Appendix D – Engineering Assessment of the Potential Passenger Rail Alternatives:

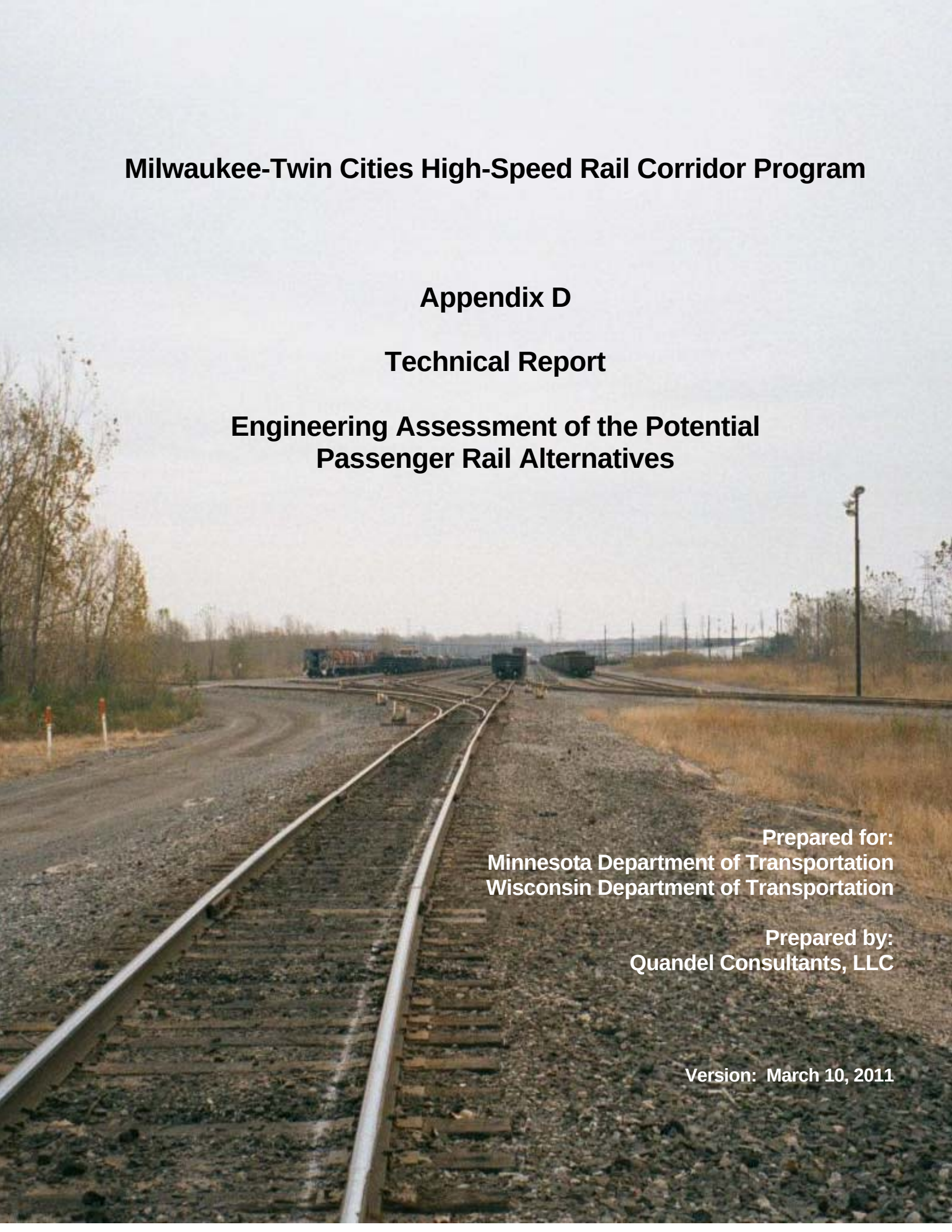
By Sub-Segment

Milwaukee-Twin Cities High-Speed Rail Corridor Program

Appendix D

Technical Report

Engineering Assessment of the Potential Passenger Rail Alternatives



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INTRODUCTION

This Engineering Assessment was prepared from information obtained during observations made in the field between August 2010 and January 2011. The observations were made from public vantage points such as highway-rail grade crossings, highway overpasses, adjacent public property and other locations such as passenger station platforms. Some of the information included in this report was obtained from the timetables and track charts of the railroads. Other information was provided by persons familiar with various aspects of the covered territory.

Each of the routes being considered consists of several route segments as described in the main report. Within those route segments are several track sub-segments. The information in this report is presented by track sub-segment. There are 47 track sub-segments and they are presented in numerical order.

Each track sub-segment contains the following information:

- Track Sub-Segment Number — Listed as numbers 1 through 47.
- Sub-Segment Description — Describes the end points of the sub-segment.
- Existing Passenger Service — Identifies any existing passenger or commuter service.
- Maximum Track Speed — Maximum currently authorized speed. Some sections may have speeds lower than the maximum speed shown for the sub-segment.
- Yards and Junctions — Identifies major and minor yards in the sub-segment. Minor yards may consist only of a small group of local industry tracks.
- Major Infrastructure Elements — Highlights the important infrastructure elements as well as quantities of smaller elements that taken together may be considered major.
- Photographs — For each of the sub-segments, photographs or licensed Google Earth™ images are included to assist the reader in visualizing the field conditions or understanding complex locations such as groups of rail junctions. The content of the photos has been designed to explain the environment and the nature of the sub-segment and to provide views of track and structure conditions at selected locations.
- Infrastructure Needs — The Infrastructure Needs section describes the improvements needed to implement the Milwaukee to Twin Cities High Speed Passenger Rail Program across the fourteen route alternatives that remain after initial screening. The various routes are composed

of Route Segments; the Route Segments are composed of sub-segments. The infrastructure needs for each sub-segment have been developed by applying the Draft Cost Estimating Methodology for High Speed Rail on Shared Right of Way. By blending the results of earlier stages of this project with observations from the field visits described above, the conceptual improvements and the associated conceptual costs required to implement the Milwaukee to Twin Cities High Speed Passenger Rail Program were estimated. The description of the improvements is general in nature and should be viewed as a guide to the costs shown in the trailing table for each sub-segment rather than an exact description of each quantity and unit of cost within the capital cost estimate.

- Constraints

Identifies constraints that were observed that would or could have limiting effects on the capacity or efficiency of the particular sub-segment. There may be additional constraints that have not yet been identified. This assessment does not attempt to identify all the utilities, including parallel buried fiber optic lines, which may constitute important constraints when planning capital improvements such as the construction of an additional parallel main track.

TRACK SUB-SEGMENTS:

Track Sub-Segment 1 (Segment A)

The route between Milwaukee and Madison is a stand-alone project to implement passenger rail service between these two cities. Since Track Sub-Segment 1 is a part of the Milwaukee to Madison project, the existing railroad infrastructure along this track sub-segment was not examined in the field.

Description – This track sub-segment begins at Milwaukee's Intermodal Station (MP 85.8) and runs west for 2.5 miles along the Canadian Pacific (CP) Watertown Sub until reaching Grand Avenue Junction (MP 88.3).

Maximum Track Speed – The maximum speed within this track sub-segment is 40 MPH for passenger trains and 40 MPH for freight trains. Centralized Traffic Control (CTC) is in effect.

Existing Passenger Service – Amtrak currently operates a single daily round trip passenger train service (Empire Builder) along this track sub-segment with a stop in Milwaukee. Amtrak also operates seven round trip Hiawatha passenger train trips Monday-Saturday and six round trips on Sunday between Chicago and Milwaukee.

Yards & Junctions – There are no yards in this sub-segment. CP's Muskego Yard facilities are located to the south of Track Sub-Segment 1 and are reached via track connections at "Cut Off" which is a major junction located at MP 87.2 near the west end of the Track Sub-Segment 1. Some CP freight trains operate through the Milwaukee Intermodal Station via Track Sub-Segment 1 to Grand Avenue Junction to bypass Muskego Yard.

Major Infrastructure Elements – The two-track, multiple-span Menominee River Bridge is located at MP 88.0. Other major elements include the track and signals at Cut-Off and Grand Avenue Junction.

Photo 1 – Milwaukee, WI

This aerial view of the CP junction at "Cut-Off" shows the nearby CP Muskego Yard facilities which are located to the south and southeast of Sub-Segment 1. Certain CP freight trains operate through the Milwaukee Intermodal Station to bypass Muskego Yard.

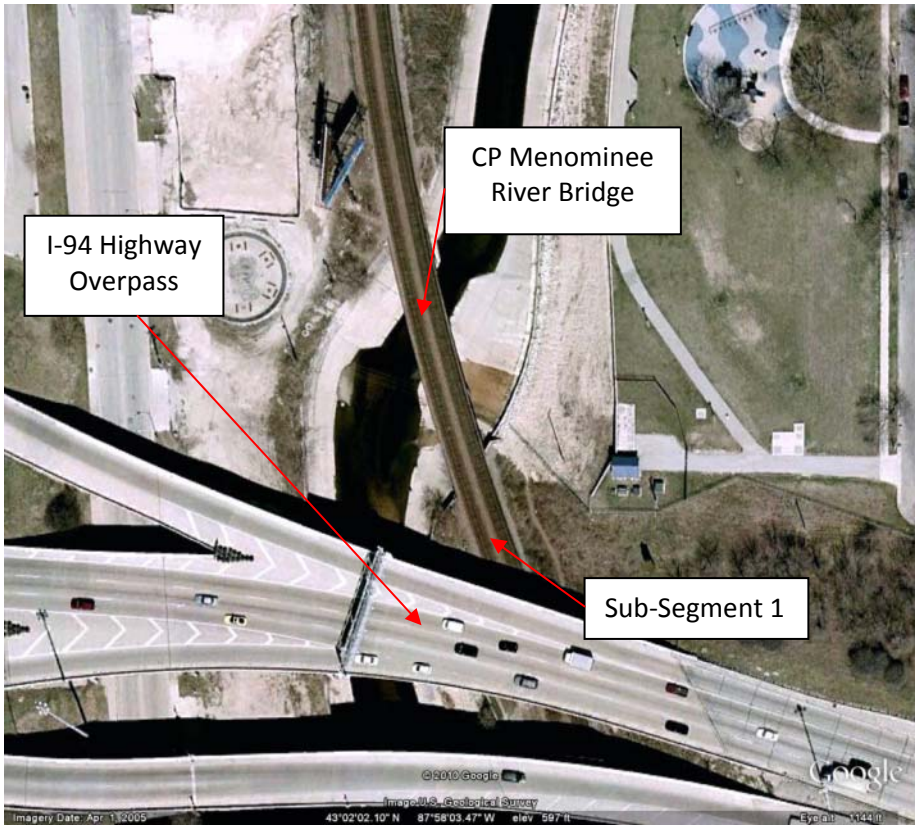

Photo 2 – Milwaukee, WI

This aerial view of the Menominee River Bridge shows the double track, multiple-span structure located between Cut-Off and Grand Avenue Junction. At the time the bridge was replaced, additional improvements to the river channel were made and are visible in the photo.

Infrastructure Needs - Please refer to the Milwaukee to Madison HSR Service ARRA Application and supporting documentation for details concerning engineering plans for this sub-segment (see Attachment 1).

Sub-Segment 1 Capital Cost	Amount (1,000's)
Trackwork	$0
Structures	$0
Systems	$442
Crossings	$0
Allocations for Special Elements	$12,466
Sub-Total Construction Elements	$12,908
Contingency	$0
Professional Services and Environmental	$0
Total Segment Cost	$12,908
Segment Cost Per Mile	$5,163

Constraints: - The principal constraints in this sub-segment are: (1) the buildings and city streets on both sides of the right-of-way much of the way between the Milwaukee Intermodal Terminal and Grand Avenue Junction that limit the property available to add or reconfigure trackage, (2) heavy freight train traffic moving to and from the CP's Muskego Yard via CP Cut-Off located near the west end of the track sub-segment, (3) some freight trains pass through the Milwaukee Intermodal Terminal to bypass Muskego Yard, (4) several major overhead highway structures as well as a major bridge over the Menominee River just south (railroad east) of Grand Avenue Junction and (5) Amtrak's Chicago-Milwaukee Hiawatha train service (7 round trips Monday through Saturday and 6 on Sundays and holidays) terminates at the Milwaukee Intermodal Terminal and occupies track at the terminal.

Track Sub-Segment 2 (Segments B & C)

The route between Milwaukee and Madison is a stand-alone project to implement passenger rail service between these two cities. Since Track Sub-Segment 2 is a part of the Milwaukee to Madison project, the existing railroad infrastructure along this track sub-segment was not examined in the field.

Sub-Segment Description – This track sub-segment begins at Grand Avenue Junction (MP 88.3) and continues west through Wauwatosa for 42.9 miles along the CP until it reaches Watertown, WI (MP 131.2).

Maximum Track Speed – The maximum speed within this track sub-segment is 79 MPH for passenger trains, 60 MPH for expedited trains and 50 MPH for general freight trains. CTC is in effect.

Existing Passenger Service - Amtrak currently operates a single round trip passenger service (Empire Builder) along this track sub-segment. There are no Amtrak station stops in Track Sub-Segment 2.

Yards & Junctions – There are no major yards between Grand Avenue Junction and Watertown. Junctions are located at Grand Avenue Junction (Track Sub-Segment 3 to North Milwaukee), Brookfield (CP), Duplainville (CN) and Watertown (Track Sub-Segment 6 to Madison and Track Sub-Segment 36 to Portage).

Major Infrastructure Elements – This sub-segment travels through lowlands and there are smaller drainage structures at several locations.

Photo 3 – Milwaukee, WI

This aerial view of Grand Avenue Junction shows an eastward CP freight train approaching Grand Avenue Junction from the northwest on Sub-Segment 2. Sub-Segment 1 continues from Grand Avenue Junction at the bottom of the photo to Cut-Off and Milwaukee. Sub-Segment 3 diverges from the mainline under the highway overpass and continues north at the top of the photo to North Milwaukee. In prior years, the Chicago, Milwaukee, St. Paul & Pacific Railroad (CMStP&P) had large volumes of passenger and freight train traffic and major shops in the Milwaukee area.

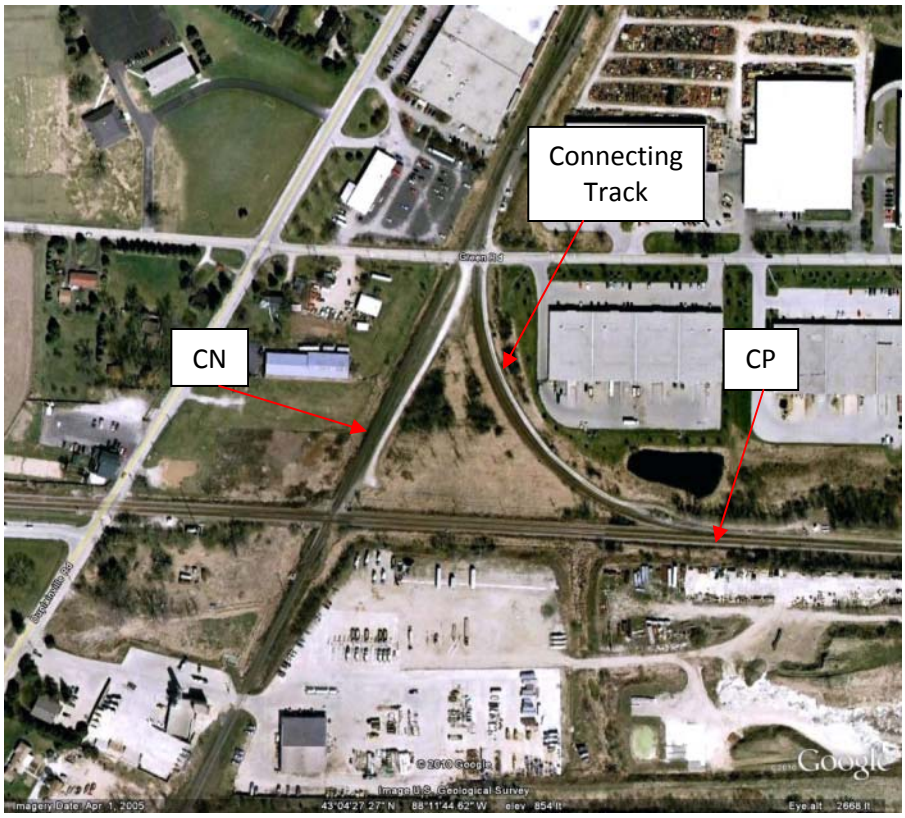

Photo 4 – Duplainville, WI

This aerial view of Duplainville shows the CP east-west double track Sub-Segment 3 (Grand Avenue Junction to Watertown) crossing CN's single track north-south single main track between Fond du Lac and Chicago. Some CN trains use the connecting track in the northeast quadrant at Duplainville to connect with the CP.

Infrastructure Needs - Please refer to the Milwaukee to Madison HSR Service ARRA Application and supporting documentation for details concerning engineering plans for this sub-segment (see Attachment 1).

Sub-Segment 2 Capital Cost	Amount (1,000's)
Trackwork	$25,983
Structures	$0
Systems	$12,817
Crossings	$0
Allocations for Special Elements	$213,908
Sub-Total Construction Elements	$252,708
Contingency	$0
Professional Services and Environmental	$0
Total Segment Cost	$252,708
Segment Cost Per Mile	$5,891

Constraints - The principal constraints in this sub-segment are: (1) the limitations posed by the adjacent residential and commercial development and the terrain including rivers and wetlands, and (2) segments of single main track CTC.

Track Sub-Segment 3 (Segment D)

Sub-Segment Description - Track Sub-Segment 3 begins at Grand Avenue Junction (MP 88.3) and runs generally north for 5.1 miles along the CP until reaching North Milwaukee, WI at MP 94.4. Trains of CP, Canadian National (CN) and Wisconsin & Southern Railroad (WSOR) operate over this track sub-segment.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed for freight trains within this track sub-segment is 40 MPH. There is no block signal system currently in operation.

Yards & Junctions – Glendale Yard is located close to the north end of this track sub-segment. This was once a major facility that included smaller yards on both sides of the main tracks to serve local industries. Track Sub-Segment 3 passes through what was once one of the busiest heavy industrial and manufacturing districts of Milwaukee. Sidings, industrial lead tracks, storage tracks, industry tracks and main track crossovers are located throughout the track sub-segment.

Major Infrastructure Elements – Track Sub-Segment 3 has no rail-highway crossings at grade. However, it does have a high concentration of rail-highway grade separations. On the southern half of the Track Sub-Segment 3, most grade separations are highway over rail. But on the northern half, most grade separations are rail over highway. Many of the bridge structures show little or no signs of recent maintenance. Most of the rail bridges are through plate girder bridges which were built to accommodate five or 6 (or more) parallel tracks. Repairs to, or replacement of, the innermost spans, which carry the main track(s), will likely require the removal of one or more adjacent spans, some of which are no longer occupied.

Additional Comments - Much of the legacy industry has left and several of the old plant sites are being demolished and cleared. Some industry tracks have been removed. Others are abandoned in place. Some industry tracks and most of the yard tracks are still active. Surplus empty freight cars are stored on several available tracks in this area. Some rail-served industry exists and a re-development district has been established to help revitalize this area including rail-related businesses. Reorganizing of the use of the existing tracks is recommended to reduce capital costs and improve fluidity in Track Sub-Segment 3.

Photo 5 - Milwaukee, WI

Five track bridge over Center Street-The view is to the west.

Infrastructure Needs - In order to preserve CPs' ability to serve its customers and maintain the potential for additional business, an additional main track will be required in this segment. A CTC signal system and PTC overlay will be added to the segment forming a new 2 main track system. To increase the flexibility of the added capacity, the existing track will undergo "heavy rehabilitation" including replacement of up to 2/3 of the existing ties, associated track surfacing and rail replacement. This approach will allow both passenger and freight operations to share the use of a corridor with 2 main tracks and avoid the conflicts present when capacity is constrained.

Most of the railroad right of way in this sub-segment has sufficient width to support construction of an additional track without the need for right of way acquisition. On the south portion, the piers and abutments supporting the overhead bridges have sufficient room to allow the addition of a new track. On the northern portion, a placeholder has been added to allow the rationalization of the use of the remaining yard tracks and industrial leads. This rationalization program will allow the best use of the existing track, bridges, right of way and new construction dollars.

The existing undergrade bridges will require varying degrees of rehabilitation to support the addition of passenger train service and its associated speeds in this sub-segment. At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; a unit of cost within the structures category has been used to acknowledge the need for bridge rehab to allow higher speed passenger trains to operate safely.

Sub-Segment 3 Capital Cost	Amount (1,000's)
Trackwork	$16,936
Structures	$2,623
Systems	$7,866
Crossings	$0
Allocations for Special Elements	$10,000
Sub-Total Construction Elements	$37,425
Contingency	$11,228
Professional Services and Environmental	$11,677
Total Segment Cost	$60,329
Segment Cost Per Mile	$11,829

Constraints - This short sub-segment is characterized by a large number of rail-highway grade separations. On the south half of the corridor where the railroad is in a cut, most structures are highway over railroad. On the north half, where the railroad is elevated, most structures are railroad over highway. On the south half, the support columns between the tracks limit where an additional track can be located. On the north half, where the tracks pass over parallel through plate girder bridges over the roadway, the position of the spans dictate track alignment options. Because the grade separations are spaced fairly close together due to the city street network, shifting from one span on one bridge to an adjacent span on the following bridge may pose both alignment (speed) and operating (capacity and flexibility) issues.

In the past, the concentration of heavy industry and the need for locomotives with cars to move back and forth across all the tracks to perform the necessary rail operations dictated the present track network. But the industry conditions have changed substantially and many industries no longer exist along the railroad. As a result, the rationalization of the use of the tracks in this sub-segment (re-assessing what track alignments are to be selected as the main tracks and where yard tracks can be located) may be helpful in reducing capital costs and streamlining both infrastructure and operations.

Track Sub-Segment 4 (Segment II)

Sub-Segment Description - Track Sub-Segment 4 begins at North Milwaukee (MP 93.7) where WSOR ownership begins, and runs for 2.0 miles to Mill Road at MP 95.7. Trains of WSOR and CN operate over this track sub-segment.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed for freight trains within this track sub-segment is 10 MPH. There is no block signal system in operation.

Yards & Junctions – North Milwaukee serves as a small industrial yard and junction point just north of the north end of Track Sub-Segment 3. At North Milwaukee, there is a junction with Track Segment 3, with the WSOR industrial spur toward Milwaukee and also with the CP route north to Canco.

Major Infrastructure Elements – The principal infrastructure elements in this sub-segment are three long steel rail bridges over North Sherman Boulevard, West Silver Spring Drive and the intersection of West Mill Road and North 60th Street. There is also a small river bridge over Lincoln Creek. UPRR crosses this sub-segment on a large steel overhead rail bridge at MP 95.5 located about 0.2 miles south of Mill Road. The bridge was built for two main tracks but presently carries only one.

Photo 6 - North Milwaukee, WI

The view is south toward Track Sub-Segment 3 with freight cars on the north end of Glendale Yard just visible in the background. The Track Sub-Segment 4 main track is to the right immediately in front of the freight cars being held for industry unloading in the small WSOR North Milwaukee Yard. Both WSOR and CN operate over Sub-Segment 4.

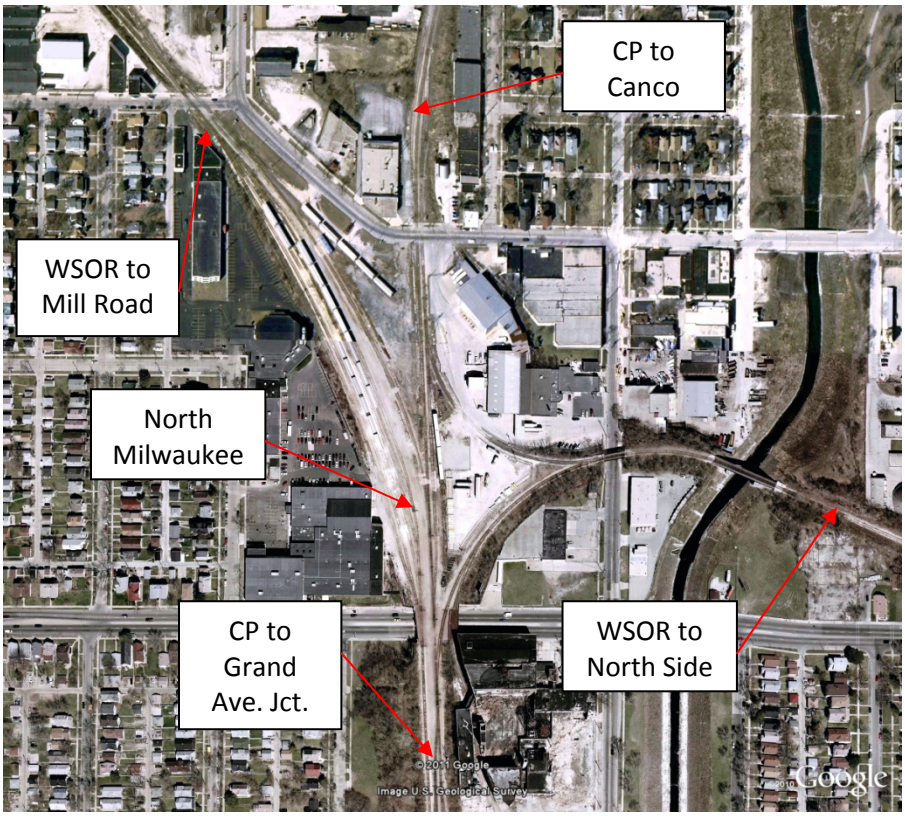

Photo 7- North Milwaukee, WI

This aerial view of the junction at North Milwaukee shows the small yard with freight cars that are destined to local industries. Some cars are trans-loaded from rail cars to trucks at this location. The track to the south is Track Sub-Segment 3 from North Milwaukee to Grand Avenue Junction. Track Sub-Segment 3 serves the Miller Brewing Company facility near Grand Avenue Junction. The track to the northwest is Track Sub-Segment 4 to West Mill Road and Granville. The track to the right is the WSOR industrial spur track that serves the former CMStP&P's North Side Industrial District about four miles north of the downtown Milwaukee business district. In past years, this line served the Schlitz, Blatz and Pabst breweries. The track to the north is the CP line to Canco, Elkhart Lake and the CN connection at Hilbert. A WSOR locomotive shop is located just north of Villiard Street crossing on the west side of the track on the CP line to Canco.

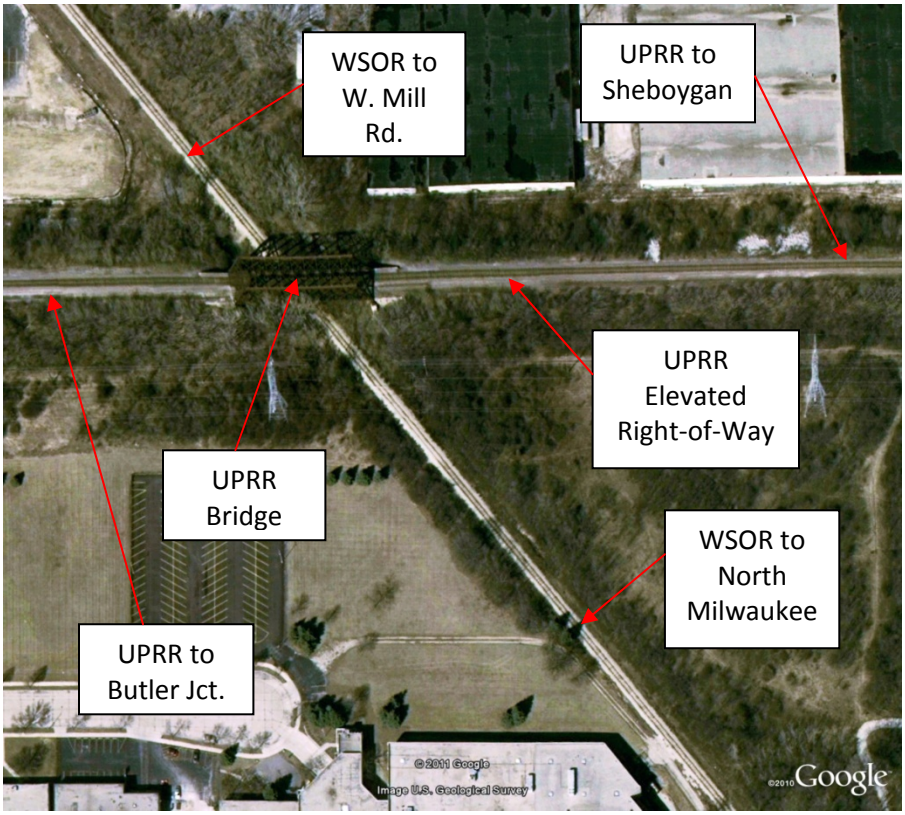

Photo 8 – Menomonee Falls, WI

This aerial view shows the UPRR double track through riveted truss overhead rail bridge crossing Track Sub-Segment 3 approximately 0.2 miles south of Mill Road. Also visible in the aerial photo are the towers of an overhead electrical transmission line which parallels the UPRR right-of-way on its south side.

Infrastructure Needs – The single main track in this sub-segment will be constructed to HSR standards from the subballast up. A CTC signal system and PTC overlay will be added to the segment. One freight siding will be constructed between North Milwaukee and Granville to accommodate primarily the local freight trains that travel this line. The capital cost of the freight siding has been shown in Sub-Segment 5. However, instead of constructing a single freight siding three miles long, it may better serve both the HSR and freight trains to construct several smaller sidings where the shorter local trains and yard engines that work this route can clear HSR trains without as much interruption of their switching duties. Bridge work is estimated to be limited to rehabilitation work only. No bridge replacements are anticipated. No additional bridges for a new parallel main track are anticipated, especially if several smaller freight sidings are used and can be located between major bridges. Highway-rail grade crossings will be reconstructed with associated roadway improvements and fencing will be utilized to close the corridor. Electric locks will be applied to industry track turnouts as a part of the installation of the

new signal system.

The estimated capital costs for this sub-segment are shown in the following table. The costs for the rehabilitation of the large rail bridge over the intersection of Mill Road and North 60th Street are shown in this track sub-segment even though the north half of that long bridge is inside Track Sub-Segment 5.

At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; a unit of cost within the structures category has been used to acknowledge the need for bridge rehab to allow higher speed passenger trains to operate safely.

Sub-Segment 4 Capital Cost	Amount (1,000's)
Trackwork	$5,373
Structures	$2,486
Systems	$3,398
Crossings	$1,665
Allocations for Special Elements	$0
Sub-Total Construction Elements	$12,922
Contingency	$3,876
Professional Services and Environmental	$4,032
Total Segment Cost	$20,829
Segment Cost Per Mile	$10,415

Constraints - The principal constraints in this sub-segment are the three major rail bridges over highways, a small river bridge over Lincoln Creek and a major steel bridge under the UPRR. The railroad runs through the Havenswood State Forest area in Menomonee Falls. In addition, there are active rail-served industries on both sides of the main track that will require turnouts and electric lock switches. All of these constraints will effectively limit where the freight siding(s) can be located.

Track Sub-Segment 5 (Segment II)

Sub-Segment Description - Track Sub-Segment 5 begins at Mill Road (MP 95.7) and continues 4.6 miles on WSOR to Granville, WI at MP 100.3.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed for freight trains within this track sub-segment is 10 MPH. There is no block signal system in operation.

Yards & Junctions – There are no major yards in Track Sub-Segment 5. There is a junction with UPRR at Granville.

Major Infrastructure Elements – Large rail bridges over roadways are located at North 60th Street/Mill Road and North 76th Street. A large overhead highway bridge carries West Brown Deer Road (Wisconsin Route 100) over the WSOR and the UPRR at Granville. The railroad is on an embankment between West 60th Street and West 76th Street. There is a small river bridge over the Menomonee River in Riverton Heights.

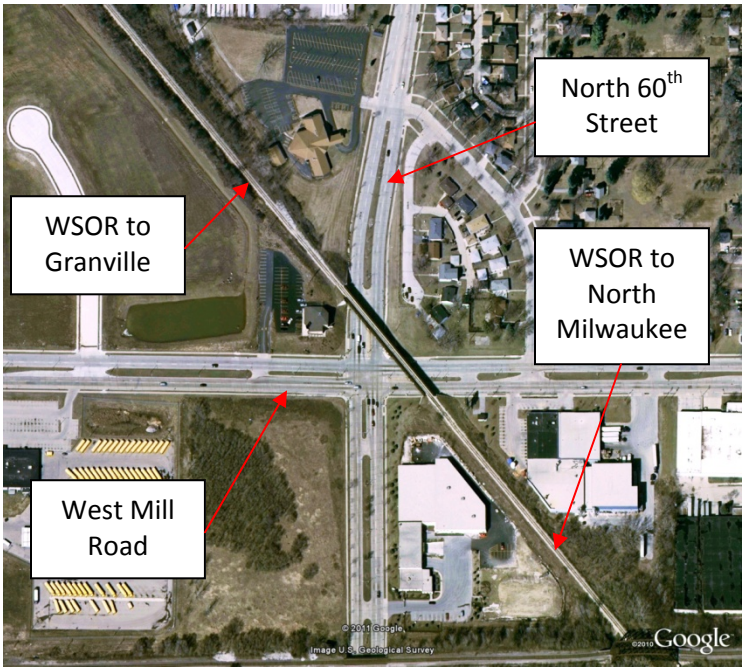

Photo 9 – Menomonee Falls, WI

This aerial view shows the WSOR rail bridge over the intersection of West Mill Road and North 60th Street. The capital costs for rehabilitation of this bridge are shown in Track Sub-Segment 4 although the bridge itself lies within both segments.

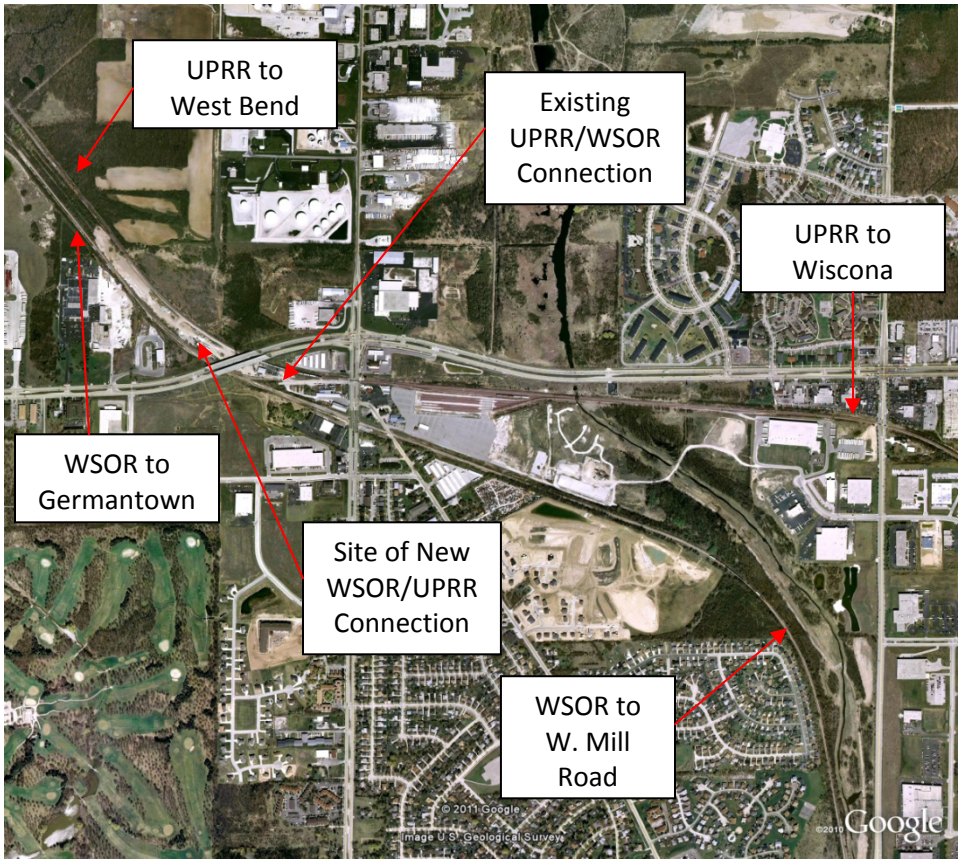

Photo 10 – Granville, WI

This aerial view of Granville shows the existing connecting track between the UPRR and the WSOR immediately south of the Wisconsin Highway 100 Bridge carrying West Brown Deer Road over both railroads. The automobile unloading and distribution facility on the UPRR at Granville station is currently handling a much lower level of traffic than in past years. The UPRR local train from West Bend is also visible on the curve under the Highway 100 Bridge. Both railroads perform industrial switching in the Granville area.

Infrastructure Needs - The single main track in this sub-segment will be constructed to HSR standards from the subballast up. A new connection from WSOR to UPRR will be required at about MP 100.3 at Granville to provide a direct connection to the north with Track Sub-Segment 7 (the UPRR to West Bend, WI). A CTC signal system and PTC overlay will be added to the segment. One freight siding will be constructed between North Milwaukee and Granville to accommodate primarily the local freight trains that travel this line. The capital cost of the freight siding has been shown in this sub-segment. However, instead of constructing a single freight siding three miles long, it may better serve both the HSR and freight trains to construct several smaller sidings where the shorter local trains and yard engines that work this route can clear HSR trains without as

much interruption of their switching duties.

Bridge work is estimated to be limited to rehabilitation work only. No bridge replacements are anticipated. No additional bridges for a new parallel main track are anticipated, especially if several smaller freight sidings are used and can be located between major bridges. Highway-rail grade crossings will be reconstructed with associated roadway improvements and fencing will be utilized to close the corridor. Electric locks will be applied to industry track turnouts as a part of the installation of the new signal system.

The estimated capital costs for this sub-segment are shown in the table below. The costs for the rehabilitation of the large rail bridge over the intersection of Mill Road and North 60th Street are shown in Track Sub-Segment 4 even though the north half of that long bridge is inside Track Sub-Segment 5.

At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; a unit of cost within the structures category has been used to acknowledge the need for bridge rehab to allow higher speed passenger trains to operate safely.

At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; a unit of cost within the structures category has been used to acknowledge the need for bridge rehab to allow higher speed passenger trains to operate safely.

Sub-Segment 5 Capital Cost	Amount (1,000's)
Trackwork	$11,316
Structures	$583
Systems	$6,676
Crossings	$1,895
Allocations for Special Elements	$0
Sub-Total Construction Elements	$20,471
Contingency	$6,141
Professional Services and Environmental	$6,387
Total Segment Cost	$32,998
Segment Cost Per Mile	$7,174

Constraints - The principal constraints in this sub-segment are the two major rail bridges over highways, a small river bridge over the Menominee River and a major highway bridge over both the WSOR and the UPRR at Granville. In addition, there are active rail-served industries that will require turnouts and electric lock switches. All of these constraints will effectively limit where the freight siding(s) can be located.

Track Sub-Segment 6 (Segment F)

The route between Milwaukee and Madison is a stand-alone project to implement passenger rail service between these two cities. Since Track Sub-Segment 6 is a part of the Milwaukee to Madison project, the existing railroad infrastructure along this track sub-segment was not examined in the field.

Sub-Segment Description – Track Sub-Segment 6 begins at Watertown, WI (MP 131.5) on the WSOR and continues for 34.6 miles to Madison, WI (MP 81.1).

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed for freight trains within this track sub-segment is 10 MPH. There is no block signal system in operation.

Yards & Junctions – There are no major yards in Track Sub-Segment 6. At Watertown, there is a junction with Track Sub-Segment 2 (Grand Avenue Junction-Watertown) and Track Sub-Segment 36 (Watertown – Portage). At Madison, there are two junctions; Junction A and Junction B. Both junctions connect with Track Sub-Segment 8 (Madison – Portage).

Major Infrastructure Elements – There are bridges over the Rock River at Watertown and the Crawfish River at Hubbleton.

Photo 11 – Madison, WI

This aerial view of Madison shows Junction A where Sub-Segment 6 from Watertown joins Sub-Segment 8 (Madison to Portage). Junction B at the south end of WSOR's

Madison Yard WSOR's is the location where the wye track connection from Sub-Segment 6 (Watertown to Madison) connects with Sub-Segment 8 and the railroad east (south) end of Madison Yard. Downtown Madison is to the lower left of the photo. Sub-Segment 9 (Madison to Prairie du Chien) begins at Madison and continues to the west.

Infrastructure Needs - Please refer to the Milwaukee to Madison HSR Service ARRA Application and supporting documentation for details concerning engineering plans for this sub-segment (see Attachment 1).

Sub-Segment 6 Capital Cost	Amount (1,000's)
Trackwork	$0
Structures	$0
Systems	$6,124
Crossings	$0
Allocations for Special Elements	$292,788
Sub-Total Construction Elements	$298,912
Contingency	$0
Professional Services and Environmental	$0
Total Segment Cost	$298,912
Segment Cost Per Mile	$8,639

Constraints – The two major constraints in this sub-segment are: (1) several portions of track in Madison where the right-of-way is narrow and constrained by adjacent buildings in residential, industrial and commercial neighborhoods and (2) trains arriving at the proposed Convention Center station in Madison from Chicago and Milwaukee and destined for the Twin Cities will need to reverse direction at Madison to access Track Sub-Segment 8 going north between Madison and Portage. This will likely add both time and operating complexity to the train schedules. Trains moving west from Madison to Prairie du Chien would not have this issue.

Track Sub-Segment 7 (Segment II)

Sub-Segment Description - Track Sub-Segment 7 begins at Granville and uses the CN north for 19.0 miles to West Bend, WI.

Existing Passenger Service - None operated.

Maximum Track Speed – The maximum speed for freight trains within this track sub-segment is 40 MPH.

Yards & Junctions – There are no yards in Track Sub-Segment 7. The only junction is with Track Sub-Segment 5 at Granville.

Major Infrastructure Elements – The end of track is located just south of Rusco Drive approximately 3 miles south of the station at West Bend. From that point north, the right-of-way has been converted to a recreational trail, the Eisenbahn State Trail. There is a bridge over the Milwaukee River at West Bend south of the downtown area which is used by the state trail. The former C&NW Railway station building has been restored as part of the downtown riverside park project through which the state trail passes.

Photo 12 - West Bend, WI

The view of the restored former C&NW station is to the southwest. The Milwaukee River area is in the background. The Eisenbahn State Trail which begins three miles south of the station is on the right. Track Sub-Segment 7 from Granville ends at the station building. Track Sub-Segment 10 begins at the station. The track has been removed and the Eisenbahn State Trail follows the former C&NW right-of-way to Eden, WI.

Infrastructure Needs - An additional main track offset 30' from the existing track will be required to allow passenger operations in this segment; crossing warning devices will be added to accommodate the new track. A CTC signal system and PTC overlay will be added to the segment forming a new 2 main track system. The existing track will be rebuilt in place from the subballast up. This approach will allow both passenger and freight operations to share the use of a corridor with 2 main tracks, allow appropriate passenger speeds for the service proposed and avoid the conflicts present when capacity is constrained.

Most of the railroad right of way in this sub-segment does not have sufficient width to support construction of an additional track without the need for right of way acquisition. Property acquisition will be required for the widened embankment. South of the town of West Bend, the railroad ends and the right of way have been converted to the Eisenbahn State Trail. Provisions must be made to acquire sufficient right of way for the proposed passenger service while preserving the recreational trail.

Since a track is being proposed offset 30' from the existing track, the track embankment will need to be widened. Existing culverts along the length of the sub-segment must be extended to provide adequate drainage to both the new and the existing tracks and preserve existing drainage patterns.

New bridges will be required over both roadways and streams/minor rivers along the route. The existing undergrade bridges will require varying degrees of rehabilitation to support the addition of passenger train service and its associated speeds in this sub-segment. At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; a unit of cost within the structures category has been used to acknowledge the need for bridge rehab to allow higher speed passenger trains to operate safely.

Sub-Segment 7 Capital Cost	Amount (1,000's)
Trackwork	$116,256
Structures	$6,218
Systems	$12,990
Crossings	$15,556
Allocations for Special Elements	$0
Sub-Total Construction Elements	$151,019
Contingency	$45,306
Professional Services and Environmental	$47,118
Total Segment Cost	$243,443
Segment Cost Per Mile	$12,813

Constraints – The Eisenbahn State Trail occupies the northern portion of the former C&NW right of way.

Track Sub-Segment 8 (Segment G)

Sub-Segment Description - Track Sub-Segment 8 begins at Madison (MP 30.2) and travels north a distance of 31.4 miles along the CP to Portage Junction, WI (MP 0.0) and on to Portage at MP 178.2.

Existing Passenger Service - None operated between Madison and Portage Junction. Amtrak operates the Empire Builder between Portage Junction and Portage.

Maximum Track Speed – The maximum speed for freight trains on the Madison-Portage Jct. portion of this track sub-segment is 40 MPH. No block signal system is in operation.

Yards & Junctions – Track Sub-Segment 8 passes through the CP's Madison Yard which is parallel to and connects with the WSOR Madison Yard north of downtown Madison. There are three junctions in this track sub-segment: Jct. A is located in downtown Madison north of the Convention Center and is the direct connection with Track Sub-Segment 6 (Watertown-Madison) near the Baldwin Street grade crossing. Jct. B is located north of downtown Madison and is the wye track connection from Track Sub-Segment 6 to both the CP and the WSOR Madison yards. At Portage Jct. which is located at MP 0.0, Track Sub-Segment 8 connects with the CP's Watertown-Portage main tracks and yard (Track Sub-Segment 36) east of downtown Portage. Trains using Track Sub-Segment 8 from Madison must use a portion of Track Sub-Segment 36 from Portage Jct. to Portage to reach Track Sub-Segment 11 (Portage-Camp Douglas).

Major Infrastructure Elements – Between MP 30 and MP 27 near the Dane County Regional Airport, a long concrete bridge structure has recently been constructed over the Cherokee Marsh which has unstable soils and had historically been a maintenance issue for CP's predecessor, the Milwaukee Road (CMStP&P). Track Sub-Segment 8 passes through several marsh areas which may require a similar solution to achieve a stable roadbed.

Additional Comments: The Wisconsin Power & Light Company generating station south of Portage (at Columbia) receives unit coal trains from Wyoming. A rail car repair facility and the Unimin Company sand plant in this same area also generate additional freight rail activity on Track Sub-Segment 8.

Photo 13 – Madison, WI

The view is to the south from the North Baldwin Street grade crossing along the main track of Track Sub-Segment 6 toward downtown Madison. Track Sub-Segment 8 (from Portage Jct.) is visible converging from the right.

Photo 14 – Madison, WI

The view is north from the East Johnson Street grade crossing. The WSOR Madison yard is to the left. The Track Sub-Segment 8 main track through the CP yard is to the right. The gravel area to the right is the alignment of the former Milwaukee Road (CMStP&P) mainline to Portage Jct. Yard track is jointed rail.

Photo 15 – North Madison, WI

The view is to the south on CP toward Madison at the Schlimgen Avenue grade crossing at MP 31.9 on Track Sub-Segment 8.

Photo 16 – Dane County, WI

The view is to the northeast at the Darwin Road grade crossing at MP 30.7. The south end of the newly constructed single track bridge over Cherokee Marsh is visible in the curve.

Photo 17 – Dane County, WI

The view is to the northwest in the vicinity of MP 30.0. The low profile of the new CP rail bridge over the Cherokee Marsh is visible from the highway. The site is near the northwest corner of the Dane County Regional Airport.

Photo 18 – Windsor, WI

The view is to the north from the State Highway 19 grade crossing at MP 25.81. The narrow right-of-way, concentration of industry track switches and industrial park activity including vehicle and pedestrian traffic are evident at this location. In the far background beyond the trees, the track, with jointed rail, crosses the Lake Windsor marsh area between MP 25.1 and MP 24.8 south of DeForest, WI where track stability has been an issue.

Photo 19 – Portage (Columbia), WI

The view is to the north from the Highway V grade crossing at MP 6.5. The south track entrance to the rail yard for the Wisconsin Power & Light Company (WP&L) Columbia generating station is visible to the left. Track Sub-Segment 8 continues north to the right toward Columbia (MP 4.0) and Portage Jct. (MP 0.0). Electrical transmission towers are located along the geographic east side of the CP right-of-way for several miles in this area.

Photo 20 – Portage (Columbia), WI

The view is to the west at the WP&L Columbia generating station. This plant receives unit trains of coal from Wyoming's Powder River Basin. The grade crossing at the main entrance to the plant is located at approximately MP 4.02 just south of the CP's station sign at Columbia (MP 4.0).

Photo 21- Portage (Columbia), WI

This view at MP 4.0 is northwest toward the rail car repair facility. The track switch in the foreground is the north entrance to the WP&L generating station's rail yard. The Columbia station sign is visible to the right of the main track. Beyond the station sign, on the right side of the main track but not clearly visible are the two wye track switch entrances to the Unimin Company (formerly Manley Brothers) sand plant. Unimin ships rail cars of silica from its Columbia plant. Beyond the station sign, the track descends towards Portage Jct. Track raises have been made several times in this area due to unstable soils in the Wisconsin River flood plain.

Infrastructure Needs - No additional main track will be required in this segment; the existing track will be upgraded to support FRA Class VI track speeds for passenger traffic. One 10 mile long passenger siding and one 3 mile long freight siding will be provided to trains to meet and pass each other in this shared corridor. Crossing warning devices will be improved to accommodate the new higher speeds. A CTC signal system and PTC overlay will be added to the segment.

Most of the railroad right of way in this sub-segment has sufficient width to support construction of the proposed sidings without the need for right of way acquisition. Near Columbia, Wisconsin, there are two significant railroad customers whose freight operations must be accommodated within the proposed service: Wisconsin Power and Light coal fired generating station and Unimin which handles sand and other materials. An allocation has been added to the cost estimate to provide funding needed to construct infrastructure improvements not yet designed that will assure reliable passenger and freight service to continue in this area

The existing undergrade bridges will require varying degrees of rehabilitation to support the addition of passenger train service and its associated speeds in this sub-segment. At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; a unit of cost within the structures category has been used to

acknowledge the need for bridge rehab to allow higher speed passenger trains to operate safely.

Sub-Segment 8 Capital Cost	Amount (1,000's)
Trackwork	$64,313
Structures	$8,464
Systems	$19,538
Crossings	$25,140
Allocations for Special Elements	$11,200
Sub-Total Construction Elements	$128,655
Contingency	$38,596
Professional Services and Environmental	$40,140
Total Segment Cost	$207,391
Segment Cost Per Mile	$6,605

Constraints - The principal constraints in this sub-segment are: (1) several portions of track in Madison where the right-of-way is narrow and constrained by adjacent buildings in residential, industrial and commercial neighborhoods, (2) trains arriving at the proposed Convention Center station in Madison from Chicago and Milwaukee and destined for the Twin Cities will need to reverse direction at Madison to access Track Sub-Segment 8 going north between Madison and Portage. This will likely add both time and operating complexity to the operating schedules. Trains moving west from Madison to Prairie du Chien would not have this issue. (3) The sub-segment passes through several marsh areas that have historically been subject to settlement of embankment and track. (4) At Windsor, an industrial park with public access very close to both sides of the main track poses safety and operating flexibility issues. (5) At Columbia, WP&L's Columbia generating station receives unit coal trains from Wyoming. These movements pose operating conflicts that may not be able to be completely mitigated by the construction of additional track. (6) Between Portage Junction and the west end of Portage, due to the presence of adjacent residential and commercial neighborhoods, there may be little or no opportunity to add main tracks without the need to re-configure CP's Portage Yard. (7) The right of way is near the Wisconsin River and subject to periodic flooding in some areas.

Track Sub-Segment 9 (Segment J)

Sub-Segment Description - Track Sub-Segment 9 begins at Madison (MP 81.1) on the WSOR and ends at Prairie du Chien (Crawford), WI (MP 233.6), 98.9 miles to the west. The line traverses three milepost series at Madison.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed for freight trains within this track sub-segment is 25 MPH. No block signal system is in operation. A Track Warrant Control System is in use.

Yards & Junctions – A small yard is located at Prairie du Chien, WI. Junctions are located in Madison with Track Sub-Segment 6 (Watertown-Madison), at Washington Avenue in Madison with WSOR and at Crawford (just south of Prairie du Chien) with the Burlington Northern Santa Fe Railway (BNSF) Track Sub-Segment 12.

Major Infrastructure Elements – Major bridges that cross the Wisconsin River are located near Helena, Lone Rock, Spring Green and four structures west of Woodman. Additional smaller drainage structures are located along the Wisconsin River flood plain between Helena and Crawford. A new connecting track would be required at Crawford to reach the BNSF on Track Sub-Segment 12.

Photo 22 – Madison, WI

The view is to the southeast at the West Main Street grade crossing. Track Sub-Segment 9 bears to the left and connects with the Track Sub-Segment 6 (Watertown-Madison). The track diverging to the center right is the WSOR route to Oregon. Track Sub-Segment 9 continues railroad west to Crawford and Prairie du Chien.

Photo 23 – Madison, WI

The view is to the north from the Washington Avenue grade crossing at the former CMStP&P Madison station and division office building. Note the barrier-type crossing gate installed for the westbound lanes of Washington Avenue.

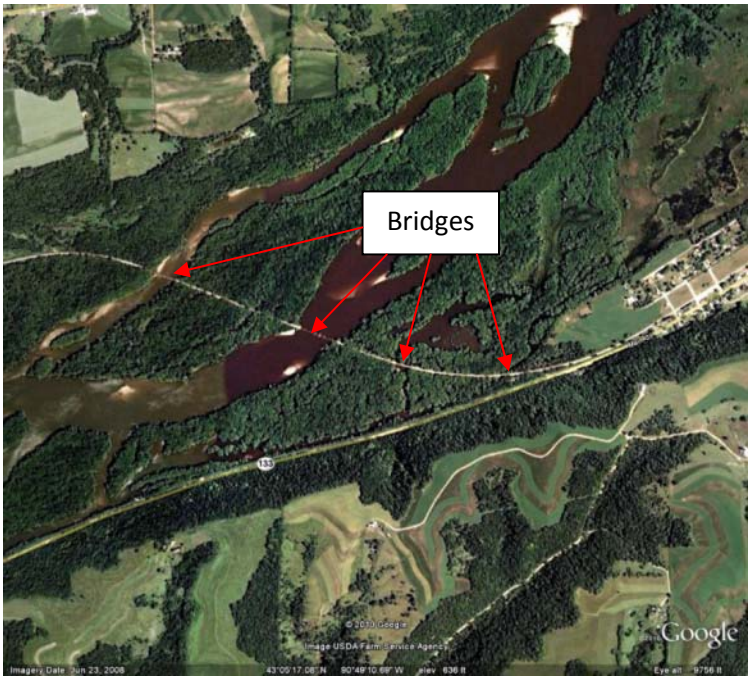

Photo 24 – Woodman, WI

Aerial view shows the four WSOR bridges required to cross the Wisconsin River west of Woodman.

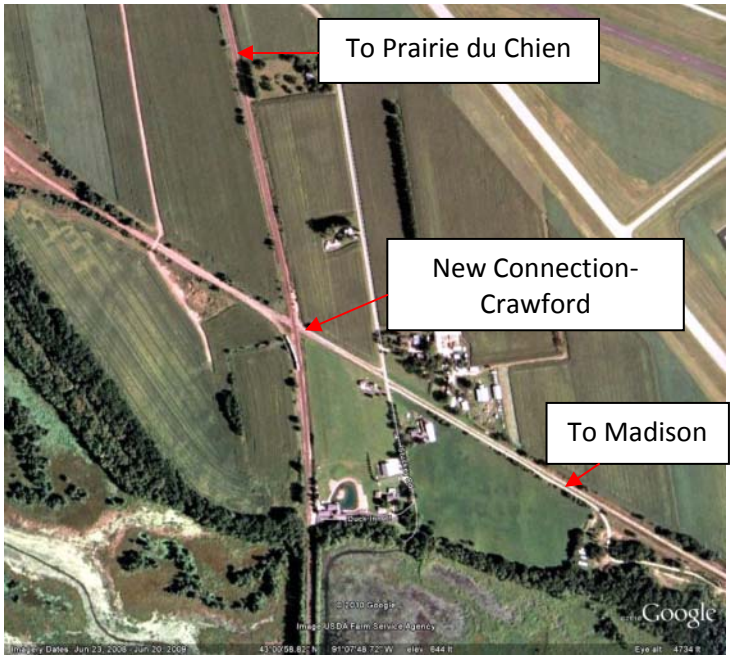

Photo 25 – Prairie du Chien (Crawford), WI

Aerial view shows the location of the WSOR-BNSF crossing at Crawford. A short freight connecting track is visible in the southwest quadrant. A new connecting track would be required in the northeast quadrant.

Infrastructure Needs - WSOR operates this lightly used branch line between Madison and Prairie du Chien, Wisconsin. Due to the condition of the existing track, it must be completely rebuilt from the subballast up to support FRA Class VI track speeds for passenger traffic. Two ten mile long passenger sidings and five three mile long freight sidings will be provided to allow trains to meet and pass each other in this shared corridor. Crossing warning devices will be improved to accommodate the new higher speeds. A CTC signal system and PTC overlay will be added to the segment.

At Crawford, BNSF crosses Sub-Segment 9; the proposed passenger route leaves the WSOR at this point and begins traveling along the BNSF toward La Crosse. There is no existing connection that would allow this transition, so a new connecting track must be constructed. The connection will consist of a siding along both WSOR and BNSF with the new connection between the sidings. This approach allows passenger traffic to divert to and from the connection while freight operations continue without interruption.

New bridges will be required over both roadways, streams, and minor and major rivers along the route. Land bridges will be required as the track passes through wet, low lying areas near Woodman, Lone Rock, Wauzeka, Spring Green and Prairie du Chien.

Sub-Segment 9 Capital Cost	Amount (1,000's)
Trackwork	$215,746
Structures	$132,397
Systems	$67,917
Crossings	$65,070
Allocations for Special Elements	$15,700
Sub-Total Construction Elements	$496,830
Contingency	$149,049
Professional Services and Environmental	$155,011
Total Segment Cost	$800,891
Segment Cost Per Mile	$8,098

Constraints - The principal constraints in this sub-segment are: (1) narrow right-of-way through the west end of Madison, (2) the Wisconsin River bridges west of Woodman, WI and (3) winter operations that may be periodically restricted by blowing and drifting snow. Historically, the Milwaukee Road's passenger trains encountered serious delays several times each winter between the Dakotas and Madison due to extensive portions of track that were blocked with snow drifts and required plowing to restore train operations.

Track Sub-Segment 10 (Segment II)

Sub-Segment Description - Track Sub-Segment 10 begins at West Bend (MP 117.0) and uses an abandoned former C&NW right of way for 21.0 miles to reach Eden, WI at MP 138.0.

Existing Passenger Service – Not applicable.

Maximum Track Speed – Not applicable.

Yards & Junctions – Not applicable.

Major Infrastructure Elements – The former C&NW railroad right of way has been converted to a recreational trail called the Eisenbahn State Trail between West Bend and Eden, WI. There are several crossings of small rivers and branches of the Milwaukee River between West Bend and Eden. The rail bridges appear to all still be in place and in use by the state trail at these locations. The trail stops south of the Main Street crossing in Eden.

Photo 26 – Kewaskum, WI

This aerial view shows the alignment of the state trail on former C&NW right-of-way.

Photo 27 –Eden, WI

This aerial view shows the end of the state trail and the beginning of CN track to the north at Eden, WI.

Infrastructure Needs - The former track right of way in this proposed sub-segment has been converted to the Eisenbahn State Trail. In order for HSR passenger operations to occur, an arrangement must be made to allow the needed track and other infrastructure to be built. An allocation has been added to the cost estimate to address the need to preserve the trail while allowing HSR service to be implemented.

Since there are no freight operations in this sub-segment, only a single track is required; this track will be built completely built new, as will bridges and highway crossings along the line along with other required infrastructure. A CTC signal system and PTC overlay will be included within the segment.

Sub-Segment 10 Capital Cost	Amount (1,000's)
Trackwork	$42,114
Structures	$42,130
Systems	$15,121
Crossings	$20,366
Allocations for Special Elements	$16,100
Sub-Total Construction Elements	$135,832
Contingency	$40,749
Professional Services and Environmental	$42,379
Total Segment Cost	$218,961
Segment Cost Per Mile	$10,427

Constraints - The principal constraint in this sub-segment may be the presence of the Eisenbahn State Trail which has been constructed on the former C&NW right-of-way between West Bend and Eden.

Track Sub-Segment 11 (Segment K)

Sub-Segment Description - Track Sub-Segment 11 begins at Portage, WI (MP 178.2) and travels along the CP to Camp Douglas, WI at MP 226.0, a distance of 47.8 miles.

Existing Passenger Service - Amtrak currently operates a single round trip passenger service (Empire Builder) along this track sub-segment. Station stops are scheduled at Portage and Wisconsin Dells.

Maximum Track Speed – The maximum speed within this track sub-segment is 79 MPH for passenger trains and 60 MPH for freight trains. CTC is in effect.

Yards & Junctions – Portage Yard extends from CP's control point Portage East at MP 174.4 on Track Sub-Segment 36 to Portage (Amtrak station and CP's office at MP 178.2) and then continues westward on Track Sub-Segment 11 to control point Portage West at MP 180.4. At New Lisbon, there is a junction and a wye with the CN track from Necedah and Wisconsin Rapids. At Camp Douglas, Track Sub-Segment 11 connects with Track Sub-Segment 16 (Camp Douglas-La Crosse) and with Track Sub-Segment 15 (Camp Douglas-Wyeville).

Major Infrastructure Elements – The Wisconsin River Bridge west of the Wisconsin Dells Amtrak station is the largest infrastructure element in Track Sub-Segment 11. The bridge is a two-track, multiple-span deck truss on two concrete piers with only the west track bed currently being used. Between Portage and Wisconsin Dells, the railroad runs in the Wisconsin River flood plain and has several smaller drainage structures and lengths of track which are constructed on embankment. Between Wisconsin Dells and Camp Douglas, there are several smaller bridges over various Wisconsin River tributaries.

Photo 28 – Portage, WI

The view is northwest toward Portage from the State Highway 33 overpass at the east end of Portage Yard. The two main tracks are to the left and the east yard lead track is to the right. The CP freight train is heading railroad eastward toward Watertown and Milwaukee. Electrical transmission lines from the WP&L Columbia generating station parallel and then cross the right of way at this location. Amtrak trains use this track sub-segment. The Portage station stop is around the curve to the left.

Photo 29 – Portage, WI

The view is to the north at the railroad overpass of Portage Yard over Pinery Road, which is also U. S. Highway 51, north of the Portage business district. Electrical transmission lines parallel the right of way at this location.

Photo 30 – Portage, WI

The northeast view is of the Portage Amtrak station building and parking area that are adjacent to the Canadian Pacific's offices and crew base at Portage (MP 178.2). The CP offices are located in the former CMStP&P station and office building. An electrical sub-station is visible above the freight cars on the north side of the Portage Yard.

Photo 31 – Portage, WI

The view is to the northeast. An eastward CP freight train has stopped at the CP's general office and crew base at Portage for a crew change. While some CP freight trains stop to pick up and/or set out cars at Portage Yard, many only stop to change crews. Portage is not a major freight classification yard for CP. Most trains occupy the main tracks while they are stopped at Portage to work or to change crews.

Photo 32 – Wisconsin Dells, WI

The view is to the northwest at the Amtrak station. The railroad is currently single track at this location, but in past years with Milwaukee Road operation, the railroad had two main tracks at this location with a platform on the outside of each main track connected by a crosswalk in front of the station building. The Amtrak station platform visible in the photo occupies the site of the former CMStP&P westward main track. North of the station, Wisconsin Highway 23 passes under the railroad and then the railroad crosses the Wisconsin River. South (or railroad east) of the station, a short siding is located between MP 194.6 and MP 195.0 on the west side of the main track. While this siding is not long enough to meet two normal-length CP freight trains, it is sufficient to allow a freight train to meet an Amtrak train near the Wisconsin Dells station stop.

Photo 33 - Wisconsin Dells, WI

The view is to the north at the Wisconsin River Bridge at MP 195.1. This is the principal infrastructure element in Track Sub-Segment 11. When the Milwaukee Road was operating its full complement of intercity passenger trains prior to 1970, this bridge formerly carried two main tracks. Currently only one main track occupies the west side of the bridge.

Photo 34 – Camp Douglas, WI

The view is west at the Washburn Street grade crossing on Track Sub-Segment 11 looking toward Track Sub-Segment 16 (Camp Douglas-La Crosse). The junction switch to the UPRR Camp Douglas-Wyeville line (Track Sub-Segment 15 and currently out of service) is visible at the center of the photo at MP 227.4. CTC is in effect on the CP on both Track Sub-Segments 11 and 16 at this location. A second main track in CTC territory extends from MP 224.05 to MP 226.9, approximately one half mile east of this location (behind the photographer).

Infrastructure Needs - The existing line consists of a single main track supplemented by controlled sidings at nominal 20 mile intervals to allow trains to meet and pass as well as support service to customers. Formerly, the line was a double track main line. In order to implement HSR in this section, new track will be constructed between the existing sidings; the existing sidings will undergo “heavy rehabilitation” including replacement of up to 2/3 of the existing ties, associated track surfacing and rail replacement. On the existing main line track, up to 1/3 of the existing ties will be replaced and associated track surfacing will occur. One ten mile long passenger siding and two three mile long freight sidings will be built to preserve the needed operational flexibility of the sub-segment.

Portage Yard operations including arrivals, departures and switching present a congestion point at the east end of the sub-segment. An allocation has been added to the cost estimate to provide funding needed to construct infrastructure improvements not yet designed that will assure reliable passenger and freight service in this area.

The railroad right of way in this sub-segment has sufficient width to support the construction previously outlined without the need for right of way acquisition. CP has indicated that it will likely allow HSR operations at up to 110 mph using the existing track center spacing of 14’.

The existing undergrade bridges will require varying degrees of rehabilitation to support the addition of passenger train service and its associated speeds in this sub-segment.

The bridge over the Wisconsin River at Wisconsin Dells is a two track bridge as mentioned earlier; the bridge will be rehabilitated to allow HSR service and the currently unoccupied bay will be restored to service. Throughout the remainder of the sub-segment, existing bridges will be rehabilitated and replaced as needed to support the restoration of the double main track system. At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; units of cost within the structures category have been used to acknowledge the need for bridge rehab and replacement to allow higher speed passenger trains to operate safely.

Sub-Segment 11 Capital Cost	Amount (1,000's)
Trackwork	$102,273
Structures	$3,799
Systems	$22,039
Crossings	$23,387
Allocations for Special Elements	$10,000
Sub-Total Construction Elements	$161,498
Contingency	$48,449
Professional Services and Environmental	$50,387
Total Segment Cost	$260,335
Segment Cost Per Mile	$5,446

Constraints - The principal constraints in this sub-segment are: (1) Portions of single main track CTC where double track was removed. While the Wisconsin River Bridge at Wisconsin Dells was built for two tracks and now carries one (on the west side), the alignment of the second track at the nearby Wisconsin Dells Amtrak station has been filled with a new platform. (2) Between Portage and Wisconsin Dells, the railroad follows the Wisconsin River where embankments are required and settling due to unstable sub-soils can occur.

Track Sub-Segment 12 (Segment J)

Sub-Segment Description - Track Sub-Segment 12 begins at Prairie du Chien (Crawford) on the Burlington Northern / Santa Fe Railroad (BNSF) at MP 237.0 and travels 63.2 miles to LaCrosse, WI at MP 300.2.

Existing Passenger Service – None operated. However, the route of Amtrak's Empire Builder crosses this track sub-segment at Grand Junction (MP 299.9) in La Crosse.

Maximum Track Speed – The maximum speed for freight trains within this track sub-segment is 60 MPH. An Automatic Block Signal System (ABS) and CTC are in effect between Prairie du Chien and La Crosse.

Yards & Junctions - There is a small BNSF freight yard at Prairie du Chien. At La Crosse there is a large BNSF freight yard (North La Crosse Yard). At Crawford, at MP 237.0 on the south end of Prairie du Chien, there is a junction with Track Sub-Segment 9 (Madison to Prairie du Chien). A new connection would be required at that location. At Grand Junction (BNSF MP 299.9) in La Crosse, there is a busy rail crossing at grade and junction with CP (Track Sub-Segment 16). If the route selected were to travel from Prairie du Chien on Sub-Segment 12 and then cross the Mississippi River at La Crosse on Sub-Segment 21, a new track connection would be required in the southwest quadrant at Grand Junction. The existing La Crosse Amtrak station on CP would still be used.

Major Infrastructure Elements – The major infrastructure element in this track sub-segment is the North La Crosse Yard. This track sub-segment follows the east bank of the Mississippi River most of the way between Prairie du Chien and La Crosse and has many smaller drainage structures including the La Crosse River Bridge. There are also several sections of railroad causeway where the roadbed has been constructed out into the river rather than follow the irregular line and profile of the river bank.

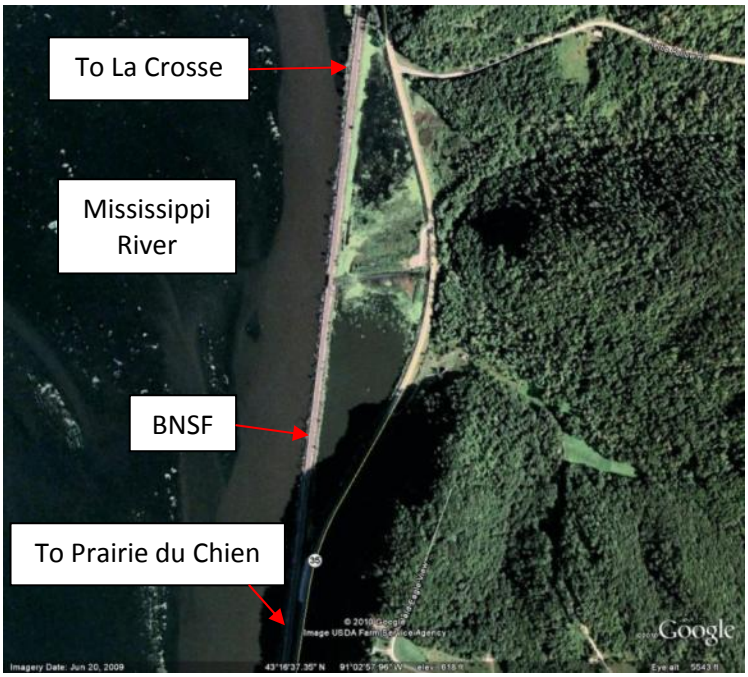

Photo 35 – Lynxville, WI

This aerial view of the Mississippi River between Lynxville and Ferryville, WI shows the BNSF right-of-way and track constructed along a causeway in the Mississippi River. The straighter alignment permits higher train operating speeds.

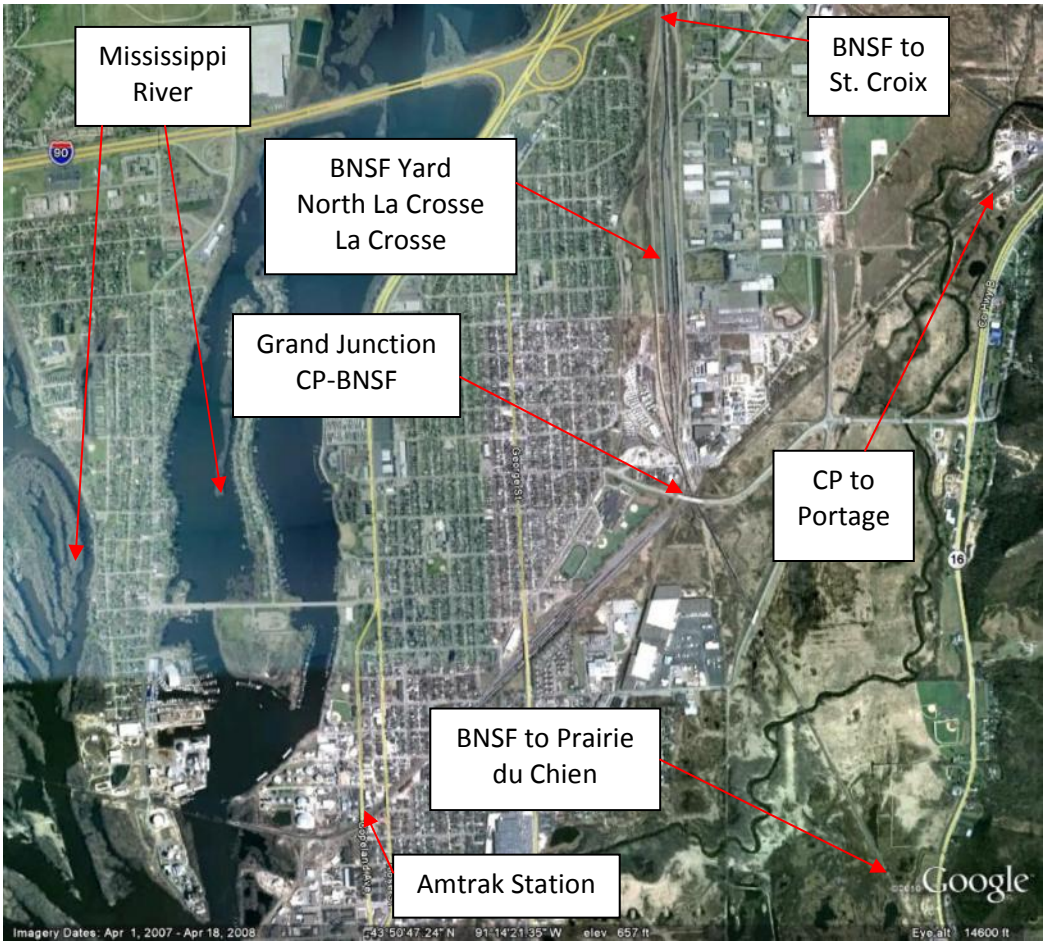

Photo 36 – La Crosse, WI

This aerial view of La Crosse shows the CP main track (Sub-Segment 16 - Camp Douglas to La Crosse) in the upper right side of the photograph. The CP crosses the BNSF main tracks of Sub-Segment 12 (Prairie du Chien to La Crosse) at Grand Junction shown near the center of the picture. Above Grand Junction, on Sub-Segment 20, the BNSF North La Crosse Yard is visible. To the southwest of Grand Junction, the CP's La Crosse yard and the La Crosse Amtrak station are shown. Sub-Segment 16 (Camp Douglas to La Crosse) terminates at the Amtrak station and Sub-Segment 21 (La Crosse to Winona) continues across the Mississippi River bridges to CP River Junction near La Crescent, MN, following the west bank of the Mississippi River to Winona. Please refer to Photo 63 in Sub-Segment 21 for additional detail of the CP's Mississippi River bridges.

Infrastructure Needs - This sub-segment is presently a BNSF double track main line. In order to provide HSR service within the sub-segment, a new third main track is required. A CTC signal system for the new third main and PTC overlay for all tracks will be added to the segment forming a new 3 main track system. A new control point with universal crossovers will be provided within the sub-segment to provide operational flexibility; existing control points will be maintained "as is" or expanded to include the new third track. The railroad right of way in this sub-segment does not have sufficient width to

support the construction of a third main without the need for right of way acquisition.

Due to the position of the track between the Mississippi River to the west and the slope of the bluff along the eastern side of the railroad, adding a third track in many places will require building out into the river or cutting away the slope of the bluff; both of these approaches are considered within the cost estimate. Because of its proximity to the Mississippi River and the associated flood plains, drainage areas and wetlands along the eastern shore, it should be anticipated that there will be environmental permitting and remediation required for any construction in this sub-segment. There may be areas where construction outside the existing railroad right of way is completely prohibited. The extent of this potential project cost has not been estimated, primarily because of the large number of unknown factors at this level of planning, but also because as design advances, requirements and assumptions may be able to be adapted to the situation lessening the potential impacts to the environment and lowering the associated cost.

Existing bridges will be rehabilitated as needed; new bridges will be constructed as required for the new third main. At this level of engineering assessment, the type, size and location for the new bridges, and actual bridge inspection and design of rehab and repairs is not available; units of cost within the structures category have been used to acknowledge the need for new bridges as well as bridge rehab and replacement to allow higher speed passenger trains to operate safely.

North La Crosse Yard operations including arrivals, departures and switching present a congestion point at the north end of the sub-segment. An allocation has been added to the cost estimate to provide funding needed to construct infrastructure improvements not yet designed that will assure reliable passenger and freight service in this area.

On the south side of LaCrosse, at Grand Junction, this BNSF sub-segment crosses the CP main line. A westbound connection to CP is proposed in the southwest quadrant of the Grand Junction rail crossing. Property acquisition will be required for the connection. The connection will consist of an approach siding along the BNSF, the connection itself, and an approach siding along CP extending to the location of the existing Amtrak station, approximately 4,500'. A connection from westbound CP to northbound BNSF is also required at Grand Junction, but it will be briefly discussed within Sub-Segment 16.

Sub-Segment 12 Capital Cost	Amount (1,000's)
Trackwork	$531,577
Structures	$36,453
Systems	$33,527
Crossings	$18,521
Allocations for Special Elements	$12,300
Sub-Total Construction Elements	$632,378
Contingency	$189,713
Professional Services and Environmental	$197,302
Total Segment Cost	$1,019,393
Segment Cost Per Mile	$16,130

Routes 7 & 8 require a connection to be constructed allowing traffic to flow from northbound BNSF to westbound CP at Grand Crossing. The following table provides an estimate of the additional costs that would be incurred to implement these two routes.

Sub-Segment 12-option Capital Cost	Amount (1,000's)
Trackwork	$5,231
Structures	$1,832
Systems	$3,444
Crossings	$0
Allocations for Special Elements	$0
Sub-Total Construction Elements	$10,506
Contingency	$3,152
Professional Services and Environmental	$3,278
Total Segment Cost	$16,936
Segment Cost Per Mile	$11,291

Constraints - The principal constraints in this sub-segment are: (1) the Mississippi River including causeways, drainage structures and the risk of flooding, (2) segments of single main track CTC along the Mississippi River with heavy freight train traffic and (3) congestion associated with Grand Crossing (CP) and the North La Crosse yard on BNSF.

Track Sub-Segment 13 (Segment II)

Sub-Segment Description - Track Sub-Segment 13 begins on the CN at Eden (MP 138.0) and runs 7.8 miles to Fond du Lac, WI at MP 145.8 (MP 157.0).

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed for freight trains within this track sub-segment is 10 MPH between Eden and Eden Jct. and 30 MPH in Fond du Lac. No block signal system is in operation between Eden and MP 145.8.

Yards & Junctions – There are no major yards in this track sub-segment. However CN's North Fond du Lac Yard is located to the north end this track sub-segment in Track Segment 14 (Fond du Lac-Owen). At Eden Jct. in Fond du Lac, Track Sub-Segment 13 joins CN's main track from Duplainville, WI and Chicago, IL.

Major Infrastructure Elements – There are two bridges over the East and West Branches of the Fond du Lac River within the city of Fond du Lac on the CN's main track.

Additional Comments - A grain elevator at Eden and a limestone quarry north of Eden are the principal rail freight customers outside of Fond du Lac on Track Sub-Segment 13.

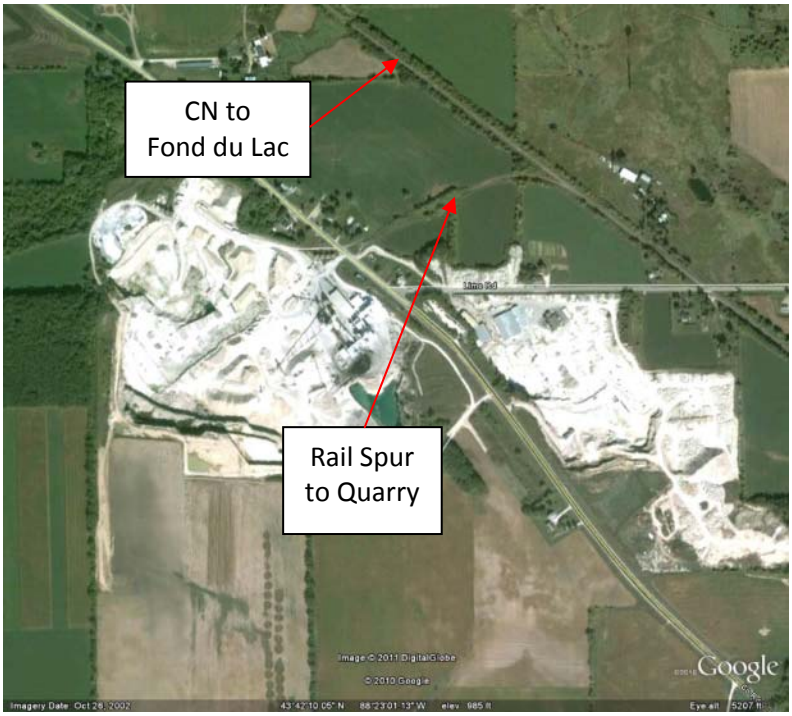

Photo 37 – Eden, WI

This aerial view shows the large limestone quarry north of Eden on CN and the rail spur serving the quarry.

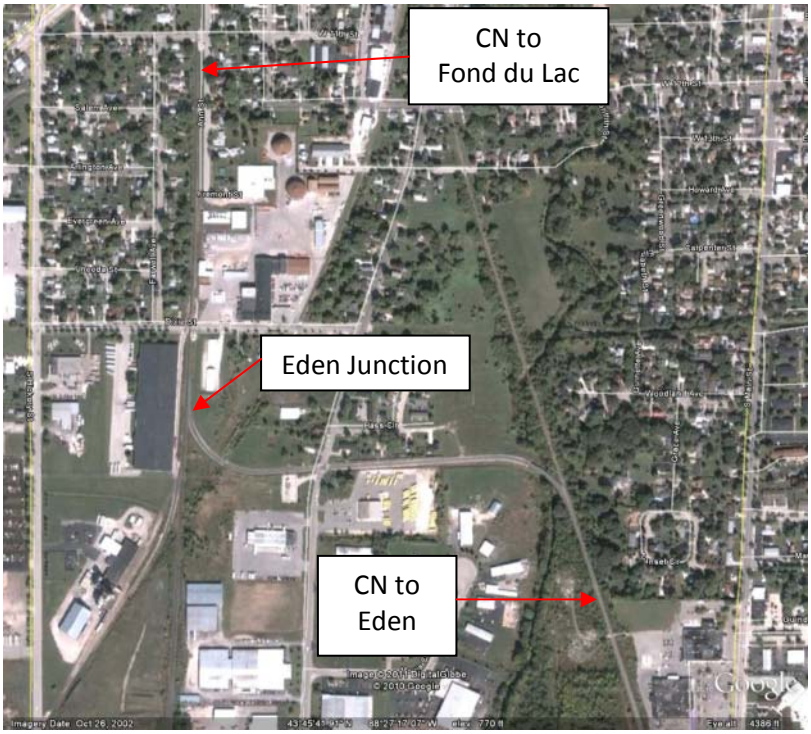

Photo 38 –Fond du Lac, WI

This aerial view shows the connection between the former C&NW route and CN at Eden Jct. in Fond du Lac.

Infrastructure Needs - CN provides service along Sub-Segment 13 to a grain elevator at Eden and a large limestone quarry north of Eden. An additional track along this branch line will be required to prevent conflicts with service to these customers. Due to the condition of the existing track, it must be completely rebuilt from the subballast up to support FRA Class VI track speeds for passenger traffic. Crossing warning devices will be modified to accommodate the new track and improved to accommodate the new higher speeds. A CTC signal system and PTC overlay will be added to both tracks within the segment. An allocation has been provided for construction at Eden Junction to prevent that location from becoming a bottleneck as the new passenger service flows into the CN mainline to Fond du Lac.

New bridges will be built to carry the new track over Main Street in Fond du Lac and 11 minor rivers/streams. The existing undergrade bridges will require varying degrees of rehabilitation to support the addition of passenger train service and its associated speeds in this sub-segment. At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; a unit of cost within the structures category has been used to acknowledge the need for bridge rehab to allow higher speed passenger trains to operate safely.

Sub-Segment 13 Capital Cost	Amount (1,000's)
Trackwork	$35,774
Structures	$13,819
Systems	$4,661
Crossings	$3,053
Allocations for Special Elements	$10,100
Sub-Total Construction Elements	$67,408
Contingency	$20,223
Professional Services and Environmental	$21,031
Total Segment Cost	$108,662
Segment Cost Per Mile	$13,931

Constraints - The principal constraints in this sub-segment are: (1) the narrow right-of way, curves and industrial areas near Eden Junction and (2) narrow right-of-way, grade crossings and small river bridges in Fond du Lac.

Track Sub-Segment 14 (Segment II)

Sub-Segment Description - Track Sub-Segment 14 begins at Fond du Lac (MP 157.0) and continues along the CN to Owen, WI at MP 308.7, a distance of 151.7 miles.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed for freight trains within this sub-segment is 60 mph. CTC is in effect.

Yards & Junctions – Yards are located at North Fond du Lac, Oshkosh, Neenah, Stevens Point, Marshfield and Owen. Junctions are located at Neenah, Stevens Point, Junction City, Spencer and Owen.

Major Infrastructure Elements – A railroad shop facility is located at North Fond du Lac. Major bridges are located at Oshkosh (a swing bridge with multiple approach spans), Neenah, Fremont (3 small river bridges and a swing-span bridge), Amherst (1 river bridge and 2 bridges over highways on a high fill), Stevens Point (a river bridge on a fill at the east end of the yard, two large bridges taking the yard over Michigan Avenue and Church Street, a three span bridge over the Wisconsin River, a bridge over a highway in Marshfield and a river bridge east of Owen. Because much of this track sub-segment passes through undulating terrain and areas of the Wisconsin River Flowage and its tributaries, there are many smaller drainage facilities that are not individually mentioned here.

Additional Comments – CN's Stevens Point facilities include a major freight classification yard, major mechanical department and maintenance-of-way shops, a crew base and management offices in the former Soo Line passenger station. There is a junction on the south side of the Stevens Point freight yard with the line to Wisconsin Rapids.

Photo 39 – North Fond du Lac, WI

The view is northwest from the Scott Street grade crossing in Fond du Lac toward the CN's North Fond du Lac facility. The former C&NW right-of-way is to the right. The former Wisconsin Central right-of-way is to the left and carries CN's main track to Duplainville and Chicago. The CN freight train in the photo is departing southbound toward Chicago.

Photo 40 – Junction City, WI

The view is to the southeast toward Stevens Point showing the switches leading to the southwest and northwest legs of the 4-quadrant wye and rail crossing at Junction City. CN's single track line from Tomahawk to Marshfield and New Lisbon crosses the two main tracks of Track Sub-Segment 17 in the center of the photo.

Photo 41 – Marshfield, WI

The view is northwest on CN near the west edge of Marshfield looking toward Spencer and Owen. CN has two main tracks, both equipped with CWR, on Track Sub-Segment 17 through Marshfield.

Infrastructure Needs - An additional main track offset 30' from the existing track will be required to allow passenger operations in this segment; crossing warning devices will be extended to accommodate the addition of the new track. Through Oshkosh, coordination with the city highway department is required because of numerous "humped crossings" and areas where the track is in close proximity to residential streets and homes. The new track will be provided with a CTC signal system and PTC overlay will be added to the segment forming a 2 main track system. The existing track will be rehabilitated with up to 1/3 of the existing ties to be replaced and associated track surfacing occurring. This approach will allow both passenger and freight operations to share the use of a corridor with 2 main tracks, allow appropriate passenger speeds for the service proposed and avoid the conflicts present when capacity is constrained.

Major yards are present at North Fond du Lac and Steven's Point with additional smaller yards at Oshkosh, Neenah, Marshfield and Owen. Allocations have been added to the cost estimate for congestion mitigation in these areas.

Most of the railroad right of way in this sub-segment does not have sufficient width to support construction of an additional track without the need for right of way acquisition. Since a track is being proposed offset 30' from the existing track, the track embankment will need to be widened and property acquired to allow this to occur. Existing culverts along the length of the sub-segment must be extended to provide adequate drainage to both the new and the existing tracks and preserve existing drainage patterns.

New bridges will be required over both roadways, streams, and minor and major rivers

along the route. An allocation has been added to the cost estimate to account for major rehabilitation of the swing bridges at Oshkosh and Gill's Landing. The route along this sub-segment passes through several significant wetland areas and will require the construction of land bridges to support the new track in these areas. The existing undergrade bridges will require varying degrees of rehabilitation to support the addition of passenger train service and its associated speeds in this sub-segment. At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; a unit of cost within the structures category has been used to acknowledge the need for bridge rehab to allow higher speed passenger trains to operate safely.

Sub-Segment 14 Capital Cost	Amount (1,000's)
Trackwork	$547,038
Structures	$96,648
Systems	$76,469
Crossings	$81,674
Allocations for Special Elements	$65,700
Sub-Total Construction Elements	$867,529
Contingency	$260,259
Professional Services and Environmental	$270,669
Total Segment Cost	$1,398,456
Segment Cost Per Mile	$9,219

Constraints - The principal constraints in this sub-segment are: (1) major freight yards at North Fond du Lac and Stevens Point where the railroad has concentrated many of its operations, maintenance of equipment and maintenance of way functions and equipment, (2) narrow right of way through residential and commercial districts with many grade crossings in the Fox River Valley, (3) undulating terrain and small river bridges that cross marshlands and smaller rivers, (4) many cuts that may fill with blowing and drifting snow in winter, (5) long segments of single main track CTC and (6) major rail-highway grade separations and river bridges in the Stevens Point area.

Track Sub-Segment 15 (Segment L)

Sub-Segment Description - Track Sub-Segment 15 runs between Camp Douglas at MP 173.9 and Wyeville, WI at MP 183.7. The track is in place for all 9.8 miles of Track Sub-Segment 15 except at Wyeville where the former C&NW rail crossing diamond has been removed. The line is designated as "Out of Service" by UPRR, although empty freight cars were observed stored on the Camp Douglas end of the sub-segment.

Existing Passenger Service – None operated.

Maximum Track Speed – This is not applicable since the line is designated as "Out of Service." No block signal system is in effect.

Yards & Junctions – There are no yards in Track Sub-Segment 15. There are junctions with the CP at Camp Douglas and with the UPRR at Wyeville.

Major Infrastructure Elements – The northeast, southeast and southwest and legs of the former C&NW 4-quadrant wye are still in place. Maintenance-of-way equipment and materials occupy several tracks and storage areas at Wyeville. The Wyeville interlocking tower has been removed. The rail crossing diamond where the line from Camp Douglas crossed the east-west line to La Crosse and continued north to connect directly with the line from Milwaukee to Eau Claire has been removed. The east-west track is still in place at this location. A direct connection would have to be restored at the location of the former crossing to accommodate passenger service from track Sub-Segment 15 to Track Sub-Segment 18 (Wyeville to Eau Claire). UPRR mainline freight trains between Chicago and the Twin Cities use the northeast quadrant of the wye as a main track. Track Sub-Segment 15 from Camp Douglas to the south end of Wyeville is heavily overgrown with vegetation as shown in Photo 42 below. Much of the sub-segment is through marsh land and there are three small river bridges between Camp Douglas and Wyeville. The south portion of the line passes diagonally through the Mill Bluff State Park.

Photo 42 – Wyeville, WI

The view is southeast from the Fulda Avenue grade crossing along Track Sub-Segment 15 between Wyeville and Camp Douglas. The UPRR track is out of service and heavily overgrown with vegetation from Camp Douglas to the south end of Wyeville.

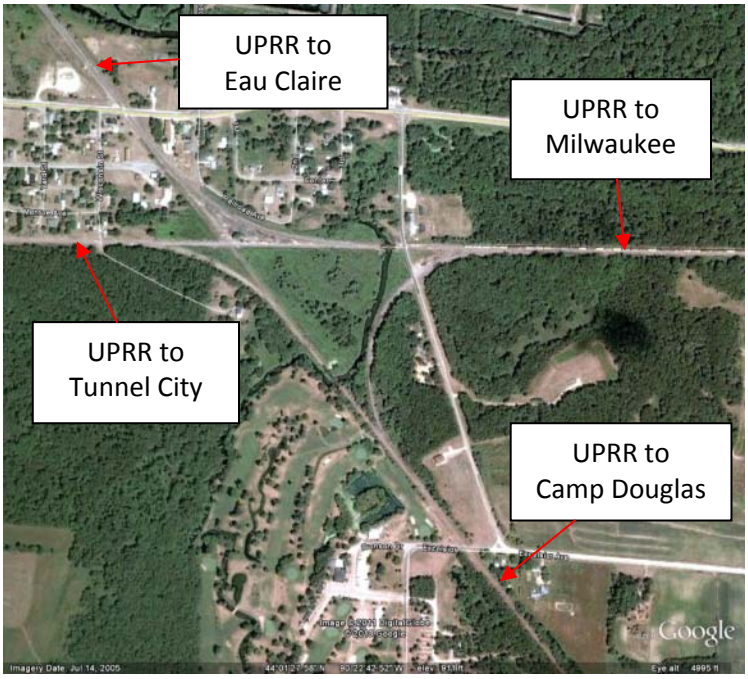

Photo 43 – Wyeville, WI

This aerial view shows the intersection of four UPRR lines at Wyeville. Track Sub-Segment 15 (Camp Douglas to Wyeville) is at the bottom of the photo. Track Sub-Segment 18 (Wyeville to Eau Claire) is shown at the upper left of the photo. The tower shown in the photo has since been removed. The UPRR track to the left of the photo connects with the CP at Tunnel City on Track Sub-Segment 16 (Camp Douglas to La Crosse).

Photo 44 – Wyeville, WI

The view is looking west from the Excelsior Street grade crossing along the UPRR Milwaukee-Eau Claire main track just east of the northeast leg of the wye (the UPRR to Eau Claire) which is visible beyond the bridge in the center of the photo. Track Sub-Segment 15 (Camp Douglas to Wyeville) would cross the route of the tangent track from left to right beyond the pole line crossing in the background.

Infrastructure Needs - The track in this proposed sub-segment is not in service. In order for HSR passenger operations to occur, a new track must be built from the subballast up. There are 8 roads that will be crossed and new conventional crossing warning devices will be provided. There are 2 locations where new bridges over streams will be required and two locations where properly sized box culverts will be provided to maintain stream flow. A CTC signal system and PTC overlay will be included within the segment.

Sub-Segment 15 Capital Cost	Amount (1,000's)
Trackwork	$14,281
Structures	$3,316
Systems	$6,630
Crossings	$2,225
Allocations for Special Elements	$200
Sub-Total Construction Elements	$26,653
Contingency	$7,996
Professional Services and Environmental	$8,316
Total Segment Cost	$42,965
Segment Cost Per Mile	$4,384

Constraints - The principal constraints in this sub-segment are: (1) the right of way that passes through the Mill Bluff State Park, (2) stretches of marshland are subject to settling of embankment and track and (3) a segment of the track has been removed at Wyeville where UP north-south and east-west lines cross each other.

Track Sub-Segment 16 (Segments N & O)

Sub-Segment Description - Track Sub-Segment 16 begins on the CP at Camp Douglas (MP 226.0) and continues 55.0 miles to LaCrosse, WI at MP 281.0.

Existing Passenger Service – Amtrak currently operates a single round trip passenger service (Empire Builder) along this track sub-segment. Station stops are scheduled at Tomah and La Crosse.

Maximum Track Speed – The maximum speed for passenger trains is 79 MPH and 60 MPH for freight. CTC is in effect.

Yards & Junctions – CP has a yard at La Crosse. Junctions are located at Camp Douglas (UPRR to Wyeville), Tunnel City (UPRR from Wyeville), Fort Mc Coy (an active military installation), and Grand Junction (the BNSF crossing and connection in La Crosse). If the route selected were to travel from Camp Douglas on Sub-Segment 16 and then connect at La Crosse to Sub-Segment 20 to Hastings (St. Croix Jct.) on BNSF, a new track connection would be required in the northeast quadrant at Grand Junction. A new station at LaCrosse would also be required.

Major Infrastructure Elements – A single track tunnel, approximately 1,200 feet long is located just west of the junction switch with the UPRR at Tunnel City. The former C&NW tunnel which is parallel and to the north of the CP tunnel, collapsed in the 1970s and was never repaired. C&NW trains then used the former CMStP&P (now CP) tunnel to reach La Crosse. Small river bridges are located in Tomah, Sparta, Bangor, Medary and La Crosse. The Elroy-Sparta State Trail uses the adjacent former C&NW right-of-way between Sparta and the connection to the continuing La Crosse River trail into La Crosse.

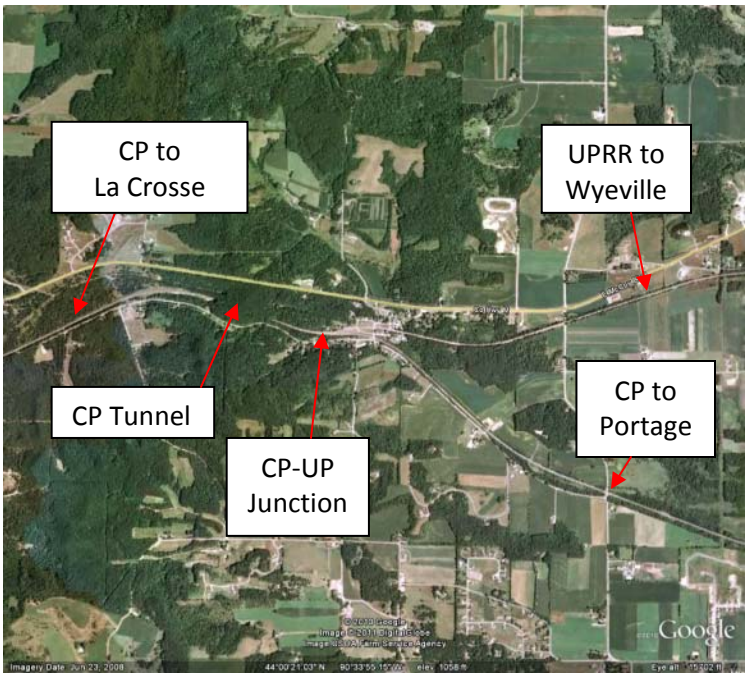

Photo 45 – Tunnel City, WI

This aerial view shows the CP single main track at Tunnel City, WI on Track Sub-Segment 16 (Camp Douglas to La Crosse). Immediately west of the town and just east of the east portal of the CP tunnel, the UPRR single track from Wyeville connects with CP. The line of the former C&NW tunnel, which is parallel to and north of CP's tunnel and visible in the photo, collapsed in the late 1970s and was never repaired.

Photo 46 – Tunnel City, WI

The view is northwest along CP from Tunnel City toward the east portal of the CP single-track tunnel. The UPRR track from Wyeville is approaching from the right and connects just out of sight at the center of the photo.

Photo 47 – La Crosse, WI

The view is northeast along CP at the Amtrak station in La Crosse. Amtrak's Empire Builder stops at this facility which formerly served as the CMStP&P's passenger station and division headquarters. The CP's La Crosse Yard is in the background. Just east of the CP yard is Grand Junction where the BNSF from Prairie du Chien to North La Crosse (Track Sub-Segment 12) crosses the CP line from Portage.

Infrastructure Needs - The existing line consists of a single main track supplemented by

controlled sidings at nominal 20 mile intervals to allow trains to meet and pass as well as support service to customers. Formerly, the line was a double track main line. In order to implement HSR in this section, new track will be constructed between the existing sidings; the existing sidings will undergo “heavy rehabilitation” including replacement of up to 2/3 of the existing ties, associated track surfacing and rail replacement. On the existing main line track, up to 1/3 of the existing ties will be replaced and associated track surfacing will occur. One ten mile long passenger siding and two three mile long freight sidings will be built to preserve the needed operational flexibility of the sub-segment.

At Tomah and La Crosse, yard operations including arrivals, departures and switching will cause congestion especially when through passenger operations are added to the sub-segment. An allocation has been added to the cost estimate to provide funding needed to construct infrastructure improvements not yet designed that will assure reliable passenger and freight service in these areas.

Except for the connection to BNSF at La Crosse which is required for Routes 3 & 6, the railroad right of way in this sub-segment has sufficient width to support the construction previously outlined without the need for right of way acquisition. CP has indicated that it will likely allow HSR operations at up to 110 mph using the existing track center spacing of 14’.

At Tunnel City, the existing tunnel and associated infrastructure will be rehabilitated as needed, but an additional portal is not planned. The double track will end at both ends of the tunnel, with a single track continuing through. The double track approaches will act to allow the meeting and passing of trains using the tunnel.

The existing undergrade bridges will require varying degrees of rehabilitation to support the addition of passenger train service and its associated speeds in this sub-segment. The bridge over the Mississippi River at La Crosse is a single track bridge; the bridge will be rehabilitated to allow HSR service. Throughout the remainder of the sub-segment, existing bridges will be rehabilitated and replaced as needed to support the restoration of the double main track system. At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; units of cost within the structures category have been used to acknowledge the need for bridge rehab and replacement to allow higher speed passenger trains to operate safely.

Sub-Segment 16 Capital Cost	Amount (1,000's)
Trackwork	$93,216
Structures	$13,836
Systems	$22,713
Crossings	$21,866
Allocations for Special Elements	$20,400
Sub-Total Construction Elements	$172,030
Contingency	$51,609
Professional Services and Environmental	$53,673
Total Segment Cost	$277,312
Segment Cost Per Mile	$5,042

Routes 3 & 6 require a connection to be constructed allowing traffic to flow from westbound CP to northbound BNSF at Grand Crossing. The following table provides an estimate of the additional costs that would be incurred to implement these two routes.

Sub-Segment 16-option Capital Cost	Amount (1,000's)
Trackwork	$2,442
Structures	$59,850
Systems	$336
Crossings	$0
Allocations for Special Elements	$15,100
Sub-Total Construction Elements	$77,729
Contingency	$23,319
Professional Services and Environmental	$24,251
Total Segment Cost	$125,299
Segment Cost Per Mile	$100,239

Constraints - The principal constraints in this sub-segment are: (1) the single main track tunnel at Tunnel City, (2) the Camp McCoy military reservation located between Tunnel City and Sparta, (3) the recreational trails that occupy the former C&NW right of way parallel to the CP between Sparta and La Crosse, and (4) Grand Crossing (BNSF) at La Crosse.

Track Sub-Segment 17 (Segment II)

Sub-Segment Description - Track Sub-Segment 17 begins at Owen, WI on the CN (MP 308.7) and continues to Chippewa Falls, WI at MP 350.9, a distance of 42.2 miles.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed for freight trains within this sub-segment is 50 MPH. CTC is in effect.

Yards & Junctions – Yards are located at Owen and Chippewa Falls. Junctions are located at Owen (with the CN to Duluth) and at Chippewa Falls with the UPRR and Track Sub-Segment 19 (Chippewa Falls to Eau Claire).

Major Infrastructure Elements – A high, multiple-span bridge crosses the Chippewa River at Chippewa Falls. Smaller river bridges are located at Owen, Riverside, east and west of Thorpe, Stanley and Lake Wissota. There is a rail crossing at grade with the UPRR on the east side of the Chippewa River in Chippewa Falls. Two highway under-grade bridges are located in Chippewa Falls.

Photo 48 – Owen, WI

The view is to the southeast toward Marshfield. The track in the left foreground is the CN from Duluth. The track in the right foreground is Track Sub-Segment 17 (Owen to Chippewa Falls).

Photo 49 – Owen, WI

The view is to the northwest along the Duluth line at Owen. Owen is not a major yard for CN, but does serve as a base primarily for maintenance-of-way operations. The train shown in the photo is a welded rail distribution train.

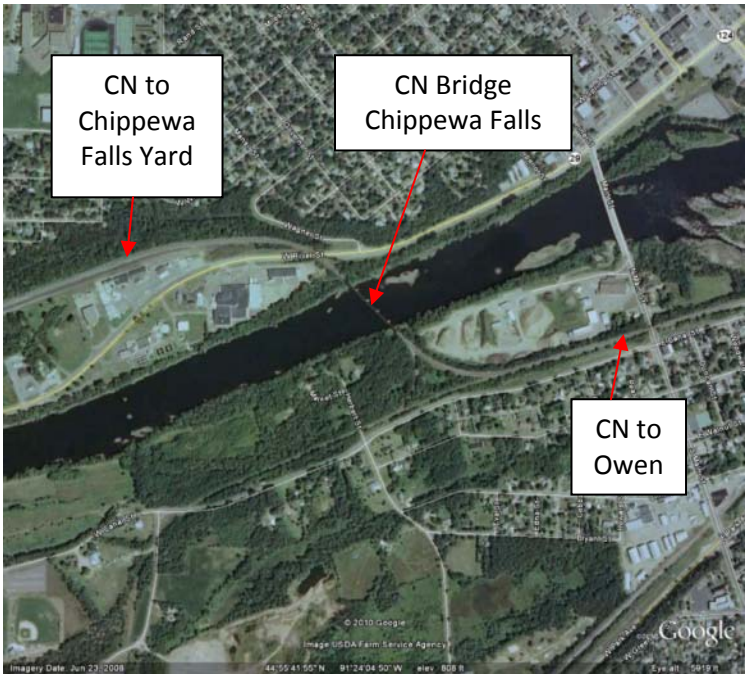

Photo 50 – Chippewa Falls, WI

CN's Chippewa River Bridge is located southeast of the downtown portion of Chippewa Falls, and east of the CN's Chippewa Falls Yard (which is to the west or left of the photo). The bridge is a 5-span steel bridge on concrete columns with an under-grade bridge for an abandoned rail route immediately adjacent to the west end of the bridge.

Photo 51 – Chippewa Falls, WI

The view is northwest of the CN's bridge over Business Route 29 (West River Street) in Chippewa Falls. The CN Chippewa Falls Yard is approximately one mile to the west of this location (to the right).

Photo 52 – Lake Wissota, WI

The view is to the northwest along the CN and the parallel County Highway X at Lake Wissota, east of Chippewa Falls. The CN's 3-span, single-track bridge and the parallel Highway X are on a short causeway at this location.

Photo 53 - Chippewa Falls

The view is to the west toward the crossing of the UPRR's route from Eau Claire and the CN route between Owen and Chippewa Falls (in the left side of the photo). The CN's route is laid with CWR while the UPRR route in the foreground is a lighter weight jointed rail.

Infrastructure Needs - The level of traffic on the CN line west of Owen in this sub-segment drops considerably, so that a second main track is not required to support the proposed HSR passenger service. The existing track and sidings will be rehabilitated by replacing up to 2/3 of the ties, surfacing the track and replacing the remaining jointed rail (CN has been replacing segments of jointed rail with CWR in recent years). Two three mile long freight sidings and one ten mile long passenger siding will be required. The construction of these sidings will require the acquisition of additional property. CTC signaling will be installed on the sub-segment and PTC overlay will be added.

The existing undergrade bridges will require varying degrees of rehabilitation to support the addition of passenger train service and its associated speeds in this sub-segment. At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; units of cost within the structures category have been used to acknowledge the need for bridge rehab and replacement to allow higher speed passenger trains to operate safely.

Sub-Segment 17 Capital Cost	Amount (1,000's)
Trackwork	$63,670
Structures	$4,423
Systems	$21,208
Crossings	$22,414
Allocations for Special Elements	$0
Sub-Total Construction Elements	$111,715
Contingency	$33,515
Professional Services and Environmental	$34,855
Total Segment Cost	$180,085
Segment Cost Per Mile	$4,267

Constraints - The principal constraints in this sub-segment include: (1) the Chippewa River Bridge at Chippewa Falls, (2) the long portion of single track and the track configuration at and near the UPRR junction in Chippewa Falls, and (3) smaller river bridges located in the sub-segment.

Track Sub-Segment 18 (Segment M)

Sub-Segment Description - Track Sub-Segment 18 begins on the UPRR at Wyeville, WI (MP 173.5) and continues for 86.0 miles to Eau Claire at MP 87.5.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed for freight trains within this sub-segment is 30 MPH. ABS and Track Warrant Control are both in effect.

Yards & Junctions – A yard is located at Altoona, WI. Junctions are located at Wyeville (UPRR) and Merrillan (CN).

Major Infrastructure Elements – The Eau Claire River Bridge is a high single-track seven-span major bridge located between Altoona Yard and Eau Claire. Altoona is the site of the former C&NW depot, crew base, freight classification yard, mechanical shops and maintenance-of-way headquarters. Most of the yard tracks at the Altoona yard remain in service, as do maintenance-of-way facilities. Most mechanical facilities have been removed. Another major river bridge is located at Black River Falls. Small river bridges are located at or near Wyeville, Warrens, Merrillan, Fairchild-Baldwin (7 bridges), Baldwin-Fall Creek (4 bridges), and Fall Creek.

Photo 54 – Altoona, WI

The view is to the northwest from the 19 Mile Road highway bridge along the UPRR toward the east end of the Altoona Yard. A second main track is visible to the left and extends from Altoona Junction (behind the photographer) to the far west end of Altoona Yard. The Altoona siding is visible to the left of the second main track. ABS is in effect at this location. Train movements are controlled through the use of a Track Warrant Control System.

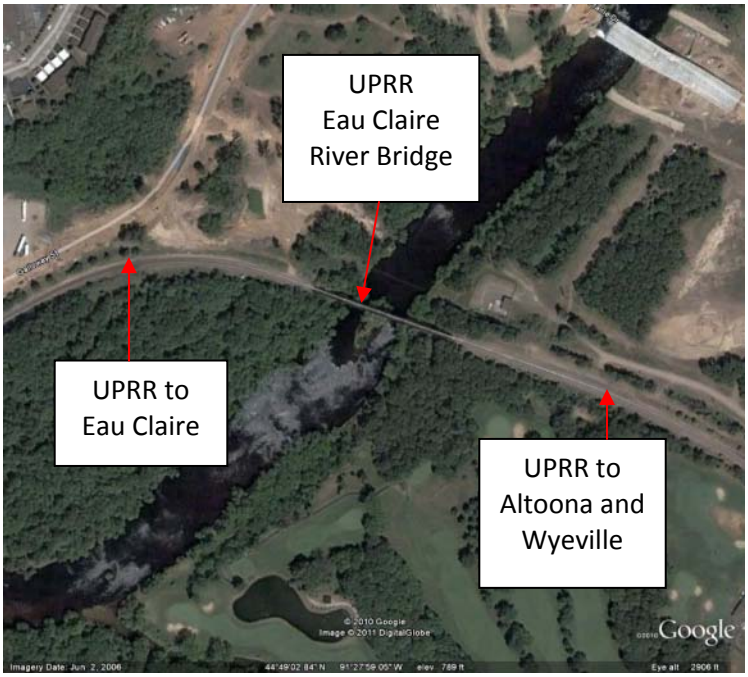

Photo 55 – Eau Claire, WI

The UPRR's seven-span Eau Claire River Bridge is located railroad west of the Altoona Yard and geographically east of downtown Eau Claire (which is around the sharp curve off the west (left) end of the bridge. The bridge is approximately one mile downstream from the Altoona Dam.

Photo 56 – Eau Claire, WI

The view is to the west at the Galloway Street grade crossing. The UPRR mainline is single track ABS with CWR at this location.

Infrastructure Needs - An additional main track offset 30' from the existing track will be required to allow passenger operations in this segment; crossing warning devices will be added to accommodate the new track. A CTC signal system and PTC overlay will be added to the segment forming a new 2 main track system. The existing track will be rehabilitated by renewing up to 2/3 of the ties, surfacing the track and replacing the rail with 136/141 CWR for the entire length of the sub-segment. This approach will allow both passenger and freight operations to share the use of a corridor with 2 main tracks, allow appropriate passenger speeds for the service proposed and avoid the conflicts present when capacity is constrained.

At Altoona, yard operations including arrivals, departures and switching will cause congestion especially when through passenger operations are added to the sub-segment. An allocation has been added to the cost estimate to provide funding needed to construct infrastructure improvements not yet designed that will assure reliable passenger and freight service in this area.

Most of the railroad right of way in this sub-segment does not have sufficient width to support construction of an additional track without the need for right of way acquisition. Since a track is being proposed offset 30' from the existing track, the track embankment will need to be widened. Existing culverts along the length of the sub-segment must be extended to provide adequate drainage to both the new and the existing tracks and preserve existing drainage patterns.

New bridges will be required over both roadways and streams/minor rivers along the route. The existing undergrade bridges including the high bridge at Eau Claire, will require varying degrees of rehabilitation to support the addition of passenger train

service and its associated speeds in this sub-segment. At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; a unit of cost within the structures category has been used to acknowledge the need for bridge rehab to allow higher speed passenger trains to operate safely.

Sub-Segment 18 Capital Cost	Amount (1,000's)
Trackwork	$406,294
Structures	$13,717
Systems	$51,591
Crossings	$38,757
Allocations for Special Elements	$15,000
Sub-Total Construction Elements	$525,359
Contingency	$157,608
Professional Services and Environmental	$163,912
Total Segment Cost	$846,878
Segment Cost Per Mile	$9,847

Constraints - The principal constraints in this sub-segment are: (1) a missing segment of track at Wyeville where the UPRR east-west line crosses the route of sub-segment 15, (2) the lack of CTC and the long segments of single main track on the UPRR between Wyeville and Eau Claire, (3) UPRR's Altoona Yard, (4) the Eau Claire River Bridge, (5) sharp curvature in the Eau Claire area and (6) the current condition of the ties and rail on the main track for the length of the sub-segment.

Track Sub-Segment 19 (Segment P)

Sub-Segment Description - Track Sub-Segment 19 uses the UPRR for 9.9 miles between Chippewa Falls, WI at MP 0.0 and Eau Claire at MP 9.9.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed for freight trains within this sub-segment is 30 MPH. There is no block signal system in effect.

Yards & Junctions – There are no yards in this track sub-segment. Junctions are located on the east side of the Chippewa River in Chippewa Falls with CN (Track Sub-Segment 17-Owen to Chippewa Falls) and at Yukon Junction west of Eau Claire with UPRR (Track Sub-Segment 23-Eau Claire to Westminster Street).

Major Infrastructure Elements – A new track connection would be needed at Chippewa Falls near the CN-UPRR rail crossing at grade. A direct connection which existed in past years has been abandoned. The UPRR route to Chippewa Falls parallels Routes 53 and 124 in several portions of the line. Intersections of roadways near grade crossings would require signalization and pre-emption. The track connection in Eau Claire is at Yukon Junction. At Yukon Junction, an active wye track connects to Track Sub-Segment 23 (Eau Claire to Westminster Street).

Photo 57 – Eau Claire (Yukon Jct.), WI

The view is to the southwest from the Eddy Street Bridge overlooking the northeast wye track switch at Yukon Junction at the south end of Track Sub-Segment 19. Trains moving to and from St. Paul via Track Sub-Segment 19 would use the right (west) leg of the wye to reach Track Sub-Segment 23 (Eau Claire to Westminster Street). Trains moving via Track Sub-Segment 19 to and from Eau Claire and then east via Track Sub-Segment 18 to Altoona, Wyeville and points east would use the east (left) leg of the wye. Yukon Junction currently consists of hand throw turnouts (as shown in the photo). CTC control points would be constructed to replace the hand throw turnouts. The former C&NW Eau Claire passenger station (located approximately one mile east via the left leg of the wye) has been removed. No passenger station facilities exist in Eau Claire at this time. There are no passenger stations located on Track Sub-Segment 19 between Chippewa Falls and Eau Claire. Photo 58 on the following page provides an overview of the key features of the Eau Claire area. Photo 59 shows an aerial view of Yukon Junction.

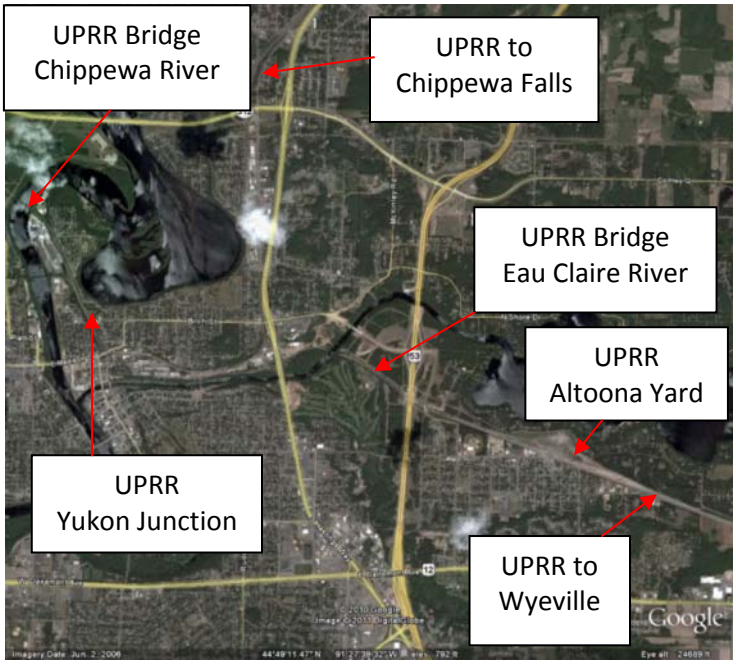

Photo 58 – Eau Claire, WI

This aerial view provides an overview of Eau Claire showing the convergence of Track Sub-Segments 18 (Wyeville to Eau Claire), 19 (Chippewa Falls to Eau Claire) and 23 (Eau Claire to Westminster Street). Also visible are the convergence of the Eau Claire and Chippewa Rivers, Yukon Junction and the UPRR's Altoona Yard.

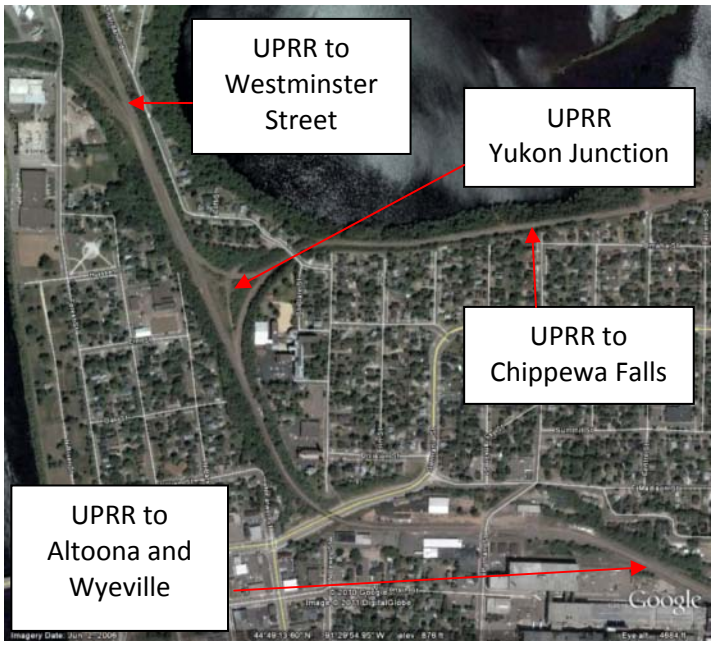

Photo 59 – Eau Claire, WI

This aerial view shows the convergence of track Sub-Segments 18, 19 and 23 at Yukon Junction, located approximately one mile railroad west of Eau Claire on the UPRR. There is no longer a station at Eau Claire.

Infrastructure Needs - An additional main track offset 30' from the existing track will be required to allow passenger operations in this segment; crossing warning devices will be added to accommodate the new track. There are a number of crossings where the track closely parallels major roadways; at these locations, traffic signal pre-emption and pre-emption with intersection signalization are to be provided. A CTC signal system and PTC overlay will be added to the segment forming a new 2 main track system. The existing track will be rehabilitated by renewing up to 2/3 of the ties and surfacing the track for the entire length of the sub-segment. This approach will allow both passenger and freight operations to share the use of a corridor with 2 main tracks, allow appropriate passenger speeds for the service proposed and avoid the conflicts present when capacity is constrained.

Most of the railroad right of way in this sub-segment does not have sufficient width to support construction of an additional track without the need for right of way acquisition. Since a track is being proposed offset 30' from the existing track, the track embankment will need to be widened. Existing culverts along the length of the sub-segment must be extended to provide adequate drainage to both the new and the existing tracks and preserve existing drainage patterns.

A new bridge will be required over the divided highway at North Crossing Road in Eau Claire and the existing single track structure will require rehabilitation to support the addition of passenger train service and its associated speeds in this sub-segment. At this level of engineering assessment, actual bridge inspection and design of rehab and

repairs is not available; a unit of cost within the structures category has been used to acknowledge the need for bridge rehab to allow higher speed passenger trains to operate safely.

Sub-Segment 19 Capital Cost	Amount (1,000's)
Trackwork	$37,091
Structures	$5,600
Systems	$11,180
Crossings	$12,276
Allocations for Special Elements	$0
Sub-Total Construction Elements	$66,147
Contingency	$19,844
Professional Services and Environmental	$20,638
Total Segment Cost	$106,629
Segment Cost Per Mile	$10,771

Constraints - The principal constraints in this sub-segment are: (1) the curvature and track configurations at both Chippewa Falls and Yukon Junction (Eau Claire) and (2) the lack of a signal system on the sub-segment.

Track Sub-Segment 20 (Segment Q)

Sub-Segment Description - Track Sub-Segment 20 uses the BNSF for 110.3 miles between LaCrosse, WI at MP 300.2 and Hastings, WI (St. Croix Jct.) at MP 410.5.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed for freight trains within this sub-segment is 60 MPH. CTC is in effect between La Crosse, WI and St. Croix Jct. Except for the single track St. Croix River Bridge at Prescott, the route is double track for the entire distance between La Crosse, WI and St. Croix Jct.

Yards & Junctions – A major BNSF freight yard is located at North La Crosse. Junctions are located at La Crosse (with CP and Track Sub-Segment 16-Camp Douglas to La Crosse), at Marshland (east of East Winona) with CN, and at St. Croix (with CP and Track Sub-Segment 24-Winona to Hastings-St. Croix Jct.). If the route selected were to travel from Camp Douglas on Sub-Segment 16 and then connect at La Crosse to Sub-Segment 20 to Hastings (St. Croix Jct.) on BNSF, a new track connection would be required in the northeast quadrant at Grand Junction. A new station at LaCrosse would also be required.

Major Infrastructure Elements – Much of Track Sub-Segment 20 consists of critical infrastructure (causeways and bridges) alongside and in the Mississippi River. Between Brice Prairie (north of La Crosse) and Trempealeau the railroad is constructed on an alternating structure of causeways and seven river bridges through the Black River flowage. Beginning at Trempealeau, the river is constructed primarily on causeways (and several bridges) in the Mississippi River through East Winona and north to Fountain City, WI. See Photo 60 below. From Fountain City to Nelson, the river is primarily built on the Mississippi River flood plain and river bank with intermittent sections of causeways and river bridges. North of Nelson, the line traverses the Nelson-Trevino Bottoms State Natural Area on alternating causeway and major bridge structures, including the Chippewa River Bridge, until reaching Pepin. Between Pepin and Prescott, the railroad primarily follows the east bank of the Mississippi River with several sections of causeway and several river bridges. The single-track, moveable span St. Croix River Bridge is located at Prescott, WI. See Photos 61 and 62 below.

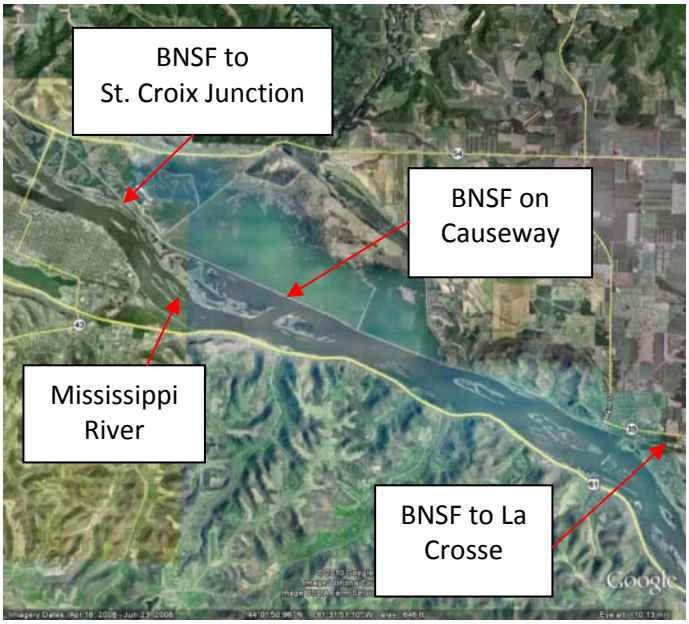

Photo 60 – East Winona, MN

This aerial view of the Mississippi River between Trempealeau and East Winona, WI shows the construction of extensive causeway in the Mississippi River channel to carry the BNSF right-of-way for Track Sub-Segment 20.

Photo 61 – Prescott, MN

The view is to the east across the St. Croix River at Prescott, WI of the BNSF's St. Croix River Bridge at the confluence of the St. Croix and the Mississippi Rivers. The far end of the bridge is in Wisconsin. The near end of the bridge is in Minnesota.

Photo 62 – Prescott, MN

The view is to the west through the BNSF's single-track movable span St. Croix River Bridge at Prescott, WI. The far end of the bridge is in Minnesota. With the exception of this piece of single track, Track Sub-Segment 20 is double track from La Crosse, WI to St. Croix Jct.

Infrastructure Needs - This sub-segment is presently a BNSF double track main line. In order to provide HSR service within the sub-segment, a new third main track is required. A CTC signal system for the new third main and PTC overlay for all tracks will be added to the segment forming a new 3 main track system. New control points with universal crossovers will be provided within the sub-segment to provide operational flexibility; existing control points will be maintained "as is" or expanded to include the new third track. The railroad right of way in this sub-segment does not have sufficient width to support the construction of a third main without the need for right of way acquisition.

Due to the position of the track between the Mississippi River to the west and the slope of the bluff along the eastern side of the railroad, adding a third track in many places will require building out into the river or cutting away the slope of the bluff; both of these approaches are considered within the cost estimate. Because of its proximity to the Mississippi River and the associated flood plains, drainage areas and wetlands along the eastern shore, it should be anticipated that there will be environmental permitting and remediation required for any construction in this sub-segment. There may be areas where construction outside the existing railroad right of way is completely prohibited. The extent of this potential project cost has not been estimated, primarily because of the large number of unknown factors at this level of planning, but also because as design advances, requirements and assumptions may be able to be adapted to the situation lessening the potential impacts to the environment and lowering the associated cost.

Existing bridges will be rehabilitated as needed; except for the St Croix River lift bridge which will remain single track, and several areas where existing bridge / causeway combinations will be rehabilitated as the line passes through areas with unstable soils or wetlands, (These areas include Trempealau, East Winona, Alma & Pepin as well as the delta area where the Chippewa River joins the Mississippi), new bridges will be constructed as required for the new third main. At this level of engineering assessment, the type, size and location for the new bridges, and actual bridge inspection and design of rehab and repairs is not available; units of cost within the structures category have been used to acknowledge the need for new bridges as well as bridge rehab and replacement to allow higher speed passenger trains to operate safely.

At St Croix Junction, CP joins BNSF from the west side of the Mississippi and operates as joint track going toward St Paul.

Sub-Segment 20 Capital Cost	Amount (1,000's)
Trackwork	$833,240
Structures	$172,742
Systems	$59,554
Crossings	$20,105
Allocations for Special Elements	$0
Sub-Total Construction Elements	$1,085,641
Contingency	$325,692
Professional Services and Environmental	$338,720
Total Segment Cost	$1,750,054
Segment Cost Per Mile	$15,866

Constraints - The principal constraints in this sub-segment are: (1) the Mississippi River including long segments of causeways, drainage structures and risk of flooding, (2) the St. Croix River Bridge at Prescott, (3) heavy freight train traffic and (4) congestion associated with conflicting train movements at the North La Crosse Yard and St. Croix Junction.

Track Sub-Segment 21 (Segment R)

Sub-Segment Description - Track Sub-Segment 21 uses CP between LaCrosse, WI (MP 281.0) and Winona, MN (MP 308.2), a distance of 27.2 miles.

Existing Passenger Service – Amtrak currently operates a single round trip passenger service (Empire Builder) along this track sub-segment. Station stops are scheduled at La Crosse, WI and Winona, MN.

Maximum Track Speed – The maximum speed for passenger trains is 65 MPH and 55 MPH for freight. CTC is in effect.

Yards & Junctions – A group of industrial tracks and a CP maintenance-of-way base are located in the vicinity of the former CMStP&P roundhouse at the east bank of the Mississippi River in La Crosse. On the Minnesota side of the Mississippi River, a small CP yard is located at La Crescent and connects with the mainline at River Jct. At Winona, there is a group of active industrial tracks and a small CP yard near the Amtrak passenger station downtown. There are also additional yard tracks at the north (railroad west) end of Winona (in adjoining Track Sub-Segment 24) that connect to the Port of Winona trackage serving riverfront industries. If the route selected were to travel from Prairie du Chien on Sub-Segment 12 and then cross the Mississippi River at La Crosse on Sub-Segment 21, a new track connection would be required in the southwest quadrant at Grand Junction. The existing La Crosse Amtrak station on CP would still be used.

Major Infrastructure Elements – Between La Crosse and La Crescent, the CP crosses the Mississippi River on four major multiple-span river bridges that connect across three islands in mid-stream. The east bridge and the west bridge both contain movable spans to accommodate river traffic. The east bridge is a bascule-type lift-span design to permit access to local port traffic and the west bridge is a long swing span design crossing the main navigation channel in the river. See Photos 63 and 64 below. There are many other smaller bridges along the route which follows the west bank of the Mississippi River. There are also many small road public and private grade crossings that connect small riverfront residential and recreational properties to the streets and highways that parallel the railroad. Many of these grade crossings serve only one property, with no alternate access.

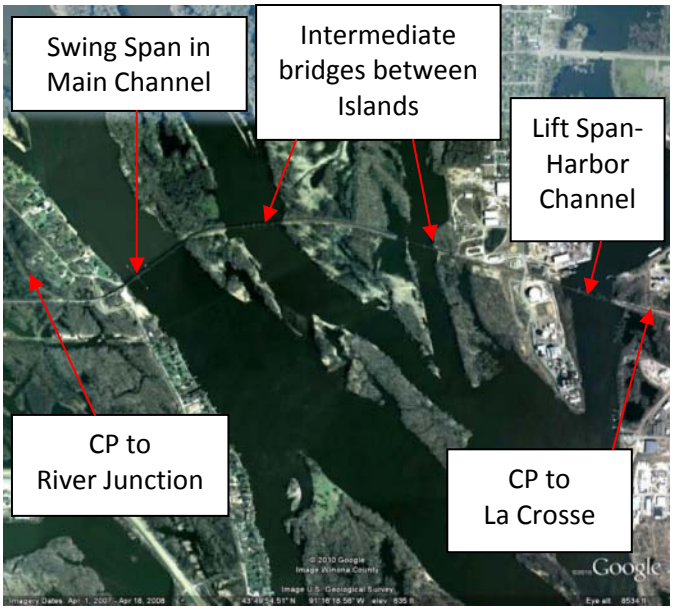

Photo 63 – La Crosse, WI

This aerial view shows CP's four separate bridge structures crossing the Mississippi River at La Crosse.

Photo 64 – La Crescent, MN

The view is to the northeast looking at the CP movable span bridge over the main Mississippi River navigation channel on the Minnesota side of the river crossing. This is the western most of four multiple-span river bridges that connect with three islands and the east bank of the river at La Crosse.

Photo 65 – River Junction West, MN

The view is northeast from U. S. Highway 61 overlooking a main track crossover in CP's River Junction West CTC control point. At this location, the two main tracks closest to the Mississippi River form Track Sub-Segment 21 (La Crosse to Winona) and the track in the foreground is the CP's line south along the west bank of the river to La Crescent, MN and points south. Also visible in the photo are the housings for the hot air switch heaters for winter operations. The in-track ductwork for these switch heaters has been removed from both turnouts for the summer months.

Photo 66 – Winona, MN

The view is railroad east along CP from the Main Street grade crossing in downtown Winona. The Amtrak depot visible at the left edge of the photo is being restored. Amtrak's Empire Builder serves this station. The center track is the main track and is controlled by CTC. The track to the left occupied by CP's standing yard locomotives is the Winona Siding which is reached through hand throw turnouts. Note that the Winona Siding has grade crossing materials laid from the Main Street crossing approximately 300 feet railroad east to the Amtrak station to permit Amtrak trains to stop on the main track to receive and/or discharge passengers. The original concrete platforms are visible to the right and left of the black rubber panels. The track to the far right is one of several tracks in CP's Winona Yard that are used to serve local industry. In Winona, the main track is frequently occupied by the CP yard locomotives and standing cuts of cars during switching operations for local industry.

Photo 67 – Winona, MN

Restoration is underway on the Amtrak passenger station and CP yard office at Winona.

Infrastructure Needs - The existing line consists of a single main track supplemented by controlled sidings at nominal 20 mile intervals to allow trains to meet and pass as well as support service to customers. Formerly, the line was a double track main line. In order to implement HSR in this section, new track will be constructed between the existing sidings; the existing main track & sidings will undergo “heavy rehabilitation” including replacement of up to 2/3 of the existing ties and associated track surfacing with siding rail replacement.

At Winona, yard & industrial operations including arrivals, departures and switching will cause congestion especially when through passenger operations are added to the sub-segment. An allocation has been added to the cost estimate to provide funding needed to construct infrastructure improvements not yet designed that will assure reliable passenger and freight service in this area.

The railroad right of way in this sub-segment has sufficient width to support the construction previously outlined without the need for right of way acquisition. CP has indicated that it will likely allow HSR operations at up to 110 mph using the existing track center spacing of 14’.

The existing undergrade bridges will require varying degrees of rehabilitation to support the addition of passenger train service and its associated speeds in this sub-segment. Existing bridges will be rehabilitated as needed to support the restoration of the double main track system. At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; units of cost within the structures category have been used to acknowledge the need for bridge rehab and replacement to allow higher speed passenger trains to operate safely.

Sub-Segment 21 Capital Cost	Amount (1,000's)
Trackwork	$50,583
Structures	$3,553
Systems	$12,418
Crossings	$12,920
Allocations for Special Elements	$10,000
Sub-Total Construction Elements	$89,473
Contingency	$26,842
Professional Services and Environmental	$27,916
Total Segment Cost	$144,231
Segment Cost Per Mile	$5,303

Constraints - The principal constraints in this sub-segment are: (1) the Mississippi River and the risk of flooding, (2) the Mississippi River Bridges at La Crosse including their movable spans and railroad speed restrictions across the bridges, (3) Lower operating speeds along certain portions of the line immediately adjacent to the Mississippi River, (4) long segments of single main track CTC, (5) industrial rail traffic occupying sidings (former main tracks) at Winona, (6) flood plains and many smaller river bridges over Mississippi River tributaries and (7) freight traffic conflicts at the junctions at La Crosse and Winona.

Track Sub-Segment 22 (Segment CC)

Sub-Segment Description - Track Sub-Segment 22 begins on the CN in Chippewa Falls (MP 350.9) and runs for 81.2 miles to Withrow, MN at MP 432.1.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed for freight trains within this sub-segment is 40 MPH. CTC is in effect.

Yards & Junctions – Small yards are located at Chippewa Falls and at customer unit grain train facilities east of Boyceville and west of Cylon. There is a junction at Withrow with CN's branch line to Dresser.

Major Infrastructure Elements The largest infrastructure element is the high, multiple-span steel arch trestle over the St. Croix River Bridge east of Arcola, MN. Smaller river bridges are located west of Chippewa Falls, west of Colfax, east of Wheeler, west of Boyceville, seven bridges west of Downing, 5 bridges near Cylon, and three bridges near New Richmond. There are highway under-grade bridges for County Road T near Howard, 930th Street near Colfax, County Road X, 310th Street, County Road S, 95th Street, and Wisconsin 64 between Chippewa Falls and the Wisconsin-Minnesota border. In Minnesota, there are two highway under-grade bridges for Arcola Trail North and St. Croix trail North between the Wisconsin border at Withrow, MN.

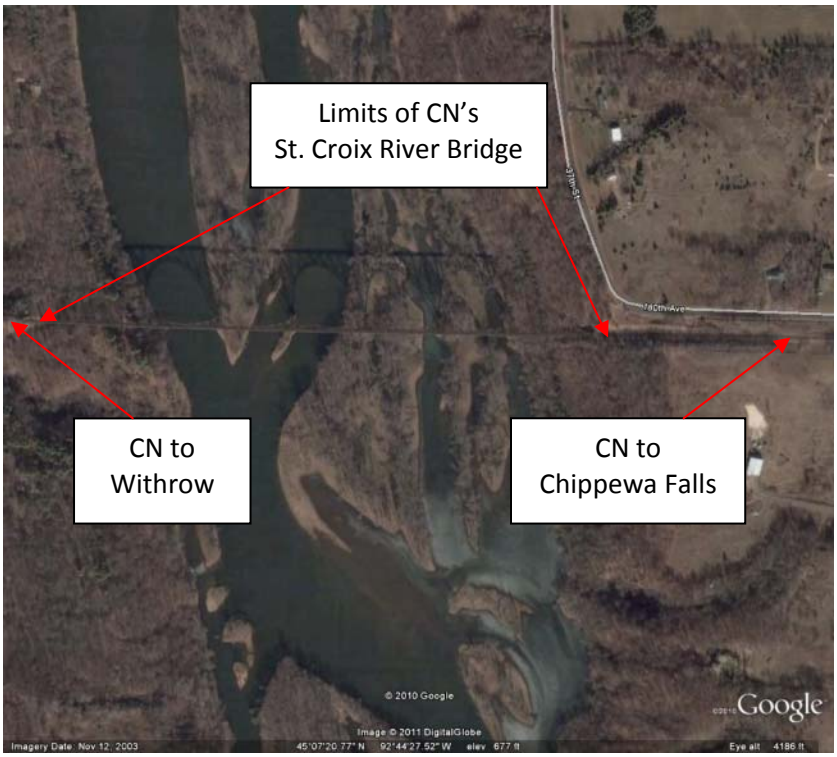

Photo 68 – Arcola, MN

This aerial view shows the CN's St. Croix River single bridge east of Arcola, MN in Track Sub-Segment 22 (Chippewa Falls to Owen). This former Soo Line high bridge consists of several large steel arch spans connecting the high bluffs on either side of the river. The shadow of the bridge is visible above the actual bridge in the photo.

Infrastructure Needs – The level of traffic in this sub-segment is such that a second main track is not required to support the proposed HSR passenger service. The existing track and sidings will be rehabilitated by replacing up to 1/3 of the ties, surfacing the track and replacing the remaining jointed rail (CN has been replacing segments of jointed rail with CWR in recent years). Three freight sidings three miles long and two ten mile long passenger sidings will be required. The construction of these sidings will require the acquisition of additional property. CTC signaling will be installed on the sub-segment and PTC overlay will be added.

The existing undergrade bridges will require varying degrees of rehabilitation to support the addition of passenger train service and its associated speeds in this sub-segment. At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; units of cost within the structures category have been used to acknowledge the need for bridge rehab and replacement to allow higher speed passenger trains to operate safely.

Sub-Segment 22 Capital Cost	Amount (1,000's)
Trackwork	$99,455
Structures	$7,622
Systems	$56,797
Crossings	$58,824
Allocations for Special Elements	$0
Sub-Total Construction Elements	$222,698
Contingency	$66,810
Professional Services and Environmental	$69,482
Total Segment Cost	$358,990
Segment Cost Per Mile	$4,421

Constraints - The principal constraint in this sub-segment is the high single track bridge over the St. Croix River east of Arcola, MN. Other significant constraints include a large number of smaller bridges (rivers and roadways) and long segments of single main track CTC.

Track Sub-Segment 23 (Segment DD)

Sub-Segment Description - Track Sub-Segment 23 begins on the UPRR at Eau Claire (MP 87.5) and continues 86.9 miles to the BNSF's CP Westminster Street in St. Paul, MN at MP 0.6.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed for freight trains within this sub-segment is 50 MPH. ABS and a Track Warrant Control System are in effect.

Yards & Junctions – There are no major yards in Track Sub-Segment 23. The UPRR (former C&NW) East St. Paul Yard has been abandoned and much of the property has been vacated. Junctions are located at Yukon with the UPRR-Track Sub-Segment 19 (Chippewa Falls to Eau Claire), at Hudson with the UPRR (former CMStP&P) branch to the power generating plant at Stillwater, and in St. Paul at CP Westminster with the BNSF-Track Sub-Segment 32 (Westminster to Seventh Street).

Major Infrastructure Elements – The Chippewa River Bridge is a high, multiple-span, double-track deck truss bridge located west of Eau Claire between Yukon Junction and Truax. The St. Croix River Bridge west of Hudson, WI is a low, single-track, multiple-span swing bridge located at Lakeland Junction on the west end of the causeway across the St. Croix River. There are several other smaller river bridges in this sub-segment. There are a series of highway under-grade bridges, primarily near Eau Claire and East St. Paul. There are many locations along U.S. Highway 12 west of Eau Claire, and in the St. Paul area, where roadways at grade crossings intersect with parallel highways.

Additional Comments – UPRR handles unit coal trains with distributed power from Wyoming's Powder River Basin through South St. Paul then through CP Westminster to UPRR and on to the St. Croix River swing bridge at Hudson, WI. Once the rear of the train clears the junction switch at Lakeland Junction, the train then makes a reverse movement from the main track at Hudson north up the former CMSTP&P branch to the electrical generating station at Stillwater (north of Bayport), MN. The movements are made at a speed of approximately 5 MPH and occupy the UPRR's single main track in the vicinity of the river bridge for a period of about one hour. While these loaded and empty coal train movements are occurring, no other trains may move through this bottleneck location.

Photo 69 – Eau Claire, WI

The view is to the south of the new UPRR double track bridge over Madison Street near the west end of Eau Claire. The railroad, however, is currently single track at this location.

Photo 70 – Eau Claire, WI

The view is east at the UPRR's Forrest Street highway under-grade crossing west of Yukon Junction and east of the Chippewa River Bridge in Eau Claire. The UPRR is double track at this location.

Photo 71 – Eau Claire, WI

The view is south toward the UPRR's double-track, multiple-span high bridge over the Chippewa River between Yukon Junction and Truax west of Eau Claire.

Photo 72 – Eau Claire, WI

The view is east looking down at the UPRR's double-track, multiple-span Chippewa River Bridge west of Eau Claire. Although most of Track Sub-Segment 23 is single track, double track capacity has been preserved over this major river bridge.

Photo 73 – Eau Claire, WI

The view is to the west along the UPRR from the Minnesota 970 / U.S. 12 grade crossing west toward Elk Mound. The UPRR single main track is jointed rail on wood ties. An ABS System and Track Warrant Control are used in Track Sub-Segment 23.

Photo 74 – East St. Paul, MN

The view is to the west along the UPRR Track Sub-Segment 23 at the Payne Avenue crossovers adjacent to Phalen Boulevard in East St. Paul. The westward UPRR freight train from Chicago is stopped through the west crossover between the two UPRR main tracks. The front of the train is stopped for the signal and main track derail at the bottom of Westminster Hill. The BNSF's CP Westminster Street route to Seventh Street and St. Paul Union Depot (SPUD) is accessible only from the left main track. UPRR trains must pull down to the signal and await their turn to move through the series of BNSF interlockings in St. Paul. When doing so, they block both main tracks, preventing any other movements to/from St. Paul or Minneapolis. UPRR freight trains to/from Minneapolis can only use the right main track to reach the BNSF Midway Subdivision at West Westminster.

Photo 75 – St. Paul, MN

The view is north along BNSF toward CP Westminster Street. UPRR MP 0.6 on Track Sub-Segment 23 (Eau Claire to Westminster Street) is located at the connection switch to the BNSF, shown to the right of center in the photo.

Infrastructure Needs - An additional main track offset 30' from the existing track will be required to allow passenger operations in this segment; crossing warning devices will be added to accommodate the new track. A CTC signal system and PTC overlay will be added to the segment forming a new 2 main track system. The existing track will be rebuilt in place from the subballast up for the entire length of the sub-segment. This approach will allow both passenger and freight operations to share the use of a corridor with 2 main tracks, allow appropriate passenger speeds for the service proposed and avoid the conflicts present when capacity is constrained.

An allocation has been added to the cost estimate to construct infrastructure to be designed to mitigate conflicts from coal train traffic moving to and from the power plant at Stillwater, MN.

Most of the railroad right of way in this sub-segment does not have sufficient width to support construction of an additional track without the need for right of way acquisition. Since a track is being proposed offset 30' from the existing track, the track embankment will need to be widened. Existing culverts along the length of the sub-segment must be extended to provide adequate drainage to both the new and the existing tracks and preserve existing drainage patterns.

New bridges will be required over numerous minor river and stream crossings; the existing single track structures will require rehabilitation to support the addition of passenger train service and its associated speeds in this sub-segment. The St Croix River swing bridge will remain single track. At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; a unit of cost within the structures category has been used to acknowledge the need for bridge rehab

to allow higher speed passenger trains to operate safely.

Sub-Segment 23 Capital Cost	Amount (1,000's)
Trackwork	$448,024
Structures	$19,426
Systems	$54,804
Crossings	$43,585
Allocations for Special Elements	$10,000
Sub-Total Construction Elements	$575,838
Contingency	$172,751
Professional Services and Environmental	$179,661
Total Segment Cost	$928,251
Segment Cost Per Mile	$10,682

Constraints - The major constraints in this sub-segment are: (1) the double track Chippewa River Bridge west of Eau Claire, (2) the single track movable span swing bridge and causeway for the St. Croix River at Hudson, WI, (3) coal train activity moving to and from Bayport (Stillwater), MN adjacent to the St. Croix River Bridge at Hudson, (4) steep grades on both sides of the bridge at Hudson and again between East St. Paul and CP Westminster Street, (5) the lack of CTC for the entire sub-segment, (6) the lack of operational flexibility of the track configuration at the west end of UPRR at CP Westminster where trains to/from St. Paul can block trains to/from Minneapolis and vice versa and (7) the current condition of the ties and rail on the main track for the length of the sub-segment.

Track Sub-Segment 24 (Segments S & V)

Sub-Segment Description - Track Sub-Segment 24 begins on the CP at Winona (MP 308.2) and continues to Hastings (St. Croix Jct.) at MP 392.1, a distance of 83.9 miles.

Existing Passenger Service – Amtrak currently operates a single round trip passenger service (Empire Builder) along this track sub-segment. Station stops are scheduled at Winona and Red Wing.

Maximum Track Speed – The maximum speed for passenger trains is 79 MPH and 60 for freight. CTC is in effect.

Yards & Junctions – Yards are located at Winona, Minnesota City, Red Wing, Wabasha and Hastings. Junctions are located at Winona (CK) with CPRR, at Minnesota City with CPRR and Track Sub-Segment 25 (Winona to Owatonna), at St. Croix with BNSF.

Major Infrastructure Elements – The Mississippi River Bridge at Hastings is the major infrastructure element in Track Sub-Segment 24. It is a single-track, multiple-span lift bridge located just north (railroad west) of Hastings Yard. More than 30 other river bridges carrying the CP over various Mississippi River tributaries are located between Winona and St. Croix (railroad west of Hastings). The CP route follows the west bank of the Mississippi River for much of the sub-segment where the right-of-way runs through flood plains, marshlands and causeways. There are also many small road public and private grade crossings that connect small riverfront residential and recreational properties to the streets and highways that parallel the railroad. Many of these grade crossings serve only one property, with no alternate access. Correcting poor crossing quadrant visibility and sub-standard access gradients to the crossings, along with signalization and pre-emption, will be a major infrastructure consideration.

Photo 76 – Red Wing, MN

The view is to the north along the CP from the Highway 63 Bridge over the CP and the Mississippi River on the south end of Red Wing, MN. The track in the center is the CP main track. The track to the left of the main track is the Red Wing Siding. The other tracks visible in the photo are used by the major grain elevator and processing facility which also includes river barge loading facilities shown in the right of the photo. The CP main track is CWR and CTC is in effect. The siding and industry track switches are hand throw switches. The Red Wing Amtrak station, located along the siding (which was the former CMSTP&P eastward main track) is located just above the right hand curve at the center of the photo.

Photo 77 – Red Wing, MN

The view is railroad west in front of the Red Wing Amtrak station. The newly-ballasted track in the foreground is the Red Wing Siding. An eastbound loaded coal train is passing on the CP's main track to the right. Amtrak's Empire Builder normally stops on the main track to receive and discharge passengers, although both the main track and the siding have platforms. Note the crosswalk between the two platforms immediately in front of the passenger station.

Photo 78 – Red Wing, MN

The view is to the west from the Red Wing Amtrak passenger station. The CP's Red Wing yard engine is switching on one of the Red Wing yard tracks. Note the freight cars occupying the Red Wing Siding (foreground) north of the grade crossing. Additional cars are being held on the yard track to the right of the main track. The CP's Red Wing yard engine crews frequently use the main track and the Red Wing Siding to switch the large volume of industry cars that move to and from Red Wing industries. In this photo, industry cars are being stored on the siding.

Photo 79 – Hastings, MN

The view is to the north on CP at Hastings, MN of the CP's single-track movable span bridge over the Mississippi River. The CP has two main tracks through the Hastings yard area. Hastings Yard is used to hold cars for industries along the line and is not a major freight classification yard for CP. Freight classification occurs further north at the former CMStP&P Pigs Eye yard now known as CP's St. Paul Yard. Visible on the bridge is an ultrasonic rail defect detector truck (yellow) followed by a hi-rail track inspection pickup truck (white), both headed north (railroad west) performing inspection activities.

Photo 80 – Hastings, MN

The view is to the northwest facing the CP's (former CMStP&P) Mississippi River Bridge. The bridge is a vertical lift-span configuration with one small approach span on the railroad east (south) end and three approach spans on the railroad west end. The ultrasonic rail defect detection vehicle is seen operating over the movable span of the bridge. Beyond the bridge to the right is St. Croix Junction where the double track BNSF-Track Sub-Segment 24 (La Crosse to St. Croix Jct.) joins the CP single track route. The two routes are operated as a combined joint track railroad, dispatched by BNSF, between St. Croix Junction and Hoffman Avenue.

Infrastructure Needs - The existing line consists of a single main track supplemented by controlled sidings at nominal 20 mile intervals to allow trains to meet and pass as well as support service to customers. Formerly, the line was a double track main line. In order to implement HSR in this section, new track will be constructed between the existing sidings; the existing main track & sidings will undergo "heavy rehabilitation" including replacement of up to 2/3 of the existing ties and associated track surfacing with siding rail replacement.

At Hastings, Red Wing, Lake City & Wabasha, yard & industrial operations including arrivals, departures and switching will cause congestion especially when through passenger operations are added to the sub-segment. Allocations have been added to the cost estimate to provide funding needed to construct infrastructure improvements not yet designed that will assure reliable passenger and freight service in these areas.

The railroad right of way in this sub-segment has sufficient width to support the construction previously outlined without the need for right of way acquisition. CP has indicated that it will likely allow HSR operations at up to 110 mph using the existing track center spacing of 14'.

The existing undergrade bridges will require varying degrees of rehabilitation to support the addition of passenger train service and its associated speeds in this sub-segment.

Existing bridges will be rehabilitated and new bridges constructed as needed to support the restoration of the double main track system. Landbridges will be required on the west approach to the Hastings Bridge as well as west of Red Wing, across a wetland / delta area. At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; units of cost within the structures category have been used to acknowledge the need for bridge rehab and replacement to allow higher speed passenger trains to operate safely.

Sub-Segment 24 Capital Cost	Amount (1,000's)
Trackwork	$188,038
Structures	$23,551
Systems	$51,873
Crossings	$48,952
Allocations for Special Elements	$80,000
Sub-Total Construction Elements	$392,414
Contingency	$177,724
Professional Services and Environmental	$122,433
Total Segment Cost	$632,571
Segment Cost Per Mile	$7,540

Constraints - The principal constraints in this sub-segment are: (1) the Mississippi River and the risk of flooding, (2) the Mississippi River Bridge at Hastings including the movable span and railroad speed restrictions across the bridge, (3) lower operating speeds along certain portions of the line immediately adjacent to the Mississippi River, (4) long segments of single main track CTC, (5) industrial rail traffic occupying sidings (former main tracks) at Winona and Red Wing with little nearby room for additional trackage, (6) flood plains and many smaller river bridges over Mississippi River tributaries between Red Wing and Hastings and (7) freight traffic conflicts at junctions (Winona and St. Croix Junction).

Track Sub-Segment 25 (Segments T, W & X)

Sub-Segment Description - Track Sub-Segment 25 uses the CP (former Dakota, Minnesota & Eastern Railroad) for 88.3 miles between Winona (Minnesota City) at MP 0.0 and Owatonna, MN at MP 88.3.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed for freight trains within this sub-segment is 30 MPH. No block signal system is in effect. A Track Warrant Control System is used to control train movements.

Yards & Junctions – Minor freight yards are located at Minnesota City, Rochester and Owatonna. Junctions are located at Minnesota City with CP-Track Sub-Segment 24 (Winona to Hastings), at Plainview Jct., Rochester, and Zumbrota Jct. with CP branch lines, and at Owatonna with the CP (former Iowa, Chicago & Eastern Railroad) and with UPRR's Twin Cities-Kansas City route-Track Sub-Segment 26 (Owatonna to Northfield).

Major Infrastructure Elements – "Stockton Hill" is the name given to the easternmost section of the railroad between Minnesota City, Stockton and Lewiston. The railroad follows a small river valley from Lewiston down to Minnesota City with a series of curves, cuts, fills and small river bridges. In the westward direction, "Stockton Hill" is the ruling (steepest) grade between Minnesota City and Rapid City, SD. Heavy rainfall in Eastern Minnesota has periodically caused floods which have washed out sections of embankments and destroyed or damaged bridges between Lewiston and Minnesota City. The most recent was in 2009 when embankments were cut, bridges damaged and several homes were displaced and deposited on the railroad track by the flood. Because of the densely wooden terrain, frequent tree trimming and vegetation control is required. At Rochester, there is a major bridge over the Zumbro River. There are several highway under-grade bridges on the line. A new connecting track would be required at Owatonna that would likely need to utilize a portion of CP (former IC&E) through downtown Owatonna and approximately two miles further north to connect with UPRR-Track Sub-Segment 26 (Owatonna to Northfield). A small river bridge would be required at the north end of the connection where the CP and UPRR routes closely parallel each other.

Photo 81 – Owatonna, MN

The view is to the northwest on the CP (former IC&E Railroad) approximately one half mile northwest onto the route of the connecting track that would be required for this location. The track, which may not currently be in service and may not meet FRA standards for Class I track at all locations, passes closely between buildings, across several grade crossings and through a wooded area parallel to the Straight River to reach a point that closely parallels the UPRR-Track Sub-Segment 26 (Owatonna to Northfield).

Photo 82 – Owatonna, MN

The view is to the south from the County Highway 34 Bridge over the Straight River north of Owatonna showing the location where a new connecting track between the CP (former IC&E) on the left out of sight and the UPRR out of sight on the right would likely be needed to connect Track Sub-Segments 25 and 26.

Photo 83 –Owatonna, MN

The view is to the south along the UPRR's South St. Paul-Kansas City route from the County Highway 34 grade crossing north of Owatonna. A new track from the CP to the UPRR (Track Sub-Segment 26) would cross the Straight River and pass through the trees on the left to connect with the UPRR in the foreground of the photo.

Infrastructure Needs - The former DM&E track will be completely rebuilt from the subballast up with an estimated 1/5 of the line requiring new embankment. Four three mile long freight sidings and two ten mile long passenger sidings will be required. The construction of these sidings will require the acquisition of additional property. CTC signaling will be installed on the sub-segment and PTC overlay will be added.

An allocation has been added to the cost estimate to allow rationalization of the track through Rochester, especially at the east end of the city near the Zumbro River Bridge and adjacent rail served power plant.

The existing undergrade bridges will require varying degrees of rehabilitation to support the addition of passenger train service and its associated speeds in this sub-segment. Open deck bridges will be converted to ballast deck and timber structures will be completely replaced. At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; units of cost within the structures category have been used to acknowledge the need for bridge rehab and replacement to allow higher speed passenger trains to operate safely.

Sub-Segment 25 Capital Cost	Amount (1,000's)
Trackwork	$179,859
Structures	$12,432
Systems	$57,056
Crossings	$45,872
Allocations for Special Elements	$10,000
Sub-Total Construction Elements	$305,218
Contingency	$91,565
Professional Services and Environmental	$95,228
Total Segment Cost	$492,012
Segment Cost Per Mile	$5,572

Constraints - The principal constraints in this sub-segment are: (1) The junction with the CP at Winona, (2) Stockton Hill as described in the text above, (3) blowing and drifting snow accumulating in cuts particularly between Stockton and Owatonna that can disrupt winter operations, (4) narrow right-of-way in several sectors particularly in towns and near grain elevators due to previous sales and leases, (5) the configuration of the track through the business district at Owatonna to a connection with the UPRR, (7) undulating terrain with gentle grades primarily westbound and sharper grades primarily eastbound and (8) restrictions in the Rochester area including grades on both sides of the town, the Zumbro River bridge and levee walls, several grade crossings and heavy vehicular traffic in the central business district which includes the Mayo Clinic.

Track Sub-Segment 26 (Segment Z)

Sub-Segment Description - Track Sub-Segment 26 runs along the UPRR for 27.8 miles between Owatonna at MP 285.4 and Northfield at MP 313.2.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed for freight trains within this sub-segment is 50 MPH. CTC is in effect.

Yards & Junctions – Small yards are located at Owatonna and Faribault. Junctions are located at Owatonna with UPRR, at Comus with CP and at Northfield with Progressive Rail which operates portions of the former Minneapolis, Northfield & Southern (MN&S) to Eureka Center and the former CMStP&P-C&NW branch line to Cannon Falls.

Major Infrastructure Elements – Between Owatonna and Northfield there are many smaller river bridges over rivers and creeks that converge with the Cannon River (a Mississippi River tributary).

Photo 84 – Faribault, MN

The view is to the north of the 1st Street NE (Mill Street) Bridge over the UPRR (far right) showing the open spans where tracks of the former CMSTP&P, Rock Island (CRIP) and Chicago Great Western (CGW) previously existed.

Photo 85 – Faribault, MN

The view is to the north along the UPRR at the restored CRIP depot which is now a restaurant.

Photo 86 – Northfield, MN

The view is to the north along the UPRR at the St. Olaf Street grade crossing in Northfield showing the junction switch to the former MN&S Railroad currently operated by Progress Rail. The former CMStP&P/C&NW branch line to Cannon Falls, also currently operated by Progress Rail is just visible at the center right of the photo. Grain and grain products are the principal commodities handled on the Progress Rail-served branch lines.

Photo 87 – Northfield, MN

The view is to the south along the UPRR at the Fremouw Avenue grade crossing in Northfield. A wooden bridge over the railroad is visible in the background. The UPRR is equipped with CWR laid on wood ties. CTC is in effect. This track is UPRR's principal route between the Twin Cities, Des Moines and Kansas City. The maximum authorized speed for freight trains on this sub-segment is 50 MPH.

Infrastructure Needs - An additional main track offset 30' from the existing track will be required to allow passenger operations in this segment; crossing warning devices will be added to accommodate the new track. A CTC signal system will be provided for the new track and PTC overlay will be added to the segment forming a new 2 main track system. The existing track will be rebuilt in place for the entire length of the sub-segment. This approach will allow both passenger and freight operations to share the use of a corridor with 2 main tracks, allow appropriate passenger speeds for the service proposed and avoid the conflicts present when capacity is constrained.

A new connection from the CP (DM&E) to this UPRR sub-segment will be required at Owatonna; the connection requires both a new track and a bridge. Most of the railroad right of way in this sub-segment does not have sufficient width to support construction of an additional track without the need for right of way acquisition. Since a track is being proposed offset 30' from the existing track, the track embankment will need to be widened. Existing culverts along the length of the sub-segment must be extended to provide adequate drainage to both the new and the existing tracks and preserve existing drainage patterns.

The existing single track structures will require rehabilitation to support the addition of

passenger train service and its associated speeds in this sub-segment. The new track construction will require new bridges since the existing bridges are for single track. At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; a unit of cost within the structures category has been used to acknowledge the need for bridge rehab to allow higher speed passenger trains to operate safely.

Sub-Segment 26 Capital Cost	Amount (1,000's)
Trackwork	$165,987
Structures	$10,424
Systems	$18,362
Crossings	$8,619
Allocations for Special Elements	$10,000
Sub-Total Construction Elements	$213,392
Contingency	$64,018
Professional Services and Environmental	$66,578
Total Segment Cost	$343,988
Segment Cost Per Mile	$12,374

Constraints - The principal constraints in this sub-segment are: (1) the track configuration at Owatonna where a connecting track between sub-segments would be required and (2) the single main track CTC on UPRR's Twin Cities-Kansas City mainline.

Track Sub-Segment 27 (Segment BB)

Sub-Segment Description - Track Sub-Segment 27 runs along the UPRR for 10.0 miles between Inver Grove Heights and Robert Street.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed for freight trains within this sub-segment is 30 MPH. ABS and Yard Limit rules are in effect.

Yards & Junctions – A UPRR freight yard (the former CGW and CNW South Park Yard) is located in the rail-served industrial district at South St. Paul. A large industrial port area (rail to barge terminal) with many industrial tracks is located at Roseport south of the South Park Yard. Junctions are located at Inver Grove Heights with the line to Roseport, at Park Jct. with the UPRR's main track to Hoffman Avenue Yard and at Robert Street where UPRR crosses the CP's Merriam Park Subdivision and enters the St. Paul Union Depot Company track.

Major Infrastructure Elements – The UPRR South Park freight yard at South St. Paul, the Robert Street Drawbridge over the Mississippi River at St. Paul and the crossing of the CP's Merriam Park Subdivision are the principal infrastructure elements in Track Sub-Segment 27.

Photo 88 – South St. Paul, MN

The view is to the northwest along the UPRR's South Park Yard in South St. Paul. The Mississippi River runs approximately 500 feet to the east (to the right of the photo) in this area. The top of the St. Paul skyline is visible in the far background. The main track (not visible on the far left of the photo) proceeds north and follows a curving route through the industrial area to reach the UPRR's Robert Street drawbridge and the CP's Merriam Park Subdivision. The west connection to SPUD will be across the CP's Merriam Park Subdivision just north of the Robert Street Bridge. The UPRR's Park Jct. is located immediately below the white pedestrian overpass seen in the background. At the Park Jct. switch (which is accessed only via the yard lead track), the UPRR's main track curves to the east (right) and uses the UPRR's Hoffman Avenue Bridge over the Mississippi River to reach UPRR's Hoffman Avenue Yard and the CP and BNSF at Hoffman Avenue. The UPRR Hoffman Avenue Bridge is a swing-span style movable bridge in the navigation channel of the Mississippi River.

Photo 89 – South St. Paul, MN

The view is southwest along the UPRR industrial lead track from the Barge Channel Road grade crossing at the far north end of the South Park Yard in South St. Paul. The locomotive of a UPRR loaded unit coal train from Wyoming's Powder River Basin is visible standing on the main track at the center of the photo. The train is destined for the electrical power generating plant at Stillwater (Bayport), MN near Hudson on the UPRR, Track Sub-Segment 23 (Eau Claire to Westminster Street).

Photo 90 – St. Paul, MN

The view is to the northeast of the UPRR Robert Street Drawbridge over the Mississippi River in downtown St. Paul. On the far end of the bridge, Track Sub-Segment 27 crosses the CP Merriam Park Subdivision-Track Sub-Segment 37 (Robert Street to Chestnut Street) with crossings diamonds and enters the St. Paul Union Depot Company track. The west entrance to SPUD's new station tracks will be at this location. Note that trains arriving at SPUD from Owatonna and Northfield via the Robert Street Drawbridge would be facing east when they stop at SPUD. Other trains from the railroad east (south) would be facing west when they stop at SPUD.

Infrastructure Needs – Because this sub-segment is primarily yard and industrial service track, a new dedicated passenger track is required. By providing a dedicated track for passenger service, potential congestion caused by yard switching and industrial service will be completely avoided. An allocation has been added to address construction to prevent congestion at the South St. Paul Yard area. Since the existing uses occupy most of the right of way, property acquisition will be required through this sub-segment. CTC and PTC overlay will be provided for the new track. The new track will connect to the existing track as it approaches Robert Street and will use the existing single track moveable bridge to cross the Mississippi River. The Robert Street Bridge will be rehabilitated to provide greater reliability and a potential speed increase.

Sub-Segment 27 Capital Cost	Amount (1,000's)
Trackwork	$25,290
Structures	$582
Systems	$6,707
Crossings	$1,490
Allocations for Special Elements	$10,000
Sub-Total Construction Elements	$44,070
Contingency	$13,221
Professional Services and Environmental	$13,750
Total Segment Cost	$71,040
Segment Cost Per Mile	$7,104

Constraints - The principal constraints in this sub-segment are: (1) long segments of single main track, (2) the South St. Paul Park Yard of UPRR and slow-moving freight traffic conflicts including coal trains, (3) the number of spur tracks to serve local industries particularly on the east side of the main track, (4) freight traffic moving slowly via the connection to the UPRR's Mississippi River Bridge to Hoffman Avenue, (5) the narrow right of way and curvature through the industrial district between South St. Paul and the Robert Street Bridge, (6) the Robert Street vertical lift span bridge over the Mississippi River with levee walls at downtown St. Paul, (7) susceptibility to flooding and closure of the levee wall gates that would prevent train traffic during periods of high water on the Mississippi River and (8) the diamond crossings of the tracks of the CP's Merriam Park Subdivision at Robert Street and the west end of SPUD.

Track Sub-Segment 28 (Segment AA)

Sub-Segment Description - Track Sub-Segment 28 uses the BNSF/CP joint tracks for 16.9 miles between Hastings, WI (St. Croix Jct.) at MP 392.1 and Hoffman Avenue in St. Paul, MN at MP 409.0. BNSF dispatches the joint tracks as a "two main track CTC railroad" between St. Croix Junction and Hoffman Avenue.

Existing Passenger Service – Amtrak currently operates a single round trip passenger service (Empire Builder) along this track sub-segment. There are no Amtrak station stops in Sub-Segment 28.

Maximum Track Speed – The maximum speed within this track sub-segment is 70 MPH for passenger trains and 50 MPH for freight trains. CTC is in effect.

Yards & Junctions - The CP's St. Paul Yard (formerly known as the CMStP&P's Pigs Eye Yard) is located at the north end of this sub-segment railroad east of Hoffman Avenue. St. Paul Yard is a large facility with many trains arriving and departing each day. It includes a freight classification yard, locomotive shops, a car repair facility and a maintenance-of-way department base. A major junction is located at Hoffman Avenue with the BNSF, CP and UPRR. UPRR's Hoffman Avenue Yard is also adjacent to the CP's St. Paul Yard facilities at this location.

Major Infrastructure Elements – The St. Paul Yard with its supporting mechanical and maintenance of way facilities is the principal infrastructure element in this track sub-segment.

Photo 91 – St. Paul, MN

The view is to the southeast looking toward the Hoffman Avenue east signal bridge (called East Hoffman) and CP's St. Paul Yard (formerly the CMStP&P's Pigs Eye Yard). A westbound CP freight train is pulling up to the signals at East Hoffman. BNSF tracks are at the far left of the photo to the left of the signal bridge. BNSF's Dayton's Bluff Yard and auto facility is visible in the background through the uprights of the signal bridge. CP's tracks are visible under the signal bridge. The UPRR's single track to the UPRR Hoffman Avenue Yard passes immediately to the right of the right support for the signal bridge. The overhead highway bridge in the center of the photo carries County Highway 36-Warner Road over the tracks of BNSF, CP and UPRR. The CP's main tracks at this location are laid with CWR and operations are controlled thru the use of a CTC system. Amtrak's Empire Builder uses this route daily in each direction. The Mississippi River levee is out of sight approximately 300 feet to the right of the photo.

Infrastructure Needs - An additional main track offset 30' from the existing track will be required to allow passenger operations in this segment; crossing warning devices will be added to accommodate the new track. A CTC signal system will be provided for the new track and PTC overlay will be added to the segment forming a new 3 main track system. Presently, CP and BNSF each own 1 track with joint use of both tracks by both companies; it is assumed that the new track would be operated coincidentally with the two existing tracks to provide the greatest degree of operational flexibility and reliability. Both tracks will be rehabilitated by renewing up to 1/3 of the ties and surfacing the entire length of the sub-segment. This approach will allow both passenger and freight operations to share the use of a corridor with 2 main tracks, allow appropriate passenger speeds for the service proposed and avoid the conflicts present when capacity is constrained.

Since a track is being proposed offset 30' from the existing track, the track embankment

will need to be widened and property acquisition will be required. Existing culverts along the length of the sub-segment must be extended to provide adequate drainage to both the new and the existing tracks and preserve existing drainage patterns.

Allocations have been added to the cost estimate to mitigate the impacts of yard congestion at Cottage Grove and St. Paul.

The existing structures will require rehabilitation to support the addition of passenger train service and its associated speeds in this sub-segment. The new track construction will require new bridges. At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; a unit of cost within the structures category has been used to acknowledge the need for bridge rehab to allow higher speed passenger trains to operate safely.

Sub-Segment 28 Capital Cost	Amount (1,000's)
Trackwork	$73,006
Structures	$13,942
Systems	$8,863
Crossings	$2,334
Allocations for Special Elements	$40,700
Sub-Total Construction Elements	$138,845
Contingency	$41,653
Professional Services and Environmental	$43,320
Total Segment Cost	$223,818
Segment Cost Per Mile	$13,244

Constraints - The principal constraints in this sub-segment are: (1) the Class 1 railroad freight yards near Hoffman Avenue (CP's St. Paul Yard, BNSF's Dayton's Bluff Yard and UPRR's Hoffman Avenue Yard), (2) conflicting freight and passenger train movements at St. Croix Junction and Hoffman Avenue that can delay trains within this sub-segment while other movements clear, (3) the Mississippi River and the risk of flooding and (4) the heavy volume of freight train movements on conflicting routes and (5) the complexity of the track and signal networks in the triangle created by Division Street, Seventh Street and St. Paul Junction.

Track Sub-Segment 29 (Segment AA)

Sub-Segment Description - Track Sub-Segment 29 continues for 0.6 miles along the BNSF between Hoffman Ave at MP 429.1 and Division Street in St. Paul at MP 429.7.

Existing Passenger Service - Amtrak currently operates a single round trip passenger service (Empire Builder) along this track sub-segment. There are no Amtrak station stops in Sub-Segment 29.

Maximum Track Speed – The maximum speed within this track sub-segment is 30 MPH for passenger trains and 25 MPH for freight trains. CTC is in effect.

Yards & Junctions – There are no major yards in this sub-segment. Major junctions are located on both ends of the sub-segment. Hoffman Avenue is located on the railroad east (or south east) end of the track sub-segment. Division Street is located on railroad west end of the track sub-segment. Major yards on CP and BNSF are located immediately to the railroad east (south) of Hoffman Avenue. Division Street is the southeast corner of a three-leg "wye" track configuration of major routes and adjacent junctions in St. Paul located east of SPUD. Please refer to Photo 92 for an aerial photograph of the area with major junctions identified.

Major Infrastructure Elements – In addition to the major junctions at each end of this sub-segment, the route lies adjacent to Warner Road and the Mississippi River east bank levee. The roadway and levee are not the maintenance responsibility of the railroad. However, high water levels in the Mississippi River can affect the levee, the road and the railroad in this track sub-segment.

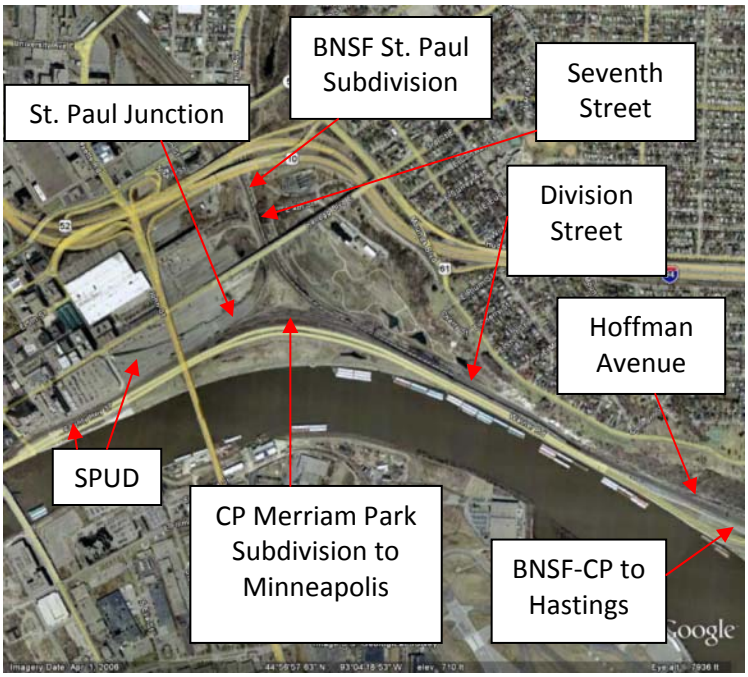

Photo 92 – St. Paul, MN

This aerial view of St. Paul, MN shows SPUD at the left center of the photo and several of the key railroad junctions east of SPUD. Several others (CP Westminster Street, Mississippi Street, Soo Line Jct. and Soo Jct.) are all located within the first 2.3 miles railroad west (north) of CP Seventh Street which is shown near the center of the photo. Robert Street on the CP Merriam Park Subdivision is located immediately to the left of the photo just below center and west of SPUD. This area is one of the principal bottlenecks in the Twin Cities.

Infrastructure Needs -This short sub-segment will be modified to rationalize the movement of passenger trains from both the BNSF and CP to the track connection to St Paul Union Depot which is presently just west of Division Street. The work required here includes the addition of a new track and several turnouts to facilitate movement to BNSF #2 track which leads to the SPUD connection switch. CTC will be provided for the new track and the new turnouts will be incorporated into the existing control points at Hoffman Avenue and Division Street.

Sub-Segment 29 Capital Cost	Amount (1,000's)
Trackwork	$1,233
Structures	$0
Systems	$1,135
Crossings	$0
Allocations for Special Elements	$0
Sub-Total Construction Elements	$2,368
Contingency	$710
Professional Services and Environmental	$739
Total Segment Cost	$3,817
Segment Cost Per Mile	$6,362

Constraints - The principal constraints in and near this sub-segment are: (1) the freight yards near Hoffman Avenue (CP's St. Paul Yard, BNSF's Dayton's Bluff Yard and UPRR's Hoffman Avenue Yard), (2) the Mississippi River and the risk of flooding, (3) the heavy volume of freight train movements on conflicting routes and (4) the complexity of the track and signal networks in the triangle created by Division Street, Seventh Street and St. Paul Junction.

Track Sub-Segment 30 (Segment CC)

Sub-Segment Description - Track Sub-Segment 30 follows the CP from Withrow, MN at MP 20.7 to Cardigan Jct. at MP 8.4 and then from Cardigan Jct. at MP 11.8 railroad west (south) on CP's St. Paul Subdivision to Soo Jct. at MP 17.1, a total distance of 17.6 miles.

Existing Passenger Service - None operated.

Maximum Track Speed - The maximum speed for freight trains within this sub-segment is 40 MPH between Withrow and Cardigan Jct. and 25 MPH between Cardigan Jct. and Soo Jct. Operations between Withrow and Cardigan Jct. are controlled by CTC with a Track Warrant Control System in effect between Cardigan Jct. and Soo Jct.

Yards & Junctions – There are no major freight yards in this track sub-segment. A small yard is located at Cardigan Jct. Junctions are located at both ends of the track sub-segment, at Cardigan Jct. and at Parkway. Note that Soo Jct. on CP's St. Paul Subdivision and Soo Line Jct. on the BNSF's St. Paul Subdivision are the two railroads' different names for the same location. Please refer to Photo 96 below.

Major Infrastructure Elements – Several smaller river bridges and two sections of causeway in Pine Tree Lake are located near Dellwood. A rail-rail crossing at grade with the Minnesota Commercial Railroad is located at Bald Eagle. Much of the railroad is on fill through the lowlands of White Bear Lake. A small river bridge and a steel bridge over Rice Street are located east of Cardigan Jct. A large multiple span steel bridge carries the railroad over I-694 just south (railroad west) of the wye at Cardigan Jct. Steel bridges over Rice Street and the Minnesota Commercial Railroad are located just beyond the I-694 bridge near MP 13. Between Cardigan Jct. and Soo Jct., the railroad descends a long grade with multiple reverse curves, rail-highway grade crossings in curves, and a series of highway overpasses and underpasses, much of it in wooden terrain. If the former Soo Line route to Mississippi Street and SPUD were to be reconstructed, the overhead rail bridge shown in Photo 96 would carry the route over the BNSF St. Paul Subdivision. It is currently in use to serve a local industry.

Photo 93 – Little Canada, MN

The view is to the east from the Rice Street highway bridge toward the CP rail bridge at MP 13.0 over the Minnesota Commercial Railway's single main track between St. Anthony and Bald Eagle. In this photo, on the CP's St. Paul Subdivision, the south switch of the Cardigan Jct. wye is approximately 1.0 miles to the left and Soo Jct. is approximately 4.1 miles to the right.

Photo 94 – Roseville, MN

The view from the Larpenter Avenue grade crossing is to the southeast (toward Soo Jct.) at MP 16.29 on the CP St. Paul Subdivision. The overhead bridge carries Wheelock Parkway over CP. The track is CWR on wood ties. The track descends from MP 13.0 (CP's rail bridge over the Minnesota Commercial Railway) to MP 17.1 at Soo Jct.

Photo 95 – Roseville, MN

The view is to the northwest from the Wheelock Parkway overpass toward the Larpenter Avenue grade crossing. The crossing is in a curve and is equipped with a warning system including warning signs, bell, flashers, flashers on cantilevers and gates. Note the markers for the buried fiber optic cable that runs along the right-of-way of the CP's St. Paul Subdivision. Also note the reduced superelevation in the curve at the crossing to facilitate highway geometry.

Infrastructure Needs – There is no new main track required for this sub-segment, however, the existing track will be rehabilitated by track surfacing and 2/3 tie renewal and a 3 mile long freight siding will be constructed to facilitate meeting and passing trains. CTC will be provided for the siding and PTC will be overlaid across the entire sub-segment. Existing bridges will be rehabilitated to support the proposed HSR passenger service; an existing open deck bridge will be replaced by a ballast deck bridge constructed using the rehabilitated existing substructure.

Sub-Segment 30 Capital Cost	Amount (1,000's)
Trackwork	$11,636
Structures	$6,235
Systems	$5,559
Crossings	$7,059
Allocations for Special Elements	$1,000
Sub-Total Construction Elements	$31,488
Contingency	$9,446
Professional Services and Environmental	$9,824
Total Segment Cost	$50,759
Segment Cost Per Mile	$2,884

Constraints – The principal constraints in this sub-segment are: (1) the numerous bridges for small rivers and grade separations (highway and 2 for rail), (2) long segments of single main track, (3) no signal system between Cardigan Jct. and Soo Jct., (4) three junctions, and (5) the grade and curvature of the single track between Cardigan Jct. and Soo Jct.

Track Sub-Segment 31 (Segment CC)

Sub-Segment Description - Track Sub-Segment 31 uses the BNSF St. Paul Subdivision from Soo Line Junction at MP 2.3 to CP Seventh Street in St. Paul at MP 0.0, a distance of 2.3 miles.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed for freight trains within this sub-segment is 30 MPH. CTC is in effect.

Yards & Junctions – There are no yards in this track sub-segment. Junctions are located at both ends of the track sub-segment and at Mississippi Street. The BNSF St. Paul Subdivision passes under but does not currently connect with the BNSF Midway Subdivision at CP Westminster Street. Note that Soo Jct. on CP's St. Paul Subdivision and Soo Line Jct. on the BNSF's St. Paul Subdivision are the two railroads' different names for the same location. Please refer to Photo 96 below.

Major Infrastructure Elements – The major infrastructure elements in this track sub-segment include the CTC control points as well as a series of rail bridges and tunnels and highway bridges located near Mississippi Street, Westminster Street and Seventh Street. If the former Soo Line route to Mississippi Street and SPUD were to be reconstructed and used for passenger operations, the overhead rail bridge shown in Photo 96 would carry the route over the BNSF St. Paul Subdivision. It is currently in use only to serve local industry traffic.

Photo 96 – St. Paul, MN

The view is looking west along the BNSF St. Paul Subdivision at Soo Line Jct. (MP 2.3). The two BNSF main tracks curving to the left under the bridge lead to BNSF's CP University in Minneapolis. The track diverging from the junction switch at the BNSF station sign (Soo Line Jct.) to the right in the center of the photo is the CP St. Paul Subdivision. On the CP, this location is known at Soo Jct. The station name Soo Jct. is shown on the smaller CP station sign at about the center of the photo. The CP's overhead rail bridge which formerly carried the Soo Line Railroad's single main track to SPUD now carries an industry track to serve a rail freight customer facility just out of sight at the left end of the bridge. The former Soo Line track between the overhead bridge shown above and St. Paul has been abandoned from a point approximately 0.1 miles to the left of the bridge to St. Paul and the majority of the track has been removed. If the former Soo Line route were to be reconstructed and utilized to reach SPUD, the bridge in Photo 96 above would carry the new main track toward Mississippi Street, Seventh Street and SPUD.

Photo 97 – St. Paul, MN

The view is to the north along the BNSF St. Paul Subdivision at approximately MP 1.95 south (railroad east) of Soo Line Jct. The two main tracks run from CP Seventh Street in St. Paul to CP University in Minneapolis. CP Seventh Street is behind the photographer. Both tracks are CWR on wood ties. CTC is in effect. The former Soo Line route ran over the rail bridge at Soo Line Jct. which is around the curve in the trees in the upper left corner of the photo, and to the left of the scrap yard, to the vicinity of Mississippi Street where the lines essentially ran side-by-side to Seventh Street.

Photo 98 – St. Paul, MN

The view is to the southwest at Mississippi Street on the BNSF St. Paul Subdivision. The former Soo Line trackage discussed in the caption for Photo 97 above ran on the opposite side of the BNSF St. Paul Subdivision at this location. Mississippi Street may be a suitable location to reconnect an extended CP St. Paul Subdivision to the BNSF St. Paul Subdivision. Doing so could utilize the BNSF tunnel under CP Westminster Street and avoid some of the route conflicts that would occur in this busy freight corridor.

Photo 99 – St. Paul, MN

The view is to the north (railroad west) along the BNSF St. Paul Subdivision at the north end of CP Westminster Street. The track crossing overhead is the UPRR connection from its main tracks at East St. Paul to the junction with the BNSF Midway Subdivision at West Westminster (which is out of the photo to the left) to reach Minneapolis.

Photo 100 – St. Paul, MN

The view is to the northwest at the south (railroad east) end of BNSF's CP Westminster Street. The two tracks in the foreground center of the photo are the BNSF Midway Subdivision from CP Seventh Street in St. Paul (behind the photographer) to Minneapolis Jct. in Minneapolis. The track using the tunnel on the right is one of the two tracks of the BNSF St. Paul Subdivision heading toward Mississippi Street, Soo Line Jct. and CP University in Minneapolis. The other St. Paul Subdivision main track uses a tunnel out of sight to the left of the photo. The St. Paul Subdivision bypasses CP Westminster Street. The junction switch in the upper right of the photo is the connection to the UPRR's main tracks from East St. Paul to the BNSF to reach St. Paul Jct., Hoffman Avenue, SPUD and Robert Street.

Infrastructure Needs - There is no new main track required for this sub-segment, however, 2/3 of the existing ties will be renewed, existing rail will be replaced and the track will be surfaced. A new crossover will be added to Soo Line Jct. to enhance flexibility. PTC will be overlaid across the entire sub-segment. Existing bridges will be rehabilitated to support the proposed HSR passenger service.

Sub-Segment 31 Capital Cost	Amount (1,000's)
Trackwork	$2,730
Structures	$2,974
Systems	$1,788
Crossings	$0
Allocations for Special Elements	$0
Sub-Total Construction Elements	$7,492
Contingency	$2,248
Professional Services and Environmental	$2,337
Total Segment Cost	$12,076,711
Segment Cost Per Mile	$5,250,744

Constraints – The principal constraints in this sub-segment are: (1) the CP's rail to rail grade separation structure at Soo Jct., (2) important rail junctions at Soo Jct. (Soo Line Jct. on BNSF) and CP Seventh Street, (3) the bridges and tunnels at CP Westminster Street, (4) the reduced speed required through this segment due to the grade and the short distance between junctions, (5) heavy freight train traffic and (6) the challenges that would be associated with acquiring real estate and re-constructing a main track on the former CP right of way between the overhead bridge at Soo Jct. and the BNSF at Mississippi Street and then constructing an additional main track between the south end of the tunnel at CP Westminster Street and CP Seventh Street.

Track Sub-Segment 32 (Segment DD)

Sub-Segment Description - Track Sub-Segment 32 continues along the BNSF between CP Westminster Street at MP 1.0 and CP Seventh Street at MP 0.4 in St. Paul, MN at MP 0.0, a distance of 0.6 miles.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed for freight trains within this segment is 30 MPH. CTC is in effect.

Yards & Junctions – There are no yards in this track segment. Junctions are located on both ends of the track sub-segment.

Major Infrastructure Elements – In addition to the track and signal installations at both CP Seventh Street and CP Westminster Street, there are a series of tunnels and bridges (rail over rail and highway over rail) at CP Westminster Street. In the vicinity of CP Seventh Street, there are several highway overpasses. At the south (railroad east) end of the sub-segment, there are several highway tunnels and underpasses, some of which are used, and some of which are not currently in use.

Photo 101 – St. Paul, MN

The view is to the north (railroad west) looking at the east end of the BNSF CP Seventh Street. The two BNSF St. Paul Subdivision main tracks from Hoffman Avenue and Division Street are in the center of the photo. The main track entering the photo at the lower left corner is the SPUD Company track between CP Seventh Street and St. Paul Jct. Trains arriving and leaving SPUD from the north and/or east could utilize this track. A second track could be constructed to the left of the existing track, bypassing CP Seventh Street and joining the west track to access the west tunnel underneath CP Westminster to reach Mississippi Street and the former Soo Line right-of-way to reach the CP's St. Paul Subdivision to Cardigan Jct. A former Northern Pacific Railroad (BNSF System) right-of-way runs to the right of the BNSF main tracks at this location. It is currently in use as a recreational trail and is partially visible at the right edge of the photo.

Infrastructure Needs - On the BNSF Midway Sub, a new track is required from Westminster to 7th Street. The existing track will have 2/3 of the ties replaced, the track will be surfaced and exiting rail will be replaced with new CWR. A new crossover will be added to the existing control point at Westminster St. to enhance flexibility. CTC is presently in place; PTC overlay will be provided. An allocation has been added to the cost estimate to provide for measures to be designed to rationalize the tracks between the endpoints of the sub-segment.

Sub-Segment 32 Capital Cost	Amount (1,000's)
Trackwork	$1,698
Structures	$0
Systems	$1,011
Crossings	$0
Allocations for Special Elements	$2,500
Sub-Total Construction Elements	$5,209
Contingency	$1,563
Professional Services and Environmental	$1,625
Total Segment Cost	$8,397
Segment Cost Per Mile	$13,994

Constraints – The principal constraints in this sub-segment are: (1) the network of closely-situated rail junctions in each of three directions from CP Seventh Street, (2) heavy freight train traffic moving through this bottleneck area, (3) the grade and track configuration between CP Seventh Street and CP Westminster Street, (4) the tunnels under CP Westminster Street, (5) the reduced speed necessary due to the short distances between the various rail junctions and(6) the grade separations of roadways both above and under the tracks near CP Seventh Street.

Track Sub-Segment 33 (Segment EE)

Sub-Segment Description - Track Sub-Segment 33 uses the BNSF/SPUD Company track between BNSF's CP Seventh Street at MP 0.0 and St. Paul Junction at MP 0.3, a distance of 0.3 miles.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed for freight trains within this track sub-segment is 10 MPH. Yard Limit rules are in effect.

Yards & Junctions – There are no yards in this sub-segment. There are junctions at both ends of the track sub-segment.

Major Infrastructure Elements – There are bridge/tunnel structures under the railroad grade that carry this track and others over roadways. Some of these structures are not plainly visible from the track. There are also several major roadway bridges passing over this track sub-segment. The new tracks to serve the SPUD platforms will be connected to this track sub-segment at St. Paul Jct.

Photo 102 – St. Paul, MN

The view is to the southwest on the BNSF/SPUD Company track between CP Seventh Street and St. Paul Jct. The property visible to the right of the fence in the photo extends to the west (right) and formerly contained tracks and other facilities of the SPUD. There is sufficient right-of-way to the right of the existing main track to construct a second main track between St. Paul Jct. (above-right), past CP Seventh Street (behind the photographer) to connect with the west track of the BNSF St. Paul Subdivision just south (railroad east) of the west tunnel under CP Westminster Street. Doing so could permit access to former Soo Line right of way from Mississippi Street to Parkway and the CP's St. Paul Subdivision to Cardigan Jct.

Infrastructure Needs - This short sub-segment will be modified to rationalize the movement of passenger trains from BNSF Seventh Street to a new track connection to St Paul Union Depot (the former connection and depot tracks have been removed). The work required here includes the addition of a new track and several turnouts to facilitate movement to SPUD. A new control point will be established at "St Paul Junction" to control movement from both Seventh Street and Division Street into and around SPUD. CTC and PTC overlay will be provided for all tracks; new turnouts will be incorporated into the existing control points at Seventh Street and St Paul Junction.

Sub-Segment 33 Capital Cost	Amount (1,000's)
Trackwork	$2,341
Structures	$0
Systems	$1,549
Crossings	$0
Allocations for Special Elements	$1,500
Sub-Total Construction Elements	$5,390
Contingency	$1,617
Professional Services and Environmental	$1,682
Total Segment Cost	$8,689
Segment Cost Per Mile	$28,962

Constraints - The principal constraints in this sub-segment are: (1) the network of closely-situated rail junctions in each of three directions from CP Seventh Street, (2) heavy freight train traffic moving through this bottleneck area, (3) the grade and track curvature between CP Seventh Street and St. Paul Junction, (4) the tunnels under CP Westminster Street, (5) the reduced speed necessary due to the short distances between the various rail junctions and (6) the grade separations of roadways both above and under the track of this sub-segment.

Track Sub-Segment 34 (Segment AA)

Sub-Segment Description - Track Sub-Segment 34 uses the joint BNSF/SPUD Company track between Division Street at MP 429.7 and St. Paul Jct. at MP 0.3, a distance of 0.3 miles.

Existing Passenger Service – None operated. However, Amtrak's Empire Builder does operate on the adjacent main tracks of CP's Merriam Park Subdivision between Division Street in St. Paul and the Minnesota Transfer Railway in Minneapolis to access the Amtrak Midway station.

Maximum Track Speed – The maximum speed for freight trains within this sub-segment is 10 MPH. Yard Limit rules are in effect.

Yards & Junctions – There are no yards in this track sub-segment. However, the planned access to the SPUD station tracks and platforms will be via a new CP to be constructed at St. Paul Junction. Trains entering and leaving the east end of SPUD will operate via St. Paul Jct. Trains entering and leaving the west end of SPUD will utilize an expanded connection at Robert Street.

Major Infrastructure Elements – In addition to the control points at either end of this track segment, major infrastructure elements include large concrete tunnels and several bridges carrying tracks over roadways not readily visible from the right-of-way at all locations.

Photo 103 – St. Paul, MN

The view is east toward St. Paul Junction (the points where the tracks diverge) from the property to be used for the reconstruction of the SPUD tracks and platforms. The left of the three main tracks visible in the photo is the BNSF/SPUD Company track between St. Paul Jct. and Robert Street (which is behind the photographer). The two main tracks to the far right are the CP's Merriam Subdivision between Hoffman Avenue and Robert Street. The fenced property at the left of the photo is the area to be occupied by the SPUD tracks and facilities.

Infrastructure Needs – Similar to Sub-Segment 33, this sub-segment will be modified to rationalize the movement of passenger trains from BNSF Division Street to the new St. Paul Junction control point. The work required here includes completely rebuilding the existing track in place and adding several turnouts to facilitate movement to SPUD. The existing Division Street control point will be expanded to include the switch controlling access to the connection track and a crossover will be added to facilitate mainline movements around the connection. CTC and PTC overlay will be provided for all tracks.

Sub-Segment 34 Capital Cost	Amount (1,000's)
Trackwork	$617
Structures	$0
Systems	$1,549
Crossings	$0
Allocations for Special Elements	$0
Sub-Total Construction Elements	$2,166
Contingency	$650
Professional Services and Environmental	$676
Total Segment Cost	$3,491
Segment Cost Per Mile	$11,637

Constraints – The principal constraints in this sub-segment are: (1) the short distance of the sub-segment and the proximity to junctions at Division Street, Seventh Street, St. Paul Jct. and Robert Street, (2) the track is on a curve on an elevated embankment adjacent to the CP Merriam Park Subdivision on the south with an ascending grade toward St. Paul Jct. and (3) the heavy freight train traffic moves over all of the adjacent track sub-segments and junctions at and near either end of the track segment.

Track Sub-Segment 35 (Segment FF)

Sub-Segment Description - Track Sub-Segment 35 uses the SPUD Company track from St. Paul Junction at MP 0.3 to St. Paul Union Depot at MP 0.8, a distance of 0.5 miles.

Existing Passenger Service – None operated. However, Amtrak's Empire Builder does operate on the adjacent main tracks of CP's Merriam Park Subdivision between Hoffman Avenue and Merriam Park.

Maximum Track Speed – The maximum speed for freight trains within this sub-segment is 10 MPH. Yard Limit rules are in effect.

Yards & Junctions – There are currently no yards in this track sub-segment. However, the SPUD station tracks and platforms will be constructed adjacent to this track between St. Paul Jct. and Robert Street. There is a junction at the east end of this track sub-segment.

Major Infrastructure Elements – The track in this area is on an elevated right-of-way that carries the CP's Merriam Park Subdivision and this track sub-segment. Embankment walls, large concrete roadway underpasses, as well as the new station and its tracks, platforms, parking areas and roadway ramps in the area of SPUD are (or will be) the major infrastructure elements in this track sub-segment.

Photo 104 – St. Paul, MN

The SPUD Company main track is immediately to the left of the fence, with the two main tracks of CP's Merriam Park Subdivision at the far south side of the elevated right-of-way at this location. Warner Road runs between the elevated railroad embankment and the Mississippi River levee wall. The St. Paul Union Depot station building is visible at the right. The property currently used for parking is the site of the former station tracks (east end) of SPUD. New station tracks and platforms will be reconstructed at this location. The station tracks will connect to this track sub-segment at St. Paul Junction on the east end and at Robert Street on the west end. The top of the Robert Street drawbridge on the UPRR line to South St. Paul, Owatonna and Kansas City is visible above the fence line in the center of the photo.

Infrastructure Needs - A new track will be built from St. Paul Junction to SPUD. This track will become the lead to the station tracks when the station is developed. There is an existing track running along the south side of SPUD which will be rebuilt in place and act as a station runaround track. CTC and PTC will be provided. A yard allocation has been added to the cost estimate to account for the cost to avoid impacts to roadway tunnels below grade.

Sub-Segment 35 Capital Cost	Amount (1,000's)
Trackwork	$1,293
Structures	$0
Systems	$192
Crossings	$0
Allocations for Special Elements	$2,500
Sub-Total Construction Elements	$3,985
Contingency	$1,195
Professional Services and Environmental	$1,243
Total Segment Cost	$6,424
Segment Cost Per Mile	$12,847

Constraints – The principal constraints in this sub-segment are: (1) the short distance of the sub-segment and the proximity to junctions at St. Paul Jct. and Robert Street, (2) the track is on an elevated embankment adjacent to the CP Merriam Park Subdivision on the south with SPUD property to the north, (3) the elevated roadway passes over several roadway tunnels connecting the business district and Warner Road, and (4) heavy freight train traffic moves over all of the adjacent track sub-segments and junctions at and near either end of the track segment.

Track Sub-Segment 36 (Segment E)

Sub-Segment Description - Track Sub-Segment 36 uses the CP between Watertown at MP at MP 131.2 and Portage at MP 178.2, a distance of 47.0 miles.

Existing Passenger Service - Amtrak currently operates a single round trip passenger service (Empire Builder) along this track sub-segment. A station stop is made at Columbus.

Maximum Track Speed – The maximum speed for passenger trains in this sub-segment is 79 MPH and 60 MPH for freight. CTC is in effect.

Yards & Junctions – Yards are located at Watertown and Portage. Junctions are located at Watertown and Portage Jct.

Major Infrastructure Elements – The major infrastructure elements in this track sub-segment are the double track Rock River Bridge at Watertown which presently carries only one track and the yard tracks and connection with the WSOR at Watertown. Between Richwood and Reeseville, the double track mainline crosses the low marshlands of Mud Lake where the embankment and track are subject to settling and flooding. A double track smaller river bridge over the Crawfish River is located east of the Amtrak station in Columbus. Other infrastructure elements include the CTC control points and the yard at Portage.

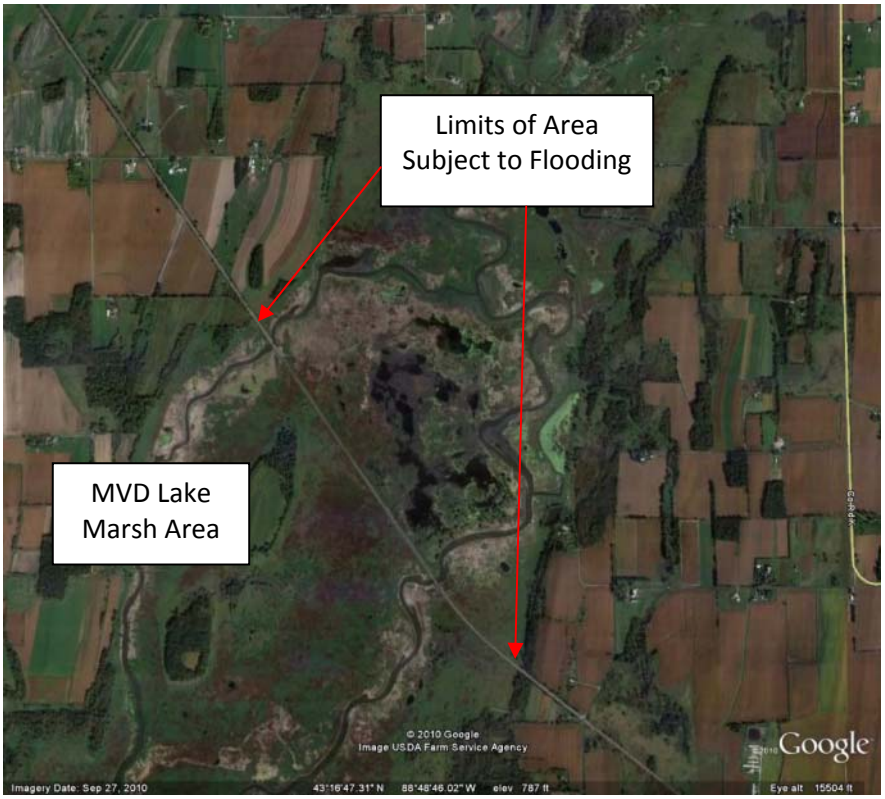

Photo 105 – Reeseville, WI

This aerial view of the CP between Watertown and Portage, WI shows a section of low-lying railroad grade that traverses the Mud Lake marsh area. There is a small river bridge on either end of the embankment across the marsh. This area is subject to settling of the embankment and track and subsequent flooding.

Infrastructure Needs - The existing line consists of a single main track with CTC supplemented by controlled sidings at nominal 20 mile intervals to allow trains to meet and pass as well as support service to customers. Formerly, the line was a double track main line. In order to implement HSR in this section, new track will be constructed between the existing sidings; the existing sidings will undergo "heavy rehabilitation" including replacement of up to 2/3 of the existing ties, associated track surfacing and rail replacement. On the existing main line track, up to 1/3 of the existing ties will be replaced and associated track surfacing will occur. CTC will be provided for the new track sections and PTC overlay will be added to the entire sub-segment.

The railroad right of way in this sub-segment has sufficient width to support the construction previously outlined without the need for right of way acquisition. CP has indicated that it will likely allow HSR operations at up to 110 mph using the existing track center spacing of 14'.

There are several areas of unstable soils in this sub-segment; addition of the second main track through these areas will require the construction of land bridges to prevent loss of vertical and horizontal track alignment. The existing undergrade bridges will

require varying degrees of rehabilitation to support the addition of passenger train service and its associated speeds in this sub-segment. At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; units of cost within the structures category have been used to acknowledge the need for bridge rehab and replacement to allow higher speed passenger trains to operate safely.

Sub-Segment 36 Capital Cost	Amount (1,000's)
Trackwork	$56,623
Structures	$63,292
Systems	$16,859
Crossings	$18,963
Allocations for Special Elements	$71,200
Sub-Total Construction Elements	$226,937
Contingency	$68,081
Professional Services and Environmental	$70,804
Total Segment Cost	$365,823
Segment Cost Per Mile	$7,783

Constraints – The principal constraints in this sub-segment are: (1) the section of track between Richwood and Reeseville where the embankment and track are on unstable soils and subject to settling and (2) the sections of single main track CTC in this busy sub-segment.

Track Sub-Segment 37 (Segment HH)

Sub-Segment Description - Track Sub-Segment 37 uses the CP between Robert Street in St. Paul at MP 410.5 and Chestnut Street at MP 411.2, a distance of 0.7 miles.

Existing Passenger Service - Amtrak currently operates a single round trip passenger service (Empire Builder) along this track sub-segment. There are no station stops in this track sub-segment.

Maximum Track Speed – The maximum speed for both passenger and freight trains within this sub-segment is 30 MPH. CTC is in effect.

Yards & Junctions – There are no yards in this sub-segment. Junctions are located at both ends of the track sub-segment

Major Infrastructure Elements – In addition to the rail-rail crossing at Robert Street, the principal infrastructure elements in this track sub-segment are the raised embankment and adjacent slopes along the Mississippi River bluff.

Photo 106 – St. Paul, MN

The view is to the west along the CP Merriam Park Subdivision at Chestnut Street. The UPRR trackage is to the left and the Merriam Park Subdivision climbs the bluff from this location to the west. The CP train with empty auto parts box cars and tri-level auto rack cars transporting new autos is descending from the Ford Plant and Fordson Jct. on the Merriam Park Subdivision and moving toward Robert Street and CP's St. Paul Yard.

Photo 107 – St. Paul, MN

The view is to the east toward Robert Street and SPUD along CP's Merriam Park Subdivision at the Old Chestnut Street grade crossing. Shepard Road is to the right and parallel to the tracks.

Infrastructure Needs - The existing line consists of a double main track with CTC. In order to implement HSR in this section, new track will be constructed along the north side of the existing tracks. CTC will be provided for the new track and PTC overlay will be added to the entire sub-segment.

The railroad right of way in this sub-segment has sufficient width to support the construction of a new track without the need for right of way acquisition, however, retaining wall will be required to support the new track until it matches grade with the existing tracks near Chestnut Street; an allocation has been added to the cost estimate to accommodate this need.

Sub-Segment 37 Capital Cost	Amount (1,000's)
Trackwork	$2,093
Structures	$58
Systems	$718
Crossings	$397
Allocations for Special Elements	$16,000
Sub-Total Construction Elements	$19,266
Contingency	$5,780
0Professional Services and Environmental	$6,011
Total Segment Cost	$31,057
Segment Cost Per Mile	$44,367

Constraints – The principal constraints in this sub-segment are: (1) the adjacent right of way of Warner Road to the south, (2) the commercial and residential development to the north, (3) many key railroad junctions on or close to this sub-segment and the freight train traffic moving over conflicting routes at those junctions.

Track Sub-Segment 38 (Segment HH)

Sub-Segment Description - Track Sub-Segment 38 uses CP from Chestnut Street in St. Paul, MN at MP 411.2 and Merriam Park (MP 417.6), a distance of 6.4 miles.

Existing Passenger Service - Amtrak currently operates a single round trip passenger service (Empire Builder) along this track sub-segment. A station stop is scheduled at the Midway Amtrak station on the Minnesota Transfer Railway (MNNR), just past the end of this track sub-segment.

Maximum Track Speed – The maximum speed for passenger and freight trains within this sub-segment is 40 MPH. CTC is in effect.

Yards & Junctions – There are no yards in this track sub-segment. However, there are two UPRR yards near the junction at Chestnut Street. There is also a major yard and two support yards all serving the St. Paul Ford auto assembly plant at the far west end of the spur that connects with the Merriam Park Subdivision at Fordson Jct. Junctions are located at Robert Street (SPUD and UPRR), Chestnut Street (UPRR), at Fordson Jct. (CP line serving the Ford plant) and at Merriam Park (MNNR). MNNR has a large yard (and the Amtrak Midway station) immediately adjacent to the end of the Merriam Park Subdivision at Merriam Park.

Major Infrastructure Elements – The major infrastructure elements in this track sub-segment are the cuts and fills and the slopes along the Mississippi River bluff including some low wooden trestle segments. There are many grade crossings and several rail-over-highway grade separations in this track sub-segment. There are also several highway-over-rail grade separations between Fordson Jct. and Merriam Park.

Photo 108 – St. Paul, MN

The view is to the southeast from the Western Avenue grade crossing on the CP's Merriam Park Subdivision looking toward Fordson Junction. The track at the right is the CP spur that serves the Ford auto assembly plant in St. Paul.

Photo 109 – St. Paul, MN

The view is to the north from the Cleveland Avenue highway overpass looking at the CP's rail yard serving the Ford Motor Company's St. Paul auto assembly plant. In this photo, rail cars loaded with auto parts are on the yard tracks in the left group. Empty tri-level auto rack cars for transporting new autos are on the yard tracks in the right group. The loading ramps for the new autos are out of sight at the upper right corner of the photo. Time-sensitive rail freight traffic moves to and from this facility. There are also two smaller support yards between this point and Fordson Junction, where the spur joins the Merriam Park Subdivision.

Photo 110 – Minneapolis, MN

The view is to the north at Amtrak's Midway station located on the Minnesota Transfer Railway (MNNR). This single Amtrak station currently serves both St. Paul and Minneapolis. There are no other Amtrak station stops scheduled in the immediate vicinity of the Twin Cities. The freight tracks of the MNNR's Midway Yard are located north of this station. The leads to reach the yard are to the right of the passenger platform and train shed in the photo.

Infrastructure Needs - Because of the level of traffic on the existing track along this sub-segment, construction of a new track will be required. The new track will be incorporated into the existing CTC system and PTC overlay will be added to the entire sub-segment. Warning devices at all crossings will be modified to accommodate the new track. 10 new structures will be required to accommodate the new track.

Sub-Segment 38 Capital Cost	Amount (1,000's)
Trackwork	$14,873
Structures	$39,199
Systems	$13,766
Crossings	$3,114
Allocations for Special Elements	$0
Sub-Total Construction Elements	$70,951
Contingency	$21,285
Professional Services and Environmental	$22,137
Total Segment Cost	$114,374
Segment Cost Per Mile	$17,871

Constraints – The principal constraints in this sub-segment are: (1) Warner Road and the UPRR right of way on the south, (2) the Mississippi River bluffs on the north, (3) an

ascending grade from Chestnut Street to Merriam Park, (4) time-sensitive freight traffic moving to and from the Ford plant and Amtrak's Empire Builder passenger trains as well as the many highway-rail grade crossings and grade separations.

Track Sub-Segment 39 (Segment HH)

Sub-Segment Description - Track Sub-Segment 39 uses MNNR from Merriam Park to reach the BNSF Midway Subdivision at St. Anthony, and then continues west on BNSF to Minneapolis Junction, a total distance of 3.2 miles.

Existing Passenger Service - Amtrak currently operates a single round trip passenger service (Empire Builder) along this track sub-segment. A station stop is scheduled at the Midway Amtrak station on the MNNR.

Maximum Track Speed – The maximum speed for passenger trains and freight within this sub-segment is 40 MPH. No signal system is in effect on MNNR. CTC is in effect on the BNSF Midway Subdivision.

Yards & Junctions – A major freight yard (Midway Yard) and Amtrak's Midway station and auxiliary tracks are located on the MNNR. Union Yard is located on the BNSF Midway Subdivision. In addition, BNSF's Dale Street Intermodal terminal is located east of St. Anthony on the Midway Subdivision. Major grain elevator facilities and yard are located in Southeast Minneapolis near St. Anthony. Junctions are located at Merriam Park (CP), St. Anthony (BNSF, MNNR) and Minneapolis Junction (BNSF).

Major Infrastructure Elements – The yards and junctions, with the tracks, signals and facilities associated with them, are the principal infrastructure elements. There are several rail-highway grade separations in this track sub-segment, the largest of which is the BNSF Midway Subdivision over Interstate 35W and 10th Avenue SE followed by the BNSF over East Hennepin Avenue at the east end of Minneapolis Junction. Private rail passenger car and locomotive shop facilities are located within the wye at Minneapolis Junction.

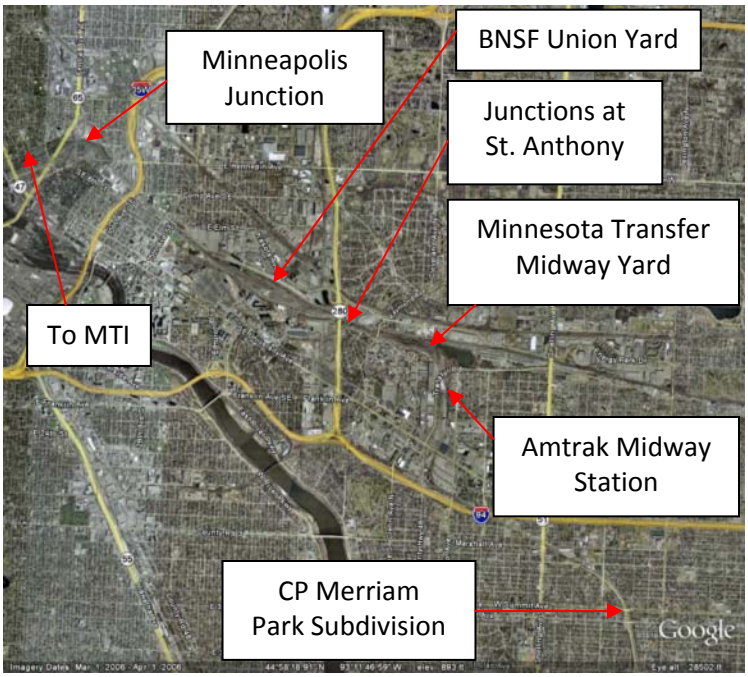

Photo 111 - Minneapolis, MN

This aerial view of the Minneapolis area shows several of the key rail routes, yards and junctions. BNSF's CP University, CP's Shoreham Yard and BNSF's Northtown Yard are all out of the photo beyond the upper left corner. Amtrak's Empire Builder stops at Amtrak's Midway Station. The Northstar commuter service from the northwest suburban area terminates at Target Field (shown as MTI in the photo).

Infrastructure Needs - Because of the level of traffic on the existing track(s) along this sub-segment and the complex traffic patterns associated with the adjacent yards and Amtrak station, construction of a new track will be required. The new track will be incorporated into the existing CTC system and PTC overlay will be added to the entire sub-segment. Warning devices at all crossings will be modified to accommodate the new track.

One new bridge over University Avenue will be required for the new track.

Sub-Segment 39 Capital Cost	Amount (1,000's)
Trackwork	$6,675
Structures	$5,642
Systems	$2,156
Crossings	$835
Allocations for Special Elements	$0
Sub-Total Construction Elements	$15,307
Contingency	$4,592
Professional Services and Environmental	$4,776
Total Segment Cost	$24,676
Segment Cost Per Mile	$7,711

Constraints – The principal constraints in this sub-segment are: (1) the complexity of the rail network in the area and the heavy traffic moving over it and (2) the private property limitations on both sides of the right of way for the entire sub-segment.

Track Sub-Segment 40 (Segment HH)

Sub-Segment Description - Track Sub-Segment 40 uses the BNSF between Minneapolis Junction and the Minneapolis Transportation Interchange (MTI), a distance of 1.9 miles.

Existing Passenger Service – The Northstar commuter service uses this track sub-segment. The Target Field station (at MTI) is the eastern terminal point for the service and the only station stop in this track sub-segment.

Maximum Track Speed – The maximum speed for both passenger and freight trains within this sub-segment is 40 MPH. CTC is in effect between Minneapolis Junction and MTI.

Yards & Junctions – Passenger train layover tracks for the Northstar commuter trains are located at Target Field station. There are no other yards in this track sub-segment. Junctions are located at either end of the track sub-segment.

Major Infrastructure Elements – The major infrastructure elements in this track sub-segment include the Mississippi River Bridge, the facilities at MTI (Target Field), many highway-rail grade separation structures and the retaining walls for the depressed right-of-way through Minneapolis. Other infrastructure includes the track and signals in this sub-segment.

Photo 112 – Minneapolis, MN

The view is to the north at the Northstar commuter station at Target Field. The MTI station will be constructed at this location. Commuter trains are seen in the photo during their mid-day layovers. The trains are operated in a push-pull configuration with the locomotives all facing north. Northstar commuter trains arriving at Target Field from the north are operated from the cab control coach at the railroad east (south) end of the train.

Infrastructure Needs - The work included in this sub-segment consists of a new track, a new control point, and new connections from the BNSF Wayzata Subdivision to the Midway Subdivision at Minneapolis Junction. CTC and PTC overlay will be provided.

Sub-Segment 40 Capital Cost	Amount (1,000's)
Trackwork	
Structures	
Systems	
Crossings	
Allocations for Special Elements	$5,100
Sub-Total Construction Elements	$5,100
Contingency	$1,530
Professional Services and Environmental	$1,591
Total Segment Cost	$8,221
Segment Cost Per Mile	$4,350

Constraints – The principal constraints in this sub-segment are: (1) the depressed right of way in downtown Minneapolis, (2) the Mississippi River Bridge, (3) multiple grade separations with highways overhead, (4) private property limitations on both sides of the right of way for the entire sub-segment, (5) the complexity of the rail network in the area and the heavy traffic moving over it and (6) the passenger trains of the Northstar commuter service that use this sub-segment.

Track Sub-Segment 41 (Segment GG)

Sub-Segment Description - Track Sub-Segment 41 uses the SPUD Company/UPRR track between SPUD at MP 0.8 and Robert Street at MP 1.1, a distance of 0.3 miles.

Existing Passenger Service – None operated. Amtrak's Empire Builder operates on the adjacent tracks of the CP's Merriam Park Subdivision between Hoffman Avenue and Merriam Park.

Maximum Track Speed – The maximum speed within this sub-segment is 10 MPH. Yard Limit rules are in effect.

Yards & Junctions – There are currently no yards in this track sub-segment. However, the SPUD station tracks and platforms will be constructed adjacent to this track between St. Paul Jct. and Robert Street. There is a junction at the west end of this track sub-segment.

Major Infrastructure Elements – The track in this area is on an elevated right-of-way that carries the CP's Merriam Park Subdivision and this track segment. Embankment walls, large concrete roadway underpasses, as well as the new station and its tracks, platforms, parking areas and roadway ramps in the area of SPUD are (or will be) the major infrastructure elements in this track sub-segment.

Photo 104 also shown in Track Sub-Segment 35 is repeated below for a view toward Track Sub-Segment 41.

Photo 113 – St. Paul, MN

Infrastructure Needs - A new track will be built from St Paul Union Depot to Robert Street. This track will become the lead to the station tracks when the station is developed. A connection will be built to the existing track running along the south side of SPUD. CTC and PTC will be provided. A yard allocation has been added to the cost estimate to account for the cost to avoid impacts to roadway tunnels below grade.

Sub-Segment 41 Capital Cost	Amount (1,000's)
Trackwork	$906
Structures	$8,834
Systems	$907
Crossings	$0
Allocations for Special Elements	$10,000
Sub-Total Construction Elements	$20,647
Contingency	$6,194
Professional Services and Environmental	$6,442
Total Segment Cost	$33,283
Segment Cost Per Mile	$110,944

Constraints - The principal constraints in this sub-segment are: (1) the adjacent right of way of Warner Road to the south, (2) the SPUD property to the north, (3) the elevated right of way on an embankment with several highway tunnels that pass under and several bridges that pass over the grade between SPUD and Robert Street, and (4) many key railroad junctions close to this sub-segment and the freight train traffic moving

over conflicting routes at those junctions.

Track Sub-Segment 42 (Segment Z)

Sub-Segment Description - Track Sub-Segment 42 uses the UPRR between Northfield at MP 313.2 and Inver Grove Heights at MP 344.2, a distance of 31.0 miles.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed in this track sub-segment is 50 MPH. CTC is in effect.

Yards & Junctions – There are no yards in this track sub-segment. However, a large industrial park and river port area is located at Roseport south (railroad east) of Inver Grove Heights. The South St. Paul Park Yard and the adjacent industrial areas are located to the north in Track Sub-Segment 27. Junctions are located at Northfield and Rosemount with Progress Rail.

Major Infrastructure Elements – There are no major infrastructure elements in this sub-segment. However, there are several highway and rail structures over the right of way in this track sub-segment.

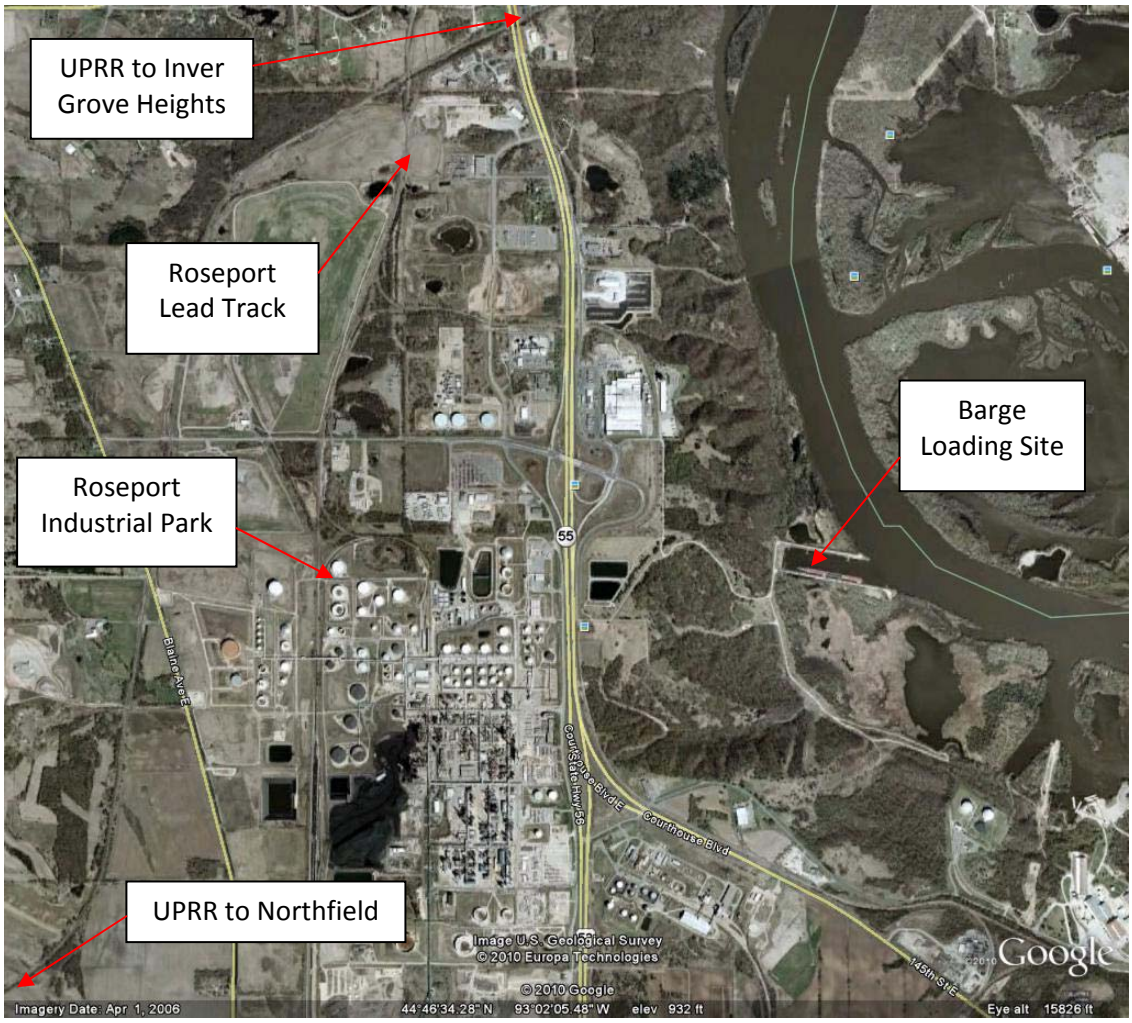

Photo 114 – Inver Grove Heights, MN

This aerial view of the Roseport Industrial Park located south of Inver Grove Heights shows the various plants and the river barge terminal site that are near Track Sub-Segment 42. Rail access to Roseport is via the Roseport industrial lead track which connects to the UPRR main track north of the complex.

Infrastructure Needs - An additional main track offset 30' from the existing track will be required to allow passenger operations in this segment; crossing warning devices will be added to accommodate the new track. A CTC signal system will be provided for the new track and PTC overlay will be added to the segment forming a new 2 main track system. The existing track will be rebuilt in place for the entire length of the sub-segment. This approach will allow both passenger and freight operations to share the use of a corridor with 2 main tracks, allow appropriate passenger speeds for the service proposed and avoid the conflicts present when capacity is constrained.

Most of the railroad right of way in this sub-segment does not have sufficient width to support construction of an additional track without the need for right of way acquisition. Since a track is being proposed offset 30' from the existing track, the track embankment

will need to be widened. Existing culverts along the length of the sub-segment must be extended to provide adequate drainage to both the new and the existing tracks and preserve existing drainage patterns.

The existing single track structures will require rehabilitation to support the addition of passenger train service and its associated speeds in this sub-segment. The new track construction will require new bridges since the existing bridges are for single track. At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; a unit of cost within the structures category has been used to acknowledge the need for bridge rehab to allow higher speed passenger trains to operate safely.

Sub-Segment 42 Capital Cost	Amount (1,000's)
Trackwork	$150,764
Structures	$5,054
Systems	$16,723
Crossings	$8,619
Allocations for Special Elements	$0
Sub-Total Construction Elements	$181,160
Contingency	$54,348
Professional Services and Environmental	$56,522
Total Segment Cost	$292,030
Segment Cost Per Mile	$9,420

Constraints – The principal constraints in this sub-segment are: (1) the raised embankment and the right of way limitations in the vicinity of the Roseport Industrial Park and (2) both rail and highway grade separations primarily near Roseport.

Track Sub-Segment 43 (Segment KK)

Sub-Segment Description - Track Sub-Segment 43 uses the CP/WSOR between North Milwaukee (MP 94.4) and Canco (MP 95.6), a distance of 1.2 miles.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed in this track sub-segment is 30 MPH. There is no block signal system in operation.

Yards & Junctions – North Milwaukee serves as a small industrial yard and junction point just north of the north end of Track Sub-Segment 3. Canco is the junction with the UPRR located at the north end of this track sub-segment.

Major Infrastructure Elements – A narrow railroad right-of-way and industrial activity including shippers loading rail cars on industrial tracks very close to the main track are factors that may limit operating speeds and the ability to add an additional main track over most of Track Sub-Segment 43.

Photo 115 – North Milwaukee, WI

The view is south toward Track Sub-Segment 3 with the north end of Glendale Yard visible in the background. Track Sub-Segment 43 main track is to the left. The freight cars being held in the small North Milwaukee Yard to the right are for industry unloading.

Photo 116 – North Milwaukee, WI

The view is to the northeast at the Villiard Street grade crossing. WSOR shops are shown on the left side. The original right-of-way has been narrowed on both sides of the main track due to previous real estate sales/leases.

Photo 117 – North Milwaukee, WI

The view is to the northeast along Track Sub-Segment 43 at the Cameron Street grade crossing. The loading activity on the adjacent industry track is close to the main track and close to the grade crossing.

Infrastructure Needs - In order to preserve CP and WSOR's ability to serve the

customers and maintain the potential for additional business, an additional main track will be required in this track sub-segment and crossing warning devices will be added to accommodate the new track. A CTC signal system and PTC overlay will be added to the segment forming a new 2 main track system. To increase the flexibility of the added capacity, the existing track will undergo "heavy rehabilitation" including replacement of up to 2/3 of the existing ties, associated track surfacing and rail replacement. This approach will allow both passenger and freight operations to share the use of a corridor with 2 main tracks and avoid the conflicts present when capacity is constrained.

The existing undergrade bridges will require varying degrees of rehabilitation to support the addition of passenger train service and its associated speeds in this sub-segment. At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; a unit of cost within the structures category has been used to acknowledge the need for bridge rehab to allow higher speed passenger trains to operate safely.

Most of the railroad right of way in this sub-segment does not have sufficient width to support construction of an additional track without the need for right of way acquisition. Sufficient property must be purchased adjacent to the existing right of way to allow construction and safe operation of the additional track required for the proposed HSR passenger route as well as the continued operations existing on the line today. To enable construction of an additional track, the existing embankment must be widened and new bridges constructed over Teutonia Avenue and Silver Springs Drive.

Property acquisition will be required to allow the existing embankment to be widened along most of the sub-segment.

Sub-Segment 43 Capital Cost	Amount (1,000's)
Trackwork	$4,363
Structures	$11,953
Systems	$2,985
Crossings	$1,665
Allocations for Special Elements	$0
Sub-Total Construction Elements	$20,966
Contingency	$6.290
Professional Services and Environmental	$6,541
Total Segment Cost	$33,797
Segment Cost Per Mile	$28,164

Constraints - The principal constraints in this sub-segment are the areas where the right-of-way is narrow and restricted by adjacent buildings.

Track Sub-Segment 44 (Segment KK)

Sub-Segment Description - Track Sub-Segment 44 is a connecting track that uses the UPRR between the CP/WSOR (Track Sub-Segment 43) at Canco (MP 95.6) and the UPRR Shoreline Subdivision elevated right-of-way (Track Sub-Segment 45) at Wiscona (MP 101.5), a distance of 0.7 miles.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed in this track sub-segment is 10 MPH. There is no block signal system in operation.

Yards & Junctions – There are no yards in this track sub-segment. Each end of this connecting track is a junction as defined in the Sub-Segment description above.

Major Infrastructure Elements – The connecting track follows a curving ascending grade on an embankment from the CP/WSOR connection up to the elevated UPRR Shoreline Subdivision.

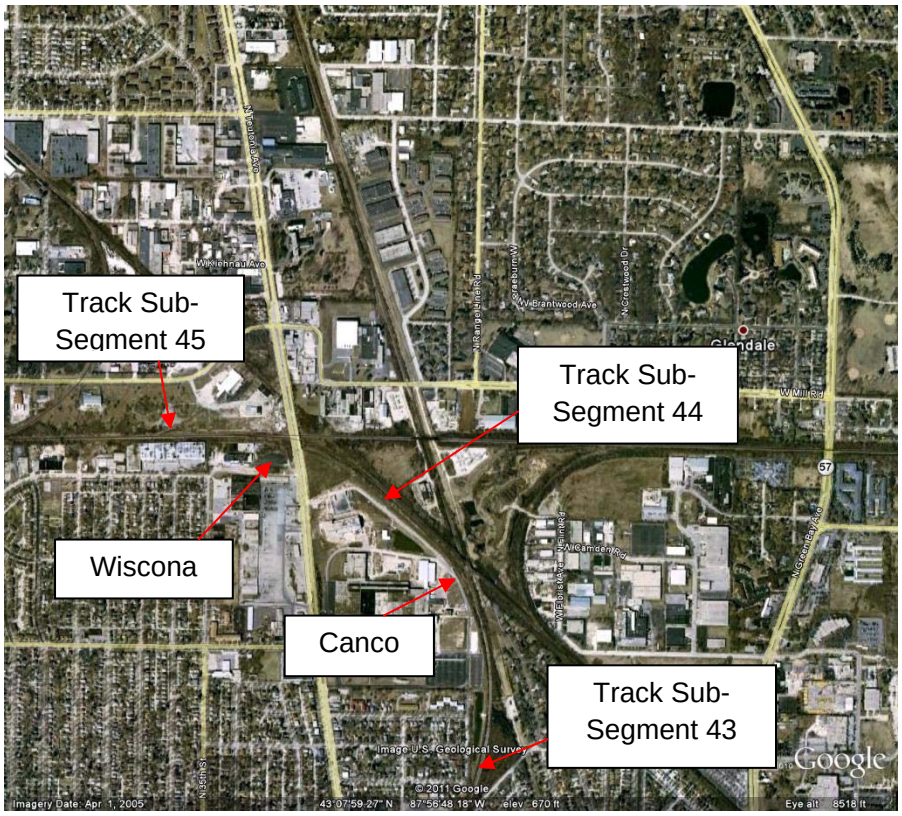

Photo 118 – Wiscona, WI

This aerial view of Wiscona shows Track Sub-Segment 43 from North Milwaukee at the lower center of the photo, the 0.7 mile long connecting track from Canco (Track Sub-Segment 44), and the connection back to the west to meet the UPRR Shoreline Subdivision (Track Sub-Segment 45) at Wiscona.

Infrastructure Needs – In order to preserve UPRR, CP and WSOR's ability to serve their customers and maintain the potential for additional business, an additional main track will be required in this short connecting track sub-segment and crossing warning devices will be added to accommodate the new track. A CTC signal system and PTC overlay will be added forming a new 2 main track system. To increase the flexibility of the added capacity, the existing track will undergo "heavy rehabilitation" including replacement of up to 2/3 of the existing ties, associated track surfacing and rail replacement. This approach will allow both passenger and freight operations to share the use of a corridor with 2 main tracks and avoid the conflicts present when capacity is constrained.

Much of the railroad right of way in this sub-segment does not have sufficient width to support construction of an additional track without the need for right of way acquisition. Sufficient property must be purchased adjacent to the existing right of way to allow construction and safe operation of the additional track required for the proposed HSR passenger route as well as the continued operations existing on the line today. To enable construction of an additional track, the existing embankment must be widened. The connecting track passes under the Teutonia Avenue Bridge where the distance between supporting columns may affect the alignment of the new second track.

Property acquisition will be required to allow the existing embankment to be widened along most of the sub-segment.

Sub-Segment 44 Capital Cost	Amount (1,000's)
Trackwork	$1,897
Structures	$0
Systems	$1,795
Crossings	$0
Allocations for Special Elements	$0
Sub-Total Construction Elements	$3,692
Contingency	$1,108
Professional Services and Environmental	$1,152
Total Segment Cost	$5,951
Segment Cost Per Mile	$8,502

Constraints – The principal constraints in this track sub-segment are the connecting rights-of-way at the junctions, the difference in elevation of the CP right of way at Canco and the UPRR Shoreline Subdivision, the electrical power transmission line which parallels the UPRR on the south side and the North Teutonia Avenue overhead highway bridge which crosses above both the connecting track and the elevated UPRR Shoreline Subdivision just east of Wiscona.

Track Sub-Segment 45 (Segment KK)

Sub-Segment Description - Track Sub-Segment 45 begins at Wiscona (MP 101.5) on the UPRR Shoreline Subdivision and continues west to Butler Junction West at MP 96.3, a distance of 5.2 miles.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed in this track sub-segment is 40 MPH. An ABS and a TWC system are both in effect.

Yards & Junctions – There are no yards in this track sub-segment. However, UPRR's Butler Yard (the UPRR's major freight yard for the Milwaukee area on its Chicago-Twin Cities mainline route) is located just south of Butler Junction (also referred to as "BJ" on the Milwaukee Subdivision. At Wiscona, the connecting track joins the UPRR's elevated Shoreline Subdivision. At Butler Junction (BJ East), the route follows the north leg of the wye (the former C&NW passenger train route from Milwaukee to the Twin Cities) and connects with the UPRR Adams Subdivision (Track Sub-Segment 46) at a hand-throw turnout referred to as BJ West.

Major Infrastructure Elements – The UPRR is elevated from Wiscona west to MP 100.6, located between North 60th Street and North 64th Street, where it returns to grade. An electrical transmission tower line parallels the UPRR on the south side. It crosses from the north to the south side at Wiscona. In the elevated section, there are double track rail bridges over two highways, 1 small river and at MP 100.52, the WSOR route from North Milwaukee north to Granville, Rugby Jct. and Fond du Lac. The former C&NW double track route is single track from Wiscona to Fonda at MP 95.28 where a siding runs on the south side to BJ East at MP 96.68. In the two-track section, there are bridges over West Appleton Avenue (US 41) and the Little Menominee River and three overhead highway bridges.

Photo 119 – Milwaukee, WI

The UPRR's double track bridge passes over the CN at MP 100.52. The bridge over North 60th Street is visible to the left of the double track bridge over the WSOR.

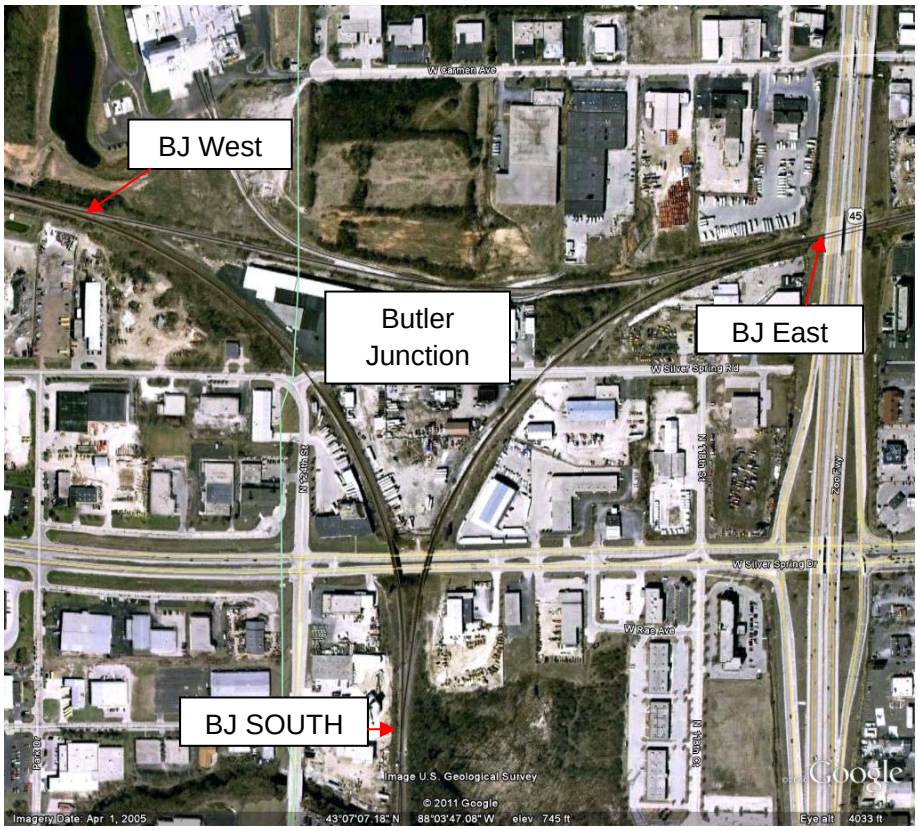

Photo 120 – Butler, WI

This aerial view of Butler Junction shows junctions at BJ East, BJ South (the entrance to the UPRR's Butler Yard) and BJ West, which is presently a hand-throw turnout located at MP 313.25. Track Sub-Segment 45 (Wiscona to Butler Junction west) uses the north leg of the wye in the picture between BJ East and BJ West.

Infrastructure Needs – In order to preserve the UPRR's ability to serve the customers and maintain the potential for additional business, an additional main track will be required in this track sub-segment and crossing warning devices will be added to accommodate the new track. A CTC signal system and PTC overlay will be added to the segment forming a new 2 main track system. To increase the flexibility of the added capacity, the existing track will undergo "heavy rehabilitation" including replacement of up to 2/3 of the existing ties, associated track surfacing and rail replacement. This approach will allow both passenger and freight operations to share the use of a corridor with 2 main tracks and avoid the conflicts present when capacity is constrained.

The existing undergrade bridges will require varying degrees of rehabilitation to support the addition of passenger train service and its associated speeds in this sub-segment. At this level of engineering assessment, actual bridge inspection and design of rehab and repairs is not available; a unit of cost within the structures category has been used to acknowledge the need for bridge rehab to allow higher speed passenger trains to operate safely.

Most of the railroad right of way in this sub-segment does not have sufficient width to support construction of an additional track without the need for right of way acquisition. Sufficient property must be purchased adjacent to the existing right of way to allow construction and safe operation of the additional track required for the proposed HSR passenger route as well as the continued operations existing on the line today. To enable construction of an additional track, the existing embankment must be widened and new bridges constructed over Teutonia Avenue and Silver Springs Drive.

Property acquisition will be required to allow the existing embankment to be widened along most of the sub-segment.

Sub-Segment 45 Capital Cost	Amount (1,000's)
Trackwork	$9,174
Structures	$15,606
Systems	$3,034
Crossings	$1,665
Allocations for Special Elements	$0
Sub-Total Construction Elements	$29,479
Contingency	$8,844
Professional Services and Environmental	$9,197
Total Segment Cost	$47,519
Segment Cost Per Mile	$9,138

Constraints - The principal constraints in this relatively short track sub-segment are the elevated right of way on the eastern portion, the electrical transmission tower line to the south, several bridges, the Fonda siding, many local industry tracks on both sides of the right of way, and slow-moving freight traffic moving to and from UPRR's Butler Yard

Track Sub-Segment 46 (Segment JJ)

Sub-Segment Description - Track Sub-Segment 46 begins at Butler Junction West (MP 313.3) in Butler, WI (northwest suburban Milwaukee) and runs generally northwest on the UPRR to Adams, WI at MP 201.9, a distance of 111.4 miles.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed for freight trains within this track sub-segment is 50 MPH. An ABS system and a TWC system are both in effect.

Yards & Junctions – Adams Yard, on the west end of this track sub-segment is the major yard and crew change point for UPRR on this track sub-segment. Butler Yard, the principal UPRR yard in the Milwaukee area, is located just south of this track sub-segment near Butler Junction. Junctions are located at Butler Jct. (the UPRR's main route to/from Chicago) and Clyman Junction (the UPRR branch line from Watertown).

Major Infrastructure Elements – Track Sub-Segment 46 traverses large areas of central Wisconsin's lowlands and marshes. As a result, there are several large river bridges, many small river bridges and smaller drainage structures as well as portions of railroad that have been constructed on long embankments through these wetlands. The route crosses the watersheds of the Fox, Bark, Oconomowoc, Ashippun, Rock and Beaver Dam Rivers. The largest river bridges are located over Buffalo Lake on the Fox River, and over Neenah Lake at Oxford. The former double track railroad is now a single track route, centered on the right-of-way at most locations. Freight sidings are located at or near Marcy, Rock, Clyman Junction, South Beaver Dam, Dalton, Oxford and Adams.

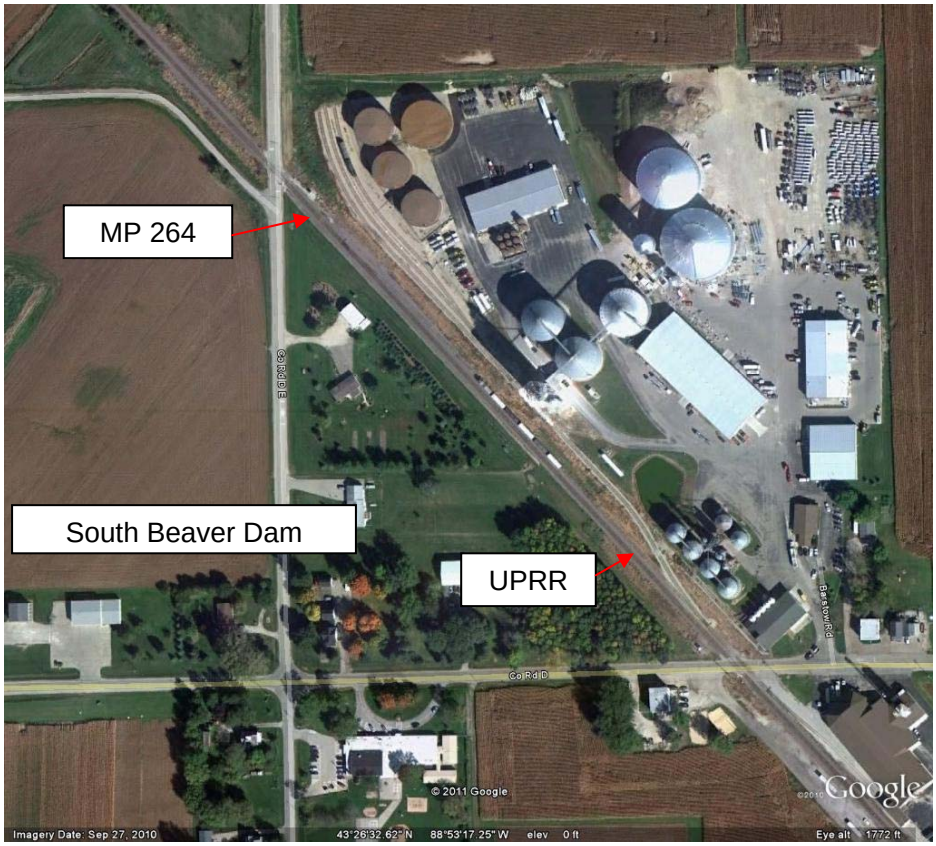

Photo 121 – South Beaver Dam, WI

This aerial view shows recently-constructed rail shipper grain loading facilities which are located between MP 264 and MP 265 at South Beaver Dam.

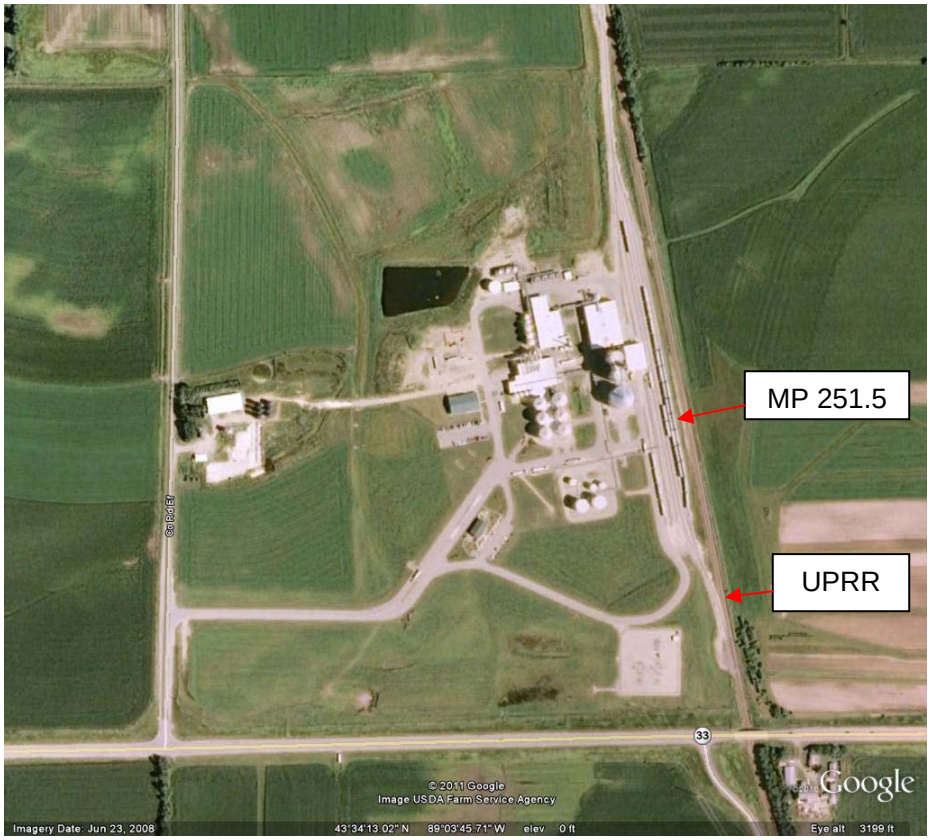

Photo 122 – Friesland, WI

This aerial view shows a recently-constructed ethanol plant and rail loading facilities located at UPRR MP 251.5 south of Friesland, WI.

Photo 123 – Buffalo, WI

This aerial view shows the UPRR's bridge over Buffalo Lake on the Fox River located at MP 225.45 between Glen Oak and Oxford, WI. The bridge is 1,006 feet long.

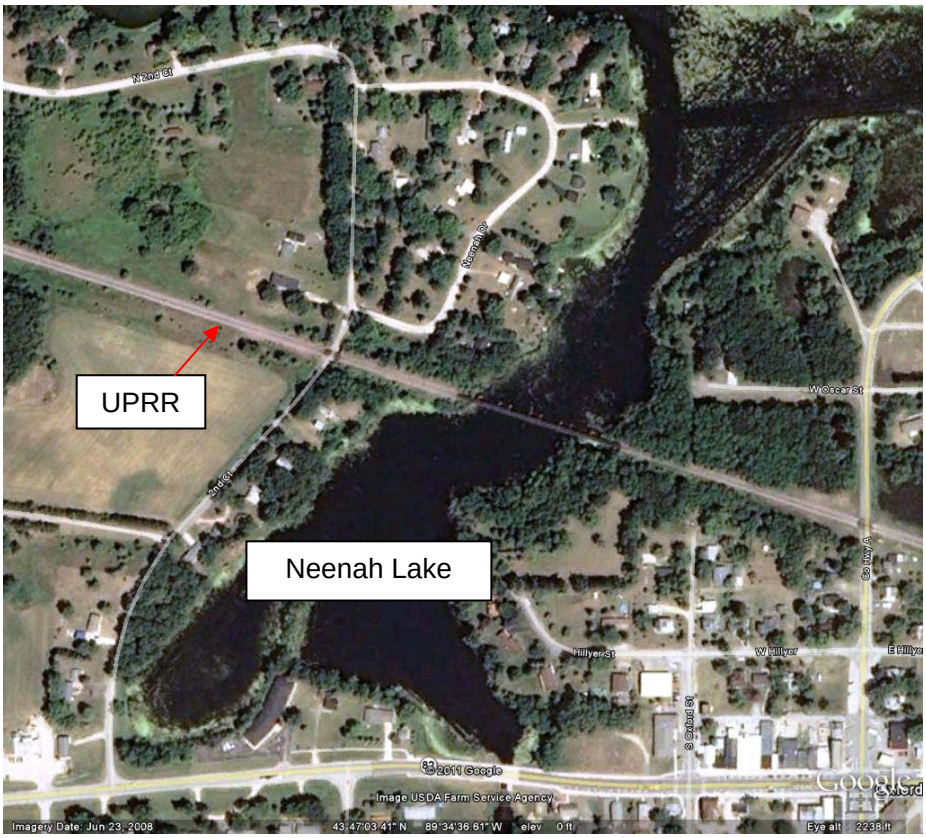

Photo 124 – Oxford, WI

This aerial view shows the UPRR's bridge over Neenah Lake on Neenah Creek. The 480-foot bridge is located at MP 219.83 west of Oxford, WI.

Photo 125 – Adams, WI

This aerial view shows the UPRR Adams Yard. The yard extends from MP 202.8 near Wisconsin Highway 13 to MP 200.8, a distance of 2.0 miles. Adams is also a crew base.

Infrastructure Needs –

Sub-Segment 46 Capital Cost	Amount (1,000's)
Trackwork	$425,207
Structures	$108,277
Systems	$77,203
Crossings	$54,976
Allocations for Special Elements	$9,200
Sub-Total Construction Elements	$674,863
Contingency	$202,459
Professional Services and Environmental	$210,557
Total Segment Cost	$1,087,880
Segment Cost Per Mile	$9,766

Constraints - The principal constraints in this track sub-segment are the large areas of wetlands and the major river bridges. The UPRR also has a height restriction of 19' 6" above the top of the rail between Butler and Adams due to the height of the bridges. This prevents the operation of double stack container trains and certain series of the higher multi-level automobile cars over this route. This is an important freight train restriction since it effectively prevents UPRR from competing with BNSF, CP and CN for this type of traffic in the Chicago-Twin Cities market. This restriction would not prevent the operation of gallery-type push-pull intercity passenger trains since that equipment normally does not exceed 17"6" above the top of the rail. The short freight sidings will not accommodate rolling meets (where trains may not need to stop) between trains.

Track Sub-Segment 47 (Segment JJ)

Sub-Segment Description - Track Sub-Segment 47 begins at Adams, WI (MP 201.9) and continues along the UPRR to Wyeville, WI at MP 173.5, a distance of 28.4 miles.

Existing Passenger Service – None operated.

Maximum Track Speed – The maximum speed for freight trains within this track sub-segment is 50 MPH. An ABS system and a TWC system are both in effect.

Yards & Junctions – Adams Yard is a yard and crew change point for UPRR. Junctions are located at Necedah (CN) and Wyeville (UPRR) (Track Sub-Segment 15-Camp Douglas to Wyeville and Track Sub-Segment 18-Wyeville to Eau Claire).

Major Infrastructure Elements – Track Sub-Segment 47 traverses large areas of central Wisconsin's lowlands and marshes. As a result, there are two large river bridges, many small river bridges and smaller drainage structures as well as portions of railroad that have been constructed on embankments through these wetlands. The route crosses the watershed of the Wisconsin River. The largest river bridges are located west of Dellwood where the UPRR crosses the Wisconsin River and east of Necedah where the UPRR crosses the Yellow River. The former double track railroad is now a single track route, and is centered on the right-of-way at most locations. Freight sidings are located at Adams, Necedah and Wyeville. Necedah and Wyeville are both just over one mile long.

Photo 126 – Dellwood, WI

This aerial view shows the UPRR's bridge over the Wisconsin River at MP 194.90 located west of Dellwood, WI. The 16-span bridge is 1,080 feet long and is located downstream from the Petenwell Dam.

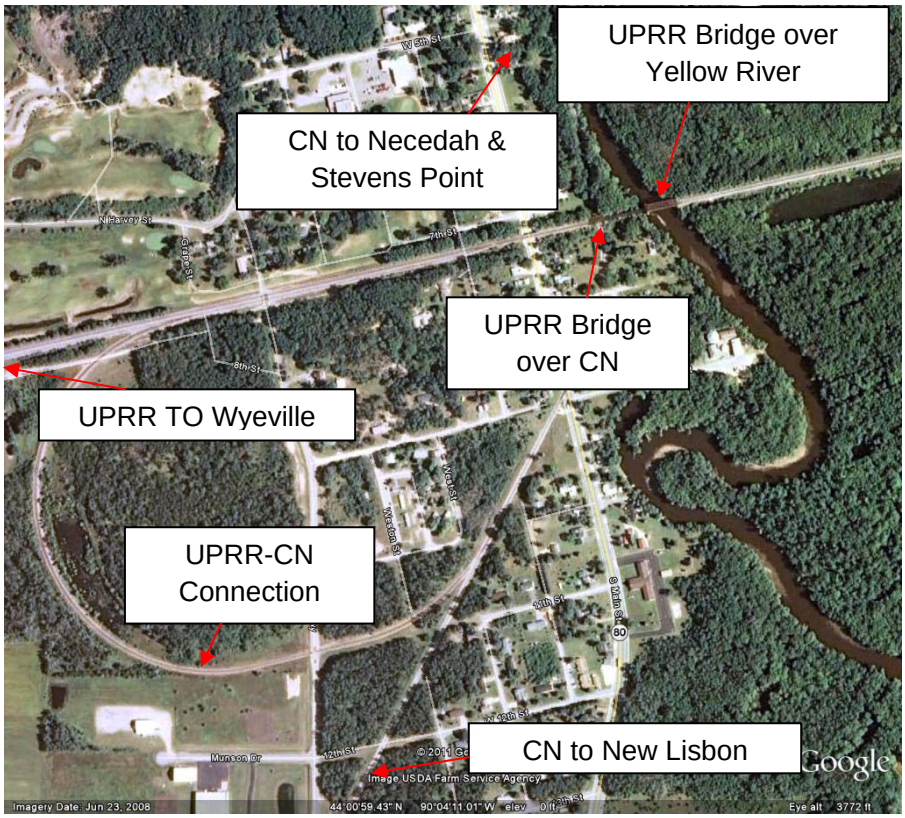

Photo 127 – Necedah, WI

The aerial view shows the UPRR Yellow River Bridge at Necedah. The 5-span bridge is 435 feet long. Just to the left of the river bridge is the bridge over the CN line between new Lisbon and Wisconsin Rapids. The curving connecting track between the UPRR and the CN is also visible in the photo.

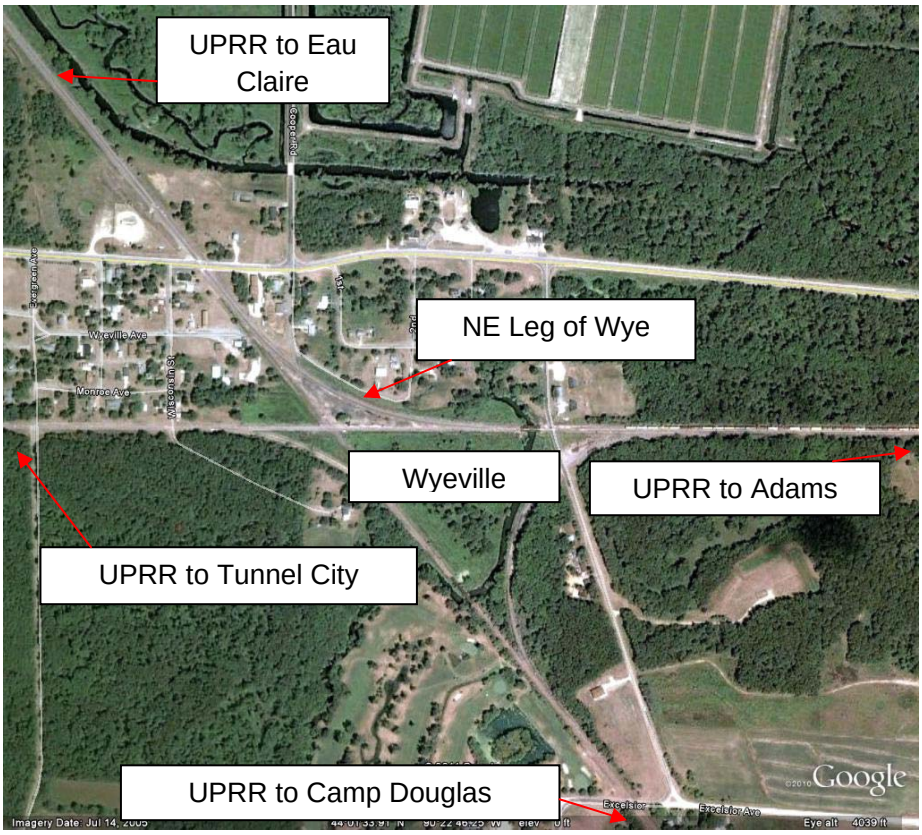

Photo 128 – Wyeville, WI

This aerial view of Wyeville shows the northeast leg of the wye where trains connect between Track Sub-Segments 47 and 18 (Wyeville to Eau Claire). Track Sub-Segment 15 (Camp Douglas to Wyeville) is visible at the bottom of the photo.

Photo 129 – Wyeville, WI

This view is looking west from the Excelsior street grade crossing to the east switch of the northeast leg of the wye (seen turning to the right in the photo). This area of the railroad was originally double track. The Wyeville siding on the Adams Subdivision is behind the photographer and is shown in the photo below.

Photo 130 – Wyeville, WI

This view is looking east from the Excelsior Avenue grade crossing and shows the main track to the right and the Wyeville siding to the left. The hand throw switch in the foreground is the west end of the Wyeville siding.

Infrastructure Needs –

Sub-Segment 47 Capital Cost	Amount (1,000's)
Trackwork	$106,748
Structures	$20,137
Systems	$18,320
Crossings	$11,464
Allocations for Special Elements	$4,600
Sub-Total Construction Elements	$161,270
Contingency	$48,381
Professional Services and Environmental	$50,316
Total Segment Cost	$259,967
Segment Cost Per Mile	$9,154

Constraints - The principal constraints in this track sub-segment are the wetlands and the major river bridges. The short freight sidings will not accommodate rolling meets between trains. At Wyeville, the configuration of the northeast leg of the wye, the connecting tracks, a river bridge and two grade crossings restrict the ability to change curvature and accordingly, can be expected to restrict the maximum speed that can be attained passing through this community.