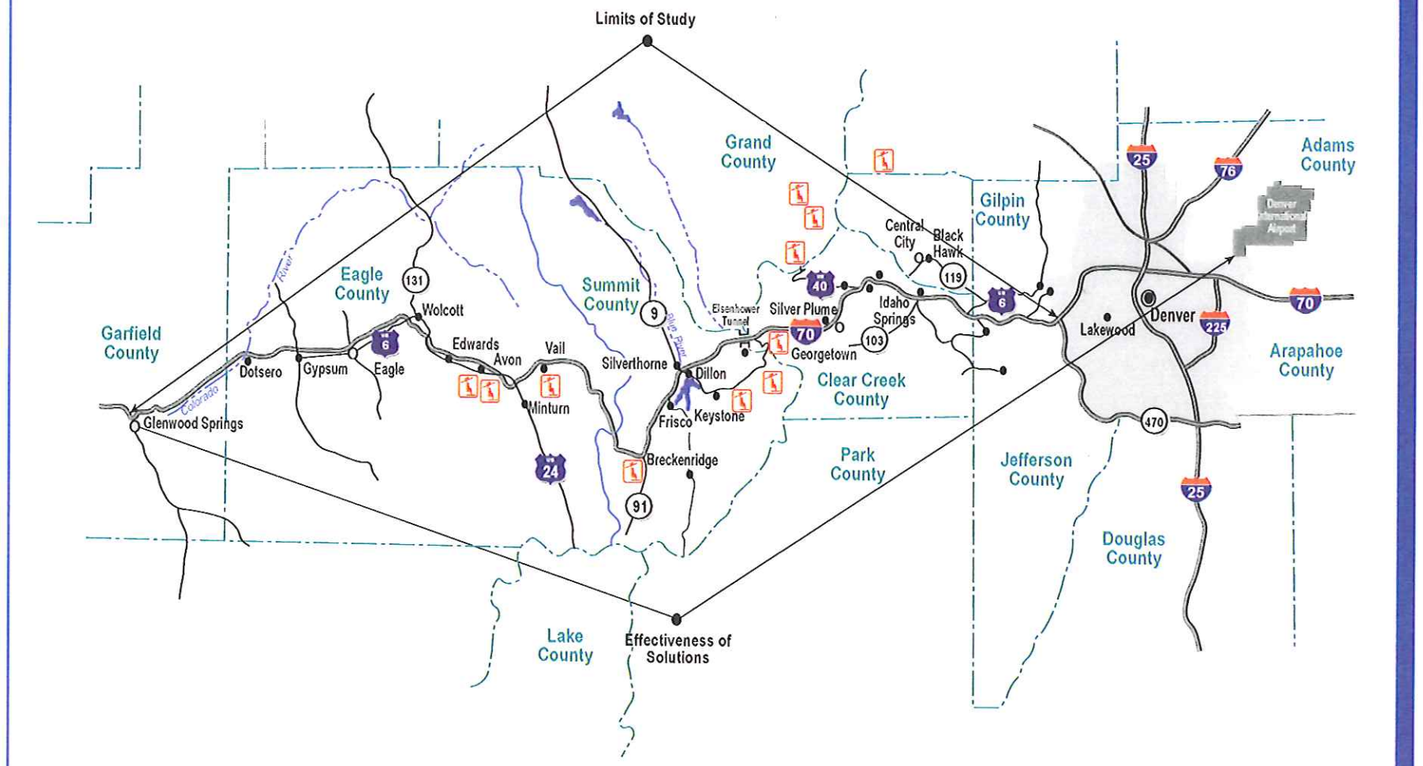
I-70 Mountain Corridor Major Investment Study

Final Report



Prepared for

Colorado Department of Transportation

Prepared By

CH2MHILL

in association with Manuel Padron and Associates
Felsburg Holt & Ullevig
L.S. Gallegos and Associates
Intermountain Partners and Pat Noyes & Associates

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List of Acronyms

A	Aviation
AADT	Annual Average Daily Traffic
A/D	acceleration/deceleration
ADT	Average Daily Traffic
AR	alternate routes
ASE	Aspen-Pitkin County Airport
ATR	automatic traffic recorder
Btu	British thermal unit
CAST	Colorado Association of Ski Towns
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CEC	Colorado Environmental Coalition
CIFGA	Colorado Intermountain Fixed Guideway Authority
CMCA	Colorado Motor Carriers Association
CORSIM	Corridor Simulation Model
COS	Colorado Springs Airport
CWC	Citizens' Workshop Committee
dB	decibel
DHV	Design Hour Volume
DIA	Denver International Airport
DMU	Diesel Multiple Unit
DRCOG	Denver Regional Council of Governments
DUT	Denver Union Terminal
EA	environmental assessment
EB	eastbound
ECRTA	Eagle County Regional Transportation Authority
EGE	Eagle County Regional Airport
EIS	Environmental Impact Statement
Eisenhower Tunnel	Eisenhower-Johnson Tunnels
EJ	Environmental Justice
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
FAST	Functional Analysis Systems Technique
FG	fixed-guideway
FGT	fixed guideway transit
FHWA	Federal Highway Administration
GIS	Geographic Information System
GJT	Grand Junction-Walker Field
GRT	Ground rapid transit
HCM	Highway Capacity Manual
HDN	Yampa Valley Regional Airport
HOT	High Occupancy Toll
HOV	high occupancy vehicle
HSGT	High-speed ground transportation
HTRW	hazardous, toxic, radioactive waste
HUTF	Highway Users Trust Fund
HY	Highway Widening
ISTEA	Intermodal Surface Transportation Efficiency Act
ITPR	Intermountain Transportation Planning Region
ITS	Intelligent Transportation System
kWh	kilowatt hour
lf	linear feet
LOS	level of service
LRT	light rail transit
MP	mile post
MIS	Major Investment Study
mph	miles per hour
MTJ	Montrose Regional Airport
MVM	million vehicle-miles
NB	No-Build
NEPA	National Environmental Policy Act
NPIAS	National Plan of Integrated Airport Systems
O&M	Operations and Maintenance
OSC	Oversight Committee
PRT	Personal Rail Transit
RFTA	Roaring Fork Transit Agency
ROW	Right-of-Way
RTD	Regional Transportation District
RV	recreational vehicle
SEL	Sound Exposure Level
SHI	selected highway improvements
STIP	State Transportation Improvement Program
STOL	short takeoff and landing
T&E	threatened and endangered
TAZ	traffic analysis zone
TDM	Travel Demand Management
TDP	transportation development plan
TGV	Train-a-Grande Vitesse
TSM	Transportation Systems Management
ULTRA	Urban light transit
USC	United States Code
USDOT	U.S. Department of Transportation
Vision	I-70 MIS Recommended Vision Strategy
VMT	vehicle miles traveled
VTC	Vail Transportation Center
WB	westbound

Executive Summary

Introduction

The I-70 Mountain Corridor Major Investment Study (MIS) was commissioned by the Colorado Department of Transportation (CDOT) to identify the short- and long-term mobility solutions for I-70 from Denver International Airport (DIA) to Glenwood Springs. The 140-mile corridor[1] has many uses; it serves as a major east/west interstate route; a designated defense route; a freight route; the main access to the Colorado mountains; and the way to work, shopping, and school for many people.

This is a recreational corridor through small historic towns and provides access to many world renowned ski resorts. The corridor traverses many planning regions, 5 counties, and over 20 municipalities. The traffic problems vary from summer to winter, occur primarily on the weekends, and cause delays of over three hours on peak summer Sundays. With no transportation improvements, these delays will increase.

The corridor contains diverse interest groups, including organizations opposed to highway widening, as well as ski industry representatives who are concerned about access to ski resorts, one of the state's leading industries.

These unique conditions require a vision for the I-70 Mountain Corridor MIS built on a common mission and guiding principles.

From the beginning of the MIS, the idea emerged to plan the corridor improvements beyond the traditional 20-year horizon. This long-term futuristic approach to the corridor prompted important changes in the traditional planning method.

The goal of the MIS became to develop a 50-year vision that balances the competing interests. The longer time frame has both advantages and disadvantages. Over 50 years, technologies change, and, therefore, the I-70 MIS Recommended Vision Strategy (Vision) was not limited to existing technologies. Also, over 50 years, funding sources and funding legislation can change. Thus, the Vision includes looking at potential new funding sources and is not limited to funding through traditional public sources.

The uniqueness of this corridor necessitates a creative approach to stakeholder involvement. Through a series of workshops attended by interested parties, a Vision consensus was reached. The workshops provided a forum for diverse groups of concerned stakeholders to find a common ground. They came to respect each other's views and worked to build a solution that all could live with, the true meaning of consensus.

[1]The limits of the MIS study area extend 140 miles from the intersection of I-70/C-470 west to Glenwood Springs. However, the study impacts the 185-mile corridor from I-70/C-470 to DIA.

Growing Congestion on I-70

This consensus was built around the basic themes of maintaining quality of life and integrity for the communities adjacent to the I-70 corridor, and respecting that I-70 is the lifeline to resort communities.

Participants used the workshops to develop, design, and combine options into a strategy that supported their values. Through this process, a Vision for the corridor was developed, and a consensus was reached. Although not everyone's "best" or "preferred" plan, the Vision has the participants' support because it incorporates common goals and values.

Implementing the Vision remains a controversial issue. Because of the multi-modal elements, the magnitude of the strategy, and the multi-jurisdictional responsibility for implementing the many elements, no consensus has been reached on the implementation strategy. In the long run, this controversy will serve the I-70 Mountain Corridor well, as it will maintain the stakeholders' ongoing interest. Public debate should work toward developing a strategy that serves the needs of the corridor that will balance community, environmental, and fiscal criteria.

Even without consensus on an implementation strategy, the stakeholders have articulated their goals well. These goals include:

- Work aggressively toward travel behavior changes.
- Keep the highway open and operating safely.
- Implement the elements of transit in tandem with the highway elements.
- Aggressively pursue transit funding.
- Look for innovative mechanisms for funding transit, such as public/private partnerships.
- Implement transportation improvements that preserve rural character and protect the environment.

The I-70 Mountain Corridor presented unique challenges, and the MIS process resulted in a non-traditional solution. The I-70 Mountain Corridor MIS is a true vision of the future built on common goals.

Purpose

Need for Study

In 1988, the Colorado Department of Highways (now the Colorado Department of Transportation, CDOT) conducted a transportation study of the I-70 Mountain Corridor within Clear Creek, Summit, and Eagle counties. This segment of I-70 is in mountainous terrain, and the study area represents a significant portion of the recreational areas within the state. Through that study, CDOT forecasted dramatic increases in congestion and other significant mobility problems in the corridor over a 20-year period. Current traffic patterns and congestion on I-70 are consistent with the trends projected in the 1988 study. Currently, the problem is typically limited to congestion on 20 weekends per year, with the most severe congestion experienced in Clear Creek County, between the twin tunnels in Idaho Springs and U.S. 40, and the Eisenhower-Johnson Tunnels (Eisenhower Tunnel).

Continued high population growth and the attractiveness of the Colorado area for development have caused annual increases in traffic from 2 to 7 percent within the corridor. Based on the type of growth, annual travel demand forecasts suggest that traffic will continue to double every 11 to 35 years depending on the location along the corridor. Furthermore, the duration of congestion at critical locations is projected to increase nearly six-fold by 2020 during 30 weekends per year. For this reason, and because current operational, safety, and congestion problems demand prompt attention, CDOT initiated the I-70 MIS.

Background

Study Limits

As shown in Figure ES.1, the limits of the study extend 140 miles from the intersection of I-70/C-470 west to Glenwood Springs. Because DIA is a key corridor trip origin/destination, improvements considered for the I-70 Mountain Corridor should interface effectively through the Denver Metro area, and into Glenwood Springs, a 185-mile distance.

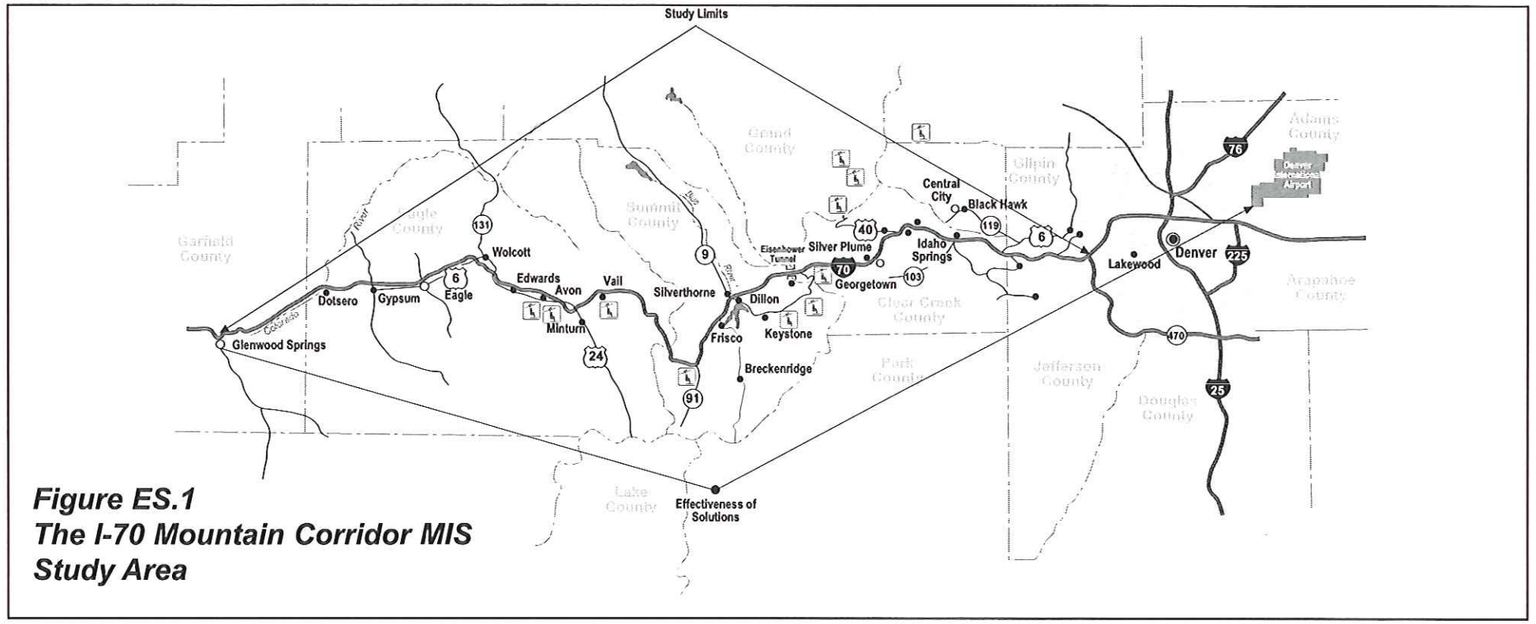


Figure ES.1
The I-70 Mountain Corridor MIS Study Area

The study area is unique in that it traverses a distance of 140 miles, encompassing three CDOT regions, two Transportation Planning regions, and numerous political subdivisions. Additionally, any construction of mobility improvements involves the challenges of steep grades of up to 6 percent, high altitude, and a sensitive natural environment.

Why an MIS Process Was Used

The MIS serves as a critical element of a metropolitan area's long-range planning process. Although the MIS process is intended for urban transportation problems, it was determined that the structure of the MIS process would serve the needs of the study for the following reasons:

- The MIS process is focused on multimodal solutions, including fixed and non-fixed guideway transit and highways, as well as measures that change both behavior and demand, all of which are applicable to the I-70 Mountain Corridor.
- An MIS contains information sufficient to measure and evaluate a range of investment options and to test public values, resulting in a regional consensus on the range of alternative strategies to be studied and the criteria used in the evaluation.
- The MIS process provides decision makers with improved information on the options available for addressing regional transportation problems before financial commitments are made.

How This Study is Different from a Traditional MIS

The I-70 Mountain Corridor MIS is different from a traditional MIS for at least five reasons. Each of the following issues should be considered when reading this report:

- First, CDOT adopted a goal to recommend a 50-year Vision for the corridor, recognizing that both 20-year and 50-year mobility issues needed to be addressed. This compares to a 20-year timeline for a traditional MIS.
- Second, due to the long-term perspective of the study, it was decided that whether or not a technology is a "proven technology" should not be used as an evaluation criterion for the Vision Strategy. The corridor stakeholders felt that it would not be reasonable to limit decision-making to current technologies, given the tremendous level of technological advances occurring today. Further, it was felt that the team should identify a technology that could be molded to the mountain environment, as opposed to modifying the environment to accept a technology.
- Third, due to the 50-year planning horizon, a budget for the Vision was not set. The Vision was developed without using cost as a screening or detailed evaluation criteria. Costs were developed for each element of the solution and presented at the workshop. When the Vision was completed, a total cost was calculated and evaluated against available funds from traditional funding sources. New revenue sources were examined and are presented in this report.
- Fourth, the I-70 Mountain Corridor is recreational and rural in character and covers 140 miles. The typical MIS corridor is urban and limited to 10 to 20 miles. The longer corridor increases the complexities of the environmental, institutional, technical, and financial analyses. This results in evaluations that in some cases are more conceptual than typically found in a traditional MIS.
- Fifth, it should also be noted that this document is not intended to serve as an Environmental Impact Statement (EIS). The environmental work included in this MIS provides a relative comparison of environmental consequences. A detailed EIS will be provided as a next step as discussed later in this section.

Process Overview

The decision process for the I-70 Mountain Corridor MIS was created to develop consensus among the involved stakeholders. As shown in Figure ES.2, the process was organized around three groups, including a Project Team, a Citizens' Workshop Committee (CWC), and an Oversight Committee (OSC), who collectively worked through all phases of the MIS.

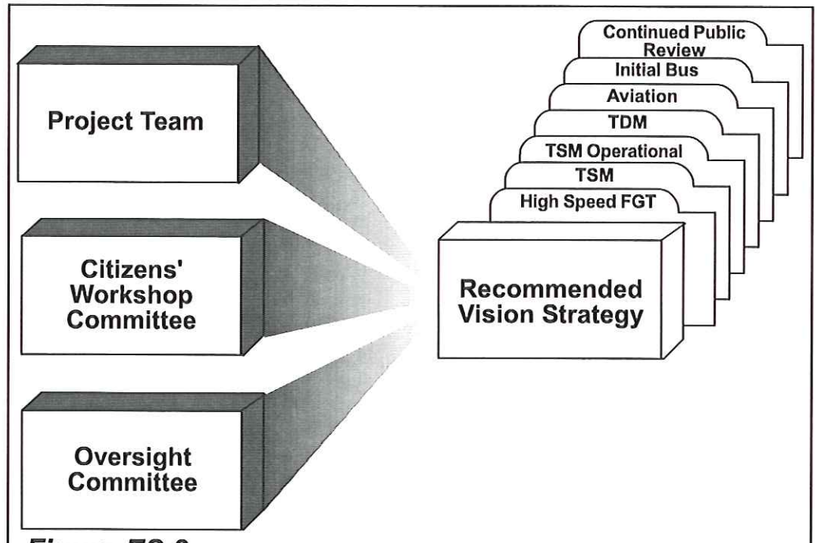


Figure ES.2
Project Organization for Consensus

The Project Team provided technical resources to the project. The CWC was charged with participating in the five workshops that were used to develop the Vision Strategy. The OSC was responsible for policy guidance and was charged with endorsing the ultimate Vision (or Recommended Strategy) for the I-70 Mountain Corridor.

OSC members included representatives of groups with responsibility for implementation of major and/or minor elements of any strategy that might emerge from the MIS. The group included elected officials of the counties in the I-70 corridor, representatives of cities and towns, the Denver Regional Council of Governments (DRCOG), the

Intermountain Transportation Planning Region (ITPR), Regional Transportation District (RTD), CDOT Regional Directors, Colorado Motor Carriers Association (CMCA), Colorado Ski Country USA, Colorado Environmental Coalition (CEC), the Federal Highway Administration (FHWA) District Director, Colorado Association of Ski Towns, and the U.S. Forest Service.

The project team included representatives from CDOT, DRCOG, ITPR, RTD, and the consultant team.

The CWC was formed on an expressed-interest basis. A mailing list of over 1,300 names was used to begin the process. These names included people who had shown interest in past projects within the I-70 corridor, and all were invited to attend the first and subsequent workshops. Attendance at one workshop entered a participant's name onto the workshop mailing list, thus making the participant a recipient of all-future invitations and information. A telephone hot line was also maintained, and interested parties could leave their name and mailing address on the hot line for inclusion on the workshop mailing list.

All members of the OSC and the project team were also encouraged to attend the workshops.

The foundation of the planning for the I-70 Mountain Corridor MIS included workshops and meetings at critical decision points. These meetings included five workshops and eight public open houses.

Each of the workshops was attended by over 100 people representing government agency staff, resource agencies, special interest groups, and the local residents. Public open houses were scheduled in the affected communities to obtain public input and to display various elements of the alternatives under evaluation.

Decision Steps

As shown in Figure ES.3, the study evaluated alternatives at the screening and detailed levels of analysis. The results of each step were presented to the CWC and OSC. These steps were designed for making decisions and choices throughout the study and for providing adequate information and criteria to the OSC, the project team, and the CWC.

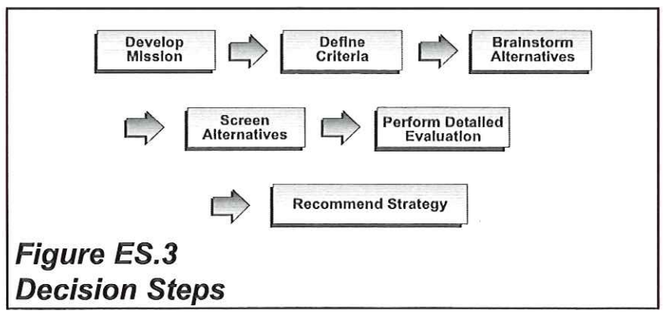


Figure ES.3
Decision Steps

Five workshops were conducted to highlight critical issues, formulate a project mission, develop evaluation criteria, brainstorm alternatives, screen alternatives, and develop a recommended strategy and vision for the future. Throughout the workshop process, guidance was provided through reinforcing the mission, restating the concerns, and clarifying the participants' intentions.

This section summarizes the decision process in each of the workshops and the conclusions of the workshop participants.

Workshop No. 1 - Develop Critical Issues and Project Mission

Summary of Decision Process

At the first workshop, critical project issues were identified, the bounds of the study were outlined, and a collective mission statement supported by "guiding principles" was developed.

The most cited critical issues developed in the workshop fell into four general categories: environmental impacts, community values, safety/mobility, and financing.

As a result of the critical issues definition, the workshop participants developed the Project Mission and a set of guiding principles.

Guidance from Workshop Participants

The mission of the I-70 Mountain Corridor Project is to improve safe movement of people and goods through short- and long-term solutions using the following four guiding principles:

- Deploy innovative technologies that minimize or eliminate the impacts on the natural and manmade environments.
- Preserve the rural character and community values of settlements located within the corridor.
- Provide a balance of economic development and employment opportunities for the corridor.
- Ensure that those who benefit the most from the improvements pay proportionately.

This mission served as the basis for developing and evaluating alternatives for solving mobility problems in the corridor.

The participants felt that a successful and implementable project must be compatible with the environment. There was a strong concern that degradation of the alpine environment would lower the quality of life and reduce the area's attraction for tourists. The selected solution will need to support the community goals for land use and development. The solution will need to address the impact of poor weather on traffic conditions.

It was also determined that cost and affordability should not be screening-level criteria. Those who benefit the most from the project should pay their fair share. The workshop participants decided to consider a longer planning period (50 years) and new technologies.

Workshop No. 2 - Develop Evaluation Criteria

Summary of Decision Process

The intent of the second workshop was to build on the results of the first workshop where critical issues, study scope boundaries, the project mission, and guiding principles had been developed. Participants broke into five groups, each under the direction of a facilitator and scribe.

Guidance from Workshop Participants

Criteria and measurements were developed based on the four categories of critical issues.

- Environmental Impacts - Minimize or eliminate impacts
- Community Values - Preserve the rural character
- Safety/Mobility - Safe movement of people and goods
- Financing - Ensure that those who benefit pay their fair share

Workshop No. 3 - Brainstorm Alternatives

Summary of Decision Process

The goal of the third workshop was to develop an extensive list of alternative solutions for satisfying the project mission. This long list of ideas was organized into conceptual alternatives for future screening.

Approximately 640 alternatives were developed. These were combined and refined into 20 alternatives and hundreds of features, characteristics, and goals for each of the alternatives. An example of the idea refinement process is shown in Figure ES.4, which shows only one of the categories of ideas.

Guidance from Workshops Participants

The 20 alternatives taken forward for screening by various modes were:

- No Build (NB)
- Transportation System Management (TSM) and Travel Demand Management (TDM)
- Two Non-fixed Guideway Transit Alternatives
- Four Fixed Guideway Transit Alternatives (FGT)
- Four Aviation Alternatives
- Four Alternate Route Alternatives
- Four Highway Alternatives

Workshop No. 4 - Screen Alternatives

Summary of Decision Process

The intent of this workshop was to screen and eliminate the unacceptable long-term vision alternatives within each mode from the list of alternatives developed in Workshop No. 3. Although the goal was to identify at least one acceptable alternative within each mode,

The Process

For the purposes of organizing the ideas developed at the workshop, three steps were undertaken:

- Develop a master list of ideas
- List ideas that represent features, characteristics, and goals
- Develop alternatives for screening

Master List for Alternate Routes

Workshop Idea	Alternative in which it is incorporated	Workshop Idea	Alternative in which it is incorporated
• More routes other than I-70 - Moffat Tunnel/Rollins Pass - Bailey to Breckenridge - U.S. 285 - U.S. 24 to Breckenridge - U.S. 34 from Fort Collins/Loveland	 - AR-2 - AR-1 - AR-1 - AR-2	• New tunnel from Bakerville to Silverthorne	FG-1 High-Speed Rail with Tunneling
• Alternative intrastate travel	ALL	• Moffat Tunnel/Rollins Pass	AR-1,3
• Alternative trucking routes	AR-2,3	• Boulder to Winter Park	AR-1,3
• Tunnels on alternative routes	ALL	• Bailey to Breckenridge	AR-2,3
• Alternate route from City of Loveland to Winter Park	AR-2,3	• Alternative intrastate travel	Feature
• From Empire to Winter Park-Berthoud Tunnel	AR-2,3	• Alternate route avoids I-70 from Denver to Wolcott	AR-1,3
• Alternate route avoids I-70 from Denver to Wolcott	AR-2,3	• Alternate truck routes (I-80)	AR-4
• Alternate truck routes (I-80)	AR-2,3,4	• S.H. 285	AR-2,3
• Utilize corridor from Colorado Springs to the mountain resorts S.H. 24	AR-1,3	• Colorado Springs to Vail	AR-2,3
• New connection to existing rail into I-70 at Dillon	FG Transit	• Fort Collins to Steamboat	AR-1,3
• Alternate routes - Henderson Mine - Grand County - S.H. 285 - S.H. 24 - Loveland Pass (improve as an alternate route)	 AR-2,3 AR-2,3 AR-1,3 AR-1,3 AR-1,3	• Alternate truck routes • Tunnels in general • Henderson Mine • S.H. 24 • S.H. 72	AR-4 ALL AR-1,3 AR-1,3 AR-1,3

Features, Characteristics, and Goals

- Tunnels
- Alternatives for crossing the mountains
- Alternative intrastate travel

Alternatives

AR1 Travel lane improvements to routes south of I-70

AR2 Travel lane improvements to routes north of I-70

AR3 Travel lane improvements to routes north and south of I-70, a combination of the best of north and south routes

Figure ES.4
Example of the Idea Refinement Process

there were no limitations placed on eliminating all alternatives within a mode.

Guidance from Workshop Participants

As a result of the screening workshop, six transportation strategies were carried to detailed evaluation:

- NB Strategy
- TSM/TDM Strategy
- Bus/High Occupancy Vehicle (HOV) Strategy
- FGT Strategy
- FGT with Selected Highway Improvements (SHI) Strategy
- Highway Widening (HY) Strategy

A number of important conclusions resulted from this workshop. The workshop participants expressed concerns regarding the need to preserve rural character and quality of life in the I-70 corridor. Highway capacity improvements and continuation of rapid growth in the corridor do not support these values.

The screening process established the preference that any FGT system needs to provide both local service and fast travel speeds. Circuitous routes that depart from the immediate I-70 Mountain Corridor were not favored. Technologies that could not produce high travel speeds were considered unacceptable. Consequently, concepts involving emerging/innovative technologies within the I-70 Mountain Corridor were favored over existing, conventional technologies. There was also the public belief that emerging technologies can be tailored to the mountain environment more effectively than conventional technologies, resulting in fewer and more manageable construction impacts.

Alternatives involving the construction of new airports were not supported due to environmental impacts such as loss of wildlife habitat and noise. Alternatives involving improvements to existing airports and improvements to current airport operations were supported and included in the TSM/TDM package for detailed evaluation.

It was felt that alternate highway routes outside the mountain corridor should be incorporated into CDOT's future statewide planning effort and not analyzed as part of the MIS. This was due to the concern that the public, who would be affected by the construction and operation of those new or improved routes, had not participated in the MIS stakeholder involvement process.

None of the highway alternatives received strong support because of impacts on community values and the environment. However, there was limited support for developing an environmentally sensitive highway alternative that combined the use of "smart" widening (minimal construction footprint) with mitigations such as "Glenwood Canyon-type" design techniques through environmentally sensitive areas. Additionally, there were participants who felt that highway improvements would not receive any consideration unless combined with FGT. Thus, it was concluded that another alternative should be carried into detailed evaluation that incorporated highway widening in areas where traffic volumes most critically warrant improvements, combined with FGT.

Workshop No. 5 - Detailed Evaluation

Summary of Decision Process

Prior to the fifth workshop, the project team performed a preliminary detailed evaluation on the six strategies recommended from Workshop No. 4. A summary of the project team detailed evaluation is presented in the next section. The intent of Workshop No. 5 was to review the results of the detailed evaluation information presented by the Project Team and review each of the six transportation strategies and develop a recommended strategy.

Guidance from Workshop Participants

The results from Workshop No. 5 were consistent with the opinions expressed throughout the course of the MIS project. The following conclusions were drawn from the stakeholder participation process.

Concepts that received general CWC support included:

- FGT as a Vision
- TSM/TDM program (with the qualification that citizens have the right to participate in project design)
- Incentives for carpools
- Need for mobility options
- Need for changing travel behavior
- Measures that improve safety

Concepts that have limited CWC support included:

- Highway widening as a Vision, even if the lanes are used for HOV
- Conventional transit technology as a Vision
- Congestion pricing
- No-Build or "do nothing" alternative

Concepts where the CWC was neutral or the results were not conclusive included:

- Use of flex lanes for HOV
- Use of tolls to provide revenue

The workshop participants clearly articulated the need to change the way mobility problems are solved in the future in the I-70 Mountain Corridor. Conventional solutions are considered too restrictive, environmentally destructive, and are perceived as short-term fixes. The public mandate includes development of new technology that can be configured to the uniqueness of the environment and represents a long-term solution. Coupled with this is the need to develop both the social and institutional infrastructure required to change the way people think about travel and use the corridor. This Vision is described below.

At the close of the workshop, all of the participants met as a group to discuss the conclusions from the breakout groups and decide on the preferred strategy of improvements. The group achieved consensus by recommending a Vision Strategy that included FGT with selected HY elements chosen from the TSM/TDM Strategy.

Summary of the Project Team Detailed Evaluation

A summary of the results of the detailed evaluation prepared by the project team is presented below. Copies of the detailed evaluation report (CH2M HILL, et al., 1998a) were presented to the CWC the week before Workshop No. 5.

Key to the results of the detailed evaluation is that a high-speed electric train, such as the French TGV, was assumed for the FGT Strategies. The TGV was assumed because it is the most powerful technology currently available. This power is needed to climb the grades found in the I-70 Mountain Corridor and to maintain a travel speed that is competitive with the automobile. This assumption was made to provide a baseline of cost, benefits, and impacts.

Summary results for environmental, community values, mobility, and financial criteria are provided below based on the TGV technology.

Environmental

Because all of the strategies represent long, linear projects, and all have been contained within existing I-70 right of way, dramatic differences in impact do not result at this level of analysis, and environmental impact is not a discriminator among the strategies. Additionally, all attempts were made to place additional highway lanes and FGT guideways within the median of I-70. Since this is currently a "developed" area, it typically offers no refuge or habitat for wildlife. In general, less construction results in less impact. The probable amount of acres disturbed for each of the strategies is presented in Table ES-1. These totals do not include additional acreage associated with adding TSM build elements to the Vision Strategies.

TABLE ES-1
Acres Disturbed During Construction
(Based on the Project Team Estimates for Detailed Evaluation)

Strategy	Potential Acres Disturbed
No Build	0
Transportation System Management/Travel Demand Management	430
Bus/High Occupancy Vehicle	555
Fixed Guideway Transit	550
Fixed Guideway Transit/Selected Highway Improvements	740
Highway Widening	585

The FGT/SHI Strategy appears to represent the potential for the greatest environmental disturbance. The HOV, FGT, and HY strategies would disturb about the same amount of area. In all instances, there are potential impacts on water resources, air quality, noise, and visual quality during construction.

More significantly, all of the strategies provide improved access to the mountain environment, which is likely to have secondary or indirect impacts. The principal impact is the potential for additional growth and development in the corridor. More people and more development would not only affect the rural character of the corridor, it could result in fewer open spaces and less critical winter habitat for migrating wildlife such as deer and elk. The FGT and FGT/SHI strategies are anticipated to provide a greater potential for stimulating additional development than the TSM, HOV, and HY strategies. This is due to the fact that the FGT systems would allow commuters to travel from the mountains to the Denver Metro area with more convenience and reliability than the other strategies because productive work can be accomplished on the "train," and weather is a lesser consideration.

Community Values

Rural character is one of the most important elements of community values in the mountain corridor. This criterion is difficult to precisely define, but in general terms is characterized as preservation of open spaces, small town atmosphere, and avoidance of the crowding and other inconveniences of urban life. Large construction projects typically do not support these values.

All of the strategies represent large construction projects. In general, the higher the cost of the project, the more construction and resulting associated inconveniences. Issues include noise, delays to motorists, dust, and visual impacts. Construction of any of the build strategies would take at least 10 years or more, prolonging these impacts.

Likewise, all of the build strategies involve visual impacts due to the need for rock cuts and retaining walls and, in the case of the FGT and FGT/SHI strategies, elevated structures. FGT stations could also impact rural character. The greatest potential for visual change, as defined by rural character, is for the FGT and FGT/SHI strategies.

Other impacts include construction employment. Estimates for construction employment, in person years, range from 9,000 for the TSM, 15,000 for the HOV, 20,000 for the HY, and 40,000 for the FGT. The FGT/SHI Strategy is estimated to create up to 50,000 person years of construction employment. While construction employment would provide local economic prosperity, housing shortages and the disruption to the host communities caused by the construction workers would be negative impacts.

Regardless of potential construction impact, the FGT strategies were found to be more acceptable to community values than the HOV or HY strategies. All of the comprehensive plans developed by communities along the mountain corridor recommend more transit, less reliance on the automobile, less urban sprawl, and the provision of travel options. Additionally, highway capacity improvements were viewed negatively by some participants in all five of the CWC workshops.

Mobility

Relief of congestion on weekends, improvements of safety on steep grades, improved movement of freight, and reliability serve as the basis of the mobility criteria that were evaluated.

Table ES-2 presents the impact on congestion provided by each of the strategies. With the NB Strategy, congestion at the Eisenhower Tunnel is projected to increase nearly six-fold; at Idaho Springs it is estimated to increase slightly more than 4 times.

At the Eisenhower Tunnel, the HY Strategy provides the best relief of future congestion. This is due to the fact that this is the only strategy

TABLE ES-2
Annual Estimated Hours of Congestion in 2020
(Based on the Project Team Estimates for Detailed Evaluation)

Strategy	Annual Estimated hours of Congestion on I-70 at Eisenhower Tunnel	Annual Estimated hours of Congestion on I-70 in Idaho Springs
Existing Conditions	120	160
No Build	700	700
Transportation Systems Management/Transportation Demand Management	450	225
Bus/High Occupancy Vehicle	500	200
Fixed Guideway Transit	500	400
Fixed Guideway Transit/ Selected Highway Improvements	500	100
Highway Widening	175	150

that includes a third bore at the tunnel. It is important to note that future conditions still deteriorate over existing conditions. That is, annual congestion would increase from a current 120 hours to 175 hours in 2020. Congestion at the Eisenhower Tunnel would increase to 500 hours per year with the FGT, HOV, and FGT/SHI strategies and to 450 hours per year with the TSM Strategy.

Through Idaho Springs, the FGT/SHI Strategy provides the best mitigation of congestion. In fact, future conditions would likely improve over existing conditions. This is due to the fact that this strategy provides both FGT and highway capacity improvements through Idaho Springs. The HY Strategy provides the second best relief of congestion through Idaho Springs, resulting in conditions that are about the same as experienced currently. The TSM and HOV strategies result in some deterioration over existing conditions. The FGT Strategy results in a significant increase in congestion through Idaho Springs, due to the fact that it captures relatively few users as compared to the number of persons using the highway.

To varying degrees, all of the build strategies would improve safety. The FGT strategies would provide safe and reliable travel to those using the systems. HOV and HY improvements would improve travel safety to motorists using I-70. Providing both highway and FGT improvements, as with the FGT/SHI Strategy, would also provide safety benefits.

Regarding the movement of freight, the impact of the FGT strategies cannot be fairly determined until a technology is defined. However, the FGT could be used for the transport of freight to the communities along the mountain corridor. Until the fixed guideway technology is determined, the HY Strategy is the best strategy for the movement of freight, followed by the HOV and TSM strategies.

The FGT Strategy provides the most reliable form of travel, because it is typically not constrained by inclement weather, accidents on the highway, or periods of congestion. The other build strategies provide additional reliability over the NB Strategy, but all lose reliability during poor weather, accidents, and peak travel periods.

In summary, none of the strategies would likely provide significant improvement over existing conditions at the Eisenhower Tunnel. However, even with the addition of a third bore at the tunnel, the increased capacity is consumed by the increased demand in 2020. Travel conditions at Idaho Springs improve over existing conditions with the FGT/SHI and are maintained to about current levels with the HY Strategy. Congestion increases dramatically with any of the other build strategies.

Forecasting travel demand for peak periods to the year 2050, the target year for the 50-year Vision, indicates failure of I-70 in many locations with any of the build strategies as currently defined. To overcome these conditions, more highway construction would be required, such as greatly expanding the FGT system and/or adding more lanes to I-70 and capacity to the Eisenhower Tunnel and significant changes in travel characteristics that would transfer more demand to the FGT system.

Financial

Table ES-3 presents the capital cost estimates for each of the strategies analyzed during detailed evaluation. With the exception of the NB or TSM strategies, implementation of any of the remaining strategies is projected to require substantial additional sources of funding. This could include tolling, or increases to motor fuel, property, income, sales, or tourism/recreation taxes.

TABLE ES-3
Total Project Cost By Strategy (Based on the Project Team Estimates for Detailed Evaluation)

Strategy	Project Cost (Millions)
No Build	$80
Transportation System Management/Travel Demand Management	$1,100
Bus/High Occupancy Vehicle	$1,900
Fixed Guideway Transit	$5,300
Fixed Guideway Transit/Selected Highway Improvements	$5,700
Highway Widening	$3,200

Recommended Vision Strategy

The Vision as shown in Figure ES.5 responds to the major elements of the Project Mission collectively developed by the affected stakeholders in the corridor. The Project Mission mandates the safe movement of people and goods through the use of innovative technologies, preservation of visual character, and provisions for a balance between economic development and environmental protection. The mission also states that users should pay proportionately for benefits received.

In response to the mission, the Vision incorporates futuristic thinking, including a 50-year planning horizon, minimizing the focus on highway elements, changing travel behavior, and preserving the communal and environmental character of this unique setting. As such, the strategy incorporates mobility solutions that overcome steep grades, difficult construction conditions, severe weather conditions, and unique travel demand characteristics. Recognizing that conventional rail technologies do not universally address these requirements, the Vision incorporates the use of innovative fixed guideway solutions conforming to rigid performance specifications and tailored to this special environmental setting. Other Vision elements include bus transit, highway, aviation, and bicycle and pedestrian improvements.

Exhibit A presents the Vision statement developed by the OSC.

Exhibit B highlights the technical characteristics of the Vision. All costs and technical evaluations were completed on the Vision elements as described in Exhibit A. The exact technologies used are described in Section 5.

Consequences of Implementing the Vision

Environmental Impacts

Anticipated environmental impacts include the following:

- Disturbance of approximately 1,000 to 1,300 acres during construction from West Denver to Glenwood Springs. Of this, approximately 70 percent would be associated with the FGT and 30 percent with the TSM build improvements.
- Construction of geometric improvements in Clear Creek County would involve rock cuts and visual impacts from Floyd Hill to the twin tunnels, a distance of about 2.5 miles.
- Construction of flex lanes would impact about 33 acres and construction of slow-moving vehicle lanes about 60 acres, much of which is in sensitive environment.
- Construction of highway improvements between West Vail and Dowd Junction would require rock cuts to the north of I-70, immediately east of Dowd Junction.
- Frontage road construction in Eagle County would require approximately 40 acres.
- TSM interchange improvements may impact as much as 60 acres and intermodal transfer stations as much as 50 acres.
- Construction of new bicycle and pedestrian trails may affect up to 110 acres.

Exhibit A

Vision Statement

The I-70 MIS Vision Program includes development of a High Speed Fixed Guideway Transit System (FGT) from DIA to Glenwood Springs, recognizing that as an interim measure, conventional technology may be appropriate from Vail to Glenwood Springs. This will be supplemented by the TSM/TDM programs as described below. The FGT improvements from West Denver to Vail will be procured through a performance specification, and the specific technology is not known at this time.

The project is estimated to cost approximately $7.4 billion [1], not including improvements from West Denver to DIA, which may add as much as $1.0 billion to the program. Annual Operations and Maintenance (O&M) costs are estimated at $160 million.

The Vision Strategy incorporates:

- *Transportation improvements compatible with the mountain environment.*
- *A permanent behavioral change in mobility with more acceptance and support for transit, including the needed land use management policies to support this change.*
- *The need to optimize the existing highway infrastructure currently in place.*
- *A philosophy of finality: What is implemented through the MIS program represents a strategic commitment to the vision statement described herein.*

Summary of FGT Improvements

The specific elements of the FGT System cannot be described in detail until a technology is chosen. However, the system can be expected to include:

- *Up to 185 miles of guideway including both an aerial structure and at-grade construction*
- *Traction Power System*
- *Communications System*
- *Signalization System*
- *Automatic Train Control*
- *Security System*
- *Vehicles*
- *Stations, including parking*
- *Landscaping Program/Environmental Mitigation*

Summary of TSM/TDM Improvements

The proposed TSM/TDM program includes Build, Travel Demand, Operational, Aviation, and Transit elements as described below.

Build Elements

The program includes the following "Build Elements":

- *Flex Lanes for 14 miles in Clear Creek County*
- *Geometric Improvements in Clear Creek County*
- *Interchange Improvements at selected locations*
- *Frontage Road Improvements in Eagle County*
- *Slow-Moving Vehicle-Climbing/Descending Lanes*
- *Enhanced Bus Operations*
- *Intermodal Transfer Centers*
- *Enhanced Air Service*

Key Facts of Build Elements

These projects represent approximately:

- *$850 million in new construction*
- *38 miles of highway improvements*
- *Improvements at 10 interchanges*
- *Reconfiguration at 2 interchanges*
- *Construction of 2 new interchanges*

It is anticipated that the design details of the TSM build elements will be subject to review and refinement during the completion of the environmental review process.

Travel Demand Management (TDM)

The proposed TDM elements include:

- *Measures to change behavior, including greater marketing of shuttle services; carpool matching services; preferential parking for carpools; and subsidies for transit passes.*
- *Operational options for the management of the flex lanes shall be included and evaluated for their benefit in changing demand patterns and encouraging an increase in HOV usage. Such options include, but are not limited to, HOV designations or High Occupancy Toll (HOT) lanes.*
- *Intermodal Transfer Centers at Cold Spring park-n-Ride, West Metro, Idaho Springs, Empire Junction, Silverthorne, Frisco, Vail, Avon, Eagle, Eagle County Regional Airport, and Glenwood Springs.*
- *Parking Management Program to control the number, location, and pricing of available parking spaces.*
- *Access management to control the spacing and design of highway interchanges.*
- *Land use strategies to support the Vision.*

Operational Improvements

The operational improvements include:

- *Intelligent Transportation System (ITS) Program: a broad range of driver information and communications improvements using advanced technology*
- *Incident Management Program: addition of remote surveillance cameras; development of an incident management plan; outfitting vehicles with probes to provide real-time speed and travel estimates; test and evaluation of MAYDAY operations for in-vehicle signaling from stranded vehicles; expanded highway advisory radio and variable message systems; and emergency services district program for funding local programs*
- *Truck Operations Plan: expanded chainup areas; minimum left-lane speeds; Georgetown gusty wind sensor/variable message signage; more aggressive use of chains for icy/snow conditions; and expanded automated port-of-entry/weigh-in-motion programs*

Aviation Improvements

Aviation improvements should be provided at all airports along the corridor to promote passenger and cargo air service. Five airports currently offer the majority of passenger and air cargo services along the I-70 corridor. These airports will continue to provide for significant passenger and air cargo services over the next 20 years. These airports are Aspen, Eagle County, Grand Junction, Montrose, and Steamboat Springs/Hayden. The total costs for airport improvements over the next 10 years at these airports are estimated at $123 million. A large portion of these funds could come from Federal Aviation Administration sources. Additionally, facilities at Garfield County Airport, Gunnison County Airport, Kremmling-McElroy Field, and Telluride Regional Airport currently have or could support potential passenger and air cargo service to meet the additional needs of air travelers in the vicinity of the I-70 corridor. Each of these nine airports will require continued planning and support from local and state government to maintain their viability and service potential into the future.

Initial Transit Improvements

The transit improvements are estimated to cost about $55 million, representing a 150 percent increase in bus service, and include the following:

- *Expanded Intermountain Bus Service from Denver to Glenwood Springs with stops at Denver Union Terminal (DUT), Idaho Springs, Frisco, Silverthorne, Vail, Avon, Eagle, Gypsum/Eagle County Regional Airport, and Glenwood Springs*
- *Skier Express Service from Denver area park-n-Rides to mountain ski resorts*
- *Enhancements to local bus service in Jefferson, Summit, and Eagle counties and a new bus service to Clear Creek County, with the availability of funding*

After the FGT service is implemented, the Intermountain and Skier Express services would be discontinued and replaced with additional bus feeder systems to support the FGT system.

Alternate Routes

Alternate route information shall be forwarded to the statewide planning process with a recommendation to review and consider these improvements for the statewide benefit.

Continued Public Review

The program includes the maintenance of a group with similar composition to the existing OSC. This group would be convened at key steps in the existing public planning processes or, as a minimum, once per year. Joint meetings of the Intermountain Transportation Planning Region and the Denver Regional Council of Governments will be held annually to review the I-70 Mountain Corridor program. Further, an aggressive outreach program will be conducted with each environmental document, and concurrent with the 20-Year Statewide Planning Process, a corridor workshop will be held.

[1] The final Vision is conceptually the same as recommended by the CWC with the exception that the definition of the High-Speed FGT element was modified. During the detailed evaluation, High-Speed FGT was defined as extending from West Metro Denver to Vail. Service from Vail to Glenwood Springs would be provided using conventional diesel commuter rail technology, and service from West Metro Denver to DIA was to be provided on track constructed through RTD's Guide-the-Ride Program. Under this program, the FGT element was estimated to cost about $4.1 billion. The total Vision was estimated to cost $5.3 billion.
The OSC decided that the Vision should assume High-Speed FGT technology from DIA to Glenwood Springs, a distance of approximately 185 miles. The addition of approximately 100 miles of High-Speed FGT for the ultimate alignment is estimated to increase the cost of the Vision by about $3 billion, to a total cost of $7.1 billion for the FGT element and $8.4 billion for the Vision.

Exhibit B

Summary of Vision Characteristics

Vision Elements

Major FGT Elements		Ultimate development of a 185-mile high-speed Fixed Guideway Transit (FGT) System from DIA to Glenwood Springs. The specific technology is not identified at this time. Alignment is not specified in detail but is expected to be within I-70 Right-of-Way (ROW) in the mountains. As an interim measure, conventional passenger rail is proposed from Vail to Glenwood Springs; 8 stations identified from West Denver to Vail; 8 passenger rail stations identified west to Glenwood Springs.
Freeway Elements		• Floyd Hill to U.S. 40 (Empire): flex lanes (possibly restricted to HOV or HOT), geometric improvements (curve smoothing) from U.S. 6 to Idaho Springs and twin tunnel modifications; examples cited, specifics to be developed later • Interchange reconstruction: U.S. 40 (Empire), East Idaho Springs • Interchange improvements: 10 locations including Fall River Road, West Idaho Springs, 13th Avenue, Hidden Valley, and U.S. 6 • New interchanges: 2 locations in Eagle County • Slow-moving vehicle lanes (2 directions) on Georgetown/Silver Plume Hill (4 miles), east tunnel approach (2 miles), and Vail Pass (14 miles) • Continuous acceleration/deceleration lanes from East Avon to West Vail (5 miles)
Frontage Road/Arterial Element		Widen U.S. 6 to 4 lanes in Eagle County; Squaw Creek to East Avon (9 miles).
Aviation Element		Improvements per master plans at 5 airports in western Colorado; improved land use control adjacent to existing airports
Transportation Management Element	***Highway***	• Snow slide mitigation at West Vail Pass and Seven Sisters • Intelligent transportation system (comprehensive) • Incident management (including courtesy patrols and emergency services district program) • Enhanced trucking operations program (including improved chain up areas and minimum left lane speed limits) • Enhanced maintenance actions (including signing, striping, lighting) • Access management around interchanges
	Bus Transit	• Ultimate: reconfigure local transit as feeder to FGT. Establish public transit service in Clear Creek County • Interim: expanded intermountain bus service, expanded skier express service, expanded local public transit (including new in Clear Creek), recognizing private shuttle service (specific recommendations uncertain), intermodal transfer centers (at sites of future FGT stations)
	Bicycle/ Pedestrian	Complete continuous bike path along I-70 from West Metro to Glenwood (75 new miles)–
	Demand Management	• Traveler information and marketing • Carpool/vanpool formation/matching • Preferential parking • Subsidized transit passes • Parking management at destinations
Alternate Routes		Recommendation to statewide planning process to consider improvements to alternate routes
Land Use		Land use strategies to support the Vision

Vision Costs

Capital Cost Total	Cost in Millions (rounded)
FGT Transit	$7,100
Other Transit	$340
Highway	$802
Aviation	$123.5
Bicycle/Pedestrian	$30
Total Capital Cost	$8,400

Effectiveness, Capacity and Usage, and Travel Times

Effectiveness Measures		
Daily users (transit)*	4,750 for operations plan (does not include potential intra-metro riders)	
Change in annual linked transit trips	1.7 million "new" riders	
Change in annual VMT	Increases by about 59 million/year over No-Build; 58 million/year less than the HY Strategy	
Transit Capacity (persons per hour per direction)		
Capacity provided*	1,200	
Amount of capacity used in peak theoretical maximum capacity*	1,200	
Highway Travel Times (Vail to C-470)		
Non-congested off peak highway	1 hour, 30 minutes	
Existing – 1995; 30th highest hour	1 hour, 55 minutes	
No Build – 2020; 30th highest hour	3 hours, 5 minutes	
Vision – 2020; 30th highest hour	2 hours	
Transit Travel Times (Vail to C-470)		
Vision – All years; all times	1 hour, 20 minutes	
Annual Hours of Highway Congestion	**At Eisenhower Tunnel**	**At Idaho Springs**
1995	120	160
No Build – 2020	700	700
Vision – 2020 •	500	100

* Assumes Train-a-Grande Vitesse (TGV) technology - the fastest train system currently operating in France.
• Vision for 2020 assumes completion of all elements of the Vision.

Community and Environmental Impacts*

Relocations	Possibly None
Remaining residences within 500 feet	2,600
Direct park impacts	None
Wetlands impacted	1 to 5 acres
Total acreage disturbed	1,000 to 1,300 acres (West Denver to Glenwood Springs)
Potential T&E species habitat impacts	14 miles along I-70 Vail Pass; 2 miles east approach to Eisenhower Tunnel
Historic districts	In Idaho Springs and Georgetown
Construction socioeconomics	"Boomtown"; 40,000 person-years of employment estimated for "test system"; potential housing shortages and community disruption

* Assumes TGV Technology

Vision Financial Measures

Financial Measures	Cost
Total Capital Cost	$8,400,000,000
Annualized Capital Cost	$610,000,000
Yearly O&M Cost (excluding West Denver to DIA)*	$162,000,000
Total Annualized Cost (Capital Recovery and O&M)	$772,000,000
Total Annualized Cost per user (including highway and transit users)*	$6.11
Annualized Transit Cost per new transit user (one-way trip)	$350

*Assumes TGV Technology-Based on estimated 126,350,000 person trips per year

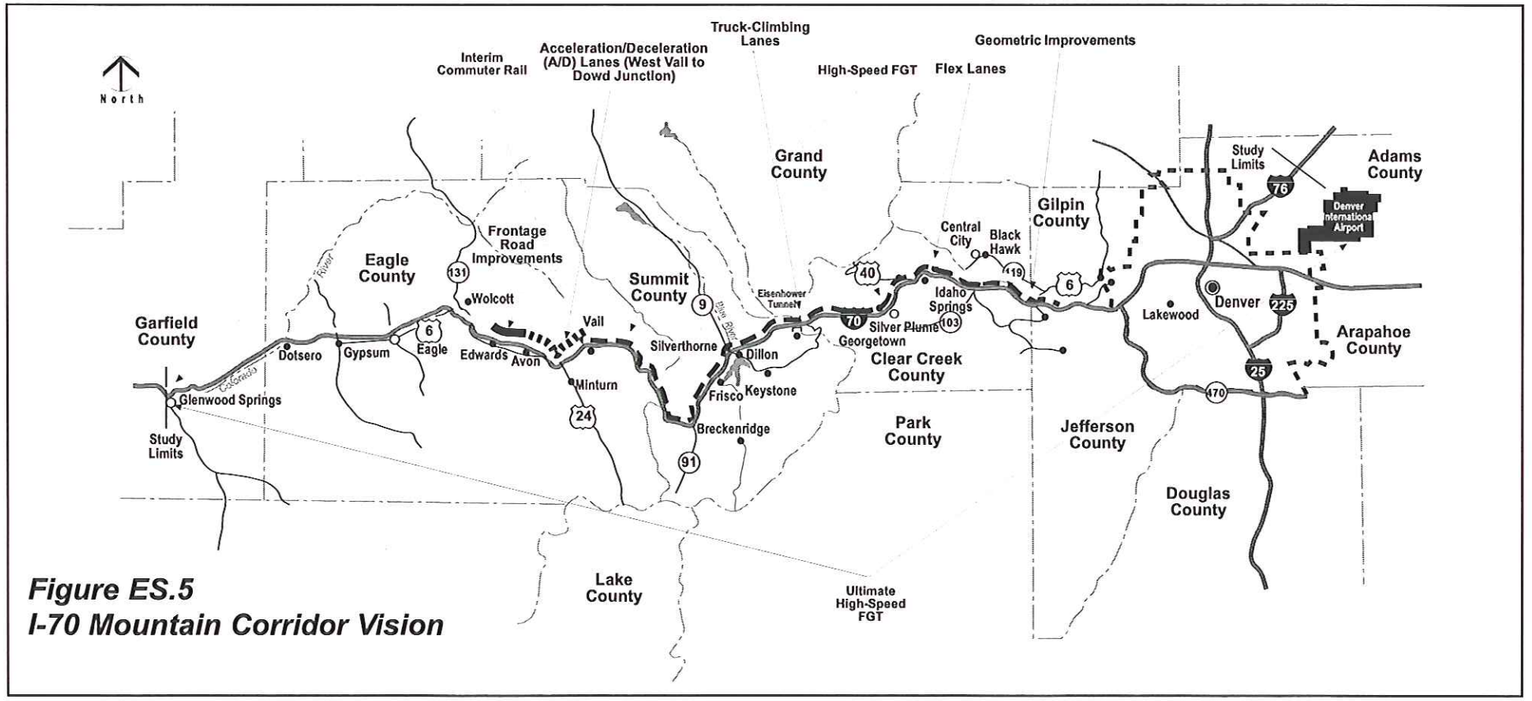


Figure ES.5
I-70 Mountain Corridor Vision

Stakeholder Workshop

- It is anticipated that the potential impact to wildlife and habitat would be minimal because the majority of construction will occur in the I-70 median or in other areas contained within the CDOT right-of-way.
- Construction through approximately 14 miles of threatened and endangered (T&E) species habitat over Vail Pass for the implementation of slow-moving vehicle lanes.
- Potential loss of 1 to 5 acres of wetlands during construction for bridge widening required for both the FGT and highway improvements. Wetlands will need to be delineated during the environmental clearance process.
- Potential impacts on water quality due to construction of both guideways and highway improvements proximate to riparian areas along I-70.
- Compared to the non-FGT alternatives, there will be a potential increase in corridor energy consumption due to the operation of the FGT.
- Potential secondary impacts from loss and fragmentation of wildlife habitat due to the increased development resulting from improvements in mobility between Colorado's populated Front Range and the mountain communities.

Community Impacts

Anticipated community impacts include the following:

- The Vision best supports the community values criteria voiced by the workshop participants throughout the planning process.
- The construction of an elevated FGT will impact noise and the visual character of the I-70 corridor. The development of the stations and the intensified land use surrounding the stations may impact the rural visual character of the corridor.
- Implementation of the Vision is anticipated to represent a significant strain on availability of employee housing during the peak years of construction. Delays during construction will represent significant inconvenience to the travelers on I-70. This will persist throughout the construction of the recommended Vision.
- There is a potential need to acquire private properties for the construction of the frontage roads in Eagle County and for the development of Intermodal Transfer Centers and FGT stations.
- Construction of the FGT and highway elements will require clearances for construction through historic districts in Idaho Springs and historic landmark districts in Georgetown and Silver Plume.
- A potential for indirect and secondary impacts exists resulting from increased development throughout the corridor due to improved mobility between Colorado's populated Front Range and the mountain communities. The FGT is anticipated to increase the number of commuters relocating to the mountain communities. This will serve to reduce the rural character of the corridor.

Mobility Impacts

Anticipated mobility impacts include the following:

- FGT and bus service add mobility options in the I-70 corridor.
- Reduction of 58 million vehicle miles traveled (VMT) per year compared to the highway alternative.
- Reduction of 2020 thirtieth highest hour (an estimated volume used by design engineers as a basis for highway designs) highway travel times between Vail and C-470 from 3 hours, 5 minutes for the NB Strategy to 2 hours with the Vision Strategy. Further, travel times on the FGT system will not be affected by congestion or inclement weather.
- In 2020, the hours of highway congestion will be reduced from 700 annually with the NB Strategy to 500 hours at the Eisenhower Tunnel and from 700 to 100 hours at Idaho Springs.
- Increase in person-carrying capacity from 1,200 to 4,685 persons per hour per direction depending on the location in the corridor (the higher value occurs where highway capacity is increased, approximately 38 miles in the corridor).
- Increase in transit ridership of approximately 1.7 million riders per year.
- Reduction in highway crash potential.

Financial Impacts

Anticipated financial impacts include the following:

- Currently identified and anticipated funds total approximately $1.28 billion for the I-70 Mountain Corridor. This compares to an estimated project cost of about $8.4 billion, resulting in a project shortfall of about $7.1 billion (1997 dollars) as shown in Table ES-4.
- Project shortfalls will be $2 to $3 billion less if the use of conventional rail is assumed from DIA to West Metro Denver and from West Vail to Glenwood Springs. The higher costs result from assuming that a high-speed technology is ultimately constructed in these segments.
- Also, costs will be about $3 billion less if CIFGA's assumptions are correct and the FGT costs $20 million mile per mile versus the reported cost estimate of approximately $40 million per mile.
- Need for voter approval to initiate both new primary and secondary revenue sources including consideration of tolling, and increases in state sales, income and gas taxes, as well as increases in local sales and property taxes. Taxes on rental cars, hotel rooms, ski tickets, and recreational equipment may also need to be considered.
- Need for legislative approval to use Highway Users Trust Fund (HUTF) monies for transit and to provide CDOT with bonding authority.
- Recognition that travel on the I-70 corridor will probably become more costly in the future.

Next Steps for Resolving Issues

The next step in the process will be for CDOT to sponsor an EIS on the Vision. The EIS will define the cumulative and secondary impacts of all of the Vision elements. It is also probable that individual EISs will be prepared for each of the major build elements (flex lanes, twin tunnel improvements, startup local bus systems, FGT demonstration projects, geometric improvements, slow-moving vehicle lanes, etc.) of the Vision. A proactive public involvement program will be part of all environmental approval processes.

CDOT will conduct a programmatic EIS analyzing the cumulative impact of the projects included in the MIS vision. This programmatic EIS will determine an early action plan for the corridor.

Since the fixed guideway and related transit are core elements of the MIS vision, the programmatic EIS will review and consider these elements for inclusion in the early action plan. This will include the consideration of all potential sources of available funding for the transit elements of the vision, including multimodal federal funds in Colorado's allocation of the Surface Transportation Program, the portion of Interstate Maintenance funds available to be used for transit projects in the corridor, the portion of state funds in Sb1 and HB 1202 available for multimodal projects, and other state and federal funds available for multimodal or transit use.

TABLE ES-4
Total Project Cost

Transit Projects	Cost (rounded) (a)
Commuter Rail Right-of-Way Preservation/Acquisition	Yet to be determined
Transit Market Studies (Ridership/O&D)	$1,000,000
FGT Preliminary Performance Specifications	$1,000,000
Transit Supportive Comp Plan Updates	$700,000
Measures to Change Behavior	$50,000
Parking Management Program	$50,000
Intermodal Transfer Centers	$9,000,000
TSM Bus/Transit System Improvements	$45,600,000
FGT Testing & Demonstration Research Program	$100,000,000
Commuter Rail In Eagle Co.	$185,000,000
High Speed FGT DIA to West Denver	$1,000,000,000
High Speed FGT West Denver to Vail	$4,100,000,000
High Speed FGT Vail to Glenwood (Ultimate)	$2,000,000,000
Total Transit	**$7,440,000,000 (b)**
Highway Projects	
Current STIP Improvements	$82,000,000
Corridor-wide ITS Improvements	Included above
Improved Maintenance Program	NA
Interchange Improvement Program	$153,000,000
Geometric Improvements to Clear Creek Co./Twin Tunnels	$60,500,000
Geometric Improvements to Clear Creek Co./Curve	$33,000,000
Flex Lanes in Clear Creek Co.	$80,000,000
A/D Lane Improvements: Vail to Eagle	$34,000,000
Improvements to Frontage Roads: U.S. 6 in Eagle Co.	$34,000,000
Slow-Moving Vehicle Lanes at Georgetown Hill	$65,500,000
Slow-Moving Vehicle Lanes at Eisenhower	$32,500,000
Slow-Moving Vehicle Lanes at Vail Pass	$227,000,000
Total Highway	**$802,000,000**
Aviation Improvements	
Land Use Planning at Airports	$500,000
Aviation Improvements	$123,000,000
Total Aviation	**$123,500,000 (c)**
Bicycle and Pedestrian Improvements	
Early Action Bicycles & Pedestrian Improvements	$30,000,000
Total Bicycle & Pedestrian	**$30,000,000**
Grand Total	**$8,400,000,000**

(a) Includes construction costs plus estimated non-construction costs associated with the project.
(b) Assumes connection to DIA cost of $1 billion and conversion of commuter rail in Eagle County to High-Speed FGT at an additional cost of $2 billion.
(c) Same as No Build Strategy

While the development of the Vision involved extensive public and stakeholder input, there are still many issues that need to be addressed in the EIS. Given in no particular order of priority, some of these issues that have been presented by the participants to the project team are provided in the following subsections.

Environmental Issues

In compliance with National Environmental Policy Act (NEPA), all environmental impacts and alternatives will need to be evaluated. During the stakeholder process, the environmental issues that were identified as concerns include:

1. **Secondary and Indirect Impacts.** The effect of improved mobility in the corridor on development trends and on fragmentation of wildlife habitat, and the effects of more permanent and second home residents on the mountain ecology need to be carefully assessed. Likewise, the effects of not providing (or providing fewer) mobility improvements in the corridor on the long-term economic vitality of both the mountain communities and the statewide tourism industry need to be determined.
2. **Ultimate FGT Alignment through Glenwood Canyon.** Service from Vail to Glenwood Springs will be provided with an interim commuter rail system. This system can utilize existing track with little or no impact. Construction of the ultimate High-Speed FGT from Vail to the mouth of Glenwood Canyon can generally be accommodated in the existing CDOT right-of-way, with minimal environmental impact. However, the ultimate extension of the High-Speed FGT through Glenwood Canyon would be extremely difficult from an environmental approval standpoint. Nonetheless, the best alignment will need to be identified during the design phase.
3. **Impacts on T&E Species.** Elements of the Vision cross through habitats of T&E species near the Eisenhower Tunnel and over Vail Pass. The effects of building and operating the Vision elements on these species will need to be addressed.
4. **Protection of Wildlife.** Methods to mitigate vehicle/animal accidents will need to be investigated. Concerns are especially pronounced in Clear Creek County where bighorn sheep frequent the I-70 right-of-way and near Dowd Junction, where accidents with migrating elk on I-70 are an ongoing problem.
5. **Water Quality Impacts.** The impact of construction of the Vision elements is a concern identified throughout the planning process. This includes the impact of the Vision due to increased runoff of sediments, deicing chemicals, metals, oil and grease, etc., into proximate streams.

6. **Wetlands.** Construction of the Vision will be located within 150 feet of 24 miles of riparian habitat, much of which includes wetlands. Additionally, numerous bridges and culverts will need to be replaced over watercourses. Consequently, there is significant concern regarding wetlands impacts. Wetlands maps will need to be updated and quantities of potentially affected wetlands calculated.
7. **Noise.** Approximately 2,600 dwellings are located within 500 feet of I-70, and noise impacts are a concern. After a transit technology is defined, an evaluation and mitigation of noise impacts will be required.
8. **Hazardous Wastes.** Local citizens are concerned about potential spills of hazardous waste.
9. **Energy.** Operation of the FGT will require a power source. It may be necessary to construct a transmission line to serve the FGT. While energy requirements cannot be estimated until a technology is defined, the issue of the need for a new transmission line needs to be resolved.

Community Values

Community values issues identified by the public include:

1. **Boomtown Impacts.** Affordable employee housing is in short supply throughout the corridor. The addition of a huge demand for employee housing during the construction of the Vision will need to be addressed.
2. **Land Use Planning.** As discussed in the Mobility/Safety Section, the shift of trips from the automobile to FGT will require behavioral and cultural changes. Agencies in the corridor will need to support the concept of land use controls to increase densities in general, and particularly around station areas, to support the effectiveness of transit. Land use planning to protect operations of the airports in the corridor will be critical for allowing the expansion of air travel. Last, innovative land use planning, such as cluster development, could help maintain rural character, while accommodating the level of growth that is projected in the future.
3. **Rural Character.** The need for the Vision is a corollary to the explosive growth being experienced in the corridor, and the state in general. The extents to which the secondary effects of the Vision influence growth in the corridor need to be presented. The tradeoffs of economic development and growth versus quality of life and rural character are contentious and complicated issues.
4. **Visual Impacts.** The amount of rock cuts and retaining wall needed for the TSM build elements will need to be addressed, as will the visual impact of the FGT guideway. Impacts of the FGT stations will also need to be mitigated.
5. **Historic Districts and Section 4(f) Impact Analysis.** The Vision will pass through an historic district in Idaho Springs and an historic landmark district in Georgetown and Silver Plume. This will complicate approvals for construction through these areas.

Mobility/Safety

Three mobility issues have been identified:

1. **Behavior Changes**. Successful implementation of the Vision will require a change in travel behavior. Levels of service and congestion will not be improved unless the FGT system is endorsed and used by the traveling public. History suggests that transit will not be used sufficiently to address the corridor's mobility problems without a different view of travel. Mobility to mountain recreation must rely less on the automobile in the future. The "political will" to affect this change may be an issue.
2. **Operation of the FGT Through the Denver Metro Area**. The Vision cannot be implemented without support from metro area communities, the DRCOG, and RTD. Numerous issues need to be resolved such as travel speeds through communities, the number of stops in the metro area, compatibility of technologies, right-of-way constraints, and competition with other projects for available space for construction.
3. **Design Standards**. Minimization of highway footprints to reduce environmental impacts will require narrower medians, shoulders and clear zones. This will significantly reduce impacts but may reduce clear zones and space for disabled vehicles. Tradeoff analyses will need to be prepared and the results supported by the public, FHWA, and CDOT.

Financial Impacts

Several critical financial issues will need to be resolved:

1. **Impacts on Local Communities**. There is a goal that the mountain communities should not pay more than their proportionate share for implementing the Vision. Another fairness concern is that Colorado residents who will seldom or never use the I-70 corridor will pay to support an FGT system.
2. **Increases in Taxation**. Implementation of the Vision will require additional revenues that will increase the cost of traveling on I-70. While the implementation of the FGT system is supported, additional taxes to finance it will also have to be supported.
3. **Impact of Funding of Other Projects**. There is a concern that committing significant dollars to the I-70 Mountain Corridor will detract from the funding of other equally important projects in the state.
4. **Expenditure of Funds by Mode**. There is a concern that available funding be spent equally on transit and highways in the short term.

SECTION 1

MIS Background and Mission

This section presents the history of the I-70 Mountain Corridor Major Investment Study (MIS), the purpose of the study, and the Project Mission. The Project Mission and its guiding principles served as the basis for developing and evaluating the alternatives investigated for the project.

Project History

In 1988, the Colorado Department of Highways, now the Colorado Department of Transportation (CDOT), conducted a transportation study of the I-70 Mountain Corridor within Clear Creek, Summit, and Eagle counties (Colorado Department of Highways, 1989). This segment of I-70, shown in Figure 1.1, is in mountainous terrain, and the study area represents a significant portion of the recreational areas within the state. Part of that transportation study consisted of developing a travel demand model for the I-70 Mountain Corridor from the Clear Creek/Jefferson County line to Glenwood Springs. Using this model, CDOT was able to project major congestion areas over a 20-year period.

The current traffic patterns and congestion on I-70 are consistent with the trends projected in the 1988 study. For this reason, and because current operational, safety, and congestion problems demand prompt attention, CDOT initiated the I-70 Mountain Corridor MIS in 1996. The actual limits of the study were established through the Citizens' Workshop Committee (CWC) process and include the length of I-70 from Denver International Airport (DIA) to Glenwood Springs[1].

This study is referred to as an MIS because its purpose is to determine an effective multimodal transportation strategy that will warrant the investment of major public funds.

Purpose of the MIS

Under the policies promoted by the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA), the MIS serves as a critical element of a metropolitan area's long-range planning process. Federal laws and regulations provide the general guidance on the expectations and processes for local decision making in which there is a federal interest. The major phases of an MIS are shown on the flow diagram in Figure 1.2.

The MIS process is characteristically focused on urban transportation problems. However, CDOT determined that the structure of the MIS process would serve the needs of the I-70 Mountain Corridor for the following reasons:

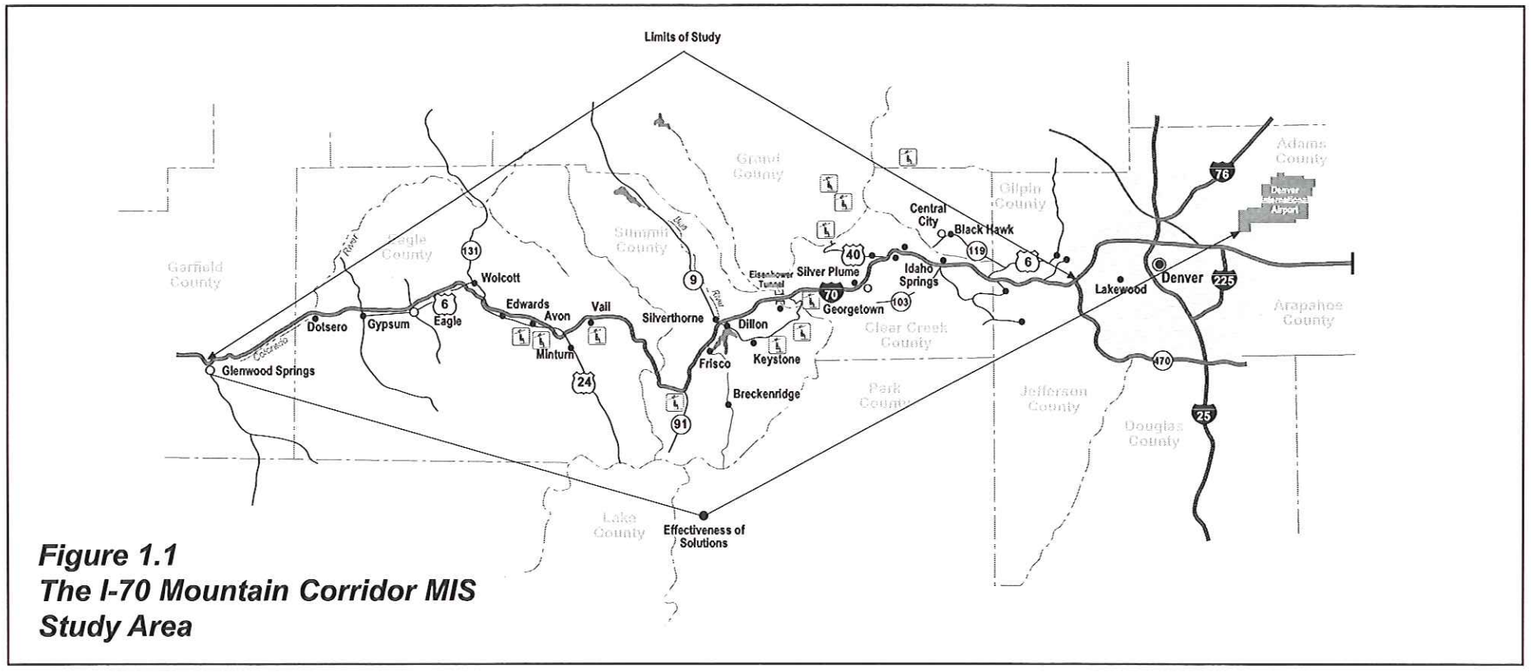


Figure 1.1
The I-70 Mountain Corridor MIS Study Area

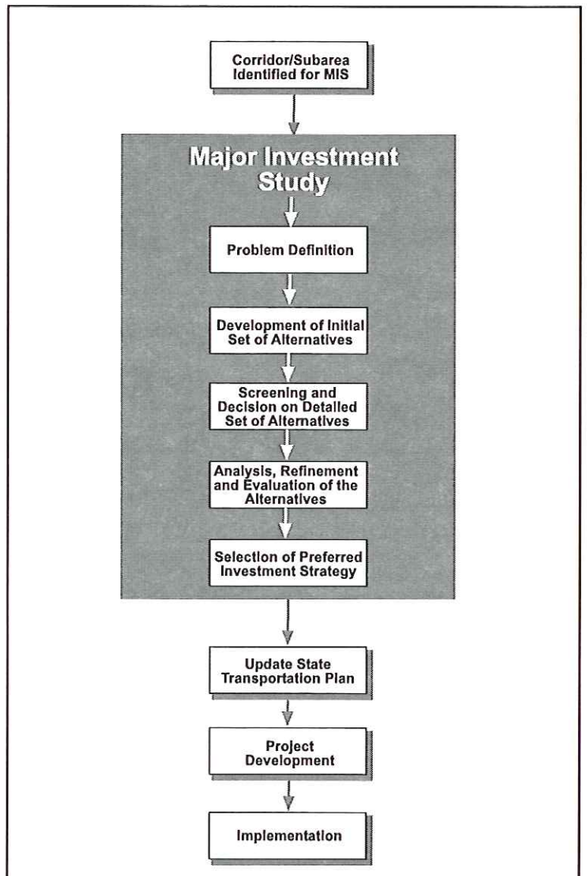


Figure 1.2
Major Phases of an MIS

- The process is focused on multimodal solutions, including fixed and non-fixed guideway transit and highway, as well as measures that change both behavior and demand, all of which are applicable to the I-70 Mountain Corridor.
- The MIS contains information sufficient to measure and evaluate a range of investment options and test public values, resulting in a regional consensus on the range of alternative strategies studied and the criteria used in the evaluation.
- The MIS process provides decision makers with improved information on the options available for addressing regional transportation problems before financial commitments are made.

[1]The limits of the MIS study area extend 140 miles from the intersection of I-70/C-470 west to Glenwood Springs. However, the study impacts the 185-mile corridor from DIA to Glenwood Springs.

This MIS was undertaken to define the scope of investments within the I-70 Mountain Corridor, which addresses mobility problems over the next 50 years.

ISTEA planning rules define two options for relating the MIS process to the National Environmental Policy Act (NEPA). Option 1 involves an MIS evaluation that is supportive of the subsequent NEPA Environmental Impact Statement (EIS) requirements. Conversely, Option 2 combines the MIS and the EIS documents. This MIS followed the Option 1 format. As such, the process has been configured to address environmental issues at a general level and avoid a complete reexamination of alternatives during the subsequent NEPA process. An environmental inventory for the corridor was developed to identify the major cultural and natural resource areas and sites that might be affected by transportation improvements.

Hazardous waste, noise, and air quality issues also were evaluated through environmental surveys, file searches, and assessments. The resulting examination was sufficient to identify fatal flaws that could terminate the implementation of a given mobility strategy. The MIS has adhered to the general principles of the NEPA process, including the consideration of alternatives and their relative environmental effects as compared to a No-Build benchmark.

The next step in the process will be for CDOT to sponsor an EIS that will define the cumulative direct and secondary impacts of implementing any, or all, of the Vision elements. It is also possible that individual EISs will be prepared for each of the build elements of the Vision.

Project Mission

CDOT's over-arching mission for the I-70 Mountain Corridor is stated as: "We will work together to develop the best possible transportation system in Colorado." Based on this context and the need to accommodate the goals, interests, and concerns of numerous stakeholders, a Project Mission was developed through a collaborative workshop process for the I-70 Mountain Corridor.

It was determined that "the Mission of the I-70 Mountain Corridor Project is to improve safe movement of people and goods through short- and long-term solutions that:

- Deploy innovative technologies that minimize or eliminate the impacts on the natural and manmade environments.
- Preserve the rural character and community values of settlements located within the corridor.
- Provide a balance of economic development and employment opportunities for the corridor.
- Ensure that those who benefit the most from the improvements pay proportionately."

This mission served as the basis for developing and evaluating alternatives for addressing mobility problems in the corridor.

SECTION 2

Study Process

The planning methodology for the I-70 Mountain Corridor MIS was configured to consider a broad spectrum of criteria for developing the preferred Vision for addressing long-term mobility problems. CDOT's principal goal for the process was to develop consensus among the stakeholders in the I-70 corridor.

This section presents the technical approach, the participants, and the stakeholder participation process used to develop consensus in the corridor.

Decision Steps

The evaluation approach for the I-70 Mountain Corridor MIS followed the federal guidelines for MIS development as adapted to meet the specific characteristics of the I-70 Mountain Corridor. The decision process used for the MIS is shown in Figure 2.1.

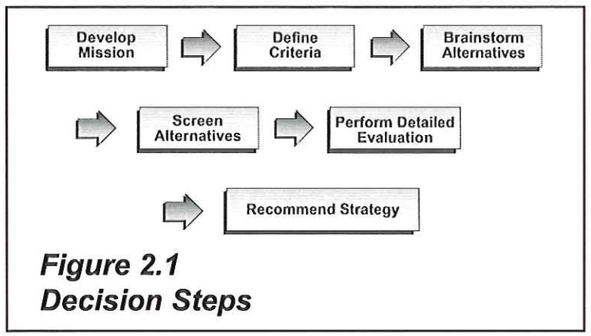


Figure 2.1
Decision Steps

The I-70 Mountain Corridor MIS decision-making process was founded on the premise that the ultimate selection of the preferred Vision would be from the "bottom up." CDOT empowered the stakeholders to formulate the draft of the locally preferred Vision through the CWC. The recommendations of the CWC were presented to the Oversight Committee (OSC) at the completion of each milestone for policy consideration. The final strategy recommended by the CWC was reconciled by the OSC. From this point, the elements of the recommended strategy will be carried forward through the Statewide Planning Process and State Transportation Improvement Program (STIP) process for funding and implementation.

Each step in the decision process was documented by either a task memorandum or technical report. These reports served as a source of information for this Final MIS report. The complete series of technical references available from this study include the following:

1. Project Mailing List
2. Synopses of Past Studies
3. Mobility Evaluation Report
4. Aerial Photography
5. Field Investigation Report
6. Environmental Maps
7. Screening Level Report
8. Detailed Level Evaluation Report
9. Cost Estimating Methodology Report
10. Aerial Mapping of the Recommended Alternative

These references are available through CDOT.

Stakeholder Workshop

Project Participants

The study methodology emphasized gaining insight from three groups:

- Oversight Committee
- Project Team
- Citizens' Workshop Committee

Participants were selected to provide a balanced perspective for addressing mobility issues faced in the corridor. The role of each group is described in the following subsections.

Oversight Committee

The objective of the OSC was to evaluate the policy implications of the corridor alternatives. The OSC recommended the final or preferred strategy to the Intermountain Transportation Planning Region (ITPR) and the Denver Regional Council of Governments (DRCOG), as well as any other agencies that would implement some aspect of the final recommended strategy.

The OSC consisted of representatives from the corridor. Table 2-1 presents the members of the OSC and the organizations they represented.

TABLE 2-1
Oversight Committee Members

Name	Organization
Aden, Doug	Transportation Commissioner for District 7
Anderson, Flodie	Transportation Commissioner for District 2
Bear, Chuck	Mayor of Silverthorne
Daves, Jim	Federal Highway Administration (FHWA)
Fulton, Greg	Colorado Motor Carriers Association
Haight, Bill	Transportation Commissioner for District 6
Iwamoto, Robert	U.S. Forest Service/White River
Johnson, Jr. James	Eagle County Commissioner
Leonard, Owen	CDOT
Lindstrom, Gary	Summit County Commissioner
Macy, Bill	Mayor of Idaho Springs
Marsella, Cal	Regional Transportation District (RTD)
Martens, Lauren	Colorado Environmental Coalition (CEC)
Martin, John	Garfield County Commissioner
Mills, Melanie	Colorado Ski County USA
Moston, Bob	CDOT
Roussos, George	Eagle County Engineer
Schenk, Jan	DRCOG
Sorenson, Jo Ann	Clear Creek County Commissioner
Trapani, Lou	Intermountain Transportation Planning Region (ITPR)
Unbewust, John	CDOT
Warner, Larry	CDOT
Whitsitt, Jacque	Colorado Association of Ski Towns (CAST)

Project Team

The objective of the Project Team was to review project status and progress, coordinate work efforts, plan workshops, review technologies, evaluate mobility strategies, and help configure implementation strategies. The Project Team included the CDOT project manager, CDOT staff, DRCOG staff, RTD staff, Eagle County staff, and the consultant team.

Citizens' Workshop Committee

The objective of the CWC was to obtain the opinions, knowledge, and guidance of the stakeholders living in and using the I-70 Mountain Corridor. The CWC was key to the implementation of the stakeholder participation process described below. The CWC included approximately 300 individuals. Of these individuals, between 120 and 150 regularly participated in each of the workshops. The CWC mailing list is included in Appendix A.

Stakeholder Participation

The development of consensus for the I-70 Mountain Corridor MIS relied on a comprehensive stakeholder participation process. This process met and surpassed the federal planning regulations suggested in MIS guidance. The foundation for gaining consensus was the collaborative decision-making process involving all affected stakeholders. As shown in Figure 2.2, the stakeholder participation meetings included the following:

- Five CWC workshops
- Six public open houses
- Ten monthly OSC meetings

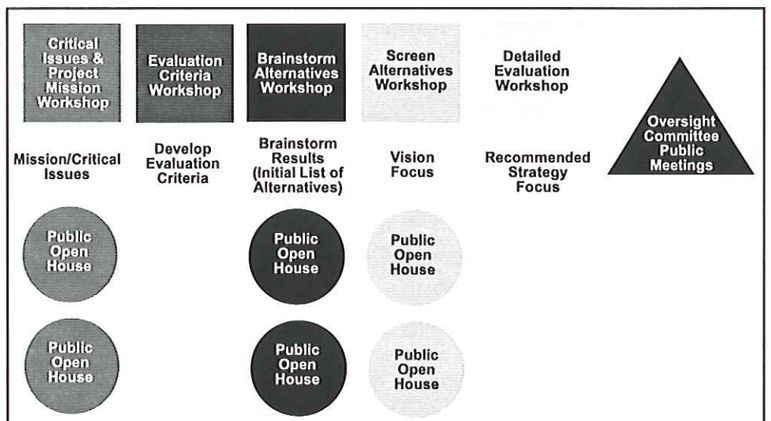


Figure 2.2
Stakeholder Participation Meetings

The CWC workshops were scheduled at critical decision points during the planning process. As a result, stakeholder input was received on all elements leading to the development of a final strategy, as listed below:

- Workshop No. 1—Develop Critical Issues and Project Mission
- Workshop No. 2—Develop Evaluation Criteria
- Workshop No. 3—Brainstorm Alternatives
- Workshop No. 4—Screen Alternatives
- Workshop No. 5—Perform Detailed Evaluation/Recommend a Strategy

The results of Workshop No. 1 are presented in detail below, because these findings set the foundation for the remainder of the study. The results of Workshop Nos. 2 to 5 are highlighted below and discussed in greater detail in Sections 4 and 6.

Workshop No. 1—Develop Critical Issues and Project Mission

On October 23, 1996, the CDOT/CH2M HILL team conducted the Scoping Mission Workshop in Frisco, Colorado. The workshop was attended by approximately 130 people, representing agency staff, resource agencies, special interest groups, and the affected public. At the workshop, critical project issues were identified, the bounds of the study were outlined, and a collective mission statement supported by "guiding principles" was developed.

Critical Issues

The most cited critical issues developed in the workshop fell into four general categories: environmental impacts, community values, safety/mobility, and financing. The major issues identified for each category are presented below.

Environmental Impacts. It was stated that the successful and implementable project would need to be compatible with the environment. Impacts on water quality (from runoff), wildlife (from vehicle-animal collisions, land use, etc.), hazardous waste sites (runoff from old tailings), and aesthetics (from construction scars and permanent structures) would ideally be avoided or mitigated to an acceptable level. Air quality and noise impacts associated with an increase in vehicles were also an issue. There was a strong concern that degradation of the alpine environment would not only impact the quality of life but would also ultimately reduce the area's draw to tourists, thereby reducing employment opportunities within the tourism industry for area residents. There was also a concern that improvements in transportation would bring more development and secondary impacts.

Community Values. In addition to development and growth issues, there was the concern that improvements to transportation within the corridor would result in an erosion of community values, most notably a loss of the rural character of the communities along the corridor. Therefore, the workshop participants suggested that the selected solution would need to support the community goals for land use and development, and the advantages of additional economic opportunity versus the impacts of more development would need to be considered. Impacts from new development, and potentially the project itself, on historic structures and community character were of significant concern.

Safety/Mobility. It was noted that the I-70 Mountain Corridor is the "life-line" of communities in the corridor. As a major element of transport for people and goods, it is the critical link to people and markets on the eastern and western slopes. The impact of more traffic congestion and safety problems resulting from growth were a concern of the workshop participants. The lack of preparedness of many drivers during bad weather compounds the problems caused by more congestion. Workshop participants suggested that the study solution would need to address methods to mitigate the impact of poor weather on traffic conditions.

Financing. The cost of the solution and how it will be funded received the lowest level of priority by the workshop participants compared to the other issues discussed earlier. *In fact, it was determined that cost and affordability should not be screening-level criteria.* Additionally, the participants suggested that those who benefit the most from the project should pay their fair share. The residents of the corridor stated that they do not want to pay disproportionately for any improvements to the I-70 Mountain Corridor. Participants suggested private participation in the funding, such as a Public-Private Venture. It was also recognized that the need for tolling and additional taxes would need to be addressed in the study.

Study Scope Boundaries

The participants' viewpoints on the geographic extent of the project and technologies evaluated are highlighted below.

Geographic Extent. The majority of the participants felt that the study should not be limited to the I-70 Mountain Corridor. There was a strong belief that improvements to other corridors to the north and to the south of I-70 also needed to be investigated, and that additional use of local airports should be considered as a method for relieving traffic in the I-70 Mountain Corridor. There was also the opinion among workshop participants that the project team needed to better understand travel patterns on I-70. They felt the study should evaluate the mobility and travel patterns of people from the Front Range (defined as Fort Collins to Colorado Springs) to the Western Slope. Participants believed that the study should concentrate on solving problems from Floyd Hill to Glenwood Canyon (as opposed to Vail as originally planned).

Technologies Evaluated. The participants indicated a desire to focus on transit strategies other than "traditional" highway solutions such as adding another lane to I-70. The participants generally believed that all transit technologies needed to be considered, including technologies that have not yet been developed such as the full

spectrum of personal rapid transit technologies. It was suggested that today's technologies that are currently unproven may be commonplace tomorrow. The workshop participants urged CDOT to consider a longer planning period, such as 50 years, rather than the standard 20-year planning period. Examples of innovative technologies are provided in Figure 2.3.

Project Mission

As a result of the critical issues defined above, the workshop participants developed the Project Mission and a set of four guiding principles. (See Section 1, Project Mission.)

Workshop No. 2—Develop Evaluation Criteria

The I-70 Mountain Corridor MIS Criteria Workshop was held on May 8, 1997, at the Copper Mountain Conference Center. Approximately 130 participants attended the workshop representing citizen, business, environmental, and other interests. The intent of the workshop was to build on the results of Workshop No. 1, held in October 1996, where critical issues, study-scope boundaries, the project mission, and guiding principles were developed.

Stakeholder Participation

Participants broke into five groups, each under the direction of a facilitator and scribe. Criteria and measurements were developed based on the following four categories of critical issues:

- Environmental Impacts — Minimize or eliminate impacts
  - Wildlife
  - Water quality
  - Air quality
  - Noise
  - Hazardous waste
- Community Values—Preserve the rural character
  - Socioeconomic issues
  - Rural character
  - Historic resources
- Safety/Mobility—Safe movement of people and goods
  - Congestion
  - Safety
- Financing—Ensure that those who benefit pay their fair share
  - User payment
  - Ability to identify funding sources

Criteria Development Process

Each of the critical issues categories became the basis for brainstorming evaluation criteria. The process involved the following four steps:

- Step 1 — Review the critical issues categories
- Step 2 — Develop measures
- Step 3 — Collect data
- Step 4 — Compile data

Step 1—Review the Critical Issues Categories. The following questions were asked by the facilitators:

- Are there other critical issue categories?
- Are there more criteria in a given category?
- Should we look at more than wildlife, water quality, air quality, noise, and hazardous waste impacts under the environmental category?

Technology Fair

In this case, it was collectively determined that threatened and endangered (T&E) species, wetlands, and energy consumption should also be considered.

Under the Community Values category, visual impact, compatibility with local comprehensive plans, and impacts on parkland and environmental justice were added.

Additional criteria under the Safety/Mobility category included movement of freight, weather conditions mitigation, reliability, connectivity with other transportation plans, and accessibility to the system.

Under Financing, one additional criteria category was added: The ability to facilitate flexible and multiple financing into one program.

Step 2—Develop Measures. The intent of Step 2 was to focus on criteria that could be measured objectively with numbers. The facilitators challenged the participants to brainstorm means by which to measure their concerns objectively. As a result, a list of measures was developed.

Step 3—Collect Data. All ideas relating to criteria were recorded for each team. No judgment of the ideas was allowed at this time.

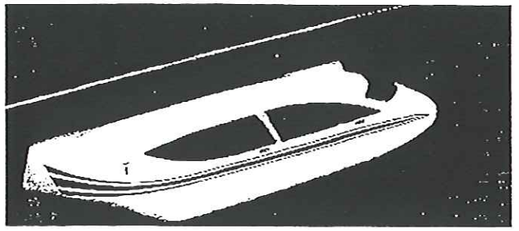
Step 4—Compile Data. After the workshop, the facilitators met to compare notes and search for common themes among the groups. An interim table of all possible criteria was developed. Criteria that were redundant were dropped from the table. Criteria that were required through environmental regulations and not previously included were added. The resulting screening and detailed evaluation criteria are presented in Sections 4 and 6, respectively.

Workshop No. 3—Brainstorm Alternatives

The third workshop was held on June 19, 1997, at the Copper Mountain Conference Center. There were approximately 120 participants representing citizen, community, business, environmental, and other interest groups. The goal of the workshop was to develop a long list of alternative solutions for satisfying the Project Mission identified in Workshop No. 1. This long list of ideas was organized into conceptual alternatives for screening, as presented in Section 3.

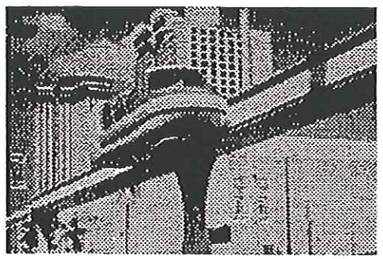
Technology Fair

Before the workshop, a technology fair was held where over 20 presenters displayed proven as well as emerging and innovative transit technologies. Table 2-2 presents the technologies represented at the fair. The intent of the technology fair was to provide the workshop participants with information on the types of innovative systems available for addressing mobility problems.



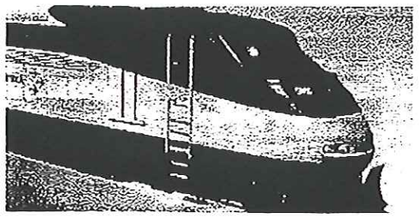
PeoplePod™

The PeoplePod is a magnetically levitated concept that features a lightweight, aerodynamic one- to two-passenger suspended vehicle with possible speeds of up to 100 mph. PeoplePod service would be non-stop on an extensive network of guideways. The vehicle would be collision proof, nonpolluting, and have an energy efficiency equivalent to 400 mpg.



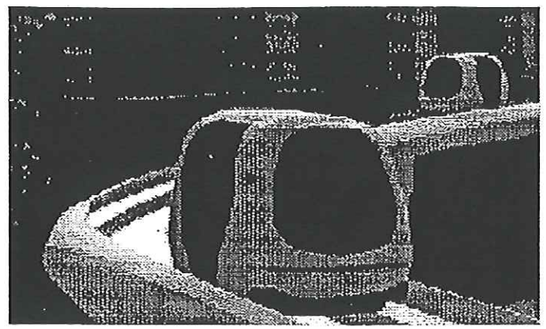
System 21® Monobeam

A technology developed by FUTREX, Inc., System 21 uses 4-car trains capable of seating 52 passengers. The trains hang from one side of a triangular guideway. Design speeds are estimated to be 55 mph for initial installations with a potential for 75 to 125 mph in later installations. The monobeam technology provides two-way travel with the use of only one guideway.



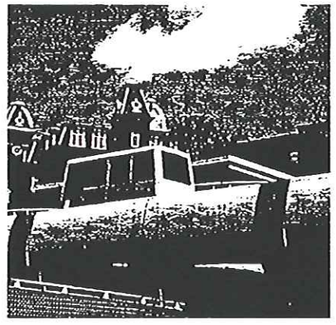
High-Speed Ground Transportation (HSGT)

HSGT is a family of technologies ranging from upgraded existing railroads to magnetically levitated vehicles, which are a passenger transportation option that can link cities lying about 100 to 500 miles apart. The system will soon serve travelers between New York and Boston.



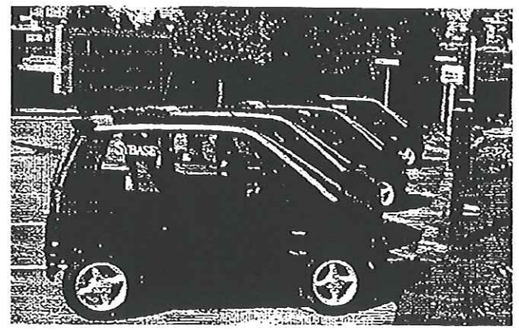
Urban Light Transport (ULTRA)

ULTRA is an automatically controlled personal taxi system that runs on its own guideway with all stations on the network offline to allow ease of travel. ULTRAs are 4-person vehicles that would be accessible at frequent stations within a city. ULTRA traveling speeds would be about 20 to 25 mpg on feeders and 40 to 50 on expressways.



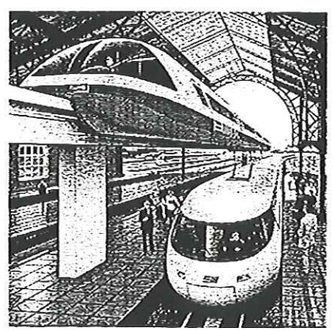
Group Rapid Transit (GRT)

A GRT system has been operational in Morgantown, West Virginia, since 1975, with an expansion in 1978. Each vehicle seats 8 people and offers standing room for 13. All stations are off-line and direct station-to-station service is provided with no intermediate stops. Top speed for the GRT is 30 mph.



Station Cars

Station cars are small battery-powered electric cars that can be rented for use beween home and a mass transit station or a mass transit station and work. The cars are being field tested at the Bay Area Rapid Transit District, Asby Station in Berkeley, California.



Eureka Project 277 Trainline EM Series

EM series trains run on a monorail approximately 6 feet above the ground and travel at speeds of up to 186 mph. EM trains are "one piece" with no between carriage corridors, making derailments virtually impossible.

Figure 2.3
Examples of Innovative Transportation Technologies

TABLE 2-2
Technologies Represented at the Technology Fair

Topic/Technology or Group Represented
1. Intelligent Transportation Systems (ITS)
2. Colorado Passenger Rail Study
3. Front Range Railroad
4. Personal Rail Transit
5. Colorado Transit
6. Linear Induction Motors
7. Cyber Tran
8. High Speed Rail
9. Air Passenger Forecasts
10. Options for Transportation (Star Trans)
11. Alternate Routes
12. CORT system, a PRT- type option, which moves both people and freight on an overhead guideway
13. Flex-Lane and High-Tech Platform options. (Highway options that limit construction areas to within the existing I-70 guard rails)
14. Rader Railcar Inc. Purveyors of luxury railcars
15. Colorado Central Railroad, a narrow-gauge railroad between Idaho Springs and Central City and Black Hawk

Workshop No. 4—Screen Alternatives

Workshop No. 4 was held on September 11, 1997, at the Easter Seal Handicamp near Idaho Springs. Attendance at the workshop was approximately 120 persons. As discussed in more detail in Section 3, the workshop covered only the long-term or "Vision" alternatives:

- Non-Fixed Guideway Transit
- Fixed-Guideway Transit
- Aviation Alternatives
- Alternate Routes
- Highway Alternatives

The intent of the workshop was to eliminate the unacceptable long-term vision alternatives within each mode. While the goal was to identify at least one acceptable alternative within each mode, there were no limitations placed on eliminating all alternatives within a category.

The workshop format included a general session, open house, and breakout groups for general discussions of the alternatives. The purpose of the open house session was to afford the participants an opportunity to ask questions of the project team to be better prepared for the workshop. Display boards of each of the alternatives, as well as background data covering environmental, traffic forecasting, accident, and other issues relevant to screening the alternatives were presented.

Innovative Technologies Exhibit

Workshop No. 5—Perform Detailed Evaluation

Workshop No. 5 was conducted on December 11, 1997, at the Easter Seal Handicamp near Idaho Springs. Approximately 130 persons participated in the workshop. The intent of this workshop was to review the results of the preliminary Detailed Evaluation Report prepared by the project team and, based on this information, select a preferred strategy. Six strategies were evaluated:

- No-Build (NB) Strategy
- Transportation System Management/Travel Demand Management (TSM/TDM) Strategy
- Bus/High Occupancy Vehicle (HOV) Strategy
- Fixed Guideway Transit (FGT) Strategy
- Fixed Guideway Transit/Selected Highway Improvements (FGT/SHI) Strategy
- Highway Widening (HY) Strategy

Copies of the preliminary Detailed Evaluation Report were sent to the participants one week prior to the workshop. The agenda for the workshop included an overview presentation of the detailed evaluation, including questions and answers, followed by breakout group discussions. At the close of the workshop, all of the participants met as a combined group to discuss the conclusions from the breakout groups and decide on the preferred strategy of improvements. As discussed in more detail in Section 6, the group achieved consensus by selecting a Vision that included FGT combined with all of the elements of the TSM/TDM package with the exception of congestion pricing.

Open Houses

Open houses were held after each project workshop to present the findings of the workshop and to receive additional public input. The results of Workshop No. 1, Scoping and Mission Development, and Workshop No. 2, Developing Evaluation Criteria, were presented during September 1996. The ideas developed in Workshop No. 3, Brainstorming Alternatives, were presented in June, 1997. In September 1997, the results of Workshop No. 4, Screening Alternatives, were presented with a special focus on the TSM alternatives in open houses in the cities of Georgetown and Eagle. A focus on the TSM alternatives was provided, since the workshop had concentrated on the evaluation of the more comprehensive vision alternatives.

SECTION 3

Corridor Context

The I-70 Mountain Corridor is the primary east-west highway link in the State of Colorado. It is a significant highway for both interstate and intrastate travel. I-70 connects the front range metropolitan areas to the majority of the skiing and other recreation areas in the state.

The I-70 Mountain Corridor traverses a difficult and sensitive environment. The 140-mile corridor contains numerous areas with steep grades, sharp curves, and a growing percentage of heavy slow-moving vehicles (trucks, RVs, etc.). As shown in Figure 3.1, the physical nature of the mountainous corridor presents numerous challenges and constraints for construction of new or additional transportation modes.

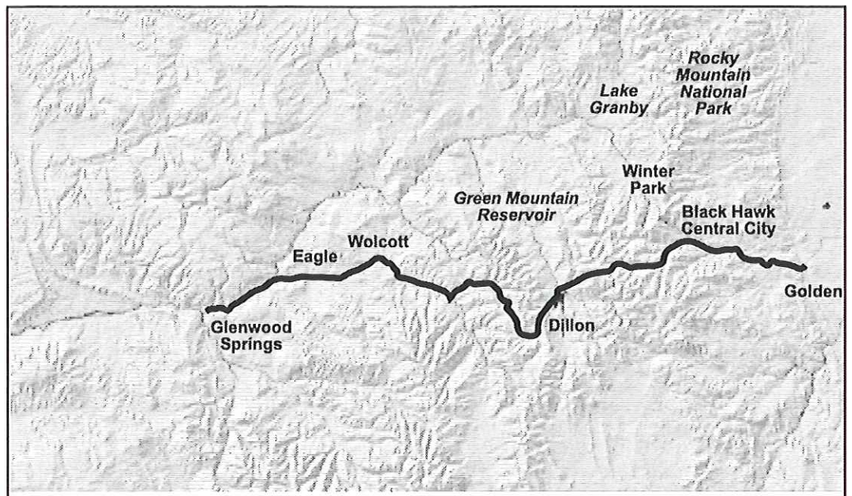


Figure 3.1
General Topography of I-70 Corridor

There are many highway structures along I-70, consisting of bridges, concrete box culverts, retaining walls, tunnels, and overhead sign structures. Right-of-way (ROW) widths vary throughout the I-70 corridor. They are generally set at 150 to 200 feet from the centerline of the median, to each side of I-70. Consequently, the existing ROW appears to be sufficient to accommodate either transit or highway mobility improvements.

This section presents the baseline information used to evaluate the impacts and effectiveness of the alternative mobility packages considered for the I-70 Mountain Corridor. The information is provided in the following categories:

1. Environmental Baseline
2. Community Baseline
3. Mobility Baseline
4. Travel Demand Forecasts
5. I-70 Needs Assessment

Environmental Baseline

Environmental baseline data include wildlife habitation/migration routes, T&E species, water resources and water quality, wetlands, hazardous waste, air quality, and noise. These categories follow the criteria subsets recommended by the CWC.

Wildlife Habitat/Migration Routes

The area surrounding the I-70 Mountain Corridor provides a wealth of habitat for many species of wildlife. A wide variety of ecosystems are present throughout the area due to the changes in elevation as the corridor descends from Vail to Denver. The ecosystems surrounding the I-70 Mountain Corridor include the following:

- Wetlands and riparian areas share similar characteristics of soil saturation, proximity to drainages, and plant community composition. Riparian ecosystems occur as valley-bottom corridors along rivers and streams. At lower elevations, riparian plant communities are comprised of willows and cottonwoods, while at higher elevations willows, alders, and sedges are dominant. This ecosystem is extremely rich in fauna due to the resources it offers: cover, abundant food, migration routes, and water. Riparian systems have the highest species richness of all the ecosystem types in Colorado.
- Canyon and gulch ecosystems provide corridors for movements of wildlife; their south-facing slopes provide favorable microclimates. Only hardy, well-adapted species are capable of utilizing the canyon walls as habitat. This is typically limited to species of birds and reptiles. Few plants are able to survive with the exception of those that occupy fissures that have collected soil from overland runoff.
- Semi-desert shrubland occurs in arid regions at lower elevations. This is a cold desert ecosystem, which is dominated by shrubs over a sparse understory of grasses and forbs, or even bare ground where poor, alkaline soils and drought prevail. The dominant plants consist of sagebrush species, greasewood, shadscale, saltbrush, rabbitbrush, and balsamroot. These factors limit wildlife occurrence.
- Piñon-juniper woodlands are open stands of juniper, which occur in warm, well-drained areas. They are typically bounded by semidesert shrubland and montane shrublands. The junipers are drought tolerant and typically dominate the lower areas, whereas piñons are more cold tolerant and dominate the upper extreme. Grasses, cacti, and a variety of annual and perennial composites form much of the sparse ground cover. Many large mammals and birds use this ecosystem seasonally to avoid the rigors of higher elevations. Species diversity in the area is typically high, in Colorado second only to riparian systems. The dominant plants consist of piñon pine, Utah juniper, red cedar, blue grama, June-grass, Indian ricegrass, prickly-pear, fescues, muhly, and blue-grass.
- Montane shrublands typically occur at higher elevations than either grasslands or piñon-juniper woodlands. This system is characterized as having Gambel oak communities intermingled with piñon-juniper, and mixed stands of service berry, snowberry, and rabbitbrush. This system is a rich and diverse ecosystem, which supports plants and animals more typical of adjacent ecosystems. They serve as a winter refuge for some species. The dominant plants include the Gambel oak, mountain mahogany, serviceberry, skunkbrush, smooth sumac, wax currant, wild rose, needle-and-thread, and choke cherry.

In addition, there are numerous designated wilderness areas in the corridor vicinity, providing preserved ecosystems for wildlife. Wilderness areas and migration routes are shown in Figure 3.2.

- The corridor lies within valleys between mountain ranges and thus is a natural wildlife migration corridor. Wildlife species migrate throughout the corridor in response to forage/prey availability that is a function of seasonal changes. The major large animal species include mule deer and elk.
- Other migratory species are known to occur in Colorado such as moose, pronghorn antelope, and the greater sandhill crane, but do not generally occupy the immediate I-70 corridor because the habitat is not preferential for their occurrence. One exception is the bighorn sheep that often frequent the I-70 right-of-way through Clear Creek County.

Threatened and Endangered Species Habitat

T&E species of wildlife and vegetation are known to exist in the area surrounding the I-70 Mountain Corridor. The major habitat areas for these species are shown in Figure 3.3.

The results of this review indicate the following:

- The current I-70 corridor traverses the known habitat range of the lynx.
- Federally protected species of the Ute's ladies tresses (*Spiranthes diluvialis*) and the Preble's meadow jumping mouse (*Zapus hudsonius preblie*) are known to occur within riparian areas associated with canyon mouths.
- The I-70 corridor is adjacent to a stream or river throughout most of the proposed project area (i.e., the Colorado River, Eagle River, Gore Creek, and others). There is minimal record of occurring aquatic T&E species with the exception of the green backed cutthroat (*Oncorhynchus clarki stomias*), which has been historically observed within Clear Creek at Dumont.

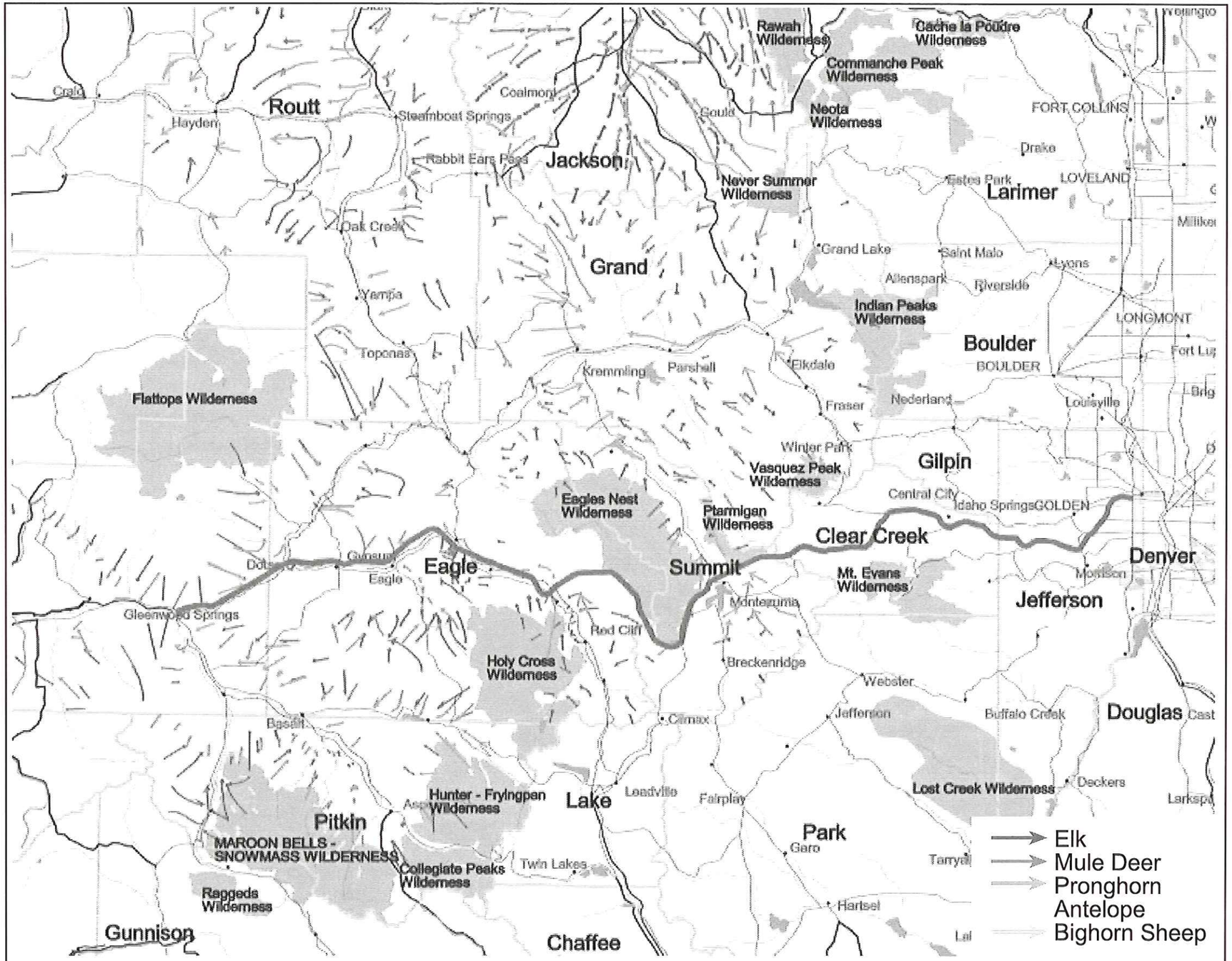


Figure 3.2
Wilderness Areas and Wildlife Migration Routes

- The Colorado cutthroat trout (*Oncorhynchus clarki pleuriticus*) has been observed at Corral Creek (near Vail pass), Polk Creek, and Miller Creek.
- Loveland Pass contains two occurrences of rare high alpine butterflies and plants. The existence of these species is under some threat from current recreational use.
- The Boreal Toad is known to reside on both sides of I-70 immediately east of Eisenhower Tunnel.

Water Resources and Quality

The I-70 Mountain Corridor parallels streams and rivers over most of its length. Approximately 100 miles of the 140-mile I-70 corridor parallels a nearby creek or river. In addition, the project corridor crosses named creeks or rivers at 77 locations. As mentioned below, when all categories of water resources are included, the number of crossings is 177.

Water quality is frequently judged by its ability to support beneficial uses. Higher levels of water quality support greater levels of beneficial uses such as a public drinking water supply and trout fisheries. Within the corridor, Clear Creek, Straight Creek, and Gore Creek are all used as public water supplies. Figure 3.4 shows the public water supplies in the corridor.

With the exception of portions of Clear Creek, which was contaminated principally by mining operations above and below Idaho Springs, the water quality of streams in the corridor is generally high.

Runoff from rain and snow that flows over exposed mineral-rich rock cuts or fills can potentially pick up acid and toxic metals, and contaminate downstream waterways in a similar fashion to abandoned mine sites. Areas with such mineral-rich rocks include locations in the vicinity of Idaho Springs, Dumont, Bakerville, Georgetown, and areas just west of Loveland Pass.

Wetlands

Wetland areas are generally associated with streams, irrigation canals, and other drainages.

Each of these metrics is discussed below.

As mentioned earlier, I-70 crosses approximately 177 rivers, streams, irrigation canals, and intermittent drainages. Of the total, approximately 100 are unnamed drainages, which exhibit intermittent flow and may not meet the jurisdictional wetland definition. Approximately 24 miles of riparian corridor are situated within 150 feet of the existing I-70 ROW.

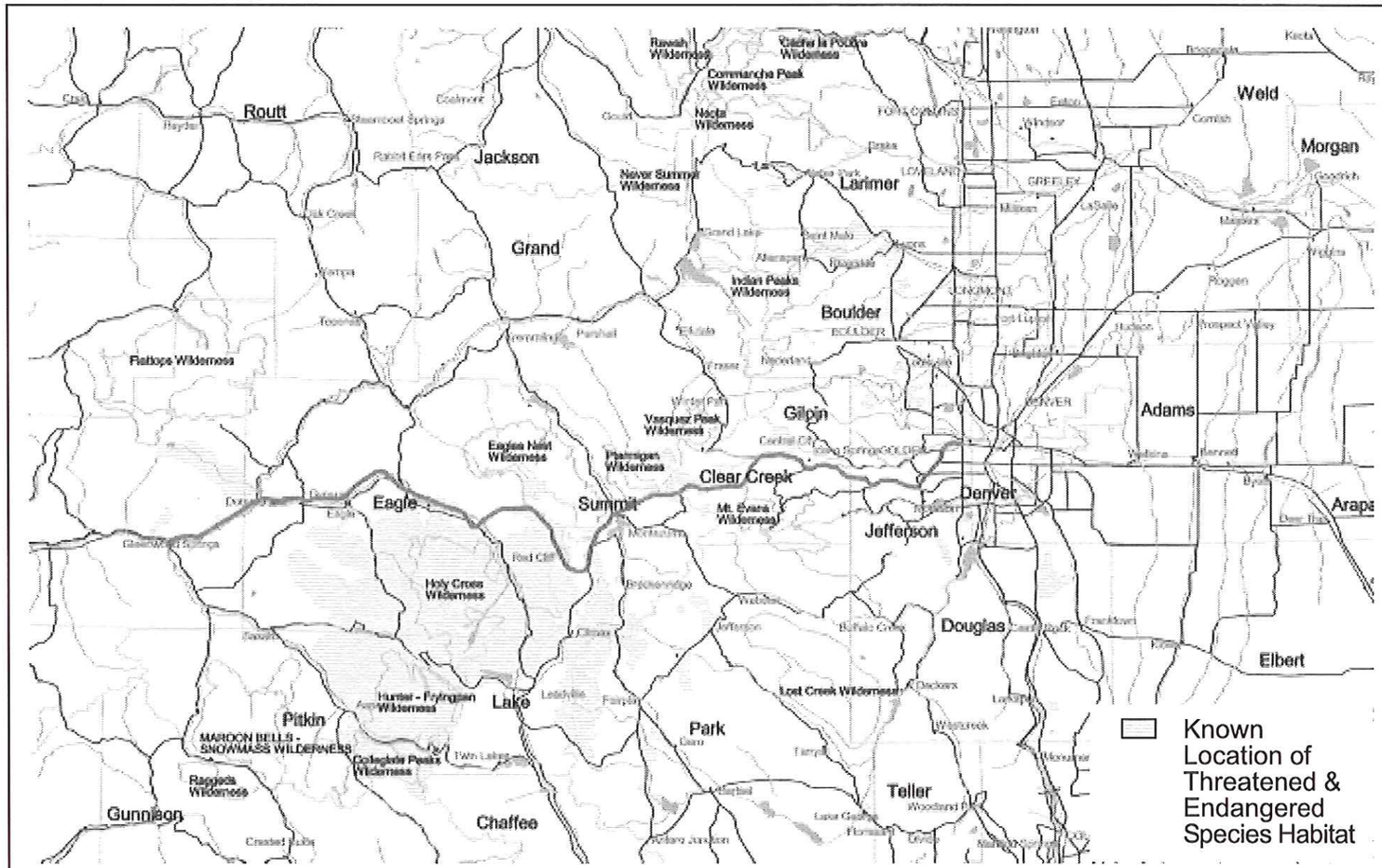


Figure 3.3
Threatened & Endangered Species Habitat Areas

Based on this information, the following areas are of special wetlands concern:

- **Clear Creek:** Between U.S. 40 and U.S. 6 (Mile Post [MP] 232-245), approximately 7.5 miles of Clear Creek are situated within 150 feet of the existing I-70 footprint. Along this segment, much of Clear Creek is sparsely vegetated and highly disturbed due to its proximity to I-70 and mining activity.
- **Straight Creek:** Between Silverthorne and the west portal of the Eisenhower Tunnel (MP 205-214), Straight Creek parallels I-70 to the south. Wetlands associated with Straight Creek include emergent and scrub/shrub wetlands, many of which were formed by historic beaver activity. These wetlands generally exhibit higher quality wildlife habitat due to the relative distance from I-70 and the well-developed wetland vegetation. Although these wetland areas are located more than 150 feet from the existing I-70 footprint, development on the south side of I-70 may require fill to be placed as far downslope as Straight Creek.
- **Tenmile Creek:** Between Frisco and U.S. 91 (MP 196-201), approximately 2.5 miles of Tenmile Creek are situated within 150 feet of the existing I-70 footprint. Wetlands associated with Tenmile Creek along this segment include scrub/shrub and open water areas, many of which are associated with historic beaver activity. In addition, widening of the existing I-70 footprint would potentially encroach on the Curtain Ponds on both sides of I-70 just north of U.S. 91.
- **East Approach, Vail Pass:** A well-developed willow wetland complex is situated along I-70 from just west of U.S. 91 to Vail Pass (MP 191.5-194.5). This wetland complex is associated with Tenmile Creek and is situated between eastbound (EB) and westbound (WB) I-70. In addition, 11 drainages enter Tenmile Creek along this segment.
- **Eagle River:** Between MP 159 and 169, improvement of U.S. 6 into a 4-lane highway has been proposed as an alternative to widening I-70. Approximately 3.5 miles of the Eagle River are situated within 150 feet of U.S. 6 along this segment.

Hazardous Waste

Constructing transportation infrastructure within the project corridor includes the possibility of having to manage hazardous wastes and hazardous material spills. Figure 3.5 shows the regulated hazardous waste sites in the corridor.

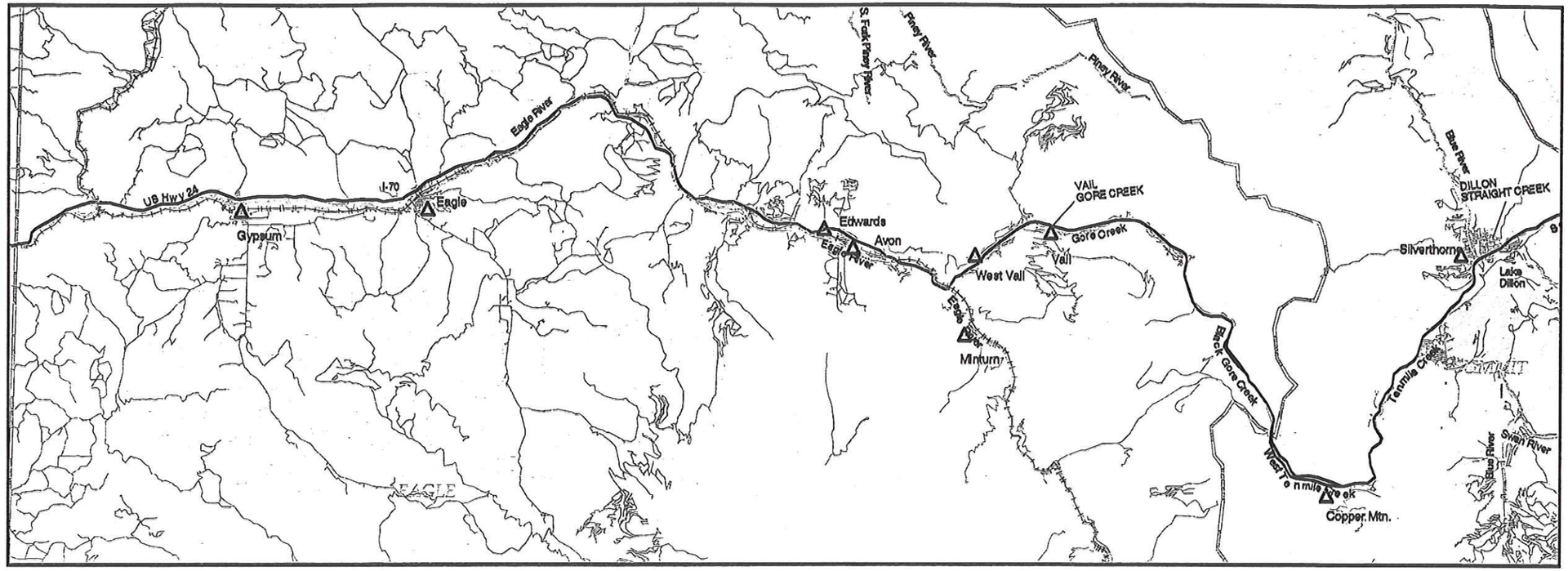
The two major regulated hazardous waste sites in the vicinity of the corridor are the Clear Creek Central City and the Eagle Mine sites. These two Superfund sites each contain numerous abandoned mines. In addition to these two Superfund sites, there are over 1,300 additional smaller abandoned mining sites in the vicinity of the project corridor that have been identified but are not yet regulated. Runoff from rain and snow flows through these mining sites and picks up acid and toxic metals that contaminate downstream waterways. Runoff from these abandoned mining sites is primarily responsible for the areas of high and moderate aquatic biota toxicity in Clear Creek and some of its tributaries. The Eagle River, downstream of the Eagle Mine site, had similar toxicity problems before the clean up of this site.

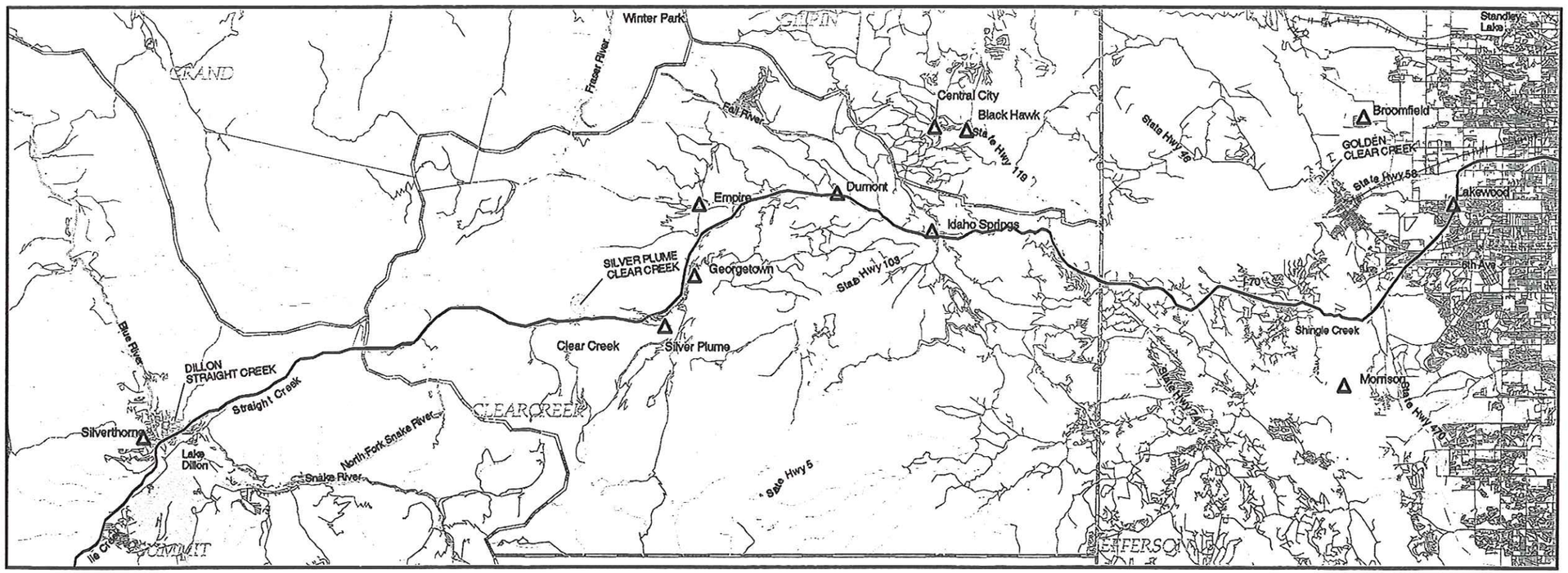
There are no regulated hazardous waste sites that are within the project corridor or the construction ROWs. However, the U.S. Environmental Protection Agency (EPA) reports that there are mine tailings in the existing I-70 ROW. There may be additional mine tailings along I-70 near Dumont and perhaps at a few other locations that could be impacted by construction in the project corridor.

There were no reported spills of hazardous materials on I-70 in the project corridor in 1996. However, the potential impacts of such spills on drinking water supplies and trout fisheries are significant because the project corridor parallels streams and rivers over most of its length. Public water supply agencies within the project corridor are acutely aware of the potential for spills and have developed contingency plans. These plans include an immediate spill reporting and notification system, emergency response cleanup, and bypass of contaminated water. Many of the water supply agencies have alternative water sources that can be used on a temporary basis.

Air Quality

The majority of the I-70 Mountain Corridor is situated outside of the Denver Metropolitan area and is considered to be in an air quality attainment area. Colorado Department of Public Health and Environment (CDPHE) has monitored PM_{10} in the communities of





Public Water Supplies

Colorado Department of Transportation

△ City/Town

Town and Public Water Supply

Area Hydrology

County Boundary

Road

Highway

Interstate 70 (I-70)

Railroad

Notes:

1. Arvada, Northglenn, Thornton, and Westminster get water supply from Lower Clear Creek based on a variety of means.

2. Only water supplies whose source is a creek or river paralleling I-70 are shown. Many towns have alternative water supply sources.

Figure 3.4
Public Water Supplies

Scale 1:300000

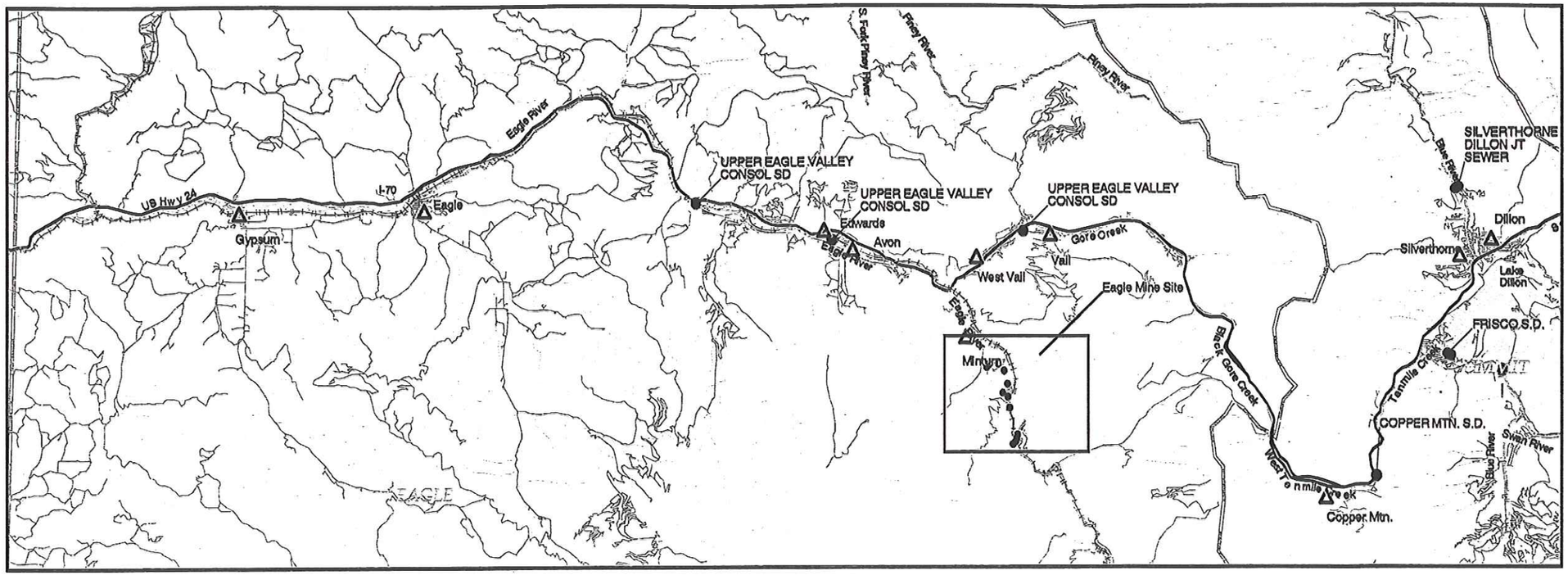
1 in = 4.7 mi

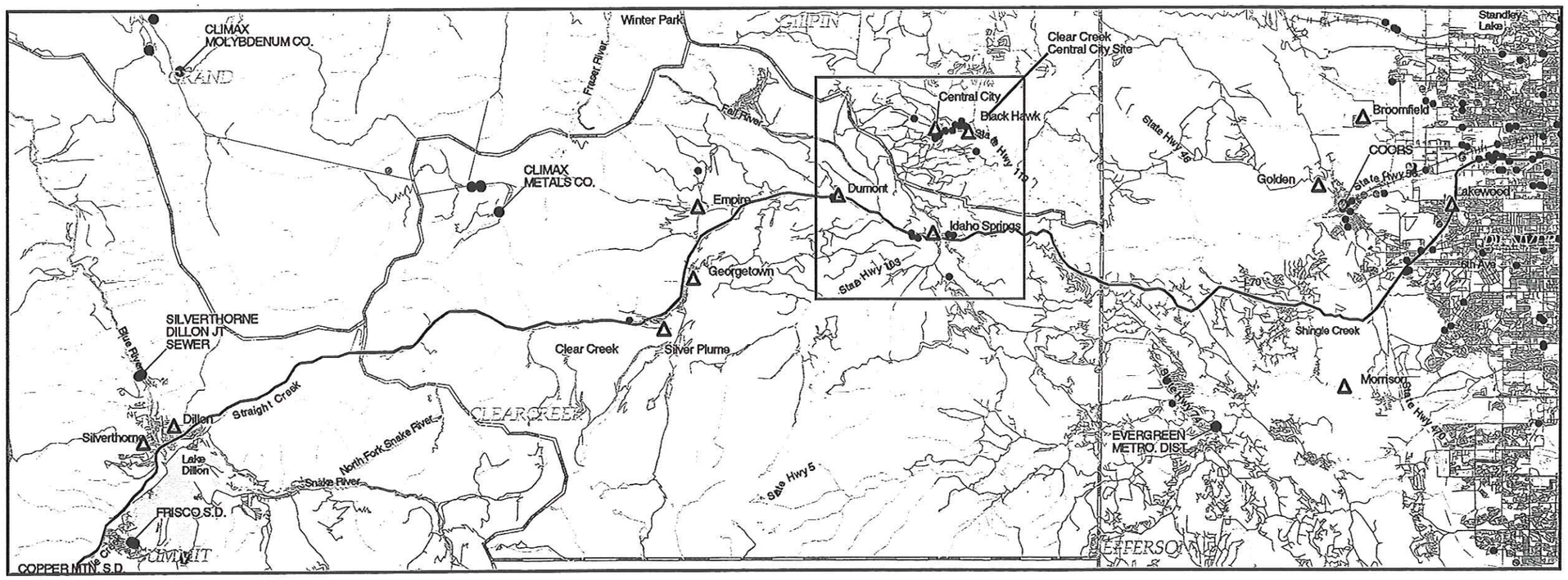
0 1 2 3 4 5

MILES

Mapping Sources: CH2M HILL, EPA Region VIII

CH2MHILL





Regulated Facilities

Colorado Department of Transportation

- City/Town
- Superfund Sites
- RCRA Sites
- Selected NPDES Discharges
- TRI Sites

- Area Hydrology
- County Boundary
- Road
- Highway
- Interstate 70 (I-70)
- Railroad

Figure 3.5
Regulated Hazardous Waste Sites

Scale 1:300000
1 in = 4.7 mi
0 1 2 3 4 5
MILES

Mapping Sources: CH2M HILL, EPA Region VIII

CH2MHILL

Silverthorne, Breckenridge, Vail, Avon/Edwards, and Glenwood Springs. The communities of Vail and Breckenridge have had high levels of PM_{10} in the past, which could be a result of woodburning and sanding of roads in winter months. In general terms, however, the existing air quality throughout the corridor is good.

Noise

Background noise conditions in the I-70 Mountain Corridor have not been quantified for this report. In general, significant levels of noise were and will continue to be present within the I-70 Corridor due to traffic and other mobile sources of noise.

Community Baseline

The Western Slope of Colorado has been one of the fastest growing regions of the state in recent years on a percentage basis. The potential for further gains and above-average growth is likely because of the area's attractiveness. The I-70 Mountain Corridor will absorb a large part of this growth, resulting in increased demands on the transportation system servicing this area. Many residents are deeply concerned about the impacts of additional development, loss of rural character, and quality of life. There are also public concerns that improvements in mobility and access in the I-70 corridor would encourage additional growth. This section highlights past and current trends in land use, population, and employment.

Land Ownership and Land Use

The study area is characterized as a mountainous and rural area where the vast majority of land is under federal ownership. In general, these federal lands are available for recreational use by the public both from Colorado and nationally. Several ski areas can be found on these federal lands: Loveland, Arapahoe Basin, Copper Mountain, Vail, Beaver Creek, and Arrowhead. Other recreation includes camping, hiking, rock climbing, fishing, hunting, and sightseeing.

Because of its unique natural amenities, the area continues to experience intense development pressure, especially in Jefferson, Summit, Eagle, and Garfield counties. As a result of a high percentage of lands belonging to the federal government, pressures to acquire and develop private land in the corridor are increasing. The limited availability of private land has caused housing prices to increase dramatically and residential development to migrate out even farther into rural areas. As described in more detail in the subsection discussing socioeconomics, Summit, Eagle, and Garfield counties are expected to realize a near doubling of population over the next 20 years. This factor, along with the increasing recreational use, has increased traffic and congestion on I-70.

Local Planning

Within areas of privately held land, use is generally guided by county or municipal land use plans. As a part of this study, each comprehensive plan or land use plan for these entities was reviewed as available. Most have similar goals for land use, including reduction of sprawl, preservation of rural character, and provisions for alternate travel modes. All local plans identify the need for more affordable housing located near employment centers.

The following subsections summarize the type of land use found in each of the five counties in the I-70 Mountain Corridor.

Jefferson County. Jefferson County is widely considered to be a part of the Denver Metropolitan area. For the I-70 Mountain Corridor MIS, only the western portion of Jefferson County is a part of the study area. This end of Jefferson County extends into the mountains along I-70 and includes the communities of Evergreen, Bergen Park, and Lookout Mountain. The county is growing rapidly and is a large source of commuters traveling within the Denver Metro area.

Much of the land in Jefferson County is privately held, a factor which has exposed the county to a significant amount of development in the past 20 years. The Pike National Forest comprises 172 square miles or 22 percent of Jefferson County, while the Roosevelt and Arapahoe National Forests comprise only 0.5 percent.

Clear Creek County. Clear Creek County is situated in a rugged mountainous area, with I-70 traversing the county in an east-west direction. The county contains the historic communities of Idaho Springs, Georgetown, Empire, and Silver Plume. Clear Creek County offers a variety of outdoor recreational activities and can be reached in only 35 minutes from Denver on I-70. However, growth in this county has been modest to date and has not contributed significantly to traffic on I-70.

The county contains a total of 396 square miles. Of this, 66 percent is owned by the U.S. Forest Service, and 24 percent is privately owned land in unincorporated areas. Although Clear Creek's neighbor, Jefferson County, has a higher percentage of privately held land, there is still a substantial amount of private land in Clear Creek County that could be subject to development pressures in the near future.

Summit County. Although Summit County encompasses just under 600 square miles of land, only an estimated 150 square miles or 25 percent is privately held. The vast majority of this 150 square miles is found in a narrow band along the valleys and adjacent to the major road corridors of I-70 and Colorado State Highways 6 and 9. It is along these major roadways that the bulk of the county's existing and approved development occur, often in conflict with some of the county's most environmentally important and sensitive lands. The county is projected to build out all existing approved development areas and more than double the number of housing units in less than 50 years. Consequently, Summit County is projected to be responsible for increasing travel demands on I-70.

Eagle County. Eagle County is also heavily oriented to recreational opportunities. Approximately 80 percent of the county is comprised of public land. The demand for housing and development pressure has been high and constantly increasing during the 1990s.

According to the Eagle County master plan, the growth in the county has been occurring in previously undeveloped locations and has taken on a form of sprawl generally following the I-70 Mountain Corridor. Urbanized land use is projected to double in the next 20 years, placing additional travel demands on I-70.

The county would like to direct future growth by protecting critical wildlife habitat and other key environmental resources, preserving open corridors between communities and the rural character of the county's outlying valleys, encouraging energy-efficient development patterns, and efficiently delivering public services and public transportation.

Adopted county policies discourage "leapfrog" growth and direct growth to occur where infrastructure is available.

Garfield County. The Bureau of Land Management and the U.S. Forest Service collectively manage approximately 64 percent of the land in Garfield County. Agricultural uses occupy over 88 percent of the privately owned land within the county. The remaining 12 percent of privately held land is used for residential, commercial, and a very small amount of industrial use.

Garfield County and Glenwood Springs are known for year-round recreational opportunities and related services. Primary recreational facilities and attractions include the Hot Springs Pool, Sunlight Ski Area, White River National Forest, the Colorado and Roaring Fork rivers, and Glenwood Canyon. Like Summit and Eagle counties, this county is projected to nearly double in the next 20 years, causing additional traffic on I-70.

Socioeconomic Conditions

State Population

The population within Colorado has grown more rapidly than the national average for the last 50 years, and the 1994-95 growth rate of 2.3 percent was the third highest in the nation. Between 1995 and 2010, Colorado's population is expected to grow by another 960,000 people. The state expects that nearly 60 percent of this growth will migrate to Colorado. Net in-migration on the Western Slope is expected to account for as much as 78 percent of its population growth between 1995 and 2010.

I-70 Corridor Population

Clear Creek, Eagle, Garfield, Gilpin, Jefferson, and Summit counties are very different from one another in population and demographics. The combined total population of these counties was 513,902 in the 1990 census. Populations ranged from 3,070 residents in Gilpin County to 438,430 residents in Jefferson County, which accounted for 85 percent of the total six-county population. By 1995, the population

of these counties was estimated to have grown to 581,862, an annual rate of increase of 2.5 percent.

Table 3-1 shows the state's population forecasts for the I-70 Mountain Corridor counties in conjunction with its state population projections.

TABLE 3-1
I-70 MIS County and State Population Forecasts (1995-2020)

County	1995	2000	2010	2020
Clear Creek	8,621	9,273	10,782	12,125
Eagle	28,687	34,989	45,260	54,087
Garfield	35,731	41,010	50,981	61,051
Gilpin	3,660	4,287	5,616	7,202
Summit	17,146	20,801	27,782	34,071
Mountain County Subtotal	93,845	110,360	140,421	168,536
Jefferson	488,017	518,623	566,527	609,848
I-70 Mountain Corridor Total	581,862	628,983	706,948	778,384
State Total	3,747,566	4,100,962	4,710,393	5,298,097

Source: Colorado Demography Section, Colorado Division of Local Government, Web Site, 1997.

Selected population statistics for residents of the I-70 Mountain Corridor counties are shown in Table 3-2.

TABLE 3-2
Selected Population Characteristics (1995)

County	Percent 65 years and over	Percent owner-occupied housing	Percent high school graduates	Percent college graduates
Clear Creek	6.8	71.9	91.8	31.2
Eagle	3.0	57.5	89.8	33.0
Garfield	9.6	57.9	85.2	21.6
Gilpin	4.5	75.5	93.0	29.5
Summit	2.8	48.2	95.5	39.7
Jefferson	9.5	70.1	89.8	30.7

Source: U.S. Bureau of the Census Web Site, 1998

I-70 Corridor Employment

Table 3-3 shows the civilian labor force available by county and the percent of unemployment for each of the I-70 Mountain Corridor counties.

TABLE 3-3
Labor Force Availability (1994)

County	Civilian labor force	Percent unemployed
Clear Creek	4,827	4.7
Eagle	15,691	4.4
Garfield	18,945	4.4
Gilpin	2,926	3.0
Summit	10,111	3.5
Jefferson	280,580	3.3

Source: U.S. Bureau of Labor Statistics Web Site, 1998

The State of Colorado reported 4.2 percent unemployment for 1994, according to the Department of Labor and Employment (Colorado State Data Center Web Site, 1998). The average unemployment rate as a percent of the labor force in the United States was reported as 6.1 percent in 1994 and 5.6 percent in 1995.

A summary of the historic and forecast employment and population for the I-70 Mountain Corridor counties (excluding Jefferson County) is provided in Figure 3.6.

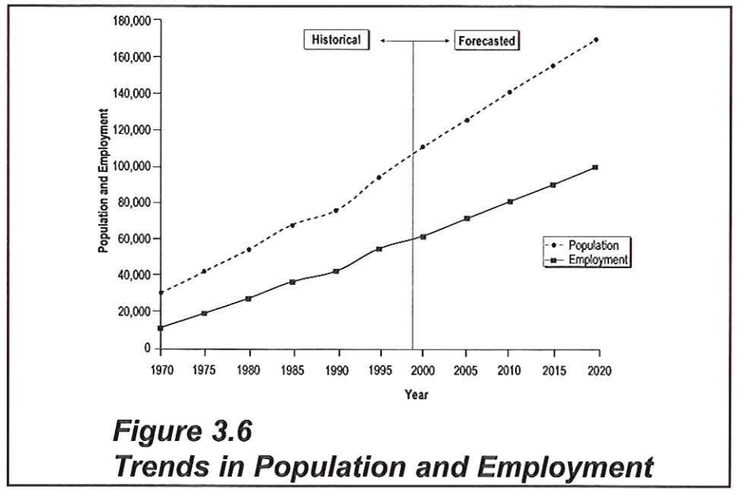


Figure 3.6
Trends in Population and Employment

Mobility Baseline

This section describes the existing conditions for highway, transit, aviation, and bicycle and pedestrian facilities within the I-70 Mountain Corridor. It is, along with the two sections that follow entitled Travel Demand Forecasts and I-70 Needs Assessment, presented in the companion Mobility Evaluation Report in much greater detail and with references to reports, studies, and other documentation used in the preparation of the analyses that follow here. Readers wishing more information concerning the development of material in these sections should consult the *I-70 Mountain Corridor MIS: Mobility Evaluation Report* (CH2M HILL, et al., 1998b).

Highway

Context of I-70 in the National and Statewide Highway System

I-70 is the primary east-west highway link in the State of Colorado. It has significance for both interstate and intrastate travel. Figure 3.7 illustrates daily traffic volumes on the primary highways linking the

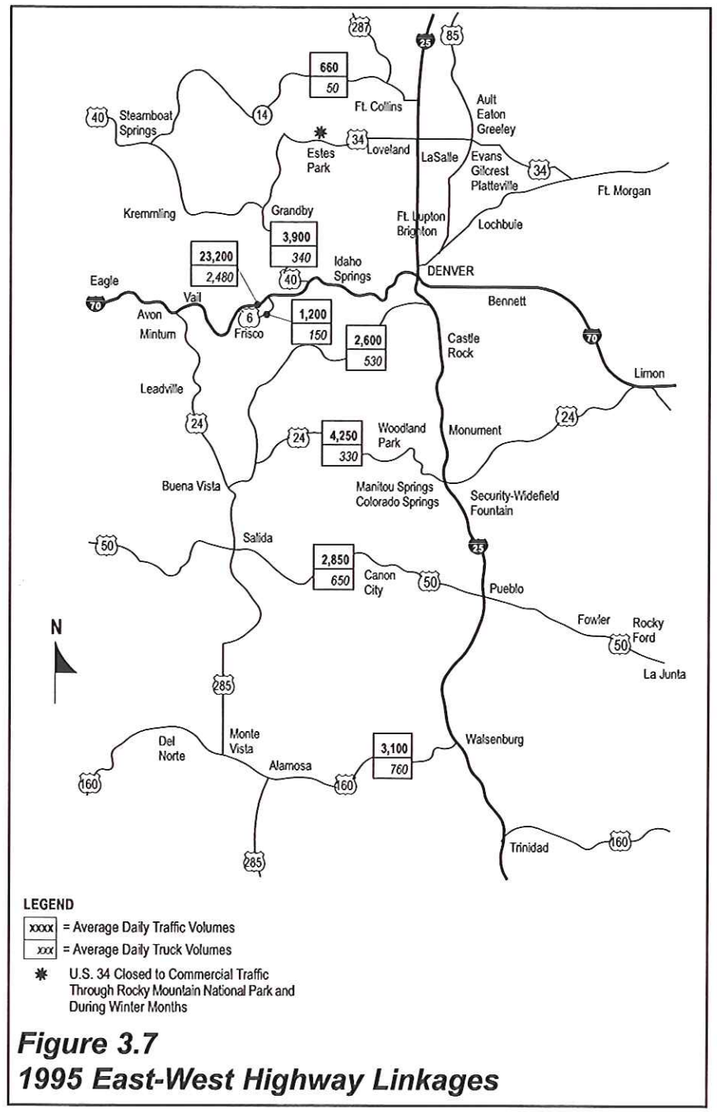


Figure 3.7
1995 East-West Highway Linkages

eastern and western parts of the state. I-70 carried almost 56 percent of the state's total east-west traffic in 1995. U.S. 6 and U.S. 40 combined with I-70 account for 68 percent of the east-west traffic across the state.

I-70 carried approximately 48 percent of the east-west truck traffic in the state. I-70 is very important from the perspective of truck traffic in the western states. In Colorado, I-70 is one of the major corridors for truck traffic between the West Coast and the Upper Midwest/ Northeast parts of the country.

Past and Present Patterns of Use

General Growth. Figure 3.8 provides CDOT 1995 average daily volumes along major segments of I-70 and on other state highways that intersect I-70. These volumes emphasize the importance of I-70 as a conduit within the Mountain Corridor and as a connector between communities. Traffic volumes decrease from the Denver Metropolitan area up to Summit County. The volumes increase in Dillon/Frisco and then again in Eagle County.

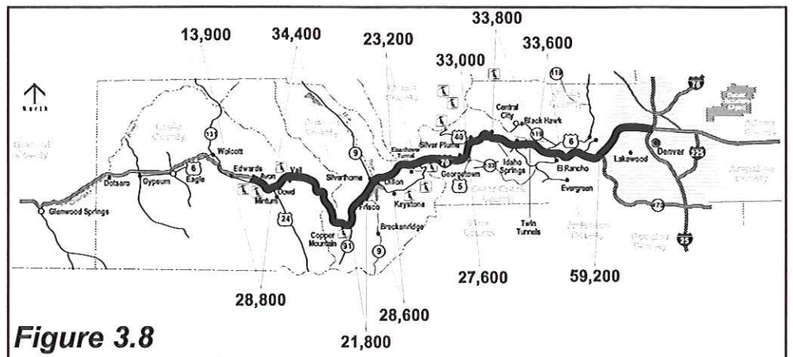


Figure 3.8
Existing (1995) Annual Average Daily Traffic Volumes

CDOT has established three Automatic Traffic Recorder (ATR) stations on I-70 and one on U.S. 40 that have been in operation for a number of years. The three ATRs on I-70 are located east of the Genesee interchange in Mount Vernon Canyon, at the Eisenhower Tunnel, and at No Name interchange just east of Glenwood Springs. Although the No Name location is outside of the primary study area, it provides a good indication of traffic characteristics in the western portion of the corridor. The ATR on U.S. 40 was established in 1989 and is located at Berthoud Falls on the east side of Berthoud Pass. Figure 3.9 shows the growth in traffic since 1971 at three of these four sites.

Since 1971, traffic on I-70 has grown by almost 4 percent per year at the No Name interchange. This growth primarily reflects "background" growth happening statewide and nationwide. The growth rate at the Eisenhower Tunnel has been more than 5.5 percent per year, although this rate has decreased significantly in recent years. In addition to the background growth measured at No Name,

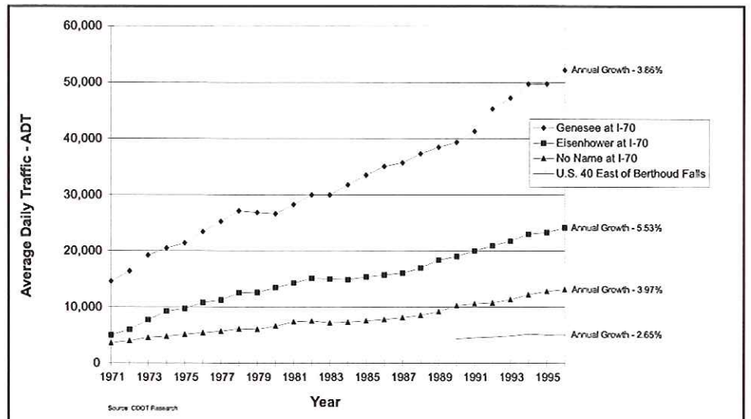


Figure 3.9
Traffic Growth Rates 1971 to 1995

the increase in traffic at the tunnel reflects the increased access demand to recreational activities and second homes in Summit and Eagle counties. Traffic at Genesee has grown at an annual rate of 3.9 percent. Although the percentage of growth is slightly lower than at No Name, the increase in absolute volume of traffic has been highest at Genesee, resulting in a higher overall level of traffic. This increase reflects residential growth in Jefferson, Gilpin, and Clear Creek counties, where residents in the foothills commute to jobs in the Denver Metropolitan area as well as increases in background and recreational traffic.

Truck Traffic Growth. Truck traffic has also shown a consistent pattern of growth on I-70, as shown in Figure 3.10. Between 1985 and 1995, trucks at the Eisenhower Tunnel increased at a rate of almost 7.4 percent per year. This is a significantly higher rate of growth than was experienced by all traffic (almost 4.3 percent per year) over the same 11-year period. This truck growth characteristic is illustrated in Figure 3.11, which shows that truck traffic has increased from 8.5 to 10.9 percent of the overall traffic volume at the tunnel.

Monthly Patterns. Similarities in monthly patterns of traffic along the I-70 corridor are also evident from the ATR data. Figure 3.12 provides average monthly traffic for the years 1994 through 1996 at the four ATR locations. The patterns at Genesee, Eisenhower Tunnel, and U.S. 40 are remarkably similar. The highest volumes are recorded in the summer, with winter volumes close to the average for the year. Spring and fall months have the lowest traffic. This pattern reflects the significance of recreational activities at these three locations.

Figure 3.13 shows the importance of recreation along the I-70 Mountain Corridor using Friday, Saturday, and Sunday traffic patterns. Directional traffic volumes show that there is a heavy outflow of traffic from Denver on Friday and Saturday, with drivers returning to Denver on Sunday afternoon and evening.

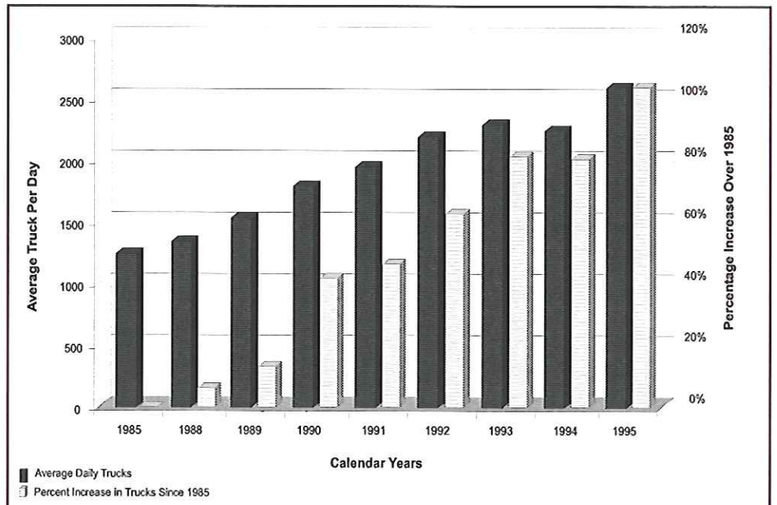


Figure 3.10
Growth Trends in Truck Traffic

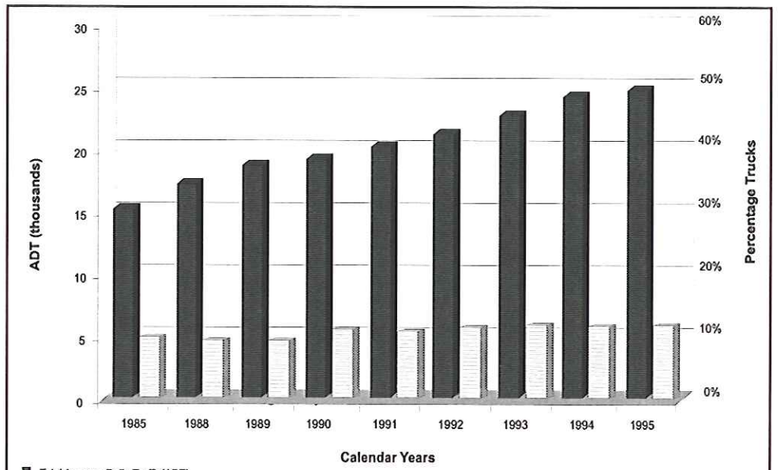


Figure 3.11
Percent of Truck Traffic to Total ADT

Operational Characteristics

Recent field observations confirm that there are rarely backups and congestion through the Genesee section of I-70, which has three lanes in each direction. The eastbound volumes at the Eisenhower Tunnel require CDOT to actively manage the tunnels during peak periods. During peak eastbound flows, one lane in the westbound tunnel is reversed so that there are three eastbound lanes. This lane reversing provides enough capacity that traffic flows are better during peak conditions rather than conditions that would exist without this active management.

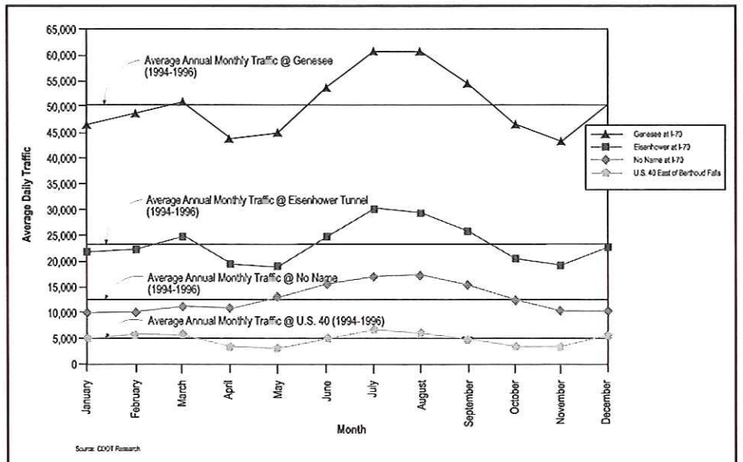


Figure 3.12
Average Monthly Traffic

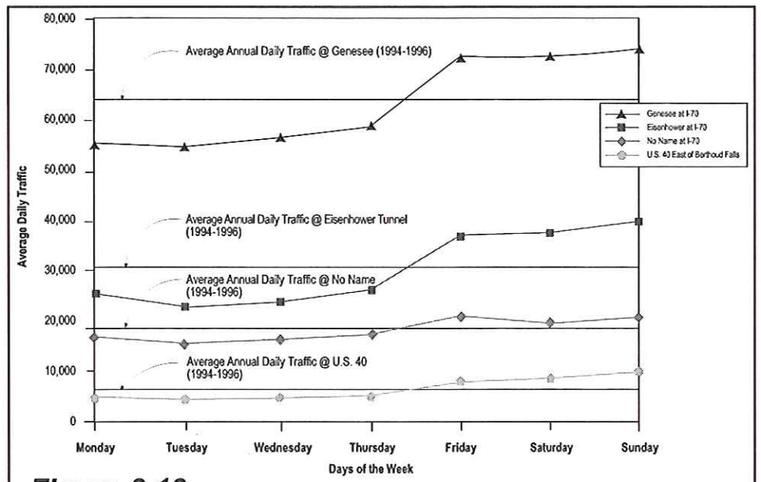


Figure 3.13
Weekly Traffic Patterns

A CDOT report (1996) states that:

"Analysis of summer data indicated that Sunday afternoons, which are the periods of highest overall demand and interest, eastbound (EB) volumes on the sections east of U.S. 40 are as high as nearly 1.5 times those on the section west of U.S. 40. Data also indicate that added traffic from eastbound U.S. 40 is the predominant contributor to this increase. In addition, comparison of data from an auxiliary station west of Copper Mountain and counts from the ATR at the Eisenhower Tunnel show that this section west of the Eisenhower Tunnel is a major generator in the EB direction and an equally significant attractor in the westbound (WB) direction. On Sunday afternoons, EB counts at the Tunnel are up to double those west of Copper Mountain."

Currently, the existing free-flow (or unimpeded) travel time along I-70 from the Main Vail interchange (MP 176) to the C-470 interchange (MP 260) is approximately 90 minutes. During the thirtieth highest hour of travel demand in 1995, the estimated travel time between Vail and C-470 was approximately 115 minutes, a 25-minute or 28 percent increase in travel time from free-flow conditions. Most of the travel time increase originates from congestion that typically occurs between the confluence of U.S. 40 and I-70 (near Empire) and the twin tunnels, east of Idaho Springs.

Impact of Freight

In general, trucking continues to be the primary source of freight transportation in the state, especially in the I-70 corridor. Nationwide, the number of truck miles driven and the total volume of ton miles is estimated to grow by approximately 2.6 percent per year over the next 10 years, a rate commensurate with longer-term trends in the number of vehicle miles traveled in the I-70 corridor. Trucking along the I-70 corridor, because it serves as a critical link to the mountain communities and because a large percentage of freight shipments through the state are pass-through, will continue to grow through the forecast period. Increased utilization of intermodal shipments may also increase, but commodity movement by freight rail will likely play a small role in the transport of freight through the corridor.

Safety and Accidents

Figure 3.14 shows the annual number of accidents, injury accidents, and fatal accidents and then compares the total accident rate by segment to the statewide average rate on all rural interstate highways. In general, I-70 experiences higher than average rates for all types of accidents. Figure 3.14 shows that highest rates of total accidents occur in the vicinity of Idaho Springs and from Silver Plume to Minturn.

The highest annual fatality average is in the Mt. Vernon/Genesee/Bergen Park area. These conditions are not unexpected because the highway alignment is tighter in this area, and there are more interchanges along this stretch than along most other sections of I-70. The section of I-70 from the Eisenhower Tunnel over Vail Pass also experiences high rates of accidents. The approaches to the tunnel and the highway over Vail Pass include the highest and steepest portions of the corridor and often severe weather conditions.

Transit

The I-70 corridor has numerous transit services, including city and county public transit providers, intercity transit services, and private

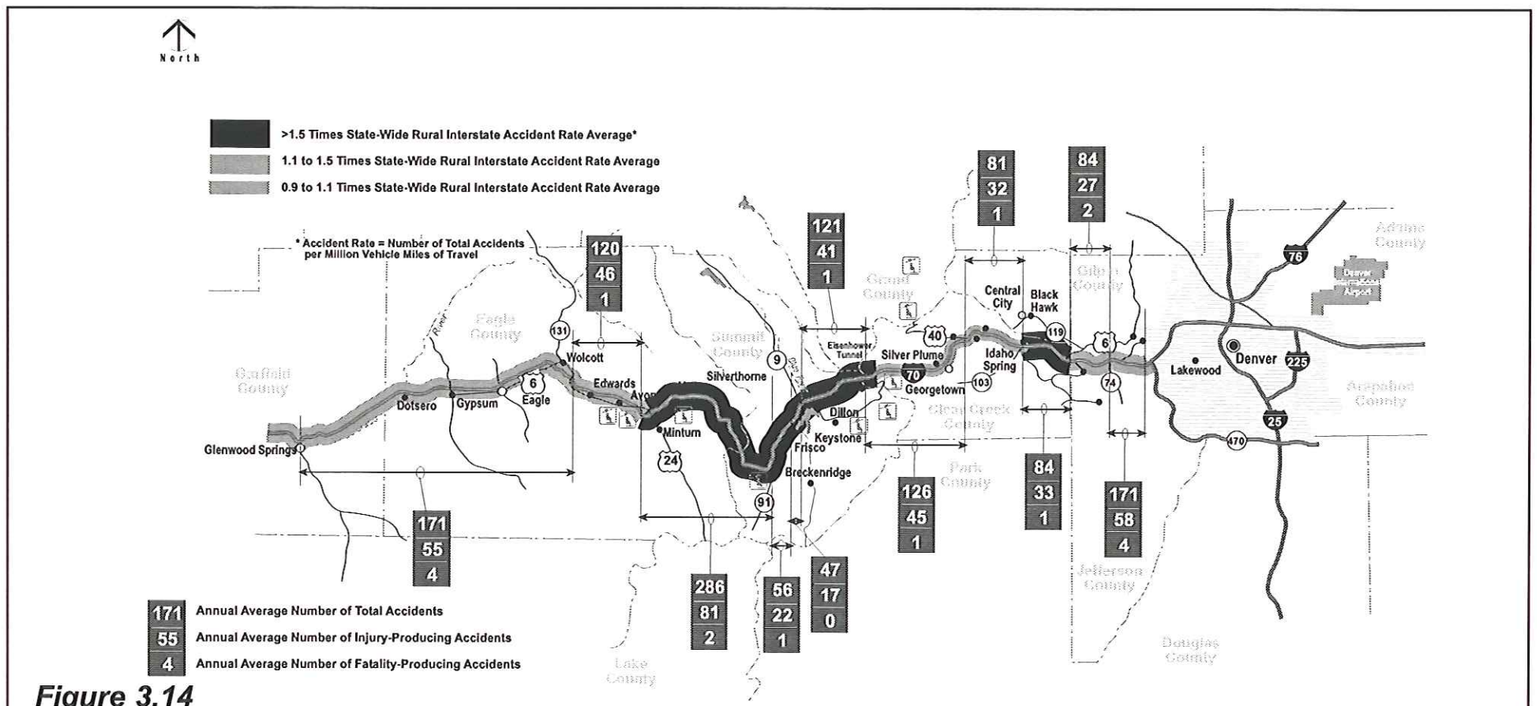


Figure 3.14
Accident Data

transit companies. Route alignments, service levels, ridership characteristics, operating costs, and future expansion plans vary greatly among each of these transit providers.

Public Transit Providers

The I-70 Mountain Corridor is served by a number of local public transit providers. At the east end of the corridor, RTD provides transit service to the Denver Metropolitan area. In the mountains, Summit Stage provides transit service within Summit County. Eagle County Regional Transportation Authority (ECRTA), Vail Transit, and Avon/Beaver Creek Transit serve Eagle County. The Roaring Fork Transit Agency (RFTA) provides transit service at the west end of the corridor in Glenwood Springs.

- **Regional Transportation District of Denver.** RTD's 2,400-square-mile service area encompasses 41 municipalities and services more than 2 million residents. Its boundaries include the City and County of Denver, all of Boulder and Jefferson counties, the western portions of Adams and Arapahoe counties, and northeastern areas of Douglas County, including Highlands Ranch.
- **Summit Stage.** The Summit Stage is a line-haul bus system serving activity centers and incorporated areas within Summit County. There are three components to Summit Stage service: town-to-town, skier express, and residential. The town-to-town element is the backbone of the bus system and comprises five routes, four of which are configured in a hub-and-spoke arrangement with a central transfer facility in north Frisco. The five town-to-town routes connect Breckenridge, Silverthorne, Keystone, Copper Mountain, and Dillon Valley.
- **Eagle County Regional Transportation Authority.** ECRTA provides line-haul "point-to-point" bus service to communities along the I-70 and U.S. 24 corridors. ECRTA oversees five regional bus routes and complementary paratransit service. Avon and Vail each function as hubs, with spoke routes serving Dotsero, Gypsum Eagle, Edwards, Minturn, Red Cliff, and Leadville. ECRTA contracts with the Town of Vail to operate the routes that serve Dotsero and Gypsum, and with the Town of Avon/Beaver Creek to operate all other regional routes. ECRTA's five regional bus routes include Dotsero/Gypsum, Edwards, Minturn, Beaver Creek/Vail, and Leadville.
- **Town of Vail Transit.** The Town of Vail operates a bus system that is free of charge to riders. Most of its eight routes operate through the Vail Transportation Center (VTC). These eight routes are West Vail (two routes), East Vail and Sandstone, Lionsridge and Ford Park, Golf Course, and the In-Town Shuttle.
- **Town of Avon/Beaver Creek Transit.** The Town of Avon operates four local bus routes serving Avon and the Beaver Creek Ski Area during the winter months (November through April). Paratransit service also is available with a 24-hour notice and is free of charge to the user. Central Avon, including the Avon Center and destinations along Beaver Creek Boulevard and Benchmark Road, serves as the system hub. In addition to the contract services provided for the ECRTA, the Town of Avon also operates services specifically for the Beaver Creek Resort Association. The four bus routes are Hurd Lane Shuttle, Avon Skier Shuttle, Avon Town Shuttle, and the Wildridge Shuttle.
- **Roaring Fork Transit Agency.** RFTA provides transit service within Aspen; between Aspen, Snowmass, Basalt, El Jebel, and Carbondale; and, since 1993, to Glenwood Springs. This service is provided on the two routes of Downvalley Buses and the Glenwood Springs Trolley.

Corridor Intercity Transit Services

In addition to the local public transit providers described above, a number of operators provide intercity transit service within the I-70 corridor. The following is a brief description of each intercity transit provider operating within the study area.

Amtrak. Amtrak operates one train trip a day in each direction through the I-70 Mountain Corridor. The California Zephyr provides service from Chicago, Illinois, to Oakland, California, with service through the corridor. Westbound trains depart from Denver's Union Station stopping at Winter Park-Fraser, Granby, and Glenwood Springs. Eastbound trains depart from Glenwood Springs and make the same stops. The Desert Wind provided service from Denver to Los Angeles via the same railroad alignment, but this service was eliminated due to Amtrak budget cuts. Fares between Denver and Glenwood Springs range between $80 and $122 roundtrip, depending on availability.

The Amtrak railroad alignment is significantly north of I-70 throughout most of the corridor. From Denver, the alignment generally parallels S.H. 72 to Rollinsville, then extends west to Winter Park, and crosses under the Continental Divide via the Moffat Tunnel. From Winter Park, the alignment parallels S.H. 40 to Kremmling, follows the Colorado River to Dotsero, and then parallels I-70 to Glenwood Springs.

Winter Park Ski Train. The Rio Grande Ski Train is a private for-profit passenger train operated seasonally from the Denver Union Station to the Winter Park Ski Resort, following the Amtrak route from Denver to Fraser. The Ski Train operates on Saturday and Sunday from December 19 to January 31 and on Friday, Saturday, and Sunday from February 1 to April 3. December and January adult round-trip fares vary from $35 to $60, and children ride for $20. Round-trip fares between February and April range from $40 to $60, and there is no discount for children.

Greyhound. Greyhound operates two bus routes in the I-70 corridor. One route runs from Denver to Salt Lake City, Utah, with corridor stops at Idaho Springs, Silverthorne, Vail, Eagle, and Glenwood Springs. There are five daily bus trips in each direction. The second route operates along I-70 and U.S. 40 from Denver to Granby, Steamboat Springs, and points farther west. There are two daily bus trips in each direction on this route, and the round trip fare between Denver and Glenwood Springs is $62.

Ski Express. CDOT initiated Ski Express service for the 1996-97 ski season. These buses ran from December 14 through March 30 on weekends from the following four Denver RTD park-n-Ride lots to Vail, Copper Mountain, Keystone, Loveland, and Winter Park ski areas:

- Foothills park-n-Ride in Boulder
- Ward Road park-n-Ride in West Denver
- Avoca park-n-Ride in Southwest Denver
- Highlands Ranch park-n-Ride

For the 1997-98 ski season, Ski Express provided service from Heritage Square and Highlands Ranch to Winter Park on the weekends. The charge to riders was underwritten by the ski resorts and industry groups.

Private Transit Providers

A number of private transit providers serve the I-70 corridor as well. Many of these operators provide service from DIA and Eagle County Airport to the various ski resorts located within the corridor. Three of the major private operators are Resort Express, Colorado Mountain Express, and Vans to Breckenridge/Vans to Vail. However, no service is provided in Clear Creek County.

Resort Express. Resort Express provides year-round door-to-door service from DIA to the resort destinations of Breckenridge, Copper Mountain, Keystone, and the towns of Dillon, Frisco, and Silverthorne. Resort Express operates a fleet of 60 vans and transports and carries approximately 135,000 passengers each year. Winter ridership primarily consists of skiers; summer ridership is typically conference participants. There is a steady year-round local clientele as well. During the winter months, Resort Express provides 16 daily round trips to and from DIA. During the summer months, it operates nine daily round trips to and from DIA. The fare each way is $42 and $44 for summer and winter months, respectively.

Colorado Mountain Express. This service provides year-round transportation from DIA and Eagle County Airport to Vail, Beaver Creek, and Aspen with a fleet of 130 vehicles. During the winter months, Colorado Mountain Express provides 21 daily one-way trips from DIA to Vail and Beaver Creek, 18 daily one-way trips from Vail to DIA, and 18 daily one-way trips from Beaver Creek to DIA. From DIA to Vail and Beaver Creek, the fare each way is $56 in the winter months and $54 in the summer months. Colorado Mountain Express also offers frequent shuttle service to Eagle County Airport, with shuttle service timed to meet scheduled airline arrivals and departures. Limited shuttle service is also provided to Aspen/Snowmass from Eagle County Airport and Vail. Frequent-service shuttles from Eagle County Airport to Vail and Beaver Creek cost $26

each and only operate during the winter ski season. Additionally, limited shuttle service to Aspen from Eagle County Airport, during winter months only, is $49 each way, and limited year-round service to Aspen from DIA costs $85 in the winter months and $81 in the summer months.

Vans to Breckenridge/Vans to Vail. Van service is provided from DIA to Vail, Beaver Creek, and Breckenridge. Round-trip fares vary depending on the season (summer versus winter) and the destination (Breckenridge, Vail, or Beaver Creek). As with the other private transit providers, more frequent service is scheduled during the ski season.

Resort Transit Services. The major ski resorts within the corridor also provide local transit services. These services are described below:

- Keystone and A-Basin Shuttle. Keystone provides free shuttle service in the resort area and between Keystone/A-Basin and Breckenridge.
- Breckenridge Shuttle. Breckenridge Resort Transportation provides free shuttle service within the town limits between residential areas and the ski base areas.
- Breckenridge Trolley. This service is provided within the town limits between commercial, residential, and ski base areas, and is coordinated with the ski resort service. The trolley is owned by the town, which operates the service during non-ski seasons. The ski area operates the trolley during ski season.
- Copper Mountain Shuttle. This system provides transportation to remote skier parking and the internal village, operates employee shuttles, and provides transportation for special groups. The system runs only during the winter months.
- Beaver Creek Shuttle. Beaver Creek provides a free shuttle service on a contract basis around the resort area. Five routes provide intra-village service, and a sixth route links the U.S. 6 parking lots to Beaver Creek Village.
- Arrowhead Shuttle. This free shuttle service runs between Avon and the Arrowhead Village. This is a contract service operated by the Colorado Mountain Express.
- Winter Park Shuttle. Free shuttle service is provided between the ski area and the Towns of Winter Park and Fraser. This contract service is provided by the Lift.

Some of the services also connect to the Summit Stage. In addition, the Town of Vail Transit provides free shuttle service within the town limits, and ECRTA provides transit service to other Eagle County communities.

Aviation

The I-70 Mountain Corridor and areas farther west of the study area contain a number of airports that influence or relieve highway traffic volumes along I-70. There are commercial service airports that either currently handle passenger and cargo operations, or did in the past, and general aviation airports that are used by private pilots and air taxi operators. The commercial airports in Aspen, Eagle County, Grand Junction, Montrose, and Steamboat Springs/Hayden are the ones most closely identified with commercial air service in the I-70 Mountain Corridor; these airports are shown in Figure 3.15.

Air service to and from the five principal commercial airports in the I-70 corridor has been quite variable in the past. Seasonal variations in demand for air service to these locations, combined with inconsistency in airline pricing, passenger service, and equipment utilization, add to the complexity of the aviation service to this region.

Passenger enplanement activity at the Steamboat Springs/Hayden airport exceeded the rate of growth for both the state and the nation over the 15-year period between 1980 and 1995. No enplanements were reported for 1980 or 1985 at the Eagle County Airport, and once-a-day scheduled service was provided in 1990. The Grand Junction and Montrose airports did not keep pace with the annual passenger growth rates for the state and the nation during this period.

Airport Characteristics and Operational Data

Each of the five commercial service airports identified in the I-70 Mountain Corridor has different characteristics affecting its air service market and frequency of service. The general characteristics of the five airports are described below. Each airport name is followed by its three-letter airport identifier code.

Aspen-Pitkin County Airport (ASE). This airport is a worldwide destination point for access to a variety of winter and summer recreational activities. It is surrounded by high mountain terrain and has a full range of aviation facilities available onsite to accommodate airmen and passenger needs. The airport has a single main runway that accommodates both airline and commuter operations. Air traffic control is provided during the day, and nonprecision instrument approaches are conducted in adverse weather situations.

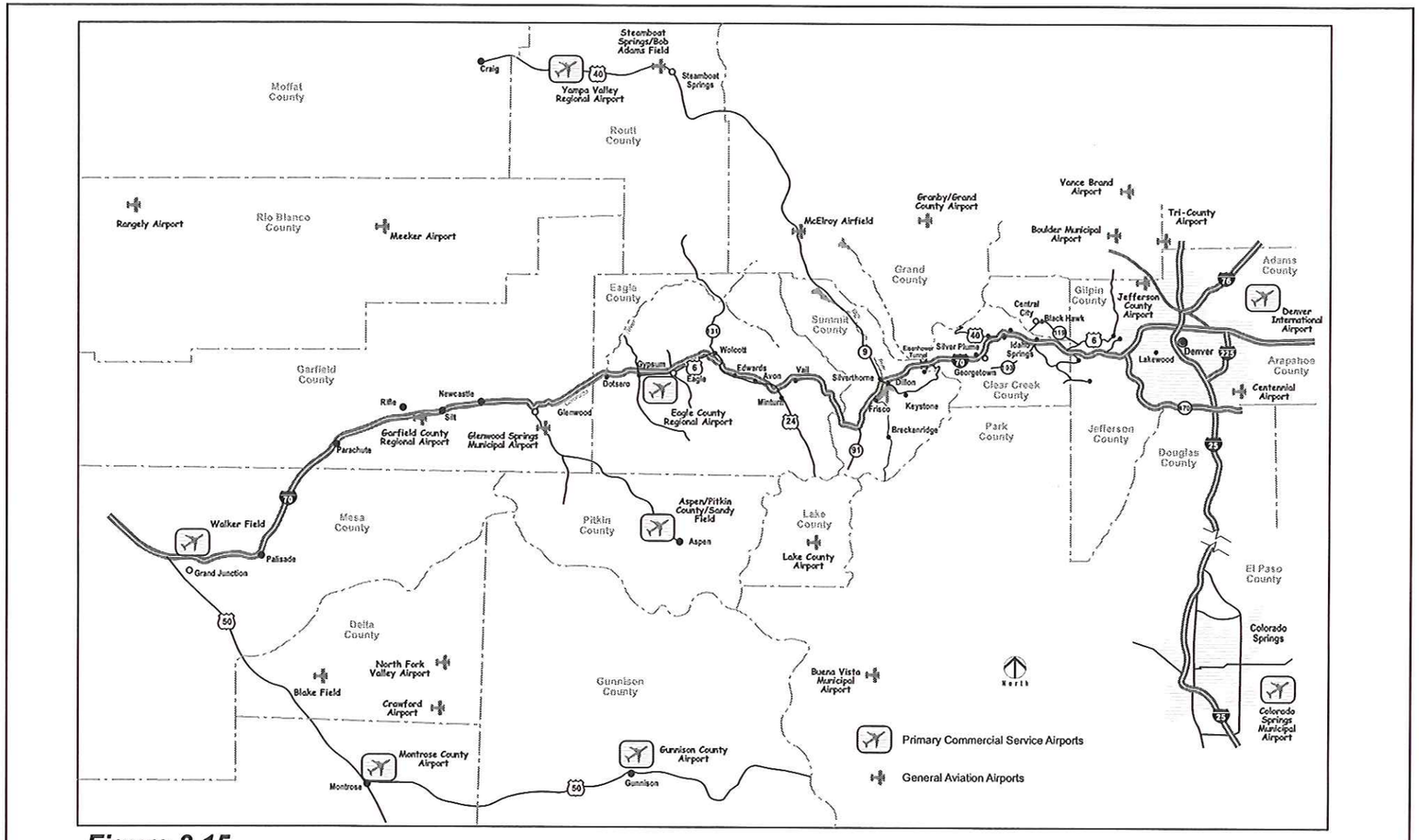


Figure 3.15
Airport Locations

Eagle County Regional Airport (EGE). The Eagle County Regional Airport is in immediate proximity to I-70 adjacent to U.S. 6 and serves the communities of Eagle, Vail, Avon, and Gypsum. The airport lacked commercial air service prior to 1990. Since then, growth in passenger service has been substantial. Beginning with slightly more than 8,000 enplanements in 1990, there has been a dramatic increase, with over 177,000 enplanements reported for 1997.

The airport provides contract air traffic control services and is capable of accommodating aircraft with wingspans up to 170 feet (e.g., B-727, B-737, and B-757) on its single air carrier runway. Nonprecision aircraft approaches are permitted, and there are various ongoing airfield improvements to accommodate increasing aviation demands. Additional air service could be supported in the EGE market on a year-round basis.

Grand Junction - Walker Field (GJT). Walker Field has historically offered more traditional commercial air service, with fairly consistent year-round activity compared to the large seasonal variations experienced by the high mountain airports. The airport's highest level of activity generally occurs in July and August. GJT has offered commercial air service for many years, accommodating a variety of aircraft sizes from a number of major markets nationwide. More recently, air service has been almost exclusively to and from Denver.

Montrose Regional Airport (MTJ). The Montrose airport serves as a principal access point for passengers traveling to the Telluride area, and year-round air service recently has been provided to Denver and Phoenix by commuter airlines. The winter ski demand has been a driving force behind the activity numbers at MTJ. The proximity and competition of the Grand Junction and Gunnison airports, the seasonal nature of the ski operations, and the level and quality of airline services have all impeded substantial increases in aviation activity at MTJ. The airport can accommodate larger aircraft operations in varying weather conditions on its main runway, and jet and commuter aircraft on its second runway.

Yampa Valley Regional Airport (HDN). All of the commercial air service needs of the Steamboat Springs and Hayden areas are currently met by the Yampa Valley Regional Airport outside of Hayden. The Steamboat Springs Municipal Airport is restricted from large commercial airliners due to its size and development limitations, although commercial air service has been provided in the past by aircraft capable of operating on short takeoff and landing (STOL) runway strips. HDN has experienced fairly consistent increases in passenger levels. Most of this traffic has been, and is expected to continue to be, during the winter ski season. Nonstop service is provided from HDN to connecting hubs of major airlines throughout the country.

Other Commercial Service Airports

In addition to the five airports described above, two other commercial airports are located within the general service area of the I-70 corridor; however, they are not as readily accessible to the highway. Gunnison County Airport is located 66 miles beyond Montrose to the east on U.S. 50 for travelers using I-70 for surface access. The airport was designed and constructed for air carrier aircraft, has an instrument landing system for precision instrument approaches, and has provided commercial air service for a number of years. It enplaned 56,400 passengers in 1995, exceeding the passenger enplanement level at Montrose airport for that year. Gunnison County Airport provides seasonal ski service on trunk airlines for passengers going to the Crested Butte Mountain Resort, located approximately 28 miles to the north. Commuter aircraft provide summer service on a less frequent basis for passengers primarily going to and from Denver.

Telluride Regional Airport is located south of Montrose, approximately 60 miles farther from I-70. The airport elevation of 9,078 feet is the highest of all the commercial airports in the state. Aircraft performance effects, combined with the surrounding terrain and weather conditions, restrict the possibility of providing unlimited air passenger access throughout the year. Some direct service is provided by airliners to the market's winter ski resort area using airline revenue guarantees. In 1995, 18,300 passenger enplanements were recorded for Telluride Regional Airport.

Other Mountain Corridor Airports

A number of other airports are located in the vicinity of the I-70 Mountain Corridor. These airports are primarily used for general aviation activity by recreational flyers, although some, such as the Garfield County Regional Airport, have the capability to handle passenger aircraft, which has been diverted from one of the commercial airports in the corridor, in addition to charter and air taxi service. There is a great variation in airfield, weather, and aircraft service facilities among these airports.

While these other airports do not currently accommodate scheduled commercial service, their significance to air service in the I-70 corridor should not be underestimated. The opportunity for developing new commercial airports in this area is limited due to site area availability, altitude and temperature effects, public objections, and environmental concerns. The existing airports have already overcome many of these constraints and, with adequate land use protection, will help to meet the additional needs of the corridor in future years.

Bicycle and Pedestrian Trails

As shown in Figure 3.16, existing bicycle and pedestrian trails include the Scott Lancaster Trail in Clear Creek County, 10 Mile Canyon Recreation Trail in Summit and Eagle counties, and the Glenwood Canyon Trail in Eagle and Garfield counties. A new trail is currently proposed from near Edwards to Dotsero in Eagle County. Additionally, Clear Creek County's master plan for bicycle and pedestrian trails suggests the ultimate development of new trails from the U.S. 6/I-70 interchange to the Loveland Ski Area.

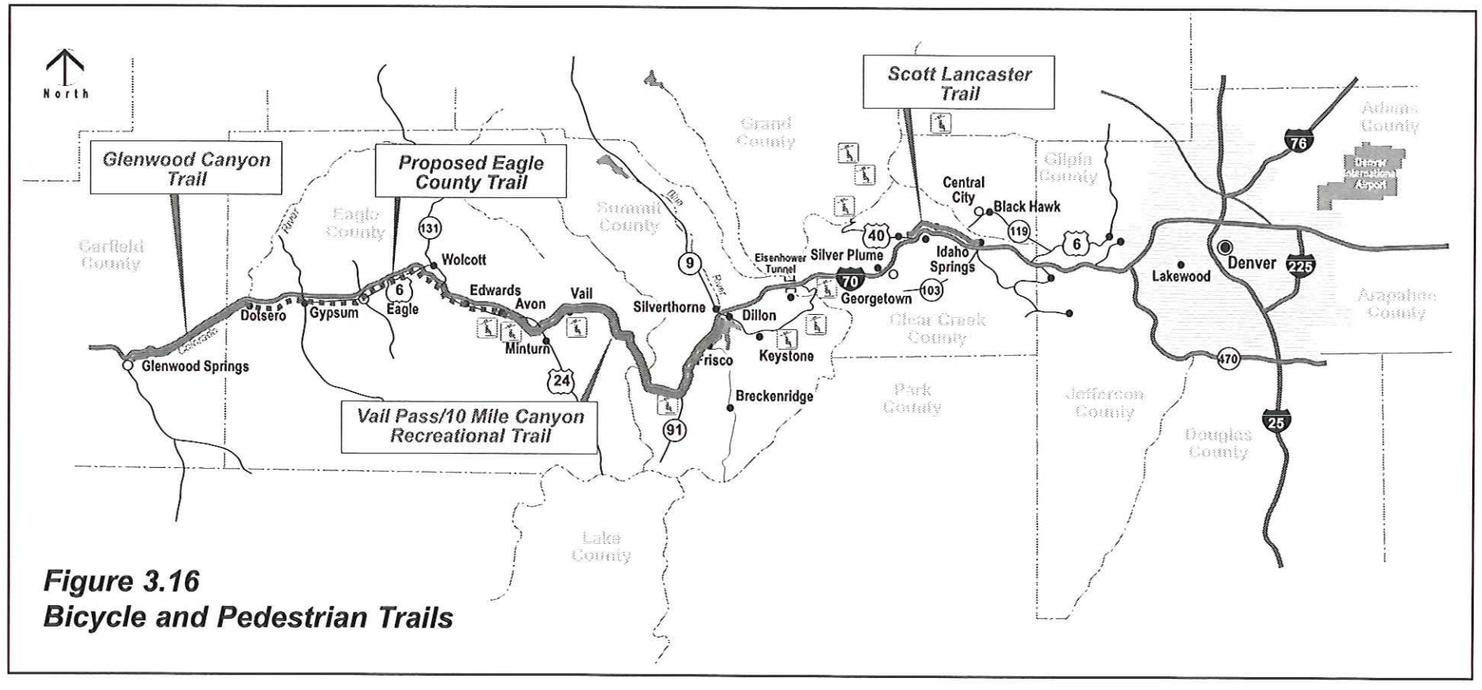


Figure 3.16
Bicycle and Pedestrian Trails

Travel Demand Forecasts

Forecasting Approach and Scope

The I-70 Mountain Corridor is more than 140 miles long and serves a host of origins and destinations well outside the study area. To fully understand travel demand in the I-70 corridor, detailed travel demand surveys would need to be performed throughout nearly the entire mountainous area of Colorado.

Although a detailed computerized travel model was not developed, a number of standard transportation planning analyses were used to estimate travel demand forecasts in the corridor. A computerized travel demand model did not exist for the extent of the corridor, but calibrated computer models did exist in DRCOG's six-county transportation management domain (including Jefferson County and, to a much lesser extent, Clear Creek County) and in Eagle County. These two existing models were used to assist in the development of baseline forecasts for the I-70 corridor.

Experience has shown that rural interstate facility forecasts tend to correlate very well with simple time-series regression analyses. This is the current forecasting approach used by CDOT in the I-70 corridor. This forecast methodology essentially assumes that past trends will continue into the future. In addition to time-series analyses, regression analyses based on population and employment in the corridor were performed to relate these parameters to I-70 travel demand.

Travel patterns in the corridor were summarized from existing literature, traffic counts, videotape surveys, and past studies to help estimate primary origin-destination pairs in the corridor. Primary "travel markets" were identified, and anticipated growth in these markets was estimated based on future population and employment projections as well as anticipated growth in summer and winter recreational activities. After baseline forecasts were developed, trip diversions to alternate travel modes or alternative routes in the study area were estimated by applying mathematical models formulated from an extensive literature review and from reasonableness checks using I-70 corridor data.

Data Collection and Analysis

Most of the forecasting effort for the I-70 MIS has focused on collecting existing data and available forecast information for both travel demand and the socioeconomic and land use conditions that help predict travel demand in the corridor. This information was used to develop alternative forecasts of varying complexity. Forecasts ranged from time-series extrapolations and regression analyses to more data-intensive mode and route choice models calibrated from available data within the study area. Computerized travel demand models in Eagle County (TRANPLAN) and the DRCOG Regional Model were used to establish additional forecasts at each end of the study corridor.

Average daily traffic and peak-hour traffic statistics were provided by CDOT for historic, current, and 20-year projected traffic volumes in the corridor. Additionally, traffic data obtained from CDOT were used to estimate the modal split (that is, the percentage of vehicles categorized as personal automobiles, shuttle vans, buses, and commercial vehicles [trucks]). Information on traffic volume by vehicle-trips and person-trips within the corridor was also collected from previous studies and surveys. Vehicle trip-ends were also estimated using existing I-70 mainline and ramp data with the TRANSCAD® Geographic Information System (GIS) model in association with specialized software developed at the University of Colorado at Denver.

Additional sources of socioeconomic and person-trip data included the U.S. Census, Colorado Ski Country U.S.A., the former Colorado Tourism Board, the State Demographics Office, the Leisure Trends Group, individual city and county statistics, the Colorado Division of Wildlife, the U.S. Forest Service, the National Park Service, chambers of commerce, hotel and gaming industry sources, personal interviews, transit system sources, and past studies conducted by CDOT.

Freight movements, hazardous materials routings, and other trucking information were collected from the American Trucking Association, Colorado Motor Carriers Association, and other CDOT sources by the Western Highway Institute. Passenger rail transportation information was obtained from public and private rail companies that operate in or closely parallel the I-70 Mountain Corridor. Other data sources included DRCOG and Intermountain Transportation Planning Region (ITPR) planning studies and model forecasts, previous I-70 corridor studies, and the state-wide passenger rail study.

Aviation traffic statistics and forecasts were obtained from individual airport master plans, the Colorado Division of Aeronautics data, the *Colorado Intrastate Air Passenger Service Study* (The Airport Technology and Planning Group, Inc., 1996), passenger origin-destination surveys conducted by DIA and the Colorado Springs Airport, as well as data contained in the OD-Plus database (a United States Department of Transportation [USDOT] nationwide 10-percent passenger survey). Key Colorado aviation personnel were also interviewed, including representatives of the Colorado Division of Aeronautics, the Federal Aviation Administration (FAA), and individual airport operators/managers.

Videotape Survey

In addition to the vehicular traffic counts on I-70, an automated videotape survey was conducted during July and August of 1997 to collect additional data on corridor activity.

More than 8,800 license plates were recorded and matched with county codes in order to assign a county of origin for each vehicle. Due to the high speed of vehicles on interstate highways, manual data collection and standard videotape recorders could not provide reliable results.

Vehicle occupancy was determined from the recorded video images of the passenger compartment of each automobile and recreational vehicle; bus and commercial van occupancies were determined from transit agency records. Vehicles were classified according to type and size of commercial and recreational vehicles and passenger automobiles. The video survey enabled travel demand forecasts to be made with a higher confidence level regarding the types and usage of vehicles in the corridor.

Some conclusions can be drawn from the video survey results:

- Local trips do not constitute a significant portion of I-70 traffic (approximately 2 percent) in Clear Creek County (Idaho Springs), especially during peak travel periods (Friday and Sunday). Even during typical commuter travel times, Clear Creek County license plates accounted for only 8 percent of the total I-70 traffic in Idaho Springs.
- Local trips do not constitute a significant portion of I-70 traffic (approximately 6 percent) in Summit County (Frisco), especially during peak travel periods (Friday and Sunday). Even during typical commuter travel times, Summit County license plates accounted for only 15 percent of the total I-70 traffic in Frisco.
- Local trips constitute a significant portion of I-70 traffic, as much as 40 to 50 percent, in Eagle County. Thus, while Summit County and Clear Creek County have a large proportion of traffic from non-local origins, Eagle County (Vail and Eagle) supports a large amount of local trips.

I-70 appears to be serving more regional markets in Summit and Clear Creek counties, while I-70 in Eagle County serves a significant local commuter travel market. The aggregated data suggest that Front Range origins make up over 50 percent of the traveling public on I-70. Figure 3.17 compares the videotape survey results with existing origin-destination statistics (outlined earlier) collected for the corridor.

Vehicle Classification. According to the videotape survey, passenger automobiles comprised the vast majority of vehicles travelling in either direction at all locations in the I-70 corridor. Overall, an average of 89.5 percent of the vehicles surveyed were passenger cars. On the weekend, the next highest average use was 4.8 percent recreational vehicles (RV) on Sunday and 4.2 percent RVs for all of the survey days. On selected weekdays, commercial vehicles (typically trucks) constituted between 4.8 and 15.8 percent of the daily vehicle counts. The higher percentages of commercial vehicles are farther to the west in the corridor where automobile traffic volumes are lower. Commercial vehicles averaged 6.3 percent of the total vehicles classified in the videotape survey. The percentage and volume of truck traffic tends to decrease during the peak travel days (Friday and Sunday), and the proportion and number of RVs tend to increase during these peak travel days.

Vehicle Ridership. Based on the videotape survey, automobile and RV occupancy rates averaged 1.69 persons per vehicle for westbound

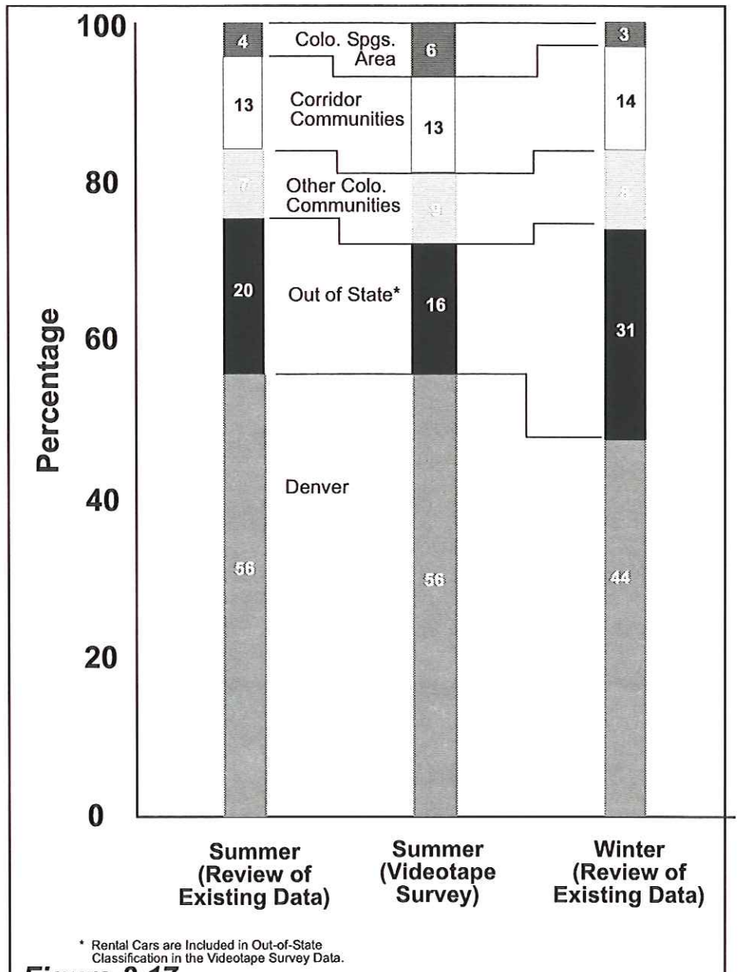


Figure 3.17
Estimated Origins of Mountain Trips

traffic and 1.83 persons per vehicle eastbound. The overall average occupancy rate during the entire videotape survey period (peak and off-peak travel times) was 1.77 persons per vehicle. Occupancy rates for buses and commercial vans were not determined. Variations in average occupancies were minimal, ranging from 1.57 occupants per vehicle in Gypsum traveling westbound to 1.95 occupants in Frisco going eastbound. Figure 3.18 summarizes the average vehicle occupancy information. In general, most vehicles contained two people, compared to essentially one person per vehicle in typical urban settings. Also, similar ridership studies performed in the rural gaming area of Gilpin County indicated that average vehicle occupancies in the winter months was 2.2 persons per vehicle (Muller, 1995).

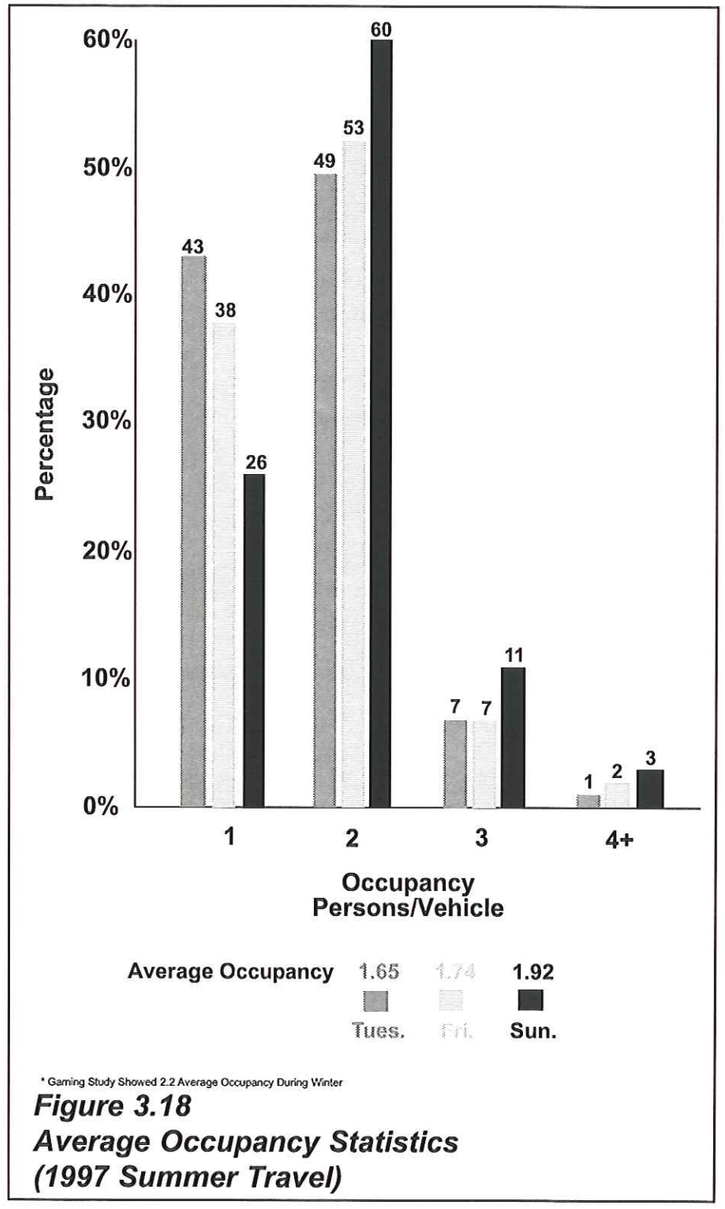


Figure 3.18
Average Occupancy Statistics
(1997 Summer Travel)

Rental Car Use. To assess the impact of rental cars on the estimation of trip origins based on license plates, the station managers or staff of the six largest rental car companies at DIA, the AAA Auto Club, and the American Car Rental Association were all contacted. None of these companies keeps records on the destinations of rental cars. Instead, the information is based on the best judgments of people most familiar with the operations of their fleets as to where these cars travel.

The rental car companies estimated that, overall, from 30 to 80 percent of their total rentals are for use in the mountains. The majority of responses fell in the 40 to 70 percent range, with two companies estimating that between 40 and 50 percent of their rentals are for mountain use and two other companies estimating 60 to 70 percent. Every contact said these mountain-use percentages would increase during the winter months. AAA estimated that 50 percent of their statewide rentals have mountain destinations in the summer, rising to 75 percent in the winter. Actual rental car usage statistics during summer months were obtained from a recent DRCOG air passenger survey of ground access to DIA.

Using the data obtained from the various rental car companies and using the detailed survey information for summer travel conditions provided in the DRCOG survey, it is difficult to quantitatively determine the exact contribution of rental car traffic to I-70 on a daily basis. However, it is clear that rental car traffic can vary significantly on a seasonal and daily basis. Based on the information obtained for this MIS, the likely impact of rental car traffic in the I-70 corridor could vary from between 2 and 11 percent of the daily traffic. The percent range of daily traffic caused by rental cars was expanded to accommodate both sources. Time of year travel ranges could all be included in the resulting percent range.

Forecast Model Development

From the data collected, several forecast models were prepared to analyze potential travel demand along the I-70 Mountain Corridor to the year 2020. These models focus on forecasting annual average daily traffic (AADT) volumes. Peak-hour projections also were made based on a review of existing peaking characteristics using historic data and trend analysis. Except for the mode or route choice models, the models provide baseline future-year forecasts for AADT conditions. The trip diversion model was used to adjust the baseline forecasts to take into account the impact of alternate modes or alternate routes for traffic in the corridor. The models vary in complexity and can be grouped into the following general categories.

- **Time-series Model.** Based on a review of historical volumes along the corridor, a time-series (or trend regression) model was developed to project future traffic conditions, similar to CDOT's current forecast methodology used for rural interstate forecasting. This model assumes that ridership and available modes will remain essentially unchanged through the planning horizon.
- **Socioeconomic Regression Models.** Based on available data, a series of single and multiple regression models were formulated to associate travel demand data with socioeconomic variables such as corridor population and employment. Other input, such as skier visit data, was used to develop traffic projection models. Other than the population and employment trends, no significant mathematical relationships were established. These models also provide details regarding travel demand under existing infrastructure conditions.

- **Travel Market Model.** A travel market model was developed to represent a simplified link and node network, with the links representing I-70 and the nodes representing primary production and attraction areas. The model was simplified to an approximate 20-by-20 origin-destination person-trip table for three primary trip purposes: home-based work trips, summer recreation-based trips, and winter recreation-based trips. Forecasts for each type of trip were then combined and applied to the simplified network to estimate the percentage increases in traffic on the various major segments of I-70.
- **Computerized Travel Demand Models.** Computerized travel demand models prepared for Eagle County and the Denver Front Range were used to establish additional forecasts for the years 2010 and 2015. Forecasts to the year 2020 were prepared using straight-line extrapolation of the 2010 and 2015 forecasts. The Eagle County model (TRANPLAN) is based on existing and future land use projections. The DRCOG Regional Model contains currently approved future land use projections (at the time of the analysis) developed as part of the 2020 Transportation Plan and Conformity Analysis.
- **Mode or Route Choice Model.** A more detailed mode or route choice (or diversion) model was developed with origin-destination (person-trips) input estimated from data collected on intrastate, interstate, and even international trip patterns. Price and travel time elasticities were reviewed to help calibrate a logic choice model, in order to predict mode or route choice diversion so that alternative transportation infrastructure options can be analyzed. The model focuses on the potential mode shift to transit, but the price and travel time elasticities of other transportation options such as aviation and even Transportation Systems Management (TSM) could be evaluated using this technique. Quick-response models that simply compare travel times between alternatives also were used to estimate the diversion to alternate routes.

A detailed analysis of the forecasting process and results is contained in the *I-70 Mountain Corridor MIS: Mobility Evaluation Report* (CH2M HILL, et al., 1998b).

Baseline Average Annual Daily Traffic Forecasts

From the various approaches to forecasting travel demand patterns in the I-70 corridor, a set of baseline AADT forecasts was prepared. These forecasts, segmented by interchange location, are presented in Appendix G of the *I-70 Mountain Corridor MIS: Mobility Evaluation Report* (CH2M HILL, et al., 1998b). Figure 3.19 provides a graphical summary of the highest AADT forecast by subarea. These forecasts assume transportation infrastructure similar to existing conditions.

As indicated earlier, the I-70 MIS includes an analysis of the future travel demand conditions expected under a typical 20-year development scenario (or to the year 2020) and a 50-year growth scenario (or to the year 2050). This long-range analysis is unique to the I-70 MIS and was developed in response to the corridor residents' and users' desire to plan a 50-year transportation vision for their communities.

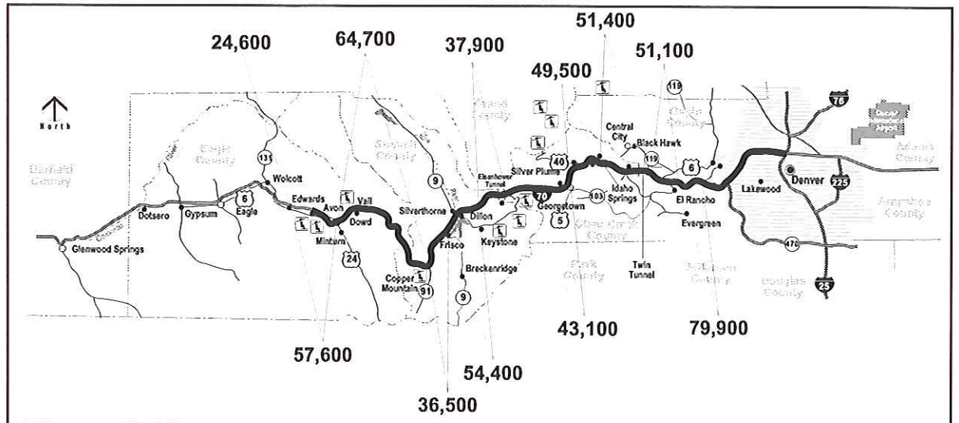


Figure 3.19
2020 Annual Average Daily Traffic Volumes (Peak Volumes by Subarea)

The stakeholders in the corridor preferred the 50-year planning horizon because it brought flexibility in the consideration of emerging technologies, provided options not currently available, and represented a plan less vulnerable to obsolescence over time. Forecasts for 2050 were prepared by simple straight-line trend extrapolation from the 2020 forecasts. The 2050 AADT forecasts are also contained in Appendix G of the *I-70 Mountain Corridor MIS: Mobility Evaluation Report* (CH2M HILL, et al., 1998b).

I-70 Needs Assessment

The previous assessments have summarized existing travel conditions and potential travel demand forecasts along the 140-mile segment of the I-70 corridor study area. The following discussion summarizes existing traffic operations conditions in terms of Levels of Service (LOS) and duration of congestion, as well as, the predicted LOS and duration of congestion if no improvements are made in the corridor. This analysis sets the stage for depicting the need for improved travel conditions in the corridor, both now and in the future.

The travel demand conditions of the I-70 Mountain Corridor are unique in terms of the recreational nature of the peak travel demand. Demand along the corridor fluctuates on a seasonal (summer versus winter) basis, as well as a daily (weekday versus weekend) basis. Addressing solutions to the peak summer weekend demands are complex because of the nearly infinite set of possible origin-destination pairs, whereas winter driving patterns exhibit more consolidated origin-destination pairs. Additionally, the capacity of I-70 is impaired further by poor weather conditions in winter. The relationship between travel demand and the capacity characteristics of the corridor, and the unique mobility challenges presented by the impacts of weather conditions, and the effects of the two tunnels are presented in the study. The relationship between the travel demand and capacity conditions in the corridor are also discussed. The resulting analysis illustrates existing and future mobility bottleneck areas. The future year scenario serves as the basis for the "no-build" analysis.

Travel Demand Characteristics Summary

Travel patterns throughout the I-70 Mountain Corridor are vastly different than those that occur under typical urban conditions. Based on the data analyzed from the three automatic traffic recorders (ATR) located along I-70 (at the No Name interchange at Glenwood Springs, the Eisenhower Tunnel near Frisco, and the Genesee interchange at Evergreen), definitive temporal peak demands occur during the summer months (June to September) along the I-70 Mountain Corridor.

Due to heavy summer recreational use, peak month (usually July or August) average daily traffic (ADT) is approximately 25 to 30 percent greater than the AADT traffic count at each ATR location. In the winter peak month (typically December), ADT is approximately equal to the AADT at each location. *Nearly all of the highest hourly volumes at each ATR location occurred from Friday to Sunday or during a Monday holiday.* Eastbound traffic on Sunday afternoons typically represents the most concentrated peak demand period. Directional peaking is usually more concentrated in the winter, and thus, directional flow rates in the winter are comparable to summer directional flow rates.

ATR data on the highest hourly volumes for the year at the Eisenhower Tunnel typically show a dramatic, yet consistent, peaking for the thirtieth highest hourly volume, with a significant drop beyond that point. However, these data may reflect the capacity (or constrained demand) of the tunnel rather than the true demand. The thirtieth highest hours for the Genesee interchange decline more gradually from their peaking. Some of the travel demand characteristics for three sections of the I-70 corridor are described below.

Western Section of the I-70 Corridor

The hourly traffic recorded at the No Name interchange (Glenwood Springs) ranges from 13.4 percent of the AADT volume for the twentieth highest hourly volume of the year to 12.6 percent for the fiftieth highest hourly volume. Directional distribution (the volume of traffic flowing in one direction versus the other during the peak hour, as a percentage) varies from 65:35 to 50:50 for the same time periods. Volume fluctuations at the No Name interchange exhibit relatively flat fluctuation in hourly demand for both the weekend-day and weekday, as compared to typical urban conditions where commuter peaks in both the morning and evening tend to produce two distinct "humps."

Central Section of the I-70 Corridor

The highest hourly volume of traffic at the Eisenhower Tunnel ranges from 14.8 percent of the AADT volume for the twentieth highest hour of the year to 13.6 percent for the fiftieth highest hourly volume. Directional distribution varies from 70:30 to 60:40 for the same time periods. The peak demand periods tend to be heavily favored in the westbound direction in the morning and eastbound direction in the evening, reflecting the surge of recreational traffic from Front Range originations.

Eastern Section of the I-70 Corridor

The highest hourly volume of traffic at the Genesee interchange ranges from 11.2 percent of the AADT volume for the twentieth highest hour of the year to 10.6 percent for the fiftieth highest hourly volume. Directional distribution varies from 65:35 to 50:50 for the same time periods. The weekday hourly travel demand fluctuations are more comparable to typical urban commuter travel peaks and correspond to the typical morning and afternoon commuter peak hour of travel, illustrating the suburban Denver commute characteristics of the Genesee area. Weekend hourly travel demand fluctuations are comparable to the recreational travel conditions at the Eisenhower Tunnel.

Travel Demand Changes in the I-70 Corridor

Travel demand in the I-70 Mountain Corridor has grown at a significant rate in certain sections of the corridor. Individual yearly growth rates range from flat (or even negative) to 5 to 10 percent.

Although traffic volumes for the thirtieth highest volume hour have increased, the absolute percentage of AADT during this hour has actually been decreasing. This indicates that as traffic grows, daily traffic volumes are being spread more evenly throughout the day and even throughout the year as motorist avoid the most congested times. The definitive peaking characteristics of the I-70 corridor are flattening as traffic volumes increase.

For example, while peak-hour volumes at the Eisenhower Tunnel have grown by more than 50 percent over the past 20 years, the percentage of AADT that occurs during the peak hour has dropped from 18 percent to 14 percent. This trend happens to a somewhat lesser extent in urban corridors, where the highest hourly volume is typically 9 to 10 percent of the AADT. In congested corridors, this percentage is often projected to decrease to as low as 7 percent in the future. It is expected that the design hour volume (DHV) percentage of the AADT will decrease by at least 2 percentage points throughout the corridor by the year 2020 as motorist continue to avoid peak hour congestion. Depending on the future-year development scenario, implementing various transportation system options such as Transportation Systems Management (TSM) and Transportation Demand Management (TDM) could reduce peak period travel demand.

Mobility Challenges in the I-70 Corridor—System Capacity

Conditions that affect roadway capacity can be divided into two main categories:

(1) traffic factors such as the percentage of large vehicles in the traffic stream (the higher the number of large vehicles, the lower the average speed and the lower the available capacity), lane distribution, and other flow interruptions and conflicts. Trucks move slower because of steep grades and impact traffic flow and LOS.

(2) geometric and environmental factors such as lane width, lateral clearance to objects (Drivers are more likely to alter driving behavior by braking and reducing speeds when obstructions such as tunnel walls are located close to the edge of a travel lane), topography, pavement conditions (dry versus wet or icy), visibility, and other weather conditions.

Of primary importance to the I-70 corridor system capacity are the effects from topography, vehicle mix, weather conditions, and tunnel impacts.

Tunnel Impacts

Some decrease in capacity is expected due to driver apprehension and the unwillingness to pass through a tunnel at the same speed. A literature review of studies indicates that the capacity of a tunnel could be as much as 35 percent less than the corresponding capacity of a similar travel lane condition upstream from the tunnel.

Data from the Automated Traffic Recorder at the Eisenhower Tunnel indicate that the highest traffic volumes measured during the year tend to "cap" at approximately 2,600 vehicles per hour. Given that the tunnel is known to reach saturation at various times during the year due to the need to add a reverse lane in one of the tunnel portals, this volume of traffic appears to be a reasonable estimate of the tunnel capacity for a two-lane section. Also, based on the I-70 West Corridor Study, volumes measured at the twin tunnels would also indicate that the maximum tunnel throughput was approximately 2,600 vehicles per hour. While both locations provide different entrance/exit horizontal/vertical (grade) alignments, the tunnel throughput is similar at each tunnel. Computing the two-lane tunnel capacity at 2,600 vehicles per hour represents a 26 percent decrease from the calculated capacity of the two-lane freeway segments near the twin tunnels. Therefore, the 2,600 vehicle-per-hour capacity, or 1,300 vehicles-per-hour-per-lane capacity, was used to simulate capacity conditions at both the Eisenhower Tunnel and at the twin tunnels.

Weather Conditions

Trace precipitation reduces freeway capacity by about 8 percent. For each 0.01 inches per hour increase in rainfall, a reduction in the observed capacity was on the order of 0.6 percent. When the precipitation fell as snow, a 2.8 percent decrease in capacity was predicted for each 0.01 inches per hour of snow (water equivalent). One study determined that the average capacity losses due to pavement conditions were 7 percent, 18 percent, and 43 percent for wet above freezing, wet below freezing, and packed snow, respectively.

Although studies conclude that rain, and in particular snow and ice, can have significant impacts to roadway capacities, traffic volumes (in terms of demand, not capacity) measured during snow storms have shown proportional decreases in demand, on the order of 12 to 50 percent, depending on the day or time of travel and the severity of the storm. Thus, while the capacity of a freeway segment during poor weather conditions can decrease substantially from dry pavement conditions, the expected demand during adverse weather can also be expected to witness a proportional decrease in volume. At the lower end of the expected capacity reduction (8 percent), it is not likely that weather conditions would deter actual demand. Therefore, similar to the 1988 study of the I-70 corridor, an 8 percent reduction in the capacity of the freeway system was analyzed to provide a sensitivity analysis of the impact of poor pavement conditions on the expected LOS. It was found that an 8 percent decrease in capacity had a range from no to little impact on the LOS rating. In general, the LOS would remain the same or would decrease by one LOS rating.

Traffic Operations Analysis

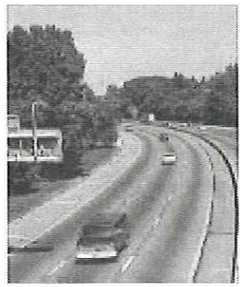
A thorough analysis of vehicle operating conditions in terms of perceived LOS and duration of congestion was performed for the freeway system within the study area. LOS ratings vary from the most desirable (LOS A) to forced flow breakdown (LOS F). These six LOS ratings, taken from the Highway Capacity Manual (HCM), are illustrated in Figure 3.20. The photos do not represent the actual I-70 corridor.

Mobility calculations are based on the peak-hour condition as defined as the thirtieth highest hour conditions. This design hourly volume is considered an "industry standard" for transportation planning analysis in a rural condition.

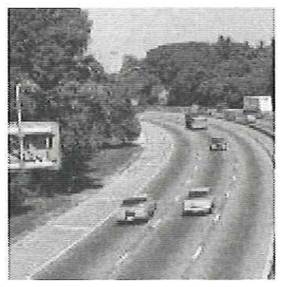
The analysis of traffic operations was performed for the I-70 MIS using the corridor analysis model Corridor Simulation Model (CORSIM) and HCM methodologies. The CORSIM model uses information regarding the number of lanes, grades, truck percentage, and ramp locations to provide estimates of speed and delay along the route. CORSIM also presents a visual simulation of traffic flow, revealing locations of bottlenecks and capacity constraints. When used in combination with the techniques of the HCM, estimates of freeway LOS are available.

Existing (1995) Operating Conditions

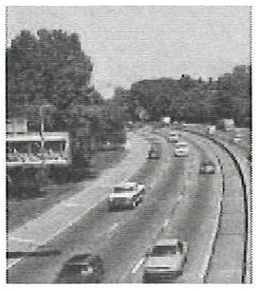
Levels of service range from LOS D in the Edwards/Avon/Vail areas to LOS C at Frisco, but deteriorate to LOS E at the Eisenhower Tunnel east to Idaho Springs. In the six-lane sections farther east, LOS improves to LOS C during weekend travel periods. These conditions are also consistent with observed traffic operations.



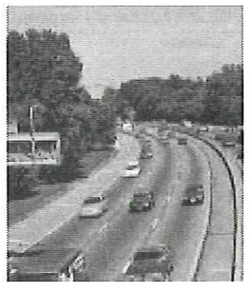
LOS A



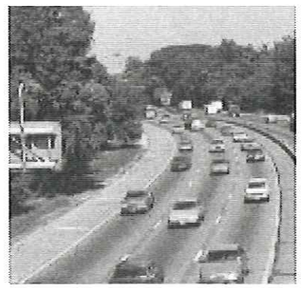
LOS B



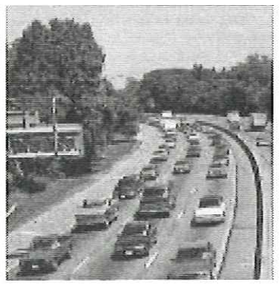
LOS C



LOS D



LOS E



LOS F

Note: These figures are not specific to I-70.
Source: 1994 Highway Capacity Manual

Figure 3.20
Freeway Level of Service Definitions

Figure 3.21 presents an illustration of the congestion problems experienced from the Bakerville area to the twin tunnels during peak periods. Based on a speed study conducted during a summer Sunday holiday peak hour time period in 1997, forced flow conditions occur from approximately MP 220 to MP 244, immediately past the twin tunnels. The initiation of congestion takes place largely due to the queues caused by the eastbound entrance to I-70 at the U.S. 40 interchange when a surge of traffic, coming from U.S. 40 in the

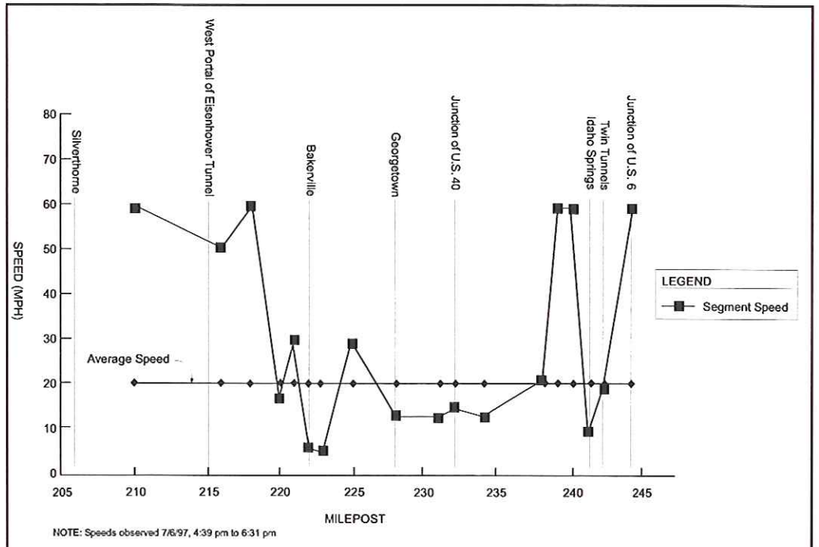


Figure 3.21
Congestion Experienced from Eisenhower Tunnel to Floyd Hill July 4th Weekend 1997

Winter Park Fraser River Valley area, enters the I-70 traffic stream. The I-70 traffic condition is worsened due to the restriction in capacity at the twin tunnels. The spike in speed prior to the twin tunnels is likely due to the unstable flow regime caused by the twin tunnels bottleneck and the fact that some drivers in the queue divert from I-70 through local streets in Idaho Springs only to reenter the I-70 traffic stream immediately prior to the twin tunnels.

The segment of I-70 between the twin tunnels (just east of Idaho Springs) and the U.S. 40 exit near Empire is the most critical in terms of current traffic operations. As indicated earlier, the free-flow travel time, or the travel time during non-congested conditions between the main Vail interchange with I-70 to the C-470 interchange, a distance of 84 miles, is approximately 90 minutes. In 1995, travel times for the thirtieth highest hour of travel demand was approximately 115 minutes, a 25-minute or 28 percent increase in travel time from free-flow conditions.

For the purpose of this study, congestion is defined as conditions where the hourly demand is at least 80 percent of the calculated freeway capacity. This percentage represents the minimum volume-to-capacity ratio threshold between LOS D and LOS E for a four-lane freeway. LOS D is typically considered to be the minimum acceptable LOS in rural settings according to CDOT standards. LOS E is considered to be the point where travel conditions can be highly volatile and the level of comfort afforded the driver is extremely poor. The existing (1995) duration of congested conditions is estimated to be 120 hours annually at the Eisenhower Tunnel and 160 hours in Idaho Springs. Assuming that congested operations occur on about 20 weekends each year (10 in summer and 10 in winter), this translates to an average duration of 3 to 4 hours in the peak direction on those days (Fridays and Sundays) when congestion is experienced.

In addition to the LOS and congested period conditions explained above, other existing deficiencies of the corridor are illustrated in Figure 3.22.

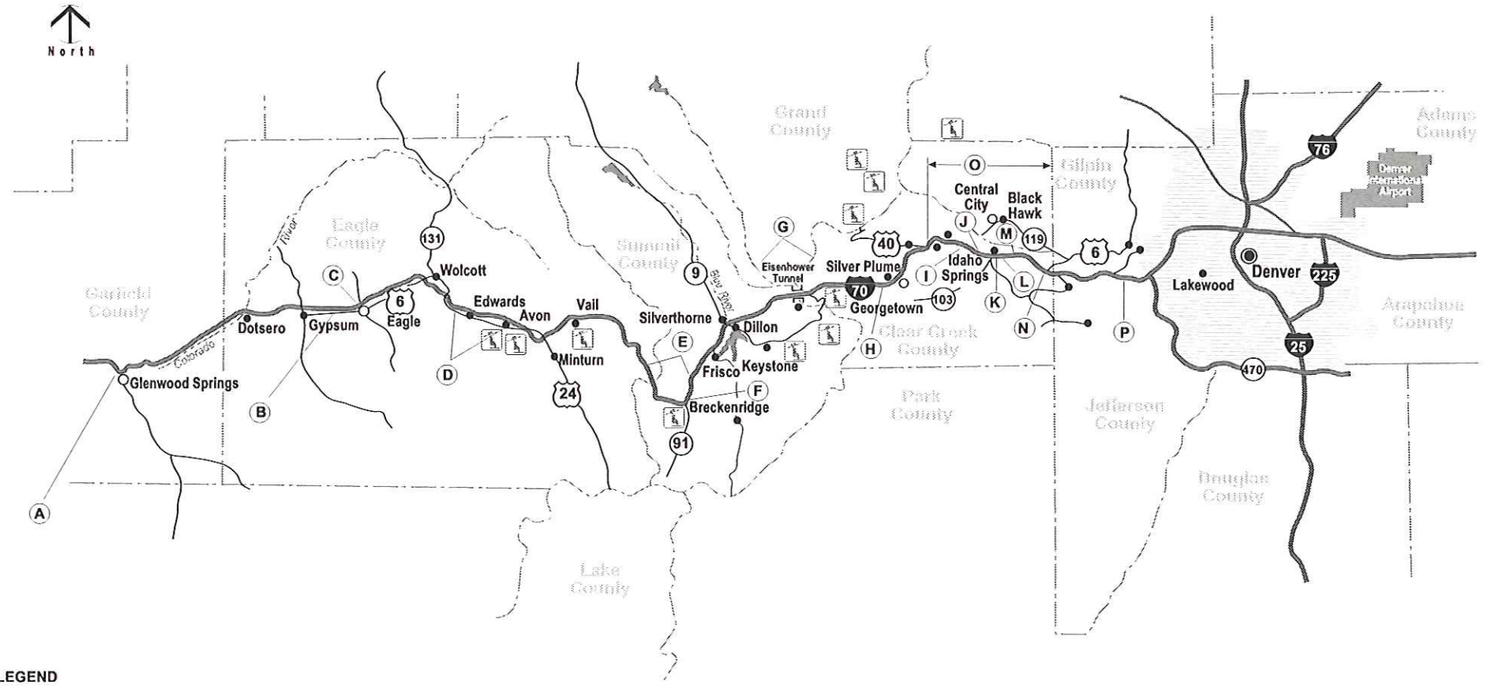
Future (2020) Operating Conditions

Annual forecasts were developed to reflect the likely impacts of the future year no-build scenario and to estimate the LOS and duration of congested conditions. Under current conditions, the travel time during the thirtieth highest hour of demand between the main Vail interchange and the C-470 interchange is 1 hour and 55 minutes on I-70. Under the future no-build scenario, the travel time during the thirtieth highest hour of demand will increase dramatically to 3 hours and 5 minutes between the main Vail interchange and the C-470 interchange in the year 2020. During the thirtieth highest hour, operating speeds would range as low as 13 miles per hour (mph) at the twin tunnels, with an average speed between Vail and C-470 of about 30 to 35 mph. As expected, LOS also significantly deteriorates under the 2020 no-build scenario. Levels of service range from D/E in the Genesee area but deteriorate to F in the Idaho Springs area for the majority of the corridor west to Avon and Vail. LOS improves to LOS D between Frisco and Copper Mountain. Adequate LOS ratings are provided from west of the Edwards area to Glenwood Springs.

In the year 2020, congestion is expected to affect travel on about 30 weekends annually. On these peak weekends, congested operation could be expected to endure for 12 hours in the peak direction (westbound Friday and eastbound Sunday). Traffic flow would be operating at capacity during these times, limiting the throughput of vehicles and creating queues at existing bottlenecks. Thus, even though the forecast average daily traffic is expected to approximately double by the year 2020, the duration of congested periods could witness a dramatic increase by quadrupling to approximately 700 hours. In addition to the deteriorated LOS and congested period durations, other deficiencies of the corridor that would be exacerbated under the no-build scenario are highlighted in Figure 3.23.

Summary

The I-70 Mountain Corridor is the "life-line" of communities in the corridor. As a major element of transport for people and goods, it is the critical link to people and markets on the eastern and western slopes. The impact of a potential four-fold increase in the duration of traffic congestion resulting from general growth and the safety problems associated with growth are a concern to the citizens of the western slope and the State of Colorado as a whole. The lack of preparedness of many drivers during bad weather compounds the



LEGEND

(A) Glenwood Springs Interchange
Circuitous connection through downtown area along S.H.82.

(B) Eagle Airport Interchange
Indirect access route through Eagle on S.H.6 to airport.

(C) Eagle Spur Interchange
Seasonal delays at interchange ramp terminals.

(D) Edwards-Avon Area
Seasonal delays for travel along S.H.6 and connections to I-70 interchanges.

(E) Vail Pass
Slow-moving vehicles on long grades impede peak-hour traffic flow.

(F) Wheeler Junction Interchange
Insufficient ramp geometrics and tapers.

(G) Eisenhower Tunnel Approaches
Congestion routinely develops at tunnel approaches in response to travel demand patterns, slow-moving vehicle operation, and adverse weather conditions.

(H) Georgetown Grade
Slow-moving vehicles operating on steep grades impede peak-hour traffic flow.

(I) Fall River Interchange
Substandard ramp geometrics.

(J) West Idaho Springs Interchange
Substandard ramp tapers.

(K) Idaho Springs Interchange
Substandard ramp tapers and westbound weaving segments to the east and west.

(L) East Idaho Springs Interchange
Substandard ramp geometrics and tapers.

(M) Twin Tunnels
Congestion routinely develops at tunnel approaches in response to weekend travel patterns.

(N) Clear Creek Canyon/U.S. 6 Interchange
Tight curves and left-side entrance/exit ramps reduce capacity in this section.

(O) U.S. 40 to Floyd Hill
Insufficient number of mainline travel lanes to accommodate current weekend travel demand.

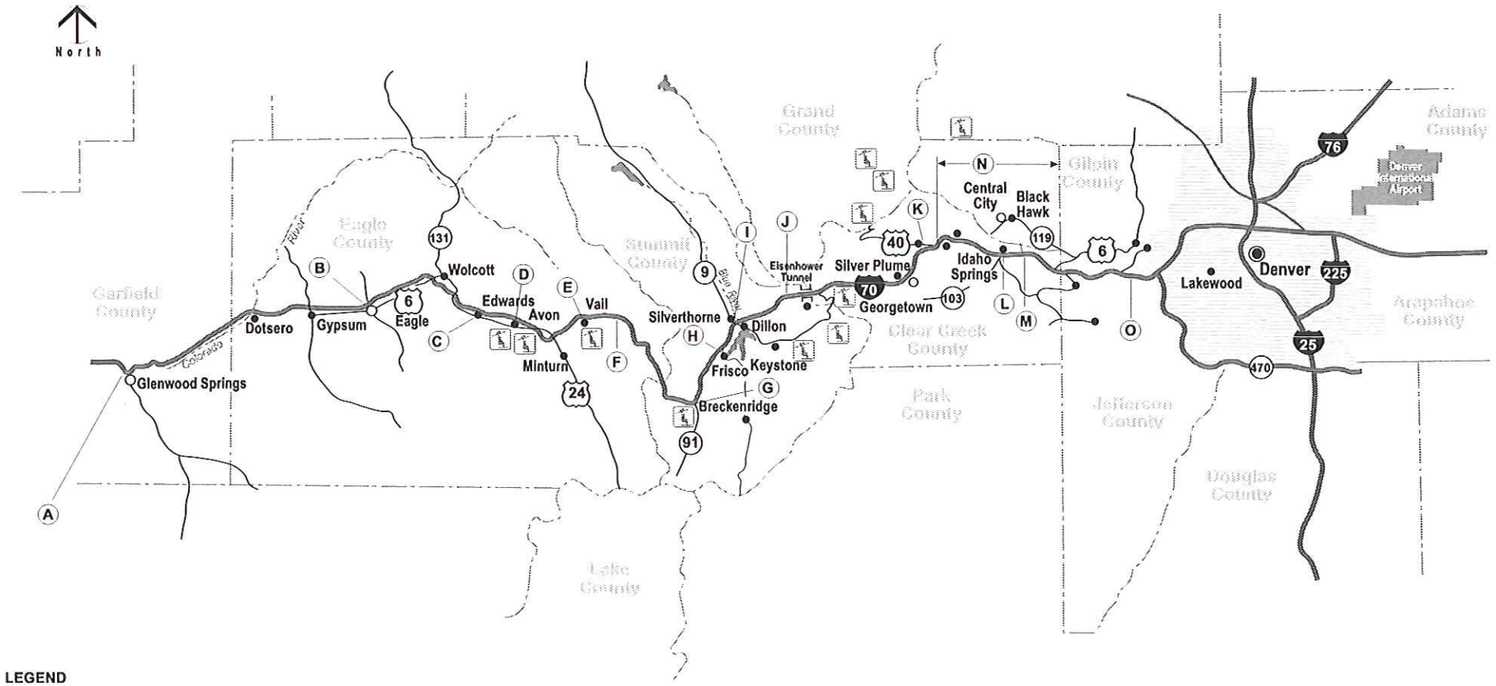
(P) Genesee to Morrison Interchanges
Slow-moving vehicles operating on long grades impede peak-period traffic flow.

Figure 3.22
Existing Corridor Operating Deficiencies

problems caused by more congestion. Without improvements in the I-70 infrastructure, continued degradation would be expected, resulting in more travel delays, more congestion, and a reduction in the economic viability of the State of Colorado.

The problem is heightened considering that the primary travel purpose along the corridor during peak travel times is a form of discretionary travel. Unlike urban conditions where travelers continue to make work trips, discretionary travel trips may be eliminated, resulting in potential losses in economic opportunity.

Based on new dollars in the state's economy, tourism is Colorado's second largest industry and is estimated to bring in more than $7 billion annually (Silverstein, 1992). Colorado tourism depends on its natural resources to attract visitors and relies heavily on easy access to outdoor and resort destinations. Specifically, tourism experts would agree that I-70 travel conditions are very influential in bringing visitors to the Mountain Corridor. As a result, Colorado must be able to provide adequate travel resources to maintain and improve market share in ski, touring, outdoor, and country resort vacations.



LEGEND

(A) Glenwood Springs Interchange
Congested operation along S.H. 82 through downtown area.

(B) Eagle Airport Interchange
Increasing congestion on ramps and crossroad will require interchange reconstruction and signalization. High volumes suggest need for additional interchange to serve airport.

(C) Edwards Interchange
Growing ramp volumes will require widening and signalizing ramp terminals.

(D) Avon Area
Congested operations will develop at existing interchange. Relief can be provided with new interchange connection to U.S. 6 at Nottingham Ranch.

(E) Vail Area
High mainline volumes will require auxiliary lanes on I-70 from West Vail to main Vail interchanges.

(F) East Vail
Increasing ramp volumes at existing interchange suggest relief should be provided with a new interchange at U.S. 6.

(G) Wheeler Junction Interchange
Increasing ramp volumes will aggravate substandard ramp geometrics.

(H) Frisco Interchange
Growing ramp volumes will require signalization.

(I) Dillon/Silverthorne Interchange
Increasing ramp volumes will require ramp and signal revisions.

(J) Eisenhower Tunnel Approaches
Severe congestion will develop on long grades, from a combination of travel demand patterns, slow-moving vehicles, and traffic incidents.

(K) Empire Junction Interchange
High connecting volumes at U.S. 40 will require interchange revisions and improved treatment of local traffic.

(L) Idaho Springs Interchanges
Growing ramp volumes will aggravate substandard ramp geometrics and inadequate weaving sections.

(M) Twin Tunnels
Severe congestion will extend peak periods.

(N) U.S. 40 to Floyd Hill
Insufficient number of travel lanes to serve future peak travel demand.

(O) Genesee to Morrison Interchanges
Growing mainline volumes will aggravate impacts of slow-moving vehicles on long grades.

Figure 3.23
Future (2020) Corridor Deficiencies

SECTION 4

Alternative Development and Screening

The alternatives development and screening process was completed within the framework of the Citizens' Workshop Committee (CWC). The findings of this process were presented to the Oversight Committee (OSC) resulting in a list of six strategies, or packages of alternatives, for detailed evaluation. These procedures are presented in the following narrative. Additional details on the development and screening of alternatives are presented in the document *I-70 Mountain Corridor Major Investment Study: Definition and Screening of Conceptual Alternatives* (CH2M HILL, et al., 1997).

Alternative Development

As mentioned in Section 2, the initial listing of alternatives was developed using the CWC process. The approach used to brainstorm alternatives, refine the ideas, and package the ideas into conceptual alternatives is presented below.

Brainstorming Process

The process for developing the long list of alternatives included four steps:

- Step 1 – Develop a Functional Analysis Systems Technique (FAST) diagram
- Step 2 – Brainstorm alternatives
- Step 3 – Organize the ideas
- Step 4 – Package the ideas into concepts for screening

Step 1—Develop a FAST Diagram

A FAST diagram is a tool that organizes the problem to be solved into a series of basic functions, such as reduce congestion, change behavior, reduce erosion, minimize visual impact, and so forth. The basic functions serve as subject areas for group brainstorming. The diagram structure addresses "how" each project function will solve a problem as well as "why" the problem needs to be solved. As shown in Figure 4.1, each of the basic functions shown on the FAST diagram support the project mission and screening evaluation criteria developed earlier in the CWC process.

Step 2—Brainstorm Alternatives

The workshop participants were divided into five breakout groups, and each of the critical project functions was brainstormed independently. All ideas were recorded, and judgment on any idea was deferred.

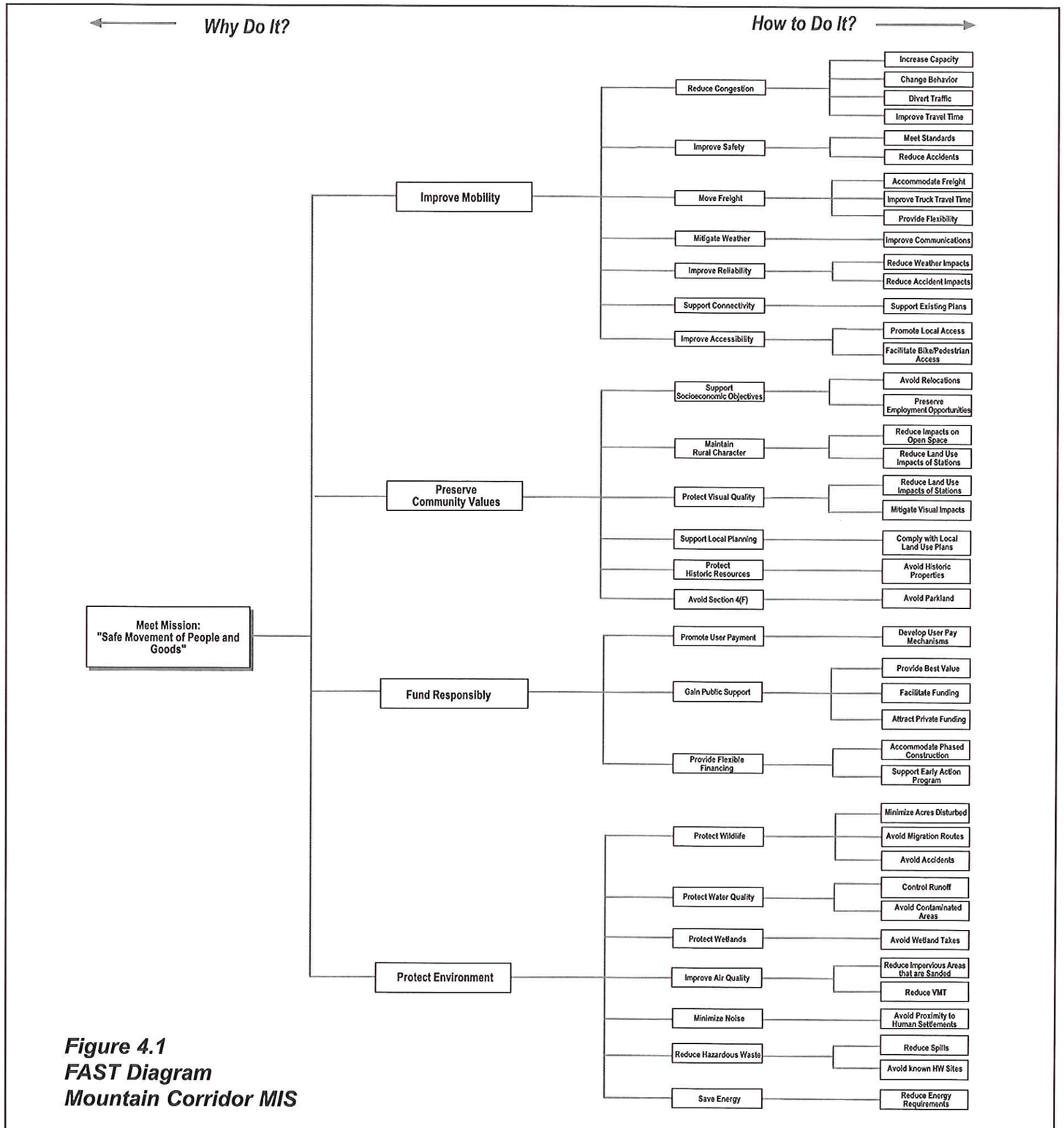


Figure 4.1
FAST Diagram
Mountain Corridor MIS

Step 3—Organize the Ideas

The five breakout groups developed over 640 ideas that could be used to satisfy portions of the Project Mission. After culling redundant ideas, the remaining ideas were organized into a Master List under the following categories:

Modal

1. No-Build Alternative
2. TSM/ITS Alternatives
3. TDM Alternatives
4. Non-Fixed Guideway Transit Alternatives
5. FGT Alternatives
6. Aviation Alternatives
7. Alternate Routes
8. Highway Alternatives

Supplemental Features

1. Mitigations
2. Enhancements
3. Implementation Strategies
4. Land Use Planning

The intent of organizing the alternatives within a modal category was to compare each idea to others within a mode. In this sense, the preferred multimodal Vision would then be made up of the best mode subcomponents.

Step 4—Package the Ideas into Concepts for Screening

Many of the ideas from the master brainstorm list were not stand-alone alternatives, but represented features, characteristics, and goals that were important to include in the mobility solutions. These ideas were packaged in such a way that all were incorporated into the final conceptual alternatives. As a result, the alternatives presented in Table 4-1 were carried forward to the screening evaluation. Figure 4.2 presents an example of how the brainstormed ideas were refined to develop alternatives. (More detail on this process can be obtained from review of the document *I-70 Mountain Corridor Major Investment Study: Definition and Screening of Conceptual Alternatives* [CH2M HILL, et al., 1997].)

The Process

For the purposes of organizing the ideas developed at the workshop, three steps were undertaken:

- Develop a master list of ideas
- List ideas that represent features, characteristics, and goals
- Develop alternatives for screening

Features, Characteristics, and Goals

- Tunnels
- Alternatives for crossing the mountains
- Alternative intrastate travel

Master List for Alternate Routes

Workshop Idea	Alternative in which it is incorporated	Workshop Idea	Alternative in which it is incorporated
• More routes other than I-70 - Moffat Tunnel/Rollins Pass - Bailey to Breckenridge - U.S. 285 - U.S. 24 to Breckenridge - U.S. 34 from Fort Collins/Loveland	 - AR-2 - AR-1 - AR-1 - AR-2	• New tunnel from Bakerville to Silverthorne	FG-1 High-Speed Rail with Tunneling
• Alternative intrastate travel	ALL	• Moffat Tunnel/Rollins Pass	AR-1,3
• Alternative trucking routes	AR-2,3	• Boulder to Winter Park	AR-1,3
• Tunnels on alternative routes	ALL	• Bailey to Breckenridge	AR-2,3
• Alternate route from City of Loveland to Winter Park	AR-2,3	• Alternative intrastate travel	Feature
• From Empire to Winter Park-Berthoud Tunnel	AR-2,3	• Alternate route avoids I-70 from Denver to Wolcott	AR-1,3
• Alternate route avoids I-70 from Denver to Wolcott	AR-2,3	• Alternate truck routes (I-80)	AR-4
• Alternate truck routes (I-80)	AR-2,3,4	• S.H. 285	AR-2,3
• Utilize corridor from Colorado Springs to the mountain resorts S.H. 24	AR-1,3	• Colorado Springs to Vail	AR-2,3
• New connection to existing rail into I-70 at Dillon	FG Transit	• Fort Collins to Steamboat	AR-1,3
• Alternate routes - Henderson Mine - Grand County - S.H. 285 - S.H. 24 - Loveland Pass (improve as an alternate route)	 AR-2,3 AR-2,3 AR-1,3 AR-1,3 AR-1,3	• Alternate truck routes • Tunnels in general • Henderson Mine • S.H. 24 • S.H. 72	AR-4 ALL AR-1,3 AR-1,3 AR-1,3

Alternatives

- **AR1** Travel lane improvements to routes south of I-70
- **AR2** Travel lane improvements to routes north of I-70
- **AR3** Travel lane improvements to routes north and south of I-70, a combination of the best of north and south routes

Figure 4.2
Example of the Idea Refinement Process

TABLE 4-1
Alternatives for Screening

No-Build Alternative
• No-Build (NB)—Existing infrastructure plus committed projects
Non-Fixed Guideway Alternatives
• Non-Fixed Guideway (NFG) 1—Enhanced bus/van service limited to improvements to existing services and incentives to use these services
• NFG 2—High-speed bus/van service with dedicated peak-hour busway constructed from Floyd Hill to Frisco
Fixed-Guideway Alternatives
• Fixed-Guideway (FG) 1—High-speed rail line, West Denver to Vail with a tunnel alignment
• FG 2—Local service rail line with minimal tunneling, West Denver to Vail
• FG 3—Emerging/innovative FGT, West Denver to Vail
• FG 4—Winter Park Ski Train with extension from State Bridge to I-70
Aviation Alternatives
• Aviation (A) 1—New airports in Summit and/or Park County
• A 2—Heliport/STOL facilities
• A 3—Existing aviation facilities improvements
• A 4—Aviation systems management and subsidy consideration
Alternate Routes
• Alternate Routes (AR) 1—Travel lane improvements to routes north of I-70
• AR 2—Travel lane improvements to routes south of I-70
• AR 3—Travel lane improvements to routes north and south of I-70
• AR 4—Travel lane improvements to U.S. 287
Highway Alternatives
• Highway (HY) 1—One lane added to I-70 using a rural standard section from Floyd Hill to Eagle/third bore at Eisenhower Tunnel
• HY 2—One lane added to I-70 with an urban standards section from Floyd Hill to Eagle/third bore at Eisenhower Tunnel
• HY 3—High-tech platform: signage and movable barriers from Floyd Hill to Edwards/no Eisenhower Tunnel improvements
• HY 4—One lane added on I-70 within the guard rail at selected locations/no Eisenhower Tunnel improvements

Screening of Alternatives

As discussed in Section 2, the screening of conceptual alternatives was conducted at Workshop No. 4 by the CWC. The workshop focus was limited to the 18 long-term or Vision alternatives:

- No-Build Alternative
- Two Non-Fixed Guideway Transit Alternatives
- Four Fixed-Guideway Transit Alternatives
- Four Aviation Alternatives
- Four Alternate Route Alternatives
- Four Highway Alternatives

Prior to the workshop, the consultant team prepared and distributed an evaluation mailer to the CWC mailing list. This document provided the attendees with the basic environmental and engineering information needed to assess the relative considerations associated with each of the 18 alternatives. The intent of the workshop was to eliminate the unacceptable long-term Vision alternatives within each mode. Although the goal was to identify at least one acceptable alternative within each mode, there were no limitations placed on eliminating all alternatives within a mode. Figure 4.3 presents an example of this process.

To simplify the workshop agenda, TSM/TDM alternatives were not included in the workshop evaluation. The TSM/TDM alternatives received public input at two open houses the following week.

TSM/TDM alternatives, because of their purpose "to relieve congestion and reduce demand," are options that cannot be eliminated. CDOT must have these options available as tools to maintain the roadway efficiency.

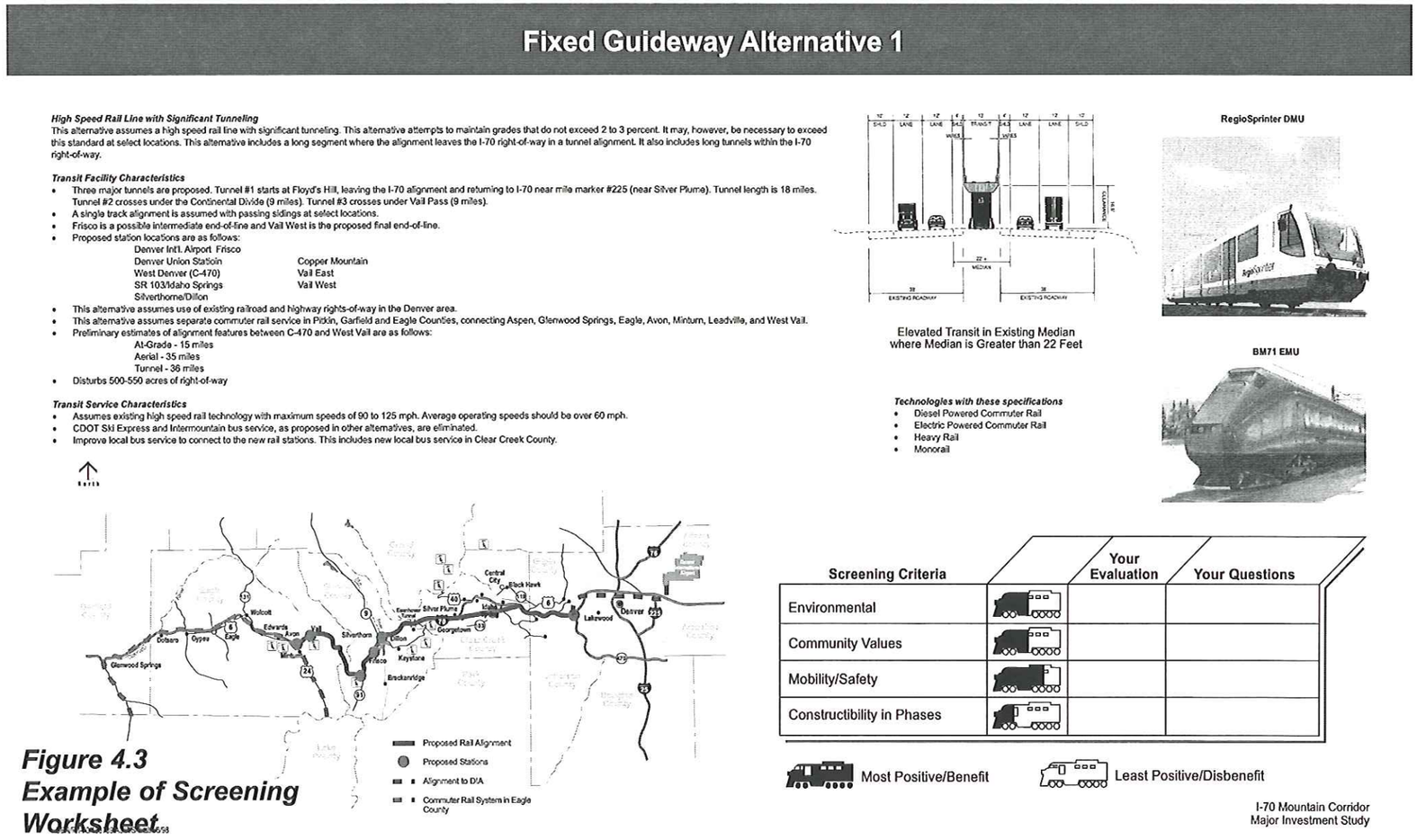


Figure 4.3
Example of Screening Worksheet

Screening Criteria

The screening evaluation was based on the criteria developed by the CWC in Workshop No. 2, as described in Section 3. Table 4-2 presents the screening criteria.

TABLE 4-2
Screening Criteria

Criteria	Measurement
Environmental Impact	
1. Overall construction impact	Total acres disturbed
2. Irresolvable impacts	• Permanent loss of habitat • Impacts on T&E species • Impacts on wilderness areas; wild and scenic rivers
Community Values	
1. Land use	• Opposes local land use goals, comprehensive plans
2. Visual	• Severe impact due to mass/scale
3. Character	• Impacts on historic districts
Safety/Mobility	
1. Safe movement of people and goods	• Travel time between major origin-destination (OD) pairs • Congestion relief on I-70
Financing	
1. Ease in financial implementation	• Provides mobility options • Accommodates phased construction • Results in viable construction segments

Results of the Screening-Level Evaluation

The screening-level alternatives recommended for detailed evaluation by the CWC are presented in Table 4-3. A narrative supporting the disposition of each alternative within each modal category follows.

No-Build/Committed Projects

This alternative was carried forward based on MIS guidance and NEPA requirements. However, there was little public support for an NB alternative.

TSM/TDM Alternatives

Federal guidelines for the MIS process suggest that a TSM alternative be carried forward to detailed evaluation. The TSM/TDM package received very few comments during the public open houses. The general consensus is that CDOT will need to provide the improvements needed to maintain the operation of I-70. The only TSM element eliminated at screening was congestion pricing.

TABLE 4-3
Results of Alternative Screening

Disposition of Alternatives			
	Description	**Disposition**	**Comments**
No-Build Alternative			
No-Build (NB)-Existing Infrastructure plus committed projects	Includes all committed highway, transit, and aviation projects.	Advanced	Required for NEPA considerations.
TDM Alternatives			
Includes highway build elements, bus transit, aviation, operational improvements, and travel demand management	Build elements include 38 miles of highway improvements, improvements to 12 interchanges, and 2 new interchanges.	Advanced	Provides many Early Action improvements that are well supported by the public. Also, TSM/TDM is required for detailed evaluation to fulfill MIS guidance.
Non-Fixed Guideway Alternatives			
Non-Fixed Guideway (NFG) 1-Enhanced bus/van service	Includes new transit centers; queue jump bypass lanes at Eisenhower Tunnel; expansion of Ski Express, Intermountain, and local bus services.	Advanced	Will be included in TSM package.
NFG 2-High-speed bus/van service with dedicated peak-hour busway	Includes a one-lane reversible busway from Floyd Hill to Frisco coupled with a significant increase in bus service over NFG 1.	Advanced	Additional alternative recommended by the OSC.
Fixed-Guideway Alternatives			
Fixed-Guideway (FG) 1-High-speed rail line with a tunnel alignment	High-speed electrified rail technology with approximately 40 miles of tunnel to restrict grades to <3 %. Alignment runs from C-470 to Vail with stops at all communities along I-70.	Dropped from further evaluation	Environmental concerns regarding extensive tunneling.
FG 2-Local service rail line with minimal tunneling	Conventional diesel rail technology without tunnels requiring rack & pinion technology to climb grades; minimal tunneling; alignment from C-470 to Vail. Slow travel speeds due to rack technology and steep grades.	Dropped from further evaluation	Service too slow to be competitive.
FG 3-Emerging/innovative FGT	Assumes the same alignment as FG 2 but with high-speed (emerging or innovative) technology that can negotiate grades with minimal tunneling. A technology is not defined but will be procured via a performance specification.	Advanced	Expanded to include all technologies.
FG 4-Winter Park Ski Train with Extension from State Bridge to I-70	Assumes the expansion of the "Ski Train" route through Moffat Tunnel on existing SPRR track with construction of new track from State Bridge to I-70. Alignment goes from Denver Union Station to Wolcott and on to Vail.	Dropped from further evaluation	Considered to have little benefit to the corridor.
Aviation Alternatives			
Aviation (A) 1-New airports in Summit and/or Park County	Provides an entirely new airport(s) at appropriate locations, allowing access to the national air system and potential all-weather capability. All new terminal, airfield, and landside facilities.	Dropped from further evaluation	Environmental concerns/lack of public support.
A 2-Heliport/STOL facilities	Provides new or revamped aviation facilities for use by vertical flight aircraft (e.g., rotocraft, tiltrotor, tilt-wing, etc.) aircraft.	Dropped from further evaluation	Environmental concerns/lack of public support.
A 3-Improve existing aviation facilities	Includes improvements to the Aspen, Eagle, Grand Junction, Montrose, and Hayden airports over the next 10 years.	Advanced	Will be included in TSM package.
A 4-Aviation systems management and subsidy consideration	Includes scheduling techniques combining two or more destination markets on the same flight and the use of seat guarantees or subsidies to encourage air travel.	Advanced	Will be included in TSM package.
Alternate Routes			
Alternate Routes (AR) 1-Travel lane improvements to routes south of I-70	Improves all major routes south of I-70, including U.S. 24, U.S. 285, and S.H. 9. Major improvements include widening, new tunnels to shorten travel times, and safety improvements.	Dropped from further evaluation	Will be recommended to statewide planning.
AR 2-Travel lane improvements to routes north of I-70	Improves all major routes north of I-70 including S.H. 14, S.H. 131, S.H. 9, S.H. 72, S.H. 93, S.H. 119, and U.S. 40. Major improvements include highway widening, new tunnels to shorten travel times, and safety improvements.	Dropped from further evaluation	Will be recommended to statewide planning.
AR 3-Travel lane improvements to routes north and south of I-70	Includes all improvements stated above for ARs 1 and 2.	Dropped from further evaluation	Will be recommended to statewide planning.
Highway Alternatives			
Highway (HY) 1-One lane added each direction to I-70/third bore at Eisenhower Tunnel	Uses a "Rural Standard Section," with a footprint that varies from 168 to 192 feet, from Floyd Hill to Eagle (120 miles), and a third bore at Eisenhower Tunnel.	Dropped from further evaluation	Environmental concerns.
HY 2- One lane added to I-70 with an urban standards section/third bore at Eisenhower Tunnel	Same as HY1 but assumes urban standard resulting in average footprint of 138 feet.	Advanced	Combined with HY 4 Alternative.
HY 3-High-Tech Platform: Signage and movable barriers for 100 miles/third bore at Eisenhower Tunnel	Use signing technology and movable barriers to maximize highway capacity and reverse traffic flow. Will increase the highway footprint by about 20 feet.	Dropped from further evaluation	Dropped in favor of HY 4 Alternative.
HY 4-One lane added on I-70 within the guard rail at selected locations/no additional Eisenhower Tunnel bore	Uses double decking and/or "Glenwood Canyon-type" design to minimize impacts and keep the improvements to within the guardrail, for essentially no increase in the highway footprint. Capacity increases are provided only for the most congested segments, approximately 43 miles, including 14 miles from Floyd Hill to U.S. 40, 5 miles from Silverthorne to Frisco, 4 miles from West Vail to Dowd Junction, and 20 miles of slow moving vehicle lanes on steep grades.	Advanced	Combined with HY 2 Alternative.
Fixed Guideway Transit with Selected Highway Improvements	Provides a combination of FG 3 plus HY 4.	Advanced	This compromise alternative was suggested by the OSC.

It is anticipated that elements within the TSM/TDM package will be refined through the public involvement and the design and environmental approval processes.

Non-Fixed Guideway Alternatives

These alternatives generally received favorable ratings for community values and environment by the public. Nonetheless, the CWC indicated a strong preference for rail transit over bus transit.

NFG 1, improvements to existing bus systems, was endorsed as a part of the TSM strategy. It was recommended that this concept be carried forward for detailed evaluation. This option falls within the public's acceptable limits for the community values, environmental, and safety/mobility criteria. Conversely, it was not considered as a stand-alone, long-term solution to the corridor's mobility problems. It was felt to be appropriate as part of a short-term strategy for implementing one of the Vision alternatives.

NFG 2, bus improvements with a dedicated busway from Floyd Hill to Frisco, was not strongly supported by the CWC due to its similarity to highway widening and concerns regarding its construction impact. This option would require widening the highway platform by 30 to 40 feet, as well as extensive highway reconstruction from the I-70/C-470 interchange to Frisco. There were also concerns that the effort placed on implementing NFG 2 would detract from, and compete with, the implementation of a rail transit alternative.

Although the CWC exhibited concerns with advancing NFG 2, the OSC felt that it should be carried forward to provide a comparison to an FG alternative(s).

Fixed-Guideway Alternatives

FG 1, 2, and 3 all involved construction of a new rail system from West Denver to Vail. FG4 involved improving passenger service from Denver Union Terminal to Winter Park following the SPRR alignment with construction of new track from Wolcott to Vail.

From the public's standpoint, an FG system needs to provide both local service and fast travel times. The CWC felt that FG 3, emerging/innovative technology, would provide both of these features. There is also the belief that emerging technologies can be tailored to the mountain environment more effectively than can conventional technologies, resulting in fewer and more manageable construction impacts. FG 3 was thus the preferred alternative of the CWC.

FG 1, high-speed rail with tunnels, was weakly supported due to construction impacts from extensive tunneling. There was also the concern that it would not provide local service to Idaho Springs or Silver Plume due to the fact that the system would pass under these cities in a tunnel.

FG 2, local service with minimal tunneling, was considered to have travel times that are too slow (travel speeds of 20 mph up steep grades) due to the requirement for rack and pinion drive technology, which is needed to handle the steep grades. Further, there was less public support for conventional technology as compared to innovative and emerging technology. Diesel Multiple Unit (DMU) and/or diesel-powered commuter rail technologies, as originally suggested by FG 2, were considered impractical for use in the I-70 Mountain Corridor due to their inability to negotiate the prolonged steep grades.

As a result, the use of DMU and other diesel technologies were not evaluated further. It was concluded that negotiation of the steep mountain grades would require the improved power-to-weight ratios provided by electrified vehicles. Any future connection to the Gold Line or the Air Train systems, which are both slated to use diesel technology, from the mountains is anticipated to require electrification of the track and possibly the addition of a second parallel track. If an emerging or innovative technology is implemented for the I-70 Mountain Corridor, alternate and parallel guideways will probably need to be considered.

Lastly, FG 4, Winter Park Ski Train alignment, was not received well due to the fact that the alignment does not directly serve the I-70 corridor communities. Further, operation of the system at high speed is not compatible with the existing freight operation.

Aviation Alternatives

Alternatives involving the construction of new airports, A 1 and A 2, were not supported by the CWC due to environmental impacts such as noise and loss of wildlife habitat. However, the participants did support A 3, improvements to existing airports, and A 4, improvements to existing airport operations. It was determined that A 3 and A 4 should be incorporated into the TSM/TDM package for detailed evaluation.

Alternate Routes

The CWC generally felt that alternate routes should be incorporated as part of CDOT's future statewide planning effort and not analyzed as part of the I-70 Mountain Corridor MIS. Some of these alternative routes did offer some potential diversion of traffic; however, they did not offer the best solution to the I-70 corridor. Local entities and communities along these alternate routes were concerned and it was determined that a separate process was necessary to evaluate these routes.

Highway Alternatives

None of the highway alternatives received strong support by the CWC due to impacts on community values and the environment. In fact, many of the CWC felt that no highway alternatives should be carried forward to detailed evaluation. However, there was limited support for developing an environmentally sensitive highway alternative that combined the best characteristics of HY 2 and HY 4 (that is, the use of minimal platform width [the "smart widening" concept] with mitigations such as "Glenwood Canyon-type" design techniques through Idaho Springs, Georgetown Hill, and other environmentally sensitive areas).

The OSC supported carrying forward a highway alternative that followed the guidelines suggested by the CWC.

Additionally, there was concern on the part of the OSC that highway improvements would not be implementable unless fixed guideway transit was included as part of the long-term vision. Thus, it was suggested that an alternative be carried into detailed evaluation that incorporated highway widening, with FGT in areas where traffic volumes warrant these improvements.

Supplemental Features

Mitigations, Enhancements, Implementation Strategies, and Land Use Planning ideas developed by the public were all carried forward to the detailed evaluation phase.

A summary of the final alternatives recommended for detailed evaluation is presented below.

Alternative Strategies Recommended for Detailed Evaluation

Based on the input received from the CWC and the OSC, the following alternative strategies (defined as strategies since each represents a package of improvements) were recommended for detailed evaluation:

- No-Build – Currently Committed Projects Only
- TSM/TDM Package
- Bus/HOV Lanes
- FGT
- Highway Widening
- FGT with Addition of Highway Lanes in Select Locations

It is important to note that all of the "build" strategies incorporated the TSM/TDM alternative. A description and evaluation of the detailed evaluation strategies are presented in Sections 5 and 6, respectively.

SECTION 5

Description of Strategies Recommended for Detailed Evaluation

This section presents a description of the six strategies recommended for further study by the CWC and OSC. Full documentation of the detailed evaluation of alternatives for the I-70 Mountain Corridor is included in the report entitled *I-70 Mountain Corridor Major Investment Study: Detailed Evaluation Report* (CH2M HILL, et al., 1998a).

The six strategies represent a broad range of mobility options that were used to test the values of the affected public and stakeholders in the I-70 Mountain Corridor. The strategies range from constructing nothing beyond currently committed projects, the NB Strategy, to five build programs that stress either transit or highway improvements.

The TSM/TDM Strategy calls for improving existing infrastructure so that it functions better during periods of peak weekend congestion. This requires modifications to I-70 such as improvements to congestion in Clear Creek County and slow-moving vehicle lanes in areas of steep grades. It also includes operational improvements, such as higher levels of maintenance and the provision of real-time information to drivers, and improvements to existing airports and bus service. Measures to change behavior are also part of this strategy. Variations of the TSM/TDM Strategy are included as an element in all of the five remaining "build" strategies.

The Bus/HOV Strategy adds additional lanes to I-70 from Floyd Hill to Eagle, Colorado, a distance of 99 miles. The new lanes would be dedicated to buses, vans, and other high (more than three persons) occupancy vehicles (HOV). The strategy would also provide improved bus service for skiers, and regional and local travelers.

The FGT Strategy includes construction of a new transit system from West Metro Denver to Glenwood Springs. High-speed technology is assumed from West Metro Denver to Vail. Commuter rail technology is assumed from Vail to Glenwood Springs.

The FGT/SHI Strategy is the same as the FGT Strategy but also incorporates adding a lane in each direction to I-70 from Floyd Hill to U.S. 40 near Empire, from Silverthorne to Frisco, and from West Vail to Avon. Additionally, slow-moving vehicle lanes are proposed at Georgetown Hill, the eastern approach to Eisenhower Tunnel, and over Vail Pass.

The HY Strategy adds a lane in each direction to I-70 from Floyd Hill to the Town of Eagle, a distance of 99 miles. It also includes the same bus service improvements as called for with the TSM/TDM Strategy.

The following sections provide a more detailed description of the six strategies.

No-Build (NB) Strategy

The NB Strategy adds no additional capacity to the I-70 Corridor beyond that which is already funded and programmed in each region's State Transportation Improvement Program (STIP). The NB Strategy assumes completion of the projects within the STIP but no new construction beyond the STIP. Additionally, the NB Strategy assumes currently planned transit and aviation projects in the study area.

I-70 Improvements

At the time of the detailed evaluation (December 1997), the currently committed projects for I-70 included those shown in Table 5-1.

TABLE 5-1
Committed I-70 Projects

Mile Region	Post	Miles	Type of Improvement	Description	Fiscal Year* 1997	1998	1999	2000-2002
1	208	6.1	Auxiliary Development	East of U.S. 6 (Dillon) to tunnel; Straight Creek Water Quality Improvements	$432	$70	$385	$525
1	190	54.3	Reconstruction	I-70 west of Floyd Hill to Vail Pass		$200	$5,500	$4,000
3	116.4	2.2	Surface Treatment	East of Glenwood Springs	$1,300			
3	161.1	7.5	Surface Treatment	Avon east and west		$3,200		
1	205.6	8.1	Surface Treatment	Eisenhower Tunnel west		$2,000		
1	205.8	31.2	Surface Treatment	Georgetown east	$2,000			

* All costs in thousands

Transit

All elements of the adopted Transportation Development Plan's (TDP) Five-Year Capital Improvement Programs for the Summit Stage, the Roaring Fork Transit Agency, the Eagle County Regional Transportation Authority, Town of Vail Transit, Avon/Beaver Creek Transit, and the Regional Transit District are included.

Aviation

Five commercial airports are identified in the NB Strategy. Airports at Aspen, Eagle, Hayden, Grand Junction, and Montrose service the air passenger needs in this area. Their respective capital program costs are listed in Table 5-2.

TABLE 5-2
Airport Capital Program Costs

Airport	Total Cost	Fiscal Years
Aspen-Pitkin County Airport (ASE)	$23,202,240	1993-2003
Eagle County Regional Airport (EGE)	$50,061,982	1996-2007
Grand Junction-Walker Field (GJT)	$15,954,330	1994-2005
Montrose Regional Airport (MTJ)	$17,196,231	1995-2003
Yampa Valley Regional Airport (HDN)	$16,808,063	1994-2003

All of the projects and costs included within these requests are currently included in the National Plan of Integrated Airport Systems (NPIAS). Some have also been included in the FAA's capital improvement program.

Supporting commercial service airports are located at Gunnison, Kremmling, and Rifle. These airports also provide prospects for meeting long-term passenger needs.

TSM/TDM Strategy

The TSM/TDM Strategy focuses on improvements to the operational efficiency of the existing I-70 facility and manages travel demands among the various modes. The TSM measures fall into six major categories:

1. Build Elements
2. Aviation Elements
3. Operational Elements
4. Travel Demand Management
5. TSM Transit Elements
6. Bicycle and Pedestrian Paths

The TSM/TDM Strategy can be implemented as a stand-alone alternative, or selected measures can be integrated into other strategies. For the I-70 Mountain Corridor, all of the five build strategies include about the same TSM/TDM actions.

TSM Build Elements

Highway Improvements. The following highway improvements have been identified as part of the TSM Build Strategy. (See Figure 5.1.)

- **Flex Lanes** – Fourteen and one-half miles of flex lanes are proposed from Floyd Hill to U.S. 40 by improving outside shoulders to allow them to be used as travel lanes during peak traffic usage.
- **Geometric Improvements at Existing Bottlenecks** – This is to include modifications of the twin tunnels east of Idaho Springs to improve traffic flow. Additionally, existing sharp curves will receive alignment "smoothing" from the twin tunnels to the interchange with S.H. 6 to improve the current design speed of 50 to 55 mph to 60 to 65 mph.

- **Proposed Interchange Improvements**
  - S.H. 6/S.H. 24 (MP 171)
  - West Frisco (MP 201)
  - S.H. 9/U.S. 6 (MP 206)
  - West Idaho Springs (MP 239)
  - Hidden Valley (MP 243)
  - Wheeler Junction (MP 196)
  - Frisco (MP 204)
  - Fall River Road (MP 238)
  - 13th Avenue (MP 240)
  - U.S. 6 (MP 244)
- **Interchange Reconfiguration/Reconstruction**
  - U.S. 40 (MP 232) (New interchange with frontage road alignment)
  - East Idaho Springs (MP 241) (Full movement tight diamond)
- **New Interchanges**
  - Eagle County Airport Access (MP 143) (Full movement diamond)
  - Nottingham Road (MP 168) (Full movement diamond)
  - East Avon (MP 169) (Half diamond to the east)
- **Frontage Road Improvements and Systems Enhancements**
  - Widening of S.H. 6 to four lanes from Squaw Creek Road to East Avon (MP 169) (9 miles) with geometric enhancements to approximately 20 at-grade intersections, plus the addition of 4 miles of continuous I-70 acceleration and deceleration (A/D) lanes from East Avon to West Vail
- **Intermittent Slow-Moving Vehicle-Climbing/Descending Lanes** – 20 miles of slow-moving vehicle lanes at the following locations:
  - 14 miles over Vail Pass
  - 2 miles on the east approach to Eisenhower Tunnel
  - 4 miles at Georgetown Hill from Silver Plume to Georgetown
- **Safety Improvements** including the construction of snow slide mitigation on West Vail Pass and at Seven Sisters

Aviation Elements

As part of this strategy, aviation improvements are proposed at all airports along the corridor to promote passenger and cargo air service. Five airports currently offer the majority of passenger and air cargo services along the I-70 corridor. These airports will continue to provide for significant passenger and air cargo services over the next 20 years. These airports are Aspen, Eagle County, Grand Junction, Montrose, and Steamboat Springs/Hayden. The total costs estimated for airport improvements over the next 10 years at these airports is estimated at $123 million. A large portion of these funds could come from FAA sources. Additionally, facilities at Garfield County Airport, Gunnison County Airport, Kremmling-McElroy Field, and Telluride Regional Airport currently have or could support potential passenger and air cargo service to meet the additional needs of air travelers in the vicinity of the I-70 corridor. Each of these nine airports will require continued planning and support from local and state government to maintain their viability and service potential into the future.

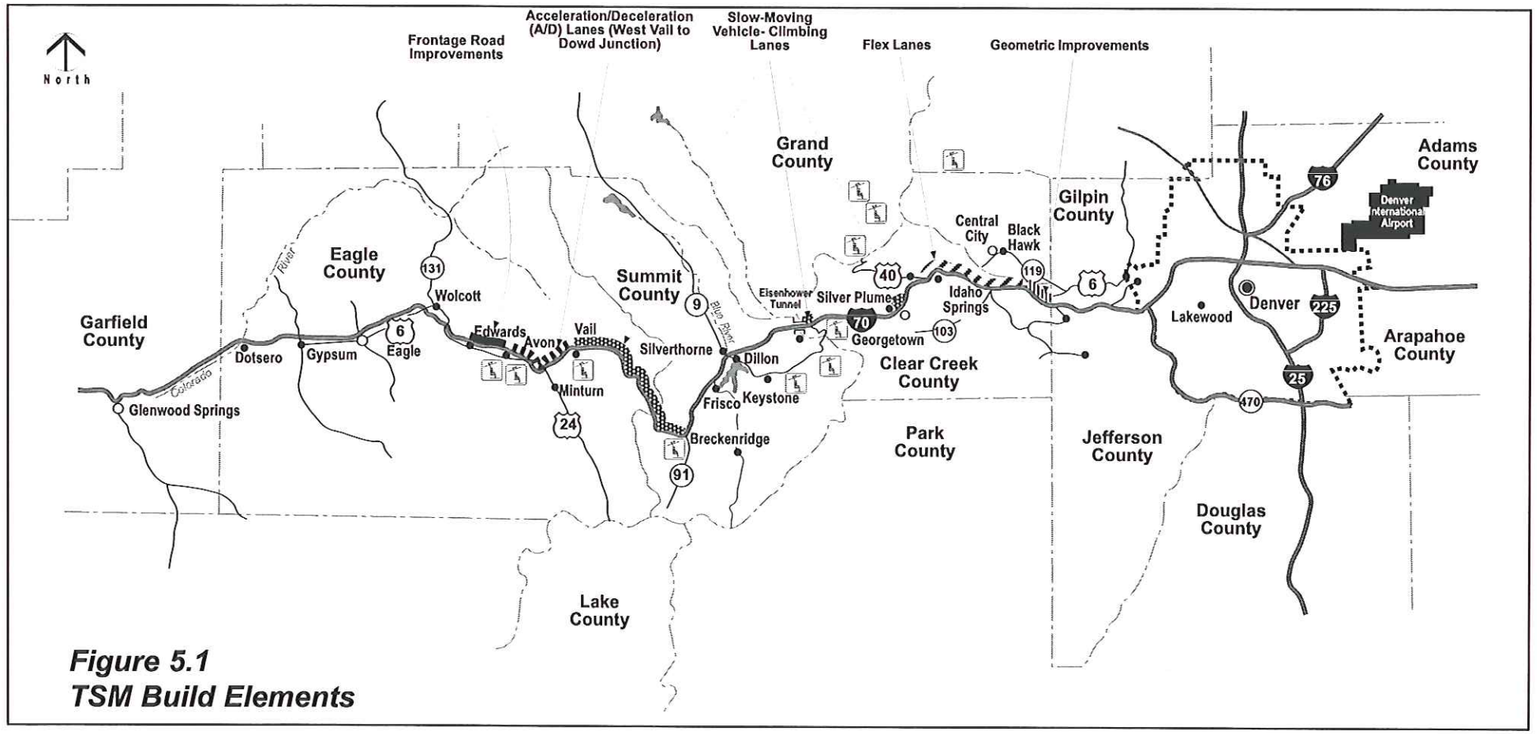


Figure 5.1
TSM Build Elements

Operational Improvements

The following operational improvements are included in the TSM Strategy:

- **Intelligent Transportation (ITS) Program**—including a broad range of driver information and communications improvements using advanced technology. This could range from variable message signage that improves driver information to the use of ramp metering in Clear Creek County (or other locations based on more detailed analysis) at locations susceptible to peak hour surges in I-70 entrance ramp traffic.
- **Incident Management Program**—adding remote surveillance cameras for improved incident detection; developing an incident management plan; outfitting vehicles with probes to provide real-time speed and travel estimates; installing remote detection systems for ice/wind/avalanche; evaluating MAYDAY operations for in-vehicle signaling from stranded vehicles; expanding highway advisory radio and variable message systems; and instituting an emergency services district program to fund local programs.
- **Truck Operations Plan**—including expanded chainup areas; expanded truck emergency operations with additional tow and push capabilities; minimum left lane speeds; Georgetown gusty wind sensor/variable message signage; more aggressive use of chains for icy/snow conditions; and expanded automated port-of-entry/weigh-in-motion programs.
- **Expanded Maintenance Program**—including improvements in pavement marking materials, installation of advanced pavement delineation devices, lighting at select locations, improved snow removal, more use of grooved pavements, and improved signing and reflectorization.

TDM Strategies

TDM strategies are directed toward reducing the demand for vehicle travel and increasing vehicle occupancies, providing incentives and support facilities for alternative modes of travel, managing parking, and implementing tolls. A number of these measures seek to change personal travel behavior as a means of making efficient use of the transportation infrastructure. Other actions focus on shifting trips away from peak periods.

The proposed TDM elements include:

- Measures to change behavior include greater marketing of shuttle services, carpool matching services, preferential parking for carpools, and subsidies for transit passes.

- Operational options for the management of the flexlanes shall be included and evaluated for their benefit in changing demand patterns and encouraging an increase in HOV usage. Such options include, but are not limited to, HOV designations or High Occupancy Toll (HOT) lanes.
- Intermodal Transfer Centers at Cold Spring park-n-Ride, West Metro, Idaho Springs, Empire Junction, Silverthorne, Frisco, Vail, Avon, Eagle, Eagle County Airport, and Glenwood Springs.
- Parking management program to control the number, location and pricing of available parking spaces.
- Access management to control the spacing and design of highway interchanges.
- Congestion pricing where tolls would be charged during peak periods on I-70; tolls would be waived for vehicles with more than three occupants.

TSM Transit Elements

The TSM transit elements include expansion of four major existing systems:

1. Intermountain Bus Service
2. Skier Express Service
3. Local Bus Service
4. Private Shuttle Service

A key element of the TSM Alternative's transit strategy is the introduction of new intercity, intermountain bus service from Denver to Glenwood Springs. The new intermountain bus service would begin in downtown Denver and would include a stop at the Regional Transportation District's (RTD) Cold Spring park-n-Ride to provide passengers from the intermountain bus line with access to numerous RTD bus routes and eventually to RTD's West Corridor light rapid transit (LRT) line.

As previously noted in this report, Greyhound currently provides limited intercity service in the corridor. The intercity bus service proposed in this alternative differs from existing Greyhound service with respect to more frequent stops (Greyhound currently stops at four cities in the corridor) and more frequent service (Greyhound currently makes five round trips per day). This new bus service would also be integrated with the schedules of local transit service providers.

The Skier Express service provides direct bus service from Denver area park-n-Rides to the mountain resorts. Three Denver area locations are proposed: Stapleton, a West Metro Denver location, and the Highlands Ranch park-n-Ride. The proposed operating plan increases service to two morning trips from each location, or a total of 36 round trips to the six mountain resorts.

Local transit service is expanded beyond what is proposed in the TDPs as part of the TSM/TDM Alternative. Approximately 36 percent additional bus hours have been added in Summit and Eagle Counties above the current TDPs, and a new service is proposed for Clear Creek County.

Finally, private shuttle service is considered an essential part of the TSM transit strategy. The TSM transit strategy assumes expanded private shuttle service from DIA and Eagle County Airport to the mountain destinations. It is accomplished by including private shuttle service as part of the overall marketing efforts of mountain resorts and including that service as part of the overall package price of the trip. Fare subsidies are proposed in order to draw a significant number of person trips from rental cars to the mountain private transit carriers.

Bicycle and Pedestrian Paths

Several bike paths exist along the I-70 corridor and in the surrounding mountain communities. However, there is not a contiguous bike path along the length of the I-70 corridor. A complete bicycle/pedestrian facility throughout the I-70 corridor is a common goal shared by all of the counties in the study area. As part of the I-70 transportation improvements, completion and enhancement of this system incorporating approximately 75 miles of new trails is suggested by the TSM build program.

Bus/HOV Strategy

As shown in Figure 5.2, the Bus/HOV Strategy adds one HOV lane in each direction to I-70 and improves existing bus service. The minimum occupancy requirement for vehicles using the lane would be three to four passengers, and the minimum speed limit would be posted for the lane. An additional bore at the Eisenhower Tunnel would not be included.

The widening, principally in the median, occurs from Floyd Hill to Eagle, Colorado, a distance of 99 miles. No improvements are planned from Floyd Hill east to C-470. To minimize construction impacts, the plan provides for the following three terrain-sensitive typical section applications as shown in Figure 5.3:

- "Smart Widening" sections that include a median barrier with 4-foot inside shoulders and 6-foot outside shoulders
- "Urban Standard Platform" sections with 10-foot outside and inside shoulders and a median barrier
- "Rural Standard Platform" sections with 10-foot outside and inside shoulders and an open 22- to 60-foot median

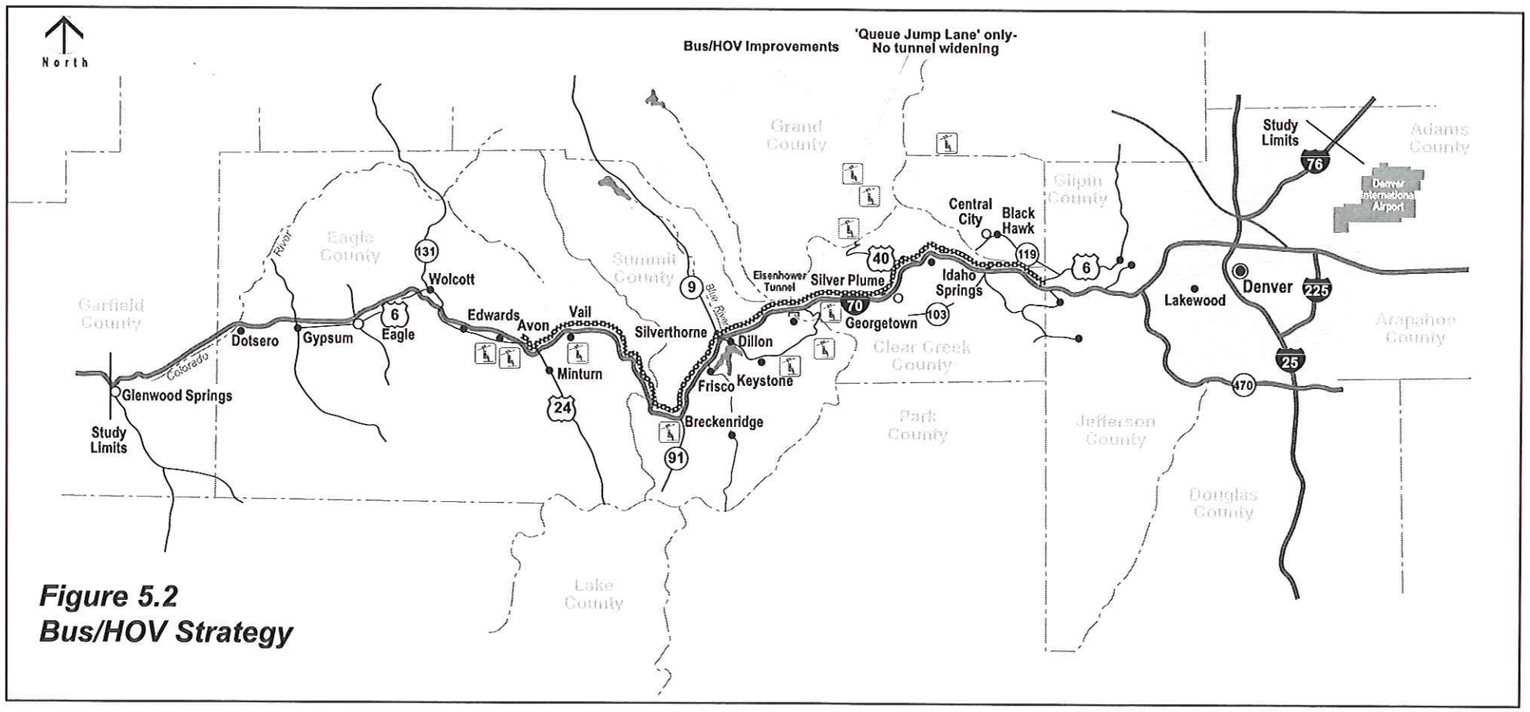
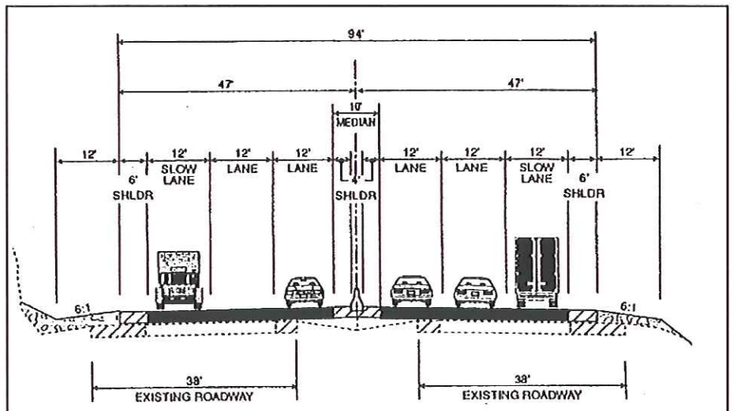
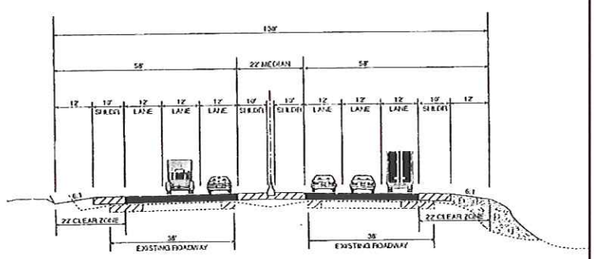


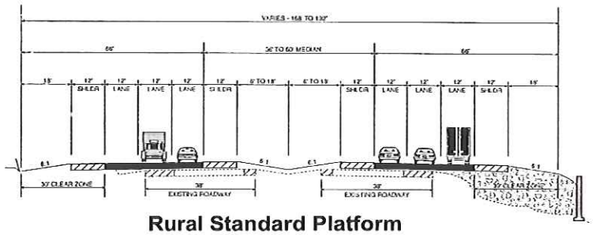
Figure 5.2
Bus/HOV Strategy



Smart Widening



Urban Standard Platform



Rural Standard Platform

Figure 5.3
Terrain-Sensitive Section Applications

Key Construction Elements

HOV Improvements

- 99 miles of HOV lane addition; one eastbound, one westbound:
  - 20 miles of "Smart" widening
  - 35 miles of "Urban Standard Platform"
  - 44 miles of "Rural Standard Platform"
- HOV "queue jumping" lanes at Eisenhower Tunnel involving 12-foot widening and barrier separation at each approach to the tunnel for approximately one-half mile, restricted to HOV use
- Widening 106 bridges and replacing 3 bridges
  - 79,000 linear feet (lf) (15 miles) of retaining walls
  - 21,000 lf (4 miles) on Vail Pass
  - 29,000 lf (5.5 miles) on the west approach to Eisenhower Tunnel
  - 15,800 lf (3 miles) at Georgetown Hill
  - 13,200 lf (2.5 miles) in Idaho Springs

Interchange Improvements (In addition to TSM/TDM Improvements)

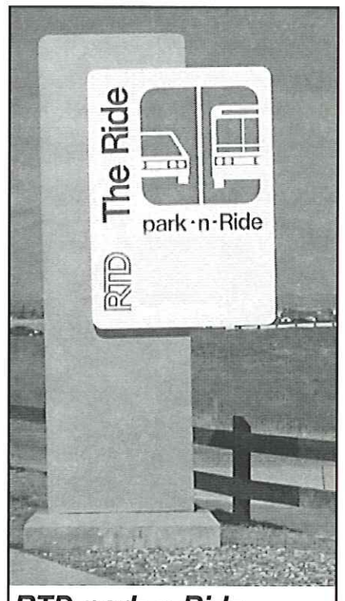
- S.H. 6/Floyd Hill (reconstruction for a "smoother" alignment for I-70 and the connection with S.H. 6 using longer structures and benched rock cuts)
- 13th Avenue in Idaho Springs (reconfiguration of interchange ramps to accommodate a wider I-70 section through Idaho Springs)

Transit Element

The transit element of the Bus/HOV Strategy includes a similar mix of local and corridor transit service improvements as does the TSM Strategy but at enhanced service frequencies. The transit element for this strategy assumes a higher level of transit service than the TSM Strategy to take advantage of the travel time savings provided by the dedicated Bus/HOV lanes. The following paragraphs detail each transit element of the Bus/HOV Strategy.

Intermountain Bus Service. Expanded intermountain bus service would begin in downtown Denver and include a stop at the RTD Cold Spring park-n-Ride to provide passengers from the intermountain bus line with access to numerous RTD bus routes and, eventually, the RTD's planned West Corridor LRT line. Buses operate in general traffic lanes on U.S. 6 and I-70 to Floyd Hill, in the Bus/HOV lanes from Floyd Hill to Eagle, and in general traffic lanes from Eagle to Glenwood Springs.

The intermountain buses would stop at existing transit centers, where available (e.g., the Frisco Transit Center and the Vail Transportation Center). New transit centers would be constructed at locations currently without a transit facility (e.g., Idaho Springs). (These locations will be evaluated in more detail during implementation planning.) Because of the higher service frequencies and improved reliability, enhanced passenger amenities are assumed at each transit center. The following list is of the proposed transit centers:



RTD park-n-Ride

- Cold Spring park-n-Ride
- Idaho Springs Transit Center
- Silverthorne/Dillon Transit Center
- Frisco Transit Center
- Vail Transit Center
- Avon Transit Center
- Eagle Transit Center
- Glenwood Springs

Skier Express Service. Another integral part of the Bus/HOV Strategy is direct bus service from Denver area park-n-Rides to mountain ski resorts in the winter months. Skier Express weekday service is proposed from the West Metro Denver location to Vail, Keystone, Breckenridge, Loveland, Winter Park/Silver Creek, and Copper Mountain. One weekday round trip is proposed to each resort. The proposed weekend service plan includes one additional round trip from the West Metro Denver location. Thus, 12 round trips are provided from the East Denver and South Denver locations, and 18 round trips are provided from the West Metro Denver location. Forty-two buses are required for the service. The fleet requirement (using a 20 percent spare ratio) is 50 buses. Public/private fare subsidies may be desirable to encourage ridership on the Ski Express bus routes.

Local Bus Service. The Bus/HOV Strategy also includes enhancements to existing local bus systems. These service improvements are similar to those previously described for the TSM Strategy.

Private Shuttle Service. Finally, private shuttle service is considered an essential part of the Bus/HOV Strategy. Private shuttle service incentives previously described for the TSM Strategy are also proposed for the Bus/HOV Strategy.

TSM, TDM, and Aviation Elements Included in this Strategy

- Geometric Improvements at Existing Bottlenecks
- Interchange Construction and Improvements
- Intermodal Transfer Centers
- Operational Improvements
- TDM Strategies
- Safety Improvements
- Aviation System Management and Improvements to Existing Airports
- Bicycle and Pedestrian Facilities

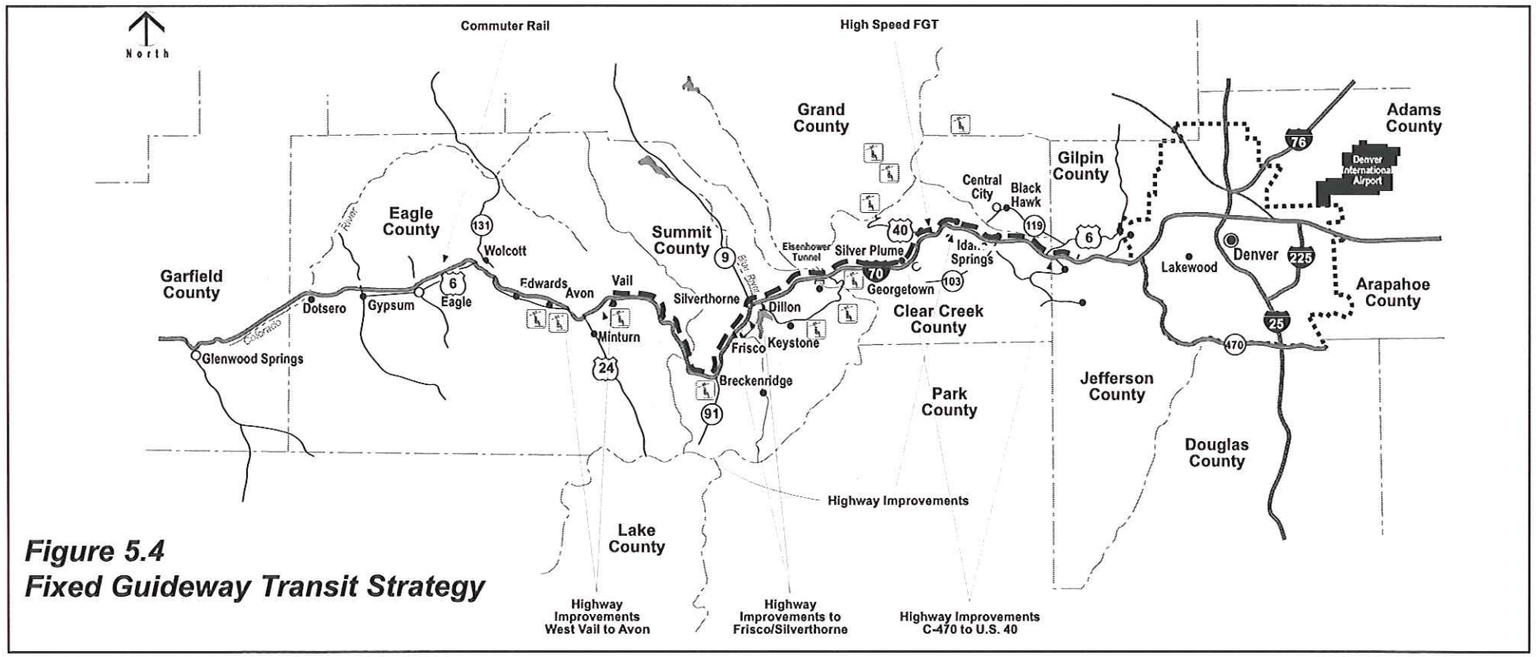


Figure 5.4
Fixed Guideway Transit Strategy

TSM Elements Not Included in this Strategy

- Flex lanes in Clear Creek County
- Slow-moving vehicle-climbing/descending lanes
- Frontage road improvements in Eagle County
- Congestion pricing

Fixed Guideway Transit Strategy

The strategy includes an FGT system from DIA to Glenwood Springs. (See Figure 5.4.) High-Speed technology would be deployed from DIA to Vail. From Vail to Glenwood Springs, a commuter rail system would be constructed using the existing Union Pacific right-of-way (ROW) and track. Construction of the FGT system to Glenwood Springs will allow future connectivity with proposed commuter rail systems to Aspen (which is currently funded in TEA-21) and Parachute as recommended in the *Colorado Passenger Rail Study* (Kimley-Horn and Associates, 1997).

It is assumed that connection to DIA would be provided at no additional cost by either the Gold Line or the West Corridor FGT projects currently being evaluated in other MISs.

This strategy also includes all of the TSM/TDM improvements referenced earlier with the exception of the flex lanes in Clear Creek County.

For the segment from West Metro Denver to Vail, a specific FGT technology has not been proposed. Rather, performance and cost criteria will be identified for technology selection. Selection criteria could include maximum speeds, average speed, speed while climbing existing grades, passenger capacity, environmental impacts, and community support. Establishing the minimum requirements will ultimately define the technology. For the purposes of estimating costs and potential environmental impacts, a high-speed conventional electrified FGT system (similar to the French Train-a-Grande Vitesse [TGV]) has been assumed. The TGV technology was chosen because of its high power to weight ratio. This would allow the FGT to climb the steep grades characteristic of the I-70 Mountain Corridor.

FGT Station Locations

For the purposes of estimating costs and impacts, the FGT stations listed below have been assumed.

DIA to Vail

- West Metro Denver
- Idaho Springs
- Georgetown
- Loveland
- Dillon/Silverthorne
- Frisco
- Copper Mountain
- Vail

In addition to the stations described above, stations may also be provided at DIA and Denver Union Terminal (DUT), depending on the assumed metro service operating plan. No parking is assumed at these stations. Bus access, however, will be needed at DUT.

Vail to Glenwood Springs. The *Colorado Passenger Rail Study* (Kimley-Horn and Associates, 1997) identifies the following potential stations along the proposed alignment:

- Avon
- Minturn
- Edwards
- Wolcott
- Eagle
- Gypsum/Eagle County Regional Airport
- Dotsero
- Glenwood Springs

FGT Operating Plan

A train operating plan was developed to help evaluate potential ridership and operating cost estimates. It should be understood that these operating plans are for study purposes only and will need to be refined when more detailed information is available.

The train operating plan assumes 60-minute weekday service frequencies from DIA to Vail with supplemental service on weekends from DUT to Vail, resulting in 20-minute peak period, peak direction service on the weekends. It may also be beneficial to provide limited (e.g., peak period) weekday service to and from DUT. Trains would operate at speeds of up to 90 mph in at-grade and aerial segments and 125 to 150 mph in tunnel segments. The average speed from the West Metro Denver Station to Vail would be 60 mph, resulting in a travel time of about 1 hour and 21 minutes. This assumes station dwell times of 1 minute at Idaho Springs, Georgetown, and Loveland Ski Area. Four-minute dwell times are assumed at all other stations. This train operating plan is projected to require 5 train sets for weekday service and 12 train sets for weekend peak period service. Using a 20 percent spare ratio, a total of 15 train sets are required.

West of Vail, 60-minute service frequencies are assumed, with supplemental (30-minute) peak period, peak direction service between Vail and Glenwood Springs.

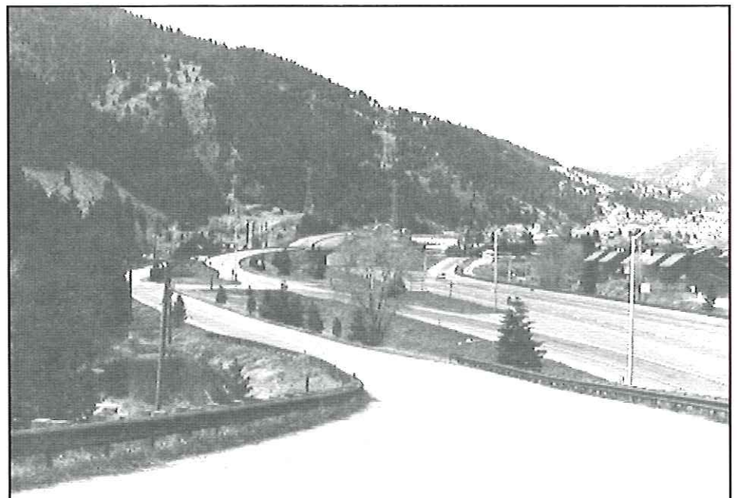
FGT Alignment Assumptions

The final alignment will be determined during environmental approval and engineering design. The following alignment assumptions were used to estimate costs and environmental impacts.

DIA to West Metro Denver

A separate study has evaluated the following four alternative service options between West Denver and DIA:

1. I-70 Mountain Corridor trains begin/end service in West Metro Denver, forcing a transfer to the metro rail system for a connection to/from DIA.



I-70 Mountain Corridor

2. I-70 Mountain Corridor trains begin/end service at DIA, with an alignment that uses the East Corridor and Gold Line alignment. All train trips would stop at DUT.
3. I-70 Mountain Corridor trains begin/end service at DIA, with an alignment that uses the East Corridor, Rock Island Railroad, and Gold Line alignment. Trains to/from DIA would bypass DUT. Additional Mountain Corridor train service would be provided to DUT on a limited basis.
4. I-70 Mountain Corridor trains begin and end service at DIA, via an exclusive grade-separated track that parallels the East Corridor, Rock Island Railroad, and Gold Line alignment. Trains to and from DIA would bypass, DUT. Additional mountain corridor train service would be provided to DUT on a limited basis.

At this time, a preferred alignment through Metro Denver has not been determined.

For the purposes of patronage and cost estimates, Alignment No. 3 has been assumed. This would require the electrification of these two segments of track. Costs for electrifying the track were not included in the cost-effectiveness analysis. The ridership sensitivity analysis suggests that additional stops through the Metro Denver area will reduce ridership to the mountains. Assuming an additional 20 minutes of travel time through metro Denver results in a loss of just over 100,000 riders per year. However, the additional stops through the metro area would presumably attract other (non-DIA) riders. The ridership model is not capable of measuring this impact.

West Metro Denver to Vail

The alignment for this section begins at the proposed West Metro Denver Station, located in the vicinity of I-70/C-470/U.S. 6. From there, the alignment ascends into the mountains. A median alignment has been assumed for most of the alignment, although there are several sections where the alignment shifts to either the north or south side of I-70 (usually because of station locations). A single-track alignment is assumed with passing sidings at noted locations.

West Metro Denver to Evergreen Parkway (8.3 miles). From the West Metro Denver Station, the alignment crosses over the westbound travel lane of I-70 and into the median. Much of the alignment may need to be on structure because the westbound I-70 travel lanes are at a higher elevation than the eastbound travel lanes. The rail alignment transitions to the north side of I-70 just west of the Genesee Interchange (Exit 254). This alternative does not assume an initial station at this location. However, a station could eventually be constructed at this site.

Evergreen to Idaho Springs (12.0 miles). From Evergreen, the alignment transitions from the north side of I-70 to the median just west of Exit 251. Beginning at Exit 247, I-70 has only a median barrier for the descent down Floyd Hill. To accommodate FGT in the median, I-70 will need to be reconstructed through this section. At the bottom of Floyd Hill, the rail alignment transitions to the south side of I-70. Again, significant reconstruction of I-70 will probably be required to accommodate the rail alignment. The necessary reconstruction would also provide an opportunity to increase the radius of highway curves from the bottom of Floyd Hill to the twin tunnels. At the twin tunnels, either a new tunnel is needed for the fixed guideway line or open rock cutting is needed on the south side of the hill. The rail alignment remains on the south side of I-70 through Idaho Springs. A station is assumed in the vicinity of the S.H. 103 (Exit 239) interchange.

Idaho Springs to Georgetown (10.9 miles). The rail alignment remains on the south side of I-70 through Idaho Springs, transitioning to the median west of town. The alignment remains in the median until it approaches the Georgetown interchange (Exit 228), where it transitions to the south side of I-70. A station is proposed east of the Exit 228 interchange.

Georgetown to Loveland Ski Area (11.5 miles). From Georgetown, the alignment crosses over I-70 on structure and immediately enters a tunnel, crossing under the Georgetown Hill on the north side of I-70. The west portal of the tunnel is located immediately west of Silver Plume. The tunnel would be approximately 2.7 miles long. The alignment then transitions into the median of I-70, crossing to the south side of I-70 just east of the Loveland Ski Area. The proposed Loveland Ski Area Station is at the east Loveland parking lot.

Loveland Ski Area to Silverthorne/Dillon (10.4 miles). From Loveland Ski Area, the alignment immediately enters a tunnel to cross the Continental Divide. The west portal of the tunnel is located approximately 1.5 miles east of the Silverthorne/Dillon exit. The tunnel is approximately 8.5 miles long. The alignment continues west in the median of I-70, crossing to the south side of I-70 at Exit 205. The proposed Silverthorne/Dillon station is located south of I-70 with access from Wildernest Road.

Silverthorne/Dillon to Frisco (3.0 miles). Immediately west of the Silverthorne Station, the alignment transitions back to the median of I-70, continuing up the hill to Frisco. The alignment crosses to the south side of I-70 immediately west of the Frisco exit (Exit 203) to serve the proposed Frisco station, located at the existing Summit Stage's transit center.

Frisco to Copper Mountain (8.2 miles). Immediately west of the Frisco station, the alignment transitions back to the median of I-70. The alignment must cross back to the south side of I-70 near the Copper Mountain interchange (Exit 195) to serve a station at Copper Mountain.

Copper Mountain to Vail (16.9 miles). The alignment crosses back to the median of I-70, ascending up Vail Pass. The east portal of a Vail Pass tunnel is located approximately 2.7 miles west of the Copper Mountain station. The tunnel is approximately 10.8 miles long. The proposed west portal is near Exit 180. The rail alignment is back in the median of I-70 at this point. The proposed Vail Station is located in the median of I-70, near the existing Vail parking decks (just east of Exit 176).

Vail to Glenwood Springs

From Vail to Dowd Junction (8 miles), no track currently exists. New track will be constructed in the median of I-70 from the Vail Transit Center to West Vail. At West Vail, the alignment shifts to the north of I-70, requiring extensive rock cuts to Dowd Junction. From Dowd Junction to Dotsero (34 miles), track exists and is rated as being in "good" condition. Between Dotsero and Glenwood Springs (18 miles), the alignment uses an existing, active Union Pacific track. Freight and Amtrak passenger service currently are provided in this segment. The overall condition of track in this segment is also rated as "good" according to the *Colorado Passenger Rail Study* (Kimley-Horn and Associates, 1997).

Passing Sidings

Locations for passing sidings are primarily determined by the proposed rail operating plan and physical constraints. The proposed rail operating plan consists of periods when there are 60-minute service frequencies in both directions, 30-minute service frequencies in both directions, and 20-minute service frequencies in one direction and 60-minute service frequencies in the other direction. Ideally, passing sidings should be located to facilitate the greatest level of operational flexibility for the FGT. In reality, trains will be operating behind or ahead of schedule because of variations in station dwell

times (length of time that a train is stopped at the station) and variations in run times (e.g., weather conditions could affect run times). When trains are operating behind or ahead of schedule, trains operating in the peak direction should be given priority over trains in the reverse direction. For example, on Saturday mornings, westbound trains should be given priority over eastbound trains, with eastbound trains forced to wait on passing sidings until the westbound train clears the section.

Proposed locations of passing sidings are based on an attempt to space sidings approximately 10 minutes apart. Travel time estimates indicate that most stations are approximately 10 minutes apart (including station dwell times). Therefore, passing sidings are proposed at or near each station from West Metro Denver to Vail. Passing sidings should be at least 1 mile in length, unless physically constrained. For example, a tunnel is proposed immediately west of the Georgetown Station. Thus, the passing siding should start immediately at the tunnel portal and end east of the station. Nine passing sidings are proposed between C-470 and Vail.

FGT Feeder Bus System

Feeder bus operations are essential for the rail line. Thus, good feeder bus connections are needed from proposed rail stations (see Figure 7.3) to the mountain destinations. Rail-to-bus transfer times should be minimized by timing bus schedules with rail schedules. The bus operating plan relies on service to and from rail stations through the various local transit providers located along the corridor. Private sector shuttle service is also a major component of the feeder bus plan in the mountain counties, but would not be emphasized from DIA into the mountains. The following paragraphs describe service modifications by county. The following bus feeder configurations were developed for estimating operations costs. A final bus operating plan would be developed during detailed design.

Jefferson County. One rail station is proposed in Jefferson County—West Metro Denver. This station is located within the RTD service area. Existing RTD bus service must be modified to provide transfer opportunities to and from the proposed rail line.

Clear Creek County. Three railstations are proposed in Clear Creek County—Idaho Springs, Georgetown, and Loveland Ski Area. Currently, Clear Creek County does not provide public transportation. However, new public transit service has been assumed for the county.

Summit County. Three rail stations are proposed for Summit County—Silverthorne/Dillon, Frisco, and Copper Mountain. Summit Stage provides public transit service in Summit County. There are currently three components to Summit Stage service: town-to-town, skier express, and residential. The *Summit County TDP* (Summit Stage, 1994) includes proposals to improve town-to-town service frequencies to 30 minutes in the winter. Service improvements are also proposed for Summit Stage's residential routes and skier routes. All town-to-town routes will have connections at the Frisco rail station. Bus schedules should also be modified to the extent possible to minimize bus-to-rail transfer times.

It is also important to note that there are a number of private transportation providers in Summit County. For example, Keystone and Copper Mountain provide fixed route service in the winter. Resort Express and Vans to Breckenridge also provide private shuttle service between DIA and Summit County resorts. It is anticipated that these private carriers will have a major role in feeding passengers to and from the three Summit County rail stations.

Eagle County. A rail station is proposed at Vail for the I-70 service. Several other stations are proposed in Eagle County, but as part of the separate Eagle County Commuter Rail System. The proposed Vail Station is located in the median of I-70, adjacent to Vail Transportation Center (VTC). This center is serviced by all Town of Vail bus routes, one Avon/Beaver Creek Transit bus route, and all Eagle County Regional Transportation Authority (ECRTA) bus routes. The proposed bus operating plan for Avon/Beaver Creek Transit is also similar to the other alternatives, but the bus transit center is replaced with an Avon commuter rail station. Service for ECRTA is dramatically altered. The line-haul service currently provided by ECRTA is replaced by the proposed commuter rail system west of Vail. Therefore, ECRTA routes have been restructured to provide community circulator service to and from commuter rail stations.

As was noted for Summit County, private transportation providers play an important role in Eagle County. It is anticipated that these private carriers will have a major role in feeding passengers to and from the Vail rail station as well as the proposed commuter rail stations west of Vail. Stations must be designed to accommodate both public and private transit providers.

TSM/TDM Elements Included in this Strategy

- Geometric Improvements at Existing Bottlenecks
- Frontage Road Improvements in Eagle County
- Interchange Construction and Improvements
- Intermittent Slow-Moving Vehicle-Climbing/Descending Lanes
- Intermodal Transfer Centers
- Operational Improvements
- TDM Strategies
- Safety Improvements

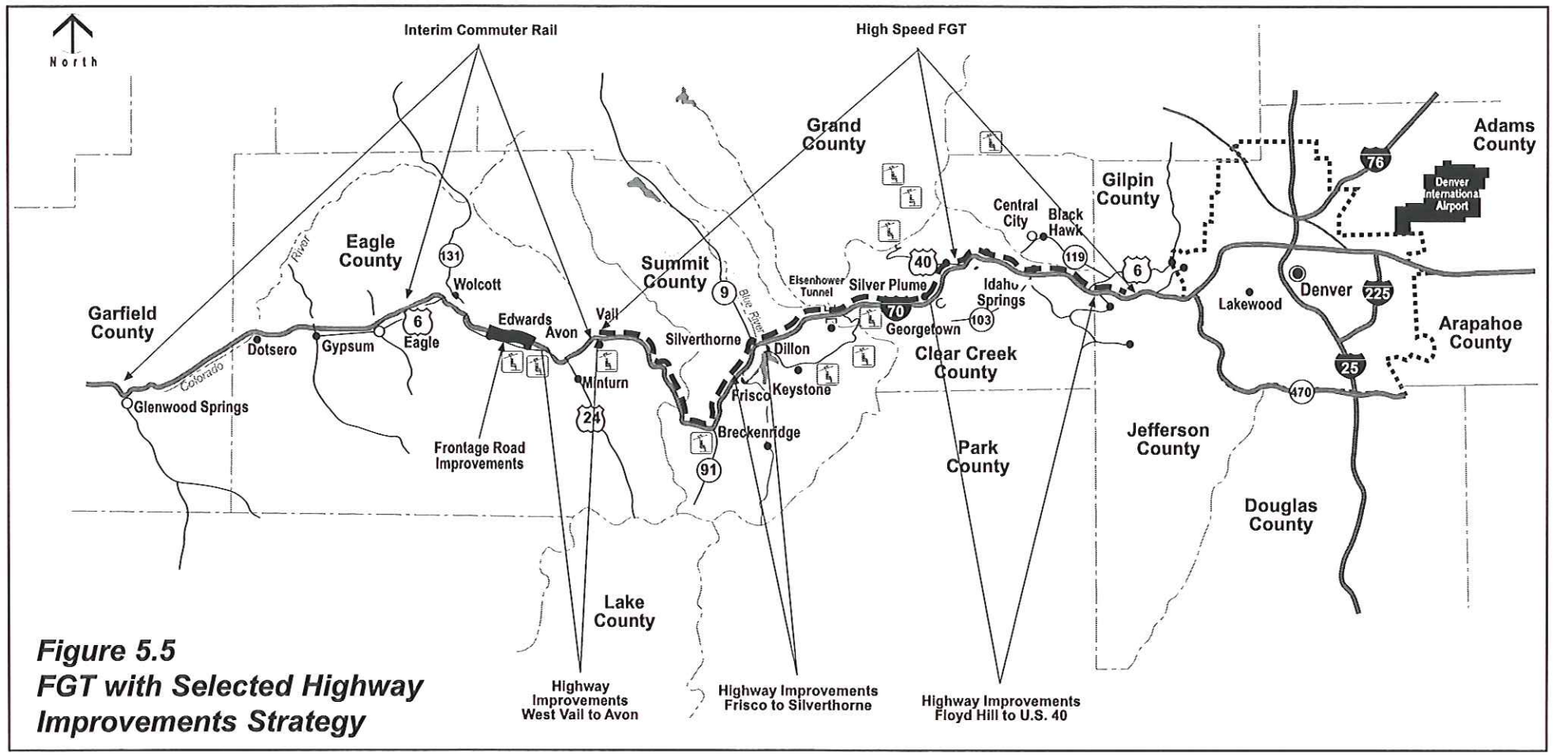


Figure 5.5
FGT with Selected Highway Improvements Strategy

- Aviation System Management and Improvements to Existing Airports
- Bicycle and Pedestrian Facilities

TSM Elements Not Included in this Strategy

- Flexible lanes in Clear Creek County
- Congestion pricing

FGT with Selected Highway Improvements Strategy

This strategy focuses on a fixed guideway line with speeds that match or exceed the highway speeds. The transit elements of this strategy are exactly the same as the Fixed Guideway Transit Strategy.

This strategy also includes highway capacity improvements at selected locations. (See Figure 5.5.) The proposed improvements include:

- Three lanes in each direction from Floyd Hill to S.H. 40 (approximately 14.5 miles)
- Three lanes in each direction from Silverthorne to Frisco (approximately 5 miles)

Highway improvements are assumed to be based on the "smart" widening concept to minimize the construction footprint and associated environmental impacts. (Refer to the Bus/HOV Strategy for a preview of the typical sections proposed.) No congestion improvements are planned at the Eisenhower Tunnel.

This alternative strategy includes the TSM, TDM, and aviation elements listed below and includes the currently committed projects.

TSM, TDM, and Aviation Elements Included in this Strategy

- Geometric Improvements at Existing Bottlenecks
- Frontage Road Improvements in Eagle County
- Interchange Construction and Improvements
- Slow-MovingVehicle-Climbing/Descending Lanes
- Intermodal Transfer Centers
- Operational Improvements
- TDM Strategies
- Safety Improvements
- Aviation System Management and Improvements to Existing Airports
- Bicycle and Pedestrian Facilities

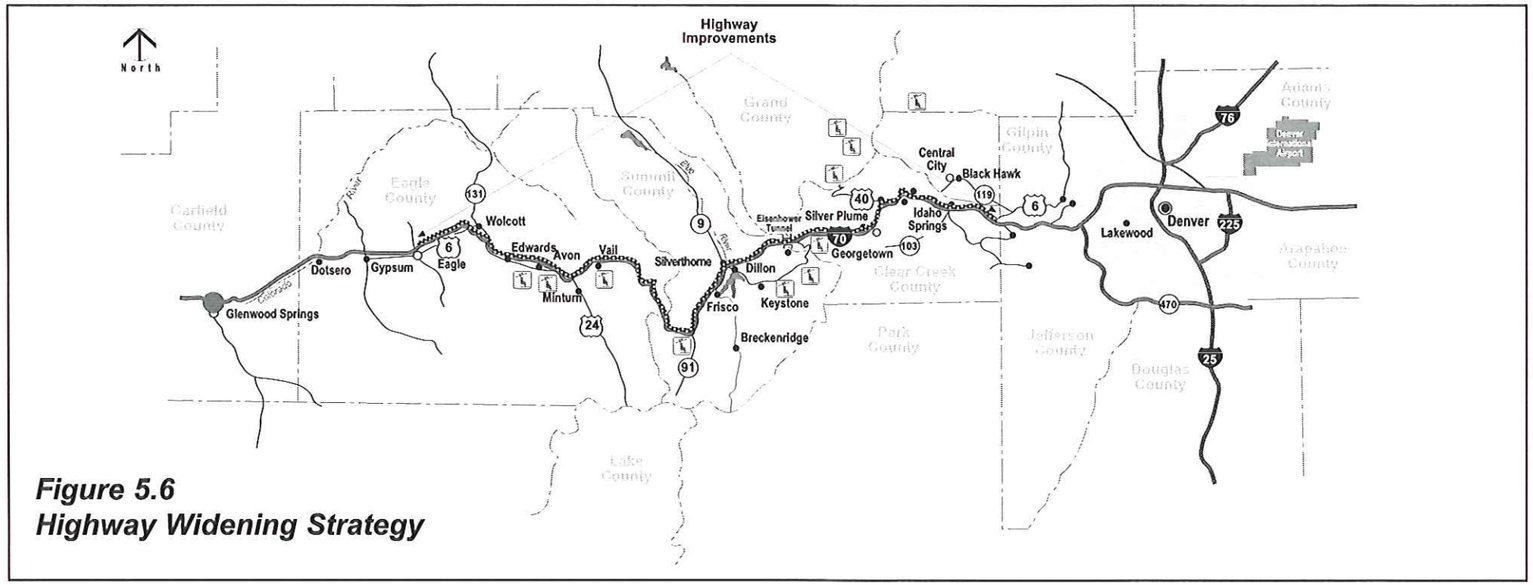


Figure 5.6
Highway Widening Strategy

TSM Elements Not Included in this Strategy

- Congestion pricing
- Flex lanes in Clear Creek County

Highway Widening Strategy

This strategy focuses on highway capacity improvements as the major element supplemented by the TSM/TDM elements listed below. The highway improvements include adding one additional eastbound and westbound lane from Floyd Hill to Eagle (99 miles) with an additional bore at the Eisenhower Tunnel to accommodate the additional lanes. (See Figure 5.6.) The focus of this lane widening is to use the existing medians to the extent reasonable. Any additional widening required, beyond the median, will generally be to the mountain side to minimize impacts to drainage and waterways. Extensive use of retaining walls will be made. Similar to the Bus/HOV Strategy, the plan provides for three terrain-sensitive typical section applications:

- "Smart" widening sections with narrow 4-foot inside shoulders and 6-foot outside shoulders that include a median barrier
- "Urban" sections with 10-foot outside and inside shoulders and median barrier
- "Rural" sections with 10-foot outside and inside shoulders with open 22- to 60-foot median

Design to minimize impacts will include Glenwood Canyon-like techniques in Idaho Springs, mechanically stabilized earth walls, and other wall and structure treatments with aesthetically pleasing finishes. (Refer to the Bus/HOV Strategy for a preview of the typical sections proposed.)

Key Construction Elements

Highway Improvements

- 99 miles of lane addition; one eastbound, one westbound:
  - 20 miles of "Smart" widening
  - 35 miles of "Urban Standard Platform" widening
  - 44 miles of "Rural Standard Platform" widening
- 2.2 miles of a new 32-foot bore at Eisenhower Tunnel
- Widening 106 bridges and replacing 3 bridges
- 79,000 lf (15 miles) of retaining walls
  - 21,000 lf (4 miles) on Vail Pass
  - 29,000 lf (5.5 miles) on the west approach to Eisenhower Tunnel
  - 15,800 lf (3 miles) at Georgetown Hill
  - 13,200 lf (2.5 miles) in Idaho Springs
- Additional roadway footprint from 18 to 38 feet required (18 feet for approximately 20 percent to 38 feet for approximately 44 percent of the total lengths). Construction of the additional footprint is anticipated to occur principally to the median side while maintaining traffic on existing pavement surfaces through use of shoulders and existing laneage. Approximately 10 miles of incremental widening is anticipated for traffic control.
- Slope disturbance varies from 10 to 60 feet at a few locations, most notably from the twin tunnels to the S.H. 6 interchange.

Interchange Improvements (In addition to TSM Improvements)

- Interchange reconfiguration/reconstruction applied at the following interchanges:
  - S.H. 6/Floyd Hill (reconstruction for a "smoother" alignment for I-70 and the connection with S.H. 6 using longer structures and benched rock cuts)
  - 13th Avenue in Idaho Springs (reconfiguration of interchange ramps to accommodate wider I-70 section through Idaho Springs)
  - West Idaho Springs (reconfiguration to improve ramp alignments and connection with frontage roads)

Transit Element

The transit element of the Highway Widening Strategy includes the same bus service improvements described for the TSM/TDM Strategy.

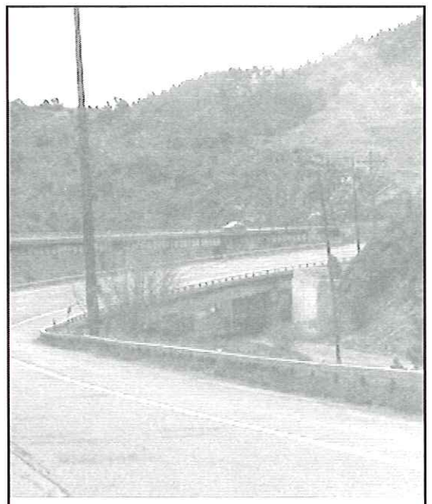
For a description of these programs, refer to the TSM/TDM Strategy.

TSM, TDM, and Aviation Elements Included in this Strategy

- Geometric Improvements at Existing Bottlenecks
- Interchange Construction and Improvements
- Intermodal Transfer Centers park-n-Rides
- Operational Improvements
- TDM Strategies
- Safety Improvements
- Aviation System Management and Improvements to Existing Airports
- Bicycle and Pedestrian Facilities

TSM Elements Not Included in this Strategy

- Flex lanes
- Slow-moving vehicle-climbing/descending lanes
- Congestion pricing



I-70 Through Idaho Springs

SECTION 6

Detailed Evaluation

Using the criteria developed by the CWC and presented in Table 6-1, the detailed evaluation was used to test the values of the affected citizens and stakeholders in the I-70 Mountain Corridor. The detailed evaluation provided the information needed by the CWC to determine the "best project" for addressing the needs of the corridor.

The detailed evaluation is organized as follows:

- Environmental Evaluation
- Community Values Evaluation
- Mobility/Safety Evaluation
- Financial Evaluation
- Conclusions

Environmental Evaluation

The intent of the environmental evaluation was to identify potential "fatal flaw" environmental issues (those that could potentially stop the implementation of an alternative strategy) and to generally address the potential environment consequences associated with each of the six strategies. It should be noted that this section does not replace the environmental evaluations that will be required for a future EIS.

With the exception of the NB Strategy, all of the five build strategies considered include many significant construction projects.

The number of acres disturbed is often a reliable measurement of potential environmental impact. To varying degrees, all of the build strategies represent linear, relatively narrow areas of construction impact. It has been estimated that the construction zone (width of disturbance) will generally range from 20 to 40 feet, regardless of whether highway or FGT improvements are built. As shown in Figure 6.1, the number of acres disturbed for construction ranges from negligible for the NB Strategy to approximately 400 for the TSM/TDM Strategy, 525 for the HOV Strategy, 540 for the FGT Strategy, 680 for the FGT/SHI Strategy, and 565 for the HY Strategy.

It is important to note that the impacts of the TSM/TDM Strategy, which are elements of all of the build strategies, potentially represent the greatest potential for disturbance. Most notable are the impacts associated with the geometric improvements in Clear Creek County, the slow-moving vehicle lanes over Vail Pass, and construction of the A/D lanes between West Vail and Avon. Since these impacts are common to all but the NB Strategy, they cannot be used to discriminate among the five build strategies.

TABLE 6-1
Detailed Evaluation Criteria

Mission Supportive Criteria	Measurement	
Environmental Impact		
1. Wildlife Habitat/Migration Routes	• Acres disturbed • Number of crossings of migration routes	• Probability of traffic accidents with animals
2. Threatened and Endangered Species	• Acreage of T&E species habitats	
3. Water Quality/Water Resources	• Amount of new impervious surface area	• Mineral cuts/tailings piles/ rock area
4. Wetlands/Riparian Areas	• Acres of wetlands taken	
5. Air Quality	• Amount of impervious surface sanded	• Vehicle miles traveled
6. Noise	• Dwelling units within 500 feet of corridor	
7. Hazardous Waste/ Materials	• Number of spills • Amount of cut through tailings piles	• Impacts on known Hazardous Toxic, Radioactive Waste (HTRW) sites
8. Energy Consumption	• Btu equivalent consumed/saved per year	
Community Values		
1. Socioeconomics	• Environmental justice - Adverse impacts - Benefits gained or denied	• Number of businesses and houses taken • Impact on permanent employment
2. Rural Character	• Percent of open space and undeveloped land lost • Number and location of stations and interchanges/impact on land use	
3. Visual	• Mass and scale • Compatibility of materials for construction • Area of cuts	• Number of bridges/retaining walls/other structures • Plans and other planning initiatives
4. Compatibility/Acceptability With Local Planning Goals	• Compliance with local comprehensive plans	
5. Historic Preservation	• Number of historic resources disturbed	
6. Parkland/4(f) & 6(f)	• Number of acres of 4(f) and 6(f) land disturbed	
Mobility/Safety		
1. Congestion Relief	• Solution focuses on time and location of congestion • Ability to change travel behavior (i.e., provides incentives or disincentives)	• Daily users of an alternate mode • Users per hour (peak direction) • Change in travel time • Change in roadway capacity • Number of transfers
2. Safety/Accidents	• Meets national design standards	• Number of accidents
3. Movement of Freight	• Accommodates both freight and passengers	• Long-term flexibility • Improves truck travel time
4. Weather Condition Mitigation	• Effectively communicates conditions (real time information)	
5. Reliability	• Impact on travel time from external conditions (weather)	
6. Connectivity	• Supports local services	• Consistent with existing and future transportation plans
7. Accessibility	• Promotes local access	• Facilitates bike/pedestrian access
Financing		
1. Promotes Payment by the User	• Percent of cost borne by the user	
2. Ability to Gain Public/Private Support	• Total life cycle cost • Total life cycle per user • Ability to be funded	• Trip cost • Benefit/cost ratio • Ability to attract private money

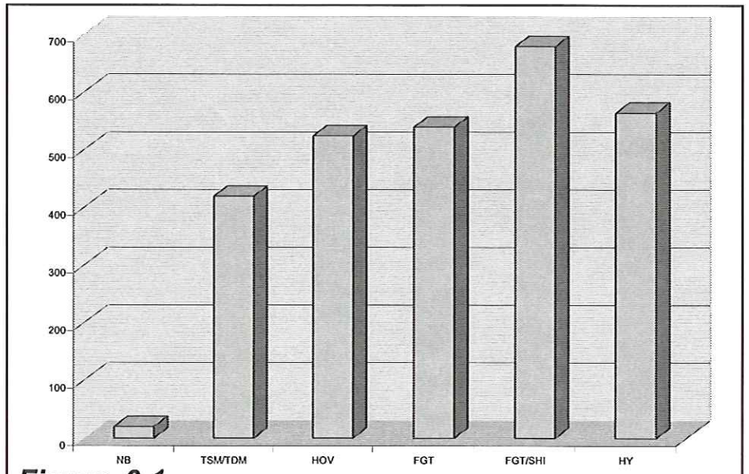


Figure 6.1
Acres Disturbed

Wildlife Habitat/Migration Routes

As shown in Figure 6.2, wildlife areas in mountain areas often are intersected by transportation corridors. This fragmentation of wildlife habitats are of major concern to environmental agencies. Large game animals such as mule deer and elk are the most likely wildlife species to be involved in vehicle/animal incidents. Their migration during seasonal changes is a large factor in accidents. The area near Dowd Junction in Eagle County is a known problem area for accidents with migrating elk attempting to cross I-70. Additionally, bighorn sheep frequent the I-70 ROW throughout much of Clear Creek County.

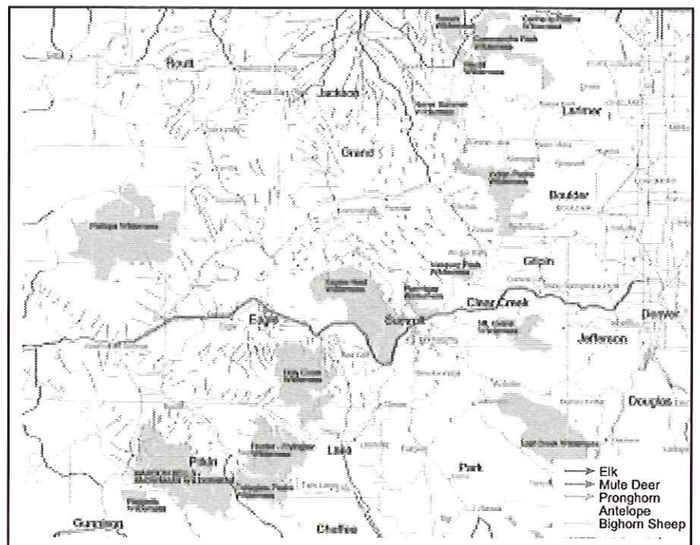


Figure 6.2
Wildlife Migration Routes

Because the geographic extent of the build alternatives is nearly the same (improvements in the I-70 ROW from Floyd Hill to Eagle), impacts on wildlife are similar for all the build strategies. That is, more vehicles traveling through the corridor would potentially cause additional vehicle/animal incidents and more disturbance to wildlife. However, there would be essentially no loss of wildlife habitat other than the acres disturbed within the CDOT ROW as described previously, which typically provides little or no habitat.

For the TSM/TDM improvements common to all of the build strategies, geometric improvements, such as rock cuts at the twin tunnels, may disturb Rocky Mountain bighorn sheep during construction. In consultation with wildlife agencies and the U.S. Forest Service, mitigation techniques will need to be identified before construction. For all of the strategies, the number of accidents with wildlife will be minimized through mitigation measures such as fences and wildlife underpasses located throughout the corridor. It should be noted that the potential for animal-vehicle accidents will not materially decrease with the NB Strategy, as the volume of traffic under this scenario is essentially the same as any of the build strategies.

Threatened and Endangered Species

Although the five build strategies differ slightly in the number of acres disturbed during construction, the overall impacts to T&E species would not vary significantly. As described earlier, the construction impact area is typically localized to the medians and roadsides for all strategies and does not support viable habitat for T&E species or any other wildlife. The Vail Pass area contains some known T&E species habitat, as shown in Figure 6.3, which has the potential of being affected during construction of the slow-moving vehicle lanes called for with the TSM/TDM Strategy. However, these improvements are common to all of the build strategies except for the HOV and HY strategies, which includes general purpose lanes only.

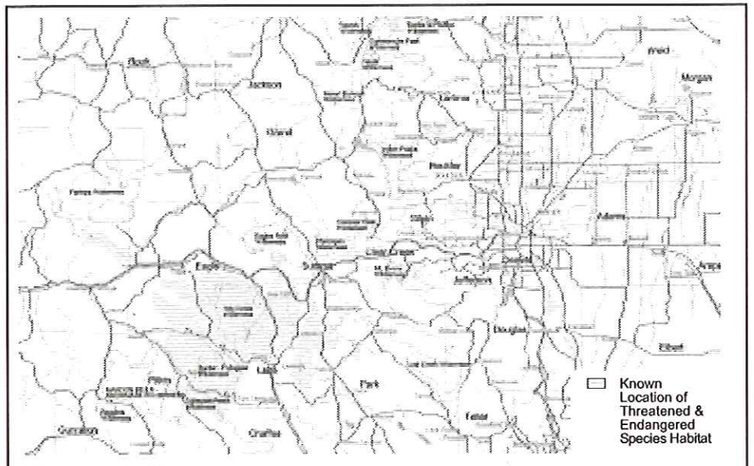


Figure 6.3
Threatened & Endangered Species Habitat

The construction of approximately 75 miles of new bicycle trails throughout the corridor also has the potential to impact T&E species. These impacts will have to be analyzed during the environmental impact assessment or when the alignment and extent of these improvements is determined. Again, since the bicycle trails are part of all of the build strategies, the associated impacts do not represent a differentiation among the strategies.

Water Quality/Water Resources

The project corridor parallels streams and rivers over most of its length. Within the study area, I-70 crosses a watercourse at 177 locations. In most of these instances, existing water quality is considered good. Construction and operation of any of the strategies considered have the potential for impacting water quality and water resources.

None of the five build strategies is anticipated to require extensive construction within waterways. Runoff from construction can be prevented from polluting these waterways through best management practices. All of the build strategies involve the need to widen bridges to accommodate additional highway lanes or the FGT guideway. In cases where construction cannot avoid the creeks, permits will need to be obtained and mitigation plans developed to minimize in-stream turbidity. Additionally, it is possible that construction within waterways may be considered to avoid other undesirable impacts. This is especially true where the alignment travels through Idaho Springs and where construction in Clear Creek may be considered preferable in order to avoid widening the corridor to the north and impacting the city. In these cases, special design and construction steps will have to be taken to mitigate sedimentation of the creek and to avoid permanent destruction of the natural channel. Ideally, new construction in any of the creeks may provide the opportunity to improve the aesthetics and habitat characteristics of the waterway as part of the mitigation procedures. Restoration of the Clear Creek aquatic habitat through Idaho Springs is one example.

Highway and park-n-Ride improvements are anticipated to result in hundreds of acres of new impervious surfaces, depending on the strategy. The TSM/TDM Strategy is estimated to produce 250 acres of new impervious surfaces. The other build alternatives all involve about 400 acres of new impervious surfaces. The potential for additional water quality impacts from storm runoff is the greatest for the HY and HOV strategies. However, runoff, and the associated deicing chemicals, sand, oil, and grease from these surfaces, would be captured and treated before discharge as part of all of the mitigation strategies.

CDOT studies indicate that approximately 90 percent of sand and sediment can be removed from runoff by the use of sedimentation basins. It is more difficult to remove dissolved contaminants such as certain deicing compounds. However, recent CDOT studies indicate no impacts on water quality resulting from the use of magnesium chloride in the corridor. At this time, it is difficult to establish that any one of the build strategies is better for water quality, assuming mitigation through best management practices. In fact, mitigation of highway and transit improvements may result in improved water quality within the corridor if these improvements are designed with runoff collection systems and sedimentation basins to capture and treat all highway runoff, including runoff from existing pavements. Conversely, with the selection of the NB Strategy, much of the existing highway surface runoff may not be captured and treated.

Wetlands/Riparian Areas

As mentioned previously, there are 177 river, stream, or large drainage crossings in the corridor, 80 of which have jurisdictional wetlands associated with them. Approximately 24 miles of the I-70 alignment is located within 150 feet of riparian habitat.

The amount of wetland acres disturbed for each strategy will not be accurately delineated until preliminary design information is available. However, an estimate of impacts to wetlands was made by counting the number of stream crossings that each strategy would require and the miles of riparian area and wetland habitat within 150 feet of the anticipated construction. These estimations are shown in Table 6-2.

TABLE 6-2
Potential Impacts on Wetlands

Alternative Strategy	No. of River and Stream Crossings	Miles of Riparian and Wetland Habitat within 150 feet of Construction Activities
Transportation Systems Management/Transportation Demand Management	37	16
Bus/High Occupancy Vehicle	65	24
Fixed Guideway Transit	46	21
Fixed Guideway Transit/Selected Highway Improvements	63	24
Highway Widening	65	24

Source: CH2M HILL

As would be anticipated, the NB Strategy would have the least impact on wetland areas. The HOV, HY, and FGT/SHI Strategies potentially involve about 65 stream crossings and approximately 24 miles of construction near riparian areas. Thus, the construction of any of these strategies presents the greatest, but nearly equal, potential for affecting wetlands. The FGT Strategy would cross 46 streams and be adjacent to approximately 21 miles of riparian areas.

This alternative is potentially less damaging to wetlands since 22 miles of the alignment is underground rather than along the I-70 ROW. The TSM/TDM Strategy would impact 37 stream crossings and approximately 16 miles of riparian area, making it potentially the least damaging to wetland areas of all of the build strategies.

Air Quality

Impacts on air quality were assumed to grossly relate to the level of vehicle miles traveled (VMT). The estimates of VMT for each of the strategies are presented in Table 6-3. A more detailed explanation is provided in the Mobility/Safety discussion later in this section.

TABLE 6-3
Comparison of Vehicle Miles Traveled (VMT) by Strategy

Strategy	VMT (Billions/Yr.)	Difference (%) Over the NB Package
Existing Conditions	1.17	NA
No-Build	1.82	NA
Transportation Systems Management	1.90	4.4
Bus/HOV	1.82	0
Fixed Guideway Transit	1.86	2.2
Fixed Guideway Transit/Selected Highway Improvements	1.88	3.3
Highway Widening	1.94	6.6

Under current conditions, VMT in the corridor is 1.17 billion miles per year. This is projected to increase to 1.82 billion miles per year by 2020 under the NB Strategy, for a change of approximately 55 percent. With the exception of the HOV Strategy, the absolute increase in VMT is greater for all of the build alternatives.

Although the impacts on air quality will need to be confirmed with modeling during the environmental permitting processes, it appears that VMT will increase the most with the HY Strategy. However, the HY Strategy also results in the least amount of congestion, which may offset any increases in VMT. This is because both automobiles and trucks emit more pollutants when operating under stop-and-go conditions. Additionally, it needs to be recognized that air quality can be degraded around transit stations and park-n-Rides, due to their attraction of vehicles and as a result of more numerous and concentrated cold vehicle starts during the winter.

Noise

Noise levels were predicted for each strategy at a distance of 500 feet from the center of the existing I-70 alignment. This distance was chosen because it encompasses the majority of the residential development along the corridor that is potentially the most affected by noise from the highway. Table 6-4 shows the noise levels predicted for the hour with the thirtieth highest traffic volume (annually) and the hour when the most transit operations are expected (EPA, 1974).

TABLE 6-4
Predicted Noise Levels (dB) [a]

Strategy	Predicted Noise Level at 500 feet (dB)
Existing Conditions–1995	61
No Build–2020	64
Transportation Systems Management/Transportation Demand Management–2020	63
Bus/High Occupancy Vehicle–2020	63
Fixed Guideway Transit–2020	70 [b]
Fixed Guideway Transit/Selected Highway Improvements–2020	70 [b]
Highway Widening–2020	64

[a] Determined using the Sound Exposure Level (SEL) Noise Metric, which compresses the sound energy from the event into a 1 second duration, expressed in decibels.
[b] Increased noise levels are limited to the times (up to three times an hour) that the train passes the receptor.

Increased noise levels are limited to the times (up to three times an hour) that the FGT passes the receptor. Compared to other mountain communities, significant levels of noise currently exist and will continue to be present within the I-70 corridor because of traffic (EPA, 1974). The greatest noise levels, 70 dB, are predicted for the FGT and FGT/SHI strategies. This is because while these strategies remove some traffic from I-70, the corresponding decrease in noise levels is outweighed by the added noise from the assumed (high-speed electric train) FGT system. Noise levels could be as much as 5 dB less if a rubber-tired and/or slower speed system were implemented. It is possible that if one of the innovative/emerging technologies is selected, noise impacts could be in the range of 63 to 64 dB.

Under the assumptions made for this study, the quietest options are the HOV and TSM/TDM strategies at 63 dB. This is because these strategies slightly reduce traffic on I-70 and do not add any new sources like an FGT system. In addition, if the number of buses were to increase under the strategies, it would not appreciably affect noise levels. The HY and NB strategies have a predicted noise level of 64 dB. These strategies are predicted to be slightly louder than the HOV and TSM/TDM strategies because they do not significantly reduce I-70 traffic volumes.

Hazardous Waste/Materials

Hazardous materials may be encountered during the construction of any of the build strategies. Additionally, hazardous material spills resulting from the transport of hazardous materials through the project corridor are also possible with any of the strategies.

There are no regulated hazardous waste sites that are within the project corridor or the construction ROWs anticipated for any of the build strategies. However, EPA reports that there are mine tailings in the existing I-70 ROW. There may be additional mine tailings along I-70 near Dumont, and perhaps at a few other locations, that could be impacted by construction in the corridor. Regardless of the alternative constructed, a "materials management plan" dictating the methods for identifying, characterizing, removing, and disposing of hazardous materials, would have to be prepared before construction. Likewise, an agreement among CDOT, EPA, and the Attorney General should be developed before construction in any known hazardous waste areas along the corridor.

Runoff from rain and snow that flows over exposed mineral-rich rock cuts or fills can potentially pick up acid and toxic metals and contaminate downstream waterways in a similar fashion to abandoned mine sites. Areas with such mineral-rich rocks include locations in the vicinity of Idaho Springs, Dumont, Bakerville, Georgetown, and areas just west of Loveland Pass. All of the build alternatives involve rock cuts, from Floyd Hill to Idaho Springs, as well as rock cuts for the proposed slow-moving vehicle climbing lanes near Georgetown. Because rock cuts are consistent with all of the build strategies, it is not possible to distinguish between the strategies concerning their runoff effects.

Accidents/Spills

There were no reported spills of hazardous materials on I-70 in the project corridor in 1996. However, the potential impacts of such spills on drinking water supplies and trout fisheries are significant because the project corridor parallels streams and rivers over most of its length. Public water supply agencies within the project corridor are acutely aware of the potential for spills and have developed contingency plans. These plans include an immediate spill reporting and notification system, emergency response cleanup, and bypass of contaminated water. Many of the water supply agencies have alternative water sources that can be used temporarily.

In all of the considered strategies, it is assumed that all transport of hazardous materials will continue to be by highway. Therefore, the HY Strategy, which provides the greatest improvement to I-70, has the potential to result in safer travel conditions and the highest probability for fewer accidental spills.

Energy Consumption

British thermal unit (Btu) equivalents were calculated for the energy that would be needed for each of the six strategies. Annual energy budgets included Btu consumed for highway users and bus and rail operations. The results of the analysis are shown in Table 6-5.

TABLE 6-5
Predicted Energy Consumption

Strategy	Annual Energy Consumed Compared to the No-Build	
	Btu's (x 10^6)	%
No Build	12,759,000	100
Transportation Systems Management/Transportation Demand Management	13,350,000	105
Bus/High Occupancy Vehicle	12,800,000	100
Fixed Guideway Transit	15,377,000	121
Fixed Guideway Transit/Selected Highway Improvements	15,512,000	122
Highway Widening	13,623,000	107

Notes:
1 gal. Gasoline = 140,000 Btu
1 gal. Diesel = 160,000 Btu
1 kWh = 10,239 Btu
Fuel Efficiency = 20 mpg autos; 5 mpg buses

The FGT and the FGT/SHI strategies consume the most energy because of the electrical requirements of the FGT. The TSM/TDM and HY strategies would represent respective increases of about 5 and 7 percent over the NB Strategy. The NB and HOV strategies are predicted to have about the same as well as the least energy requirements.

Community Values Evaluation

Community Acceptance

As a result of the public workshops and ongoing communication with the affected public, local community acceptance evolved as the most important criteria for developing consensus in the corridor. The most support has been for an FGT Strategy. There is less support for an FGT that deploys conventional technology because of the need for extensive tunneling and the perception of significant construction impacts. The local public believes that construction of an innovative, lightweight, and elevated FGT will minimize community impacts. It is also felt that such a system will be capable of handling steep grades and will avoid the need for extensive tunneling.

The HOV Strategy received minimal community support because of the pronounced amount of highway widening in this strategy. There is also a concern that the HOV will compete with and offset the ability to implement an FGT solution as a long-term vision. Others believe that bus transit will be needed to establish the market and cultural changes needed for FGT.

Most of the public appears to recognize that some short-term "fixes" are needed to improve I-70, yet the TSM/TDM Strategy received comparatively little public interest throughout the course of the study. Conversely, there is little local support for the HY Strategy, although other public interest groups, such as the ski industry, local businesses, and the trucking industry, do support some level of highway widening. One common concern with the HY Strategy is that it is not a long-term solution; lanes would continually have to be added to I-70 to keep pace with travel demand and development. However, it needs to be recognized that none of the six strategies as currently proposed would solve year 2050 mobility requirements without additional construction. Thus, the 50-year vision must address the possibility of providing transportation options in addition to addressing congestion-related issues.

Socioeconomics

Socioeconomic impacts that were evaluated for each strategy include:

- Years of construction time and associated delays and inconveniences
- Duration of construction
- Construction employment
- Relocations of residences and/or businesses

With the exception of the NB Strategy, all of the strategies represent major public works programs and are anticipated to require a minimum of 10 years to complete construction. Regardless of the strategy, all would result in potentially significant delays to motorists on I-70 during construction. Noise, dust, and visual degradation will also occur during the construction phase, regardless of the build strategy. The FGT Strategy and the FGT/SHI Strategy are anticipated to need more time to construct because of greater cash flow requirements, which represent potentially more inconvenience and delay than the TSM/TDM, HOV, and HY strategies.

The amount of construction employment associated with the strategies is related to the cost of the programs. Potential person-years of construction are listed in Table 6-6.

Clearly, the construction of any of these strategies will represent both positive and negative boomtown-type impacts on the communities along the corridor. Personal income will be favorably affected for both large and small construction companies as well as the service industries that support the construction employees. Unfavorable consequences would be characterized by shortages of housing, increases in traffic, additional incidences with alcohol and drug abuse, crime, etc. The FGT and FGT/SHI strategies would have the greatest boomtown effects on the mountain communities.

TABLE 6-6
Potential Person-Years of Employment

Strategy	Potential Person-Years of Employment
No Build	Negligible difference
Transportation Systems Management/ Transportation Demand Management	Up to 9,000
Bus/High Occupancy Vehicle	Up to 15,000
Fixed Guideway Transit	Up to 40,000
Fixed Guideway Transit/Selected Highway Improvements	Up to 50,000
Highway Widening	Up to 20,000

Potential relocation of homes and businesses is about the same for all of the build strategies. Any of the strategies present the potential for the acquisition of private property. Based on preliminary planning estimates, all of the construction along I-70 is contained within the CDOT ROW. Widening U.S. 6 in Eagle County represents the greatest potential for property acquisition. However, this TSM improvement is an element of all of the build strategies.

The intent of the detailed evaluation is to identify possible "fatal flaws" raised by the local public regarding the various strategies. Environmental Justice (EJ) relates to identifying and addressing disproportionately high and adverse human health impacts on low-income and minority populations as a result of any of the proposed actions. Because the strategies all lie within existing rights-of-way and from the results of demographic data collected during the MIS study process, there is no indication that EJ is a fatal flaw at this level of analysis.

Rural Character and Development

The public is concerned with retaining the rural character of the corridor, which is interpreted as maintenance of open space, with minimal crowding, traffic, crime, and other inconveniences associated with urban environments. To many, it is best described as maintenance of existing conditions. These conditions need to be weighed against the desire for employment opportunities valued by other corridor residents and stakeholders.

It is largely accepted by the environmental community that the FGT Strategy offers the opportunity to control land use more effectively than strategies that focus on highway improvements, including the TSM/TDM, HOV, and HY strategies. The FGT Strategy potentially provides planners with the opportunity to increase the intensity of land use around the stations. Highway improvements are felt to encourage sprawl due to the freedom of access provided by the automobile.

All five of the build strategies will improve access to the mountain communities compared to the NB Strategy. As such, all could encourage development when compared to not improving access. This, combined with a high demand for mountain living and a lack of strict land use controls, will perpetuate additional sprawled development. All of the build strategies will need to be combined with advancements in land use control to preserve rural character.

For example, without land use controls, the FGT strategies will allow commuters improved access to mountain communities. While development could intensify around the stations, suburban and large lot development may also increase as new residents access the FGT stations through drop-off points and carpooling. Further, because the FGT will reduce the inconveniences of driving and facilitate a more productive use of commuting time (use of laptop computers and reading, etc.), more commuters will be drawn to the I-70 corridor. Conversely, the HY Strategy will provide improved access but will not eliminate the inconveniences and poor time management characteristic of driving. A combination of the HY Strategy with strict land use controls could also be used to preserve rural character.

In conclusion, the effectiveness of preserving rural character through the use of FGT is only possible if it is combined with more effective land use controls and incentives that direct development to transit-oriented development, which is generally characterized by higher densities. This will result in fewer acres developed and possibly more open space. However, the land that is developed will be urban in character and not rural. Without land use controls, the FGT alternative will be no more effective at preserving rural character than the other four build strategies. In fact, it may serve as a greater stimulant to development.

Visual Character

Visual character pertains to the degree of visual change associated with implementing each strategy. In the I-70 Mountain Corridor, there is a close relationship between rural and visual character.

Construction of the geometric improvements in Clear Creek County at the twin tunnels and for curve smoothing represent the greatest potential for visual impact due to the need for extensive rock cuts. Additionally, the need for retaining walls for construction of slow-moving vehicle lanes on Georgetown Hill and Vail Pass can be expected to result in a localized visual change. However, these improvements are included as part of all of the five build strategies and thus do not serve as a measure for differentiating among the build strategies.

The HOV and HY strategies increase the amount of pavement on I-70 by 50 percent from Floyd Hill to Eagle, a distance of 99 miles. However, since portions of I-70 through Jefferson County are currently six lanes and the widening would occur with minimal new rock cuts, the potential visual impact is lessened. For the HY Strategy, a third bore would be constructed at the Eisenhower Tunnel, which would change the visual appearance of the pass.

The FGT and FGT/SHI strategies would also be constructed in the I-70 median. The aerial structures and overhead catenary (which would vary depending on the technology ultimately selected) would be visible and may not blend with the rural character of the corridor. Transit stations may attract more intensive land uses that will also have the potential to reduce rural character. Consequently, the FGT and FGT/SHI strategies, combined with their respective TSM build improvements, represent the greatest potential for altering the visual character of the corridor.

Compatibility/Acceptability with Local Planning Goals

The universal needs identified in the comprehensive planning documents prepared by the agencies in the I-70 corridor include:

1. Development of additional affordable housing
2. Preservation of rural character
3. Control of sprawled development
4. Increased use of mass transit

The I-70 build strategies will provide only minimal support for the first need. Construction of commuter rail from Vail to Glenwood Springs as part of the FGT Strategy may provide some additional access to affordable housing.

As mentioned earlier, regardless of the build strategy selected, the preservation of rural character will be difficult to realize as long as the corridor continues to attract new residents and realize population growth rates as high as 7 percent per year.

As stated above, sprawled development will continue without stricter land use controls.

In reference to need number four, increased use of mass transit is fulfilled the best by the HOV and FGT strategies.

Historic Preservation

Historic districts are located in Idaho Springs, Georgetown, and Silver Plume as shown in Figure 6.4. Georgetown and Silver Plume are considered the "Georgetown-Silver Plume National Historic Landmark District." This is a mining district, and its designation is not singly based on historic structures within the communities. Since I-70 bisects this district, any build alternative will be subject to a 4(f) review. All of the five build alternatives involve construction in these areas. Since none of the construction is outside of the CDOT ROW, the potential for direct impacts on these historic districts is small. It appears that no historic structures or properties will need to be acquired. This will need to be confirmed during the design phase.

Regardless of the build strategy considered, there is the potential for indirect impacts during construction. This will be determined in the 4(f) review discussed above. The permanent visual impacts caused by retaining walls for slow-moving vehicle lanes on Georgetown Hill and elevated structures (and potentially catenary) for the FGT, may result in indirect visual impacts. Potential impacts of vibration on historic structures caused by the FGT will need to be assessed after a technology is defined.

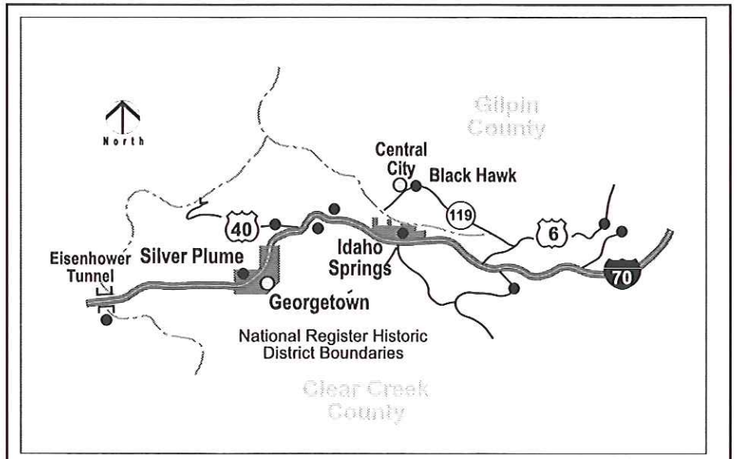


Figure 6.4
Historic Districts

Parkland

Special protection is required for parkland or recreational facilities that are considered to be local "public use" facilities, or properties that qualify under Section 4(f) or 6(f) of the Transportation Act (49 USC 303). No 4(f) or 6(f) properties are located in the proposed alignment for any of the build strategies. However, as mentioned above, there will be a potential for indirect impacts on the National Historic Landmark District located in Georgetown and Silver Plume. A more quantitative evaluation of this issue will be provided during the preparation of environmental assessment (EA) and/or EIS documents.

Mobility/Safety Evaluation

The mobility/safety criteria used for evaluating the six strategies were developed through the CWC process presented in Section 2. These criteria include:

- Congestion Relief
- Safety/Accidents
- Movement of Freight
- Reliability
- Connectivity
- Accessibility

Additional criteria evaluated include transit ridership, peak capacity, and vehicle miles traveled.

Mobility calculations are based on the peak-hour condition as defined as the thirtieth highest hour conditions.

The results of the evaluation follow for each of the specified criteria. Table 6-7 provides estimates of the annual vehicle miles of travel and person-trip projections for the I-70 corridor. Projections are provided for existing conditions (1995) and for each of the alternative transportation development scenarios under consideration. To illustrate differences in travel statistics between modal alternatives, a detailed analytical approach was performed.

Due to insufficient data that could succinctly identify the number of existing person-trips throughout the 140-mile corridor, person-trip estimates were calculated from estimates of vehicular volumes on individual I-70 segments and from average trip-length data estimated from a license-plate survey of the corridor. Data obtained from a synthetic origin-destination table estimated from vehicular volumes on all major highways on the Western Slope was also used to estimate average trip lengths. Existing vehicle occupancy data, obtained from the license plate survey, were then used to convert estimated vehicle-trips to person-trips. Additional data that took forecasts of public transit trips for each strategy were then added to the estimated number of persons traveling by automobile to determine the total person-trip estimate.

No fixed total annual person-trips total was established by this methodology; rather, it is intended to be illustrative of the types of shifts in mode and vehicle occupancy that might result from policy actions in the corridor.

Typically, vehicle occupancy can be expected to vary within a small range of its existing value, given established patterns of travel. Over a 20-year planning horizon, a number of influences could push occupancies higher. These include regional policy mandates, increased costs of driving, growing congestion, and social/cultural shifts that will occur even in the absence of corridor-specific actions. In these circumstances, average vehicle occupancy could be boosted about 10 percent, to almost two persons per vehicle.

To reflect the impacts of the various corridor strategies, changes in VMT and vehicle occupancies were estimated according to the policy, program, and physical elements of each strategy. With expanded highway capacity, VMT is likely to remain high in response to the added supply, and occupancies move upward only slightly. In the Bus/HOV Strategy, occupancies would move sharply upward in response to the travel time incentives from the use of a reserved lane, with a corresponding reduction in VMT. The TSM/TDM Strategy produces higher occupancies with programs and services, but without the traveltime incentives, so VMT is affected to a lesser extent. The transit alternatives reduce VMT by shifting trips to a new mode, with occupancies in a mid-range, reflecting competition between ridesharing and transit modes. Overall occupancies among these estimates vary another 10 percent above those associated with the No-Build Strategy. These assumptions represent a conservative approach to estimating future travel demand in the I-70 corridor. Variations in the number of annual person-trips reflect the preponderance of discretionary trips served by I-70.

It would be anticipated that each of the development scenarios would likely result in a change in vehicle occupancy. Past research has shown that changes in vehicle occupancy over time can amount to an increase of approximately 10 percent as roadways become more heavily traveled over a 20-year period. While this may not amount to a large difference when considering typical urban vehicle occupancies (where vehicle occupancies hover around 1.2 to 1.3), a 10 percent difference to the high vehicle occupancy conditions in the I-70 corridor can be measurable and can not be ignored.

Using the existing data as a starting point, changes to future vehicle occupancies were examined for each of the alternative development scenarios. Using a 10 percent change in vehicle occupancies as a starting point to reflect the no-build scenario, the anticipated vehicle occupancy under this strategy would increase from 1.77 under existing conditions to 1.95 for the no-build scenario. Also, because each of the alternative strategies includes a TSM/TDM component to increase vehicle occupancies, past research would indicate that a 5 percent increase in vehicle occupancy could be achievable. This accounts for the expected 2.05 vehicle occupancy for the TSM/TDM, Fixed Guideway Transit with Select Highway Improvements, and Highway Widening alternatives.

The occupancy increase because of the TSM/TDM programs was considered to be an additive to the 10 percent increase of vehicle occupancy over time. While these assumptions regarding changes in vehicle occupancy provide what some may consider significant increases, they provide a conservative approach to distinguish the difference in travel characteristics among alternatives. The level of congestion during peak time periods will influence vehicle occupancies between alternatives as well, as will be discussed below. However, data to distinguish that difference are not readily available, and the approach used herein likely overestimates the change in vehicle occupancy. Hence, the differences in travel statistics between strategies would likely be even less than what is presented in Table 6-7.

Because the Fixed Guideway Transit Strategy will likely result in higher degrees of congestion than the other strategies, an increase in the vehicle occupancy to 2.10 was forecast. Also, because of the travel time benefit of the high-occupancy vehicle lanes in the Bus/HOV Strategy, an increase in vehicle occupancy, because travelers will tend to take advantage of this travel time advantage, would be expected. Thus, considering an increase in vehicle occupancy as a result of the speed benefit of the HOV lane plus the expected number of public transit trips in this alternative, an even higher occupancy of 2.15 was predicted. Note that the estimate of transit trips for the corridor was produced in the report entitled *I-70 Mountain Corridor MIS Ridership Methodology and Results Report* (Manuel Padron and Associates, 1998).

Annual VMT was predicted from the various alternative forecasts for the individual highway segments along I-70. These forecasts account for the reduction in vehicle miles traveled when a competing transit mode is available. Using the occupancy assumptions stated previously and using the projected number of person trips on the public transit mode for each strategy (determined as part of the public transit ridership analysis that took into account travel time, fare and other transit system attributes), person trip estimates were then calculated. By calculating trips in this manner, the total number of person trips between alternatives will vary. This result does not conform to typical network systems analyses (especially in urban conditions) where the number of person trips is fixed, and these trips are analyzed to assess the changes in transportation mode and route selection among alternatives within that system. However, it was felt that since much of the travel on I-70 is in the form of discretionary trips, it is possible for person-trips in the I-70 corridor "system" to be relocated to alternative "systems," or to eliminate the trips entirely.

TABLE 6-7
I-70 Corridor System Statistics

	1995	2020					
	Existing	No Build	TSM/TDM	Bus/HOV	Fixed Guideway Transit	Fixed Guideway Transit/ Selected Highway	Highway Widening
Annual VMT (1000s)	1,168,000	1,818,000	1,896,000	1,816,000	1,858,000	1,877,000	1,935,000
Occupancy	1.77	1.95	2.05	2.15	2.10	2.05	2.05
Annual Vehicle Trips	37,016,475	57,604,560	60,097,800	57,541,190	58,871,300	59,484,560	61,311,800
Auto Person Trips	65,519,200	112,328,900	123,200,500	123,713,560	120,686,165	121,943,348	122,623,570
Transit Trips	N/A	N/A	630,000	709,000	1,736,000	1,736,000	600,000
Total Trips	65,519,200	112,328,900	123,830,500	124,422,560	125,365,730	126,653,580	123,223,570
Daily Vehicle Trips: Eisenhower Tunnel	23,200	35,610	37,140	35,570	36,390	36,760	37,900
Daily Auto Person Trips: Eisenhower Tunnel	41,064	69,440	76,140	76,470	76,420	75,358	74,600

In addition to the system statistics presented in Table 6-7, vehicle and person-trip statistics for the Eisenhower Tunnel are also illustrated. These statistics will eventually be used in the financial analysis to help describe the effect of toll pricing at an isolated area along the corridor.

Congestion Relief

Congestion along the existing I-70 corridor was identified as a major issue during the public process. During peak periods, congested operation produces a lengthening of travel times, reduced travel speeds, and associated discomfort and inconvenience of stop-and-go travel. Congestion is closely related to the patterns of travel demand. It occurs as the cumulative result of numerous individual decisions regarding the timing of travel.

Three different aspects of highway congestion were considered in the detailed evaluation: travel times, level of service (LOS), and duration of congestion.

Travel Times

Two travel times are compared: first, travel time on the "alternate mode" represented by either a bus or FGT; and second, travel time on I-70 in a private auto. Travel times for the rail mode were estimated using running time and stopped time at stations. For the Bus/HOV Strategy, a separate travel time estimate was prepared for users of the exclusive HOV lane. All travel time calculations assume travel between the Main Vail interchange and the C-470/I-70 interchange. The results of the travel time impact analysis are presented in Table 6-8.

TABLE 6-8
Thirtieth Highest Hour and Off-Peak Travel Times, Existing (1995) and Year 2020

	Travel Time–Vail to C-470 on Alternate Mode	Travel Time–Vail to C-470 on Highway
Off-peak Conditions (1995)	N/A	1 hour, 30 minutes
Existing 30th Highest Hour Conditions (1995)	N/A	1 hour, 55 minutes
No Build (2020)	N/A	3 hours, 5 minutes
Transportation Systems Management/Transportation Demand Management (2020)	2 hours, 35 minutes (buses)	2 hours, 10 minutes
Bus/High Occupancy Vehicle (2020)	1 hour, 55 minutes	2 hours, 10 minutes
Fixed Guideway Transit (2020)	1 hour, 20 minutes	2 hours, 25 minutes
Fixed Guideway Transit with Selected Highway Improvements (2020)	1 hour, 20 minutes	2 hours
Highway Widening (2020)	2 hours, 15 minutes (buses)	1 hour, 50 minutes

Assuming 1995 thirtieth highest hour (weekend) conditions, the travel time between Vail and C-470 is 1 hour and 55 minutes on I-70, while the off-peak or unimpeded travel time is 1 hour, 30 minutes. Under the NB Strategy, the travel time will increase dramatically to 3 hours and 5 minutes in the year 2020 during the thirtieth highest hour. During peak periods, operating speeds would range as low as 13 mph at the twin tunnels, with an average between Vail and C-470 of about 30 mph.

Under the TSM/TDM Strategy, travel time in the year 2020 on I-70 between Vail and C-470 will be 2 hours and 10 minutes during the thirtieth highest hour (weekend), an improvement of 55 minutes as compared to the NB Strategy. Travel time using the bus is estimated at 2 hours and 35 minutes. The slower travel time is due to station stops and slightly reduced speeds on steep grades.

Travel times on I-70 in the year 2020 are projected to be 2 hours and 10 minutes between Vail and C-470 with the HOV Strategy. The travel time on the HOV lane will be improved with an estimated time of approximately 1 hour and 55 minutes. This suggests that the general-purpose travel lanes will be more congested than the HOV lanes.

At an average speed of 60 mph, the FGT Strategy will provide a travel time between Vail and C-470 of 1 hour and 20 minutes on the alternate mode, comparable to off-peak (nonweekend) travel times by automobile in the year 2020. However, the automobile trip will take 2 hours and 25 minutes on I-70 during the thirtieth highest hour travel time due to the anticipated level of congestion.

With the FGT/SHI Strategy, the travel time between Vail and C-470 on the FGT will remain at 1 hour and 20 minutes in the year 2020. The travel time between Vail and C-470 on I-70 via the highway is reduced by 25 minutes to 2 hours with this strategy. The improvement over the FGT Strategy without highway improvements is a result of the additional highway capacity included with this strategy. Travel times on the FGT system are significantly superior to bus transit, under any of the alternatives.

The HY Strategy results in improved speeds, 1 hour and 50 minutes versus 3 hours, 5 minutes, between Vail and C-470 on I-70 over the NB Strategy, for the thirtieth highest hour in the year 2020. Bus travel times also improve by about 20 minutes over the TSM/TDM Strategy, 2 hours and 15 minutes versus 2 hours and 35 minutes, due to increased highway capacity and reduced congestion at Eisenhower Tunnel.

Level of Service

LOS analysis on I-70 was performed at Vail, Frisco, Eisenhower Tunnel, Idaho Springs, and Genesee for the years 2020 and 2050 for the thirtieth highest hour of travel time reflecting typical peak weekend operating conditions. It should be noted that the LOS on the alternate mode, either the HOV lanes or the FGT, should be acceptable even in cases where failed conditions are experienced on the general purpose lanes of I-70.

As shown in Table 6-9, if improvements are not made, as is the case with the NB Strategy, LOS F would be experienced throughout the corridor from Floyd Hill to Avon by the year 2020. Additional specifics by location are given below.

TABLE 6-9
Thirtieth Highest Hour (Weekend) Level of Service (LOS) Analysis

Strategy	Vail Area	Frisco	Eisenhower Tunnel	Idaho Springs	Genesee
Existing Conditions (1995)	D	C	E	E	C
No Build (2020)	F	F	F	F	D
Transportation Systems Management/ Transportation Demand Management (2020)	D/E	F	F	D/E	D
Bus/High Occupancy Vehicle (2020)	D/E	D	F	D/E	D
Fixed Guideway Transit (2020)	D/E	E	F	F	D
Fixed Guideway Transit with Selected Highway Improvements (2020)	D/E	C	F	D	D
Highway Widening (2020)	D/E	D	D	D	D

In 2050, the thirtieth highest hour (weekend) would be LOS F at all locations regardless of the improvement package. In other words, none of these alternatives truly represents a long-term solution.

Vail. Currently, the LOS experienced through Vail is D during peak weekend conditions. The NB Strategy results in LOS F in both 2020 and 2050 through Vail. All of the remaining strategies provide an LOS of between D to E (depending on actual location) in 2020.

Frisco. Currently, the LOS experienced through Frisco is C during peak weekend conditions. The NB and TSM/TDM strategies result in LOS F on I-70 in Frisco in 2020. The HOV and HY strategies provide LOS D, and the FGT Strategy provides LOS E in 2020. LOS C is provided in Frisco with the FGT/SHI Strategy in 2020. This is a result of the selected highway widening and the added diversion of the FGT in the vicinity of Frisco.

Eisenhower Tunnel. Currently, LOS E is experienced at this location during peak weekend conditions. LOS F is predicted for all of the strategies except the HY Strategy, where an LOS D is predicted in 2020. The HY Strategy is the only option that provides capacity improvements at Eisenhower Tunnel, thus explaining the improved LOS over the other strategies.

Idaho Springs. Currently, the LOS in Idaho Springs is E during peak periods on the weekends. In 2020, both the NB and FGT strategies result in LOS F through Idaho Springs. The FGT/SHI and the HY strategies provide the best mobility, where LOS D is predicted. This improvement is largely a result of the increased highway capacity provided through Idaho Springs as part of these strategies. The HOV Strategy is predicted to provide LOS D/E in 2020 through Idaho Springs.

Genesee. Under existing conditions at Genesee, LOS C is experienced during peak periods. In 2020, these conditions are reduced but still acceptable at LOS D with all five of the build strategies.

In summary, while the alternative development strategies have differing results with regard to the impact to highway LOS during the thirtieth highest hour (weekend conditions) by the year 2020, LOS during weekday off-peak conditions should be acceptable. Note that by 2050, none of the alternative solutions provide an acceptable highway LOS during the thirtieth highest hour. However, as in typical urban transportation conditions, long-term solutions to solving congestion may not be possible. In fact, in most metropolitan areas, much shorter term forecasts can result in travel demands that simply cannot be accommodated without an overwhelming investment in transportation infrastructure. Thus, the decision to simply expand the highway to accommodate the additional demand on the highway system must be weighed against providing alternatives in the form of public transportation. Often, solutions to travel demand issues are not based solely on the fact that the particular investment can solve congestion, but rather that other options are available for making a trip.

Hours of Congestion

As shown in Table 6-10, hours of congestion on I-70 were evaluated at Eisenhower Tunnel and the City of Idaho Springs. Under current conditions, 120 hours of congestion are experienced per year at Eisenhower Tunnel; 160 hours of congestion are experienced at Idaho Springs. These conditions occur approximately 20 weekends per year. For the purposes of this study, congestion is defined as conditions where the hourly demand is at least 80 percent of the calculated freeway capacity. Congestion was only predicted for the year 2020. In 1995, about 3.2 percent of annual VMT took place under congested conditions.

In the year 2020, congestion is expected to affect travel on about 30 weekends annually. On these peak weekends, congested operation could be expected for 12 hours in the peak direction (westbound Friday and eastbound Sunday). Traffic flow would be operating at reduced capacity during these times, limiting the throughput of vehicles and creating queues at existing bottlenecks. (Note that the transit strategies represent an alternative travel mode that will not be congested during peak periods.)

Predicted congestion at Eisenhower Tunnel and Idaho Springs follows.

TABLE 6-10
Annual Estimated Hours of Congestion in 2020

Strategy	Annual Estimated hours of Congestion on I-70 at Eisenhower Tunnel	Annual Estimated hours of Congestion on I-70 in Idaho Springs
Existing Conditions	120	160
No Build	700	700
Transportation Systems Management/Transportation Demand Management	450	225
Bus/High Occupancy Vehicle	500	200
Fixed Guideway Transit	500	400
Fixed Guideway Transit with Selected Highway Improvements	500	100
Highway Widening	175	150

Eisenhower Tunnel. Under the NB Strategy, year 2020 congestion is predicted to increase nearly six-fold from 120 hours to 700 hours annually or approximately 12 hours during the weekend in the peak direction. This compares to 450 hours annually for the TSM/TDM Strategy or 7.5 hours per weekend in the peak direction; 175 hours annually or 3 hours for the HY Strategy; and 500 hours annually or 7.5 hours per weekend in the peak direction for the general traffic in the Bus/HOV Strategy, although the HOV lane itself would be uncongested. For the FGT and FGT/SHI strategies, congestion would amount to 500 hours annually or 8.3 hours per weekend in the peak direction.

The HY Strategy results in the fewest hours of congestion due to additional capacity at Eisenhower Tunnel. None of the other strategies provide improvements to Eisenhower Tunnel.

Idaho Springs. The annual hours of congestion at Idaho Springs increase from 160 to 700 with the NB Strategy, or as much as 12 hours on peak weekend periods.

Annual year 2020 congestion is reduced with the HY Strategies from 160 hours annually to 150 hours or about 2.5 hours during the weekend in the peak direction. Annual congestion is reduced with the FGT/SHI Strategy to 100 hours or about 1.7 hours per weekend in the peak direction. The TSM/TDM Strategy is predicted to reduce annual congestion to 225 hours or 4 hours during peak weekend periods because of the provision of the flex lanes through the city. Annual congestion of 200 hours or about 4 hours per weekend in the peak direction is estimated for the Bus/HOV Strategy. The FGT Strategy provides the poorest reduction of congestion on I-70 through Idaho Springs at 400 hours or the equivalent of 6.7 hours during the peak weekend period.

In summary, the HY Strategy provides the best 2020 mobility improvement at Eisenhower Tunnel. However, congestion in 2020 will still be more severe than currently experienced (i.e., 175 hours versus 120 hours currently). Selection of the FGT Strategy without any highway improvements offers the poorest level of service, with congestion increasing by three times over current conditions. Since none of the remaining alternatives provide a third bore at Eisenhower Tunnel, the level of 2020 congestion on weekends will increase about four times over what is currently experienced. Congestion at Idaho Springs will be less than current conditions with the FGT/SHI strategy because it provides both highway and FGT improvements. The HY Strategy provides congestion conditions that are about the same as today. The TSM/TDM and HOV strategies result in some deterioration of congestion through Idaho Springs over existing conditions.

Safety/Accidents

The safety performance of a transportation system is an important index of public confidence in the various travel modes and an indicator of economic losses associated with accidents. Accident statistics for highways, rail, and air travel were obtained in the evaluation process.

Highway. Along I-70, accident data were analyzed for 11 roadway segments, including rates for property damage, injury, and fatality accidents. Highway accident rates were estimated for future conditions, based on national data correlated to traffic volumes, number of lanes, and terrain. These criteria were used to adjust the observed accident rates based on the elements of each strategy.

Accident data were obtained from CDOT for the I-70 Mountain Corridor. Rates of property damage, injury, and fatality accidents were determined using 1995 accident and traffic volume data. The overall accident rate for the corridor was determined to be 1.20 accidents per million vehicle-miles (MVM), or about 31 percent above the average rate for other rural Colorado interstate highways (0.91 accidents per MVM).

Injury rates in the corridor average 0.41 accidents per MVM, compared to the statewide average of 0.34 accidents per MVM. The fatality rate in 1995 was 2.11 accidents per 100 MVM, compared to the statewide interstate average of 1.76 accidents per 100 MVM. Both of these rates are about 20 percent above the statewide averages. Among the 1995 mountain corridor accidents, 34.2 percent involved injuries and 1.75 percent involved fatalities. In 1995, 479 injuries and 30 fatalities occurred along I-70.

Some of the segments with higher accident rates include S.H. 24 (Minturn) to S.H. 91 (Wheeler Junction) and S.H. 103 (Idaho Springs) to S.H. 6 (Clear Creek). In these areas, accident rates are about double the statewide interstate average.

Accident rates were estimated for future conditions for each of the strategies using an adjusted accident rate and projections of future

vehicle-miles of travel in the corridor. Research in California has produced accident averages for four- and six-lane rural freeways, according to traffic volume, speed, and terrain parameters. These factors were used to adjust the observed accident rates in the I-70 Mountain Corridor, accounting for the future traffic volume and number of lanes specific to each strategy. The accident rates estimated in this way are presented in Table 6-11.

TABLE 6-11
Summary of Accident Rates and Numbers

		Accident Rates			Annual Number of Accidents			
		All [1]	Injury [1]	Fatal [2]	All	Property Damage	Injury	Fatal
1995	Existing	1.20	0.41	2.11	1,402	893	479	30
2020	No Build	1.33	0.45	2.54	2,421	1,555	820	46
2020	TSM/TDM	1.24	0.42	2.37	2,350	1,510	795	45
2020	Bus/HOV	1.11	0.37	2.16	2,014	1,305	670	39
2020	FGT/SHI	1.26	0.42	2.38	2,365	1,530	790	45
2020	HY	1.11	0.37	2.16	2,147	1,390	715	42

[1] Per million vehicle-miles
[2] Per 100 million vehicle-miles

Other Modes. Accident statistics for the air and rail mode were obtained from national and international data for air travel, and commuter rail and high-speed rail systems. These records provide information regarding the frequency of injuries and fatalities. From 1990 to 1994, commuter rail systems averaged 11.5 injuries per MVM and 0.49 fatalities per MVM.

Accident rates for air and rail travel were also obtained from national statistics. For rail modes, both high-speed and commuter rail technologies were evaluated for those strategies proposing rail service. Accident rates for air travel are low, and expanded air service is included in all of the action strategies. It was not explicitly reflected in the evaluation.

For high-speed rail systems, no injuries or fatalities have been reported in more than 15 years of operation in France and Japan. An accident rate of zero is assumed for this mode. This impressive safety record is obtained through aggressive maintenance and monitoring of the trackage and rolling stock.

Accident rates for air travel are computed on the basis of passenger miles. Injuries averaged 0.05 per billion passenger miles, and fatalities averaged 0.2 per billion passenger miles between 1990 and 1994.

Projected Safety Performance

For future conditions, accident rates are projected to remain highest in the NB Strategy, because no additional infrastructure construction to improve safety is undertaken, but traffic volumes continue to grow. The TSM/TDM and FGT/SHI strategies exhibit lower accident rates, because some widening is provided, and traffic volumes are reduced compared to the NB Strategy. The lowest accident rates are projected for the HY and Bus/HOV strategies.

A comparison of the safety performance estimated for each of the strategies is presented in Table 6-11. As indicated in the table, the number of annual injury accidents in 2020 is the least with the HOV Strategy at 670. This compares to 820, or 22 percent more, injury accidents than with the NB Strategy. The HY Strategy is the second lowest at 715, and the TSM/TDM and FGT strategies are about equal at 795 and 790, respectively.

Movement of Freight

The movement of goods is a critical issue for economic vitality at the local, state, and national levels. Currently, most goods delivered in the I-70 Mountain Corridor are shipped by truck. Only the westernmost 60 miles of the corridor are served by rail freight mode.

Each strategy was reviewed for its ability to efficiently serve freight movement. For the highway mode, travel times are a key determinant in assessing freight mobility. Opportunities for ITS applications, climbing lanes, chain-up areas, and maintenance operations in the various alternatives will improve the efficiency and safety of goods movement.

Because freight movement is directly related to conditions on I-70, the HY Alternative would provide the greatest benefit to freight. It is probable that the FGT strategies could be configured to carry some freight. This cannot be confirmed until an FGT technology is defined. Additionally, the truck-climbing lanes that are components of all of the build strategies, including the FGT strategies, will improve the conditions for the movement of freight.

Reliability

Reliability is a measure of the transportation system to perform consistently under various external conditions. In the I-70 Mountain Corridor, inclement winter weather can adversely affect travel times for automobiles, buses, and trucks. Traffic accidents and unanticipated incidents also can reduce the day-to-day and week-to-week stability of travel times.

For transit, rail, and air travel modes, reliability is measured by travel time stability and schedule adherence. Adverse weather conditions also affect these modes. Transit vehicles that are forced to operate in mixed highway traffic, such as for the TSM/TDM strategies, could be expected to provide a lower level of reliability than would be experienced with the FGT strategies, which because of their reserved ROW, would provide the highest levels of reliability. Of the build strategies, the TSM/TDM and HY strategies provide the lowest level of reliability in poor weather.

Connectivity

Connectivity is a measure of the completeness and continuity offered by a transportation network. In the I-70 Mountain Corridor, connections are provided to numerous state highways, county roads, and recreational access routes. In some areas, topographic constraints and development patterns create circuitous travel patterns. These may be corrected with new or reconstructed interchanges or by improved use of parallel roads.

Connectivity among modes is also an important issue. Strategies were assessed for opportunities to develop efficient interfaces between the highway and transit modes. Transit stations and park-n-Ride lots facilitate transfer between modes, but numerous transfers serve to discourage transit use. Intermodal transfer stations must be conveniently located in relation to the users. For FGT strategies, feeder bus systems are used to connect stations to residences, employment centers, and recreational destinations.

Connectivity issues will be the most challenging with the FGT strategies, especially from West Denver to DIA. Numerous issues exist including:

- **Travel Speed**. High-speed travel through Metro Denver would be met with resistance. Travel speeds will need to be consistent with the speeds recommended in the East Corridor and Denver to Golden Corridor MISs (i.e., not more than 45 to 55 mph through urbanized areas).
- **Technology Compatibility**. Selection of a new technology will require either a separate guideway and potential ROW conflicts (see below) or transfer to an existing technology either in West Metro Denver or DUT. A transfer would reduce potential ridership.
- **Guideway Geometry**. The acceptability of elevated track and high-speed travel through the Denver Metro area.
- **Number of Stops**. The need to provide stops in all of the political jurisdictions through which the FGT travels will reduce travel times and impact ridership. As mentioned earlier, the modeling sensitivity analysis suggests that an increase in travel time of 20 minutes due to additional stops through Metro Denver would reduce annual ridership by about 100,000.
- **Right-of-Way Conflicts**. Availability of ROW in existing transit corridors will be needed, including the Gold Line, West Corridor, and East Corridor. It is anticipated that it will be necessary to add a second track for the Mountain Corridor FGT to accommodate an acceptable operating plan. In many cases, it will be difficult to accommodate a second track within the existing ROW. An additional track for the Mountain Corridor FGT could trigger potential environmental justice issues in the Denver Metropolitan area, especially in the East Corridor.

- **Competition for Median Space**. Competition will occur for the median space in the I-70 footprint between the FGT and future highway widening, especially in the segments west of Wadsworth Boulevard to the C-470/I-70 Interchange.

By comparison, the connectivity issues for the TSM/TDM, HOV, and HY strategies are not as difficult. In all cases, the construction of additional lanes on I-70 would provide the majority of the needed connectivity. However, the widening of I-70 east of Wadsworth to I-25 presents a high potential for relocation and environmental justice issues because of minimal ROW in these areas.

Accessibility

This criterion measures the ability of the transportation system to provide access to a wide range of trip origins and destinations. The I-70 route serves many towns and cities within the corridor, winter and summer tourists, and national interstate travelers. For transit modes, accessibility is measured by the proximity to its users and the frequency of service provided. All of the build alternatives provide an expanded bus service, which will provide mobility options to transit-dependent persons. The accessibility advantages of the FGT Strategy will be somewhat offset if the cost of the fare is comparable to existing van and shuttle services that currently range from $48 to $60 from DIA to Vail. Nonetheless, the FGT strategies will provide mobility options that do not exist at this time in the corridor.

Other Mobility Criteria

Peak-Hour Capacity

Peak-hour capacity is one indicator of the effectiveness of mobility options. The peak-hour capacity of each of the build strategies is presented in Table 6-12 and discussed below.

TABLE 6-12
Hourly One-Way Additional Peak-Hour Person Capacity

	Strategy	Additional Capacity
1995	No Build	0
2020	Transportation Systems Management/Transportation Demand Management	3,485 [a, b]
2020	Bus/High Occupancy Vehicle Lanes	5,525 [c]
2020	Fixed Guideway Transit	1,200 [d]
2020	Fixed Guideway Transit with Selected Highway Improvements	4,685 [e]
2020	Highway Widening	3,485 [a]

[a] Assumes 2.05 persons per vehicle and 1,700 vehicles per lane per hour in one direction.
[b] Represents the equivalent of the addition of one highway lane. The capacity increase is limited to 39 miles of the corridor.
[c] Assumes 3.25 persons per vehicle and 1,700 vehicles per lane per hour in one direction. Capacity can be dramatically increased with the addition of buses.
[d] Assumes a single-track configuration.
[e] Assumes 1,200 persons per hour per direction for the FGT system and 3,485 persons per hour per direction for the additional highway capacity. The full impact, additional capacity of 4,685 persons per hour per direction would only be realized over 44 miles of the corridor.

On average, a travel lane on I-70 carries approximately 1,700 vehicles per lane per hour, which is less than the more typical 2,200 vehicles per lane per hour experienced on most interstate highways. The reduced capacity is a result of steep grades, altitude, and slow-moving vehicles that are unable to maintain design speeds because of insufficient horsepower to weight ratios. Eisenhower Tunnel capacities are further reduced to 1,300 vehicles per lane per hour because of steep grades and other physical constraints.

At 1,700 vehicles per lane per hour, the existing I-70 corridor provides a capacity of 6,800 vehicles or 12,240 persons per hour (in both directions), assuming 1.8 persons per vehicle. This number would be significantly higher if the occupancy per vehicle increased. The NB Strategy provides no additional capacity over the existing condition.

The HOV Strategy provides for an additional 1,700 vehicles or a 25 percent increase in highway capacity. However, assuming an average of three persons per vehicle, the actual increment is 5,100 additional persons per hour over the NB Strategy.

The operating plan for the FGT Strategy allows for a maximum of three trains per hour or, at least 400 persons per train for a total of 1,200 persons per hour. *This represents the equivalent of 40 percent of one highway travel lane.*

The FGT/SHI Strategy will provide the additional 1,200 persons per hour (40 percent of a lane throughout the corridor) as defined above and a 50 percent increase in highway capacity in the 38 miles of corridor where a third lane is added, most notably from Floyd Hill to U.S. 40, Silverthorne to Frisco, and West Vail to Avon. The capacity of the FGT strategies would be significantly higher if a two-track guideway were constructed.

Transit Ridership

The estimate of transit ridership does not include existing patrons who currently use public transit provided by counties or municipalities in the corridor or those using private van or shuttle services. The values shown attempt to represent new transit riders on the I-70 corridor system although it is probable that there will be some cross-over from existing systems to the new programs being proposed as part of the MIS alternatives. Predicted transit ridership is shown in Table 6-13. Ridership projections shown for the fixed guideway alternative assume direct service to DIA via use of the Gold Line, Rock Island Railroad and East Corridor metro rail alignments.

Assuming the NB Strategy as the baseline, the TSM/TDM and HY strategies are estimated to result in approximately 600,000 new transit riders in 2020. The similarity is a result of the fact that both alternatives provide analogous bus transit systems. The HOV Strategy is projected to provide a ridership of approximately 709,000 patrons as a result of the improved travel times provided by the dedicated HOV lanes. The designated lanes for the HOV Strategy are estimated to include an additional 6.2 million users in vehicles with three or more occupants.

TABLE 6-13
Transit Ridership

Future Alternatives	2020 Annual I-70 Intermountain Public Transit Ridership	2020 Annual Private Transit/HOV Person Ridership in HOV Lane
No Build	N/A	N/A
TSM/TDM	630,000	N/A
Bus/HOV	709,000	6,205,000
Fixed Guideway Transit	1,736,000	N/A
Fixed Guideway Transit with Selected Highway	1,736,000	N/A
Highway Widening	600,000	N/A

The FGT and FGT/SHI strategies have identical annual ridership, estimated at approximately 1.7 million. Of this, the riders from DIA to Vail are estimated to comprise 1.3 million of the total with the remaining 400,000 using the commuter rail from the Vail area to Glenwood Springs. If either of the FGT strategies were implemented, the number of line haul bus patrons would be dramatically reduced because these people would shift from bus to rail transit. However, local bus service would need to be increased to feed the FGT system. Persons using the feeder bus system are not included in the ridership estimates. Conversely, the cost of accommodating these patrons is included in the operational cost estimates presented later in this document.

Financial Evaluation

The financial evaluation is based on the capital and O&M cost estimates shown in Tables 6-14 and 6-15, respectively. The capital cost estimates were developed in the report, *Cost Methodology: I-70 Mountain Corridor Major Investment Study* (L.S. Gallegos and Associates, 1998). Development of the O&M cost estimates is provided in the report, *1-70 Mountain Corridor Major Investment Study: Detailed Evaluation Report* (CH2M HILL, et al., 1998a).

TABLE 6-14
Project Cost Estimates: West Denver to Glenwood Springs

Strategy	Project Cost (millions in 1998 dollars)
No Build	$80
Transportation Systems Management/ Transportation Demand Management	$1,103
Bus/High Occupancy Vehicle	$1,917
Fixed Guideway Transit	$5,312
Fixed Guideway Transit/Selected Highway Improvements	$5,674
Highway Widening	$3,183

Note: Costs do not include connectivity from West Denver to DIA, which may increase project costs from $400 million to $1.0 billion.

TABLE 6-15
Summary Annual Operational and Maintenance Costs (millions in 1998 dollars)

Strategy	Cost (millions in 1998 dollars)
No Build	$37
Transportation Systems Management/Transportation Demand Management	$57
Bus/High Occupancy Vehicle	$54
Fixed Guideway Transit	$162
Fixed Guideway Transit/Selected Highway Improvements	$163
Highway Widening	$58

Note: Costs do not include connectivity from West Denver to DIA.

Financial Results

Annual Cost

Estimated life-cycle costs of the strategies are shown in Table 6-16. As indicated, total annual costs range from $43 million for the NB Strategy and $134 million for the TSM/TDM Strategy, to a high of $573 million for the FGT/SHI Strategy.

TABLE 6-16
Annual Cost Summary (millions in 1998 dollars)

Strategy	Capital	Annualized Capital[a]	O&M	Total Annual
No Build	$80	$6	$37	$43
Transportation Systems Management/Transportation Demand Management	$1,103	$80	$57	$137
Bus/High Occupancy Vehicle	$1,917	$139	$54	$193
Fixed Guideway Transit	$5,312	$386	$162	$548
Fixed Guideway Transit with Selected Highway Improvements	$5,674	$412	$163	$575
Highway Widening	$3,183	$231	$58	$289

[a]Capital costs annualized at a 6 percent interest rate over 30 years.
Note: Costs do not include connectivity from West Denver to DIA.

In the table, capital costs are "annualized" using a 6 percent interest rate over a 30-year period. User costs are presented for each strategy in Table 6-17.

Annual User Cost

For the purposes of this analysis, "annual user costs" do not include fares or operating costs borne by users. Rather, annual user cost is defined as all persons using the corridor divided into the total annual cost of each strategy. As such, the user costs can be viewed as the amount that would need to be charged to all users in the corridor to pay for one of the six strategies. As shown in Table 6-17, annual user costs range from a low of $0.38 for the NB Strategy, to $1.11 for the TSM/TDM Strategy, to $1.55 for the HOV Strategy, to $4.37 for the FGT Strategy, to $4.54 for the FGT/SHI Strategy, and $2.35 for the HY Strategy. (It should be noted that these estimates of annual user cost do include transit ridership for the High Speed FGT from DIA to Vail but do not include the additional capital costs from West Denver to DIA.)

TABLE 6-17
Annual Cost per User

Strategy	No Build	Transportation Systems Management/ Transportation Demand Management	Bus/High Occupancy Vehicle	Fixed Guideway Transit	Fixed Guideway Transit with Selected Highway Improvements	Highway Widening
Total Annual Cost (Millions of 1998$)	$43	$137	$193	$548	$575	$289
Number of Users						
Annual No. of Users[a]						
Highway Other Than Transit	112,328,900	123,200,500	123,713,560	120,686,165	121,943,348	122,623,570
New Transit Programs						
Bus	0	630,000	709,000	0	0	600,000
Rail	0	0	0	1,736,000	1,736,000	0
Total Users	112,328,900	123,830,500	124,422,560	125,365,730	126,653,580	123,223,570
Total Annual Cost per User (1998$)	$0.38	$1.11	$1.55	$4.37	$4.54	$2.35

[a] Users refers to the estimated number of person-trips in the corridor in 2020.
Note: Costs do not include connectivity from West Denver to DIA.

Other Measures of User Cost

Tables 6-18, 6-19, and 6-20 present user cost estimates from three different perspectives. Table 6-18 shows the cost per person-trip and cost per person-mile for each of the different strategies. Nontransit person-trips are based on a 32-mile average trip. The estimates assume an average of 40 cents per mile for driving personal automobiles. As shown in Table 6-18, the annual vehicle operating costs tends to dominate the results. The cost per person-trip of the strategies ranges from a low of $7.28 per trip for the TSM/TDM Strategy to $10.42 per trip for the FGT/SHI Strategy. When dividing these estimates by an average trip length for each mode, the TSM/TDM Strategy costs 23 cents per mile, and the FGT/SHI Strategy costs 33 cents per mile. The cost per mile values are lower than the 40 cents cited previously because of the fact that more than one rider is included in each vehicle.

In Table 6-19, the cost of the FGT is isolated to provide cost estimates for that part of the system only. As shown, the cost per rider (person-trip) is approximately $268 for the high-speed FGT system and $121 for the commuter rail system (Vail to Glenwood Springs). The resulting per-mile costs are $5.95 per rider-mile for the high-speed FGT system (excluding costs for the line from West Denver to DIA), and $5.25 per rider-mile for the commuter rail system.

In Table 6-20, user costs are shown that reflect the amount that would need to be recovered from roadway users if a toll were established at the Eisenhower Tunnel to pay for the project (including rail costs). This cost is calculated by dividing annual costs by the estimated number of persons that pass through the tunnel each year. While this is not necessarily a recommended funding option, it is useful to provide a sense of the magnitude of a potential tolling option. As shown, the cost ranges from $1.70 per person trip for the NB Strategy to $20.39 per person trip for the FGT/SHI Strategy. To obtain an approximate estimate of the toll needed per vehicle, multiply the values presented in the last column of Table 6-20 by 2.0 (the average occupancy per car is approximately 2.0 persons). In other words, for a toll to cover the entire cost of the TSM/TDM Strategy, the cost would be $9.64; for the FGT/SHI Strategy, the toll would need to be $40.78. It should be recognized that it is doubtful that tolls would be used to finance 100 percent of the project cost for any of the strategies. For example, if tolling covered 25 percent of the total financial obligation, the values presented would be divided by four.

Conclusions

The findings of the detailed evaluation were presented to the CWC, which participated in the Recommended Strategy Workshop (Workshop No. 5) on December 11, 1997. The intent of the workshop was to review the results of the detailed evaluation information prepared by the project team and, after assessing the considerations associated with each of the Vision strategies, recommend a preferred strategy. The results from the CWC were then presented to the OSC for a final policy recommendation.

Findings

The findings of Workshop No. 5 were consistent with the opinions expressed throughout the course of the I-70 Mountain Corridor MIS project and are expressed below:

- Concepts that received general overall support included:
  - FGT Strategy
  - TSM/TDM Strategy (with the qualification that citizens have the right to participate in individual project designs)

TABLE 6-18
Equivalent Annual Cost per Person-Trip and Person-Mile for All Corridor Users

Strategy	Annual Cost of Project Constr. And Operation ($M1998) [a]	Annual Vehicle Operating Cost ($M1998)[b]	Total Annual Cost ($M1998)	Millions of Annual Person-Trips [c,d]	Millions of Annual Person-Miles	Cost per Person-Trip [d]	Cents per Person-Mile [e]
No Build	$43	$727	$770	112	3,545	$6.86	21.7
Transportation Systems Management/Transportation Demand Management	$137	$758	$895	123	3,875	$7.28	23.1
Fixed Guideway Transit	$548	$743	$1,289	125	3,938	$10.31	32.7
Fixed Guideway Transit with Selected Highway Improvements	$575	$751	$1,324	127	4,000	$10.42	33.1
Bus/High Occupancy Vehicle	$193	$726	$917	124	3,928	$7.37	23.4
Highway Widening	$289	$774	$1,061	123	3,888	$8.61	27.3

[a] Project capital costs annualized at 6% over 30 years plus annual operations and maintenance costs.
[b] Vehicle miles of travel times $0.40 per mile vehicle operating cost. Source of vehicle operating cost estimate is "Review of Cost of Driving Studies," K.T. Analytics and the Victoria Policy Institute, May 1997.
[c] Estimated number of person-trips in the corridor in 2020.
[d] Assumes average highway trip length of approximately 32 miles in all alternatives.
[e] Total annual cost divided by annual person miles traveled in corridor for all modes.
Note: Costs exclude the cost of extending rail service from West Denver to DIA.

TABLE 6-19
Fixed Guideway Transit Cost per Rider and Rider-Mile

	Total Annual Cost [a] ($M1998) [a]	Millions of Annual Riders[b]	Millions of Annual Rider-Miles[c]	Cost per Rider	Cost per Rider-Mile
High Speed Fixed Guideway Transit: West Denver to Vail	$359	1.34	60	$268	$5.95
Commuter Rail: Vail to Glenwood Springs	$48	0.40	9	$121	$5.25
Total Fixed Guideway Transit	$407	1.74	69	$234	$5.86

[a] Includes annualized cost plus O&M cost.
[b] Assumes 1,336,000 riders on east side and 400,000 riders on the west side.
[c] Assumes 23-mile average trip length for Commuter Rail.
Note:
Costs exclude the cost of extending rail service from West Denver to DIA.

TABLE 6-20
Hypothetical Toll at Eisenhower Tunnel

Strategy	Annual Cost ($M1998)[a]	Millions of Annual Person-Trips [b]	Per-Person Toll (Each way)
No Build	$43	25.3	$1.70
Transportation Systems Management/Transportation Demand Management	$137	27.8	$4.82
Bus/High Occupancy Vehicle	$193	27.9	$6.84
Fixed Guideway Transit	$548	27.9	$19.64
Fixed Guideway Transit with Selected Highway Improvements	$575	28.2	$20.39
Highway Widening	$289	27.7	$10.37

[a] Includes all costs (highway plus transit).
[b] Estimated number of person-trips at the Eisenhower Tunnel 2020.
Notes:
Costs exclude the cost of extending rail service from West Denver to DIA.
Does not account for reduction in demand that would result from toll.

- Incentives for carpools
- Need for mobility options
- Need for changing travel behavior
- Measures that improve safety

- Concepts that have limited support:
  - HY Strategy as a Vision alternative, even if the lanes are used for HOV
  - Conventional transit technology as a long-term vision
  - Congestion pricing
  - NB Strategy or "do nothing" alternative
  - Measures that compromise safety
- Concepts where the public appears to be neutral or the results are undetermined:
  - Use of flex lanes for HOV
  - Use of tolls to provide revenue

Workshop Committee Recommended Strategy

Based on the process and findings described above, the CWC recommended the FGT Strategy as the long-term Vision combined with TSM/TDM Strategy. This strategy is essentially the same as the FGT Strategy presented in Section 5, with the exception that congestion pricing was not included. This strategy was presented to the I-70 MIS OSC on January 8, 1998.

Oversight Committee Concerns Regarding the Recommended Strategy

After the presentation of the CWC's Recommended Strategy to the OSC on January 8, several significant points of departure were identified. These are listed below.

Amount of Highway Widening/Slow-Moving Vehicle-Climbing Lanes. The greatest point of contention was related to the 39 miles of highway widening, especially the 14 miles of slow-moving vehicle-climbing lanes over Vail Pass. It was felt by the Colorado Environmental Coalition that slow-moving vehicle-climbing lanes are not justified for mobility and result in excessive environmental impact. Conversely, the Colorado Motor Carriers Association was of the opinion that the climbing lanes are needed for safety, especially during inclement weather.

Clear Creek County representatives also raised a concern regarding the slow-moving vehicle-climbing lanes at Georgetown Hill. As the basis for the cost estimate, the project team had assumed that the climbing lanes would be constructed away from the mountainside (i.e., to the south, on retained fill). This placement was determined to avoid excessive rock cuts and the associated visual impacts. It was agreed that a preferred design option would be addressed during the preliminary engineering and draft EIS phase of the project.

Use of Improved Highway Capacity as HOV Lanes. Some members of the OSC suggested that wherever I-70 is widened, the additional lanes should be devoted to HOV use in an effort to change behavior and move travelers toward transit. However, as indicated previously, the use of flex lanes or slow-moving vehicle lanes for HOV was not strongly supported by the CWC.

Flex Lane Geometry. Clear Creek County representatives were not in agreement with the flex lane concept suggested in the detailed project description, which called for widening 6.5 feet of travel surface both eastbound and westbound from Floyd Hill to Empire Junction, resulting in an additional 13 feet of new paved area. Representatives from Clear Creek County felt that flex lane construction should result in no additional widening. It was also noted that a single reversible lane should be investigated.

Timing of Geometric Improvements. Clear Creek County representatives went on record stating that geometric improvements should be scheduled for design and construction prior to the flex lanes.

Intermodal Transfer at Empire Junction. Another Clear Creek County concern was raised regarding the 300 parking spaces suggested for the Intermodal Transfer Center at Empire Junction.

Twin Tunnels. Clear Creek County did not support the specific MIS concept shown for mobility improvements at the twin tunnels. These concerns include potential impacts on climate conditions and wind, as well as impacts to aesthetics and bighorn sheep. (To reduce the bottleneck at the twin tunnels, the project team assumed for cost estimating purposes only that the eastbound lanes would be constructed through a cut to the south of the tunnels. This would require a significant amount of rock cut and associated impacts as indicated in the project team's environmental evaluation.) However, there is general agreement that improvements at the twin tunnels are required.

Lighting Versus Acceleration/Deceleration Lanes and Frontage Road Improvements in Eagle County. One suggestion was provided that proposed lighting at Dowd Junction to offset the need for acceleration/deceleration lanes in the vicinity of Grand Junction. The traffic projections developed by the project team suggest that the original concept is needed to avoid congestion between Vail and Eagle. These improvements would not be provided in the future if they were not supported through the preliminary engineering/draft EIS process.

Vision Strategy Reconciled with the Oversight Committee

White Papers were prepared for each of the concerns discussed above and presented to the OSC on February 11, 1998. As a result of that meeting, a reconciled Vision Strategy was developed. The disposition of each of these items follows.

Amount of Highway Widening. It was agreed that the ultimate length of highway widening in the Vision would not increase above 38 miles. The details of the approved configuration of both the flex lanes in Clear Creek County and the slow-moving vehicle-climbing lanes will be developed during the preliminary engineering/draft EIS phase. To assure continued public representation in the process, it was agreed that the Vision would include a mechanism for continued involvement of the OSC.

Operation of Capacity Improvements for HOV Lanes. This issue was also addressed in the final Vision. The following narrative was included in the Vision: Options for the management of the flex lanes shall be "*included and evaluated for their benefit in changing demand patterns and encouraging an increase in HOV usage. Such options include but are not limited to HOV designations or High Occupancy Toll (HOT) lanes.*"

Flex Lane Geometry. It was agreed that the dimensions of the flex lanes would be determined during the preliminary engineering/draft EIS phase. Clear Creek County agreed to accommodate the need to construct flex lanes within the existing I-70 footprint, which was defined as the "toe of slope." It was agreed that any impacts to private or City-owned property would be mitigated. This will allow a variety of potential designs and mitigation techniques.

Intermodal Transfer Center. It was agreed that the size of the Intermodal Transfer Center at Empire would be determined during the preliminary engineering/draft EIS phase.

Twin Tunnels. It was determined that the design for capacity improvements at the twin tunnels in Clear Creek County will be finalized during the preliminary engineering/draft EIS phase.

Lighting Versus Acceleration/Deceleration Lanes and Frontage Road Improvements in Eagle County. It was determined that improved lighting may be justified as a short-term improvement, but that it will not offset the need for the acceleration/deceleration lanes in the vicinity of Grand Junction.

High-Speed FGT Alignment. The reconciled final Vision is conceptually the same as recommended by the CWC with the exception that the definition of the High-Speed FGT element was modified. During the detailed evaluation phase, High-Speed FGT was defined as extending from West Metro Denver to Vail. Service from Vail to Glenwood Springs would be provided using conventional diesel commuter rail technology, and service from West Metro Denver to DIA was to be provided on track constructed through RTD's Guide-the-Ride Program.

The OSC decided that the Vision should assume High-Speed FGT technology from DIA to Glenwood Springs, a distance of approximately 185 miles. It was recognized that conventional commuter rail technology could be used from Vail to Glenwood Springs "as an interim solution." The addition of nearly 100 miles of High-Speed FGT for the ultimate alignment is estimated to increase the ultimate cost of the Vision by about $3 billion. This assumes a consultant's estimated average cost of approximately $30 million per mile.

A detailed description of the Vision resulting from the I-70 MIS process is presented in Section 7.

SECTION 7

Recommended Vision Strategy

The I-70 MIS Recommended Vision Strategy responds to the Project Mission collectively developed by the local public and affected stakeholders in the corridor. The Project Mission mandates the safe movement of people and goods through the use of innovative technologies, preservation of visual character, and a balance between economic development and environmental protection. The mission also states that users should pay proportionately for benefits received. There is consensus that the Vision meets the intent of this mission.

In response to the mission, the Vision incorporates futuristic thinking over a 50-year planning horizon. It minimizes the focus on highway elements and emphasizes changing travel behavior and preservation of the communal and environmental character of this unique setting while correcting existing mobility deficiencies. As such, the strategy incorporates mobility solutions that overcome steep grades, difficult construction conditions, severe weather conditions, and unique travel demand characteristics. Recognizing that conventional rail technologies do not universally address these requirements, the Vision incorporates the use of innovative fixed guideway solutions that, through the use of performance specifications, can be tailored to this special environmental setting.

The Vision incorporates:

- Transportation elements compatible with the mountain environment
- A permanent behavioral change toward mobility with more acceptance and support for transit, including the needed land use management policies to support this change
- The need to optimize the existing highway infrastructure currently in place
- A philosophy of finality: What is implemented through the MIS program represents a strategic commitment to the I-70 Mission Statement

Description of the Vision

As indicated in Figure 7.1, the Vision includes many complementing elements:

- Fixed Guideway Transit
- Transportation System Management (TSM) Build Elements
- TSM Operational Elements
- Travel Demand Management (TDM) Elements
- Aviation Elements
- Initial Bus Transit Elements
- Alternate Route Investigations
- Continued Public Review

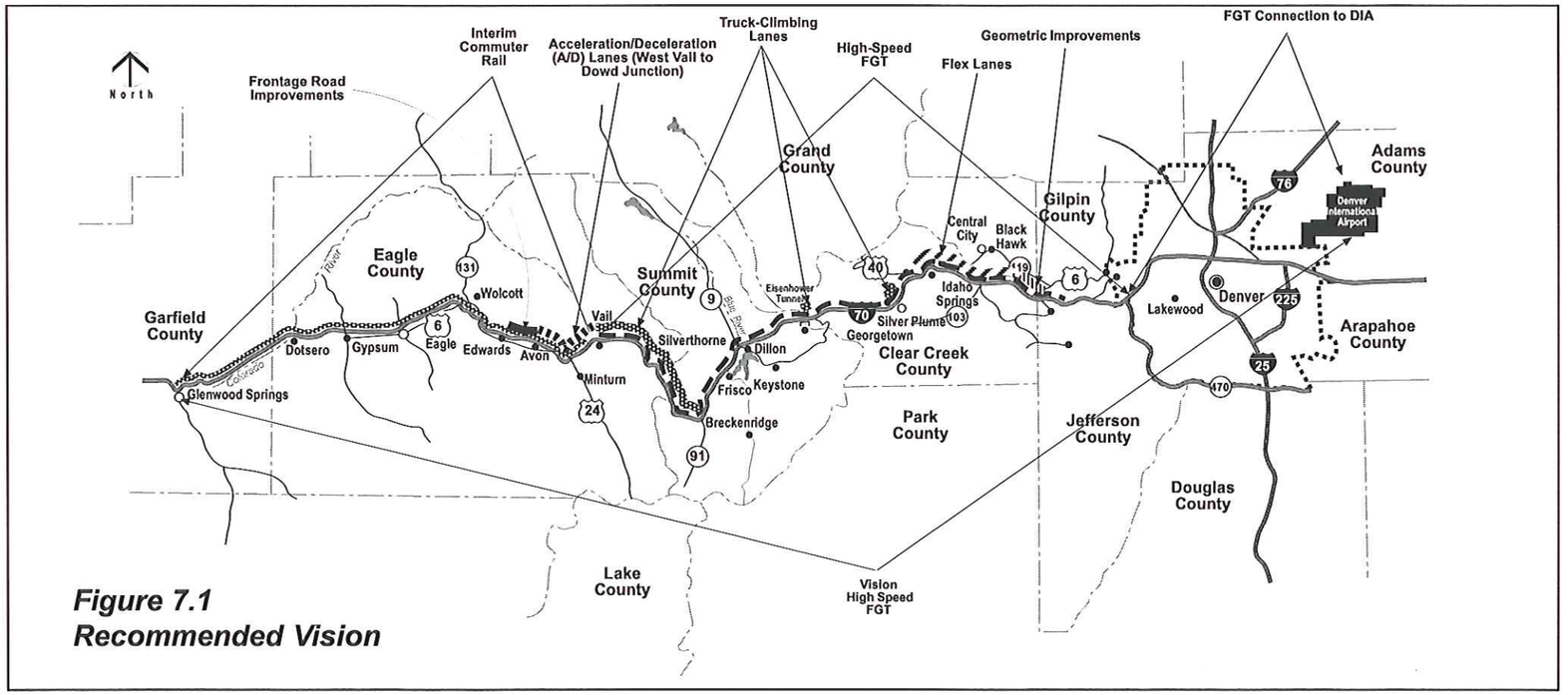


Figure 7.1
Recommended Vision

The following narrative provides a detailed description of the Vision elements as reconciled by the CWC and OSC.

Fixed Guideway Transit

High-Speed FGT

The Vision centers around the ultimate development of a 185-mile High-Speed FGT System from DIA to Glenwood Springs, recognizing that as an interim measure, conventional technology may be appropriate from Vail to Glenwood Springs. The FGT elements will be procured through a performance specification and the specific technology is not known at this time. Figure 7.2 presents an example of elevated technology.

The performance specification could include criteria for maximum speeds, average speed, speed while climbing existing grades, passenger capacity, environmental impacts, and community support. Establishing the minimum requirements will ultimately define the technology.

Emerging technologies may be able to meet or exceed this baseline in a bid for this facility. Some baseline criteria, such as speed while climbing existing grades, could be subject to adjustment in the future for reasons of cost or duration of construction.

Connections to DIA

The recommended Vision calls for a connection of the I-70 Mountain Corridor through the Denver Metro area to DIA. As discussed under "FGT Alignment Assumptions," several alternatives are being considered in other corridor studies.

Interim Commuter Rail

For the segment from Vail to Glenwood Springs, conventional diesel locomotive or diesel multiple unit (DMU) commuter rail service was assumed as an interim solution because of the presence of existing track over most of the alignment. (See Figure 7.1.) The existing flat grades are compatible with conventional diesel technology. Construction costs from Vail to Dowd Junction (about 8 miles) were estimated by the project team. Extensive rock cuts between West Vail and Dowd Junction have been assumed. Costs from Dowd Junction to Glenwood Springs were taken directly from the *Colorado Passenger Rail Study (Appendices)* (Coley/Forrest, 1997).

FGT Station Locations

DIA to Vail. Station locations will be finalized during the design and environmental approval processes. For cost estimating purposes only, it has been assumed that stations would be located in the following areas:

- West Metro Denver
- Georgetown
- Dillon/Silverthorne
- Copper Mountain
- Idaho Springs
- Loveland Ski Area
- Frisco
- Vail

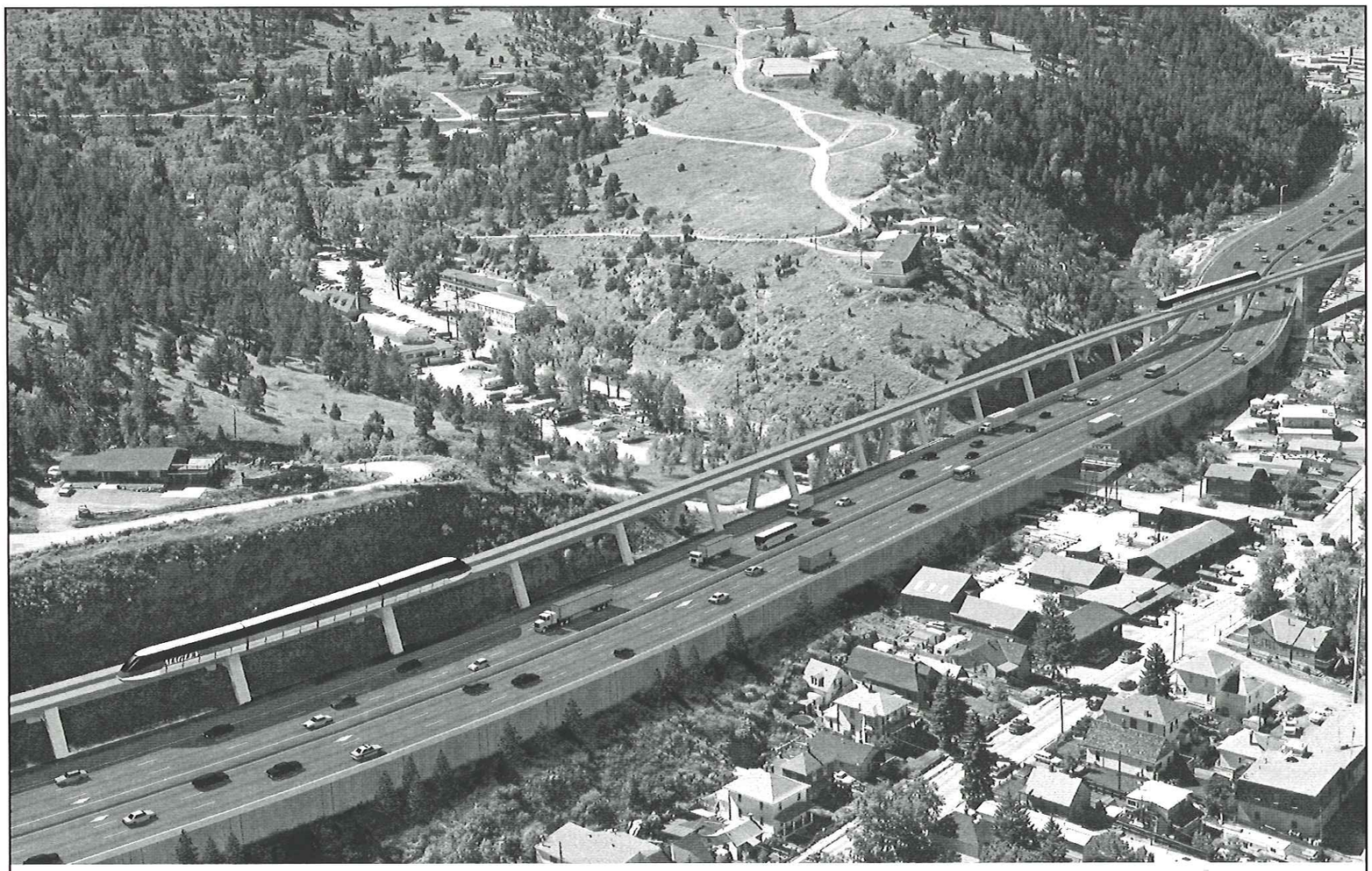


Figure 7.2
Example of Elevated Technology

In addition to the stations above, stations may also be provided at DIA and Denver Union Terminal (DUT), depending on the assumed metro service operating plan.

Vail to Glenwood Springs. The *Colorado Passenger Rail Study (Appendices)* (Coley/Forrest, 1997) identifies the following potential stations along the proposed alignment:

- Minturn
- Edwards
- Eagle
- Dotsero
- Avon
- Wolcott
- Gypsum/Eagle County Airport
- Glenwood Springs

It may be beneficial to consolidate some stations to maximize train operating speeds.

Figure 7.3 shows assumed FGT station locations.

FGT Operating Plan

Because an FGT technology has not been identified for the Vision at this time, a specific operating plan has not been identified. However, ridership estimates prepared as part of the MIS process suggest that the operating plan used for cost estimating purposes (see Section 5) is a reasonable approximation of any future operating plans. The operating plan called for hourly service Monday through Friday from DIA to Vail with supplemental service on weekends from DUT to Vail, resulting in 20-minute peak period, peak direction service on weekends. West of Vail, hourly service frequencies were assumed, with supplemental 30-minute, peak period, peak direction service between Vail and Glenwood Springs.

FGT Alignment

It is anticipated that the identified FGT technology would follow an alignment similar to the alignment used for the detailed evaluation. The detailed alignment assumptions are presented in Section 5.

TSM Build Elements

The following build elements have been identified as part of the Vision to improve the operations of the existing highway (see Figure 7.4). It is recognized that the configuration of each of these elements will be defined during subsequent design and environmental approval phases.

Intermittent Flex Lanes

Flex lanes are an Intelligent Transportation System (ITS) technique to manage a total pavement surface for variable flow conditions. The flex lane footprint would convert the existing open median to a barrier-separated median to maximize use of existing roadway width. Where the existing median is 23 feet or wider, the flex lane features can be incorporated within the current roadway width. Where medians are less than 23 feet, some incremental widening is required. Where existing medians are 8 to 10 feet, an additional 12 to 14 feet widening will be required.

The flex lanes would be configured at a 16-foot total width with access controlled through automated gating at 1-mile spacing. Flow operations would be managed through the communications of overhead variable message signs at 2-mile spacing. Access to/from existing interchanges will be provided from the outside flex lane location. The flex lane footprint will be incorporated with other TSM build features within this 14-mile stretch that includes curve smoothing from Floyd Hill to the twin tunnels and the modifications to the twin tunnels as further described below.

Geometric Improvements at Existing Bottlenecks

As part of the vision, two geometric improvement projects are planned for Clear Creek County:

- Twin Tunnel Modifications
- Curve Smoothing

First, the twin tunnels east of Idaho Springs will be modified to improve traffic flow. Multiple alternatives will be further developed and evaluated during the environmental phase of the project, and concerns relating to meteorological and related wind impacts will need to be addressed. One proposed method of improvement involves realignment of the eastbound travel lanes to the south with a 65 mph design speed. Under this approach, two new roadway structures over Clear Creek would be provided and configured to mitigate construction impacts to

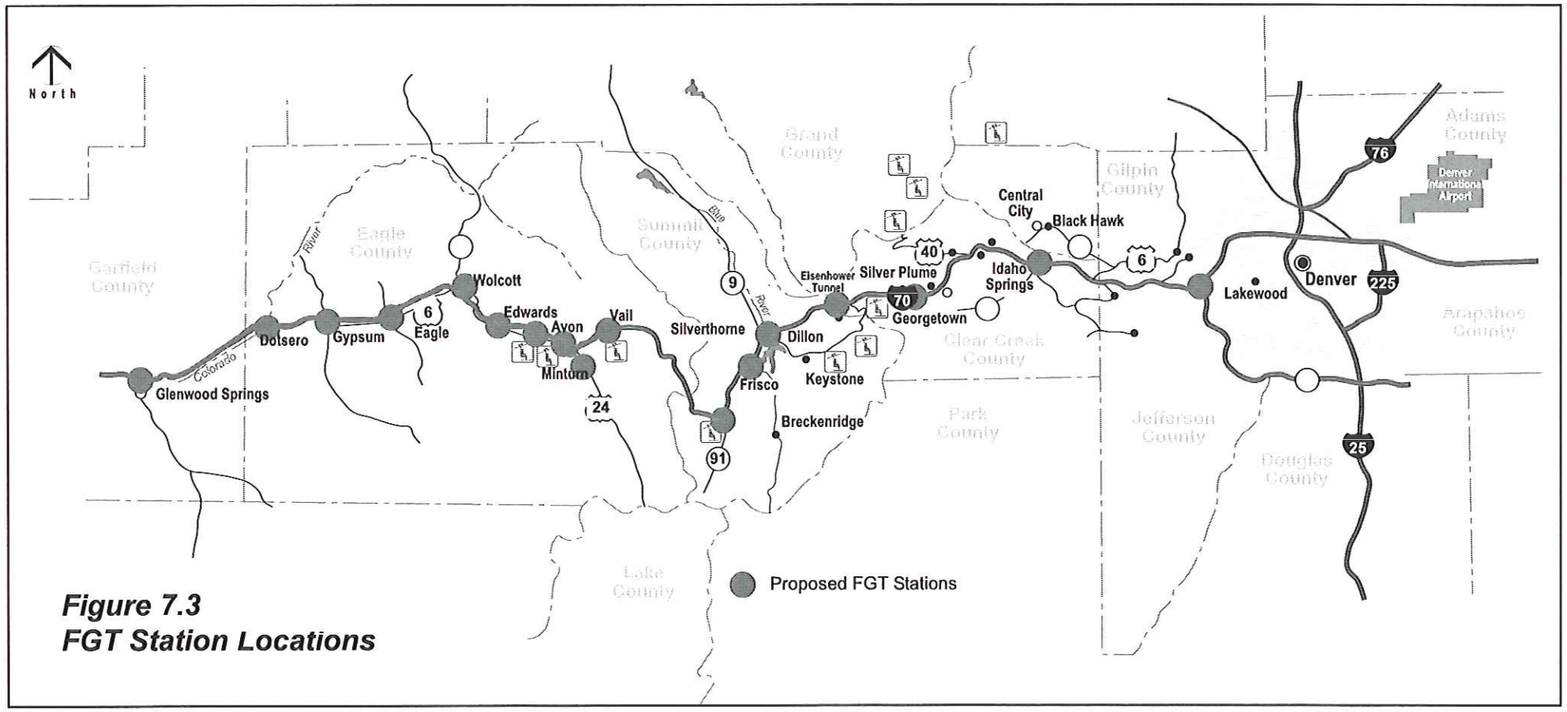


Figure 7.3
FGT Station Locations

Clear Creek. The eastbound roadway section through the rock outcropping will have the option of open cutting this segment or providing a new, wider tunnel. The westbound lanes would be left in place, and the approach grades for the existing eastbound/westbound roadways would be reconfigured to convert their use for westbound traffic only for the existing tunnels. Other possible alternatives include widening existing tunnels and/or the addition of a third bore.

Second, the existing sharp curves will receive alignment "smoothing" from the twin tunnels east to the interchange with S.H. 6 at the bottom of Floyd Hill. The typical section will be enhanced to include better drainage features, flex lane features, and will improve the current design speed from 50 to 55 mph to 60 to 65 mph. The smoothing of the curves will require significant rockcuts (up to 150 to 170 feet) in limited locations. These areas will incorporate rock fall protection techniques, such as rock bolts and other applications.

Interchange Improvements

For budgeting purposes, it is assumed that the following interchanges would be improved:

- S.H. 6/S.H. 24 (MP 171)
- West Frisco (MP 201)
- S.H. 9/U.S. 6 (MP 206)
- West Idaho Springs (MP 239)
- Hidden Valley (MP 243)
- Wheeler Junction (MP 196)
- Frisco (MP 204)
- Fall River Road (MP 238)
- 13th Avenue (MP 240)

In general, improvements proposed for these interchanges consist of lengthening the ramps for additional acceleration/deceleration (A/D) lengths and improving the merge/diverge tapers for better exit and entrance flows. Additionally, the ramp terminal intersections with the crossroads will be upgraded to reflect better traffic control measures, whether signals and/or additional signing. Enhanced intersection geometrics will provide safer and better traffic operations. Some of the interchange locations may require reconstruction, including widening or replacement of the separation structure to provide for updated crossroad improvements. It is possible that future priorities may change and that some of the recommended interchange improvements will be replaced by others.

Interchange Reconfiguration/Reconstruction

Two interchange reconfiguration/reconstruction projects are recommended:

- U.S. 40 (MP 232)
- East Idaho Springs (MP 241)

The U.S. 40 Interchange improvements plan for a new interchange with frontage road realignment. This would provide for improved directional access at a singular interchange location with I-70. The integration of the frontage road through the interchange area will be reconfigured with a grade separation to avoid the current traffic conflicts. The current eastbound and westbound off movements from I-70 will be upgraded and realigned to the west to provide better sight distance and safety/traffic operations.

The East Idaho Springs (MP 241) Interchange represents the principal access to Idaho Springs and currently integrates frontage road access directly onto the ramps. The frontage road movements will be separated from the ramp movements, and the crossroad alignment will be reconfigured across or near the existing bridge. A tight diamond ramp configuration will be provided to allow for more typical interchange movements that better meet driver expectancy. Safety and signing enhancements will be provided for the new configuration. Also, ramp metering in Idaho Springs as well as at the U.S. 40 Interchange will be evaluated as part of the eventual design.

New Interchanges

Two new interchanges are recommended:

- Eagle County Airport Access (MP 143)
- Nottingham Road (MP 168)

A new interchange is proposed for the Eagle County Airport. This airport access would provide a direct connection from I-70 to Cooley Mesa Road (entrance road to Eagle County Airport). It includes a full movement diamond with a crossroad located underneath I-70 and a connecting road that traverses the Eagle River Valley floor, recognizing environmental features and constraints. A grade-separated facility is to be provided under the existing railroad tracks to a reconfigured U.S. 6 vertical profile. The location near the railroad tracks of the connecting road has been identified as a multimodal facility to ensure access to the passenger rail service when provided in the future, as well as for shuttle vans, busing, and parking needs related to the airport and subarea transit service.

A second new interchange is recommended at Nottingham Ranch Road. This new interchange is critical to the operation of the frontage road improvements proposed for S.H. 6, as discussed below. It would include a full movement diamond with supplemental on and off ramps to S.H. 6. This interchange configuration incorporates interchange movements at two locations within 3,300 feet. The two locations would act as one interchange complex in providing access to and from the area, but would not duplicate movements due to the topography and local road systems. It provides an eastbound on ramp from S.H. 6 to I-70 that begins the eastbound A/D lanes identified in the system enhancements described below. The off ramp to S.H. 6 will provide the terminating A/D lane from the West Vail Interchange. The full movement configuration at Nottingham Ranch Road will provide for all movements to and from the east and west with a connecting road between I-70 and S.H. 6. The Nottingham Ranch Road will require new structures, and the half movement configuration at S.H. 6 would use the existing structure over the railroad, the river, and S.H. 6.

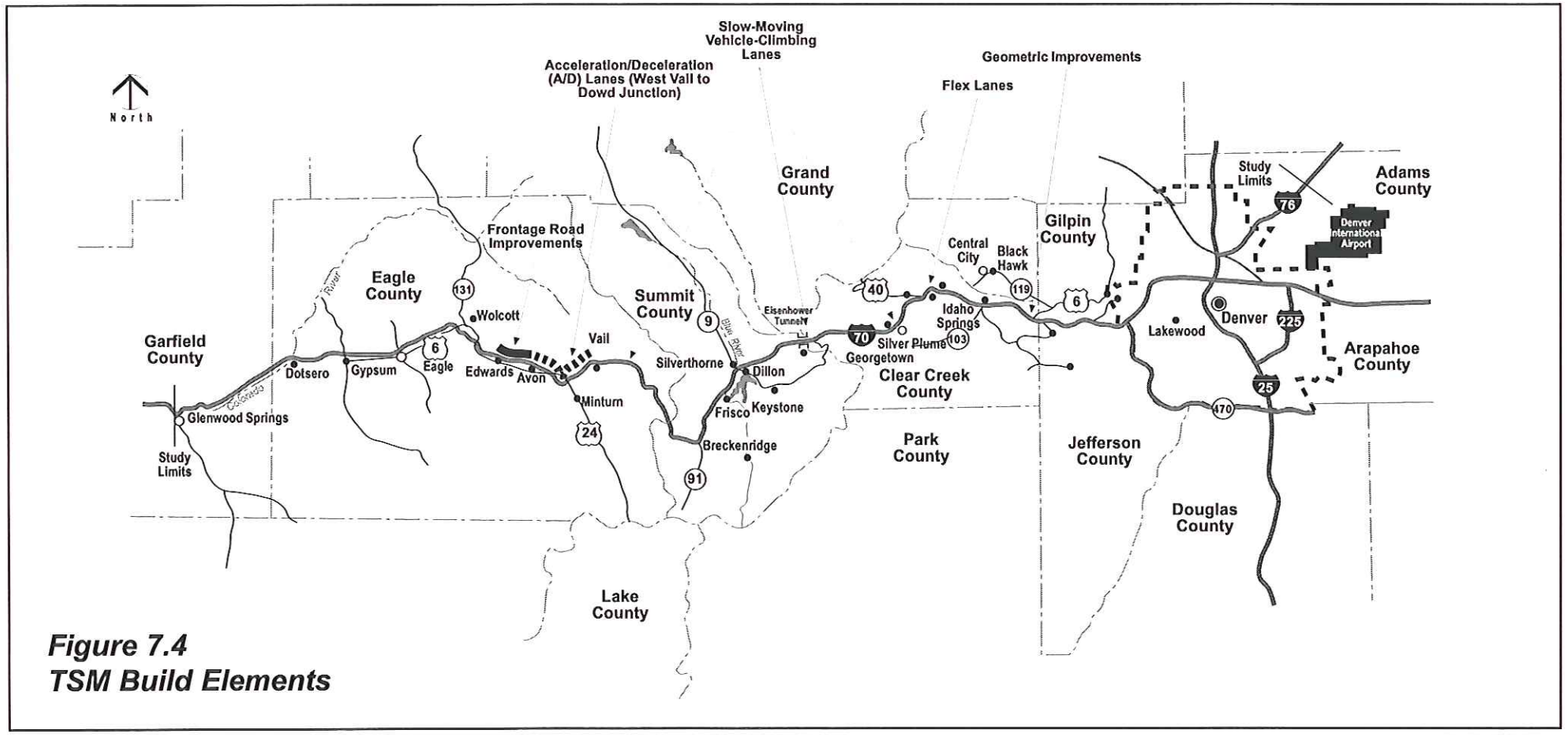


Figure 7.4
TSM Build Elements

Frontage Road Elements and System Enhancements in Eagle County

Two system enhancements are recommended in Eagle County:

- Widening of S.H. 6 from two to four lanes from Squaw Creek Road to East Avon (9 miles)
- Construction of 5 miles of continuous I-70 A/D lanes from East Avon to West Vail

As part of the Vision, U.S. 6 would be upgraded from the current two-lane roadway to incorporate four through lanes with a continuous left turn lane and appropriate speed change lanes at the major intersections. There are approximately 20 at-grade intersections that will be improved and where warranted, traffic signals would be provided.

Additionally, 5 miles of continuous I-70 A/D lanes would be constructed from East Avon to West Vail. The intent of this improvement is to remove local traffic from I-70 during congested periods, by allowing motorists to make better use of the proposed improvements to U.S. 6. This feature would provide for better operational performance on one of the more heavily traveled I-70 linkages in this area. It would incorporate a 12-foot continuous lane from MP 168 to MP 173 and would integrate the proposed on and off ramps at U.S. 6 with the existing on and off ramps of S.H. 24 (Minturn Interchange ramp movements) and would provide for the connection of the West Vail on and off ramps to begin the A/D lane improvements. The location would be tailored to "best fit" the topography, which would include a mixture of retaining walls and selected rock cuts. This section also has both game and pedestrian crossings under I-70, just west of the West Vail Interchange. The expansion of these crossing structures would be provided as part of the enhancements.

Slow-Moving Vehicle-Climbing/Descending Lanes

As part of the Vision, slow-moving vehicle-climbing lanes are recommended at three locations:

- Vail to Copper Mountain (MP 181 to MP 195)
- Eisenhower Tunnel to Herman Gulch (East Tunnel Approach) (MP 216 to MP 218)
- Silver Plume to Georgetown (Georgetown Hill) (MP 224 to MP 228)

Slow-moving vehicle-climbing/descending lanes consist of a 12-foot-wide travel lane plus a 6- or 8-foot shoulder consistent with topography. The lanes will be tailored to fit within the lateral clear zone features where practicable. Sections with narrow medians and common eastbound and westbound profiles may shift roadway platforms through the application of retaining walls to avoid excessive rock cuts, such as the Georgetown Hill section. Existing bridges will be widened to the outside to match previous environmental commitments. Provisions also need to be made to accommodate the future FGT alignment. For example, the "smart" highway widening section shown in Figure 5-3 indicates how the slow-moving lanes would still provide an interior median that could accommodate a thin-profile elevated FGT technology.

Safety Elements

The Vision includes snow slide mitigation at West Vail Pass and at Seven Sisters. These two areas consistently produce snow slides that cause winter road closures. Several options need to be evaluated during the environmental approval process, including realignments, snow sheds, slope modifications, and storage platforms.

TSM Operational Elements

The operational elements of the Vision include:

1. ITS Elements
2. More aggressive Incident Management Program
3. Trucking Operations Plan
4. Improved Maintenance Program

Intelligent Transportation System

The ITS elements include a broad range of driver information and communications programs featuring applications of advanced technology. Recent studies of potential ITS applications in the I-70 Mountain Corridor produced a listing of early action projects for implementation in the short term, including:

- **Voice/Data/Video Communications Upgrade**—for improving traffic operations centers and their related communications needs, including operating video equipment in the Eisenhower Tunnel to include data recognition.
- **Highway Advisory Radio and Variable Message Signing**—located in the Vail area to provide traveler information.
- **Automated Port of Entry**—to permit trucks with legal weights to bypass the Downieville weigh station.
- **Advanced Public Transportation System in Summit County**—serving shuttle and transfer needs for travelers.
- **Incident Investigation Sites**—to be developed along I-70 to provide safe refuge for disabled vehicles.
- **Automated Reversible Lane Program**—to facilitate reversible operations in the Eisenhower Tunnel.
- **Mobile Emission Testing Stations**—using remote sensing to alert owners of excessive emissions from their vehicles.
- **Multimodal Transfer Center at the Hogback**—to provide additional traveler amenities and advanced information service.
- **Corridor-Wide Call Box System**—for motorist communication needs.

- **High-Capacity Data Transmission Links**—using fiber optic cable to provide connections among rural communities.
- **Hot-Spot Courtesy Patrols**—using private-sector service assistance during peak travel periods.
- **Advanced Technology Roadway Delineation**—to provide lighted indications of the pavement edge at hazardous locations.
- **Corridor Road Show**—to describe the I-70 ITS technology to highway users.
- **Public Acceptance Program**—to promote an improved interchange of ideas between CDOT and the traveling public.
- **Legislative/Organizational Change**—to identify and amend legal barriers to ITS implementation.
- **Ramp Metering**—to help reduce the impact of peak traffic surges at the U.S. 40 Interchange and to limit the diversion of traffic through Idaho Springs.

Incident Management

The following additional incident management elements beyond those that are part of the ITS element have been identified:

- Install remote video surveillance cameras, for improved incident detection, at the twin tunnels, Floyd Hill, Dowd Junction, and Vail Pass. The real-time video information could be routed to traffic control centers, to motorist information centers, or over the Internet.
- Develop a regional incident management plan, identifying responsibilities among courtesy patrols, emergency service tow operators, and police/fire units.
- Outfit vehicles as probes in the traffic stream to provide real-time speed and delay estimates.
- Test and evaluate MAYDAY operations for in-vehicle signaling from stranded disabled vehicles.
- Install remote detection of ice/wind/avalanche conditions to initiate warnings or road closures.
- Publicize MOVE-IT/REMOVE-IT laws along the I-70 Mountain Corridor to improve clearance of disabled vehicles.
- Expand highway advisory radio and variable-message signs to additional areas of the corridor, including Frisco/Dillon/Silverthorne; Georgetown/Empire Junction; and Floyd Hill.
- Implement an Emergency Services District Program for the establishment and funding of local programs.

Trucking Operations

The recommended trucking operations elements include the following:

- Expand chain-up areas on the approaches and descents at Vail Pass and the Eisenhower Tunnel. A total of six new and two expanded areas would be provided, each about 2,000 feet long.
- Expand truck emergency operations with additional tow and push capability, including the purchase of additional "Mountain Assistance Trucks."
- Install Georgetown gusty wind sensors and variable message signs to alert truck and recreational vehicles of wind conditions in the Georgetown area and other areas deemed appropriate.
- Require use of chains on trucks in icy or snowy conditions. Allow private companies at a site (or sites) along the corridor to charge a fee for the installation and removal of chains.
- Expand automated port-of-entry and weigh-in-motion programs to reduce delays for trucking. Develop communication links with adjacent states to facilitate unimpeded truck passage.

Other aspects of the plan would provide information to truckers regarding approaching road conditions. This feature will give advance warning of congestion or closures, allowing trucks to plan their stops or divert to other routes.

Slow-Moving Vehicles

Establish minimum left lane speed limits to separate slow-moving traffic.

Improved Maintenance

The following types of actions would improve roadway maintenance in the I-70 Mountain Corridor:

- Improve pavement marking materials, and increase their frequency of renewal.
- Install advanced pavement delineation devices, lighting at selected locations, and glare screens on median barriers.
- Improve snow removal practices.
- Install grooved pavements for improved traction.
- Improve signing and reflectorization.

TDM Elements

Techniques under this category include:

- General measures to change travel behavior
- Additional Intermodal Transfer Centers and park-n-Ride lots
- Parking Management Program
- Access management

Measures to Change Travel Behavior

The following trip reduction techniques are included among these measures:

- Providing information and marketing regarding shuttle and transit services, including kiosks at DIA and other Front Range sites.
- Developing carpool matching services for winter travelers and vanpool services for Front Range and Vail/Avon commuters.
- Providing preferential parking for carpools carrying three or more persons at winter resort areas.
- Subsidizing transit passes for travelers served by local transit systems.

Intermodal Transfer Centers/park-n-Ride Lots

Intermodal transfer facilities are planned at 10 locations throughout the corridor. The sites would serve as park-n-Ride lots to facilitate changes of mode and also could include shelters, waiting rooms, restrooms, bike storage, and other traveler services. Sites would be selected to ultimately be converted to intermountain bus and/or FGT stations.

The intermodal centers would serve transfer functions among private vehicles, shuttle vans, and buses. They would also facilitate carpool formation and would support commuter trip reduction in certain portions of the corridor. Although there may be less use of these facilities in the summer, some commuter and recreational travellers could be expected to make use of these facilities.

Transfer center locations and the proposed number of park-n-Ride spaces used as a basis for estimating costs are listed below:

- Cold Spring—Expand existing park-n-Ride lot to add 200 spaces
- West Metro Denver—Locate in vicinity of I-70/U.S. 6/C-470
- Idaho Springs—Develop new park-n-Ride lot with 50 spaces
- Empire Junction/Georgetown—Develop new facility with 300 spaces
- Silverthorne/Dillon—Develop new park-n-Ride lot with 150 spaces
- Frisco—Expand existing facility to add 100 spaces
- Vail—Develop new facility with 200 spaces
- Avon—Develop new facility with 300 spaces
- Eagle—Develop new facility with 50 spaces
- Eagle County Regional Airport—Develop new park-n-Ride lot with 100 spaces
- Glenwood Springs—Develop new park-n-Ride lot with 150 spaces

Parking Management

Parking management consists of actions to control the number, location, and pricing of parking spaces. By decreasing the supply or increasing the price of parking, parking will be in higher demand, and growth in the overall level of driving may be reduced. These techniques have found wide application in dense urban areas, particularly for commuter trip reduction at large employment centers. Similar techniques are used for event parking at sports arenas and concert venues.

To address weekend congestion along the I-70 Mountain Corridor, parking management plans would be oriented to large traffic generators, including summer and winter resorts, National Forest areas, and other

recreational uses. Free parking at these sites reinforces the tendency for visitors to drive. If travelers encounter parking charges as out-of-pocket expenses, they are more likely to consider alternative modes of travel. Obviously, programs and services to support and market parking options must be in place. In this sense, parking management strategies are intended to complement other travel demand management measures forming a coordinated approach to reducing the growth of trip making in private automobiles.

At some resort areas, parking availability is already limited, and excess demand might easily be shifted to proposed park-n-Ride lots using a shuttle operation. Such a shift could be accomplished with a small fee for onsite parking.

Some resort operators might view parking charges as a deterrent to their patronage base, particularly if they currently have excess parking supply. Parking fees are likely to be absorbed into lift ticket prices negating the effect of an additional out-of-pocket expense. In these cases, parking management might consist only of preferential parking for carpools of three or more persons, and improved shuttle access and waiting areas.

Policy measures adopted at the local level could be used to discourage or prohibit parking expansion. In the long term, these policies could lead to the imposition of parking fees by limiting the supply of parking.

Resort areas could reclaim parking spaces currently devoted to employee parking by charging employees for parking. This would stimulate ride sharing and transit use among the employee population.

The National Forest Service has implemented parking charges at popular day-use trailheads in other parts of the country. These programs can increase vehicle occupancies and reduce parking demand. Overall, parking management programs may be less effective in addressing summer congestion because of the wide diversity of destinations and greater number of out-of-state motorists.

Access Management

Each of the interchange elements on I-70 will include an access management plan for the intersecting roadway in the vicinity of the ramp intersections.

Access management is the control and regulation of the spacing and design of highway interchanges, medians, median openings, intersections, traffic signals, and driveways. The principles of access management are to limit the number of conflict points, separate the conflict points, and remove turning vehicles from the through lanes.

The benefits of access management are reduction of access-related accidents, increased traffic capacity, and balance between the needs of landowners and the traveling public. A direct correlation exists between the number of access points per mile of road and the number of accidents along that mile of road. Fewer access points mean fewer access-related accidents.

Access management reduces accidents and increases capacity of the through lanes by separating turning vehicles from through traffic. This can be accomplished with construction of the following alternatives:

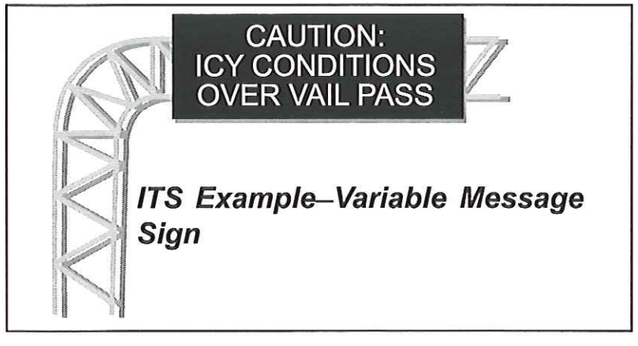
- Auxiliary lanes for right or left turns
- Raised medians to eliminate left turns
- Installation of traffic signals at high volume intersections
- Consolidated access points
- Alternate access roads such as frontage roads
- Curbs to channelize turns.

Although these measures improve safety and capacity, they also restrict access to adjacent property. Striking a balance between the needs of the adjacent properties and those of the traveling public produces the best access plan for an area.

Aviation Elements

The aviation elements of the Vision call for continuous improvement to existing facilities. Five commercial airports are identified in the vicinity of the I-70 Mountain Corridor. These are located at Aspen, Eagle, Grand Junction, Montrose, and Steamboat Springs/Hayden. (See Figure 7.5.) These airports have historically served the majority of air travel for residents of the Western Slope and combined to provide access to more than 1 million air passengers in 1995. Additionally, facilities at Garfield County Airport, Gunnison County Airport, and Kremmling-McElroy Field have or could support passenger and air cargo service to meet the additional need of air travelers in the I-70 Mountain Corridor.

Improving existing facilities at these airports assumes incremental improvements to these aviation facilities. No major capital projects such as a new runway or a new terminal building are currently needed. Each airport has runway capacity already existing to accommodate year 2015 annual aircraft operations forecasts and, depending on aircraft fleet mix and demand, to provide service beyond that time. Runway lengthening at Eagle County Regional Airport would facilitate operations by some larger aircraft that are currently limited to flying there during certain



ITS Example–Variable Message Sign

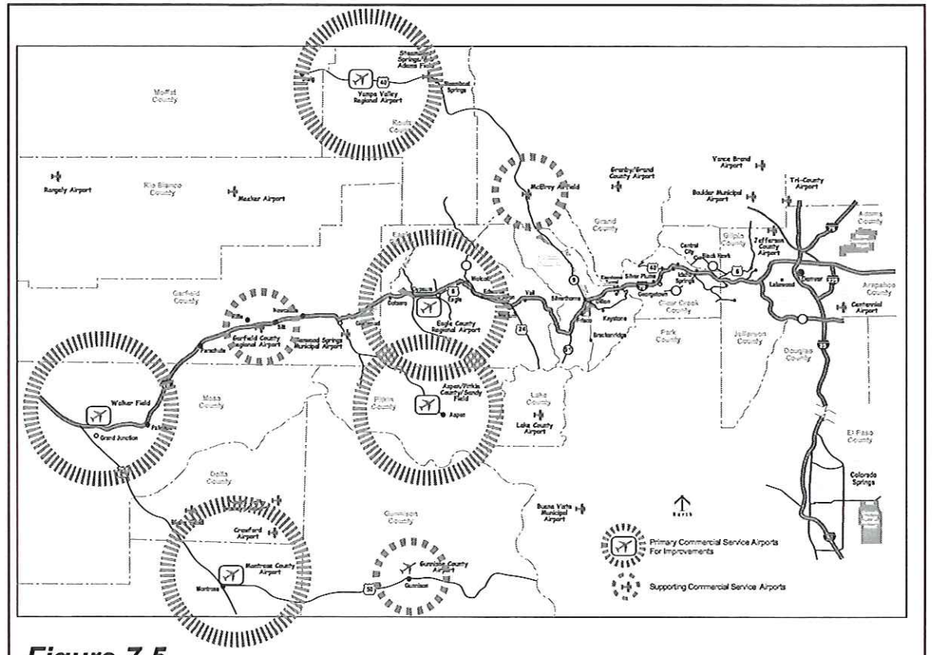


Figure 7.5
Commercial Airports with Direct Impact in I-70 Mountain Corridor

times of the year. All of the airports have indicated that apron expansion for aircraft parking and loading is needed, and various taxiway elements are required at all of these facilities.

Terminal area expansions are needed in the future at the Eagle County and Yampa Valley Regional airports. Access and service road elements for Aspen-Pitkin County Airport, Eagle County Regional Airport, Grand Junction-Walker Field, and the Yampa Valley Regional Airport at Hayden have also been identified.

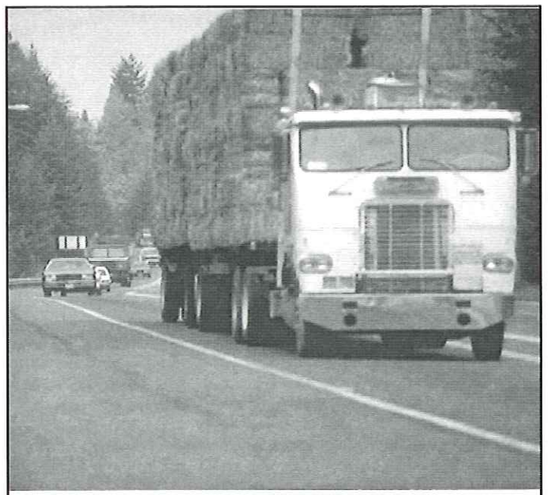
In addition, there are various needs for equipment for snow removal and firefighting, fencing, and taxiway connectors. The total improvement cost for the five airports has been carried forward from the NB strategy and is estimated at $123 million. A large portion of this amount could come from FAA funding sources.

Specifically, the following aviation service elements are proposed:

1. Preservation and enhancement of existing airports' aviation activity is important, whether for general aviation or commercial aviation purposes, since these facilities are the most likely to absorb future growth as compared to the likelihood of developing entirely new airports.
2. Projects and programs that improve surface access to airports should be implemented as a means of facilitating air travel. These measures

include upgrading the interchange at Eagle County Airport, additional winter maintenance in the vicinity of airports, road relocation, and improving signage to reinforce driver awareness of airports.

3. Adequate funding should be made accessible by the state to assist in completing meaningful projects at airports. Use of state money for FAA matching grants to obtain 90 percent federal funding for the 10 percent share of state funds should also be pursued.
4. The existing second tier airports in the I-70 corridor, such as Garfield County Airport, also have the prospect of meeting long-term needs for aviation out to 50 or more years, when additional new airport sites may be impractical because of site area limitations or environmental reasons. These airports provide potential for long-term solutions to future aviation needs.



Trucking Operations on I-70

Initial Bus Transit Elements

Initial bus transit elements are being provided as a first step to affect a behavioral change in, and mature the market for, future FGT transit. It is probable that the publicly funded initial bus transit elements would be phased out when the FGT system is in service and replaced with a bus feeder system.

Four new or enhanced services are provided as elements of the initial bus transit system:

1. Intermountain Bus Service
2. Skier Express Service
3. Expanded Local Bus Service
4. Private Shuttle Service

Intermountain Bus Service

A key element is the expansion of intermountain bus service. (See Figure 7.6.) The intermountain bus service would begin in downtown Denver and would include a stop at RTD's Cold Spring park-n-Ride to provide passengers from the intermountain bus line with access to numerous RTD bus routes and eventually the West Corridor LRT line. Buses would operate in general traffic lanes on U.S. 6 and I-70 to Glenwood Springs, with stops at the following locations:

- Idaho Springs
- Vail
- Glenwood Springs
- Silverthorne/Dillon
- Eagle
- Frisco
- Avon

The intermountain bus service could be replaced by the FGT line upon full implementation of the FGT system.

Skier Express Service

Another integral part of the initial bus transit elements is direct bus service from Denver area park-n-Rides to mountain ski resorts. In the winter of 1997-98, CDOT sponsored SkiXpress service from Heritage Square and Highlands Ranch park-n-Rides to Vail, Keystone, Loveland, Winter Park/Silver Creek (both served by one route), and Copper Mountain. One trip was offered in the morning to the resorts. Nine buses were required for SkiXpress service. The resorts contracted the service to Powder River, a private transportation company.

The recommended future Skier Express service is similar to the SkiXpress service. This package assumes expanded service from Denver with pick-up/drop-off from three Denver locations—Stapleton, a West Metro Denver location (e.g., Ward Road park-n-Ride or Heritage Square), and Highlands Ranch park-n-Ride. Service would be offered to the resorts currently served by the SkiXpress program—Vail, Keystone, Loveland, Winter Park/Silver Creek, and Copper Mountain. In addition, service would be provided to Breckenridge and Loveland Ski Areas. The proposed operating plan includes two morning trips from each location. This results in a total of 12 round trips from each location (36 total round trips). Service would be offered only on weekends and on weekday holidays. The fleet requirement is 43 buses (includes a 20 percent spare ratio).

Subsidies may be desirable to encourage ridership on the Skier Express service. For example, ski tickets could be discounted for all bus passengers by an amount equivalent to the cost of a round-trip bus ticket. A public (CDOT)/private (ski resorts) partnership could sponsor the subsidies.

Upon full implementation of the FGT system, Skier Express service to/from Denver would be replaced by shuttle ski service between the FGT line and ski resorts.

Expanded Local Bus Service

The initial transit element also includes enhancements to existing local bus systems. These service elements are described by county.

Jefferson County. RTD provides service to Jefferson County. As previously described, the expanded intermountain line will provide

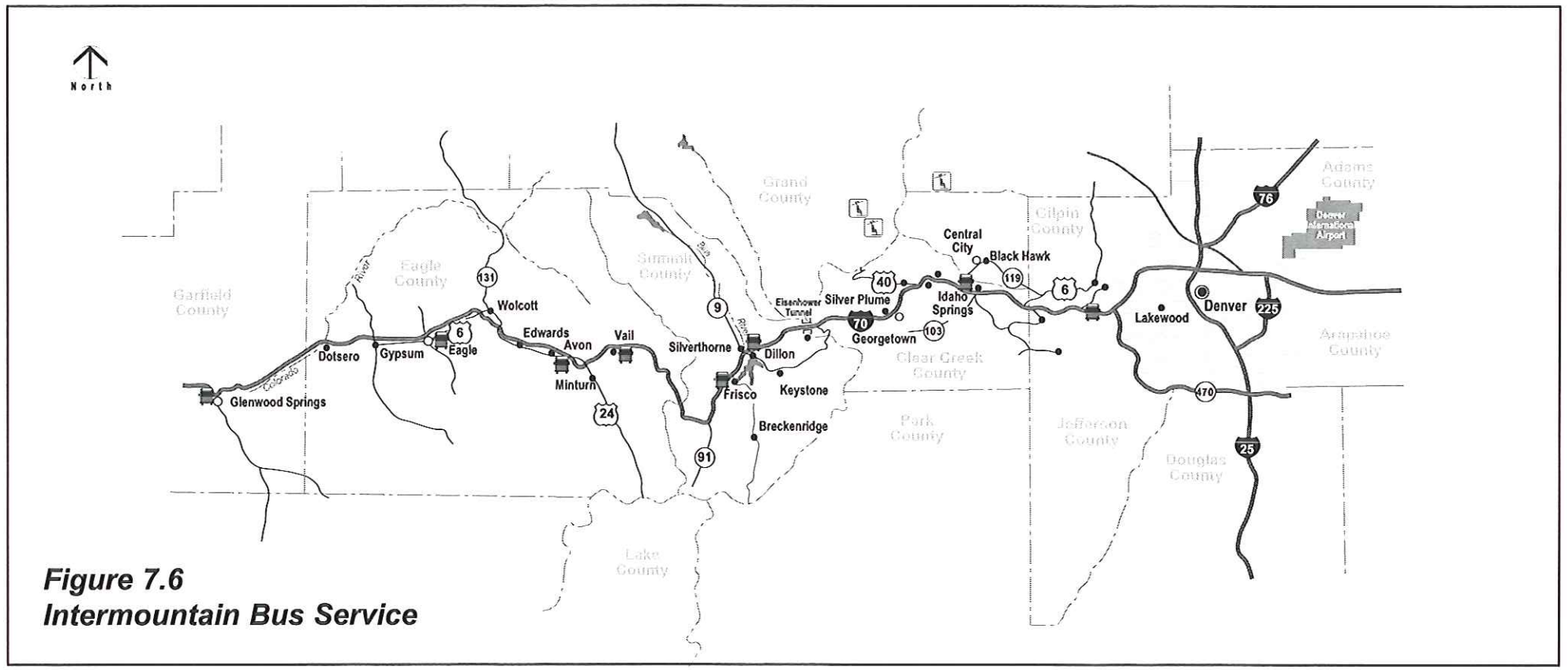


Figure 7.6
Intermountain Bus Service

service to the Cold Spring park-n-Ride. This provides transfer opportunities to numerous RTD local, express, and regional routes, and will eventually provide a transfer opportunity to the proposed West Corridor LRT line.

Clear Creek County. Currently, Clear Creek County does not provide public transportation. As part of the Vision, a new public transit service is provided for the county. The following new local service bus routes are assumed:

- Summer Routes
  - Route 1—Echo Lake-Idaho Springs-Georgetown (60-minute service frequency)
  - Route 2—Idaho Springs-Georgetown-Silver Plume (60-minute service frequency)
  - Route 3—Idaho Springs-Empire (60-minute service frequency)
- Winter Routes
  - Route 1—Echo Lake-Idaho Springs-Georgetown (60-minute service frequency)
  - Route 2—Idaho Springs-Georgetown-Silver Plume (45-minute service frequency)
  - Route 3—Idaho Springs-Empire-Winter Park (45-minute service frequency)

The proposed intermountain bus line also includes a stop at Idaho Springs. Transfers between the intermountain bus line and the local Clear Creek County bus system would be accommodated at a new Idaho Springs Transit Center. Thus, residents in Clear Creek County will have access to the Denver Metro area and to communities west of the Continental Divide via the new intermountain bus line.

Summit County. Summit Stage provides year-round public transit service in Summit County. There are three components to Summit Stage service: town-to-town, skier express, and residential. The transit element of the Vision includes implementation of Summit Stage's 1994 Transportation Development Plan (TDP). Specifically, this plan calls for the following service elements:

- Service frequencies for the four town-to-town routes are improved from 60 minutes to 30 minutes in the winter season. The Vision also includes 30-minute service frequencies in the summer season.
- All residential services have improved service frequencies ranging between 30 and 45 minutes.
- The Skier Express service provides 45-minute service frequencies during the morning and afternoon peak use hours during the winter season.
- New services are extended to Warrior's Mask (outside of Breckenridge) and to park-n-Ride service areas north on S.H. 9 and south on S.H. 9 in the Blue River area.

In addition to the changes described in the TDP (Summit Stage, 1994), bus route schedules should be modified to the extent possible to minimize bus transfer times between the new intermountain bus lines and Summit Stage routes at the Frisco Transit Center and the Silverthorne/Dillon stop.

RTD park-n-Ride

Eagle County. Public transit service within Eagle County includes the Town of Vail Transit, Avon/Beaver Creek Transit, and ECRTA. The Town of Vail Transit provides service via several routes that meet at the Vail Transportation Center. The Vision includes service elements identified in the Eagle County TDP (Felsburg Holt & Ullevig, 1997). Specifically, the TDP calls for service level elements on the East Vail, West Vail, and Lionsridge/Sandstone routes. These service elements result in a need for four additional buses. All Town of Vail routes would connect to the proposed intermountain bus line at the Vail Transportation Center.

Garfield County. The proposed intermountain bus line begins/ends service at the City of Glenwood Springs. Roaring Fork Transit Agency (RFTA) provides service in Glenwood Springs, with transit service connecting Glenwood Springs with Aspen. The RFTA routes would connect to the proposed intermountain bus line downtown Glenwood Springs. No changes are proposed to RFTA bus routes beyond what is proposed in the RFTA TDP.

Private Shuttle Service

Finally, initial private shuttle service is considered an essential part of the Vision transit element. Currently, private carriers provide shuttle van/bus service from DIA and Eagle County Airport to the mountain destinations. The two primary carriers are Resort Express and Colorado Mountain Express. Fares from DIA are typically $78 round trip to Summit County resorts and $108 round trip to Eagle County resorts. Fares from Eagle County Airport to Vail/Beaver Creek are typically $58 round trip.

Existing private shuttle fares are competitive with automobile rental prices for parties of one or two persons. However, rental cars usually have a cost advantage over the private shuttle service for parties of three to four or more persons. The transit element assumes expanded private shuttle service from DIA and Eagle County Airport to the mountain destinations. Private shuttle service should be included as part of the overall marketing efforts of mountain resorts. Shuttle van fares could be included as part of a trip's overall package price. Fare subsidies may be required to draw a significant number of person trips from rental cars to the mountain private transit carriers.

Upon full implementation of the FGT system, the private shuttle market is expected to change from long-distance trips to/from DIA and Eagle County Airport to short-distance trips to/from nearby rail stations.

Upon full implementation of the FGT system, local bus service would be restructured in all corridor counties. Local route service will be enhanced with feeder route service to/from nearby rail stations. Bus schedules will be coordinated to provide times that meet with the FGT schedule.

Bicycle and Pedestrian Trails

Several bike paths exist along the I-70 Corridor and in the surrounding mountain communities. However, there is not a contiguous bike path along the length of the I-70 corridor. A complete bicycle/pedestrian facility throughout the I-70 corridor is a common goal shared by all of the counties in the study area. As part of the I-70 transportation improvements, completion and enhancement of this system incorporating approximately 75 miles of new trails is suggested by the TSM build program.

Alternate Routes

Alternate routes were evaluated at the screening phase of the MIS. Further consideration of the alternate routes alternatives was not recommended by the Citizens' Workshop Committee because the communities affected by the alternate routes had not been involved in the I-70 Mountain Corridor MIS workshop process. However, it was agreed that as part of the Vision that the alternate routes analysis conducted for the screening-level evaluation be forwarded to the statewide planning process.

Continued Public Review

The Vision includes the maintenance of a group with similar representation as the existing Oversight Committee. This group would be convened at key steps in existing public planning processes or, at a minimum, once per year. Joint meetings of the Intermountain Transportation Planning Region and the Denver Regional Council of Governments will be held annually to review the I-70 Mountain Corridor program. Further, an aggressive outreach program will be conducted concurrent with each environmental document preparation. Concurrent with the 20-Year Statewide Planning Process, a corridor workshop will be held.

Consequences of Implementing the Vision

Environmental Impacts

Anticipated environmental impacts include the following:

- Disturbance of approximately 1,000 to 1,300 acres during construction from West Denver to Glenwood Springs. Of this, approximately 70 percent would be associated with the FGT and 30 percent for the TSM build improvements.
- Construction of geometric improvements in Clear Creek County would involve rock cuts and visual impacts from Floyd Hill to the twin tunnels, a distance of about 2.5 miles.
- Construction of flex lanes would impact about 33 acres, and slow-moving vehicle lanes would impact about 60 acres, much of which is in sensitive environment.
- Construction of highway improvements between West Vail and Dowd Junction would require rock cuts to the north of I-70, immediately east of Dowd Junction.
- Frontage road construction in Eagle County would require approximately 40 acres.
- TSM Interchange improvements may impact as much as 60 acres, and intermodal transfer stations as much as 50 acres.
- Construction of new bicycle and pedestrian trails may affect up to 110 acres.
- It is anticipated that the potential impact to wildlife and habitat would be minimal due to the fact that the majority of construction will occur in the I-70 median or in other areas contained within the CDOT right-of-way. However, construction of a High-Speed FGT through Glenwood Canyon would be extremely difficult.
- Construction through approximately 14 miles of T&E species habitat over Vail Pass for the implementation of slow-moving vehicle lanes.
- Potential loss of 1 to 5 acres of wetlands during construction for bridge widening required for both the FGT and highway improvements. Wetlands will need to be delineated during the environmental clearance process.
- Potential impacts on water quality due to construction of both guideways and highway improvements proximate to riparian areas along I-70.
- Compared to the non-FGT alternatives, there will be a potential increase in corridor energy consumption due to the operation of the FGT.
- Potential secondary impacts from loss and fragmentation of wildlife habitat due to the increased development resulting from improvements in mobility between Colorado's populated Front Range and the mountain communities.

Community Impacts

Anticipated community impacts include the following:

- The Vision best supports the community values criteria voiced by the workshop participants throughout the planning process.
- The construction of an elevated FGT will impact the visual character of the I-70 corridor. The development of the stations and the intensified land use surrounding the stations may impact the rural visual character of the corridor.
- Implementation of the Vision is anticipated to represent a significant strain on employee housing during the peak years of construction. Delays during construction will represent significant inconvenience to the travelers on I-70. This will persist throughout the construction of the recommended Vision.
- There is a potential for the need to acquire private properties for the construction of the frontage roads in Eagle County and for the development of Intermodal Transfer Centers and FGT stations.
- Construction of the FGT and highway elements will require clearances for construction through historic districts in Idaho Springs and historic landmark districts in Georgetown and Silver Plume.
- Potential for indirect and secondary impacts resulting from increased development throughout the corridor due to improved mobility between Colorado's populated Front Range and the mountain communities. Construction of the FGT is anticipated to increase the number of commuters relocating to the mountain communities. This will serve to reduce the rural character of the corridor.

Mobility Impacts

Anticipated mobility impacts include the following:

- FGT and bus service add mobility options in the I-70 corridor.
- Reduction of 58 million vehicle miles traveled (VMT) per year compared to the highway alternative.
- Reduction of 2020 thirtieth highest hour (an estimated volume used by design engineers as a basis for highway designs) highway travel times between Vail and C-470 from 3 hours, 5 minutes for the NB Strategy to 2 hours with the Vision Strategy. Further, travel times on the FGT system will be consistent and reliable regardless of weather or time.
- In 2020, the hours of highway congestion will be reduced from 700 annually with the NB Strategy to 500 hours at the Eisenhower Tunnel and from 700 to 100 hours at Idaho Springs.
- Increase in person-carrying capacity from 1,200 to 4,685 persons per hour per direction depending on the location in the corridor (the higher value occurs where highway capacity is increased, approximately 38 miles in the corridor).
- Increase in transit ridership of approximately 1.7 million riders per year.
- Reduction in highway crash potential.

Financial Impacts

Anticipated financial impacts include the following:

- Currently identified and anticipated funds total approximately $1.28 billion for the I-70 Mountain Corridor. As shown in Table 7-1, this compares to an estimated project cost of about $8.4 billion, resulting in a project shortfall of about $7.1 billion (1997 dollars).
- Project shortfalls will be $2 to $3 billion less if the use of conventional rail is assumed from DIA to West Metro Denver and from West Vail to Glenwood Springs. (The higher costs result from assuming that a high-speed technology is ultimately constructed in these segments.)
- Also, costs will be about $3 billion less if CIFGA's assumptions are correct and the FGT costs $20 per mile versus the consultant's cost estimate of approximately $40 per mile. Financial shortfalls under these circumstances then are about $4 billion (i.e., $7 billion – $3 billion = $4 billion).
- Need for voter approval to initiate both new primary and secondary revenue sources including consideration of tolling, increases in state sales, income and gas taxes, as well as increases in local sales and property taxes. Taxes on rental cars, hotel rooms, ski tickets, and recreational equipment may also need to be considered.
- Need for legislative approval to use HUTF monies for transit and to provide CDOT with bonding authority.
- Recognition that travel on the I-70 corridor will probably become more costly in the future.

I-70 Mountain View

Consequences of Implementing the Vision

Environmental Impacts

Anticipated environmental impacts include the following:

- Disturbance of approximately 1,000 to 1,300 acres during construction from West Denver to Glenwood Springs. Of this, approximately 70 percent would be associated with the FGT and 30 percent for the TSM build improvements.
- Construction of geometric improvements in Clear Creek County would involve rock cuts and visual impacts from Floyd Hill to the twin tunnels, a distance of about 2.5 miles.
- Construction of flex lanes would impact about 33 acres, and slow-moving vehicle lanes would impact about 60 acres, much of which is in sensitive environment.
- Construction of highway improvements between West Vail and Dowd Junction would require rock cuts to the north of I-70, immediately east of Dowd Junction.
- Frontage road construction in Eagle County would require approximately 40 acres.
- TSM Interchange improvements may impact as much as 60 acres, and intermodal transfer stations as much as 50 acres.
- Construction of new bicycle and pedestrian trails may affect up to 110 acres.
- It is anticipated that the potential impact to wildlife and habitat would be minimal due to the fact that the majority of construction will occur in the I-70 median or in other areas contained within the CDOT right-of-way. However, construction of a High-Speed FGT through Glenwood Canyon would be extremely difficult.
- Construction through approximately 14 miles of T&E species habitat over Vail Pass for the implementation of slow-moving vehicle lanes.
- Potential loss of 1 to 5 acres of wetlands during construction for bridge widening required for both the FGT and highway improvements. Wetlands will need to be delineated during the environmental clearance process.
- Potential impacts on water quality due to construction of both guideways and highway improvements proximate to riparian areas along I-70.
- Compared to the non-FGT alternatives, there will be a potential increase in corridor energy consumption due to the operation of the FGT.
- Potential secondary impacts from loss and fragmentation of wildlife habitat due to the increased development resulting from improvements in mobility between Colorado's populated Front Range and the mountain communities.

Community Impacts

Anticipated community impacts include the following:

- The Vision best supports the community values criteria voiced by the workshop participants throughout the planning process.
- The construction of an elevated FGT will impact the visual character of the I-70 corridor. The development of the stations and the intensified land use surrounding the stations may impact the rural visual character of the corridor.
- Implementation of the Vision is anticipated to represent a significant strain on employee housing during the peak years of construction. Delays during construction will represent significant inconvenience to the travelers on I-70. This will persist throughout the construction of the recommended Vision.
- There is a potential for the need to acquire private properties for the construction of the frontage roads in Eagle County and for the development of Intermodal Transfer Centers and FGT stations.
- Construction of the FGT and highway elements will require clearances for construction through historic districts in Idaho Springs and historic landmark districts in Georgetown and Silver Plume.
- Potential for indirect and secondary impacts resulting from increased development throughout the corridor due to improved mobility between Colorado's populated Front Range and the mountain communities. Construction of the FGT is anticipated to increase the number of commuters relocating to the mountain communities. This will serve to reduce the rural character of the corridor.

Mobility Impacts

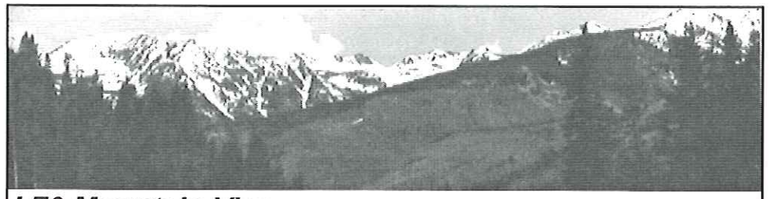
Anticipated mobility impacts include the following:

- FGT and bus service add mobility options in the I-70 corridor.
- Reduction of 58 million vehicle miles traveled (VMT) per year compared to the highway alternative.
- Reduction of 2020 thirtieth highest hour (an estimated volume used by design engineers as a basis for highway designs) highway travel times between Vail and C-470 from 3 hours, 5 minutes for the NB Strategy to 2 hours with the Vision Strategy. Further, travel times on the FGT system will be consistent and reliable regardless of weather or time.
- In 2020, the hours of highway congestion will be reduced from 700 annually with the NB Strategy to 500 hours at the Eisenhower Tunnel and from 700 to 100 hours at Idaho Springs.
- Increase in person-carrying capacity from 1,200 to 4,685 persons per hour per direction depending on the location in the corridor (the higher value occurs where highway capacity is increased, approximately 38 miles in the corridor).
- Increase in transit ridership of approximately 1.7 million riders per year.
- Reduction in highway crash potential.

Financial Impacts

Anticipated financial impacts include the following:

- Currently identified and anticipated funds total approximately $1.28 billion for the I-70 Mountain Corridor. As shown in Table 7-1, this compares to an estimated project cost of about $8.4 billion, resulting in a project shortfall of about $7.1 billion (1997 dollars).
- Project shortfalls will be $2 to $3 billion less if the use of conventional rail is assumed from DIA to West Metro Denver and from West Vail to Glenwood Springs. (The higher costs result from assuming that a high-speed technology is ultimately constructed in these segments.)
- Also, costs will be about $3 billion less if CIFGA's assumptions are correct and the FGT costs $20 per mile versus the consultant's cost estimate of approximately $40 per mile. Financial shortfalls under these circumstances then are about $4 billion (i.e., $7 billion – $3 billion = $4 billion).
- Need for voter approval to initiate both new primary and secondary revenue sources including consideration of tolling, increases in state sales, income and gas taxes, as well as increases in local sales and property taxes. Taxes on rental cars, hotel rooms, ski tickets, and recreational equipment may also need to be considered.
- Need for legislative approval to use HUTF monies for transit and to provide CDOT with bonding authority.
- Recognition that travel on the I-70 corridor will probably become more costly in the future.



I-70 Mountain View

TABLE 7-1
Total Project Cost

Transit Projects	Cost (rounded) (a)
Commuter Rail Right-of-Way Preservation/Acquisition	Yet to be determined
Transit Market Studies (Ridership/O&D)	$1,000,000
FGT Preliminary Performance Specifications	$1,000,000
Transit Supportive Comp Plan Updates	$700,000
Measures to Change Behavior	$50,000
Parking Management Program	$50,000
Intermodal Transfer Centers	$9,000,000
TSM Bus/Transit System Improvements	$45,600,000
FGT Testing & Demonstration Research Program	$100,000,000
Commuter Rail In Eagle Co.	$185,000,000
High Speed FGT DIA to West Denver	$1,000,000,000
High Speed FGT West Denver to Vail	$4,100,000,000
High Speed FGT Vail to Glenwood (Ultimate)	$2,000,000,000
Total Transit	**$7,440,000,000 (b)**
Highway Projects	
Current STIP Improvements	$82,000,000
Corridor-wide ITS Improvements	Included above
Improved Maintenance Program	NA
Interchange Improvement Program	$153,000,000
Geometric Improvements to Clear Creek Co./Twin Tunnels	$60,500,000
Geometric Improvements to Clear Creek Co./Curve	$33,000,000
Flex Lanes in Clear Creek Co.	$80,000,000
A/D Lane Improvements: Vail to Eagle	$34,000,000
Improvements to Frontage Roads: U.S. 6 in Eagle Co.	$34,000,000
Slow-Moving Vehicle Lanes at Georgetown Hill	$65,500,000
Slow-Moving Vehicle Lanes at Eisenhower	$32,500,000
Slow-Moving Vehicle Lanes at Vail Pass	$227,000,000
Total Highway	**$802,000,000**
Aviation Improvements	
Land Use Planning at Airports	$500,000
Aviation Improvements	$123,000,000
Total Aviation	**$123,500,000 (c)**
Bicycle and Pedestrian Improvements	
Early Action Bicycles & Pedestrian Improvements	$30,000,000
Total Bicycle & Pedestrian	**$30,000,000**
Grand Total	**$8,400,000,000**

(a) Includes construction costs plus estimated non-construction costs associated with the project.
(b) Assumes connection to DIA cost of $1 billion and conversion of commuter rail in Eagle County to High-Speed FGT at an additional cost of $2 billion.
(c) Same as No Build Strategy

SECTION 8

Response to Oversight Committee Comments

This section presents the letters received from the OSC as comments on the Draft Final MIS, dated July 1998. In most instances, the recommended changes have been incorporated directly into the document. In other situations, the comments did not require a change to the document. In all cases, a response to the comment has been made. Many of the comments related to issues that will have to be addressed during the next phase of the process, which is the EIS process.

While the development of the Vision involved extensive public and stakeholder input, there are still many issues that need to be addressed in the EIS and project design processes. Given in no particular order of priority, these issues have been summarized in the four categories of critical issues developed at the beginning of the MIS process: Environmental Impacts, Community Values, Mobility/Safety Issues, and Financial Impacts.

Environmental Issues to be Resolved

Environmental impacts include:

1. **Secondary and Indirect Impacts.** The effects of improved mobility in the corridor on development trends and on fragmentation of wildlife habitat, and the effects of more permanent and second-home residents on the mountain ecology need to be carefully assessed. Likewise, the effects of not providing (or providing fewer) mobility improvements in the corridor on the long-term economic vitality of both the mountain communities and the statewide tourism industry need to be determined.
2. **Disproportionate Impacts on Clear Creek County**. Residents of Clear Creek County are concerned that they will be disproportionately impacted by the Vision. This concern is especially strong with regard to highway improvements.
3. **Ultimate FGT Alignment through Glenwood Canyon**. Service from Vail to Glenwood Springs will be provided with an interim commuter rail system. This system can utilize existing track with little or no impact. Construction of the ultimate High-Speed FGT from Vail to the mouth of Glenwood Canyon can generally be accommodated in the existing CDOT right-of-way, with minimal environmental impact. However, the ultimate extension of the High-Speed FGT through Glenwood Canyon would be extremely difficult and potentially impossible from an environmental approval standpoint. Nonetheless, the best alignment through the canyon will need to be identified during the design phase.
4. **Impacts on T&E Species.** Elements of the Vision cross through habitats of T&E species near Eisenhower Tunnel and over Vail Pass. The effects of building and operating the Vision elements on these species will need to be addressed.
5. **Protection of Wildlife.** Methods to mitigate vehicle/animal accidents will need to be investigated. Concerns are especially pronounced in Clear Creek County where bighorn sheep frequent the I-70 right-of-way and near Dowd Junction where accidents with migrating elk on I-70 are an ongoing problem. As development continues to force wintering big game animals to the congested I-70 corridor, innovative mitigations to protect wildlife will become increasingly important.
6. **Water Quality Impacts.** The impact of construction of the Vision elements is a concern identified throughout the planning process. Of even greater concern is the operational impact of the Vision due to increased runoff of sediments, deicing chemicals, metals, oil and grease, etc., into proximate streams.
7. **Wetlands.** Construction of the Vision will be located within 150 feet of 24 miles of riparian habitat, much of which includes wetlands. Additionally, numerous bridges and culverts will need to be replaced over water courses. Consequently, there is significant concern regarding wetlands impacts. Wetlands maps will need to be updated and quantities of potentially affected wetlands calculated.
8. **Noise.** Approximately 2,600 dwellings are located within 500 feet of I-70, and noise impacts are a concern. When a technology is defined, an evaluation and mitigation of noise impacts will be required.
9. **Hazardous Wastes.** Local citizens are concerned about accidental spills of hazardous waste.
10. **Energy.** Operation of the FGT will require a power source. It may be necessary to construct a transmission line to serve the FGT. Although energy requirements cannot be estimated until a technology is defined, the issue of the need for a new transmission line needs to be resolved.

Community Values Issues to be Resolved

Community values issues include:

1. **Boomtown Impacts.** Affordable employee housing is in short supply throughout the corridor. The addition of a huge demand for employee housing during the construction of the Vision will need to be addressed.
2. **Land Use Planning.** As discussed in the Mobility/Safety Issues Section, which follows, movement of travelers from the automobile to FGT will require behavioral and cultural change. Agencies in the corridor will need to support the concept of land use controls to increase densities in general, and particularly around station areas, to support the effectiveness of transit. Land use planning to protect land adjacent to the airports in the corridor will be critical for allowing the expansion of air travel. Last, innovative land use planning, such as cluster development, will be needed to maintain rural character, while accommodating the level of growth that is projected.
3. **Rural Character.** The need for the Vision is a corollary to the explosive growth being experienced in the corridor, and the state in general. The extents to which the secondary effects of the Vision influence growth in the corridor need to be presented. The tradeoffs of economic development and growth versus quality of life and rural character are contentious and complicated issues.
4. **Visual Impacts.** The amount of rock cuts and retaining wall needed for the TSM build elements will need to be addressed, as will the visual impact of the FGT Strategy, especially if an elevated technology is used. Impacts of the FGT stations will also need to be mitigated.
5. **Historic Districts and 4(f) Impact Analysis.** The Vision will pass through an historic district in Idaho Springs and an historic landmark district in Georgetown and Silver Plume. This will complicate approvals for construction through these areas.

Mobility/Safety Issues to be Resolved

Mobility and safety issues include:

1. **Behavior Changes**. Successful implementation of the Vision will require a change in travel behavior. Levels of service and congestion will not be improved unless the FGT system is endorsed and used by the traveling public. History suggests that transit will not be used sufficiently to address the corridor's mobility problems without a different view of travel. Mobility to mountain recreation must rely less on the automobile in the future. The "political will" to affect this change may be an issue.
2. **Operation of the FGT through the Denver Metro Area**. The Vision cannot be implemented without the support from metro area communities, DRCOG, and RTD. Numerous issues need to be resolved such as travel speeds through communities, the number of stops in the metro area, compatibility of technologies, right-of-way constraints, and competition with other projects for available space for construction.
3. **Safety versus Design Standards**. The geometry of the flex lanes in Clear Creek County is the cause of much concern. Residents would like to minimize design standards, while some users are concerned that reduced standards compromise safety. Minimization of highway footprints to reduce environmental impacts will require narrower medians, shoulders, and clear zones. This will significantly reduce impacts but provides less space for disabled vehicles.

4. **Immediate Need for Short- and Long-Term Highway Improvements.** Business interests believe there is a need for immediate highway improvements for support of commerce in the corridor. This viewpoint is not shared by many others in the corridor.

Financial Impacts Issues to be Resolved

Financial impacts include the following:

1. **Impacts on Local Communities**. There is a concern that the mountain communities will pay more than their proportionate share for implementing the Vision. The opposite concern is that Colorado residents who will never use the I-70 corridor will support an FGT system that provides them no benefit.
2. **Increases in Taxation**. There is a concern that implementation of the Vision will require additional motor fuel taxes and tolling and that this will increase the cost of traveling on I-70. While the implementation of the FGT system is supported, additional taxes to finance it do not appear to be endorsed.
3. **Siphoning Funding from Other Projects**. There is a concern that committing many billions of dollars to the Mountain Corridor will detract from the funding of other equally important projects in the state. Conversely, there are also concerns that all funds for transportation improvements will flow to the metro Denver area and away from mountain communities.
4. **Split of Funds by Mode**. There is a concern that available funding will be disproportionately spent on one mode at the expense of another. Public consensus will not be obtained on the implementation of the Vision until this is resolved. Exhibit A presents information submitted by the Colorado Environmental Coalition on Transit Funding Issues.

Table 8-1 presents full copies of the letters received from the OSC on the July 1998 and November 1998 Draft Final I-70 Mountain Corridor MIS Reports and the project team's responses to the comments. Exhibit A presents information submitted by the Colorado Environmental Coalition on Transit Funding Issues.

Exhibit A

Colorado Environmental Coalition

Review of Transit Funding Issues for I-70 Mountain Corridor

Prepared by Lauren Martens, 9/10/98

1. Total identified funding: $660 million through year 2020

According to the latest draft version of the implementation plan, "approximately $660 million is planned for the I-70 corridor from the I-70/C-470 interchange to Eagle County airport by 2020. Most of this funding, $577 million is not available until after 2004... an additional $123 million in funds for airport improvements in the corridor will be requested from FAA."

Note that the 20-year state plan counts on significant new (not yet approved funds): approximately $2-3 billion out of $12 billion total are new funds.

2. CDOT funding of non-highway components in draft implementation plan

Fixed guideway:	$1 million in transit market studies is marked "CDOT/new revenues"
Bus:	$46 million is marked "state/local"
Intermodal transfer centers:	$9 million is marked "CDOT/local govt"
Commuter Rail in Eagle County:	$185 million is marked "CDOT" (but Bill Vidal's article in the Post did not mention this as part of the early action program)

If CDOT funded all of these, the total would be $236 million. **Local governments and citizen groups have requested that at least half of the available funds, or $330 million be spent on the transit elements.** This could additionally fund a demonstration project of the fixed guideway, estimated to cost $100 million.

3. Potential sources of CDOT funding for transit components

HB 1202 allocates about $1.4 billion of surplus funds for use in the 28 Strategic Projects for the years 2003 -- 2008. Twenty percent of these funds are allowed to be used in the 6 Major Investment Study corridors (including the I-70 Mountain Corridor). Of this, half (or $140 million) can be used for non-highway projects. These funds could be used as a local match for federal funds.

CDOT's 20-year plan also assumes additional new funds of this type. Furthermore, a proposal to the legislature for funding a demonstration project (with approval by voters) could include a proposal to increase the percentage for non-highway projects.

Federal funding has significant flexibility. One major category of funds, the Surface Transportation Program, is a multimodal fund that can be used for either highways or transit. Under ISTEA funding levels, CDOT would receive about $900 million in these funds through the year 2020. TEA-21 increases funding levels about 50 percent.

In addition, 20 percent of federal Interstate Maintenance can be "flexed" for non-highway projects in Interstate corridors. At ISTEA levels of funding, Colorado expected $1 billion over 20 years in IM funds. TEA-21 will increase funding for the state by about 50 percent. Thus $200 - 300 million in federal Interstate Maintenance funds could potentially be available for non-highway projects on interstate corridors in the state, including the I-70 corridor.

These sources that could be used to fund transit total $1.2 -- 1.8 billion, not counting the new money CDOT is assuming for their budget. Metro areas have additional federal multimodal funds. Thus, if $330 million were spent in the I-70 Mountain Corridor on transit, that would amount to less than 1/4 of statewide multimodal funding available to CDOT.

Table 8-1 OSC Comments to Draft I-70 Mountain Corridor MIS and Project Team Responses	
Comment	**Response**
August 3, 1998 Don Ulrich Project Manager CH2M HILL 100 Inverness Terrace East Englewood, CO 80112 Re: Review of Draft Final Report: I-70 Mountain Corridor Major Investment Study Dear Mr. Ulrich: Thank you for the opportunity to review I-70 Mountain Corridor Major Investment Study report. Both George Scheuernstuhl and I read through it, and the attached comments reflect our concerns and suggestions. The review comments are presented in three levels. First are general comments, dealing primarily with substantive issues throughout the entirety of the report. Second are (mostly) technical comments directed at specific sections of the report (referenced by page and section). Finally, editorial and typographical comments are contained as "red-lines" on a copy of the document. Most of these "red-line" comments are self-explanatory; to the extent that revised language may be appropriate, we have included suggested text revisions. Again, we appreciate the opportunity to comment on the document and trust our observations will be useful in helping you produce an improved final product. If you have questions, please do not hesitate to call me (480-6747). Sincerely, Steven D. Rudy, P.E. Mobility Management Program Manager Mm/7.05.03 Enclosure Cc: Sam Atencio	
Attachment 1 – General Comments	
A. In its entirety, this report is a tremendously cumbersome "read." That implies that the Executive Summary will be what most people actually read and reference. Accordingly, the key "findings" from the analysis should be presented in the Executive Summary. For example, more elements should be included from the "I-70 Needs Assessment," such as daily and weekend peak and off-peak volumes by season, current and projected number of congested hours, and current accident conditions. Specific data from the detailed evaluation should be included for each alternative considered; such as mobility statistics (weekday and weekend peak hour traffic volumes by season and daily transit ridership by season), costs (total, annual), cost per rider, etc. Actual mobility statistics should be reported for the recommended option, and "improvements" should be placed in context (e.g., what percent is 40 million annual VMT of total?). Clearly indicate what actual benefits are realized for the $8+ billion expenditure.	This change has been made. The Executive Summary has been expanded to include more quantitative data, including summary results of the Detailed Evaluation.
B. There is a tremendous amount of information in the report; so much that key points simply don't rise to the readers' attention. You should explore techniques in both the Executive Summary and the body of the report that would ensure that items of importance are highlighted. Sound-bite summaries or side-bars at pertinent points, bolding, italic or unusual type—anything to bring forward the key issues. For example, the traffic volume presentation is rather esoteric. Is it really clear to the reader that the problem we are dealing with in the I-70 corridor is now 6-8 hours of moderate to severe congestion occurring during approximately 20 weekends/holidays per year, growing to 24 hours of weekend/holiday congestion 30 weekends per year in 2020?	This change has been made. More information has been brought forward to the Executive Summary and the mobility section of Chapter 3.
C. The treatment of FGT in the body of the report seems inconsistent, waffling back and forth between rail technology and "performance spec" technology as the reader moves through the text. Because the report seems for the most part to hold true to the process followed, we suggest that Chapter 5 and Chapter 6 accurately identify the technology that was in fact subjected to detailed evaluation (high speed, steel-wheel-on-steel-rail, electrified) with its specific alignment, stations, tunnels, etc. Certainly, this technology can be described as "for the purposes of preparing a detailed evaluation" [This is actually the first sentence of page 7-2, which should be the recommendation!]. But the actual assumptions used for costing purposes and for patronage forecasting should be clearly articulated in Chapter 5. Much of the Chapter 7 text could be moved into Chapter 5.	This change has been made. Chapters 5 and 7 have been revised to clarify our assumptions.

Comment	Response
D. Following on this thought it seems that the actual course of events was that after the detailed evaluation, the WSC and OSC concluded they would support FGT, just not the specific technology evaluated. If the actual technology evaluated is defined in Chapter 5, the oversight committee concerns section of Chapter 6 can identify that this was a problem, and text can indicate that this was "reconciled" by accepting the "performance-spec" technology. Chapter 7 can then "describe" the recommended elements of the "performance-spec" technology. It would seem that since we don't know much about this "performance-spec" stuff, the FGT discussion in Chapter 7 would be far less detailed than it is currently.	This change has been made. Comment noted. Chapters 5, 6, and 7 have been revised to address the thought process used for recommending the Vision.
E. The treatment of the DIA to West Denver segment also seems inconsistent and illogically sequenced. It would seem that Chapter 5 could identify the potential "options" that would be pertinent to the FGT rail technology examined during detailed evaluation. Then, the text could specifically state which assumptions were made for costing and patronage forecasting purposes. The connectivity section of Chapter 6 would then be logically consistent (mountain rail technology versus metro rail technology). Alignment/connectivity/compatibility concerns of the mountain "technology-spec" recommendation with metro rail technology could then be noted in Chapter 7 as uncertain, or problematic, or something similar.	The alternative alignments are described and the assumptions used are disclosed. See revised text for page 5-5, under the Fixed Guideway Transit (FGT) Strategy header.
Attachment 2 – Specific Comments	
1. Pages ES-5, 5-3, and 7-7; TDM Elements. Intermodal transit centers are listed under TDM. Most people would consider these "transit capital" improvements, not TDM. Access management is **NOT** a TDM action; it is a TSM action (or "operational improvement" in your text).	This is technically correct. However, modifying the Vision Statement at this time is not appropriate.
2. Pages ES-6 and 7-11; Financial Impacts. Why is the $40M/mile listed as "the CDOT cost?" It makes it sound as if the FGT will cost less simply because CDOT wouldn't be doing it. Why not say "The consultant's estimate?"	This change has been made. See revised text. The CDOT cost estimate is presented as the "consultant's estimate."
3. Page 1-1 and others. The proposed improvements don't "solve" or "resolve" corridor mobility problems. It is preferable to use a word which doesn't imply that the problem goes away—perhaps "address" or "deal with."	This change has been made. See revised text.
4. Page 3-10; Operational Characteristics. It would be appropriate to introduce existing travel time here—both for non-peak (free flow) conditions and peak weekend conditions. These travel times are appropriately part of the "Mobility Baseline."	This change has been made. See revised text.
5. Pages 3-11 and 3-12; several sections. Fare information (say from Glenwood Springs to Denver or DIA) would be appropriate information to present for Amtrak, Greyhound, and private transit providers (move up from page 7-10).	This change has been made. See added text in these sections. Fares were added for Amtrak and Greyhound. The private provider fares are only shown in the Mobility Evaluation Report (CH2M HILL, et. al., 1998b).
6. Page 3-13; Forecasting Approach. The DRCOG model does not specifically include Clear Creek County; it focuses on the six-county TMA.	This change has been made. See revised text.
7. Page 3-15; Figure 3.18. The Colorado Springs area is part of the "Front Range," so what does the "Front Range" modifier mean when combined with "Denver." Generally, where are the "other Colorado communities" located if they are not in Colorado Springs, Denver, the Front Range, or the corridor?	This change has been made. See revised Figure 3.17.
8. Page 3-15; Rental car use. The latter half of this section deals with information partly derived from the DIA air passenger survey. However, the glaring omission is the DIA survey result that only 9 percent of originating passengers came from the 1-70 corridor area (this information was provided to the study team early on). I suggest the following logic for computation of DIA rental cars in the 1-70 corridor: Ave. month = 2.68 million passengers (p. 3 of Access to DIA report) Assume: 50 percent enplaned Assume: 50 percent originating/50 percent transferring (a guess, Veazey can verify real number) Therefore: 22,300 average originating passengers per day 9 percent come from 1-70 corridor: i.e., about 2000/day 57.1 percent are visitors, and 50.6 percent of those rent cars: i.e., about 580 people per day Average occupancy (from DIA study actual data, for recreation trips) is 1.87: i.e., about 310 rental cars per day (per direction)	See revised text page 3-14. The range of percent of daily traffic caused by rental cars was expanded to accommodate both methodologies. Time of year travel ranges could all be accommodated in the resulting range.
Note that this method suggests substantially fewer rental cars. Also, when we geocoded license plates from your Idaho Springs videotape location, only 132 vehicles came back addressed at DIA. That wasn't an all day count, but it did include the peak several hours. The real question is does this section add anything to the report. Maybe it should simply be eliminated.	

Comment	Response
9. Pages 3-18 and 3-19; Existing conditions/future conditions. The travel time discussion needs more qualifiers. First, identify from where to Vail. Second, identify mileage for that segment. Third, identify travel time under non-congested conditions. Then, identify travel time under whatever conditions are being reported (30th highest hour? peak hour? when demand equals 80 percent of capacity?) and make those conditions clear. Also, the definition of congestion as starting at 80 percent of capacity warrants at least an explanatory sentence as to "why" that threshold. In the metro area, our congestion management system defines "severe" congestion as beginning at 95 percent of capacity, moderate congestion as beginning at 85 percent.	See revised text on pages 3-16 and 3-17.
10. Pages 5-2 and 7-5; Interchange improvements. Which improvement addresses the US-6 interchange (MP 244) existing deficiencies (i.e., left-hand entrances/exits) noted in Figure 3.23. The "improvements" under TSM/TDM on page 5-2? Or the "Improvements" under Bus/HOV on page 5-3 or HY on page 5-7? Or are these left-hand ramps not addressed? What is recommended at this location in Chapter 7?	The Vision incorporates the TSM improvements defined on page 7-3, which are identical to the improvements recommended on page 5-2. As part of the TSM package, 10 interchanges were identified as needing modifications. Specific improvements will be refined on a case-by-case basis during feasibility studies and design. Both the HOV and HY packages assumed reconstruction of the US6/I-70 Interchange of the highway widening element. The Vision does not assume the reconstruction of this interchange.
11. Page 5-2; Aviation Elements. All of the "build" alternatives are described as being "in addition to" No Build. The $123M of aviation improvements referenced in this paragraph describes the TSM/TDM package are exactly those noted under No Build. Paragraph should be restructured to highlight improvements proposed beyond No Build.	The proposed program is the same as "No-Build."
12. Page 5-3 (see also ES-5 and 7-8 and following); TSM Transit Elements. This section should be reworded to imply that these elements are generally expansions/extensions (or as noted on page 7-8, "enhancements") of existing actions, not new ones. This is specifically true for "intercity, intermountain bus service." Pages 3-11 and 3-12 identify that Greyhound operates five daily trips per direction in the I-70 corridor and two in the US-40 corridor. **That service is intercity, intermountain bus service.** So, what is being proposed here? More frequent? More stops? Public ownership or subsidy? The discussions about Skier Express, local transit service, and private shuttles (which all currently exist) should focus on the aspects that are proposed to be added. For private shuttles, the context should be what is being "proposed" in this package, not "could" or "may."	The proposed intermountain bus service should not be considered an enhancement to existing Greyhound service. The intermountain bus service would operate more frequently, with more stops. Schedules would be coordinated with existing local transit providers. It would also probably assume a much different fare structure. (Greyhound fares are set to make a profit.) The service being proposed is significantly different from Greyhound service. The text on page 5-3 has been modified to clarify the difference in service.
13. Page 5.3; Bus/HOV, and Page 5-4; Figure 5.3 (see also page 7-5, Slow Moving Lanes). We question the merit (in "Smart Widening") of having only six-foot paved outside shoulders when there are essentially no useful inside shoulders. A six-foot shoulder does not provide a **safe** refuge for disabled vehicles, particularly if this section is applied over an extended length. It may be "smarter" to pave a 10-12 foot shoulder and provide retaining wall and guard rail to keep the overall envelope small. Six foot outside shoulders are not our long-term vision of a safe freeway.	Comment noted. The impact analysis was based on the smart widening concept, modeled after the precedent at Glenwood Canyon. The dimensions of the highway section will be carefully resolved, by location, during the EIS and design phases.
14. Page 5-5; FGT. If, as noted earlier in the report, congestion is not a problem in the future west of Avon, why does this option include commuter rail all the way to Glenwood? An explanation in the text would be in order.	See revised text, page 5-5. Construction of the FGT system to Glenwood Springs will allow future connectivity with proposed FGT Systems to Aspen and Parachute as recommended in the *Colorado Passenger Rail Study* (Kimley-Horn and Associates, Inc., 1997).
15. Page 6-1; Introductory paragraph. Please reconcile the statement that the evaluation provided the information needed to determine the best project for solving (addressing!) mobility problems over the next 50 years with the fact that the majority of the evaluation focuses on year 2020.	See revised text on page 6-1.
16. Page 6-3; Noise. Report states "significant levels of noise currently exist..." but doesn't indicate why a noise level of 61 dBA (current) is significant. Text also indicates these noise levels are based on the loudest hour, defined as the hour with the most traffic, and then implies that the FGT and FGT/SHI packages "remove some traffic from 1-70" during this period. Similar claims are made for HOV and TSM/TDM. It is our expectation that the volume of traffic during "the hour with the most traffic" is likely to be at the level of capacity in all packages; the total volume at that time dependent mainly on the number of lanes. So it seems confusing that NB and HY show the same noise level. Suggest this entire section be re-examined and clarified.	The predicted existing noise level of 61 dB is stated in the report as being significant not on the basis that it exceeds CDOT's and FHWA's 67 dB impact criterion, but on the basis that it would be considered annoying or disturbing to the average member of the public. For example, the commonly referred to EPA "Levels Document" states that noise levels above 55 dB adversely impact public health and welfare. Also, typical ambient noise levels in mountain communities, not levels near I-70, are predicted to be approximately 20 dB higher than this, which is a very significant increase. Text has been added to the MIS to clarify this. The report should not have stated that the analysis was conducted for loudest-hour conditions. In fact, it was conducted using thirtieth highest hour traffic volumes and peak hour transit operations. Under thirtieth highest hour conditions, I-70 is not operating at capacity; therefore, traffic volume is not dependent on the number of lanes. The highway widening alternative is predicted to have slightly less traffic than the no build alternative for the thirtieth highest hour, and the resulting predicted noise levels for these alternatives differ by only 1/10 of a dB. The MIS has been corrected to state the correct basis for the analysis.
17. Page 6-4; Community Acceptance. Text states "one common concern with the HY package is that it is not a long term solution; lanes would continually have to be added..." While it is true that this reflects public sentiment, it would seem relevant to point out that (as discussed subsequently on pages 6-6 and 6-9) the FGT doesn't "solve" the problem long-term (2050 LOS F) and as evaluated represents the equivalent of less than one lane of traffic.	See revised text, page 6-4. This is correct. Addressing 2050 congestion will require significantly more construction regardless of the strategy.
18. Page 6-5; Table 6-7, Mobility. What causes the occupancy to increase from 1.77 in 1995 to 1.95 under No Build? What causes the annual number of total person trips in 2020 to vary between packages? These findings are "unusual" in MISs, and warrant explanation in the text.	See revised text, page 6-6.

Comment	Response
19. Page 6-6; Travel Times. Non-peak travel times should be presented in the table and text for comparative purposes. Remaining travel time references should be consistent in their identification that they reflect "30th highest hour (weekend)" conditions. The text discussions should note highway and alternate mode differences under both non-peak and 30th highest hour (weekend) conditions.	See revised text, page 6-7.
20. Page 6-6; Level of Service. Text should explain that levels presented reflect 30th highest hour (weekend) conditions. Text should comment about what the LOS would be in weekday conditions. Text should point out that in 2050, 30th highest hour (weekend) LOS is F at all locations under all alternatives; that none of the alternatives is truly a long-term "solution" to corridor congestion.	See revised text, pages 6-7 and 6-8, and Table 6-8.
21. Page 6-8; Connectivity. The discussion in this section on DIA to West Denver should first comment that MISs in the Denver metro area have been completed on the East and West corridors (this could also be done in Chapter 5—see General Comment E). The list of issues can then be bulleted as: • travel speed (capability vs. allowable) • number of stops • technology compatibility vs. transfers • right-of-way additions • environmental justice if additional r-o-w is for "mountain train" The DIA to west Denver connectivity issues for other modes need to point out: • East Major Investment Study did not endorse HOV lanes to DIA • East Major Investment Study did not endorse I-70 widening for through lanes from Brighton Boulevard to I-270	See revised text, starting on page 6-9.
22. Page 6-9; Transit Ridership. Please identify the portion of 2020 transit ridership that takes place during weekends (critical times) as opposed to that during weekdays. Please present that split on a daily basis (not annual). Text should clearly indicate that the DIA to Vail operating assumption used to compute the 1.3 million riders was (whichever of the options now described on page 7-2 you used). See previous comment about clearly stating assumptions.	The available data do not breakout ridership as weekday versus weekend. See revised text on page 6-10. Ridership forecasts were developed for an average winter and non-winter day. The daily forecast reflects an average over seven days. Weekend ridership would likely be higher and weekday ridership would likely be lower than the reported average daily figures. Annual ridership was calculated by multiplying average winter day ridership by 140 days and average non-winter ridership was multiplied by 216 days. For Skier Express service (included in the TSM and Bus/HOV Alternatives), annual ridership is based on 34 weekend days and 86 weekdays.
23. Pages 6-5 and 6-9 through 6-11; Tables. Numbers are not consistent through these tables (see red-line mark-ups). Also, please footnote all cost tables as to your assumptions about DIA to West Denver (as in Table 6-14, and 6-18 through 6-20).	See revised tables.
24. Pages 6-11 and 6-12; Implementation Schedule. Eliminate these paragraphs; nowhere do you present implementation schedule information to put this "issue" in context.	See revised text.
25. Page 7-1; FGT. Nowhere do you describe how the vision recommendation evolved from a combination FGT/commuter rail package to 185 miles of FGT.	See revised text in the Executive Summary (Exhibit A) and Section 7.
26. Pages 7-2 through 7-4; High Speed FGT "definition." As alluded to in the General Comments, this entire section suffers from trying to provide a lot of detail about a system that is, frankly, undefined. Much of the language would have been more appropriate in defining the alternative you took into detailed evaluation. However, that alternative was NOT what the OSC endorses nor this study recommends. For example, the text discussion of the DIA to West Metro Denver alignments reasonably reflects the range of options for a steel-wheel-on-steel-rail system, but it seems there are many, many alignment options open for a "performance spec" system. I think the entire alignment discussion is far too detailed as a "recommendation," because, in fact, the recommendation is not for a rail line (this terminology is improperly used throughout Chapter 7 text).	See revised text in Sections 5 and 7.
27. Page 7-5; Safety. Snow slide mitigation at Seven Sisters (does everyone know where this is?) is not mentioned as a safety improvement under TSM/TDM package (page 5-2) nor anywhere else in Chapter 5 that we can see. Either add it to text on page 5-2, or explain in Chapter 6 or 7 why it is part of the recommendation.	See revised text, pages 5-2, 5-4, and 5-5.
28. Page 7-6; ITS Example-VMS. Do not show "Have a Great Day!" on this figure. Most ITS practitioners avoid displaying meaningless messages. Why not have this sign depict a meaningful message, such as "Crash Ahead on Vail Pass, expect 1 hr. delay."	See revised figure on page 7-6.
29. Page 7-8; Aviation elements. Land use planning is the prerogative of local governments. Therefore we suggest that the recommendation be that airport operators and local governments take necessary steps to assure airport-compatible land use planning. What is the function of the "specific State staff position" referenced in the paragraph; enforcing some regulation that would be proposed to "ensure" compliance? The discussion regarding inadequate airport funding bogs down due to detail pertaining to institutional issues. It seems that a simple statement that "adequate funding should be made available by the State to assist in completing meaningful projects at airports" keeps the implementation mechanism flexible, and doesn't imply new bureaucracy.	See revised text, page 7-6. The state staff position is the designation of a current member to assist agencies in coordination of compatible land use around airports. Text regarding adequate funding has been clarified regarding the opportunity that a minimal amount of state money provides in federal grants in aid.

Comment	Response
30. Page 7-9; Expanded Local Bus Service, and Page 7-10; Private Shuttle Service. Text should be adjusted to continually reflect that these discussions are part of the Initial Bus Transit Element. Should there also be a section on the "ultimate" transit network (i.e., once FGT is implemented)?	See revised text.
31. Pages 7-10 and 7-11; Mobility Impacts. Several of the statistics reported (see redlines) are not consistent with statistics presented in Chapter 6 (e.g., Tables 6-3, 6-7 and 6-8). Where do they come from? Please provide a summary table that depicts the mobility statistics of the "recommendation" (extracting these, presumably, from the Tables in Chapter 6). Please add a bullet that this recommendation is not in fact a long-term solution to the problem, as 30th highest hour (weekend) LOS will be F at all locations in the corridor in year 2050.	Vital statistics for the Vision have been included in the revised Executive Summary.
Date: August 4, 1998 To: Sam Atencio (by fax, 303-757-9746) Don Ulrich (by fax, 303-754-0199) From: Greg Fulton Colorado Motor Carriers Association 4060 Elati Street Denver, Colorado 80216 303/433-3375 fax 303/477-6977 Re: Comments on I-70 MIS Study First, I wanted to take this opportunity to thank you for your work on this project. This has been a long and arduous effort and you have consistently attempted to work toward some form of consensus on this study. As for our comments on the recommended vision I offer the following:	
1) As we indicated in our verbal comments throughout the study, we remain concerned that affordability was not a criteria in project selection. An $8.3 billion program of improvements is unlikely based on current and future revenue streams as well as other needs in the state. Not addressing the affordability issue threatens the credibility of the study.	Comment noted. CDOT will address each improvement as funding becomes available.
2) As earlier, we question why the concept of "finality" is in the vision statement. To indicate that the vision should not or will not change over a fifty year period. Plans must be flexible to address a changing environment. We suggest that this statement be removed from the vision.	Comment noted. The word "finality" was reconciled by the Oversight Committee, including CMCA. Revising the Vision Statement at this time is not appropriate.
3) We remain concerned that one of the central portions of the study focuses on a "technology yet to be determined." As indicated throughout the study, a proven technology does not exist to meet the performance specifications, as defined in the study, for the fixed guideway system to address the needs of this challenging environment. Further, we are concerned that the success of this strategy is dependent upon the linkage of this system to currently unfunded transit corridors in the Denver Metro Area. Complicating this further is the transfer of passengers from one system to another, which greatly reduces ridership from locations such as DIA and downtown Denver.	Comment noted. Refer to page 6-9, Connectivity.
4) In regard to the flexlanes and the slow vehicle lanes, the plan does not address the issue of shoulders. We wish to ensure that adequate shoulders are provided so as to allow autos or trucks to safely remove themselves from the through lanes. In addition we wish to reinforce the need for the flexlanes and other lane improvements which are critical toward enhancing mobility in the corridor.	Comment noted. The issue of flex lane and general purpose lane geometry will be resolved at the EIS and design phases.
5) Under the Truck Operations Plan, we are concerned that the measures do little to improve freight operations in the corridor that is critical for the mountain communities, state and region. Several of our key concerns, which have been expressed at meetings, do not appear in the report. We believe these measures are important from a mobility and safety viewpoint. Along these lines we would like to make the following changes in the plan: a) We agree that more chain-up areas are needed and would like to work with the state on the identification of those areas.	Comment noted .
b) CMCA has provided one Mountain Assistance Truck to the state and will soon provide a second truck to the state. CMCA provided these vehicles which assist not only trucks but also other vehicles such as RVs at no cost to the state. We do believe that an additional two vehicles of this nature may be needed in the future and should be added as an additional expenditure for the plan.	Comment noted. This can be considered as part of the Vision.
c) The minimum left lane speed limits section should not appear in this part of the report. This gives the appearance that only slow-moving trucks are the problem yet CDOT and other have indicated that RVs and other vehicles may be as much a problem. Move this recommendation under general TSM measures.	Comment noted. The text has been changed to reflect this concern.

Comment	Response
d) We agree with the installation of the wind sensor signs but we may need these in other locations as well in the corridor.	Comment noted.
e) Chains and cables are already required for trucks when conditions warrant it. We recommend that this item be struck because it is not necessary. We would suggest that the plan incorporates a provision that would allow private companies at a site or sites along the corridor to charge a fee for the installation and removal of chains or cables for trucks. This is done in California and is very successful.	See revised text on page 7-5.
f) What does the plan imply by expansion of the weigh-in-motion program? Dumont is already automated in the westbound direction. We would suggest that prior to automating the eastbound direction that a study be conducted relating to safety considerations in regard to Mount Vernon Canyon.	Comment noted. Safety considerations at Mount Vernon Canyon will need to be evaluated as part of the Vision.
g) Although a portable brake testing system sounds good, there is not a reliable system of this nature in the country that is now working. We would ask that this recommendation be struck from the report.	Comment noted.
h) A critical measure that we have requested since the beginning of this plan is improvements to Eisenhower Tunnel for trucks. These include: 1. Access for Certain Hazardous Material Trucks – Currently ALL hazardous material trucks are routed over Loveland Pass, which is a much more treacherous route for trucks. In many cases these hazardous material trucks are transporting materials that we use everyday in our homes such as paint and do not represent a substantial safety problem. Not only are weather conditions dangerous at many times of the year on Loveland Pass but also the alignment of the roadway is much more difficult to negotiate. In addition a hazardous material truck that overturns on Loveland Pass could create substantial problems from an environmental perspective, posing a problem to water supplies for the area. Finally, the remoteness of the pass from emergency response groups in Clear Creek or Summit Counties creates a significant problem in addressing an incident when it occurs. We recommend that the study reflect improvements to the Tunnel that will allow some if not all hazardous material trucks to use it. This route is much safer for trucks and other motorists. Currently, CDOT allows all hazmat trucks to travel through the Glenwood Springs Tunnel. We would like the plan to reflect that CDOT will seek improvements to Eisenhower Tunnel whereby either a portion (low level) or all hazmat trucks be able to travel through the Tunnel. We would ask that an immediate study be sought to identify the necessary improvements to allow for hazmat transport.	Comment noted. The policy regarding the transport of hazardous waste through Eisenhower Tunnel cannot be changed as part of the revisions to the MIS.
2. Access for Higher Profile Vehicles – Currently many trucks cannot use the tunnel because of their height, which is slightly larger than what is permitted. By recessing the signs or moving the signs to one lane, these vehicles could easily be accommodated at a relatively low cost to the state. We would ask that the state incorporate a provision in the plan to address this improvement or at least study the improvements in conjunction with the hazardous material study.	Comment noted. This will be referred to the Region 1 Tunnel Maintenance Superintendent.
6) A major concern of our association lies in the financial impact area. As shown the plan reflects a shortfall of $7 billion. To address this shortfall the plan notes that primary and secondary funding sources including tolls, state sales tax, gas taxes, and local sales and property taxes. Early on in this process, the concept of tolls and a gas tax increase were termed unacceptable, yet these measures appear in the plan. We ask that these specific measures be struck from the plan.	Comment noted. Increases in motor fuels taxes and tolls will need to be considered regardless of unpopularity.
The plan notes a need for approval of changes to the Highway Users Trust Fund that would allow its use for transit purposes. We wish to remind you that this cannot be done by the Legislature because the State Constitution restricts these funds for highway construction and maintenance purposes. Such a change would require a referendum before the voters.	Comment noted.
Also, I am concerned as to the incorporation of this concept, which I do not believe was discussed or approved by the Oversight Committee. With several billion dollars in needs for highway projects throughout the state we would be very concerned with this measure. Based on the lack of discussion and consensus on this issue we would ask that this point be struck from the report.	Comment noted.
7) The last point regarding travel on I-70 be markedly more costly in the future is disconcerting. What does "markedly more expensive" imply? This seems to imply tolls, gas tax increases which have not been agreed upon in the plan. We suggest the removal of this phrase.	The project mission clearly addresses the "user pay" concept. A consequence of the Vision, as well as the explosive growth the state is experiencing, is that users will need to pay more for mobility improvements in the I-70 corridor.
In closing, I wish to note our sincere desire to work with CDOT, the local communities, and others toward implementing a series of solutions which provide a "win-win" scenario for the state.	Comment noted. Thank you.

Comment	Response
DATE: August 5, 1998 TO: Sam Atencio FROM: Oversight Committee Members Gary Lindstrom, Summit County Commissioner Bill Macy, Mayor – City of Idaho Springs Lauren Martens, Colorado Environmental Coalition John Martin, Garfield County Commissioner Jo Ann Sorensen, Clear Creek County Commissioner RE: Comments on MIS Draft Report As we reviewed the Draft Final Report of the I-70 Mountain Corridor MIS numerous specific concerns arose. They are listed on the accompanying table. In addition to the specific details of the Draft Report, we are concerned about the process and the product in general:	
Several members of the Oversight Committee (specifically elected officials for whom Tuesday nights are regularly taken up with local responsibilities) were not in attendance at the July 14 meeting and did not benefit from the discussion that took place that night.	Having full attendance at the OSC meetings has always been our objective. When setting up the meeting, we polled all of the OSC members and were told that July 14 would be the best time. Only one member, Commissioner Sorensen, indicated that she would not be able to attend.
We feel that the August 5 deadline for comments is probably too short. Since many members of the OSC are not technical folks, we need to rely on input from our engineers/ consultants as we attempt to evaluate this product. A couple of weeks – especially during the summer vacation season – is just not enough time for thorough and thoughtful review.	When the review schedule was proposed at the July 14 OSC meeting, the August 5 deadline for receipt of comments was established and agreed to.
The entire section on "Implementation" is missing from the Draft Report. We believe that an implementation plan is critical to the MIS process, and a necessary component of the final report. The implementation plan proposed at the July 14 meeting put our support for the vision in jeopardy by failing to commit CDOT to a balanced implementation of the vision.	Comment noted.
With the extensive list of concerns we have, we don't believe it is appropriate to simply list them as an addendum to the report. We recommend that the report be revised and then reviewed by the OSC at a meeting prior to publication. Until our concerns are resolved we cannot endorse this document. In addition, we are requesting a full public review of the Draft Report, including public hearings.	The report has been revised to include the comments presented in this letter. In some instances, a more thorough response will be more appropriate in the Environmental Impact Statement.
We are also attaching two additional documents which we would like to have included as comments on the Draft Final Report: *Memo from Bruce Snyder of Parsons Engineering Science, Inc. This memo (prepared for the City of Idaho Springs) presents his overall concerns about the adequacy of the information and conclusions presented in the report. *Copy of our response to Guillermo Vidal's July 26 *Denver Post* Article cc: Don Ulrich, CH2M HILL U.S. Senator Wayne Allard James Daves, Federal Highway Administration State Representative Tony Grampsas State Senator Sally Hopper Louis Mraz, Federal Transit Administration Governor Roy Romer Jim Scherer, CARTS Lieutenant Governor Gail Schoettler U.S. Representative David Skaggs State Representative Byran Sullivant Guillermo Vidal, CDOT	

Comment	Response
Section ES	
Page ES-2 Seems the summary of workshop results should also disclose other general results of the workshops, including the basic themes of simultaneously moving forward with both short-term and long-term corridor capacity solutions; maintaining quality of life and integrity for communities adjacent to the I-70 corridor; and not expanding the roadway corridor through all or selected portions of the corridor. The current wording does not seem to disclose that the FGT is the long-term solution, not a secondary one.	"Basic themes" relating to implementation were not discussed during alternatives screening. However, a dislike for highway solutions and a need to preserve rural character were evident at all of the workshops. Text has been added to pages ES-5 and ES-6.
Page ES-4 To the extent currently possible, the build elements of the FGT system should be listed in the same manner that the elements of the TSM/TDM package were listed. This addition will give the public a better understanding of the components and scope of the FGT package.	Since the FGT technology is unknown, it is possible only to list probable components such as guideway, vehicles, stations etc. We have added this information to help clarify the text.
Page ES-6 Table ES-1 seems to require the addition of the FGT component.	Table ES-1 has been revised to include more detail. Since other information has been added to the Executive Summary, Table ES-1 is now Table ES-4.
Section 1	
Page 1-1 The "Purpose of the MIS" discussion should disclose the anticipated relationships between the proposed programmatic EIS for the corridor and the individual EISs or EAs for specific TSM/TDM projects that were identified as essential portions of the environmental review process described by CDOT/CH2M HILL during several of the OSC meetings. The risk of the proposed approach seems to be that the specific projects will not receive the "hard look" at potential project impacts required by the NEPA process. (Perhaps the plan for evaluating the near-term TSM/TDM projects will be described by the scope of work for the programmatic EIS.)	The specific approach to the EIS has not been determined at this writing. However, we have added text in the Executive Summary to clarify the relationship of the two studies. It is not possible that any of the TSM build elements would avoid NEPA review due to federal funding, the influence of the USFS and BLM, and local public sentiment. A statement on page 1-2 has also been included for clarification.
Page 1-2 Some of the solutions described in this section do not appear to be addressed by the Draft Final MIS Report. The report should be revised to address how the proposed vision package implements the following commitments or the report text should be revised to eliminate the implication that the proposed plan provides the following solutions: • The Plan/Proposed Package should be revised to disclose how it balances economic development and employment in the corridor. • The Plan/Proposed Package should be revised to show how it ensures that those who benefit the most from the improvements will pay proportionately. How was this achieved during the MIS process and by the Proposed Package?	We have attempted to address this difficult question in the revised text. As noted, the interpretation of the Mission varied among the CWC participants and corridor stakeholders. It was felt that the reconciled Vision strategy best represented fulfillment of the Mission. The selected Vision may not fulfill all aspects of the Mission perfectly for all stakeholders since it represents a compromise solution. It has been evident through the planning process that the strict interpretation of the Mission varied among the CWC participants. There appears to be consensus among the participants that the use of emerging technology for the FGT element will satisfy the first guiding principle of the mission – innovative technologies to minimize impacts. The second guiding principle, preservation of rural character, is extremely difficult to define, but appears to be fulfilled by not constructing a "highway solution." The project team was given clear direction by local residents that an FGT-oriented solution was preferred. Balancing economic development with other values such as environment and quality of life was also difficult to define. Biases skewed in favor of either extreme were voiced by stakeholders in the corridor. However, the majority opinion of what this is NOT can more readily be defined. Traditional highway solutions, more sprawled development, and resultant environmental degradation should be avoided according to the CWC participants. The project team was given clear direction by local residents that an FGT-oriented solution was preferred from the onset of the process. The concept that users pay proportionately would suggest that tolls on I-70, congestion pricing, increases in the motor fuels taxes, and tourism taxes, etc., would have been supported by the CWC. However, the project team was not able to gain general support for higher taxes or user fees through the CWC process.
Section 2	
Page 2-2 There are a number of critical issues identified from the workshops that do not appear to have been addressed by the MIS Draft Final Report. Because these critical issues are described as the basis and focus of the MIS analysis, the report should be revised to clearly demonstrate how these critical issues were addressed or incorporated into the analysis. These points should also be included in the Executive Summary section to show how the Proposed Package addresses the critical issues. Examples of critical issues that do not appear to be addressed include the following: • Transportation improvement bringing more development and secondary impacts (Note – Secondary impacts were not substantively addressed in the MIS analysis. Almost all impact discussions focused on direct impacts.)	The critical issues on page 2-2 are those that were identified at the Mission Workshop (Workshop No. 1) in October 1996. The last sentence under Environmental Impacts introduces the concerns over secondary impacts. We have also added narrative regarding secondary impacts to the Executive Summary, Next Steps. Also, this issue is addressed on page 6-4. A more thorough review of secondary impacts will be provided in the EIS.
• Addressing methods to mitigate the impacts of poor weather on traffic conditions did not seem to be provided. The problem was acknowledged, but discussion of mitigation options did not seem to be provided.	Mitigating poor weather is addressed through the inclusion of improvements in ITS, incident management, and highway maintenance. To some extent, the provision of FGT will offset the impacts of inclement weather, at least for the users of the FGT system.

Comment	Response
• Methods or a range of practical steps for ensuring that users who would benefit the most from the I-70 improvements would pay their fair share were not discussed or explained. Plans to protect corridor residents from paying a disproportionate share of the improvement costs were not addressed. The report should be revised to address this critical corridor issue. In this regard, it seems that Clear Creek County and Eagle County residents could be faced with substantial improvement costs based on the number of project components proposed for these counties. Citizens' Committee Workshop participants were strong in their sentiment that alternate routes should be included in this study. This is not reflected in the statements in ES-2, nor on page 4-2.	Pages ES-3 and ES-4 and 4-2 discuss the "screening" level evaluation. The concepts of affordability and finance were not addressed during the screening phase. In fact, no cost information was presented at the screening workshop at the request of the CWC and OSC. Although a financial plan has not been developed for the FGT, the TSM build elements would probably be financed by motor fuel taxes. Aviation elements will be funded by the FAA and the airlines. Local bus systems would principally be funded locally.
Section 3	
Page 3-2 Impacts to some wildlife, particularly bighorn sheep, are underreported by characterizing use of the I-70 ROW by bighorn sheep as not occurring. This is not the case in the Georgetown to Idaho Springs area on the north side of I-70.	The text has been revised on page 3-1.
Page 3-2 T&E species are characterized as not occurring in the localized ROW. This is not the case for the Boreal Toad, which is known to exist and breed on both sides of I-70 just east of the Eisenhower Tunnel.	This change has been made. See text revision, page 3-2.
Page 3-2 The Water Quality discussion should be revised to address several long-term water quality problems associated with the I-70 corridor. These problems include regular truck accidents that release contaminants into Clear Creek; sediment and salinity increases in Straight Creek, Clear Creek and Gore Creek from I-70 winter deicing activities. These changes have been long-term water quality degradation problems. The existing discussion gives an impression of no concern by noting that there were no reported accidents in 1996. What should be presented are statistics for the past 5 – 10 year period, including 1997. Such data would be more representative of the potential water quality impacts from accidental spills.	The text on page 3-3 suggests that spills can be a serious threat to potable drinking water supplies and fisheries. EPA data did not indicate regular truck spills into Clear Creek or any other drainages in the study area. The greatest degradation to the Clear Creek systems results from mine waste and acid mine drainage. Increases in congestion on I-70 will affect safety and could potentially increase the incidence of spills in the future.
Page 3-2 Recent studies in Texas and California indicate concern about "first flush" and other contaminants including mercury and dioxins from tailpipes, copper from brake pads, and dioxins, trace metals, and polyaromatic hydrocarbons from tires. Because Clear Creek serves as the drinking water supply for the Standley Lake cities of Broomfield, Thornton, and Westminster this issue needs further study.	Impacts of urban runoff can be a problem and will be addressed in more detail in the EIS.
Page 3-3 In the Wetlands discussion, the report seems to indicate none in Clear Creek county. Wetlands have been marked between the junction of US 40 and Dumont.	Comment noted. Wetlands maps will need to be updated as part of the EIS. Existing wetlands maps provided by the U.S. Army Corps of Engineers did not show the wetland between U.S. 40 and Dumont.
Page 3-6 In the Noise discussion there is no discussion of mitigation for this problem.	Noise mitigation will be identified during the design of the selected FGT technology.
Page 3-6 In the community Baseline discussion, it was clear during the Citizen Workshops that participants were concerned about development pressures, increased visitation, increased traffic within communities, increased demands on infrastructure, and visual impacts. None of these topics were discussed in this section.	These concerns are briefly addressed on page 3-6. We attempted to address these issues under "Workshop Results" throughout the report. The intent of Section 3 was to highlight the information found in local comprehensive plans. As discussed under "Local Planning," control of sprawl, preservation of rural character, the need for affordable housing, and more transit were common goals of all the plans.
Page 3-19 The summary section should address key points made in the preceding paragraphs of the section. It seems the current summary is unrelated to the key points of the section. Instead it seems to be a PR discussion promoting need for highway improvements to support state economic development.	Comment noted. Failure to make improvements to I-70 will increase travel delays, increase accidents, and have an unfavorable impact on the state's economy.
Section 4	
Page 4-2 The report should describe how the short term alternatives were screened. It is important to understand the critical review process that was applied to this group of construction elements because the short-term TSM/TDM measures were incorporated into all the alternatives. It appears from the report discussion presented on page 4-5 that these measures did not receive critical analysis or screening.	The TSM build alternatives specifically addressed current and projected system deficiencies. See Figures 3.22 and 3.23. The gamut of TSM/TDM improvements were presented at open houses in Georgetown and Eagle with little or no comment. The only TSM/TDM element eliminated was congestion pricing. Moreover, the inclusion of the TSM/TDM elements in the Vision was agreed to by the CWC Workshop 5 and by the OSC. The specific construction options for the TSM build elements (flex lanes, geometric improvements, etc.) will be resolved during the design and environmental improvement processes.
Section 5	
Page 5-5 Regarding the FGT operating plan description, is a "dwell time" the same as the time required to unload and load people at a station stop? If so, an assumed dwell time of 1 minute seems unreasonable if it is anticipated that a mix of general riders, families, and packages would be involved at each station.	Comment noted. A dwell time is the period required to load and unload transit patrons. Dwell times will need to be finalized after the selection of a technology and finalization of an operating plan.

Comment	Response
Section 6	
Page 6-2 The Water Quality/Water Resource discussion of impacts misrepresents the ability to adequately treat highway runoff contaminated with deicing compounds. Deicing compounds are very difficult to effectively manage and keep from contaminating local streams. Sand, oil, and grease can be managed much more easily than deicing compounds. This section should be revised to recognize the inherent difficulty associated with managing deicing contaminants and that measures that work for sand and sediment are ineffective for deicers. There are numerous aquatic life and water quality technical reports that can be cited to substantiate this problem in the Rocky Mountains.	Comment noted. Sedimentation ponds do not typically remove deicing compounds or other dissolved contaminants. CDOT studies suggest that sedimentation is the more significant problem in the I-70 corridor. See text revision on page 6-2.
Page 6-4 "Environmental justice" impacts are not defined, but are represented as not highly probable. This statement needs further explanation.	The intent of the detailed evaluation is to identify possible "fatal flaws" raised by the local public regarding the various strategies. Environmental Justice (EJ) relates to identifying and addressing disproportionately high and adverse human health impacts on low-income and minority populations as a result of any of the proposed actions. Since the strategies all lie within existing rights of way and from the results of demographic data collected during the MIS study process, there is no indication that EJ is a fatal flaw at this level of analysis.
Page 6-5 In the discussion of Historic Preservation, it is important to make that distinction that although Idaho Springs has a designated Historic District, Georgetown and Silver Plume are properly referred to as the Georgetown-Silver Plume National Historic LANDMARK District. This is a mining district and its designation is not singly based on historic structures within the communities. I-70 bisects this district and will be subject to Section 4(f) review. Visual impacts are considered impacts on a LANDMARK District.	This change has been made. See text revisions on page 6-5.
Pages 6-5 to 6-6 The Mobility/Safety Evaluation would benefit the general public by presenting the effectiveness of each package in terms of how much congestion it would reduce or eliminate relative to the present and forecast future conditions. This issue is addressed in terms of three parameters presented in the report, but it is not readily apparent from the current presentation what the overall or combined effects of these parameters would be to reduce congestion. The report section would benefit greatly from providing an expanded discussion that integrates the information to provide a direct answer. This approach would help the users determine the relative benefits of the different packages.	The text has been revised for clarification. In general, the Vision strategy would improve 2020 mobility through Idaho Springs and between Vail and Eagle as compared to current conditions. However, congestion at Eisenhower Tunnel is predicted to increase from 120 hours currently to 450 hours in 2020. This represents nearly a four-fold increase in congestion over 30 weekends per year. On average, this means motorists would experience an average of 15 hours of congestion during the 30 busiest weekends. Riders on the FGT would not experience this congestion. The only additional solutions to congestion at Eisenhower Tunnel include construction of a third bore, constructing an alternate route, congestion pricing, or a combination of these options. None of these options was well received by the CWC. See text revisions on page 6-7.
Pages 6-6 to 6-7 Table 6-10 shows the FGT alternative generating 400 hours of congestion at Idaho Springs annually. Is this correct? If so, the reason(s) for this increase in congestion should be identified because these results seem contrary to what would be expected.	The 400 hours is correct because only 1 to 2 percent of total "person trips" make use of the FGT System in 2020. The majority of the improvements is provided by the "flex lanes."
Page 6-11 In the Conclusions section it needs to be acknowledged that Clear Creek County has a long-standing agreement with CDOT that a preliminary and final design review process exists with the County Commissioners. This agreement has been in place because the county is not part of a TPR and projects built through Clear Creek would therefore not have the public review process provided in other counties in the state.	The concerns expressed by the residents of Clear Creek County that the Department of Transportation would proceed with highway widening projects without notice to the affected community is acknowledged. The Department of Transportation Commissioners are committed to informing the community and coordinating the development of the appropriate environmental documents and preliminary engineering activities in the I-70 Mountain Corridor with the affected citizens.
Page 6-11 In the discussion of Flexlane Geometry, Clear Creek County also recommended a thorough exploration of the concept of a reversible lane.	Comment noted. Narrative has been added regarding the reversible lane on page 6-13.
Page 6-11 In the discussion of Timing of Geometric Improvements, Clear Creek County recommended the timing of these improvements be prior to flexlane construction because of the possible effects on congestion.	Comment noted. This statement was included under "Timing of Geometric Improvements on page 6-13."
Page 6-11 In the discussion of Intermodal Transfer at Empire Junction, Clear Creek County raised the concern of 300 parking spaces not being related to the FGT plan and its projected needs.	Comment noted. This statement was included under "Intermodel Transfer at Empire Junction on page 6-13." The exact size of the facility will be determined at final design.
Pages 6-11 The description of OSC concerns regarding the Twin Tunnels portion of the Recommended Package discussion should be revised to disclose the following points of significant concern to the City of Idaho Springs. The City believes that excavating all or part of the hillside that bounds the Twin Tunnels to the south is not an acceptable alternative until such time as detailed meteorological investigations and wind modeling demonstrate that changes of the mountainside will not cause more adverse weather conditions in the City and surrounding areas. Historical evidence suggests that previous alterations of the mountainside to accommodate the existing Twin Tunnels adversely affected weather patterns in the City and its vicinity. The City does not want to incur additional wind damage and other problems that may result from large-scale alterations of the mountain topography. The existing text should be revised to adequately reflect the level of City concern associated with this issue so that it is appropriately incorporated into future decision-making processes. The current report description of this site give no indication of this local community concern.	This change has been made under the heading "Twin Tunnels on page 6-13." Meteorological studies would be done as part of the EIS for the twin tunnels project.

Comment	Response
Without detailed meteorological modeling and analysis of the potential wind and other effects of such excavation, this option would not be considered acceptable to the City of Idaho Springs.	
Page 6-12 In the Flexlane Geometry discussion, Clear Creek County requested a thorough analysis of a single reversible lane as opposed to two flexlanes.	See the second comment for page 6-11 addressed previously.
Page 6-12 In the Flexlane Geometry discussion, the definition of footprint was not defined as the CDOT right of way. It was described as the currently paved roadway, plus median, and toe of the ditch slope.	This change has been made under "Flex Lane Geometry."
Section 7	
Page 7-2 The assumption of no parking at the FGT station locations is probably not reasonable. The issue of access to and departure from each of the FGT stations is very important in these communities which are generally located and constrained by narrow valley bottoms. Not addressing the effects of providing parking would underestimate socioeconomic and environmental effects of this alternative.	Comment noted. It is not reasonable to design the stations until an FGT technology has been selected. At the design phase, communities will have the opportunity to address design issues. Parking can be minimized with the provision of an effective feeder bus system. It is also the communities' prerogative to not have a station.
Page 7-3 Proposed FGT passing sidings at each station would effectively widen the affected area in each community, leading to indirect effects on community structure and routine. Proposed passing sidings of 1 mile in length could be significant factors affecting smaller communities like Idaho Springs.	Land requirements for stations will be an issue. The location and characteristics of each station will need to be carefully configured during project design. Again, a community has the right to not have a station.
Page 7-3 Consider locating passing sidings outside smaller communities located in narrow valleys.	Comment noted. The design of the FGT would need to minimize impacts on local communities.
Page 7-4 The FGT plan assumes public transit system development for Clear Creek County, which currently has none, and expansions in other counties. The report does not address potential construction and operation costs of such a system. Who would operate the system, how would the system be financed, and what would be potential effects to county residents?	A financing plan has not been developed for local bus improvements at this time. Initial bus transit is endorsed as part of the Vision. Given the high level of support for transit, it appears reasonable that local bus transit improvements would be sponsored locally, with the potential for some state and federal participation. Our estimates for the Clear Creek system suggest the need for seven new buses plus annual O&M of $1.1 million (1997 dollars).
Page 7-4 Revise the discussion of the Geometric Improvements at Existing Bottlenecks to add that the City of Idaho Springs will require that detailed wind and other meteorological analyses will be required to address significant community concerns about potential effects of mountainside excavation on existing wind patterns and speeds through Clear Creek Canyon. This text should be added so future highway decision-makers are aware of the significant concerns regarding wind characteristics in this part of the corridor. These concerns should be factored in to the work plan for the planned programmatic EIS.	See the third comment for page 6-11 addressed previously.
Page 7-5 In the discussion of Slow Moving Vehicle Climbing/Descending Lanes there needs to be provision for analysis of ROW needs of the FGT.	See revised text, page 7-5, referring the reader to Section 5, which explains the FGT alignment assumptions used to assess this technology in the MIS. The "smart" highway widening section shown in Figure 5-3 is an example of how the slow-moving lanes would still provide an interior median that could accommodate a thin profile elevated FGT technology.
Pages 7-4 to 7-6 Provide milepost numbers in Figure 7.4 to help readers correlate text with figure and station locations.	Milepost markers were purposely omitted in Figure 7.3, FGT Station Locations. The intent of this graphic is to indicate the extent of station needs and generalized community and highway interchange locations. Actual station locations are a matter of local government concern at a level of detail that is outside the scope of this MIS.
Page 7-10 The section on Consequences of Implementing the Vision should be revised to disclose whether the listed effects are for all or only some of the vision elements, the text should be revised to clearly disclose which elements are responsible for which effects.	See revised "Consequences."
Page 7-10 The list of environmental impacts does not appear to address indirect impacts or cumulative impacts, which could be significant. For example, no mention is made of how and where materials produced by tunneling would be disposed of; effects of providing electrical power for the FGT; effects of widening US 6 in Eagle County; effects from developing new powerlines; and other similar consequences.	Secondary impacts related to growth are conceptually addressed in Section 6. The majority of these issues can be more accurately quantified in the EIS document and after more definitive design information is available. For cost estimating, it was assumed that approximately 25 percent of the tunnel spoils would be used for track ballast and 75 percent would be disposed of within 25 miles of the tunnel site. It is expected that the majority of the material would be useable for sub-base material or aggregate after crushing. Regarding the power supply for the FGT, our calculations suggest that it is possible that a new transmission line would be needed in Eagle County. However, it was assumed the cost of transmission would be included in the cost of power, regardless of the source because this was not a cost consideration. In both cases, the potential impacts will vary tremendously depending on the FGT technology selected. Impacts for constructing frontage road improvements in Eagle County were included in the totals for acres disturbed (about 40 acres) and the potential for property acquisition resulting from frontage road widening was included in Section 6, under Socioeconomics. Private property acquisitions can be anticipated; we could not determine needs for relocation of homes or businesses without a detailed alignment that would be provided during design. However, these impacts would occur with any of the five build strategies considered.

Comment	Response
Page 7-10 Effects to wetlands look too small given that most changes would be located in valley bottoms with many wetland and riparian locations.	Wetlands impacts will need to be revisited in the EIS. Since nearly all construction is assumed to occur in the median, impacts potentially are mitigated. We expect impacts on wetlands to result primarily from bridge widening. Bridge designs will need to be reviewed by the Corps of Engineers.
Page 7-10 The Community Impacts relative to Clear Creek County, and especially Idaho Springs, seem to be substantially underestimated given that the county and Idaho Springs would be the focal point for: 3 FGT stations, a passing siding, expanded local bus service, a new public transit system, a new intermountain bus service station, expanded Twin Tunnels, an Intermodal Transfer Station/park-N-Ride facility; east Idaho Springs interchange configuration; west Idaho Springs interchange improvements, I-70/Hwy 40 interchange improvements, truck climbing lanes, and flexlanes. County communities, facilities, and roads already experience substantial traffic congestion and lack of adequate parking areas because of space limitations. There is no mention of adverse cumulative effects on community quality of life and traffic mobility with the alternatives.	The impacts on Clear Creek County have not been underestimated, they simply have not been separated out from the collective discussion. The impacts of the TSM improvements have been defined as best as possible given the fact that there is no design information. Estimates of acres disturbed, extent of rock cut, construction employment, and other issues were presented in matrices distributed at Workshop No. 5 and highlighted in the Draft Final MIS report. Estimates of rock cut are difficult to define at this time but are assumed to occur from the bottom of Floyd Hill to the twin tunnels (about 2.5 miles). Depending on the extent of curve smoothing, visual impacts could be significant. If the impacts are too great, the scope of the project may have to be modified to obtain environmental approvals. The flex lanes have been estimated to disturb about 33 acres and the truck climbing lanes, about 18 acres. The impact of the twin tunnels' improvements would be relatively modest with an addition of tunnel capacity. "Day-lighting" the tunnels would have a significant visual impact. FGT stations would require 1 to 5 acres depending on the amount of parking provided. Mitigation measures cannot be defined until the design concept is known, and impacts cannot be fully characterized until the effectiveness of the mitigation is known. Concerns regarding transit stations and intermodel facilities can be effectively mitigated – in the extreme case, the county may simply opt for no (or reduced levels of) service. Interchange improvements will hopefully improve safety and reduce congestion. All of these issues are important and need to be clarified and resolved at the EIS and design phases.
Page 7-10 There is no mention of potential mobility, financial, and other impacts to Clear Creek County and its communities of potentially implementing a new public transit system, and the impacts to other counties and communities of the potential expansion of the public transit systems. The effects of this assumption should be disclosed and concisely characterized.	Proposed bus transit improvements in Summit County and Eagle County generally parallel existing plans and will be funded locally through existing methods (fare box and sales taxes). A new bus system in Clear Creek County, benefiting county residents, would also be funded locally as mentioned above.
ADDITIONAL COMMENTS FOR DRAFT FINAL I-70 MOUNTAIN CORRIDOR MIS **BDS 8/3/98** The following comments present overall concerns about the adequacy of information and conclusions presented in the Draft Final I-70 Mountain Corridor MIS report. These concerns affect the accuracy and completeness of the report, which should be revised or amended to address. Not addressing these concerns results in a report that possesses several significant weaknesses. These weaknesses include the following:	
• Report content does not achieve or agree with all its expressed goals and objectives:	Comment noted.
• The report does not address some substantive issues expressed by members of the OSC and other members of the public;	Comment noted.
• The report implies group consensus and concurrence on several key issues, when in fact, there are several substantial public issues regarding the proposed vision package and its alternatives which remain unresolved;	Comment noted.
• The reported impacts of the proposed vision and its alternatives are incomplete and inaccurate;	The assessment presents the consequences as completely as possible without the benefit of more detailed design information. The intent was to define major differences among alternatives and to identify potential "fatal flaw" impacts. These issues need to be resolved in the EIS as required by NEPA.
• Integration of public input has been selectively implemented to enhance positions favored by report authors and to eliminate concerns that did not support CDOT policies and planning goals; and	This development of the Vision was based on five public workshops, open to any individual wishing to attend.
• Integration of public involvement was suspended at the most critical step of the MIS process by failing to revise the draft final report to address or disclose information relative to matters that are considered significant to the acceptability and to the balanced analysis of alternatives affecting the public and communities along the future I-70 corridor.	All of the comments received have been responded to and are available for public review. A copy of this response will be included in the final MIS report.
Reasons for these conclusions are based on the following general concerns. More specific comments are provided herein. Major concerns are as follows: 1. The impact analysis process and report do not address potentially significant adverse indirect and cumulative impacts. These omissions are significant and suggest actual levels of impact that may be more extensive and expensive that those suggested by the current draft final report.	This has been addressed in earlier comments and will be addressed in more detail at the EIS phase.
2. The scope of work for the future I-70 programmatic EIS must be written to include detailed evaluation of indirect and cumulative types of impacts in order to comply with NEPA implementation guidelines and requirements.	NEPA will require this.
3. Public review of the draft final report was confined to a very short period that did not allow adequate review of the numerous detailed technical background reports relevant to the conclusions and characterizations that were presented in the draft final report. The shortened review allowed by CDOT and its consultants discouraged meaningful public review and input.	The OSC had the responsibility for review of the document. Public input was also provided at five public workshops and six open houses. Formal public reviews of the Vision will be provided during the EIS phase.

Comment	Response
4. Requests to CDOT's consultant for a copy of the draft final report for public review were not responded to. This action reinforced the perception that CDOT and its consultant were not interested in receiving public input.	Over 70 copies of the report were distributed for comment. Also see above response.
5. It is unclear how the TSM build elements were screened and evaluated for environmental impacts. It appears the complex of TSM build components that were included in all alternatives may not have received critical and objective evaluations required by NEPA. It appears these components, several of which are of high concern to the communities that would accommodate them, may not be the focus of either the proposed future programmatic EIS or any other EA or EIS. Thus, these build components may avoid detailed environmental investigation and evaluation. These components require detailed NEPA environmental evaluation, if the evaluation has not already been completed, for no other reason than the components have (and will) generate significant public controversy.	See previous comments regarding the TSM elements.
6. The apparent decision not to revise the draft final report to address public comments provides a clear indication that CDOT does not intend to incorporate public input into the most important parts of the process – conclusions, recommendations, and balanced treatment of project and community issues established through the scoping process. It is strongly recommended that the draft final report be revised to objectively and completely address the public concerns.	The document has been revised to include public comment. The objective is to move forward to the EIS, which provides the legal venue for formal public scoping, impact analysis, and mitigation.
7. The report does not provide a clear understanding of how effective the proposed vision and alternatives will be in reducing future I-70 traffic congestion, which is the primary objective of the MIS. The report should provide a clear and straight forward answer to this basic question in a manner that is understandable to the general public. The answer may be present, but it is masked by technical jargon and the present structure of the report. Given the current position of CDOT to avoid revisions to the draft final document, it can be inferred that a straight forward answer will not be provided.	Section 6 presents the relative comparison of mobility benefits for each of the alternatives. The Executive Summary has been revised to clarify this information.
8. The CDOT OSC presentation of July 14, 1998 suggested that project financing and affordability played the most important role in screening and determining the specific TSM projects to be constructed in the near term. The draft final report did not imply that project financing and affordability received the level of importance in screening the build options as described by that meeting's sponsors. Thus, it appears that the actual analysis and rating of alternatives were conducted using a different method than described in the draft final report. This apparent discrepancy should be addressed by a revised report.	The TSM build options were based on a systemwide deficiency analysis (see Figures 3-23 and 3-24 in the original report), accident information, existing local transportation plans, and input received at public meetings. At the presentation on July 14, it was suggested that because funding is available (from the HUTF) for these improvements, they would be easier to implement, and thus given priority, over build elements where no funds have been identified. Further, these improvements provide tangible mobility benefits over the next 20 years.
I-70 Consensus Claims Premature Open Response to Guillermo Vidal Article, July 26, 1998 - *Denver Post* Members of the Oversight Committee of the 1-70 Mountain Corridor Major Investment Study (MIS) read with interest the article by Guillermo Vidal, Executive Director of the Colorado Department of Transportation, in the July 26 Denver Post. The assessment of I-70's importance to Colorado and the nation as an access to mountain recreation areas and an east-west freight artery is well addressed and the problem of 120 hours of annual congestion is well documented. However, the conclusion that a consensus has been achieved for the solution to that congestion is premature and inaccurate. The vision of a fixed guideway as a 50 year, permanent solution to the projected increased traffic flow was indeed the result of the Citizens Workshops for the I-70 Mountain Corridor Major Investment Study. There was far less than agreement from that group on some key components of the interim improvements, which CDOT proposes to be mostly highway construction. At the final gathering of the Citizen Workshop Committee in December of 1997, the particulars for the Interim highway improvements were remanded to the Oversight Committee which represents the CDOT, affected counties, planning regions and special interest groups. In the opening months of 1998 the Oversight Committee reviewed and debated the plan components. Major areas of concern arose in regard to the role and financial commitment of CDOT to the guideway vision, and in regard to the timing and extent of the proposed highway improvements. Vidal states, "CDOT is solidly committed to this multi-modal vision" which would indicate a leadership role for the Department of Transportation in planning for, and with, the recently authorized Colorado Intermountain Fixed Guideway Authority (CIFGA) to achieve the 2008 construction goal. Unfortunately, there is no indication that CDOT will commit any resources to building fixed guideway transit. Nearly all CDOT moneys for the Golden to Vail segment are committed to interim highway projects with a "Good luck to CIFGA" attitude toward guideway needs. Clearly, the "highway only" restriction on most state transportation funds will have to be removed if the I-70 vision is to be implemented. We look forward to working with CDOT and others to remove this obstacle to smart transportation planning. However, CDOT has not yet agreed to use any of the funds that could be tapped to help build the fixed guideway system. The legislature has allowed a portion of the state surplus to be used for rail projects and a portion of federal funding for the interstate system could also be used. There is no disagreement about the points of congestion in Clear Creek County or the need to improve traffic flow in those areas. The traffic backs up from the Twin Tunnels east of Idaho Springs and from the I-70/Highway 40 Interchange north of Georgetown. Yet, the first highway improvement discussed is 14 miles of flexlanes through Idaho Springs. If this is the first priority cars will back up in three lanes in front of the Twin Tunnels instead of in two lanes. The configuration of flexlanes or a reversible lane also has no consensus. No implementation or time schedule is currently proposed for any of the highway improvements although it is suggested that ten to fifteen years of construction would be required for completion of the proposed projects. Consider the congestion this would cause. In addition, there was strong support for the concept of equal spending for highway projects and fixed guideway projects. The DRAFT report does not address this issue. If there were a commitment to the guideway would all of these highway projects be necessary?	Comments noted.

Comment	Response
A DRAFT of the I-70 Mountain Corridor Final Report was presented to the Oversight Committee on July 14, 1998 at the end of their meeting. This DRAFT certainly has not been endorsed by the Oversight Committee as a group nor by the individual members. The Draft has major flaws in articulating the vision and factual inaccuracies in its details. The environmental baseline fails to include some significant habitats and endangered species. The water quality concerns do not present a complete accounting of potential pollutants to the public water supply of the Standley Lake cities, Northglenn, Thornton and Westminster. Further, there is disagreement on the definition of the land area to be used for highway improvements. The Oversight Committee has defined "footprint " to be at the toe of slope, meaning the existing built elements of pavement, median, shoulders and ditches of I-70, which range from 70 to 96 feet wide depending on the width of the median. CDOT's version of '"footprint" would include the entire legal right of way. The right of way is 200 feet wide through some areas of Idaho Springs, nearly three times the width of the presently constructed I-70 in the area. Construction in the right of way would affect housing, streets, recreational facilities and would impact National Historic Districts. Resolution of the footprint definition and establishing a balance of highway and transit in CDOTs interim plan for 2010 is essential for our endorsement of the MIS Vision. The mountain counties have clearly said that more pavement, an expansion of the "footprint" (hidden under any guise) destroys our natural and cultural environments, the very reasons our citizens and visitors love Colorado. That price is beyond the reach of cost analysis. We promise continued conversation in hopes of actually achieving the consensus of which Mr. Vidal speaks. We hope Mr. Vidal will personally join the discussion. Until then, however, claim of a consensus is inaccurate. Gary Lindstrom Summit County Commissioner Oversight Committee Member Bill Macy Mayor of Idaho Springs Oversight Committee Member Lauren Martens Colorado Environmental Coalition Oversight Committee Member John Martin Garfield County Commissioner Oversight Committee Member Jo Ann Sorensen Clear Creek County Commissioner Oversight Committee Member	

Comment	Response
August 10, 1998 Sam Atencio Colorado Department of Transportation, Region 1 18500 East Colfax Ave. Aurora, CO 80222 Don Urich CH2M HILL P.O. Box 241325 Denver, CO 80224-9325 Re: I-70 Mountain Corridor Major Investment Study Report Dear Sam and Don: Colorado Ski Country USA (CSCUSA) is the trade association representing the Colorado ski industry. CSCUSA represents 25 Colorado resorts in the areas of marketing, public and media relations and public policy. Personnel from CSCUSA's member resorts and CSCUSA staff have been active participants in the I-70 Mountain Corridor Major Investment Study (MIS) from the outset of the process in October, 1996. We participated in every public workshop and held a seat on the oversight committee, where we were vocal participants in the debate over the strategy for the I-70 mountain corridor. CSCUSA hereby submits the following comments on the Draft Final Report for the I-70 Mountain Corridor MIS. Underlying Need for Major Investment. CDOT undertook the I-70 Mountain Corridor NUS because forecasts suggest that traffic will continue to double every 15 to 25 years in various locations throughout the corridor; the duration of congestion at critical locations is projected to increase nearly six-fold by 2020 during 30 weekends per year; and because current operational, safety and congestion problems demand prompt attention. (Draft MIS Report at ES-1). In discussing current operating conditions on the I-70 corridor, CDOT explained that "without improvements in the I-70 infrastructure, continued degradation would be expected, limiting the economic capacity of the state of Colorado." (Draft MIS Report at 3-19). CDOT also noted that, based on new dollars in the state's economy, tourism is the state's second largest industry, that I-70 conditions are very influential in bringing visitors to the mountain corridor and that "Colorado must be able to provide adequate travel resources to maintain and improve market share in ski, touring, outdoor and country resort vacations." (Id.) CSCUSA underscores CDOT's identification of the need for strategic investment on the I-70 Mountain Corridor to address current and future safety and congestion problems. CSCUSA also strongly agrees with and supports CDOT's recognition that I-70 is a route critical to Colorado's economy and to a vital tourism industry in Colorado. CSCUSA's MIS Position. The I-70 Mountain Corridor is the lifeline of several CSCUSA member ski resorts whose guests rely on I-70 to access the resorts and whose economies are served by the on-time delivery of goods which are transported on I-70. Arapahoe Basin, Beaver Creek, Berthoud Pass, Breckenridge, Copper Mountain, Keystone, Loveland, Silver Creek, Ski Cooper, Vail and Winter Park all rely on I-70 as the primary access route for guests coming from Denver International Airport or other locations on the front range. Aspen, Steamboat and Sunlight Mountain Resort also rely on I-70 for access. CSCUSA's participation in all discussions concerning the I-70 Mountain Corridor MIS has been based on these three principles: 1) Immediate, mid-term and long-term improvements to the corridor are needed. 2) Improvements to the corridor must serve the unique needs of the resort guest and Colorado tourist, as well as the needs of corridor residents, the freight community and other users. 3) Improvements to the corridor must be implementable within a reasonable timeframe and must be fundable with resources which are expected to be available.	

Comment	Response
Requested Changes to Draft MIS Report. CSCUSA believes that three key revisions should be made to the Draft MIS Report: the emphasis of the corridor vision should be balanced, the "philosophy of finality" should be eliminated and an implementation chapter should be added.	See responses to the following comments.
First, the corridor vision set forth in the Draft MIS Report identifies development of a high speed fixed guideway transit system to be "supplemented by" a series of transportation system management (TSM) and transportation demand management (TDM) measures, which address improvements to the existing I-70 highway. (MIS Report at ES-4). CSCUSA believes that the characterization of these highway measures as "supplemental" to developing a fixed guideway system, which may take 50 years or more, does not accurately reflect the needed balance between highway and transit strategies. The need statement for the MIS plainly indicates that the corridor faces problems which require some solutions now. CSCUSA has stated during the entire MIS process that highway improvements in the short and mid-terms are a critical, not a supplemental, part of the overall corridor vision. The vision statement in the Draft MIS Report should be revised to reflect the importance of the TSM and TDM measures to the overall corridor strategy.	Comment noted. The narrative supporting the Vision was carefully developed with the OSC to obtain consensus. Revising the intent of the Vision statement at this time is not appropriate.
Second, CSCUSA believes that the "philosophy of finality" incorporated into the corridor vision does not serve the interest of improving corridor mobility. We believe that corridor improvements and strategies should be evaluated and assessed on an ongoing basis, as they are implemented. Funding for certain components of the vision may not be available. Certain measures may be more or less successful than projected at alleviating problems on the corridor. Such possibilities make it unwise to rule out making mid-course corrections or changes in strategy over the next 50 years. The "philosophy of finality" should be eliminated from the Draft MIS Report.	Comment noted. The work "finality" was reconciled by the OSC, including CSCUSA. Revising the Vision statement at this time is not appropriate.
Third, CSCUSA believes that the fact that cost was specifically excluded from consideration in the selection of the recommended corridor strategy is a serious flaw in the MIS process. This flaw will be compounded if a realistic discussion of available funding and a prioritization of the elements of the corridor strategy, given the available funding, is not included in the MIS Report. CSCUSA believes that the MIS Report is incomplete without a detailed chapter which discusses how and when the corridor strategies will be funded and implemented and urges CDOT to add such a chapter before finalizing the report.	Comment noted. It has been decided not to include an Implementation Plan in this MIS because project prioritization and funding are established through the statewide planning and State Transportation Improvement Program (STIP) processes. The MIS does not override these processes.
CSCUSA Recommendations. CSCUSA recommends that CDOT revise and finalize the MIS Report without delay and commence the next steps towards implementing the MIS strategies. First, an aggressive timetable should be set forth for the presentation of the MIS to the transportation planning regions, DRCOG and the Intermountain TPR, and for coordinating the MIS strategies with regional planning efforts. During this process, CDOT must defend the broader regional interests of the I-70 Mountain Corridor against attempts to supercede them with Metro Denver priorities.	Comment noted. Please refer to the response above.
Second, CDOT should allocate sufficient resources to the National Environmental Policy Act (NEPA) review of the I-70 Mountain Corridor MIS so that the NEPA process also can move forward on an aggressive schedule.	Comment noted. This has been done.
Third, CSCUSA urges CDOT to focus on accomplishing as many of the I-70 corridor strategies as possible as expeditiously as possible with available funding. CSCUSA strongly disagrees with the position taken by some corridor stakeholders that available funding should be divided 50-50 between advancing the fixed guideway strategy for the corridor and advancing short-and mid-term corridor solutions, specifically the TSM and TDM measures. The immediacy of the operational, safety and congestion concerns on the corridor mandates that highway improvements not be held hostage to the fixed guideway effort.	Comment noted.
In conclusion, CSCUSA urges that CDOT make the changes suggested above to the MIS Report before finalizing it and then focus on moving incremental solutions forward quickly. None of the strategies identified in the MIS Report are perfect and none will eliminate operational, safety and congestion concerns on the I-70 Mountain Corridor, in either the short or long term. However, these concerns are urgent and should be addressed incrementally with highway improvements identified in the MIS while technology and funding catch up with the long-term vision for the corridor. Sincerely yours, Melanie D. Mills Executive Vice President of Public Policy cc: Transportation Commissioners Aden, Anderson and Haight Guillermo Vidal, Executive Director, CDOT Matt Reay, CDOT Region 1 Transportation Director Bob Farley, Executive Director, DRCOG Margaret Carpenter, Chair, DRCOG George Roussos, Intermountain TPR	Comment noted.

Comment	Response
Memorandum To: Sam Atencio From: Jo Ann Sorensen, Clear Creek County Bill Macy, City of Idaho Springs Date: October 14, 1998 Re: I-70 Mountain Corridor Major Investment Study The City of Idaho Springs and Clear Creek County remain concerned about aspects of the Draft Final Report (July, 1998) and the proposed resolution of report review comments that were provided by us and others on the Oversight Committee. We believe some aspects of the report should be revised to address the previous comments, several of which are significant concerns. Because the Oversight Committee was "responsible for policy guidance and was charged with endorsing an ultimate Vision (or Locally Preferred Alternative) for the I-70 Mountain Corridor" (page ES-2), we believe it is important that these (as well as previous) issues are addressed by the report so we can fully endorse the Vision package. In addition to comments that were previously submitted, the following new concerns would be addressed either by a revised document or by the proposed programmatic EIS. These additional concerns resulted from having additional time to review the draft final report in greater detail and to consider the implications of the projects and the alternatives on our communities and the environment along the I-70 corridor. Additional comments are as follows:	
1. There is still continued concern that the draft final report will not be revised to address our comments. As explained on pages ES-1, 1-1 and 1-2, and reinforced by our meeting with Mr. Vidal on September 24, 1998, this report serves as a major planning document and evaluation tool. As a minimum, we believe the report should be revised to include an appendix that lists and addresses each comment. Comment responses could include a range of approaches that would include the following: (a) concisely answering the comment; (b) indicating a difference of opinion and stating the reason(s) for the difference; (c) indicating that no change in the original text is necessary; and (d) indicating the concern or matter will be addressed by the programmatic EIS. This step is important because the Major Investment Study, the future programmatic EIS, and the future project-specific EIS/EA/negative declarations (ND) will form the three major environmental documents for this important project. The documentation of each step should be as complete as reasonably possible to avoid unintentionally failing to address significant community and public-interest issues.	Section 8 has been added to the report to include comments and show how they are addressed in the Revised Draft Final Report dated November 1998.
2. If the Colorado Department of Transportation does not intend to revise the draft final report, we request that CDOT allow interested members of the Oversight Committee an opportunity to review and provide direction in developing the scope of work for the programmatic EIS. Because CDOT is proposing to assign the resolution and evaluation of many of the existing City and County issues to the programmatic EIS process, we believe it is appropriate that the tasks be included in the scope of work to ensure they are addressed. City and County involvement could be accomplished without compromising the anticipated schedule for developing the scope of work.	Comment noted. One of the first tasks in the EIS process includes a scoping meeting where all public concerns will be expressed. These concerns will then be incorporated into the EIS work plan.
3. There are still concerns that significant environmental and community issues associated with the proposed plan may not be fully determined, disclosed, and mitigated in a timely fashion to decision makers and potential funding sources **before** the major planning decisions are made. As the draft final report acknowledges at several places, this is a long-term project with major changes anticipated along the corridor. We believe that all reasonable efforts should be made to identify the significant effects of these changes before the decision to move forward with a plan is made so that appropriate mitigation measures (and their cost) can be agreed to as part of the decision-making process. We believe that the proposed programmatic EIS should be as specific and detailed as possible about the potential environmental and community effects if future specific highway and corridor improvement projects anticipated for the corridor and especially those proposed for the County. The overall environmental impact analysis process could span a period of 5 to 20 years as the project moves through the MIS, programmatic EIS, and the project-specific EA, EIS, or ND process. We do not want to see the difficult and potentially significant community issues repeatedly deferred to a future environmental documentation step to be resolved, only to find out in the future that it is too late to address the issue because the impacts have already occurred. In summary, we request that (a) as many of the project-specific impacts be addressed by the programmatic EIS as possible, even though some of these analyses might traditionally be deferred to a later time when a project-specific EIS or EA would be prepared and (b) these impacts should be presented for public review before decisions are made regarding major investments for the corridor.	All impacts and mitigation will be addressed to the level of public satisfaction prior to issuance of a Record of Decision (ROD). Design work cannot be started until receipt of the ROD. The programmatic EIS will address the issues (many of which have been documented in the MIS) brought forth in the EIS scoping meeting as discussed above. Also, if it is determined that a specific element of the Vision would result in significant or publicly unacceptable impacts, it would not be implemented under the NEPA process. Both the programmatic and project-level EIS findings will be subject to public comment prior to the ROD.

Comment	Response
4. The issue of existing water quality in the Clear Creek watershed is of significant importance to Clear Creek communities. There are two additional water quality issues to be added to the points that were identified earlier. The first issue involves potential conflicts with the Standley Lake Agreement. The draft final report needs to address this agreement because of the potentially substantial implications further water quality degradation by the I-70 project would have on our communities along I-70. Basically the agreement sets water quality discharge restrictions on the communities for nitrogen and phosphorus. Each increment of nutrient releases derived from future I-70 earthwork, vegetation removal, construction, and operation activities is an additional increment of wastewater treatment flexibility that is lost by the communities. The result will be the imposition of higher wastewater treatment and water quality monitoring costs on the communities. The draft final report should identify this significant local impact and should identify potential options for mitigating the impact. These conditions and potential effects should be addressed at pages 3-2, 6-2, and 7-10.	The MIS report states the need for mitigating runoff from all proposed highway and transit improvements. A final assessment of regional water quality issues will be addressed in the EIS. The purpose of the MIS was to address major differences among alternatives. It was determined that mitigation of water quality impacts would be required regardless of the strategy implemented.
5. The second additional water quality issue involves increased releases of regulated and hazardous metals associated with new roadway cuts and construction disturbances, such as those discussed for the tunnels east of Idaho Springs and those required through historic mine tailing deposits, into Clear Creek. The creek already has high background concentrations of metals that are derived from storm runoff across old mine tailings, and from the periodic disturbance of mine tailings by routine highway maintenance and runoff management. There is an existing impact to our communities from these effects, which would become greater in the future unless there is effective and adequate mitigation employed to compensate for additional metal pollution. The impact is increased wastewater treatment costs to achieve a more efficient metal removal from the wastewater in order to remain below the wasteload allocations for Clear Creek. As metal pollutants from I-70 increase, our communities have to spend more money to achieve more stringent wastewater treatment levels. These costs are significant for our small communities. The draft final report should identify this significant local impact and it should identify potential options for mitigating this impact. These conditions and potential effects should be addressed at pages 3-3, 6-3, and 7-10.	Our initial assessment suggests that construction would avoid known tailings piles in Clear Creek County. Additional rock cuts, if found to be publicly acceptable, will need to be evaluated for non-point source pollution.
6. The project financial evaluation (pages 6-9 through 6-11) is apparently based only on capital, operations, and maintenance cost estimates (pages 6-9). The report should be revised to show a separate cost estimate for anticipated environmental and community mitigation measures and programs for the different packages. It is anticipated mitigation costs would be significant and there would be substantial differences among packages. This cost should be presented for public information and for consideration by decision makers. A discussion should be provided that discloses the potential sources of funds for mitigation. If mitigation costs are included as part of the operation and maintenance cost, then this point should be disclosed by the revised report. Mitigation costs will play an increasingly more important role in decision making as the details and environmental analyses of the packages progress. We believe it is essential that a reasonable estimate of all mitigation costs be provided in the revised MIS report.	Generous environmental investigation costs are included in the estimate. Mitigation costs were assumed to be approximately $200 million for the original $5.3 billion Vision. Extending the High-Speed FGT from DIA to west Denver and from Vail to Glenwood Springs would add approximately $120 million to the mitigation budget. Thus, the total mitigation budget for the Vision is over $300 million.
It was suggested at one or more of the Oversight Committee meetings that CDOT corridor improvements made as a result of this project would be the last set of CDOT changes needed for I-70. This concept seems to be confirmed by text at page ES-4, which refers to "finality," although the meaning of this text, "A philosophy of finality:…described here" is unclear. If this interpretation is correct, our communities will request initiation of discussions regarding the transfer of land ownership of segments of unused CDOT right-of-way back to our communities to compensate for the loss of property that occurred with construction of existing I-70 and that will be required to accommodate the support facilities needed for the Vision package.	Comment noted. Discussions regarding ROW transfers are premature at this time.
Finally, we request that CDOT make available an electronic copy of the text file (and graphics, if everything is tied into one file) of the draft final MIS report and all the supporting detailed documents that are referred to by the MIS report. We would like to have the ability to review particular aspects of the study as we progress through this project, and doing so electronically will be much easier than flipping through hundreds of pages of paper.	Copies of the report and supporting documents will be released to the Oversight Committee and will be available from CDOT. It is CDOT's policy to release only hard copies of documents.

Comment	Response
November 17, 1998 Mr. Matt Reay Region 1 Director Colorado Dept. of Transportation 18500 East Colfax Aurora, Colorado 8001 Re: Final Report for I-70 Mountain Corridor Major Investment Study Dear Mr. Reay: The November 1998 draft final report is generally responsive to review comments and changes that were suggested by the previous review comments. The revised report presents a more balanced treatment of the environmental and community concerns of many of the corridor stakeholders. A major underlying theme of the November 1998 report and response to reviewer comments is to defer treatment of some of the potentially significant environmental issues to future environmental impact statement(s) (EIS). The report recognized their importance of the first EIS ("and probable…individual… EISs…prepared for…major build elements") in addressing environmental issues of concern identified during the stakeholder process (page ES-10). The deference by the Response to Oversight Committee Comments (Section 8 of the November 1998 report) of about 25 percent (17 of 68 comments previously submitted by us) of the comments to be addressed by the future EIS(s) indicates the important role this document and process will play in determining the selection of the preferred alternative and its required mitigation. There are a number of responses that do not appear to address the original comment. Rather than engage in another round of comment-and-response, we have two suggestions for more effectively and efficiently addressing previously identified concerns. • First, time would be more effectively used by allowing our participation in developing and/or reviewing the proposed scope of services, details of the proposed work plan, and list of anticipated deliverables to be created by the National Environmental Policy Act (NEPA) EIS process. This participation would provide us with a better understanding of how unresolved concerns would be addressed during the EIS process. This type of involvement would not be provided through the typical public scoping steps as was suggested by one of the Section 8 comment responses.	One of the first steps of the EIS process will be a public scoping meeting. The results from this meeting will be used to refine the scope of work for the EIS. Comments from the County, as well as all other I-70 mountain corridor communities, would be received at this time.
• Second, if this involvement cannot be accommodated, it is strongly recommended that Section 6, Detailed Environmental Evaluation of the November 1998 report be revised to describe conceptually how the initial programmatic EIS (as is has previously been identified) will be structured and completed to facilitate linkages with future project-specific EIS and EA (environmental assessments) to ensure that incremental cumulative effects of projects already completed are combined with proposed projects to give an accurate and realistic estimate of actual project impacts.	The scope of work (SOW) for the EIS has not been completed at this time. The purpose of the programmatic EIS is to focus on the cumulative impacts of **all** the vision elements assuming all were constructed.
We remain concerned that with a project of this magnitude and duration that the potential is very high for significant incremental impacts to go unrecognized in time to effectively manage their occurrence and severity. With the probability of significant adverse effects occurring and options for reversing effects potentially limited, we believe these requests are reasonable and could be readily accommodated. Sincerely yours, William V.K. Macy Mayor, City of Idaho Springs cc: Governor Elect Bill Owens Dave James, FMHA Holly Fliniau, EPA Clear Creek County Board of Commissioners Senator Tony Grampas U.S. Senator Wayne Allard	The significance of the combined impacts associated with the project is a critical issue for Colorado. The significance of impacts will be determined by the degree of land use planning and enforcement at the local level.

SECTION 9

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Appendix A

Citizens' Workshop Committee Mailing List

Code	NmLast	NmFirst	Co Bus Assoc Org	Address1	City	StateOrI	PostalCode	WorkPhone	FAXPhone	WS1	WS2	WS3	WS4	WS5
WS			CLEAR CREEK COURANT	PO BOX 2020	IDAHO SPRINGS	CO	80452-	(303) 567-4491						
WS			CHAMBER OF COMMERCE	PO BOX 127	CONIFER	CO	80433-	(303) 838-0178						
WS			WINTER PARK-FRASER VALLEY CHAMBER OF COMMERCE	50 VASQUEZ RD	WINTER PARK	CO	80482-	(303) 726-4118	(303) 726-9449					
WS			EAGLE VALLEY CHAMBER OF COMMERCE	P O BOX 964	EAGLE	CO	81631-	(303) 328-5220	(303) 328-6254					
WS			GILPIN COUNTY CHAMBER OF COMMERCE	440 LAWRENCE	CENTRAL CITY	CO	80427-	(303) 582-5077						
WS			AVON-BEAVER CREEK RESORT ASSN.	260 BEAVER CREEK PL	AVON	CO	81620-	(303) 949-5189	(303) 949-4385					
WS			METRO NORTH CHAMBER OF COMMERCE	11990 GRANT ST #218	DENVER	CO	80233-	(303) 450-0335	(303) 450-2610					
WS			LIONS CLUB OF COLORADO	1591 FULTON	AURORA	CO	80010-	(303) 366-4323						
WS			HISPANIC CHAMBER OF COMMERCE	W 7TH AVE #100	DENVER	CO	80204-	(303) 534-7783						
WS			EVERGREEN AREA CHAMBER OF COMMERCE	29015 UPPER BEAR CREEK RD	EVERGREEN	CO	80439-	(303) 674-3412						
WS			SOUTH METRO DENVER CHAMBER OF COMMERCE	7901 SOUTH PARK PLAZA #110	LITTLETON	CO	80120-	(303) 795-0142	(303) 795-7520					
WS			CHAMBER OF COMMERCE	PO BOX 248	GEORGETOWN	CO	80444-							
WS			NORTHWEST METRO CHAMBERS OF COMMERCE	7305 GRANDVIEW AVE	ARVADA	CO	80002-	(303) 424-0313	(303) 424-5370					
WS			GEORGETOWN CHAMBER OF COMMERCE	P O BOX 444	GEORGETOWN	CO	80444-	(303) 569-2888						
WS		PATCH	MOUNTAIN MESSENGER	P O BOX 2090	IDAHO SPRINGS	CO	80452-	(303) 567-9623	(303) 567-4140			X		
WS			IDAHO SPRINGS CHAMBER OF COMMERCE	P O BOX 80452	IDAHO SPRINGS	CO	80452-	(303) 567-0607						
WS			WEST CHAMBER OF COMMERCE	P O BOX 280748	LAKEWOOD	CO	80228-0748	(303) 233-5555	(303) 237-7633					
WS			SUMMIT COUNTY CHAMBER OF COMMERCE	011 S SUMMIT BLVD	FRISCO	CO	80443-	(303) 668-0376	(303) 668-1515					
WS	ABRAHAMSON	CRAIG	GEORGETOWN	BOX 426	GEORGETOWN	CO	80444-	(303) 569-2555	(303) 569-2705	X				X
WS	ADEN	DOUG	CDOT TRANSPORTATION COMMISSION	P O BOX 608	GRAND JUNCTION	CO	81502-							
WS	AGLER	VICKI		10289 W BURGUNDY AVE	LITTLETON	CO	80127-	(303) 866-2952	(303) 966-2291					
WS	AINSWORTH	DAN	CMCA	220 E 56TH AVE	DENVER	CO	80216-	(303) 298-1411	(303) 298-1744					X
WS	ALLARD	WAYNE		7340 EAST CALEY SUITE 215	ENGLEWOOD	CO	80111-	(303) 220-7414	(303) 220-8126					
WS	ALLEN	JIM	TOWN OF SILVERTHORNE	BOX 23964	SILVERTHORNE	CO	80498-	(970) 262-0528	(970) 668-0708			X		
WS	ALLEN	DANA	USEPA	999 18TH STREET	DENVER	CO	80202-	(303) 312-6870	(303) 312-6897					
WS	ALTHOFF	JOHN	EAGLE COUNTY	P O BOX 850	EAGLE	CO	81631-	(970) 328-8760	(970) 328-7185					
WS	AMMON III	ALBERT	CORT	9693 W 87TH CIRCLE	ARVADA	CO	80005-	(303) 424-7577				X		X
WS	ANDERSON	GWEN	UNION STATION INTERMODAL TRANSPORT DEV CORP	1701 WYNKOOP ST #301	DENVER	CO	80202-	(303) 573-5944						X
WS	ANDERSON	ROBERT	GRAND COUNTY	308 BYERS AVENUE	HOT SULPHUR SPRINGS	CO	80451-	(970) 725-3347	(970) 725-3303					
WS	ANDERSON	LORRAINE	CITY OF ARVADA	8101 RALSTON RD	ARVADA	CO	80002-	(303) 424-0225	(303) 431-3085					
WS	ANDERSON	J EDWARD	TAXI 2000 CORPORATION	5164 RAINER PASS NE	FRIDLEY	MN	55421-	(612) 586-0878	(612) 586-0878			X		X
WS	ANDERSON	NORMA		10415 W HAMPDEN AVE	LAKEWOOD	CO	80227-	(303) 866-2927	(303) 866-2291					
WS	ANDREWS	RICK	CDOT	4340 E LOUISIANNA	DENVER	CO	80222-	(303) 757-9426	(303) 757-9242					
WS	ANGLUSKI	DEB	CDOT REGION 1	18500 E COLFAX AVENUE	AURORA	CO	80011-	(303) 757-9651	(303) 757-9746	X	X			
WS	ANKLEY	SEAN		BOX 508	SILVERPLUME	CO	80476-	(303) 569-3155				X		
WS	ANTHONY	TOM	PRT ASSOCIATES	2629 W 32ND AVENUE	DENVER	CO	80211-	(303) 477-2263	(303) 480-1638			X		X
WS	ARNOLD	LANDIS		3170 EASTWOOD CT	BOULDER	CO	80304-	(303) 444-3088						
WS	ARRINGTON	BARRY		5622 TABOR CT	ARVADA	CO	80002-	(303) 866-2962	(303) 866-2291					
WS	ARTHUR	RICHARD	CYBERTRAN	1223 PEOPLES AVE	TROY	NY	12180-	(518) 276-2225	(518) 276-6380			X	X	
WS	ASTLE	BILL		788 CHIMNEY CREEK DRIVE	GOLDEN	CO	80401-	(303) 526-2868	(303) 526-4197					X
WS	BACHAND	RICHARD		444 W 43RD ST	LOVELAND	CO	80538-							X
WS	BAKER	ED	IMPROVE THE SUMMIT	P O BOX 1892	DILLON	CO	80435-	(970) 468-5022	(970) 468-2758		X	X		X
WS	BALLAH	ART	ARTHUR BALLAH & ASSOC CMCA	6591 S HIGH ST	LITTLETON	CO	80121-2713	(303) 795-8985	(303) 795-1807			X		X
WS	BARRETT	MIKE	MARTIN/MARTIN	P O BOX 4001	WHEAT RIDGE	CO	80034-	(303) 431-6100	(303) 431-4028			X		
WS	BAUER	J ALBERT	ITS LIMITED/BRECKENRIDGE	P O BOX 307	BRECKENRIDGE	CO	80424-	(970) 453-2734	(970) 453-9046		X			
WS	BECKHOUSE	DAVE	FTA	216 16TH STREET #650	DENVER	CO	80202-	(303) 969-8371						X
WS	BEHM	JOE	HARVEY'S WAGON WHEEL CASINO	321 GREGORY STREET	CENTRAL CITY	CO	80427-	(303) 716-9769	(303) 716-9770					
WS	BENNETT	DOUG	FHWA COLO DIV	555 ZANG ST SUITE 250	LAKEWOOD	CO	80228-	(303) 969-6730	(303) 969-6740					
WS	BERG	ERIC		P O BOX 3002	VAIL	CO	81657-	(970) 476-1929				X		
WS	BERRY	GAYLE		3049 E 1/4 RD	GRAND JUNCTION	CO	81504-	(303) 866-2908	(303) 866-2291					
WS	BEST	ALLEN		BOX 3067	AVON	CO	81620-	(970) 949-5875	(970) 845-7204			X	X	
WS	BESTALL	JACK	SILVER CREEK SKI RESORT	P O BOX 1110	SILVER CREEK	CO	80446-	(970) 887-3384						
WS	BIRENBOIM	FLO	SUMMIT STAGE	P O BOX 1355	FRISCO	CO	80443-	(970) 668-2088				X		X
WS	BISHOP	TILLIE		2697 G ROAD	GRAND JUNCTION	CO	81506-	(303) 866-3077	(303) 866-2012					
WS	BLACK	ELIZABETH	COPPER MOUNTAIN METRO DIST	BOX 3002	COPPER MOUNTAIN	CO	80443-	(970) 968-2537	(970) 968-2932		X			X
WS	BLAHA	SANDY	NWCOG	P O BOX 2308	SILVERTHORNE	CO	80498-	(970) 468-0295	(970) 468-1208	X	X	X	X	

Code	NmLast	NmFirst	Co_Bus_Assoc_Org	Address1	City	StateOri	PostalCode	WorkPhone	FAXPhone	WS1	WS2	WS3	WS4	WS5
WS	BLICKENSDERFER	TOM		9 PARKWAY DRIVE	ENGLEWOOD	CO	80110-	(303) 866-2587	(303) 866-2012					
WS	BOOKAS	TOM			BOULDER	CO								
WS	BORDONI	JOHN	CDOT EISENHOWER TUNNEL	P O BOX 397	IDAHO SPRINGS	CO	80452-	(303) 573-5301				X		
WS	BORNHOEFT	THEODORE	PRT ASSOCIATES	1630 WELTON SUITE 300	DENVER	CO	80202-	(303) 977-4416	(303) 977-1907			X		
WS	BORTON	JOHN	USFS	BOX 620	SILVERTHORNE	CO	80498-							
WS	BOWLAND	BOB	IDAHO SPRINGS	BOX 1498	IDAHO SPRINGS	CO	80452-	(303) 567-4321	(303) 567-4605				X	
WS	BOYD	JULIE	TOWN OF DILLON	P O BOX 8	DILLON	CO	80435-	(970) 468-2403						
WS	BOYER	BARBARA	CCCTB	P O BOX 100	IDAHO SPRINGS	CO	80452-	(303) 567-4660	(303) 567-0967					
WS	BRADLEY	DEAN	FELSBURG HOLT & ULLEVIG	5299 DTC BOULEVARD SUITE 400	ENGLEWOOD	CO	80111-							X
WS	BRAKE	MIKE	TOWN OF SILVERTHORNE	BOX 1309	SILVERTHORNE	CO	80498-	(970) 262-7345	(970) 262-7311					
WS	BRAMAN	DICK		4145 ROAD 275	IDAHO SPRINGS	CO	80452-	(303) 567-2470						
WS	BROOKES	JONI	CDOT ITS OFFICE	700 KIPLING ST SUITE 2500	LAKEWOOD	CO	80215-	(303) 239-5805	(303) 757-1026					
WS	BROOKS	LARRY	TOWN OF AVON	P.O. BOX 975	AVON	CO	81620-	(970) 949-5101	(970) 845-8589	X		X		
WS	BROWN	LARRY		BOX 698	IDAHO SPRINGS	CO	80452-	(303) 674-9813						
WS	BROWN	CLAY	TOWN OF FRISCO	BOX 4100	FRISCO	CO	80443-	(970) 668-5276	(970) 668-0677		X		X	X
WS	BURNETT	ADAM		P O BOX 969	IDAHO SPRINGS	CO	80452-	(303) 567-4061						
WS	CAMPBELL	BEN NIGHTH		1129 PENNSYLVANIA ST	DENVER	CO	80203-	(303) 866-1900	(303) 866-1919					.
WS	CARES	CHRIS	RCC ASSOCIATES	4940 GROW EAST CIRCLE	BOULDER	CO	80301-	(303) 449-6558						
WS	CAREY	TIM	US ARMY COE	9307 SH121	LITTLETON	CO	80123-6901	(303) 979-4120	(303) 979-0602					
WS	CARLSON	LEROY	US FISH & WILDLIFE	P O BOX 25486	DENVER	CO	80225-0207	(303) 275-2370	(303) 275-2371	X				
WS	CASEY	WILL		1300 GOLDEN CIRCLE #107	GOLDEN	CO	80401-	(303) 216-9509	(303) 216-9509				X	
WS	CLANCY	KATHERINE	VACATION CHANNEL	P O BOX 5368	BRECKENRIDGE	CO	80424-	(970) 453-7746	(970) 453-8833					
WS	CLARK	PHIL	GEORGETOWN	BOX 576	GEORGETOWN	CO	80444-	(303) 569-3257	(303) 569-3258	X	X			
WS	CLARKE	THOMAS	CORT	2134 GAYLORD ST	DENVER	CO	80205-	(303) 333-3075	(303) 832-9533	X		X	X	X
WS	CLOSE	STEVE	JHCE	134 UNION BLVD	DENVER	CO	80228-	(303) 989-9000	(303) 989-9003					X
WS	CLYDE	JONES		5525 E BAILS DRIVE	DENVER	CO	80222-							
WS	COATS	JIM	I-70 TASK FORCE COMMITTEE FOR CLEAR CREEK COUNTY	4253 FALL RIVER RD	IDAHO SPRINGS	CO	80452-	(303) 567-4606					X	
WS	COLE	SHERI	VAIL TRAIL	P O DRAWER 6200	VAIL	CO	81658-	(970) 949-0187	(970) 949-0199					
WS	CONGER	JOHN	CDOT	4201 E ARKANSAS	DENVER	CO	80222-	(303) 757-9440	(303) 757-9439					
WS	CONGROVE	JIM		PO BOX 357	ARVADA	CO	80001-	(303) 866-4866	(303) 866-2012					
WS	COOK	SHELLEY	CITY OF ARVADA	8101 RALSTON ROAD	ARVADA	CO	80002-	(303) 424-0225	(303) 420-2589	X				
WS	CORCORAN	LARRY	CDOT TOC	700 KIPLING ST	LAKEWOOD	CO	80215-	(303) 239-5807	(303) 239-0848					
WS	COUPAL	STEVE	USDA FOREST SERVICE	P O BOX 948	GLENWOOD SPRINGS	CO	81602-	(970) 945-3281						
WS	COWAN	MAYNARD	SANDIA NATIONAL LABS	1101 STAGECOACH SE	ALBUQUERQUE	NM	87123-	(505) 298-9054						
WS	CUCINELLA	MARK	TOWN OF EMPIRE	P O BOX 167	EMPIRE	CO	80438-	(303) 569-2978	(303) 569-2978				X	X
WS	CUNNINGHAM	DAVID		P O BOX 4683	FRISCO	CO	80443-	(970) 668-8853						
WS	CUNNINGHAM	CURT	SIERRA CLUB	2260 BASELINE RD SUITE 105	BOULDER	CO	80302-							
WS	DANGLER	RICHARD	TOWN OF MINTURN	BOX 309	MINTURN	CO	81645-	(970) 827-5645	(970) 827-4049		X			
WS	DAVES	JAMES	FHWA COLO DIV	555 ZANG ST SUITE 250	LAKEWOOD	CO	80228-	(303) 969-6730	(303) 969-6740		X			
WS	DEARIAN	JOHN	CYBERTRAN INTERNATIONAL	2300 N YELLOWSTONE	IDAHO FALLS	ID	83401-	(208) 526-1837	(208) 526-5337			x		
WS	DEGETTE	DIANA		1400 GLENARM PLACE SUITE 202	DENVER	CO	80202-	(303) 844-4988	(303) 844-4996					
WS	EDGAR	ROBERT	EPA REGION 8	999 18TH ST SUITE 500	DENVER	CO	80202-	(303) 312-6669						X
WS	EFTING	BILL	TOWN OF AVON	P O BOX 975	AVON	CO	81620-	(970) 949-4280	(970) 949-9139			X	X	X
WS	ELLIOTT	THOMAS		P O BOX 1916	IDAHO SPRINGS	CO	80452-	(303) 567-9235						
WS	ERICKSON	JEANNE	CASTA	225 E 16TH AVE SUITE 1070	DENVER	CO	80203-	(303) 839-5197	(303) 832-3053	X	X	X	X	X
WS	ESTY	JOHN	COLORADO RAIL	3080 S MONROE	DENVER	CO	80210-	(303) 756-6810						X
WS	EUBANKS	LARRY	UNIVERSITY OF COLORADO	ECONOMICS DEPT	COLORADO SPRINGS	CO		(719) 262-3502			X			
WS	EVERHART	DALLAS	TOWN OF SILVERTHORNE	BOX 1309	SILVERTHORNE	CO	80443-	(970) 262-7305	(970) 262-7311	X				
WS	EYE	KEN	GILPIN COUNTY	BOX 429	CENTRAL CITY	CO	80427-	(303) 582-5214	(303) 582-5440					
WS	FEDRIZZ	J		P O BOX 487	EAGLE	CO	81631-	(970) 328-6961						
WS	FEELEY	MIKE		1120 LINCOLN SUITE 1120	DENVER	CO	80206-	(303) 839-1120	(303) 839-1980					
WS	FELTON	JIM	TOWN OF BRECKENRIDGE	BOX 1058	BRECKENRIDGE	CO	80424-	(970) 453-3210	(970) 453-3202		X			
WS	FETZER	LEON	ARDA INC	P O BOX 7249	BRECKENRIDGE	CO	80424-7249	(970) 453-0888	(970) 453-0711			X		
WS	FIELD	WALTER	CONSULTANT SAFETY	BOX 892	EDWARDS	CO	81632-	(970) 328-3785	(970) 328-3785					
WS	FITZGERALD	H		P O BOX 2568	DILLON	CO	80435-	(970) 468-7681						
WS	FOLLICK	WAYNE	NATIONS WAY	P O BOX 710	DENVER	CO	80201-							X

Code	NmLast	NmFirst	Co_Bus_Assoc_Org	Address1	City	StateOr	PostalCode	WorkPhone	FAXPhone	WS1	WS2	WS3	WS4	WS5
WS	FORREST	RUSS	TOWN OF VAIL	75 S FRONTAGE RD	VAIL	CO	81657-	(970) 479-2146	(970) 479-2452	X				
WS	FOWLER	SARAH	USEPA	999 18TH ST SUITE 500	DENVER	CO	80202-	(303) 312-6192	(303) 312-6067					
WS	FOX	JOE	SKI COPPER	P O BOX 896	LEADVILLE	CO	80461-	(719) 486-3684						X
WS	FRANCO	FRED	DENVER METRO CHAMBER OF COMMERCE	1445 MARKET ST	DENVER	CO	80202-1729	(303) 620-8024	(303) 534-3200					
WS	FREEMAN	SAM	TOWN OF DILLON	743 S ONEIDA WY	DENVER	CO	80224-	(303) 296-2808	(303) 321-5959					X
WS	GARNER	JOE	ROCKY MTN NEWS	400 W COLFAX AVE	DENVER	CO	80206-	(303) 892-5421	(303) 892-2841	X	X		X	
WS	GATHER	JASON	L S GALLEGOS AND ASSOCIATES	9137 E MINERAL CIRCLE #220	ENGLEWOOD	CO	80112-	(303) 790-8474	(303) 790-8477				X	X
WS	GATHMAN	CHRIS	MINTURN	P O BOX 309	MINTURN	CO	81645-	(970) 827-5645	(970) 827-4049	x				
WS	GAUBATZ	RICK	SILVER PLUME	BOX 989	SILVER PLUME	CO	80476-	(303) 569-2523	(303) 569-2363	X	X	X	X	X
WS	GENTLING	JIM	ARAPAHOE BASIN	P O BOX 38	KEYSTONE	CO	80435-	(970) 468-4267	(970) 468-4546	X				
WS	GEORGE	RUSS		1300 E SEVENTH ST	RIFLE	CO	81650-	(303) 866-2945	(303) 866-2291					
WS	GERSTENBERGER	JAN	COLORADO MUNICIPAL LEAGUE	1660 LINCOLN SUITE 2100	DENVER	CO	80203-	(303) 831-6441						
WS	GERSTLE	GEORGE	CDOT ENVIRONMENTAL DIVISION	4201 E ARKANSAS AVE	DENVER	CO	80222-	(303) 757-9795	(303) 757-9445	X				
WS	GIBBONS	ANNIE	GYPSUM ECHO STAFF	P O BOX 782	GYPSUM	CO	81637-	(970) 524-9680						
WS	GOFF	LLOYD		1422 DELGANY ST SUITE LL3	DENVER	CO	80202-	(303) 820-3311	(303) 820-0528			X		
WS	GOSNELL	WILL	BECKENRIDGE JOURNAL	P O BOX 709	FRISCO	CO	80443-0709	(970) 668-0750	(970) 668-3859			X		
WS	GOSSE	HAROLD		475 17TH SUITE 900	DENVER	CO	80202-	(303) 297-3466				X		.
WS	GRAFEL	LARRY	VAIL	1309 VAIL VALLEY DRIVE	VAIL	CO	81651-	(970) 479-2173	(970) 479-2166	X	X		X	
WS	GRAMPAS	TONY		3237 S. HIWAN DR	EVERGREEN	CO	80439-	(303) 866-2957	(303) 866-2291					
WS	GRUBER	MIKE	EAGLE COUNTY	500 BROADWAY	EAGLE	CO	81631-	(970) 328-8760	(970) 328-7185					
WS	HALL	GREG	TOWN OF VAIL	1309 VAIL VALLEY DR	VAIL	CO	81657-	(970) 479-2169	(970) 479-2166			X		X
WS	HAMILTON	KAREN	USEPA	999 18TH ST SUITE 500	DENVER	CO	80202-	(303) 312-6236	(303) 312-6071					
WS	HAMMER	MIKE	USEPA REGION 8	999 18TH ST SUITE 500	DENVER	CO	80202-2466	(303) 312-7210	(303) 312-6563		X			
WS	HAMMOND	COURT	COLORADO CENTRAL RAILROAD	1701 WYNKOOP SUITE 303	DENVER	CO	80202-	(303) 623-6035						
WS	HAMPTON	KEN		P O BOX 770	INDIAN HILLS	CO	80454-	(303) 661-4968						
WS	HANCOCK	TIA		830 ELK RUN	NEWCASTLE	CO	81631-		(970) 328-6901					
WS	HANKARD	MICHAEL	HANKARD ENGINEERING	205 E GENESEO ST	LAFAYETTE	CO	80026-	(303) 666-0617	(303) 666-1053					
WS	HANNON	STEVEN		66 ASH	DENVER	CO	80220-	(303) 321-1675	(303) 355-6422					X
WS	HARDY	KATHY	HOLY CROSS RD	P O BOX 190	MINTURN	CO	81645-	(970) 827-5715	(970) 827-9343	X				
WS	HASBROUCK	BRUCE	TOWN OF EAGLE	P O BOX 186	EAGLE	CO	81631-	(970) 328-5218	(970) 328-5328	X	X			
WS	HAUSMAN	BOB	FRISCO TERRACE PROPERTY HOMEOWNERS ASSOC.	BOX 2118	FRISCO	CO	80443-	(970) 668-5340						
WS	HAWKES	BOBBIE	CLEAR CREEK COUNTY	P O BOX 2000	GEORGETOWN	CO	80444-	(303) 534-5777	(303) 569-0731					
WS	HAYNES	LONNIE	DMAC	534 WASHINGTON #203	DENVER	CO	80205-	(303) 722-3453	(393) 433-5227		X	X	X	
WS	HEFLEY	JOEL		6059 SOUTH QUEBEC	ENGLEWOOD	CO	80111-	(303) 843-0401	(303) 843-0758					
WS	HESTEKIN	PATTI & CHRI		P O BOX 757	GEORGETOWN	CO	80444-	(303) 569-2604	(303) 569-3307					
WS	HILL	DALE & BEC	TRANS TEQ	1705 EAST 39TH AVE	DENVER	CO	80205-	(303) 382-1041	(303) 382-1041					X
WS	HILL	GRAHAM		1464 PERIWINKLE DR	BOULDER	CO	80304-	(303) 544-0025						
WS	HILL CLAUS	JANET	GEORGETOWN	BOX 426	GEORGETOWN	CO	80444-	(303) 569-2055	(303) 567-2705		X	X		
WS	HODGES	HOLLY	UNIVERSITY OF COLO @ DENVER	CAMPUS BOX 165 P O BOX 173364	DENVER	CO	80217-3364	(303) 556-5817		X				
WS	HOLGERSON	J ERIC	TOWN OF DILLON	BOX 8	DILLON	CO	80435-	(970) 468-2403	(970) 262-3410					
WS	HOPKINS	THOMAS	MCTAGGART HOLDINGS LLC	5036 GORE CIRCLE	VAIL	CO	81657-	(970) 476-9164	(970) 476-1097					
WS	HOPKINS	FRED	PRT	1630 WELTON #300	DENVER	CO	80202-	(303) 685-4647	(303) 433-5451		X	X		X
WS	HOPKINS	TOM		5036 GORE CIRCLE	VAIL	CO	81657-							X
WS	HOPPER	SALLY		21649 CABRINI BLVD	GOLDEN	CO	80401-	(303) 526-0785	(303) 526-9438	X			X	
WS	HORMAECHEA	DAN	USFS WHITE RIVER NATIONAL FOREST	P O BOX 948	GLENWOOD SPRINGS	CO	81602-	(970) 945-3221					X	
WS	HOWELL	SUE		BOX 432	IDAHO SPRINGSS	CO	80452-	(303) 567-4349						
WS	HOZA	MARY		P O BOX 600	EAGLE	CO	81631-	(970) 328-6638						
WS	HUDSON	MILLER	CARTS	4906 W 32ND AVE	DENVER	CO	80212-	(303) 480-1105	(303) 573-5275			X	X	X
WS	HUGHES	BILL		P O BOX 127	PALMER LAKE	CO	80133-			X				
WS	HUGINS	PHYLLIS	SOS ENVIRONMENT	P O BOX1210	FRISCO	CO	80443-	(970) 668-0661	(970) 668-0671			X		
WS	HULSE	STEVEN	EAGLE COUNTY	P O BOX 131	AVON	CO	81620-	(970) 949-5969						
WS	HUNTER- MAURER	TAMARA	DELEUW CATHER	1700 BROADWAY	DENVER	CO	80290-	(303) 863-7900	(303) 863-7110		X			
WS	I-70 CORRIDOR CHAI		COLORADO OPTIMIST CLUB	333 LOGAN STREET SUITE 200	DENVER	CO	80203-	(303) 698-5990	(303) 698-5091					
WS	IMMER	STEVE	SHAPING OUR SUMMIT/SILVERTHORNE	PO BOX 1946	FRISCO	CO	80443-	(970) 688-8946	(970) 453-0698	X	X		X	X
WS	ITKONEN	MARK	CITIZENS FOR BALANCED TRANS	1832 SIMMS ST	LAKEWOOD	CO	80215-	(303) 238-4312	(303) 271-9493		X	X	X	
WS	IWAMOTO	ROBERT	US FOREST SERVICE/WHITE RIVER	P O BOX 948	GLENWOOD SPRINGS	CO	81602-	(970) 945-3200			X			

Code	NmLast	NmFirst	Co Bus Assoc Org	Address1	City	StateOr	PostalCode	WorkPhone	FAXPhone	WS1	WS2	WS3	WS4	WS5
WS	JAEGER	CARL		P O BOX 825	GEORGETOWN	CO	80444-	(303) 569-2285						
WS	JANAKY	THOMAS	RADER RAILCAR INC	10525 E 40TH AVE	DENVER	CO	80239-	(303) 375-9796	(303) 375-1895			X	X	
WS	JESAITIS	PAUL	FHWA COLORADO	555 ZANG ST RM 250	LAKEWOOD	CO	80228-	(303) 969-6703	(303) 969-6740			X		
WS	JOBE	JACK	PRT	BOX 370985	DENVER	CO	80237-	(303) 773-2106	(303) 290-8151	X	X	X	X	
WS	JOHNSON	LINDA		925 UNIVERSITY AVE	BOULDER	CO	80302-							
WS	JOHNSON	BYRON	ADVANCED TRANSIT ASSOC	2451 S DAHLIA LANE	DENVER	CO	80222-	(303) 756-5864				X		X
WS	JONES	JAY	HARP	333 W ELLSWORTH #513	DENVER	CO	80223-							X
WS	JONES	R L	CLEAR CREEK COUNTY WATERSHED	BOX 847	IDAHO SPRINGS	CO	80452-	(303) 567-4324	(303) 567-4337					X
WS	JORGENSEN	IB FALK	JORGENSEN HENDRICKSON CLOSE ENGINEERS INC	134 UNION BLVD SUITE 660	DENVER	CO	80228-1820	(303) 989-9000	(303) 989-9003				X	X
WS	JOY	CECILIA	CDOT DTD INTERMODAL BRANCH	4201 E ARKANSAS ROOM 212	DENVER	CO	80222-	(303) 757-2075	(303) 757-9727	X	X			
WS	JUDY	DAVID	CDOT ITS	1325 S COLORADO BLVD	DENVER	CO	80222-	(303) 757-9813	(303) 757-1026			X		
WS	JUNE	VI		7500 WILSON CT	WESTMINSTER	CO	80030-	(303) 866-2843	(303) 866-2291					
WS	KALIN	MARTHA		1216 PRESERVE CIRCLE	GOLDEN	CO	80401-	(303) 526-2942	(303) 526-5773					X
WS	KAUS	KRISTY	RRC ASSOCIATION	4940 PEARL EAST CIRCLE	BOULDER	CO	80301-	(303) 449-6558	(303) 449-6587					
WS	KELLER	MOE		4325 IRIS ST	WHEAT RIDGE	CO	80033-	(303) 866-5522	(303) 866-2291					
WS	KELLY	DEVIN			GEORGETOWN	CO	80444-	(303) 569-2336						
WS	KERST	LYNNE	OFFICE CONGRESSMAN SCOTT MCGUINNESS	526 PINE	GLENWOOD SPRINGS	CO	81601-	(970) 928-0637						
WS	KHAN	SAROSH	UNIV OF COLO AT DENVER	CAMPUS BOX 113 PO BOX 173364	DENVER	CO	80217-3364	(303) 556-5246	(303) 556-2368					
WS	KILEY	CHRIS	ASPEN SKIING COMPANY	P O BOX 1248	ASPEN	CO	81612-	(970) 923-8756						
WS	KILJAN	JOHN	CDOT ITS	1325 S COLORADO BLVD B770	DENVER	CO	80222-	(303) 757-9508	(303) 757-1026		X			
WS	KLUSMAN	RON		1145 SADDLEBACK DR	EVERGREEN	CO	80439-	(303) 273-3617						
WS	KNAPPMILLER	KEVIN		PO BOX 5115	FRISCO	CO	80443-							
WS	KNIGHT	GUSSIE		1297 VAIL VALLEY DR	VAIL	CO	81657-	(970) 479-9540	(970) 479-9521			X		
WS	KOEHLER	JOE	TRANSPORTATION INITIATIVES	1720 ROBB STREET #11 103	LAKEWOOD	CO	80215-	(303) 239-6313	(303) 239-8592	X	X	X		
WS	KOZINSKI	PETER	JF SATO AND ASSOCIATES	5898 S RAPP ST	LITTLETON	CO	80120-	(303) 797-1200				X		
WS	KRAMER	JIM	KIMLEY HORN & ASSOC	1515 ARAPAHOE ST TOWER I	DENVER	CO	80202-	(303) 446-8552	(303) 446-8678			X		
WS	KRAMER	CALLY	CDOT STATEWIDE PLANNING	4201 E ARKANSAS AVE	DENVER	CO	80222-	(303) 757-9282	(303) 757-9727		X			
WS	KRIESCHER	PAUL	COPIRG	1530 BLAKE ST SUITE 220	DENVER	CO	80210-	(303) 573-7474	(303) 573-3780					
WS	LAFLIN	GEORGE		1827 QUAIL ST #8	LAKEWOOD	CO	80215-	(303) 233-6821						
WS	LAMOREAUX	BEN	LAMOREAUX ASSOC ENGINEERING	389 N 100 W SUITE 1	CEDAR CITY	UT	84720-	(801) 586-0174	(801) 865-1848			X	X	
WS	LASHLEY	RAYMOND	LABS	2874 C 1/2 ROAD	GRAND JUNCTION	CO	81501-	(970) 243-1849						X
WS	LAU	LORRIE	FHWA	555 ZANG ST RM 400	LAKEWOOD	CO	80228-	(303) 969-6712	(303) 969-6727				X	
WS	LAURA	GARY	JEFFERSON COUNTY	100 JEFFERSON COUNTY PARKWAY	GOLDEN	CO	80419-	(303) 271-6511	(303) 271-8941					
WS	LAWLER-SKALL	LYNN	SUMMIT COUNTY CHAMBER OF COMMERCE	P O BOX 214	FRISCO	CO	80443-	(970) 668-2051	(970) 668-1515		X			
WS	LAYMAN	JEFF	RESORT EXPRESS	P O BOX 1429	SILVERTHORNE	CO	80498-	(970) 468-7600						
WS	LEAHY	DAVID	TDA COLORADO INC	1675 LARIMER ST SUITE 600	DENVER	CO	80202-	(303) 825-7107	(303) 825-6004					
WS	LEHMANN	DAVID	PRT ASSOCIATES	1630 WELTON SUITE 300	DENVER	CO	80202-	(303) 685-4647	(303) 480-1638	X	X	X	X	X
WS	LEVIN	MARK	CLEAR CREEK COUNTY	P O BOX 1511	IDAHO SPRINGS	CO	80452-	(303) 567-4174	(303) 567-4174					X
WS	LEWIS	BARBARA	DAMES & MOORE	633 SEVENTEEN ST SUITE 2500	DENVER	CO	80202-3625	(303) 299-7853	(303) 299-7901				X	
WS	LLOYD	RAY	EAGLE CO REGIONAL TRANSPORTATION AUTHORITY	P O BOX 1564	AVON	CO	81620-	(970) 748-0702	(970) 748-0710					
WS	LOERWALD	CHUCK	CDOT REGION 1	18500 E COLFAX AVE	AURORA	CO	80011-	(303) 757-9649						
WS	LOEVLIE	MARY JANE	I70 TASK FORCE	P O BOX 218	IDAHO SPRINGS	CO	80452-	(303) 567-4100	(303) 567-4605	X	X	X	X	X
WS	LOHF	DAVE	CO STATE PATROL	1096 MCINTIRE	GOLDEN	CO	80401-	(303) 273-1616	(303) 273-1607	X	X			
WS	LONG	TOM	SUMMIT COUNTY	PO BOX 68	BRECKENRIDGE	CO	80443-	(970) 453-3412	(970) 453-3535		X			
WS	LOWE	JACK	USDA FOREST SERVICE	740 SIMMS ST	GOLDEN	CO	80401-	(303) 275-5195	(303) 275-5170					
WS	LUECKENHOFF	RENNETTA	COLO SKI COUNTRY USA	1560 BROADWAY SUITE 2000	DENVER	CO	80202-	(303) 837-0793	(303) 837-1627		X			X
WS	LYLE	JEFF	SHAPING OUR SUMMIT	P O BOX 1735	SILVERTHORNE	CO	80498-	(970) 262-0640	(970) 513-0147	X	X	X	X	X
WS	MACY	JOE	VAIL ASSOCIATES INC	P O BOX 7	VAIL	CO	81658-	(970) 479-3012	(970) 479-2053		X			X
WS	MALMGREN	TOM	COPPER MTN METRO SUMMIT COUNTY ITS	P O BOX 3216	COPPER MOUNTAIN	CO	80443-	(970) 968-6854	(970) 968-2217		X			
WS	MARCHUS	MARK	TOWN OF WINTER PARK	P O BOX 3327	WINTER PARK	CO	80482-	(970) 726-8081	(970) 726-8084	X				
WS	MARDER	BARRY	SANDIA NATIONAL LABS		ALBUQUERQUE	NM	87185-	(505) 845-7274	(505) 845-7890			X	X	
WS	MARKIN	DOW		P O BOX 1850	IDAHO SPRINGS	CO	80452-	(303) 567-0720	(303) 567-0720			X		
WS	MARSHALL	DON	COLORADO CENTRAL RR	UNION STATION F303 1701 WYNKOOP	DENVER	CO	80202-	(303) 623-6035	(303) 693-5698			X		X
WS	MASON	JACK	WINTER PARK RESORT	BOX 36	WINTER PARK	CO	80482-	(970) 726-1530	(303) 892-5823				X	X
WS	MATTSON	KEITH	DRCOG	2480 W 26TH AVE SUITE 200B	DENVER	CO	80211-	(303) 480-6763	(303) 480-6790			X		
WS	MCINNIS	SCOTT		526 PINE ST #111	GLENWOOD SPRINGS	CO	81601-	970-928-0637	970-928-0630					

Code	NmLast	NmFirst	Co_Bus_Assoc_Org	Address1	City	StateOr	PostalCode	WorkPhone	FAXPhone	WS1	WS2	WS3	WS4	WS5
WS	MCINTYRE	SCOTT		BOX 1077	FRISCO	CO	80443-	(970) 668-5276	(970) 668-0677					
WS	MCKEE	BILL	DEPT OF PUBLIC HEALTH & ENVIRONMENT	4300 CHERRY CREEK DR S	DENVER	CO	80222-1530	(303) 692-3583	(303) 782-0390					
WS	MERKEL	LEE	TOWN OF DILLON	PO BOX 8	DILLON	CO	80435-	(970) 468-2403	(970) 262-3410	X				
WS	MILES	PAUL	COPPER MTN RESORT	P O BOX 3001	COPPER MOUNTAIN	CO	80443-	(970) 968-2318	(970) 968-2308	X	X	X		
WS	MILLER	BONNIE	COORS BREWING CO	216 SIXTEENTH ST #1010	DENVER	CO	80202-							
WS	MILLER	BETTY	JEFFERSON COUNTY	100 JEFFERSON COUNTY PARKWAY	GOLDEN	CO	80419-	(303) 271-6511	(303) 271-8941					
WS	MILLER	LYNN	CLEAR CREEK PLANNING & ECON DEV CORP	BOX 3718	EVERGREEN	CO	80437-							X
WS	MILLER	DAN		BOX 23185	SILVERTHORNE	CO	80498-	(303) 886-5014	(303) 433-0686					
WS	MILLER	SCOTT		P O BOX 443	IDAHO SPRINGS	CO	80452-	(303) 567-2865						
WS	MITCHELL	BOYD	KEYSTONE RESORT	P O BOX 38	KEYSTONE	CO	80435-	(970) 496-2316						X
WS	MOHR	BRIAN		2260 BASELINE ROAD #105	BOULDER	CO	80302-							
WS	MURRENE	MARTY		BOX 28	EMPIRE	CO	80438-	(303) 569-2207						
WS	MUTZEBAUGH	DICK		9965 S WYECLIFF DR	HIGHLANDS RANCH	CO	80126-	(303) 866-4866	(303) 866-2012					
WS	MYERS	BILL	SIERRA CLUB ROCKY MT CHAPTER	8982 W TEMPLE PL	LITTLETON	CO	80123-	(303) 932-7506	(303) 932-7506					X
WS	NEAL	DICK		P O BOX 151	VAIL	CO	81658-	(970) 845-3642						
WS	NEELY	CYNTHIA	CLEAR CREEK COUNTY	BOX 532	GEORGETOWN	CO	80444-	(303) 569-2530	(303) 569-0910	X	X			X
WS	NELSON	BILL	CDOT/EAGLE	BOX 298	EAGLE	CO	81631-	(970) 328-6385	(970) 328-6385			X		.
WS	NEUWIRT	ANNE MARIE	TOWN OF GYPSUM	3355 S FLOWER ST #164	LAKEWOOD	CO	80227-	(303) 986-6905				X		
WS	NEWBERRY	JAMES	GRAND COUNTY	308 BYERS AVENUE	HOT SULPHER SPRINGS	CO	80451-	(970) 725-3347	(970) 725-3303					
WS	NGUYEN	STEVE	CITY OF WHEATRIDGE	7500 W 29TH AVE	WHEATRIDGE	CO	80215-	(303) 235-2862	(303) 235-2857	X				
WS	NIMON	JIM		BOX 662	EAGLE	CO	81631-	(970) 328-7719						
WS	NOLL	THAD		P O BOX 38	KEYSTONE	CO	80435-	(970) 496-4217				X		
WS	NORBECK	CARL	CLEAR CREEK WATERSHED FORUM	4300 CHERRY CREEK DR SO	DENVER	CO	80222-	(303) 692-3513	(303) 782-0390	X				
WS	NORRIS	STEVE	STATE DIV OF WILDLIFE	6060 BROADWAY	DENVER	CO	80216-	(303) 291-7347	(303) 294-0874	X				
WS	OHRI	PAUL	GRAND COUNTY	P O BOX 65	KREMMLING	CO	80459-	(970) 724-3338	(970) 724-3555	X		X		
WS	OROURKE	TERE	USDA FOREST SERVICE	P O BOX 620	SILVERTHORNE	CO	80498-	(970) 468-5400	(970) 468-7735					
WS	OSBORN	MARSHA	SUMMIT COUNTY	P O BOX 68	BRECKENRIDGE	CO	80424-	(970) 453-3412	(970) 453-3535	X				
WS	OSBORNE	GEORGE	FHWA COLO DIVISION	555 ZANG ST ROOM 250	LAKEWOOD	CO	80228-	(303) 969-6730	(303) 979-6740					
WS	OSTRANDER	AMY	SUMMIT STAGE	P O BOX 68	BRECKENRIDGE	CO	80443-	(970) 668-0999	(970) 668-8187	X	X	X		X
WS	PANKEY	PHIL		200 E COLFAX RM 271	DENVER	CO	80203-	(303) 866-2953	(303) 866-2291					
WS	PASCHALL	MARK		7903 WEST 62ND WAY	ARVADA	CO	80004-	(303) 866-2950	(303) 866-2291					
WS	PEACOCK	JOHN	FRONT RANGE RAILROAD	3039 ANCHOR WAY #4	FT COLLINS	CO	80525-	(970) 223-0541	(970) 223-0541	X	X	X	X	X
WS	PEARSON	GRAY	PEARSON ENGINEERING	BOX 2301	FRISCO	CO	80443-	(970) 668-5067	(970) 668-3073		X	X		
WS	PELOT	ROGER	TOWN OF DILLON	P O BOX 8	DILLON	CO	80435-							X
WS	PEREZ	CARLA	CDOT	4201 E ARKANSAS AVE RM 230	DENVER	CO	80222-	(303) 757-9077	(303) 757-9877	X				
WS	PERLMUTTER	ED		370 17th St #2600	DENVER	CO	80202-	(303) 866-4865	(303) 866-4543					
WS	PETERS	RICK	PARK COUNTY	BOX 147	FAIRPLAY	CO	80440-	(719) 836-4277	(719) 836-4275				X	
WS	PFIFFNER	PENN		38 S ZINNIA WAY	LAKEWOOD	CO	80228-	(303) 866-2951	(303) 866-2291					
WS	PIERGROSSI	MONICA	CEC	777 GRANT ST SUITE 606	DENVER	CO	80203-	(303) 837-1198	(303) 861-2456					
WS	PINE	GEORGE & A		P O BOX 633	SILVERTHORNE	CO	80498-	(970) 513-0689				X		
WS	POCIUS	RICK	SUMMIT COUNTY	BOX 68	BRECKENRIDGE	CO	80424-	(970) 668-4210	(970) 668-4225	X		X		X
WS	POINSETT	FRANCOIS		2636 5TH STREET	BOULDER	CO	80304-							
WS	POIROT	BOB	CLEAR CREEK COMM	663 CORD 487	EVERGREEN	CO	80439-	(303) 674-7219						X
WS	POWELL	DIENNE		PO BOX 1871	IDAHO SPRINGS	CO	80452-	(303) 567-0835						X
WS	POWELL	WILLIAM	TOWN OF EAGLE	P O BOX 1227	EAGLE	CO	81631-	(970) 328-6354	(970) 328-5203	X	X	X	X	X
WS	POWERS	CONNIE	SINGLETREE HOMEOWNERS BOARD	P O BOX 1226	EDWARDS	CO	81632-	(970) 926-7020	(970) 926-7020					
WS	POWERS	CHUCK	SINGLETREE HOMEOWNERS BOARD	P O BOX 1226	EDWARDS	CO	81632-	(970) 926-7020	(970) 926-7020				X	
WS	PRATT	JENNIFER	SHAPING OUR SUMMIT	P O BOX 130	FRISCO	CO	80443-	(970) 668-2766	(970) 668-1515			X		
WS	RADER	TOM	RADER RAILCAR INC	10525 E 40TH AVE SUITE 207	DENVER	CO	80239-	(303) 375-9796						
WS	RAITANO	FLO	CO RURAL DEVELOPMENT COUNCIL/DILLON	P O BOX 4528	DILLON	CO	80435-	(970) 262-2073	(970) 262-2075	X	X	X		X
WS	RAITANO	BEN	TOWN OF DILLON	P O BOX 5	DILLON	CO	80435-	(970) 468-2291	(970) 468-2291					
WS	RAO	LIZ	RTD	1600 BLAKE ST	DENVER	CO	80202-	(303) 299-2485	(303) 299-2425	X				
WS	RAPP	ED	CARTS	P O BOX 376	DUMONT	CO	80439-	(303) 567-2204	(303) 273-3015	X		X	X	X
WS	RAY	ROBERT	NWCOG	P O BOX 2308	SILVERTHORNE	CO	80498-	(970) 468-0295	(970) 468-1208					X
WS	REAY	MATT	CDOT	4201 E ARKANSAS RM 172	DENVER	CO	80222-	(303) 757-9271	(303) 757-9219					
WS	REDDY	MIKE	DEPT OF LOCAL AFFAIRS	15075 S GOLDEN RD	GOLDEN	CO	80465-3979	(303) 273-1778	(303) 273-1795	X	X			

Code	NmLast	NmFirst	Co_Bus_Assoc_Org	Address1	City	StateOrI	PostalCode	WorkPhone	FAXPhone	WS1	WS2	WS3	WS4	WS5
WS	REGESTER	GARY	SILVER PLUME	BOX 457	SILVER PLUME	CO	80476-							
WS	REUTER	JANE	SUMMIT DAILY NEWS	P O BOX 329	FRISCO	CO	80443-	(970) 668-3998	(970) 668-3859					
WS	ROBERTS	DENNIS	CDOT AERONAUTICS DIV	56 INVERNESS DR E #101	ENGLEWOOD	CO	80112-	(303) 792-2160	(303) 792-2180	X		X		
WS	ROMAN	ALAN	COPPER MOUNTAIN RESORT	P O BOX 3001	COPPER MOUNTAIN	CO	80443-	(970) 962-2882						X
WS	ROMERO	CYNTHIA	FEDERAL AVIATION ADMINISTRATION	26805 E 68TH AVE SUITE 224	DENVER	CO	80249-							
WS	ROURKE	BILL		P O BOX 3309	EVERGREEN	CO	80437-	(303) 674-1639						
WS	RUBLE	DAVE	CDOT/ENGINEERING	4201 E ARKANSAS AVE	DENVER	CO	80222-	(303) 757-9819	(303) 757-9727					X
WS	RUDZIEWICZ	ADAM	LODGING SUMMIT COUNTY	P O BOX 6	BRECKENRIDGE	CO	80424-	(970) 453-6475	(970) 453-3977	X	X			
WS	RUHL	TERRY	CH2M HILL	100 INVERNESS TERRACE EAST	ENGLEWOOD	CO	80111-	(303) 771-0900	(303) 754-0195				X	X
WS	RUHTER	ED		55 S GUANELLA ST	EMPIRE	CO	80438-	(303) 569-2206						X
WS	RUPPENDHAL	ROLF		10450 HOYT WAY	BROOMFIELD	CO	80021-	(303) 466-6199				X		
WS	RUSSELL	CAROL	USEPA	999 18TH ST SUITE 500	DENVER	CO	80202-	(303) 312-6310	(303) 312-6961					
WS	RYAN	MARLYS		BOX 829	GEORGETOWN	CO	80444-	(303) 569-2099						X
WS	RYNERSON	ROBERT	RTD	1600 BLAKE ST	DENVER	CO	80202-	(303) 299-2480	(303) 299-2008					X
WS	RYON	DEB	US FOREST SERVICE	P O BOX 3307	IDAHO SPRINGS	ID	80452-	(303) 567-3010	(303) 567-3021			X		
WS	SABATINI	MARK	EAGLE INDUSTRIES PARTNERS	BOX 1397	FRISCO	CO	80443-	(970) 668-8665	(970) 668-0542	X	X	X		
WS	SCHAEFER	DAN		3615 S HURON	ENGLEWOOD	CO	80110-	(303) 762-8890	(303) 762-7282					.
WS	SCHROEDER	BILL		4420 S BRAUN COURT	MORRISON	CO	80465-	(303) 866-4866	(303) 866-2012					
WS	SCHROEDER	BARB	DELEUW CATHER	1700 BROADWAY SUITE 1016	DENVER	CO	80290-	(303) 863-7900	(303) 863-7110			X		
WS	SCHROLL	JEFF	TOWN OF GYPSUM	BOX 130	GYPSUM	CO	81637-	(970) 524-7514	(970) 524-7522					
WS	SCHUTZ	PETER	COLUMBINE MANAGEMENT COMPANY	P O BOX 2590	DILLON	CO	80435-	(970) 670-9437						
WS	SEMBRAT	RICH	CDOT ITS	700 KIPLING ST SUITE 2500	LAKEWOOD	CO	80215-	(303) 239-5804	(303) 239-0848		X			
WS	SEYMOUR	ROGER & KA		P O BOX 270	IDAHO SPRINGS	C0	80452-	(303) 567-4216						X
WS	SEYMOUR	RICHARD	SEYMOUR LODGING CORP	3075 E EXPOSITION AVE	DENVER	CO	80209-							
WS	SHACKLE	MIKE	BLS COMMUNICATIONS NW INC	25797 CONIFER ROAD	CONIFER	CO	80433-	(303) 838-1657	(303) 838-1678		X			
WS	SHAFFER	BOB		801-8TH STREET	GREELEY	CO	80631-	(970) 353-3507	(970) 353-3509					
WS	SHELTON	KRISTIAN		99 NOME WAY UNIT B	AURORA	CO	80012-	(303) 343-4656						
WS	SHIMON	SHIRLEY		BOX 263	GEORGETOWN	CO	80444-	(303) 569-2649						X
WS	SHIPLEY	CATHY	DEPT OF LOCAL AFFAIRS	P O BOX 2308	SILVERTHORNE	CO	80498-	(970) 468-0295	(970) 468-1208	X	X	X		
WS	SHRUM	JIM	EAGLE COUNTY REG TRANS AUTHORITY	P O BOX 1564	AVON	CO	81620-	(970) 748-0704	(970) 748-0710				X	X
WS	SICCARDI	JOE	FIGG ENGINEERS INC	1873 S BELLAIRE SUITE 1025	DENVER	CO	80225-	(303) 757-7400	(303) 757-0698					
WS	SILL	WEB	GILPIN COUNTY	BOX 429	CENTRAL CITY	CO	80427-	(303) 582-5214	(303) 056-9315		X			
WS	SIMONSON	JIM	WHITE RIVER NATIONAL FOREST	P O BOX 948	GLENWOOD SPRINGS	CO	81602-	(970) 945-2521						
WS	SKAGGS	DAVID		9101 HARLAN ST SUITE 130	WESTMINSTER	CO	80030-	(303) 650-7886	(303) 650-7893					
WS	SKINNER	CHRIS	SILVER PLUME HOMEOWNER	P O BOX 508	SILVERPLUME	CO	80476-	(303) 509-3155		X	X	X	X	X
WS	SMITH	MATT		3074 ALEGRE CT	GRAND JUNCTION	CO	81504-	(970) 434-4727	(303) 866-2291					
WS	SMITH	SCOTT	COORS BREWING CO	ATTN: NH250	GOLDEN	CO	80401-							
WS	SPANN	STEPHEN		4801 S GALAPAGO STREET	ENGLEWOOD	CO	80110-	(303) 781-2430	(303) 781-2430					
WS	SPERAL	RON	FHWA	555 ZANG ST #250	LAKEWOOD	CO	80228-	(303) 969-6730						
WS	SRAMEK	RICK	BRECKENRIDGE RESORT	P O BOX 1058	BRECKENRIDGE	CO	80424-	(970) 453-3211	(970) 453-3202		X			X
WS	STARRY	JIM	ENVIRONMENTAL PROTECTION BY DESIGN	P O BOX1931	BOULDER	CO	80306-	(303) 939-9825				X		
WS	STAUFFER	JACK	CLEAR CREEK COUNTY PLANNING COMMISSION	821 COTTONWOOD DR	EVERGREEN	CO	80439-	(303) 670-5070	(303) 670-5070				X	X
WS	STEELE	RICHARD	CDOT	BOX 397	IDAHO SPRINGS	CO	80452-	(303) 623-7705				X		
WS	STERN	MORT	GEORGETOWN SELECTMAN	P O BOX 549	GEORGETOWN	CO	80444-	(303) 569-2063						
WS	STOKSTAD	PEGGY	I-70 TASK FORCE CLEAR CREEK COUNTY	P O BOX 2030	GEORGETOWN	CO	80452-	(303) 825-6116	(303) 569-2133	X				
WS	STOUDER	RANDY	TOWN OF GYPSUM	PO BOX 130	GYPSUM	CO	81637-	(970) 524-7514	(970) 524-7522	X	X	X	X	X
WS	STOUFFER	JACK		821 COTTONWOOD DR	EVERGREEN	CO	80439-							
WS	STRAILY	SHERI	UPS	5020 IVY ST	COMMERCE CITY	CO	80022-							X
WS	STRUNK	DAVE	BLM	2850 YOUNGFIELD	LAKEWOOD	CO	80215-	(303) 239-3731						
WS	SULLIVAN	DONALD	CREATIVE TECHNOLOGY INC	28038 DOROTHY DR SUITE #5	AGOURA HILLS	CA	91301-	(818) 707-3435	(818) 707-2520			X		
WS	SULLIVANT	BRYAN		293 SHERWOOD TRAIL	BRECKENRIDGE	CO	80424-	(303) 866-2916	(303) 866-2291					
WS	SUNDIN	HAL	GLENWOOD SPRINGS TRANSPORTATION COMMISSION	810 N TRAVEL TRAIL	GLENWOOD SPRINGS	CO	81601-	(970) 945-0966						
WS	SWARTOUT	JOHN	SENATOR ALLARD'S OFFICE	7340 E CALEY ST SUITE 215	ENGLEWOOD	CO	80111-	(303) 220-7414	(303) 220-8126			X	X	
WS	SWISHER	MYRON	CDOT DTD	4201 E ARKANSAS AVE	DENVER	CO	80222-	(303) 757-9804	(303) 757-9727					X
WS	SZYLIOWICZ	JOSEPH	DU CENTER FOR TRANSPORTATION		DENVER	CO	80208-	(303) 871-2992	(303) 871-2496	X				
WS	TASSETT	JOE	CDOT REGION 1	18500 E COLFAX	AURORA	CO	80011-	(303) 757-9647	(303) 757-9746	X				

Code	NmLast	NmFirst	Co Bus Assoc Org	Address1	City	StateOri	PostalCode	WorkPhone	FAXPhone	WS1	WS2	WS3	WS4	WS5
WS	TAYLOR	ROBERT	SUMMIT COUNTY	BOX 68	BRECKENRIDGE	CO	80424-	(970) 453-2561	(970) 453-5461					X
WS	TAYLOR	JACK		P O BOX 5656	STEAMBOAT SPRINGS	CO	80477-	(303) 866-2949	(303) 866-2291					
WS	THOMPSON	LAUREL	CITIZENS FOR BALANCED TRANSPORTATION	2765 S HUMBOLDT ST	DENVER	CO	80210-	(303) 756-6635						X
WS	TIEHEN	TERRI	CDOT REGION 1	18500 E COLFAX AVE	AURORA	CO	80011-	(303) 757-9651	(303) 757-9746	X	X			
WS	TILLEY	BERT & SHAR	AREA SPORTS INC	P O BOX 1510	IDAHO SPRINGS	CO	80452-	(303) 562-2146						
WS	TOMASI	EDWIN	GEORGETOWN	BOX 1039	GEORGETOWN	CO	80444-	(303) 569-3034	(303) 569-2705				X	X
WS	TOOLEN	JOHN	CDOW	711 INDEPENDENT AVE	GRAND JUNCTION	CO	81505-							
WS	TOZEL	LEE ANN		1303 ALPINE AVE #13A	BOULDER	CO	80304-	(970) 679-5229						
WS	TRAST	RICHARD	PARK COUNTY	BOX 220	FAIRPLAY	CO	80440-	(719) 836-2771	(719) 836-4204					
WS	TUCKER	SHIRLEEN		615 S. ELDRIDGE ST	LAKEWOOD	CO	80228-	(303) 866-2923	(303) 866-2291					
WS	UHLE	RON		1590 S ARBUTUS PL	LAKEWOOD	CO	80228-	(303) 980-0540						
WS	UPRIGHT	WENDELL	I-70 TASK FORCE CLEAR CREEK	P O BOX 1029	IDAHO SPRINGS	CO	80452-	(303) 567-2936		X		X	X	X
WS	VALERIE	JOHN	STC	27 S 0GDEN #6	DENVER	CO	80209-	(303) 715-9713						X
WS	VALLIN	TRAVIS	CDOT AERONAUTICS DIV	56 INVERNESS DRIVE E	ENGLEWOOD	CO	80112-	(303) 792-2160	(303) 792-2180					
WS	VAN DE WEGE	DEAN	CDOT REGION 1	18500 E COLFAX AVE	AURORA	CO	80011-	(303) 757-9647	(303) 757-9746		X			
WS	VAN LAUWE	LIZ	CDOT DTD	4201 E ARKANSAS RM 212	DENVER	CO	80222-	(303) 757-9063	(303) 757-9727		X		X	X
WS	VAN NUYS	MAX		5001 BENTON WAY	DENVER	CO	80212-	(303) 433-7187		X	X	X	X	.
WS	VEAZEY	DICK	CH2M HILL	100 INVERNESS TERRACE EAST	ENGLEWOOD	CO	80111-	(303) 771-0900	(303) 754-0195				X	X
WS	VENGRIN	JOHN	EAGLE COUNTY	P O BOX 2125	EAGLE	CO	81631-	(970) 328-4520						
WS	VEY	C R		P O BOX 2023	AVON	CO	81620-	(970) 845-7490	(970) 949-9305					
WS	VOXAKIS	MICHAEL	CDOT	P O BOX 399	DUMONT	CO	80436-	(303) 623-4678	(303) 623-0542			X		
WS	WAGNER	MIKE		P O BOX 156	GEORGETOWN	CO	80444-	(800) 365-6365						
WS	WALCHER	GREG	CLUB 20	BOX 550	GRAND JUNCTION	CO	81502-							
WS	WALLACE	GLENN	BUREAU OF LAND MANAGEMENT	2850 YOUNGFIELD	LAKEWOOD	CO	80215-	(303) 239-3728	(303) 239-3808	X	X		X	X
WS	WALLACE	BILL	SUMMIT COUNTY	BOX 68	BRECKENRIDGE	CO	80424-	(970) 453-3413	(970) 485-1594			X		X
WS	WATTENBERG	DAVE		DRAWER 797	WALDEN	CO	80480-	(303) 866-4866	303-866-2012					
WS	WATTS	BOB	CITY OF ARVADA	8101 RALSTON ROAD	ARVADA	CO	80002-							X
WS	WEAVER	BERT	CLEAR CREEK COUNTY	BOX 2000	GEORGETOWN	CO	80444-	(303) 534-5777	(303) 569-0731		X		X	
WS	WEBER	DAVID	COLO DIV OF WILDLIFE	6060 BROADWAY	DENVER	CO	80216-	(303) 291-7231						X
WS	WELTZR	LOU		5471 FALL RIVER RD	IDAHO SPRINGS'	CO	80452-	(303) 567-4677	(303) 569-2391					
WS	WESSEL	PETER	I-70 CORRIDOR HWY AUTHORITY	627 S CORONA ST	DENVER	CO	80209-	(303) 777-5016	(303) 777-5209			X	X	
WS	WHEELER	BRIAN	COLO STATE PATROL	P O BOX 585	FRISCO	CO	80443-	(970) 668-3133	(303) 567-2630	X	X	X		
WS	WHEELOCK	EILEEN		P O BOX 952	IDAHO SPRINGS	CO	80452-	(303) 567-2008						X
WS	WHITE	JIM	CITY OF IDAHO SPRINGS	P O BOX 907	IDAHO SPRINGS	CO	80452-	(303) 567-4421	(303) 567-4955	X	X		X	
WS	WILLIAMS	KIT		2925 BOOTH CREEK DR	VAIL	CO	81657-	(970) 476-0909	(970) 476-2320	X	X	X	X	
WS	WILSON	JOHN	CDOT EISENHOWER TUNNEL	P O BOX 397	IDAHO SPRINGS	CO	80452-	(303) 573-5301				X		
WS	WISE	JOHN	CO STATE PATROL	1096 MCINTIRE	GOLDEN	CO	80401-	(303) 273-1600	(303) 273-1607	X				
WS	WISE	JOHN		3105 S GILPIN ST	ENGLEWOOD	CO	80110-	(303) 761-3408		X	X		X	
WS	WOLFE	JACK	EAST WEST PARTNERS	P O BOX 7700	BRECKENRIDGE	CO	80424-	(970) 453-9400						
WS	WONG	COREY	CLEAR CREEK RANGER DISTRICT	P O BOX 3307	IDAHO SPRINGS	CO	80452-	(303) 567-3001	(303) 567-3021	X			X	
WS	WOODBURY	ROBERT	WINTER PARK RESORT WINTER PARK REC ASSOC	P O BOX 36	WINTER PARK	CO	80482-	(970) 726-1516	(303) 892-5823	X	X			X
WS	YOUNG	FRANK	TOWN OF SILVERPLUME	P O BOX 1027	SILVER PLUME	CO	80476-	(303) 569-3172	(303) 569-2363		X	X		X
WS	YOUNG	RICKY	DENVER POST	1560 BROADWAY	DENVER	CO	80202-	(303) 820-1010	(303) 820-1369				X	
WS	ZEBAUERS	ZEKE	JEFFERSON COUNTY HIGHWAY & TRANSPORTATION	100 JEFFERSON COUNTY PARKWAY	GOLDEN	CO	80419-3500	(303) 271-8498	(303) 271-8490	X	X		X	
WS	ZITTI	CATHY		BOX 2141	EAGLE	CO	81631-	(970) 328-1220						
WS	ZURBRIGGEN	BERNIE	SUMMIT COUNTY	P O BOX 4010	FRISCO	CO	80443-	(970) 668-5132	(970) 668-5066		X	X		