4.0 PROPOSED FREIGHT RAIL IMPROVEMENTS AND INVESTMENTS

As noted in CHAPTER 3, the 2010 rail plan included a needs analysis for all freight and potential passenger rail corridors in Minnesota. This process was developed in a manner that allowed for a clear understanding of rail system needs for both current and future (2030) freight and passenger operations. A full needs analysis was not undertaken for the 2015 Minnesota State Rail Plan. Instead, projects identified on freight-only corridors in 2010 were brought forward as a basis for the update, and were complemented with crossing safety improvements and a qualitative description of capacity improvements in the past five years. The latter category incorporates projects recently identified in the 2014 Grade Crossing Safety Report compiled by MnDOT.

For the most part, cost estimates presented in this document are general in nature, are reflected in original 2010 dollars and are not detailed engineering cost estimates. Although some corridors provide connections to points beyond the state border, this evaluation only reflects costs for work within Minnesota.[60] More detailed information about the cost evaluation can be found in Appendix C, which also contains the detailed project list.

This section is organized around previously identified capacity improvements on freight corridors—track, signal and bridge; weight, speed and track restrictions; and other major Class I improvments, followed by discussions of other potential investment areas including major capacity improvements, intermodal service expansion, positive train control, rail service relocation, and hazardous materials. Lastly, grade crossing safety needs across key crude oil corridors are specified. Overall rail needs and improvements are organized by freight rail operator and then by subdivision. The investments are summarized in Table 4.1.

Table 4.1: Summary of Freight Investments for 2030

NEED	COST TO UPGRADE (MILLIONS)
TRACK, SIGNAL, BRIDGE	
BNSF	$68.0
CN	$68.0
CP	$331.8
UP	$35.4
OTHER MAJOR CLASS I IMPROVEMENTS	
Bottlenecks *(incl. in passenger line costs)*	–
Bridges *(incl. in passenger line costs, except for Roberts Street Bridge)*	$51.0
Intermodal Facilities	$150.0
WEIGHT, SPEED AND TRACK RESTRICTIONS	
286,000 Pound Upgrades	$548.0

[60] 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.

NEED	COST TO UPGRADE (MILLIONS)
Bridge and speed restrictions	$13.0
FRA Class II to I Upgrades (less 286,000 overlap)	$244.0
GRADE CROSSINGS	
Active Warning Devices (1,400)	$280.0
Cost of Upgrades	$50.0
10% Engineering/30% Contingency	$132.0
Total Cost (shown in 2010 dollars)	$462.0

Capacity Needs

Capacity needs for all four Class I railroads are summarized by subdivision in Table 4.2. An overview of issues surrounding each operators freight-related capacity needs are discussed below.

BNSF

BNSF is among the most aggressive Class I railroads in reinvesting in its network in the past several years. This is largely in response to unprecedented demand for rail services across the United States. While Bakken oil shale–related growth in the northern tier receives a lot of publicity, BNSF saw growth across nearly all service areas. The need for capacity expansion led to an annual capital investment programs in excess of $5 billion in recent years, and $6 billion in 2015.

In Minnesota, increased Bakken oil shipments and record agriculture harvests put a heavy strain on several of BNSF's primary main lines since 2010, specifically on the Staples Subdivision from Dilworth to St. Paul and the St. Croix Subdivision from St. Paul to La Crosse, Wisc. Improvements throughout both subdivisions are necessary to avoid ongoing traffic congestion. BNSF has announced plans to invest in safety improvements and add a second mainline track in portions of both subdivisions in the near future.

Increasing crop yields and recent record harvests compounded the impact of Bakken-related traffic. These impacts strained BNSF's network across many regions of Minnesota. As described in the 2010 State Rail Plan, improvements are recommended for the Marshall Subdivision. The Wayzata, Morris and Brainerd subdivisions also are recommended for investment based on congestion and current weight restrictions.

Originally the Great Northern mainline between St. Paul and Minneapolis, the BNSF line—now known as the "south main"—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 grade separated for the majority of its length. From St. Anthony Junction to Minnesota Junction, the line

involves multiple interlockings and single track, an area requiring significant upgrades. The right of way and bridges are sufficient to allow all needed expansion.[61]

The CP line is single tracked for its entire length, but 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 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 7-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 St. 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.

Freight improvements are noted within this corridor, with most investment going towards St. Anthony and Minneapolis Junction upgrades for both BNSF and CP railways.

CANADIAN NATIONAL

The 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 far northern part of the state. Three freight-only corridors 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. At present, CN is investing in its freight capacity between Duluth and International Falls.

CANADIAN PACIFIC

The 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 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.

The Bass Lake Spur Subdivision between Minneapolis and Hopkins is proposed to be modified and improved with the construction of the METRO Green Line Extension Project. Several new bridges and new mainline track are proposed to be constructed on the Bass Lake Spur and the tracks where Twin Cities & Western Railroad operates in Minneapolis. This infrastructure will be financed by METRO Green Line Extension Project monies.

Due to the Bakken oil boom and record crop yields, the Paynesville Subdivision between Glenwood and Minneapolis saw increased traffic and requires safety and capacity improvements. CP plans to upgrade track in the Paynesville Subdivision.

[61] In January 2015, BNSF announced a capacity expansion project between Minneapolis Junction and the St. Paul intermodal yard that entails installation of second main track and reconfiguration of several interlockings along most of this route. Work on these improvements is anticipated to be substantially completed in 2015.

Five CP subdivisions demonstrated a need for investment in the 2010 State Rail Plan. The two corridors demanding immediate needs, Bemidji and MN&S, had improvements since 2010 and additional improvements are planned.

UNION PACIFIC

In Minnesota, UP's service is concentrated in the state's south, with connections to Iowa, Nebraska, Chicago and points beyond. UP also has invested heavily in its eastern connection to Chicago through Wisconsin. Four UP subdivisions demonstrate a need for immediate improvement and all four lines are lightly used collection/distribution routes where various restrictions are found. The Hartland, Montgomery, Rake and Winona subdivisions share many similarities. All are short in length, ranging from the 1.8-mile Winona Subdivision to the 21-mile Montgomery Subdivision, and all are used as branch lines.

Table 4.2: Twin Cities Core Freight Totals

NEEDS	COST TO UPGRADE (MILLIONS)
BNSF	
Browns Valley	$54.6
KO	$0.5
Marshall	$6.2
P-Line	$1.0
St. Croix	$1.4
St. Paul	$4.2
Cost of BNSF Freight Upgrades	$67.9
CN	
Dresser	$13.1
Osage	$20.6
Rainy	$34.0
Cost of CN Freight Upgrades	$67.7
CP	
Bemidji	$29.6
Detroit Lakes	$84.0
Elbow Lake	$38.5
MN&S	$24.4
Noyes	$28.2
Paynesville	$48.2
DM&E Waseca	$77.5
ICE Owatonna	$1.4
Cost of CP Freight Upgraes	$331.8
UP	
Hartland	$18.7

NEEDS	COST TO UPGRADE (MILLIONS)
Montgomery	$10.4
Rake	$4.1
Winona	$2.2
Total UP Freight Upgrades	$35.4
TOTAL FREIGHT UPGRADE COSTS (IN 2010 DOLLARS)	$502.8

Crossing Safety Improvements

In December 2014, MnDOT released a Grade Crossing Safety Report that identifies sites where safety can be improved by reducing public exposure to derailments, spills and fires in areas with the highest risks for personal injury and property damage. Four possible crossing improvement strategies were considered: closing at-grade crossings, upgrading passive warnings to active signals, improving active protection with more effective safety treatments, and constructing grade separations. Three corridors were focused on due to high volumes of Bakken crude oil unit trains:

- BNSF mainline from the Twin Cities to Fargo/Moorhead via St. Cloud, Staples and Detroit Lakes
- CP's mainline from La Crescent to the Twin Cities and then to North Dakota via Glenwood
- BNSF corridor from Fargo/Moorhead to Willmar to the South Dakota border via Marshal and Pipestone

Results of this report with associated crossing safety improvement costs are shown in Table 4.3.

Table 4.3: BNSF and CP Crossing Safety Improvements

LOCATION/CORRIDOR	COST TO UPGRADE (MILLIONS)
BNSF Crossing Upgrades	
Downtown Moorhead	$40.0
Moorhead to Iowa Border	$49.8
Moorhead to Willmar	$1.3
Twin Cities Core	$25.0
Twin Cities to Duluth	$62.0
Twin Cities to Fargo/Moorhead	$170.5
Twin Cities to North Dakota Border (Morris Subdivision)	$10.0
Twin Cities to St. Cloud	$3.5
Twin Cities to Sioux Falls, SD	$3.6
Willmar to Iowa Border	$0.7
10% Engineering/30% Contingency	$146.6
COST OF BNSF CROSSING SAFETY UPGRADES	$513.0

LOCATION/CORRIDOR	COST TO UPGRADE (MILLIONS)
CP Crossing Upgrades	
Twin Cities to North Dakota Border	$12.7
Twin Cities to Chicago (River Route)	$13.2
Twin Cities to La Crescent (River Route)	$14.2
10% Engineering/30% Contingency	$16.0
COST OF CP CROSSING SAFETY UPGRADES	$56.5*

Weight, Speed and Track Restrictions

In the volume-to-capacity analysis of the state's rail network in 2010, several of the non-Class I railroads exhibited elevated volume-to-capacity issues. In some cases, train volumes on these lines are modest. There are, however, a number of conditions that affect 2014 freight flows, including 286,000 pound compliance, bridge restrictions, track restrictions, and FRA Class I track (see Table 4.4). Several improvements on Class I and short lines alike in the near future will upgrade existing lines. No 2030 restrictions were found on these lines, indicating that these repairs, for a total investment of more than $772.1 million, will carry these segments' needs through 2030.

As of 2010, 453 miles of railroad in Minnesota were 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 8 percent of the national total.

Table 4.4: Weight, Speed and Track Restrictions

OWNER	SUBDIVISION	286K	BRIDGE	SPEED	TRACK CLASS	TOTAL COST (MILLIONS)
BNSF	Browns Valley	X	X			$54.6
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

OWNER	SUBDIVISION	286K	BRIDGE	SPEED	TRACK CLASS	TOTAL COST (MILLIONS)
NLR	Cold Spring		X	X	X	$24.0
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	$772.1

Other Major Capacity Improvements

A number of other major capacity project needs were identified to alleviate present day or projected bottlenecks. While these projects are each on the freight system today, many of these upgrades only become critical as passenger service is introduced. CHAPTER 3 discusses specific passenger corridors that require these major capacity improvements.

Not included in these identified structural improvements are the issues and potential costs associated with limited capacity in downtown Minneapolis on the BNSF Wayzata Subdivision, specifically at the site of Target Field Station. The constricted right of way at the Target Field Station currently allows one through freight track, used by BNSF and TC&W for increasing volumes of through train movements, and two passenger tracks on either side of a center platform. The track, approaches, signals, and overpasses were upgraded to accommodate Northstar commuter rail service in 2009. This plan assumes freight traffic will continue to grow and that there is currently no easily accessed alternative for rerouting freight in this corridor. A large projected increase in intercity and commuter trains at this site exacerbates capacity needs. Rail studies since 2010 also list Target Field Station as a potential terminus for NLX, Zip Rail and a potential HSR route to Chicago. Although the construction of additional infrastructure at Target Field Station helped with local transit rail vehicle storage, additional track capacity will be needed as freight and passenger train movements increase in response to growing demand.

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 also is 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 use this track and junction to enter the Hinckley Subdivision

and access the proposed double track between Coon Creek Junction and Sandstone. It also is the site of a proposed north suburban station at Foley Boulevard, which would include 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.

Savage Interchange

In order to provide passenger service from Mankato to Minneapolis, a connecting track between the UP Mankato Subdivision and the CP MN&S Subdivision would need to be built. The two railroads are grade separated at this location, which would require a new connecting grade and track. 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 traverse this junction. UP 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, which would increase capacity through the junction. In cooperation with the railroads, passenger projects, MnDOT and the Metropolitan Council, the Ramsey County Regional Rail Authority completed a study that positively identifies the demands, alignments and investments needed in this area.

Minneapolis Junction

Minneapolis Junction is a major emerging bottleneck 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 is currently a seven degree curve, which restricts 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; however, many businesses within the affected area would need to be acquired and demolished 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 for diverging traffic.

City of Shakopee Track Realignment

To increase the speed through the city of Shakopee, a bypass may need to be constructed for UP's Mankato Subdivision. The rerouting would provide 10 miles of track around the downtown area of Shakopee, bypassing an area of what is largely 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 is to relocate some of the track. This would minimize existing curvature and increase speeds. A multiple-track, high-speed interlocking also would need to be installed.

St. Louis Park Interchange

As a part of the METRO Green Line Extension Project, Hennepin County is improving the interchange between the TC&W and the CP alignment. Previous studies to improve major geometric challenges of grade and curvature in St. Louis Park proved to be too difficult politically, so the expanded route options will not be realized.

County-commissioned engineering estimates suggest a cost of $48 million for improvements to the mainline TC&W line, and with a variety of assumptions on potential grades, curvatures, and line displacements, final costs are approximated between $40 million and $70 million.

University Interlocking

University Interlocking is a station location on the BNSF. The speeds through this junction are adequate for the BNSF, but the CP has slow speeds as it leaves the BNSF and enters the Paynesville Subdivision. A track could be built to the east for the CP to exit the BNSF at higher speeds and potentially avoid congestion on the BNSF line. 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.

Willmar Wye

The Willmar Wye is a proposed new rail alignment and industrial park access on the west side of the city of Willmar. The project would also include the construction of two new highway bridges on Highway 12 and Highway 40 over the proposed new rail line, along with other associated local road modifications. The existing local rail configuration impedes local traffic and train service. The project would alleviate crossing blockage due to train and locomotive maneuvers related to BNSF's Willmar Yard. Currently, trains entering Willmar from the northwest or southwest destined for locations on the other subdivision must first travel into the yard over several at-grade intersections and stop in the yard to reverse direction by reallocating power. The engines are moved from the front of the train to the back of the trains, which then travel back out of the yard to connect with the other subdivision. This movement creates excess emissions, blocks crossings in Willmar and consumes yard and mainline capacity that would otherwise be used for switching local business and handling through trains. This movement results in trains blocking intersections in Willmar's Central Business District for up to 30 minutes at a time. Stakeholders, including BNSF Railway, MnDOT, City of Willmar, Kandiyohi County and the local economic development council are working in partnership to advance development of this project.

Bridges

Railroad bridges provide key connections between a number of important rail lines in Minnesota. Many of these have been in place and operable with little maintenance or investment for decades. The 2010 State Rail Plan identified a number of key bridge improvements, highlighting five bridges owned by BNSF, four owned by UP, one owned by CP and one owned by the Minnesota Valley Regional Rail Authority. 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 will require replacement. 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, Minn.. The current bridge is a steel through truss center pivot swing span. A proposed replacement bridge would be a 240-foot single track vertical lift span. This bridge would serve the proposed NLX project and is estimated to cost $51 million. A relocated channel crossing between Superior and Rice's Point (Duluth CP and BNSF yards) could potentially improve HSR travel times into Duluth and open up Duluth Port to through intermodal container services.

Hastings Bridge

The Hastings Bridge crosses the Mississippi River on CP's River Subdivision. The current bridge, completed in 1981, is a through truss vertical lift span. A proposed replacement bridge would be a 324-foot 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 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 CP's Tomah Subdivision and 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 for all four bridges would be a fixed span, perhaps on a different alignment. The estimated cost for all four bridges is $117 million.

Mendota Heights Bridge

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

Savage Bridge

This former MN&S bridge in Savage, Minn., crosses the Minnesota River. Presently out of service, the 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 geographically and capacity limited. Existing terminals are all located in the Twin Cities, and the only existing direct services connect to Chicago and the Pacific Northwest. Efforts to provide service in other parts of the state were not successful, with a public terminal opening and closing in the western part of the state at Dilworth. Elsewhere, a private intermodal operation at Montevideo handled grain products intermittently.

Conversations with stakeholders revealed a strong desire for additional terminal capacity in the Twin Cities and 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. Terminal capacity is adequate for the markets that are currently being served, but it would be difficult to accomdate service to new markets. Providing new terminal capacity is a challenge, as was evident during an ultimately unsuccessful effort in the 1990s by MnDOT 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, particularly for domestic traffic. The existing central locations of the BNSF in St. Paul and CP in Shoreham are hard to beat.

Offering intermodal service beyond the Twin Cities in locations such as Duluth or western Minnesota may 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 annual volume threshold is around 50,000 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 the clientele for such a service will be quite limited.

A major influence on the competitiveness of a terminal is the availability of empty containers and trailers for loading. For export moves, empty containers are generally concentrated in major markets such as Chicago. If a western Minnesota shipper requests equipment for a West Coast export move, it is quite possible that an empty container must be repositioned 700 miles from Chicago to the point of loading. The cost of this move is significant, and can increase the cost of an intermodal move to a level that exceeds the 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 ownership of the terminal raises 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.

Despite these impediments, expansion of intermodal service is important and a collaborative effort among stakeholders should be initiated to ensure expanded intermodal service options in Minnesota.

Positive Train Control

Positive Train Control 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; lineside infrastructure such as switches, crossings and junctions; automated cataloging of speed restrictions and traffic conditions; and real-time wireless communications with locomotives and other operating equipment, dispatchers and work crews. The Rail Safety Improvement Act of 2008, Public Law 110-432, mandated the widespread installation of PTC systems by December 2015 on all lines handling passenger trains or hazardous materials, a network totaling approximately 80,000 miles.[62]

[62] Source: Federal Railroad Administration, www.fra.dot.gov.

According to the AAR, as of January 2015 freight railroads invested approximately $5.2 billion in PTC, with the following results:[63]

- 60 percent of the required locomotives are fully or partially equipped with PTC
- Half of the required PTC wayside units are installed
- One-third of the required PTC radios (base station, wayside and locomotive) are installed
- As of May 2014, one-third of the required PTC antennas are installed

The Association of American Railroads projects that full implementation of PTC will cost approximately $9 billion. Once the full system is in place, it is predicted that it will cost hundreds of millions of dollars per year to maintain the entire system. BNSF anticipates that they will be able to meet the 2015 deadline; however, other Class I railroads indicate they may not have PTC fully implemented until 2017 or later.

Class I railroads are bearing most of the burden associated with installing PTC, but some Class II and III railroads also are affected by the mandate. These smaller railroads are similarly required to implement PTC on tracks that carry passenger trains over a certain threshold or have a significant volume of toxic or poisonous-by-inhalation hazardous materials. In addition, some locomotives operated by Class II and Class III carriers may need to be equipped with on-board PTC systems to operate on PTC-equipped Class I track, a situation encountered by at least two Minnesota short lines, the Twin Cities and Western, and Minnesota Commercial. The amended final rule issued by the FRA extended the deadline requiring Class II and Class III locomotives traveling further than 20 miles on PTC required track to be equipped with an onboard PTC system until Dec. 31, 2020. Locomotives of Class II and Class III railroads traveling less than 20 miles, and with fewer than four movements per day on track with PTC, are exempt under the amended final rule *Equipping Locomotives Operating in PTC Territory*.[64] However, Class I Railroads may impose stricter conditions than FRA guidelines require, such as requiring any locomotive operating over PTC-equipped territory to have the necessary on-board technology. The $100k+ cost of retrofitting older locomotives that are typical of short line fleets is beyond the financial ability of many carriers.[65]

The cost of implementing PTC is not included in the 2015 Minnesota State Rail Plan, as the implementation is well along and the Class I railroads are largely bearing the implementation cost. It does include (in CHAPTER 5), an estimate for equipping 20 locomotives operated by Class III railroads with on-board PTC systems.

Line Relocation

Freight rail tracks and associated infrastructure represent significant capital investments at fixed locations; however, under certain circumstances 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 pursued changes in the freight rail network

[63] AAR: Current Implementation of Positive Train Control; www.aar.org/Pages/Status-of-PTC-Implementation.aspx

[64] Equipping Locomotives Operating in PTC territory: www.gpo.gov/fdsys/pkg/CFR-2010-title49-vol4/pdf/CFR-2010-title49-vol4-sec236-1006.pdf

[65] The 2010 State Rail Plan included estimated costs of implementing PTC in Minnesota totaling $1.6 billion. However, with PTC implementation substantially underway and in varying states of completion, an updated cost estimate was not included as part of this plan. Implementation of passenger services will require some additional investment in PTC to accommodate passenger traffic along these lines. These costs are included as part of the investment plan (see Chapter 5).

and freight rail operations in order to accomplish a variety of objectives including:

- 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 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.
- 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, those communities may experience negative impacts, including on 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 bypass, a new line or significant increases in train volumes, require the review and approval of the federal Surface Transportation Board. Such projects may be initiated either by a private entity, 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, freight traffic increases, and as communities grow. Currently, several relocation projects in the state 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,proposed a 48-mile freight rail bypass south of Rochester to replace downtown freight rail service operated by CP. In 2013, MnDOT conducted a feasibility study and alternatives analysis of the existing alignment and proposed bypass alignments. The Southeastern Minnesota Freight Rail Capacity Study, completed in 2013, recommended maintaining the existing alignment through downtown Rochester. Incremental improvements could further improve safety in the corridor if implemented in advance of any capacity need.

In Hennepin County, the Twin Cities and Western Railroad 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. This alignment was chosen as the locally preferred alternative for the METRO Green Line Extension Project and will require the TC&W freight tracks to be rebuilt. After several years of discussion and public engagement, full municipal consent was provided by all municipalities for a plan to build a tunnel for the METRO Green Line tracks in the Kenilworth Corridor. TC&W service will reopen in 2018, and the METRO Green Line Extension service is planned to begin in 2019.

Both the Rochester Southern Rail Corridor and the 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.
- The need to preserve and enhance communities through which freight rail lines pass by means of effective mitigation and design strategies.

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, are actively engaged to improve the safe transport of hazardous materials by rail. Substantial progress was made in the design of and materials used in tank cars, reporting, custody, education, communications, and safe handling. The railroads and car builders responded with better steels and coatings, higher build quality, repositioned vents and valves, shelf couplers, and puncture shielding that made tank cars more able to survive an accident without spillage. Concurrently, the rail infrastructure improved materially, reducing the incidents of equipment failures and derailments to the lowest levels in history. The net result was 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.

In spite of the excellent safety record, the most dangerous of these commodities, Toxic Inhalation Hazards, 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 are viewed as increasingly difficult and insufficiently compensatory for the risks incurred. 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 embarked on efforts to not only increase the safety of their transport, but also to greatly reduce the volumes being handled. Since 2005, new initiatives are 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, were designed and implemented since 2010.

Since 2010, the increased transport of Bakken oil raised another concern regarding hazardous material hauling. This concern is especially concentrated along BNSF tracks, where in July 2014 more than 50 train cars moved volatile oil shipments through heavily populated areas in the Twin Cities, including Anoka, Fridley and several dense neighborhoods in Minneapolis and St. Paul. Although few accidents in the United States involving oil explosions have occurred in recent years, a December 2013 train derailment caused a large explosion near Casselton, N.D., and another July 2013 derailment in Lac-Megantic, Quebec, resulted in 47 deaths. To prevent disasters from occurring in Minnesota, MnDOT hired two full-time rail inspectors, and Gov. Mark Dayton held a rail summit in October 2014 with freight company representatives to discuss, among other topics, the current and future condition of rail safety procedures. Following these recent oil train incidents, new car standards will go into effect.

Due to 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 oversaw the regulation and control of the transport of these materials. Both the economic costs and public exposure aspects suggest that rail transport of

these materials should remain as the preferred method of transport where applicable. The state of Minnesota relies on the FRA Hazardous Materials Inspector for inspections of facilities and methodologies involving the movement and storage of hazardous materials. In addition, the state also uses 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 inter-organizational coordination.