



# COMPONENTS OF AN ATTRACTIVE MINNESOTA FREIGHT MARKET

## White Paper

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## Executive Summary

This white paper represents an effort to identify key aspects of an attractive freight market in Minnesota. Findings are based on approximately 30 individual consultant-led conversations with key stakeholders in Minnesota's freight industry, including producers that grow, manufacture, and ship product; carriers in trucking, rail, air, and water-based transportation modes; third-party logistics firms that track and contract shipping routes to the nearest nanosecond; and regulators and planners at various levels of government.

Perspectives vary on what constitutes and contributes to a competitive freight environment in Minnesota, with differences among various interests giving rise to a certain competitive tension underlying decision making and investment.

- *Shippers* tend toward long-haul trips; they seek a balance between cost and capacity, specifically, low rates with as little as same-day notice; flexibility and responsiveness are incredibly important to supply-chain management and just-in-time delivery.
- *Carriers* tend toward short-haul trips; they value predictability and an even flow of freight over their respective modes; planning routes and optimizing trips allow for efficiency and economies of scale.
- *Retailers* need affordable, reliable, and timely delivery to compete with increasingly attractive and popular online alternatives.
- *Consumers* seek wide selection, affordability, and convenience as they weigh traditional in-store purchases against online alternatives; they tend to be indifferent to freight transportation and can view trucking and rail as a nuisance or safety hazard.
- *Government* regulators and planners are responsible for ensuring safe modes of travel, well-maintained transportation infrastructure, proper load securement for perishable food and potentially hazardous freight, and responsible use of resources such as land, water, and air.

Based on conversations with various interests, key components of an attractive Minnesota freight market include:

- Increasingly efficient supply-chain management
- Stronger balance between inbound and outbound freight movement
- Additional options for shippers, including improved access to rail and, to a lesser extent, water modes through new or improved intermodal terminals
- Sufficient investment in transportation infrastructure and congestion mitigation
- Improved career pathways and geographically balanced labor supply
- Consistent regulation and policies that promote technology adoption, public-private partnerships, and private investment

External factors—such as shifting port activity due to widening of the Panama Canal, impacts from global climate change, and rapid technological advances in vehicle automation, including the potential for self-driving trucks—present a mix of challenges and opportunities as freight

shippers and carriers alike respond to changing realities and pressures in a highly competitive freight market.

## **Diverse and Complex Stakeholders**

The Minnesota Freight Advisory Committee serves as a forum for freight deliberation and, to the extent possible, strives to speak with one voice on issues related to freight movement and its economic impact. Not unlike Minnesota’s broader economy, the state’s freight industry is increasingly diverse and complex. Organizations such as the Midwest Shippers Association, Minnesota Trucking Association, Minnesota Grain and Feed Association, Transportation Club of Minneapolis and Saint Paul, and Minneapolis–Saint Paul Council of Supply Chain Management Professionals organize and advocate for segments of the broader freight industry.

These organizations and others represent specific interests within Minnesota, including shippers producing a wide range of goods, from large bulk commodities to relatively small high-tech products; carriers operating through air, rail, trucking, and water-based ports; retailers facing unprecedented pressure from Internet-based competitors; and increasingly tech-savvy consumers balancing “buy-local” values with the convenience of buying online.

Given the imperative for safety and sufficiently maintained transportation infrastructure, government engagement is critical to a competitive freight market. State and federal governments contribute to maintenance of transportation infrastructure and regulate and permit various aspects of the freight industry. For their part, local governments and the Metropolitan Council play an important role in zoning and land-use decisions.

Although all levels of government contribute directly to freight’s competitive landscape, no amount of planning can dismiss the fact that nearly every decision made within the freight industry — ranging from routing and scheduling to facility development, consolidation, and more — is driven by market forces. Competition within the freight industry and pressure for cost containment and savings in both vertically and horizontally integrated industries require increasing attention to producing greater efficiencies in transportation logistics.

## **Fundamentals of the Minnesota Freight Market**

Situated near the geographic center of North America, with direct access to interstate highway corridors, rail options, an international airport, and water routes leading to the Gulf of Mexico and Atlantic Ocean, Minnesota enjoys certain location advantages. However, these advantages are tempered by the state’s relative distance from the continent’s dominant east-west trucking and rail corridors through Chicago and the American heartland.

At its core, transportation is about distance and geography, and Minnesota is a big state. Its rich traditions in agriculture, mining, and timber mean that large quantities of commodities need to be shipped great distances. Likewise, many relatively small manufacturers populate major transportation corridors — and areas in between — throughout the state, providing an essential driver to local and regional economies. As one transportation official put it, “The economic impact of small-town manufacturers and their supply chains is considerable.”

However, those working closest to Minnesota’s freight industry call it “a lost orphan,” “an invisible operator,” and a “hidden empire.” Its limited role in public consciousness and policymaking was summarized repeatedly with the acknowledgement that “freight doesn’t vote.” “Citizens are indifferent to transportation, caring more about *when* than *how* something arrives at their door.” Freight is not considered an “attractive or compelling issue, but it’s really important — and poorly understood.”

Minnesota producers likely shared these sentiments until unprecedented belt-tightening caused them to view the state’s freight industry differently. As one shipper summarized, “The Great Recession revealed inefficiencies in transportation operations, with resulting movement toward deferred or just-in-time delivery and an increasing push for supply-chain optimization.”

The need for increased efficiency in transportation operations is hardly new given deregulation and the decades-long march toward globalization through open markets and international competition. However, the advance of third-party logistics and sophisticated supply-chain management accelerated considerably during and after the Great Recession as big-box retailers promoted just-in-time delivery and warehousing models.

Getting goods to market today is defined by outsourced transportation logistics, centralized operations, and pressure for increased efficiency. “Location, location, logistics” is the name of the game, and “access to highways is key,” according to one carrier. “First- and last-mile connections” are important to shippers and many smaller distribution centers, with access to and from rail, river, or major highway corridors often serving as a limiting factor.

While “infrastructure is important, asset movement defines the freight industry,” according to one third-party logistics official. Above all, the market is driven by supply and demand, production and consumption, and seasonality, with the end of the growing season, quarter, and month each accounting for spikes in freight activity. Minnesota’s rich resource base in agriculture, forest products, and mining coupled with robust manufacturing of specialty tech products yields fierce internal competition for access to freight infrastructure and services.

Labor and capital and time and transportation all contribute to the bottom line of Minnesota producers. Transportation systems can make all the difference in getting goods to market safely and on-time, and highly efficient transportation systems can save producers time and, in the process, money.

Generally, though, markets tend not to concentrate major manufacturing in sparsely populated areas, and a great deal of Minnesota’s manufacturing takes place within the Minneapolis–Saint Paul metropolitan area. Given the balance between bulk commodities and

compact, high-value products, Minnesota’s freight market is governed by just-in-time delivery, with certain exceptions for commodities that are very heavy and slow to ship.

Despite pressure for increased efficiency and centralization, “trucking remains a small-business story, with diffuse operations, incremental growth, and responsiveness to changes in the market,” one third-party logistics official said. And regardless of the collective economic output of the Minneapolis–Saint Paul metropolitan area and the rest of the state, Minnesota freight is not as densely concentrated as policymakers and the public may think.

## Making Sense of Modes

Minnesota shippers rely on a steady balance of truck, rail, water, and air-based carriers to bring their commodities and products to other markets and destinations. Time requirements and pricing drive these decisions, and while both factors can change over time, Minnesota shippers are not expected to drive significant modal shifts over the next 20 years.

### *What travels by truck and why*

Trucking accounts for more than 60 percent of freight mode share by weight and value, and it is projected to continue to dominate freight transportation for the foreseeable future (Figures 1 and 2). Just about every type of product, except for heavy commodities and perishable goods, is shipped by truck.

Figure 1: Freight mode share by weight (2040)

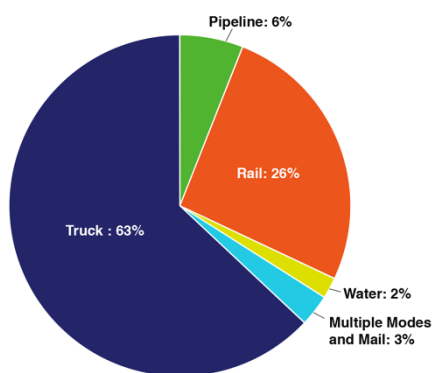
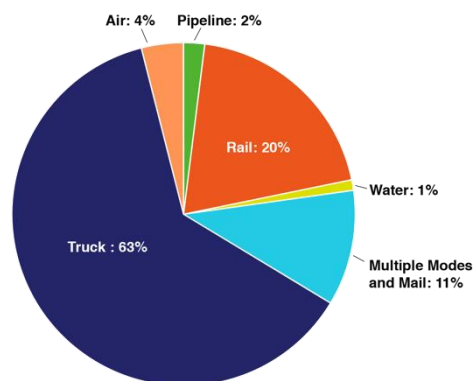


Figure 2: Freight mode share by value (2040)

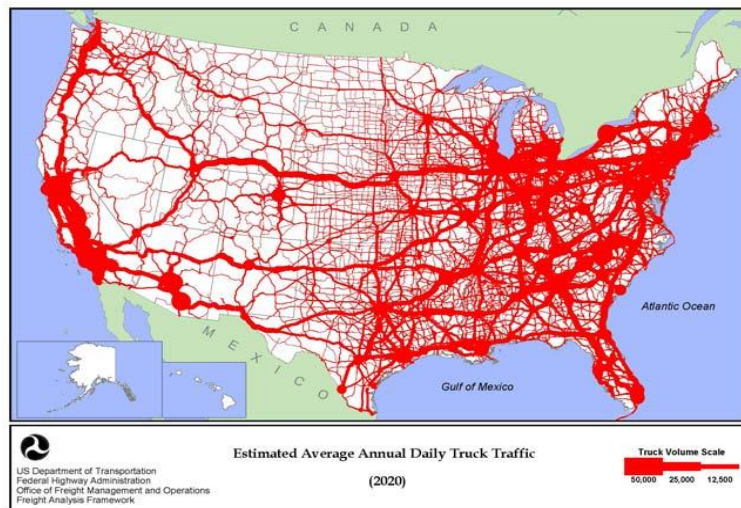


Source: Minnesota Statewide Freight System Plan, MnDOT (2016)

Technological advances, pressure for increased efficiency, and predominant market forces have resulted in a freight environment that favors the flexibility and first-mile/last-mile responsiveness of trucking products to market. Figure 3 shows estimated average annual daily truck traffic in the United States for 2020. While Minnesota and the Minneapolis–Saint Paul metropolitan area see considerable truck traffic, volumes are modest compared to other regions and corridors.



**Figure 3:** Estimated average annual daily truck traffic (2020)



Source: U.S. Federal Highway Administration

### *What travels by rail and why*

For Minnesota’s largest Class I carrier, rail freight leaving Minnesota comprises agricultural products (40.3 percent), like grain; industrial products (36.2), including forest products, chemicals, and metals; and consumer products (23.5), such as vehicles. In total, these shipments accounted for more than 350,000 carloads and intermodal units in 2016. As for what’s coming in by train, consumer products (40.1 percent), coal (37.3), industrial products (13.4), and agricultural products (9.2) comprised the nearly 250,000 carloads and intermodal units destined for Minnesota in 2016.

Minnesota’s 13 short line railroads play an important role in bringing agricultural products, such as grain and ethanol, to market or for transfer to other modes, and in return they bring fertilizer and other agricultural inputs to rural communities. These short lines feed Minnesota’s Class I carriers, play an important role in integrating services, and factor into car-supply placement.

### *What travels by air and why*

Air is the preferred mode for highly perishable goods, such as flowers and seafood, and compact, relatively lightweight, high-value products, such as medical devices. Timely delivery is the greatest factor driving decisions to ship by air, but delivery by truck can compete with air on timeliness when shipping between many markets.

### *What travels by water and why*

Minnesota’s agricultural producers depend on barge and ship traffic to take grain to domestic markets and abroad. The Twin Ports of Duluth, Minnesota, and Superior, Wisconsin, predominately export grain, taconite, and timber, while river barge traffic from ports in Savage, Saint Paul, Red Wing, and Winona cycle grain, ethanol, and aggregate out of the state and fertilizer, salt, urea, and potash into the state. According to one large agricultural shipper, barge traffic is “efficient, simple, and big when the river works.”

Barge tows can move large volumes of product great distances at competitive rates, making barges an attractive option for bulk goods, such as aggregate, grain, and fertilizer. Although trucking has become the dominant mode for most other products due to its reliability and first-mile/last-mile agility, there's no ignoring the capacity of rail—and to a greater extent, barge and maritime modes—to move large volumes of slower-moving product.

## **Economic Drivers in Freight**

Consumers and policymakers alike may be surprised to know that freight decisions typically are not made at the local level. Due to consolidation of operations, globalization, and a push for greater efficiency, freight decision making is increasingly centralized and automated, with computer systems in logistics operations making bids to the nearest nanosecond on an open market. Terms of sale and other factors can vary depending on the country of origin, destination, and bid.

For this reason, political boundaries are much less important than market forces and a variety of other factors contributing to change within the broader transportation sector. These economic drivers include increasing utilization of supply-chain management, adoption of rapidly advancing technology, changing automobile use, significant demographic shifts, increased congestion and development of new corridors, changing energy markets, heightened sensitivity to environmental impacts of transportation, an increasing competitive advantage with intermodal freight, and necessary revenue for addressing transportation infrastructure needs. Several of these factors are highlighted below.

### ***Supply-chain management***

Defined by the Council of Supply Chain Management Professionals as the “active management of supply-chain activities to maximize customer value and achieve a sustainable competitive advantage,” supply-chain management includes “everything from product development to sourcing and production to logistics, as well as the information systems needed to coordinate these activities.”

In an era of just-in-time delivery and reduced reliance on traditional warehousing, supply-chain management emphasizes efficiencies in freight transport and the importance of proximity — whether to manufacturing hubs, intermodal facilities, distribution centers, or retail markets. According to University of Wisconsin–Superior transportation and logistics management professor Richard Stewart, the organizations that make up the supply chain are linked together through physical flows and information flows, forming partnerships.

### ***Technology***

Advances in technology allow for obvious changes in transportation such as new opportunities for automation and driverless vehicles. Use of drones for parcel delivery as well as for infrastructure monitoring and maintenance is very promising. Automated vehicle inspection, which offers new efficiencies in trucking and increased capacity for oversized and overweight shipments, presents both opportunities and challenges.



### *Changing automobile use*

Although recent data indicate the upward trend in annual total vehicle-miles traveled (VMT) in the United States has leveled off, projected population growth means that the Minneapolis–Saint Paul metropolitan area likely will continue to experience an increase in VMT and congestion. Nonetheless, changing consumer behavior tied to car ownership and use could have related impacts on fuel-tax revenues and infrastructure investment.

### *Demographic shifts*

According to one third-party logistics official, “Minnesota’s labor supply is good, but tightening, and its workforce exudes integrity and a strong work ethic.” But there is increasing resistance to overnight shifts and deliveries, and relatively fewer workers are drawn to jobs in freight transportation — whether as truck drivers, rail operators, engineers, or general laborers. This trend is especially true in rural areas; as one third-party logistics official put it, Northern Minnesota is experiencing a labor crisis in transportation. Although age restrictions impede development of career pathways to trucking, new immigrant populations could provide a fresh supply of drivers in a tightening market for qualified drivers with clean criminal and driver histories.

### *Revenue for infrastructure needs*

Given the freight industry’s need for sufficient and adequately maintained transportation infrastructure, there is growing concern over the state’s ability to invest. The Minnesota Department of Transportation (MnDOT) estimates that Minnesota currently faces a \$900 million annual transportation-funding shortfall.

According to one transportation official, “Wisconsin is setting a terrible example of putting Band-Aids on its infrastructure needs, especially when it comes to first-mile/last-mile investment. If we’re not careful, Minnesota could be next.” There is interest among freight advocates to leverage state or federal grant funds to collaborate on intermodal facilities and other public-private partnerships as well as to increase dedicated state funding for roads and bridges.

## **The Role of Regulation**

Regulation is an important consideration when examining the competitiveness of any industry. When it comes to freight, increased restrictions on the number of hours a truck driver spends behind the wheel and mandates for positive train control in rail operations have been well-reported. These are two examples of changing federal regulations that are uniform from state to state.

Recently, FedEx Freight President and CEO Michael Ducker provided testimony to the U.S. Senate surface transportation subcommittee regarding the benefits of increasing the national standard for twin trailers from 28 feet to 33 feet. His testimony summarized how a new national standard could increase per-truck volume and decrease the number of incremental truck trips. He highlighted that drivers operating the longer trailers reported increased truck stability and that fewer truck trips would produce less stress on the highway system.

Absent uniform national standards, state and even local governments set certain regulations that impact the trucking industry.

### *Truck weight limits*

Minnesota is considered a freight bottleneck due to relatively low vehicle weight limits and restrictions on triple-trailer trucks. The state is not alone, however, as a geographic divide over select trucking regulatory issues exists between larger, less-populated western states and their relatively smaller, more-populated eastern neighbors.

While the federal government sets standards for truck length and weight (both in terms of gross weight and weight per axle), states are allowed to adopt exceptions. Generally, trucks are restricted to 80,000 pounds in gross vehicle weight (GVW) in Minnesota, while neighboring states allow for more: 105,500 pounds GVW in North Dakota and as much as 129,000 pounds GVW in Iowa and South Dakota. Wisconsin tends to allow for higher GVW than Minnesota on an individual commodity basis.

Improved safety and decreased highway deterioration have been attributed to Minnesota's relatively tight restriction on truck weights; however, a wide array of industry officials believes this position is not competitive in practice and unsubstantiated by research.

Regulation doesn't simply impact the movement of goods across state lines. Canada is Minnesota's largest single trading partner, and much of the trade occurs along the northern border and through the Twin Ports. Recently, Canada moved toward using 60-foot intermodal containers, and the implications for Minnesota carriers remain unknown. Unresolved questions regarding the future of select pipeline routes also create uncertainty for the movement of energy across the Minnesota-Canadian border.

### *Land use and zoning*

At the local level, decisions over land use and zoning are increasingly important to the freight industry, especially as urban gentrification and mixed-use development along riverbanks increase over time. As a result, intermodal facilities in Minneapolis and Saint Paul are feeling the pinch, and new residents are not always pleased with the obvious truck traffic. According to one third-party logistics official, "Converted industrial is cool unless it's still industrial."

Increased population density in formerly industrial-only areas, particularly in Minneapolis and Saint Paul, can make scarce truck parking a real problem. Likewise, movement toward dedicated bike lanes and pedestrian facilities can restrict certain turn maneuvers by trucks, limiting important routes and access to terminals or other destinations as a result.

Although the Minneapolis–Saint Paul metropolitan area is hardly facing a shortage of industrial land, new facilities are being pushed to suburban and exurban locations farther from the region's economic core. There is also growing concern over decreased river access for truck and rail facilities.

Differences in land use and zoning, as well as various regulatory and permitting issues, can lead to unnecessary inefficiency and a competitive disadvantage for Minnesota's freight industry as well as its producers and customers. As a result, some support more continuity

and “regulatory harmonization” between Minnesota and neighboring states. Perhaps a different balance could be established between perceived safety and asset preservation on one hand and an optimally efficient transportation system on the other.

## Who Needs What and Why

In addition to the desire for greater regional regulatory continuity and the benefits of increased truck weights, contributors to Minnesota’s freight industry could benefit, for instance, from improved conditions on several fronts. Table 1 provides a summary of some of these opportunities.

<b>TABLE 1: SAMPLE OF FREIGHT MARKET CONTRIBUTOR NEEDS</b>	
<b>Air</b>	Minnesota’s regional and international airports need maintenance and infrastructure investment.
<b>Pipeline</b>	Minnesota’s pipeline industry would benefit from regulatory consistency and certainty.
<b>Producers</b>	Efficient transportation systems allow Minnesota producers to survive in an increasingly competitive global economy with, for example, mounting pressure from China on steel and from Brazil on soybeans. Transportation has been and can continue to be a competitive advantage for Minnesota producers as long as public infrastructure is properly maintained and the broader transportation logistics system is optimally managed and regulated.
<b>Rail</b>	Class I carriers cite the need for longer sidings, particularly in their metro-area yards, and a desire for more attention to the economic benefits of rail — rather than simply associated safety concerns — in policy discussions. Short line carriers are concerned with a lack of investment capital for maintaining critical corridors and incorporating technology. They encourage assistance in the form of state loans, competitive grants, or capital investment bonding.
<b>Trucking</b>	Minnesota’s trucking industry would benefit from more drivers, more rest stops and parking options, more reliable travel times (particularly through the metro area), and smoother road conditions. In addition, limited river crossings, both within the metro area and between Minnesota and Wisconsin, adversely impact route options, particularly for oversized or overweight loads.
<b>Water</b>	Similar to other aspects of the state’s transportation infrastructure, Minnesota’s ports and river corridors need investment for repair and replacement. “Docks and locks are in poor condition,” according to one shipper, and “the problem is only getting worse.” Ports note that limited fleeting capacity and congested truck traffic in and out of their facilities can be inefficient due to tight rail and road crossings at the terminal. Investment in federal lock and dam infrastructure along the

Mississippi River and Saint Lawrence Seaway, which connect Minnesota to the Gulf of Mexico and Atlantic Ocean, respectively, have not kept pace with need. Likewise, state investment in its Port Development Assistance Program has represented a fraction of dollars requested.
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In addition to requisite infrastructure investment, improved engagement and scoping from public agencies can produce better transportation results. These agencies also can help amplify the voice of Minnesota producers and improve transportation access through strengthened shipper-driven economics.

## **Additional Considerations on Competitiveness**

According to University of Wisconsin–Superior professor Richard Stewart, “freight, like water, follows the path of least resistance.” Economic factors drive decisions, and workarounds predominate where infrastructure, regulation, or markets present barriers. In the words of another transportation official, “freight will always find an equalizer.”

Despite such resiliency, Minnesota’s freight market likely will face continued pressures regarding supply and demand, production and consumption, efficiency and technology, demographics, and other forces of a local, state, national, and global scale. In particular, the following issues affecting freight competitiveness may be worth in-depth review.

### ***Concerns over containers***

Due to Minnesota’s significant export of bulk commodities such as grain, the state’s freight industry faces an ongoing container shortage, with many “empties” concentrating in Chicago or Port Rupert, British Columbia. As a result, the cost of shipping empty containers back to Minnesota must be incorporated into pricing for corresponding freight exports. While one port official was interested in possibly replicating a container-on-barge pilot currently taking place along the Illinois River, another third-party logistics official suggested that interested parties work with Class I rail carriers to induce market-based changes to increase Minnesota’s container supply.

### *Intermodal options*

One third-party logistics official lamented, “It took five days to reach California by rail 10 years ago; now it takes eight or nine days.” The “Chicago problem” facing Minnesota producers and shippers means that a good deal of outgoing rail freight must travel east to Chicago before it can switch tracks and head west to California. Short of direct access to valued California ports, new or expanded intermodal facilities in Minnesota are considered the “key to extending transportation networks and giving shippers of all sizes more options, greater flexibility, and the ability to compete.”

### *New openings to Asia*

Canadian National (CN) and Duluth Cargo Connect formed a new alliance establishing the first rail-served intermodal container ramp in the Twin Ports that leverages CN’s rail connection to West Coast ports and Asian markets, Great Lakes and Saint Lawrence Seaway access to East Coast ports and European markets, and rail and river routes to the Gulf of Mexico. As one transportation official stated, “Maritime and intermodal can provide the lowest average cost a shipper can hope for.”

Recent improvements to the Panama Canal now allow full seafaring container ships to enjoy the time-saving benefits of direct access between Asia and U.S. ports in the Gulf of Mexico and up the Atlantic Coast. Over time this could reduce reliance on Pacific-based U.S. and Canadian ports, giving shippers and carriers additional choice for freight shipment between the United States and Asia.

### *Testbed for Self-Driving Trucks?*

Minnesota’s large geographic footprint, relatively uninterrupted interstate highway corridors, and reliance on trucking make it an ideal state to pilot a technology-enabled approach to self-driving trucks or platooning multiple-truck caravans. Shippers, carriers, and transportation officials agree that change is both necessary and inevitable, and as one shipper stated, “If Minnesota is going to be attractive to investors, it needs to lean into change—not be afraid of it.” A pilot project examining the technological feasibility of platooning or self-driving trucks, for instance, paired with examination of related policy implications, could make a difference in improving Minnesota’s competitive position and reputation as a testbed for innovation and efficiency.

### **About MFAC**


The Minnesota Freight Advisory Committee (MFAC) was established in 1998 to advise the Minnesota Department of Transportation (MnDOT) and other public agencies and officials on the performance and importance of Minnesota’s freight transportation system to support the state’s economic competitiveness.

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