



Colorado Statewide Intercity and Regional Bus Network Study

Appendix B: Interregional Express Bus







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OVERVIEW

Introduction and Purpose

As part of the “*Colorado Intercity and Regional Bus Network Plan - 2013 Update*” (Network Plan), specific emphasis was placed on developing express regional bus services. Initially referred to as regional commuter buses, they are now called “Interregional Express Buses” (IXB) to better reflect the type of service proposed. While most of the Network Plan provides mid-level planning appropriate for policy development and resource allocation, this Interregional Express bus work extended to service and implementation planning.

The first part of this report provides planning information, including a peer analysis, demand analysis, and conceptual service plans. The report continues with more detailed implementation plans as part two. This includes service plans for the initial phase of services, information on park-and-ride development, fare revenues, and operating and capital budgets.

CDOT’s Interregional Express Bus Purpose Statement is shown in the text box on the following page and has provided a framework for this planning activity. A subcommittee of the Transit and Rail Advisory Committee has been closely involved with the development of recommendations for Interregional Express Bus services. This subcommittee and stakeholders in the corridors have been instrumental in bringing to the table related policy issues, resulting in a broader vision of commuter bus and other regional services. The findings at various stages of the study have also resulted in refinement of the recommendations so they best meet the needs in Colorado.

Findings and Strategies

DTR recommends a focus on a core set of services for the initial phase of service development. Work to date has also shown that:

- Working in partnership with both public and private sector providers will result in the most effective deployment of resources.
- The services that seem to provide the most benefit do not all fit in the regional commuter bus category but do provide key connections between regions.
- In addition to operating services, it will be important for DTR to pursue other activities in developing a seamless statewide network of services. Such activities might include:



CDOT Interregional Express Bus Purpose Statement

To provide an integrated transportation system, improve mobility, and increase modal choice, CDOT will implement a basic system of express Interregional buses (IXB) service along the I-25 Front Range and I-70 Mountain corridors. This service will primarily address peak-hour commuter needs on two of the state's heavily congested corridors and will create an enhanced transit network by establishing interregional transit connections between major local transit providers. By providing express commuter bus service, major employment and population centers will be linked and CDOT will be able to maximize and enhance capacity of the existing transportation system without major infrastructure costs. This service helps to fulfill the CDOT Vision, and is consistent with the duties identified in the DTR enabling legislation to administer funding for the construction, maintenance, and operation of interregional transit services.

- **CDOT Vision and DTR Duties:** Providing IXB service will embrace the CDOT Vision Statement by creating a convenient and integrated transportation system that connects regional and local transit, and will further incorporate the DTR enabling legislation by utilizing funding to provide interregional transit services.
- **I-25 and I-70 Focus:** CDOT will initiate IXB service in the I-25 Front Range and I-70 Mountain corridors in order to connect major local transit systems together, serve the highest interregional bus needs in the state, and to respond to studies and demonstrated demand in the highest travelled corridors, as follows:
 - The North I-25 EIS calls for express bus service on I-25 between Fort Collins and Denver.
 - The I-70 PEIS identifies providing bus transit service as one way to address immediate issues on the corridor.
 - There is a demonstrated demand for RCB service between Colorado Springs and Denver as shown by the Colorado Springs-Denver FREX service.
- **Modal Connectivity:** By providing a basic, affordable service, the CDOT IXB service will connect seven of the largest local transit agencies in the state and provide significant modal choice to access job markets.
- **Growth Platform:** With connected RCB service on the I-25 and I-70 corridors, the CDOT system will provide a base level of service that connects much of the state's population. Additionally, the IXB service will provide a platform for connectivity with local transit and additional network expansion.



- Creating a framework for measuring performance of the States investments in regional and intercity bus services, collecting data and using it to improve performance over time.
- Developing ticket sharing agreements with partner agencies.
- Developing comprehensive customer information that will support passengers traveling regionally across more than one transit system.
- Working with urban area partners to include statewide vanpool options to address needs in corridors not suited to express regional bus services or as a precursor to developing more comprehensive transit services.

A broad approach that is firmly grounded in performance will meet the intention of DTR's establishing legislation, play to CDOT's strengths, and result in effective Interregional services.

Priority Service Recommendations

The first priority for funding is for the primary commuter corridors: Colorado Springs to Denver, Fort Collins-Loveland to Denver, and Glenwood Springs to Denver. However, there is also the need to develop transit services oriented to broader regional travel needs. Other key priorities for regional service development are:

- Increased connecting services between Glenwood Springs and Gypsum/Eagle will enable CDOT to leverage the investment in existing mountain transit services;
- Support of FLEX services will assist in stabilizing a regional service that has been productive. It is not an express service but has demonstrated that it is meeting traveler needs and connects Transfort, COLT, and RTD systems.

Funding for these services might be a priority as using FASTER funds for operations is considered.

Detailed recommendations for the first phase of services are located in Part 2 of this document.





PART 1: PLANNING FOR REGIONAL COMMUTER BUS SERVICES

This section begins with a presentation of findings from the peer analysis. Next, the demand analysis is summarized, describing the methodology and results. The full demand analysis is contained in Appendix C of the Network Plan. The section then presents overall recommendations for both the initial service implementation and ongoing development. Ongoing development will consider evaluation of the services once implemented, expansion of services or stops in the initial corridors, and development of services in additional corridors.

Peer Analysis

A peer analysis was conducted to gain perspective on how other state DOT supported / operated long-distance commuter bus operations are organized and operated. The team identified agencies operating service similar to that proposed by CDOT and contacted these systems to obtain information on:

- Organizational structure
- Infrastructure provision and ownership
- Contracting models
- Operating costs
- Ridership and farebox recovery

Selection of Peers

In selecting systems for consideration, the following criteria were used:

- State DOT directed regional commuter bus programs similar to that proposed by CDOT
- Operated by contractors
- Some variation in organizational structure
- Focus is long-distance, peak hour, peak direction service—not local transit service
- Not part of statewide transit operations providing all services—e.g., not New Jersey Transit, Delaware DART, Connecticut DOT
- Not commuter service into NYC

The following systems were selected for in-depth analysis:

- Maryland Transit Administration (MTA) - Commuter Bus
- Georgia Regional Transportation Authority (GRTA) - Xpress
- New Mexico DOT (NMDOT) Park and Ride
- New Hampshire Department of Transportation (NH DOT) - Boston Express
- Antelope Valley Transit Authority (AVTA) – Commuter Services

Summary statistics for these systems are listed in Table B-1.



Table B-1: Summary Characteristics of Peers

System	Number of Buses Operated in Commuter Service	Number of Commuter Routes	Number of Park and Ride Lots Served	Annual Ridership	Range of Route Lengths (One-Way)	Number of Contractors
MTA	220	24	33	4,290,486	22-52 miles	Five (23 separate contracts)
GRTA	134	39	33	2,371,773	9-42 miles	2 (plus two counties)
NM DOT P&R (145 days)	25	10	24	160,849	20-100 miles	One
NHDOT		2	6 (plus three terminals w/o parking)	535,941	63-69 miles	One
AVTA	18-20	3	2	267,759	63-70 miles	One



Organizational Structure

A review of the organizational structure of these agencies showed no single model for organizational structure and state agency role. The role of policy boards is generally guided by overall DOT structure and roles. Only GRTA was designed to address a commuter bus program.

The organizational characteristics of each peer system are listed below, followed by the lessons they have learned as a result of their structure.

MTA Structure

The Commuter Bus program is part of state transit administration, which is both an operating and funding agency. The state transit administration operates Baltimore's transit system, statewide commuter rail, statewide commuter bus, funds and provides oversight for local transit programs.

There is not an MTA or DOT Board or Commission. Commuter bus policy recommendations come from staff, approved by MTA/MDOT executive level for inclusion in budgets. The Legislature functions as policy board through budget process

All service is contracted, with park-and-ride lots provided by MTA or leased by MTA.

There are no transfers with local systems except the Transit Link monthly pass allows use of Washington Metro, Montgomery Ride-On, and Baltimore MTA local services along with Commuter Bus.

Lessons Learned:

With no advisory or policy board to address potential issues, they may not be addressed until they become a political issue or problem. For example: a fare increase is needed for commuter bus—constant fares for ten years have led to crowding/service issues. However, fare increases are viewed as politically unpopular.

Given the level of service, there should be four or five additional field supervisors. Currently there are only two.

GRTA Structure

GRTA is a regional authority created by state legislation to improve mobility, air quality & land use in greater Atlanta region. The Board of Directors is the policy board with members appointed by the Governor. However, they are appointed from the 12 metro area counties in the region. It is worth noting that MARTA only serves three of these counties.

GRTA contracts for Xpress commuter services; there is no direct operation. Historically they have been funded by fares and CMAQ, but are now seeking funding from the



legislature. In two counties GRTA services are provided under contract by County systems.

GRTA provides or leases park and ride capacity for Xpress services. The agency also provides planning support for the statewide Human Service Transportation Coordinating Council.

There are no transfers with other providers, but will accept the MARTA “Breeze Card” as payment.

Lessons Learned:

GRTA is neither a statewide nor a local agency. There is no funding from locals; the Governor appoints the Board rather than local governments. Because it is not a statewide agency it is difficult to get special funding from the legislature.

GRTA does performs some functions that would normally be performed by a state DOT

As CMAQ funding for operations ends, GRTA is appealing to legislature for state operating funds.

New Mexico DOT

The Park and Ride program is managed by Rail and Transit Division of NMDOT. Rail and Transit Division staff oversees the contractor and makes policy recommendations. Policy approval rests with the Deputy Secretary/DOT Secretary, or the Governor’s office if needed.

Service is operated by a single turnkey contractor. Park and ride lots are arranged by NMDOT through intergovernmental agreement or lease.

There are no transfers with local transit; the program provides their own “last-mile” shuttles.

Lessons Learned:

NMDOT reported no problems from lack of advisory/policy board, however the structure is untested by controversy.

With their turnkey contract the service can be operated with minimal staff - 1 ¾ FTE.

New Hampshire DOT

NHDOT Bureau of Rail and Transit (BRT) provides management and oversight of federal and state transit funding for local systems. BRT also oversees S. 5311(f) and CMAQ-funded commuter bus (Boston Express); both are managed as grant programs by one FTE who also has other duties.



There is no policy board or advisory board for commuter/intercity bus at either the Bureau level or the DOT.

BRT provides a statewide Park and Ride network, including lots serving commuter and intercity bus, and public intercity bus/commuter terminals (operated by contractors)

The Boston Express is operated under contract to NHDOT, providing commuter and mid-day service to/from Boston South Station and Logan Airport, so more than just work trips are served. This service is coordinated with non-funded ICB service by same carrier. CMAQ funded vehicles are used for the Boston Express

No transfers or agreements with local/regional transit agencies, except for carrier access to South Station and Logan Airport.

Lessons Learned:

The limited organizational structure appears to work well, but as in New Mexico it is untested by controversy.

Because there is a very high farebox recovery, the end of CMAQ operating funding may not be major issue.

There is a strong carrier role, allowing for limited state role in operations. Commuter services benefit from a historically strong state role in providing park and ride lots and public intermodal terminals.

Antelope Valley Transportation Authority (AVTA)

AVTA is a regional public entity created by a Joint Powers Agreement between two municipalities and the County of Los Angeles. The Board of Directors serves as the policy board; representatives are appointed by participating jurisdictions.

There is no dedicated “commuter bus” staff. The service (both local and commuter to Los Angeles) is operated by contractor under one hourly rate contract using AVTA vehicles.

AVTA uses two park and ride lots it provides. These are joint ventures with municipalities. AVTA maintains bus stop areas while the municipality is responsible for the parking areas.

There are no transfer arrangements with other service providers, or even between its own commuter and local services. AVTA does participate in regional “Tap Card” that has separate accounts for each transit service used.

Lessons Learned:

A local/regional provider can serve long-distance commute needs, providing both infrastructure and services, if it is a local priority.



Spreading management and operating costs over a single contract that includes local and commuter service may show reduced unit costs as there is a single hourly rate for all types of service, shared maintenance facility, etc.

Staffing

The staffing levels for each peer are listed in Table B-2. Generally the larger programs, MTA and GRTA, require more staff to monitor and evaluate operations, and inspect capital equipment procured by each. For AVTA, staff responsibilities are shared among the other services they are responsible for: local transit and demand response. NH and NM have minimal staff support and are satisfied with the performance of their contractor.

Peer Performance Data Review

A variety of data was compared for the peer systems to gain an understanding of their performance. This is summarized in Table B-3. The second column lists both the contracting strategy (Do they have a single contract for all services or multiple contracts?) and the ownership of the vehicles.

Before describing findings at each agency, some general findings are:

- MTA has the highest cost per mile, operates the most revenue miles, and has the highest ridership
- GRTA and AVTA own all of the vehicles in their service, and MTA owns a portion of the vehicles in its service
- GRTA and MTA have the highest boardings per mile
- GRTA and MTA cost per mile varied by route/contract—deadheading and possible alternative use of vehicles can have significant impacts
- NH DOT and GRTA have the lowest costs per mile. These are two systems with different levels of service
- NH DOT and AVTA have the highest farebox recovery ratios. Also, these two operate the fewest routes, and the destinations (Boston and Los Angeles) are known for high levels of congestion and high parking costs

Note that NM DOT Park & Ride performance data are for a 145-day period.

MTA Service and Performance

MTA staff monitor performance and ensure proper maintenance of vehicles procured by MTA. MTA maintains commuter services website.

MTA operates the most revenue vehicle miles of the group and provides the most boardings of the peer group. The farebox recovery is approximately 40%

Most riders are employed by the federal government, and will have access to Transit Benefits.



Lessons Learned:

- Staff includes a mechanic/engineer to inspect vehicles procured by MTA
- Customers have easy access to agency staff
- Demand for service has been increasing; the problem now is securing additional parking
- As previously mentioned, a fare change requires a legislative action and the fare has not changed for a long time—impacts farebox recovery and capacity problems

GRTA

GRTA staff monitors performance and, as with MTA, maintain commuter services website. GRTA operates the most routes of the group and carries 2,371,773 annual passenger trips. The farebox recovery approximately 42%.

Lessons Learned:

Staff includes a mechanic/engineer to ensure proper maintenance of vehicles procured by GRTA. He also examines upkeep of the GRTA facility used by one contractor.

Given monthly reporting requirements to the GRTA Board, staff and contractors are quick to address any service issues.

New Mexico DOT

NM DOT program staff monitor service performance and maintains the commuter services website. The data provided was for about six months - 145 service days, ending January 31, 2013. In this period 160,849 passenger trips were carried. The farebox recovery is approximately 15%.

Lessons Learned:

Agency is pleased with contractor and the Turnkey arrangement. They would like to continue this with the next contract. As there is no agency capital involved, there is no need for staff to track capital equipment. Remember that the structure is untested by controversy.

Customers have easy access to agency staff

New Hampshire DOT

NH program staff primarily is in a grants management role, monitoring operations and reporting. The State role in providing terminals/park and ride lots is done through other programs.

The operator manages and addresses rider feedback. The operator also maintains commuter services website. To the public, the service appears to be privately-provided.



Table B-2: Staffing Levels

System	MTA	GRTA	NM DOT P&R	NH DOT	AVTA
	<ul style="list-style-type: none"> • Superintendent • Assistant • Chief Maintenance Operator • 2 Field Supervisors 	<ul style="list-style-type: none"> • Chief - Regional Transit Operations Officer • Director of Operations • Director of Maintenance • Director of Engineering • Director of Procurement • 2 Support Staff 	<ul style="list-style-type: none"> • Transit Bureau Chief • Transit Planning & Coordination Manager 	<ul style="list-style-type: none"> • Public Transportation Administrator • Transportation Specialist 	<ul style="list-style-type: none"> • Senior Transit Planner • Director of Operations • Fleet Maintenance • 2 Field Supervisors
Total	5	7	1 ¾	1 ½	% of FTE for each.



Table B-3: Performance Data

System	Contract Strategy	Operating Expenses	Cost Per Trip	Cost Per Mile	Annual Ridership	Boardings Per Mile	Farebox Recovery
	Vehicle Ownership						
MTA	Multiple	\$42,325,544	\$9.86	\$8.12	4,290,486	.82	38%
	Mix						
GRTA	Multiple	\$16,884,121	\$7.12	\$4.85	2,371,773	.68	42%
	Agency						
NM DOT P&R (145 days)	Single	\$3,198,356	\$19.88	\$5.78	160,849	.26	15%
	Vendor						
NHDOT	Single	\$6,006,921	\$11.21	\$4.10	535,941	.37	84%
	Vendor						
AVTA	Single	\$3,240,237	\$12.10	-	267,759	-	72%
	Agency						



The farebox recovery is approximately 84%. The operator maintains CMAQ-funded vehicles.

Lessons Learned:

The operator operates additional trips along the same route, not funded by the program. The operator also receives S. 5311(f) for some rural intercity trips that are interwoven with commuter schedules as they enter commute zone.

Given operator experience and ability in managing customer feedback, staff requirements to monitor service are minimal.

Antelope Valley Transportation Authority

Program staff monitors operations of commuter and local services. AVTA maintains the commuter services website. The farebox recovery is approximately 72% for the commuter service.

There is some duplication of service in that there is MetroLink commuter rail service connecting downtown Lancaster to LA Union Station.

Lessons Learned:

In the short-term AVTA will conduct a review of fare levels. Even with public agency fares, farebox recovery is high for these long-distance services. In part this appear due to low costs resulting from including commuter routes in the same contract with local services.

Contracting Strategies

There are a mix of contracting strategies that have evolved in response to operating conditions and the availability of contractors.

- Three providers (MTA, NM DOT, and AVTA) use an RFP process to contract for services, with NM DOT using a single turnkey contractor. MTA contracts by route, resulting in many contracts with a few operators. AVTA has single contract for local and commuter routes.
- GRTA has intergovernmental agreements with two counties for the counties to provide services; for all other services GRTA contracts out using RFP process.
- NH DOT uses a grant process with a single operator.

Vehicle Ownership

The provision and ownership of vehicles varies. Some vehicles are state/agency owned and leased to contractor. NM DOT is a turnkey operation so the contractor provides the vehicles. MTA uses both vehicles they own and lease to the contractor and vehicles owned by the operators.



GRTA and AVTA provide all the vehicles for their operations, but the processes are different. The GRTA procurement process is assisted by GDOT, using the process developed to procure intercity buses for S. 5311(f). AVTA procured vehicles in a process similar to that used for procuring vehicles for their local services.

NHDOT provided grant funding to operator to procure vehicles for use in Boston Express service, so both the ownership of the vehicles and responsibility for procurement was with the operator.

MTA provides some vehicles to operators under lease. The contractors provide two rates, one if MTA buses are used and one if their own vehicles are used. In FY 2012 average per mile rate using MTA buses was 14.35 percent lower than for carrier buses

Vehicle Maintenance

The contractors maintain the vehicles in all five peer systems. They are maintained in the contractor facilities regardless of whether the contractor owns the vehicles or leases them from the state or transit agency.

The role of the state is to monitor results. If the contractors provide their own vehicles, the state/agency monitors service quality (missed trips, breakdowns, heat and a/c, lifts, general bus condition, etc.). If the contractor operates state vehicles, the state monitors the maintenance program, vehicle condition, and service quality. This requires state program staff time.

The state role in oversight for vehicles and service quality varies with scale of services and number of contractors. It appears minimal for limited service, single (reliable) contractor.

Passenger Facilities

At the origin end, all programs provide for park and ride capacity. They either build, own and maintain their own lots; utilize state/local lots built by other programs; and/or lease spaces. Some do a combination of all three. Providing for parking and access to stop locations is generally a state program role, rather than a contractor role.

At the destination end, only one of the five provides service into a bus terminal (Boston Express into South Station, Boston). All others pickup and drop off on the street looping through downtown destination areas.

Findings: A Review

- There is no single model for organizational structure and state agency role. Role of policy boards, etc. generally guided by overall DOT structure and roles—only GRTA designed to address commuter bus program
- Commuter bus riders are park and ride customers, do not use local transit to access the commute trip so limited need for joint fares, transfers, etc. at origin



end—so limited or no partnership (unless the commuter operator is also the local operator like AVTA)

- Riders may use transit at the destination end to go the last mile, several systems make arrangements for joint fare payment at that end.
- All of the programs provide for park and ride facilities, either building/maintaining them, or leasing from private owners for use by riders,
- Provisions of vehicles varies—some are turnkey (contractor provides), some are state/agency owned leased to contractor, some do both
- State role in oversight varies with scale of services, number of contractors—appears minimal for limited service, single (reliable) contractor.
- State role in information and marketing varies. While NH places responsibility on the contractor, the other four peer states/agencies maintain this responsibility in-house.

Demand Analysis

The demand analysis for regional commuter services is documented in Appendix C of the Network Plan. It addresses both overall potential demand and the ridership that might be expected given a proposed level of service.

The demand estimation work relied on existing planning studies, the Census Journey-to-Work data, and ridership history for the FREX service that operated in the I-70 corridor as well as the ridership levels in the mountain I-70 services operated by Summit Stage, ECO Transit, and RFTA.

The overall findings were that:

- (1) Colorado residents will use transit when services are available and viable for their travel needs. Workers have generally shown a propensity to use transit when it is available, with mode shares of 4-10% of work trips fairly common and higher numbers in some corridors. This reinforces the projections made in a variety of planning studies and the rule of thumb estimates that have developed for US services (e.g. 2% of total trips will use transit at a minimum). While mode shares provide an important guide to what might be expected, qualitative factors are also important, including:
 - a. Quality of service as measured by travel time, frequency of service, span of service, and availability of parking
 - b. Location of employment (central core vs. dispersed locations)
 - c. Availability of car and van pools



- (2) There are a variety of corridors with high levels of employment travel that have the potential for regional commuter bus services. In addition to the North and South I-25 corridors, other corridors where there are significant work flows are between:
 - a. Pueblo and Colorado Springs
 - b. Larimer County and Boulder County
 - c. Larimer County and Weld County
 - d. Weld County and Boulder County

Many of these areas have higher total commuter flows than North and South I-25, but have more dispersed travel patterns. In the I-25 corridor, trips are funneled towards a common destination.

Serving these other corridors will require, for the northern counties, development of a comprehensive network of services. It is useful to begin with key corridors. In the NFR Regional Transit Plan, the I-25 and Hwy 287 corridors were identified as the most important. The Hwy 287 corridor is now being served by FLEX and the I-25 is the next logical corridor to develop. Development of services between Greeley and Denver and Greeley and Loveland will need to be addressed in service planning efforts. The Pueblo to Colorado Springs market also has complex travel patterns to serve. While work flows are high, the workers go to dispersed destinations (Fort Carson, downtown, Garden of the Gods, Research Parkway). Developing services will require addressing each of these markets. Future planning activities can be undertaken to develop viable services to serve workers in Larimer, Weld, and Pueblo counties.

- (3) The issue of dispersed locations for employment sites is an important one for proposed services in the North and South I-25 corridors. On the south end, the Denver Tech Center is an important destination but one that is difficult to serve. On the north end, Boulder County is a destination that is on par with Downtown Denver and the Denver Tech Center in terms of the number of jobs available. In addition, many Weld County residents tend to work in the northeast portion of the Denver Metro Area, including the airport, Commerce City, and Aurora locations. The initial service is geared around Downtown Denver because the density of employment is high and it can be effectively served. However, over the long-term it will be important to address more dispersed sites.
- (4) A similar issue is how to serve mid-range cities in the north and south I-25 corridors. The Carbon Valley communities (Firestone, Dacono, and Frederick) and Castle Rock are important contributors to the congestion on I-25 as many workers live in these communities. In neither case is there local transit service in the community, although each could join RTD and become part of the RTD network. Policy discussion regarding the role of these cities in funding services will be important prior to beginning service to these communities. Is a condition for a stop the provision of local services? In both situations, the ridership from these communities could overwhelm the capacity of the proposed system, so additional vehicles and service would need to be programmed to serve workers from these communities.



The north and south I-25 corridors are substantially different from the I-70 mountain corridor, so different methodologies were used in each. Different types and levels of information were also available. High-level demand estimations have been prepared in a variety of studies such as the *“I-70 Mountain Corridor Programmatic Environmental Impact Statement”*, the *“North I-25 Environmental Impact Statement”*, and the *“Front Range Commuter Express Study”*. Each of these documents show the potential for high levels of ridership based on typical ridership patterns for similar services around the nation and specific travel patterns for the corridors in question.

For general project planning, such estimates have an appropriate level of detail. For service planning, more detail is desired to answer the question, “For the planned quality of service, what level of ridership would be expected?” This section summarizes the approach and findings for the corridors under consideration.

North and South I-25 Corridors

Approach

Data available in these corridors includes Census Journey-to-Work data describing the flow of employment trips to Denver from other counties; prior FREX ridership data for the South I-25 corridor, and planning studies illustrating overall demand in the North I-25 corridor.

A multi-step process was used to estimate demand for transit services in the north and south I-25 corridors. The general steps were:

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

Findings

The ridership estimates are grounded in the reality of ridership experienced in the South I-25 corridor when FREX service was operated and consider the quality of proposed services. Because detailed origin and destination data was available from a survey of FREX riders that was carried out in 2008, 2008 was used as a base year. Ridership was then projected for a 2015 start.

In each corridor, two alternative levels of service were modeled and a range of ridership estimated. It was assumed fares remain at a level comparable to those charged by FREX.



Table B-4 identifies ridership for proposed north and south I-25 services using the low (elasticity of 1.25%) and high (elasticity of 1%) ridership levels for each alternative. 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.

The demand for regional services on the I-25 corridor is well documented, and the corridors are well suited to commuter services. Projected ridership levels are constrained by the proposed service quality and by the availability of park-and-ride spaces. The provision of more trips operating over a greater span of service would result in higher ridership.

Table B-4: Projected Ridership for Proposed Regional Services

	Daily One-way Rides			
South I-25 Service	2008 Baseline		2015 Projection	
	Low Riders	High Riders	Low Riders	High Riders
Alternative A: 5 round trips	335	418	371	463
Alternative B: 6 round trips	402	502	445	556
North I-25 Service	2008 Baseline		2015 Projection	
	Low Riders	High Riders	Low Riders	High Riders
Alternative A: 4 round trips	116	145	171	214
Alternative B: 5 round trips	140	175	206	257

I-70 Mountain Corridor

Demand in the I-70 Mountain Corridor is complex, serving varied markets and travel patterns. There are complex trip purpose and peaking characteristics that reflect the unique mix of recreational, employee, and general travel markets. In those parts of the corridor where there is strong travel demand for employees, comprehensive transit systems have developed.

The demand analysis in the I-70 Mountain Corridor resulted in understanding where the gaps and demand for service exist, and in strategies for building services in the corridor to meet the demand.

Approach and Findings

There are three basic types of information available for this corridor: Census Journey-to-Work data, the “I-70 Mountain Corridor Programmatic Environmental Impact Statement” (PEIS), and ridership data from the systems in the corridor.



Together, this information presents a picture of the overall demand for service in the corridor and can be used to inform decisions on service development. The corridor is a long one, and most of this information only covers segments of the corridor. The focus of the available information is on the 160-mile stretch between Denver and Glenwood Springs. The available information is, however, fairly high level and best for conceptual planning. When the knowledge gained from this information is combined with detailed service plans, ridership can be estimated on specific segments.

The analysis began with an analysis of Journey-to-Work data. This validated the propensity to use transit, but also showed relatively low levels of employment trips in the gaps where transit service does not presently exist. The PEIS data, was also reviewed. In the PEIS a comprehensive travel demand modeling effort was undertaken, providing an important understanding of the markets for transit services and when the travel occurs by direction. It also provides an understanding of the magnitude of both service and park-and-ride infrastructure that will be required to address recreational travel even as an initial system is developed. The PEIS work was not, however, geared to evaluate trade-offs that need to be considered in various start-up bus operating scenarios.

The analysis showed that demands for transit services in the I-70 corridor are not primarily for employment trips as RFTA, ECO, and Summit Stage services cover that market well. The exception is between Frisco and Vail where employee-oriented services presently do not operate. Rather, the I-70 Corridor Analysis (conducted as part of the Network Plan) showed two primary areas of demand. One is for service is to connect the existing operators, filling the gaps in services between Glenwood Springs and Eagle and between Vail and Frisco and providing connections to a broader network for the high number of transit riders. The other primary transit demand is for service between Denver and Vail. The latter will require significant infrastructure and service levels to address adequately but initial service with low levels of service can begin to meet essential travel needs.

The initial service being considered under the Interregional Express Bus project is very limited, and is part of a start-up system. The reader is referred to the I-70 Corridor Analysis, in Appendix A of the Network Plan for an evaluation of service and ridership possibilities. In this analysis, a mid-term operating scenario was developed with moderate levels of service. Implementation is designed to occur over 10 to 20 years. Most importantly, it recommends beginning service in the mountain corridor by (a) filling the gaps between existing providers and (b) initiating limited service to Denver that would complement existing private services in the corridor, begin to provide a public transit presence, and provide a framework for establishing the operating arrangements, customer information, and infrastructure necessary to build service in this corridor.

As with the I-25 corridors, a key constraint to developing service between Denver, Vail, and Glenwood Springs is the infrastructure necessary to support such services. This includes the ability for buses to travel faster than autos (addressed by managed lanes in key areas of congestion), park-and-ride capacity, and the ability to build awareness



about the availability of such service and provide high quality customer information using the latest technologies.

Service level planning has been completed for transit service in the gap between Glenwood Springs and Gypsum/Eagle and shows demand adequate to support full-day service (approximately 15 round trips). Service level planning has not occurred for service between Frisco and Vail, but rather relies on anecdotal evidence and existing ridership between Frisco and Copper Mountain. In both of these segments, the ridership is important but the true value of such service is the ability to connect existing systems with high levels of service.

Service Development Recommendations

The planning work has led to a variety of service development recommendations. These address services and how they may be developed over time. The recommendations also address items such as organizational structure, delivery of services, fares, and a variety of managerial considerations such as the provision of customer information and provision of passenger facilities.

The recommendations reflect the diversity shown by peer agencies and the specific conditions in Colorado that suggest benefits from a specific course of action. A key lesson learned from the peers is that each has successfully developed services based on how organizations have developed over time and in response to local conditions.

The various recommendations are summarized in this section.

Service Recommendations

In the North and South I-25 corridors, begin with peak hour services and one mid-day trip, serving only Downtown Denver.

- As ridership develops, additional trips can be added. Funds for up to two additional round trips would be budgeted initially.
- After that point, the value of strengthening service in an existing corridor versus expanding to additional markets will need to be weighed.

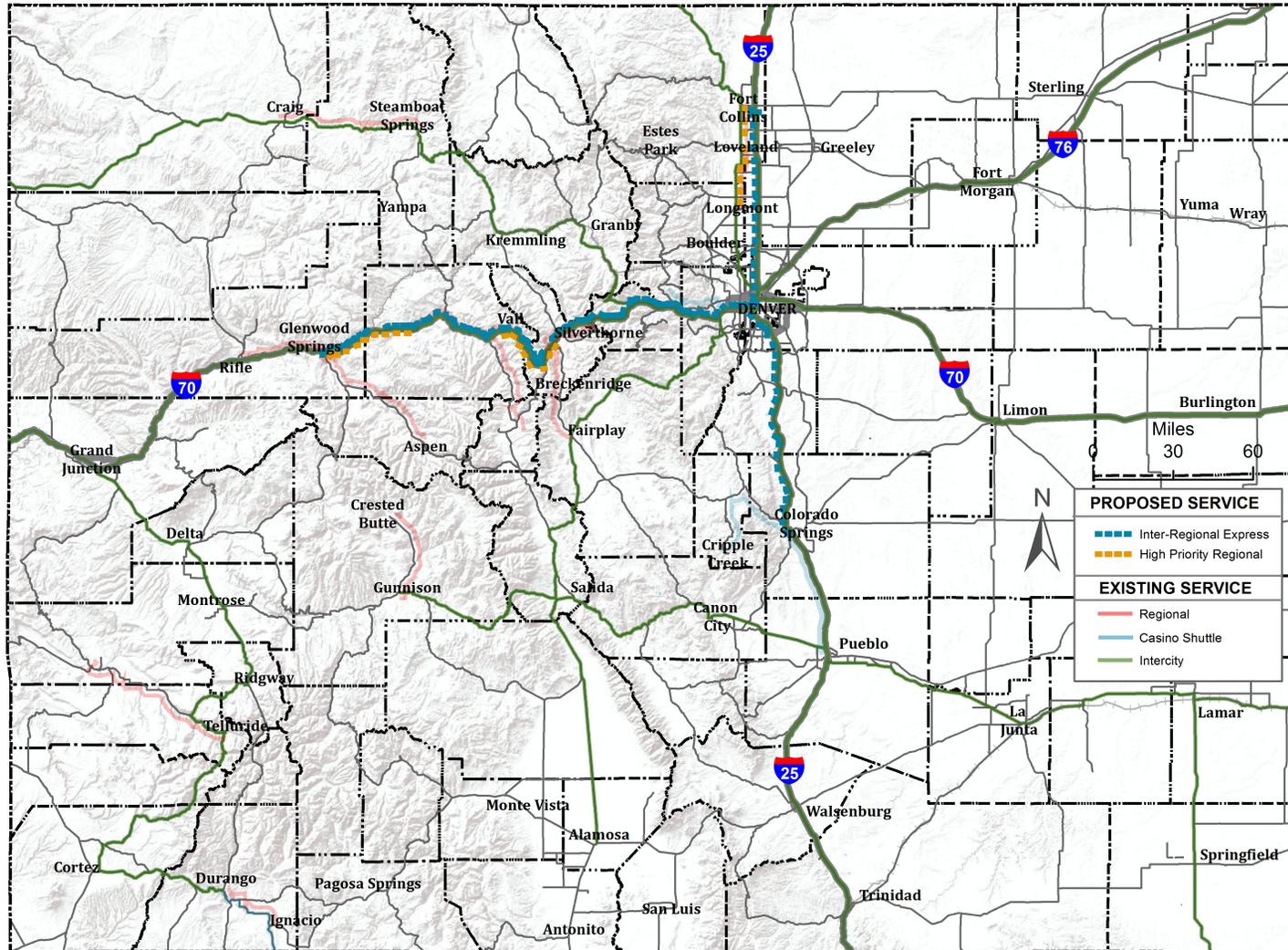
Figure 1 illustrates the initial service corridors.





Figure B-1: Recommended Interregional Express Routes with Phasing

High Priority Proposed Services







In the Mountain I-70 corridor, the recommended services are focused on (a) positioning CDOT to develop regional services between Vail and Denver, in line with the PEIS recommendations and (b) filling gaps between systems that are primarily responsible for commuter services. Only the Glenwood Springs - Denver service is proposed for Interregional Express service; the service that would fill gaps is categorized as regional service. The I-70 services are:

- Glenwood Springs - Denver: begin with one round-trip a day that complements the intercity service in the corridor. Expand to two round trips as demand warrants, with the second round trip operating between Vail and Denver.
- Eagle/Gypsum - Glenwood Springs: six or more round trips daily, connecting with services provided by ECO and RFTA. (Regional services operated by local agencies)
- Frisco – Vail: three round trips daily (Regional services operated by local agencies)

Recommendations for Future Development

Monitor initial services including ridership, farebox recovery ratio, and reliability and adjust service levels as appropriate within the budget. Goals, objectives, and service standards are discussed at the end of part one of this report.

Work with partners to address both planning and policy issues related to developing additional services in the Pueblo to Colorado Springs corridor, for mid-range cities and dispersed work sites in the Denver Metro area, and for Larimer and Weld County workers.

Service Contracting

Colorado can benefit from the lessons learned from peer agencies. The availability of contractors varies between corridors so different providers may be able to provide the most cost-effective service in different corridors. It is recommended that RFPs for service contracts be structured to allow entities to bid on various segments of the service or all of the service.

Having more than one contractor reduces the ability to switch vehicles between corridors and to use the same back-up vehicle for all service. It also requires more oversight on the part of CDOT staff. In selecting contractors CDOT will need to balance between these program costs and the rates bid for service.

It is recommended that CDOT:

- Purchase vehicles and lease them to the operator(s), providing oversight on both maintenance programs and service quality;
- Establish a customer information system and website and maintain responsibility for this. While the work may be contracted out (e.g. CDOT may contract with a



university to update and maintain the transit service information or include website and telephone information in the IXB contract) the overall responsibility for this function should reside with CDOT to assure the system is effective and connects with other traveler information.

- Develop passenger facilities adequate to meet the needs of services in each corridor. The existing structure of having CDOT Regions own the park-and-ride facilities and entering into agreements with local entities for minor maintenance is a solid model for owned lots. However, it is anticipated that diverse arrangements will be needed, with CDOT owning some lots, leasing some lots, or leasing spaces in existing lots as services develop. It is recommended that CDOT plan for diverse arrangements in providing for park-and-ride lots.

Fares

Comparing to the peer systems, a farebox recovery ratio of approximately 40% appears to be appropriate for the types of services provided. This will vary between corridors and types of service. Farebox recovery is anticipated to be higher than this for the South I-25 service (50% is a realistic goal) and somewhat lower for North I-25 as it is anticipated that ridership will take longer to develop in the north corridor.

The initial service plan for I-70 is not expected to generate this high of farebox recovery. Over the long term, as an effective network is developed in the corridor, a farebox recovery of around 40% is realistic for the Denver to Vail stretch. Initial levels of farebox recovery may be as low as 10% until the market develops. The farebox recovery for services filling the gaps between Glenwood Springs and Eagle/Gypsum is anticipated to match that of ECO Transit, or be around 20%. Many riders will have ECO Transit or RFTA passes. From the perspective of developing a seamless system for riders, this is one area where revenue sharing is worth investigating.

Overall, however, peer agencies reinforce the concept that revenue sharing is not an important issue as most riders arrive to the stop using their car. For the initial services, the free shuttles in downtown Denver, combined with looped routing between DUS and Broadway will enable passengers to easily reach a wide range of destinations.

Goals, Objectives, and Service Standards

The study process included the development of goals and objectives, and discussion of service standards. The Transit and Rail Advisory Committee's working group on inter-regional express service reached consensus on the goals and objectives presented in the text box on the next two pages. Following this is a discussion of proposed service standards.



Inter-regional Express Bus Service

Goals and Objectives

CDOT will implement a basic system of express inter-regional bus (IXB) service along the I-25 Front Range and I-70 Mountain corridors. This service will primarily address peak-hour commuter needs on two of the state's heavily congested corridors and will establish interregional transit connections between major local transit providers.

GOAL 1: Provide a foundation of regional transit services connecting Colorado Springs, Denver, and Fort Collins on I-25 and the mountain communities along West I-70.

Objective A: Establish core service on North and South I-25 connecting the three major urban areas of Colorado Springs, Denver and Fort Collins by Summer/Fall of 2014.

Objective B: Establish core service on West I-70 by Summer/Fall of 2014.

Objective C: Monitor services to assure they are compliant with best practices and meet standards for reliability, safety, efficiency, and travel time. *(Draft standards attached)*

Objective D: Adopt fare and operating policies for the system.

GOAL 2: Work in partnership with local and regional entities operating transit services, vanpool services, and human service transportation along the corridors to provide well-connected services traveling on State and local roadways.

Objective A: Establish an advisory group to address service, operating, facility, customer information, fare, and financing issues.

Objective B: Work with other jurisdictions to expand services, as warranted based on demand for services. The expansion is anticipated to include additional trips in the initial corridors as well as expansion to additional corridors or to serve communities along the route.



GOAL 3: Develop and maintain adequate financing to meet the needs of the regional commuter bus network.

Objective A: Adopt a budget and financial plan that addresses cash flow, reserve account requirements, capital replacement, and options for capital purchases and improvements.

Objective B: Leverage available resources in support of developing a regional network.

Objective C: Develop shared funding system expansions. This may include growth on the initial core routes and/or expansion of services.

GOAL 4: Support the development of the park-and-ride facilities, stations, and other facilities to meet the needs of travelers in high frequency corridors.

Objective A: Provide park-and-ride facilities, in partnership with local jurisdictions and CDOT Regions, to meet the parking needs of passengers using the Regional Commuter Bus service.

Objective B: Provide for shelters, lighting, ticketing machines, and other amenities at Regional Commuter Bus stops to meet standards for each type of stop.

Objective C: Provide for maintenance and security of park-and-ride facilities in partnership with partners.

GOAL 5: Provide customer information and marketing materials for Regional Commuter Bus services through print and web sources.

Objective A: Develop customer information materials that meet the needs of residents, visitors, and human service programs. Provide customers with information on schedules for the local systems with which the services connect.

Objective B: Brand the system and provide coordinated customer information, tickets, and marketing materials.

GOAL 6: Balance the need for maximum operating revenues with affordability.

Objective A: Develop a fare structure that is market-based with eventual use of smart cards for ticketing to facilitate intra-system transfers.

Objective B: Address issues of transferability with local transit systems for the first and last mile of the trip or for riders who routinely use two systems for their commute.

Objective C: Develop internal advertising on vehicles for additional revenues.



Measuring Performance of Regional Commuter Bus Services

What standards and range of performance is expected for the proposed Regional Commuter Bus service? It is useful to identify the range of performance for similar services, and expected differences that may affect the range of performance. What follows is initial information for several types of recommended performance measures.

Reliability Standards

Considerations in reliability are that these routes travel relatively long distances and may be subject to peak hour traffic congestion, weather/road conditions, and long distances to obtain replacement service. It will be important to allow for peak traffic conditions in setting schedules (peak hour trips will be scheduled for longer travel times) and to provide for arrangements for repairs with transit agencies in the service corridor. The vehicles will be new, so once they are through the initial shake down, maintenance reliability should be good.

Two suggested measures are:

- 90% of trips will operate within 0 -10 minutes of scheduled times
- No more than one road-call every 5,000 revenue miles

Efficiency and Financial Standards

As new routes, it will take time to build ridership. These are also routes that are expected to carry passengers on long-distance trips – the average may be 50 miles per rider – so this characteristic will affect productivity. It is suggested that riders per trip be used rather than riders per mile. With 50-passenger buses, an average of 30 per trip would be excellent, but the question is, what is the minimum that would be acceptable? The answer will likely be affected by the subsidy per trip, but an average of about fifteen may be appropriate as a floor – after the system has time to grow.

Until bids are let, the cost per mile will not be known, but initially the vehicles in the I-25 corridor will only travel in service in the peak direction, except for a single mid-day trip. This should keep the riders per hour at relatively high levels – about double what FREX experienced. This structure will be reflected in the cost per mile, as bidders will have to determine how they can develop driver shifts that will work well.

Work completed for the peer review and *Colorado Intercity and Regional Bus Network Study* provides insights on appropriate ranges for the farebox recovery ratio and subsidy per trip, both critical measures. The tables and graphs on the next pages provide some comparative information on ridership, cost, and mileage. This data was gathered to describe the range of existing services. There may be some differences among operators in how items are measured, but the data is adequate for the purpose of understanding how the services function and the range of values for various measures.



Measures that may be considered to measure efficiency and productivity are listed below. Values have not been assigned, but the comparative information on the following charts help to bracket the numbers where Colorado communities have agreed subsidizing regional transit services makes sense. It will be important to provide fare information and subsidy information as we move forward.

Possible Measures

- Riders per trip: Average of XX within 2 years of operation
- Cost per passenger trip: Maximum of \$X.XX after 2 years of operation
- Subsidy per passenger trip: Minimum of XX% after 2 years of operation
- Farebox recovery ratio: Maximum of \$X.XX per mile
- Total Cost per mile: Minimum of \$X.XX per mile
- Total Revenue per mile:

Table B-5: Financial Characteristics of Regional Routes

Corridor	Annual Op. Expense	Length of Corridor	Cost per Passenger	Passengers per Mile	Operating Expense per Mile
Ft Collins-Longmont	\$933,347	31	\$5.05	0.90	\$4.56
Gypsum-Vail, I-70 only	\$1,680,787	40	\$8.55	0.36	\$3.09
Aspen-Glenwood Spgs.	\$10,472,000	40	\$6.90	0.69	\$4.75
Leadville-Vail	\$443,758	37	\$16.35	0.35	\$5.72
Leadville-Frisco	\$78,370	30	\$11.68	0.28	\$3.30
Craig-Steamboat Springs	\$267,551	42	\$11.03	0.31	\$3.46
Telluride-Norwood	\$127,719	33	\$7.29	0.40	\$2.92
Telluride-Placerville	\$103,923	16	\$11.85	0.20	\$2.35
Gunnison-Crested Butte	\$494,527	28	\$7.40	0.57	\$4.20
Ignacio-Durango	\$103,081	24	\$13.62	0.90	\$2.11
Bayfield-Durango	\$103,081	20	\$13.62	0.90	\$2.11
Ignacio-Aztec, NM	\$118,882	36	\$38.79	0.06	\$2.18
TOTAL OR AVERAGE	\$13,993,679	31	\$12.68	0.49	\$3.40



Figure B-2: Passengers per Mile for Regional Routes

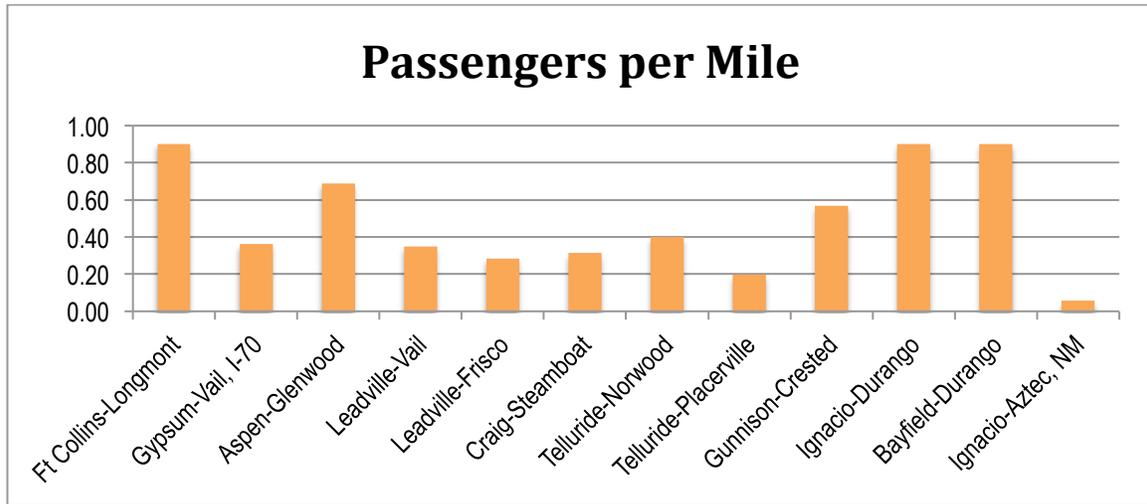
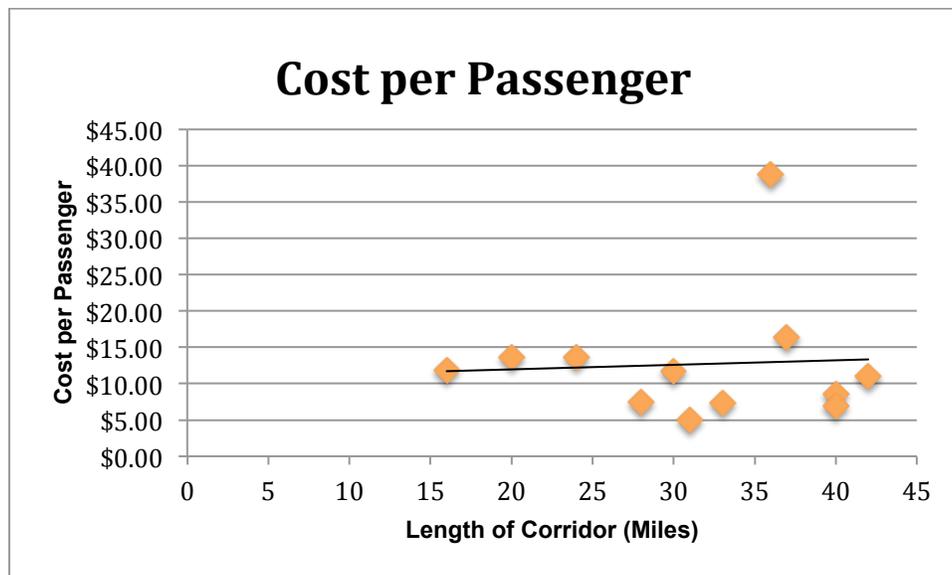


Figure B-3: Cost per Passenger for Regional Routes



Looking at passengers per mile, this measures total boardings per mile. These routes will not have passengers traveling short distances with many on-and-off movements, but rather passengers traveling long distances. If the buses are half-full on average one would only expect a measure of .25-.35 riders per mile – as each passenger will travel 50-70 miles.

The cost per passenger data shows a slight upward increase for passengers traveling longer distances, so for routes lengths of 60-70 miles the costs would be expected to be higher than for routes that are half this length. The number of passengers is also a major factor in the cost per passenger calculation.



Travel Time

The intention of the Regional Commuter Bus service is to operate in an express mode, so travel times should be relatively close to that of a single occupant automobile. The number of stops and the availability of managed lanes will affect travel time. It is anticipated that this number should be in the range of 1.25 to 1.5 times the single occupant vehicle travel time, from passenger pick-up to passenger drop-off. The walk time to and from the stops is not included.

Strive for travel time on Regional Commuter Bus routes that is no more than 1.25 times the auto travel time between primary passenger origin and destinations.

Safety

Again, no comparative data has been collected yet but safety seems to be a measure one would want included as a performance measure.

No more than one accident every X.XXX revenue miles

Part 2 of this report covers the implementation of services, and provides the details of how the first phase of services will be implemented.



PART 2: IMPLEMENTATION OF SERVICES

This part summarizes the service plan and characteristics, capital plan, and financial plan. Total system and individual corridor characteristics are covered.

Service Plan

Three routes are included in the system, serving Colorado Springs- Denver, Fort Collins - Denver, and Glenwood Springs – Denver. Service is designed as express, with limited stops at park-and-rides. It will operate weekdays, and not on major Holidays. Each route is described below.

Colorado Springs – Monument - Denver

This route serves Colorado Springs, Monument, and travels on South I-25 to downtown Denver. Stops are at:

- Tejon Park-and-Ride
- Woodman Road Park-and-Ride
- Broadway and I-25
- Denver Union Station

The last trip in the morning will serve the Colorado Springs Downtown Transit Center as connecting service will be available. Afternoon trips will serve the Downtown Transit Center on request after dropping passengers at the Tejon Park-and-Ride.

The recommended schedule includes five peak hour trips and one mid-day trip, as shown in the schedule below. The schedule is modeled on that run previously by FREX. Travel times are approximate and will need to be refined for final schedules and reviewed with local entities.

Table B-6: South I-25 Proposed Schedule

Trip	Departs Tejon	Arrives 18th & CA		Trip	Depart 19th & Stout	Arrives Tejon
1	5:15 AM	6:45 AM		7	1:35 PM	3:35 PM
2	5:30 AM	7:00 AM		8	3:35 PM	5:35 PM
3	5:45 AM	7:15 AM		9	3:50 PM	5:50 PM
4	6:00 AM	7:30 AM		10	4:05 PM	6:05 PM
5	6:15 AM	7:45 AM		11	4:20 PM	6:20 PM
6	11:30 AM	1:00 PM		12	4:35 PM	7:35 PM

Five buses are required for the peak schedule and these would be over-the-road coaches.



Fort Collins – Loveland – Denver

This route serves Fort Collins, Loveland, and travels on North I-25 to downtown Denver using the busway to speed its travel. Stops are at:

- Harmony Park-and-Ride at I-25,
- Loveland park-and-ride at US 34 at the Outlet Mall in Loveland, and
- Denver Union Station.

The first afternoon trip, departing Denver at 3:52 PM, can serve the South Transfer Center. However, by the time this service begins, Transfort plans to extend the route on Harmony Road to the park-and-ride. City of Loveland Transit (COLT) has also indicated they will be able to provide connecting transit services.

The recommended schedule is for 10 one-way trips, operating weekdays. The North I-25 subcommittee preferred a fifth peak hour trip rather than a mid-day trip. The most flexible approach would be to operate four peak hour trips and then based on ridership either add a fifth trip in the peak or a mid-day trip.

The following table shows four peak hour trips and one mid-day trip as the capital investment is significantly lower. Five peak hour trips require five vehicles while the schedule with four peak hour trips and one mid-day trip requires four vehicles.

Travel times are approximate and need to consider the final stops and expanded HOV lane. In addition, having two buses travel to Denver on Friday evening and return Sunday evening is recommended. Vehicles returning to Denver would be rotated for maintenance. This has been included in the budget.

Table B-7: North I-25 Proposed Schedule

Trip	Departs Harmony PNR	Arrives 17th & Stout		Trip	Depart 18th & Calif.	Arrives Harmony PNR
1	5:30 AM	6:35 AM		6	1:15 PM	2:35 PM
2	5:45 AM	6:50 AM		7	3:52 PM	5:15 PM
3	6:15 AM	7:20 AM		8	4:22 PM	5:45 PM
4	6:45 AM	7:50 AM		9	4:52 PM	6:15 PM
5	11:45 AM	12:50 PM		10	5:22 PM	6:45 PM

Five buses are required for the peak schedule and these would be over-the-road coaches.



Glenwood Springs - Vail – Frisco – Denver

This route serves Glenwood Springs, Eagle, Vail, Frisco, Silverthorne, Federal Center Station, and Denver stops. It is scheduled to operate one round trip daily, to complement Greyhound intercity service operating in the same corridor.

The route is proposed to depart Glenwood Springs at 7:20 AM weekdays, arriving in Denver at 10:40 AM. The route would depart Denver at 5:50 PM, arriving in Vail at 7:25 PM and Glenwood Springs at 11:20 PM. This limited schedule is proposed initially, with the ability to expand to two daily trips once ridership warrants doing so. The second expanded trip is planned to operate from Vail to Denver, and would be scheduled to arrive in Denver earlier in the morning (approximately 9 AM) and depart at approximately 3 PM.

Greyhound routes depart Denver at 12:15 PM (and 12:15 AM), traveling to Vail, and depart Vail at 5:40 AM and 3:55 PM, traveling to Denver. It is proposed that the services are jointly marketed and that an interline agreement be established. This agreement would provide for with each system honoring the tickets issued by the other and provides for marketing the service through Greyhound.

Primary stops are the South Glenwood Station to connect with RFTA's BRT, Eagle, Vail Transportation Center and the Frisco Transportation Center. Stops are also proposed for Denver Union Station and the Denver Bus Center.

One vehicle is required for initial service and an over-the-road coach is proposed.

System Characteristics

Table B-8 on the following page illustrates the overall system characteristics based on the service describe above. A low-end estimate was used and it is estimated that it will take three years for ridership to reach its potential. Initially 13 buses are required as the second I-70 route (Vail-Denver) is not programmed to begin operation at the same time as the other routes but rather will depend on demand.



Table B-8: System Characteristics

Characteristic	Colorado Springs	Fort Collins	Glenwood Springs	Vail	System Total
Trips					
Initial 1-way Trips	12	10	2	0	24
Additional Budgeted	<u>2</u>	<u>2</u>	<u>0</u>	<u>2</u>	<u>6</u>
Total Budgeted	14	12	2	2	30
Vehicles					
Peak	5	4	1	1	11
Back-up	<u>1</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>3</u>
TOTAL	6	5	2	1	14
Annual Revenue Miles	305,652	247,780	84,500	53,800	691,732
Daily Ridership					
First Year (50%)	223	103	18	15	344
Second year (60%)	267	124	21	18	412
Third year of operation (80%)	356	165	28	24	549

Fares

Fare Structure

The proposed fare structure is based on a zone system, as shown in Table B-9. The rates are based on those used by FREX, following the recommendations for the rates planned for 2014 with a cash fare averaging \$0.17 per mile. It is comparable to RFTA and other similar services. A fare schedule by stop is included as an appendix to this report and provides an easy reference for fares between any two points.

The fare structure provides for cash fares and multiple-ride tickets, with discounts for purchasing larger quantities of tickets. A multiple-ride ticket is recommended rather than a monthly pass as it will allow for easier future conversion to smartcard technology.

In estimating fare revenues, consideration is given to the proportion of people who will choose each fare type and who will board in different zones. Table B-10 shows the average fare in each corridor based on these factors. These average fare estimates are reflected in the operating budget, where the average fare is multiplied by the annual ridership in calculating average fare revenue.

Assumptions were made based on what was known about the FREX service for the North and South I-25 services. Interlining agreements with private intercity bus services are anticipated to result in significant ridership, particularly in the I-70 corridor. Ridership and revenue estimates will need to be closely monitored as service begins and adjusted as needed.



Table B-9: Zone Fare System

	Approximate Distance	Towns	Cash Fare	10% Off 10-pack	20% Off 20-pack	25% Off 40-pack
Zone A	Up to 35 miles	Glenwood-Eagle, Eagle-Vail, Vail-Frisco	\$5	\$45	\$80	\$150
Zone B	From 35-60 miles	Monument, Loveland, Fort Collins	\$9	\$81	\$144	\$270
Zone C	From 60 - 85 miles	Colorado Springs, Frisco	\$12	\$108	\$192	\$360
Zone D	From 85 - 110 miles	Vail	\$17	\$153	\$272	\$510
Zone E	From 110- 140	Eagle	\$22	\$198	\$352	\$660
Zone F	From 140- 165	Glenwood Springs	\$28	\$252	\$448	\$840

Table B-10: Average Fares

Percent of Riders	Percent of Full Fare	South I-25		North I-25		Glenwood		Vail (2nd Trip)	
		Fare	Per 100	Fare	Per 100	Fare	Per 100	Fare	Per 100
40%	75%	\$8.33	\$333	\$6.75	\$270	\$12.53	\$501	\$10.31	\$413
20%	80%	\$8.88	\$178	\$7.20	\$144	\$13.72	\$274	\$11.00	\$220
20%	90%	\$9.99	\$200	\$8.10	\$162	\$16.25	\$325	\$12.38	\$248
20%	100%	\$11.10	\$222	\$9	\$180	\$16.25	\$325	\$13.75	\$275
Total Fares for 100 Riders			\$932		\$756		\$1,425		\$1,155
Average Fare per Passenger			\$9.32		\$7.56		\$14.25		\$11.55



Operating Budget

The budget in Table B-11 shows three years of operating expenses and revenues. All are based on current dollars and the service characteristics shown in Table B-8. The operating and administrative expenses cover purchased transportation services, and the administrative costs associated with running the program.

It is proposed that the call center for customer information will be contracted out as part of the service package. It is recognized that telephone information will continue to be an important way in which people obtain information about the services so adequate staff time will need to be allocated to the function. Similarly, the contractor would be responsible for lost-and-found, a functional arrangement as the coach operators will turn in articles left on buses at the end of their shifts.

The fare revenues are calculated based on the ridership and average fare estimated above. This results in a 26% farebox recovery ratio in the first fiscal year of operation, growing to a 42% farebox recovery ratio in the third year.

The total annual operating expenses are budgeted at \$3 million for a full year of operation. The net operating expense is projected at just over \$1.7 million in the 2014-15 fiscal year (9 months of service), \$2.0 million in 2015-16, and then dropping to \$1.7 million as fare revenues increase.

Table B-11: Operating and Administrative Expenses

OPERATING EXPENSES FOR FY 2015 – FY 2017			
	Oct 1, 2014 - June 30, 2015	July 1, 2015 - June 30, 2016	July 1, 2016 - June 30, 2017
Purchased Transportation			
Over-the-Road Buses	\$1,985,563	\$2,647,418	\$2,647,418
Administrative Expenses			
Staffing and Related Expenses	\$187,500	\$250,000	\$250,000
Marketing	\$150,000	\$100,000	\$100,000
Fare Media and Supplies	\$1,000	\$1,000	\$1,000
Materials and Supplies	\$1,000	\$1,000	\$1,000
SUBTOTAL	\$339,500	\$352,000	\$352,000
Subtotal Administrative & Operating Expenses	\$2,325,063	\$2,999,418	\$2,999,418
Fare Revenues	\$597,981	\$953,923	\$1,271,252
Farebox Recovery Ratio	26%	32%	42%
Net Operating Costs	\$1,727,082	\$2,045,495	\$1,728,166



Capital Expenses

The capital expenses include the costs of vehicles, upgrading park-and-ride lots, and costs associated with fare collection.

Vehicles

A fleet of thirteen vehicles is recommended, allowing for a spare in each corridor and the following peak vehicles:

South I-25:	5
North I-25:	4
I-70:	<u>1</u>
TOTAL	10

When a second I-70 trip is added an additional vehicle will be required in the peak period, as would the addition of any more peak period trips in north or south I-25. At that point there will be adequate experience with the routes to know if two spares, a 20% ratio, would be adequate.

Park-and-Ride Lot Improvements

While park-and-ride lots are available at most planned stops, capacity and other improvements are needed at various lots. A summary of park-and-ride lots and issues at each is listed below. A total of \$1,000,000 is included in the capital budget for the various improvements to park-and-rides, including signage, shelters and access improvements.

South I-25 Stops

Projected ridership will fill existing lots, although no short-term issues are projected at either Tejon or Monument. With ridership split between Tejon (38%), Woodman (14%), and Monument (38%) the parking requirements would grow to approximately 170 spaces at Tejon, 60 spaces at Woodman, and 170 spaces at Monument park-and-ride.

Tejon Park-and-Ride: Capacity and turning capacity are adequate. Shelter and signage improvements needed.

Woodman Park-and-Ride: The existing lot is at capacity; turning radius is not adequate for over-the-road coaches; entrance is too close to intersection with Corporate Drive. The existing lot is used by employees and customers of the Tiffany Square shopping center, along with a variety of people riding the Mountain Metro bus or meeting for carpools. Tiffany Square was required to build a lot for their customers, and at present it is not used as people prefer to use the lot closer to their destination.



Two options are being explored. The first is to control access to the existing lot, restricting it to bus riders, minor improvements to the lot to provide an adequate radius for the larger over-the-road coaches to circulate (curb and gutter work along with re-striping) and to install a round-about at the intersection to improve vehicle circulation.

The second is a property swap with Tiffany Square, trading the existing public lot for the one constructed by the shopping center. This would allow customers of the shopping center to use the lot closest to their destination while the extra distance would matter little to people riding the bus as they drive to the lot and transfer to cars. It would allow safer access and egress for buses as the entrance is farther from the intersection. The improvements needed would include some re-design to allow room for a bus stop and circulation within the lot (turn-around for buses that would support the weight of the vehicle, curb, gutter, and passenger platform, and some re-striping) and installation of a shelter and signage. Prior to transferring the existing lot, it is anticipated that some environmental remediation would be needed. The location of the two lots is illustrated in Figure B-5.

Woodman Park-and-Ride: Adequate capacity and bus turn around exist. Shelter and signage improvements needed. Largest problem with this lot is the access and egress to I-25. Explore future northbound access to I-25 via a short connection from the frontage road to the weigh station.

North I-25 Stops

Parking capacity is limited at the Fort Collins-Harmony PNR, which runs close to full on many days. There appears to be adequate capacity at the US 34 PNR at present. There is no prior experience to guide how ridership will be split between the Fort Collins-Harmony and the Loveland stops. Ridership estimates are at a low of 70 riders per day and a high of 103 riders per day, based on 2008 estimates and between 88 and 129 per day based on 2015 estimates.

Harmony Park-and-Ride: This lot, owned by the City of Fort Collins, needs expansion, and a 150-car extension has been proposed. The bus turn around and shelters exist, so only minor signage improvements would be necessary. Shelter and signage improvements needed. Largest problem with this lot is the access and egress to I-25. Explore future northbound access to I-25 via a short connection from the frontage road to the weigh station.

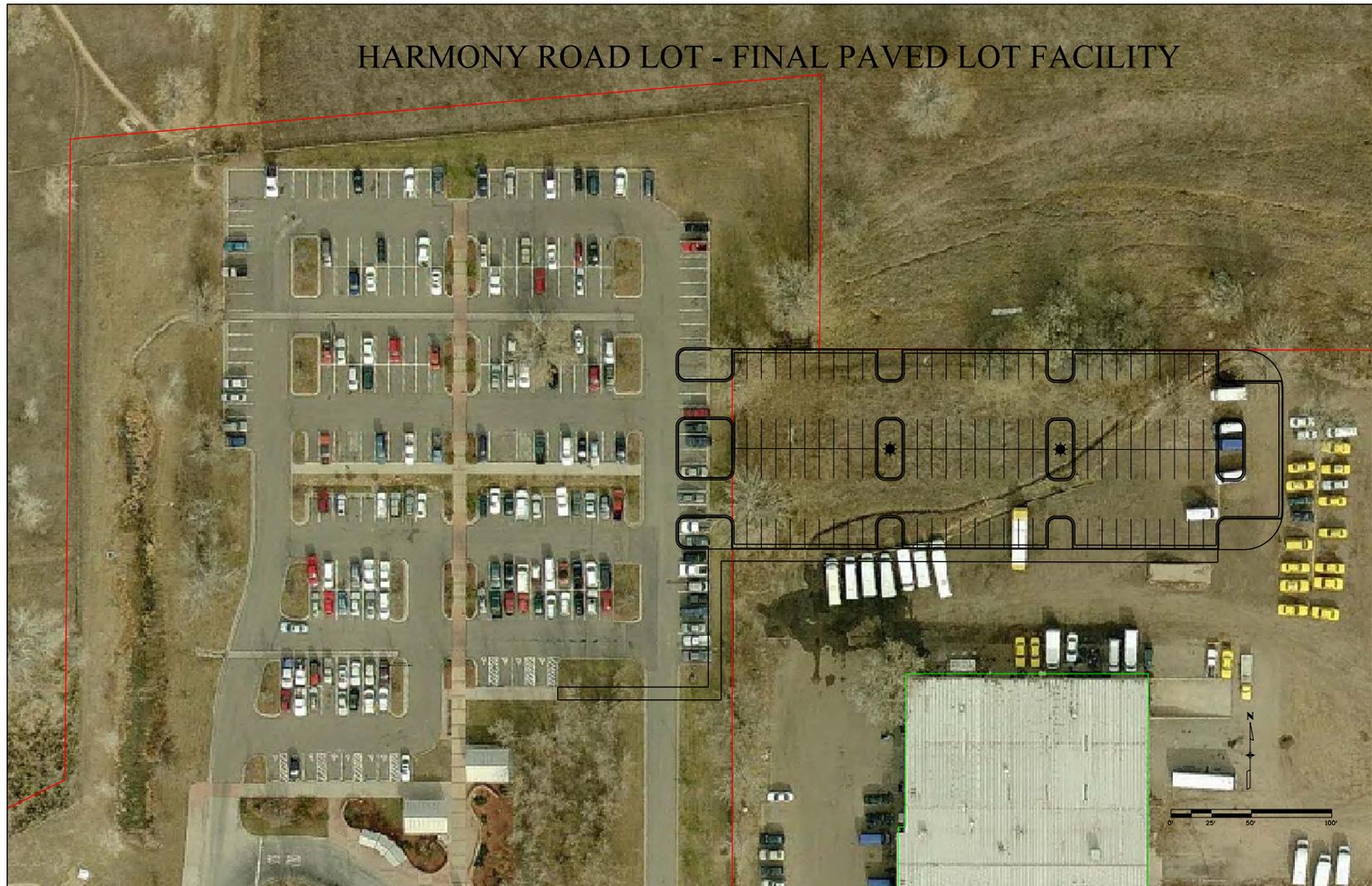
Figure B-6 illustrates the proposed improvements to the lot. The lot can be expanded as a gravel lot at a cost of approximately \$172,000. Paving of the expanded area, with the island and lighting noted in Figure B-3 is estimated at \$400,000.

Figure B-5: Site view of Woodmen Park-n-Ride





Figure B-6: Proposed Harmony PNR Expansion







US 34 PNR: This location has adequate capacity but requires minor upgrades, including a shelter and minor concrete work for the platform and passenger waiting area. Circulation is adequate but requires significant time as the vehicle must circulate around the mall to return to US 34 and I-25, adding significant time to the route. It is recommended that alternative access and egress options be explored.

I-70 Stops

In general, the proposed stops in the I-70 corridor are in place, have adequate circulation and shelters or passenger waiting areas. Initially, parking requirements are not large as the service is limited. It is anticipated that for the I-70 corridor stops, the number of passengers transferring between bus systems will be significant. The specifics of each location are noted below.

Glenwood Springs: The VelociRFTA station at 27th Street and Highway 82. This location has only limited parking but connects with the BRT to the Roaring Fork Valley. A new station location in Glenwood has been identified that will serve all routes, but funding for construction has not been identified. In January of 2015 reconstruction will begin on the Highway 82 bridge, so at that time the service will need to detour and start in a West Glenwood location. The West Glenwood park-and-ride is recommended. It may be desirable to begin service at this location as the 27th Street South Glenwood station will not be accessible until mid-2018. It is recommended that CDOT work with RFTA and City of Glenwood Springs to determine if any improvements are needed at the temporary site and to assure that good connections are available to and from the South Glenwood station.

Eagle: The existing Chambers PNR lot is at capacity and Eagle County is constructing a new lot that will be used by CDOT's IX service.

Vail: The Vail Transportation Center will be used as the stop for this service. There is a charge for parking in Vail, but there is a high level of bus access.

Frisco: The Frisco Transit Center will serve as the stop. This location has adequate parking, good bus circulation, and indoor waiting areas for passengers.

Other Capital Items

Fareboxes and related computer equipment are the other capital items that are needed. Mountain Metropolitan Transit has twelve electronic fareboxes from the FREX service they are willing to lease to CDOT at a nominal cost. Only one new electronic farebox will need to be purchased, along with the computer and related software for reading and reporting on fares. The fare equipment is included in the budget



Capital Budget

The capital budget (Table B-12) lists the items required for initiating IX service. Most expenses will occur in calendar year 2014 for service beginning in October of 2014.

Table B-12: Interregional Express Bus Capital Expenses - 2014

INTERREGIONAL EXPRESS BUS CAPITAL EXPENSES - 2014		
	Unit Cost	
Vehicles		
13 Over-the-road Coaches	\$600,000	\$7,800,000
1 Vaults & related, including PC		\$17,500
Park-and-Ride Improvements		
<i>Woodman Road</i>		
Option1 - Land Swap with Tiffany Square w/improvements		
Option 2 - Roundabout at Corporate Drive and Mark Dabley Bld	\$300,000	
<i>Harmony Road</i>		
- Grading, gravel, for 150 new spaces	\$172,000	
- Paving and final finish	\$399,000	
Shelters, Benches, Infrared heating for Tejon, Woodman, Monument, Centerra, Ft Collins, and Eagle.		
Total		\$1,000,000
Branding and Pre-Launch Communication		\$200,000
Contingency		\$1,900,000
TOTAL CAPITAL		\$10,917,500



APPENDIX 1: PROPOSED FARES BY STOP

I-25 South Fare Structure							
Between	Walk up	10 Ride		20 ride		40 Ride	
		Total	Fare/Ride	Total	Fare/Ride	Total	Fare/Ride
Colorado Sprngs Tejon/Woodmen and Denver Monument and Denver	\$12	\$108	\$10.80	\$192.00	\$9.60	\$360.00	\$9.00
	\$9	\$81	\$8.10	\$144.00	\$7.20	\$270.00	\$6.75

Note: No passengers will be carried whose entire trip is between Tejon PNR, Woodmen PNR, and Monument

I-25 North Fare Structure							
Between	Walk up	10 Ride		20 ride		40 Ride	
		Total	Fare/Ride	Total	Fare/Ride	Total	Fare/Ride
Fort Collins Harmony and Denver	\$10.00	\$90.00	\$9.00	\$160.00	\$8.00	\$300.00	\$7.50
Loveland and Denver	\$9.00	\$81.00	\$8.10	\$144.00	\$7.20	\$270.00	\$6.75

Note: No passengers will be carried whose entire trip is between Ft. Collins and Loveland



I-70 Fare Structure							
	Denver/Denver Federal Center						
	Walk up	10 Ride		20 Ride		40 ride	
		Total	Fare/Ride	Total	Fare/Ride	Total	Fare/Ride
Glenwood Springs	\$28.00	\$252.00	\$25.20	\$448.00	\$22.40	\$840.00	\$21.00
Eagle	\$22.00	\$198.00	\$19.80	\$352.00	\$17.60	\$660.00	\$16.50
Vail	\$17.00	\$153.00	\$15.30	\$272.00	\$13.60	\$510.00	\$12.75
Frisco/Silverthorne	\$12.00	\$108.00	\$10.80	\$192.00	\$9.60	\$360.00	\$9.00
	Frisco/Silverthorne						
	Walk up	10 Ride		20 Ride		40 ride	
		Total	Fare/Ride	Total	Fare/Ride	Total	Fare/Ride
Glenwood Springs	\$17.00	\$153.00	\$15.30	\$272.00	\$13.60	\$510.00	\$12.75
Eagle	\$12.00	\$108.00	\$10.80	\$192.00	\$9.60	\$360.00	\$9.00
Vail	\$5.00	\$45.00	\$4.50	\$80.00	\$4.00	\$150.00	\$3.75
Denver Federal Center/Denver	\$12.00	\$108.00	\$10.80	\$192.00	\$9.60	\$360.00	\$9.00
	Vail						
	Walk up	10 Ride		20 Ride		40 ride	
		Total	Fare/Ride	Total	Fare/Ride	Total	Fare/Ride
Glenwood Springs	\$12.00	\$108.00	\$10.80	\$192.00	\$9.60	\$360.00	\$9.00
Eagle	\$5.00	\$45.00	\$4.50	\$80.00	\$4.00	\$150.00	\$3.75
Frisco/Silverthorne	\$5.00	\$45.00	\$4.50	\$80.00	\$4.00	\$150.00	\$3.75
Denver Federal Center/Denver	\$17.00	\$153.00	\$15.30	\$272.00	\$13.60	\$510.00	\$12.75
	Eagle						
	Walk up	10 Ride		20 Ride		40 ride	
		Total	Fare/Ride	Total	Fare/Ride	Total	Fare/Ride
Glenwood Springs	\$5.00	\$45.00	\$4.50	\$80.00	\$4.00	\$150.00	\$3.75
Vail	\$5.00	\$45.00	\$4.50	\$80.00	\$4.00	\$150.00	\$3.75
Frisco/Silverthorne	\$12.00	\$108.00	\$10.80	\$192.00	\$9.60	\$360.00	\$9.00
Denver Federal Center/Denver	\$22.00	\$198.00	\$19.80	\$352.00	\$17.60	\$660.00	\$16.50
	Glenwood Springs						
	Walk up	10 Ride		20 Ride		40 ride	
		Total	Fare/Ride	Total	Fare/Ride	Total	Fare/Ride
Eagle	\$5.00	\$45.00	\$4.50	\$80.00	\$4.00	\$150.00	\$3.75
Vail	\$12.00	\$108.00	\$10.80	\$192.00	\$9.60	\$360.00	\$9.00
Frisco/Silverthorne	\$17.00	\$153.00	\$15.30	\$272.00	\$13.60	\$510.00	\$12.75
Denver Federal Center/Denver	\$28.00	\$252.00	\$25.20	\$448.00	\$22.40	\$840.00	\$21.00

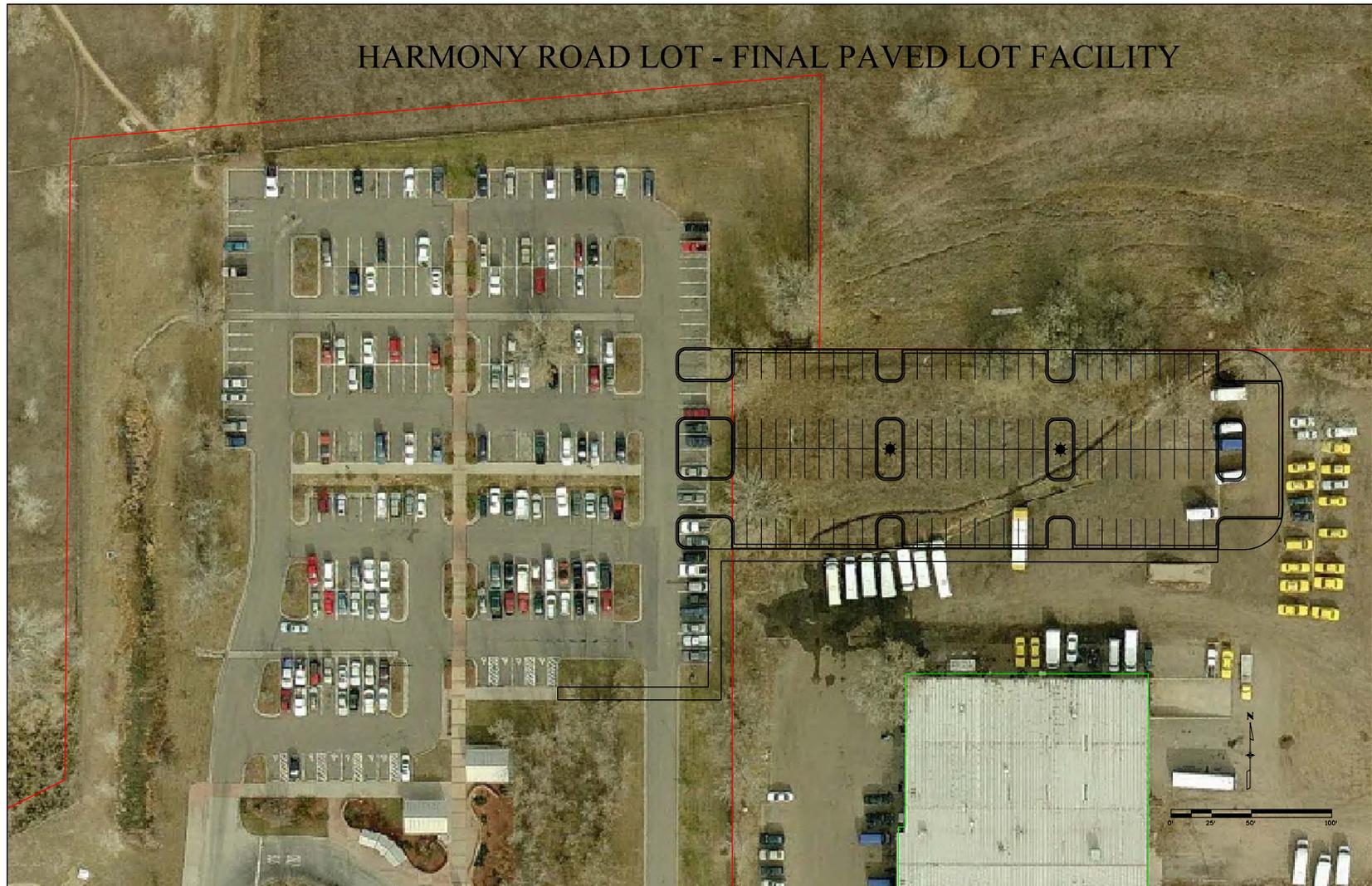
Note: No passengers will be carried whose entire trip is between Downtown Denver and Denver Federal Center.

Figure B-5: Site view of Woodmen Park-n-Ride





Figure B-6: Proposed Harmony PNR Expansion









In the Mountain I-70 corridor, the recommended services are focused on (a) positioning CDOT to develop regional services between Vail and Denver, in line with the PEIS recommendations and (b) filling gaps between systems that are primarily responsible for commuter services. Only the Glenwood Springs - Denver service is proposed for Interregional Express service; the service that would fill gaps is categorized as regional service. The I-70 services are:

- Glenwood Springs - Denver: begin with one round-trip a day that complements the intercity service in the corridor. Expand to two round trips as demand warrants, with the second round trip operating between Vail and Denver.
- Eagle/Gypsum - Glenwood Springs: six or more round trips daily, connecting with services provided by ECO and RFTA. (Regional services operated by local agencies)
- Frisco – Vail: three round trips daily (Regional services operated by local agencies)

Recommendations for Future Development

Monitor initial services including ridership, farebox recovery ratio, and reliability and adjust service levels as appropriate within the budget. Goals, objectives, and service standards are discussed at the end of part one of this report.

Work with partners to address both planning and policy issues related to developing additional services in the Pueblo to Colorado Springs corridor, for mid-range cities and dispersed work sites in the Denver Metro area, and for Larimer and Weld County workers.

Service Contracting

Colorado can benefit from the lessons learned from peer agencies. The availability of contractors varies between corridors so different providers may be able to provide the most cost-effective service in different corridors. It is recommended that RFPs for service contracts be structured to allow entities to bid on various segments of the service or all of the service.

Having more than one contractor reduces the ability to switch vehicles between corridors and to use the same back-up vehicle for all service. It also requires more oversight on the part of CDOT staff. In selecting contractors CDOT will need to balance between these program costs and the rates bid for service.

It is recommended that CDOT:

- Purchase vehicles and lease them to the operator(s), providing oversight on both maintenance programs and service quality;
- Establish a customer information system and website and maintain responsibility for this. While the work may be contracted out (e.g. CDOT may contract with a



university to update and maintain the transit service information or include website and telephone information in the IXB contract) the overall responsibility for this function should reside with CDOT to assure the system is effective and connects with other traveler information.

- Develop passenger facilities adequate to meet the needs of services in each corridor. The existing structure of having CDOT Regions own the park-and-ride facilities and entering into agreements with local entities for minor maintenance is a solid model for owned lots. However, it is anticipated that diverse arrangements will be needed, with CDOT owning some lots, leasing some lots, or leasing spaces in existing lots as services develop. It is recommended that CDOT plan for diverse arrangements in providing for park-and-ride lots.

Fares

Comparing to the peer systems, a farebox recovery ratio of approximately 40% appears to be appropriate for the types of services provided. This will vary between corridors and types of service. Farebox recovery is anticipated to be higher than this for the South I-25 service (50% is a realistic goal) and somewhat lower for North I-25 as it is anticipated that ridership will take longer to develop in the north corridor.

The initial service plan for I-70 is not expected to generate this high of farebox recovery. Over the long term, as an effective network is developed in the corridor, a farebox recovery of around 40% is realistic for the Denver to Vail stretch. Initial levels of farebox recovery may be as low as 10% until the market develops. The farebox recovery for services filling the gaps between Glenwood Springs and Eagle/Gypsum is anticipated to match that of ECO Transit, or be around 20%. Many riders will have ECO Transit or RFTA passes. From the perspective of developing a seamless system for riders, this is one area where revenue sharing is worth investigating.

Overall, however, peer agencies reinforce the concept that revenue sharing is not an important issue as most riders arrive to the stop using their car. For the initial services, the free shuttles in downtown Denver, combined with looped routing between DUS and Broadway will enable passengers to easily reach a wide range of destinations.

Goals, Objectives, and Service Standards

The study process included the development of goals and objectives, and discussion of service standards. The Transit and Rail Advisory Committee's working group on inter-regional express service reached consensus on the goals and objectives presented in the text box on the next two pages. Following this is a discussion of proposed service standards.



Inter-regional Express Bus Service

Goals and Objectives

CDOT will implement a basic system of express inter-regional bus (IXB) service along the I-25 Front Range and I-70 Mountain corridors. This service will primarily address peak-hour commuter needs on two of the state's heavily congested corridors and will establish interregional transit connections between major local transit providers.

GOAL 1: Provide a foundation of regional transit services connecting Colorado Springs, Denver, and Fort Collins on I-25 and the mountain communities along West I-70.

Objective A: Establish core service on North and South I-25 connecting the three major urban areas of Colorado Springs, Denver and Fort Collins by Summer/Fall of 2014.

Objective B: Establish core service on West I-70 by Summer/Fall of 2014.

Objective C: Monitor services to assure they are compliant with best practices and meet standards for reliability, safety, efficiency, and travel time. *(Draft standards attached)*

Objective D: Adopt fare and operating policies for the system.

GOAL 2: Work in partnership with local and regional entities operating transit services, vanpool services, and human service transportation along the corridors to provide well-connected services traveling on State and local roadways.

Objective A: Establish an advisory group to address service, operating, facility, customer information, fare, and financing issues.

Objective B: Work with other jurisdictions to expand services, as warranted based on demand for services. The expansion is anticipated to include additional trips in the initial corridors as well as expansion to additional corridors or to serve communities along the route.



GOAL 3: Develop and maintain adequate financing to meet the needs of the regional commuter bus network.

Objective A: Adopt a budget and financial plan that addresses cash flow, reserve account requirements, capital replacement, and options for capital purchases and improvements.

Objective B: Leverage available resources in support of developing a regional network.

Objective C: Develop shared funding system expansions. This may include growth on the initial core routes and/or expansion of services.

GOAL 4: Support the development of the park-and-ride facilities, stations, and other facilities to meet the needs of travelers in high frequency corridors.

Objective A: Provide park-and-ride facilities, in partnership with local jurisdictions and CDOT Regions, to meet the parking needs of passengers using the Regional Commuter Bus service.

Objective B: Provide for shelters, lighting, ticketing machines, and other amenities at Regional Commuter Bus stops to meet standards for each type of stop.

Objective C: Provide for maintenance and security of park-and-ride facilities in partnership with partners.

GOAL 5: Provide customer information and marketing materials for Regional Commuter Bus services through print and web sources.

Objective A: Develop customer information materials that meet the needs of residents, visitors, and human service programs. Provide customers with information on schedules for the local systems with which the services connect.

Objective B: Brand the system and provide coordinated customer information, tickets, and marketing materials.

GOAL 6: Balance the need for maximum operating revenues with affordability.

Objective A: Develop a fare structure that is market-based with eventual use of smart cards for ticketing to facilitate intra-system transfers.

Objective B: Address issues of transferability with local transit systems for the first and last mile of the trip or for riders who routinely use two systems for their commute.

Objective C: Develop internal advertising on vehicles for additional revenues.



Measuring Performance of Regional Commuter Bus Services

What standards and range of performance is expected for the proposed Regional Commuter Bus service? It is useful to identify the range of performance for similar services, and expected differences that may affect the range of performance. What follows is initial information for several types of recommended performance measures.

Reliability Standards

Considerations in reliability are that these routes travel relatively long distances and may be subject to peak hour traffic congestion, weather/road conditions, and long distances to obtain replacement service. It will be important to allow for peak traffic conditions in setting schedules (peak hour trips will be scheduled for longer travel times) and to provide for arrangements for repairs with transit agencies in the service corridor. The vehicles will be new, so once they are through the initial shake down, maintenance reliability should be good.

Two suggested measures are:

90% of trips will operate within 0 -10 minutes of scheduled times

No more than one road-call every 5,000 revenue miles

Efficiency and Financial Standards

As new routes, it will take time to build ridership. These are also routes that are expected to carry passengers on long-distance trips – the average may be 50 miles per rider – so this characteristic will affect productivity. It is suggested that riders per trip be used rather than riders per mile. With 50-passenger buses, an average of 30 per trip would be excellent, but the question is, what is the minimum that would be acceptable? The answer will likely be affected by the subsidy per trip, but an average of about fifteen may be appropriate as a floor – after the system has time to grow.

Until bids are let, the cost per mile will not be known, but initially the vehicles in the I-25 corridor will only travel in service in the peak direction, except for a single mid-day trip. This should keep the riders per hour at relatively high levels – about double what FREX experienced. This structure will be reflected in the cost per mile, as bidders will have to determine how they can develop driver shifts that will work well.

Work completed for the peer review and *Colorado Intercity and Regional Bus Network Study* provides insights on appropriate ranges for the farebox recovery ratio and subsidy per trip, both critical measures. The tables and graphs on the next pages provide some comparative information on ridership, cost, and mileage. This data was gathered to describe the range of existing services. There may be some differences among operators in how items are measured, but the data is adequate for the purpose of understanding how the services function and the range of values for various measures.



Measures that may be considered to measure efficiency and productivity are listed below. Values have not been assigned, but the comparative information on the following charts help to bracket the numbers where Colorado communities have agreed subsidizing regional transit services makes sense. It will be important to provide fare information and subsidy information as we move forward.

Possible Measures

Riders per trip	Average of XX within 2 years of operation
Cost per passenger trip:	
Subsidy per passenger trip:	Maximum of \$X.XX after 2 years of operation
Farebox recovery ratio:	Minimum of XX% after 2 years of operation
Total Cost per mile:	Maximum of \$X.XX per mile
Total Revenue per mile:	Minimum of \$X.XX per mile

Table B-5: Financial Characteristics of Regional Routes

Corridor	Annual Op. Expense	Length of Corridor	Cost per Passenger	Passengers per Mile	Operating Expense per Mile
Ft Collins-Longmont	\$933,347	31	\$5.05	0.90	\$4.56
Gypsum-Vail, I-70 only	\$1,680,787	40	\$8.55	0.36	\$3.09
Aspen-Glenwood Spgs.	\$10,472,000	40	\$6.90	0.69	\$4.75
Leadville-Vail	\$443,758	37	\$16.35	0.35	\$5.72
Leadville-Frisco	\$78,370	30	\$11.68	0.28	\$3.30
Craig-Steamboat Springs	\$267,551	42	\$11.03	0.31	\$3.46
Telluride-Norwood	\$127,719	33	\$7.29	0.40	\$2.92
Telluride-Placerville	\$103,923	16	\$11.85	0.20	\$2.35
Gunnison-Crested Butte	\$494,527	28	\$7.40	0.57	\$4.20
Ignacio-Durango	\$103,081	24	\$13.62	0.90	\$2.11
Bayfield-Durango	\$103,081	20	\$13.62	0.90	\$2.11
Ignacio-Aztec, NM	\$118,882	36	\$38.79	0.06	\$2.18
TOTAL OR AVERAGE	\$13,993,679	31	\$12.68	0.49	\$3.40



Figure B-2: Passengers per Mile for Regional Routes

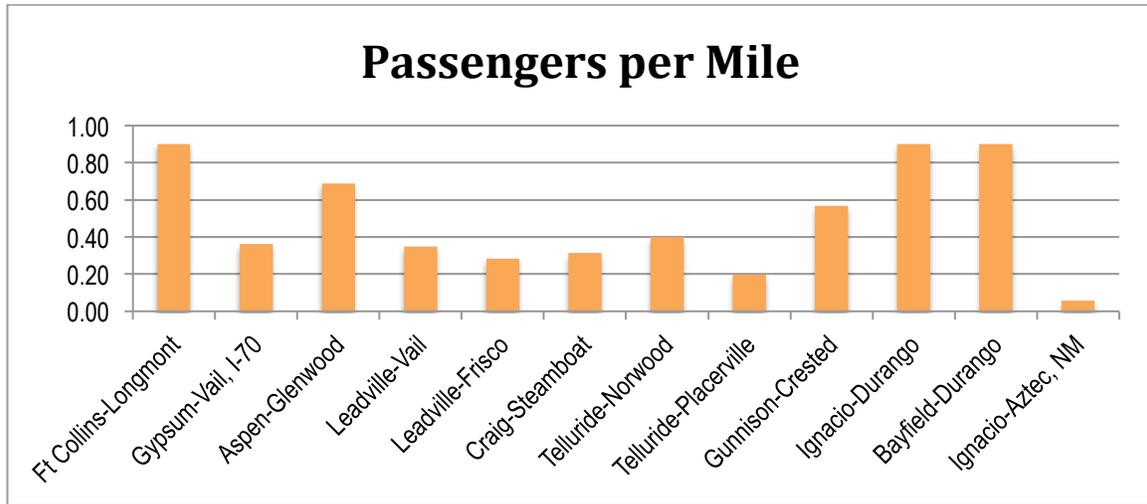
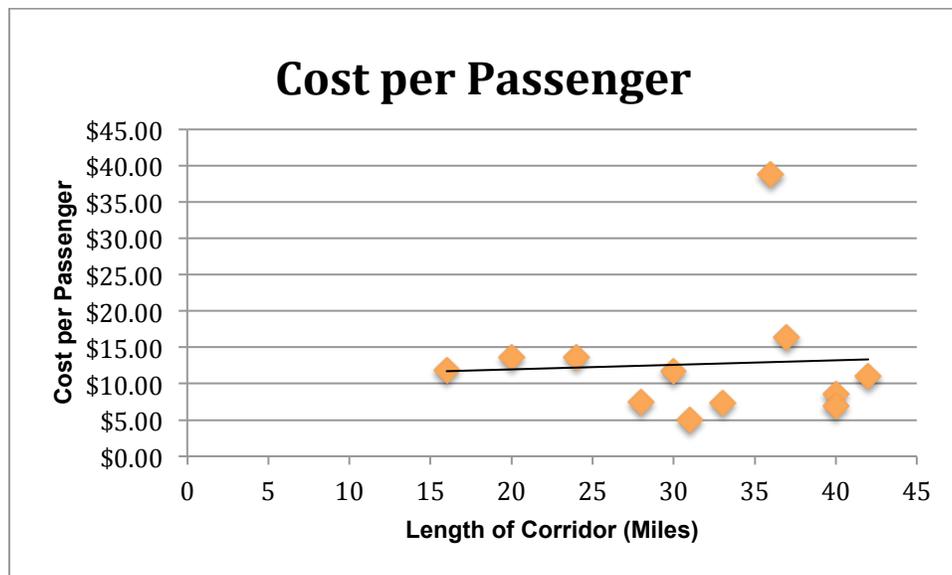


Figure B-3: Cost per Passenger for Regional Routes



Looking at passengers per mile, this measures total boardings per mile. These routes will not have passengers traveling short distances with many on-and-off movements, but rather passengers traveling long distances. If the buses are half-full on average one would only expect a measure of .25-.35 riders per mile – as each passenger will travel 50-70 miles.

The cost per passenger data shows a slight upward increase for passengers traveling longer distances, so for routes lengths of 60-70 miles the costs would be expected to be higher than for routes that are half this length. The number of passengers is also a major factor in the cost per passenger calculation.



Travel Time

The intention of the Regional Commuter Bus service is to operate in an express mode, so travel times should be relatively close to that of a single occupant automobile. The number of stops and the availability of managed lanes will affect travel time. It is anticipated that this number should be in the range of 1.25 to 1.5 times the single occupant vehicle travel time, from passenger pick-up to passenger drop-off. The walk time to and from the stops is not included.

Strive for travel time on Regional Commuter Bus routes that is no more than 1.25 times the auto travel time between primary passenger origin and destinations.

Safety

Again, no comparative data has been collected yet but safety seems to be a measure one would want included as a performance measure.

No more than one accident every X.XXX revenue miles

Part 2 of this report covers the implementation of services, and provides the details of how the first phase of services will be implemented.



PART 2: IMPLEMENTATION OF SERVICES

This part summarizes the service plan and characteristics, capital plan, and financial plan. Total system and individual corridor characteristics are covered.

Service Plan

Three routes are included in the system, serving Colorado Springs- Denver, Fort Collins - Denver, and Glenwood Springs – Denver. Service is designed as express, with limited stops at park-and-rides. It will operate weekdays, and not on major Holidays. Each route is described below.

Colorado Springs – Monument - Denver

This route serves Colorado Springs, Monument, and travels on South I-25 to downtown Denver. Stops are at:

- Tejon Park-and-Ride
- Woodman Road Park-and-Ride
- Broadway and I-25
- Denver Union Station

The last trip in the morning will serve the Colorado Springs Downtown Transit Center as connecting service will be available. Afternoon trips will serve the Downtown Transit Center on request after dropping passengers at the Tejon Park-and-Ride.

The recommended schedule includes five peak hour trips and one mid-day trip, as shown in the schedule below. The schedule is modeled on that run previously by FREX. Travel times are approximate and will need to be refined for final schedules and reviewed with local entities.

Table B-6: South I-25 Proposed Schedule

Trip	Departs Tejon	Arrives 18th & CA		Trip	Depart 19th & Stout	Arrives Tejon
1	5:15 AM	6:45 AM		7	1:35 PM	3:35 PM
2	5:30 AM	7:00 AM		8	3:35 PM	5:35 PM
3	5:45 AM	7:15 AM		9	3:50 PM	5:50 PM
4	6:00 AM	7:30 AM		10	4:05 PM	6:05 PM
5	6:15 AM	7:45 AM		11	4:20 PM	6:20 PM
6	11:30 AM	1:00 PM		12	4:35 PM	7:35 PM

Five buses are required for the peak schedule and these would be over-the-road coaches.



Fort Collins – Loveland – Denver

This route serves Fort Collins, Loveland, and travels on North I-25 to downtown Denver using the busway to speed its travel. Stops are at:

- Harmony Park-and-Ride at I-25,
- Loveland park-and-ride at US 34 at the Outlet Mall in Loveland, and
- Denver Union Station.

The first afternoon trip, departing Denver at 3:52 PM, can serve the South Transfer Center. However, by the time this service begins, Transfort plans to extend the route on Harmony Road to the park-and-ride. City of Loveland Transit (COLT) has also indicated they will be able to provide connecting transit services.

The recommended schedule is for 10 one-way trips, operating weekdays. The North I-25 subcommittee preferred a fifth peak hour trip rather than a mid-day trip. The most flexible approach would be to operate four peak hour trips and then based on ridership either add a fifth trip in the peak or a mid-day trip.

The following table shows four peak hour trips and one mid-day trip as the capital investment is significantly lower. Five peak hour trips require five vehicles while the schedule with four peak hour trips and one mid-day trip requires four vehicles.

Travel times are approximate and need to consider the final stops and expanded HOV lane. In addition, having two buses travel to Denver on Friday evening and return Sunday evening is recommended. Vehicles returning to Denver would be rotated for maintenance. This has been included in the budget.

Table B-7: North I-25 Proposed Schedule

Trip	Departs Harmony PNR	Arrives 17th & Stout		Trip	Depart 18th & Calif.	Arrives Harmony PNR
1	5:30 AM	6:35 AM		6	1:15 PM	2:35 PM
2	5:45 AM	6:50 AM		7	3:52 PM	5:15 PM
3	6:15 AM	7:20 AM		8	4:22 PM	5:45 PM
4	6:45 AM	7:50 AM		9	4:52 PM	6:15 PM
5	11:45 AM	12:50 PM		10	5:22 PM	6:45 PM

Five buses are required for the peak schedule and these would be over-the-road coaches.



Glenwood Springs - Vail – Frisco – Denver

This route serves Glenwood Springs, Eagle, Vail, Frisco, Silverthorne, Federal Center Station, and Denver stops. It is scheduled to operate one round trip daily, to complement Greyhound intercity service operating in the same corridor.

The route is proposed to depart Glenwood Springs at 7:20 AM weekdays, arriving in Denver at 10:40 AM. The route would depart Denver at 5:50 PM, arriving in Vail at 7:25 PM and Glenwood Springs at 11:20 PM. This limited schedule is proposed initially, with the ability to expand to two daily trips once ridership warrants doing so. The second expanded trip is planned to operate from Vail to Denver, and would be scheduled to arrive in Denver earlier in the morning (approximately 9 AM) and depart at approximately 3 PM.

Greyhound routes depart Denver at 12:15 PM (and 12:15 AM), traveling to Vail, and depart Vail at 5:40 AM and 3:55 PM, traveling to Denver. It is proposed that the services are jointly marketed and that an interline agreement be established. This agreement would provide for with each system honoring the tickets issued by the other and provides for marketing the service through Greyhound.

Primary stops are the South Glenwood Station to connect with RFTA's BRT, Eagle, Vail Transportation Center and the Frisco Transportation Center. Stops are also proposed for Denver Union Station and the Denver Bus Center.

One vehicle is required for initial service and an over-the-road coach is proposed.

System Characteristics

Table B-8 on the following page illustrates the overall system characteristics based on the service describe above. A low-end estimate was used and it is estimated that it will take three years for ridership to reach its potential. Initially 13 buses are required as the second I-70 route (Vail-Denver) is not programmed to begin operation at the same time as the other routes but rather will depend on demand.

**Table B-8: System Characteristics**

Characteristic	Colorado Springs	Fort Collins	Glenwood Springs	Vail	System Total
Trips					
Initial 1-way Trips	12	10	2	0	24
Additional Budgeted	<u>2</u>	<u>2</u>	<u>0</u>	<u>2</u>	<u>6</u>
Total Budgeted	14	12	2	2	30
Vehicles					
Peak	5	4	1	1	11
Back-up	<u>1</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>3</u>
TOTAL	6	5	2	1	14
Annual Revenue Miles	305,652	247,780	84,500	53,800	691,732
Daily Ridership					
First Year (50%)	223	103	18	15	344
Second year (60%)	267	124	21	18	412
Third year of operation (80%)	356	165	28	24	549

Fares

Fare Structure

The proposed fare structure is based on a zone system, as shown in Table B-9. The rates are based on those used by FREX, following the recommendations for the rates planned for 2014 with a cash fare averaging \$0.17 per mile. It is comparable to RFTA and other similar services. A fare schedule by stop is included as an appendix to this report and provides an easy reference for fares between any two points.

The fare structure provides for cash fares and multiple-ride tickets, with discounts for purchasing larger quantities of tickets. A multiple-ride ticket is recommended rather than a monthly pass as it will allow for easier future conversion to smartcard technology.

In estimating fare revenues, consideration is given to the proportion of people who will choose each fare type and who will board in different zones. Table B-10 shows the average fare in each corridor based on these factors. These average fare estimates are reflected in the operating budget, where the average fare is multiplied by the annual ridership in calculating average fare revenue.

Assumptions were made based on what was known about the FREX service for the North and South I-25 services. Interlining agreements with private intercity bus services are anticipated to result in significant ridership, particularly in the I-70 corridor. Ridership and revenue estimates will need to be closely monitored as service begins and adjusted as needed.



Table B-9: Zone Fare System

	Approximate Distance	Towns	Cash Fare	10% Off 10-pack	20% Off 20-pack	25% Off 40-pack
Zone A	Up to 35 miles	Glenwood-Eagle, Eagle-Vail, Vail-Frisco	\$5	\$45	\$80	\$150
Zone B	From 35-60 miles	Monument, Loveland, Fort Collins	\$9	\$81	\$144	\$270
Zone C	From 60 - 85 miles	Colorado Springs, Frisco	\$12	\$108	\$192	\$360
Zone D	From 85 - 110 miles	Vail	\$17	\$153	\$272	\$510
Zone E	From 110- 140	Eagle	\$22	\$198	\$352	\$660
Zone F	From 140- 165	Glenwood Springs	\$28	\$252	\$448	\$840

Table B-10: Average Fares

Percent of Riders	Percent of Full Fare	South I-25		North I-25		Glenwood		Vail (2nd Trip)	
		Fare	Per 100	Fare	Per 100	Fare	Per 100	Fare	Per 100
40%	75%	\$8.33	\$333	\$6.75	\$270	\$12.53	\$501	\$10.31	\$413
20%	80%	\$8.88	\$178	\$7.20	\$144	\$13.72	\$274	\$11.00	\$220
20%	90%	\$9.99	\$200	\$8.10	\$162	\$16.25	\$325	\$12.38	\$248
20%	100%	\$11.10	\$222	\$9	\$180	\$16.25	\$325	\$13.75	\$275
Total Fares for 100 Riders			\$932		\$756		\$1,425		\$1,155
Average Fare per Passenger			\$9.32		\$7.56		\$14.25		\$11.55



Operating Budget

The budget in Table B-11 shows three years of operating expenses and revenues. All are based on current dollars and the service characteristics shown in Table B-8. The operating and administrative expenses cover purchased transportation services, and the administrative costs associated with running the program.

It is proposed that the call center for customer information will be contracted out as part of the service package. It is recognized that telephone information will continue to be an important way in which people obtain information about the services so adequate staff time will need to be allocated to the function. Similarly, the contractor would be responsible for lost-and-found, a functional arrangement as the coach operators will turn in articles left on buses at the end of their shifts.

The fare revenues are calculated based on the ridership and average fare estimated above. This results in a 26% farebox recovery ratio in the first fiscal year of operation, growing to a 42% farebox recovery ratio in the third year.

The total annual operating expenses are budgeted at \$3 million for a full year of operation. The net operating expense is projected at just over \$1.7 million in the 2014-15 fiscal year (9 months of service), \$2.0 million in 2015-16, and then dropping to \$1.7 million as fare revenues increase.

Table B-11: Operating and Administrative Expenses

OPERATING EXPENSES FOR FY 2015 – FY 2017			
	Oct 1, 2014 - June 30, 2015	July 1, 2015 - June 30, 2016	July 1, 2016 - June 30, 2017
Purchased Transportation			
Over-the-Road Buses	\$1,985,563	\$2,647,418	\$2,647,418
Administrative Expenses			
Staffing and Related Expenses	\$187,500	\$250,000	\$250,000
Marketing	\$150,000	\$100,000	\$100,000
Fare Media and Supplies	\$1,000	\$1,000	\$1,000
Materials and Supplies	\$1,000	\$1,000	\$1,000
SUBTOTAL	\$339,500	\$352,000	\$352,000
Subtotal Administrative & Operating Expenses	\$2,325,063	\$2,999,418	\$2,999,418
Fare Revenues	\$597,981	\$953,923	\$1,271,252
Farebox Recovery Ratio	26%	32%	42%
Net Operating Costs	\$1,727,082	\$2,045,495	\$1,728,166



Capital Expenses

The capital expenses include the costs of vehicles, upgrading park-and-ride lots, and costs associated with fare collection.

Vehicles

A fleet of thirteen vehicles is recommended, allowing for a spare in each corridor and the following peak vehicles:

South I-25:	5
North I-25:	4
I-70:	<u>1</u>
TOTAL	10

When a second I-70 trip is added an additional vehicle will be required in the peak period, as would the addition of any more peak period trips in north or south I-25. At that point there will be adequate experience with the routes to know if two spares, a 20% ratio, would be adequate.

Park-and-Ride Lot Improvements

While park-and-ride lots are available at most planned stops, capacity and other improvements are needed at various lots. A summary of park-and-ride lots and issues at each is listed below. A total of \$1,000,000 is included in the capital budget for the various improvements to park-and-rides, including signage, shelters and access improvements.

South I-25 Stops

Projected ridership will fill existing lots, although no short-term issues are projected at either Tejon or Monument. With ridership split between Tejon (38%), Woodman (14%), and Monument (38%) the parking requirements would grow to approximately 170 spaces at Tejon, 60 spaces at Woodman, and 170 spaces at Monument park-and-ride.

Tejon Park-and-Ride: Capacity and turning capacity are adequate. Shelter and signage improvements needed.

Woodman Park-and-Ride: The existing lot is at capacity; turning radius is not adequate for over-the-road coaches; entrance is too close to intersection with Corporate Drive. The existing lot is used by employees and customers of the Tiffany Square shopping center, along with a variety of people riding the Mountain Metro bus or meeting for carpools. Tiffany Square was required to build a lot for their customers, and at present it is not used as people prefer to use the lot closer to their destination.



Two options are being explored. The first is to control access to the existing lot, restricting it to bus riders, minor improvements to the lot to provide an adequate radius for the larger over-the-road coaches to circulate (curb and gutter work along with re-striping) and to install a round-about at the intersection to improve vehicle circulation.

The second is a property swap with Tiffany Square, trading the existing public lot for the one constructed by the shopping center. This would allow customers of the shopping center to use the lot closest to their destination while the extra distance would matter little to people riding the bus as they drive to the lot and transfer to cars. It would allow safer access and egress for buses as the entrance is farther from the intersection. The improvements needed would include some re-design to allow room for a bus stop and circulation within the lot (turn-around for buses that would support the weight of the vehicle, curb, gutter, and passenger platform, and some re-striping) and installation of a shelter and signage. Prior to transferring the existing lot, it is anticipated that some environmental remediation would be needed. The location of the two lots is illustrated in Figure B-5.

Woodman Park-and-Ride: Adequate capacity and bus turn around exist. Shelter and signage improvements needed. Largest problem with this lot is the access and egress to I-25. Explore future northbound access to I-25 via a short connection from the frontage road to the weigh station.

North I-25 Stops

Parking capacity is limited at the Fort Collins-Harmony PNR, which runs close to full on many days. There appears to be adequate capacity at the US 34 PNR at present. There is no prior experience to guide how ridership will be split between the Fort Collins-Harmony and the Loveland stops. Ridership estimates are at a low of 70 riders per day and a high of 103 riders per day, based on 2008 estimates and between 88 and 129 per day based on 2015 estimates.

Harmony Park-and-Ride: This lot, owned by the City of Fort Collins, needs expansion, and a 150-car extension has been proposed. The bus turn around and shelters exist, so only minor signage improvements would be necessary. Shelter and signage improvements needed. Largest problem with this lot is the access and egress to I-25. Explore future northbound access to I-25 via a short connection from the frontage road to the weigh station.

Figure B-6 illustrates the proposed improvements to the lot. The lot can be expanded as a gravel lot at a cost of approximately \$172,000. Paving of the expanded area, with the island and lighting noted in Figure B-3 is estimated at \$400,000.