SH82 CORRIDOR OPTIMIZATION PLAN

DECEMBER 2010

DOT DEPARTMENT OF TRANSPORTATION

RFTA ROARING FORK TRANSPORTATION AUTHORITY
Connecting our region with transit and trails

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1 Executive Summary

The City of Glenwood Springs (City), the Colorado Department of Transportation (CDOT), the Roaring Fork Transportation Authority (RFTA), and Garfield County have identified the need to plan for transportation improvements along the State Highway 82 (SH 82) Corridor in Glenwood Springs. It is recognized SH 82 is the City's "main street," while also serving as the main regional transportation artery serving the Roaring Fork Valley; therefore, strategies to address future regional and local transportation demand must be developed within the context that any transportation strategy will have an impact on one or more areas of the City or future travel times through the Corridor.

This Corridor Optimization Plan (COP) is the third in a series of documents designed to identify concerns with existing and future transportation on SH 82 and to provide decision makers with the information necessary to determine the appropriate direction for the Corridor and the City. The first document, the *SH 82 Corridor Conditions Assessment* (CCA) (CDOT & City of Glenwood Springs, 2005) confirmed that improvements to SH 82 will be necessary based on future transportation demand. The CCA also identified that both regional and local traffic contribute to congestion on SH 82. The *Corridor Optimization Study* (COS) (PBS&J, 2007) identified and evaluated 22 alternative routes for SH 82. This document, the COP, identifies ten strategies for addressing future SH 82 transportation demand. This study recognizes there may be a variety of methods to address future transportation demand and corridor capacity; therefore, the strategies evaluated in the COP examine various modes of travel and combinations of changes that would accommodate projected transportation growth. The following strategies are discussed:

- No Action (Strategy A)
- Operational Improvements (Strategy B)
- Transit Expansion (Strategy C)
- Operational Improvements and Local Circulation (Strategy D)
- Operational Improvements, Local Circulation, and Transit Expansion (Strategy E)
- Widen Bridge, New Interchange and Local Circulation (Strategy F)
- Additional Lanes on SH 82 (Strategy G)
- Additional Lanes on SH 82 and Transit Expansion (Strategy H)
- Glenwood Springs Bypass – Two Lanes (Strategy I)
- SH 82 Relocation – Four Lanes (Strategy J)

The strategies are made up of combinations of the following nine elements:

- Transit operations
- Transit capacity
- Transportation demand management (TDM)
- Roadway operations
- Transportation system management (TSM)
- Local circulation improvements
- Highway relocation
- New bridge and interchange
- Highway expansion

The COP is meant to be a tool for decision makers to use while planning for the future of Glenwood Springs. A recommended strategy, or course of action, is not identified in this document; rather, a technical evaluation of the strategies is provided for decision makers to have the technical knowledge to weigh the pros and the cons of each strategy against the community's values. It is anticipated the COP will be used by planners developing the revision to the City's Comprehensive Plan, as well as by City Council and decision makers at CDOT, RFTA, and Garfield County to plan for the future of SH 82.

This executive summary provides a brief overview of the pros and cons of each strategy in Section 1.1. A comprehensive description and technical evaluation of the strategies are in the COP document.

1.1 Strategy Pros/Cons (Tabular Format)

Table 1 summarizes the pros and cons of each strategy developed for the COP. As a point of reference for comparison with forecast future conditions, traffic under baseline (2009) conditions exhibits the following characteristics:

- There are minimal periods of congestion (no Grand Avenue failure)
- Current travel times are moderate (11 minute Grand Avenue peak travel time)
- Congestion imposes a barrier to pedestrian and bicycle circulation on and across SH 82
- Local circulation accessing or crossing SH 82 can be difficult

Table 1
Pros and Cons Identified for Strategies

Pros	Cons
No Action (Strategy A)	
• No right of way (ROW) takes. • No cost. • No physical improvements, therefore no new project related environmental mitigation is required. • No changes to existing parking infrastructure. • No physical changes to existing highway alignment; therefore no project impacts to other areas of Glenwood Springs.	• Travel times on SH 82 are projected to be 27 minutes during peak periods. • SH 82 failure is projected to last 11 hours daily. • Grand Avenue remains SH 82, limiting opportunities for modification to improve Grand Avenue character. • Decreased safety due to increased projected traffic through the existing corridor configuration. • Noise and emissions continue to increase along Grand, Midland, and Blake Avenues. • Congestion imposes an increasing barrier to pedestrian and bicycle circulation on and across SH82. • Transit travel times and headways will increase and may be inconsistent. • Local circulation accessing or crossing SH 82 is increasingly difficult because of increased congestion on the existing corridor configuration. • Regional travel time is projected to be 27 minutes because of congestion related delays.

Table 1
Pros and Cons Identified for Strategies

Pros	Cons
	• Small town character diminishes due to increased traffic on the existing corridor configuration. • May be more traffic on Midland and Blake Avenues trying to avoid SH82 congestion.
Operational Improvements (Strategy B)	
• No ROW takes. • Minimal cost to construct and maintain. • No physical improvements, therefore no new project related environmental mitigation is required. • No physical changes to existing highway alignment; therefore no project impacts to other areas of Glenwood Springs.	• Travel times on SH 82 are projected to be 31 minutes during peak period. • SH 82 failure is projected to last 10 hours daily. • Grand Avenue remains SH 82, limiting opportunities for modification to improve Grand Avenue character. • Decreased safety due to increased projected traffic through the existing corridor configuration. • Noise and emissions continue to increase along Grand, Midland and Blake Avenues. • Congestion imposes a barrier to pedestrian and bicycle circulation on and across SH 82. • Transit travel times and headways will increase and may be inconsistent. • Some parking loss will occur to accommodate operational improvements. Parking restrictions may be increased to help control travel demand. • Local circulation accessing or crossing SH 82 is increasingly difficult because of increased congestion on the existing corridor configuration. • Regional travel times projected to increase by four minutes compared to no action because of congestion related delays and reallocation of green time to reduce side street delay. • Small town character diminishes due to increased traffic on the existing corridor configuration. • May be more traffic on Midland and Blake Avenues trying to avoid SH82 congestion.

Table 1
Pros and Cons Identified for Strategies

Pros	Cons
Transit Expansion (Strategy C)	
• Limited new ROW acquisition may be required along the RFTA corridor for transit expansion. • Moderate cost to construct and maintain. • Duration of periods of congestion on SH 82 is limited to peak hours (2 hours of Grand Avenue failure). • Safety is marginally improved by fewer conflicts. • Noise and emissions are marginally reduced on Grand Avenue by reducing vehicles on highway and number of stopping and starting vehicles. • Reduces duration of congestion barriers to pedestrian and bicycle circulation and provides additional travel choices. • Transit operations are improved by being more reliable and more frequent. • May increase parking opportunities with new park and ride lots. • Reduced SH 82 congestion related barriers to local circulation and increased options for local travel. • Reduced duration of SH 82 regional delay and increased options for regional travel.	• Travel times along SH 82 will be 34 minute on Grand Avenue during peak periods. • Grand Avenue remains SH 82, limiting opportunities for modification to improve Grand Avenue character. • Some physical improvements required, therefore some new project related environmental mitigation may be required. • Physical improvements along RFTA Corridor may cause project related impacts to additional properties.
Operational Improvements and Local Circulation (Strategy D)	
• Marginal reduction in noise and emissions on Grand Avenue because of fewer cars on Grand Avenue. • Low cost to construct and maintain. • Marginal improved connections for pedestrian and bicycle travel. • No changes to existing parking infrastructure. • Improved local circulation because of new connections.	• Requires some ROW acquisition for local circulation improvements. • 7 hours of Grand Avenue failure and travel time of 21 minutes on Grand Avenue during peak travel time) for all modes of travel. • Grand Avenue remains SH 82, limiting opportunities for modification to improve Grand Avenue character. • Some local trips are diverted to local streets through residential areas. • Marginally decreased safety in neighborhoods because of additional trips through local intersections. • Some physical improvements required, therefore some new project related environmental mitigation may be required. • Physical local roadway improvements may cause project related impacts to additional properties.

Table 1
Pros and Cons Identified for Strategies

Pros	Cons
Operational Improvements, Local Circulation, and Transit Expansion (Strategy E)	
• Moderate cost to construct and maintain. • Duration of periods of congestion is limited to the peak hours (2 hours of Grand Avenue failure) and delay is moderate (16 minutes Grand Avenue peak travel time). • Marginal reduction in noise and emissions on Grand Avenue because fewer cars on Grand Avenue. • Reduces duration of congestion barriers to pedestrian and bicycle circulation. • Provides additional travel opportunities and improved connections for pedestrian and bicycle travel. • Transit operations are improved by being more reliable and more frequent. • May increase parking opportunities with new park and ride lots. • Reduced SH 82 congestion related barriers to local circulation and increased options for local travel. • Reduced duration of SH 82 regional delay and increased options for regional travel.	• Requires some ROW acquisition for local circulation improvements and possibly along the RFTA corridor for transit expansion. • Grand Avenue remains SH 82, limiting opportunities for modification to improve Grand Avenue character. • Some local trips are diverted to local streets through residential areas. • Marginally decreased safety in neighborhoods because of additional trips through local intersections. • Some physical improvements required, therefore some new project related environmental mitigation may be required. Physical local roadway and RFTA Corridor improvements may cause project related impacts to additional properties
Widen Bridge, New Interchange, and Local Circulation (Strategy F)	
• Marginal reduction in noise and emissions on Grand Avenue because fewer cars on Grand Avenue. • Marginally improved connections for pedestrian and bicycle travel. • No changes to existing parking infrastructure. • Improved local circulation because of new connections. • Marginally improved regional travel time because fewer local trips on SH 82 and improved operation of the SH 82/I-70 interchange.	• Requires some ROW acquisition for local circulation improvements. • High capital cost for construction; however, low cost to maintain. • Moderate periods of congestion (7 hours of Grand Avenue failure) and delay (20 minute Grand Avenue peak travel time) for all modes of travel. • Grand Avenue remains SH 82, limiting opportunities for modification to improve Grand Avenue character. • Some local trips are diverted to local streets through residential areas. • Marginally decreased safety in neighborhoods because of additional trips through local intersections. • Physical improvements will likely require project related environmental mitigation. • Physical local roadway improvements may cause project related impacts to additional properties.

Table 1
Pros and Cons Identified for Strategies

Pros	Cons
Additional Lanes on SH82 (Strategy G)	
• Duration of periods of congestion is limited to the peak hours (2 hours of Grand Avenue failure) and delay is moderate (14 minute Grand Avenue peak travel time). • Safety is marginally improved because of reduced conflicts. • Marginal reduction in noise and emissions on Grand Avenue because of smoother traffic flow on Grand Avenue. • Improved local circulation because of new connections and increased gaps for crossing SH 82. • Improved regional travel time because fewer local trips on SH 82, increased SH 82 capacity and improved operation of the SH 82/I-70 interchange.	• Requires some ROW acquisition for local circulation improvements and may require some along SH 82 for new lanes. • High capital cost for construction; however, low cost to maintain. • Grand Avenue remains SH 82 and is widened, significantly limiting opportunities for modification to improve Grand Avenue character. • Some local trips are diverted to local streets through residential areas. • No significant safety improvements. • Physical improvements will likely require project related environmental mitigation. • Increased highway width creates a barrier to pedestrians and bicyclists crossing SH 82. • Parking along Grand Avenue will be removed to accommodate travel lanes. • Physical Grand Avenue improvements may further impact adjacent properties, but will not impact additional properties.
Additional Lanes on SH 82 plus Transit Expansion (Strategy H)	
• Duration of periods of congestion is limited to the peak hours (2 hours of Grand Avenue failure) and delay is minimal (9 minute Grand Avenue peak travel time). • Safety is marginally improved because of reduced conflicts. • Marginal reduction in noise and emissions on Grand Avenue because of fewer cars and smoother traffic flow on Grand Avenue. • Marginally improved connections for pedestrian and bicycle travel because of new local links. Reduced duration of congestion barriers to pedestrian and bicycle circulation. Provision of additional travel opportunities because of transit improvements. • Improved local circulation because of new connections, increased gaps for crossing SH 82 and increased transit opportunities. • Improved regional travel time because fewer local trips on SH 82, increased SH 82 capacity, improved operation of the SH 82/I-70 interchange and increased transit opportunities.	• Requires some ROW acquisition for local circulation improvements from SH 82 and may require some along SH 82 for new lanes. • High capital cost for construction and moderate cost to maintain. • Grand Avenue remains SH 82 and is widened, significantly limiting opportunities for modification to improve Grand Avenue character. Some local trips are diverted to local streets through residential areas. • Physical improvements will likely require project related environmental mitigation. • Parking along Grand Avenue will be removed to accommodate travel lanes (partially offset by additional parking provided at new park and ride locations). • Physical Grand Avenue improvements may further impact adjacent properties and RFTA corridor improvements might impact additional properties.

Table 1
Pros and Cons Identified for Strategies

Pros	Cons
Glenwood Springs Bypass – Two Lanes (Strategy I)	
• Safety is improved because of reduced conflicts. • Reduction in noise and emissions on Grand Avenue because of less vehicle traffic on Grand Avenue. • Improved connections for pedestrian and bicycle travel because of new local links. Reduced barriers to pedestrian and bicycle circulation because traffic redistributed from Grand Avenue. • No changes to existing parking infrastructure. • Improved local circulation because of new connections, increased gaps for crossing SH 82 and bypass. • Improved regional circulation because fewer local trips on SH 82, increased regional capacity because of the bypass, and improved operation of the SH 82/I-70 interchange.	• Significant new ROW required for bypass and new local connections. • High capital cost for construction and maintenance. • Moderate periods of congestion (7 hours of Grand Avenue failure) and delay (20 minute Grand Avenue peak travel time) for all modes of travel on Grand Avenue (bypass has minimal congestion (no bypass failure) or delay (6 minute bypass peak travel time). • Grand Avenue remains SH 82, limiting opportunities for modification to improve Grand Avenue character. Some local trips are diverted to local streets through residential areas. • Physical improvements will likely require project related environmental mitigation. • Addition of bypass will impact additional properties. • Some local trips are diverted to local streets through residential areas. • Marginally decreased safety in neighborhoods because of additional trips through local intersections.
SH 82 Relocation – Four Lanes (Strategy J)	
• Congestion (2 hours of Grand Avenue failure and no failure of SH 82) and delay (7 minute Grand Avenue and SH 82 peak travel times) for all modes of travel on SH 82 and Grand Avenue are minimized. • Grand Avenue can be modified to address Grand Avenue character goals. • Safety is improved because of reduced conflicts. • Reduction in noise and emissions on Grand Avenue because of less vehicle traffic on Grand Avenue. • Improved connections for pedestrian and bicycle travel because of new local links. Reduced barriers to pedestrian and bicycle circulation because traffic redistributed from Grand Avenue. • No changes to existing parking infrastructure. • Improved local circulation because of new connections, increased gaps for crossing Grand Avenue and relocation of SH 82 away	• Significant new ROW required for relocated SH 82 and new local connections. • High capital cost for construction and maintenance. • Physical improvements will likely require project related environmental mitigation. • Relocation of SH 82 will impact additional properties. • Some local trips are diverted to local streets through residential areas. • Marginally decreased safety in neighborhoods because of additional trips through local intersections.

Table 1
Pros and Cons Identified for Strategies

Pros	Cons
from downtown. • Improved regional travel time because fewer local trips on SH 82, increased regional capacity because of the relocation, and improved operation of the SH 82/I-70 interchange.	

2 Introduction

2.1 Purpose

The CDOT *Corridor Optimization Guidelines* (2001) define the purpose of a COP is to "[…] provide an assessment of how to best meet future travel demands in a given corridor." The purpose of the SH 82 COP, therefore, is to identify and assess methods for how to best meet future travel demand within the study area in Glenwood Springs, Colorado. As defined for this study, the study area through Glenwood Springs is the area that extends from United States Highway 6 (US 6) to the north, just beyond the Glenwood Springs Airport to the south, Midland Avenue to the west, and the edge of the valley to the east (see Figure 1).

2.2 Background

SH 82 is a four-lane roadway that serves as the main access from Interstate 70 (I-70) to the entire Roaring Fork Valley. As Glenwood Springs' "main street" and the most critical commuter corridor for the Roaring Fork Valley, SH 82 serves an important function for City and regional travel, economic vitality, and character. Per the 2004 *Local & Regional Travel Patterns Study* (RRC Associates, Charlier Associates, & Healthy Mountain Communities, 2005), approximately 35 percent of all work trips and virtually all freight and goods delivery vehicles in the Roaring Fork Valley travel along SH 82 in Glenwood Springs.

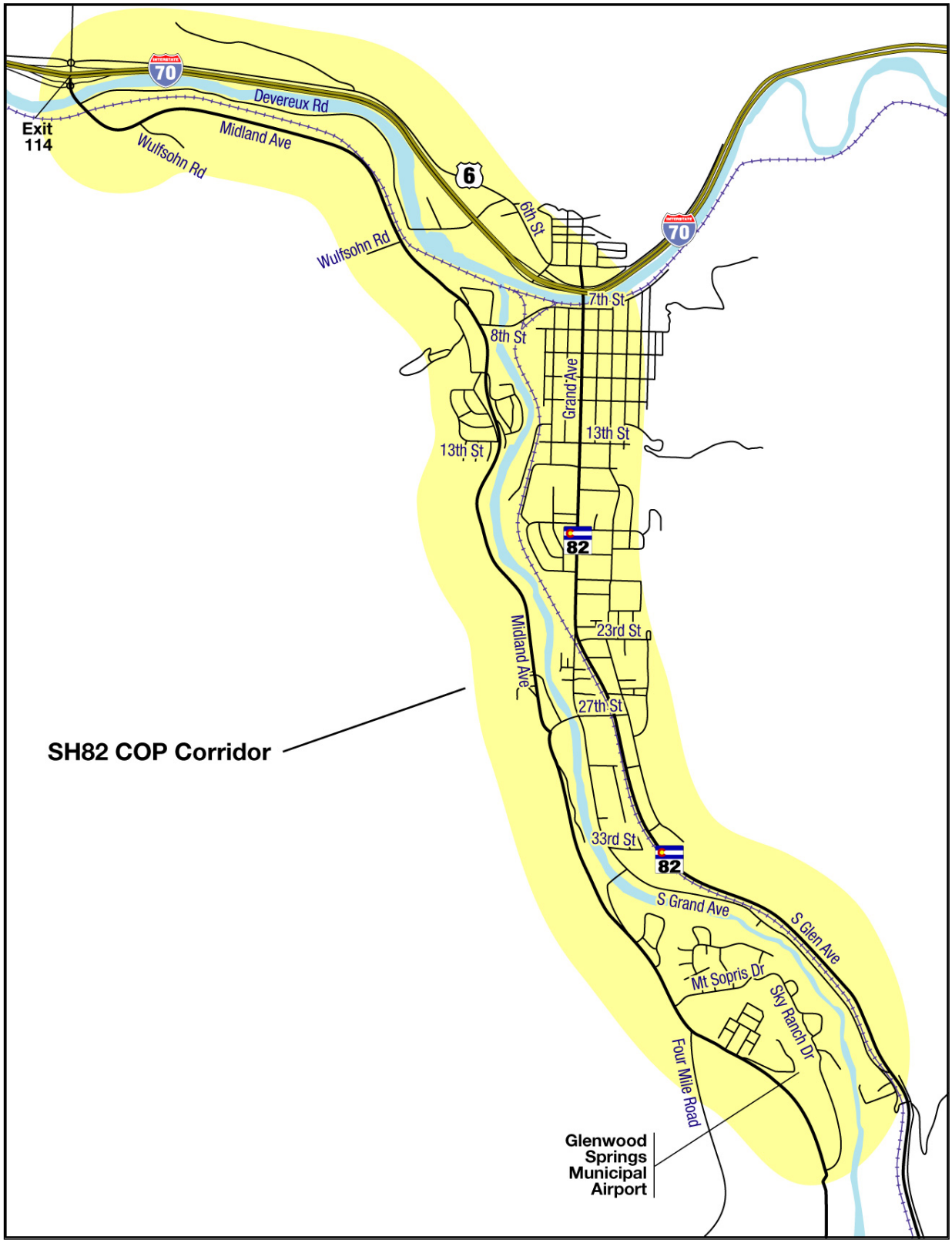
The City of Glenwood Springs *Comprehensive Plan* (1998) identifies the following vision statement:

> The City of Glenwood Springs desires to maintain its small town character and preserve its cultural and natural resources – by implementing a proactive plan – to achieve directed and balanced development, social and economic diversity and address its transportation needs (p. 3).

The findings of previous studies are presented in this section. These findings provide the basis for developing a COP for SH 82 through Glenwood Springs. The cumulative findings of the previous studies are the reason the City and CDOT have decided to further evaluate the study area and potential strategies to address long-term local and regional travel demands.

One of the community goals identified in the *Comprehensive Plan* is to "Address Transportation Needs." Addressing the negative impacts of traffic congestion associated with regional growth is one of the needs identified in the plan's needs assessment.

Figure 1
Study Area



The Glenwood Springs *Downtown Plan* (1999) identifies the following preferred development scenario:

> Maintaining the existing small-town scale and character of downtown becomes a high priority of the [C]ity […]. New, well-designed parking lots and structures are built on the edge of the district primarily for employees; on-street and lots near Grand Avenue are reserved for customers and visitors. The [C]ity undertakes a more detailed assessment of building a bypass to remove truck traffic from downtown. A variety of routes are explored.
>
> The existing rail corridor is dedicated to transit and a hike/bike trail. Steps are taken to make Grand Avenue and the downtown core much more pedestrian-oriented. Sixth Avenue and Grand Avenue are not widened. The Grand Avenue Bridge is replaced with a well-designed structure similar in size to the existing bridge […]. Pedestrian connections are improved to the downtown core.

These visions identified in the *Downtown Plan* provide direction for what types of improvements the City envisions for the study area as well as some of the goals the City would like to achieve by developing corridor improvements.

To address these needs, studies have been performed by the City and others to evaluate existing and future congestion and travel patterns within the study area. Four specific studies have identified growth and travel patterns within the study area through Glenwood Springs:

- SH 82 CCA
- *Local & Regional Travel Patterns Study*
- SH 82 COS
- *West Glenwood Springs to Aspen Corridor Investment Study* (CIS) (RFTA, 2003)

CDOT and the City performed the SH 82 CCA to determine if future operating conditions on SH 82 in Glenwood Springs would be acceptable. The SH 82 CCA also evaluated information regarding existing and future traffic conditions and pass-through trips within the study area through Glenwood Springs. Specifically, the SH 82 CCA evaluated travel time, duration of congestion, and level of service (LOS) for the corridor under existing and anticipated future conditions. The report identified population growth in the City of Glenwood Springs based on City data. The data indicated the population growth rate in the City has been gradually declining from a high of just over 2.00 percent annually over the past 14 years to future projected rates around 1.55 percent. Transportation demands generally grow at a rate that is equal to, or slightly higher than, population rates. To ensure the analysis adequately addressed potential future growth along the corridor, the SH 82 CCA evaluated 1.0 percent, 1.5 percent, and 2.5 percent annual growth scenarios to represent a low growth, medium growth, and high growth scenario.

The following summarizes the conclusions for the 1.5 percent (medium) and 2.5 percent (high) annual growth scenarios evaluated in the SH 82 CCA. Because the 1 percent (low) annual growth scenario represents a growth rate that is unlikely, it is not discussed in this document.

- **The Medium Growth Scenario (1.5 percent annually).** The corridor will begin to experience unacceptable performance (LOS E or F, as described in this document's glossary), 16 to 17 years in the future, during certain times of a typical day, primarily the weekday PM period. Key intersections such as 8th Street, Laurel Street, and Pine Street begin to fail, LOS E or F, for most of the peak periods of a typical week. Starting 15 years in the future, congested conditions will exist for 1 to 2 hours of a typical weekday and would increase to as many as 6 to 7 hours by the 20-year horizon.

- **The High Growth Scenario (2.5 percent annually).** The corridor begins to experience unacceptable performance (LOS E or F) during the weekday midday and evening periods, and during the weekend midday period. The impacts of this growth rate will start to impact the corridor in approximately 10 years. Numerous intersections such as those at both the north and south ends of the corridor will begin to fail, LOS E or F, for most of the peak periods of a typical week. The poor performance of these key intersection results in the arterial LOS reaching unacceptable (LOS E or F) levels and in the travel times more than doubling during some time periods. Congested conditions will be experienced for 1 to 2 hours of a weekday in 10 years, 7 to 8 hours in 15 years, and for as many as 12 to 13 hours 20 years in the future. On the weekend, congested traffic conditions can be expected to occur during a 1 to 2 hour period of the day in 15 years and for more than 8 hours of a day in 20 years.

The *Local & Regional Travel Patterns Study* identified that only 34 percent of Glenwood Springs' workers live in Glenwood Springs and approximately 31 percent of the people living in Glenwood Springs work outside the City (RRC Associates, Charlier Associates, & Healthy Mountain Communities, 2005). This means that in addition to pass-through and local circulation demands on SH 82, there is a regional demand on SH 82 to provide access to Glenwood Springs. The report also evaluated projected population growth in both Glenwood Springs and places influencing regional travel in the area, including the rest of the Roaring Fork Valley, Garfield County to the west and Eagle County to the east. Between 2000 and 2025, the population of Glenwood Springs is projected to increase 72 percent. This equates to an average annual growth rate of 2.19 percent. The population of the remainder of the Roaring Fork valley is projected to grow approximately 70 percent during this same period (average annual growth of 2.1 percent); however, during the same timeframe, growth of jobs in the Aspen area is forecasted to increase 104 percent (average annual growth of 2.89 percent). This means, if growth occurs as projected, there will be increasing demand for both local and regional worker travel through the Roaring Fork Valley as transportation demand tends to increase at the same rate or slightly greater than population growth.

In addition to completed studies in the area, data regarding traffic volumes and growth on SH 82 is available from CDOT. CDOT collects continuous data for the highway facilities they operate and calculates historic growth rates for their highways. Typically, these growth rates are calculated using 20 years of historic data. Based on data from CDOT's website, traffic on SH 82 is projected to grow at a 1.47 percent annual rate south of 6th Street and at an annual rate of 1.94 percent south of 32nd Street based on historic data.

While long-term historic growth rates provide a good picture of what has happened along a roadway, they may not reflect current traffic growth trends, which is why it is also important to evaluate short-term historic traffic volumes to identify recent patterns and how they compare to the historic data. CDOT provides daily and hourly traffic volumes on its website for its permanent count locations. Data for 2004 through 2008 from a permanent count station on SH 82 south of the 32nd Street intersection was analyzed to identify short-term historic traffic growth. According to the data from the website, travel demand on SH 82 south of 32nd Street has fluctuated from year-to-year, but has shown an annual growth of 1.71 percent between 2004 and 2008.

2.3 Findings

Based on previously completed studies and available traffic data, there is a range of potential annual growth rates that have been identified. A projected growth rate is an estimate based on historic and projected population growth and transportation demand growth; however, because many factors

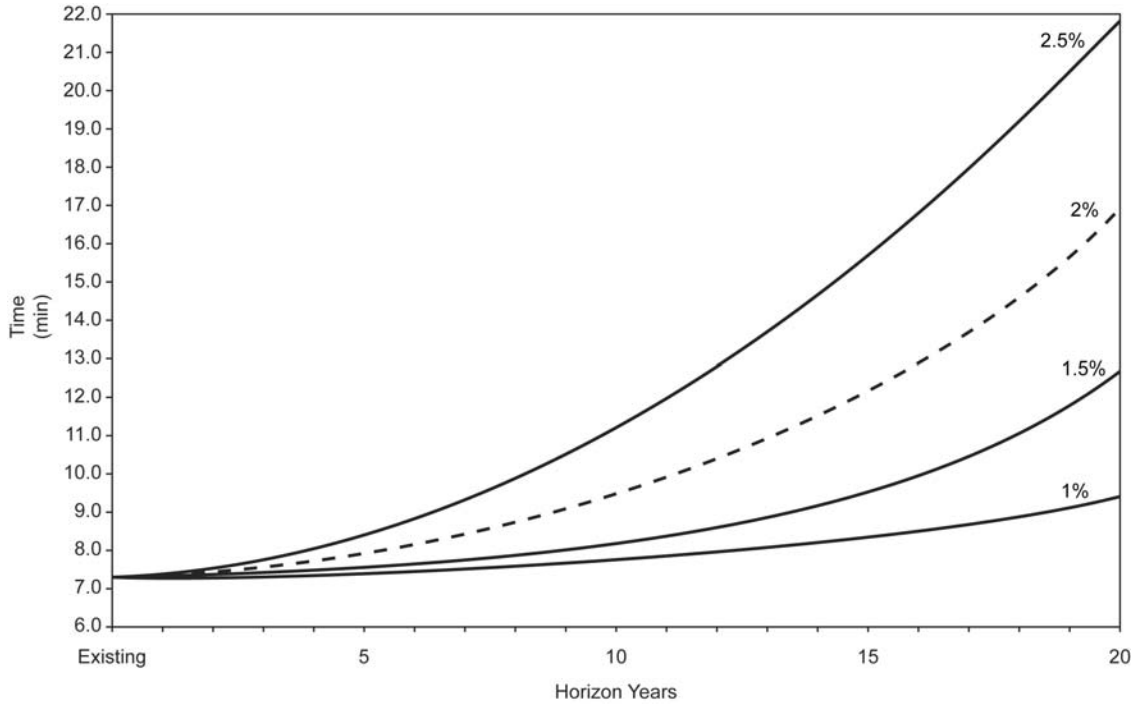
impact population and transportation growth it is possible transportation demand will grow at a rate slightly slower or faster than identified. The important reason for identifying a growth rate is to project future transportation needs and approximately when transportation thresholds will be reached. This helps agencies program funding for the development and implementation of improvement projects. Table 2 summarizes the average annual growth rates identified from the sources discussed in Section 4.1, Growth Rate, which identifies a two percent annual growth rate be used for the future conditions analysis for the SH 82 COP

Table 2
Summary of Average Annual Growth Rates

Source	Rate (% annual growth)
Long-Term Traffic Volumes (CDOT)	1.47-1.94
Short-Term Traffic Volumes (CDOT & PBS&J)	1.39-2.84
Historic Population Growth (SH 82 CCA)	1.55-2.00
Forecast Population Growth (*Local & Regional Travel Patterns Study*)	2.19

Figure 2 provides projected weekday PM peak period northbound travel times (identified as the most congested time period and direction of travel in the SH 82 CCA) as analyzed in the SH 82 CCA. The figure has been modified to include the two percent annual growth rate identified for use in the SH 82 COP. As shown in Figure 2, peak hour travel times between 32nd Street and I-70 are estimated to more than double from an average of seven minutes in 2005 to 17 minutes in 2025.

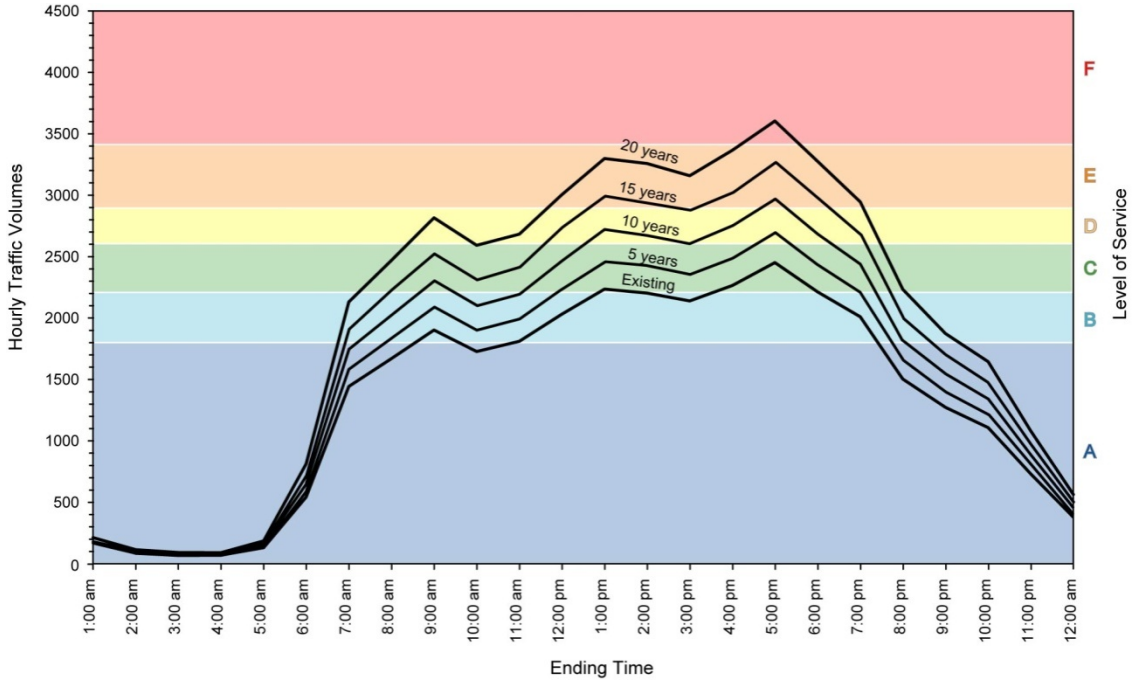
Figure 2
Projected Weekday PM Peak Hour Northbound Travel Times



Source: Adapted from the SH 82 CCA (2005).
Travel times measured for vehicle trips between 32nd Street and I-70 (Exit 116).
As this figure is from the 2005 SH 82 CCA, existing is 2005.

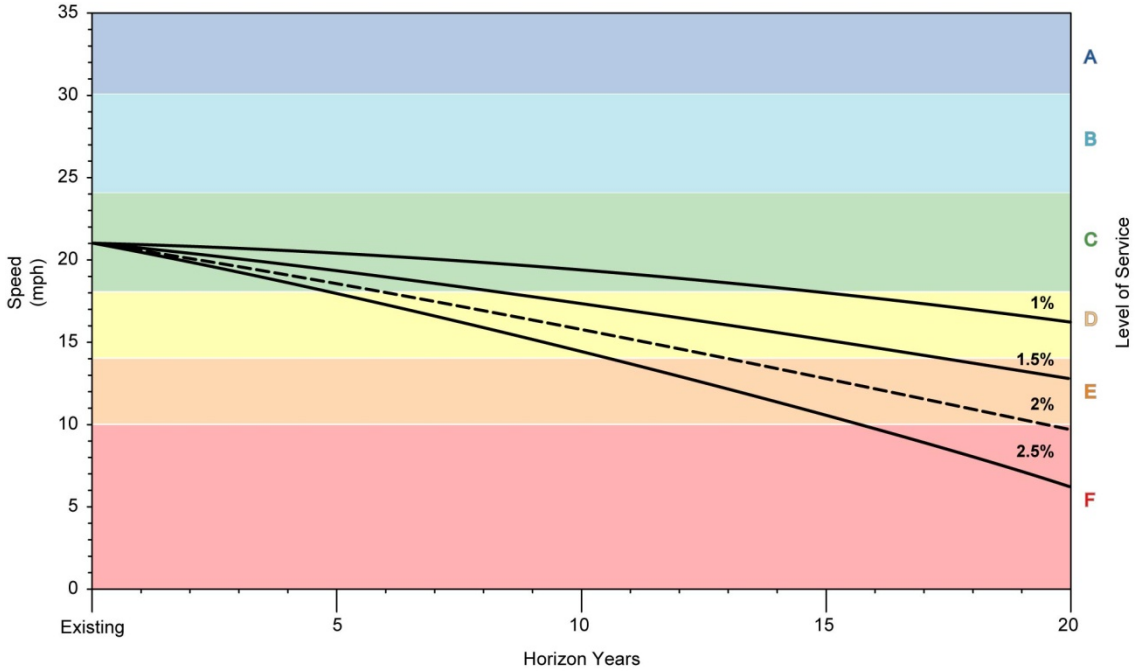
The duration and severity of congestion is also forecast to increase over time, as identified in Figure 3. Figure 3 is adapted from the SH 82 CCA for two percent average annual growth. Based on Figure 3 and how congestion was defined in the SH 82 CCA (LOS E or F), significant congestion is expected to occur for seven hours of the day in 2025. Figure 4 shows how corridor travel speed and LOS is forecast to degrade over time based on the analysis completed in the SH 82 CCA. The figure has been modified to add the two percent annual growth rate recommended for use in the SH 82 COP. The figure shows how a two percent annual increase in traffic on SH 82 will reduce travel speeds of vehicles on the corridor by more than 50 percent. Operations will also degrade to the unacceptable LOS range in approximately 12 years.

Figure 3
Weekday Congestion for 2 Percent Annual Growth



Source: Adapted from the SH 82 CCA (2005).
Congestion measured for vehicle trips between 32nd Street and I-70 (Exit 116).

Figure 4
Projected Weekday PM Peak Hour Northbound Arterial Speed and LOS



Source: Adapted from the SH 82 CCA (2005).
Speed and LOS measured for vehicle trips between 32nd Street and I-70 (Exit 116).

In addition to identifying existing and future operating conditions for SH 82 within Glenwood Springs, the SH 82 CCA also identified the number of pass-through trips made within the study area. Pass-through trips are trips that neither begin nor end in Glenwood Springs; during a pass-through trip, a vehicle is driven through Glenwood Springs, but does not stop in Glenwood Springs. The SH 82 CCA identified pass-through trips make up 34 percent of PM peak hour traffic in the study area.

Using the two percent annual growth rate, the pass-through data collected in the SH 82 CCA, and the traffic volume data collected in the SH 82 COS, it is estimated pass-through trips currently (2009) account for as much as 40 percent of SH 82's PM peak hour capacity within Glenwood Springs. Table 3 summarizes northbound peak period volumes and how much of the roadway capacity used at ten intersections along SH 82.

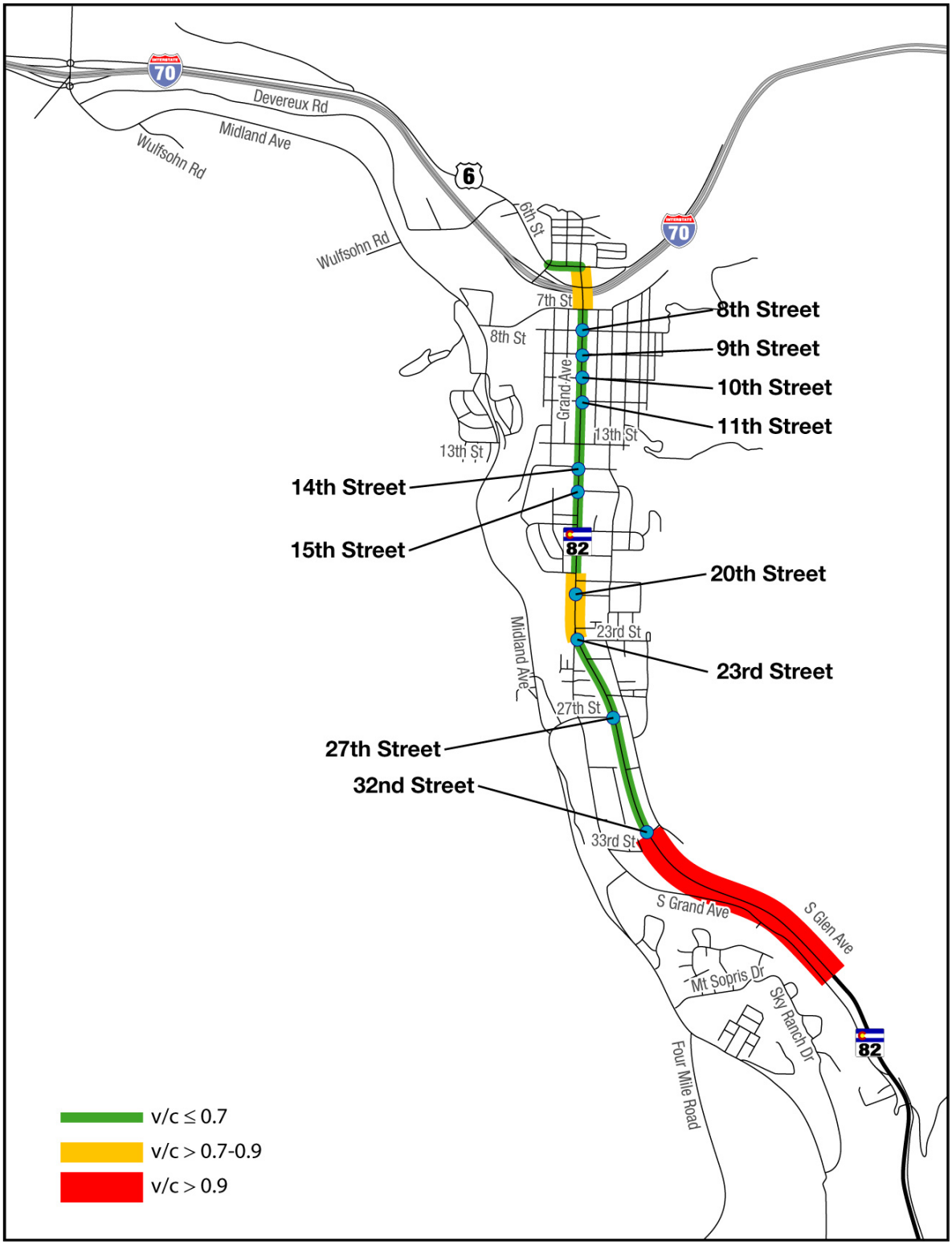
Figure 5 identifies the locations where peak direction and capacity volume was evaluated as well as the northbound PM peak volume to capacity of SH 82. If traffic volumes continue to grow at an annual rate of two percent, it is estimated there will be locations along SH 82 within Glenwood Springs where demand exceeds capacity within one year (by 2010). Within 20 years, it is projected two locations will be over capacity, two intersections will be above 95 percent capacity, and two others will be above 90 percent capacity. In 25 years, it is forecasted five intersections will be above capacity and the remainder will be above 90 percent capacity.

Table 3
SH 82 Northbound Volumes and Capacities

Intersection	2009 Total Volume	2009 Truck Volume	2009 Trucks PCE	2009 Adjusted Volume (PCE)	Capacity	2009 Volume % of Capacity	2009 Pass Through % of Capacity	2009 Trucks % of Capacity
8th	1227	55	83	1254	1871	67.1%	34.3%	4.4%
9th	1185	53	80	1212	1900	63.8%	33.8%	4.2%
10th	1366	61	92	1397	2476	56.4%	25.9%	3.7%
11th	1408	63	95	1440	2506	57.5%	25.6%	3.8%
14th	1403	63	95	1434	2496	57.5%	25.7%	3.8%
15th	1487	67	100	1520	2318	65.6%	27.7%	4.3%
20th	1462	66	99	1495	2007	74.5%	32.0%	4.9%
23rd	1376	62	93	1407	2325	60.5%	27.6%	4.0%
27th	1308	59	88	1338	2381	56.2%	26.9%	3.7%
32nd	1571	71	106	1606	1620	99.1%	39.6%	6.5%

Note: Volumes are for the PM peak period in the peak (northbound) direction. Thirty-four percent of trucks are combination trucks.
PCE = passenger car equivalent.

Figure 5
Existing Northbound PM Volume to Capacity



2.4 Needs

Drawing from the findings identified previously, it is possible to define a set of study area transportation needs that can become the basis for defining study area goals and objectives and for identifying strategies to address the needs. There are five study area transportation needs:

1. **Pass-through trips impact local mobility**. Data from the SH 82 CCA indicates that as much as 40 percent of SH 82's capacity through Glenwood Springs during the PM peak period is used by pass-through (external-external) trips. The *Local & Regional Travel Patterns Study* does not evaluate vehicle trips entering or exiting Glenwood Springs; however, it does evaluate where people work compared to where they live. The study indicates 34 percent of Glenwood Springs' workers live in Glenwood Springs (internal-internal trips) and that 31 percent of people who live in Glenwood Springs work in other communities (internal-external trips). These pass-through (external-external) and regional (internal-external) trips add to congestion for local traffic, which uses SH 82 for trips that begin and end in Glenwood Springs.

2. **Local trips impact regional mobility**. Based on comparison of the capacity of the highway used by pass-through trips with the total used capacity, roughly 60 percent of the demand on SH 82 is from local trips (internal-internal) or from trips that begin or end in Glenwood Springs (internal-external/external-internal). This local traffic demand adds to congestion for traffic that uses SH 82 within Glenwood Springs for regional trips.

3. **Future vehicle volumes forecast to degrade traffic operations**. Future traffic growth will impact both local and regional circulation within the study area. The SH 82 CCA analyzed existing and future traffic conditions for the study area. Historic CDOT data (collected over the past 20 years) suggest traffic volumes will grow at a rate of approximately two percent annually along SH 82. This will result in approximately 50 percent growth in traffic volumes over 20 years, which in turn will significantly increase the average travel time along SH 82 from 32nd Street to I-70 during the peak period from approximately 11 minutes currently (2009) to 17 minutes in 2025, as shown in Figure 2. The higher volumes are forecasted to increase the severity and duration of congestion within the study area, as shown in Figure 4. LOS is a measure of traffic operations along corridors and at intersections. The LOS throughout the study area and at key intersections is forecast to fail during the peak periods with the forecast traffic growth as identified in Figure 4.

4. **Commercial vehicle traffic impacts mobility**. According to current CDOT traffic data and data in the SH 82 CCA and SH 82 COS, trucks use as much as 6.5 percent of the capacity of SH 82 within Glenwood Springs during the PM peak period. The slower acceleration, larger size, and poorer maneuverability of trucks create friction along roadways, which in turn impacts mobility. This is further exacerbated by narrow lanes, such as on the Grand Avenue Bridge over I-70 and the Colorado River.

5. **Traffic volumes are inconsistent with existing land uses**. Traffic within the study area creates noise, pollution, and congestion that may be incompatible with many of the uses along the corridor (residences, schools, parks, the library, the post office, and small businesses). This inconsistency impacts quality of life. Furthermore, the high number of properties that have direct access onto SH 82 or depend on SH 82 for parking is inconsistent with the *Colorado State Highway Access Code* (Access Code) (State of Colorado, 2002). The high number and types of accesses, which are inconsistent with the Access Code, results in reduced mobility and safety impacts for SH 82.

2.5 Goals and Objectives

Project goals for the SH 82 COP were developed from input obtained at a public meeting held in February 2008 and from the project stakeholder group, which contains members from the City's Transportation Commission and staff from the following agencies:

- The City
- CDOT
- RFTA
- Garfield County

The following project goals served as a guide for developing and evaluating strategies to address the project's needs:

- Provide effective, efficient, multimodal travel options within the study area for all users (local goal)
- Provide effective, efficient, multimodal travel options through the study area for all users (regional goal)
- Provide safe travel conditions within the study area for all users
- Minimize adverse environmental impacts related to study area mobility improvements
- Provide financially feasible mobility improvements to the study area
- Maintain the RFTA Corridor for existing trail and future mass transit use

2.6 Support

The SH 82 COP was developed by a collaborative group that included the City, CDOT, RFTA, and Garfield County. In addition to the representatives from these agencies who participated in the development of the COP, the document and findings were presented to these agencies for review to obtain support for the SH 82 COP from their governing bodies. The letters of support from the agencies are included in Appendix A.

3 Development of Strategies

A series of nine transportation elements were identified in order to address study area travel demands. These elements involve fundamental transportation methods for addressing transportation supply and demand. The following elements are discussed in more detail in Section 3.1, Elements:

- Transit operations
- Transit capacity
- TDM
- Roadway operations
- TSM
- Local circulation improvements
- Highway relocation
- New bridge and interchange
- Highway expansion

Generally, the transportation elements, on their own, could not completely address future study area transportation demand; therefore, they were combined , with complementary elements to form more comprehensive strategies to address future travel demand. The following ten strategies were developed for the COP, and are further discussed in Section 3.2, Strategies:

- No Action (Strategy A)
- Operational Improvements (Strategy B)
- Transit Expansion (Strategy C)
- Operational Improvements and Local Circulation (Strategy D)
- Operational Improvements, Local Circulation and Transit Expansion (Strategy E)
- Widen Bridge, New Interchange and Local Circulation (Strategy F)
- Additional Lanes on SH 82 (Strategy G)
- Additional Lanes on SH 82 (Strategy H)
- Glenwood Springs Bypass – Two Lanes (Strategy I)
- SH 82 Relocation – Four Lanes (Strategy J)

3.1 Elements

Each element was identified as a way to address the transportation goals identified for the study. Recognizing various interests in the community, the elements were designed to address transportation capacity and demand in different ways to allow for strategies that address community values. Subsections 3.1.1 through 3.1.8, describe each element in detail, including an element objective, description, demand/capacity effect, and supply/demand assumptions. It should be noted that a detailed Section 4(f) analysis has not been conducted as part of this study as specific solutions and potential alignments are not being analyzed. Additional analysis will need to be performed during the project development phase of this process when specific solutions and alignments are identified to determine if these specific solutions and alignments have Section 4(f) impacts.

3.1.1 Transit Operations

Element Objective: To reduce SOV demand by improving transit operations.

Element Description: The purpose of this element is to reduce SOV demand on SH 82 by improving transit operations, such as implementing the following:

- Queue jumps
- Route restructuring
- Transit priority
- Transit pre-emption

Demand/Capacity Effects: Transit operations may have a marginal impact on SOV demand.

Supply/Demand Assumptions: In order to analyze potential transit operations improvement benefits to SH 82 for the COP, existing transit ridership was evaluated. Based on RFTA and Ride Glenwood ridership numbers, transit currently accommodates approximately eight percent of the travel demand along SH 82 (four percent regional and four percent local). This number indicates transit is a significant travel mode for Glenwood Springs. Because transit accommodates a significant portion of SH 82 traffic, it is estimated transit operations improvements may reduce bus travel times and improve system reliability, but the improvements are unlikely to result in additional ridership. It is estimated transit operations improvements may result in an insignificant change in ridership. Therefore, transit operations improvements are estimated to allow transit ridership accommodate up to eight percent of the total future Grand Avenue transportation demand.

3.1.2 Transit Capacity

Element Objective: To reduce SOV demand by increasing transit capacity.

Element Description: The purpose of this element is to reduce SOV demand on SH 82 by implementing transit capacity improvements, such as the following:

- Expanded route coverage
- Reduced headways
- Exclusive transit lanes (fixed guide-way)
- New stations
- New park and ride facilities

Demand/Capacity Effects: Transit capacity will reduce SOV demand.

Supply/Demand Assumptions: In order to analyze potential transit capacity improvement benefits to SH 82 for the COP, existing transit ridership was evaluated. Based on RFTA and Ride Glenwood ridership numbers, transit currently accommodates approximately eight percent of the travel demand along SH 82 (four percent regional and four percent local). This number indicates transit is a significant travel mode for Glenwood Springs. The Corridor Investment Study (CIS) identified future bus rapid transit (BRT) or rail service extending through Glenwood Springs. Based on this additional service, the CIS projects transit will make up approximately 9.3 to 11.4 percent of the total mode share. It is therefore estimated that transit capacity improvements can accommodate up to ten percent of the total future Grand Avenue transportation demand.

3.1.3 Transportation Demand Management (TDM)

Element Objective: To reduce need for primarily local vehicle trips to use SH 82 by implementing TDM measures.

Element Description: TDM is the use of incentives, and market devices to shift travel onto non-motorized or higher-occupancy modes, and/or shift travel onto less congested routes. Examples of TDM are:

- Pedestrian operations improvements
- Bicycle operations improvements
- Land use planning
- Telecommuting
- Alternative work schedules/flex times
- Parking management strategies
- Transit use incentives

Demand/Capacity Effects: The TDM element would decrease demand for the use of SH 82.

Supply/Demand Assumptions: Parking management was the example used to analyze potential TDM benefits to SH 82 for the COP. Based on the *Worksite Trip Reduction Model and Manual* (National Center for Transit Research, 2004), it is estimated TDM (specifically parking management) can result in up to a two percent trip reduction in total transportation demand for the corridor. This two percent reduction is a result of people choosing alternative modes of travel because of the TDM programs.

3.1.4 Roadway Operations

Element Objective: To improve the operation of SH 82 in order to provide additional capacity.

Element Description: The purpose of this element is to increase SH 82 capacity through roadway operations improvements, such as implementing the following:

- Signal improvements
- Signing and marking improvements
- Access management
- Intelligent transportation system
- Turn Restrictions

Demand/Capacity Effects: Roadway operations element would increase capacity.

Supply/Demand Assumptions: In order to analyze the benefits of potential highway operations improvement to SH 82 for the COP, a Synchro model developed for the SH 82 COS was used. The example used for this analysis modeled signal improvements (including the adjustment of timing, phasing, and other operations), signing and marking improvements, and turn restrictions. Specifically, left-turn restrictions at intersections, the addition of right-turn lanes, and signal timing improvements were modeled to evaluate this example of roadway operations improvements. Based on the analysis it is estimated roadway operations improvements (as modeled) will be able to accommodate up to two percent of total future Grand Avenue transportation demand.

3.1.5 Transportation System Management (TSM)

Element Objective: To improve the operation of SH 82 through TSM in order to provide additional capacity.

Element Description: The purpose of this element is to increase SH 82 capacity through TSM improvements, such as implementing the following:

- Signal improvements
- Traffic calming
- Intersection improvements (roundabouts)
- Reversible lanes
- One-way pairs
- High-occupancy vehicle (HOV) lanes

Demand/Capacity Effects: TSM element would increase capacity.

Supply/Demand Assumptions: In order to analyze the benefits of potential TSM improvements to SH 82 for the COP, a Synchro model developed for the SH 82 COS was used. The example used for this analysis modeled signal improvements and one-way couplets on roadways crossing SH 82 in downtown. Based on the analysis, it is estimated TSM improvements (as modeled) will be able to accommodate up to eight percent of total future Grand Avenue transportation demand.

3.1.6 Local Circulation Improvements

Element Objective: To reduce need for primarily local trips to use SH 82, by implementing local circulation improvements.

Element Description: The purpose of this element is to reduce local traffic demand on SH 82 by implementing local circulation improvements, such as the following:

- Pedestrian facilities
- Bicycle facilities
- River/rail/interstate crossings
- Local roadway connections
- Local roadways

Demand/Capacity Effects: Local circulation improvement element would decrease demand for the use of SH 82.

Supply/Demand Assumptions: In order to analyze potential local circulation benefits to SH 82 for the COP, improved local roadway connections and river/rail/interstate crossings were identified as an example and evaluated. The analysis made assumptions regarding potential new connections and crossings, to include the following:

- Extension of Blake Avenue
- Extension of Riverside Drive (adjacent to the Roaring Fork River between 7th Street and 23rd Street)
- Crossing of Roaring Fork River near 14th Street
- Crossing of Colorado River/Rail/I-70 near Devereux Road

Currently, the City is separated into four relatively distinct sections: east of SH 82, between SH 82 and the Roaring Fork River, west of the Roaring Fork River, and north of I-70. In order to identify potential SH 82 trip reduction, various land uses and potential origin and destinations for local trips were identified. Based on current connections and the origins and destinations, it was estimated approximately one-third of local trips (ten percent of SH 82 trips, as local trips make up approximately one-third of SH 82 trips) will be impacted by the new local facilities. Of these trips, approximately one-half will still use SH 82 for a small portion of their trip, but will travel a shorter distance along SH 82. The

remaining one-half will be redistributed from SH 82 to the new local facilities. Based on these numbers, it was calculated local circulation improvements (specifically improved local roadway connections and river/rail/interstate crossings) can result in a five percent trip reduction for SH 82 by redistributing trips to other corridor roadways. Strategies using this element assume the preservation of existing trail and future mass transit services along the RFTA Corridor. It is estimated local circulation improvements can accommodate up to ten percent of total future Grand Avenue transportation demand.

3.1.7 Highway Relocation

Element Objective: To redistribute regional traffic and some local traffic from Grand Avenue to a bypass or relocated SH 82.

Element Description: The purpose of this element is to redistribute regional and some local traffic to a bypass or relocated SH 82, such as implementing the following:

- Bypass (all vehicles)
- Truck bypass
- Limited access
- Four lane relocated highway
- Improved or new interchange with I-70

Demand/Capacity Effects: Highway relocation element would increase capacity.

Supply/Demand Assumptions: In order to analyze the benefits of a potential relocation of SH 82 for the COP, a Synchro model developed for the SH 82 COS was used. The examples used for this analysis modeled an alternate highway alignment (bypass for all vehicles) along the east side of the Roaring Fork River, with an improved or new interchange with I-70 to the north and connecting at 23rd Street to the south. This general alignment was selected to model this element because, historically, the east side of the Roaring Fork River has been used as a transportation corridor—originally serving as a rail corridor and currently reserved by RFTA for future rail and trail use. Strategies using this element assume the preservation of existing trail and future mass transit use along the RFTA Corridor. While the East River Corridor was used for analysis it is not implied that if a bypass or highway relocation is pursued that it must be along the East River Corridor. Twenty two alternative alignments were identified and studied in the SH 82 COS—the COS document would likely be the starting point for a discussion regarding the selection of a bypass or relocation route. Ultimately final route selection would only occur after a comprehensive NEPA process. In the e-mail from CDOT addressing relocation concerns, it was made clear that a relocated highway would require four lanes; however a local bypass could be constructed as two lanes. Based on the analysis, it is estimated 100 percent of future SH 82 travel demand may be accommodated with a bypass or highway relocation (as modeled). However, a large component of corridor traffic has a local origin and/or destination and will continue to use Grand Avenue. Therefore for the purpose of this study it was estimated a by-bass would accommodate up to 18 percent of total Grand Avenue future transportation demand and highway relocation 28 percent of total Grand Avenue future transportation demand. It should be noted this future transportation demand is primarily regional trips that would be diverted from Grand Avenue.

3.1.8 New Bridge and Interchange

Element Objective: To provide additional capacity on SH 82 through expansion of the existing bridge over the railroad, Colorado River, and I-70.

Element Description: The purpose of this element is to provide additional SH 82 capacity through physical capacity improvements, including:

- Widening the Grand Avenue bridge
- Constructing a new interchange between SH 82 and I-70

Demand/Capacity Effects: New bridge and interchange element would increase capacity.

Supply/Demand Assumptions: In order to analyze the benefits of potential physical capacity improvements to SH 82 for the COP, a Synchro model developed for the SH 82 COS was used. For this example, modeling highway capacity improvements, the Synchro model was modified to include widening of the SH 82 bridge over the Colorado River/I-70/railroad and adding a new I-70 interchange at the widened bridge. From this modeled example, new bridge and interchange improvements are insufficient to accommodate future traffic demand on SH 82; however, they are required for the highway expansion element to accommodate 100 percent of future SH 82 travel demand.

3.1.9 Highway Expansion

Element Objective: To provide additional capacity on SH 82 through expansion of the existing highway.

Element Description: The purpose of this element is to provide addition SH 82 capacity through physical capacity improvements, such as the following:

- Removing on-street parking
- Constructing new lanes

Demand/Capacity Effects: Highway expansion element would increase capacity.

Supply/Demand Assumptions: In order to analyze the benefits of potential physical capacity improvements to SH 82 for the COP, a Synchro model developed for the SH 82 COS was used. For this example modeling highway capacity improvements, the Synchro model was modified to include three through lanes northbound. Based on this modeled example, highway expansion improvements combined with the existing facilites can accommodate 100 percent of future SH 82 travel demand. However, because a significant portion of the traffic for the highway expansion is accommodated on existing infrastructure, the expansion itself is identified as accommodating up to eight percent of total future Grand Avenue transportation demand. The new bridge and interchange element is required to accommodate this level of future traffic volumes for the highway expansion element.

3.2 Strategies

Strategies are made up of a series of elements and were developed to meet specific themes/policies to address the transportation goals identified for the COP in a variety of ways. Ten strategies were developed for the COP, including a no-action strategy. With the exception of the no-action strategy, all of the strategies include the transit operations, TDM, and roadway operations elements. The decision to include these three elements in all of the strategies, except for the no-action strategy, was made because CDOT, RFTA, and the City will likely implement these elements as part of typical operational modifications to SH 82 and the study area. All of the strategies, including the no action strategy assume study area improvements that have already been approved will be in place; these include modifications to Exit 116 and the north side of the Grand Avenue Bridge, Phase I of RFTA's BRT project is implemented and operating, and the South Bridge project is complete. The following subsections describe each of the strategies along with their themes/policies, the elements of which they are comprised, and their impact

on traffic demand and capacity in the study area. Table 4 summarizes the elements that make up the strategies.

3.2.1 No Action (Strategy A)

The no action strategy assumes no changes are made to the corridor, other than minor roadway operations improvements like signal timing. SH 82 remains as it is, with the exception of the already approved or planned changes. These approved or planned changes include improvements to the interchange between I-70 and SH 82 and the construction of South Bridge. Because the South Bridge project is currently going through the environmental planning process, both no action and no action without South Bridge are evaluated for reference. The no action strategy serves as a baseline to compare the other strategies, and is made up of only the roadway operations element. Local and regional vehicle traffic will continue to use SH 82 as the primary route of travel through Glenwood Springs under the no action strategy.

3.2.2 Operational Improvements (Strategy B)

The Operational Improvements (Strategy B) strategy represents minimum capital improvements to the study area. Under this strategy only the basic operational improvements all of the action strategies share in common will be implemented. The elements that make up Strategy B are transit operations, TDM, and roadway operations. Strategy B will marginally reduce vehicle demand through the TDM element; however, the roadway operations element will also marginally increase capacity on SH 82, allowing more vehicle traffic on SH 82.

3.2.3 Transit Expansion (Strategy C)

The Transit Expansion (Strategy C) strategy attempts to reduce demand on SH 82 by increasing transportation capacity. This strategy is made up of the transit operations, transit capacity, TDM, and roadway operations elements. Strategy C will reduce SOV demand within the study area by providing additional transit options for travelers.

3.2.4 Operational Improvements and Local Circulation (Strategy D)

The Operational Improvements and Local Circulation (Strategy D) strategy focuses on improving circulation on SH 82 without significant transit improvements. This strategy is comprised of the transit operations, TDM, roadway operations, TSM, and local circulation improvements elements. Strategy D will marginally reduce SOV demand through TDM measures and bicycle and pedestrian improvements associated with the local circulation improvements element. This strategy will redistribute some local traffic from SH 82 onto local roadways, which may have a negative impact on residences and businesses. Finally, the roadway operations and TSM elements components of this strategy will marginally increase the capacity of SH 82, allowing for more traffic on the highway.

3.2.5 Operational Improvements, Local Circulation, and Transit Expansion (Strategy E)

The Operational Improvements, Local Circulation, and Transit Expansion (Strategy E) strategy is meant to do everything that can be done to the study area to address future transportation needs without building new highway capacity in the form of either an alternate route or additional capacity on the existing alignment of SH 82. This strategy is made up of the transit operations, transit capacity, TDM, roadway operations, TSM, and local circulation improvements elements. Strategy E decreases SOV demand in the study area through transit improvements, TDM, and pedestrian and bicycle

improvements that are part of the local circulation improvements element. This strategy will redistribute local traffic from SH 82 onto local roadways, which may have an impact on residential and businesses not on SH 82. Finally, the roadway operations and TSM elements components of this strategy will marginally increase the capacity of SH 82, allowing for more traffic on the highway.

3.2.6 Widen Bridge, New Interchange, and Local Circulation (Strategy F)

The Widen Bridge, New Interchange, and Local Circulation (Strategy F) strategy will increase the capacity of the interchange between I-70 and SH 82 by widening the Grand Avenue Bridge and/or construction of a new interchange. This strategy assumes the transit operations, TDM, roadway operations, local circulation improvements, new bridge and interchange, and highway expansion elements are implemented. This strategy will create slightly more capacity on SH 82 and may result in some additional traffic on local roadways, potentially impacting businesses and residences on these other facilities.

3.2.7 Additional Lanes on SH 82 (Strategy G)

The Additional Lanes on SH 82 (Strategy G) strategy will go one step further than Strategy F by including physical capacity improvements to SH 82 in the form of additional lanes. These lanes will likely be the result of a combination of constructed improvements and removal of on-street parking. This strategy assumes the transit operations, TDM, roadway operations, local circulation improvements, new bridge and interchange, and highway expansion elements are implemented. This strategy will create significantly more capacity on SH 82 and may result in some additional traffic on local roadways, potentially impacting businesses and residences on these other facilities.

3.2.8 Additional Lanes on SH 82 plus Transit Expansion (Strategy H)

The Additional Lanes on SH 82 plus Transit Expansion (Strategy H) strategy will go one step further than Strategy G by including transit capacity improvements to SH 82 in the form of additional service. This strategy assumes the transit operations, transit capacity, TDM, roadway operations, local circulation improvements, new bridge and interchange, and highway expansion elements are implemented. This strategy will create significantly more capacity on SH 82 and may result in some additional traffic on local roadways, potentially impacting businesses and residences on these other facilities. The transit capacity improvements should offset some of the impacts of the highway capacity improvements, accommodating a portion of the future transportation demand; therefore, the traffic volumes on SH 82 and on the local roadways should be lower than would be expected in Strategy G.

3.2.9 Glenwood Springs Bypass – Two Lanes (Strategy I)

The Glenwood Springs Bypass – Two Lanes (Strategy I) strategy provides an alternate route for regional traffic to bypass downtown Glenwood Springs. This new facility would likely have limited access; however, it could be a City facility, and therefore, not be constrained by CDOT roadway classification standards, such as number of lanes required, access spacing, and speed limits. The new facility might be less impactful than the SH 82 Relocation – Four Lanes (Strategy J) strategy. Strategy I is made up of the transit operations, TDM, roadway operations, local circulation improvements, and highway relocation elements. Strategy I will likely remove a significant amount of regional SOV and truck traffic from Grand Avenue; however, because SH 82 remains on Grand Avenue, it is likely the tourist traffic and some truck traffic will continue to use SH 82. This may result in more tourists heading up the Roaring Fork Valley to stop at downtown businesses. Because Grand Avenue will remain SH 82, there will be limits to what modifications can be done to the facility as it will need to continue to meet CDOT requirements.

3.2.10 SH 82 Relocation – Four Lanes (Strategy J)

The SH 82 Relocation – Four Lanes (Strategy J) strategy results in relocation of SH 82 from its existing alignment along Grand Avenue to some other alignment. This new facility would likely be at least four lanes (two lanes in each direction) and have a fairly restrictive classification, such as expressway, to minimize access points and maintain long-term mobility for the new facility. This strategy is made up of the transit operations, TDM, roadway operations, local circulation improvements, and highway relocation elements.

Strategy J will take a significant number of SOV and trucks off of Grand Avenue and allow the City to obtain ownership of Grand Avenue. The change of ownership would allow the City to make changes to Grand Avenue, such as the addition of traffic calming; however, the relocated facility might have significant impacts on other areas of the City as traffic is re-routed. Additionally, tourists and other travelers heading up the Roaring Fork Valley may bypass downtown businesses as they take the new SH 82.

Table 4
Strategy Definitions

Element	Strategies											
	No Action (Strategy A)	Operational Improvements (Strategy B)	Transit Expansion (Strategy C)	Operational Improvements and Local Circulation (Strategy D)	Operational Improvements, Local Circulation and Transit Expansion (Strategy E)	Widen Bridge, New Interchange and Local Circulation (Strategy F)	Additional Lanes on SH 82 (Strategy G)	Additional Lanes on SH 82 plus Transit Expansion (Strategy H)	Glenwood Springs Bypass - 2 Lanes (Strategy I)		SH 82 Relocation - 4 Lanes (Strategy J)	
									Grand Ave/SH 82	Bypass	Grand Ave	SH 82
Transit Operations		●	●	●	●	●	●	●	●	●	●	●
Transit Capacity			●		●			●				
TDM		●	●	●	●	●	●	●	●	●	●	●
Roadway Operations	●	●	●	●	●	●	●	●	●	●	●	●
TSM				●	●							
Local Circulation Improvements				●	●	●	●	●	●	●	●	●
Highway Relocation									●	●	●	●
New Bridge and Interchange						●	●	●				
Highway Expansion							●	●				

Note: All Strategies assume completion of ongoing Exit 116 interchange improvements, implementation of RFTA Phase I BRT and completion of the new South Bridge.

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4 Evaluation of Strategies

All ten potential strategies identified to address future study area traffic needs were evaluated to identify trade-offs between the strategies. This chapter discusses the evaluation of the elements including discussions of the growth rate used for future traffic analysis, a threshold analysis based on the projected future traffic, general pros and cons of each strategy, and a technical evaluation of the strategies.

4.1 Growth Rate

In order to evaluate different strategies for addressing future travel demand through the study area in Glenwood Springs, it is necessary to forecast future travel volumes. An important tool for projecting future travel demand is an estimated annual traffic growth rate. In order to identify a reasonable and appropriate growth rate for the study area, the following several factors were evaluated:

- Long-term historic traffic volumes
- Short-term historic traffic volumes
- Historic population growth
- Forecast future population growth

4.1.1 Evaluation of Existing Information

Data were gathered and evaluated from several sources to provide a recommended growth rate for the study area through Glenwood Springs. This subsection summarizes the evaluation of this existing data.

4.1.1.1 Long-Term Historic Traffic Volumes

CDOT collects data for the highway facilities they operate. Based on these data, they calculate historic growth rates for their highways. Typically, these growth rates are calculated using 20 years of data. Table 5 is adapted directly from CDOT's website and provides a 20-year growth factor for SH 82 at a location south of 6th Street and at another location south of 32nd Street. When converted to an annual growth rate, the 20-year growth factors of 1.34 and 1.47 equate to annual growth rates of 1.47 percent and 1.94 percent respectively.

Table 5
CDOT Long-Term Historic Traffic Growth Rate

Route	Reference Point	End Reference	Start Point Description	Annual Average Daily Traffic (AADT)	AADT Year	AADT Derivation	20-Year Factor
082A	0.176	1.401	On SH 82, Grand Ave. S/O 6th St, Glenwood Springs	25,000	2007	Actual	1.34
082A	2.194	7.824	On SH 82, Glen Ave S/O Blake Ave, Glenwood Springs	24,900	2007	Automatic Traffic Reporting Station (ATR)	1.47

4.1.1.2 Short-Term Historic Traffic Volumes

While long-term historic growth rates provide a good picture of what has happened along a roadway, they may not reflect current traffic growth trends, which is why it is also important to evaluate short-term historic traffic volumes to identify recent patterns and how they compare to the historic data. CDOT provides daily and hourly traffic volumes on its website for its permanent count locations. Data for 2004 through 2008 for a permanent count station on SH 82 south of the 32nd Street intersection were analyzed to identify short-term historic traffic growth. Table 6 summarizes the data and the evaluation of the short-term weekday traffic growth for this location. This table shows that on average, travel demand on SH 82 has increased between 1.39 to 2.84 percent annually.

Table 6
Short-Term Historic Traffic Growth Rate

Year	% Growth from Previous Year	Average Annual % Growth from 2004	AADT
2004	-	-	25,037
2005	1.16%	1.46%	25,328
2006	1.61%	1.39%	25,736
2007	5.80%	2.84%	27,227
2008	-1.60%	1.71%	26,791

4.1.1.3 Historic Population Growth

The SH 82 CCA identified population growth in Glenwood Springs based on City data. The data indicated the population growth rate in the City has been gradually declining from a high of just over two percent annually over the past 14 years to future projected rates around 1.55 percent. Traffic volumes typically grow approximately equal to or slightly greater than the population growth. It is anticipated traffic growth will be greater than 1.55 percent if the population forecast is accurate.

4.1.1.4 Forecast Future Population Growth

The *Local & Regional Travel Pattern Study* evaluates projected population growth in both Glenwood Springs and places influencing regional travel in the area, including the rest of the Roaring Fork Valley, Garfield County to the west, and Eagle County to the east. Between 2000 and 2025, the population of Glenwood Springs is projected to increase 72 percent. This equates to an average annual growth rate of 2.19 percent. The population of the remainder of the Roaring Fork valley is projected to grow approximately 70 percent during this same period (average annual growth of 2.1 percent); however, growth of jobs in the Aspen area is forecasted to increase 104 percent during the same time frame (average annual growth of 2.89 percent). This growth of jobs means there will be increasing demand for both local and regional worker travel through the Roaring Fork Valley. Between 2003 and 2025, the population of Parachute, Rifle, Silt, and New Castle is projected to grow 114 percent, while the percentage of jobs in the area is forecast to grow only 94 percent during the same period. It is likely some or all of the 20 percent difference will work in the Roaring Fork Valley, further contributing to traffic growth in the study area. Transportation demand generally tends to increase at the same rate or slightly greater than population growth.

4.1.2 Corridor Optimization Plan Growth Rate

There is a range of potential growth rates that can be identified based on the data identified previously. For the SH 82 COP, one growth rate will be identified for the future conditions analysis. This growth rate will be used to identify the future transportation demand in the study area. The growth rate identified for this study represents person trip demand; however, the availability and convenience of transportation options in the study area will determine the mode split of these future trips. If, for example, there are limited alternative mode choices, these trips may be in the form of private vehicles. On the other hand, if there are significant alternative transportation options, there may be a reduction in the growth of automobile trips, while growth of the other modes may increase at a more rapid pace.

A projected growth rate is based on historic and projected population growth and transportation demand growth; however, because many factors impact population and transportation growth, it is possible transportation demand will grow at a rate slightly slower or faster than identified. The important reason for identifying a growth rate is to project future transportation needs and approximately when transportation thresholds will be reached. This helps agencies program funding for the development and implementation of improvement projects.

Table 7 summarizes the average annual growth rates identified from the variety of sources evaluated in Subsection 4.1.1, Evaluation of Existing Information. Based on this information, an average annual growth rate of two percent was selected to be used for the future conditions analysis for the SH 82 COP. The study area growth rate assumes no changes to modal split for trips; however, the availability and convenience of transportation options in the study area will determine the mode split of these future trips and will likely result in a redistribution of trips to modes other than the private automobile.

Table 7
Summary of Average Annual Growth Rates

Source	Rate (% annual growth)
Long-Term Traffic Volumes (CDOT)	1.47-1.94
Short-Term Traffic Volumes (CDOT & PBS&J)	1.39-2.84
Historic Population Growth (SH 82 CCA)	1.55-2.00
Forecast Population Growth (*Local & Regional Travel Pattern Study*)	2.19

The two percent growth rate to be used for this analysis is consistent with previous growth rates used for other studies, including the SH 82 COS (two percent), the *State Highway 82 Relocation Alternative Analysis* (Balloffet, 1999) (2.4 to3.2 percent), and the SH 82 CCA (1-2.5 percent). In the future, as the City prepares to allocate funding for SH 82 improvements, it may be desirable to re-assess traffic growth to determine if improvements are required sooner or later than identified in the COP to accommodate future person trip demands.

4.1.3 Sensitivity Analysis

As identified in Subsection 4.1.2, Corridor Optimization Plan Growth Rate, it is possible for the average annual growth rate to differ over time. While it is impractical to perform analysis on each strategy for every possible growth rate scenario, it is possible to perform a sensitivity analysis to identify how use of different growth rates will impact when traffic thresholds are met. Table 8 summarizes the growth rates sensitivity analysis for a range of annual growth rates from one percent to 2.5 percent. The table

identifies the year traffic on SH 82 would be equivalent to projected 2035 volumes using a two percent annual growth rate.

Table 8
Growth Rate Sensitivity Analysis

Rate (Percentage annual growth)	Equivalent 2035 Traffic Volume Year (based on 2% annual growth)
1.0	2061
1.5	2043
2.0	2035
2.5	2030

Based on Table 8, the actual rate of traffic growth will have a significant impact on when mitigation strategies are necessary. It is recommended traffic data continue to be monitored to evaluate if traffic volume thresholds are met to require mitigation. Future traffic volumes may also indicate the same or a different growth rate should be considered for study area planning purposes.

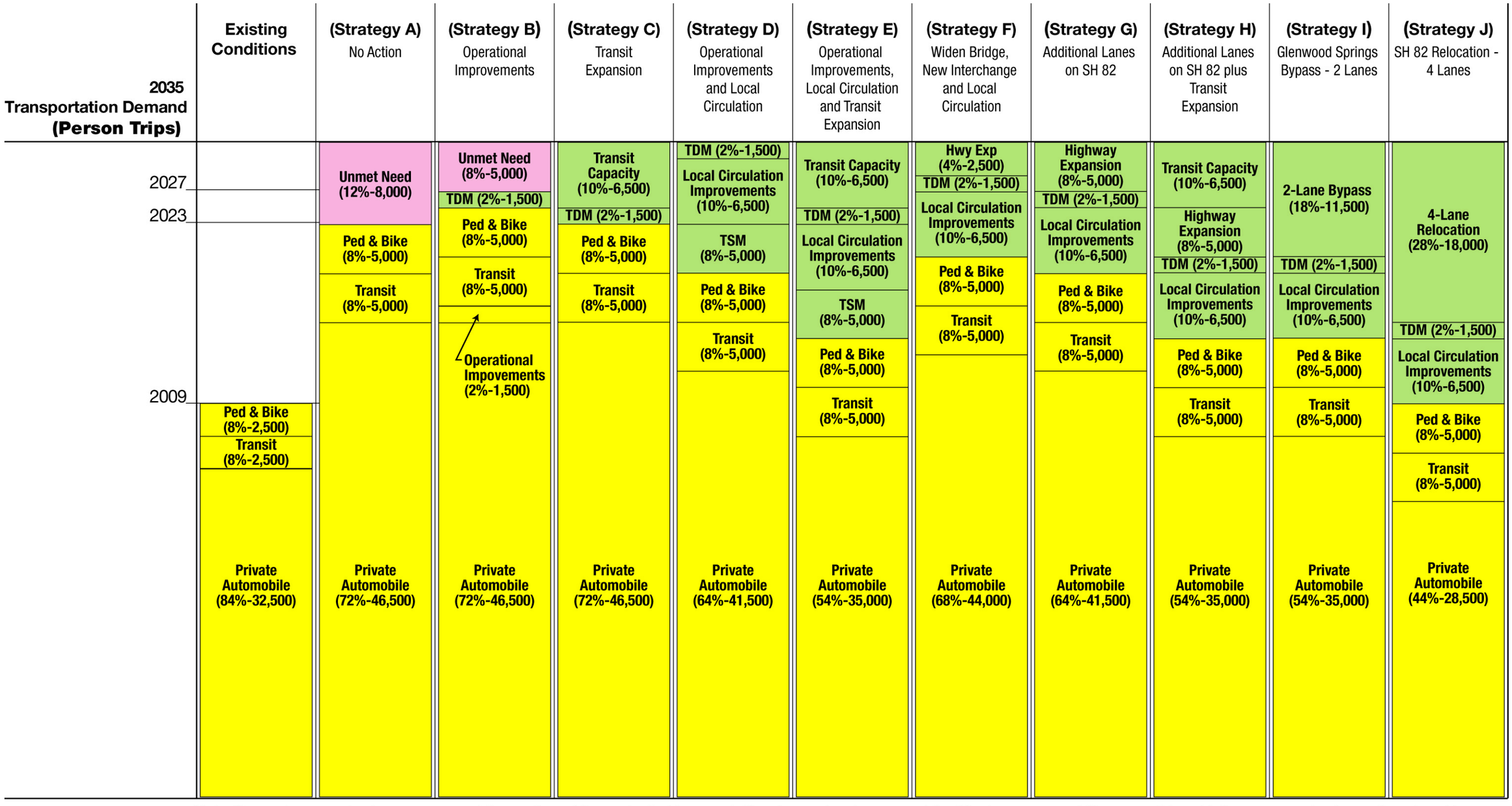
4.2 Threshold Analysis

The strategies were identified and developed to address future local and regional transportation demand within the study area. A threshold analysis was performed to identify if the strategies will address future projected transportation demand. The threshold analysis is based on the assumptions identified for the elements and strategies in Chapter 3, Development of Strategies. The volume thresholds and horizon years are based on the two percent annual growth rate identified for use in this study.

Figure 6 identifies the components that makeup each strategy and their contribution to accommodating future (2035) study area transportation demand. Figure 6 represents total forecast future demand in terms of person trips in order to adequately address all modes of travel. Each strategy contains the element that could provide travel capacity. The goal of this figure is to demonstrate the potential each strategy has for reducing private automobile travel while continuing to accommodate travel demand. In the case of Strategy B, the operational improvements actually increase roadway capacity and because there is unmet need the potential volume of private automobile traffic is projected to increase to address some of the unmet need.

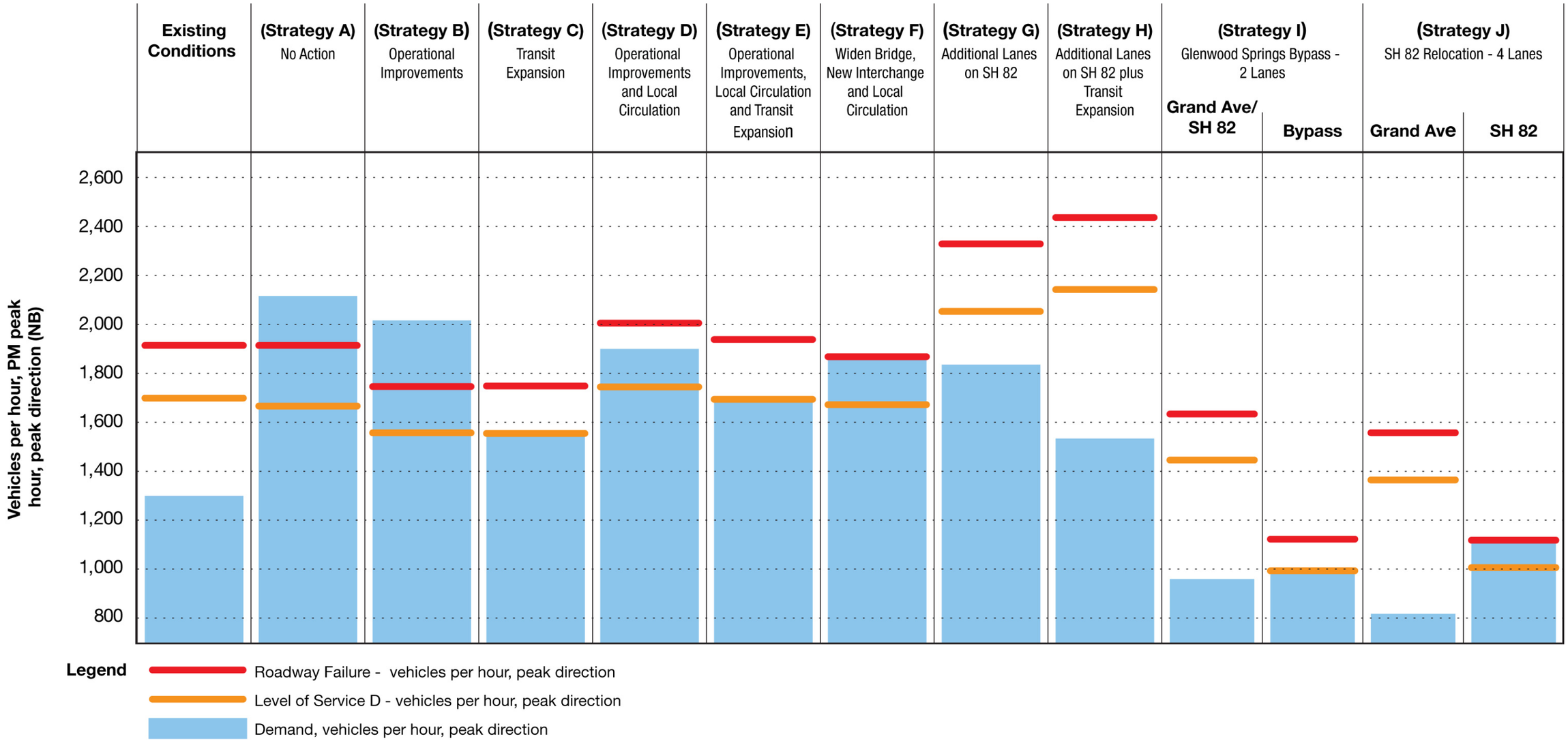
Figure 7 and Figure 8 compare capacity and demand of the strategies for both local (8th Street to 11th Street) and regional (32nd Street to Exit 116) scenarios respectively. While Figure 6presents how total projected future demand can be addressed by the elements that make up the strategies, Figure 7 and Figure 8 present SH 82/Grand Avenue roadway demand in comparison with roadway capacity. In these figures, the peak roadway demand and capacity varies depending upon how each element impacts capacity and demand. Of particular note in Figure 7 and Figure 8 is that roadway capacity on SH 82/Grand Avenue is sometimes shown to decrease with operational improvements; the reason for this is that priority was placed on local circulation, the strategy provided an opportunity for improving local circulation, which often has the effect of reducing SH 82/Grand Avenue capacity.

Figure 6
Future Daily Transportation Composition



Note: Percentages and volumes represent the portion of the projected transportation demand, volumes are identified as average daily person trips. Yellow represents demand captured by existing facilities, green representes demand captured by new strategies, and red represents unmet demand.

Figure 7
Local Capacity and Demand Comparison

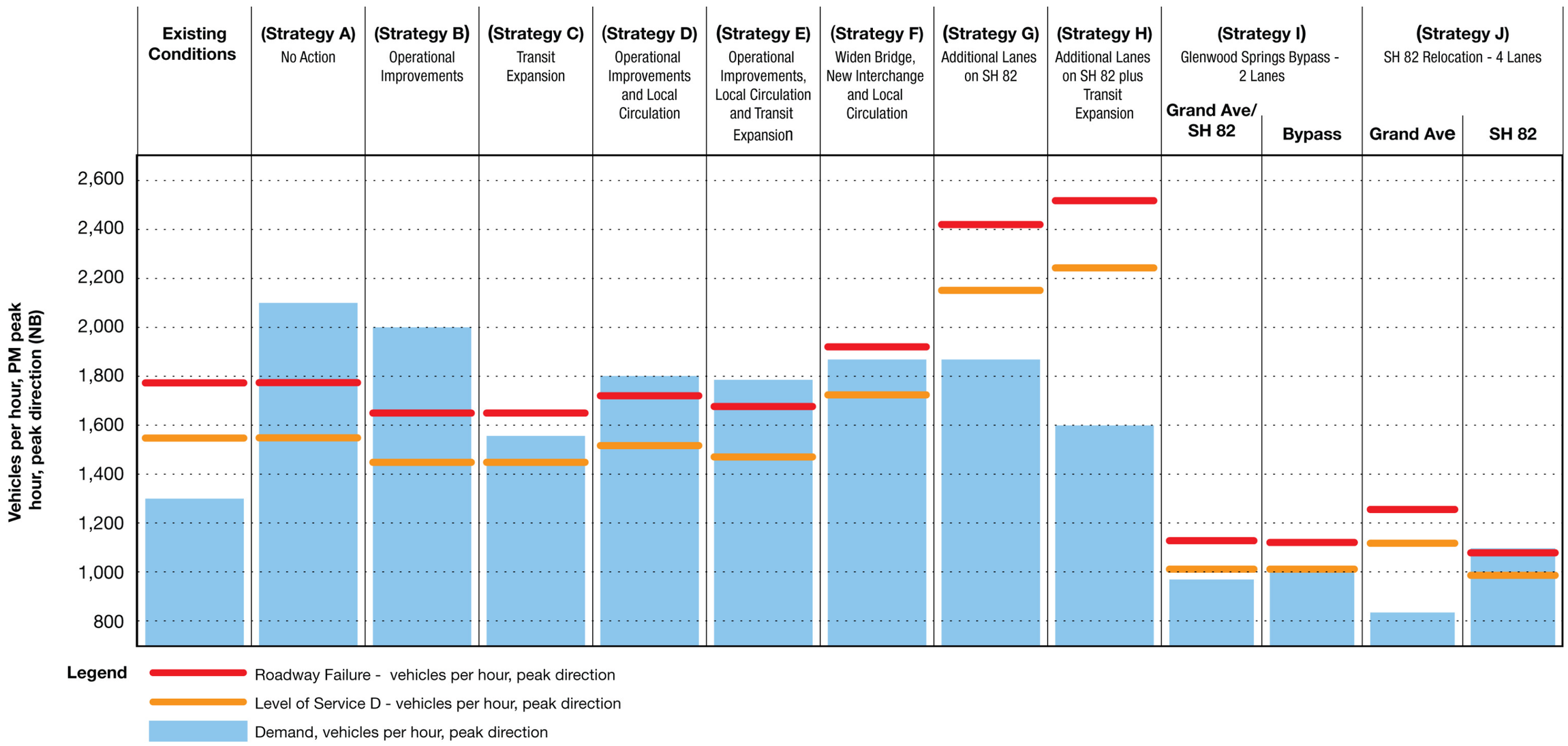


Notes: Capacity and demand shown are in vehicles per hour, peak direction (i.e., PM peak hour, northbound).

Demand will vary depending on the elements included in the strategy; e.g., local circulation improvements should reduce the number or length of trips using SH 82.

Capacity will vary depending on elements included in the strategy; e.g., TSM and roadway operations improvements add no significant capacity, transit expansion does not increase roadway capacity, but does reduce vehicle demand, and roadway widening increases capacity but may increase vehicle demand.

Figure 8
Regional Capacity and Demand Comparison



Notes: Capacity and demand shown are in vehicles per hour, peak direction (i.e., PM peak hour, northbound).

Demand will vary depending on the elements included in the strategy; e.g., local circulation improvements should reduce the number or length of trips using SH 82.

Capacity will vary depending on elements included in the strategy; e.g., TSM and roadway operations improvements add no significant capacity, transit expansion does not increase roadway capacity, but does reduce vehicle demand, and roadway widening increases capacity but may increase vehicle demand.

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4.3 Evaluation Criteria

In order to objectively evaluate the alternatives, project goals and evaluation criteria were developed. Using the purpose and need, five project goals were developed to score the alternatives:

- Provide effective, efficient, multimodal travel options within the study area for all users (local goal)
- Provide effective, efficient, multimodal travel options through the study area for all users (regional goal)
- Provide safe travel conditions within the study area for all users
- Minimize adverse environmental impacts related to study area mobility improvements
- Provide financially feasible mobility improvements to the study area

Once these goals were developed, evaluation criteria were developed for each goal to determine how the alternatives compared to one another. The project goals and evaluation criteria are listed in Table 9.

Table 9
Goals and Evaluation Criteria

Project Goals	Evaluation Criteria
Provide effective, efficient, multimodal travel options within the study area for all users (local goal)	Average peak direction volume to capacity ratio on Grand Avenue
	Average peak hour headways (local) with same number of stops
	Number of side street approaches (for signalized intersections) LOS E or F
	Total peak hour volumes on Grand Avenue
	Opportunity for increased pedestrian and bicycle modes of travel
	Average number of peak hour stops per vehicle
Provide effective, efficient, multimodal travel options through the study area for all users (regional goal)	SOV demand
	Average peak hour headways (regional)
	Average peak hour travel time
	Number of hours with corridor LOS E or F
Provide safe travel conditions within the study area for all users	Opportunity to reduce number of vehicles entering Grand Avenue intersections
	Average daily traffic on adjacent links
Minimize adverse environmental impacts related to study area mobility improvements	Potential number of new historic properties adjacent to facilities
	Potential length of parks/recreation/open space adjacent to new or improved facilities
	Potential number of residential properties adjacent to facilities
	Potential number of noise-sensitive sites within noise contour of new or improved facilities
	Potential proportion of traffic that is potential business patrons
	Potential vehicle emissions (from Synchro)
	Potential impacts to wetlands/riparian habitat
	Potential acres of new impermeable surface
Provide financially feasible mobility improvements to the study area	Potential estimate to construct
	Estimated degree of effort to complete National Environmental Policy Act (NEPA) of 1969 process
	Estimate of costs to purchase ROW
	Estimated annual costs for operations and maintenance

4.4 Strategy Evaluation

Once the goals and evaluation criteria were finalized, evaluation thresholds were developed for each measure. Subsections 4.4.1 through 4.4.5 describe the evaluation thresholds for each criterion. Approximately half of the evaluation thresholds are quantitative and easily measured and the other half are qualitative in nature. The following subsections discuss the measures and how good, neutral, or poor scores were assigned. Subsection 4.4.6, Evaluation Matrix, summarizes the evaluation of all of the strategies.

4.4.1 Provide Multimodal Travel Options for All Users (Local)

The first goal was to provide effective, efficient, multimodal travel options within the study area for all users and is a local goal. Within this goal, there were six evaluation criteria identified. These criteria along with their evaluation thresholds are shown in Table 10.

Table 10
Local Multimodal Evaluation Criteria

	Evaluation Thresholds		
	○ (Good)	◑ (Neutral)	● (Poor)
Average peak direction volume to capacity ratio on Grand Avenue	< 0.75	0.75 - 1.0	> 1.0
Average peak hour headways (local) with same number of stops	More frequent (Increased capacity and <12 min travel time)	Same (12 min travel time or less, >12 min travel time with increased capacity	Less frequent (>12 min travel time without capacity)
Number of side street approaches (for signalized intersections) LOS E or F	< 7	7-11	> 11
Total peak hour volumes on Grand Avenue	< 1,700	1,700-2,100	> 2,100
Accommodate pedestrian and bicycle modes of travel	High	Medium	Low
Average number of peak hour stops per vehicle	> 50% reduction	25-50% reduction	< 25% reduction

The qualitative measure is intended to evaluate how well pedestrian and bicyclist trips are accommodated. The guidelines for determining the value of this measure are:

- Good – Strategy includes local circulation and transit capacity elements
- Neutral – Strategy includes either the local circulation or transit capacity elements
- Poor – Strategy does not include local circulation or transit capacity

4.4.2 Provide Multimodal Travel Options for All Users (Regional)

The second goal was to provide effective, efficient, multimodal travel options through the study area for all users and is a regional goal. Within this goal, there were four evaluation criteria identified. These criteria along with their evaluation thresholds are shown in Table 11.

Table 11
Regional Multimodal Evaluation Criteria

	Evaluation Thresholds		
	○ (Good)	◑ (Neutral)	● (Poor)
SOV demand	Low	Medium	High
Average peak hour headways (regional)	More frequent (capacity improvements)	Same (12 min travel time or less without capacity improvements)	Less frequent (>12 min travel time without capacity improvements)
Average peak hour travel time	< 10 min	10-20 min	> 20 min
Number of hours with corridor LOS E or F	< 3	3-8	> 8

The first criterion is a qualitative measure intended to measure how well each element is reassigning person trips from SOV to other modes. The guidelines for determining the value of this measure are:

- Good – Strategy includes transit capacity and TDM elements
- Neutral – Strategy includes either transit capacity or TDM elements
- Poor – Strategy does not include transit capacity or TDM elements

4.4.3 Provide Safe Travel Conditions for All Users

The third goal was to provide safe travel conditions within the study area for all users. Within this goal, there were two evaluation criteria identified and both are quantitative measures. The first measures reductions in vehicles on Grand Avenue and the second measures traffic on links adjacent to pedestrian and cyclist activity (schools, parks, etc). The number of potential conflicts increases as the volume entering an intersection increases; therefore, the greater the reduction in volume entering intersections, the better the strategy. Similarly, potential conflicts between vehicles and pedestrians or cyclists are higher when traffic volumes near pedestrian activity centers increase. Therefore, strategies with less traffic near these activity centers will score better. These criteria along with their evaluation thresholds are shown in Table 12.

Table 12
Safety Evaluation Criteria

	Evaluation Thresholds		
	○ (Good)	◑ (Neutral)	● (Poor)
Opportunity to reduce number of vehicles entering Grand Avenue intersections	> 10% reduction	5-10% reduction	< 5% reduction
Average daily traffic on adjacent links	< 20,000	20,000 – 30,000	> 30,000

4.4.4 Minimize Adverse Environmental Impacts

The fourth goal was to minimize adverse environmental impacts related to study area mobility improvements. Within this goal, there were eight evaluation criteria identified and most are qualitative measures. These criteria along with their evaluation thresholds are shown in Table 13.

Table 13
Environmental Evaluation Criteria

	Evaluation Thresholds		
	○ (Good)	◑ (Neutral)	● (Poor)
Potential number of new historic properties adjacent to facilities	Low	Medium	High
Potential length of parks/recreation/open space adjacent to new or improved facilities	Low	Medium	High
Potential number of new residential properties adjacent to facilities	Low	Medium	High
Potential number of noise-sensitive sites within noise contour of new or improved facilities	Fewer	Same	More
Potential proportion of traffic that is potential business patrons	High	Medium	Low
Potential vehicle emissions (from Synchro)	> 20% reduction	10-20% reduction	< 10% reduction
Potential impacts to wetlands/riparian habitat	Low	Medium	High
Potential acres of new impermeable surface	Low	Medium	High

The first four criteria are qualitative measures intended to measure how well each element is minimizing impacts to the social environment. The guidelines for determining the value of the first measure are:

- Good – Low potential for new historic properties adjacent to facilities
- Neutral – Medium potential for new historic properties adjacent to facilities
- Poor – High potential for new historic properties adjacent to facilities

The guidelines for determining the value for the impacts to parks/recreation/open space are:

- Good – Reduction in the length of parks/recreation/open space adjacent to existing/new facilities
- Neutral – No change in the length of parks/recreation/open space adjacent to existing/new facilities
- Poor – Increase in the length of parks/recreation/open space adjacent to existing/new facilities

The guidelines for determining the value of the residential properties measure are:

- Good – Low potential for new residential properties adjacent to facilities
- Neutral – Medium potential for new residential properties adjacent to facilities
- Poor – High potential for new residential properties adjacent to facilities

The guidelines for determining the potential number of noise-sensitive sites within the noise contour are:

- Good – Fewer noise-sensitive sites
- Neutral – Same number of noise-sensitive sites
- Poor – More noise-sensitive sites

The fifth criterion is intended to measure how well the elements minimize economic impacts in implementation of transportation solutions. The guidelines for determining the potential proportion of traffic that is potential business patrons are:

- Good – High proportion of traffic is potential business patrons
- Neutral – Medium proportion of traffic is potential business patrons
- Poor – Low proportion of traffic is potential business patrons

The goals of the next three criteria are to minimize impacts to the natural environment. The first criterion is quantitative and measures the potential reduction of vehicle emissions. The guidelines for determining the potential impacts to wetlands/riparian habitat are:

- Good – Low potential for impacts to wetlands/riparian habitat
- Neutral – Medium potential for impacts to wetlands/riparian habitat
- Poor – High potential for impacts to wetlands/riparian habitat

The final evaluation criteria measures how well the elements minimize potential acres of new impermeable surface. The guidelines for determining the scores for this criterion are:

- Good – Low potential for change in impermeable surface
- Neutral – Medium potential for change in impermeable surface
- Poor – High potential for change in impermeable surface

4.4.5 Provide Financially Feasible Mobility Improvements

The fifth and final goal is to provide financially feasible mobility improvements to the study area. Within this goal, there were four evaluation criteria identified and all are qualitative measures. These criteria along with their evaluation thresholds are shown in Table 14.

Table 14
Financial Feasibility Evaluation Criteria

	Evaluation Thresholds		
	○ (Good)	◑ (Neutral)	● (Poor)
Potential estimate to construct	Low	Medium	High
Estimated degree of effort to complete NEPA process	Low	Medium	High
Estimate of costs to purchase ROW	Low	Medium	High
Estimated annual costs for operations and maintenance	Low	Medium	High

The first three evaluation criteria are intended to measure how well an element minimizes the cost of implementation. The guidelines for scoring the potential estimate to construct are as follows:

- Good – (Low cost) Local funding (the City) – less than $5 million (similar to the gap project)
- Neutral –(Medium cost) Regional funding (the City, CDOT, Garfield County, and RFTA) - $5 million to $50 million (similar to South Bridge)
- Poor – (High cost) National funding (the City, CDOT, Garfield County, RFTA, and others) – more than $50 million

The degree of NEPA required will affect the implementation cost of the project. The guidelines for scoring this criterion are:

- Good – Low level of NEPA clearance likely required (none to categorical exclusion)
- Neutral – Medium level of NEPA clearance likely required (environmental assessment)
- Poor – High level of NEPA clearance likely required (environmental impact statement)

The cost to purchase ROW is another important factor to consider in the cost of implementation. The guidelines for scoring the estimated ROW cost are:

- Good – Low amount of new ROW likely required
- Neutral – Medium amount of new ROW likely required
- Poor – High amount of new ROW likely required

The implementation cost isn't the only cost that should be considered when scoring elements on financial feasibility. Another cost to be considered is the estimate of annual operations and maintenance. The guidelines for scoring the operations and maintenance costs are:

- Good – Low increase in annual maintenance and operations costs
- Neutral – Medium increase in annual maintenance and operations costs
- Poor – High increase in annual maintenance and operations costs

4.4.6 Evaluation Matrix

All of the strategies were evaluated by the criteria described in Subsections 4.4.1 through 4.4.5. The evaluation of the strategies is summarized in Table 15. This evaluation is not meant to be used as a cumulative assessment of good and bad for each strategy; rather, it is meant to be a tool that can be used to identify potential impacts transportation strategies might have on livability and community values. This table and the COP may be used by decision makers during future planning processes, such as revision of the *Comprehensive Plan*, to identify appropriate strategies to meet the City's transportation goals.

Table 15
Evaluation Matrix

Goal		Objective	Evaluation Period	Performance Measure	Scoring Criteria: Good ○	Scoring Criteria: Neutral ◑	Scoring Criteria: Poor ●	Existing 2009	2035 Planning Horizon: (Strategy A) No Action	No Action without South Bridge	(Strategy B) Operational Improvements	(Strategy C) Transit Expansion	(Strategy D) Operational Improvements Local Circulation	(Strategy E) Operational Improvements, Local Circulation and Transit Expansion	(Strategy F) Widen Bridge, New Interchange and Local Circulation	(Strategy G) Additional Lanes on SH 82	(Strategy H) Additional Lanes on SH 82 plus Transit Expansion	(Strategy I) Glenwood Springs Bypass - 2 Lanes: Grand Ave/SH 82	(Strategy I) Glenwood Springs Bypass - 2 Lanes: Bypass	(Strategy J) SH 82 Relocation - 4 Lanes: Grand Ave	(Strategy J) SH 82 Relocation - 4 Lanes: SH 82
Mobility	Local	a. Reassign vehicle trips from Grand Avenue to other modes and/or routes	PM Peak	**Average peak direction volume to capacity ratio on Grand Avenue (or as designated)**	< 0.75	0.75 - 1.0	> 1.0	○	●	●	●	◑	◑	◑	◑	○	○	○	◑	○	◑
								0.67	1.07	1.09	1.1	0.98	0.95	0.84	0.85	0.68	0.56	0.67	0.84	0.67	0.9
		b. Make transit times (Ride Glenwood) more competitive with private automobile travel	PM Peak	**Average Peak Hour Headways (Local) w/ same number of stops**	More frequent (Increased Capacity & <12 min)	Same (12 Min TT or Less, >12 Min TT w/inc. Capac.)	Less frequent (>12 Min TT w/out capacity)	◑	●	●	●	◑	●	◑	●	●	○	●		◑	
								Same	Less Frequent	Less Frequent	Less Frequent	Same	Less Frequent	Same	Less Frequent	Less Frequent	More Frequent	Less Frequent		Same	
	1. Provide effective, efficient, multimodal travel options within the study area for all users (local goal)	c. Reduce barriers to local circulation	PM Peak	**Number of side street approaches (for signalized intersections) LOS E or F**	< 7	7 - 11	> 11	●	●	●	●	◑	◑	○	●	○	○	○	○	○	○
								15	22	22	13	7	11	3	13	1	1	5	2	5	3
			PM Peak	**Total peak hour volumes on Grand Avenue (or as designated)**	< 1,700	1,700-2,100	>2,100	◑	●	●	●	●	●	●	●	●	●	◑	○	○	○
								2,076	3,310	3,310	3,190	2,840	2,785	2,390	2,899	2,899	2,488	1,765	1,364	1,562	1,538
		d. Facilitate pedestrian and bicyclist trips	Daily	**Opportunity for increased pedestrian and bicycle modes of travel**	High	Medium	Low	◑	●	●	●	◑	◑	○	◑	◑	○	◑		◑	
								N/A	Low	Low	Low	Medium	Medium	High	Medium	Medium	High	Medium		Medium	
		e. Reduce the impacts of commercial vehicles to travel on SH 82	PM Peak	**Average number of peak hour stops per vehicle**	> 50% reduction	25 - 50% reduction	< 25% reduction	●	●	●	●	●	◑	○	●	○	○	○		○	
								0% Reduction	0% Reduction	15% Increase	14% Increase	14% Increase	29% Reduction	54% Reduction	19% Reduction	64% Reduction	81% Reduction	56% Reduction		65% Reduction	
	Regional	a. Reassign person trips from single occupant vehicles to other modes/alternatives	Daily	**SOV demand**	Low	Medium	High	●	●	●	◑	○	◑	○	◑	◑	○	◑		◑	
								High	High	High	Medium	Low	Medium	Low	Medium	Medium	Low	Medium		Medium	
	2. Provide effective, efficient, multimodal travel options through the study area for all users (regional goal)	b. Make transit times (RFTA) more competitive with private automobile travel	PM Peak	**Average Peak Hour Headways (Regional)**	More frequent (Capacity Improvements)	Same (12 Min TT or Less w/out Capacity)	Less frequent (>12 Min TT w/out capacity)	◑	●	●	●	○	●	○	●	●	○	●		◑	
								Same	Less Frequent	Less Frequent	Less Frequent	More Frequent	Less Frequent	More Frequent	Less Frequent	Less Frequent	More Frequent	Less Frequent		Same	
		c. Reduce congestion on SH 82	PM Peak	**Average peak hour travel time**	< 10 min	10 - 20 min	> 20 min	◑	●	●	●	●	●	◑	◑	◑	○	◑	○	○	○
								11	27	21	31	34	21	16	20	14	9	20	6	7	7
		d. Reduce congestion on Grand Avenue	Daily	**Number of hours with corridor LOS E or F**	< 3	3 - 8	> 8	○	●	●	●	○	◑	○	◑	○	○	◑	○	○	○
								0	11	11	10	2	7	2	7	2	2	7	0	2	0
Safety	3. Provide safe travel conditions within the study area for all users	b. Reduce the exposure of pedestrians/bicyclists to automobile traffic	PM Peak	**Opportunity to reduce number of vehicles entering Grand Avenue intersections**	> 10% reduction	5 - 10% reduction	< 5% reduction	◑	●	●	●	○	●	●	◑	●	◑	○	N/A	○	N/A
								N/A	0% Reduction	3.9% increase	2.7% Reduction	11.1% Reduction	2.7% Reduction	4.9% Reduction	7.2% Reduction	0.7% Reduction	8.5% Reduction	16.9% Reduction		22.2% Reduction	
			Daily	**Average daily traffic on adjacent links**	< 20,000	20k - 30k	> 30,000	◑	●	●	●	◑	◑	◑	◑	◑	◑	○		○	
								21,074	33,592	33,592	32,863	28,824	29,417	25,250	24,598	24,598	21,113	17,504		16,241	
Environment	4. Minimize adverse environmental impacts related to study area mobility improvements	a. Minimize impacts to social environment	N/A	**Potential number of new historic properties adjacent to facilities**	Low	Medium	High	○	○	○	○	◑	◑	◑	◑	◑	◑	◑	●	◑	●
								Low	Low	Low	Low	Medium	Medium	Medium	Medium	Medium	Medium	Medium	High	Medium	High
			N/A	**Potential length of parks/recreation/open space adjacent to new or improved facilities**	Low	Medium	High	◑	◑	◑	◑	◑	◑	◑	◑	◑	◑	◑	●	◑	●
								Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	High	Medium	High
			N/A	**Potential number of new residential properties adjacent to facilities**	Low	Medium	High	○	○	○	○	○	◑	◑	◑	◑	◑	◑	●	◑	●
								Low	Low	Low	Low	Low	Medium	Medium	Medium	Medium	Medium	Medium	High	Medium	High
			Daily	**Potential number of noise-sensitive sites within noise contour of new or improved facilities.**	Fewer	Same	More	◑	◑	◑	◑	◑	◑	◑	◑	◑	◑	◑	●	◑	●
								Same	Same	Same	Same	Same	Same	Same	Same	Same	Same	Same	More	Same	More
		b. Minimize economic impacts in implementation of transportation solutions	Daily	**Potential proportion of Traffic that is Potential Business patrons**	High	Medium	Low	◑	◑	◑	◑	◑	◑	◑	◑	◑	◑	○	●	○	●
								Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	High	Low	High	Low
		c. Minimize impacts to natural environment	PM Peak	**Potential vehicle emissions (from Synchro)**	> 20% reduction	10-20% reduction	< 10% reduction	◑	●	●	●	◑	●	◑	◑	◑	○	○		○	
								N/A	0% Reduction	6% Increase	1% Increase	10% Reduction	8% Reduction	20% Reduction	12% Reduction	12% Recuction	24% Reduction	26% Reduction		25% Reduction	
			N/A	**Potential impacts to wetlands/riparian habitat**	Low	Medium	High	○	○	○	○	○	○	○	◑	◑	◑	○	●	○	●
								Low	Low	Low	Low	Low	Low	Low	Medium	Medium	Medium	Low	High	Low	High
			N/A	**Potential acres of new impermeable surface**	Low	Medium	High	○	○	○	○	○	◑	◑	◑	◑	◑	◑	●	◑	●
								Low	Low	Low	Low	Low	Medium	Medium	Medium	Medium	Medium	Medium	High	Medium	High
Cost	5. Provide financially feasible mobility improvements to the study area	a. Minimize costs of imple	N/A	**Potential estimate to construct**	Low	Medium	High	○	○	○	○	◑	○	◑	●	●	●	◑	●	◑	●
								Low	Low	Low	Low	Medium	Low	Medium	High	High	High	Medium	High	Medium	High
			N/A	**Estimated degree of effort to complete NEPA process**	Low	Medium	High	○	○	○	○	◑	○	◑	●	●	●	○	●	○	●
								Low	Low	Low	Low	Medium	Low	Medium	High	High	High	Low	High	Low	High
			N/A	**Estimate of costs to purchase ROW**	Low	Medium	High	○	○	○	○	○	◑	◑	◑	◑	◑	◑	●	◑	●
								Low	Low	Low	Low	Low	Medium	Medium	Medium	Medium	Medium	Medium	High	Medium	High
		b. Minimize operations/ m	N/A	**Estimated annual costs for Operations and Maintenance**	Low	Medium	High	○	○	○	○	◑	○	◑	○	○	◑	○	●	○	●
								Low	Low	Low	Low	Medium	Low	Medium	Low	Low	Medium	Low	High	Low	High

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4.5 Pros and Cons

Table 15 provides a relatively technical look at the evaluation of the various strategies. This section was developed to provide a less technical look at the pros and cons of the various strategies. While potential pros and cons are identified, major issues identified in Table 15 as well as other potentially significant factors identified in the descriptions of the elements and strategies are identified in this section.

4.5.1 Existing Conditions

Comparison to existing conditions can assist evaluation of what future conditions might be like. The following bullets summarize existing conditions relative to the items identified as pros and cons for the array of strategies:

- There are minimal periods of congestion (no Grand Avenue failure)
- Current travel times are moderate (11 minute Grand Avenue peak travel time)
- Congestion imposes a barrier to pedestrian and bicycle circulation on and across SH 82
- Local circulation accessing or crossing SH 82 can be difficult

4.5.2 No Action (Strategy A)

Pros	Cons
• No ROW takes. • No cost. • No physical improvements, therefore no new project related environmental mitigation is required. • No changes to existing parking infrastructure. • No physical changes to existing highway alignment; therefore no project impacts to other areas of Glenwood Springs.	• Travel times on SH 82 are projected to be 27 minutes during peak periods. • SH 82 failure is projected to last 11 hours daily. • Grand Avenue remains SH 82, limiting opportunities for modification to improve Grand Avenue character. • Decreased safety due to increased projected traffic through the existing corridor configuration. • Noise and emissions continue to increase along Grand, Midland, and Blake Avenues. • Congestion imposes an increasing barrier to pedestrian and bicycle circulation on and across SH82. • Transit travel times and headways will increase and may be inconsistent. • Local circulation accessing or crossing SH 82 is increasingly difficult because of increased congestion on the existing corridor configuration. • Regional travel time is projected to be 27 minutes because of congestion related delays. • Small town character diminishes due to increased traffic on the existing corridor configuration. • May be more traffic on Midland and Blake Avenues trying to avoid SH82 congestion.

4.5.3 Operational Improvements (Strategy B)

Pros	Cons
• No ROW takes. • Minimal cost to construct and maintain. • No physical improvements, therefore no new project related environmental mitigation is required. • No physical changes to existing highway alignment; therefore no project impacts to other areas of Glenwood Springs.	• Travel times on SH 82 are projected to be 31 minutes during peak period. • SH 82 failure is projected to last 10 hours daily. • Grand Avenue remains SH 82, limiting opportunities for modification to improve Grand Avenue character. • Decreased safety due to increased projected traffic through the existing corridor configuration. • Noise and emissions continue to increase along Grand, Midland and Blake Avenues. • Congestion imposes a barrier to pedestrian and bicycle circulation on and across SH 82. • Transit travel times and headways will increase and may be inconsistent. • Some parking loss will occur to accommodate operational improvements. Parking restrictions may be increased to help control travel demand. • Local circulation accessing or crossing SH 82 is increasingly difficult because of increased congestion on the existing corridor configuration. • Regional travel times projected to increase by four minutes compared to no action because of congestion related delays and reallocation of green time to reduce side street delay. • Small town character diminishes due to increased traffic on the existing corridor configuration. • May be more traffic on Midland and Blake Avenues trying to avoid SH82 congestion.

4.5.4 Transit Expansion (Strategy C)

Pros	Cons
• Limited new ROW acquisition may be required along the RFTA corridor for transit expansion. • Moderate cost to construct and maintain. • Duration of periods of congestion on SH 82 is limited to peak hours (2 hours of Grand Avenue failure). • Safety is marginally improved by fewer conflicts. • Noise and emissions are marginally reduced on Grand Avenue by reducing vehicles on highway and number of stopping and starting vehicles. • Reduces duration of congestion barriers to pedestrian and bicycle circulation and provides additional travel choices. • Transit operations are improved by being more reliable and more frequent. • May increase parking opportunities with new park and ride lots. • Reduced SH 82 congestion related barriers to local circulation and increased options for local travel. • Reduced duration of SH 82 regional delay and increased options for regional travel.	• Travel times along SH 82 will be 34 minute on Grand Avenue during peak periods. • Grand Avenue remains SH 82, limiting opportunities for modification to improve Grand Avenue character. • Some physical improvements required, therefore some new project related environmental mitigation may be required. • Physical improvements along RFTA Corridor may cause project related impacts to additional properties.

4.5.5 Operational Improvements and Local Circulation (Strategy D)

Pros	Cons
• Marginal reduction in noise and emissions on Grand Avenue because of fewer cars on Grand Avenue. • Low cost to construct and maintain. • Marginal improved connections for pedestrian and bicycle travel. • No changes to existing parking infrastructure. • Improved local circulation because of new connections.	• Requires some ROW acquisition for local circulation improvements. • 7 hours of Grand Avenue failure and travel time of 21 minutes on Grand Avenue during peak travel time) for all modes of travel. • Grand Avenue remains SH 82, limiting opportunities for modification to improve Grand Avenue character. • Some local trips are diverted to local streets through residential areas. • Marginally decreased safety in neighborhoods because of additional trips through local intersections. • Some physical improvements required, therefore some new project related environmental mitigation may be required. • Physical local roadway improvements may cause project related impacts to additional properties.

4.5.6 Operational Improvements, Local Circulation, and Transit Expansion (Strategy E)

Pros	Cons
• Moderate cost to construct and maintain. • Duration of periods of congestion is limited to the peak hours (2 hours of Grand Avenue failure) and delay is moderate (16 minutes Grand Avenue peak travel time). • Marginal reduction in noise and emissions on Grand Avenue because fewer cars on Grand Avenue. • Reduces duration of congestion barriers to pedestrian and bicycle circulation. • Provides additional travel opportunities and improved connections for pedestrian and bicycle travel. • Transit operations are improved by being more reliable and more frequent. • May increase parking opportunities with new park and ride lots. • Reduced SH 82 congestion related barriers to local circulation and increased options for local travel. • Reduced duration of SH 82 regional delay and increased options for regional travel.	• Requires some ROW acquisition for local circulation improvements and possibly along the RFTA corridor for transit expansion. • Grand Avenue remains SH 82, limiting opportunities for modification to improve Grand Avenue character. • Some local trips are diverted to local streets through residential areas. • Marginally decreased safety in neighborhoods because of additional trips through local intersections. • Some physical improvements required, therefore some new project related environmental mitigation may be required. Physical local roadway and RFTA Corridor improvements may cause project related impacts to additional properties

4.5.7 Widen Bridge, New Interchange, and Local Circulation (Strategy F)

Pros	Cons
• Marginal reduction in noise and emissions on Grand Avenue because fewer cars on Grand Avenue. • Marginally improved connections for pedestrian and bicycle travel. • No changes to existing parking infrastructure. • Improved local circulation because of new connections. • Marginally improved regional travel time because fewer local trips on SH 82 and improved operation of the SH 82/I-70 interchange.	• Requires some ROW acquisition for local circulation improvements. • High capital cost for construction; however, low cost to maintain. • Moderate periods of congestion (7 hours of Grand Avenue failure) and delay (20 minute Grand Avenue peak travel time) for all modes of travel. • Grand Avenue remains SH 82, limiting opportunities for modification to improve Grand Avenue character. • Some local trips are diverted to local streets through residential areas. • Marginally decreased safety in neighborhoods because of additional trips through local intersections. • Physical improvements will likely require project related environmental mitigation. • Physical local roadway improvements may cause project related impacts to additional properties.

4.5.8 Additional Lanes on SH 82 (Strategy G)

Pros	Cons
• Duration of periods of congestion is limited to the peak hours (2 hours of Grand Avenue failure) and delay is moderate (14 minute Grand Avenue peak travel time). • Safety is marginally improved because of reduced conflicts. • Marginal reduction in noise and emissions on Grand Avenue because of smoother traffic flow on Grand Avenue. • Improved local circulation because of new connections and increased gaps for crossing SH 82. • Improved regional travel time because fewer local trips on SH 82, increased SH 82 capacity and improved operation of the SH 82/I-70 interchange.	• Requires some ROW acquisition for local circulation improvements and may require some along SH 82 for new lanes. • High capital cost for construction; however, low cost to maintain. • Grand Avenue remains SH 82 and is widened, significantly limiting opportunities for modification to improve Grand Avenue character. • Some local trips are diverted to local streets through residential areas. • No significant safety improvements. • Physical improvements will likely require project related environmental mitigation. • Increased highway width creates a barrier to pedestrians and bicyclists crossing SH 82. • Parking along Grand Avenue will be removed to accommodate travel lanes. • Physical Grand Avenue improvements may further impact adjacent properties, but will not impact additional properties.

4.5.9 Additional Lanes on SH 82 plus Transit Expansion (Strategy H)

Pros	Cons
• Duration of periods of congestion is limited to the peak hours (2 hours of Grand Avenue failure) and delay is minimal (9 minute Grand Avenue peak travel time). • Safety is marginally improved because of reduced conflicts. • Marginal reduction in noise and emissions on Grand Avenue because of fewer cars and smoother traffic flow on Grand Avenue. • Marginally improved connections for pedestrian and bicycle travel because of new local links. Reduced duration of congestion barriers to pedestrian and bicycle circulation. Provision of additional travel opportunities because of transit improvements. • Improved local circulation because of new connections, increased gaps for crossing SH 82 and increased transit opportunities. • Improved regional travel time because fewer local trips on SH 82, increased SH 82 capacity, improved operation of the SH 82/I-70 interchange, and increased transit opportunities.	• Requires some ROW acquisition for local circulation improvements from SH 82 and may require some along SH 82 for new lanes. • High capital cost for construction and moderate cost to maintain. • Grand Avenue remains SH 82 and is widened, significantly limiting opportunities for modification to improve Grand Avenue character. Some local trips are diverted to local streets through residential areas. • Physical improvements will likely require project related environmental mitigation. • Parking along Grand Avenue will be removed to accommodate travel lanes (partially offset by additional parking provided at new park and ride locations). • Physical Grand Avenue improvements may further impact adjacent properties and RFTA corridor improvements might impact additional properties.

4.5.10 Glenwood Springs Bypass – Two Lanes (Strategy I)

Pros	Cons
• Safety is improved because of reduced conflicts. • Reduction in noise and emissions on Grand Avenue because of less vehicle traffic on Grand Avenue. • Improved connections for pedestrian and bicycle travel because of new local links. Reduced barriers to pedestrian and bicycle circulation because traffic redistributed from Grand Avenue. • No changes to existing parking infrastructure. • Improved local circulation because of new connections, increased gaps for crossing SH 82 and bypass. • Improved regional circulation because fewer local trips on SH 82, increased regional capacity because of the bypass, and improved operation of the SH 82/I-70 interchange.	• Significant new ROW required for bypass and new local connections. • High capital cost for construction and maintenance. • Moderate periods of congestion (7 hours of Grand Avenue failure) and delay (20 minute Grand Avenue peak travel time) for all modes of travel on Grand Avenue (bypass has minimal congestion (no bypass failure) or delay (6 minute bypass peak travel time). • Grand Avenue remains SH 82, limiting opportunities for modification to improve Grand Avenue character. Some local trips are diverted to local streets through residential areas. • Physical improvements will likely require project related environmental mitigation. • Addition of bypass will impact additional properties. • Some local trips are diverted to local streets through residential areas. • Marginally decreased safety in neighborhoods because of additional trips through local intersections.

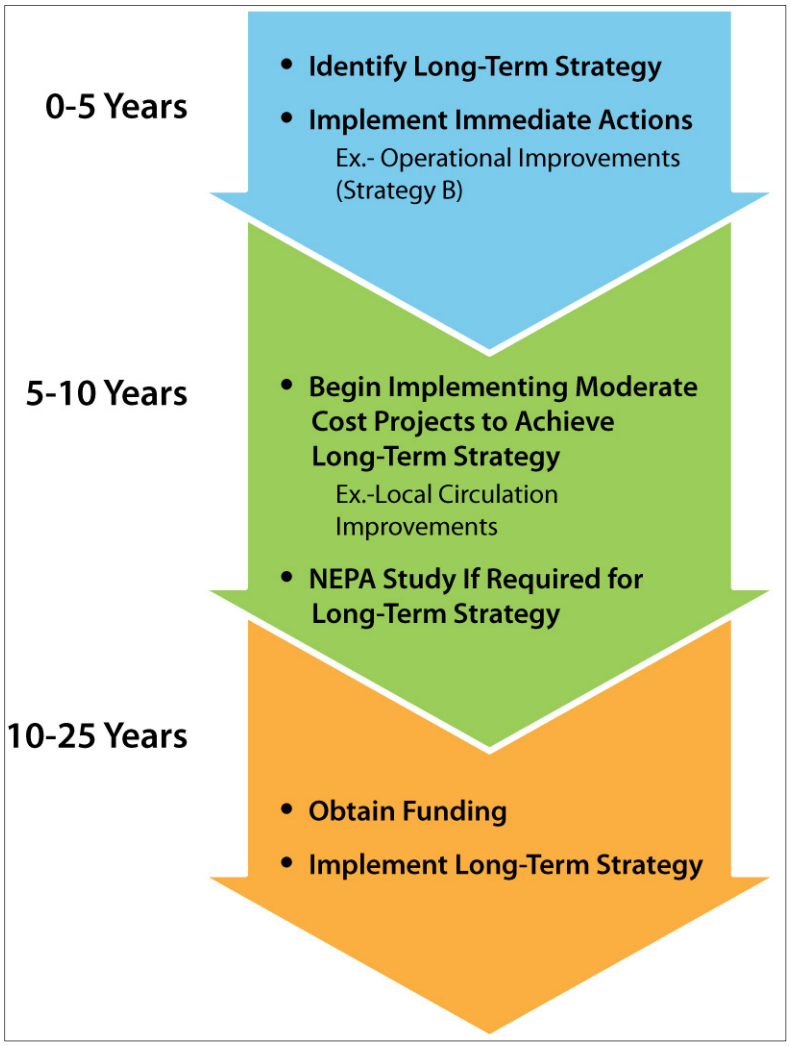
4.5.11 SH 82 Relocation – Four Lanes (Strategy J)

Pros	Cons
• Congestion (2 hours of Grand Avenue failure and no failure of SH 82) and delay (7 minute Grand Avenue and SH 82 peak travel times) for all modes of travel on SH 82 and Grand Avenue are minimized. • Grand Avenue can be modified to address Grand Avenue character goals. • Safety is improved because of reduced conflicts. • Reduction in noise and emissions on Grand Avenue because of less vehicle traffic on Grand Avenue. • Improved connections for pedestrian and bicycle travel because of new local links. Reduced barriers to pedestrian and bicycle circulation because traffic redistributed from Grand Avenue. • No changes to existing parking infrastructure. • Improved local circulation because of new connections, increased gaps for crossing Grand Avenue and relocation of SH 82 away from downtown. • Improved regional travel time because fewer local trips on SH 82, increased regional capacity because of the relocation, and improved operation of the SH 82/I-70 interchange.	• Significant new ROW required for relocated SH 82 and new local connections. • High capital cost for construction and maintenance. • Physical improvements will likely require project related environmental mitigation. • Relocation of SH 82 will impact additional properties. • Some local trips are diverted to local streets through residential areas. • Marginally decreased safety in neighborhoods because of additional trips through local intersections.

5 Next Steps

One purpose of this COP is to be a tool that can be used by decision makers to identify potential impacts transportation strategies might have on livability and community values. The information in this document can help guide transportation decisions made during the revision of the *Comprehensive Plan*. It is envisioned that the City Council and other decision making bodies will use the information in this document to identify solutions to future transportation needs that address the livability and community character goals of Glenwood Springs. Figure 9 identifies the process to identify and implement corridor improvements over an anticipated 20 year timeframe.

Figure 9
Process for Long-Term Strategy Development



6 Business Plan

The purpose of this COP is to provide high-level corridor transportation planning information for the City, CDOT, Garfield County, and RFTA to decide the best direction to proceed. As such, the strategies and the elements that make up the strategies are well developed concepts, but are not detailed design or implementation plans. As a result of the high-level planning nature of this document, the business plan was also developed at a relatively high level.

It was determined the best method for developing a business plan would be to identify the approximate cost range of each strategy and to place them in one of three categories related to expense and complexity of funding. These categories are:

- Local Funding (the City) – less than $5 million (similar to the gap project)
- Regional Funding (the City, CDOT, Garfield County, and RFTA) - $5 million to $50 million (similar to South Bridge)
- National Funding (the City, CDOT, Garfield County, RFTA, FHWA, and others) – more than $50 million

While it is possible for any of the strategies to fall in any of the categories, based on the complexity of the ultimate alternatives chosen for implementation, Table 16 represents the likely funding category of each strategy. These funding categories are likely to be representative of typical alternatives selected for the strategies.

Table 16
Funding Categories

Strategy	Local Funding	Regional Funding	National Funding
No Action (Strategy A)			
Operational Improvements (Strategy B)			
Transit Expansion (Strategy C)			
Operational Improvements and Local Circulation (Strategy D)			
Operational Improvements, Local Circulation, and Transit Expansion (Strategy E)			
Widen Bridge, New Interchange, and Local Circulation (Strategy F)			
Additional Lanes on SH 82 (Strategy G)			
Additional Lanes on SH 82 plus Transit Expansion (Strategy H)			
Glenwood Springs Bypass – Two Lanes (Strategy I)			
SH 82 Relocation – Four Lanes (Strategy J)			

7 References

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8 Glossary

Abatement [Noise]	A reduction in the degree or intensity of traffic and other noise sources through various forms of mitigation measures, such as noise barriers or walls.
Access	Access refers to the ability of a person to get to/from a specific origin/destination or transportation facility.
Along the Corridor	Trips along the corridor are those that begin outside the study area, travel through the study area and end outside the study area. Trips that originate or end outside the study area and end or begin inside the study area, respectively, are also considered along the corridor.
Alternative	A detailed method for addressing corridor mobility goals, such as constructing a road along the East River Corridor.
Annual Average Daily Traffic (AADT)	The total volume of traffic passing a point or segment of a highway facility in both directions for 1 year, divided by the number of days in the year.
Average Daily Traffic (ADT)	The total volume of traffic passing a point or segment of a highway facility in both directions for an average weekday.
Capacity	Capacity of a roadway is the maximum amount of traffic a roadway can accommodate. Examples of factors that reduce capacity may include lane width, number of lanes, roadway geometry, on-street parking, traffic signals, composition of traffic, grades, terrain, driver population, and adjacent land uses.
Capacity Analysis	The use of engineering analytical tools to determine level of service for existing or projected traffic volumes. It is used to evaluate degrees of traffic congestion.
Commercial Vehicle	See the definition for *Truck*.
Criteria	The specific metric used to determine if an element or strategy furthers, hinders, or is neutral towards the aim of a specific objective.
Cultural Resource	Cultural resources include archeological sites, traditional sites, and the built environment resources, such as buildings, structures, objects, districts, and sites. A cultural resource that is listed on, or is eligible for the National Register of Historic Places (NRHP) is considered a historic property for the purposes of Section 106.
Delay	The amount of time during a trip attributed to not moving because of congestion, traffic controls or other factors.
East River Corridor	The East River Corridor is a potential alignment for a SH 82 (Grand Avenue) bypass or a relocated SH 82 which runs along the east side of the Roaring Fork River from I-70 to 23rd Street. This corridor designation was created to distinguish it from the RFTA corridor and in recognition of the need to preserve the RFTA Corridor for existing trail and future mass transit use.
Element	A general method for addressing corridor mobility goals, such as transit, transportation demand management (TDM), etc.
Free-Flow Speed (FFS)	Free flow speed is the speed a motorist would travel if there were no congestion or other adverse conditions (such as bad weather).
Geographic Information Systems (GIS)	Tools (including computer programs) used to store, transform, manipulate, analyze and produce spatial information. This information or data may be represented as maps, three dimensional models, tables and/or lists.

***Geometric Design of Highways and Streets 2004, A Policy on* (“*Green Book*”)**	*A Policy on Geometric Design of Highways and Streets 2004* (“*Green Book*”) by the American Association of State Highway and Transportation Officials (AASHTO) provides guidance for the administration, planning, and design of highways and streets. This guidance is based on established practices and recent research. The procedures and practices identified in the “*Green Book*” represent the industry standard.
Goal	A statement that captures the common thread shared by a collection of several objectives for mobility improvements, as expressed in CDOT's *Corridor Optimization Guidelines*.
High Occupancy Vehicle (HOV) Lanes	HOV lanes are a network of delineated or separated roadways that allow buses, vanpools, and carpools to move higher volumes of passengers on roadways.
***Highway Capacity Manual 2000* (*HCM*)**	The Transportation Research Board's (TRB's) *Highway Capacity Manual* (*HCM*) provides a collection of state-of-the-art techniques for estimating the capacity and determining the level of service (LOS) for transportation facilities, including intersections and roadways as well as facilities for transit, bicycles, and pedestrians. The methodologies identified in the *HCM* are the industry standard for evaluating capacity and LOS.
Intelligent Transportation System (ITS)	Integrated applications using a wide range of advanced technologies and ideas, which, in combination, can improve mobility and transportation productivity, enhance safety, maximize the capacity of existing transportation facilities, conserve energy resources and reduce adverse environmental effects and transportation problems.
Intermodal	Interconnectivity between various types (modes) of transportation.
Land Use Plan	A plan that establishes strategies for the use of land to meet identified community needs.
Level of Service (LOS)	LOS refers to the overall quality of traffic flow at an intersection or mainline section. Levels range from very good, represented by LOS A, to very poor, represented by LOS F. The following summarizes the general definitions of LOS as identified in Exhibit 2-31 of the “*Green Book*”: **LOS** — **General Operating Conditions** A Free flow B Reasonably free flow C Stable flow

D Approaching unstable flow

E Unstable flow

F Forced or breakdown flow

Signalized Intersection LOS is directly related to the control delay value. The following summarizes the LOS criteria for signalized intersections as identified in Exhibit 16-2 of the *HCM*:

LOS	Control Delay per Vehicle (s/veh)
A	≤ 10
B	> 10-20
C	> 20-35
D	> 35-55
E	> 55-80
F	> 80

Two-Way Stop-Controlled Intersection LOS is measured based on the average control delay for the stop controlled approach with the greatest delay. The following summarizes the LOS criteria for two-way stop-controlled intersections as identified in Exhibit 17-2 of the *HCM*:

LOS	Average Control Delay per Vehicle (s/veh)
A	0-10
B	> 10-15
C	>15-25
D	> 25-35
E	> 35-50
F	> 50

All-Way Stop-Controlled Intersection LOS is based on the weighted average control delay of the individual intersection approaches. The following summarizes the LOS criteria for all-way stop-controlled intersections as identified in Exhibit 17-22 of the *HCM*:

LOS	Average Control Delay per Vehicle (s/veh)
A	0-10
B	> 10-15
C	>15-25
D	> 25-35
E	> 35-50
F	> 50

Urban Street LOS is based on average through-vehicle travel speed for the segment of for the entire street under consideration. The average travel speed is computed from the running times on the urban street and the control delay of through movements at signalized intersections. The LOS

for urban streets is influenced both by the number of signals per mile and by the intersection control delay. The following summarizes the LOS criteria for urban streets as identified in Exhibit 15-2 of the *HCM*:

Urban Street Class	I	II	III	IV
Range of free-flow speeds (FFS)	55 to 45 mph	45 to 35 mph	35 to 30 mph	35 to 25 mph
Typical FFS	50 mph	40 mph	35 mph	30 mph
LOS	**Average Travel Speed (mph)**			
A	> 42	> 35	> 30	> 25
B	> 34-42	> 28-35	> 24-30	> 19-25
C	> 27-34	> 22-28	> 18-24	> 13-19
D	> 21-27	> 17-22	> 14-18	> 9-13
E	> 16-21	> 13-17	> 10-14	> 7-9
F	≤ 16	≤ 13	≤ 10	≤ 7

Local Trips	Local trips are those that begin and end within the study area.
Long-range Transportation Plan (LRTP)	A long range strategy and capital improvement program developed to guide the effective investment of public funds in transportation facilities. The plan is updated every five years and may be amended as a result of changes in projected Federal, State and local funding, major improvement studies, congestion management system plans, interstate interchange justification studies and environmental impact studies.
Measure	The information that is evaluated to determine how well an element or strategy meets an objective.
Methodology	The method used to evaluate how an element or strategy addresses a measure.
Mobility	Mobility refers to the ability of a person to move through the transportation system efficiently by whichever mode they chose.
Mode	The method of travel, such as private automobile, bus, bicycle, etc.
National Environmental Policy Act of 1969 (NEPA)	The Federal law that establishes the U.S. government policy towards the environment. NEPA's fundamental policy is to "encourage productive and enjoyable harmony between man and his environment." Federal agencies are required to assess the environmental impacts of their proposed actions.
National Highway System (NHS)	The Interstate System as well as other roads that are important to the nation's economy, defense, and mobility; developed by the USDOT in cooperation with States, local officials, and metropolitan planning organizations.
No Action Alternative	The alternative in a plan that proposes to continue current management direction. "No action" means the proposed activity would not take place, and the resulting mobility, safety, environmental, and cost effects from taking no action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward.
No-Build Alternative	The proposed actions would not take place and the resulting mobility, safety, environmental, and cost effects from taking no action would be compared with the effects of the build alternatives. It also serves as a baseline for comparison to the proposed build alternatives.
Objective	A guide to develop corridor elements and strategies and provide the framework for evaluation of elements and strategies which address mobility, safety, environment, and cost based on identified needs.

Peak Hour	The 1-hour period during which the roadway carries the greatest number of vehicles. Traffic impacts are typically evaluated during the morning and afternoon peak hours when the greatest number of motorists are traveling to and from work.
Percentage of Capacity	V/C ratio expressed as a percentage. This is a measure of the percentage of a roadway's capacity used by traffic demand.
Private Vehicle	See the definition for *Single Occupant Vehicle*.
Project Study Area	The area between logical termini in which strategies can be developed that meet the purpose and need for the project.
Purpose and Need	The general intent and justification for an intended action to address a specified transportation-related problem. The statement clearly demonstrates that a "need" exists and defines the "need" in terms understandable to the general public. The statement should clearly describe identified and documented problems that the proposed action is to correct. Basis may include: capacity and transportation demand, safety, legislative directive, economic development/planned growth, modal interrelationships, system linkage and roadway deficiencies. The statement provides the basis for developing a range of reasonable strategies.
Regional Trips	Regional trips are those that begin outside the study area, travel through the study area and end outside the study area. Trips the originate or end outside the study area and end or begin inside the study area, respectively, are also considered regional trips.
Right-of-Way (ROW)	A general term denoting land, property, or interest therein, usually in a strip, acquired for or devoted to transportation purposes.
Riparian Areas	Lands adjacent to water bodies. Riparian areas are transitional between terrestrial and aquatic ecosystems, through which surface and subsurface hydrology connects water bodies with their adjacent uplands. Riparian areas are adjacent to streams, lakes and estuarine-marine shorelines and provide a variety of ecological functions and services and help improve or maintain local water quality.
Roaring Fork Transportation Authority Corridor (RFTA Corridor)	The RFTA Corridor runs along the abandoned Rio Grande rail line which extends the length of the Roaring Fork Valley. Currently the RFTA corridor contains the Rio Grande Trail – a multi-use trail that extends from Glenwood Springs to Aspen. The RFTA Corridor has been identified for preservation for existing trail and future mass transit use.
Section 4(f)	National legislation that stipulates that the FHWA will not approve any program or project which requires the use of any publicly owned park, recreation area, or wildlife or waterfowl refuge, or any land from a historic site of national, State, or local significance unless: there is no feasible and prudent alternative to the use, and all possible planning to minimize harm resulting from such use is included.
Single Occupant Vehicle (SOV)	A privately operated vehicle whose only occupant is the driver. The drivers of SOVs use their vehicles primarily for personal travel, daily commuting and for running errands. The types of vehicles include, but are not limited to sport utility vehicles (SUVs), light-duty trucks, and any combination thereof, along with all the various van and car sizes, but would generally be taken to exclude human powered vehicles such as bicycles.

State Highway 82 (SH 82)	SH 82 is the actual highway that extends from I-70 Exit 116 to the north along 6th Street, Grand Avenue, and South Glen Avenue. After leaving Glenwood Springs, SH 82 heads south and east through the Roaring Fork Valley.
Statewide Transportation Improvement Program (STIP)	A staged, multiyear, statewide, intermodal program of transportation projects which is consistent with the statewide transportation plan and planning process and metropolitan plans, TIPs, and processes.
Signal Improvements	Signal improvements include items such as signal timing adjustments, phasing changes, and other operational changes.
Storm water	Rainwater (or other water that results from precipitation such as snowmelt) that flows over land and into natural and artificial drainage systems. Storm water runoff is a major transporter of non-point source pollutants.
Strategy	A set of consistent elements that is responsive to the problem statement and addresses corridor mobility needs.
Study Area	The study area for this project is the area in Glenwood Springs that extends from United States Highway (US) 6 to the north, just beyond the Glenwood Springs Airport to the south, Midland Avenue to the west, and the edge of the valley to the east.
Transportation Demand Management (TDM)	The TDM program assists communities with the development of services and facilities for alternative transportation methods. Methods of accomplishing this goal include rideshare programs, park and ride lots, telecommuting programs, and incentive programs to encourage the use of alternatives to driving alone.
Transportation Demand Measures	The use of incentives, and market devices to shift travel into non-motorized or higher-occupancy modes, and/or shift travel onto less congested routes.
Transportation Improvement Program (TIP)	Short-term (three to five years) plan of approved policies developed by an MPO for a jurisdiction that is fiscally constrained.
Transportation System Management (TSM)	A part of the transportation planning process which identifies short-range, low-cost improvements for the urban transportation system (including both roads and public transportation). Its goal is to insure the most efficient use of the present transportation system, and it may identify improvements such as better fare structures for buses, traffic engineering changes, and new management systems for public transportation.
Travel Time	The amount of time it takes to travel from one specific point to another.
Truck	The Federal Highway Administration (FHWA) classifies vehicles into a 13-class typology for data collection. Classes 5-7 are single-unit trucks and classes 8-13 are combination trucks. The following summarizes classes 5-13 of the FHWA's typology: 5. **NOTE:** In reporting information on trucks the following criteria should be used: a. Truck tractor units traveling without a trailer will be considered single-unit trucks. b. A truck tractor unit pulling other such units in a "saddle mount" configuration will be considered one single-unit truck and will be defined only by the axles on the pulling unit. c. Vehicles are defined by the number of axles in contact with

	the road. Therefore, "floating" axles are counted only when in the down position. d. The term "trailer" includes both semi- and full trailers. 6. ***Two-Axle, Six-Tire, Single-Unit Trucks*** — All vehicles on a single frame including trucks, camping and recreational vehicles, motor homes, etc., with two axles and dual rear wheels. 7. ***Three-Axle Single-Unit Trucks*** — All vehicles on a single frame including trucks, camping and recreational vehicles, motor homes, etc., with three axles. 8. ***Four or More Axle Single-Unit Trucks*** — All trucks on a single frame with four or more axles. 9. ***Four or Fewer Axle Single-Trailer Trucks*** — All vehicles with four or fewer axles consisting of two units, one of which is a tractor or straight truck power unit. 10. ***Five-Axle Single-Trailer Trucks*** — All five-axle vehicles consisting of two units, one of which is a tractor or straight truck power unit. 11. ***Six or More Axle Single-Trailer Trucks*** — All vehicles with six or more axles consisting of two units, one of which is a tractor or straight truck power unit. 12. ***Five or fewer Axle Multi-Trailer Trucks*** — All vehicles with five or fewer axles consisting of three or more units, one of which is a tractor or straight truck power unit. 13. ***Six-Axle Multi-Trailer Trucks*** — All six-axle vehicles consisting of three or more units, one of which is a tractor or straight truck power unit.
Vehicle Miles Traveled (VMT)	A measure of the extent of motor vehicles operation; the total number of vehicle miles traveled within a specific geographic area over a given period of time.
Vehicle Per Day (VPD)	The number of vehicles that travel on a road each day.
Volume/Capacity (V/C) Ratio	The V/C ratio is a measure of how much of a roadway's capacity is used by traffic demand (volume).
Wetland	A wetland is defined by the USACE as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.
Within the Corridor	Trips within the corridor are those that begin and end within the study area.

APPENDIX

STATE OF COLORADO

DEPARTMENT OF TRANSPORTATION
Region 3

222 South Sixth Street, Room 317
Grand Junction, Colorado 81501-2769
(970) 683-6202 FAX# (970) 683-6205

November 12, 2009

Mike McDill, City Engineer
101 W. 8th Street
Glenwood Springs, CO 81601

Dear Mr. McDill:

The Colorado Department of Transportation (CDOT) wishes to express our strong support for the City of Glenwood's S.H. 82 Corridor Optimization Plan (COP) process.

As you and your project manager described at our recent Region Leadership Team meeting, the current process is identifying concerns with the existing and future transportation needs on S.H. 82 in Glenwood Springs. This process was authorized by the Transportation Commission in 2005, and it is understood that a concluding presentation will be made to the Commission in the spring of 2010 to summarize the findings.

The final report will list strategies that have varying levels of effectiveness in meeting the future capacity demands, as well as varying levels of cost, and the strategies are comprised of the following elements:

- Transit Operations
- Transit Capacity
- Transportation Demand Management (TDM)
- Roadway Operations
- Transportation System Management (TSM)
- Local Circulation Improvements
- Highway Relocation
- New Bridge and Interchange
- Highway Expansion

CDOT appreciates the City's effectiveness in working closely with Garfield County and the Roaring Fork Transportation Authority (RFTA) on this process, and our staff will continue to work with you as you incorporate different strategies into the broader planning process.

Sincerely,

Weldon Allen, Director
Transportation Region 3

cc: Elsen/Wagner
Smith/Woodmansee/Burgess
Brown
file

Hanson, James

From: Elsen, Joseph [Joseph.Elsen@DOT.STATE.CO.US]
Sent: Wednesday, December 16, 2009 4:54 PM
To: 'Mike McDill'; Hanson, James
Cc: Allen, Weldon; Mertes, Pete; Smith, Tammie; Woodmansee, Tim; Burgess, Dwight; Wagner, Roland; Necessary, Bart; Elsen, Joseph
Subject: Glenwood Springs Downtown Bypass Questions as It Relates to StateHighway Traffic

Mike:

We took a bit extra time in replying to make sure that we got the answers right.

Thank you for all of your cooperation in the SH 82 COP process.

Joe

From: Mike McDill [mailto:mike.mcdill@cogs.us]
Sent: Thursday, October 01, 2009 3:15 PM
To: Elsen, Joseph; Wagner, Roland
Cc: 'Hanson, James'
Subject: Glenwood Springs Downtown Bypass Questions as It Relates to State Highway Traffic

Dear Joe,

The SH 82 Corridor Optimization Plan (COP) study team is considering several possible strategies for an additional route around downtown Glenwood Springs and desires guidance from CDOT Region 3 on the likely characteristics of such a facility and the process by which such a change would be effected.

One concept being considered is to relocate SH 82 around downtown to a new location and transfer ownership of the existing roadway through downtown to the City of Glenwood Springs. Another concept discussed is leaving SH 82 where it is and constructing a new City-owned facility around downtown, which would allow the City more flexibility in operating the new facility to meet its own goals, such as designating it a truck route/bypass if so desired.

The basic question is, "If SH 82 were to be relocated around downtown, would CDOT <u>require</u> it to be four lanes (maintain its current characteristics), or could it be fewer lanes with fewer intersection to maintain comparable capacity (based on a capacity analysis)?"

In order to aid us in defining the strategies to be considered in the study, we pose the following questions to provide more detailed response to the general question, above, and request that Region 3 provide responses to each:

1. If SH 82 were to be routed around downtown, must the new facility be four lanes (consistent with the current facility), or could it be fewer lanes with fewer intersections based on demonstrated traffic demand and operational analysis?

CDOT's position now, which would be fully analyzed during the NEPA process that would be required for such a project, is that a relocation of SH 82 would have to be a minimum of the current four lanes, and would need to be sized to handle the horizon year demand efficiently.

Traffic projections indicate that a two-lane facility around Glenwood Springs would be able to accommodate the 2035 travel demand at a level of service D or better (approximately 30 percent of the traffic forecasted on SH 82 in 2035 is expected to be diverted onto this new route). What other factors would you consider in determining how many lanes would be required (preservation of existing facility type; preservation of investment made to date; system continuity; traffic operations, reduced lane

mileage, fewer signals to maintain) and what process is involved in making such a decision (NEPA studies, policy-based decisions, etc.)?

CDOT interprets the two-lane "City-owned" facility that accommodates approximately 30% of the SH 82 future, projected traffic, to be a "bypass" facility that leaves SH 82 on Grand Avenue and adds the regional trip capacity on a separate alignment. The above-stated factors would all be considered for this scenario, and the project would need to closely follow our Policy and Procedural Directives 1601.0 and 1601.1 for guidance. Please note that PD 1601 intends for interchange connections to the state highway system to improve the operations and safety of the system, and serve regional travel purposes or provide access to regional destinations; this means that the connecting roadway must be "regionally significant" such as a principal arterial or higher designation.

2. We understand that the ability to allow for future transportation needs is always important, and that if SH 82 were to be relocated to this new alignment with fewer than four lanes, CDOT may want to ensure their future ability to widen. What factors should be considered in meeting this goal (right-of-way, process, funding, etc.)?

For a relocation of SH 82, to a separate alignment, the minimum lane requirements would be the lesser of existing, or what was required to meet the purpose and need for the planning horizon. In order for a new alignment to be transferred to CDOT, the City must be able to certify that all right-of-way for the new alignment was acquired in accordance with the Uniform Act and CDOT's Right-of-Way Manual. The 2 exceptions to this requirement are (1) dedications to the City made pursuant to normal zoning & subdivision procedures or local planning processes, and (2) advanced arms-length purchases of lands on the open market made without the threat of condemnation or the exercise of the power of eminent domain.

3. What facility type would be appropriate for a relocated highway, and would it be different based on the number of lanes determined as in the first question?

A relocated "CDOT-owned" highway would need to be a "limited access" type facility that would efficiently serve regional and inter-regional trips. The facility type will be determined in the multiple processes of NEPA, PD 1601, and the Interstate Access Request (IAR); it is highly unlikely that a relocation of SH 82, given the projected 2% annual growth rate, will be of a capacity that is less than the current four lanes.

4. What would be the financial implications to the involved parties of relocating the highway?

Currently, the CDOT budget is at very low levels; prior to the recession the Governor's Blue Ribbon Panel had estimated that approximately $2.5 Billion of additional annual revenue was required to adequately address increased mobility needs across the state. With conceptual estimates in the range of $300 Million or more to relocate SH 82, it is safe to assume that the financial implications would need to be shouldered by a wide array of "interested parties."

What would be the magnitude of the costs involved, and what would be the City's obligation in abandoning the existing highway, constructing the new facility, and maintaining both facilities?

The 2007 Corridor Optimization Study includes an estimated cost of approximately $300 Million (including ROW and Construction Engineering; year 2007) for the East River Corridor. It will take some creative financial partnerships to fund a $300+ Million transportation improvement. For a jurisdictional swap, following construction, the state would simply take over the new facility and the associated maintenance responsibilities, and the City would do the same for Grand Avenue.

5. What is the policy on no additional lane miles being added to the state highway system, and what affect will that have on the issue? Note that previous discussions have been held regarding the City taking over US 6 and 24 between Exits 114 and 116 as a way to balance the mileage.

The Transportation Commission clearly does not wish to take on additional lane miles as the current funding is insufficient to maintain our current system adequately. However, each project is viewed on its merits, and the positive outcome of a cost/benefit analysis. Creative solutions, such as the trading of lane miles for similar facilities will be considered during the project development and Intergovernmental Agreement phase.

6. Is tolling a new highway around Glenwood Springs an option, and what issues must we consider for that option?

The current policy is that tolling only be applied to additional capacity, i.e., your bypass concept above. Details would be worked out during the NEPA process, however, we could arrange a meeting with our tolling experts and your staff to discuss FAQ's and to give broad advice on possible revenues and expenses.

Thank you for consideration of these questions. If you need clarification on any of the requests or would like to discuss them, we would be pleased to do so.

Thanks,

Mike McDill, P.E.
City Engineer
Glenwood Springs, CO
(970) 384-6413

February 11, 2010

Mike McDill
City Engineer
101 W. 8th Street
Glenwood Springs, CO 81601

Re: RFTA's Support for the Corridor Optimization Plan Process

Dear Mr. McDill:

The Roaring Fork Transportation Authority (RFTA) joins the Colorado Department of Transportation in expressing its support for the City of Glenwood Springs' S.H. 82 Corridor Optimization Plan (COP) process.

As your February 2, 2010 letter reflects, an important, yet incomplete part of your process is to solicit public input as to the costs and benefits of available strategies. As your process continues, RFTA looks forward to providing any feedback or information that may be of assistance in incorporating those strategies into the broader planning process.

Along those lines, two of the ten strategies currently under evaluation call for the creation of a bypass or a relocated S.H. 82. Although the analysis does not yet identify the potential alignments for a bypass or relocated SH 82, RFTA must confirm that its railroad right-of-way through Glenwood Springs is not available for such purposes. RFTA manages its railroad right-of-way under the jurisdiction of the Surface Transportation Board and federal statutes that allow it to operate as an interim trail until such time as rail service is restored. No other use of the right-of-way is permitted.

As the City continues to consider its options and prepares for its presentation to the Colorado State Transportation Commission, it may be prudent to specify that this right-of-way is excluded from consideration so as not to unreasonably influence expectations or skew the analysis of any strategy. At the same time, the prospect of future passenger rail service may be worthy of consideration in the planning process.

With this clarification, RFTA reiterates its support of the City's SH 82 Corridor Optimization planning process.

Sincerely,

Jacque Whitsitt
Vice Chair

John Martin, Chair
District 2

Trési Houpt, Chair Pro-Tem
District 1

Mike Samson
District 3

Garfield County

BOARD OF COUNTY COMMISSIONERS

September 10, 2010

Mr. Mike McDill
City Engineer
101 West 8th Street
Glenwood Springs, CO 81601

Dear Mr. McDill,

The Garfield County Board of County Commissioners (BOCC) wishes to express our support for the City of Glenwood Springs' Draft State Highway 82 Corridor Optimization Plan (COP), as presented at our March 1, 2010 meeting. The BOCC appreciates the effort that has been put forth in collaborating between the County, Colorado Department of Transportation, Roaring Fork Transportation Authority and the City in constructing this plan.

The County would also like to acknowledge that this plan will be a valuable tool that can be used by decision makers to identify potential impacts varying transportation strategies might have on livability and community values. The BOCC recognizes that this plan will help decision making bodies to use the information in this document to indentify solutions to future transportation needs that address the livability and community character goals of Glenwood Springs.

Respectfully,

John Martin, Chair
Garfield County Board of County Commissioners

108 Eighth Street, Suite 213 • Glenwood Springs, CO 81601
(970) 945-5004 • Fax: (970) 945-7785

Roaring Fork Transportation Authority

November 18, 2010

Mike McDill
City Engineer
101 West 8th Street
Glenwood Springs, CO 81601

Re: Clarification of RFTA's Letter of Support for the Corridor Optimization Plan Process, dated February 11, 2010

Dear Mr. McDill:

It has come to my attention that the Letter of Support referenced above may have created some misunderstanding about whether the Roaring Fork Transportation Authority (RFTA) could ever allow the Rio Grande rail right-of-way to be used as a multi-modal transportation corridor. The RFTA Board of Directors is responsible for ensuring that the Rio Grande rail corridor is preserved for the future reactivation of rail service and, therefore, must exercise considerable caution regarding uses it allows within or to encroach upon the corridor. Decisions as to which types of uses might be permitted within the corridor at any particular location ultimately rest with the RFTA Board of Directors. However, insofar as other proposed transportation-related uses within the rail corridor would not jeopardize RFTA's ability to reinstitute rail service in the future by making it technically or financially infeasible, it is not believed that they would be precluded by any of the agreements or regulations governing the corridor. Please be advised, though, that the Union Pacific Railroad maintains the rights to a perpetual, exclusive freight rail easement, on, under, over and through the wye area and along the mainline track to approximately as far south as 13th Street in Glenwood Springs (see attached Exhibits B and C from the Aspen Branch Purchase and Sale Agreement).

RFTA remains committed to working cooperatively with other entities whenever the use of the Rio Grande corridor or other RFTA property would contribute to increased transit/transportation efficiency within our region. However, it also must be emphasized that the Rio Grande rail corridor represents an extremely valuable asset to all of RFTA's members and the RFTA Board of Directors has been entrusted with the responsibility for assuring its ongoing protection. No action that would serve to sever the continuous corridor and thereby jeopardize its Rail Banking status could ever be allowed by RFTA. However, RFTA remains willing to participate in multi-modal transportation planning discussions that might result in enhanced public benefit as long as the corridor's need for protection and its continuing availability for future rail use are recognized as fundamental requirements of the process.

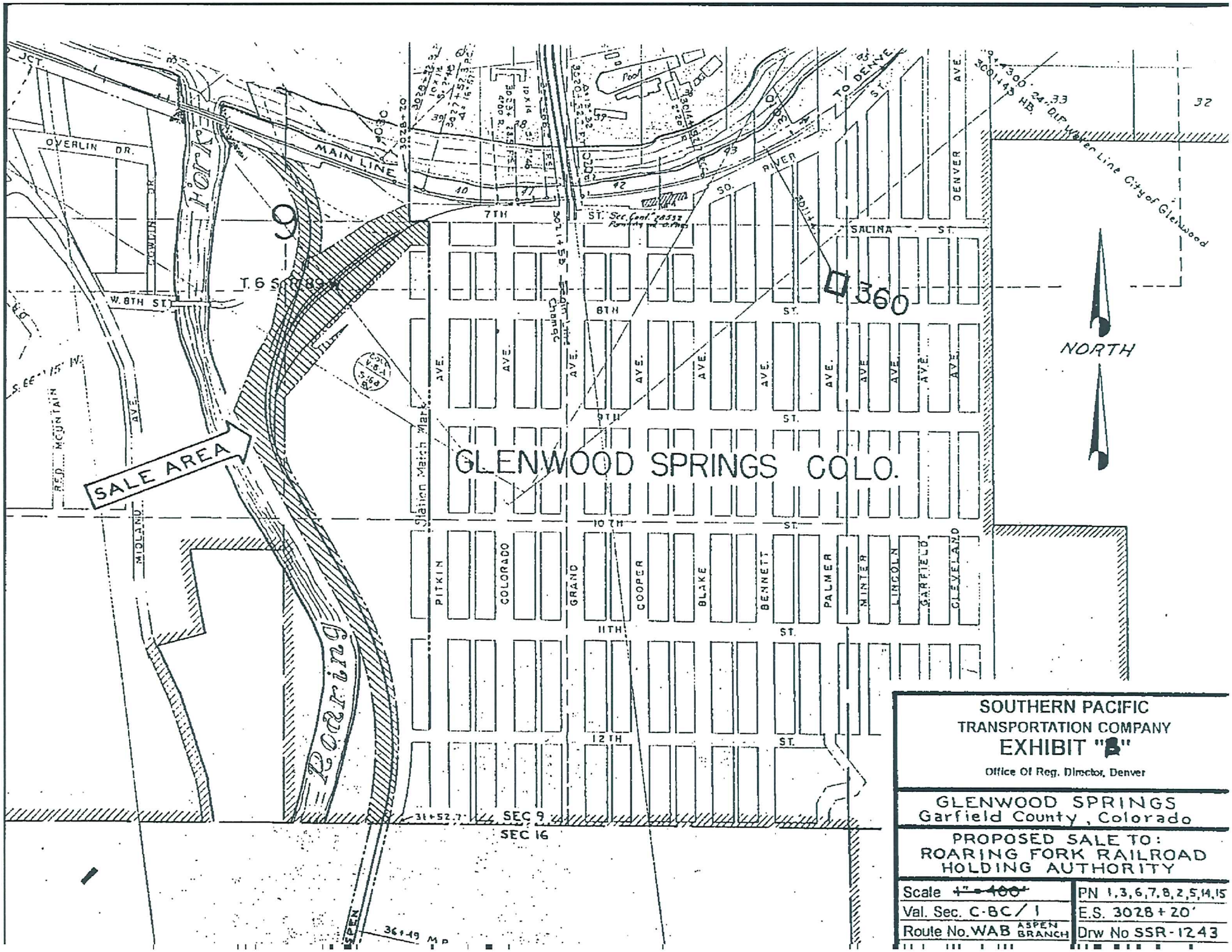
If you have questions, please let me know.

Sincerely,

Dan Blankenship

Dan Blankenship
Chief Executive Officer

www.rfta.com
Ph 970.384.4974 · Fx 970.945.7386
2307 Wulfsohn Road · Glenwood Springs, CO 81601



SOUTHERN PACIFIC
TRANSPORTATION COMPANY
EXHIBIT "B"
Office Of Reg. Director, Denver

GLENWOOD SPRINGS
Garfield County, Colorado

PROPOSED SALE TO:
ROARING FORK RAILROAD
HOLDING AUTHORITY

Scale ~~1" = 400'~~	PN 1,3,6,7,8,2,5,14,15
Val. Sec. C-BC/1	E.S. 3028+20'
Route No. WAB ASPEN BRANCH	Drw No SSR-1243

Exhibit C

Railroad Easement

Grantor excepts from the Property hereby conveyed and reserves unto itself, its affiliates, successors and assigns, a perpetual, exclusive freight rail easement, on, under, over and through the portion of the Property described on Exhibit B attached hereto for the purpose of maintaining, repairing, replacing, installing, operating, storing and using in connection with Grantor's rail operations existing and/or future railroad, rail and railroad-related equipment, railroad facilities, transportation systems, and railroad communication systems, including, but not limited to, all existing facilities and related equipment and appurtenances.