

A VISION FOR **FREIGHT** IN MIDDLE TENNESSEE

REGIONAL FREIGHT AND GOODS
MOVEMENT STUDY | 2016



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MORE THAN **80%** OF GOODS IN THE REGION MOVE BY TRUCK.

OVERVIEW

Residents of Middle Tennessee are accustomed to the sights and sounds of large trucks on the interstates and trains traveling through their neighborhoods. Whether you are at home and hear the sound of a train horn, waiting in a line of cars as a train passes through a busy street, or driving to work alongside a truck carrying anything from gravel to groceries, your relationship with goods movement is unavoidable; you rely on the movement of these goods to eat, furnish your home, and shop. It's no surprise that our dense transportation infrastructure and proximity to other metropolitan areas in the Midwest, Northeast, and South make it a prime location for manufacturing as well as distribution companies to locate. Still, you likely have a number of questions about how and why goods move through our region, such as:

Why are there are so many trucks on our roadways?

Why are freight trains so common in our region?

Why is there only one passenger rail service, when rail lines extend in all directions?

To help answer these questions, the Nashville Area Metropolitan Planning Organization (MPO) has spent more than a decade conducting a number of studies that examine the importance of goods movement for our region, our economy, and our people. These studies help us to better understand what freight and goods movement looks like in our region, where it's headed, and how we can optimize it to enhance our economic potential and quality of life.

As part of the visioning process, the region has begun to explore opportunities to improve the efficiency of truck as well as automobile travel. This includes not only improving the mobility of truck travel, but also exploring opportunities to reduce the amount of truck travel throughout the region. Better utilizing our region's rail, water, and air facilities for freight travel also plays a role in improving conditions on our region's roadways. These efforts may include further study into the potential relocation of facilities, including CSX's Radnor Intermodal Yard, as opportunities to reduce overall truck travel, separate truck traffic from incompatible uses, and free up existing industrial land for non-industrial purposes.

By pursuing these activities, the Middle Tennessee region has the opportunity to increase connectivity to and from major freight generators, improve coordination between local and regional planning and economic development activities, and increase the quality of life of those living in the region. These are intended for multiple parties who are responsible for components of the freight infrastructure network and economy including (but not limited to) public and private railroads, airports, water ports, cities, counties, MPOs, and the state.

FOR MORE INFORMATION ON THE MPO'S FREIGHT PLANNING ACTIVITIES, VISIT FREIGHT.NASHVILLEMPO.ORG.

A VISION FOR FREIGHT

A broad vision for freight in the Middle Tennessee region is presented below and includes both a statement about the region's pursuit of freight-related activities as well as a map that identifies the preferred locations and networks for freight movement and related industries. These are accompanied by a set of strategies, objectives, and actions that will assist the region in the pursuit of this vision. The ability of the region to prosper and grow in a sustainable and coordinated fashion requires significant efforts on the part of local, regional, state, and federal stakeholders.

The Middle Tennessee region has historically been a logistical hub that benefits tremendously from goods movements and its associated infrastructure. Dense transportation infrastructure and a location in close proximity to multiple metropolitan areas has the region well positioned to continue to use its geographical location, existing infrastructure, and history of manufacturing to prosper economically.

VISION STATEMENT

To ensure economic prosperity for our region, job opportunities for our residents, safety and reliability on our roadways, and a continued improvement in quality of life for our communities, the Middle Tennessee region must coordinate freight planning with other efforts to attract manufacturing, logistics, and industrial growth while minimizing negative impacts on surrounding communities and citizens.

SUPPORTING DOCUMENTS

Tech Memo # 1 - Historic, Existing, and Future Conditions – Uses historic, current, and future data to describe the conditions and trends related to the regional freight economy and the associated travel patterns and flows that correspond with these trends. Includes information on economic and market conditions, freight generators, truck counts, commodity flows, truck speeds, rail movements, and water and airport movement.

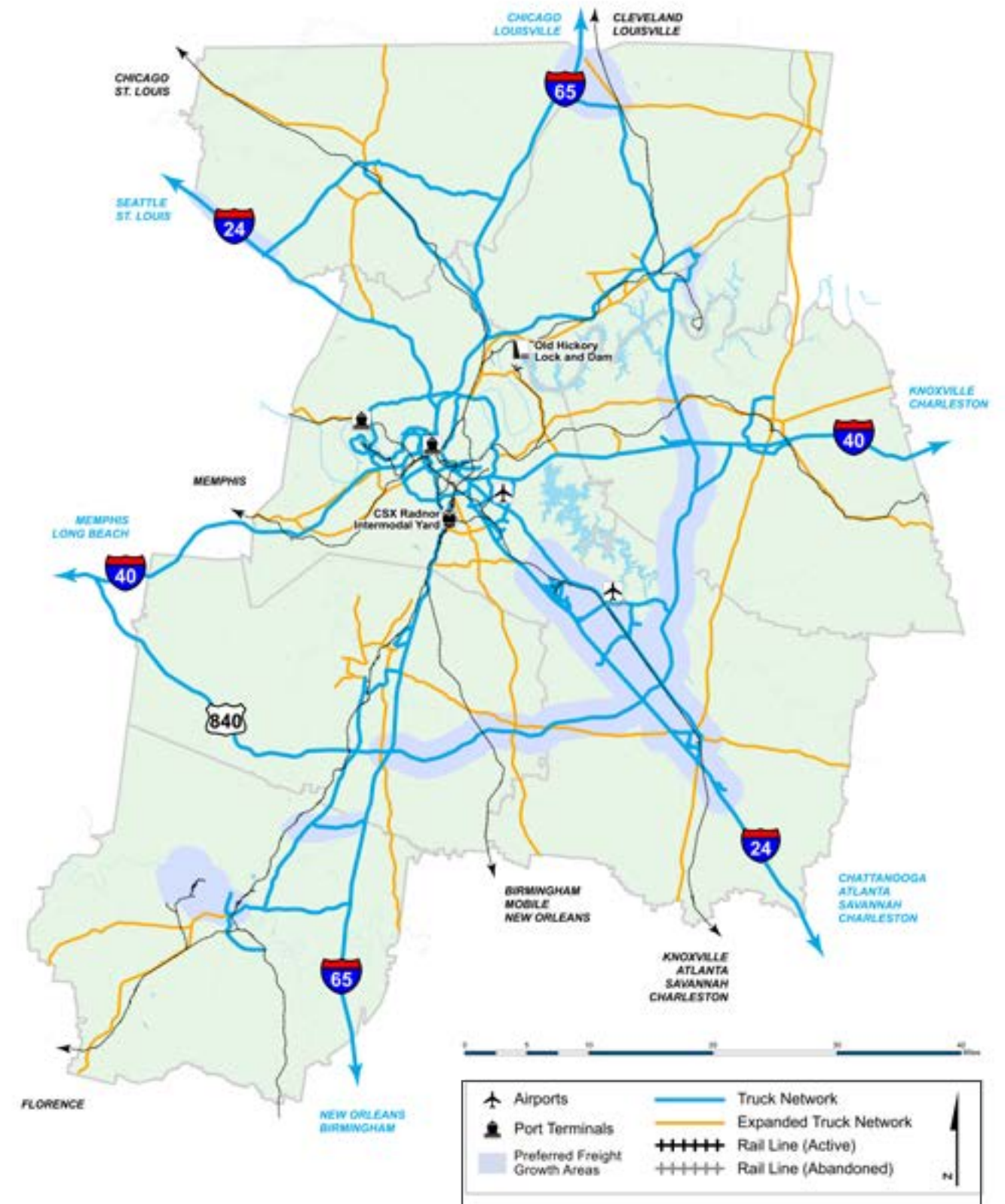
Tech Memo # 2 - Performance of Freight Systems and Designed Truck Network – Discusses the implications of future trends on freight and goods movement. Introduces a regional designated truck network as a strategy to help address changes based on the region's current trajectory.

Tech Memo # 3 - Land Use Planning and Urban Designated Recommendations – Reviews national best practices and local plans, policies, and regulations for land use and urban design to develop a set of recommendations to improve the efficiency of goods movement across and within the region. Implementation of these best practices would minimize the impact of freight movement on local quality of life through improved coordination between regional transportation planning and local land use planning.

Tech Memo #4 - Freight and Goods Movement Strategies – Describes strategies that may be used in coordination with a regional freight vision for the Nashville Area MPO, and is focused on three primary strategies: implementing a regional truck network, optimizing the location of rail operations, and coordinating economic development and land use decisions with planned investments.

Tech memos and study-related information can be found online at Freight.NashvilleMPO.org.

FIGURE 1 | FREIGHT VISION



STRATEGIES

IMPLEMENT A REGIONAL TRUCK NETWORK

A key goal for the region is the implementation of a regional truck network. A designated truck network will include routes heavily used by trucks today, as well as those routes that improve connectivity for freight movement in the region and mitigate congestion for both truck and passenger vehicles. To be effective, a designated network requires truck friendly design standards as well as adequate signage that encourages truck routing along these roadways.

If implemented, a regional truck route network would improve connectivity to manufacturing, rail, air cargo, and waterway facilities; improve safety to manufacturing facilities and along rail, air cargo, and waterway facilities; protect delivery access for trucks; improve quality of roadways heavily used by trucks and extend time between necessary maintenance and reconstruction of roadways; provide incentives for freight and logistics companies to do business in the region; minimize impacts of heavy trucks on local communities; and shepherd pass-through trucks through region.

OBJECTIVES	ACTIONS	TIMEFRAME
Provide incentives for freight and logistics companies to do business in the region.	Formally designate a regional truck network	Short
	Adopt truck network design standards	Short
Improve safety and efficiency of local freight operations.	Adopt performance measures and targets	Short
	Upgrade existing routes to design standards	Mid to Long
Minimize impact of heavy truck movements on local communities.	Expand network to meet future demand	Mid to Long
	Regulate/Incent use of designated network	Short to Mid
Shepherd pass-thru truck travel through the region.	Restrict the use of key commuter routes by trucks	Short to Mid

FIGURE 2 | REGIONAL TRUCK NETWORK



HOW WILL A REGIONAL TRUCK NETWORK HELP ACHIEVE THE VISION?

Middle Tennessee is among the fastest growing regions in the country. Couple this population growth with our key location between the Midwest and South and it's understandable that freight flowing in, out, and through the region is anticipated to grow. As a result, the region's roadways are going to experience worsening congestion, negatively impacting both trucking operations as well as passenger vehicles. Growing congestion will require trucks to travel for longer periods of time to move goods, increasing shipping costs and the price of goods for consumers. Additionally, the region experiences a high proportion of through truck travel that would benefit from a designated network which provides optimal routing and bypasses highly congested areas of the region. The regional truck network is geared toward enhancing the separation of truck activity from mismatched land uses, reducing strain on local communities, and designating a set of roads most amenable to goods movement and manufacturing and industrial siting.

ARE THESE ROUTES ALREADY TRUCK FRIENDLY OR WHAT WOULD IT TAKE TO ACHIEVE?

The proposed regional truck network includes interstates, state routes and arterial roadways, some more friendly to trucks than others. Currently, some trucks are forced to make deliveries along roadways that have relatively small widths and intersections that make it difficult for trucks to turn. After designating the network, a thorough evaluation of current roadway design and function should be undertaken to identify key issues and potential strategies for improving the efficiency of these roadways for trucks. This evaluation should consider roadway type as well as the environment in which the roadway is located, be it urban, suburban, or rural. Recommendations may include signal and intersection improvements, adding signage or installing median barriers. A preliminary example of what these roadways could look like is included in the Performance of Freight Systems and Designated Truck Network report.

HOW WILL THIS AFFECT PASSENGER VEHICLES, BICYCLISTS AND PEDESTRIANS?

The interaction of trucks and passenger vehicles is a significant topic in the region, leading to conversations about trade-offs between efficient truck travel and other modes of transportation. While the network is intended to shepherd pass through traffic through the region in a way that minimizes truck impacts on local communities, passenger vehicles and other travelers will still interact with trucks. A regional truck network will need to consider all of the functions of the roadway during design and implementation, including passenger vehicles, bicyclists, pedestrians, and transit. Passenger vehicles, bicyclists, and pedestrians traveling along the truck network should expect to interact more frequently with truck traffic. Additional consideration should be given to increase safety and minimize conflicts for all modes. An analysis of potential conflicts is presented in the Performance of Freight Systems and Designated Truck Network report.

HOW WILL THIS AFFECT LOCAL COMMUNITIES?

The implementation of a regional truck network will help alleviate undue burden of truck traffic from communities. By encouraging truck traffic along designated routes, conflicts between truck travel and residential communities will be reduced. Additionally, in locations where the network is in close proximity to residential areas, it will be important to conduct outreach to further the understanding of the purpose of the network and the needs of the community it traverses. Design standards will consider community desires related to design, aesthetic, and the environment in an effort to better coexist with the community.

NEARLY
65%
OF REGIONAL FREIGHT TRUCK
TRAFFIC PASSES THROUGH
MIDDLE TENNESSEE ANNUALLY

CASE STUDY | ATLANTA REGIONAL COMMISSION



The Atlanta Regional Commission (ARC) embarked on a similar effort when they developed their Strategic Truck Route Master Plan (ASTRoMaP) which identified preferred routes and developed strategies to support the efficient movement of truck traffic.

The master plan was adopted in 2010 as a follow up to the Atlanta Regional Freight Mobility Plan. ASTRoMaP helped ensure truck traffic is directed to roadways whose physical and operational characteristics can effectively accommodate truck traffic, and identified supportive improvement strategies to implement the regional truck route concept as well as access management best practices to protect freight corridors.

More information can be found at the Atlanta Regional Commission website, <http://www.atlantaregional.com/transportation/freight>.

WHAT ARE THE BENEFITS AND HOW ARE DESIGNATED TRUCK ROUTES DIFFERENT?

The regional truck network will assist through truck drivers by avoiding highly congested areas, such as downtown Nashville, while also preserving delivery access for local operations and the efficient movement of trucks originating and destined for the region. While roadways on the network include interstates, state routes, and arterials, all identified roads should be designed in a manner that allows for the efficient movement of freight traffic, including (but not limited to) proper lane widths, turning radii, timing and coordination of signals, access management strategies, and climbing lanes in areas with steep grades. Beyond this, the designation of a regional truck network can result in various safety benefits. Between 2010 and 2014, there were 5,102 crashes on area roadways involving heavy or semi-trucks, about half occurring on U.S. Interstates. Of those, 70 or nearly 1.5 percent involved a fatality and 1,584 or 31 percent involved an injury. Insurance rates are directly proportional to crashes for truck operators. Properly designing roadways for trucks will not only increase safety for drivers, but will also reduce costs that increase the overall supply chain costs and the cost of doing business in our region. Following this effort, a study identifying the proper truck network design standards should begin. Adopting proper design standards will be a multi-jurisdictional effort that will lead to trucks moving throughout the region in a safe and efficient manner and encourage freight-related economic development and business siting.

HOW ARE LOCAL GOVERNMENTS, THE STATE, AND THE MPO INVOLVED?

The regional truck network presented as part of the freight vision has been informed not only by existing federal and local truck routes, but also by conversations with truckers, the MPO's Freight Advisory Committee, as well as local, regional, and state stakeholders. Each jurisdiction has unique implementation challenges, and building a consensus around roadway and design standards while also fostering support in communities that may have concerns over increased truck traffic on designated routes should be anticipated. State support and collaboration will also be imperative given the state's authority over state routes and the interstate system in our region. A number of potential solutions should be explored to minimize the impacts of enhanced truck travel on local communities including the potential for noise ordinances and landscape buffers. Beyond this, a thorough evaluation of current route design and upgrades will be needed to bring the network to proper truck-friendly design standards and will need to be conducted in a collaborative way with all relevant stakeholders.

POTENTIAL IMPACTS OF FUTURE ROADWAY PERFORMANCE INCLUDE

- Longer travel times for trucks and other vehicles
- Inefficient routing of trucks
- Increases in supply chain costs
- Decreased competitiveness relative to attracting and retaining freight-related businesses

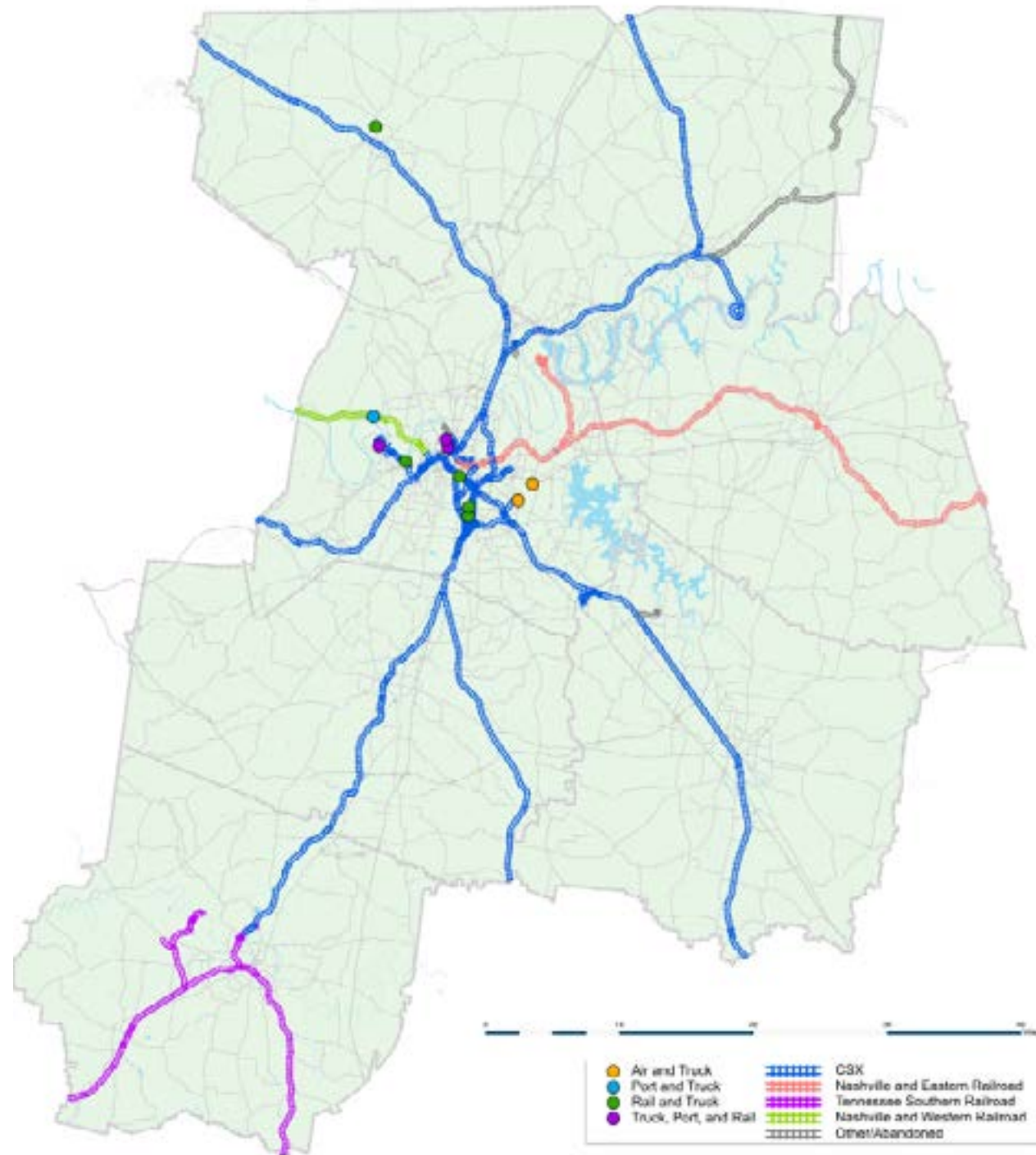
OPTIMIZE THE LOCATION OF RAIL OPERATIONS

Middle Tennessee has a dense rail network which is highly concentrated in the densest parts of the region. This leads to frequent interactions between trains and passenger vehicles, pedestrians, bicyclists, and local communities. The second goal established as part of this effort is to optimize the location of rail operations. This effort will broaden opportunities to use this valuable regional asset to increase economic development opportunities and improve the quality of life of the region's citizens, while also mitigating the conflicts that presently exist between freight rail operations, neighborhoods, and other modes of travel.

OBJECTIVES	ACTIONS	TIMEFRAME
Better access to existing and potential customers in the region.	Establish long term vision for freight rail alignments	Short
	Identify desired rail transit movements/station areas	Short
Improve safety and speed/efficiency of rail movements.	Upgrade existing short-line rail lines Class 1 standards	Mid to Long
	Improve or upgrade at grade rail crossings	Short to Long
Help manage heavy truck movements throughout the region.	Expand capacity of existing rail lines	Mid to Long
	Realign existing rail lines	Mid to Long
Minimize conflicts with existing neighborhoods and emerging mixed use development.	Relocate Radnor Intermodal Yard	Mid to Long
	Implementation of transit service on rail lines	Mid to Long
Provide increased opportunity for use of existing rail lines/ROW for public transit.		

FREIGHT FLOWS ARE EXPECTED TO INCREASE 92% BY 2040.

FIGURE 3 | CURRENT RAIL AND INTERMODAL OPERATIONS



HOW WILL THIS HELP ACHIEVE THE VISION?

Middle Tennessee has a number of advantages when it comes to business recruitment and job creation. The region should capitalize on its key location near other metropolitan areas in the Midwest and South as well as the presence of rich and dense transportation networks that have attracted a clustering of freight-related businesses. However, much like our roadways, the region’s rail lines often experience a significant amount of congestion. This congestion will only continue to grow as goods movement increases over time, making rail a less competitive mode for moving goods and inhibiting its ability to compete with highways as an efficient way to move products through the region. Moreover, rail infrastructure provides a valuable asset that should be considered for public transportation opportunities. Rail alignments travel through a number of regional population centers that may help serve these communities with much needed alternatives to the automobile. Lastly, while rail operations provide employment opportunities and attract businesses that may take advantage of the rail, optimizing rail operations can help reduce the impacts of freight rail movements on nearby communities.

WHAT ARE THE ISSUES ASSOCIATED WITH CURRENT RAIL OPERATIONS?

The region’s rail infrastructure is primarily single track, meaning that two trains may not operate in the same area at the same time should one need to pass the other. Single track rail alignments have a capacity of approximately 20 trains per day, with many areas of the region already congested. This congestion will continue to worsen in the future. Anticipated growth and development patterns in Middle Tennessee reveal that improvements are necessary to optimize the movement of freight rail throughout the region. By doing so, we will support the diversion of trucks to rail and provide current and future businesses the opportunity to use rail in transporting goods.

Beyond congestion, safety and security at at-grade crossings as well as the interaction of rail operations with residential uses also present significant issues in the region. Much of the rail congestion occurring today occurs near downtown Nashville and in high growth corridors including the southeast and northwest portions of the region. This creates congestion not only for goods moving along these rail lines, but also for automobiles, bicyclists and pedestrians who conflict with trains at railroad crossings.

Looking ahead, it will be imperative to plan for anticipated growth in goods movement. Investing in the region’s rail network is integral in helping to alleviate roadway congestion by diverting trucks to rail, keeping all modes of travel safe and efficient, and maintaining the region’s status as a premier location for manufacturing and industrial businesses. For more information on the anticipated growth in goods movement in our region, please see the Historic, Existing, and Future Conditions report.

RADNOR INTERMODAL YARD

Operated by CSX, the Radnor Intermodal Yard is the largest rail yard in the Middle Tennessee region. This yard is used for intermodal truck-to-rail transfers along with carload operations in the Middle Tennessee region.

In late 2013, Norfolk Southern (NS) relocated their intermodal yard from Uptown Charlotte, North Carolina to six miles west of Uptown at the Charlotte-Douglas International Airport between the second and third runway. The new facility, a key anchor of the company's Crescent Corridor, is 200-acres and cost \$92 million to develop. It had an opening day capacity of 140,000 containers with the ability to expand to 200,000. The location near the airport creates an intermodal hub linking air, rail, and roadway transportation.



PHOTO: Aerial view from the southern portion of the facility's site looking north.

Source: Charlotte-Douglas International Airport. "Fast Facts: Charlotte Regional Intermodal Facility at CLT."

<http://charmec.org/city/charlotte/airport/news/pages/intermodalfacilityfastfacts.aspx>

CASE STUDY | CHARLOTTE REGIONAL INTERMODAL FACILITY

HOW DO CURRENT RAIL OPERATIONS AFFECT LOCAL COMMUNITIES?

A significant amount of present day freight rail activity occurs in or around downtown Nashville and south into Rutherford County. These are densely populated and growing portions of our region, with Rutherford County expected to more than double in size by 2040 and Davidson County expected to remain the most populous county in the region and the center of the region's job market. The projected growth in population combined with growth in goods movement will not only make the efficient movement of goods throughout the region more difficult, but also intensify conflicts at existing rail crossings. Local communities are often faced with issues where freight rail activities abut residential areas. Issues of concern include noise and vibration, truck related congestion, pavement maintenance, and railroad crossing safety, and may disproportionately affect disadvantaged populations. These are especially apparent near Radnor Intermodal Yard and in and around downtown Nashville.

Downtown Nashville experiences a high volume of automobile and non-motorized travel that directly conflicts with freight trains traveling through the region. This leads to safety issues at existing crossings, noise pollution in adjacent residential areas, and other quality of life concerns. Additionally, residential development in the vicinity of Radnor Intermodal Yard has resulted in a mismatch of land uses, leading to inefficient freight movement and quality of life issues for residents living near the facility. Concerns of current freight rail noise have led to calls for quiet zones in some communities of the region.

WHAT ARE BENEFITS OF OPTIMIZING RAIL OPERATIONS?

Better aligning freight rail operations to current manufacturing and logistics clusters may help divert a portion of trucks to rail, providing manufacturing and industrial businesses with additional transportation opportunities. A byproduct of this may be the freeing up of land for other uses in areas prime for mixed-used, residential, or commercial development. Failing to take strides towards optimizing rail operations in the region will inhibit the ability to use rail infrastructure as one of our valuable regional assets, and perpetuate conflicts already experienced between rail operations and communities throughout the region.

Moreover, the growth of residential development near Radnor Intermodal Yard has led to intensifying conflicts between a growing population of residents and intermodal terminal operations. This growth in residential development and the corresponding growth of manufacturing and industrial development in the southeast has led to discussion of potential relocation of Radnor Intermodal Yard to an area with more industrial clustering. Ideal characteristics of new locations would include a suitable amount of available land that allows for future expansion, easy access to the regional truck network, a customer base within close proximity, and minimal impact on residential areas. Particularly noteworthy locations for consideration are along the I-24 corridor to the southeast and along I-840 between I-65 eastward through Rutherford County and north to Wilson County.

Locating an intermodal facility closer to anticipated future freight-related growth has the opportunity to improve the efficiency of freight rail operations in the region, free up land for other development, reduce truck related congestion on our roadways, and provide greater economic development opportunities for our cities, counties, and region.

CASE STUDY | MEMPHIS INTERMODAL FACILITY



The new Norfolk Southern (NS) intermodal facility in Rossville, Tennessee covers 571 acres and includes six loading tracks and 2,200 parking spaces. The facility is a key anchor in Norfolk Southern's Crescent Corridor and was the first of four anchors NS built to help move freight between the Gulf Coast and the Northeast. The facility cost an estimated \$112 million to build.

PHOTO: A straddle crane at NS' new regional intermodal facility at Rossville, Tenn., removes a 53-foot domestic freight container from a double-stack train.

Source: JOC.com, "NS confident slowing intermodal conversion just a hiccup." October 2015.

http://www.joc.com/rail-intermodal/class-i-railroads/norfolk-southern-railway/ns-confident-slowing-intermodal-conversion-just-hiccup_20151012.html

Photo: Norfolk Southern

CAN FREIGHT RAIL ASSETS BE USED FOR LOCAL PASSENGER RAIL SERVICE?

The Middle Tennessee region is a rapidly growing area that will require forward thinking policies and projects to help best accommodate growth in population and the associated jobs, travel, and growth in goods movement that corresponds with it. Rail alignments travel through a number of regional population centers that may benefit from passenger rail as a viable mode of transportation. Taking advantage of our valuable rail infrastructure to reduce strain on the region's roadways can be accomplished not only by considering opportunities to divert truck traffic to rail, but also by looking for opportunities to allow passenger rail service on freight rail lines.

If freight rail is to remain a competitive option to truck travel, facilities will need to expand and modernize. Similarly, if the Middle Tennessee region is to create opportunities for passenger rail to compete with and complement automobile travel that reduces congestion on our roadways, existing rail infrastructure will need to expand. As the owners of rail in our region, the support and buy in of freight rail operators is a prerequisite to any passenger rail service on existing lines. Allowing passenger rail service would require extensive discussion on liability terms, capacity needs, and safety.

There are a number of examples of passenger rail services throughout the country that either share tracks with freight operations, or purchased tracks from freight rail companies. Middle Tennessee's Music City Star commuter rail service operates on track publicly owned by short-line freight rail operator Nashville and Eastern Rail Authority. The Regional Transportation Authority of Middle Tennessee is currently conducting a study on transit feasibility in the northwest portion of the region, which includes both short-line and CSX rail alignments.

WHAT WOULD IT TAKE FOR US TO ACCOMPLISH THIS?

Implementing any changes to current rail operations in the region would require a significant level of coordination and cooperation between the freight rail operators as owners of the rail line, state and local governments, as well as the public to determine current issues stemming from freight and community conflicts as well as potential benefits of passenger rail service. The needs of freight rail operations and passenger rail operations are very different, with both in need of significant investment.

Freight rail is a business with goals motivated by cost and profitability, whereas passenger rail operations focus on reliability, safety, and frequency. Regardless of the path the Middle Tennessee region takes, both of these pursuits will require investments in capacity and upgrading of existing rail infrastructure. Additional issues that must be considered as part of this strategy include the assumed liability of freight operators and rail owners who allow passenger service on their tracks. Freight railroads require adequate protection from liability before they can agree to host passenger trains. Track and right-of-way will likely need to be upgraded with additional safety measures to allow passenger rail. Beyond that, additional capacity will be needed to accommodate not only anticipated growth in freight rail operations, but also passenger rail. This may be full double tracking or additional sidings.

HOW ARE LOCAL GOVERNMENTS, THE STATE, AND THE MPO INVOLVED?

Local officials, the state, and the MPO will be responsible for identifying strategies to optimize rail operations for goods movement and identifying opportunities for passenger rail services in the region. Building consensus around the preferred growth and development patterns of the region and optimal locations for residential and freight development will help reduce both current and future land use conflicts. Regardless of the outcome of these efforts, it is apparent that local government, the state and the freight rail operators must work together to find solutions that benefit numerous stakeholders with often conflicting priorities.



SunRail in Orlando, Florida is 31-mile commuter rail line opened in 2014 and was made possible when the state purchased 62 miles of CSX track. In 2007, officials from counties along the proposed line approved the project and entered into agreements with each other and the Florida Department of Transportation (FDOT) which included commitment by FDOT, counties, and cities to fund half of capital improvements, with half of the project funded by the Federal New Starts grant program. The 31 miles of operation represent phase 1 of the project, with the second phase set to begin construction in 2016. CSX used the funds acquired through the deal to enhance tracks elsewhere near their new Winter Haven intermodal facility.

Source: Community Transportation Association. "Rail Prevails: Orlando's SunRail Set to Become Central Florida's First Modern Rail System." Summer 2012. web1.ctaa.org/webmodules/webarticles/articlefiles/RAIL_30_SunRail.pdf

POTENTIAL IMPACTS OF FUTURE RAIL PERFORMANCE INCLUDE

- Diversion of freight rail traffic from rail to roadways, especially I-24
- Loss of customer base from rail to trucking
- Decreased competitiveness

COORDINATE ECONOMIC DEVELOPMENT AND LAND USE DECISIONS WITH PLANNED INVESTMENTS

As a logistical hub, Middle Tennessee boasts a vast transportation infrastructure and economic engine that helps support thousands of jobs and brings businesses to our region. However, this economic engine also creates a number of conflicts related to the uses and needs of residential areas that are situated near industrial and manufacturing development that rely on Middle Tennessee’s robust transportation infrastructure. The improved and consistent coordination of economic development and land use decisions with freight investments planned within the region is the third recommended goal of the freight vision. Formalizing coordination between economic development decisions, land use planning decisions, and investments in the region is important to ensure that freight transportation options are compatible with adjacent land uses and that land use decisions are consistent with freight mobility needs.

OBJECTIVES	ACTIONS	TIMEFRAME
Enhance Middle Tennessee’s attractiveness as a freight/logistics hub.	Establish criteria for siting industrial/logistics companies	Short
	Designate regional freight/logistics industrial zones	Short
Identify infrastructure-ready sites for industrial recruitment or expansion.	Update local land use policies and zoning ordinances	Short to Mid
	Implement restrictions of the location of freight intensive land uses	Mid
Maximize locational efficiencies of industry clustering.	Identify economic incentives for company recruiting and siting	Short to Mid
Protect freight intensive areas from incompatible land development/uses.	Augment/extend freight infrastructure to optimal zones	Mid to Long

HOW WILL THIS HELP ACHIEVE THE FREIGHT VISION?

When investments and development decisions are well coordinated, both the public and private sector will benefit through reduced congestion, improved air quality and safety, enhanced community livability, improved operational efficiency, reduced transportation costs, and greater access to freight facilities and markets. On the contrary, if investment decisions are not coordinated with economic and land use planning decisions, goods movement may become less efficient, conflicts between community and quality of life goals increase, the area suffers from increased congestion, and the ability to ensure the reliability of deliveries is hindered. By adopting a coordinated approach to these decisions, the region has an opportunity to attract businesses while reducing the burden of manufacturing and industrial development on nearby residential areas.

ARE THESE DECISIONS ALREADY COORDINATED?

Improved coordination is achievable by implementing changes in existing land use and zoning codes, development of regulations that seek to lessen the conflict between different land uses, and creation of consensus between key stakeholders about the balancing of land use decisions with economic development strategies. Examples of increasing coordination include the creation of ad-hoc working groups of local governments, state and local economic development agencies, and property owners about the future of the region. If not properly planned, freight movements and freight-related uses can have negative impacts on residential land uses, including but not limited to noise and light pollution, odors, vibrations, safety concerns, and increased truck traffic. Properly calibrated land use regulations provide local governments with the right tools to lessen incompatibilities and negative externalities when residential land uses and freight-related uses are situated nearby.

HOW CAN WE BETTER MINIMIZE CONFLICTS CAUSED BY THE PROXIMITY OF INCOMPATIBLE LAND USES NEAR MAJOR FREIGHT FACILITIES OR GENERATORS?

The MPO has looked at what other parts of the country do to assist in the siting of industrial and logistics companies in a way that aims to reduce conflicts among various uses while also safely and efficiently moving both freight and passenger vehicles. For example, the region may choose to require industrial land uses be near the regional truck network to minimize travel on other roadways. Facilities generating a large amount of truck traffic should be located away from residential and other conflicting uses.

Additionally, encouraging industrial uses to be located close to railroads increases the opportunity to utilize rail and reduce the total number of trucks generated from an industrial location. Comprehensive Plans and Future Land Use Development Maps may assist local jurisdictions in protecting locations that feature industrial activity and ensure they are not rezoned for other purposes. Local land use policies and zoning regulations may also help minimize conflicts caused by the proximity of incompatible land uses near major freight facilities or generators including conflicts between truck and auto movement, noise pollution, heavy wear on roadways in residential streets, and increased burden for freight delivery.

Where conflicts will exist, it will be important for local communities to consider efforts to minimize any negative impacts. This may include the addition of vegetative or structural buffers for sound and vibration, off peak delivery requirements, truck parking requirements, increased landscape requirements, access management standards, and other strategies. Additional recommendations are provided in the Land Use Planning and Urban Design report and in Table 1.

WHAT ARE THE BENEFITS OF BETTER COORDINATION?

Improving coordination efforts at a regional level can help expedite the implementation of plans, programs, and projects that support economic development, improve quality of life, and increase job opportunities. Regional stakeholders should work together to identify appropriate locations for key industries across the region and to identify economic incentives to coordinate company recruitment and siting to appropriate locations.

Rail industrial access programs, tax reductions, and sales tax exemptions on purchases of materials to construct or renovate facilities are some mechanisms that may be used to help recruit long-term manufacturing and industrial presence in identified freight-intensive locations throughout the region. Providing economic incentives to encourage the recruitment and retention of businesses to these areas is a critical component to coordinated freight and land use planning needed to achieve the freight vision. Improved coordination may also have environmental benefits such as reduced truck VMT and emissions. Freight villages are an effective way to reduce the sprawl of impervious surface while also increasing land uses dedicated to industrial and manufacturing needs. Freight villages are a clustering of activities related to transport, logistics, and distribution of goods, for domestic and/or international transit, and carried out by various operators.

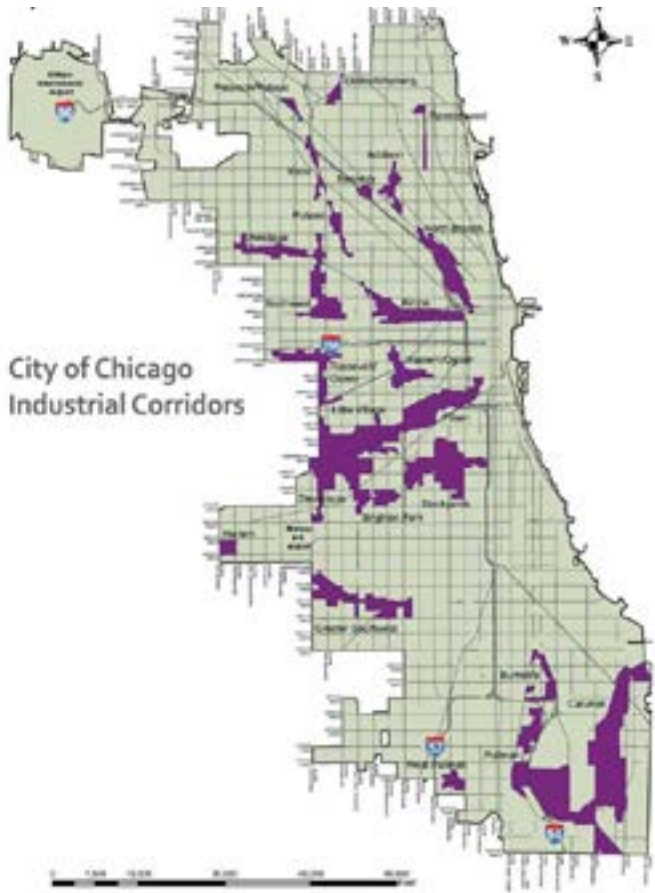
POTENTIAL IMPACTS OF UNCOORDINATED LAND USE AND INVESTMENT DECISIONS INCLUDE

- Longer truck trips and an increase truck travel
- Increased congestion for trucks and autos
- Increased number of truck-involved crashes
- No indication for developers of non-compatible land uses and where they can locate to minimize conflicts

TABLE 1 | FREIGHT-RELATED LAND USE POLICIES

HOW ARE LOCAL GOVERNMENTS, THE STATE, AND THE MPO INVOLVED?

Establishing partnerships with ECD and Chamber officials will help gain better understanding of the wide spectrum of needs within the region. Local governments and regional partners may benefit from coordinated efforts with business partners to better understand industry needs and priorities. Beyond that, the MPO can serve as a forum for discussion of optimal land use policies, context sensitive decisions, and the needs of local governments as they relate to fostering a welcoming business environment for manufacturing, industrial, and logistics companies.



CITY OF CHICAGO INDUSTRIAL CORRIDORS

Freight intensive corridors, or industrial corridors, are roadways with high levels of adjacent freight-related establishments. Some jurisdictions have developed specific industrial corridor programs to establish a growth plan for these types of roads. THE CITY OF CHICAGO INDUSTRIAL CORRIDOR PLAN was designed to counteract the residential housing market expansion putting increasing pressure on many of the City’s prime industrial sites, especially those located near downtown. The City established “buffer” subzones near the edges of some of the “Planned Manufacturing Districts” (PMD) that allow for a variety of commercial and institutional uses to smooth the transition between industrial and sensitive land uses. Chicago’s zoning code also includes performance criteria specific to the conditions within each PMD zone that limit the levels of noise, vibration, smoke and particulate matter, toxic matter, noxious odorous matter, fire and explosive hazards, and glare or heat emitted from properties within the zones. There are currently over 35 designated industrial corridors in Chicago. They are identified by a series of characteristics, including their accessibility to goods dependent industries and transit, and the existence of compatible uses within the corridor.

More information can be found at the City of Chicago website, http://www.cityofchicago.org/city/en/depts/dcd/supp_info/repositioning-chicago-s-industrial-corridors-for-today-s-economy.html.

LAND USE ZONING TOPIC AREA	RECOMMENDATION
PERMITTED USES	Increase Use Classifications for Industrial Land Use Types to include such use subtypes such as Manufacturing, Transportation, and/or Warehousing/ Distribution Center to allow for a more fine-grained permitted use framework.
ACCESS MANAGEMENT	Require access to industrial facilities from arterial or collector street. Driveway separation between property and street shall be appropriate for adjacent uses.
INDUSTRIAL OVERLAY	Develop districts to create flexibility in the zoning process areas for future industrial activity.
SETBACK STANDARDS	Side or Rear Yard Adjacent to Residential Use: 50 feet. Front yard: 50 feet.
DISTRICT LANDSCAPE AND BUFFER STANDARDS	Incorporate buffer and screening requirements for freight-intensive uses located in close proximity to residential neighborhoods: maintain scalable exclusive buffer zone between freight-intensive uses and other uses and require vehicular use areas to be screened from public streets and adjacent uses.
PERFORMANCE AND CONTEXT STANDARDS	Incorporate performance standards for freight-intensive uses to avoid nuisances of noise, air pollution, hazardous waste, and odor requirements on adjacent land uses.
PARKING, LOADING AND CIRCULATION STANDARDS	Parking and loading requirements shall be consistent with facility usage. Major industrial facilities shall conduct a traffic impact analysis.
TRUCK ROUTE STANDARDS	A regional truck route network should be incorporated into local truck route designation. Municipalities can add supplemental roads based on local needs including truck prohibited routes. Designated truck routes should have adequate pavement depth and material. Designated truck routes should be designed appropriately based on urban, suburban, and rural designations. Additional design features should be considered for truck designated routes that are adjacent to bicycle lanes, sidewalks, schools, and hospitals.

FREIGHT MOVEMENT AND OTHER MODES

The efficient movement of goods along our roadways, railroads, air, and water, provides a variety of benefits including employment, tax benefits, and contributions to economic output. On the other hand, goods movement may include such drawbacks as air quality impacts, environmental justice issues, and other quality of life concerns. Freight is often perceived as in conflict with other modes including the passenger vehicle, bicyclist, and pedestrian.

Effectively planning for the coexistence of all modes within the Middle Tennessee region, and even along the same street is needed to minimize conflicts and provide a safe and friendly environment for all travelers. While truck activity tends to be problematic when it occurs on the same roadways as bicycle and pedestrian traffic, delivery of goods to retail locations and manufacturing and industrial facilities by truck is needed for the region's continued economic growth, employment opportunities, shopping, and quality of life. Similarly, freight trains may create delays at crossings for motorists, bicyclists, and pedestrians, while also providing jobs and goods for residents in Middle Tennessee.

Planning for all travelers and encouraging collaboration among those responsible for the planning and maintenance of facilities with all users of the system will help freight, passenger vehicles, buses, bicyclists, and pedestrians move safely and reliably throughout the region.

DAVIDSON STREET IN NASHVILLE RUNS THROUGH A HEAVY INDUSTRIAL AREA. THE ROADWAY HAS RECENTLY BEEN UPDATED TO ACCOMMODATE ALL USERS MORE SAFELY.



COORDINATION WITH EXISTING PLANS

The vision for freight in the Middle Tennessee region is informed not only by the supporting documents and tech memos developed as part of this effort, but also the ongoing conversations between the MPO and its state and federal partners. Both the Tennessee Department of Transportation and the U.S. Department of Transportation have recently released freight plans that are multimodal in nature and align with regional efforts.



TENNESSEE DEPARTMENT OF TRANSPORTATION STATEWIDE MULTIMODAL PLAN

TDOT's Statewide Multimodal Freight Plan defines strategic goals as well as policy recommendations and initiatives for the statewide freight system. The three goals identified by the state, and related to FHWA's National Freight Policy, to address current and future needs of the freight transportation system are:

1. Improving the safety, security, and resilience of the freight transportation system
2. Improving the state of good repair of the freight transportation system
3. Reducing the congestion on the freight transportation system

A number of the policy initiatives and recommendations outlined in the statewide plan align well with efforts occurring at the regional level.

As part of their system performance analysis, the state has identified a number of highway bottleneck locations which could be improved by implementation of a regional truck network and freight-friendly design standards. Identifying bottlenecks can assist in selecting projects to improve the efficiency of Tennessee's multimodal freight system. Thirty-two highway bottleneck locations are identified in the plan for potential improvements. Most of these locations are concentrated in and around the four major urban areas of the state, including Nashville.

The plan also identifies upgrading short-line railroad tracks as a priority for the state. With short-line railroads comprising approximately one-fourth of the railroad track miles in Tennessee, upgrading short-line track to 286,000 pound track capacity is important to Tennessee's freight transportation system. As of 2011, 39 percent of short-line track had been retrofitted for this standard. TDOT also identifies issues related to freight and land use compatibility as well as the integration of transportation planning and economic development as needs and next steps in the plan.

Additional policy and initiatives recommendations from the statewide multimodal plan include:

- Reaffirming and expanding Tennessee's Strategic Corridors to include rail, water, and intermodal facilities
- Establishing a multimodal freight funding program with a dedicated revenue source
- Expanding the State Industrial Access Program to allow for non-road improvements
- Establishing a freight and logistics office within TDOT to further advance freight planning and investments in the state
- Increasing TDOT's capabilities to assist communities and freight partners in best practices considering freight land use
- Continuing coordination with the statewide Freight Advisory Committee (FAC)
- Continuing to increase TDOT's technical resources in freight decisions
- Sustaining the transportation support for industrial land use development, including re-use of former industrial areas



U.S. DEPARTMENT OF TRANSPORTATION NATIONAL FREIGHT STRATEGIC PLAN

The U.S. Department of Transportation recently released a Draft National Freight Strategic Plan (NFSP), mandated through the Moving Ahead for Progress in the 21st Century Act (MAP-21) of 2012. The NFSP aims to describe the freight transportation system and future demands on it; identify major corridors and gateways; assess physical, institutional, and financial barriers to improvement; and specify best practices for enhancing the system.

The plan outlines a number of strategies across three categories that hinder the safe and efficient movement of goods:

- Infrastructure bottlenecks
- Institutional bottlenecks
- Financial bottlenecks

In addition to recommending strategies to address these bottlenecks, U.S. DOT proposed a series of national performance objectives and performance measures.

The NFSP identified that only 13 percent of MPOs have dedicated or permanent staff for freight transportation-related efforts. With growing Federal and State emphasis on freight planning, however, MPOs will need more personnel with freight knowledge to represent urban interests in the planning process.

Infrastructure bottleneck strategies include ways to mitigate impacts of freight projects and freight movements on local communities. This is highly related to the MPO's efforts related to land use and planned investment strategies. Institutional bottlenecks resulting from a lack of multijurisdictional, multimodal collaboration, and a need for improved coordination between public and private sectors were also highlighted.

The MPO's efforts through its Freight Advisory Committee work to gain private sector perspective as do relationships with various shippers, carriers and other private sector stakeholders. These relationships help the MPO in evaluating existing conditions of the transportation network, as well as transportation projects and policies, from a user perspective.

NEXT STEPS

Similar to many other regions, funding for freight infrastructure improvements is constrained. There are limited funds available for pursuing the more costly elements of the freight vision such as relocating freight facilities and making improvements to freight infrastructure that would improve the sharing of freight and passenger movements. The recently passed FAST Act federal transportation bill established a new discretionary funding program catered to freight projects. The FASTLANE Grant program, funded through 2020, has \$800 million dollars available in 2016 for projects that reduce highway congestion, increase intermodal connectivity, improve first and last mile connections, and enhance safety at grade crossings.

This program presents an opportunity for the Middle Tennessee region to consider when pursuing some of the actions proposed as part of the freight vision. The strategies and actions presented above represent a starting point by which the region can begin thinking about next steps. Exploring more comprehensive strategies and actions through dedicated studies and successfully implementing low cost actions may help build momentum and consensus around the direction of the vision. Other ways to move forward include:

- Develop a policy that identifies the preferred locations for developing future industrial, warehouse and distribution centers in the Middle Tennessee region. Meet with industrial real estate brokers and economic development professionals to educate them on the preferred locations.
- Develop a regional industrial land use policy that covers operational characteristics of freight-intensive land uses and how they interact with nearby features of the built environment.
- Develop the regional truck network as the policy for the region. Work with cities and counties to determine local impacts. Meet with members of the Tennessee Trucking Association and the Owner Operators Independent Drivers Association to educate them on the routes included in the network.
- Identify additional corridors for passenger rail exploration. Conduct a feasibility study of this corridor in cooperation with the host railroad(s).

Ultimately, the strategies and actions identified as part of this effort will help guide improved and coordinated freight planning in the Middle Tennessee region into the future. Tracking opportunities for funding in future Federal transportation legislation, working with economic development officials, industrial real estate brokers and large freight facility operators to determine the level of interest in moving to a freight-friendly preferred location, and if cost-sharing for relocation expenses can incentivize or accelerate these types of moves, and monitoring the performance of the truck route network to determine its usefulness and areas of improvement are continuing efforts that should also be part of next steps.

ABOUT THE NASHVILLE AREA MPO

MISSION

The Nashville Area MPO coordinates strategic planning for the region's multi-modal transportation system by serving as a forum for collaboration among local communities and state leaders. The MPO's vision is to develop policies and programs that direct public funds toward transportation projects that increase access to opportunity, while promoting the health and wellness of Middle Tennesseans and their environment.

A FORUM FOR COLLABORATIVE DECISION-MAKING

The MPO is a regional coalition comprised of TDOT, area transit agencies, county highway departments, and city and county governments across Davidson, Maury, Robertson, Rutherford, Sumner, Williamson, and Wilson counties. The coalition serves as a formal partnership which brings together state and federal agencies, local elected leadership, and planning and public works officials to develop a unified transportation plan for the region. Together, these partners work with the business community and interested citizens to identify the transportation priorities for Middle Tennessee.

As the federally-designated transportation planning agency for the seven-county area, the MPO has the authority to plan, prioritize, and select transportation projects for federal funding appropriated by the U.S. Congress through the Federal Highway Administration and Federal Transit Administration, and is responsible for ensuring the region is in compliance with federal planning requirements and national ambient air quality standards.

GUIDING PRINCIPLES

Livability

Enhance quality of life by prioritizing initiatives that increase opportunities for housing, learning, employment, recreation, and civic involvement while maintaining affordability.

Sustainability

Encourage growth and prosperity without sacrificing the health, natural environment, historical and cultural assets, or financial stability for this or future generations.

Prosperity

Contribute to the region's economic well-being by targeting solutions that attract talent, connect workforce with jobs, reduce the cost of doing business and leverage additional investment.

Diversity

Respect the multitude of backgrounds and the variety of perspectives of Middle Tennesseans by pursuing an array of strategies that are customized to local community needs and character.

Funding for this report was provided by grants from the Federal Highway Administration and Federal Transit Administration, and contributions from the Tennessee Department of Transportation and local government members. The Nashville Area Metropolitan Planning Organization does not discriminate on the basis of race, color, national origin, gender, gender identity, sexual orientation, age, religion, creed or disability in admission to, access to, or operations of its programs, services, or activities. Discrimination against any person in recruitment, examination, appointment, training, promotion, retention, discipline or any other employment practices because of non-merit factors shall be prohibited. For ADA or Title VI inquiries, contact Michelle Lacewell, ADA Compliance Coordinator, at 615-880-2452 or email lacewell@nashvillempo.org.

ACRONYMS AND DEFINITIONS

Bottleneck - A section of a highway or rail network that experiences operational problems such as congestions. Bottlenecks may result from factors such as reduced roadway width or steep freeway grades that can slow trucks.

Carrier – A firm which transports goods or people via land, sea, or air.

Class I Railroad – Railroad with annual operating revenue of at least \$433.2 million (2011).

Commodity – An item that is traded in commerce. The term usually implies an undifferentiated product competing primarily on price and availability

Context-Sensitive Solutions - A collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic, and environmental resources, while maintaining safety and mobility. CSS is an approach that considers the total context within which a transportation improvement project will exist.

Distribution Center – The warehouse facility which holds inventory from manufacturing pending distribution to the appropriate stores.

FHWA – Federal Highway Administration

Freight as a Good Neighbor – Refers to the wide range of sit selection, site and building design, and operating strategies that limit the negative impacts (such as noise, light, emissions, etc.) on nearby communities.

Freight Villages – A clustering of activities related to transport, logistics, and the distribution of goods, for domestic and/or international transit are carried out by various operators.

Intermodal Transportation- Transporting freight by using two or more transportation modes such as by truck and rail or truck and oceangoing vessel.

Logistics – All activities involved in the management of product movement; delivering the right product from the right origin to the right destination, with the right quality and quantity, at the right schedule and price.

MPO – Metropolitan Planning Organization

Quiet Zones - Designated areas in which trains are not required to sound their whistles while approaching grade crossings. Quiet zones are intended to reduce the noise impacts of rail operations, but require the installation of advance warning systems and gates, and possibly additional safety equipment depending upon location-specific conditions.

Shipper – Party that tenders goods for transportation.

Short-line Railroad – Freight railroads which are not Class I or Regional Railroads, that operate less than 350 miles of track and earn less than \$40 million.

Supply Chain – Starting with unprocessed raw materials and ending with final customer using the finished goods.

TDOT – Tennessee Department of Transportation

Truck Parking – Facilities either on-highway (such as state-operated rest areas and service-plazas) or off-highway (private truck stops), which provide spaces for trucks to park and for drivers to rest.

Warehouse – Storage place for products. Principal warehouse activities include receipt of product, storage, shipment, and order picking.

Zoning – Regulations established by local governments which designate “zones” and define the allowable land uses, density, ground cover, building types, and dimensions within them.



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