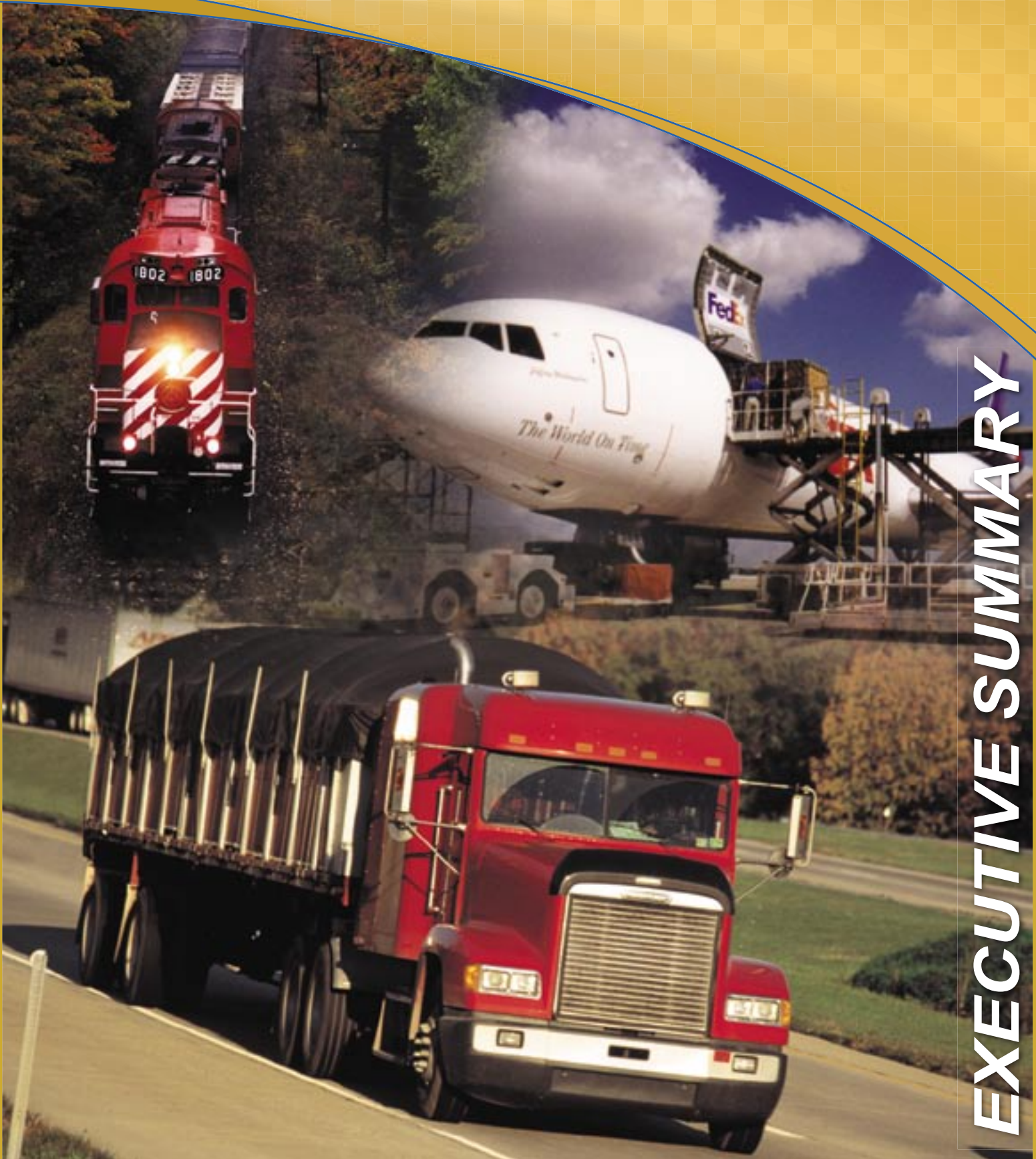


NASHVILLE

REGIONAL FREIGHT AND GOODS MOVEMENT STUDY



EXECUTIVE SUMMARY

Preface

The Nashville Area Metropolitan Planning Organization (NAMPO) inaugurated a study of the movement of freight and the role it plays in the local economy in late 2003. A principal goal of the study is to institutionalize freight needs into the overall NAMPO planning process, by modifying existing planning tools and priorities.

In order to meet this goal, two primary study objectives were established by NAMPO staff:

- Establish the basis for subsequent freight planning efforts by assembling a regional freight advisory committee and developing a regional freight profile.
- Produce freight related strategies, policies and projects specific to the Nashville area that can be implemented within the NAMPO planning process in the near term.

The NAMPO includes Davidson, Rutherford, Sumner, Wilson, and Williamson Counties. The study region further extends to the cities of Springfield and Spring Hill in Robertson and Maury counties, with their important industrial production.

Transportation in the Modern Economy

In today's global society, commercial transportation has become crucial to a region's business and industrial development potential. For many industries, economic competitiveness is defined by the ability of goods and services to be transported in a time-definite manner. And, while a well functioning commercial transport system is largely responsible for the modern quality-of-life attributes that consumers' value; for most consumers commercial transport is an invisible process manifested by large trucks and loud, cumbersome trains that threaten their own timely commute.

In the current business environment cost effective, time sensitive transportation services are increasingly a strategy for competitive advantage in manufacturing and service based industries. To attract economic development in this new environment, planning agencies must understand and support new economy transportation needs. There are a number of important changes currently taking place within the economy of the United States that have significant implications for any long range transportation planning effort:

- The globalization of trade
- Shift from manufacturing to service economy
- The evolution of business logistics

This evolving business environment and associated impacts on transportation networks also has significant implications for regional and local economic development. Robust growth in Nashville's economy and population over the past several decades is now putting pressure on the Region's transportation system, resulting in unwanted externalities and unforeseen consequences; traffic congestion is growing, air quality is declining and industrial land use patterns are shifting away from the center of the city.

Nashville occupies a strategic location within North America. It is within 650 miles of half the U.S. population and sits at the nexus of major highways and rail routes. Its position as a crossroad city brings to Nashville a set of challenges in dealing with the various aspects of traffic, particularly highway congestion and air quality, as their major sources originate outside of the area.



Appendix B: Project Listing

	Location	Condition	Source
1	I-65/I-40 Jct. at Fesslers Rd	Congestion: Access point to freight terminal and industrial district, as well as traffic convergence/divergence	Trimac Transport
2	I-24 & I-40 Split, East & West	Very congested in half mile section where routes converge	Dollar General
3	I-65 North	Congestion: Construction based, but; a) with Briley also under construction, alternate route is also bad, and b) locals report I-65 under perpetual construction for two decades	TCW Distribution
4	11th Avenue at Church St.	Obstructed view of spur into Tennessean Newspaper	CSX
5	Briley Parkway	Wet driving conditions: 'Worst' bad weather road in Nashville for truck handling - slick, or road surface, or road pitch - unsure why	M & W Transportation
6	Murfreesboro Road	Congestion and operating conditions: Major secondary artery 'miserably' congested, and tied up with lights and intersections	Trimac Transport
7	Exit 239 Lebanon & Watertown exit toward Watertown Hwy 70	Cars exit off at 50 mph, has turn lane that runs together in one lane, very bad between 3 - 5:30 p.m	Field observation
8	City loading zones	Contractor & utility trucks utilize parking in loading zones, blocking real freight activity	Fed Ex Driver
9	Elliston Place	Lack of parking causes backup in turn lanes: Various delivery trucks using the center turn lane as parking while making deliveries, causing a backup as cars wait to turn from single travel lanes	Field observation
10	424 Church Street - Arcade Alley	Alley parking needs enforcement - narrow space exacerbated by parked cars. Blind side backing into Sun dock	Fed Ex Driver
11	1801 West End Avenue	Short apron in front of the loading dock causes 28' trailer to block travel on Ave.	Fed Ex Driver
12	Jefferson Pike at Murfreesboro Rd. - LaVergne	Need to consider red light; cannot turn left	Fed Ex Driver
13	Mason Road - LaVergne	Narrow, rough pavement, pot holes	Fed Ex Freight
14	Heil Quaker Rd, Bridgestone Pkwy and Old Hickory Rd.	Extremely difficult to exit industrial park due to combined truck and car traffic	Menlo Logistics
15	North Point Rd & 31 North	Intersection needs signal light; turn is slow and dangerous	Survey
16	I-24 at Hwy 840	4 lanes converging to 2 lanes	Fed Ex Freight
17	So. Royal Pkwy - Franklin, btw Hwy 96 and Mack Hatcher Pkwy	No trucks allowed. Eliminating the prohibition would allow trucks faster access to the truck by-pass and alleviate traffic on Hwy 96	Fed Ex Freight
18	8th Avenue Rail Bridge	Low bridge struck regularly by trucks, this bridge is a rail main line that must be closed for inspection each time it is hit	CSX, M&W Transportation
19	Bridgestone Pkwy & Old Hickory Blvd.	Heavy truck congestion at TA Truck Stop	Fed Ex Freight
20	109 at Gallatin	PM rush hour chaos: Mixed passenger & truck traffic at heavy time for both; route designed for car traffic now used for freight by-pass	Averitt
21	Industrial Blvd at Waldon Rd - LaVergne	Pot holes, low shoulder	Fed Ex Freight
22	Harding near Sidco	Need light at truck terminal entrance: Left turn to I-65 from 50 trucks/day terminal across busy 7 lane road	Allied Auto Haulers
23	Various	Tree branch and traffic light overhead clearances - Auto haulers carrying SUV's are often exposed to damage from inadequate clearances	Allied Auto Haulers
24	New Shakle Rd at Gallatin West Bound	Need more turn lanes room for right hand turns - railroad track too close	Fed Ex Freight
25	I-40 at White Bridge Rd	Speeding, narrow lanes, concrete barriers too close	Fed Ex Freight
26	I-24/I-40 Bridge crossing over Cumberland River	Open the Gateway Bridge before starting I-24/I-40 construction to provide an alternate for a key route.	Trimac Transport

Appendix A: Fast Action Project Descriptions, Continued



Photo looking west on Highway 31 (Prior to Start of Construction)

Project #5

Source

New Shackle Island Rd. at Gallatin Rd. (US Hwy 31)

Location

Motor Carrier Survey

Jurisdiction

Sumner County (Hendersonville, TN)

Problem

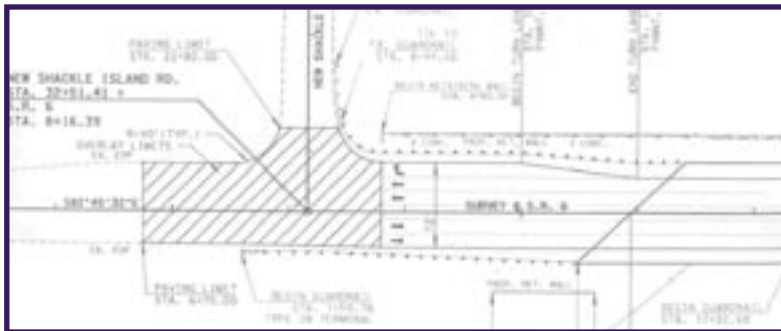
A new turn lane is needed going right. The rail line is seen as being too close to the road.

Proposed Actions

T.D.O.T project currently under construction to replace bridge, widen roadway, and install a new westbound right turn lane.



Location Map



Copy of TDOT plan to install a right turn lane from Gallatin Road onto New Shackle Island Road



Old Hickory Boulevard looking southbound

Project #6

Source

Old Hickory Boulevard at Firestone Pkwy

Location

Motor Carrier Survey

Jurisdiction

Davidson county (Nashville, TN)

Problem

Extremely difficult to exit industrial park due to combined truck and car traffic. (Intersection capacity issues during peak traffic periods)

Proposed Actions

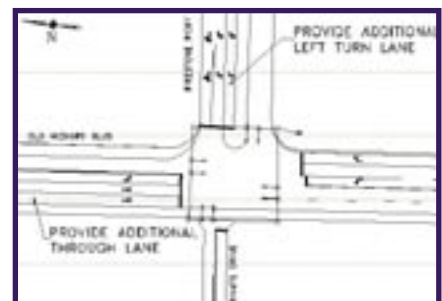
Conduct study to consider geometric improvements to intersection to provide additional capacity. A concept would be to provide an additional through lane on old hickory boulevard in advance of the intersection and to provide a dual left turn from Firestone Pkwy as shown below.



Looking east from private driveway at Firestone Pkwy



Location Map



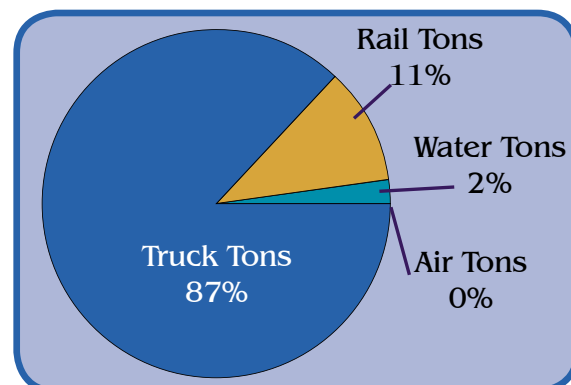
Sketch of potential geometric improvements

Nashville's Modal Profile

Nashville has an excellent distribution network at hand with highway, rail, air, and barge facilities all readily available. Three major U.S. interstate highways intersect in Nashville: I-40, I-65, and I-24. The area is served by numerous freight carriers with terminal locations throughout the metropolitan area and beyond. The Cumberland River provides full river barge access to the Gulf of Mexico. CSX Transportation serves Nashville with a major classification yard as well as container, automotive, and bulk terminals. Companies who arrange freight transportation on behalf of local businesses are also active in the Region.

Nashville's infrastructure carries significant tonnage of freight traffic through the year. The total volume is just short of 300 million tons. While all four modes of transport – truck, rail, water, and air – are represented, trucking far surpasses others in volume.

Nashville Freight by Weight and Mode



Truck Freight

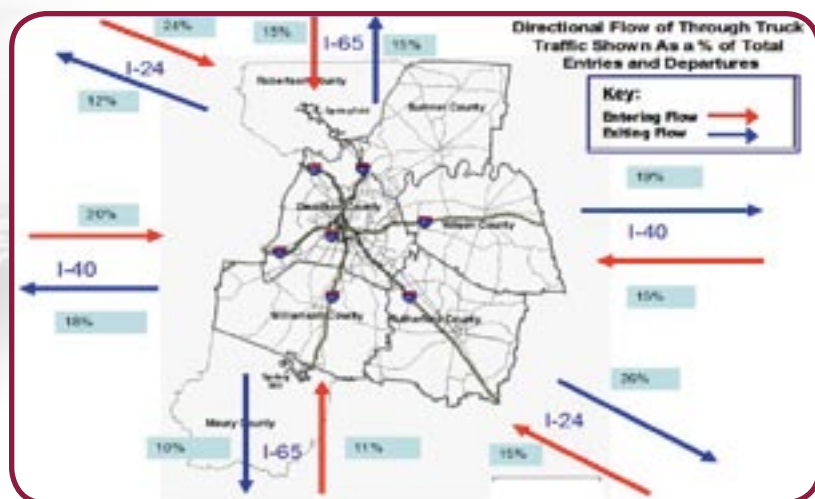
Two-thirds of truck traffic passes through Nashville rather than originating or terminating in the area. The need for through traffic management creates a distinct requirement for cooperation with other cities within Tennessee and with neighboring states, in the formation and implementation of rail and highway development plans. States surrounding Tennessee have the ability, through their individual policy decisions, to influence the volume of traffic in the Nashville area. It is therefore incumbent on area planners to be involved and attentive to the projects in surrounding regions. In fact, the interests of other MPO groups are directly in

line with those of the Nashville area, as through traffic is an issue across the state. These common interests suggest the need for organizations to ally, in seeking comprehensive solutions to transportation and air quality challenges.

Trucks moving through the area travel primarily on the interstate highway system. The crossroads aspect of Nashville is clear in the

view of that movement; the map below shows the direction of through truck traffic and trip direction shifts when it reaches the Nashville area. The 12 million annual through truck trips estimated from Transearch, places the Nashville Region among the top ten metropolitan regions in the country for through truck traffic. Typically, only about 30% of total truck volumes in urban areas are represented by through traffic.

Nashville Area Truck Activity			
Class of Traffic	Annual Truck Volume	Daily Trucks	% of Total
Local	600,000	1,609	3%
Inbound	2,100,000	5,669	12%
Outbound	2,000,000	5,401	11%
Through	12,600,000	34,485	73%
Total	17,200,000	47,164	100%





Rail Freight

Rail freight volumes in the Nashville area are shaped primarily by the structure and operating standards of the national rail network. Nashville is a crossroad in the rail system as it is for highways, and it carries a substantial burden of tonnage. Even so, the ability of rail to further relieve the highway congestion, is constrained by Nashville's position in the national network, capacity ceilings, and institutional factors.

Nashville is served by a single Class I railroad: CSX Transportation, and its related intermodal unit. The orientation of CSX lines in Tennessee is chiefly north-south, with a spur west from Nashville to Memphis. Major Class I railroads all interchange east/west traffic at their Mississippi gateways. Nashville's relatively close proximity (less than 500 miles) to major interchange points, restrict the region's opportunities for significantly shifting road freight to rail. Of the three key Interstate highway corridors at Nashville, all are constrained by rail:

- I-40: no through rail line east from Nashville to Knoxville to compete with trucks on I-40, and the line west hits the gateway at Memphis
- I-24: the rail route parallel to I-24 reaches a gateway at St. Louis in about 300 miles
- I-65: the I-65 route arrives at the Chicago gateway within 475 miles

The map below places Nashville's rail volumes in the context of national rail traffic network. Nashville is a key hub in the CSX system, routing sixty trains per day through the Nashville area toward five key cities: Atlanta, Birmingham, Chicago, Louisville, and Memphis. Forty of these trains simply pass through; the rest are "hubbed" in a classification yard, with the majority of railcars sent out again on a different train set - much like airline passengers change planes in an air hub.





Looking east on Elliston Place

Project #3

Source

Elliston Place

Location

Motor Carrier Survey

Jurisdiction

Davidson County (Nashville, TN)

Problem

Metropolitan Government

Delivery trucks often park in the (center) turning lane to unload. This causes reduced service of the roadway specifically when multiple vehicles need use of the turning lane.

Proposed Actions

Conduct a study to determine if alternate loading zone areas can be identified, coordinate with vendors, store owners and metro public works.



Elliston Place looking west



Location Map



Exit ramp from I-40 onto Sparta Pike (SR-26/US-70)

Project #4

Source

Lebanon and Watertown: Exit 239

Location

Motor Carrier Survey

Jurisdiction

Wilson County (Lebanon, TN)

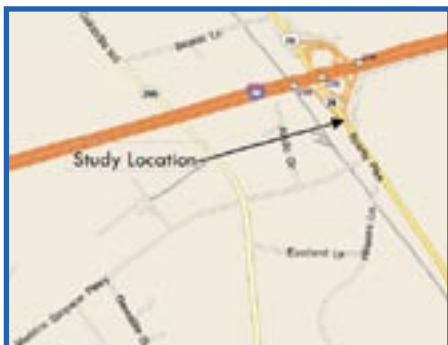
Problem

T.D.O.T.

Vehicles coming down the off-ramp of exit 239 attempting to merge with thru traffic have great difficulty. Trucks are not able to turn left due to congestion in the area. The problem increases during peak hours.

Proposed Actions

MPO has identified a project in the Transportation Improvement Program (TIP) to relocate Maddox-Simpson Parkway (SR-26). The proposed improvement will solve traffic problems by providing sufficient separation between the I-40 exit ramp and Maddox Simpson Pkwy. TDOT is currently selecting a consultant and the project will soon be under engineering design.



Location Map



Concept Plan from TDOT to relocate Maddox Simpson Pkwy approximately 500 feet to the south along Sparta Pike

Appendix A: Fast Action Project Descriptions



Looking west on Beechcroft Road (Hwy 247)



Location Map

Project #1
Source
Location
Jurisdiction
Problem

Beechcroft Road (sr 247) at csx crossing

Motor Carrier Survey

Maury County (Spring Hill, Tn)

T.D.O.T. / City of Spring Hill

Current at-grade railway crossing causes traffic delays as a result of its design. delay caused by Train blocking crossing for excessive amounts of time. City of Spring Hill has pending litigation with CSX regarding this issue.

Proposed Actions

Await results of pending litigation. Consider possible I.T.S. solution to advise approaching motorists' to seek alternative routes if litigation does not resolve the traffic problem.



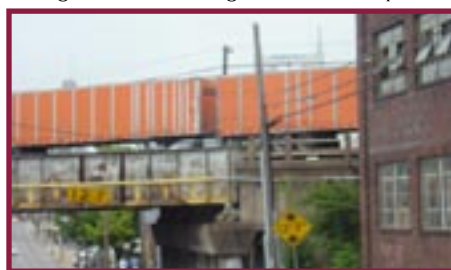
Looking east on Beechcroft Road (Hwy 247)



Advance warning sign on Beechcroft Road (Hwy 247) eastbound



Eight Avenue South looking south at railroad overpass



Eight Avenue South looking north at railroad overpass



Eight Avenue South looking north at railroad overpass

Project #2
Source
Location
Jurisdiction
Problem

8th Avenue Rail Bridge

Motor Carrier Survey

Davidson County (Nashville, TN)

T.D.O.T.

Design attributes of the bridge create inadequate height for trucks.

Proposed Actions

Interim solution: Study to determine the feasibility and design parameters for the installation of a vehicle height detection system in advance of overpass in both directions to warn of clearance problems. Long-Term solution: determine feasibility of improving clearance height by lowering roadway section.



Location Map

Air Freight

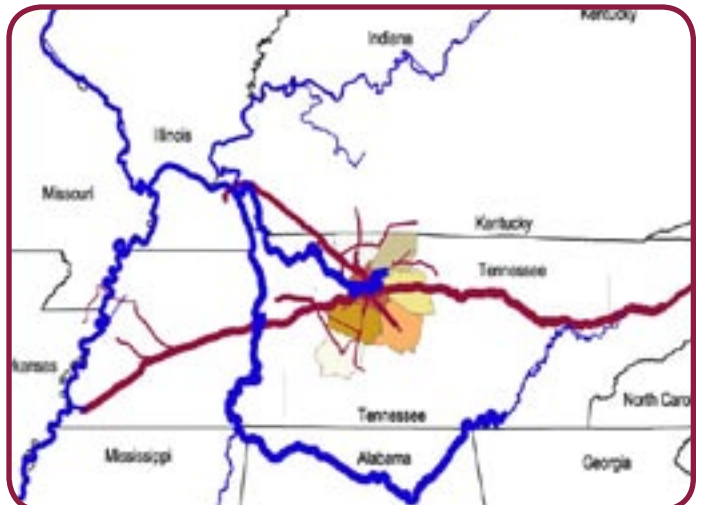
The Nashville International Airport covers 4,417 acres and is served by 17 scheduled air carriers. Scheduled passenger carriers provide direct service to 81 different markets. The freight facilities, which handle over 110,000 tons of freight each year, are located adjacent to the airport's passenger terminal. The Nashville Air Cargo Link all-cargo complex is located across the airfield from the passenger facility. These cargo connections help meet the high speed transportation needs of area industries such as Dell, whose business model depends on rapid integration of components to the market. Auto manufacturers also depend occasionally on air cargo to keep assembly lines moving.



Continued development and improvement of the airport facilities for freight purposes plays an important role in attracting and retaining business of this type. The more "high tech" the industry, the more likely it is to require air transport as part of its operating strategy. While growth in air traffic will not likely reduce the number of trucks on the highway, it is still an integral part of the transportation infrastructure requiring the same careful planning as the rest of the network.

Waterborne Freight

Nashville lies on the banks of the Cumberland River, 180 miles above the point where the Cumberland and the Tennessee join the Ohio River at Paducah, and continue to the Mississippi at Cairo. The waterway is navigable upriver and east to Celina, then downriver into the American heartland and the Gulf. River barges on the Cumberland carry 7 million tons of freight for the Nashville Area. Ninety percent of it comes inbound, making the river responsible for almost 20% of the inbound commodity tonnage supplied from outside to the Nashville region.



Getting Freight Stakeholder Input

The process of building stakeholder involvement in the NAMPO planning process began with a public forum at a 2003 winter meeting of the Middle Tennessee Council of Logistics Management.

Following the CLM meeting, a wide-area mailing was completed to 451 companies identified in the Harris InfoUSA data set, or through CLM and other contacts, representing a cross-section of area businesses. This mailing announced the study and contained a relatively brief, top-line fax-back survey

The study team completed face-to-face and telephone interviews with target companies touching all key sectors of the Nashville area economy, and covering the commercial geography.

Interview targets included both top industrial employers within the Nashville area, such as automotive manufacturers, electronics, and the printing and publishing businesses. They also included important service sectors whose goods movement requirements are service sensitive and logistically complex. The health care institutions were prominent in this group. Wholesale distributors and suppliers were sought out who were active in food and exhibition services.

Aligning Transportation Policy and the Economy

With the tremendous growth experienced in many metropolitan areas over the past several decades, urban planners are being challenged to incorporate sustainable development methods into their planning process. Sustainability with respect to freight implies the degree to which safety and economic benefits of freight transport are maximized, while at the same time minimizing travel delay and pollution. Sustainability with respect to freight is likely to be best addressed through efforts such as:

- Maximizing the efficiency of regional logistics
- Facilitating freight consolidation/intermodal transfer
- Promoting safe and efficient infrastructure design
- Urban (corridor) planning and design

Key industries in the Nashville Area fit a profile of service sensitivity with regard to freight transportation. Mobility is essential for the optimal function of regional business supply chains. Delays in freight transport carry business and social costs, including:

- Higher probability of inventory or production failure
- Risks of product degradation
- Inflated job site expenses
- Congestion at loading docks or staging areas
- Lower labor productivity
- Under utilized capital assets
- Risks to individual business viability

NAMPO has established a good foundation for regional freight planning through the goals stated in the Long Range Transportation Plan:

Policy Goal 2: Regional Mobility through a Multimodal System: Achieve enhanced mobility by providing an intermodal and multimodal transportation system that supports safe, efficient and convenient travel options for the movement of people and goods.

Working from this goal, a strategic policy framework was developed as a foundation for recommendations provided in the full report.

Fast Action Projects

This study utilized a process that included feedback from regional freight stakeholders to identify freight oriented projects and improvements that were of immediate concern. The process included a presentation of all projects identified to the Freight Advisory Committee. Members of NFAC were asked to priority rank the complete list so that follow up by field investigations could be made on a reasonable number of projects. Most of these projects are low cost and provide significant improvements to local freight operations. These projects represent “fast action projects” in the sense that they are achievable at a low cost and yield noticeable benefits for users. These projects intended for possible inclusion in the MPO’s next TIP. The top six projects selected by the advisory committee were:

- Beechcroft Road (SR 2247) at the CSX Crossing
- 8th Avenue Railroad Bridge
- Elliston Place
- Lebanon and Watertown: Exit 239
- New Shackle Island Rd. at Gallatin Rd (US Hwy 31)
- Old Hickory Blvd at Firestone Parkway

Sketch-level assessments of the top rank projects were prepared including a brief description of the issue and the proposed solution, accompanied by maps and photos.

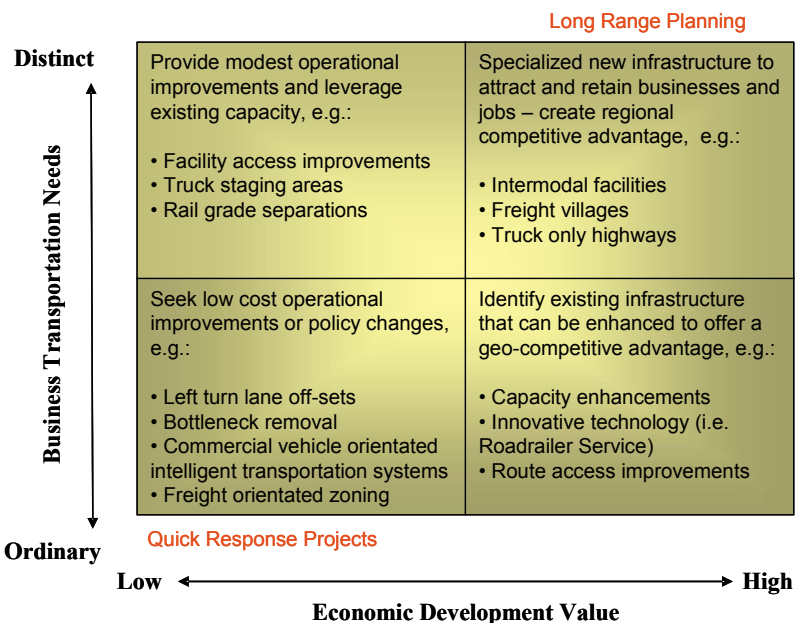
Regional planning agencies, such as the Nashville Area MPO have historically focused planning on passenger/commuter transportation needs. The increasing need for freight transportation places an emphasis on understanding private industry behavior and needs. This study is intended to set the foundation and provide direction for future freight related planning and investment efforts.

on through the established metropolitan planning process or on to other outside “fast track” planning processes that may be available at the state or federal levels.

In keeping with the concept of corridor-based planning for freight and goods movement, projects should be “packaged” in a corridor-wise fashion as they are developed throughout the programming process, not scattered around the Region. Developing and submitting projects focused on freight-intensive corridors will maximize the overall efficiency benefit realized from the implementation of projects that enhance freight mobility.

For projects within the Nashville Area MPO Boundary, project programming is coordinated and managed in partnership with MPO Staff, the Technical Coordinating Committee (TCC), and TDOT with the ultimate decision resting in the hands of the MPO Executive Board.

In the private sector, businesses often approach customer service needs through the creation of “customer service bundles.” Applying this approach to public transportation planning can help identify short and long term priorities. The graphic below presents a freight transportation services matrix with examples of how public agencies might approach both “quick response” and long term transportation needs. The transportation services framework is provided as a means of thinking about “what” types of responses local and regional governments can foster to improve freight transportation in the Region.



Promoting Economic Vitality & Quality of Life

Air Quality

The transport of freight, goods and services is affected not only by policies related to urban and transportation system design, but by policies related to environmental pollution. Two areas of focus in this regard are noise pollution and air quality. Complaints about noise from railroads and heavy truck traffic are common in residential areas. Policy development which specifically addresses freight mobility, by establishing truck corridors or designated truck routes, optimizing the location of industrial and warehousing facilities, or perhaps addressing operational constraints, can reduce the strain on the existing transportation infrastructure within the Region, and reduce heavy truck routing through residential neighborhoods.

Both state environmental agencies and the Federal government are afforded further authority to implement additional regional measures to achieve air quality attainment, which in some cases involve more stringent emissions requirements placed on heavy trucks and other vehicles. Not only will such potential decisions impact the bottom-line to shippers, but likewise the cost to manufactures and industries will be apparent. In either case, the Region's economic growth may be stalled as a result.

Pollutants emitted by trucks and automobiles, especially in areas of heavy congestion, impact a region's ability to maintain attainment of air quality standards. One function of the Nashville Area MPO's Long Range Transportation Plan is to estimate the amount of NOx and VOCs resulting from forecasted traffic on the Region's transportation network. The output from the computerized travel demand model is an estimate of vehicle miles traveled (VMT) and vehicle speeds. Using a factor of grams per mile, the VMT estimate can be converted to estimated emissions at a future target year.

Despite the fact that total VMT in the Nashville Region is forecasted to increase by more than 30% between 2002 and 2025, emissions of both VOC and NOx are expected to decrease by more than 30%. Anticipated improvements in vehicle technology, along with the scheduled future federal requirements such as low-sulfur gasoline and the gradual replacement of older vehicles, will offset much of the increase in miles traveled.

One suggested addition for future air quality related planning efforts in the Nashville Region is the collection and tracking of commercial vehicle registration data in the metropolitan counties. Registration data would provide information about the age of the local delivery fleet in the urban core.

Freight Project Programming and Funding

The process for programming projects is a complex and time consuming effort. It is important to consider that the types of projects developed for improved freight mobility are typically operational in nature. That is, they do not add vehicle capacity to the transportation system. Such projects do not raise problems of air quality conformity, and are very cost-effective to implement compared to other capital improvements. Some projects, however, can be implemented as a result of partnering between the public and private sectors that could encourage "modal shifts" of freight delivery from one mode

(example, trucks) to another (example, railroad) or vice versa.

The Knoxville "Truck Stop Electrification" project highlighted on the previous page is another good example of public/private partnering to develop freight infrastructure that benefits both carriers and the community.

Once needs have been identified through the system monitoring process, it is necessary to specify projects that address them. Projects that can benefit the Nashville Area freight network are likely to fall into one of three categories:

- Projects to mitigate physical or operational deficiencies
- Projects to improve system monitoring capabilities
- Projects to encourage or discourage modal shifts between freight modes

Design specifications and cost estimates of freight related projects should be made based on the recognized design standards developed as part of the metropolitan freight planning process. Once preliminary project specifications and cost estimates have been developed, potential projects can then be forwarded

Public Policy Objectives for Freight Planning

Three primary objectives provide the basis for achieving regional freight network goals:

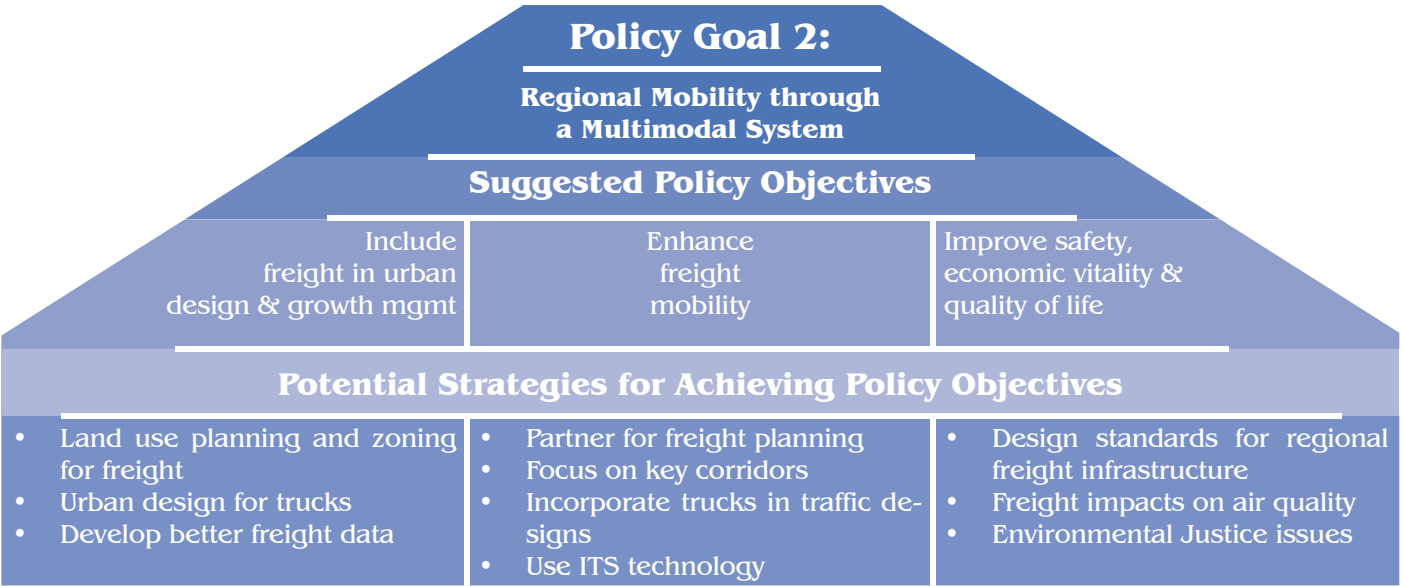
- **Freight Mobility-** A typical objective of freight planning is the enhancement of freight mobility; i.e. improving the efficiency of freight movements in the Region. All policies, strategies or projects implemented in the Region should be evaluated to determine the impacts on freight mobility.
- **Urban Design and Growth Management -** Another objective in support of developing a sound freight network is the need to manage urban design and growth. By employing measures and policies to improve urban design, one can also improve the reliability of the system. Zoning and building codes can be used both in shaping urban design and improving transport efficiency and reliability.

- **Economic Vitality and Quality of Life -** Mobility objectives must be balanced with public safety, overall economic vitality and quality of life. Regional planning activities should be evaluated to determine the impact on the environment, safety and the community (environmental justice), i.e. projects that improve freight mobility and relieve congestion can also lower emissions, improving air quality and quality of life in the Region.

The Nashville Regional Freight and Goods Movement Study Report provides specific opportunities that can be leveraged toward reaching the broader objectives of freight planning. Proposed strategies depicted in an outline format as follows:

1. **Planning to Enhance Freight Mobility**
 - Focus on key truck corridors
 - Incorporate trucks in traffic design

- Enhance freight operation using technology
 - Support freight planning with data
 - Promote intermodal operations
 - Partner for effective freight transportation planning
2. **Urban Design and Growth Management Policy**
 - Land use planning for freight
 - Regional zoning for freight infrastructure
 - Design standards for freight infrastructure
 - Urban development
 - Use development review process to benefit freight
 3. **Policies for Economic Vitality & Quality of Life**
 - Air quality issues
 - Environmental justice



Planning to Enhance Freight Mobility

The level of mobility and accessibility to the Nashville Area transportation network is a key consideration to the smooth and efficient flow of freight. Within the Region, increasing highway congestion affects the cost and efficiency of truck transport, and subsequently the reliability required for just-in-time delivery. Congestion is occurring at a time when the need for time reliable truck travel is likely to increase significantly.



Focus on Key Truck Corridors

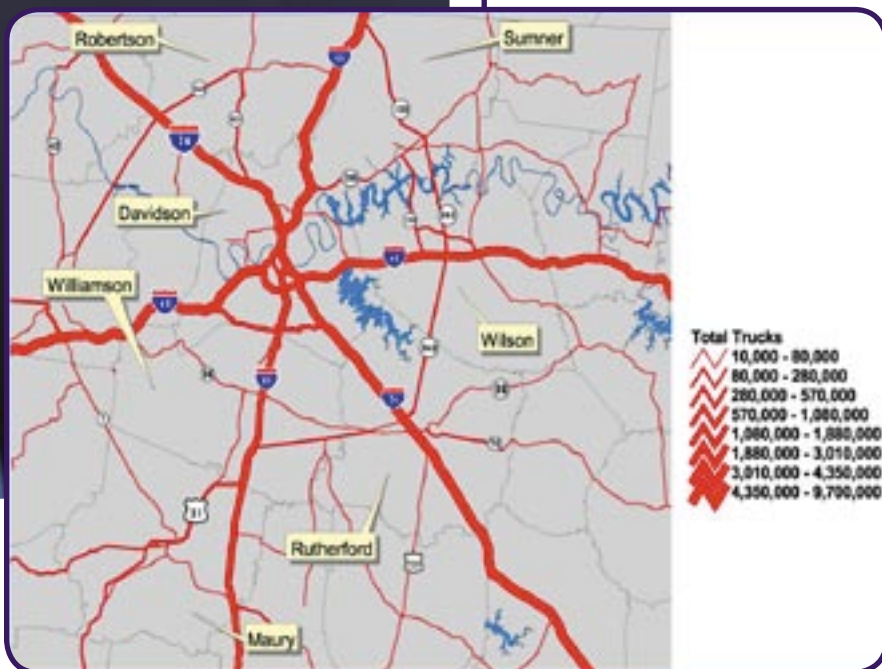
The Nashville Area has a well developed network of roadways with specific routes playing specific roles in network distribution. From a freight movement standpoint, network roles should become a central part of planning the Region's transportation system. At a very basic level, there are at least three network roles the regional street and highway system serves in providing for truck traffic:

- Through routes
- Regional arterial stem routes
- Local connectors to freight activity centers

Continued investment in these key through routes is important in sustaining the Nashville Area freight network. Moreover, investing in routes that function as viable alternatives such as adjacent arterials, as well as the completion of circumferential bypasses can help sustain primary corridors.

Through trucks are a significant piece of overall traffic volumes, but should not overshadow the need to plan for regional truck traffic. Growing congestion, the service sensitivity of key industries, and the tension between commercial development and commercial transportation needs argue for a core network of freight-effective radials, rings, and connectors. The strategic purpose of a system of freightways is both developmental and operational:

- Developmentally, the network is protected by zoning, building permits, and enforcement, so it can sustain truck traffic volumes efficiently.
- Operationally, the network is managed for freight. Traffic management centers observe the routes, have staff members conversant with trucking requirements, and can reach the logistics community with timely advisories. Signaling is timed for truck movement from known freight generators and receivers.



- Transportation information like traffic advisories, construction activity, and route alternatives is readily available.

At least as important, freight villages are locations that industrial development has targeted, not only as suited to freight-dependent businesses, but as so suited in preference to other areas. Towns may market their advantages and allow development to follow where it will; the clustering of functions like distribution centers may then come about on its own, as it has in areas around La Vergne and Lebanon.

- All modes are represented
- Land prices are lower than general commercial properties
- Adequate land is developable
- Facilities are accessible by local arterials
- Facilities have good access to interstate routes and freeways for regional and national distribution
- Accessible to a Class I railroad main line
- Accessible to an airport with air cargo services
- Accessible to a port

During the course of the study investigation, an area on the Western edge of Nashville was brought

to the attention of the consulting team as a potential location for a freight village. Hailey's Harbor River Terminal on the Cumberland River is situated near the convergence of Briley Parkway and the Nashville and Western Railroad (NWRR). Currently the NWRR serves 11 customers, hauling scrap/recycling, concrete, steel, chemicals and a variety of other products. The current line operates between Hailey's Harbor and

the Cheatham County Industrial Park located in Ashland City. Future plans for the rail line include eventual track upgrade to allow 286,000 pound railcars. The site which is currently zoned for light industrial use is situated across the Cumberland River from the John C. Tune Airport.



'WL' Zoning Classifications and Freight Villages – There are many benefits to defining a specific zoning classification for freight village types of development. Often the zoning designation of "warehousing and logistics" (WL) is used. This designation, supported by the comprehensive plan, can be used to cluster warehouse activities around specific areas that make operational sense. Such clustering can also provide the basis for the development of a "freight village". The model definition of a freight village is where:

Knoxville Truck Stop Electrification

The Knoxville Regional Transportation Planning Organization (TPO) Board approved, in the summer of 2002, the use of CMAQ funding for the installation of 200 IdleAire units. The TPO also funded an evaluation of the truck stop electrification project at the Watt Road interchange at I-40. The PETRO truck stop at that location has a total of 650 spaces, and to date 110 have been equipped with IdleAire hookups.

The project funded by the TPO supports air quality research being conducted by the University of Tennessee to examine the effectiveness of the IdleAire Truck Stop Electrification units in reducing diesel emissions which are often concentrated near truck stops. UT has been monitoring the air at the truck stop since December, 2003 and have observed concentrations of NOx and PM higher than EPA standards with the highest concentrations of NOx occurring during the winter. So far the research has recorded a reduction in NOx emissions at the PETRO truck stop on the order of 0.13 tons per day. Dr. Miller from UT noted that many trucks are parking in IdleAire spaces and not using the service as during the summer, the average use rate of the IdleAire units was 33%.

Source: TPO Technical Committee Meeting Minutes, October 12, 2004, online at: <http://www.knoxtrans.org/meetings/techmin.htm>

Land-Use Planning for Freight

Industrial location patterns are critical to freight transport demand and general freight transportation systems. Successful planning and zoning efforts should strike a balance between competing land-uses while accommodating freight transportation. When structured appropriately, such strategies can help reduce or prevent freight-driven sprawl on the outer fringe of the Region by developing freight and trade-related distribution facilities within existing transportation corridors and zones.

Urban designs frequently encroach on industrial locations resulting in reduced accessibility to terminal facilities and reduced efficiency of freight networks. Local Nashville planning jurisdictions could actively work to guide warehouse and distribution center development to appropriate locations for sustainable freight movement by taking into account modal accessibility needs and adjacent land uses. For freight system users and operators, access to transportation and freight facilities (e.g., warehouses, distribution centers, intermodal yards, air cargo ramps, and other facilities) is very important, and will frequently dictate where and how they locate. Freight

system users frequently locate where transportation corridors converge.

To properly plan for a regional freight network, it is necessary that proposed planning activities be officially recognized and implemented at a regional level. Planning procedures that differ across jurisdictional boundaries work against each other, diminishing the efficiencies gained through “just-in-time” inventory management. Without region-wide adoption of transportation planning activities and standards, the value of identifying a regional freight network may be lost. For example, major urban freight corridors often span multiple municipalities and/or counties. The benefits gained from coordinating traffic signal systems along these corridors include reduced travel delay and fuel consumption – benefits that can translate into savings for freight transporters. These benefits are lost if neighboring jurisdictions do not coordinate traffic signals throughout a corridor.

Regional Zoning for Freight Infrastructure

The creation, by all jurisdictions in the Nashville Area, of a zoning classification specifically designed to accommodate freight staging and distribution facilities would greatly enhance the ability of the Nashville Area to coordinate, plan for, and attract freight-related development. The following benefits would be realized from the creation of a specialized zoning classification:

- Continued development of freight-intensive clusters and trade-related distribution facilities within existing freight transportation corridors and zones.
- Opportunities for increased efficiencies by consolidating/clustering distribution centers near existing intermodal facilities.
- Zoning and development review processes ensure efficiency is not compromised by land use decisions that hinder freight operations.

Freight Villages: Conceptually - a class of industrial park designed and built for productive logistics, freight villages provide multimodal services, information systems support, goods staging and consolidation functions, and attractive industrial or distribution space. More broadly, it is a commercial zone where freight-intensive businesses have clustered or are encouraged to cluster, and that can be supported and managed for logistical efficiency.

Volume concentration in freight usually builds service economies, whereby transportation costs and time performance are both improved. Dense pockets of business establishments speed pickup and delivery operations, reduce empty repositioning, and help construct stem or linehaul movements with high levels of utilization. Commercial concentration also eases the management burden on public transportation officials trying to raise freight performance. Villages become the points where:

- Building codes and zoning are stressed for adequate accommodation of freight vehicles, including dock space and staging aprons.
- Freightways are specifically designed and managed to reach inside the village with fast access.
- Local streets are kept free of obstruction and encroachment, and parking or waiting areas are sufficient and held clear.
- Off-peak operations may be developed in ways that address their startup inefficiency for pickup and delivery, by attempting to coordinate shipping hours between businesses in the same zone.

Local Routes: Incorporate Trucks in Traffic Design

Through the interviews/survey process shippers and motor carriers in the Nashville Area identified truck turning radii on narrow roads as an issue, as well as narrow roads coupled with roadside ditches. The problem of road width is also exacerbated by the encroachment of structures on the right of way. Traffic design issues often contribute to a less reliable freight network. By developing a defined network and understanding the specific freight roles played by the Region's highways, roadway improvement strategies are likely to be more successful. There are several common areas of need for roadway design standards for truck activities:

- Intersection design
- Cross-section and geometric design

- Signalization
- Grade separation

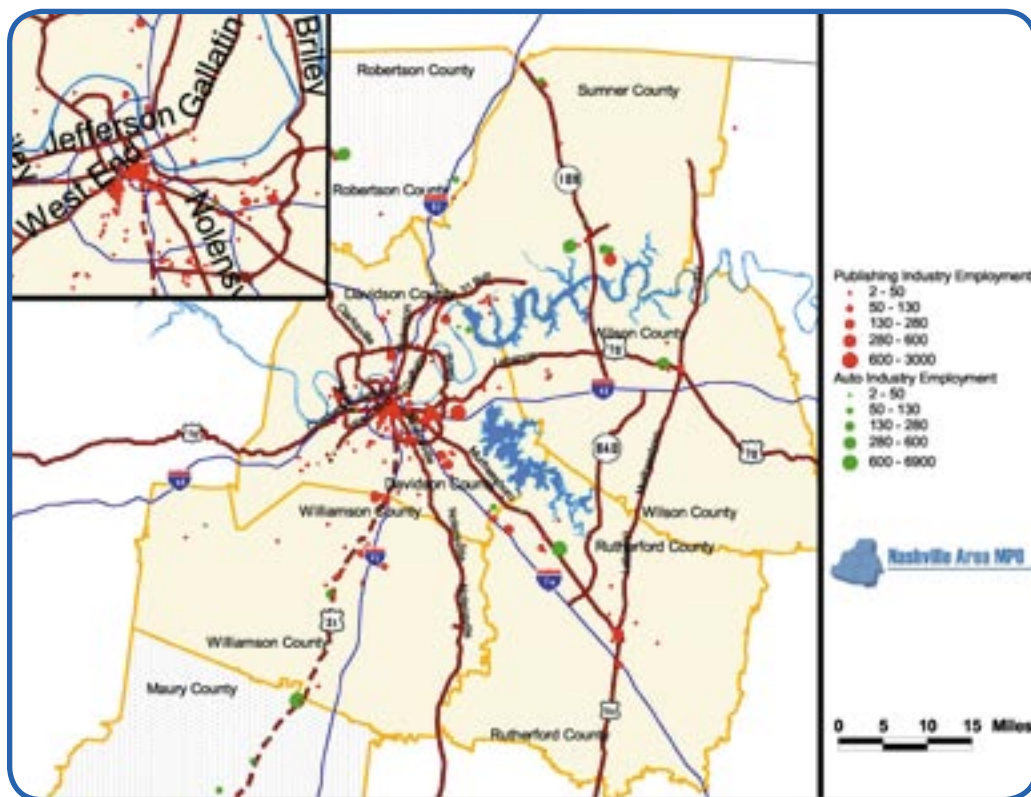
Intersection Design affects accessibility through delayed right turns due to oncoming traffic. To avoid oncoming traffic, trucks may be forced to "cut corners" onto curbs, while in other instances "curb hopping" may be attributed to lane-dividing medians. In either case, when forced onto curbs or medians while negotiating a turn, trucks run the risk of load shifts and damage to the goods they carry. Left hand turning requirements can be accommodated by the use of offset turn lanes where vehicles are held back to a stop line some yards short of an intersection. This creates a wider turning space for commercial vehicles negotiating the corner, and lanes like this were cited by motor carriers as sensible management

for narrow road widths, in districts with significant truck activity.

Intersection impediments, such as telephone poles, signs, or landscaping can also affect maneuverability. Landscaping, when combined with either oncoming traffic or center medians, can be a difficult challenge for truck driver maneuverability.

Cross-Section and Geometric Design – The geometry of a specific roadway, including the turning radii, lane widths, and other cross-sectional factors should be based upon the intended use or role of the facility. Regional truck routes tend to accommodate large, as well as smaller, trucks (WB50 and WB70) and, therefore, should be designed to accommodate those vehicles without creating significant traffic impacts. Local truck routes also need to accommodate larger and smaller truck sizes, and hence would have to be designed accordingly.

Signalization – The last several decades have seen significant advancements in signal technology and timing methods. Unfortunately, better timing plans are limited by the availability of good traffic data on a continuing basis. The Public Works Department at the Metropolitan Government of Nashville and Davidson County is currently conducting signal studies on seven heavily traveled truck corridors.



Promote Rail Intermodal Operations

The consideration of rail alternatives is also a response to through truck traffic. It is acknowledged that rail could capture traffic originating or terminating in the Nashville area, and initiatives like the Basic Rail Connector linking middle with eastern Tennessee should help it do so. However, allowing that intermodal services are the most effective at converting highway traffic, the truck drayage for intermodal operations will remain on the streets, and retard (but not eliminate) the truck VMT and emissions improvements that might otherwise seem possible. This fact, coupled with the sheer volume and distance profile of overhead truck freight, makes that segment the appropriate focus.

One alternative is to seek reintroduction of sprint train service on the Atlanta-Nashville-Chicago lane. This could attract through traffic from I-24 and I-65, and Nashville traffic to the north; good connections from Atlanta to Florida could enlarge the market addressed. CSX may not have strong interest in this initiative if it lacks capacity for it.

One way to attract its interest might be to explore options for expansion or relocation of Radnor Yard functions, with public financing and expedition of approval processes.

Another potential intermodal service option for the Region to examine is RoadRailer service. RoadRailer equipment is a hybrid that is both a highway trailer and a railcar at the same time. On the highway, RoadRailer equipment is hauled by a regular highway tractor on the RoadRailer unit's rubber-tired wheels. These same units can be coupled together into a railroad train, without having to be loaded onto flatcars. Terminals simply require an area where tracks are set into pavement (as on trolley lines) and simple forklifts for moving the rail bogies around.

Alliances with other MPOs may also be useful to forge. Several of them in Tennessee have challenges similar to Nashville, since through truck freight is a statewide phenomenon, and certain of them face air quality requirements as well. Allied MPOs

are not necessarily more effective at bringing about large changes from the private sector, but there are at least three advantages to cooperation: a) a unified voice has more influence with the State, especially in the attraction of financing; b) effective railroad actions take place on a network level, so that terminal construction or line expansion in one city may well have benefits for another, or require that another act in concert; and c) should a strategic opening like a rail merger come about, MPOs will be most persuasive if they have prepared joint positions and developed their stipulations in anticipation.



Partner for Effective Freight Transport Planning

The Nashville Regional Freight Advisory Committee: Creating a formal freight advisory group has become a more common practice for regional freight planning. A common starting point for freight planning is to understand predominant freight patterns in the study region. The consultant team conducted a series of interviews with key stakeholders throughout the Region including shippers, operators, public officials, economic development officials and modal operators. Based upon these interviews, a list of key advisory committee members was developed. Those parties were then contacted to assess their willingness to serve on the committee. The list on the following page provides the names of contacts who agreed to participate in Nashville's Freight Advisory Committee.

Nashville Regional Freight Advisory Committee

- Dennis Cook, Assistant Chief Engineer -TDOT
- James Dyer, General Manager, - CSX, Nashville
- Bobby Franklin, City Planner - City of Mt. Juliet, TN
- Andrea Hayes, Vice President - TN Trucking Association
- Tommy Lee Jones, Director of Business Development-Metropolitan Nashville Airport Authority
- Phil Maples, Director, Local Planning - TN Department of Economic and Community Development
- Jim Rose, Manager Domestic Logistics - Nissan North America, Inc.
- Bob Weithofer, Transportation Manager - Metropolitan Government of Nashville and Davidson County
- Eric Zavattero, Business Development Manager - Fortna
- Malcom Baird, Ph.D., Director - Vanderbilt Center for Transportation Research
- Arun Chatterjee, Ph.D., University of Tennessee
- Anthony M. Linn, Director - Nashville & Western Railway Corporation

The inclusion and successful implementation of freight-specific policies within the overall Nashville Area comprehensive planning efforts can improve freight mobility, and help maintain the Region's competitive edge. Such policies are strengthened by facilitating a dialogue between public entities charged with policy development and the freight transport interests, who through their daily interaction with the transportation network can provide valuable insights about needs.



Urban Design & Growth Management Policy

While highways, railways, and air travel all play a key role in moving freight to, from and through the Nashville Area, local flow of goods and services is dominated by the trucking sector. This flow supports retail distribution, manufacturing and warehouse distribution, construction activities, waste disposal services, and the pick-up and delivery of courier packages and shipments.

The design of the Region's neighborhoods, streets, buildings and shopping centers, as well as the location of manufacturing and industrial sectors within the Region, must allow for safe and efficient interaction between the movement of people, freight, goods and services. By carefully considering and integrating freight transport into regional growth planning, the Nashville Area can enhance its ability to influence the Region's urban form, and ultimately ensure both a high quality of life and a logistics competitive edge for the Region.



This report was prepared by the Nashville Area MPO (NAMPO) in cooperation with the U.S. Department of Transportation (USDOT), the Federal Highway Administration (FHWA), and the Tennessee Department of Transportation (TDOT). The contents of this report reflect the views of NAMPO staff who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the FHWA, TDOT, or NAMPO. This report does not constitute a standard, specification, or regulation. FHWA or TDOT acceptance of this report as evidence of fulfillment of the objectives of this planning study does not constitute endorsement/approval of the need for any recommended improvements nor does it constitute approval of their location and design or a commitment to fund any such improvements. Additional project level environmental impact assessments and/or studies of alternatives may be necessary.

