

**Colorado Department of Transportation
Division of Transit and Rail**

**Statewide Intercity and Regional Bus
Network Study**

DRAFT TECHNICAL MEMORANDUM 3

**POPULATION CHARACTERISTICS AND NEED FOR
SERVICE**

March 11, 2013



JACOBS™



Technical Memorandum #3:

Population Characteristics and Need for Service

This technical memorandum examines the extent to which Colorado's current bus network meets public need for intercity and regional connections. Intercity demand is calculated separately from regional demand, although there is overlap in the markets served by intercity and regional bus services.

The analysis of demographic and economic characteristics of the population provides a foundation for both intercity and regional service demand. Areas of high relative need for transportation services are determined based on the density and percentage of potentially transit-dependent populations.

The memorandum then identifies places or facilities that are likely to be intercity bus destinations: educational institutions, major hospitals, correctional facilities, commercial airports, ski resorts, and military bases. By overlaying the existing bus network with origin areas of higher relative need and potential destination points, the analysis reveals key intercity connections and gaps.

The last section of this memorandum addresses the demand for regional transit services. It contains a general description of overall needs for regional services and a detailed examination of demand in the corridors where CDOT has proposed operating regional commuter bus services.

POPULATION PROFILE

The need for any type of transit service, including intercity and regional bus service, depends upon the size and distribution of an area's population and on the demographic and economic characteristics of that population. Using data from the 2010 Census and the 2007-2011 American Community Survey (ACS), the following potentially transit-dependent population segments of the Colorado population were selected:

1. Young Adults (persons 18 to 34): enlisted military personnel, college students, and other young adults often do not have access to an automobile. Research also suggests that individuals in this age range make up the bulk of intercity bus ridership.
2. Elderly (persons 65 and above): advancing age can mean diminished ability or desire to drive (particularly on a long trip) and a need for access to medical facilities on a regular basis.

3. Persons living below poverty: persons that typically lack the economic means to own or operate a vehicle, or a vehicle perceived as capable of a long trip.
4. Autoless households: persons without access to a car must rely on alternative transportation services.

These factors were chosen in part because of national and statewide data regarding intercity bus passenger characteristics.^{1, 2, 3} Passengers are most likely to be traveling for pleasure or personal business, have relatively low annual household incomes, and fall within the 18 to 35 age bracket. These characteristics are also supported by Greyhound's 2004 10K report to the Securities and Exchange Commission. The average customer travels to visit friends or relatives and has an annual income below \$35,000. These individuals may own automobiles that they think are reliable enough for a trip, but they travel by bus because the costs of a bus trip are lower than driving alone.

In addition, data from the American Community Survey is presented on mode of transportation to work for counties along the I-70 and I-25 corridors where regional services geared towards employees are either provided or being considered. This provides perspective on the numbers of employees presently using transit and other modes to access jobs.

This technical memorandum update differs from the previous 2008 study in that it increases the youth/young adult category from 18-24 to 18-34. The change reflects findings by Fischer and Schwieterman (2011) that almost three quarters of intercity passengers fall within the latter range. In addition, this update does not include those persons with a disability (age 16 and above) as a transit-dependent population segment. Due to Census reporting, the most current disability information at the block group level is from Census 2000. This information is both dated and incompatible with 2010 block group geographies.

It should be noted that the intercity bus analysis focuses mainly on the likely ridership for "traditional" intercity bus services, i.e. persons with higher transportation need characteristics. It does not fully address potential markets of "choice" riders—those who have a vehicle available, could drive or fly, and could choose to take transit or not for intercity trips. Quantifying potential demand from such markets is difficult,

¹ U.S. Department of Transportation. Bureau of Transportation Statistics. 2001 National Household Travel Survey, preliminary long-distance trip file.

² Fischer, Lauren and Joseph Schwieterman. *Who Rides Curbside Buses? A Passengers Survey of Discount Curbside Bus Services in Six Eastern and Midwestern Cities*. DePaul University. August 2011.

http://las.depaul.edu/chaddick/docs/2011-2012_Reports/Who_Rides_Curbside_Buses_-_A_Passenger_.pdf

³ Sperry, Benjamin and Curtis Morgan. *Analysis of the 2011 Michigan DOT Intercity Rail and Bus Passenger Surveys*. Texas Transportation Institute. March 2012.

http://www.michigan.gov/documents/mdot/MDOT_2011_Analysis_Intercity_Rail_Bus_Surveys_407633_7.pdf

and must be supplemented with qualitative knowledge collected through stakeholder outreach.

INTERCITY BUS DEMAND

Methodology

The purpose of this task is to compare the locations served by the current network with the locations in Colorado that have concentrations of persons more likely to need public transportation. The first step involved extracting block group level ACS and Census 2010 data for the overall population and for each of the four needs categories (young adults, older adults, persons living below poverty, and autoless households). For each category, block groups were ranked relative to the rest of the block groups in the state. Such rankings were performed twice, once based on the density of the population within each category, and a second time based on the percentage of the population in that category. Individual variable rankings were then summed by block group, resulting in two rankings that represent relative transportation need based on:

1. The density of potentially transit-dependent persons, and
2. The percentage of potentially transit-dependent persons.

While fixed-route transit service is often prioritized for areas that contain block groups with higher densities of potentially transit-dependent persons (ranking 1), it is also important to look at the percentage of the population with transit-dependent characteristics (ranking 2). Substantial percentages of transit-dependent populations indicate a high proportion of people who may need transit, though spread out over large areas.

The rankings for density and percentage of transit-dependent persons were mapped by natural breaks (with some manual adjustment), representing ranges of low, moderate, and high relative need. To depict the density of transit-dependent persons, the urbanized areas of Denver and Colorado Springs were not highlighted. These metro areas generally already have significant intercity bus service, and may mask other places of potential need. Overall population density was also mapped to compare with the ranked density of transit-dependent persons. For the most part, the general population density map confirms that the towns with high ranked densities of transit-dependent persons also have relatively high overall densities.

Results

It is important to recognize that this methodology produces relative rankings that may not translate directly into demand (ridership). The map of transit need by ranked density of transit-dependent persons is typically most useful in identifying locations with high concentrations of potential riders, indicating potential demand. The

map of transit need by ranked percentage is most useful in identifying areas with a high degree of need. However, rural areas with a high degree of need may not have the density of demand to support intercity bus service without subsidy, or even with subsidy. Such areas may be candidates for rural feeder services, particularly as part of local rural transit options. Examining these rankings independently and then comparing them to one another results in a better understanding of the relative potential need for transit services in each block group.

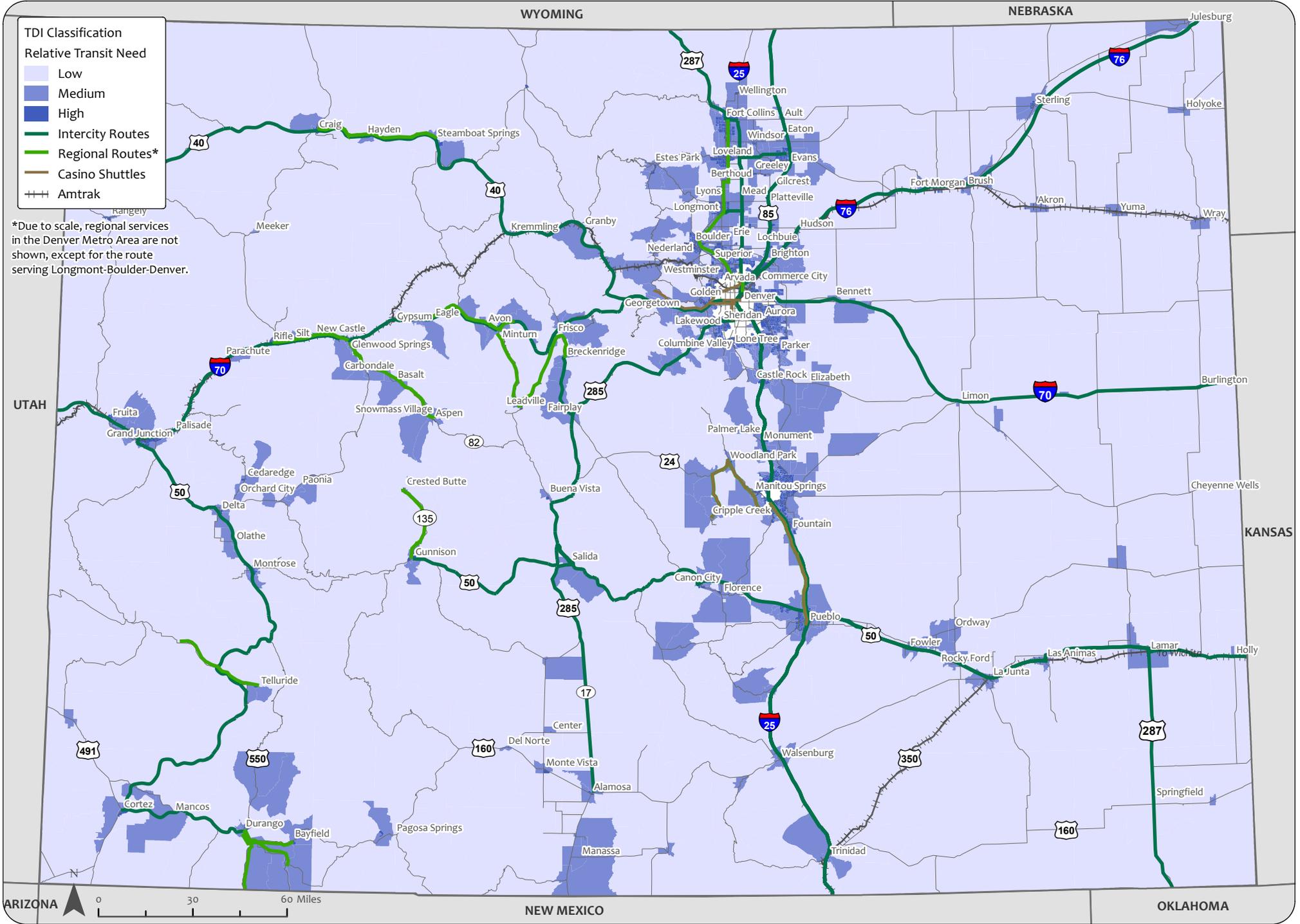
Density Ranking of Transit-Dependent Populations

Figure 3-1 displays relative levels of need for public transportation based on the density of transit-dependent populations, overlaid with the intercity and regional bus network. Similar to the 2008 results, the block groups with high relative need that are outside the major metro areas tend to occur along major highways. With some exceptions, the existing bus network currently serves almost all of these areas. The block groups with high to moderate relative need based on ranked density that are not currently served by intercity or regional bus include places like Hotchkiss, Meeker, and Ranglely to the west, Pagosa Springs and Manassa to the south, and Holyoke to the northeast. Akron, Yuma, and Wray are also pockets of need without bus service, but they are located along an Amtrak corridor.

Percentage Ranking of Transit-Dependent Populations

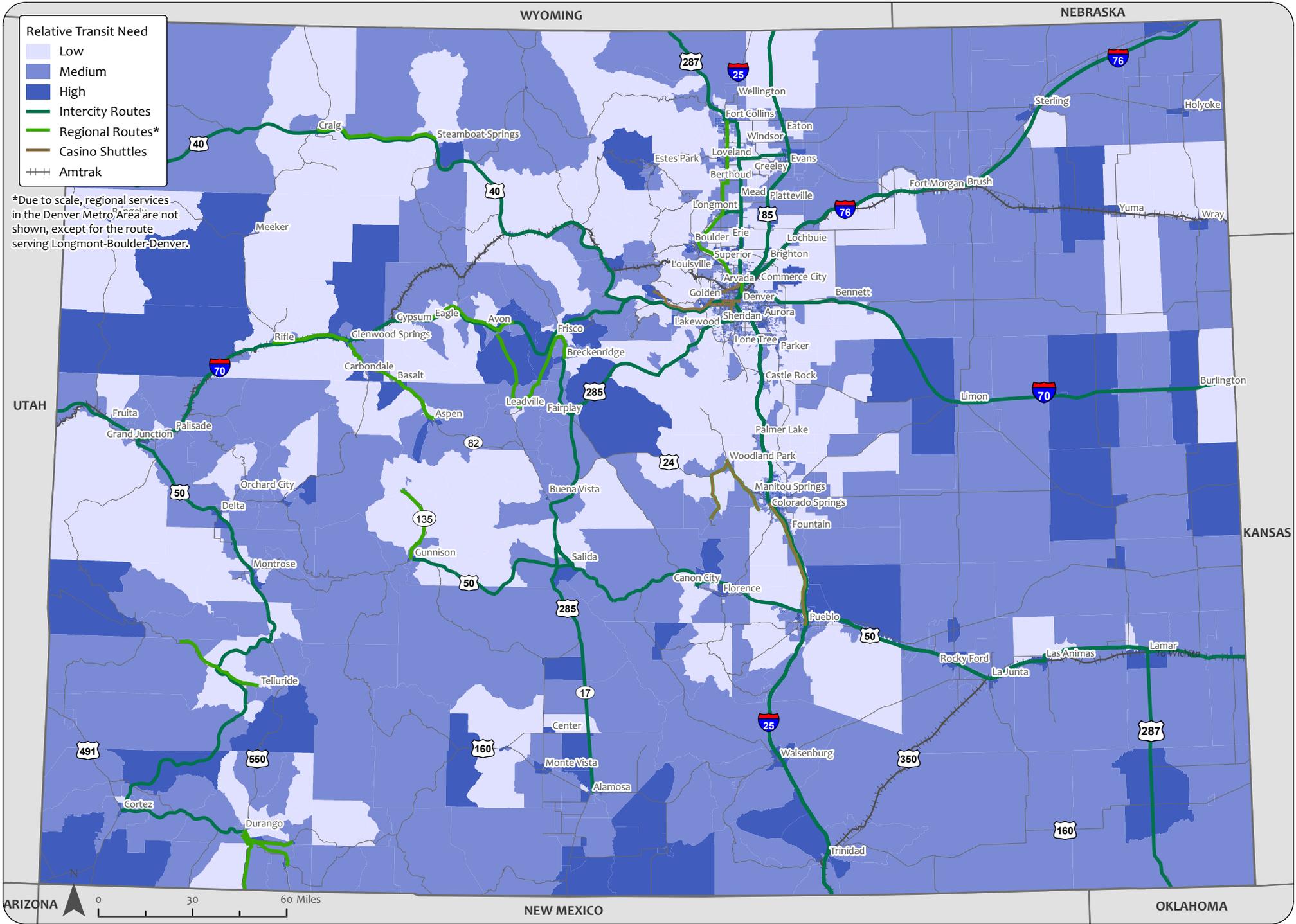
The next summary ranking is based on the percentage of potentially transit-dependent persons by block group. As with the density ranking, the variables were ranked separately and then summed to create an overall percentage ranking. Figure 3-2 shows the relative level of need among the block groups with the intercity and regional bus network superimposed. Block groups with a low percentage-based need are concentrated in the center and northwestern quadrant of the state. High need areas are scattered throughout the rural areas. Though this distribution is not radically different from the 2008 results, the high needs to the east of I-25 in particular are no longer as prominent.

Figure 3-1: Transit Dependence Ranked by Density



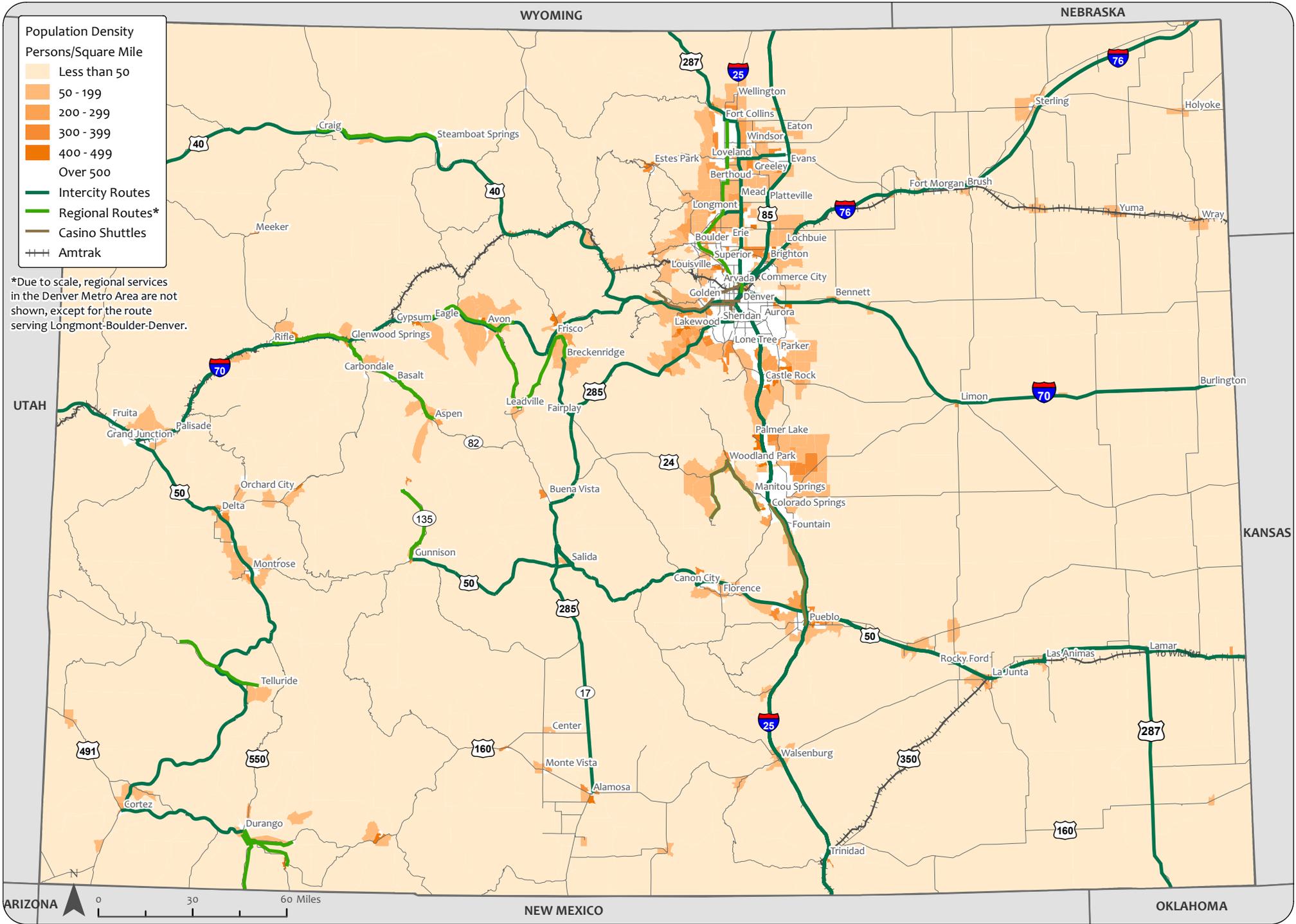
Data sources: ESRI Census 2010 base map files, ACS 2007-2011, Census 2010, and provider bus schedules as of Jan. 2013.

Figure 3-2: Transit Dependence Ranked by Percentage



Data sources: ESRI Census 2010 base map files, ACS 2007-2011, Census 2010, and provider bus schedules as of Jan. 2013.

Figure 3-3: 2010 Population Density



Data sources: ESRI Census 2010 base map files, ACS 2007-2011, Census 2010, and provider bus schedules as of Jan. 2013.

Historical Service Coverage

In addition to analyzing demographics and potential destinations, another way to determine possible network improvements is to review what cities and routes had service when ridership was higher and operating costs were lower. Places that formerly received service might be candidates for some type of reinstated service, either as an intercity route or some type of feeder or regional service.

Figure 3-5 depicts Colorado's intercity bus network as presented in the timetables of *Russell's Official National Motorcoach Guide* from the summer of 1980, two years prior to the passage of the Bus Regulatory Reform Act of 1982. Compared to the current network, the southern portion of the state in particular has lost service. For example, routes no longer run on US 550 south of Ridgway, on US 50 between Montrose and Gunnison, or on US 160 between Durango and Walsenburg. To the east, US 24 and 287/40 between Colorado Springs and the Kansas border also lost service.

Changes have also occurred since the 2008 study. Greyhound absorbed its previously independent subsidiary TNM&O; the restructuring resulted in a loss of service between Walsenburg south to New Mexico via Alamosa. Greyhound also discontinued its route from Grand Junction to Durango in September 2011. SUCAP plans to restore this service in May 2013, along a parallel route through Cortez. In addition, new service has been instated in the center of the state along US 50 and 285 by Black Hills Stage Lines. Greyhound also now serves the entire I-40 corridor from Denver west to Utah.

This comparison of service over time suggests some possibilities for the development of service options in areas that either have lost significant coverage or that are now bypassed by express service. However, further analysis of potential demand and appropriate service type/provider is needed before simply reinstating any now-defunct route segments.

Summary of Intercity Demand

This analysis has compared the current intercity bus network with locations that are potentially in need of service, based on population characteristics and potential destinations. It suggests that some cities and towns in the state that were served in 1980 no longer have service. In the more recent past, however, service has both been lost and gained. Much of the current network service appears to be responsive to identified need. Further investigation and additional input regarding the proposed plan for regional commuter service are necessary to fully evaluate intercity connectivity and possible service changes.

REGIONAL BUS DEMAND

Colorado has a variety of regional services, with many developing around resort economies. Generally, such services were originally designed to meet the needs of employees traveling to and from work. People traveling to ski resorts for recreation have been an important part of the ridership in many corridors. While these systems may have begun catering to just the primary work trip, as they develop they tend to serve as the primary mode of transportation for employees, many of whom do not own autos. Both the ECO and RFTA systems are good examples of this trend.

Information on existing services includes information on ridership levels for the existing regional services, providing a measure of demand in various corridors. Given the financing structure in Colorado, local areas have worked together to serve primary markets (generally employees) while leaving gaps between systems. The maps illustrate existing regional services and gaps between existing systems, including service on:

- US 34 from Greeley to Loveland
- US 34 from Loveland to Estes Park for seasonal access to Rocky Mountain National Park
- Regional human service transportation providing for grouped trips to major service centers with trips providing for arrival by 9 AM and departure at 3 PM. The need is for people to access medical services and conduct other business without an overnight stay. Areas that have been identified where such regular access is needed include the South I-25 corridor from Trinidad and Walsenburg (with connections from the San Luis Valley) to Colorado Springs and/or Denver; the I-70 corridor with access both east to Denver and west to Grand Junction, Grand and Jackson County access to Denver and to Fort Collins, and access to Grand Junction from points south.
- I-70 from Glenwood Springs to Gypsum and from Vail to Frisco

Each of the regional routes serves a somewhat different market, and as a result demand estimations for a particular corridor must consider the unique characteristics of the corridor and the travelers within the corridor. In addition, the quality of the service provided or proposed (frequency, span of service, cost, etc.) must be considered.

This section of the technical memorandum examines regional demand in two corridors where CDOT has proposed establishing regional commuter bus services: the I-25 and I-70 corridors.

Methodology

As employment transportation is a key reason for the development of regional services, it is useful to examine the proportion of workers who use transit for the commute trip. This provides a context for understanding the likelihood of residents to use transit for their commute trip and the degree to which existing services are meeting this need.

A several-step methodology was used to determine the demand for regional transit services in the north and south I-25 corridors. Full results are presented in Appendix B. These steps are:

1. Review historic ridership and service trends
2. Estimate mode share from journey-to-work data and consider qualitative and market factors in estimating mode share for proposed services.
3. Identify population and employment forecasts to determine how ridership might grow through 2040
4. Apply factors to estimate ridership for specific service plans

While some of the general information is applicable to the I-70 markets, demand for the I-70 corridor has not yet been developed. Based on the March 6, 2013 meeting of the I-70 Transit Advisory Group, the team plans to look at demand for employee, human service, and recreational travel markets.

Mode of Transportation to Work

The mode of transportation to work, as reported in the American Community Survey, is presented in Table 3-1. The destination counties of the Denver Metropolitan Area are listed first, followed by counties that would be served by the proposed I-25 regional commuter bus services, and then the counties in the I-70 corridor. Rows illustrate the mode of transportation for residents living in the county and for employees working in the county. In counties where a significant number of workers live elsewhere, this is an important distinction.

This data illustrates the completeness of the transit networks in various counties. Those counties where either 5% or more of riders use transit are highlighted. This occurs in Denver and Boulder counties in the metropolitan area; and in Gilpin, Summit, Eagle, and Pitkin counties in the I-70 corridor.

- In the Denver Metro Area, note that 4.4% of residents use transit for work trips, many of whom likely travel into Denver. However, only 2.5% of employees use transit, a reflection that it is more difficult to use transit to access jobs in Arapahoe County.

Table 3-1: Mode of Transportation to Work

			Total Workers	Drove alone	2-person Carpool	3-or-more-person Carpool	Public Transportation	Bike	Walked	Taxi, Motorcycle and Other	Worked at Home
Denver	Residents	Number	295,432	204,843	23,645	6,122	22,968	5,472	12,365	4,015	16,002
		Percent	100.0	69.3	8.0	2.1	7.8	1.9	4.2	1.4	5.4
	Workers	Number	451,562	325,369	36,869	8,655	41,003	5,616	12,359	5,689	16,002
		Percent	100.0	72.1	8.2	1.9	9.1	1.2	2.7	1.3	3.5
Adams	Residents	Number	204,553	155,965	21,099	5,614	8,735	736	3,065	2,453	6,886
		Percent	100.0	76.2	10.3	2.7	4.3	0.4	1.5	1.2	3.4
	Workers	Number	157,037	123,315	14,083	3,543	3,471	793	3,070	1,876	6,886
		Percent	100.0	78.5	9.0	2.3	2.2	0.5	2.0	1.2	4.4
Arapahoe	Residents	Number	281,253	219,450	20,739	4,935	12,336	1,255	4,897	2,999	14,642
		Percent	100.0	78.0	7.4	1.8	4.4	0.4	1.7	1.1	5.2
	Workers	Number	269,772	217,198	19,596	3,743	6,729	1,193	4,567	2,104	14,642
		Percent	100.0	80.5	7.3	1.4	2.5	0.4	1.7	0.8	5.4
Boulder	Residents	Number	150,237	99,407	10,557	2,647	8,022	6,183	6,703	1,862	14,856
		Percent	100.0	66.2	7.0	1.8	5.3	4.1	4.5	1.2	9.9
	Workers	Number	176,783	123,463	13,449	3,047	7,336	6,197	6,622	1,813	14,856
		Percent	100.0	69.8	7.6	1.7	4.1	3.5	3.7	1.0	8.4
El Paso	Residents	Number	293,332	226,775	22,225	6,019	3,766	1,146	13,572	3,344	16,485
		Percent	100.0	77.3	7.6	2.1	1.3	0.4	4.6	1.1	5.6
	Workers	Number	292,588	227,392	22,330	5,704	3,592	1,134	13,237	2,714	16,485
		Percent	100.0	77.7	7.6	1.9	1.2	0.4	4.5	0.9	5.6
Larimer	Residents	Number	148,674	112,454	11,267	3,011	1,157	5,583	3,639	1,892	9,671
		Percent	100.0	75.6	7.6	2.0	0.8	3.8	2.4	1.3	6.5
	Workers	Number	141,534	107,298	10,088	2,636	1,047	5,550	3,757	1,487	9,671
		Percent	100.0	75.8	7.1	1.9	0.7	3.9	2.7	1.1	6.8
Weld	Residents	Number	115,789	91,550	10,056	2,930	717	625	2,483	1,401	6,027

	Workers	Percent	100.0	79.1	8.7	2.5	0.6	0.5	2.1	1.2	5.2
		Number	91,856	70,473	8,171	2,529	529	620	2,439	1,068	6,027
		Percent	100.0	76.7	8.9	2.8	0.6	0.7	2.7	1.2	6.6
Gilpin	Residents	Number	3,053	2,194.0	352	6.0	125	11.0	40	17.0	308
		Percent	100	71.9	12	0.2	4	0.4	1	0.6	10
	Workers	Number	5,373	2,888	452	130	1,416	0	33	146	308
		Percent	100.0	53.8	8.4	2.4	26.4	0.0	0.6	2.7	5.7
Clear Creek	Residents	Number	5,217	3,897	426	41	69	78	223	97	386
		Percent	100.0	74.7	8.2	0.8	1.3	1.5	4.3	1.9	7.4
	Workers	Number	3,392	2,111	482	98	22	39	193	61	386
		Percent	100.0	62.2	14.2	2.9	0.6	1.1	5.7	1.8	11.4
Summit	Residents	Number	17,430	10,904	1,579	357	1,311	275	1,128	223	1,653
		Percent	100.0	62.6	9.1	2.0	7.5	1.6	6.5	1.3	9.5
	Workers	Number	19,172	12,283	1,747	535	1,433	255	1,148	118	1,653
		Percent	100.0	64.1	9.1	2.8	7.5	1.3	6.0	0.6	8.6
Eagle	Residents	Number	30,238	21,815	2,024	435	2,084	248	1,341	65	2,226
		Percent	100.0	72.1	6.7	1.4	6.9	0.8	4.4	0.2	7.4
	Workers	Number	30,271	21,739	2,368	801	1,454	228	1,376	79	2,226
		Percent	100.0	71.8	7.8	2.6	4.8	0.8	4.5	0.3	7.4
Garfield	Residents	Number	29,204	18,706	3,375	1,954	1,354	483	1,332	158	1,842
		Percent	100.0	64.1	11.6	6.7	4.6	1.7	4.6	0.5	6.3
	Workers	Number	27,945	18,902	2,889	1,570	756	477	1,332	177	1,842
		Percent	100.0	67.6	10.3	5.6	2.7	1.7	4.8	0.6	6.6
Pitkin	Residents	Number	10,238	5,290	622	269	1,114	288	1,330	195	1,130
		Percent	100.0	51.7	6.1	2.6	10.9	2.8	13.0	1.9	11.0
	Workers	Number	17,917	9,144	1,878	1,394	2,437	320	1,395	219	1,130
		Percent	100.0	51.0	10.5	7.8	13.6	1.8	7.8	1.2	6.3
Source/Note	US Census Bureau, ACS 2006-2008 3yr est., Special Tabs for CTPP										

- In Gilpin County over 26% of workers arrive by transit, riding the many casino shuttles that serve Black Hawk and Central City. Four percent of residents in the County use transit for their work trip.
- The strength of the transit networks in Summit, Eagle, and Pitkin counties are reflected in the high use of transit for commute trips. Parking costs in the Vail and Aspen area also is an important factor. Summit County has a 7.5% transit mode share; Eagle County has a 6.9% transit mode share among residents and 4.8% among workers; Pitkin County has a 10.9% transit mode share among residents and 13.6% transit mode share among workers. Note that in Pitkin and Garfield counties the carpool mode share is extraordinarily high as well.

The journey-to-work data also illustrates the propensity of residents to use transit. First, it shows that where there are good transit connections, people do use transit services. A 7% transit mode share is reasonable where the transit network is strong, providing effective connections between home and work. Second, it points out those counties where the propensity to use transit for the work trip is low. El Paso County had 1.3% of people reporting that they use transit for the work trip. While a low number, it was more than twice the 0.6% rate for Weld County. Larimer County, at 0.8% of residents using transit for their work trip. While not reflective of what people who travel long distances may choose to do, it still provides information on the relative propensity to use transit in various counties.

Historic Ridership and Service Levels

Table 3-2 illustrates FREX service characteristics between 2005 and 2012. Service was cut by one-third in 2010, and the Castle Rock stop was eliminated. Fares were steadily increased in 2007, 2008, and 2009.

This table shows that the FREX service carried between 300 and nearly 700 one-way passenger trips per day, showing the level of demand that exists. The highest ridership was when gas first went over \$4.00 per gallon in 2008. The lowest ridership was in 2010 after service was reduced and after the future of the service was threatened; it appears many riders found other means of traveling. Ridership did climb again to nearly 400 a day in 2011 and 2012.

The ridership appears to be directly related to the level of services operated. When service was reduced to 26 trips per day, riders did not condense onto the remaining available trips. Rather, boardings per trip remained in the same range as previously. This indicates the importance of having a broad schedule so people have flexible travel time.

Table 3-2: Historical FREX Service Characteristics

	2005	2006	2007	2008	2009	2010	2011	2012
								<i>8 months</i>
Revenue Hrs.	23,607	24,614	23,056	24,920	24,819	16,280	16,100	10,773
One-way trips per day	42	42	42	42	42	26	32	32
Boardings	118,387	154,861	136,765	175,935	141,316	79,444	101,282	66,685
Boardings/ Hour	5.0	6.3	5.9	7.1	5.7	4.9	6.3	6.2
Boardings / Trip	10.9	14.2	12.6	16.2	13.0	11.8	15.0	10.7
1-way daily passenger trips	457	598	528	679	546	307	391	397

Source: 2011 FREX Business Plan, detailed ridership records

Transit planners use the concept of “elasticity” to describe how ridership changes when there are service changes or fare changes. This tool provides a way to quantify the percentage change in ridership for every percentage change in service. In an ideal situation, one would be able to see a clear relationship between a change in service or fares and the change in ridership. This occurs when there is a fare increase but no changes in service or if headways are changed (such as from 60 to 30 minutes) with no other changes.

In the real world, many things happen together so the challenge becomes how to measure the impact of changes and tease out meaningful data. Often, gross measures are used. An example is comparing total revenue miles or overall frequency changes to ridership changes. In the case of FREX there were many influences each year between 2008 and 2011. Ridership peaked in 2008 when gas prices were high and before the recession hit. By 2010, there were substantial service cuts. At the same time, ridership grew with the perception that service was stable or dropped with the perception that it was not stable.

The historical data was examined to see if patterns would emerge that had both internal consistency and consistency with national patterns. The analysis showed that it is important to look at a finer level – for example not just the difference in total trips operated but the difference in peak hour peak direction trips. It also showed that it is important to look at longer periods than one year, to allow changes to settle in.

The proposed I-25 regional commuter bus service is substantially less than that operated by FREX, even on the reduced schedule of 16 round trips (32 one-way trips).

There are two important differences:

The buses are proposed to remain in Denver, so the peak hour trips will operate in the peak direction. FREX return trips served some reverse commute travel but in the peak hours did not carry many riders.

1. Each bus will have 20% more capacity.

To understand how this will impact ridership, a detailed look was taken at ridership by trip, by direction and on the number of trips in the peak direction and peak hour, during mid-day, and early and late trips. Table 3-3 shows how the overall level of service changed by time of day.

Table 3-3: Changes in FREX Service Levels

Time of Day	2008-2009	2010	2011 - 2012	Proposed
Peak hour, peak direction trips	8 NB; 8 SB	6 NB; 6 SB	6 NB; 6 SB	4 NB; 4 SB
Mid-day trips	5+ NB; 4 SB	3 NB; 4 SB	4 NB; 4 SB	1 NB; 1 SB
Early & late trips	2 NB AM; 3 SB PM	1 NB AM; 0 SB PM	2 NB AM; 0 SB PM	0
TOTAL	30	20	22	10
% Change by Period	---	-33%	+10%	-55%
% Change 2009-2011	---	---	-27%	---

Comparing the information on the level of service reductions from Table 3-3 to the change in ridership in Table 3-2, one sees that the reduction in ridership from 2009 (141,316) to 2011 (101,282) was 28%. 2009 was chosen because the impact of the gas prices was not as apparent and the employment market is closer to that in 2011. 2011 was chosen because the ridership had a chance to settle in after the reductions that occurred in 2010 and it was a full year of service. A one percent reduction in ridership for each one percent reduction in service is in the expected range.

The proposed service is still a 55% reduction from services provided in 2011 with a shorter span of service, fewer trips in the peak periods, and significantly less service in the mid-day. These reductions in service quality will affect ridership; the assumption is that the impact will be similar to previous service reductions. Partially offsetting this is that fact that the buses will have more capacity, with 50 seats rather than 40, a 20% increase. Capacity was a constant issue for FREX. Although the average trip load, over

The course of the month shows there is available capacity, the reality is that ridership varied significantly throughout the week. On a Wednesday there might be people who could not get a seat while on a Friday there would be empty seats. When people could not regularly obtain a seat they looked for other options for travel.

Mode Share for Regional Service in the I-25 Corridor

Journey-to-Work data was used to identify the overall market for regional trips. The data is limited to county-level analysis, but provides a sense of the overall market share between the major markets. Complete data can be found in Appendix B.

Comparing the ridership between markets to the size of the employment markets, the mode share can be identified. The experience from FREX indicates that 1% to 5% of commuters between El Paso County and Metro Denver counties used the FREX service at its service peak in 2008, as illustrated in Table 3-4. Meanwhile, commuters between Castle Rock and Colorado Springs and Castle Rock and Metro Denver accounted for 9% and 28% of FREX passengers, respectively.

Table 3-4: Transit Mode Share by Market for FREX Services

Commute O-D (A - B)	Total Number of Commuters (A to B)	Total Number of Commuters (B to A)	FREX 2008 Boarding O-D Data (boardings divided by 2)	Mode Share
El Paso - Denver	2,805	725	162	5%
El Paso - Arapahoe	2,170	1,060	62	2%
El Paso - Douglas	1,190	2,215	33	1%
Source/Note	US Census Bureau, ACS 2006-2008 3yr est.; FREX Ridership Data			

In determining the potential ridership in proposed corridors, the above mode shares provide an important guide to what might be expected. Other qualitative factors must also be considered, including:

- Propensity of residents to use transit for the commute trip
- Location of employment (central core vs. dispersed locations)
- Availability of car and van pools

One surprising finding from Table 3-1: Mode of Transportation to Work is that despite the strong van pool program in the North Front Range, the percentage of people who carpool is similar for Larimer and El Paso counties; Weld County is slightly higher than the other two. Currently the Van Go program has 18 vanpools that operate in the North

I-25 corridor and have a destination of downtown Denver. At an average occupancy of 6 per van, this represents 108 individuals⁴. If service was in place, a portion of these may have chosen fixed route transit instead of a vanpool. It is important to note that once people are in a vanpool, few leave to use fixed route transit.

Based on the service levels provided by FREX, the riders served, and the other factors as listed above, the mode shares for various markets in the north and south I-25 corridors are listed below. In the next step, each will be adjusted based on proposed service quality (frequency, span of service, travel time), markets served, and fares.

Table 3-5: Estimated Transit Mode Share for Proposed Regional Service

Commute O-D (A - B)	Total Number of Commuters (A to B)	Total Number of Commuters (B to A)	Mode Share for Proposed Regional Services
El Paso - Denver	2,805	725	5%
El Paso - Arapahoe	2,170	1,060	2%
El Paso - Douglas	1,190	2,215	1%
Pueblo - El Paso	3,600	1,590	1%
Larimer - Denver	1,950	410	3%
Larimer - Adams	1,105	870	1%
Weld - Denver	6,485	680	1%
Weld - Adams	7,170	3,675	1%
Source/Note	US Census Bureau, ACS 2006-2008 3-year estimate; Consultant team estimates		

Application of Factors to Proposed I-25 Corridor Services

While Table 3-5 shows the transit mode share expected if service quality and fares were the same as provided by FREX in 2008, the experience with FREX shows that ridership will decline as service is reduced. For this exercise, assume fares remain unchanged. The proposed service for South I-25 is estimated at 55% lower than the 2010-2011 schedule. The proposed service for North I-25 is estimated at 64% less than the same schedule. There is, however, a 20% increase in capacity per trip.

⁴ Looking at Larimer County to Denver workflows, a 5% capture rate would be 98 employees; for Weld County to Denver work flows, a 5% capture rate would be 324 employees. Only a portion of them are in the path of travel served by van pools, but this suggests that this corridor is one with more people in 3-person carpools than the Journey-to-Work average data suggests.

This suggests that ridership for the South I-25 route might range between a low that is a rate 55% below what occurred for FREX in 2011 and a rate that is 20% higher, reflecting the additional capacity. Adjusting for other factors such as gas prices increasing again, or reductions in disposable income due to the recession, a high estimate that is another 15-20% higher can be considered. In the North I-25 corridor, the similar range would be calculated at a rate that is 64%, 44%, and 24% below the FREX 2011 ridership rates.

Table 3-6 projects ridership for proposed north and south I-25 services using the low, medium, and high ridership levels described above. Projections for this same service level, carried out to 2040, can be found in Appendix B. To the extent that service levels or fares change, the projections would also need to be adjusted.

Table 3-6: Projected Ridership for Proposed Regional Services

	Daily One-way Rides	
South I-25 Service	2010 Baseline	2015 Projection
Low	165	178
Medium	239	257
High	312	336
North I-25 Service	2010 Baseline	2015 Projection
Low	89	95
Medium	138	148
High	187	201

Summary of Regional Demand

The demand for regional services on the I-25 corridor is well documented, and the projected ridership levels are constrained by the proposed service quality. The provision of more trips operating over a greater span of service would result in higher ridership. It is important to give consideration to the balance between expenses, fare revenues, and ridership. It will also be important to develop plans to address demands that are greater than the service can carry.

As the I-70 Analysis progresses, additional detail will be developed on demand in that corridor to address employee, recreational, and human service markets.

It will be important, as alternatives are developed, to consider demand for commuter services in the I-25 and I-70 corridors within the broader context of both how

Colorado finances transit services and the need for human service transportation for access to services only available in urban areas. What are the roles and responsibilities of State and local entities in providing such services? What is the role of each in coordinating both services and fund sources to provide for a comprehensive and connected network that meets the needs of a wide range of passengers?

APPENDIX A

Colorado Intercity and Regional Bus Network, Potential Destinations

Destination Type	Name	Location
Military Facility	Buckley AFB	Aurora
Military Facility	Fort Carson	Colorado Springs
Military Facility	Peterson AFB	Colorado Springs
Military Facility	United States Air Force Academy	Colorado Springs
Military Facility	Schriever AFB	Colorado Springs
Ski Resort	Arapahoe Basin	Keystone
Ski Resort	Aspen Highlands	Aspen
Ski Resort	Aspen Mountain	Aspen
Ski Resort	Beaver Creek	Avon
Ski Resort	Breckenridge	Breckenridge
Ski Resort	Buttermilk	Aspen
Ski Resort	Copper Mountain	Copper Mountain
Ski Resort	Crested Butte	Crested Butte
Ski Resort	Durango Mountain Resort	Durango
Ski Resort	Eldora	Nederland
Ski Resort	Keystone	Keystone
Ski Resort	Loveland	Georgetown
Ski Resort	Monarch	Monarch
Ski Resort	Powderhorn	Mesa
Ski Resort	Ski Cooper	Leadville
Ski Resort	Ski Sunlight	Glenwood Springs
Ski Resort	Snowmass	Aspen
Ski Resort	Steamboat Ski Area	Steamboat Springs
Ski Resort	Telluride	Telluride
Ski Resort	Vail	Vail
Ski Resort	Winter Park	Winter Park

Ski Resort	Wolf Creek	Pagosa Springs
Commercial Airport	Aspen - Pitkin Co (ASE)	Aspen
Commercial Airport	City Of Colorado Springs Municipal (COS)	Colorado Springs
Commercial Airport	Cortez - Montezuma County (CEZ)	Cortez
Commercial Airport	Denver International (DEN)	Denver
Commercial Airport	Durango - La Plata County (DRO)	Durango
Commercial Airport	Eagle County Regional (EGE)	Eagle
Commercial Airport	Fort Collins - Loveland Municipal (FNL)	Fort Collins
Commercial Airport	Gunnison County (GUC)	Gunnison
Commercial Airport	Montrose Regional (MTJ)	Montrose
Commercial Airport	Pueblo Memorial (PUB)	Pueblo
Commercial Airport	San Luis Valley Regional (ALS)	Alamosa
Commercial Airport	Telluride Regional (TEX)	Telluride
Commercial Airport	Walker Field (GJT)	Grand Junction
Commercial Airport	Yampa Valley (HDN)	Hayden
Correctional Facility	Arrowhead Correctional Center	Canon City
Correctional Facility	Arkansas Valley Correctional Facility	Crowley
Correctional Facility	Buena Vista Correctional Complex	Buena Vista
Correctional Facility	Colorado Correctional Center (Camp George W.)	Golden
Correctional Facility	Centennial Correctional Facility	Canon City
Correctional Facility	Colorado State Penitentiary	Canon City
Correctional Facility	Colorado Territorial Correctional Facility	Canon City
Correctional Facility	Delta Correctional Center	Delta
Correctional Facility	Denver Reception & Diagnostic Center	Denver
Correctional Facility	Denver Women's Correctional Facility	Denver
Correctional Facility	Freemont Correctional Facility	Canon City
Correctional Facility	Four Mile Correctional Center	Canon City
Correctional Facility	Limon Correctional Facility	Limon
Correctional Facility	La Vista Correctional Facility	Pueblo
Correctional Facility	Rifle Correctional Center	Rifle
Correctional Facility	Skyline Correctional Center	Canon City
Correctional Facility	San Carlos Correctional Facility	Pueblo
Correctional Facility	Sterling Correctional Facility	Sterling

Correctional Facility	Trinidad Correctional Facility	Model
Correctional Facility	Youthful Offender System	Pueblo
Correctional Facility	Bent County Correctional Facility	Las Animas
Correctional Facility	Crowley County Correctional Facility	Olney Springs
Correctional Facility	Cheyenne Mountain Re-entry Center	Colorado Springs
Correctional Facility	Kit Carson Correctional Center	Burlington
College/University	Adams State College	Alamosa
College/University	Arapahoe Community College	Littleton
College/University	Belleview Christian College	Westminster
College/University	Blair College	Colorado Springs
College/University	Colorado Christian University	Lakewood
College/University	Colorado College	Colorado Springs
College/University	Colorado Heights University	Denver
College/University	Colorado Mountain College	11 campuses
College/University	Colorado School of Mines	Golden
College/University	Colorado State University	Fort Collins
College/University	Colorado State University- Pueblo	Pueblo
College/University	Community College of Aurora	Aurora
College/University	Fort Lewis College	Durango
College/University	Front Range Community College	Brighton
College/University	Front Range Community College	Fort Collins
College/University	Front Range Community College	Longmont
College/University	Front Range Community College	Westminster
College/University	George Y. Clayton Charter College	Denver
College/University	Martin Luther King Jr. Early College	Denver
College/University	Mesa College	Grand Junction
College/University	Naropa University	Boulder
College/University	Nazarine Bible College	Colorado Springs
College/University	Otero Junior College	La Junta
College/University	Pikes Peak Community College	Colorado Springs
College/University	Pueblo Junior College	Pueblo
College/University	Red Rocks Community College	Lakewood
College/University	Red Rocks Community College - Arvada	Arvada

College/University	Regis University	Denver
College/University	Regis University-Broomfield	Broomfield
College/University	Regis University - Colorado Springs	Colorado Springs
College/University	Southwest Early College	Denver
College/University	Sterling Junior College	Sterling
College/University	Trinidad State Junior College	Trinidad
College/University	United States Air Force Academy	Colorado Springs
College/University	University of Colorado - Colorado Springs	Colorado Springs
College/University	University of Colorado - Boulder	Boulder
College/University	University of Denver	Denver
College/University	University of Denver - Park Hill	Denver
College/University	University of Northern Colorado	Greeley
College/University	Western State College	Gunnison
Hospital/Medical Center	Arkansas Valley Regional Medical Center	La Junta
Hospital/Medical Center	Aurora Presbyterian Hospital	Aurora
Hospital/Medical Center	Aurora Regional Medical Center	Aurora
Hospital/Medical Center	Aurora Surgery Center	Aurora
Hospital/Medical Center	Avista Adventist Hospital	Louisville
Hospital/Medical Center	Beth Israel Hospital	Denver
Hospital/Medical Center	Boulder Community Hospital	Boulder
Hospital/Medical Center	Boulder Medical Center Hospital	Boulder
Hospital/Medical Center	Cedar Springs Hospital	Colorado Springs
Hospital/Medical Center	Centennial Peaks Hospital	Louisville
Hospital/Medical Center	Children's Hospital	Aurora
Hospital/Medical Center	Children's Hospital-Broomfield	Broomfield
Hospital/Medical Center	Children's Hospital-Westminster	Westminster
Hospital/Medical Center	Colorado Acute Hospital	Denver
Hospital/Medical Center	Colorado Mental Health Institute-Fort Logan	Denver
Hospital/Medical Center	Colorado Psychiatric Hospital	Denver
Hospital/Medical Center	Colorado State Veterans Center at Homelake	Monte Vista
Hospital/Medical Center	Colorow Care Center	Olathe
Hospital/Medical Center	Community Medical Center	Lafayette
Hospital/Medical Center	Conejos County Hospital	La Jara

Hospital/Medical Center	Craig Hospital	Englewood
Hospital/Medical Center	Denver Health Medical Center	Denver
Hospital/Medical Center	Denver West Surgery Center	Lakewood
Hospital/Medical Center	Dolores Medical Center	Dolores
Hospital/Medical Center	Durango Medical Center	Durango
Hospital/Medical Center	Eben-Ezer Hospital	Brush
Hospital/Medical Center	Evans Hospital (Fort Carson)	Colorado Springs
Hospital/Medical Center	Four Corners Healthcare Center	Durango
Hospital/Medical Center	Good Samaritan Medical Center	Lafayette
Hospital/Medical Center	Gunbarrel Medical Center	Boulder
Hospital/Medical Center	Gunnison Valley Hospital	Gunnison
Hospital/Medical Center	Jefferson County Health Department	Lakewood
Hospital/Medical Center	Kindred Hospital-Denver	Denver
Hospital/Medical Center	Kit Carson Memorial Hospital	Burlington
Hospital/Medical Center	Kremmling Memorial Hospital	Kremmling
Hospital/Medical Center	Littleton Adventist Hospital	Littleton
Hospital/Medical Center	Longmont Medical Campus	Longmont
Hospital/Medical Center	Longmont United Hospital	Longmont
Hospital/Medical Center	Lutheran Medical Center	Wheat Ridge
Hospital/Medical Center	McKee Medical Center	Loveland
Hospital/Medical Center	Medical Center of Aurora-Centennial Plaza	Centennial
Hospital/Medical Center	Medical Center of Aurora-North & South Campus	Aurora
Hospital/Medical Center	Memorial Hospital	Craig
Hospital/Medical Center	Mercy Medical Center	Denver
Hospital/Medical Center	Mercy Medical Center	Durango
Hospital/Medical Center	Montrose Memorial Hospital	Montrose
Hospital/Medical Center	Mount San Rafael Hospital	Trinidad
Hospital/Medical Center	National Jewish Medical and Research Center	Denver
Hospital/Medical Center	North Colorado Medical Center	Greeley
Hospital/Medical Center	North Suburban Medical Center	Thornton
Hospital/Medical Center	Parker Adventist Hospital	Parker
Hospital/Medical Center	Parkview Hospital	Pueblo

Hospital/Medical Center	People's Clinic	Boulder
Hospital/Medical Center	Pioneer Health Care Center	Rocky Ford
Hospital/Medical Center	Platte Valley Medical Center	Brighton
Hospital/Medical Center	Porter Adventist Hospital	Denver
Hospital/Medical Center	Presbyterian / Saint Luke's Medical Center	Denver
Hospital/Medical Center	Riverside Medical Building	Durango
Hospital/Medical Center	Rose Medical Center	Denver
Hospital/Medical Center	Saguache County Health Clinic	Saguache
Hospital/Medical Center	San Luis Valley Regional Medical Center	Alamosa
Hospital/Medical Center	Sky Ridge Medical Center	Lonetree
Hospital/Medical Center	Southwest Memorial Hospital	Cortez
Hospital/Medical Center	Spalding Rehabilitation Hospital	Aurora
Hospital/Medical Center	St. Anthony Hospital	Lakewood
Hospital/Medical Center	St. Francis Hospital	Colorado Springs
Hospital/Medical Center	St. Joseph Hospital	Denver
Hospital/Medical Center	St. Mary Corwin Hospital	Pueblo
Hospital/Medical Center	St. Mary's Hospital	Grand Junction
Hospital/Medical Center	Swedish Medical Center	Englewood
Hospital/Medical Center	Teller County Hospital	Cripple Creek
Hospital/Medical Center	Telluride Medical Center	Telluride
Hospital/Medical Center	University of Colorado Health Services Center	Englewood
Hospital/Medical Center	University Of Colorado Hospital	Aurora
Hospital/Medical Center	Valley View Hospital	Glenwood Springs
Hospital/Medical Center	Veterans Affairs Eastern CO Health Care System	Denver
Hospital/Medical Center	Vibra Hospital	Thornton

Hospital/Medical Center

Wellington E. Webb Center For Primary Care

Glenwood Springs

**APPENDIX B
Regional Bus Ridership Forecasting Methodology for South I-25 Cored**

Step 1 - Existing and Historic Ridership and Service Trends

Observation: FREX ridership decreased by more than half when the agency sold nearly half of its buses and decreased service substantially in 2009/2010. An analysis of ridership losses in relationship to service reductions suggest about a 1% loss in ridership for each 1% loss in peak direction, peak hour, and mid-day trips.

Year	FREX Trips per Day (total both directions)	Riders	Riders per Trip
2008	42	680	16
2010	26	300	12
2011-2012	32	400	2011 = 15 2012 = 12
Source/Note	Existing FREX Operation, Service Change Recommendations, Market Analysis of Lincoln Avenue and Fort Carson Stops, 2009; FREX 2010 Data Collection, Comprehensive Operations Analysis, and Performance Audit, 2010		

Step 2 – Journey-to- Work Data

Observation: County-to-county commuter flows provide an indication of potential markets

WORKPLACE	Arapahoe County, Colorado	Denver County, Colorado	Douglas County, Colorado	El Paso County, Colorado	Pueblo County, Colorado
RESIDENCE	↕↔	↕↔	↕↔	↕↔	↕↔
Arapahoe County, Colorado	137,230	88,700	18,580	1,060	75
Denver County, Colorado	42,925	182,245	7,605	725	65
Douglas County, Colorado	39,575	25,760	59,470	2,215	15
El Paso County, Colorado	2,170	2,805	1,190	277,880	1,590
Pueblo County, Colorado	120	380	120	3,600	58,950
Source/Note	US Census Bureau, ACS 2006–2008 3yr est., Special Tabs for CTPP				

Step 3 – Qualitative Observations

Observation: Factors such as employment density near transit stops and transit connectivity are more difficult to quantify but have an impact on the viability of regional transit service.

Downtown Denver is an attractive transit commuter destination because of its dense employment districts and good transit connectivity.
Colorado Springs has potential as a transit commuter destination because its relatively high employment density and transit connectivity in certain corridors. Primary access to regional services will be at park-and-ride lots.
The Denver Tech Center, much of which is in Arapahoe County, is a relatively attractive transit commuter destination because of its relatively high employment density and connectivity to the Denver light rail system. Arapahoe County workers use transit at a much lower rate than Denver County workers.
Pueblo is a smaller city with less density and transit service.
Castle Rock and Monument are not attractive destinations for regional transit commuting due their lack of density and transit connectivity. Primary access to regional services will be at park-and-ride lots.

	I-25 north of Monument	Total
Traffic Volumes on major highway corridors	59,000	59,000

Step 4 - Modal Share: Relations to Ridership

Observation: The experience from FREX indicates that 1% to 5% of commuters between El Paso County and Metro Denver counties used the FREX service at its service peak in 2008. Meanwhile, commuters between Castle Rock and Colorado Springs and Castle Rock and Metro Denver accounted for 9% and 28 % of FREX passengers, respectively.

Commute O-D (A - B)	Total Number of Commuters (A to B)	Total Number of Commuters (B to A)	FREX 2008 Boarding O-D Data (boardings divided by 2)	Mode Share
El Paso - Denver	2,805	725	162	5%
El Paso - Arapahoe	2,170	1,060	62	2%
El Paso - Douglas	1,190	2,215	33	1%
Pueblo - El Paso	3,600	1,590	-	-
Pueblo - Denver	380	65	-	-
Source/Note				

Step 5 - Population and Employment Forecasts

Observation: Overall population growth in these front range counties by 2040 is forecast to be between 34 and 68 percent. Overall employment growth is forecast to be 52 percent in the Denver Metro Area, and 74 percent in El Paso County.

Population Forecasts	July, 2000	July, 2005	July, 2010	July, 2015	July, 2020
Arapahoe	490,722	528,214	574,819	620,974	667,037
Denver	556,738	559,459	604,879	650,792	688,053
Douglas	180,510	244,442	287,124	314,619	351,832
El Paso	519,802	569,322	627,232	676,597	731,156
Pueblo	141,854	149,969	159,496	168,610	183,142
Employment Forecasts	July, 2000	July, 2005	July, 2010	July, 2015	July, 2020
Metro Denver	1,607,446	1,627,605	1,648,512	1,762,600	1,934,895
El Paso County	309,776	324,006	323,103	356,078	394,829
Pueblo County	65,128	66,419	68,466	73,379	78,585
Population Forecasts	July, 2025	July, 2030	July, 2035	July, 2040	2010-2040 Growth %
Arapahoe	715,869	762,228	805,459	843,400	47%
Denver	718,402	746,166	773,898	808,921	34%
Douglas	391,576	425,118	454,908	482,604	68%
El Paso	790,805	852,624	913,053	972,887	55%
Pueblo	198,497	213,656	226,321	235,020	47%
Employment Forecasts	July, 2025	July, 2030	July, 2035	July, 2040	2010-2040 Growth %
Metro Denver	2,088,703	2,232,884	2,371,882	2,503,784	52%
El Paso County	437,921	481,865	523,654	562,834	74%
Pueblo County	83,877	88,801	93,591	98,336	44%

Source/Note Colorado State Demographer's Office

Step 6 - Application

Assumptions

- 1) Which markets are being served?
 - a) Estimate transit mode share by assessing destination employment density, trip length, transit connectivity.
 - b) Multiply commuter flow rates by estimate of transit mode share.

- 2) What service levels are being provided?

	2008	2010	2011-2012	
2014				
a) Peak Hour, Peak direction trips	8 NB; 8 SB	6 NB; 6 SB	6 NB, 6 SB	4 NB;
				4 SB
b) Mid-day trips	5 + NB; 4 SB	3 NB; 4 SB	4 NB; 4 SB	1 NB; 1 SB
c) Early & late trips	2 NB AM; 3 SB PM	1 NB AM; 0 SB PM	2 NB AM; 0 SB PM	

- 3) Forecast future ridership by applying growth factors on population forecasts.

1) Potential Markets	2010	2015	2020	2025	2030	2035	2040
El Paso County to Denver							
a. Transit mode share	5%	5%	5%	5%	5%	5%	5%
b. Commuter Flow	2,805	3,022	3,231	3,436	3,682	3,920	4,148
c. Multiply	140	151	162	172	184	196	207
El Paso to Arapahoe							
a. Transit mode share	2%	2%	2%	2%	2%	2%	2%
b. Commuter Flow	2,170	2,326	2,542	2,703	2,864	3,022	3,192
c. Multiply	43	47	51	54	57	60	64

El Paso to Douglas

a. Transit mode share	1%	1%	1%	1%	1%	1%	1%
b. Commuter Flow	1,190	1,275	1,394	1,482	1,589	1,691	1,790
c. Multiply	12	13	14	15	16	17	18

Pueblo to El Paso

a. Transit mode share	1%	1%	1%	1%	1%	1%	1%
b. Commuter Flow	3,600	3,914	4,311	4,747	5,188	5,595	5,952
c. Multiply	36	39	43	47	52	56	60

The above calculations assume that the same service level provided in 2008 by FREX would be provided; lower levels of service result in lower ridership. Below, calculations are based on lower proposed levels of service. The range is based on historical traveler's response to FREX service changes, time of trips, and capacity.

2) Service Levels	2010	2015	2020	2025	2030	2035	2040
Alternative 1 – Provide 10 peak hour peak direction trips per day from Colorado Springs to Downtown Denver (5 NB in AM, 5 SB in PM)							
Daily 2-way Ridership –Low	165	178	191	203	217	231	244
Daily 2-way Ridership –Med	239	257	276	294	314	333	353
Daily 2-way Ridership –High	312	336	361	384	410	436	461

Appendix C Regional Bus Ridership Forecasting Methodology for North I-25 Corridor

Step 1 - Existing and Historic Ridership and Service Trends

Observation: There is no existing regional commuter service. Estimations will be needed based on commuter flows. Information from FREX can serve as a starting point.

Step 2 - Journey-to- Work Data

Observation: County-to-county commuter flows provide an indication of potential markets

WORKPLACE	Adams County, Colorado	Arapahoe County, Colorado	Boulder County, Colorado	Broomfield County, Colorado	Denver County, Colorado	Larimer County, Colorado	Weld County, Colorado
RESIDENCE	↕↔	↕↔	↕↔	↕↔	↕↔	↕↔	↕↔
Adams County, Colorado	83,060	15,460	12,285	7,415	55,730	870	3,675
Arapahoe County, Colorado	16,385	137,230	1,625	795	88,700	515	610
Boulder County, Colorado	3,720	1,420	121,995	5,365	7,765	1,885	3,010
Broomfield County, Colorado	5,140	1,020	6,545	7,365	3,440	90	980
Denver County, Colorado	18,580	42,925	4,140	1,775	182,245	410	680
Larimer County, Colorado	1,105	600	7,700	510	1,950	123,375	8,385
Weld County, Colorado	7,170	930	11,445	1,060	6,485	13,710	75,570
Source/Note	US Census Bureau, ACS 2006–2008 3yr est., Special Tabs for CTPP						

Step 3 – Qualitative Observations

Observation: Factors such as employment density near transit stops and transit connectivity are more difficult to quantify but have an impact on the viability of regional transit service.

Downtown Denver is an attractive transit commuter destination because of its dense employment districts and good transit connectivity.
Fort Collins has relatively high employment density in certain corridors and transit connectivity.
Service on the north I-25 corridor is some distance from many Larimer and Weld residents. More so than in the south I-25 corridor, employment locations are dispersed. Park-and-ride lots along north I-25 are already well-used.
The US 287 Corridor has reasonable transit connectivity, and several employment districts.

	US 287 south of Berthoud	I-25 south of SH 52	US 85 south of SH 52	Total
Traffic Volumes on major highway corridors	18,000	84,000	21,000	123,000

Step 4 - Modal Share: Relations to Ridership

Observation: The Flex bus service already serves the US 287 corridor fairly successfully, but that is a different market than that proposed for I-25 service. The Van Go van pool program serves a significant amount of the existing market for downtown Denver commuters.

Commute O-D (A - B)	Total Number of Commuters (A to B)	Total Number of Commuters (B to A)	Boarding O-D Data (boardings divided by 2)	Mode Share
Larimer - Denver	1,950	410	-	0%
Larimer - Adams	1,105	870	-	0%
Larimer - Boulder	7,700	1,885	-	0%
Weld - Denver	6,485	680	-	0%
Weld - Adams	7,170	3,675	-	0%
Weld - Boulder	11,445	3,010	-	0%
Source/Note				

Step 5 - Population and Employment Forecasts

Observation: Overall population growth in these front range counties by 2040 is forecast to be between 32 and 123 percent. Overall employment growth is forecast to be 52 percent in the Denver Metro Area, and 77 percent in Larimer County and 85 percent in Weld County.

Population Forecasts	July, 2000	July, 2005	July, 2010	July, 2015	July, 2020	July, 2025	July, 2030	July, 2035	July, 2040	2010-2035 Growth %
Adams	351,736	395,384	443,711	484,186	527,858	576,500	621,271	665,723	710,240	60%
Arapahoe	490,722	528,214	574,819	620,974	667,037	715,869	762,228	805,459	843,400	47%
Boulder	276,255	282,910	295,605	315,122	333,399	350,807	366,519	379,768	390,228	32%
Broomfield	38,547	48,251	56,107	63,848	71,119	77,331	81,943	84,888	85,825	53%
Denver	556,738	559,459	604,879	650,792	688,053	718,402	746,166	773,898	808,921	34%
Larimer	253,088	275,873	300,532	328,236	360,813	394,236	424,833	453,561	481,193	60%
Weld	183,076	223,432	254,230	282,706	328,588	385,394	445,160	505,705	567,218	123%
Employment Forecasts	July, 2000	July, 2005	July, 2010	July, 2015	July, 2020	July, 2025	July, 2030	July, 2035	July, 2040	2040 Growth %
Metro Denver	1,607,446	1,627,605	1,648,512	1,762,600	1,934,895	2,088,703	2,232,884	2,371,882	2,503,784	52%
Larimer County	152,131	161,537	165,614	186,096	208,938	231,999	252,960	273,108	293,556	77%
Weld County	91,528	101,131	105,463	115,754	132,314	148,411	163,885	178,933	195,275	85%
Source/Note	Colorado State Demographer's Office									

Step 6 - Application

Assumptions

- 4) Which markets are being served?
 - a) Estimate transit mode share by assessing destination employment density, trip length, transit connectivity.
 - b) Multiply commuter flow rates by estimate of transit mode share.

- 5) What service levels are being provided?
 - a) Peak Hour, Peak direction trips
 - b) Mid-day trips
 - c) Early & late trips

- 6) Forecast future ridership by applying growth factors on population forecasts.

1) Potential Markets	2010	2015	2020	2025	2030	2035	2040
Larimer County to Denver							
a. Transit mode share	3%	3%	3%	4%	4%	4%	4%
b. Commuter Flow	1,950	2,092	2,297	2,484	2,659	2,827	2,986
c. Multiply	59	63	69	99	106	113	119
Larimer to Adams							
a. Transit mode share	1%	1%	1%	1%	1%	1%	1%
b. Commuter Flow	1,105	1,185	1,302	1,408	1,507	1,602	1,692
c. Multiply	11	12	13	14	15	16	17

Weld to Denver

a. Transit mode share	1%	1%	1%	1%	1%	1%	1%
b. Commuter Flow	6,485	6,971	7,714	8,432	9,127	9,808	10,467
c. Multiply	65	70	77	84	91	98	105

Weld to Adams

a. Transit mode share	1%	1%	1%	1%	1%	1%	1%
b. Commuter Flow	7,170	7,707	8,529	9,323	10,092	10,843	11,572
c. Multiply	72	77	85	93	101	108	116

The above calculations assume that the same service level provided in 2008 by FREX would be provided; lower levels of service result in lower ridership. Below, calculations are based on lower proposed levels of service. The range is based on historical traveler's response to FREX service changes, time of trips, and capacity.

2) Service Levels	2010	2015	2020	2025	2030	2035	2040
Alternative 1 – Provide 8 peak hour peak direction trips per day from Fort Collins to Downtown Denver, stopping in Weld County (4 SB in AM, 4 NB in PM)							
Daily 2-way Ridership –Low	89	95	105	132	142	152	161
Daily 2-way Ridership –Med	138	148	164	206	221	236	251
Daily 2-way Ridership –High	187	201	222	279	300	321	341