Minnesota Comprehensive Statewide Freight and Passenger Rail Plan

Draft Final Report

December 2009

Your Destination...Our Priority

draft final report

Minnesota Comprehensive Statewide Freight and Passenger Rail Plan

prepared for

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Executive Summary

The purpose of the Minnesota Comprehensive Statewide Freight and Passenger Rail Plan ("State Rail Plan"), pursuant to Minnesota Statute Minnesota Session Law 2008, Section 174.03 subd 1b, is to guide the future of the rail system and rail services in the State. The development of the Plan, managed by the Minnesota Department of Transportation (Mn/DOT), included extensive involvement by the private sector, public officials, and representatives, as well as the general public.

The timing of this plan is critical. The rail system has long played a significant role in the movement of freight in Minnesota, carrying an estimated thirty percent of all freight tonnage – much more so than many comparable states. Minnesota has the eighth highest number of track miles in the U.S. At the same time, intercity passenger rail service has been minimal in recent decades. In recent years, Minnesota has experienced a dramatic renewal of interest in passenger rail, with Northstar commuter rail service initiated in December 2009 following the introduction of Hiawatha light rail service several years earlier. Numerous counties, cities, regional rail authorities, other supporters, and Mn/DOT have been actively engaged in planning new passenger rail services.

During 2008 and 2009, major new Federal funding support emerged for rail, particularly for investment in intercity passenger rail. This Plan addresses opportunities for Minnesota to improve both freight and passenger rail in the State, and intentionally builds upon and supports several rail transportation programs in place and new initiatives currently under development. Many of these opportunities overlap as most of the proposed passenger rail services would operate in whole or in part on existing trackage owned and operated by the freight railroads.

The State Rail Plan effectively integrates Minnesota's efforts with a national resurgence of interest in high speed and intercity passenger rail. The Plan has determined that the option for a high-capacity, high-speed rail transportation option is not only desirable, but affordable and even preferable as fuel prices rise and larger volumes of travelers shift to an available rail system here and around the nation. These services have the potential to offer faster, more economical alternatives to automobile and air travel in intercity corridors up to 500 miles in length that have sufficient density and demand. The State Rail Plan is the first step in establishing a federally compliant program with an intentional, well-planned, and incremental approach to building the regional and national system, similar to the Interstate System of Highways. Minnesota will positively benefit economically and in our style of life from these expanded transportation options, including high speed trains that tie into the emerging national rail system using the best available technologies, designs, and operating methods.

Relatively small Federal and state grant and loan programs have existed for many years to support certain types of freight rail investments which have broader public purposes, such as grade crossings. In 2008, Congress enacted the Passenger Rail Improvement and Investment Act (PRIIA) which authorized approximately $750 million/year in grants for intercity rail projects. In 2009, the American Reinvestment and Recovery Act (ARRA or "Stimulus") appropriated an additional $8 billion for passenger rail projects in the PRIIA programs. These actions at the Federal level have set off a lively national competition for current and potential future funding.

The State Rail Plan establishes the following:

- A long-term vision for Minnesota's rail system, consisting of an integrated freight and passenger rail network, as part of a balanced statewide transportation system, as defined in Mn/DOT's Statewide Transportation Plan;
- A recommended program of priority improvements over the next 20 years, including an estimate of investments needs and benefits resulting from those investments;
- Recommended potential approaches to financing these improvements, including accessing federal funds, public-private partnerships, and alternative financing mechanisms; and
- Other suggested changes, including refinements to existing state rail programs, and institutional responsibilities for rail service and infrastructure development.

Vision for Rail

The vision for freight rail is that Minnesota should develop a balanced multimodal freight system which can respond to increased regional and international economic competition, constrained highway capacity, environmental challenges, a diverse customer base, and rising energy costs. Actions necessary to implement this vision include:

- Continue to make improvements to the condition and capacity of Minnesota's primary railroad arterials to accommodate existing and future demand.
- Address critical network bottlenecks.
- Upgrade main line track (all Class I-III railroads) to 25 mph minimum speed, as warranted.
- Improve the network (all Class I-III railroads) to support the use of 286,000 pound railcars throughout.
- Implement state-of-the-art traffic control and safety systems.
- Expand intermodal service access options throughout the State.
- Maintain and ensure broad access to competitive freight rail services for shippers throughout the State.
- Better integrate rail into the public planning process.

- Build upon the existing Minnesota Rail Service Improvement Program (MRSI), including an increase in the maximum loan amount in excess of the current $200,000 ceiling.
- Expand the Rail/Highway Grade Crossing program.
- Actively manage preserved rail corridors held in the State Rail Bank and evaluate for possible future transportation uses.

The vision for passenger rail is that Minnesota should develop a robust intrastate and interstate intercity passenger rail system which results in improved travel options, costs and speeds for Minnesota and interstate travelers. The priority program elements are as follows:

- Continue to participate in the Midwest Regional Rail Initiative (MWRRI) and support the development of sustained 110 mph service for connections from the Twin Cities to Wisconsin and the Chicago Hub Network.
- Develop an intrastate intercity passenger rail network connecting the Twin Cities with viable service to major outlying regional centers.
- Connect all services eventually to both the new Minneapolis downtown terminal and St. Paul Union Depot.
- Advance corridors incrementally and simultaneously with Mn/DOT's support; sequencing depending on financing, ROW acquisition and agreements with freight railroads.
- In Phase II, rail connections should be established to additional intercity and commuter rail markets in Wisconsin and Minnesota, and to an interstate/I-35 Corridor, Red River Valley, Eastern plains, and Canada.

This State Rail Plan focuses on the development of intercity passenger rail service that would link the Twin Cities with the Chicago Hub high speed rail network, the national Amtrak system, and major regional trade centers in Greater Minnesota and the upper Midwest, fully coordinated with independent and shared freight improvements. The priority passenger and freight program elements are as follows:

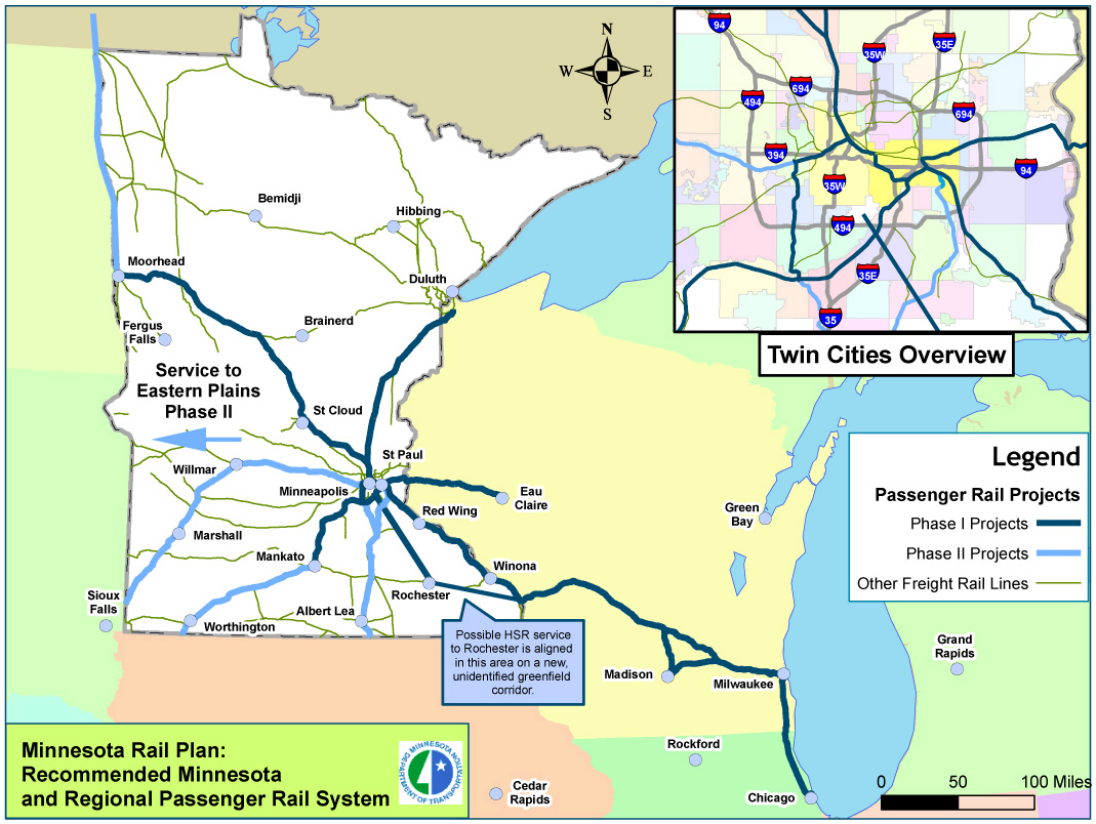
- High-Speed Rail passenger service from the Twin Cities to Madison/Milwaukee/Chicago, to Duluth, and to Rochester (sustained speeds of 110 mph), with connections in Chicago to numerous other Midwestern cities also via high speed service;
- Enhanced conventional passenger rail service (sustained speeds of 79 to 90 mph) from the Twin Cities to St. Cloud; Mankato; Fargo, North Dakota; Eau Claire, Wisconsin; and between Minneapolis and St. Paul;
- Positive Train Control (PTC) on all shared passenger-freight corridors and any freight-only corridors which may handle certain categories of hazardous material to prevent train to train collisions;
- Highway/rail grade crossing safety improvements on all shared corridors;
- Upgrades of major junctions and bridges;

- Mainline track upgrades to accommodate freight industry standard 286,000 pound railcars and provide 25 mph operations;
- Systematic statewide replacement of all existing active highway/rail grade crossing warning devices (flashers/gates) and warning signs;
- Additional intermodal (truck to rail) freight loading facilities to improve statewide access to international and domestic container shipping and transloading; and
- Short line railroad bridge upgrades including repair and replacement.

If fully implemented, this program would eliminate all substandard rail system capacities due to current and anticipated growth in rail traffic. The improvements would allow for a comprehensive network of passenger rail services and the preservation and continued growth of freight rail service in Minnesota, with connections for both to destinations beyond the State's borders.

The State Rail Plan's proposed passenger rail system is shown in Figure ES.1. The dark blue lines represent Phase I priority corridors, and the lighter blue lines are identified as longer-term Phase II projects (not included in the Plan's cost estimate).

Figure ES.1 Recommended Minnesota and Regional Passenger Rail System



System Costs

The total capital cost of the fully implemented program (both passenger and freight) over 20-years is estimated to be $6.2 to $9.5 billion. This total includes $2.2 to $4.4 billion for stand-alone freight improvements, which traditionally have been the responsibility of the private railroads. The total estimate also includes $4.0 to $5.1 billion for the priority passenger and shared freight improvements if built as a system rather than as a series of individual, unrelated projects. Substantial synergies across projects can be achieved if planned as parts of an eventual unified system.

These "planning" level cost estimates are based on high-level systemwide unit costs. More detailed engineering costs developed for specific corridors may vary significantly from these estimates as individual projects enter actual assessment and design processes. These detailed and refined estimates will of necessity be the actual qualifying numbers for any and all actual funding applications. High- and low-end ranges were developed for most cost elements. The high-end numbers are referred to as the "base case," and the low-end numbers are referred to as the "best case."

All costs shown in this report are in current real (uninflated) dollars as is typically done in a report of this type so that the difficult to predict impacts of inflation are factored out. However, for the purposes of consistency with Mn/DOT's Statewide Plan, the total program costs inflated over the 20-year life of the program would be between $12.4 and $19.0 billion. This estimate is based on an annual inflation rate of four percent through 2020, three percent thereafter, and equal expenditures across the 20-year period. In reality, expenditures would probably start out low, peak in the middle years, and then decline in the out years.

Passenger Rail Performance and Benefits

Table ES.1 summarizes annual passenger rail system performance for both the base and best case forecasts for the fully developed Phase 1 system. In general, this system compares favorably on several dimensions with existing national rail performance data. The system would carry 4.1 to 6 million riders annually. Annual operating subsides for the passenger system as a whole would range from $95 million per year in the base case (49 percent farebox recovery) to $41 million in the best case (71 percent farebox recovery). The latter assumes that operating subsidies from the Minnesota portion of the interstate Twin Cities to Chicago high-speed rail route could not be applied to intrastate operating deficits. If it can be so applied, the overall operating deficit would almost be eliminated in the best case. Note that the best case forecast assumes higher ridership and revenue than the base case.

Transportation investments can generate a range of direct and indirect economic benefits in excess of the cost of the programs. While not quantified in this Plan, these benefits are discussed qualitatively in Section 5.3.

Rail System Development and Funding Responsibilities

The State of Minnesota, through Mn/DOT management and the active oversight of the Legislature, should assume a lead role in advancing the unified system envisioned in this Plan. Specific steps include:

- Organize the State's response to Federal rail grant programs to maximize the opportunities for Federal funding;
- Coordinate negotiation of actual operating agreements with the freight railroads;
- Analyze public/private benefit/cost allocation for each passenger rail corridor to better position corridors for FRA grants:
  - Ensure third party due diligence of each corridor investment;
  - Clarify capital/operating costs, revenues, financial plan, and project management plan; and
  - Provide for Legislative review/acceptance.
- The State should adopt the following principles in moving forward:
  - Limit state funding of operating subsidies to about 25 percent of total O&M costs; (overall existing state-supported Amtrak corridors generate revenues that cover more than 85 percent of costs);
- Assume equal capital cost share of freight investments in shared corridors – actual state capital costs will depend on benefit/cost allocation with freight rail owner;
- Public sector pays for passenger-related capital costs; and
- Stand-alone freight improvements will continue to be the primary responsibility of the private freight railroads, with public participation only for priority projects (up to approximately 25 percent of overall costs) where clear public benefits can be identified and where such improvements are consistent with a publicly adopted plan, such as this State Rail Plan. Projects involving grade crossing safety that facilitate passenger rail projects, or that clearly support local economic development efforts, are logical candidates for expanded public investment.

Table ES.1 Annual Passenger Rail Systemwide Performance Measures

Performance Measure	Base Case Forecast	Best Case Forecast
Train Miles	12,252	12,252
Ridership (thousands)	4,157	6,000
Passenger/Vehicle	154	231
Passenger/Train Mile	1.1	1.61
Vehicle Miles of Travel Saved (millions)	489	733
Greenhouse Gases Reduced (thousands of tons)	318	526
Greater Minnesota Population with Access to System by contiguous County or MPO	1 million (41%)	1 million (41%)
Operating and Maintenance Costs (million $ annually)	$181	$140
Farebox Revenue (million $ annually)	$89	$99
Subsidy (million $ annually)	$92	$51
Farebox Recovery Ratio	49%	71%
Operating Subsidy/Rider	$22	$6.6

Other public entities such as Regional Rail Authorities and Joint Powers Boards should partner with Mn/DOT and provide such additional funding as necessary for program elements such as rolling stock, operating subsidies, and local station development for passenger rail service development, or to facilitate priority freight improvements. Future partnerships for both funding and governance will be facilitated by the transition of the Minnesota Passenger Rail Forum and similar advisory bodies to permanent status. The State and Mn/DOT considers this ongoing relationship and coordination with local partners and other stakeholders in freight and passenger services to be vital for the ultimate success and implementation of the Plan.

The State Rail Plan presumes the need for multiple parties, multiple financing techniques, and a long-term implementation horizon. This 20-year program represents a long-term goal to be achieved incrementally over the life of the program. A range of financing tools will be needed among the public sector stakeholders – Federal, state, regional/local – and the private railroads. Unlike the interstate highway program to which this national rail initiative is often compared, there currently is no single dedicated source of funding.

The 2008 Passenger Rail Improvement and Investment Act (PRIIA) created three new passenger rail investment programs for states: the State Capital Grant for Intercity Passenger Rail, Congestion Grants, and HSR grants. The American Reinvestment and Recovery Act of 2009 (ARRA, commonly referred to as "the Stimulus") appropriated an additional $8 billion for projects in the three PRIIA programs. The FRA developed a three-track grant process for distribution of these funds. Mn/DOT submitted applications for $135.8 million in partnership with the Ramsey County Regional Railroad Authority for design and construction of the Union Depot Multimodal Transit Hub; and with the Wisconsin Department of Transportation for

$600,000 to prepare a Service Level environmental document for a HSR route between Milwaukee and the Twin Cities.

Options for leveraging private sector investment include the following:

- Expanding the Minnesota Rail Service Improvement Program (MRSI) from a revolving loan program to a combination of loan and grant programs as done in some other states like Iowa, Wisconsin and Virginia, and increase the loan ceiling above the current $200,000.
- Offering financial assistance for Railroad Rehabilitation and Improvement Financing (RRIF) applicants (Oregon has such a program);
- Providing state maintenance and investment tax credits for rail improvements; and
- Broadening access to the Minnesota Revolving Loan Fund for rail projects beyond grade crossing improvements.

In addition to these existing or potentially expanded Federal funding programs and Federal/state programs designed to leverage private investment, a dedicated stream of state and or local/regional revenue should be considered to support bonding for capital investment and to defray annual operating subsidies, provide local match for Federal programs, and ensure the orderly development of corridors. Otherwise, this program will always be in competition with a broad array of annual state priorities and it will be difficult to achieve the unified system envisioned in the Plan. Note that a Minnesota constitutional limit of $200 million originally limiting MRSI program investments for freight improvements may impact passenger rail program bonding for state capital funds.

Of the $2.2 to $4.4 billion in freight-only improvements, 74 percent of these costs are assumed in the Plan to be covered by the private railroads, with public contributions primarily in the areas of Positive Train Control (PTC), 286,000 pound railcar compliancy, and grade crossings. The financing plan for the shared passenger and freight improvements (including the stand-alone HSR passenger lines) assumes three levels of Federal funding support (0, 50, and 80 percent), and base and best case cost estimates.

Total annual non-Federal public sector costs under all scenarios, including capital and operating, range from $119 million (best case financial assumptions, 80 percent Federal share) to $455 million (base case financial assumptions, zero Federal share).

Detailed technical analyses can be found separately in Technical Memoranda 1 through 9 which are posted on Mn/DOT's web site at http://www.dot.state.mn.us/planning/railplan/resources.html. Information from the Technical Memoranda which are in the Final Report have been updated to reflect the newest information and to respond where possible to comments received during the course of the project from stakeholders.

1 Overview and Vision

1.1 Background and Purpose of Study

The purpose of the Minnesota Comprehensive Statewide Freight and Passenger Rail Plan ("State Rail Plan"), pursuant to Minnesota Statute Minnesota Session Law 2008, Section 174.03 subd 1b, is to guide the future of the rail system and rail services in the State. The development of the Plan was jointly managed by the Minnesota Department of Transportation's (Mn/DOT) Office of Freight and Commercial Vehicle Operations, and the newly created Office of Passenger Rail.

This Final Plan Report describes the existing conditions of rail service in the State in 2009 (Section 2.0); forecasts for economic growth in the State, and for the likely demand for freight and passenger rail service in 2030 (Section 3.0); an assessment of investment needs based on these forecasts (Section 4.0); the needs arrayed against key performance measures (Section 5.0); an assessment of institutional issues, strategies, and roles for moving the plan forward (Section 6.0); and a financing plan (Section 7.0). The major findings are highlighted below. Detailed technical analyses can be found separately in Technical Memoranda 1 through 9 which are posted on Mn/DOT's web site at http://www.dot.state.mn.us/planning/railplan/resources.html. Information from the Technical Memoranda which are in the Final Report have been updated to reflect the newest information and to respond where possible to comments received during the course of the project from stakeholders.

The timing of this plan is critical. Rail has long played a significant role in the movement of freight in Minnesota, much more than in many comparable states and regions. It is essential for the economic well-being of the State that it continue to have the capacity and financial ability to do so. During 2008 and 2009, major new Federal funding support has appeared for rail, particularly for investment in intercity passenger rail. This Plan addresses opportunities for Minnesota to improve both freight and passenger rail in the State. Many of these opportunities overlap as most of the proposed passenger rail services would operate in whole or in part on existing trackage owned and operated by the freight railroads.

Relatively small Federal and state grant and loan programs have existed for many years to support certain types of freight rail investments which have broader public purposes, such as grade crossings. In 2008, Congress enacted the Passenger Rail Improvement and Investment Act (PRIIA) which authorized approximately $750 million/year in grants for intercity rail projects. In 2009, the American Reinvestment and Recovery Act (ARRA or "Stimulus") appropriated an additional $8 billion for passenger rail projects in the PRIIA programs. These actions at the Federal level have set off a lively national competition for current and potential future funding. Figure 1.1 shows the Federal government's vision for a national high-speed passenger rail network.

Figure 1.1 National Passenger Rail Vision

During the course of the study, the following visions were identified for guiding the strategies relative to investment in freight and passenger rail.

1.2 Freight Rail System Vision

Minnesota's railroads form a critical part of the State's multimodal transportation system. Many of the State's major industries rely on the rail system for efficient delivery of goods. The rail system is particularly critical in providing efficient connections to markets beyond the State's borders, throughout North America, and to the world through the seaports on the Pacific and Atlantic coasts, and the Great Lakes. Rail provides critical options to shippers in terms of market access, modal economics, and service. With expected higher energy costs, the inherent energy efficiency of rail will make it a more appealing choice for many shippers.

For Minnesota, a strong rail system supports economic development, enhances environmental sustainability, helps to preserve the publicly owned roadway infrastructure, and increases the business marketability of the State. A future of increasing regional and international economic competition, constrained highway capacity, environmental challenges, and rising energy costs, calls for effectively developing and utilizing a rail system that can support expanded traffic volumes and a more diverse customer base. Ownership of Minnesota's rail system, which is

largely private, presents unique challenges and opportunities, requiring strategies and solutions that are unique to the mode.

The rail industry in Minnesota is a vital and vibrant transportation sector consisting of 24 carriers, ranging from four large Class I railroads to many smaller regional and local carriers. In recent years, growth in traffic hauled by Minnesota's small railroads has outpaced the industry as a whole, and has shown success in locations where prior efforts failed. This success has been recognized by industry, with several receiving awards for innovative marketing and operations. Maintaining and expanding this vitality should be central to the State's involvement with the rail industry.

Therefore, Minnesota should undertake the following steps to accomplish a vision which will develop a balanced multimodal freight system which can respond to increased regional and international economic competition, constrained highway capacity, environmental challenges, a diverse customer base, and rising energy costs.

1.2.1 Infrastructure

A successful, viable rail industry that meets the future needs of Minnesota's economy requires continued investment and improvement to its infrastructure. As private firms, the freight railroad industry is unique in that it has largely borne the cost of maintaining its own infrastructure. This is expected to continue, but further improvements to the infrastructure will be necessary, not all of which may be fully self-funded. In recent experience, rail shippers and public entities have also partnered in both mainline improvements and secondary lines and shipping facilities. Key elements are as follows:

Continue to make improvements to the condition and capacity of Minnesota's primary railroad arterials to accommodate existing and future demand. At present, these lines are in the best condition that they have ever been.

Address critical network bottlenecks that degrade present service and inhibit the ability of the State's railroads to effectively absorb future traffic.

Upgrade main line track (all Class I-III railroads) to 25 mph minimum speed, as warranted. This is needed to ensure commercial viability and safety for rail operators, and current and future shippers that rely on them.

Improve the network (all Class I-III railroads) to support the use of 286,000 pound railcars throughout. This weight limit has become the industry-wide standard, and the viability of lines and shipper's facilities that do not have this capacity will diminish over time.

Implement state-of-the-art traffic control and safety systems to ensure a safe and efficient rail system on key arterials.

Expand intermodal service access options throughout the State. Presently, rail intermodal (the haulage of containers and trailers) services available in Minnesota are limited geographically and capacity-wise. With one minor exception, existing terminals are all located in the Twin Cities, and the only direct services available connect to Chicago and the Pacific Northwest. Service to other regions is either unavailable or circuitous, which has made intermodal a relevant and economical choice for only a small subset of shippers. Quality service to a broader set of markets beyond the State's borders is needed from a competitive and environmental standpoint, as is development of a major new Twin Cities terminal, and one or more intermodal terminals in regions distant from the Twin Cities.

1.2.2 Planning and Policy Development

Maintain and ensure broad access to competitive freight rail services for shippers throughout the State. The relevance of rail service to Minnesota's industry is directly related to geographic coverage, trip times, reliability, availability of appropriate rolling stock, and cost. These needs should be achieved through a range of competitive service offerings, from single carload to high-volume unit train shipments, bulk transloading, intermodal, and innovative solutions that are yet to be developed.

Better integrate rail into the public planning process, including modal tradeoff analysis, local and regional comprehensive plans, modal diversion, industrial development strategies, and public ports planning.

1.2.3 Existing Rail Programs

State assistance for freight rail projects should build upon the existing Minnesota Rail Service Improvement Program (MRSI). While the 30-year-old program has helped to support a strong rail system in the State, funding limits have become inadequate, and a broader program should go beyond small loans for infrastructure improvements. The program should include a range of solutions and financing options, including branch and short line preservation, and an increase in the maximum loan amount in excess of the current $200,000 ceiling.

The Rail/Highway Grade Crossing program should expand to consider a broader array of strategies beyond active warning devices, and match or exceed device replacement needs**.** The Federal Section 130 grade crossing program has provided an institutional structure and a modest source of funds to improve rail/highway grade crossings primarily through the installation of active warning devices. Substantial reductions in grade crossing incidents have been the result, and Minnesota has embraced the program and the public/private partnership model that lies at its foundation. Going forward a more dynamic approach to grade crossings will be necessary, as regions of the State continue to urbanize and rail traffic volumes and speeds increase. While grade crossing warning devices and other low-cost improvements will remain an important part of the mix, other, more complex and costly strategies – such as quiet

zones, advanced crossing systems and even grade separations – are increasingly being demanded by the public. With resources being insufficient to meet existing program mandates, expanded state involvement will necessitate development of a range of creative solutions.

Preserved rail corridors held in the State Rail Bank should be more actively managed and evaluated for possible future transportation uses. While interim uses of preserved rail corridors, typically as recreational trails, have seemingly maintained their integrity for future transportation use, the likelihood of their reuse for rail transportation purposes is very modest. Encroachment by abutters, regulations, and political considerations make conversion to an active railroad extremely difficult and costly. If demand for rail service continues to increase, the ability to reconstitute some of these trails as rail lines may be desirable. A more nuanced rail banking strategy that establishes clear policies for line acquisition and disposition, and that differentiates rail banking for purposes of future rail use versus other indefinite "interim" public uses should be established.

1.3 Passenger Rail Vision

Minnesota currently has one active intercity passenger rail service – Amtrak's Empire Builder which provides service between Chicago and points west, and one light rail line – Hiawatha – which operates between the Mall of America and downtown Minneapolis. Minnesota's first commuter rail service – Northstar – providing service between Big Lake and the Twin Cities, started up just as this Plan was being completed in late 2009.

Many conditions exist which make it desirable for Minnesota to develop an intrastate and interstate intercity rail system. These conditions include 1) expected continued population and economic growth once the State emerges from the current recession, putting further demands on the State's capacity constrained highway system; 2) the sudden availability of significant Federal funds dedicated to intercity passenger rail; and 3) macroeconomic and global environmental and energy trends and policies which are likely to significantly increase long-term fuel prices and require significant controls on greenhouse gas emissions.

Given these conditions, Minnesota should undertake the following steps to accomplish a vision which will develop a robust intrastate and interstate intercity passenger rail system which results in improved travel options, costs and speeds for Minnesota and interstate travelers.

Continue to participate in the Midwest Regional Rail Initiative (MWRRI) and support the development of sustained 110 mph service for connections from the Twin Cities to Wisconsin and the Chicago Hub Network.

Develop an intrastate intercity passenger rail network connecting the Twin Cities with viable service to major outlying regional centers. These services can be started-up as stand-alone projects and coordinated as part of a larger regional/national system. These services should use interchangeable and interoperable equipment. Local transit services in the major MPO regions should be coordinated to support the rail system. System speeds should be a sustained 79 to 90 mph, with a goal of achieving 110 to 150 mph where track conditions and

market demand permit and warrant. Systems should be built out on existing freight lines where possible, and on new dedicated passenger tracks where desirable and necessary.

All services should ultimately connect to both the new Minneapolis downtown terminal and St Paul Union Depot.

Corridors should be advanced incrementally, to build ridership and system advantages, leaving open all future options for viable improvements – stand-alone branches, through routes, new alignments, potential airport connections, and true high-speed rail (HSR).

Corridors should advance simultaneously with Mn/DOT's support; sequencing depending on financing, ROW acquisition and agreements with freight railroads.

In Phase II, rail connections should be established to additional intercity and commuter rail markets in Wisconsin and Minnesota, and to an interstate/I-35 Corridor, Red River Valley, Eastern plains and Canada.

1.4 Categories of Passenger Rail

This study focuses on the development of intercity passenger rail service that would link the Twin Cities with outlying locations in Greater Minnesota and the upper Midwest. Opportunities also exist for the development of overlapping commuter rail and intercity services in the Twin Cities metropolitan area on many of the proposed intercity passenger lines. It is possible that intercity trains could pick up passengers at a few key outlying commuter stops, or at the very least interchange with the commuter services. However, if long-distance intercity trains make frequent commuter rail stops they will cease to provide time competitive quality service to more distant origins and destinations. This study acknowledges the potential for such synergies, but a detailed analysis will need to come out of the individual commuter and intercity rail studies.

Following is a description of the different categories of passenger rail services and how this study fits into that typology.

Light Rail Transit (LRT). LRT is an electrically powered, two-rail technology capable of providing a broad range of passenger capacities, and operating as single vehicles or in short trains on a variety of alignment types. It is a mode combining vehicle technology very similar to that of streetcars, but operating primarily on a partially controlled right-of-way and typically at higher speeds and passenger loadings. LRT typically operates with frequent stops in dense urban environments at speeds of 20 to 50 mph. The Hiawatha line from the Minneapolis/St. Paul Airport to downtown Minneapolis is an example of LRT, as will be the proposed Central Corridor line along University Avenue connecting St. Paul and Minneapolis.

Heavy Rail Transit. Heavy Rail Transit, typically referred to as a "subway," is an electric railway with the capacity for a heavy volume of traffic in dense urban areas. It is characterized by high-speed and rapid acceleration passenger railcars operating singly or in multicar trains on fixed rails; separated right-of-way from which all other vehicular and foot traffic are excluded; sophisticated signaling; and high platform loading. Heavy rail is not compatible with other transit modes in the Minneapolis and St. Paul area.

Commuter Rail. Commuter Rail is an urban passenger train service that connects an urban region together over moderate distances; which typically operates on existing freight tracks; and whose primary clientele travels between home and work. Commuter rail service may be either locomotive-hauled or self-propelled, and is characterized by reduced fair multitrip tickets, specific station-to-station fares, and usually only one or two stations in the central business district. Average speeds are 18 to 55 mph. The Northstar rail line from Big Lake to Minneapolis is the first example of commuter rail in Minnesota.

Conventional Intercity Rail. Traditional intercity passenger rail services are typically more than 100 miles with as little as one to as many as 7 to 16 daily frequencies. Top speeds of up to 79 miles per hour to as high as 90 miles per hour are common on shared freight track. Current Amtrak service connecting the Twin Cities to Chicago and the Pacific Northwest is an example of this service.

High-Speed Rail (HSR). HSR service has the characteristics of intercity rail service but at substantially higher speeds. It is most applicable in markets where the combination of travel demand and distance justifies the higher investment cost. North American practice defines HSR as being at least 110 mph.

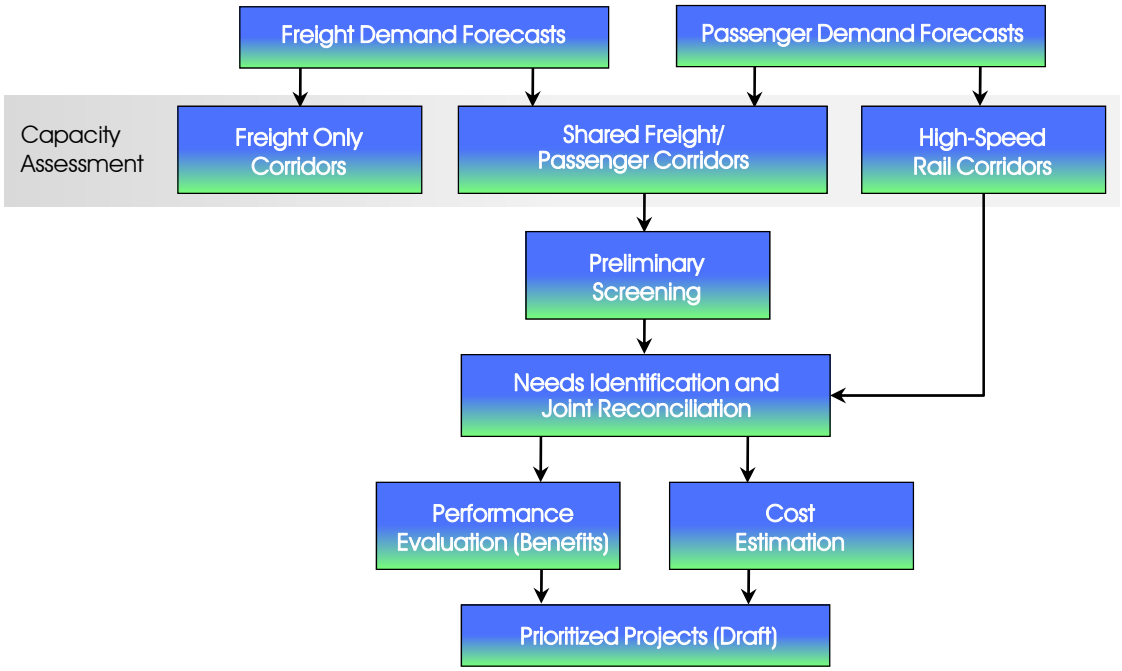
Operations can occur over track shared with slower passenger and freight trains at speeds of up to 150 mph, and on dedicated track where speeds in some countries now exceed 200 mph. Amtrak's Northeast Corridor Acela service is the only (partial) operational example of HSR in North America.

1.5 Investment Needs

The analytical methodology used to develop the Rail Plan is shown in Figure 1.2. Demand forecasts were developed for the year 2030 for both freight and passenger rail services in Minnesota. These forecasts were compared to a detailed capacity analysis of the existing and proposed freight and passenger rail networks, including three types of lines: 1) those likely to remain freight only; 2) those proposed for shared freight and passenger services; and 3) those proposed for stand-alone high-speed passenger rail services. An initial screening was conducted of potential passenger services and some were eliminated from further consideration.

The remainder of the system was subject to an extensive needs assessment for its ability to meet future freight and passenger demand. Rail lines were rated on a Level of Service (LOS) scale of A-F, where A-C was considered to be adequate capacity to meet future demand. High-level cost estimates were developed and the benefits of the improvements were compared against a set of performance measures. Those projects with the highest ratings were included in the resulting Priority Program.

Figure 1.2 Needs Assessment Methodology



Ridership forecasts are shown in Table 1.1. All services would be between the Twin Cities and the identified city pair. Cities have been grouped into four tiers based on market size. The base case forecasts come directly out of the modeling process used by this project. The best case forecasts represent a 50 percent higher forecast which could be achieved in a variety of ways – by including the demand from intermediate intercity and commuter rail stops, network effects, or by changes in external variables such as higher than predicted fuel prices.

The performance measures used to analyze the projects were as follows:

- System Performance – Capacity, speed, annual production of ton/miles, ridership;
- System Condition – Track, bridges, crossings;
- Connectivity/Accessibility – Proximity to users, commercial terms, modes;
- Safety and Security – At-grade crossings, hazmat, inspections;
- Environmental – Positive and negative impacts of construction and operations; and
- Financial/Economic – Capital costs, operations, taxes, jobs, economic development, cost/benefit comparisons.

Table 1.1 Ridership Forecasts Results

2030 Annual Trips with Most Favorable Variables Tested

Base Case Forecast	Best Case Forecast
Over 1 million (Selected Cities)	Over 1.5 million (Selected Cities)
• Chicago	• Chicago
• St. Cloud	• St. Cloud
400,000-600,000	600,000-800,000
• Duluth (NLX)	• Duluth (NLX)
• Rochester	• Rochester
100,000-300,000	150,000-450,000
• Wisconsin Points on MWRRI	• Wisconsin Points on MWRRI
• Mankato	• Mankato
• Eau Claire	• Eau Claire
• Northfield	• Northfield
100,000 or under	100,000 or more
• Fargo	• Fargo
• Red Wing	• Red Wing
• Winona	• Winona
• Willmar	• Willmar

A significant number of primary rail lines operate over capacity in 2009 and are shown in Figure 1.3. The number of lines experiencing capacity constraints are expected to increase substantially by 2030 given the forecast increases in freight demand and proposed passenger services.

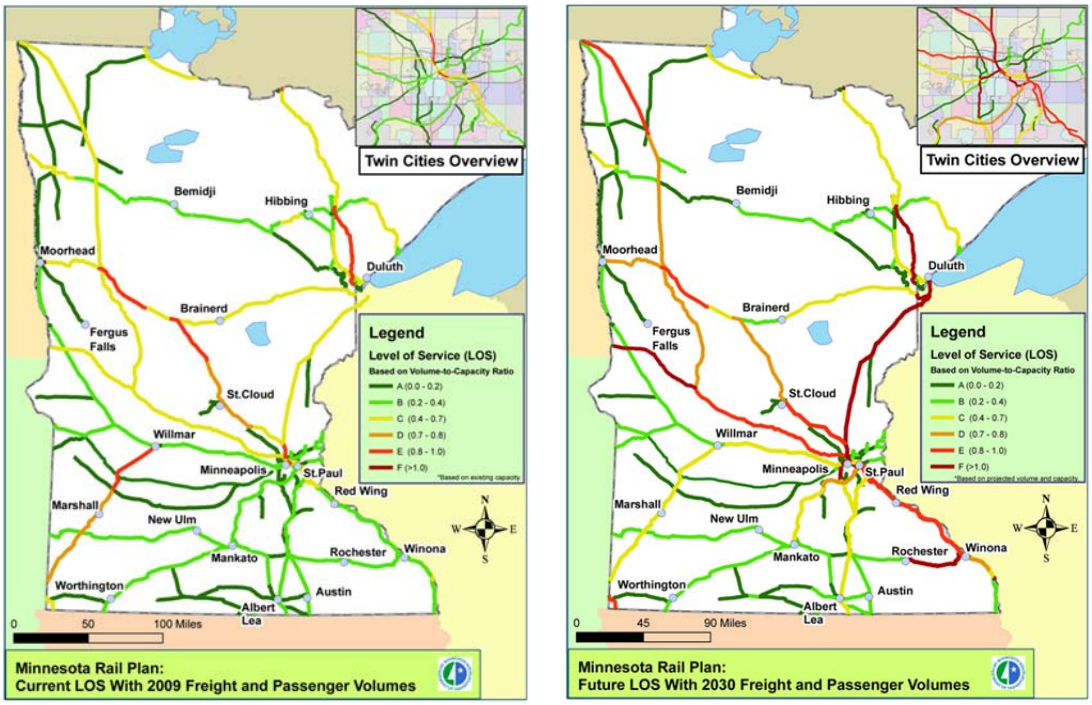
A priority program was developed which would meet the identified needs and achieve the Rail Visions described above. The program contains the following elements:

- HSR passenger service to Chicago, Duluth, and Rochester: Upgrade/develop corridors to FRA Class 6 conditions[1];

[1] The Federal Railroad Administration classifies track into a series of categories based on physical condition (i.e., tie and rail condition, surface, cross-level, etc.). For each category, which ranges from I to VIII, trains are permitted to travel up to a set speed, with the higher numbered categories allowing higher speeds. Permissible speeds generally differ for passenger and freight trains; thus, while freight trains can travel up to 40 mph on FRA Class III track, passenger trains can reach 60 mph. Typical short line track is maintained to FRA Class II (24 mph maximum for freight), and Class I (10 mph maximum). For more information, see 49 CFR 213.9 and 213.307.

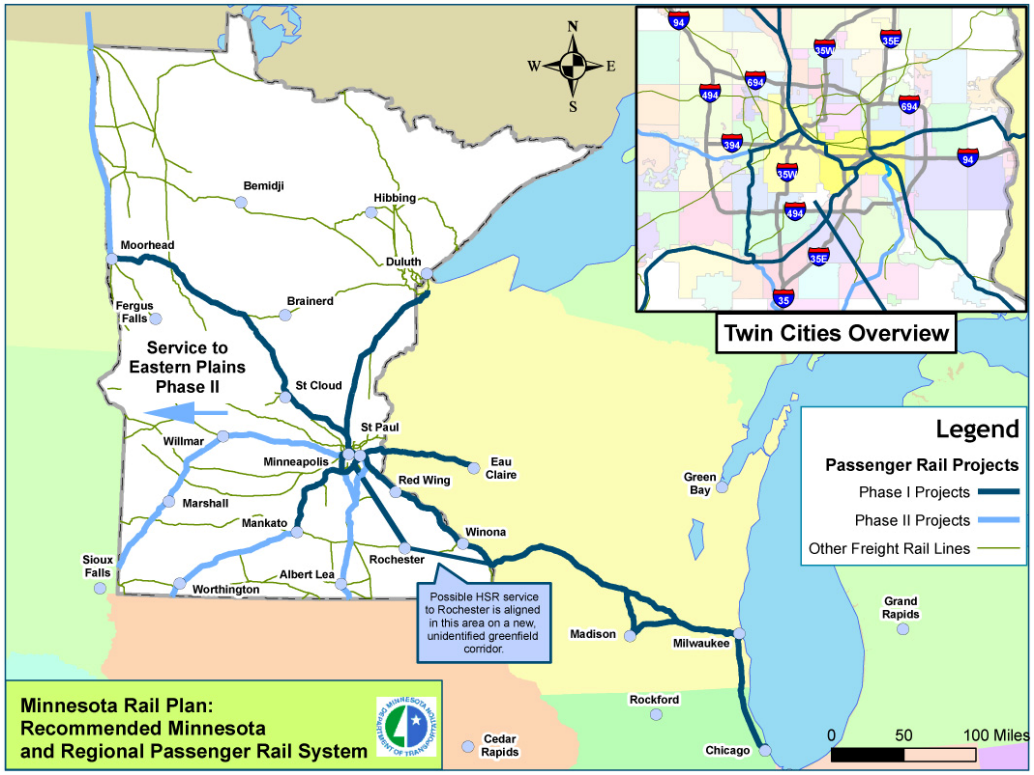
- Enhanced conventional passenger rail to St. Cloud, Mankato, Fargo, Eau Claire and between the Twin Cities: Upgrade corridors to Class 4 (minimum), 5, or 6 conditions as warranted (respectively 79, 90, or 110 mph);
- Positive Train Control (PTC) on all shared corridors and freight-only corridors which may handle certain categories of hazardous material;
- Grade crossing upgrades on all shared corridors;
- Upgrade major junctions and bridges;
- All mainline track upgraded to minimum 286,000 pound capacity and 25 mph condition;
- Programmed upgrades of all active warning devices and signs;
- Additional intermodal facilities; and
- Short line bridge upgrades.

Figure 1.3 Current LOS with 2009 Freight and Passenger Volumes and Future LOS with 2030 Freight and Passenger Volumes, with No Improvements



This priority program essentially combines all investments that are needed for implementation of both freight and passenger improvements. Integrating the demand forecasts and the passenger-related projects, the resulting passenger rail system is shown in Figure 1.4. The dark blue lines are included in the Phase I priority program, and the lighter blue lines are identified as Phase II projects but not included in the final cost estimate for the program.

Figure 1.4 Recommended Minnesota and Regional Passenger Rail System



If fully implemented, this program would eliminate all substandard capacities in 2009 and 2030 as shown in Figures 1.5 and 1.6 respectively.

Figure 1.5 Current LOS with Freight and Passenger Volumes versus LOS with Post-2009 Freight and Passenger Improvements

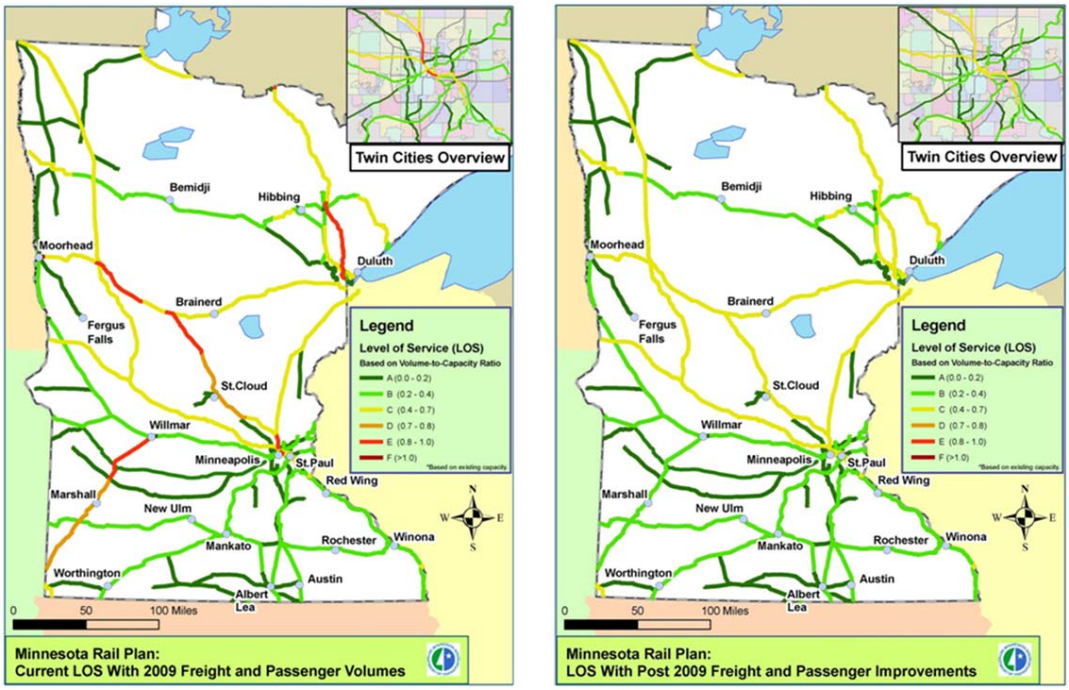
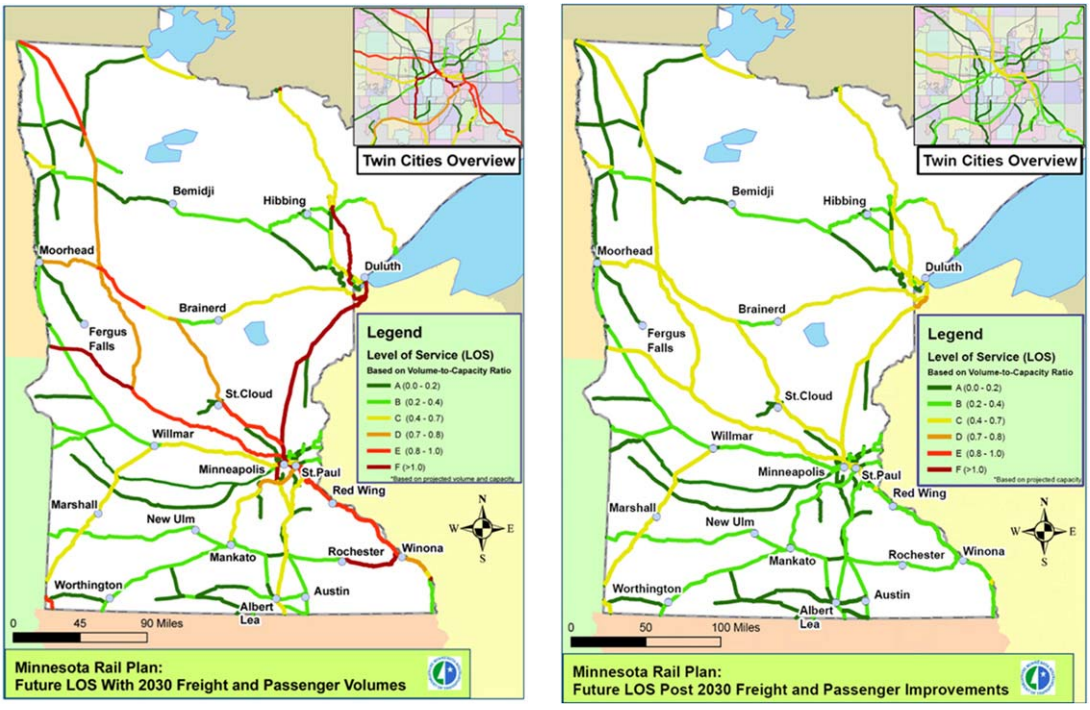


Figure 1.6 Future LOS with 2030 Freight and Passenger Volumes versus Future LOS Post-2030 Freight and Passenger Improvements



The total capital cost of the fully implemented program over 20-years would be between $6.9 and $10.2 billion. This amount consists of the $2.2 to $4.4 billion for freight-only improvements; and $4.7 to $5.8 billion for the priority passenger and shared freight improvements if built as a system rather than as a series of individual, unrelated projects. Substantial synergies across projects can be achieved if planned as parts of an eventual unified system. Section 1.7 discusses how the program could be financed across various public and private participants.

Cost estimates are based on high-level systemwide unit costs. More detailed engineering costs developed for specific corridors may vary significantly from these estimates. High- and low-end ranges were developed for most cost elements. The high-end numbers are referred to as the "base case," and the low-end numbers are referred to as the "best case." The primary differences in the two sets of estimates are as follows:

- The base case assumes the ridership forecasts developed for this study; the best case assumes a 50 percent increment in ridership and 25 percent increment in revenue.
- The base case assumes a 30 percent contingency and the best case assumes a 10 percent contingency.
- The base case assumes that Positive Train Control (PTC) would be implemented on Class I freight lines in combination with conventional Central Traffic Control (CTC). PTC is a state-of-the-art technology which is intended to prevent train collisions. PTC is an unfunded Federal mandate enacted by the Rail Safety Improvement Act of 2008 (RSIA) and must be implemented by 2015 on all shared passenger and freight lines, and on all Class I freight mainlines which may carry certain classes of hazardous materials. The best case assumes proceeding directly to PTC implementation, with CTC capabilities integrated into the PTC technology rather than as a stand-alone system. Full implementation of PTC accounts for $2.3 billion of program costs in the base case. The best case assumes a reduced cost of $335 million.
- The best case reduces the number of trainsets required for the entire system by 20 percent, on the assumption that trains can be through routed across the system once it is in place.
- The base case assumes the cost of operations and maintenance to be $70/mile based on Amtrak's fully allocated overhead costs, excluding depreciation and interest. The best case assumes $55/mile based on actual Amtrak direct costs, excluding infrastructure maintenance and system costs. These estimates are used for costing purposes only; there is no presumption regarding who the ultimate operator of the system will be.
- The base case assumes capacity rights fees on freight railroads of $85,000/train per mile based on the actual negotiated Northstar rate; the best case assumes about one-half of that or $40,000 on the assumption that the combination of high freight demand and intensive commuter rail service drove up the Northstar price.

The resulting range of system capital costs are as follows:

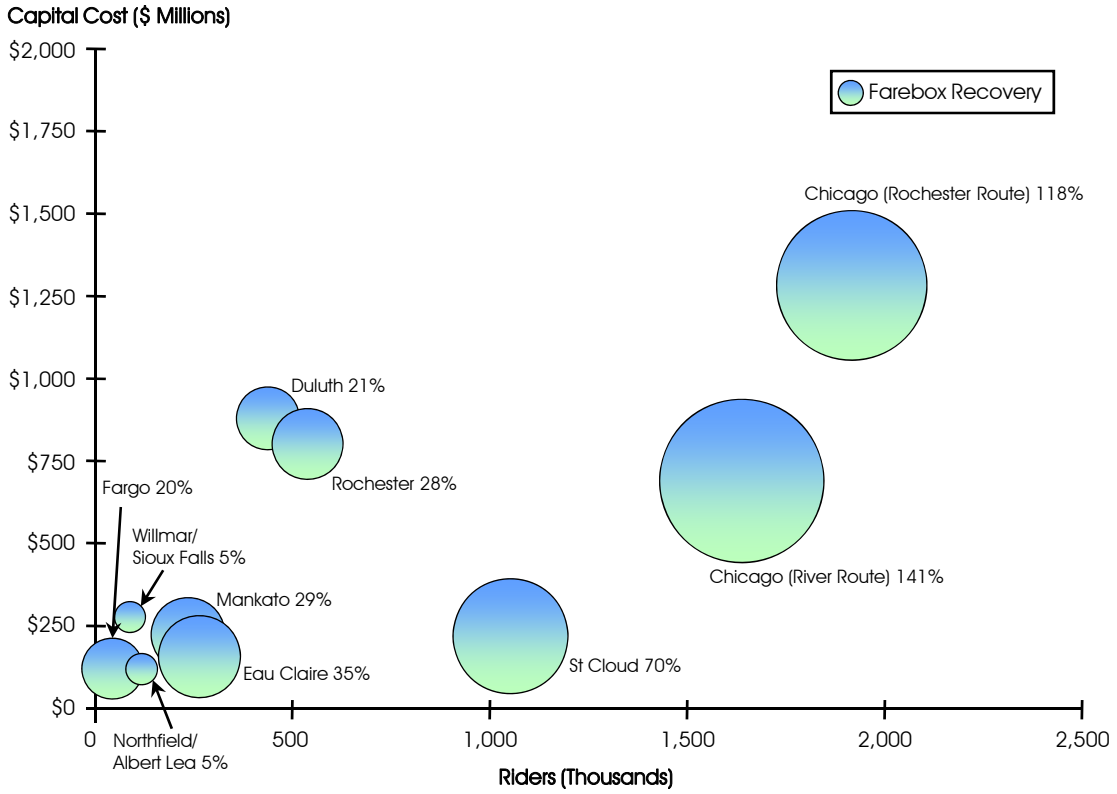
- All freight-only improvement needs = $2.2 to $4.4 billion;
- All passenger and shared passenger/freight improvement needs as individual projects = $6.8 to $8.4 billion (passenger needs include all of the lines shown on Figure 1.4);

- All passenger and shared passenger/freight improvement needs as a system = $4.5 to $5.7 billion;
- All passenger and shared passenger/freight improvement needs on Phase I passenger rail priority system = $4.0 to $5.1 billion (passenger needs include only lose lines shown in dark blue on Figure 1.4, including Chicago/MWRRI via the River Route, and services between the Twin Cities and Rochester, Duluth, Mankato, St. Cloud, and Fargo); and
- Total program costs = $6.2 to $9.5 billion.

All costs shown in this report are in current real (uninflated) dollars as is typically done in a report of this type so that the difficult to predict impacts of inflation are factored out. However, for the purposes of consistency with Mn/DOT's Statewide Plan, the total program costs inflated over the 20-year life of the program would be between $12.4 and $19.0 billion. This estimate is based on an annual inflation rate of four percent through 2020, three percent thereafter, and equal expenditures across the 20-year period. In reality, expenditures would probably start out low, peak in the middle years, and then decline in the out years.

The performance of the various passenger projects in the base case based on forecast ridership, capital cost, and farebox recovery ratio is shown in Figure 1.7. The ideal location of a project would be the lower right-hand corner where a project would have low cost and high ridership. The size of the circle reflects the percentage of farebox recovery. All capital costs (passenger-only and shared freight) are included in the vertical axis.

Figure 1.7 Summary of Passenger Route Performance – Base Case



As shown, both Chicago routings are expensive but have high ridership and excellent farebox recovery ratios consistent with Amtrak's Northeast Corridor Acela service. Note that costs and revenues are prorated to reflect only the Minnesota portion of these services. St. Cloud has relatively modest costs and excellent ridership and farebox recovery for an intrastate service. Both Chicago, through the MWRRI plans, and St. Cloud, as the eventual termination point of Northstar commuter services, have long been in the forefront of passenger rail planning in the State.

Duluth and Rochester have the next highest ridership levels but are expensive to build because they are proposed as HSR lines (unlike St. Cloud). Mankato and Eau Claire are relatively inexpensive conventional lines and show reasonably good farebox recovery ratios. The other projects are inexpensive but with relatively lower ridership, which is why Willmar and Albert Lea were put into Phase II. Fargo, of course, currently has passenger rail service as part of Amtrak's Empire Builder route, and this service should continue and be enhanced as part of the overall MWRRI program.

Figure 1.8 shows the same analysis based on the best case annual operating and maintenance costs and 25 percent higher revenue based on the higher ridership forecasts. Note that revenue is not increased by the full 50 percent increment in ridership, but by 25 percent, since riders from intermediate destinations would pay lower fares than riders traveling between the end points.

Figure 1.8 Summary of Passenger Route Performance – Best Case

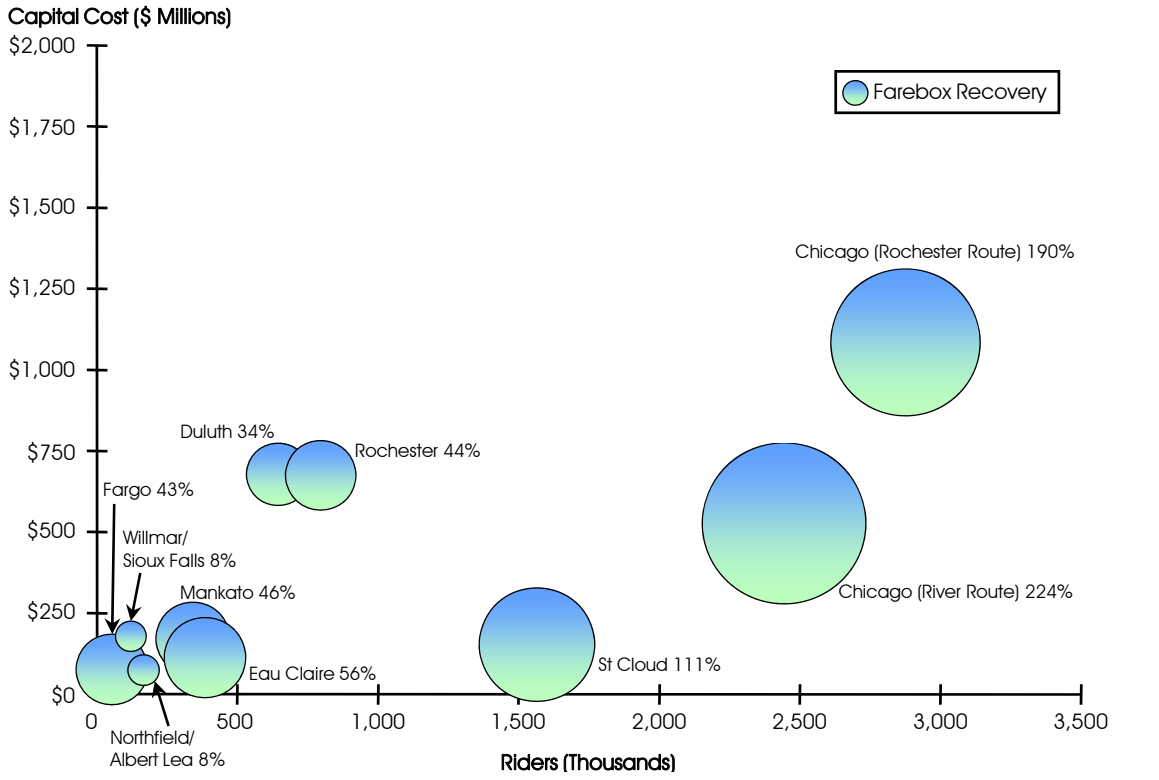


Table 1.2 Annual Passenger Rail Systemwide Performance Measures (Annual) – Phase I

Performance Measure	Base Case Forecast	Best Case Forecast
Train Miles	12,252	12,252
Ridership (thousands)	4,157	6,000
Passenger/Vehicle	154	231
Passenger/Train Mile	1.1	1.61
Vehicle Miles of Travel Saved (millions)	489	733
Greenhouse Gases Reduced (thousands of tons)	318	526
Greater Minnesota Population with Access by County or MPO of Station	1 million (41%)	1 million (41%)
Operations and Maintenance Costs (millions $ annually)	$181	$140
Farebox Revenue (millions $ annually)	$89	$99
Subsidy (millions)	$92	$51
Farebox Recovery Ratio	49%	71%
Operating Subsidy/Rider/Day	$22	$6.6

Table 1.2 shows a series of systemwide performance measures for both the base and best case forecasts. In general, this system compares favorably on several dimensions with existing national rail performance data. Note that annual operating subsides for the system as a whole would range from $95 million per year in the base case (49 percent farebox recovery) to $41 million in the best case (71 percent farebox recovery). The latter assumes that operating subsidies from the Minnesota portion of the interstate MWRRI route could not be applied to intrastate operating deficits. If it can be so applied, the overall operating deficit would almost be eliminated.[2]

The VMT reduction equals between approximately 1-2 percent of statewide VMT depending on the scenario, which is typical of most major public transportation investments. VMT reductions on a corridor specific basis would be higher.

Implementation of the freight program would result in the following metrics being achieved:

- All mainline track speeds would be at least 25 mph;
- All rail lines would have 286,000 pound railcar capacity;
- Significant increases in track to siding ratios would be achieved;
- Positive Train Control (PTC) would be implemented on all Class I mainlines; and

[2] This is why a 25 percent increase in revenue for each route does not produce an overall increase in revenue of 25 percent, since the additional surplus from the Chicago route is not applied to the intrastate routes in this calculation.

- All active grade crossing devices would be upgraded or replaced.

Transportation investments can generate a range of direct and indirect economic benefits in excess of the cost of the programs. While not quantified in this study, there benefits are discussed qualitatively in Section 5.3.

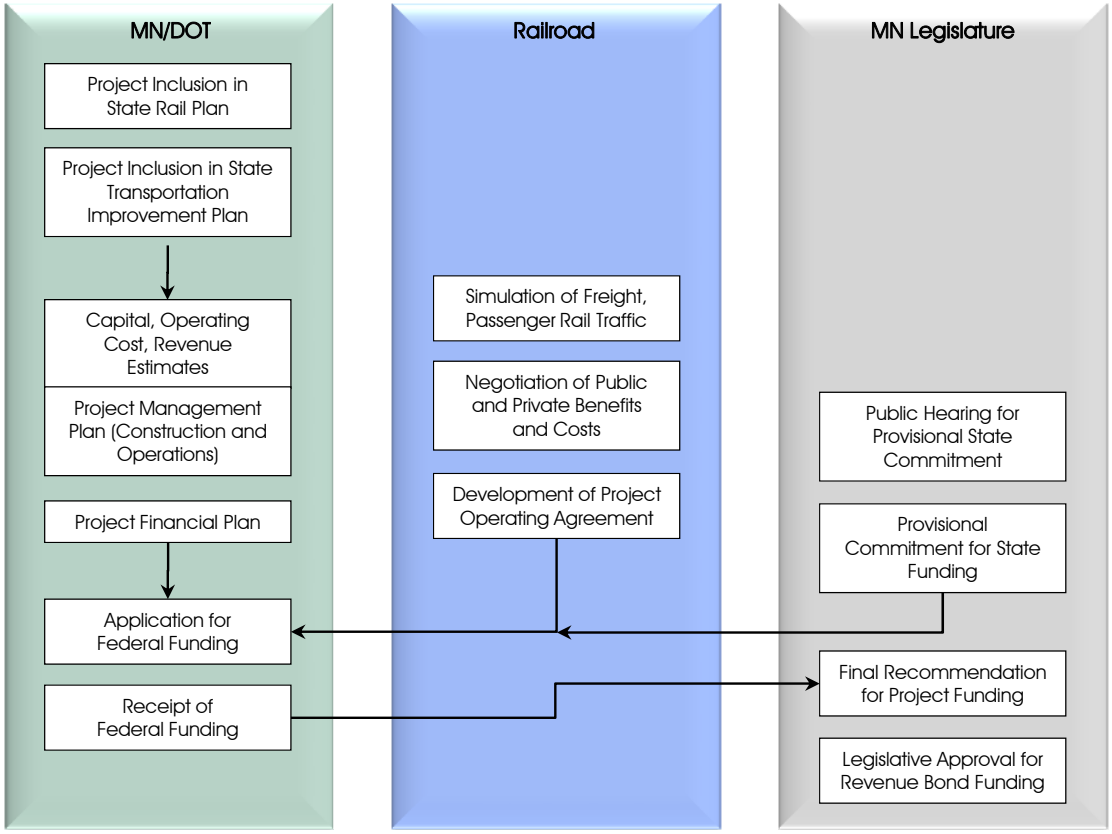
1.6 Management Approach

The State of Minnesota, through dedicated Mn/DOT departments, with the active oversight of the Legislature, should take a strong lead in advancing the process forward in order to develop the unified system envisioned in this Plan. Specific steps include:

- Organize the State's response to Federal rail grant programs to maximize the opportunities for Federal funding;
- Coordinate negotiation of actual operating agreements with the freight railroads;
- Analyze public/private benefit/cost allocation for each passenger rail corridor to better position corridors for FRA grants:
  - Ensure third party due diligence of each corridor investment;
  - Clarify capital/operating costs, revenues, financial plan, and project management plan; and
  - Provide for Legislative review/acceptance.
- The State should adopt the following principles in moving forward:
  - Limit state funding of operating subsidies to about 25 percent of total O&M costs; (overall state-supported Amtrak corridors generate revenues that cover more than 85 percent of costs);
  - Assume equal capital cost share of freight investments in shared corridors – actual state capital costs will depend on benefit/cost allocation with freight rail owner; and
  - Public sector pays for passenger-related capital costs.

Other public entities such as Regional Rail Authorities and Joint Powers Boards should partner with Mn/DOT and provide such additional funding as necessary for program elements such as rolling stock, operating subsidies, and local station development. The decision-making framework is shown in Figure 1.9.

Figure 1.9 Passenger Rail Project Decision Process



1.7 Financing

The approach to financing the State Rail Plan presumes the need for multiple actors, methodologies, and years. This is a 20-year program and the full program costs should not be viewed as daunting but rather as a long-term goal which can be achieved incrementally over the life of the program. A range of financing tools will be needed among the public sector stakeholders – Federal, state, regional/local – and the private railroads. Unlike the interstate highway program to which this national rail initiative is often compared, there is no single dedicated source of funding.

State and local funding commitment to planning, capital investment, and operations has already been demonstrated in Minnesota, and will continue. State general fund and bonding funds have been dedicated to the existing freight and safety programs (including MRSI), the Office of Passenger Rail in Mn/DOT, Northstar Commuter Rail, NLX, MWRRI, and a $26 million bonding commitment to advance and match Federally funded projects and future applications. Minnesota counties and Regional Railroad Authorities have also committed local matches from both general funds and tax levies toward these and other projects.

On the Federal side, there are a number of program elements within the existing surface transportation program (SAFETEA-LU) which can be used to fund rail projects. SAFETEA-LU has expired and is currently being operated under continuing Congressional resolutions. The future timing and content of full reauthorization is uncertain. Existing rail-eligible program elements include the following:

- Surface Transportation Program;
- Congestion Mitigation and Air Quality (CMAQ) Improvement Program;
- Rail Line Relocation Grant Program;
- Transportation Infrastructure Finance and Innovation Act (TIFIA);
- Private Activity Bonds (PABs); and
- Rail Rehabilitation and Improvement Financing (RRIF) Financing Program.

The 2008 Passenger Rail Improvement and Investment Act (PRIIA) created three new passenger rail investment programs for states: the State Capital Grant for Intercity Passenger Rail, Congestion Grants, and HSR grants. The American Reinvestment and Recovery Act of 2009 (ARRA, commonly referred to as "the stimulus") appropriated an additional $8 billion for projects in the three PRIIA programs. The FRA developed a three-track grant process for distribution of these funds. Mn/DOT submitted applications for $135.8 million in partnership with the Ramsey County Regional Railroad Authority for design and construction of the Union Depot Multimodal Transit Hub; and with the Wisconsin Department of Transportation for $600,000 to prepare a Service Level environmental document for a HSR route between Milwaukee and the Twin Cities.

The outcome of this application process is pending. What is clear is that there is likely to be significant Federal funding available for rail projects, but that the process for obtaining this funding will be highly competitive. FRA received 214 applications from 34 states for $7 billion in August 2009, and 45 applications from 24 states for $50 billion in October. The U.S. DOT received 1,400 applications for $57 billion in September for the $1.5 billion for the Transportation Investment Generating Economic Recovery (TIGER) grants. FY'10 appropriations for high-speed and intercity and passenger rail programs authorized in PRIIA are $2.5 billion. While PRIIA authorizes programs with up to 80 percent Federal funding, consistent with Federal highway funding, actual funding levels may be in the 50 percent range consistent with how the Federal Transit Administration (FTA) now funds urban New Starts projects. For purposes of this analysis, we assumed overall Federal funding contributions of 50 percent and 80 percent.

Options for leveraging private sector investment include the following:

- Expanding the Minnesota Rail Service Improvement Program (MRSI) from a revolving loan program to a combination of loan and grant programs as done in some other states like Iowa, Wisconsin, and Virginia, and to increase the loan ceiling from the current $200,000;

- Offering financial assistance for Railroad Rehabilitation and Improvement Financing (RRIF) applicants (Oregon has such a program);
- Providing state maintenance and investment tax credits for rail improvements; and
- Broadening access to the Minnesota Revolving Loan Fund for rail projects beyond grade crossing improvements.

In addition to these existing or potentially expanded Federal funding programs and Federal/state programs designed to leverage private investment, a dedicated stream of state and or local/regional revenue should be considered to support bonding for capital investment and annual operating subsidies. Otherwise, this program will always be in competition with a broad array of annual state priorities and it will be difficult to achieve the unified system envisioned in the Plan. Full state participation in capital bonding for passenger rail system construction may be impacted by a $200 million constitutional limit originally meant to constrain the MRSI freight improvement program.

Table 1.3 and Figure 1.10 show a strategy for distributing the costs of the $2.2 to $4.4 billion in freight-only improvements. As shown, 74 percent of these costs are assigned to be covered by the private railroads, with public contributions primarily in the areas of PTC, 286k lb. compliancy, and grade crossings. The 2007 American Association of Railroads (AAR) National Capacity Study estimated that on a national level, the railroads would be able to finance $96 out of $135 billion (70 percent) in identified capacity expansion needs through 2035. The annual public sector cost of this investment over 20 years would be between $25 and $50 million. In order to meet this financing level, the private railroads will have to achieve higher earnings through improved productivity, volume, and revenue. Global economic and environmental trends are likely to favor the long-term competitiveness of freight railroads. Certainly, that is what Warren Buffet is betting on with his purchase of BNSF.

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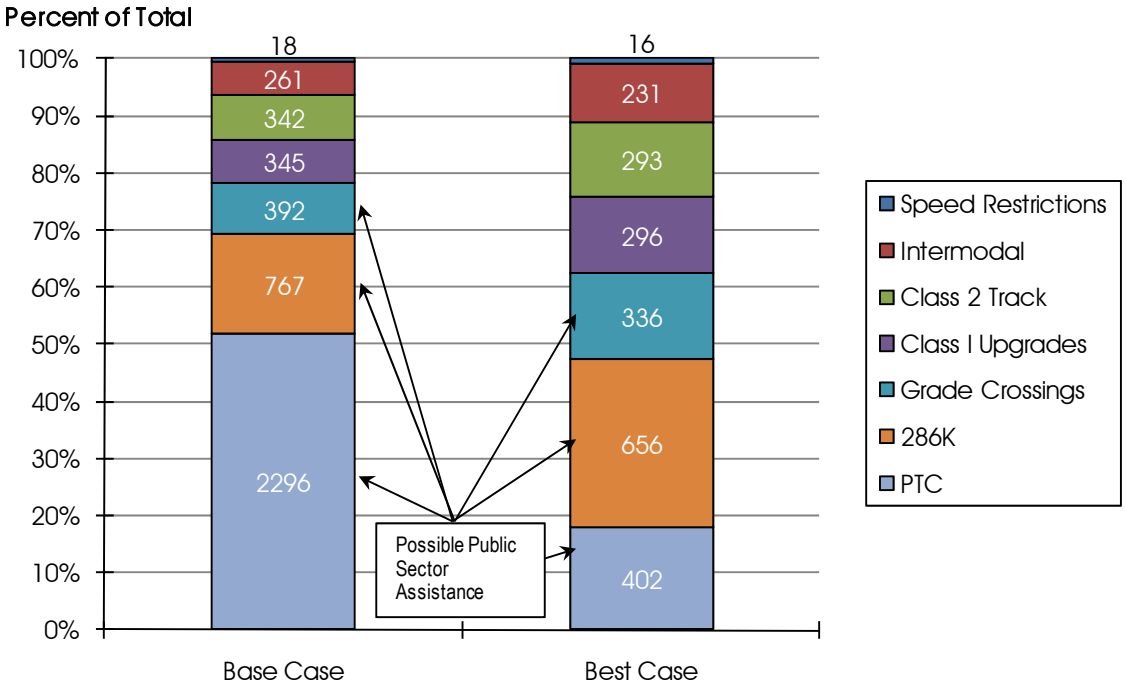
Table 1.3 Freight System Costs, Public and Private Shares
Including Contingencies ($millions)

	Total Cost	Public Share	Private Cost
Base Case			
Class I upgrades	$345.52	$86.38	$259.14
Other Class I improvements	$261.00	–	$261.00
PTC	$2,296.00	$574.00	$1,722.00
286K restrictions	$767.20	$76.72	$690.48
Non Class I speed restrictions	$18.20	–	$18.20
Grade Crossings	$392.00	$392.00	–
Class 2 track upgrades	$341.60	–	$341.60
Total	$4,421.52	$1,129.10	$3,292.39
Percent of Total		26%	74%
Best Case			
Class I upgrades	$296.16	$74.04	$222.12
Other Class I improvements	$231.00	–	$231.00
PTC	$402.00	$100.50	$301.50
286K restrictions	$657.60	$65.76	$591.84
Non Class I speed restrictions	$15.60	–	$15.60
Grade Crossings	$336.00	$336.00	–
Class 2 track upgrades	$292.80	–	$292.80
Total	$2,231.16	$576.30	$1,654.86
Percent of Total		26%	74%

Note: Contingencies include 30 percent contingency and 10 percent engineering costs in base case; 10 percent contingency and 10 percent engineering cost in best case.

Figure 1.10 Freight Rail System Improvement Costs

Including Contingencies, ($millions)



Note: Contingencies are 30 and 10 percent base/best cases; and 10 percent engineering.

The financing plan for the shared passenger and freight improvements (including the stand-alone HSR passenger lines) assumes three levels of Federal funding support (0, 50, and 80 percent), and base and best case cost estimates.

Total annual non-Federal public sector costs under all scenarios, including capital and operating, are shown in Table 1.4 and range from $119 million (best case financial assumptions, 80 percent Federal share) to $455 million (base case financial assumptions, zero Federal share).

Table 1.4 Total Possible Annual Costs, State Rail Plan
($millions)

	No Federal Funds	50% Federal Matching Funds	80% Federal Matching Funds
Base Case			
Phase I Infrastructure Costs	$274.55	$137.28	$54.91
Freight Only Improvements, Public Share	$50.86	$50.86	$50.86
Phase I Operating Costs	$130.07	$101.53	$84.40
Subtotal Annual Cash Costs	$180.93	$152.39	$135.26
Total Annual Costs, Capital and Cash Costs	$455.48	$289.67	$190.17
Best Case			
Phase I Infrastructure Costs	$237.25	$118.63	$47.45
Freight Only Improvements, Public Share	$24.02	$24.02	$24.02
Phase I Operating Costs	$81.05	$60.08	$47.50
Subtotal Annual Cash Costs	$110.91	$89.94	$77.36
Total Annual Costs, Capital and Cash Costs	$343.12	$202.73	$118.97

Best Case includes discounted rolling stock, reduced O&M costs, reduced capacity rights costs, higher revenues.

Passenger rail Phase I costs presume traditional MN public debt, 20-year term, 5 percent annual interest.

Annual Operating Costs include RRIF debt for rolling stock and capacity access, 25-year term, 4.8 percent annual interest.

Note: Contingencies are 30% and 10% respectively for the base and best cases.

1.8 Stakeholder and Public Outreach

Public involvement has always been part of a successful public agency's mission. The challenge of a project such as the State Rail Plan is that it must address multiple needs over a wide geographic area, while maintaining a data-driven approach in a politically charged atmosphere. Mn/DOT's approach to public outreach is guided by the *Hear Every Voice* philosophy, which encourages a transparent project development process which allows opportunities for public input early and at key points throughout the project process. In the spirit of *Hear Every Voice*, the project team engaged stakeholders and the public in the proposed project and the process of decision-making; and collected stakeholder and public input to make a better project.

It was determined that the most effective outreach techniques to accomplish the *Hear Every Voice* guidelines was a program which included active participation by policy and technical advisory committees, opportunities for general public participation through open houses, and identification of additional specific issues and concerns through stakeholder meetings. Each of these outreach components are discussed below.

1.8.1 Advisory Committees

Policy Advisory Committee (PAC)

The PAC met four times throughout the course of the project (March 20, May 29, August 14, and November 13) and served as a communication link to constituents and elected officials regarding the project. The PAC functioned at a broad policy level, providing input at key project milestones as well as discussing project issues and concerns from a policy standpoint. Since this is a legislatively mandated study, the PAC included five legislators who were formally assigned as legislative liaisons by Minnesota House and Senate leadership. PAC membership is shown in Appendix A.

Overriding themes from the meetings included:

- Strong support for new passenger rail service and belief that demand will be sufficient;
- New passenger rail services cannot degrade existing freight services, which need more investment;
- Decisions should not only be driven by existing land use patterns, but by growth forecasts and energy assumptions;
- Concern about how to balance data-driven approach and inevitable political influence on ultimate decisions; and
- Costs of project implementation should be assumed by both public and private sectors.

Freight and Passenger Rail Technical Advisory Committees (FTAC and PTAC)

To better facilitate and streamline discussions, two separate technical advisory committees (TACs) were formed for the project – one for freight rail (FTAC) and one for passenger rail (PTAC). The two TACs convened separately on the same day, three times each throughout the course of the project (May 28, August 13, and November 12). The purpose of the TACs was to review project progress and issues from a technical point of view. Members provided input into the development of assumptions and methodologies, and served as liaisons to the agencies they represented. Membership of each TAC is shown in Appendix A.

1.8.2 Public Open Houses

Two rounds of public open houses were held during the drafting of the State Rail Plan, in April

2009 and October 2009. During each round, meetings were held in the same seven locations across the State: St. Cloud, Rochester, Red Wing, Twin Cities, Duluth, Mankato, and Moorhead. In the second round, Willmar also was added as an eighth location. Press releases and web site updates were the primary tools for advertising public open houses. The Open Houses and themes which emerged from each are shown in Appendix A.

1.8.3 Stakeholder Meetings

Multiple stakeholder meetings were held to discuss needs and concerns of specific groups representing freight, passenger rail, and other financial and economic interests in the various corridors considered. Some stakeholder meetings were set up by the project team to solicit specific information important in the development of technical assumptions, while others were held at the request of various groups. Over 78 stakeholder groups were addressed in these efforts as shown in Appendix A.

Opportunities for public input will continue until the Plan is adopted in February 2010. Mn/DOT will continue to present plan information to stakeholder and interest groups as requested. In addition, Mn/DOT will host another round of public meetings in January, after the Plan is released for public review. The final Plan document will be available on the project web site (http://www.dot.state.mn.us/planning/railplan/resources.html).

2 Existing Rail System

2.1 Railroad Industry Organization and Investment Strategies

The institutional structure of the rail industry in North America is quite different from the other transportation modes (highways, air, water, etc.) that have typically been the subject of public planning studies and policy development efforts. In contrast to highway, air, and water facilities, which are generally owned and maintained at public expense and accessible to any licensed operator, rail carriers provide not only the service but also maintain and control the tracks and other facilities that are required to provide service. Thus, physical conditions, service, and institutional structure are closely linked.

Understanding how the rail industry is structured, and the varying scale, ownership and operating arrangements that are present in Minnesota is critical to developing responsive strategies that will meet the goals set forth in a vision for rail. While the North American rail system is an integrated network, the individual carriers, which range from very small railroads that operate in only a county or two to the largest carriers that service much of the nation, have significantly varying perspectives and needs.

This chapter provides an overview of Minnesota's railroads, their economic structure, and a delineation of the major differences among them. It concludes with an estimation of the value of the railroad industry to the Minnesota economy using selected metrics.

2.2 Composition of Minnesota's Freight Railroad Industry

Railroads are typically categorized by measures of size and geographic reach. This classification is important in that carrier size is a critical determinant of the rail services that are available in a region, competitive posture, market access, physical condition, and financial strength.

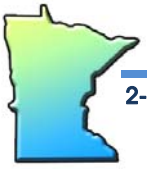
In the United States, railroads are classified by size following a scheme developed by the Association of American Railroads (AAR).[3] This scheme is based on a combination of revenues and carrier characteristics.

[3] The Surface Transportation Board uses a similar but not identical classification scheme that is purely revenue based.

- **Class I –** The largest railroads with revenues exceeding $319.3 million are designated Class I carriers. Since 2000, there have been seven such carriers operating in the United States, of which four – Burlington Northern Santa Fe (BNSF), Union Pacific (UP), Canadian National (CN), and Canadian Pacific (CP) have operations in Minnesota. Smaller regional and short line railroads fall into the following three categories (based on 2004 dollar values).
- **Class II –** A non-Class I line-haul railroad operating 350 miles or more with operating revenues of at least $40 million but less than $319.3 million. Class II railroads are called regional railroads, though they are often classified with and referred to as short lines. Minnesota currently has no independent Class II railroads.
- **Class III –** The remaining railroads that have revenues of less than $40 million and are engaged in line-haul movement. Class III railroads are commonly referred to as short line railroads.
- **Switching or Terminal –** A railroad engaged primarily in switching and/or terminal services for other railroads (i.e., they are not typically involved in line-haul moves between two geographical locations). Switching and terminal railroads are often categorized with short line railroads due to their operational and revenue characteristics, except in cases where they are owned by one or more Class I carriers.

Small railroad ownership takes on many different forms, of which many are represented by one or more Minnesota railroads:

- **Class I Parent(s) –** Typically a jointly owned switching or terminal railroad, such as the Terminal Railroad Association (TRRA) of St. Louis and the Belt Railway Company (BRC) in Chicago. Minnesota does not host any such railroads at this time.
- **Industry –** Usually operated for one industry, but can provide service to other unrelated firms. The most common owners are steel and forest products companies. Over the years, Minnesota has had several significant industry-owned railroads, most notably the Duluth Minnesota and Iron Range (DMIR), which was acquired by the CN in 2004 from an affiliate of U.S. Steel. A current example is the Cloquet Terminal Railroad Company, a three-mile switching railroad located in the City of Cloquet that is owned by SAPPI Paper.
- **Holding Company –** A railroad that is owned by a corporation holding several short lines. The two largest are RailAmerica, currently with 47 short line properties, and the Genesee & Wyoming, with 43 properties. RailAmerica owns one property in Minnesota, the Otter Tail Valley Railroad; Anacostia and Pacific, another major short line holding company, operates the Northern Lines Railway.
- **Public –** This includes state and county/city/municipality owned, as well as Federally owned (typically for military purposes). At present, there are no publicly operated railroads in Minnesota; however, several Minnesota short lines operate under a lease agreement over trackage that is owned by regional railroad authorities. Most notably, these include the Minnesota Prairie Line, the North Shore Scenic, and the Minnesota Southern Railway.
- **Independent –** Railroads that are independently owned and operated (e.g., Progressive Rail, Inc., Minnesota Commercial Railway, etc.), with the underlying infrastructure either



directly owned by the operator or by a third party, such as a Class I railroad or public agency. Most of the short lines in Minnesota are independently owned, although several, including the Red River Valley & Western, have multiple operating entities in Minnesota and the Dakotas.

A listing of each of Minnesota's active freight railroads, their parent companies, and miles operated, is shown in Table 2.1. In the case where the railroad property is owned by a public entity, the owning agency and parent company of the operator are both indicated.

Table 2.1 Freight Railroads Operating in Minnesota

Railroad	SCAC[a]	Parent Company/ Owning Agency	Miles Operated in Minnesota[b]	Percent of Total Miles Operated
Class I Railroads				
Burlington Northern Santa Fe	BNSF		1,686	29.3%
Canadian National	CN		479	8.3%
Canadian Pacific	CP		1,804	31.3%
Union Pacific Railroad Co.	UP		665	11.5%
Regional and Short Line I Railroads				
Minnesota Northern Railroad, Inc.	MNN	KBN Inc.	257	4.5%
Minnesota Prairie Line	MPLI	TCWR (RRVW); Minnesota Valley Regional RR Authority	94	1.6%
Minnesota Southern Railway, Inc.	MSWY	Independent; Buffalo Ridge Regional Rail Authority	42	0.7%
Minnesota, Dakota, and Western	MDW	Independent	6	0.1%
North Shore Scenic Railroad	NSSR	Independent; St. Louis and Lakes Counties Regional Railroad Authority	25	0.4%
Northern Plains Railroad	NPR	Independent	51	0.9%
Otter Tail Valley Railroad	OTVR	RailAmerica	72	1.3%
Progressive Rail, Inc.	PGR	Independent	97	1.7%
Red River Valley and Western Railroad Co.	RRVW	Independent	32	0.6%
St. Croix Valley Railroad, Inc.	SCXY	KBN Inc.	60	1.0%
Twin Cities and Western Railroad Co.	TCWR	Red River Valley and Western	234	4.1%
Switching and Terminal Railroads				
Cloquet Terminal Railroad Company, Inc.	CTRR	SAPPI Fine Paper	3	0.1%
Minnesota Commercial Railway	MNNR	Independent	125	2.2%
Northern Lines Railway	NLR	Anacostia and Pacific	28	0.5%
Total Miles Operated (including Trackage Rights)			5,760	100.0%

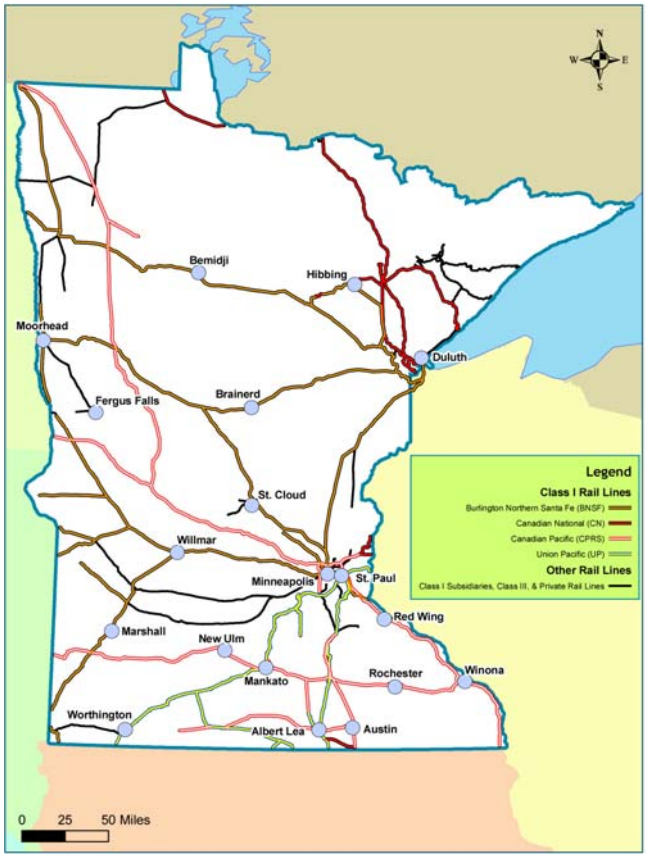
[a] Standard Carrier Alpha Code, an industry standard 2 to 4 letter abbreviation.

[b] Mileage shown for each carrier includes trackage rights mileages; thus the total miles shown for all carriers exceeds physical mileage.

[c] Includes 564 miles of the former Dakota, Minnesota, and Eastern (includes former Iowa, Chicago, and Eastern) railroads.

In Minnesota, four Class I railroads and their affiliates provide the substantial majority of rail service from the standpoint of many key measures such as traffic handled and mileage operated (over 80 percent). Given their importance, it is useful to take a closer look at the characteristics and recent trends of each of these four Class I railroads. The available information for the smaller railroads is quite limited; in many cases they are privately held, and, until recently, only one of the major holding companies was publicly held and thus subject to reporting requirements.

Figure 2.1 Minnesota Class I Railroads



The Class I route system is shown in Figure 2.1.

BNSF Railway

The BNSF Railway is one of the four largest U.S. railroads, along with the Union Pacific Railroad, CSX, and Norfolk Southern. It operates in 28 states and two Canadian provinces; has 32,000 route-miles (1,598 in Minnesota); and employs 40,000 people systemwide (2,422 in Minnesota). In 2008, the railroad had total assets of $36.4 billion, and annual revenues of $18 billion systemwide ($752 million in Minnesota). BNSF dominates many markets in Minnesota; its business strategy in the State emphasizes bulk freight, consisting primarily of coal, ore, and agricultural commodities, along with intermodal traffic along the northern corridor "High Line" between the Pacific Northwest, the Twin Cities, and Chicago. BNSF intermodal service in the Twin Cities is split between St. Paul's Hub Center, which handles domestic traffic, and nearby Union Yard in Minneapolis, which serves the international liner trade. While BNSF is the dominant railroad in Minnesota, its operations in the State constitute only a small part of its total network and revenue.

BNSF's network covers the western half of the U.S., serving all of the major markets in the region. The firm connects to eastern markets through all five primary gateways (Chicago, St. Louis, Kansas City, Memphis, and New Orleans) and several minor interchange locations, including a southeastern connection at Birmingham, Alabama. North American service is provided through connections with Canadian and Mexican railroads.

BNSF moves more intermodal traffic than any other rail system in the world. In 2008, more than 4.6 million intermodal shipments (truck trailers or containers) were transported on BNSF's rail lines. According to the BNSF, the railroad is one of the largest grain-hauling railroads in the United States, transporting more than 1 million carloads of agricultural commodities in 2008, nearly one-half of which were corn and wheat movements. Among the industrial products carried by BNSF's carload services are lumber, newsprint, printing paper, paperboard, propane, lube oil, motor oil, asphalt, canned beverages, coiled sheet steel, recycled iron and steel, cement, asphalt, gypsum, crushed stone, limestone, iron ore, soda ash for glass, and kaolin clay for paper.

BNSF moves more intermodal traffic than any other rail system in the world.

Union Pacific Railroad

The Union Pacific Railroad (UP) is the largest railroad in North America, operating 32,400 route miles in the western United States, and employing over 50,000 people, of which 456 work in Minnesota. 2008 gross revenues virtually matched BNSF's revenues of $18 billion, and carloads totaled 9.26 million. The railroad serves 23 states, every major West Coast and Gulf Coast port, and the five largest gateways between the East and West at Chicago, St. Louis, Memphis, Kansas City, and New Orleans. The railroad has one of the most diversified commodity mixes in the industry, including chemicals, coal, food and food products, forest products, grain and grain products, metals and minerals, automobiles and parts, and of course intermodal. UP is the nation's largest hauler of chemicals, much of which originates along the Gulf Coast near Houston, Texas. With access to the coal-rich Powder River Basin in Wyoming and coalfields in Illinois, Colorado, and Utah, the railroad moves more than 250 million tons of coal annually. UP's intermodal services, which largely parallel BNSF's network linking the large West Coast ports with major markets in the interior, handled 3.16 million units in 2008, 31 percent less than BNSF. BNSF's longstanding dominance of the Nation's largest intermodal lane between Los Angeles and Chicago provided a substantial boost over UP; differences in intermodal market strategy account for the rest.

UP gained entry to Minnesota through its 1995 acquisition of the Chicago and North Western. At present the firm owns approximately 462 miles of track in the State, and operates over an additional 203 miles through trackage rights. Volume in 2008 amounted to 19.1 million tons of freight originated and/or terminated in Minnesota. UP's business strategy in the region has focused on developing unit train and carload markets, which are heavily oriented toward agricultural crops, ethanol, and coal. Intermodal is not much in the picture at present, with the exception being a twice-weekly Road Railer service between Chicago and Minneapolis that is operated under contract with the Norfolk Southern's Triple Crown subsidiary. There has been some interest in starting service to the south and southwestern U.S.

UP is the nation's largest hauler of chemicals, much of which originates along the Gulf Coast near Houston, Texas.

Canadian National

Canadian National Railway Company (CN), headquartered in Montréal, Canada, operates the largest rail network in Canada and the only transcontinental railroad in North America. The CN operates approximately 20,264 track miles in eight Canadian provinces and 16 U.S. states. CN's Canadian operations span across Canada from Nova Scotia to British Columbia. Through a series of acquisitions that began in 1999 with the purchase of the Illinois Central, CN gained control of an extensive network in the central United States along the Mississippi River valley from the Great Lakes to the Gulf of Mexico.

Canadian National Railway Company (CN), headquartered in Montréal, Canada, operates the largest rail network in Canada and the only transcontinental network in North America.

In Minnesota, CN has had a long-standing presence with its Duluth Winnipeg and Pacific (DW&P) subsidiary. However, much of CN's current 436 miles of track came through its recent acquisitions of the Wisconsin Central (2001) and the Duluth, Minnesota and Iron Range (DMIR) (2004). The latter had the well-known operation between the Iron Range and the ports of Twin Harbors and Duluth/Superior, and has made the CN the largest carrier of iron ores in North America. The Wisconsin Central acquisition allowed the CN to create a through route to Chicago, thereby forming a transcontinental link from western Canada through the United States; secondarily, it also gave the road access to St. Paul from the east. However, volumes on that route are modest, as CN lacks a yard in the Twin Cities, and enters the region over trackage owned by the CP. CN does not offer intermodal service in Minnesota, even though several intermodal trains linking Chicago and western Canada ply its northern Minnesota main line daily.

Company-wide, the firm employed an average of 22,000 people in Canada and the United States in 2008, with 440 located in Minnesota. In the same year, gross revenues amounted to $8.4 billion Canadian and carloads totaled 4.61 million, placing CN in fifth place among the seven Class I railroads. Traffic mix is quite evenly balanced among carload, unit train, and intermodal, and between the United States and Canada. Thus, 54 percent of traffic is U.S. domestic and cross-border, 23 percent is international, and 23 percent is Canadian domestic.

Canadian Pacific Railroad

Based in Calgary, Alberta, the Canadian Pacific Railway (CP) provides freight transportation services with 15,700 employees over a 14,000-mile network in Canada and the United States, of which 1,240 miles and 1,050 employees (does not include DME/ICE) are located in Minnesota. CP's rail network stretches from Vancouver to Montréal, and also serves major cities in the United States such as Minneapolis, Chicago, and New York City. In 2008, 2.64 million carloads generated revenues of $4.9 billion Canadian, placing the firm in sixth place among the Class I railroads, behind CN and ahead of Kansas City Southern (KCS). Over one-half of the CP's freight traffic is in coal, grain, and intermodal freight. It also ships automotive parts and automobiles, sulfur, fertilizers, other chemicals, forest products, and

other types of commodities. The busiest part of its railway network is along its main line between Calgary and Vancouver.

CP has had a lengthy presence in the State through its controlling ownership of the Soo Line Railroad, which served the upper Midwest. In 1985, CP purchased the remaining assets of the Milwaukee Road, giving it a more direct through route between Chicago and the Twin Cities. Combined with CP's existing lines west of the Twin Cities, a stronger link between Chicago, the upper Midwest and western Canada could thus be established through gateways at Portal, North Dakota and Noyes, Minnesota. Subsequent to the Milwaukee acquisition, the CP's Midwestern network shrank considerably through a series of line spin-offs. This trend was reversed in September 2007 when CP initiated acquisition of the Dakota Minnesota and Eastern (DME) and its affiliate the Iowa, Chicago, and Eastern (ICE); ironically, the latter had been spun off by the CP in 1997, and had passed through several owners prior to its reacquisition. Combined, the DME and ICE properties added 472 miles of track (564 total, including trackage rights) in Minnesota, and 2,500 route miles throughout the Upper Midwest to the CP's portfolio. Many elements of DME's operations are slowly being absorbed into the CP, but the firm is expected to remain as an identifiable subsidiary entity under the CP umbrella.

The DME acquisition brought with it rights to build an extension west into Wyoming's Powder River Basin (PRB). Planning for this controversial and costly ($6 billion in 2006[4]) extension began in 1997, with the DME receiving final Surface Transportation Board approval to construct the line nine years later in February, 2006. By the time this approval was secured however, the future of this project had started to dim. The likelihood of its construction was further diminished subsequent to the CP transaction, with the recession, turmoil in the financial markets, flattening electricity demand, and possible imposition of new regulations on carbon-based fuels from pending climate change legislation all contributing factors. Although CP remains publicly committed to its construction and is preserving its option to build into the PRB, recent actions indicate that the project is not presently a high priority.

Combined, the DME and ICE properties added 472 miles of track (564 total, including trackage rights) in Minnesota, and 2,500 route miles throughout the Upper Midwest to the CP's portfolio.

Prior to the DME acquisition, Minnesota had become more of a through state for the CP, and traffic volumes thus depend heavily on general economic trends in North America, and not so much on local conditions. However, with the DME acquisition this trend has been reversed to some degree. The commodity mix remains largely the same, consisting largely of agricultural products, ethanol, fertilizers, and coal, most of which moves in high volume unit train service. Intermodal service is available at Shoreham Yard in the Twin Cities, with access to all major markets on the CP, including

[4] http://www.dmerail.com/Media/News%20Releases/060815%20STB%20WDR%20Ruling.pdf.

Chicago, Calgary, Winnipeg, Vancouver, and points east. Service to Kansas City and Mexico is likely to be implemented in the near future. In 2009, CP projects to handle approximately 83,000 lifts at Shoreham, a decline of more than 20 percent from previous years.

2.3 Freight Rail Industry Environment

2.3.1 Economics of Class I Railroads

The present rail industry is a reflection on its history as one of America's oldest large-scale geographically dispersed commercial enterprises. From its beginnings in the 1830s to World War I, the railroad industry had established itself as the dominant form of land transportation through its ability to move large volumes of passengers and freight much more rapidly and efficiently than any other mode. However, by the 1920s, when the rail network had reached its largest size of more than 250,000 miles, it was generally recognized that too many lines had been constructed, that competition among railroads had weakened the financial outlook for the once all-powerful industry, and that trucks were evolving to the point where they could compete for freight. It was also apparent that automobiles, buses, and – somewhat later – airplanes would take most of the passenger traffic away. The faster and more flexible highway mode had begun to make inroads into the railroads' traffic during the 1920s, a trend that then continued largely unbroken – with the exception of World War II – for almost 70 years.

By the 1990s, the size of the rail network had declined by almost one-half, and the rail industry's shares of traffic and especially transportation revenue had dropped dramatically. Mergers, which had begun almost as soon as railroads were first constructed, have continued until only a handful of major carriers remain.

In Minnesota, mileage declined from a peak of over 9,100 miles in 1920 to 4,545 in 2007, with most of the reduction occurring between 1970 and 1990, and the number of Class I carriers dropped from 10 to four over a space of just 14 years between 1970 and 1985.

At the same time as the primary railroad network was being consolidated, many lower density lines were spun off as small railroads. By 2007, these railroads operated one-third – 45,800 miles – of the 140,100-mile U.S. network, and, for commodities other than coal and intermodal, they handled 41.5 percent of all rail shipments in North America.[5] Short lines have come to perform a critical transportation function for smaller agricultural and industrial product shippers, connecting them to the Class I railroad mainline services, for whom they generate a significant volume of revenue (20 percent for BNSF, for example).

[5] Martland, Carl D., and Steve Alpert Research Priorities for Regional and Short Line Railroads, Research Report prepared for the American Short Line and Regional Railroad Association, Department of Civil and Environmental Engineering, Massachusetts Institute of Technology, December 2006.

In addition to rationalizing the network, the industry greatly improved operating efficiency through the use of better technologies for track, equipment, and communications and operations control. New technologies allowed the operation of longer trains with heavier cars and smaller crews, and the costs of shipping by rail continued to decline. New vehicle designs allowed railroads to compete effectively with both barge and truck competition. Larger cars, dedicated unit trains, and better track structure enabled much cheaper transport of coal, grain and other bulk materials. Multilevel automobile carriers allowed railroads to compete effectively with trucks for serving automobile assembly plants. Intermodal innovations, especially the introduction of double-stack container trains, allowed railroads to remain competitive for long-haul shipments of general merchandise.

The net effect of these improvements, combined with long-term economic growth, has resulted in a situation where rail traffic has grown in terms of ton-miles and tonnage, but not in terms of revenue and commodity value transported. Whereas railroads produced 28 percent of intercity freight ton-miles in 2005, they carried only five percent of the value of commodities transported by all modes in the U.S.[6] The railroads' modest share of overall freight value and revenues produced is caused by several factors, of which the nature of the commodities handled by the railroads, service quality (trip times, reliability) vis-à-vis motor freight, and the markets served by the railroads have had the most influence. Railroads attain their greatest efficiency and competitive advantage over other modes when handling large volumes over longer distances in point to point service. Thus, coal has been the single largest commodity hauled for many years, accounting for around 40 percent of originated tons, followed by chemicals, farm products, and nonmetallic minerals, each with between seven percent and nine percent of total tons. Intermodal is in fifth place with over six percent of originated tons. The actual share is somewhat higher, as figures for the commodity-specific categories include some traffic that moves intermodally in addition to carload and unit train service.

Competitive pricing has been a critical factor in the railroads' ability to stabilize and at least maintain its market share. Rail rates to shippers dropped following economic deregulation in 1980, allowing the railroads to hold market share, but at the cost of revenue and profitability. Between 1980 and 2002, railroad freight revenues remained essentially flat in current dollars, and were only partially offset by increases in productivity, asset sales, and other business strategies. The result was a relatively low rate of return on investment for the railroads. In the 1980s, calculations by the Interstate Commerce Commission (predecessor to the Surface Transportation Board) indicated that the railroads' return on net investment (ROI) fluctuated between two and six percent, compared to a cost of capital that ranged between 12 and 18 percent. Since then, the industry's rate of ROI has improved, albeit slowly.

[6] From forthcoming AASHTO Freight Bottom Line Update, based on IHS-Global Insight TRANSEARCH Insight data.

Following the recession of 2001 to 2002, the railroads' ROI began to surpass historic trends, reaching a high of 10.17 percent in 2007 for the Class I railroads as a whole. However, this still placed the industry below the Surface Transportation Board's calculated cost of capital of 11.33 percent, and the industry as a whole continues to generate less revenue than is desirable from the standpoint of it needs. While these rates of return may seem robust for transportation carriers, railroads must carry the full burden of building and maintaining their own infrastructure. They are among the most capital intensive of all industries and thus require far greater access to capital. Between 1995 and 2004, the rail industry invested 17.8 percent of its revenues in capital (16.7 percent between 1998 and 2007). By contrast, U.S. manufacturing industries spent an average of 3.5 percent, with the electric utility industry topping the group at 11.6 percent. And with few exceptions, the rail industry must continue to make capital investments and maintain track, bridges, and locomotives across its network regardless of the business cycle. It cannot disinvest itself of mainline track or discontinue maintenance during recessions without ceasing revenue-generating service. This situation encourages railroads to be highly risk-averse.

While these rates of return may seem robust for transportation carriers, railroads must carry the full burden of building and maintaining their own infrastructure. They are among the most capital intensive of all industries and thus require far greater access to capital.

The relatively low rates of return, high capital needs, and lack of liquidity (i.e., the inability to quickly and easily sell track and right-of-way), has traditionally made railroad stock less attractive to Wall Street and investors looking to invest in high growth and profit industries. This has resulted in a persistent shortfall or gap between what the railroads "should" be investing out of their revenues to maintain the rail network, expand it, and grow market share and what they can afford to invest. Through the 1990s, this shortfall was about $2 billion annually for the Class I railroads. The gap closed during the 2002 to 2007 traffic boom, but was still estimated at about $1 billion per year despite record revenues and investment by the railroads in those years.

It should be noted that the largest share of capital investment goes to maintaining existing infrastructure in a state of good repair, and purchasing new rolling stock. Relatively little is left over for infrastructure expansion and this investment is focused on high growth, high density, and most profitable lanes.

The rise in returns from 2003 onward has in part occurred due to a rapid rise in traffic volumes without associated increases in capacity among both the railroads and their highway competition. This allowed railroads to raise rates and generate greater profits, thereby boosting stock prices and generating greater attention on Wall Street. To deal with this new business

environment, the railroads adopted a number of strategies. A primary strategy has been to focus on their "hook and haul" business – the high-density, long-haul freight movements where large volumes enable economies of scale in operation and revenue generation. This meant giving priority to intermodal container movements from West Coast ports, unit coal trains from the Powder River Basin to Midwest, Southeast, and East Coast utilities, and unit grain trains to Pacific Northwest and Gulf ports. Railroads also faced strong political pressure to maintain capacity, service, and price in the energy and intermodal markets, so infrastructure expansion has been focused on the coal lines out of the Powder River Basin and the intermodal lines out of Ports of Los Angeles and Long Beach.

A second strategy has been to increase prices and reduce service to divest of lower-profit traffic. This happened across many rail markets, where growing bulk and intermodal traffic was squeezing out carload traffic. The use of such strategies to allocate rail service makes business sense from the railroads' perspective, but for individual shippers and some short lines that are "captive" to a single railroad, higher rail rates and inferior service mean lower profits, smaller market share, and in some cases the risk of business failure.

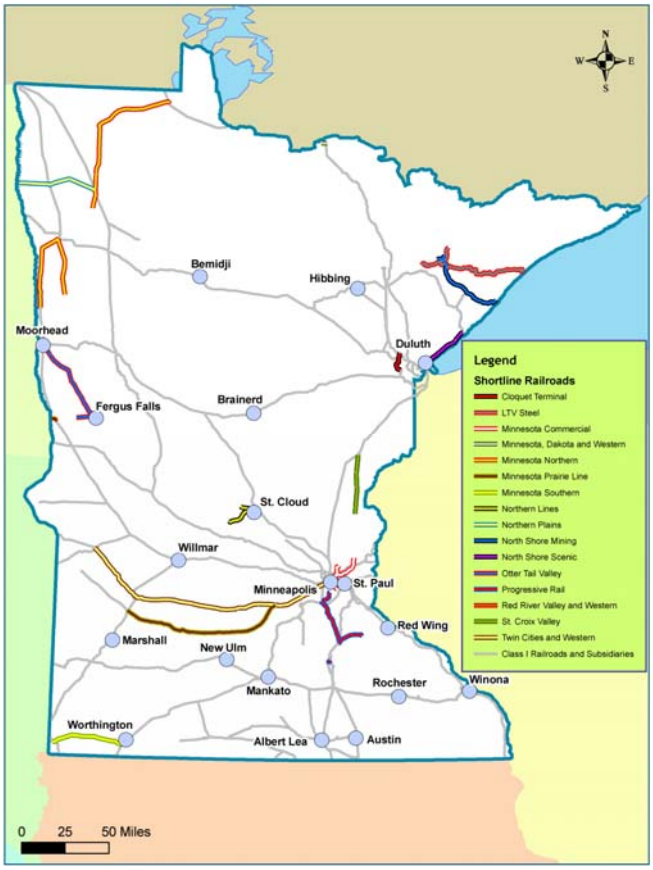
Because the carload business still accounts for a large and profitable element of the railroads' business, the railroads are pushing a third strategy, which is to encourage consolidation of car-load traffic at centers on their main lines. Logistics parks, transload centers, and grain consolidation facilities enable the railroads to continue to provide carload service, but do it as a more operationally simple "hook and haul" operation. To provide collection and distribution services to these centers, the Class I railroads continue to transfer low-density branch lines to short line railroads, who can operate at lower cost than the Class I railroads, and encourage shippers to truck shipments to the centers. This has been an effective strategy in maintaining rail services in some markets, but at the cost of transferring risk to the short line operators and, where trucks are substituted for rail, increased pavement and bridge maintenance costs to the public sector.

2.3.2 Short Lines

In recent years, the short line industry has consisted of a mix of profitable and marginal performers. The short line route network in Minnesota is shown in Figure 2.2.

The volume of traffic handled by a short line has a direct impact on track maintenance levels, speeds, service reliability, and ultimately the financial viability of the short line service. High-volume markets and lines have done relatively well; low-volume markets and lines struggle. The national trend toward consolidation of short line ownership and some consolidation of low-density lines and collector/distributor functions has improved the business outlook for short lines in some areas. This trend has not emerged in Minnesota, which can be attributed to the minimal presence of short line holding company ownership in the State. It is apparent that some Minnesota short lines operating in Minnesota and elsewhere are not meeting critical volume thresholds, and services and investment in track and equipment is declining.

Figure 2.2 Regional and Short Line Railroads in Minnesota



Beyond volume, short lines face several challenges as an industry as follows.

Infrastructure conditions tend to be inferior to those of the large railroads. Track is less well maintained, with lighter weight rail, inferior tie and ballast conditions, and no active signaling system. As a result, mainline trains speeds are lower, typically 40 mph or less for freight trains, and operations are far less automated. Although these conditions are usually adequate for existing business, many carriers struggle to maintain track at minimal commercially acceptable levels, and are unable to accommodate some modern rolling stock. With the large railroads moving from 263,000 to 286,000 pounds as the standard maximum car weight, the ability to handle standard modern rolling stock has become a particular concern; without accommodation of these heavier cars, the competitive position of many short lines will be substantially compromised.

The availability of suitable railcars for short line shippers can be problematic. Although railcar supply has exceeded demand in recent years, some smaller carriers continue to have difficulty obtaining proper equipment on a timely and cost-effective basis. Most commonly, this issue occurs when equipment supply is controlled by contractual agreements with the prior owners of the line.

Smaller railroads, with their narrow geographic coverage, must rely far more heavily on connecting carriers to serve the market needs of their customers. Key are the agreements between short lines and their Class I connections, which are the result of a lines' prior history and present ownership. A short line may or may not have independent rate making authority, i.e., the ability to negotiate its own revenue levels for local and interchanged traffic. If carloads are interchanged with one or more railroads, traditionally each rail entity would be entitled to individually establish a rate for its participation in transporting a shipment. In the case of several short lines in the State, this ability to make rates is superseded or preempted by agreements with their Class I connections. These agreements, which were established when the line was spun off by the former Class I owner, often restrict independent rate making, car

supply, and the interchange of cars to the line's original owner, even if connections to other Class I carriers are available. This process was designed to allow the seller to retain some of the benefits of unique access to businesses on the branch, often in return for favorable purchase terms. These rate and operating restrictions, or the ability of the short line to only interchange with one railroad due lack of other connections, creates what is known as a "captive" short line.

Although most of these restrictive terms are contractually agreed relationships, with advantages or compensation accruing to both parties to the agreement, in a few cases the restrictions have led to ongoing inefficiencies, such as unintended increases in short-haul switching moves at or near the interchange point, and insufficient revenue yields with detrimental effects on the carriers' ongoing viability. In some cases, short lines have had to forego new business that would have been logically routed onto another connecting Class 1, or divert natural rail traffic onto trucks to reach final destinations that are otherwise rail accessible.

While the terms creating these "captive" conditions are a matter of private contract and have been deemed acceptable under Federal law concerning interstate commerce, it is notable that if and when the State of Minnesota were to purchase track that is being abandoned, and maintain it in revenue service for local economic benefit (similar to state-owned rail properties in Wisconsin, Michigan, Georgia, and Vermont), these restrictions should not be acceptable to the State. Any operating entity on this track would be expected to have unrestricted access to all connections and freedom to negotiate compensation with shippers, within the strictures of both interchange agreements, STB case law, and state oversight.

2.4 What's Next for the Freight Rail Industry?

Overall, the rail industry today has become stable, productive, and competitive, with enough business and profit to operate, but not to replenish its infrastructure quickly or grow rapidly. The railroads' return on investment has been increasing; a major achievement of an industry that just a few decades ago was struggling financially. However, as economic growth picks up, it is risky to assume that rail traffic (or freight in general) will simply resume its former growth patterns, and with it, that the private railroad industry will be able to maintain, let alone increase investment to expand capacity and improve service. More likely, the railroads stand at the threshold of major changes that may be as extensive as those that occurred following deregulation in 1980. Three factors are particularly concerning:

- A rapidly changing customer base;
- Ongoing initiatives to modify economic regulation; and
- Shifting modal economics.

Although any or all of these potential changes may impart some beneficial effects on railroad industry, they also have the potential to be negative, or at the very least engender substantial uncertainty that will affect their willingness to invest. Each of these elements is elaborated on below.

2.4.1 Customer Base

Although a railroad's traffic base constantly evolves to some degree, three of its most important sectors are expected to undergo major transformations: automobiles, international trade, and coal. With the bankruptcy of General Motors, the United States' largest domestic automaker, and the substantial distress by most others, longstanding patterns of auto manufacturing and distribution are being upended. Annual sales volumes, which regularly exceeded 17 million units only a few years ago, are now running at less than 10 million, and few analysts expect them to exceed 14 to 15 million any time in the next decade. Not only is the automobile industry a significant railroad customer, ranking sixth in 2007 revenues by commodity, many other important rail-oriented industries, such as chemicals and steel, also are substantial suppliers to the auto industry.

International trade, the primary driver behind the boom in intermodal traffic from the mid-1980s until 2006, has ceased being an engine of growth for the railroads. Although volumes are expected to increase as the economic recovery gets underway, it is unlikely to reach the levels of growth that were achieved in recent years.

Coal, which has represented roughly one-quarter of the railroad's revenues and upward of 40 percent of its ton-miles, faces considerable uncertainty as a fuel. Major recent discoveries of natural gas in the United States as well as rising concerns about greenhouse gas emissions are likely to result in either stable or lower demand for coal in future years. Compounding these effects are pending regulations that mandate cleaner emissions. These will require all coal-burning plants to implement scrubbing, which will affect the heavy dependence on low sulfur Powder River Basin (PRB) coal. Once PRB coal requires scrubbing, coalmines that are located closer to the Midwestern electric utility plants will become more attractive, since the cost of transportation far exceeds that of the coal itself. Midwestern coal fields will benefit, as will the barge industry operating on the Mississippi River System, which has served some of these markets in the past.

2.4.2 Economic Regulation

The Staggers Rail Act of 1980 substantively deregulated the rail industry. The railroads have successfully fended off a series of legislative attempts at changing the fundamental conditions of the Staggers Act. However, since 2006 the Surface Transportation Board has made significant changes to their procedures to make them more attuned toward shippers. This more "shipper-friendly" attitude also was evident recently when the STB issued several rate case decisions in favor of shippers that only a short time ago would likely have favored the railroads. Furthermore, the current Congress is developing legislation that may further tilt the regulatory balance against the railroads by modifying longstanding provisions that the industry has enjoyed. How these changes may impact the financial performance of the industry is not known, but they are very unlikely to improve them.

2.4.3 Shifting Modal Economics

Significant challenges faced by motor freight, the railroad's primary competitor and sometime collaborator, stand to influence future rail traffic in a direction that could either benefit or disadvantage them. The rail industry's improving financial performance that began in the early 1990s is in part attributable to disproportionate increases in costs faced by motor carriers versus railroads. Rising diesel prices, growing highway congestion, reduced driver utilization resulting from new hours of service regulations, and a continuous shortage of long-haul truck drivers at prevailing wages, not only raised costs but also narrowed the service gap. One outcome was the development of new intermodal business with long-haul trucking firms which could use the railroads to carry their shipments in some major lanes as a transparent substitute for over-the-road line-haul operation. Two of the largest truckload firms, J.B. Hunt and Schneider National, have subsequently become among the railroad's largest customers.

The impacts of evolving Federal transportation policy add to the uncertainty. The Highway Transportation Trust Fund, which for decades has funded most capital investment in highways through user fees, is insolvent. Starting in FY 2009, the Federal Government has used general funds to bridge shortfalls, but longer-term solutions are very much still in flux. However, some form of increased user fees seem inevitable, irrespective of how highway investments will be funded. While there is some agreement in the trucking industry about the need to increase these fees, many in the industry are demanding a productivity boost in return through changes in Federal truck size and weight regulations. Maximum weight has been set to 80,000 pounds since 1983, and long combination vehicles were limited to certain highways located primarily in the West since 1991.

The economic impact of a nationwide increase in truck size and weight on the rail industry has been a matter of contentious discussion for many years. However, any significant changes in truck size and weight beyond current limits that are broadly applicable will provide productivity gains to trucking firms that will tilt modal economics toward highway transport. Short lines are likely to bear the brunt of these impacts disproportionately, given their heavy orientation toward small volume carload traffic hauling commodities that are most readily divertible to truck. Perhaps the impact on Minnesota's short lines may be less severe, given a traffic mix that is more oriented toward low-value bulk commodities.[7]

[7] Mn/DOT examined changes in truck size and weight standards within the state in a 2006 study. However, the study did not quantify the impact on railroads; in large part because most of the scenarios affected short-haul truck trips that were not attractive to railroads, even to short lines. One recent study found that an increase in truck weight from 80,000 to 97,000 pounds could reduce merchandise traffic volumes by 44 percent and overall traffic by 17 percent. Carl Martland, *Estimating the Competitive Effects of Larger Trucks on Rail Freight Traffic*, September 2007.

2.5 Freight Rail Investment and Financing Practices

Being privately owned, it is obvious that the sources of funds to operate, maintain, and improve a freight railroad are drawn from private capital. However, while this is largely true, there are exceptions, some recent, and others longstanding. This is particularly the case with short lines, where some degree of public funding has been rather common. Table 2.2 lists the typical sources of funding for operations and maintenance, and the primary categories of capital investment by carrier type. Entries marked with a green background indicate funding from public sources, which could be through direct (grants, loans, etc.) or indirect (tax credits, abatements, etc.) means.

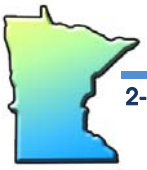
Table 2.2 Typical Sources of Funding of Rail Operations and Infrastructure

	Typical Sources of Funding	
Cost Category	Class I Carriers	Class II and III Carriers
Operations and Maintenance	Private capital – Cash flow	Private capital – Cash flow, loans, etc.
Capital Maintenance and Expansion	Private capital – Cash flow, loans, stock, etc.	Private capital – Cash flow, loans, stock, etc.
		Tax credits, public loans and grants
Cars and Locomotives	Private capital – Direct ownership, third-party lease	Private capital – Direct ownership, third-party lease
Grade Crossings	Private capital – Cash flow	Private capital – Cash flow
	Federal Section 130 and state/local match	
Customer Facilities	Private capital – Customer cash flow, loans, etc.	Private capital – Customer cash flow, loans, etc.
	Freight rail and economic development assistance programs	

2.6 Value of Rail Industry to Minnesota

Economic development of Minnesota was heavily shaped by the railroads, which opened up access to its fertile lands and connected the region together through an integrated network. They continue to provide considerable value to the State, through their services to shippers, employment of its residents, and support of its institutions through various taxes.

Direct measures of value include carrier revenues associated with traffic handled in Minnesota, payroll size, services purchased, taxes paid, capital invested, and valuation of plant and property. More indirect measures include the value of goods transported, indirect employment, and the contribution to state GDP of industries served. In this section three direct measures are examined:



- Employment;
- Plant and property; and
- Corporate tax contributions to the State.

The following sections detail and provide estimates for each of these measures. Data for much of the material that follows was obtained through e-mail correspondence with the Minnesota Department of Revenue (MNDOR).

2.6.1 Employment, Wages, and Payroll Taxes

Employment is an indication of the importance of the railroad industry to the State's workforce, directly as a career choice, and indirectly as a market to which goods and services can be sold, in effect the multiplier effect from employment driven economic activity. Given the massive contraction in rail employment over the past 50 years, it is useful to note not only current employment, but also the number of retirees and beneficiaries that are drawing railroad pensions.

Data on industry employment and wages are readily available from several sources. The Railroad Retirement Board (RRB), a Federal agency that administers the railroad retirement system (which is separate from Social Security), maintains statistics on active and retired employees. Information on aggregate wages paid by the State was drawn from the AAR's state fact sheets, for which 2007 is the most current year.[8]

In 2008, Minnesota RRB records indicated employment of 4,500 individuals. With typical average wages of $71,400 (plus $28,400 in fringe benefits), the total freight-related payroll of Minnesota's railroad employees was $321.3 million. These figures include Amtrak employees domiciled in Minnesota, which totaled 43 individuals in 2008.[9] The net revenue to the State from payroll taxes of active railroad employees amounts to 4.66 percent of $321.3 million, or $15.0 million.

In addition to the 4,500 active employees, 7,600 retired employees live in Minnesota, and a further 7,986 are beneficiaries of railroad retirement. This latter group is made up of spouses and survivors of deceased railroad employees. For all retired railroad employees, the industry-wide average annual remittance was $23,760, $8,800 for spouses, and $14,580 for survivors. In Minnesota, the net payout to these beneficiaries amounted to approximately $277 million in 2008, not much less than the active payroll.

[8] http://www.aar.org/~/media/AAR/InCongress_RailroadsStates/Minnesota2.ashx.

[9] http://www.amtrak.com/pdf/factsheets/MINNESOTA08.pdf.

2.6.2 Plant, Property, and Corporate

In Minnesota, railroads pay an annual assessment on the property that they use for conducting their business. The Commissioner of Revenue, using data supplied by the railroads, estimates the value of property that is used for operating purposes annually. The estimate is not based on direct evaluation of each individual property, but rather carrier financial data. For publicly held carriers, property values are calculated on the basis of cost, income, stock price, and debt levels; for privately held firms, original cost and income are used. In Minnesota, these property tax rates are uniform, and the treatment for rail yards and main lines is identical. Property that is not used for operating purposes is assessed and taxed by the local jurisdiction in which it is located.

For taxes payable in 2008, MNDOR estimated a market value of rail property at $676,443,314, resulting in a net tax of $20,657,836.

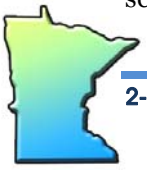
Since the market value of rail property is estimated from an allocation of current revenues attributed to activity in Minnesota, the current average capital spending to revenue ratio for the industry as a whole, 14.7 percent between 1998 and 2007, can be applied to estimate annual expenditures for capitalized maintenance and infrastructure improvements. This permits an indication of the industry's ability and willingness to maintain its plant and property, and offers a comparison with estimates for capital needs. Using the above figures, 2008 capital investment in Minnesota would have been roughly $100 million. This amount appears to represent a minimum, and reflects continued disinvestment from non core routes, particularly among the smaller railroads. This amount is used in Chapter 7 to estimate the ability of the railroads to contribute to the proposed capital program.

In addition to property and payroll taxes, railroads also pay income and corporate franchise taxes to the State. According to the Minnesota Department of Revenue (MDOR), the liability for these taxes was $12.8 million in 2007.

2.7 Passenger Rail

Minnesota has two active passenger rail services – Amtrak's Empire Builder and the Northstar commuter rail service. The Empire Builder operates one train per day between Chicago and Seattle/Portland, with stops in Minnesota in Winona, Red Wing, St. Paul, St. Cloud, Staples, Detroit Lakes, and Fargo. The Northstar commuter rail service began operations between Big Lake and Minneapolis as this Plan was being completed.

Although Amtrak's presence in Minnesota is limited to the one daily train each way, both the Empire Builder and its patronage by Minnesota riders are standouts in Amtrak performance. The Twin Cities boasts the highest boardings and alightings of any station in the U.S. served by a single frequency. Local stops in Red Wing, St. Cloud, Staples, and Fargo/Moorhead show above-normal ridership generation. The Empire Builder's cost recovery performance is near the top among national system trains, second only to the Auto Train between the east central states and Florida. During the run-up in gasoline prices in 2008, every Minnesota station showed ridership increases of up to 15 percent despite a perpetually sold-out condition on this service, limiting any larger potential for growth.



Over the years, a number of studies have examined proposed new intercity passenger services in Minnesota. The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 identified HSR corridors throughout the nation. At around the same time, the state departments of transportation from Minnesota, Wisconsin, and Illinois were completing the Tri-State Rail Study, outlining route and service alternatives between Chicago, Milwaukee, and the Twin Cities. That study looked at two broad corridors – a northern and a southern option. The Southern Corridor studied three alternative routings within the corridor – along the existing Amtrak route, a corridor through La Crosse and Rochester, and a corridor that included both Madison and Rochester. The Northern Corridor included four alternative routings in northern Wisconsin.

By 1996, Minnesota was part of the Midwest Regional Rail Initiative (MWRRI), which envisioned a HSR network serving the Midwestern states centered around a Chicago hub. In 2000, Minnesota and Wisconsin commissioned the Tri-State Study II. This study showed that a Milwaukee to Twin Cities connection through Rochester, including a route that involved new alignments between Rochester and the Twin Cities and Winona, had the best benefit/cost ratio of the alternatives studied and should be implemented following the incremental upgrading of the existing Amtrak route. By 2004, the MWRRI routes showed Milwaukee to Twin Cities through Madison but not Rochester. Development of the Madison-Twin Cities route continued through 2008 with the preparation of environmental documentation.

As these studies were underway, two other intrastate intercity HSR corridors were being examined. The Minneapolis-Duluth/Superior corridor, now known as the Northern Lights Express, was studied to restore and improve upon passenger rail service that was suspended in 1985. In 2000, an initial concept study for intercity passenger rail service was produced. In 2007, a more comprehensive business plan for 110 mph rail service was prepared for a consortium of counties and regional rail authorities, which led to the creation of the Minneapolis-Duluth/Superior Passenger Rail Alliance (the "Alliance," a consortium of county regional rail authorities). Mn/DOT has received FRA funding for the preparation of a Preliminary Environmental Impact Statement, including associated engineering reviews, for the proposed route along the BNSF rail lines. SRF Consulting Group is leading a consultant team performing this work with the Alliance in cooperation with the Minnesota and Wisconsin DOTs and the FRA.

HSR via Rochester has been discussed in Midwest HSR studies going back to the 1991 Tri-State Study and in early MWRRI reports. In 2003, Mn/DOT, with the cooperation of the City of Rochester, produced a study on the feasibility of a new route for HSR between the Minneapolis/St. Paul International Airport and the Rochester International Airport. The City of Rochester, Olmsted County, Mayo Clinic, and Rochester Area Chamber of Commerce formed the Southeast Minnesota Rail Alliance, which advocates for passenger rail service through Rochester and a new freight rail bypass around Rochester called the Southern Rail Corridor alignment. In September 2009, the Southeast Minnesota Rail Alliance produced a new study on the Rochester route, the "Tri-State III High-Speed Rail Study: Minnesota Segment Assessment." This study supports an alignment of Twin Cities to Chicago service through Rochester on a new alignment, and questions extensive investment in the River Route.

The Minnesota High-Speed Rail Commission is a joint powers board which also plays a role in advancing HSR projects. The group, focused on the River Route for HSR between the Twin Cities and Chicago, involves Regional Rail Authorities from Ramsey, Washington, Dakota, Goodhue, Wabasha, and Winona counties. Just as the St. Louis and Lakes County Regional Railroad Authority acts as the financial agent and lead Authority for the NLX Alliance, so the Ramsey County Regional Railroad Authority serves as the financial agent and lead Authority for the Commission. The Commission will comment on corridor plans, advocate with the Legislature for HSR funding and corridor alignments, and coordinate public outreach and education efforts on behalf of passenger rail in the corridor.

As this Plan was just getting underway, in February 2009, the United States Congress enacted the American Recovery and Reinvestment Act of 2009, appropriating $8 billion for HSR and intercity passenger rail services. This appropriation followed the enactment of the Passenger Rail Investment and Improvement Act of 2008 in October 2008, authorizing new programs for high-speed and intercity passenger rail. More information about these programs is found in Chapter 7 of this report. In order to develop consensus recommendations on how to respond to grant application cycles before the completion of the State Rail Plan (and identification of HSR corridors therein), Mn/DOT created the Intercity Passenger Rail Forum.[12] The Forum advised Mn/DOT on which projects to seek funding through the 2009 FRA grant application cycle. The Forum is likely to participate in further public discussion of the State Rail Plan itself, and may have an ongoing role in advising Mn/DOT and the Legislature as passenger rail investment decisions are made in the future (more discussion of post-Rail Plan implementation also is in Chapter 7 of this report).

Mn/DOT submitted two grant applications in August 2009:

- St. Paul Urban Depot construction – Mn/DOT, in cooperation with the Ramsey County Regional Railroad Authority, prepared an application for final design and construction of the St. Paul depot renovation project, to serve as a multimodal hub for light rail, commuter rail and intercity rail services.[10] The application sought $135,800,000 in Federal funding, to match $101,700,000 in other Federal and local funds applied to the project.
- Minnesota-Wisconsin Service NEPA – Mn/DOT, on behalf of the Wisconsin Department of Transportation, sought $600,000 in Federal funding,[11] to be matched by $600,000 from both state DOTs, to support the completion of a high-level environmental review of corridors between Milwaukee and the Twin Cities. This would result in a Service Level NEPA document, which combined with other materials of the MWRRI, would comprise a Service Development Plan, and permit both states to seek further development funds for the entire corridor from the FRA.

[10] This application for construction and final design was submitted as a Track 1 funding grant, referring to FRA's Strategic Plan and Grant Application guidance documents issued in 2009.

[11] This application for planning funds was submitted as a Track 3 funding grant, which required a 50%/50% federal/state funds match.

[12] More information about the Passenger Rail Forum, including membership and meetings, can be found at http://www.dot.state.mn.us/planning/passengerrailforum/index.html.

3 Forecasts

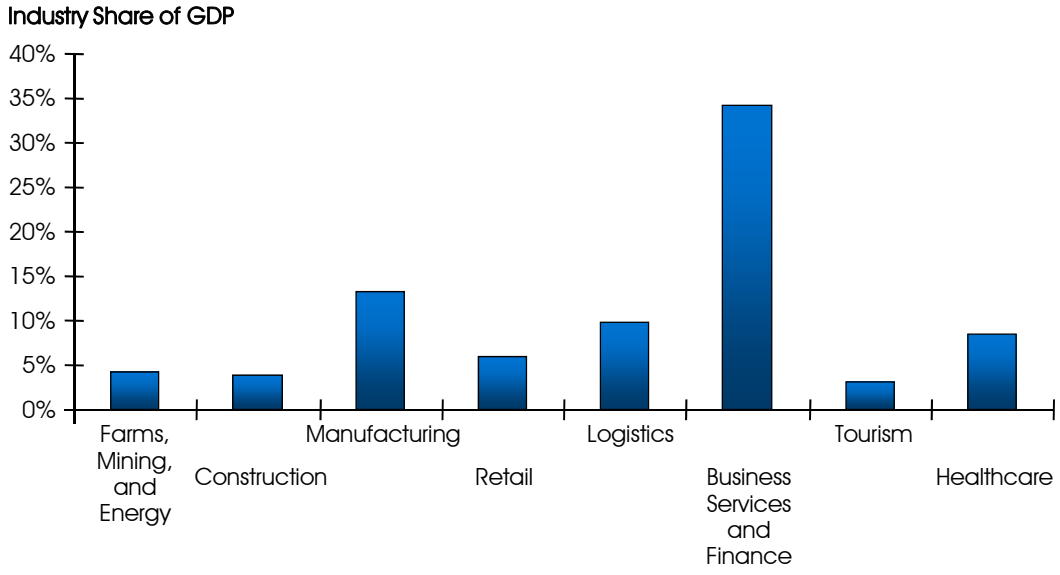
This chapter presents forecasts for overall economic growth in Minnesota (3.1), Freight Demand (3.2), and Intercity Rail Passenger Demand (3.3). These forecasts drive the Needs Assessment presented in Section 4.0.

3.1 Minnesota Economic Overview

3.1.1 Existing Conditions

The structure of the Minnesota economy – the types of businesses and industries, their size, location, and trading patterns – determines the volume of freight moving in the State and the potential for passenger rail ridership. Understanding the structure of the economy and how it may change over the next decades provides a foundation for assessing the overall demand for freight and passenger transportation. This section provides an overview of the structure of the Minnesota economy and how it is expected to change by examining employment and population projections.

Figure 3.1 Minnesota GSP by Industry Sector
2007



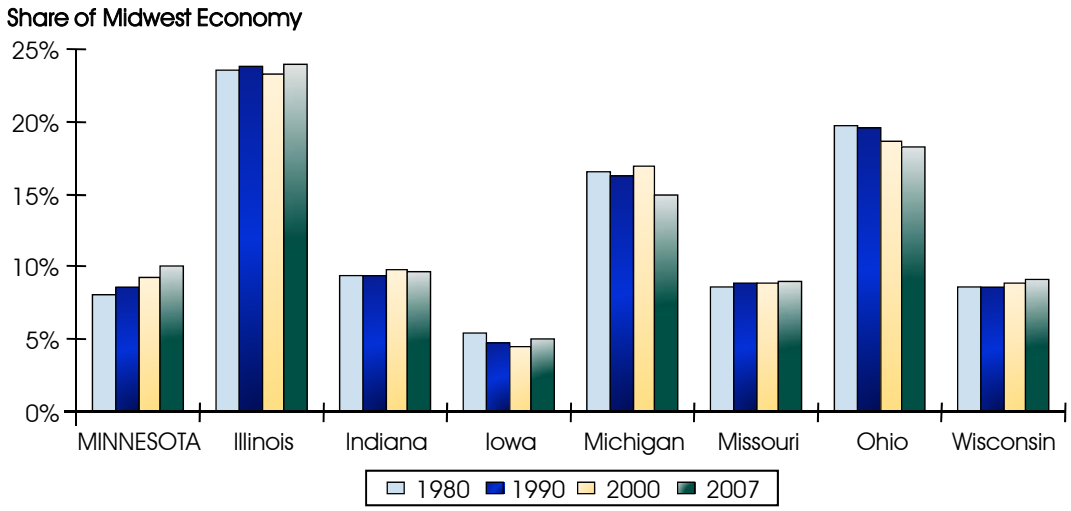
Source: Bureau of Economic Analysis, 2007.

Figure 3.1 shows the relative shares of gross state product (GSP) contributed by major industries in Minnesota.[13]

The economy is dominated by four sectors: business services and finance, manufacturing and logistics (i.e., transportation, warehousing and distribution), and healthcare. All four are dependent on truck, intermodal rail, and air cargo services. The other significant sectors are retailing, farming/mining/energy, construction, and tourism. Retailing also is dependent on truck, intermodal and air cargo services, while farming/mining/energy are dependent on carload rail, water, and truck services. Tourism is dependent on auto, air, and rail passenger services.

Relative to the rest of the Midwest states, Minnesota's economy is stronger in business services and finance; health care; logistics; and farming, mining and energy. Between 1980 and 2007, Minnesota's economy grew significantly faster compared to other Midwest states, as shown in Figure 3.2, accounting for a steadily rising share of the Midwestern economy. This highlights the need for continued investment in Minnesota's infrastructure such that this enviable record of economic growth can continue into the future.

Figure 3.2 Share of Midwestern Economy by State
1980 to 2007



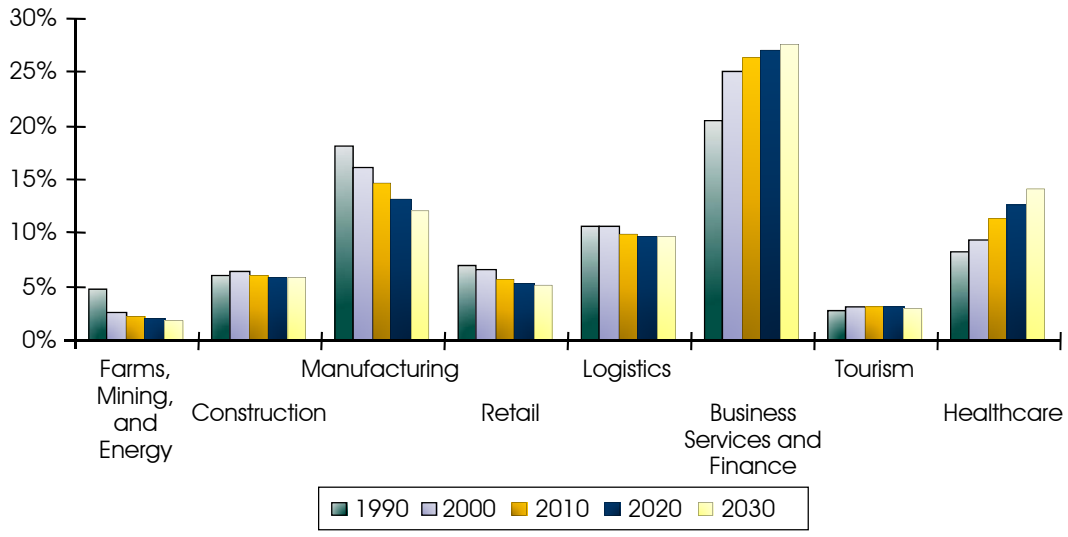
The Twin Cities of Minneapolis and St. Paul are the third-largest economy in the region behind only Chicago and Detroit. Depending on the future of the automotive industry and new initiatives in the Michigan-Ohio-Indiana region, the Twin Cities could become the second largest metropolitan economy in the region. This trend underscores the importance of examining the role of freight and passenger rail in linking the Twin Cities to Chicago, other parts of the Midwest, and to the global economy.

[13] Gross state product (GSP), or gross domestic product (GDP) for the nation as a whole, is a measure of the output – the market value – of all final goods and services produced by labor and property in a year.

3.1.2 Forecasts

Figure 3.3 shows how the structure of the Minnesota economy has changed since 1990 and how it is projected to change between now and 2030. These projections look at long-term trends, averaging out the effects of short-term business cycles. The recovery from the current recession may shift economic development patterns and trends more significantly than currently forecast. It is still expected that over time Minnesota will see continued strong growth in business services, finance, and healthcare. Construction and tourism are expected to remain stable, while farming/mining/energy, retailing and logistics may contract modestly.

Figure 3.3 Projected Change in Earnings by Industry
1990 to 2030



Source: Woods & Poole (forecast); industry share earnings.

While unemployment spiked in Minnesota during 2009 as in the rest of the nation, the Minnesota employment growth rate is expected to recover and exceed the average growth rates for both the Midwest and the U.S. as a whole. This anticipated growth rate suggests that Minnesota will see a steady growth in demand for employees' commuting and related business travel.

Projection of employment by county of job location indicates how jobs and the economic growth underpinning them will be distributed across the State. Figure 3.4 shows the forecast percentage change in employment by county from 2007 through 2030. The map shows that the majority of Minnesota counties will experience positive growth in employment over the next two decades. The areas showing a relative decline in employment growth are primarily in the southwest and western counties and in a few of the far northern counties. These counties are dominated by agricultural and/or mineral extraction industries.

Figure 3.4 Minnesota Employment, Percentage Change by County
2007 to 2030

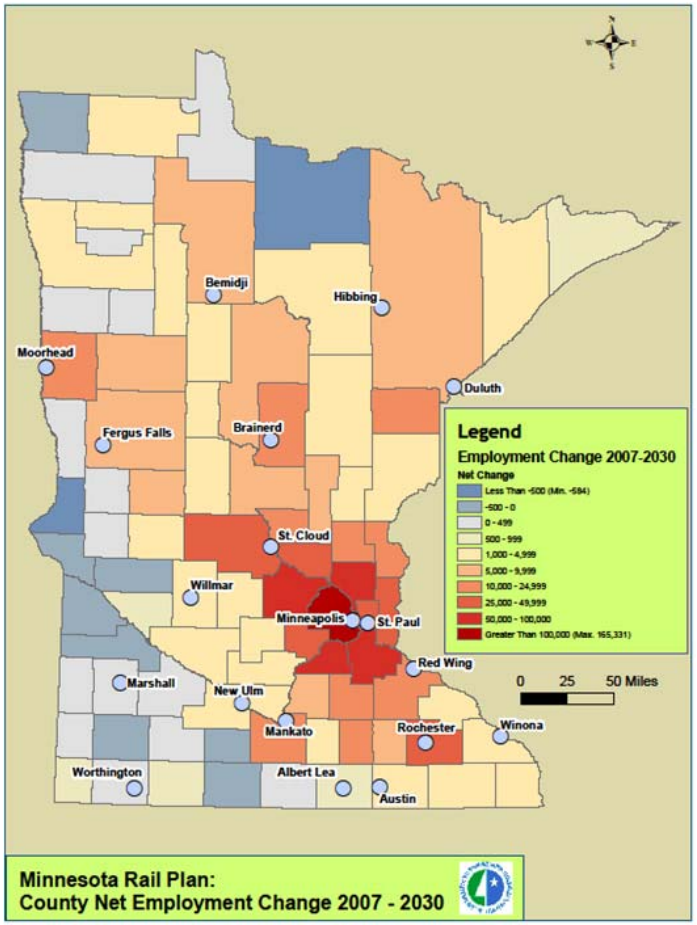
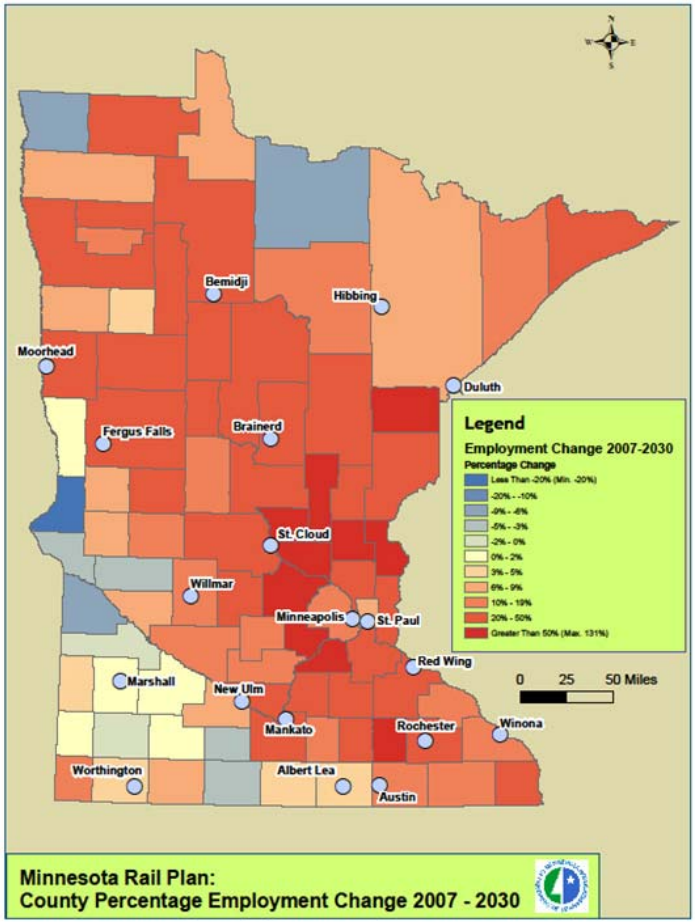


Figure 3.5 Minnesota Employment, Net Change by County
2007 to 2030



Source: Cambridge Systematics, Inc., based on Minnesota State Demographic Center and Woods & Poole data.

A more precise picture emerges if we look at net employment growth by county as shown in Figure 3.5. This map shows a decided concentration of growth in the Twin Cities region and northward along the I-94 corridor toward St. Cloud. This pattern reinforces the importance of connecting the Twin Cities metropolitan economy with the Chicago economy and also examining opportunities to link smaller cities around the State to the Twin Cities by passenger rail where the volumes will support sufficiently frequent services.

Minnesota's State Demographic Center and the U.S. Census Bureau projections show that Minnesota's population will grow apace with the U.S. average and significantly faster than the Midwest region as a whole. Figure 3.6 shows the forecast percentage changes in population by Minnesota County from 2007 through 2030. The map shows that about one-half of Minnesota's counties will experience positive growth in population. The counties in the southwest and western regions of the State, and a few of the far northern counties, will see little or no population growth.

Figure 3.7 shows the forecast net change in population by county from 2007 to 2030. An analysis of the changing settlement patterns shows pronounced growth in the exurban areas, especially northwest and south of the Twin Cities. Time-series data show that until about 25 years ago, migration into the Twin Cities area was focused tightly within the metropolitan area. In recent decades, development has become less focused within the metropolitan area, spreading into exurban areas at a fairly rapid pace. Much of this growth will be at commuter rail or the shorter intercity rail distances from the core of the Twin Cities. Expansion of rail services could serve forecast growth along the I-94 corridor north of the Twin Cities toward St. Cloud (Northstar began to service this market in 2009), and south toward Rochester.[14]

The industry, employment, and population forecasts indicate that Minnesota will continue to grow at a robust rate relative to its Midwestern peer states. This growth will generate more demand for transportation services for housing materials, food, clothing and merchandise to support a growing population; of materials, parts, and finished products to support the State's substantial and growing manufacturing sector; and of people for commuting, recreational and business travel. There also will be a continuing demand for transportation services to support the State's agricultural and resource extraction industries, which while not projected to grow as fast as other economic sectors, are still productive and profitable, generating jobs and sustaining many Minnesota communities.

[14] Ramsey County/St. Paul is forecast to experience a slight population decline through 2030 according to the Minnesota State Demographic Center, but the Metropolitan Council forecasts higher urban core growth rates for both Ramsey and Hennepin (Minneapolis) counties. Decisions regarding rail investments could influence the outcome of these forecasts.

Figure 3.6 Minnesota Population, Percentage Change by County
2007 to 2030

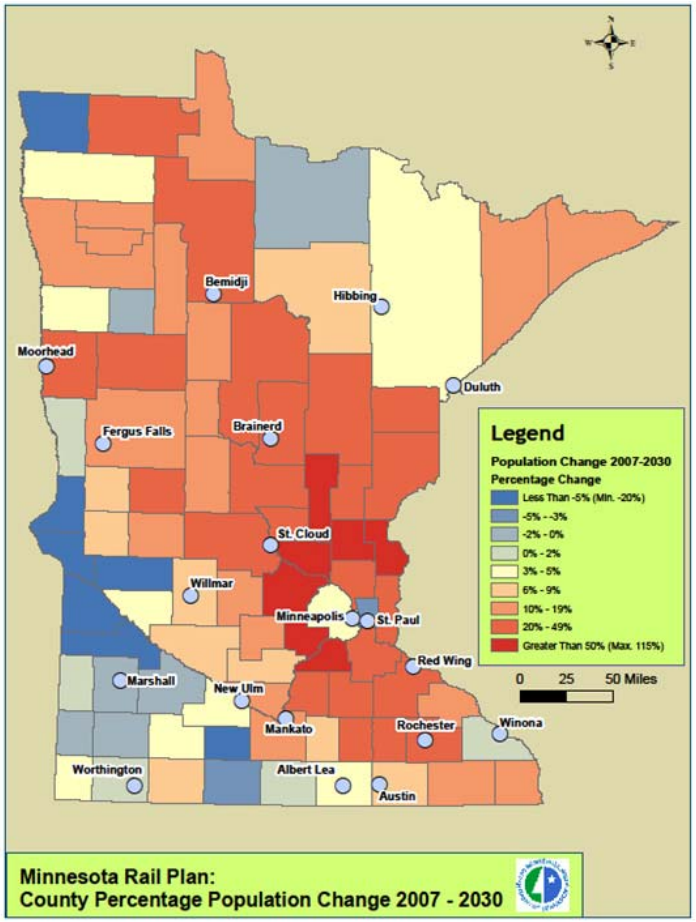
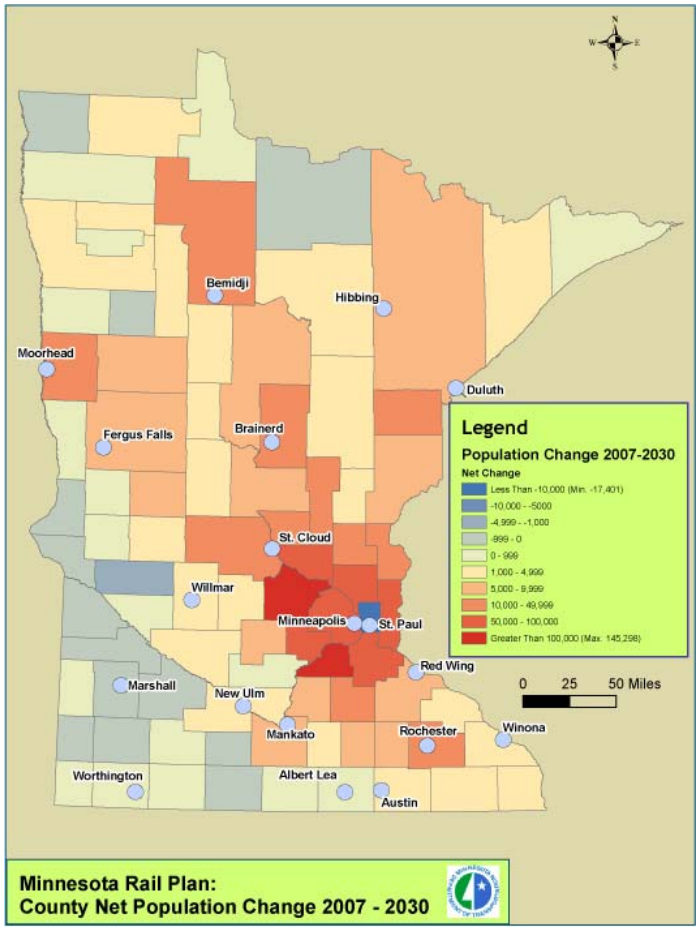


Figure 3.7 Minnesota Population, Net Change by County
2007 to 2030



Source: Cambridge Systematics, Inc., based on Minnesota State Demographic Center Data.

The pattern of development suggest that growth will be focused around the Twin Cities, but that there also will be development northwest toward St. Cloud and southeast toward Rochester and the river cities of Red Wing and Winona. The latter will be strongly influenced by the strength and patterns of future economic development along the mega-corridor between Chicago and the Twin Cities.

The coming decades could see either a reconcentration of growth in the Twin Cities region or a more diffuse development pattern along the I-94 corridor. For example, rising fuel costs – whether driven by supply and demand or climate change policies – are factors which could make travel by auto and truck more expensive than it is today, pushing more employment and population growth into the Twin Cities region.

The following highlights recent and historical economic activity for each of Minnesota's Metropolitan Statistical areas:

- **Duluth –** Duluth's growth has focused on business services, finance, healthcare, and regional tourism. The traditional industries of iron ore mining and logistics are declining in terms of relative job numbers; however iron ore and steel making are both undergoing a resurgence.
- **Fargo-Moorhead –** This resilient economy has not experienced job losses on a par with other regions during the recession, and continues to experience growth in business services, finance, and manufacturing. Fargo-Moorhead is a regional retail center for a vast area. It also is a center for grain transport (much of it by rail) and grain storage for the Red River Valley.
- **Mankato –** Mankato's recent growth has centered on business services, finance, and as a regional retail center. Mankato is located in the heart of the State's corn and soybean growing areas, though the farming sector's share of jobs is declining. Mankato has a larger manufacturing sector than the State as a whole primarily in food processing, feed preparation, and farm machinery. Manufacturing is more dependent on freight transportation than most other sectors.
- **Minneapolis-St. Paul –** The Twin Cities comprise two-thirds of the Minnesota economy, with growth mostly in the business services, finance, and healthcare sectors. The Twin Cities are the transportation and retail hub for the North Central U.S. Although construction activity has slowed during the recession, the region will remain the focus of much of the State's (and the North Central U.S.'s) long-term population growth. Construction depends on the reliability of the rail and roadway networks to ensure on-time delivery of building material. The region's population growth will drive future demand for commuter, recreational and business travel by auto or other modes such as passenger rail.
- **Rochester –** Rochester is a center of healthcare services, technology, and biosciences due to the presence of the Mayo Clinic, the University of Minnesota-Rochester, the Hormel Institute, and others. Healthcare accounts for 30 percent of the region's jobs compared to only 12 percent statewide. Rochester's relative competitiveness in healthcare and life science industries is expected to sustain long-term economic growth for the region, and drive demand for passenger travel and low volume high value freight movement.

- **St. Cloud** – The St. Cloud region is on the western fringe of the expanding greater Twin Cities region. Population and economic growth will sustain growth in St. Cloud's already sizeable construction industry and on the importance of passenger transportation connections to and from the Twin Cities. As a regional center, St. Cloud also has a relatively large retail sector. At the heart of Minnesota's dairy industry, St. Cloud has a large farming sector, although its relative share of state jobs is declining. St. Cloud has a larger manufacturing sector than the State as a whole focused on food processing, optics and appliances.

To account for these possibilities in developing a rail plan for Minnesota, we examined two development and settlement patterns in projecting ridership demand for passenger rail in Section 3.3:

- **Future A: Twin Cities-Centered Development.** This future would assume that growth and development are concentrated in the Twin Cities region with some expansion toward St. Cloud. It would look to intercity rail along the Chicago-Twin Cities-St. Cloud corridor to support continued radial development.
- **Future B: Multicentered Development.** This future would assume multicentered growth and development, with substantial growth in the Twin Cities region, but also high growth rates in St. Cloud, Rochester, and Duluth. It would look to intercity rail between Chicago and the Twin Cities, but anticipate a more corridor-oriented pattern of development with stronger intercity links to the regional trade centers such as Duluth.

We also estimated what would happen to each of these scenarios if overall growth rates were 10 percent higher than currently forecast, and if gasoline prices spiked again to the $4 per gallon range.

3.2 Freight Demand in Minnesota

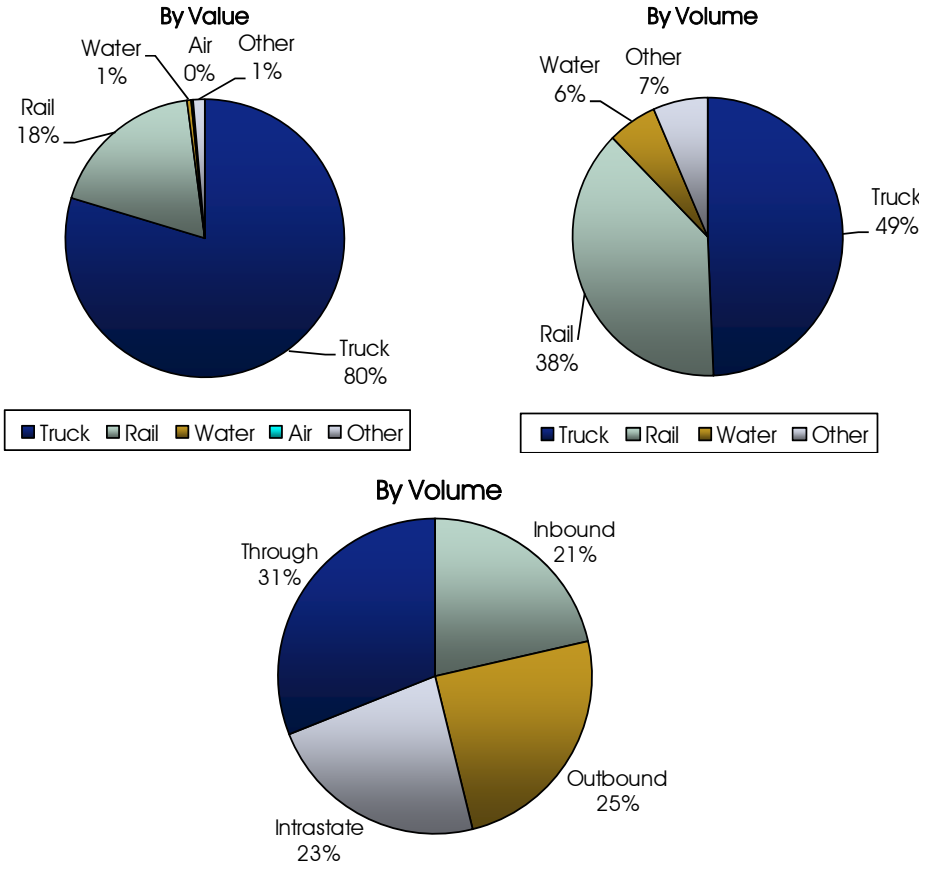
This section provides more detail on the regions and economic sectors which drive freight movement in the State. The analysis of freight traffic is based on IHS-Global Insight's 2007 TRANSEARCH INSIGHT database, and the U.S. Surface Transportation Board's 2007 Rail Waybill Sample. TRANSEARCH provided information on traffic flows for all primary modes. Geographic resolution varied from county-level within Minnesota to the Census' Bureau of Economic Analysis (BEA)-level beyond the State. The Waybill sample provides detailed information on rail traffic. In general, traffic is characterized by volume (tons and value), commodity, and trading pattern. Future traffic forecasts were developed by using the TRANSEARCH INSIGHT database projections for 2030. This forecast depicts the demand for goods movement between regions, and is not a general economic projection. The forecast takes into account industry, regional, national and international economic trends to estimate commodity-level trade flows. These are the standard tools used in freight analysis and forecasting across the country.

3.2.1 Existing Conditions

With a total volume of 630 million tons and a value of slightly over $1 trillion annually, Minnesota hosted nine percent by value and five percent by tonnage of all intercity freight transported in the U.S. in 2007. As in most states, highways handled the majority of goods in Minnesota, with modal share for all inbound, outbound, local and through intercity shipments amounting to 81 percent of value and 49 percent of tonnage. However, at 19 percent for value and 38 percent for tonnage, the State has more rail traffic and less truck traffic than the U.S. as a whole, where market share by value is only four percent. Shipments by water represent six percent of total tonnage, versus four percent nationally. The relatively higher portion of freight traffic carried by rail and water in Minnesota is due to the mix of industries in the State and a geographic location that plays to the railroads' strengths of handling large volumes of traffic over long distances. This pattern is most clearly evident in that approximately 50 percent of all rail traffic neither originated nor terminated in the State. An increasing part of Minnesota's rail traffic has been cross-border with Canada, which accounted for 18 percent of rail traffic tonnage in 2007.

Figure 3.8 summarizes patterns of freight movement by tonnage, mode, value, and type of move for Minnesota.

Figure 3.8 Minnesota Freight Movement
2007



Source: TRANSEARCH.

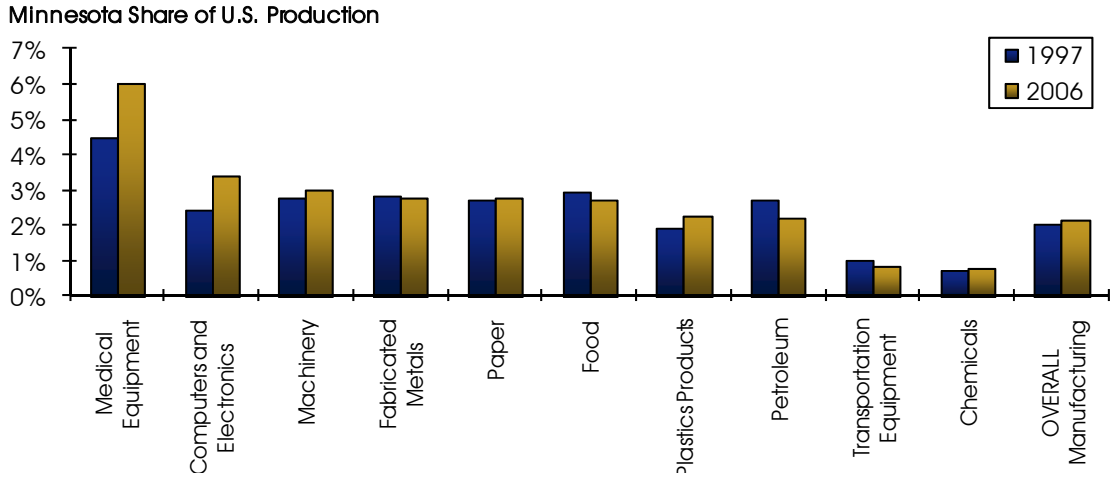
Within Minnesota, several industries are key players within the State's economy due to their size, growth opportunities, and strategic importance; and highly dependent on efficient freight transportation to keep supply chains flowing, manage costs, and remain productive in very competitive national and global markets. These are the shippers that depend on Minnesota's freight transportation network and services to transport their goods in the global marketplace, to stock their shelves with the latest products for Minnesota residents and visitors, and to haul construction materials to keep pace with infrastructure, commercial and residential building projects.

According to the STB Waybill Sample, Minnesota's short line, regional, and switching railroads handled over 110,000 cars in 2007. The short line's importance to the State's shippers is shown with originating traffic, where they accounted for one out of every 12 carloads. In spite of the State's large size, short line participation in intrastate shipments is quite small at 2.3 percent; the majority of this traffic consists of ores moving from the iron range to the Lake Superior ports, which is handled by Class I railroads.

Eight specific industries were selected as being especially sensitive to the performance of the State's rail freight transportation system, and/or strategically significant to the State's future economic competitiveness. The trends do not reflect the impact of the current recession.

- **Manufacturing** – Minnesota's manufacturing sector employs approximately 360,000 people or 10 percent of all state jobs, about equal to the U.S. as a whole. While employment in Minnesota's manufacturing sector has been dropping (similar to almost all states), the value of goods manufactured in Minnesota has been rising. Minnesota manufacturers have invested heavily in automation and sophisticated process technologies, reducing their need for labor while maintaining and increasing output. Output surged in the emerging medical equipment industry, doubling from $1.7 billion in 1997 to $3.4 billion in 2006, increasing the State's share of this industry nationally from 4.5 to six percent (see Figure 3.9). Manufacturing relies on all modes of transportation to move raw materials to industrial sites, and finished products to markets.

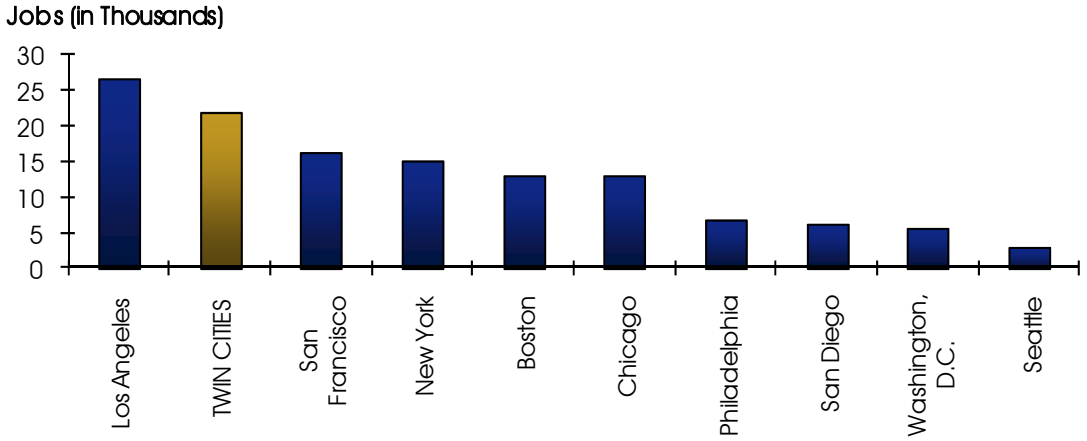
Figure 3.9 Minnesota's Share of U.S. Production by Manufacturing Industry
1997 to 2006



Source: U.S. Census Bureau, Census of Manufactures and Annual Survey of Manufactures.

- **Life Sciences –** Beginning with the Mayo Clinic in Rochester, Minnesota has developed a strong health care services and medical technology sector. Healthcare is one of the fastest growing compounds of the State's economy, both in terms of job gains and contribution to GSP. Since 1997 healthcare services has accounted for over one-quarter of Minnesota's job growth. The Mayo Clinic is a worldwide medical destination. It employs over 30,000 people and contributes $4 billion per year to the State's economy, or 1.3 percent. Minnesota's life science industries also are among the largest in the U.S. As shown in Figure 3.10, the Twin Cities rank second to the metropolitan Los Angeles region (a much larger area) in total jobs within the life sciences industry. These industries tend to rely on passenger transportation and on air and truck for the movement of high value, just-in-time delivery cargos.

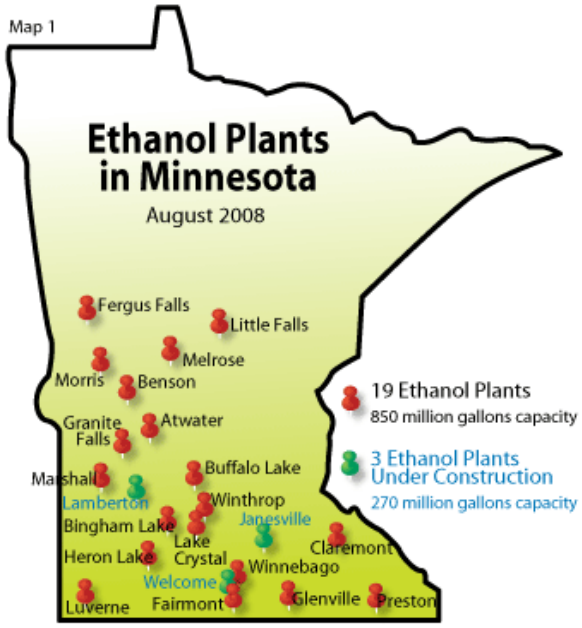
Figure 3.10 Medical Device Employment by Metropolitan Area
2007



Source: Bureau of Labor Statistics, U.S. Census Bureau, Harris Info Source, Milken Institute.

- **Agriculture and Food –** Agriculture and food are interrelated industries. "Agriculture" is the growing of crops and raising of livestock, while "food" is the manufacture of items commonly found on grocery store shelves. Both industries use rail, roadways, and water-ways for inputs (fertilizer, feed, etc.) and to transport commodities to markets. Minnesota has the sixth largest agricultural industry in the country, producing crops and livestock valued at $11 billion. The growing use of ethanol as a fuel is an important element in agricultural growth in the State. As shown in Figure 3.11, there are 19 ethanol plants currently operating in the State which combined have the fifth highest ethanol production capacity in the U.S. Ethanol consumption is concentrated in California, Texas, and the Northeast U.S. Most of this traffic is handled by rail in tank cars. Short line railroads play a critical role in moving these supplies.

Figure 3.11 Ethanol Production Facilities



Source: Minnesota Department of Agriculture.

The value of Minnesota's food products output reached $6.4 billion in 2006, ranking Minnesota 15th in the nation and increasing by 31 percent between 1997 and 2006, a rate of increase somewhat below the national average. Minnesota is in the top tier of cheese (#5) and milk (#6) producers.

Rail freight plays a crucial role in these industries, which tend to ship goods that are heavy, bulky, and relatively low in value per ton, and which must often be shipped long distances to markets. This means that transportation costs are a significant portion of the price of delivered shipments and products. The value of the State's agricultural exports has grown in recent years to $3.6 billion, seventh highest in the nation. Rail freight access to the country's international gateways, including the Port of Duluth/Superior, is crucial to maintaining agricultural competitiveness. The agricultural sector now finds itself competing with the retail industry and coal/electrical industries for space on the rail network, which could cause smaller shippers in particular to switch to truck.

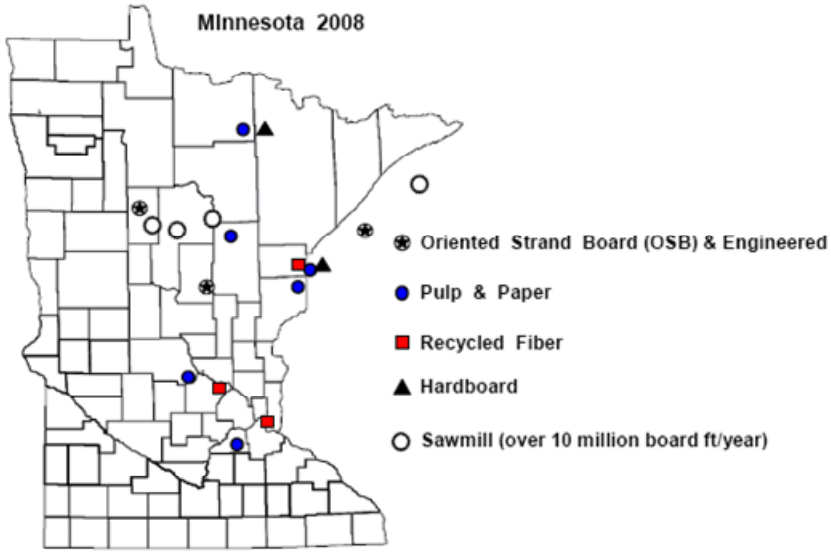
- **Energy –** Electricity costs are a key business climate consideration that affects the site location decisions of companies and influences the willingness of local companies to expand. Due to the intensive use of coal to generate electricity and the high coal volumes hauled on Minnesota's railways, the link between rail freight and energy production is clear. Minnesota's total energy consumption has grown proportionately in recent decades with the State's population growth. Rail currently is the dominant mode of transportation to bring coal into Minnesota, and coal is the top commodity brought into Minnesota accounting for 53 percent (22 million tons) of all goods transportation by rail with a Minnesota destination. The State is the 22nd largest consumer of coal in the U.S., with coal accounting for 20 percent of energy consumption in 13 generating facilities. The future of coal production will be impacted by global policies related to greenhouse gas emissions and global warming, and to the development of clean coal technologies.

Due to the intensive use of coal to generate electricity and the high coal volumes hauled on Minnesota's railways, the link between rail freight and energy production is clear.

- **Construction –** Economic expansion and population growth are the two main drivers of growth in the construction industry. Minnesota accounts for about 1.5 to two percent of total U.S. construction, declining slightly in recent years relative to Sunbelt states. The construction industry is a primary end user of a range of supplies – including lumber, aggregate, and structural steel – that are typically carried by rail due to their bulk, cost, weight, and transport distances. The timeliness of freight deliveries is crucial to the construction industry. Among the major construction-related commodities transported by rail in Minnesota are sand and gravel and taconite tailings for use in roadway construction. Minnesota quarries about 40 to 50 million tons of sand and gravel per year, making it the country's fifth largest producer. Shipments are transported by rail, truck, and barge.

- **Paper and Wood Products –** Minnesota's paper and wood products industry includes logging, sawmills, paper mills and wood products. In 2007, these industries accounted for 38,000 jobs in the State with production valued at $6.6 billion. Minnesota's wood products industry is the 11th largest in the country, but the State is the 2nd largest producer of window and door components. The State's paper and lumber product facilities are shown in Figure 3.12. Rail is a key mode for shipping lumber and wood products to and from the State, in particular for bringing construction lumber into the State.

Figure 3.12 Minnesota Paper and Lumber Products Facilities



Rail is a key mode for shipping lumber and wood products to and from the State, in particular for bringing construction lumber into the State.

Source: Minnesota Department of Natural Resources.

- **Iron Ore and Steel –** Minnesota's Iron Range represents 80 percent of U.S. iron production and has benefited in recent years from increased worldwide demand, in particular from China. This increase in demand has driven up prices changing the economics of supplying imported iron ore to inland U.S. markets. This shift is favoring Minnesota's iron ore producers as inland steel producers transition from consuming imported products (primarily Brazilian) to domestic producers. Iron Range ore has

become much more price competitive compared to the landed cost of imported ore, including ocean and inland transport. After years of slow decline, Minnesota iron production started to increase after a low point in 2000. Even during the current recession, major investments in the Iron Range continue to move forward, including a $2 to $3 billion iron concentration facility in Northeast Minnesota undertaken by an Indian Company, Essar Steel. Such development would stimulate demand for rail, truck, and water freight transport.

- **Distribution, Warehousing, and Retail** – The retail industry comprises establishments that sell merchandise and is the final step in the distribution process. Retail is the third largest jobs producer in Minnesota after services and healthcare, accounting for 11 percent of the State's jobs. Growth in retail sales correspond to overall economic and population growth. Retail products are brought to market through sophisticated logistical channels that put demands on Minnesota's intermodal transportation system, including rail. Retail merchandise is often imported through high-volume container port facilities at West and East Coast ports, and then transported by truck or rail to regional distribution facilities, with several located in Minnesota primarily along the I-94 corridor. From these facilities, the merchandise is trucked to retail stores. Retailers strive to minimize fixed inventory to keep costs down. This operational strategy places great importance on a freight transportation system to carry inventory responsively and reliably. The importance of "just-in-time" delivery strategies depends on having roads and railroads functioning at high levels of service.

- **Transshipments** – At the far western end of Lake Superior, the Port of Duluth/Superior is the busiest port on the Great Lakes, handling over 40 million tons of cargo per year. Historically, the Port's highest volume commodity has been iron ore (taconite) mined in the nearby Mesabi Range, and shipped to steel facilities located throughout the Great Lakes/St. Lawrence Seaway region. Beyond locally sourced taconite, the port ships other bulk product, including stone, coal, and grain. The total tonnage of goods handled by the Port has increased since 2000 after remaining fairly steady since the mid-1960s. In recent years coal has surpassed iron ore by a slight margin as the Port's top commodity. The increases in coal and iron have more than offset declines in grain tonnage at the Port. Consistent with its role as a major port, intermodal transfer point and retail center, Duluth/Superior handles significant volumes of rail and truck traffic. Mesabi Range iron ore reaches the Port by rail or truck and is transshipped to ships bound for steel plants along the Great Lakes. Rail is also used to carry iron ore to inland steel plants in other parts of the country (i.e., Utah and Alabama). Unit trains bring Wyoming coal (Powder River Basin) into the port where it is stockpiled and transloaded onto ships for distribution throughout the Midwest and exported overseas.

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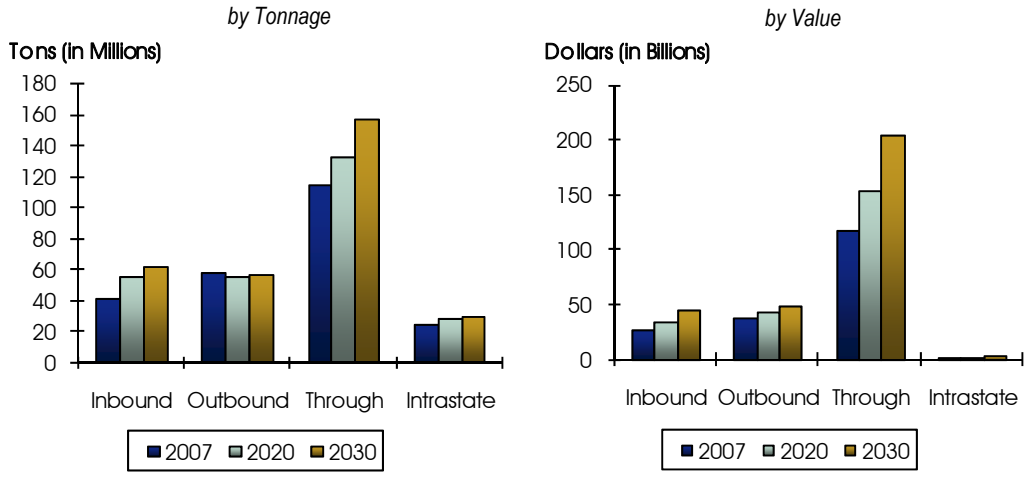
3.2.2 Freight Demand Forecasts

This section describes in detail the demand for rail freight services in 2007 and forecast for 2030. In order to provide a complete picture of freight movement now and in the future in the State, a brief overview also is provided of other major modes – truck, water, and air.

Rail Demand

In 2007, Minnesota's freight railroads moved over 240 millions tons of freight, and by 2030 it is expected that these railroads will carry more than 300 million tons, a 25 percent increase. Figure 3.13 details inbound, outbound, intrastate and through movements by tonnage value for 2007, and forecasts for 2020 and 2030. Clearly, through movements are dominant, with a greater tonnage than inbound and outbound movements combined, and are expected to grow by over 40 million tons over the next two decades. Through, inbound and outbound movements exhibit similar patterns when measured by weight and value. Intrastate movements are considerably less (20 million tons annually) and tend to be concentrated among heavy, low-value goods.

Figure 3.13 Rail Movement Types
2007 to 2030



Source: TRANSEARCH.

When measured by tonnage, carload rail freight is overwhelmingly dominant in Minnesota, with 93 percent of total rail freight tonnage. When measured by number of rail units, intermodal freight becomes much more significant, accounting for 35 percent of all units moved in the State. Intermodal traffic tends to be comprised of higher value lower weight items such as consumer goods, while carload shipments tend to carry heavy lower value goods such as coal, metallic ore, and grain.

The top five rail-bound commodities account for over 80 percent of outbound tonnage: metallic ores, farm products, food products, chemicals, and mixed shipments. The IHS-Global Insight forecast projects a decline in metallic ores and farm products and growth in the next three categories through 2011.[15] Measured by value, mixed shipments, which form most of the traffic carried in trailers and containers, are predicted to be the top commodity by value. The other top commodities by value are food products (highest today), chemicals, transportation equipment, and pulp and paper products.

The top five inbound commodities account for over 80 percent of all inbound tons, with coal accounting for over one-half of all inbound tonnage. The other top commodities are farm products, chemicals, clay etc., and mixed shipments. Mixed shipments are expected to more than double by 2030.

Approximately 10 percent of Minnesota's rail freight tonnage is attributed to intrastate movements and the top five commodities account for 98 percent of the tonnage. Metallic ores alone make up 85 percent of intrastate movements, increasing to 89 percent in 2030. Metallic ores also represent the highest value of intrastate shipments, 26 percent today, and 28 percent in 2030.

Rail traffic that neither originates nor terminates in Minnesota is more diverse than other rail movements, with the top 10 commodities comprising only 71 percent of the total tonnage. Coal holds the largest share of through movements (22 percent), followed by farm products, chemicals, mixed freight (intermodal), lumber, wood products, and food products. Measured by value, intermodal is the top through routed commodity ($33 billion) and is expected to more than double by 2030 ($72 billion).

For inbound commodities by tonnage, the top origins are Billings, Montana and Casper, Wyoming, which reflects the substantial demand for utility coal in the upper Midwest. The other top five trading partners are Chicago, Saskatchewan, and Fargo. All are expected to increase shipments to Minnesota by 2030. When measured by value, Chicago is the top trading partner reflecting the importance of intermodal traffic, Chicago's position as the primary gateway between the eastern and western U.S., and the largest inland origin and destination point for containers moving in the Pacific trade. Seattle is the second largest partner reflecting the role of Pacific Northwest ports in providing a link between Minnesota and Asian markets.

[15] The TRANSEARCH forecasts supplied for this study indicated continued substantial growth in coal volumes of 50% through 2030, an outcome that most energy experts believe is unlikely to occur, even absent a strong regulatory regime controlling greenhouse gas emissions. Forecasts produced by HIS-Global Insight subsequent to the completion of this analysis indicate flat growth for coal. Counteracting this trend is an expectation by agricultural experts that growth in crop production will be significant and thus place this group of commodities as a significant driver of rail traffic growth.

For outbound shipments, the non-Minnesota portion of the Duluth, Minnesota BEA was by the far the largest destination for Minnesota rail freight due to the iron ore from Minnesota mines being shipped through the Port of Superior, Wisconsin. Chicago and Seattle are the next largest destinations. The top outbound destinations by value are Chicago, Seattle, and Portland (OR), all of which are expected to grow by 2030. Chicago receives over twice as much rail freight from Minnesota by value as any other destination. Both Seattle and Portland serve as primary gateways to Asia for Minnesota industries, and particularly the growing medical sciences sector.

Chicago receives over twice as much rail freight from Minnesota by value as any other destination.

Figures 3.14 and 3.15 show the volume of freight moving on Minnesota's railroads in 2007 and forecast for 2030 based on the freight demand volumes discussed above. The allocation of freight to specific lines as shown in the figures are used to assess demand versus capacity over the State's freight lines for the purpose of identifying capital investment needs in Section 4.0.

The most significant changes in volume are forecast to occur on the BNSF mainline between Minneapolis and Fargo, ND, the CP main connecting Minneapolis to North Dakota, and the CN's former Duluth, Winnipeg, and Pacific route running south from International Falls through Duluth. Both of the CP and CN lines form parts of through routes between Chicago and the Canadian west, with access to the natural resources and Pacific port cities of Vancouver and Prince George, British Columbia.

Figure 3.14 Freight Volume on Minnesota Railroads (2007)

In Tons

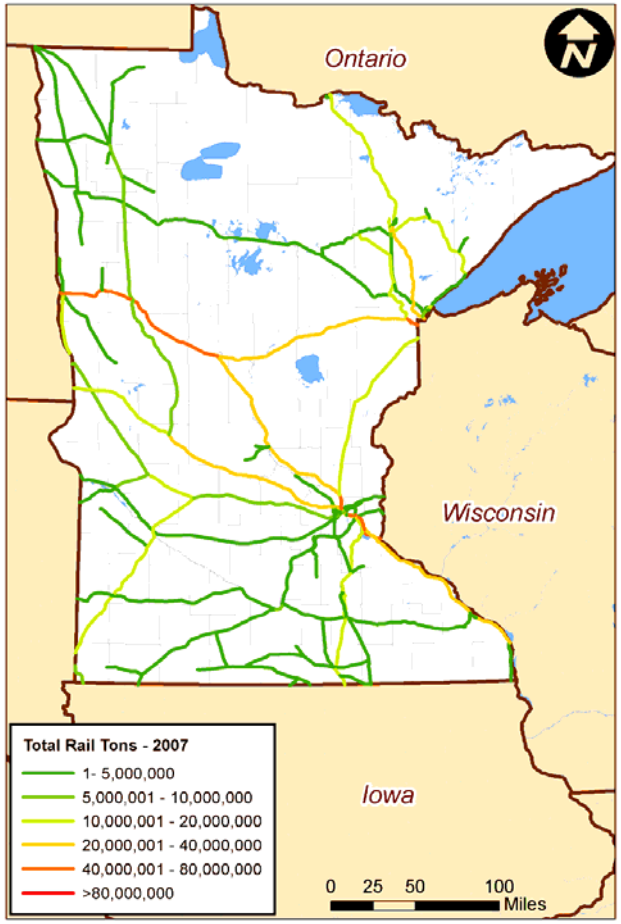
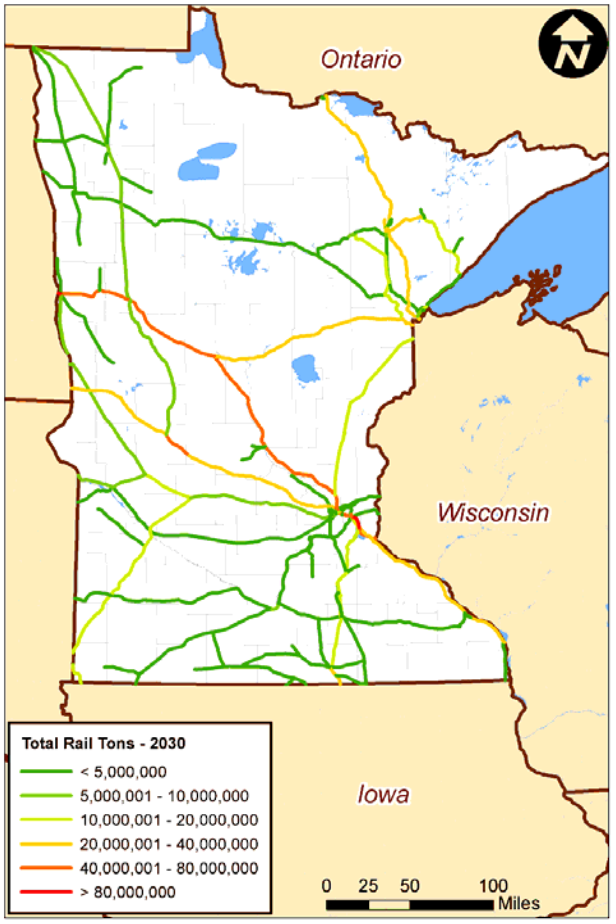


Figure 3.15 Freight Volume on Minnesota Railroads (2030)

In Tons



Source: TRANSEARCH.

Annual volume on the BNSF mainline between Minneapolis and Fargo, currently the highest volume line in Minnesota, is forecast to increase by between 12 and 17 million tons, with some segments near the North Dakota state line expected to carry over 72 million tons in 2030. CP's mainline between Minneapolis and North Dakota is forecast to carry 14 to 18 million tons more than in 2007. Volume on the CN line between International Falls and Duluth is expected to increase by roughly 10 million tons. In 2030, Minnesota's highest volume rail segment, which is located in the Twin Cities, is expected to carry nearly 100 million tons annually, up from less than 70 million tons in 2007. Some of these lines struggle to carry existing volumes. While these expectations for volume growth are substantially lower than those shown in prior forecasts, the expected growth is nevertheless still substantial, and will require significant capital investment to handle it. This will particularly be the case on lines where new or expanded passenger services are introduced.

Figures 3.16 and 3.17 depict the 2007 distribution of originating and terminating tonnage by county. St. Louis County has by far the most originating tonnage (36 million tons) followed by Itasca (6.6 million) and Washington counties (four million tons). The high volumes in Itasca and Washington counties are due to the iron mining industry in the region. Lake and St. Louis counties, with their Lake Superior ports, have the highest volume of terminating tonnage (13.6 and 12.2 million respectively). Hennepin, Dakota, and Washington counties, located in the Twin Cities region, each had over three million terminating rail tons.

In 2030, Minnesota's highest volume rail segment, which is located in the Twin Cities, is expected to carry nearly 100 million tons annually, up from less than 70 million tons in 2007.

Figure 3.16 Total Tonnage Originating in Minnesota Counties (2007)

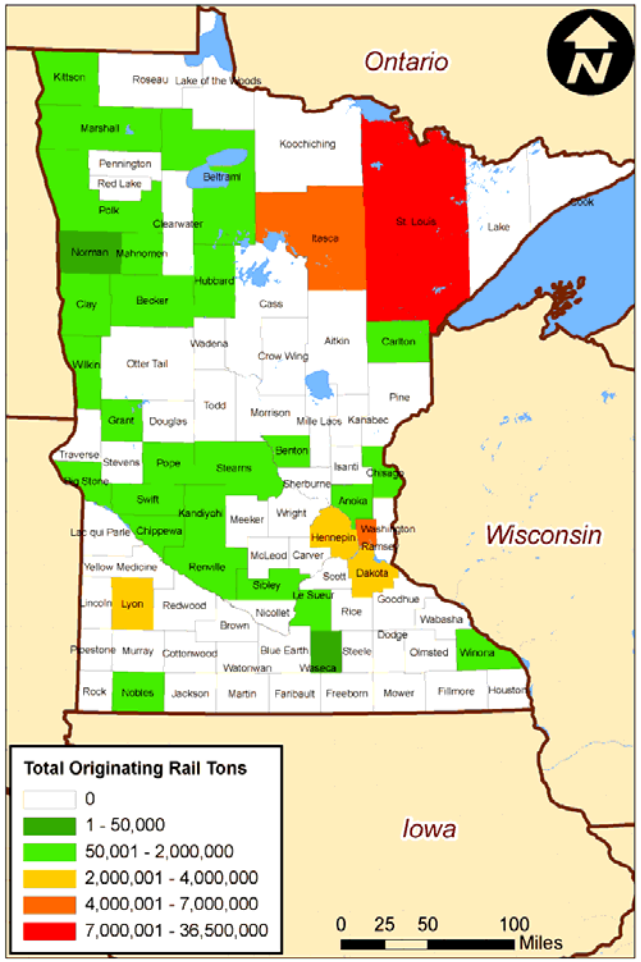
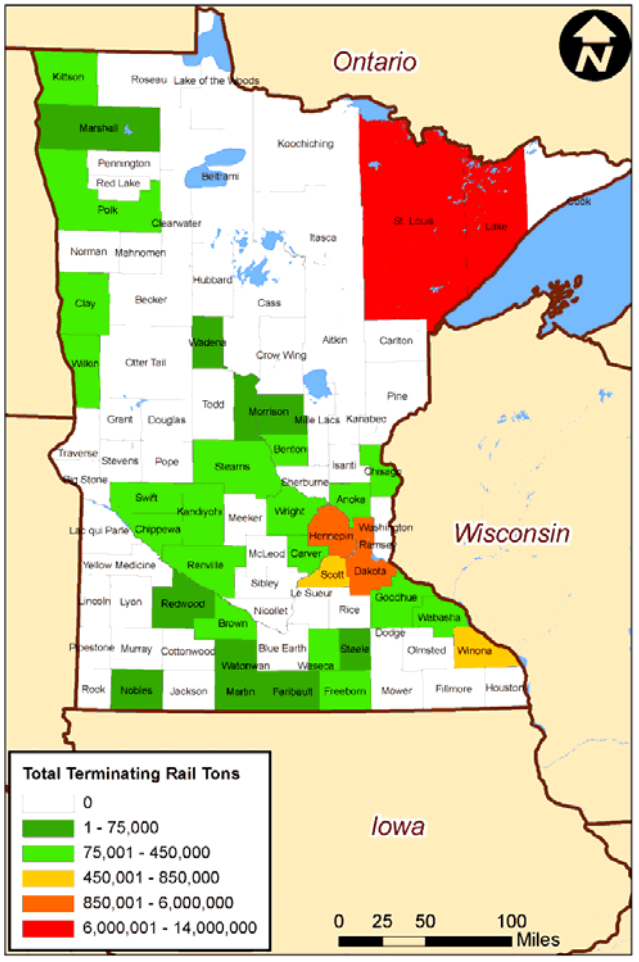


Figure 3.17 Total Tonnage Terminating in Minnesota Counties (2007)

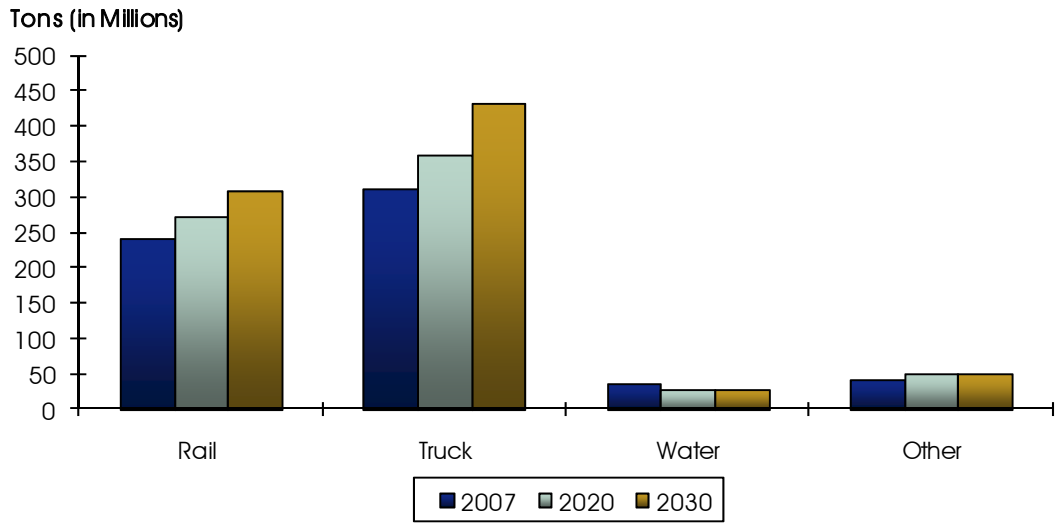


Source: 2007 STB sample.

Non-Rail Demand

In 2007, Minnesota's nonrail freight modes (truck, air, water and others) moved over 390 million tons of freight, as shown in Figure 3.18. Trucks carried the vast majority of this freight, over 311 million tons, and by 2030 trucks are expected to handle over 430 million tons – an increase of more than 30 percent. By value, truck freight is even more dominant, accounting for nearly $820 million in 2007, and a forecast $1.5 trillion in value in 2030. Other freight, primarily pipeline shipments to and from Canada, is expected to grow modestly. Air cargo, which is not shown in the figure, accounted for approximately 480,000 tons in 2007 and is expected to grow to 600,000 tons in 2030. The only mode that is expected to lose volume is waterway, which is expected to decline by almost 25 percent, from 37 to 28 million tons in 2030.

Figure 3.18 Modes by Tonnage
2007 to 2030

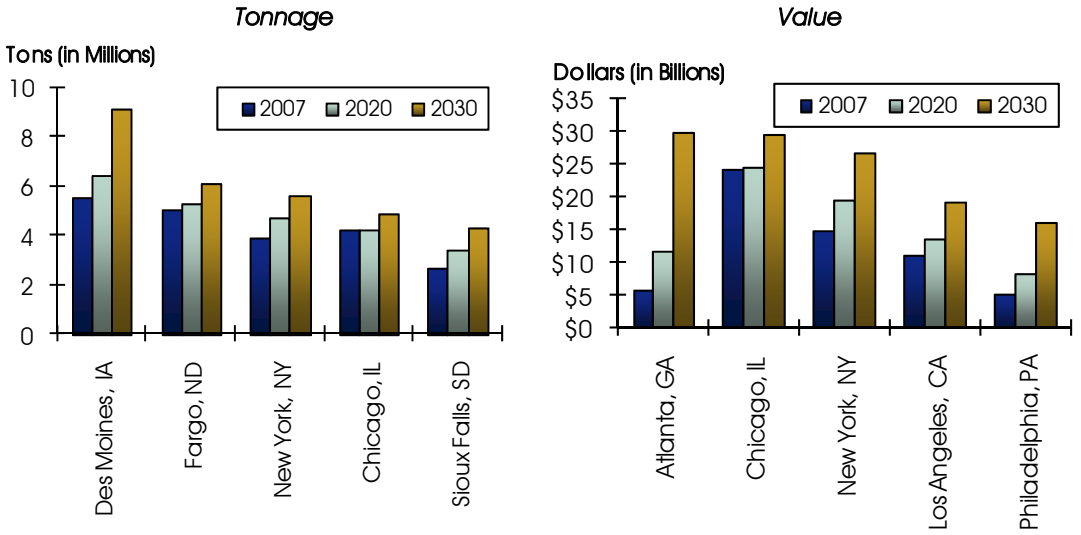


Source: TRANSEARCH.

While rail plays a small role in intrastate movements, the largest single component of truck trips are intrastate, often moving goods between warehouse, distribution centers and retail outlets.

Figure 3.19 shows the top destinations for truck freight from Minnesota by weight and value in 2007 and 2030. Des Moines currently is, and forecast to remain, the top outbound destination. Other top destinations are Fargo, New York City, Chicago, and Sioux Falls, South Dakota. All are expected to remain major destinations in 2030. The biggest forecast change in 2030 is the rise in the value of truck shipments from Minnesota to the Atlanta, Georgia region. This traffic is forecast to increase from $6 billion in 2007 to $30 billion in 2030.

Figure 3.19 Top Five Truck Freight Destinations
2007 to 2030



Source: TRANSEARCH.

Between 2007 and 2030, truck traffic patterns in the State are expected to remain relatively stable, with interstate highways carrying the highest volume and exhibiting some of the most significant growth as shown in Figures 3.20 and 3.21. I-94 will remain the State's most heavily used truck route. The Minneapolis area, at the intersection of I-35 and I-94, also is expected to see a significant growth in truck traffic. I-90, which crosses the southern portion of the State, along with I-35 south of Minneapolis, leading to Des Moines – a top outbound truck destination – are both projected to carry significantly higher volumes of truck traffic in 2030. Among non-Interstate highways, some of the most significant truck traffic growth is expected on U.S. 52 between the Twin Cities and Rochester. This forecast growth in truck volumes point to the need to maintain a robust freight rail system and potentially to invest in passenger rail to relieve congestion on the region's major highways which could constrain economic growth.

Figure 3.20 Minnesota Truck Traffic by Tonnage
2007

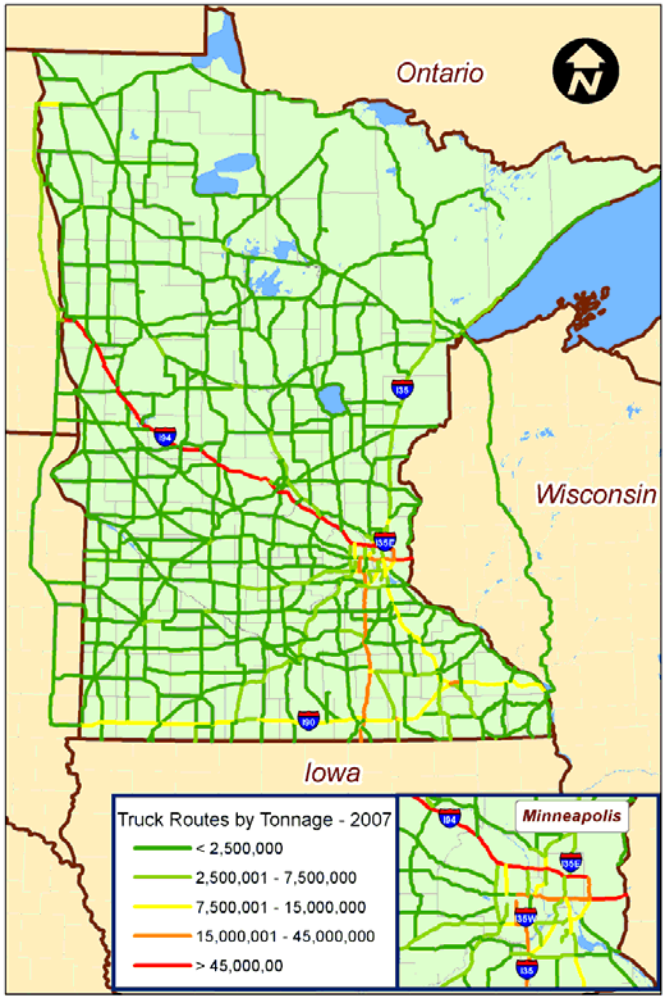
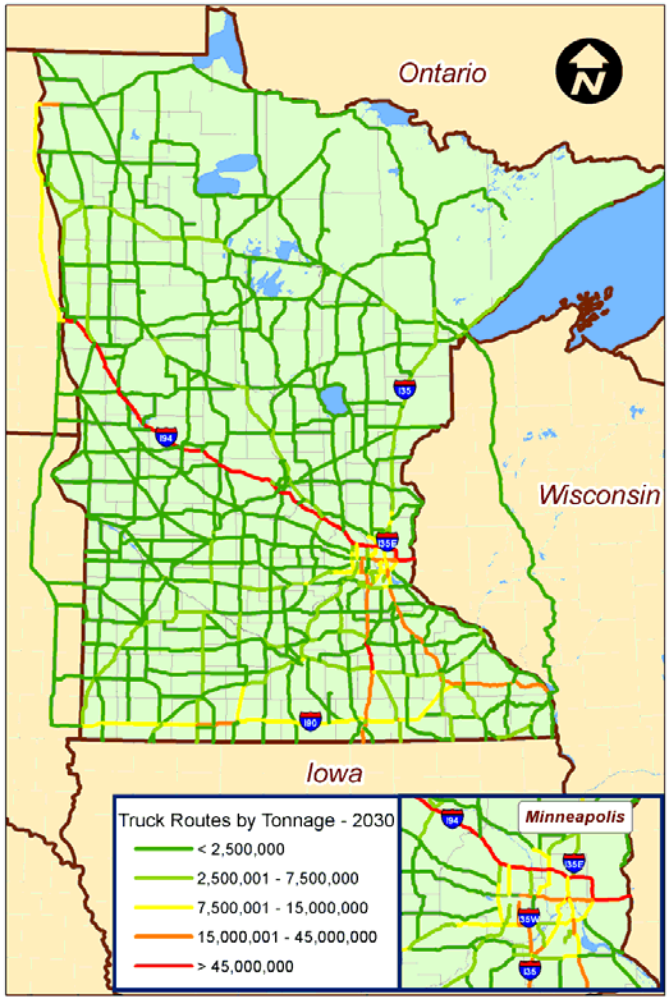


Figure 3.21 Minnesota Truck Traffic by Tonnage
2030



Source: TRANSEARCH.

Waterborne shipments are dominated in both weight and value by cargo moving outbound from Minnesota. Outbound shipments are forecast to decline from 29 million tons in 2007 to around 17 million tons in 2030, while increasing slightly in value. Today, waterborne freight is dominated by Great Lake movements consisting primarily of metallic ores.

Air freight is typically only used for very high-value, low-weight goods due to its high cost. Air cargo movements are expected to climb steadily over the next two decades in terms of both weight and value, with outbound cargo increasing faster than inbound. While air shipments are expected to more than double during this period, they will still constitute only a tiny fraction of total freight movement in the State. Top commodities are mail, machinery and instruments, with the latter overtaking mail in the future as the largest commodities. Air freight can be a critical component of freight shipment for the State's biomedical sciences and healthcare industries.

North American Free Trade Agreement (NAFTA) trade with primarily Canada and, to a small extent (1.5 percent of the NAFTA total) Mexico, makes up a large and growing sector of total freight movements to and from Minnesota. Total trade today is around 30 million tons and is forecast to increase to over 40 million tons by 2030. While Mexican imports are forecast to double by 2030, Mexican trade will remain a small piece of total NAFTA trade. Petroleum products make up the largest share of inbound commodities from Canada in both weight and value. Metallic ore and transportation equipment are the largest outbound commodities.

3.3 Passenger Demand

Whereas freight demand could be estimated using readily available national databases and forecasts, no such consistent methodology existed for forecasting demand for intercity passenger rail services. Minnesota, like many states, does not have a statewide model. As a result, several individual forecasts have been developed by project proponents and their consultants for some of the most advanced projects, including the Northern Lights Express (NLX) between the Twin Cities and Duluth, HSR service between the Twin Cities and Rochester, and Midwest Regional Rail Initiative (MWRRI) service between Chicago and the Twin Cities. Ridership forecasting is both an art and a science, in which there are a range of acceptable assumptions and methodologies. Project proponents will typically use the most favorable assumptions to optimize projected ridership for their projects. Therefore, it was not possible to stitch together a consistent set of forecasts for all possible intercity rail services in the State from the existing pool of forecasts, since these individual forecasts were developed with inconsistent underlying assumptions about future population and job growth, rail service levels and fares, and external factors such as fuel prices.

Instead, the consultant team developed a high-level, sketch planning, spreadsheet-based approach which could be applied consistently across all possible service options to create an apples to apples comparison for this statewide analysis. Sketch planning has a long history and is commonly used in statewide forecasting in the transportation planning field, particularly when resources do not allow for statewide transportation surveys and models. In developing this approach, we deliberately used conservative (low ridership) assumptions. Therefore, the

forecasts which follow may in some cases be lower than other forecasts which have been developed at the individual corridor level. Ultimately, each project will be responsible for developing its own "official" forecasts to support planning, environmental, and engineering analyses as the projects move forward through approval processes. These official forecasts will be thoroughly vetted by permitting and funding agencies.

The forecasts which follow analyzed travel only between the Twin Cities and key outlying markets which have been identified as possible intercity rail origins and destinations. Since a full-scale trip table with all possible origins and destinations does not exist, it was necessary to use this simplified approach. However, we did analyze a limited number of intermediate stops such as Superior, Wisconsin and Hinckley on the NLX line, and the Minneapolis-St. Paul International Airport (MSP) on the Rochester line. We specifically did not consider outlying commuter rail markets such as Cambridge on the NLX line, Rosemount on the Rochester line, or cities inbound of Red Wing on the River Route. We acknowledge the potential for combining some intercity and commuter services, or at the very least creating interchanging opportunities. However, for intercity services to maintain competitive travel times to their longer distance destinations, close-in commuter rail type stops should be few and far between. Ridership demand from commuter rail locations is best analyzed using the Twin Cities Metropolitan Council's regional travel demand modeling. By not analyzing any such services, we maintained a level playing field for all services.

Most demand was estimated using standard demographic data such as population and employment. However, certain institutions – called special generators – have unique demand characteristics. Special generators considered in this analysis include casinos, medical centers, universities, and tourism markets.[16]

[16] Of particular concern was estimating the demand for casinos. No casino in the U.S. today is served primarily by passenger rail, and no definitive forecasts of the willingness of casino patrons to use rail, such as would be developed by a stated preference survey, were made available. Much of the casino travel today is handled by charter bus services organized by affinity groups for no or nominal costs. Since the business plan for the NLX line proposes to relocate existing rail such as to provide door-to-door service to the Grand Casino Hinckley, we increased current intercity bus demand to Hinckley by 500 percent over what other data, principally from Greyhound, would suggest. As rail and intercity bus are close substitutes, increasing bus travel in the base case in turn increased projected rail ridership. Even with this "bus bonus," the resulting forecasts were lower than other forecasts. We did not apply this factor to any other casino since no other "door-to-door" services are currently proposed. It has been suggested that similar demand could be generated by the Treasure Island Casino in Red Wing. Stopping an interstate high speed rail line at a casino in one state could be problematic from an overall service perspective. The Chicago River Route already has among the highest ridership forecasts of the alternatives studied. While the Hinckley casino demand is critical in analyzing the overall performance of the NLX line, it is insignificant in analyzing the overall performance of the Chicago MWRRI River Route. If rail captured the entire current charter bus market of slightly over 100,000 riders, this would represent between a 5 and 10 percent increment in overall line ridership. It would, however, provide a significant portion of any local (LaCrosse-Winona to the Twin Cities) service offering.

In order to test the model's sensitivity to potentially different demand characteristics, the following variables were tested in some or all of the markets:

- Train speed – 79 mph (conventional service), 110 and 150 mph (HSR service). HSR speeds were tested only where proposed – NLX, Rochester, and Chicago.
- Fares – $0.20 per mile for conventional and HSR up to 110 mph; $0.32 for 150 mph.
- Trains per day – four for conventional service and eight for HSR.
- Gas prices – $2 and $4 per gallon. The base case used $2. This range reflects the variability of fuel prices over the last two years. (In all cases, constant noninflated prices are used).
- Personal/business travel splits of 90/10 and 50/50. Business travelers tend to have higher values of time (estimated at $31 per hour versus $12 per hour for personal travel) because their travel costs are often reimbursed by employers and clients. Personal travel includes all other recreational, personal business and commuter trips. The 50/50 split was used only for HSR services.
- Growth forecasts – Official state growth forecasts as defined in Section 3.1 were used as the base case. Variables tested included a 10 percent higher forecast, and a forecast which distributed more growth away from the Twin Cities toward the outlying city markets.

The first step in developing a consistent forecasting process is to determine reasonable intercity demand targets for the relevant city pairs – in other words, estimating the total potential number of trips ("the pie") for travel between two cities. There are significant data limitations for estimating targets for intercity travel, since most forecasting is focused on travel within individual metropolitan regions which maintain large detailed travel demand models for this purpose. Four modes of travel were considered – auto, air, rail and intercity bus. Different approaches were used to estimate the existing use of each mode depending on availability of existing data, as described in detail in Technical Memorandum 3.

These four modal demand inputs were added together to generate the total estimated travel between the Twin Cities and all interstate and intrastate tested origin/destinations, as shown in Table 3.1. Demand estimates are for the year 2005, the most recent year for which consistent data was available.

As shown, the highest total travel demand to/from the Twin Cities is with Chicago and St. Cloud, with nine to 11 million trips respectively. Chicago, of course, is the largest city of the Midwest and a major origin and destination point throughout the region. St. Cloud has elements of both intercity and commuter demand to the Twin Cities. These two city pairs are followed by a second cluster of city pairs in the three to five million trip range which includes Des Moines, Duluth, Eau Claire, Grand Forks, Hinckley, La Crosse, Madison, Mankato, Milwaukee, and Rochester. These cities encompass most of the intercity rail routes under consideration today.

Assembling the modal targets for the base year (2005) was the first step in generating new forecasts. The second step was to estimate costs and travel times for the various modes, since these two factors are the key to forecasting mode choice. These input assumptions are described in detail in Technical Memorandum 3.

From this base year forecast, demand forecasts could be developed for the future analysis year of 2030. Growth forecasts were extracted from Minnesota, Wisconsin, North Dakota and Iowa statewide forecasts, and metropolitan planning organization (MPO) forecasts for Chicago, Northeast Indiana, and Detroit.

Table 3.1 Estimated Annual Demand from/to Twin Cities for 2005

City	Total Annual Demand – 2005
Bemidji, Minnesota	525,305
Central Wisconsin (Wausau)	2,823,015
Chicago, Illinois	9,731,342
Columbus, Wisconsin	452,235
Des Moines, Iowa	2,913,580
Detroit Lakes, Minnesota	711,529
Detroit, Michigan	1,865,987
Duluth, Minnesota	4,314,250
Eau Claire, Wisconsin	5,753,730
Fargo, North Dakota	3,923,654
Grand Forks, North Dakota	2,669,011
Hinckley, Minnesota	5,770,875
Indianapolis, Indiana	637,612
International Falls Minnesota	514,100
Kansas City, Missouri	1,782,201
La Crosse, Wisconsin	2,987,809
Madison, Wisconsin	4,238,230
Mankato, Minnesota	3,742,800
Marshall, Minnesota	612,925
Milwaukee, Wisconsin	4,382,516
Northfield, Minnesota	1,672,200
Oneida/Rhinelander, Wisconsin	1,669,035
Quad Cities, Iowa	1,088,900
Red Wing, Minnesota	1,021,053
Rochester, Minnesota	4,835,215
Sioux City, Iowa	595,810
Sioux Falls, South Dakota	1,657,380
St. Cloud, Minnesota	11,007,431
St. Louis, Missouri	610,396
Thief River Falls, Minnesota	447,743
Tomah, Wisconsin	1,079,395
Willmar, Minnesota	1,580,175
Winona, Minnesota	856,262

Table 3.2 shows the projected total demand for each city pair with significant forecast rail demand for 2030, the rail demand, and the rail mode share. The results show the most favorable demand numbers for each city based on the testing of the variables described earlier in the section. Except as noted, the base forecast shown assumes 79 mph speed, four trains per day, a rail fare of $0.20 per mile, gas prices of $2, personal/business travel splits of 90/10, and the standard state growth forecast. For the three tested HSR city pairs – Duluth, Rochester and Chicago, 110 mph speed and eight trains per day was assumed with all other factors held constant. The color codes reflect the four distinct ridership brackets.

Table 3.2 Projected 2030 Rail Demand to/from Twin Cities and Selected Cities – Base Case

City	Service Type	Total Demand (Thousands)	Rail Ridership (Thousands)	Rail Mode Share
Chicago	HSR	11,320	1,630	11.7%
St. Cloud	Conventional	12,953	1,044	8.1%
Rochester	HSR	6,085	531	8.7%
Duluth	HSR	3,909	430	11.0%
Eau Claire	Conventional	6,511	257	3.9%
Wisconsin Cities on MWRRI	HSR	14,457	221	1.5%
Mankato	Conventional	4,041	228	5.6%
Northfield	Conventional	2,007	111	5.5%
Willmar	Conventional	1,543	81	5.2%
Red Wing	HSR	1,113	63	5.6%
Fargo	Conventional	3,963	37	0.9%
Winona	HSR	789	27	3.3%

As shown in the table, the demand for the top cities can be divided roughly into four brackets. At the top are Chicago and St. Cloud with over one million rail trips. Not surprisingly, planning for extending and/or improving rail service to these cities has long been on the public agenda through MWRRI planning for Chicago, and Northstar planning for St. Cloud. Forecast rail mode shares for these cities are 11.7 percent for Chicago and 8.1 percent for St. Cloud.

The second cluster consists of Rochester and Duluth (NLX) with HSR service and including stops at the MSP Airport for Rochester, and at the Hinckley casino and at Superior (Wisconsin) for NLX. In the case of airport demand, it was assumed that a HSR connection between Rochester and MSP would essentially consume most demand for air travel directly to Rochester such that commercial service would no longer be viable. The mode shares of 8.7 and 11.0 percent for Rochester and Duluth hence include the demand for these special generators.

The third cluster consists of cities with demand of between 100,000 and 300,000, including Eau Claire (Wisconsin), the Wisconsin cities along the currently proposed MWRRI route, Mankato, and Northfield. Mode shares are generally between four and six percent. The fourth

cluster consists of Willmar, Red Wing, Fargo and Winona, all with demand under 100,000 and mode shares between three and six percent with the exception of Fargo at slightly under one percent. With the exception of Willmar, these cities have current Amtrak service and would certainly continue to enjoy improved Amtrak or other passenger rail service in the future. Willmar, however, does not have current rail service.

The following summarizes the impacts of the variables tested:

- In the cases of HSR service, optimal demand is generated in most cases by the combination of 110 mph service and lower fares ($0.20 per mile). The higher fare of $0.32 per mile may optimize revenue but depress demand, even at the higher 150 mph speed.
- Doubling gas prices from $2 to $4 per gallon could result in almost doubling these ridership forecasts.
- Assumption of the 50/50 personal/business travel split is necessary to optimize ridership on the HSR routes.
- Varying the growth assumptions by 10 percent higher, or by assuming a more dispersed development pattern, did not significantly impact the forecasts.

Table 3.3 shows the forecasts for the best case in which intermediate stop ridership is added, and other external factors (such as higher than assumed fuel prices) is assumed.

Table 3.3 Projected 2030 Rail Demand to/from Twin Cities and Selected Cities – Best Case

City	Service Type	Total Demand (Thousands)	Rail Ridership (Thousands)	Rail Mode Share
Chicago	HSR	11,320	2,400	21.2%
St. Cloud	Conventional	12,953	1,500	11.6%
Rochester	HSR	6,085	750	12.3%
Duluth	HSR	3,909	650	16.6%
Eau Claire	Conventional	6,511	380	5.8%
Wisconsin Cities on MWRRI	HSR	14,457	330	2.3%
Mankato	Conventional	4,041	340	8.4%
Northfield	Conventional	2,007	160	8.0%
Willmar	Conventional	1,543	120	7.8%
Red Wing	HSR	1,113	100	9.0%
Fargo	Conventional	3,963	50	1.3%
Winona	HSR	789	40	5.1%

The top three clusters of cities have forecast rail mode shares generally from five to 11 percent in the base case, and 7.5 to about 16 percent in the best case. Table 3.4 looks at forecast

demand for major city pairs in which HSR service continues to be investigated. The study, High-Speed Ground Transportation for America, was prepared by the Federal Railroad Administration (FRA) in 1997. As shown, the FRA study forecast mode shares generally between four and 12 percent, consistent with the forecasts in this study.

Table 3.4 Forecast Rail Mode Share

Other City Pairs – 15 Trains/Day

	90 mph	110 mph	150 mph
SF-LA-SD	4.5%	5.8%	7.4%
Chicago Hub	7.1%	7.9%	8.3%
Chicago-Detroit	6.9%	7.6%	7.5%
Chicago-St. Louis	8.7%	10.5%	11.9%
Florida	3.4%	3.5%	3.8%
Portland-Seattle-Vancouver	6.3%	6.3%	6.6%
Texas Triangle	5.8%	8.5%	10.3%

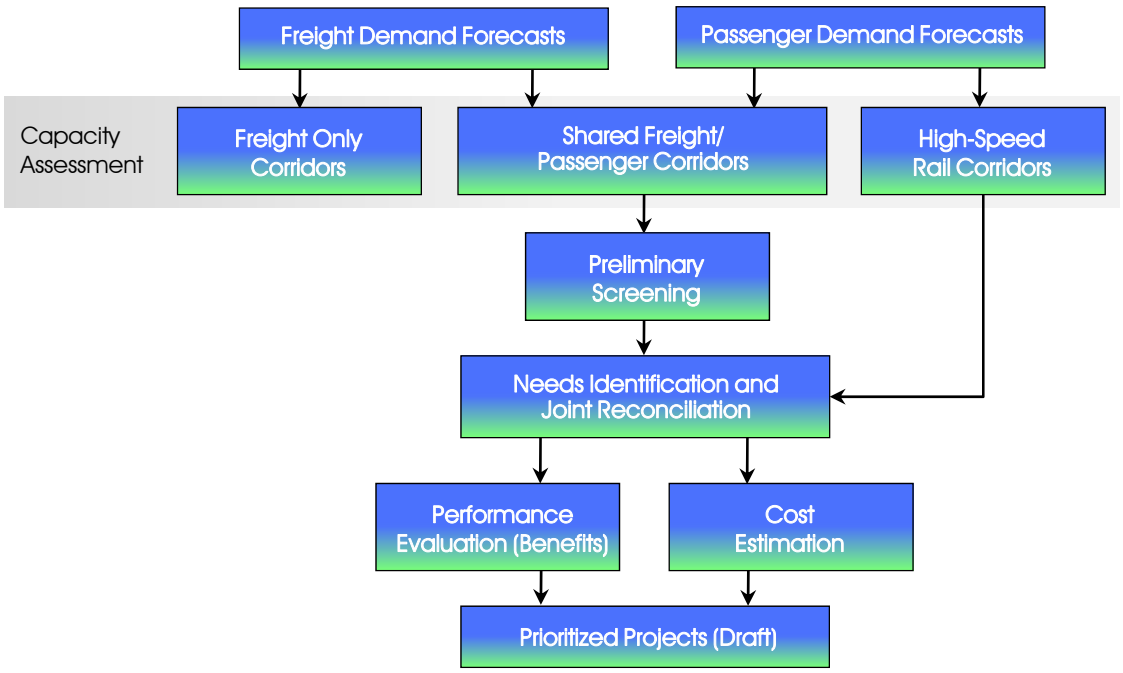
4 Investment Needs

4.1 Methodology

This section summarizes investment needs for passenger and freight rail corridors consistent with the visions for rail in Minnesota. The following process was used to identify and evaluate needs. Figure 4.1 outlines the overall approach. Detailed background data and assumptions are provided in Technical Memorandum 6.

- Define improvements for freight only segments of the rail system, organized first by rail operator and then by rail subdivision;
- Define improvements for shared freight and passenger corridors that are proposed to operate conventional intercity passenger rail service (79 to 90 mph); and
- Define improvements for passenger corridors that are proposed to operate HSR passenger service (110 to 150 mph).

Figure 4.1 Summary of Approach to Needs Identification and Evaluation



4.1.1 Preliminary Screening of Passenger Rail Corridors

Prior to undertaking a complete needs assessment of all rail lines in Minnesota, an initial screening process as shown in Table 4.1 was conducted of all passenger rail corridors and city pairs which have been under discussion or analysis. Different service levels were tested based on previous analyses and proposals, and likely demand as shown in Section 3.0. HSR services were assessed for connections to the Twin Cities from Rochester, Duluth, and Chicago. Eight train pairs per day was assumed for all HSR routings, and four to eight train pairs per day for all others. Conventional rail services were assumed to operate at 79 mph with the potential to go to 90 mph, and HSR services at a minimum of 110 mph with potential to go to 150 mph.

Based on this analysis, the following six city pairs were removed from further analysis:

- **Willmar-Fargo/Moorhead –** This corridor has lower potential ridership and comparatively poorer track conditions than the current corridor through St. Cloud. Therefore, it is not considered as a viable corridor since it serves a similar city pair.
- **Mankato-Worthington (Sioux City) –** This corridor has low potential ridership. Sioux City is a relatively small metropolitan area that is a significant distance (more than 250 miles) away from the Twin Cities. This corridor is not as viable in comparison to other city pairs. The goal of this study was to evaluate potential connections to other states, but not entire multistate routes; in this instance, a likely service would continue on to Omaha, which may result in substantially higher ridership volume than was estimated.
- **Minneapolis-Owatonna-Rochester –** This corridor is circuitous and slow in comparison to the other alternatives and thus would yield relatively low ridership numbers. The HSR corridor option has far higher potential for viability than this route.
- **Rochester-Winona –** The current alignment would not allow sufficient speeds for competitive passenger rail service. A separate high-speed alignment has been carried forward for further analysis.
- **Minneapolis-Norwood/Young America –** This corridor has low potential ridership and would require significant improvements to have trip times that are competitive with automobiles.
- **Norwood/Young America-Appleton –** This corridor has very low potential ridership and would require significant improvements to have trip times that are competitive with automobiles.

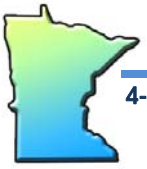


Table 4.1 Initial Screening, Data Evaluation

Corridor	Service Level (Round Trips)	Potential Ridership	FRA Track Class	Available Capacity
Minneapolis-Coon Rapids	4/Day	High	3	Low
Minneapolis-Coon Rapids	8/Day	High	3	Low
Minneapolis-Coon Rapids	HSR	High	N/A	N/A
Coon Rapids-Big Lake	4/Day	High	4	Medium
Coon Rapids-Big Lake	8/Day	High	4	Medium
Big Lake-St. Cloud	4/Day	High	4	Low
Big Lake-St. Cloud	8/Day	High	4	Low
St. Cloud-Fargo/Moorhead	4/Day	Medium	4	Low
Coon Rapids-Cambridge	4/Day	Medium	4	Low
Coon Rapids-Cambridge	8/Day	Medium	4	Low
Coon Rapids-Cambridge	HSR	High	N/A	N/A
Cambridge-Duluth	4/Day	Medium	4	Low
Cambridge-Duluth	8/Day	Medium	4	Low
Cambridge-Duluth	HSR	High	N/A	N/A
Minneapolis-Willmar	4/Day	Medium	4	High
Willmar-Fargo/Moorhead	**4/Day**	**Low**	**3**	**High**
Willmar-Sioux Falls, South Dakota	4/Day	Low	4	Medium
Minneapolis-St. Paul (BNSF)	4/Day	High	3	Medium
Minneapolis-St. Paul (CP)	4/Day	High	3	Medium
St. Paul-Hastings	4/Day	High	4	Medium
St. Paul-Hastings	HSR	High	N/A	N/A
Hastings-Winona (La Crosse)	4/Day	High	4	Medium
Hastings-Winona (La Crosse)	HSR	High	N/A	N/A
St. Paul-Northfield	4/Day	High	4	High
Northfield-Albert Lea (Kansas City)	4/Day	Low	4	High
Minneapolis-Mankato	4/Day	Medium	3	High
Mankato-Worthington (Sioux City)	**4/Day**	**Low**	**4**	**High**
St. Paul-Eau Claire, Wisconsin	4/Day	High	4	High
St. Paul-Owatonna-Rochester	4/Day	Medium	3	High
Minneapolis-Owatonna-Rochester	**4/Day**	**Medium**	**2**	**High**
Rochester-Winona	**4/Day**	**Low**	**2**	**High**
Minneapolis-Norwood/Young America	**4/Day**	**Low**	**3**	**High**
Norwood/Young America-Appleton	**4/Day**	**Low**	**3**	**High**
Twin Cities-Rochester	HSR	High	N/A	N/A

4.1.2 Needs Analysis

A needs analysis was conducted for all freight and potential passenger rail corridors in Minnesota. A process was developed so that a clear understanding of needs on the rail system for both freight and passenger operations, today and in the future (2030), could be derived. Key to this process is the understanding of the cumulative effect projects have on each other, and how important the underlying freight infrastructure is to the eventual development of a robust passenger rail network in the State (with a few exceptions where entirely new alignments are considered). The following evaluation process was used to establish needs.

- Corridors were evaluated to determine current freight Level of Service (LOS). A GIS-tool was used as a guide for determining LOS, complimented by expert opinions on Minnesota rail operations (Mn/DOT staff, consultant team, railroads, and others) to determine any additional system chokepoints that were not evident in the GIS-tool. For this evaluation, a LOS of C or better was considered acceptable. LOS C conditions describe a volume-to-capacity ratio of 0.4 to 0.7, meaning there exist low to moderate train flows in the corridor and there is enough available capacity to accommodate maintenance operations and to recover from incidents. Figure 4.2 shows current freight LOS with existing passenger rail services (Amtrak Empire Builder and Northstar) overlaid.
- Corridors were then evaluated to determine future freight LOS (see Figure 4.3), with the forecast levels of passenger trains as developed as part of the ridership forecasting process described in Section 3.0 applied to shared freight and passenger corridors. IHS-Global Insight TRANSEARCH data as presented in Section 3.0 was used to determine 2030 future freight flows. For corridors that were LOS D or worse (volume-to-capacity ratio of 0.7 or greater), improvements were identified to enable these corridors to be brought back to a minimum of LOS C. Improvements identified included additional tracks or signal systems, and more general improvements to overall operations and terminals.
- HSR services are proposed to be developed in new right-of-way in some corridors. Overall infrastructure, right-of-way, rolling stock, and operating and maintenance costs were identified. These improvements are effectively independent of the other improvements.

The outcome of the recommended improvements described in Section 4.2 are shown here in Figure 4.4 (2009) and Figure 4.5 (2030).

Figure 4.2 2009 Freight Level of Service
Without Improvements

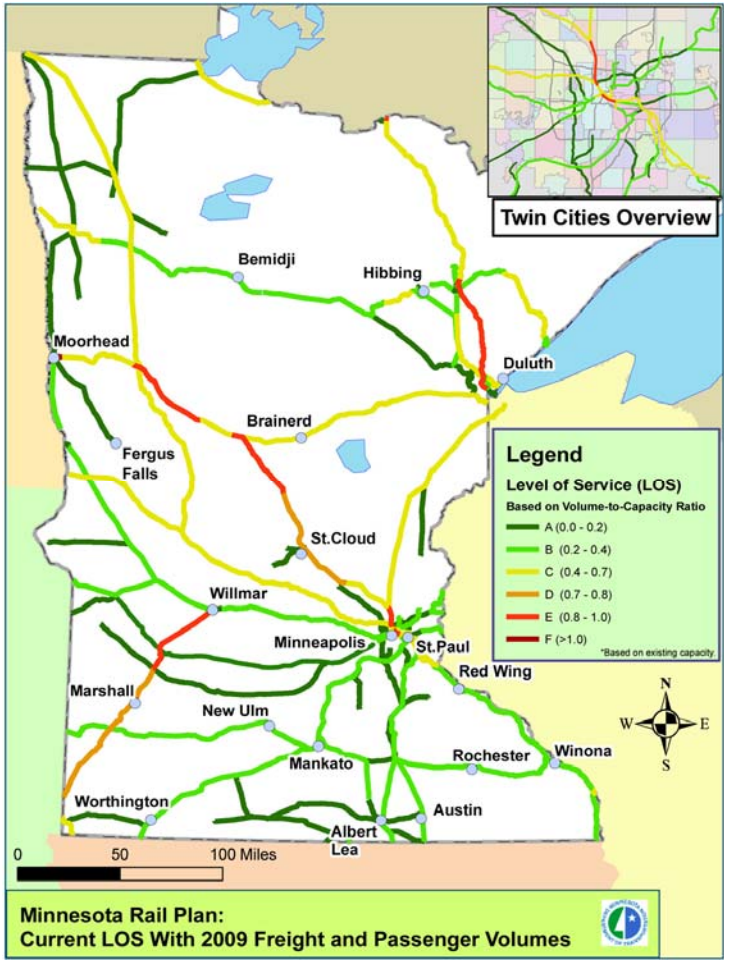


Figure 4.3 2030 Freight Plus 2030 Passenger Level of Service
Without Improvements

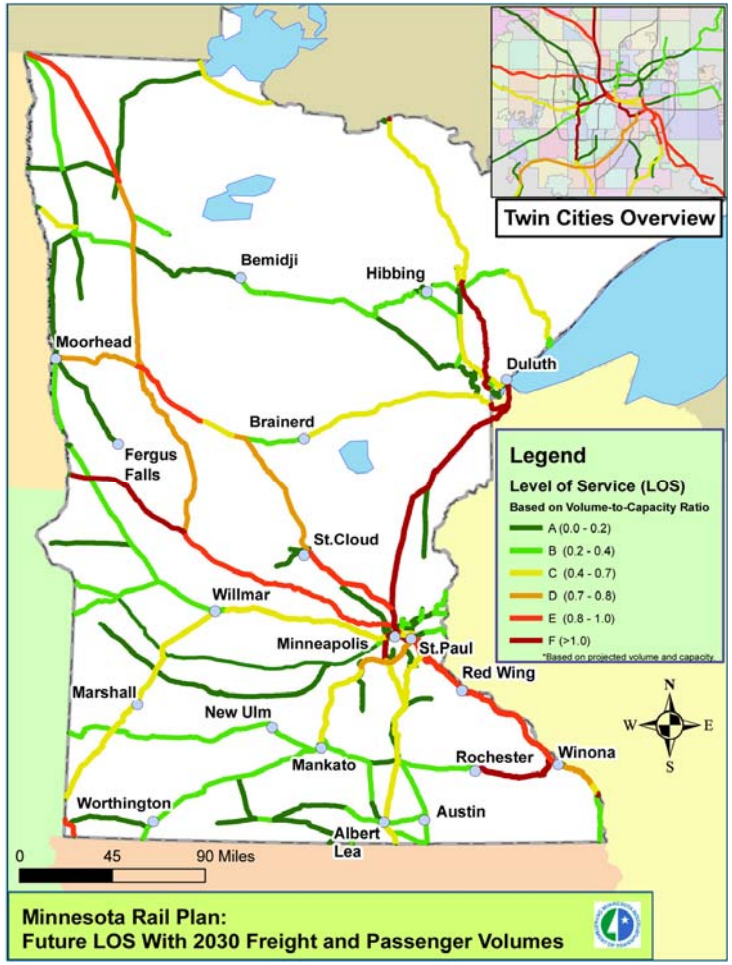


Figure 4.4 2009 Freight Level of Service

Shared Corridors with Recommended Improvements

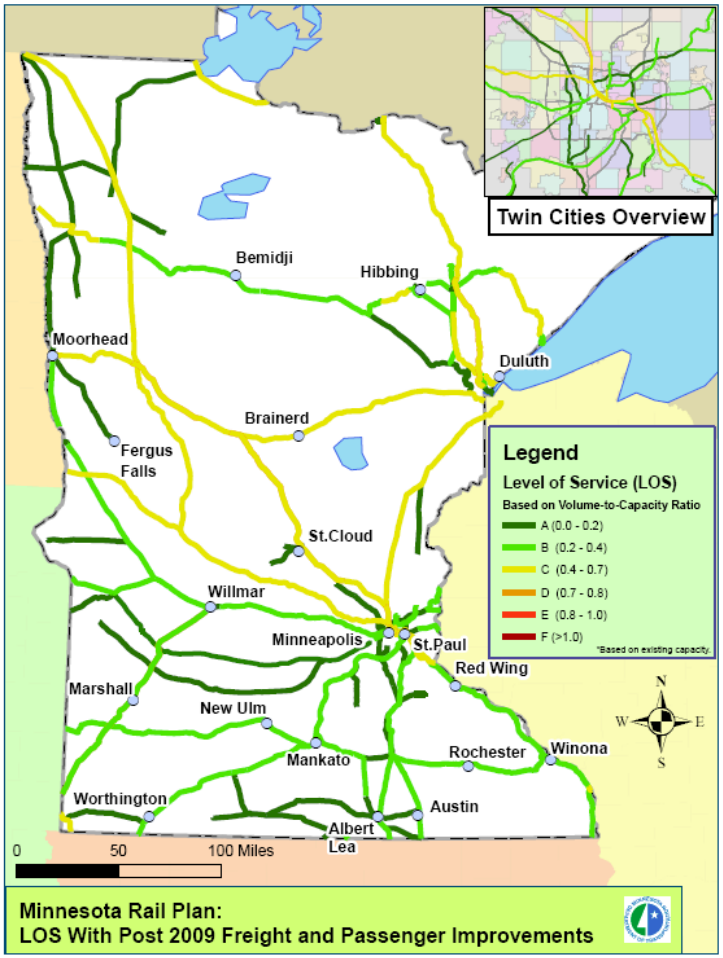
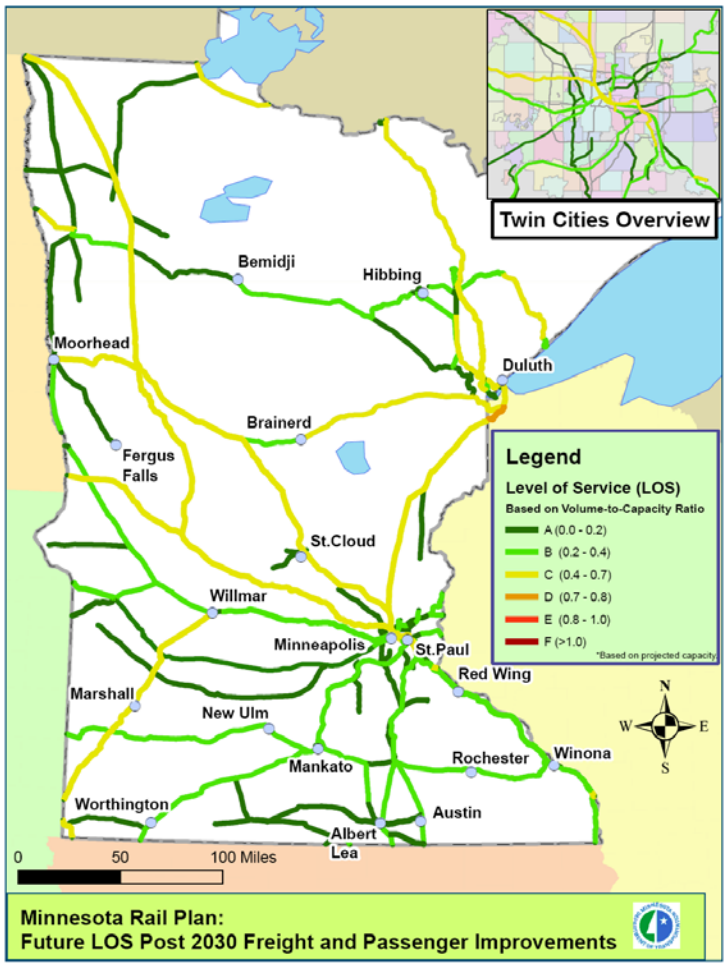


Figure 4.5 2030 Freight Plus 2030 Passenger Level of Service

Shared Corridors with Recommended Improvements



4.1.3 Improvement Cost Evaluation

After improvements were identified for each line or corridor, estimates were developed to quantify the costs of improvements and to start weighing the benefits versus costs of improvements. The cost estimates presented herein are general in nature and are not detailed engineering cost estimates. The intent is to use these order-of-magnitude cost estimates for an apples-to-apples comparison among corridors – much as was done with the ridership forecasts. Even though some corridors provide connections to points beyond the state border, this evaluation only reflects costs for work in the State of Minnesota.[17] Several of the corridors listed have gone through advanced levels of engineering assessment; those cost estimates should take precedence for evaluating subsequent steps of project development.

As described below, some cost elements have high degrees of uncertainty such as trackage rights on freight rail lines, O&M costs, contingencies, Positive Train Control (PTC) implementation (and also ridership and revenue as discussed elsewhere). For these cost elements, high (referred to as base) and low (referred to as best) cost estimates were developed. Data for individual rail segments and corridors is shown only for the base case. All summary tables show both sets of estimates.

Freight Rail Cost Estimates

Improvement cost estimates were developed using the assumptions and unit costs listed in Table 4.2. While use of unit costs for calculating improvements is the simplest approach, in several cases combinations of improvements were required and lump sum costs are displayed for various projects. Costs are provided for items such as track and signal upgrades, clearance restrictions, 286,000-railcar compliancy, and other categories of improvements. Cost estimates do not include cost for right-of-way.

An alternative methodology was developed for the best case scenario assuming that the wayside and track infrastructure of a CTC system would not be added in conjunction with the installation of a PTC system. This would change the per mile cost to $100,000 for just the PTC architecture. In addition, a 10 percent contingency was applied to the best case scenario, rather than the 30 percent in the base case.

[17] The one exception is the Eau Claire to Twin Cities corridor which is predominantly in Wisconsin. Including only Minnesota costs and benefits would have been meaningless.

Table 4.2 Cost Assumptions for Freight Rail

Cost Item	Cost	Unit	Source
Upgrade Track			
Class I to II	$63,360	Mile	TKDA
Class II to IV	$712,800	Mile	TKDA
Class III to IV	$712,800	Mile	TKDA
New Class IV	$1,709,000	Mile	TKDA
Signalization			
CTC (Single Track)	$550,000	Mile	Northstar
CTC (Double Track	$750,000	Mile	Northstar
PTC	$100,000	Mile	Estimated implementation cost of the Rail Safety Improvement Act (RSIA) of 2008 divided by Class I system mileage from the Bureau of Transportation Statistics (BTS)
Crossings			
Active Warning Device	$200,000	Signal	Mn/DOT
Additional Costs (Applied to Track and Signal)			
Engineering	10%		
Contingencies Base/Best Case	30%/10%		

Passenger Rail Costs Estimates

Improvement cost estimates were developed using the assumptions and unit costs listed in Tables 4.3. Costs are provided for items such as track and signal upgrades, rolling stock, and operating and maintenance costs, and are based on a variety of sources, including recent Northstar[18] and Amtrak information.[19,20,21] Estimates do not include costs that may be associated with stations, nor do they include costs for any major structural modifications to railroad overpasses or underpasses. The following differences were applied to the base and best case scenarios:

[18] Based on recent internal Northstar team communications

[19] Consolidated Financial Statements. National Railroad Passenger Corporation and Subsidiaries (Amtrak). For the Years Ended September 30, 2007 and 2006.

[20] System Mileage within the United States. Bureau of Transportation Statistics. http://www.bts.gov/publications/national_transportation_statistics/html/table_01_01.html. Retrieved 9/22/2009.

[21] U.S. Vehicle Miles. Bureau of Transportation Statistics. http://www.bts.gov/publications/national_transportation_statistics/html/table_01_32.html. Retrieved 9/22/2009.

- Operating and maintenance costs were varied between $70 and $55/mile. The $70 reflects Amtrak's fully allocated overhead costs, excluding depreciation and interest, for providing specific services, while the $55 cost reflects actual Amtrak direct costs, excluding infrastructure maintenance and system costs.
- Capacity rights costs were varied between $85,000/train mile and $40,000. These costs reflect only the cost of securing trackage rights from the private railroad operators of the lines, and not costs of any improvements to the lines. These costs could vary significantly depending on the excess capacity available now and as projected in the future by the freight railroad. Actual costs would have to be negotiated in each case, and represent one of the biggest unknowns in these estimates. Although Amtrak has the legal right to operate on freight tracks, the reality is that this right is exercised through negotiation of fees. The $85,000 estimate reflects the actual negotiated agreement between the Northstar commuter rail project and BNSF beyond the cost of capital projects. However, this BNSF corridor has the heaviest freight demand in the State, and commuter rail service is more intensive than intercity service. Therefore, a lower estimate was developed.

Another unknown is the cost of right-of-way for greenfield line segments. It has been suggested that greenfields in rural areas could be acquired inexpensively. It is likely that all landowners will fight hard for maximum compensation, even to the point of court actions, which regardless of the outcome will significantly increase the time and cost of acquisitions. It is likely that any rail alignments will split individually owned land parcels requiring premium payments. Therefore, a relatively high estimate of this cost has been carried through both scenarios.

Table 4.3 Cost Assumptions for Passenger Rail

Cost Item	Cost	Unit	Source
Rolling Stock			
High-Speed Rail	$23.5 million	Trainset	Talgo/Wisconsin
Conventional Rail	$18 million	Trainset	Northstar
Upgrade Track			
Class I to II	$63,360	Mile	TKDA
Class II to IV	$712,800	Mile	TKDA
Class III to IV	$712,800	Mile	TKDA
Class IV to VI	$79,200	Mile	TKDA
New Class IV/VI	$2,600,000	Mile	TKDA
Signalization			
CTC (Single Track)	$550,000	Mile	Northstar
CTC (Double Track	$750,000	Mile	Northstar
PTC	$100,000	Mile	Estimated implementation cost of the Rail Safety Improvement Act (RSIA) of 2008 divided by Class I system mileage from the Bureau of Transportation Statistics (BTS)
PTC Loco	$30,000	Locomotive	Northstar

Table 4.3 Cost Assumptions for Passenger Rail (continued)

Cost Item	Cost	Unit	Source
Crossings			
Grade Crossing Upgrade	$200,000	Mile	TKDA
Quad Crossing	$400,000	Mile	TKDA
Operations and Maintenance (O&M)			
HSR O&M – Base/Best Case	$70/$55	Annual Train Miles	Amtrak fully allocated expenses divided by train mileage from BTS/Amtrak direct costs divided by train mileage from BTS
Conventional O&M – Base/Best Case	$70/$55	Annual Train Miles	Amtrak fully allocated expenses divided by train mileage from BTS/Amtrak direct costs divided by train mileage from BTS
Right-of-Way (ROW)			
ROW	$910,000	Mile	$50,000/Acre and 150-foot ROW assumed
Capacity Rights			
Capacity Rights – Base/Best Case	$85,000/ $40,000	Daily Train Miles	Northstar/Reduction from Northstar amount to account for congestion on Staples subdivision
Additional Costs (Applied to Track and Signal)			
Engineering	10%		
Contingencies – Base/Best Case	30%/10%		

4.2 Freight-Only Corridor Needs

Freight-only corridors were evaluated with the GIS tool to determine what improvements are needed today or will be needed by 2030 to achieve a freight LOS of C or better on all lines in the State. This section specifically defines and costs improvements identified to mitigate those sections of congested LOS D, E, and F lines as shown previously in Figures 4.2 and 4.3 and improve them to the targeted capacity needed for LOS C. Needs and improvements are organized by freight rail operator, and then by subdivision. The investments are summarized in Table 4.4. Further detail on each subdivision of each railroad is provided in Technical Memorandum 6.

Table 4.4 Summary of Freight-Only Investments

Subdivision	2009	Cost to Upgrade (Millions of Dollars)
Track, Signal, Bridge		
	BNSF	$68.00
	CN	$68.00
	CP	$331.80
	UP	$35.40
Other Major Class I Improvements		
	Bottlenecks *(incl. in passenger line costs)*	–
	Bridges *(incl. in passenger line costs, except for Roberts Street Bridge)*	$51.00
	Intermodal Facilities	$150.00
Weight, Speed and Track Restrictions[a]		
	286k lb Upgrades	$548.00
	Bridge and speed restrictions	$13.00
	FRA Class 1 to 2 Upgrades (less 286k overlap)	$244.00
Positive Train Control		
	Class I Mainlines Base/Best Cases	$1,640.00/$335.00
Grade Crossings		
	Active Warning Devices (1,400)	$280.00
	Cost of Upgrades – Base/Best Cases	$3,173/$1,867
	10% Engineering/10-30% Contingency – Base/Best Cases	$1,269/$373
	Total Cost – Base Case/Best Case	**$4,442/$2,241**[a]

[a] Does not include unknown costs.

4.2.1 Burlington Northern Santa Fe (BNSF)

BNSF lines serve nearly every part of Minnesota, providing vital linkages to important freight hubs such as Chicago and the coal-rich Powder River Basin. Despite this, most BNSF freight-only corridors in the State show comfortable volume-to-capacity ratios through 2030 and do not require much investment. Two corridors – the Browns Valley and P-Line subdivisions – are recommended for investment based on either weight or speed restrictions today. Both of these subdivisions carry few trains and serve primarily grain producers in western parts of Minnesota. Only one freight-only corridor, the St. Croix subdivision, demonstrates a need for investment based on high freight volumes, but not until 2030.

Small portions of three other subdivisions (KO, Marshall, and St. Paul) also are recommended for improvement. Passenger rail service is slated for most of each of these three subdivisions, but small segments are identified as freight-only and will need investment due to volume and capacity

issues. These improvements are summarized in Table 4.5. For each individual corridor, only the base case cost estimates are shown. Best case estimates are shown in the summary tables.

Table 4.5 Summary of BNSF Improvements on Freight-Only Corridors

Subdivision	2009	Cost to Upgrade (Millions of Dollars)	2030	Cost to Upgrade (Millions of Dollars)
Browns Valley	X	$54.6		
KO			X	$0.5
Marshall			X	$6.2
P-Line	X	$1.0		–
St. Croix			X	$1.4
St. Paul			X	$4.2
Cost of BNSF Upgrades				$67.9

4.2.2 Canadian National (CN)

CN's Minnesota network is concentrated primarily in the northeast between Duluth and International Falls, with some segments in the Twin Cities area and near the Iowa border, plus a transcontinental line in the northern part of the State. Of the freight-only corridors, three demonstrate an immediate need for improvement – two in the Duluth region and one east of the Twin Cities. The Rainy subdivision, which connects Duluth to International Falls and Ontario, shows an elevated volume-to-capacity ratio, due primarily to lack of modern signalization. Additionally, both the Dresser and Osage subdivisions have weight restrictions that necessitate investment. Interestingly, none of CN's lines show any need for improvement in 2030 based on volume and capacity projections. This highlights that the immediate need for repair will be able to support traffic through 2030. These improvements are summarized in Table 4.6.

Table 4.6 Summary of CN Improvements on Freight-Only Corridors

Subdivision	2009	Cost to Upgrade (Millions of Dollars)	2030	Cost to Upgrade (Millions of Dollars)
Dresser	X	$13.1		
Osage	X	$20.6		
Rainy	X	$34.0		
Cost of CN Upgrades				$67.7

4.2.3 Canadian Pacific (CP)

CP's rail operations generally run southeast to northwest across the State, with Minnesota acting as a linchpin between CP's major operations on Canada's west coast and its operations in the U.S. Midwest and Montreal. In fact, a CP train could enter the far southeastern tip of the State near Minnesota Slough on the Marquette subdivision, which is owned by a CP affiliated railroad, and exit into Canada at Noyes in the far northwest.

Considering the important role Minnesota plays in CP's operations, it is not surprising that five CP subdivisions demonstrate a need for investment. However, of these recommended improvements, only two are immediate needs, and both are for lightly used lines. We recommend upgrading weight-restricted track and a bridge on the Bemidji subdivision and improving the Class I track on the MN&S subdivision. This last investment may prove more important, as CP could use the MN&S sub to bypass bottlenecks such as University Junction.

The remaining four subdivisions are major CP corridors in the State. While the volume-to-capacity ratios on these subs are acceptable currently, growth is expected to occur on them by 2030, necessitating investment. These improvements are summarized in Table 4.7.

Table 4.7 Summary of CP Improvements on Freight-Only Corridors

Subdivision	2009	Cost to Upgrade (Millions of Dollars)	2030	Cost to Upgrade (Millions of Dollars)
Bemidji	X	$29.6		
Detroit Lakes			X	$84.0
Elbow Lake			X	$38.5
MN&S	X	$24.4		
Noyes			X	$28.2
Paynesville			X	$48.2
DM&E Waseca		$77.5		
ICE Owatonna		$1.4		
Cost of CP Upgrades				$331.8

4.2.4 Union Pacific (UP)

Union Pacific is the nation's largest railroad with connections to every major port on the west and gulf coasts. In Minnesota, UP's service is concentrated in the State's south, with connections to Iowa, Nebraska, Chicago, and points beyond. Four UP subdivisions demonstrate a need for immediate improvement and all four lines are lightly used collection/distribution routes where various restrictions are found. In fact, the Hartland, Montgomery, Rake, and Winona subdivisions share many similarities. All are short in length, ranging from the 1.8-mile Winona sub to the 21-mile Montgomery sub, and all are used as branch lines. These improvements are summarized in Table 4.8.

Table 4.8 Summary of UP Improvements on Freight-Only Corridors

Subdivision	2009	Cost to Upgrade (Millions of Dollars)	2030	Cost to Upgrade (Millions of Dollars)
Hartland	X	$18.7		
Montgomery	X	$10.4		
Rake	X	$4.1		
Winona	X	$2.2		
Cost of UP Upgrades				$35.4

4.2.5 Weight, Speed, and Track Restrictions

In the volume-to-capacity analysis of the State's rail network, none of the non-Class I railroads exhibited elevated volume-to-capacity issues. In most cases, train volumes on these lines are minimal. There are, however, a number of conditions which affect 2009 freight flows, including 286k-lb. compliance, bridge restrictions, track restrictions, and FRA Class 1 track. These needs are listed in Table 4.9. No 2030 restrictions were found on these lines, indicating that these repairs, for a total investment of over $772.1M, will carry these segments' needs through 2030.

Table 4.9 Weight, Speed, and Track Restrictions

Owner	Subdivision	286k	Bridge	Speed	Track Class	Total Cost
BNSF	Browns Valley	X	X			$54.6
CN	Dresser	X	X			$13.1
CN	Osage	X	X			$20.6
CP	Bemidji	X	X		X	$29.6
CP	MN&S Spur				X	$24.4
CP	Owatonna			X		$1.4
CP	Waseca	X	X			$77.5
CTRR		X	X	X	X	$6.7
MDW				X		$5.6
MNN	P-Line			X	X	$61.5
MNN	Warroad	X	X	X	X	$146.6
MNN	Ada			X	X	$21.9
MNNR	Hugo			X	X	$19.0
MNNR	St. Paul-Fridley			X	X	$18.1
MPLI	Redwood Falls	X	X	X	X	$110.3
MSWY	LaVerne	X	X	X	X	$56.4
NLR	Cold Spring		X	X	X	$24.0

Table 4.9 Weight, Speed, and Track Restrictions (continued)

Owner	Subdivision	286k	Bridge	Speed	Track Class	Total Cost
NLR	East Side			X	X	$2.7
NLR	St. Joe			X	X	$7.0
OTVR	Barnsville		X			Unknown
PGR	Cannon Falls			X	X	$12.3
PGR	Dan Patch		X	X	X	$12.8
PGR	Eagandale		X	X	X	$12.3
PGR	Faribault			X	X	$2.5
PGR	Jesse James			X	X	$28.9
SCXY	Amber		X			$0.6
UP	Hartland	X	X		X	$18.7
UP	Montgomery	X	X			$10.4
UP	Rake	X	X			$4.1
UP	Winona				X	$2.2
					Total Cost	$805.7

[a] Does not include costs for "unknown" improvements.

The American Short Line and Regional Railroad Association (ASLRRA) released a report in 2000 that identified $6.9 billion in costs (1999 dollars) to upgrade the track of America's short line and regional railroads to accommodate the current standard weight of 286,000 pounds. This estimate was updated as part of the AAR *National Rail Freight Infrastructure Capacity and Investment Study*[22] that derived a new value for upgrading short line and regional railroad track to accommodate 286,000-pound loads of $7.2 billion (in 2007 dollars).

In Minnesota there are 453 miles of railroads that currently are non-286,000-pound-complaint. Most noncompliant lines are restricted from carrying any heavy railcar in excess of 263,000 pounds. Based on this study's assessment, the cost to upgrade these noncompliant lines to carry 286,000-pound railcars is nearly $550 million, roughly eight percent of the national total.

4.2.6 Other Major Capacity Improvements

Table 4.10 highlights other major capacity project needs and the cost to alleviate these present day bottlenecks. Following the table is a brief description of each of these bottlenecks. While these projects are each on the freight system today, many of these upgrades only become critical as passenger service is introduced on the line. Section 4.3 discusses specific passenger corridors that require these major capacity improvements.

[22] National Rail Freight Infrastructure and Investment Capacity Study, Association of American Railroads, 2007.

Not included in these identified structural improvements is the issue and potential costs associated with limited capacity in downtown Minneapolis on the BNSF Wayzata sub, specifically at the site of Target Stadium and the new Northstar commuter rail station, also known officially as the "Minneapolis Interchange." The constricted right-of-way at the Stadium site currently allows one through freight track, utilized by BNSF and TC&W for significant volumes of through train movements, and two passenger tracks on either side of a center platform. All of the track, approaches, signals, and overpasses have just been upgraded to accommodate Northstar. The Plan assumes freight traffic will continue to grow, and there is currently no easily accessed alternative for rerouting freight in this corridor. Adding to capacity needs is a projected large increase in intercity and commuter trains calling at this site. There will be a need for major expansion of the passenger rail terminal and associated passenger train storage and servicing facilities in the area. An independent station study is currently being conducted to determine expansion needs at this site.

Table 4.10 Other Major Capacity Improvements

Project	Cost to Upgrade (Millions of Dollars)
Junctions	
Coon Creek Junction/Third Main	$100
Dan Patch Interchange (Savage)	$10
Hoffman Interlocking	$54
Minneapolis Junction	$33
Moorhead Junction	$5
Shakopee Realignment	$163
St. Anthony Junction	$29
St. Louis Park Interchange	$70
University Interlocking	$14
Bridges	
BNSF Bridge 28.3	$4
BNSF Bridge 30.2	$6
BNSF Bridge 62.4	$13
BNSF Bridge 91.8	$2
Grassy Point Swing Bridge (BNSF) over Saint Louis River	$51
Hastings (CP) over Mississippi River	$90
Hudson (UP) over St. Croix River	$87
La Crescent Bridge (CP)	$117
Mendota Heights (UP) (Omaha Road Bridge Number 15) over Mississippi River	$44
Pigs Eye Bridge (UP) over Mississippi River	$76
Robert Street Vertical Lift Bridge (UP) over Mississippi River	$51
Savage Bridge over Minnesota River	$34
Intermodal Facility – New Twin Cities Area Facility	$150
Total Cost	**$1,203**

Junctions

Coon Creek Junction/BNSF Third Main. Coon Creek junction is the location on the Staples subdivision where the Hinckley subdivision begins and heads north toward Duluth. Besides the need to improve speed and capacity at this junction, this bottleneck extends south approximately seven miles to International Junction, where BNSF and CP transcontinental routes from Chicago to the Pacific Northwest cross. This track segment and the junction sits astride BNSF's busiest freight route and is also used by CP and UP to serve Duluth and Superior. It is the route for Northstar Commuter Rail and the Empire Builder. The NLX high-speed passenger service to Duluth would utilize this track and junction to enter the Hinckley subdivision and access the proposed "raceway" of double track between Coon Creek Junction and Sandstone. It also is the site of a proposed north suburban station at Foley Boulevard, site of freeway access and the Twin Cities' largest Park-and-Ride facility. This site would be consistent with FRA guidance for key suburban stops for intercity service to enhance urban service coverage and convenience for riders, similar to proposals for Rosemount or Hastings in the southeast. The possibility of an additional third mainline track from Coon Creek junction to International Junction would significantly improve the capacity of this location.

Dan Patch Interchange (Savage). In order to provide passenger service from Mankato to Minneapolis a connecting piece between the Mankato subdivision and the Dan Patch line would need to be built. The two railroads are grade separated so a significant amount of track would need to be built in order to accommodate a small grade. Several rail-dependent bulk terminals currently abut or occupy the right-of-way that would need to be acquired.

Hoffman Interlocking. Hoffman Junction is one of the current major bottlenecks in the State of Minnesota. Three of the four Class I railroads operating in Minnesota have facilities that interchange in this area. The UP movement crosses the CP and BNSF main lines to access the Pigs Eye area. This movement limits capacity for all three rail carriers. The identified improvement will provide for grade separation between the UP movement and the CP and BNSF mainlines and thus increase capacity through the junction. Ramsey County Regional Rail Authority has commissioned a study to positively identify the demands, alignments, and investments that will be needed in this area, in cooperation with the railroads, passenger projects, Mn/DOT, and the Metropolitan Council.

Minneapolis Junction. Minneapolis Junction is one of the major emerging bottlenecks in the State of Minnesota. The potential capacity of the junction could be increased with the addition of a second main around the west leg of the wye. This improvement would not satisfy the lack of speed through the west leg of the wye. The curve currently is a seven degree curve therefore restricting the speed of passenger trains to 25 mph. A true fix to the current bottleneck would include property acquisition and the easing of the curve around the west leg of the wye. There are many businesses within the affected area that would need to be purchased and leveled to accommodate the new alignment. Several bridges, particularly the Hennepin Avenue overpass, would need to be reconstructed as well to implement this easing of curvature.

Moorhead Junction. Larger turnouts are needed to increase speed.

City of Shakopee Track Realignment. To increase the speed through the city of Shakopee a bypass may need to be constructed for the Union Pacific's Mankato subdivision. The rerouting could provide 10 miles of track around the downtown area of Shakopee, bypassing an area of what is essentially 10 mph street running on City-owned right-of-way.

St. Anthony Junction. The CP alternative to connect commuter and intercity rail from St. Paul to Minneapolis requires traveling through the Minnesota Commercial Railroad's A yard before joining the BNSF mainline leading to Minnesota Junction. An option to increase speed through the A yard would be to relocate some of the track. This would minimize existing curvature and increase speeds. A multiple-track, high-speed interlocking would also need to be installed.

St. Louis Park Interchange. A study is currently underway to determine the future for the St. Louis Park Interchange. Based on Hennepin County's desire to utilize the Kenilworth corridor east of the interchange for other transportation alternatives, improving the interchange between TC&W and the CP is the preferred route modification. Although the improvement faces major geometric challenges of grade and curvature, a successful project would provide TC&W and CP with expanded route options between the southwest metro area and Class I yards and interchanges.

County-commissioned engineering estimates suggest a cost of $48 million for improvements, and within a variety of assumptions on potential grades, curvatures, and line displacements, final costs are expected to fall in the $40 to $70 million range. More advanced work on engineering, mitigation, and possible agreements with CP and TC&W are scheduled for 2010.

University Interlocking. University interlocking is a station location on the BNSF. The speeds though this junction are adequate for the BNSF but the CP has slow speeds as it leaves the BNSF and begins the Paynesville subdivision. To avoid congestion on the BNSF line a track could potentially be built to the east for the CP to exit the BNSF at higher speeds. In order for the CP to continue at higher speeds on the Paynesville subdivision there would need to be either easing of the curve leading to the bridge or construction of a new bridge for CP over BNSF that is not as perpendicular to the BNSF as the current bridge.

Bridges

The following cost estimates do not include demolition of the current bridges and assume that the new bridges would be constructed at least 25 feet from the existing structures. Approach construction, engineering, and contingencies are not included in the cost. Parts of bridges on either side of the spans described below are assumed to be constructed using plate girder spans.

BNSF Bridges on Hinckley Subdivision. Four single track bridges on the BNSF's Hinckley subdivision. The cost to replace all four bridges on the Hinckley subdivision would be $25 million.

Grassy Point Bridge. The Grassy Point Bridge crosses the St. Louis River on the BNSF's line between Superior, Wisconsin and Duluth, Minnesota. The current bridge is a steel through

truss center pivot swing span. A proposed replacement bridge would be a 240-foot-long single track vertical lift span. The estimated cost of the bridge is $51 million. A relocated channel crossing between Superior and Rice's Point (Duluth CP and BNSF yards) could also potentially improve HSR travel times into Duluth and open up Duluthport to through intermodal container services.

Hastings Bridge. The Hastings Bridge crosses the Mississippi River on the Canadian Pacific's River Subdivision. The current bridge is a through truss vertical lift span. A proposed replacement bridge would be a 324-foot-long double track vertical lift span. The estimated cost of the bridge is $90 million.

Hudson Bridge. The Hudson Bridge crosses the St. Croix River on the Union Pacific's Altoona Subdivision. The current bridge is a steel through truss center pivot swing span. A proposed replacement bridge would be a 160-foot-long single track vertical lift span. The estimated cost of the bridge is $87 million.

La Crescent Bridge. The La Crescent Bridge consists of four different bridges that cross the Mississippi River, the east channel of the Mississippi, the Black River, and the French slough. The bridges are located on the Canadian Pacific's Tomah Subdivision. The types of current bridges listed above are respectively a steel through truss center pivot swing span, a steel deck plate girder, a steel through truss draw span, and a steel deck plate girder. The proposed replacement will be a fixed span, perhaps on a different alignment. The estimated cost for all of the bridges is $117 million.

Mendota Heights Bridge. The Mendota Heights Bridge crosses the Mississippi river on the Union Pacific's Mankato Subdivision. The current bridge is a steel through truss swing span. A proposed replacement bridge would be a 200-foot-long single track vertical lift span. The estimated cost of the bridge is $44 million.

Pigs Eye Bridge. The Pigs Eye Bridge crosses the Mississippi River on the Union Pacific's Albert Lea Subdivision. The current bridge is a steel through truss center pivot swing span. A proposed replacement bridge would be a 240-foot-long single track vertical lift span. The estimated cost of the bridge is $76 million.

Robert Street Bridge. The Roberts Street Bridge crosses the Mississippi river on the Union Pacific's State Street Industrial Lead. The current bridge is a through truss vertical lift span. A proposed replacement bridge would be a 200-foot-long single track vertical lift span. The estimated cost of the bridge is $51 million.

Savage Bridge. The bridge in Savage, Minnesota crosses the Minnesota River on the MN&S line. The current bridge is a steel through truss center pivot swing span. A proposed replacement bridge would be a single track 160-foot-long through truss vertical lift span. The estimated cost of the bridge is $34 million.

Intermodal Services

In its present form, rail intermodal (the haulage of containers and trailers) services available in Minnesota are limited geographically and capacity-wise. Existing terminals are all located in the Twin Cities, and the only direct services available connect to Chicago and the Pacific Northwest. Efforts to provide service in other parts of the State have not been successful, with a public terminal opening and closing in the western part of the State at Dilworth. Elsewhere, a private intermodal operation at Montevideo has handled grain products on a seasonal basis.

The stakeholder conversations revealed a strong desire for additional terminal capacity in the Twin Cities, as well as access to intermodal service in other parts of the State.

The stakeholder conversations revealed a strong desire for additional terminal capacity in the Twin Cities, as well as access to intermodal service in other parts of the State. From the Twin Cities, service to regions other than Chicago and the Pacific Northwest is either unavailable or circuitous, which has made intermodal a relevant and economical choice for only a small subset of shippers. While terminal capacity is adequate for the markets that currently are being served, it would be difficult to add service to new markets. Providing new terminal capacity has been a difficult issue, as was evident during an ultimately unsuccessful effort in the 1990s by Mn/DOT to locate a new terminal in the Twin Cities. With large volumes of truck traffic, terminals are not attractive neighbors, and drayage costs make their geographic location sensitive to shippers, at least for domestic traffic. Thus, the existing central locations of the BNSF in St. Paul and CP in Shoreham will be hard to beat.

Offering intermodal service beyond the Twin Cities in locations such as Duluth or western Minnesota would be beneficial given the size of the State. However, intermodal service is heavily density driven, and, given that direct access is only provided to a few major markets, there must be sufficient demand in those lanes to justify daily service. For a terminal served by a Class I railroad, the minimum threshold is around 25,000 units, while for a short line 10,000 and sometimes fewer units are sufficient. Smaller volumes are usually insufficient to justify a daily frequency that represents the minimum threshold for quality service that is attractive to a range of shippers. For specialty purposes, such as containerized grain for export, less frequent or even seasonal service may meet the need, but it must be understood that the clientele for such a service will be quite limited.

A major influence on the competitiveness of a terminal is the availability of equipment for shippers in smaller, lower density markets. For export moves, empty containers are generally concentrated in major markets such as Chicago. Thus, if a western Minnesota shipper requests equipment for a West Coast export move, most likely an empty box must be relocated 700 miles from Chicago to the point of loading. The cost of this move can be substantial, and can result in the intermodal shipping cost exceeding an equivalent all-truck move. Adding to that are volatile equipment management strategies that can quickly change the economics of using

intermodal from attractive to unattractive. This was the case at the Dilworth terminal, as well as the seasonal operation out of Montevideo.

Public involvement raises tricky competitive issues for railroads, who strongly prefer to control their own terminals. In the Twin Cities, this issue is most clearly manifested by the lack of service along the I-35 corridor between Minnesota, Iowa, Kansas, Texas, and Mexico. Although volumes are sufficient to support competitive service in this corridor, it does not exist largely because UP – the carrier that has the most direct route paralleling I-35 – does not have a suitable site for an intermodal terminal in the Twin Cities.

In spite of these impediments, expansion of intermodal service is important enough that a collaborative effort among the stakeholders should be initiated to ensure expanded intermodal service options in Minnesota.

4.2.7 Positive Train Control

Positive Train Control (PTC) refers to technology that is capable of preventing train-to-train collisions, overspeed derailments, and casualties or injuries to roadway workers (e.g., maintenance-of-way workers, bridge workers, and signal maintainers), operating within their limits of authority, as a result of unauthorized incursion by a train. The technology combines GPS locating of all trains, infrastructure switches, crossings, and junctions; computer cataloging of speed restrictions and traffic conditions; and wireless communications between all operating units including engineers, dispatchers, and work crews. Prior to October 2008, PTC systems were being voluntarily installed by various carriers. However, the Rail Safety Improvement Act of 2008 (RSIA) (signed by the President on October 16, 2008, as Public Law 110-432) mandated the widespread installation of PTC systems by December 2015 on all lines handling passenger trains or hazardous materials, essentially the majority of the entire national rail system.[23]

For the purpose of the base case it was assumed that all Class I railroads in Minnesota would be required to comply with this ruling. Calculating the cost for this systemwide upgrade involved two steps: first, identifying those signals on the Class I system that needed to be upgraded to Centralized Traffic Control (CTC), essentially a comprehensive hard-wired conventional signal system; and second, calculating the cost of installing PTC along the entire Class I network. This cost was estimated to be approximately $1.64 billion. It should be noted that there are a number of passenger rail projects being pursued in the state and cost sharing for the installation of this technology is likely between the freight railroads and passenger service implementers. It also is likely that the strategy for implementation of this mandate will undergo further discussion and revision in the coming years.

[23] Federal Railroad Administration, www.fra.dot.gov.

While some short lines also may need to equip locomotives with PTC so as to interface with the Class I's, this cost has not been included.

If it is possible for the freight railroads to move directly to PTC rather than implementing CTC first, then the total cost could be reduced to $335 million.

4.2.8 Freight Rail Relocation

Freight rail tracks and associated infrastructure represent significant capital investments at fixed locations. Nonetheless, there are circumstances under which the relocation of freight rail lines may be warranted. Similarly, freight rail traffic itself can be deployed differently across the network. States, cities, and the railroads themselves have pursued changes in the freight rail network and freight rail operations in order to accomplish a variety of objectives. These include:

- Rationalizing network operations to reduce freight rail operating costs and improve service reliability, particularly through enhanced speed, capacity, connectivity, and flexibility;
- Freeing up rail line capacity so as to accommodate passenger rail operations;
- Mitigating the impacts of rail operations in communities, including noise, vibration, and aesthetics;
- Minimizing risk exposure of hazmat freight rail operations; and
- Providing service to freight facilities such as new intermodal (container) terminals or improving access to water ports.

The relocation of freight rail lines or operations can ease rail bottlenecks, reduce vehicle traffic delays at grade crossings, improve safety, and spur economic development opportunities. At the same time, when rail service is introduced to newly served areas or significantly increased along existing lines, there is potential for realizing negative impacts on those communities, including land use, safety, and environmental concerns. These impacts may require mitigation, such as noise walls, grade separations, and other strategies.

Substantial freight rail relocation projects, such as a rail bypass, a new line or significant increases in train volumes, require the review and approval of the Federal Surface Transportation Board (STB). Such projects may be initiated either by private entities (such as a railroad) or a public agency. Typically the STB requires extensive environmental documentation and assessment to be completed for major projects. In addition, other state and Federal environmental requirements apply to such projects, particularly when public funding is involved.

In Minnesota, the issue of freight rail relocation will become increasingly important as the passenger rail network develops and as communities grow. Currently, there are several relocation projects in the State that are under consideration.

In Rochester, the Southern Rail Corridor coalition, including the Olmsted County Regional Rail Authority, the City of Rochester, and the Mayo Clinic have proposed a 48-mile freight rail bypass south of Rochester to replace downtown freight rail service operated by the Canadian Pacific (CP/DM&E). The coalition has identified far-reaching benefits that would result, including improved community safety, enhanced economic development, improved freight rail service, and better integration with passenger rail service. At the same time, the Citizens Against Rochester's Bypass (CARB) actively opposes the proposal, citing far-reaching negative impacts, including environmental concerns, loss of productive farmland, impacts on landowners, safety concerns, and lack of need for the relocation. The Dodge County Regional Rail Authority, through which a portion of the rail bypass would pass, has approved a resolution opposing the proposal for many of the same reasons. The CP/DM&E railroad has expressed neither support nor opposition to the proposal, and has recently completed a rehabilitation of track work through downtown Rochester.

In Hennepin County, the Twin Cities and Western Railroad (TC&W) currently operates freight rail service along the Kenilworth Corridor through the City of St. Louis Park and the City of Minneapolis providing a connection into downtown Minneapolis. Hennepin County owns the rail line. Kenilworth was originally intended to "temporarily" accommodate freight rail traffic that originally crossed the TH55/Hiawatha LRT corridor at-grade. However, freight rail service has operated over 10 years on Kenilworth, which has required County investment for infra-structure improvements. The County and its municipal partners are exploring future alternative routings to select a long-term solution for freight rail service. A bike/pedestrian trail also operates in the Kenilworth Corridor, and the corridor also is under consideration as a segment of the preliminary locally preferred alternative for the Southwest LRT Transitway.

Both the Rochester Southern Rail Corridor and Hennepin County Kenilworth freight rail relocation examples suggest the need for full consideration of:

- A public and transparent planning process that allows all affected stakeholders to fairly represent their interests;
- State, regional, and local comprehensive, transportation, and land use plans, including those for passenger rail development;
- The impacts, costs, and benefits of proposed relocation projects, including the "no-build" alternative;
- Equitable sharing of costs and benefits for the project amongst governmental units, the railroad, and other stakeholders as warranted;
- The need to preserve and enhance freight rail service and to provide adequate capacity to meet current and future demand; and
- The need to preserve and enhance communities through which freight rail lines pass by means of effective mitigation and design strategies.

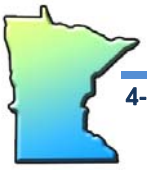
It is recommended that both the Southern Rail Corridor and Kenilworth projects should proceed through further study development and evaluation, led by locally responsible public agencies. The State of Minnesota should cooperate in these efforts, providing technical resources, potential access to Federal funds, and to assess consistency of the proposals with the State Rail Plan. The consequences of pursuing and also not pursuing these projects should be fully understood prior to decision-making about funding and implementation. Environmental clearances would be required from all regulatory agencies.

4.2.9 Railroads and Hazardous Materials

Following a rash of severe releases of hazardous materials in the 1970s, the individual railroads, together with the Association of American Railroads, the U.S. Department of Transportation, and the chemical industry, have been actively engaged to improve the safe transport of hazardous materials by rail. Substantial progress has been made in the design of and materials used in tank cars, reporting, custody, education, communications, and safe handling. The railroads and car builders have responded with better steels and coatings, higher build quality, repositioned vents and valves, shelf couplers, and puncture shielding that have made the tank car much more able to survive an accident without spillage. Concurrently, the rail infrastructure has improved materially, reducing the incidents of equipment failures and derailments to the lowest levels in history. The net result has been that injuries and fatalities related to rail transportation of hazardous materials to be just one-eighth of those related to truck transportation for the same year, with comparable miles and tons moved.

Only a few cars releasing TIH – approximately 20 – resulted in 15 deaths, over 400 injuries, thousands of evacuees from dozens of square miles of commercial and residential neighborhoods, and tens of millions of dollars in damages.

In spite of the excellent safety record, the most dangerous of these commodities, Toxic Inhalation Hazards (TIH), have caused increasing concerns among the railroads and governments in recent years. Although a very small part of the rail traffic mix (with 5,000 carloads on Minnesota's railroads in 2007, of which 240 were handled by short lines), the security and operational risks associated with handling TIH have been viewed as increasingly difficult and insufficiently compensatory for the risks incurred. Since 2001, there have been several high-profile incidents involving TIH releases from pressure tank cars. Only a few cars releasing TIH – approximately 20 – resulted in 15 deaths, over 400 injuries, thousands of evacuees from dozens of square miles of commercial and residential neighborhoods, and tens of millions of dollars in damages.



Although all of these incidents were determined to be industrial accidents, the risks associated with the handling of these commodities were brought into stark relief. As a result, the industry has become increasingly reluctant to handle TIH, and has embarked on efforts to not only increase the safety of their transport, but also to greatly reduce the volumes that are being handled. Since 2005, new initiatives have been aimed at further car improvements, facility and track upgrades, and other safety improvements. Presently, new hazardous materials routing standards, tied to systematic risk assessments by the railroads and shippers are being designed and are scheduled for implementation in 2010.

Because of the nature of interstate commerce, the constitutional responsibility of the Federal government, and the large distances and volumes transported in bulk via rail, Federal authorities have overseen the regulation and control of the transport of these materials. Both the economic costs and public exposure aspects suggest that rail transport of these often essential materials should remain as the preferred method of transport where applicable. The State of Minnesota relies on the Federal Railroad Administration Hazardous Materials Inspector for inspections of facilities and methodologies involving the movement and storage of hazardous materials. In addition, the State also utilizes the services of the State Motor Carrier Hazardous Material Inspector, in the event of a complaint or a significant release of hazardous materials.

The Federal program provides a dedicated Hazardous Material Inspector for the State of Minnesota and portions of Wisconsin. The Federal inspector is expected to enforce all Federal regulations regarding the movement of hazardous materials by rail. Inspections are conducted at railroads, intermodal facilities, freight forwarders/agents, chemical shippers, and tank car manufacturers and repair facilities. Inspectors also review methods of construction and testing of specification containers used for the transport of hazardous materials. Finally, inspectors review and observe procedures used by those who offer hazardous materials for transportation by rail and a review of rail carrier documentation and procedures for loading, unloading, switching, and transportation of rail cars containing hazardous materials.

The Federal Inspector also participates in investigations of hazardous material spills that result in evacuations or casualties resulting from a release. Federal Inspectors have the authority to issue citations when violations of Federal regulations are discovered during inspections. The FRA also cooperates with the railroads and local Emergency Response agencies in ongoing education as to characteristics of materials and threats, response methods, and interorganizational coordination.

4.3 Shared Freight and Passenger Rail Corridors

Shared freight and passenger rail corridors were evaluated with the GIS-tool to determine what improvements are needed today and will be needed in 2030 to achieve a freight LOS C or better. The corridors were then evaluated to determine what additional improvements would be needed when proposed passenger rail service is added to the line to maintain a LOS C or better. This section discusses specific improvements identified to mitigate sections of LOS D, E, and F.

Needs and improvements are organized by major corridor city pair. Further detail broken down by freight subdivision is provided in Technical Memorandum 6.

In several cases city pair segments overlap each other, and on any given corridor two or three different passenger services may be provided. The "2030 Passenger Service Needs" provided in tables within the city pair discussion include the cost for track and signal improvements, and other essential costs like rolling stock, capacity rights, etc., for that segment only. Table 4.11 provides a summary of each service which was analyzed and the passenger service levels assumed.

Table 4.11 2030 Shared Freight and Passenger Rail Corridors Reviewed

City Pair/Description	Corresponding Minnesota Subdivisions	Freight Rail Operator	Type of Service Reviewed	Train Pairs/Day
Twin Cities to Cambridge				
Northstar – Cambridge Ext.	Wayzata, Midway, Staples, Hinckley	BNSF	79 mph	4
Twin Cities to St. Cloud				
Northstar – Expanded to St. Cloud	Wayzata, Midway, Staples	BNSF	79 mph	8
Twin Cities to Fargo/Moorhead				
Expanded Empire Builder	Wayzata, Midway, Staples, KO, Prosper	BNSF	79 mph	2
Twin Cities to Willmar/Sioux Falls, South Dakota				
Little Crow	Marshall, Morris, Wayzata	BNSF	79 mph	4
Twin Cities Connection (as part of MWRRI)				
Minneapolis – St. Paul (BNSF)	St. Paul, Merriam Park, Midway, Wayzata	BNSF	79 mph	4
Minneapolis – St. Paul (CP)	Merriam Park, Midway, Minn. Comm., Wayzata	CP, BNSF MNNR	79 mph	4
Twin Cities to Albert Lea (Kansas City, Missouri)				
	MN&S, Savage, Merr. Park, Albert Lea	CP, UP, PGR	79 mph	4
Twin Cities to Mankato (Sioux City, Iowa)				
Minnesota Valley Line	MN&S, Wayzata, Mankato	BNSF, UP	79 mph	4
Twin Cities to Eau Claire, Wisconsin				
	Merriam Park, St. Paul, Altoona	UP, CP, BNSF	79 mph	4
Twin Cities to Chicago(via MWRRI River Route) – HSR				
MWRRI	Merriam Park, River, Tomah	CP	110 mph	8
Twin Cities to Duluth – HSR				
Northern Lights Express	Midway, Staples, Hinckley	BNSF	110 mph	8
Twin Cities to Rochester – HSR				
Rochester Rail Link			110 mph	8
Twin Cities to Chicago (via Rochester) – HSR				
			110 mph	8

4.3.1 BNSF: Twin Cities to Cambridge

Needs in this corridor include freight needs and standard (79 mph) passenger service needs for Northstar's Cambridge Extension. This city pair also is designated for HSR (110 mph) passenger service to Duluth as part of the Northern Lights Express (NLX) project. This corridor has been divided into segments from Minneapolis to Coon Rapids and Coon Rapids to Cambridge. Investment needs for passenger service on the Cambridge to Duluth pair are only addressed in the HSR alternative and can be found in Section 4.4.2; however, freight needs are identified for the entire corridor. Table 4.12 summarizes corridor freight and passenger needs by year.

Table 4.12 Summary of Twin Cities to Cambridge Improvements

	Year	Need	Cost to Upgrade (Millions of Dollars)
Needs for Freight			
Staples Subdivision	2009	Additional passing sidings totaling 3.57 miles	$6.1
Midway Subdivision	2030	Additional passing sidings totaling 0.624 miles	$1.1
Staples Subdivision	2030	Adding third main track, a total of 6.08 miles of additional track	$10.3
Hinckley Subdivision	2030	Additional passing sidings totaling 23.54 miles	$10.7
		University Interlocking	$14.0
		Minneapolis Junction	$33.0
		Coon Creek Junction	$100.0
		10% Engineering	$17.5
		30% Contingency	$52.5
		Total Freight Needs	**$245.2**
2030 Passenger Service Needs – Twin Cities to Cambridge, only [a]			
Staples Subdivision		5.4 miles new track	$19.4
		Upgrade 14 miles of track from FRA 3 to FRA 4	$28.0
Hinckley Subdivision		29.9 miles, install CTC signals	$23.0
Midway Subdivision		0.56 miles new track	$2.0
Other Costs		Rolling Stock (four train sets)	$72.0
		Positive Train Control (four train sets)	$4.6
		Grade Crossing Improvements	$1.2
		Capacity Rights – Minneapolis to Cambridge[b]	$29.9
		Operations and Maintenance Costs[c]	$7.4

[a] Passenger service need estimates include engineering and contingency costs.

[b] Negotiated on a case by case basis.

[c] Cost is post implementation.

4.3.2 BNSF: Twin Cities to St. Cloud

This section represents expanded Northstar service to St. Cloud with eight train sets per day. This corridor overlaps the proposed Northstar Cambridge Extension as well as Amtrak's Empire Builder. Segments on this line include Minneapolis to Coon Rapids, Coon Rapids to Big Lake, and Big Lake to St. Cloud. Improvements are summarized in Table 4.13.

Table 4.13 Summary of Twin Cities to St. Cloud Improvements

	Year	Need	Cost to Upgrade (Millions of Dollars)
Needs for Freight			
Staples Subdivision	2009	Additional track and passing sidings totaling 4.2 miles	$7.3
Midway Subdivision	2030	Additional passing sidings totaling 0.624 miles	$1.1
Staples Subdivision	2030	Additional track totaling 37 miles, including a full third main track between University and Coon Creek junctions	$62.8
		University Interlocking	$14.0
		Minneapolis Junction	$33.0
		Coon Creek Junction	$100.0
		10% Engineering	$21.8
		30% Contingency	$65.4
		Total Freight Needs	**$305.4**
2030 Passenger Service Needs[a]			
Staples Subdivision		24 miles new track	$86.6
		Upgrade 14 miles of track from FRA 3 to FRA 4	$28.0
Midway Subdivision		0.4 miles of new track	$1.4
Other Costs		Rolling Stock (eight train sets)	$144.0
		Positive Train Control (eight train sets)	$7.4
		Grade Crossing Improvements	$3.5
		Capacity Rights – Minneapolis to St. Cloud[b]	$91.1
		Operations and Maintenance Costs[c]	$22.5

[a] Passenger service need estimates include engineering and contingency costs.

[b] Negotiated on a case by case basis.

[c] Cost is post implementation.

4.3.3 BNSF: Twin Cities to Fargo/Moorhead

Needs in this corridor include freight needs and standard (79 mph) passenger service needs for expanded Amtrak service on the Empire Builder. This corridor overlaps the existing Northstar service to Big Lake as well as the proposed Northstar Cambridge Extension. Segments on this line include Minneapolis to Coon Rapids (also discussed in Section 4.2.1), Coon Rapids to Big Lake, Big Lake to St. Cloud, and St. Cloud to Fargo/Moorhead. Improvements are summarized in Table 4.14.

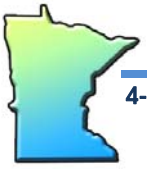


Table 4.14 Summary of Twin Cities to Fargo/Moorhead Improvements

	Year	Need	Cost to Upgrade (Millions of Dollars)
Needs for Freight			
Staples Subdivision	2009	Additional track and passing sidings totaling 25.46 miles, including full double main build-out between St. Cloud and Little Falls	$43.3
Staples Subdivision	2009	Installation of CTC signaling on a 32-mile segment from St. Cloud to Little Falls	$24.6
KO Subdivision	2009	Additional passing sidings totaling 1.16 miles beyond the existing double main track	$2.0
KO Subdivision	2009	Installation of CTC signaling on entire 5.5-mile line	$4.1
Midway Subdivision	2030	Additional passing sidings totaling 0.624 miles	$1.1
Staples Subdivision	2030	Additional track totaling 80.25 miles, including a full third main track between University and Coon Creek junctions	$136.4
Staples Subdivision	2030	Installation of CTC signaling on a 45.19-mile segment from Bluffton to Detroit Lakes	$33.9
KO Subdivision	2030	Additional passing sidings totaling 1.25 miles	$2.1
		University Interlocking	$14.0
		Minneapolis Junction	$33.0
		Coon Creek Junction	$100.0
		Moorhead Junction	$5.0
		10% Engineering	$40.0
		30% Contingency	$119.9
		Total Freight Needs	**$559.4**
2030 Passenger Service Needs[a]			
Staples Subdivision		5.9 miles new track	$21.2
		Upgrade 14 miles of track from FRA 3 to FRA 4	$28.0
KO Subdivision		0.22 miles of new track	$0.8
Prosper Subdivision		0.53 miles, upgrade ABS to CTC signals	$0.6
Other Costs		Rolling Stock (one train set)	$18.0
		Positive Train Control (one train set)	$24.3
		Grade Crossing Improvements	$3.6
		Capacity Rights – Minneapolis to Fargo/Moorhead[b]	$41.1
		Operations and Maintenance Cost[c]	$10.2

[a] Passenger service need estimates include engineering and contingency costs. It is possible that from Coon Rapids to St. Cloud rolling stock could be shared with Twin Cities to Duluth.

[b] Negotiated on a case by case basis.

[c] Cost is post implementation.

4.3.4 BNSF: Twin Cities to Sioux Falls, South Dakota

Needs in this corridor include freight needs and standard (79 mph) passenger service needs to accommodate four train set per day via the proposed Little Crow route. The corridor includes the segments from Minneapolis to Willmar and Willmar to Sioux Falls, South Dakota. For the purpose of this analysis, costs are only provided for the Twin Cities south to the state line only for operations within the State of Minnesota. Improvements are summarized in Table 4.15.

Table 4.15 Summary of Twin Cities to Sioux Falls, South Dakota Improvements

	Year	Need	Cost to Upgrade (Millions of Dollars)
Needs for Freight			
Marshall Subdivision	2009	Installation of CTC on 122.6 miles from Willmar to South Dakota border	$67.4
		10% Engineering	$6.7
		30% Contingency	$20.2
		Total Freight Needs	**$94.3**
2030 Passenger Service Needs[a]			
Marshall Subdivision		Upgrade 91 miles of track from FRA 3 to FRA 4	$91
Other Costs		Rolling Stock (four train sets)	$72.0
		Positive Train Control (four train sets)	$23.9
		Capacity Rights – Minneapolis to State Line[b]	$161.2
		Operations and Maintenance Costs[c]	$39.8

[a] Passenger service need estimates include engineering and contingency costs.

[b] Negotiated on a case by case basis.

[c] Cost is post implementation.

4.3.5 Twin Cities Connection: Minneapolis and St. Paul

Needs in this corridor include freight needs and standard (79 mph) passenger service needs for expanded Amtrak service on the Empire Builder to four trains per day. This connection also is being studied to provide both Minneapolis and St. Paul with intercity rail stations connecting a future Amtrak and HSR station at Union Depot in St. Paul to a downtown Minneapolis station for commuter rail and potential intercity rail services, including HSR. From a system stand-point, this connection between western and northern corridors, and eastern corridors is an absolute necessity to provide system efficiencies and advantages gained from run-through routing, rider convenience, and time advantages to final destinations (platform-to-platform times are projected to be 20 minutes between the downtowns' CBD's). Direct service and station stops within separated and distinct CBDs is also recommended in the FRA "Corridor Transportation Plan: A Guidance Manual" (2005), as are limited but key suburban stops.

Currently, Amtrak provides Empire Builder service to the Twin Cities (via CP, with portions of BNSF and Minnesota Commercial Railroad) with a stop at the Midway Amtrak station in between the two downtowns.

While the CP line is the current Empire Builder route, operating with once daily service between Chicago and Seattle, either the CP or BNSF routes between the Twin Cities could serve larger purposes in the future. Red Rock commuter rail service has been studied along both the BNSF and CP alignments as part of the feasibility analysis conducted for the Red Rock Corridor Commission.[24] Coordination with existing freight rail and the associated cost for track and signal improvements have been two challenges to implementation. One of the potential draw-backs of the BNSF route is the need to "back-out" of the St. Paul Union Depot for trains coming from the south and east and wanting to go north and west. Previously, these lines have been studied as Central Corridor commuter rail alignments, but environmental documentation and design are proceeding on a new light rail alignment along University and Washington Avenues. Improvements are summarized in Table 4.16. Considerable detail is provided on these alignments in Technical Memorandum 6.

The BNSF line (known as the "south main"), originally the Great Northern mainline between St. Paul and Minneapolis, is a high-speed alignment historically allowing 70 mph service over the majority of the route. Double track is still in place from the Hoffman Junction wye to St. Anthony Junction, where it joins CP and Minnesota Commercial. The line is essentially grade separated for its entire length. From that point to Minnesota Junction it involves multiple interlockings and single track, an area shared by both possible routes and requiring significant upgrades. Right-of-way and bridges are sufficient to allow all needed expansion.

The CP line (known as the "short line") is single tracked for its entire length, but was originally was double tracked and capable of 50 mph speeds over the majority of the route. The right-of-way and all overpasses are still sufficient for relaying double track, with the exception of two single track rail bridges over Snelling and Prior avenues. The City of St. Paul is currently attempting to condemn part of the right-of-way for trail use, which would severely damage the ability to restore the speed and capacity of this route. The Minnesota Commercial portion of the route contains two sharp seven-degree curves, one of which can be eased completely in Commercial's "A" yard, and one that could be moderately eased just north of Prior Avenue. As noted with the BNSF route, the track from Saint Anthony Junction to Minneapolis Junction will need double tracking and upgrades. While much of the line is grade-separated, there are six at-grade crossings on the CP segment in St. Paul that will require upgrading.

For the purposes of this analysis, the cost of the CP routing is assumed because it does not require the back-out move out of St. Paul, and is expected to remain as the preferred route for the Empire Builder after the 2012 move of Amtrak to St. Paul Union Depot. Additionally, rolling stock is not included as it is assumed it will be part of the MWRRI service and will use trainsets from that line's operation. A full engineering and operational analysis will be needed to finalize route selection.

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[24] http://www.redrockrail.org/.

These routings are shown in Figure 4.6.

Figure 4.6 Twin Cities Metro Rail Connections

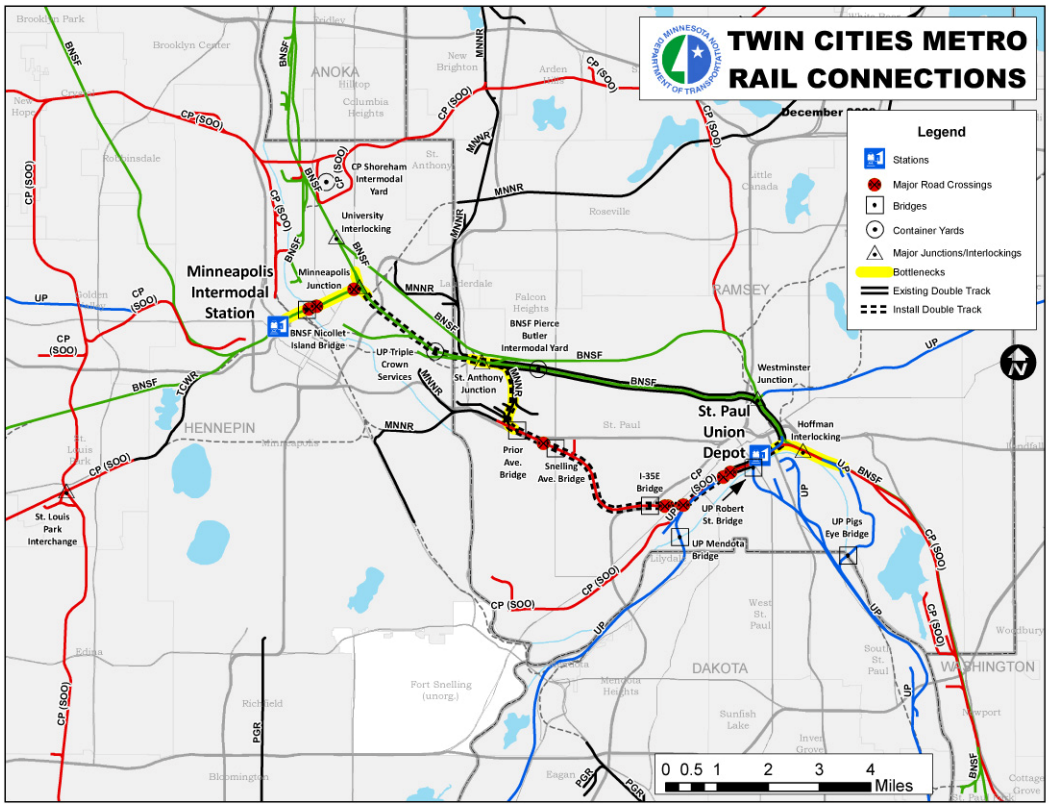


Table 4.16 Summary of Minneapolis to St. Paul Improvements

	Year	Need	Cost to Upgrade (Millions of Dollars)
Needs for Freight			
BNSF Corridor			
Midway Subdivision	2009	Additional passing sidings totaling 0.52 miles	$0.9
Midway Subdivision	2030	Completing double track build-out by adding 1.9 miles of new track	$3.3
St. Paul	2030	Adding 0.26 miles of additional track to the existing double main track between Seventh Street and Hoffman Junction	$0.4
		Hoffman Interlocking	$9.0
		St. Anthony Junction	$27.0
		Minneapolis Junction	$33.0
		10% Engineering	$7.4
		30% Contingency	$22.1
		Total Freight Needs	**$103.1**

Table 4.16 Summary of Minneapolis to St. Paul Improvements (continued)

Year	Need	Cost to Upgrade (Millions of Dollars)
CP Corridor		
	Prior Ave Jct Easement/Merriam Park Jct.	$20.0
	Prior Ave Bridge	$3.0
	Snelling Ave Bridge	$10.0
	MN Commercial Yard "A" curve easement (St. Anthony Junction)	$29.0
	Minneapolis Junction	$33.0
	10% Engineering	$9.5
	30% Contingency	$28.5
	Total Freight Needs	**$133.0**
2030 Passenger Service Needs[a]		
BNSF Corridor		
St. Paul Subdivision	Add 0.24 miles of track	$0.9
Midway Subdivision	0.52 miles of new track	$1.9
	Upgrade 14 miles of track from FRA 3 to FRA 4	$14.0
Other Costs[b]	Positive Train Control (four train sets)	$1.5
	Capacity Rights[c]	$9.5
	Operational and Maintenance Costs[d]	$2.4
CP Corridor		
Midway Subdivision	0.52 miles of new track	$1.9
Midway/Merriam Park Subdivision	Upgrade 13 miles of track from FRA 3 to FRA 4	$13.0
Merriam Park Subdivision	9 miles of new track	$32.4
Minnesota Commercial Yard	1.1 miles of CTC signal	$0.8
Other Costs[b]	Positive Train Control (four train sets)	$1.4
	Capacity Rights[c]	$8.8
	Operations and Maintenance Costs[d]	$2.2

[a] Passenger service need estimates include engineering and contingency costs.

[b] Rolling stock may not be necessary if other corridors are implemented.

[c] Negotiated on a case by case basis.

[d] Cost is post implementation.

4.3.6 UP: Twin Cities to Albert Lea (Kansas City, Missouri)

Needs in this corridor include freight needs and standard (79 mph) passenger service needs to accommodate four train sets per day. The corridor includes the segments from St. Paul and Minneapolis to Northfield, Northfield to Albert Lea, and Albert Lea to Kansas City, Missouri, utilizing the previously proposed Dan Patch commuter rail corridor alignment. For the purpose of

this analysis, costs are provided from the Twin Cities south to Albert Lea; therefore, all costs here are only for operations within the State of Minnesota. Improvements are summarized in Table 4.17.

Table 4.17 Summary of Twin Cities to Albert Lea Improvements

	Year	Need	Cost to Upgrade (Millions of Dollars)
Needs for Freight			
Albert Lea Subdivision	2030	Installing CTC signaling between St. Paul Yard across the St. Paul Union Pacific Bridge	$1.6
		Hoffman Interlocking	$54.0
		St. Louis Park Interchange	$70.0
		Dan Patch Interchange (Savage)	$10.0
		Savage Bridge over Minnesota River	$34.0
		Pigs Eye Bridge (UP) over Mississippi River	$76.0
		10% Engineering	$24.6
		30% Contingency	$73.7
		Total Freight Needs	**$343.9**
2030 Passenger Service Needs[a]			
MN&S Subdivision		12.7 miles, install CTC signal	$9.8
Savage Subdivision		20.9 miles, install CTC signal	$16.1
Albert Lea Subdivision		5.6 miles, convert ABS to CTC signal	$4.3
Other Costs		Rolling Stock (four train sets)	$72.0
		Positive Train Control (four train sets)	$11.5
		Capacity Rights[b]	$76.8
		Operations and Maintenance Costs[c]	$19.0

[a] Passenger service need estimates include engineering and contingency costs.

[b] Negotiated on a case by case basis.

[c] Cost is post implementation.

4.3.7 UP: Twin Cities to Mankato (Sioux City, Iowa)

Needs in this corridor include freight needs and standard (79 mph) passenger service needs to accommodate four train sets per day via the proposed Minnesota Valley Line. The corridor includes the segments from Minneapolis to Mankato, Mankato to Worthington, and Worthington to Sioux City, Iowa. As discussed in the preliminary screening (Section 3.0) service between Mankato and Worthington had low ridership potential due to the relatively small metropolitan area around Sioux City, as well as the significant distance (more than 250 miles) from the Twin Cities. Thus, only the segment between Minneapolis and Mankato was evaluated and all costs are only for operations within the State of Minnesota. Improvements are summarized in Table 4.18.

Table 4.18 Summary of Twin Cities to Mankato Improvements

Year	Need	Cost to Upgrade (Millions of Dollars)
Needs for Freight		
	St. Louis Park Interchange	$70.0
	Dan Patch Interchange (Savage)	$10.0
	Shakopee Realignment	$163.0
	Savage Bridge over Minnesota River	$34.0
	Mendota Heights (UP) (Omaha Road Bridge Number 15) over Mississippi River	$44.0
	10% Engineering	$32.1
	30% Contingency	$96.3
	Total Freight Needs	**$449.4**
2030 Passenger Service Needs[a]		
MN&S Subdivision	12.7 miles, install CTC signal	$9.8
Mankato Subdivision	82.6 miles, convert NS, ABS and TWC to CTC signal	$63.6
	Upgrade 84 miles of track from FRA 3 to FRA 4	$84
Other Costs	Rolling Stock (four train sets)	$72.0
	Positive Train Control (four train sets)	$8.5
	Capacity Rights[b]	$57.1
	Operations and Maintenance Costs[c]	$14.1

[a] Passenger service need estimates include engineering and contingency costs.

[b] Negotiated on a case by case basis.

[c] Cost is post implementation.

4.3.8 UP: Twin Cities to Eau Claire, Wisconsin

Needs in this corridor include freight needs and standard (79 mph) passenger service needs to accommodate four train sets per day between the Twin Cities and Eau Claire, Wisconsin. This route has potential to be a bistate intercity commuter corridor, and while ridership has been reviewed to take into consideration Wisconsin ridership, costs are summarized by state. Since most of this alignment is in Wisconsin, Wisconsin data is essential to evaluating this corridor. Improvements are summarized in Table 4.19.

Table 4.19 Summary of Twin Cities to Eau Claire, Wisconsin Improvements

	Year	Need	Cost to Upgrade (Millions of Dollars)
Needs for Freight			
St. Paul Subdivision	2030	Adding 0.26 miles of additional track to the existing double main track between Seventh Street and Hoffman Junction	$0.4
		Hoffman Interlocking	$9.0
		Hudson (UP) over St. Croix River	$87.0
		10% Engineering	$9.6
		30% Contingency	$28.9
		Total Freight Needs	**$134.9**
2030 Passenger Service Needs[a]			
Minnesota			
St. Paul Subdivision		Add 0.24 miles of track	$0.9
Altoona Subdivision		Minnesota – 18 miles, convert ABS to CTC signal	$13.9
Other Costs		Rolling Stock (4 train sets)	$72.0
		Minnesota – Positive Train Control (4 train sets)	$1.9
		Minnesota – Capacity Rights[b]	$12.2
		Minnesota – Operations and Maintenance Costs[c]	$3.0
Wisconsin			
Altoona Subdivision		Wisconsin – 68.9 miles, convert ABS to CTC signal	$73.2
Other Costs		Wisconsin – Positive Train Control (4 train sets)	$7.0
		Wisconsin – Capacity Rights[b]	$46.9
		Wisconsin – Operations and Maintenance Costs[c]	$11.6

[a] Passenger service need estimates include engineering and contingency costs.

[b] Negotiated on a case by case basis.

[c] Cost is post implementation.

4.4 High-Speed Rail Passenger Service Needs

In addition to the needs identified for conventional passenger service (79 mph) in Section 4.3, needs were identified for HSR, 110 mph service implementation in four corridors that showed significant potential for an upgraded level of service between the Twin Cities, Chicago (via the River Route and via Rochester), Duluth, and Rochester. The specific needs for implementing high-speed service are described for each of these corridors below.

Any new construction should not preclude 150 mph service implementation at a later date. Other than larger radius curves, 150 mph service will require complete grade separation and tighter tolerances in track construction. In addition, electrification may be desirable depending on rolling stock options procured for higher speed service. High-speed service may share right-of-way with existing freight lines, but it is assumed in this Memorandum that it will operate on dedicated track. Further detail on each corridor is provided in Technical Memorandum 6.

4.4.1 Midwest High-Speed Regional Rail Initiative – Twin Cities to Chicago (via River Route)

This scenario addresses HSR service between the Twin Cities and Chicago for the portions of the corridor that are within Minnesota. The segments evaluated include St. Paul to Hastings and Hastings to Winona. While this service is proposed to be on dedicated track, and not interfere or require improvements to the freight railroads, implementing HSR service on this corridor will still require significant investment as shown in Table 4.20.

Table 4.20 Summary of Midwest High-Speed Regional Rail Initiative Twin Cities to Chicago (River Route) Improvements
Minnesota Costs

	Need	Cost to Upgrade (Millions of Dollars)
Existing Line Costs		
	Merriam Park Sub, add 1.05 miles track	$1.8
	MNNR Yard, add 0.3 miles track, 1.4 miles signal	$1.3
	Midway Sub, add 0.59 miles track	$0.1
	Wayzata Sub, add 0.5 miles track	$0.8
	Hoffman Interlocking	$54.0
	St. Anthony Junction	$27.0
	Minneapolis Junction	$33.0
	La Crescent Bridge (CP)	$117.0
	Hastings (CP) over Mississippi River	$90.0
	10% Engineering	$32.5
	30% Contingency	$97.5
	Total Freight Needs	**$455.0**
Capital Costs[a]		
	Upgrade 127 miles from Class 4 to Class 6 track	$16.0
	Add 99.2 miles of new Class 6 track	$357.1
	Upgrade 127 miles to CTC	$79.2
	Add 127 miles of Positive Train Control	$13.2
	Grade Crossing Improvements	$50.8
	Rolling Stock (eight train sets)	$188.0
	Capacity Rights[b]	$172.7
O&M Costs		
	Operations and Maintenance Costs[c]	$42.7

[a] Passenger service need estimates include engineering and contingency costs.

[b] Negotiated on a case by case basis.

[c] Cost is post implementation.

4.4.2 HSR: Twin Cities to Duluth

This scenario addresses HSR (110 mph) service between the Twin Cities and Duluth, as prescribed in the Northern Lights Express study.[25] The segments evaluated include Twin Cities to Coon Rapids, Coon Rapids to Cambridge, and Cambridge to Duluth. The HSR segment of this service, between Coon Rapids and Sandstone, is proposed to be on dedicated track, and not interfere or require improvements for the freight railroads. The segment between Sandstone and Superior is proposed in the NLX business plan to be operated on shared trackage at 90 mph. This will require additional and lengthened sidings.

Five bridges on this line will ultimately need to be replaced or undergo major rehabilitation, including the Grassy Point Swing Bridge at a cost of $51 million. These costs are not included in the NLX business plan. This study identifies all needs and assigns them to specific corridors. Other major differences associated with the NLX plan include the cost of CTC and PTC.

Costs are shown in Table 4.21.

Table 4.21 Summary of Twin Cities to Duluth High-Speed Rail Improvements
Minnesota Costs

	Need	Cost to Upgrade (Millions of Dollars)
Existing Line Costs		
	Staples Sub, add 5.4 miles new track	$9.2
	Midway Sub, add 0.94 miles new track	$1.6
	Wayzata Sub, add 0.47 miles new track	$0.8
	University Interlocking	$14.0
	Minneapolis Junction	$33.0
	Coon Creek Junction	$100.0
	Grassy Point Swing Bridge (BNSF) over Saint Louis River	$51.0
	BNSF bridge 28.3	$4.0
	BNSF bridge 30.2	$6.0
	BNSF bridge 62.4	$13.0
	BNSF bridge 91.8	$2.0
	10% Engineering	$23.5
	30% Contingency	$70.4
	Total Freight Needs	**$328.5**

[25] http://www.northernlightsexpress.org/joomla/index.php.

Table 4.21 Summary of Twin Cities to Duluth High-Speed Rail Improvements (continued)

Minnesota Costs

	Need	Cost to Upgrade (Millions of Dollars)
Capital Costs[a]		
	Add 121 miles for new Class 6 track	$435.6
	Add 152 miles to CTC	$159.6
	Add 152 miles of Positive Train Control	$15.8
	Grade Crossing Improvements	$60.8
	Rolling Stock (six train sets)	$141.0
	Capacity Rights[b]	$206.7
O&M Costs		
	Operations and Maintenance Costs[c]	$45.7

[a] Passenger service need estimates include engineering and contingency costs.

[b] Negotiated on a case by case basis.

[c] Cost is post implementation.

4.4.3 HSR: Twin Cities to Rochester

This scenario addresses HSR (110 mph) service between the Twin Cities and Rochester, as prescribed in the Rochester Rail Link Feasibility study.[26] A large portion of this alignment is Greenfield; however, there are still significant investment requirements for HSR implementation as shown in Table 4.22. The costed alignment is consistent with the independent Rochester studies, and assumes a stop at the Minneapolis-St. Paul International Airport, with service continuing to downtown St. Paul. For reasons discussed in Section 4.13, the ROW estimates below are considerably higher than those used in the Rochester-specific studies.

[26] http://www.dot.state.mn.us/passengerrail/onepagers/rochesterstudy.pdf.

Table 4.22 Summary of Twin Cities to Rochester High-Speed Rail Improvements

	Need	Cost to Upgrade (Millions of Dollars)
Existing Line Costs		
	Eagandale Sub, upgrade 9 miles of track from FRA 1 to FRA 4	$7.0
	Mankato Sub, upgrade 7 miles of track from FRA 3 to FRA 4	$5.0
	Merriam Sub, upgrade 1 mile of track from FRA 3 to FRA 4	$0.7
	Mendota Heights (UP) (Omaha Road Bridge #15) over Mississippi River	$44.0
	10% Engineering	$5.7
	30% Contingency	$17.0
	Total Freight Needs	**$79.4**
Capital Costs[a]		
	Minnesota River Crossing to MSP	$163.8
	Connection from Eagandale Sub to Minnesota River Crossing	$90.0
	Add 91 miles for new Class 6 track	$328.0
	Add 86 miles to CTC (Existing Freight and Passenger Lines)	$66.2
	Add 87 miles of Positive Train Control (Existing Freight and Passenger Lines)	$9.1
	Grade Crossing Improvements	$34.8
	Rolling Stock (four train sets)	$94.0
	Right-of-way[b]	$63.7
	Capacity Rights[b]	$23.1
O&M Costs		
	Operations and Maintenance Costs[c]	$28.9

[a] Passenger service need estimates include engineering and contingency costs.

[b] Negotiated on a case by case basis.

[c] Cost is post implementation.

4.4.4 HSR: Twin Cities to Chicago (via Rochester Route)

This scenario addresses HSR (110 mph) service between the Twin Cities and Chicago via the Greenfield route through Rochester. This scenario includes all of the costs associated with the stand-alone Greenfield route between Rochester and the Twin Cities as detailed in Section 4.4.3, plus the costs of a Greenfield route connecting Rochester to the rest of the MWRRI alignment probably in the vicinity of La Crosse, Wisconsin. A large portion of this alignment is Greenfield; however, there are still significant investment requirements for HSR implementation as shown in Table 4.23.

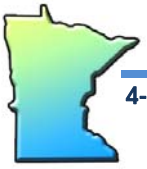


Table 4.23 Summary of Twin Cities to Chicago (via Rochester) High-Speed Rail Improvements

	Need	Cost to Upgrade (Millions of Dollars)
Existing Line Costs		
	Eagandale Sub, upgrade 9 miles of track from FRA 1 to FRA 4	$7.0
	Mankato Sub, upgrade 7 miles of track from FRA 3 to FRA 4	$5.0
	Merriam Sub, upgrade 1 mile of track from FRA 3 to FRA 4	$0.7
	Mendota Heights (UP) (Omaha Road Bridge #15) over Mississippi River	$44.0
	La Crescent Bridge (CP)	$117.0
	10% Engineering	$17.4
	30% Contingency	$52.1
	Total Freight Needs	**$243.2**
Capital Costs[a]		
	Minnesota River Crossing to MSP	$163.8
	Connection from Eagandale Sub to Minnesota River Crossing	$90.0
	Add 182 miles for new Class 6 track	$655.2
	Add 156 miles to CTC (Existing Freight and Passenger Lines)	$120.1
	Add 157 miles of Positive Train Control (Existing Freight and Passenger Lines)	$16.3
	Grade Crossing Improvements	$62.8
	Rolling Stock (eight train sets)	$188.0
	Right-of-way[b]	$127.4
	Capacity Rights[b]	$23.1
O&M Costs		
	Operations and Maintenance Costs[c]	$52.8

[a] Passenger service need estimates include engineering and contingency costs.

[b] Negotiated on a case by case basis.

[c] Cost is post implementation.

4.5 Cost of Project Implementation

As previously noted in this study, Minnesotans have been active in the pursuit of passenger rail service from studying corridors to actual service implementation. Much ground work has been laid to help development of this state rail plan. In fact, a number of passenger rail studies have developed cost estimates for line construction, capacity rights, and annual operating and maintenance costs. This study's estimates are not intended to supersede engineering studies that already have been conducted using much more detailed data. It is important to note that freight and passenger needs identified in this study have been determined through use of a GIS-

tool developed specifically for this project – each corridor in the State has been analyzed using the same assumptions and costs derived to provide a high-level apples-to-apples comparison. Output from the GIS-tool has been augmented by expert advice throughout cost development.

This study shows that cost of project implementation can vary depending on how the program is developed and what assumptions are made regarding cost input factors. Table 4.23 (base case) and Table 4.24 (best case) provide the cumulative costs of implementing full build passenger service for each individual city pair. The total cost for implementing passenger service on a corridor-by-corridor basis is roughly $6.8 to $8.4 billion.[27]

In several cases city pair segments overlap each other, and on any given corridor two or three different passenger services may be provided. A key corridor where this can be shown is along BNSF's Staples subdivision; this corridor is a conduit for service to Duluth, Cambridge, St. Cloud, and Fargo/Moorhead. Table 4.26 builds on Tables 4.24 and 4.25 and provides the cost for implementing all of these city pair corridors through sharing infrastructure among projects. The total cost for implementing passenger service as a system is $5.4 to $6.7 billion.

While it is important to proceed with a "system approach" for implementation, it is possible to identify those projects that provide the biggest bang for the buck investment. Table 4.28 builds on Table 4.27 and assumes that projects in shared corridors with shared infrastructure are pursued; however, it only includes those projects that have been identified as higher priorities. Those higher-priority projects include:

- HSR service of 110 to 150 mph between the Twin Cities and Duluth, Rochester, and Chicago; and
- Enhanced conventional rail service of up to 90 mph between the Twin Cities and St. Cloud, Mankato, Fargo and Eau Claire, Wisconsin, and between St. Paul and Minneapolis.

As shown in Figure 4.7, higher priority projects are described as Phase I projects, and all other projects are described as Phase II projects. These phases will be referred to again in Section 5.0 Performance Evaluation. It is notable that BNSF's and CP's stated passenger implementation principles accept speeds on their right-of-way of up to 110 mph, with clearly defined standards for safety, operating control, and segregation between freight and passenger trains. UP's principles accept up to 90 mph with similar provisions, applicable to the Mankato and Eau Claire corridors. Review of track and signal costs, only, indicate the total cost for implementing higher priority passenger corridors as a system is $4.7 to $5.9 billion.

[27]These costs are derived by adding together the infrastructure total and capacity rights columns.

Figure 4.7 Phase I and Phase II Passenger

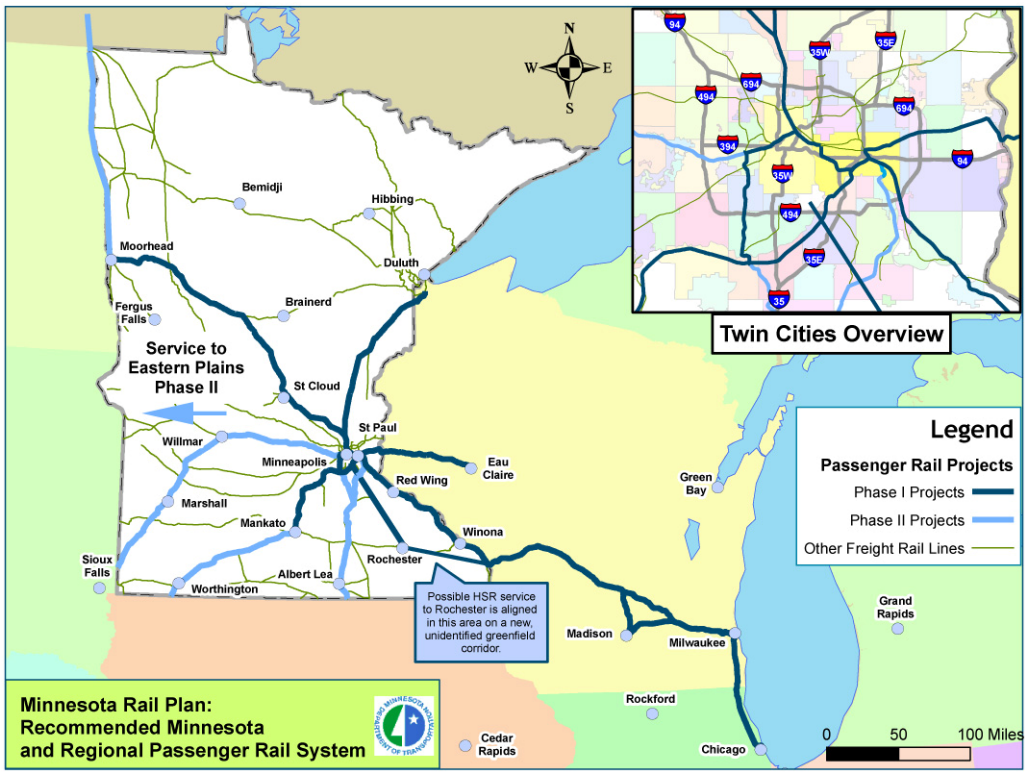


Table 4.24 2030 Shared Freight and Passenger Rail Corridors Reviewed – BASE CASE

Costs for All Improvements between City Pairs (Does Not Assume Improvements Build Upon Each Other)

City Pair/Description	Type of Service Reviewed	Train Pairs/Day	Freight Capital Costs 2009-2030[a] (Millions of Dollars)	2030 Passenger Infrastructure Costs (Millions of Dollars)	Infrastructure Total (Millions of Dollars)	Rolling Stock (Millions of Dollars)	Capacity Rights (Millions of Dollars)	Annual O&M Costs (Millions of Dollars)
Twin Cities to Cambridge								
Northstar-Cambridge Extension	79 mph	4	$245.2	$222.2	$467.4	$72.0	$29.9	$7.4
Twin Cities to St. Cloud								
Northstar-Expanded to St. Cloud	79 mph	8	$305.4	$126.9	$432.3	$144.0	$91.1	$22.5
Twin Cities to Fargo/Moorhead								
Expanded Empire Builder	79 mph	2	$559.3	$78.5	$637.8	$18.0	$41.1	$10.2
Twin Cities to Fargo/Sioux Falls, South Dakota								
Little Crow	79 mph	4	$94.4	$114.9	$209.3	$72.0	$161.2	$39.8
Twin Cities Connection[b]								
Minneapolis-St. Paul (CP)	79 mph	4	$133.0	$49.5	$182.5	0[c]	$8.8	$2.2
Twin Cities to Albert Lea (Kansas City, Missouri)								
	79 mph	4	$343.8	$41.7	$385.5	$72.0	$76.8	$19.0
Twin Cities to Mankato (Sioux City, Iowa)								
Minnesota Valley Line	79 mph	4	$449.4	$165.9	$615.3	$72.0	$57.1	$14.1
Twin Cities to Eau Claire, Wisconsin								
Minnesota	79 mph	4	$135.0	$16.7	$151.7	$72.0	$12.2	$3.0
Wisconsin	79 mph	4	$0	$80.2	$80.2	*(incl. in MN)*	$46.9	$11.6
Twin Cities to Chicago (via River)-HSR								
MWRRI	110 mph	8	$455.0	$516.3	$971.3	$188.0	$172.7	$42.7
Twin Cities to Duluth-HSR								
Northern Lights Express	110 mph	8	$328.4	$671.8	$1,000.2	$141.0	$206.7	$45.7
Twin Cities to Rochester-HSR								
Rochester Rail Link	110 mph	8	$79.4	$755.6	$835.0	$94.0	–	$28.9
Twin Cities to Chicago (via Rochester)-HSR								
	110 mph	8	$243.2	$1235.6	$1,478.8	$188.0	–	$52.8
Totals			**$3,371.6**	**$4,075.9**	**$7,447.5**	**$1,133.0**	**$950.7**	**$299.9**

[a] Some unknown freight costs have not been accounted for.

[b] Higher-cost option used between BNSF and CP.

[C] Cost included in MWRRI.

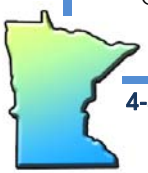


Table 4.25 2030 Shared Freight and Passenger Rail Corridors Reviewed – BEST CASE

Costs for All Improvements between City Pairs (Does Not Assume Improvements Build Upon Each Other)

City Pair/Description	Type of Service Reviewed	Train Pairs/Day	Freight Capital Costs 2009-2030[a] (Millions of Dollars)	2030 Passenger Infrastructure Costs (Millions of Dollars)	Infrastructure Total (Millions of Dollars)	Rolling Stock (Millions of Dollars)	Capacity Rights (Millions of Dollars)	Annual O&M Costs (Millions of Dollars)
Twin Cities to Cambridge								
Northstar-Cambridge Extension	79 mph	4	$210.2	$157.7	$367.9	$45.0	$14.1	$5.8
Twin Cities to St. Cloud								
Northstar-Expanded to St. Cloud	79 mph	8	$261.8	$109.4	$371.2	$72.0	$42.9	$17.7
Twin Cities to Fargo/Moorhead								
Expanded Empire Builder	79 mph	2	$479.4	$61.2	$540.6	$18.0	$14.0	$5.8
Twin Cities to Fargo/Sioux Falls, South Dakota								
Little Crow	79 mph	4	$80.9	$101.9	$182.8	$54.0	$75.8	$31.3
Twin Cities Connection[b]								
Minneapolis-St. Paul (CP)	79 mph	4	$114.0	$42.5	$156.5	*(incl. in MWRRI)*	$4.2	$1.7
Twin Cities to Albert Lea (Kansas City, Missouri)								
	79 mph	4	$294.7	$37.4	$332.1	$54.0	$36.2	$14.9
Twin Cities to Mankato (Sioux City, Iowa)								
Minnesota Valley Line	79 mph	4	$385.2	$143.4	$528.6	$45.0	$26.9	$11.1
Twin Cities to Eau Claire, Wisconsin								
Minnesota	79 mph	4	$115.7	$14.6	$130.3	$45.0	$5.8	$2.4
Wisconsin	79 mph	4		$69.7	$69.7	*(incl. in MN)*	$22.0	$9.1
Twin Cities to Chicago (via River)-HSR								
MWRRI	110 mph	8	$390.0	$444.1	$834.1	$188.0	$81.3	$33.5
Twin Cities to Duluth-HSR								
Northern Lights Express	110 mph	8	$281.5	$579.3	$860.8	$141.0	$97.3	$35.9
Twin Cities to Rochester-HSR								
Rochester Rail Link	110 mph	8	$68.1	$656.7	$724.8	$94.0	–	$22.7
Twin Cities to Chicago (via Rochester)-HSR								
	110 mph	8	$208.5	$1,070.2	$1,278.7	$188.0	–	$41.5
Totals			**$2,890.0**	**$3,488.2**	**$6,378.1**	**$944.0**	**$442.3**	**$233.4**

[a] Some unknown freight costs have not been accounted for.

Table 4.26 2030 Shared Freight and Passenger Rail Corridors Reviewed – Built as a System

Costs for All Improvements between City Pairs (Assumes Improvements Built upon Each Other)

	Improvement Type	Base Case Cost ($M)	Best Case Cost($M)
Junctions, Bottlenecks and Bridges	BNSF Bridge 28.3	$4.0	$4.0
	BNSF Bridge 30.2	$6.0	$6.0
	BNSF Bridge 62.4	$13.0	$13.0
	BNSF Bridge 91.8	$2.0	$2.0
	Coon Creek Junction	$100.0	$100.0
	Dan Patch Interchange (Savage)	$10.0	$10.0
	Grassy Point Swing Bridge (BNSF) over Saint Louis River	$51.0	$51.0
	Hastings Bridge (CP) over Mississippi River	$90.0	$90.0
	Hoffman Interlocking	$54.0	$54.0
	Hudson Bridge (UP) over St. Croix River	$87.0	$87.0
	La Crescent Swing Bridge (CP)	$117.0	$117.0
	Mendota Heights (UP) (Omaha Road Bridge Number 15) over Mississippi River	$44.0	$44.0
	Minneapolis Junction	$33.0	$33.0
	Moorhead Junction	$5.0	$5.0
	Pigs Eye Bridge (UP) over Mississippi River	$76.0	$76.0
	Prior Ave Bridge	$3.0	$3.0
	Prior Ave Jct. Easement/Merriam Park Jct.	$20.0	$20.0
	Savage Bridge over Minnesota River	$34.0	$34.0
	Shakopee Realignment	$163.0	$163.0
	Snelling Ave Bridge	$10.0	$10.0
	St. Anthony Junction	$27.0	$27.0
	St. Louis Park Interchange	$70.0	$70.0
	University Interlocking	$6.1	$6.1
	Engineering and Contingencies (40% Base/20% Best)	$410.8	$205.4
	Total Existing Line Costs	**$1,437.9**	**$1,232.5**
Shared Corridors	2009 Freight Shared Track and Signal	$245.3	$210.3
	2030 Freight Shared Track and Signal	$264.4	$226.6
	2030 Conv. – Passenger Track and Signal	$387.5	$322.9
	2030 HSR – Passenger Track, Signal, and ROW	$2,441.5	$2,108.8
	Capacity Rights	$950.7	$442.3
	Total Shared Corridor Track and Signal Cost	**$4,289.4**	**$3,310.9**
	Total Cost	**$5,727.3**	**$4,543.4**

Note: Does not include rolling stock or annual operations and maintenance costs.

Table 4.27 2030 Shared Freight and Passenger Rail Corridors Reviewed – High-Priority Corridors

(Assumes Improvements Built upon Each Other)

	Improvement Type	Base Case Cost ($M)	Best Case Cost ($M)
Junctions, Bottlenecks and Bridges	BNSF Bridge 28.3	$4.0	$4.0
	BNSF Bridge 30.2	$6.0	$6.0
	BNSF Bridge 62.4	$13.0	$13.0
	BNSF Bridge 91.8	$2.0	$2.0
	Coon Creek Junction	$100.0	$100.0
	Dan Patch Interchange (Savage)	$10.0	$10.0
	Grassy Point Swing Bridge (BNSF) over Saint Louis River	$51.0	$51.0
	Hastings Bridge (CP) over Mississippi River	$90.0	$90.0
	Hoffman Interlocking	$54.0	$54.0
	Hudson Bridge (UP) over St. Croix River	$87.0	$87.0
	La Crescent Swing Bridge (CP)	$117.0	$117.0
	Mendota Heights (UP) (Omaha Road Bridge Number 15) over Mississippi River	$44.0	$44.0
	Minneapolis Junction	$33.0	$33.0
	Moorhead Junction	$5.0	$5.0
	Pigs Eye Bridge (UP) over Mississippi River	$76.0	$76.0
	Prior Ave Bridge	$3.0	$3.0
	Prior Ave Jct. Easement/Merriam Park Jct.	$20.0	$20.0
	Savage Bridge over Minnesota River	$34.0	$34.0
	Shakopee Realignment	$163.0	$163.0
	Snelling Ave Bridge	$10.0	$10.0
	St. Anthony Junction	$27.0	$27.0
	St. Louis Park Interchange	$70.0	$70.0
	University Interlocking	$6.1	$6.1
	Engineering and Contingencies (40% Base/20% Best)	$410.8	$205.4
	Total Existing Line Costs	**$1,437.9**	**$1,232.5**
Shared Corridors	2009 Freight Shared Track and Signal	$152.5	$121.5
	2030 Freight Shared Track and Signal	$269.6	$231.1
	2030 Conv. – Passenger Track and Signal	$334.0	$278.4
	2030 HSR – Passenger Track, Signal and ROW	$1,961.5	$1,695.3
	Capacity Rights	$950.7	$442.3
	Total Shared Corridor Track and Signal Cost	**$3,668.3**	**$2,768.6**
	Total Cost	**$5,106.3**	**$4,001.1**

Note: Does not include rolling stock or annual operations and maintenance costs.

These tables show that there is a long list (21 projects) of junctions and bridges that require improvement. And while a few of these projects are related to a specific corridors' implementation (e.g., four BNSF bridges on the Hinckley Subdivision for the Duluth NLX project) even more of these projects are required due to the complex intertwined network of railroads present in the Twin Cities area. This web of rails is further challenged by the fact that the Twin Cities is proposed as the "hub" for a network of rail "spokes" emanating throughout the State and Midwest. This means that improvements to a bottleneck like Hoffman Junction will provide benefits to multiple passenger rail projects, as well as to freight service in general, and highlights the importance of building projects as a "system." As previously stated, a project like BNSF's third mainline on the Staples subdivision can provide increased capacity to several services.

Work already is underway to secure funding for several projects that have detailed engineering studies already complete. Table 4.28 shows the estimated capital and operating and maintenance costs anticipated for these studies, as well as the amount of funding applied for by source.

Table 4.28 Passenger Rail Project Earmark Requests

Study/Corridor	Capital Cost Estimate	Operating and Maintenance Cost Estimate	Requested Grant Amount	Grant Source
Rochester Rail Link Study	$697,327,000 to $768,719,000	$37.59 per train mile		
Tri-State III	$973,000,000			
Southern Rail Corridor	$334,253,853		$10,000,000	TIGER
NLX	$360,000,000	$33.34 per train mile	$45,000,000	HSIPR
BNSF Staples Subdivision Third Main	$113,500,000		$99,000,000	TIGER
Northstar Phase II	$150,000,000	$125 per train mile	$75,000,000	TIGER

5 Performance Assessment

Performance measures are a tool used in all steps of the planning and project development process. They help to set appropriate targets for a policy or system plan where tradeoffs involve different system elements or different objectives given varying assumptions about resources available in a set timeframe. This project's performance assessment was based on the six performance factors identified in Technical Memorandum 5 (Performance Measures), applied to both the passenger and freight systems. These performance measures include:

- **System Performance –** The operating characteristics of the rail service and existing or potential demand for the service.
- **System Condition –** Condition of existing infrastructure relative to a state of good repair.
- **Connectivity and Accessibility –** Population and businesses served by new or expanded rail service and the impact of rail investments on the larger multimodal transportation network.
- **Safety and Security –** Ability of rail investments to enhance safety (reduced crashes, injuries, and fatalities) and security of the system.
- **Environmental –** Impact of rail investments on the natural and built environments, as overall quality of life, and consistency with community land use plans.
- **Financial/Economic –** Estimated cost, revenue generating potential, and economic development benefits resulting from new or expanded rail service.

Section 5.1 describes passenger rail project evaluation, and Section 5.2 describes freight rail project evaluation. The end product of this effort is intended to be a passenger and freight rail system that provides Minnesota with improved transportation options, costs, and speeds for intrastate and interstate travelers.

5.1 Passenger Evaluation

This section describes the potential system performance benefits of expanding passenger rail in Minnesota as discussed in the needs assessment. The process for evaluating passenger rail was conducted first at the corridor level and then at the system level. Performance measures were then used to evaluate each of the criteria areas described in Table 5.1.

Table 5.1 Passenger Variable Estimation Procedure

Category	Measure
System Performance	**Ridership**. Total ridership by corridor and scenario (Vision Phase I, Phase II, and Passenger build-out).
	System efficiency. Average riders per train.
System Condition	*Impacts cost estimate, not directly considered in performance analysis.*
Connectivity and Accessibility	**System accessibility.** Total number and percent of Minnesota residents outside of the Twin City metro area with access to the rail system.
Safety and Security	*Not evaluated for passenger investments.*
Environmental	**Environmental impact**. Qualitative assessment of the impact of new track or right-of-way on the environment.
Financial/Economic	**Cost**. Cost of implementing each scenario.
	Cost per rider. Total cost per passenger (over a 30-year period).
	Qualitative cost-effectiveness. Summary of overall benefits achieved by scenario relative to total cost.

5.1.1 Performance Measure Calculation Methodology

The specific measures outlined in Table 5.1 were calculated and applied based on the following methodology. Results of the performance evaluation can be found in Tables 5.2 (Benefits) and 5.3 (Cost and Cost-Effectiveness).

Ridership

Ridership forecasts were developed in Technical Memorandum 3 and summarized in Section 3.0. Sensitivity analyses were run to produce the most favorable results for each city pair. Specific changes since Technical Memorandum 3 (as shown in Section 3.0) include the following:

- For each of the HSR corridors, a low-fare high-speed (110 mph) service combination was calculated and compared to other models;
- For Duluth HSR service, ridership demand for Superior, Wisconsin was included in the estimates; and
- For HSR service to Rochester (or via Rochester on the MWRRI), the Minneapolis-St. Paul International Airport was included as a stop.

In addition to overall ridership, system efficiency was calculated by estimating the total number of riders on an average train and the total number of riders per train mile. These were calculated by estimating daily ridership (assuming 300 service days per year) and dividing it by the number of trains in service each of those days and the number of train miles operated each day. These measures were produced for both the base and best case forecasts.

System Accessibility

System accessibility was calculated as the total population and percent of population living outside of the Twin Cities Metropolitan area that would have access to rail service in the future. County and metropolitan area population projections from the Minnesota Department of Administration were used to evaluate this measure. Every county or metro area with a station was considered to have access to the rail system. Metropolitan estimates were used for stations in Duluth, Fargo, La Crosse, Rochester, and St. Cloud. Only the Minnesota population within each of these metropolitan areas was used. County-level estimates were used for Albert Lea, Mankato, Marshall, Northfield, Red Wing, Willmar, and Winona. Of course, all residents of the Twin Cities metropolitan area would, by definition, have access.

The total population estimated was compared to the total population of the State outside of the Twin City area to estimate the percent with access.

Environmental Impact

A qualitative assessment was made of environmental impacts. Corridors using new alignments have a high potential of impact. Only Rochester currently is expected to be built on entirely new right-of-way at this time. Corridors that would require significant new track, including high-speed corridors that would, in many cases, need separate track, are identified as having a medium potential for impact. Passenger services that would use shared track with freight railroads are expected to have a low potential for environmental impact.

VMT and Greenhouse Gas Emissions

The likely impact on the roadway system was identified through estimates of expected changes in auto vehicle miles of travel (VMT) and greenhouse gas emissions.

VMT changes were estimated based on the changing mode share predicted by the demand modeling exercise. These changes in mode share were multiplied by auto distances for the city pairs and average vehicle occupancy to generate an estimate of change in VMT. The National Highway Travel Survey estimates average vehicle occupancy for nonwork trips of 1.14 persons per vehicle. However, given the long distances for many of these corridors, the likely excursion nature of many of the riders, and a desire to be relatively conservative in estimating both VMT changes (and greenhouse gas emissions), the work-based average vehicle occupancy (1.6) was used for all trips.

Greenhouse gas emissions were estimated using data developed by the Center for Clean Air Policy and the Center for Neighborhood Technology for evaluating the impact of HSR.[28] These estimates were based primarily on 90 to 100 mph diesel-powered rail systems. Increased

[28] High-Speed Rail and Greenhouse Gas Emissions in the U.S., July 2006, Center for Clean Air Policy and Center for Neighborhood Technology.

greenhouse gas emissions from rail were estimated by multiplying the total number of train trips by the distance they travel by the emissions factor. Only the overall rail trip was examined (i.e., Twin Cities to Chicago) to avoid double counting. Decreased greenhouse gas emissions from automobiles were estimated by multiplying the estimated VMT change by the automobile emission factor. The difference between the two is the overall greenhouse gas emissions expected to be reduced.

Cost

Several cost values were estimated and a qualitative scale was developed. Because any passenger rail service operating on a freight route would need to be negotiated between the passenger rail provider and the freight railroad, it is difficult to establish a definitive cost. The cost values that were estimated include:

- **Infrastructure Cost –** This value represents the infrastructure needs for passenger service in 2030 above and beyond the total infrastructure needs identified for freight. For example, if the level of freight investment identified in Section 4.0 also can accommodate four passenger trains per day, that scenario would produce no additional infrastructure cost for passenger rail. Track, signal systems, and crossings are included in this cost.
- **Rolling Stock –** This is the cost to purchase rolling stock to operate these services. In general, it is assumed that new rolling stock will be required for each new route, with the exception of the Twin Cities Connection, which can readily be operated as part of another service. There may be opportunities for synergies among the several services, especially if Phase II services are brought on-line. While these synergies cannot be determined at this time, a 20 percent discount to the systemwide cost of rolling stock was applied to the best case forecast.
- **Capacity Rights Cost –** Because the actual cost must be negotiated with the freight railroad for use of the network, it is likely that the freight railroad will expect passenger rail to pay more than just the additional infrastructure cost. This also addresses that the owner (freight railroad) has invested in their own reserve capacity and would likely attempt to maintain the same level of reserve capacity after implementation of passenger service. Further, there is no guarantee that all of the freight needs will be addressed prior to implementing passenger rail service. To account for this, a "capacity rights cost" was estimated based on the negotiated public investment made as part of the Northstar service, roughly $85,000 per train mile for the base case and $40,000 for the best case. This represents a best guess for a potential negotiation and is useful only in helping to qualitatively assess costs.
- **Operations and Maintenance Costs –** This value represents the costs required to operate the service and maintain the track and rolling stock. This is reported as an annual cost. Operating and maintenance costs were estimated at $70 per train mile of service for the base case and $55 for the best case. Operating and maintenance costs were estimated for the entire distance of each route, with the exception of the high-speed routes to Chicago. For these, only the Minnesota portion is estimated.

Revenue

Potential revenue for each of the services is based on the fares used to estimate ridership. The model includes fare estimates on a per mile basis. These were multiplied by ridership by segment to calculate revenue. Except for high-speed routes to Chicago, revenue was estimated for the entire corridor. For the Chicago routes, the revenue was prorated to Minnesota based on the number of trip ends within the State. A minimum of 50 percent of the revenue was assumed to accrue against Minnesota's costs because all trip ends have an origin or destination in the Twin Cities. If the other trip end also was in Minnesota (i.e., Red Wing for the River Route or Rochester for the Rochester alignment), 100 percent of the revenue is assumed to accrue against Minnesota's costs.

A best case revenue forecast was developed assuming 25 percent higher revenue to account for the higher ridership forecasts in the best case. Since some of this additional ridership would likely come from shorter intermediate trips, they would not pay the full fare of the full trip between the Twin Cities and the outlying city pairs.

Cost-Effectiveness

In addition to overall cost, cost-effectiveness was evaluated using several metrics, including:

- **Capital Cost per Mile of Service –** This is the total capital cost divided by the corridor length. This shows the average cost of implementation of each new route and allows a normalized comparison of routes.
- **Farebox Recovery Ratio –** The farebox recovery ratio is the total revenue divided by operations and maintenance costs. It captures the extent to which a new service, once implemented, can pay for itself. According to July, 2009 Amtrak data, farebox ratios for single or bistate corridors range from 18 percent for the Hoosier State service to 96 percent for Washington-Newport News service, with an average of 69 percent. Long distance, multistate Amtrak routes average about 44 percent. Only the Acela has consistently covered its operating costs through revenues.
- **Operating Subsidy per Rider –** In addition to the farebox recovery ratio, an average operating subsidy per rider is estimated. In combination with the capital cost, this captures the magnitude of public expenditures required to support each service.

5.1.2 Summary of Passenger Performance

Passenger service was evaluated first by the corridors and then as an overall system. Tables 5.2 through 5.5 present a subset of the performance measures identified above for each of the corridors for the base and best cases. Some key findings include:

- Four routes have potential for over 400,000 riders per year – St. Cloud, Chicago, Rochester and Duluth.

- Four routes have ridership better than one passenger per train mile – St. Cloud, Mankato, Eau Claire, and Rochester. St. Cloud has over three riders per train mile, indicating a high likelihood of success for this line.
- Three routes provide access to the passenger rail system for over 200,000 residents – St. Cloud, Duluth, and Rochester.
- High-speed routes have potential environmental issues that will need to be addressed through detailed studies.
- High-speed routes are the most costly to implement.
- St. Cloud is the most cost-effective generator of new riders, with just under $350 in capital cost per new rider and an operating subsidy of under $7 per rider. High-speed service to Chicago (via River Route or Rochester) does not require an operating subsidy and may contribute an operating surplus to other services, though it is difficult to assess without considering the service over its entire length.
- Service to several destinations requires significant capital investment for each annual rider generated.

Annual operating subsidies are highest for Sioux Falls (over $450 per rider/day), Fargo (over $200 per rider), and Albert Lea (over $150 per rider). All other routes have subsidies under $100 per rider.

Table 5.2 Passenger Project Performance Measures – Benefits: Base

In Millions

Corridor	Scenario Evaluated	Phase	Distance	Ridership	Ridership per Train Mile	Population with Rail Service Outside Twin Cities	Potential Environmental Impact
Twin Cities-St. Cloud	Conventional, 8 round trips	Phase I	67	1,044,300	3.25	245,700	Low
Twin Cities-Fargo	Conventional, 2 RTs	Phase I	242	36,500	0.25	66,900	Low
Twin Cities-Duluth	High speed, 8 RTs	Phase I	152	430,155	0.59	283,750	Medium/High
Twin Cities-Willmar/Sioux Falls, South Dakota	Conventional, 4 RTs	None	237	81,000	0.14	68,330	Low
Twin Cities Connection	Conventional, 4 RTs	Phase I	13	N/A	–	N/A	Low
Twin Cities-Northfield-Albert Lea	Conventional, 4 RTs	Phase II	113	110,500	0.41	114,250	Low
Twin Cities-Mankato	Conventional, 4 RTs	Phase I	84	228,000	1.13	68,080	Low
Twin Cities-Eau Claire, Wisconsin	Conventional, 4 RTs	Phase II	86	257,000	1.23		Low
Twin Cities to Chicago *(River Route)*	High speed, 8 RTs	Phase I	410	1,629,800	0.83	106,180	Medium/High
Twin Cities to Rochester	High Speed, 8 RTs new ROW	Phase I	46	531,100	1.23	236,200	High
	MWRRI Rochester alternative	*Alt*	*420*	*1,917,516*	*0.95*	*236,200*	*High*

Table 5.3 Passenger Project Performance Measures – Benefits: Best

In Millions

Corridor	Scenario Evaluated	Phase	Distance	Ridership	Ridership per Train Mile	Population with Rail Service Outside Twin Cities	Potential Environmental Impact
Twin Cities-St. Cloud	Conventional, 8 round trips	Phase I	67	1,566,450	4.87	245,700	Low
Twin Cities-Fargo	Conventional, 2 RTs	Phase I	242	54,750	0.38	66,900	Low
Twin Cities-Duluth	High speed, 8 RTs	Phase I	152	645,300	0.88	283,750	Medium/High
Twin Cities-Willmar/Sioux Falls, South Dakota	Conventional, 4 RTs	None	237	121,500	0.21	68,330	Low
Twin Cities Connection	Conventional, 4 RTs	Phase I	13	N/A	-	N/A	Low
Twin Cities-Northfield-Albert Lea	Conventional, 4 RTs	Phase II	113	165,750	0.61	114,250	Low
Twin Cities-Mankato	Conventional, 4 RTs	Phase I	84	342,000	1.70	68,080	Low
Twin Cities-Eau Claire, Wisconsin	Conventional, 4 RTs	Phase II	86	385,500	1.85		Low
Twin Cities to Chicago (*River Route)*	High speed, 8 RTs	Phase I	410	2,444,700	1.24	106,180	Medium/High
Twin Cities to Rochester	High Speed, 8 RTs new ROW	Phase I	46	796,650	1.84	236,200	High
	MWRRI Rochester alternative	*Alt*	*420*	*2,876,250*	*1.43*	*236,200*	*High*

Table 5.4 Passenger Project Performance Measures – Costs and Cost-Effectiveness: Base

In Millions

Corridor	Scenario Evaluated	Phase	Capital Cost (Millions of Dollars One-Time)[a]	Operating and Maintenance Cost (Millions of Dollars Annual)	Revenue (Millions of Dollars)	Farebox Recovery (Percent)	Capital Cost per Mile (Millions of Dollars)	Capital Cost per Rider (Dollars)	Operating Subsidy per Rider (Dollars)
Twin Cities-St. Cloud	Conventional, 8 RTs	Phase I	$218.0	$22.5	$15.7	70%	$3.3	$209	$6.56
Twin Cities-Fargo	Conventional, 2 RTs	Phase I	$119.6	$10.2	$2.0	20%	$0.5	$3,277	$223.47
Twin Cities-Duluth	High speed, 8 RTs	Phase I	$878.5	$45.7	$9.6	21%	$5.8	$2,042	$83.82
Twin Cities-Willmar/ Sioux Falls, South Dakota	Conventional, 4 RTs	None	$276.1	$39.8	$2.0	5%	$1.2	$3,409	$466.98
Twin Cities Connection	Conventional, 4 RTs	Phase I	$58.3	*incl. in MWRRI*	*Not est.*	*Not est.*	$4.2	*Not est.*	*Not est.*
Twin Cities-Northfield-Albert Lea	Conventional, 4 RTs	Phase I	$118.5	$19.0	$1.0	5%	$1.0	$1,072	$162.81
Twin Cities-Mankato	Conventional, 4 RTs	Phase I	$223.0	$14.1	$4.1	29%	$2.7	$978	$44.08
Twin Cities-Eau Claire, Wisconsin	Conventional, 4 RTs	Phase I	$156.0	$14.6	$5.1	35%	$1.8	$607	$36.88
Twin Cities to Chicago (*River Route)*	High speed, 8 RTs	Phase I	$689.0	$44.9	$63.3	141%	$5.4	$423	–
Twin Cities to Rochester	High Speed, 8 RTs new ROW	Phase I	$778.7	$28.9	$8.0	28%	$8.7	$1,466	$39.42
	MWRRI Rochester alternative	*Alt*	*$1,258.7*	*$52.8*	*$63.3*	*120%*	*$7.9*	*$656*	–

[a] Includes passenger-specific costs, including capacity rights, but not rolling stock which is expensed as an operating cost in Chapter 7. Does not include freight-related costs.

Table 5.5 Passenger Project Performance Measures – Costs and Cost-Effectiveness: Best

In Millions

Corridor	Scenario Evaluated	Phase	Capital Cost (Millions of Dollars One-Time)[a]	Operating and Maintenance Cost (Millions of Dollars Annual)	Revenue (Millions of Dollars)	Farebox Recovery (Percent)	Capital Cost per Mile (Millions of Dollars)	Capital Cost per Rider (Dollars)	Operating Subsidy per Rider (Dollars)
Twin Cities-St. Cloud	Conventional, 8 RTs	Phase I	$152.3	$17.7	$19.6	111%	$2.3	$97	–
Twin Cities-Fargo	Conventional, 2 RTs	Phase I	$75.2	$5.8	$2.5	43%	$0.3	$1,374	$60.10
Twin Cities-Duluth	High speed, 8 RTs	Phase I	$676.6	$35.9	$12.0	34%	$4.5	$1,049	$36.96
Twin Cities-Willmar/ Sioux Falls, South Dakota	Conventional, 4 RTs	None	$177.7	$31.3	$2.5	8%	$0.7	$1,463	$237.13
Twin Cities Connection	Conventional, 4 RTs	Phase I	$46.7	*incl. in MWRRI*	*Not est.*	*Not est.*	$3.3	*Not est.*	–
Twin Cities-Northfield-Albert Lea	Conventional, 4 RTs	Phase I	$73.6	$14.9	$1.2	8%	$0.7	$444	$82.40
Twin Cities-Mankato	Conventional, 4 RTs	Phase I	$170.3	$11.1	$5.1	46%	$2.0	$498	$17.61
Twin Cities-Eau Claire, Wisconsin	Conventional, 4 RTs	Phase I	$112.1	$11.5	$6.4	56%	$1.3	$291	$13.17
Twin Cities to Chicago (*River Route*)	High speed, 8 RTs	Phase I	$525.4	$35.2	$78.9	224%	$4.1	$215	–
Twin Cities to Rochester	High Speed, 8 RTs new ROW	Phase I	$667.6	$22.7	$10.0	44%	$7.4	$838	$15.99
	MWRRI Rochester alternative	*Alt*	*$1081.1*	$41.5	*$79.0*	190%	*$6.8*	*$376*	–

[a] Includes passenger-specific costs, including capacity rights, but not rolling stock which is expensed as an operating cost in Chapter 7. Does not include freight-related costs.

Figures 5.1 (base) and 5.2 (best) summarize three key factors for consideration of new service – ridership, total capital cost, and farebox recovery (i.e., the percent of operating and maintenance costs expected to be covered by revenue from ridership). The ideal project would be located in the lower right-hand corner – high ridership/low cost. The size of the circle indicates the farebox recovery ratios.

Figure 5.1 Summary of Individual Passenger Route Performance – Base

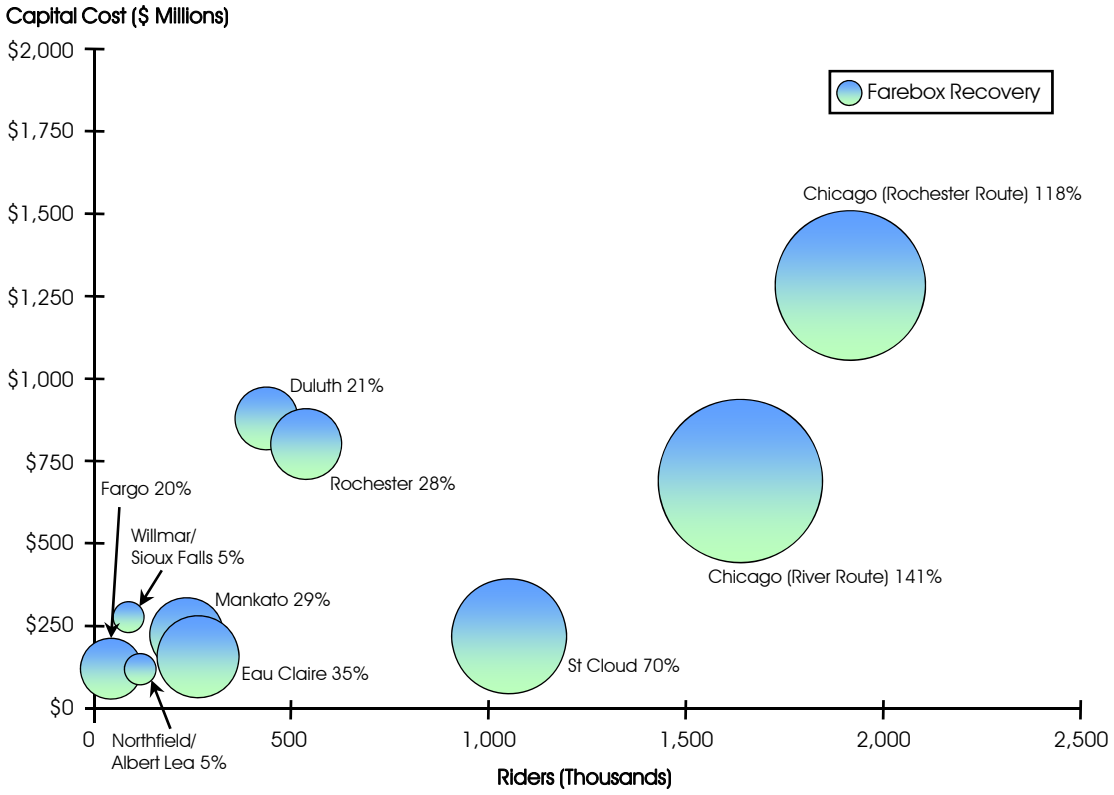
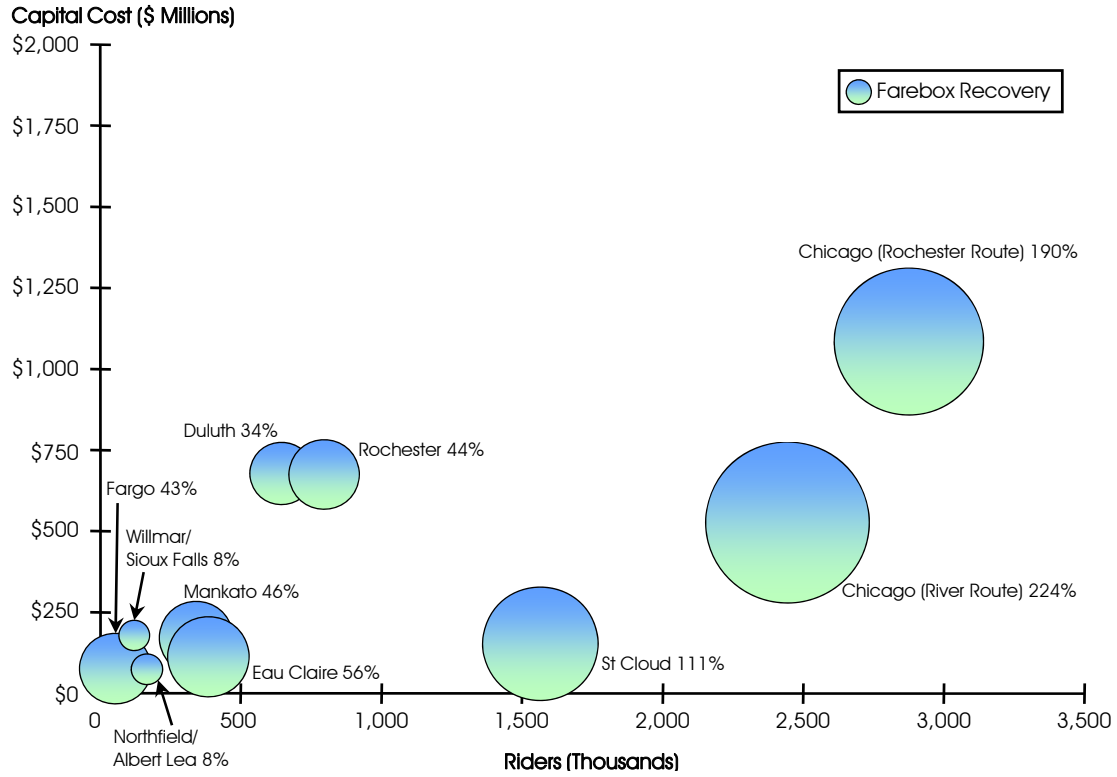


Figure 5.2 Summary of Individual Passenger Route Performance – Best



Dividing the figures into four quadrants suggests the following findings:

- High-speed services to Chicago (via River and Rochester routes) are in the upper right quadrant. These services are expensive to implement, but generate significant ridership and are likely to cover operating costs or even provide a surplus.
- Service to St. Cloud, in the bottom right quadrant, is a relatively low-cost high-ridership service with ability to cover a significant portion of operating costs. This service has clear, outstanding performance.
- In the top left quadrant, high-speed service to Duluth and Rochester (separate from service to Chicago) provide good ridership, but at significant capital expense.
- In the bottom left quadrant, the remaining services are all relatively inexpensive to implement, but the routes generate only modest or minimal ridership and many are unable to cover operating expenses with revenues. Services to Mankato and Eau Claire are clear exceptions.

In addition to examining the performance of individual routes, overall system performance was considered, taking into account the cost efficiencies described above. Table 5.6 summarizes performance at the system level for the priority Phase I system under the base and best scenarios.

Table 5.6 Annual Passenger Rail Systemwide Performance Analysis

	Scenario	
Metric	Base	Best
Miles of New Service	1,145	1,145
Train Miles	12,252	12,252
Ridership (Thousands)	4,157	6,235
Passenger/Vehicle	154.0	231
Passenger/Train Mile	1.1	1.61
Vehicle Miles of Travel Saved (millions)	489	733
Tons Greenhouse Gases Reduced (thousands)	318	526
Greater Minnesota Population with Access to System by Contiguous County or MPO	1,007	1,007
Pct with Access	41%	41%
Operations and Maintenance Costs (millions of dollars annual)	$181	$140
Farebox Revenue (millions of dollars annual)	$89	$99
Farebox Recovery Ratio	49%	71%
Operating Subsidy/Rider (dollars)	$22	$6.6

From an operating perspective, farebox recovery is 49 percent in the base case and 71 percent in the best case. This assumes that any operating surplus generated by the Minnesota portion of the interstate MWRRI routes cannot be used to offset deficits on intrastate routes. These figures are comparable to a range of Amtrak services today.[29]

5.2 Freight Evaluation

This section describes the performance metrics reviewed related to investing in freight rail in Minnesota as discussed in the needs assessment. The freight rail system evaluation was conducted at the subdivision level within the performance criteria areas described in Table 5.7.

[29] This is why a 25 percent increase in revenue for each route does not produce an overall increase in revenue of 25 percent, since the additional surplus from the Chicago route is not applied to the intrastate routes in this calculation.

Table 5.7 Freight Variable Estimation Procedure

Category	Measure
System Performance	**Operating Speed.** Operating speed/percent of system with track speeds > 25 mph.
System Condition	**Railcar Capacity Rating.** Percent of system with 286,000 railcar capacity rating.
	FRA Track Class. All tracks FRA Class 2 or better.
	Track-to-siding Ratio. Increase in number of mainline tracks to siding tracks by subdivision.
Connectivity and Accessibility	**Intermodal Connectivity**. Proximity to an intermodal facility.
Safety and Security	**Active Warning Devices**. Annual active warning device upgrades.
	Positive Train Control. Implement PTC on all Class I rail lines.

5.2.1 Performance Measure Calculation Methodology

Each metric was reviewed by comparing the 2009 freight condition to the 2030 freight condition by subdivision. The intent was to determine to what extent improvements have been recommended to the freight system.

Operating Speed

A goal of this study is to improve freight track speeds to 25 mph or greater, essentially an FRA Class 2 track condition or better, as warranted. This is needed to ensure commercial viability and safety for operators and current and future shippers that rely on them. Table 5.8 highlights the percent of subdivisions with freight rail speeds greater than 25 mph, and indicates what percent of these subdivisions have been upgraded by 2030. Note that after recommendations are implemented the majority of subdivisions in the State will have speeds of 25 mph or greater. Though not noted in this table, the DM&E railroad currently is upgrading the Waseca Subdivision.

Table 5.8 Percent Freight Rail Lines More Than 25 mph

Railroad	Subdivision	2009 Percent of miles > 25 mph	2030 Percent of miles > 25 mph	Percent of Subdivision Upgraded	Miles Improved
BNSF	Marshall	99.8	100	0.2	0.3
BNSF	Midway	39.4	93.1	53.7	5.9
BNSF	St. Croix	96	100	4	0.1
BNSF	St. Paul	47.1	61.4	14.3	4.4
BNSF	Staples	96.5	100	3.5	8.4
CN	Osage	32.6	100	67.4	12.4
CN	Rainy	99.9	100	0.1	0.2
CP	Bemidji	0	100	100	22.3
CP	Detroit Lakes	97.4	100	2.6	4.9
CP	Elbow Lake	97.3	100	2.7	1.9
CP	MN&S	0	100	100	18.5
CP	Noyes	94.1	100	5.9	10.0
CP	Paynesville	87.9	100	12.1	14.3
CP/BNSF	River Route	98	100	2	0.7
CTRR	Cloquet Terminal	0	100	100	3.0
DME	Waseca	31.4	31.4	–	0.0
MDW	MDW	0	100	100	4.0
MNN	Ada	0	100	100	15.8
MNN	P-Line	0	100	100	44.5
MNN	Warroad	0	100	100	92.3
MNNR	Fridley	0	100	100	11.5
MNNR	Hugo	0	100	100	13.7
MNNR	MNNR Yard	0	100	100	1.6
MPLI	Redwood Falls	0	100	100	94.3
MSWY	LaVerne	0	100	100	41.5
NLR	Cold Spring	0	100	100	17.0
NLR	East Side	0	100	100	2.0
NLR	St. Joe	0	100	100	5.1
PGR	Cannon Falls	0	100	100	8.9
PGR	Dan Patch	0	100	100	9.2
PGR	Eagandale	0	100	100	8.8
PGR	Faribault	0	100	100	1.8
PGR	Savage	0	100	100	20.9
UP	Albert Lea	93.9	100	6.1	6.9
UP	Hartland	0	100	100	12.4
UP	Montgomery	69.9	100	30.1	7.1
UP	Rake	99.8	100	0.2	0.0
UP	Winona	0	100	100	1.7

Railcar Capacity Rating

A goal of this study is to improve the freight rail network to support the use of 286,000 pound railcars throughout the State. This weight limit has become the industry-wide standard, and the viability of lines that do not have this capacity will diminish over time. Table 5.9 highlights the percent of each subdivision that is not 286,000-pound compliant in 2009, and what percent of these subdivisions have been upgraded by 2030, based on this plan. It is recommended that all rail lines be made 286,000-pound compliant by 2030.

Table 5.9 Percent Freight Rail Lines with 286,000-Pound Railcar Capacity

Railroad	Subdivision	2009 Percent of Line 286,000-Pound Compliant	2030 Percent of Line 286,000-Pound Compliant	Percent of Subdivision Upgraded
BNSF	Browns Valley	–	100.0	100.0
CN	Dresser	–	100.0	100.0
CN	Osage	–	100.0	100.0
CP	Bemidji	–	100.0	100.0
CTRR	Cloquet Terminal	–	100.0	100.0
DME	Waseca	–	100.0	100.0
MNN	Warroad	–	100.0	100.0
MPLI	Redwood Falls	31.0	100.0	69.0
MSWY	LaVerne	–	100.0	100.0
UP	Hartland	–	100.0	100.0
UP	Rake	–	100.0	100.0
UP	Montgomery	98.8	100.0	1.2

Track to Siding Ratio

Track to siding ratio is a measure by which capacity of a line is determined. Table 5.10 highlights the 2009 and 2030 track to siding ratios. In order to accommodate the high traffic freight corridors in the State in 2030 investments in track will be required, e.g., the Staples and Midway subdivisions.

Table 5.10 Percent Freight Rail Lines with Increased Track to Siding Ratio

Railroad	Subdivision	2009 Track to Siding Ratio	2030 Track to Siding Ratio	Increase in Track to Siding Ratio
BNSF	KO	2.00	2.49	0.49
BNSF	Marshall	1.09	1.22	0.13
BNSF	Midway	1.77	2.06	0.28
BNSF	Staples	1.85	2.29	0.44
BNSF	Hinckley	1.11	1.21	0.10
BNSF	St. Paul	2.00	2.27	0.27
BNSF	St. Croix	2.00	2.32	0.32
CP	Detroit Lakes	1.03	1.13	0.09
CP	Noyes	1.02	1.21	0.19
CP	Paynesville	1.08	1.24	0.15
CP	Tomah	1.75	1.82	0.07
CP/BNSF	River Route	2.00	2.35	0.35

Connectivity and Accessibility

A qualitative assessment of freight connectivity and accessibility was made using intermodal connectivity as a measure. This study identified the need for enhanced intermodal connectivity either through expansion of existing intermodal facilities, reinstating service in closed facilities, or through the construction of a new intermodal facility in the Twin Cities. Each of these options will provide enhanced connectivity and accessibility to shippers in the State of Minnesota.

Safety and Security

A qualitative assessment of freight system safety and security was made using active warning devices and positive train controls as measures. It is recommended that by 2030 1,400 active warning devices be replaced, enhancing the safety of the system for railroads and the motoring and nonmotoring public alike. Similarly, it is recommended that by 2030 Positive Train Control (PTC) be added to all Class I rail lines, increasing the efficiency of operations for freight railroads, but also enhancing safety in those freight corridors with shared passenger operations.

In conclusion, based on this cursory evaluation, recommended freight rail system improvements are anticipated to provide enhancements to freight service, shared corridor passenger service, as well as additional benefits to the motoring and nonmotoring public.

5.3 Benefits and Costs of the Program

Potential rail investments will generate a range of economic impacts in the areas served by the improvements. Though not quantified in this study, this section provides a discussion of the range of impacts that these investments may bring about, and the methodology whereby they are typically quantified.

Impacts are usually categorized into direct and indirect benefits and costs. Direct benefits and costs are those that are directly associated with the investment during planning and construction, and subsequent implementation. During construction, typical benefits include construction jobs and direct supplier purchases. Once operational, the range of benefits expand beyond direct system employment and vendor sales to include out-of-pocket cost reductions by system users, time savings, reduced maintenance costs on parallel highways, and gains in safety from a reduction in accidents. Examples would include personal time savings for all riders on any train faster than competing auto or air travel, and lowered costs on rail per passenger mile versus automobile use. The largest cost is usually the financial outlay required to accomplish the program, but there may be other direct costs that are not fully reflected in the financial outlay. These could be uncompensated construction-related impacts on abutters, or revenue losses incurred by a competing service provider. For example, introduction of a new passenger rail service could divert traffic from an existing bus service, with the operator suffering a financial loss.

Beyond the direct financial impacts are indirect benefits and costs. These entail the broader economic effects that an investment will have on a region's economy, as well as other collateral effects. For example, new passenger rail service may expand tourism opportunities and, with it, increase the amount of investment and jobs in that sector. In considering the economic impact of a transportation investment, there are two broad classes of analysis:

1. Transportation as derived demand (e.g., passenger travel); and
2. Transportation as a substitutable input (in competition with raw materials, labor, capital and other inputs necessary for production).

Transportation as a sector is often overlooked since the general public is more aware of 1 than 2. While empirical evidence from research suggests that the quality and quantity (as well as the specific form) of transportation infrastructure is a major contributor to economic growth, it also has been demonstrated that regions that provide more transportation services tend to dominate growth. Obviously, the nature of these services is important – are they provided efficiently, in a timely manner and at competitive prices?

For freight, changes in a region's economy will occur because of changes in the cost of doing business associated with the cost of freight transportation. Business costs end up affecting productivity and profitability, and ultimately also the competitiveness of a region's businesses. Of course, the value of this cost differs by industry, depending on the extent to which it depends on rail freight, trucking, or "on-the-clock" employee travel. Likewise, improvements in

passenger rail service also will result in economic benefits, particularly through increased business and tourism travel.

The direct, indirect, and induced economic impacts of a proposed transportation investment are usually examined using an economic impact model.[30] These models provide a framework for evaluating both user impacts and total regional economic impacts of transportation investments, and can account for both short-term and long-term travel cost impacts, as well as the effects of changes in market access and spending patterns. This involves coupling a model of the regional economy with a forecasting and analysis system and a detailed accounting framework for calculating impacts on revenues and costs affecting various classes of shippers, carriers, households, and government. With this approach, the impact on how different industries are likely to be affected by changes in costs of alternative rail, road, and intermodal transportation options can be analyzed.

In practice, these frameworks provide a way of tracking how travel time, reliability, and expense changes will affect the local cost of doing business in future years, as well as direct cost of transportation and transportation-related expenses for businesses and households. Changes in these factors end up shifting local spending patterns and cost-competitiveness, thus affecting business growth and investment, and ultimately jobs and income. The economic analysis also recognizes that some of these changes are absorbed in a regional economy, while others are passed on to customers outside of the region.

As one example, the California High-Speed Rail Project, probably the most advanced and thoroughly analyzed such plan in the country, estimates total benefits through 2050 of $150 billion versus a cost of $53 billion for a benefit/cost ratio of 2.84.[31]

[30] A variety of models are available for this purpose, including the Regional Economic Model, Inc. (REMI), Economic Development Research Group' (EDRG) Transportation Economic Development Impact System (TREDIS), and the University of Illinois' Regional Economics Application Laboratory (REAL).

[31] California High Speed Rail Authority Business Plan 2008.

6 Institutional Relationships

This chapter consists of four sections:

- Section 6.1 examines the roles and responsibilities of the state departments, regional agencies, and to a lesser extent, Federal agencies from the perspective of the railroad industry. Mandates and application of Minnesota statutes with relatively minor impacts on the industry are summarized, and the perspectives of rail industry stakeholders presented.
- Section 6.2 evaluates the two existing programs that involve public investment in Minnesota's railroads – the Minnesota Rail Service Improvement (MRSI) Program, and the Railroad-Highway Grade Crossing Safety Improvement Program, both of which are administered by Mn/DOT.
- Section 6.3 examines structure, practices, and funding strategies of rail-related functions in other representative states, for identification and comparison of alternatives to Minnesota's institutional structures and programs.
- Section 6.4 provides a possible management plan for Minnesota.

Specifically addressed are a series of questions that were defined at the outset of the rail planning process:

- Identify and quantify how the key public policies and programs affect Minnesota's rail industry, and compare with the experience of other states;
- Examine the institutional elements of how Minnesota manages rail-related policies and programs;
- Examine different approaches and their impacts of public investment on private railroads;
- Review the experience in other states in the assignment of roles and responsibilities for freight and passenger rail planning and implementation; and
- Identify current roles and responsibilities in Minnesota for freight and passenger rail planning and implementation.

The chapter draws extensively on information obtained through a series of public and private stakeholder discussions that took place throughout the project. Respondents included agency employees, railroad managers, shippers, state legislators, as well as the public at large that attended the open meetings that were held throughout the State. More detailed information is provided in Technical Memorandum 7/8.

6.1 Minnesota Agency Organization and Rail Program

Minnesota's railroads, with their significant and long-time presence have a broad range of interactions with government agencies at all levels, including the Federal, state, and local governments. While the nature of these interactions vis-à-vis the rail industry range from minimal to major, collectively they significantly affect rail industry behavior and performance in the State. This chapter examines the institutional roles and responsibilities of these agencies and relates the perspectives of rail industry stakeholders to their current effectiveness and potential for improvement, particularly as Minnesota embarks on a broader vision for rail.

With this Rail Plan having a statewide focus, the primary emphasis is on the state departments, programs, and legislative mandates that affect railroads. Beyond the state-level interactions, several Federal agencies also have important institutional roles.

6.1.1 Minnesota State Agencies

Seven departments in the Minnesota State government, along with a handful of regional agencies have ongoing roles and responsibilities as they relate to the rail industry.

Minnesota Department of Transportation

With its mandate to handle transportation issues for the State, the Minnesota Department of Transportation (Mn/DOT) has the most extensive interactions with the rail industry on a regular basis. Mn/DOT consists of six divisions, 24 offices, and eight districts located throughout the State. Offices that have significant interactions with the rail industry are as follows:

- **Office of Freight and Commercial Vehicle Operations (OFCVO).** Located within the Modal Planning and Project Management Division, OFCVO has primary responsibility in handling freight-related matters for the State, including policy development, multi-modal planning, and investment processes. Prior to the recent creation of the Office of Passenger Rail, Mn/DOT's rail-oriented programs were all located within OFCVO, which presently include the Rail Grade Crossing Improvement program, Operation Lifesaver, the Minnesota Rail Service Improvement (MRSI) program, the track inspection program, and management of state-owned rail bank assets. This office has a staff of 70, of which 50 are assigned to commercial vehicle operations and 20 to other freight and rail functions.
- **Office of Passenger Rail (OPR).** This office was established in 2009, under the Modal Planning and Project Management Division. Its purpose will be to coordinate and manage Mn/DOT activities related to intercity passenger rail, including planning. With this Office only being recently launched, staffing levels and responsibilities are still being determined.

- **Office of Transit.** Also located within the Modal Planning and Project Management Division, this Office administers grant programs for capital and operating assistance to transit services outside of the Twin Cities metropolitan area, and provides coordination and planning support for nonmotorized travel and telecommuting. Although intercity passenger rail services would not generally fall under the Office of Transit, certain elements could be included such as station improvements and connections with local transit services in outstate locations.

- **Office of Environmental Services (OES).** This office, located within the Engineering Services Division, conducts environmental review for FHWA projects, including air/water quality and analysis, endangered species, noise, regulated materials and waste, and erosion control. Although OES generally focuses on highway projects, more recently it has become involved in some rail-related activities.

- **Office of Land Management (OLM).** Part of the Engineering Services Division, OLM provides a variety of services for managing and acquiring real estate for transportation purposes. OLM acquires abandoned rail rights-of-way under the direction of OFCVO, and maintains extensive records on rail property in the State.

Given the central role of Mn/DOT as the state agency with the most extensive interaction with the railroads on non-administrative matters, stakeholders had the most comments about Mn/DOT.

Mn/DOT organizational structure. Mn/DOT, like most state DOTs, developed initially as a highway department and experienced its greatest growth during the period of interstate highway construction in the 1950s through 1970s. It has therefore traditionally had a strong highway focus. In recent decades, Mn/DOT has strived to develop more of a multimodal focus in response to changing state and national priorities. The focus has been reflected in Mn/DOT's support for both urban and rural public transportation projects, including the development of the Hiawatha light rail line and the Northstar Commuter Rail Service, and in creation of the Office of Freight and Commercial Vehicle Operations which focuses on rail, waterway, and highway freight movement.

Autonomy of the eight Mn/DOT Districts in some areas of freight and safety discourages coordination and distribution of funds according to local priorities instead of statewide need. Furthermore, regional staff ability varies greatly, with some having little knowledge or interest in addressing rail-related matters. A common outcome is a lack of coordination and communication with stakeholders.

Mn/DOT management, with specific funding from the State Legislature, responded to stakeholders' desire for central leadership and improved State passenger rail involvement by establishing the Office of Passenger Rail in 2009. This department is charged with coordinating the Minnesota Passenger Rail Forum, the stakeholders' advisory committee; facilitating Federal funding applications for Minnesota passenger rail corridors and projects; representing the State in multistate compacts and national passenger rail organizations; and advancing the recommendations of the State Rail Plan.

Mn/DOT, absent any specific redirection by the Legislature or the Governor, should continue to be responsive to stakeholder and partner needs in advancing passenger and freight rail improvements in the State. This will involve an intentional and active assumption of a leadership role in both serving to coordinate local projects and represent Minnesota in multistate and Federal dealings.

Planning. Planning efforts that incorporate rail as a mode have traditionally occurred outside of the standard Mn/DOT planning processes. This has placed rail at a distinct disadvantage, particularly for project funding, long-term transportation investment strategies and needs assessments. However, Mn/DOT has recently made a concerted effort to include multimodal freight in its Minnesota Statewide Transportation Plan 2009-2028. For example, there is a freight dimension to the Infrastructure Preservation Policy, which includes freight objectives and performance measures. New initiatives were started in mid-2009 to enhance multimodal planning and the centralized coordination of investments and performance evaluation of all modes in a consistent, agency-wide process.

Mn/DOT should improve recognition of rail-related needs as well in day-to-day highway engineering activities. The agency has been slow to adopt current standards, such as overpass clearances (Federal standard is 23 feet, 3.75 inches), and taking into consideration future needs during the design of highways. For example, when projects are proposed that entail constructing highway structures over rail lines, future capacity needs should be taken into consideration. Thus, in instances where a line currently is single track, if traffic projections indicate potential need for a second track, sufficient clearance should be provided to do so.

Safety. OFCVO is involved in administering several safety-related initiatives, including Operation Lifesaver, and monitoring of grade crossing and right-of-way trespassing incidents. In 2008, OFCVO was given responsibility to administer two new safety mandates that are defined by statute:

- **Walkway legislation (MN Statutes 219.501).** Effective August 1, 2008 railway companies were required to provide walkways next to portions of rail tracks where employees work on the ground performing switching activities at least one shift per day, five days per week. Mn/DOT can order modifications to meet set standards for walkways constructed before or after the effective date. Although this mandate is quite limited in scope, the expected benefits have not been quantified, and efforts to expand these provisions could have a disproportionate impact on short lines.
- **Track inspection program (MN Statutes 219.015).** Instituted in July 2008, Mn/DOT was directed to employ a state rail safety inspector to participate in the FRA's Federal State Rail Safety Partnership Program. This inspector collaborates with existing FRA inspectors to examine track, right-of-way, civil works, and other facilities, including enforcement of the walkway legislation. The cost of the inspector is being covered through an assessment of Class I railroads operating in Minnesota. Having an additional resource to inspect track may provide Mn/DOT with a better picture of conditions in the field, and improve efforts to manage the MRSI program.

Minnesota Pollution Control Agency

The Minnesota Pollution Control Agency (PCA) monitors environmental quality, offers technical and financial assistance, and enforces environmental regulations. Three of eight divisions regularly intersect with the rail industry: Industrial, Remediation, Prevention, and Assistance. However, most interactions are related to hazardous materials releases and facility permitting.

Permitting and clean-up. With the most common interaction following the occurrence of an environmental mishap, some rail carriers perceive that the PCA primarily focuses on enforcement, rather than working cooperatively to develop effective solutions that minimize risk.

Emissions reduction. Some states, such as California and Texas, have programs that aid railroads in acquiring (usually through grants) emissions reduction technologies, such as genset locomotives and standby systems. Genset locomotives, which shut down automatically when they are not in use, are far less polluting in switching applications. Such a program could be administered through the PCA or Mn/DOT.

Minnesota Department of Agriculture

Given the significance of agriculture to Minnesota's economy, the Department of Agriculture is a substantial state function. The department consists of 12 divisions, of which the Agricultural Development, Marketing Services, and the Pesticide and Fertilizer Management Divisions most commonly interact with the rail industry. Agriculture Development and Marketing Services develop new markets and uses for agricultural products, of which the most noteworthy recent development from the perspective of the rail industry has been ethanol.

The Pesticide and Fertilizer Division enforces regulation of chemicals used for the control of noxious weeds, which the rail industry became subject to on June 1, 2009 through an amendment to Minnesota Statute 18B.346, Pesticide Application on Railroad Property. Applicants must be properly trained in the use of restricted-use pesticides on railroad property, which must only be used for their intended use as specified on the label. Since the railroads almost entirely rely on third-party specialists to apply pesticides, this already is being done.

Minnesota Department of Employment and Economic Development

The Department of Employment and Economic Development (DEED) is the State's principal economic development agency, with responsibilities for managing the unemployment and job services programs and retaining and attracting businesses to the State. Four divisions make up DEED, of which railroads interact with three: Workforce Development, Unemployment Insurance, and Business and Community Development (BCD).

Although DEED participates in Mn/DOT's Rail Advisory Committee, there is little active coordination between DEED, Mn/DOT, and the railroads in retaining existing or attracting new businesses. At times DEED has had in-house rail expertise, but it has not been a consistent

focus, and coordination with Mn/DOT has generally been infrequent. Stronger focus on this function should be provided, either at DEED or Mn/DOT.

Minnesota Department of Revenue

Collecting taxes to fund state programs is the MDOR's primary function. Most importantly for the railroads, the agency administers the property and corporate tax collection process. For the former, while MDOR administers the collection process, revenues are dispersed to local jurisdictions. The MDOR also enforces compliance with state purchasing regulations of other state departments, including Mn/DOT.

Treatment of railroads by the DOR is viewed to be acceptable for the most part, although two issues have been of concern, particularly to short lines:

Recognition of Federal tax credits for short line infrastructure investment. Minnesota has not adjusted its tax structure to conform to the U.S. Federal Tax Maintenance Track Credit that was reauthorized and expanded in the Railroad Safety Enhancement Act of 2008, thus treating the Federal tax credit as ordinary income. With a total impact on Minnesota's Class II and III railroads of approximately $200,000, this does not have a major financial impact; however, it is seen as discriminatory by some railroads.[32]

Diesel fuel sales and use tax (MN Statutes 297A.62). In 2000, Minnesota imposed a diesel sales and use tax on railroads that was viewed as discriminatory by the railroads. Since motor carriers and air carriers pay a separate petroleum excise tax, they are not subject to this tax via an exemption provided in MN Statute 297.68 subdivision 19(1). Following a series of court challenges led by the CP, the Eighth Circuit Court of Appeals ruled in favor of the railroads on November 6, 2007, following an appeal of a summary judgment by the Federal district court. Taxes collected by the State under this provision have yet to be refunded to some of the railroads. The outstanding amount is unclear, although one estimate places the amount at several million dollars.

Minnesota Department of Public Safety

The Department of Public Safety (DPS) provides a one-stop shop for most safety-related functions in which the State is involved, including law enforcement, emergency management, and driver and vehicle services. Consisting of 12 divisions and offices, DPS' involvement with rail is primarily through law enforcement functions, and collection of accident statistics, including grade crossing incidents. At one time, DPS also collected data on railroad accidents, a function that is handled Federally by the FRA.

[32] Edward A. Robinson, CPA, *Minnesota Railroad Track Maintenance Credit for Small Railroads,* undated.

In the DPS realm, two issues are of concern to railroads: trespassing on rights-of-way, and the authority of railroad police. Trespassing is not permitted in yards, but along main lines it is only a major misdemeanor. This raises serious safety concerns, and exposes railroads to potential liability. Carriers feel that these risks could be reduced if their own officers had the authority to make arrests. Minnesota and Wyoming are the only two states where railroad police are not deputized, and thus must rely on local law enforcement authorities whose priorities may differ.

6.1.2 Regional Authorities and Metropolitan Planning Agencies

Regional Rail Authorities

Through legislative action in 1980, a mechanism was created for counties to preserve and improve local rail service for both industrial shippers and/or passenger traffic. The means through which such preservation could take place was through the creation of Regional Rail Authorities (RRA), of which 24 currently exist. Minnesota Statute 398A grants significant powers to these authorities, including the ability to acquire and dispose of property, apply for state and Federal funds, exercise eminent domain, and levy taxes.

The performance of Regional Rail Authorities has been mixed. Many authorities are only minimally active and have not developed into robust entities. Only a few of the authorities have a regular funding stream, with the others funded sporadically, if at all. However, some have been very active, and have effectively utilized different elements of the statute. The RRA's clustered around the Twin Cities region have all been active to varying degrees in acquiring and preserving rights-of-way and even some active facilities, and planning for future transit and regional rail uses. However, many of these rights-of-way have been acquired for use as recreational trails. Among rural authorities, the Minnesota Valley RRA, and the St. Louis and Lake Counties RRA stand out. The former owns and oversees operation of the Minnesota Prairie Line (MPL), a 94-mile line from Norwood to Hanley Falls, while the latter operates a tourist line (the North Shore Scenic) and is active in freight rail service development elsewhere in its region.

Metropolitan Council

Established in 1967, the Metropolitan Council was created to coordinate planning and development within the Twin Cities metropolitan area and to address issues that could not be adequately addressed within existing governmental arrangements. In addition to being one of the oldest regional planning agencies in the U.S., the Metropolitan Council also is unique in not only having planning responsibilities, but also operational responsibility through its Metro Transit division, operator of the core bus system and the Hiawatha Light Rail line. Metro Transit also is overseeing operation of the new Northstar Minneapolis to Big Lake commuter rail service.

Close cooperation with the Metro Council is a prerequisite to a successful statewide initiative to improve Minnesota's rail system. Many of the most critical bottlenecks are located in the Twin Cities, affecting both future freight and passenger needs. Efforts to expand regional rail service will draw on much of the same infrastructure as intercity services, and the public's investment will be maximized if the intercity rail services are closely coordinated with Metro Transit.

6.1.3 Federal Agencies

At least nine Federal departments, agencies, and boards are involved in rail-related matters. The U.S. Department of Transportation (DOT) has the most extensive involvement, both directly with the carriers and indirectly in conjunction with the state departments of transportation and regional jurisdictions. The purpose and relationship of the agencies that are most heavily involved with the railroad industry are summarized below.

- **Federal Railroad Administration (FRA)**. One of the modal agencies within U.S. DOT, the FRA develops and enforces railroad safety rules, manages the Railroad Rehabilitation and Improvement Financing (RRIF) program, provides oversight of Amtrak for U.S. DOT, and manages a small research program. With the passage of the Passenger Rail Improvement and Investment Act (PRIIA) in 2008, and the subsequent provision of capital funding for intercity passenger rail in the American Recovery and Reinvestment Act (ARRA), the FRA was tasked with managing these programs. Traditionally, the vast majority of FRA personnel and financial resources have been devoted to safety enforcement activities.
- **Federal Transit Administration (FTA)**. The FTA administers formula and grant funding for the development of public transportation in urban and rural areas, supports existing and recommends funding for new services, and coordinates research and training. Through the New Starts process, the FTA establishes criteria and evaluates applicants seeking Federal funding for new transit lines. The most common funding requests for rail transit entail urban light rail, rapid transit (which is fully grade separated), and commuter or regional services. While light rail and rapid transit usually operate over dedicated trackage, commuter services utilize the freight network, and thus are subject to FRA and railroad industry standards that are administered by the Association of American Railroads (AAR). The FTA presents an option for funding some improvements where intercity operations are shared with commuter rail and transit.
- **Surface Transportation Board (STB)**. Established in 1996 as a successor to the long-lived Interstate Commerce Commission, the Surface Transportation Board has administrative authority over railroad mergers and line abandonments and adjudicates disputes over rates and services between shippers and carriers. In 2008, the PRIIA expanded the STB's role to mediate conflicts between passenger rail operators with freight rail owners. This new provision is intended to address long-standing concerns about enforcement of Amtrak's statutory rights to operate passenger trains over the freight network.

6.2 Minnesota Public Rail Programs

The State of Minnesota has had involvement with various aspects of the rail industry throughout its history. As early as 1885, the state created the Railroad and Warehouse Commission to regulate and oversee local rail activities, an organization that continued until merged into Mn/DOT in the 1950s. The State partnered with Amtrak from 1975 until 1985 to support an intrastate passenger rail service from Minneapolis and St. Paul to Superior and Duluth. From 1976 on, Mn/DOT has administered the Minnesota Rail Service Improvement (MRSI) program for support of rail shippers and short lines with both Federal and state grants and revolving loans. During the significant rail line abandonments of the 1980s and 1990s, the State has worked to preserve some strategic rail rights-of-way with the State Rail Bank program. Mn/DOT has actively been involved in grade crossing and rail safety during this entire period. A Minnesota Rail Inspection program was reinstituted in 2009 after being discontinued in the mid 1980s. Also in 2009, Mn/DOT formed a new Office of Passenger Rail to coordinate passenger rail development planning and funding with local corridor projects and stakeholders.

Like many of its neighbor states, including Wisconsin, Iowa, and the Dakotas, Minnesota has promoted rail shipping as an economic development tool, particularly for rural areas whose employment base revolves around rail-dependent industries such as agriculture, mineral extraction, logging, and manufacturing. Much of this has centered on providing financial assistance to rail shippers through programs like MRSI. Specific project assistance, in the form of loans and legislative earmarks, has been provided for rail line rehabilitation and for capital improvements for rail shippers and railroads, as well as purchased assistance to regional rail authorities for acquisition of rail lines. Mn/DOT's rail section also coordinates the construction of grade crossing safety projects at all public road crossings in the state, and overpasses and underpasses associated with construction projects on the state trunk highway system. These latter construction projects have provided Mn/DOT with ownership of approximately 57 railroad bridges throughout the State, and practical experience with engineering, land acquisition, legal, contract oversight, and inspection.

6.2.1 Minnesota Rail Service Improvement (MRSI) Program

Operating as a program of Mn/DOT's Office of Freight and Commercial Vehicles, MRSI has been primarily a low-interest revolving loan assistance program aimed at helping to finance rail shipping facilities for private shippers including rail sidings and loading sites. The MRSI Program provides funding for projects in the following five categories:

- **Rail Purchase Assistance –** Financially assist regional rail authorities in acquiring rail lines. State funds only require repayment when a line is sold and/or ceases to serve a transportation function.
- **Rail Rehabilitation –** Provide low or no interest loans to rehabilitate and preserve rail lines (replace rail, ties, ballast, etc.) to either an operating railroad or regional railroad

authority. Approval is subject to a set of requirements that include a cost/benefit analysis, shipper survey, and rehabilitation needs assessment.

- **Loans for Capital Improvements –** Provides loans to shippers and railroads for rail sidings, storage buildings, loading equipment, etc., with a limit of $200,000 per application for shippers. In recent years, loans have been used solely for rail-related improvements, and not for storage buildings and other customer facilities.
- **Rail User and Rail Carrier Loan Guarantee –** Assists shippers and carriers to obtain financing by guaranteeing up to 90 percent of a loan for rail line rehabilitation and rolling stock acquisition.
- **State Rail Bank –** Acquire and preserve abandoned rail lines for future transportation use or for current use as utility corridors.

Since 2008, the revolving loans also have been available to qualifying short lines. Operating with as much as $36 million in loan funds in its peak years, MRSI has been well-subscribed with little or no defaults throughout its history, administering loans of up to $200,000 per qualified project. Because of staff expertise and statewide contacts, the MRSI program also has served as a natural conduit for state and Federal rail grants and earmarks, notably for projects such as the purchase and upgrade of the Minnesota Prairie Line, a 94-mile short line in central Minnesota; and the Minnesota Southern short line in southwest Minnesota. Finally, MRSI has been used as the funding source for Rail Bank purchases.

The MRSI program has been scaled back in recent years, due to the transfer of excess funds to passenger rail projects, rail studies, other rail programs, and back to the State's general fund for budget balancing measures. The loan funds in use currently are less than one-half that in use during peak years. Another challenge to the program is the inflation of construction costs.

Although the scope of the MRSI legislation is similar to that found in other states, the program as implemented fails to match the success of some of the more robust programs in other states. Particular concerns were raised by stakeholders about four elements:

- **Project Funding Options –** These should offer a broader range of project funding options, from higher loan limits for shippers and railroads to outright grants for some projects where the applicant cannot fully capture the potential benefits. Coupled with greater funding flexibility should be an increase in the maximum loan amount to at least $1 million. The $200,000 loan cap is often too small to be effective, with the basic investment needed to convert a rail shipping facility (such as a conventional grain elevator, ethanol plant, power plant, or other bulk facility) to a unit train or shuttle facility costing over a million dollars for a single mile of track for loading or storage. However, increasing loan limits will introduce contracting complications that may make the loans less attractive to private entities, and at the same time substantially increase the commercial risk to the State, particularly with shipper facilities. In addition, administrative processes, oversight, audit, and other documentation requirements would require a significantly expanded staff to handle larger loans safely, while operating budget limits have curtailed staff resources. These issues must be addressed if the loan program is increased.

These same constraints have limited the program's usefulness for the State's short line railroads. Despite specific grants legislatively mandated and administered in the past, MRSI does not maintain nor is mandated to have an ongoing grant program for short line assistance similar to many other state programs around the nation.

- **Applicant Qualification –** Stakeholders found qualification requirements unnecessarily limiting, which sometimes forces political approaches that subvert the process and divert funding from other meritorious projects. In the past, requirements for asset collateral made MRSI unsuitable for railroads that lease most of their property from a private entity, which is often a Class I railroad. (The Federal RRIF loan program suffers from the same limitations.) However, more recently this situation has been successfully overcome with several loan applicants.

  Although the MRSI loan guarantee program does permit acquisition of rolling stock, including locomotives, none has occurred thus far, as the program is viewed as uncompetitive. With rolling stock being a readily marketable secured asset, shippers and carriers requiring cars and locomotives can obtain equipment cost-effectively in private markets. However, with the impending tightening of emissions regulations starting in 2010, the traditional sources of locomotives for small railroads – Class I railroads disposing of older units – will no longer be available. Since small railroads can rarely afford new or rebuilt locomotives, programs that assist in the acquisition of new low emissions and fuel-efficient locomotives should be implemented. Programs providing public matching funds for the acquisition of new low-emissions locomotives are in place in several states, including Texas, California, Illinois, and Pennsylvania. This may require a change to Minnesota's Constitution, Federal bonding requirements and Minnesota Statutes 222.57, which forbid outright funding of rolling stock.

- **Program Administration –** Stakeholders spoke highly of Mn/DOT staff that administers the MRSI program, but they felt that staffing was insufficient for the program as currently structured. In part, this is because the same staff also manages other rail-related activities. If a larger program is established, staffing levels will need to be increased.

- **Program Funding –** Over the years, appropriated funding levels have fluctuated considerably and have often been minimal, with total state participation since 1976 amounting to $56 million dollars, or less than $2 million per year. Program expansion will require larger and more stable funding sources. Also, preventing the return of loan repayments into the General Fund would enhance program stability.

6.2.2 Minnesota Rail Bank

Mn/DOT holds 214 miles of abandoned railroad right-of-way in a state rail bank program. There is a similar Federal rail bank program, but this program has not been utilized in Minnesota. The banked property includes three significant segments that have been purchased to preserve these routes in the public domain for future uses, rather than let them return to contiguous land owners or nontransportation uses. The Rail Bank grants operating rights for trails over much of this property, particularly to the Department of Natural Resources (DNR) for recreational trails (165 of the total 214 miles). All of these properties have reversionary rights enabled in Mn/DOT's ownership and usage agreements, allowing future return to rail operations as needed. The roadbed and structures on these Minnesota Rail Bank properties are maintained to railroad specifications to insure good condition for possible reuse. Although these routes include some strategic connections, much of the 4500 miles of railroad abandoned during the last three decades were sold to private land owners, the DNR, and assorted county Regional Railroad Authorities, the latter two parties using the purchases primarily for recreational trails.

Funding for Rail Bank purchases and maintenance has come from MRSI, and administration of the program is supported by a Policy Board made up of Mn/DOT Rail Office personnel, along with Mn/DOT District and DNR representatives. One of the major ongoing challenges of the program is criteria for acquiring new properties in a systematic way or pattern (past purchases have largely been opportunistic), and criteria for selling or trading properties that over time have appeared to have lost their need for preservation. Periodic reviews of the program could result in a better and more useful catalog of properties. Notably, several of the current and potential properties in the Rail Bank may have potential to become dedicated segments of future high-speed, intercity, or commuter rail lines, and could be reevaluated in light of this new use.

6.2.3 Future Program Evolution

Minnesota rail programs have focused primarily on freight assistance for shippers and short lines, safety, highway interaction at grade crossings and grade separations, and preservation of transportation rights-of-way. Through the open houses and stakeholder meetings conducted for the State Rail Plan, a new focus for these programs has been suggested.

Of the 4500 miles of active track in the State, 778 miles are operated by 16 short lines. Almost 20 percent of the system originates only eight percent of rail carloads, and four percent of terminating carloads. In spite of this light usage, these lines have a high local visibility and importance for their on-line communities and businesses. In addition, the Class 1 railroads value these connections as traffic generators and local agents. All four of the major railroads in Minnesota have short line coordination programs or departments to facilitate these connections. As indicated by the BNSF, almost 20 percent of their non unit-train freight traffic comes from or goes to a short line across their system, and they are considered "the local face of the industry." Because of rural community subsistence and economic development issues,

states such as Kansas and Iowa have short line support programs, including grant components, and states like Wisconsin and Connecticut actually own significant mileages of short line routes, maintaining them as active transportation infrastructure and leasing them back to operating railroads. These programs are justified and considered necessary for the competitiveness and economic health of the State as a whole wherever they have been adopted. Their existence and prevalence especially in Midwest and Great Plains states suggest an economic benefit that could accrue to Minnesota though similar emphasis on an expanded MRSI program and short line support as warranted on a selective basis. Local matching funds and industry participation could be incorporated to insure both financial viability and shipper buy-in for the program expansion, while Mn/DOT planning and evaluation in partnership with stakeholders could be designed to insure valid and efficient use of investments.

This program also would allow the upgrade of substandard short line trackage, as identified in the investment inventories, to the joint standard of 286K weight capacity and 25 mph operating condition. An expanded program also could insure against catastrophic line failures and closures, providing needed capital resources to insure continuous operations and facilitating new plant location and economic development along these short lines by removing this risk to their survival.

The revamping of the management and evaluation of the Rail Bank program, and the integration of these assets into freight and passenger rail corridor planning, is also suggested as a logical improvement. The properties currently held by the Minnesota Rail Bank, the DNR, and the respective Regional Railroad Authorities have been integrated as a result of this evaluation and are available in a consolidated Mn/DOT database and map.

Rail grade crossing safety (see section below) will need a significant program expansion and dedicated funding to respond adequately to the needs forecast for both increasing freight traffic and high-speed/intercity passenger rail implementation. In addition to at-grade crossing improvements, grade crossing closures, grade separations, and an active education component all need to be integrated into an expanded program to be effective in the future.

6.2.4 Rail-Highway Grade Crossing Safety Improvement Program

Mn/DOT's rail-highway grade crossing protection program was established in 1974 to leverage off of the Federal Highway Administration's 23 USA Section 130 program. Since then, the program has participated in the installation of active warning devices (lights, gates, or a combination of the two) at more than 1,400 grade crossings out of the approximately 4,500 crossings located in Minnesota. Through improvements in infrastructure and public education, grade crossing incidents have declined substantially. Whereas the State experienced 400 vehicle/train collisions and 50 fatalities in 1972, by 2008 vehicle/train collisions had dropped to 52 – an 80 percent decline – and only six fatalities.

Mn/DOT administers the Federal Highway Administration Section 130 grade crossing safety program funds for Minnesota, which provides about $5.5 million annually. Mn/DOT staff regularly evaluates and prioritizes grade crossing improvement projects based on accident frequency and safety needs, as well as replacement needs. Given the current cost of grade crossing equipment and design, this allows the funding of about 25 major projects each year. While the cost of new installations has been steadily inflating, the Federal funding has remained relatively static over the last several years, resulting in fewer projects being possible each year.

Whereas the State experienced 400 vehicle/train collisions and 50 fatalities in 1972, by 2008 vehicle/train collisions had dropped to 52 – an 80 percent decline – and only six fatalities.

In addition to the Section 130 program, Mn/DOT also administers about $600,000 per year in Highway Safety Account (HSA) state funds for other safety improvements. This funding allows another 30 to 40 projects per year to be completed, consisting of more basic or low-cost enhancements such as line-of-sight corrections, vegetation removal, geometric fixes, sign upgrades, closures, and other betterments. Programming for all of these projects is routed through the eight Area Transportation Partnerships (ATP's), including the metro area Transportation Advisory Board, and is integrated into highway project programming. Because of other local transportation priorities, many grade crossing projects are delayed or rejected at this stage, creating deficiencies and inequities in the statewide safety program. The protocol requires a six-year process for planning, programming, approvals, and reviews before any project is funded and awarded for construction. Each project is an independent contract, although this ignores the fact that most work is done by specialty rail contractors and not highway or general contractors. The result of the local prioritization and the programming cycle is to leave 20 to 30 percent of the Federal funding unused before expiration, and the contracting requirements are inefficient and administratively complex due to the decentralized and fragmented nature of the process, unlike the more streamlined structure used in other states. Because of the need to work centrally with the safety evaluation and the railroad's engineering representatives, the Mn/DOT Rail Office is involved in all rail grade crossing safety even though much of the programming remains decentralized. A workable alternative to this situation is used in many states, such as the Texas program where centralized administration, programming, and a master construction contract are utilized to maximize the program's effectiveness.

Mn/DOT recently conducted an analysis of grade crossing active warning devices to determine the prevalence of and the need to upgrade aging infrastructure, and estimated that approximately 270 signals are 20 years old or older (as of 2006), while the normal lifespan for an active warning device is 25 years. Aging active warning devices are increasingly difficult to maintain due to technological obsolescence thus often entirely new warning devices must be installed at a cost of $200,000 to $500,000, depending on the complexity of the installation. As many signals were installed in the 1980s and 1990s, Mn/DOT estimates that within 20 years, almost all of the 1,400 warning devices will need upgrading. At current values, it is estimated that $280 million over 20 years will be needed, and the capacity to install 70 major

grade crossing devices each year, not counting new installations for high-speed passenger corridors, quiet zones, and the proposed expanded deployment of an additional 170 devices on paved county roads.

Based on a recommended 25-year replacement cycle, the current grade crossing replacement or upgrade program for major improvements would increase the number of projects three-fold, and require two to three times the funding level in 2009 dollars. HSA funds for basic safety enhancements should be increased under these same assumptions to a level of approximately $1 million per year. Federal Railroad Administration requirements for a complete and current grade crossing inventory are an additional draw on grade crossing safety program funds that is being met only in part with present resources. However, there have been proposals to remove the grade crossing safety dedication on some Federal safety funds in favor of more flexible funds, and this could negatively impact even those limited funds now in use. This may severely handicap any move toward expanding the current program.

In addition to work on active warning devices, Minnesota has not addressed the issue of road closures and grade crossing separations in its current safety program. Both of these strategies will be appropriate in corridors with high-speed trains, or increasing railroad or highway traffic levels, but are significantly more expensive in the case of grade separations, ranging from $3 to $10 million dollars per overpass or underpass for normal (two-lane) installations. In addition, multiple lane highways and multitrack spans increase the cost significantly above these estimates.

Concerns regarding grade crossings go beyond simply maintaining and improving what's already present. Industrial development patterns and the urbanization of areas surrounding rail lines necessitate a range of mitigations that are needed to minimize the interaction between trains, highway vehicles, and pedestrians. Pedestrian fatalities in Minnesota due to trespassing are now higher than vehicle grade crossing fatalities, suggesting the need for extended fencing of rights-of-way, and pedestrian warnings and gates at major crossings. Short of grade separations, more advanced barrier systems, such as four-quadrant gates with median barriers and pedestrian amenities are an intermediate alternative, at a somewhat higher cost than a basic active warning installation. These and other technologies for warnings and enforcement are effective at reducing grade crossing incidents. These applications already are in use in quiet zones and high-speed corridors in other parts of North America.

Undertaking these types of improvements can be substantially more costly than maintaining existing warning systems. As roads are widened and traffic increases, more substantial protection needs to be installed, and double tracking a railroad mainline to accommodate more or faster trains also significantly magnifies the complexity and cost of any warning installation. Also, the funding of these new installations may be subject to sharing with local jurisdictions, high-speed rail projects, or new rail-oriented industrial sites, such as business parks or ethanol plants that will generate both major truck and rail traffic. Centralized and focused planning oversight and approvals that involve Mn/DOT and an expanded grade crossing safety program would benefit both statewide safety and implementation of a new intercity high-speed passenger rail system.

Grade crossing safety and trespassing also are impacted by public and institutional education. Informing people who interact with railroad traffic about the increase in train volumes and speeds, the hazards of pedestrians around active railroads, and the surprises that can occur at multiple track crossings with several trains crossing at once, are all subjects for public information. The railroads support the Operation Lifesaver program throughout the U.S., as a tailor-made program offering this information. Mn/DOT and other in-state rail associations would be well served to assist in funding and promoting the volunteers working on this national program.

Stakeholder Perspectives

This program functions well, but according to stakeholders suffers from a number of limitations that reduce its potential efficacy:

- **Funding**. With Minnesota's rail network being the ninth largest in the nation, the current Federal and state funding levels are insufficient to meet continuing needs for new grade crossing projects and replacement of obsolete systems.
- **Replacement of signage and obsolete active crossing warning devices.** Out of the more than 1,400 active systems currently installed, 270 systems or 21 percent are over 30 years of age, thus beyond their typical design life of 20 to 25 years. Once they reach that age, the electronics are completely obsolete and parts are often difficult to obtain. Mn/DOT is in the process of designing a statewide lifecycle planning process, which must address replacing approximately 60 crossing systems each year. Additional funding will be necessary to undertake this effort, the source of which has yet to be identified.
- **Program Flexibility**. Many stakeholders indicated a desire to see the program broadened beyond its primary focus on active crossing systems, to include the full range of options, including quiet zones, sealed corridors, grade separations, etc. Implementation of expanded passenger operations in particular will result in the demand for a greater variety of solutions to address highway/rail interactions and right-of-way protection, for which expertise is generally not available at local jurisdictions. This does not mean that a state program should necessarily fund these more expensive solutions, but rather act as a clearinghouse and developer of common standards that can be applied statewide.
- **Project Prioritization**. Although the OFCVO staff administers the grade crossing program and oversees the evaluation of potential projects, the eight Mn/DOT districts have considerable autonomy in establishing investment priorities. This leads to inconsistent application of funding to projects, and needless delays in implementing improvements at high-priority grade crossings. Planning and distribution of funds should be centralized instead of done by each of the eight Mn/DOT Districts.

Furthermore, the absence of statewide funding prioritization contributes to the lengthy delays from the time when improvements are initially identified to when they can actually be implemented. The backlog is now upward of five years, which is considerably longer than in some other states. Also, once improvements are programmed, it is difficult to adapt funding

priorities to changing needs, such as when volumes on a low-density rail line increase substantially.

6.3 Rail Agency Organization and Programs in Other States

6.3.1 Institutional Roles and Responsibilities for Rail

Earlier sections of this report described some of the ways in which the rail-related programs and activities of public agencies affect one another. This section discusses the kinds of programs that various state rail agencies use to assist freight and passenger rail operations, and describes the dimensions of how such programs are administered in state government.

Administration

Approaches to administering rail programs are as varied as the programs themselves. In most cases, some form of rail responsibility is assumed within a state DOT, but the delivery of other rail programs may be shared by other divisions within a DOT or by completely separate state agencies. The Virginia Department of Rail and Public Transportation conducted a survey in 2005 of rail program administration in states, which identified a number of states to consider emulating. Table 6.1 summarizes information on these states from the 2005 report and information from the state agency web sites.

Among most of these 11 states, including Minnesota, the rail-related functions are administered by a division, office, or bureau within the DOT. In Virginia and Ohio, separate organizations within a cabinet-style Transportation Department administer rail programs. Each of these states administers some form of freight rail assistance, even if aimed at short line railroads or railroad shippers. Amtrak reports that only 14 states provide funding for 20 state-supported train routes, so not every state will have passenger rail funding activities, and not every one of those 14 states invest in capital projects for passenger rail improvements. In most states in the table, passenger and freight funding programs are administered by the rail office, or at least within the DOT. A majority of the states in the table separate rail safety and grade crossing funding functions into completely separate agencies.

California, Texas, Ohio, and Florida had created independent HSR authorities to focus on HSR systems in the states. Ohio combined its authority into the Ohio Rail Development Commission in 1994, Texas abolished its authority in 1995, and Florida's authority has been generally inactive and unfunded from 2004 through 2009 (and FDOT is leading HSR efforts at present). Each of these states were or are considering implementation of HSR projects along new locations in excess of 150 mph, and creating a special purpose authority to focus on this very complex and expensive undertaking made sense to these states. However, any such organization will still need to coordinate with a state DOT for grade crossings and terminal access issues.

Table 6.1 Approaches to Rail Program Administration

Characteristics	California	Florida	Illinois	Michigan	Minnesota	New York	North Carolina	Ohio	Pennsylvania	Virginia	Washington
Rail Division in DOT?	•	•	•	•	•	•	•		•		•
Separate agency attached to DOT?								•		•	
Office responsible for freight programs?	•	•	•		•	•	•	•	•	•	•
Rail freight programs in DOT?				•	•						
State funding for freight rail projects?	•	•	•	•	•	•	•	•	•	•	•
Office responsible for passenger programs?	•	•	•	•	•	•	•	•		•	•
Passenger programs in DOT?					•				•		
State operating support for Amtrak?	•		•	•	•	•	•		•	•	•
Separate unit for HSR?	•	•		•	•						
HSR in DOT?				•	•						
Office responsible for rail safety?		•		•	•	•	•				
Separate rail safety agency?	•		•					•	•	•	•
Office responsible for grade crossings?		•			•	•	•	•			
Separate grade crossing agency?	•		•	•					•	•	•
Rail Division	•	•	•				•				
Bureau of Passenger Transportation				•							
Freight, Rail and Waterways					•						
Freight and Passenger Rail Bureau			•			•					
Rail Development Commission								•			
Bureau of Freight Rail, Ports and Waterways									•		
Department of Rail and Public Transportation										•	
State Rail and Marine Office											•

Sources: Agency web sites, 2005 VDRPT Draft Report.

6.3.2 Public Rail Programs

Rail-eligible corridor investments. Some states have identified major intercity corridors that enable economic activity, and focus infrastructure investment in modes within these corridors. These programs will allow for capacity expansion and congestion relief in road and rail facilities. Examples include:

- **Interregional Trade Corridors (Minnesota).** In 2000, Mn/DOT designated a primary set of highways for moving goods and people between regional trade centers in Minnesota. This set, called the Interregional Corridor System (IRC), is comprised of 2,939 miles of highways. As described in the Minnesota Statewide Transportation Plan (STP), 2009-2028, the IRC represents only two percent of all roadway miles in the State, but it carries approximately 27 percent of all vehicle miles traveled and the majority of freight traffic. To complement the IRC system, Mn/DOT also designated a set of Regional Corridors that connect smaller trade centers with larger ones or with IRCs. As highlighted in the STP, "many of the Regional Corridor routes serve as the primary transportation linkage into and out of entire regions, especially in Greater Minnesota, providing critical support to the region's ability to move people and freight in a cost-effective way."

- **Goods Movement Action Plan (California).** California's cabinet agencies for transportation and environmental issues have cooperated to identify a program of investment in freight systems that increase capacity, reduce freight-related greenhouse gas emissions, and improve security. The program, which allocates $3.1 billion in bond financing, identified and evaluated projects with assistance of stakeholders. More information can be found at http://www.arb.ca.gov/gmp/docs/gmap-1-11-07.pdf.

- **Strategic Intermodal System (Florida).** Florida's Legislature directed the DOT to plan for near- and long-term investments in a network of intermodal transportation infrastructure: commercial airports, ports and waterways, freight rail and transit terminals, passenger and freight rail facilities, and highways. The SIS network carries "more than 99 percent of all commercial air passengers, virtually all waterborne freight tonnage, almost all rail freight, and more than 68 percent of all truck traffic and 54 percent of total traffic on the State Highway System." More information can be found at http://www.dot.state.fl.us/planning/sis/strategicplan/.

- **Connect Oregon (Oregon).** Oregon created a program for allocating $100 million in lottery-backed bonds to transportation improvements to connect the highway system to other modes, including rail, air, marine and transit. The program is administered through a performance-based application review process, and its success is demonstrated in its third program in 2009, after $100 million allocations in 2005 and 2007. More information can be found at http://www.oregon.gov/ODOT/COMM/CO/overview.shtml.

Freight Rail Improvements. Many states have programs to offer financial assistance to freight railroad operations. In some cases, these programs are focused on short line or regional railroads, and can involve public ownership of rail lines with private operators. Other programs offer tax incentives for expansion of facilities, spurs, or lines for new or expanded business

development. Some states offer assistance through revolving loan programs while others make direct grants. Examples include:

- **Freight Railroad Preservation Program (Wisconsin).** In addition to a loan program for freight rail improvements, Wisconsin invests appropriated funds in grants to local governments and railroads for public ownership of short line railroad lines operated by private railroads. $78 million has been distributed to local governments and railroads since the program was created in 1993. More information can be found at http://www.dot.wisconsin.gov/localgov/aid/frpp.htm.
- **Stimulus-Funded Freight Rail Improvements (Ohio).** Ohio took advantage of modal flexibility in the highway allocations in the American Recovery and Reinvestment Act of 2009, allocating $61 million to 21 rail-related projects in the summer of 2009. The Ohio Railroad Development Commission is administering the projects, identified through the Commission's planning activities. More information can be found at http://www.dot.state.oh.us/Divisions/Rail/Programs/special/Pages/default.aspx.
- **Nebraska Advantage Act (Nebraska).** Industrial projects, including rail access projects, investing more than $3 million and creating 30 jobs are eligible for refunds of sales tax on capital purchases and a 10 percent income tax credit for capital investments made. More information can be found at http://www.neded.org/content/view/119/308/.

Passenger Rail Investments. Most investments in passenger rail capacity by states are expanding the facilities of freight railroads over which the passenger services will operate. As such, in many cases, these passenger rail investment programs provide operating benefits for the freight railroads and can be characterized as investments in shared corridors. Examples from two states are as follows:

- **North Carolina Railroad Improvements (North Carolina).** The 317-mile railroad between Charlotte, Raleigh, and Morehead City is a publicly owned private railroad. North Carolina has invested $30 million in track improvements on the corridor between Raleigh and Charlotte (the path of state-supported Piedmont Route passenger service), with $35.5 million in projects underway, and another $87 million in improvements in planning and engineering stages. North Carolina DOT prepares design plans and provides construction funds, and Norfolk Southern (which holds an operating lease on the NCRR) produces final plans and performs the construction work. Improvements since 2001 have shortened trip times from Raleigh to Charlotte by 35 minutes. More information on these improvements can be found at http://www.bytrain.org/track/.
- **Rail Enhancement Fund (Virginia).** Virginia created a special fund administered by the Department of Rail and Public Transportation (collected from a portion of car rental taxes) to apply to projects to expand rail facilities for passenger and freight projects. VDRPT created a public benefit methodology that measures prospective fund applications against a series of performance measures. VDRPT, in conjunction with a Rail Advisory Board, has recommended a six-year investment plan which allocates $150 million in enhancement funds to corridor projects for commuter and intercity passenger rail and freight corridors. More information can be found at http://www.drpt.virginia.gov/projects/files/REF%20Application.pdf.

Rail Safety Programs. Thirty states cooperate in enforcing Federal rail safety regulations and in supporting Federally certified rail safety inspectors. These state programs, funded solely with state resources, effectively leverage the efforts of the FRA, and are coordinated through the FRA's eight regional safety offices throughout the country.

The Federal Surface Transportation Program dedicates $220 million to funding highway-rail grade crossing protections. A number of states augment this Federal funding with state resources, aimed at allocating resources on a safety risk-based process. States and railroads update grade crossing inventory information which is collected and maintained by the U.S. DOT and is then used by states in making safety improvement decisions. In most states, grade crossings are maintained by the railroad operator (including the road surface between the rails, and active warning devices), although some states provide crossing maintenance assistance to railroads. Grade crossing funds are administered by the Federal Highway Administration, and the FRA provides assistance for overall grade crossing accident education and prevention.

6.3.3 Public Private Partnerships

As this section discusses the institutional and implementation issues for passenger and freight rail projects, such projects can be examined to determine the extent to which the private sector can or should be involved. Mn/DOT has limited legal authority to implement some of these public-private partnership (PPP) approaches, but the state of the practice has changed since Mn/DOT's PPP authorization legislation was created.[33] This section describes some of these approaches, how Mn/DOT programs could be expanded, issues raised by PPP implementation, and possible applications for projects identified in this Plan.

Types of Public Private Partnerships

The 2004 U.S. DOT Report to Congress on Public-Private Partnerships[34] defines a PPP as:

> A public-private partnership is a contractual agreement formed between public and private sector partners, which allow more private sector participation than is traditional. The agreements usually involve a government agency contracting with a private company to renovate, construct, operate, maintain, and/or manage a facility or system. While the public sector usually retains ownership in the facility or system, the private party will be given additional decision rights in determining how the project or task will be completed.

PPPs vary by the extent to which the public sector transfers project responsibility, risk, and ownership to the private sector. Table 6.2 describes PPP methods.

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[33] http://www.fhwa.dot.gov/ipd/p3/state_legisltation/minnesota.htm.

[34] Report found at http://www.fhwa.dot.gov/reports/pppdec2004/index.htm.

Table 6.2 Public Private Partnerships Infrastructure Approaches[a]

Approach	Description
Traditional Approach	
Design-Bid-Build (DBB)	The traditional method of project delivery in which the design and construction are awarded separately and sequentially to private firms.
Public Private Partnerships Approaches	
Design-Build (DB)	Combines the design and construction phases into a single fixed-fee contract, thus potentially saving time and cost, improving quality, and sharing risk more equitably than the DBB method.
Private Contract Fee Services/Maintenance Contract	Contracts to private companies for services typically performed in-house (planning and environmental studies, program and financial management, operations and maintenance, etc.)
Construction Manager @ Risk (CM@R)	A contracted construction manager (CM) provides constructability, pricing, and sequencing analysis during the design phase. The design team is contracted separately. The CM stays on through the build phase and can negotiate with construction firms to implement the design.
Design-Build with a Warranty	A DB project for which the design builder guarantees to meet material workmanship and/or performance measures for a specified period after the project has been delivered.
Design-Build-Operate-Maintain (DBOM), Build-Operate-Transfer (BOT), or Build-Transfer-Operate (BTO)	The selected contractor designs, constructs, operates, and maintains the facility for a specified period of time meeting specified performance requirements. These delivery approaches increase incentives for high-quality projects because the contractor is responsible for operation of the facility after construction. The public sector retains financial risk, and compensation to the private partner can be in the form of availability payments.
Design-Build-Finance (DBF), Design-Build-Finance-Operate (DBFO), or Design-Build-Finance-Operate-Maintain (DBFOM)	DBF, DBFO, and DBFOM are variations of the DB or DBOM methods for which the private partner provides some or all of the project financing. The project sponsor retains ownership of the facility. Private sector compensation can be in the form of tolls (both traffic and revenue risk transfer) or through shadow tolls (traffic risk transfer only).
Long-Term Lease Agreements/Concessions (Brownfield)	Publicly financed existing facilities are leased to private sector concessionaires for specified time periods. The concessionaire may pay an upfront fee to the public agency in return for revenue generated by the facility. The concessionaire must operate and maintain the facility and may be required to make capital improvements.
Full Privatization	
Build-Own-Operate (BOO)	Design, construction, operation, and maintenance of the facility are the responsibility of the contractor. The contractor owns the facility and retains all operating revenue risk and surplus revenues for the life of the facility. The Build-Own-Operate-Transfer (BOOT) method is similar, but the infrastructure is transferred to the public agency after a specified time period.
Asset Sale	Public entity fully transfers ownership of publicly financed facilities to the private sector indefinitely.

Source: Public-Sector Decision-Making for Public Private Partnerships, NCHRP Synthesis Report 319, 2009, Table 1.

[a] Listed from least private involvement to greater.

Table 6.3 describes some of these PPP methods according to the involvement of the public and private sector in elements of surface transportation projects.

Table 6.3 Types of Public Private Partnerships Approaches in Surface Transportation Projects

	Responsibility for Project Element					
PPP Method	Design	Construction	Maintenance	Operations	Financing	Ownership
Traditional Design Bid Build	Public/Private	Public/Private	Public Sector	Public Sector	Public Sector	Public Sector
Fee-Based Contract Services	Private Sector	Public/Private	Public/Private	Public/Private	Public Sector	Public Sector
CM @ Risk	Public/Private	Private Sector	Public Sector	Public Sector	Public Sector	Public Sector
Design Build (DB)	Private Sector	Private Sector	Public Sector	Public Sector	Public Sector	Public Sector
DB with Warranty	Private Sector	Private Sector	Public/Private	Public Sector	Public Sector	Public Sector
DB Operate Maintain (DBOM)	Private Sector	Private Sector	Private Sector	Private Sector	Public Sector	Public Sector
DB Finance Operate (DBFO)	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Public Sector
Build Operate Transfer (BOT)	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Public/Private
Build Own Operate (BOO)	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector

Source: Connecticut Transportation Strategy Board, Connecticut Electronic Tolls and Congestion Pricing Study – Final Report – Volume 2: Background Report, April 2009, Table 4.1, page 4-4, found at http://www.ct.gov/opm/lib/opm/tsb/reports_tsb/final_report_-_tolling_study.pdf.

Legend: Public Sector Public/Private Private Sector.

Public Private Partnership Guidelines

Mn/DOT has authority to design and construct transportation projects through design-build (DB) contracts.[35] From 1996 through 2002, Mn/DOT awarded DB on a lowest bid basis, and changed to a best value award basis in 2002. Since 2002, Mn/DOT has awarded seven DB highway projects totaling more than $860 million. Four more projects funded through the American Recovery and Reinvestment Act of 2009 are being procured through DB.

Minnesota statutes do not restrict DB projects to highway projects. However, given the structure of the legislation (which limits the number of DB contracts on an annual basis and requires an annual report on DB contracts), Mn/DOT might seek more explicit authority to use DB for rail projects.

Mn/DOT has had authority[36] since 1993 to enter into PPPs for toll roads through a development agreement that "may provide for any mode of ownership or operation approved by the road authority,"[37] specifically authorizing BOT or BTO methods. This authority does not extend to other transportation projects such as railroad projects.

[35] Minnesota Statutes, Section 161.3410 to 161.3428.

[36] Minnesota Statutes, Section 160.84 to 160.98.

[37] Section 160.85 (4) (a).

Institutional Considerations

The 2007 FHWA User Guidebook on Implementing Public-Private Partnerships for Transportation Infrastructure Projects in the United States[38] offers extensive advice to states ready to implement PPP programs. Mn/DOT would do well to spend time deciding what kind of PPP program they want to have before executing a program to advance railroad projects. The 2007 FHWA PPP Guidebook offers a series of questions to prompt internal discussions of PPP program development.

What is the institutional context for the PPP program? States implement PPP programs to address a variety of problems. For some, PPPs might address internal agency capacity constraints to manage mega-projects; for others, PPPs appear to be a means of bringing private capital to address state funding shortfalls; for others, ongoing entreaties from the private sector may be the cause for creating a program to handle the requests. A state also should be clear about what kind of criteria it will use to assign projects to PPP delivery.

Does the sponsoring agency have the statutory and regulatory authority for PPPs? Having the legal authority to proceed with PPP projects is a necessary condition for a state; otherwise, private firms would have no assurance that a PPP contract with the state will be binding and enforceable. Mn/DOT has some legal authority to enter into certain kinds of PPPs, but not necessarily for rail projects; therefore, the legislature and Mn/DOT should craft a statutory and regulatory regime that offers the flexibility to solicit PPP proposals to implement rail projects in this Plan or to solicit or accept PPP proposals for other surface transportation projects.

What are the potential public and private partner responsibilities, risks, and returns? PPP projects are likely to be most successful when they balance the risks and returns between the public and private sector in a way that shares rewards and mitigates risks for both parties. Careful delineation of risks and rewards is a productive step in crafting a sustainable, productive PPP program. This also necessarily involves quantifying relative costs and benefits for a project for the public and private sector parties, so that relative shares of costs (capital and operating) can be allocated between partners. This benefits assessment is part of the PRIIA state rail plan guidelines, and also was part of the recent U.S. DOT Transportation Investment Generating Economic Recovery (TIGER) grant program, and is likely to be required by future Federal funding programs.

Does the sponsoring agency have the capabilities and resources to develop and manage a PPP program and the resulting projects? While a new PPP program will likely require specialized advice for program definition and procedures, Mn/DOT would be wise to carefully connect the PPP procedures with the overall agency mission and responsibilities, rather than create stand-alone organizational structures that fail to recognize that PPPs are a means of advancing the public interests of the agency, not an end unto itself. Therefore, part of the PPP program development process should be an analysis of the public sector resources necessary to implement the program. This not only requires an assessment of the kinds of knowledge, skills and abilities required of program personnel, but also what kind of outside assistance would be necessary to analyze proposals and draft contract documents.

[38] Found at http://www.fhwa.dot.gov/ppp/pdf/ppp_user_guidebook_final_7-7-07.pdf.

What kind of procurement approach should be used to select qualified PPP teams? Public concerns about PPP methods can be mitigated through careful contracts and monitoring. A recent NCHRP report[39] offers a thorough discussion of how the PPP procurement process can be designed and executed in a way that protects the public's interests as it secures the resources of the private sector for projects, including various suggestions for how proposals are structured, solicited, evaluated, awarded, and administered. While many PPP resources focus on procurement processes to attract the private sector, this report concludes that if the procurement process is designed with sufficient and appropriate transparency, then the PPP process is much more likely to achieve and sustain the public acceptance and political support it needs to be successful.

Applicability for Rail Projects

General Assessment. A recent TRB report, Funding Options for Freight Transportation Projects[40] describes a number of freight projects funded and implemented through different methods, including some PPPs. The report also summarizes a number of general provisions for public investments in freight transportation projects.

Projects likely to be chosen for public contributions:

- Projects with construction cost beyond the capacity of private infrastructure owners/operators or local/regional governments;
- Institutionally complex projects, as indicated by the number of public jurisdictions and private sector entities;
- Likely availability and cost of financing in the private credit markets to fund the projects;
- Eligibility for funding through established Federal or state programs (lack of such programs may lead to public funding through PPPs);
- Need for extensive upfront planning (including environmental clearance), coordination and seed money (this is the case for new passenger rail services with revenue risk); and
- Project risks associated with the novelty of organizational or technological solutions (high-risk, high-return projects may need governmental assistance).

Effective public management of a PPP program for rail also would contain elements of the freight investment programs cited in the TRB study:

[39] *Public-Sector Decision-Making for Public-Private Partnerships,* NCHRP Synthesis Report 319, 2009.

[40] Funding Options for Freight Transportation Projects, TRB Special Report 297, April 2009.

- Strong capabilities to evaluate project benefits and shared costs, and standard economic valuation methods.
- Decision-making must be transparent and consistent.
- Decision-making criteria must define when state resources are needed (as opposed to regional or local) and when projects qualify for state funding (even if such projects are not uniformly distributed across the state).
- PPPs can accomplish state goals:
  - Projects which are part of the state transportation planning process;
  - Projects that have measurable external benefits and which would not have been begun or completed without public assistance; and
  - PPPs should be subject to periodic reviews to assess the economic value of the completed projects (compared to estimated value) and the projects' success in meeting other goals.

The experience of the Capitol Corridor Joint Powers Authority between San Jose and Sacramento offers lessons for PPPs in passenger rail expansion. The State of California has provided steady funding for additional trainsets, track and signal improvements, dedicated maintenance of way crews and equipment, and operating assistance. As a result, service on the Capitol Corridor has improved frequency (eight daily to 24 daily trains from 1996 to 2009) and reliability of service (current 90 percent OTP in July 2009), leading to greater ridership (from 463,000 to 1,693,000, from 1996 to 2009). This has required investment in rolling stock, freight rail infrastructure and a commitment from the public and private sectors to improving service levels through careful coordination of service planning, dispatching, and maintenance.

The California High-Speed Rail Authority[41] also has identified a number of factors that need to be decided for projects to attract private sector investments:

- Firm, dependable public funding commitments;
- Fair and transparent public regulatory requirements;
- Firm public sector support and funding commitments for the project in question;
- Clear legislation enabling public private partnerships; and
- Unwillingness by the private sector to accept risks associated with the environmental process, which firms feel is best borne by the public sector.

Practical Examples. Mn/DOT has a growing number of freight rail PPPs to examine for lessons in attracting and leveraging public investment in private infrastructure. PPPs can be used to resolve

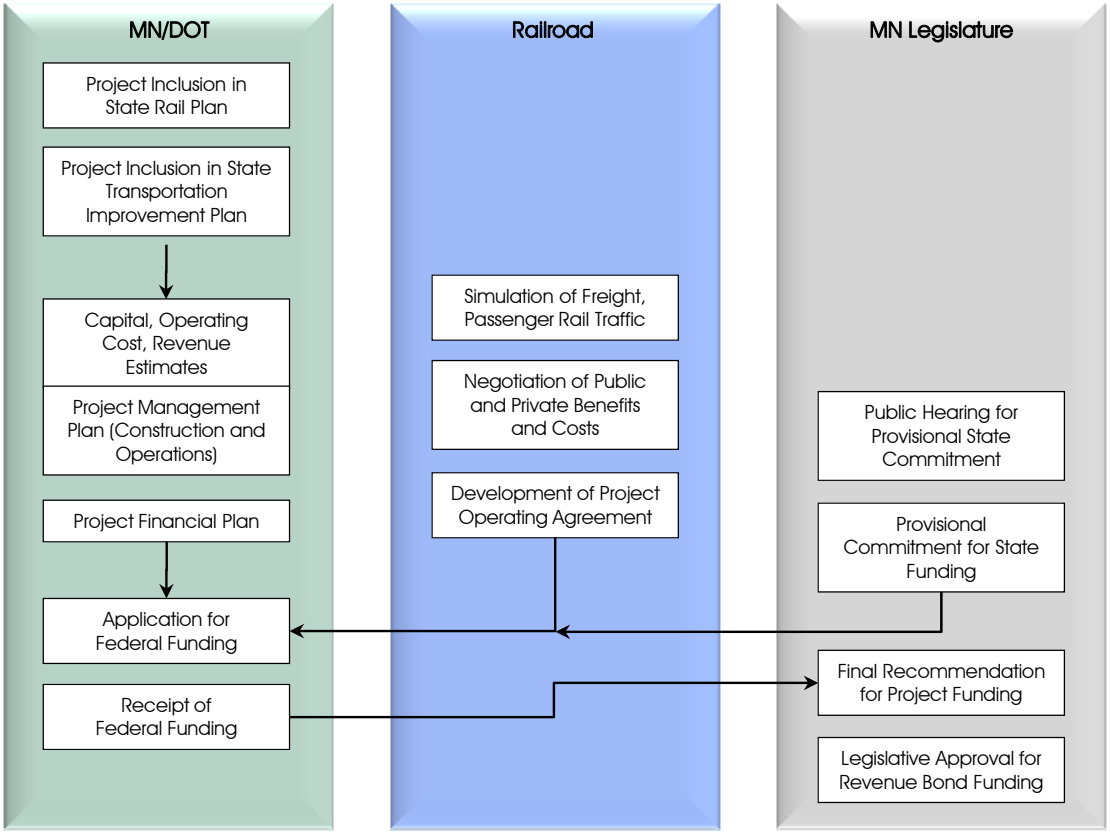
[41] California High-Speed Rail Authority Expression of Interest in Implementing a High-Speed Intercity Passenger Rail Corridor, September 2009, page 51, submission in Federal Railroad Administration Docket 2008-0140.

access or bottleneck issues, like the Alameda Corridor project in Los Angeles, California or the Sheffield and Argentine Flyovers in Kansas City, Missouri; resolve community impact issues like the ReTRAC project in Reno, Nevada; improve passenger rail throughput and reduce grade crossing impacts such as the CREATE project in Chicago, Illinois; or provide economic development for endpoints and reduce truck traffic such as the Heartland Corridor project in Ohio, Virginia and West Virginia.

6.4 Management Plan for Minnesota

A multistep process is recommended for making decisions on investing in passenger rail corridor projects, shown in Figure 6.1.

Figure 6.1 Passenger Rail Project Decision Process



The first part of this process has begun with the completion of this State Rail Plan, and the following inclusion of projects in the State's long-range transportation plans. Once projects are included in the state plans, environmental analyses can begin that further refine the routes for passenger rail corridors. In particular, service-level environmental assessments and alternatives analysis should be prepared for all identified components of the Passenger Rail System to prepare for the next rounds of Federal solicitations and funding opportunities.

The next step belongs to Mn/DOT and its designated Offices (or an enhanced or streamlined internal organizational structure), to develop a common analysis framework for preparing project estimates of capital costs, operating and maintenance expenses (which are not eligible for Federal assistance) and revenue estimates (which are crucial to determining overall public benefits and to limiting state O&M exposure). This might begin with a state-managed travel demand model on which all other project analyses (feasibility, environmental, and business planning documents) could be based. The result will be a much stronger project that will compete more effectively in the Federal funding competitions to come. The State also would work with project advocates to perfect project management and financing plans, elements required in a Federal grant application.

At the same time, in parallel, the State could begin working with the freight railroads that own the track or rights-of-way to be used for the passenger rail projects. Reaching formal agreements with the freight railroads is necessary to secure future Federal funding commitments, and will force discussions to move beyond high-level conversations to detailed financial obligations.

Both the Mn/DOT and Railroad processes are necessary for completion of a Federal grant application, and this detailed information should be made available to the State Legislature before they are asked to commit state taxpayer resources to the projects. Just as committees of legislators study requests for state agency spending or capital budget development, a separate legislative committee(s) could be established for reviewing the application of dedicated state rail funds on individual projects. Once the project information is fully vetted, when the requested state funding is considered in light of total revenues and other commitments to other projects, the State could make a provisional commitment to a project in order to attract Federal funding. Final state funding commitments could await final decisions on how much Federal funding is being leveraged on the project.

Mn/DOT's Office of Freight and Commercial Vehicle Operations (OFCVO) consolidates freight investment, safety, and grade crossing programs into one division. This central unit offers a single point of contact for railroads, and allows state rail staff to become better versed in freight railroad issues and challenges. The recent creation of a Passenger Rail Office will help to coordinate among passenger rail projects and corridors identified in this Comprehensive State Freight and Passenger Rail Plan. Coordination among freight and passenger rail investments as outlined in this Plan will be a responsibility of the head of the Modal Planning and Program Management Division.

An organizationally separate rail department like Virginia or Ohio might not fit within Minnesota's cabinet style departmental organization. Moreover, for Mn/DOT, organizational separation might not be as necessary as internal capacity-building. If the two offices for freight and passenger rail programs receive additional responsibilities and funding to implement this State Rail Plan, both offices could need additional staff and/or consultant resources to administer (planning, programming, grant administration and monitoring) these new programs. Building up staff capacity to operate and grow new programs as they are funded would ensure overall program effectiveness, keep up with new Federal and state funding streams and requirements, and manage overall performance. The Minnesota Legislature is

likely to require transparency and accountability from Mn/DOT for new programs as they are funded, just as the Legislature directed the preparation of this State Rail Plan.

As passenger rail corridors advance beyond environmental and planning stages, Minnesota could consider authorization of corridor-level special purpose authorities or joint powers authorities, much like the Northstar Commuter Rail system was originally planned by Mn/DOT and delivered by the Northstar Commuter Rail Development Authority and operated by Metro Transit. However, this kind of special purpose, corridor-based approach might not permit a statewide system of operations. This State Rail Plan does not recommend governmental operation of the passenger rail system, as would a transit service or commuter rail service. Instead, the State is urged to contract with a single entity to provide passenger rail services that are desired. This would allow economies of scale, interoperable equipment and grow ridership among multiple city pairs.

7 Financial Program

This chapter develops a financial program for implementing the proposed State Rail Plan. It examines potential Federal, state, regional, local, and private sector financing elements.

7.1 Federal Funding

Several programs under the existing surface transportation authorizing legislation (SAFETEA-LU) include elements which can be used to finance rail investments, including:

- Surface Transportation Program (STP);
- Congestion Mitigation and Air Quality (CMAQ) Improvement Program;
- Rail Line Relocation Grant Program;
- Transportation Infrastructure Finance and Innovation Act (TIFIA);
- Private Activity Bonds (PABs); and
- Rail Rehabilitation and Improvement Financing (RRIF) Program.

This legislation has expired and is being extended through Congressional continuing resolutions. Timing and content of reauthorization are uncertain.

Minnesota is connected to a HSR corridor designated by the U.S. Department of Transportation under authorization first granted in 1991. However, no dedicated funding sources had been identified to fund this or other corridors until the passage of the **Passenger Rail Improvement and Investment Act of 2008 (PRIIA)** in October 2008, which created three new passenger rail investment programs for states:

- **State Capital Grant for Intercity Passenger Rail (Section 301 of PRIIA).** $380 million per year is authorized for grants to states for capital costs of facilities and equipment necessary to provide new or improved passenger rail service. These grants, providing a Federal share of up to 80 percent of total capital costs, will be administered by the U.S. Secretary of Transportation through the Federal Railroad Administration.
- **Congestion Grants (Section 302 of PRIIA).** An average of $65 million is authorized out of the Intercity Passenger rail program for projects to reduce congestion in bottlenecks on high-priority corridors. These grants will support projects to reduce congestion, facilitate ridership growth, or improve on-time performance and reliability of intercity passenger rail services.

- **High-Speed Rail (Section 501 of PRIIA).** $300 million a year is authorized for grants to states to bring about high-speed rail (reasonably expected to reach speeds of up to 110 mph) in Federally designated corridors. These grants also will be awarded on a competitive basis by the FRA.

Before the incoming Congress could consider how to appropriate funds for these newly authorized purposes, Congress enacted an economic stimulus appropriations bill, the **American Reinvestment and Recovery Act of 2009 (ARRA),** which appropriated an additional $8 billion for projects in the three programs described in PRIIA. The legislation also outlined a process by which the FRA would develop a strategic plan for administering the newly appropriated funds, followed by a detailed grant program, and a competitive grant application cycle.

The strategic plan issued in April 2009 and the grant application guidance in June 2009 are available on the FRA web site. A detailed explanation of the initial grant process is beyond the scope of this State Rail Plan, and since the first round of applications in August and October of 2009 have passed, that grant cycle is not necessarily applicable to the projects identified in this Plan.[42] The overall grant process does offer hints of future calls for grant applications, spending whatever might be unexpended from the $8 billion ARRA funds and applying funds appropriated for FY 2010 toward PRIIA programs.

The FRA developed a three tiered grant distribution process to address projects from the three PRIIA rail programs. These three tiers are likely to characterize future grant cycles:

- **Projects**. Track 1 grants, due in August 2009, supported final design and construction of rail projects or development of final environmental clearance and project design documents necessary to apply for future project grants.[43] This set of applications focused on near-term projects, often for rail segments or facilities authorized by the Intercity Rail and Congestion Relief programs rather than HSR corridors. Environmental clearance was necessary for construction funding, and the grant applications required extensive information on capital projects, and also included information on performance measurements that represented the public benefits associated with the projects.
- **Programs**. Track 2 grants, due in October 2009, supported a longer term commitment to an overall program of passenger rail improvements on a corridor basis. These corridor

[42] Mn/DOT submitted a Track 1(a) application in conjunction with the Ramsey County Regional Railroad Authority for $135.8 million for design and construction of the Union Depot Multi-Modal Transit Hub and a Track 3 application in cooperation with the Wisconsin Department of Transportation for $600,000 for preparation of a Service Level NEPA document for a HSR route connecting Milwaukee and the Twin Cities.

[43] In the 2009 grant cycle, FRA also included a Track 4 application for passenger rail service (not necessarily infrastructure) improvements funded by FY 09 appropriations, not by the ARRA funds. It is not clear that Congress intends to fund these kinds of improvements outside of the PRIIA categories, or whether FRA intends to organize future grants beyond the three general categories summarized herein.

level plans outlined a series of individual projects for Intercity Rail and HSR services, and would lead to Letters of Intent between the FRA and state(s) to support completion of project planning activities for corridor-level services for which the aggregate benefits of multiple projects would exceed the values of each distinct project. States were required to have an overall environmental assessment complete (Service Level NEPA), and a Service Development Plan (which described purpose and need, service and operations plans, capital project implementation and financial plans).

- **Planning**. No ARRA funds could be used to develop plans or environmental clearance documentation to bring corridors to the level of detail to be eligible for Project or Program funding. However, the FRA allocated funds from FY 2009 appropriations for Track 3 grants, due in August 2009, and 50/50 Federal/state matching funds for planning activities, including state rail plans, service development plans, and service-level environmental documents.

States have more reasons than ever to plan for Federal financial participation in intercity passenger rail corridors, with new demonstrations of legislative authority and funding for such programs. This financial plan includes different levels of Federal financial participation in Phase I projects in the State Rail Plan, even though no one can really anticipate future levels of Federal funding. However, the following observations can inform expectations of Federal assistance in the future:

- **Heavy competition**. FRA received 214 applications from 34 states totaling $7 billion for Track 1, 3, and 4 applications in August 2009, and 45 applications from 24 states totaling $50 billion for Track 2 applications in October 2009. The U.S. Department of Transportation received 1,400 applications totaling $57 billion in September 2009 for grants under a $1.5 billion supplemental discretionary transportation program created by ARRA, referred to by U.S. DOT as Grants for Transportation Investment Generating Economic Recovery or TIGER grants. Competition for future FRA grant cycles will likely be similarly tough. This means that Mn/DOT should put forth the most compelling grant applications possible. While PRIIA authorizes programs with up to 80 percent Federal funding, the FRA can be expected to continue to show preference for states that leverage Federal funding with non-Federal investments.

- **Future appropriations**. Federal FY 2010 appropriations for high-speed and intercity passenger rail programs authorized in PRIIA are in the range of $1.2 billion to $4 billion (in the Senate and House versions of the U.S. DOT appropriations bills, respectively). The requirement in PRIIA that grant applications must be coordinated with an approved state rail plan was waived in the ARRA and FY 2010 appropriations, which makes sense, since the FRA has yet to issue guidelines for what will be acceptable as a state rail plan. However, this State Rail Plan was prepared to meet the state rail plan elements enumerated in PRIIA. Completion of this State Rail Plan will put Minnesota in a competitive advantage to other states once the guidelines are issued and future grants require state rail plans.

- **Environmental clearances**. Environmental planning is an eligible use of Federal highway and transit funding programs. No such planning program was created for

passenger rail projects,[44] and so unless states have been spending their own funds for environmental studies, many states were not fully ready for the PRIIA and ARRA project construction funds once they were made available. This financial plan will recommend creating state revenue streams to support passenger rail project planning to position the State for future Federal funding.

- **Sophisticated applications**. FRA grant applications required detailed information on not just the projects to be funded but also the benefits expected from the projects. TIGER grant applications required even more specific benefit cost analyses and assessment of performance metrics. If future transportation grant programs require similar levels of detail for rail and other transportation programs, Mn/DOT should consider expanding capacity through staffing and consultant resources to meet the increasingly complicated processes of seeking Federal funding.
- **Future authorizations**. SAFETEA-LU expired at the end of August 2009, and has been extended by short-term bills enacted by Congress. The House Transportation and Infrastructure Committee has published a six-year proposal, totaling over $500 billion (almost $250 billion more than expected Highway Trust Fund revenues). The House proposal calls for dramatically streamlined Federal funding programs, offering multimodal flexibility for states. The bill also requires more performance management by state DOTs, and also creates a $50 billion HSR program. This legislation may require Mn/DOT to work with Legislators to consider whether the structure of state highway, transit and rail funds are sufficiently flexible to take advantage of funding flexibility that may come in this new legislation.

7.2 Financial Plan

This financial plan has been created with a unifying principle, an acknowledgment that there is no single action for the State of Minnesota to take right now to bring about the benefits associated with the projects in this Comprehensive State Freight and Passenger Rail Plan.

The plan identifies a number of freight railroad projects that are typically funded by the private owners of this infrastructure, and may not require direct public funding, but could be abetted by tax incentives or loan programs. Some projects may attract Federal funding through loans or grants. Other types of projects may provide promising benefits for regional or local governments and those

This Plan identifies:

- Actions that will require funding and ownership by more than one entity or actor;
- Projects that will be delivered over more than one year; and
- Rail improvements that will necessitate application of more than one funding method.

[44] With the exception of modest appropriations in FY 2008 and FY 2009 for passenger rail improvements, which funded some environmental studies, including an EIS for the Northern Lights Express project.

governments may assist with funding. This financial plan will identify a variety of entities that could be expected to participate in delivering these kinds of projects.

This plan lists improvements in the freight and passenger rail networks needed over the next 20 years. The plan has big numbers associated with statewide needs, but not all improvements will need to be accomplished in the first year, or in the first five years. Many projects will be completed over time, and could be funded through a series of capital bond issues and annual appropriations. Complex high-speed passenger rail projects would proceed through planning, design, and construction phases, and would not require instantaneous funding.

The relatively large 20-year capital needs in this plan should not be seen as a daunting obstacle, but rather as a goal which can be achieved over time. There is no one, single, "silver bullet" answer that will pay for all the State's rail needs. While the national intercity rail initiative is often compared to the early stages of the interstate highway program, there is at least one major difference – the lack of a single dedicated funding source. Rather, a varied set of financial tools will be described which can be used to deliver the goals of this plan.

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Public Investment Principles

State and local jurisdictions, in integrating their investments with private parties, the Federal government, and each other, will be faced with the question of beneficial and cost-effective investment in competition with other regions and projects, as well as with other demand centers. It is assumed that, unlike much highway funding, there is not yet a dedicated funding source that can simply be allocated by need, nor may there ever be a comparable source. There is also the question of conscientious and justifiable stewardship of public tax dollars. In order to meet these needs, a set of Public Investment Criteria were developed and reviewed through the public outreach and Advisory Committees. It is recommended that these criteria form the basis of investment evaluation guidelines to aid Mn/DOT and the State in evaluating the validity of future investments in rail.

- Determine whether a project is not justified or only partially justified for private investment by Return on Investment (ROI) analysis.
- Acceptable costs are balanced by both direct and indirect public benefits, including FRA allowable measures such as employment, economic development, national security (petrochemical use), and the environment.

- The project will have Significant Utility – Good ridership, new service access, complementary to other public investments in transportation.
- Answers an identified deficiency, including the accommodation of new or expanded passenger services with travel time, cost, reliability, or predictability advantages; promotes freight and industrial growth; or corrects bottlenecks noted in public planning processes.
- Exhibits Multiple Utility – The investment succeeds in benefiting a combination of intercity passenger, local/commuter, and freight operations and capacity (the "three-for-one" principle).
- Provides a clear and acknowledged contribution to established State Priorities – Environmental and green growth goals, reduced energy use, enhanced land use patterns, improved travel options, and lifestyle and competitiveness enhancements.
- Judge the project on its timeliness of implementation – The project is in a high state of readiness and deliverable in a timely manner.

7.2.1 Financial Tools

This section will describe potential tools for private sector and public sector investments in rail infrastructure.

The tools could address some or all of the following financial elements:

- Try to gain access to capital with lower interest costs, gentler terms than bank debt;
- Gain access to capital on the front end, then agree to pay debt over time in smaller slices;
- Offer lower cost capital or tax incentives to improve return on investment calculations for private investors for rail projects; and
- Offer loans or incentives to reduce one-time outlays for state government, or in the cases of loan programs, provide for revolving funds that can make future loans with repayment proceeds, and reduce future state outlays.

Tools for Private Sector Investments

Expanding MRSI loan program. The Minnesota Rail Service Improvement program is a revolving loan program similar to those in many states originally begun with Federal Local Rail Financial Assistance capital in previous decades. However, as described in earlier chapters, the program has not been recapitalized regularly (unlike other state loan programs in the Midwest like Iowa or Kansas) and the current maximum loan amount of $200K may be limited in offering assistance for short line/regional railroad operators seeking funding to address infrastructure needs identified in this report such as upgrading track or bridges for heavier weights. A revolving loan program may not be the answer for every railroad operator (given the collateral requirements), but recapitalization of the fund and expansion of the loan limit would put more of the State's money to work in addressing infrastructure upgrades identified in this report.

Offering assistance for RRIF applicants. The Railroad Rehabilitation and Improvement Financing program, a Federal financial program administered by the Federal Railroad Administration, has been expanded by Congressional authorization, up to $35 billion in

authority to issue loans or credit enhancements.[45] However, Congress has never appropriated funding to offset the cost to the Federal government for extending this credit to the railroad industry, nor has the government appropriated any funding to provide for Federal consideration of the funding applications. As a result, applicants for RRIF loans must pay for access to this capital – paying a credit risk premium that offsets the cost of borrowing from the government, and paying an application fee that pays for Federal consideration of the loan application itself. The application fee and costs of loan application analysis can range from $50,000 to $100,000 per loan, and the credit risk premium, which depends on the creditworthiness of the applicant, could range from one to 12 percent of the total loan amount.

In some cases, short line railroads may not have sufficient liquidity to finance the development of the loan application or the cost of capital (through the credit risk premium), nor have the luxury of waiting for Federal acceptance of the loan itself.

In some cases, short line railroads may not have sufficient liquidity to finance the development of the loan application or the cost of capital (through the credit risk premium), nor have the luxury of waiting for Federal acceptance of the loan itself. States may not be able to do anything about the loan preparation and processing time, but could provide some financial assistance to loan applicants in the interest of attracting non-state-funded capital investments in railroad infrastructure in Minnesota. Oregon has a program that provides financial assistance for RRIF loan applicants,[46] and a small appropriation of state funds from the Minnesota State Legislature could effectively offer access to RRIF funding for MN applicants, bringing about improvements in railroad infrastructure.

In addition, the state could consider offering loan guarantees to RRIF applicants, either to protect against default, or to offer payment of a year's principal and interest, much like municipal bond insurance used to work. This kind of credit enhancement could be offered without cost or with a modest premium. Paying the premium to obtain a lower credit risk premium would be a good use of the applicant's resources, and would be another effective way for the State to provide access to this large pool of relatively low-interest capital. If Minnesota created statutory authorization for a credit assistance program, appropriated funds could be used for both purposes (application fee grants, RRIF application guarantees).

State maintenance tax credits for rail improvements. Short line railroads have access to a Federal railroad maintenance tax credit for funds expended on maintaining or improving rail infrastructure. The tax credit covers 50 percent of eligible maintenance spending, up to a

[45] More information on the RRIF program, including application and eligibility procedures, can be found at http://www.fra.dot.gov/us/content/177.

[46] Division 25, Chapter 741, Oregon Administrative Rules, found at http://arcweb.sos.state.or.us/rules/OARS_700/OAR_741/741_025.html.

limit based on the number of line miles of the railroad. A similar tax credit could be tailored to certain freight rail improvements, such as bringing track and structures up to 286,000 pound load standards. The tax incentive, added to the overall rate of return on the rail improvements, might make such improvements very attractive to short line railroads. Not only would that tax incentive encourage rail investments in building load capacity, the incentives may attract private capital of short line holding companies to improvements in Minnesota instead of in other states.

Rail investment tax credit for Class I railroads. Freight railroads are seeking Federal legislation to create a tax credit for investments made in expanding railroad capacity.[47] Freight rail investments outlined in this State Rail Plan include positive train control and infrastructure improvements that would improve the physical and operating capacity of Class I railroads in Minnesota. Creating a state income tax credit for these rail investments modeled after the Federal program, in which 25 percent of annual spending on capacity expansions – track, structures, terminals, yards, signal and communication systems, and intermodal facilities – can be credited in establishing state tax liability.

Broaden access to the Transportation Revolving Loan Fund. State Infrastructure Banks (SIBs) in many states offer local governments access to capital to help finance local match funding for Federal transportation projects or to help finance otherwise local contributions to projects such as utility readjustments and right-of-way purchases. Federal law allows use of Federal highway funds to capitalize these revolving loan funds, in which public agencies are allowed to borrow money to meet local matching requirements for transportation projects.

The Minnesota Transportation Revolving Loan Fund (TRLF) is authorized by state law to be used to "provide loans for public transportation projects eligible for financing or aid under any Federal act or program or state law." Rail-highway grade crossings are the only rail projects listed as an eligible expense, but the overall connection of eligibility to Federal programs would seem to broaden the application of TRLF for more rail-related projects. However, the Minnesota State Legislature could clarify eligibility for rail owners, and funding for freight and passenger rail projects.

Public Investment Tools

Broaden funding sources for Regional Rail Authorities. Regional Railroad Authorities, authorized under state law, could assist in the development of passenger rail service through station construction and operation, rolling stock purchases or sharing in passenger rail operating expenses. This could be done with cash contributions for annual operating subsidies (for operations and rolling stock) and financed costs for station development. Table 7.1 lists the Regional Railroad Authorities created by Minnesota counties, and includes information on those authorities which have exercised their property tax authority.

[47] H.R. 1806, Freight Rail Capacity Expansion Act of 2009.

Table 7.1 Minnesota Regional Railroad Authorities

		Tax rate		Tax Collections ($M)	
County/Name	Created	Bonds	General	Bonds	General
Anoka	1987	0.586	0.562		2.405
Buffalo Ridge[a]	1988				
Carlton					
Chisago					
Dakota	1987	–			0.140
Dodge					
Goodhue	1982				
Hennepin	1980	–	0.380	2.879	3.080
Isanti					
Itasca	1987	–			0.048
Lac qui Parle	1983				
McLeod					
Minnesota Valley[b]	1982				
Morrison		–			0.024
Mower					
Olmsted					
Pine					
Ramsey		–	0.035		1.701
Scott					
St. Louis and Lake	1985	–			0.705
Stearns	1984				
Wabasha					
Washington	1987	–			0.571
Winona					

Sources: Creation dates taken from authority information available on county web sites. Tax rates taken from county web sites. Tax collection amounts are 2004 data from a Minnesota Department of Revenue report on Special Taxing District Levies by Major Purpose, available at http://www.taxes.state.mn.us/taxes/property_tax_administrators/other_supporting_content/pay04_tab38.pdf.

[a] Created by Nobles and Rock counties.

[b] Created by Carver, Redwood, Renville, Sibley and Yellow Medicine counties.

Many of these Authorities were created to rescue and support freight rail branch lines subject to the abandonment surge from Federal deregulation and the bankruptcy of the Milwaukee railroad in the early 1980s. Many of the most active Authorities also are supporting passenger rail studies for commuter and intercity projects. This interest in passenger rail could lead to an ongoing role in delivery of intercity passenger rail service.

Most studies of new state-supported service by Amtrak assume that local governments will be responsible for station construction and operation. Ramsey County has been leading efforts to redevelop the St. Paul Union Depot, for the purposes of affecting development patterns on the

eastern side of downtown, attracting future HSR service to downtown rather than alternate sites, and offering connections from HSR and commuter rail service to planned Central Corridor light rail service. Since local governments gain financially from development spurred by rail station development, it may make sense to expect local governments, independently or through their Regional Railroad Authorities, to be responsible for station development. State lawmakers may need to adjust property tax limits to allow urban Authorities to support regional and intercity rail projects, and may want to consider other funding to augment the property tax, since only eight of the 24 authorities have levied property taxes.

Established State Financial Commitments. To support freight rail shipping and line rehabilitations, the MRSI program has been funded from both state bonding and from general funds over the last thirty years, with current revolving loan funds in use of about $15 million. The Grade Crossing Safety program annually utilizes about $5.7 million of Federal grants and $600,000 of State highway safety funds, all formula or program driven.

Mn/DOT has maintained its membership and joint funding for the Midwest Regional Rail Initiative (the "Chicago Hub") through its general appropriation for its operating budget. Other operating funds have been dedicated from consultant budgets and other departmental sources as needed. Hiawatha Light Rail, Northstar Commuter Rail, and NLX projects have moved ahead or to completion with Legislatively approved bonding and project funding. This commitment has extended to the necessary operating funding for Hiawatha and Northstar. The Legislature in the 2009 Session authorized $26 million in bonding to advance passenger rail projects, particularly to match Federal funds being applied for under PRIIA and ARRA/Stimulus programs. In 2009 the Legislature also appropriated funds to start up and finance the new Mn/DOT Office of Passenger Rail. The three named projects also were supported by significant local funds contributed by a combination of Regional Railroad Authorities, Counties, Cities, and Indian Nations. These sources are committed for both current expenditures and project advancement. In the case of Hiawatha and Northstar, the local jurisdictions in which the services run are also sharing operating costs.

Create state rail revenue sources. Rather than jostling among all other worthy competitors for limited state general funds or state capital budget bond funding, state rail supporters would be better served by specific revenue streams dedicated to freight and passenger rail projects.

Dedicated revenues could be used for the following two major purposes:

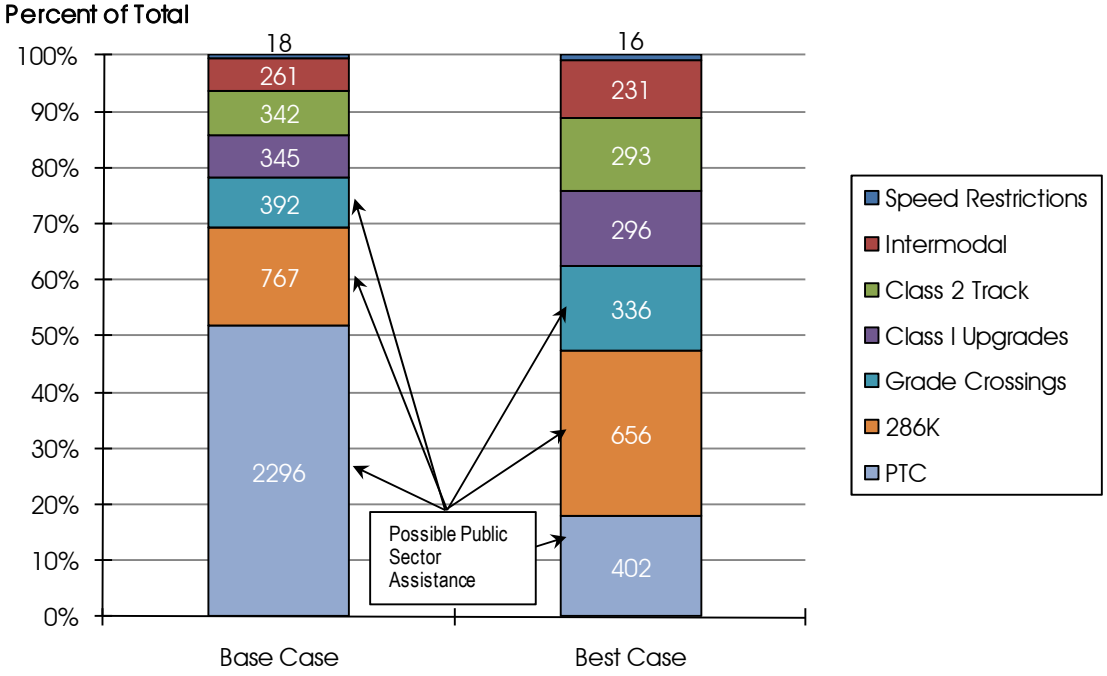
- Bonds for capital investments. Dedicated sources of stable funding could accelerate capital investments by issuing revenue bonds backed by a portion of the revenues. This would mean that rail projects would compete against each other, not against other items in the State's capital budget supported by general obligation bonds. Using these revenues to issue bonds rather than funding capital investments through annual revenue collections would allow for larger, more complete projects. Completing a project faster rather than in phases over time also will allow tax dollars to accomplish more results than having project cost inflation reduce the total amount of investments made on an annual basis.

- Annual funding. The other portion of dedicated revenues would support annual contributions for the following kinds of purposes:
  - Funds to offset general taxes reduced through tax credit programs for freight system improvements;
  - Funds for increased grade crossing improvements;
  - Operating costs for passenger rail services; and
  - Funds for environmental planning, engineering design and specifications, ridership, revenue and financial analyses, and Federal funding applications for passenger rail corridors.

7.2.2 Freight System Financial Plan

The State Rail Plan identifies $2.2 to $4.4 billion in improvements for the freight rail system not otherwise related to passenger rail projects. Figure 7.1 describes the elements in the freight system improvements, including engineering and contingencies, with a base case scenario including a high end estimate of positive train control costs (PTC) and a 30 percent contingency, and a best case including lower PTC costs and a 10 percent contingency (see Chapter 4.0). Four sets of improvements lend themselves to possible public sector financial participation, indicated in the figure: Class I upgrades, Positive train control, 286,000 lb. Track upgrades, and Grade Crossing improvements.

Figure 7.1 Freight Rail System Improvement Costs
Including Contingencies, ($millions)



Note: Contingencies are 30% and 10% base/best case; and 10% engineering.

Investments in the privately owned and operated freight rail system in Minnesota will expand capacity to serve rail shippers, provide uncongested movement of rail shipments for the benefit of shippers and communities, and improve rail safety. Since those investments will benefit the overall economic climate for the State, this plan recommends some form of public investment in some of these freight improvements (even though the State Rail Plan is not a financially constrained plan that must match investments to available funding).

The following public financing options should be considered, as shown in Table 7.2:

- **Twenty five percent Investment Tax Credits for Class I railroad spending on positive train control and system upgrades.** This plan assumes a tax credit program that would offer state income tax credits equal to 25 percent of eligible spending for these purposes. Even though the Federal mandate for full implementation of positive train control is 2015, this plan will assume gradual implementation of this new technology over all Class I track in Minnesota over the span of this State Rail Plan. There could be changes in the pace and scope of implementation on all Class I miles in the State, either from the extension of the 2015 deadline or the regulatory requirements that specify which rail lines would need the new system. This estimate is based on the currently assumed progression of investment first in CTC and then in PTC, or a best case assumption of proceeding directly to PTC.
- **Maintenance Tax Credit for 286K upgrades.** A state tax credit for short line rail improvements to track and structures to accommodate standard 286,000 lb train cars could be calibrated to offset 10 percent of the total costs of the upgrades. For ease of analysis, gradual implementation of the upgrades was assumed.
- **Grade crossing improvements.** Mn/DOT receives roughly $5 million annually in Federal grade crossing protection funds, matched by $600,000 in state funding. The remaining funding to bring about the replacement of all grade crossing safety devices would come from additional state funding.

Table 7.2 Freight System Costs, Public and Private Shares
Including Contingencies ($millions)

	Total Cost	Public Share	Private Cost
Base Case			
Class I upgrades	$345.52	$86.38	$259.14
Other Class I improvements	$261.00	–	$261.00
PTC	$2,296.00	$574.00	$1,722.00
286K restrictions	$767.20	$76.72	$690.48
Non Class I speed restrictions	$18.20	–	$18.20
Grade Crossings	$392.00	$392.00	–
Class 2 track upgrades	$341.60	–	$341.60
Total	**$4,421.52**	**$1,129.10**	**$3,292.39**
Percent of Total		**26%**	**74%**

Table 7.2 Freight System Costs, Public and Private Shares (continued)
Including Contingencies ($millions)

	Total Cost	Public Share	Private Cost
Best Case			
Class I upgrades	$296.16	$74.04	$222.12
Other Class I improvements	$231.00	–	$231.00
PTC	$402.00	$100.50	$301.50
286K restrictions	$657.60	$65.76	$591.84
Non Class I speed restrictions	$15.60	–	$15.60
Grade Crossings	$336.00	$336.00	–
Class 2 track upgrades	$292.80	–	$292.80
Total	**$2,231.16**	**$576.30**	**$1,654.86**
Percent of Total		**26%**	**74%**

Note: Contingencies are 30% and 10% respectively for the base and best cases.

Assuming that these tax credits would be timed equally over the 20-year plan horizon, and assuming that state funds would augment continued Federal grade crossing funding,[48] the following Table 7.3 translates the public funding shares into annual costs. The best case assumption about PTC would lower the bottom lines significantly.

It is estimated that the freight railroads currently are making capital investments in Minnesota at a rate of about $100 million per year, but these investments are mostly oriented toward routine maintenance rather than capital improvements. On a national level in the American Association of Railroads (AAR) National Capacity Study, the railroads report being able to finance $96 billion of $135 billion (70 percent) in identified capacity expansion needs through 2035. This would be achieved through projected earnings from revenue growth, higher volumes and productivity improvements. It does seem likely that global economic and environmental trends will improve the competitiveness of freight rail service in the long-term. Clearly, this is what a shrewd investor like Warren Buffet is betting on with his purchase of BNSF. If the railroads could finance 70 percent of the identified freight-only railroad needs in Minnesota that would bring them close to the $1.6 to $3.2 billion (74 percent of total) private sector investment shown in Table 9.2, plus an additional $700 million contribution to the shared passenger-freight needs described below. If relief can be gained from the PTC mandate (as assumed in the best case financial forecast), then it is possible that the freight railroads can meet the financial elements allocated to them in this Plan.

[48] The House authorization proposal mentioned earlier calls for the consolidation of many separate highway safety programs into a combined, performance-driven system. Even if the separate highway-rail grade crossing program were not continued, this analysis assumes that Mn/DOT will choose to maintain historical levels of federal funding for this purpose.

Table 7.3 Freight System Costs, Annual Public Costs
Including Contingencies ($millions)

	Base Case	Best Case
PTC, 25% Tax Credit	$28.70	4.19
Class I upgrades, 25% Tax Credit	$4.32	3.09
286K, Tax Credit	$3.84	2.74
Grade Crossings	$14.00	14.00
Total	**$50.86**	**24.02**

Note: Contingencies include 30% contingency and 10% engineering costs in base case; 10% contingency and 10% engineering cost in best case.

7.2.3 Shared Freight and Passenger Rail Corridors Financial Plan

The State Rail Plan needs assessment identified approximately $2.2 to $2.6 billion in freight-related infrastructure improvements for the Phase I priority projects. Phase I passenger rail corridors for these financing estimates refer to the following routes connecting to the Twin Cities: St. Cloud; Fargo; Duluth; Mankato; Eau Claire (Minnesota only); Chicago via River Route; Rochester via new route; and a connection between Minneapolis and St. Paul via the CP route. This financial plan assumes that the public and private sectors will share equally in the costs of freight rail improvements in shared freight/passenger corridors. The actual share will be subject to a detailed operational analysis and negotiation process with each railroad owner that will determine private and public benefits and respective cost responsibilities. Passenger-specific investments are those improvements solely necessary for passenger rail operations, and since those improvements are likely to have limited benefits for freight rail operations, this financial plan assumes these costs will be borne by the public sector.

This analysis began with an assessment of likely public and private cost sharing. Since the amounts of available Federal funds over the span of the State Rail Plan is speculative, and since those Federal grants are likely to be highly sought after, this financial plan does not assume that Mn/DOT can count on full 80 percent Federal funding of the capital needs for the Phase I priority projects. Instead, three Federal scenarios are included in these subsequent tables: zero Federal funds; one in which Federal funds are 50 percent of costs; and one in which Federal funds are 80 percent of costs. The Federal Transit Administration (FTA) today typically tries to limit Federal contributions to urban transit New Start projects to 50 percent in a similarly highly competitive grant process, but PRIIA offers the potential to receive up to 80 percent Federal funding as in the Federal highway program.

If the 20-year capital costs for the public (non-Federal) costs were financed over time through state revenue bonds, the annual debt service costs for a single bond issue for the entire public costs would be the following:

	Base Case	**Best Case**
No Federal funds	$275 million	$237 million
50% Federal funds	$137 million	$119 million
80% Federal funds	$55 million	$48 million

Timing of bond financing that matches project development and receipt of Federal funds may bring about a different annual cost of debt service over the span of the State Rail Plan, but capital costs for the actual projects also may be significantly different after full engineering plans and host railroad negotiations are completed, so the annual figure will serve as an adequate representation of possible annual funding requirements for the entire Phase I program, to illustrate the possible needs for state rail program revenue sources.

These infrastructure costs do not capture the capital and operating costs associated with actually delivering intercity passenger rail services. These costs include the costs of the trains themselves (rolling stock), costs of operation and maintenance of the routes (equipment and infrastructure maintenance, personnel costs for operation and maintenance, system costs for providing the services like security, ticketing, and insurance), and whatever additional costs access to the freight railroad lines might cost. The plan further assumes that train operations on all Phase I routes will be provided by one party (Amtrak or another private provider). Making this assumption allows the rolling stock costs and any other costs of access to the freight network to be assumed by this party, and this informs the subsequent financial analysis.

This financial plan includes two scenarios for these operating costs, a base case and a best case. The base case includes conservative assumptions about rolling stock costs, operating costs on a train mile basis, and ridership and revenue. The best case offers an alternative based on certain different assumptions, explained in the following Table 7.4.

Table 7.4 Base Case and Best Case Assumptions

Cost Element	Treatment in Base Case	Treatment in Best Case
Rolling Stock	Trainsets assumed for corridor service only.	20% cost discount for probable system operation benefits of sharing trainsets among all corridors.
Operations and Maintenance Costs	$70/train mile, similar to Amtrak fully allocated overhead costs.	$55/train mile, similar to Amtrak's direct costs.
Capacity Access Costs	Costs of access to freight rail network similar to that negotiated for Northstar service.	50% lower capacity access fees assuming less intensive use of the line.
Ridership and Revenue	Baseline ridership and revenue estimates used for project evaluation.	Assuming 50% higher ridership and 25% higher revenues.

These two cases, combined with two Federal funding alternatives applied to rolling stock costs (no assumptions are made about whether the capacity access costs are eligible Federal expenses), are shown in Table 7.5. While the rolling stock and capacity charges are annualized as if financed, this does not presume that the State would be the entity financing these costs. Instead, the analysis presumes that the contracted passenger rail operator would be expected to procure rolling stock and pay applicable capacity access charges. This would allow the operator to maximize cost savings from pooled equipment purchases and any available equipment leasing options not available to the State. This plan further assumes that the State should not subsidize more than about 25 percent of O&M costs for passenger rail services. According to Amtrak monthly financial records, state supported passenger rail routes cover more than 85

percent of their total O&M costs (not including depreciation). To the extent that early operations of passenger rail routes do not meet this 85 percent farebox recovery ratio, the difference could be made up by Regional Railroad Authorities or joint powers agencies of multiple railroad authorities.

Table 7.5 Passenger Rail Corridor Operating Costs
($millions)

	No Federal Funds	50% Federal Share	80% Federal Share
Base Case			
Rolling Stock Cost	$729.00	$729.00	$729.00
Rolling Stock, Less Federal Share	–	$410.50	$164.20
Capacity Rights	$589.70	$589.70	$589.70
Annualized Capital Costs	$98.10	$69.55	$52.42
Operations and Maintenance Amount	$181.00	$181.00	$181.00
25% State Stare	$31.98	$31.98	$31.98
Annual Operating Cost	$130.07	$101.53	$84.40
Best Case			
Rolling Stock Cost	$603.00	$603.00	$603.00
Rolling Stock, Less Federal Share	–	$301.50	$120.60
Capacity Rights	$272.40	$272.40	$272.40
Annualized Capital Costs	$60.87	$39.91	$27.33
O&M Amount	$140.00	$140.00	$140.00
25% State Stare	$20.18	$20.18	$20.18
Annual Operating Cost	$81.05	$60.08	$47.50

Best Case: Base case, rolling stock costs reduced 20% for system synergies, capacity rights reduced 50%, O&M costs reduced 21%, Revenues increased 25%.

Annualized Capital Costs assume RRIF type financing, 25-year term, 4.8% annual interest rate, for non-Federal capital costs.

Routes with surplus zeroed out of state share.

These estimates do not include small final changes in total costs, which will have minimal impact on annualized costs.

When these reduced O&M and increased revenue figures are compared to the base case, it offers a more optimistic performance assessment as shown in Table 7.6. The best case farebox recovery ratio would be a very respectable 71 percent. However, a 95 percent systemwide farebox recovery could be achieved if the surplus generated on the Minnesota portion of the MWRRI interstate route to Chicago could be used to offset the deficit on the Minnesota intrastate routes.

Table 7.6 Farebox Recovery Scenarios
($millions)

	Base Case	Best Case
O&M Cost	$181	$140
Revenue	$89	$99
Farebox Recovery	49%	71%

Totals for all Phase I corridors.

Best case includes reduced O&M costs, 50% higher ridership, 25% higher revenues.

7.2.4 Total Freight and Passenger Rail Costs

When the annual public sector costs of the freight only infrastructure costs are combined with shared freight/passenger infrastructure annual costs and the annual operating cost estimates, the resulting Table 7.7 offers a range of possible annual costs associated with the State Rail Plan projects.

Earlier in the financial plan, a set of dedicated state revenue sources was recommended, with two uses of the funds: support of revenue bonds and annual costs of the rail plan. Looking at Table 7.7, the relative sizes of these two funding pools can be seen. The annual costs associated with financing the costs of the public (non-Federal) passenger rail infrastructure ranges from $47 to $275 million. The costs of supporting freight and passenger operations would range from $77 to $180 million, and the total annual public cost could range from $119 to $455 million. This information should help to inform legislative consideration of state revenue sources needed to implement freight and passenger rail improvements in Minnesota.

Table 7.7 Total Possible Annual Costs, State Rail Plan
($millions)

	No Federal Funds	50% Federal Matching Funds	80% Federal Matching Funds
Base Case			
Phase I Infrastructure Costs	$274.55	$137.28	$54.91
Freight Only Improvements, Public Share	$50.86	$50.86	$50.86
Phase I Operating Costs	$130.07	$101.53	$84.40
Subtotal Annual Cash Costs	$180.93	$152.39	$135.26
Total Annual Costs, Capital and Cash Costs	$455.48	$289.67	$190.17
Best Case			
Phase I Infrastructure Costs	$237.25	$118.63	$47.45
Freight Only Improvements, Public Share	$24.02	$24.02	$24.02
Phase I Operating Costs	$81.05	$60.08	$47.50
Subtotal Annual Cash Costs	$110.91	$89.94	$77.36
Total Annual Costs, Capital and Cash Costs	$343.12	$202.73	$118.97

Best Case includes discounted rolling stock, reduced O&M costs, reduced capacity rights costs, higher revenues.

These estimates do not reflect small final changes in total costs, which will have minimal impact on the annualized costs.

Passenger rail Phase I costs presume traditional MN public debt, 20-year term, 5% annual interest.

Annual Operating Costs include RRIF debt for rolling stock and capacity access, 25-year term, 4.8% annual interest.

A List of Outreach Activities and Committees

Table A.1 Policy Advisory Committee (PAC)

Cities and Counties
Counties Transit Improvement Board (CTIB)
Environmental Organizations
Legislators and Other Elected Officials
Metropolitan Planning Organizations (MPOs), Metropolitan Council
Organized Labor
Rail Corridor Coalitions
Railroads
Regional Railroad Authorities
Regional Development Commissions (RDCs)
Shippers
State DOTs
Trade Associations
Transportation Associations, Ports, Minnesota Trade Associations

Table A.2 Freight and Passenger Rail Technical Advisory Committees (FTAC and PTAC)

Freight Technical Advisory Committee (FTAC)
Agricultural Associations
Burlington Northern Santa Fe Railroad
Canadian Pacific Railway
Duluthport
Federal Highway Administration
Federal Railroad Administration
Metropolitan Council
Midwest Shippers Association
Minnesota Commercial Railroad
Minnesota Freight Advisory Committee
Minnesota Railroad Association
Minnesota Trucking Association
Mn/DOT Districts 1, 7, and 8
North Dakota DOT
Northwest Minnesota RDC
Twin Cities and Western Railroad
United Transportation Union
Passenger Technical Advisory Committee (PTAC)
Amtrak
Anoka County Regional Rail Authority
Burlington Northern Santa Fe Railroad
Canadian Pacific Railway
Dakota County
Federal Railroad Administration
Goodhue County Public Works
Hennepin County
Metropolitan Council
Mid-Minnesota Development Commission
Minnesota Commercial Railroad
Mn/DOT Districts 3 and 6
Mn/DOT Metro District
Mn/DOT Office of Transit
Northern Lights Express Board
Ramsey County Regional Rail Authority
Rochester Area
St. Louis County
St. Cloud Area Planning Organization
Twin Cities and Western Railroad
Union Pacific Railway
United Transportation Union
Washington County
Wisconsin DOT

Table A.3 Summary of Open Houses

Date	Location	Attendance	Main Themes
4/21/09	St. Cloud	34	• Extend Northstar • Consider relationship between freight and passenger rail
4/22/09	Rochester	85	• Connect to MWRRI • Move freight service out of downtown
4/29/09	Duluth	216	• Dedicate alignment for Northern Lights Express • Use union labor to operate
4/30/09	St. Paul	29	• Enhance connectivity between St. Paul and Minneapolis
5/6/09	Red Wing	47	• Use River Route for MWRRI
5/13/09	Mankato	45	• Study passenger rail to St. Paul
5/14/09	Moorhead	12	• Invest more in freight rail
10/6/09	St. Cloud	32	• Carefully consider passenger corridor rankings and timelines • Reinforce importance of intermodal
10/7/09	Rochester	75	• Support passenger service between Rochester and Twin Cities • Explore opportunity for intermodal • Be clear about sources of funding
10/8/09	Red Wing	128	• Select River Route for MWRRI • Connect Rochester as spoke from Winona
10/14/09	St. Paul	80	• Support high-speed rail • Research project costs and funding • Coordinate timing of passenger rail projects
10/15/09	Duluth	48	• Support NLX alignment • Coordinate with railroads • Support union labor
10/21/09	Moorhead	14	• Carefully consider issues related to freight regulation, safety, tax equity
10/22/09	Mankato	82	• Support passenger service between Mankato and Twin Cities • Sustain and enhance short lines and freight infrastructure
10/28/09	Willmar	28	• Consider importance of corridor to regional freight operations • Don't underestimate potential for commuter rail
		Total attendance: > 900	

Table A.4 Stakeholder Meetings

1000 Friends of Minnesota	Minnesota Public Transit Association Conference
169 Corridor Coalition	Minnesota Regional Development Commissions Association
American Institute of Architects, St. Paul	Minnesota Regional Railroads Association
Association of Minnesota Counties	Minnesota Rural Counties Caucus
Burlington Northern Santa Fe Railway	Minnesota Trucking Association
Canadian Pacific Railway	Mississippi Valley Freight Coalition
Center for Transportation Studies, University of Minnesota	Mn/DOT Planning Directors Committee
Citizens Against Rail Bypass	New Urbanism Workshop, University of Minnesota
City of Red Wing, River Corridor Joint Powers Group	Northern Lights Express Board
City of St. Paul	Northern Lines Railway
Civic Caucus	Northstar Corridor Development Association
Counties Transit Investment Board	Prairie Island Indian Community Tribal Council
Dakota County Board	Progressive Rail
DM&E Railroad	Ramsey County Board
East Metro Transportation Alliance	Red Rock Corridor Coalition
Fresh Energy	Red Wing 2020
Growth and Justice	Representative Alice Hausman
Harbor Technical Advisory Committee	Right-of-Way Professionals Conference
Hennepin County Board	Rochester Delegation
Housing Preservation Project	Rush Line Corridor Coalition
Humphrey Institute of Public Affairs, University of Minnesota	Scott County Area Leadership Council
Mankato Area Transportation Committee	Sierra Club
Metropolitan Council	Southeast Minnesota Rail Coalition
Metropolitan Council TAB	St. Cloud Rotary Club
Midwest Regional and Short Line Railroads Annual Conference	Transit for Livable Communities
Minnesota Chamber of Commerce	Transportation Alliance
Minnesota Commercial Railway	Twin Cities and Western Railroad
Minnesota Farm Bureau	Twin Cities Transportation Advisory Board
Minnesota Freight Advisory Committee	Union Pacific Railway
Minnesota Grain and Feed Association	United Transportation Union
Minnesota High-Speed Rail Coalition	Washington County Board
Minnesota Joint Environmental Panel	West Central Rail Shippers
Minnesota Joint House and Senate Transportation Policy and Oversight Committee	West Central Wisconsin Rail Coalition
Minnesota Metropolitan Planning Organization Council	Wisconsin DOT