Technical Memorandum No. 4

Project No. C SWOO-242

Data Collection and Evaluation of Railroad Project
May 18, 2005

DOT DEPARTMENT OF TRANSPORTATION | DMJM HARRIS AN AECOM COMPANY | HDR

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All information and assessments contained herein are the sole responsibility of the Consultant. Although many other parties contributed substantially to the report, they shall not be held accountable for its accuracy.

4.1 Introduction

To accurately identify and understand the issues affecting the Proposed BNSF/UP Front Range Infrastructure Rationalization Project it is necessary to compile and review a large amount of data. This involved an extensive search through relevant completed studies and ongoing projects both in Colorado and elsewhere as well as associated websites and libraries of listings. This technical memorandum is a reference for all future technical memorandums associated with this study as well as any future related phases of this project.

As noted in the table of contents, Section 4.1.1 includes a listing of all sources and websites that were accessed and reviewed for this study. The next section, 4.1.2 includes a summary of any relevant completed studies. Section 4.1.3 lists the relevant ongoing studies, summarizing those that were found most beneficial. The remainder of this Technical Memorandum includes the results of data collected, displayed graphically where possible, along with a review of the cost estimates provided by the two Class 1 railroads. A glossary of words and phrases associated with this study are included in Section 4.1.6.

Most documents listed are available in hard copy form. Studies related to passenger rail are summarized in Technical Memorandum No. 7. URL's for relevant newspaper articles are referenced on our project website at http://www.dot.state.co.us/railroadstudy/.

4.1.1 Literature Review

This project required the input of several different professionals reviewing various topics. The sources sited below were relevant for the indicated topic. Detailed summaries of selected documents are included in Sections 4.1.2 and 4.1.3.

Railroad Operations

- Bridging the Valley Transportation Study, Ongoing.
- Colorado State Rail Plan – Rail Bypass Feasibility Study, State Department of Highways with FRA, URS-R L Banks, 1979
- Metro Vision 2025 Interim Regional Transportation Plan, DRCOG, 2002
- Eastern Colorado Mobility Study, Felsburg, Holt, and Ullevig with DMJM, Jacobs, Cambridge Systematics, and Infrastructure Management Group, 2002
- Orlando Freight Relocation Study (ongoing study), HDR, 2003
- DM&E Powder River Basin Expansion Project, Burns and McDonald, 2000
- Colorado Transportation Profile, U.S. Department of Transportation, Bureau of Transportation Statistics, 2002
- TransPort Market Overview, Ross Consulting Group, 2002
- Alameda Corridor Project, DMJM and Moffat & Nichols, 1995

Websites:

- BNSF System and Division Maps http://www.bnsf.com/about_bnsf/html/division_maps.html.
- FRA Office of Safety Analysis http://safetydata.fra.dot.gov/officeofsafety/.
- UPRR industrial development site http://www.up.com/re.shtml.

Environment

- Eastern Colorado Mobility Study, Felsburg, Holt, and Ullevig with DMJM, Jacobs, Cambridge Systematics, and Infrastructure Management Group, 2002
- Bridging the Valley Transportation Study, Ongoing.
- North Front Range 2025 Regional Transportation Plan, DRCOG

- DM&E Powder River Basin Expansion Project, Burns and McDonald, 2000
- Alameda Corridor Project, DMJM and Moffat & Nichols, 1995

Economic Impact/Property Value

- Indiana Rail Plan, Parsons
- Economic Impact of Railroad Abandonment: Carrington-to-Turtle Lake Rail Line, Upper Great Plains Transportation Institute and the Department of Agriculture Economics at North Dakota State University, by Honeyman et al., 1996
- Economic Effects of Transportation: The Freight Story, IFC Consulting and HLB Decision Economics Inc., 2002
- The Value of Rail Intermodal to the U.S. Economy, by T. Brown and A. Hatch, 2002
- Commercial Property Benefits of Transit, Federal Transit Administration, 2002
- Impacts of Rail Transit on Property Values, Booz-Allen & Hamilton Inc.
- Rail Transit's Value-Added: Effects of Proximity to Light and Commuter Rail Transit on Commercial Land Values in Santa Clara, California, Institute of Urban and Regional Development, University of California – Berkley, by R. Cervero and M. Duncan, 2001
- The Effect of Rail Transit on Property Values: A Summary of Studies, Parsons Brinkerhoff, 2001
- Meta-Analysis of Airport Noise and Hedonic Property Values: Problems and Prospects, Jon P. Nelson, Department of Economics, Pennsylvania State University, 2003
- Ignoring Whistle Bans and Residential Property Values: An Hedonic Housing Price Analysis, David E. Clark, Professor of Economics, Marquette University and Argonne National Laboratory
- Fresno Rail Consolidation Study, HDR, 2001
- Measuring Economic Benefits of Intermodal Transportation, Dr. Yuri V. Yedokimov
- "Rail Service Is Playing a Crucial Role in the Alliance Area's Development" Article in the Fort Worth Star-Telegram, 12-12-1999, by Hornaday
- Colorado Mining Association: Facts about Mining in the United States, 2002
- Alameda Corridor Project, DMJM and Moffat & Nichols, 1995

Safety/Security

- Railroad Safety Statistics, Federal Railroad Administration, 2002
- Federal Railroad Administration – Highway-Rail Incidents, 2002
- TranStats: The Intermodal Transportation Database
- DM&E Powder River Basin Expansion Project, Burns and McDonald, 2000
- Colorado Strategy for Homeland Security, 2003
- Alameda Corridor Project, DMJM and Moffat & Nichols, 1995
- Eastern Colorado Mobility Study, Felsburg, Holt, and Ullevig with DMJM, Jacobs, Cambridge Systematics, and Infrastructure Management Group, 2002
- Orlando Freight Relocation Study, HDR, Ongoing
- Colorado Transportation Profile, U.S. Department of Transportation, Bureau of Transportation Statistics, 2002

Other Rail Operations

- Colorado Passenger Rail Study, Kimley-Horn, 1997
- Eastern Colorado Mobility Study

Passenger Rail

- Colorado Passenger Rail Study, Kimley-Horn, 1997
- North Front Range Transportation Alternatives Feasibility Study, DRCOG

- South I-25 Corridor and U.S. 85 Corridor DEIS, PBS & J, 2000
- Rail Oriented Development: Strategies and Tools to Support Passenger Rail, CDOT, 2001
- East Corridor MIS Final Report, DRCOG and Kimley-Horn, 1997
- RTD FasTracks
- Metro Vision 2020 Plan, DRCOG, 2000
- Metro Vision 2025 Interim Regional Transportation Plan, DRCOG, 2002
- North Metro Transportation Study, BRW, 2001
- North Front Range 2025 Regional Transportation Plan, DRCOG
- Transportation Expansion (T-REX) Multi-Modal Transportation Project Fact Book, RTD, 2002

Archaeological and Historic Resources

Documents:

- A Profile of the Cultural Resources of Colorado 2003. This document includes the following data:
  1. Percent of the land surveyed for cultural resources in the State of Colorado.
  2. Listing of counties with Prehistoric Districts and general location of districts.
  3. Counties with no officially eligible prehistoric sites.
  4. List of officially eligible sites.

Websites

- Known historic, archeological, and cultural resources in Colorado = http://www.coloradohistory-oahp.org
- Known historic, archeological, and cultural resources in Colorado = http://www.nationalregisterofhistoricplaces.com
- Information about the Old Santa Fe Trail http://www.nps.gov/safe/
- Rixey School and historical marker http://www.coloradohistory.com/ghostsearchresults_lnk.asp?TypeOfSearch=County&SearchString=bent

Special Status Plant and Animal Resources

Documents:

- *Colorado Revised Statues 1994*
  1. Definition of a state endangered species
  2. Definition of a state threatened species

Web Sties:

- Definitions of a federally endangered species, a federally threatened species, a candidate species = http://midwest.fws.gov/endangered/glossary/index.html
- US Fish and Wildlife Service, list of federally endangered or threatened species = http://endangered.fws.gov/ and http://mountain-prairie.fws.gov
- For plants, each federal and state listed species was then compared to comprehensive species lists for each county prepared by the Colorado State University Herbarium, which is concerned with the documentation of Colorado's vascular flora, including the natural variation based on geographic and ecological distribution = http://herbarium.biology.colostate.edu/rare
- The Threatened and Endangered Species System (TESS) for federal species lists them in the following categories for Region 6 of the US Fish and Wildlife Service: Mammals, Amphibians, Fishes, Snails, Insects, and Flowering Plants = http://ecos.fws.gov/tess_public/TESSWebpage
- The federally listed species were then supplemented with Colorado listed species provided by the Bureau of Land Management = http://www.co.blm.gov/botany/listedtb
- Natural Areas Program of Colorado State Parks = http://www.parks.state.co.us/cnap/Natural_Areas/Countylist.htm#BOULDER
- Colorado Natural Heritage Program = http://www.cnhp.colostate.edu/index

- Center for Plants Conservation = http://www.mobot.org/CPC
- Natural Diversity Information Source, Colorado State University = http://ndis.nrel.colostate.edu/
- Natural Resource Conservation Service = http://plants.usda.gov/cgi_bin/topics.cgi?earl=threat
- Colorado Division of Wildlife = http://wildlife.state.co.us/swa/
- Bald Eagle = http://wildlife.state.co.us/species_profiles/baldeagle.asp
- Ferruginous Hawk = http://www.rmbo.org/pif/bcp/phy36/grasland/feha.htm
- Greater Sandhill Crane = http://ndis.nrel.colostate.edu/wildlifespx.asp?SpCode=040701
- Interior Least Tern = http://wildlife.state.co.us/species_profiles/leasttern.asp, and http://www.nwf.org/watersheds/platte/tern.html
- Lesser Prairie Chicken = http://www.rmbo.org/pif/bcp/phy36/grasland/feha.htm
- Long-billed Curlew = http://www.rmbo.org/pif/bcp/phy36/grasland/feha.htm
- Mexican Spotted Owl = http://www.rmbo.org/pif/bcp/phy62/ppine/meso.htm
- Mountain Plover = http://www.rmbo.org/pif/bcp/phy36/grasland/moup.htm
- Piping Plover = http://wildlife.state.co.us/species_profiles/pipingplover.asp
- Plains Sharp-tailed Grouse = http://www.rmbo.org/pif/bcp/phy36/grasland/feha.htm
- Southwestern Willow Flycatcher = http://www.usgs.nau.edu/swwf/wiflhab.html
- Western Burrowing Owl = http://wildlife.state.co.us/species_profiles/burrowingowl.asp
- Western Snowy Plover = http://www.azgfd.com/w_c/edits/documents/Charalni.d.pdf
- Whooping Crane = http://wildlife.state.co.us/species_profiles/whoopingcrane.asp
- Yellow-billed Cuckoo = http://ndis.nrel.colostate.edu/wildlifespx.asp?SpCode=040277
- Black-footed Ferret = http://ndis.nrel.colostate.edu/wildlifespx.asp?SpCode=050120
- Black-tailed Prairie Dog = http://ndis.nrel.colostate.edu/wildlifespx.asp?grp=Prairie
- Northern Pocket Gopher = http://ndis.nrel.colostate.edu/wildlifespx.asp?SpCode=050047
- Northern River Otter = http://ndis.nrel.colostate.edu/wildlifespx.asp?SpCode=050109
- Preble's Meadow Jumping Mouse = http://rockyweb.cr.usgs.gov/frontrange/virtour/ftcoll4.htm
- Swift Fox = http://ndis.nrel.colostate.edu/wildlifespx.asp?SpCode=051063
- Wolverine = Sources: http://mountain-prairie.fws.gov/pressrel/00-22.htm, "Gulo gulo" (On-line), Animal Diversity Web. Accessed January 30, 2004 at http://animaldiversity.ummz.umich.edu/site/accounts/information/Gulo_gulo.html, and http://www.enature.com/fieldguide/showRguide.asp?rguideID=714&speciesID=4029
- *Common Kingsnake = http://ndis.nrel.colostate.edu/wildlifespx.asp?grp=Snakes*
- Common Garter Snake = http://ndis.nrel.colostate.edu/wildlifespx.asp?grp=Snakes
- Massasauga = http://ndis.nrel.colostate.edu/wildlifespx.asp?grp=Vipers
- Midget Faded Rattlesnake = http://ntri.tamuk.edu/herpetarium/viperidae/c.v.concolor/cvconcolor.html
- Texas Blind Snake = http://ndis.nrel.colostate.edu/wildlifespx.asp?grp=Snakes
- Texas Horned Lizard = http://ndis.nrel.colostate.edu/wildlifespx.asp?SpCode=030173
- Tripliod Checkered Whiptail = http://ndis.nrel.colostate.edu/wildlifespx.asp?SpCode=030174
- Couches Spadefoot = http://ndis.nrel.colostate.edu/wildlifespx.asp?grp=Toads
- Northern Cricket Frog = http://ndis.nrel.colostate.edu/wildlifespx.asp?grp=Frogs
- Northern Leopard Frog = http://ndis.nrel.colostate.edu/wildlifespx.asp?grp=Frogs
- Plains Leopard Frog = http://ndis.nrel.colostate.edu/wildlifespx.asp?grp=Frogs
- Yellow Mud Turtle = http://ndis.nrel.colostate.edu/wildlifespx.asp?grp=Turtles
- Pallid Sturgeon = http://www.nwf.org/watersheds/platte/sturgeon.html
- Arkansas darter = http://wildlife.state.co.us/species_profiles/arkansasdarter.asp
- Colorado Butterfly Plant = http://mountain-prairie.fws.gov/pressrel/00-31.htm
- Ute Ladies'-tresses = http://www.natureserve.org/explorer/servlet/NatureServe?searchName=Spiranthes+diluvialis

- The Colorado Natural Heritage Program (CNHP) tracks and ranks Colorado's rare and imperiled species and habitats = http://www.cnhp.colostate.edu/index.html
- State Wildlife Areas in the vicinity of the study area = http://wildlife.state.co.us/swa/

Major Creeks and Rivers, Wetlands, and other Surface Water Resources

Documents:

- Water resources of the study area in this technical report were identified with minimal field reconnaissance using USFWS National Wetland Inventory maps, both electronic and paper. These maps used *Classification of Wetlands and Deep-Water of the United States* (an Operational Draft), Cowardin, et al, 1977, to define the types of streams.

Websites:

- Several major surface waters in the study area are under the jurisdiction of the Colorado Division of Wildlife (State Wildlife Areas) = http://wildlife.state.co.us/swa/

Hazardous and Contaminated Materials Resources

Websites:

- The Office of Solid Waste operates under authority of the Resource Conservation and Recovery Act (RCRA) regarding the national management of hazardous and non-hazardous waste = http://www.cqs.com/esuper.htm and http://www.epa.gov/superfund/programs/index.htm
- Comprehensive Environmental Response, Contamination and Liability Information System (CERCLIS) database, Superfund Program = http://www.cqs.com/esuper.htm
- GIS files of hazardous materials and wastes = Colorado Department of Public Health and Environment (CDPH) Hazardous Materials and Waste Management Division Geographical Information System Files
- Weld County solid waste sites = http://www.co.weld.co.us/departments/health/environmental/composting/health_composting_facilities.html
- List of active solid waste sites = http://www.cdphe.state.co.us/hm/lflist.pdf
- List of active waste transfer sites = http://www.cdphe.state.co.us/hm/transfer.pdf
- Disposition of the Fort Bent Veteran's Hospital = http://www.bentcounty.org/abc/cities/lasanimasfrm.htm and http://www.cha.com/Hospitals/hospitals.shtml

Demographics

Websites

- Racial Minorities, Low Income populations, and Group Housing data was collected to the census tract level from the U.S. Bureau of the Census, Census 2000 = HTTP://factfinder.census.gov
- Low Income Minorities Thresholds by county = http://www.hudser.org/datasets/il/fmr00/hud00co.txt
- Percent of minority populations for the State of Colorado = http://dola.colorado.gov/demog/QTables/

4.1.2 Previous Studies

A number of studies ongoing and completed in Colorado offer information that is valuable as they identify study methodology and compiled data that is relative to this effort. The completed studies that were found to be most valuable are summarized below.

DM&E Dakota, Minnesota, and Eastern Railroad Corporation Powder River Basin Project Draft EIS
Burns and McDonald in cooperation with the Surface Transportation Board, 2000

This study was conducted to determine the environmental impacts associated with the construction of new rail line totaling 300 miles and the rehabilitation of an additional 600 miles. This study analyzes all things important

to the environment including air quality, noise, energy usage, transportation impacts, environmental justice, and grade crossing safety related impacts.

Contained within the appendices of this study are all the methodologies associated with calculating the impacts of the various environmental factors. For the purposes associated with the Public Benefits and Costs Study of the Proposed BNSF/UP Front Range Railroad Infrastructure Rationalization Project (the Railroad Study) these methodologies were extracted and used as a reference for appropriate measurement techniques for environmental impacts.

Colorado State Rail Plan – Rail Bypass Feasibility Study

This study was prepared for the Colorado General Assembly by the State Department of Highways with the FRA and URS-R L Banks, 1979. The study is a predecessor of this project.

Four alternatives were defined:

- The Urban alternative would maintain present coal train routing but reduce auto-train conflicts with 40 grade separations from Sterling to Trinidad.
- The Loops alternative would bypass coal train traffic around Denver to Colorado Springs with new and existing tracks east of the urban area near Watkins, Elizabeth, and Elbert.
- The Sterling Rock alternative would construct new alignment between Brush and Limon and use existing track from Limon to Colorado Springs.
- The All New alternative would provide new tracks between Brush and Las Animas.

The benefit to cost ratio of all four alternatives was less than one. The All New alternative was the most attractive in spite of high capital cost because the 100-mile haul reduction provided significant railroad and utility benefits. The study recommends a multi-step process of incremental improvements that would monitor actual coal traffic development and respond appropriately. The study provided historical background and baseline benefit to cost ratio expectations.

East Corridor Major Investment Study Final Report

This Major Investment Study was prepared for DRCOG by Kimley-Horn and Associates, July 1997. The MIS recommended single-track commuter rail from Denver Union Terminal to Denver International Airport. It also recommended extending RTD's Central Corridor LRT one mile to connect with commuter rail. Intermediate stations would be located at Stapleton and Gateway. RTD feeder buses would connect to the stations. Diesel Multi Unit (DMU) vehicles would be an appropriate mode and I-70 would be widened. This study provided background on passenger rail service for the east side of the Denver metro area.

RTD FasTracks Executive Summary

FasTracks is RTD's twelve-year comprehensive plan for high quality transit service and facilities in the region. FasTracks responds to the growing transportation needs of the Denver metropolitan region by providing an enhanced region-wide, reliable and safe transit system. According to the Denver Regional Council of Governments (DRCOG), the Denver metropolitan region is expected to add more than 900,000 people and 600,000 jobs by 2025.

This growth will place a tremendous strain on the region's already congested transportation system. Weekday vehicle miles of travel are expected to increase from 58 million in the year 2001 to 95 million by the year 2025, a 64 percent increase. As part of its Fiscally Constrained 2025 Interim Regional Transportation Plan (RTP), DRCOG has noted that severe congestion will increase by 89 percent even with the transportation improvements

that are scheduled for implementation. Person hours of delay are predicted to increase by two times the current amount. By 2025, the region will have more traffic than the existing transportation system can handle. In its *2003 Annual Urban Mobility Report*, the Texas Transportation Institute (TTI) rated Denver as the third most congested city in the United States. The report indicates "Public transportation lines that do not intersect roads can be particularly reliable as they are not affected by weather, road work, and other unreliability producing events." FasTracks also responds to *Metro Vision*, the Denver region's plan for future growth and development. The second of the six core elements of Metro Vision states that the region must create "a balanced multimodal transportation system" which includes "an extensive fixed guide-way transit system and bus transit." Finally, FasTracks responds to current sentiment on transportation needs within the metropolitan area.

In a recent survey entitled *2003 Statewide Customer Survey – Results on Transportation Issues in Colorado,* conducted by the Colorado Department of Transportation (CDOT), the lack of public/mass transportation was identified as one of the top transportation issues. The CDOT survey also states that if transportation funds became available, in the metro are, the highest priority for spending that money should be on light rail. FasTracks provides the opportunity to implement rapid transit by funding a region-wide system of light rail, commuter rail and bus rapid transit in the next twelve years. This study was the basis for examining RTD corridors that would be impacted by the railroad project and provided cost elements for the No-Build Option.

Metro Vision 2020 Plan

The Metro Vision 2020 Plan is the Denver region's plan for addressing the future growth of the metropolitan area. It frames the overall regional planning background. It outlines strategies and implementation steps to preserve quality of life while positioning the region to benefit from growth.

There are six core elements of development patterns, transportation system, and water quality. The extent of urban development will occur within 747 square miles by 2020 to accommodate population growth. The plan seeks to protect another 100 to 500 square miles of open space by 2020 to meet regional objectives. The plan seeks to help designated communities to remain separate from the larger urbanized area. It seeks a balanced multimodal transportation system.

Metro Vision 2025 Interim Regional Transportation Plan – The Fiscally Constrained Element

This plan was adopted by DRCOG in April 2002. It presents regional transportation facilities that can be provided thru 2025 based on reasonably expected revenues. The plan presents data on freight movement by air, rail trucks, and combinations. The Western Transportation Trade Network (Western ASHTO), of which CDOT is a member, is described. Figures included within the plan include the Freight RR Network with trains per day and at-Grade railroad crossings on the Regional Highway Network showing 500 plus at-grade crossings in the metro region.

North Metro Transportation Study

This study was prepared for RTD by BRW, Oct 2001. It is the Final Report of the Major Investment Study for the North I-25/Northeast Corridor. The triangular study area is bounded by I-25 to I-76 and to the Weld County line on the north. This study presented information and data for potential passenger rail service north of Denver and its relationship to existing railroad traffic.

The locally preferred alternative is a combination of roadway widening, bus/HOV lanes, new interchanges, bus park-n-ride lots, LRT/DMU lines, and LRT or DMU stations. The LRT/DMU alignment is on the UPRR Boulder Branch from Denver Union Terminal to 124th Avenue.

4.1.3 Ongoing Studies

Bridging the Valley Transportation Study

This project is presently on going in Spokane for the Spokane Regional Transportation Council by HDR Engineering Inc. CH2M Hill w/ HDR and ITC, April 2000. The Spokane to Sandpoint, ID, corridor is strategic to system capacity for BNSF. UP's only Western US connection to Canada converges at Spokane. The project would eliminate 40 miles of UP corridor and consolidate to BNSF ROW.

Major study issues are:

- Local Communities – traffic congestion, delays, safety, noise, air quality, emergency vehicle delays, at-grade crossing safety, school children, train horn noise, safety vs. horn noise.
- Rail shippers – relocate, retain branch lines, discontinue rail service.
- Rail carriers – don't increase costs (cap and O&M) (reluctant to acknowledge benefits), no loss in operating capacity, don't reduce competitive position (maybe rotate branch line business on an annual basis). Maintain sense of autonomy, sense of control.

"Shuttle diplomacy" was conducted between RR upper management and study team. The decision support process should lead to agreement on solutions, clarity and agreement on the problem, preclude redo loops, provide exposure of the process, documentation, appropriate decision tools, avoidance of analysis paralysis, focus on solutions at the appropriate time, and present no surprises.

Costs and Benefits are projected for private railroads, private local RR users, general public for safety and environment, delay time, and economic development. Railroad data includes timetable and track profiles (BNSF Website), ROW maps, programmed maintenance schedules, forecast traffic, capital budget, AMTRAK capital improvement budget, train file data or Line Occupancy Index, unit costs, crew change locations, and air quality parameters.

Highway data includes delay estimates. The methodology uses "Traffic Flow Fundamentals" (Adolf D. May 1990) equations (inputs are frequency of train events, road capacity, traffic volume, and duration of each train event). This study confirmed categories of benefits and provided a methodology for estimating crossing delay.

Chicago Regional Environmental and Transportation Efficiency project (CREATE)

In Chicago Mayor Richard M. Daley engaged the National Surface Transportation Board to reassess the region's rail transportation system and help reduce the impact of freight traffic growth on the city and its surrounding communities. The State of Illinois and the City of Chicago has joined with passenger and freight railroads serving the region to identify critically needed improvements to the Chicago region's rail and highway transportation infrastructure.

The resulting Chicago Regional Environmental and Transportation Efficiency project (CREATE), a public/private partnership, aims to improve passenger rail service, reduce motorist delay, ease traffic congestion, increase safety and provide economic, environmental and energy benefits for the Chicago region. The CREATE project hopes to increase the efficiency and reliability of much of the nation's rail service as Chicago is the nation's transportation hub.

The project will maximize the use of five rail corridors for a faster and more efficient rail network, eliminate the wait for motorists at 25 grade crossings by creating grade separations that separate motorists from trains, and create six rail-to-rail "flyovers" - overpasses and underpasses that separate passenger trains from freight trains.

It is the intension of this project to have the railroads pay for the benefits they receive under the project, and the city, state and federal government pay for the public benefits generated by the plan, certainly a model for this Colorado project. The Public/private partnership established for CREATE is meant to help prepare for the increased demand on our nation's freight infrastructure, and at the same time take advantage of the many public benefits offered by rail.

For further information refer to the following website address: http://ncppp.org/cases/create.html.

Alameda Corridor Study (Concept Study of Railroad and Highway Improvements for the Development of the Alameda Corridor), Oct 1991

This study was prepared for the Alameda Corridor Transportation Authority by DMJM/M&N (joint venture). The project was driven by increasing volumes of cargo moving through San Pedro ports. It provides for two-track mainline railway, widening Alameda Street, and grade separations. The cost range of alternatives was 1.2 to 1.5 billion 1991 dollars. Alternatives were evaluated and ranked with criteria from Corridor goals. The next phase is the production of an Environmental Impact Report and receipt of public comment.

Project goals were to:

- Improve Alameda St. port-related trucking
- Consolidate main line freight operations of Southern Pacific, ATSF, and UP to "encourage the diversion of truck traffic to rail transport"
- Reduce delays and improve operations and safety

Train traffic was projected to grow to 100 TPD in 2020 from 30 today, longer trains. A 45% increase in vehicular traffic by 2020 was projected. There were 298 grade crossings on the existing 3 lines. Roadway and Railroad Design Standards were presented. Data Collection included; aerial mapping, geotechnical & hazardous waste, utilities, property lines, future development plans, trainway and traffic volume projections.

Alternatives discussed were

- One-way Alameda couplet design
- 4 or 6 lane w/ median
- 2-lane flyovers at major intersections
- Exclusive truck lanes
- Depressed Alameda
- Depressed trainway
- Elevated trainway.

The Screened Alternatives were

- At-grade trainway
- Depressed trainway
- Vernon Diversion
- Trainway at-grade at Rosecrans
- Trainway at-grade at Firestone
- Depressed trainway.

Alternatives were evaluated with respect to the goals (w/ weighting) as follows:

- Traffic (weighted 17%) - reduce delays, improve speeds, improve LOS at intersections, provide alternative truck route, improve emergency vehicle access, divert truck traffic to rail, coordinate w/ plans at corridor ends.

- Safety and Security 8% - reduce hazard index (TPD x ADT), improve pedestrian safety, improve operations personnel safety, and improve security.
- Railroad 20% - Improve RR operating flexibility and efficiency, improve RR speeds, provide fair and equal access for all carriers, maintain service to customers.
- Environmental 15% - improve quality of life, minimize air pollution, reduce energy consumption, compatible with adjacent land uses, resolve present poor situation, aesthetics, and minimize noise and vibration.

4.2 Additional Data Collection

To perform our benefits analysis it is necessary to gather all available data on the existing railroad operations in Colorado as well as the future operations for both the No-Build Option and the Build Option. To help tabulate this data, the two Class 1 railroads were asked to fill in tables relative to Master Train Counts, Track data and Train data. The information provided is shown in Tables 4.2.1 through 4.2.8. The combined train counts are shown graphically in Figures 4.2.1 and 4.2.2. The data is also extrapolated to fit within our GIS database and reproduced graphically showing each railroads information separately in Figures 4.2.3 through 4.2.10. Note that Figures 4.2.3 through 4.2.6 show the track *Segment ID's* as they have been labeled for this project while Figures 4.2.7 through 4.2.10 show the train counts for the UP and the BNSF railroads at the State level and through Denver.

Another important benefit to the relocation study is the potential movement of rail yards. Part of our data collection included locating the yards and mapping their characteristics in our GIS system. Information provided by the railroads relative to the yards is shown in Tables 4.2.9 and 4.2.10. The locations of the yards are shown graphically in Figures 4.2.11 and 4.2.12.

The grade crossing data was collected using the FRA database and refined through meetings the Public Utility Commission (PUC). Shown in Tables 4.2.11 through 4.2.17 are all the at-grade crossings that intersect with the rail lines of concern on this project. This data was gathered using the most up to date information provided by the FRA. Detailed discussion of the crossings is included in Technical Memorandum No. 5. The FRA database can be accessed at http://safetydata.fra.dot.gov/officeofsafety/.

Part of Technical Memorandum No. 5 includes the need to determine land use along the existing and proposed corridors. A method to calculate the acres that would be affected by the movement of through-freight out of the Front Range and into the eastern plains was devised using existing land-use information derived from 1:250,000-scale Landuse/Landcover Geographic Information Retrieval Analysis System (GIRAS) spatial data available from the USGS. This coverage is shown graphically in Figure 4.2.13. A calculation of the acres could be found by using a strip-corridor of a width selected as the impacted zone or buffer zone. This method is shown graphically in Figure 4.2.14. The areas calculated, broken down into acres based on land use, are shown in Table 4.2.18.

4.3 No-Build Data

The No-Build Option, as defined in Technical Memorandum No. 2, establishes a future point of reference or baseline to compare the Build Option. The two Class 1 railroads were asked to provide the data that answers the question, *What would the freight railroad situation be like in the year 2030 if the proposed railroad project were not built?* The combined train counts are shown graphically in Figures 4.3.1 and 4.3.2. Figures 4.3.3 through 4.3.6 show the exact train counts provided by each railroad.

This data is used in subsequent Technical Memorandums to identify important capital investments and on-going operating costs accruing to the railroads and to the public. Specific inclusions or exclusions in the No-Build Option may affect the outcome of the study. The benefits are discussed in detail in Technical Memorandum No. 5.

4.4 Build Data

The Build Option is largely defined by the capital and operating improvements, as well as a corresponding freight service plan. This plan, proposed by the UP and BNSF Railroads, is described in Appendix A, included with Technical Memorandum No. 2. Specifically the increased opportunity for commuter/passenger service between Denver and Pueblo due to the removal of freight train traffic should be noted as discussed in Technical Memorandum No. 7.

The two Class 1 railroads were asked to provide specific data that would allow us to calculate qualitative and quantitative benefits of the Build Option. Clearly the most significant piece of information is the number of trains that would be dispatched along the given segments of track. These combined train counts are shown graphically in Figures 4.4.1 and 4.4.2. The exact breakdown of train counts provided by each railroad is shown in Figures 4.4.3 through 4.4.6.

4.5 Evaluation of the Railroads Costs

The two Class 1 Railroads have provided us with a cost estimate to construct all items listed in Appendix A - the Railroad Project. The Railroads costs as they were presented to us are shown in Table 5.1. This table does not include 3 of the items listed in Appendix A. The additional item costs were subsequently provided by the railroads and include:

Relocation of BNSF Facilities	$259,280,000
Add 9300' of sidings…Union to Omar	$5,293,000
Additional Capacity…Palmer Lake to Pueblo	$79,526,000

It should be noted that Table 5.1 provided by the railroads did not follow the same lettering convention as that shown in Appendix A.

In general all estimates seem accurate in terms of ballpark construction and material costs. The engineering design costs and the contingency used vary for most of the individual estimates. For consistency, it is recommended that 6% of the construction cost be used across the board for design engineering. It is also recommended that the contingency range increase from 15% to 30% based on the level of accuracy of each estimate.

The only other recommended change is to remove the costs for improvements along the line from South Denver to Palmer Lake and Palmer Lake to Pueblo. The improvements would only be done to help facilitate commuter rail along this corridor and not be part of the Railroad Project. Reducing traffic on these southern routes would be a great benefit to commuter rail from Denver to Pueblo as a new corridor would not need to be created. This benefit is discussed further in Technical Memorandum No. 7. It should be noted that this change was made with the permission of the railroads.

The results of making the above changes do not have a significant impact on the cost. The overall total decreases by less than 5%. The most significant impact is the removal of siding costs south of Denver. Other minor changes are noted in the comments column of Table 5.2. The total cost that we are recommending be used for this study is $1,167,369,667.

Table 4.5.1 The Railroad Project – Cost

Burlington Northern Santa Fe / Union Pacific
Front Range Railroad Infrastructure Rationalization
Proposal 1 (Modified Denver Bypass)

1. New Construction			
A.	Double Track Connection between UP Moffat Tunnel Subdivision and Belt Line Main Line at Utah Junction [1]	**$**	**43,832,000**
B.	Grade Separate BNSF Switching Lead from UP North Yard to Belt Junction Main Line [2]	*$*	*30,000,000*
C.	Double Track with CTC UP's Utah Junction to Belt Junction	**$**	**40,193,000**
	- Grade Separate or Close All Road Crossings		
D.	Rebuild and Double Track with CTC DRI/COE Line between Belt Junction and Sandown Junction	**$**	**78,204,000**
	- Grade Separate or Close All Road Crossings		
E.	Remove BNSF-UP Crossing at Sand Creek; Replace with Power-Operated Cross-Overs, Including Double Track on UP's Greeley Subdivision M.P. 4.0 to M.P. 7.0	**$**	**15,546,360**
F.	New Double Track Connection in the Northeast Quadrant between UP's Greeley Subdivision (M.P. 4.3) and the Current DRI Line	**$**	**7,983,000**
G.	Add Sidings or Sections of Double Track with CTC on UP's Limon Subdivision between Sandown Junction (M.P. 634.2) and Watkins (M.P. 612), Including Necessary Grade Separations of Road Crossings	**$**	**106,511,000**
H.	Add 9300' Sidings with CTC on UP's Limon Subdivision between M.P. 612 and Aroya	**$**	**37,712,000**
I.	New 60-Mile Line with CTC between Aroya and BNSF Boise City Subdivision at Las Animas	**$**	**182,967,000**
J.	Add a Second Track with CTC on UP Moffat Tunnel Subdivision between Utah Junction and Prospect Junction	**$**	**6,679,000**
K.	CTC and Additional Sidings as Necessary on the UP-BNSF Freight Line between South Denver and Palmer Lake [3]	*$*	*20,000,000*
L.	~~Additional Capacity (Sidings, Double Track, CTC) as Needed on UP-BNSF Joint Line between Palmer Lake and Pueblo~~		
	~~- Accommodate Both Freight and Commuter Passenger Operations on a Common Line~~		
M.	Freight Terminal Facilities at or near Irondale (BNSF) and Watkins (UP) to Replace Facilities in the Denver City Area (Estimate Does Not Include Facility at Irondale)	**$**	**208,024,000**
N.	Construct 35-Mile Connection Between BNSF (Omar, CO) and UPRR (Peoria, CO) [4]	*$*	*105,000,000*
		$	**882,651,360**

[1] Includes total cost ($11,000,000) of Pecos Street underpass. UPRR portion anticipated to be 50% of total cost
[2] Ballpark estimate based on connection similar to Utah Junction project
[3] Ballpark estimate based on construction of five new sidings @ $4MM per siding
[4] Ballpark estimate based on construction of 35-mile connection @ $3MM per mile

Italicized figures represent estimates without detailed backup information

Revised 01/16/04 th

4.6 Summary of the Public Involvement Results

Overview

The Public Involvement Plan of the Public Benefits and Costs Study was designed to:

- Provide information statewide and beyond about the study;
- Engage key stakeholders in working together to think through issues related to the study and making recommendations to decision makers at CDOT; and
- Solicit input from potentially affected citizens, businesses, and interest groups regarding possible positive and negative impacts to their communities and their perceptions of the value of those benefits and costs of those impacts.

To solicit this input, a database of approximately 375 individuals from the Front Range, Eastern Plains, and northwest Colorado was created. These individuals:

- Are involved in planning and development efforts that shape the physical characteristics and quality of life in their communities;
- Interact with, or represent, a broad cross-section of people in their community; and/or
- Represent the perspective of numerous organizations and interests.

A copy of the database is included at the end of this section.

Each of the people on this database received background on the project and a survey soliciting their opinions on a variety of topics, including their perspectives on the potential environmental, economic, and safety issues associated with this proposed project. They were asked whether they thought the project was more positive or more negative for their community, and how their community might react to the proposal. A copy of the background and survey document is included at the end of this section.

Several of the organizations that received the survey also distributed the survey to their members. For example, Progressive 15, the organization representing the interests of 15 northeastern Colorado counties, distributed it to their membership. All were asked to respond via e-mail or mail. In addition, phone interviews were conducted with several key individuals whose opinion was particularly relevant to the study.

Approximately 600 surveys were distributed, and a total of 70 were completed and returned.[1] Each survey that was returned was numbered and categorized into one of five regions of the state: Denver Metro, Eastern Plains, North Central, South Central, and Western Slope. The regional breakdown of returned surveys is as follows: Denver Metro – 31, Eastern Plains – 17, North Central – 9, South Central – 8, Western Slope – 5 (see G*raph 1 – Survey Response Distribution by Region*).

[1] Of the 600 surveys that were distributed, 100 were sent to state legislators. Because the legislature was in session when this study was being conducted, we received minimal response from this group.

- Two respondents from the Colorado Springs area also raised a concern over wanting to minimize any negative impact on rail freight traffic to Fort Carson and other military installations in the area. Military activities are a significant contributor to the economy of Colorado Springs, and these respondents want to avoid any impact that may harm this important segment of its economy.
- Xcel Energy recently announced plans to build a new coal-burning power plant in Pueblo. Respondents from Pueblo were very concerned that moving the rail line to a location significantly east of where the new plant is to be located could have a negative impact on the economics of this new plant. They were concerned that this study could negatively impact that new plant and whether it is built.
- One respondent from Pueblo noted that there is only one rail line manufacturer currently operating in the United States, and it is CF&I Steel located in Pueblo. To the extent new lines need to be manufactured because of the potential relocation, Pueblo could benefit from the new jobs that might be added to manufacture the rails.
- Another issue raised by residents in and near Pueblo is that the City has the second largest rail yard in the state, which presents both a concern in that jobs could be shifted east (although the individuals may continue to live in Pueblo) and a benefit in that the rail yard could be redeveloped.

Survey and Background Document

Public Survey
February 2004

The Colorado Department of Transportation (CDOT) has commissioned a study to examine the potential benefits and costs associated with a proposed project that would relocate through-freight rail traffic from the Front Range to the Eastern Plains and make other rail improvements. Our purpose in contacting you is to provide some background on this proposed project and ask for your feedback on how it might impact your community.

The Front Range has seen increases in freight train traffic, much of it coal from Wyoming and western Colorado traveling to and through the Front Range. These increases, along with increasing urbanization and limitations related to topography, combine to result in longer delays at crossings and other operational inefficiencies in Colorado's transportation infrastructure. Consequently, for a number of years there have been suggestions that longer freight trains should be moved out from Front Range cities.

CDOT and the two Class I railroads operating in Colorado, the Burlington Northern Santa Fe Railway Company (BNSF) and the Union Pacific Railroad Company (UP), have been discussing possible rail infrastructure changes for several years. The two railroads have proposed a package of improvements (the "proposed project") designed to move most coal traffic from the Front Range to the Eastern Plains and improve and consolidate freight movement -- while still maintaining local freight traffic. The railroads recognize the benefits of this proposed project to their operations. They also believe the public will significantly benefit from the project, and therefore have expressed interest in exploring a public/private financial partnership to help defray the costs of the proposed project.

CDOT has commissioned a study, called the Public Benefits and Costs Study, to identify, quantify and qualify the public benefits associated with this proposed project. Costs refer to the full range of impacts, positive and negative, including social, economic and environmental costs and benefits. Examples include improvements in traffic movement and air quality, as well as the opportunity to redevelop certain railroad yards and the creation of construction jobs. The study will also consider the ability of western Colorado coal to be efficiently moved to market and remain competitive, as well as the possibility that passenger rail service could be added in the future within rail corridors once freight traffic is reduced. The ultimate goal of the study will be to determine whether the benefits to Coloradans are sufficient to warrant investing public dollars in a public/private partnership with the BNSF and UP to accomplish this proposed project.

Additional information on the Public Benefits and Costs Study is available on our website, http://www.dot.state.co.us/railroadstudy/, which might help to provide you with greater detail. In addition, a very informative article on this project was published by The Rocky Mountain News and can be found at the following Web address: http://www.rockymountainnews.com/drmn/business/article/0,1299,DRMN_4_2599024,00.html. The article included a map showing the current alignment and a map showing the realignment as proposed by the railroads; these Rocky Mountain News maps are available on our website, at http://www.dot.state.co.us/railroadstudy/maps/default.asp. It should be noted, however, that this study is not meant to establish or analyze any specific railroad alignments. Such work, as well as more detailed analyses, would be carried out in a more detailed implementation study phase, if such a next phase is deemed to be warranted.

Public input will play an important part in shaping this study. We would therefore like to ask you to complete the attached public information survey. The questions on the survey are designed to solicit your overall impression, at this early stage of the study, of the potential costs and benefits of the proposed project.

Subsequent phases of this project, if conducted, would likely include a more detailed analysis of the impacts on particular communities in greater detail.

We would greatly appreciate your response to the survey no later than February 20, 2004, if possible. To respond, simply hit REPLY TO ALL and respond to the questions below. (It is recommended that you temporarily save a copy on your computer in case there are problems sending/receiving your response.) You can also mail your response to Ron Thorstad, the project manager for this study, at DMJM/Harris, 717 17th Street, Suite 500, Denver, CO 80202. You may also provide additional feedback throughout the study until April 1, 2004, by clicking on the submit feedback tab or by mailing it to us at the address designated above. Any information submitted will be compiled in our database, reviewed and summarized by our public involvement team. To the extent you want more information, let us know and we will try to provide you what you need. We would also ask you to share this information with others in your community, such as members of organizations to which you belong, and ask them to respond to the survey and provide us their thoughts.

Thank you in advance for taking the time to provide us with your thoughts, and we look forward to hearing from you. For any questions regarding this survey, contact Tom Mauser, CDOT Modal Planning Manager, at (303) 757-9768 or tom.mauser@dot.state.co.us.

Thanks for your participation!

Sincerely,

Tom Norton
Executive Director
Colorado Department of Transportation

Public Survey

We would greatly appreciate your response to the survey no later than February 20, 2004, if possible. To respond, simply hit REPLY TO ALL and respond to the following questions.

1. Do you see this proposed project as having an impact on your community? To what extent (slight to significant)?
2. Who in your community do you think could potentially feel the greatest impact? How might they be affected?
3. What do you think the potential impact might be in terms of:
    a. Economic impacts
        i. Potential job creation or job loss?
        ii. Potential additions or loss to the tax base?
        iii. Attracting businesses to locate to, or move from, your community?
        iv. Other economic impacts?
    b. Environmental impacts
        i. Potential improvements or deterioration in air quality?
        ii. Potentially positive or negative impacts on land use?
        iii. Impacts on water quality, either positive or negative?
        iv. Other environmental impacts?
    c. Traffic movement, in terms of increased or decreased congestion, or increased or decreased safety risks?
4. What other potential impacts not mentioned do you see?
5. Of these potential impacts, which have the potential to be the greatest benefit to your community? Which cause you the greatest concern?
6. When considering all the potential positive and negative impacts, do you think the overall impact could be more positive or negative for your community?
7. How do you think your community in general will react to this proposed project?
8. Do you see this possible realignment as conflicting with any development, land use, or other plans for your community? As being consistent with redevelopment opportunities in your community?
9. Do you have any other comments or information you consider important for evaluating the impacts on your community that we have not mentioned?
10. In which part of the state you reside? (City or region)
11. You are responding as:
    a. An elected official _____
    b. A government official _____
    c. A chamber of commerce or economic development official _____
    d. A private sector business _____
    e. Other _____

Please feel free to provide any additional comments.

4.7 Study Glossary

AAR	Association of American Railroads (AAR)
At-grade roadway crossing	The location where a local street or highway crosses railroad tracks at the same level or elevation
Attainment area	An area that meets National Ambient Air Quality Standards (NAAQS) specified under the Clean Air Act.
A-weighted Sound Level (dBA)	The most commonly used measure of noise, expressed in "A-weighted" decibels (dBA), is a single-number measure of sound severity that accounts for the various frequency components in a way that corresponds to human hearing.
Ballast	Top surface of rail bed, usually composed of aggregate (i.e., small rocks and gravel).
Branch line	A secondary line of railroad usually handling light volumes of traffic.
Bulk Train	Also known as a unit train. A complete train consisting of a single non-breakable commodity (such as coal, grain, semi-finished steel, sulfur, potash, orange juice) with a single point of origin and destination.
CTC	Centralized Traffic Control (CTC)
Consist	The make-up of a train, usually referring to the number of cars.
Construction footprint	The area of a construction site subject to both permanent and temporary disturbances by equipment and personnel.
Class I Railroad	Railroads that exceed annual gross revenues of $250 million, in 1991 dollars. The amount is indexed annually to reflect inflation. For 1996, the annual gross revenue was $255 million.
Cultural resource	Any prehistoric or historic district, site, building, structure, or object that warrants consideration for inclusion in the National Register of Historic Places (NRHP). For the purposes of this document, the term applies to any resource more than 50 years of age for which SEA gathered information to evaluate its significance.
Day-Night Sound (L_{dn})	One of the most widely accepted measures of cumulative noise exposure in residential areas. The Day-Night Sound Level (L_{dn}) is the A-weighted sound level, average over a 24-hour period, but with levels observed during the nighttime hours between 10 p.m. and 7 a.m., increased by 10 dBA to account for increased sensitivity at night.
dBA	Adjusted decibel level. A sound measurement that adjusts noise by filtering out certain frequencies to make it analogous to that perceived by the human ear. It applies what is known as an "A-weighting" scale to acoustical measurements.

Decibel (dB)	A logarithmic scale that compresses the range of sound pressures audible to the human ear over a range from 1 to 140, which 0 decibels represents sound pressure corresponding to the threshold of human hearing, and 140 decibels corresponds to a sound pressure at which pain occurs. Sound pressure levels that people hear are measured in decibels, much like distances are measured in feet or yards.
Deciduous	Any plant whose leaves are shed or fall off during certain seasons; usually used in reference to tree types.
DMU	Diesel Multiple Unit - a new-generation version of the Rail Diesel Car.
Emergent species	An aquatic plant with vegetative growth mostly above the water.
Endangered species	A species of plant or animal that is in danger of extinction throughout all or a significant portion of its range and is protected by state and/or federal laws.
FRA	Federal Railroad Administration - the governing body whose mission is to provide support, analysis and recommendations on broad subjects relating to the railroad industry, such as: mergers and restructuring; economic regulation; rail economics; financial health; traffic patterns and network analysis; labor-management issues; freight data and operations; intermodalism; environmental issues; and international programs.
Flat yard	A system of relatively level tracks within defined limits for making up trains, storing cars, and other purposes, which requires a locomotive to move cars (switch cars) from one track to another.
Floodplain	The lowlands adjoining inland and coastal waters and relatively flat areas and flood prone areas of offshore islands, including, at a minimum, that area inundated by a one percent (also known as a 100-year or Zone A floodplain) or greater chance of flood in any given year.
Frog	A track structure used where two running rails intersect that permits wheels and wheel flanges on either rail to cross the other rail.
Grade crossing	An intersection between a railroad track and a roadway where they cross at the same grade or elevation.
Grade separation	An intersection between a railroad track and roadway where they are separated by height or elevation, the roadway crosses over the railroad on a structure or visa versa.
Habitat	The place(s) where plant or animal species generally occur(s) including specific vegetation types, geologic features, and hydrologic features. The continued survival of that species depends upon the intrinsic resources of the habitat. Wildlife habitats are often further defined as places where species derive sustenance (foraging habitat) and reproduce (breeding habitat).
Haulage right	The limited right of one railroad to operate trains over the designated lines of another railroad.
Hazardous materials	Any material that poses a threat to human health and/or the environment. Typical hazardous substances are toxic, corrosive, ignitable, explosive or chemically reactive.

Historic property	Any prehistoric or historic district, site, building structure, or object that warrants consideration for inclusion in the National Register of Historic Places (NRHP). The term "eligible for inclusion in the NRHP" includes both properties formally determined as such by Secretary of the Interior and all other properties that meet NRHP listing criteria.
Hump yard	A railroads classification yard in which the classification of cars is accomplished by pushing them over a summit, known as a "hump", beyond which they run by gravity.
Interlocking	An arrangement of switch, locks, and signal appliances interconnected so that their movements succeed each other in a predetermined order, enabling a moving train to switch onto adjacent rails. It may be operated manually or automatically.
Intermodal facility	A site or hub consisting of tracks, lifting equipment, paved areas, and a control point for the transfer (receiving, loading, unloading, and dispatching) of intermodal trailers and containers between rail and highway or rail and marine of transportation.
Intermodal train	A train consisting or partially consisting of highway trailers and containers or marine containers being transported for the rail portion of a multimodal movement on a time-sensitive schedule; also referred to as a piggyback, TOFC (Trailer on Flat Car), COFC (Container on Flat Car), and double stakes (for containers only).
Key routes	As defined by the Association of American Railroads (AAR), a key route is a track that carries an annual column of 10,000 car loads or intermodal tanks loads of any hazardous material. AAR has developed voluntary industry key route maintenance and equipment guidelines designed to address safety concerns in the rail transport of hazardous materials. For analysis purposes, SEA has used the term "major key route" to identify routes where the volume of hazardous materials carried a route would double and exceed a column of 20,000 carloads as a result of the proposed Conrail Acquisition.
Key train	The Association of American Railroads (AAR) defines a key train as any train handling five or more carloads of poison inhalation hazard (PIH) materials or a combination of 20 or more carloads containing hazardous materials. Under AAR voluntary industry guidelines, railroads impose operating restrictions on key trains to ensure safe rail transport of these materials. These restrictions include maximum speeds, and meeting and passing procedures.
LOS	Level of Service (LOS) (rating A through F). A measure of the functionality of a highway or intersection that factors in vehicle delay, intersection capacity and effects to the street/highway network.
Lift	A lift us defined as an intermodal trailer or container lifted onto or off of a rail car. For calculations, lifts are used to determine the number of trucks using intermodal facilities.
Locomotive, road	One or more locomotives (or engines) designed to move trains between yards or other designated points.
Locomotive, switching	A locomotive (or engine) used to switch cars in a yard, between industries, or in other areas where cars are sorted, spotted (placed at a shipper's facility), pulled (removed from a shipper's facility), and moved within a local area.
Mainline	The principle line or lines of a railway.
Merchandise train	A train consisting of single and /or multiple car shipments of various commodities.

Mitigation	Actions to prevent or lessen negative effects.
National Register	A listing of historic places maintained by the Secretary of the Interior.
National Wetlands Inventory	An inventory of wetland types in the United States compiles by the U.D.S.. Fish and Wildlife Service.
Noise	Any undesired sound or unwanted sound.
Palustrine wetland	Non-tidal wetland dominated by trees, shrubs or persistent emergent vegetation. Includes wetlands traditionally classified as marshes, swamps, or bogs.
Passby	The passing of a train past a specific reference point.
Pick up	To add one or more cars to a train from an intermediate (non-yard) track designated for the storage of cars.
Prime farmland	Land defined by the Natural Resource conservation Service (NRCS) as having the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops.
PUC	Public Utility Commission (PUC) - The body governing over and changes to rail crossings. This includes adding or removing at-grade vehicle crossings.
Rail spur	A track that diverges from a main line, also known as a spur track or rail siding, which typically serves one or more industries.
Rail yard	A location where rail cars are switched and stored.
Railbanking	A set-aside of abandoned rail corridor for recreational and/or transportation uses, including reuse for rail.
Receptor/receiver	A land use or facility where sensitivity to noise or vibration is considered.
ROW	Right-of-way. The strip of land for which an entity (e.g., a railroad) has a property right to build, operate, and maintain a linear structure, such as a road, railroad or pipeline.
Riparian	Relating to, living, or located on. Or having access to, the bank of a natural watercourse, sometimes also a lake or tidewater.
Riprap	A loose pile or layer of broken stones erected in water or on soft ground such as a guard against erosion.
Riverine wetland	All wetlands and deepwater habitats contained within a channel, either naturally or artificially created.
Route miles	Distance calculated along a railroad's main and branch lines.
Scrub-shrub	Areas dominated by woody vegetation less than 6 meters (20 feet) tall, which includes shrubs and young trees.
Set onto	To remove one or more cars from a train at an intermediate (non-yard) location such as a siding, interchange track, spur track, or other rack designated for the storage of cars.
TPD	Trains per day
Take or taking	Refers to a removal of property, an acquisition of right-of-way, or loss and/or degradation of species' habitat.
Threatened	A species that is likely to become an endangered species within the foreseeable future throughout all or part of its range, and is protected by state and/or federal law.

Trackage rights	The right or combination of rights of one railroad to operate over the designated trackage of another railroad including, in some cases, the right to operate trains over the designated trackage; the right to interchange with all carriers at all junctions; the right to build connections or additional tracks in order to access other shippers or carriers.
Turnout	A track arrangement consisting of a switch and frog with connecting and operating parts, extending from the point of the switch to the frog, which enables engines and cars to pass from one track to another.
Unit train	A train consisting of cars carrying a single commodity, e.g., a coal train (see also bulk train).
Water resources	An all inclusive term that refers to many types of permanent and seasonally wet/dry surfaces water features including springs, creeks, streams, rivers, ponds, lakes, wetlands, canals, harbors, bays, sloughs, mudflats, and sewage-treatment and industrial waste ponds.
Wetland	As defined by 40 CFR Part 230.3, wetlands are "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions". Wetlands generally include swamps, marches, bogs, and similar areas.
Wye track	A principal track and two connecting tracks arranged like the letter "Y".
Yard truck	Any truck that has delivery into a rail yard.