



Economic Contributions of Freight

Rio Grande Valley Freight and Trade Transportation Plan

Final: December 30, 2020

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Acronyms

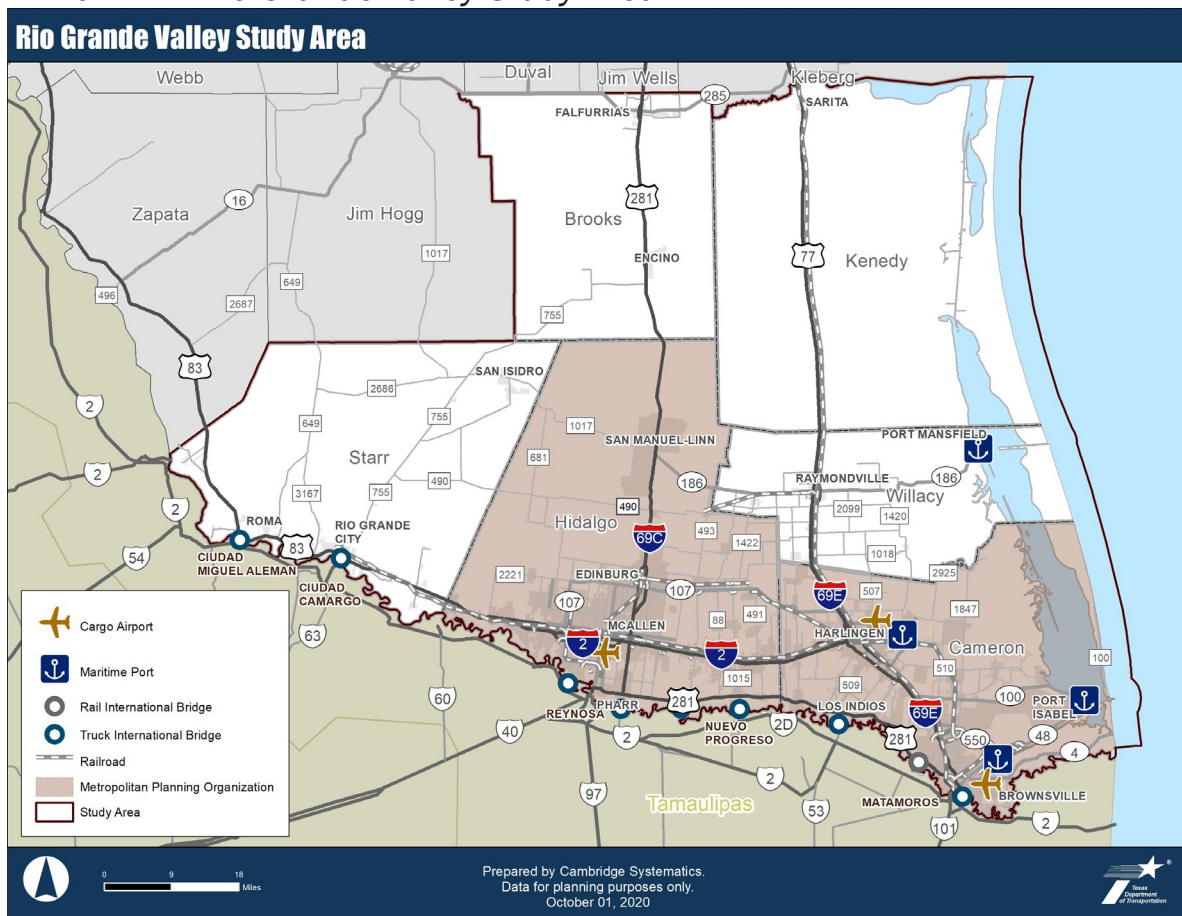
BLS	Bureau of Labor Statistics
BTMP	Border Transportation Master Plan
BTS	Bureau of Transportation Statistics
FTZ	Foreign Trade Zone
GIS	Geographic Information Systems
GRP	Gross Regional Product
GSP	Gross State Product
LNG	Liquefied Natural Gas
NAICS	North American Industry Classification System
NES	Non-employer Statistics
POE	Port-of-entry
OES	Occupational Employment Statistics
QCEW	Quarterly Census of Employment and Wages
RGV	Rio Grande Valley
SOC	Standard Occupational Classification
TREDIS	Transportation Economic Development Impact System
TSA	Transportation Security Administration
TTI	Texas A&M Transportation Institute
TFMP	Texas Freight Mobility Plan
TxDOT	Texas Department of Transportation
TxFAC	Texas Freight Advisory Committee

1.0 Introduction

Freight movement and trade at the Texas-Mexico border are significant contributors to regional, statewide, and national economic vitality. The border and its surrounding region were identified as key freight issues during the development of the 2018 Texas Freight Mobility Plan (TFMP). Stakeholder engagement workshops held throughout the state, including four in the Rio Grande Valley (RGV), highlighted freight issues impacting the region and the state. During these workshops, as well as meetings of the Texas Freight Advisory Committee (TxFAC), the RGV was identified as an important area for study.

This project builds on the work started by the Texas Department of Transportation (TxDOT) with the TFMP by creating a regional freight plan covering the six counties of Brooks, Cameron, Hidalgo, Kenedy, Starr, and Willacy as shown in **Exhibit 1**. Additionally, the project complements the concurrent Border Transportation Master Plan (BTMP) which will identify transportation issues, needs, challenges, and opportunities and strategies for moving people and goods across the border, the border regions, and beyond.

Exhibit 1: Rio Grande Valley Study Area



1.1 Context of this Memorandum

TxDOT is developing a Rio Grande Valley Regional Freight and Trade Transportation Plan (“Regional Freight and Trade Plan”). This Regional Freight and Trade Plan is critical given the importance of the RGV to freight movement in Texas and nationally. The region is linked to many strategic Texas supply chains such as manufacturing, agriculture, and energy production, particularly through international trade activity. To complete this Regional Freight and Trade Plan, the following technical tasks will be completed:

- **Task 2.1: Develop Goals and Objectives.** Develop goals and objectives for the Regional Freight and Trade Plan in alignment with existing and ongoing planning efforts and stakeholder input.
- **Task 2.2: Regional Data Collection, Inventory and Analysis.** Collect, review, and analyze plans, studies, and data relevant to the RGV. This task will culminate in a Geographic Information Systems (GIS) database that will be updated throughout plan development.
- **Task 2.3: Regional Trade and Freight Corridor and Network Identification.** Identify transportation assets to be included in the Regional Multimodal Freight and Trade Network through data analysis and stakeholder input. This task culminated in the freight network used to prioritize recommendations and ultimately to update the TFMP.
- **Task 2.4: Existing Regional Freight and Trade Needs Identification and Assessment.** Identify and assess the existing conditions, issues, and trends related to freight and trade movement in the region. This task culminated in a needs assessment identifying the types and locations of high priority needs in the region and formed the basis for implementation recommendations.
- **Task 2.5: Regional Trade and Freight Commodity Flow Profile.** Describe current freight and trade movements in the region using commodity flow and border crossing data. This task, in combination with Task 2.6, culminated in a commodity flow and forecast summary.
- **Task 2.6: Regional Trade and Freight Forecasting.** Forecast commodity flows and freight movements for 2030, 2040, and 2050 and estimate the impact of freight growth on the transportation network. This task, in combination with Task 2.5, culminated in a commodity flow and forecast summary.
- **Task 2.7: Regional Trade, Freight, and Economic Analysis.** Document the importance of the RGV’s freight and trade movements to the regional, state, and national economies by quantifying jobs, income, gross regional product, and tax revenue related to freight and trade activities. This task will culminate in a summary of economic importance and fact sheets. *This task is the subject of this memorandum.*
- **Task 2.8: Regional Land Use and Community Impacts.** Assess current and planned land use for industrial, commercial, and residential uses as it relates to the freight

transportation network. This task culminated in a summary of land uses, potential economic development opportunities, and environmental justice concerns.

- **Task 2.9: Regional Project Identification and Prioritization.** Identify transportation strategies to improve freight and trade movement in the region and prioritize projects based on the needs assessment completed in Task 2.4. This task culminated in a prioritized list of strategies to include projects, programs, and policies.
- **Task 2.10: Regional Recommendations and Investment Plan.** Refine recommendations based on the strategy identification and prioritization conducted in Task 2.9. This task culminated in a Freight Investment Plan for the RGV.
- **Task 2.11: Implementation and Action Plan.** Develop an implementation and action plan describing responsible parties, timeframes, and funding options for the recommendations identified in Task 2.10.
- **Task 2.12: Final Plan Documents.** Develop a final Regional Freight and Trade Plan and Executive Summary consolidating the technical and stakeholder engagement tasks completed throughout this project.

1.2 Organization of this Memorandum

This memorandum documents key supply chains identified through data analysis and stakeholder interviews. The methodology and results of the economic analysis of freight and trade movements of the RGV are then documented along with the economic disbenefits of lack of investment in the freight system. The remainder of this memorandum is organized into the following sections:

- Section 2.0: Role of the Rio Grande Valley
- Section 3.0: Economic Contributions of Freight Transportation in the Rio Grande Valley
- Section 4.0: Economic Cost of Lack of Investment
- Section 5.0: Next Steps

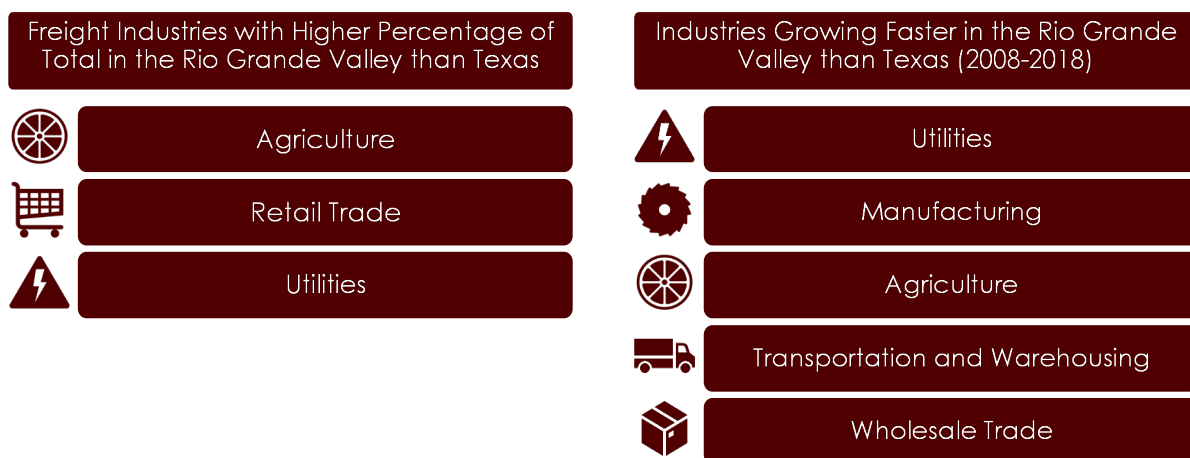
2.0 Role of the Rio Grande Valley

The RGV serves as an international trade hub between Texas and Mexico, and the impact of its freight system extends beyond the goods produced and consumed in the region. Trade between Mexico and the U.S. (as well as other counties via the region's maritime ports) depends on the efficient movement of freight through the RGV.

Freight stakeholders identified agriculture, energy, and manufacturing as three critical industries for the region. These industries are also significant at the state and national levels, providing food, power, consumer and industrial products, and jobs. The region's location on the Texas-Mexico border positions it to act at times as a hub of production or consumption, and at times as a transportation gateway supporting production and consumption from other regions of Texas, Mexico, and the world.

Gross regional product (GRP) measures the value of final goods and services produced in a region. In 2018, GRP in the RGV was \$37.4 billion. The freight-intensive industries of agriculture, retail trade, and utilities contributed a larger percentage of GRP in the RGV than in Texas, indicating a degree of specialization in these industries (**Exhibit 2**). From 2008 to 2018, five industries grew at a faster rate in the RGV than in Texas: utilities, manufacturing, agriculture, transportation and warehousing, and wholesale trade. This growth patterns include a further concentration of agriculture and utilities industries. All five high-growth industries are freight-intensive industries and align with the key industries identified by stakeholders.

Exhibit 2: Gross Regional Product in the Rio Grande Valley and Texas, 2008 and 2018

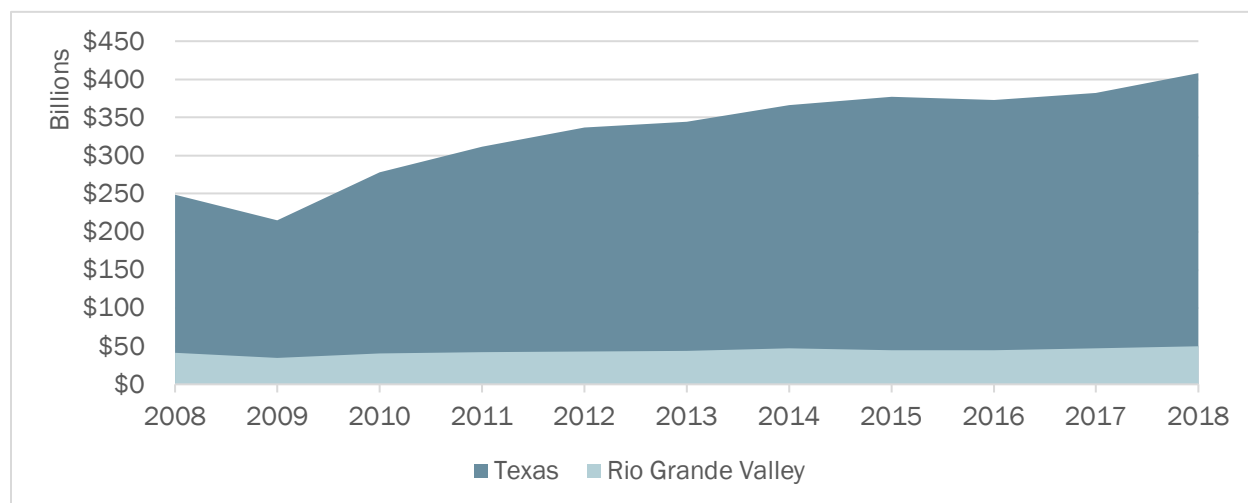


Source: Bureau of Economic Analysis, Gross Domestic Product by County, 2018.

The RGV's contribution to the state and national economies is greater than the final goods and services produced, and its role as a freight and trade gateway supports economic activity throughout Texas and beyond. Nearly \$50 billion in truck and rail trade was handled

by the ports-of-entry (POEs) in the RGV in 2018. While the value of trade through the region's POEs has steadily increased over the last 10 years (approximately 20 percent between 2008 and 2018), its share of all Texas trade has slowly declined as POEs in the Laredo and El Paso regions have increased more quickly (greater than 70 percent increase in the same period). The RGV has handled between 12 and 13 percent of trade value through Texas border POEs since 2012 (**Exhibit 3**).

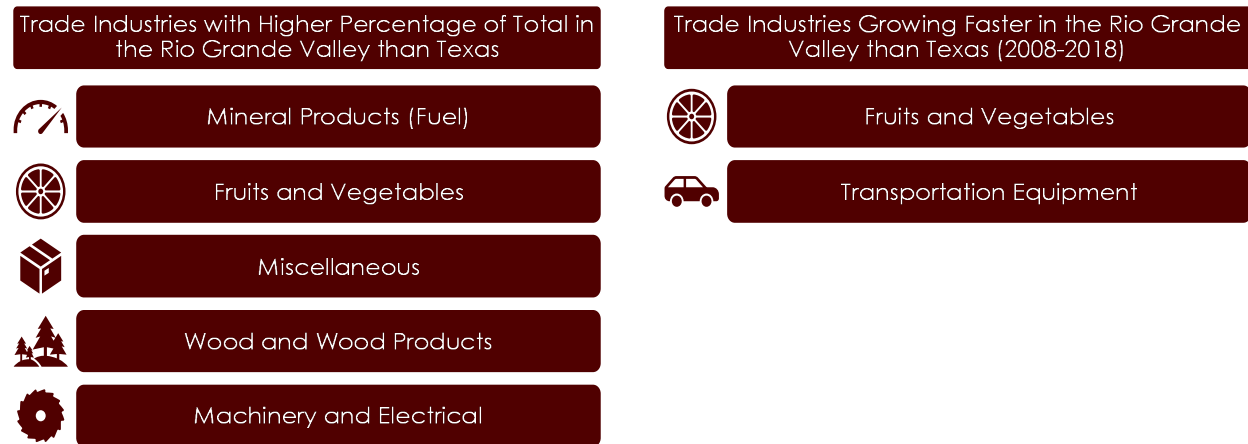
Exhibit 3: *Texas-Mexico Cross-border Truck and Rail Trade Value by POE (2010–2018)*



Source: Bureau of Transportation Statistics, Transborder Freight Data (2006–2019), values adjusted to 2019 dollars. Analysis for Border Transportation Master Plan, 2020.

Exhibit 4 compares trade volumes by commodity group for the RGV and all Texas border POEs. Compared to the state as a whole, mineral products (petroleum products such as fuel), fruits and vegetables, miscellaneous shipments, wood and wood products, and machinery and electrical products comprise a higher share of the total volume in the RGV, indicating a specialization or concentration in these goods. The RGV is a critical gateway for fruits and vegetables, and trade of these products through the state's POEs continues to concentrate in the RGV: growth in trade of these products grew 158 percent from 2008 to 2018 in the RGV and only 85 percent statewide. Growth in the trade of transportation equipment is also occurring faster in the RGV than statewide (159 percent compared to 146 percent for the 2008 to 2018 period).

Exhibit 4: Border Trade Volumes in the Rio Grande Valley and Texas, 2008 and 2018



Source: Bureau of Transportation Statistics, Transborder Freight Data, 2008 and 2018.

2.1 Agriculture and Produce

The RGV plays a central role in the production and transportation of agricultural products destined for markets in the U.S. The crop, livestock, and agriculture-related businesses located in the RGV have an annual statewide economic impact of about \$1.1 billion, with \$584 million in gross sales and retail store sales accounting for \$7 billion annually.¹ Farmers in the RGV produce grain, citrus, vegetables, cotton, sugarcane, and other crops.

Additionally, a wide variety of produce grown in Mexico travels through the region to reach U.S. markets. Avocados are a major import for the region, with \$1.49 billion in imports at Pharr International Bridge in 2019, and berries accounted for \$0.91 billion.² Tomatoes are also a major import through the region's international bridges. The Mexican state of Michoacán is the largest source of fruit and produce, followed by Sinaloa. Highway development in Mexico has shortened drive times between the Pacific Coast and Texas international bridges, and produce from throughout the country is utilizing the infrastructure of the RGV to reach U.S. markets in Texas, the Midwest, and the Northeast.

2.1.1 Modes and Flow Patterns

The majority of agricultural products in the RGV are moved by truck. Bulk products such as grain can be moved by barge, rail, and international bulk vessels. The RGV does not currently have the infrastructure to move fresh produce by non-highway modes. While there is rail service in the RGV, railroad operators are hesitant to provide the refrigerated service

¹ Rod Santa Ana, "Agriculture Tells the History of the Rio Grande Valley," accessed October 20, 2020.

<https://agriflifelife.tamu.edu/2017/01/03/valley-agriculture-history>. Published by AgriLife Today.

² Pharr Trade Numbers, World City, 2020. <https://bridge.pharr-tx.gov/wp-content/uploads/2020/08/TN20Pharr-Pamphlet-English.pdf>

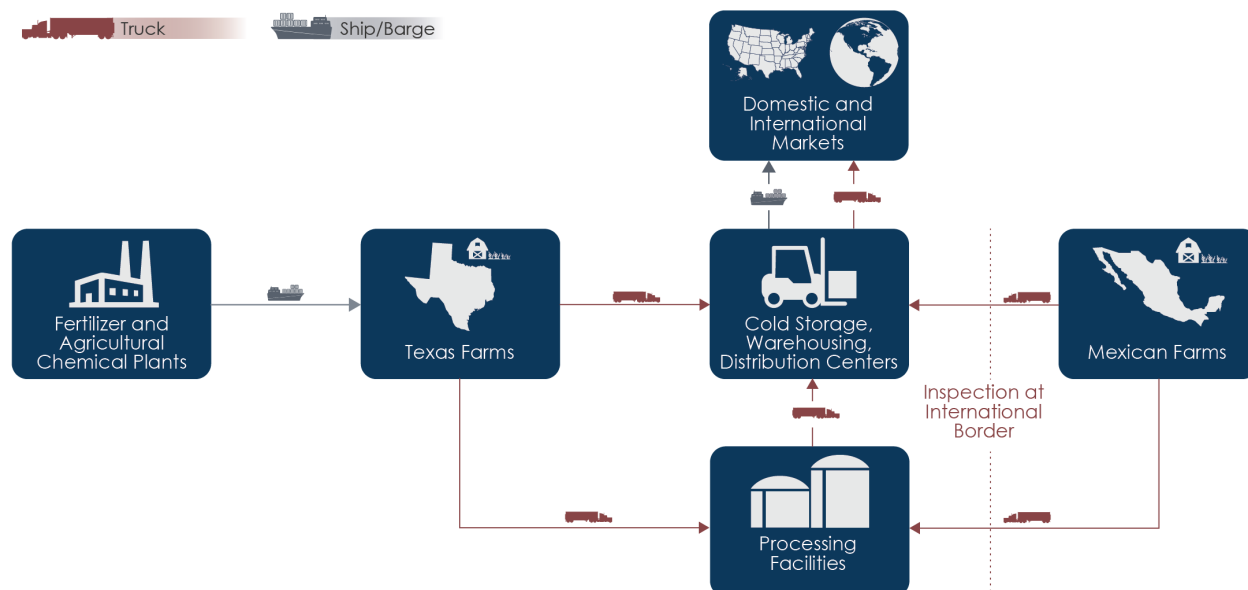
needed to transport produce because of the limited refrigerated backhaul market.³ Despite a large market in Asia for Texas citrus (specifically grapefruit), produce is not currently shipped out of the Port of Brownsville. These products are typically trucked to the Port of Houston or Port of Long Beach for shipment overseas on established maritime trade routes. These options are more economical due to the large volume of freight to markets around the world from these ports. The proposed deepening of the Port of Brownsville to 52 feet could make water transportation from the region more competitive if increased shipping volumes and frequency result in lower shipping costs and frequent enough operations to support demand.

Production within the region necessitates flows of fertilizers and other chemicals as inputs, and it requires packaging or labeling for some outputs. Some products are grown and processed locally, such as citrus farming and juicing. In addition to transportation, cold storage and warehousing of agricultural products are necessary components of the agriculture supply chain. As the volume of fresh produce grown in and transported through the RGV increases, the demand for cold storage to hold product until it is distributed to market increases. Cold storage development in the RGV is concentrated near the Pharr International Bridge due to its capacity to handle agricultural imports, including physical infrastructure as well as inspection staff. The Pharr International Bridge has invested in a multiphase expansion project that includes a cold inspection dock to preserve produce quality during import inspections to further accommodate this supply chain. The Nogales POE in Arizona has a similar specialization in agricultural imports from Mexico, and interviews with industry stakeholders indicated that bridges in the RGV are primarily used for customers in the Midwestern and Northeastern U.S., while Nogales is better positioned to serve the western half of the U.S..

Exhibit 5 displays an overview of freight and trade activity in the RGV related to agriculture. **Appendix A** includes additional commodity-specific information from interviews conducted with private businesses throughout 2020. In-person interviews were conducted until March 2020, and phone interviews were conducted through October 2020.

³ Costs of shipping include the cost to return the transportation equipment (of any mode) to its starting point or to another customer. Backhaul refers to a shipment moving the opposite direction of a flow that can support the cost of the return trip.

Exhibit 5: Agricultural Activity in the Rio Grande Valley



Source: Analysis by Freight Insights and Cambridge Systematics, 2020.

2.1.2 Trading Partners and Sphere of Influence

Exhibit 6 identifies the top ten trading partners for farm and food products to and from the RGV. Note that through traffic (e.g., Mexico to the Northeast) is not included as a trading partner for the region.

Exhibit 6: Top Origins and Destinations for Rio Grande Valley Farm and Food Products

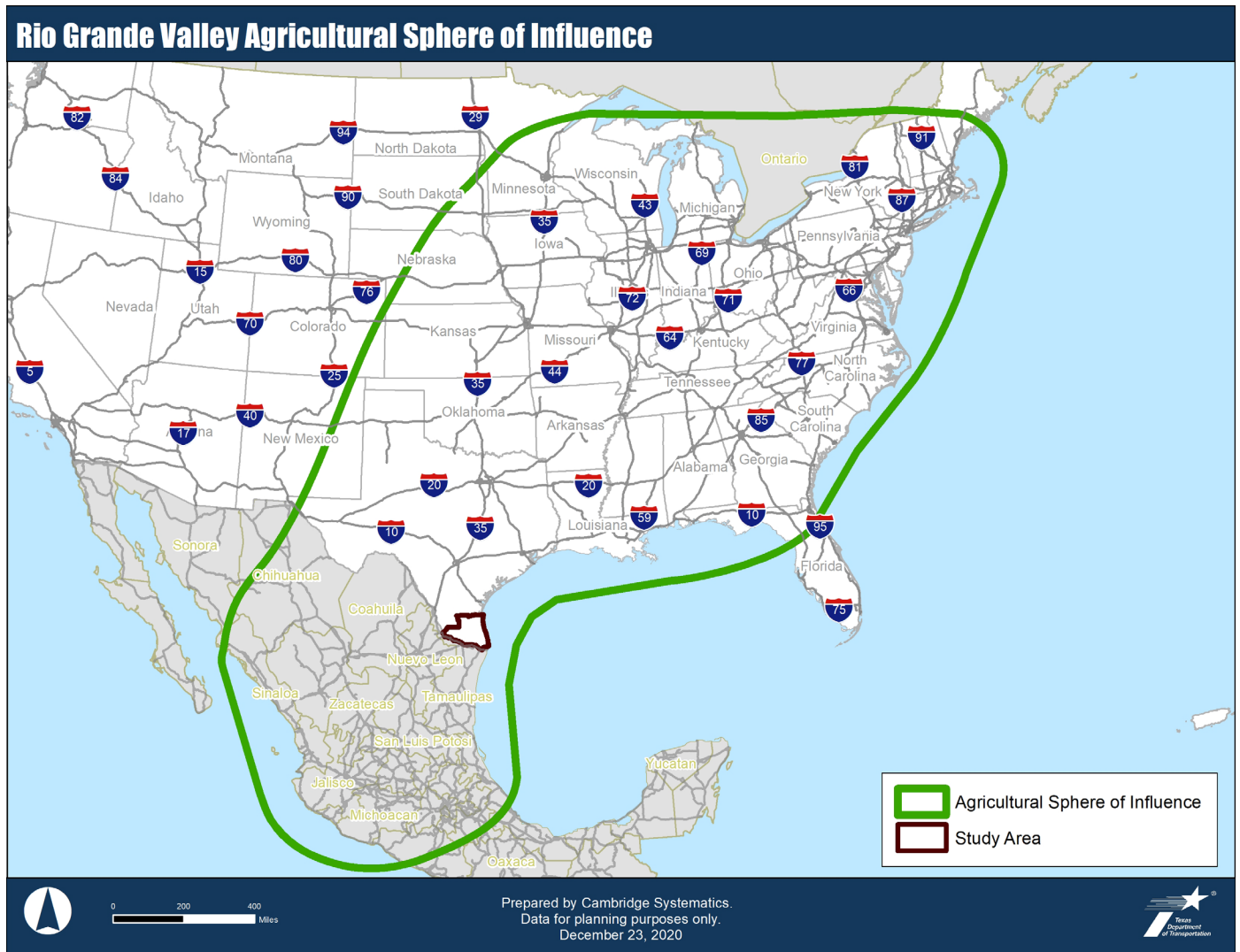
Inbound Trading Partners	Top Outbound Partners	Top Total Partners
<ul style="list-style-type: none"> ▪ Mexico ▪ Iowa ▪ Nebraska ▪ California ▪ South Dakota ▪ Minnesota ▪ Harris County, TX ▪ Bexar County, TX ▪ Oklahoma ▪ Wharton County, TX 	<ul style="list-style-type: none"> ▪ Mexico ▪ San Patricio County, TX ▪ Harris County, TX ▪ Nueces County, TX ▪ California ▪ Louisiana ▪ Canada ▪ Bexar County, TX ▪ Dallas County, TX ▪ Illinois 	<ul style="list-style-type: none"> ▪ Mexico ▪ San Patricio County, TX ▪ Harris County, TX ▪ California ▪ Nueces County, TX ▪ Louisiana ▪ Iowa ▪ Bexar County, TX ▪ Canada ▪ Dallas County, TX

Source: Analysis by WSP and Cambridge Systematics, 2020.

The RGV's agricultural sphere of influence is the area most impacted by freight movement and trade of agricultural commodities in the RGV. These areas depend on efficient freight movement to, from, and through the RGV to maintain competitive shipping costs and deliver perishable goods in a timely fashion to prevent reduced quality or waste. Based on commodity flow information and interviews with regional industry stakeholders, the agricultural sphere of influence of the RGV includes producers throughout Mexico,

production and processing in the RGV, and consumer markets in the Midwestern and Northeastern U.S (Exhibit 7) The reach of the agricultural sphere of influence of the RGV is wide, emphasizing the critical importance of freight movement through the region’s international bridges as well as between production regions, cold storage, processing facilities, and consumers.

Exhibit 7: Rio Grande Valley’s Agricultural Sphere of Influence



Source: Analysis by Cambridge Systematics and Freight Insights, 2020.

2.1.3 Future Expectations

The volume of agricultural products in the RGV is expected to grow considerably from 2018 to 2050. Farm products are forecasted to grow from an annual total volume of 4.7 million tons in 2018 to 7.8 million tons by 2050,⁴ and flows of fertilizers, chemicals, packaging, and other support commodities will grow alongside farm products. Additionally, industry

⁴ See Task 2.5/Task 2.6 memorandum for details on commodity flow analysis.

stakeholders observed growing supply from Mexico and expect produce volumes through the RGV's international bridges to grow for the foreseeable future.

Local producers are exploring new ways to ship agricultural products to customers, including container-on-barge service at ports and direct-to-customer shipping through e-commerce. The shift to an e-commerce model introduces a new set of shipping challenges for producers, including packaging requirements and smaller shipment sizes.

2.2 Fuel and Energy Supply Chain

The RGV plays an important role in the supply chains of both extractive and renewable energy sources. The region is a hub for transport of refined fuels destined for Mexico as well as wind energy equipment entering the U.S. from Mexico, though few energy products are produced or refined in the region. There are two critical impacts of this industry on the RGV's freight network: oversize/overweight freight from wind farm equipment, and significant bidirectional truck traffic to support fuel exports due to pipeline shutdowns in Mexico. The movement of fuel is the focus of the following discussion due to its outsized impact on the freight network.

2.2.1 Modes and Flow Patterns

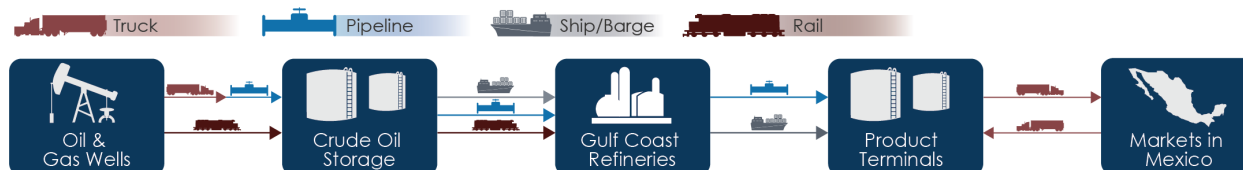
Energy and chemical products transported to, from, and within the RGV include gasoline, distillate fuel oil (diesel fuels and fuel oils), lubrication oils and greases, naphtha (a liquid hydrocarbon mixture), and solvents. Fuels currently enter the RGV from Gulf Coast refineries by barge, pipeline, or rail to arrive at maritime ports in the region. Short-term storage occurs at the ports until fuels leave the RGV to Mexico by truck or rail. Stakeholders commented that minimal value-add activity occurs in the RGV, and storage and transportation are the primary roles of the RGV in this supply chain. The modal choice for these shipments depends on the volume, shipping cost, and speed and reliability needs of the shipper and receiver. Industry stakeholders reported that domestic pipeline capacity is limited in the RGV, and barges are commonly used; however, NuStar Energy expanded its Valley Pipeline System in 2019. The expansion doubled its capacity for refined products between Corpus Christi and the RGV to 90,000 barrels per day.⁵ Fuel is also barged from Corpus Christi or Houston to the Port of Brownsville or Port of Harlingen, where it is transloaded to truck or, in some cases, rail.

Pipeline transportation between the RGV and Mexican customers was utilized until late 2018 when several key pipelines in Mexico were shut down due to theft by organized crime groups. This disruption in transportation patterns has led to enormous growth in truck trips between RGV maritime ports and international bridges, particularly at Veterans International Bridge and Free Trade Bridge at Los Indios (the two bridges closest to the Port of Brownsville

⁵ <https://www.bulktransporter.com/fleet-management/storage-terminals/article/21658209/nustar-using-new-pipelines-to-move-fuel-into-northern-mexico>

and Port of Harlingen). The truck activity from this trade leads to significant demand at international bridges as trucks travel back and forth across the border several times per day depending on their destination in Mexico. Additionally, drivers must find a place to park while waiting for Mexican customs paperwork to clear before approaching the international bridge. The high truck parking demand near the border as a result of this activity has led the Port of Brownsville to develop its own truck parking lot for customers of tenants, though stakeholders expect that some demand will remain unmet despite this investment. **Exhibit 8** summarizes the fuel transportation activity in the RGV.

Exhibit 8: Fuel Transportation Activity in the Rio Grande Valley



Source: Analysis by Freight Insights and Cambridge Systematics, 2020.

2.2.2 Trading Partners and Sphere of Influence

The majority of products enter the RGV from Gulf Coast refineries for export to Mexico, and the RGV’s role is primarily in storage and transportation rather than production or refining. There is a large and growing market for diesel and gasoline fuels in Mexico, and their refining capacity is limited. Some of the product is destined for Northern Mexico, while others go well into the interior of Mexico. This flow is expected to continue due to the relaxation of Mexico's trade rules for energy products initiated in 2013.⁶ Additional trading partners are shown in **Exhibit 9**. Nueces County (Corpus Christi) is the largest trading partner in Texas, followed by Webb County (Laredo). Other U.S. states, Mexico, and Canada are also identified as top trading partners for the region, emphasizing the reach of the region’s activity.

⁶ U.S. Energy Information Administration, “Mexico’s energy reform seeks to reverse decline in oil production,” 2014. <https://www.eia.gov/todayinenergy/detail.php?id=16431>

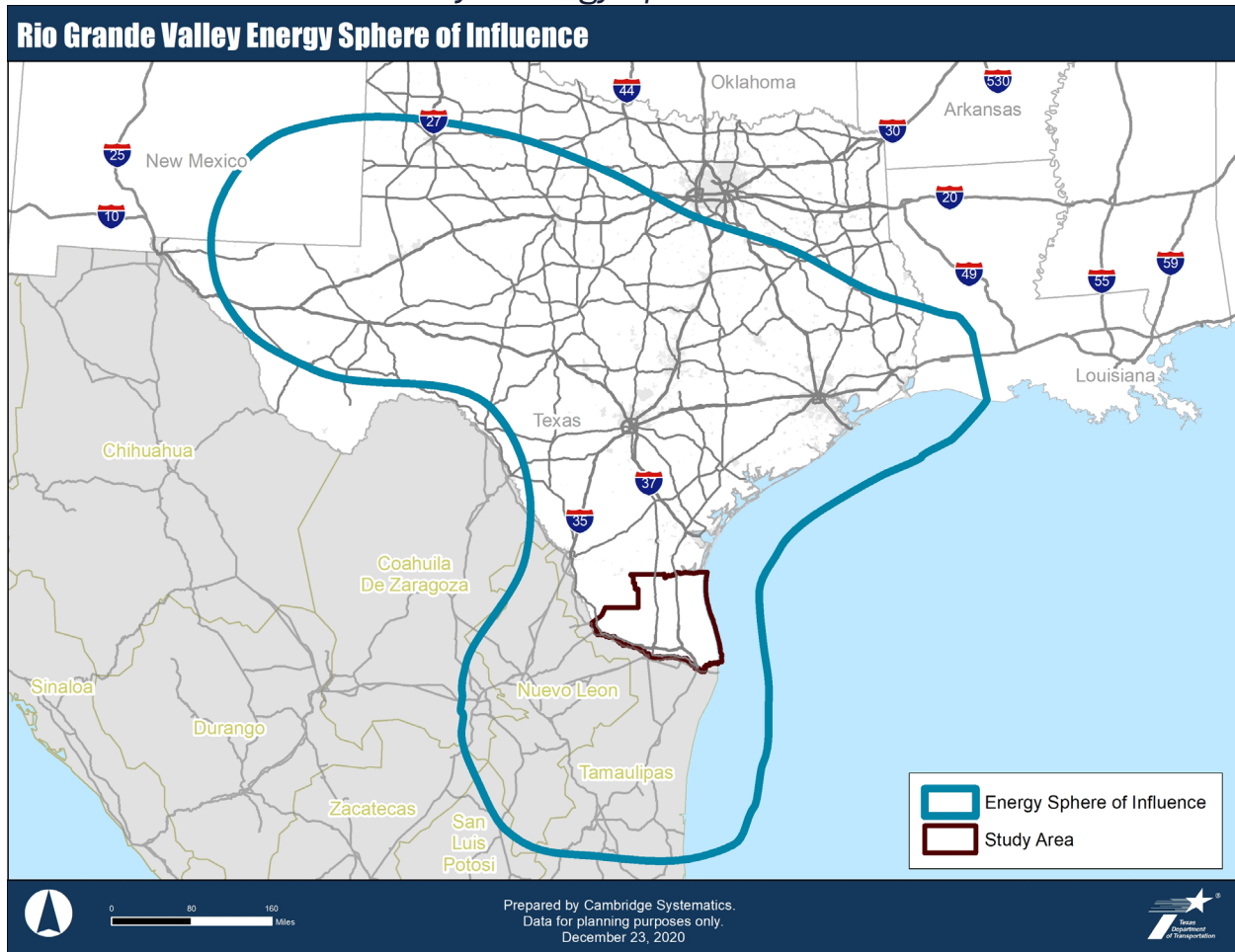
Exhibit 9: Top Origins and Destinations for Rio Grande Valley Energy Products

Inbound Trading Partners	Top Outbound Partners	Top Total Partners
<ul style="list-style-type: none"> ▪ Nueces County, TX ▪ Mexico ▪ Webb County, TX ▪ Harris County, TX ▪ Louisiana ▪ Ohio ▪ California ▪ Canada ▪ Arkansas ▪ Oklahoma 	<ul style="list-style-type: none"> ▪ Mexico ▪ Nueces County, TX ▪ Canada ▪ Bexar County, TX ▪ Zapata County, TX ▪ Travis County, TX ▪ Jim Wells County, TX ▪ Harris County, TX ▪ California ▪ Dallas County, TX 	<ul style="list-style-type: none"> ▪ Mexico ▪ Nueces County, TX ▪ Webb County, TX ▪ Harris County, TX ▪ Canada ▪ California ▪ Louisiana ▪ Ohio ▪ Oklahoma ▪ Arkansas

Source: Analysis by WSP and Cambridge Systematics, 2020.

The RGV’s energy sector sphere of influence defines the areas most impacted by import flows to the Ports of Brownsville and Harlingen, and regional truck and rail operations between the maritime ports and international bridges. Despite the wide geography of top trading partners, the vast majority of the supply chain travels between the production regions in the Permian Basin, to Gulf Coast refineries, through the RGV, and to markets in Mexico (**Exhibit 10**). The economic competitiveness of each of these regions depends on efficient freight operations in the RGV.

Exhibit 10: Rio Grande Valley's Energy Sphere of Influence



Source: Analysis by Cambridge Systematics and Freight Insights, 2020.

2.2.3 Future Expectations

The movement of energy products in the RGV is expected to grow significantly from 9.8 million tons in 2018 to 44.1 million tons in 2050.⁷ Stakeholders expect the current flows of fuels between the RGV and Mexico to increase. One distributor is expecting to double or nearly double the number of trucks they operate into Mexico by 2025, and is developing a new gasoline terminal in the RGV to support this expansion. Liquefied natural gas (LNG) is also forecasted to be a major growth area for the region. Three LNG plants are under development and will have a combined export capacity of 42 million tons per year. Wind farm projects are expected to bring more than \$1 billion in investments to the RGV.⁸

⁷ See Task 2.5/Task 2.6 memorandum for details on commodity flow analysis.

⁸ Sergio Contreras: "We are the Rio Grande Valley," retrieved October 26, 2020. Published by RG Vision on August 26, 2020. <https://rgvisionmagazine.com/we-are-the-rio-grande-valley/>

2.3 Manufacturing Supply Chain

The RGV is part of a binational manufacturing environment, and every part of the manufacturing process impacts and is impacted by freight in the region from raw materials to finished goods. The maquiladora manufacturing model in the region refers to binational manufacturing operations in which U.S.-based companies manufacture and/or assemble products in Mexico. This practice results in a trade pattern where intermediate goods travel back and forth between facilities in both countries for manufacturing, assembly, warehousing, and distribution. The labor base is also binational. Some of the employees involved in manufacturing live on the U.S. side of the border and cross over to work in Mexico. The reverse is also true. There are 274 maquiladoras in Matamoros and Reynosa with 174,000 employees, and the freight and passenger travel demand generated by the binational manufacturing environment puts additional strain on the RGV's international bridges.⁹

Many of the manufacturers in the binational region (including the RGV and northern Mexico) support the automotive supply chain, and consumer appliances are another common industry. Access to the workforce, short supply chains, and a growing consumer market in Mexico are all attractive features of the RGV. Foreign Trade Zones (FTZs) also provide tax advantages to companies.

2.3.1 Modes and Flow Patterns

The manufacturing and distribution activity in the RGV can be divided into three components: raw materials, intermediate goods, and distribution of final goods. **Exhibit 11** summarizes the various activities described below.

2.3.1.1 Raw Materials

Raw materials enter and leave the RGV by all modes, and maritime and rail transportation are common for these heavy commodities. The most significant volume of raw materials is the flow of steel from South America and Europe to the Port of Brownsville, where it is then transloaded to rail for furtherance to Mexico. About 2.3 million tons of primary metal products were shipped from the region to Mexico in 2018, which was by far the largest rail move to or from the RGV. Additionally, bulk commodities such as limestone as well as chemical products, are imported through the maritime ports for use in the RGV and Mexico. As products are refined, or if destinations are near enough to the border, trucking becomes the more common mode. Some producers use common carriers based in either the U.S. or Mexico, and a few maintain a private fleet for their cross-border operations.

⁹ "Maquiladoras Advantages to U.S. and Mexico Economies." Retrieved October 20, 2020. Published by the Harlingen Economic Development Corporation.

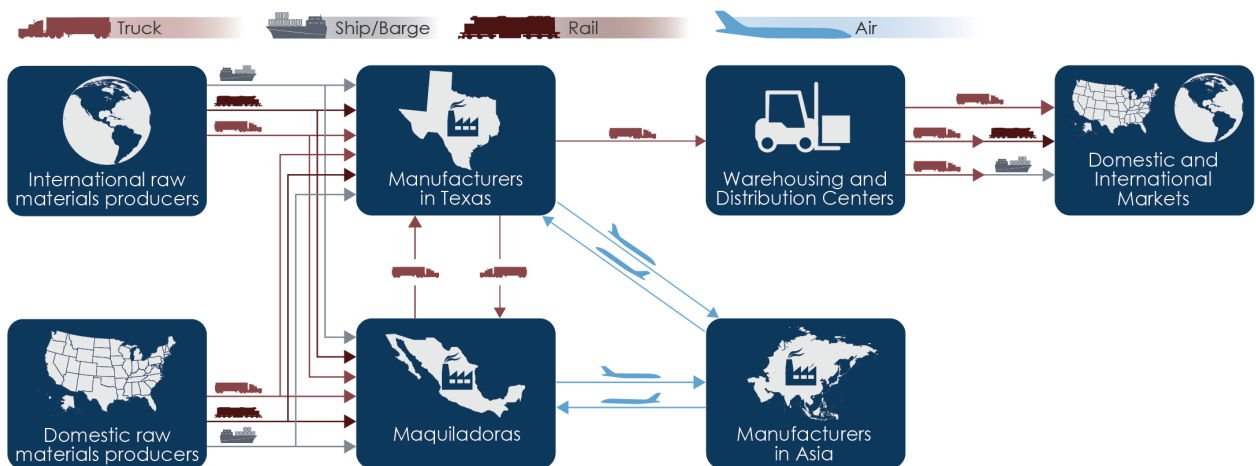
2.3.1.2 Intermediate Goods

Intermediate goods travel back and forth across the border between manufacturing and assembly operations, and trucking is the primary mode for this activity. For example, intermediate goods, such as bronze valves and pipe fittings, are sent from facilities in the RGV across the border to foundries and machine shops in Mexico. The resulting loads are heavy and often reach maximum weight per container. Products are returned from Mexico for additional finishing and/or packaging for distribution from facilities in the RGV. Much of this activity occurs inside an FTZ. In other industries, manufacturers in the region send foam for car seats, electronics and metal components for motors and generators, and semi-finished metal products to incorporate into the assembly of cars, HVAC systems, coiled steel, and other products.

2.3.1.3 Distribution of Final Goods

Finished goods are warehoused in and distributed from the RGV to local, domestic, and Mexican markets. Most of this secondary traffic moves by truck to or from larger distribution hubs in Texas for delivery to consumer markets throughout Texas, supporting quality of life and low transportation costs throughout the state. Transportation through the region also supports trade overseas: products are trucked to the Port of Houston or Port of Long Beach for shipment to Asian markets. As with agricultural commodities, the high volume of maritime trade at these ports results in more competitive shipping costs than maritime transportation directly from the RGV. If shipping from the region's ports met the cost and operational requirements of these supply chains, this trucking flow could be reduced.

Exhibit 11: Manufacturing and Warehousing Activity in the Rio Grande Valley



Source: Analysis by Freight Insights and Cambridge Systematics, 2020.

2.3.2 Trading Partners and Sphere of Influence

Consumers in the RGV and northern Mexico also consume products produced throughout the nation and world. Most of the inbound secondary traffic that flows to the RGV is shipped from warehouses in larger hubs such as Houston or Dallas-Fort Worth or from ports in Louisiana and California. Texas and Oklahoma markets are the primary receivers of outbound products. Through traffic between Mexico and domestic markets are not included in the list of trading partners shown in **Exhibit 12**.

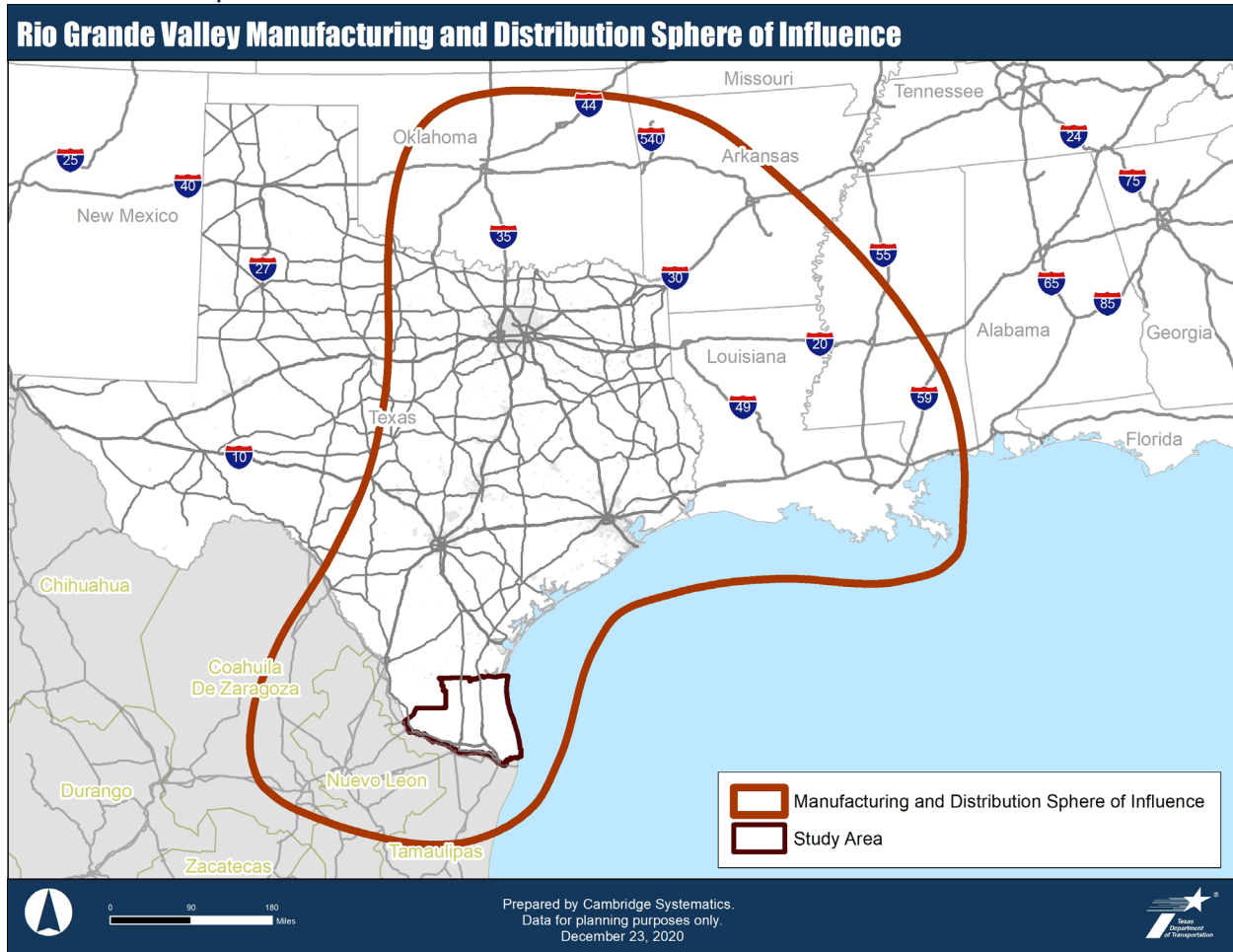
*Exhibit 12: Top Origins and Destinations for Rio Grande Valley
Secondary Traffic*

Inbound Trading Partners	Top Outbound Partners	Top Total Partners
<ul style="list-style-type: none"> ▪ Harris County, TX ▪ Webb County, TX ▪ Dallas County, TX ▪ Louisiana ▪ McLennan County, TX ▪ Nueces County, TX ▪ Tarrant County, TX ▪ Bexar County, TX ▪ Travis County, TX ▪ California 	<ul style="list-style-type: none"> ▪ Harris County, TX ▪ Dallas County, TX ▪ Tarrant County, TX ▪ Bexar County, TX ▪ Travis County, TX ▪ El Paso County, TX ▪ Oklahoma ▪ Massachusetts ▪ Webb County, TX ▪ Collin County, TX 	<ul style="list-style-type: none"> ▪ Harris County, TX ▪ Dallas County, TX ▪ Webb County, TX ▪ Tarrant County, TX ▪ Bexar County, TX ▪ Travis County, TX ▪ Nueces County, TX ▪ El Paso County, TX ▪ Oklahoma ▪ Louisiana

Source: Analysis by WSP and Cambridge Systematics, 2020.

The manufacturing and warehousing sphere of influence of the RGV is concentrated in northern Mexico, where manufacturing linkages in Reynosa and Matamoros are concentrated, and the major urban centers of Texas. The sphere extends to Oklahoma and Louisiana, where consumers and shippers alike depend on trade to, from, and through the RGV (**Exhibit 13**). Additionally, this activity in the RGV depends on distant linkages throughout the world, and efficient truck, rail, maritime, and air cargo transportation systems are all necessary to support the consumer supply chains.

Exhibit 13: Rio Grande Valley's Manufacturing and Warehousing Sphere of Influence



Source: Analysis by Cambridge Systematics and Freight Insights, 2020.

2.3.3 Future Expectations

Raw materials, intermediate goods, and distribution of finished goods are all expected to continue to increase. The Port of Brownsville expects steel imports and possibly production to increase as existing tenants grow and potential tenants are considering relocation to the port. Secondary traffic in the RGV is forecasted to more than double between 2018 to 2050, from 3.3 million tons to 7.8 million tons.¹⁰

Additionally, natural disasters and the Covid-19 pandemic have revealed vulnerabilities in global supply chains, particularly for critical goods such as medical equipment. The RGV may attract additional manufacturing, warehousing, and freight activity if North American companies decide to move part of their operations closer to their base markets, as 64 percent of companies in manufacturing and industrial sectors said they were likely to do in

¹⁰ See Task 2.5/Task 2.6 memorandum for details on commodity flow analysis.

an April 2020 survey.¹¹ This movement of manufacturing or assembly operations from overseas to the U.S. (reshoring) or other North and Central American countries nearer U.S. markets (nearshoring) may further increase growth in manufacturing and distribution activity in and through the RGV.

3.0 Economic Contributions of Freight Transportation in the Rio Grande Valley

Freight and trade activity in the RGV has economic impacts beyond the industries it serves directly. Employment and value-added to the economy from freight transportation and handling activity generates additional regional and state economic benefits. However, failure to invest in the transportation system can also result in economic losses due to increased shipping times and costs.

The economic contribution of freight transportation in the RGV was estimated by assessing freight transportation jobs, labor income, value-added (i.e., contribution to Gross State Product), output (i.e., sales), and tax revenue. Freight transportation has a multiplier effect on the local economy as a result of expenditures on goods and services from suppliers and the expenditure of disposable income of freight transportation employees, referred to respectively as direct, indirect, and induced effects:

- **Direct Impact:** Employment, income, value-added, and output generated by the direct operations of the freight transportation sector.
- **Indirect Impact:** Employment, income, value-added, and output generated as part of the intermediate consumption of the freight transportation sector, for example, spending on vehicles, fuel, supplies, maintenance parts, and real estate costs.
- **Induced Impact:** Impact measured in terms of additional jobs, income, value-added, and output as a result of the consumption patterns of freight transportation employees (due to their labor income), for example, spending on education and health, entertainment, groceries, and real estate.

3.1 Data and Methodology

This analysis relies on the 2018 IMPLAN® and Transportation Economic Development Impact System (TREDIS®) input-output models to capture the quantitative interdependencies between different sectors. TREDIS® was used to isolate the contribution of freight exclusively within the RGV, while the 2018 IMPLAN® model was used for Texas to estimate the economic multiplier of the freight transportation sectors in the state.

Note that while the analysis will describe impacts in terms of type (e.g., 'direct impact'), this analysis is a measure of economic contribution and not impact. That is to say, no new jobs are modeled in this analysis. The economic contribution is measured in terms of

¹¹ <https://www.supplychaindive.com/news/manufacturing-reshoring-pandemic-thomas/577971/>

employment (number of jobs supported by an industry), labor income (compensation of employees), value-added (economic output less intermediate inputs, accounting for the additional output create at that stage of production), industry output (total sales), and tax revenue generated by existing economic activity associated with the freight sector.

3.1.1 Freight Transportation Employment

The economic contribution of freight transportation goes beyond businesses that provide for-hire services. To estimate the economic contribution of transportation and logistics in the RGV, this analysis uses a broad definition of freight employment. Specifically, the analysis includes all employment within sectors that are primarily driven by freight (e.g., North American Industry Classification System [NAICS] 484 – Truck Transportation), traditional wage and salary employees (as reported through the Bureau of Labor Statistics' Quarterly Census of Employment and Wages), as well as self-employed individuals (as reported through the United States Census Bureau's Non-employer Statistics (NES)) (**Exhibit 14**). The analysis also includes other freight occupations within businesses in which transportation is not the main economic activity (e.g., a truck driver employed for a big box retailer), as reported through the Bureau of Labor Statistics' Occupational Employment Statistics.

3.1.2 Jobs in the Freight Transportation Sectors

Freight transportation in the RGV supported approximately 39,800 jobs in 2018. Approximately 30 percent of these jobs are self-employed (as reported through the United States Census Bureau's (NES)), approximately 62 percent are traditional wage and salary employees working in the freight sectors (as reported by the Bureau of Labor Statistics' Quarterly Census of Employment and Wages), and approximately eight percent are employees of other industries but are focused on moving freight (as reported by the Bureau of Labor Statistics' Occupational Employment Statistics). The majority of these jobs are concentrated in the truck transportation subsector (NAICS 484), with approximately 14,900 jobs and 38 percent of all freight-related employment (**Exhibit 14**). Of those, approximately 60 percent of drivers are self-employed and 40 percent are traditional wage- or salary-earning employees. Truck transportation is the only subsector in the region where self-employed employees outnumber traditional employees. The second-largest subsector by the number of employees is merchant wholesalers of durable goods (NAICS 423), with approximately 7,000 jobs and 18 percent of all freight-related employment.

Trucking is the dominant mode used to transport freight in the region. Air Transportation (NAICS 481) supports approximately 170 jobs and Water Transportation (NAICS 483) supports approximately 30 jobs. Note that some establishments may not fall under the NAICS subsector code that matches the mode primarily used by the establishment. For example, some rail, port, and harbor operations fall under NAICS subsector 488 (Support activities for transportation). Additionally, some employment impacting the region is located

outside of the region. Employment information by county is included in **Appendix B**, and additional information by employment type is included in **Appendix C**.

Exhibit 14: Freight Transportation Employment within Freight Sectors in the Rio Grande Valley, 2018

NAICS	NAICS Description	Employment Type	Employment
423	Merchant wholesalers, durable goods	Wage and Salary Employees	6,210
		Self-Employed Employees	805
424	Merchant wholesalers, nondurable goods	Wage and Salary Employees	5,294
		Self-Employed Employees	382
425	Electronic markets and agents and brokers	Wage and Salary Employees	506
		Self-Employed Employees	43
481	Air transportation	Wage and Salary Employees	125
		Self-Employed Employees	43
482	Rail transportation*	Wage and Salary Employees	0
		Self-Employed Employees	0
483	Water transportation*	Wage and Salary Employees	0
		Self-Employed Employees	30
484	Truck transportation	Wage and Salary Employees	6,019
		Self-Employed Employees	8,906
486	Pipeline transportation	Wage and Salary Employees	52
		Self-Employed Employees	39
488	Support activities for transportation	Wage and Salary Employees	2,891
		Self-Employed Employees	1,074
491	Postal service	Wage and Salary Employees	1,168
		Self-Employed Employees	0
492	Couriers and messengers	Wage and Salary Employees	962
		Self-Employed Employees	601
493	Warehousing and storage	Wage and Salary Employees	1,281
		Self-Employed Employees	105
Total			36,536

Source: Quarterly Census of Employment and Wages (QCEW) database and the Non-employer Statistics (NES) provided by the U.S. Census Bureau. *Note that some employment supporting a mode will be categorized under 488.

Exhibit 15 shows the freight occupations identified for this analysis by Standard Occupational Classification (SOC) number. To estimate employment in the RGV from freight occupations in non-freight sectors, the Bureau of Labor Statistics' Occupational Employment Statistics Research Estimates of occupation by state and industry was used. The analysis assumes that the proportion of freight employment in non-freight sectors that applies at a state-level applies within the RGV, and is used here to avoid double-counting jobs that are captured by other data sources. This analysis does not include occupational employment in sectors where heavy machinery, logistics, or trucking may be used for non-freight purposes; for example, an individual employed as a Heavy and Tractor-Trailer Truck Driver for a firm engaged in mineral extraction should not be included in this analysis and has not been included.

Exhibit 15: Freight Occupations Included in Analysis

SOC	Title
11-3071	Transportation, Storage, and Distribution Managers
43-5011	Cargo and Freight Agents
43-5071	Shipping, Receiving, and Traffic Clerks
53-1011	Aircraft Cargo Handling Supervisors
53-1048	First-Line Supervisors of Transportation and Material Moving Workers, Except Aircraft Cargo Handling Supervisors
53-3032	Heavy and Tractor-Trailer Truck Drivers
53-3033	Light Truck or Delivery Services Drivers
53-7051	Industrial Truck and Tractor Operators
53-7062	Laborers and Freight, Stock, and Material Movers, Hand
53-7121	Tank Car, Truck, and Ship Loaders

Source: Occupational Employment Statistics (OES) provided by The Bureau of Labor Statistics (BLS)

Exhibit 16 highlights the level of freight occupations in non-freight sectors. These values were input into the 2018 IMPLAN® model for Texas to capture the importance of the economic contribution of freight in the RGV at a regional level. Outside of freight-intensive sectors, freight employment is overwhelmingly focused on retail trade (NAICS sectors 44-45), with 1,700 jobs. Real estate and leasing (NAICS 53) and professional and technical services (NAICS 54) also supported approximately 300 jobs in freight occupations each, respectively.

Exhibit 16: Employment in Freight Occupations in Non-Freight Sectors, 2018

NAICS	NAICS Description	Hidalgo	Cameron
44-45	Retail trade	1,174	531
51	Information	10	5
52	Finance and insurance	2	1
53	Real estate and rental and leasing	236	92
54	Professional and technical services	197	110
55	Management of companies and enterprises	57	20
61	Educational services	65	26
62	Health care and social assistance	112	50
71	Arts, entertainment, and recreation	69	31
72	Accommodation and food services	60	24
81	Other services, except public administration	163	72
99	Unclassified	112	43
Total		2,257	1,005

Source: Occupational Employment Statistics (OES) provided by The Bureau of Labor Statistics (BLS). Note: Employment summaries for Hidalgo and Cameron Counties are individually available from the OES. However, the other four counties in the RGV are only available within a 22-county region and are not included in this analysis.

3.2 Economic Contribution by Freight Transportation Sector

Exhibit 17 presents the economic contribution of the freight transportation sectors in the RGV. To complete this analysis, the total employment contribution was calculated using the TREDIS® model for the six-county RGV. The IMPLAN® model for the state of Texas was also run to capture impacts outside of the RGV. The difference between IMPLAN® outputs and TREDIS® outputs is used to estimate the economic contribution of freight activity in the RGV outside of the six-county region within the state of Texas. The TREDIS® results were used only to scale IMPLAN outputs to capture the approximate contribution of freight exclusively within the RGV.

The results indicate that the freight transportation sector supports more than 98,000 jobs on an annual basis, and contributes more than \$6 billion in labor income, nearly \$10 billion in GSP, and approximately \$19 billion in economic output. The freight sector further supports approximately \$1.9 billion in tax revenues on an annual basis, of which

approximately \$1.0 billion is generated within the RGV in federal taxes and \$900 million in state/local taxes (**Exhibit 18**).

Exhibit 17: Economic Contribution of the Freight Transportation Sectors in the Rio Grande Valley, 2018

Geography	Employment	Labor Income (\$M)	Value Added (\$M)
Rio Grande Valley	86,150	\$4,320	\$5,900
Rest of Texas	12,150	\$2,110	\$4,600
Total	98,300	\$6,450	\$10,500

Source: 2018 IMPLAN® model for Texas (values outside RGV) and 2018 TREDIS® model for the RGV.

Exhibit 18: Tax Contribution of the Freight Transportation Sectors in the Rio Grande Valley, 2018

Geography	Local/ State/ Federal Tax (\$M)
Rio Grande Valley	\$1,030
Rest of Texas	\$890
Total	\$1,920

Source: 2018 IMPLAN® model for Texas (values outside RGV) and 2018 TREDIS® model for the RGV.

Of the more than 98,000 jobs stemming from the freight transportation sector in the RGV, approximately 39,800 are direct jobs (40 percent of total employment contribution) from the firms and industries that provide transport services, use transportation to ship and receive goods, or support activities to transportation and warehousing. The multiplier impacts associated with the suppliers providing intermediate goods and services to the directly impacted industries, as well as the induced impacts associated with the re-spending of earned income, created approximately 58,500 additional jobs (60 percent of total employment contribution). Within the RGV, every freight job supports an additional 1.5 jobs in the RGV and state.

Impact of Freight Transportation Employment in the Rio Grande Valley:

- For every 100 freight jobs in the RGV, another 147 jobs are created in Texas.
- For every dollar of value added in freight transportation, an additional \$1.13 of value is added to the state economy.

The comparatively larger share of multiplier-related jobs (i.e., indirect and induced jobs) compared to direct jobs demonstrates how freight activity benefits other non-freight users. For every 100 jobs in the freight transportation sector overall, another 147 jobs are created by suppliers and due to the consumption of goods and services by freight transportation employees in Texas. Therefore, the 39,800 direct jobs in the freight transportation sector support nearly 98,300 jobs, including direct, indirect, and induced jobs.

Freight transportation is expected to generate an increase in regional output due to linkages with other local economic activities, as well as its strong local labor intensity. For every dollar of value-added in freight transportation, an additional \$1.13 is added through suppliers and local industries that support the consumption expenditure of transportation employees. Therefore, of the \$5.0 million of the freight sector's direct contribution to GSP, the sector supports a total of \$10.5 million, including direct, indirect, and induced value added to GSP.

Exhibit 19 presents the total economic contribution of freight transportation sectors in the RGV. The combined economic contribution of truck transportation, wholesale trade, and support activities represent over 89 percent of the total economic contribution of the freight transportation sector in Texas. The provision, use, and related multiplier effects of truck transportation generate the majority of freight transportation-related employment at 44 percent, followed by wholesale at 36 percent. Air, pipeline, water, and rail transportation contribute relatively few jobs in this truck-dominated region and together contribute less than one percent of the freight industry's economic contribution.

Exhibit 19: Total Economic Contribution by Freight Transportation Sector in Rio Grande Valley, 2018

Sector	Total Jobs	Labor Income (\$M)	GSP (\$M)	Taxes (\$M)
Truck transportation	42,700	\$2,800	\$4,600	\$835
Wholesale trade	34,900	\$2,300	\$3,700	\$680
Support activities	9,800	\$640	\$1,050	\$190
Postal Service	2,900	\$190	\$300	\$60
Couriers and messengers	3,900	\$250	\$400	\$75
Warehousing and storage	3,400	\$220	\$370	\$65
Air transportation	400	\$30	\$45	\$10
Pipeline transportation	200	\$15	\$25	\$4
Water transportation	100	\$5	\$10	\$1
Total	98,300	\$6,450	\$10,500	\$1,920

Source: 2018 TREDIS® model for the RGV. To perform the analysis, the total number of direct jobs by sector was used as the reference for the calculation of other economic impacts (labor income, value-added, output and taxes). Note that sectors with no employment were excluded. Some employment supporting a mode will be categorized under "Support activities."

4.0 Economic Cost of Lack of Investment

The continued positive impacts on the regional economy from freight will depend on investment in its transportation infrastructure to maintain competitiveness. The current costs of highway congestion and economic disbenefits associated with highway congestion were calculated to demonstrate the connection between freight performance and economic benefits.

4.1 Congestion Costs

The costs associated with congestion on the highway network, not including congestion or delays at international bridges, in the RGV are calculated at a county level by the Texas A&M Transportation Institute (TTI). TTI calculated travel time for all segments within the RGV, as well as the associated annual costs due to congestion from delay and wasted fuel. The primary cost components associated with congestion include delay cost and fuel cost, both of which are a function of travel speed. In 2018, the value of a person-hour of time was estimated to be \$18.58 for passenger vehicles, and \$57.28 for trucks. The prices for a gallon of gasoline is assumed to be equal to \$2.63 and a gallon of diesel is assumed to be \$2.99, consistent with the state of Texas.

In 2018, Hidalgo County experienced the largest highway delays within the RGV, with more than 13 million person-hours of delay across all vehicles, or approximately 66 percent of all person-hours of delay in the region (**Exhibit 20**). Hidalgo County experienced approximately 578,000 truck-hours of delay and Cameron County experienced approximately 361,000 truck-hours of delay, approximately 57 percent and 35 percent of the total delay in the region, respectively. Delay at international bridges further increases the hours and costs of delay.

Exhibit 20: Total Hours of Highway Delay by Purpose Type by County, 2018

County	Annual Person-Hours of Truck Delay	Annual Person-Hours of Passenger Vehicle Delay			Annual Person-Hours of Delay (All Vehicles)
		Commute Trips	Work-related Business Trips	All Other Trips	
Hidalgo	578,425	2,208,061	188,187	10,149,552	13,124,225
Cameron	361,264	965,679	82,302	4,438,830	5,848,075
Starr	34,161	87,030	7,417	400,042	528,651
Willacy	21,532	25,254	2,152	116,081	165,019
Brooks	18,082	15,618	1,331	71,788	106,819
Kenedy	6,291	1,463	125	6,727	14,606
Total	1,019,756	3,303,104	281,515	15,183,019	19,787,394

Source: Texas Transportation Institute, 2020. Analysis does not include delays at international bridges or other freight facilities.

While the truck delay accounts for approximately 5 percent of all person-hours of highway delay in the RGV, higher fuel demands and value of time for truck traffic means that truck congestion accounts for approximately 14 percent of annual congestion costs for all vehicles in the region (**Exhibit 21**). As with hours of delay, these values are highest in Hidalgo and Cameron counties, which together account for approximately 57 and 36 percent of all truck congestion costs on highways in the region, respectively.

Exhibit 21: Total Cost of Congestion by Purpose Type by County, 2018

County	Annual Truck Congestion Cost (\$2018)	Annual Passenger Vehicle Congestion Costs (\$2018)			Annual Congestion Cost (All Vehicles) (\$M)
		Commute Trips	Work-related Business Trips	All Other Trips	
Hidalgo	\$32,262,286	\$43,259,281	\$3,686,871	\$198,845,219	\$278.1
Cameron	\$20,175,303	\$18,964,538	\$1,616,296	\$87,172,222	\$127.9
Starr	\$1,906,156	\$1,698,875	\$144,791	\$7,809,034	\$11.6
Willacy	\$1,188,288	\$490,539	\$41,807	\$2,254,805	\$4.0
Brooks	\$944,708	\$303,642	\$25,879	\$1,395,717	\$2.7
Kenedy	\$339,449	\$28,492	\$2,428	\$130,965	\$0.5
Total	\$56,816,190	\$64,745,366	\$5,518,071	\$297,607,962	\$424.7

Source: Texas Transportation Institute, 2020. Analysis does not include delays at international bridges or other freight facilities.

4.2 Economic Disbenefits

The economic disbenefits of failing to address congestion can be estimated by using the Transportation Security Administration’s (TSA’s) Commodity-by-Industry Direct Requirements provided by the Bureau of Transportation Statistics. Congestion costs in the RGV can be distributed amongst the 546 sectors present in the RGV based on each industry’s economic output and the direct freight requirements per dollar of industry output at producer’s prices. For business travelers and trucks (both for-hire and in-house), it is assumed that the additional costs of conducting business accrue to individual industries based on 1) the proportion of each industry’s output share of total industry output in the RGV and 2) the value of transportation services each respective industry consumes to produce one dollar of output.

Exhibit 22 presents the economic impacts due to freight congestion for the RGV. When distributed amongst industries, the congestion costs in the RGV are equal to the loss of approximately 1,400 jobs and \$77.3 million in GSP. The loss in taxes to local, state, and federal governments is equal to approximately \$8.3 million. Note that additional statewide impacts (and losses) are not available for this analysis due to differences in the way IMPLAN® and TREDIS® disaggregate households by income; for consistency, only the TREDIS® model results are included here.

Exhibit 22: Economic Impacts (Losses) due to Truck Congestion for the Rio Grande Valley, 2018

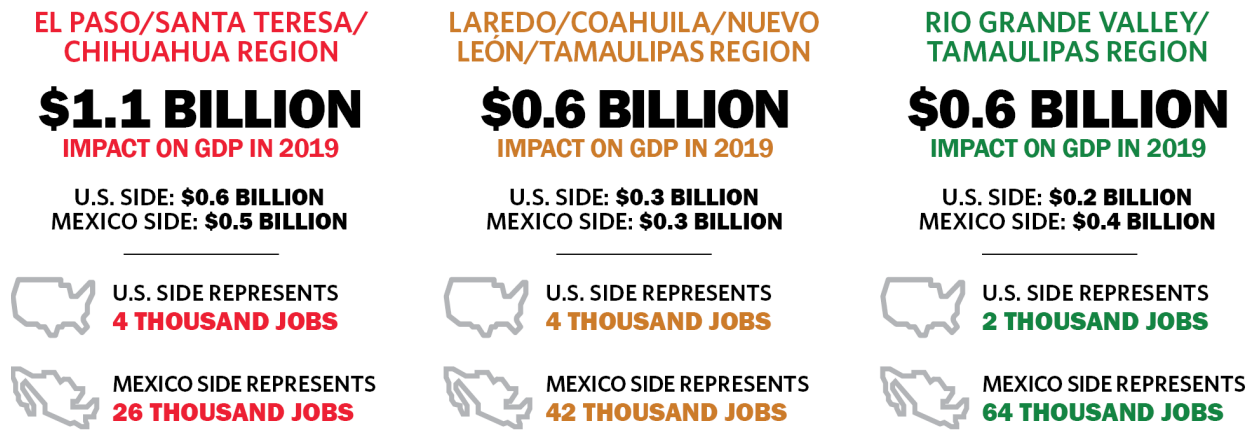
Impact	Employment	GSP (\$M)	Labor Income (\$M)	Local/ State/ Federal Taxes (\$ M)
Rio Grande Valley Business Impact	(700)	(\$34)	(\$27)	(\$3)
Rio Grande Valley Household Impact	(700)	(\$43)	(\$29)	(\$5)
Total	(1,400)	(\$77)	(\$56)	(\$8)

Source: 2018 TREDIS® model for the Rio Grande Valley region. Analysis does not include delays at international bridges or other freight facilities.

Economic losses due to delays at international bridges are even larger than those associated with highway transportation. Several of the key freight industries in the RGV rely on transportation across the Texas-Mexico border multiple times per day for fuel or maquiladora, and delay at these locations quickly accrues costs to roadway users. TxDOT estimates \$0.6 billion in economic losses due to delay at international bridges annually, including \$0.2 billion in the U.S. and \$0.4 billion in Mexico (**Exhibit 23**). The magnitude of these losses highlights the need for investment in international bridges as well as the infrastructure accessing and connecting them for a resilient system. The RGV is uniquely positioned to overcome delays from intermittent disruptions due to its numerous international bridges serving truck traffic and potential for flexibility.

Exhibit 23: Economic Impacts (Losses) due to International Bridge Truck Congestion, 2019

Current Delays of Moving Goods across the Texas-Mexico Border



Source: TxDOT, draft Texas-Mexico Border Transportation Master Plan, 2020.

5.0 Next Steps

This memorandum summarized the RGV’s role in the Texas economy, the region’s impact on three supply chains, quantified the economic contributions of the freight transportation industry in the RGV, and estimated the economic losses due to congestion to communicate the cost of not investing in the freight transportation system. The findings presented in this memorandum will be combined with infrastructure analysis in the Regional Freight and Trade Plan to communicate the critical importance of investment in freight and trade transportation to the regional, state, and national economies.

Appendix A: Additional Commodity and Supply Chain information

The following sections contain additional information about commodity-specific flows in the RGV obtained during interviews with private businesses involved in the production or transportation of these products. In-person interviews were conducted until March 2020, and phone interviews were conducted through October 2020.

Citrus

Citrus is a prime agricultural commodity for the region. In-season fruit is brought to regional plants where it is cleaned and sorted into whole fruit for shipping and also juiced as a concentrate or fresh juice products. This inbound product is carried by trucks making round trips between farms and the processing plants. Outbound products ship via truckload. End markets tend to be fairly close because of the perishability of the fresh fruit, although there are also international markets for the products. One producer identified the following domestic consumption zones: Texas, Louisiana, the San Francisco Bay Area, the Pacific Northwest, and the Midwest. Exports to China and Taiwan are trucked to the Port of Houston or the Port of Long Beach for export.

Sugar

The sugar grown in Texas is primarily cane sugar. The cane is harvested and refined locally and shipped as raw sugar and liquid. It comes from Santa Rosa by truck, is discharged into a warehouse, loaded by conveyer onto a barge, and shipped to a processing warehouse in Louisiana, near New Orleans. Most of the sugar grown and processed in the RGV is exported through the Port of Harlingen. Sugar volumes fluctuate as the production of sugar has largely moved out of the US.

Grains

Large international grain merchandisers buy grain from local farmers. They bring in soybeans, milo, and corn via truck from the field to transloading locations. Grain goes out via rail and barge. An interview with an international grain supplier revealed that soybeans, corn, and milo are the primary grain products moving in the RGV. Soybeans and corn are moved from the upper gulf coast of Texas, from Wharton south to Brownsville. Roughly 98 percent of these two grains are exported to Mexico. They move into and out of the regional collection point by truck. All of this shipper's grains to Mexico cross at the Progreso International Bridge.

Milo is grown within the RGV and ships out via the Ports of Brownsville and Corpus Christi on bulk vessels. In 2020, the primary destination for milo has been China. Some of the grain products make their way to Africa as part of the U.S. Agency for International Development program. Europe, and in particular Spain, have also been purchasers in the recent past. One interviewee carries overweight permits for its shipments but cited the need for farmers to

have some leniency for weight during harvest season when moving from the farm to local collection sites.

The shipper that was interviewed reported to be handling 224,000 tons of grain per year. That volume is combined among inbound, outbound and facility transfers in the region. At 25 tons per truck, this equates to nearly 10,000 truckloads of grain, a large quantity of which crosses into Mexico through the RGV.

Cotton

Cotton is another agricultural commodity grown in the RGV, but volumes have declined as acreage has transferred to grain production. The Port of Harlingen is exploring container-on-barge service to support the cotton industry. In the past, natural disasters have not been a persistent threat due to the timing of harvest and hurricane seasons. However, in 2020, Hurricane Hanna resulted in a loss of 95 percent of the cotton crop.¹²

Primary Metal Products

Primary metal products are transported from the RGV to Mexico as a manufacturing input. Much of this is transported via outbound rail freight, including primary iron/steel products that have been shipped to the Port of Brownsville and then transloaded to rail for furtherance to Mexico. About 2.3 million tons of primary metal products were shipped from the region to Mexico in 2018, which was by far the largest rail move to or from the RGV.¹³ According to a representative of the Union Pacific Railroad, shipments are equivalent to a train per day.

Semi-Finished Metal Products

Some companies produce semi-finished metal products at fabrication facilities in Mexico. They send the materials to manufacturing plants in the RGV where value-add functions are applied. Those facilities then act as a distribution center for the finished goods. One company said it ships four to six loads of coiled steel per day, for example.

Intermediate Materials

Intermediate materials such as bronze valves and pipe fittings are frequently sent from facilities in the RGV across the border to foundries and machine shops in Mexico. The resulting loads are heavy and often reach maximum weight per container. Products are returned from Mexico for additional finishing and/or packaging for distribution from facilities in the RGV. Much of this activity occurs inside an FTZ.

Motors, Generators, and Power Transmission Products

¹² Hurricane Hanna delivers blow to South Texas, AgriLife Today, 2020.

<https://agrilifetoday.tamu.edu/2020/08/11/hurricane-hanna-delivers-blow-to-south-texas/>

¹³ See Task 2.5/Task 2.6 memorandum for details on commodity flow analysis.

One company that manufactures and distributes electric motors, generators, and power transmission products operates one plant in Reynosa and four in Monterrey. Their distribution center in McAllen serves as an independent sales entity and distribution point. In an interview, this company indicated that they have 7,000 truck trips per year for combined north and south directional travel. This company regularly ships containers internationally to destinations including Dubai, the UK, China, and India. These container shipments leave the continent through the Port of Houston, Port of Long Beach, or Mexican ports.

Appendix B: Freight Transportation Employment by County

NAICS	NAICS Description	Employment Type	Hidalgo	Cameron	Starr	Willacy	Brooks	Kenedy
423	Merchant wholesalers, durable goods	Wage and Salary Employees	3,954	2,200	56	0	0	0
		Self-Employed Employees	578	174	35	10	8	0
424	Merchant wholesalers, nondurable goods	Wage and Salary Employees	4,223	1,057	0	14	0	0
		Self-Employed Employees	260	110	9	3	0	0
425	Electronic markets and agents and brokers	Wage and Salary Employees	381	125	0	0	0	0
		Self-Employed Employees	29	14	0	0	0	0
481	Air transportation	Wage and Salary Employees	8	117	0	0	0	0
		Self-Employed Employees	29	14	0	0	0	0
482	Rail transportation	Wage and Salary Employees	0	0	0	0	0	0
		Self-Employed Employees	0	0	0	0	0	0
483	Water transportation	Wage and Salary Employees	0	0	0	0	0	0
		Self-Employed Employees	14	16	0	0	0	0
484	Truck transportation	Wage and Salary Employees	4,330	1,586	85	18	0	0
		Self-Employed Employees	6,314	1,879	529	170	14	0
486	Pipeline transportation	Wage and Salary Employees	41	0	0	0	11	0
		Self-Employed Employees	26	9	4	0	0	0
488	Support activities for transportation	Wage and Salary Employees	1,464	1,334	93	0	0	0
		Self-Employed Employees	699	302	61	12	0	0
491	Postal service	Wage and Salary Employees	765	313	54	23	12	1
		Self-Employed Employees	0	0	0	0	0	0

NAICS	NAICS Description	Employment Type	Hidalgo	Cameron	Starr	Willacy	Brooks	Kenedy
492	Couriers and messengers	Wage and Salary Employees	543	419	0	0	0	0
		Self-Employed Employees	365	215	12	9	0	0
493	Warehousing and storage	Wage and Salary Employees	766	515	0	0	0	0
		Self-Employed Employees	68	25	6	6	0	0
Grand Total			24,857	10,424	944	265	45	1

Source: Quarterly Census of Employment and Wages (QCEW) database and the Non-employer Statistics (NES) provided by the U.S. Census Bureau.

Appendix C: Additional Employment, Wage, and Receipt Data

Employment in the Freight Transportation and Handling Sectors in the Rio Grande Valley Region, 2018

NAICS	NAICS Description	Number of Establishments	Total Employment	Total Wages (Millions)
481	Air transportation	12	125	\$9.8
482	Rail transportation	1	0	\$0.0
488	Support activities for transportation	279	2,891	\$117.7
483	Water transportation	1	0	\$0.0
484	Truck transportation	502	6,019	\$274.0
486	Pipeline transportation	12	52	\$9.3
491	Postal service	51	1,168	\$66.8
492	Couriers and messengers	25	962	\$39.1
493	Warehousing and storage	110	1,281	\$54.9
423	Merchant wholesalers, durable goods	662	6,210	\$291.7
424	Merchant wholesalers, nondurable goods	480	5,294	\$218.6
425	Electronic markets and agents and brokers	131	506	\$22.2
Total		2,266	24,508	\$1,103.9

Source: Quarterly Census of Employment and Wages (QCEW). *Note that some employment supporting a mode will be categorized under 488.

*Self-Employed Workers in Freight Sectors in the Rio Grande Valley
Region, 2018*

NAICS	NAICS Description	Total jobs	Total Receipts (Millions)
481	Air transportation	43	\$2.4
482	Rail transportation	0	\$0.0
488	Support activities for transportation	1,074	\$64.8
483	Water transportation	30	\$1.4
484	Truck transportation	8,906	\$983.1
486	Pipeline transportation	39	\$2.0
491	Postal service	0	\$0.0
492	Couriers and messengers	601	\$11.1
493	Warehousing and storage	105	\$6.9
423	Merchant wholesalers, durable goods	805	\$93.7
424	Merchant wholesalers, nondurable goods	382	\$77.5
425	Electronic markets and agents and brokers	43	\$22.4
Total		12,028	\$1,265.3

Source: Non-employer Statistics (NES) provided by the U.S. Census Bureau. *Note that some jobs supporting a mode will be categorized under 488. Note also that this data source does not indicate wages paid per job, but rather receipts per individual tax filing. Receipts include revenue and other assets, and may not accurately reflect each individual's annual earnings. Jobs indicated here may be either part-time or full-time.

*Freight Employment in Non-Freight Sectors in the Rio Grande Valley
Region, 2018*

NAICS	NAICS Description	Total employment	Total wages (Millions)
51	Information	15	\$0.4
52	Finance and insurance	3	\$0.1
53	Real estate and rental and leasing	328	\$10.3
54	Professional and technical services	307	\$9.1
55	Management of companies and enterprises	77	\$2.9
61	Educational services	91	\$3.1
62	Health care and social assistance	162	\$4.5
71	Arts, entertainment, and recreation	100	\$2.3
72	Accommodation and food services	84	\$2.3
81	Other services, except public administration	235	\$8.3
99	Unclassified	155	\$5.8
44-45	Retail trade	1,705	\$46.0
Total		3,262	\$94.9

Source: Occupational Employment Statistics (OES) provided by The Bureau of Labor Statistics (BLS). Note: Employment summaries for Hidalgo and Cameron Counties are individually available from the OES. However, the other four counties in the RGV are only available within a 22-county region and are not included in this analysis.