Jefferson-Orange-Hardin Regional Transportation Study

Regional Freight Mobility Plan

South East Texas Regional Planning Commission
Metropolitan Planning Organization (SETRPC-MPO)
for the Jefferson-Orange-Hardin Regional
Transportation Study (JOHRTS) Area

SETRPC
SOUTH EAST TEXAS REGIONAL PLANNING COMMISSION

TRANSPORTATION & ENVIRONMENTAL RESOURCES

June 2020 Final

This document was prepared in cooperation with the Texas Department of Transportation

Table of Contents

CHAPTER 1: Existing Conditions

CHAPTER 2: Regional Freight Flows

CHAPTER 3: Economic Impacts

List of Figures

CHAPTER 1: Existing Conditions

CHAPTER 2: Regional Freight Flows

CHAPTER 3: Economic Impacts

CHAPTER 4: Goals and Objectives

CHAPTER 6: Freight Needs, Projects, Policies, Programs and Studies

List of Tables

CHAPTER 1: Existing Conditions

CHAPTER 2: Regional Freight Flows

CHAPTER 3: Economic Impacts

CHAPTER 4: Goals and Objectives

CHAPTER 5: Performance Measures

CHAPTER 6: Freight Needs, Projects, Policies, Programs and Studies

Appendices

Chapter 1
Existing Conditions

It is important to assess the region’s existing multimodal freight infrastructure, how it is performing, and where the chokepoints are. It is equally important to understand the federal and state policy backdrop as this informs freight planning strategies and funding opportunities. This chapter summarizes the policy environment for freight in the JOHRTS region, and then discusses existing conditions for freight, focusing on the area’s key truck, rail, and port and waterway infrastructure. It also includes a brief assessment of employment in the transportation and warehousing sector within the region.

Federal Legislation

The 1991 Intermodal Surface Transportation Efficiency Act, or ISTEA, was the first federal surface transportation funding act to encourage planning for the movement of freight. ISTEA and several subsequent transportation reauthorization bills passed by the US Congress, however, failed to provide state and local agencies with freight specific funding. In 2015, the Fixing America’s Surface Transportation Act, or FAST Act, was the first surface transportation funding bill to provide a dedicated source of federal funding for freight projects, including intermodal projects. This section will describe freight related provisions from the 2015 FAST Act.

The FAST Act

The FAST Act was signed into law on December 4, 2015. The FAST Act funds federal surface transportation programs at $305 billion for five years, fiscal years 2016 through 2020. The FAST Act builds on the program structure and reforms introduced by the previous surface transportation funding act, Moving Ahead for Progress in the 21st Century (MAP-21). MAP-21 introduced critical changes to the planning process by linking investment priorities to the achievement of established performance targets in key areas such as safety, infrastructure condition, congestion, system reliability, emissions, and freight movement.

The FAST Act establishes new funding programs to support critical transportation projects to ease congestion and facilitate the movement of freight on the Interstate System and other major roads. The FAST Act develops a new National Multimodal Freight Policy, apportions funding through a new National Highway Freight Program, and authorizes a new discretionary grant program for Nationally Significant Freight and Highway Projects (FASTLANE Grants).

National Highway Freight Program

The FAST Act provides an estimated average of $1.2 billion each year for the new National Highway Freight Program (NHFP); focused on improving the efficient movement of freight on the National Highway Freight Network. Funds from the NHFP are distributed to states by formula for eligible activities including construction, operational improvements, freight planning, and performance measurement. Each state may use up to 10 percent of awarded NHFP funds during each fiscal year for public or private freight rail, water facilities (including ports), and intermodal facilities. For a state to receive NHFP funds, it must develop a state freight plan by December 4, 2017 that comprehensively addresses the state's immediate and long-range freight planning activities and investments. In 2017, TxDOT developed the Texas Freight Mobility Plan to comply with this new requirement from the FAST Act. The Texas Freight Mobility Plan is discussed further in the section "State Plans."

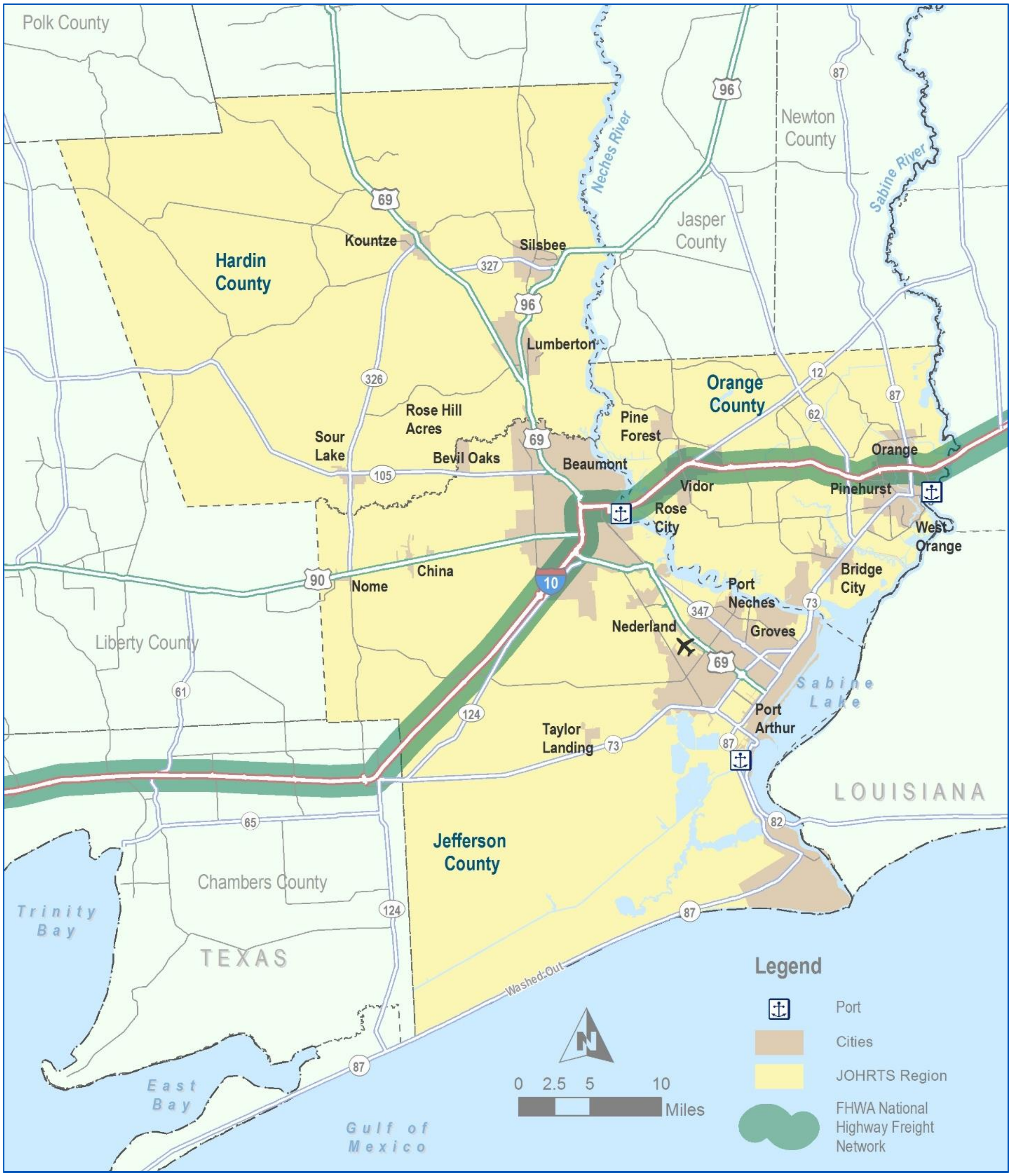
National Highway Freight Network

The FAST Act directs the FHWA to establish a National Highway Freight Network (NHFN) that strategically directs federal resources and policies toward improved performance of highway portions of the US freight transportation system. The NHFN includes the following subsystems of roadways:

- **Primary Highway Freight System (PHFS) –** The most critical highway portions of the US freight transportation system, mostly Interstate System highways
- **Other Interstate portions not on the PHFS –** The remaining Interstate System highways not included in the PHFS
- **Critical Rural Freight Corridors (CRFCs) –** Roads not in an urbanized area that provide access and connection to important freight facilities
- **Critical Urban Freight Corridors (CUFCs) –** Roads in urbanized areas that provide access and connection to important freight and intermodal facilities

After the initial designation, FHWA must re-designate the PHFS every five years, with up to three percent growth each time. Within the JOHRTS area, I-10 is the only roadway that is part of the NHFN. I-10 is designated as a Primary Highway Freight System (PHFS) roadway. The JOHRTS area does not contain other Interstate portions, CRFCs, or CUFCs as designated by the NHFN. The NHFN designations within the JOHRTS area are shown in **Figure 1.1**.

***Figure 1.1**: Designations of the National Highway Freight Network within the JOHRTS Area*



The FAST Act established a national multimodal freight policy of maintaining and improving the condition and performance of the National Multimodal Freight Network (NMFN). The NMFN strategically directs resources toward improved system performance for the efficient movement of freight, informs freight transportation planning, and assists in prioritization of federal investments.

An Interim National Multimodal Freight Network was established in 2016 and open to public comment ending in February 2018. The Interim NMFN consists of the following components:

- The NHFN,
- The freight rail systems of Class1 railroads,[1]
- Public ports of the United States that have a total annual foreign and domestic trade of at least 2,000,000 short tons,
- The inland and intracoastal waterways of the United States, the Great Lakes, the St. Lawrence Seaway, and coastal and ocean routes along which domestic freight is transported,
- The 50 airports located in the United States with the highest annual landed weight, and
- Other strategic freight assets such as railroad connectors and border crossings.

The USDOT must designate the National Multimodal Freight Network following a public comment period. The USDOT must re-designate the NMFN every five years, considering input from a wide range of stakeholders.

The Interim NMFN assets within the JOHRTS region are shown in **Figure 1.2** and include the following:

- **Ports:** Port of Beaumont, Port of Port Arthur
- **Inland and Coastal Waterways:** Gulf Intracoastal Waterway, Sabine Pass, Neches River, Sabine Neches Waterway
- **National Highway Freight Network** (NHFN): I-10
- **Railroads:** BNSF (Burlington Northern Santa Fe), KCS (Kansas City Southern), UP (Union Pacific)

[1] Class 1 railroads consist of railroads with operating revenues of at least $447, 621,226. The different railroad classes will be discussed in greater detail in the section entitled "Railroad Operators and Infrastructure."

Figure 1.2: *Designations of the Interim National Multimodal Freight Network within the JOHRTS Area*

In addition to the National Highway Freight Program (NHFP), the 2015 FAST Act established a discretionary competitive grant program providing financial assistance to nationally and regionally significant highway, rail, port, and intermodal freight and highway projects at $4.5 billion over five years. This program was introduced under the FAST Act as "FASTLANE" grants (Fostering Advancements in Shipping and Transportation for the Long-term Achievement of National Efficiencies). In 2017, the Trump Administration retooled the grant funding program, renaming the program the Infrastructure for Rebuilding America (INFRA) Grant Program. The retooled program creates opportunities for all levels of government and even the private sector to fund infrastructure. The INFRA Grants Program is focused on using innovative approaches to improve the necessary processes for building significant projects and increasing accountability for all the projects that are built. A variety of freight projects are eligible for application to the INFRA Grants Program through application by the SETRPC-MPO.

State Plans

While the role of the federal government is to provide guidance through establishing policy and funding assistance, most transportation planning efforts occur at the state, regional, and local levels. The Texas Department of Transportation (TxDOT) is responsible for planning, designing, building, operating, and maintaining the transportation system in the state of Texas. This section will identify TxDOT freight planning efforts.

Texas Freight Mobility Plan

As stated previously, one of the provisions of the FAST Act is the requirement that each state which receives funding under the National Highway Freight Program (NHFP) must develop a state freight plan that comprehensively plans freight activities and improvements. In 2016, the first Texas Freight Plan was developed to fulfill the requirements of the FAST Act. The 2016 Freight Plan was the first comprehensive multimodal transportation plan in the state focusing on the needs of the freight industry. The subsequent 2017 Texas Freight Mobility Plan builds upon the preceding 2016 Freight Plan, ensuring a comprehensive approach for facilitating the efficient and safe movement of people and freight. The 2017 Texas Freight Mobility Plan outlines priority plans for freight investments and planning activities, identifies freight facilities critical to economic growth, provides strategies to enhance economic growth, identifies policies and investment strategies, and provides a realistic implementation plan.

The 5-Year Freight Investment Plan of the 2017 Texas Freight Mobility Plan covers the years 2016-2020 and consists of 515 fiscally constrained projects across the state at a total cost of $7.5 billion. Within the state's fiscally constrained 5-Year Freight Investment Plan, six projects are located within the JOHRTS Area at a total cost of $317.765 million. **Table 1.1** provides descriptions and costs of these projects. The Texas Freight Mobility Plan also provides a fiscally unconstrained freight investment plan, additional projects that would fulfill freight needs but currently lack funding.

Within the JOHRTS Area, the Plan identifies 52 additional freight projects within this fiscally unconstrained freight investment plan.

Table 1.1: *Texas Freight Mobility Plan Fiscally Constrained 5-Year Freight Investment Plan, Projects within the JOHRTS Area*

District	TIP/Project Number	Facility	MPO	Location	Description	Project Category	Fiscal Year	Project Cost (Millions)	Priority
Beaumont	0028-14-091	I-10	SETRPC	0.54 Miles East of FM 3247 to Sabine River Bridge	Widen Existing Mainlanes From 4 to 6 Lanes	Mobility and Reliability	2019	$40.000	High
Beaumont	0065-07-062	US 69	SETRPC	Tram Road, South to LNVA Canal	Widen Freeway From 4 to 6 Lanes	Mobility and Reliability	2018	$14.250	Medium
Beaumont	0200-11-095	US 69	SETRPC	LNVA Canal, South to I-10	Widen Freeway From 4 to 6 Lanes	Mobility and Reliability	2018	$19.300	High
Beaumont	0739-02-161	I-10	SETRPC	0.64 Miles West of Hamshire Rd, East to 0.76 Miles East of FM 365	Widen Freeway From 4 to 6 Lanes	Mobility and Reliability	2017	$108.315	High
Beaumont	0739-02-162	I-10	SETRPC	FM 365, East to CR 131 (Walden Road)	Widen Freeway From 4 to 6 Lanes	Mobility and Reliability	2018	$133.400	High
Beaumont	0200-10-067	US 69	SETRPC	FM 421, South to US 96	Widen Existing Highway to 4 Lanes with a Continuous Left Turn Lane	Mobility and Reliability	2018	$2.500	High

Texas Rail Plan

The 2016 Texas Rail Plan Update is a federally mandated plan detailing the status of the Texas rail system and opportunities for improvement. The Texas Rail Plan provides an inventory and review of the use of all rail lines, analyzes rail service goals, identifies and assesses potential infrastructure projects, examines financing issues for projects, and reviews rail safety improvement projects. A significant component of the Texas Rail Plan is an assessment of the current state of freight rail transportation within Texas.

Although Class I Railroad companies in Texas mostly use private financing to cover the cost of infrastructure improvements, the 2016 Texas Rail Plan Update includes a listing of recommended Class I Railroad projects that are intended to improve capacity or system velocity. Texas Rail Plan projects in the JOHRTS region are shown in **Table 1.2**.

Table 1.2: *Recommendations from the Texas Rail Plan within the JOHRTS Area*

Location	Project Name	Project Description	Estimated Cost ($1,000)	Source	Project Need	Project Priority
Beaumont	Neches River Rail Crossing	Construction of a second bridge for a rail crossing of the Neches River at Beaumont: The existing single-track lift bridge is a significant capacity constraint on a major intercontinental rail line between Los Angeles and New Orleans. More than 30 trains per day cross the existing bridge at reduced speeds and are often delayed by trains entering/ leaving the Port of Beaumont, which is adjacent to the existing lift bridge, and by watercraft moving along the Neches, requiring the bridge to lift	$240,000	TxDOT Freight Mobility Plan	Class I Capacity/Port Related	High
Beaumont	Beaumont Rail Capacity	Expand rail capacity through the Beaumont, Texas rail corridor to address projected rail traffic increases through that corridor, improve fluidity and reduce traffic congestion	TBD	KCS	Class I Capacity	Low

Freight Infrastructure and Existing Conditions

This section provides an overview of the existing conditions for freight infrastructure within the Jefferson-Orange-Henderson Regional Transportation Study (JOHRTS) area. This overview will serve as an inventory of the freight infrastructure and supporting facilities within the JOHRTS area. Within the context of determining the needs and opportunities for freight transportation within the three-county region, this chapter presents a profile of the regional freight transportation infrastructure. This assessment will serve as an input to inform the vision and goals for the future of the regional freight transportation system.

The three-county region has a robust freight transportation system that includes highways, railroads, waterways, airports, and pipelines. Effectively utilizing these assets will increase the economic competitiveness of the region.

Truck Network/Roadway Network

The regional truck network is composed of one interstate highway and several state highways, a number of arterials and collectors, and local roads that provide last mile access to major freight generators. Key truck routes include I-10, US 69/96, and US 90. State routes such as SH 73, SH 347, and SH 87 provide access to the Port of Port Arthur and landside linkages to the Sabine-Neches Waterway. The regional truck network serves as a vital link between nodes of goods production, consumption, interchange, and re-handling locations such as ports, intermodal facilities, truck/pipeline terminals, industrial parks, warehouse and distribution centers, and manufacturing facilities. The regional truck network is shown in **Figure 1.3**.

Truck traffic represents a major contributor to the average annual daily traffic (AADT) for several designated truck routes within the JOHRTS region. **Figure 1.4** indicates the percentage of AADT on roadways that is attributed to truck traffic. As shown in the map, a large percentage of the AADT of I-10 consists of trucks. This is to be expected since I-10's primary function is to facilitate long-distance travel and trade.

According to the Port of Port Arthur,[2] trucks carry about 60,000 to 80,000 twenty-foot equivalent units (TEUs)[3] annually from the Port of Port Arthur to the Houston metropolitan area. From Houston, this freight is exported out of Port Houston or travels to the West Coast by railroad. UP and BNSF connect the Port of Port Arthur to ports on the West Coast. Key truck shippers include Goodyear in Beaumont, ExxonMobil in Beaumont, the WestRock paper mill in Evadale, Honeywell in Orange, Firestone and DuPont in Orange, and Chevron Phillips in Port Arthur. Typical commodities shipped include synthetic lube, plastics, synthetic rubber, chemicals, and paper products.

[2] Kelley, L., Port of Port Arthur, personal communication, June 24, 2018.
[3] TEUs are a common measure of intermodal container volume.

I-10 is a major truck route on the National Highway System (NHS), the National Multimodal Freight Network (NMFN), and the National Highway Freight Network (NHFN). Portions of I-10 within the JOHRTS area carry upwards of 12,000 trucks per day, or every fourth vehicle is a truck. The growth in commercial truck traffic poses challenges for the region and requires the identification of strategies and investments to enhance the mobility provided by the regional truck network.

With freight having a significant role within the economy of the JOHRTS area, the Beaumont District of TxDOT has prioritized improvements along Primary Freight Corridors. The Beaumont District is working to improve the "freight friendliness" of the state roadways within the region. Several freight-beneficial projects are currently programmed by the District as shown in **Table 1.3**.[4]

[4] Ayres, S., TxDOT Beaumont District, personal communication, December 7, 2018.

Figure 1.3: *Trucking Network*

Figure 1.4: Truck Percentage of AADT

Table 1.3: *TxDOT Beaumont District Programmed Freight Improvements*

CSJ	Highway	County	Limit From	Limit To	Description	Estimate	Current let date
0028-13-135	IH 10	Jefferson	Hollywood Overpass, East	7th Street	Widen freeway to 6 main lanes and reconstruct interchange	$300,000,000	04/01/2021
0028-14-091	IH 10	Orange	0.54 mi East of FM 3247	Sabine River Bridge	Widen existing mainlanes from 4 to 6 lanes	$50,000,000	06/01/2020
0064-07-044	US 96	Jasper	Sabine CO/L, South	0.8 mi North of RE 255	Widen to four lane divided highway	$50,000,000	01/01/2023
0064-08-062	US 96	Jasper	0.8 mi North of RE 255, South	RE 255	Widen to four lane divided highway	$8,000,000	01/01/2023
0065-07-062	US 69	Jefferson	Tram Road, South	LNVA Canal	Widen freeway from 4 to 6 lanes	$21,471,461	05/01/2019
0200-08-049	US 69	Tyler	0.1 mi South of Black Creek	Hardin County Line	Construct new location 4 lane divided facility	$70,000,000	05/01/2021
0200-09-069	US 69	Hardin	Tyler County Line	0.75 mi South Of Fm 1003	Construct new location 4 lane divided facility	$70,000,000	05/01/2021
0200-14-060	US 69	Jefferson	IH 10, SE	SH 347	Widen to six lanes	$49,000,000	03/01/2023
0200-16-020	US 69	Jefferson	At SH 73		Improve interchange	$70,000,000	05/01/2020
0339-04-036	SH 105	Hardin	.10 mi East of SH 326	Pine Island Bayou	Widen to four lanes with ctl	$38,200,000	05/01/2021
0508-02-120	IH 10	Chambers	At FM 3180		Construct overpass and reconfigure interchange	$32,118,947	02/01/2019
0739-02-140	IH 10	Jefferson	CR 131 (Walden Road), East	US 90	Widen freeway from 4 to 6 lanes	$200,000,000	04/01/2021
0920-38-261	CS	Jefferson	On Carroll Street	Inside Port of Beaumont	Construct overpass into the port of Beaumont	$5,087,464	03/01/2019

Truck Bottleneck Analysis

Highway congestion impacts shippers' ability to deliver cargo to destinations within time window commitments. Unreliable travel conditions create inefficiencies and increase costs that are often passed on to the customer and ultimately to consumers. Highway bottlenecks therefore impact not only area traffic conditions and quality of life, but also regional economic competitiveness.

Freight bottlenecks in the South East Texas Region were identified using the Federal Highway Administration's (FHWA) National Performance Measure Research Data Set (NPMRDS) vehicle probe data. The NPMRDS is a national data set of average travel times for use in analyzing highway system performance. The data provided is actual observed measurement of travel times. No estimates or historical data substitutions for missing data are included. The data used in this analysis cover truck speed data for the entire year of 2017, aggregated in 15-minute time periods, which comprised nearly 12 million records. The NPMRDS data includes distinct average travel time information for each 15-minute interval for freight and all traffic on the entire National Highway System (NHS), organized by Traffic Message Channel (TMC) segments on roadways to enable mapping of the data.

Since there is no universally accepted methodology to identify truck bottlenecks, multiple parameters were defined to better understand traffic congestion patterns in the JOHRTS region:

- **Free-flow Speed –** This measure indicates the travel time on a roadway under free-flow conditions, with little to no interaction from traffic. To calculate this measure, the 85th percentile travel times during weekday overnight hours (10:00 p.m. to 5:00 a.m.) are considered because of low traffic volumes. If not enough data are available (less than 50 percent), the midday data (10:00 a.m. to 3:00 p.m.) are added to the pool and the 95th percentile is considered. This measure was calculated based on all vehicles, not just trucks.
- **85th Percentile Travel Time –** This measure indicates that 85% of the time, the travel time on a roadway segment is lower than the 85th percentile value. So, the higher the 85th percentile travel time, the longer it takes to travel on a roadway.
- **Planning Time Index 85th (PTI 85th) –** The planning time index is computed as the 85th percentile travel time divided by the free-flow travel time. For example, a planning time index of 1.60 means that, for a 15-minute trip in light traffic, the total time that should be planned for the trip is 24 minutes. So, the higher the PTI the longer the travel time that should be budgeted to reach a destination on time.
- **Frequency of Congestion –** This is expressed as the percent of time that travel speeds fall below 75% of the free-flow speed during the afternoon peak (4:00 p.m. to 7:00 p.m.). So, the higher the frequency of congestion, the longer the roadway is congested during that period.

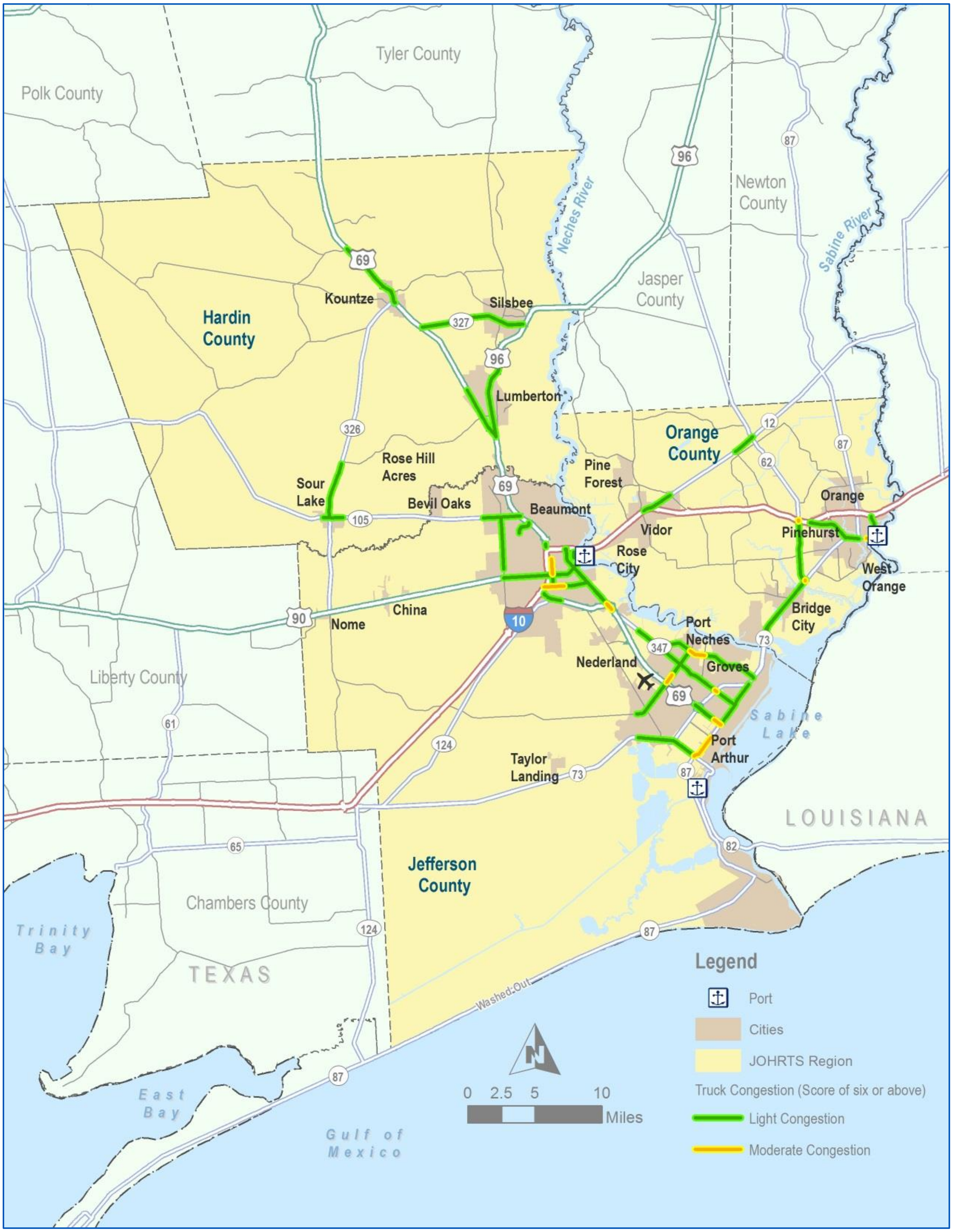
Freight bottlenecks were identified using a combination of PTI and frequency of congestion. The portions of the congested roadway network which had the highest combination of planning time index and frequency of congestion were identified as bottlenecks. Road segments were scored based on their frequency of congestion and PTI scores as shown in **Table 1.4**. So, for example, a roadway segment with a frequency of congestion of 25% and a PTI greater than 3 would receive a score of 7. For the purposes of this analysis, only segments with a combined score of 6 or higher are considered bottlenecks.

Table 1.4: *Road Segments Scoring*

SCORE	FREQUENCY OF CONGESTION	PLANNING TIME INDEX 85TH
1	Frequency ≤ 0.15	PTI ≤ 1.25
2	0.15 < Frequency ≤ 0.35	1.25 < PTI ≤ 1.5
3	0.35 < Frequency ≤ 0.5	1.5 < PTI ≤ 2
4	0.5 < Frequency ≤ 0.75	2 < PTI ≤ 3
5	Frequency > 0.75	PTI > 3

The results of this analysis are shown in **Figure 1.5**. Truck traffic is generally uncongested on major freight corridors like I-10, US 90, and US 69/96. However, certain segments show light to moderate levels of truck congestion, especially within Port Arthur and Beaumont, along some key port road connections, and on routes that connect the industrial areas in Beaumont and Port Arthur. Congestion around the US 69/96 split in Lumberton is probably driven by commuter traffic growth which also affects trucks.

***Figure 1.5:** Truck Congestion*



Railroad Infrastructure and Operators

Rail is the only freight mode that relies almost exclusively on private funding for both infrastructure and operations. Freight rail is also an important mode for the JOHRTS region since many of the commodities that are processed and shipped via the region are rail-oriented.

Railroads are classified by the US Surface Transportation Board based on their annual operating revenues. The railroad classification is determined by the following operating revenue thresholds:[5]

- **Class 1 –** $447,621,226 or more
- **Class 2 –** Less than $447,621,226 and greater than $35,809,698
- **Class 3 –** $35,809,698 or less

These revenue thresholds are periodically updated to account for the effect of inflation. The most recent update was in 2017.

Four major railroad lines operate in the region,[6] as shown in **Figure 1.6**:

- **Burlington Northern Santa Fe (BNSF) –** The BNSF Railroad runs across the region in both the north-south and east-west directions. The BNSF rail yard in Silsbee has capacity for 1200 railcars, and the rail yard in Beaumont has capacity for 600 railcars.
- **Kansas City Southern (KCS) Railroad –** The KCS Railroad travels from the northeast portion of Orange County to Beaumont where it turns southeast to Port Arthur. The KCS line provides rail access to the Port of Port Arthur and the communities between Beaumont and Port Arthur. KCS has two major rail yards in the region. The rail yard in Port Arthur has capacity for 1790 railcars, and the rail yard in Beaumont has capacity for 420 railcars.
- **Union Pacific (UP) Railroad –** The UP Railroad travels in an east-west direction from the Louisiana border, through Orange County to Beaumont. Along US 90 in Beaumont, the railroad splits into two separate railroads through western Jefferson County. UP maintains a railroad along West Port Arthur Road (Spur 93) that provides access from Beaumont to the refineries and port facilities in the Port Arthur area. Other UP rail lines extend from the City of Orange north through Orange County. UP has three major rail yards in the JOHRTS region. The Beaumont yard has a capacity of 1700 railcars, the Guffie yard between Beaumont and Port Arthur has a capacity of 200 railcars, and the rail yard near Sour Lake has a capacity of 550 railcars.

---

[5] Surface Transportation Board. (2017). FAQs. Retrieved from https://www.stb.gov/stb/faqs.html
[6] Southeast Texas Region Planning Commission. (2014). JOHRTS Metropolitan Transportation Plan 2040.

- **Sabine River and Northern (SRN) Railroad –** The SRN Railroad is the smallest railway operator in the region. SRN Railroad operates the rail line that runs from the City of Orange to the Inland Paper Company plant in northeast Orange County, then travels west to Mauriceville to connect to the north branch of the UP rail line. SRN operates a small rail yard near the Inland Paper Company plant.

Figure 1.6: *Railroads within the JOHRTS Area*

Railway operations play a major role in the economy of southeast Texas, so an efficient and effective rail freight system is necessary for the continued economic success of the region. Railroads provide transportation to and from the Ports of Beaumont and Port Arthur, where much of the commodity base is rail oriented (e.g., bulk liquids, grains, military cargo). It is estimated that about 90 percent of the region's port-related tonnage moves in and out by rail. This massive share of railroad transportation makes the railroad links to the ports vital to their operations.

Railroads in southeast Texas also import raw materials to petroleum industry facilities within the region. Examples include the Motiva refinery in Port Arthur (the largest in the nation with a capacity of 650,000 barrels per day, or bpd); Valero (200,000 bpd capacity); and ExxonMobil (400,000 bpd). ExxonMobil's Beaumont Polyethylene Plant, located off US 90 west of Beaumont, is also rail-served and is currently expanding. The facility receives ethylene via pipeline which is used for plastics production. The finished plastic products are shipped out by rail[7].

The shale revolution has led to an industrial boom in the region with concurrent growth in rail shipments. Four new loop tracks have been recently constructed or planned, including Sunoco Logistics, GT Logistics, and Valero. These facilities are all handling crude by rail shipments from North Dakota, Canada, and elsewhere[8].

Highway-rail grade crossings are generally the only points where the privately-owned rail network interacts with public streets. There are 925 at grade railroad crossings in the JOHRTS area. **Table 1.5** below displays the number of incidents involving rail equipment at grade crossings. Overall there were 19 such incidents in the three years ending in 2017[9].

Table 1.5: *Highway-Rail Incidents*[10]

Region	Incident Counts by Calendar Year (CY)		
	CY 2015	CY 2016	CY 2017
Jefferson	3	5	6
Orange	1	2	1
Hardin	0	1	0
Texas (Statewide)	224	232	233

[7] Kelley, L., Port of Port Arthur, personal communication, June 24, 2018.
[8] Kelley, L., Port of Port Arthur, personal communication, June 24, 2018.
[9] Federal Railroad Administration, Office of Safety. (2018). Query by Location. Retrieved from https://safetydata.fra.dot.gov/officeofsafety/publicsite/crossing/xingqryloc.aspx
[10] Federal Railroad Administration, Office of Safety. (2018). Query by Location. Retrieved from https://safetydata.fra.dot.gov/officeofsafety/publicsite/crossing/xingqryloc.aspx

Neches River Bridge Study

The Neches River rail bridge is the only rail crossing over the Neches River in the JOHRTS region. The bridge is a part of the primary east-west rail corridor through the City of Beaumont, owned and operated by the KCS Railway. The Neches River rail bridge is a single track vertical lift span that averages about seven to eight lifts per week resulting in train delays while ships navigate the river below. The bridge is the second most congested railroad choke point in Texas[11]. TxDOT conducted a feasibility study in 2013 to evaluate rail corridor system improvements at or near the existing Neches River rail bridge crossing. In 2015, TxDOT and the Federal Rail Administration (FRA) conducted an environmental assessment of the proposal to add an additional track over the Neches River, requiring construction and operation of an additional lift bridge north of the existing rail bridge in Jefferson and Orange counties. The recommendation from the environmental assessment is to build the bridge, however, momentum for the project from Class I railroads in the region has diminished.

Ports and Waterways

A comprehensive system of ports and waterways exists in the three-county region. The JOHRTS region is home to the “Golden Triangle” ports: the Port of Beaumont, the Port of Orange, and the Port of Port Arthur. Vessel access to these ports is provided by the Sabine River, the Neches River, Sabine Lake (also known as the Sabine-Neches Waterway), and the Gulf Intracoastal Waterway. **Figure 1.7** shows the network of Ports and Waterways within the JOHRTS area.

Port of Beaumont

The Port of Beaumont is located 84 miles east of Houston and 270 miles west of New Orleans, accessible from the Gulf of Mexico and the Intracoastal Waterway by the federally maintained Sabine-Neches Waterway. The Port of Beaumont channel is 40 feet deep and 400 feet wide. The Intracoastal Waterway and the Mississippi River connect Beaumont with the inland waterway system servicing major cities located along the Mississippi River.

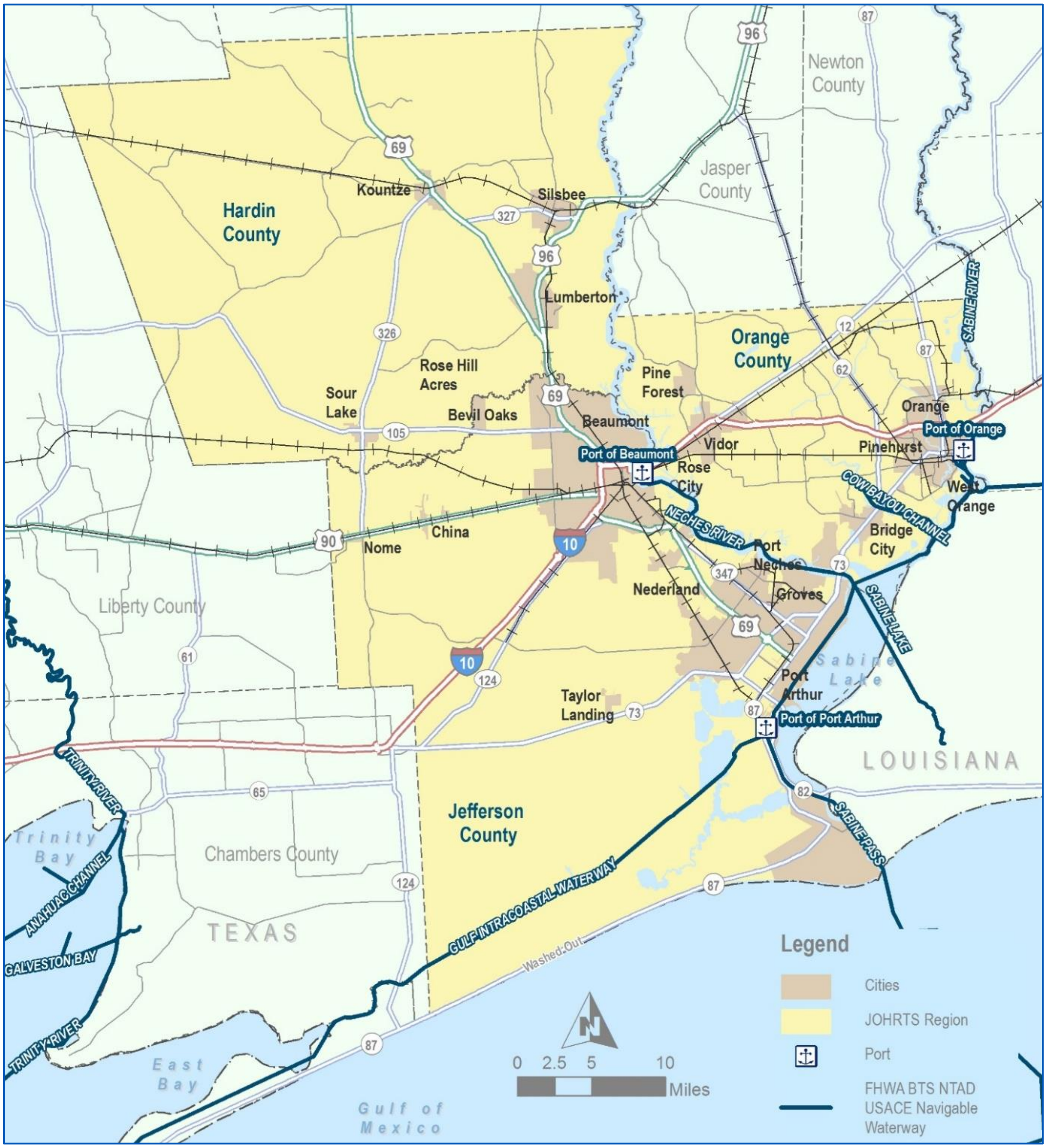
Serving as the primary lay berth for the fleet of the US Department of Transportation – Maritime Administration, the port is a strategic military port within the National Port Readiness Network and is the busiest port for US military cargo. The port also serves as the headquarters for the US Army 842nd Transportation Battalion which is responsible for all military maritime logistics in the Gulf of Mexico, the Pacific Northwest, and Alaska. On-site, the port provides 620,000 square feet of covered storage and 90 acres of open-air storage.

---

[11] Texas Department of Transportation, Rail Division. (2016, June). *Environmental Assessment for the Neches River Bridge Study (CSJ: 7220-01-001)*. Retrieved from http://ftp.dot.state.tx.us/pub/txdot-info/bmt/projects/neches-bridge/final-ea.pdf

The Port of Beaumont is well connected to both railroads and roadways. The BNSF, UP, and KCS railroads each provide connections directly to the Port of Beaumont, generating 16,653 railcar transits annually. BNSF serves the port five days a week, UP serves the port three days a week, and KCS serves the port two days a week. The Port of Beaumont is connected to several major truck routes, including I-10, US 90, and US 69/287/96, generating over 10,000 trucks from the port annually.

Figure 1.7: *Ports and Waterways within the JOHRTS Area*



The Port of Beaumont is the fifth-busiest port in the US by total tonnage. This includes public and private terminals that handle breakbulk and bulk cargo, as well as petroleum products[12]. Top commodities that the Port of Beaumont handles include military cargo, forest products, steel and iron, crude oil, industrial project cargo, aggregate or bulk cargo, bulk grain, and wind energy components. The port also accommodates the movement of grain cargo with a 3.5 million bushel grain elevator onsite operated by Louis Dreyfus Commodities with a loading capacity of 80,000 bushels per hour. The Port of Beaumont continues to actively invest in the port's capacity, efficiency, and security.

In October 2018, the US Commerce Department awarded the Port of Beaumont Navigation District a grant in the amount of $5 million to reconstruct three docks in support of the Port's Main Street Terminal 1 Dock Project. The improvement will support additional cargo which will increase economic activity and business growth within the region. Estimates project that the investment will create or retain 15,750 jobs and generate $9.8 million in private investment[13].

Port of Orange

The Port of Orange is a deep draft port with a channel depth of 30 feet and a width of 200 feet. Located on the Sabine-Neches Waterway, it operates as a successful landlord port, complementing activities at larger ports on the Sabine-Neches Waterway and larger ports in the region. The port is also used for lay berthing. In 2013, the Port of Orange handled 837,869 tons of cargo[14]. However, more recently the port has not handled any freight due to the loss of a key tenant and has instead focused on barge lay berthing, repairs, and new construction. The annual economic impact of the Port of Orange is $41.3 million.

The Port of Orange is connected to railroad by the Orange Port Terminal Railway which provides switching service to UP and BNSF. The port is accessible to I-10 and SH 87 for trucking. On-site, the port provides 2,300 feet of docking space at a depth of 30 feet, four berths, and eight warehouses. The Port of Orange provides services onsite, dry dock services and shipyards that can accommodate new barge construction and repairs[15].

[12] Texas Department of Transportation, Maritime Division. (2017, March). *Texas Port Profiles*. Retrieved from https://ftp.dot.state.tx.us/pub/txdot-info/mrt/port-profiles.pdf
[13] PA News. (2018, October 11). $10M in grants steered toward PA, Beaumont Ports. *PA News*. Retrieved from https://m.panews.com/2018/10/11/10m-in-grants-steered-toward-pa-beaumont-ports/
[14] Texas Department of Transportation, Maritime Division. (2017, March). *Texas Port Profiles*. Retrieved from https://ftp.dot.state.tx.us/pub/txdot-info/mrt/port-profiles.pdf
[15] Ibid.

Port of Port Arthur

The Port of Port Arthur is located directly on the Gulf Intracoastal Waterway, only 19 miles from the Gulf of Mexico. The port has a channel depth of 40 feet and a width of 450 feet. The port is a military strategic port within the National Port Readiness Network. Recently, the port has emerged as a major break-bulk port for forest products, project cargo, steel, and military redeployments. Onsite, the port provides 48,159 square meters of shed storage space and 68,798 square meters of open storage space[16]. The Port of Port Arthur can accommodate up to 150 rail cars dockside[17].

Commodities the port handles are mostly rail oriented, including bulk liquids, wood pellets, military cargo, iron, steel, dry bulk, bagged cargo, bailed cargo, and project cargo. The KCS railroad provides a direct connection to the port. However, the port also moves about 35,000 outbound tons per year by truck with access to I-10 and US 90A. Diesel fuel moving through the port has destinations on the West Coast of Latin America (e.g. Ecuador, Chile) as well as the Caribbean. Many of the port's energy exports, including to the west coast of South America, are made possible by the expanded Panama Canal[18].

The Port of Port Arthur is the 19th busiest port in the US by total tonnage handled with 35 million tons handled in 2015. The annual economic impact of the port is $128 million providing 1,509 jobs directly and 1,132 jobs indirectly[19].

The US Commerce Department announced in October 2018 the award of a $4.8 million grant to the Port of Port Arthur Navigation District to increase capacity of rail, storm drainage, and roadway infrastructure. Estimates project the improvements will create or retain 200 jobs and generate $36 million in private investment[20].

Sabine-Neches Waterway

The Sabine-Neches Waterway is a 66-mile ship channel, recognized as the top importer of ship-borne crude oil in the US. The waterway serves both the Port of Beaumont and the Port of Port Arthur and is a primary driver of the southeast Texas economy. The Sabine-Neches Waterway handles about 14 percent of the gasoline used east of the Mississippi River and 57 percent of the US petroleum reserves. The Waterway is connected to the second largest pipeline network in the US. Annually, more than 125 million tons of cargo is transported along the Sabine-Neches Waterway to

---

[16] Ibid.
[17] City of Port Arthur. (2018). *Imagine Port Arthur: Comprehensive Plan*.
[18] Texas Department of Transportation, Maritime Division. (2017, March). *Texas Port Profiles*. Retrieved from https://ftp.dot.state.tx.us/pub/txdot-info/mrt/port-profiles.pdf
[19] Ibid.
[20] PA News. (2018, October 11). $10M in grants steered toward PA, Beaumont Ports. *PA News*. Retrieved from https://m.panews.com/2018/10/11/10m-in-grants-steered-toward-pa-beaumont-ports/

energy, petrochemical, and military users. Cargo moving along the waterway includes natural gas, crude oil, gasoline, jet fuel, chemicals, steel, lumber, grain, and others[21].

In 2017, the Sabine-Neches Waterway accounted for more than $20 billion in exports and produced a balance of trade surplus of about $9 billion. According to the Sabine-Neches Navigation District, the waterway is expected to increase its annual exports to more than $73 billion by 2026 with a projected balance of trade surplus of about $62 billion[22]. Recently, crude oil exports from the ports of Port Arthur, Sabine, Beaumont, and Orange account for 25% of all US crude oil exports since mid-2017[23].

The Sabine-Neches Waterway is the nation's largest exporter of crude oil, liquefied natural gas, and petroleum coke. The waterway is home to the nation's third largest refining complex, and proposed expansions to increase refining capacity at existing operations would make it the largest in the US. Refineries along the ship channel produce 60 percent of the nation's commercial jet fuel and most of the US military's jet fuel.

As activity on Sabine-Neches Waterway continues to increase, it faces operational challenges in the future. The Waterway will have to consider how to manage increases in ship traffic due to an "Energy Renaissance", plan for deepening projects, and manage operations on the waterway that affect vessel traffic while keeping all stakeholders informed.

Sabine-Neches Navigation District

The Sabine-Neches Navigation District (SNND) is a political subdivision that acts to responsibly manage, advocate for, and improve the ship channel and navigable waters of Jefferson County to enhance the economy, environment, and quality of life in southeast Texas. The SNND works closely with the US Army Corps of Engineers on waterway maintenance and acts as a liaison between the Corps of Engineers and local industry regarding operations and new construction. The SNND provides channel alignment, land reclamation, drainage and erosion control for the Sabine-Neches Waterway, the Neches River, and Taylor's Bayou. The SNND is the non-federal sponsor of the ship channel deepening project, the Channel Improvement Project (described in more detail below).

The Channel Improvement Project

The SNND is working with the federal government to advance a project to deepen the Sabine-Neches Waterway from 40 feet to 48 feet. The waterway was first widened and deepened in 1912.

---

[21] Sabine-Neches Navigation District. (2018). *The Waterway*. Retrieved from https://www.navigationdistrict.org/about/the-waterway/

[22] King, K. (2018, July). Feds begin to fund waterway. *Beaumont Business Journal*, Pages 2-4.

[23] Kallanish Energy. (2018, August 22). Crude oil exports surpass imports for first time at Texas ports. Retrieved from http://www.kallanishenergy.com/2018/08/22/crude-oil-exports-surpass-imports-for-first-time-at-texas-ports/

Since that time, the waterway was improved three more times, most recently in 1962. Ship design has evolved since the last improvement over 50 years ago. Deepening the channel will allow larger ships to reach local ports and better manage waterway traffic which will enable the ports in southeast Texas to remain competitive. In 2014, the Sabine-Neches Waterway deepening project achieved federal authorization to move forward when President Obama signed the Water Resources Reform and Development Act into law. Currently, the financing and construction process is underway. The project is set to receive $2,317,000 in federal funding to complete the pre-construction, engineering, and design phase[24]. According to the SNND, the project would create thousands of jobs, generate billions of dollars in economic impact, enhance trade infrastructure and position the US to complete in the global marketplace. The Construction General phase of the project is the next step – when the dredging will take place. The SNND and state legislators will need to approach the federal government again to seek funds to complete that phase.

Gulf Intracoastal Waterway

The Gulf Intracoastal Waterway (GIWW) is a shallow draft, man-made, protected waterway running 1,100 miles along the coastline of the Gulf of Mexico from Brownsville, Texas to St. Marks, Florida. The GIWW is the third busiest inland waterway in the US, with the Texas portion handling 63 percent of the traffic along the waterway. The GIWW connects Texas ports with destinations in North America, allowing ports on the Texas gulf coast to function as key hubs for multimodal freight transportation[25].

The Texas portion of the GIWW (GIWW-T) consists of 406 miles of waterway, shown in **Figure 1.8**. The main channel is 379 miles long from the Sabine River to Brownsville. Over 86 million short tons of cargo moved on the Texas portion of the waterway in 2014. Petroleum and chemical products made up 77.8 million short tons or 91 percent of the freight moving along the GIWW in Texas[26]. Half of the total tonnage on the entire GIWW occurs between Lake Charles and Houston. Chemicals move back and forth on the waterway to different plants which transform them into other products[27]. The GIWW-T is therefore a critical link in the state's multimodal freight network, particularly for its petrochemical supply chain.

---

[24] King, K. (2018, July). Feds begin to fund waterway. *Beaumont Business Journal*, Pages 2-4.
[25] Texas Department of Transportation, Maritime Division. (2016). Gulf Intracoastal Waterway Legislative Report – 85th Legislature. Retrieved from http://ftp.dot.state.tx.us/pub/txdot-info/tpp/giww/legislative-report-85.pdf
[26] Texas Department of Transportation, Maritime Division. (2016). Gulf Intracoastal Waterway Legislative Report – 85th Legislature. Retrieved from http://ftp.dot.state.tx.us/pub/txdot-info/tpp/giww/legislative-report-85.pdf
[27] Durkay, J., Industrial Safety Training Council/Industry of Southeast Texas, personal communication, September 14, 2018.

Figure 1.8: *Texas Gulf Intracoastal Waterway*[28]

By providing an alternative transportation mode for bulk cargoes, freight carried on the GIWW-T reduces congestion on Texas highway and rail systems which decreases maintenance costs. Water transportation is also an environmentally friendly mode, producing the smallest amount of air pollutants per ton of cargo carried. For the JOHRTS area, the GIWW-T has evolved as a key player in the regional and state economy due to the increased coastal development resulting from the energy booms occurring in the Eagle Ford Shale, South and Central Texas, and the Permian Basin. Pipelines are bringing raw products to the JOHRTS area that are then prepared for export domestically or internationally via the GIWW-T. The future of the GIWW-T is an essential consideration for freight mobility within the JOHRTS region.

Marine Highway 69

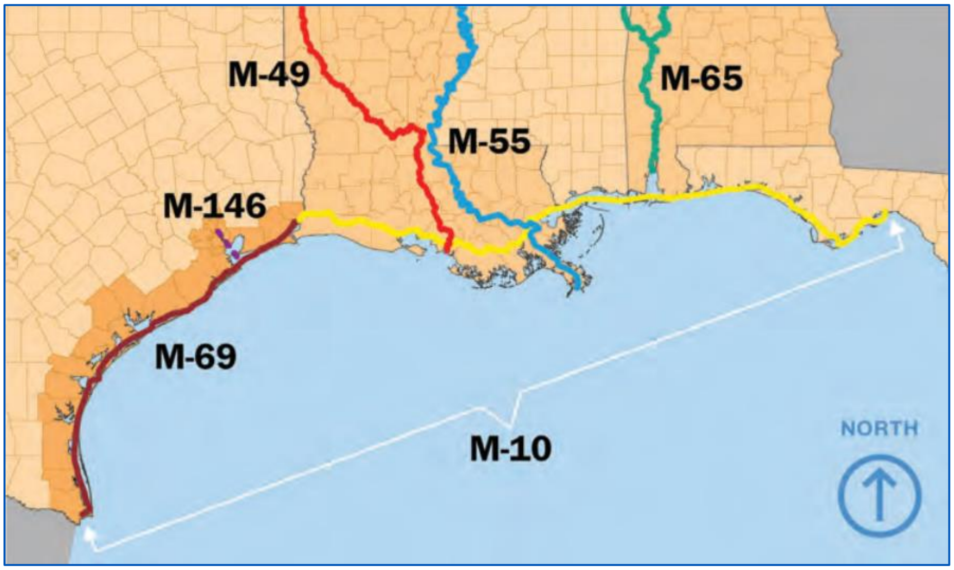
The GIWW is designated by the Maritime Administration (MARAD) of the USDOT as part of America's Marine Highways. America's Marine Highways are navigable waterways that have demonstrated the ability to provide additional capacity to relieve congested landside routes serving freight and passenger movement. The portion of the GIWW in Texas was designated as Marine Highway 69 (M-69) in June 2016, shown in **Figure 1.9**. The M-69 connects 13 shallow draft ports and 11 deep water ports along the Texas Gulf Coast. Before the M-69 designation, the GIWW-T was a part of the M-10 Corridor consisting of the full GIWW. With the M-69 designation, projects along the GIWW-T are eligible for federal funding focused on increasing waterborne transportation and

---

[28] Texas Department of Transportation, Maritime Division. (2016). Gulf Intracoastal Waterway Legislative Report – 85th Legislature. Retrieved from http://ftp.dot.state.tx.us/pub/txdot-info/tpp/giww/legislative-report-85.pdf

improving mobility on I-69 and other highways along the Texas Gulf Coast by reducing freight truck traffic. For projects that address challenges that impact the full GIWW, Texas is still included as part of the larger M-10 designation.

Figure 1.9: *Marine Highways along the Gulf Intracoastal Waterway*[29]



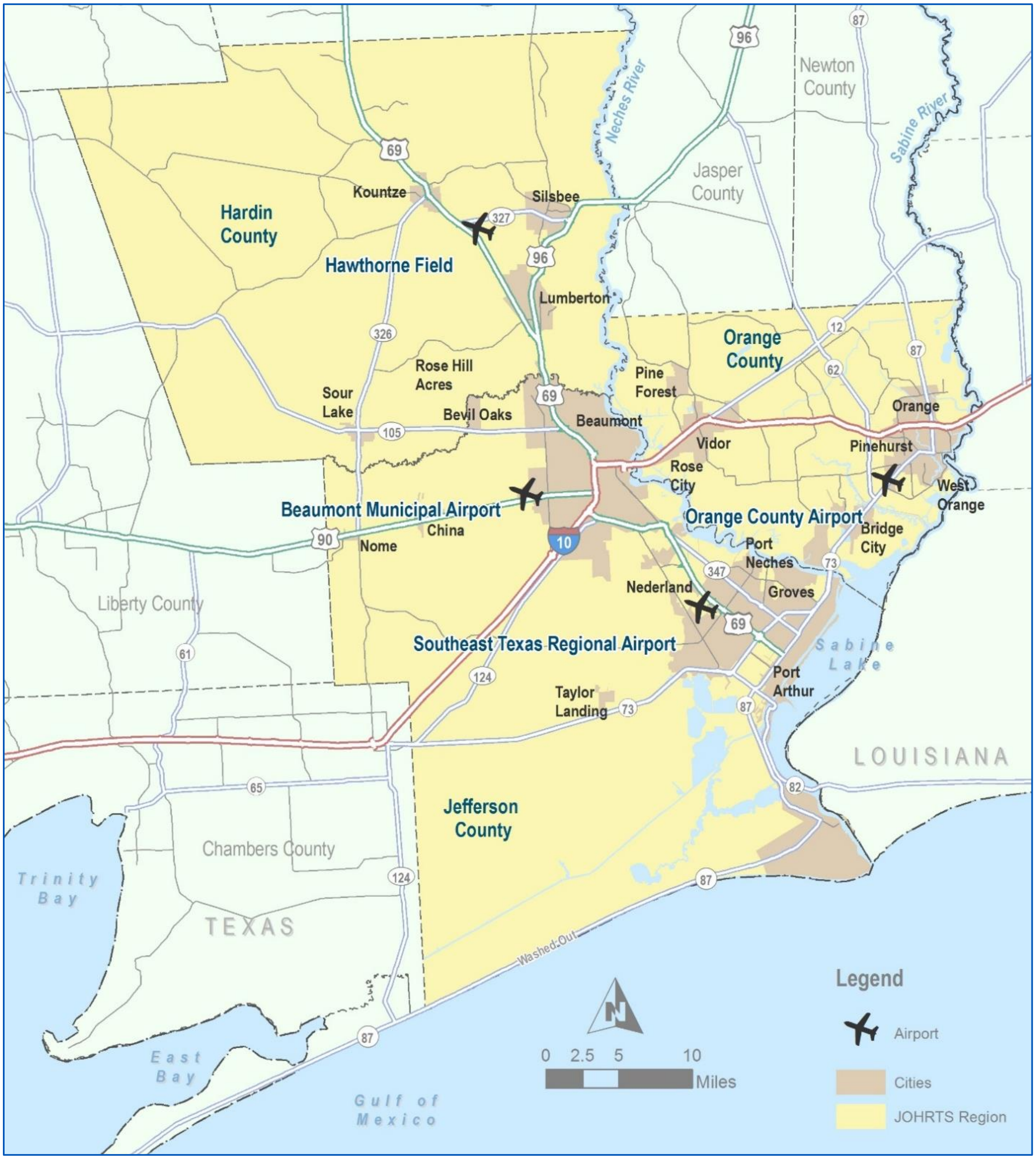
Aviation

Jack Brooks Regional Airport (JBRA), or Southeast Texas Regional Airport, is a public airport located nine miles southeast of downtown Beaumont and about 100 miles from Houston. JBRA covers an area of approximately 1,800 acres and has two paved runways. Renovated in 2009, the terminal facility is 24,000 square feet. American Eagle, a regional branch of American Airlines, operates flights daily to Dallas/Fort Worth International Airport. Over 30,000 passengers a year take flights from JBRA. JBRA averages 75 aircraft operations per day[30]. Atlantic Southeast Airlines is the only carrier that provides cargo services, however, the volume and tonnage of freight movements are limited. According to the 2007 Airport Master Plan feeder service by the larger express package carriers such as Federal Express and UPS, represents a viable potential for increasing air cargo at the airport.

[29] Texas Department of Transportation, Maritime Division. (2016). Gulf Intracoastal Waterway Legislative Report – 85th Legislature. Retrieved from http://ftp.dot.state.tx.us/pub/txdot-info/tpp/giww/legislative-report-85.pdf
[30] Jack Brooks Regional Airport. (2009). Airport Facts. Retrieved from https://flysetx.com/airport-information/airport-facts/

Additional airports in the region that are open to the public for personal aviation include Hawthorne Field in Kountze, Beaumont Municipal Airport, and Orange County Airport. Airports located within the JOHRTS region are shown below in **Figure 1.10**.

Figure 1.10: *Airports within the JOHRTS Area*



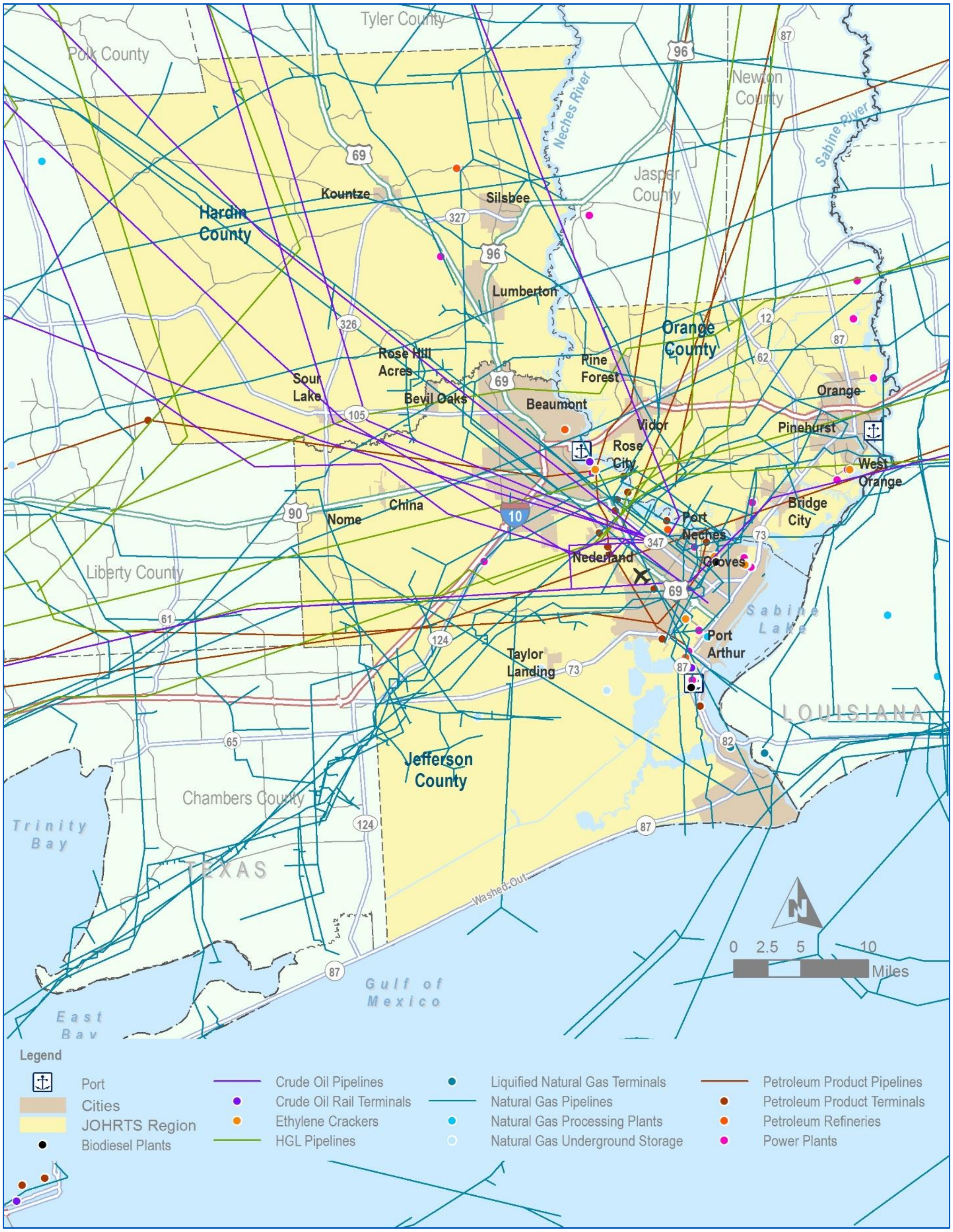
Pipelines

Often unseen, the JOHRTS area is served by a vast network of underground transmission lines for natural gas and refined resources. The region is crisscrossed with thousands of miles of pipelines that transport natural gas, oil, and petroleum products like ethylene. Many major transcontinental pipelines pass through or terminate within the JOHRTS region include the Keystone XL and Colonial Pipelines[31]. Several pipelines from the Permian Basin terminate in Port Arthur, where natural gas is liquefied for export to Europe or Asia. Many pipelines also exist solely to move materials such as crude oil from ship to shore for refining, or vice versa for export. **Figure 1.11** shows the locations and variety of pipelines located within the JOHRTS area.

Due to proprietary concerns, very little public data exists about pipeline performance. Nonetheless, pipelines are critical for the safe and efficient operation of the area's petrochemical industry.

[31] Durkay, J., Industrial Safety Training Council/Industry of Southeast Texas, personal communication, September 14, 2018.

Figure 1.11: *Pipelines and Petrochemical Facilities within the JOHRTS Area*



Transportation and Warehousing Sector Employment

Freight traffic generators, such as ports, shipping terminals, and refineries, place an intense demand on the transportation system. These points of major activity attract large numbers of vehicles on the freight transportation infrastructure and contribute to regional traffic volumes and flow patterns. Identifying the competitive industries and freight generators within the JOHRTS region is an important step in planning effectively for freight transportation infrastructure and improvements.

Industry Cluster Analysis

The South East Texas Economic Development District completed an industry cluster analysis as part of their 2014 *Comprehensive Economic Development Strategy*. The industry cluster analysis identified industries located in the region that have a competitive advantage. The location quotient (LQ) was calculated for a variety of industries located in southeast Texas. The LQ is a measure of an industry's concentration in an area relative to the nation. For industries with an LQ equal to one, the industry share of local employment is equal to the national share of employment for the industry. Industries with LQ's greater than one indicates that the industry has a local competitive advantage. From the analysis, industries in the JOHRTS region showing the highest competitive advantage (LQs greater than one) include:

- Energy (fossil and renewable)
- Chemicals and chemical-based products
- Fabricated metal product manufacturing
- Glass and ceramics

The results of the industry cluster analysis show that freight generating industries have a competitive advantage within the region. The JOHRTS region must plan for a transportation system that can handle the freight traffic generated by these industries.

Major Freight Generators

Several major freight generators exist within the JOHRTS region. Industrial facilities, such as manufacturing facilities, distribution centers, and oil refineries place intense demands on the transportation system from the high volume of trucks. Identifying locations of major freight generators in the region is helpful in determining infrastructure that could be impacted by high truck volumes. **Figure 1.12** shows locations of major freight generators within the JOHRTS area. **Table 1.6** lists the freight generators identified in **Figure 1.12**. These facilities clearly cluster around the seaports, which is unsurprising given the need of many key industries to have access to marine shipping options. However, freight-intensive businesses are also located along major highways (I-10, US 90) and rail lines (UP, KCS, BNSF, and Sabine River and Northern).

Figure 1.12: *Major Freight Generators within the JOHRTS Area*

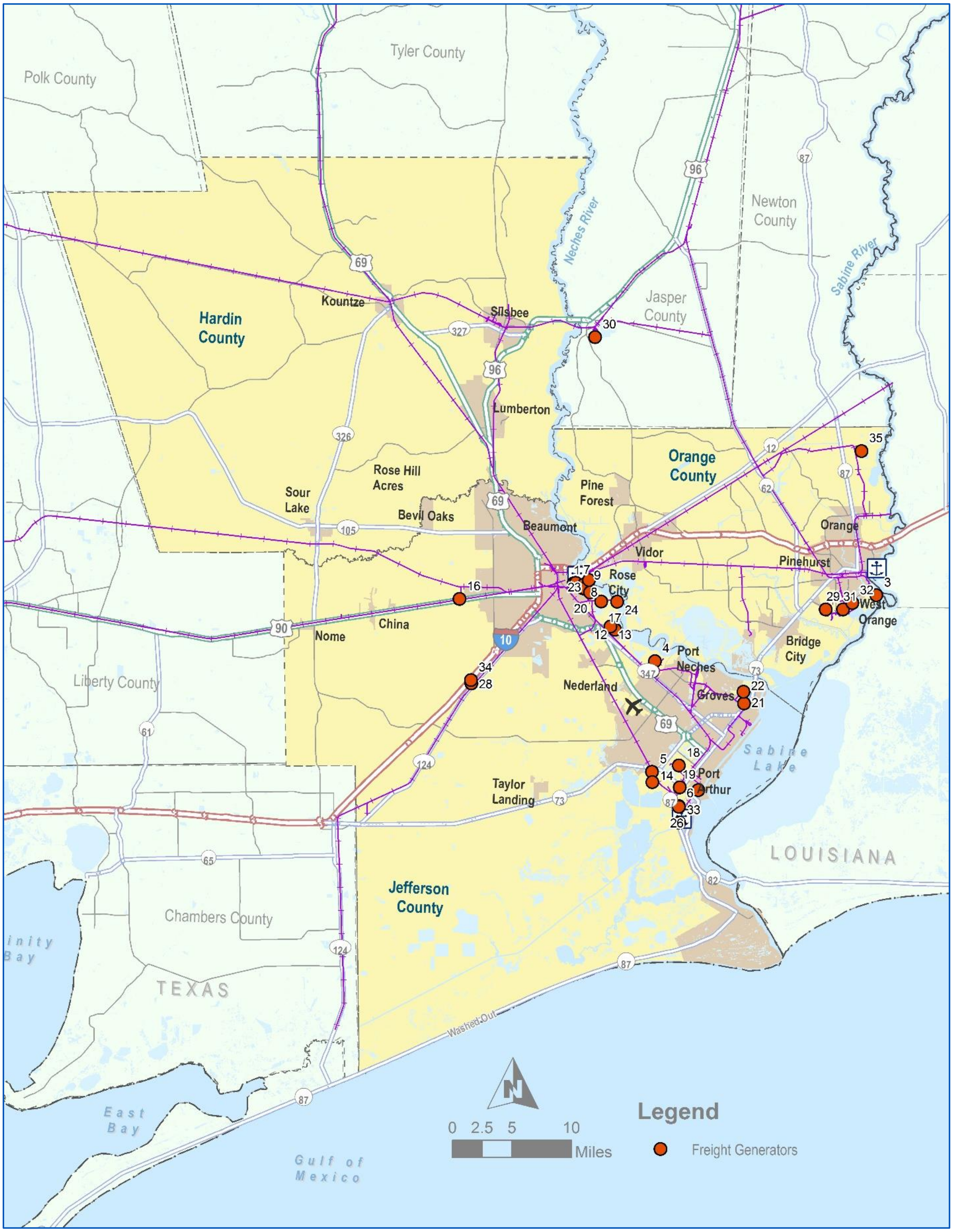


Table 1.6: *List of Generators in the JOHRTS Area*

Map ID	Name
1	Port of Beaumont
2	Port of Port Arthur
3	Port of Orange
4	Sunoco Logistics
5	GT Logistics
6	Valero Port Arthur Terminal
7	596th Transportation Group
8	Vulcan Materials (Beaumont)
9	Louis Dreyfus Energy Corporation (Beaumont)
10	Jefferson Energy Terminal (Beaumont)
11	Martin Marietta Aggregates
12	Beaumont Enterprise Marine Terminal
13	Natgasoline LLC
14	Omni Terminal
15	Phillips 6 Beaumont Terminal
16	ExxonMobil Polyethylene Plant/BPEX
17	Arkema Inc.
18	Motiva
19	Valero Port Arthur Refinery
20	ExxonMobil (Beaumont, refinery/chemicals/lube)
21	BASF Total Petrochemicals Inc.
22	Total Port Arthur Refinery
23	Optimus Steel
24	Martin Midstream Partners
25	Chevron Phillips Chemical (Port Arthur)
26	Chevron Port Arthur Lubricant Plant
27	German Pellets Woodville
28	Goodyear Tire
29	Firestone Polymers (Orange)
30	WestRock (paper mill in Evadale)
31	Honeywell (Orange) - synthetic rubber
32	DuPont (Orange)
33	KMTEX
34	Total Cray Valley
35	International Paper

Chapter 2
Regional Freight Flows

Introduction

Millions of tons and billions of dollars in freight annually traverses southeast Texas' transportation infrastructure, including finished goods and intermediate materials. A key objective of the JOHRTS Regional Freight Plan is to outline and understand the characteristics of those movements, which contextualizes and complements other tasks in the Regional Freight Mobility Plan including the economic impacts of freight and identification of freight needs.

Freight data is complex, characterized by multiple data dimensions that are partially compiled within various individual sources, none of which are comprehensive. As such, this Freight Flows Assessment first outlines the data dimensions and sources, then compiles the applicable modal-specific data from the respective sources, and ultimately synthesizes the major freight movements from the disparate data into a comprehensive freight story for the JOHRTS region.

Freight Data Dimensions and Sources

Unfortunately, a universal freight database that encompasses all freight data dimensions is not publicly available. Each freight data source is limited across one or more dimensions. Consequently, to understand freight movements, it is important to assess multiple sources to compensate for these limitations.

Data Dimensions

Freight data are always characterized relative to an analysis geography and/or facility (i.e., the southeast Texas region), by direction, within a given timeframe, and by mode, typically measured by weight and/or monetary value in aggregate or by commodity detail.

- **Geography/Facility –** data are presented relative to the SETRPC tri-county region (i.e., Jefferson, Orange, Hardin), the Beaumont MSA (i.e., the tri-county plus Newton County), or the individual port facilities in the region, depending on the data source.
- **Direction –** freight is typically delineated by four major movement directions relative to the geography/facility: outbound, inbound, intra, and through; such directions may be subcategorized depending on geographic resolution (e.g., outbound to Texas, foreign exports, etc.).
- **Time –** freight data from the sources herein are in annual terms, always with a historical base year (i.e., 2015); some sources include forecasts, some do not.
- **Mode –** freight is frequently multimodal; however, most freight databases identify only the primary mode. As such, freight data is typically binned into modal silos that typically include: truck, rail, water (ports and waterways), airports, pipeline, and sometimes other.
- **Value –** freight is typically measured by weight (e.g., tons) and/or monetary value; given the disparity from the respective sources compiled, only tonnage data are presented herein for comparability.
- **Commodity –** freight comprises all goods movements, which typically entails a mix of commodities, both intermediary and final products. Three commodity conventions are used in the freight databases, most of which do not align perfectly. Consequently, commodity data are presented within each source's unique convention. The three conventions used (by source and mode) are:
  - Standard Transportation Commodity Code (STCC) – used by TRANSEARCH for truck and rail;
  - Lock Performance Monitoring System (LPMS) – used by the U.S. Army Corps of Engineers for water; and
  - Standard Classification of Transported Goods (SCTG) – used by the Freight Analysis Framework for air and pipeline.

Data Sources

There are two major multi-modal freight databases available: the for-hire IHS Markit TRANSEARCH database, and the publicly-available Federal Highway Administration (FHWA) Freight Analysis Framework (FAF). Each claim coverage of all major modes but have individual limitations. An additional primary source compiled is the United States Army Corps of Engineers (USACE)

Waterborne Commerce Statistics (WCS) specifically for waterborne freight, given the critical waterfront freight and manufacturing infrastructure in southeast Texas.

- **IHS Transearch –** IHS Markit develops a North American freight database (NAFTA-only), compiled from various sources, including rail and truck carriers, with base- and future-year county-level estimates. It establishes production tonnages by industry/commodity, drawn from IHS's Business Markets Insights (BMI) database, and supplemented by trade associations, industry reports, federal government data, and the Surface Transportation Board's (STB) Waybill sample for rail data. Originally developed for private truck and rail users, other modes lack extensiveness, especially due to the NAFTA-focused geography. As such, non-NAFTA water and air movements are excluded. Nonetheless, Transearch® provides a comprehensive database of truck and rail freight using the STCC commodity code convention.
- **FHWA FAF 4.3 –** An integrated freight database for all primary transportation modes, produced by the Federal Highway Administration (FHWA) in collaboration with the Bureau of Transportation Statistics (BTS), based primarily on domestic data via the 2012 Commodity Flow Survey (CFS) and international trade data from the Census. It is a comprehensive database and internally consistent; however, it is limited in routing information that precludes certain freight density mapping and cannot identify through volumes, which can often be significant, especially for major interstate truck freight. FAF uses the SCTG commodity code convention.
- **USACE –** United States Army Corps of Engineers Waterborne Commerce Statistics makes various waterborne freight data publicly available for both foreign and domestic movements, by direction, port, commodity, and year. It compiles domestic waterborne movements, as reported by vessel operators of record. Foreign-related import, export, and in-transit statistics are derived primarily from the Port Import-Export Reporting System (PIERS) via the Census and Customs Service using the LPMS commodity code convention.

Other secondary freight data sources are available, some for-hire, some freely-available, mostly pertaining to a singular mode and/or singular data dimension (e.g., foreign trade versus domestic). Such complementary sources were not compiled due to scope limitations, but also because they sometimes overlap with the aforementioned sources, and/or have limited modal applicability to the SETRPC region. Such secondary sources include, but are not limited to, United States Census foreign trade data (ports/airports), MARAD (ports), Port Import/Export Reporting System (PIERS), and Bureau of Transportation Statistics T100 (airports) data.

Table 2.1 outlines the dimensions available within the three databases, and their respective strengths and weaknesses. Although the FHWA FAF database includes suitable information for all modes, it is limited due to its inability to identify through movements for surface modes (rail and truck); for water, it is also unable to identify individual port data within the Beaumont MSA. As such, the FHWA FAF data is presented for pipeline and airborne freight; however, for truck and rail, the TRANSEARCH data is presented and for water, the USACE data are shown. Note that the three respective sources have three commodity code systems that are not easily bridged.

Table 2.1: *Freight Data Sources, Dimensions and Strengths/Weaknesses*

	IHS TRANSEARCH	FHWA FREIGHT ANALYSIS FRAMEWORK	USACE WATERBORNE COMMERCE STATISTICS
Measured Volume			
Weight	Short Tons	Short Tons	Short Tons
Value	Current Dollars	Current and Constant Dollars	N/A
Units	Trucks and Rail Carloads	N/A	TEUs (partial data)
Analysis Detail			
Trade Limits	NAFTA (US, CA, MX)	World	World
Geographic Level	Texas Counties/NAFTA States	Domestic MSAs/Foreign Continents	Individual Ports/Waterways Only
Direction	In, Out, Intra, Through (Truck/Rail)	In, Out, Intra by Foreign/Domestic	In, Out, Intra by Foreign/Domestic
Commodity Code	STCC	SCTG	LPMS
Commodity Level	4 Digit (700+)	2 Digit (43)	2 Digit (33)
Years Available	2015, 2045	2012-2016, 2020-2045 in 5-year increments	2011-2016
Applicability			
Strengths	Multiple Modes Comprehensive Truck and Rail (including important Through)	Multiple Modes Federal Source International Multimodal Identifiable	Seminal Source for Ports and Waterways
Weaknesses	NAFTA-limitations (esp. Water/Air) Questionable Pipeline Multimodal Difficult to Identify	Limited Commodity Resolution No Through Truck/Rail; No Ports 2012 CFS Baseline	Singular Mode Limited Commodity Resolution Cannot Identify Multimodal
SETRPC Mode	Truck and Rail	Pipeline and Air	Water (Ports)

Freight Data

In the following subsections are summary-level freight data from the three primary sources for the respective modes. Additional detailed freight data tables are in **Appendix A**.

TRANSEARCH

TRANSEARCH data is presented below in **Table 2.2** for the two surface modes: truck and rail. Although the database includes other modes, the NAFTA-level trade restriction limits the usefulness of the water and air freight data, and the pipeline data is questionable. As such, the multi-modal summary is provided below by mode and major direction, with the non-surface modes grayed-out. Directional data is relative to the tri-county SETRPC region, which includes Jefferson, Hardin, and Orange counties.

Table 2.2: *TRANSEARCH Summary, 2015*

DIRECTION	TRUCK	RAIL	WATER	PIPE	OTHER	AIR
Tons						
Outbound	25,424,508	5,268,667	27,315,547	2,620,353	21,999	1
Inbound	19,254,757	9,939,137	25,169,790	#N/A	193,963	1
Intra-Regional	11,139,949	3,740,433	1,576,032	#N/A	#N/A	#N/A
Through	60,169,247	37,232,098	#N/A	#N/A	#N/A	#N/A
Total	115,988,461	56,180,335	54,061,369	2,620,353	215,962	2
Units						
Outbound	1,804,125	66,716	#N/A	#N/A	#N/A	#N/A
Inbound	1,833,090	105,550	#N/A	#N/A	#N/A	#N/A
Intra-Regional	1,245,049	35,670	#N/A	#N/A	#N/A	#N/A
Through	3,346,040	577,172	#N/A	#N/A	#N/A	#N/A
Total	8,228,304	785,108	0	0	0	0
Value, in millions						
Outbound	$25,727	$7,413	$13,392	$1,860	$39	$0
Inbound	$18,840	$4,579	$9,506	#N/A	$81	$0
Intra-Regional	$6,715	$3,108	$664	#N/A	#N/A	#N/A
Through	$118,794	$51,624	#N/A	#N/A	#N/A	#N/A
Total	$170,075	$66,725	$23,562	$1,860	$120	$0

Source: Prepared by CDM Smith, based on Transearch data for 2015

Truck

In 2015, the TRANSEARCH database from IHS Markit estimated almost 116 million tons of goods travelling on the tri-county highway network, per **Table 2.3**. Such goods were transported within 8.2 million units and valued at over $170 billion.

- **Directions –** A majority of the tonnage (52%) and value (70%) of the highway freight traverses the tri-county network as through traffic, which is typical of regions situated on a major interstate. The tri-county region exhibited a positive truck-bound trade balance, with more outbound than inbound goods, in terms of tonnage and value. This indicates that the SETRPC region is a net producer of truck-borne freight; i.e., it produces more than it consumes. Intraregional truck movements represent the smaller directional share.
- **Commodities –** More than half (56%) of all highway tonnage in the tri-county region is comprised of two commodity groups: *Chemicals and Allied Products* (STCC28) and *Petroleum or Coal Products* (STCC29), both of which pertain to the oil refining supply chain along the Gulf Coast, see **Table 2.3**: TRANSEARCH Truck Summary, 2015

Direction	Tons		Units		Value (in millions)		Average	Average
	Amount	Percent	Amount	Percent	Amount	Percent	Value/Ton	Tons/Unit
Outbound	**25,424,508**	**21.9%**	**1,804,125**	**21.9%**	**$25,727**	**15.1%**	**$1,012**	**14.1**
Outbound to TX	13,863,256	12.0%	1,050,154	12.8%	$10,290	6.1%	$742	13.2
Outbound to nonTX	11,561,252	10.0%	753,972	9.2%	$15,436	9.1%	$1,335	15.3
Inbound	**19,254,757**	**16.6%**	**1,833,090**	**22.3%**	**$18,840**	**11.1%**	**$978**	**10.5**
Inbound from TX	13,053,764	11.3%	1,394,328	16.9%	$12,189	7.2%	$934	9.4
Inbound from nonTX	6,200,993	5.3%	438,762	5.3%	$6,651	3.9%	$1,073	14.1
Intra-Regional	**11,139,949**	**9.6%**	**1,245,049**	**15.1%**	**$6,715**	**3.9%**	**$603**	**8.9**
Through	**60,169,247**	**51.9%**	**3,346,040**	**40.7%**	**$118,794**	**69.8%**	**$1,974**	**18.0**
Through TX to TX	360,507	0.3%	31,554	0.4%	$230	0.1%	$638	11.4
Through nonTX to TX	18,940,424	16.3%	1,020,778	12.4%	$27,260	16.0%	$1,439	18.6
Through TX to nonTX	21,014,602	18.1%	1,307,881	15.9%	$29,361	17.3%	$1,397	16.1
Through nonTX to nonTX	19,853,714	17.1%	985,826	12.0%	$61,943	36.4%	$3,120	20.1
Total	**115,988,461**	**100.0%**	**8,228,304**	**100.0%**	**$170,075**	**100.0%**	**$1,466**	**14.1**

Source: Prepared by CDM Smith, based on TRANSEARCH data for 2015

- **Figure 2.1**. Only a small percentage of total highway tonnage pertains to goods for final consumption (e.g., Food or Kindred Products at 4.7% of total).
- **Density –** Reflecting the relatively large through volumes, most truck freight concentrates on I-10, per **Figure 2.2**. I-10 is also a critical connection for outbound and inbound regional movements. Aside from I-10, regional highways including US 69 and US 96 do not accommodate comparable volumes but do facilitate regional connections with eastern Texas and western Louisiana.
- **Growth –** By 2045, the horizon year in TRANSEARCH, truck freight on the tri-county network is projected to increase to over 222 million tons, a 92% total increase, or 2.2% annually, see

Table A.2 in **Appendix A**. Over 42% of this growth will be driven by *Chemical or Allied Products*. Meanwhile, truck shipments of *Petroleum or Coal Products* are forecast to decrease by 7%.

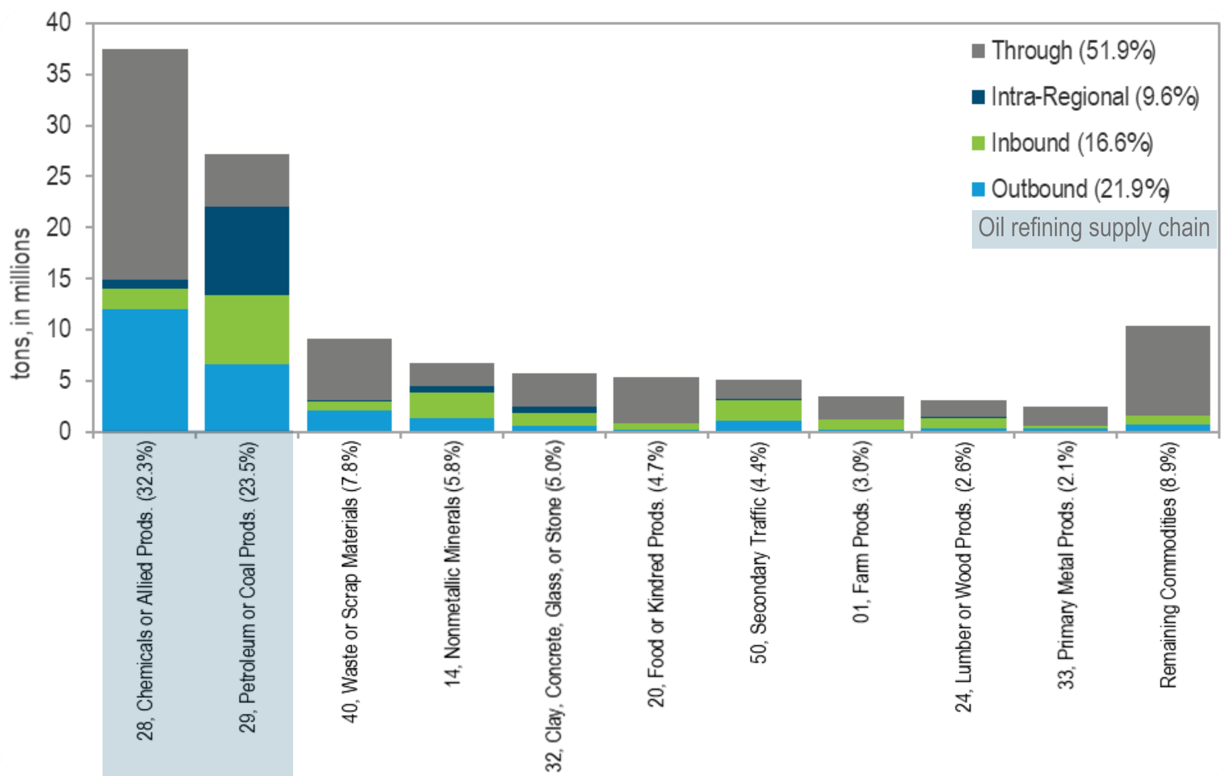
- **Summary –** The SETRPC region is mostly a “bridge” for truck freight along I-10, connecting the regional oil-refinery supply chain along the Gulf Coast as well as domestic and international movements along the southern tier states from California to Florida. A significant majority of the goods travelling the highway network, regardless of direction, are products relating to the oil industry and other manufacturing. As such, the regional highway network is vital to the economies beyond the tri-county area.

***Table 2.3**: TRANSEARCH Truck Summary, 2015*

Direction	Tons		Units		Value (in millions)		Average	Average
	Amount	Percent	Amount	Percent	Amount	Percent	Value/Ton	Tons/Unit
Outbound	**25,424,508**	**21.9%**	**1,804,125**	**21.9%**	**$25,727**	**15.1%**	**$1,012**	**14.1**
Outbound to TX	13,863,256	12.0%	1,050,154	12.8%	$10,290	6.1%	$742	13.2
Outbound to nonTX	11,561,252	10.0%	753,972	9.2%	$15,436	9.1%	$1,335	15.3
Inbound	**19,254,757**	**16.6%**	**1,833,090**	**22.3%**	**$18,840**	**11.1%**	**$978**	**10.5**
Inbound from TX	13,053,764	11.3%	1,394,328	16.9%	$12,189	7.2%	$934	9.4
Inbound from nonTX	6,200,993	5.3%	438,762	5.3%	$6,651	3.9%	$1,073	14.1
Intra-Regional	**11,139,949**	**9.6%**	**1,245,049**	**15.1%**	**$6,715**	**3.9%**	**$603**	**8.9**
Through	**60,169,247**	**51.9%**	**3,346,040**	**40.7%**	**$118,794**	**69.8%**	**$1,974**	**18.0**
Through TX to TX	360,507	0.3%	31,554	0.4%	$230	0.1%	$638	11.4
Through nonTX to TX	18,940,424	16.3%	1,020,778	12.4%	$27,260	16.0%	$1,439	18.6
Through TX to nonTX	21,014,602	18.1%	1,307,881	15.9%	$29,361	17.3%	$1,397	16.1
Through nonTX to nonTX	19,853,714	17.1%	985,826	12.0%	$61,943	36.4%	$3,120	20.1
Total	**115,988,461**	**100.0%**	**8,228,304**	**100.0%**	**$170,075**	**100.0%**	**$1,466**	**14.1**

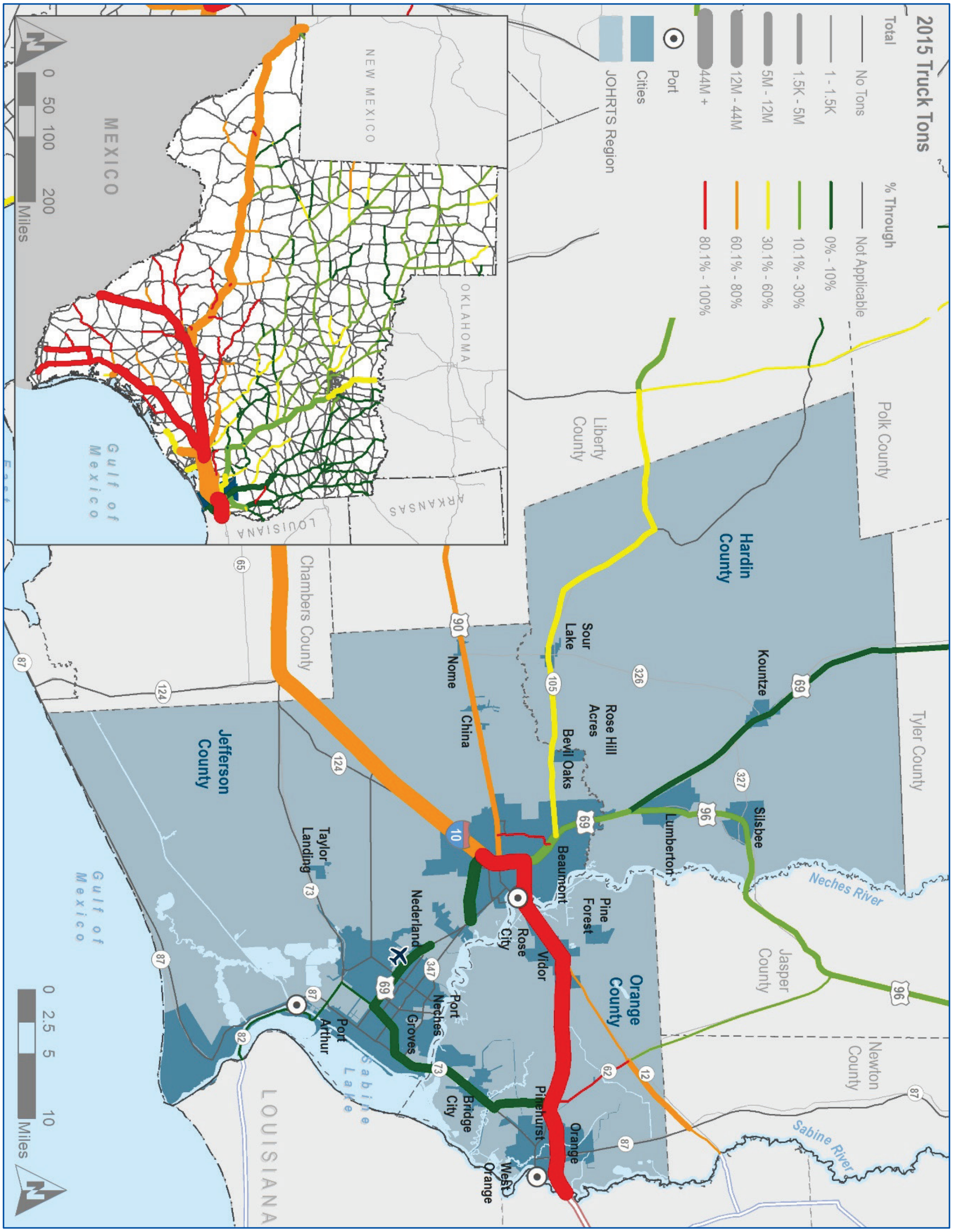
Source: Prepared by CDM Smith, based on TRANSEARCH data for 2015

***Figure 2.1:** TRANSEARCH Truck Commodities, Tons in 2015*



Source: Prepared by CDM Smith, based on TRANSEARCH data for 2015

Figure 2.2: *TRANSEARCH Truck Density, Tons in 2015*



Rail

In 2015, the TRANSEARCH database estimated more than 56 million tons of goods travelling on the tri-county railroad network, as shown in **Table 2.4**. These goods were transported within 785,000 railcar units and valued at almost $67 billion. Compared to truck movements, rail moves about half as much (48%) tonnage as trucks and 29% of the value.

- **Directions –** A majority of the tonnage (66%) and value (77%) of rail freight consists of through traffic. Outbound and inbound movements exhibit different characteristics due to different commodity mixes, with outbound tonnage less than inbound, but with a much higher value, reflecting notably different values/ton of $461 for inbound and $1,407 for outbound. Like trucking, intraregional movements represent the smaller directional share.
- **Commodities –** As with trucking, over half (53%) of all railroad tonnage in the tri-county region comprises two commodities: *Chemicals and Allied Products* (STCC28) and *Petroleum or Coal Products* (STCC29), both related to the oil refining supply chain along the Gulf Coast (see **Figure 2.3**).

Density – Railroad freight network patterns are like the highway network patterns, in that most movements travel east-west along the Union Pacific and Kansas City Southern routes that generally parallel I-10. Most of this traffic consists of through freight (see

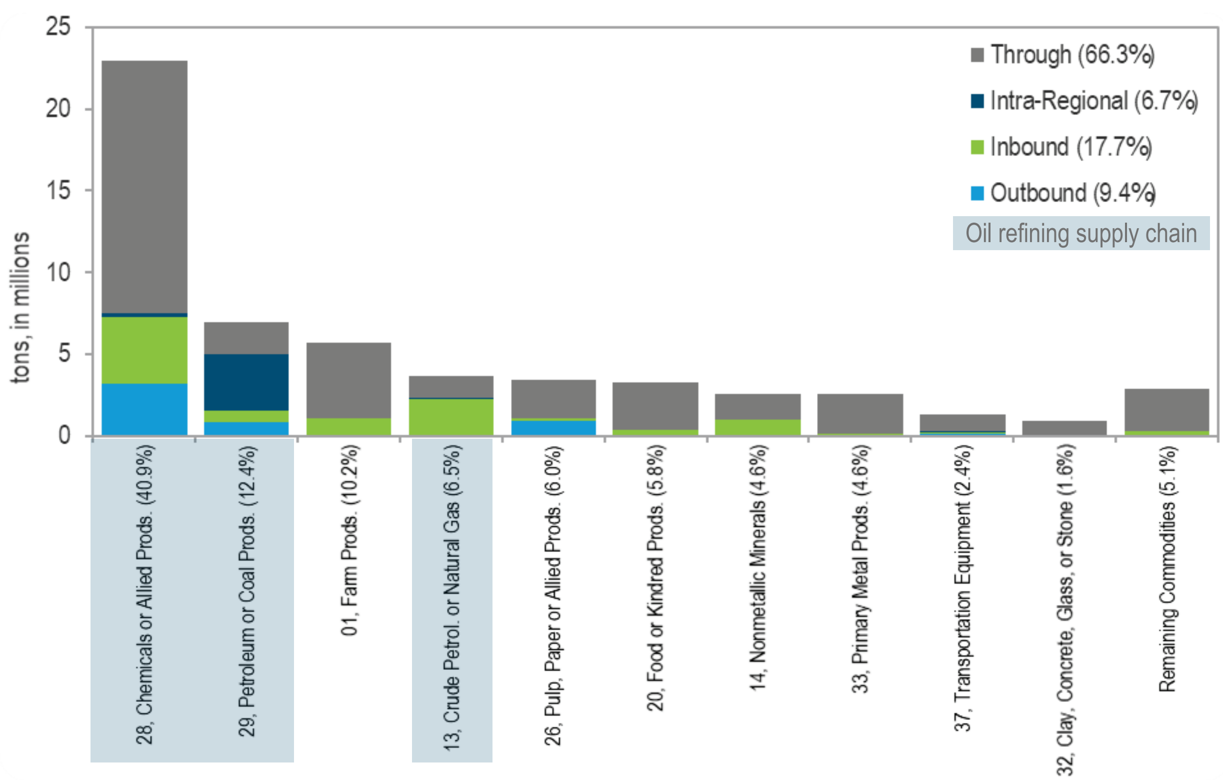
- **Figure 2.4**).
- **Growth –** By 2045, rail flows on the tri-county network will increase to over 100 million tons, a 78% total increase (see **Table A.4** in the Appendix for a detailed breakdown of rail flows by commodity). Over half (58%) of this growth is attributable to *Chemical or Allied Products*, while *Petroleum or Coal Products* are forecast to decrease by 5%.
- **Summary –** As with trucks, the SETRPC region is mostly a "bridge" for rail freight, most of which travels east-west, paralleling I-10. A majority of the goods travelling the railway network, regardless of direction, reflect the oil industry and related manufacturing. Generally, the regional rail facilities accommodate through traffic and regional traffic, mostly pertaining to the oil industry cluster along the Western Gulf coast.

Table 2.4: *TRANSEARCH Rail Summary, 2015*

Direction	Tons		Units		Value (in millions)		Average	Average
	Amount	Percent	Amount	Percent	Amount	Percent	Value/Ton	Tons/Unit
Outbound	**5,268,667**	**9.4%**	**66,716**	**8.5%**	**$7,413**	**11.1%**	**$1,407**	**79.0**
Outbound to TX	1,029,308	1.8%	16,628	2.1%	$1,488	2.2%	$1,446	61.9
Outbound to nonTX	4,239,359	7.5%	50,088	6.4%	$5,925	8.9%	$1,398	84.6
Inbound	**9,939,137**	**17.7%**	**105,550**	**13.4%**	**$4,579**	**6.9%**	**$461**	**94.2**
Inbound from TX	1,619,134	2.9%	20,296	2.6%	$1,035	1.6%	$639	79.8
Inbound from nonTX	8,320,003	14.8%	85,254	10.9%	$3,544	5.3%	$426	97.6
Intra-Regional	**3,740,433**	**6.7%**	**35,670**	**4.5%**	**$3,108**	**4.7%**	**$831**	**104.9**
Through	**37,232,098**	**66.3%**	**577,172**	**73.5%**	**$51,624**	**77.4%**	**$1,387**	**64.5**
Through TX to TX	356,991	0.6%	3,554	0.5%	$58	0.1%	$162	100.4
Through nonTX to TX	11,100,517	19.8%	142,153	18.1%	$13,038	19.5%	$1,175	78.1
Through TX to nonTX	9,183,048	16.3%	142,362	18.1%	$16,094	24.1%	$1,753	64.5
Through nonTX to nonTX	16,591,541	29.5%	289,103	36.8%	$22,435	33.6%	$1,352	57.4
Total	**56,180,335**	**100.0%**	**785,108**	**100.0%**	**$66,725**	**100.0%**	**$1,188**	**71.6**

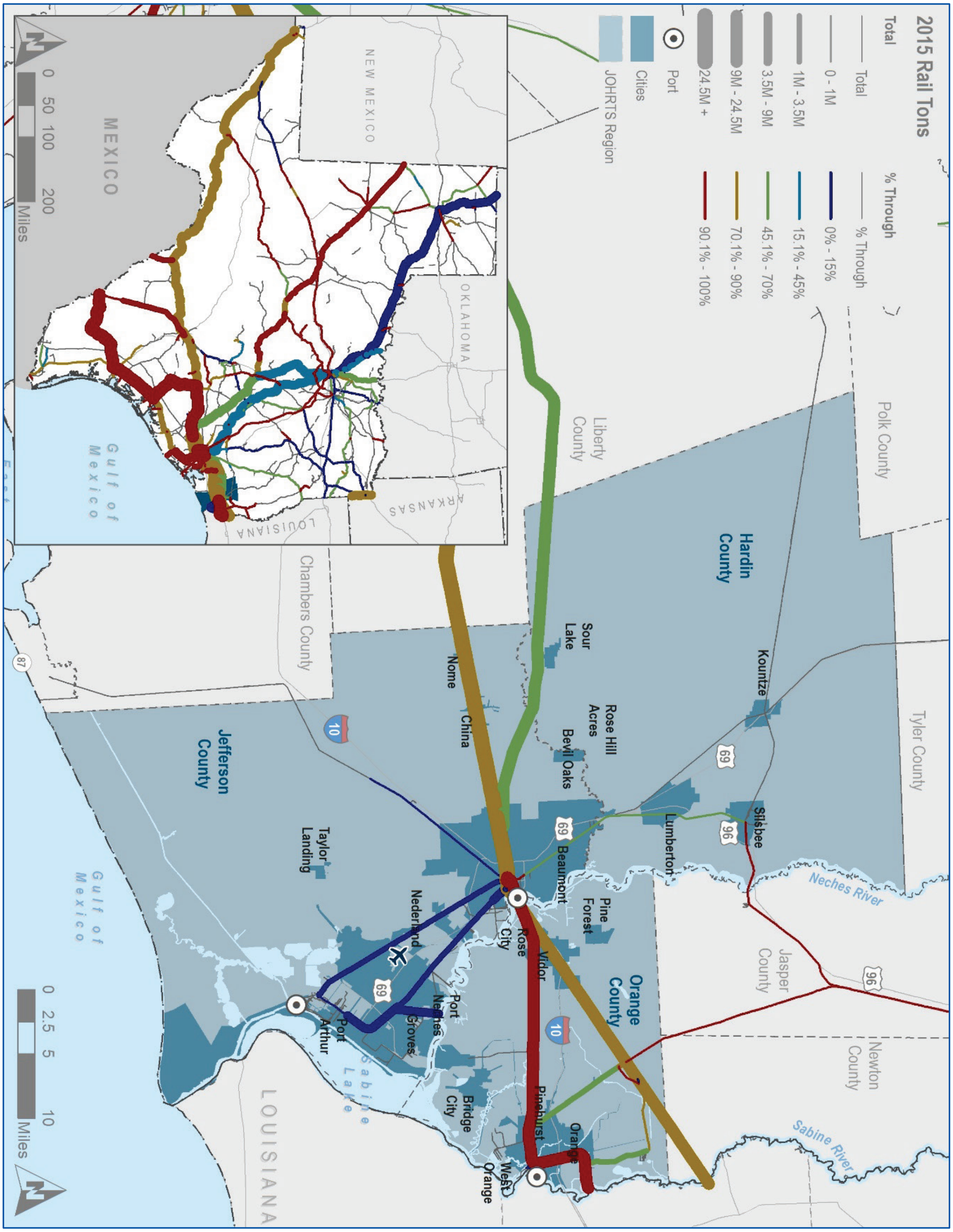
Source: Prepared by CDM Smith, based on TRANSEARCH data for 2015

Figure 2.3: *TRANSEARCH Rail Commodities, Tons in 2015*



Source: Prepared by CDM Smith, based on TRANSEARCH data for 2015

Figure 2.4: *TRANSEARCH Rail Density, Tons in 2015*



USACE Waterborne Commerce Statistics

The USACE Waterborne Commerce Statistics (WCS) provides data on the foreign and domestic waterborne commerce moved at the ports and harbors (i.e., nodes) and on the waterways and canals (i.e., links) of the United States. This includes port-specific freight data, which TRANSEARCH and FAF do not provide. While the USACE WCS data has such detailed geographic resolution, it is limited to historical tons; data on the value of waterborne cargo are not available, and no forecasts are provided.

In 2015, the USACE WCS estimated almost 124 million tons of goods travelling to (receipts), from (shipments), and within (intraport) the three major port facilities in the JOHRTS region: Beaumont, Orange, and Port Arthur. As tabulated in **Table 2.5** and depicted in **Figure 2.5**, most of the tonnage is handled by Beaumont (70%), followed by Port Arthur (29%) and Orange (1%).

- **Directions –** Intraport movements represent a small share of total tonnage at the three ports, at 2% of the total; outbound shipments are 51% and inbound receipts are 47%. Of these moves, 37% were domestic and 63% were foreign.
- **Commodities –** Waterborne freight in the Southeast Texas region is dominated by the oil refining supply chain, which represented 95% of all marine tonnage, totaling 118 million tons in 2015. As shown in **Figure 2.5**.
- Crude Petroleum alone constitutes 44% of all the waterborne goods movements in the region, most of which is inbound for refining.
- **Density –** Most of the tonnage moving to and from the respective ports traverses a few critical waterways: the Sabine Pass connecting the Gulf Coast to Sabine Lake, the Gulf Intracoastal Waterway, and the Sabine-Neches Waterway, which includes parts of the Neches River, Sabine River, and Sabine Lake (**Figure 2.6**).
- **Growth –** USACE does not provide forecast data for port-specific movements; however, the more-aggregated FHWA FAF 4.3 data for the Beaumont MSA does include future-year 2045 forecasts. According to the FHWA FAF data, total waterborne tonnage for the Beaumont MSA is projected to increase 1.7% on average, annually. Exports are projected to grow by over 3.5% per year, probably driven by increasing exports of domestically produced crude oil, natural gas, and refined products.
- **Summary –** Waterborne freight in the JOHRTS region is critical for the oil refining supply chain in Southeast Texas and the surrounding Gulf Coast – accounting for 95% of tonnage movements. While the ports facilitate these large volumes of oil products, the vessels calling at the ports are funneled through critical waterways with few or no alternative routes.

Table 2.5: *USACE WCS Ports Summary, Tons in 2015*

Direction	Beaumont	Orange	Port Arthur	Total	%
Domestic					
Intraport	2,110,055	0	131,521	2,241,576	1.8%
Receipts	11,686,692	595,440	4,575,860	16,857,992	13.6%
Shipments	21,540,323	242,269	4,983,746	26,766,338	21.6%
Total	**35,337,070**	**837,709**	**9,691,127**	**45,865,906**	**37.0%**
Foreign					
Intraport	0	0	0	0	0.0%
Receipts	32,351,597	160	8,597,232	40,948,989	33.1%
Shipments	19,481,208	0	17,498,972	36,980,180	29.9%
Total	**51,832,805**	**160**	**26,096,204**	**77,929,169**	**63.0%**
All Traffic					
Intraport	2,110,055	0	131,521	2,241,576	1.8%
Receipts	44,038,289	595,600	13,173,092	57,806,981	46.7%
Shipments	41,021,531	242,269	22,482,718	63,746,518	51.5%
Total	**87,169,875**	**837,869**	**35,787,331**	**123,795,075**	**100.0%**

Figure 2.5: *USACE WCS, Port Commodities, Tons (millions) in 2015*

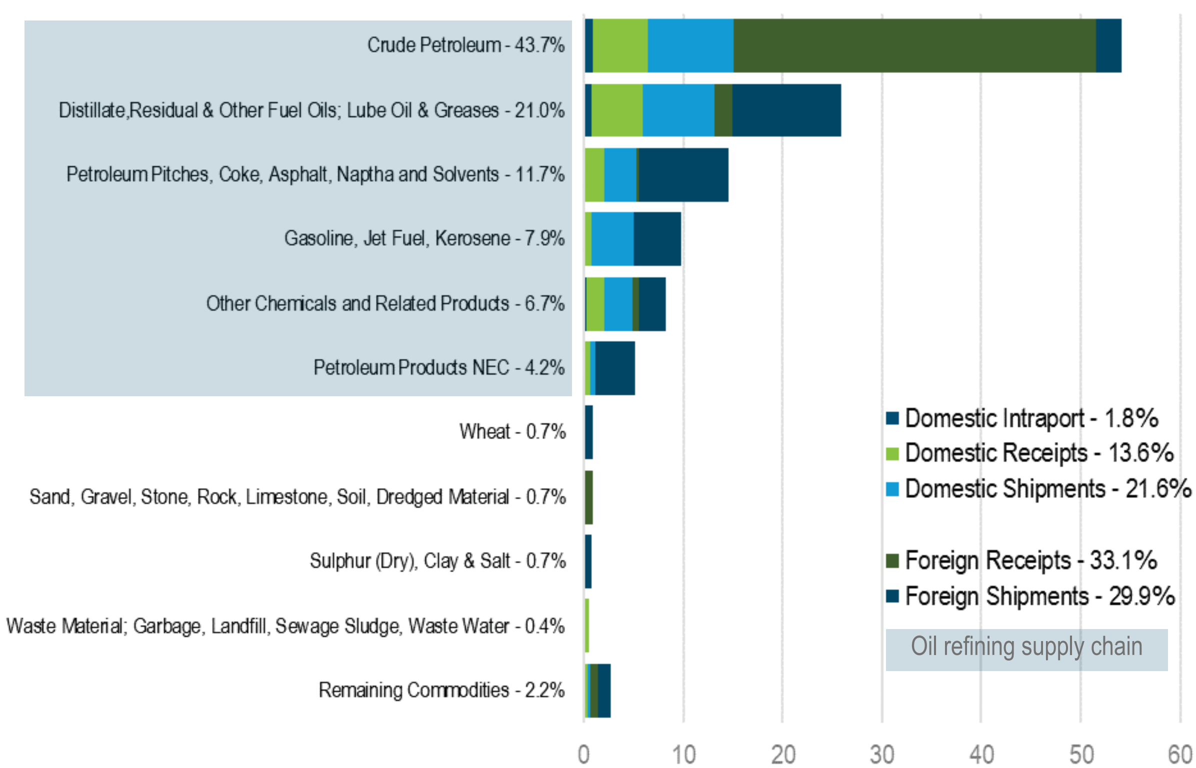
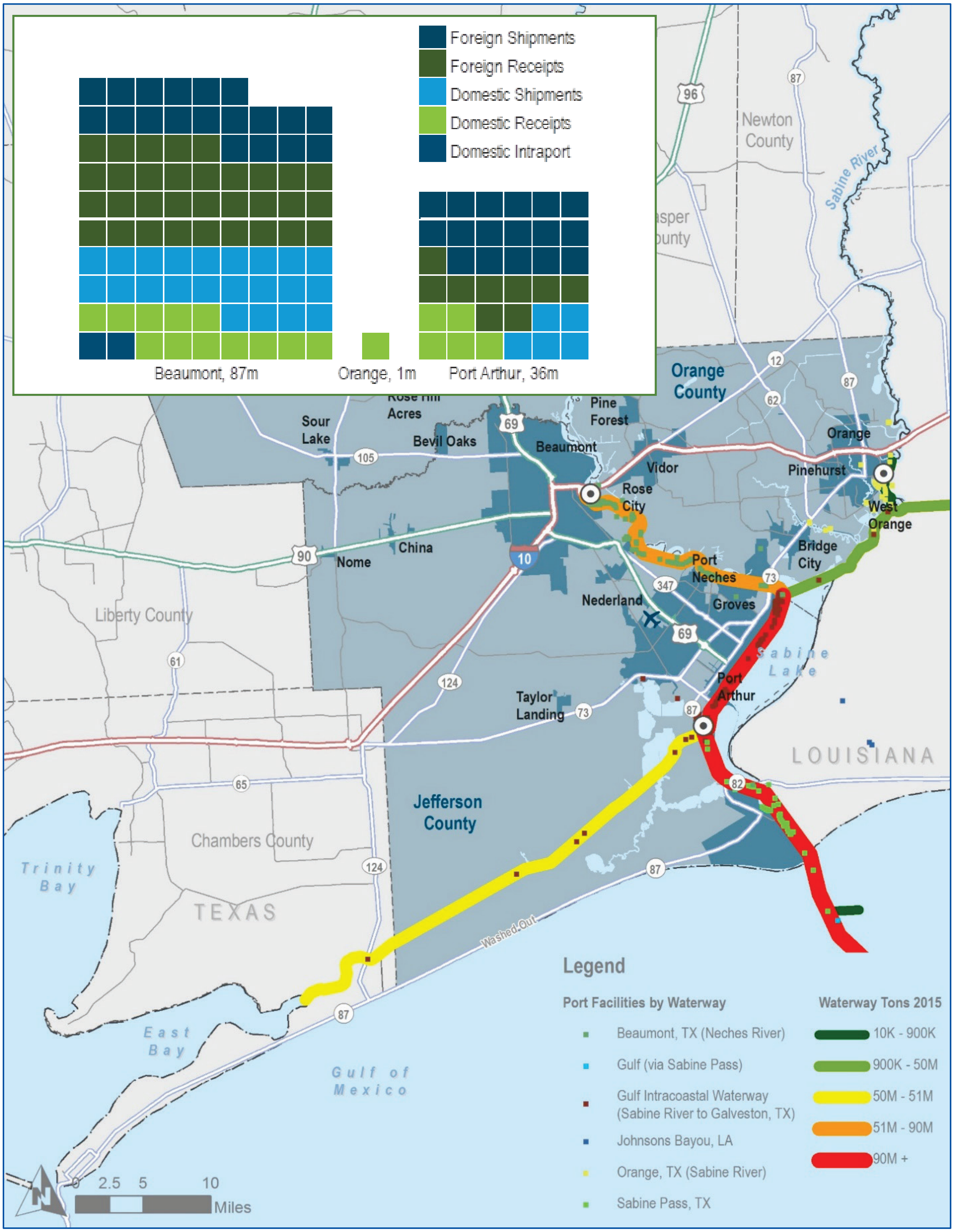


Figure 2.6: *USACE Ports and Waterways*



Freight Analysis Framework

FHWA Freight Analysis Framework (FAF) version 4.3 data was culled for the Beaumont MSA. Data for all eight modes were extracted from the database, as shown in **Table A.6** in the Appendix. However, only pipeline and air (including air-truck) are summarized here, as the other major modes were previously detailed more thoroughly from other sources.

Airborne

Airborne freight for the region is relatively small volume-wise, which is typical of that mode compared to other modes (high value, low weight) and for a region without a major commercial airport. Only 1,297 tons of air cargo moved via the Beaumont MSA in 2015, as shown in **Table 2.6** (presumably through the Jack Brooks Regional Airport, although FAF does not provide facility-specific data). Most of the airborne movements were *Machinery* or *Electronics*.

Pipeline

In contrast with the relatively small airborne tonnage, FAF pipeline volumes are substantial, amounting to almost 122 million tons in 2015 (see **Table 2.6**). FAF categorization enables tracking inbound waterborne petroleum shipments through local Southeast Texas refineries that are shipped out via pipeline. Specifically, FAF includes a special “no domestic mode” category comprised of “import shipments of crude petroleum transferred directly from inbound ships to a U.S. refinery at the zone of entry”, which reflects the waterborne data described from the USACE.

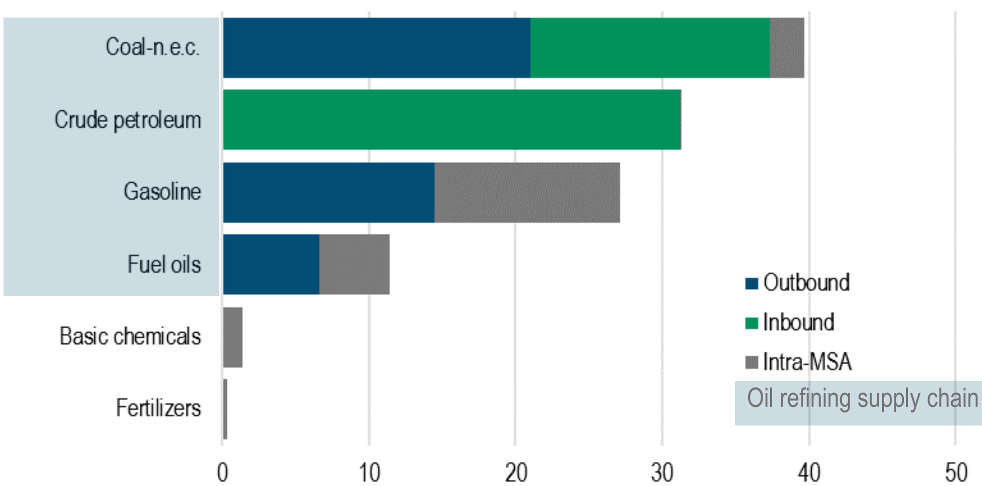
- **Directions –** Domestic pipeline movements represent 92% of the total, with the domestic legs of imports (2 million tons) and exports (7 million tons) representing most of the remaining pipeline flows. Only a small percentage (<1%, 0.7 million) pertains to international movements. All FAF database pipeline connections are within Texas and Louisiana, with 21 million tons (18%) moving within the Beaumont MSA (e.g., between storage tanks and refineries).
- **Commodities –** Like waterborne freight, pipeline movements are goods related to the oil refining industry, mostly four major commodities: *Coal/Petroleum not-elsewhere-classified* (n.e.c.), inbound *Crude Petroleum*, and outbound/intra-MSA *Gasoline* and *Fuel Oils*, as shown in **Figure 2.7**.
- **Density –** Although FAF does not identify specific facilities and pipeline routing, the origin-destination pairing data within the dataset identifies all Beaumont MSA pipeline freight as originating and/or terminating in Texas and Louisiana, especially with the Houston MSA. As such, the pipeline freight is Gulf Coast-regional.
- **Growth –** Overall, FAF projects a 0.6% annual growth in pipeline tonnage through 2045, to reach a total 144 million tons. Most of the growth is associated with outbound movements, where inbound and intra-MSA are slightly declining or stagnant.

- **Summary –** Pipeline movements of oil-related products are a major component of regional freight, which exceeds other more-traditionally scrutinized modes. Almost 122 million tons traversed the Beaumont MSA in 2015, connecting the Gulf Coast regional oil refining supply chain. A large share of outbound pipeline movements enters the region via its ports, which highlights the intermodal relationship between port and pipeline movement.

***Table 2.6**: FHWA FAF4.3 Pipeline and Air Summary, Tons in 2015*

	Pipeline	Air
Domestic Movements		
Outbound	42,292,770	231
Inbound	47,457,958	934
Intra-MSA	21,533,879	0
Exports Movements		
Domestic Leg	7,108,735	0
Foreign Leg	0	121
Imports Movements		
Domestic Leg	2,190,482	0
Foreign Leg	701,677	132
Total	**121,285,498**	**1,297**

***Figure 2.7**: FHWA FAF Pipeline Commodity Detail, Tons in 2015*



Summary and Conclusions

Freight data is complex, but sometimes the story behind the data is relatively simple. In the JOHRTS region, the oil refining supply chain dominates all tonnage, value, and most modes. Of course, the whole story also includes inbound final products for consumption by the regional population, and outbound goods produced by employees outside the oil industry. However, the dominant theme is oil and refining. The freight data compiled from various sources reinforce this theme.

Although the freight data compiled is from three separate sources with respective strengths and weaknesses that limit comparability, the top-level tonnage is distilled by mode and major direction, per **Table 2.7**. Since the data is from dissimilar sources with noted differences, a comprehensive total cannot be calculated directly. In addition, the modal summary data likely includes multimodal and inbound-outbound paired movements, which partially double-counts some flows. Still, the summary data provide a good idea of regional commodity flows, which are clearly dominated by crude oil movements and related refining/manufacturing activity.

- **Modes –** Most of the freight tonnage moving in the SETRPC region pertains to waterborne and pipeline movements, two modes that, for most regions, haul little or no freight. This modal concentration is due to the oil refining supply chain and the goods associated with production (e.g., crude oil, refined gasoline, etc.). Trucks also haul a large volume of freight, however, unlike the waterborne and pipeline modes, truck freight is mostly through traffic along I-10 and not directly related to the region. Although rail moves less tonnage than trucks in the region, it nonetheless hauls tens of millions of tons per year and is a critical mode for bulk shipments. Air, by contrast, is a very small fraction of the other modes.
- **Commodities –** Regardless of data source and for all modes except the small air cargo volumes, the major commodities include Chemicals and Petroleum-related products (regardless of each source's commodity code convention). For the surface modes, these two commodity groups constitute slightly more than half of the total, whereas for water and pipeline, those two major groupings are almost the entirety. Such chemicals and petroleum-related products reflect the regional petrochemical refining complex, and related supply chain connections throughout the rest of Texas and Louisiana. These commodity movements are larger than all other groupings combined.

__Table 2.7:__ Beaumont Freight Summary, Tons in 2015

	TRUCK	RAIL	WATER	PIPELINE	AIR
Source	TRANSEARCH	TRANSEARCH	USACE WCS	FHWA FAF4.3	FHWA FAF4.3
Geo/Facility	Tri-County	Tri-County	3 Ports	Beaumont MSA	Beaumont MSA
Outbound	25,424,508	5,268,667	63,746,518	43,818,376	232
Inbound	19,254,757	9,939,137	57,806,981	48,159,634	991
Intra	11,139,949	3,740,433	2,241,576	29,307,488	195
Through	60,169,247	37,232,098	#N/A	#N/A	#N/A
Total	**115,988,461**	**56,180,335**	**123,795,075**	**121,285,498**	**1,418**

Chapter 3
Economic Impacts

Introduction

Freight is the movement of traded goods in an economy. This chapter discusses the freight-related economic activity in the tri-county JOHRTS region, outlining regional socioeconomic characteristics, illustrating the industries' composition and trade relationships, and highlighting the relative importance of petroleum and petrochemical manufacturing.

The preceding *Freight Flows Assessment* chapter illustrated the physical movements and routing patterns of regional freight, highlighting the tonnage of goods moved by truck, rail, port, and pipeline, with a large proportion pertaining to the petrochemical supply chain. Such physical freight context is reinforced with the following economic data, sourced from the IMPLAN® software. Most of the following data are presented in terms of regional employment and dollar-value metrics (e.g., labor income, etc.).

Economic data regarding freight and trading relationships are multidimensional, considering economic geography, industry, socioeconomic measures, etc. As such, this *Economic Impact Analysis* first outlines the economic data sources and dimensions, synthesizes and presents data from a broad regional overview to a detailed supply chain, and concludes with a synopsis of the major data-driven themes.

Data Sources and Dimensions

Most of the economic data presented are sourced from the IMPLAN® economic model software, although some data were compiled and evaluated from Woods & Poole Economics, Inc. (W&P) and the Energy Information Administration (EIA). Additionally, some value data presented in the *Freight*

Flows Assessment from the TRANSEARCH database were compared to that from IMPLAN®. Data from W&P, EIA, and TRANSEARCH (not presented) were compiled to validate some IMPLAN® data/conclusions.

Data dimensions include: economic geography, timeframe, economic relationships, industry and institutional definitions and structure, impact measures, and impact types.

IMPLAN®

IMPLAN® is an input-output (I/O), social account matrix software used for estimating regional annual economic impacts from assumed industry or commodity changes. A social account matrix reflects economic interrelationships between industries, commodities, households, and governments, measured by impact multipliers and other economic characteristics. Multipliers are developed from regional purchase coefficients, production functions, and socioeconomic data for each geographically-specific variable. IMPLAN® also provides commodity-to-industry production and absorption relationships that enable the identification, for example, of industry supply chain relationships underpinning the production of goods and services.

IMPLAN® is one of the most commonly used models for quantifying economic interactions along various metrics and dimensions and can be evaluated in myriad ways for myriad purposes.

Economic Geography

IMPLAN® data are geographically defined and available at various resolutions (national, states, counties, zip codes) that can be evaluated as singular geographies or aggregations. Herein, the data are aggregated into a tri-county SETRPC region comprised of Jefferson, Hardin, and Orange Counties, Texas. Data are presented at that aggregate regional level unless otherwise specified.

Timeframe

IMPLAN® models represent a static, single-year snapshot of regional economic relationships, providing an internally-balanced and fixed input/output structure. It does not include dynamic multi-timeframe feedback effects (e.g., compounding technology efficiencies, etc.). Data presented are for year 2016, the latest available at the time of analysis.

Economic Relationships

As an I/O model, IMPLAN® includes the dollar-value relationships between industries along with the associated employment requirements. It delineates the production inputs (intermediary goods and services and value-added components), outputs (intermediary and final goods and services) and distribution (industries and institutions) within the region. Consequently, detailed supply and demand relationships are available that can identify patterns of economic activity, such as major industries, import and export volumes, and supply chain relationships.

Industry Structure

Within the model, IMPLAN® includes 538 industries, generally structured by the two- and three-digit North American Industry Classification System (NAICS) framework. Industry data were evaluated at the full-538 detail; however, data presented are collapsed into the two-digit NAICS structure or further collapsed into goods, services, and transportation/warehousing industries. Corresponding with the industry structure, the model also includes 538 commodities. Institutions, which mostly pertain to demand-side factors, include households and government entities.

Socioeconomic/Impact Measures

All data in the IMPLAN® model are in dollar-denominated terms, excepting employment and some baseline demographics (population and households). Dollar-denominated and employment measures are available at the detailed 538-industry level and can be aggregated into industry groupings and regional totals.

- **Employment (Jobs) –** Measured in terms of full-time-equivalent (FTE) job-years.
- **Output –** Total sales value associated with all levels of economic activity (comprises intermediate inputs and value added, combined).
  - **Intermediary Inputs –** The value of goods and services purchased and applied to production processes (e.g., component parts, etc.)
  - **Value-Added –** Net additional economic activity beyond intermediate inputs in the production of goods and services, synonymous with gross regional product (GRP); includes labor income, other property income types, and taxes.
    - **Labor Income –** Includes both employee compensation, which is the wage/salary earnings paid to employment, and proprietor income.
    - **Other Property Type Income –** Income derived from dividends, royalties, corporate profits, payments for rent, and interest income, realized from capital (non-labor) returns (e.g., technology, scale efficiencies, investments, etc.)
    - **Taxes –** Various taxes on production and imports (sales, property, excise, etc.), fines, fees, licenses, permits, etc. resulting from business economic activity; this includes all federal, state, and local tax revenues.

Note that since calculations are conducted at a detailed county level resolution with results rounded to the nearest job, millions of dollars, etc., some rounding error differences may occur between component and subtotal results.

Impact Types

An industry or commodity change applied to the IMPLAN® model yields three types of impacts that aggregate into a total impact for each of the above-mentioned measures.

- **Direct –** Impacts attributable to the changed industry or commodity.
- **Indirect –** Impacts associated with the suppliers that provide intermediate goods and services to the directly impacted industries; this is a supply-chain effect.
- **Induced –** Impacts associated with the re-spending of earned income from both the direct and indirect industries in the study region; this is a net regional gain/loss income effect.
- **Total –** Summation of direct, indirect, and induced types.

Other

In addition to the primary IMPLAN® model data source, data were also compiled and evaluated from Woods & Poole Economics, Inc. (W&P), the Energy Information Administration (EIA), and IHS' TRANSEARCH freight database. Such data either overlapped with that available from IMPLAN® or were not available with necessary detail to specifically pertain to the JOHRTS region. Therefore, the data from these sources are not directly incorporated but used to confirm the reasonableness of the economic data from the IMPLAN® model.

Woods & Poole

W&P provides trend data for major socioeconomic variables, such as population and top-level industry employment from historical year 1969 through future year 2050. Such trends were evaluated for the tri-county region, indicating steady economic growth and a relatively slow-growth population base. Additionally, an industry location quotients were calculated, indicating the same industry concentration patterns that are identifiable from the IMPLAN® data.

Energy Information Administration

EIA provides various energy consumption and production data (e.g., barrels per day) that are not comparable with monetized economic data, and/or are unavailable at a sub-state geographic resolution.

TRANSEARCH

TRANSEARCH includes the dollar value of freight along with tonnage and units; however, as discussed in the preceding *Freight Flows Assessment* chapter, the data are limited, especially for modes other than highway and rail due primarily to the NAFTA-only focus. As such, the TRANSEARCH data is only partially comparable to the economic data, but nonetheless provides an order-of-magnitude comparison check for the trade values obtained from IMPLAN®.

Freight Impacts in the Southeast Texas Economy

Economic data from the IMPLAN® model are outlined below for the tri-county JOHRTS region. A basic regional overview of the major socioeconomic measures is followed by industry detail.

Petroleum Product Manufacturing and *Petrochemical Manufacturing* are highlighted for their relative concentration in the region, followed by a discussion of the supply chain relationships for the *Petroleum Refining* industry and the economic impact of the petrochemical supply chain.

Regional Overview

In 2016, the JOHRTS region had a population of 395,965 with 205,349 people employed earning $12.2 billion in labor income in the value-added (or GRP) production of $27.0 billion in goods and service, which has a total sales value (output) of $69.6 billion, see **Table 3.1**. According to W&P data, the population, employment, and real GRP of the JOHRTS region in 2016 represented 1.4%, 1.3%, and 1.5% of the State of Texas, respectively.

Table 3.1: *Regional Socioeconomics, 2016*

	Jefferson	Orange	Hardin	JOHRTS
Socioeconomic Totals				
Population	254,679	84,964	56,322	395,965
Employment	155,439	30,029	19,881	205,349
Labor Income*	$9.9	$1.5	$0.8	$12.2
Value Added*	$22.8	$2.7	$1.5	$27.0
Output*	$59.4	$6.7	$3.6	$69.6
Regional Percent				
Population	64%	21%	14%	100%
Employment	76%	15%	10%	100%
Labor Income	81%	13%	6%	100%
Value Added	84%	10%	6%	100%
Output	85%	10%	5%	100%

Jefferson County is relatively largest in the region, comprising almost two-thirds of the population base, over 75% of the employment, and over 80% of the three dollar-denominated socioeconomic measures. Orange County is the second-largest followed by Hardin County.

Industry Detail by Socioeconomic Measure

The tri-county JOHRTS region is driven by the production and transport of petroleum/coal and chemical products. The following section summarizes socioeconomic measures (employment, income, etc.) by sector, and drills down to the manufacturing sector. The multiple perspectives presented highlight the magnitude of petroleum/coal and chemical products manufacturing relative to the overall economy.

Industry Sectors

The JOHRTS region's industry composition is tabulated below in **Table 3.2** by the two-digit NAICS convention for employment, labor income, value-added, and output. The 20 industries comprise three broad sectors (groups):

- **Goods-related –** Generally, the first seven NAICS Industry Codes, from *11 Agricultural, Forestry, Fishing, and Hunting* through *44-45 Retail Trade* are in the goods-related sector.
- **Services-related –** The last 12 NAICS Industry Codes, from *51 Information* through *92 Government and non-NAICS,* are predominately the services-related sector.
- **Freight Service –** In between these groups is *48-49 Transportation and Warehousing* which provides a combination of both goods- and services-related sectors.

In the bottom portion of **Table 3.2**, the NAICS structure is collapsed into goods, transportation/warehousing, and services industries. The *31-33 Manufacturing* industry detail highlights the *Petroleum Refining* and *Petrochemical Manufacturing*.

Manufacturing Sector

Such tabulated data is visualized in **Figure 3.1**, which sorts the two-digit NAICS industry output by component (intermediary inputs, labor income, and other value added). The bottom of **Figure 3.1** details *Petroleum and Coal Product Manufacturing* and *Chemical Manufacturing*.

NAICS *31-33 Manufacturing* is by far the largest regional industry group in terms of economic value, with 46% of the regional value-added, and 65% of the regional economic output. In effect, the economic value of that one industry group is larger than the remaining industries combined. In particular, the *Petroleum and Coal Product Manufacturing* and *Chemical Manufacturing* industries comprise the largest relative share of total *31-33 Manufacturing*.

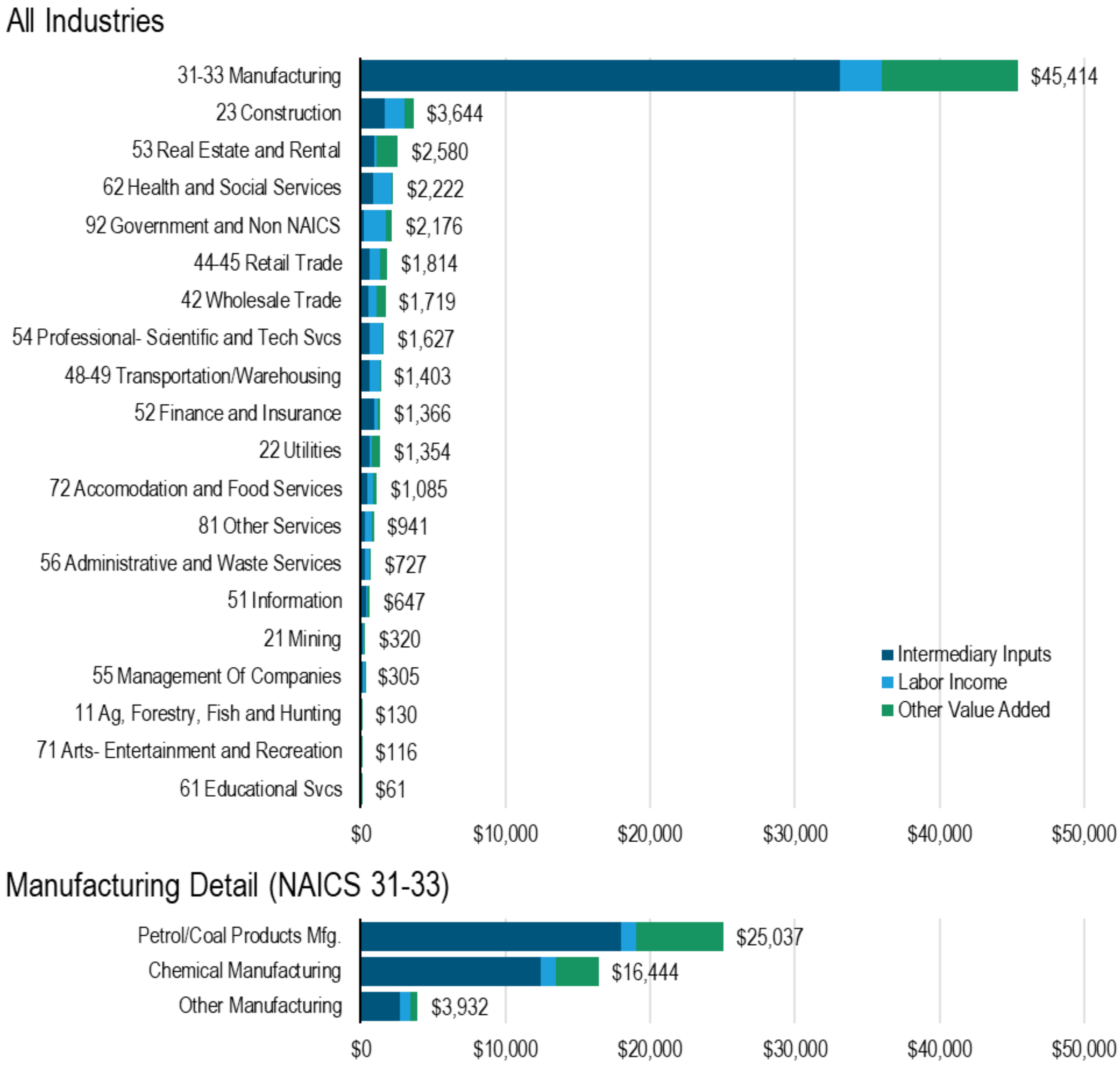
Table 3.2: *Industry Composition, 2016*

	NAICS Industry	Employment	%	Labor Income*	%	Value Added*	%	Output*	%
Goods	11 Ag, Forestry, Fish and Hunting	3,532	2%	$27	0%	$64	0%	$130	0%
Goods	21 Mining	1,998	1%	$109	1%	$198	1%	$320	0%
Goods	22 Utilities	1,076	1%	$170	1%	$743	3%	$1,354	2%
Goods	23 Construction	21,676	11%	$1,346	11%	$1,964	7%	$3,644	5%
Goods	31-33 Manufacturing	22,081	11%	$2,898	24%	$12,331	46%	$45,414	65%
Goods	42 Wholesale Trade	6,475	3%	$601	5%	$1,197	4%	$1,719	2%
Goods	44-45 Retail Trade	22,485	11%	$715	6%	$1,162	4%	$1,814	3%
	48-49 Transportation/Warehousing	6,932	3%	$703	6%	$756	3%	$1,403	2%
Services	51 Information	1,606	1%	$80	1%	$245	1%	$647	1%
Services	52 Finance and Insurance	8,411	4%	$302	2%	$452	2%	$1,366	2%
Services	53 Real Estate and Rental	6,513	3%	$177	1%	$1,617	6%	$2,580	4%
Services	54 Professional- Scientific and Tech Svcs	10,699	5%	$876	7%	$1,015	4%	$1,627	2%
Services	55 Management Of Companies	1,547	1%	$129	1%	$159	1%	$305	0%
Services	56 Administrative and Waste Services	11,252	5%	$328	3%	$432	2%	$727	1%
Services	61 Educational Svcs	1,572	1%	$38	0%	$39	0%	$61	0%
Services	62 Health and Social Services	23,430	11%	$1,283	11%	$1,349	5%	$2,222	3%
Services	71 Arts- Entertainment and Recreation	2,023	1%	$24	0%	$48	0%	$116	0%
Services	72 Accomodation and Food Services	16,303	8%	$348	3%	$602	2%	$1,085	2%
Services	81 Other Services	11,110	5%	$484	4%	$672	2%	$941	1%
Services	92 Government and Non NAICS	24,627	12%	$1,560	13%	$1,956	7%	$2,176	3%
	Total	205,349	100%	$12,196	100%	$26,999	100%	$69,649	100%

* in millions of dollars

Industry	Employment	%	Labor Income*	%	Value Added*	%	Output*	%
Goods Industries	79,323	39%	$5,866	48%	$17,657	65%	$54,394	78%
Manufacturing	22,081	11%	$2,898	24%	$12,331	46%	$45,414	65%
Petrol/Coal Products Mfg.	4,852	2%	$1,090	9%	$7,080	26%	$25,037	36%
Petroleum Refineries	*4,667*	*2%*	*$1,051*	*9%*	*$6,999*	*26%*	*$24,855*	*36%*
Other Petroleum and Coal Products	*184*	*0%*	*$39*	*0%*	*$81*	*0%*	*$182*	*0%*
Chemical Manufacturing	6,599	3%	$1,026	8%	$4,006	15%	$16,444	24%
Petrochemical Manufacturing	*1,704*	*1%*	*$304*	*2%*	*$2,023*	*7%*	*$9,932*	*14%*
Other Chemical Manufacturing	*4,895*	*2%*	*$722*	*6%*	*$1,983*	*7%*	*$6,512*	*9%*
Other Manufacturing	10,630	5%	$781	6%	$1,245	5%	$3,932	6%
Other Goods Industries	57,242	28%	$2,968	24%	$5,326	20%	$8,980	13%
Transportation/Warehousing	6,932	3%	$703	6%	$756	3%	$1,403	2%
Services Industries	119,095	58%	$5,627	46%	$8,586	32%	$13,853	20%
Total	205,349	100%	$12,196	100%	$26,999	100%	$69,649	100%

Figure 3.1: *Industry Output by Component, 2016 (in millions)*



Subsector Detail

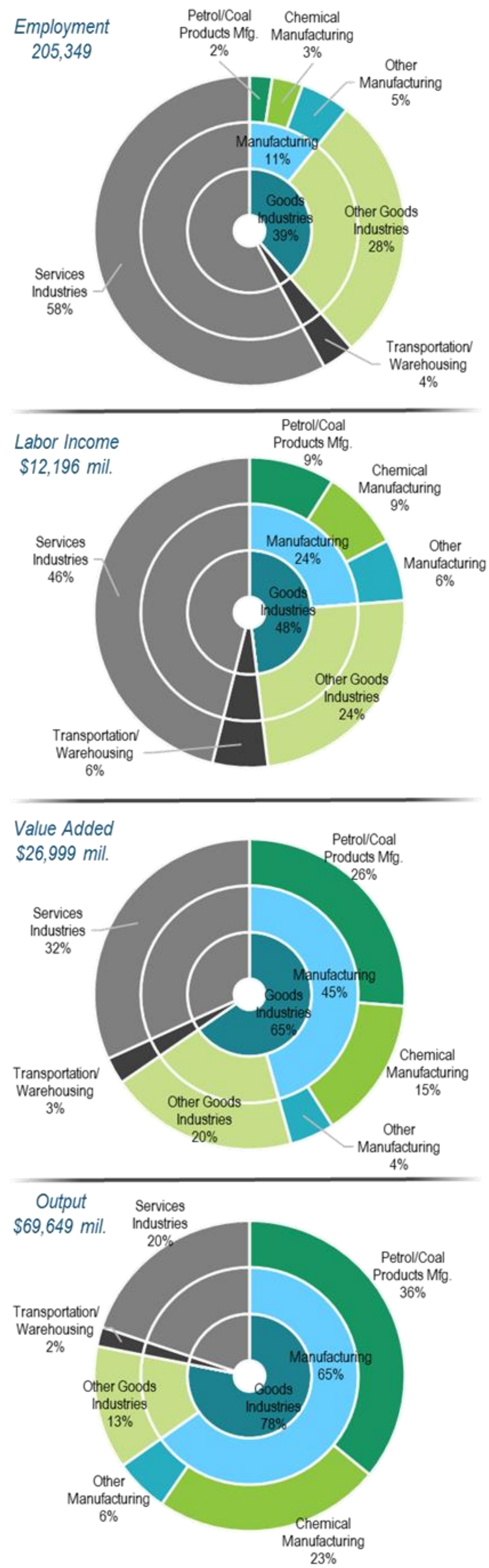
The **Figure 3.2** nested pie charts illustrate the relative size variance of regional *Petroleum/Coal Products* and *Chemical Manufacturing* for employment, labor income, value-added, and output.

- **Inner Ring –** The most-collapsed goods, services, and transportation/ warehousing industries.
- **Middle Ring –** Goods industries are subdivided between *31-33 Manufacturing* and other (non-manufacturing) goods industries.
- **Outer Ring –** *31-33 Manufacturing* subdivided into *Petroleum and Coal Products Manufacturing* (includes *Petroleum Refineries*), *Chemical Manufacturing* (includes *Petrochemical Manufacturing*) and other manufacturing.

As the chart sequences from employment to labor income to value-added to output, the proportion attributed to services industries declines, replaced with an increased share of *31-33 Manufacturing*, and especially the detailed industries related to the petroleum supply chain.

In employment terms, the *Petroleum and Coal Products Manufacturing* and *Chemical Manufacturing* industries combined represent about 5% of the regional economy. In labor income, those two industries comprise 18% of the economy. Their collective value-added is 41% of the GRP; and, their combined output is 59%.

Figure 3.2: *Key Industries by Economic Measure*



Production Efficiency

Rationale for the relatively small employment composition for *Petroleum and Coal Products Manufacturing* and *Chemical Manufacturing* industries versus a relatively high monetary-contribution reflects production efficiency. **Table 3.3** depicts the per-employee labor income, value-added, and output for the region (same industry structure as the bottom-half of **Table 3.2**).

Average Socioeconomic/Impact Measures

On average, the per-employee regional labor income was $59,400 in 2016, producing $131,500 in value-added (GRP), for an equivalent of $339,200 in sales-value output. *Petroleum Refineries*, contrastingly, had a per-employee labor income of $225,200, producing almost $1.5 million in per-employee value-added, which sold for more-than $5.3 million in output per worker. A similar pattern is observable in *Petrochemical Manufacturing*, with more-than three times the average income, over nine-times the average value-added, and over 17 times the average output, per-employee.

Capital Intensive

Such extraordinary per-employee value-added and output reflects the capital-intensive nature of these industries, in conjunction with the high-yield technologies in the production processes.

Table 3.3: *Income, Value Added, and Output per Employee by Major Industry, 2016*

Industry	Income	%	Value Added	%	Output	%
Goods Industries	$73,900	125%	$222,600	169%	$685,700	202%
Manufacturing	$131,200	221%	$558,400	425%	$2,056,700	606%
Petrol/Coal Products Mfg.	$224,800	378%	$1,459,300	1110%	$5,160,600	1522%
Petroleum Refineries	*$225,200*	*379%*	*$1,499,600*	*1141%*	*$5,325,300*	*1570%*
Other Petroleum and Coal Products	*$214,300*	*361%*	*$437,500*	*333%*	*$989,800*	*292%*
Chemical Manufacturing	$155,500	262%	$607,000	462%	$2,491,800	735%
Petrochemical Manufacturing	*$178,600*	*301%*	*$1,187,000*	*903%*	*$5,828,700*	*1718%*
Other Chemical Manufacturing	*$147,500*	*248%*	*$405,100*	*308%*	*$1,330,300*	*392%*
Other Manufacturing	$73,500	124%	$117,100	89%	$369,900	109%
Other Goods Industries	$51,800	87%	$93,000	71%	$156,900	46%
Transportation/Warehousing	$101,500	171%	$109,100	83%	$202,400	60%
Services Industries	$47,300	80%	$72,100	55%	$116,300	34%
Total	$59,400	100%	$131,500	100%	$339,200	100%

Regional Supply and Demand

While the JOHRTS region produces $27.0 billion in GRP, worth $69.6 billion in output, much of that production value relates to goods and services traded beyond the region. Freight is the movement of traded goods in an economy; thus, most of the regional economy is freight dependent.

Trade Composition

Table 3.4 shows the regional supply and demand of goods (commodities) and services in the JOHRTS region by two-digit NAICS hierarchy. In total, $71.2 billion of goods and services were supplied by regional industries and institutions, with $47.7 billion exported; the remaining $23.4 billion was self-supplied and consumed within the area. In conjunction with the regionally-demanded $23.4 billion that was self-supplied, an additional $43.6 billion was imported into the JOHRTS region to satisfy the $67.0 billion in total regional demand. As such, only about one-third of the area's demand and supply are intra-regional, the remaining two-thirds is traded externally. Given the larger export value than import, the region had a net positive trade balance.

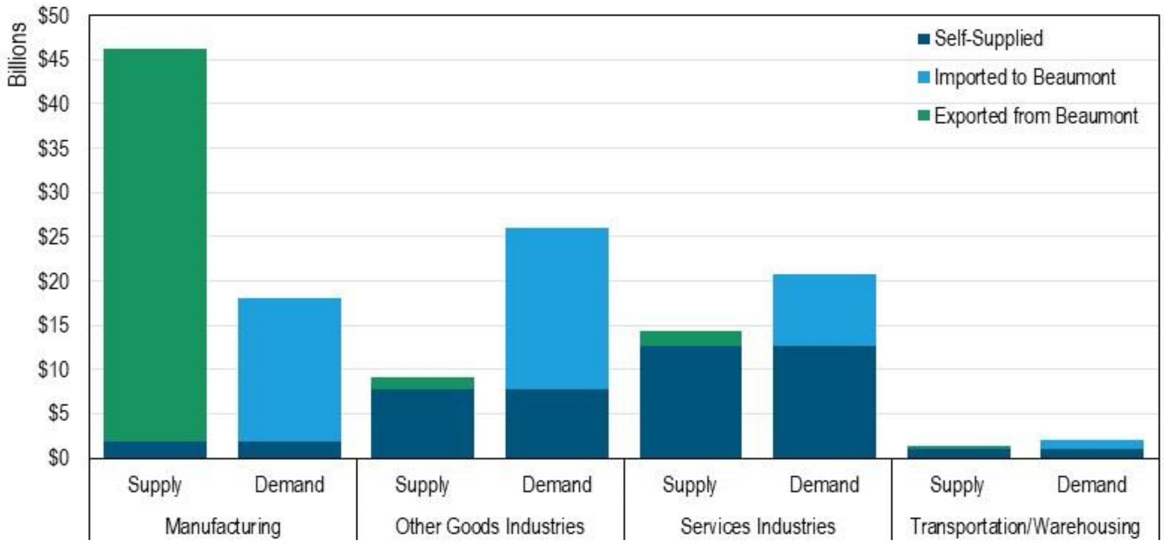
Table 3.4: *Regional Supply and Demand of Commodities by NAICS Industries (in millions)*

	Industry	Supply	Exported from Beaumont	Self-Supplied	Imported to Beaumont	Demand
Goods	11 Ag, Forestry, Fish and Hunting	$136	$72	$64	$276	$340
	21 Mining	$306	$174	$132	$15,943	$16,075
	22 Utilities	$1,474	$319	$1,154	$449	$1,603
	23 Construction	$3,644	$262	$3,382	$48	$3,429
	31-33 Manufacturing	$46,235	$44,431	$1,804	$16,332	$18,137
	42 Wholesale Trade	$1,719	$248	$1,471	$1,150	$2,621
	44-45 Retail Trade	$1,814	$182	$1,632	$336	$1,968
	48-49 Transportation and Warehousing	$1,425	$371	$1,054	$1,042	$2,096
Services	51 Information	$577	$19	$559	$937	$1,496
	52 Finance and Insurance	$1,349	$121	$1,228	$1,175	$2,403
	53 Real Estate and Rental	$2,649	$71	$2,578	$1,230	$3,808
	54 Professional- Scientific and Tech Svcs	$1,714	$287	$1,427	$1,771	$3,198
	55 Management Of Companies	$305	$39	$266	$488	$754
	56 Administrative and Waste Services	$750	$39	$711	$268	$979
	61 Educational Svcs	$185	$1	$184	$235	$420
	62 Health and Social Services	$2,260	$198	$2,062	$766	$2,829
	71 Arts- Entertainment and Recreation	$182	$12	$170	$234	$404
	72 Accomodation and Food Services	$1,081	$243	$839	$250	$1,088
	81 Other Services	$1,427	$630	$797	$663	$1,460
	92 Government and Non NAICS	$1,924	$28	$1,896	$26	$1,922
	Total	$71,156	$47,747	$23,410	$43,622	$67,031
	Production (Supply)	*Total =*	*Export +*	*Regional*		
	Consumption (Demand)			*Regional +*	*Import*	*= Total*

Manufacturing Trade

Figure 3.3 visualizes the regional supply and demand data by major industry group, subcategorizing goods-related industries into *Manufacturing* and *Other Goods Industries*. Such subcategorization highlights the relatively small proportion of *Manufacturing* that is intra-regionally traded; most of the supply and demand is traded – as imported *Mining* and *Manufacturing* goods (and services) and exported *Manufacturing* goods (and services). Most of that traded value is related to freight along the petrochemical supply chain. In contrast to the relatively freight-intensive goods-related industries, most of the *Services* and *Transportation/Warehousing* industries are regionally self-supplied.

Figure 3.3: *Regional Supply and Demand of Commodities by Major Industries*



Petroleum Refining Industry Supply Chain

Petroleum Refining is the largest industry in Southeast Texas, contributing 26% of GRP (see **Table 3.5**), which reinforces the freight story from the TRANSEARCH database. Crude oil imports (domestically and internationally) and refined petroleum product exports (via all modes except air) dominate freight movement. The following discussion details the economic-related supply chain relationships based on *Petroleum Refining* industry data; breaks down the economic components to the industry and **Figure 3.4** visualizes the data.

Table 3.5: *Petroleum Refining – Production Process and Commodities Produced*

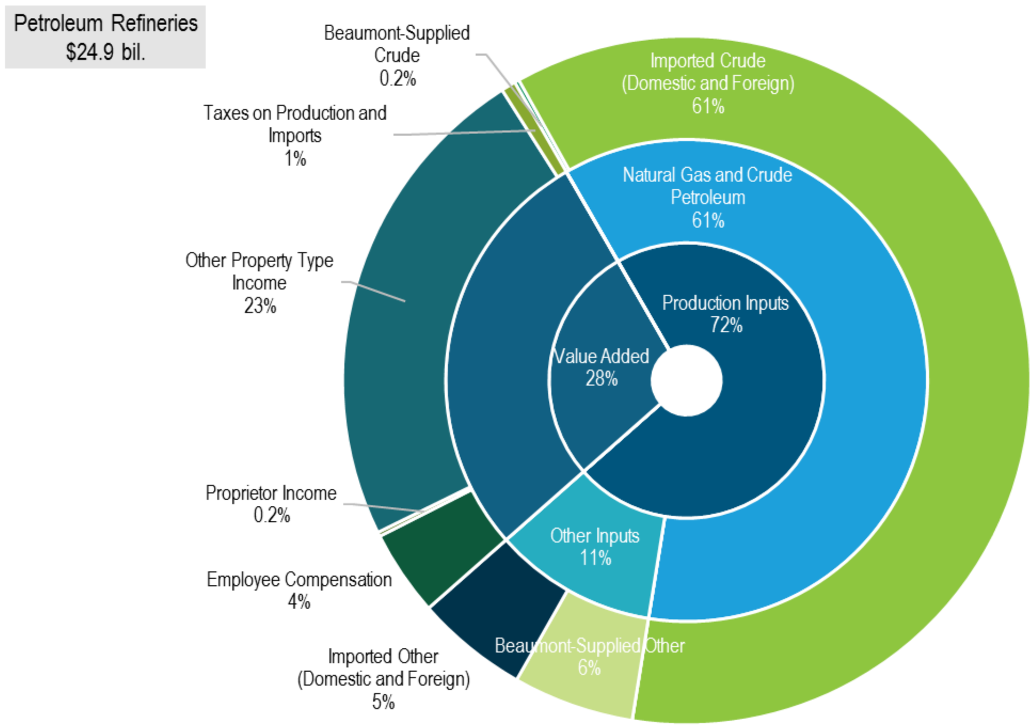
Production Process		
Production Inputs		
Natural Gas and Crude Petroleum		
Beaumont-Supplied Crude	$56	0.2%
Imported Crude (Domestic and Foreign)	$15,074	60.6%
Subtotal	$15,130	60.9%
Other Inputs		
Beaumont-Supplied Other	$1,414	5.7%
Imported Other (Domestic and Foreign)	$1,311	5.3%
Subtotal	$2,726	11.0%
Total Production Inputs	$17,856	71.8%
Value Added		
Employee Compensation	$1,001	4.0%
Proprietor Income	$50	0.2%
Other Property Type Income	$5,780	23.3%
Taxes on Production and Imports	$169	0.7%
Total Value Addded	$6,999	28.2%
Total Production	$24,855	100.0%
Commodities Produced		
Refined Petroleum Products	$23,444	94%
Petroleum Lubricants and Petrochemicals	$1,411	6%
Total Commodities Produced	$24,855	100.0%

* in millions of dollars

Production and Commodities

In 2016, the *Petroleum Refining* industry in the tri-county area produced $24.9 billion in output, representing 36% of total regional output (see **Table 3.2**); mostly as refined petroleum products ($23.4 billion, 94%) with some petroleum lubricants and petrochemicals ($1.4 billion, 6%).

Figure 3.4: *Petroleum Refining – Production Process*



To produce over a third of the total regional output, the industry applied almost $7.0 billion in value-added processes to $17.9 billion in intermediate production inputs. Most of the production inputs, $15.1 billion, consist of natural gas and crude petroleum from domestic (mostly via pipeline and rail) and foreign origins (via ports). Other non-crude petroleum production inputs include $1.4 billion in self-supplied goods and services and $1.3 billion imported from beyond the JOHRTS region.

The industry, employing 4,667 people, applied almost $1.1 billion in labor income to the production process, and realized $5.8 billion in other property type incomes, which includes the industry's value-added returns from capital and technology.

Petroleum Refining Supply Chain

Refined petroleum products (e.g., gasoline, etc.) is the largest commodity group produced by the *Petroleum Refining* industry, in the amount of $23.4 billion. Another $0.7 billion is regionally-produced by other industries (mostly *Petrochemical Manufacturing*) for a regional total of $24.2 billion, representing 34% of the $71.2 billion total regional supply.

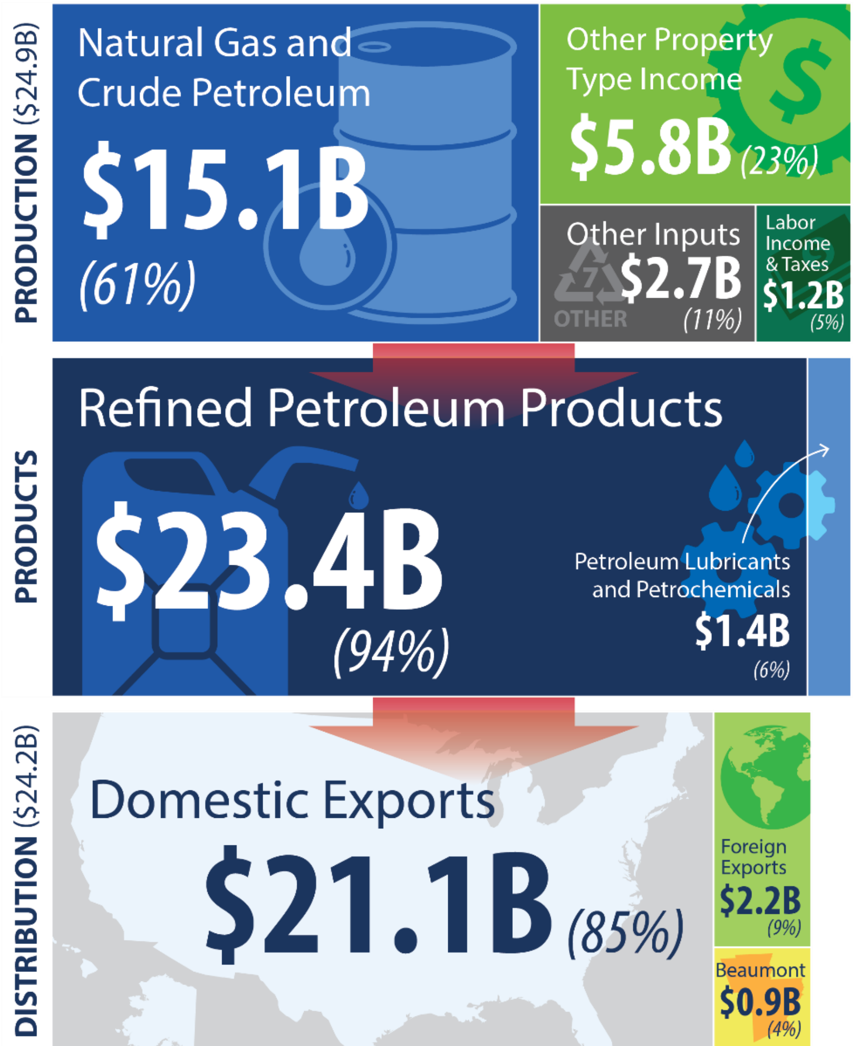
Only 4% of the regionally-produced refined petroleum products are consumed within the area, per **Table 3.6**, most of which is absorbed by other regional industries as intermediate inputs into downstream production. The remaining 96% of the commodity is freighted to other geographies, $21.1 billion of which is destined domestically and $2.2 billion to foreign destinations. **Figure 3.5** provides a schematic of these economic relationships along the petroleum supply chain.

Table 3.6: *Regionally-Supplied Refined Petroleum Products' Distribution*

Industry Production		
Petroleum Refineries	$23,444	96.9%
Other Industries	$746	3.1%
Total Industry Production	$24,190	100.0%
Industry/Institutional Consumption		
Beaumont		
Industries	$816	3.4%
Households	$97	0.4%
Government	$34	0.1%
Beaumont Total	$946	3.9%
Domestic Exports	$21,089	87.2%
Foreign Exports	$2,155	8.9%
Total Industry/Inst. Consumption	$24,190	100.0%

* in millions of dollars

***Figure 3.5**: Petroleum Refining Industry Supply Chain Schematic*



National Context

In 2016, Texas industries produced $115.8 billion in refined petroleum products, accounting for 30% of total production in the United States ($387.3 billion). The JOHRTS region thus produced 21% of Texas' and 6% of the Nation's refined petroleum products' output.

Economic Impacts

As freight is the movement of traded goods, economic activity in the JOHRTS region pertains mostly to the goods industries, which constitutes a minority of the regional employment base, but most of the GRP and economic output. As outlined, the major freight-intensive goods industries in the region are *Petroleum Refineries* and *Petrochemical Manufacturing*. Economic impacts of the petroleum supply chain were modeled through IMPLAN® via an assumed shock to the two specific industries.

Disrupted Petroleum Supply Chain Impacts

If the freight transportation network facilitating the JOHRTS region's petroleum supply chain was severely compromised, inbound crude oil and outbound refined petroleum products could effectively cease. In such an extreme circumstance (e.g., hurricane), the *Petroleum Refineries* and *Petrochemical Manufacturing* industries would be throttled, resulting in a direct economic impact equivalent to the loss of those two industries, see **Table 3.7**.

Table 3.7: *Impacts of Disrupted Petroleum Refining and Petrochemical Manufacturing*

	Employment	Labor Income*	Value Added*	Output*
Beaumont Economy	*205,349*	*$12,196*	*$26,999*	*$69,649*
Impact Type				
Direct	-6,371	-$1,355	-$9,022	-$34,785
Indirect	-10,966	-$923	-$1,491	-$3,006
Induced	-10,627	-$423	-$776	-$1,357
Total	-27,964	-$2,701	-$11,289	-$39,149
Percent of Economy				
Direct	-3%	-11%	-33%	-50%
Indirect	-5%	-8%	-6%	-4%
Induced	-5%	-3%	-3%	-2%
Total	-14%	-22%	-42%	-56%

* millions of dollars

On an annual basis, such a loss amounts to a direct regional employment reduction of 6,371, representing 3% of the workforce. Annually, such industry employment earns $1.4 billion (11% of regional economy) producing $9.0 billion in GRP (33%) and $34.8 billion in economic output (50%).

Indirect impacts are a consequence of the direct impact rippling through the supply chain, as suppliers from other non-petroleum regional industries are affected, which results in an additional 10,966 affected employees (5% of regional economy), who earn $0.9 billion (8%) annually. Induced impacts are a consequence of income re-spending effects form the directly and indirectly affected employees. Removing labor income ($2.3 billion in annual terms) from the directly and indirectly affected employees would impact an additional 10,627 employees.

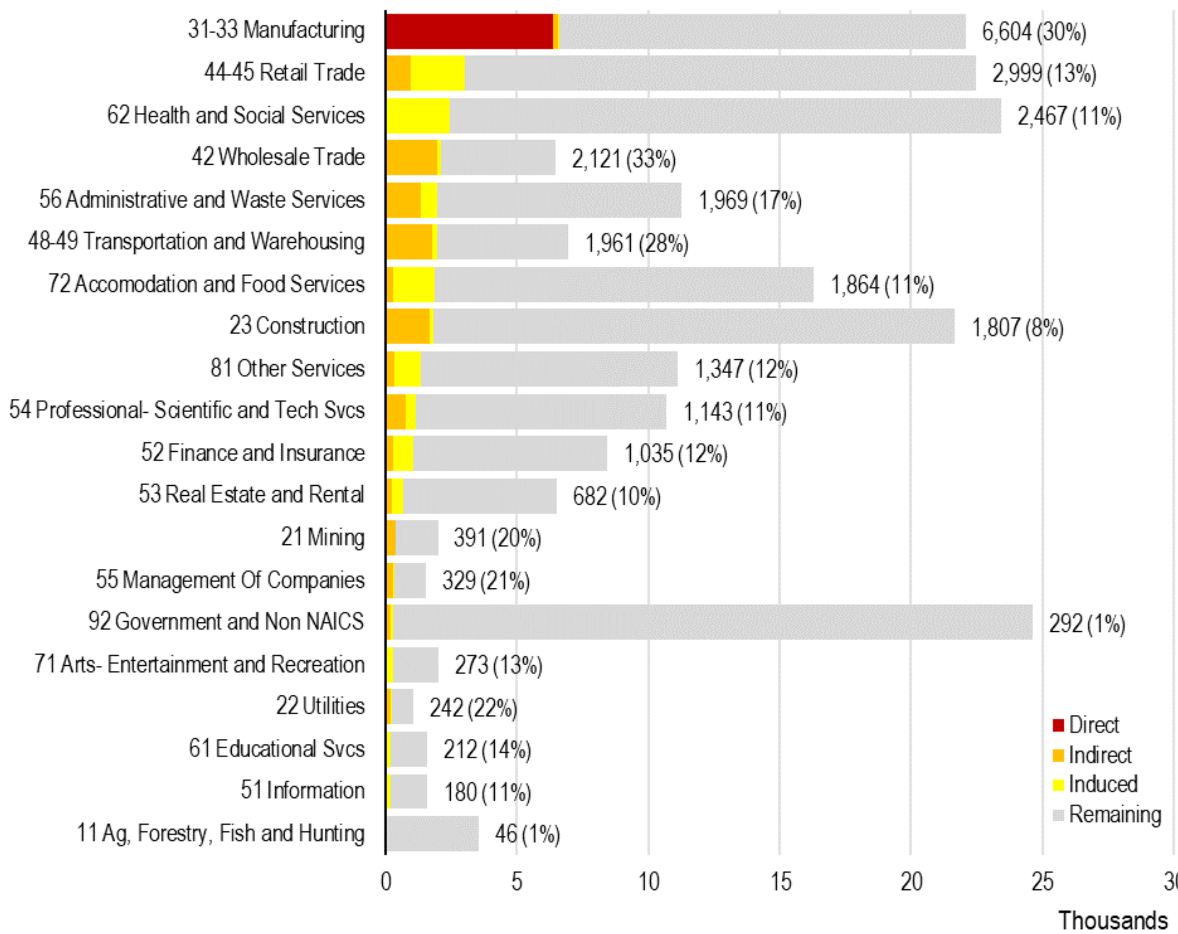
Combined, the direct, indirect, and induced impacts from a bottlenecked transportation network and compromised petroleum supply chain in the region would affect nearly 28,000 jobs, representing 14% of the regional economy. While notable, the total employment impact is a minor fraction of the total employment base, however the monetary-related total impacts are much greater. Due to the relatively high per-employee production and earnings, the 14% employment loss results in a total loss of 22% in income, 42% in GRP, and 56% in output.

Disruption Impacts by Industry and Type

Figure 3.6 visualizes the employment impacts by two-digit NAICS industries and impact type, compared against the remaining unimpacted employment base. As shown, the direct impacts are in the *31-33 Manufacturing* industries, which includes *Petroleum Refineries* and *Petrochemical*

Manufacturing. Industries with the greatest indirect (supply chain) effect are the *Wholesale Trade*, *Transportation and Warehousing*, and *Construction* industries. Induced impacts are greatest for the *Retail Trade*, *Health and Social Services*, and *Accommodation and Food Services* industries.

Figure 3.6: *Employment Impact of Disrupted Petroleum Refining and Petrochemicals Manufacturing*



Impact Summary/Conclusions

Effectively, the multimodal petroleum supply chain feeding Southeast Texas represents about one-seventh of the employment base, but almost half the GRP. It is thus regionally important to ensure that the pipelines, ports, waterways, rail, truck, and intermodal facilities are well-functioning, have redundancy, and can be repaired quickly and efficiently following a destabilizing event.

Aside from the regional impacts, the effects from a broken supply chain would cascade beyond with national implications. Per **Figure 3.5**, $21.1 billion in refined petroleum products are exported from the JOHRTS area to the rest of the nation. Applying the domestic average per-capita demand for refined petroleum products from national 2016 IMPLAN® data, $21.1 billion of domestically-exported refined petroleum products from the tri-county region serves almost 16.5 million people, or about 5% of the domestic population base, which is over 40 times the population base of the JOHRTS region. This outsized impact on the national fuel supply became obvious in the aftermath of Hurricane Harvey, when gas prices spiked around the nation because of supply disruptions along the western Gulf Coast.

A supply-side market shock to the domestic petroleum market would not only affect millions, but likely could affect the market clearing prices for refined petroleum products. Given that IMPLAN® is a static model, the price-sensitivity and relative elasticity from such an assumed shock on market prices cannot be assessed; a dynamic economic model or other industry-specific analyses would be required to determine the national disbenefits from a regional supply chain shock. However, a supply-side shock to 21% of Texas' and 6% of the nation's refined petroleum products would likely result in a significant shift in national supply, causing market prices to increase and resulting in national increases in vehicle operating costs – a net societal disbenefit.

Summary/Conclusions

Economic data from the IMPLAN® model provides various metrics to evaluate the economic composition of the JOHRTS region and the relationship with freight.

- **Regional Overview –** In 2016, the area had a population of 395,965 with 205,349 employed earning $12.2 billion in labor income in the production of $27.0 billion in value-added, which has an output of $69.6 billion; it represents about 1.5% of the Statewide population and economy.
- **Industry Detail –** Services-related industries comprise most of the regional employment base (58%); however, almost half (48%) of labor income is attributable to goods-related industries, which comprise 65% of the GRP and 78% of the output. *Manufacturing* is the largest industry group, specifically with the *Petroleum and Coal Manufacturing* and *Petrochemical Manufacturing* industries as the dominant two. *Transportation and Warehousing* comprises between 2% and 6% of the regional economy, depending on measure.

- **Regional Supply and Demand –** About one-third of the region's demand and supply values are intra-regional and the remaining two-thirds are traded. Most of that traded value is related to goods-intensive industries along the petrochemical supply chain. *Transportation/Warehousing* and *Services* industries are mostly self-supplied regionally.
- **Petroleum Refining Supply Chain –** The *Petroleum Refining* industry produced $24.9 billion in output (36% of regional total), mostly as refined petroleum products, by applying $7.0 billion in value-added to $17.9 billion in intermediate production inputs (mostly crude petroleum). Only 4% of the regional production was retained within Southeast Texas for consumption; the remaining 96% is shipped domestically (87%) and to foreign destinations (9%).
- **Economic Impacts –** The multimodal petrochemical supply chain represented by the *Petroleum Refineries* and *Petrochemical Manufacturing* industries comprises about 14% of the regional employment base, 22% of labor income, 42% of GRP, and 56% of output, once the direct, indirect, and induced impacts are totaled. The $21.1 billion in domestically-exported refined petroleum products from Southeast Texas may serve as much as 16.5 million people, or about 5% of the national population.

Freight-intensive goods industries, dominated by the petroleum supply chain within the *Manufacturing* industry group comprise a minority of the 205,349 regional employment base, yet comprise a significant majority of the $27.0 billion GRP.

Although transportation and warehousing represent a relatively small fraction of regional economic activity, the service pipeline, port, truck, and rail providers facilitate the freight movement of the rest of the economy, most importantly the inbound crude oil and outbound refined petroleum products. Given the multimodal nature of the supply chain, it is impossible to attribute a certain proportion of economic activity associated with the freight-intensive goods-industries to one mode over another. However, what is clear is that freight infrastructure in the JOHRTS region is critical not only to Southeast Texas, but to the rest of the country.

Chapter 4
Goals and Objectives

Introduction

Clearly defined goals and objectives are the foundation of any regional planning effort. For a regional freight plan, it is important to define goals and objectives that support freight stakeholder priorities while remaining consistent with regional, state, and federal goals and requirements. Freight goals have been established under the Fixing America's Surface Transportation (FAST) Act, as well as in the Texas Freight Mobility Plan. Other state and regional plans contain goals that are not freight-specific but may still be supported by freight improvements. The JOHRTS Regional Freight Mobility Plan has been developed to support and complement these plans.

This chapter summarizes the key freight-related provisions in the FAST Act, the Texas Freight Mobility Plan, the Texas Port Capital Program, and the Texas Rail Plan Update, while assessing freight-related goals and objectives from relevant local planning efforts such as the Metropolitan Transportation Plan (MTP). In addition, it will recommend a set of freight goals and objectives for use in the JOHRTS Regional Freight Mobility Plan.

Fixing America's Surface Transportation (FAST) Act

The FAST Act is the current federal surface transportation funding bill, signed into law on December 4, 2015. The FAST Act is a five-year, $305 billion bill that reauthorized key federal transportation programs and provided a dedicated source of federal funding for freight projects for the first time ever. The legislation established a National Multimodal Freight Policy aimed at maintaining and improving the condition and performance of the national freight transportation system. The FAST ACT specifies nine key goals to achieve this policy shown in **Table 4.1**.

***Table 4.1**: FAST Act Freight Planning Goals*

Goal	Objectives
Economic Competitiveness	• To strengthen the contribution of the National Multimodal Freight Network to the economic competitiveness of the United States • To increase productivity, particularly for domestic industries and businesses that create high-value jobs
Freight Mobility	• To improve the reliability of freight transportation • To improve the short- and long-distance movement of goods that: Travel across rural areas between population centers; Travel between rural areas and population centers; Travel from the Nation's ports, airports, and gateways to the National Multimodal Freight Network • Reduce congestion and eliminate bottlenecks on the National Multimodal Freight Network
Safety, Security, and Resiliency	• To improve the safety, security, efficiency, and resiliency of multimodal freight transportation
State of Good Repair	• To achieve and maintain a state of good repair on the National Multimodal Freight Network
Advanced Technology	• To use innovation and advanced technology to improve the safety, efficiency, and reliability of the National Multimodal Freight Network
Economic Efficiency	• To improve the economic efficiency and productivity of the National Multimodal Freight Network
Partnerships	• To improve the flexibility of States to support multi-State corridor planning and the creation of multi-State organizations to increase the ability of States to address multimodal freight connectivity
Environmental	• To reduce the adverse environmental impacts of freight movement on the National Multimodal Freight Network
Administrative Efficiency	• To pursue the goals described in a manner that is not burdensome to State and local governments

Source: Fixing America's Surface Transportation Act, Public Law 114-94, Section 70101(b).

State Freight Guidance

TxDOT conducts statewide freight planning through its Freight and International Trade Section, as well as divisions dedicated to maritime and rail transportation.

Texas Freight Mobility Plan

The Texas Freight Mobility Plan was updated in 2017 to be FAST Act compliant. The plan provides the state with a blueprint for facilitating continued economic growth through a comprehensive, multimodal strategy for addressing freight transportation needs and moving goods efficiently and safely through the state. The Texas Freight Mobility Plan goals are in **Table 4.2**.

Table 4.2: *Texas Freight Mobility Plan Goals*

GOAL	OBJECTIVES
Economic Competitiveness	• Improve the contribution of the Texas freight transportation system to economic competitiveness, productivity, and development
Safety	• Improve multimodal freight transportation safety
Asset Preservation and Utilization	• Maintain and preserve infrastructure assets using cost-beneficial treatment
Mobility and Reliability	• Reduce congestion and improve system efficiency and performance
Multimodal Connectivity	• Provide transportation choices and improve system connectivity for all freight modes
Stewardship	• Manage environmental and TxDOT resources responsibly and be accountable in decision-making
Customer service	• Understand and incorporate citizen feedback in decision making processes and be transparent in all TxDOT communications
Sustainable Funding	• Identify sustainable funding sources for all freight transportation modes

Source: TxDOT 2017 Texas Freight Mobility Plan Update.

Texas Rail Plan Update

TxDOT updated its State Rail Plan in 2016. The plan assesses existing and future passenger and rail freight service in Texas and includes an analysis of rail service goals and rail's contribution to statewide transportation priorities, including goods movement.

The goals and objectives of the Texas Rail Plan Update are listed in **Table 4.3**.

Table 4.3: *Texas Rail Plan Update Goals and Objectives*

GOALS	OBJECTIVES
Safety	• Reduce rail related fatalities and serious injuries, especially at at-grade rail crossings
Asset Management	• Achieve a state of good repair of the rail assets, especially those assets owned by TxDOT
Mobility and Reliability	• Reduce congestion and improve rail system efficiency, capacity, and performance, including rail freight and passenger travel time reliability
Multimodal Connectivity	• Provide freight and passenger choices by improving the rail system and providing intermodal and multimodal connectivity
Economic Competitiveness	• Strengthen Texas' position as a trade and logistics hub and support both existing industries and the attraction of new industries

Source: TxDOT 2016 Texas Rail Plan Update.

Texas Ports Strategic Mission Plan

Chapter 55 of the Texas Transportation Code establishes the Port Authority Advisory Committee which is comprised of seven port representatives (one from the Port of Houston Authority and three each from ports on the upper and lower Texas coast), one member appointed by the lieutenant governor, and one member appointed by the speaker of the Texas House.[1] The Port Authority Advisory Committee develops the Texas Port Capital Program and Ports Strategic Mission Plan in consultation with TxDOT every two years per the requirements of Chapter 55. The most recent Ports Strategic Mission Plan identifies four goals for the Texas maritime system and six strategies to help achieve the goals, as shown in **Table 4.4**.

[1] Funding of Port Security, Projects, and Studies, Tex. Stat. §§ 55.001-55.009 (2001 & Supp. 2003, 2011, and 2017).

Table 4.4: *Texas Ports Strategic Mission Plan Goals and Strategies*

GOALS	STRATEGIES
Identify high-priority and strategic port projects and make recommendations to the department for investment	• Secure a recurring state general revenue funding source that supports the growth and development of the Texas maritime system • Optimize the statewide intermodal transportation system to streamline the movement of freight and passengers • Develop and maintain state of the art port systems that will strengthen Texas ports' global competitiveness • Identify and capitalize on key market opportunities that will increase exports to the Americas, Asia, and Europe • Advocate to secure resources for smaller regional ports so they can continue to exist and grow • Develop a communications strategy to engage state agencies and the federal government
Incorporate maritime interests in TxDOT planning activities and documents	
Promote Texas ports for economic development opportunities	
Identify federal, state, or other funding opportunities for maritime investment	

Source: Texas Ports Strategic Mission Plan.

Local and Regional Planning Goals

Other local and regional plans covering topics such as transportation, the environment, and economic development may also impact regional freight planning. This section summarizes goals from relevant regional JOHRTS planning efforts.

2045 Metropolitan Transportation Plan

The 2045 Metropolitan Transportation Plan (MTP) is the long-range (minimum 20-year) transportation plan for the three-county region. The goals of the 2045 MTP are to:

- Preserve and Maintain the Existing Transportation System
- Improve the Operational Efficiency of the Transportation Network
- Enhance the Safety and Security of the Transportation Community
- Protect and Improve the Environment
- Foster Economic Development
- Maintain Financial Responsibility in the Development and Preservation of the Transportation System

Goods movement has a direct bearing on many of these goals, especially economic development, safety and security, transportation efficiency, and asset maintenance and preservation. Where feasible, mode shifting from trucks to more eco-friendly forms of freight transportation such as rail and marine would also support the region's environmental goals.

Comprehensive Economic Development Strategy

The Southeast Texas Economic Development District develops and maintains the Comprehensive Economic Development Strategy (CEDS) for the three-county region, following U.S. Economic Development Administration guidelines. The 2010 Comprehensive Economic Development Strategy defined 11 goals supported by specific objectives as shown in **Table 4.5**. Two of the goals can be directly supported by freight transportation improvements, namely job creation and retention and promoting intermodal connections.

Table 4.5: *2010 Comprehensive Economic Development Strategy Goals and Objectives*

Goals	Objectives
Create new jobs and retain existing meaningful, well-paying jobs	• Foster entrepreneurship • Increase business and industry retention efforts • Develop projects within the region
Improve quality of life in the region	• Improve aesthetic appeal of southeast Texas • Increase affordable, quality housing stock • Improve race relations in the region
Improve perception of southeast Texas from within and outside	• Market improved labor relations to national business community • Publish and disseminate data promoting the region • Market internally to residents of southeast Texas
Enhance and expand tourism in southeast Texas	• Develop a united effort to promote attractions in the region • Take advantage of "eco-tourism" trend
Balance protection of natural resources and environmental quality with business, industry, and economic development	• Increase awareness at national & state level of "common sense" approaches to environmental regulations that do not stifle industry operations • Develop partnerships between government and industry to develop programs designed to meet regulations and improve environmental quality
Further promote intermodal connections & transportation in the area	• Enhance the capacity of major truck routes • Improve local access to ports • Make sure citizens have access to public transit

GOALS	OBJECTIVES
Be poised for disaster recovery	• Develop ways to get businesses up and running after disasters
Raise awareness locally of the importance of economic development	• Share economic development benefits and successes with those outside of the economic development community • Increase interaction with those who could fund economic development efforts
Increase regionalism in southeast Texas' economic development efforts	• Better connect various economic development efforts in the area • Share resources and ideas for economic development • Foster cooperation, not competition in the economic development effort • Coordinate economic development planning among various economic development entities
Improve workforce training	• Realign the relationship that exists between business and industry and education and training • Go beyond simple training for a job, teach soft skills • Provide early training
Embrace changing and emerging innovative technologies	• Capitalize on existing knowledge base and infrastructure

Source: Southeast Texas Economic Development District 2010 Comprehensive Economic Development Strategy.

The more recent 2015 Comprehensive Economic Development Strategy does not explicitly define goals, but it does incorporate most of the goals from the 2010 CEDS via several specific project and policy recommendations, each of which is linked to one of the 2010 CEDS goals. The projects relevant for regional freight planning and their supported goals are listed in **Table 4.6**. There is also one new goal dealing with connectivity between key military bases and deployment seaports. Some of the projects are very specific, such as improving truck route signage and widening/deepening ship channels. Others are more policy-oriented, for example developing financing mechanisms and providing resources for startups.

Table 4.6: *2015 Comprehensive Economic Development Strategy Projects and Goals Supported*

Project	Goal Supported
Improve signage of truck routes to ports	Further promote intermodal connections and transportation in the area
Improve turning radii at intersections along designated truck routes	
Widen and deepen local ship channels	
Increase awareness of foreign trade zone	
Improve Spur 93 to improve access to the Jack Brooks Regional Airport	
Develop financing mechanisms for site development	Create new jobs and retain existing meaningful, well-paying jobs
Establish outreach program to stay informed of project ideas in the region	
Assemble parcels of land into desirable business and industrial sites	
Develop programs and policies that provide access to capital, technology, and incubator services	
Increase awareness of local business needs	
Aid local business and industry in getting what they need for success/growth	
Work with local entities to develop quality, high profile projects	
Maintain awareness of EDA investment priorities to inform local efforts	
Develop upgraded IH-14 access to multimodal facilities in southeast Texas	Improve access between military installations and deployment seaports

Source: Southeast Texas Economic Development District 2015 Comprehensive Economic Development Strategy.

Port Arthur Draft Comprehensive Plan

The City of Port Arthur is developing a Comprehensive Plan to serve as a 20-year framework document for Port Arthur's growth and development. The draft plan, called Imagine Port Arthur, defines the following goals for the city:

- Establish Port Arthur as a community that supports life-long learning for its citizens that includes cultivating the strengths of citizens, enhancing job skills, understanding the environment, increasing cultural enjoyment, exploring various age-group interests, and providing personal enrichment.
- Utilize economic development policies and tools to encourage the retention, expansion and creation of businesses and recreational opportunities that enhance Port Arthur's economic well-being and maximizes the utilization of Port Arthur's waterfront areas.
- Ensure that neighborhoods reflect standards that respect the history and character of the community, as well as the changing demographics and needs of residents.
- Encourage greater accessibility/connectivity and community cohesion by prioritizing multi-modal transportation networks that support the efficient use of land, minimize traffic congestion, and facilitate community-wide and regional mobility.
- Develop and enact flexible land use regulations and economic development policies that encourage the preservation, conservation, and rehabilitation of existing neighborhoods and opportunity areas in Port Arthur.
- Establish community character and identity to enhance Port Arthur's aesthetic quality and sense of place by using development ordinances that promote cohesive urban design, beautification, and branding.

The second goal includes fostering economic development by maximizing use of the waterfront. While such uses are not exclusively freight-related (they can include waterfront retail, dining, and recreation), the plan does recognize the economic importance of the Port of Port Arthur as well as the importance of goods movement in general, given the city's industrial nature.

Summary

Figure 4.1 provides a summary of common goals observed in the legislation and plans that were reviewed. Unsurprisingly, economic competitiveness and job creation are common themes, highlighting the strong linkage between goods movement and the economy. Goals related to freight mobility, reliability, and connectivity also feature heavily. (Note that connectivity can be first- and last-mile, or between modes). Other important goal areas include safety and security, state of good repair and asset preservation, and environmental/stewardship considerations.

Figure 4.1: *Common Goals from Federal, State, and Local Plans and Legislation*

	FAST Act	Texas Freight Mobility Plan	Texas Rail Plan	Texas Ports Strategic Mission Plan	Metropolitan Transportation Plan	Comprehensive Economic Development Strategy	Port Arthur Draft 2018 Comprehensive Plan
Economic Competitiveness and Job Creation	●	●	●	●	●	●	●
Freight Mobility, Reliability, and Connectivity	●	●	●	●	●	●	●
Safety and Security	●	●	●		●		
State of Good Repair	●	●	●		●		
Advanced and Innovative Technology	●					●	
Partnerships and Coordination	●			●		●	
Environment, Stewardship, and Resiliency	●	●			●	●	
Administrative and Governmental Efficiency	●	●			●		
Sustainable and Multimodal Freight Funding		●		●			

JOHRTS Regional Freight Mobility Plan Goals and Objectives

Using the plans and legislation reviewed for this study, the team developed a set of goals and objectives for the JOHRTS Regional Freight Mobility Plan. These goals and objectives are provided in **Table 4.7**. The goals and objectives are structured to be fully consistent with both the Texas Freight Mobility Plan and FAST Act freight guidance, while also incorporating key regional priorities found in the other plans and documents reviewed above.

Key freight stakeholders also reviewed and approved the draft goals and objectives at the Regional Freight Plan kickoff meeting held on October 18, 2018. The only change proposed by the stakeholders was the addition of a quality of life goal and objective, which was included under 'Environmental Stewardship and Quality of Life' based on this feedback.

Table 4.7: *JOHRTS Regional Freight Mobility Plan Goals and Objectives*

GOALS	OBJECTIVES
Economic Competitiveness	• Improve the contribution of the freight system to economic competitiveness • Support existing industries and attract new industries that create high-value jobs
Freight Mobility and Reliability	• Reduce congestion on freight corridors • Reduce the number of bottlenecks on the freight system • Improve the reliability of the freight system as measured by corridor travel times • Improve the intermodal connectivity of the freight system • Use advanced technologies in projects to enhance the freight system
Safety, Security, and Resiliency	• Reduce the number of fatal and serious injuries and crashes on the freight transportation system • Reduce the number and severity of truck involved crashes • Improve geometric issues affecting freight movements • Improve freight network resiliency after natural disasters
State of Good Repair	• Maintain the freight system in a state of good repair using resilient and cost-effective approaches
Environmental Stewardship and Quality of Life	• Reduce the adverse environmental impacts of freight movement • Consider freight traffic impacts on adjacent land uses, including in designating truck routes
Sustainable Funding	• Identify sustainable funding sources • Seek competitive grant funding opportunities

Chapter 5
Performance Measures

Introduction

This chapter proposes a set of freight performance measures for the JOHRTS Regional Freight Mobility Plan. Beginning with a review of the existing JOHRTS performance measurement process and tools, this chapter proposes measures for each freight goal and objective. These measures are then cross-referenced with MAP-21 and FAST Act freight requirements to ensure consistency with federal guidance. Next, the performance measures are evaluated to ensure proper data are available for ongoing measurement and performance monitoring. The chapter concludes with a set of recommended performance measures and targets for JOHRTS to consider as it implements the freight plan.

The goals and objectives established for the JOHRTS Regional Freight Mobility Plan create the plan's strategic framework. However, data-driven performance measures are required to understand freight transportation system performance over time and to track the progress of freight plan implementation. It is also important to ensure consistency between this plan and relevant state and federal plans and legislation, including the Texas Freight Mobility Plan, MAP-21, and the FAST Act.

Identifying Freight Performance Measures

Existing JOHRTS Performance Measures

In 2012, the Moving Ahead for Progress in the 21st Century (MAP-21) bill required the USDOT to establish performance metrics to improve the transparency and accountability of federal transportation programs. The more recent FAST Act legislation continued this emphasis on performance-based planning and programming. Recipients of federal transportation funds are required to make investments that further progress toward the national goals shown in **Table 5.1**.

Table 5.1: *National Performance Management Goals*

Goal Area	National Goal
Safety	To achieve a significant reduction in traffic fatalities and serious injuries on all public roads
Infrastructure Condition	To maintain the highway infrastructure asset system in a state of good repair
Congestion Reduction	To achieve a significant reduction in congestion on the National Highway System
System Reliability	To improve the efficiency of the surface transportation system
Freight Movement and Economic Vitality	To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development
Environmental Sustainability	To enhance the performance of the transportation system while protecting and enhancing the natural environment
Reduced Project Delivery Delays	To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices

USDOT is establishing national performance measures for these goals through a series of rulemakings. State DOTs, transit providers, and MPOs must establish performance targets to support these measures. Hence, JOHRTS developed safety, infrastructure condition, system performance, transit asset management, and freight movement performance metrics as part of the 2045 Metropolitan Transportation Plan (MTP) update. The specific measures proposed by JOHRTS and proposed performance targets (where available) are provided in **Table 5.2**. For safety, JOHRTS has adopted the TxDOT performance targets.

For system performance, JOHRTS has proposed to use travel reliability measures developed by the Texas Transportation Institute based on federal guidance. JOHRTS is also proposing to use a truck travel reliability measure on I-10 to monitor freight travel reliability. It should be noted that FHWA does not yet have final rules on how to use these targets. However, JOHRTS is sending the targets to FHWA to meet the deadline and the requirements of the FAST Act. JOHRTS will then await further guidance from FHWA.

For goods movement, the truck travel reliability measure will adequately capture freight travel performance on I-10, which is naturally the primary highway freight corridor in the JOHRTS region. However, given the significant truck volumes that traverse the non-interstate portions of the JOHRTS highway network, it may be advisable to include freight reliability metrics for the remainder of the National Highway System routes in the region.

Goods movement also has an impact on the safety and infrastructure condition measures. Trucks are sometimes involved in traffic accidents and due to the size of freight vehicles, the consequences can be severe. Moreover, numerous studies have shown that trucks have an impact on pavement deterioration and bridge consumption many times that of passenger cars. Conversely, shifting freight to the rail and marine modes, where appropriate, can help keep road infrastructure in good repair.

Table 5.2: *JOHRTS MTP Performance Targets*

Performance Area	Measures	JOHRTS Performance Target
Safety	Expected rise in fatalities	Reduce by 2% over current baseline forecast
	Expected fatality rate	Reduce by 2% over current baseline forecast
	Expected rise in incapacitating injuries	Reduce by 2% over current baseline forecast
	Incapacitating injury rate	Maintain current downward trend
	Expected rise in non-motorized injuries and fatalities	Reduce by 2% over current baseline forecast
Infrastructure Condition	Percentage of pavement of the Interstate System in good condition	2020: N/A; 2022: 66.4%
	Percentage of pavement of the Interstate System in poor condition	2020: N/A; 2022: 0.3%
	Percentage of pavements of the non-Interstate system in good condition	2020: 52.0%; 2022: 52.3%
	Percentage of pavements of the non-Interstate system in poor condition	2020: 14.3%; 2022: 14.3%
	Percentage of NHS bridges classified as in good condition	2020: 50.58%; 2022: 50.42%
	Percentage of NHS bridges classified as in poor condition	2020: 0.80%; 2022: 0. 80%
System Performance	Percent of Person-Miles Traveled on the Interstate System That Are Reliable	2020: 97%; 2022: 95%
	Percent of Person Miles Traveled on the other Freeways and Principal Arterials That Are Reliable	2020: 75%; 2022: 70%

PERFORMANCE AREA	MEASURES	JOHRTS PERFORMANCE TARGET
Transit Asset Management	Percentage of transit system rolling stock, facilities, and equipment exceeding useful life benchmark (ULB)	Not applicable to Freight[1]
Freight Movement	Ratio of unreliable truck travel to average truck travel on the Interstate System	2020: 1.45; 2022: 1.50

[1] JOHRTS has adopted several useful life benchmark performance targets covering multiple asset classes within each transit service area (urban and rural) and asset category (rolling stock, facility, and equipment). The targets are not reproduced here since they are not relevant to freight movement, but they can be found in the JOHRTS FY 2019-2022 Transportation Improvement Program*.*

The Texas Freight Mobility Plan outlines a set of freight-specific goals and objectives that articulate TxDOT's freight investment priorities, help define freight system investment needs, and identify the desired future performance of the Texas Multimodal Freight Mobility Network. The Texas Freight Mobility Plan goals are in **Table 5.3**.

Table 5.3: *Texas Freight Mobility Plan Goals*

GOALS	OBJECTIVES
Economic Competitiveness	• Improve the contribution of the Texas freight transportation system to economic competitiveness, productivity, and development
Safety	• Improve multimodal freight transportation safety
Asset Preservation and Utilization	• Maintain and preserve infrastructure assets using cost-beneficial treatment
Mobility and Reliability	• Reduce congestion and improve system efficiency and performance
Multimodal Connectivity	• Provide transportation choices and improve system connectivity for all freight modes
Stewardship	• Manage environmental and TxDOT resources responsibly and be accountable in decision-making
Customer service	• Understand and incorporate citizen feedback in decision making processes and be transparent in all TxDOT communications
Sustainable Funding	• Identify sustainable funding sources for all freight transportation modes

Source: TxDOT 2017 Texas Freight Mobility Plan Update.

Guided by the national, TxDOT, and JOHRTS MTP goals, objectives, and performance measures, the following JOHRTS freight plan goals, objectives, and performance measures are proposed in **Table 5.4.** The proposed freight plan goals, objectives, and performance measures use the MTP measures, but with a freight focus. For example, the safety metrics assess truck involved crashes instead of all crashes.

Table 5.4: *Proposed Freight Plan Goals, Objectives, and Performance Measures*

Goals	Objectives	Performance Measures
Economic Competitiveness	• Improve first/last mile connectivity between freight modes and major freight generators and gateways • Improve the contribution of the freight system to economic competitiveness • Support existing industries and attract new industries that create high-value jobs	• Number of completed intermodal port connectors projects from Port Connectivity Report and Appendix • Number of critical freight infrastructure improvements necessary to support future freight demands • Number of high-value jobs measured by CEDS Location Quotient for freight intensive industries (energy, chemicals) in the JOHRTS region
Freight Mobility and Reliability	• Reduce congestion on freight corridors • Reduce the number of bottlenecks on the freight system • Improve the reliability of the freight system as measured by corridor travel times • Improve the intermodal connectivity of the freight system • Use advanced technologies in projects to enhance the freight system	• Truck Travel Time Index • Truck Planning Time Index • Truck Frequency of Congestion • Percentage/lane miles of intermodal connectors with an identified geometric issue • Number of freight system projects with advanced technologies

GOALS	OBJECTIVES	PERFORMANCE MEASURES
Safety, Security, and Resiliency	• Reduce the number of fatal and serious injuries and crashes on the freight transportation system • Reduce the number and severity of truck involved crashes • Improve geometric issues affecting freight movements • Improve freight network resiliency after natural disasters	• Number of fatal and serious injuries and crashes on the freight transportation system • Number of fatal and serious injuries and crashes involving trucks in the JOHRTS region • Number of truck-involved crashes in the JOHRTS region • Number of geometric issues affecting freight movements • Number of redundant freight corridors • Number of days/weeks/months to reopen freight corridors or freight facilities
State of Good Repair	• Maintain the freight system in a state of good repair using resilient and cost-effective approaches	• Percentage of NHS roadway pavement in the JOHRTS region in good condition • Percentage of NHS roadway pavement in the JOHRTS region in poor condition • Percentage of intermodal connectors pavement in good condition
Environmental Stewardship and Quality of Life	• Reduce the adverse environmental impacts of freight movement • Consider freight traffic impacts on adjacent land uses, including in designating truck routes	• Enact truck idling programs • Promote private sector businesses that have undertaken fuel reduction strategies • Promote and support freight villages • Truck route signing • Develop truck route landscape and vegetation plans
Sustainable Funding	• Identify sustainable funding sources • Seek competitive grant funding opportunities	• Increase funding for freight related projects • Apply for at least one competitive grant every other year

The proposed JOHRTS Regional Freight Mobility Plan goals are compared with the MAP-21 National Goal Areas to ensure consistency. Many of the JOHRTS proposed freight goals cross-cut multiple National Goal Areas. **Table 5.5** shows the relationship between the National Goal Areas and the proposed JOHRTS Regional Freight Mobility Plan goals.

Table 5.5: *Proposed JOHRTS Regional Freight Mobility Plan Goals compared to the National Goals*

National Goal Area	Proposed Freight Plan Goals					
	Economic Competitiveness	Freight Mobility and Reliability	Safety, Security, and Resiliency	State of Good Repair	Environmental Stewardship and Quality of Life	Sustainable Funding
Safety			●			
Infrastructure Condition			●	●		
Congestion Reduction	●	●				
System Reliability	●	●	●	●		
Freight Movement and Economic Vitality	●	●				
Environmental Sustainability					●	
Reduced Project Delivery Delays				●		●

Evaluating Freight Performance Measures

Performance measures are a valuable part of the planning process, because the objectives associated with the various goals can be expressed in a quantitative and consistent way over time. Most of the performance measures are quantitative measures that can be tracked numerically, while a few are qualitative measures that are not conducive to tracking analytically. The quantitative performance measures were evaluated on the availability of consistent data expected to be readily available over time through the identification of data sources, analysis, and reporting mechanisms.

As a result, some of the **Table 5.4** performance measures were not carried forward after this evaluation. The performances measures not carried forward were not deemed specific enough to be consistently measured over time with confidence. The performance measures not carried forward include:

- **Number of critical freight infrastructure improvements necessary to support future freight demands –** Since there is no universal definition of a “critical freight infrastructure improvement,” it is difficult to assign a number to this measure. However, certain projects such as channel deepening are widely recognized to be crucial for regional cargo movements, and hence can be advanced as a matter of policy.
- **Number of geometric issues affecting freight movements –** This measure is too vague and requires a clear definition.
- **Number of redundant freight corridors –** This measure would require a clear definition of “redundant,” possibly supported by analytical assessment of route classification and spacing.
- **Percentage/lane miles of intermodal connectors with an identified geometric issue** – Like geometric issues affecting freight movements, this measure lacks a clear definition.
- **Number of funded freight system projects with advanced technologies –** While technology deployments such as Intelligent Transportation Systems can certainly enhance goods movement, they would probably be used as part of a larger application that also benefits non-freight traffic.

It is also important to evaluate the performance measures to ensure proper data are available and capable analysis tools and agency/people are in place to do the analysis. These items are identified in **Table 5.6**.

These performance metrics could be monitored and reported via a Freight Dashboard posted to the SETRPC website, an Annual Freight Report, or another mechanism deemed appropriate by SETRPC. The goal would be to measure and report on freight plan progress and challenges in meeting the performance targets.

Table 5.6: *Proposed JOHRTS Regional Freight Mobility Plan Performance Measures, Supporting Data, and Analysis Tools*

Proposed Freight Plan Goals	Proposed Freight Performance Measures	Data Set	Analysis Tools
Economic Competitiveness	• Number of identified intermodal port connector projects from Port Connectivity Report and Appendix completed • Number of high-value jobs measured by CEDS Location Quotient for freight intensive industries (energy, chemicals)	Port Connectivity Report/JOHRTS Comprehensive Economic Development Strategy	JOHRTS analysis
Freight Mobility and Reliability	• Truck Travel Time Index • Truck Planning Time Index • Truck Frequency of Congestion	NPMRDS	JOHRTS analysis
Safety, Security, and Resiliency	• Number of truck-involved crashes in the JOHRTS region • Number of severe crashes (injuries and fatalities) involving trucks in the JOHRTS region • Number of injuries involving trucks in the JOHRTS region • Number of days/weeks to reopen freight corridors or freight facilities	FARS/CRIS/ARF, JOHRTS/Ports data	JOHRTS analysis
State of Good Repair	• Percentage of NHS roadway pavement in the JOHRTS region in good condition • Percentage of NHS roadway pavement in the JOHRTS region in poor condition • Percentage of intermodal connectors pavement in good condition	NPMRDS TxDOT PMIS	JOHRTS analysis
Environmental Stewardship and Quality of Life	• Enact truck idling programs • Promote fuel reduction strategies • Promote and support freight villages • Truck route signing • Develop truck route landscape and vegetation plans	JOHRTS Policies and Programs	JOHRTS analysis
Sustainable Funding	• Increase funding on freight related projects based on a five-year rolling average • Apply for at least one competitive grant every other year	JOHRTS	JOHRTS

Recommended Freight Performance Measures and Targets

The recommended freight performance measures provide key performance areas to assist in the project investment decisions and to track the progress toward meeting regional freight goals. Freight performance measures are therefore closely aligned with freight goals and targets as shown in **Table 5.7**.

For Economic Competitiveness, the JOHRTS Regional Freight Mobility Plan proposes to use the number of completed intermodal port connector projects from the TxDOT Port Connectivity Report and Appendix.

Another proposed performance measure is the increase in high-value jobs as measured by the CEDS location quotient for freight intensive industries such as energy and chemical industries in the region.

For Freight Mobility and Reliability, JOHRTS has proposed to use travel reliability measures developed by the Texas Transportation Institute based on federal guidance. JOHRTS is also proposing to use a truck travel reliability measure on I-10 to monitor freight travel reliability. Although this will adequately capture freight travel performance on I-10 in the JOHRTS region, it is recommended to include freight reliability metrics for the remainder of the National Highway System routes in the region. Moreover, the data to do this analysis is readily available to JOHRTS through the NPMRDS program.

For Safety, Security, and Resiliency, the JOHRTS MTP has adopted the TxDOT performance targets. The JOHRTS Regional Freight Mobility Plan proposes to follow these targets for the number of truck-involved crashes, number of severe crashes involving trucks, and number of injuries involving trucks. The freight plan also recommends including a measure of the time required to reopen key freight facilities after a disaster.

For State of Good Repair, the JOHRTS Regional Freight Mobility Plan proposes following the MTP goals, objectives, and performance measures.

For Environmental Stewardship and Quality of Life, the JOHRTS Regional Freight Mobility Plan proposes several performance measures to work towards minimizing freight’s impact on the environment through JOHRTS policy and programming efforts.

Transportation funding is a national, state, and regional issue. For Sustainable Funding, the JOHRTS Regional Freight Mobility Plan proposes additional points for projects meeting freight goals during the MTP funding process, and increasing funding for freight-related improvements on a five-year rolling average basis. In addition, the plan encourages JOHRTS to continue participating in the national competitive grants process and supporting the efforts of key regional freight stakeholders (such as the ports) in applying for such grants.

Table 5.7: *Proposed JOHRTS Freight Performance Measures and Targets*

Proposed Freight Plan Goals	Proposed Freight Performance Measures	2022 Targets
Economic Competitiveness	• Number of completed intermodal port connector projects from Port Connectivity Report and Appendix • Number of high-value jobs	• Increase the number of completed intermodal port connector projects from Port Connectivity Report and Appendix • Increase the location quotient in energy and chemical industries
Freight Mobility and Reliability	• Truck Travel Time Reliability Index • Truck Planning Time Index • Truck Frequency of Congestion	• TTRI = 1.50 • TPTI = 1.50 • Congestion = 70%
Safety, Security, and Resiliency	• Number of truck-involved crashes in the JOHRTS region • Number of severe crashes (injuries and fatalities) involving trucks in the JOHRTS region • Number of injuries involving trucks in the JOHRTS region • Number of months/weeks to reopen freight corridors or freight facilities	• Reduce by 2% over current baseline forecast • Reduce by 2% over current baseline forecast • Reduce by 2% over current baseline forecast • Reduce the time to recover from disasters
State of Good Repair	• Percentage of NHS roadway pavement in the JOHRTS region in good condition • Percentage of NHS roadway pavement in the JOHRTS region in poor condition • Percentage of intermodal connectors pavement in good condition	• Good NHS pavement condition = 52.3% • Poor NHS pavement condition = 14.3% • Increase intermodal connectors pavement in good condition by 1% over baseline
Environmental Stewardship and Quality of Life	• Enact truck idling programs • Promote fuel reduction strategies • Promote and support freight villages • Truck route signing • Develop truck route landscape and vegetation plans	• Policy/Qualitative items

Proposed Freight Plan Goals	Proposed Freight Performance Measures	2022 Targets
Sustainable Funding	• Increase funding for freight related projects (or number of freight projects funded) • Apply for competitive grants	• Award additional points for projects that help meet regional freight goals during MTP process • Increase funding on freight related projects based on a five-year rolling average • Apply for at least one competitive grant every other year

Chapter 6
Freight Needs, Projects, Policies, Programs and Studies

Introduction

Freight is multimodal, frequently crosses jurisdictional boundaries, and does not behave the same way as passenger and commuter traffic. It is therefore important to identify regional freight transportation needs and the extent to which those needs are being met by existing programs. It is also important to define the unmet freight needs, develop projects or programs to address them, and prioritize such projects to arrive at a strategic list of regional freight priorities.

This chapter (1) collects and classifies multimodal freight system needs by identifying capacity constraints, deficiencies, challenges, and opportunities; (2) identifies freight relevant projects in the MTP and other existing plans/programs and matches them to the needs to identify unmet or partially met freight system needs (gaps); (3) identifies new and potential freight projects, policies, programs and/or studies to meet the unmet needs; (4) prioritizes the new and potential projects; and (5) maps freight system needs and projects when possible and lists them otherwise.

Freight system needs were identified using insights collected through outreach and interviews combined with the most recent data on freight mobility, safety, and infrastructure condition and review of relevant transportation studies. The project team conducted 14 interviews with shippers, carriers, seaports, and other freight stakeholders. Participants in a project kickoff meeting held on October 18, 2018 also provided input on freight needs. **Appendix B** provides lists of interviewees and kickoff meeting attendees.

Mappable (location-specific) freight needs were matched to previously planned projects from the **2045 Metropolitan Transportation Plan (MTP)**. When these needs were not met or partially met by previously planned projects, new and potential freight projects were identified through a location matching analysis.

For the new and potential projects, depending on the type of project, scoring information was gathered to prioritize them. High-priority projects were combined with other closely located projects (of any priority) to create project packages. Freight goals-based weighting information was used to finally rank the project package locations (that include at least one high-priority project) and labeled as recommended freight projects (**Figure 6.1**). In addition to this, policies, programs, and studies were identified for the needs that are not met by planned/recommended projects.

Figure 6.1: *Process for Identifying Freight Needs and Prioritizing Projects*

- **Define Needs**
  - Analyze freight mobility, safety, and infrastructure conditions
  - Combine with stakeholder input
  - Develop master needs list
  - Map location-specific needs
- **Define New Freight Projects**
  - Match freight needs to MTP 2045 projects
  - Define new projects to address unmet freight needs
- **Score Freight Projects and Create Project Packages**
  - Score projects based on freight mobility, safety, and infrastructure condition impacts
  - Combine high-priority projects with nearby freight projects to develop project packages
- **Rank Freight Project Packages**
  - Use freight goals-based weighting information to rank project package locations
- **Identify Non-project Freight Needs**
  - Develop policies, programs, and study recommendations for needs not met by planned or recommended projects

Maps of location-specific freight needs and planned/recommended freight projects, and master lists of all freight needs, projects, policies, programs and studies are included in this chapter.

The remainder of this chapter is organized as follows:

- Freight System Needs
- Previously Planned Freight Projects
- Recommended Freight Projects
- Recommended Freight Policies, Programs and Studies

Technical details on the methodology and results are provided in **Appendices C**, **D**, **E**, and **F**.

Freight System Needs

A total of 105 multimodal freight system needs were identified on the regional freight system. **Table 6.1** identifies five need types into which these needs were categorized and lists the data sources used to analyze them. Freight mobility needs are mostly disaggregated locations where freight plan stakeholders identified congestion or restricted access issues. On the other hand, truck safety hotspots, "poor"/"fair" pavement condition locations, and bridge locations needing improvements were identified primarily based on TxDOT datasets[1]. Similarly, highway/rail at-grade crossing safety issues were identified primarily based on Federal Railroad Administration (FRA) data[2]. Other needs were identified through stakeholder input.

Table 6.1: *Freight Need Type Definitions and Data Sources*

Need Type	Definition	Data Sources
Economic/ Institutional Needs, Challenges and Opportunities	Needs related to freight regulations or policies that impact goods movement efficiency, or large-scale freight infrastructure investments that could transform the regional freight landscape	• Stakeholder input and interviews • Online resources
Freight Mobility Needs	Freight congestion hotspots or locations with restricted access, and system operational or freight traveler information needs	• Truck bottleneck analysis via National Performance Management Research Data Set • Stakeholder input and interviews • 2045 MTP volume to capacity ratio maps
Freight Safety and Resiliency Needs	Locations with high numbers of truck-involved crashes, rail grade crossing safety hotspots, flood-prone areas and other resiliency issues	• TxDOT Crash Records Information System

[1] TxDOT Crash Records Information System (CRIS) 3-Year (2016-2018) crash history data and CDM Smith analysis for truck safety hotspots; TxDOT 2016 Pavement Conditions data updated by CDM Smith to existing (2019) conditions by considering pavement condition improvement projects completed between 2016-2019; and 2018 TxDOT Bridge Conditions data.

[2] Federal Railroad Administration's Office of Safety Analysis' top highway/rail crossings list by predicted number of accidents using Web Accident Prediction System (WBAPS) and 10-year (2009-2018) highway/rail accidents history data

Need Type	Definition	Data Sources
		• Federal Railroad Administration grade crossing safety data • Stakeholder input and interviews
State of Good Repair Needs on Freight Facilities	Locations with pavement in poor or fair condition or bridges requiring improvements to handle truck traffic	• TxDOT pavement and bridge conditions data • Stakeholder input and interviews
Freight related Quality of Life Issues/ Environmental Challenges	Areas where trucks route through neighborhoods or other incompatible land uses; shoaling, weather, and sedimentation on waterways affecting navigation safety and efficiency	• Stakeholder input and interviews

Source: CDM Smith

Table 6.2 summarizes the number of needs by primary need type and relevant modes. About 50% of the identified needs are on the highway system and 50% on other modal systems. While 44 of the 105 needs are location-specific or mappable, 61 are not. **Appendix C** contains a brief overview of the freight system to understand the context and extent of identified needs. **Appendix D** contains a master list of all identified needs and maps of location-specific needs.

Table 6.2: *Number of Multimodal Freight System Needs in JOHRTS Region by Type and Mode*

Primary Need Type	Highway	Rail	Water	Pipeline	Highway/ Rail	Pipeline/ Water	Other Multi-modal	TOTAL
Economic/ Institutional Needs, Challenges and Opportunities	16	5	15	1		2	14	**53**
Freight Mobility Needs	26	1	1					**28**
Freight Safety and Resiliency Needs	6				4		5	**15**
State of Good Repair Needs on Freight Facilities	3							**3**
Freight related Quality of Life Issues/ Environmental Challenges	2		4					**6**
TOTAL	**53**	**6**	**20**	**1**	**4**	**2**	**19**	**105**

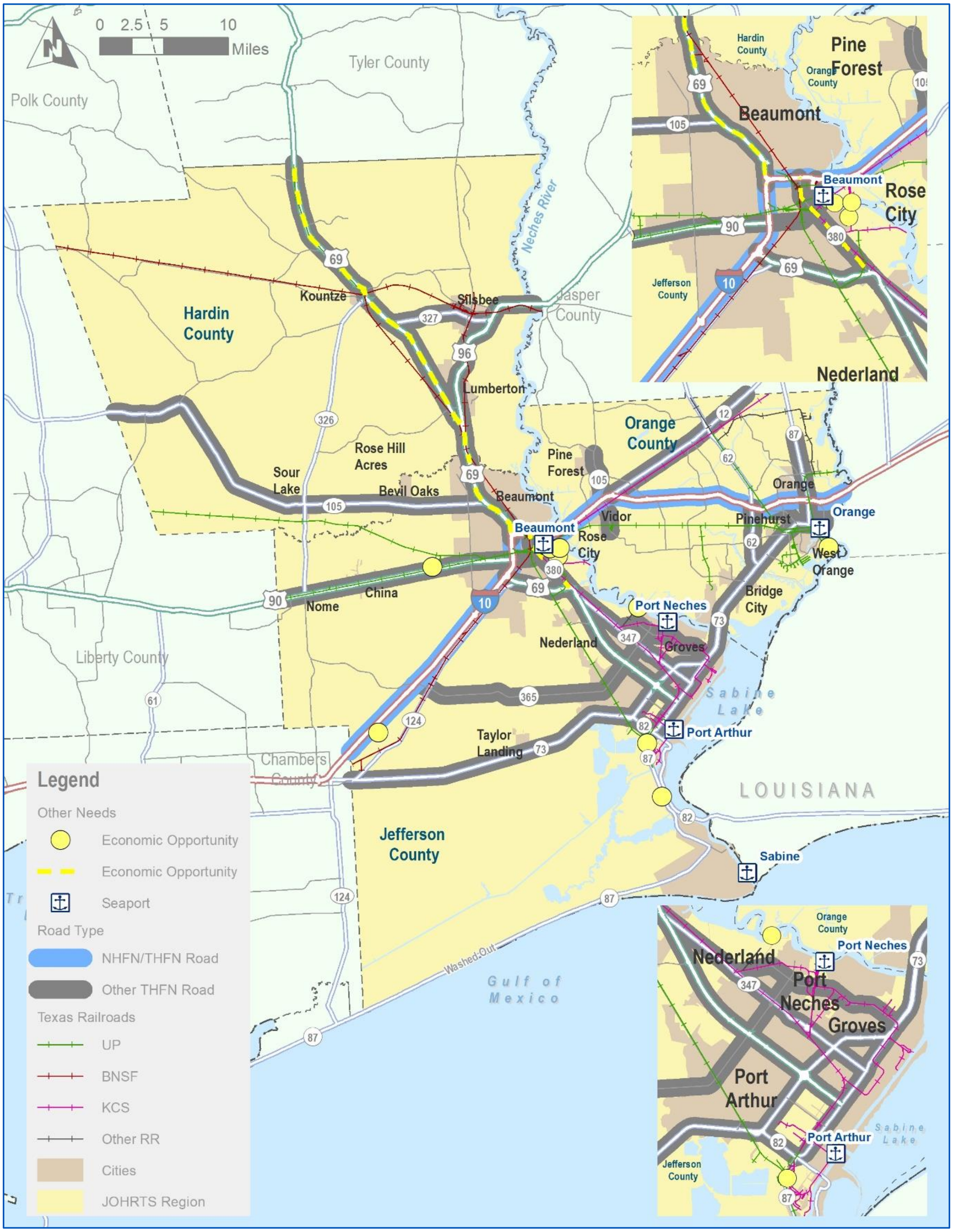
Source: CDM Smith

The following sections summarize needs under each of the primary need types.

Economic/Institutional Needs, Challenges, and Opportunities

About half of the identified needs (including challenges and opportunities) are economic/institutional needs. They were identified primarily based on stakeholder inputs. Input was gathered through one-on-one interviews and a project kickoff meeting held on October 18, 2018. A few were also identified through news articles and online publications. Out of the 53 total needs, 12 are location-specific and 41 are not. **Figure 6.2** shows the location-specific economic/institutional needs. **Appendix D** contains a list of all unmapped needs.

Figure 6.2: *JOHRTS Region Economic/Institutional Needs and Opportunities*



Source: TxDOT GIS Datasets (via TxDOT Open Data Portal); CDM Smith's JOHRTS Region Base Map; Stakeholder Inputs.

The JOHRTS Region has been in the center of several economic developments and opportunities in the last decade. These trends are driving many regional freight needs. Key economic trends and their impact on regional goods movement include:

- **Domestic energy boom.** Since 2005, there has been an oil and natural gas boom[3] in the Permian Basin in Texas, attributed to advances in hydrocarbon recovery such as horizonal drilling and hydraulic fracturing. A longstanding crude oil export ban was lifted in December 2015, leading to a rapid increase in exports of oil and natural gas products through Gulf Coast ports (including Port Arthur and Beaumont)[4]. New and developing marine terminals along the Sabine-Neches Waterway (e.g., Jefferson Energy terminal expansions, Sempra's proposed LNG facility, Golden Pass LNG facility expansion), and pipeline projects (e.g., TransCanada's Keystone pipeline from Cushing, OK to Nederland, TX) as well as storage facility projects (e.g., Caliche Coastal Salt Dome Storage Cavern) for crude oil, petroleum products and liquefied natural gas (LNG) near Beaumont and Port Arthur are likely to continue the growth trend. Pipeline projects especially would reduce the need for surface transportation (truck/rail/barge/vessel).
- **Sabine-Neches Waterway deepening project.** In order to take full advantage of the energy sector boom and Panama Canal expansion completed in 2016, the Port of Beaumont and the Port of Port Arthur realized it is necessary to increase the channel depth on the Sabine-Neches Waterway from 48 feet to 52 feet to accommodate larger vessels. Construction for this improvement began in 2019 and will take seven years. There is a new ship channel account created by the Texas Legislature; the Texas Ports Association is trying to capitalize this fund for such projects.
- **Diversifying waterborne cargo.** The ports in the JOHRTS Region are also diversifying their cargo base. They are looking at new services such as container-on-barge, and "ISOtainer"[5] transport. High real estate and congestion costs in Houston are also shifting barge and shipping services to the JOHRTS region.
- **Long-term vision highway investments.** Long-term vision projects of a proposed Interstate 14 (I-14 or "Forts to Ports" corridor) and improvement of US 69/96/287 to interstate standards (between Woodville and Port of Beaumont) would improve access to the ports in the JOHRTS Region and improve mobility and safety for not only industrial goods but also military cargo.
- **Private sector rail and warehousing investments.** New rail interchange facilities (e.g., Iron Horse Terminals facility on US 90) and warehousing facilities (e.g., proposed

---

[3] https://www.eia.gov/petroleum/drilling/pdf/permian.pdf (last accessed on October 3, 2019)

[4] https://www.eia.gov/dnav/pet/pet_move_exp_dc_R30-Z00_mbbl_a.htm (last accessed on October 3, 2019)

[5] ISOtainer or ISO tank container is a pressure vessel (the tank) supported and protected within an ISO frame used to transport liquids, powders or gases.

warehousing facilities near the I-10/Hampshire Rd interchange) in the JOHRTS Region are increasing mobility options for freight.

- **Labor and business migration to Texas and the JOHRTS region.** Migration of labor and businesses from other states to the metro areas in Texas and spillover from the Houston metro area to Southeast Texas is creating a rise in the demand for consumer goods and development of goods storage/packaging/distribution facilities.

Aside from the economic opportunities, there are also economic and institutional needs and challenges as follows:

- **Truck routing and signage.** Heavy and oversized cargo corridors in the JOHRTS Region need to be expanded, alternate “freight-friendly” routes should be provided, and truck and hazardous goods restriction signage needs to be installed (both permanent and temporary during construction-related full or partial closures on the highway network) to improve freight system redundancy, provide mobility options for military goods , reduce the number of truck trips, improve travel time reliability and avoid conflicts with auto traffic on neighborhood streets.
- **Marine cargo operational issues.** Specific port related issues such as loss of rail service to the Port of Orange after Hurricane Ike, aging port terminal infrastructure, pipeline damage due to vessel activity, insufficient dock space capacity/availability at private terminals, yard capacity and on-dock rail capacity exist that need to be overcome for the JOHRTS Region to remain a competitive water transportation hub. However, some of these issues (like dock space at private terminals) need to be resolved by the private sector.
- **Gulf Intracoastal Waterway maintenance needs.** The Gulf Intracoastal Waterway is not maintained to authorized depth due to funding shortfalls. This impacts barge/vessel economics (loading capacity and number of trips) for intracoastal trade in the Gulf of Mexico. This directly impacts petrochemical industry competitiveness in the JOHRTS region.
- **Lack of freight-specific funding sources.** Lack of designated critical urban freight corridors (CUFCs) and limited stakeholder support for tolls in the JOHRTS Region pose funding challenges. Funding support for freight needs to be improved by developing information for policy makers and the public on how the region and its industries relate to the FAST Act, how congestion and delay impact freight transportation in the region, and how opportunities at the ports can influence regional economic development.
- **Better weather, flooding, and port conditions information.** Stakeholders stated that there is a lack of information on the infrastructure, traffic and weather conditions at port and shipping channels. There is also a requirement for better information on the regional freight system during and after storm events, e.g., information on the routes with flooding and alternate routes and incidence clearance times. In addition, permitting

delays in draining flood water result in additional operational cost or loss of revenue to freight facilities.

- **Neches River Rail Bridge bottleneck.** Insufficient rail crossings across Neches River lead to lower rail capacity and delays to rail service. However, based on recent TxDOT communications, this need is not a high priority investment at this time for the Class I railroads.
- **Regulatory challenges.** Hours of service regulations and electronic log mandates pose challenges to truckers in the JOHRTS Region including the inability to meet the service hours for port (both within the JOHRTS region as well as at the Port of Houston) and other freight facilities. Needs such as faster delivery to customers, decentralization of warehouses, and issues such as highway construction activity and incident related delays, insufficient truck parking, driver shortage and difficulty in finding skilled drivers capable of handling heavy cargo add to the regulatory challenges. For the marine mode, the Jones Act[6] poses barge/vessel/labor restrictions for domestic shipping and dredging works.
- **Labor skills gaps.** There are some gaps between local labor force skill sets and those needed by regional employers. For example, the decline in the region's shipyard industry has led to a gap in metal working skills, which have become more valuable with the domestic energy renaissance. The truck driver shortage (a national issue) also impacts regional shippers and freight service providers. Clear and concise writing is an increasingly in-demand skill even in industrial jobs. While some programs exist to help fill these gaps, more training opportunities may be needed to prepare the region's workforce for a rapidly evolving economy.
- **Other uncertainties and risks.** Tariff increases, continuity of tax credits (incentives), project approvals and environmental clearances, and cybersecurity affect industries, ports and their transportation service providers.

Freight Mobility Needs

About 27% of the identified needs are related to freight mobility. They were identified based on stakeholder inputs and congestion data. As shown in **Chapter 1**, some segments of the regional highway network experience light to moderate truck congestion based on National Performance Management Research Data Set data. However, stakeholders identified more expansive mobility needs. Out of the 28 total needs, 23 are location-specific and five are not location-specific. **Figure 6.3** maps the location-specific freight mobility needs. Mobility needs are represented as both point and line features in the map.

The location-specific freight mobility needs can be classified into four broad categories:

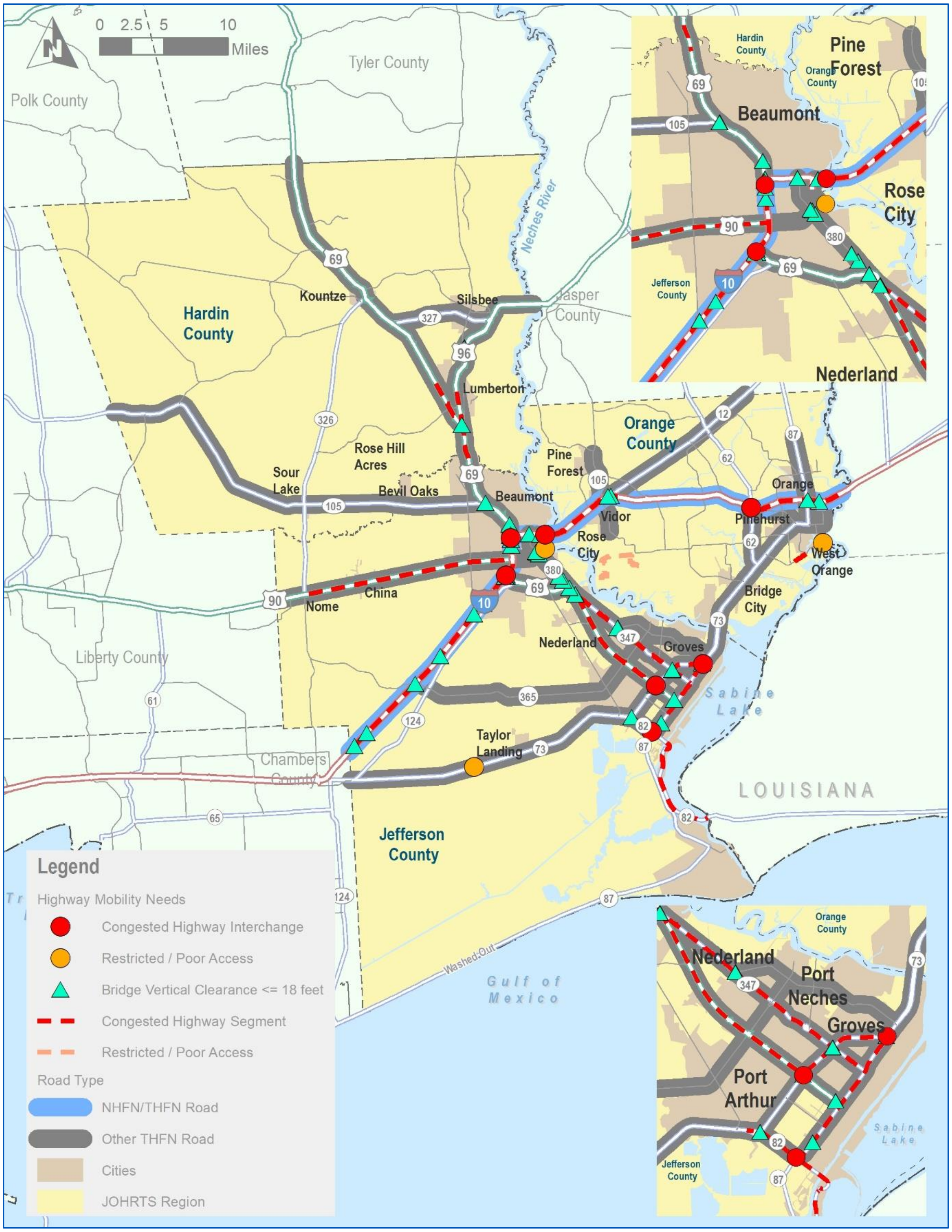
[6] The Jones Act is a federal law that regulates domestic maritime commerce in the United States.

- **Congestion issues on interregional connectivity:** These were identified on the interregional corridors of I-10, US 90 and SH 82.
- **Congestion issues on regional corridors with significant freight usage:** These were identified on the regional corridors of US 69/96/287, US 69/287, US 96, SH 73, SH 87 and SH 347.
- **Congestion issues at bridges/intersections/interchanges with significant freight usage:** Congestion was identified at the US 69/SH 73 and SH 73/SH 82 interchanges, SH 82/SH 87 intersection, and Purple Heart Memorial Bridge on I-10.
- **Restricted/poor access for freight:** Vertical clearance of less than 18.5 feet[7] was identified at 47 locations on THFN roadways, which formed a single need in the master needs list. Poor/restricted access was noted on FM 1006 in Orange County, the SH 73 bridge over the Needmore Diversion Channel (in Jefferson County), and the entrance road (one lane bridge) to the Port of Orange. Two low-volume roads in Orange County, namely, South Mansfield Ferry Road and Church House Road were also identified to have poor/restricted access. Lack of truck parking or marshalling areas within the Port of Beaumont premises also results in delays and queueing in and around the port.

Appendix D contains a list of all needs relating to freight mobility.

[7] TxDOT proposed use of 18.5 feet as the minimum vertical clearance for freight use in the 2018 TxDOT Freight Mobility Plan.

Figure 6.3: JOHRTS Regional Highway Freight Mobility Needs



Source: TxDOT GIS Datasets (via TxDOT Open Data Portal); CDM Smith's JOHRTS Region Base Map; CDM Smith's Mobility and Safety Analysis; Stakeholder Inputs.

The non-location specific mobility needs include:

- **Increasing crude by rail shipments.** With the energy sector boom and lifting of crude oil export ban, crude by rail movements have risen in the region. Growth in tank rail cars is reducing the Class I railroad mainline capacity for other types of freight by rail and is adding congestion and delay.
- **Increasing vessel traffic.** Similar to rail, the energy sector boom and lifting of the export ban has resulted in a growth in crude oil vessels on the Sabine-Neches Waterway. This is limiting the waterway capacity for other types of freight and is adding congestion and delay.
- **Traffic operational issues.** Long construction and incident clearance durations are resulting in delays and queuing issues on I-10 and at the SH 99/SH 146 interchange[8] which in turn result in inefficient truck movements and unreliable travel times. While construction activities and incidents are temporary in nature, there seems to be a need for a consistent application of traffic management practices and solutions (e.g., identification of alternate "freight-friendly" routes).
- **Poor geometry in delivery zones.** Narrow curb cuts reduce a truck's maneuverability at delivery zones. Locations should be identified by stakeholders where curb cuts need a redesign/reconstruction.

Freight Safety and Resiliency Needs

Freight safety needs were identified using a mix of safety data analysis and stakeholder inputs. Two types of analysis were performed to identify freight safety needs:

- **Truck-involved crash hotspots analysis:** Three years of crash history data (2016-2018) on truck-involved crashes was collected from TxDOT's Crash Records Information System and generalized to roughly 0.6-mile by 0.6-mile cells across the JOHRTS Region. Crash data aggregated to the cells includes number of crashes, number of persons killed or with incapacitating injuries[9], number of persons with non-incapacitating injuries[10], and number of persons with no or unknown injuries[11]. Truck safety hotspots were defined as the cells where at least one of the following statements is true: (a) number of persons killed or with incapacitating injuries >= 1; (b) number of persons with non-incapacitating injuries >= 10; or (c) number of persons with no or unknown injuries >= 20. Seventy-one such hot spots were identified, which were consolidated into a single need in the master list of needs.

---

[8] This interchange is outside the JOHRTS region but is important for interregional freight connectivity.

[9] K or A in KABCO Injury Classification Scale developed by the National Safety Council (NSC)

[10] B in KABCO Injury Classification Scale developed by the National Safety Council (NSC)

[11] C or O in KABCO Injury Classification Scale developed by the National Safety Council (NSC)

In addition, unit costs by severity assumptions based on TxDOT's Safety Improvement Index (SII) calculator[12] were used to calculate crash costs for the defined cells. The economic cost for a person killed or with incapacitating injury and person with non-incapacitating injury are assumed based on the 2018 SII Calculator[13] as $3,500,000 and $500,000, respectively. No cost is assumed for a person with no or unknown injury. This information was used in the project prioritization task.

- **At-grade crossing safety issues analysis:** The Federal Railroad Administration's Office of Safety Analysis provided: (a) top highway/rail crossings list by predicted number of accidents using Web Accident Prediction System (WBAPS); and (b) 10-year (2009-2018) highway/rail accidents history data. Using the former, a list of the top 25 at-grade crossings was identified; while using the latter a list of all at-grade crossings with at least one fatal or injury crash was identified. These two lists were consolidated to avoid duplication, and three more stakeholder identified at-grade crossing safety issue locations were added. The stakeholder identified locations include at-grade crossings at the entrance to the Port of Beaumont, at the entrance to the Iron Horse Terminals and near the FM 565 and US 90 intersection[14]. The final consolidated needs list consisted of 44 at-grade crossings with safety issues, which were consolidated into one grade crossing safety need.

The other 13 safety needs were identified from stakeholder input, leading to a total of 15 safety needs. The stakeholder identified needs pertain mainly to drainage issues, grade crossings and driver behavior. The drainage issue on freight facilities is a result of flooding/submergence due to hurricane and ice storm events. The factors that exacerbate the drainage issue are: poor drainage design of freight facilities, inadequate drainage requirements during land development, and delays in draining due to natural causes (persistent high-tide) or permitting delays/constraints from local authorities. The stakeholder identified grade crossing issues are at Port of Beaumont, proposed rail interchange facility on US 90 and on FM 565 and US 90 west of Jefferson County. The stakeholders also identified aggressive driver behavior at work zones.

Of the total of 15 needs, five are location-specific and ten are not location-specific. **Figure 6.4** and **Figure 6.5** show location-specific highway and railroad grade crossing safety needs, respectively.

In **Figure 6.4**, truck safety hotspots and a stakeholder identified need at Cardinal Loop under US 69/96/287 are shown. Truck safety hotspots mostly align with the congested regional corridors indicating that delays at these locations have both recurring and non-recurring components.

---

[12] http://onlinemanuals.txdot.gov/txdotmanuals/hsi/using_the_safety_improvement_index.htm (last accessed on October 3, 2019)

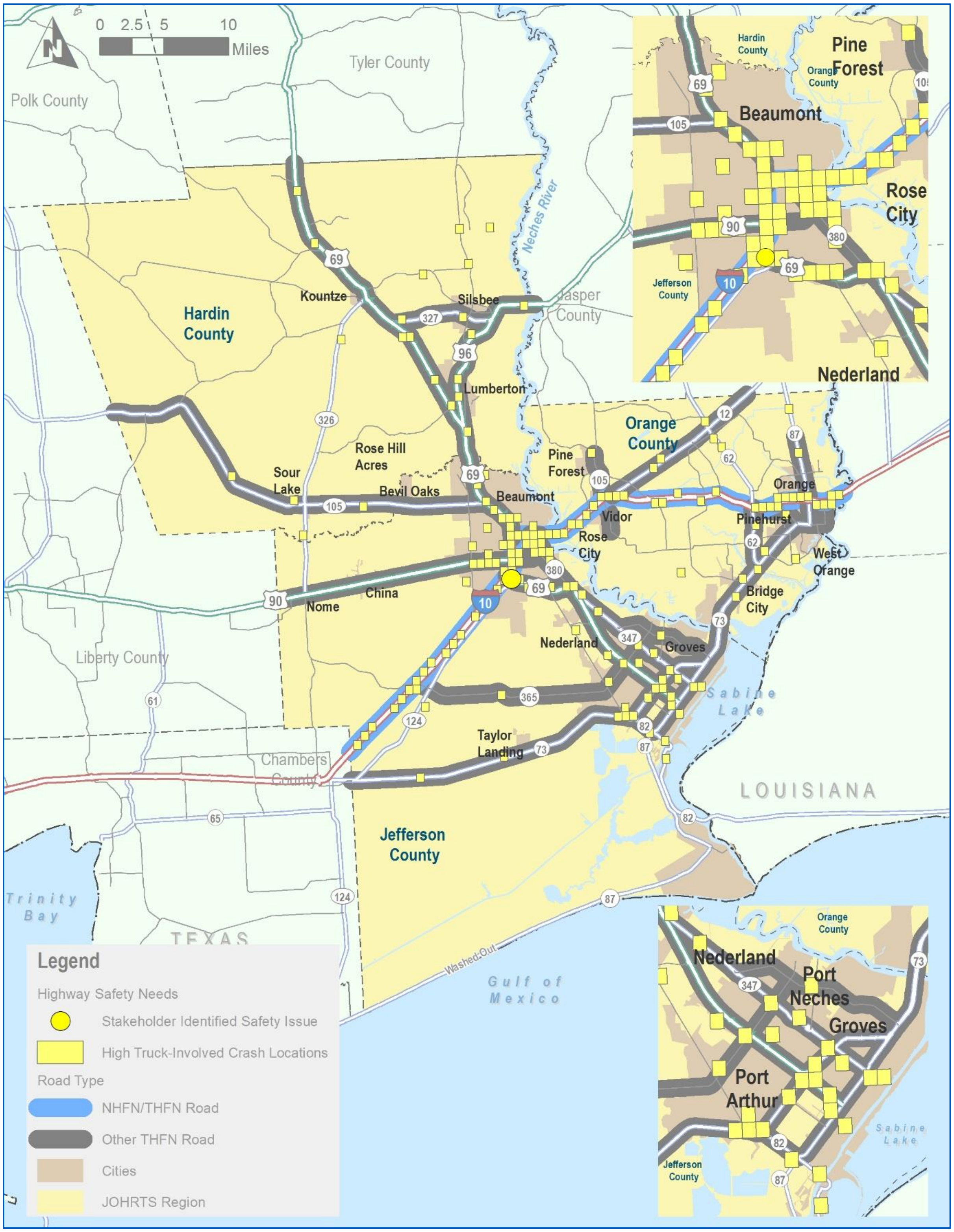
[13] https://www.txdot.gov/inside-txdot/forms-publications/publications/highway-safety.html (last accessed on October 3, 2019)

[14] This at-grade crossing is outside the JOHRTS Region but is important for interregional connectivity.

In **Figure 6.5**, only at-grade crossing safety issues are shown. The at-grade crossing safety issue near the FM 565 and US 90 intersection was not mapped as it falls outside the JOHRTS Region.

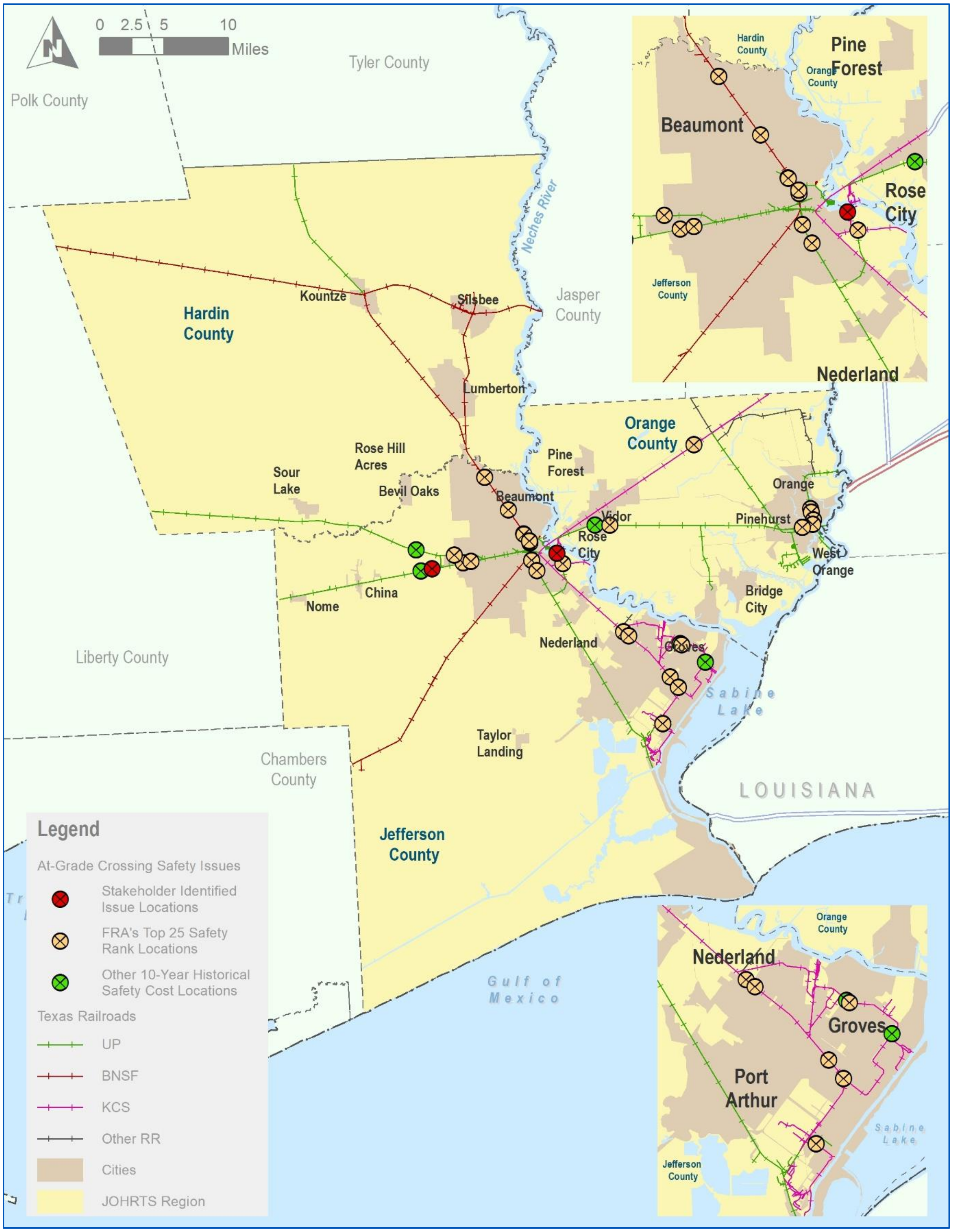
Appendix D also contains these maps and a list of all needs relating to freight safety and resiliency.

Figure 6.4: *JOHRTS Regional Highway Safety Needs*



Source: TxDOT GIS Datasets (via TxDOT Open Data Portal); CDM Smith's JOHRTS Region Base Map; TxDOT Crash Records Information System; Stakeholder Inputs.

Figure 6.5: *JOHRTS Regional Highway/Rail At-Grade Crossing Safety Needs*



Source: TxDOT GIS Datasets (via TxDOT Open Data Portal); FRA Grade Crossings Inventory; CDM Smith's JOHRTS Region Base Map and At-Grade Crossings Safety Analysis; Stakeholder Inputs.

The needs that are not location-specific include:

- **Freight system resiliency.** Resiliency of freight facilities from flooding/submergence due to storm events like Hurricane Harvey is the biggest safety threat faced by the JOHRTS region. Existing and new initiatives are needed to address this issue. These include:
  - Stakeholders indicated that a strategic risk-based asset management approach is needed to identify freight system vulnerabilities and areas that are most prone to weather events and prioritize for improvements. Scenarios that need to be considered include flood gates remaining closed until tides recede, which prevents water from draining to the coast.
  - In the 2045 MTP, maps of vulnerable bridges and roadways were identified as shown in **Appendix C**. These maps broadly identify locations that may have resiliency issues, but they do not identify specific problems or suggest potential solutions. Moreover, data available for this study does not support detailed risk assessment or prioritization. Therefore, more data on the frequency and severity based on hydrological modeling is needed to develop projects addressing the issues.
  - TxDOT seeks cost-effective and intelligent design solutions to overcome roadway drainage issues. Potential solutions include raising roads (while considering the upstream impacts), adding more culverts for drainage, and using concrete barriers with slots to allow for better drainage.
  - Private freight developments are considering concepts such as storage/drainage ponds, which are likely to avoid flooding within the property and reduce runoff to nearby roadways. Building infrastructure strong versus light (with low replacement cost and time) is also under debate.
  - Availability of safety equipment, materials, and information in case of emergencies is essential for safe and fast action and recovery without loss and injury of human life.
- **Lack of truck parking areas.** There is a need for truck parking or pull-off areas in the JOHRTS region, particularly on I-10 and US 90. The existing rest area on I-10 (in the western portion Jefferson County) gets full at night.
- **Driver behavior issues.** Stakeholders also found unique or odd contributing factors affecting safety in the JOHRTS region including road rage and trucks on passing lanes in construction zones on two-lane freeway facilities. There may be a need for better commercial vehicle enforcement operations.

State of Good Repair Needs on Freight Facilities

State of good repair needs were identified mainly using the TxDOT pavement condition and bridge condition data. An additional state of good repair need was identified by a stakeholder on the SH 87 bridge between Port Arthur and Sabine Pass that faces submergence due to ship wakes and flooding. All of the state of good repair needs are location-specific. **Figure 6.6** shows the location-specific state of good repair needs in the region. State of good repair needs on pavement are represented as line features in the map while state of good repair needs on bridges are shown as point features. **Appendix D** contains a map and a list of all needs relating to state of good repair.

The most recent publicly available TxDOT pavement condition data (from 2016) was downloaded to assess pavement needs. This data was updated by eliminating locations where pavement condition improvements were made between 2016-2018. Pavement condition of “fair” and “poor”[15] on or within 500 feet of THFN were considered as state of good repair issues. The assessment identified 569 highway links with state of good repair issues; these were grouped based on location to form 47 highway segments. These grouped segments formed a single need in the master list of needs. To maintain continuity, the grouped highway segments include “good”, “fair” and “poor” condition links.

Bridge condition data from 2018 was used to identify bridges that might need improvement. Bridges on or within 500 feet of THFN needing improvement works (as identified by TxDOT) were considered state of good repair issues. The improvement works include: (a) bridge or structure replacement; (b) bridge widening; (c) bridge rehabilitation; and (d) other structural work. Fifty-nine bridges with state of good repair issues were identified, which formed a single need in the master needs list.

[15] TxDOT uses International Roughness Index (IRI) to classify pavements into “good” (IRI < 95), “fair” (IRI 95-170) and “poor” (IRI > 170) conditions.

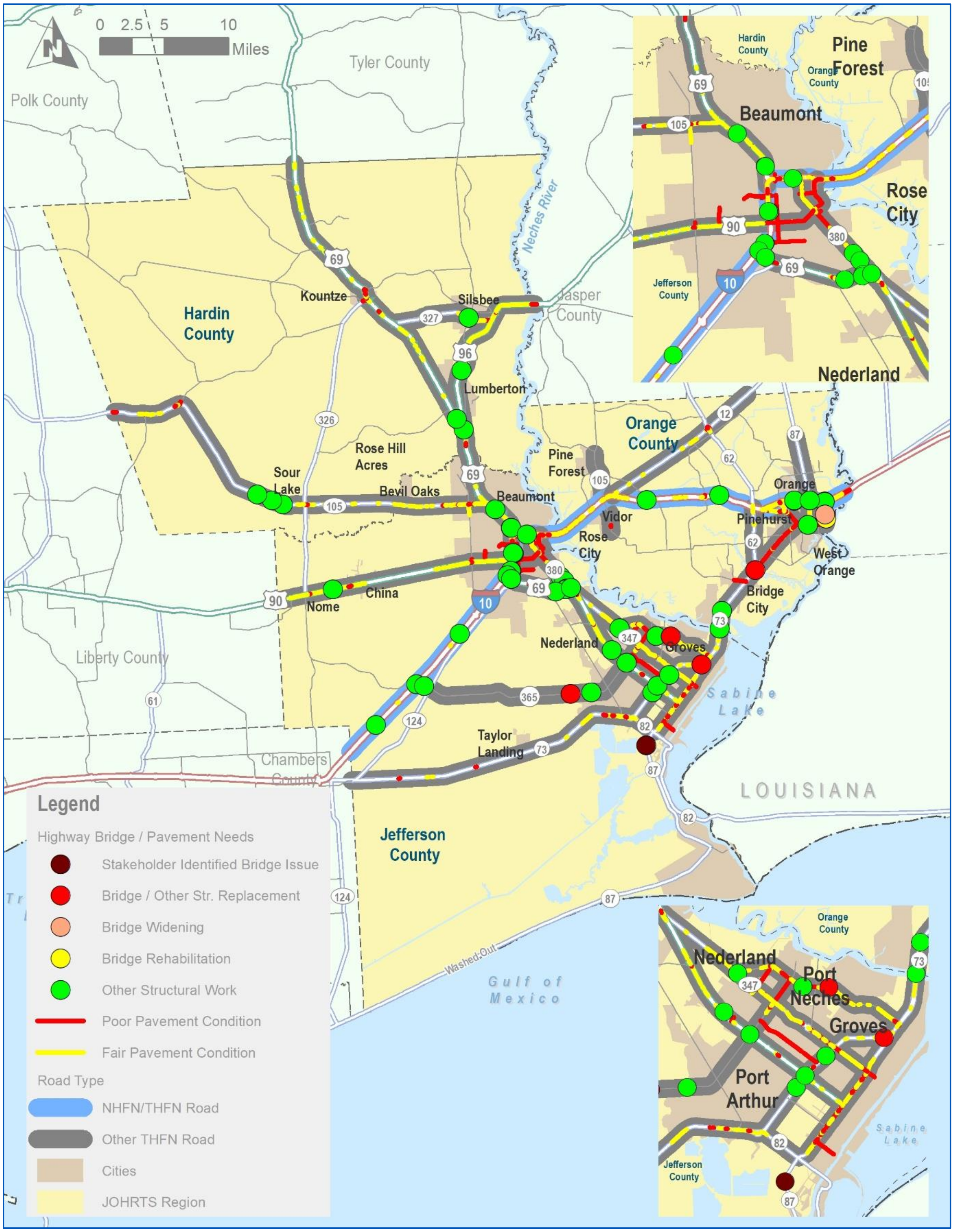
Freight-related Quality of Life Issues and Environmental Challenges

Two categories of quality of life and environmental needs were identified by stakeholders under this primary need type:

- Trucks carrying heavy or hazardous cargo and entering neighborhood streets result in unsafe travel conditions (truck-car and truck-pedestrian conflicts) and rapid pavement deterioration. Stakeholder reported examples include: Hogaboom Road from Highway 347 to Highway 366 in Groves and residential streets near ExxonMobil in Beaumont. Only one of these needs (trucks routing on Hogaboom Road in Groves) is location-specific; it is shown in **Figure 6.7**.
- Water transportation faces a wide range of environmental challenges. These include fog, sedimentation, shoaling on channel bends, and barges unmooring during storm events.

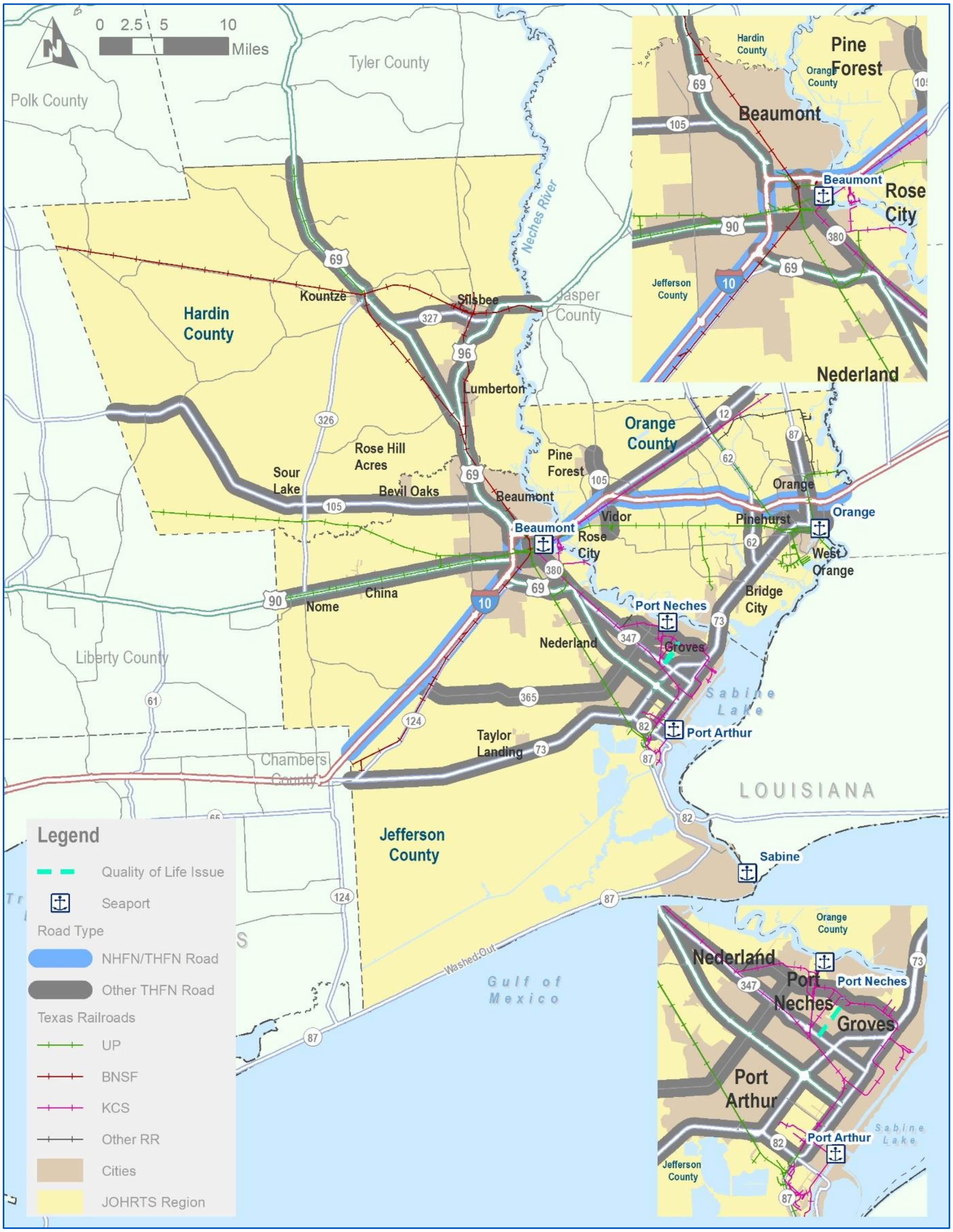
Appendix D contains a map of the single location-specific need and a list of all needs relating to quality of life issues/environmental challenges.

Figure 6.6: *JOHRTS Regional State of Good Repair Needs*



Source: TxDOT GIS Datasets (via TxDOT Open Data Portal); CDM Smith's JOHRTS Region Base Map; CDM Smith's Pavement Condition and Bridge Condition Analysis; Stakeholder Inputs.

Figure 6.7: *JOHRTS Regional Freight-related Quality of Life Issues*



Source: TxDOT GIS Datasets (via TxDOT Open Data Portal); CDM Smith's JOHRTS Region Base Map; Stakeholder Inputs.

Previously Planned Freight Projects

It is important to identify freight-beneficial transportation projects that are already programmed in the JOHRTS region. This helps identify not only where the gaps may exist, but also where the region is already responding to freight needs and concerns.

The primary source to identify previously planned freight projects is the 2045 Metropolitan Transportation Plan (MTP). Other sources searched to identify previously planned freight projects include:

- TxDOT 2020-2021 Port Capital Program
- TxDOT 2015-2016 Port Capital Program
- TxDOT 2016 Texas Rail Plan
- TxDOT Texas Port Access Study
- Sabine-Neches Navigation District Channel Deepening Fact Sheet[16]

Appendix E includes master lists of the previously planned projects.

The MTP projects are mainly based on the TxDOT Unified Transportation Program and are fully funded. They contain a CSJ (control-section-job) Number as an identifier for each project. The MTP projects list only relates to the highway or highway/rail modes. Eighty-five projects were identified in the MTP for the JOHRTS Region. MTP projects were deemed relevant to freight based on any one of the following criteria: (a) Project is on Texas Highway Freight Network (THFN); (b) Project is not on THFN but improves access to a freight facility; (c) Project is not on THFN but improves access or safety across freight rail tracks; and (d) Project provides interregional connectivity or regional network redundancy for freight flow. Seventy-three of the MTP projects met one of these criteria.

Other sources provided projects only related to freight in the JOHRTS Region. Twenty projects were identified from the other sources. Five projects in the 2020-2021 Texas Port Capital Program are known to be currently funded. The Sabine-Neches channel deepening project has been Congressionally authorized but is not yet fully funded. The funding status of the remaining 14 projects is unknown except in one case – TxDOT has been in communication with the Class I railroads on the Second Neches River Rail Crossing project included in the 2016 Texas Rail Plan, and as of today, the railroads do not consider this a high-priority investment although the project has the potential to significantly increase train capacity across the Neches River.

No grade crossing safety projects were identified. However, TxDOT is conducting a freight rail mobility and safety study for Southeast Texas, including Houston and Beaumont. This study will

[16] Sabine-Neches Navigation District. (2019). Deepening Project. Retrieved from https://www.navigationdistrict.org/projects/deepening-project/

identify grade crossing safety projects, but the findings are not yet available. The results of this study may address grade crossing safety needs in the JOHRTS region.

Previously planned freight relevant projects were not prioritized in this plan. However, their locations and project descriptions were matched against the freight need locations and their primary need type to determine whether the previously planned projects meet the need(s) and to identify unmet or partially met freight system needs (gaps).

The freight relevant MTP projects met only 17 out of the total of 44 location-specific needs, while the projects based on other sources met only seven out of the 44 location-specific needs. Most of the previously planned projects meeting the needs only met them partially. Additional projects, policies, programs and studies were needed to supplement the previously planned projects.

Recommended Freight Projects

For the location-specific unmet or partial met needs (gaps), new and potential freight projects were identified or proposed. The proposed projects fall under one of the following four categories: (a) mobility improvement; (b) safety improvement; (c) pavement condition improvement; and (d) bridge condition improvement. Each category of project has its own scoring system to determine a low, medium or high priority. Each project category is aligned with only one freight plan goal (see **Chapter 4** for a detailed discussion of freight plan goals and objectives). High-priority projects within each project category were combined with other closely located projects (of any project category or priority) to create "project packages". A project package is a collection of projects meeting various freight plan goals and having various priorities but sharing a common geographical context. Each project package contains at least one high-priority project. Project package ranks were determined by combining scores for priority (1 for low, 3 for medium and 5 for high priority) with freight plan goal weights. The details on the scoring systems and weights, as well as the master lists of proposed projects (all priority types before packaging) and projects within each of the high-priority project packages are shown in **Appendix E**.

Figure 6.8 shows a map of the recommended high-priority project packages. The projects are listed in **Table 6.3**. The key findings are:

- Three of the top 5 project packages are focused on I-10, which is the primary freight corridor in the JOHRTS region. The differences, however, are:
  - I-10 from US 90 Bus to Martin Luther King Jr Drive: primary improvement needs include pavement rehabilitation, safety improvement and bridge replacement
  - I-10 from Jefferson county line to US 69: primary improvement need is safety improvement
  - I-10 from SH 380 to Old US 90: primary improvement need is mobility improvement

- SH73/SH 82 from Taylor Bayou to the Texas-Louisiana border, SH 87 from SH 73 to SH 82 and US 69 from SH 73 to SH 347 are key access corridors for the Port of Port Arthur and its customer industries. Mobility improvement is a key need for these corridors.
- Several regional corridors such as SH 347, 9th Avenue, Phelan Boulevard, Calder Avenue, Washington Boulevard and SH 380 provide freight system redundancy. The needs are generally centered around pavement rehabilitation. Safety is also a primary need on some of these corridors.
- SH 87 bridges west of SH 82 have some infrastructure vulnerability issues. Bridge replacement projects are also needed at multiple locations in the JOHRTS Region on the lightly traveled freight corridors of SH 73 and SH 124. Failure of bridges can lead to catastrophic results and complete loss of connectivity, hence they should be prioritized.
- Aside from the above, based on mobility and safety conditions, US 69 from US 96 to Wheeler Road, SH 327 from South 19th Street to US 96 and US 69 from Tram Road to Lumberton are other locations to improve in the short term.
- Although US 90 is not part of the high-priority project packages, it is important to continue monitoring mobility and safety conditions on this interregional connectivity corridor.

Figure 6.8: *JOHRTS Regional High-Priority Freight Project Packages*

Source: TxDOT GIS Datasets (via TxDOT Open Data Portal); CDM Smith analysis.

Table 6.3: *Recommended JOHRTS Regional High-Priority Freight Project Packages List*

Project Package #	Project Package Extents
1	I-10 from US 90 Bus to MLK Jr Drive
2	SH73/SH 82 from Taylor Bayou to Texas-Louisiana Border
3	I-10 from Jefferson County line to US 69
4	I-10 from SH 380 to Old US 90
5	SH 347 from SH 87 to FM 366
6	SH 87 from SH 73 to SH 82
7	SH 380 from US 69 to I-10
8	SH 87 bridges west of SH 82
9	US 69 from US 96 to Wheeler Road
10	US 69 from SH 73 to SH 347
11	SH 327 from S. 19th Street to US 96
12	Washington Boulevard from I-10 to San Antonio Street
13	US 69 from Tram Road to Lumberton
14	Phelan Boulevard from N. Major Drive to I-10
15	Calder Avenue from Phelan Boulevard to US 90
16	9th Avenue from SH 73 to FM 365
17	FM 365/SH 124 Intersection
18	SH 73 Bridge between Labelle Road and Boondocks Road
19	SH 73 Bridge on Mayhaw Bayou
20	SH 124 Bridge at 1.6 miles northeast of SH 73

Source: CDM Smith analysis.

Recommended Freight Policies, Programs and Studies

In addition to the projects identified, this freight plan provides policies, programs and study recommendations to support freight activity in the JOHRTS region. **Appendix F** includes master lists of the recommended policies, programs and studies. The needs met by these policies, programs and studies are also included in the appendix. Some definitions are included as follows:

- **Policies** include broad recommendations to help change the way the region approaches freight planning.
- **Programs** are initiatives that can be undertaken to achieve policy goals.
- **Studies** are identified where additional information on policies and programs may be needed.

Policy Recommendations

Policy recommendations are provided to align the region's freight goals and objectives with the freight investments. These policies embrace the multimodal nature of freight movement in the JOHRTS region and provide guidance for freight plan implementation. The proposed policies for the region include:

- Lead initiatives to improve freight service and funding in Southeast Texas Region.
  - Regional stakeholders have applied for federal and state grants (e.g., BUILD Grant application for Jefferson Energy terminal expansions). They should continue to seek public funds for freight projects of regional and national significance.
  - Continue support for inclusion of critical urban and rural freight corridors in the Southeast Texas Region.
  - Use this Regional Freight Mobility Plan to increase public awareness on the importance of freight to the economy (both end customers and interim industries) and develop funding programs that include freight benefits in prioritization.
  - Maintain access for legal loads on Texas Highway Freight Network (THFN) Corridors and discourage additional restrictions from local jurisdictions when possible.
  - Reduce traffic delay impacts of construction activities and incidents on regionally important freight corridors through measures like reducing length of work zone segments, using shoulders temporarily for traffic, and working during overnight hours. A best practices study may identify more work zone strategies to consider.
  - Maintain design standards for curb cuts in freight delivery zones.
  - Reduce risks, safeguard and/or evacuate vulnerable communities and transportation infrastructure in Southeast Texas Region after harmful or dangerous industrial or weather incidents.
- Support and/or coordinate with other public sector and private sector entities to continuously identify freight transportation needs and solutions.
  - Continue coordination between regional freight related private stakeholders and national, state and local agencies.
  - Continue coordination between transportation and land use development to maximize efficiency of freight operations and property and sales tax revenue for Southeast Texas region while minimizing local community impacts.
  - Encourage local jurisdictions to adopt best practices in site and development approval to reduce flooding related impacts on freight corridors and facilities.
  - Support and strengthen enforcement (funds and recruitment) to minimize commercial driver violations and harmful or dangerous road situations.

  - Encourage truck driver safety awareness and skill development.
  - Coordinate with location-based services (Google, GPS navigation companies, truck routing application companies, etc.) to ensure route directions are customized to vehicle type.
  - Expand existing and/or develop new workforce training programs to prepare workers for emerging jobs in the regional energy, industrial, and freight sectors. These could leverage existing programs such as the truck driver school run by Texas State University, the barge deckhand and captain program at Lamar State College Orange, and the Associated Builders and Contractors craft training program.
- Assist disadvantaged private sector entities to preserve existing freight services and develop alternatives to highway mode for goods movement.
  - Support existing programs/projects for non-highway modes of freight transportation and to avoid adverse highway traffic impacts when possible.
  - Assist barge operators and water-based freight customers to receive a well-balanced water-based freight service from marine terminal operators.
  - Assist short line railroads and rail customers to receive a well-balanced freight rail service from Class I railroads.

Program Recommendations

The proposed program recommendations for Southeast Texas region support the policies above and would address some freight transportation challenges in the Southeast Texas region. The proposed recommendations include coordination and partnering with other transportation providers such as TxDOT and the Corps of Engineers. These programs are distinct from individual freight system projects because they involve multiple locations and upgrades over time and/or they are multijurisdictional with potential regional or national impacts. The proposed program recommendations for Southeast Texas include:

- Upgrade US 69/US 96 to Interstate standards.
- Increase vertical clearance to 18.5 feet on Texas Highway Freight Network corridors.
- Increase channel depth on Sabine-Neches Waterway.
- Maintain channel depth on Gulf Intracoastal Waterway at the authorized depth.
- Roadway and bridge elevation to avoid flooding after storm events.

Study Recommendations

The proposed study recommendations for Southeast Texas are areas where more information is needed to either make policy or program decisions or to identify future projects. The topic areas were derived from public input into freight issues. The proposed study recommendations include:

- Identify potential "last mile" heavy/oversize cargo haul corridors between IH 10 and bulk and military goods handling facilities.
- Identify potential truck size and weight restrictions and "truck-friendly" route signage locations to avoid adverse impacts on neighborhood streets.
- Identify information and communications technologies to inform land side and water side infrastructure, traffic and weather conditions to freight users.
- Identify innovative funding strategies to support future freight investments in the Southeast Texas region (project examples include the Second Neches River Rail Bridge).
- Identify potential best practice solutions to weather issues on water-based freight transportation including sedimentation, shoaling, barge unmooring after storm events, and fog.
- Identify truck parking demand and potential sites to improve safety and reduce impacts of hours of service regulations on local trucking industry.
- Identify engineering solutions at critical regional at-grade crossings including warning type upgrade, grade separation and grade crossing closure. (Note that the ongoing TxDOT Houston-Beaumont Freight Rail Study may identify some of these solutions; however, JOHRTS may wish to conduct its own study to identify and address grade crossing safety issues that are not addressed by the TxDOT study.)

Appendix A
Additional Commodity Flow Data

Table A.1: *TRANSEARCH Truck Commodity Detail, 2015*

STCC2	Commodity	Tons		Units		Value (in millions)		Average	Average
		Amount	Percent	Amount	Percent	Amount	Percent	Value/Ton	Tons/Unit
01	Farm Products	3,437,792	3.0%	195,237	2.4%	$2,528	1.5%	$735	17.6
08	Forest Products	61,124	0.1%	2,630	0.0%	$138	0.1%	$2,266	23.2
09	Fresh Fish or Marine Products	62,037	0.1%	2,675	0.0%	$684	0.4%	$11,032	23.2
10	Metallic Ores	100,902	0.1%	3,976	0.0%	$1,177	0.7%	$11,669	25.4
11	Coal	3,411	0.0%	138	0.0%	$0	0.0%	$27	24.8
13	Crude Petroleum or Natural Gas	10,262	0.0%	420	0.0%	$2	0.0%	$188	24.4
14	Nonmetallic Minerals	6,724,535	5.8%	276,612	3.4%	$221	0.1%	$33	24.3
19	Ordnance or Accessories	25,770	0.0%	1,150	0.0%	$907	0.5%	$35,214	22.4
20	Food or Kindred Products	5,398,207	4.7%	235,700	2.9%	$6,777	4.0%	$1,255	22.9
21	Tobacco Products	6,401	0.0%	290	0.0%	$115	0.1%	$17,915	22.1
22	Textile Mill Products	284,305	0.2%	13,314	0.2%	$1,710	1.0%	$6,016	21.4
23	Apparel or Related Products	178,471	0.2%	10,850	0.1%	$2,116	1.2%	$11,857	16.4
24	Lumber or Wood Products	3,047,511	2.6%	118,421	1.4%	$1,865	1.1%	$612	25.7
25	Furniture or Fixtures	488,377	0.4%	32,406	0.4%	$2,692	1.6%	$5,512	15.1
26	Pulp, Paper, or Allied Products	2,156,275	1.9%	89,255	1.1%	$2,252	1.3%	$1,045	24.2
27	Printed Matter	145,223	0.1%	8,150	0.1%	$409	0.2%	$2,815	17.8
28	Chemicals or Allied Products	37,477,067	32.3%	1,842,816	22.4%	$51,628	30.4%	$1,378	20.3
29	Petroleum or Coal Products	27,222,945	23.5%	1,125,245	13.7%	$16,652	9.8%	$612	24.2
30	Rubber or Miscellaneous Plastics	1,461,384	1.3%	123,155	1.5%	$6,594	3.9%	$4,512	11.9
31	Leather or Leather Products	29,628	0.0%	2,010	0.0%	$561	0.3%	$18,951	14.7
32	Clay, Concrete, Glass, or Stone	5,772,788	5.0%	361,141	4.4%	$1,652	1.0%	$286	16.0
33	Primary Metal Products	2,408,716	2.1%	96,425	1.2%	$8,158	4.8%	$3,387	25.0
34	Fabricated Metal Products	1,492,528	1.3%	83,468	1.0%	$6,396	3.8%	$4,285	17.9
35	Machinery	1,428,683	1.2%	105,452	1.3%	$16,494	9.7%	$11,545	13.5
36	Electrical Equipment	881,039	0.8%	53,121	0.6%	$10,398	6.1%	$11,802	16.6
37	Transportation Equipment	1,253,109	1.1%	89,065	1.1%	$12,261	7.2%	$9,784	14.1
38	Instrument, Photo, and Optical Equip.	74,237	0.1%	5,929	0.1%	$1,669	1.0%	$22,484	12.5
39	Miscellaneous Manufacturing Products	188,473	0.2%	9,774	0.1%	$1,341	0.8%	$7,117	19.3
40	Waste or Scrap Materials	9,078,392	7.8%	352,399	4.3%	$2,400	1.4%	$264	25.8
41	Miscellaneous Freight Shipments	2,995	0.0%	147	0.0%	$16	0.0%	$5,215	20.4
42	Shipping Containers	#N/A	#N/A	2,706,379	32.9%	#N/A	#N/A	#N/A	#N/A
43	Mail or Contract Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
44	Freight Forwarder Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
45	Shipper Association Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
46	Miscellaneous Mixed Shipments	10,143	0.0%	493	0.0%	$90	0.1%	$8,828	20.6
47	Small Packaged Shipments	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
48	Waste	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
49	Hazardous Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
50	Secondary Traffic	5,075,730	4.4%	280,061	3.4%	$10,169	6.0%	$2,003	18.1
60	Unclassified	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Total	*115,988,461*	*100.0%*	*8,228,304*	*100.0%*	*$170,075*	*100.0%*	*$1,466*	*14.1*

Table A.2: *TRANSEARCH Truck Commodity Growth, Tons 2015-2045*

STCC2	Commodity	2015		2045		Absolute	Percent	Percent
		Amount	Percent	Amount	Percent	Tons	Total	CAGR
01	Farm Products	3,437,792	3.0%	8,352,080	3.8%	4,914,288	142.9%	3.0%
08	Forest Products	61,124	0.1%	125,695	0.1%	64,571	105.6%	2.4%
09	Fresh Fish or Marine Products	62,037	0.1%	94,908	0.0%	32,871	53.0%	1.4%
10	Metallic Ores	100,902	0.1%	130,287	0.1%	29,384	29.1%	0.9%
11	Coal	3,411	0.0%	5,864	0.0%	2,453	71.9%	1.8%
13	Crude Petroleum or Natural Gas	10,262	0.0%	16,494	0.0%	6,233	60.7%	1.6%
14	Nonmetallic Minerals	6,724,535	5.8%	14,975,963	6.7%	8,251,428	122.7%	2.7%
19	Ordnance or Accessories	25,770	0.0%	76,738	0.0%	50,968	197.8%	3.7%
20	Food or Kindred Products	5,398,207	4.7%	12,561,377	5.6%	7,163,170	132.7%	2.9%
21	Tobacco Products	6,401	0.0%	2,383	0.0%	-4,018	-62.8%	-3.2%
22	Textile Mill Products	284,305	0.2%	509,131	0.2%	224,826	79.1%	2.0%
23	Apparel or Related Products	178,471	0.2%	398,729	0.2%	220,258	123.4%	2.7%
24	Lumber or Wood Products	3,047,511	2.6%	5,924,700	2.7%	2,877,188	94.4%	2.2%
25	Furniture or Fixtures	488,377	0.4%	1,774,601	0.8%	1,286,224	263.4%	4.4%
26	Pulp, Paper, or Allied Products	2,156,275	1.9%	4,051,654	1.8%	1,895,380	87.9%	2.1%
27	Printed Matter	145,223	0.1%	171,689	0.1%	26,466	18.2%	0.6%
28	Chemicals or Allied Products	37,477,067	32.3%	82,326,653	37.0%	44,849,586	119.7%	2.7%
29	Petroleum or Coal Products	27,222,945	23.5%	25,383,379	11.4%	-1,839,566	-6.8%	-0.2%
30	Rubber or Miscellaneous Plastics	1,461,384	1.3%	3,605,791	1.6%	2,144,408	146.7%	3.1%
31	Leather or Leather Products	29,628	0.0%	40,037	0.0%	10,409	35.1%	1.0%
32	Clay, Concrete, Glass, or Stone	5,772,788	5.0%	13,163,312	5.9%	7,390,525	128.0%	2.8%
33	Primary Metal Products	2,408,716	2.1%	4,031,934	1.8%	1,623,218	67.4%	1.7%
34	Fabricated Metal Products	1,492,528	1.3%	3,080,877	1.4%	1,588,349	106.4%	2.4%
35	Machinery	1,428,683	1.2%	4,091,576	1.8%	2,662,892	186.4%	3.6%
36	Electrical Equipment	881,039	0.8%	2,608,004	1.2%	1,726,965	196.0%	3.7%
37	Transportation Equipment	1,253,109	1.1%	1,836,621	0.8%	583,512	46.6%	1.3%
38	Instrument, Photo, and Optical Equip.	74,237	0.1%	350,030	0.2%	275,793	371.5%	5.3%
39	Miscellaneous Manufacturing Products	188,473	0.2%	567,426	0.3%	378,953	201.1%	3.7%
40	Waste or Scrap Materials	9,078,392	7.8%	21,841,885	9.8%	12,763,493	140.6%	3.0%
41	Miscellaneous Freight Shipments	2,995	0.0%	8,134	0.0%	5,139	171.6%	3.4%
42	Shipping Containers	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
43	Mail or Contract Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
44	Freight Forwarder Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
45	Shipper Association Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
46	Miscellaneous Mixed Shipments	10,143	0.0%	59,639	0.0%	49,495	488.0%	6.1%
47	Small Packaged Shipments	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
48	Waste	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
49	Hazardous Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
50	Secondary Traffic	5,075,730	4.4%	10,198,905	4.6%	5,123,175	100.9%	2.4%
60	Unclassified	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Total	*115,988,461*	*100.0%*	*222,366,497*	*100.0%*	*106,378,035*	*91.7%*	*2.2%*

Table A.3: TRANSEARCH Rail Commodity Detail, 2015

STCC2	Commodity	Tons		Units		Value (in millions)		Average	Average
		Amount	Percent	Amount	Percent	Amount	Percent	Value/Ton	Tons/Unit
01	Farm Products	5,703,356	10.2%	53,784	6.9%	$904	1.4%	$159	106.0
08	Forest Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
09	Fresh Fish or Marine Products	840	0.0%	40	0.0%	$1	0.0%	$598	21.0
10	Metallic Ores	56,480	0.1%	600	0.1%	$25	0.0%	$442	94.1
11	Coal	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
13	Crude Petroleum or Natural Gas	3,630,724	6.5%	37,708	4.8%	$1,184	1.8%	$326	96.3
14	Nonmetallic Minerals	2,577,617	4.6%	25,290	3.2%	$85	0.1%	$33	101.9
19	Ordnance or Accessories	2,612	0.0%	64	0.0%	$70	0.1%	$26,659	40.8
20	Food or Kindred Products	3,278,322	5.8%	46,905	6.0%	$2,391	3.6%	$729	69.9
21	Tobacco Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
22	Textile Mill Products	7,320	0.0%	480	0.1%	$31	0.0%	$4,267	15.3
23	Apparel or Related Products	18,200	0.0%	1,600	0.2%	$96	0.1%	$5,299	11.4
24	Lumber or Wood Products	681,920	1.2%	7,640	1.0%	$371	0.6%	$545	89.3
25	Furniture or Fixtures	45,320	0.1%	3,760	0.5%	$205	0.3%	$4,527	12.1
26	Pulp, Paper, or Allied Products	3,384,280	6.0%	52,960	6.7%	$2,843	4.3%	$840	63.9
27	Printed Matter	1,680	0.0%	80	0.0%	$12	0.0%	$7,147	21.0
28	Chemicals or Allied Products	22,971,601	40.9%	253,646	32.3%	$33,373	50.0%	$1,453	90.6
29	Petroleum or Coal Products	6,948,324	12.4%	77,152	9.8%	$4,364	6.5%	$628	90.1
30	Rubber or Miscellaneous Plastics	57,200	0.1%	4,120	0.5%	$293	0.4%	$5,131	13.9
31	Leather or Leather Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
32	Clay, Concrete, Glass, or Stone	914,684	1.6%	11,852	1.5%	$169	0.3%	$184	77.2
33	Primary Metal Products	2,560,013	4.6%	30,244	3.9%	$3,534	5.3%	$1,381	84.6
34	Fabricated Metal Products	50,560	0.1%	3,760	0.5%	$346	0.5%	$6,842	13.4
35	Machinery	147,028	0.3%	5,856	0.7%	$1,543	2.3%	$10,492	25.1
36	Electrical Equipment	198,640	0.4%	15,560	2.0%	$1,423	2.1%	$7,165	12.8
37	Transportation Equipment	1,331,790	2.4%	71,106	9.1%	$8,538	12.8%	$6,411	18.7
38	Instrument, Photo, and Optical Equip.	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
39	Miscellaneous Manufacturing Products	11,040	0.0%	1,240	0.2%	$113	0.2%	$10,242	8.9
40	Waste or Scrap Materials	519,596	0.9%	8,300	1.1%	$137	0.2%	$264	62.6
41	Miscellaneous Freight Shipments	77,948	0.1%	4,040	0.5%	$256	0.4%	$3,288	19.3
42	Shipping Containers	32,000	0.1%	8,000	1.0%	#N/A	#N/A	#N/A	4.0
43	Mail or Contract Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
44	Freight Forwarder Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
45	Shipper Association Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
46	Miscellaneous Mixed Shipments	904,720	1.6%	58,520	7.5%	$4,417	6.6%	$4,882	15.5
47	Small Packaged Shipments	840	0.0%	40	0.0%	#N/A	#N/A	#N/A	21.0
48	Waste	65,680	0.1%	760	0.1%	#N/A	#N/A	#N/A	86.4
49	Hazardous Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
50	Secondary Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
60	Unclassified	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Total	*56,180,335*	*100.0%*	*785,108*	*100.0%*	*$66,725*	*100.0%*	*$1,188*	*71.6*

Table A.4: TRANSEARCH Rail Commodity Growth, Tons 2015-2045

STCC2	Commodity	2015		2045		Absolute	Percent	Percent
		Amount	Percent	Amount	Percent	Tons	Total	CAGR
01	Farm Products	5,703,356	10.2%	10,924,199	10.9%	5,220,843	91.5%	2.2%
08	Forest Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
09	Fresh Fish or Marine Products	840	0.0%	1,641	0.0%	801	95.4%	2.3%
10	Metallic Ores	56,480	0.1%	83,165	0.1%	26,685	47.2%	1.3%
11	Coal	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
13	Crude Petroleum or Natural Gas	3,630,724	6.5%	5,021,933	5.0%	1,391,209	38.3%	1.1%
14	Nonmetallic Minerals	2,577,617	4.6%	4,476,761	4.5%	1,899,144	73.7%	1.9%
19	Ordnance or Accessories	2,612	0.0%	2,437	0.0%	-175	-6.7%	-0.2%
20	Food or Kindred Products	3,278,322	5.8%	5,692,732	5.7%	2,414,410	73.6%	1.9%
21	Tobacco Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
22	Textile Mill Products	7,320	0.0%	19,876	0.0%	12,556	171.5%	3.4%
23	Apparel or Related Products	18,200	0.0%	23,912	0.0%	5,712	31.4%	0.9%
24	Lumber or Wood Products	681,920	1.2%	1,119,916	1.1%	437,996	64.2%	1.7%
25	Furniture or Fixtures	45,320	0.1%	115,673	0.1%	70,353	155.2%	3.2%
26	Pulp, Paper, or Allied Products	3,384,280	6.0%	5,236,208	5.2%	1,851,928	54.7%	1.5%
27	Printed Matter	1,680	0.0%	2,348	0.0%	668	39.8%	1.1%
28	Chemicals or Allied Products	22,971,601	40.9%	48,415,478	48.3%	25,443,877	110.8%	2.5%
29	Petroleum or Coal Products	6,948,324	12.4%	6,576,093	6.6%	-372,231	-5.4%	-0.2%
30	Rubber or Miscellaneous Plastics	57,200	0.1%	185,483	0.2%	128,283	224.3%	4.0%
31	Leather or Leather Products	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
32	Clay, Concrete, Glass, or Stone	914,684	1.6%	1,761,508	1.8%	846,824	92.6%	2.2%
33	Primary Metal Products	2,560,013	4.6%	4,216,162	4.2%	1,656,149	64.7%	1.7%
34	Fabricated Metal Products	50,560	0.1%	133,693	0.1%	83,133	164.4%	3.3%
35	Machinery	147,028	0.3%	462,844	0.5%	315,816	214.8%	3.9%
36	Electrical Equipment	198,640	0.4%	737,980	0.7%	539,340	271.5%	4.5%
37	Transportation Equipment	1,331,790	2.4%	1,784,946	1.8%	453,156	34.0%	1.0%
38	Instrument, Photo, and Optical Equip.	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
39	Miscellaneous Manufacturing Products	11,040	0.0%	21,715	0.0%	10,675	96.7%	2.3%
40	Waste or Scrap Materials	519,596	0.9%	705,758	0.7%	186,162	35.8%	1.0%
41	Miscellaneous Freight Shipments	77,948	0.1%	153,226	0.2%	75,278	96.6%	2.3%
42	Shipping Containers	32,000	0.1%	61,105	0.1%	29,105	91.0%	2.2%
43	Mail or Contract Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
44	Freight Forwarder Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
45	Shipper Association Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
46	Miscellaneous Mixed Shipments	904,720	1.6%	2,173,158	2.2%	1,268,438	140.2%	3.0%
47	Small Packaged Shipments	840	0.0%	1,328	0.0%	488	58.1%	1.5%
48	Waste	65,680	0.1%	124,424	0.1%	58,744	89.4%	2.2%
49	Hazardous Materials	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
50	Secondary Traffic	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
60	Unclassified	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Total	*56,180,335*	*100.0%*	*100,235,700*	*100.0%*	*44,055,365*	*78.4%*	*1.9%*

Table A.5: *USACE WCS Ports (Beaumont, Orange, Arthur, Combined) Commodity Detail, 2015*

		All Traffic Types				Domestic				Foreign			
LPMS2	Commodity	Total	Intraport	Receipts	Shipments	Total	Intraport	Receipts	Shipments	Total	Intraport	Receipts	Shipments
10	Coal,Lignite & Coal Coke	82,769	0	31,147	51,622	31,147	0	31,147	0	51,622	0	0	51,622
21	Crude Petroleum	54,130,832	902,988	42,056,054	11,171,790	15,063,260	902,988	5,568,149	8,592,123	39,067,572	0	36,487,905	2,579,667
22	Gasoline, Jet Fuel, Kerosene	9,806,146	25,015	780,424	9,000,707	5,051,569	25,015	741,056	4,285,498	4,754,577	0	39,368	4,715,209
23	Distillate,Residual & Other Fuel Oils; Lube Oil & Greases	25,957,132	740,204	7,137,961	18,078,967	13,134,885	740,204	5,262,057	7,132,624	12,822,247	0	1,875,904	10,946,343
24	Petroleum Pitches, Coke, Asphalt, Naptha and Solvents	14,522,092	174,210	2,120,762	12,227,120	5,340,838	174,210	1,944,288	3,222,340	9,181,254	0	176,474	9,004,780
29	Petroleum Products NEC	5,180,766	119,798	580,435	4,480,533	1,134,078	119,798	576,744	437,536	4,046,688	0	3,691	4,042,997
31	Fertilizers	38,711	0	0	38,711	38,711	0	0	38,711	0	0	0	0
32	Other Chemicals and Related Products	8,273,612	279,361	2,464,682	5,529,569	4,850,823	279,361	1,750,316	2,821,146	3,422,789	0	714,366	2,708,423
41	Forest Products, Lumber, Logs, Woodchips	515,333	0	0	515,333	10,000	0	0	10,000	505,333	0	0	505,333
42	Pulp and Waste Paper	488,243	0	475,702	12,541	0	0	0	0	488,243	0	475,702	12,541
43	Sand, Gravel, Stone, Rock, Limestone, Soil, Dredged Material	911,073	0	911,073	0	18,030	0	18,030	0	893,043	0	893,043	0
44	Iron Ore and Iron & Steel Waste & Scrap	60,768	0	60,768	0	60,768	0	60,768	0	0	0	0	0
45	Marine Shells	0	0	0	0	0	0	0	0	0	0	0	0
46	Non-Ferrous Ores and Scrap	0	0	0	0	0	0	0	0	0	0	0	0
47	Sulphur (Dry), Clay & Salt	834,154	0	26,342	807,812	14,700	0	14,700	0	819,454	0	11,642	807,812
48	Slag	38,404	0	36,774	1,630	38,404	0	36,774	1,630	0	0	0	0
49	Other Non-Metal. Min.	0	0	0	0	0	0	0	0	0	0	0	0
51	Paper & Allied Products	74,555	0	358	74,197	0	0	0	0	74,555	0	358	74,197
52	Building Cement & Concrete; Lime; Glass	258,432	0	256,745	1,687	258,424	0	256,737	1,687	8	0	8	0
53	Primary Iron and Steel Products (Ingots,Bars,Rods,etc.)	279,071	0	69,011	210,060	230,252	0	22,433	207,819	48,819	0	46,578	2,241
54	Primary Non-Ferrous Metal Products;Fabricated Metal Prods.	18,469	0	18,087	382	9,401	0	9,401	0	9,068	0	8,686	382
55	Primary Wood Products; Veneer; Plywood	0	0	0	0	0	0	0	0	0	0	0	0
61	Fish	0	0	0	0	0	0	0	0	0	0	0	0
62	Wheat	920,985	0	0	920,985	0	0	0	0	920,985	0	0	920,985
63	Corn	80,366	0	0	80,366	0	0	0	0	80,366	0	0	80,366
64	Barley, Rye, Oats, Rice and Sorghum Grains	68,512	0	29,840	38,672	29,840	0	29,840	0	38,672	0	0	38,672
65	Oilseeds (Soybean, Flaxseed and Others)	294,015	0	0	294,015	0	0	0	0	294,015	0	0	294,015
66	Vegetable Products	134,254	0	75,930	58,324	18,168	0	2,954	15,214	116,086	0	72,976	43,110
67	Animal Feed, Grain Mill Products, Flour, Processed Grains	2,059	0	0	2,059	0	0	0	0	2,059	0	0	2,059
68	Other Agricultural Products; Food and Kindred Products	11,962	0	918	11,044	0	0	0	0	11,962	0	918	11,044
70	All Manufactured Equipment, Machinery and Products	104,791	0	82,192	22,599	13	0	3	10	104,778	0	82,189	22,589
80	Waste Material; Garbage, Landfill, Sewage Sludge, Waste Water	532,595	0	532,595	0	532,595	0	532,595	0	0	0	0	0
99	Unknown or Not Elsewhere Classified	174,974	0	59,181	115,793	0	0	0	0	174,974	0	59,181	115,793
	Total	123,795,075	2,241,576	57,806,981	63,746,518	45,865,906	2,241,576	16,857,992	26,766,338	77,929,169	0	40,948,989	36,980,180

Table A.6: *FHWA FAF4.3 Summary, Tons in 2014*

	Truck	Rail	Water	Pipeline	Air (include truck-air)	Multiple Modes & Mail	Other and Unknown	No Domestic Mode	Aggregated
Domestic Movements									
Outbound	13,173,591	5,746,705	17,898,804	42,292,770	231	470,887	0	0	79,582,988
Outbound to TX	4,476,337	1,092,534	13,553,863	34,441,392	0	155,178	0	0	53,719,303
Outbound to nonTX	8,697,254	4,654,171	4,344,941	7,851,378	231	315,710	0	0	25,863,685
Inbound	6,461,041	13,765,604	13,565,424	47,457,958	934	681,847	0	0	81,932,807
Inbound from TX	4,771,550	3,262,030	8,125,293	41,215,754	0	620,195	0	0	57,994,821
Inbound from nonTX	1,689,491	10,503,574	5,440,131	6,242,204	934	61,652	0	0	23,937,986
Intra-MSA	13,757,558	1,595,023	5,165,216	21,533,879	0	2,650	0	0	42,054,325
Through	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Exports Movements									
Domestic Leg	9,290,624	3,301,372	5,358,542	7,108,735	0	2,409,225	21,848	0	27,490,346
from Beaumont	5,231,656	168,676	1,433,106	7,108,735	0	48	20,405	0	13,962,625
from TX	3,699,698	127,392	3,905,481	0	0	2,409,096	1,443	0	10,143,110
from nonTX	359,270	3,005,305	19,954	0	0	82	0	0	3,384,612
Foreign Leg	1,191,152	99,198	26,194,150	0	121	2,579	3,145	0	27,490,346
from Beaumont	888,044	65,539	13,003,444	0	119	2,540	2,938	0	13,962,625
from TX	13,014	0	10,129,849	0	2	37	208	0	10,143,110
from nonTX	290,094	33,659	3,060,857	0	0	2	0	0	3,384,612
Imports Movements									
Domestic Leg	1,375,279	558,829	1,186,281	2,190,482	0	440,538	29,361	48,595,382	54,376,151
to Beaumont	907,942	55,255	134,643	664,875	0	1	28,039	48,595,382	50,386,136
to TX	422,634	183,623	609,000	392,130	0	440,460	1,322	0	2,049,168
to nonTX	44,703	319,951	442,639	1,133,477	0	78	0	0	1,940,847
Foreign Leg	709,197	188,626	52,773,600	701,677	132	2,750	171	0	54,376,151
to Beaumont	398,117	1,141	49,985,981	0	75	670	152	0	50,386,136
to TX	298,734	75,322	1,607,976	65,412	57	1,649	19	0	2,049,168
to nonTX	12,345	112,163	1,179,642	636,265	0	431	0	0	1,940,847

Appendix B
Stakeholders

This appendix contains lists of the stakeholders interviewed for the JOHRTS Regional Freight Mobility Plan (**Table B.1**) as well as attendees at the kickoff meeting held on October 18, 2018 at the SETRPC offices (**Table B.2**).

Table B.1: *List of Freight Plan Interviewees*

Organization	Contact Person & Title
PORTS	
Port of Beaumont	David C. Fisher *Port Director and CEO*
Port of Port Arthur	Larry Kelley *Executive Port Director/CEO*
Port of Orange	Gene Bouillion *Port Director and CEO*
TERMINALS	
842nd Transportation Battalion	Ricardo Roach *Lead Traffic Management Specialist*
Iron Horse Terminals	Cody Wilson *General Manager*
Jefferson Energy Terminal	Mark Viator *Director, Public & Government Affairs*
Natgasoline LLC	Trey Fielder
SHIPPERS/REFINERS	
Union Pacific	Tyson Moeller *General Director Network Development*
Wilson Warehouse	Joe Ochoa *Quality Assurance Coordinator*
Clark Freight Lines, Inc.	Danny Schnautz
OTHER	
Lamar University	Erik Stromberg *Director, Center for Advances in Port Management*
Southeast Texas Plant Manager's Forum	John Durkay *General Counsel*
GOVERNMENT	
TxDOT Beaumont District	Scott Ayres *Transportation Planning Engineer*
Jefferson County Judge	Jeff Branick *County Judge*

Table B.2: *List of Kickoff Meeting Attendees*

Name	Organization
Bob Dickinson, Paige Callaway, Jimmie Lewis, Pam Lewis	SETRPC
Roger Schiller, Bin Wang, Liza Amar	CDM Smith
Larry Kelley	Port of Port Arthur
Chris Fisher	Port of Beaumont
Jonny Trahan, Clark Slacum	Orange County
Lisa Collins	TxDOT Beaumont District
Joe Ochoa	Wilson Group Logistics
Taylor Shelton	City of Port Neches
Robert Woods	City of Nederland
Shain Eversley	Houston-Galveston Area Council
Eddie Arnold	Jefferson County
Sue Bard	Southeast Texas Art Council
Cody Birdwell	Iron Horse Terminals, LLC
Troy Foxworth	City of Groves
Dennis Isaacs	Greater Beaumont Chamber of Commerce

Appendix C
Freight System Overview

This appendix contains overview information about the multimodal freight system in the JOHRTS region. This information was drawn from the TxDOT Open Data portal, **Chapter 2** of this freight plan, US Army Corps of Engineers Waterborne Commerce Statistics, and the 2045 JOHRTS Metropolitan Transportation Plan.

Figure C.1 shows the multimodal freight system in the JOHRTS Region, while **Figure C.2** and **Table C.1** show the locations and names of major freight generators. (The numbers in **Figure C.2** correspond to those in **Table C.1**.)

I-10 is the only roadway that is designated as part of the National Highway Freight Network (NHFN). US 69/96/287, US 90, SH 73, SH 87, SH 82, SH 105, SH 12, SH 327, FM 347, FM 365 and SS 380 are other highways designated as part of the Texas Highway Freight Network (THFN). US 69 between SH 73 and I-10, and US 69 between I-10 and US 96 were proposed as part of the state's Critical Urban Freight Corridors (CUFCs) in the 2018 Texas Freight Mobility Plan. These highway segments were however not confirmed as CUFCs and remain as candidates. Class I railroads[1] in the JOHRTS Region include Union Pacific Railroad (UPRR), Burlington Northern Santa Fe Railway (BNSF) and Kansas City Southern (KCS). Sabine River & Northern Railroad[2] and Orange Port Terminal Railway[3] are the non-Class I railroads in the JOHRTS Region. JOHRTS Region has a commercial service airport (Jack Brooks Regional Airport) but it has limited passenger enplanements (just about 24,000 in the year 2017) and freight usage. People and freight by air mainly use the nearby located major commercial service airport at Houston. The region however has significant vessel/barge-based freight operations at the four ports – Port of Beaumont, Port of Port Arthur, Port of Orange, Port of Neches – and several private marine terminals along the Sabine-Neches Waterway. The region also supports the freight operations at the Port of Houston.

Table C.2 and **Table C.3** show the mileage summaries for the highway and rail freight networks in the JOHRTS Region, and **Table C.4** shows the tonnage of cargo handled at the region's ports based on US Army Corps of Engineers' Waterborne Statistics.

Figure C.3 to **Figure C.6** provide additional maps which were used in either the identification or prioritization of freight projects. These include information on truck average daily traffic (ADT), highway level of service (LOS) in 2045, vulnerable roadways, rail lines and bridges.

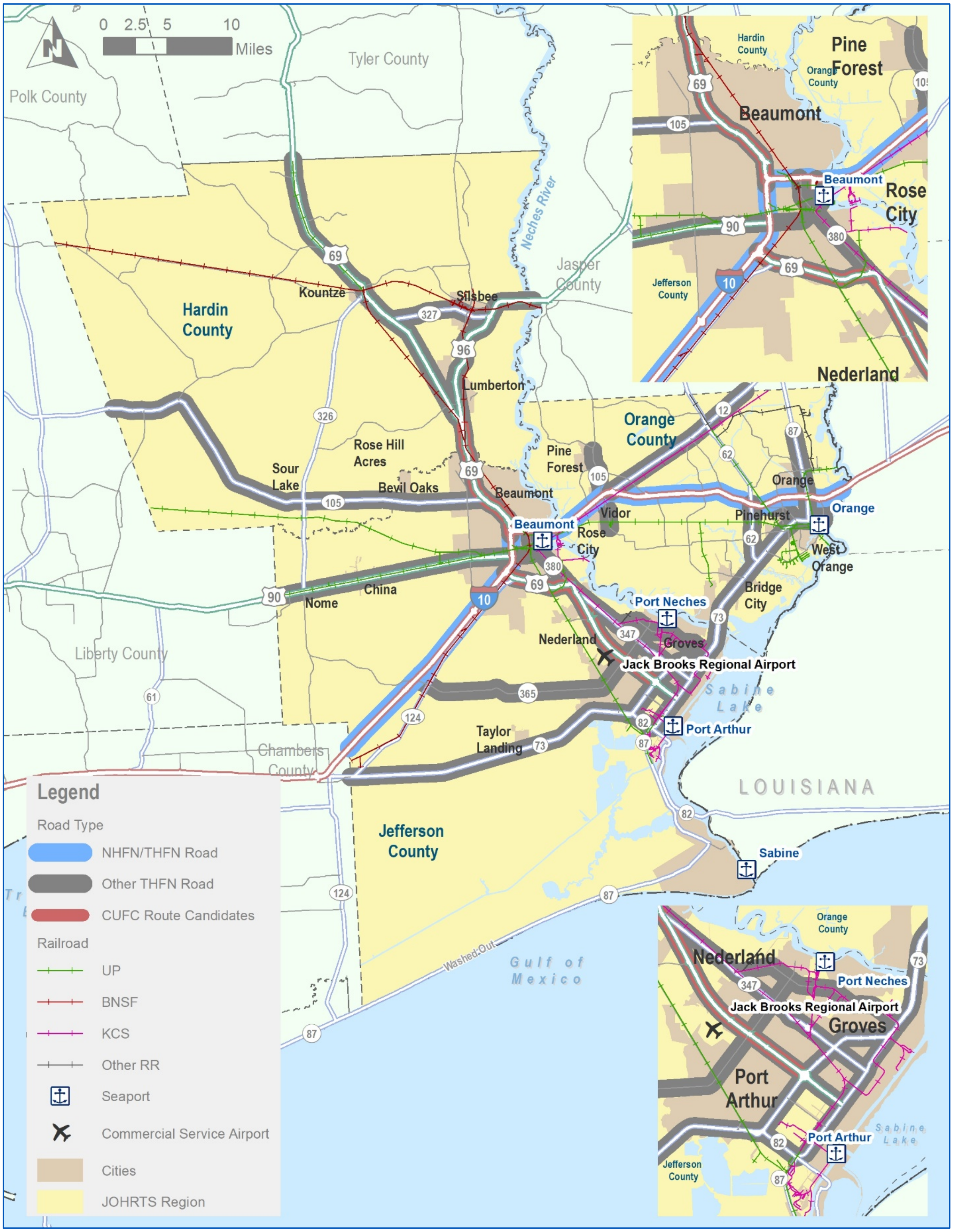
---

[1] A Class I railroad is a freight railroad with an operating revenue exceeding $457.9 million and provides national rail connectivity.

[2] https://www.up.com/customers/shortline/profiles_q-s/srn/index.htm (last accessed on October 3, 2019)

[3] https://www.up.com/customers/shortline/profiles_l-p/opt/index.htm (last accessed on October 3, 2019)

Figure C.1: *JOHRTS Regional Multimodal Freight System*



Source: TxDOT GIS Datasets (via TxDOT Open Data Portal); CDM Smith's JOHRTS Region Base Map

Figure C.2: *JOHRTS Regional Freight Generators*

Source: JOHRTS Freight Mobility Plan, Existing Conditions Report

***Table C.1:** List of Major Freight Generators in the JOHRTS Region*

Map ID	Name
1	Port of Beaumont
2	Port of Port Arthur
3	Port of Orange
4	Sunoco Logistics
5	GT Logistics
6	Valero Port Arthur Terminal
7	596th Transportation Group
8	Vulcan Materials (Beaumont)
9	Louis Dreyfus Energy Corporation (Beaumont)
10	Jefferson Energy Terminal (Beaumont)
11	Martin Marietta Aggregates
12	Beaumont Enterprise Marine Terminal
13	Natgasoline LLC
14	Omni Terminal
15	Phillips 6 Beaumont Terminal
16	ExxonMobil Polyethylene Plant/BPEX
17	Arkema Inc.
18	Motiva
19	Valero Port Arthur Refinery
20	ExxonMobil (Beaumont, refinery/chemicals/lube)
21	BASF Total Petrochemicals Inc.
22	Total Port Arthur Refinery
23	Optimus Steel
24	Martin Midstream Partners
25	Chevron Phillips Chemical (Port Arthur)
26	Chevron Port Arthur Lubricant Plant
27	German Pellets Woodville
28	Goodyear Tire
29	Firestone Polymers (Orange)
30	WestRock (paper mill in Evadale)
31	Honeywell (Orange) - synthetic rubber
32	DuPont (Orange)
33	KMTEX
34	Total Cray Valley
35	International Paper

Source: JOHRTS Freight Mobility Plan, Existing Conditions Report

Table C.2: *Mileage Summary on JOHRTS Regional Freight Highway System*

County	NHFN/THFN Route-Miles	Other THFN Route-Miles	THFN Sub-Total Route-Miles	"Candidate" CUFC Route-Miles	Total Route-Miles
Hardin	0	77	77	3	80
Jefferson	24	143	167	22	189
Orange	25	49	74	0	74
TOTAL	**49**	**269**	**318**	**25**	**343**

Note: NHFN = National Highway Freight Network; THFN = Texas Highway Freight Network. NHFN/THFN refers to roadways that are designated as both NHFN and THFN. Other THFN refers to roadways that are designated only as THFN and not NHFN.

Source: TxDOT THFN GIS Data (via TxDOT Open Data Portal)

Table C.3: *Mileage Summary on JOHRTS Regional Freight Railroad System*

County	Class I RR Route-Miles	Other RR Route-Miles	Total Route-Miles
Hardin	111	0	111
Jefferson	195	9	204
Orange	137	24	161
TOTAL	**443**	**33**	**476**

Note: Class I RR refers to Class I Railroad. It is a freight railroad with an operating revenue exceeding $457.9 million and provides national rail connectivity. In the JOHRTS Region, Class I RRs include Union Pacific Railroad (UPRR), Burlington Northern Santa Fe Railway (BNSF) and Kansas City Southern (KCS).

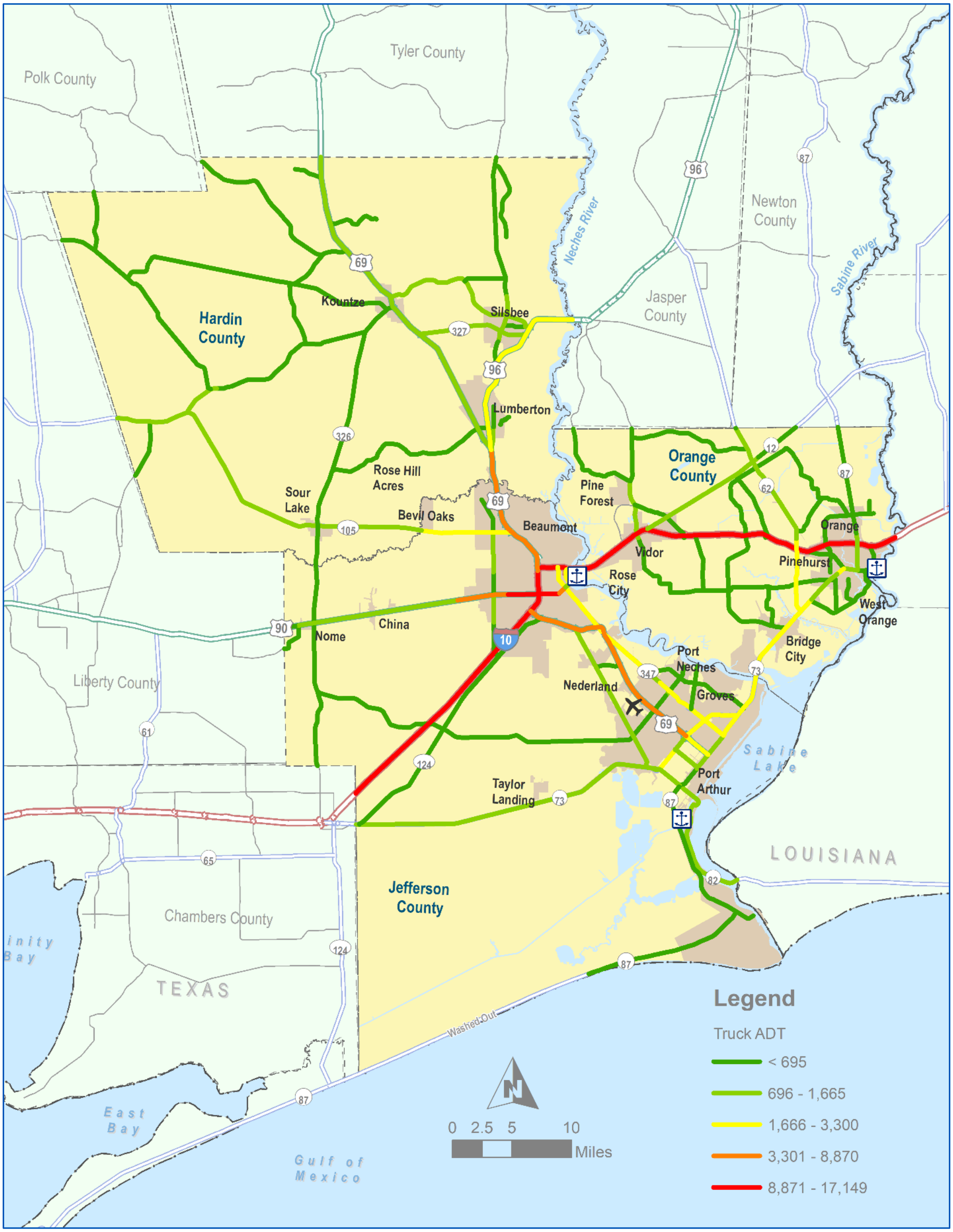
Source: TxDOT Rail Network GIS Data

Table C.4: *Freight Tonnage Handled by Seaport in the JOHRTS Region*

Seaport	2017 Export (in millions of tons)	2017 Import (in millions of tons)	2017 Domestic (in millions of tons)	2017 Total (in millions of tons)
Beaumont	26	28	36	90
Port Arthur	19	10	10	39
Sabine Pass	14	0	0	14
Orange	0	0	1	1
TOTAL	**59**	**38**	**47**	**144**

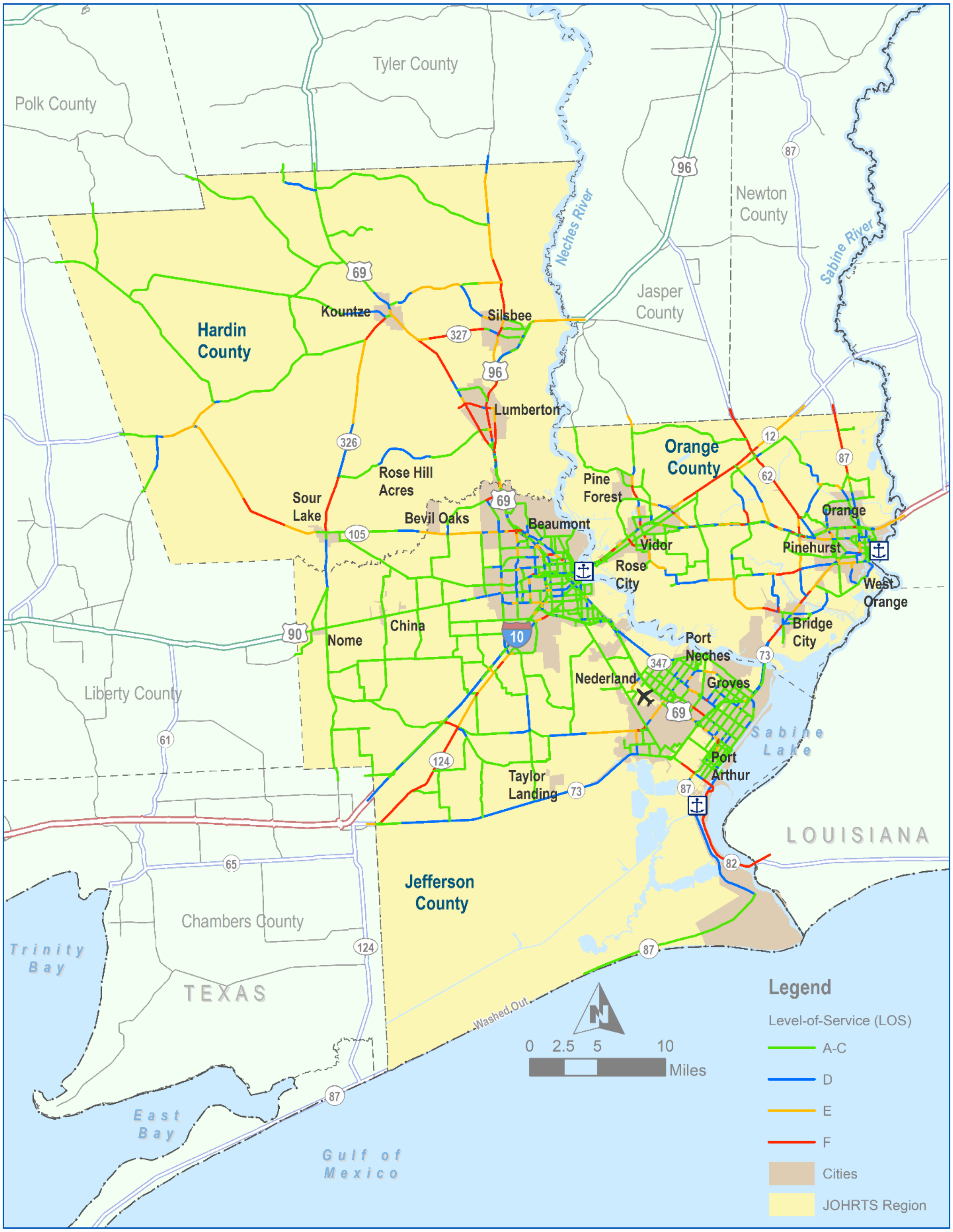
Source: US Army Corps of Engineers Waterborne Commerce Statistics

***Figure C.3:** JOHRTS Regional Highway System Existing Truck ADT*



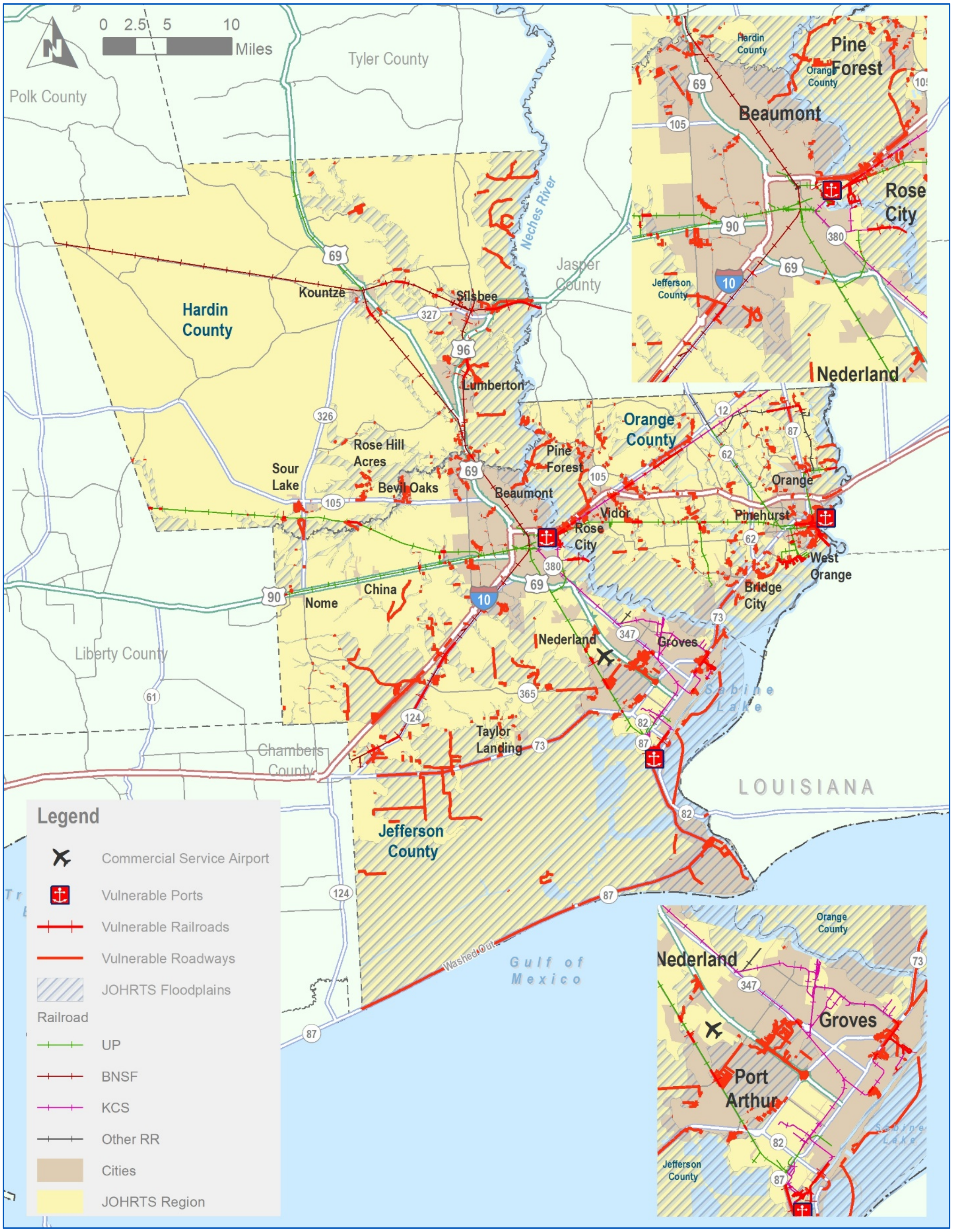
Source: JOHRTS Freight Mobility Plan, Existing Conditions Report

Figure C.4: *JOHRTS Regional Highway System 2045 Level of Service*



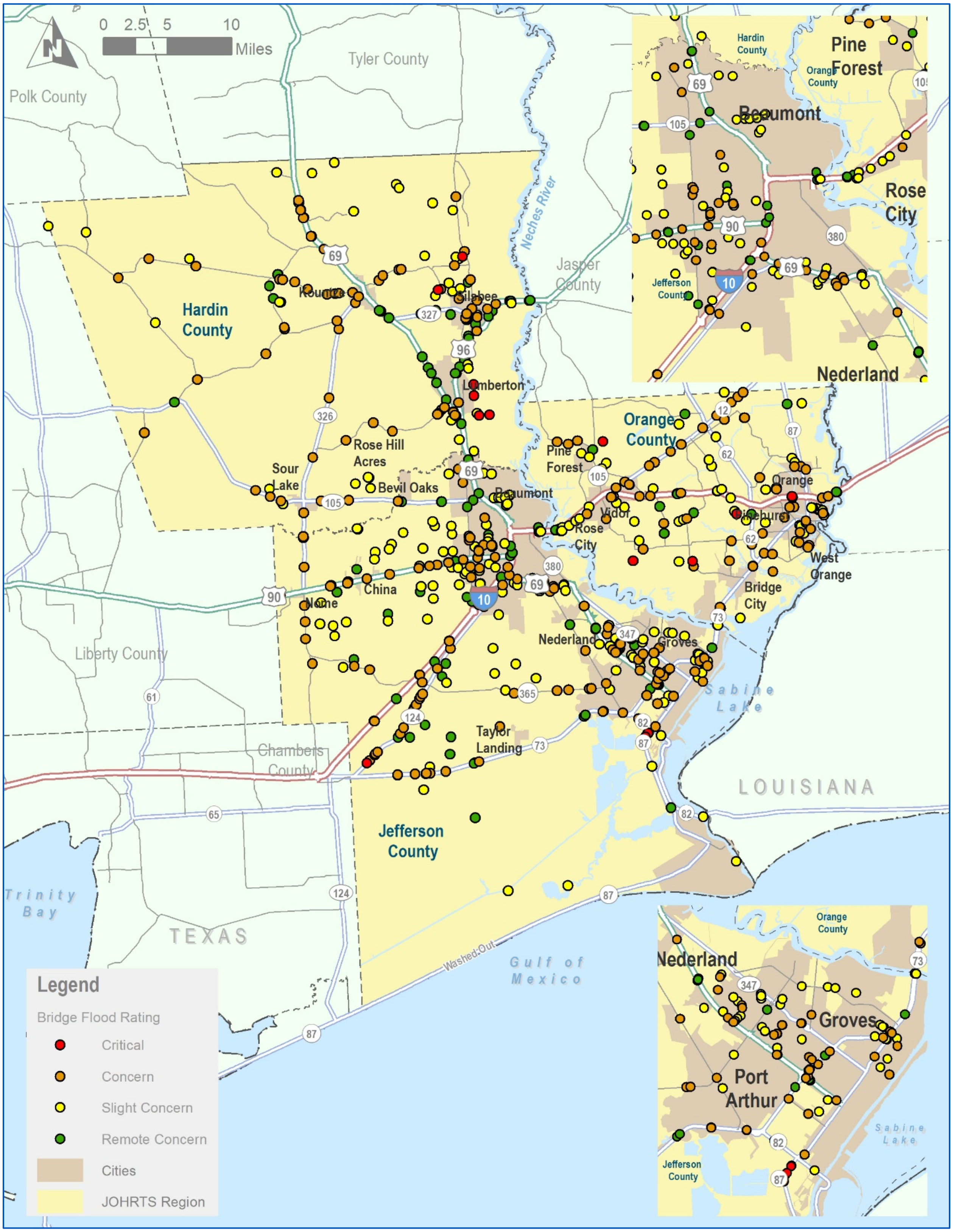
Source: JOHRTS Freight Mobility Plan, Existing Conditions Report

Figure C.5: JOHRTS Regional Vulnerable Roadways and Rail Lines



Source: JOHRTS 2045 MTP

Figure C.6: *JOHRTS Regional Vulnerable Bridges*



Source: JOHRTS 2045 MTP

Appendix D

List and Maps of Freight Needs in the JOHRTS Region

This appendix inventories all the needs identified for the JOHRTS Regional Freight Mobility Plan. Freight needs were identified by reviewing relevant transportation plans, truck and rail safety data, TxDOT pavement and bridge conditions data, future Level of Service data from the regional travel demand model, and stakeholder input and interviews. Needs were classified into five categories, which are defined in **Table D.1** along with the data sources for each.

Table D.1: *Freight Need Type Definitions and Data Sources*

Need Type	Definition	Data Sources
Economic/ Institutional Needs, Challenges and Opportunities	Needs related to freight regulations or policies that impact goods movement efficiency, or large-scale freight infrastructure investments that could transform the regional freight landscape	• Stakeholder input and interviews • Online resources
Freight Mobility Needs	Freight congestion hotspots or locations with restricted access, and system operational or freight traveler information needs	• Truck bottleneck analysis via National Performance Management Research Data Set • Stakeholder input and interviews • 2045 MTP volume to capacity ratio maps
Freight Safety and Resiliency Needs	Locations with high numbers of truck-involved crashes, rail grade crossing safety hotspots, flood-prone areas and other resiliency issues	• TxDOT Crash Records Information System • Federal Railroad Administration grade crossing safety data • Stakeholder input and interviews
State of Good Repair Needs on Freight Facilities	Locations with pavement in poor or fair condition or bridges requiring improvements to handle truck traffic	• TxDOT pavement and bridge conditions data • Stakeholder input and interviews
Freight related Quality of Life Issues/ Environmental Challenges	Areas where trucks route through neighborhoods or other incompatible land uses; shoaling, weather, and sedimentation on waterways affecting navigation safety and efficiency	• Stakeholder input and interviews

Table D.2 shows a master list of all needs in the JOHRTS Region, including those that are location-specific (mapped) and those that are not location-specific (not mapped). The list also shows the mode type, primary need type, identifiers for the matched projects, proposed projects, policies, programs and studies (the IDs noted are as included in **Appendix D** and **Appendix E**).

Figure D.1 through **Figure D.6** show the location-specific needs. **Figure D.1** includes the location-specific economic / institutional needs and opportunities. **Figure D.2** includes the location-specific freight mobility needs. **Figure D.3** includes the first part of location-specific freight safety and resiliency needs on highway system only. **Figure D.4** includes the second part of the location-specific freight safety and resiliency needs. **Figure D.5** includes the location-specific state of good repair needs on freight facilities. Lastly, **Figure D.6** includes the location-specific quality of life issue.

Table D.2: JOHRTS Regional Freight Needs Master List

Need ID	Mode	Need / Opportunity Description	Mapped (Y/N)?	Primary Need Type	Relevant 2045 MTP (Previously Planned) Projects (CSJ_NUMBERS)	Relevant Other (Previously Planned) Projects	Relevant Proposed Projects (Proj ID)	Relevant Proposed Programs (Prog ID)	Relevant Proposed Policies (Policy ID)	Relevant Proposed Studies (Study ID)	Unmet Need?
1	Highway	No limited access connection between Port of Beaumont and proposed I-14 "Forts to Ports" corridor.	Y	Economic / Institutional Need, Opportunity or Challenge				PRG1		STDY4	
2	Highway	I-10 expansion from Cardinal Drive to Eastex Freeway Project along with interchange improvements in Jefferson County.	Y	Freight Mobility Need	'002813135', '073902140'		MI1				
3	Highway	I-10/SH 62 interchange and I-10 from SH 62 to Texas/Louisiana State Border congestion issues congestion issue in Orange County.	Y	Freight Mobility Need	'002814091', '024304056'		MI2				
4	Highway	US 96/US 69 from Hwy 73 to Hwy 347 congestion issue in Jefferson County.	Y	Freight Mobility Need	'020016020', '020016021'		MI3				
5	Highway	Hwy 73 from US 69 to Atlantic Rd congestion issue in Jefferson County.	Y	Freight Mobility Need	'020016020'		MI4				
6	Highway	Hwy 82 from Texas/ Louisiana Border to Hwy 73 (Port of Port Arthur) congestion issue in Jefferson County.	Y	Freight Mobility Need			MI5				
7	Highway	Hwy 87 from Hwy 82 to Hwy 73 congestion issue in Jefferson County.	Y	Freight Mobility Need	'030603129', '030603130', '030603131'	OTH13, OTH14, OTH15	MI6				
8	Highway	I-10 from Hwy 124 to US 96 congestion issue in Jefferson County.	Y	Freight Mobility Need	'073902140'		MI7				
9	Highway	US 90 from Nome (Hwy 365) to I-10 (Beaumont) congestion issue in Jefferson County.	Y	Freight Mobility Need	'002807056', '002807057'		MI8				
10	Highway	US 287 from Wheeler Rd to US 96 congestion issue in Hardin County.	Y	Freight Mobility Need	'020010083'		MI9				
11	Highway	US 96/US 69 from Pine Island Bayou (Beaumont North) to Lumberton congestion issue in Hardin County.	Y	Freight Mobility Need	'006505148', '006505149', '006505150', '006506067', '006507065'		MI10				
12	Highway	I-10 from Port of Beaumont to Old US 90 (Vidor) congestion issue in Orange County.	Y	Freight Mobility Need			MI11				
13	Highway	S Mansfield Ferry Rd from S Main Street to Old Mansfield Ferry Rd access issue in Orange County.	Y	Freight Mobility Need							Y
14	Highway	Church House Rd from S Mansfield Ferry Rd to Reserve Fleet access issue in Orange County.	Y	Freight Mobility Need							Y
15	Highway	FM 1006 from Foreman Rd to Hwy 2177 congestion issue in Orange County.	Y	Freight Mobility Need			MI12				
16	Highway	SH 347 from Hwy 87 to US 96/US 69 congestion issue in Orange County.	Y	Freight Mobility Need	'066701115', '066701119'		MI13				

Need ID	Mode	Need / Opportunity Description	Mapped (Y/N)?	Primary Need Type	Relevant 2045 MTP (Previously Planned) Projects (CSJ_NUMBERS)	Relevant Other (Previously Planned) Projects	Relevant Proposed Projects (Proj ID)	Relevant Proposed Programs (Prog ID)	Relevant Proposed Policies (Policy ID)	Relevant Proposed Studies (Study ID)	Unmet Need?
17	Highway	US 73/Hwy 87 interchange area congestion issue in Jefferson County.	Y	Freight Mobility Need			MI14				
18	Highway	Inefficient truck movements on I-10 due to long construction periods and/or long incident clearance periods.	N	Freight Mobility Need					POL1E		
19	Highway	Heavy haul corridor(s) development opportunity to reduce number of trucks.	N	Economic / Institutional Need, Opportunity or Challenge						STDY1	
20	Highway	SH 99 / SH 146 interchange backup issue due to construction activity.	N	Freight Mobility Need					POL1E		
21	Highway	Shoulder widening and use as travel lane opportunity during construction period and/or incident clearance period.	N	Economic / Institutional Need, Opportunity or Challenge					POL1E		
22	Highway	Lack of signage and traveler information on "Freight Friendly" alternate routes.	N	Economic / Institutional Need, Opportunity or Challenge					POL2D, POL2F	STDY2	
23	Highway	Increase in number and daytime concentration of trucks due to electronic log mandates.	N	Economic / Institutional Need, Opportunity or Challenge						STDY6	
24	Highway	Oversized cargo (e.g., military shipments) haul corridor(s) development opportunity to safely transport goods.	N	Economic / Institutional Need, Opportunity or Challenge						STDY1	
25	Highway	Increase truck parking inside Port of Beaumont to reduce congestion at gates.	Y	Freight Mobility Need		OTH10					
26	Highway	Driver shortage issue made severe due to hours-of-service regulations, and the issue to worsen further as freight volumes grow, consumers expect faster delivery and warehouse facilities become more decentralized and smaller in size.	N	Economic / Institutional Need, Opportunity or Challenge					POL2G	STDY6	
27	Highway	Missing Port of Houston Authority terminal hours (or the threat thereof) or other such freight facilities can cause drivers to hurry up and compromise safety.	N	Economic / Institutional Need, Opportunity or Challenge						STDY6	
28	Highway	Drivers are increasingly less-skilled to handle heavy loads and larger trucks.	N	Economic / Institutional Need, Opportunity or Challenge					POL2E, POL2G		

Need ID	Mode	Need / Opportunity Description	Mapped (Y/N)?	Primary Need Type	Relevant 2045 MTP (Previously Planned) Projects (CSJ_NUMBERS)	Relevant Other (Previously Planned) Projects	Relevant Proposed Projects (Proj ID)	Relevant Proposed Programs (Prog ID)	Relevant Proposed Policies (Policy ID)	Relevant Proposed Studies (Study ID)	Unmet Need?
29	Highway	GPS routing or driver choices that bring trucks on neighborhood streets resulting in deterioration of pavement, truck-car conflicts and unsafe conditions of travel. E.g., Hogaboom Road from Hwy 347 to Hwy 366 in City of Groves.	Y	Freight Related Quality of Life Issue / Environmental Challenge					POL2D, POL2F	STDY2	
30	Highway	Trucks stuck on embankment of Cardinal Loop under US 69 due to poor roadway geometry and drainage issues.	Y	Freight Safety and Resiliency Need	'020014060'						
31	Highway	Curb cuts too narrow for trucks at delivery zones.	N	Freight Mobility Need					POL1F		
32	Highway	No roadway designated as critical urban freight corridor (CUFC) in Southeast Texas region.	N	Economic / Institutional Need, Opportunity or Challenge					POL1B		
33	Highway	Lack of truck parking or pull-off areas in the Southeast Texas region, particularly on I-10 and US 90. Rest area on I-10 (towards Winnie) gets full at the state line at night. No good place to check a load on I-10. Truck parking at warehouses would allow drivers to park after hours to keep more traffic off-peak.	N	Freight Safety and Resiliency Need						STDY6	
34	Highway	Road rage trends, such as dropping off things from an overpass, are seen in the Southeast Texas region.	N	Freight Safety and Resiliency Need					POL2D		
35	Highway	A regional stakeholder has expressed preference of gas, diesel and LPG/NG tax over tolls.	N	Economic / Institutional Need, Opportunity or Challenge						STDY4	
36	Highway	Narrow entrance road to the Port of Orange with a single lane bridge, although this constraint has never impacted port operations.	Y	Freight Mobility Need							Y
37	Highway	Trucks from/to ExxonMobil are moving hazardous material through residential neighborhoods. Finding a truck friendly connector road to MLK way is needed.	N	Freight Related Quality of Life Issue / Environmental Challenge					POL2D, POL2F	STDY2	
38	Highway	Upgrade US 69 and US 96 to interstate standards while considering community impacts.	N	Economic / Institutional Need, Opportunity or Challenge				PRG1		STDY4	
39	Highway	Proposed warehouse storage capacity near I-10 / Hampshire Rd interchange.	Y	Economic / Institutional Need, Opportunity or Challenge					POL2B		

Need ID	Mode	Need / Opportunity Description	Mapped (Y/N)?	Primary Need Type	Relevant 2045 MTP (Previously Planned) Projects (CSJ_NUMBERS)	Relevant Other (Previously Planned) Projects	Relevant Proposed Projects (Proj ID)	Relevant Proposed Programs (Prog ID)	Relevant Proposed Policies (Policy ID)	Relevant Proposed Studies (Study ID)	Unmet Need?
40	Highway	Rebuild Hwy 87 bridge between Port Arthur and Sabine Pass to avoid submergence due to ship wakes and flooding.	Y	State of Good Repair Need on Freight Facilities				PRG5			
41	Highway	The SH 73 bridge over the Needmore Diversion Channel in southwestern Jefferson County has a new weight restriction that will prevent trucks from accessing freight producing businesses like Motiva and Valero.	Y	Freight Mobility Need					POL1D		
42	Highway	US 69/US 96/US 287 and US 73 interchange congestion issue in Port Arthur due to LNG facility construction.	Y	Freight Mobility Need	'020016020'						
43	Highway	Purple Heart Memorial Bridge congestion issue in Beaumont.	Y	Freight Mobility Need			MI15				
44	Highway	Hwy 82 and Hwy 87 intersection congestion issue in Port Arthur.	Y	Freight Mobility Need			MI16				
45	Highway	Trucks on passing lanes in construction zones causing backups and dangerous situations.	N	Freight Safety and Resiliency Need					POL1E		
46	Highway	Need regional designated truck routes that make sense and can handle truck weights, where route provides access to a freight facility but is not part of TxDOT freight highway network.	N	Economic / Institutional Need, Opportunity or Challenge					POL2D, POL2F	STDY1, STDY2	
47	Highway	Spur 380 (SMLK Jr Pkwy) to the Port of Beaumont improvement needs.	Y	Economic / Institutional Need, Opportunity or Challenge	'006508166', '006508167'					STDY1	
48	Highway	Insufficient bridge vertical clearance for primary freight corridors (less than 18.5 feet clearance) - 47 locations identified.	Y	Freight Mobility Need				PRG2			
49	Highway	The state highway system doesn’t connect directly to the ports; hence, funding freight projects is a challenge. However, many projects on state highway system have a freight benefit even if they are not freight-focused.	N	Economic / Institutional Need, Opportunity or Challenge					POL1C		

Need ID	Mode	Need / Opportunity Description	Mapped (Y/N)?	Primary Need Type	Relevant 2045 MTP (Previously Planned) Projects (CSJ_NUMBERS)	Relevant Other (Previously Planned) Projects	Relevant Proposed Projects (Proj ID)	Relevant Proposed Programs (Prog ID)	Relevant Proposed Policies (Policy ID)	Relevant Proposed Studies (Study ID)	Unmet Need?
50	Highway	Need for cost-effective and intelligent design of roadways to overcome drainage issues due to storm events. Key tools that TxDOT uses include raising roads (but the upstream impacts need to be considered when doing this), adding more culverts for drainage; and using concrete barriers with slots to allow for better drainage.	N	Freight Safety and Resiliency Need				PRG5	POL1G, POL2A, POL2B		
51	Highway / Rail	Grade separation at entrance to Port of Beaumont to separate trains after crossing the Neches River bridge from the road traffic.	Y	Freight Safety and Resiliency Need						STDY7	
52	Highway / Rail	Grade crossing improvement at entrance to Iron Horse Terminals to improve safety for vehicles crossing UP tracks to use US 90.	Y	Freight Safety and Resiliency Need						STDY7	
53	Highway / Rail	Grade crossing improvement needs at FM 565 and US 90.	N	Freight Safety and Resiliency Need						STDY7	
54	Multimodal	New pipelines for natural gas and crude oil development opportunity to minimize surface transportation (road/rail/barge/vessel) impacts of freight growth.	N	Economic / Institutional Need, Opportunity or Challenge					POL3A		
55	Multimodal	Access improvement opportunities for industries, ports, and warehousing and transportation service providers based on their service needs (hours of service, origins (suppliers)/destinations (users), transportation modes used, "last mile" connectors used, carrier/shipment characteristics, etc.).	N	Economic / Institutional Need, Opportunity or Challenge		OTH1-19			POL2B	STDY1	
56	Multimodal	Lift of oil export ban, more domestic drilling, more chemical production and higher export leads to growth in cargo movements.	N	Economic / Institutional Need, Opportunity or Challenge					POL3A		
57	Multimodal	Migration of labor and businesses to Texas leads to growth in cargo movements.	N	Economic / Institutional Need, Opportunity or Challenge					POL3A		
58	Multimodal	Shortage of staff at freight facility for late (off-peak) pick-up or drop-off (or a 24 / 7 operation).	N	Economic / Institutional Need, Opportunity or Challenge					POL2A		
59	Multimodal	Economic and political uncertainties such as tariffs, tax credits (incentives) and pipeline capacity/connectivity affect industries, ports and transportation service providers.	N	Economic / Institutional Need, Opportunity or Challenge					POL2A		

Need ID	Mode	Need / Opportunity Description	Mapped (Y/N)?	Primary Need Type	Relevant 2045 MTP (Previously Planned) Projects (CSJ_NUMBERS)	Relevant Other (Previously Planned) Projects	Relevant Proposed Projects (Proj ID)	Relevant Proposed Programs (Prog ID)	Relevant Proposed Policies (Policy ID)	Relevant Proposed Studies (Study ID)	Unmet Need?
60	Multimodal	Improve resiliency of freight facilities from flooding/submergence due to hurricane and ice storm events by increasing elevation, improving geometry, drainage and durability, providing redundancy, etc. I-10, I-10 frontage road, roads in Port Arthur were flooded during Hurricane Harvey. Flood gates remain closed till tides lower; which prevents water from draining to the coast. Different weather events present different challenges. It is therefore important to focus on specific areas that are known to be vulnerable. Discuss/debate whether to build strong to withstand flooding or build light and replace quickly considering impacts of infrastructure on drainage after flooding.	N	Freight Safety and Resiliency Need				PRG5	POL1G, POL2A, POL2B		
61	Multimodal	Informational effort towards freight users in region - informing how region and industry relate to "FAST Act", and how congestion and delay impact freight transportation in the region.	N	Economic / Institutional Need, Opportunity or Challenge					POL1C		
62	Multimodal	Consider drainage requirements during land development process, including storage of storm runoff.	N	Freight Safety and Resiliency Need					POL1G, POL2D		
63	Multimodal	LNVA (Lower Neches Valley Authority) canal does not effectively drain stormwater from industrial facilities; lack of drainage improvements is a threat to the freight industry.	N	Freight Safety and Resiliency Need					POL1G		
64	Multimodal	Upkeep or upgrade of aging terminal infrastructure at ports while improving mobility and safety.	N	Economic / Institutional Need, Opportunity or Challenge					POL2B		
65	Multimodal	Port of Beaumont is working to diversify its cargo base to minimize financial risks under economic and political uncertainties	N	Economic / Institutional Need, Opportunity or Challenge					POL2A		
66	Multimodal	Increase storage capacity for industrial facilities.	N	Economic / Institutional Need, Opportunity or Challenge		OTH11			POL2B		

Need ID	Mode	Need / Opportunity Description	Mapped (Y/N)?	Primary Need Type	Relevant 2045 MTP (Previously Planned) Projects (CSJ_NUMBERS)	Relevant Other (Previously Planned) Projects	Relevant Proposed Projects (Proj ID)	Relevant Proposed Programs (Prog ID)	Relevant Proposed Policies (Policy ID)	Relevant Proposed Studies (Study ID)	Unmet Need?
67	Multimodal	Need for strategic risk-based strategic asset management approach to weather events including data collection, analysis and modeling to identify vulnerabilities and areas that are most prone to weather events and prioritize for improvements.	N	Freight Safety and Resiliency Need				PRG5	POL1G		
68	Multimodal	Availability of safety equipment, material and information to industries in case of emergencies. E.g., communication networks, use of drones for assessment of conditions, nitrogen for petrochemical fires, the Port Coordination Team (PCT) provided information.	N	Freight Safety and Resiliency Need					POL1F	STDY3	
69	Multimodal	Concerned about data security with the recent database hacking of the Cajun Navy's information.	N	Economic / Institutional Need, Opportunity or Challenge					POL2A		
70	Multimodal	Need to inform policy makers how opportunities at the ports can influence regional economic development and how congestion and delay impact freight transportation in the region.	N	Economic / Institutional Need, Opportunity or Challenge					POL1C		
71	Multimodal	Permitting delays/constraints in draining of floodwater after storm events.	N	Economic / Institutional Need, Opportunity or Challenge					POL2A		
72	Pipeline	Additional pipeline capacity needed at Jefferson Energy Terminal.	N	Economic / Institutional Need, Opportunity or Challenge					POL3A		
73	Pipeline / Water	Sempra's proposed LNG facility development at Port Arthur - some ports, however, think that they would bring large ships and displace barges off the main channels.	Y	Economic / Institutional Need, Opportunity or Challenge					POL3A, POL3B		
74	Pipeline / Water	Occasionally, pipelines are damaged by vessels or barges moving on Sabine-Neches Waterway.	N	Economic / Institutional Need, Opportunity or Challenge						STDY5	
75	Rail	Insufficient yard capacity for Port of Beaumont's rail interchange - project development opportunity through use of CMAQ funds.	Y	Economic / Institutional Need, Opportunity or Challenge		OTH1, OTH2, OTH9				STDY4	
76	Rail	Insufficient rail crossings across Neches River - project development opportunity through public-private partnership.	Y	Economic / Institutional Need, Opportunity or Challenge		OTH6			POL2A	STDY4	

Need ID	Mode	Need / Opportunity Description	Mapped (Y/N)?	Primary Need Type	Relevant 2045 MTP (Previously Planned) Projects (CSJ_NUMBERS)	Relevant Other (Previously Planned) Projects	Relevant Proposed Projects (Proj ID)	Relevant Proposed Programs (Prog ID)	Relevant Proposed Policies (Policy ID)	Relevant Proposed Studies (Study ID)	Unmet Need?
77	Rail	Insufficient rail interchange facilities and services for bulk-oriented regional cargo base.	Y	Economic / Institutional Need, Opportunity or Challenge					POL3A		
78	Rail	Oversized cargo (e.g., military shipments) rail service development opportunity to reduce number of trucks.	N	Economic / Institutional Need, Opportunity or Challenge						STDY1	
79	Rail	Loss of rail access to Port of Orange due to Hurricane Ike; although no business case for rail at this time.	N	Economic / Institutional Need, Opportunity or Challenge					POL3A		
80	Rail	Crude oil exports taking over rail mainline capacity.	N	Freight Mobility Need					POL3C		
81	Water	Multi-regional coordination for "Container on Barge" service (e.g., DuPont has expressed interest, but fuel costs don't support such a service at this time).	N	Economic / Institutional Need, Opportunity or Challenge					POL3A	STDY4	
82	Water	Insufficient dock space availability at Phillips 66's private terminal for Natgasoline's shipments.	Y	Economic / Institutional Need, Opportunity or Challenge					POL2B		
83	Water	Sabine Neches Waterway congestion issue due to growth in crude oil vessels.	N	Freight Mobility Need					POL3B		
84	Water	Increase deep water and barge dock capacity at Port of Beaumont.	Y	Economic / Institutional Need, Opportunity or Challenge					POL2B		
85	Water	Increase channel depth on Sabine-Neches Waterway to accommodate Panamax sized vessels, and in light of the shale revolution and domestic energy renaissance. Port of Beaumont expects use of large ships will reduce congestion on waterway, while Port of Orange expects increase in channel depth on Sabine River may not be environmentally feasible. The waterway will deepen to 52 feet from 48 feet with construction beginning in 2019. This will also increase the width of the waterway to allow two-way traffic. The construction will take 7 years. Concerns about erosion due to deepening of channel or otherwise need to be addressed, e.g. Hwy 87 along the Sabine-Neches Waterway.	N	Economic / Institutional Need, Opportunity or Challenge		OTH20		PRG3		STDY4	

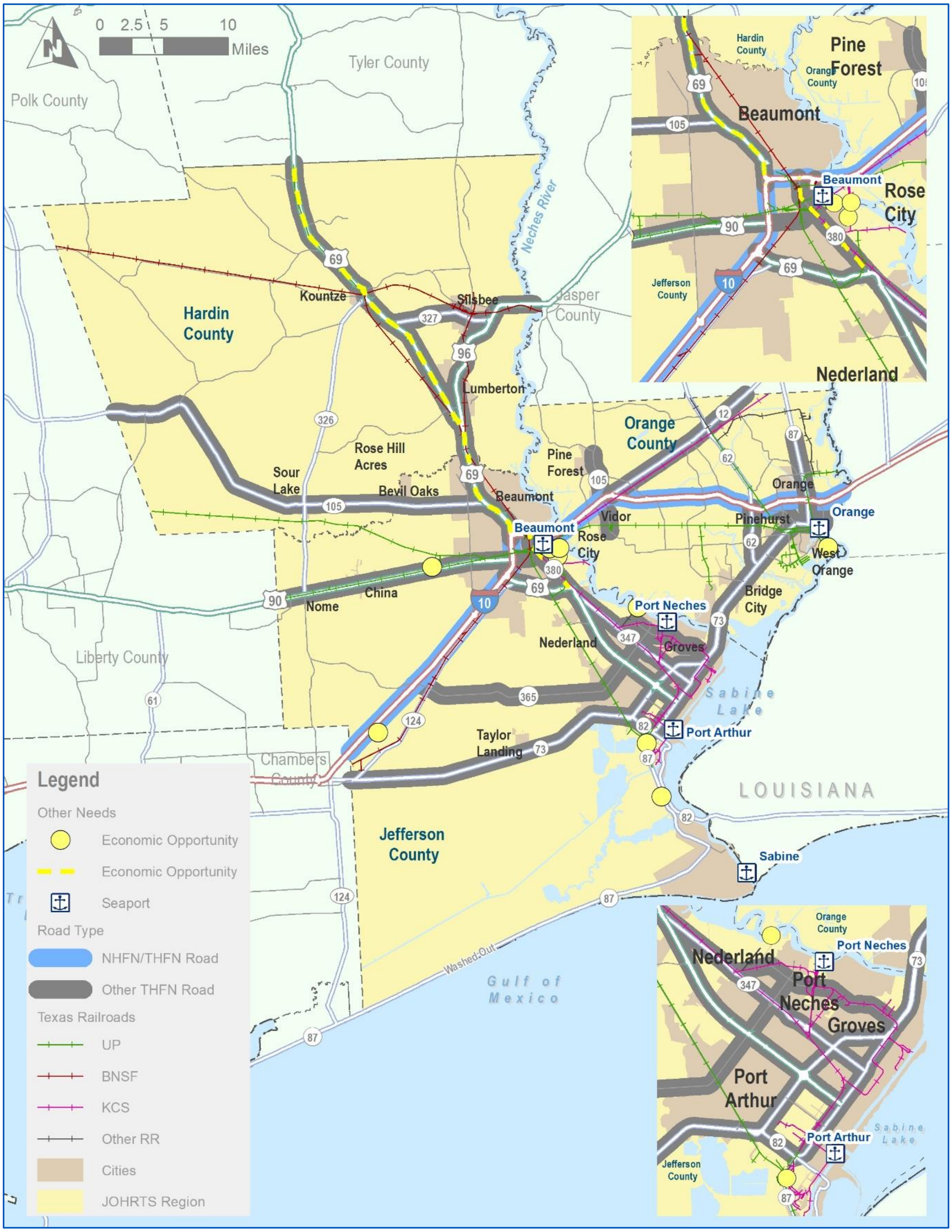
Need ID	Mode	Need / Opportunity Description	Mapped (Y/N)?	Primary Need Type	Relevant 2045 MTP (Previously Planned) Projects (CSJ_NUMBERS)	Relevant Other (Previously Planned) Projects	Relevant Proposed Projects (Proj ID)	Relevant Proposed Programs (Prog ID)	Relevant Proposed Policies (Policy ID)	Relevant Proposed Studies (Study ID)	Unmet Need?
86	Water	Insufficient port storage capacity (cargo laydown acreage) at Port Arthur.	Y	Economic / Institutional Need, Opportunity or Challenge		OTH3, OTH4, OTH5, OTH7, OTH12			POL2B		
87	Water	The Jones Act creates restrictions for domestic shipping. It allows use of only certain qualifying vessels; and restricts use of ocean-going vessels owned by non-US companies that are used in international shipping. Dredging also cannot use international workers to dredge the waterways.	N	Economic / Institutional Need, Opportunity or Challenge					POL2A		
88	Water	Insufficient weather event and weather event management information for port facilities.	N	Economic / Institutional Need, Opportunity or Challenge						STDY3	
89	Water	Lack of tenant for storage facility at Port of Orange and resultant loss of revenue.	Y	Economic / Institutional Need, Opportunity or Challenge					POL2B		
90	Water	High real estate value and congestion has caused the shifting of the barge services business from the Houston Ship Channel, the Sabine-Neches Waterway, and Lake Charles to the Port of Orange.	N	Economic / Institutional Need, Opportunity or Challenge					POL3A		
91	Water	Channel depth on Gulf Intracoastal Waterway is maintained below the authorized depth due to funding shortage.	N	Economic / Institutional Need, Opportunity or Challenge				PRG4			
92	Water	Fog is an issue faced during water-based shipping in Southeast Texas region.	N	Freight Related Quality of Life Issue / Environmental Challenge					POL2A	STDY5	
93	Water	Jefferson Energy has applied for BUILD grants for two deep water international ports and one dock for domestic barges.	Y	Economic / Institutional Need, Opportunity or Challenge					POL1A; POL2B	STDY4	
94	Water	Sedimentation in water near the docks due to hurricane results in grounding accidents, delays to loading / unloading of ships, or diversion to another port, and the ports also incur additional dredging costs.	N	Freight Related Quality of Life Issue / Environmental Challenge					POL2A	STDY5	
95	Water	The Texas Ports Association is working to capitalize the new ship channel account the Legislature created. One potential source is the Rainy Day Fund.	N	Economic / Institutional Need, Opportunity or Challenge					POL3A	STDY4	

Need ID	Mode	Need / Opportunity Description	Mapped (Y/N)?	Primary Need Type	Relevant 2045 MTP (Previously Planned) Projects (CSJ_NUMBERS)	Relevant Other (Previously Planned) Projects	Relevant Proposed Projects (Proj ID)	Relevant Proposed Programs (Prog ID)	Relevant Proposed Policies (Policy ID)	Relevant Proposed Studies (Study ID)	Unmet Need?
96	Water	Limited or no ISOtainer service in Southeast Texas region.	N	Economic / Institutional Need, Opportunity or Challenge					POL3A	STDY4	
97	Water	Potential use of barge for high-value cargo.	N	Economic / Institutional Need, Opportunity or Challenge					POL3A	STDY4	
98	Water	Barges unmoored at Sabine Pass during storm events.	N	Freight Related Quality of Life Issue / Environmental Challenge					POL2A	STDY5	
99	Water	Lack of timely information from private terminals on waterway use.	N	Economic / Institutional Need, Opportunity or Challenge						STDY3	
100	Water	Bends in the river result in shoaling, especially during storm events. They need to be straightened when possible. Other vulnerabilities along the SNWW and GIWW should also be identified.	N	Freight Related Quality of Life Issue / Environmental Challenge					POL2A	STDY5	
101	Highway / Rail	Public at-grade crossing safety issues - top 25 predicted accidents, and grade crossings with highway/rail crashes in the last 10 years on freight rail lines.	Y	Freight Safety and Resiliency Need						STDY7	

Need ID	Mode	Need / Opportunity Description	Mapped (Y/N)?	Primary Need Type	Relevant 2045 MTP (Previously Planned) Projects (CSJ_NUMBERS)	Relevant Other (Previously Planned) Projects	Relevant Proposed Projects (Proj ID)	Relevant Proposed Programs (Prog ID)	Relevant Proposed Policies (Policy ID)	Relevant Proposed Studies (Study ID)	Unmet Need?
102	Highway	Safety hotspots on highways - high crash numbers - using a 3-year historical truck-involved crash location data.	Y	Freight Safety and Resiliency Need	'002807056', '002807057', '002807058', '002813135', '002814091', '006505148', '006505149', '006505150', '006505152', '006505153', '006506067', '006507063', '006507065', '006508166', '006508167', '020009069', '020010083', '020014060', '020016020', '020016021', '024304056', '030507068', '030507069', '030507072', '030603129', '030603130', '030603131', '033903039', '033904036', '036803037', '036804032', '066701115', '066701119', '066702113', '066702114', '066702115', '073902140', '078601087', '088202059', '093201113', '093201115', '109601065', '236701061', '256201020', '256201023'		SI1-SI28				
103	Highway	Poor pavement condition on highways - poor or fair condition locations.	Y	State of Good Repair Need on Freight Facilities	'002813135', '002814091', '002815054', '006506062', '006506067', '006506068', '006507056', '006507065', '020009069', '020010075', '020011099', '020014060', '020014089', '020015021', '020016016', '020016022', '024304056', '030507071', '030507072', '030601060', '030603122', '030603127', '030701149', '033904036', '033904037', '050804164', '066701115', '073902140', '256201020'		PRR1-PRR44				

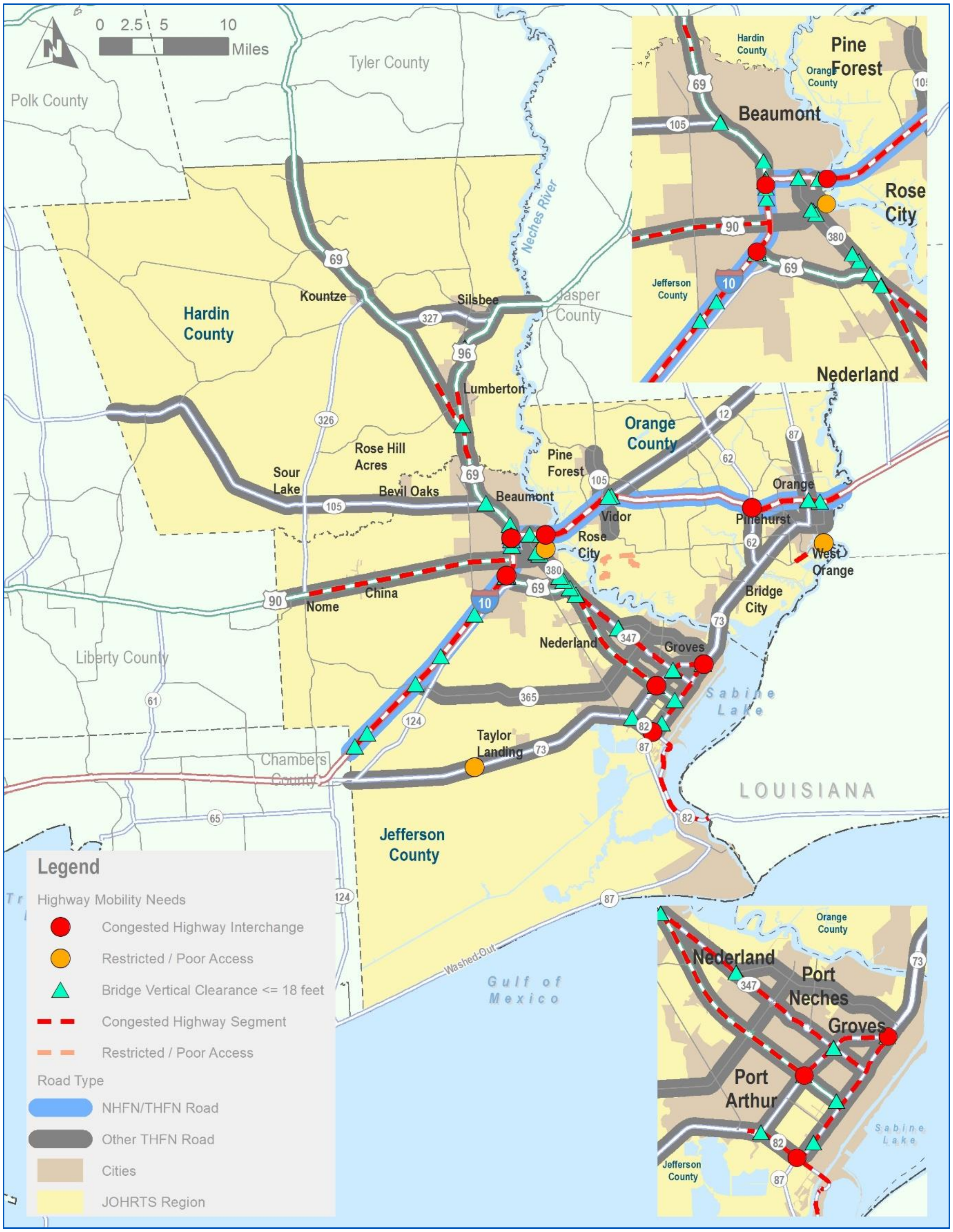
Need ID	Mode	Need / Opportunity Description	Mapped (Y/N)?	Primary Need Type	Relevant 2045 MTP (Previously Planned) Projects (CSJ_NUMBERS)	Relevant Other (Previously Planned) Projects	Relevant Proposed Projects (Proj ID)	Relevant Proposed Programs (Prog ID)	Relevant Proposed Policies (Policy ID)	Relevant Proposed Studies (Study ID)	Unmet Need?
104	Highway	Poor bridge condition on highways - improvement needed locations.	Y	State of Good Repair Need on Freight Facilities	'002814116', '002814117', '020011107', '020016020', '020016023', '050804169', '050804173', '050804174', '066701120', '066701121', '066701122', '093201113'		BCWRR1-BCWRR44				
105	Multimodal	Gap between regional freight workforce skills and those required by employers.	N	Economic / Institutional Need, Opportunity or Challenge					POL2G		

***Figure D.1:** JOHRTS Region Economic/Institutional Needs and Opportunities*



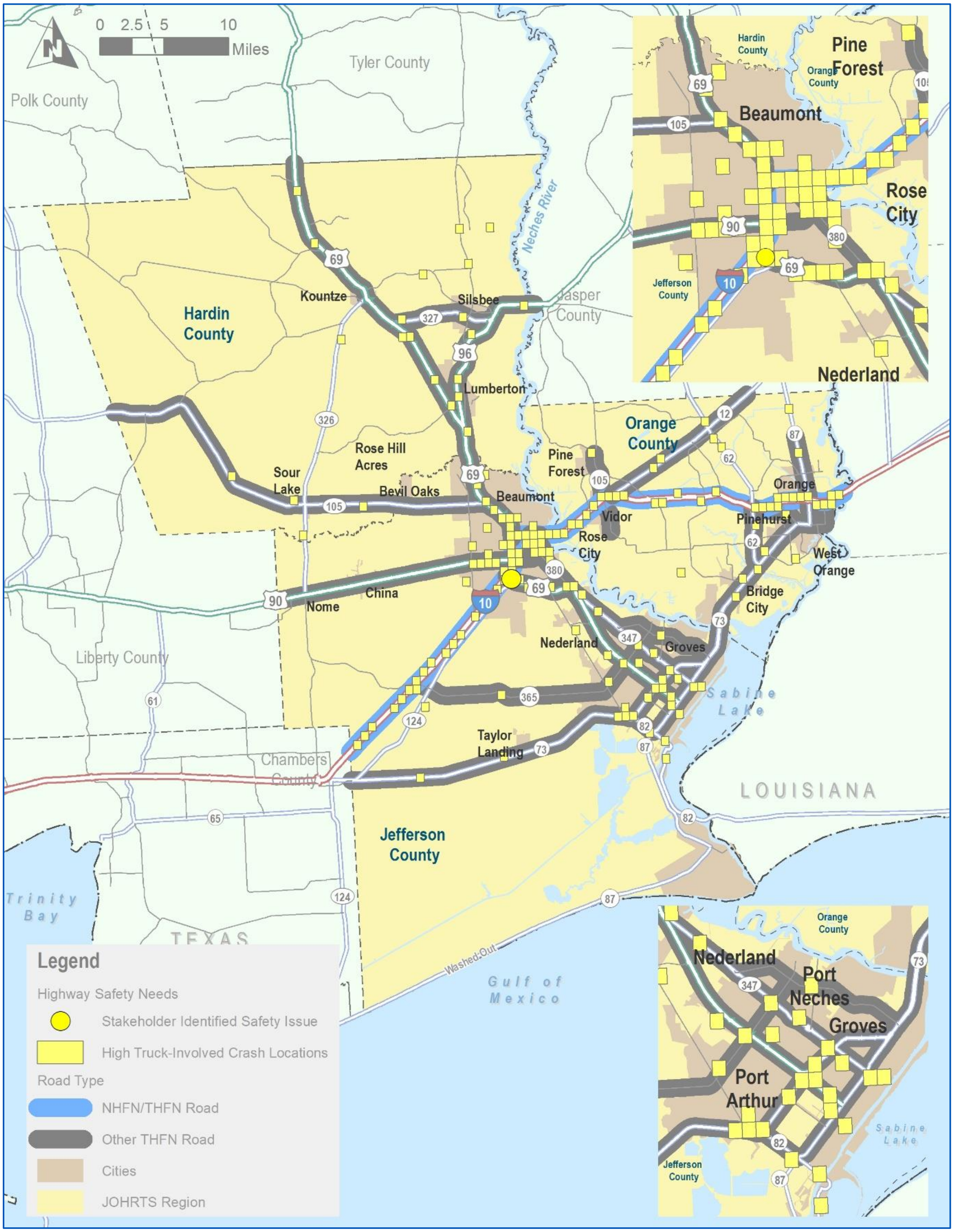
Source: TxDOT GIS Datasets (via TxDOT Open Data Portal); CDM Smith's JOHRTS Region Base Map; Stakeholder Inputs

***Figure D.2:** JOHRTS Regional Highway Freight Mobility Needs*



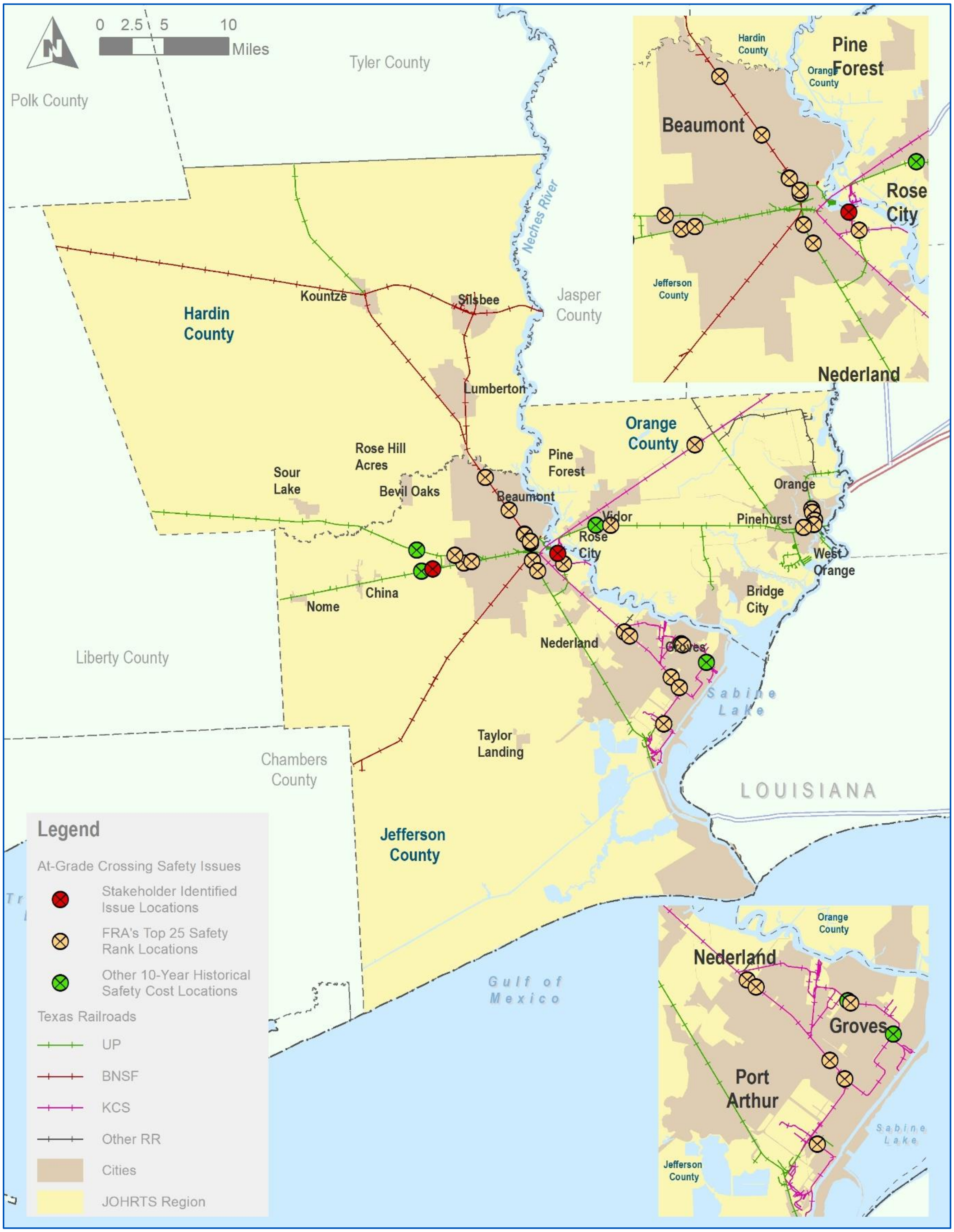
Source: TxDOT GIS Datasets (via TxDOT Open Data Portal); CDM Smith's JOHRTS Region Base Map; CDM Smith's Mobility and Safety Analysis; Stakeholder Inputs

***Figure D.3:** JOHRTS Regional Highway Safety Needs*



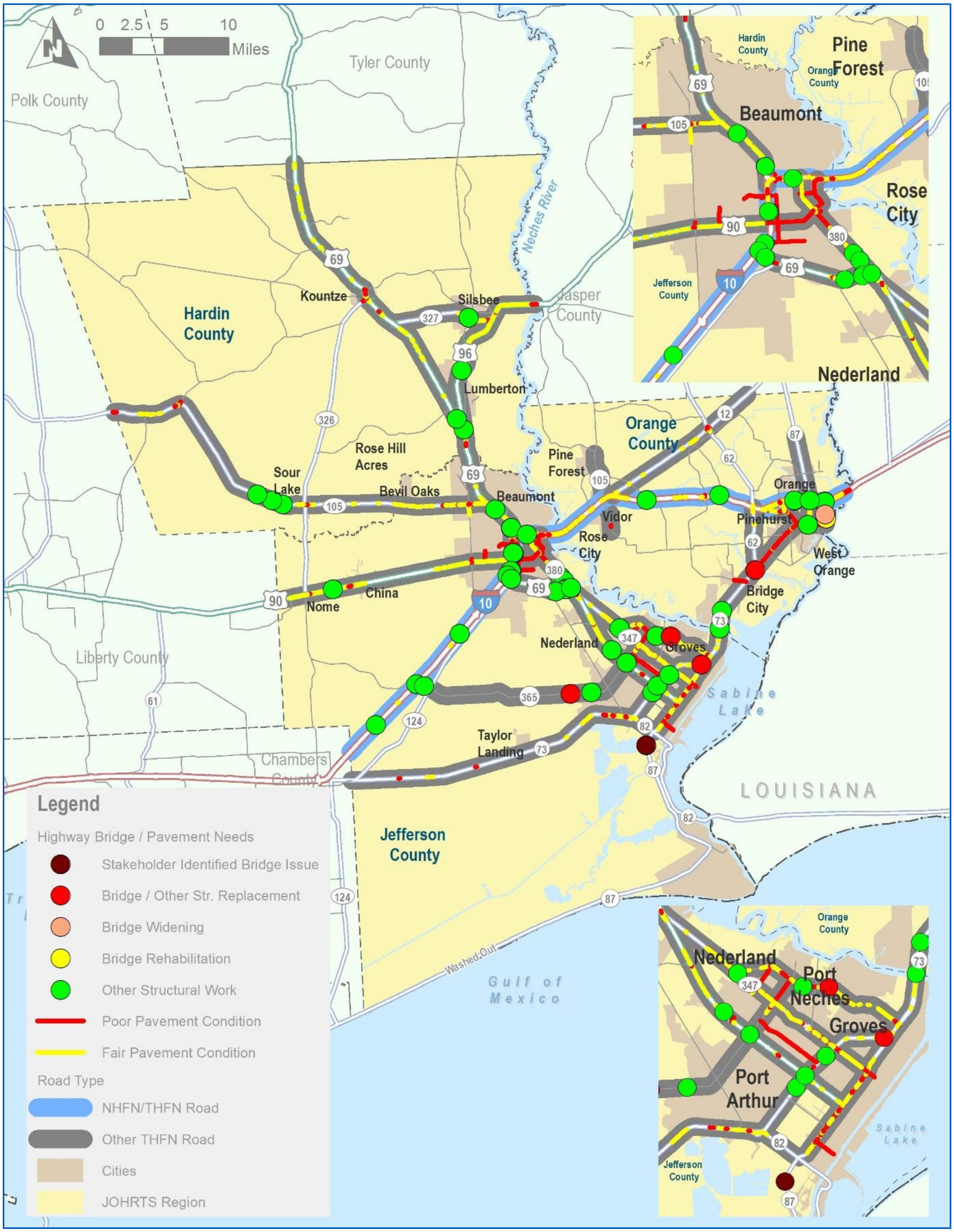
Source: TxDOT GIS Datasets (via TxDOT Open Data Portal); CDM Smith's JOHRTS Region Base Map; TxDOT Crash Records Information System; Stakeholder Inputs

Figure D.4: *JOHRTS Regional Highway/Rail At-Grade Crossing Safety Needs*



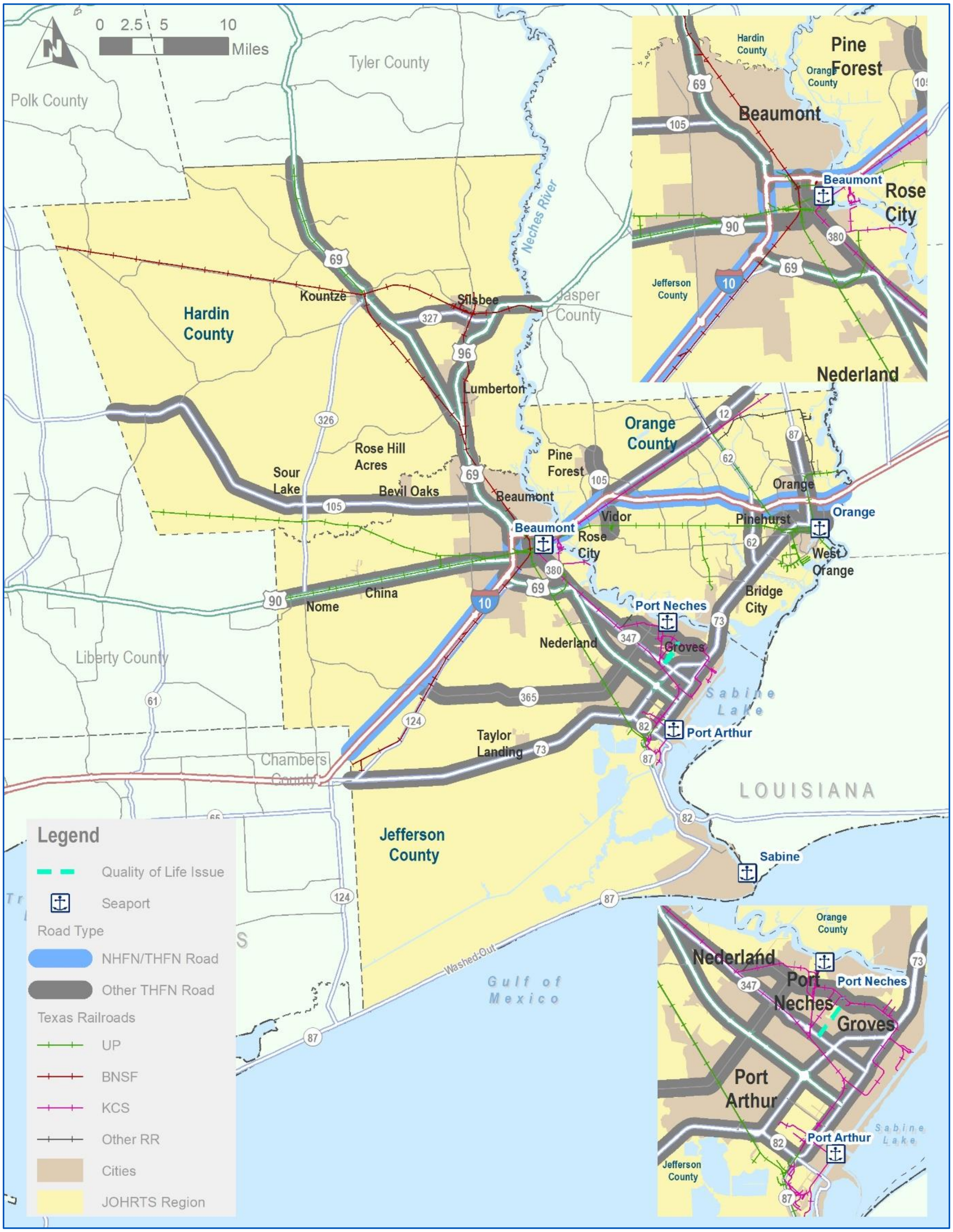
Source: TxDOT GIS Datasets (via TxDOT Open Data Portal); FRA Grade Crossings Inventory; CDM Smith's JOHRTS Region Base Map and At-Grade Crossings Safety Analysis; Stakeholder Inputs

***Figure D.5:** JOHRTS Regional State of Good Repair Needs*



Source: TxDOT GIS Datasets (via TxDOT Open Data Portal); CDM Smith's JOHRTS Region Base Map; CDM Smith's Pavement Condition and Bridge Condition Analysis; Stakeholder Inputs

Figure D.6: *JOHRTS Regional Freight-related Quality of Life Issues*



Source: TxDOT GIS Datasets (via TxDOT Open Data Portal); CDM Smith's JOHRTS Region Base Map; CDM Smith's Pavement Condition and Bridge Condition Analysis; Stakeholder Inputs

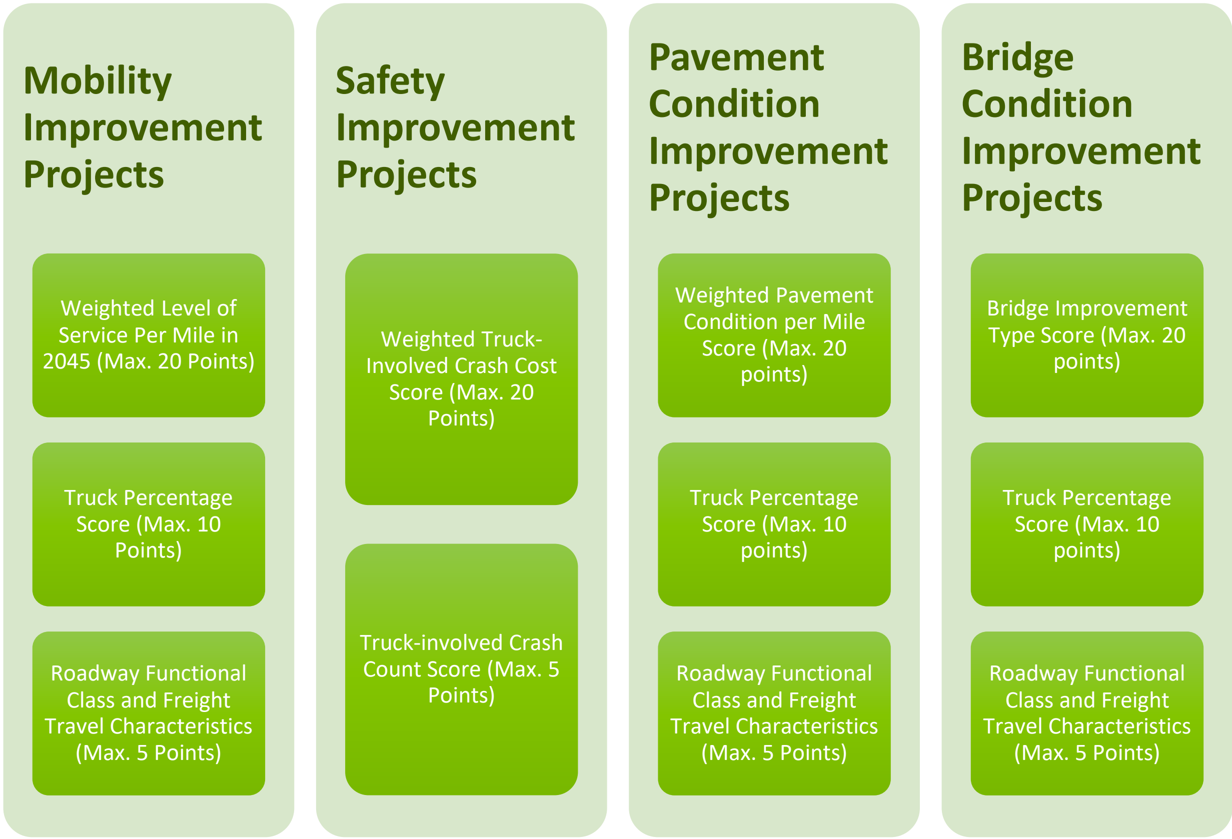
Appendix E
List and Maps of Freight Projects in the JOHRTS Region

Table E.1 and **Table E.2** show master lists of previously planned freight relevant projects in the JOHRTS Region based on the MTP and other sources, respectively. Both lists include information such as project identifier, project description, county location and need(s) met (Need IDs as included in **Appendix D** were used to identify the needs). For the MTP projects list, project phase, construction cost estimate and project relevance to freight are also included. For the previously planned projects list based on other sources, project cost, port relevant to the project and source of project are also included. The previously identified projects were not subject to a prioritization process in this freight plan.

Table E.3 shows a master list of proposed projects and their prioritization. These projects fill unmet freight needs uncovered by analyzing previously planned projects (from the 2045 MTP and elsewhere) against the identified freight needs. **Table E.3** includes information such as project identifier, project description, county location, priority, project relevance to freight and need(s) met (Need IDs as included in **Appendix D** were used to identify the needs).

Figure E.1 shows an overview of the scoring and weighting process used in this freight plan to prioritize the proposed projects. SETRPC has also defined a project selection process and criteria as part of the 2045 MTP. For the proposed pavement and bridge improvement projects, the MTP criteria related to rehabilitation project type were adopted mostly as provided. Minor modification was however done to the roadway functional class score by incorporating levels of truck volume (freight characteristic). For the proposed bridge projects, the specific type of improvement work identified in the bridge inventory was used as a proxy for bridge condition. For safety improvement projects, the MTP criteria are not freight specific and one of the MTP criteria requires use of Safety Improvement Index (SII) reduction factors for specific improvements. The proposed safety projects in this freight plan are not specific enough to identify SII reduction factors. Therefore, a simplified set of two criteria which are freight specific and make use of costs by severity in the SII calculator were used for prioritizing the proposed safety projects. For mobility improvement projects, a level of service criterion was used in this freight plan, which is similar to the MTP. However, the other criteria in the MTP for mobility such as social benefits, scope of benefits, multimodal support, smart growth, etc. were too broad-based or not relevant to freight. Instead freight specific mobility criteria were added to prioritize the proposed mobility projects.

***Figure E.1:** JOHRTS Regional Plan Scoring and Weighting Process for Prioritization of Proposed Projects*



Source: CDM Smith, 2045 MTP Project Scoring Process

Figure E.1 through **Figure E.4** map JOHRTS regional previously planned mobility, safety improvement, pavement condition improvement, and bridge condition improvement projects. They also show the proposed freight projects to address unmet freight needs and their priorities (high, medium or low).

Table E.4 shows a comparison of the goal weights identified by the stakeholders of this freight plan and the weights of the closest/equivalent goals in the 2045 MTP. Considering both the stakeholders of this freight plan and the MTP, an average of these goal weights was used to the score high-priority packages that meet the regional unmet freight system needs and are formed using projects in **Table E.3**. **Table E.5** shows the listing of high-priority project packages and **Figure E.5** includes their locations on a map.

Proposed Mobility Improvement Projects Identification and Prioritization

Identification of mobility improvement projects was done by analyzing gaps in location-specific mobility needs left by the previously planned mobility improvement projects (mainly roadway and intersection capacity and operations, and major bridge/roadway rehabilitation projects). The unmet need locations were divided into two groups: (a) lines (13 Nos.), and (b) points (3 Nos.). The point locations were identified to be important nodes in the regional freight system and qualitatively declared as high-priority locations needing mobility improvements. The line locations were however quantitatively assessed. The scoring system for the line locations includes the following criteria:

- **Weighted Level of Service Per Mile in 2045 Score (Max. 20 points):** For a given start and end positions of an unmet line need, LOS A-C lane-miles were scored at 1 point, LOS D lane-miles were scored at 3 points, LOS E lane-miles were scored at 6 points, and LOS F lane-miles were scored at 10 points. A weighted average LOS per mile score was derived and normalized to a scale of 1-20, with the highest LOS per mile score line need receiving 20 points.
- **Truck Percentage Score (Max. 10 points):** Around the mid-point of the segment, truck percentage was measured. The following rules were followed for scoring: < 1% - 0 points, >=1% and < 3% - 3 points, >=3% and <6% - 5 points, >=6% and <10% - 7 points, >=10% and <20% - 9 points, and >=20% - 10 points.
- **Roadway Functional Class and Freight Travel Characteristics Score (Max. 5 points):** If the existing truck average daily traffic (ADT) is less than 1,000 vehicles, then the location was labeled as lightly traveled freight corridor (LTFC); if the truck ADT equals or exceeds 5,000 vehicles, then the location was labeled as heavily traveled freight corridor (HTFC), otherwise the location was labeled as moderately traveled freight corridor (MTFC). The following rules were followed for scoring: Interstate or Freeway/Expressway + LTFC/MTFC/HTFC – 3/4/5 points (respectively), Principal Arterial + LTFC/MTFC/HTFC – 2/3/4 points (respectively), and for all other road functional classification types + LTFC/MTFC/HTFC – 1/2/3 points (respectively).

Total score was computed by adding the above criteria scores. Using 50th percentile and 80th percentile values as cut-off, the scores were divided into three classes: below 50th percentile score value – low priority location, between 50th percentile and 80th percentile score value – medium priority location, and above 80th percentile score value – high priority location.

Proposed Safety Improvement Projects Identification and Prioritization

Identification of safety improvement projects was done by analyzing truck safety hotspots identified in the need analysis. The safety needs that are not met by the previously planned safety improvement type projects (mainly roadway and intersection capacity, operations and safety, and major bridge/roadway rehabilitation projects) were identified. Seventy-one (71) truck safety hotspot cells (as explained in **Chapter 6**) were identified, which were then grouped into 28 truck safety hotspot segments. Due to the use of truck-involved crash data, there was no need to further verify relevance to freight. The unmet need locations were divided into two groups: (a) lines (11 Nos.), and (b) points (17 Nos.). Both point and line locations were quantitatively assessed. The scoring system includes the following criteria:

- **Weighted Truck-Involved Crash Cost Score (Max. 20 points):** The severity weighted crash cost1 per mile (aggregated over truck safety hotspot cells enclosing the need location and divided by segment miles) was used for unmet line needs; while crash cost total (for the truck safety hotspot cell enclosing the need location) was used for unmet point needs. The crash cost score was normalized to a scale of 1-20, with the highest crash cost score receiving 20 points.
- **Truck-Involved Crash Count Score (Max. 5 points):** Crash count per mile (aggregated over truck safety hotspot cells enclosing the need location and divided by segment miles) was used for unmet line needs; while crash count total (for the truck safety hotspot cell enclosing the need location) was used for unmet point needs. The crash count score was normalized to a scale of 1-5, with the highest crash count score receiving 5 points.

Total score was computed by adding the above criteria scores. Using 50th percentile and 80th percentile values as cut-off, the scores were divided into three classes: below 50th percentile score value – low priority location, between 50th percentile and 80th percentile score value – medium priority location, and above 80th percentile score value – high priority location.

Proposed Pavement Condition Improvement Projects Identification and Prioritization

Identification of pavement condition improvement projects was done by analyzing gaps in location-specific pavement condition needs left by the previously planned pavement condition improvement projects (mainly roadway repair, resurfacing and rehabilitation projects). The gap locations were verified to be relevant to freight, which resulted in the removal of three (3) out of the forty-seven (47) grouped pavement condition needs. The unmet need locations were all lines (44 Nos.) and quantitatively assessed. The scoring system for the unmet need locations includes the following criteria:

- **Weighted Pavement Condition per Mile Score (Max. 20 points):** For a given start and end positions of an unmet line need, good route-miles were scored at 1 point, fair route-

[1] The economic cost for a person killed or with incapacitating injury (K or A in KABCO injury scale) and person with non-incapacitating injury (B in KABCO injury scale) are assumed based on the 2018 SII Calculator as $3,500,000 and $500,000, respectively.

miles were scored at 3 points, and poor route-miles were scored at 5 points. A weighted average pavement condition per mile score was derived and normalized to a scale of 1-20, with the highest pavement condition per mile score line need receiving 20 points.

- **Truck Percentage Score (Max. 10 points):** The same definition as that used for mobility needs.
- **Roadway Functional Class and Freight Travel Characteristics Score (Max. 5 points):** The same definition as that used for mobility needs.

Total score was computed by adding the above criteria scores. Using 50th percentile and 80th percentile values as cut-off, the scores were divided into three classes: below 50th percentile score value – low priority location, between 50th percentile and 80th percentile score value – medium priority location, and above 80th percentile score value – high priority location.

Proposed Bridge Condition Improvement Projects Identification and Prioritization

Identification of bridge condition improvement projects was done by analyzing gaps in location-specific bridge condition needs left by the previously planned bridge improvement projects (mainly bridge and other structural repair, rehabilitation and replacement projects). The gap locations were verified to be relevant to freight, which resulted in the removal of ten (10) out of the forty-seven (47) bridge improvement needs. The unmet need locations were all points (44 Nos.) and quantitatively assessed. The scoring system for the unmet need locations includes the following criteria:

- **Bridge Improvement Type Score (Max. 20 points):** The following rules were followed for scoring: bridge replacement – 20 points, bridge widening – 15 points, bridge rehabilitation – 10 points, and other structural work – 5 points.
- **Truck Percentage Score (Max. 10 points):** The same definition as that used for mobility needs.
- **Roadway Functional Class and Freight Travel Characteristics Score (Max. 5 points):** The same definition as that used for mobility needs.

Total score was computed by adding the above criteria scores. Using 50th percentile and 80th percentile values as cut-off, the scores were divided into three classes: below 50th percentile score value – low priority location, between 50th percentile and 80th percentile score value – medium priority location, and above 80th percentile score value – high priority location.

High-Priority Project Package Recommendations

Using the high-priority project locations under the previous four categories; a shortlist of high-priority project locations was prepared. Projects under any category and any priority but sharing the same geography as the high-priority project were added to the project package. At the end, each project package contains one or more projects meeting different freight plan goals. Project package ranks were determined by combining scores for priority (1 for low, 3 for medium and 5 for high priority) with freight plan goal weights. **Table E.4** shows that the freight plan goal weights were computed as an average of goal weights based on the inputs gathered from stakeholders of this freight plan and the weights of the closest/equivalent goals in the 2045 MTP.

Table E.5 shows a master list of the recommended high-priority freight project packages. This includes information on project package identifier (or rank), project package weighted score, package component identifier and project, project description, county location, priority and project relevance to freight. Each project package contains at least one high-priority project. Weighted score for a project package is an estimate made using priority scores (1 for low-priority, 3 for medium-priority and 5 for high-priority projects) for projects constituting the package and applying freight plan goal weights.

The priority freight project packages are mapped in **Figure E.4.** The package numbers are indexed to **Table E.5**.

Table E.1: Previously Planned JOHRTS Regional Freight relevant MTP Projects Master List

CSJ Number (Proj ID)	Highway Number	Project Description	From	To	County	Project Phase	Construction Cost (Est. Dollars)	Why Project is Relevant to Freight?	Need(s) Met IDs
2807056	US 90	IMPROVE TRAFFIC SIGNALS	AT LANGHAM RD		Jefferson	Construction begins within 4 years	$181,548	Project on THFN	**9, 102**
2807057	US 90	IMPROVE TRAFFIC SIGNALS	AT LINDBERGH DR		Jefferson	Construction begins within 4 years	$157,253	Project on THFN	**9, 102**
2807058	US 90	SAFETY LIGHTING	S MAJOR DRIVE, EAST	IH 10	Jefferson	Construction begins within 4 years	$1,138,510	Project on THFN	**102**
2813135	IH 10	WIDEN ROAD - ADD LANES	HOLLYWOOD OVERPASS, EAST	7TH STREET	Jefferson	Construction begins within 4 years	$275,000,000	Project on THFN	**2, 102, 103**
2814091	IH 10	WIDEN ROAD - ADD LANES	0.54 MILES EAST OF FM 3247	SABINE RIVER BRIDGE	Orange	Construction begins within 4 years	$47,500,000	Project on THFN	**3, 102, 103**
2814116	IH 10	DECK REPAIRS, END SPAN IMPROVEMENTS	AT SABINE RIVER (EAST BOUND)		Orange	Construction begins within 4 years	$1,500,000	Project on THFN	**104**
2814117	IH 10	DECK REPAIRS, END SPAN IMPROVEMENTS	AT SABINE RIVER (WEST BOUND)		Orange	Construction begins within 4 years	$1,500,000	Project on THFN	**104**
2815054	BU 90-Y	OVERLAY EXISTING ROADWAY	IH 10, EAST	FM 3247	Orange	Construction begins in 5 to 10 years	$800,000	Project on THFN	**103**
6505148	US 96	IMPROVE TRAFFIC SIGNALS	AT EAST CHANCE		Hardin	Construction begins within 4 years	$168,271	Project on THFN	**11, 102**
6505149	US 96	IMPROVE TRAFFIC SIGNALS	AT RAIDER LN		Hardin	Construction begins within 4 years	$178,778	Project on THFN	**11, 102**
6505150	US 96	IMPROVE TRAFFIC SIGNALS	AT FM 421		Hardin	Construction begins within 4 years	$188,213	Project on THFN	**11, 102**
6505152	US 96	INSTALL RAISED MEDIAN	0.2 MI N OF WEST CHANCE CUTOFF, SOUTH	LINDSEY RD	Hardin	Construction begins within 4 years	$973,708	Project on THFN	**102**
6505153	US 96	HIGH FRICTION SURFACE TREATMENT (CURVE)	AT US 69		Hardin	Construction begins within 4 years	$204,852	Project on THFN	**102**
6506062	US 69		US 96	JEFFERSON CO LINE	Hardin	Construction begins in 5 to 10 years	$400,000	Project on THFN	**103**
6506067	US 69	WIDEN FREEWAY FROM 4 TO 6 LANES	US 96, SOUTH	JEFFERSON C/L	Hardin	Construction begins in 5 to 10 years	$30,000,000	Project on THFN	**11, 102, 103**
6506068	US 69	1.5" MILL AND OVERLAY	US 96, SOUTH	PINE ISLAND BAYOU (FRONTAGE ROADS)	Hardin	Construction begins within 4 years	$500,000	Project on THFN	**103**
6507056	US 69		HARDIN CO LINE	0.2 MI SOUTH OF TRAM ROAD	Jefferson	Construction begins in 5 to 10 years	$444,499	Project on THFN	**103**
6507063	US 69	INSTALL INTERSECTION FLASHING BEACON, INSTALL ADVANCED	AT CHINN LN	(FRONTAGE ROADS)	Jefferson	Construction begins within 4 years	$21,105	Project on THFN	**102**
6507065	US 69	WIDEN FREEWAY FROM 4 TO 6 LANES	HARDIN C/L, SOUTH	TRAM ROAD	Jefferson	Construction begins in 5 to 10 years	$6,000,000	Project on THFN	**11, 102, 103**
6508166	SS 380	IMPROVE TRAFFIC SIGNALS	AT CALDER AVE		Jefferson	Construction begins within 4 years	$189,271	Project on THFN	**47, 102**
6508167	SS 380	IMPROVE TRAFFIC SIGNALS	AT WASHINGTON BLVD		Jefferson	Construction begins within 4 years	$138,285	Project on THFN	**47, 102**
20009069	US 69	CONSTRUCT NEW LOCATION 4 LANE DIVIDED FACILITY	TYLER COUNTY LINE	0.75 MI SOUTH OF FM 1003	Hardin	Construction begins within 4 years	$64,000,000	Project on THFN	**102, 103**
20010075	US 69		0.5 NORTH OF MITCHELL ROAD	US 96	Hardin	Construction begins in 5 to 10 years	$400,000	Project on THFN	**103**
20010083	US 69	IMPROVE TRAFFIC SIGNALS	AT FOREST RD		Hardin	Construction begins within 4 years	$147,753	Project on THFN	**10, 102**

CSJ Number (Proj ID)	Highway Number	Project Description	From	To	County	Project Phase	Construction Cost (Est. Dollars)	Why Project is Relevant to Freight?	Need(s) Met IDs
20011099	US 69	REPAIR EXISTING PAVEMENT AND OVERLAY ROADWAY	LNVA CANAL, SOUTH	DELAWARE (FRONTAGE ROADS)	Jefferson	Construction begins in 5 to 10 years	$5,500,000	Project on THFN	**103**
20011107	US 69	CLEAN JOINTS, PAINT STEEL, REPLACE BEARINGS	11TH STREET SB OVERPASS		Jefferson	Construction begins within 4 years	$276,909	Project on THFN	**104**
20014060	US 69	WIDEN TO SIX LANES	IH 10, SE	SH 347	Jefferson	Construction begins in 5 to 10 years	$49,000,000	Project on THFN	**30, 102, 103**
20014089	US 69	SURFACING/ROADWAY RESTORATION	IH 10, SOUTH	SH 347	Jefferson	Construction begins within 4 years	$3,000,000	Project on THFN	**103**
20015021	US 69	SURFACING/ROADWAY RESTORATION	SPURLOCK RD., SOUTH	FM 365	Jefferson	Construction begins within 4 years	$1,720,000	Project on THFN	**103**
20016016	US 69	OVERLAY EXISTING ROADWAY	FM 365, SOUTH	MAIN B CANAL (FRONTAGE ROADS)	Jefferson	Construction begins in 5 to 10 years	$1,800,000	Project on THFN	**103**
20016020	US 69	HIGHWAY IMPROVEMENT	AT SH 73		Jefferson	Construction begins within 4 years	$67,000,000	Project on THFN	**4, 5, 42, 102, 104**
20016021	US 69	IMPROVE TRAFFIC SIGNALS	AT FM 365	(FRONTAGE ROADS)	Jefferson	Construction begins within 4 years	$310,802	Project on THFN	**4, 102**
20016022	US 69	SURFACING/ROADWAY RESTORATION	FM 365, SOUTH	39TH ST	Jefferson	Construction begins within 4 years	$2,280,000	Project on THFN	**103**
20016023	US 69	DECK REPAIRS, CLEAN JOINTS, PAINT STEEL, NEW BEARINGS	AT FM 365		Jefferson	Construction begins within 4 years	$495,181	Project on THFN	**104**
24304056	SH 62	WIDEN HIGHWAY FROM 2 TO 4 LANES	FM 1078, SOUTH	IH 10	Orange	Construction begins in 5 to 10 years	$6,000,000	Project improves access to local truck transportation companies and truck services	**3, 102, 103**
30507068	SH 87	IMPROVE TRAFFIC SIGNALS	AT MLK/FM 3247(W)		Orange	Construction begins within 4 years	$147,308	Project not on THFN but improves access to Orion Engineered Carbons and Buzzi Unicem USA companies	**102**
30507069	SH 87	IMPROVE TRAFFIC SIGNALS	AT FM 3247(E)/FM 736		Orange	Construction begins within 4 years	$130,380	Project not on THFN but improves access to Orion Engineered Carbons and Buzzi Unicem USA companies	**102**
30507071	SH 87	MILL AND OVERLAY	IH 10	SH 87	Orange	Construction begins within 4 years	$3,150,000	Project on THFN	**103**
30507072	SH 87	WIDEN HIGHWAY FROM 2 TO 4 LANES	NEWTON C/L, SOUTH	LITTLE CYPRESS DRIVE	Orange	Construction begins in 5 to 10 years	$20,000,000	Project not on THFN but improves interregional freight access and traffic safety	**102, 103**
30601060	SH 87	OVERLAY EXISTING ROADWAY	FM 105, SOUTH	SH 62	Orange	Construction begins in 5 to 10 years	$2,772,840	Project on THFN	**103**
30603122	SH 73	OVERLAY EXISTING ROADWAY	SH 87, EAST	3000 FT EAST OF FM366(FRONTAGE_RDS)	Jefferson	Construction begins in 5 to 10 years	$800,000	Project on THFN	**103**
30603127	SH 73	MILL AND OVERLAY EXISTING ROADWAY	1.0 MI WEST OF RAINBOW BRIDGE	0.3 MI EAST (WB LANES ONLY)	Jefferson	Construction begins in 5 to 10 years	$1,500,000	Project on THFN	**103**
30603129	SH 87	IMPROVE TRAFFIC SIGNALS	AT MAIN AVE		Jefferson	Construction begins within 4 years	$167,088	Project on THFN	**7, 102**
30603130	SH 87	IMPROVE TRAFFIC SIGNALS	AT ROSEDALE DR		Jefferson	Construction begins within 4 years	$177,138	Project on THFN	**7, 102**
30603131	SH 87	IMPROVE TRAFFIC SIGNALS	AT US 69		Jefferson	Construction begins within 4 years	$181,625	Project on THFN	**7, 102**
30701146	SH 87		S OF INTRACOASTAL CANAL BRIDGE	N OF KEITH LAKE BRIDGE	Jefferson	Construction begins in 5 to 10 years	$10,000,000	Project not on THFN but improves access and safety to LNG Terminals along Sabine Pass	

CSJ Number (Proj ID)	Highway Number	Project Description	From	To	County	Project Phase	Construction Cost (Est. Dollars)	Why Project is Relevant to Freight?	Need(s) Met IDs
30701149	SH 87	MILL AND INLAY	US 69	TERMINAL RD.	Jefferson	Construction begins within 4 years	$3,850,000	Project on THFN	**103**
33903039	SH 105	INSTALL CONTINUOUS TURN LANE	AT OLD BATSON-SARATOGA ROAD		Hardin	Construction begins within 4 years	$448,122	Project on THFN	**102**
33904036	SH 105	WIDEN TO FOUR LANES WITH CTL	.10 MILES EAST OF SH 326	PINE ISLAND BAYOU	Hardin	Construction begins within 4 years	$53,200,000	Project on THFN	**102, 103**
33904037	SH 105	MILL AND OVERLAY, CONCRETE REPAIR	HOUSTON ST. , EAST	SH 326	Hardin	Construction begins within 4 years	$550,000	Project on THFN	**103**
36803037	SH 124	INSTALL CONTINUOUS TURN LANE, MILLED EDGELINE RUMBLE STRIPS	0.6 MI E OF FM 364, WEST	0.289 MI E OF FM 364	Jefferson	Construction begins within 4 years	$256,866	Project not on THFN but improves access and safety to numerous goods movement dependent industries	**102**
36804032	SH 124	INSTALL CONTINUOUS TURN LANE, MILLED EDGELINE RUMBLE STRIPS	0.5 MI W OF BROOKS RD, WEST	0.6 MI E OF FM 364	Jefferson	Construction begins within 4 years	$256,866	Project not on THFN but improves access and safety to numerous goods movement dependent industries	**102**
50804164	SH 73	OVERLAY EXISTING ROADWAY	MAIN A CANAL, EAST	SH 87 (FRONTAGE ROADS)	Jefferson	Construction begins in 5 to 10 years	$3,000,000	Project on THFN	**103**
50804169	SH 73	DECK REPAIRS, CLEAN JOINTS, PAINT STEEL, NEW BEARINGS	AT SH 82		Jefferson	Construction begins within 4 years	$496,863	Project on THFN	**104**
50804173	SH 73	REPAIR ABUTMENT CAPS, BACKWALLS, BEARING, AND GUARDFENCE	AT KCS RAILROAD (EASTBOUND)		Jefferson	Construction begins within 4 years	$1,000,000	Project on THFN and across freight railroad track	**104**
50804174	SH 73	REPAIR ABUTMENT CAPS, BACKWALLS, BEARINGS.	AT KCS RAILROAD (WESTBOUND)		Jefferson	Construction begins within 4 years	$1,000,000	Project on THFN and across freight railroad track	**104**
66701115	SH 347	REHABILITATE EXISTING ROADWAY	MAIN C LATERAL, SOUTH	AVE B IN NEDERLAND	Jefferson	Construction begins in 5 to 10 years	$2,000,000	Project on THFN	**16, 102, 103**
66701119	SH 347	IMPROVE TRAFFIC SIGNALS	AT 75TH ST		Jefferson	Construction begins within 4 years	$168,029	Project on THFN	**16, 102**
66701120	SH 347	BACKWALL REPAIRS, CLEAN JOINTS, PAINT STEEL, REPLACE	AT KCS RAILROAD (WESTBOUND)		Jefferson	Construction begins within 4 years	$558,198	Project on THFN and across freight railroad track	**104**
66701121	SH 347	BACKWALL REPAIRS, CLEAN JOINTS, PAINT STEEL, REPLACE	AT KCS RAILROAD (EASTBOUND)		Jefferson	Construction begins within 4 years	$240,876	Project on THFN and across freight railroad track	**104**
66701122	SH 347	CLEAN JOINTS, PAINT STEEL, REPLACE BEARINGS	AT FM 366 (NORTH BOUND)		Jefferson	Construction begins within 4 years	$275,000	Project on THFN	**104**
66702113	FM 366	IMPROVE TRAFFIC SIGNALS	AT NEDERLAND AVE		Jefferson	Construction begins within 4 years	$151,814	Project on THFN	**102**
66702114	FM 366	IMPROVE TRAFFIC SIGNALS	AT MERRIMAN ST		Jefferson	Construction begins within 4 years	$178,337	Project on THFN	**102**
66702115	FM 366	IMPROVE TRAFFIC SIGNALS	AT PARK ST		Jefferson	Construction begins within 4 years	$123,161	Project on THFN	**102**
73902140	IH 10	WIDEN ROAD - ADD LANES	CR 131 (WALDEN ROAD), EAST	HOLLYWOOD OVERPASS	Jefferson	Construction begins within 4 years	$185,000,000	Project on THFN	**2, 8, 102, 103**
78601087	FM 364	INSTALL ADVANCED WARNING SIGNALS AND SIGNS (INTERSECTION)	MANION DRIVE	PHELAN BLVD	Jefferson	Construction begins within 4 years	$26,257	Provides traffic safety near at-grade freight railroad crossings	**102**
88202059	FM 1006	SAFETY TREAT FIXED OBJECTS, MILLED CENTERLINE RUMBLE STRIPS	SH 87, EAST	0.171 MI N OF FM 2177	Orange	Construction begins within 4 years	$657,796	Project not on THFN but improves access and safety to numerous goods movement dependent industries	**102**
93201113	FM 365	BRIDGE REHABILITATION	AT RHODAIR GULLY		Jefferson	Construction begins within 4 years	$2,300,000	Project on THFN	**102, 104**

CSJ Number (Proj ID)	Highway Number	Project Description	From	To	County	Project Phase	Construction Cost (Est. Dollars)	Why Project is Relevant to Freight?	Need(s) Met IDs
93201115	FM 365	IMPROVE TRAFFIC SIGNALS	AT FM 366		Jefferson	Construction begins within 4 years	$187,309	Project on THFN	**102**
109601065	FM 770	SAFETY TREAT FIXED OBJECTS, MILLED EDGELINE AND CENTERLINE	0.12 MI S OF SH 105, SOUTH	LIBERTY C/L	Hardin	Construction begins within 4 years	$2,284,954	Project not on THFN but improves access to Batson Lumber Company	**102**
236701061	SH 82	SAFETY TREAT FIXED OBJECTS	AT LEVEE RD		Jefferson	Construction begins within 4 years	$22,321	Project not on THFN but improves access and safety to LNG Terminals along Sabine Pass	**102**
256201020	FM 1442	REHABILITATE EXISTING ROADWAY	FM 408, EAST	SH 73 IN BRIDGE CITY	Orange	Construction begins within 4 years	$2,500,000	Project not on THFN but improves access and safety to Entergy Sabine Power Plant and other goods movement dependent businesses	**102, 103**
256201023	FM 1442	SAFETY TREAT FIXED OBJECTS, INSTALL CONTINUOUS TURN LANE,	FM 105, SOUTH	FM 408	Orange	Construction begins within 4 years	$3,690,354	Project not on THFN but improves access and safety to Entergy Sabine Power Plant and other goods movement dependent businesses	**102**

Table E.2: *Previously Planned JOHRTS Regional Freight Projects from Other Sources Master List*

Proj ID	Mode	Project Description	County	Cost (in millions of dollars)	Which Port is Project related to?	Source of Project	Need(s) Met IDs
OTH1	Rail	Main Street Terminal 1	Jefferson	$79.0	Port of Beaumont	Texas Port 2020-2021 Capital Program	55, 75
OTH2	Rail	Bufford Rail Yard Interchange Track	Jefferson	$13.1	Port of Beaumont	Texas Port 2020-2021 Capital Program	55, 75
OTH3	Water	Berth 6 Expansion	Jefferson	$55.0	Port of Port Arthur	Texas Port 2020-2021 Capital Program	55, 86
OTH4	Water	Berth 5 Cargo Deck and Multimodal Transfer Area	Jefferson	$13.4	Port of Port Arthur	Texas Port 2020-2021 Capital Program	55, 86
OTH5	Rail	Rail Reliever	Jefferson	$4.3	Port of Port Arthur	Texas Port 2020-2021 Capital Program	55, 86
OTH6	Rail	Second Neches River Rail Crossing	Jefferson	$120.0	N.A.	TxDOT Rail Division	55, 76
OTH7	Rail	Grade separation of Rev. Doctor Ransom Howard Street COT 329559B in Port Arthur from KCS main line & yard access	Jefferson	$15.0	N.A.	TxDOT Rail Division	55, 86
OTH8	Rail	Rail-to-rail grade separation on low line track at Port of Beaumont	Jefferson	$6.0	Port of Beaumont	Port Access Study	55
OTH9	Rail	Siding track parallel to UP Mainline to allow oil trains to get off the mainline at Port of Beaumont	Jefferson	$15.6	Port of Beaumont	Texas Port 2015-2016 Capital Program	55, 75
OTH10	Multimodal	Development of Carroll St. & Buford St. Lots	Jefferson	$5.7	Port of Beaumont	Texas Port 2015-2016 Capital Program	25, 55
OTH11	Multimodal	Multimodal Loading or Industrial Facility	Jefferson	$45.0	Port of Beaumont	Texas Port 2015-2016 Capital Program	55, 66
OTH12	Rail	Rail extension at Port of Port Arthur (4,000 ft of rail which includes tie-in to KCS and added spur to existing port track)	Jefferson	$4.5	Port of Port Arthur	Texas Port 2015-2016 Capital Program	55, 86
OTH13	Highway	Traffic light synchronization on SH 87 throughout the cities of Port Arthur, Bridge City, and Orange	Jefferson	$0.9	Port of Port Arthur	Port Access Study	7, 55
OTH14	Highway	Review SH 87 for lane width, truck access, turn radii and maintenance (Gulfway Drive and Houston Ave)	Jefferson	N.A.	Port of Port Arthur	Port Access Study	7, 55
OTH15	Highway	Construct a right turn lane at Port Arthur - Spur 215 to SH 87	Jefferson	$4.0	Port of Port Arthur	Port Access Study	7, 55
OTH16	Highway	Overpass at Carroll Street Crossing Port Main Lead Track	Jefferson	$10.0	Port of Beaumont	Texas Port 2015-2016 Capital Program	55
OTH17	Highway	Access Roadway to Hwy 90 with Overpass at KCS and new entrance/security checkpoint	Jefferson	$9.0	Port of Beaumont	Texas Port 2015-2016 Capital Program	55
OTH18	Highway	Second Access Roadway to IH-10 (0.5 mile of Old Hwy 90 between new overpass and IH-10)	Jefferson	$2.0	Port of Beaumont	Texas Port 2015-2016 Capital Program	55
OTH19	Highway	Road and Site Access - Phase 2. Improve connectivity on downriver side of SH 82	Jefferson	$1.2	Port of Port Arthur	Texas Port 2015-2016 Capital Program	55
OTH20	Water	Deepen Sabine-Neches Waterway	Regional	N.A.	Port of Beaumont, Port of Port Arthur	Sabine-Neches Navigation District	85

Table E.3: Proposed JOHRTS Regional Freight Projects Master List

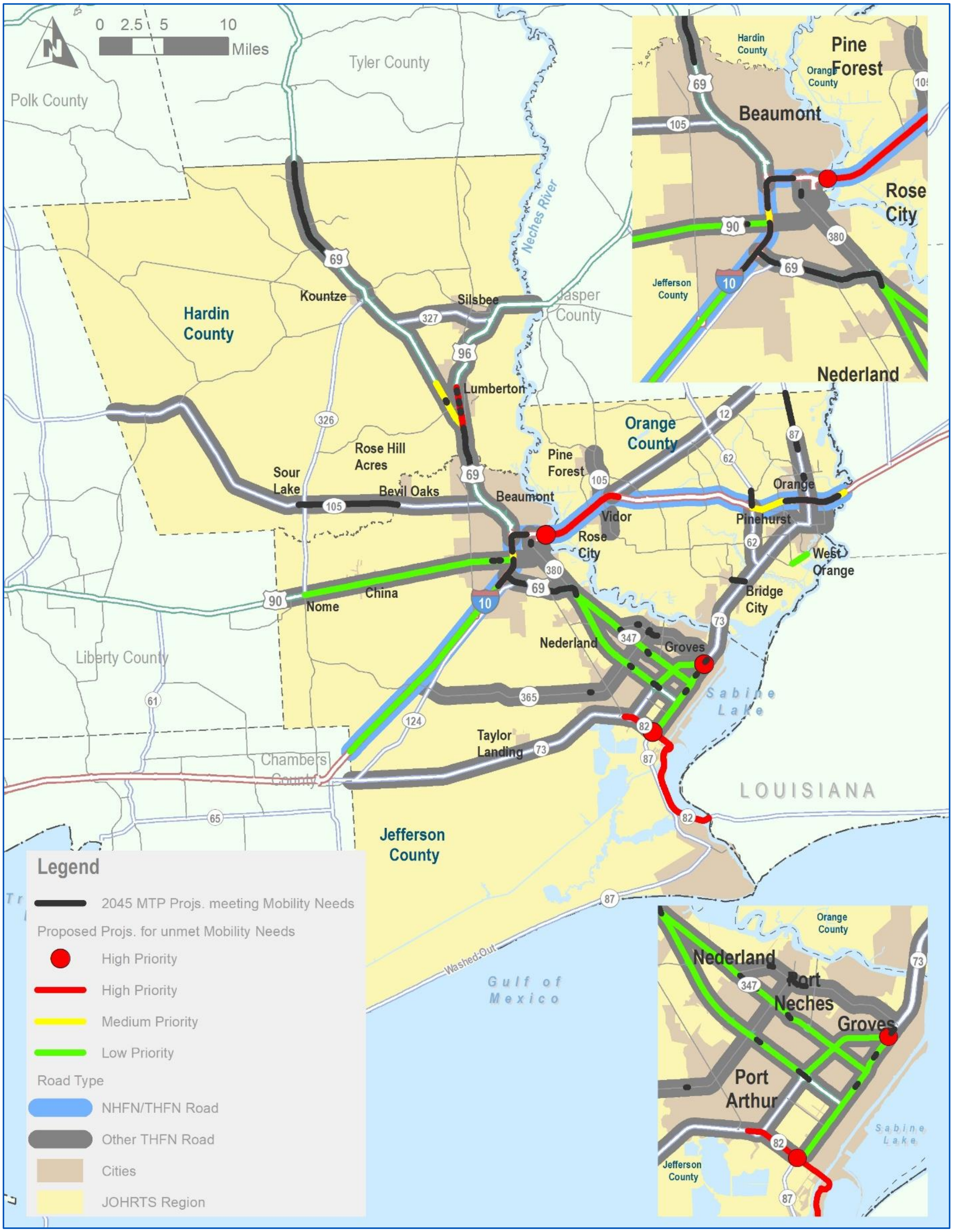
Proj ID	Highway Number	Project Description	From	To	County	Project Priority	Why Project is Relevant to Freight?	Need(s) Met IDs
MI1	IH-10	Roadway Mobility Improvement	Cardinal Drive	Eastex Freeway	Jefferson	Medium	Project on THFN	2
MI2	IH-10	Roadway Mobility Improvement	SH 62	Texas/Louisiana Border	Orange	Medium	Project on THFN	3
MI3	US 69	Roadway Mobility Improvement	SH 73	SH 347	Jefferson	Low	Project on THFN	4
MI4	SH 73	Roadway Mobility Improvement	US 69	Atlantic Road	Jefferson	Low	Project on THFN	5
MI5	SH 82	Roadway Mobility Improvement	Texas/Louisiana Border	SH 87	Jefferson	High	Project on THFN	6
MI6	SH 87	Roadway Mobility Improvement	SH 82	SH 73	Jefferson	Low	Project on THFN	7
MI7	IH-10	Roadway Mobility Improvement	SH 124	US 69	Jefferson	Low	Project on THFN	8
MI8	US 90	Roadway Mobility Improvement	SH 365	IH-10	Jefferson	Low	Project on THFN	9
MI9	US 69	Roadway Mobility Improvement	Wheeler Rd	US 96	Hardin	Medium	Project on THFN	10
MI10	US 69	Roadway Mobility Improvement	Pine Island Bayou	Lumberton	Hardin	High	Project on THFN	11
MI11	IH-10	Roadway Mobility Improvement	SS 380	Old US 90 Hwy	Orange	High	Project on THFN	12
MI12	FM 1006	Roadway Mobility Improvement	Foreman Rd	SH 2177	Orange	Low	Project not on THFN but provides access to freight facilities	15
MI13	SH 347	Roadway Mobility Improvement	SH 87	US 69	Orange	Low	Project on THFN	16
MI14	US 73	Intersection Mobility Improvement	At SH 87		Jefferson	High	Project on THFN	17
MI15	IH-10	Intersection Mobility Improvement	At Neches River		Jefferson	High	Project on THFN	43
MI16	US 82	Intersection Mobility Improvement	At SH 87		Jefferson	High	Project on THFN	44
SI1	IH-10	Roadway Safety Improvement	US 90 (Bus)	MLK Jr Drive	Orange	High	Project on THFN	102
SI2	SH 62	Roadway Safety Improvement	Tulane Road	Hoo Hoo Road	Orange	Low	Project on THFN	102
SI3	IH-10	Roadway Safety Improvement	Evangeline Drive	Old Buna Road	Orange	Low	Project on THFN	102
SI4	IH-10	Roadway Safety Improvement	Pine Street	Old US 90 Highway	Orange	Medium	Project on THFN	102
SI5	US 69	Roadway Safety Improvement	IH-10	SH 105	Jefferson	Medium	Project on THFN	102
SI6	IH-10	Roadway Safety Improvement	Smith Road	Boyt Road	Jefferson	Low	Project on THFN	102
SI7	IH-10	Roadway Safety Improvement	0.7 miles S of Boyt Road	1.5 miles N of S Fork Drive	Jefferson	Low	Project on THFN	102
SI8	IH-10	Roadway Safety Improvement	Santa Fe Trail	Brush Island Road	Jefferson	Medium	Project on THFN	102
SI9	SH 347	Roadway Safety Improvement	Dorothy Street	US 69	Jefferson	Low	Project on THFN	102
SI10	SH 73	Roadway Safety Improvement	SH 347	SS 215	Jefferson	Low	Project on THFN	102
SI11	SH 82	Roadway Safety Improvement	S of SH 73	Cambridge Street	Jefferson	High	Project on THFN	102
SI12	US 90	Intersection Safety Improvement	At SS 380		Jefferson	High	Project on THFN	102
SI13	4th Street	Intersection Safety Improvement	At Liberty Avenue		Jefferson	Low	Project not on THFN but provides increases network redundancy and connectivity.	102
SI14	US 90	Intersection Safety Improvement	At 11th Street		Jefferson	Low	Project on THFN	102
SI15	US 96	Intersection Safety Improvement	At Tull Road		Hardin	Low	Project on THFN	102
SI16	US 69	Intersection Safety Improvement	At Wheeler Road		Hardin	High	Project on THFN	102
SI17	Dowlen Road	Intersection Safety Improvement	At Delaware Street		Jefferson	Low	Project not on THFN but provides increases network redundancy and connectivity.	102
SI18	Dowlen Road	Intersection Safety Improvement	At Phelan Boulevard		Jefferson	Low	Project not on THFN but provides increases network redundancy and connectivity.	102
SI19	IH-10	Interchange Safety Improvement	At SH 124		Jefferson	High	Project on THFN	102
SI20	SS 93	Intersection Safety Improvement	At Hebert Road		Jefferson	Low	Project not on THFN but provides increases network redundancy and connectivity.	102

Proj ID	Highway Number	Project Description	From	To	County	Project Priority	Why Project is Relevant to Freight?	Need(s) Met IDs
SI21	SH 347	Intersection Safety Improvement	At FM 365		Jefferson	Low	Project on THFN	**102**
SI22	US 69	Intersection Safety Improvement	At FM 365		Jefferson	Medium	Project on THFN	**102**
SI23	9th Avenue	Intersection Safety Improvement	At Jimmy Johnson Boulevard		Jefferson	Low	Project not on THFN but provides increases network redundancy and connectivity.	**102**
SI24	SH 82	Intersection Safety Improvement	At SH 87		Jefferson	Medium	Project on THFN	**102**
SI25	US 69	Intersection Safety Improvement	At 25th Street		Jefferson	Low	Project on THFN	**102**
SI26	SH 347	Intersection Safety Improvement	At 32nd Street		Jefferson	Low	Project on THFN	**102**
SI27	SH 347	Intersection Safety Improvement	At SH 87		Jefferson	High	Project on THFN	**102**
SI28	SH 105	Intersection Safety Improvement	At FM 1131		Orange	Medium	Project on THFN	**102**
PRR1	11th Street	Repair and/or Replace Pavement	US 69	Washington Boulevard	Jefferson	Medium	Project not on THFN but provides increases network redundancy and connectivity.	**103**
PRR2	US 90	Repair and/or Replace Pavement	Rose Lane	IH-10/Pine St	Jefferson	Low	Project on THFN	**103**
PRR3	SR 380 Spur	Repair and/or Replace Pavement	US 69	IH-10	Jefferson	Medium	Project on THFN	**103**
PRR4	Washington Boulevard	Repair and/or Replace Pavement	IH-10	San Antonio Street	Jefferson	High	Project not on THFN but provides increases network redundancy and connectivity.	**103**
PRR5	Phelan Boulevard	Repair and/or Replace Pavement	N Major Drive	IH-10	Jefferson	High	Project not on THFN but provides increases network redundancy and connectivity.	**103**
PRR6	Calder Avenue	Repair and/or Replace Pavement	Phelan Boulevard	US 90	Jefferson	High	Project not on THFN but provides increases network redundancy and connectivity.	**103**
PRR7	Dowlen Road	Repair and/or Replace Pavement	US 69	US 90	Jefferson	Medium	Project not on THFN but provides increases network redundancy and connectivity.	**103**
PRR8	IH-10	Repair and/or Replace Pavement	SR 380 Spur	Concord Street	Orange	Medium	Project on THFN	**103**
PRR9	Major Drive	Repair and/or Replace Pavement	SH 105	US 90	Jefferson	Low	Project not on THFN but provides increases network redundancy and connectivity.	**103**
PRR10	SH 105	Repair and/or Replace Pavement	Jefferson C/L	US 69	Jefferson	Low	Project on THFN	**103**
PRR11	US 69	Repair and/or Replace Pavement	Range Road	Spurlock Road	Jefferson	Low	Project on THFN	**103**
PRR12	SH 347	Repair and/or Replace Pavement	FM 366	Industrial Park Road	Jefferson	Medium	Project on THFN	**103**
PRR13	Nederland Avenue	Repair and/or Replace Pavement	US 69	FM 365	Jefferson	Medium	Project not on THFN but provides increases network redundancy and connectivity.	**103**
PRR14	FM 366	Repair and/or Replace Pavement	SH 347	SH 73	Jefferson	Low	Project on THFN	**103**
PRR15	SH 347	Repair and/or Replace Pavement	Nederland Avenue	Lewis Drive	Jefferson	Medium	Project on THFN	**103**
PRR16	FM 365 / Nall Street	Repair and/or Replace Pavement	S 21st Street	FM 366	Jefferson	Medium	Project on THFN	**103**
PRR17	9th Ave	Repair and/or Replace Pavement	SH 73	FM 365	Jefferson	High	Project not on THFN but provides increases network redundancy and connectivity.	**103**
PRR18	SH 73 / SH 82	Repair and/or Replace Pavement	Bridge on Alligator Bayou	Bridge on Taylor Bayou	Jefferson	Low	Project on THFN	**103**
PRR19	SH 87	Repair and/or Replace Pavement	Beverly Drive	Woodworth Boulevard	Jefferson	Medium	Project on THFN	**103**
PRR20	SH 73	Repair and/or Replace Pavement	Old Ferry Road	Lake Street	Orange	Low	Project on THFN	**103**
PRR21	SH 73	Repair and/or Replace Pavement	Bridge on Levee between Labelle Rd and Boondocks Road		Jefferson	High	Project on THFN	**103**
PRR22	SH 73	Repair and/or Replace Pavement	Bridge on Mayhaw Bayou		Jefferson	High	Project on THFN	**103**
PRR23	FM 365	Repair and/or Replace Pavement	at SH 124 Intersection		Jefferson	High	Project on THFN	**103**
PRR24	US 90	Repair and/or Replace Pavement	Jefferson C/L	Broadway Street	Jefferson	Medium	Project on THFN	**103**

Proj ID	Highway Number	Project Description	From	To	County	Project Priority	Why Project is Relevant to Freight?	Need(s) Met IDs
PRR25	SH 87	Repair and/or Replace Pavement	at SH 62 Intersection		Orange	Medium	Project on THFN	**103**
PRR26	SH 87	Repair and/or Replace Pavement	Holland Street	US 90 Bus	Orange	Medium	Project on THFN	**103**
PRR27	US 90 Bus	Repair and/or Replace Pavement	IH-10	SH 87	Orange	Low	Project on THFN	**103**
PRR28	IH-10	Repair and/or Replace Pavement	US 90 Bus	Tejas Parkway	Orange	High	Project on THFN	**103**
PRR29	MLK Jr Dr	Repair and/or Replace Pavement	IH-10	US 90 Bus	Orange	Low	Project not on THFN but provides increases network redundancy and connectivity.	**103**
PRR30	SH 62	Repair and/or Replace Pavement	IH-10	Tulane Road	Orange	Low	Project on THFN	**103**
PRR31	IH-10	Repair and/or Replace Pavement	FM 1132	FM 1442	Orange	Low	Project on THFN	**103**
PRR32	SH 12	Repair and/or Replace Pavement	at SH 62 Intersection		Orange	Low	Project on THFN	**103**
PRR33	FM 1442	Repair and/or Replace Pavement	IH-10	Nobles Road	Orange	Low	Project not on THFN but provides access to Orange County Landfill site and Entergy Sabine Power Plant.	**103**
PRR34	US 69	Repair and/or Replace Pavement	Tram Road	SH 105	Jefferson	Low	Project on THFN	**103**
PRR35	US 69	Repair and/or Replace Pavement	Ellis Drive	Bush Drive	Hardin	Low	Project on THFN	**103**
PRR36	US 69	Repair and/or Replace Pavement	Forest Rd	US 96	Hardin	Low	Project on THFN	**103**
PRR37	US 96	Repair and/or Replace Pavement	US 96 Bus	Hardin C/L	Hardin	Low	Project on THFN	**103**
PRR38	SH 327	Repair and/or Replace Pavement	S 19th Street	US 96	Hardin	High	Project on THFN	**103**
PRR39	SH 327	Repair and/or Replace Pavement	Bridge on Village Creek		Jefferson	Medium	Project on THFN	**103**
PRR40	US 69	Repair and/or Replace Pavement	FM 418	Overstreet Loop	Hardin	Low	Project on THFN	**103**
PRR41	FM 770	Repair and/or Replace Pavement	SH 105	SH 326	Hardin	Low	Project not on THFN but trucks form a high percentage of traffic and increases network redundancy and connectivity	**103**
PRR42	SH 105	Repair and/or Replace Pavement	Hardin C/L	FM 770	Hardin	Low	Project on THFN	**103**
PRR43	US 96	Repair and/or Replace Pavement	Willow Run	US 96 Bus	Hardin	Low	Project on THFN	**103**
PRR44	SH 326	Repair and/or Replace Pavement	FM 770	US 69	Hardin	Low	Project not on THFN but trucks form a high percentage of traffic and increases network redundancy and connectivity	**103**
BCWRR1	SH 73/SH 87 SB	Structural Work (Other) on Bridge	2.90 MI S OF FM 1442		Orange	Low	Project on THFN	**104**
BCWRR2	IH 10	Structural Work (Other) on Bridge	1.2 MI E OF US 69		Jefferson	Medium	Project on THFN	**104**
BCWRR3	PARK AVE	Bridge Rehabilitation	0.05 MI E OF LOOP 358		Orange	Low	Project not on THFN but provides access to American Industrial Minerals on Pier Rd	**104**
BCWRR4	FM 365	Structural Work (Other) on Bridge	0.6 MI SE OF IH 10		Jefferson	Low	Project on THFN	**104**
BCWRR5	SH 73/SH 87 WB	Structural Work (Other) on Bridge	RAINBOW BRIDGE		Jefferson	Low	Project on THFN	**104**
BCWRR6	IH 10 EB FR	Structural Work (Other) on Bridge	2.85 MI W OF SH 62		Orange	Low	Project on THFN	**104**
BCWRR7	IH 10 WB	Structural Work (Other) on Bridge	1.20 MI E OF SH 87		Orange	Medium	Project on THFN	**104**
BCWRR8	IH 10 EB	Structural Work (Other) on Bridge	1.20 MI E OF SH 87		Orange	Medium	Project on THFN	**104**
BCWRR9	SH 87	Structural Work (Other) on Bridge	0.80 MI E OF US 90 BUS		Orange	Medium	Project on THFN	**104**
BCWRR10	US 90 BUS	Structural Work (Other) on Bridge	1.30 MI S OF IH 10		Orange	Low	Project on THFN	**104**
BCWRR11	SH 73/SH 87 NB	Bridge / Other Structure Replacement	0.40 MI S OF SH 62		Orange	High	Project on THFN	**104**
BCWRR12	US 96 NB	Structural Work (Other) on Bridge	4.55 MI N OF US 69		Hardin	Medium	Project on THFN	**104**
BCWRR13	E LAVACA ST	Structural Work (Other) on Bridge	1.30 MI N OF US 96		Jefferson	Low	Project not on THFN but provides access to Montagne Center and associated freight deliveries	**104**

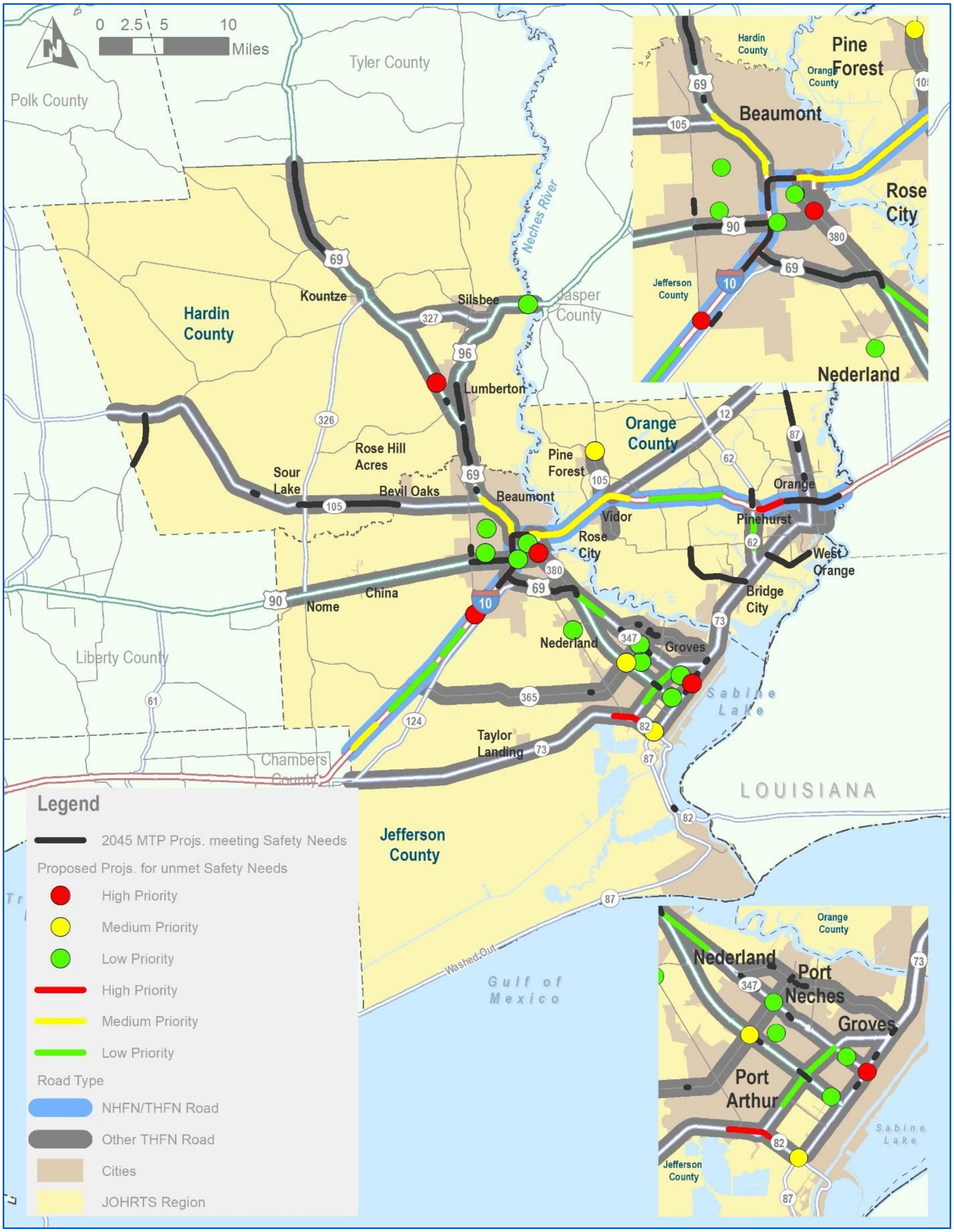
Proj ID	Highway Number	Project Description	From	To	County	Project Priority	Why Project is Relevant to Freight?	Need(s) Met IDs
BCWRR14	E VIRGINIA ST	Structural Work (Other) on Bridge	0.70 MI NW OF US 96		Jefferson	Low	Project not on THFN but provides access to Montagne Center and associated freight deliveries	**104**
BCWRR15	FM 365	Structural Work (Other) on Bridge	7.1 MI SW OF FM 364		Jefferson	Medium	Project on THFN	**104**
BCWRR16	IH 10 WBFR	Structural Work (Other) on Bridge	5.7 MI NE OF SH 73		Jefferson	Low	Project on THFN	**104**
BCWRR17	SMITH RD	Structural Work (Other) on Bridge	5.2 MI NE OF FM 365		Jefferson	Medium	Project not on THFN but provides access to freight services (Love's Travel Shop - Truck Fueling and Restaurant Stop)	**104**
BCWRR18	FM 365	Bridge / Other Structure Replacement	5.4 MI SW OF US 69,96,287		Jefferson	High	Project on THFN	**104**
BCWRR19	US 69, FM 3513	Structural Work (Other) on Bridge	2.75 MI N JEFFERSON C/L		Hardin	Low	Project on THFN	**104**
BCWRR20	US 96 BUS & SH 327	Structural Work (Other) on Bridge	US 96 BUS @ SH 327		Hardin	Low	Project on THFN	**104**
BCWRR21	US 69 NB	Structural Work (Other) on Bridge	0.5 MI SE OF IH 10		Jefferson	Low	Project on THFN and across freight railroad track	**104**
BCWRR22	US 69 SB	Structural Work (Other) on Bridge	0.5 MI SE OF IH 10		Jefferson	Low	Project on THFN and across freight railroad track	**104**
BCWRR23	PARK NORTH RD	Structural Work (Other) on Bridge	1.00 MI S OF FM 421		Hardin	Low	Project on THFN	**104**
BCWRR24	SH 105	Structural Work (Other) on Bridge	1.75 MI W OF SH 326		Hardin	Low	Project on THFN	**104**
BCWRR25	SH 105	Structural Work (Other) on Bridge	2.70 MI NW OF SH 326		Hardin	Low	Project on THFN	**104**
BCWRR26	SH 105	Structural Work (Other) on Bridge	4.00 MI NW OF SH 326		Hardin	Low	Project on THFN	**104**
BCWRR27	US 69 NB	Structural Work (Other) on Bridge	1.7 MI E OF SH 93		Jefferson	Medium	Project on THFN	**104**
BCWRR28	SH 73	Bridge / Other Structure Replacement	0.2 MI W OF SH 87		Jefferson	High	Project on THFN	**104**
BCWRR29	IH 10 EB	Structural Work (Other) on Bridge	1.10 MI W OF SH 87		Orange	Medium	Project on THFN	**104**
BCWRR30	IH 10 WB	Structural Work (Other) on Bridge	1.10 MI W OF SH 87		Orange	Medium	Project on THFN	**104**
BCWRR31	IH 10 EB	Structural Work (Other) on Bridge	IH 10 @ SH 87		Orange	Medium	Project on THFN	**104**
BCWRR32	IH 10 EB FR	Structural Work (Other) on Bridge	0.4 MI N OF US 90		Jefferson	Low	Project on THFN and across freight railroad track	**104**
BCWRR33	IH 10 WB FR	Structural Work (Other) on Bridge	0.4 MI N OF US 90		Jefferson	Low	Project on THFN and across freight railroad track	**104**
BCWRR34	SH 73	Structural Work (Other) on Bridge	0.6 MI SW OF US 69		Jefferson	Low	Project on THFN	**104**
BCWRR35	IH 10 EB	Structural Work (Other) on Bridge	1.0 MI SW OF US 90		Jefferson	Medium	Project on THFN	**104**
BCWRR36	IH 10 WB	Structural Work (Other) on Bridge	1.0 MI SW OF US 90		Jefferson	Medium	Project on THFN	**104**
BCWRR37	IH 10 WB	Structural Work (Other) on Bridge	US 69 @ IH 10		Jefferson	Medium	Project on THFN	**104**
BCWRR38	US 69 SB	Structural Work (Other) on Bridge	2.5 MI N OF US 90		Jefferson	Medium	Project on THFN	**104**
BCWRR39	US 69 NB	Structural Work (Other) on Bridge	2.5 MI N OF US 90		Jefferson	Medium	Project on THFN	**104**
BCWRR40	US 69 SB	Structural Work (Other) on Bridge	0.8 MI SE OF SH 105		Jefferson	Medium	Project on THFN	**104**
BCWRR41	US 69 NB FR	Structural Work (Other) on Bridge	0.4 MI W OF SPUR 380		Jefferson	Low	Project on THFN	**104**
BCWRR42	US 69 SB FR	Structural Work (Other) on Bridge	0.4 MI W OF SPUR 380		Jefferson	Low	Project on THFN	**104**
BCWRR43	US 69 NB	Structural Work (Other) on Bridge	1.2 MI W OF SPUR 380		Jefferson	Medium	Project on THFN	**104**
BCWRR44	IH 10	Structural Work (Other) on Bridge	2.20 MI E OF KCS RR		Orange	High	Project on THFN	**104**
BF1	SH 87	Bridge Replacement	0.5 MI SW OF SH 82		Jefferson	High	Project on THFN	**60**
BF2	SH 87	Bridge Replacement	0.9 MI SW OF SH 82		Jefferson	High	Project on THFN	**60**
BF3	SH 87	Bridge Replacement	0.8 MI SW OF SH 82		Jefferson	High	Project on THFN	**60**
BF4	SH 124	Bridge Replacement	1.6 MI NE OF SH 73		Jefferson	High	Project on THFN	**60**
BF5	IH 10 EB FR	Bridge Replacement	1.10 MI W OF SH 87		Orange	High	Project on THFN	**60**
BF6	IH 10 WB FR	Bridge Replacement	1.10 MI W OF SH 87		Orange	High	Project on THFN	**60**

***Figure E.1**: JOHRTS Regional Proposed Mobility Improvement Projects*



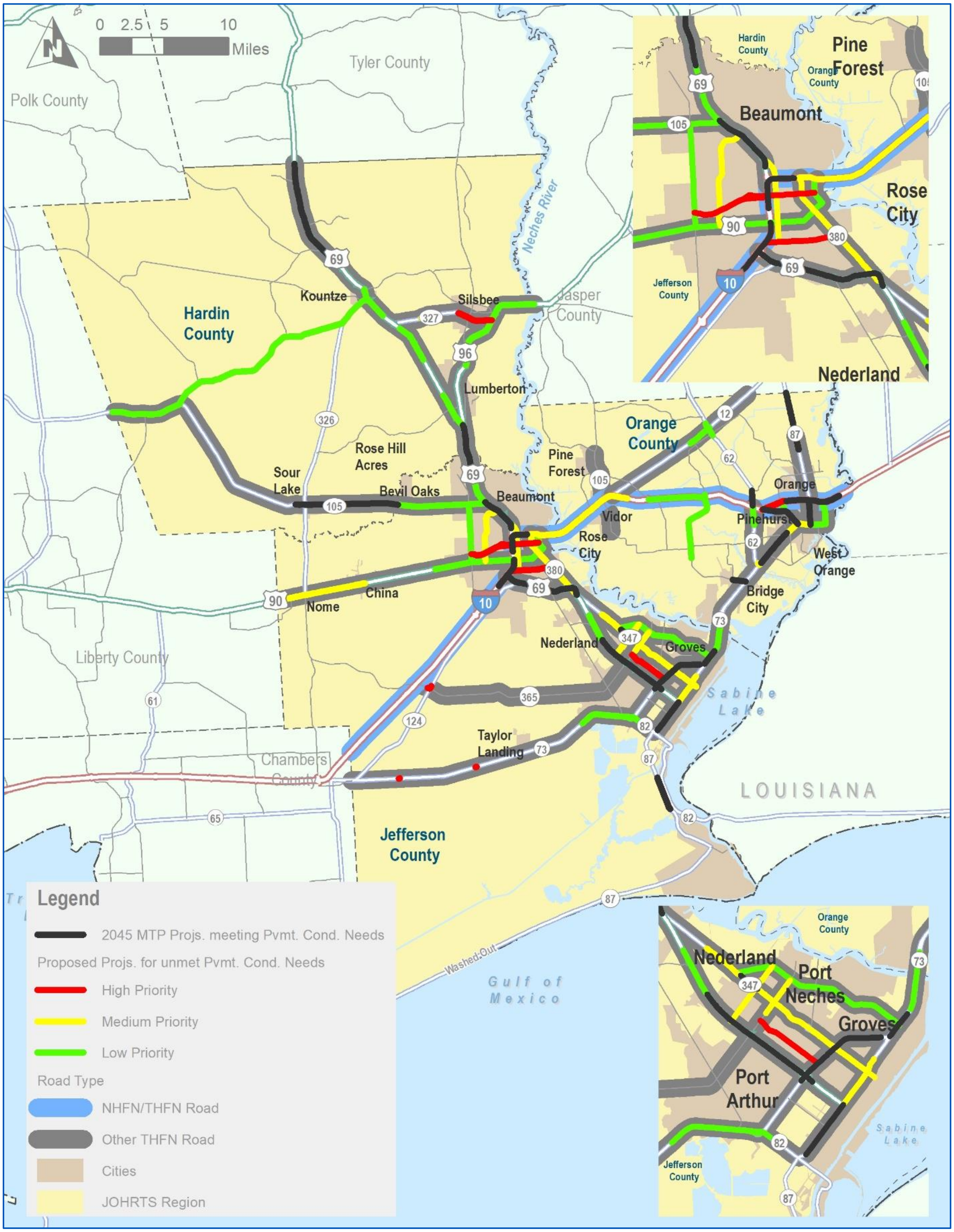
Source: TxDOT GIS Datasets (via TxDOT Open Data Portal); CDM Smith's JOHRTS Region Base Map; CDM Smith's Mobility Improvement Projects Identification and Prioritization

Figure E.2: *JOHRTS Regional Proposed Safety Improvement Projects*



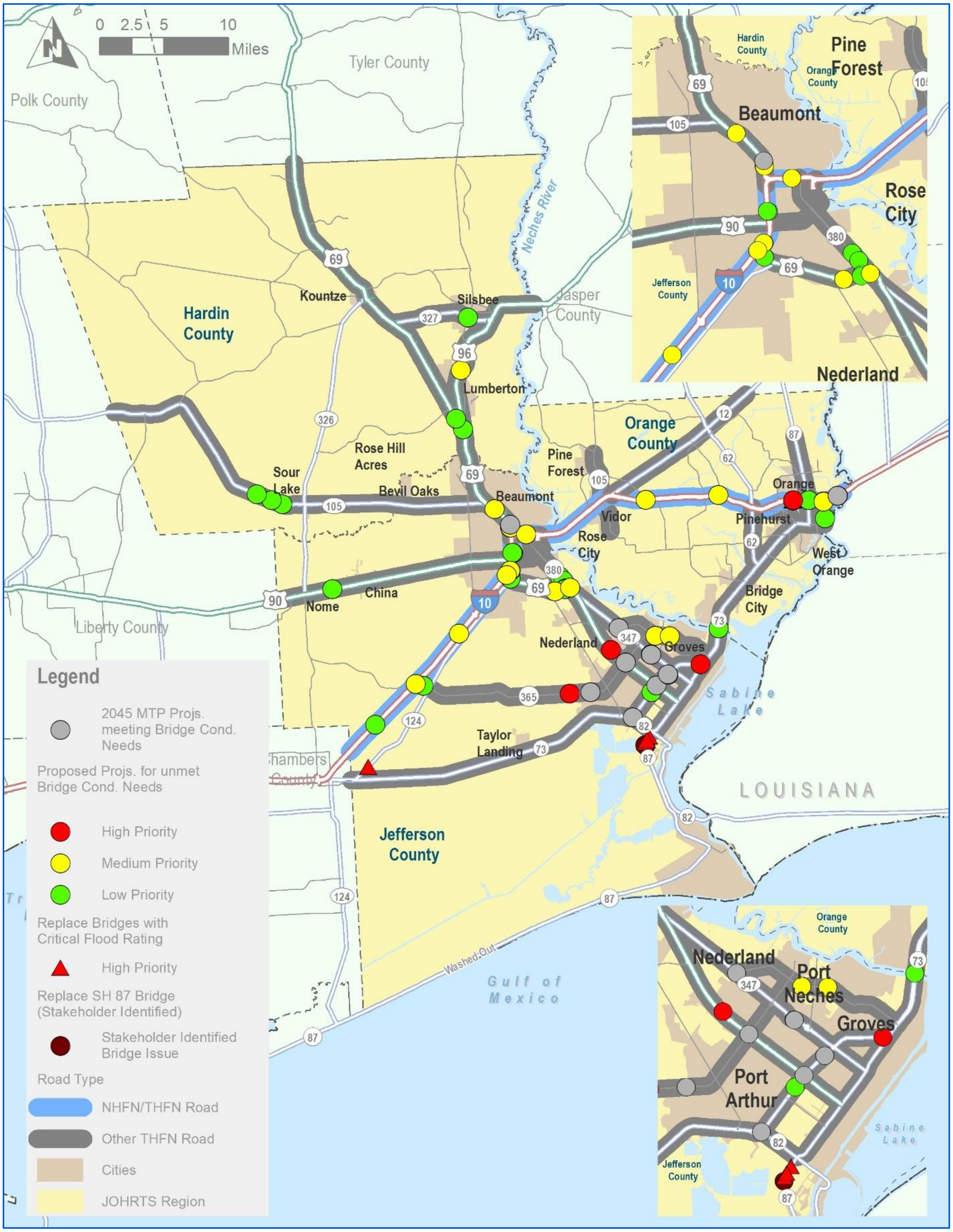
Source: TxDOT GIS Datasets (via TxDOT Open Data Portal); CDM Smith's JOHRTS Region Base Map; CDM Smith's Safety Improvement Projects Identification and Prioritization

Figure E.3: *JOHRTS Regional Proposed Pavement Condition Improvement Projects*



Source: TxDOT GIS Datasets (via TxDOT Open Data Portal); CDM Smith's JOHRTS Region Base Map; CDM Smith's Pavement Condition Improvement Identification and Prioritization

Figure E.4: JOHRTS Regional Proposed Bridge Condition Improvement Projects



Source: TxDOT GIS Datasets (via TxDOT Open Data Portal); CDM Smith's JOHRTS Region Base Map; CDM Smith's Bridge Condition Improvement Identification and Prioritization

Table E.4: *JOHRTS Regional Freight Plan Goal Weights*

Goal Type	Stakeholder Inputs Based Goal Weights	2045 MTP Based Goal Weights	Average Freight Plan Goal Weights
Economic Competitiveness	18%	9%	**14%**
Freight Mobility and Reliability	25%	21%	**23%**
Freight Safety, Security and Resiliency	21%	30%	**25%**
State of Good Repair	13%	16%	**15%**
Quality of Life / Environmental Stewardship	9%	11%	**10%**
Sustainable Funding	14%	13%	**13%**
TOTAL	**100%**	**100%**	**100%**

Source: Stakeholder Outreach; 2045 MTP; CDM Smith

Table E.5: *Recommended JOHRTS Regional High-Priority Freight Project Packages Master List*

Project Package ID	Weighted Project Package Score	Project Package Component ID	Proj ID	Highway Number	Project Description	From	To	County	Project Priority	Why Project is Relevant to Freight?
1	6.14	1A	PRR28	IH-10	Repair and/or Replace Pavement	US 90 Bus	Tejas Parkway	Orange	High	Project on THFN
		1B	SI1	IH-10	Roadway Safety Improvement	US 90 (Bus)	MLK Jr Drive	Orange	High	Project on THFN
		1C	BF5	IH 10 EB FR	Bridge Replacement	1.10 MI W OF SH 87		Orange	High	Project on THFN
		1D	BF6	IH 10 WB FR	Bridge Replacement	1.10 MI W OF SH 87		Orange	High	Project on THFN
		1E	BCWRR11	SH 73/SH 87 NB	Bridge / Other Structure Replacement	0.40 MI S OF SH 62		Orange	High	Project on THFN
		1F	BCWRR9	SH 87	Structural Work (Other) on Bridge	0.80 MI E OF US 90 BUS		Orange	Medium	Project on THFN
		1G	BCWRR31	IH 10 EB	Structural Work (Other) on Bridge	IH 10 @ SH 87		Orange	Medium	Project on THFN
		1H	MI2	IH-10	Roadway Mobility Improvement	SH 62	Texas/Louisiana Border	Orange	Medium	Project on THFN
		1I	BCWRR10	US 90 BUS	Structural Work (Other) on Bridge	1.30 MI S OF IH 10		Orange	Low	Project on THFN
		1J	BCWRR1	SH 73/SH 87 SB	Structural Work (Other) on Bridge	2.90 MI S OF FM 1442		Orange	Low	Project on THFN
2	4.45	2A	MI5	SH 82	Roadway Mobility Improvement	Texas/Louisiana Border	SH 87	Jefferson	High	Project on THFN
		2B	MI16	US 82	Intersection Mobility Improvement	SH 87		Jefferson	High	Project on THFN
		2C	SI11	SH 82	Roadway Safety Improvement	S of SH 73	Cambridge Street	Jefferson	High	Project on THFN
		2D	SI24	SH 82	Intersection Safety Improvement	SH 87		Jefferson	Medium	Project on THFN
		2E	PRR18	SH 73 / SH 82	Repair and/or Replace Pavement	Bridge on Alligator Bayou	Bridge on Taylor Bayou	Jefferson	Low	Project on THFN
3	3.78	3A	SI19	IH-10	Interchange Safety Improvement	SH 124		Jefferson	High	Project on THFN
		3B	BCWRR15	FM 365	Structural Work (Other) on Bridge	7.1 MI SW OF FM 364		Jefferson	Medium	Project on THFN
		3C	BCWRR17	SMITH RD	Structural Work (Other) on Bridge	5.2 MI NE OF FM 365		Jefferson	Medium	Project not on THFN but provides access to freight services (Love's Travel Shop - Truck Fueling and Restaurant Stop)
		3D	SI8	IH-10	Roadway Safety Improvement	Santa Fe Trail	Brush Island Road	Jefferson	Medium	Project on THFN
		3E	BCWRR16	IH 10 WBFR	Structural Work (Other) on Bridge	5.7 MI NE OF SH 73		Jefferson	Low	Project on THFN
		3F	MI7	IH-10	Roadway Mobility Improvement	SH 124	US 69	Jefferson	Low	Project on THFN
		3G	SI6	IH-10	Roadway Safety Improvement	Smith Road	Boyt Road	Jefferson	Low	Project on THFN
		3H	SI7	IH-10	Roadway Safety Improvement	0.7 miles S of Boyt Road	1.5 miles N of S Fork Drive	Jefferson	Low	Project on THFN
4	3.50	4A	MI11	IH-10	Roadway Mobility Improvement	SS 380	Old US 90 Hwy	Orange	High	Project on THFN
		4B	MI15	IH-10	Intersection Mobility Improvement	Neches River		Jefferson	High	Project on THFN
		4C	PRR8	IH-10	Repair and/or Replace Pavement	SR 380 Spur	Concord Street	Orange	Medium	Project on THFN
		4D	SI4	IH-10	Roadway Safety Improvement	Pine Street	Old US 90 Highway	Orange	Medium	Project on THFN
5	3.13	5A	SI27	SH 347	Intersection Safety Improvement	SH 87		Jefferson	High	Project on THFN
		5B	PRR15	SH 347	Repair and/or Replace Pavement	Nederland Avenue	Lewis Drive	Jefferson	Medium	Project on THFN
		5C	PRR12	SH 347	Repair and/or Replace Pavement	FM 366	Industrial Park Road	Jefferson	Medium	Project on THFN
		5D	MI13	SH 347	Roadway Mobility Improvement	SH 87	US 69	Orange	Low	Project on THFN

Project Package ID	Weighted Project Package Score	Project Package Component ID	Proj ID	Highway Number	Project Description	From	To	County	Project Priority	Why Project is Relevant to Freight?
		5E	SI21	SH 347	Intersection Safety Improvement	FM 365		Jefferson	Low	Project on THFN
		5F	SI26	SH 347	Intersection Safety Improvement	32nd Street		Jefferson	Low	Project on THFN
		5G	SI9	SH 347	Roadway Safety Improvement	Dorothy Street	US 69	Jefferson	Low	Project on THFN
6	2.81	6A	BCWRR28	SH 73	Bridge / Other Structure Replacement	0.2 MI W OF SH 87		Jefferson	High	Project on THFN
		6B	MI14	US 73	Intersection Mobility Improvement	SH 87		Jefferson	High	Project on THFN
		6C	PRR19	SH 87	Repair and/or Replace Pavement	Beverly Drive	Woodworth Boulevard	Jefferson	Medium	Project on THFN
		6D	MI4	SH 73	Roadway Mobility Improvement	US 69	Atlantic Road	Jefferson	Low	Project on THFN
		6E	MI6	SH 87	Roadway Mobility Improvement	SH 82	SH 73	Jefferson	Low	Project on THFN
7	2.45	7A	SI12	US 90	Intersection Safety Improvement	SS 380		Jefferson	High	Project on THFN
		7B	BCWRR27	US 69 NB	Structural Work (Other) on Bridge	1.7 MI E OF SH 93		Jefferson	Medium	Project on THFN
		7C	PRR3	SR 380 Spur	Repair and/or Replace Pavement	US 69	IH-10	Jefferson	Medium	Project on THFN
		7D	BCWRR13	E LAVACA ST	Structural Work (Other) on Bridge	1.30 MI N OF US 96		Jefferson	Low	Project not on THFN but provides access to Montagne Center and associated freight deliveries
		7E	BCWRR14	E VIRGINIA ST	Structural Work (Other) on Bridge	0.70 MI NW OF US 96		Jefferson	Low	Project not on THFN but provides access to Montagne Center and associated freight deliveries
8	2.25	8A	BF1	SH 87	Bridge Replacement	0.5 MI SW OF SH 82		Jefferson	High	Project on THFN
		8B	BF2	SH 87	Bridge Replacement	0.9 MI SW OF SH 82		Jefferson	High	Project on THFN
		8C	BF3	SH 87	Bridge Replacement	0.8 MI SW OF SH 82		Jefferson	High	Project on THFN
9	2.24	9A	SI16	US 69	Intersection Safety Improvement	Wheeler Road		Hardin	High	Project on THFN
		9B	MI9	US 69	Roadway Mobility Improvement	Wheeler Rd	US 96	Hardin	Medium	Project on THFN
		9C	BCWRR23	PARK NORTH RD	Structural Work (Other) on Bridge	1.00 MI S OF FM 421		Hardin	Low	Project on THFN
		9D	PRR36	US 69	Repair and/or Replace Pavement	Forest Rd	US 96	Hardin	Low	Project on THFN
10	1.73	10A	BCWRR44	IH 10	Structural Work (Other) on Bridge	2.20 MI E OF KCS RR		Orange	High	Project on THFN
		10B	SI22	US 69	Intersection Safety Improvement	FM 365		Jefferson	Medium	Project on THFN
		10C	MI3	US 69	Roadway Mobility Improvement	SH 73	SH 347	Jefferson	Low	Project on THFN
11	1.65	11A	PRR38	SH 327	Repair and/or Replace Pavement	S 19th Street	US 96	Hardin	High	Project on THFN
		11B	BCWRR18	FM 365	Bridge / Other Structure Replacement	5.4 MI SW OF US 69,96,287		Jefferson	High	Project on THFN
		11C	BCWRR20	US 96 BUS & SH 327	Structural Work (Other) on Bridge	US 96 BUS @ SH 327		Hardin	Low	Project on THFN
12	1.65	12A	PRR4	Washington Boulevard	Repair and/or Replace Pavement	IH-10	San Antonio Street	Jefferson	High	Project not on THFN but provides increases network redundancy and connectivity.
		12B	BCWRR35	IH 10 EB	Structural Work (Other) on Bridge	1.0 MI SW OF US 90		Jefferson	Medium	Project on THFN
		12C	BCWRR36	IH 10 WB	Structural Work (Other) on Bridge	1.0 MI SW OF US 90		Jefferson	Medium	Project on THFN
13	1.45	13A	MI10	US 69	Roadway Mobility Improvement	Pine Island Bayou	Lumberton	Hardin	High	Project on THFN

Project Package ID	Weighted Project Package Score	Project Package Component ID	Proj ID	Highway Number	Project Description	From	To	County	Project Priority	Why Project is Relevant to Freight?
		13B	BCWRR19	US 69, FM 3513	Structural Work (Other) on Bridge	2.75 MI N JEFFERSON C/L	0	Hardin	Low	Project on THFN
		13C	PRR34	US 69	Repair and/or Replace Pavement	Tram Road	SH 105	Jefferson	Low	Project on THFN
14	**1.00**	**14A**	PRR5	Phelan Boulevard	Repair and/or Replace Pavement	N Major Drive	IH-10	Jefferson	High	Project not on THFN but provides increases network redundancy and connectivity.
		14B	SI18	Dowlen Road	Intersection Safety Improvement	Phelan Boulevard		Jefferson	Low	Project not on THFN but provides increases network redundancy and connectivity.
15	**1.00**	**15A**	PRR6	Calder Avenue	Repair and/or Replace Pavement	Phelan Boulevard	US 90	Jefferson	High	Project not on THFN but provides increases network redundancy and connectivity.
		15B	SI13	4th Street	Intersection Safety Improvement	Liberty Avenue		Jefferson	Low	Project not on THFN but provides increases network redundancy and connectivity.
16	**1.00**	**16A**	PRR17	9th Ave	Repair and/or Replace Pavement	SH 73	FM 365	Jefferson	High	Project not on THFN but provides increases network redundancy and connectivity.
		16B	SI23	9th Avenue	Intersection Safety Improvement	Jimmy Johnson Boulevard		Jefferson	Low	Project not on THFN but provides increases network redundancy and connectivity.
17	**0.90**	**17A**	PRR23	FM 365	Repair and/or Replace Pavement	at SH 124 Intersection		Jefferson	High	Project on THFN
		17B	BCWRR4	FM 365	Structural Work (Other) on Bridge	0.6 MI SE OF IH 10		Jefferson	Low	Project on THFN
18	**0.75**	**18**	PRR21	SH 73	Repair and/or Replace Pavement	Bridge on Levee between Labelle Rd and Boondocks Road		Jefferson	High	Project on THFN
19	**0.75**	**19**	PRR22	SH 73	Repair and/or Replace Pavement	Bridge on Mayhaw Bayou		Jefferson	High	Project on THFN
20	**0.75**	**20**	BF4	SH 124	Bridge Replacement	1.6 MI NE OF SH 73		Jefferson	High	Project on THFN

Figure E.5: Recommended JOHRTS Regional High-Priority Freight Project Packages Map

Appendix F
List of Freight Policies, Programs, and Studies

Tables F.1 through **F.3** show master lists of recommended freight policies, programs, and studies. This includes information such as identifier, description and need(s) met (Need IDs as included in **Appendix D** were used to identify the needs). **Table F.1** also identifies potential lead agencies and collaborators for each policy recommendation.

Table F.1: Recommended JOHRTS Regional Freight Policies Master List

Policy ID	Policy	Policy Action ID	Mode	Policy Action Title	Lead Agency	Collaborators	Need(s) Met IDs
POL1	Lead initiatives to improve freight service and funding in Southeast Texas Region	POL1A	Highway / Rail	Regional stakeholders have applied for federal and state grants (e.g., BUILD Grant application for Jefferson Energy terminal expansions). They should continue to seek public funds for freight projects of regional and national significance.	JOHRTS	Ports of Beaumont, Port Arthur, and Orange Regional shippers, carriers, and manufacturers	**93**
		POL1B	Highway / Rail	Continue support for inclusion of critical rural and urban freight corridors in Southeast Texas region.	JOHRTS	Ports of Beaumont, Port Arthur, and Orange Regional shippers, carriers, and manufacturers	**32**
		POL1C	Multimodal	Use this Regional Freight Mobility Plan to increase public awareness on the importance of freight to the economy (both end customers and interim industries) and develop funding programs that include freight benefits in prioritization.	JOHRTS	TxDOT Local jurisdictions	**49, 61, 70**
		POL1D	Highway	Do not restrict STAA and State maximum truck weights and dimensions on THFN roadways.	JOHRTS	TxDOT Local jurisdictions	**41**
		POL1E	Highway	Reduce traffic delay impacts of construction activities and incidents on regionally important freight corridors through measures like reducing length of work zone segments, using shoulders temporarily for traffic, and working during overnight hours. A best practices study may identify more work zone strategies to consider.	JOHRTS	TxDOT	**18, 20, 21, 45**
		POL1F	Highway	Maintain design standards for curb cuts in freight delivery zones.	JOHRTS	TxDOT Local jurisdictions	**31**
		POL1G	Multimodal	Reduce risks, safeguard and/or evacuate vulnerable communities and transportation infrastructure in Southeast Texas Region after harmful or dangerous industrial or weather incidents.	JOHRTS	Lamar University TxDOT	**50, 60, 62, 63, 67, 68**

Policy ID	Policy	Policy Action ID	Mode	Policy Action Title	Lead Agency	Collaborators	Need(s) Met IDs
POL2	Support and/or coordinate with other public sector and private sector entities to continuously identify freight transportation needs and solutions	POL2A	Multimodal	Continue coordination between regional freight related private stakeholders and national, state and local agencies.	JOHRTS	USDOT Local jurisdictions Regional shippers, carriers, and manufacturers	**50, 58, 59, 60, 65, 69, 71, 76, 87, 92, 94, 98, 100**
		POL2B	Multimodal	Continue coordination between transportation and land use development to maximize efficiency of freight operations and property and sales tax revenue for Southeast Texas region while minimizing local community impacts.	JOHRTS	Local jurisdictions	**39, 50, 55, 60, 64, 66, 82, 84, 86, 89, 93**
		POL2C	Multimodal	Encourage local jurisdictions to adopt best practices in site and development approval to lower flooding related impacts on freight corridors and facilities.	JOHRTS	Local jurisdictions	**30, 50, 60, 62, 63, 71**
		POL2D	Highway	Support and strengthen enforcement (funds and recruitment) to avoid commercial driver violations and harmful/dangerous road situations.	Department of Public Safety Local law enforcement	JOHRTS Local jurisdictions	**22, 29, 34, 37, 46**
		POL2E	Highway	Encourage truck driver safety awareness and skill development.	Regional vocational programs	Regional shippers, carriers, and manufacturers	**28**
		POL2F	Highway	Coordinate with location-based services (Google, GPS navigation companies, truck routing application companies, etc.) to ensure route directions are customized to vehicle body type.	Local jurisdictions	JOHRTS	**22, 29, 37, 46**
		POL2G	Multimodal	Expand existing and/or develop new workforce training programs to prepare workers for emerging jobs in the regional energy, industrial, and freight sectors. These could leverage existing programs such as the truck driver school run by Texas State University, the barge deckhand and captain program at Lamar State College Orange, and the Associated Builders and Contractors craft training program.	Regional vocational programs	Regional shippers, carriers, and manufacturers	**28, 105**
POL3	Assist disadvantaged private sector entities to preserve existing freight services and develop alternatives to highway mode of freight transportation	POL3A	Multimodal	Support existing programs/projects for non-highway modes of freight transportation and to avoid adverse highway traffic impacts when possible.	JOHRTS	Ports of Beaumont, Port Arthur, and Orange Regional shippers, carriers, and manufacturers	**54, 56, 57, 72, 73, 77, 79, 81, 90, 95, 96, 97**
		POL3B	Water	Assist barge operators and water-based freight customers to receive a well-balanced water-based freight service from marine terminal operators.	JOHRTS	Ports of Beaumont, Port Arthur, and Orange Regional shippers, carriers, and manufacturers	**73, 83**
		POL3C	Rail	Assist short line railroads and rail customers to receive a well-balanced freight rail service from Class I railroads.	JOHRTS	Ports of Beaumont, Port Arthur, and Orange Regional shippers, carriers, and manufacturers	**80**

***Table F.2:** Recommended JOHRTS Regional Freight Programs Master List*

Prog ID	Program Title	Needs Met IDs
PRG1	Upgrade US 69/US 96 to Interstate Standards	**1, 38**
PRG2	Increase vertical clearance to 18.5 feet on Texas Highway Freight Network (THFN) Corridors	**48**
PRG3	Increase channel depth on Sabine-Neches Waterway	**85**
PRG4	Maintain channel depth on Gulf Intracoastal Waterway at the authorized depth	**91**
PRG5	Roadway and bridge elevation to avoid flooding after storm events	**40, 50, 60, 67**

***Table F.3:** Recommended JOHRTS Regional Freight Studies Master List*

Study ID	Study Title	Needs Met IDs
STDY1	Identify potential "last mile" heavy / oversize cargo haul corridors between IH 10 and bulk and military goods handling facilities	**19, 24, 46, 47, 55, 78**
STDY2	Identify potential truck size/weight restriction and "truck-friendly" route signage and dynamic message sign locations to avoid adverse impacts on neighborhood streets	**22, 29, 37, 46, 47**
STDY3	Identify information and communications technologies to inform land side and water side infrastructure, traffic and weather conditions to freight users	**68, 88, 99**
STDY4	Identify innovative funding strategies to support future freight investments in Southeast Texas region (project examples include the Second Neches River Rail Bridge)	**1, 35, 38, 75, 76, 81, 85, 93, 95, 96, 97**
STDY5	Identify potential best practice solutions to weather issues on water-based freight transportation including sedimentation, shoaling, and barge unmooring after storm events, and fog	**74, 92, 94, 98, 100**
STDY6	Identify truck parking demand and potential sites to improve safety and reduce impacts of hours of service regulations on local trucking industry	**23, 26, 27, 33**
STDY7	Identify engineering solutions at critical regional at-grade crossings including warning type upgrade, grade separation and grade crossing closure	**51, 52, 53, 101**

South East Texas Regional Planning Commission

2210 Eastex Freeway, Beaumont, Texas 77703
409-899-8444 ext. 6600

www.setrpc.org