Executive Summary

Introduction

For many years railroads have played a key role in Colorado's economic engine. Yet as the Front Range has grown, there has been much discussion of the need to relocate through-freight train traffic away from Colorado's Front Range. Over the past few years the Burlington Northern Santa Fe Railway Company (BNSF), the Union Pacific Railroad Company (UP), and the Colorado Department of Transportation (CDOT) have been discussing the possibility of such a "bypass." In 2002 the two railroads proposed a Front Range Railroad Infrastructure Rationalization Project (the Project), which would improve and relocate freight rail infrastructure, moving through-freight traffic and facilities east of the Front Range while still maintaining local freight service.

Study Approach

CDOT initiated a *Public Benefits & Costs Study* (the Study) to identify, and in some cases quantify, the potential public and private benefits and costs of the proposed Project. The purpose of the Study was to determine whether the public benefits warranted consideration of public participation in the proposed Project. The study was designed to assess funding and financing options, measure economic impacts, and estimate construction costs.

> The ultimate goal of the Study is to determine whether there are sufficient benefits to the general public to warrant consideration of the investment of public dollars in the Project.

The Study is preliminary in nature and broad in terms of detail. Some matters will require additional detailed study in the future, including environmental mitigation and impacts, project costs, appraisals related to right-of-way acquisitions, transit feasibility, future refinements of infrastructure locations and alignment, economic impact of the proposed improvements, and construction phasing.

This Study focuses on two options for through-freight rail: Build and No-Build.

The No-Build Option

This Option establishes a baseline against which to evaluate the proposed Project. The No-Build Option is a scenario in which the proposed bypass Project is not built. Significant improvements to the existing freight railroad infrastructure would still be needed. Capital investments and ongoing operating and maintenance (O&M) costs would continue to accrue to the railroads even if the Project is not built. For example, some track improvements to handle increased traffic along the Front Range would be required under the No-Build Option, but not with the Build Option.

The Build Option

The Build Option involves a major relocation of through-freight train traffic east of the Front Range urban corridor, plus additional infrastructure improvements and/or relocations of rail yards and intermodal facilities. There are benefits and costs for each of these undertakings. Some of the public benefits associated with the Build Option are:

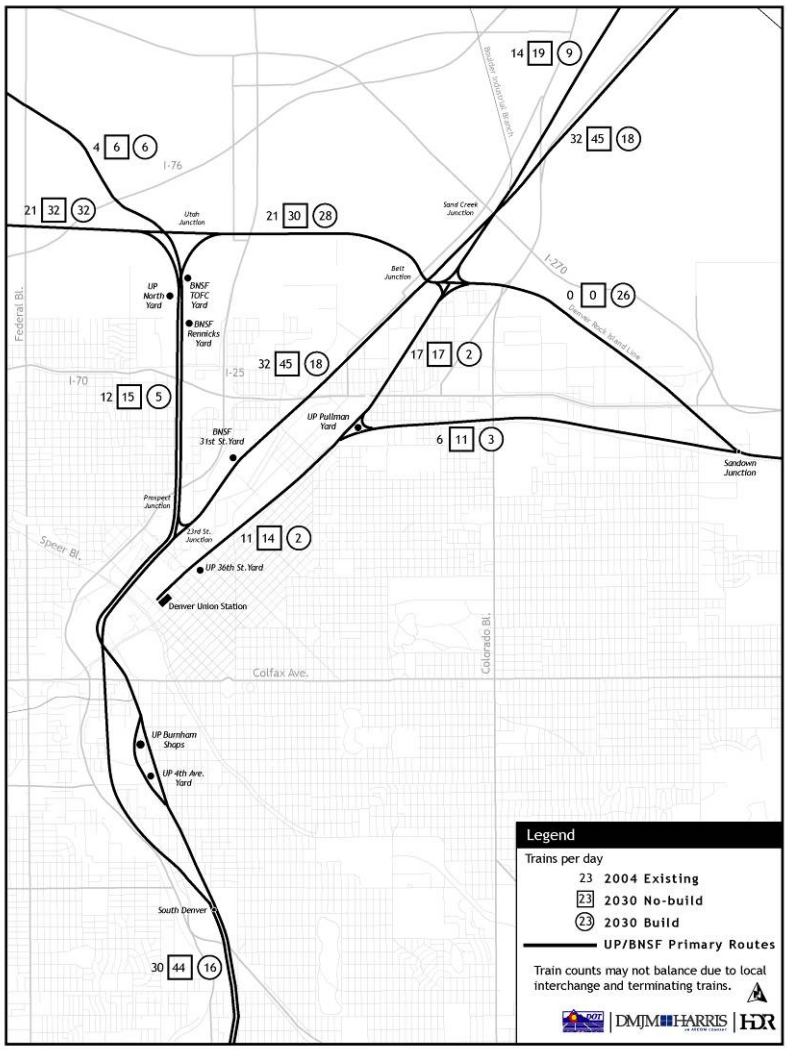
- Reduced auto, truck, and emergency vehicle delays at grade crossings.
- Improved air quality and reduced noise and vibration in built-up metro areas. Less populated areas may experience reduced air quality and more noise and vibration.
- Statewide economic development, jobs creation, and urban redevelopment opportunities.
- Reduced train-vehicle accidents.
- Alternate routing to reduce terrorist and hazardous materials risk and system-wide delays.
- Future passenger rail facilitation.

No-Build Option	Build Option
No new track construction	New track construction
Required O&M	Track improvements in addition to O&M
Freight terminals remain "as is", with O&M	Relocated freight terminals
Improvements to road/grade crossings	Improvements to road/grade crossings
Freight continues to pass directly through major Front Range cities	Most through-freight bypasses major Front Range cities

The Study Focus

The Study focused on reviewing available data and collecting or projecting a wide variety of additional data on railroad operations to perform a benefit to cost analysis. Most critical to data collection are the trains per day for both the Build and No-Build Options now (2004) and in the future (2030). These numbers are shown on the Denver and Colorado maps below.

Number of trains per day - Denver



Of particular interest to many is the effects this Project might have on at-grade crossings. On average one at-grade crossing is upgraded to a grade separated crossing each year. Many of these grade separations, avoided by the Build Option, are in the Denver metro area, where construction is expensive and very disruptive to traffic flows – a cost of the No-Build Option.

To accurately evaluate the Build and No-Build Options, an extensive review of past and ongoing railroad-related studies around the country and existing documents and data was conducted. Of particular interest were the Bridging *the Valley Transportation Study* and the *Chicago Regional Environmental and Transportation Efficiency (CREATE)* Project, both of which are public-private partnerships, much like the proposed Project. Both studies provided valuable insight to public-private partnerships, study methods and funding options.

Estimated Project Costs

The Study estimated Project costs and considered three cost scenarios for the Build Option: Low, Mid, and High-range. The Mid-range scenario is based on cost data provided by the railroads and adjusted by the Study Team to account for the scope of the Projects Build Option. The Low-range Scenario was derived by reducing (by 10%) the estimated Project costs of the Mid-range Scenario values. The High Scenario was derived by increasing (by 30%) the Mid-range Scenario values. The evaluations and recommendations in this Study are based on the Mid-range Scenario.

Project Capital Costs
(2004 dollars in billions)

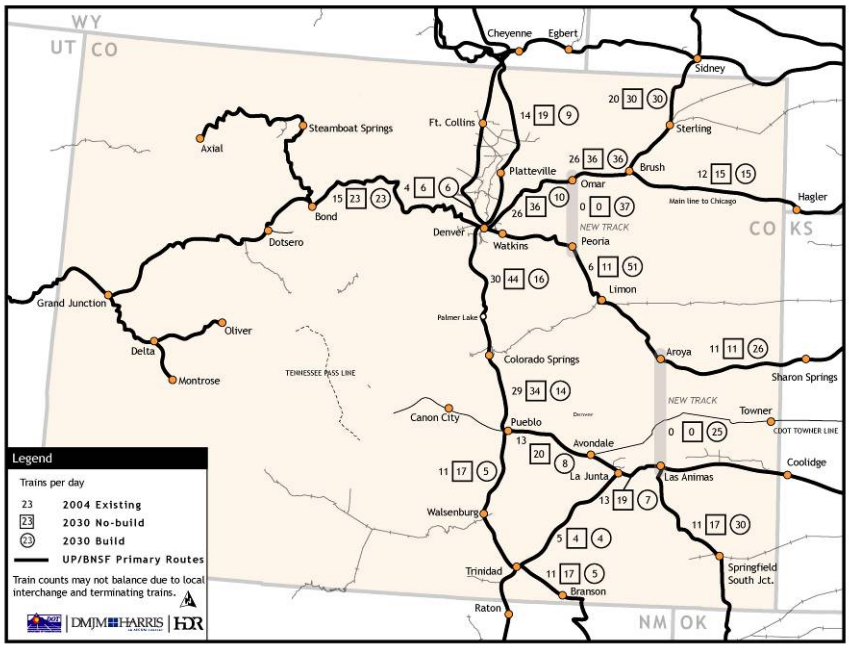
Low Scenario	Mid Scenario	High Scenario
$1.05	$1.17	$1.52

The estimated cost for the Build Option under the Mid-range Scenario is $1.17 billion. The Study assumes the Project would be developed over the four-year period from 2006 through 2009, with operations beginning in 2010. The table above summarizes the Project cost estimates for the Low, Mid and High-range Scenarios.

Project Benefits

Primary Benefit Classifications are transportation benefits, economic development and land use benefits, safety and security benefits,

Number of trains per day - Colorado



environmental benefits, quality of life benefits, and passenger rail facilitation benefits. Secondary Benefit Classifications are statewide job creation or "expanded" benefits, and additional railroad project and freight carrier benefits.

Given the high level of uncertainty associated with many of these benefits, a range of potential benefits and costs were studied, and three benefits to cost Scenarios were developed, as with the Project Costs. These are the Low, Mid- and High-range Scenarios.

For the private sector, benefits were projected based on the additional profit generated by the net increase in economic development afforded by the Build Option.

For the public sector, benefits were projected based on reductions in travel time, increased safety, improved air quality, increases in property values, improved quality of life, increased job opportunities, and increased tax revenues.

Summary of Total Project Benefits (Direct and Indirect) by Scenario*

	Low Scenario	Mid-range Scenario	High Scenario
Total Benefits	$2.35	$5.17	$16.34

* Net Present Value (NPV) in Billions

Results

This analysis demonstrated that the level of Project benefits exceeds the estimated costs for the Project. Excluding indirect benefits, the direct benefits to the private and public sectors would be about twice the cost of the Project. Significant public indirect benefits at the state level are likely to include maintaining or enhancing Colorado's quality of life, image, and economic attractiveness.

The results of the Mid-range Scenario analyses show a total direct benefit to the public and private sectors of about $2.3 billion (in 2004 dollars) over the period 2004 through 2030. This is equivalent to about $129 million per year.

Mid-Range Project Benefits Summary

	Direct Public Benefits	Indirect Public Benefits	Total Public Benefits
Benefits in Billions	$2.30	$2.86	$5.17
Job Creation	0	5,966	5,966
Benefit/Cost Ratio	2:1	2.4:1	4.4:1

Funding and Financing Strategies

Case studies of similar mega-projects demonstrate that a wide variety of traditional and innovative funding and financing arrangements are available to expeditiously move major rail infrastructure projects from concept to construction. The innovative approaches being used across the country to leverage resources and expedite important transportation projects include:

- Using public-private partnerships to balance the risks and funding responsibilities of private and public sector sponsors.
- Applying the Design-Build approach to project delivery to assure project completion within budget and schedule requirements.
- Using innovative financing strategies that combine grant, bond, and in-kind funding resources.

While debt financing raises the total costs of major infrastructure projects over their expected life-cycle, project sponsors are able to realize benefits much sooner and at potentially lower life-cycle costs than when using traditional approaches. The funding and financing method will have a significant impact on overall Project costs and completion date.

Summary and Recommendations

The Mid-range Scenario benefit to cost ratio for the estimated direct benefits is 2:1. When indirect benefits are included the ratio increases to 4.4:1. At a minimum, the estimated return for each construction dollar spent is two dollars. This return is much greater when the additional construction, supporting, and ancillary jobs are added. In addition, governments at all levels will see additional tax revenues. Many Colorado citizens will see qualitative improvements in their surroundings and lifestyles as significant through-freight traffic shifts out of the Front Range urban corridor, reducing noise, pollution, and unsightly facilities.

The No-Build Option is certainly less expensive than the Build Option, but the economic development benefits, jobs creation, increased tax revenues, and the large benefits to quality of life would not occur.

Under any scenario studied, there seems to be more than sufficient benefit accruing to the citizens of Colorado to warrant the investment of public dollars in the proposed Project.

Resources for a project like this are scarce, and numerous projects compete for these dollars. It is likely that a public-private partnership would be needed to fund the proposed Project, using debt financing in proportion to each sector's future benefits and funding responsibilities. While debt financing can add as much as 50% to the cost of a construction project, sponsors are more quickly able to realize project benefits than with traditional funding approaches.

Many environmental studies are required if federal funding is sought for any part of the proposed Project. These are a significant effort, best begun as soon as possible. Project beneficiaries must agree to a funding and financing arrangement as soon as possible, which may require additional studies for validation of benefits and costs to improve stakeholder confidence in the feasibility and value of the proposed Project.

When evaluating whether to proceed with further development of the Project, careful consideration should be given to the beneficial role the Project could play in:

- Promoting Colorado's economic vitality.
- Providing greater mobility and accessibility for both freight and passenger travel in Colorado.
- Improving air quality along the Front Range.
- Preserving Colorado's quality of life.
- Enhancing Colorado's competitive position within the region.

At this stage of the proposed Project, it is too early to develop actual funding and financing combinations for the Project. This should be done when Project sponsors have indicated their level of interest and the underlying estimates of Project benefits and costs have been analyzed in more detail. At that point, Project sponsors might consider one or more of the funding sources and financing strategies noted earlier for crafting an adequate financial plan for the Project. Should the Project development process proceed, the Project funding and financing plan should be tailored to take into consideration the capabilities, constraints, and interests of each potential Project sponsor and stakeholder. As this Project evolves, changes in the economic outlook for the nation, the region, and Colorado will play key roles in determining whether the Project can attain the needed support and funding to move forward.