



**Wasco County Planning Department**  
*"Service, Sustainability & Solutions"*

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# **WASCO COUNTY PLANNING COMMISSION AGENDA PACKET**

**FOR**

**Hearing Date: September 6, 2016**

**Hearing Time: 3:00 pm**

**Hearing Location: Columbia Gorge Discovery Center,  
Theater/Auditorium  
5000 Discovery Drive  
The Dalles, Oregon 97058**

**Action Item(s):**

**QUASI JUDICIAL HEARING:**

PLASAR-15-01-0004

Request by Union Pacific Railroad and their land use consultants, CH2M Hill, to expand an existing railroad siding on either side of Mosier, Oregon for 4.02 miles of new second mainline track and realigned existing track; place five new equipment shelters; install drainage structures, a retaining wall, new lighting and signage, and wireless communication poles; modify existing utilities, temporary landing zones for construction; construct temporary and permanent access roads; and a property line adjustment. The request also includes off-site wetland mitigation east of the primary project site.

**SUPPLEMENTAL #1**





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Date: September 6, 2016  
To: Wasco County Planning Commission  
From: Wasco County Planning Office  
Subject: Submittal for Hearing dated September 6, 2016

### QUASI JUDICIAL HEARING:

PLASAR-15-01-0004

Request by Union Pacific Railroad and their land use consultants, CH2M Hill, to expand an existing railroad siding on either side of Mosier, Oregon for 4.02 miles of new second mainline track and realigned existing track; place five new equipment shelters; install drainage structures, a retaining wall, new lighting and signage, and wireless communication poles; modify existing utilities, temporary landing zones for construction; construct temporary and permanent access roads; and a property line adjustment. The request also includes off-site wetland mitigation east of the primary project site.

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# WASCO COUNTY PLANNING COMMISSION HEARING

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Application Number: PLASAR-15-01-0004

Applicant: Union Pacific Railroad

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September 6, 2016

The Columbia Gorge Discovery Center & Museum

The Dalles, Oregon



# If you wish to provide comment:

- Please:
  - **Sign up to provide comment**
  - Come to the waiting area when your name is called
  - State your name for the record
  - Limit your comments to 3 minutes
  - Be respectful of one another and the process

It is important that as many people are able to speak as possible, please be respectful in your time management.

# Hearing Format

- Public hearing begins at 3:00pm
- The hearing will be conducted in the following order:
  - The Planning Commission Chair will open the hearing
  - Staff will provide a presentation
  - The applicant has an opportunity to speak
  - Testimony from those in favor, then those opposed
  - Board to deliberate and decide next steps

# STAFF PRESENTATION

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Application Number: PLASAR-15-01-0004

Applicant: Union Pacific Railroad

Landowners: UPRR, ODOT, OPRD, Schacht

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Read the full Staff Summary online at:  
<http://co.wasco.or.us/planning/UPRR.html>



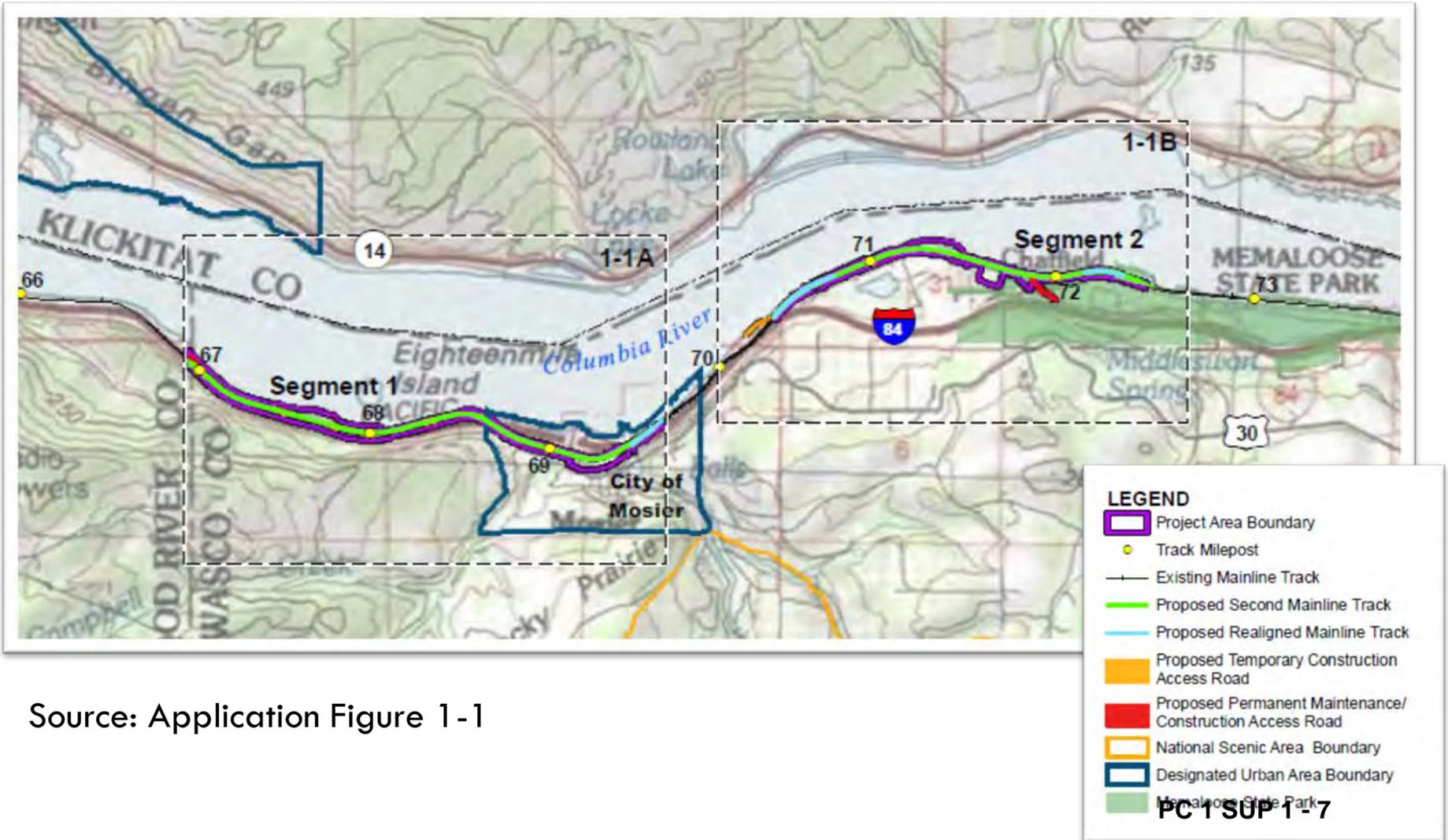
# Proposed Development:

- Expand an existing railroad siding to create 4.02 miles of second mainline track
- Replace 5 equipment buildings and associated equipment
- Install drainage structures
- Fill wetlands and remove vegetation for new ballast
- Blast out a rock wall
- 170-foot long, 25-foot tall concrete retaining wall
- 12 new signal lights
- Required safety signage
- Remove telephone poles
- 5 new monopole wireless communication poles
- Modify existing utilities
- Clearing of vegetation for construction of temporary landing zones
- Improve access roads (grade and gravel)
- Off-site wetland mitigation

# Location and Zoning

- Only those portions located outside of the Mosier Urban Area are subject to the National Scenic Area Act, the Management Plan for the Columbia River Gorge National Scenic Area and the requirements of the Wasco County NSA Ordinance.
- General Management Area Large-Scale and Small-Scale Agriculture, Open Space, and Water; and Special Management Area Public Recreation, Agriculture, and Open Space.

# Site Plan / Vicinity Map



Source: Application Figure 1-1

# Applicable Rules

- The proposed development is subject to compliance with the:
  - *Management Plan for the Columbia River Gorge National Scenic Area*, and the
  - Wasco County National Scenic Area Land Use and Development Ordinance (NSALUDO)
- NSALUDO Chapters that apply:
  - Chapter 1 – Introductory Provisions
  - Chapter 2 – Development Approval Procedures
  - Chapter 3 – Basic Zoning Provisions
  - Chapter 5 – Conditional Use Review
  - Chapter 6 – Variance Criteria
  - Chapter 11 – Fire Safety Standards
  - Chapter 14 – Scenic Area Review

Wasco County Staff prepared a staff summary and recommendation to consider the proposal's consistency with the applicable rules.

These documents can be viewed in at:  
<http://co.wasco.or.us/planning/UPRR.html>

# Chapter 3: Basic Zoning

<b>Proposed Use: Railroad construction, reconstruction, replacement, and expansion</b>		
<b>Zone:</b>	Listed as allowed review use?	Applicable Section NSALUDO:
<b>GMA Large Scale Agriculture</b>	Yes, subject to full review	Section 3.120(E)(20)
<b>SMA Agriculture</b>	Yes, subject to full review	Section 3.120(E)(18)
<b>GMA Small Scale Agriculture</b>	Yes, subject to full review	Section 3.130(E)(14)
<b>GMA Open Space</b>	Yes, subject to full review	Section 3.180(D)(2)
<b>SMA Open Space</b>	Yes, subject to full review	Section 3.180(D)(3)
<b>SMA Public Recreation</b>	Yes, subject to full review	Section 3.170(E)(27)
<b>GMA Water</b>	There are no uses listed for GMA Water. Consistent with past policy, the proposed use is subject to compliance with Chapter 14.	

# Chapter 5: Conditional Use Criteria

- Must be consistent with the MP and NSALUDO
- Must be compatible with the surrounding area
- Must not significantly burden public service, including Fire & EMS
- Must not impair traffic flow or safety
- Must minimize noise, dust, odor, in all phases
- Must not reduce or impair sensitive habitat or cause erosion
- Must not adversely effect air, water, or land
- Must not detract from the visual character
- Must preserve historic value and cultural significance
- Must be compatible with agriculture
- Must not significantly increase fire hazard, suppression costs, or risks to personnel

{ Failure to comply with any conditions of approval = revocation of CUP permit }- 10

# Conditional Use Criteria – Conditions

- Staff Recommends the following conditions of approval:
  - Non-compliance (at any time) = revoke permit
  - Coal cars shall be covered
  - Adhere to all FRA safety standards, including any safety improvements that are optional
  - Stay within existing range of 20 to 30 trains per day
  - A Spill Response Plan must be prepared prior to construction
  - Provide regular training to Gorge fire departments included in the Mid-Columbia Five County Mutual Aid Agreement
  - UPRR solicit feedback about local needs for combatting a railroad related fire incident and make a good faith effort to assist in meeting those needs.
  - Must comply with agriculture resource protections
  - Temporary traffic impacts must be coordinated with ODOT, Wasco County Public Works, and OPRD
  - Grading, excavation, vegetation removal must be minimized where possible and revegetated as soon as possible. BMPs shall be implemented at all times.

# Chapter 6: Variances

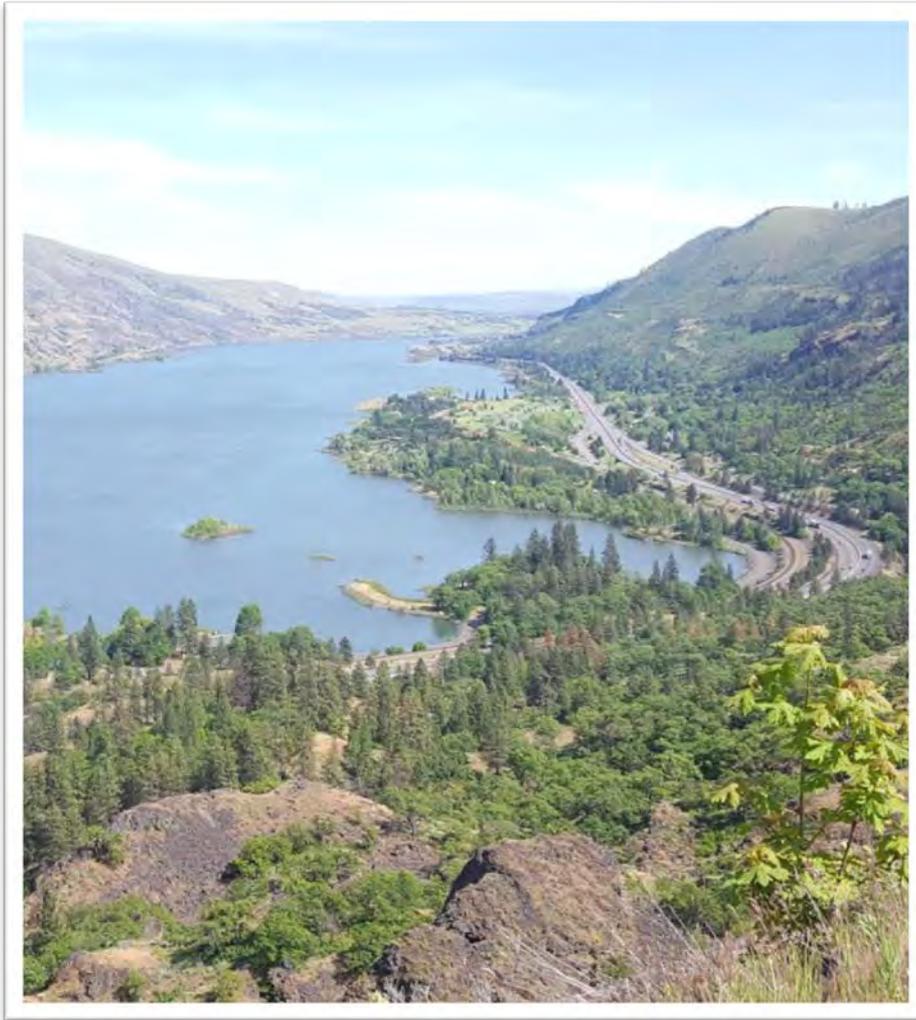
- Requested Planning Commission Variances:
  - Columbia River development setback standards
  - Scenic Travel Corridor (I-84) setback standard
  - Wetland buffer standards
  - Sensitive plant buffer zones

{ Planning Commission Variance = more than 50%  
variance is requested by the applicant }

# Chapter 11: Fire Safety Standards

- Fire Safety Standard Self-Certification Checklist to confirm compliance with requirements of Chapter 11.
- No concerns were expressed by local or regional fire or emergency services during staff consultation.
- **Condition of approval** to require the development of a Spill Response Plan , provide regular training to Gorge fire departments included in the Mid-Columbia Five County Mutual Aid Agreement, and UPRR to solicit feedback about local needs for combatting a railroad related fire incident and make a good faith effort to assist in meeting those needs.

# Chapter 14 - Scenic Area Review



- Scenic
- Cultural
- Natural
- Recreation
- Treaty Rights
- GMA and SMA rules are applied throughout.

# Chapter 14: Scenic Resources

- Key viewing areas:
  - State Route 14; Columbia River; I-84; and the Historic Columbia River Highway
  - Foreground, middle ground and background views
  - Scenic Standards: visually subordinate & visually not evident
- Landscape settings
  - Pastoral landscape setting in the GMA, the Oak Pine Woodland Landscape Setting in the SMA, River Bottomlands Landscape Setting in the GMA and SMA, the Gorge Walls, and the Canyonlands and Wildlands Landscape Setting in the GMA.
- Scenic travel corridors:
  - I-84 and the Historic Columbia River Highway

# Scenic – Anticipated Impacts

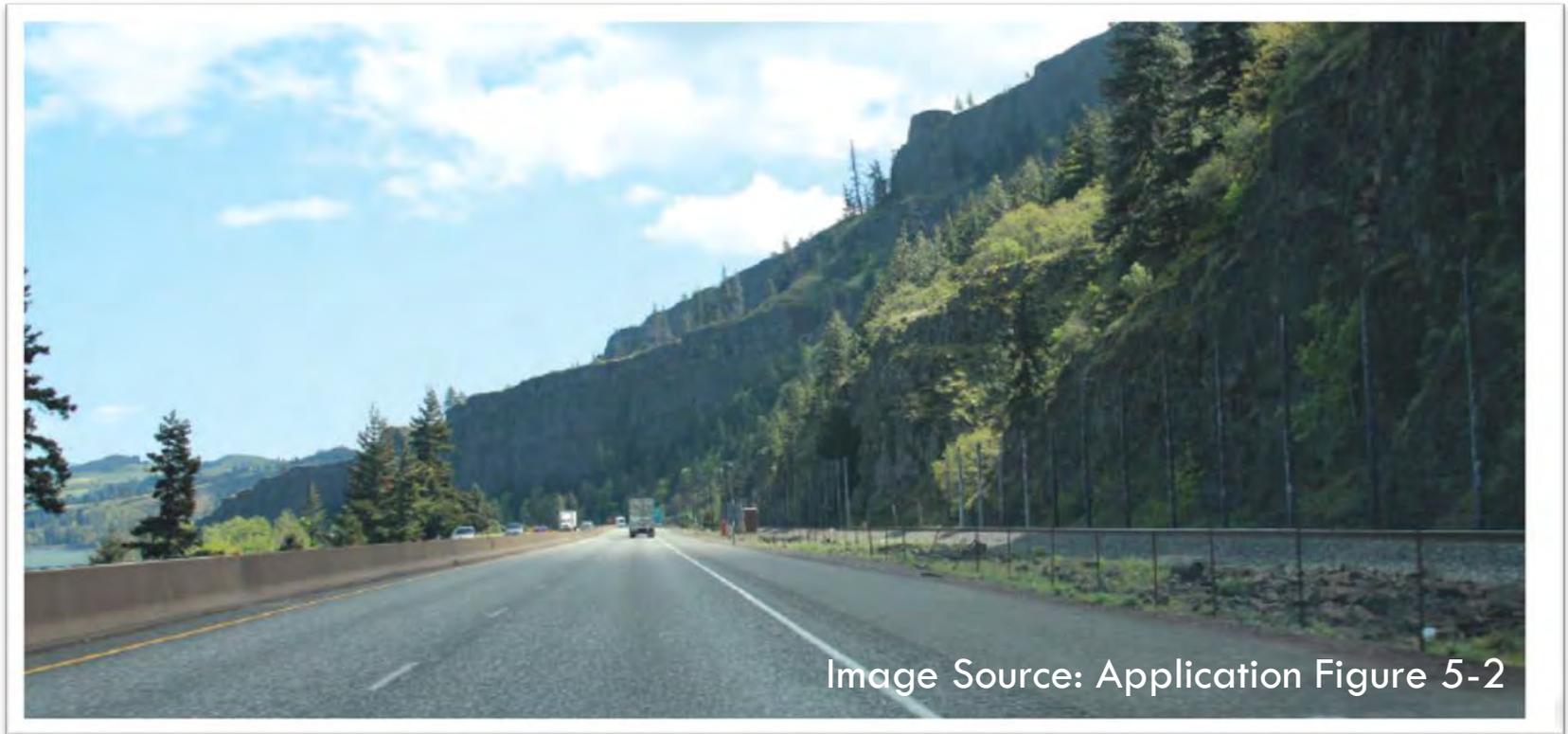


Image Source: Application Figure 5-6

View from SR14 and Columbia River; foreground and middle ground

**Red circles** (added by staff) indicate areas of blasting and vegetation clearing

# Scenic – Anticipated Impacts



View from I-84; foreground

Anticipated impact = Second track and vegetation clearing as needed construction

# Scenic – Recommended Conditions

- ❑ Prohibit the clearing of 6.62acre Open Space site east of rock blasting site (scenic and natural)
- ❑ Retain all vegetation to the maximum extent practicable
- ❑ Rock blasting must occur in natural appearing, irregular patterns to emulate a natural cut face
- ❑ Retaining wall must be a basalt rock pattern color treated to blend with surrounding rock wall colors, shadows, and patterns
- ❑ Revegetate all disturbed areas immediately with native seed mixes
- ❑ All new structures, buildings and signage shall comply with the color and material requirements of the I-84 Corridor Strategy, a plan developed for infrastructure in the NSA
- ❑ Buildings must be treated for non-reflective finish
- ❑ New lighting shall not cause visual pollution or create a hazard
- ❑ Guardrail replacement shall be in-kind to ensure a continuous aesthetic, consistent with the I-84 Corridor Strategy

# Chapter 14: Cultural Resources

- There are three types of cultural resources protected in the NSA:
  - Archaeological
  - Traditional Cultural Properties
  - Historic
- A survey was prepared, shared, and amended based on feedback.
- There are no anticipated impacts
- Conditions of approval to cease development upon discovery during construction

# Chapter 14: Natural Resources

- **Waterbodies** – will impact wetlands and lakes; mitigation plan approved by USACE, NMFS, NFW, ODFW, USFS NSA.
- **Wildlife habitat** – deer and turkey range, shallow water habitat; mitigation plan approved by ODFW
- **Rare plant** populations – 3 plant species will be affected; mitigation plan approved by ORBIC
- **SMA Priority Habitats** – USFS expressed concerns regarding Oregon white oak impacts and the high quality Priority Habitat areas proposed to be affected

Table 1  
**Wetland and Water Body Disturbance**

Wetland ID	GMA/SMA	Approx. Milepost(s)	Total Wetland/ Waterbody Area (acres)	Open Water Permanent Impacts (acres)	Vegetated Wetland Permanent Impacts (acres)	Total Buffer Zone Impact (acres)
Wetland 7	SMA	72.28 – 72.34	0.17	0	0.17	
Wetland 9	SMA	71.46 – 71.51	0.24	0	0	1.59 <sup>1</sup>
Wetland 9B	SMA	71.47 – 71.51	1.78	0	0	
Wetland 11	GMA	70.72 – 70.95	1.15	0.00	0.25	
Lake 11	GMA	70.78 – 70.94	1.86	0.14	0.00	1.01 <sup>1</sup>
Wetland 12	GMA	70.69 – 70.72	0.14	0	0.03	
Wetland 17	GMA	68.55 – 68.57	0.08 <sup>2</sup>	0.00	0.06 <sup>2</sup>	
Wetland 18	GMA	68.56 – 68.58	0.09 <sup>2</sup>	0	0	0.20 <sup>1</sup>
Lake 18	GMA	68.56 – 68.58	1.21 <sup>3</sup>	0	0	
Wetland 20	GMA	66.97 – 67.12	0.15	0	0	0.55
Lake 20	GMA	66.97 – 67.12	1.66	0.02	0	
Columbia River/Bonneville Reservoir	GMA/SMA	North of project area for full project length	-	0.00 <sup>3</sup>	0	5.58 <sup>4</sup>
<b>Total Impacts to Wetlands, Waterbodies &amp; Buffers</b>				<b>0.41</b>	<b>0.75</b>	<b>Temp: 3.52 Perm: 8.75</b>

<sup>1</sup> The buffer zones of adjacent wetlands and/or waterbodies overlap in some cases, necessitating buffer disturbance to be reported as a combined acreage.

<sup>2</sup> A portion of Wetlands 17 and 18 are located within the NSA-designated Urban Area; the total wetland/waterbody and impact areas provided in this table constitute only the portions within the NSA and outside of the designated Urban Area.

<sup>3</sup> No permanent disturbance to the Columbia River/Bonneville Reservoir will result from the project; however, approximately 0.01 acres will be temporarily affected during the installation of two culverts proposed to mitigate for potential impacts to fish habitat.

<sup>4</sup> Acreage excludes Columbia River buffer impact areas that intersect with wetland buffers accounted for in above calculations.



## Wetland impacts and mitigation proposals:



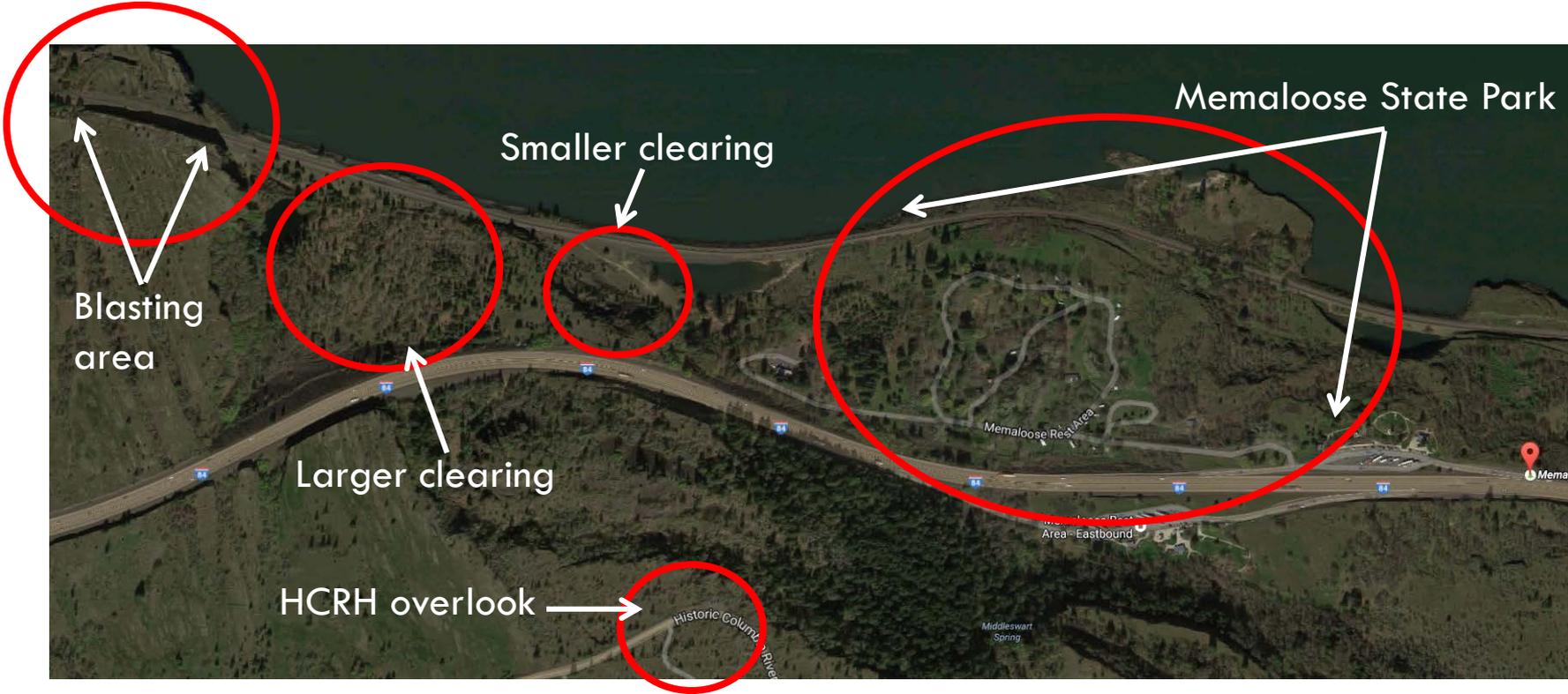
# Natural – Recommended Conditions

- ❑ Prohibit 6.62acre Open Space clearing
- ❑ Implement the Tooley Lake Wetland Mitigation Plan
- ❑ Implement the Sensitive Species and Wildlife Habitat Protection and Rehabilitation Plan
- ❑ Remove blasted materials for off-site crushing
- ❑ Avoid areas of identified special-status plant populations, priority habitats, sensitive wildlife and plant areas, and their buffer areas to the maximum extent practicable.
- ❑ Implement micro-siting of development during construction to avoid habitat where practicable
- ❑ Remove and conserve, and immediately replant plants that will be directly affected
- ❑ Implement weed control procedures to prevent the spread of noxious weeds
- ❑ Require the SMA Oregon white oak replacement ratio of 8:1 (*please note this would be a correction to the staff summary*)

# Chapter 14: Recreation Resources

- Established recreation sites within vicinity of development: Memaloose State Park & Historic Columbia River Highway State Trail
- Comments from OPRD cite impacts of noise, disconnection from park properties, and resource impact concerns at Memaloose as well as the Gorge region of state parks properties.
- Recommended conditions of approval:
  - (1) to develop a Columbia River access feasibility study to ensure long term impacts of the railroad do not impact established recreation uses or sites. Improved access from State Parks properties to the Columbia River shall be the outcome of this study and any resulting action items. And,
  - (2) minimize impacts of construction to recreation users

# Recreation - proximity



Oregon State Parks properties are cut by railroad

Image source: Google Maps

# Chapter 14: Treaty Rights

- Comments received from the Confederated Tribes of the Umatilla Indian Reservation:
  - ▣ River access and fisherman safety while crossing
  - ▣ Significant natural resource impacts
  - ▣ Cultural resource impacts
- Government to government consultation with the USACE
- Anticipated impacts: decreased safety in crossing tracks
- REQUIRED condition to add at least 2 safe crossings
- **Failure to comply = denial of this development request**

# Chapter 23: Sign Provisions

- Proposed signage is required by FRA for safety
- Proposed signage is allowed without review; however Staff recommends condition of approval to require compliance with this chapter through the Interstate 84 Corridor Strategy
- *Staff recommends a correction to the Staff Summary to accurately reflect the applicability of this chapter.*

# New Information

**Received After 8/30/2016 Staff Summary & Recommendation was prepared.**

- ❑ Many more public comments expressing concern via email
- ❑ Letter from Mosier Volunteer Fire and Rescue citing capacity concerns, requesting clarification of risks, and a fire mitigation plan.
- ❑ Letter from Mosier City Council opposing project for public health and safety reasons, river access concerns, noise, and wetland impacts.
- ❑ Letter from ODOT requesting structural analysis for seismic stability and expressing support for improved recreation access condition of approval
- ❑ Letter from OPRD describing regional context of recreation disconnection, noise and resource impacts
- ❑ Letter from Columbia Gorge Windsurfing Association expressing opposition to the proposed development
- ❑ Letter from the Confederated Tribes of the Umatilla requesting a study to analyze the impacts on tribal fishing (note this would be a required condition).
- ❑ Several large items from the Friends of the Gorge

# Opportunity for Applicant to Speak

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# Public Hearing – Rules of Conduct

**If you'd like to comment, please sign up for comment**

- ❑ Come to the waiting area when your name is called
- ❑ State your name for the record
- ❑ Limit your comments to 3 minutes

**To provide time for as many people as possible to speak, please:**

- ❑ No applause
- ❑ No calling out comments or questions from the audience
- ❑ No demonstrations

**Please be respectful of all speakers.**

# Planning Commission

- At the end of the hearing,
  - Continue or close the public hearing?
    - If the hearing is continued, please specify the date, time and location.
    - If the hearing is closed, the Commission will deliberate at a future public meeting. Please specify the date, time and location.

# For additional information:

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Wasco County Planning Department  
2705 East Second Street, The Dalles, Oregon 97058  
(541) 506-2560

Materials related to this case can be viewed online at  
<http://co.wasco.or.us/planning/UPRR.html>

Angie Brewer, Director  
[angieb@co.wasco.or.us](mailto:angieb@co.wasco.or.us)



# National Rail Freight Infrastructure Capacity and Investment Study

*prepared for*

Association of American Railroads

*by*

Cambridge Systematics, Inc.

September 2007

[www.camsys.com](http://www.camsys.com)

**CAMBRIDGE**  
SYSTEMATICS

PC 1 SUP 1 - 33

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*final report*

# National Rail Freight Infrastructure Capacity and Investment Study

*prepared for*

Association of American Railroads

*prepared by*

Cambridge Systematics, Inc.  
100 Cambridge Park Drive, Suite 400  
Cambridge, Massachusetts 02140

*date*

September 2007

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# Acknowledgments

This study was prepared by Cambridge Systematics, Inc. under contract to the Association of American Railroads. The major authors of the study were Lance R. Grenzeback, David T. Hunt, and Daniel F. Beagan. The key contributing staff were John Lewis, Siddharth A. Pandit, Jessica E. Tump, Thomas C. Messer, and Nathan R. Higgins.

The AAR's steering committee provided invaluable information and advice to the consultant team throughout the study. Their time and effort were very much appreciated.

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- Norfolk Southern
  - Daniel Mazur
  - Jackie Corletto
- Union Pacific
  - John T. Gray
  - John H. Ransom
  - Eric Wilson
  - Simon J. Hjelm
- Association of American Railroads
  - Craig F. Rockey, Project Manager
  - Frank Hardesty, Deputy Project Manager
  - Paul Posey
  - Dan Sapphire

The assistance of the American Short Line and Regional Railroad Association, CN, Canadian Pacific, and Kansas City Southern was also appreciated.

# Executive Summary

This study is an assessment of the long-term capacity expansion needs of the continental U.S. freight railroads. It provides a first approximation of the rail freight infrastructure improvements and investments needed to meet the U.S. Department of Transportation's (U.S. DOT) projected demand for rail freight transportation in 2035. The U.S. DOT estimates that the demand for rail freight transportation – measured in tonnage – will increase 88 percent by 2035.

The study was commissioned by the Association of American Railroads (AAR) at the request of the National Surface Transportation Policy and Revenue Study Commission. The Commission is charged by Congress to develop a plan of improvements to the nation's surface transportation systems that will meet the needs of the United States for the 21<sup>st</sup> century.

The study focuses on 52,340 miles of primary rail freight corridors, which carry the preponderance of rail freight traffic.<sup>1</sup> These corridors, which constitute about one-third of all continental U.S. rail freight miles, are expected to absorb the bulk of the forecast traffic and nearly all of the investment to expand capacity.

The study estimates the need for new tracks, signals, bridges, tunnels, terminals, and service facilities in the primary corridors. The study does not estimate the cost of acquiring additional land, locomotives, and freight cars, or the cost of replacing and updating existing track, facilities, locomotives, and freight cars. The study assumes no shift in modal tonnage shares among rail, truck, and water beyond those projected by the U.S. DOT.

The study does not forecast passenger rail demand or estimate future passenger rail capacity needs; however, capacity is provided for the long-distance Amtrak and local commuter passenger rail services that are currently operated over rail freight lines. Additional investment, beyond that projected in this report, will be needed if the freight railroads host increased levels of passenger rail service. The Commission has convened a passenger rail committee that is studying the need for improvements and investments to support passenger rail demand through 2035. The findings of that committee will be reported separately.

This study estimates that an investment of \$148 billion (in 2007 dollars) for infrastructure expansion over the next 28 years is required to keep pace with economic growth and meet the U.S. DOT's forecast demand. Of this amount, the Class I freight railroads' share is projected to be \$135 billion and the short line

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<sup>1</sup> Nearly all of these primary corridor miles are owned and operated by the seven Class I freight railroads: BNSF Railway, Canadian National (Grand Trunk Corporation), Canadian Pacific (Soo Line), CSX Transportation, Kansas City Southern, Norfolk Southern, and Union Pacific. There are more than 550 short line and regional freight railroads.

and regional freight railroads' share is projected to be \$13 billion. Without this investment, 30 percent of the rail miles in the primary corridors will be operating above capacity by 2035, causing severe congestion that will affect every region of the country and potentially shift freight to an already heavily congested highway system.

The investment requirement is driven by three factors: demand, current system capacity, and infrastructure expansion costs. The U.S. DOT estimates that population growth, economic development, and trade will almost double the demand for rail freight transportation by 2035. The projected rate of growth over the next 30 years is not extraordinary, but it comes after two decades of growth in rail freight tonnage that has absorbed much of the excess capacity in the existing rail freight system. Most of the moderate-cost capacity expansions have already been made; future capacity expansions will be purchased at a higher cost because they will require expensive new bridges and tunnels and more track and larger terminals in developed areas.

Meeting the U.S. DOT's forecast demand will require the Class I freight railroads to increase their investment in infrastructure expansion. The Class I railroads anticipate that they will be able to generate approximately \$96 billion of their \$135 billion share through increased earnings from revenue growth, higher volumes, and productivity improvements, while continuing to renew existing infrastructure and equipment. This would leave a balance for the Class I freight railroads of \$39 billion or about \$1.4 billion per year to be funded from railroad investment tax incentives, public-private partnerships, or other sources.

These investment projections assume that the market will support rail freight prices sufficient to sustain long-term capital investments. If regulatory changes or unfunded legislative mandates reduce railroad earnings and productivity, investment and capacity expansion will be slower and the freight railroads will be less able to meet the U.S. DOT's forecast demand.

The findings of this study provide a starting point for assessing future rail freight capacity and investment requirements. The findings outline the improvements and investments required for the railroads to carry the freight tonnage forecast by the U.S. DOT. Additional work is needed to determine how much more capacity and investment would be needed for the railroads to increase their share of freight tonnage and reduce the rate of growth in truck traffic on highways. Finally, the forecasts and improvement estimates in this study do not fully anticipate future changes in markets, technology, regulation, and the business plans of shippers and carriers. Each could significantly reshape freight transportation demand, freight flow patterns, and railroad productivity, and, thus, rail freight infrastructure investment needs.

In summary, the findings point clearly to the need for more investment in rail freight infrastructure and a national strategy that supports rail capacity expansion and investment.

# 1.0 Objective

The objective of this study is to identify rail freight infrastructure improvements and investments in the continental U.S. rail network that will allow the freight railroads to meet the U.S. Department of Transportation's (U.S. DOT) projected demand for rail freight transportation in 2035. The U.S. DOT estimates that the demand for rail freight transportation—measured in tonnage—will increase 88 percent by 2035. This projected rate of growth over the next 30 years is not extraordinary, but it comes after two decades of growth in rail freight tonnage that has absorbed much of the excess capacity in the existing rail freight system. The study assumes no shift in modal tonnage shares among rail, truck, and water beyond those projected by the U.S. DOT.

The study looks at infrastructure improvements that expand the capacity of rail lines, bridges, tunnels, terminals, and service facilities along the 52,340 miles of primary rail corridors within the U.S. owned and operated primarily by the seven Class I railroads—BNSF Railway, Canadian National (Grand Trunk Corporation), Canadian Pacific (Soo Line), CSX Transportation, Kansas City Southern, Norfolk Southern, and Union Pacific. These primary corridors constitute about one-third of all U.S. rail miles and carry the preponderance of rail freight traffic.

The investment estimates include capital costs for expansion only; that is, the cost of the new rail lines and support facilities needed to accommodate future demand. The estimates do not include costs to maintain and operate the new rail lines and support facilities; acquire additional locomotives and railcars to provide services; or operate, maintain, and replace existing rail lines and facilities. Finally, the study does not include the costs to rail shippers to accommodate growth in rail traffic volumes at their facilities. The study does include a general estimate of the investment required to bring the weight-bearing capacity of Class I branch lines and short line and regional railroad lines up to current standards.

The findings of this study provide a starting point for assessing future rail freight capacity and investment requirements. The findings outline the improvements and investments required for the railroads to carry the freight tonnage forecast by the U.S. DOT. Additional work is needed to determine how much more capacity and investment would be needed for the railroads to increase their share of freight tonnage and reduce the rate of growth in truck traffic on highways. Finally, the forecasts and improvement estimates in this study do not fully anticipate future changes in markets, technology, regulation, and the business plans of shippers and carriers. Each could significantly reshape freight transportation demand, freight flow patterns, and railroad productivity, and, thus, rail freight infrastructure investment needs.

## 2.0 Background

The study was done at the request of the National Surface Transportation Policy and Revenue Study Commission. The Commission was established by Congress in 2005 to provide a national vision and recommendations that will “preserve and enhance the surface transportation system to meet the needs of the United States for the 21<sup>st</sup> century.”<sup>2</sup> The Commission is charged with completing a comprehensive study of the national surface transportation system and the Highway Trust Fund, then developing a conceptual plan with alternative approaches to ensure that the system continues to serve the needs of the United States.

Since May 2006, the Commission has met regularly to hear about the challenges facing America’s surface transportation network. The Commissioners have heard testimony from national transportation advocates, policymakers, industry, labor, and the general public. Congress is actively following the activities of the Commission, and the Commission’s report (anticipated in December 2007) is expected to provide information that will be helpful to Congress as it considers reauthorization of the Federal surface transportation programs in 2009.

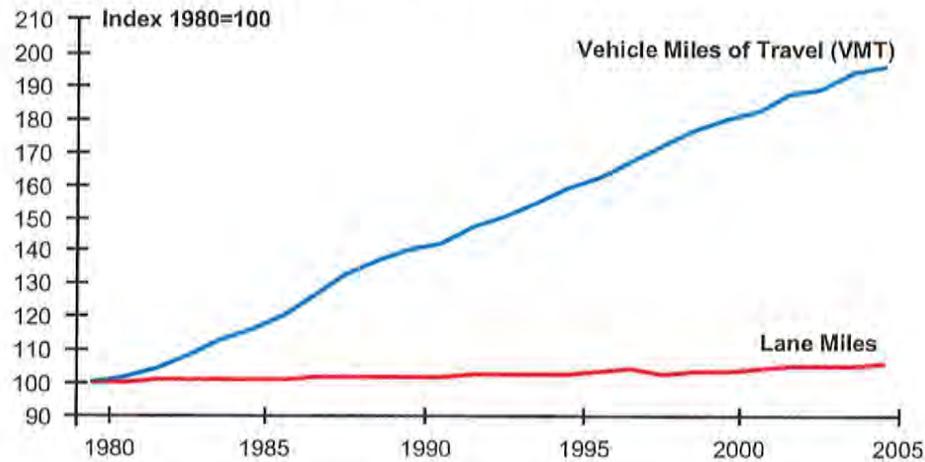
Over the course of its hearings, the Commission has expressed concern about the capacity and future of the nation’s freight transportation systems. Freight transportation is vitally important to domestic economic productivity, the international competitiveness of American businesses, and the economic well-being of all Americans.

The demand for transportation is pressing the capacity of the nation’s transportation systems, especially its critical highway and rail freight transportation infrastructure. On the highway system, vehicle-miles of travel grew by 96 percent between 1980 and 2005, while lane miles of road increased by only 5.7 percent. Figure 2.1, based on Federal Highway Administration (FHWA) statistics, illustrates the widening gap between vehicle-miles of travel and roadway capacity.

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<sup>2</sup> See Section 1909 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act—A Legacy for Users (SAFETEA-LU).

**Figure 2.1 Vehicle Miles of Travel and Lane Miles**  
1980 to 2005



Source: Federal Highway Administration, *Highway Statistics*.

The result has been increasing highway congestion. The Texas Transportation Institute reports that over the decade between 1993 and 2003, the cost of highway congestion in the nation's urban areas increased from \$39.4 billion to \$63.1 billion, an increase of 60.2 percent.<sup>3</sup> The U.S. DOT estimates that the cost of congestion across all modes of transportation could be three times as high—approaching \$200 billion per year—if productivity losses, costs associated with cargo delays, and other economic impacts are included. These include losses accruing to auto drivers, freight carriers, businesses, consumers, and the general public.<sup>4</sup>

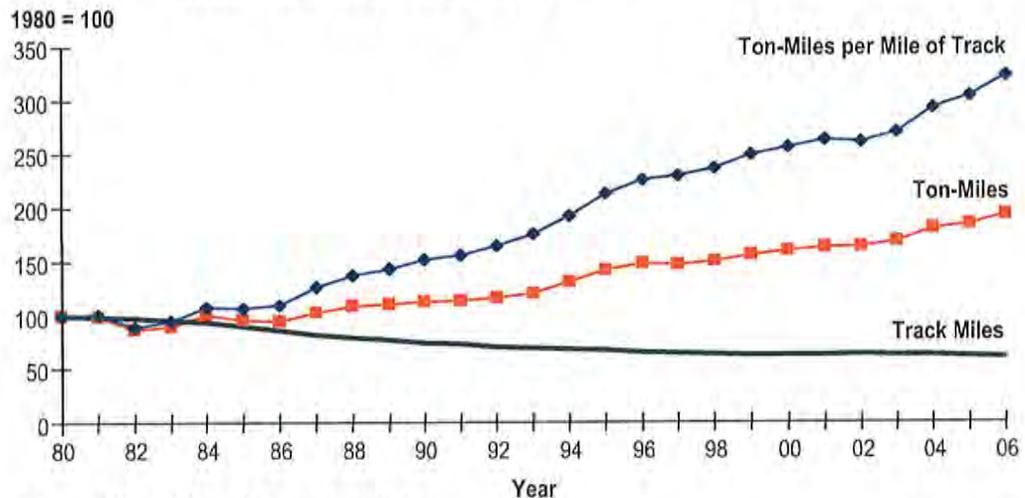
As the cost of highway congestion has increased, public policy-makers at all levels of government have started looking to the railroads to carry more freight to relieve truck and highway congestion, and to help conserve energy, reduce engine emissions, and improve safety. Shippers, too, have started looking to railroads to carry more longer-distance shipments, especially as the costs of truck fuel and labor have increased.

<sup>3</sup> David Schrank and Tim Lomax, *The 2005 Urban Mobility Report*, Texas Transportation Institute, May 2005, available at <http://mobility.tamu.edu>.

<sup>4</sup> U.S. Department of Transportation, *National Strategy to Reduce Congestion on America's Transportation Network*, Washington, D.C., March 2007. See <http://www.fightgridlocknow.gov/docs/conginitoverview070301.htm>.

However, the growing demand for freight transportation is also pressing the capacity of the nation's rail freight system. Ton-miles of rail freight (one ton of freight moved one mile counts as one ton-mile) carried over the national rail system have doubled since 1980, and the density of train traffic—measured in ton-miles per mile of track—has tripled since 1980. Figure 2.2 illustrates the widening gap between ton-miles of rail travel and track miles.<sup>5</sup>

**Figure 2.2 Rail Freight Ton-Miles and Track Miles**  
*Class I Railroads, 1980 to 2006*

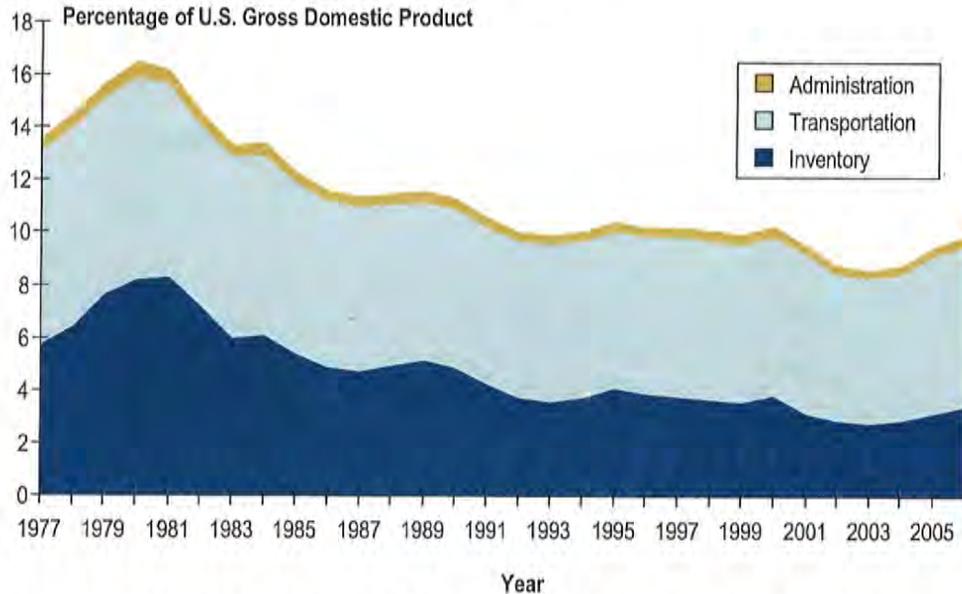


Source: AAR and Annual Report Form R-1.

The tightening of system capacity across all modes of freight transportation has likely contributed to the first notable increase in total logistics cost in over 25 years. Total logistics cost is the cost of managing, moving, and storing goods. Figure 2.3 shows the total logistics cost as a percentage of the U.S. gross domestic product (GDP).

<sup>5</sup> Association of American Railroads data and Annual Report Form R-1.

**Figure 2.3 Total Logistics Cost**  
*Percentage of Gross Domestic Product*



Source: *State of Logistics Report*, Council of Supply Chain Management Professionals, 2006.

Logistics costs rose through the 1970s to a high of about 16 percent of GDP in 1980, reflecting rising fuel prices, increasing interest rates, and deteriorating productivity across the freight transportation system. Renewed investment in highways, economic deregulation of the freight transportation industry in the early 1980s, adoption of new technologies, and lower interest rates drove down the costs of truck, rail, air, and water freight transportation. The total logistics cost declined through the 1980s and 1990s to a low of about 8.6 percent of GDP in 2003. Businesses and consumers benefited because lower transportation costs resulted in lower-cost goods and better access to global markets.

But the total logistics cost is rising again. In 2006, the total logistics cost was 9.9 percent of GDP.<sup>6</sup> The change reflects recent increases in fuel prices and increases in congestion on the nation's highways and rail lines and at its international trade gateways and ports. Freight shippers and carriers are worried that the productivity of the nation's freight systems may continue to drop and that logistics costs may rise further, undermining future domestic economic productivity, international competitiveness, and economic growth.

<sup>6</sup> Rosalyn A. Wilson, *State of Logistics Report*, Council of Supply Chain Management Professionals, 2006 and 2007.

Freight shippers and carriers are especially concerned about the future capacity and productivity of the freight system because the demand for freight transportation is projected to nearly double by 2035. The U.S. DOT Freight Analysis Framework (FAF Version 2.2) estimates that the demand for freight transportation will grow from 19.3 billion tons today to 37.2 billion tons in 2035, an increase of about 93 percent.<sup>7</sup>

To absorb this growth and maintain their existing shares of the freight transportation market, the nation's truck and rail freight systems must increase their capacity and productivity substantially. Trucks and the highway system must add capacity to handle 98 percent more tonnage. And railroads must add capacity to handle 88 percent more tonnage. The U.S. DOT estimates assume no shift in modal tonnage shares among rail and truck beyond those created by structural changes in the economy (i.e., different growth rates across freight-generating industries).

The anticipated rates of growth for the U.S. economy and freight transportation demand are about the same as those experienced over the last 30 years; however, much of the capacity existing or created over those years has been filled, leaving the nation with a need to provide new capacity through expanded infrastructure and improved productivity.<sup>8</sup>

Figure 2.4 shows the relative shares of freight—measured in ton-miles—carried by truck and rail in 2005.<sup>9</sup> If railroads cannot carry their share in 2035, then freight will be shed to trucks and an already heavily congested highway system. Conversely, if trucks cannot carry their share in 2035, then freight must be shifted to rail and the capacity of the rail system expanded even more than currently forecast.

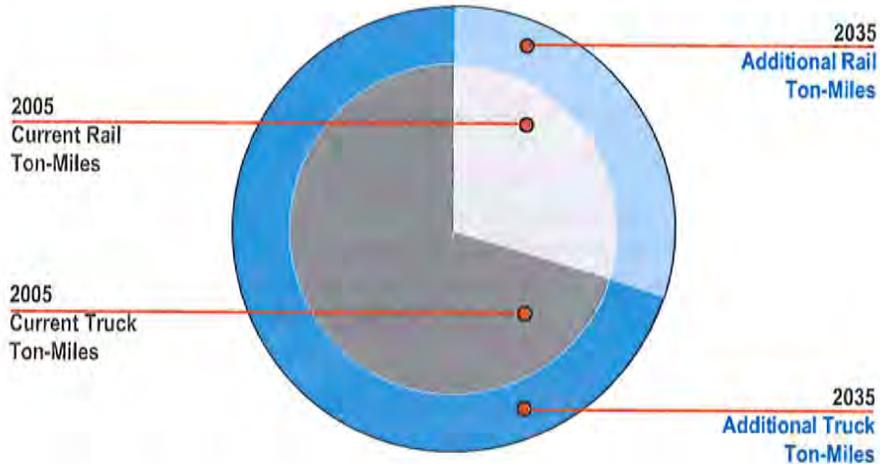
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<sup>7</sup> See U.S. Department of Transportation, Freight Analysis Framework, *Freight Facts and Figures* at <http://www.ops.fhwa.dot.gov/freight/>. This study uses the current Freight Analysis Framework (FAF Version 2.2) forecasts.

<sup>8</sup> Global Insight, Inc. forecasts that the U.S. economy will grow at a compound annual rate of about 2.8 percent over the next 30 years. Source: Global Insight, Inc. in *Freight Demand and Logistics Bottom Line Report* prepared by Cambridge Systematics, Inc. for the American Association of State Highway and Transportation Officials (AASHTO), (forthcoming, 2007).

<sup>9</sup> Ton-miles estimated by Global Insight for the AASHTO *Freight Demand and Logistics Bottom Line Report*.

**Figure 2.4 Truck and Rail Market Shares in Ton-Miles**  
2005 and 2035



Source: Cambridge Systematics, Inc., based on Global Insight, Inc. freight demand forecasts.

In response to these projections and concerns, the Commission asked the Association of American Railroads (AAR) to assess the capacity of the nation's rail system to accommodate the estimated increase in freight-rail traffic. The AAR, supported by the four largest Class I railroads—the BNSF Railway, CSX Transportation, the Norfolk Southern Corporation, and the Union Pacific Railroad—undertook this study to estimate the additional rail freight capacity and investment required to meet the U.S. DOT forecast.

This study is a hallmark study, the first effort of its kind. The U.S. DOT and the Federal Highway Administration (FHWA) have developed national infrastructure needs and cost estimates for the publicly owned highway systems, but no comparable, long-term, national estimates have been developed for the rail system. The railroads are publicly traded or privately owned companies, and the planning horizons for railroad capital projects typically do not extend out 30 years. And neither the U.S. DOT nor individual state DOTs have comprehensive rail infrastructure databases suitable for long-term planning. This study is the first collective assessment by the major freight railroads of their long-term capacity expansion and investment needs.

## 3.0 Methodology

This study provides a first approximation of the rail freight infrastructure improvements and investments in the continental U.S. rail network that will allow the freight railroads to meet the U.S. DOT's projected demand for rail freight transportation in 2035. It addresses two major rail freight infrastructure elements:

- Line expansion:
  - Upgrades to the Class I railroad system mainline tracks and signal control systems;
  - Improvements to significant rail bridges and tunnels;<sup>10</sup>
  - Upgrades to Class I railroad secondary mainlines and branch lines to accommodate 286,000-pound freight cars; and
  - Upgrades to short line and regional railroad tracks and bridges to accommodate 286,000-pound freight cars.<sup>11</sup>
- Facility expansion:
  - Expansion of carload terminals, intermodal yards, and international gateway facilities owned by railroads; and
  - Expansion of Class I railroad service and support facilities such as fueling stations and maintenance facilities.

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<sup>10</sup>Included in this category are expansions of major bridges and tunnels (or construction of new parallel bridges and tunnels) to add rail capacity along a corridor, and corridor overhead clearance projects, which typically involve raising dozens of highway bridges crossing a rail line to permit the movement of double-stacked intermodal container trains.

<sup>11</sup>Most Class I railroad tracks and bridges have been designed or reconstructed to carry railcars weighing 286,000 pounds, and some Class I lines accommodate railcars weighing up to 315,000 pounds. Older rail lines, including some Class I railroad secondary mainlines and branch lines and about half of the short line and regional railroad tracks and bridges, were designed and constructed to carry railcars weighing up to 263,000 pounds. The heavier, "standard," 286,000-pound cars can be operated over many lines designed for lighter cars, but usually at very low speeds.

The study includes the cost of designing and constructing these improvements, but does not include the cost of acquiring real estate to accommodate new rail lines and terminals.<sup>12</sup> This is consistent with the approach used in national highway system needs and investment studies, which do not estimate the cost of acquiring real estate for widening or adding highways. The study does not include the cost of capital depreciation or the cost of buying additional locomotives and rail cars to expand service. Railroad maintenance and operating costs are not included, for either existing or expanded lines and facilities.

The study assumes that capacity is provided for long-distance Amtrak and local commuter passenger rail services that are currently operated over rail freight lines, but the study does not forecast the need for new passenger rail services or the necessary capacity to support passenger rail growth. The Commission has convened a passenger rail committee that is studying the need for improvements and investments to support passenger-rail demand through 2035. The findings of that committee will be reported separately.

This study estimates rail line capacity and investment requirements by:

- Dividing the continental U.S. Class I railroad network into primary corridors;
- Establishing current corridor volume in freight and passenger trains per day for each primary corridor, based on 2005 Surface Transportation Board Carload Waybill data, the most recent comprehensive information available;
- Estimating current corridor capacity in trains per day for each primary corridor, based on current information;
- Comparing current corridor volume to current corridor capacity;
- Estimating future corridor volume in trains per day, using U.S. DOT's Freight Analysis Framework Version 2.2 forecasts of rail freight demand in 2035 by type of commodity and by the origin and destination locations of shipments moving within the U.S. and through international land and port gateways;
- Comparing the future corridor volume to current corridor capacity;

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<sup>12</sup>Current capital expenditures by the Class I railroads for expansion of lines and terminals (as reported in Section 4.5) include the cost of acquiring real estate. However, with the exception of land acquired for new or expanded intermodal terminals, the cost of real estate acquisition has been a small part of current capital expenditures because most new rail lines have been constructed within existing railroad-owned rights-of-way. As the space in existing rights-of-way is used up, the cost of acquiring real estate for new lines is expected to be a larger percentage of capital expenditures for expansion. The real estate costs will be in addition to the infrastructure costs estimated in this study.

- Determining the additional capacity needed to accommodate future train volumes at an acceptable level of service reliability;
- Identifying the rail line and signal control system improvements required to provide the additional capacity; and
- Estimating the costs of the improvements.

The study estimates the need for expansion of Class I railroad carload terminals, intermodal yards, and railroad-owned international gateway facilities by analyzing the projected increases in the number of railcars and intermodal units (containers and truck trailers) handled at major facilities and comparing them to current handling capacity. Expansion costs are estimated using unit costs per railcar or intermodal container, or estimated using recent and comparable terminal expansion project costs. Estimates of the cost of expanding service and support facilities such as fueling stations were provided by the railroads based on the anticipated changes in the number and type of trains.

Finally, the study estimates the capacity and investment requirements for secondary mainlines, branch lines, and short line and regional railroads by updating information from a prior study of short line system investment needs commissioned by the American Short Line and Regional Railroad Association.<sup>13</sup>

Wherever possible, the analysis is based upon existing and publicly available data sources. The key sources of data are the following:

- Oak Ridge National Laboratory (ORNL) Center for Transportation Analysis' Rail Network (Version 5-5) is used to develop a primary corridor network model and identify the key corridor characteristics such as the number of tracks and type of signal system;
- The U.S. DOT Surface Transportation Board's (STB) 2005 Carload Waybill Sample is used to estimate current corridor volumes based on 2005 loaded-car movements;
- Data from the Surface Transportation Board's Uniform Rail Costing System (URCS) on empty-return ratios by railroad, car type, and car ownership are used to estimate empty car movements;
- The U.S. DOT's Freight Analysis Framework (FAF Version 2.2) forecast is used to establish rail freight traffic growth by type of train service (e.g., intermodal train, manifest/carload train, auto train, and bulk train) from 2005 to 2035;

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<sup>13</sup>Zeta-Tech Associates, Inc., *An Estimation of the Investment in Track and Structures Needed to Handle 286,000-Pound Rail Cars*, prepared for the American Short Line and Regional Railroad Association, May 26, 2000.

- Data from the railroads and the AAR are used to estimate the capacity in trains per day for archetypical rail corridors representing different combinations of number of tracks and signal types. The capacities of the archetypical rail corridors are used to identify the improvements needed to accommodate future train volumes.
- Data from the Class I railroads, the AAR, and published construction industry information are used to estimate the cost of adding tracks, upgrading signal systems, expanding terminals, and adding rail-support facilities.

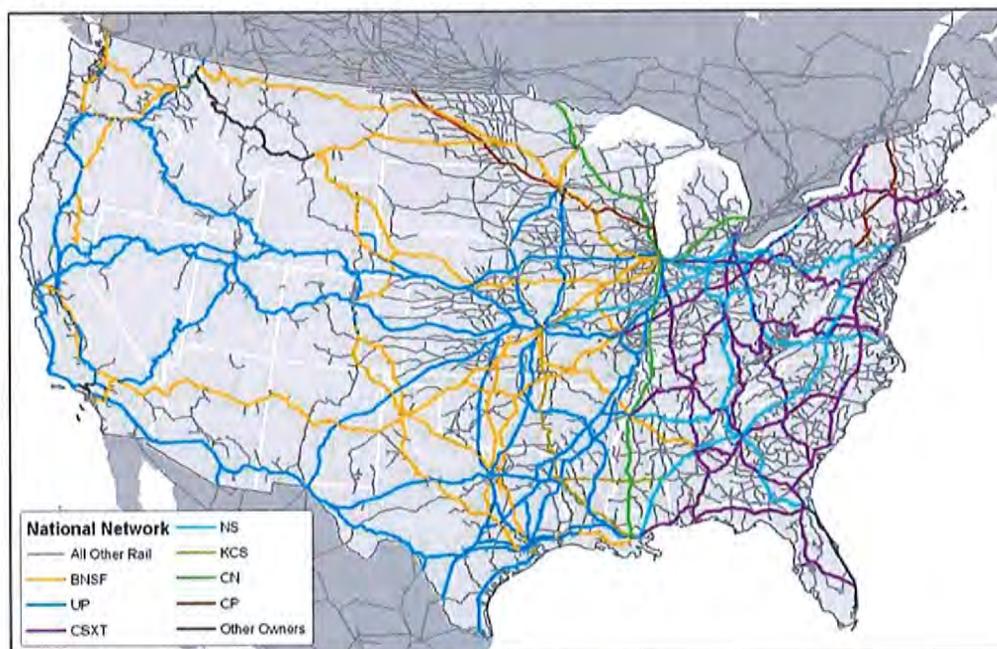
Appendix A describes the technical methodology in more detail.

## 4.0 Current Train Volumes and Capacity

### 4.1 PRIMARY CORRIDORS

The study focuses on the primary rail corridors within the national rail freight system. Figure 4.1 shows the national rail network. The primary corridors for each of the seven Class I railroads are shown in color; all other rail lines are shown in gray.

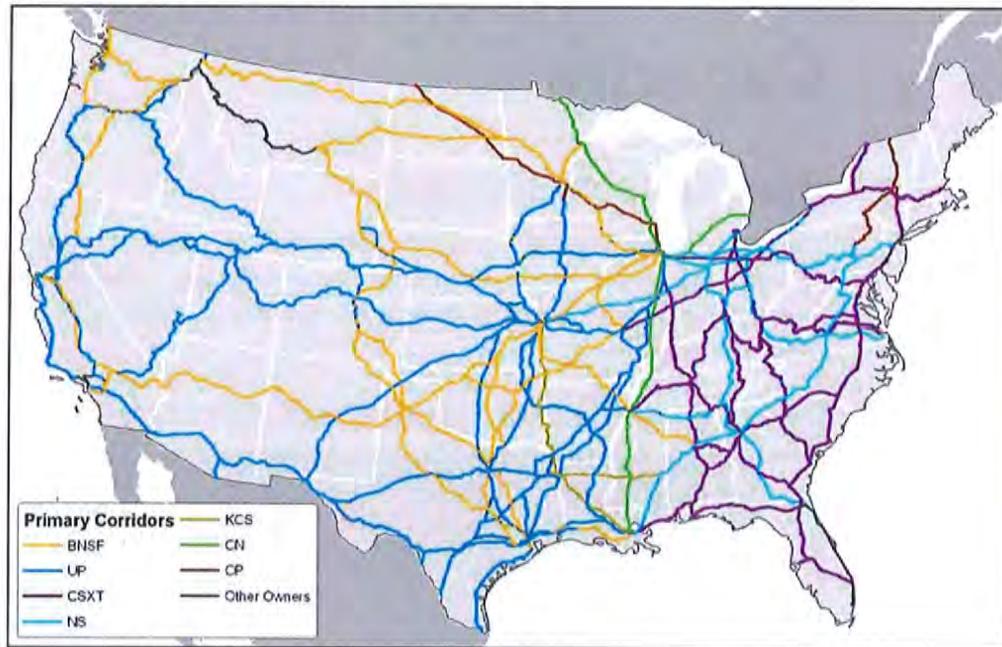
**Figure 4.1 National Rail Freight Network and Primary Rail Freight Corridors**



Source: Cambridge Systematics, Inc.

Figure 4.2 shows just the primary corridors used for this study of rail freight capacity. The primary corridors were designated by the Class I railroads for this study. The primary corridors represent the higher-volume corridors for rail freight. The primary corridors total about 52,340 miles of road (or centerline miles), representing about half of all Class I-operated miles in the U.S. and about one-third of the 140,810 miles in the U.S. rail freight network. For comparison, the Interstate Highway System comprises about 47,000 route miles, and the National Highway System, which adds other major U.S. and state freight highways, comprises about 162,000 route miles.

Figure 4.2 Primary Rail Freight Corridors



Source: Cambridge Systematics, Inc.

## 4.2 CURRENT VOLUMES

Current corridor volumes in trains per day were established for each primary corridor using data from the Surface Transportation Board's 2005 Carload Waybill Sample. The Waybill Sample is an annual survey of railcar movements on the national rail network. The survey collects information from a sample of loaded, revenue-producing railcar movements. The data include information about the commodity shipped, the type of railcar used, the origin and destination station of the shipment, any interchanges between railroads, and the names of railroads handling the shipment. The sample data are statistically expanded to represent 100 percent of the loaded revenue railcar moves in a year. The Waybill Sample is used in many regulatory proceedings and is generally considered an accurate reflection of U.S. railroad shipments. The 2005 Waybill Sample is the most recent comprehensive data available.

The Waybill Sample does not collect information about empty, non-revenue-producing railcar movements. These were estimated using information from the Uniform Rail Costing System (URCS) on empty-return ratios by railroad, car type, and car ownership. The number of empty, non-revenue-producing railcar movements were added to the number of loaded, revenue-producing railcar movements to estimate total railcar movements.

The number of carloads moving on the rail system varies daily, weekly, and seasonally. To select a representative day, the distribution of the number of carload movements for each day in 2005 was examined and the volume for the 85<sup>th</sup> percentile day was selected for analysis. This approach is consistent with the analysis procedures for highway needs studies.

The carload volumes were then allocated among four types of train service based on the commodity being carried and the type of operation:

1. **Auto Train Service** - For assembled automobiles, vans, and trucks moving in multilevel cars;
2. **Bulk Train Service** - For grain, coal, and similar bulk commodities moving in unit trains;
3. **Intermodal Train Service** - For commodities moving in containers or truck trailers on flat cars or specialized intermodal cars; and
4. **General-Merchandise Train Service** - Everything else, including commodities moved in box cars and tank cars.

The number of trains of each type needed to move the cars were estimated using information on the typical number of cars hauled by train service type, as summarized in Table 4.1. The number of intermodal trains needed is based on the number of intermodal units (e.g., container-on-flat-car [COFC] units and trailer-on-flat-car [TOFC] units). Separate calculations were made for Eastern and Western Class I railroads because differences in regional geography and topography allow Western railroads to operate longer trains.<sup>14</sup>

**Table 4.1 Typical Number of Cars or Intermodal Units by Train Service Type**

Type of Train Service	Eastern Railroads	Western Railroads
Auto	57.0	63.9
Bulk	86.0	112.4
General Merchandise	82.0	80.7
Intermodal (TOFC/COFC count)	110.7	164.3

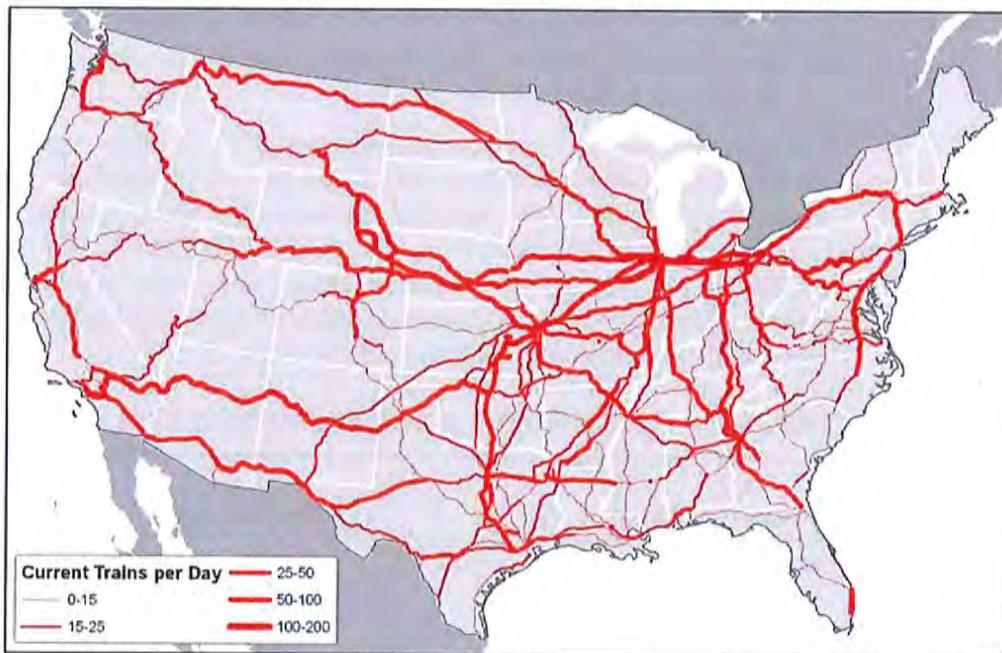
Source: Class I railroad data.

<sup>14</sup>For details, see Appendix A.

Finally, the number of long-distance Amtrak and local commuter passenger rail trains operating over the primary rail freight corridors was added to the number of freight trains to calculate the total number of trains per day per corridor. The number of passenger trains was estimated from published information on Amtrak and commuter passenger rail schedules for 2007.

Figure 4.3 maps the current corridor volumes in trains per day for the primary rail freight corridors. The number of trains per day is indicated by the width of the corridor line. The thinnest line indicates that a corridor carries up to 15 trains per day; the widest line indicates that a corridor carries between 100 and 200 trains per day.

**Figure 4.3** Current Corridor Volumes by Primary Rail Freight Corridor  
2005 Freight Trains and 2007 Passenger Trains per Day



Source: Cambridge Systematics, Inc.

Note: Volumes are for the 85<sup>th</sup> percentile day.

## 4.3 CURRENT CAPACITY

To determine whether a corridor is congested, current volume was compared to current capacity. Three variables were used to estimate the current capacity of the primary corridors: the number of tracks, the type of control system, and the mix of train types.<sup>15</sup>

- **Tracks** – Most sections of the national rail freight system are single-tracked with multiple sidings for trains to meet and pass each other, and a significant portion of the heaviest-volume corridors are double-tracked. A limited number of sections have three or four tracks.
- **Control System** – The type of control system affects capacity by maintaining a safe spacing between trains meeting and passing on the same track. There are three major types of signal systems:
  - **Automatic Block Signaling (ABS)** is a signal system that controls when a train can advance into the next track block. A block is a section of track with traffic control signals at each end. The length of the block is based on the length of a typical train and the distance needed to stop the train in a safe manner. When a train exits a block, the signal changes to yellow, indicating to the engineer of a following train that the block is now empty, but that the following train should be prepared to stop before entering the next block (currently occupied by the train ahead). Automatic block signaling is governed by block occupancy and cannot be controlled by a railroad dispatcher from a remote location.
  - **Centralized Traffic Control (CTC)** and **Traffic Control System (TCS)** are systems that use electrical circuits in the tracks to monitor the location of trains, allowing railroad dispatchers to control train movements from a remote location, typically a central dispatching office. CTC and TCS increase capacity by detecting track occupancy and allowing dispatchers to safely decrease the spacing between trains because the signal systems automatically prevent trains from entering sections of track already occupied by other trains.
  - **No Signal (N/S)** and **Track Warrant Control (TWC)** are basic train control systems that require the train crew to obtain permission or warrants

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<sup>15</sup>The capacity of rail corridors is determined by a large number of factors, including the number of tracks, the frequency and length of sidings, the capacity of the yards and terminals along a corridor to receive the traffic, the type of control systems, the terrain, the mix of train types, the power of the locomotives, track speed, and individual railroad operating practices. Complete, consistent, and current information on all these factors was not available for the study, so the capacity of the primary corridors was estimated using only the three dominant factors (e.g., number of tracks, type of signal system, and mix of train types).

before entering a section of track. Crews receive track warrants by radio, phone, or electronic transmission from dispatcher. TWC is used on low-volume track instead of more expensive ABS or CTC/TCS systems.

- **Train Types** - The mix of train types determines the speed and spacing of trains on a track. Different types of trains operate at different speeds and have different braking capabilities. A corridor that serves a single type of train will usually accommodate more trains per day than a corridor that serves a mix of train types. Trains of the single type can be operated at similar speeds and with more uniform spacing between the trains because they have similar braking capabilities. This increases the total number of trains that can traverse the corridor per day. When trains of different types—each with different length, speed, and braking characteristics—use a corridor, greater spacing is required to ensure safe braking distances. As a result, the average speed drops, reducing the total number of trains that can traverse the corridor per day. For the study, trains were grouped into three train-type groups based on their operating characteristics:
  - **Train-Type Group 1** - includes merchandise/carload trains and bulk coal and grain trains. These trains tend to haul heavier, bulkier commodities such as coal, grain, gravel, and phosphates, and operate at slower speeds.
  - **Train-Type Group 2** - includes intermodal trains and multilevel auto carriers hauling assembled automobiles. These trains tend to operate at higher speeds because they are lighter than merchandise and bulk trains and are run to more exacting schedules.
  - **Train-Type Group 3** - includes passenger trains such as Amtrak's long-distance trains and local commuter rail trains. Passenger trains operate at high speeds and on fixed schedules, similar to the speeds and schedules of intermodal trains. They require close control to ensure safe operation and stopping distances, especially when operating along corridors carrying merchandise trains or a mix of merchandise and intermodal trains. By law, Amtrak passenger trains operating over rail freight lines must be given priority; this means that when Amtrak trains meet or overtake freight trains, the freight trains are shunted to sidings or parallel lines until the passenger train has passed.

There are eight combinations of number of tracks and type of signal system that are in common use across the primary corridors today. Table 4.2 lists the combinations, along with five- and six-track corridor types, which are used in this study to accommodate future demand. The first column lists the number of tracks, and the second column lists the type of control system. For each combination of number of tracks and type of control system, the maximum number of trains that can typically be accommodated is determined by the mix of train types operating along the corridor. The third column in the table lists the maximum practical capacity in trains per day that can be accommodated if multiple train types (e.g., merchandise, bulk, and passenger trains) use the corridor. The

rightmost column lists the maximum practical capacity in trains per day that can be accommodated if a single train type (e.g., all intermodal trains) uses the corridor.

**Table 4.2 Average Capacities of Typical Rail-Freight Corridors**  
*Trains per Day*

Number of Tracks	Type of Control	Trains per Day	
		Practical Maximum If Multiple Train Types Use Corridor*	Practical Maximum If Single Train Type Uses Corridor**
1	N/S or TWC	16	20
1	ABS	18	25
2	N/S or TWC	28	35
1	CTC or TCS	30	48
2	ABS	53	80
2	CTC or TCS	75	100
3	CTC or TCS	133	163
4	CTC or TCS	173	230
5	CTC or TCS	248	340
6	CTC or TCS	360	415

Key: N/S-TWC – No Signal/Track Warrant Control.  
ABS – Automatic Block Signaling.  
CTC-TCS – Centralized Traffic Control/Traffic Control System.

Notes: \* For example, a mix of merchandise, intermodal, and passenger trains.  
\*\* For example, all intermodal trains.

The table presents average capacities for typical rail freight corridors. The actual capacities of the corridors were estimated using railroad-specific capacity tables. At the request of the railroads, these detailed capacity tables were not included in this report to protect confidential railroad business information.

Source: Class I railroad data aggregated by Cambridge Systematics, Inc.

Typically, a corridor serving multiple train types will have a lower capacity than a corridor serving a single train type. For example, a railroad corridor with two tracks, a centralized traffic control (CTC) system, and a mix of merchandise/bulk trains, intermodal/auto trains, and passenger trains would typically operate at a capacity of about 75 trains per day. The same corridor, serving all merchandise trains, would typically operate at a capacity of about 100 trains per day.

For the study, each primary corridor in the national rail network was assigned a capacity based its actual number of tracks, type of control system, and mix of train types. The calculated capacity of each corridor was reviewed with the railroads. The railroads made adjustments to update network information and better represent their actual corridor train volumes and capacities.

## 4.4 CURRENT VOLUMES COMPARED TO CURRENT CAPACITY

Current corridor volumes were compared to current corridor capacity to assess congestion levels. This was done by calculating a volume-to-capacity ratio expressed as a level of service (LOS) grade. The LOS grades are listed in Table 4.3.

**Table 4.3 Volume-to-Capacity Ratios and Level of Service (LOS) Grades**

LOS Grade	Description	Volume/Capacity Ratio
A B C	Below Capacity	Low to moderate train flows with capacity to accommodate maintenance and recover from incidents
		0.0 to 0.2
		0.2 to 0.4
D	Near Capacity	Heavy train flow with moderate capacity to accommodate maintenance and recover from incidents
E	At Capacity	Very heavy train flow with very limited capacity to accommodate maintenance and recover from incidents
F	Above Capacity	Unstable flows; service breakdown conditions
		0.4 to 0.7
		0.7 to 0.8
		0.8 to 1.0
		> 1.00

Source: Cambridge Systematics, Inc.

Rail corridors operating at LOS A, B, or C are operating below capacity; they carry train flows with sufficient unused capacity to accommodate maintenance work and recover quickly from incidents such as weather delays, equipment failures, and minor accidents. Corridors operating at LOS D are operating near capacity; they carry heavy train flows with only moderate capacity to accommodate maintenance and recover from incidents. Corridors operating at LOS E are operating at capacity; they carry very heavy train flows and have very limited capacity to accommodate maintenance and recover from incidents without substantial service delays. Corridors operating at LOS F are operating above capacity; train flows are unstable, and congestion and service delays are persistent and substantial. The LOS grades and descriptions correspond generally to the LOS grades used in highway system capacity and investment requirements studies.

A rail corridor that is operating at a volume-to-capacity ratio of 0.7 (the boundary between LOS C and LOS D), is operating at 70 percent of its theoretical maximum capacity. This is considered to be the corridor's practical capacity because a portion of the theoretical maximum capacity is lost to maintenance, weather delays, equipment failures, and other factors. A corridor operating at LOS C will have stable train flows, ensuring that schedules can be met reliably and safely, and permitting timely recovery from service disruptions. At LOS D, a corridor will have stable operations under normal conditions, but service can quickly become unstable with unplanned and unanticipated disruptions. At volume-to-capacity ratios significantly greater than 0.8 (e.g., at LOS E or F), train flow rates and schedule reliability deteriorate and it takes longer and longer to recover from disruptions. To provide acceptable and competitive service to shippers and receivers, railroads typically aim to operate rail corridors at LOS C/D or better.

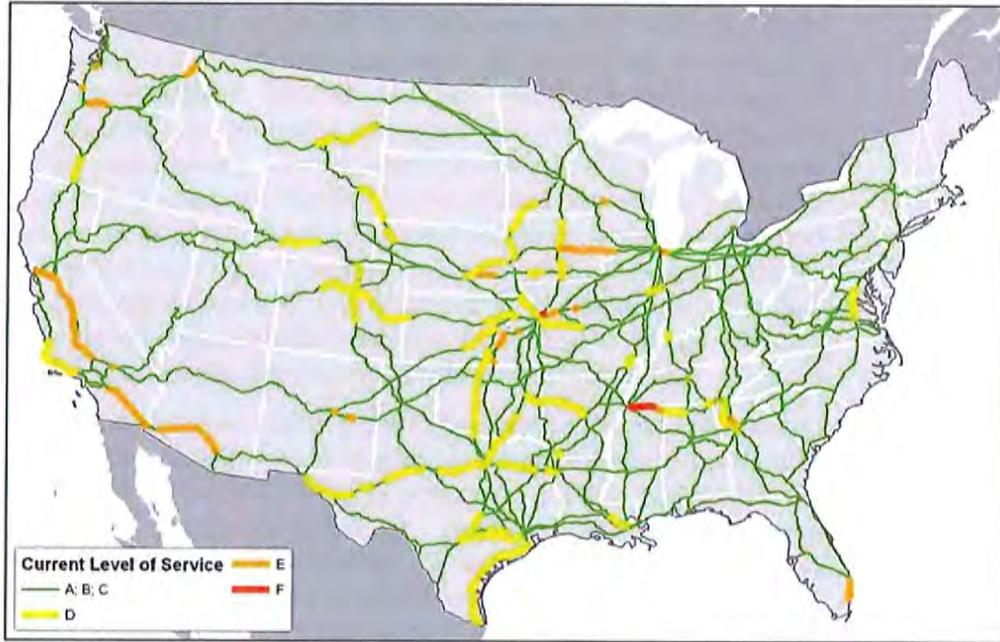
Figure 4.4 maps the volume-to-capacity ratios, expressed as LOS grades, for each primary rail corridor, based on current train volumes and current capacity.<sup>16</sup> For legibility, rail corridors operating at LOS A, B and C (below practical capacity) have been mapped in green. Corridors operating at LOS D (near practical capacity) have been mapped in yellow, and corridors operating at LOS E (at practical capacity) have been mapped in orange. Rail corridors operating at LOS F (above capacity) have been mapped in red.

Analysis of the current levels of service, summarized in Table 4.4, shows that 88 percent of today's primary corridor mileage is operating below practical capacity (LOS A/B/C), 12 percent is near or at practical capacity (LOS D/E), and less than 1 percent is operating above capacity (LOS F).

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<sup>16</sup>Current volumes are based primarily on shipment volumes reported in the 2005 STB Carload Waybill Sample. These volumes do not reflect fully recent increases in coal shipments moving from Western coal fields (e.g., Powder River Basin) to Eastern utilities nor the recent increases in intermodal containers delivered by water to East Coast ports and transferred to rail for inland delivery. Current capacity is based on 2007 information.

**Figure 4.4 Current Train Volumes Compared to Current Train Capacity**



Source: Cambridge Systematics, Inc.

Note: Volumes are for the 85<sup>th</sup> percentile day.

**Table 4.4 Primary Rail Corridor Mileage by Current Level of Service Grade**  
*Current Volumes and Current Capacity*

LOS Grade	Total Mileage	Percentage
A	9,719	19%
B	15,417	30%
C	20,683	39%
D	4,952	9%
E	1,461	3%
F	108	<1%
Totals	52,340	100%

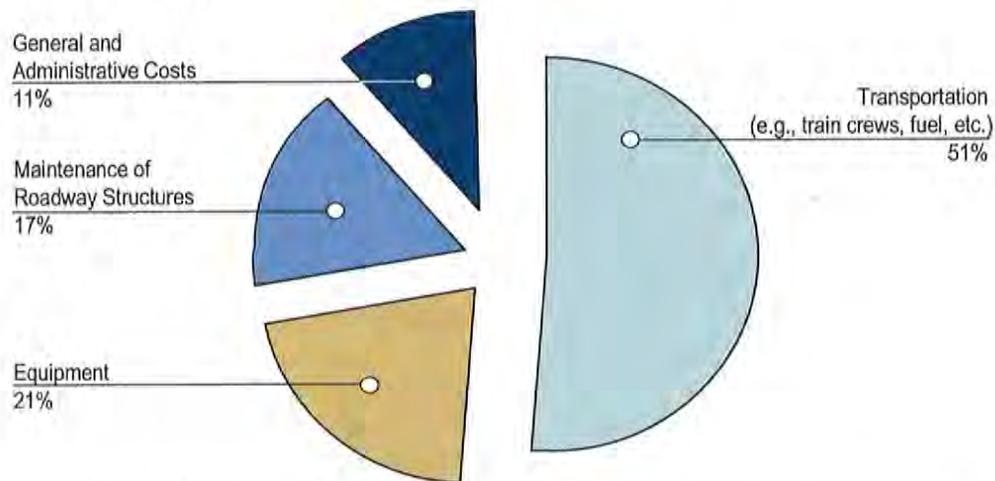
Source: Cambridge Systematics, Inc.

## 4.5 CURRENT RAILROAD INVESTMENT IN CAPACITY

The Class I railroads generated \$52.2 billion in revenue in 2006 and incurred \$41 billion in operating expenses.<sup>17</sup> After deducting interest charges, taxes and other miscellaneous items, the Class I railroads earned a net income of \$6.5 billion in 2006.

Of the \$41 billion in expenses, \$21.1 billion (40 percent of revenue) was spent on transportation, which includes the costs of train crews and fuel; \$8.5 billion (16 percent of revenue) on equipment; \$6.8 billion (13 percent of revenue) on maintenance of roadway (e.g., rails, ties, ballast and substructure) and structures (e.g., bridges, tunnels, service building, etc.); and \$4.6 billion (9 percent of revenue) on general and administrative costs. A breakdown of the operating expenditures is shown in Figure 4.5.

**Figure 4.5 Class I Railroad Operating Expenditures  
2006**



Source: American Association of Railroads.

In 2006, the Class I railroads' capital expenditures totaled \$8.5 billion. Of this, \$1.5 billion (about 18 percent) was spent on equipment, and \$7.0 billion (about

<sup>17</sup>In 2006, the operations and maintenance (O&M) cost for Class I railroads was \$210,380 per mile of track and \$359,097 per mile of road. This O&M cost is a fully burdened cost including transportation, equipment maintenance, G&A (but not maintenance of way and structures), and capital expenditures for equipment (but not way and structures). Depreciation is deducted to avoid double-counting. The calculations are based on 162,056 miles of operated track and 94,942 miles of road, less miles operated under trackage rights to avoid double-counting. This information is for the seven Class I railroads, U.S. operations only.

82 percent) on roadway and structures.<sup>18</sup> These capital expenditures include amounts for renewal of the existing roadway, structures, and equipment, as well as expenditures for expansion to serve additional traffic.

Combining operating and capital spending and adjusting for depreciation, 40 percent of the Class I railroads' revenue is spent on maintenance, replacement, or expansion of their track, structures, and equipment.<sup>19</sup> In 2006, the Class I railroads spent \$10.6 billion maintaining and improving their infrastructure, and another \$8.7 billion on equipment.<sup>20</sup>

The AAR estimates that the Class I railroads will spend approximately \$1.9 billion in 2007 for expansion of capacity through the construction of new roadway and structures. This is the highest level of investment for expansion in recent years and reflects a steady increase in investment in expansion of roadway and structures. The Class I railroads invested \$1.1 billion in expansion of roadway and structures in 2005. The Class I railroads invested \$1.4 billion in infrastructure expansion in 2006. This was in addition to an expenditure of \$17.9 billion for renewal of roadway, structures, and equipment and additions to locomotives and freight cars. The average annual investment in infrastructure expansion over the three year period from 2005 to 2006 was \$1.5 billion per year.<sup>21</sup>

As these numbers demonstrate, rail transportation is capital intensive, requiring high levels of spending on infrastructure such as track, bridges, and signals; locomotives, freight cars, and maintenance equipment; and information technology. From 1996 through 2005, Class I railroad capital expenditures averaged 17 percent of revenue. (The comparable figure for the average U.S. manufacturer was 3 percent of revenue.) Railroad capital expenditures for ties alone have exceeded \$1 billion every year since 2003, and spending for rail has been even higher.

Even though the railroads must invest heavily in infrastructure, the railroads have had substantial surplus capacity in the rail network for many years. This has enabled them to absorb traffic growth with relatively modest additional capital commitments to expand infrastructure. With this surplus capacity largely absorbed by two decades of growth and with major traffic increases in the past few years, an increasing portion of the capital investment in roadway and structures has been devoted to capacity expansion. And with traffic growth through 2035 expected to be significant, increasing amounts of capital will need to be devoted to expansion.

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<sup>18</sup>These capital expenditures do not include some equipment that was acquired under operating leases.

<sup>19</sup>Capital expenditures plus operating expenses for infrastructure and equipment, minus depreciation to avoid double-counting capital spending.

<sup>20</sup>Association of American Railroads economists estimate that each \$1 billion of investment in rail infrastructure generates over 20,000 jobs.

<sup>21</sup>Association of American Railroads data.

# 5.0 Future Train Volumes and Capacity

## 5.1 FUTURE VOLUMES

2035 train volumes were projected using economic growth and commodity forecasts from the U.S. DOT's Freight Analysis Framework (FAF Version 2.2). The FAF forecasts are national freight transportation estimates covering all types of shipments by truck, rail, water, pipeline, and air. The U.S. DOT and the Federal Highway Administration use the FAF forecasts to analyze truck freight demand and help estimate highway capacity needs and investment requirements.

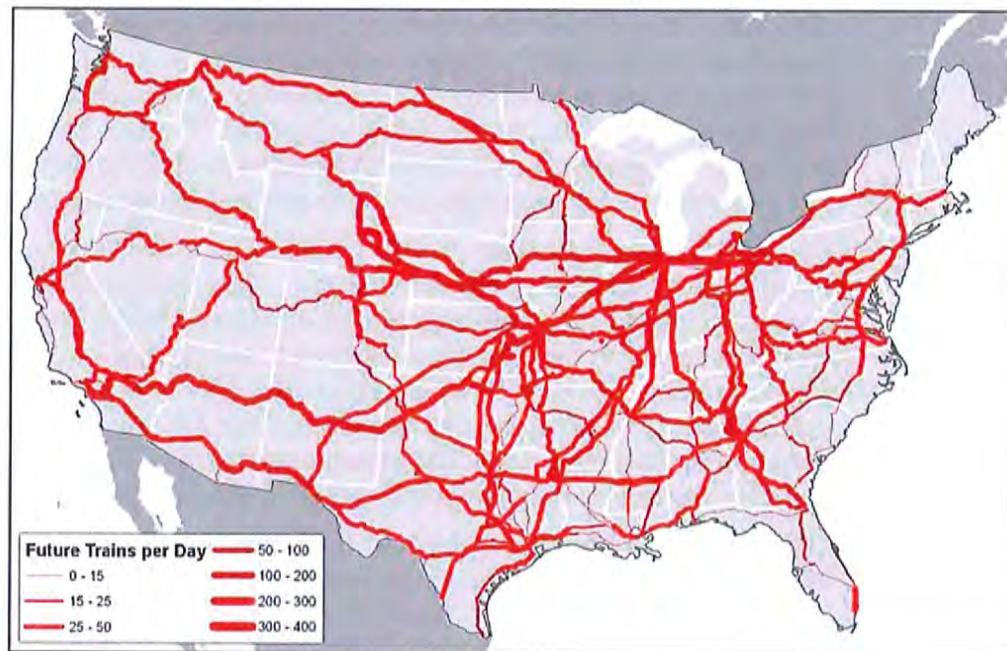
The FAF forecasts consider growth in population, the economy, and international trade. Forecasts of the demand for freight transportation are derived by examining production, consumption, and trade by major industry sector and economic region in the U.S., North America, and the rest of the world. The rail freight forecasts cover over 40 categories of commodities and estimate the volume of each type of commodity moving among 138 economic zones (114 zones representing economic areas and international trade gateways within the U.S., and 24 zones representing economic areas in Canada, Mexico, and overseas).

The forecasts are driven by demand only; they are not constrained by supply. This means that if an industry grows and the industry currently ships and receives a commodity by rail, then the industry will ship and receive more of that commodity by rail in the future. Conversely, if an industry declines and the industry currently ships and receives a commodity by rail, then the industry will ship and receive less by rail in the future. The forecasts assume that the rail system (and other freight modes) will have the capacity to meet the future demand. The forecasts also do not attempt to presuppose how markets and demand will change in response to future, but unknown, changes in technology, regulation, and politics. The forecasts are a starting point for consideration of the effect of future demand on infrastructure capacity and investment requirements, but are not comprehensive in their estimation of future freight demand.

The FAF Version 2.2 2035 commodity forecasts were used to develop weighted growth rates for the four types of train services—auto train service (for finished automobiles), bulk train service (for grain, coal, and similar bulk commodities), intermodal train service (for commodities moving in containers or truck trailer on flat cars or specialized intermodal cars), and general-merchandise train service (for everything else, including commodities moved in box cars and tank cars). The growth rates were applied to the number of 2005 trains to approximate the number of 2035 trains. The number of passenger trains was held at 2007 levels and added to the estimated number of freight trains in 2035.

Figure 5.1 maps the future corridor volumes in trains per day for the primary rail freight corridors. The number of trains per day is indicated by the width of the corridor line. The thinnest line indicates that a corridor carries up to 15 trains per day; the widest line indicates that a corridor carries between 300 and 400 trains per day.

**Figure 5.1 Future Corridor Volumes by Primary Rail Freight Corridor**  
*2035 Freight Trains and 2007 Passenger Trains per Day*

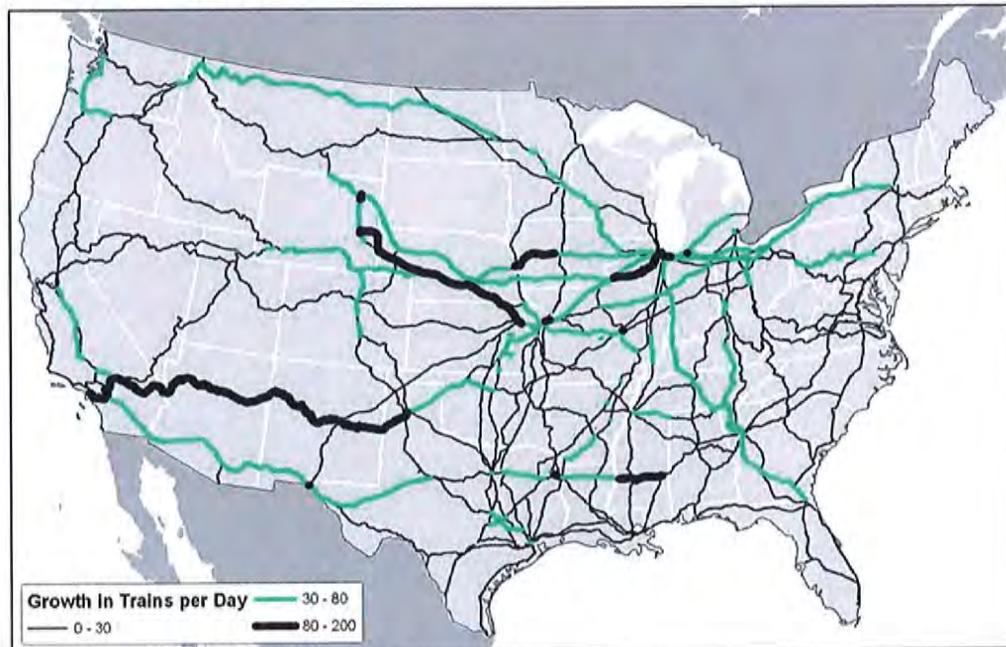


Source: Cambridge Systematics, Inc.

Note: Volumes are for the 85<sup>th</sup> percentile day.

Figure 5.2 compares current and future volumes by primary corridor. The figure shows the growth in trains per day between the 2005 volumes and the 2035 volumes. The growth is indicated by the width and color of the corridor line. A thin black line indicates that a corridor will carry up to 30 additional trains per day by 2035; a green line indicates that a corridor will carry between 30 and 80 additional trains per day; and a thick black line indicates that a corridor will carry between 80 and 200 additional trains per day.

**Figure 5.2 Growth in Trains per Day from 2005 to 2035 by Primary Rail Corridor**

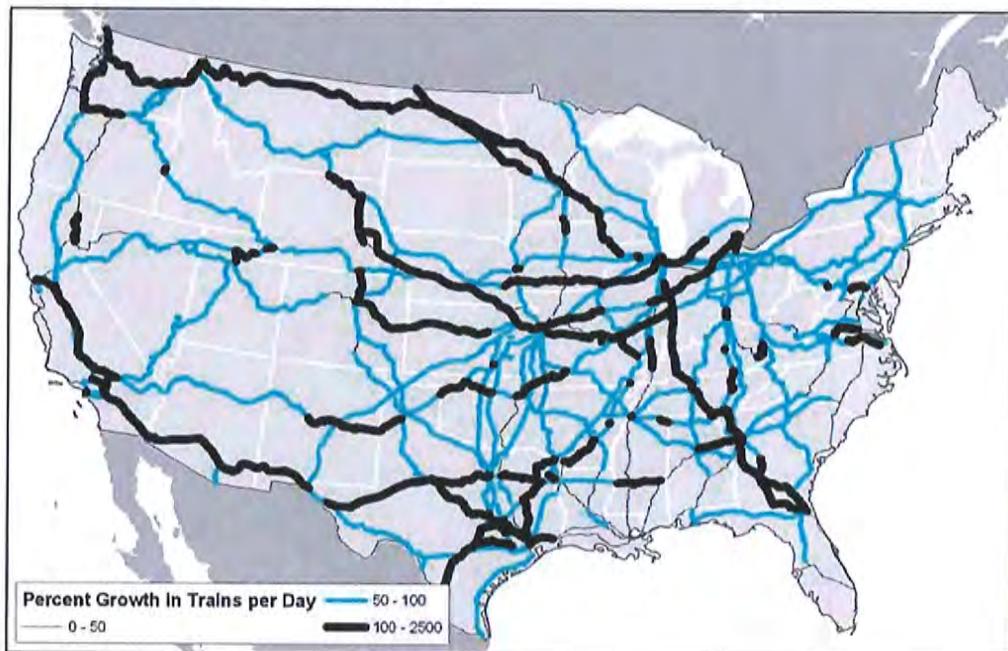


Source: Cambridge Systematics, Inc.

Note: Volumes are for the 85<sup>th</sup> percentile day.

Figure 5.3 also compares current and future volumes by primary corridor, but the figure shows the percentage growth in trains per day from 2005 to 2035. The percentage growth is indicated by the width and color of the corridor line. A thin black line indicates that a corridor will carry up to 50 percent more trains per day by 2035; a blue line indicates that a corridor will carry between 50 and 100 percent more trains per day; and a thick black line indicates that a corridor will carry over 100 percent more trains per day.

**Figure 5.3 Percentage Growth in Trains per Day from 2005 to 2035 by Primary Rail Corridor**



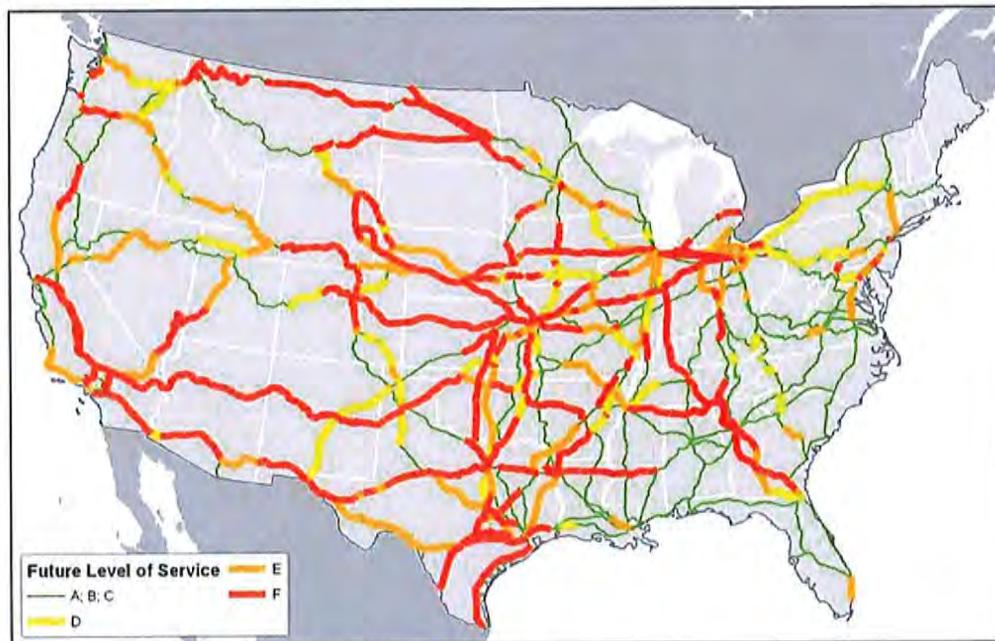
Source: Cambridge Systematics, Inc.

Note: Volumes are for the 85<sup>th</sup> percentile day.

## 5.2 FUTURE VOLUMES COMPARED TO CURRENT CAPACITY

Future volumes were compared to current capacity to estimate future volume-to-capacity ratios. This information was used to determine where demand will exceed capacity and where improvements will be required to avoid congestion. Figure 5.4 compares 2035 volumes in trains per day to current corridor capacity. The volume-to-capacity ratios are expressed as LOS grades for each primary rail corridor. Again, for legibility, rail corridors operating at LOS A, B, and C (below practical capacity) have been mapped in green. Corridors operating at LOS D (near practical capacity) have been mapped in yellow, and corridors operating at LOS E (at practical capacity) have been mapped in orange. Rail corridors operating at LOS F (above capacity) have been mapped in red.

**Figure 5.4** Future Corridor Volumes Compared to Current Corridor Capacity  
*2035 without Improvements*



Source: Cambridge Systematics, Inc.

Note: Volumes are for the 85<sup>th</sup> percentile day.

Analysis of the 2035 levels of service, summarized in Table 5.1, shows that—without improvements—45 percent of primary corridor mileage will be operating below capacity (LOS A/B/C), 25 percent will be operating near or at capacity (LOS D/E), and 30 percent will be operating above capacity (LOS F). The resulting level of congestion would affect nearly every region of the country and would likely shut down the national rail network.

**Table 5.1 Primary Rail Corridor Mileage by Future Level of Service Grade 2035 without Improvements**

LOS Grade	Total Mileage	Percentage
A	4,895	9%
B	6,626	13%
C	11,708	23%
D	5,353	10%
E	7,980	15%
F	15,778	30%
Totals	52,340	100%

Source: Cambridge Systematics, Inc.

## 6.0 Rail Capacity Improvements

### 6.1 CAPACITY IMPROVEMENTS

Rail improvements were determined by comparing the current capacity in each primary corridor to the capacity needed to accommodate future train volumes. Capacity estimates were based on the capacities of typical rail corridor combinations of tracks, controls, and mix of train types as shown in Table 6.1. (This table was described in Section 4.0 and is repeated here for reference.)

**Table 6.1 Average Capacities of Typical Rail-Freight Corridors**  
*Trains per Day*

Number of Tracks	Type of Control	Trains per Day	
		Practical Maximum If Multiple Train Types Use Corridor*	Practical Maximum If Single Train Type Uses Corridor**
1	N/S or TWC	16	20
1	ABS	18	25
2	N/S or TWC	28	35
1	CTC or TCS	30	48
2	ABS	53	80
2	CTC or TCS	75	100
3	CTC or TCS	133	163
4	CTC or TCS	173	230
5	CTC or TCS	248	340
6	CTC or TCS	360	415

Key: N/S-TWC – No Signal/Track Warrant Control.  
ABS – Automatic Block Signaling.  
CTC-TCS – Centralized Traffic Control/Traffic Control System.

Notes: \* For example, merchandise, intermodal, and passenger trains.  
\*\* For example, all intermodal trains.

The table presents average capacities for typical rail freight corridors. The actual capacities of the corridors were estimated using railroad-specific capacity tables. At the request of the railroads, these detailed capacity tables were not included in this report to protect confidential railroad business information.

Source: Class I railroad data aggregated by Cambridge Systematics, Inc.

For example, if a corridor with “one track and N/S-TWC control,” which today accommodates 15 trains per day, must accommodate 35 trains per day in 2035, it is upgraded to “one track with CTC-TCS control,” which accommodates 30 to 48 trains per day, depending on the mix of train types operating in the corridor.

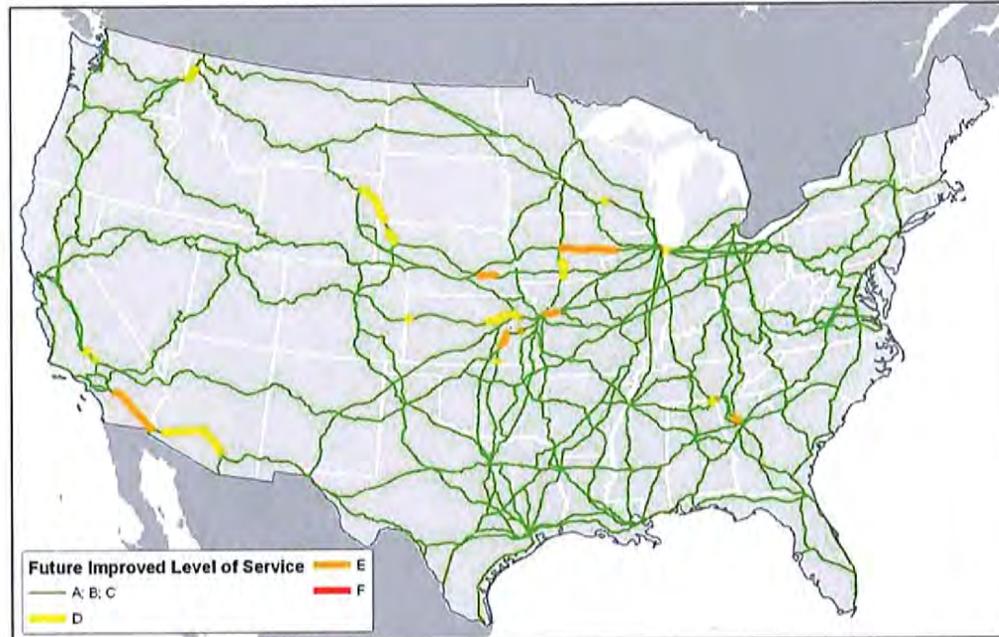
To avoid double-counting improvements that are currently programmed or underway, new improvements were selected to accommodate only forecast demand, not to correct current capacity shortfalls. If a corridor is at or above capacity today and needs additional capacity to accommodate future demand, improvements were programmed to bring the volume-to-capacity ratio back to the current ratio. For example, if the current volume-to-capacity ratio of a corridor is 0.85 and the future volume-to-capacity ratio without improvements is estimated to be 1.6, improvements were made to bring the volume-to-capacity ratio back to 0.85, not to 0.70. If a corridor is below capacity today and needs additional capacity to accommodate future demand, improvements were selected to bring the volume-to-capacity ratio up to a maximum of 0.70.

## 6.2 FUTURE VOLUMES COMPARED TO FUTURE CAPACITY

Figure 6.1 compares projected future corridor volumes in trains per day to projected future corridor capacity assuming that the necessary improvements are made. The volume-to-capacity ratios are expressed as LOS grades for each primary rail corridor. Again, rail corridors operating at LOS A, B and C (below practical capacity) have been mapped in green. Corridors operating at LOS D (near practical capacity) have been mapped in yellow, and corridors operating at LOS E (at practical capacity) have been mapped in orange. Rail corridors operating at LOS F (above capacity) have been mapped in red.

Analysis of the 2035 levels of service, summarized in Table 6.2, shows that—with improvements—97 percent of primary corridor mileage will be operating below capacity (LOS A/B/C), 2 percent will be near or at capacity (LOS D/E), and less than 1 percent will be operating above capacity (LOS F).

**Figure 6.1 Future Train Volumes Compared to Future Train Capacity  
2035 with Improvements**



Source: Cambridge Systematics, Inc.

Note: Volumes are for the 85<sup>th</sup> percentile day.

**Table 6.2 Primary Rail Corridor Mileage by Future Level of Service Grade  
2035 with Improvements**

LOS Grade	Total Mileage	Percentage
A	4,895	9%
B	15,198	29%
C	31,036	59%
D	608	1%
E	597	1%
F	6	<1%
Totals	52,340	100%

Source: Cambridge Systematics, Inc.

# 7.0 Investment Requirements

## 7.1 COST OF IMPROVEMENTS

The cost of improvements needed to accommodate rail freight demand in 2035 is estimated at \$148 billion (in 2007 dollars). The Class I freight railroads' share of this cost is projected to be \$135 billion; the short line and regional freight railroads' share is projected to be \$13 billion. The cost estimates cover:

- Line expansion:
  - Upgrades to mainline tracks and signal control systems;
  - Improvements to significant rail bridges and tunnels;
  - Upgrades to Class I railroad secondary mainlines and branch lines to accommodate 286,000-pound freight cars; and
  - Upgrades to short line and regional railroad tracks and bridges to accommodate 286,000-pound freight cars.
- Facility expansion:
  - Expansion of carload terminals, intermodal yards, and international gateway facilities owned by railroads; and
  - Expansion of Class I railroad service and support facilities such as fueling stations and maintenance facilities.

Table 7.1 summarizes the investments required by type of improvement for the Class I and the short line and regional railroads.

**Table 7.1 Cost of Rail Freight Infrastructure Improvements**  
*Millions of 2007 Dollars*

	Class I Freight Railroads	Short Line and Regional Freight Railroads	Totals
Line Haul Expansion	\$94,750	\$320	\$95,070
Major Bridges, Tunnels, and Clearance	\$19,400	\$5,000	\$24,400
Branch Line Upgrades	\$2,390	\$7,230	\$9,620
Intermodal Terminal Expansion	\$9,320		\$9,320
Carload Terminal Expansion	\$6,620		\$6,620
Service Facilities	\$2,550		\$2,550
<b>Totals</b>	<b>\$135,030</b>	<b>\$12,550</b>	<b>\$147,580</b>

Source: Cambridge Systematics, Inc.

Notes: All estimates exclude real estate acquisition costs, consistent with national highway needs analysis study practices.

Line expansion costs for short line and regional railroads are only for segments used to connect the primary corridors, not the entire system.

The category Major Bridges, Tunnels, and Clearance covers very large projects such as expansion of major bridges and tunnels (or construction of new parallel bridges and tunnels) and corridor overhead clearance projects that are not adequately accounted for by per mile unit costs.

The category Branch Line Upgrades covers upgrades to secondary main and branch lines to meet 286,000-pound weight-limit standards for the Class I railroads. A preliminary analysis shows limited need to upgrade the capacity of secondary mainlines and branch lines.

Line expansion cost estimates were based on per mile construction costs to upgrade from one level of corridor capacity to another. Table 7.2 lists the average construction cost per mile for each set of upgrades. For example, upgrading a corridor from “one track and N/S-TWC control” to “one track with CTC-TCS control” would cost \$700,000 per mile. All costs are reported in current (2007) dollars.

**Table 7.2 Average Unit Costs**

From		To		Construction Cost (per mile)
Tracks	Control	Tracks	Control	
1	N/S-TWC	1	CTC-TCS	\$700,000
2	NS-TWC	2	CTC-TCS	\$700,000
1	ABS	1	CTC-TCS	\$500,000
2	ABS	2	CTC-TCS	\$600,000
1	CTC-TCS	2	CTC-TCS	\$3,800,000
2	CTC-TCS	3	CTC-TCS	\$4,400,000
3	CTC-TCS	4	CTC-TCS	\$4,400,000
4	CTC-TCS	5	CTC-TCS	\$4,400,000
5	CTC-TCS	6	CTC-TCS	\$4,400,000

Key: N/S-TWC – No Signal/Track Warrant Control.  
 ABS – Automatic Block Signaling.  
 CTC-TCS – Centralized Traffic Control/Traffic Control System.

Note: The table presents average costs for typical rail freight corridors. The actual costs of the corridors were estimated using railroad-specific capacity tables. Per mile construction costs for Eastern rail corridors were higher than the averages presented in the table because of the number of urbanized areas, hilly terrain, and numerous river crossings. Conversely, per mile construction costs for Western rail corridors in non-urban areas were lower than the averages presented in the table because of the prevalence of flatter, non-urbanized areas along some Western railroad primary corridors. At the request of the railroads, the railroad-specific cost tables were not included in this report to protect confidential railroad business information.

Source: Cambridge Systematics based on Association of American Railroads and Class I railroads' data.

Expansion costs for major bridges and tunnels were estimated separately for each facility based on the cost of recent and comparable projects. Expansion costs for facilities such as intermodal yards, carload terminals, fueling stations, and maintenance facilities were estimated using the anticipated number of intermodal units, cars, and trains operating in the corridor.

The estimates do not include all line expansion costs on short line and regional railroads, nor the cost of expanding tunnels, bridges, and service facilities on the short lines and regionals. Neither the Class I nor the short line and regional railroad estimates include the cost of additional real estate, the cost to maintain or replace existing rail lines and facilities, or the cost to acquire additional locomotives and railcars.

Appendix A provides more information on the cost estimating methods.

## 7.2 COST SAVINGS FROM PRODUCTIVITY IMPROVEMENTS

The recommended improvements and the cost estimates assume that the future demand for rail freight transportation will be met by using current technology and existing rail corridors. The analysis also assumes that there will be no shift in freight traffic among modes (i.e., rail, truck, water), and no significant changes in regulation or other factors that could change the demand for or supply of rail freight services.

However, there are alternative futures that could, and eventually should, be examined. These include futures that assume significant changes in rail technology, major shifts in markets or trade patterns, and new innovations in railroad operations. A full examination of these alternative futures was not attempted for this first approximation study. However, a preliminary estimate was made of the potential cost savings from productivity improvements.

The railroads anticipate that they can improve train productivity by up to 0.5 percent per year over the 28-year period from 2007 to 2035. The productivity would be gained by carrying more freight over each primary rail corridor. This would be done by increasing the number of trains, hauling more cars per train, and loading railcars more efficiently to make better use of the 286,000-pound capacity of current railcars. These improvements would allow the railroads to carry the same amount of rail freight in 2035, but carry it with fewer trains.

A 0.5 percent productivity improvement would reduce the number of trains to about 87 percent of the initial 2035 forecast number of trains. This would reduce capacity expansion needs in many corridors, reducing the cost of line expansion across all railroads from \$148 billion to about \$121 billion.<sup>22</sup> The Class I freight railroads' share for infrastructure expansion would be reduced from \$135 billion to \$109 billion, a savings of \$26 billion. The short line and regional freight railroads' share of capital expenditures would be reduced from \$12.6 billion to \$12.3 billion, a savings of about \$0.3 billion.

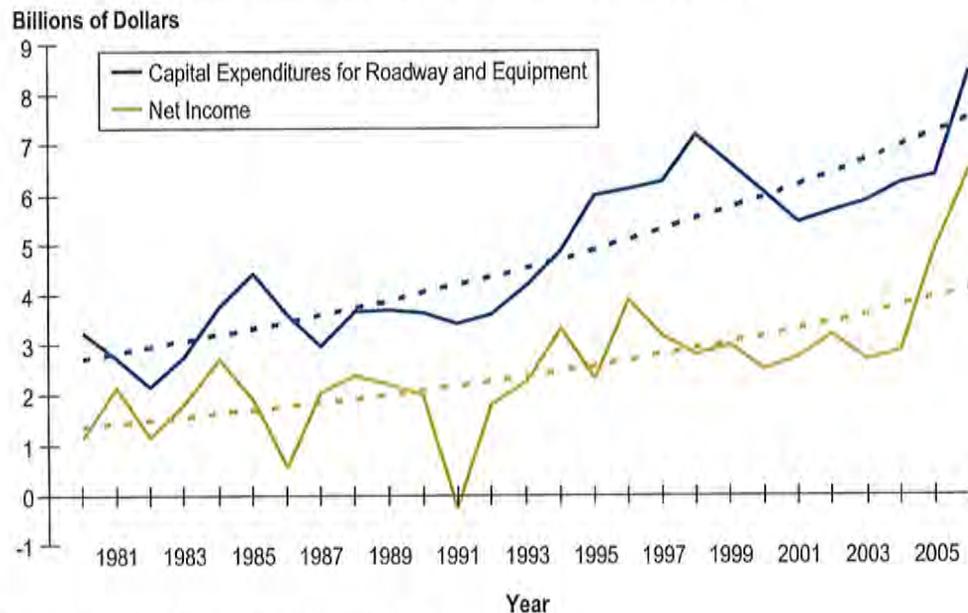
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<sup>22</sup>Productivity improvements are only applied to line costs, not to terminals, yards, facilities, etc.

## 7.3 RAILROAD INVESTMENT CAPACITY

In general, Class I railroad capital expenditures have tracked income, as shown in Figure 7.1, increasing consistently (in current dollars) since the economic deregulation of the railroad industry in 1980. Class I capital expenditures for infrastructure expansion totaled \$1.1 billion in 2005 and \$1.4 billion in 2006. The AAR estimates that Class I capital expenditures for infrastructure expansion will total \$1.9 billion in 2007.

**Figure 7.1 Capital Investment and Income**  
*Class I Railroads, 1981 to 2006, in Current Dollars*



Source: American Association of Railroads data.

If rail revenues grow proportionally to rail tonnage, currently forecast to increase by 88 percent by 2035, and if the railroads maintain their current level of effort for expansion, then the Class I railroads will invest cumulatively about \$70 billion over the 28-year period.

## 7.4 INVESTMENT REQUIREMENTS FOR CLASS I RAILROADS

The estimated cost of the improvements needed to accommodate rail freight demand in 2035 is \$148 billion. Of this amount, the Class I freight railroads' share is projected to be \$135 billion.

The Class I railroads anticipate that they will be able to generate approximately \$96 billion of their \$135 billion share through increased earnings from revenue growth, higher volumes, and productivity improvements, while continuing to renew existing infrastructure and equipment. If revenue and capital expenditures for expansion follow the growth in rail tonnage, as the railroads expect, the Class I railroads could realize about \$70 billion of the \$135 billion from growth. And if the Class I railroads can continue to achieve train productivity gains of up to 0.5 percent per year, the railroads could realize savings of \$26 billion in reduced capital expenditures. This would leave a balance for the Class I freight railroads of \$39 billion or about \$1.4 billion per year to be funded from railroad investment tax incentives, public-private partnerships, or other sources.

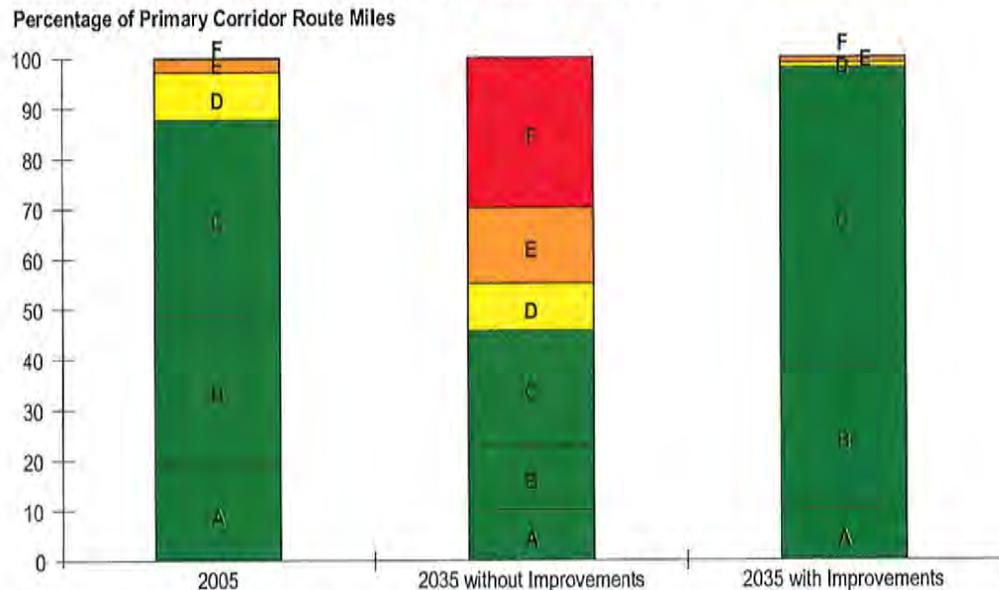
These investment projections assume that the market will support rail freight prices sufficient to sustain long-term capital investments. If regulatory changes or unfunded legislative mandates reduce railroad earnings and productivity, investment and capacity expansion will be slower and the freight railroads may not be able to meet the U.S. DOT's forecast demand.

## 8.0 Conclusions

On first approximation, the investment in the continental U.S. rail network required to allow the freight railroads to meet the U.S. DOT's projected demand for rail freight transportation is \$148 billion (in 2007 dollars). This level of investment would enable the freight railroads to keep pace with economic growth and meet the U.S. DOT's forecast demand for rail freight transportation in 2035.

The impact of the investment is illustrated in Figure 8.1, which compares the percentage of primary rail freight corridor miles by LOS grade and year.

**Figure 8.1 Percentage of Rail-Freight Primary Corridor Route Miles by Level of Service Grade in 2005, 2035 without Capacity Improvements, and 2035 with Capacity Improvements**



Source: Cambridge Systematics, Inc.

The left column shows the percentage of miles by LOS grade for the current rail system (2005 train volumes on the 85<sup>th</sup> percentile day compared to 2007 capacity). Red indicates the percentage of miles operating above capacity; yellow and orange the percentage of miles near or at capacity; and green, the percentage of miles below capacity. The center column shows the percentage of miles by LOS grade for the primary corridors in 2035 without improvements. Thirty percent of the rail miles in the primary corridors will be operating above capacity, causing severe congestion that will affect every region of the country and potentially shift freight to an already heavily congested highway system. Finally, the right column shows the estimated LOS grades in 2035 with improvements. The

improvements sharply reduce the number of primary corridor miles operating above capacity.

Meeting the U.S. DOT's forecast demand will require the Class I freight railroads to increase their investment in infrastructure expansion. The AAR estimates that between 2005 and 2007, Class I freight railroad capital expenditures for infrastructure expansion averaged \$1.5 billion per year. To meet the U.S. DOT's forecast demand for 2035, the Class I freight railroads must invest \$135 billion over the next 28 years or about \$4.8 billion per year.

The Class I freight railroads anticipate that they will be able to meet most of this increase in investment through growth and productivity gains. If revenue and capital expenditures for expansion follow the growth in rail tonnage, the Class I railroads could realize about \$70 billion of the \$135 billion from growth. And if the Class I railroads can continue to achieve train productivity gains of up to 0.5 percent per year, the railroads could realize savings of \$26 billion in reduced capital expenditures. This would leave a balance for the Class I freight railroads of \$39 billion or about \$1.4 billion per year to be funded from railroad investment tax incentives, public-private partnerships, or other sources.

These investment projections assume that the market will support rail freight prices sufficient to sustain long-term capital investments. If regulatory changes or unfunded legislative mandates reduce railroad earnings and productivity, investment and capacity expansion will be slower and the freight railroads may not be able to meet the U.S. DOT's forecast demand.

The findings of this study provide a starting point for assessing future rail freight capacity and investment requirements. The findings outline the improvements and investments required for the railroads to carry the freight tonnage forecast by the U.S. DOT. Additional work is needed to determine how much more capacity and investment would be needed for the railroads to increase their share of freight tonnage and reduce the rate of growth in truck traffic on highways. Finally, the forecasts and improvement estimates in this study do not fully anticipate future changes in markets, technology, regulation, and the business plans of shippers and carriers. Each could significantly reshape freight transportation demand, freight flow patterns, and railroad productivity, and, thus, rail freight infrastructure investment needs.

In summary, the findings point clearly to the need for more investment in rail freight infrastructure and a national strategy that supports rail capacity expansion and investment.

# A. National Rail Freight Infrastructure Capacity and Investment Study: Methodology

## A.1 INTRODUCTION

The objective of this study is to identify rail freight infrastructure improvements and investments in the continental U.S. rail network that will allow the freight railroads to meet the U.S. Department of Transportation's (DOT) projected demand for rail-freight transportation in 2035. This requires an understanding of the current and forecasted demand for rail services and the current and projected capacity of the rail network. The study encompasses the continental United States rail system.

The general approach was to divide the continental U.S. Class I railroad network into primary corridors; establish the volume of trains in 2005 and 2035; compare those volumes to current capacity; determine the additional capacity needed to accommodate 2035 volumes; identify the types of improvements warranted; and estimate the investment needed for these improvements. The improvements can be divided into line expansion and facility expansion, each with multiple components.

- Line expansion includes:
  - Upgrades to the Class I system mainlines control systems and/or number of tracks;
  - Improvements to significant bridges, tunnels, clearances, and other items above average costs;
  - Upgrades to Class I railroad secondary mainlines and branch lines to accommodate 286,000-pound freight cars; and
  - Upgrades to short line and regional railroad track and bridges to accommodate 286,000-pound freight cars.
- Facility expansion includes:
  - Expansion of capacity at Class I railroad-owned intermodal facilities, including terminals, ports and gateways;
  - Expansion of capacity at carload terminals (e.g., classification yards); and
  - Expansion of capacity at Class I railroad-owned service facilities (e.g., fueling stations, maintenance facilities).

## A.2 LINE CAPACITY EXPANSION

The work steps to estimate the cost of expanding line capacity along primary Class I railroad corridors to meet U.S. DOT projected demand was as follows:

1. Divide the continental U.S. Class I railroad network into primary corridors;<sup>23</sup>
2. Establish the number of freight trains for a day representing the 85<sup>th</sup> percentile of the maximum trains per day from the 2005 Surface Transportation Board (STB) Carload Waybill Sample (Waybill);
3. Establish the number of scheduled passenger trains for a current average weekday, and combine with the freight trains;
4. Estimate the number of freight trains per day in 2035 by applying forecast rates from the Freight Analysis Framework Version 2.2 to the 2005 STB Waybill. Passenger train volumes were held constant;
5. Estimate the current capacity on the nation's primary rail corridors in trains per day based on current track configurations;
6. Compare the 2005 and 2035 freight and passenger trains per day to the current capacity, and identify the types of improvements necessary to maintain reliable rail service in 2035;
7. Estimate the construction costs of the improvement lines;
8. Estimate the cost of significant bridges, tunnels, clearance projects, etc.; and
9. Estimate the cost to upgrade all Class I branch lines and all short line and regional lines that are currently below 286,000-pound weight standards to the current standard.

Each of these is described in more detail in the following sections.

### **Divide the Continental U.S. Class I Railroad Network into Primary Corridors**

The initial work step was to divide the continental U.S. Class I railroad network into primary corridors. The corridors are mainline track and represent the lanes that haul the majority of the freight rail traffic. A corridor is roughly homogeneous with respect to traffic mix and type of infrastructure (i.e., number of tracks and control system).

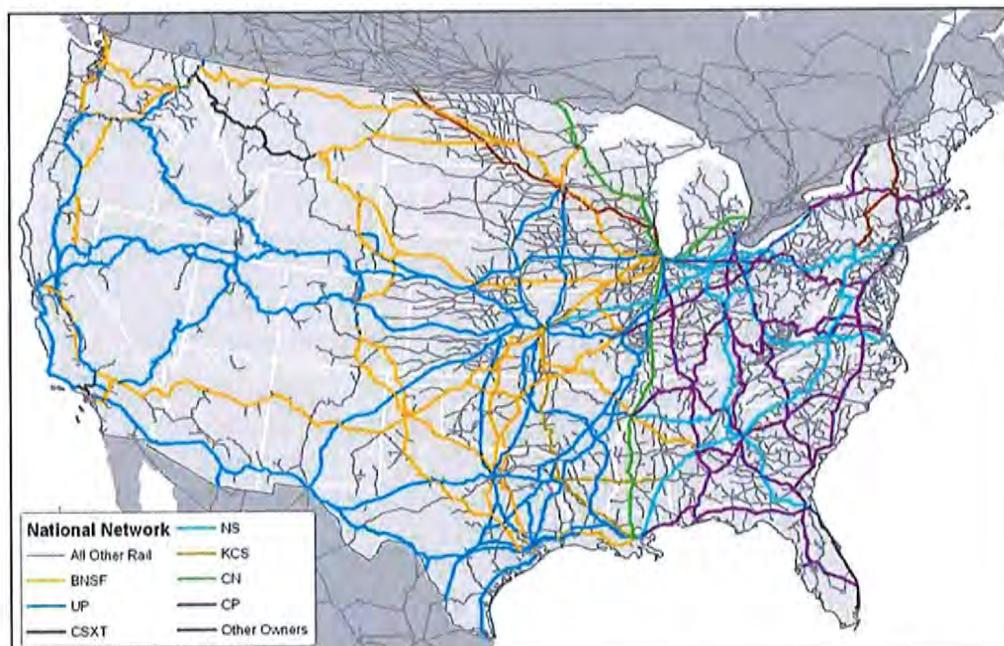
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<sup>23</sup>The Class I railroads covered in this study are BNSF, CN (U.S. operations), CP (U.S. operations), CSX, KCS, NS, and UP.

The beginnings and ends of the corridors are major urban areas corresponding with the U.S. Department of Transportation Freight Analysis Framework Version 2.2 (FAF<sup>2.2</sup>) zones, major rail traffic generators such as the Powder River Basin coal fields, port complexes, and major rail traffic junctions.

Each of the Class I railroads participating in the study provided to Cambridge Systematics (CS) a map of their recommended primary corridors. CS aggregated this information into a national network of primary corridors for use in this study.

**Figure A.1 National Rail Network and Primary Rail Corridors**



Source: Cambridge Systematics, Inc.

The primary corridors were then mapped to a network combining the Oak Ridge National Laboratory (ORNL) Center for Transportation Analysis Rail Network Version 5-5 containing infrastructure attributes, with a network developed for the Tennessee Department of Transportation that assigns rail flows using minimum distance paths. In the course of this project the TDOT network was revised to include missing links with information from the ORNL network. The mapping was done in TransCAD, a commercially available transportation network modeling program.

## Establish the Number of Freight Trains Operating on an 85<sup>th</sup> Percentile Day along Each Corridor in 2005

Data from the 2005 Surface Transportation Board Carload Waybill Sample was used to establish the total number of trains operating in each corridor with the following caveats:<sup>24</sup>

- Northbound Canadian traffic and southbound Mexican traffic will not be accounted for fully in this study because much of this traffic is absent from the Waybill Sample. Traffic terminating in Canada and Mexico (both U.S. originations and pass-through NAFTA traffic) often is waybilled to the U.S. border crossing, but much of the northbound Canadian traffic and southbound Mexican traffic is not reported.
- The Waybill Sample will not provide a complete picture of rail shipments end-to-end. The Waybill Sample is subject to “re-waybilling” (Rule 11 traffic) at key junctions such as Chicago. For example, one waybill may be written to cover a shipment from Los Angeles to Chicago, and a second waybill written to cover the same shipment as it moves on from Chicago to New York. This reporting practice makes it difficult to trace the entire route of some rail shipment. This issue did not affect the estimate of the number of trains operating in each corridor, and no effort was made to “link” these movements.

The Waybill Sample, which represents loaded revenue movements on the railroads, was adjusted to account for empty rail car moves. To estimate the empty car movements, empty return ratios were supplied by the AAR from the Uniform Rail Costing System (URCS), as shown in Table A.1. CS matched the empty return ratios to the Waybill data based on origin railroad, car type, and the car ownership flag. Table A.1 represents averaged empty return ratios for all cars ownerships – railroad, private, and leased. For a car ownership flag in the STB Waybill of “railroad” or “Trailer Train,” specific ratios for railroad-owned cars were used. For a car ownership flag of “private,” the privately owned car ratios were used. When the loaded car originated on a Class I carrier, the ratios for that carrier were applied. When a short line or regional railroad originated the load, the empty ratio was based on the East or West average, depending on whether the load originated east or west of the Mississippi River.

The carloads and intermodal units in the Waybill Sample were multiplied by the appropriate empty return ratio, reverse routed to represent the return movement from destination to origin, and then appended to the loaded cars in the Waybill. The assumption of reverse routing of the empties does not accurately reflect railroad operations, but it does place the correct amount of empty car miles on the network and it offers a reasonable approximation for this analysis.

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<sup>24</sup>The Waybill Sample is expanded to represent 100 percent of the movements on U.S. railroads.

**Table A.1 Empty Return Ratios Used in the STB's URCS Phase 3 and Waybill Costing Programs**  
*All Cars, 2005 Ratios*

URCS CT Number	Car Type	BNSF	CN (U.S.)	CP (U.S.)	CSX	KCS	NS	UP	East	West
1	Box - 40-foot	1.33	1.72	1.75	1.59	1.52	1.72	1.38	1.65	1.38
2	Box - 50-foot	1.33	1.72	1.75	1.59	1.52	1.72	1.38	1.65	1.38
3	Box - Equipped	1.69	1.89	1.86	1.87	1.76	1.99	1.76	1.92	1.74
4	Gondola - Plain	1.96	1.86	2.31	1.94	1.97	1.91	2.36	1.92	2.26
5	Gondola - Equipped	1.85	2.11	1.98	1.83	2.00	1.89	1.89	1.86	1.88
6	Hopper - Covered	1.77	1.98	1.82	1.94	2.02	2.04	2.01	1.99	1.90
7	Hopper - Open Top General	1.94	1.92	2.14	1.95	1.94	1.96	2.09	1.95	2.05
8	Hopper - Open Top Special	1.96	2.03	2.11	1.95	2.00	2.01	2.13	1.98	2.09
9	Reefer - Mechanical	1.73	1.73	1.36	1.77	1.51	1.93	1.75	1.79	1.74
10	Reefer - Nonmechanical	1.58	2.35	1.88	1.93	5.42	1.81	1.86	1.90	1.72
11	Flat - Intermodal	1.15	1.18	1.10	1.15	1.05	1.09	1.15	1.12	1.15
12	Flat - Multilevel	1.27	1.45	1.38	1.54	1.19	1.59	1.45	1.55	1.41
13	Flat - General	2.41	2.47	2.24	1.79	1.94	2.66	2.01	2.29	2.16
14	Flat - Other	1.74	2.03	1.94	1.84	1.90	2.05	1.88	1.95	1.82
15	Tank < 22,000 Gallons	1.47	1.70	6.16	1.97	2.01	2.01	2.08	1.98	1.80
16	Tank >= 22,000 Gallons	1.54	1.88	2.30	2.01	2.06	2.03	2.04	2.02	1.83
17	All Other Freight Cars	1.34	1.70	2.56	1.94	2.04	1.52	2.03	1.69	1.59
18	Average Freight Car	1.51	1.85	1.59	1.75	1.83	1.70	1.82	1.74	1.69

Note: Empty Return Ratio defined as total miles divided by loaded miles. Ratios in spreadsheet are available to six significant digits - only three shown above. Ratios for 40-foot Box Cars use same value as 50-foot Box Car as a default. URCS Phase 3 and Waybill costing use ratios for All Other Freight Cars as defaults for railroad-owned tank cars.

Source: AAR, from the Uniform Rail Costing System.

Annual cars were then converted into average daily cars. This was done by first summarizing the Waybill Sample by waybill date and number of cars. The volume from the day representing the 85<sup>th</sup> percentile (based on volume of cars) was used to scale the annual volume to a daily volume. The 85<sup>th</sup> percentile threshold is consistent with highway capacity analysis methods.<sup>25</sup> This multiplier to convert annual cars and intermodal units in the Waybill Sample to an 85<sup>th</sup> percentile day was 0.00357. An 85<sup>th</sup> percentile day has 9.9 percent more cars than a 50<sup>th</sup> percentile day in the 2005 Waybill Sample.

The cars were subdivided into four service types – intermodal, bulk, general merchandise, and auto – the same four defined in the Waybill Sample. For each service type, the number of daily cars was converted into daily trains based on average train lengths supplied by BNSF, CSX, NS and UP. For the other railroads, CS estimated the train lengths. Table A.2 contains the average values used for eastern and western railroads. Intermodal unit train conversions were based on TOFC/COFC counts rather than cars. Adjustments were made in some corridors (e.g., Powder River Basin) to reflect actual operations of significantly longer trains.

**Table A.2 Average Train Length**  
*Number of Cars*

Type of Service	Eastern Railroads	Western Railroads
Auto	57.0	63.9
Bulk	86.0	112.4
General Merchandise	82.0	80.7
Intermodal (TOFC/COFC count)	110.7	164.3

Source: Class I Railroad data averaged by Cambridge Systematics, Inc.

The next step was to unlink the trips. The Waybill Sample has records with a junction frequency up to six, indicating that seven railroads participated in the move (six junctions). The unlinked records break these apart so that each “trip” is only for a single railroad. The geographic endpoints of the trip can either be the origin and destination, or the junction location. These are generically referred to as the on-point and off-point. The Waybill does not have information on internal routings and classifications on an individual railroad.

The final step was to assign the train estimates to the ORNL rail network, using an all or nothing assignment in TransCAD. After combining the freight and

<sup>25</sup>This method of scaling the annual volume based on the 85<sup>th</sup> percentile is preferred over simply selecting the traffic on the day representing the 85<sup>th</sup> percentile. Scaling the annual volume will provide a more robust distribution of traffic over the rail lines that accounts for seasonality, instead of a snapshot of traffic for a single day.

passenger trains (see next section), density maps were developed and provided to BNSF, CSX, NS, and UP for review. The AAR reviewed the traffic density maps for CN, CP, and KCS. Corrections were made to the assignments and volumes when needed, and new maps were generated for further review.

As in all cases with this study, care was taken not to distribute confidential data about one railroad to the other railroads. Only the AAR and CS had access to the full information.

### **Establish the Current Number of Passenger Trains per Day**

In addition to the total number of freight trains, the number of passenger trains operating on the network was determined. This includes estimates of Amtrak service, and commuter services such as the Virginia Railway Express and the Southeastern Pennsylvania Transportation Agency that make significant use of freight railroad lines. Not every commuter service was included, only those operating on the primary corridor network.

Most of the train information was obtained from available published schedules. Although the term “train” is used, it should more appropriately be called a “trip.” A train that goes out and back was counted as two “trains.” An average day was considered to be a weekday, not a weekend or holiday.

The passenger train estimates were assigned directly to the ORNL rail network using TransCAD, rather than applying a traffic assignment algorithm. Passenger train maps were generated and distributed to the study participants for review and comment.

The final step was to add the daily passenger train counts directly to the freight trains that had been assigned to the network.

### **Establish the Forecasted Number of Train Equivalent Operating Along Each Corridor for the Year 2035**

The U.S. Department of Transportation’s Freight Analysis Framework Version 2.2 (FAF<sup>2.2</sup>) provides an estimate of all freight traffic moving in the U.S. by origin, destination, commodity, and mode. It has a 2002 base year and forecasts from 2010 to 2035 in five-year increments. The geography is based on 138 zones, with 114 zones in the U.S. It includes domestic traffic, North American traffic (Canada and Mexico border crossings, with the gateway location), and international traffic (by foreign region and U.S. zone, with an intermediate port). FAF<sup>2.2</sup> contains seven different modes of transportation: air and truck, other intermodal, pipeline and unknown, rail, truck, truck-rail, and water.

CS used the FAF<sup>2.2</sup> forecasts for 2035 for the rail and truck-rail modes by origin, destination, and commodity. The rail and truck-rail modes were combined into a single set of forecasts rates. The Waybill data was geographically matched to the FAF<sup>2.2</sup> zones by using a translation table mapping county to zone. Since the Waybill “starts” and “stops” trips at ports, the international forecasts were

included in the forecast rates based on the location of the port. For example, a move from Europe to the Atlanta zone with a port of Charleston, was considered a Charleston - Atlanta move and the forecasts rates were blended with the domestic forecast rates for other Charleston - Atlanta traffic by commodity. Rates by commodity for both Canadian and Mexican traffic were developed, and applied to Waybill data originating or terminating in those countries.

FAF<sup>2.2</sup> uses Standard Classification of Transported Goods (SCTG) codes. CS developed weighted averages of the forecast growth rates to establish growth factors for the general merchandise, intermodal, bulk and auto service types, based on the assignments in Table A.3. Weighted forecast growth rates for each service type were calculated for each FAF<sup>2.2</sup> origin-destination zone.

**Table A.3 FAF<sup>2.2</sup> Commodity Assignment to Rail Service Type for Establishing Forecast Growth Rates**

Auto	Bulk	Intermodal	Merchandise
<ul style="list-style-type: none"> <li>• Motorized vehicles</li> </ul>	<ul style="list-style-type: none"> <li>• Animal feed</li> <li>• Cereal grains</li> <li>• Coal</li> <li>• Coal-n.e.c.</li> <li>• Metallic ores</li> <li>• Gravel</li> <li>• Nonmetallic minerals</li> </ul>	<ul style="list-style-type: none"> <li>• Alcoholic beverages</li> <li>• Electronics</li> <li>• Furniture</li> <li>• Machinery</li> <li>• Meat/seafood</li> <li>• Miscellaneous manufactured products</li> <li>• Mixed freight</li> <li>• Pharmaceuticals</li> <li>• Plastics/rubber</li> <li>• Precision instruments</li> <li>• Printed products</li> <li>• Textiles/leather</li> <li>• Tobacco products</li> <li>• Transport equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Articles-base metal</li> <li>• Base metals</li> <li>• Basic chemicals</li> <li>• Building stone</li> <li>• Chemical products</li> <li>• Crude petroleum</li> <li>• Fertilizers</li> <li>• Fuel oils</li> <li>• Gasoline</li> <li>• Live animals/fish</li> <li>• Logs</li> <li>• Milled grain products</li> <li>• Natural sands</li> <li>• Nonmetal mineral products</li> <li>• Other agriculture products</li> <li>• Other foodstuffs</li> <li>• Unknown</li> <li>• Waste/scrap</li> <li>• Wood products</li> <li>• Newsprint/paper</li> <li>• Paper articles</li> </ul>

The 2035 forecast growth rates were applied to the 2005 base-year loaded and empty cars by FAF<sup>2.2</sup> origin-destination zone and railroad service type. (The rates were adjusted to reflect the difference between the FAF<sup>2.2</sup> 2002 base year the Waybill 2005 survey year). This makes the assumption that empty return ratios will be the same in 2035 as they were in 2005. For empty cars, the forecast rate was based on the last commodity hauled. The forecast number of loaded and empty cars were converted into average trains per day, using the same conversion factors established for the 2005 data (i.e., average train lengths were held constant.)

The number of passenger trains was held at current levels. This study did not attempt to forecast 2035 passenger rail demand and service. A separate study is being conducted to develop passenger rail needs for presentation to the Commission.

The forecasted 2035 freight trains were then assigned to the ORNL rail network using an all or nothing assignment based on minimum distances, adjusted to reflect current rail road operating restrictions validated against existing volumes. Current passenger trains were added directly to the network to provide the complete 2035 year volumes. The results was mapped and sent to the railroads for review.

### **Estimate the Current Capacity for Each of the Primary Corridors**

The capacity of the primary rail corridors was determined by defining a set of archetypical corridors, based on track and type of control, and then defining the capacity in terms of trains per day. Readily available information was supplied by the railroads participating in this study drawing from previously performed simulation studies. The information ranged from generic data to simulation results of specific corridors and general knowledge of operations.

CS used this information to identify a set of archetypical corridors that represented the various track and control combinations present along the corridors. The number of tracks was 1, 2, 3, or 4 and the type of controls included no signal or track warrant control (N/S-TWC), automated block signal (ABS), and centralized traffic control or train control system (CTC-TCS). To accommodate future demand, archetypical corridors of 5 and 6 tracks were added.

Comparison of the capacity information from each railroad yielded a range of values. One reason for this range was the mix of trains on the line. Lines with a nearly homogenous train mix have a higher capacity than lines with a mixture of train types. To adjust for this, each archetype was assigned a lower and an upper bound for the maximum number of trains. The lower bound was defined as the maximum number of trains per day, assuming an equal mix of merchandise-bulk, intermodal-auto, and passenger trains (one-third each). The upper bound was defined as the maximum number of trains per day, assuming 100 percent one type, and 0 percent of the other two types (complete homogeneity). To move between the lower bound and the upper bound, the standard deviation of the

train mix was used to scale the range between the bounds. For a train mix of 33 percent, 33 percent, and 33 percent for each of the three types, the standard deviation is zero; therefore a zero adjustment is added to the lower bound. A train mix of 100 percent, 0 percent, and 0 percent yields a standard deviation of 0.47, which was scaled to produce a factor that added to the lower bound equaled the upper bound.<sup>26</sup> A standard deviation falling between the minimum of zero and the maximum of 0.47 produced a capacity somewhere between the lower and upper bounds. Table A.4 contains the archetypes used in this study, along with the lower and upper capacity bounds.

Another reason for differences in capacity is due to differences in geography and topography. For similar types of track, a regions with longer runs and greater distances between urban areas can achieve higher speeds and greater throughput than areas with short runs and more closely spaced urban areas. Therefore, different capacity tables were developed based on regional variations. Table A.4 contains the average lower and upper maximum capacity bounds for the archetypes used in this study.

Rail capacity can take two forms. The “theoretical capacity” is the maximum number of trains assuming perfect conditions. The “practical capacity” considers factors such as possible disruptions, maintenance, human decisions, weather, possible equipment failures, supply and demand imbalances, and seasonal demand. Practical capacity is about 70 percent of the theoretical capacity and provides reliable service; it is similar to a highway level of service of C or D (described in the next section). At higher percentages, rail congestion increases and service reliability begins to deteriorate. The values established in Table A.4 represent practical capacity.

Using the number of tracks and the control system information from the ORNL rail network, CS developed a series of maps of track characteristics that were reviewed by the railroads. The track characteristics information was updated using feedback from the railroads, and then each of the primary rail corridors was assigned to one of the archetypes in Table A.4. Using the capacity for each archetype, and adjusting between the lower and upper bounds based on the standard deviation of the train mix, a practical capacity in trains per day was assigned to each of the primary corridors.

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<sup>26</sup>The population standard deviation, not the sample standard deviation, was used since the three data points representing the percent mix of merchandise/bulk, intermodal/auto, and passenger encompasses the entire population.

**Table A.4 Average Capacities of Archetypical Rail Corridors**  
*Trains per Day*

Number of Tracks	Type of Control	Trains per Day	
		Practical Maximum If Multiple Train Types Use Corridor*	Practical Maximum If Single Train Type Uses Corridor**
1	N/S or TWC	16	20
1	ABS	18	25
2	N/S or TWC	28	35
1	CTC or TCS	30	48
2	ABS	53	80
2	CTC or TCS	75	100
3	CTC or TCS	133	163
4	CTC or TCS	173	230
5	CTC or TCS	248	340
6	CTC or TCS	360	415

Key: N/S-TWC – No Signal/Track Warrant Control.  
ABS – Automatic Block Signaling.  
CTC-TCS – Centralized Traffic Control/Traffic Control System.

Notes: \* For example, a mix of merchandise, intermodal, and passenger trains.  
\*\* For example, all intermodal trains.

Source: Class I railroads' data aggregated by Cambridge Systematics, Inc.

### **Compare the 2005 and 2035 Train Volumes to the Current Capacity, and Identify the Types of Improvements Needed to Maintain Reliable Rail Service in 2035**

Current corridor volumes were compared to current corridor capacity to assess congestion levels. This was done by calculating a volume-to-capacity ratio expressed as a level of service (LOS) grade. The LOS grades are listed in Table A.5. The LOS designations and descriptions correspond to the LOS designations used in highway system capacity and investment requirements studies.

**Table A.5 Volume-to-Capacity Ratios and Level of Service (LOS) Grades**

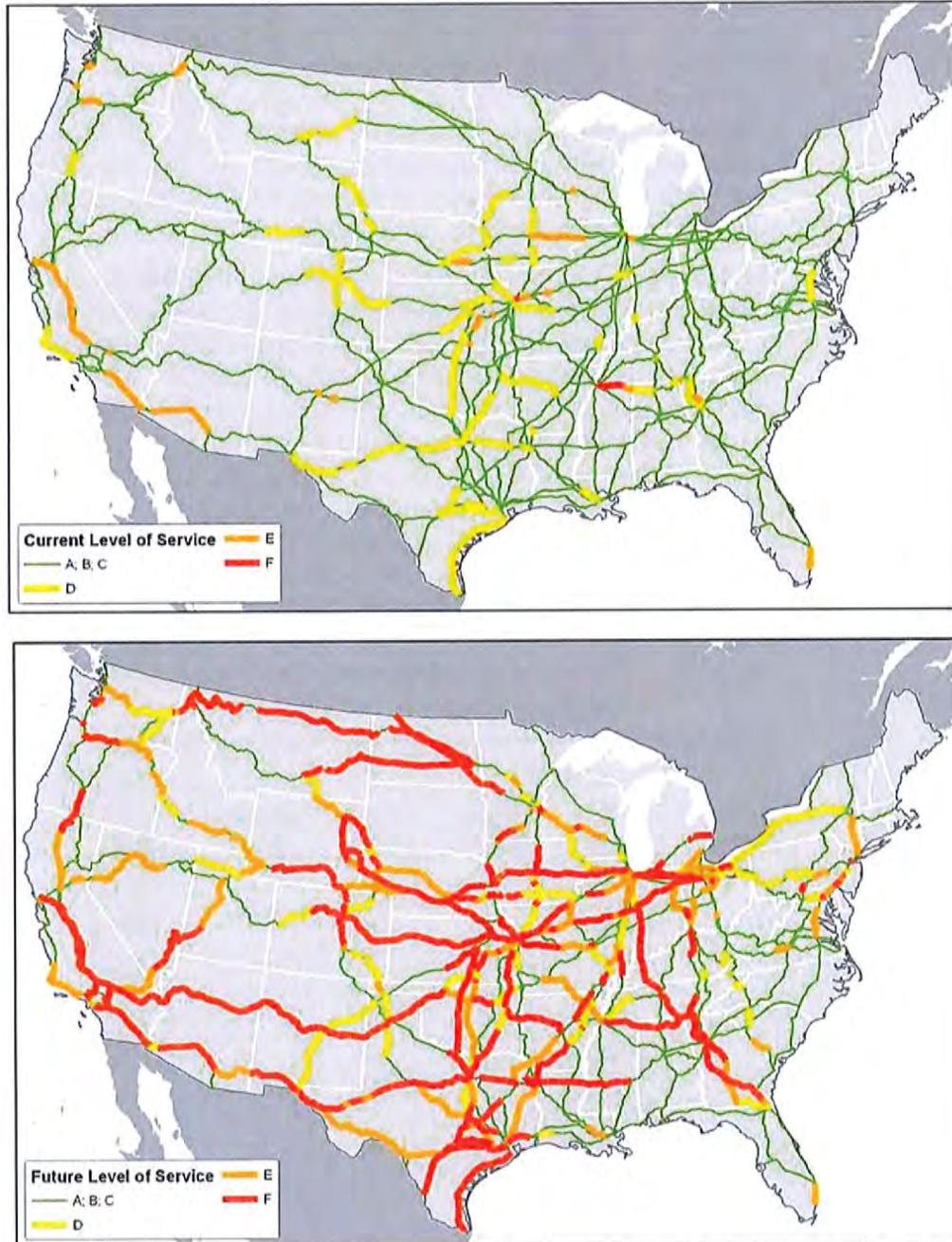
LOS Grade	Description	Volume/Capacity Ratio
A	Below Capacity	Low to moderate train flows with capacity to accommodate maintenance and recover from incidents
B		0.0 to 0.2
C		0.2 to 0.4
D	Near Capacity	Heavy train flow with moderate capacity to accommodate maintenance and recover from incidents
E	At Capacity	Very heavy train flow with very limited capacity to accommodate maintenance and recover from incidents
F	Above Capacity	Unstable flows; service breakdown conditions

Source: Cambridge Systematics, Inc.

Rail corridors operating at LOS A, B or C are operating below capacity; they carry light to moderate train flows with sufficient unused capacity to accommodate maintenance work and recover quickly from incidents such as weather delays, equipment failures, and minor accidents. Corridors operating at LOS D are operating near capacity; they carry heavy train flows with moderate capacity to accommodate maintenance and recover from incidents. Corridors operating at LOS E are operating at capacity; they carry very heavy train flows and have very limited capacity to accommodate maintenance and recover from incidents without substantial service delays. Corridors operating at LOS F are operating above capacity; train flows are unstable, and congestion and service delays are persistent and substantial. The LOS grades and descriptions correspond generally to the LOS grades used in highway system capacity and investment requirements studies.

Maps of the volume-to-capacity ratios, expressed as LOS classes, for the primary rail corridors are shown in Figure A.2. Rail corridors operating under capacity (at LOS A, B, or C) have been mapped in green, corridors operating near capacity (LOS D) have been mapped in yellow, rail corridors operating at capacity (LOS E) have been mapped in orange, and rail corridors operating over capacity (LOS F) have been mapped in red. Current volumes are those reported in the 2005 STB Waybill Sample (factored for empties and using an 85<sup>th</sup> percentile day). These volumes do not reflect fully recent trends, such as the increase in coal shipments moving from the Powder River Basin in Wyoming and Montana to Eastern utilities, nor the recent increase in intermodal containers delivered to East Coast marine ports and transferred to rail for inland delivery. Current capacity is the capacity as of 2007, and does not represent planned expansion.

Figure A.2 2005 and 2035 Train Volumes Compared to Current Train Capacity



Source: Cambridge Systematics, Inc.

Rail capacity line expansion improvements were estimated by identifying the upgrades to current capacity needed to accommodate future train volumes. To avoid double-counting improvements that are currently programmed or

underway, new improvements were selected to accommodate only forecast demand, not to correct current capacity shortfalls. If a corridor is below capacity today and needs additional capacity to accommodate future demand, improvements were selected to bring the volume-to-capacity ratio up to a maximum of 0.70. If a corridor is at or above capacity today and needs additional capacity to accommodate future demand, improvements were programmed to bring the volume-to-capacity ratio back to the current ratio. For example, if the current volume-to-capacity ratio of a corridor is 0.85 and the future volume-to-capacity ratio without improvements is estimated to be 1.6, improvements were made to bring the volume-to-capacity ratio back to 0.85, not to 0.70.

The hierarchy of corridor upgrades is shown in Table A.6. This hierarchy was used to expand from one archetypical corridor to another, until the capacity of the corridor could accommodate the forecasted 2035 volumes at a LOS of C or at current LOS if already operating at LOS D, E, or F. For example, if a corridor with “one track and N/S-TWC control” that today accommodates 16 to 20 trains per day needs to accommodate 35 trains per day in 2035, it would be upgraded to “one track with CTC-TCS control.” As a rule, upgrades were selected to provide the appropriate level of service at the least cost. For the primary corridors under consideration, it was determined that any new construction would at a minimum involve a one-track CTC system (e.g., no expansion of lines operating on track warrants or with ABS on the primary corridors).

**Table A.6 Hierarchy of Archetypical Rail-Freight Corridors**  
*Practical Capacity in Trains per Day*

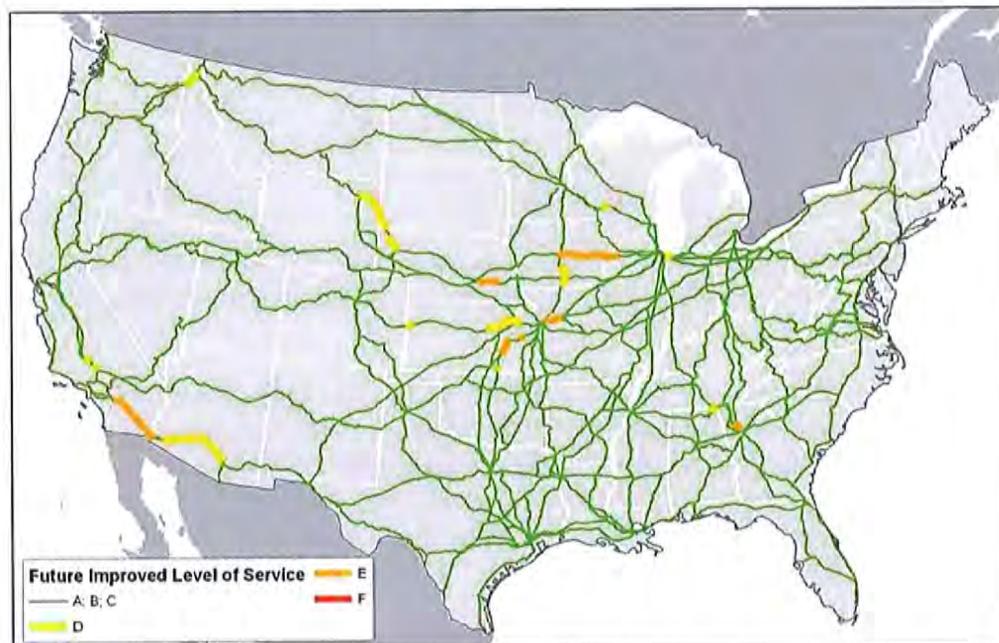
From				To			
Number of Tracks	Control	Lower Bound	Upper Bound	Number of Tracks	Control	Lower Bound	Upper Bound
1	NS-TWC	16	20	1	CTC-TCS	30	48
2	NS-TWC	28	35	2	CTC-TCS	75	100
1	ABS	18	25	1	CTC-TCS	30	48
2	ABS	53	80	2	CTC-TCS	75	100
1	CTC-TCS	30	48	2	CTC-TCS	75	100
2	CTC-TCS	75	100	3	CTC-TCS	133	163
3	CTC-TCS	133	163	4	CTC-TCS	173	230
4	CTC-TCS	173	230	5	CTC-TCS	248	340
5	CTC-TCS	248	340	6	CTC-TCS	360	415

Source: Class I railroads’ data aggregated by Cambridge Systematics, Inc.

Note: N/S-TWC is No Signal and Track Warrant Control. ABS is Automatic Block Signaling. CTC-TCS is Centralized Traffic Control and Traffic Control System.

Figure A.3 compares future corridor volumes in trains per day to future corridor capacity assuming the necessary improvements are made. The volume-to-capacity ratios are expressed as LOS classes for each primary rail corridor. This map should look similar to the 2005 map in Figure A.2, since the goal was not to improve a corridor beyond the current level of service. This is not entirely possible due to the step-function nature of adding capacity. Adding an additional track can cause the LOS to drop several levels.

**Figure A.3 Future Train Volumes Compared to Future Train Capacity  
2035 with Improvements**



Source: Cambridge Systematics, Inc.

### Estimate the Construction Costs of the Improvement Lines

The costs to upgrade from one level of corridor capacity to another are listed in Table A.7. The costs are in unit costs per mile for construction. All costs are reported in current (2007) dollars. In the example cited above, upgrading a corridor from “one track and N/S-TWC control” to “one track with CTC-TCS control” would cost \$700,000 per mile for construction. This is inclusive of design, engineering, and installation expenses. It is exclusive of any real estate costs.

Table A.7 presents average costs for typical rail freight corridors. The actual costs of the corridors were estimated using railroad-specific capacity tables. Per mile construction costs for Eastern rail corridors were about 25 percent higher than the averages presented in the table because of the number of urbanized areas, hilly terrain, and numerous river crossings. At the request of the railroads, the railroad-specific cost tables were not included in this report to protect confidential railroad business information.

**Table A.7 Hierarchy of Archetypical Rail-Freight Corridors**  
*Unit Cost to Upgrade Lines*

From		To		Average Construction Cost Per Mile
Number of Tracks	Control	Number of Tracks	Control	
1	NS-TWC	1	CTC-TCS	\$700,000
2	NS-TWC	2	CTC-TCS	\$700,000
1	ABS	1	CTC-TCS	\$500,000
2	ABS	2	CTC-TCS	\$600,000
1	CTC-TCS	2	CTC-TCS	\$3,800,000
2	CTC-TCS	3	CTC-TCS	\$4,400,000
3	CTC-TCS	4	CTC-TCS	\$4,400,000
4	CTC-TCS	5	CTC-TCS	\$4,400,000
5	CTC-TCS	6	CTC-TCS	\$4,400,000

Source: AAR and Class I railroads' data aggregated by Cambridge Systematics, Inc.

The costs in Table A.7 are additive. To expand from a one track CTC to a three track CTC would cost \$8.2 million per mile (\$3.8 million plus \$4.4 million). The lower cost to go from one to two tracks (as opposed to 2 to 3 and 3 to 4) reflects cost savings from connecting existing sidings, less need to upgrade drainage, and other savings. The costs to maintain this additional track is not included in the total.

### **Estimate the Cost of Significant Bridges, Tunnels, Clearance Projects, etc.**

Significant projects that are well outside the average unit cost in Table A.7, such as bridges spanning the Mississippi or Ohio River or expensive new or expanded tunnels and clearances, were included as additional costs in this study. The railroads, using maps provided by CS of where and how much capacity would be needed in 2035, individually provided estimates for significant structures.

It should be noted that these estimates are not based on detailed engineering studies, and therefore only provide a rough approximation. In most cases, the estimates were based on averages ranging from \$200 to \$300 million per structure. A detailed list of these projects is not contained in the report, since the cost estimates are average and should not be attributed to a specific project.

A significant structures cost estimate was developed for CN, CP, and KCS by prorating the total significant structures cost by the ratio of the line haul expansion cost for these three railroads to the total line haul expansion cost.

## **Estimate the Cost to Upgrade Class I Branch Lines and Short Line and Regional Railroad Lines Currently Below 286,000-Pound Standards to Current Standards**

The American Short Line and Regional Railroad Association (ASLRRA) released a report in 2000 that identified \$6.9 billion in costs (1999 dollars) to upgrade the track of America's short line and regional railroads to accommodate the current standard weight of 286,000-pounds. This estimate was updated as part of this study. The update involved:

- The cost was inflated to represent 2007 dollars based on a construction price index developed from the U.S. Bureau of Labor statistics. This raised the cost from \$6.9 billion to \$10.8 billion.
- The cost of upgrading bridges was removed, and an ASLRRA provided estimate of \$5 billion was included as a significant structures costs for short line and regional railroads.
- The AAR provided an estimate 898 route miles that has been upgraded between 2004 and 2007, an average of 299 miles per year. Using this ratio, an estimate of 2,395 miles were assumed to be upgraded to 286,000-pound standards between 1999 and 2007.
- The inflated cost to upgrade was reduced to reflect track already upgraded.

The final estimate for upgrading short line and regional railroad track to accommodate 286,000-pound loads is \$7.2 billion (in 2007 dollars). The calculations are contained in Table A.8.

For the Class I railroad's branch lines, an average cost to upgrade was calculated at \$300,000 per mile using the revised estimates from the ASLRRA. The miles of track not 286,000-pound ready was provided by BNSF, CSXT, NS, and UP. For CN, CP, and KCS, the estimated cost was prorated from the ratio of line expansion costs for those three railroads to the total line expansion costs.

**Table A.8 Estimation of Cost to Upgrade Short Line and Regional Railroads to 286,000-Pound Weight Standard**

Year	Inflation	Cost (Millions)	Cost Less Bridges (Millions)	Total Miles	Miles/Year Upgraded (2005 to 2007)	Estimated Miles Upgraded (1999 to 2007)	Assume 50 Percent Not 286,000-Ready (2007)	Estimated Percent Upgraded Since 1999	Estimated Cost to Upgrade (Millions)	Cost/Mile to Use for Class I (Millions)
1999	N/A	\$6,861	\$5,100	49,985	N/A	N/A	N/A	N/A	N/A	N/A
2007	0.575	\$10,806	\$8,033	48,194	299	2,395	24,097	9.94%	\$7,234	\$0.300

Source: 1999 Information from ASLRRRA An Estimation of the Investment in Track and Structures Needed to Handle 286,000-pound Rail Cars.

Note: Assumption of 50 percent not 286,000 ready provided by AAR. Based on 22,256 miles (46 percent) not 286,000 ready in 2004 less 898 miles upgraded between 2004 and 2007. Exact percentage unavailable since 10 percent of track has unknown weight limit.

## **A.3 INTERMODAL AND CARLOAD TERMINALS, AND SERVICE FACILITY CAPACITY EXPANSION**

The work steps to estimate the cost of expanding terminal and facility capacity necessary for the Class I railroads to meet U.S. DOT projected demand was as follows:

- Expansion of capacity at Class I railroad-owned intermodal facilities, including terminals, ports and gateways;
- Expansion of capacity at carload terminals; and
- Expansion of capacity at Class I railroad-owned service (e.g., fueling stations, maintenance facilities).

### **Expand Capacity at Class I Railroad-Owned Intermodal Facilities, Including Terminals, Ports and Gateways**

The cost of expanding intermodal facilities, whether they are intermodal yards, railroad-owned port facilities, or international gateways, was provided by the railroads. CS provided to each study participant a table of on-point and off-point volumes by county and railroad service type for 2005 and 2035. The railroads individually provided costs estimates for expanding the largest and most important intermodal facilities to accommodate the projected growth between 2005 and 2035. Consistent with other parts of this study, real estate costs were excluded.

It should be noted that these estimates are not based on detailed engineering studies, and therefore only provide a rough approximation. A detailed list of these projects is not contained in the report, since the cost estimates are average and should not be attributed to a specific project.

An intermodal facility cost estimate was developed for CN, CP, and KCS by prorating the total intermodal facility expansion cost by the ratio of the line haul expansion cost for these three railroads to the total line haul expansion cost.

Additional maintenance costs for these new and expanded intermodal facilities are not included.

### **Expand Capacity at Carload Terminals**

The cost of expanding carload facilities (e.g., classification yards) was provided by the railroads. CS provided to each study participant a table of on-point and off-point volumes by county and railroad service type for 2005 and 2035. The railroads individually provided costs estimates for expanding the largest and most important carload facilities to accommodate the projected growth between 2005 and 2035. Consistent with other parts of this study, real estate costs were excluded.

It should be noted that these estimates are not based on detailed engineering studies, and therefore only provide a rough approximation. A detailed list of these projects is not contained in the report, since the cost estimates are average and should not be attributed to a specific project.

A carload facility cost estimate was developed for CN, CP, and KCS by prorating the total carload facility expansion cost by the ratio of the line haul expansion cost for these three railroads to the total line haul expansion cost.

Additional maintenance costs for these new and expanded carload facilities are not included.

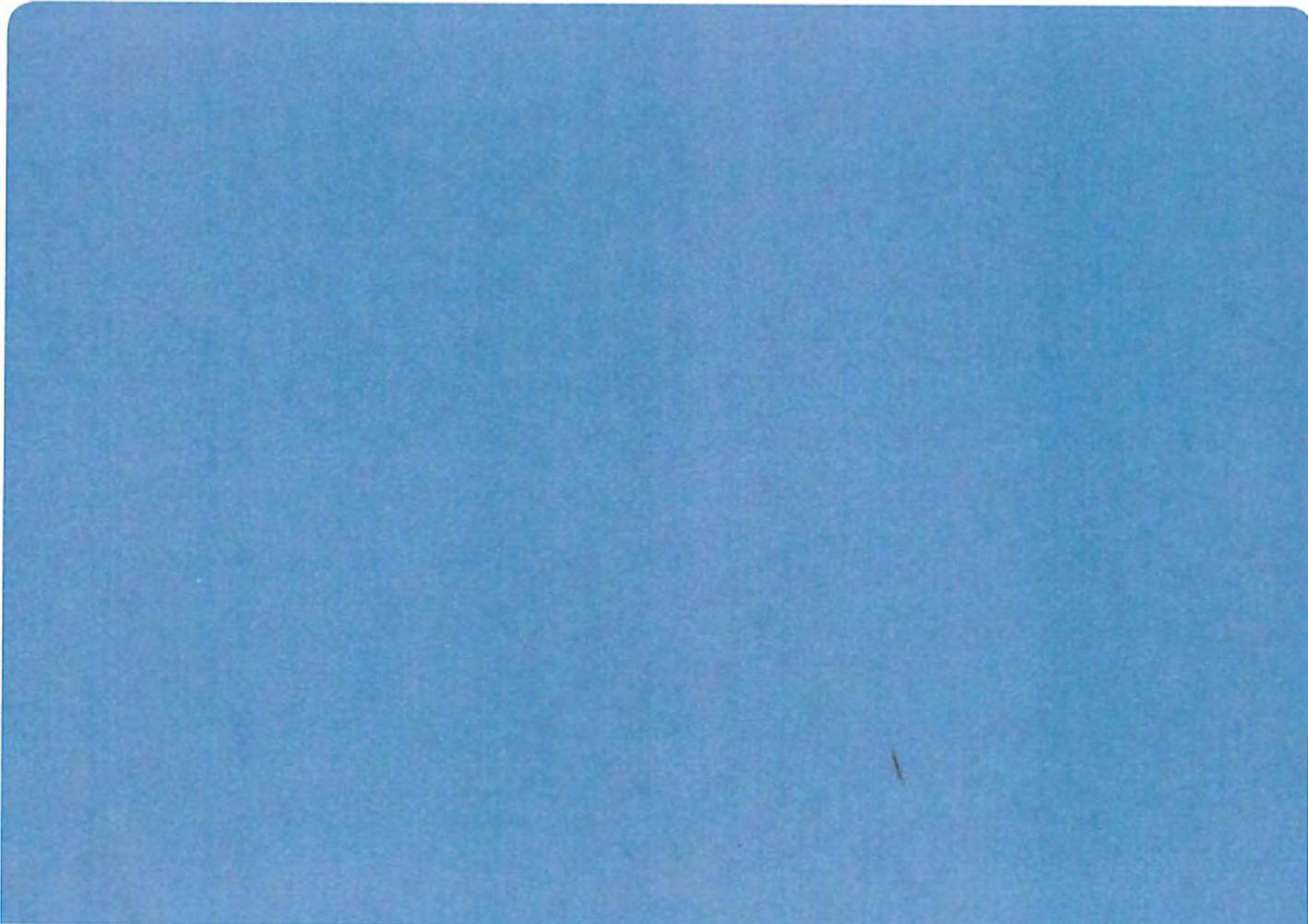
### **Expand Capacity at Class I Railroad-Owned Service Facilities**

The cost of expanding service facilities (e.g., fueling, car shops) was provided by the railroads. CS provided to each study participant a table of on-point and off-point volumes by county and railroad service type for 2005 and 2035, and a series of maps showing traffic volumes by corridor for 2035. The railroads individually provided cost estimates for expanding service facilities to accommodate the projected growth between 2005 and 2035. Consistent with other parts of this study, real estate costs were excluded.

It should be noted that these estimates are not based on detailed engineering studies, and therefore only provide a rough approximation. A detailed list of these projects is not contained in the report, since the cost estimates are average and should not be attributed to a specific project.

A service facility cost estimate was developed for CN, CP, and KCS by prorating the total service facility expansion cost by the ratio of the line haul expansion cost for these three railroads to the total line haul expansion cost.

Additional maintenance costs for these new and expanded service facilities are not included.



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*prepared for* Association of American Railroads  
*by* Cambridge Systematics, Inc.

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# About 300 gallons of diesel fuel leak from train in Columbia River Gorge, official confirms



About 300 gallons of diesel fuel leaked from a locomotive June 21, 2016, in the Columbia River Gorge, a Union Pacific spokesman said. *(The Oregonian/OregonLive/file)*

By [Jim Ryan | The Oregonian/OregonLive](#)

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on June 22, 2016 at 1:30 PM, updated June 22, 2016 at 1:32 PM



About 300 gallons of diesel fuel **leaked from an eastbound locomotive Tuesday night** in the Columbia River Gorge, a Union Pacific spokesman confirmed.

The leak happened east of a bridge over the Sandy River, said Justin Jacobs, a Union Pacific spokesman. Authorities determined fuel didn't enter any waterways, Jacobs said in an email early Wednesday.

There are no "potential impacts" to the waterways, he said.

The majority of the fuel has evaporated or been collected, Jacobs said. Officials will do soil remediation and assure the fuel that's left is properly cleaned up, he said.

The 92-car train was stopped in the Bridal Veil area Tuesday night after the leak was detected. A fuel filter ring failure caused the leak, Jacobs said.

**NORTHWEST NEWS**

He said the problem isn't a common one and didn't know if it's checked for during regular maintenance. He didn't know how the fuel filter ring failure happened.

The train has been moved, he said, and the tracks are open.

The train was headed east from Portland, Jacobs said. No one was injured Tuesday night.

The leak comes on the heels of an **oil train derailment** that spilled 42,000 gallons of oil, sent a billowing cloud of black smoke into the air and created a small oil sheen on the Columbia River near the town of Mosier earlier this month.

Almost 300 people were evacuated from their homes because of the derailment, which also damaged the town's sewage treatment plant.

— Jim Ryan

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## Union Pacific Corp

# Union Pacific chief threatens action on oil train brake rules

Surge in traffic exposes shortcomings in existing safety regulations



MAY 31, 2015 8:55 AM

by: **Robert Wright** in New York

The chief executive of Union Pacific, the US's largest rail network, has vowed legal action over a provision of new rules for oil trains that he says would cost billions of dollars and provide little benefit.

The pledge from Lance Fritz threatens further delay to rules that have already been years in preparation.

The Federal Railroad Administration and Canadian regulators jointly announced the rules (<http://next.ft.com/content/225365c4-f011-11e4-ae00-00144feab7de>) less than a month ago to improve the safety of oil movements by rail, which have risen sharply following the surge in US oil and gas production in recent years.

The surge — from only about 1m tonnes of traffic in 2007 to roughly 40m in 2013, the last

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year for which full data are available — has exposed the shortcomings of existing safety rules for tank cars, with several trains exploding following derailments.

While Mr Fritz said that most of the new provisions were “great regulation”, he criticised provisions demanding that railways start controlling tank cars’ brakes via an electric signal either transmitted wirelessly from the lead locomotive or via electrical wires running along the train.

The new arrangement, known as electronically controlled pneumatic (ECP) braking, is intended to speed up the transmission of the braking command compared with current methods, which rely on pressure changes in a pipe running along the train. That should reduce the number of cars that derail in a crash.

Mr Fritz said, however, that virtually the same improvements could be gained by spacing locomotives out along a train, as Union Pacific frequently does, and the extra benefits of ECP did not justify the costs. The new equipment would cost about \$75,000 for each of UP’s 6,500 locomotives, while there would also be substantial costs for fitting out tank cars, nearly all owned by oil shippers or leasing companies.

“The juice isn’t worth the press,” Mr Fritz said. “We think that’s very ill-considered. We provided that feedback and we will continue to provide that feedback.”

The industry could appeal against the rule both through administrative channels and in the courts, Mr Fritz said. “We as an industry are taking that path,” he added.

Railways have been pressing for improvements in tank car design to avoid a repetition of disasters like the Lac-Mégantic explosion in Canada in 2013 (<http://next.ft.com/content/7892b7f2-530d-11e3-8586-00144feabdco>), in which 47 people died when a poorly secured oil train broke loose, derailed and exploded in the centre of a small town.

Operators are barred from refusing to carry cargo that meets the minimum regulatory requirements but have been concerned that under existing regulations cars were excessively vulnerable in an explosion.

Mr Fritz also criticised the new rules’ standards for thermal protection for cars, meant to prevent their exploding in a fire, saying they were not strict enough.

The Federal Railroad Administration declined to comment publicly on Mr Fritz’s criticisms but looks determined to press ahead with the mandate for ECP brakes.

UP, which has a larger track network than any other US railway, has been a significant beneficiary of the surge in oil movements (<http://next.ft.com/content/65ac3d58-06b2-11e4-ba32-00144feab7de>). Mr Fritz said he expected a strong continuing role for rail in

transporting US-produced crude oil.

The sharp fall in the oil price in recent months has shifted traffic away from the routes that UP serves, however, pushing down crude oil movements on its network by 38 per cent in the first quarter (<http://next.ft.com/content/c765c7ec-e9c6-11e4-a687-00144feab7de>) compared with last year.

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# Oil-train car upgrades being left to industry is problematic, NTSB chief says



By [The Associated Press](#)

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on July 13, 2016 at 7:51 AM, updated July 13, 2016 at 7:52 AM

BILLINGS, Mont. — Accident-prone tank cars used to haul crude oil and ethanol by rail could remain in service for another 15 years under federal rules that allow companies to phase in upgrades to the aging fleet, according to the U.S. National Transportation Safety Board.

Transportation officials and railroad representatives have touted the rules as a key piece of their efforts to stave off future disasters, after a string of fiery derailments and big spills that raised concerns about the crude-by-rail industry.

Yet without mandatory, periodic benchmarks for meeting the requirements, the decision to upgrade to safer tank car designs "is left entirely to tank car fleet owners, and may be driven by market factor influences, not safety improvements," NTSB Chairman Christopher Hart said in a letter Tuesday to the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration.

Tom Simpson with the Railway Supply Institute, which represents tank car manufacturers and owners, said the industry is committed to putting stronger cars in place. Members of the group will meet deadlines for replacing or upgrading the cars, he said, noting that demand for rail cars has eased after crude-by-rail shipments decreased over the past two years in response to lower oil prices.

"The need to modify or install new cars isn't as urgent as when the rule was issued," Simpson said.

In recent years, accidents involving the older cars have occurred in Oregon, Montana, North Dakota, Illinois, West Virginia and Canada.

The most notable was in Lac-Megantic, Quebec, where 47 people were killed when a runaway oil train derailed in 2013. During the most recent accident last month in Oregon, 42,000 gallons of crude oil spilled, sparking a massive fire that burned for 14 hours near the small town of Mosier in the Columbia River Gorge.

Cars built before the rule was enacted do not have to be fully replaced until 2029, although most would be required to come off the tracks sooner.

Just over 10,300 stronger tank cars mandated by the new rules are available for service, according to figures obtained by The Associated Press from the Association of American Railroads.

## OIL TRAINS

[Washington state to get notification of oil train shipments](#)

[Oil-train car upgrades being left to industry is problematic, NTSB chief says](#)

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[Kate Brown renews call for oil train moratorium](#)

[Railroad defends safety of fasteners that failed in oil train wreck](#)

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That's equivalent to about 20 percent of the 51,500 tank cars used to haul crude and ethanol during the first quarter of 2016.

Transportation Department Press Secretary Clark Pettig said in response to the NTSB's criticism that the schedule to retrofit older cars was locked in by Congress in a transportation bill approved last year. The congressional deadline represents "the absolute last moment" to meet the new standards, Pettig said.

"We agree with NTSB that industry should work to beat those deadlines," he said.

A Wednesday meeting was planned in Washington, D.C., where government and industry officials were set to update the safety board on progress addressing the issue.

Safety board member Robert Sumwalt told The Associated Press that federal regulators need to set milestones to hold the industry accountable.

"There's been 28 accidents over the past 10 years. That's almost three accidents a year," Sumwalt said. "Unfortunately, history shows we probably will have more accidents involving flammable liquids."

A bill from U.S. Sen. Ron Wyden of Oregon and other Democratic lawmakers would offer tax credits for companies that upgrade their cars during the next several years.

"Communities near train tracks, like Mosier, Oregon, must be confident that companies are using the safest tank cars possible," Wyden said.

The railroad association said only 700 of the least resilient model of the older-style tank cars remain in service. Most of the cars in current use have at least some improvements, such as shields at either end of the car to help prevent punctures during derailments.

Transportation officials cautioned, however, that thousands of idled "legacy cars" could quickly come back online if oil prices rise and shipment volumes rebound.

Most tank cars are owned or leased by companies that ship fuel by rail, not the railroads themselves.

"Every tank car carrying crude or ethanol needs to be upgraded or replaced," said railroad association spokesman Ed Greenberg.

-- The Associated Press

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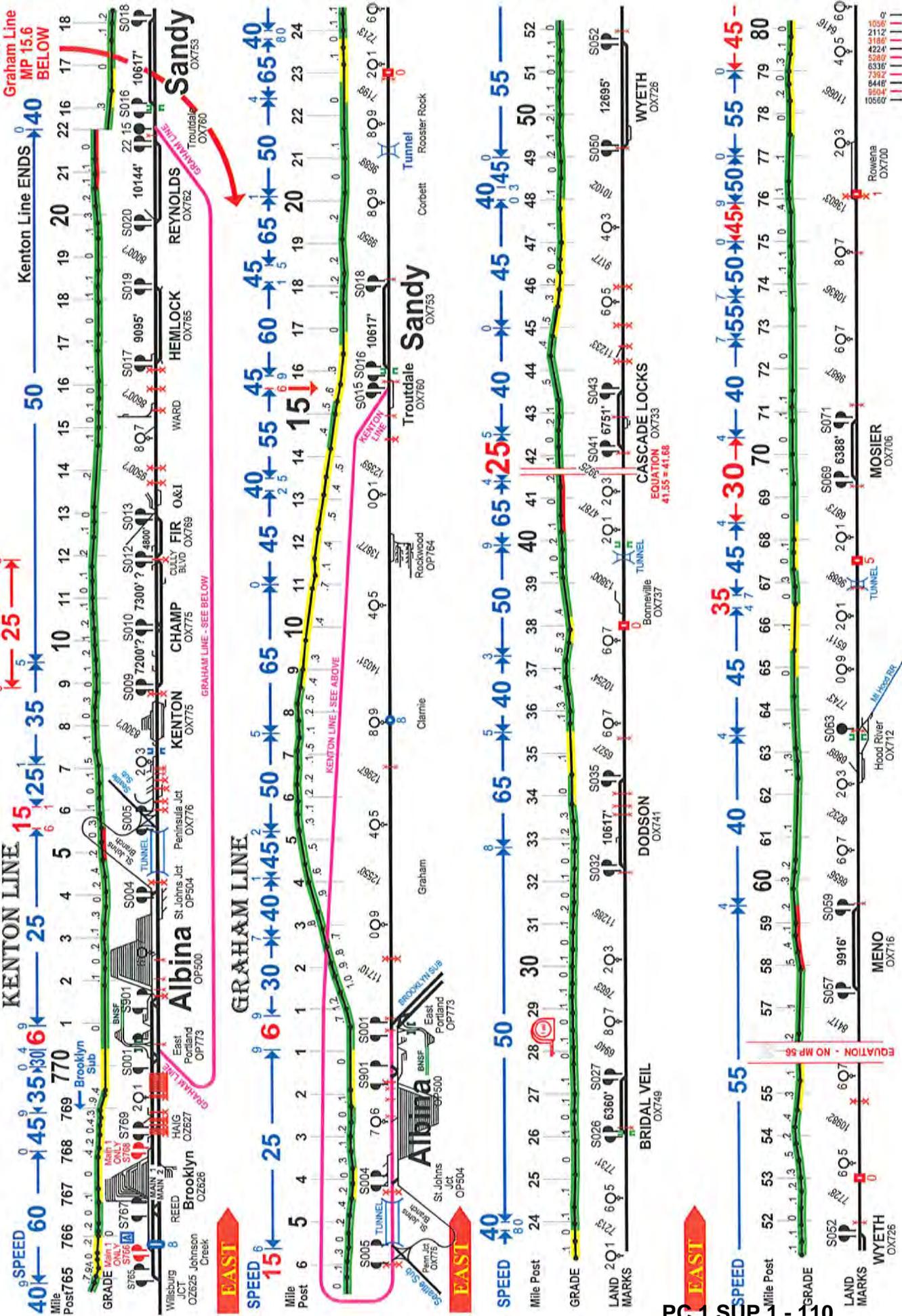
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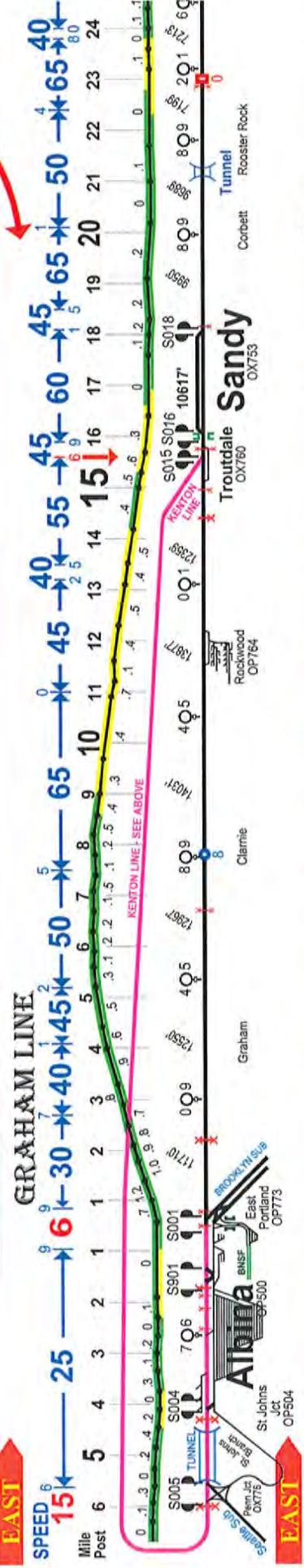
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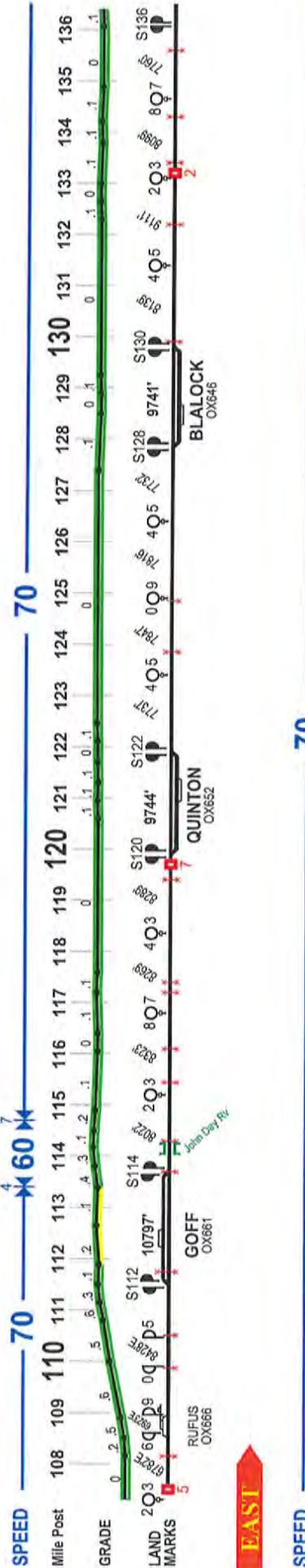
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Grade then calculated for those 2000 ft.  
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Small dips and humps will be missed.  
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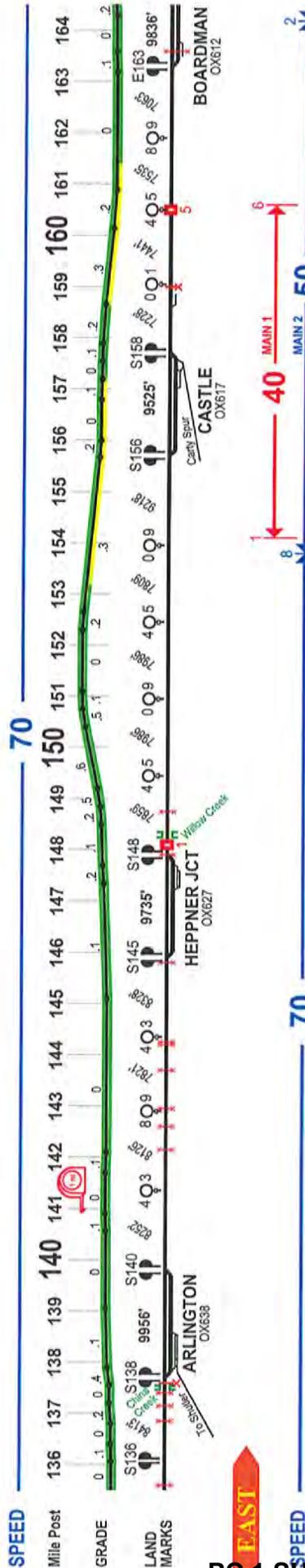
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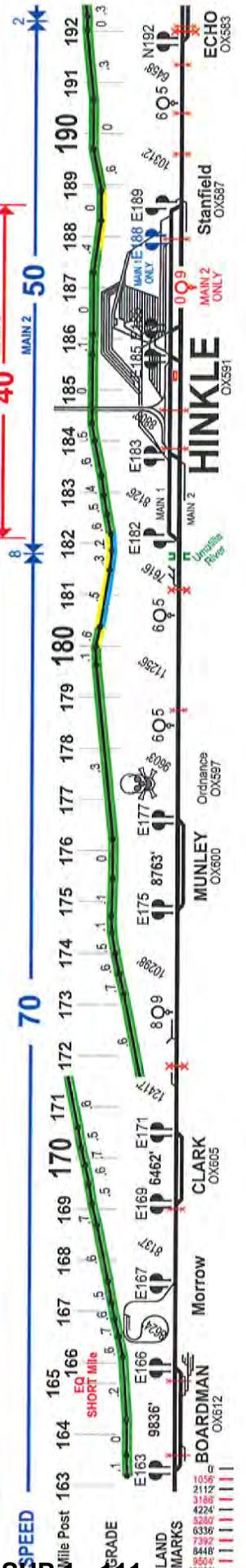
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News Releases

FINANCIAL

Union Pacific Reports Fourth Quarter and Full Year 2015 Results

Fourth Quarter Operating Ratio of 63.2 percent

OMAHA, NEB., JANUARY 21, 2016

Union Pacific Corporation (NYSE: UNP) today reported 2015 fourth quarter net income of \$1.1 billion, or \$1.31 per diluted share compared to \$1.4 billion, or \$1.61 per diluted share, in the fourth quarter 2014.

"Total volumes decreased 9 percent in the quarter, more than offsetting another quarter of solid core pricing gains," said Lance Fritz, Union Pacific chairman, president and chief executive officer. "On the cost side, we continued to adjust resources throughout the quarter and also made solid progress with our productivity initiatives. As a result of these efforts, we achieved a quarterly operating ratio of 63.2 percent."

<p style="text-align: center;"><b>Fourth Quarter Results</b></p> <ul style="list-style-type: none"> <li>› Diluted earnings per share of \$1.31 declined 19 percent.</li> <li>› Operating income totaled \$1.9 billion, down 19 percent.</li> <li>› Operating ratio of 63.2 percent, up 1.8 points.</li> </ul> <p style="text-align: center;"><b>Full Year 2015 Results</b></p> <ul style="list-style-type: none"> <li>› Diluted earnings per share of \$5.49 declined 5 percent.</li> <li>› Operating income totaled \$8.1 billion, down 8 percent.</li> <li>› Operating ratio of 63.1 percent, improved 0.4 points.</li> </ul>
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Fourth Quarter Summary

Operating revenue of \$5.2 billion was down 15 percent in the fourth quarter 2015 compared to the fourth quarter 2014. Fourth quarter business volumes, as measured by total revenue carloads, declined 9 percent compared to 2014. Volumes declined in each of the Company's business groups with the exception of automotive. In addition:

- › Quarterly freight revenue decreased 16 percent compared to the fourth quarter 2014, as volume declines, lower fuel surcharge revenue, and negative business mix more than offset core pricing gains.
- › Union Pacific's 63.2 percent operating ratio was unfavorable by 1.8 points compared to the fourth quarter 2014.
- › The \$1.61 per gallon average quarterly diesel fuel price in the fourth quarter 2015 was 39 percent lower than the fourth quarter 2014.
- › Quarterly train speed, as reported to the Association of American Railroads, was 27.0 mph, 13 percent faster than the fourth quarter 2014.
- › The Company repurchased 6.6 million shares in the fourth quarter 2015 at an aggregate cost of \$586 million.

Summary of Fourth Quarter Freight Revenues

- › Automotive up 1 percent
- › Chemicals down 7 percent
- › Agricultural Products down 12 percent
- › Intermodal down 14 percent
- › Industrial Products down 23 percent
- › Coal down 31 percent

2015 Full Year Summary

For the full year 2015, Union Pacific reported net income of \$4.8 billion or \$5.49 per diluted share versus \$5.2 billion or \$5.75 per diluted share in 2014, representing 8 and 5 percent decreases, respectively. Operating revenue totaled \$21.8 billion as compared to \$24.0 billion in 2014. Operating income totaled \$8.1 billion, an 8 percent decrease compared to 2014. In addition:

- › Freight revenue decreased to \$20.4 billion, a 10 percent decrease when compared to 2014. Carloadings were down 6 percent versus 2014, with declines in each of the Company's business groups with the exception of automotive.
- › Average diesel fuel prices decreased 38 percent to \$1.84 per gallon in 2015 from \$2.97 per gallon in 2014.
- › Union Pacific's operating ratio of 63.1 percent was a full year record, improving 0.4 points from the previous record set in 2014.
- › Train speed, as reported to the Association of American Railroads, was 25.4 mph, 6 percent faster compared to the full year 2014.
- › Union Pacific's reportable personal injury rate of 0.87 incidents per 200,000 employee-hours was a full year record, improving 11 percent compared to the full year 2014.
- › Union Pacific's capital program in 2015 totaled \$4.3 billion, an increase of approximately \$200 million compared to the full year 2014.
- › The Company repurchased 35.3 million shares in 2015 at an aggregate cost of almost \$3.5 billion.

## 2016 Outlook

"This past year was a difficult one in many respects, but our team did outstanding work in the face of dramatic declines in volumes, and shifts in our business mix," Fritz said. "Overall economic conditions, uncertainty in the energy markets, commodity prices, and the strength of the U.S. dollar will continue to have a major impact on our business this year. However, we are well-positioned to efficiently serve customers in existing markets as they rebound. The strength and diversity of the Union Pacific franchise also will provide tremendous opportunities for new business development as both domestic and global markets evolve. When combined with our unrelenting focus on safety, productivity, and service, these opportunities will translate into an excellent experience for our customers and strong value for our shareholders in the years ahead."

## Fourth Quarter 2015 Earnings Conference Call

Union Pacific will host its fourth quarter 2015 earnings release presentation live over the Internet and via teleconference on Thursday, January 21, 2016 at 8:45 a.m. Eastern Time. The presentation will be webcast live over the internet on Union Pacific's website at [www.up.com/investor](http://www.up.com/investor). Alternatively, the webcast can be accessed directly through the following link [<http://services.choruscall.com/links/unp160121>]. Participants may join the conference call by dialing 877/407-8293 (or for international participants, 201/689-8349).

## ABOUT UNION PACIFIC

Union Pacific Railroad is the principal operating company of Union Pacific Corporation (NYSE: UNP). One of America's most recognized companies, Union Pacific Railroad connects 23 states in the western two-thirds of the country by rail, providing a critical link in the global supply chain. From 2006-2015, Union Pacific invested approximately \$33 billion in its network and operations to support America's transportation infrastructure. The railroad's diversified business mix includes Agricultural Products, Automotive, Chemicals, Coal, Industrial Products and Intermodal. Union Pacific serves many of the fastest-growing U.S. population centers, operates from all major West Coast and Gulf Coast ports to eastern gateways, connects with Canada's rail systems and is the only railroad serving all six major Mexico gateways. Union Pacific provides value to its roughly 10,000 customers by delivering products in a safe, reliable, fuel-efficient and environmentally responsible manner.

Union Pacific Investor contact: Mike Staffenbeal at 402-544-4227.

- › Supplemental financial information is attached

This presentation and related materials contain statements about the Company's future that are not statements of historical fact, including specifically the statements regarding the Company's expectations with respect to economic conditions and demand levels; and its ability to generate financial returns, improve network performance and cost efficiency, and provide returns to its shareholders. These statements are, or will be, forward-looking statements as defined by the Securities Act of 1933 and the Securities Exchange Act of 1934. Forward-looking statements also generally include, without limitation, information or statements regarding: projections, predictions, expectations, estimates or forecasts as to the Company's and its subsidiaries' business, financial, and operational results, and future economic performance; and management's beliefs, expectations, goals, and objectives and other similar expressions concerning matters that are not historical facts.

Forward-looking statements should not be read as a guarantee of future performance or results, and will not necessarily be accurate indications of the times that, or by which, such performance or results will be achieved. Forward-looking information, including expectations regarding operational and financial improvements and the Company's future performance or results are subject to risks and uncertainties that could cause actual performance or results to differ materially from those expressed in the statement. Important factors, including risk factors, could affect the Company's and its subsidiaries' future results and could cause those results or other outcomes to differ materially from those expressed or implied in the forward-looking statements. Information regarding risk factors and other cautionary information are available in the Company's Annual Report on Form 10-K for 2014, which was filed with the SEC on February 6, 2015. The Company updates information regarding risk factors if circumstances require such updates in its periodic reports on Form 10-Q and its subsequent Annual Reports on Form 10-K (or such other reports that may be filed with the SEC).

Forward-looking statements speak only as of, and are based only upon information available on, the date the statements were made. The Company assumes no obligation to update forward-looking information to reflect actual results, changes in assumptions or changes in other factors affecting forward-looking information. If the Company does update one or more forward-looking statements, no inference should be drawn that the Company will make additional updates with respect thereto or with respect to other forward-looking statements. References to our website are provided for convenience and, therefore, information on or available through the website is not, and should not be deemed to be, incorporated by reference herein.

The statements and information contained in the news releases provided by Union Pacific speak only as of the date issued. Such information by its nature may become outdated, and investors should not assume that the statements and information contained in Union Pacific's news releases remain current after the date issued. Union Pacific makes no commitment, and disclaims any duty, to update any of this information.

#### Media Contact

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BEFORE THE COLUMBIA RIVER GORGE COMMISSION

FRIENDS OF THE COLUMBIA GORGE,	)	
	)	
Petitioner,	)	CRGC No. COA-S-99-01
	)	
vs.	)	<b>FINAL OPINION AND</b>
	)	<b>ORDER</b>
SKAMANIA COUNTY,	)	
	)	
Respondent.	)	
_____	)	

This case involves an appeal by Friends of the Columbia Gorge of a decision issued by Skamania County approving a new aggregate quarry, with related extraction, crushing, screening, and stockpiling operations. Petitioner Friends of the Columbia Gorge contested the approval of the quarry and related operations. The Columbia River Gorge Commission met on May 8, 2001 to hear oral argument and deliberate to a decision.

**I. Parties**

The parties to the hearing were:

Friends of the Columbia Gorge, represented by Gary K, Kahn, Reeves Kahn & Eder, Portland, Oregon.

Skamania County. Skamania County did not submit a brief and thus did not participate in oral argument. Commission Rule 350-60-120(3).

## **II. Preliminary Rulings**

Columbia River Gorge Commissioner Walt Loehrke recused himself from the hearing because of his prior involvement with the case with the Skamania County Planning Commission.

## **III. Standard of Review**

The issues presented here are both legal and factual in nature. For the legal issues, our review focuses on whether the decision violates a provision of applicable law and is prohibited as a matter of law, or whether the decision improperly construes the applicable law based on the record before us. For the factual issues, our review focuses on whether the decision is supported by substantial evidence in the whole record, whether the findings are insufficient to support the decision, or whether the decision was clearly erroneous or arbitrary and capricious.<sup>1</sup>

## **IV. Facts**

The relevant facts are:

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<sup>1</sup> Commission Rule 350-60-220 provides:

"The Commission shall reverse or remand a land use decision for further proceedings when:

- (a) The governing body exceeded its jurisdiction;
- (b) The decision is unconstitutional
- (c) The decision violates a provision of applicable law and is prohibited as a matter of law; or;
- (d) The decision was clearly erroneous or arbitrary and capricious.
- (e) The findings are insufficient to support the decision;
- (f) The decision is not supported by substantial evidence in the whole record;
- (g) The decision is flawed by procedural errors that prejudice the substantial rights of the petitioner(s);
- (h) The decision improperly construes the applicable law; or
- (i) A remand is required pursuant to 360-060-0090(s)(d) [sic].

1. The subject parcel is approximately 160 acres in size and is located northwest of Ash Lake, off Blue Lake Road, in Section 4 of T2N, R7E, Skamania County Tax Lot Nos. 2-7-4-300, 301, 302, 303, 304, 305, and 306. The property is zoned General Management Area Large Woodland (F-2) in the Skamania County Code. Rec. 323-4.

2. On January 13, 1997, Byron Slack, representing Eagle Ridge Development Corp., submitted an application for a new aggregate quarry, with related extraction, crushing, screening, and stockpiling operations. Rec. 323. The application stated, "Reclamation Drawings and Topography Map to Follow." Rec. 331.

3. The proposed quarry would be seen from at least five key viewing areas. Rec. 128.

4. On October 24, 1997, the applicant submitted to Skamania County a Washington Department of Natural Resources Standard Reclamation Plan (Form SM-8A). Rec. 191-202. On March 3, 1998, the applicant submitted four perspective drawings. Rec. 168-171. The perspective drawings were general in nature and were not identified as being the views seen from any particular key viewing areas.

5. On December 9, 1997, Washington Department of Natural Resources rejected the applicant's reclamation plan. Rec. 180.

6. Skamania County's decision imposed a condition of approval requiring the applicant to submit a revised reclamation plan. Rec. 7-11.

7. The applicant undertook a sensitive wildlife assessment study, Rec. 215-244, which was rejected as inadequate by Washington Department of Fish and Wildlife, Rec. 188-190. On July 20, 1998, the applicant prepared a Wildlife Management Plan, which significantly limited the size, scope, and location of the proposed mining. Rec. 54-65. On August 8, 1998, Washington Department of Fish and Wildlife recommended that the plan would protect sensitive wildlife resources. Rec. 31. This letter was faxed to Skamania County on August 4, 1998 prior to a Planning Commission hearing recommending approval of the application. Rec. 48-9.

8. The Skamania County Planning Commission held public hearings on the application on April 7, 1998, May 19, 1998, and August 4, 1998, recommending approval of the application.

#### **V. Contentions of the Parties**

Friends of the Columbia Gorge argued two assignments of error: (1) the county misconstrued the applicable law and rendered a decision not supported by adequate findings or substantial evidence when it concluded that the four perspective drawings in the record were adequate to satisfy SCC § 22.10.020.B.22; and (2) the county misconstrued the applicable law and rendered a decision not supported by adequate findings or substantial evidence when it concluded that a reclamation plan had been submitted as required by SCC § 22.10.020.B.5, when the reclamation plan had been rejected by Washington Department of Natural Resources and when a condition of the County's approval required submitting a revised reclamation plan.

## **VI. Analysis**

Both of the assignments of error presented in this appeal relate to the sufficiency of the application materials, to whether Skamania County's decision properly construed the applicable law in making a decision based on the incomplete application, and to whether the decision, based on incomplete application materials, is supported by substantial evidence.

Mining is a very intensive land use, which has a high potential of adversely affecting the Gorge resources. Modifying land forms is irreversible. Scenic vistas are altered, cultural resources and sensitive plant and wildlife habitat species may be removed, and recreation may be affected by the effects to scenic, cultural, and natural resources and other associated impacts such as noise, dust, and blasting.

Recognizing these issues associated with mining, Congress specifically required that the Management Plan include provisions to:

require that the exploration, development, and production of mineral resources, and the reclamation of lands thereafter, take place without adversely affecting the scenic, cultural, recreational, and natural resources of the scenic area.

16 U.S.C. 544d(d)(9). To this end, the Management Plan contains specific and detailed application requirements for mining applications in the Scenic Area.

These application materials are information necessary for a permitting agency (either a County or the Gorge Commission) to evaluate the application and make a decision about whether the proposal would adversely affect the Gorge resources.

We focus our analysis on two problems with the County's review and decision in this case. First, the County made its decision without a complete land use application and without the mandatory information necessary to make the requisite findings and conclusions that the application complied with the land use ordinance and did not adversely affect the Gorge resources. Second, in approving the application, the County imposed a condition of approval requiring the applicant to submit several maps (constituting the reclamation plan) that comply with the guidelines. Deferring this requirement is insufficient to establish that the application complies with the guidelines because the County must evaluate the maps to determine if the application complies with the guidelines.

**A. The County cannot make a decision supported by substantial evidence without a complete application and information.**

The record in this case shows that the applicant failed to submit an application that met those minimum requirements by failing to submit perspective drawings of the proposed mining as seen from key viewing areas and an approved reclamation plan. The relevant sections of the Skamania County Code are:

For proposed mining and associated activities on lands visible from key viewing areas, project applicants shall submit perspective drawings of the proposed mining areas as seen from applicable key viewing areas.

SCC § 22.10.020.B.22, and

For all new production and/or development of mineral resources and expansion of existing quarries, a reclamation plan is required to restore the site to a natural appearance that blends with and emulates

surrounding landforms to the maximum extent practicable.

Such a plan shall be approved by the Department of Natural Resources for uses under its jurisdiction \* \* \*

SCC § 22.10.020.A.5.<sup>2</sup>

In this case, the project applicant submitted perspective drawings more than one year after submitting the original land use application, and submitted a reclamation plan approximately nine months after submitting the original land use application. The perspective drawings did not purport to show the site from the various key viewing areas, and the reclamation plan was rejected was the Washington Department of Natural Resources. Nevertheless, Skamania County continued to process the application. Subsequently, the applicant prepared a wildlife management plan, which significantly limited the size, scope, and location of the proposed mining in order to protect sensitive wildlife species. Yet, despite this change, Skamania County did not require new perspective drawings or a new reclamation plan.

During the time between submission of the original application and submission of the perspective drawings and reclamation plan, Skamania County issued a Preliminary Director's Decision, Rec. 259-98, and a Determination of Non-Significance (DNS) under Washington's SEPA (not in the record, but see Rec. 300-301). The record thus reveals that Skamania County was making decisions concerning resource protection without even first having a complete

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<sup>2</sup> SCC § 22.10.020.B.23.c contains a similar requirement for quarries more than 3 miles from the nearest key viewing areas. The quarry in this case is seen from key viewing areas that are both within and beyond 3 miles.

application. This indicates that Skamania County staff conducted analyses of the proposed quarry without the benefit of complete information. These analyses were then given to the applicant and the public for review and an opportunity to comment, and to the Planning Commission for consideration during hearings. As a result, public comment and Planning Commission discussions also occurred without the benefit of complete information.<sup>3</sup>

The Scenic Area standards require submission of certain application materials up front. In this case, the county failed to obtain perspective drawings as required by SCC § 22.10.020.B.22 and failed to require the applicant to submit a reclamation plan that was approved by Washington Department of Natural Resources as required by SCC § 22.10.020.A.5 and B.23.c. Accepting and initiating review of the incomplete application misconstrued and violated these standards.

Without complete application materials, tribal governments, state and local agencies, and the public cannot review the application and provide meaningful comments that are responsive to the criteria in the land use ordinance. It is also impossible for the County to make a decision that the application complies with the approval criteria. In this case, the County could not have known what would be the appearance of the ultimate reclamation of the site without an approved

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<sup>3</sup> We also note that the record indicates the applicant did not submit an approved wildlife management plan until after the preliminary decision and DNS, and after the second of three Planning Commission hearings. Due to the presence of sensitive wildlife species, the Wildlife Management Plan was a primary factor requiring limiting the size, scope and location of the proposed mining. Again, the timing of this indicates that much of the analysis work was done without complete information.

reclamation plan and without perspective drawings showing the view from the various key viewing areas. Hence, the County's decision is not supported by substantial evidence.

**B. The County erroneously applied conditions of approval to the decision.**

In addition to reviewing and approving an application based on incomplete information, Skamania County took the approach of approving the development conditioned upon the applicant subsequently submitting several maps that complied with the guidelines. The relevant condition of approval stated:

The mining site plan maps submitted by Bell Design Company shall be modified to include the information represented on the maps attached at the end of the [Wildlife] Management Plan, specifically, the Pre-Mining Topographic Map, the Cross Section Map, the Reclamation Map, the Final Reclamation Map, and the two Reclamation Perspective Model Maps shall be modified so as to be consistent with the map attached to the July 20, 198 Emcon Wildlife Management Plan.

Condition of Approval No. 23. Rec. 10.

As stated above, these are application materials. Hence, imposition of this condition misconstrues and violates SCC § 22.10.020.A.5 and B.23.c. The County cannot defer submission of application materials to after the application is approved. Application materials, by definition, must be submitted with the application.

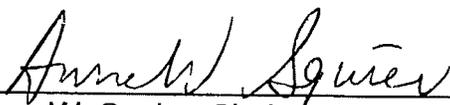
Also, as a result of deferring these application requirements to a condition of approval, the County's decision is not based on substantial evidence in the record. A condition of approval requiring submission of a reclamation plan that

complies with the guidelines cannot establish that the application complies with the land use ordinance because the County must evaluate the reclamation plan to determine if the application complies with the guidelines. The County's findings and conclusions could not be based on substantial evidence because the evidence does not yet exist, but was required after-the-fact as a condition of approval. Imposing conditions of approval is not a substitute for obtaining and reviewing complete land use applications and making adequate findings of fact and conclusions of law.

While we are not bound by state law in our interpretations, we nonetheless point out that our analysis is consistent with case law from Oregon, see e.g. *Miller v. City of Joseph*, 31 Or LUBA 478 (1996). We are unaware of any Washington case law relating to this issue.

The decision of the Skamania County Board of Commissioners is  
**REVERSED.**

DATED this 22<sup>nd</sup> day of June, 2001

  
\_\_\_\_\_  
Anne W. Squier, Chair  
Columbia River Gorge Commission

NOTICE: You are entitled to judicial review of this Final Order within 60 days from the date of this order, pursuant to section 15(b) (4) of the Scenic Area Act, P.L. 99-663.

BEFORE THE COLUMBIA RIVER GORGE COMMISSION

FRIENDS OF THE COLUMBIA GORGE,	)	
	)	
Petitioner,	)	CRGC No. COA-S-99-01
	)	
vs.	)	<b>FINAL OPINION AND</b>
	)	<b>ORDER</b>
SKAMANIA COUNTY,	)	
	)	
Respondent.	)	
_____	)	

This case involves an appeal by Friends of the Columbia Gorge of a decision issued by Skamania County approving a new aggregate quarry, with related extraction, crushing, screening, and stockpiling operations. Petitioner Friends of the Columbia Gorge contested the approval of the quarry and related operations. The Columbia River Gorge Commission met on May 8, 2001 to hear oral argument and deliberate to a decision.

**I. Parties**

The parties to the hearing were:

Friends of the Columbia Gorge, represented by Gary K, Kahn, Reeves Kahn & Eder, Portland, Oregon.

Skamania County. Skamania County did not submit a brief and thus did not participate in oral argument. Commission Rule 350-60-120(3).

## **II. Preliminary Rulings**

Columbia River Gorge Commissioner Walt Loehrke recused himself from the hearing because of his prior involvement with the case with the Skamania County Planning Commission.

## **III. Standard of Review**

The issues presented here are both legal and factual in nature. For the legal issues, our review focuses on whether the decision violates a provision of applicable law and is prohibited as a matter of law, or whether the decision improperly construes the applicable law based on the record before us. For the factual issues, our review focuses on whether the decision is supported by substantial evidence in the whole record, whether the findings are insufficient to support the decision, or whether the decision was clearly erroneous or arbitrary and capricious.<sup>1</sup>

## **IV. Facts**

The relevant facts are:

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<sup>1</sup> Commission Rule 350-60-220 provides:

"The Commission shall reverse or remand a land use decision for further proceedings when:

- (a) The governing body exceeded its jurisdiction;
- (b) The decision is unconstitutional
- (c) The decision violates a provision of applicable law and is prohibited as a matter of law; or;
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- (e) The findings are insufficient to support the decision;
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- (i) A remand is required pursuant to 360-060-0090(s)(d) [sic].

1. The subject parcel is approximately 160 acres in size and is located northwest of Ash Lake, off Blue Lake Road, in Section 4 of T2N, R7E, Skamania County Tax Lot Nos. 2-7-4-300, 301, 302, 303, 304, 305, and 306. The property is zoned General Management Area Large Woodland (F-2) in the Skamania County Code. Rec. 323-4.

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3. The proposed quarry would be seen from at least five key viewing areas. Rec. 128.

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5. On December 9, 1997, Washington Department of Natural Resources rejected the applicant's reclamation plan. Rec. 180.

6. Skamania County's decision imposed a condition of approval requiring the applicant to submit a revised reclamation plan. Rec. 7-11.

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Friends of the Columbia Gorge argued two assignments of error: (1) the county misconstrued the applicable law and rendered a decision not supported by adequate findings or substantial evidence when it concluded that the four perspective drawings in the record were adequate to satisfy SCC § 22.10.020.B.22; and (2) the county misconstrued the applicable law and rendered a decision not supported by adequate findings or substantial evidence when it concluded that a reclamation plan had been submitted as required by SCC § 22.10.020.B.5, when the reclamation plan had been rejected by Washington Department of Natural Resources and when a condition of the County's approval required submitting a revised reclamation plan.

## VI. Analysis

Both of the assignments of error presented in this appeal relate to the sufficiency of the application materials, to whether Skamania County's decision properly construed the applicable law in making a decision based on the incomplete application, and to whether the decision, based on incomplete application materials, is supported by substantial evidence.

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We focus our analysis on two problems with the County's review and decision in this case. First, the County made its decision without a complete land use application and without the mandatory information necessary to make the requisite findings and conclusions that the application complied with the land use ordinance and did not adversely affect the Gorge resources. Second, in approving the application, the County imposed a condition of approval requiring the applicant to submit several maps (constituting the reclamation plan) that comply with the guidelines. Deferring this requirement is insufficient to establish that the application complies with the guidelines because the County must evaluate the maps to determine if the application complies with the guidelines.

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Without complete application materials, tribal governments, state and local agencies, and the public cannot review the application and provide meaningful comments that are responsive to the criteria in the land use ordinance. It is also impossible for the County to make a decision that the application complies with the approval criteria. In this case, the County could not have known what would be the appearance of the ultimate reclamation of the site without an approved

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<sup>3</sup> We also note that the record indicates the applicant did not submit an approved wildlife management plan until after the preliminary decision and DNS, and after the second of three Planning Commission hearings. Due to the presence of sensitive wildlife species, the Wildlife Management Plan was a primary factor requiring limiting the size, scope and location of the proposed mining. Again, the timing of this indicates that much of the analysis work was done without complete information.

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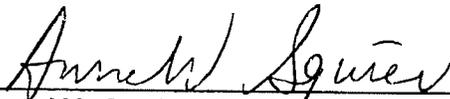
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While we are not bound by state law in our interpretations, we nonetheless point out that our analysis is consistent with case law from Oregon, *see e.g. Miller v. City of Joseph*, 31 Or LUBA 478 (1996). We are unaware of any Washington case law relating to this issue.

The decision of the Skamania County Board of Commissioners is  
**REVERSED.**

DATED this 22<sup>nd</sup> day of June, 2001

  
\_\_\_\_\_  
Anne W. Squier, Chair  
Columbia River Gorge Commission

NOTICE: You are entitled to judicial review of this Final Order within 60 days from the date of this order, pursuant to section 15(b) (4) of the Scenic Area Act, P.L. 99-663.

# CITY OF MOSIER

small enough to make a difference

PO Box 456 | 208 Washington Street, Mosier, OR 97040  
Phone: 541.478.3505 | www.CityofMosier.com

September 2, 2016

Angie Brewer, Planning Director  
Wasco County Department of Planning and Economic Development  
2705 East Second Street  
The Dalles, Oregon 97058

## **Re: Union Pacific Railroad Second Mainline Track Project – PLASAR-15-01-0004**

At a City Council meeting on August 17, 2016, the Mosier City Council voted to submit the following comments on the Union Pacific Railroad second mainline track expansion proposal.

The Mosier City Council, acting on behalf of its constituents who have recently been severely impacted by an oil train derailment, requests denial of this project application based on these concerns:

- increased fire hazards
- negative impacts to public health and safety
- safety concerns regarding river access
- significantly increased noise disturbance that will impact economic development and quality of life
- impacts on Mosier wetlands
- scenic impacts

While the application to the County only addresses a project area that lies just outside of the City of Mosier, this project will have "cumulative adverse impacts" to the entire National Scenic Area and all of the Urban Exempt Areas within the Gorge. These cumulative adverse impacts are not adequately addressed in the proposal and technical expertise is needed to better understand the risks and how to mitigate those risks. Wasco County Planning Staff are not technical experts on rail safety and the Wasco County Land Use Development Ordinance does not have specific criteria to apply to this proposal to ensure that "cumulative adverse impacts" are not created as a result of this project.

### Public Health & Safety and Fire Hazards:

The Management Plan for the Columbia River Gorge National Scenic area requires that "cumulative adverse impacts must be avoided, minimized, or mitigated." The current level of UPRR operations and maintenance standards has proven inadequate to address threats to the communities and the natural

resources of the Columbia River Gorge. In this case, the only mechanism to limit more exposure to threats to Scenic, Natural, Cultural, and Recreational resources and to limit more exposure to threats to public health and safety is to maintain the current level of train infrastructure and train traffic in the Scenic Area. Therefore the City agrees with the proposed condition #15 that UPRR stay within the existing range of 20 to 30 trains per day as stated in the application materials.

Furthermore, because any conditions of approval by the Wasco County Planning Department will be unable to mitigate the risk or to minimize the exposure to risk by limiting the hazardous materials that the trains are carrying, the only mechanism by which Wasco County can limit its exposure to these hazards is to not authorize more track and thus more train traffic.

If the permit is approved, the Mosier City Council requests additional conditions of approval that would require a broader process to address safety concerns, including engaging the technical expertise necessary to develop meaningful and binding requirements. The Mosier City Council recommends a process through which topical experts are hired to identify and address Mosier's rail safety concerns.

The City agrees with the Condition #17 – that UPRR will provide regular training to Gorge Fire Departments. However, this does not ensure that “the use or development will not significantly increase fire hazard, fire suppression costs or risks to fire suppression personnel.” This is an example of a criterion that requires further analysis by technical experts in the field of rail safety to truly understand and quantify the increased fire hazard associated with the proposed development. Further, the City of Mosier is concerned about the potential negative impacts on public health and safety associated with the increased fire risk.

#### Safety Concerns regarding River Access:

Thanks to partnership efforts between UPRR, the City of Mosier, and ODOT in 2015, Mosier now has one seasonal public access to the Columbia River. However, this access is on the far west end of town (Rock Creek), out of sight of downtown Mosier, so that most visitors are unaware that there is a connection between Mosier and the Columbia River. Double tracks would only magnify that visual and physical barrier. Communities like Hood River and The Dalles have created multiple connections to their waterfront areas that allow for significant economic development and quality of life opportunities. The City Council fears that the Double Track project will make this option less feasible.

The City Council is also concerned that because many residents currently cross the tracks at the downtown location illegally, that this practice would become far more dangerous with two tracks and with two trains running in opposite directions, and that community members would be far more likely to be killed or injured if the double track project is approved.

During the Mosier Train Derailment response, fire fighters were unable to access needed Columbia River water because the City's only access at Rock Creek was blocked by the derailed and burning cars. This experience underscores the community's pressing safety needs for a second access and a year round access to the Columbia River.

A pedestrian underpass that would link downtown Mosier to the Columbia River and to the Mosier Waterfront Park trail, and year round access at Rock Creek would resolve these issues, but the City will never be in a financial position to ever contemplate such projects.

Noise Impacts:

The existing noise impacts of one train track are significant for the residential and business communities. Next to safety fears, train noise, and specifically the high pitched screeching of metal on metal, has the greatest impact on the Mosier community. If the proposed project is allowed to increase train traffic, the Mosier community will experience an increased level of noise disturbance, which not only affects all homes and residents but directly affects economic development opportunities downtown.

Wetlands Impacts:

The City also requests that wetland mitigation efforts be expanded to directly address the areas of impact and that preference be given to wetland mitigation projects that have multi-benefits to the residents of Mosier. Several local wetlands projects with significant public value have already been identified by a team of UPRR, City of Mosier, Mosier Watershed Council, and Wasco County Soil and Water Conservation representatives who worked with a local stream restoration consultant in 2014.

Conclusion:

While the City has been working with UPRR on this proposal for several years to find mutually beneficial aspects of the project, such as local wetland mitigation projects and dedication of UPRR lands to the City of Mosier, the City Council feels that increased risks of adding more train traffic in the Gorge is too great for the residents of Mosier to bear. Mosier residents feel that they will receive no economic benefits from the proposed project, but their perception is that they will receive all of the risk.

The only way that the City of Mosier could advocate anything but opposition to this project is if UPRR would be required to develop and implement significant changes in the way that train traffic safety and access to the Columbia River are addressed in the National Scenic Area of the Columbia River Gorge.

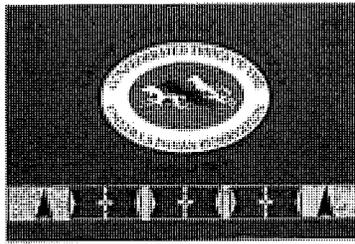
Sincerely,

*Arlene Burns*

Arlene Burns, Mayor  
City of Mosier

**Confederated Tribes *of the*  
Umatilla Indian Reservation**

Board of Trustees & General Council



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September 2, 2016

Wasco County Planning and Development Office  
2705 East Second St.  
The Dalles, OR 97058

Submitted electronically to: [angieb@co.wasco.or.us](mailto:angieb@co.wasco.or.us)

Dear Wasco County Planning Commission:

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) is deeply concerned about increased shipment of fossil fuels through the Columbia River Gorge. The transportation of dangerous fossil fuels in Oregon has increased dramatically over the last few years with little or no federal, state or local oversight. The double-tracking at Mosier will result in increased train traffic and potentially increase train speeds. More train traffic will endanger tribal fishers who access the river throughout the Columbia River Basin as well as increase the likelihood of derailments and spills in the Gorge like the one we all witnessed on June 3, 2016. Unless and until a comprehensive, regional environmental review is done that addresses the numerous proposals to ship highly flammable Bakken crude oil and other dangerous commodities and the associated safety concerns, no new infrastructure expansion should be approved to facilitate additional rail shipment.

The CTUIR has watched crude-by-rail traffic increase substantially in recent years. Oil shipments increased by 250% in 2013 alone. Analysts expect crude-by-rail shipments to increase when oil prices improve, particularly from the tar sands region of Alberta, Canada. A spill of crude oil along the Columbia River would have disastrous consequences for the people, the communities, and the resources of the Gorge.

The risks from crude-by-rail shipments have not been fully analyzed due to the regulatory patchwork over the railroads and docks subject in part to the antiquated federal Rivers and Harbors Act. This minimal, haphazard regulatory approach has been exploited by companies that have begun shipping massive amounts of crude oil little to no public input. Instead, there needs to be a regional Environmental Impact Statement pursuant to the National Environmental Policy Act to analyze the cumulative impacts and risks posed by increased fossil fuel transport. Unless and until that is done, no additional projects should be approved.

The CTUIR believes that increased shipments of crude oil will create many additional threats to the communities in the Gorge and the citizens who live and travel through it, as well as tribal members and tribal fishers. The risks of transporting such inherently dangerous commodities warrant a reconsideration of the appropriate train speeds through the Gorge. The characteristics of tar sands oil itself justify further consideration of its risks. Without knowing the cumulative impacts of all these projects, their potential risks cannot be fully understood, addressed, or mitigated will not be addressed.

This year the CTUIR commissioned a report by Hill and Associates that discusses the risks of derailments in the Columbia River Basin. The report identifies the types of incidents we've already seen with crude oil trains causing significant property damage and loss of life. Derailments have become so common and consistent, new regulations have been developed specifically for Bakken crude oil trains. The report concludes that the risks from crude oil trains are significant. There are numerous projects that currently ship crude oil through the Gorge. Still more are proposed due to drilling in the Bakken Region of North Dakota and the tar sands region of Alberta, Canada. If nothing more is done, these incidents will continue to occur.

The derailment that we all witnessed on June 3, 2016 was a stark reminder of the risks we face from crude-by-rail shipments through the Columbia River Gorge. The CUTIR is thankful that the accident didn't result in the loss of life or more significant property damage. However this derailment should be a wakeup call to the region. Currently, all crude-by-rail shipments into the Northwest travel through the Columbia River Gorge. On June 3, tribal members were on the Columbia River and witnessed the damage caused by the spill.<sup>1</sup> The derailment could have been much worse and impacted the resources of the Gorge we all depend upon for decades.

Before another project that results in more crude-by-rail shipments, the CTUIR would like to see a study done to analyze the impacts trains have on tribal fishing. It should identify uncontrolled crossings tribal fishers use and the number of train fatalities related to train traffic in the Gorge—both recent and those projected to occur in the future. There are many uncontrolled crossings along the Columbia River both within and outside the Gorge. Funding must be identified and set aside to mitigate for the impacts of additional trains. Crossings must be improved, to better protect community members and tribal members lawfully accessing the river under the rights secured in our Treaty of 1855.

Thank you for your consideration of our comments.

Sincerely

  
Gary Burke  
Chairman, Board of Trustees

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<sup>1</sup> See testimony of Randy Settler in the Washington Energy Facility Site Evaluation Council, available on-line at: <http://www.efsec.wa.gov/Tesoro%20Savage/Adjudication/TSVEPadj.shtml#Transcripts> pages 3979-3995/



# Wasco County Planning Department

*"Service, Sustainability & Solutions"*

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## WASCO COUNTY PLANNING COMMISSION

### Notice of Rescheduled Quasi-Judicial Public Hearing for September 6, 2016 Notice of Amended Agenda for July 5, 2016

Date of This Notice: June 23, 2016

**Please Note:** The quasi-judicial hearing for PLASAR-15-01-004 has been rescheduled to September 6, 2016. The July 5, 2016 work session will only include a Planning Commission work session for Commissioner training and an update on the status of long-range planning projects.

**Date & Time:** NOTICE IS HEREBY GIVEN that the WASCO COUNTY PLANNING COMMISSION will meet Tuesday, July 5, 2016 to host a Planning Commission work session and Tuesday, September 6, 2016 to hold a quasi-judicial hearing for the UPRR proposal. Both events will begin at 3:00pm.

**Location:** The July 5, 2016 work session will be held at the Wasco County Planning Department Conference Room, located at 2705 East Second Street, The Dalles, OR. The September 6, 2016 quasi-judicial hearing will be held at the Columbia Gorge Discovery Center, located at 5000 Discovery Drive, The Dalles, OR 97058. Both meeting facilities are handicapped accessible, and language interpreters are available with one week notice. If you need special accommodations to attend, please call (541) 506-2560 to make a request.

Hearings before the Wasco County Planning Commission are governed by ORS 197.763 and ORS 215.402 to 215.431, Section 2.100(B) of the Wasco County National Scenic Area Land Use and Development Ordinance, and the Rules of Procedure of the Wasco County Planning Commission. The meeting agenda include:

**July 5, 2016 Work Session Details:** Commissioner training may include Robert's Rules and Oregon State Ethics training. Staff will also provide an update on the status of long-range planning projects and work plans.

**September 6, 2016, 2016 Hearing Details:** File # PLASAR-15-01-004. The Wasco County Planning Department has received an application from Union Pacific Railroad and their land use consultants, CH2M Hill, to expand an existing railroad siding on either side of Mosier, Oregon for 4.02 miles of new second mainline track and realigned existing track; place five new equipment shelters; install drainage structures, a retaining wall, new lighting and signage, and wireless communication poles; modify existing utilities, temporary landing zones for construction; and construct temporary and permanent access roads. The request also includes off-site wetland mitigation east of the primary project site.

The project area begins at rail MP 66.98, east of the Wasco County line, approximately 2 miles west of the City of Mosier, and ends at MP 72.35, approximately 3 miles east of Mosier. The subdivision roughly parallels the Columbia River and Interstate 84 for the length of the project. More specifically, the project crosses Township 3 North, Range 12 East, Sections 31 and 32; Township 3 North, Range 11 East, Section 36; and Township 2 North, Range 11 East, Sections 1, 2, and 3. One new signal building and two signal lights are also proposed at MP 74.73, approximately 2.4 miles east of the contiguous project area and off-site wetland mitigation is

proposed on Wasco County Parcel 2N 13E Section 8 Lot 200 (Account # 1274). The project will be predominantly located on lands owned by Union Pacific Railroad. Portions of the project will also occur on lands owned by Oregon State Parks and Recreation Commission and Oregon Department of Transportation. Offsite wetland mitigation will occur on lands owned by Skylar and Kathleen Schacht.

Applicable Zoning: General Management Area Large-Scale and Small-Scale Agriculture (A-1 (40) and A-2 (80)), Open Space, and Water; Special Management Area Agriculture, Public Recreation, and Open Space.

Review Authority & Criteria: W LUDO, Chapter 1 – Introductory Provisions, Chapter 2 – Development Approval Procedures, Chapter 3 – Basic Provisions and Zoning, Chapter 4 – Supplemental Provisions, Chapter 5 - Conditional Use Review, Chapter 6 – Variances, Chapter 8 – Temporary Use Permit, Chapter 11 – Fire Safety Standards, Chapter 14 – Scenic Area Review, and Chapter 23 – Sign Provisions.

Portions of the proposed development will occur inside the City of Mosier and portions will occur outside the city, within the Columbia River Gorge National Scenic Area. Wasco County Planning has regulatory authority provided by the National Scenic Area Act outside of the Mosier Urban Area.

QUESTIONS/COMMENTS: Comments may be provided up until the date of the hearing. Comments may be submitted in writing to the Wasco County Planning and Development Office, at 2705 East Second St., The Dalles, Oregon 97058, by email to [angieb@co.wasco.or.us](mailto:angieb@co.wasco.or.us), or in person at the hearing. Written testimony submitted by Testimony and evidence must be directed toward the listed review criteria or other criteria in the plan or land use regulation which the person believes to apply to that decision. Questions about the application should be directed to: Angie Brewer, Planning Director, at 541-506-2560 or [angieb@co.wasco.or.us](mailto:angieb@co.wasco.or.us).

AVAILABILITY OF INFORMATION: Any staff report used at the hearing shall be available for inspection at no cost at least seven (7) days prior to the hearing. If additional documents or evidence are provided by any party, the local government may allow a continuance or leave the record open to allow the parties a reasonable opportunity to respond. Copies of the application(s) and all documents and evidence relied upon by the applicant(s), all applicable criteria, and any staff reports are available for inspection at no cost and will be provided at reasonable cost at 2705 East Second Street, The Dalles, OR 97058.

Documents will be available online at: [www.co.wasco.or.us/planning](http://www.co.wasco.or.us/planning), click on Pending Land Use Decisions. The actions table is sorted alphabetically by the name of the applicant/owner. The information will be available until the end of the appeal period.

APPEAL INFORMATION: Failure to raise an issue in the hearing, in person or by letter, accompanied by statements or evidence sufficient to afford the Planning Commission or other parties an opportunity to respond to the issue, precludes appeal to the Wasco County Court on such issue.

**PUBLICATION DATE: THURSDAY JUNE 26, 2016**

Statement of James E. Hall regarding crude oil train accident risk in relation to the proposed routing of crude oil trains through the Columbia River Basin

Accident experience has clearly demonstrated that the consequences of train derailments carrying large numbers of crude oil tank cars have been catastrophic. Even after industry attempts to improve the poor crashworthiness of DOT-111 tank cars by offering CPC-1232 tank cars with enhanced safety features, the failure of tank cars in accidents and the quantity of crude oil released is enormous.

To understand the scope of how serious a train derailment can be when carrying more than 3,000,000 gallons of crude oil in tank cars, it is paramount that we study and understand recent accident history, not rely upon normalized data that includes accidents from decades ago involving different equipment and operating conditions. The National Transportation Safety Board (NTSB) issued a special study on risk concepts in dangerous goods transportation regulation that identified an important concept that is applicable today: That it is not until accident experience begins to accumulate that the change in risk becomes evident.

Since 2006, there have been many accidents in the United States and Canada involving derailments of trains carrying large quantities of crude oil and ethanol that provide us a realistic picture of accident experience and consequences. In 24 of those accidents 442 tank cars derailed and 71% of them (314) were breached. About 6.5 million gallons of crude oil and ethanol were released, an average of 270,000 gallons per accident; the equivalent of 30 highway gasoline cargo tanks.

The poor crashworthiness of tank cars used to transport crude oil and ethanol is evident in these train derailments. For example:

- October 20, 2006 – New Brighton, Pennsylvania, 23 tank cars derailed and 20 tank cars breached (87%), 485,278 gallons of ethanol were released (the equivalent of 54 highway gasoline cargo tanks);
- June 19, 2011 – Cherry Valley, Illinois, 19 tank cars derailed and 15 tank cars breached (79%), 323,963 gallons of ethanol were released (the equivalent of 36 highway gasoline cargo tanks);

- February 6, 2011 – Arcadia, Ohio, all 31 tank cars derailed were breached, 834,840 gallons of ethanol were released (the equivalent of 93 highway gasoline cargo tanks);
- July 6, 2013 – Lac Megantic, Quebec, 63 tank cars derailed and 59 tank cars breached (93.6%), 1,580,000 gallons of crude oil were released (the equivalent of 175 highway gasoline cargo tanks);
- November 8, 2013 – Aliceville, Alabama, 26 tank cars derailed and 25 tank cars breached (96%), 630,000 gallons of crude oil were released (the equivalent of 70 highway gasoline cargo tanks);
- February 14, 2015 – Gogama, Ontario, 29 tank cars derailed and 19 tank cars breached (65.5%), 264,172 gallons of crude oil were released (the equivalent of 29 highway gasoline cargo tanks);
- February 16, 2015 – Mount Carbon, West Virginia, 27 tank cars derailed and 20 tank cars breached (74%), 378,034 gallons of crude oil were released (the equivalent of 42 highway gasoline cargo tanks); and
- March 7, 2015 – Gogama, Ontario, 39 tank cars derailed and 36 tank cars breached (92%), more than 500,000 gallons of crude oil were released (the equivalent of 83 highway cargo tanks).

The U.S. Department of Transportation’s Federal Railroad Administration (FRA) and Pipeline and Hazardous Materials Safety Administration (PHMSA) issued speed restriction for high hazard flammable trains (including crude oil trains) to 50 mph and to 40 mph in high-threat urban areas. The agencies recognized that greater tank car damage can be expected at high speeds.

But accident data shows that the tank car failures are significant and consequences are substantial in train derailments at speeds below 50 mph and below 40 mph. In all of the 24 accidents reviewed all but one, accidents occurred at train speed below these restrictions:

- New Brighton, Pennsylvania – 37 mph,
- Cherry Valley, Illinois – 36 mph,
- Arcadia, Ohio – 46 mph,
- Aliceville, Alabama – 39 mph,

- Gogama, Ontario (February 14) – 38 mph,
- Mount Carbon, West Virginia – 33 mph, and
- Gogama, Ontario (March 7) – 43 mph.

Even at lower speeds (23 mph, 19 mph and 10 mph), tank car failures and consequences have been significant:

- August 5, 2012 – Pleva, Montana, train speed 23 mph, 17 tank cars derailed and 12 tank cars breached (74%), 245,336 gallons of ethanol were released (the equivalent of 27 highway gasoline cargo tanks),
- August 22, 2008 – Luther, Oklahoma, train speed 19 mph, 8 tank cars derailed and 5 tank cars breached (62.5%), 80,746 gallons of crude oil were released (the equivalent of 9 highway gasoline cargo tanks), and
- September 19, 2015 – Bon Homme County, South Dakota, train speed 10 mph, 7 tank cars derailed and 3 tank cars breached (43%), 49,748 gallons of crude oil were released (the equivalent of 5 and ½ highway cargo tanks).

Fire resulting from train derailments and tank car breaches has been significant. Of the 24 train derailments reviewed with tank car breaches 20 resulted in a fire. The volatility of crude oil has significant safety implications and when it has been released from tank cars during derailments fire threats were substantial.

The FRA accident data for Class 1 railroads (Excluding AMTRAK) show 2,522 train derailments on main line track for the period 2008 through 2015. The data identifies broken rails attributed to detail fractures including shelling and head checks, irregular track alignment including track that has buckled, and wide gage including defective or missing crossties, spikes or other fasteners as leading causes of derailments assigned to track, roadbed and structure related causes. Although investigations of some of the 24 crude oil and ethanol train accidents are ongoing, a significant number of these accidents have been attributed to track conditions like broken rails.

The accumulation of data from these accidents clearly illustrate that the consequences of high hazard flammable train derailments are significant. Crude oil tank cars have increased in size over the years and now are built for a gross weight of 286,000 pounds. NTSB has investigated several accidents where rail head wear and rolling contact fatigue were attributed to rail failure. Following the New Brighton accident, NTSB recommended that the FRA require railroads to develop inspection and maintenance programs based on damage-tolerance principles that take

into account accumulated tonnage, track geometry, rail surface conditions, rail head wear and crack growth rates that can be affected by the frequency, size and weight of trains.

Although the U.S. Department of Transportation has mandated improvements for tank cars that carry crude oil – the new DOT-117 tank car – it is uncertain when enough of those tank cars will be available for all crude oil shipments. It will certainly be several years. Further, it is unknown how well they will perform in accidents until we accumulate accident history, like we have for DOT-111 and CPC-1232 tank cars. Tank cars are subject to strong forces during violent train derailments and subject to failure from punctures from broken rail and accident debris. Although the probability of any train derailment is portrayed by industry as low, we have seen many high hazard flammable train accidents since 2006 and the results have been high consequence and catastrophic.

Trains safely passed through the town of Lac Megantic, Quebec for years. But that was little comfort for the residents when one of them finally derailed on July 6, 2013. The resulting explosion and fire destroyed the downtown and killed 47 people. And consider the residents living near Gogama, Ontario, who suffered through a catastrophic derailment in February 2015. Despite industry claims about how rare such accidents are, the community was again visited by a similar disaster just three weeks later.

As tragic as industrial accidents can be (i.e., a refinery explosion), one can argue that a community has accepted certain risks for tangible benefits like employment and commerce. However, oil transportation industry statistics cannot be used to dismiss legitimate concerns of residents who bear all the risk of catastrophe with no tangible benefit simply because railroads have chosen their towns as convenient transit points.

It has been proposed that four crude oil trains a day, each carrying over 3,000,000 gallons of crude oil (the equivalent of 333 highway gasoline cargo tanks for each train), travel the Columbia River Basin. Because of the recent history of significant accidents with crude oil trains, the poor crashworthiness of tank cars and the significant number of those accidents that have resulted in fire, an extensive effort is essential to study the needs for the equipment, infrastructure and resources necessary to protect the people who live, fish and work along the Columbia River Basin.

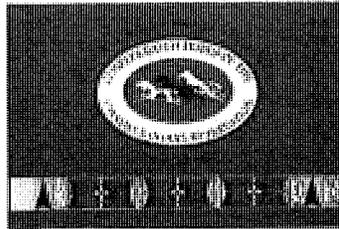
A handwritten signature in black ink, consisting of a stylized 'J' and 'H' followed by the name 'Hall'.

Jim Hall  
Principal  
Hall & Associates LLC

May 10, 2016

**Confederated Tribes *of the*  
Umatilla Indian Reservation**

Board of Trustees & General Council



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May 11, 2016

Shawn Zinszer, Regulatory Chief  
Army Corps of Engineers, Portland District  
P.O. Box 2947  
Portland, OR 97208-2946

**Re: UPRR Joint Permit Application No. 2014-364, Construction of 4.02 miles of track  
creating a 5.37 miles second mainline track near Mosier, OR**

Dear Mr. Olmstead:

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR or Umatilla Tribe) Fish and Wildlife Commission (FWC) appreciates the opportunity to provide input on the proposed track construction near Mosier, Oregon that will result in 4.02 miles of new track and a new 5.37 mile second mainline track. The CTUIR FWC has serious concerns regarding this project as it entails significant construction over two tributaries to the Columbia River and numerous wetlands, will increase rail traffic on the Columbia River and also allow for increased train speed and length. Additionally, the citizens of the CTUIR and other tribes access the river across railroad tracks, often at unmarked crossings to access the Columbia River to exercise their constitutionally-protected Treaty reserved right to fish. Increased rail traffic increases safety risks to tribal members crossing the tracks. Further, because the project potentially impacts Treaty rights, both directly and indirectly, the use of a Nationwide permit for this project is inappropriate. The CTUIR requests that the Corps of Engineers remove this project review form the Nationwide process and put it on an individual permit review process. Such a move will allow the Corps to conduct the required analyses to ensure there is little to no impacts to Treaty rights and the resources on which they depend.

**The Umatilla Tribe's Constitutionally-Protected Treaty Fishing Rights**

The Supreme Court of the United States has repeatedly recognized the significance of the treaty right to fish at off-reservation usual and accustomed places, holding that the right is "not much less necessary to the existence of the Indians than the atmosphere they breathed." *Washington v. Washington State Comm'l Pass. Fishing Vessel*, 443 U.S. 658, 680, 99 S. Ct. 3055, 3071-3072 (1978), quoting *United States v. Winans*, 198 U.S. 371, 380 (1905). This treaty right to fish is a property right, protected by the Fifth Amendment to the Constitution of the United States. See *Muckleshoot Indian Tribe v. United States Corps of Engineers*, 698 F.Supp. 1504, 1510 (W.D. Wash. 1988), citing *Menominee Tribe of Indians v. United States*, 391 U.S. 404, 411-412, 88 S.Ct. 1705, 1710-1711 (1968). The right to take fish includes a right to cross private property to access those areas, "imposing a servitude" upon the land. *Winans*, 198 U.S. at 381. Since 1968, the Umatilla Tribe has also protected these treaty rights as a plaintiff in *United States v. Oregon*, CV 68-513-KI, in the U.S. District Court for the District of Oregon.

The treaty fishing right carries with it an inherent right to protect the resource from despoliation from man-made acts. "[A] fundamental prerequisite to exercising the right to take fish is the existence of fish to be taken." *United States v. Washington*, 506 F.Supp. 187, 203 (W.D. Wash.

1980). *See also, Washington v. Washington State Commercial Passenger Fishing Vessel Ass'n*, 443 U.S. 658, 679 (1979) (Tribes with Treaty reserved fishing rights are entitled to something more tangible than “merely the chance...occasionally to dip their nets into the territorial waters.”) The ecosystem necessary to sustain the fish cannot be diminished, degraded or contaminated such that either the fish cannot survive, or that consuming the fish threatens human health. *United States v. Washington*, 2013 U.S. Dist. LEXIS 48850, 75 (W.D. Wash. Mar. 29, 2013)(State “impermissibly infringed” tribes’ treaty based fishing right in Washington by constructing culverts that “reduced the quantity of quality salmon habitat, prevented access to spawning ground, reduced salmon production...and diminished the number of salmon available for harvest.”) *See also, e.g., Kittitas Reclamation District v. Sunnyside Valley Irrigation District*, 763 F.2d 1032, 1034-35 (9<sup>th</sup> Cir. 1985)(Tribe’s fishing right can be protected by enjoining ground water withdrawals that would destroy eggs before they could hatch). This project, both in its immediate construction impacts, and its resultant long-term increase in rail traffic and speed, carry impermissible potential impacts to both the access of the treaty fishing right, and degradation of the ecosystem on which those treaty resources depend.

According to the JARPA permit document, the proposed project will construct approximately four miles of new double-track rail line, which includes two new bridges over tributaries to the Columbia River and going through multiple wetlands and adjacent lakes, many of which are spawning habitat for salmonid species listed on the Endangered Species Act. The proposal would also construct two new signal cabins, which are curiously omitted from the permit plans based on the applicant’s conclusory statement that “there are no waters for the United States what will be affected” (Project No. 2014-364 JARPA at pp 6-7.) The project also calls for over 1.5 acres of fill to open waters and wetlands. Further, the project includes a new paved area that directs any runoff from the increased train traffic to bare ground, possibly adjacent to wetlands, for “infiltration” into the ground. Given that the runoff will largely come from train traffic, and given the 250% increase in rail traffic between 2013 and 2014<sup>1</sup>, it is likely that some type of contaminants would pollute this runoff. Any runoff that infiltrates into the bare ground will then go into the groundwater, which is often hydraulically connected to the Columbia River through the Gorge. The potential for the project to contaminate the Columbia River and adjacent wetlands, in which listed salmonids – treaty resources that the Corps has a trust duty to protect - is a potential effect the Corps must analyze, and is another reason a Nationwide Permit should not be used. Similarly, the potential impacts from the construction of bridges, cabins and tracks over sensitive wetlands and lake ecosystems in which listed species spawn and travel through requires the Corps abandon the use of the Nationwide process.

#### **The Project will Likely Harm the Umatilla Tribe’s Treaty Resources and Interests**

This proposal will increase rail traffic in the Columbia River Gorge. In a one page document prepared by Union Pacific Railroad entitled “Union Pacific to Enhance Infrastructure in Mosier” submitted in their public outreach effort, UPRR stated:

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<sup>1</sup> [http://www.oregonlive.com/environment/index.ssf/2014/07/everything\\_you\\_need\\_to\\_know\\_ab.html](http://www.oregonlive.com/environment/index.ssf/2014/07/everything_you_need_to_know_ab.html)

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The Federal Railroad Administration speed limit on the new track will be 35 mph. Union Pacific currently moves about 25 to 30 trains per day through Mosier. The new double track will allow us to move 5 to 7 more trains per day through Mosier.

This statement reveals several things. First, double-tracking this area will increase the railroad speed. The current speed limit in Mosier is 30 miles per hour.<sup>2</sup> Second, UPRR estimates that this project will increase traffic through in the area by approximately 25%. Also, the Columbia River Gorge is essentially a closed system for trains. If seven more trains go through Mosier, seven more trains go through Rufus, Biggs, The Dalles, Celilo, Hood River, Cascade Locks, etc. Increased traffic in Mosier generates impacts up and down the Columbia in the form of additional trains, pollution, noise and risks of derailment. Finally, while train traffic in Mosier is currently limited to 30 miles an hour, trains up river, between The Dalles and Boardman, travel up to 70 miles an hour.

The increased railroad traffic all along the Columbia River, particularly in Zone 6 between Bonneville and McNary Dams, will impair the Tribe's interests in the following ways: damage to treaty resources and the ecosystems they depend on, eradication of tribal fishing areas, impeded access to tribal fishing areas and increased risks to tribal member safety, and damage and access to cultural resources.

**The ecosystem and treaty resources will suffer catastrophic damage from accidents and spills.**

The Project would result in an increase in shipment of tank cars, many of which may carry crude oil or similarly dangerous products, traveling in the Columbia River Gorge and adjacent to the Columbia River, where many tribal fishing areas are located. Train derailments, shipping spills, and fire and explosions from those derailments are a certainty. This is evident from the cascade of derailments across the United States and Canada reported in the media. For example, on February 17, 2015, a town in West Virginia suffered the derailment of a unit train of more than 100 oil tank cars carrying Bakken crude. Fourteen of the tankers ignited in an explosion, and at least one went into the Kanawha River. Hundreds of families were evacuated, and two downstream water treatment plants were closed. Photos of the explosion and subsequent tour of the scene as reported by the Boston Globe and Newsweek are below.

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<sup>2</sup> <http://www.fogchart.com/Down/Beta/PORTLAND.pdf>

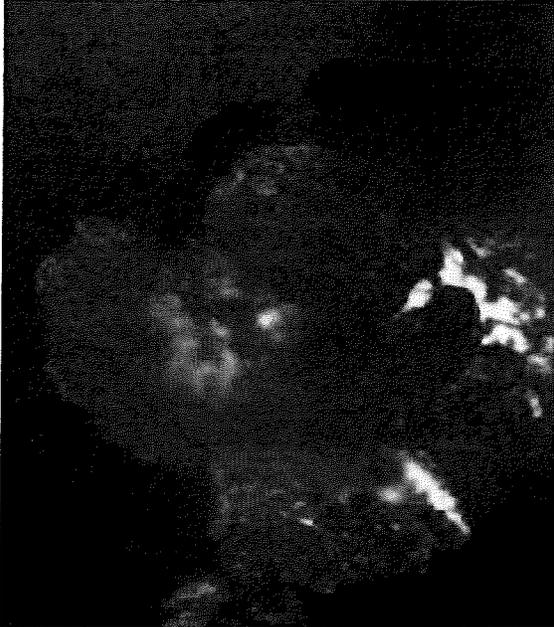


Photo caption: "Steve Keenan/The Register-Herald via Associated Press."

John Raby, *Oil-bearing train derails in West Virginia, setting off explosion*, The Boston Globe, February 17, 2015, at <http://www.bostonglobe.com/news/nation/2015/02/17/west-virginia-train-derailment-causes-oil-spill-and-fires/opo6XRXLUV0URv8EiDSYQJ/story.html>

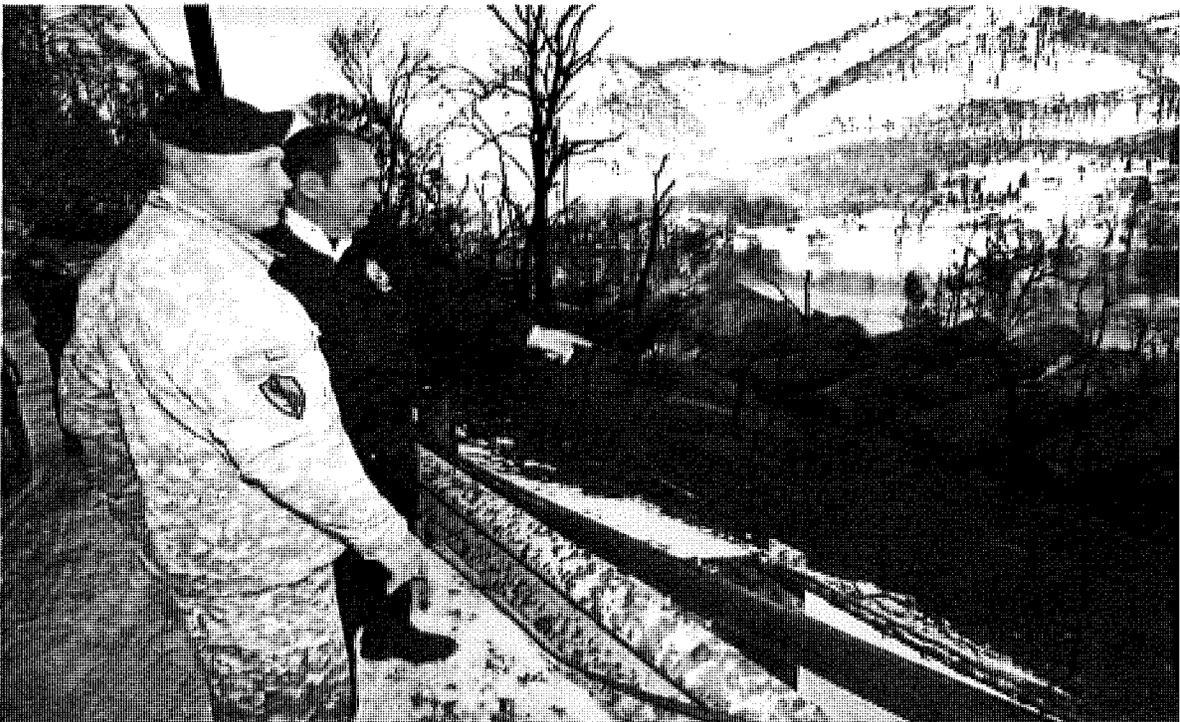


Photo caption: West Virginia Governor Earl Ray Tomblin surveyed the wreck site on February 17. "Many of the tanks had gaping holes in the tops where they had exploded," he tells Newsweek. Office of Governor Earl Ray Tomblin.

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Max Kutner, *West Virginia Begins Investigating Massive Train Derailment*, Newsweek, February 20, 2015, at <http://www.newsweek.com/west-virginia-begins-investigating-massive-train-derailment-308428>.

The day before, February 16, witnessed the derailment and spill of more than 260,000 gallons of crude oil near Timmons, Ontario. The photograph below, from the Transportation Safety Board of Canada, shows workers fighting the oil spill fire.



Photo caption: "In this Feb. 16, 2015, file photo, provided by the Transportation Safety Board of Canada, workers fight a fire after a crude oil train derailment south of Timmons, Ontario. The train derailment this month suggests new safety requirements for tank cars carrying flammable liquids are inadequate, Canada's transport safety board (sic) announced Monday, Feb. 23, 2105."

Rob Gillies, *Canada safety board says latest oil train derailment shows new safety standards are inadequate*, U.S. News, February 23, 2105, at <http://www.usnews.com/news/world/articles/2015/02/23/canada-oil-train-accident-shows-new-safety-rules-inadequate>.

While the U.S. Department of Transportation is considering new standards for rail cars, newly built tanks cars do not appear to reduce the risk of accidents and spills as "both the West Virginia accident and the oil train derailment and fire in Ontario involved recently built tank cars that

were supposed to be an improvement,” but the Canadian Transportation Safety Board said these new cars still “performed similarly” to the older models. *Id.* It is an unfortunate reality that “[t]he number of gallons spilled in the United States in [2013], federal records show, far outpaced the total amount spilled by railroads from 1975 to 2012.” Clifford Kraus and Jad Mouawad, *Accidents Surge as Oil Industry Takes the Train*, N.Y. Times, Jan. 26, 2014, at A1, and <http://www.nytimes.com/2014/01/26/business/energy-environment/accidents-surge-as-oil-industry-takes-the-train.html>. If the Project goes forward, it is only a matter of time before a similar accident brings ecological catastrophe to the Columbia River, devastating the fishery and other resources the Umatilla Tribe depends on and has worked so hard to protect and restore. A derailment and spill along the Columbia River will not only be tragic for the resource, it will also work immeasurable hardships on the many tribal members that depend on the Columbia River and its riches for their living. It will likely eradicate productive fishing areas in the immediate area of the spill, and the consequences will be along the entire River, as a spill could wipe out stocks of salmon and steelhead that are already listed under the Endangered Species Act, erasing the many years and billions of dollars of effort that has gone into restoring the resource.

**Increased rail traffic will inhibit access to fishing areas and endanger tribal members.**

On both sides of the Columbia River, tribal members cross train tracks multiple times on a daily basis to exercise their treaty fishing rights. There is a great deal of scaffold fishing up stream and downstream of the project area that is visible from satellite images on Google Earth. This fishing is most often restricted by the crossing of the railroad tracks.

The increase in the number of trains, and possibly the length of such trains, will delay tribal members’ ability to cross the tracks to access fishing areas. Such delays become acute during adverse or impending weather, when members must sometimes get to their nets in the water as quickly as possible.

The increase in rail traffic and the speed of that traffic will also increase the incidence of tribal members stuck by rail cars. Tribal members are at risk of rail-strikes when crossing the tracks to access fishing sites, In-Lieu sites, Treaty Fishing Access Sites, homes and markets for the sale of harvested fish. Recently, on February 21, 2015, a man was killed by train strike near Kalama, WA. <http://www.khq.com/story/28168097/railroad-man-on-track-dies-after-being-struck-by-train>. According to railroad statistics, 27 people were killed by train strikes across Washington State in 2014.<sup>3</sup> In Oregon, 11 were killed in 2015. *Id.* The likelihood of train-strike fatalities, injuries and property damage will increase from the increase in rail traffic and speed that would result from the Project.

**Increased rail traffic will damage cultural and religious tribal interests.**

The increased rail traffic will affect properties and items governed and protected by the National Historic Preservation Act, the Archaeological Resources Protection Act, the Native American

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<sup>3</sup> <http://safetydata.fra.dot.gov/Officeofsafety/publicsite/Query/TenYearAccidentIncidentOverview.aspx>

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Graves Protection and Repatriation Act and other laws. The transit corridor passes through tribal trust and traditional use areas. There are ancestral human remains, traditional cultural properties, historic properties of religious and cultural significance to Indian Tribes, and archaeological resources and sites in these areas. Any accidents, spills, explosions and related fires can damage these properties and items, and cause irreversible loss. Similarly, the increased traffic could result in increased risks of earthquake, liquefaction, or landslide, rail caused fires (without derailment), contaminant leakage onto tracks and sites, all of which could damage cultural and religious resources.

All of the potential impacts discussed above counsel for removal of the project review from the abbreviated Nationwide process, and the conduct of a robust review under the individual permit process. Moreover, it appears the Corps does not have accurate and complete information about the project before it on which to make a decision.

**The permit application contains inaccurate, inconsistent and incomplete information.**

There are inaccuracies and inconsistencies in the application as well. For instance, in the November, 2014 Project Purpose and Need and Alternative Analysis, it stated that trains along this route can range up to 12,000 feet and that the siding in Mosier siding is the shortest in the 206 mile subdivision. In conversations with UPRR it was clarified that UPRR does not run 12,000 foot trains, though there is nothing preventing them from doing so. The average length of train in the Gorge is 6,200 feet, half the length referenced in the report prepared by CH2M Hill. Also, Mosier is not the shortest siding in the Portland subdivision. From our information, the Mosier siding is 6,751 feet. The Bridal Veil siding is 6,360. The report contends that “[s]tandard trains currently operating on the route can range in length up to 12,000 feet, and many of these standard-length trains are unable to use the Mosier Siding for passing.” However, most of the sidings between Troutdale and The Dalles, are less than 12,000 feet including Sandy (10,617 feet), Bridal Veil (6,360 feet), Dodson (10,617 feet), Cascade Locks (6,751 feet), and Meno (9,916 feet). A chart of the siding length and locations is attached. Further, in response to cultural resource concerns by Catherine Dickson, the contractor stated that “the total number of trains per day is anticipated to remain similar to existing levels. The existing main line track speed limit would not be increased as a result of the project.” A potential increase of 28% of train traffic is not similar to existing levels. Further, as noted above, in one pager, “Union Pacific to Enhance Infrastructure in Mosier,” the speed limit will increase from 30 mph to 35 mph. The point of all of these inconsistencies is that the information before the Corps at this time is inaccurate. The project needs an individual permit review process, not the abbreviated whitewashing of the Nationwide process.

At a staff meeting with the Corps of Engineers regarding this permit on April 15, 2016, Corps staff expressed the opinion that the increased rail traffic of this project would be an indirect effect of this project. However, the Corps also did not know whether they could deny a permit if the indirect effects of the project had more than a de minimus impact on tribal treaty rights. This is a critical issue. The CTUIR believes that any impact by Corps authorized projects on treaty rights is unacceptable. Further, whether the impacts of this project are direct or indirect, the results will increase rail traffic and that will affect tribal fishers. The CTUIR would like a formal response to the question of whether or not the increased rail traffic and the threats that increase pose to tribal fishers and potential impacts on Treaty rights are direct or indirect effects of this project?

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**Project elements have changed.**

UPRR has proposed the transfer of 2.82 acres of land from the Oregon Parks and Recreation Commission (OPRC) on September 23, 2015 in order to construct the second mainline construction.<sup>4</sup> On April 27, 2016, the OPRC unanimously rejected the proposal by UPRR to secure the lands from OPRC for the expansion. This denial will affect the project proposal. Since the project can no longer as designed, how will the Corps address mid-review changes?

**The project is currently under county review.**

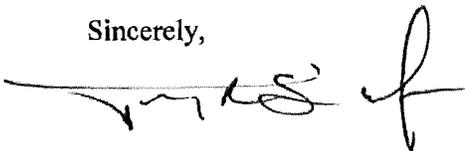
Finally, the Wasco County Planning Commission is currently reviewing the UPRR application under county rules that implement the Columbia River Gorge National Scenic Area Act (Scenic Area Act). Until this use is authorized under the county review process, with all limitations and conditions, Corps review of the project under a Nationwide permit is premature. The Scenic Area Act is federal law, and county ordinances implementing that law are federal in nature. Therefore limitations on state and local authority over railroads are inapplicable to county actions under the Scenic Area Act.

**Conclusion:**

Until these questions are answered, it remains unclear whether the Corps is willing or able to address treaty impacts of this project. Please provide the answers to these questions to Brent Hall, Tribal Attorney at 541-429-7200.

We look forward to consulting with the Corps on this issue further to address potential impacts to treaty rights.

Sincerely,

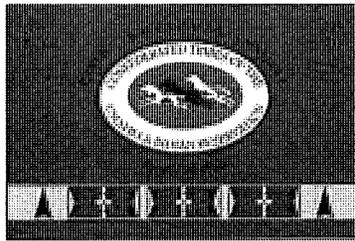


Jeremy Wolf, Chair  
Fish and Wildlife Commission  
Confederated Tribes of the Umatilla Indian Reservation

Cc: Wasco County  
Yakama Nation Fish and Wildlife Committee  
Warm Springs Fish and Wildlife Committee  
Nez Perce Tribe Fish and Wildlife Committee  
Paul Lumley, Executive Director, CRTIFC

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<sup>4</sup> <http://www.oregon.gov/oprd/Documents/Commission/2016.4-Salem/April6.pdf>



**Testimony of the Confederated Tribes of the Umatilla Indian Reservation  
Wasco County Planning Commission Hearing, September 6, 2016, 3:00 pm  
Columbia River Gorge Discovery Center**

The Confederated Tribes of the Umatilla Indian Reservation is deeply concerned about increased shipment of fossil fuels through the Columbia River Gorge.

For instance, transportation of dangerous fossil fuels in Oregon increased by 250% in 2013 with little or no federal, state or local oversight.

The double-tracking at Mosier will increase train traffic and speeds even more.

Increased train traffic will endanger tribal fishers who access the river throughout the Columbia River Basin, including the Columbia River Gorge.

Increased train traffic will also increase the likelihood of a spill.

Transporting crude oil by rail may also increase more if the tar sands region of Alberta, Canada, goes into full production if oil prices increase.

A spill of crude oil along the Columbia would have disastrous consequences for the people, the resources, and the communities in the Gorge.

In support of our testimony, the CTUIR offers a report by Hill and Associates that discusses the risks of derailments.

The CTUIR would like to see a study done that analyzes the impacts trains have on tribal fishing.

The study should identify uncontrolled crossings tribal fishers use and the number of train fatalities related to train traffic in the Gorge—both recent, and those projected to occur in the future.

There are many uncontrolled crossings along the Columbia River both within and outside the Gorge.

Funding must be provided to mitigate for the impacts of additional trains. Crossings must be improved, to better protect community members and tribal members lawfully accessing the river under the rights secured in our Treaty of 1855.

Many projects that involve shipment of crude oil through the Gorge are already operating.

Still more are proposed to accommodate more drilling in the Bakken Region of North Dakota and the Canadian Tar Sands.

The CTUIR believes increased shipments of crude oil will pose many threats to the communities in the Gorge and the citizens who live and travel through it, as well as tribal members and tribal fishers.

The derailment that we all witnessed on June 3, 2016 was a stark reminder of the risks we face from crude-by-rail shipments through the Columbia River Gorge.

The CUTIR is thankful that the accident didn't result in the loss of life or more significant property damage.

However this derailment should be a wakeup call to the region.

Currently, all crude-by-rail shipments into the Northwest travel through the Columbia River Gorge.

On June 3, tribal members were on the Columbia River and witnessed the damage caused by the spill.

The derailment could have been much worse and impacted the resources of the Gorge we all depend upon for decades.

The risks of transporting such inherently dangerous commodities require reconsideration of appropriate train speeds through the Gorge.

A regional Environmental Impact Statement should also be produced, to analyze the cumulative impacts and risks associated with the dramatic increase in fossil fuel transport.

Unless and until that is done, no additional projects should be approved.

Without knowing the cumulative impacts of all these projects, their potential risks cannot be fully understood, addressed, or mitigated until it is too late.



Columbia Gorge Windsurfing Association | [cgwa@gorge.net](mailto:cgwa@gorge.net) | 541.386.9225 |  
[www.GorgeWindsurfing.org](http://www.GorgeWindsurfing.org) | [facebook.com/gorgewindsurfing](https://facebook.com/gorgewindsurfing) | [twitter.com/gorgewind](https://twitter.com/gorgewind)

September 2<sup>nd</sup>, 2016

To: Angie Brewer  
Wasco County Planning and Development Office  
705 East Second St., The Dalles, Oregon 97058  
[angieb@co.wasco.or.us](mailto:angieb@co.wasco.or.us)

Re: Union Pacific Rail Road Application, File number PLASAR-15-01-0004, Public Comment

Dear Angie,

I hope this letter finds you well. It is our understanding that the Union Pacific Rail Road is proposing construction of four miles of mainline track through the Columbia River Gorge National Scenic Area near Mosier, OR to allow more and/or longer trains to pass through the Gorge. The CGWA would like to use this letter to formally oppose this application.

The CGWA is a certified 501.c.3 nonprofit that has been operating in The Gorge since 1987. We have 700 due paying members every year and represent the interests of thousands of others including kiteboarders, stand up paddlers, kayakers, etc. We have successfully worked on many site access improvement projects, including creating East Mayer State Park in Rowena, and supporting the creation of Rock Creek Park in Mosier. In addition to site access, our mission is rooted in preserving the resources that support windsurfing. We firmly believe that this proposed rail expansion directly conflicts with our mission statement and is not in the best interest of the CGWA, our members, and all other windsurfers and other water users in the Gorge.

Rock Creek is a very important and historic launch site in the Gorge. Its proximity to Hood River coupled with a significantly different climate offers a unique and essential outlet for many water users on a daily basis. The oil train derailment that occurred may have dodged a bullet from a safety stand point, in that no one was hurt, but it greatly affected the use of Rock Creek for the majority of the summer. The height of the summer season is short lived and having that incident occur at that time did immense damage. We cannot risk sending more trains at higher speeds through Mosier, or past any water access sites. Access to the river is a hard thing to come by, and giving in to Union Pacific's desires will potentially cause irreversible damage.

In conclusion, the CGWA, its members, and constituents would like to formally oppose Union Pacific's application under File Number: PLASAR-15-01-0004. Please help us preserve our Gorge communities and resources by declining this application.

Best,

A handwritten signature in black ink, appearing to read "Greg Stiegel".

Greg Stiegel  
Executive Director



# Oregon

Kate Brown, Governor

## Department of Transportation

James R. Bryant  
Principal Planner  
Region 4 Planning  
63055 N Hwy 97, Bldg M  
Bend, OR 97703  
Phone: (541) 388-6437  
james.r.bryant@odot.state.or.us

September 1, 2016

Angie Brewer  
Interim Planning Director  
Wasco County Planning Department  
2705 East 2nd Street  
The Dalles, Oregon 97058

Subject: UPRR Second Mainline Track Project – Wasco County, Oregon  
National Scenic Area Development Review Application

Ms. Brewer,

Thank you for the opportunity to comment on this land use action.

ODOT is interested in this project due to the proximity of the proposed second rail to the US 30 Mosier Bridge. ODOT understands that UPRR has proposed constructing a crash wall against the existing bridge column. ODOT has requested UPRR to provide the structural analysis to determine how this affects the structural rigidity of the structure with regard to its seismic resiliency.

ODOT also shares Oregon Parks and Recreation Department's interest in the long term improvement of pedestrian access from State Parks property to the Columbia River and supports Wasco County's proposed condition of approval #44 to address the pedestrian access:

*"UPRR shall work with the Oregon Parks and Recreation Department to develop a Columbia River access feasibility study to ensure long term impacts of the railroad do not impact established recreation uses or sites. Improved access from State Parks properties to the Columbia River shall be the outcome of this study and any resulting action items."*

If you have any questions, please contact me at (541) 388-6437.

Sincerely,

James R. Bryant  
Principal Planner  
ODOT Region 4

Cc: Robert W. Bryant, ODOT Region 4 Manager



RECEIVED

AUG 31 2016

## MOSIER VOLUNTEER FIRE AND RESCUE

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Jim Appleton, Chief    P.O. Box 689    210 Washington St.    Mosier, Oregon 97040

Thursday, 25 August 2016

Planning Commissioners  
Wasco County Planning Department  
2705 East Second St.,  
The Dalles, Oregon 97058

Re: Union Pacific Railroad Second Mainline Track Project

Dear Chair and Commissioners,

As President of the Mosier Fire District Board, I write on behalf of myself and the Mosier Fire District to express our concerns regarding the proposed Second Mainline Track through the Mosier Fire District.

The Mosier Fire District is responsible for the provision of Fire and Emergency Services for the length of the proposed new track, and therefore we look at the project with an eye to the public safety risks that we anticipate in construction and operation of a proposed second track.

We are particularly concerned about four issues and are interested in the planned mitigation for these risks.

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### Railroad caused Wildfires

There have been many railroad caused wildfires in the Mosier area over the years, with the most recent being in June of 2016.

Ignition sources have included locomotive exhaust, rail car brakes, wheel / rail friction, rail car derailments, and several of undetermined causes. Our understanding is that the number of potential ignition sources increases with both the number of locomotives and rail cars as well as the speed of the locomotives and cars..

It is stated in the narrative ([http://co.wasco.or.us/planning/landuse\\_actions/UPRR\\_PLASAR-15-01-0004/02\\_ProjectNarrative.pdf](http://co.wasco.or.us/planning/landuse_actions/UPRR_PLASAR-15-01-0004/02_ProjectNarrative.pdf)) that the purpose of the project is to increase 'efficiency'. Furthermore, this report states that "the vicinity of the City of Mosier yielded the lowest average train speeds." We presume that this means that there would be more rail cars and higher speeds through the District, leading to an increased risk of wildfire ignition.

The narrative also describes: 'UPRR typically moves 20 to 30 trains a day through the project area, and anticipates a similar number of daily trains with implementation of the proposed project' without identifying what 'similar' means in this context nor quantifying the absolute number of rail car movements.

The Mosier Fire District's resources have been overwhelmed by several railroad caused fires in the past. We would like to understand UPRR's mitigation proposal for this increased fire risk as we struggle to meet the demands of the current situation. It is difficult for us to even quantify the

increased risks as we do not have a clear understanding of either the change to the number of rail cars moving through the District, or the speed of these cars.

We are also concerned about the risk in construction work performed during fire season. Movement of heavy equipment, construction techniques such as welding, etc are well understood ignition risks. We would like to understand UPRR's mitigation proposal for wildfire ignition during construction.

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## 2. Hazardous Material (HAZMAT) Movement

With increased cars per hour, and potentially increased speeds (the narrative describes speed only in terms of 'to allow for trains to pass at standard operating speed') there is an increased risk of a HAZMAT release.

We have recently seen the result of a best-case release from a unit oil train where only 16 cars derailed and 4 cars released material. This event occurred with a single train moving at less than 30mph on a piece of track with excellent road access. This incident is considered best case due to the lack of usual wind, the easy access to the derailment site, the capture of much of the leaking oil by the coincidental location of Mosier's waste water system, and the relatively low speed of the derailment event.

It is not difficult to imagine a derailment event that occurs in a different location on the new double track at higher speed, two trains are involved, there is very difficult access, and the wind is blowing with its usual intensity.

Mosier Fire, and its mutual aid partners were overwhelmed very quickly during the Mosier Unit Train Derailment—which was a best case HAZMAT event. Resources came from all over the US to work on the response. UPRR was (and should be) commended for their willingness to expend resources in cleaning up the material. However for the first several hours, there were not local resources available to prevent material from escaping into the environment. It was a matter of luck that the spill was largely contained by a series of unlikely coincidences.

We would like to understand UPRR's strategy for mitigating the existing risks for HAZMAT release post the Mosier derailment, and how these mitigation strategies change for the proposed double track.

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## 3. Pedestrian Safety and Emergency Access to the North Side of the Tracks

In section 2.2.4.2 Existing Safety Concerns the project narrative document identifies the risk that pedestrians trespassing on the UPRR right of way to gain access to the Mosier Creek area are at risk of being struck by trains.

One mitigation for this risk is to run fewer trains through that area: 'Operating fewer and longer trains reduces safety risks associated with collisions at pedestrian or vehicle crossing locations...' however this seems to contradict the previous assertion that UPRR would be running a 'similar' number of trains. This assertion is also contradicted by various statements in meetings by UPRR staff where they mention 20-30% more trains.

We agree that there is a risk of pedestrians being struck in this area. It is a mile walk each way from Mosier Creek to the only designated pedestrian crossing area then back to the beach at the confluence of Mosier Creek and the Columbia River.

Pedestrians regularly illegally cross the tracks at this location to access the Mosier Creek beach.

Similarly, responders who need to access the Mosier Creek beach vicinity must either walk a mile down the path from Rock Creek or cross the tracks. During the Mosier Unit Train Derailment, the Rock Creek access was closed due to the fire and there was no way for

responders to access the north side of the tracks. Had anyone been walking or swimming in the area of the mouth of Mosier Creek they would have been unable to return to Mosier as there was a train on the tracks. Construction of a pedestrian crossing of the rail track(s) at Mosier Creek will help to mitigate both recreational and responder access. MFD believes that such an additional crossing would help to reduce potential issues and to create a workable plan for emergency access in this critical location.

At all other locations, a second track will increase the probability that MFD responders would need to access the opposite side of the tracks when a train is between them and the incident. Mosier needs a plan for such access covering the entire length of the double track. That plan should include details on how to safely respond during any construction of a second track.

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#### 4. Noise

A significant concern with rail traffic in Mosier is the noise generated by the trains. The World Health Organization website states that "Excessive noise seriously harms human health and interferes with people's daily activities at school, at work, at home and during leisure time. It can disturb sleep, cause cardiovascular and psychophysiological effects, reduce performance and provoke annoyance responses and changes in social behaviour." Our responders are invested in the health and safety of our community.

We would like to understand what plans UPRR has for reducing railroad noise levels within the City of Mosier.

\* \* \*

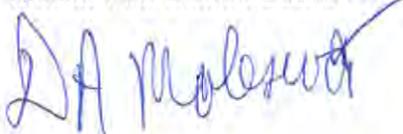
Mosier Fire District is a great supporter of transport by rail. Per unit of goods moved it is safe, efficient, and has fewer associated risks than most other transport modes. In addition, UPRR has been a great neighbor and partner in the development of Mosier as a community over the past hundred years or so.

However Mosier Fire District, without understanding and agreeing with specific and verifiable risk mitigation strategies for the issues described above, cannot at this time support the double track. Until a plan for mitigating risk is developed and agreed upon by local response agencies, we respectfully request that the commission deny the UPRR Second Mainline Track Project

Regards,

Darin Molesworth

Mosier Fire District Board President





Angie Brewer &lt;angieb@co.wasco.or.us&gt;

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## UPRR Correspondence

1 message

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**Olmstead, Peter NWP** <Peter.D.Olmstead@usace.army.mil>  
To: Angie Brewer <angieb@co.wasco.or.us>, "Shoal, Robin Z -FS" <rshoal@fs.fed.us>

Wed, Aug 31, 2016 at 5:06 PM

Sharing copies of our recent correspondence with CTUIR.

Peter D. Olmstead  
Project Manager/Biologist  
U.S. Army Corps of Engineers  
Portland District, Regulatory Branch  
La Grande Field Office  
3502 Highway 30  
La Grande, Oregon 97850-5628  
Office: 541-962-0401  
Cell: 503-758-2864

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### 2 attachments



**UPRR final info request to CTUIR.PDF**  
436K



**20160823 NWP-2014-364 (final) Response to 5-11-16 CTUIR FWC letter.pdf**  
503K



DEPARTMENT OF THE ARMY  
CORPS OF ENGINEERS, PORTLAND DISTRICT  
P.O. BOX 2946  
PORTLAND, OREGON 97208-2946

**AUG 22 2016**

Regulatory Branch  
Corps No.: NWP-2014-364

The Honorable Gary Burke  
Chair, Board of Trustees  
Confederated Tribes of the Umatilla Indian Reservation  
46411 Timine Way  
Pendleton, OR 97801

Dear Chairman Burke:

This letter is to follow up on the request my staff sent you on April 25, 2016, seeking specific information on Tribal Treaty rights that could be affected near the proposed Union Pacific Railroad second mainline project in Mosier, Oregon. The Corps recognizes the Tribe's Treaty rights and I remain committed to conducting a thorough review of this project within the scope of our Regulatory authority.

The Corps has been working with your staff to understand how the proposed project may affect tribal Treaty rights, including but not limited to tribal fishing activities. The Tribe first raised the possibility that Treaty fishing could be affected by the project in a staff-level email dated October 22, 2015. Since that time, we have had numerous discussions at the staff and Government-to-Government level, both written and verbal, but have not received the specific information we requested regarding potential impacts to Treaty fishing within the project area. For the purposes of this evaluation, the project area consists of the 5.37-mile proposed second mainline (as depicted in Enclosure 2) specifically to those areas in immediate proximity to where impacts to Waters of the U.S will occur. To date, we have received only general information indicating the Tribe believes that railroad operations have and could continue to affect Treaty resources throughout the entire Columbia River Gorge.

Our letter requested specific information regarding impacts to the Treaty-Reserved Rights of your Tribe within the project area. If you choose to submit more detailed information, please submit affidavits or declarations, which describe in detail where, how, and when tribal members utilize the location of each of the proposals and the adjacent areas. Please also describe how the proposal would impact the Tribe's fishing practices. Specifically, we request that the affidavits or declarations address, at a minimum, the following information:

- a. The specific location(s) fishing occurs by tribal members in the vicinity of each of the proposals. Please provide a drawing or map showing the location(s) of the fishing activity in relation to each of the proposals.
- b. Information (e.g., historical documentation, federal court cases) supporting that the fishing location(s) identified in item (a) is a Treaty-reserved usual and accustomed (U&A) fishing site.

c. A description of the historical and current fishing done by tribal members in the fishing area(s) identified in item (a), including a description of: (1) how tribal members access the fishing area(s); (2) type of fishing done by tribal members in the fishing area(s); (3) type of fish tribal members fish for in the fishing area(s) and any fish data regarding fish caught; and (4) time(s) of year and duration of time within those time periods that tribal members fish in the fishing area(s).

d. A description of the physical characteristics of the fishing area(s) identified in item (a) that contribute to the presence of fish that tribal members fish for.

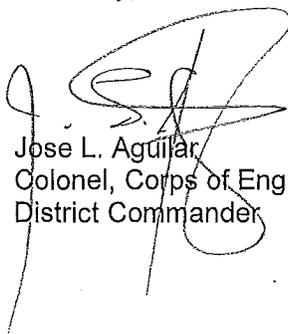
e. A description of the specific mechanisms by which each of the proposals would impact fishing activities in the fishing area(s) identified in item (a), including how fishing techniques may be affected or impacted by each of the proposals and how access to the fishing site may be affected or impacted by each of the proposals.

This information will be included in the Corps' administrative record and will be used to assess how each of these proposals may affect Treaty-reserved rights, specifically, whether the impact of each of the proposals on tribal usual and accustomed (U&A) fishing in the vicinity of the proposal is more than *de minimis*. If the CTUIR does not intend to provide additional information, please advise me in writing, but not later than September 22, 2016.

The Corps will honor and meet our federal tribal-trust responsibility, and will engage with the CTUIR in timely and meaningful consultations on this issue and other aspects of our permit evaluation. I remain committed to conducting a thorough review of the proposal within the scope of the Corps' regulatory authority. At the same time, we must also adhere to our commitment to public service to make fair, reasonable, and timely permit decisions. To that end, if the requested information is not received by September 22, 2016, we may proceed to a permit decision, which will be based upon the information contained in the administrative record at the time I am prepared to render a decision. We may consider all substantive information received prior to the date of a final permit decision.

Please feel free to contact me should you have questions or concerns, or have a member of your staff contact Mr. Olmstead of my Regulatory Branch at (541) 962-0401 or Ms. Latcu of my Office of Counsel at (503) 808-4527. Courtesy copies of this letter will be provided to your staff, Mr. Audie Huber and Mr. Brent Hall.

Sincerely,



Jose L. Aguilar  
Colonel, Corps of Engineers  
District Commander

Enclosures



17717 SW Washington Dr.  
Aloha, OR 97078  
August 31, 2016

Angie Brewer, Planning Director  
Wasco County Planning and Development Office  
2705 East Second St.  
The Dalles, Oregon 97058

Dear Ms. Brewer and Commissioners:

I am writing concerning application PLASAR-15-01-004 for the Union Pacific Railroad (UPRR) second mainline track expansion project. I have a background in chemical engineering, and have studied rail transport in our region to become familiar with the risks and industry trends regarding the transport of crude oil by rail. This project is not in the best interest of Wasco County, as it presents significant danger to people, property, and the environment. Please deny it for the reasons below.

### **Oil transport is the primary goal**

The second track is designed to increase oil-train shipments. While the proposal's wording attempts to disguise this, make no mistake. Oil trains are a very important part of UPRR's business. In the company's 2015 annual report, chemical transport makes up 17% of their overall business. While the breakout of crude oil in this category isn't disclosed, the report mentions several times that oil transport revenues dropped due to lower prices, impacting profitability. Oil trains are about a mile long, and the project need statement mentions "...decreasing the number of delayed or stopped trains, reducing barriers to industry-standard train lengths, and improving the efficiency and fluidity of train movements in this area, while maintaining safe operating conditions." It is almost a certainty that Union Pacific is working behind the scenes with Tesoro-Savage to create a backup rail route to Vancouver, Washington, for their proposed oil terminal there. When a derailment happens on the BNSF line in Washington, it will shut off access for oil trains to the terminal, possibly for months. Industry safety data indicate that once the terminal is in operation, every 18 months there could be an incident in the Columbia Gorge.<sup>1</sup> The only way to provide stable oil delivery to the terminal with such a high accident frequency is to have an alternate route. Even without the Vancouver terminal, the need for an alternate route exists today as BNSF transports oil on the Washington side of the gorge to refineries in Puget Sound.

### **Union Pacific's safety record**

UPRR has the worst safety record of the seven Class I US railroads, those having annual carrier operating revenues of \$250 million or more in 1991 dollars. The chart below shows accident rates for the leading railroads by year. UPRR has had a poorer safety record for the past ten years. Union Pacific has about a 25% market share and is the same size as BNSF. So their accident record can't be explained by their size. It indicates poor attention to safety that is part of the company's culture, not a short-term deviation.

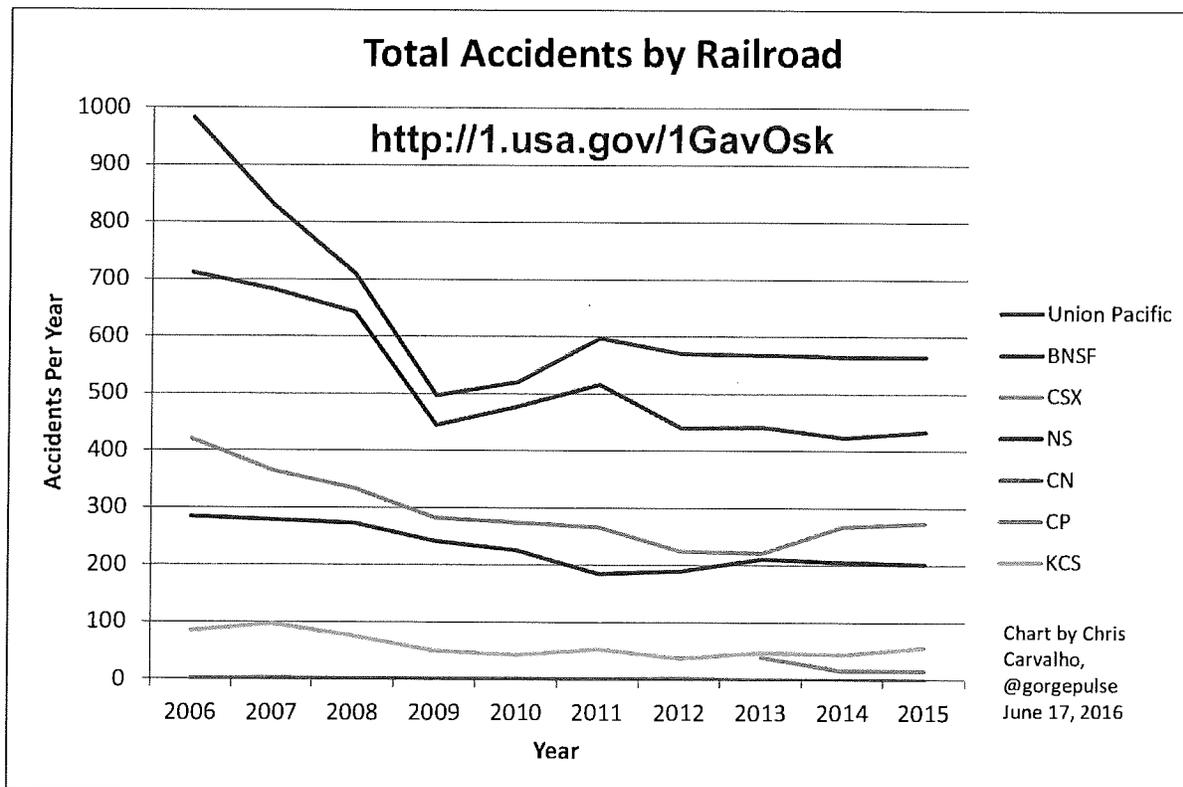


Figure 1. Accident data from Federal Railroad Administration Office of Safety Analysis

When we look more closely at the accident rates, UPRR's safety record for fire and violent rupture of cargo containers is responsible for around 75 percent of all such incidents in the US in the last two years, and their record has been poor starting around 2012 (Figure 2 below). The last two years, their rate was more than ten times that of BNSF. The data for Figures 1 and 2 were obtained from the Federal Railroad Administration's (FRA) accident record query tool at <http://1.usa.gov/1GavOsk>.

UPRR track maintenance was found to be at fault in the FRA preliminary findings report on the recent Mosier crude oil derailment (<http://1.usa.gov/28Qkxjc>). The derailment site is in the exact location where the mainline track expansion is proposed. Despite employing the industry's safer CPC-1232 tank cars, the accident still resulted in the release of 42,000 gallons of oil. We must conclude that transporting oil by rail is unsafe, and can't be made safe enough to have an acceptable risk with manageable impacts in the event of an accident.

The Oregonian/OregonLive obtained inspection records and reported (<http://bit.ly/1Xhkd3A>) that the FRA fined Union Pacific over \$7 million from 2014 through 2015, more than any other US railroad. An Oregon Department of Transportation inspection found repeated safety violations the day before Union Pacific train cars carrying crude oil derailed and caught fire in Mosier. Conductors left trains unattended without setting brakes, the same negligence that led to the disastrous 2013 Lac-Mégantic oil-train derailment that killed 47 people. In other violations switches were left unlocked, allowing anyone to divert a train – which could lead to a collision or derailment.

In light of this atrocious safety record, Union Pacific should not be allowed to increase traffic anywhere in Wasco County until it can demonstrate that it has solved its safety problems. Any increase in traffic will result in increased accidents unless safety is improved. Because most regulation of the rail system is federal, communities have very few tools to protect against a rail operator's unsafe practices. One of the few tools the county has is to limit traffic by not allowing expansion. As a way to ensure long-term compliance, the county should not sell land to UPRR for right-of-way expansion purposes. Instead, it should lease the land to the railroad under terms that are revocable for poor safety. This approach gives the county leverage in the event that accident rates are not

improving, or if the railroad doesn't fully cover cleanup costs from an accident. Denial of this proposal is the only way the community can send the strongest possible message to UPRR that safety improvements are a non-negotiable requirement for doing business in the county.

2014

Selections: State - ALL, County - ALL  
 Type of Accident - Fire/violent rupture  
 Time Frame - From January 1975 To March 2016

Railroad	Total	Reportable Damage	Casualty		Causes	
	Cnt	Amount (\$)	Kld	Inj	Eqp	Othr
Amtrak [ATK ]	1	40,000	0	0	-	1
BNSF Rwy Co. [BNSF]	3	11,000	0	0	3	-
CSX Transportation [CSX ]	2	20,000	0	0	1	1
Louisiana Southern [LAS ]	1	102,800	0	0	1	-
Port Authority Trans Hudson [P	2	236,483	0	3	1	1
Southeastern Pennsylvania Tran	1	18,000	0	0	1	-
Union Pacific RR Co. [UP ]	42	4,558,778	0	0	26	16
Wheeling & Lake Erie Rwy Co. [	1	10,709	0	0	1	-
<b>Total Count all Railroads</b>	<b>53</b>	<b>4,997,770</b>	<b>0</b>	<b>3</b>	<b>34</b>	<b>19</b>

<http://1.usa.gov/1GavOsk>

2015

Selections: State - ALL, County - ALL  
 Type of Accident - Fire/violent rupture  
 Time Frame - From January 1975 To March 2016

Railroad	Total	Reportable Damage	Casualty		Causes	
	Cnt	Amount (\$)	Kld	Inj	Eqp	Othr
Amtrak [ATK ]	3	611,484	0	0	1	2
Buckingham Branch RR Co. [BB	1	0	0	0	1	-
BNSF Rwy Co. [BNSF]	3	0	0	0	2	1
Canadian Pacific Rwy Co. [CP	2	500,000	0	0	1	1
CSX Transportation [CSX ]	1	32,155	0	0	1	-
Kansas City Southern Rwy Co. [	1	900,000	0	0	-	1
Massachusetts Bay Transit Auth	1	100,000	0	0	1	-
Port Authority Trans Hudson [P	1	41,175	0	0	1	-
Southeastern Pennsylvania Tran	1	14,319	0	0	1	-
Union Pacific RR Co. [UP ]	34	2,355,613	0	0	29	5
Wisconsin Central Ltd. [WC ]	1	25,618	0	0	1	-
<b>Total Count all Railroads</b>	<b>49</b>	<b>4,580,364</b>	<b>0</b>	<b>0</b>	<b>39</b>	<b>10</b>

Figure 2. Fire and violent rupture accident detail, Federal Railroad Administration

Another example of lax safety standards is easily seen on the UPRR tracks east of The Dalles. Along this stretch of track are miles of abandoned telephone poles that were installed many years ago and are now in deteriorating condition. Some of the poles are leaning and could fall across the track, causing a derailment. These poles should have been removed once they were no longer in service. They are certainly not being maintained.

### The project endangers sensitive lands

It's the duty of Wasco County to protect lands and habitat needed for survival of endangered or threatened species. The county would violate the public trust by approving this project. Memaloose State Park is a rare gem in the Columbia Gorge, with cultural and ecological resources such as rare plants, scenic beauty, unparalleled wildflower blooms, and Native American burial sites. An oil spill in the area could foul Memaloose Island and desecrate this important historic site. The wildflower fields of the Memaloose Hills and Mosier Plateau are some

of the most spectacular in the entire Columbia Gorge and an important driver of local tourism. We can't subject them to an unnatural source of increased fire risk.

UPRR has done a poor job of managing the lands it owns within the Columbia Gorge Scenic Area. The tracks host populations of Scotch Broom and Himalayan Blackberry, invasive species UPRR is doing nothing to control. The railroad is an east-west corridor for these plants to spread throughout the Gorge. Below is a photo at Eagle Creek, showing the healthy population of Scotch Broom with its yellow flowers. Until UPRR can demonstrate that it is managing existing lands for the benefit of the gorge, it shouldn't be allowed to obtain any more parcels.



Figure 3. Invasive Scotch Broom on Union Pacific tracks at Eagle Creek

The railroad's proposal would take land that has excellent stewardship for invasive plant control and transfer it to a company that has a track record of poor stewardship. It would be a loss for our battle against invasive plants, and would set a precedent for more land to be placed in the hands of people that only want to extract profit from it. UPRR has shown repeatedly that it is not a responsible member of the community who works and sacrifices to improve the scenic and habitat resource to make the gorge a world-class tourism and recreation destination with economic benefits for local businesses.

### **The site location is high risk**

Adding a second track in Mosier will increase the risk of a fire in a dry, windy portion of the Columbia Gorge. If an oil train burns, the result will be catastrophic. The Gorge Commission is seriously concerned about additional rail development for oil transport (<http://bit.ly/1QtDkhW>) and until the concerns in its letter are addressed, no further development should happen. Fires can happen even if a train isn't transporting oil so this risk is serious regardless of the cargo. Many homes, farms, and businesses in the area would also be harmed and lives endangered by an oil-train fire.

The planned track expansion is in close proximity to homes, businesses, and a school. In the Mosier derailment we saw evacuations, closure of the sewage treatment plant, and disruption to the water supply. Because it was a

calm day, the fire burned only a few trees but needed to burn for 14 hours because there is no known way to extinguish a crude oil fire owing to the extreme heat generated. Mosier's fire chief noted that foam could not be applied until the fire had cooled down enough by burning off the oil. Had it been a windy day as is often the case, the consequences would have been much worse. UPRR is now proposing that tracks be expanded in precisely the wrong location, an inhabited area.

## The project will increase derailments

Derailment frequency increases when train length and train speeds increase. These are exactly the goals of the project plan. Derailment risk is a complicated subject. The current thinking is illustrated in Robert Anderson and Christopher Barkan's paper on this topic:

*We observe that longer trains have an increased likelihood of being involved in a derailment. For a fixed number of cars; however, fewer train shipments are required for longer trains, thereby decreasing the overall risk that one or more trains will be involved in a derailment.<sup>2</sup>*

*...for a given position and train length, the increase in risk by shipment at 50 mph is 13-17% higher than at 25 mph.<sup>3</sup>*

Anderson and Barkan's summary implies that longer trains are safer because for a given quantity of tank cars, longer trains will decrease the number of separate train trips required to deliver the cargo and reduce the overall risk. It's the same idea as trying to win a lottery by wagering a fixed number of tickets. Is it better to put them all into one drawing, or spread them out over several? Any statistician will tell you that it makes no difference at all if the odds of winning per drawing are the same. What is different is that UPRR intends to increase all four factors affecting derailment risk in tandem: the number of trains and railcars through the Columbia Gorge, the length of the trains, and the speed of the trains. Derailment risk absolutely goes up when speeds increase, trains are longer, more railcars move along the route, and when more trains travel on the tracks. The quoted risk reduction from longer trains is only realized if the total number of railcars shipped doesn't change. If more cars are shipped, this benefit vanishes. Their analysis indicates derailment risk decreases by about 17 percent by lengthening a train from 75 to 100 cars.<sup>4</sup> The risk reduction shrinks to about 7 percent when the train length increases from 100 to 120 cars. It's highly likely UPRR is planning to increase oil shipments far more than seven percent, or they wouldn't devote the effort to this project.

As a requirement of the approval process, UPRR should furnish records to the county on the number of crude-oil tank cars shipped in the past four years, and projections of the number of cars to be shipped in the future, as well as the current and planned train lengths. Currently these figures are not public record, so there is no way to accurately estimate derailment risk. In order to understand the risk for present and future traffic, these numbers need to be disclosed. Washington does require disclosure.

It is possible to estimate recent crude-oil shipments in Oregon indirectly.<sup>5</sup> Before the Mosier accident, it is believed that UPRR was running around two unit trains per week through the Columbia Gorge. With that information we can use the following derailment risk chart (Figure 4, below) to determine the average number of months between incidents in the gorge. For the full analysis, see <http://www.lensjoy.com/Blog/OLJayInslee.htm>.

To make this estimate, all one needs is the industry-quoted failure rate of 0.0023% for hazardous-materials shipments by rail, the average trip length, the distance the shipment travels through the Columbia Gorge, and the number of shipments per month. All these numbers are well known and not subject to bias.

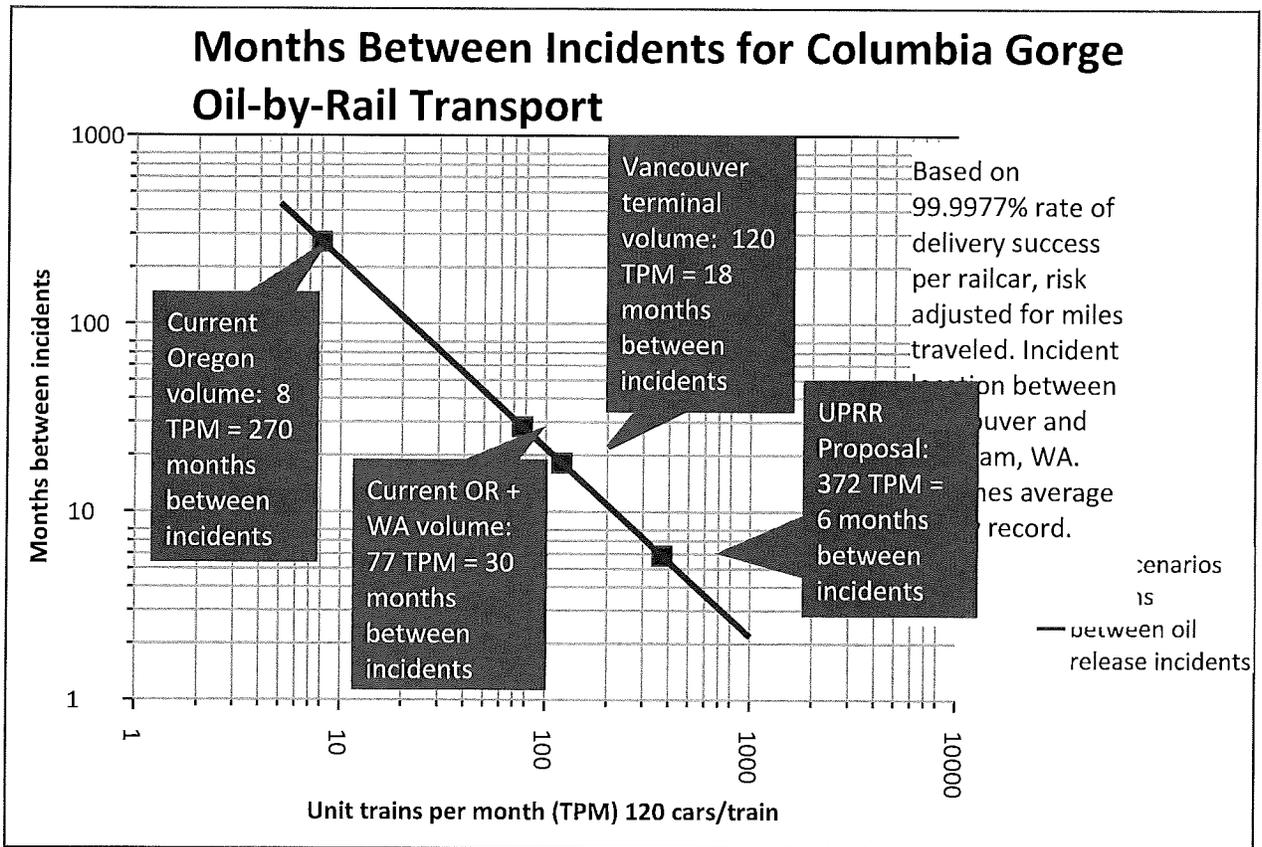


Figure 4. Risk scenarios for oil-by-rail transport in Columbia Gorge. Analysis by Chris Carvalho, July 28, 2016

The months between incidents somewhere in the Columbia Gorge range from 270 in Oregon alone using the railcar volume estimated before the Mosier derailment to 18 months in either Oregon or Washington if the Vancouver terminal is in operation. It's important to look at the numbers in the context of reality after the Mosier accident. How could an event happen after only three years of shipping crude by rail, when the estimate says it would take about 22 years? There are three major factors that could play a role in this discrepancy. First, a return-year (years between incidents) calculation can only give an average figure for random events, so after many events we would see the average match the calculated value. Any single event will happen on a random time scale. The second major factor is that the industry risk assumes an average safety record. Union Pacific's safety record is much worse, so the average time between incidents on their tracks will be shorter. Finally, oil-by-rail transport looks to be inherently more dangerous than the data used to establish industry-wide risk for hazardous materials shipments. It's also important to note that if we look at the current traffic levels in both Oregon and Washington, the industry risk predicts 30 months between incidents, but it cannot say whether it would be in Oregon or Washington. That prediction appears to match reality.

While we cannot know how much oil UPRR would ship after the expansion, in the near term it could be as much as what the proposed Vancouver terminal would handle, and that would mean 18 months between incidents in Oregon if UPRR rails are needed to move the oil. If oil export facilities are developed in Portland, expert consultants estimate that UPRR could run as many as twelve oil trains per day, or 372 per month.<sup>6</sup> That level of traffic equates to an incident every six months. Our region simply can't afford to shoulder these levels of risk.

Since I prepared this risk analysis and presented it to Governor Inslee and published it in *The Oregonian* June 21 (<http://bit.ly/28MVQ6S>) no one has come forward to challenge it. Were the methodology flawed, I should have heard about it by now.

## The project creates pollution and quality-of-life impacts

Oil trains produce volatile organic compound (VOC) emissions due to venting of oil vapors under certain conditions. When parked, these emissions can be unsafe for people and animals. Residents along the track will be harmed if exposed to these emissions. In March of this year, an oil train parked in front of the Full Sail Brewing plant in Hood River created emissions strong enough to be smelled by drivers in traffic along I-84 and people in the city's downtown. A second track will expose Mosier residents to increased emissions.

Much of the region's tourism business is located close to the river along with many residents. Increased rail activity in this corridor will produce more noise that harms the residents and businesses that depend on visitors who come to appreciate the peace, quiet, and beauty of the gorge.

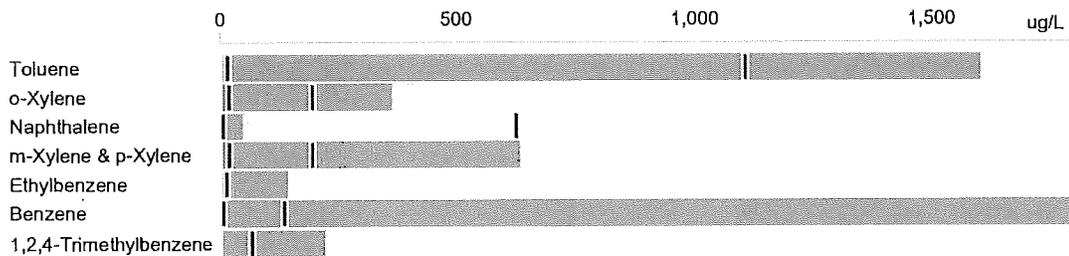
Just a few days ago, we learned that groundwater in Mosier is contaminated from the oil release in the derailment there. It will cause environmental harm to a wetland, but fortunately didn't affect the public water supply because it was located at a higher elevation. Below is a chart of the contaminants found:

### Union Pacific Mosier Derailment Groundwater Contamination Levels

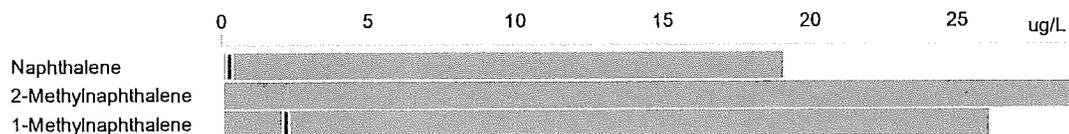
#### Petroleum hydrocarbons



#### Volatile organic compounds



#### Semi-volatile organic compounds



Tony Schick, OPB/EarthFix. Source: Oregon Department of Environmental Quality  
 Edited by Chris Carvalho for clarity and exclusion of chemicals not of concern

Figure 5. Groundwater contamination from Mosier derailment

## Union Pacific profits while residents bear all the risks

The consequences of an accident in Wasco County or anywhere in the gorge are grave. They include a massive wildfire, an oil spill fouling the river and salmon habitat, property damage, loss of human life, wildlife impact, high cost of recovery, disruption to our lives and the local economy, and a railroad bankruptcy that would transfer the costs of cleanup to the public.

UPRR is not a good partner in the Gorge. Please don't approve this proposal. It's the wrong decision and rewards them for not working with the community. Thank you for the opportunity to comment.

Sincerely,

Chris Carvalho

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<sup>1</sup> Carvalho, Chris. "An Open Letter to Jay Inslee." Web. <http://www.lensjoy.com/Blog/OJayInslee.htm> (2016).

<sup>2</sup> Anderson, Robert T and Christopher P.L. Barkan. "Derailment Probability Analyses and Modeling of Mainline Freight Trains." Web. <http://railtec.illinois.edu/CEE/pdf/Conference%20Proceedings/2005/Anderson%20and%20Barkan%202005.pdf> (2005). Page 5.

<sup>3</sup> *Ibid.*, p. 6.

<sup>4</sup> *Ibid.*, p. 6 (Figure 6, Derailment Risk by Length, Speed, & Position)

<sup>5</sup> Johnson, Miles. "Crude-by-rail in Oregon: 2012–2016." Web. [http://columbiariverkeeper.org/wp-content/uploads/2016/03/Oil-by-Rail\\_Whpaper\\_FINAL.pdf](http://columbiariverkeeper.org/wp-content/uploads/2016/03/Oil-by-Rail_Whpaper_FINAL.pdf) (2016). Page 1.

<sup>6</sup> Whiteside, Terry C. and Gerald W. Fauth III. "Testimony Concerning Union Pacific Railroad Company's Proposed Mosier Second Mainline Track Project." Web. <https://gorgefriends.org/assets/images/issues/Comments%20by%20GWFauth%20and%20TWhiteside%20Final%2008-04-2016.pdf> (2016). Page 8.



# Oregon

Kate Brown, Governor

## Parks and Recreation Department

725 Summer St. NE, Suite C

Salem, OR 97301-1271

(503) 986-0980

Fax (503) 986-0794

[www.oregonstateparks.org](http://www.oregonstateparks.org)



### MEMO

DATE: August 30, 2016

TO: Angie Brewer, Wasco County Planner

FROM: MG Devereux, Deputy Director, Oregon Parks and Recreation Department

RE: Potential Rail Impacts to Recreation on OPRD Properties in the Columbia River Gorge

This memo serves to update the comments submitted by Oregon Parks and Recreation Department (OPRD) on April 25, 2016. The update is warranted by several developments. The first is action taken by the Oregon State Parks Commission on April 27, 2016. That action directed the agency to end conversations with Union Pacific Railroad (UPRR) regarding a potential land transfer. The second is a better understanding of the full proposal being put forward by UPRR.

The initial comments from OPRD focused on impacts on three areas of concern – Recreation Disconnection, Noise, and Resource Concerns. These concerns were previously identified in the OPRD draft comprehensive plan for the Columbia Gorge, as part of the current rail operations. The updated comments provide a larger recreational context.

#### **Recreational Disconnection**

The rail line represents a significant fragmentation of the recreational experience throughout the Columbia Gorge. Recreational opportunity in the gorge is significantly constrained. Access to trails, camping, and the Columbia River is limited and demand continues to grow. The rail line often is a physical barrier to increased access. While recreational users are trespassing when they cross UPRR ownership, no amount of fencing or signs have been able to control this use. The project proposal will increase the challenge of this fragmentation in two ways. The first is within the project area. Additional tracking will create a larger obstacle for those who are seeking recreational access to the river. Fencing and signs are not sufficient. The second is a regional recreation impact due to the potential for increased rail traffic either through more frequent or longer trains. If approved, the project has the potential to increase traffic throughout the system. This could create additional safety concerns at other crossings or areas where the public is trespassing to access recreational opportunities.

The project should consider mitigation measures that:

- Create an overall analysis of vehicle and pedestrian crossings to identify areas where upgrades can be made
- Define opportunities for new separated grade crossings in the project area
- Upgrades to existing crossings to decrease vehicle wait times and improve access across the rail

**Noise**

As previously identified in the April 25, 2016 comments, noise from trains is a significant disruption to existing camping opportunities in the project area and the entire rail corridor. Any additional noise as a result of more frequent or longer trains will undermine the recreational experience at several OPRD campgrounds in the project area and the gorge. There is a threshold where the volume of train traffic will make the current campsites unusable.

The project should consider scalable mitigation to ensure that current and future noise is abated. These measures should include:

- Significant increases to the vegetative buffer between the track and overnight facilities
- Assistance to local recreation providers to identify and develop new overnight facilities away from the tracks

If approved the construction phase will have specific impacts to Memaloose State Park. The noise and disruption from construction will necessitate closure of the park. The project should compensate OPRD for this loss of revenue.

**Resource Protection**

The Columbia River Gorge is rich in natural and cultural resources. The existing rail corridor is highly degraded from a natural resource perspective. The edges of the property are weed infested, and train traffic will continue to be a vector for weed spread. The project will result in significant ground disturbing activities. While some archeological testing has been completed, if the project moves forward additional resource protection measures should be established.

The project should consider mitigations that:

- Establish a cultural resource monitoring plan for all construction activities
- Develop and implement an invasive weed management plan for the corridor
- Work with tribal representative to develop mitigation measures, such as re-establishment of access to traditional cultural sites



## **FRIENDS OF THE COLUMBIA GORGE**

*VIA E-MAIL*

August 16, 2016

Angie Brewer, Planning Director  
Wasco County Department of Planning and Economic Development  
2705 East Second Street  
The Dalles, Oregon 97058  
angieb@co.wasco.or.us

**Re: Union Pacific Railroad Mosier Area Expansion – PLASAR-15-01-0004**

Dear Ms. Brewer:

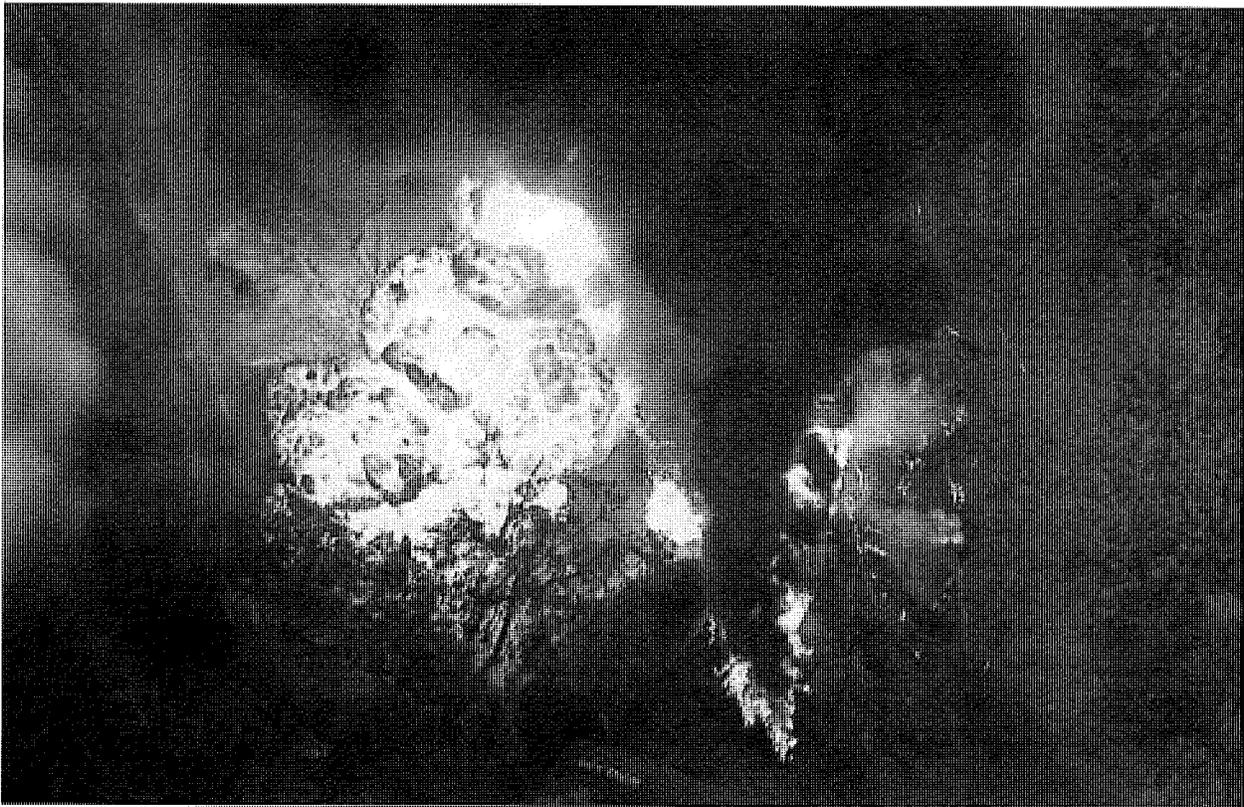
Friends of the Columbia Gorge, Columbia Riverkeeper, The Lands Council, Oregon Physicians for Social Responsibility, and Stand (collectively “Friends”) have reviewed the above-referenced application and submit these comments to augment our initial comments of April 11, 2016 and our comments of June 7, 2016.

- Friends of the Columbia Gorge is a non-profit organization with approximately 6,000 members dedicated to protecting and enhancing the resources of the Columbia River Gorge. Our membership includes hundreds of citizens who reside in the six counties within the Columbia River Gorge National Scenic Area (the NSA).
- Oregon Physicians for Social Responsibility, guided by the values and expertise of medicine and public health, works to protect human life from the gravest threats to health and survival by striving to protect our climate and advance environmental health. The organization is comprised of approximately 2,500 health professionals and public health advocates working collaboratively to protect the health of all Oregonians.
- Columbia Riverkeeper is a non-profit organization with over 10,000 members, including many members that live, work, and recreate near the proposed project area. Columbia Riverkeeper’s mission is to protect and restore the water quality of the Columbia River and all life connected to it, from the headwaters to the Pacific Ocean.
- The Lands Council, with a membership of 1,500, has protected thousands of acres of public land and, in the process, worked to preserve the forests, water, and wildlife we all depend on for life.
- Stand is an advocacy organization made up of people challenging governments and corporations to make the health of our communities, our environment and our climate the top

priority. Stand works to protect the forests and the stable climate required to keep our planet – and us – thriving.

## **I. The Mosier Derailment**

Of course, the elephant in the room is the Union Pacific railroad (UPRR) derailment in Mosier. On June 3, 2016, a Union Pacific train carrying highly flammable Bakken crude oil derailed in the community of Mosier.<sup>1</sup> When Bakken crude oil trains derail they inevitably break open, leak, and ignite. That is exactly what happened in Mosier even though reinforced railroad cars were in use. As a result of the derailment, one tank car was punctured, the volatile oil ignited, and three additional tank cars caught on fire.<sup>2</sup> The Federal Railroad Administration (FRA) determined on June 23, 2016 that “Union Pacific’s failure to maintain its track and track equipment resulted in the derailment.”<sup>3</sup> This was not an accident, but negligence on the part of Union Pacific.



*Bakken crude oil train exploding after derailling in Mosier Oregon in Wasco County on June 3, 2016. Photo by KGW Television.*

Union Pacific has about 32 miles of main line track through Wasco County. UPRR says that it runs 25-30 trains per day on the tracks.<sup>4</sup> Over a year, that is about 292,000 to 350,000 total rail miles traveled per year by UP trains through the County. From 2006-2015, UP averaged 3.3 accidents per 1 million miles traveled.<sup>5</sup> Therefore, we should expect about one accident per year

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<sup>1</sup> Federal Railroad Administration, PRELIMINARY FACTUAL FINDINGS REPORT, Derailment of Union Pacific’s Unit Crude Oil Train ONETU 02 Transporting Bakken Crude Oil for U.S. Oil, Mosier, Oregon (June 23, 2016).

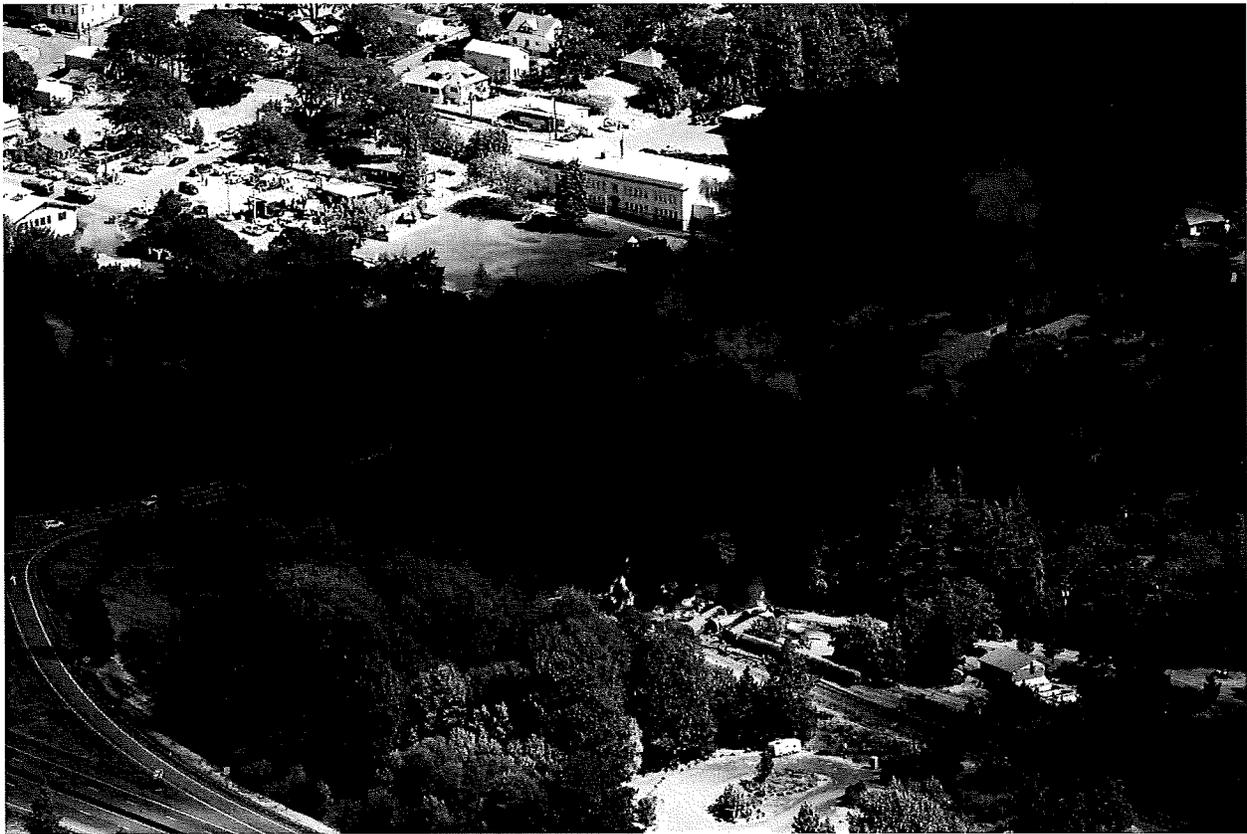
<sup>2</sup> *Id.*

<sup>3</sup> *Id.*

<sup>4</sup> Union Pacific To Enhance Infrastructure in Mosier, Fact sheet distributed by Union Pacific at March, 2016 meeting in Mosier, OR.

<sup>5</sup> <http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Query/rchart.aspx>

of a Union Pacific train in Wasco County at current traffic levels. Oil trains, being heavier and carrying a commodity that tends to slosh around when the train speeds up or slows down, tend to have greater than average accident incidence.<sup>6</sup> Their weight also can damage tracks.<sup>7</sup> Oil trains are trouble on even the best maintained tracks.



*Explosive fire in Mosier caused by a Bakken crude oil train derailment. The large white building is the Mosier K-12 school that was filled with children at the time of the crash. The building would have been “incinerated” if the normally prevailing winds were blowing on that day according to Mosier Fire Chief Ron Appleton. Photo by Paloma Ayala.*

Unfortunately, Union Pacific perennially has poor accident statistics when compared with its peers. For example, in 2015 UPRR experienced 3.17 accidents per 1 million train miles travelled.<sup>8</sup> The 2015 industry average was 2.59 accidents per 1 million train miles travelled.<sup>9</sup> Additionally, a higher percentage of Union Pacific’s 2015 accidents resulted in derailments and significantly more of them were due to faulty tracks, signals, or other equipment maintained by Union Pacific.<sup>10</sup> The industry average of accidents caused by tracks, signals, or equipment is 44% and it is 56% for Union Pacific.<sup>11</sup> This demonstrates the pattern of inadequate maintenance done by UP. While no railroad is acceptably safe, Union Pacific truly redefines “railroad safety.”

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<sup>6</sup> “Petroleum crude oil unit trains with heavily loaded tank cars will tend to impart higher-than-usual forces to the track infrastructure during their operation. These higher forces expose any weaknesses that may be present in the track structure, making the track more susceptible to failure.” Transportation Safety Board of Canada, RAIL SAFETY ADVISORY LETTER – 04/15, available at <http://www.tsb.gc.ca/eng/medias-media/sur-safe/letter/rail/2015/r15h0021/r15h0021-617-04-15.asp>

<sup>7</sup> *Id.*

<sup>8</sup> <http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/query/AccidentByRegionStateCounty.aspx>

<sup>9</sup> *Id.*

<sup>10</sup> *Id.*

<sup>11</sup> *Id.*

In an attempt to make Union Pacific and other railroads safer, the FRA has been trying for years to pass rules to improve railroad safety.<sup>12</sup> Union Pacific, however, has been aggressive in lobbying the FRA to defer safety improvements and has pushed Congress to overturn FRA safety rulemaking.<sup>13</sup> Union Pacific has gone as far as threatening to sue the FRA over critical safety improvements.<sup>14</sup> Simply put, UP is more concerned about profits than safety. This focus may well have caused UP's negligence in maintaining its tracks to progress to the explosion and fire in Mosier.

The facts are simple:

- The Mosier derailment was caused by Union Pacific's negligence in maintaining its tracks.<sup>15</sup>
- This is part of a pattern – Union Pacific perennially has a startlingly poor safety record.<sup>16</sup>
- Union Pacific has done everything in its power to prevent safety improvements that would eat into its profits – which totaled \$8.1 billion in 2015.<sup>17</sup>

At the same time, Union Pacific is proposing a project that would add more tracks on both sides of Mosier so that the railroad can run longer faster trains more frequently.<sup>18</sup> Instead of adding new tracks that will result in more trains and more accidents, Union Pacific needs to focus on maintaining the tracks it already has and fixing its industry poor safety record.

## **II. Increase in Train Traffic**

Union Pacific claimed initially that “[t]he new double track will allow [UPRR] to move 5 to 7 more trains per day through Mosier.” *Union Pacific Mosier Fact Sheet*. However, in a May 6, 2016 email response to an inquiry into the number of additional daily trains the project would allow posed by the US Army Corps of Engineers the railroad failed to back up this claim and instead changed the subject:

Q: “What is the maximum possible increase in the number of trains per day as a result of the project? (My information shows a max of 7 trains per day)”

A: “Train count and more importantly carloadings are driven by the global market, and Union Pacific regularly attempts to forecast this demand by commodity. This project is not tied to any forecasted increase in carloadings, rather it is designed to alleviate a major bottleneck in our system. This bottleneck causes delays regardless of the number of trains.” *Email from Luke Baatz, Senior Manager, Project Design, Union Pacific Railroad to Peter Olmstead, Project Manager/Biologist, US Army Corps of Engineers*.

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<sup>12</sup> See, e.g., <http://spectrum.ieee.org/transportation/mass-transit/stop-that-train>

<sup>13</sup> See, e.g., Union Pacific Railroad Company Comments on Docket No. PHMSA 2012—0082(HM-251), *available at*, [https://www.up.com/cs/groups/public/@uprr/@customers/documents/up\\_pdf\\_nativedocs/pdf\\_up\\_media\\_upcomment.pdf](https://www.up.com/cs/groups/public/@uprr/@customers/documents/up_pdf_nativedocs/pdf_up_media_upcomment.pdf)

<sup>14</sup> <https://next.ft.com/content/05834616-0647-11e5-89c1-00144feabdc0>

<sup>15</sup> *Id.*

<sup>16</sup> <http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Query/rrchart.aspx>

<sup>17</sup> See, e.g., Union Pacific Railroad Company Comments on Docket No. PHMSA 2012—0082(HM-251), *available at*, [https://www.up.com/cs/groups/public/@uprr/@customers/documents/up\\_pdf\\_nativedocs/pdf\\_up\\_media\\_upcomment.pdf](https://www.up.com/cs/groups/public/@uprr/@customers/documents/up_pdf_nativedocs/pdf_up_media_upcomment.pdf); and <http://www.up.com/media/releases/160121-4q15-results.htm>.

<sup>18</sup> Union Pacific To Enhance Infrastructure in Mosier, Fact sheet distributed by Union Pacific at March, 2016 meeting in Mosier, OR.

The US Army Corps of Engineers asked Union Pacific about “the maximum possible increase in the number of trains per day as a result of the project.” Union Pacific dodged the question entirely.

As part of our inquiry into the application submitted by Union Pacific and as a way to verify the railroad’s public pronouncements that the Mosier double tracking project would not result in significantly more train traffic even though it would remove the “the single greatest operational bottleneck in [sic] entire 206-mile Subdivision,”<sup>19</sup> Friends of the Columbia Gorge retained railroad experts Terry Whiteside and Gerald Fauth III. Between the two of them, they have over 68 years of experience in transportation working for both rail carriers and shippers.

In their expert testimony, they conclude that the Mosier double tracking project, when coupled with the modern train signaling mentioned in the application,<sup>20</sup> would provide infrastructure to increase rail traffic through Mosier by 45 to 52 trains per day or around two additional trains per hour. Up until last December there had been a ban on crude oil exports from the US for the last 40 years. An end to the crude oil export ban was stuffed into the federal budget that went into effect last December. This has opened up a gold rush for firms seeking to export oil from North Dakota, Utah, and Colorado. While some of the coal and oil export terminals that have been proposed in the Pacific Northwest have been deferred or denied, there is still a considerable amount of growth expected in coal and oil exports. For example, Portland has proposed to allow an unlimited number of new petroleum terminal facilities of up to 5 million gallons (or equivalent volume) of storage to be built in the city and to allow on site growth in the ten terminal facilities that already exist in the city based upon discretionary criteria.<sup>21</sup>

The companies that currently have terminals in Portland have speculated that they would require 2,024,000 new barrels of storage in the year 2035 versus today<sup>22</sup> – about the same new capacity as the proposed Vancouver Energy (Tesoro-Savage) oil by rail export terminal. *See* Appendix I, below. Furthermore, if every facility used its land in Portland as efficiently as Chevron does today, then the current facilities could expand to 17,219,048 total barrels of petroleum storage if the current proposal was adopted. *Id.* That is equivalent to almost 8 Tesoro-Savage terminals. This, along with the proposed double tracking, would result in a massive increase in dangerous oil train traffic through Wasco County.

In fact, Mr. Whiteside and Mr. Fauth III conclude that “UP anticipates 6 to 12 additional oil trains per day and 5 to 10 export coal trains per day through Mosier, which would equal 36 to 57 trains per day or 1.50 to 2.38 trains per hour.” Union Pacific’s contention that the project is for mere system improvements and would only provide infrastructure for an additional 5–7 more trains per day does not stand up to greater scrutiny. Instead, this proposed project would provide

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<sup>19</sup> Project Narrative at 2–4.

<sup>20</sup> The applicant’s narrative states that: “[a]ll lighting and signage installed will be the minimal amount required under federal law for the safe operation of the railroad. Additionally, up to seven wooden poles and wireless signaling appurtenances will be installed at an aboveground height of approximately 53 feet.” Project Narrative at 1–4. The seven 53 foot tall wooden poles and wireless signaling appurtenances are not required under federal law and apparently do not appear to be on the engineering drawings. If that is the case, these structures – and any others that do not appear with specificity – cannot be reviewed for scenic area criteria and cannot be approved as part of this application. The applicant acknowledges that “[s]pecific signage locations will be determined in the field.” *Id.* Therefore, whether the signage meets scenic area criteria cannot be evaluated and the signage cannot be approved.

<sup>21</sup> *See* <https://www.portlandoregon.gov/bps/article/586612>

<sup>22</sup> *See* <https://www.portlandoregon.gov/bps/article/582407>

capacity for many more dangerous oil trains to pass through Wasco County each day and increase the expected number of train accidents per year in Wasco County.

### **III. Rail Safety Impacts of Coal Trains**

Mr. Whiteside and Mr. Fauth III conclude that UPRR is banking on traffic increases from oil trains as well as coal trains. Currently, the Millennium Bulk Terminals coal export facility is undergoing review in Longview, Washington. If that terminal is approved then coal trains coming from Utah and Southern Wyoming are likely to share the tracks through Wasco County with oil trains. The U.S. Surface Transportation Board declared that coal is a “pernicious ballast foulant” that destabilizes railroad tracks and leads to “more accidents.”<sup>23</sup> At least one railroad “has determined that coal dust poses a serious threat to the stability of the track structure and the operational integrity of” its railroad network.<sup>24</sup>

Coal dust that is emitted from train cars gets into the rock ballast that supports the railroad ties, making the track unstable and more susceptible to damage. In fact, the Burlington Northern Santa Fe railroad has attributed derailments to ballast contaminated with coal dust.<sup>25</sup> Additionally, coal trains are heavy and result in more damage to tracks. As illustrated by the derailment in Mosier, damaged tracks can result in derailments of oil trains. Coal trains mean even more train safety woes for Wasco County.

### **IV. Air and Water Quality Impacts of Coal Trains**

Increased coal train traffic would also cause an increase in dangerous air pollution in Wasco County including fugitive emissions of coal dust and diesel emissions from trains. The Columbia River Gorge National Scenic Area is already severely impaired by air pollution, especially nitrogen oxides (NO<sub>x</sub>) and particulate pollution. The Gorge now stands among the most polluted places in the country, including Pittsburgh and Los Angeles. A 2005 joint study by the U.S. Forest Service and National Park Service studied twelve federally managed areas around the West and found that the Columbia River Gorge National Scenic Area and Sequoia National Park had by far the worst “annual standard visual range[s]” of the twelve areas.<sup>26</sup> Similarly, a 2000 Forest Service study of air quality monitoring data from 39 federally managed “visibility protected” areas in the West found that the Scenic Area has “the highest levels of haze” and “the sixth worst visibility pollution of these areas.”<sup>27</sup> Gorge air quality has been monitored for the last twenty years. The Forest Service has documented that visibility impairment occurs on at least 95% of the days that have been monitored.<sup>28</sup>

Deposition of pollutants also has profound negative impacts on ecosystems. Studies demonstrate that in the Western United States, some aquatic and terrestrial plant and microbial communities

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<sup>23</sup> See <http://www.troutmansandersenergyreport.com/wp-content/uploads/2011/03/Coal-Dust.pdf>

<sup>24</sup> Available at <http://www.bnsf.com/customers/what-can-i-ship/coal/coal-dust.html>.

<sup>25</sup> See Decision, March 3, 2011, Arkansas Electric Cooperative Association—Petition for Declaratory Order, Surface Transportation Board, Docket No. FD 35305, at 7.

<sup>26</sup> Mark Fenn, USDA Forest Service et al., *Why federal land managers in the Northwest are concerned about nitrogen emissions*, at 10 (Dec. 2004).

<sup>27</sup> Arthur Carroll, USDA Forest Service, Letter to Columbia River Gorge Commission, at 3 & attach. 3 (Feb. 7, 2000).

<sup>28</sup> Robert Bachman, USDA Forest Service, *A summary of recent information from several sources indicating significant increases in nitrogen in the form of ammonia and ammonium nitrate in the Eastern Columbia River Gorge and the Columbia Basin*, at 2 (June 24, 2005).

are significantly altered by nitrogen deposition.<sup>29</sup> Metals, sulfur, and nitrogen concentrations in lichen tissue found in the Gorge are comparable to that found in lichen tissue sampled in urban areas. Nitrogen deposition rates in the Gorge are comparable to the most polluted areas in the United States.

Particulate matter pollution also threatens human health and welfare. In fact, when reviewing the National Ambient Air Quality Standards for PM<sub>2.5</sub>, the EPA found that there is no level of particulate matter pollution at which there are no human health effects. According to the EPA, fine particulate matter pollution causes a variety of adverse health effects, including premature death, heart attacks, strokes, birth defects, and asthma attacks.<sup>30</sup> Even low levels of PM<sub>2.5</sub> can cause low birth weights, damage lung function, and increase risks of heart attack and premature death. Studies reviewed by EPA revealed a linear or almost linear relationship between diseases like cancer and the amount of fine particulate matter in the ambient air.<sup>31</sup> Consequently, particulate matter contamination has adverse health effects at any concentration.



*Photo of an open-top coal train emitting large quantities of coal dust at Columbia Hills State Park in the Columbia River Gorge National Scenic Area. Photo taken on May 22, 2015 five months after the Pasco re-spray facility became operational. Provided by Friends of the Columbia Gorge.*

<sup>29</sup> See Mark E. Fenn, et al, Ecological Effects of Nitrogen Deposition in the Western United States, BioScience Vol. 53:4, Apr. 2003, available at <http://www.bioone.org/doi/abs/>

<sup>30</sup> 71 Fed. Reg. 2620, 2627–36 (Jan. 17, 2006).

<sup>31</sup> *Id.*

Open-top coal trains lose huge volumes of coal dust and debris during transportation. Even after a facility designed to coat coal with sticky surfactants opened in Pasco Washington, the picture above demonstrates the occurrence of a massive coal dust emission from a coal train in the Gorge. According to Burlington Northern Santa Fe studies, between 500 lbs. and 2000 lbs. of coal can be lost in the form of dust from each rail car.<sup>32</sup> In other studies, as much as three percent of the coal in each car (around 3600 pounds per car) can be lost in the form of dust. A study of a West Virginia rail line found that one pound of coal per car per mile is lost from coal trains.<sup>33</sup> At this rate, one coal train with 120 cars traveling 85 miles through the Columbia River Gorge National Scenic Area could lose just over 10,000 pounds of coal in the Gorge. One coal train per day for 365 days is 3,650,000 lbs. per year emitted into the air and inhaled by County residents or deposited on Gorge lands and in Gorge waterways. The increase in the number of trains that can travel through Wasco County as a result of this proposal could have a direct adverse effect on the health of the County's citizens.

## **V. Conclusion**

Union Pacific has a very poor safety record and the June incident in Mosier was a direct result of poorly maintained tracks. Railroad experts refute UPRR's contention that the project would only allow 5–7 more trains per day through Wasco County. Many more dangerous oil trains are likely to pass through the County if this proposal is approved. Not all of those trains will pass through The Dalles and Mosier safely. Friends June 7, 2016 comments identify dozens of areas where the Union Pacific Mosier double tracking proposal does not meet legal criteria. We ask the County to deny the application on the legal grounds found within those comments.

Thank you for this opportunity to comment.

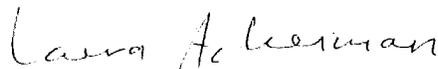
Sincerely,



Steven D. McCoy  
Staff Attorney  
Friends of the Columbia Gorge



Lauren Goldberg  
Staff Attorney  
Columbia Riverkeeper



Laura Ackerman  
Organizer and Oil Policy Director  
The Lands Council



Regna Merritt  
Healthy Climate Program Director  
Oregon Physicians for Social Responsibility



Matt Krogh  
Extreme Oil Campaign Director  
Stand

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<sup>32</sup> See Hearing, July 29, 2010, Arkansas Electric Cooperative Association—Petition for Declaratory Order, Surface Transportation Board, Docket No. FD 35305, at 42: 5-13.

<sup>33</sup> Simpson Weather Associates 1993. Norfolk southern rail emission study: consulting report prepared for Norfolk Southern Corporation. Charlottesville, VA.

CC: Columbia River Gorge Commission  
M.G. Devereux, Deputy Director, Oregon Parks and Recreation Department  
Audie Huber, Confederated Tribes of the Umatilla Indian Reservation  
Carl Merkle, Confederated Tribes of the Umatilla Indian Reservation  
Brent Hall, Confederated Tribes of the Umatilla Indian Reservation  
Brady Kent, Confederated Tribes and Bands of the Yakama Nation  
Elizabeth Sanchey, Confederated Tribes and Bands of the Yakama Nation  
Dave Cummings, Nez Perce  
Elmer Ward, Confederated Tribes of Warm Springs  
Julie Carter, Columbia River Inter-Tribal Fish Commission  
Rob Lothrop, Columbia River Inter-Tribal Fish Commission

This chart, with the original numbers taken from Figure 6 on page 14 of the City of Portland’s Fossil Fuel Zoning Amendments Discussion Draft, depicts the impacts of the city’s conceptual proposal. The City’s proposed draft zoning amendments would also allow onsite expansions of nonconforming facilities. If every facility used its land as efficiently as Chevron currently does, then the existing facilities could expand to 17,219,048 total barrels of petroleum – even if the current proposal was adopted. If Chevron’s speculative expansion is added then the total is 17,571,048 barrels.

NW Portland Facility	Acres	Current bbls	Speculative		Total bbls at 76,190/ac
			2035 new bbls	bbls/acre	
Chevron Petroleum terminal	21	1,600,000	352,000	76,190	1,600,000
Kinder Morgan Willbridge Petroleum terminal	33	1,551,000	342,000	57,364	2,514,286
Arc Logistics Asphalt/crude oil	39	1,466,000	323,000	45,872	2,971,429
NuStar Petroleum terminal	22	1,191,000	262,000	66,045	1,676,190
McCall Oil Petroleum terminal	19	930,000	205,000	59,737	1,447,619
Conoco Phillips Petroleum terminal	21	760,000	167,000	44,143	1,600,000
BP West Coast Petroleum terminal	18	601,500	132,000	40,750	1,371,429
Kinder Morgan Linnton Petroleum terminal	13	420,000	92,000	39,385	990,476
Equilon/Shell Petroleum terminal	38	400,000	88,000	12,842	2,895,238
Pacific Terminal Services Petroleum terminal	2	275,000	61,000	168,000	152,381
<b>Total</b>	<b>226</b>	<b>9,194,500</b>	<b>2,024,000</b>		<b>17,219,048</b>

*Source: City of Portland, Bureau of Planning and Sustainability, Fossil Fuel Zoning Amendments Discussion Draft, Figure 6, available at <https://www.portlandoregon.gov/bps/article/582407>*

**Testimony of Transportation Experts**

**Terry C. Whiteside, Principal, Whiteside & Associates**

**And**

**Gerald W. Fauth III, President, G. W. Fauth & Associates, Inc.**

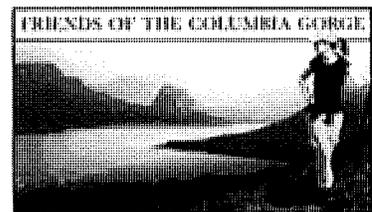
**File Number: PLASAR-15-01-0004**

**Concerning**

**Union Pacific Railroad Company's**

**Proposed Mosier Second Mainline Track Project**

**Prepared For:**



## Introduction

These comments are submitted by transportation consultants Terry C. Whiteside, Principal, Whiteside & Associates based in Billings, Montana, and Gerald W. Fauth III, President of G. W. Fauth & Associates, Inc. based in Alexandria, Virginia. We both have many decades of experience working on hundreds of projects and regulatory proceedings involving a wide-variety of transportation issues. Statements describing our backgrounds, qualifications and experience are attached hereto as Appendix A-1.

We have evaluated the potential impacts associated with Union Pacific Railroad Company's (UP) planned \$25 million and 4.02-mile track expansion near Mosier, Oregon, which was recently submitted to Wasco County for Scenic Area permitting. The proposed project would significantly expand an existing UP railroad line on either side of Mosier. **UP's proposal would not provide the local health and safety benefits the railroad promises and it would result in a massive expansion in the number of trains that could travel through Mosier.**

## Project Context

UP's proposed track expansion through Mosier is on UP's 185-mile mainline between Portland and Hinkle, Oregon. As can be seen from UP's system map in Figure 1 on the next page, the Portland to Hinkle line is one of two heavy-duty, high-density UP mainlines in and out of the Portland area. The green lines on the map have a weight capacity of 315,000 lbs. (185 tons) gross car weight and can accommodate unit trains (i.e. trains made up of cars all carrying the same commodity). Hinkle is a major junction point, it is UP's primary carload classification yard (where trains are broken down into individual cars and reassembled), and it is UP's primary locomotive service and repair facility in the Pacific Northwest. Due to its location, small improvements to the railroad infrastructure through Mosier could have tremendous ripple effects throughout Wasco County and the Pacific Northwest.

Figure 1

Northwestern Portion of UP's System Map



UP Has Overstated the Potential Health and Safety Public Benefits of the Proposed Track Improvements

In a fact sheet that UP prepared and presented to the City of Mosier, it stated that the new track would allow two trains to pass one another on parallel track without stopping in a siding

thus creating public benefits for Mosier residents including reducing noise and emissions from idling locomotives, eliminating the need to hold and meet trains on the existing siding, reducing horn blowing as train traffic passes stationary trains parked in the siding, and improving the movement of Oregon products to market.

While there may be some improvements compared to the current operations over the line – such as reducing noise and emissions from idling locomotives – these purported benefits will be more than offset by new health and safety problems associated with the increased traffic levels through Mosier. More trains through Mosier means more train noise, more train emissions and increased potential for rail accidents and spills. Moreover, more trains will increase the safety risk associated with pedestrian and vehicles collisions. Railroading is an inherently dangerous business and more trains mean more health and safety risks for the public.

### **Significance of the Project**

The proposed Mosier double-track project involves only 4.02 miles of track, which is a relatively small segment in comparison to UP's 32,100 route miles and the \$25 million price tag is only a small portion of UP's \$4.3 billion in capital spending in 2015. In fact, UP maintains that the Mosier double-track project is just "one of nearly 1,500 Union Pacific will complete across its 32,000-mile network this year to help improve train operating efficiency, reduce motorist wait times at crossings and enhance safety." As indicated herein, however, this relatively small project is a key component in UP's demonstrated master plans to significantly increase its railroad capacity and traffic to and from the Pacific Northwest.

In its application to the County, UP has indicated that the project would eliminate "the single greatest operational bottleneck in entire 206-mile Subdivision." UP admits that traffic for the entire Subdivision is directly impacted ("causes ripple effects of delays and inefficient

operations along the Subdivision”). As detailed below, addressing this single bottleneck would allow UP to move one to three more trains through Mosier and Wasco County per hour.

### **UP Has Likely Understated the Current Average Number of Trains Per Day Through Mosier**

According to its Mosier area fact sheet, UP maintains that it currently moves about 25 to 30 trains per day through Mosier and the new double track would allow UP to move 5 to 7 more trains per day through Mosier – or 30 to 37 trains per day. However, UP’s application to the County states that UP “typically moves 20 to 30 trains a day through the project area, and anticipates a similar number of daily trains with implementation of the proposed project.” In other words, UP maintains that, although it will have the capacity to move at least 37 trains per day through Mosier with the proposed improvements, it will continue to only operate 20 to 30 trains per day. If this is the case, it is reasonable to ask why does UP need to expand its capacity over the line?

In its application, UP even implies that there will be *fewer* trains on the line by the utilization of larger trains. Even if UP utilizes longer trains, it is likely that more trains and substantially more carloads will move through Mosier.

This is borne out in the rapid increase in train traffic through Oregon in the past five years. Figure 2 below details this traffic increase. Based on the reported significant increase in UP carloads originating and terminating in Oregon in the last few years (e.g., 436,925 cars in 2013 to 554,020 cars in 2015), it is safe to assume that UP’s current peak traffic levels over the line likely exceed 35 trains per day. We urge UP to provide more information concerning current traffic levels through Mosier. We also suggest that the County conduct an independent railroad traffic study and count, in order to accurately determine the number of current UP trains per day moving

through Mosier, including a separate determination of loaded and empty oil trains moving through town.

**Figure 2**

**UP Carloads Originated and Terminated in Oregon**

Year	Cars Originated in Oregon	Cars Terminated in Oregon	Total Cars O&T in Oregon	Total Cars O&T Per Day in Oregon
2011	179,014	261,840	440,854	1,208
2012	185,280	251,200	436,480	1,196
2013	185,848	251,077	436,925	1,197
2014	211,410	298,344	509,754	1,397
2015	237,165	316,855	554,020	1,518

*UP's traffic to and from Oregon has increased since 2011 from 1,208 cars per day to 1,518 per day.*

Additionally, UP reported that in the month of March, 2016, 6 unit oil trains ran through the state of Oregon instead of 4 unit trains as originally forecasted. Most, if not all, of these oil trains moved through Mosier. The improvements proposed by UP would allow the number of unit oil trains to increase significantly.

**UP Has Significantly Understated the Additional Capacity (Trains per Day) Resulting From the Proposed Project**

UP has also understated the *additional* capacity (i.e., 5 to 7 trains per day) that double tracking the line through Mosier would provide. If UP is currently operating 35 trains per day over the line and if the line is operating at or near capacity, double-tracking the line and including Positive Train Control (PTC), should result in nearly doubling the capacity. It is safe to assume that, rather than increasing the capacity to 37 trains per day, the capacity over the double-tracked line could easily exceed 60 trains per day.

In 2007, the Association of American Railroads (AAR) released the National Rail Freight Infrastructure Capacity and Investment Study, which was an assessment of the long-term capacity expansion needs of the continental U.S. freight railroads and provided an approximation of the rail freight infrastructure improvements and investments needed to meet the U.S. Department of Transportation's (U.S. DOT) projected demand for rail freight transportation in 2035. The report included the following approximation of the capacity associated with various track configurations:

**Figure 3**

**Practical Track Capacity (Trains Per Day)**

Number of Tracks	Train Control System	Trains Per Day	
		Lower Bound	Upper Bound
1	No Signal and Track Warrant Control (NS-TWC)	16	20
1	Automatic Block Signaling (ABS)	18	25
2	No Signal and Track Warrant Control (NS-TWC)	28	35
<b>1</b>	<b>Centralized Traffic Control (CTC)</b>	<b>30</b>	<b>48</b>
2	Automatic Block Signaling (ABS)	53	80
<b>2</b>	<b>Centralized Traffic Control (CTC)</b>	<b>75</b>	<b>100</b>
3	Centralized Traffic Control (CTC)	133	163
4	Centralized Traffic Control (CTC)	173	230
5	Centralized Traffic Control (CTC)	248	340
6	Centralized Traffic Control (CTC)	360	415

Based on these AAR estimates, the UP line through Mosier should currently have a practical capacity of 30 to 48 trains per day, which is within the range of UP's current traffic levels (20 to 35 trains per day) and projected capacity levels (an additional 5 to 7 trains per day). This table also demonstrates that UP has significantly understated the practical capacity of the improved line, which could range from 75 to 100 trains per day.

**Estimated Potential Trains Through Mosier**

UP’s application states that “The proposed project is not linked to the transport of any single commodity, nor is it a response to a planned rapid expansion of rail services.” It should be clear that UP has planned the proposed Mosier improvements and other capital improvements in Oregon, Washington and Idaho in order to significantly increase its capacity to handle significantly higher railroad traffic levels to and from the PNW.

While some of the oil and coal terminals in the PNW have been tabled or denied permits, there is still the potential for significant growth in coal and oil exports. Now that Congress has lifted the crude oil export ban, increased oil exports to Asian markets are likely when market conditions improve. In addition, fossil fuel terminals in Portland anticipate significant growth over the next 20 years.<sup>1</sup> UP clearly has its eyes focused on increasing oil and export coal shipments to the Pacific Northwest. We estimate that it is reasonable to assume that UP anticipates 6 to 12 additional oil trains per day and 5 to 10 export coal trains per day through Mosier, which would equal 36 to 57 trains per day or 1.50 to 2.38 trains per hour:

**Figure 4**

**Estimated Potential Trains Per Day Through Mosier**

Item	Trains Per Day	
	Lower Bound	Upper Bound
Estimated Current Trains Through Mosier	25	35
Potential New Loaded & Empty Oil Trains	6	12
<u>Potential New Loaded &amp; Empty Export Coal Trains</u>	<u>5</u>	<u>10</u>
<b>Estimated Potential Trains Through Mosier</b>	<b>36</b>	<b>57</b>

<sup>1</sup> See figure 6 here: <https://www.portlandoregon.gov/bps/article/582407>

This projected traffic level (36 to 57 trains per day) would fall well within the practical capacity of the improved line (75 to 100 trains per day).

### **Conclusion**

In its application materials and in its public discourse, UP has claimed that there will be net benefits to Mosier and Wasco County of improved health and safety at very little cost in terms of additional train traffic. However, in our expert opinions, the health and safety of communities along the rail lines will suffer due to the massive increase in train traffic that this proposal would allow. Railroads can be made safer but they cannot be made safe. The increase in train traffic that this proposed project would allow will make Mosier and Wasco County more dangerous places to live.

**STATEMENT  
OF  
BACKGROUND, QUALIFICATIONS AND EXPERIENCE  
OF  
GERALD W. FAUTH III**

My name is Gerald W. Fauth III. I am President of G. W. Fauth & Associates, Inc. (**GWF**), an economic consulting firm with offices at 116 S. Royal Street, Alexandria, Virginia 22314. I a recognized expert on transportation issues with over 38 years of experience in the private sector and in the Federal government.

This statement generally describes my background, qualifications and experience. The majority of experience has involved economic, regulatory, public policy and legislative issues primarily associated with, or related to, the U. S. railroad industry. Most of my work has involved regulatory proceedings and related projects before, or related to, the U.S. Surface Transportation Board (STB) and its predecessor, the Interstate Commerce Commission (ICC).

I have extensive experience in working in regulatory and other proceedings and projects involving: major railroad mergers and acquisitions; railroad transactions; railroad line construction and capital improvement projects; railroad line abandonments; railroad rate reasonableness and related economic issues; railroad operations and related environmental and safety concerns; and other railroad related issues. These matters have involved railroad issues on a nation-wide, system-wide and individual railroad line basis.

GWF has been engaged in the economic consulting business for over 50 years. My part time affiliation with GWF began in 1972. I began working for GWF on a full-time basis on May 15, 1978 and was employed by GWF continuously until November 1, 1999 at which time I took a leave of absence in order to take a position with the STB. At the STB, I served as Chief of Staff for one

of the three Board Members appointed by the President, Vice Chairman Wayne O. Burkes. I returned to GWF and consulting work effective June 23, 2003 after Mr. Burkes resigned his position to run for a political office.

Over the years, I have submitted expert testimony before ICC, STB, state regulatory commissions, courts and arbitration panels on a wide-variety of issues in numerous proceedings. In addition, I worked for 3½ years at the STB where I reviewed, analyzed and made recommendations on over 600 written formal decisions that were decided by the entire Board. These proceedings and decisions involved all matters of STB jurisdiction and had an impact on the transportation industry and the national economy.

Railroad transactions have long been the subject of ICC and STB regulatory proceedings and other matters involving: railroad merger and acquisition approval and oversight proceedings; railroad line abandonment proceedings; line sales; feeder line application proceedings; and other railroad transaction-related proceedings. I have been involved in numerous such proceedings and projects as an expert witness and as an STB staff advisor.

For example, I was an expert witness in the last two major Class I railroad merger proceedings: STB Finance Docket No. 32760, Union Pacific Corporation, et al. – Control and Merger – Southern Pacific Rail Corporation, et al. and STB Finance Docket No. 33388, CSX Corporation, et al., Norfolk Southern Corporation, et al. – Control and Operating Leases / Agreements – Conrail, Inc., et al. My testimony in these major merger proceedings concerned the potential adverse competitive impact of these mergers on two key areas.

In addition to my work in major railroad merger proceedings, I have submitted expert testimony in other railroad finance docket and abandonment proceedings before the ICC and STB. In these proceeding, I have developed and submitted evidence relating to the impacted railroad traffic and the valuation and economics of the railroad line at issue (such as: going concern and net liquidation values; freight revenues and traffic; operating costs; maintenance costs; right-of-way valuation; etc).

In addition to my testimony in railroad mergers and other rail finance and transaction proceedings, I served as an original member of the Conrail Transaction Council, which was established by the Board in Finance Docket No. 33388. This council consisted of representatives of the CSX, NS and shipper organization and provided a forum for timely and efficient communication of information and problems concerning the transaction. I was one of the original members of the Conrail Transaction Council and attended every meeting of the council until my employment with the Board.

During my time at the Board, I was actively involved in the STB merger oversight proceedings associated with the UP/SP and Conrail transactions. Perhaps the most significant merger-related proceedings that I was involved in during my time at the Board were STB Ex Parte No. 582, Public Views on Major Rail Consolidations and STB Ex Parte No. 582 (Sub-No.1), Major Rail Consolidation Procedures. These STB major rulemaking proceedings involved extensive oral hearings and written testimony from hundreds of witnesses. The Board concluded that its existing rules governing railroad mergers and consolidations, which had been developed nearly 20 years earlier, were not adequate for addressing the broad concerns expressed and initiated a major rulemaking proceeding which resulted in a major revision to the Board's railroad merger rules.

I have a significant amount of experience working on complex economic issues involving railroad rate reasonableness. I was actively involved in the initial ICC regulatory proceedings over 30 years ago in which the ICC first proposed and established guidelines which have since evolved into the STB's current railroad rate reasonableness guidelines. I was actively involved in several of the first cases to test the ICC's then proposed guidelines. For example, I was the primary expert witness in ICC Docket No. 40073, South-West Railroad. Car Parts Co. v. Missouri. Pacific Railroad, which was the *first* case to test the ICC's proposed simplified guidelines, which have since evolved into STB's Three-Benchmark approach. I submitted extensive written and oral testimony in STB Ex Parte No. 646 (Sub-No. 1), Simplified Standards For Rail Rate Cases, on behalf of a group of 30 major stakeholders and my testimony was cited by the Board in its decision served September 5, 2007. My work and testimony in these ICC/STB proceedings has helped shape the STB's current railroad rate reasonableness guidelines.

I have extensive experience in working in STB regulatory proceedings, litigation and other projects involving railroad valuation issues, such as the valuation of railroad track, right-of-way and equipment. These matters have involved railroad valuation issues on a nation-wide, system-wide, individual line and individual movement scope and basis.

Many of our projects have involved the development of railroad variable cost analyses based on the application of URCS and its predecessor, Rail Form A (RFA). URCS is used to determine STB jurisdiction and is an integral component of the STB's Full-SAC method, new Simplified-SAC standard and recently modified Three-Benchmark approach.

I have an extensive working knowledge of the development and application of URCS and RFA. I have prepared URCS cost analyses for thousands of individual railroad movements. I also submitted expert testimony in ICC Ex Parte No. 431 (Sub-No.1), Adoption of the Uniform Railroad Costing System as a General Purpose Costing System for Regulatory Costing Purposes and more recently in STB Ex Parte No. 431 (Sub-No. 3), Review of the Surface Transportation Board's General Costing System.

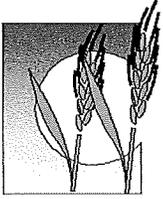
Proceedings before the Board often involve traffic and market analyses using the Board's Waybill Sample, which is a computer database of approximately 600,000 records of sampled railroad movements. I am extremely familiar with this railroad traffic database. Over the years, I have performed hundreds of analyses using this data, which has been used as evidence in merger and other proceedings before the Board.

Co-authored, with Terry Whiteside, the Study Entitled: "Heavy Traffic Ahead" in July 2012 and the follow-up study entitled: "Heavy Traffic Still Ahead." (November, 2013)

I am a 1978 graduate of Hampden-Sydney College in Hampden-Sydney, Virginia where I earned a Bachelor of Arts degree. My major areas of study were history and government. My senior paper in college dealt with the History of Railroad Deregulation. I am a 1974 graduate of

St. Stephen's School for Boys (now St. Stephen's and St. Agnes School), located in Alexandria, Virginia. My senior project and paper in high school dealt with the ICC and the Energy Crisis of 1973.

My professional memberships included the Transportation Research Forum and the Association of Transportation Law Professionals.



**STATEMENT  
OF  
BACKGROUND, QUALIFICATIONS AND EXPERIENCE  
OF  
TERRY WHITESIDE**

Terry Whiteside is a principal in Whiteside and Associates (P. O. Box 20574, Billings, Montana 59104-0574, Phone: 406-245-5132), a transportation and marketing consulting firm. Terry and wife, Beverly who is a Montana native enjoy living in the Big Sky country of Montana. Terry has over 30 years of experience in transportation with both carrier and shipper representation. He has worked in private industry for several Fortune 500 companies including Conoco, Continental Pipeline and several of the Williams Companies and later headed up the Transportation Division of the Montana Department of Agriculture and the Litigation Bureau of the Transportation Division of the Montana Department of Commerce. W&A today represents most of the Wheat and Barley Commissions throughout the Western half of the U.S. The firm does work for utilities, lumber companies, agricultural manufacturers and government entities and most importantly the growers of grain.

Terry Whiteside (TCW), principal, has experience in transportation with both carrier and shipper representation. He has worked in private industry for several Fortune 500 companies and did extensive transportation planning, management and litigation work for the State of Montana. Terry has worked for both carriers and shippers. TCW was head of a tariff department for a major Class I carrier and is an expert in tariff work. He has had extensive experience in transportation management; railroad operations and market development; costing analysis and financial evaluation; ICC/STB & FERC law and practice; facility siting; industrial plant location; develop private and public financing - Milwaukee Road Restructuring; various State Public Service Commissions; transportation law and practice; served as a transportation Expert witness in numerous cases, including Montana Power Company/Northwestern Energy contract negotiation with rail, motor, and pipeline companies; energy company development; railroad development; and transportation system design and evaluation.

Terry chairs the national Alliance for Rail Competition in Washington, DC. He currently represents the Wheat and Barley Commissions in Idaho, Colorado, Oklahoma, Nebraska, Oregon South Dakota, Texas, Washington and Wyoming

**PROFESSIONAL**

BA, MBA , Physical Distribution  
ICC/FERC/STB - Registered Law Practitioner  
Associate Member of American Society of Traffic and Transportation  
Graduate of the College of Advanced Traffic and Transportation - Chicago

**PREVIOUS CAREER AFFILIATION**

Continental Oil Company (CONOCO)  
Continental Pipeline Company  
Yellowstone Pipeline Company  
Cherokee Pipeline Company  
Geophysical Services, Inc.  
Williams Companies, Agrico Chemical, Williams Pipeline, Williams Energy  
State of Montana - Dept. of Agriculture/Dept. of Commerce  
Radermacher, Whiteside & Associates  
Whiteside & Associates

**REPRESENTATIVE PROJECTS**

Railroad Fueling Center Study  
Revenue Maximization Studies  
Litigation Involving All Aspects of Transportation  
Merger Representation  
Shipper Representation - Mining, Lumber, Agricultural, Manufacturing, Utilities  
Lease/Purchase of Coal Rail Car Fleet for MPC  
Consumer Representation - Abandonment, Transportation Negotiation  
Montana Grain Sub-terminal studies  
Montana State Rail Plan (original)  
Milwaukee Road Restructuring Plan - Statewide intermodal studies  
Bulk Intermodal Transfer Facilities Design  
Development of Hazardous Waste Transportation Entity  
Feasibility of Port Auth. in Yellowstone County (Montana TradePort)  
Negotiation of Rail Transportation Contracts - coal, petroleum coke, lumber, cement, lime, talc, bentonite, taconite, chromium, wood products, wheat, barley, oats, safflower, canola, fertilizer, & other products  
Special Consultant to Governors on Rail Car Plan for Grain Movement in Montana  
Negotiation of Truck Contracts: including LTL, truckload, small package and air services

Feasibility of Various Mining Operations - Chrome, Coal, Lime, Phosphate, etc.

Exporting western Coal to Pacific Rim countries

Coal for Fuel - Industrial demand

Railroad Rate Studies on Malt, Corn, Wheat, Barley and various value added industrial developments

Co-authored, with Gerald Fauth III, the Study Entitled: "Heavy Traffic Ahead" in July 2012 and the follow-up study entitled: "Heavy Traffic Still Ahead." (November, 2013)

**Expert Witness**

TCW has testified as an expert witness on behalf of the State of Montana: Montana Department of Agriculture, Montana Department of Commerce, Montana Governor's Office, Montana Consumer Counsel, Montana Power Company, Montana Farmer Union, Montana Grain Growers and Montana Wheat & Barley Committee, Alliance for Rail Competition, National Association of Wheat Grower and National Farmers Union. These appearances have included proceedings involving rate hearings, rail abandonments, permits, certificates of public convenience and necessity, purchase and mergers. These hearings involved state and federal administrative agencies, regional commissions, and courts of law both federal and state.

TCW has also testified on behalf of many rail and transportation shippers involving shipper transportation issues including contracts, complaints, investigations, court proceedings and authority hearings. These proceedings involved state and federal administrative agencies, courts of law both federal and state as well as local administrative bodies.

Terry has testified for Montana Power Company/Northwestern Energy as an expert witness in rate increase cases, providing testimony on the rail rates on coal movements out of the Powder River Basin, and the MPC/BN Contract for coal movement from the PRB to Corette.