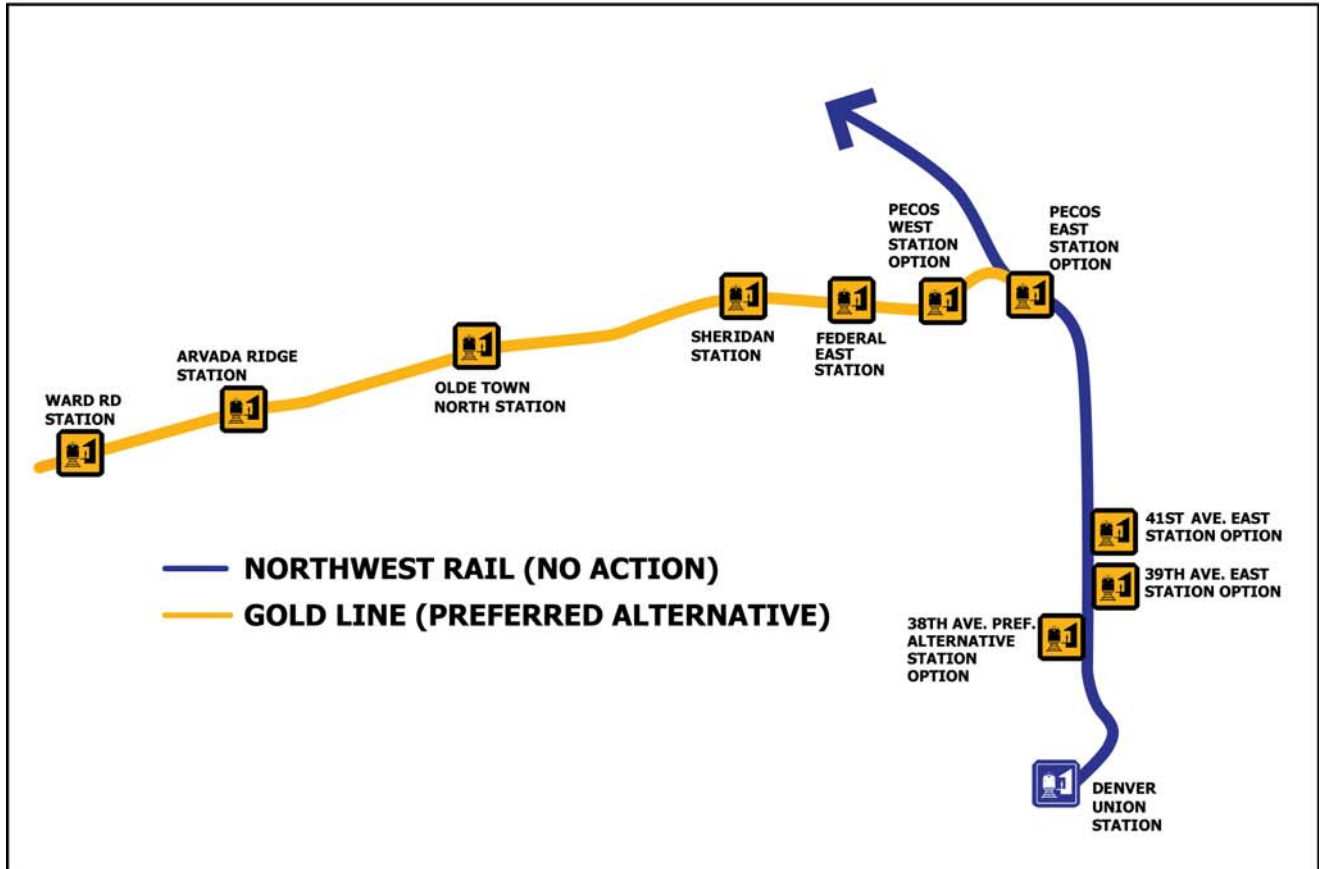




PROJECT ELEMENTS IN THE NORTHWEST RAIL (NO ACTION) AND GOLD LINE (PREFERRED ALTERNATIVE), DUS TO PECOS STREET



Project Element - Shared Section	Northwest Rail (No Action)	Gold Line (Preferred Alternative)
Trackway	✓	
Structures: South Platte River, 38th Avenue, Jersey Cutoff, and Utah Junction	✓	
Electrification: Catenary and Electric Substation		✓
38th Avenue Station Options: 38th Avenue, 39th Avenue East, and 41st Avenue East		✓
Pecos Station Options: Pecos East and Pecos West		✓
Right-of-way for Alignment	✓	
Right-of-way for Stations		✓

Source: Gold Line Team, 2008

5.0 Evaluation of Alternatives

5.1 Introduction

This chapter presents a comparative evaluation of the final alternatives carried forward in the Gold Line DEIS. The intent of this evaluation is to demonstrate the relative effectiveness of the recommended Preferred Alternative compared with the No Action and TSM Alternatives in meeting the project's stated Purpose and Need statement and other evaluation measures. Most of the information in this chapter is derived from materials presented in previous chapters and provides the basis for decision-makers and the public to assess the relative benefits, costs, and environmental consequences of the Preferred Alternative against the stated goals and objectives of the project.

This analysis is focused on four areas:

- Performance in satisfying Purpose and Need
- Tradeoff analysis: Comparative benefits and environmental effects
- Irreversible and irretrievable commitments of resources
- Financial feasibility

In addition, the FTA has established the New Starts program to evaluate and rate candidate projects for federal funding¹. The New Starts program includes a comprehensive planning and project development process that agencies must follow when seeking federal funding. RTD currently intends to seek New Starts funding for the Gold Line project. This program is described in Section 5.4, New Starts Evaluation and Rating.

5.2 National Environmental Policy Act Evaluation

5.2.1 Performance in Satisfying Purpose and Need

The Purpose and Need was used to guide the development of alternatives and define the evaluation criteria for comparing and selecting alternatives during the alternatives evaluation phase of this project. The alternative that best met the Purpose and Need, as well as the supporting goals and objectives, was selected as the Preferred Alternative to meet 2030 travel demand in the Gold Line study area. The Preferred Alternative has been supported by the RTD Board of Directors, the public, and other stakeholders.

Table 5-1 summarizes the Preferred Alternative's fulfillment of the Purpose and Need Statement.

¹ FTA Headquarters has not reviewed or approved any of the data in the DEIS related to either the Proposed Alternative or the TSM Alternative.

TABLE 5-1
Preferred Alternative Fulfillment of Purpose and Need Statement¹

Criterion	Description
Purpose	
Implement fixed-guideway transit within the Gold Line study area between DUS and Ward Road in Wheat Ridge	The Preferred Alternative provides for EMU fixed-guideway transit service in the study corridor between DUS and Ward Road.
Need	
Mobility Improvements <ul style="list-style-type: none"> • Improved travel times • Provide mobility options • Improve regional transit and connectivity 	<ul style="list-style-type: none"> • Provides reliable travel time of 19 minutes, compared with 27 minutes for single-occupant automobiles under the No Action Alternative and 27 minutes for buses in the TSM Alternative. • Provides multi-modal options for travelers in the study area. • Provides access to other parts of the region through rail and bus connections at DUS and connections to the Northwest Rail line at 2 proposed stations (38th Avenue Station and potentially the Pecos East Station).
Serve both traditional and new transit users	<ul style="list-style-type: none"> • Provides service to 2,577 traditional transit-riders and 5,547 minority persons and service to 4,500 new riders system-wide, compared with 900 for the TSM Alternative.
Provide environmental benefits to the study area and region	<ul style="list-style-type: none"> • Provides reductions in VMT and corresponding reductions in greenhouse gases. Encourages compact growth through the provision of infrastructure that is supportive of TOD.
Cost-effective and affordable under FasTracks	<ul style="list-style-type: none"> • Meets the current revised FasTracks Plan budget adopted by the RTD Board in 2007. Provides sufficient cost-effectiveness for the project to be considered fundable under FTA's Penta-P.
Meet the voter mandate of FasTracks	<ul style="list-style-type: none"> • Provides a practical transit recommendation using a vehicle technology that is accepted in other parts of the United States, and uses an existing freight ROW. There are no known major impediments to the implementation of the project.

Source: Gold Line Team, 2007

¹ FTA Headquarters has not reviewed or approved any of the data in the DEIS related to either the Proposed Alternative or the TSM Alternative.

5.2.2 Trade-Off Analysis: Comparative Benefits and Environmental Effects

Tables 5-2 and 5-3 show the relative benefits and impacts of the Preferred Alternative compared with the No Action and TSM Alternatives.

TABLE 5-2
Key Performance Discriminators¹ (Millions \$)

Criterion	No Action Alternative	TSM Alternative	Preferred Alternative
Cost (Millions \$)	\$15.2 (2015) for bus capital costs \$0.8 (2030) for bus capital costs Total 2030 capital cost of \$16.0 \$16.7 (2015) for bus annual operating and maintenance costs \$17.8 (2030) for bus annual operating and maintenance costs Northwest Rail – Unknown Highway - Unknown	Parking – \$1.4 (234 parking spaces) Bus Ramp at I-70/Ward Road (2015) TBD \$19.2 (2015) for bus capital cost \$1.2 (2030) for bus capital cost Total 2030 capital cost of TBD \$18.4 (2015) for bus annual operating and maintenance costs \$19.5 (2030) for bus annual operating and maintenance costs	\$552.5 (2015) capital cost \$55.7 (2030 with added parking) capital cost \$11.2 (2015) for bus capital cost (included in the \$552.5 above) \$0.8 (2030) for bus capital cost Total 2030 capital cost of \$609.0 \$9.5 (2015 and 2030) for EMU annual operating and maintenance costs \$ 15.6 (2015) for bus annual operating and maintenance cost \$17.1 (2030) for bus annual operating and maintenance cost
Travel time (2030)	27 minutes	27 minutes	19 minutes
Rail Ridership	NA	NA	20,100 (average weekday, 2030)
Regional VMT ²	103,444,295	103,434,262	103,435,490
Change in regional VMT over No Action Alternative	NA	-10,033	-8,805
Study Area VMT	6,392,205	6,387,191	6,377,705
Change in study area VMT over No Action Alternative	NA	-5,014	-14,500
Regional daily transit boardings	432,000	432,900	436,500
Change in regional daily transit ridership over No Action Alternative	NA	+900	+4,500
Regional VHT ²	3,392,199	3,392,153	3,395,025
Change in regional VHT over No Action Alternative	NA	-46	+2,826 ³

Criterion	No Action Alternative	TSM Alternative	Preferred Alternative
Cost share with Northwest Rail	No	No	Yes
Employment 0.5 mile from stations (2030)	6,067 ⁴	6,067 ⁵	17,411
Population 0.5 mile from stations (2030)	7,017 ⁴	7,017 ⁵	18,638

Source: Gold Line Team, 2007

¹ FTA Headquarters has not reviewed or approved any of the data in the DEIS related to either the Proposed Alternative or the TSM Alternative.

² VMT and VHT are reported as an average weekday in 2030.

³ The VHT for the Preferred Alternative is better than the No Action and the TSM Alternatives if there are no shared stations at 38th Avenue and Pecos East with Northwest Rail (the FasTracks corridor that goes from DUS to Longmont). With shared Gold Line and Northwest Rail stations, the travel time increases for Northwest Rail passengers resulting in this increase.

⁴ The No Action Alternative assumes current pnRs at Olde Town and Ward Road.

⁵ The TSM Alternative assumes all of the same pnRs as in the No Action Alternative with an increase in parking.

TABLE 5-3
Key Environmental Impact Discriminators

Criterion	No Action Alternative	TSM Alternative	Preferred Alternative
Construction Impacts	Some anticipated	Some anticipated	Approximately 95 acres
Property Acquisition	Some anticipated	None anticipated	12 to 23 Commercial
Consistent with TOD plans	No	No	Yes
Traffic Impacts	Some anticipated	Some anticipated	Low
Regional pollutant emissions (annual in tons)			
CO	318,259	318,245	318,231
NO _x	10,760	10,870	10,759
VOC	15,363	15,367	15,362
PM ₁₀	863	867	863
Parkland Impacts	Acquisition of approximately 1/4 acre of parkland	None anticipated	No acquisitions Three temporary impacts during construction to trail crossings
Historic/Archaeological Impacts	Potentially one historic site	None anticipated	One historic structure (This impact only occurs if the 39th Avenue East station option is selected under the East Direct Design Option)
Public and Agency Support	Low	Low	High

Source: Gold Line Team, 2007

5.2.3 Irreversible and Irretrievable Commitment of Resources

The Preferred, No Action, and TSM Alternatives may affect environmental resources that are both regulated and not regulated at the federal, state, or local level. Such impacts can include the consumption of natural resources such as fossil fuels and raw materials. In most cases, such impacts cannot be quantified, and cannot be avoided entirely. It is recognized that these impacts should be minimized to the extent practicable.

Sustainable practices incorporated into the project planning, construction, and maintenance can minimize impacts. RTD encourages that sustainable practices be implemented to reduce the impact of transit projects on environmental resources. This encouragement, identified in an adopted RTD Board policy, includes a commitment to allow innovative programs and flexibility in project planning, construction, and maintenance for the use of sustainable processes and materials. This may include such concepts as natural resource conservation, waste minimization, materials reuse, minimal use of native virgin materials, conservation and efficient use of water and energy, air pollution prevention, preference for “green” purchasing including recycled and minimally-processed items, and preference for locally-available resources. RTD also encourages the identification and incorporation of proven materials that are long lasting and require less maintenance when use of such materials is consistent with meeting its primary obligations for providing a safe and efficient transportation system. Alternative materials and practices can and must meet the performance goals of the construction specifications, demonstrate legitimate expenditure of public funds, and comply with all other applicable laws and regulations.

The use of nonrenewable resources during the construction and operational phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely.

Table 5-4 displays the permanent and short-term commitment of resources and long-term productivity enhancements expected with implementation of the Preferred Alternative.

TABLE 5-4
Commitment of Resources and Productivity Associated with the Preferred Alternative

Commitment of Resources	Short-Term Commitment of Resources	Long-Term Productivity Enhancements
Commitment of labor and energy (this includes the consumption of fossil fuels associated with the use of construction equipment)	Disruption of neighborhoods; increased noise and dust; and visual degradation during construction.	Improved mobility and safety for travelers in the corridor.
Use of materials (this includes aggregate, cement, and petroleum products, and metals for the rails and catenary)	Relocation of 12 to 23 commercial properties.	Modest improvements in air quality.
Commitment of energy during the operation of any transit alternative	Loss of soil due to erosion during construction.	Improved economic conditions in the study area.
Commitment of additional land for ROW acquisition primarily at stations	Temporary degradation of air quality and water quality due to construction.	Access to public transit for 5,547 minority persons and 2,577 traditional transit users within 0.5 mile of stations.
	Loss of 0.15 to 0.63 acre of jurisdictional wetlands (would be replaced). Loss of 1.17 acres of non-jurisdictional wetlands (would be mitigated).	Savings in travel time and increased worker productivity.
	Loss of trees and other natural cover during construction.	Improvements in land use planning and control of urban sprawl due to increases in densities around transit stations.

Source: Gold Line Team, 2007

5.3 Financial Feasibility

RTD has a \$6.1-billion FasTracks Plan designed to improve mobility and travel options in the metropolitan Denver region within a 12-year period. The FasTracks Plan responds to the projected increase in regional population to 3.69 million in 2030 from 2.7 million in 2006.

The ability to implement the FasTracks plan depends on a variety of financial assumptions and projections that have been developed using the best available current estimates of costs, reasonably anticipated federal funding based on current federal law and regulations, and revenues from other sources including RTD sales tax and fare collections. Over the anticipated remaining build-out of 8 years, specific cost items, federal and other contributions, and RTD revenues may vary. Based on the extensive analysis behind the financial assumptions used, RTD expects to deliver the major transit corridors and related improvements within the time frames set forth.

Under the FasTracks Plan, 28 miles of light rail, 94 miles of commuter rail, and 18 miles of BRT improvements will be developed between 2005 and 2017. Rubber-tire service levels (bus and Americans with Disabilities Act services) will increase by a minimum of 1.0 percent per year from 2008 to 2020 and a minimum of 1.5 percent per year from 2021 to 2035. Overall, 2035 rubber-tire service hours will increase by 50 percent over 2007 service levels.

The FasTracks Plan is financed in part through a 0.4-percent increase in the regional sales and use tax approved by voters in November of 2004. This increase brought the total transit tax rate in the District to 1 percent (1 cent on the dollar), comparable to other areas in the western United States with urban rail systems.

As shown in Table 5-5, the FasTracks Plan for the Gold Line assumes \$27.5 million from sales and use taxes, \$82.2 million from bond proceeds, and \$303.8 from an FTA Full Funding Grant Agreement. Approximately \$13.7 million would be provided by local contributions and \$125.3 million from a private concessionaire as discussed below. The addition of 3,140 parking spaces by 2030 is estimated at \$55.7 million and \$0.8 million for 2030 bus additions in the Gold Line corridor are assumed to be funded by RTD using proceeds from sales and use taxes.

TABLE 5-5
Anticipated Capital Funding Sources for FasTracks

Gold Line Capital Sources	Estimated Dollar Value 2015 and 2030 in Millions
Sales and Use Tax	\$27.5
Revenue Bond Proceeds	\$82.2
Federal New Starts (assumed at 55 percent)	\$303.8
Local Contributions	\$13.7
Potential Concessionaire Contribution	\$125.3
Total 2015 Cost	\$552.5
Sales and Use Tax (for 2030 Parking and buses) ¹	\$56.5
Total 2030 Cost	\$609.0

Source: RTD Adopted Financial Plan, 2007

¹ Funding for 2030 parking and buses are assumed to be funded by RTD separately.

The Gold Line has been accepted by FTA into the Penta-P along with the East Corridor and the CRMF (see Appendix H). Together, these elements comprise approximately \$2.0 billion of the total \$6.1 billion FasTracks program. Potential benefits from a Penta-P include savings in construction, operations and maintenance costs, accelerated project delivery, and

maximization of related project revenues. Evidence from other public-private partnerships nationally and internationally suggest that public-private partnerships can result in a 10 to 25 percent reduction in costs. The Plan assumes that Penta-P project costs not covered by RTD, federal, or local contributions would be financed by the private partner with taxable debt and equity. The FasTracks Plan assumes that the private partner will bridge the timing gap between expenditures and receipt of federal revenues from a Full Funding Grant Agreement during project construction.

The FasTracks Plan assumes that RTD would enter into a 40 or 50-year Design-Build-Finance-Operate-Maintain lease agreement with the Penta-P concessionaire, over which time the RTD will make periodic availability payments. Availability payments are similar to lease payments in that both are subject to annual appropriation, but are different as availability payments include all costs to operate and maintain the line.

The Gold Line project is planned to be financed within the FasTracks Plan as described above. The capital cost of the Gold Line project as well as the other FasTracks projects is shown on Table 5-6.

TABLE 5-6
Capital Costs by FasTracks Project (Millions \$)

Corridor	April 2004	September 2007 ¹
West Corridor ²	\$511.8	\$624.3
Northwest Rail Corridor	\$565.1	\$684.4
Gold Line	\$463.5	\$552.5
I-225 Corridor	\$442.3	\$619.6
East Corridor	\$702.1	\$1,141.6
North Metro Corridor	\$420.0	\$637.2
Central Corridor Extension	\$68.7	\$65.9
Southeast Corridor Extension	\$136.8	\$164.7
Southwest Corridor Extension	\$134.9	\$178.5
US 36 BRT – Phase 1	\$22.2	\$21.6
US 36 BRT – Phase 2	\$204.1	\$214.0
Denver Union Station ³	\$268.4	\$208.8
Light Rail Maintenance Facility	\$100.4	\$102.4
Commuter Rail Maintenance Facility	\$80.4	\$203.4
Bus Maintenance Facility	\$71.7	\$74.6
Other FasTracks Project Costs	\$524.7	\$571.5
Total	\$4,717.1	\$6,065.1

¹ Current capital cost estimates are inflated at Consumer Price Index (average of 3.4 percent per year); actual increases may be different.

² West Corridor costs do not include \$11 million in PE/EIS costs spent prior to the start of the FasTracks program.

³ Denver Union Station costs in the September 2007 plan includes only RTD locally-funded contributions to the joint project. CDOT and other federal sources are expected to contribute an additional \$68.3 million to the project, for total current project funding of \$277.1 million.

5.4 New Starts Evaluation and Rating

5.4.1 Background

RTD is planning to pursue New Starts (Section 5309) funding for the Preferred Alternative. The Section 5309 New Starts program is the federal government's primary program for providing financial support to locally planned, implemented and operated fixed-guideway transit capital investments. This section briefly describes the New Starts process and associated methods that FTA uses to evaluate and rate fixed-guideway transit projects seeking federal funding. The current criteria ratings for the Gold Line project are not yet available.

Each year, FTA submits its *Annual Report on New Starts* to Congress as a companion document to the annual budget submitted by the President. The report provides recommendations for the allocation of New Starts funds under Section 5309 of Title 49 of the USC.

FTA uses two major categories of rating a project, which are captured in the overall Summary Rating used to determine whether or not a project is funded. The two major categories include Project Justification and a Financial Rating. The Project Justification criteria are as follows:

- Mobility improvements
- Environmental benefits
- Cost effectiveness including operating efficiencies
- Transit-supportive existing land use, policies, and future patterns
- Other factors including economic development

The Financial Rating includes the local financial commitment and an assessment of the capital and operating financial plan for the project.

Some of these evaluation criteria can be found in Tables 5-1 to 5-3 above. The remainder of the New Starts evaluation criteria would be provided as the project progresses through the project development process.

FTA reviews the Project Justification and Financial Rating for each candidate project and assigns a rating for each criterion. For some of the project justification criteria, the proposed project is rated against a "Baseline Alternative," which is sometimes the same as the TSM Alternative. For the Gold Line DEIS, the Baseline and TSM Alternatives are one and the same and so this document references the TSM Alternative².

The Baseline Alternative for purposes of the New Starts program consists of improvements to the transit system that are relatively low in cost and the "best that can be done" to improve transit without a major capital investment in infrastructure.

A candidate project is given an overall rating of "High, Medium-High, Medium, Medium-Low or Low" as directed by SAFETEA-LU. The overall rating is based on separate ratings assigned by FTA to each of the Project Justification and Financial Rating criteria described above.

Project evaluation is an on-going process. FTA evaluation and rating occurs annually in support of budget recommendations presented in the *Annual Report on New Starts* and

² FTA Headquarters has not reviewed or approved any of the data in the DEIS related to either the Proposed Alternative or the TSM Alternative.

when projects request FTA approval to enter into preliminary engineering or final design. Consequently, as proposed New Starts projects proceed through the project development process, information concerning costs, benefits, and impacts is refined and the ratings updated to reflect new information.

5.4.2 Current Ratings for Gold Line Preferred Alternative

The New Starts ratings are not yet available for the Gold Line project. Cost effectiveness measures will be provided in the Final EIS.