

NATIONAL CAPITAL REGION FREIGHT PLAN - **DRAFT** EXECUTIVE SUMMARY

August 2023

DRAFT



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ABOUT THE TPB

The National Capital Region Transportation Planning Board (TPB) is the federally designated metropolitan planning organization (MPO) for metropolitan Washington. It is responsible for developing and carrying out a continuing, cooperative, and comprehensive transportation planning process in the metropolitan area. Members of the TPB include representatives of the transportation agencies of the states of Maryland and Virginia and the District of Columbia, 23 local governments, the Washington Metropolitan Area Transit Authority, the Maryland and Virginia General Assemblies, and nonvoting members from the Metropolitan Washington Airports Authority and federal agencies. The TPB is staffed by the Department of Transportation Planning at the Metropolitan Washington Council of Governments (COG).

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SUMMARY OF KEY POINTS

The National Capital Region Freight Plan (the Plan) describes the role freight transportation plays in the region's economy, provides an overview of the region's multimodal freight transportation system, describes the drivers of freight demand and the freight flows resulting from it, identifies the most significant freight issues and trends impacting the region, and provides recommendations to ensure the multimodal freight transportation system continues to support the economy of the region and the quality of life of its residents and visitors.

The Plan is a technical reference and serves as a foundation for future regional freight planning activities and sets the stage for freight to be considered in the region's federally-recognized metropolitan long-range transportation plan (Visualize 2045 and its successors) and other regional planning activities.

The following are key points from the Plan:

1. Freight movement in the region is shaped by regional policies (such as those articulated in Visualize 2045), state-level policies, and federal priorities and performance measures enacted by the Infrastructure Investment and Jobs Act (2021). See [Section 1](#) for an overview of what these policies and requirements mean for freight planning in the region.
2. Commercial trucking remains the dominant freight transportation mode in the region. In 2020, commercial trucking accounted for 73 percent of the region's freight transported by value and 72 percent of the region's freight transported by weight. See [Section 2](#) for more details.
3. Since the 2016 Freight Plan, technological trends, evolving supply chain and logistics patterns, and impacts from the COVID-19 pandemic have altered how freight is transported. See [Section 4](#) for an overview of how these changes are impacting goods movement in the region.
4. Proactively managing freight movement and delivery at the regional and local levels is critical as the region's population continues to grow and demand for goods increases. The National Capital Region Transportation Planning Board is committed to better understanding the community impacts of freight movement in the region to help local jurisdictions accommodate freight needs, sustain the health and wellbeing of residents and visitors, and to mitigate negative community impacts from freight movement. See [Section 5.3](#) for more details.
5. Freight movement remains vital to the economy of the National Capital Region and to the quality of life of its residents.

INTRODUCTION

The National Capital Region's multimodal transportation system is vital to the economy of the region and to the quality of life of its residents. It connects people and businesses to important regional activity centers and to major domestic and international markets.

The National Capital Region Transportation Planning Board (TPB) as the Metropolitan Planning Organization (MPO) for metropolitan Washington has an important role to play in ensuring that the regional transportation system continues to be responsive to and supportive of the freight demands placed upon it by its residents, businesses, and visitors.

The National Capital Region Freight Plan (the Plan) describes the role freight transportation plays in the region's economy, provides an overview of the region's multimodal freight transportation system, describes the drivers of freight demand and the freight flows resulting from it, identifies the most significant freight issues in the region, and provides recommendations to ensure the multimodal freight transportation system continues to support the economy of the region and the quality of life of its residents and visitors. The Plan serves as a foundation for future regional freight planning activities and builds on the results of the original National Capital Region Freight Plan adopted in 2010, and the Update adopted in 2016.

This Executive Summary contains key highlights from the Plan; see the full Plan document for details and additional information.

Freight Planning in the National Capital Region

The TPB adopted Visualize 2045, the National Capital Region's long-range transportation plan in 2022. Visualize 2045 details how the TPB and its members tackle transportation challenges facing the region, gather public opinion, and advance the most effective strategies to make progress on the region's transportation goals. A key freight policy goal of Visualize 2045 is that by addressing the congestion and mobility challenges forecast for the region, the LRTP's proposed initiatives will improve the ability of the transportation system to respond to the needs of freight movement. Additionally, Visualize 2045 identifies two freight-related planning factors and two freight-related planning goals, and identifies trends and strategies to direct freight planning in the region. The freight components in Visualize 2045 are also informed by previous TPB documents such as the 1998 TPB Transportation Vision and 2014 Regional Transportation Priorities Plan, and complements freight planning activities undertaken by state agencies and member jurisdictions.

The TPB considers freight in its overall metropolitan transportation planning process and addresses freight issues within its Long-Range Transportation Plan (Visualize 2045) as well as its Transportation Improvement Program (TIP). Federal regulations require that the transportation planning processes of Metropolitan Planning Organizations (MPOs) such as the TPB provide for consideration and implementation of projects, strategies, and services that support economic vitality, increase accessibility and mobility of freight, and enhance the integration and connectivity of the transportation system for freight (among other requirements).¹

¹ 23CFR § 450.306 Scope of the metropolitan transportation planning process.

MULTIMODAL FREIGHT TRANSPORTATION SYSTEM

The region's multimodal freight transportation system consists of:

- More than 17,000 lane miles of highways and major roadways² carrying more than 160 million tons of goods annually³.
- Two Class I railroads – CSX Transportation and the Norfolk Southern Corporation – operating over 250 miles⁴ of mainline track and carrying more than 6.7 million tons⁵ of local freight annually.
- Two major cargo airports – Washington Dulles International Airport and Baltimore Washington International Thurgood Marshall Airport.
- An extensive pipeline network that carries more than 48 million tons⁶ of freight per year.
- A number of key intermodal connectors – short roadway segments that tie rail terminal facilities, airports, and pipeline terminal facilities to the National Highway System (NHS).

The region's highway system is organized into the following categories:⁷

- Interstate⁸ - More than 200 miles that connect the region to the rest of the nation.
- Primary⁹ – More than 1,000 miles that connect communities within the region to each other and to the Interstates.
- Secondary¹⁰ – More than 2,000 miles of collector roads that connect local streets to primary roadways.
- Local¹¹ – More than 100,000 miles of local streets.

The region's highway network is publicly owned, and the majority of truck freight is moved over the Interstate and primary highway systems. However, the trucks and trailers using that network are privately owned.

² Visualize 2045: A Long-Range Transportation Plan for the National Capital Region. Page 40.

³ Federal Highway Administration Freight Analysis Framework for year 2020.

⁴ Visualize 2045: A Long-Range Transportation Plan for the National Capital Region. Page 40.

⁵ Federal Highway Administration Freight Analysis Framework for year 2020.

⁶ Federal Highway Administration Freight Analysis Framework for year 2020.

⁷ Facility types 4 (Ramp) and 5 (Non-Mainline) and 6 (Non-Inventory Direction) and 7 (Planned/ Unbuilt) were excluded from Interstate and Primary roadway mileage.

⁸ Interstate roadway mileage includes functional system 1 (Interstate).

⁹ Primary roadway mileage includes functional system 2 (principal arterial-other freeways and expressways), functional system 3 (principal arterial-other) and functional system 4 (minor arterials).

¹⁰ Secondary roadway mileage includes functional system 5 (major collectors) and functional system 6 (major collectors).

¹¹ Local street mileage includes functional system 7 (local).

Highway Freight

REGIONALLY SIGNIFICANT HIGHWAY FREIGHT NETWORK

Certain components of the region's highway system are particularly important for goods movement. Each of the region's member states, Maryland, Virginia, and the District of Columbia have identified a designated truck network linking major freight shipping and receiving areas and accommodating through state freight movement. Within the region, most of these state designated truck routes are represented by Interstate highways and major arterials. At the regional level, the importance of roadways other than state designated truck routes is also recognized. These regionally freight-significant roadways function as important connectors between retail establishments, warehouse and distribution centers, and state-designated truck routes.

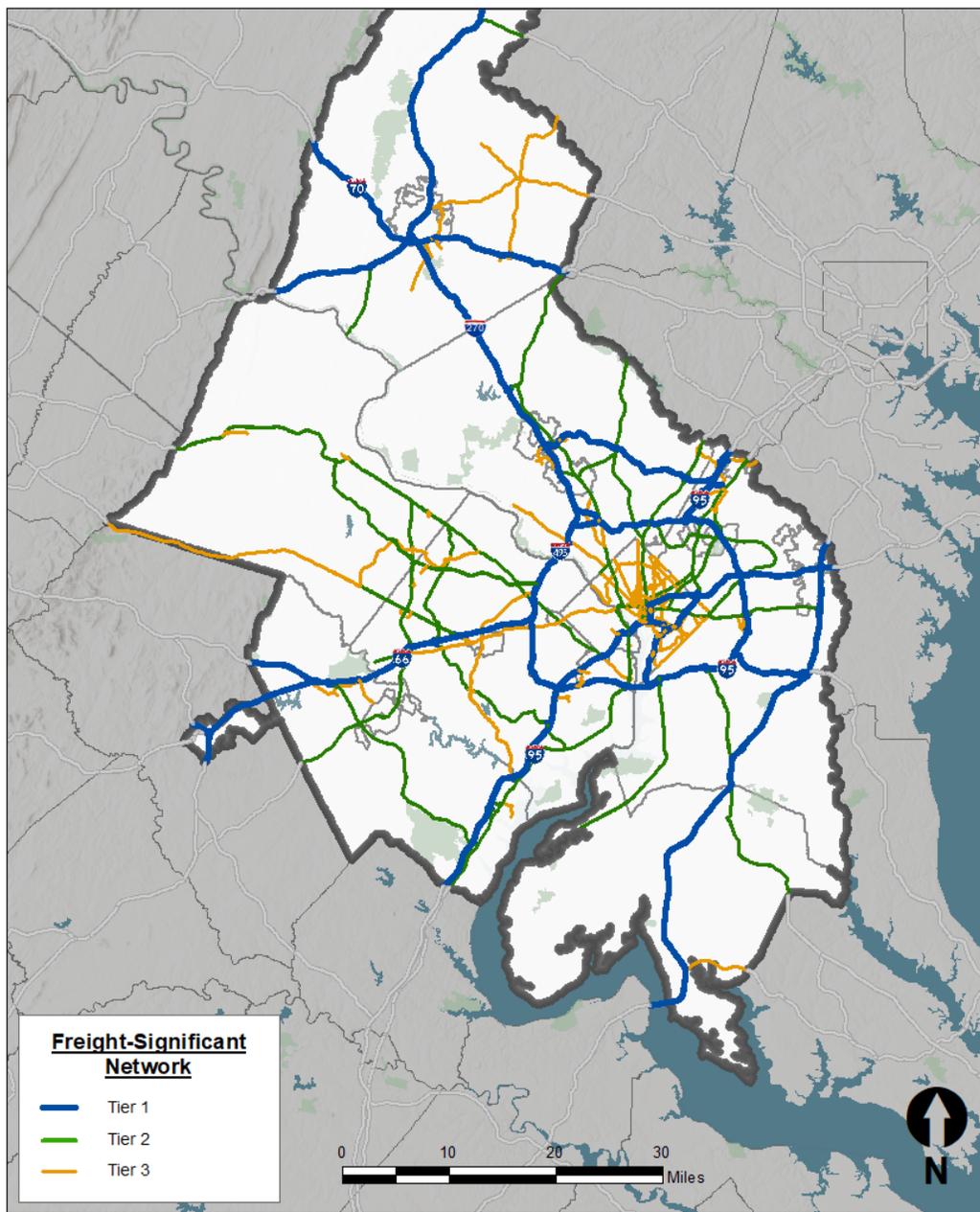
TPB staff, in consultation with the TPB Freight Subcommittee, identified a network of these freight-important roadways using a combination of data analysis and collective expertise. This Plan designates and updates the Regionally Significant Highway Freight Network (see Section 2.2.1). The resulting regional freight significant network is organized into three tiers.

- **Tier 1:** Roadways in this tier include state-designated truck routes, Interstates, and other high-volume roadways. These roads are how most freight enters and leaves the region and are typically used by pass-through trucks.
- **Tier 2:** Roadways in this tier allow trucks to permeate the region and provide access to important freight generators and attractors.
- **Tier 3:** Roadways in this tier provide last mile connectivity.

The regional freight significant network includes truck-allowed routes that are important for the movement of goods throughout the region. The freight significant network is intended for regional data analysis and is not promoted as truck routes in the same way that officially state-designated truck routes are. The primary purpose of developing the regional freight-significant network is to facilitate performance monitoring. For example, congestion can be measured on the freight significant network and compared to that of the overall region. Similar comparisons can be made for pavement condition, bridge condition, or safety.

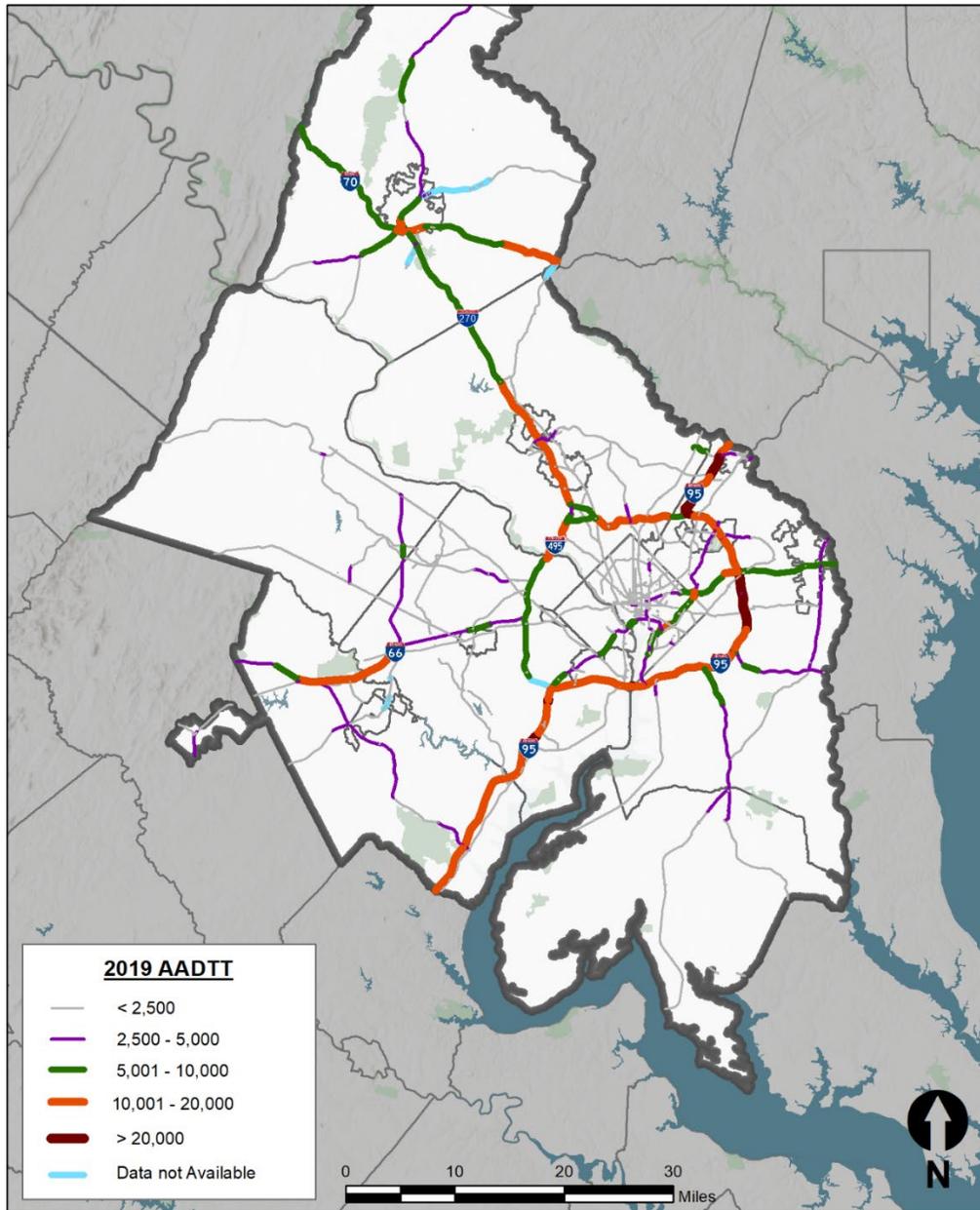
The regional freight-significant network is shown in Figure 1. Detailed maps highlighting portions of the freight significant network can be found in Appendix A. Figure 2 shows the average annual daily truck traffic (AADTT) in the region, with a dark red representing roadways with the most significant truck volume (AADTT exceeding 20,000), including I-95 and portions of I-495 in Prince George's County. All sections of I-95 in the region exceed 10,000 AADTT, as does the majority of I-495; segments of I-270 in Montgomery County, I-66 in Prince William County, I-70 near Frederick, and U.S. Route 50 in Prince George's County averaging between 10,000 and 20,000 AADTT.

Figure 1: Regionally Significant Highway Freight Network



Source: Metropolitan Washington Council of Governments GIS Data, 2023

Figure 2: Average Annual Daily Truck Traffic

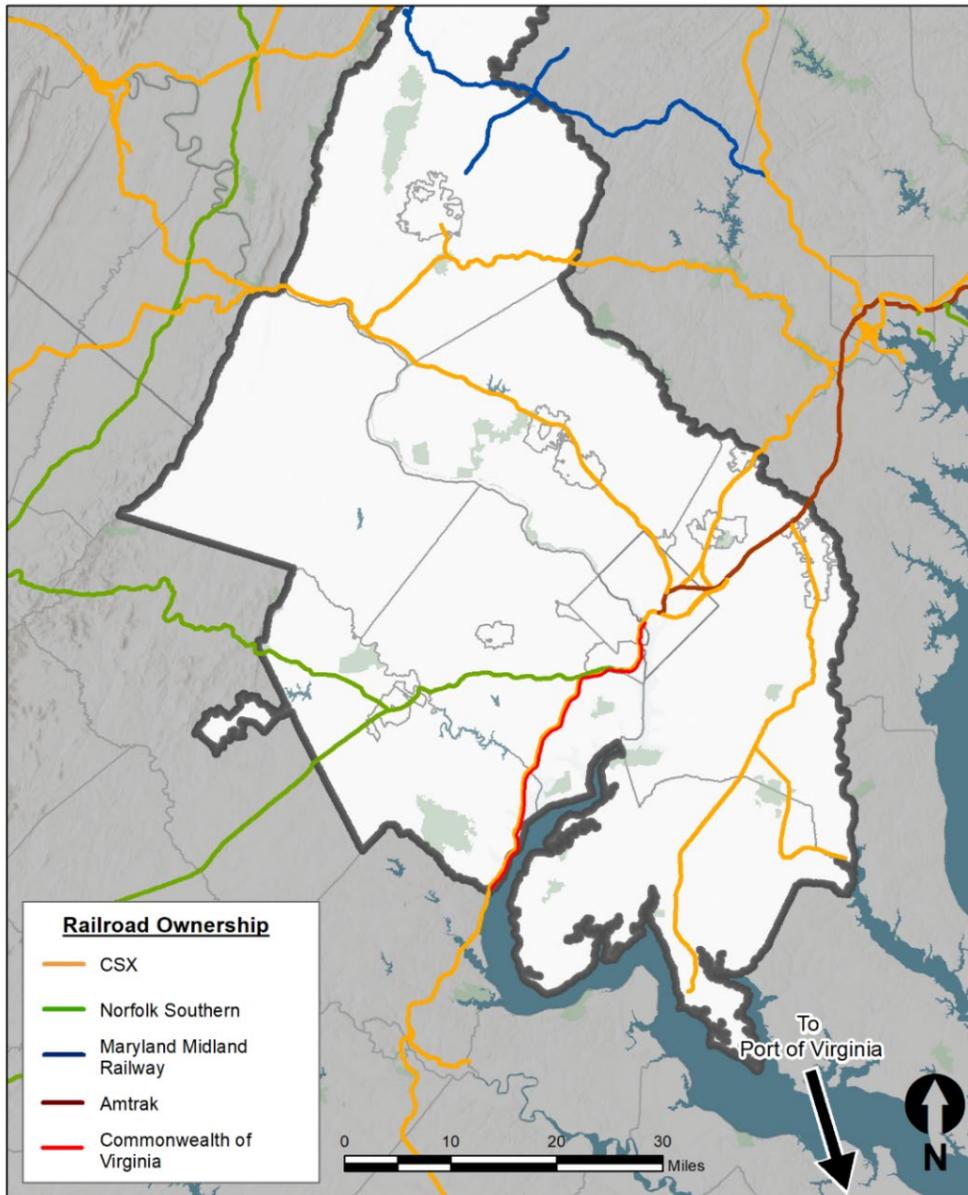


Source: 2019 Highway Performance Monitoring System Public Release Data from USDOT GIS Server (planning purposes only).

Rail Freight

The region's rail system consists of more than 300 miles of mainline track, most of which are operated by two railroads – CSX and the Norfolk Southern Corporation. Additionally, the region is served by Maryland Midland Railway, a short line operating in Frederick County, Maryland. Three passenger systems – Amtrak, Virginia Railway Express, and the Maryland Area Regional Commuter (MARC) – also operate over the region's freight rail system.

Figure 3: Regional Freight Rail Network

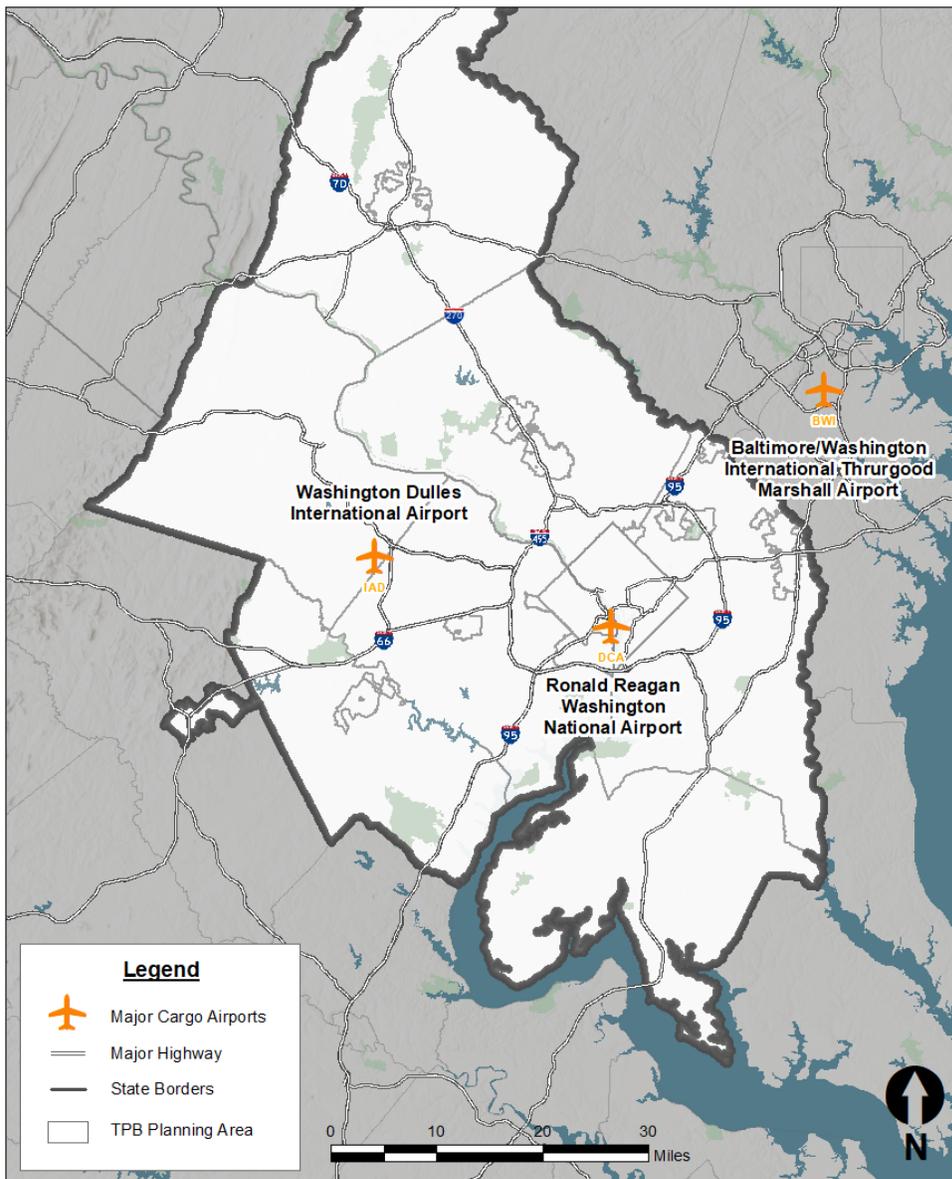


Source: Metropolitan Washington Council of Governments

Air Cargo

Most of the air cargo in the region is handled at Washington Dulles International Airport (Dulles) and Baltimore/Washington Thurgood Marshall International Airport (BWI), while Ronald Reagan Washington National Airport handles small amounts of air cargo. Of the National Capital Region's three commercial airports, BWI processes the greatest amount of air cargo based on the latest data obtained for this Plan. BWI is a regional hub for Amazon Air, and in 2019 expanded its Midfield Cargo complex, creating new storage, rehabilitating taxiways, and constructing a new runway connector. In 2021, BWI processed more than 276,000 metric-tons of freight, an increase attributed to an uptick in online shopping due to the COVID-19 pandemic. Amazon is responsible for a significant portion of freight processed at BWI, accounting for 52% of total air cargo processed in 2021.

Figure 4: Major Cargo Airports Serving the Region

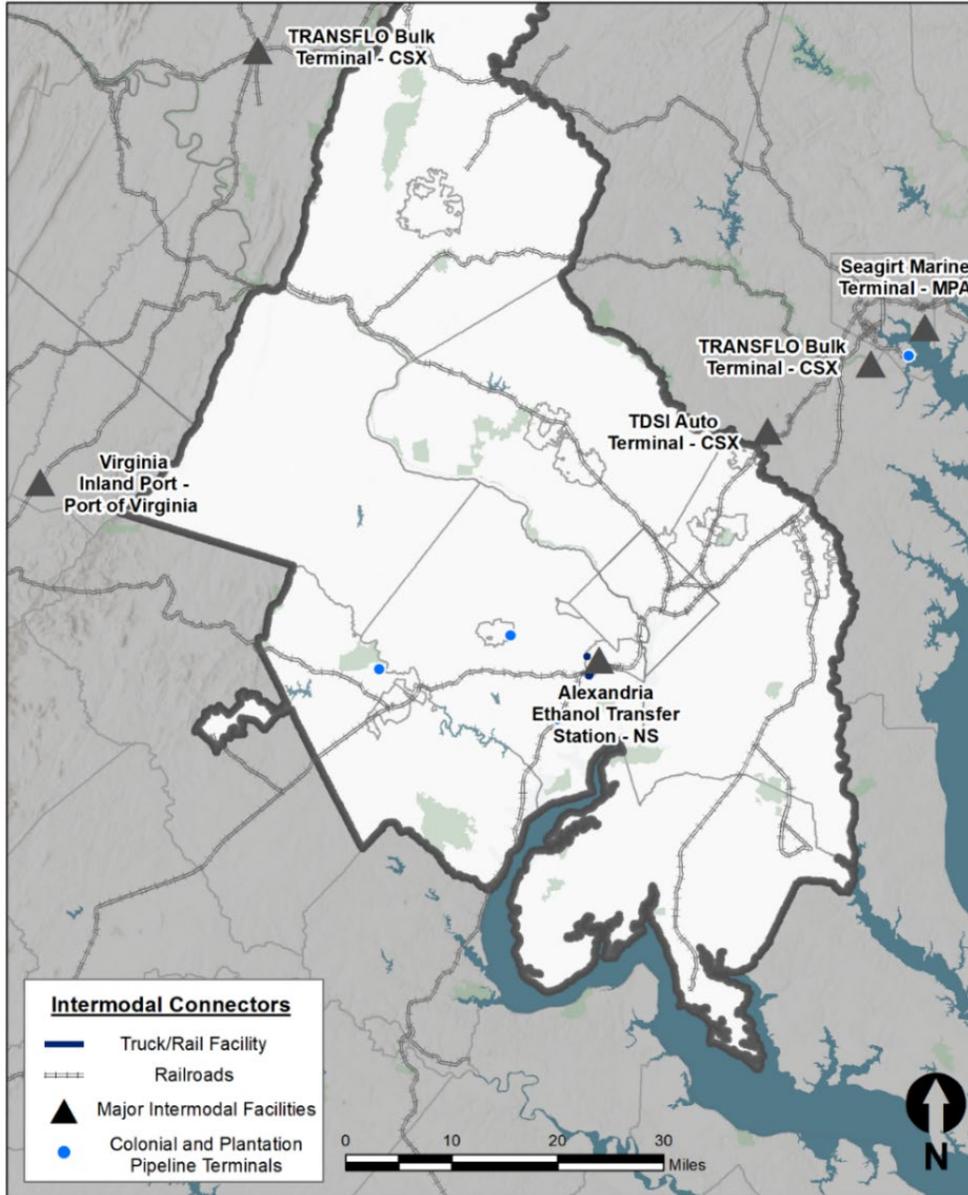


Source: Metropolitan Washington Council of Governments.

Pipelines

The region is served by an extensive pipeline network that carries more than 48 million tons of freight per year. The primary products transported by pipeline in the region are crude petroleum and natural gas. There are three petroleum pipeline terminals in Northern Virginia, and two in Baltimore City that serve the NCR.

Figure 5: Intermodal Connectors



Source: National Highway System Intermodal Connectors

FREIGHT DEMAND

The freight demand analysis presented in this report relies on the Federal Highway Administration's Freight Analysis Framework (FAF). The current FAF dataset analyzed in this report is from the 2020 calendar year. The FAF data provides estimates of the quantity of freight by weight (in tons) and by value (in 2020 dollars) moving between different geographic areas, by the various transportation modes.

WEIGHT AND VALUE SERVED BY THE REGIONAL FREIGHT NETWORK

Inbound, outbound, and intraregional (but not through) commodities total nearly 219 million tons and with an equivalent value of more than \$261 billion moved over the region's multimodal transportation system in 2020. These figures include both domestic trade (within the region or between the region and other areas of the United States) as well as international trade (between the region and other countries).

Considering weight, three major commodity groups are responsible for more than 50 percent of the region's tonnage – petroleum products, gravel and crushed stone, and non-metallic mineral products. Other important commodity groups by weight include waste and scrap, mixed freight, wood products, other prepared foodstuffs, coal, and natural sands. Comparing this to the 2016 Plan results for weight, petroleum products is now the top commodity by weight instead of gravel and crushed stone.

Four commodity groups that account for over 40 percent of the total value of commodities moved within the region- mixed freight (mixed freight includes items for grocery and convenience stores, supplies and food for restaurants and fast food chains, hardware or plumbing supplies and offices supplies), electronic and electrical equipment, pharmaceutical products, and motorized and other vehicles. Comparing the top four commodity types by value in this and the 2016 Plan, electronic and electrical equipment moved from first place to second place, mixed freight moved from the third spot to the top commodity type.

FORECAST GROWTH IN REGIONAL COMMODITIES

Freight data for the National Capital Region, gathered from the FHWA's Freight Analysis Framework, includes a set of forecasts for the growth in freight tonnage and value, by mode, commodity, and origin-destination pair. These forecasts are derived from broader forecasts for the national economy, representing a best-case scenario for the nation and the region respectively. Given that this addresses the best-case scenario, it does not consider a variety of significant changes to factors such as economic activity, fuel prices, climate, and logistics practices.

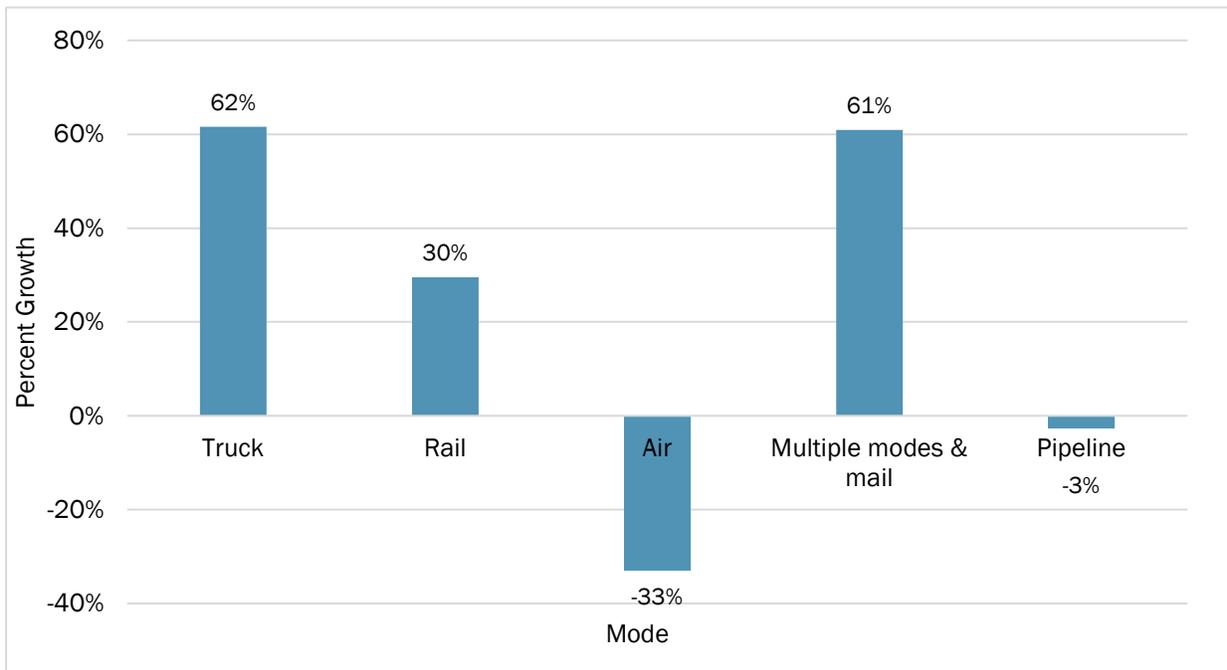
Growth in output and consumption are direct indicators of growth in freight demand and increased tonnage moving across the region's transportation infrastructure. Growth in some types of commodities will be greater than others and will change the relative proportions of commodity types transported within the region. The volume of other petroleum products is set to grow slightly yet remain the top commodity type in 2050. Similarly, gravel and crushed stone, non-metallic mineral products are forecasted to grow and retain their 2nd, 3rd rankings in 2050. Mixed freight is expected to overtake waste and scrap as the 4th most in demand commodity by weight in the region by 2050.

Based on value, the top regional commodity mixed freight is expected to show an increase in the value of trade by 2050. Other petroleum products is the only commodity class to show a small

decline in value of trade by 2050. The top commodity by value will still be mixed freight in the year 2050.

Different transportation modes will experience different growth rates. Modes that specialize in the fastest growing commodities will grow fastest. The fastest forecasted growth is for trucks followed closely by multiple modes and mail which is anticipated to increase by 62 and 61 percent respectively by 2050. Rail is anticipated to increase whereas air is expected to decline over the same period. Pipeline is also anticipated to decline by three percent by 2050.

Figure 6: Forecasted Growth in Tonnage by Mode from 2020 to 2050



Source: Federal Highway Administration Freight Analysis Framework

KEY TRENDS INFLUENCING FREIGHT IN THE REGION

While the freight transportation system is currently performing at a level that supports the region's economy and quality of life, recurring bottlenecks or recurring congestion on some roadways and railways negatively affect the reliability of freight deliveries. The growth in freight volumes forecasted for the region is a result of an increasing demand for goods – demand driven by the region's expanding economy, growing population, and high median household income levels. To fully realize the benefits associated with the forecasted growth in freight traffic, the region will need to address the challenges to the multimodal transportation system considering that growth. These challenges include more trucks sharing the roadways with passenger vehicles, bicycles, and pedestrians; more freight trains sharing the railways with commuter and intercity passenger trains; and increased wear and tear on pavements, bridges, and rail infrastructure. As trucks are the primary means by which goods are delivered to stores, restaurants, businesses, and residences, the denser and more vibrant a neighborhood becomes, the more that trucks must share the streets in proximity to pedestrians, bicyclists, and other vulnerable road users. Addressing the challenges associated with truck deliveries in dense and vibrant regional activity centers is a key planning issue. While the region has mostly recovered from the recession of 2020, the freight transportation system continues to be

affected by lingering effects from the COVID-19 pandemic and associated reductions in economic and transportation activity.

Other logistical trends influencing freight in the region, which are explored fully in the Freight Plan Update, are: evolving distribution center design and locations and the changing freight needs that impact last mile delivery.

COMMUNITY IMPACTS OF FREIGHT

The movement of goods is essential to ensure and maintain a high quality of life in the region. Each day, residents, businesses, and visitors rely on timely freight deliveries, especially for goods transported by commercial trucks. Better understanding the community impacts of freight movement in the region will help local jurisdictions accommodate freight needs while sustaining the health and wellbeing of residents and visitors. The National Capital Region's population is expected to increase to over seven million by 2045, and as the region's population grows so will the demand for freight. The Freight Plan Update also considers the community impacts from freight movement, which include land use considerations, negative externalities, and developing a workforce to support the freight industry.

Equity Analysis

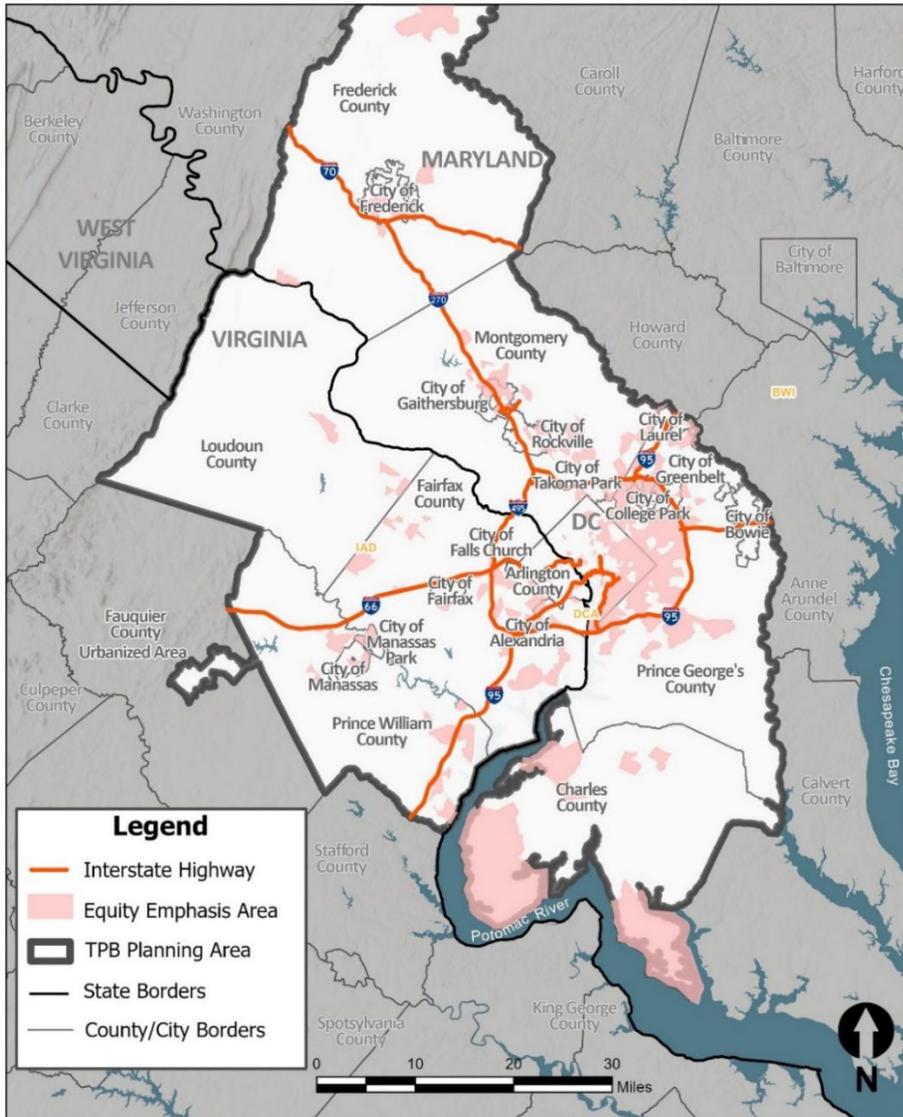
As noted in Visualize 2045, the costs and benefits of freight transportation should be distributed equitably within the region. Freight-related environmental justice issues arise when the impacts and externalities of freight, such as noise and air pollution, are unfairly concentrated in low-income and minority communities. The Freight Plan Update evaluates how the TPB's 364 Equity Emphasis Areas (EEAs), which account for 26 percent of the region's population, interact with major roadways and rail lines in the region. The purpose of this analysis is to better understand if freight has a disproportionate impact on EEAs within the National Capital Region.

At a high level, this analysis indicated that:

- EEAs feature a lower percentage of truck volumes along Interstate roadway miles, as compared to the region, but greater percentages of truck volumes of Principal Arterial-Freeway/Expressway and Principal Arterial-Other truck percentages.
- There are 306 major roadway miles that intersect with EEAs, and 66 percent of major roadways in EEAs are Principal Arterial-Other.
- EEAs represent 22 percent of the total railroad mileage in the National Capital Region (67 total miles).

This limited analysis did not show disproportionate impacts to EEAs at the regional level from freight movement. However, future equity-focused analysis between the interface of freight and the region's EEAs would provide greater insight on freight movement's impacts on these communities.

Figure 7: Interstate Highways and Equity Emphasis Areas in the NCR



REGIONAL FREIGHT POLICIES

The Transportation Planning Board (TPB) developed the following freight policy statements to guide implementation of freight infrastructure in the National Capital Region. The TPB:

1. encourages that freight related projects, programs, and activities in the region support or bolster TPB's plans, programs, and policies, such as the TPB Vision, Visualize 2050 (including its Connected and Automated Vehicle policies), Complete Streets policy, Equity and Safety policy.

2. supports the prioritized advancement of freight-related transportation projects that provide maximum value, efficiency, and safety with particular emphasis on those that improve freight access to activity centers.
3. supports investments that maintain a state of good repair for the region's freight transportation system.
4. supports freight investments that bolster the region's environmental objectives and resiliency.
5. supports the use of best practices for safety, engineering, and maintenance, of freight-related transportation infrastructure.
6. supports the alleviation of roadway bottlenecks where feasible to improve travel times and reliability for trucks and passenger vehicles.
7. supports maximizing opportunities to expand transportation options, address roadway congestion, and reduce pollution by increasing the use of passenger and freight rail.
8. encourages that freight related projects, programs, and activities provide benefits equitably to all people in the region and avoid disproportionate negative impacts to any group or community.
9. recognizes freight's role in economic development and supports efforts to maximize the use of important economic drivers, including airports, ports, and intermodal facilities serving the region's residents and businesses.
10. encourages that freight and goods are moved in ways that help minimize disruptions and facilitate livability of the region's communities.
11. encourages that freight related projects, programs, and activities in the region ensure security (including cybersecurity) and privacy, and prevention of risks to people and infrastructure.
12. supports improvements in truck safety using education, enforcement, and engineering strategies.
13. supports efforts to route hazardous materials away from the National Capital Region; for hazardous materials that must be transported to, from, within, and through the region, the TPB supports the selection of the safest and most secure modes and routes.
14. encourages information sharing on explosive, toxic by inhalation, and radioactive materials being shipped to, from, within, and through the region, including real-time notifications and long-term planning information.
15. supports robust first responder training and exercise activities regarding freight in general and hazardous materials transport in particular.

16. supports collaboration among agencies and with the private sector on freight planning and operations concerns to support mutual goals.
17. supports the proactive analysis of freight-related performance measures and data in the context of overall regional performance measurement to identify lessons learned and promote regional goals.
18. promotes sustainable methods of freight operations that are sensitive to environmental, cultural, and community resources.
19. encourages collaboration among transportation planners, land use planners, private railroads, elected officials, and other stakeholders to find creative ways to facilitate community-beneficial land use development (residential, commercial, or industrial as appropriate) while providing space for necessary future rail expansion along key rail corridors.
20. supports the review and study of new freight-related technologies, emerging business practices, and evolving commodity mixes and mode shares to advance regional goals.

RECOMMENDATIONS AND NEXT STEPS

The efficient movement of goods is vital to the economy of the National Capital Region and is necessary to support the growth of local businesses and promote a high quality of life for the region's residents and visitors. The TPB is responsible for addressing congestion and mobility limitations that delay or impede freight movements, which ensures that the region's interconnected transportation system can accommodate the movement of goods by truck, rail, air, and other modes.

Building on existing data, trends, and findings documented in the Freight Plan, this section identifies recommendations and next steps that will help the region achieve its freight goals.

Recommendations will also support planning factors identified in Visualize 2045: increase the accessibility and mobility of people and freight; and enhance the integration and connectivity of the transportation system across and between modes for people and freight.

The following recommended actions, which can be accomplished with resources that are already in place, are organized into two categories; those related to maintaining and strengthening the existing regional freight planning process and longer-term, strategic actions.

Actions Related to Maintaining and Strengthening the Regional Freight Planning Process

- Continue to support the TPB Freight Subcommittee.
- Continue to maintain and strengthen private-sector participation in the TPB Freight Subcommittee.
- Continue to create opportunities to hold joint meetings with other TPB Subcommittees.
- Continue to host periodic regional freight forums.

- Continue to collect and analyze freight data and make data available to member jurisdictions and the public.
- Continue to facilitate coordination with federal, state, local, and private-sector freight partners.
- Coordinate TPB's IJJA freight-related activities.
- Support TPB's Continuous Airport System Planning (CASP) program, which includes forecasting future air cargo needs.
- Continue to identify and communicate freight-related infrastructure issues to member agencies to address in their planning and programming activities.
- Strengthen relationships with local jurisdiction planners.
- Highlight economic development aspects of freight with local jurisdiction planners.

Strategic Regional Freight Planning Activities

- Continue to monitor key economic and industry trends impacting goods movement.
- Monitor the impact of freight movement within Equity Emphasis Areas.
- Continue to monitor technological developments in freight movement, such as autonomous and connected freight vehicles and unmanned aerial systems (drones).
- Monitor policies and efforts related to truck electrification and decarbonization of the freight industry in the National Capital Region.
- Advance policies and projects to convert commercial trucks to clean fuels in accordance with adopted TPB and COG goals.
- Deploy a regionwide robust electric vehicle charging network (or refueling stations for alternate fuels).
- Ensure consideration of freight movement issues in regional curbside management planning.
- Continue to monitor the development of new and emerging freight-relevant data sources and incorporate them into transportation planning activities as appropriate.
- Provide information to the TPB and freight stakeholders on the status or progress on this Plan's identified freight policies when such information becomes available.