



Transportation Strategies for Freight and Goods Movement in the Genesee-Finger Lakes Region

Executive Summary



prepared for

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Disclaimer

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Executive Summary

The competitiveness of a region's economy is inextricably linked to the strength of that region's transportation network. In order to thrive, a business must have fast, low-cost, secure access to the varied inputs it requires – including labor – and must have similarly fast, low-cost, and secure access to regional, national, and international markets for its outputs. Employees – the residents of the region – also demand superb access to goods – whether those goods were produced across town or halfway around the world. A top-notch, multimodal transportation network can be a region's gateway to prosperity.

The Genesee Transportation Council (GTC) and the New York State Department of Transportation, in cooperation with its partners, has undertaken this study, entitled "Transportation Strategies for Freight and Goods Movement in the Genesee-Finger Lakes Region," to help determine how transportation investments can be leveraged to increase regional economic competitiveness and maximize economic growth. Throughout the report, the term "Genesee-Finger Lakes Region" (simply "the region") refers to a nine-county study area consisting of Genesee, Livingston, Monroe, Ontario, Orleans, Seneca, Wayne, Wyoming, and Yates Counties.

The primary objectives of the study are the following:

- Develop goods movement strategies that will position the transportation system of the Genesee-Finger Lakes Region as a distinguishing factor in retaining and attracting both traditional and emerging-technology manufacturing firms as well as enhancing the viability of agriculture;
- Establish relationships between GTC and the business community that will endure beyond the completion of this project; and
- Help educate the public and key stakeholders in the Genesee-Finger Lakes Region about the importance of freight transportation.

The Final Report provides the region with detailed information about its economy and freight transportation system, and is intended to help guide future freight transportation and economic development decisions.

Regional Freight and Economic Profile

Development of a Regional Freight and Economic Profile is the first step in understanding how transportation investments ripple through the supply chain, business decisions, and ultimately consumer preferences that will determine the region's future success. This profile summarizes key trends and issues regarding population, employment, and goods movement in the region.

Key and Emerging Industries

Although its share of the regional economy is declining, manufacturing, and particularly "advanced" manufacturing, continues to grow and will likely remain a key pillar of the regional economy for the foreseeable future. Among the region's top 50 firms by employment, 12 are classified as "manufacturing" firms. These firms together contribute over 29,800 jobs to the region. Agriculture and food production remain significant economic engines for the Genesee-

Finger Lakes Region, especially for the mostly rural counties. Although the range of agriculture and food products produced in the Genesee-Finger Lakes Region is diverse, dairy products forms the largest agricultural subsector in New York State (Cornell University Program on Dairy Markets and Policy). The region also hosts a number of nationally-known food and beverage importers and processors.

In the coming decades, a number of emerging industries, including advanced manufacturing, alternative energy, technology, healthcare, tourism, and biotech and life science, will grow in importance to the region's economy. Like the already established manufacturing, agriculture, retail trade, and construction sectors, the emerging industries are also users of the Genesee-Finger Lakes Region's freight transportation services and network. The effectiveness of this system will be a factor contributing to the emerging industries' ability to compete and prosper in the region. The freight logistics structure of the Genesee-Finger Lakes Region (the types of commodities that are moved, the transportation network, and goods movement services) will inevitably change based on the needs of emerging industries, the evolving supply chain strategies of existing industries, and the spending power and preferences of the region's consumers.

Commodity/Vehicle Traffic Flows

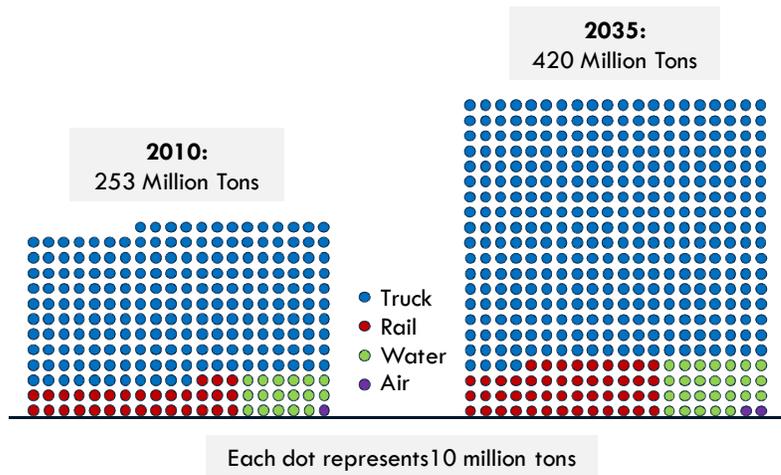
The commodity flow analysis performed for this study shows that in 2010:

- An estimated 253 million tons of freight moved into, out of, within, or through the region by truck, rail, water, or air;
- About two-thirds of the freight movement is reported as "through" movements, with neither an origin nor a destination in the Genesee-Finger Lakes Region. Inbound and outbound freight each account for about 15 percent of freight movement in the region;
- The New York City metropolitan area is the region's single-largest trading partner for both imports and exports, followed by the combined Buffalo-Toronto metropolitan area;
- Places within a one-day drive of the Genesee-Finger Lakes Region account for 74 percent of imports and 90 percent of exports by value, and more than 75 percent of imports and exports when measured by value; and
- About 30 percent of the region's imports and exports by weight (about 50 percent by value) fall into a commodity category called "Secondary Traffic," which represents freight flows through distribution centers—for example, retail goods bound for store shelves.

By 2035:

- Freight tonnage is expected to grow by 66 percent, from 253 million tons today to 420 million tons by 2035, as shown in Figure ES.1; and
- In the "business as usual" scenario assumed in these figures, the share of commodity freight moved by truck in the future is expected to increase slightly, from 80 percent to 82 percent.

Figure ES.1 Distribution of Total Annual Tonnage by Mode, 2010 and 2035



Source: IHS/Global Insight Transearch Database, via New York State Department of Transportation

Freight Infrastructure Summary

The region's freight infrastructure consists of:

- The Interstate Highway System and several key New York State highways that connect major freight-generating and receiving facilities to customers within and outside the region;
- A rail network composed of Class-I railroad lines connecting the region to other parts of the continent and a short line railroad network providing many rail customers with access to the Class-I networks;
- Truck-rail transloading and intermodal terminals within and just beyond the limits of the region, which provide the Genesee-Finger Lakes Region's shippers and receivers with multi-modal surface transportation options;
- An international airport offering cargo services, and larger airports within a one-day drive which offer more service options; and
- Lakeside seaports serving niche markets, and larger seaports beyond the region that serve as gateways for international containerized cargo.

Figure ES.2 shows the core of the Genesee-Finger Lakes Regional Freight Network. It is important to note that this map shows the facilities that are most important for interregional movements of freight and goods. Local roadways also play a crucial role in the "last mile" of freight transportation.

Two Class-I railroads own trackage in the Genesee-Finger Lakes Region: CSX and Norfolk Southern (NS). CSX traffic is routed along the Water Level Route between the Buffalo and Albany areas. Norfolk Southern's Southern Tier Line passes through parts of Genesee, Wyoming, and Livingston Counties. Like the CSX Water Level Route, most of the traffic on the Southern Tier Line is traveling through the region between Buffalo and points west and Binghamton and points south and east. In addition, the NS Corning Secondary serves as a connection between many of the short line railroads operating in the Finger Lakes region, especially the Finger Lakes Railroad, with the NS Southern Tier Line.

A third Class-I Railroad, Canadian Pacific, operates in the region using trackage rights agreements with CSX and NS. The CSX and NS main lines are also accessed by several of the region's six short line railroads through interchange at several points along the main lines.

Organization and Public Policy

The goods movement system in the Genesee-Finger Lakes Region operates within a matrix of institutional and commercial relationships, regulations, and public policies that govern the activities and decisions of all the players.

Commercial relationships influence how freight moves throughout the region, and where goods come from and are shipped to. Manufacturers and retailers located in the region are part of a complex supply chain that extends around the globe. The commercial relationships at each link in the supply chain govern how goods move, and the consumers of transportation services determine how quickly freight needs to move, at what cost, and so on. Manufacturers, in turn, have relationships with retailers that govern how much their products cost on retail shelves, how much needs to be produced, the timing of production and shipment, use of warehousing vs. just-in-time manufacturing and delivery, and who absorbs risks.

Freight movement is governed by a host of federal, state, regional, and local regulations and agencies. Even though federal regulations are broad and targeted at improving the overall performance of the nation's freight transportation system, federal policies can create significant local impacts. For example, in 2011 the FMCSA introduced new Hours-of-Service regulations (49 CFR Part 395), which put limits in place for when and how long commercial motor vehicle (CMV) drivers may drive. As the volume of traffic in the Genesee-Finger Lakes Region increases, GTC, NYSDOT, the NYS Thruway Authority, and their partners may need to examine and address the needs for expanding or developing new public and private rest facilities to meet growing demand.

Needs Assessment

Substantial outreach to stakeholders via the project Steering Committee, face-to-face interviews with a representative cross-section of industries throughout the region, three sub-regional focus groups held in various parts of the region to gather local input, a fourth focus group consisting of freight rail industry representatives, and an online survey directed to major shippers/receivers, carriers, and logistics firms, provided input for an analysis of Strengths, Weaknesses, Opportunities, and Threats (SWOT) and needs assessment. The results of the SWOT analysis are discussed in detail in Section 4 of the Final Report.

As shown in Table ES.1, the Needs Assessment is structured to align with the goals and objectives of GTC, as detailed in the *Long Range Transportation Plan for the Genesee-Finger Lakes Region*

2035, namely: **safety; security; accessibility and mobility; environment, community, and mobility; and management and operations.**

Table ES.1 Genesee-Finger Lakes Region Freight Transportation Needs

Goal Topic Area	Needs
Safety	<ul style="list-style-type: none"> • Ensure roadway geometric design can safely accommodate freight traffic • Address driver fatigue and distracted driving • Continue education and training programs for freight operators and the public
Security	<ul style="list-style-type: none"> • Protect against threats • Improve the resiliency of the freight transportation system and its ability to recover from service disruptions and incidents
Access and Mobility	<ul style="list-style-type: none"> • Implement targeted capacity expansions and operational improvements • Improve access to the freight transportation system • Coordinate land use, economic development, and transportation investment policies and strategies • Address low-clearance and weight-restricted bridges on the highway and rail networks • Preserve existing rail service and rights-of-way for future rail system expansion • Improve air cargo service • Maintain reliable access to seaports outside the region • Improve the reliability and decrease the travel time and cost associated with international border crossings • Explore the feasibility and benefits of designating additional roadways in the region as Interstate Highways
Environment, Community, and Energy	<ul style="list-style-type: none"> • Retrofit and replace truck and locomotive fleets to reduce emissions and improve energy efficiency • Avoid and mitigate the impacts of freight movement • Facilitate participation by freight stakeholders in the transportation planning process
Management and Operations	<ul style="list-style-type: none"> • Provide tax and capital improvement incentives for the use of non-highway modes for freight transportation where feasible • Improve design and operational standards to accommodate modern, efficient freight vehicles • Investigate the feasibility of implementing Positive Train Control on Class I and short-line railroads where required by FRA and, where not required, where operational benefits would outweigh the costs of implementation • Improve incident response times to reduce non-recurring delay on roadways • Provide better information on system condition and operations to freight system users • Improve existing rail interchanges (physical improvements, new or relocated sidings, and institutional changes to streamline procedures) so both Class I and short-line operators benefit.

Identification, Evaluation and Prioritization of Alternatives

The SWOT analysis and Needs Assessment guides the identification of freight transportation system projects, operational strategies, and policy changes (collectively referred to as alternatives) to address these needs. In order to develop the prioritized list of alternatives in this section, first a long list of freight improvement alternatives was compiled from three sources:

- A review of previous studies completed in the region that identified options for improving freight transportation;
- A review of best practices and innovations in freight and goods movement from other parts of the country; and
- Input received from stakeholders during focus groups, public meetings, and meetings with representatives of the region’s key existing and emerging industries.

The result was an unfiltered, unconstrained compilation of alternatives for improving the freight transportation system in the Genesee-Finger Lakes Region to help businesses remain competitive. The unconstrained compilation of alternatives was filtered through an initial screening process to eliminate those with fatal flaws (for example, those that were clearly inconsistent with local and regional plans, or those with potential for significant adverse environmental or community impacts). Then the remainder were evaluated using the criteria and performance measures described in Section 4.4 of the Final Report, “Performance-Based Planning for Freight Transportation.” Finally, a set of prioritization criteria were used to group projects into recommended near-term, medium-term, and long-term actions.

Linking the evaluation process to GTC’s goals and objectives, higher priority should be given to alternatives that:

- Keep regional freight transportation costs competitive by improving the efficiency of freight movement (**Efficiency**);
- Preserve and improve access to the freight transportation system for existing and emerging industries (**Access**);
- Are designed to accommodate freight transportation operations safely and securely, while mitigating community and environmental impacts of freight (**Mitigation**);
- Create employment in the transportation sector in the Genesee-Finger Lakes Region (**Jobs**); and
- Are cost-effective, considering up-front capital costs and ongoing operating and maintenance costs, and considering the share of public vs. private-sector funding needed to implement the alternative (**Cost-Effectiveness**).

Alternatives are evaluated against these five categories of priority factors and assigned a score in each category. The readiness of the alternative in terms of its ability to be implemented is considered as a final step to determine which priority tier to assign each alternative. Projects that are far enough along in the planning process that they can be implemented quickly are prioritized above those projects that require further planning, design, or evaluation.

Summary of Recommendations

Near-Term Recommendations

Near-term recommendations meet immediate needs and have benefits on a regional, state-wide, or national scale and/or rank high on the Cost-Effectiveness scale. They should be implemented as soon as resources are available. They include “shovel-ready” projects, operational strategies

that require relatively little design work before implementation, and policy changes and institutional changes that can be implemented in the near-term.

Near-term, regional priorities include the following **capital projects** or groups of projects:

- Address low-clearance and weight restricted bridges on major freight corridors and on access routes to development sites of regional priority.
- Implement planned improvements to the I-390/I-490 interchange, shown in Figure ES.5, to alleviate peak-period congestion and prevent this congestion from spreading to off-peak hours.
- Replace the Portage Bridge, shown in Figure ES.5, on the Southern Tier rail line to eliminate a major weight and speed restriction on the line.
- Complete remaining projects identified in the series of Transportation & Industrial Access Site Reports published in 2007, with projects located in all nine counties in the study area, plus the City of Rochester, and also improve access to the Livonia Gateway Park Road project and the Western NY Science and Technology Advanced Manufacturing Park (STAMP) facility.
- Construct rail sidings to major regional landfills to facilitate the shift of inbound municipal solid waste from truck to rail.
- New York State Route 63 Corridor Near-Term Improvements to address immediate needs, balancing operational needs of local and through freight traffic against safety concerns.
- Implement efficiency, access, and safety improvements on major regional freight corridors, as recommended by completed corridor and local area studies throughout the region.

Figure ES.5 I-390/I-490 Interchange (Left), Portage Bridge (Right)



Source: New York State Department of Transportation

Medium-Term Recommendations

Alternatives that are classified as **medium-term recommendations** may not be immediately ready to be implemented, but they have the potential to improve the status of the region's transportation system as a distinguishing competitive feature relative to other regions, serving the needs of existing businesses and enhancing the region's attractiveness to new business.

Alternatives that suggest capital investments should be priorities for further planning and development to determine if the projects are cost-effective and can be implemented quickly.

Medium-term recommendations include the following **capital projects** and **project concepts**:

- Substantial capacity and operational improvements in the New York State Route 63 corridor, balancing the operational needs of local and through freight traffic against the safety concerns raised by small communities along the route.
- Improve productivity of truck operations by increasing allowable weight and length of trucks on roadways that are designed to safely accommodate them.
- Identify the appropriate location(s) for a regional-scale rail/highway intermodal transfer facility and identify potential customers to justify private rail investment in new intermodal rail service to the region.
- Identify possible locations for local businesses to access regional short line railroads at smaller cross dock and transload facilities throughout the region.
- Investigate the feasibility of developing a multimodal logistics center or “freight village” at the Lyons Industrial Park, taking advantage of freight and goods movement opportunities provided by the intersection of the CSX main line and the Corning Secondary (former Norfolk Southern service and potential Finger Lakes Railway service), the Erie Canal (with an opportunity for connecting barge service to the Port of Oswego), and access to the NY State Thruway. The proposed site layout for the Lyons Industrial Park is illustrated in Figure ES.6.

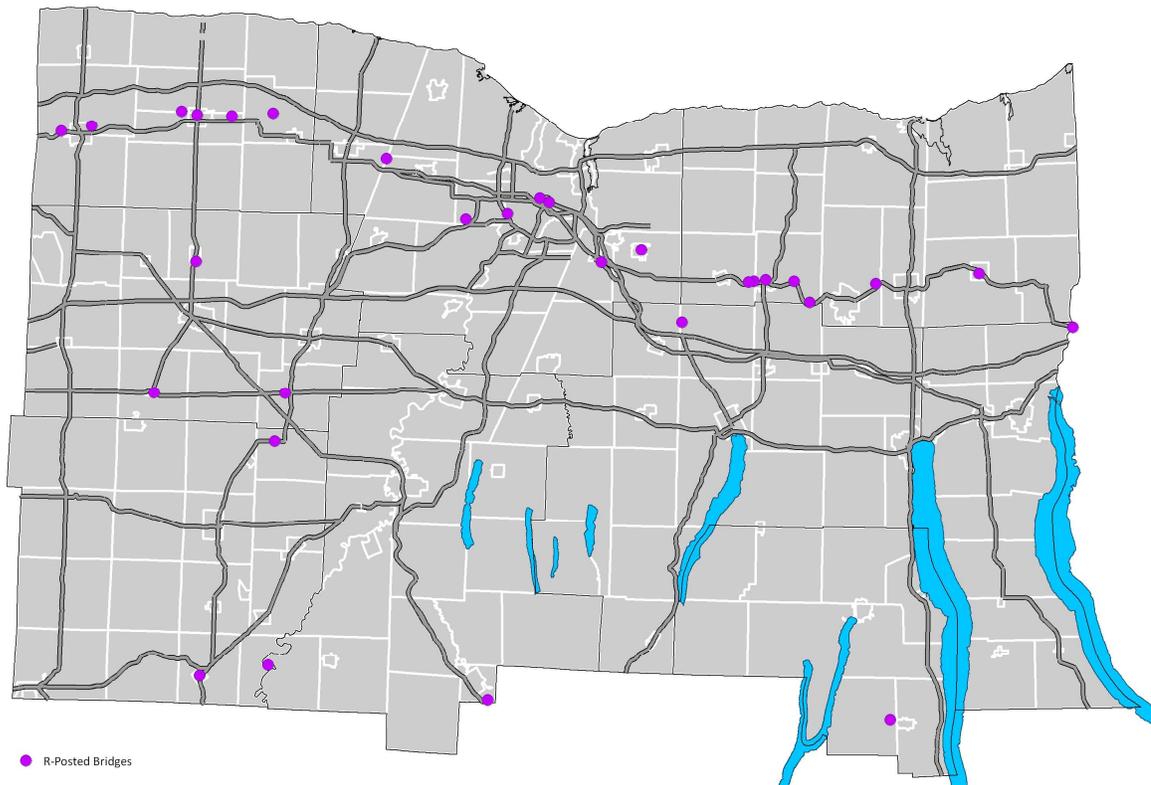
Figure ES.6 Lyons Industrial Park Freight Village Proposed Site Layout



- Preserve right of way and make necessary infrastructure improvements to re-instate rail service along Norfolk Southern's Corning Secondary Line between Geneva and Lyons.
- Investigate the feasibility of implementing rail improvements described in the "Seneca Army Depot Industrial Rail Facility" concept plan.
- Make improvements to overhead clearance restrictions and sidings on the Rochester & Southern Railroad (RSR) line to allow for improved connections to Rochester and Monroe County from Norfolk Southern's Southern Tier line.

- Preserve rail right of way and make necessary infrastructure improvements to re-instate rail service along the former Falls Road rail corridor between Brockport and Rochester.
- Take action to preserve rights of way on other lines identified in the Regional Right of Way Preservation Study, with higher priority given to lines on which potential new customers have been identified.
- Address weight, width, and clearance restrictions on roadway crossings of the Erie Canal to improve truck access to those portions of the region located north of the Erie Canal. Weight-restricted bridges throughout the region are illustrated in Figure ES.7.

Figure ES.7 Weight-Restricted Roadway Bridges in the Genesee-Finger Lakes Region



Source: New York State Department of Transportation

- Identify and implement safety improvements to reduce truck accidents at the S curves on I-490 between the Genesee River and Goodman Street.
- Extend Pre-Emption Street (Co. Road #5) from North Street to New York State Route 5 and U.S. Route 20 in the City of Geneva via an overpass across the Norfolk Southern Corning Secondary rail tracks. An overpass is required due to the presence of a rail switching yard at that location.

Transportation System Management and Operation (TSM&O) strategies that could improve freight transportation in the medium-term include the following:

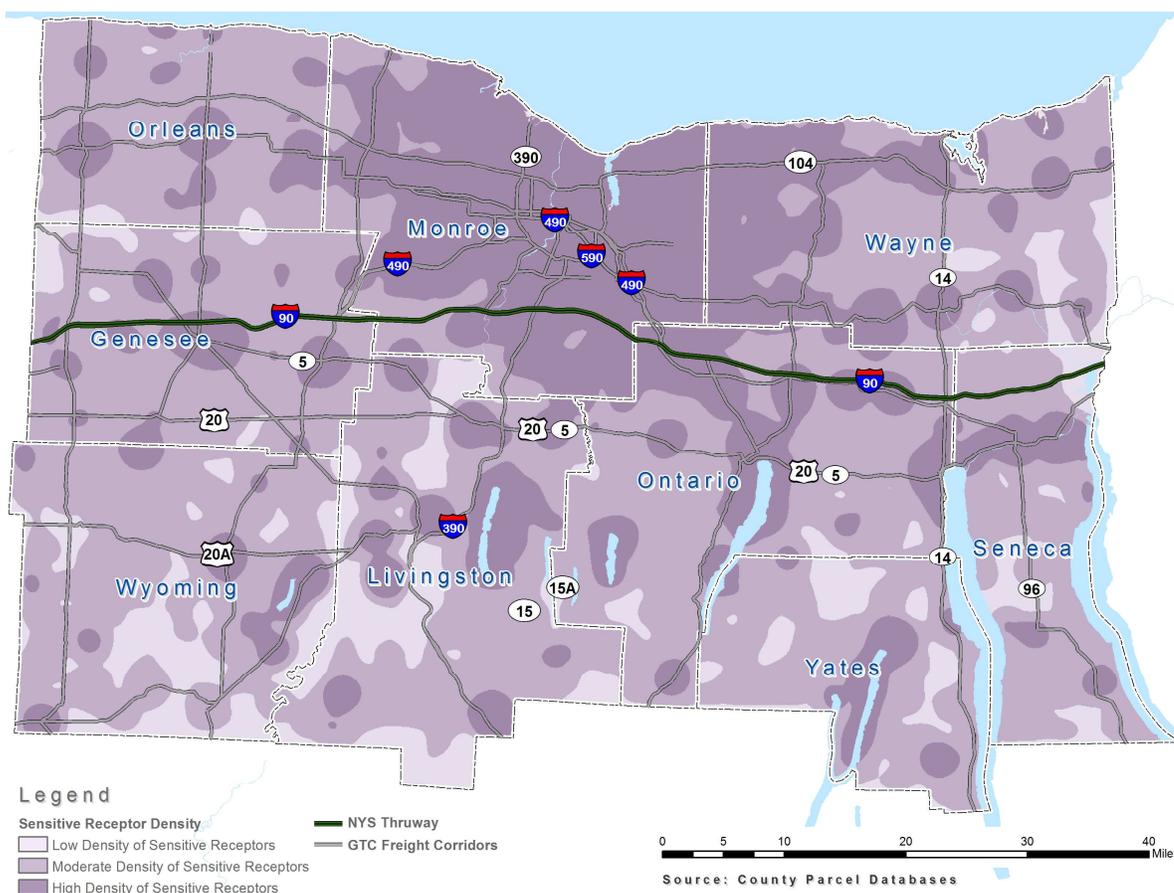
- Work with navigation system developers and fleet dispatchers to update truck driver information systems with better information about bridge clearance, width, and weight restrictions, and establish signed truck route networks to guide drivers along safe and appropriate routes where feasible.

- Monitor the operational performance of major freight corridors at congestion hot spots and implement freight-specific congestion management strategies to keep major freight corridors congestion-free.
- Reduce the impact of incidents and freight system disruptions by improving the resilience of the freight transportation system.
- Conduct a freight infrastructure vulnerability needs assessment to identify critical infrastructure and potential strategies to protect against preventable incidents and adapt to foreseeable long-term changes.

Other freight-oriented **policies and strategies** that should be implemented in the medium term include the following:

- Develop policies to manage and mitigate the impacts of trucking operations on roads used to access Marcellus Shale natural gas drilling wells inside and outside the region.
- Identify and implement specific policies and incentives to mitigate the noise, vibration, and emissions-related impacts of freight movement, particularly in areas with high densities of sensitive receptors, such as residential areas, schools, and assisted living facilities, as shown in darker shading in Figure ES.8.

Figure ES.8 Freight Sensitive Receptors in the Genesee-Finger Lakes Region



- Where suitable alternate routes do not exist, explore the feasibility of constructing new truck bypasses using innovative funding sources and financing strategies that include private sector participation.
- Work with SmartWay Transport Partnership, New York State Energy Research and Development Authority, and others to access low-interest loan programs and grants for auxiliary power units, aerodynamic vehicle retrofit kits, truck stop electrification, and other measures to reduce freight transportation fuel consumption and emissions.
- Reduce delays associated with Canada-U.S. border crossing inspections and related traffic congestion upstream of border crossings through a combination of infrastructure improvements, traffic management strategies, and policy changes.
- Change the designation of "New York State Route 390 " to "Interstate Highway 390" north of the I-490 interchange to make redevelopment parcels along the highway more attractive to national site location consultants.
- Improve the efficiency and lower costs associated with interchanges of rail cars between rail operators.
- Review existing truck stop demand, identify gaps, and build additional truck parking facilities where there is demand for overnight and daytime truck parking to help truck drivers comply with Federal hours-of-service regulations.

Long-Term Recommendations

The following **long-term recommendations** have the potential to be transformative in terms of their impact on the region's freight transportation system and the region's economic competitiveness. They will require further study and planning before they can be considered priorities from a regional perspective.

- To facilitate trade with Canada, explore options to move freight across the border by non-highway modes, including a roll-on/roll-off highway trailer-on-flatcar (TOFC) rail shuttle service or ferry service between Ontario and the Genesee-Finger Lakes Region and the necessary support infrastructure to connect the landing point with existing major regional freight corridors.
- Address growing congestion in the New York City metropolitan area (including northern New Jersey) that increases costs of transporting air cargo and marine cargo between the Genesee-Finger Lakes Region and that region's airports and seaports. Also closely monitor and address congestion and delays on routes connecting the two regions that may affect this region's ability to conduct business with global trading partners.
- Extend the main runway at Greater Rochester International Airport to accommodate larger freight aircraft and identify potential customers to justify new air cargo service to one or more destinations.

Next Steps

Implementation of freight transportation improvements will require coordinated efforts on the part of many public and private sector stakeholders. Stakeholders and participants are involved in the freight transportation planning process in different capacities depending on, for example, the type of infrastructure or policy being addressed, the scope of the project or policy change, and an

alternative's stage in the planning, development, and implementation process. This section provides examples of recommendations and the roles and responsibilities of typical stakeholders in advancing projects, operational strategies, and policy changes that are considered regional priorities.

Roles, Responsibilities, and Partnerships

Develop Policies that Guide Freight Transportation Planning and Investment. The *Long Range Transportation Plan for the Genesee-Finger Lakes Region (LRTP 2035)*, developed by GTC and its member agencies, lays out the policy framework in which regional freight transportation investment decisions are made. GTC also evaluates and assesses freight and goods movement needs from a regional perspective. Owners and operators of the system have their own policies and procedures that affect how, when, and where freight and goods move through the region. For the portions of the system under their control, they may collect their own data and conduct their own need assessments.

Identify and Evaluate Alternatives Against Goals and Objectives. At a regional level, GTC is responsible for facilitating discussions among its members and regional stakeholders regarding various options to address freight and goods movement needs. GTC's member agencies provide the MPO with information about various improvement alternatives and potential policy changes, and GTC serves as the forum for making decisions that would have regional impacts. NYSDOT is in the lead for evaluating alternatives that affect state-owned facilities and for alternatives that would have statewide impacts, while GTC member agencies and other local governments often take the lead for projects on their facilities that would likely have primarily local impacts.

Prioritize Alternatives and Select Projects for Funding. The Transportation Improvement Program (TIP), a Federally-mandated product of the regional planning process, identifies and schedules the transportation improvements in the region that will receive Federal funding within, at a minimum, four years from its adoption by GTC. Development of the TIP requires a considerable amount of coordination among the agencies that build, operate, and maintain freight transportation infrastructure. At the same time, NYSDOT is responsible for coordinating among MPOs and regions of the state without MPOs as it develops the State Transportation Improvement Program (STIP), and U.S. DOT's modal administrations play a role in allocating Federal funding to the Genesee-Finger Lakes Region for freight transportation projects of national significance. Private sector owners and operators of freight infrastructure and services make their own prioritization and funding decisions based on their own goals and objectives.

Design and Implement Projects and Policy Initiatives. Freight transportation system owners and operators, both public and private, play lead roles in designing and implementing freight projects. Policies may be developed in part by GTC, but implementation of these policies via projects and operational strategies is a function of local, state, and Federal stakeholders, many of which are members of GTC.

Measure and Track System Performance. GTC has a lead role in measuring and tracking the performance of the regional freight transportation system and sharing this information with system owners and operators so that they can make adjustments to operating procedures or make investments in capital or operational strategies. NYSDOT, GTC member agencies, and local governments can play lead roles for the state and local freight transportation systems,

respectively, while private-sector owners and operators monitor the performance of their systems as a matter of good business practice. All of these stakeholders must share information and best practices so that lessons from previous investments, strategies, and policy changes can be used to make future investments, strategies and policy changes more effective.

Implementation Challenges

Resource constraints and institutional and regulatory obstacles are among the most common implementation challenges. Freight transportation improvements are also constrained by existing institutional agreements and regulations. This is not to say that all regulations are problematic, but it is important to balance regulatory and institutional obstacles that may prevent one or more potential solutions from being realized.

Funding, Financing, and Costs

While traditional funding programs are already well known to GTC and its stakeholders, a number of new financing tools have been created or modified through recent legislation and can be used to supplement traditional finance. The following are examples of tools and grant programs available for freight transportation system improvements. These tools and programs rely on the revenue sources listed above and are not in and of themselves revenue sources:

- Private Activity Bonds
- Transportation Infrastructure Finance and Innovation Act (TIFIA)
- TIGER Grants Program
- Rail Rehabilitation and Finance (RRIF)

Existing and proposed **New York State** funding and financing programs including the following:

- NYS Consolidated Local Street & Highway Improvement Program
- New York State Industrial Access Program (IAP)
- Regional Economic Development Council Grant Programs
- State Infrastructure Banks (SIB)

The following financing tools are used elsewhere, but are not permitted and/or are not widely used in New York State:

- Grant Anticipation Revenue Vehicles (GARVEE) Bonds
- Value Capture

Finding revenue to pay for freight transportation system improvements is one part of the problem. Another approach to sustainable transportation funding is to reduce capital and operating costs so that over a project's lifecycle, the project can utilize funding that can reasonably be expected to be available.

Timeline and Process

GTC, NYSDOT, and other regional stakeholders would be well-served by integrating the recommendations of this study into the existing regional transportation planning process, ensuring that prerequisite project and policy changes are in place before new recommendations are advanced. Although there is no single freight project or policy change that can be classified as

“urgent”, GTC and its partners should ensure that the flexibility exists to quickly implement projects (e.g., access improvements) should an economic development opportunity arise.

Defining and Monitoring Success

Section 4 of the Final Report lays out a list of project-level and system-level performance measures that can be integrated into GTC’s planning process to help monitor how well investments and policy changes are performing, relative to the region’s goals and objectives. One of the biggest challenges in performance-based planning is defining “success” and then collecting, managing, and reporting on the data necessary to monitor “success.” The initial system level measures that GTC will develop benchmarks, desired changes, and likely changes for will be those that are consistent with the existing performance measures of the current LRTP. These include the following on the Highway Component of the Regional Freight Network (see Table ES.2). Going forward, GTC anticipates developing additional freight performance measures consistent with the approach used to develop those for the LRTP.

Table ES.2 System Level Performance Measures for the GTC Region

LRTP Key Area	Performance Measure
Safety	Number of Fatalities
System Preservation	Pavement Fair or Better
System Preservation	Non-Deficient Bridges
Mobility	Travel Time Index
Environment	Emissions of Nitrogen Oxides
Environment	Emissions of Volatile Organic Compounds
Environment	Emissions of Carbon Dioxide
Environment	Direct Energy Usage