate capacity on Indiana's Interstate highway	√
Federal/state user of gas taxes for other general Federal/state revenue needs	√
Lower truck weight limits compared to surrounding States	√
Lack of Federal/state funding	√
RAILROAD	**APPLICABLE IN 2017?**
Primarily pass through State for rail intermodal	√
Reliant on Chicago intermodal rail service	√
Lack of large volume intermodal facilities	*
Limited railroad access to ports	√
Lack of private investment compared to surrounding States	√
Lack of "ownership" by public entities on rail freight movement	√
Lack of Federal/state funding	√

	√ = yes × = no * = partially
WATERWAY	**APPLICABLE IN 2017?**
Decaying lock infrastructure on Great Lakes; Ohio & Mississippi rivers	√
Dredging issues for ports and waterways on Great Lakes; Ohio & Mississippi rivers	√
Limited area for disposal of dredged material from Lake Michigan	√
Limited railroad access to ports	√
Lack of "ownership" by public entities of waterborne shipping	√
Lack of Federal/state funding	√
Lack of public and legislator understanding of importance of locks infrastructure	√
AIR CARGO	**APPLICABLE IN 2017?**
7th of 8 compared to Midwest/Great Lakes Region States in air transport as a share of State transportation/warehousing GDP	√
Indiana airports have minimal international/domestic business; other than the domestic cargo shipping at Indianapolis Airport	√
Bottlenecks due to airport congestion at Chicago O'Hare Airport	√
Reliant on Chicago O'Hare Airport for international/domestic air cargo	*
Lack of "ownership" by public entities on air cargo movement	*
Lack of Federal/state funding	*

Source: 2014 Multimodal Freight and Mobility Plan, Chapter 3.

TARGETED INDUSTRY ASSESSMENT AND BUSINESS STRATEGY

Summary

Freight mobility, trade, and logistics are essential elements of Indiana's economic success, not only for fulfilling the growing demand for goods, commodities, and services in Indiana, but also for driving the State's economic development and competitiveness. The importance of freight as a driving force for maintaining and creating jobs and fueling economic development has increasingly been recognized by local, State, and Federal transportation programs in the United States and is referred to as logistics-enabled economic development. This type of economic development is about developing an ecosystem that supports the movement of freight across the State by lowering cost, reducing risk and time, and at the same time promoting job creation.

Competitiveness and sustainability of the manufacturing sector are essential to ensure job growth and economic prosperity in Indiana. Currently there is a renewed national interest in advancing U.S. leadership in manufacturing, and this creates an opportunity for States to take bold initiatives in revitalization of the manufacturing sector.

In reviewing five of the strongest industry manufacturing subsectors in Indiana, it is abundantly clear that the State has experienced deep declines in the manufacturing sector during the years 1998 to 2015, but it is most pronounced in the number of jobs lost in the transportation sector at 48,200 and the metal manufacturing and fabrication sector at 33,411. There are more gradual declines in other industries such as biopharmaceuticals, plastics, and chemicals.

However, despite these declines:

- Manufacturing generates the largest industry contributions of wages in Indiana which is a key demonstration of the value of the industry.
- Multiple subsectors of manufacturing led by the transportation sector continue to generate high levels of employment. The recreational vehicle/motor home industry is growing very rapidly and currently employs over 38,000 people. Indiana's medical devices industry is second in the nation in jobs.

The State of Indiana's economic future is strongly dependent on manufacturing. To ensure that the total manufacturing sector continues to contribute to the State's economic prosperity, it is critical to identify all of the subsectors and understand their characteristics and the trends that are shaping their future. After this assessment, policies and programs can be enacted which will support and grow the key industries and as well as identify new industries.

Potential INDOT Action Items:

- Evaluation of Indiana's manufacturing sector, its position within the existing and emerging domestic and international supply and distribution chains, and its most promising opportunities.
- Evaluation of multimodal transportation investments from an economic development and job creation perspective with a return on investment analysis for the State of Indiana.
- Educate state and local transportation professionals, as well as elected officials, on the specific needs of the freight industry and the industries being served.
- Form a sustainable coalition among other Indiana organizations for multimodal freight and logistics enabled economic development.
- Clearly state in transportation planning documents the connections between transportation and economic development.

ADVANCED PERFORMANCE MEASUREMENT AND TARGETING TO MEASURE PROGRESS

Summary

Many States are transitioning toward a performance-based planning paradigm that helps rank and measure effectiveness of transportation projects. As discussed in Chapter 6, there are a number of possible metrics that could indicate progress toward State goals across: Economic Impact, Capacity to Meet Demand, Multimodal Integration & Synergy, Access to National and International Markets, and Quality of Life. In addition, The Blue Ribbon Panel on Transportation Infrastructure, comprised of transportation, business, and government leaders throughout Indiana, released a 2014 report that offered 25 recommendations pertaining to priority projects in the State. For each project the panel proposed performance metrics across each category. For freight project purposes, Indiana maintains and has access to a number of current data sources to expand freight performance measure activity.

Potential INDOT Action Items

- Explore performance measures to evaluate and measure success of INDOT investments. For example, effective performance measures could be applied to recent INDOT-supported investments such as River Ridge Commerce Center in Southern Indiana.
- Implement freight transportation performance measures outlined in Chapter 6.
- Consider multidisciplinary committee within INDOT to discuss data availability, accuracy, and ownership. Also evaluate relative merits of possible performance measures for use within specific modal offices.

EVALUATE OVERSIZE-OVERWEIGHT TRUCK MOVEMENTS, PROGRAM, AND PERMITTING

Summary

To travel legally, commercial vehicles must fall within several dimensions and weight requirements. The State has an active Extra Heavy Duty Highway network (the northwest portion of this network is shown in Figure 34), and a system for evaluating permit applications on these and other state highways throughout the State. Oversize and overweight (OSOW) vehicles have perpetual mobility issues when navigating to first and last-mile locations and are often delayed by issues ranging from operational and enforcement restrictions to geometric and roadway-related complications. While OSOW vehicles do not represent a large volume of truck flows they do support several specific industries in the State and provide critical connections for project cargo and commodities to, from, and through the State. Indiana Department of Revenue, Motor Carrier Services administers the oversize/overweight permitting program. The current permit management system is more than 10 years old, with no automated routing or analysis capability and very limited reporting ability. Approximately half of all permit applications are manually processed. The system does not provide information in a way that allows us to identify what traveled over a given portion of infrastructure. INDOT is in the process of procuring a modern OSOW permitting system, with automated, GIS-based routing, ability to perform bridge and pavement analysis, automated restriction and clearance checks, etc. Benefits will include: much quicker service, improved ability to appropriately route OSOW loads to minimize infrastructure impacts, and data to help us understand OSOW movement in Indiana.

Potential INDOT Action Items

- Identify best practices and industry trends impacting Indiana oversize-overweight movements, and target best options for Indiana moving forward.
- Re-evaluate extra heavy duty highways to ensure they continue to be relevant and meet demand.
- Examine opportunities to expand heavy-haul corridors to attract economic development, particularly in connection to rail and port facilities.
- Examine permanent restrictions and hindrance to industries that are impacted by restrictions. Evaluate if the restriction negatively impacts current OSOW routes and prioritize investments.
- Evaluate OSOW permitting demand, procedures, objectives, and harmonization with adjacent states.
- Evaluate the impact of OSOW vehicles on Indiana's roadways and adjust fees accordingly to proactively manage OSOW routes.

INDIANA EXTRA HEAVY DUTY HIGHWAYS

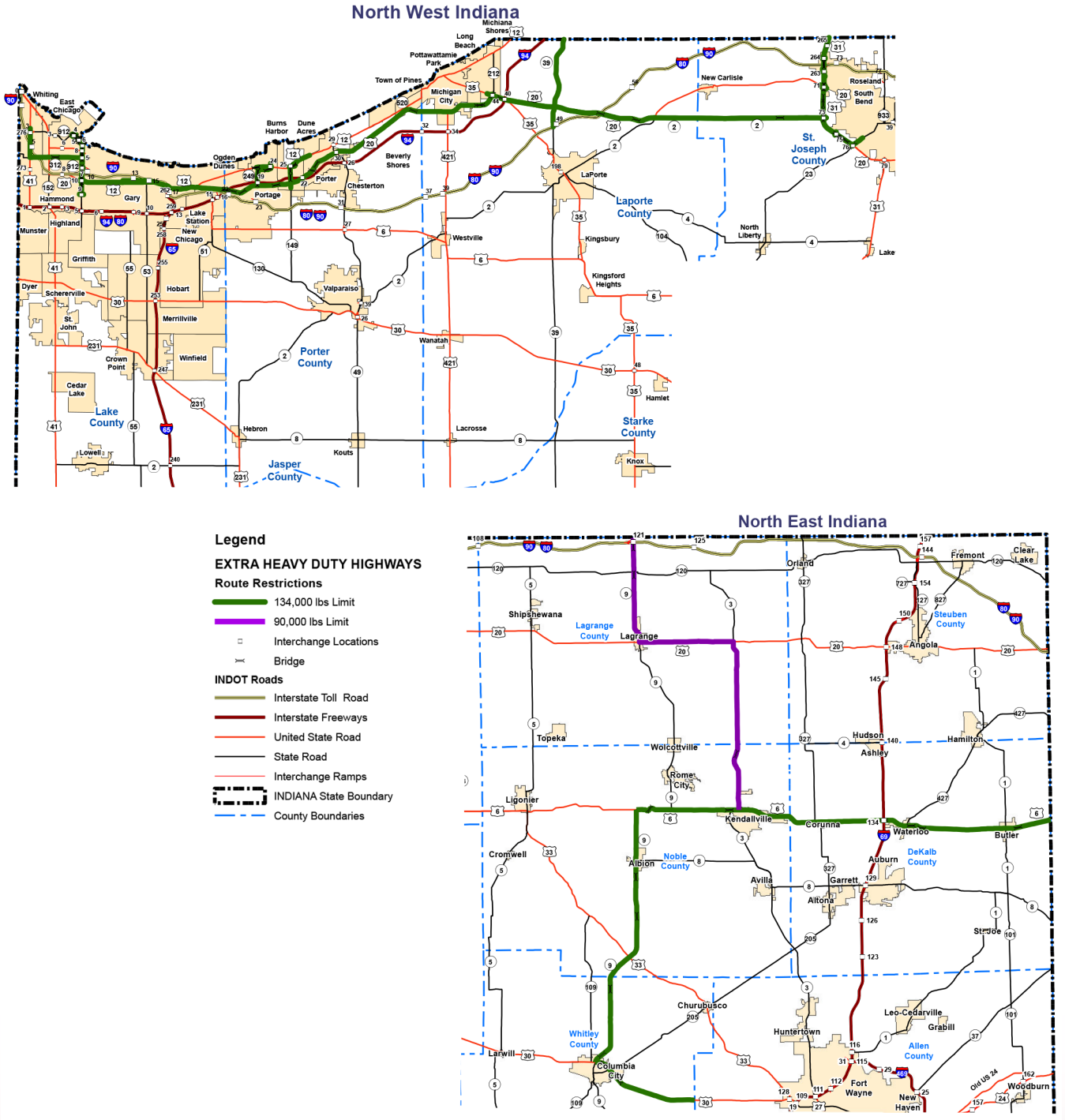

Figure 34. Extra Heavy Duty Highways

IDENTIFY AND EXPAND RAIL-SERVED OPPORTUNITIES IN INDIANA

Summary

Indiana has a robust railroad system of over 4,000 miles, placing it ninth among other States. Indiana provides multimodal connectivity to national and global markets via short line and Class I rail providers, the inland waterways via the Ohio River, and the Great Lakes (Figure 35). Intermodal facilities are organized into the following categories:

- Intermodal Terminals (container on flatcar).
- Automotive Ramps.
- Transload Facilities.
- Grain Elevators and other Agricultural Facilities.
- Port Locations.

Rail-served intermodal facilities serve as a critical component to the freight supply chain of many commodities, though much of container intermodal traffic passes through the State to hubs in adjacent States.

Potential INDOT Action Items

- Continue working with Indiana Economic Development Corporation (IEDC), Ports of Indiana (POI) and other organizations to explore ways to improve rail access.
- Further evaluate Indiana's "Position within Logistics and Supply Chain Networks": proximity issues with Chicago and also with other terminals, such as the CSX North Baltimore, OH, and the NS Rickenbacker in Columbus, OH. Determine how Indiana shippers compete in these lanes and whether the State can play an active role in promoting or expanding Indiana businesses.
- Determine the needs of shippers, how they use the freight rail system, and how the State can leverage investments and relationships to create new opportunities.

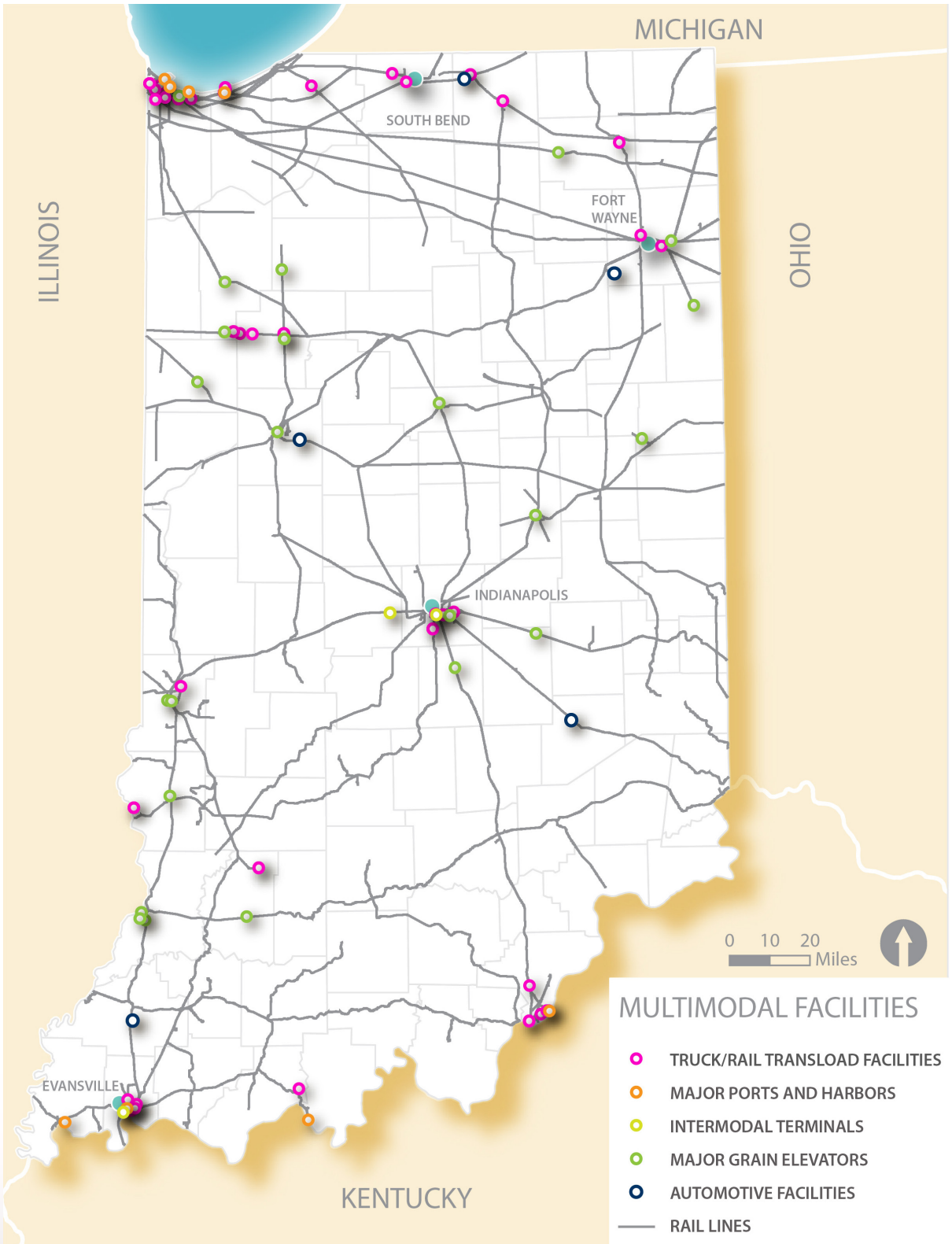

Figure 35. Rail-Served Multimodal Facilities in Indiana

Source: 2017 Indiana State Rail Plan. http://www.in.gov/indot/2394.htm.

IDENTIFY AND EXPAND WATERWAY FREIGHT OPPORTUNITIES IN INDIANA

Summary

Indiana is uniquely positioned to handle Great Lakes cargo as well as Ohio River barge traffic. In calendar year 2015, the ports handled 66.2 million tons (20.1 million shipped, 43.7 million tons received, 2.4 million tons intrastate). The State's waterway system not only provides an efficient means of freight transportation, but is also critical to many of the State's industries, including steel, minerals, fertilizer, heavy/oversize cargo, coal, and several agricultural products. There are significant opportunities for Indiana to further leverage its maritime industry connections to improve its freight transportation network and generate economic benefits.

The Ports of Indiana has increased cargo shipments by nearly 50 percent over recent years and is continuing to look at additional expansion options. There is a significant opportunity for Indiana to continue to expand cargo shipments through all of its Ohio River and Lake Michigan facilities, which would drive increased economic returns for the state, create additional jobs and reduce shipping costs for local companies. The Ports of Indiana has recently secured two federal grants that are supporting major expansions at multiple ports. These grants were awarded based on immediate needs for improvements at the state's ports to create new infrastructure that will be able to efficiently handle future cargo growth. Indiana has a unique competitive advantage by being located on two inland waterways – the Great Lakes and Inland Waterway System – and can leverage these freight arteries to drive long-term economic growth.

Indiana's three state ports generally have ample capacity for increasing shipments, but they have a limited number of acres available for future maritime economic development. In fact, 80 percent of the original land that was purchased to build the ports has been developed. The Ports of Indiana has been addressing this challenge by using retained earnings to purchase additional land at all three of the ports, as well as evaluating new sites for future expansions. An opportunity that should be further explored in Indiana is the development of large multimodal sites that would not be directly adjacent to the ports but could be connected to the docks by rail or heavy-haul roads. These "satellite" expansions would allow the port facilities to continue to attract freight-related developments and utilize existing capacity at the current port terminals.Additional maritime projects that were identified as freight priorities for Indiana by the Blue Ribbon Panel for Transportation Infrastructure included ongoing dredging at the Port of Indiana-Burns Harbor and improved rail service to all of Indiana's ports.

Currently each of the three public ports has development opportunities. A summary of assets for freight development at or around each of the current established port facilities follows.

Port of Indiana – Burns Harbor. As shown in Figure 37, a limited amount of developable land is currently avail-able at the port at Burns Harbor. The largest site is 57 acres and consists of 1,000 feet of dock wall on the West Harbor and beach frontage on Lake Michigan. The next largest site is 16 acres. Fourteen additional sites are available at Burns Harbor, ranging in size from 1 to 6 acres. Several sites have direct rail access. Available land around or adjacent to the existing port is limited.

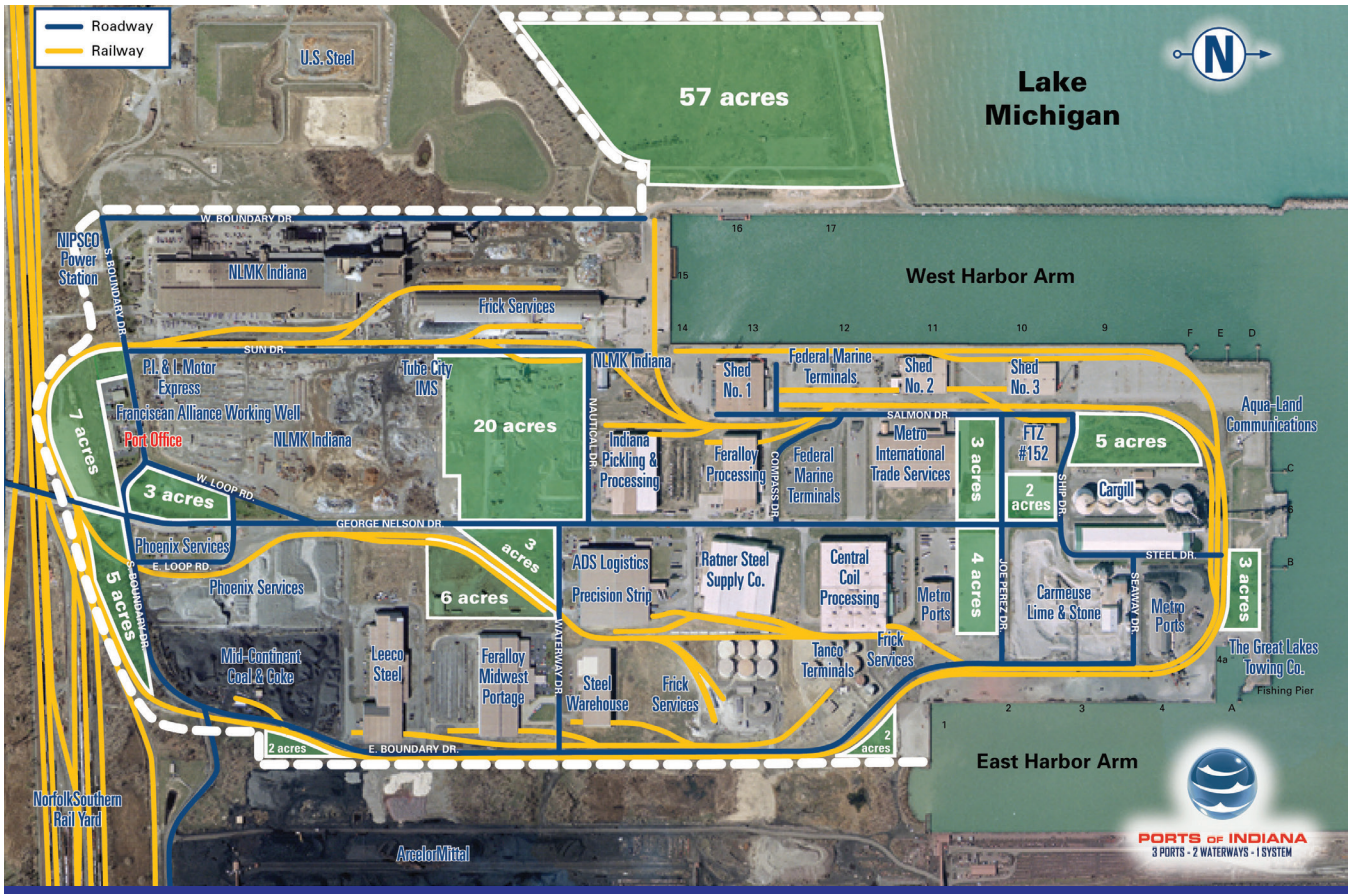

Figure 36. Port of Indiana – Burns Harbor

Port of Indiana-Burns Harbor is constrained by a single 2-lane bridge entrance that handles all port traffic in and out of the facility, including heavy-haul loads using the Extra Heavy Duty Highway connecting the Northwest Indiana steel mills to auto manufacturers in Michigan. The development of a second bridge entrance was identified by the Blue Ribbon Panel on Transportation Infrastructure as one of the top 11 priorities for the state and it was identified by the Department of Homeland Security as one of the state's most critical pieces of infrastructure because it transits 10 rail tracks, including Class I mainlines and the SouthShore commuter track, and is the only access point for the state's deep-water port. Currently, all traffic going in/out of the port crosses this two-lane bridge that is in need of repair, and any failure of this structure would require evacuation of all port traffic through a working steel mill.

Port of Indiana – Jeffersonville. As shown in Figure 38, a considerable amount of developable land is currently available at the port at Jeffersonville. The largest site is 140 acres and includes significant rail frontage. The next largest sites are 55 acres and 43 acres, but rail frontage on these sites is more limited. Ten additional sites are available at Jeffersonville, ranging in size from 3 to 14 acres. Several sites have direct rail access. A limited number of parcels in the port vicinity may be available for development in the future, but they are currently used for agricultural pur-poses. The areas around or adjacent to the port site are becoming increasingly developed; the port may soon be landlocked. The eastside Ohio River Bridge and related I-265 connections will provide a more integrated connection to a larger string of belt highways encircling Jeffersonville, Clarksville, and Louisville, Kentucky. INDOT is also partnered with the port in the development of a heavy haul roadway. In addition the port will benefit from recently completed INDOT/KYTC bridge and roadway projects on the Ohio River: The $2.5 billion project package will increase connectivity and efficiency for users of Jeffersonville facilities.

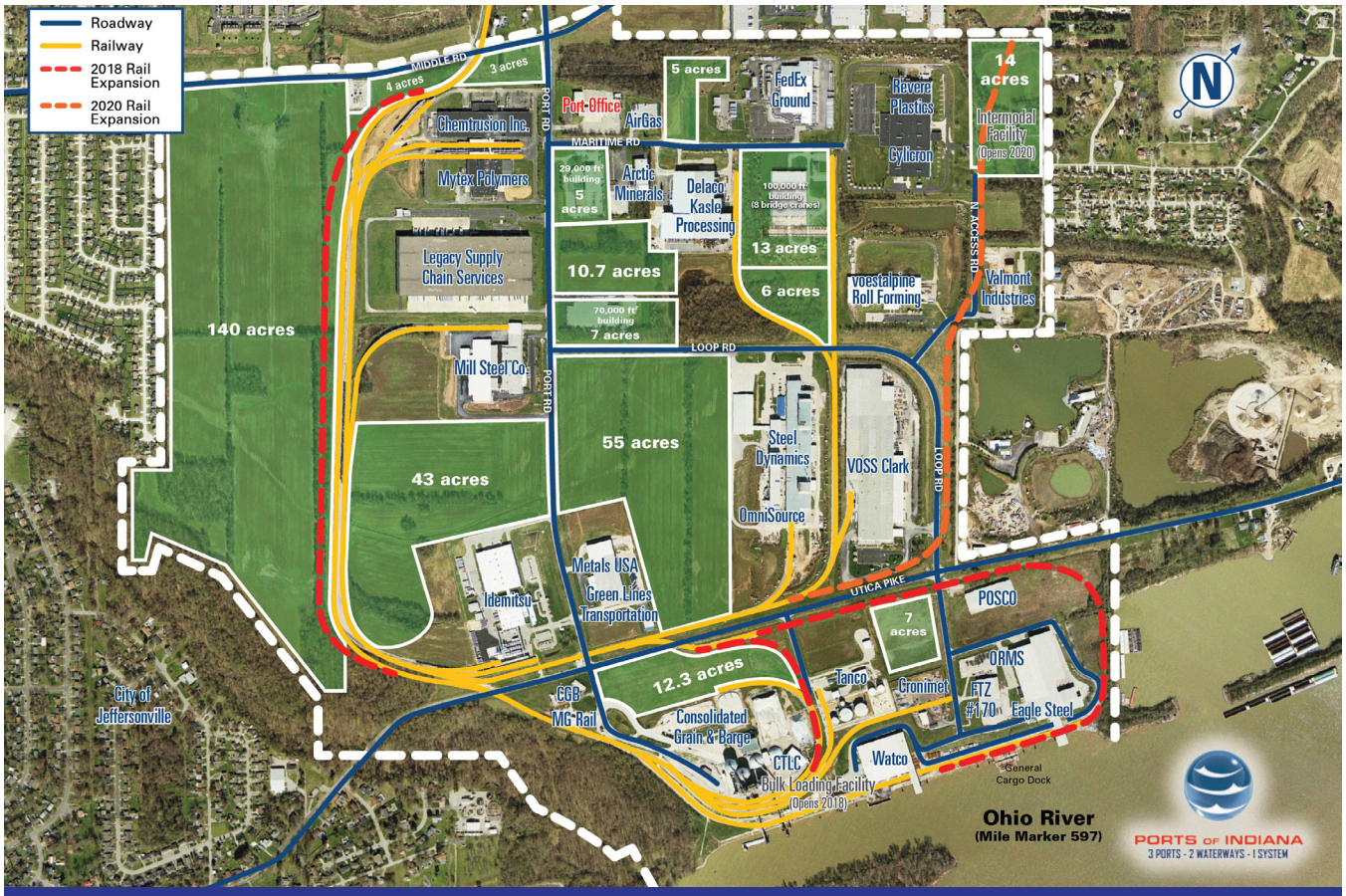

Figure 37. Port of Indiana – Jeffersonville

Port of Indiana-Jeffersonville is currently constrained because of its interstate access. A planned heavy-haul connection has been delayed and new roundabouts on the existing route are causing problems for trucks going to and from the port, including truck rollovers and semis diverting to city streets to avoid roundabouts.

Port of Indiana – Mount Vernon. As shown in Figure 39, a considerable amount of developable land is currently available at the port at Mount Vernon. The largest site is 544 acres and consists of significant rail frontage. It is also situated at the 500-year flood elevation, which denotes a resilient and long-term viable location for busi-nesses. The next largest sites are 66 acres with limited rail access and 25 acres with no current access, but can easily be connected. Eleven additional sites are available at Mount Vernon, ranging in size from 1 to 10 acres.

Figure 38. Port of Indiana – Mount Vernon

Port of Indiana-Mount Vernon is constrained because it does not have a direct interstate connection and trucks must traverse several miles of traffic lights and city traffic through Evansville before reaching I-69. This is the state's largest port in acreage, shipments and available land. The Blue Ribbon Panel on Transportation Infrastructure identified improved highway connections as one of the state's top 8 priorities, and removing stoplights from the Evansville "Expressway" was scored as having one of the highest potential economic impacts of all projects.

Potential INDOT Action Items

- Evaluate throughput and capacity for state routes and critical connectors to/from each water port facility.
- Collaborate with Ports of Indiana, IEDC, and local economic development agencies to identify areas where INDOT could support water port expansion capabilities and business recruitment.
- Identify and help market land around current and potential maritime hubs.
- Pursue designation of connectors to the state's three ports as part of the National Multimodal Freight Network.
- Collaborate with Ports of Indiana to explore multimodal projects throughout Indiana.

IDENTIFY AND EXPAND AIR CARGO OPPORTUNITIES IN INDIANA

Summary

Indiana has 450 airports throughout the State, with three of those handling substantial air cargo. In 2016 Indianapolis International Airport landed 5.3 billion lbs. (7th in the U.S.), Fort Wayne International Airport landed 198.6 million lbs. (92nd), and South Bend International Airport landed 100 million lbs. (119th). Despite the considerable amount of cargo landed, there is still capacity at or adjacent to multiple airports throughout the State.

Key air cargo conditions and opportunities are included below:

Fort Wayne International Airport, Fort Wayne, Indiana

Fort Wayne International Airport's (FWA) is within a two-hour flight or one-day drive of the major cities such as Chicago, Detroit, Cleveland, Toledo, Cincinnati, Indianapolis, Dayton, Louisville and Columbus. It ranks 92nd in the U.S. in cargo landed weight. FWA provides operators an 11,891-foot by 150-foot CAT II ILS runway. It is part of BizFTZ (#182) Foreign Trade Zone and has U.S. customs service. FWA has ready interstate access to I-69 and I-469. FWA has two cargo carriers that handle approximately 22 million pounds of cargo via FedEx and UPS. There are two areas available for development at FWA which are the Air Trade Center and Kelley Commerce Aero Centré. The Air Trade Center is a 450 acre site zoned for heavy industrial and aviation-related enterprises. The Kelley Commerce Aero Centré is a 109 acre site zoned for light industrial, non-aviation and aviation uses. It has shovel ready sites.

South Bend International Airport, South Bend, Indiana

The South Bend International Airport (SBN) is a multi-modal facility providing air, rail, and bus and cargo service. It has rail connectivity to downtown Chicago. It ranks 116th in the U.S. in all-cargo landed weight. SBN's primary runway is 8,412 feet long and 150 feet wide. In 2017, U.S. customs facilities opened at SBN and it is part of Foreign Trade Zone #125. SBN supports regular operations by FedEx and UPS as well as unscheduled cargo operations. It is located ½ mile from I-80/90 and US 31. Blackthorn Corporate Park is located just north of SBN and the airport has land available in the southwest portion of the airport with utility access that is available for development. SBN is part of the Airport Development Area TIF district that also encompasses the Blackthorn Corporate Park.

Indianapolis International Airport (IND), Indianapolis, Indiana

IND houses the second largest FedEx Express operation with room to expand. It also accommodates Cargolux that offers international temperature sensitive services several days a week. IND is ranked as the seventh in the U.S. (based on 2015 all-cargo landed weights) and as the twenty-first internationally largest cargo facility. IND is a part of the INzone Foreign Trade Zone (#72) and has available U.S. customs service. Its two parallel runways, 11,200 feet and 10,000 feet with CAT III instrument landing system (ILS), can accommodate any commercial aircraft including nonstop flights to Asia. IND has 300,000 square feet of temperature controlled air cargo facilities with approximately 50 acres of apron allowing largest aircraft such as the 747-8F to easily maneuver and taxi right up to the facility. Over one million tons of time and temperature sensitive cargo are handled annual at IND. IND cargo services can accommodate any size of shipments at a low cost with less congestion. Located in the nation's heartland, 75% of all U.S. businesses are within a one-day drive of IND. IND currently has approximately 170 acres of space divided into several leasing sites that have easy access to highway connections such as I-70, I-465, and I-65 as well as to

other major roadways. IND is actively working on development and has IND Aerovision, a group of local governmental entities, which works cooperatively on land use and economic development within eight miles of IND to actively develop land around the airport.

Gary/Chicago International Airport (GYY), Gary, Indiana

GYY is located approximately twenty-five miles from downtown Chicago with highway connections to I-90, I-80/94, I-65, the Chicago Skyway, the Dan Ryan Expressway, and Lake Shore Drive. GYY also has convenient multimodal connections and easy access surface transportation via rail and Port of Indiana-Burns Harbor. Gary/Chicago International Airport is part of the Foreign Trade Zone #152. In 2015, GYY has completed the extension of their primary runway to 8,859 feet long and 150 feet wide with a CAT I ILS allowing GYY to better accommodate various passenger and cargo jet aircraft. GYY is operated by the Aviation Facilities Company, which is focusing on developing the airport.

Grissom Air Force Base/Grissom Aeroplex (GUS), Peru, Indiana

GUS is available to civilian users under a joint use agreement. GUS is centrally located along U.S. 31, which is being upgraded to be a freeway grade arterial including a bypass around Kokomo and to the south of South Bend. GUS offers uncongested airspace to its users and has the longest runway in the State of Indiana at 12,500 feet long and 200 feet wide with a CAT I. Operated by the Miami County Economic Development Authority and located on GUS, the Grissom Aeroplex has 850 acres with the existing buildings from 3,000 to 129,000 square feet. With an onsite fixed base operator, Grissom Aeroplex is ready and able to handle all aviation business needs. GUS is part of the INzone Foreign Trade Zone (#72), as well as a Tax Incremental Financial (TIF) District and Enterprise District.

Potential INDOT Action Items

- Evaluate throughput and capacity for state routes and critical connectors to/from each airport facility.
- Collaborate with IEDC and local economic development agencies to identify areas where INDOT could support air cargo expansion capabilities and business recruitment.
- Promote technology-oriented development.

SUPPORT AND ENHANCE RURAL CONNECTIVITY WITH NHFN

Summary

While Indiana has several major urban areas, there are also 14.7 million acres of farm operations. The rural areas of the State have a diverse and productive array of livestock, milk, and crop facilities situated in all regions of the State. Major crops include: corn, soybeans, hay, tomatoes, sweet corn, mint, pumpkins, beans, and several fruits. Livestock includes beef cattle, goats, sheep, hogs, and turkey. Supply chains for each of these products include significant connectivity for production and distribution, which is largely handled by commercial vehicles. An agricultural overview of Indiana is included in the appendix.

Potential INDOT Action Items

- Explore connectivity between state networks and major rural corridors.
- Identify major agricultural production clusters throughout the State, and characterize equipment types and transportation needs.
- Coordinate with Indiana Farm Bureau on logistics needs.
- Investigate detailed supply chain patterns for each major agricultural commodity and evaluate how the State can support and expand opportunities.

ALIGN WORKFORCE TRAINING AVAILABILITY AND NEEDS

Summary

Current industry demand for qualified employees that are involved in freight-related industries far exceed the supply. This is a common lament among most states with strong economies. As noted earlier, nearly one million of Indiana's six million residents are involved in the production or distribution of goods. There are a total of 39 campuses throughout Indiana ranging from two-year to four-year programs, along with a longtime USDOT-sponsored University Transportation Center housed at Purdue University, NEXTRANS.

Potential INDOT Action Items

- Collaborate with CONEXUS, trade groups, and to identify incongruences between qualified employees and Indiana manufacturing, transportation, and logistics business needs.
- Coordinate with colleges and Universities of Indiana to evaluate current offerings, student employment surveys, and common/requested skillsets.

EXPLORE INNOVATIVE HIGHWAY FUNDING OPPORTUNITIES

Summary

Indiana, similar to other States, has freight and transportation-related projects that greatly exceed traditional funding mechanisms. Historically, state and local highway formula funds are the primary source for roadway maintenance and improvements while modal offices administer a variety of state and Federal loan and grant programs. However, 2017 legislation called for a detailed exploration of tolling feasibility on I-64, I-69, I-74, I-94, I-65, and I-70 in Indiana. The Traffic and Revenue Analysis and an Economic Impact Analysis (EIA) was delivered in fall of 2017, and a strategic plan is due in late 2018. Objectives of the feasibility study included:

- Additional highway construction spending made possible by tolling (i.e., widening of I-65 and I-70 to a minimum of 6 lanes).
- Additional spending required to implement the tolling program (e.g., construction of tolling gantries, transaction costs).
- Changes in production costs resulting from toll payments and from changes in business transportation costs (e.g., travel time, vehicle operating costs, accident costs) due to highway widening and traffic diversion.
- Changes in consumer spending resulting from toll payments and from changes in household transportation costs (e.g., vehicle operating costs).
- Potential reductions in fuel taxes (or increases in general government expenditures) made possible by tolling.

Potential INDOT Action Items

- Evaluate freight considerations and opportunities for tolling for the State's key industries and economic drivers.
- Include freight stakeholder input as the strategic plan is developed.
- Explore opportunities for freight efficiencies if tolling is pursued. This can include operational and physical improvements.

EXPAND FREIGHT TECHNOLOGY AND OPERATIONAL STRATEGIES

Summary

INDOT has supported a range of strategies and research efforts to support and promote freight technology and operational advancement. Several recent examples are described below, along with links for additional information.

INDOT has implemented a program to monitor and provide real time traffic and travel conditions which meets the requirements of the Real-Time System Management Information Program (RTSMIP) in 23 CFR 511. *The real-time traveler information benefits all travelers, including the freight industry*. The real-time traveler information provides truckers with information on construction activities that close lanes, traffic incidents, road weather observations and travel times in Indiana's three largest metro areas (Indianapolis, NW Indiana, and Louisville).

INDOT RTSMIP branded as TrafficWise. TrafficWise provides a *Truckers' Info* page as one of the traveler information web tools. The report provides real time information specifically targeted at freight carriers. Restrictions related to permitting are posted as well as information about road restrictions and closures due to weather. The Truckers' Report information complements the other TrafficWise websites.[27]

INDOT is also implementing a **Truck Parking Information Management System.** This system is part of a $25 million TIGER Grant that will provide truckers with information on availability of parking spaces in Indiana's rest areas and in surrounding Midwestern states. TPIMS will track the number of available parking spaces at upcoming rest areas and weigh stations and inform truckers via interstate signs, TrafficWise, and a future mobile app. This system will be operational in September 2018, and will enhance safety by helping truckers to efficiently plan trips and stay in compliance in Federal hours of service rules.[28]

Other Strategies

INDOT uses **ITS technology** to manage signalized arterials. Signalized arterials represent a substantial component of the highway transportation network in the United States. The National Transportation Operations Coalition (NTOC) in their 2007 Traffic Signal Report Card noted that nationally 5 to 10 percent of all traffic delay is caused by improper traffic signal timings along major roadways. INDOT is a lead developer and implementer of Automated Traffic Signal Performance Measures (ATSPM). ATSPMs modernize traffic signal management by providing high-resolution data to support objectives and performance-based maintenance and operations strategies that improve safety and efficiency while cutting congestion and cost. The reduction in delay due to implementing ATSPMs benefits freight movement on Indiana's non-Interstate state highways.

INDOT's Traffic Management Division continues to strive toward implement technology to improve operations and safety. INDOT regularly invests in research as part of the **Joint Transportation Research Program** with Purdue University. Recent highlights include:

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[27] https://indot.carsprogram.org/.

[28] http://pws.trafficwise.org/pws/.

- SPR-4205: Connected Vehicle Corridor Deployment and Performance Measures for Assessment.
- SPR-4226: Cost-Effectiveness of Converting Signalized Arterials to Free-Flow Facilities.
- SPR-4167: Synthesis of Autonomous Vehicle Legislation.
- SPR-4218: Performance of Right Turn Lane Designs at Intersections.
- SPR-4228: Developing a Business Ecosystem around Autonomous Vehicle Infrastructure in Indiana.
- SPR-4017: Implementation of Weigh in Motion Data Quality Control and Real Time Dashboard Development.

Additional project information is available at: https://engineering.purdue.edu/JTRP/projects.

INDOT also is supporting regional and national research related to **Connected and Automated Vehicle (CAV)** implementation. INDOT has committed to participate the NTOC challenge to transportation infrastructure owners and operators to cooperate together to achieve deployment of Vehicle to Infrastructure (V2I) infrastructure. The "SPaT Challenge" is the deployment of Signal Phase and Timing (SPaT) broadcasts using Dedicated Short Range Communication (DSRC) between signal infrastructure and vehicles DSRC equipment. SPaT deployment locations in Indiana include:

- Merrillville – 8 intersections on US 30 and west of I-65.
- West Lafayette – 2 intersections on US 231/US 52.
- Greenwood – 6 intersections on US 31 and I-65 ramps.

Additional information is available at: https://transportationops.org/spatchallenge.

Potential INDOT Action Items

- Continue to explore technology-based opportunities and actively measure success and effectiveness of current strategies.
- Consider regular benchmarking technology research and application from a sample of other state DOTs.
- Monitor potential industry partnerships with shippers and carriers to leverage public and private data analysis and capabilities.


INDIANA DEPARTMENT OF TRANSPORTATION
INDOT