



PREPARED FOR
Northern Virginia Transportation Authority



12/12/2022

Economic Impact

Northern Virginia Transportation Authority Capital Investment



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1. Summary

Since Fiscal Year 2015,¹ the Northern Virginia Transportation Authority (NVTA or the Authority) has implemented six funding programs, with a total planned investment of \$3.1 billion using Regional Revenue Fund (70%) proceeds from FY2014 through FY2027 with project implementation from FY2015 through FY2034. In addition, total funding allocated through the Local Distribution Fund (30%) reached \$1.5 billion.² Adding NVTA Regional Revenue Fund programs and Local Distribution Fund projects, the total actual and planned investment of NVTA will reach \$4.6 billion from FY2015 through FY2034.

It is estimated that capital spending from NVTA's total investment (Regional Revenue Fund and Local Distribution Fund projects) will generate a total economic impact (direct, indirect, and induced) of \$6.5 billion (see Table 3.3) from FY2015 through FY2034, supporting 37,202 cumulative jobs in Northern Virginia.³ The estimated economic impact of NVTA total investment in Virginia will reach \$7.1 billion (direct, indirect, and induced) that will support 41,926 jobs in the state. For every dollar of NVTA total investment, there is a total economic return of \$1.60 to Northern Virginia and \$1.75 to the state of Virginia.⁴

One specific benefit of the total economic impact is tax revenue for the state and local governments. From FY2025 through FY2034, total NVTA investment will generate estimated tax revenue of \$100.1 million for the state government and \$5.6 million for local governments in Northern Virginia.⁵

As the United States is recovering from the COVID-19 pandemic, the national economy is experiencing a period of persistent inflation. The Federal Reserve has taken action through increasing U.S. interest rates significantly in 2022. There is speculation that the economy could be headed for a recession. Construction industries especially are experiencing the pressures of inflation, facing the challenge of rising construction costs and wages. NVTA funding could be affected within this climate. Although it may not necessarily suffer in the short term, if inflation persists and the U.S. economy slows down further, this funding could be significantly impacted.

¹ Fiscal Year 2015 is from July 1, 2014 to June 30, 2015.

² Please see Section 2 for details of the NVTA funding structure.

³ Please see Section 2 for a list of cities and counties in the Northern Virginia region.

⁴ The state economic impact is inclusive of that in Northern Virginia.

⁵ Tax revenue is part of the broader economic impact. State fiscal impact does not include tax revenue intended for local governments.

2. Background

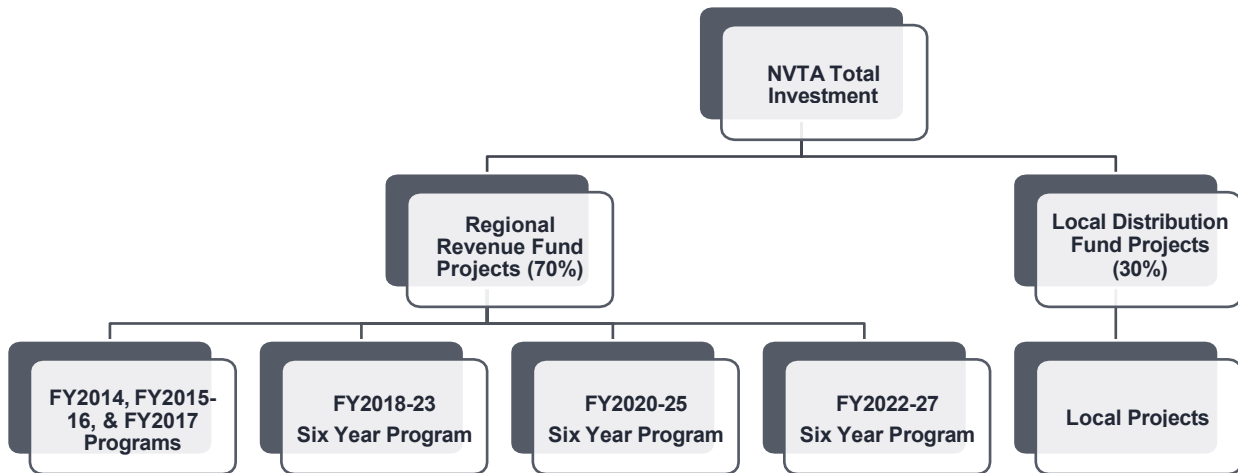
The Northern Virginia Transportation Authority (NVTA or the Authority) was created by the General Assembly of Virginia in 2002. The Authority is responsible for long-range planning of multimodal transportation projects in Northern Virginia.⁶ The member jurisdictions of the NVTA include the counties of Arlington, Fairfax, Loudoun, and Prince William; and cities of Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park.⁷

In 2013, the Virginia General Assembly passed legislation that authorized a dedicated funding stream—through regional increases in sales tax, transient occupancy tax, and grantor’s tax—for transportation projects in Northern Virginia. In 2018, the General Assembly redirected the proceeds of the regional increase in transient occupancy tax and grantor’s tax to meet funding commitments to the Washington Metropolitan Area Transit Authority (WMATA).

Subsequent General assembly sessions have sought to restore the \$102 million of NVTA revenue diverted to WMATA, through a partial restoration of the grantor’s tax, a fixed \$20 million per year transfer from the Commonwealth Transportation Fund and an annual allocation of 8.4% of funds available in the Interstate Operations and Enhancement Program Fund. The efforts are \$38.5 million short of full restoration.

In this report, the dedicated funding stream authorized by the General Assembly is referred to as the NVTA total investment. All funds received by the NVTA must be used for transportation purposes within the region. The Authority is responsible for developing Northern Virginia’s long-range, multimodal transportation plan, TransAction. Of the funds received annually, 70% must be used for regional transportation projects included in TransAction (referred to as Regional Revenue Fund projects in this report). After completing an annual certification process through the Authority, member jurisdictions receive their proportionate share of the remaining 30% of funding (Local Distribution Funds) for transportation purposes at their discretion. Figure 2.1 illustrates the funding structure for NVTA total investment.

Figure 2.1: NVTA Funding Structure



The Authority plans for and implements many projects through its Regional Revenue Fund programs. Three funding programs were developed before 2018, which are the FY2014, FY2015-16, and FY2017 programs. Total investment for projects in those programs reached \$657.7 million. In 2018, the NVTA adopted its inaugural Six Year Program (FY2018-23 Six Year Program), including multimodal transportation projects totaling \$1.3 billion of investments. In 2020, the NVTA adopted an update to the Six Year Program, the FY2020-25 Six Year Program, with planned investments of \$539.1 million.

⁶ NVTA website, accessed October 2022, <http://thenovaauthority.org/about/the-authority/>.

⁷ These cities and counties are collectively referred to as Northern Virginia in this report.

In 2022, the FY2022-27 Six Year Program was adopted, with total planned investments of \$625.1 million.⁸ In addition, local governments are planning their own project investments through the use of the Local Distribution Fund revenues.

In 2018 and 2021, Chmura Economics & Analytics (Chmura)⁹ completed two economic and fiscal impact studies of the NVTA investment programs in Northern Virginia and the Commonwealth of Virginia. In 2022, Chmura was once again retained to update the economic impact analysis of NVTA investment, with a focus on the FY2022-27 Six Year Program. In this study, Chmura presents the economic impact of NVTA's FY2022-27 Six Year Program, all NVTA Regional Revenue Fund programs, as well as NVTA total investment (including Local Distribution Fund projects). This study only quantifies the economic impact of capital expenditure activities, as broader data on the ongoing benefits of the NVTA investment are not available.¹⁰

The economic impact of capital expenditure from NVTA's transportation investment is analyzed in the following three categories of impact: direct, indirect, and induced.¹¹ Direct impact measures the actual dollar amount spent on transportation projects in Northern Virginia and Virginia. Indirect and induced impacts measure the secondary benefits of NVTA capital spending for state and regional businesses. For example, indirect impacts are attributed to state and regional industries supporting construction activities, such as site development and heavy equipment deployment. Induced impacts occur when individuals hired by the construction firms spend their income at regional or state businesses (such as retailers or doctor's offices), thus injecting more money into the regional and state economies.

The indirect and induced impacts are estimated with IMPLAN software after the direct impact is estimated. IMPLAN is an economic impact assessment modeling system allowing the user to estimate the impact of economic changes in states and communities. It is one of the most widely used economic impact software packages. IMPLAN is updated annually and is customized for individual localities—thus providing a realistic picture of the impact of an economic change on local economies.

⁸ The total investment amount does not include the Local Distribution Fund proceeds unless allocated to a specific project.

⁹ Chmura provides economic software, consulting, and data so clients can make informed decisions that benefit their communities. Our PhD economists, data scientists, and strategic planners guide clients through their local labor market. Over the past 24 years, Chmura has served hundreds of clients nationwide with thoroughness, accuracy, and objectivity.

¹⁰ The 2018 report prepared by Chmura included a qualitative discussion of such benefits.

¹¹ Appendix 1 of this study provides a glossary including these terms.

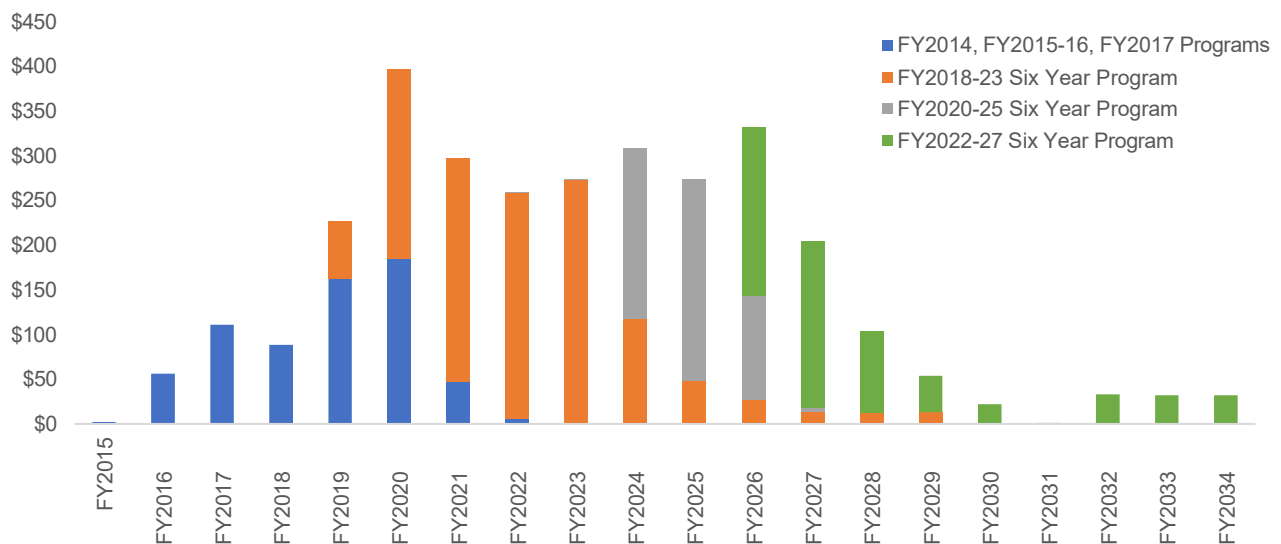
3. Economic Impact of NVTA Total Investment

3.1. Economic Impact of NVTA Regional Revenue Fund Programs

The newly approved NVTA FY2022-27 Six Year Program includes investment totaling \$625.1 million for multimodal transportation projects. This plan’s spending is expected to occur from FY2026 through FY2034 (Figure 3.1).¹² The prior two Six Year Programs had a total investment of \$539.1 million (the FY2020-25 Six Year Program), and \$1.3 billion (the FY2018-23 Six Year Program). In addition, NVTA’s FY2014, FY2015-16, and FY2017 programs included projects with a total investment of \$657.7 million.¹³

These programs overlap in certain years. For example, the total investment in FY2022 was \$259.3 million, and this amount includes projects that carried over from the FY2014 through FY2017 programs, as well as from the FY2018-23 and FY2022-25 Six Year Programs. NVTA funding programs cover a variety of transportation projects across Northern Virginia, including construction of transit facilities, bike/pedestrian facilities and necessary parking, transit equipment installation, road and bridge construction, transportation technology deployment, and capital asset acquisition.

Figure 3.1: Total Capital Expenditure for NVTA Regional Revenue Fund Programs (70% Regional Funds, Million)



The total investment presented in Figure 3.1 only includes NVTA projects with 70% Regional Revenue Fund proceeds. The 30% Local Distribution Fund proceeds are not part of this investment. The available data indicate that total funding allocated to local jurisdictions, through all programs, will amount to \$1.5 billion from FY2014 through FY2027 and the projects are expected to be completed by FY2034¹⁴. Adding Regional Revenue Fund and Local Distribution Fund projects, the total actual and planned investment of NVTA (NVTA total investment) will reach \$4.6 billion from FY2015 through FY2034.

¹² Please note that while the plan is called the Six Year Program, actual spending of funds may occur over more than six years.
¹³ In the analysis, the impacts are estimated based on the year in which the project spending occurs, not the program year. For example, the NVTA FY2020-25 Six Year Program includes capital expenditure from FY2024 through FY2027.
¹⁴ According to NVTA, some of this funding is not allocated yet. The annual amounts are not available for local projects.

3.1.1. Economic Impact of NVTA’s FY2022-27 Six Year Program

Table 3.1 presents the estimated economic impact of the NVTA’s FY2022-27 Six Year Program. The total planned investment is \$625.1 million. Chmura excludes 62% of the right-of-way cost as it involves a property transfer which makes the economic impact analysis difficult to quantify. Approximately 38% of the right-of-way cost is related to utility work, which is included in the analysis.¹⁵ Chmura further excludes the estimated spending outside the region. The resulting direct spending in Northern Virginia is estimated to be \$575.2 million (in nominal dollars), which will be spent from FY2026 through FY2034.

Table 3.1: Economic Impact of NVTA FY2022-27 Six Year Program

			Direct	Indirect	Induced	Total Impact
Northern Virginia	Cumulative (FY2026-34)	Spending (Million)	\$575.2	\$169.3	\$191.5	\$936.0
		Employment	2,569	705	1,097	4,371
	Annual Average (FY2026-34)	Spending (Million)	\$63.9	\$18.8	\$21.3	\$104.0
		Employment	285	78	122	486
Virginia	Cumulative (FY2026-34)	Spending (Million)	\$576.3	\$223.6	\$194.4	\$994.3
		Employment	2,614	927	1,241	4,782
	Annual Average (FY2026-34)	Spending (Million)	\$64.0	\$24.8	\$21.6	\$110.5
		Employment	290	103	138	531

Note: Numbers may not sum due to rounding.

Source: IMPLAN 2020 and Chmura

It is estimated that capital expenditure from NVTA’s FY2022-27 Six Year Program will generate a total economic impact (direct, indirect, and induced) of \$936.0 million in Northern Virginia, supporting a total of 4,371 cumulative jobs.¹⁶ Of the total economic impact, \$575.2 million is estimated to be direct spending within Northern Virginia, with direct cumulative jobs amounting to 2,569 from FY2026 through FY2034, or 285 per year. The cumulative indirect impact in Northern Virginia is estimated to be \$169.3 million that will support 705 cumulative jobs, or 78 per year, in industries related to construction, such as site preparation, truck transportation, and congestion-relieving technology. The cumulative induced impact is expected to total \$191.5 million with 1,097 cumulative jobs, or 122 per year, in the region. These jobs will be concentrated in consumer service-related industries such as restaurants, hospitals, and retail stores. From FY2026 through FY2034, the annual average economic impact of NVTA’s capital expenditure is estimated to total \$104.0 million that will support 486 jobs in Northern Virginia.

The economic impact of NVTA’s Six Year Program in Virginia is larger than in Northern Virginia, as businesses elsewhere in the state will also benefit from NVTA’s investment activities. It is estimated that from FY2026 through FY2034, the annual average statewide impact will reach \$110.5 million (direct, indirect, and induced) that will support 531 jobs in Virginia.¹⁷

3.1.2. Economic Impact of NVTA Regional Revenue Fund Programs (FY2014 Program through FY2022-27 Six Year Programs)

Combining economic impacts from the FY2022-27 Six Year Program, the FY2020-25 Six Year Program, the FY2018-23 Six Year Program, and NVTA’s FY2014, FY2015-16, and FY2017 programs, Table 3.2 summarizes the economic impact of all NVTA funding programs since NVTA started receiving dedicated funding. In Northern Virginia, from FY2015 through

¹⁵ Source: NVTA.

¹⁶ Please note that the cumulative jobs are the sum of jobs in each year. For example, a construction worker involved with the project for two years equals two cumulative jobs.

¹⁷ The economic impact in Virginia is inclusive of the impact in Northern Virginia.

FY2034, the estimated capital expenditure will generate a total economic impact (direct, indirect, and induced) of \$4.2 billion, supporting 22,447 cumulative jobs. On an annual average basis, the economic impact of all NVTA Regional Revenue fund programs is estimated to be \$211.4 million that will support 1,122 jobs in Northern Virginia from FY2015 through FY2034.

Table 3.2: Economic Impact of NVTA Regional Revenue Fund Programs (FY2014 through FY2022-27 Programs)

			Direct	Indirect	Induced	Total Impact
Northern Virginia	Cumulative (FY2015-34)	Spending (Million)	\$2,643.8	\$764.6	\$819.4	\$4,227.9
		Employment	13,301	3,602	5,544	22,447
	Annual Average (FY2015-34)	Spending (Million)	\$132.2	\$38.2	\$41.0	\$211.4
		Employment	665	180	277	1,122
Virginia	Cumulative (FY2015-34)	Spending (Million)	\$2,652.0	\$1,010.3	\$913.3	\$4,575.6
		Employment	13,723	4,788	6,452	24,964
	Annual Average (FY2015-34)	Spending (Million)	\$132.6	\$50.5	\$45.7	\$228.8
		Employment	686	239	323	1,248

Note: Numbers may not sum due to rounding.

Source: IMPLAN 2020 and Chmura

The economic impact of NVTA projects is larger in Virginia than in Northern Virginia, and the annual average statewide impact is estimated to reach \$228.8 million (direct, indirect, and induced) that will support 1,248 jobs in Virginia from FY2015 through FY2034.

3.2. Economic Impact of NVTA Total Investment, Including 30% Local Fund Projects

The economic impact analyzed above includes only NVTA funding programs supported by regional revenue funds, which account for 70% of the total funding stream allocated by the state legislation. The 30% funding allocated to local jurisdictions also generates a sizable impact in Northern Virginia and Virginia.

Table 3.3: Economic Impact of NVTA Total Investment

			Direct	Indirect	Induced	Total Impact
Northern Virginia	Cumulative (FY2015-34)	Spending (Million)	\$4,057.6	\$1,085.2	\$1,340.0	\$6,482.9
		Employment	22,813	5,357	9,032	37,202
	Annual Average (FY2015-34)	Spending (Million)	\$202.9	\$54.3	\$67.0	\$324.1
		Employment	1,141	268	452	1,860
Virginia	Cumulative (FY2015-34)	Spending (Million)	\$4,073.3	\$1,444.7	\$1,590.1	\$7,108.1
		Employment	23,656	7,152	11,117	41,926
	Annual Average (FY2015-34)	Spending (Million)	\$203.7	\$72.2	\$79.5	\$355.4
		Employment	1,183	358	556	2,096

Note: Numbers may not sum due to rounding.

Source: IMPLAN 2020 and Chmura

Adding the impact from local projects, Table 3.3 summarizes the economic impact of total NVTA investments. In Northern Virginia, from FY2015 through FY2034, it is estimated that capital spending from NVTA total investments will generate a total economic impact (direct, indirect, and induced) of \$6.5 billion, supporting 37,202 cumulative jobs in the region. On an annual average basis, the economic impact of NVTA total investment is estimated to be \$324.1 million that will support 1,860 jobs in Northern Virginia from FY2015 through FY2034. The economic impact of NVTA total investments in the state is larger than in Northern Virginia, and the annual average statewide impact will reach \$355.4 million (direct, indirect, and induced) that will support 2,096 jobs in Virginia.

4. Fiscal Impact

NVTA investments also generate tax revenue for local and state governments. To be conservative, only tax revenue from the direct impact is estimated in this section.¹⁸

For capital expenditure activities, local governments collect business, professional, and occupational license (BPOL) tax, and the state government collects individual and corporate income taxes. Chmura used the average BPOL tax rates of all local governments in Northern Virginia to calculate BPOL tax revenue, which is an estimated \$0.8 million for the FY2022-27 Six Year Program. When including all NVTA Regional Revenue Fund programs, the total BPOL tax is estimated to be \$3.9 million from FY2015 through FY2034. Finally, adding local projects, local tax revenue from all NVTA investment is estimated to be \$5.6 million from FY2015 through FY2034 (Table 4.1).

Table 4.1: State and Local Fiscal Impacts (Million)

	Impact Years	Northern Virginia		Virginia	
		Cumulative Tax Revenue	Annual Average	Cumulative Tax Revenue	Annual Average
NVTA FY2022-27 Six Year Program	FY2026-34	\$0.8	\$0.1	\$12.4	\$1.4
All NVTA Regional Revenue Fund Programs (FY2015, FY2015-16, FY2017, FY2018-23, FY2020-25)	FY2015-34	\$3.9	\$0.2	\$60.5	\$3.0
NVTA Total Investment (NVTA Regional Revenue Fund Programs & Local Distribution Fund Projects)	FY2015-34	\$5.6	\$0.3	\$100.1	\$5.0

Source: Chmura

For the Virginia state government, revenue originates from individual and corporate income taxes as a result of new employment and profits from capital expenditure. The total state tax revenue is estimated to be \$12.4 million from FY2026 through FY2034, from planned investment based on the FY2022-27 Six Year Program. Including all NVTA Regional Revenue fund programs, total state tax is estimated to be \$60.5 million. Finally, adding local projects, total NVTA investment can generate an estimated tax revenue of \$100.1 million for the state from FY2015 through FY2034.

¹⁸ This approach is recommended by Burchell and Listokin in *The Fiscal Impact Handbook*. The fiscal impact is part of the broader economic impact estimated in Section 3.

5. Other Impacts

The national economy is in constant transition, which affects operations of NVTA and the implementation of its projects. Since 2020, the dominating influencer on the U.S. economy has been the COVID-19 pandemic, which disrupted industries such as tourism and transportation.¹⁹ In 2022, the economy continues its recovery from the pandemic the associated recession of 2020. However, another serious issue has emerged—the threat of another recession due to persistent inflation and subsequent policy measures to control it. This section provides a qualitative discussion of inflation’s effect on potential NVTA funding revenue and construction costs, as well as other potential impacts.

Inflation is defined as a general increase in prices in the broad economy and a corresponding drop in the purchasing power of money.²⁰ The latest data from the Bureau of Labor Statistics (BLS) show that as of September 2022, the U.S. annual inflation rate, measured by the Consumer Price Index (CPI), increased 8.3% from one year prior. This rate is much higher than the target 2.0% inflation rate that the Federal Reserve intends to maintain.²¹ For the first three quarters of 2022, the average CPI was also 8.3% higher than one year prior.

CPI is a measure of the price level faced by consumers. For businesses such as those in the construction industry, the Producer Price Index (PPI) is a more apt price measure. PPI shows that when compared to consumers, businesses face even larger price increases. The latest data from the BLS show that PPI increased 10.3% from one year prior, for the first three quarters of 2022.²² Similarly, BLS data also showed the average price of commodities related to construction was 18.1% higher than one year prior for the first three quarters of 2022.

The cost of construction labor is increasing as well, especially during the COVID-19 pandemic in 2020 and 2021. This challenge is unlikely to be resolved in the near future. Data from the first two quarters of 2022 indicate that the average wage for all U.S. industries increased 5.0% from one year prior, while the average wage in the construction industry grew 7.4%.²³ Since wages can account for greater than 50% of overall construction costs, the impact of higher labor costs can have an acute influence on the profitability of a construction project.²⁴

During the COVID-19 pandemic, supply chain issues and a labor shortage impacted the construction industry, causing delays in the implementation of certain projects. Inflation adds even more challenges to the construction industry. In this environment, not only are essential materials and skilled labor more expensive, but supply chain pressures and shortages are limiting access to construction materials. As a result, inflation is not only limiting a project’s profitability, but it can persuade owners to either forgo construction or delay the start of projects.²⁵

To combat inflation, the Federal Reserve increased interest rates several times this year. This has impacted the construction industry, as this industry is particularly sensitive to higher interest rates. At the end of October 2022, the 30-year mortgage rate reached 6.9%, the highest since April 2002. The rate was only 3.1% one year earlier.²⁶ This makes financing future commercial projects more expensive than before. It is expected that private investment in residential and commercial

¹⁹ The 2020 Chmura report provides a discussion of the COVID-19 impact on transportation.

²⁰ iQuasar LLC, “Weathering the Inflation Storm in Construction Industry”, accessed October 21, 2022, <https://iquasar.com/blog/inflation-in-construction-industry/>.

²¹ Bureau of Labor Statistics, “CPI for All Urban Consumers”, accessed October 21, 2022, <https://data.bls.gov/pdq/SurveyOutputServlet>.

²² Bureau of Labor Statistics, “PPI for All Commodities”, accessed October 21, 2022, <https://data.bls.gov/pdq/SurveyOutputServlet>.

²³ JobsEQ by Chmura.

²⁴ Kelly Outram, “Inflation: The impact on the construction sector”, Marsh, published June 10, 2022, <https://www.marsh.com/us/industries/construction/insights/inflation-the-impact-on-the-construction-sector.html#:~:text=Rates%20of%20inflation%20are%20increasing,to%20secure%20needed%20construction%20materials>.

²⁵ Chris Barnett, “Inflation, material delays, labor issues: Pros face a trifecta of pricing woes”, Construction Dive, published March 4, 2022, <https://www.constructiondive.com/news/inflation-delivery-delays-labor-issues-contractors-trifecta-price-woes/619578/>.

²⁶ Federal Reserve Bank of St Louis, “30-Year Fixed Rate Mortgage Average in the United States”, accessed October 21, 2022, <https://fred.stlouisfed.org/series/MORTGAGE30US>.

construction will slow in this high-interest environment. This slowdown due to rising interest rates may free up labor and materials from private-sector builders thereby providing NVTA with the resources to complete its projects. In other words, since funding for NVTA projects is from dedicated tax revenue and not through private financing, NVTA may find construction materials and labor are comparatively more readily available as private construction slows.

Regarding the impact of inflation on NVTA funding, it can affect NVTA funding in two ways. NVTA's funding is based on a percentage of sales tax. First, as prices of many products and services go higher, nominal retail sales amounts may increase even as consumers start reducing their purchases of various goods and services. As a result, it is unlikely NVTA funding will decline significantly in the short term. Second, there is a risk that with the interest rate hikes imposed by the Federal Reserve, the U.S. economy may enter a recession in 2023. A potential recession, coupled with falling inflation, may negatively impact NVTA funding in the future.

Inflation, high interest rates, and a potential recession will present challenges and opportunities for regional transportation organizations such as NVTA. While reliance on state tax revenue may provide insulation from direct changes in the market area over the short term, the organization needs to be both flexible and prepared for the economic forces over the long term.

Appendix: Impact Study Glossary

Input-Output Analysis—an examination of business-business and business-consumer economic relationships capturing all monetary transactions in a given period, allowing one to calculate the effects of a change in an economic activity on the entire economy (impact analysis).

Direct Impact—economic activity generated by a project or operation. For construction, this represents activity of the contractor; for operations, this represents activity by tenants of the property.

Overhead—construction inputs not provided by the contractor.

Indirect Impact—secondary economic activity that is generated by a project or operation. An example might be a new office building generating demand for parking garages.

Induced (Household) Impact—economic activity generated by household income resulting from direct and indirect impacts.

Ripple Effect—the sum of induced and indirect impacts. In some projects, it is more appropriate to report ripple effects than indirect and induced impacts separately.

Multiplier—the cumulative impacts of a unit change in economic activity on the entire economy.

