

WILL COUNTY  
COMMUNITY FRIENDLY  
FREIGHT MOBILITY PLAN



**CED** WILL COUNTY  
CENTER FOR  
ECONOMIC DEVELOPMENT

APPENDIX B  
ECONOMIC ANALYSIS OF  
FREIGHT MOVEMENTS

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Economic impacts of freight moving across Will County, Illinois result from carriers who provide freight services, and local shippers/receiver who use such services. Freight impacts are estimated via the IMPLAN® economic model based on movement value from the IHS TRANSEARCH® database.

## 1. METHODOLOGY AND DATA ASSUMPTIONS

Freight transport facilitates economic activity associated with the production and consumption of goods traded. Such trade-oriented economic impacts reflect the local production of goods, the reallocation of intermediate goods, and the consumption of final goods. Will County goods movements translate into economic activity by tracing directional commodity values through local commodity-industry economic interrelationships.

Will County's freight impacts are calculated by mode (truck, rail, pipeline, and water<sup>1</sup>), activity (carriers and shippers/receivers), type (direct, indirect, induced, and aggregate total), and measure (employment, income, value added, output, and tax revenue) for year 2015. Such economic impact analysis compliments traditional freight-related analysis that emphasizes movement volume (tons and/or units) and route/facility capacity, especially considering that not all freight traversing a geography relates to local economic activity.

### 1.1 IMPACT TERMINOLOGY

Economic impacts of freight are categorized into two activities, three types, and five measures.

#### Activities:

- *Freight Carriers* – Impacts associated with providing freight services (e.g., the trucking industry) primarily include modal transport, but also include administrative operations. Carrier estimates are primarily based on transportation industry data in IMPLAN®. Rail impacts are proportioned by the freight-related composition.<sup>2</sup>
- *Shippers/Receivers* – Impacts associated with firms using freight services to trade goods (intermediate and final), excepting the freight industries. Shipper/receiver impacts are estimated by tracing Will County-specific applicable directional

<sup>1</sup> TRANSEARCH® does not report any air freight movements for Will County

<sup>2</sup> Disaggregated into respective freight and passenger subcomponents by proportioning the AMTRAK data for rail.

commodity values (from IHS TRANSEARCH®) through commodity-industry interrelationships (from IMPLAN®) for the county.

#### Types:

- *Direct* – Calculated carrier and shipper/receiver impacts.
- *Indirect* – Impacts associated with the suppliers that provide intermediate goods and services to the directly impacted industries.
- *Induced* – Impacts associated with the re-spending of earned income from both the direct and indirect industries in the study region.<sup>3</sup>
- *Total* – Summation of direct, indirect, and induced types.

#### Measures:<sup>4</sup>

- *Jobs (Employment)* – Measured in terms of full-time-equivalent (FTE) job-years.
- *Income* – Wage/salary earnings paid to the associated jobs.
- *Value-Added* – Net additional economic activity (i.e., total output less gross intermediate inputs), synonymous with GRP (gross regional product); includes employee and proprietor income, other income types, taxes, etc., required to produce final goods and services.
- *Output* – Total sales value associated with all levels of economic activity (comprise gross intermediate inputs and value added, combined).
- *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.

## 1.2 DATA SOURCES AND MODELS

Two primary data sources/models were obtained and applied: IMPLAN® as the underlying economic model for Will County; and, the IHS TRANSEARCH® database for commodity movement values (for the shipper/receiver impacts). Additionally, AMTRAK data was used to help separate rail carrier employment from the aggregated passenger and freight “rail transportation” industry data provided in IMPLAN®.

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<sup>3</sup> Note that the indirect and induced impact types are often referred to, jointly, as multiplier impacts.

<sup>4</sup> Monetary measures are presented in constant 2015 dollars (income, value-added, output, and taxes).

TRANSEARCH® – Developed by IHS Markit, TRANSEARCH® is an extensive database of North American freight<sup>5</sup>, compiled from various sources, including the largest rail and truck carriers, with base- and future-year, county-level estimates. TRANSEARCH® establishes market-specific production tonnages by industry/commodity, drawn mostly from IHS Markit's Business Markets Insights (BMI) database, supplemented by trade associations, industry reports, and federal government data.

However, the comprehensiveness and accuracy of TRANSEARCH® data varies by mode. Originally developed for private sector truck and rail users, data for other modes are less extensive and robust, especially due to the NAFTA-only focus. As such, cross-oceanic air and water movements to/from Asia, Europe, etc. are excluded; as are small volume air movements. Lastly, pipeline movements are perhaps the most inaccurate modal movements, due to insufficient U.S. federal reporting requirements and insufficient private sector pipeline data-sharing participation.

Nonetheless, TRANSEARCH® provides the most comprehensive and internally-comparable freight database, especially of the two major modes (truck and rail) and, as such, is utilized for shipper/receiver freight impacts. Additionally, it is the only comprehensive freight database available with a county-level resolution – as opposed to the Federal Highway Administration's Freight Analysis Framework database (FHWA FAF), which pertains to Bureau of Economic Analysis (BEA) regions, which are county aggregations.

In terms of freight rail, TRANSEARCH® leverages data from the Surface Transportation Board's (STB) Waybill data, which provides detailed commodity movement data using a two percent stratified sample of carload waybills for all domestic rail traffic submitted by carriers that terminate 4,500 or more revenue carloads annually.

IMPLAN® – IMPLAN® v3 is an input-output, social-account-matrix software for estimating economic impacts to a geography (i.e., Will County) from assumed changes in an industry or commodity. A social account matrix reflects annual economic interrelationships between industries (and commodities), households, and governments<sup>6</sup>, measured by impact multipliers. Multipliers are developed from regional purchase coefficients, production functions, and socioeconomic data for each geographically-specific variable. IMPLAN® is one of the most commonly used models for economic impact analysis, and includes various economic data, including industry employment, used to estimate the impacts relating to freight service providers.

IMPLAN® also provides commodity-to-industry production and absorption matrices that enable the quantification, for example, of how inbound commodities are used (absorbed) across Will County industries in respective production processes to create

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<sup>5</sup> NAFTA-related and excludes international freight traffic from countries other than Canada and Mexico.

<sup>6</sup> Results pertain to one-year *static* impacts for year 2015 flows (in year 2015 values), and do not provide any *dynamic* or feedback changes over a projected time horizon.

final goods and services, or by institutions for final consumption. Further, algorithms developed translate commodity data (Standard Transportation Commodity Classification, or STCC) into IMPLAN® industry categories to estimate the impacts associated with directional commodity movements.

Combined – TRANSEARCH® commodity detail (i.e., value by modal direction) is bridged with the IMPLAN® model to assess the freight-related interrelationships within the Will County economy. IMPLAN® does not identify commodity value movements (only the underlying commodity-to-industry structure), and TRANSEARCH® does not provide the economic interrelationships necessary to determine how the commodity movements interact within the economy. As such, the two sources are combined to derive the freight-related economic impacts to Will County. The process of translating freight movements into impacts entails adjusting total freight movements (from TRANSEARCH®) for only those relevant to Will County industries, and tracing such commodity-specific values through local industry relationships (from IMPLAN®).

## 1.3 RELEVANT FREIGHT VALUE

Applied freight data for shipper/receiver impact estimates are based on the information from the TRANSEARCH® freight flow analysis. However, while the freight flow analysis focuses on tonnage traversing Will County infrastructure, the shipper/receiver impacts are a function of freight value's relationship to regional economic activity. As such, freight data are summarized below by economically-relevant direction and commodity, and reflect commodity flow data adjustments.

### 1.3.1 DATA DIMENSIONS AND DIRECTIONAL RELEVANCE

In accounting for the shipper/receiver impacts, the freight data from TRANSEARCH® considered the following data resolution, directions, and possible overlaps.

Commodity Detail – Commodity flow data from TRANSEARCH® is translated into IMPLAN® at a detailed four-digit STCC level, whereas the freight flow analysis is aggregated at the two-digit STCC level for the sake of simplifying the freight dimensions. Evaluating the freight data at a four-digit STCC level for trade relationships enables a more-detailed bridge with the detailed industry structure in IMPLAN®. IMPLAN® has 536 industries/commodities (NAICS3 level) and is most amenable to bridging with a STCC4 commodity structure (700+ four-digit specific commodities), such that the bridge is a close 1:1 with a mostly straightforward concordance. Matching the resolution helps identify anomalous freight flows that do not correspond with regional production or consumption values.

Directional Movements – Economically-relevant directions include outbound (originating within Will County, terminating beyond), inbound (originating beyond Will County, terminating within), and intra (originating and terminating within will County). Such directions are economically relevant because the respective production and/or consumption of such traded goods occur in-region, and can be attributed to Will County.

In contrast, through traffic (originating and terminating beyond Will County) is not directly applicable to freight users (shippers/receivers) in Will County, and are thus excluded. Despite through movements not pertaining to Will County trade, such movements affect some freight carriers (service providers) based in Will County.

Outbound movement generally pertain to industry production within the county, and inbound movements pertain to the absorption of commodities into industrial production processes (intermediate goods), or as final consumption through direct sales or various retail outlets. Intra-County movements are combined with outbound movements, since both reflect industry production within Will County.

Intra-Modal Overlap – Translating economically-relevant directional commodity values into shipper/receiver impacts results in potential overlap between directions. Such an overlap, or double-counting, is possible where the outbound/intra-county impacts stem partially or wholly from inbound commodities<sup>7</sup>. Within each mode, the directional, industry-specific impacts were compared and any potential redundancies were subtracted out.<sup>8</sup>

Inter-Modal Overlap – Similarly, intermodal overlap potential exists. However, determining such potential is more difficult given the myriad multi-modal-industry-commodity permutations. Despite that, the major intermodal overlap potential conflict (rail-truck and water-truck, etc.) is effectively handled through the exclusion of *Secondary Traffic*, per the IHS TRANSEARCH® definition as a catch-all drayage and repositioning commodity category.

### 1.3.2 ADJUSTMENT PROCESS

Shipper/receiver impact estimates require two notable adjustments of Transearch® freight values prior to using the Implan® model. While the exclusion of certain commodities is straightforward, anomaly adjustments are more nuanced.

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<sup>7</sup> Example: Inbound seeds serve as intermediary inputs into the farm industry, translating into crop farming economic activity. Farm products are shipped within (intra-regional) and beyond (outbound) Will County for further processing (food products) or direct consumption. Such outbound/intra-regional farm product movements are also translated into crop farming economic activity. A potential impact overlap thus arises when the inbound seed is used to produce the farm products, which are then shipped outbound. As such, various inbound commodities may be associated with the same economic activity as different (but related) outbound commodities – the potential redundancy must be removed.

<sup>8</sup> Example: \$XXX of inbound seeds translate into \$100 million of crop farming activity; \$YYY of outbound farm products translate into \$500 million of crop farming activity. \$600 million aggregation would potentially double-count \$100 million if the inbound seeds are used entirely in producing the \$500 million farm products.



Irrelevant Commodities – Certain commodities moving across Will County infrastructure are economically irrelevant from a trade perspective, pertaining to neither Will County consumption (intermediate, or final) or production, regardless of movement direction:

- *STCC40, Waste or Scrap Materials* – typically production byproducts, mostly hauled towards final disposal and rarely used in further industrial processes; as such, most such commodities were removed from the freight movement data.
- *STCC42, Shipping Containers (empty TEUs/FEUs)* – have no production and/or consumption value; as such, the tons associated yields no shipper/receiver economic activity. However, repositioning yields some carrier-related economic activity.
- *STCC50, Secondary Traffic* – encapsulates short-haul intermodal drayage and repositioning by truck from railyards, ports, and warehouses/distribution facilities. Including *Secondary Traffic* would duplicate preciously accounted-for values .

Anomalies and Adjustments – Certain commodity directional values reported by TRANSEARCH® exceed the existing economic relationships, per IMPLAN®. Specifically, TRANSEARCH® commodity directional values are compared with associated IMPLAN® user industry production (outbound/internal) and/or absorption (inbound) values. Such comparisons provide a means to check/verify the TRANSEARCH® data. Large-scale discrepancies were researched to understand and rectify.

In some instances, the freight data is reported as inbound and/or outbound movements that, realistically, are neither – instead, such movements are truly through Will County via inter- or intra-modal drayage transfers (i.e., one rail yard to another). This reflects correct freight movement data but misrepresents actual Will County economic production/consumption activity.

For example, TRANSEARCH® reported value of inbound, outbound, and intra-county movements for 2015 across all modes totals \$175.9 billion. Conversely, IMPLAN® reports 281,338 County employees, producing \$27.0 billion in value-added activity, and \$51.9 billion in economic output. Clearly, the TRANSEARCH® database overestimates commodity movements to-, from-, and within Will County (i.e., non-through movements). Because, it is impossible for Will County to produce \$51.9 billion worth of economic output and \$27.0 billion in value-added from \$175.9 billion worth of commodity movements (239% differential over output, 551% over value-added).

TRANSEARCH® data were thus proportionately scaled back. Firstly, apparent through movements attributed as both inbound and outbound were removed. Secondly, other directional commodity adjustments ensure that resulting impacts align within Will County's year 2014 economic measures. Major freight data adjustments made include:

- *STCC 4611, Freight-All-Kind Shipments (FAK)* – loaded rail containers entering Will County, repositioned, and exiting on rail – this commodity alone accounts for almost 40% of the \$175.9 billion, which is subsequently treated as through movements, and is thus removed from the shipper/receiver impact analysis.

*STCC 3711, Motor Vehicles and STCC 3714, Motor Vehicle Parts/Accessories* – entering Will County for modal repositioning not traded within the county – hence, most pass through (inbound then outbound, on both truck and rail).

- *STCC 1311, Crude Petroleum* – inbound value (via pipeline from Alberta, Canada) is multiple-fold excessive of absorbed petroleum refining industry values documented in IMPLAN®. Significant reduction of inbound crude petroleum value to County composition totals (IMPLAN®) is supported by refinery published information regarding barrel/day capacities.

Several other adjustments to various commodities were similarly conducted to exclude inbound/outbound movements that appeared to be repositioned through movements, and/or to cap the volumes such as not to exceed actual economic activity in the county. Other commodity adjustments included *farm and food products, textiles, some chemicals and plastics, and various specialized equipment*.

### 1.3.3 ADJUSTED FREIGHT DATA

Adjustments for irrelevant commodities and anomalies reflect significant reallocations in freight volumes (both tons and value) used in estimating economic impacts. Directional summaries discussed below are supported by tabular commodity detail in Table 1.

Outbound/Intra-County – Combining outbound and intra-county directions, 18.1 million tons of economically-relevant freight, valued at \$10.7 billion (in 2015\$), originated in Will County in 2015. These tonnage and value volumes, representing 39.5% and 12.9% of all outbound/intra-county freight movements reported by TRANSEARCH®, as illustrated in Figure 1. Impacts associated with outbound/intra-county movements are derived by mapping the relevant freight values with the respective industrial production in Will County from the IMPLAN® model.

Inbound – Economically-relevant inbound commodities destined to Will County in 2015 amount to 24.1 million tons and \$10.9 billion (in 2015\$), representing 25.3% and 11.8% of the respective total inbound movements reported by TRANSEARCH®, as also illustrated in Figure 1. Inbound commodities are translated into economic impacts by mapping the value of the inbound goods via the absorption of such respective goods into industry production in Will County.

Modal Perspective – Figure 2 provides an alternative depiction of the same adjustments shown in Figure 1, which help illustrate the adjustment process discussed above. For example:

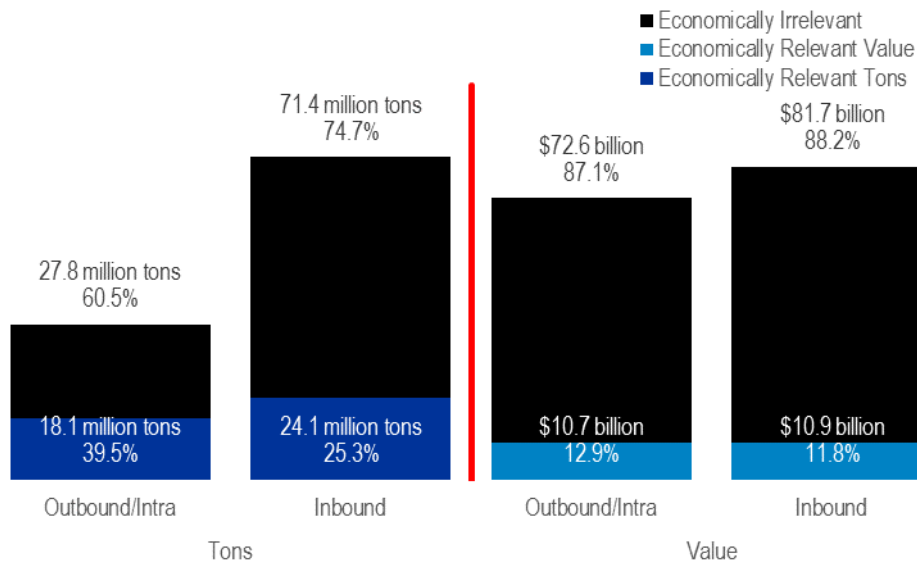
- Inbound pipeline reductions reflect adjustments to STCC 1311 Crude Petroleum.
- Rail reductions reflect repositioning of STCC 4611 Freight-All-Kind Shipment (especially value given its higher value than most other rail commodities).
- Removal of STCC 50 Secondary Traffic to eliminate double counting explains a significant share of truck movement decline.

TABLE I: ECONOMICALLY-RELEVANT FREIGHT (DIRECTION/COMMODITY)

STCC2	Commodity	Tons		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	
<b>Outbound/Intra</b>						
28	Chemicals or Allied Prods.	1,953,682	10.8%	\$3,899	36.3%	\$1,996
29	Petroleum or Coal Prods.	4,641,898	25.6%	\$2,502	23.3%	\$539
20	Food or Kindred Prods.	779,984	4.3%	\$951	8.9%	\$1,220
35	Machinery	66,851	0.4%	\$650	6.1%	\$9,726
34	Fabricated Metal Prods.	91,295	0.5%	\$366	3.4%	\$4,010
36	Electrical Equipment	20,269	0.1%	\$355	3.3%	\$17,508
33	Primary Metal Prods.	113,949	0.6%	\$307	2.9%	\$2,693
30	Rubber or Misc Plastics	67,899	0.4%	\$271	2.5%	\$3,996
41	Misc Freight Shipments	73,227	0.4%	\$255	2.4%	\$3,482
01	Farm Prods.	823,992	4.5%	\$176	1.6%	\$214
	Remaining Commodities	9,477,946	52.3%	\$1,012	9.4%	\$107
<b>Total</b>		<b>18,110,992</b>	<b>100.0%</b>	<b>\$10,745</b>	<b>100.0%</b>	<b>\$593</b>
<b>Inbound</b>						
13	Crude Petrol. or Natural Gas	8,873,922	49.0%	\$2,396	22.3%	\$270
28	Chemicals or Allied Prods.	1,298,618	7.2%	\$1,920	17.9%	\$1,478
20	Food or Kindred Prods.	1,011,011	5.6%	\$1,111	10.3%	\$1,098
29	Petroleum or Coal Prods.	1,978,309	10.9%	\$928	8.6%	\$469
37	Transportation Equipment	132,313	0.7%	\$888	8.3%	\$6,709
35	Machinery	62,864	0.3%	\$668	6.2%	\$10,628
36	Electrical Equipment	32,714	0.2%	\$370	3.4%	\$11,313
33	Primary Metal Prods.	203,460	1.1%	\$342	3.2%	\$1,682
01	Farm Prods.	767,248	4.2%	\$303	2.8%	\$395
41	Misc Freight Shipments	77,075	0.4%	\$268	2.5%	\$3,482
	Remaining Commodities	9,704,743	40.2%	\$1,680	15.4%	\$173
<b>Total</b>		<b>24,142,280</b>	<b>100.0%</b>	<b>\$10,873</b>	<b>100.0%</b>	<b>\$450</b>

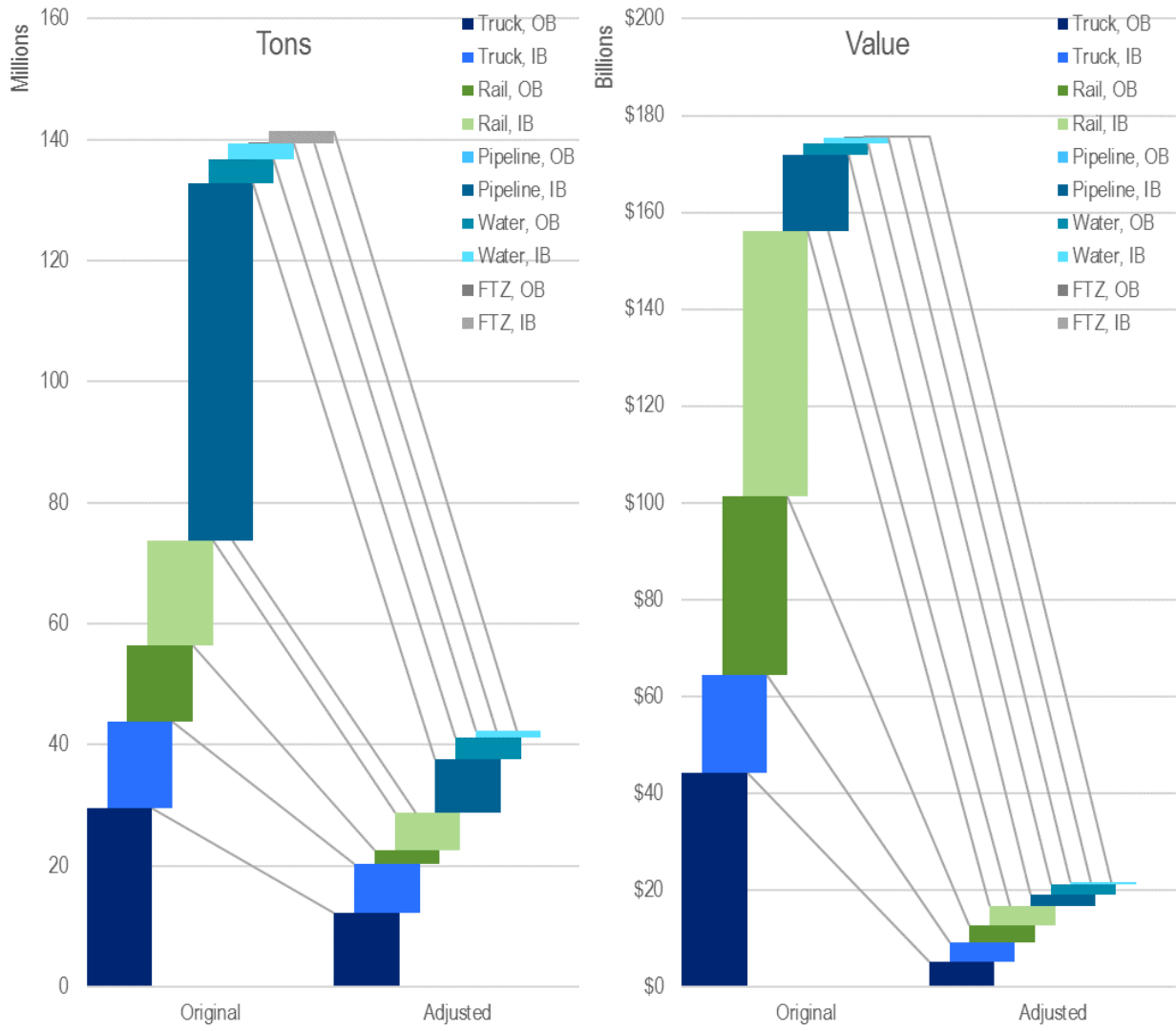
Source: CDM Smith based on TRANSEARCH®

FIGURE I: ECONOMICALLY-RELEVANT FREIGHT (COMPARISON WITH TOTAL FREIGHT)



Source: CDM Smith based on TRANSEARCH®

FIGURE 2: ECONOMICALLY-RELEVANT FREIGHT BY MODE



Source: CDM Smith based on TRANSEARCH®



## 2. ECONOMIC IMPACT RESULTS

Impacts are summarized for each transport mode (truck, rail, pipeline, and water) by activity (carriers, shippers/receivers, and a combined total), type (direct, indirect, induced, and an economic total), and measure (employment, income, value added, output, and tax revenue) for year 2015 to provide a comprehensive perspective on how freight in Will County impacts the economy. Summary-level impacts from all freight-related activity (both carriers and shippers/receivers combined) by mode and measure/type are presented below in Table 2.

Direct – Accounting for both the freight carriers and the receiver/shipper trade facilitated by such carriers, the direct economic impact to Will County amounted to 64,110 jobs in 2015, earning \$3.9 billion by producing \$9.0 billion in value-added (gross regional product, or GRP), which equates to \$22.0 billion in output (the sales value of goods/services) taxed to yield \$524 million to local, state, and federal coffers.

Total – Incorporating multiplier impacts (indirect and induced) associated with direct freight activity translates into an additional 42,280 jobs earning \$2.0 billion, by producing \$3.8 billion in value-added GRP. In total, the direct and multiplier impacts related to freight activity amounts to 106,390 jobs in 2015, earning \$5.9 billion by producing \$12.8 billion in GRP, equating to \$28.8 billion in output, taxed to yield \$916 million to local, state, and federal coffers. In Will County, the cumulative freight-related employment multiplier effect is 1.65 total jobs per every direct freight-related job.

TABLE 2: TOTAL FREIGHT IMPACTS BY MODE AND ECONOMIC MEASURE/TYPE

Measure/Type	Truck	Rail	Pipeline	Water	Total
<b>Employment*</b>					
Direct	35,900	23,640	1,210	3,360	64,110
Indirect	11,130	6,760	1,450	1,780	21,130
Induced	11,150	7,200	1,220	1,570	21,150
<i>Total</i>	<i>58,190</i>	<i>37,600</i>	<i>3,890</i>	<i>6,720</i>	<i>106,390</i>
<b>Income**</b>					
Direct	\$2,055	\$1,349	\$199	\$268	\$3,871
Indirect	\$604	\$366	\$93	\$107	\$1,170
Induced	\$448	\$289	\$49	\$63	\$849
<i>Total</i>	<i>\$3,107</i>	<i>\$2,005</i>	<i>\$341</i>	<i>\$438</i>	<i>\$5,891</i>
<b>Value Added**</b>					
Direct	\$3,900	\$2,543	\$1,645	\$953	\$9,041
Indirect	\$1,076	\$649	\$161	\$191	\$2,078
Induced	\$882	\$569	\$97	\$124	\$1,672
<i>Total</i>	<i>\$5,859</i>	<i>\$3,762</i>	<i>\$1,903</i>	<i>\$1,269</i>	<i>\$12,792</i>
<b>Output**</b>					
Direct	\$9,298	\$6,069	\$4,066	\$2,606	\$22,040
Indirect	\$1,992	\$1,204	\$306	\$361	\$3,863
Induced	\$1,550	\$1,000	\$170	\$219	\$2,939

<i>Total</i>	\$12,840	\$8,273	\$4,542	\$3,186	\$28,841
<b>Tax Revenue**</b>					
Direct	\$205	\$197	\$86	\$36	\$524
Indirect	\$97	\$62	\$17	\$19	\$195
Induced	\$104	\$67	\$11	\$15	\$197
<i>Total</i>	\$406	\$326	\$114	\$70	\$916

\* employment rounded to nearest ten jobs, totals may not sum due to rounding

\*\*in millions of 2015 dollars

Source: CDM Smith based on TRANSEARCH® and IMPLAN®

**Activity Impacts** – Depending on measure and type for all freight modes combined, between 82.5% and 95.2% of the freight activity impacts are shipper/receiver related, with the remaining 4.8% to 17.5% pertaining to freight carriers. A detailed breakdown by freight activity for each mode (carriers versus shippers/receivers) is in the Appendix (see Table 9).

**Share of Economy** – It is important to contextualize the preceding economic impact estimates, as it is difficult to visualize hundreds of thousands of jobs and billions of dollars. As such, the economic impacts are compared with the existing economic composition of Will County in 2015, by the exact same existing economic measures as the presented economic impacts, per Table 3.

TABLE 3: WILL COUNTY BASELINE ECONOMIC MEASURES, 2015

Measure	Value
Employment	281,338
Income *	\$14,776
Value Added *	\$26,998
Output *	\$51,924
Tax Revenues *	\$2,435

\*in millions of 2015 dollars

Source: IMPLAN®

Accounting for both the carriers and shippers/receivers, the direct impacts associated with Will County-related freight amount to between 21.5% (tax revenue) and 42.2% (output) of the county's economy, per Table 4. Accounting for supplier-related impacts (indirect) and the income re-circulation impacts (induced), the total economic impacts pertaining to all freight-related activity in Will County amounts to between 37.6% (tax revenue) and 55.5% (output) of the county's economy. Such estimates demonstrate the extent to which the Will County economy is reliant on the transportation infrastructure network.

TABLE 4: TOTAL FREIGHT IMPACTS AS PERCENT OF ECONOMY

Measure/Type	Truck	Rail	Pipeline	Water	Total
<b>Employment</b>					
Direct	12.8%	8.4%	0.4%	1.2%	22.8%
Indirect	4.0%	2.4%	0.5%	0.6%	7.5%
Induced	4.0%	2.6%	0.4%	0.6%	7.5%
<i>Total</i>	<i>20.7%</i>	<i>13.4%</i>	<i>1.4%</i>	<i>2.4%</i>	<i>37.8%</i>
<b>Income</b>					
Direct	13.9%	9.1%	1.3%	1.8%	26.2%
Indirect	4.1%	2.5%	0.6%	0.7%	7.9%

Induced	3.0%	2.0%	0.3%	0.4%	5.7%
<i>Total</i>	<i>21.0%</i>	<i>13.6%</i>	<i>2.3%</i>	<i>3.0%</i>	<i>39.9%</i>
<b>Value Added</b>					
Direct	14.4%	9.4%	6.1%	3.5%	33.5%
Indirect	4.0%	2.4%	0.6%	0.7%	7.7%
Induced	3.3%	2.1%	0.4%	0.5%	6.2%
<i>Total</i>	<i>21.7%</i>	<i>13.9%</i>	<i>7.0%</i>	<i>4.7%</i>	<i>47.4%</i>
<b>Output</b>					
Direct	17.9%	11.7%	7.8%	5.0%	42.4%
Indirect	3.8%	2.3%	0.6%	0.7%	7.4%
Induced	3.0%	1.9%	0.3%	0.4%	5.7%
<i>Total</i>	<i>24.7%</i>	<i>15.9%</i>	<i>8.7%</i>	<i>6.1%</i>	<i>55.5%</i>
<b>Tax Revenue</b>					
Direct	8.4%	8.1%	3.5%	1.5%	21.5%
Indirect	4.0%	2.5%	0.7%	0.8%	8.0%
Induced	4.3%	2.8%	0.5%	0.6%	8.1%
<i>Total</i>	<i>16.7%</i>	<i>13.4%</i>	<i>4.7%</i>	<i>2.9%</i>	<i>37.6%</i>

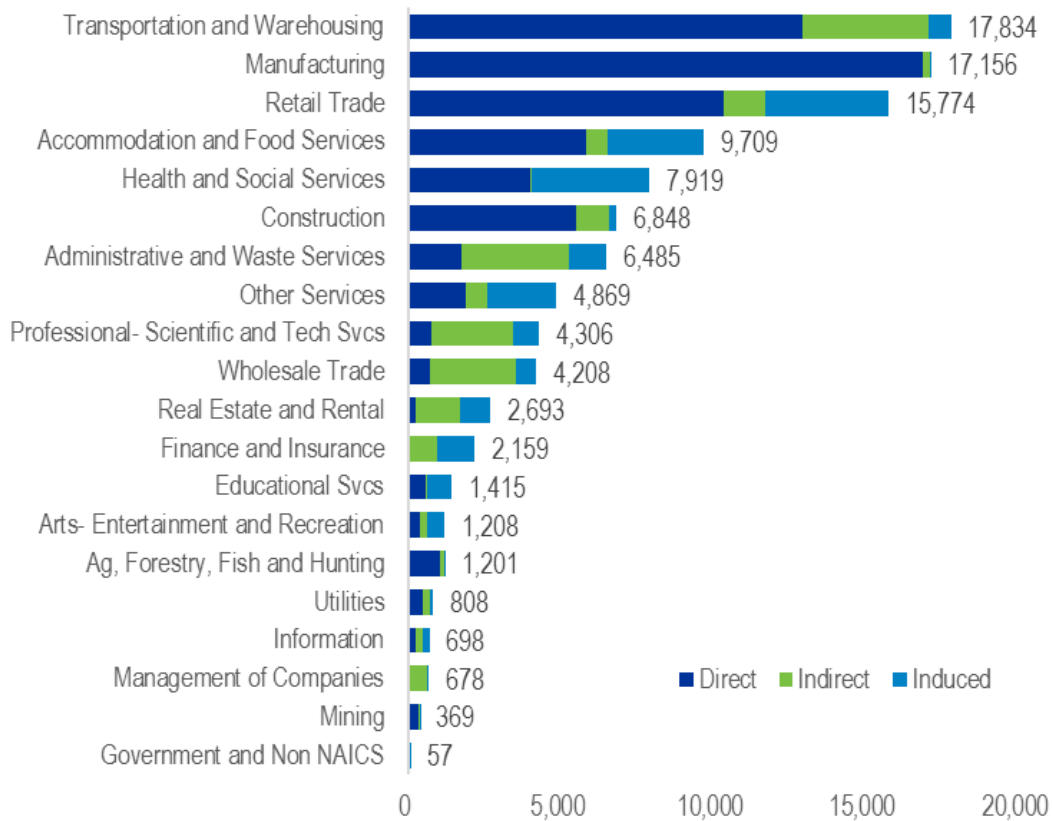
Source: CDM Smith based on TRANSEARCH® and IMPLAN®

Industry Impacts – Impacts are distributed across various industries, including freight service modal carriers and all the other shipper/receiver industries dependent on physical goods-movement (i.e., trade). Employment impacts by industry and impact type are presented graphically in Figure 3.<sup>9</sup>

Combining all freight modes total employment impacts (direct plus multiplier) amount to 106,390, of which more than half (56.8%) are concentrated within the top four industries of *Transportation and Warehousing; Manufacturing; Retail Trade; and, Accommodation and Food Service.*

<sup>9</sup> Based on North American Industry Classification System (NAICS) two-digit industries (20).

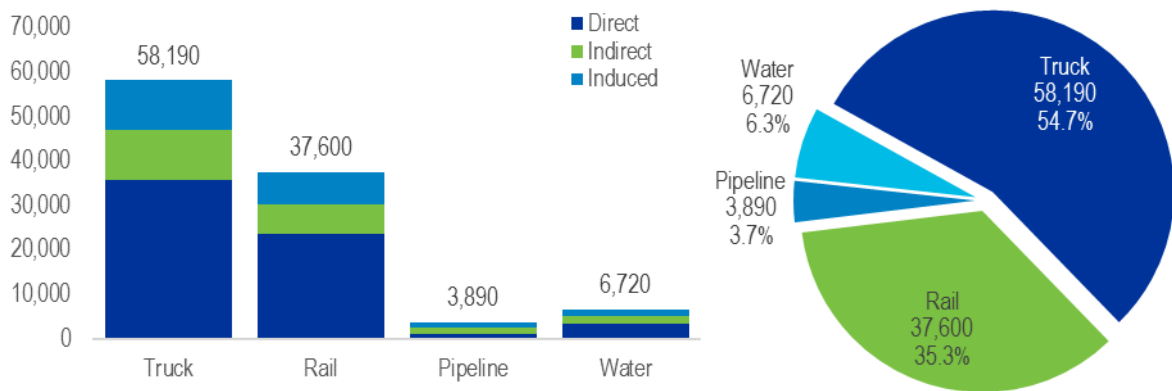
FIGURE 3: TOTAL FREIGHT ACTIVITY-RELATED EMPLOYMENT BY INDUSTRY



Source: CDM Smith based on TRANSEARCH® and IMPLAN®

Modal Impacts – Figure 4 summarizes employment impacts by mode and impact type. The largest impacts are attributable to truck (54.7%), followed by rail (35.3%), water (6.3%), and then pipeline (3.7%). Such modal impacts are mostly a function of the associated economically-relevant trade values facilitated by the respective modes.

FIGURE 4: TOTAL FREIGHT ACTIVITY-RELATED EMPLOYMENT BY MODE



Source: CDM Smith based on TRANSEARCH® and IMPLAN®



Employment impacts by mode are outlined below and detailed in the Appendix, which include directional composition of shippers/receivers (trade users).

- *Trucking* – Constitutes the largest modal impacts (54.7%) with 58,190 total employees in Will County associated directly with the trucking industry (9,420) or users (26,480), or with the associated multiplier effects (22,280).
- *Rail* – Comprises the second largest relative-modal impacts (35.3%), with 37,600 total employees: 990 directly employed in freight rail, 22,650 directly use freight rail carrier services to trade goods, and multiplier impacts include another 13,960.
- *Water* – With 6,720 total jobs associated with water movements, it is the third-largest modal impact (6.3%), comprised of 20 direct providers serving 3,340 direct trade users, and supporting an additional 3,350 multiplier-related jobs.
- *Pipeline* – Exhibits the smallest economic impact to Will County (3.7%), with 3,530 total jobs. Similarly to water, most pertain to petroleum refining users and the associated multiplier jobs.



### 3. ECONOMIC CONCLUSION

This economic analysis of Will County freight quantifies freight's contribution to the economy, and contextualizes the interaction of traded-goods between people, businesses, and institutions. The analysis highlights the fact that user-related impacts associated with shippers/receivers (i.e., manufacturing facilities) far surpass the impacts associated with freight carriers (i.e., truckers, etc.).

By going beyond freight tonnage analysis and by excluding economically-irrelevant movements (i.e. through Will County, including those attributed as inbound and outbound in the freight database but realistic represent repositioning movements), these Will County-region impact findings provide another useful perspective when considering future regional transportation infrastructure development.



## APPENDIX

TABLE 5: TRUCK IMPACTS BY ACTIVITY AND ECONOMIC MEASURE/TYPE

Measure and Type	Carriers	Shippers/ Receivers			Service and Trade
		OB/Intra	Inbound	Subtotal	
<b>Employment *</b>					
Direct	9,420	7,130	19,350	26,480	35,900
Indirect	3,120	3,270	4,750	8,010	11,130
Induced	3,020	3,280	4,860	8,130	11,150
<b>Total</b>	<b>15,560</b>	<b>13,720</b>	<b>28,900</b>	<b>42,630</b>	<b>58,190</b>
<b>Income **</b>					
Direct	\$561	\$581	\$913	\$1,494	\$2,055
Indirect	\$160	\$199	\$245	\$444	\$604
Induced	\$121	\$132	\$195	\$326	\$448
<b>Total</b>	<b>\$842</b>	<b>\$912</b>	<b>\$1,352</b>	<b>\$2,264</b>	<b>\$3,107</b>
<b>Value Added **</b>					
Direct	\$692	\$1,658	\$1,550	\$3,208	\$3,900
Indirect	\$286	\$357	\$434	\$791	\$1,076
Induced	\$239	\$259	\$384	\$643	\$882
<b>Total</b>	<b>\$1,217</b>	<b>\$2,273</b>	<b>\$2,369</b>	<b>\$4,642</b>	<b>\$5,859</b>
<b>Output **</b>					
Direct	\$1,366	\$4,473	\$3,459	\$7,933	\$9,298
Indirect	\$516	\$680	\$797	\$1,477	\$1,992
Induced	\$420	\$455	\$675	\$1,130	\$1,550
<b>Total</b>	<b>\$2,302</b>	<b>\$5,610</b>	<b>\$4,929</b>	<b>\$10,539</b>	<b>\$12,840</b>
<b>Tax Revenue **</b>					
Direct	\$12	\$55	\$138	\$193	\$205
Indirect	\$20	\$35	\$41	\$76	\$97
Induced	\$28	\$31	\$45	\$76	\$104
<b>Total</b>	<b>\$61</b>	<b>\$121</b>	<b>\$224</b>	<b>\$345</b>	<b>\$406</b>

\* employment rounded to nearest ten jobs, totals may not sum due to rounding

\*\*in millions of 2015 dollars

Source: CDM Smith based on TRANSEARCH® and IMPLAN®

TABLE 6: TRUCK IMPACTS, PERCENTAGE OF ECONOMY

Measure and Type	Carriers	Shippers/ Receivers	Total
<b>Employment</b>			
Direct	3.3%	9.4%	12.8%
<b>Total</b>	<b>5.5%</b>	<b>15.2%</b>	<b>20.7%</b>
<b>Income</b>			
Direct	3.8%	10.1%	13.9%
<b>Total</b>	<b>5.7%</b>	<b>15.3%</b>	<b>21.0%</b>
<b>Value Added</b>			
Direct	2.6%	11.9%	14.4%
<b>Total</b>	<b>4.5%</b>	<b>17.2%</b>	<b>21.7%</b>
<b>Output</b>			
Direct	2.6%	15.3%	17.9%
<b>Total</b>	<b>4.4%</b>	<b>20.3%</b>	<b>24.7%</b>
<b>Tax Revenues</b>			
Direct	0.5%	7.9%	8.4%
<b>Total</b>	<b>2.5%</b>	<b>14.2%</b>	<b>16.7%</b>

Source: CDM Smith based on TRANSEARCH® and IMPLAN®

TABLE 7: RAIL IMPACTS BY ACTIVITY AND ECONOMIC MEASURE/TYPE

Measure and Type	Carriers	Shippers/ Receivers			Service and Trade
		OB/Intra	Inbound	Subtotal	
<b>Employment *</b>					
Direct	990	4,840	17,810	22,650	23,640
Indirect	420	2,350	4,000	6,340	6,760
Induced	420	2,130	4,650	6,780	7,200
<b>Total</b>	<b>1,820</b>	<b>9,390</b>	<b>26,380</b>	<b>35,770</b>	<b>37,600</b>
<b>Income **</b>					
Direct	\$78	\$365	\$907	\$1,272	\$1,349
Indirect	\$22	\$140	\$204	\$344	\$366
Induced	\$17	\$85	\$187	\$272	\$289
<b>Total</b>	<b>\$116</b>	<b>\$592</b>	<b>\$1,296</b>	<b>\$1,888</b>	<b>\$2,005</b>
<b>Value Added **</b>					
Direct	\$122	\$946	\$1,476	\$2,422	\$2,543
Indirect	\$43	\$246	\$361	\$606	\$649
Induced	\$33	\$168	\$368	\$536	\$569
<b>Total</b>	<b>\$198</b>	<b>\$1,360</b>	<b>\$2,204</b>	<b>\$3,564</b>	<b>\$3,762</b>
<b>Output **</b>					
Direct	\$237	\$2,676	\$3,155	\$5,831	\$6,069
Indirect	\$81	\$456	\$666	\$1,123	\$1,204
Induced	\$58	\$296	\$646	\$942	\$1,000
<b>Total</b>	<b>\$376</b>	<b>\$3,432</b>	<b>\$4,464</b>	<b>\$7,896</b>	<b>\$8,273</b>
<b>Tax Revenue **</b>					
Direct	\$1	\$46	\$150	\$196	\$197
Indirect	\$3	\$24	\$35	\$59	\$62
Induced	\$4	\$20	\$43	\$63	\$67
<b>Total</b>	<b>\$8</b>	<b>\$91</b>	<b>\$227</b>	<b>\$318</b>	<b>\$326</b>

\* employment rounded to nearest ten jobs, totals may not sum due to rounding

\*\*in millions of 2015 dollars

Source: CDM Smith based on TRANSEARCH® and IMPLAN®

TABLE 8: RAIL IMPACTS, PERCENTAGE OF ECONOMY

Measure and Type	Carriers	Shippers/ Receivers	Total
<b>Employment</b>			
Direct	0.4%	8.1%	8.4%
<b>Total</b>	<b>0.6%</b>	<b>12.7%</b>	<b>13.4%</b>
<b>Income</b>			
Direct	0.5%	8.6%	9.1%
<b>Total</b>	<b>0.8%</b>	<b>12.8%</b>	<b>13.6%</b>
<b>Value Added</b>			
Direct	0.5%	9.0%	9.4%
<b>Total</b>	<b>0.7%</b>	<b>13.2%</b>	<b>13.9%</b>
<b>Output</b>			
Direct	0.5%	11.2%	11.7%
<b>Total</b>	<b>0.7%</b>	<b>15.2%</b>	<b>15.9%</b>
<b>Tax Revenues</b>			
Direct	0.0%	8.0%	8.1%
<b>Total</b>	<b>0.3%</b>	<b>13.1%</b>	<b>13.4%</b>

Source: CDM Smith based on TRANSEARCH® and IMPLAN®

TABLE 9: WATER IMPACTS BY ACTIVITY AND ECONOMIC MEASURE/TYPE

Measure and Type	Carriers	Shippers/ Receivers			Service and Trade
		OB/Intra	Inbound	Subtotal	
<b>Employment *</b>					
Direct	20	1,160	2,180	3,340	3,360
Indirect	50	940	790	1,730	1,780
Induced	20	790	760	1,550	1,570
<b>Total</b>	<b>90</b>	<b>2,900</b>	<b>3,730</b>	<b>6,630</b>	<b>6,720</b>
<b>Income **</b>					
Direct	\$2	\$128	\$138	\$266	\$268
Indirect	\$3	\$60	\$44	\$104	\$107
Induced	\$1	\$32	\$31	\$62	\$63
<b>Total</b>	<b>\$6</b>	<b>\$220</b>	<b>\$213</b>	<b>\$433</b>	<b>\$438</b>
<b>Value Added **</b>					
Direct	\$4	\$694	\$255	\$949	\$953
Indirect	\$5	\$109	\$77	\$187	\$191
Induced	\$2	\$62	\$60	\$123	\$124
<b>Total</b>	<b>\$10</b>	<b>\$864</b>	<b>\$394</b>	<b>\$1,258</b>	<b>\$1,269</b>
<b>Output **</b>					
Direct	\$17	\$1,936	\$653	\$2,589	\$2,606
Indirect	\$10	\$208	\$144	\$351	\$361
Induced	\$3	\$110	\$106	\$216	\$219
<b>Total</b>	<b>\$30</b>	<b>\$2,251</b>	<b>\$905</b>	<b>\$3,156</b>	<b>\$3,186</b>
<b>Tax Revenue **</b>					
Direct	\$0	\$21	\$15	\$36	\$36
Indirect	\$0	\$11	\$7	\$18	\$19
Induced	\$0	\$7	\$7	\$15	\$15
<b>Total</b>	<b>\$1</b>	<b>\$40</b>	<b>\$29</b>	<b>\$69</b>	<b>\$70</b>

\* employment rounded to nearest ten jobs, totals may not sum due to rounding

\*\*in millions of 2015 dollars

Source: CDM Smith based on TRANSEARCH® and IMPLAN®

TABLE 10: WATER IMPACTS, PERCENTAGE OF ECONOMY

Measure and Type	Carriers	Shippers/ Receivers	Total
<b>Employment</b>			
Direct	0.01%	1.2%	1.2%
<b>Total</b>	<b>0.03%</b>	<b>2.4%</b>	<b>2.4%</b>
<b>Income</b>			
Direct	0.01%	1.8%	1.8%
<b>Total</b>	<b>0.04%</b>	<b>2.9%</b>	<b>3.0%</b>
<b>Value Added</b>			
Direct	0.01%	3.5%	3.5%
<b>Total</b>	<b>0.04%</b>	<b>4.7%</b>	<b>4.7%</b>
<b>Output</b>			
Direct	0.03%	5.0%	5.0%
<b>Total</b>	<b>0.06%</b>	<b>6.1%</b>	<b>6.1%</b>
<b>Tax Revenues</b>			
Direct	0.01%	1.5%	1.5%
<b>Total</b>	<b>0.03%</b>	<b>2.8%</b>	<b>2.9%</b>

Source: CDM Smith based on TRANSEARCH® and IMPLAN®

TABLE II: PIPELINE IMPACTS BY ACTIVITY AND ECONOMIC MEASURE/TYPE

Measure and Type	Carriers	Shippers/ Receivers			Service and Trade
		OB/Intra	Inbound	Subtotal	
<b>Employment *</b>					
Direct	150	0	1,060	1,060	1,210
Indirect	110	0	1,340	1,340	1,450
Induced	100	0	1,130	1,130	1,220
<b>Total</b>	<b>360</b>	<b>0</b>	<b>3,530</b>	<b>3,530</b>	<b>3,890</b>
<b>Income **</b>					
Direct	\$17	\$0	\$182	\$182	\$199
Indirect	\$6	\$0	\$87	\$87	\$93
Induced	\$4	\$0	\$45	\$45	\$49
<b>Total</b>	<b>\$27</b>	<b>\$0</b>	<b>\$314</b>	<b>\$314</b>	<b>\$341</b>
<b>Value Added **</b>					
Direct	\$33	\$0	\$1,612	\$1,612	\$1,645
Indirect	\$8	\$0	\$153	\$153	\$161
Induced	\$8	\$0	\$89	\$89	\$97
<b>Total</b>	<b>\$49</b>	<b>\$0</b>	<b>\$1,855</b>	<b>\$1,855</b>	<b>\$1,903</b>
<b>Output **</b>					
Direct	\$62	\$0	\$4,004	\$4,004	\$4,066
Indirect	\$16	\$0	\$290	\$290	\$306
Induced	\$14	\$0	\$157	\$157	\$170
<b>Total</b>	<b>\$92</b>	<b>\$0</b>	<b>\$4,451</b>	<b>\$4,451</b>	<b>\$4,542</b>
<b>Tax Revenue **</b>					
Direct	\$11	\$0	\$74	\$74	\$86
Indirect	\$0	\$0	\$17	\$17	\$17
Induced	\$1	\$0	\$11	\$11	\$11
<b>Total</b>	<b>\$13</b>	<b>\$0</b>	<b>\$101</b>	<b>\$101</b>	<b>\$114</b>

\* employment rounded to nearest ten jobs, totals may not sum due to rounding  
 \*\*in millions of 2015 dollars

Source: CDM Smith based on TRANSEARCH® and IMPLAN®

TABLE 12: PIPELINE IMPACTS, PERCENTAGE OF ECONOMY

Measure and Type	Carriers	Shippers/ Receivers	Total
<b>Employment</b>			
Direct	0.05%	0.4%	0.4%
<b>Total</b>	<b>0.13%</b>	<b>1.3%</b>	<b>1.4%</b>
<b>Income</b>			
Direct	0.11%	1.2%	1.3%
<b>Total</b>	<b>0.18%</b>	<b>2.1%</b>	<b>2.3%</b>
<b>Value Added</b>			
Direct	0.12%	6.0%	6.1%
<b>Total</b>	<b>0.18%</b>	<b>6.9%</b>	<b>7.0%</b>
<b>Output</b>			
Direct	0.12%	7.7%	7.8%
<b>Total</b>	<b>0.18%</b>	<b>8.6%</b>	<b>8.7%</b>
<b>Tax Revenues</b>			
Direct	0.47%	3.1%	3.5%
<b>Total</b>	<b>0.53%</b>	<b>4.2%</b>	<b>4.7%</b>

Source: CDM Smith based on TRANSEARCH® and IMPLAN®