

CHAPTER 4: DEMAND ANALYSIS

A variety of factors influence the demand for transit services. One factor is community values and the support of alternative transportation modes. Other factors include land use patterns, travel patterns within the communities and region, population and employment densities, transportation infrastructure, and the affordability and availability of viable transit services, including connecting services.

This chapter focuses on the potential demand for transit services in the proposed corridors, illustrated in **Figure 4.1**. The corridors evaluated in this 2040 RTE are similar to the corridors evaluated in the North I-25 FEIS completed in December 2011 and in the 2035 RTE.

In addition to the services identified in the North I-25 FEIS, additional services will be needed to connect communities within the region to one another and to the services outlined in the EIS. As a result, nine potential transit corridors were analyzed:

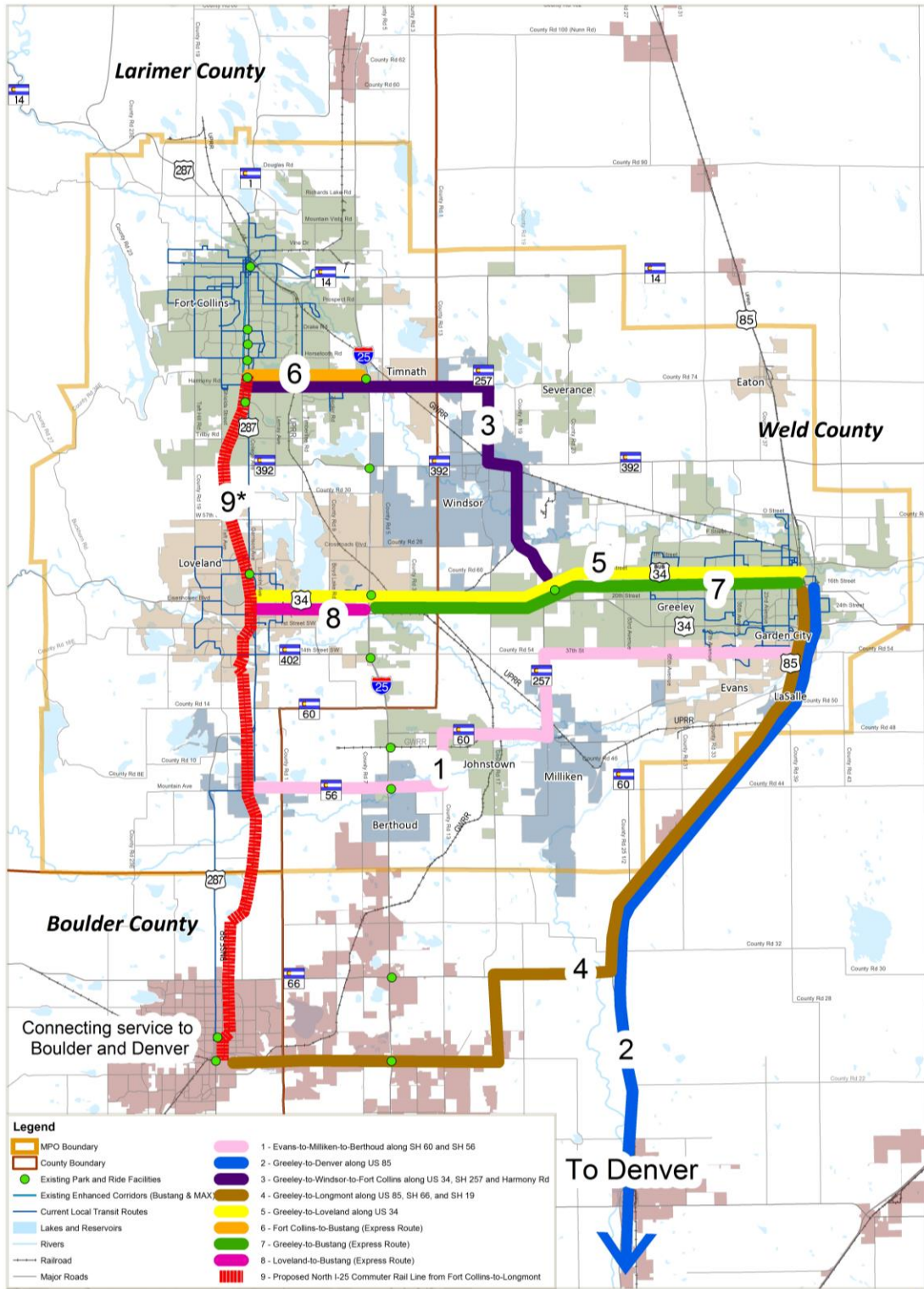
1. Evans-to-Milliken-to-Berthoud along SH 60 and SH 56
2. Greeley/Evans-to-Denver along US 85
3. Greeley/Evans-to-Windsor-to-Fort Collins along US 34, SH 257 and Harmony Road
4. Greeley/Evans-to-Longmont along US 85, SH 66, and SH 119
5. Greeley/Evans-to-Loveland along US 34
6. Fort Collins-to-Bustang (Express Route)
7. Greeley/Evans-to-Bustang (Express Route)
8. Loveland-to-Bustang (Express Route)
9. Proposed North I-25 Commuter Rail Line from Fort Collins-to-Longmont

Tools for calculating future transit demand include basic demographic information and travel model outputs. For this 2040 RTE, the 2040 NFRMPO land use model and travel demand model, with a 2012 base year, evaluated potential transit demand.

The NFRMPO travel model includes trips internal to the region, as well as trips originating or ending outside the region (internal-external or external-internal), and originating and ending outside of the region (external-external). The NFRMPO completed a Household Survey in 2010 and used this information to complete the 2014 update to both the regional land use and travel demand models.

Using the updated regional travel demand model, the current and forecasted 2040 traffic volumes were examined. **Figures 4.2 and 4.3** show the congestion levels are very high on major regional roadways, and traffic begins to move to alternate routes (for example, from US 34 to SH 402 in Loveland); however, these routes also quickly become congested. Given the high levels of congestion, it will be important to emphasize how the various forms of passenger vehicle travel (automobile, carpools, vanpools, and transit) can work together to improve the overall carrying capacity of the roadway network.

Figure 4.1 Regional Transit Corridors for Evaluation



*Adopted corridor, not operational until 2075

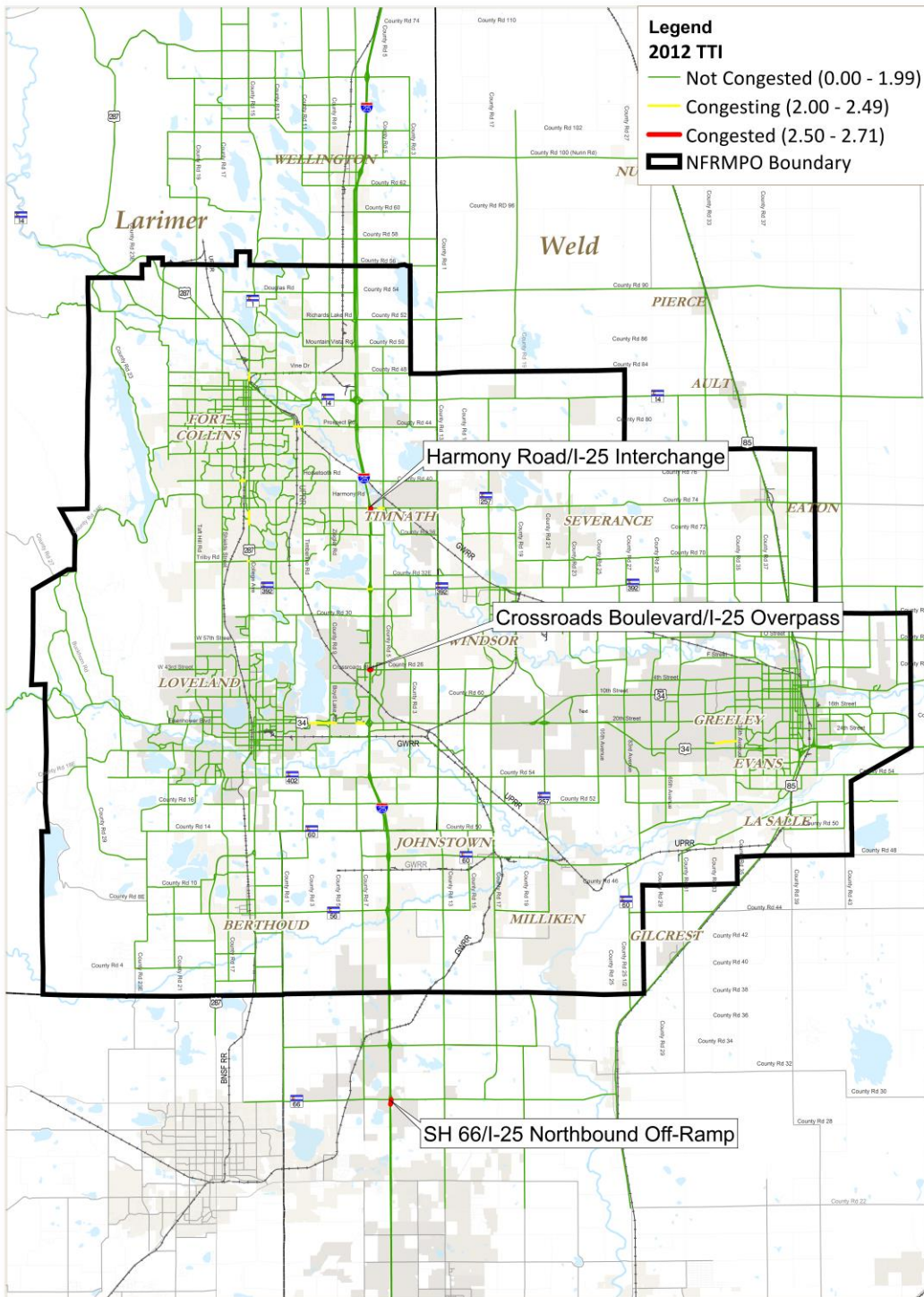
February 2015

0 0.75 1.5 3 4.5 6 7.5 Miles



Figure 4.2 2012 Base Year Model Congestion Levels

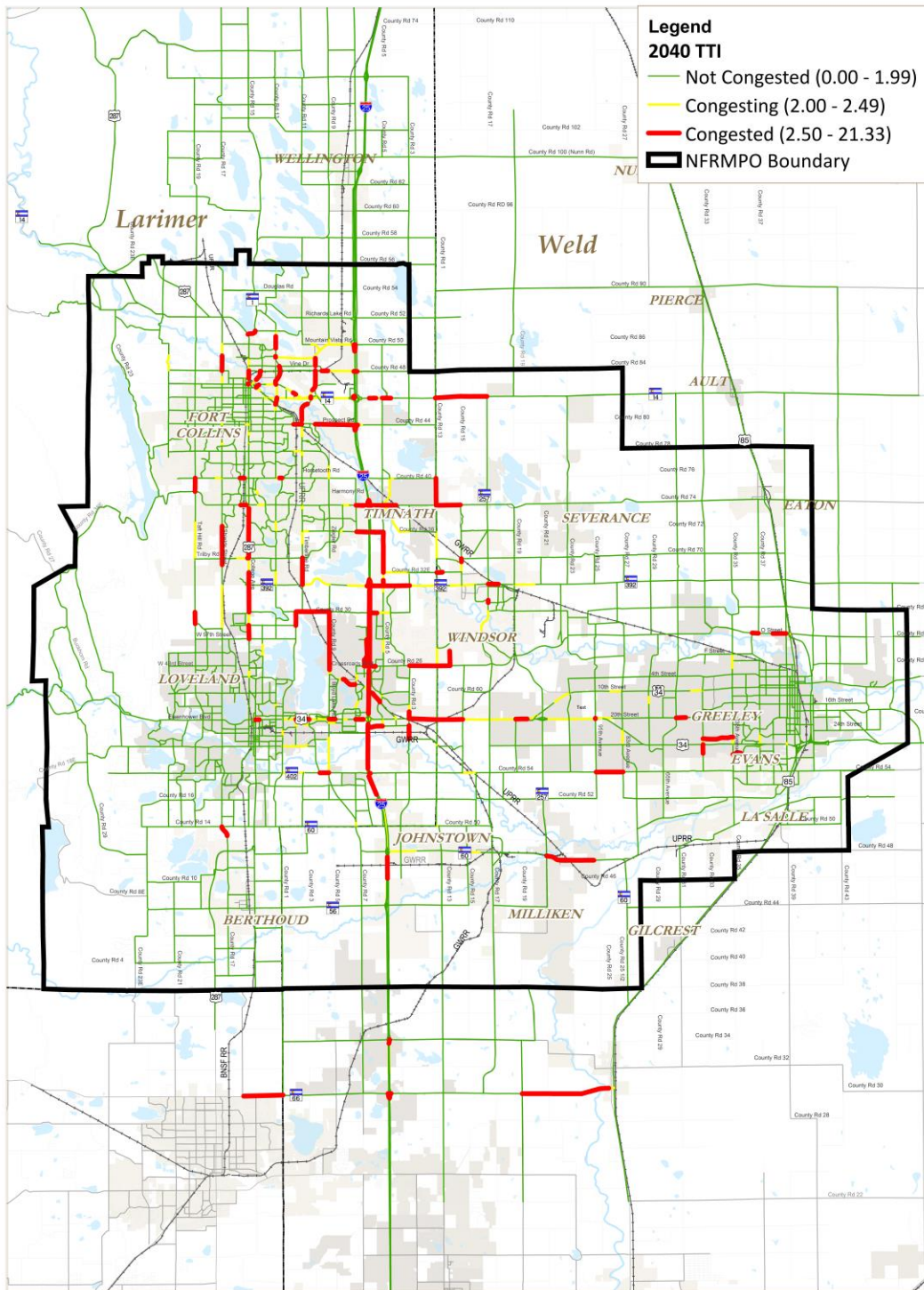
2012 Travel Time Index (TTI)



Feb. 2015
Sources: CDOT, COLT, GET, Transfort

0 0.75 1.5 3 4.5 6 7.5 Miles

Figure 4.3 2040 Model Congestion Levels
2040 Travel Time Index (TTI)



Feb. 2015
 Sources: CDOT, COLT, GET, Transfort
 0 0.75 1.5 3 4.5 6 7.5 Miles

For the proposed transit corridor analysis, staff used the 2040 travel demand model's subregion structure built in the model, detailed in **Chapter 2** and shown in **Figure 2.3**. Each subregion is made up of aggregated Traffic Analysis Zones (TAZs), smaller areas defined for use in travel modeling.¹ These subregions were used to provide information on where trips originated and were destined as well as the regional corridors they are most likely to travel along. The subregions, along with detailed trip tables with calculations for each subregion, are presented in **Appendix C**.

The travel demand analysis included the following steps:

1. Creation of trip matrices for 2012, 2020, 2030, and 2040 to show all daily trips from TAZ to TAZ using the NFRMPO Travel Model.
2. The TAZ trip matrices produced were aggregated by subregion. There are seven subregions in the modeling area. Currently, no fixed-route transit exists or is proposed in subregions 5 (rural Larimer County) or 6 (rural Weld County) and they were removed, leaving five subregions for analysis.
3. The trip matrices were organized by mode share and all transit related tables were used, including: walk to local transit, walk to express, walk to premium, drive to local transit, drive to express, and drive to premium. An example of an express route is the CDOT Bustang on I-25. An example of a premium route is the MAX system in Fort Collins.
4. The trip matrices were validated based on current assumptions in the transit portion of the travel model. Examples include, but are not limited to:
 - a) No fixed-route service currently exists between Greeley and Fort Collins, resulting in zero trips.
 - b) More trips occur inside Fort Collins (subregion 3) due to increased availability of transit service.
 - c) 'Other' (subregion 1) is farther away from transit service resulting in the least amount of trips.
 - d) Trips are allocated between Loveland and Greeley/Evans in year 2020 because of the connection to the CDOT Bustang route.

The evaluation of the zone-to-zone trips showed some important changes as the region moves towards 2040:

- Overall trips nearly double in this time period. In 2012, the model estimates 2.9 Million daily person trips, while in 2040; the model estimates 5.1 Million daily person trips.
- Much of the growth is projected to occur in the middle of the region, along the I-25 corridor – from Timnath south to Mead and from Johnstown north to west Greeley.

¹ Land use model results are typically reviewed and analyzed by TAZ. TAZs are small areas defined for use in travel modeling. They are usually bordered by roadways or geographic features which limit direct travel between TAZs. They are often, but not always, made up of homogenous activity (i.e., all residential activity, all commercial activity, etc.).

SERVICE LEVEL OPTIONS

Four service level options have been identified for the North Front Range regional transit network. The service level options are described in detail in **Chapter 5**. Each reflects a different vision for the level of regional transit services which could be provided by 2040 and the rate at which these services could be developed. The options are:

1. **Status Quo**: Regional services are available in the US 287 corridor, between Fort Collins and Longmont, with the 2016 extension to Boulder. This service would operate at a higher level than FLEX operates today, allowing for anticipated growth in ridership. Service would be provided every 30-minutes in peak hours and hourly the rest of the day on weekdays and on Saturdays. Bustang service would be provided as anticipated by CDOT. No other regional services are provided except for vanpools/carpools.
2. **Basic**: A basic level of regional transit service would be available between communities in the North Front Range region and to Boulder, Longmont, and Downtown Denver, traveling on primary corridors. These services would provide an alternative for residents who wish to use transit or do not have access to automobile transportation. Selected corridors would have services run during the peak hour with four to five trips in the morning and afternoon, weekdays only.
3. **Moderate**: Regional services provide an alternative to automobile transportation, with express trips available on the busiest corridors. Residents could use transit for many trips, with frequent service and Saturday operation in busy corridors. Services within the corridors would vary between peak hour only service with four to five trips in the morning and afternoon to 30-minute service in the peak hours with hourly mid-day service, weekdays only.
4. **High**: Regional transit services would be available in most corridors, connecting to local services in the communities in the North Front Range. Transit options would be available for a full range of trips, operating through the evening hours and on Saturdays and Sundays. Park-n-Ride lots would provide auto access to regional services. Services within the corridors would vary between peak hour only service with four to five trips in the morning and afternoon, 30-minute service in the peak hours with hourly mid-day service, to 15-minute service in the peak hours with 30-minute mid-day service.

The alternatives reflect varying levels of service in each of the corridors identified in **Figure 4.1**. More information on the individual corridors is provided later in this chapter. Each successive alternative builds on the previous one. For example, if the selected

alternative is a high level of service, the region still needs to begin with a basic level of service and build up to the high level.

Both the moderate and high alternatives are supportive of the larger vision of a region connected with future rail service along the US 287 corridor. Both of these visions would develop bus services in the key rail corridors prior to the programmed development of rail services. The key rail corridor is US 287, based on the North I-25 FEIS. The status quo and moderate alternatives recognize the financial constraints on local government organizations. While the basic alternative is a step towards developing regional services, it would not result in the level of service and ridership that is a desirable precursor to regional and/or commuter rail services; however, nothing in these alternatives precludes the development of regional and/or commuter rail services.

Regional Commuter Rail Service

A fifth alternative incorporating regional commuter rail service was also identified to reflect a very high level of services. This alternative can be described as minimizing growth in Vehicle Miles Traveled (VMT) and meeting mobility needs through the construction of a robust regional transit system. With the anticipated population growth in the region, this would require a comprehensive set of strategies including changing land use policies and shifting significant resources from roadways to transit. This alternative would result in rail transit service in the busiest corridor, providing reliable and competitive services between communities on the rail line and to Boulder, Longmont, and Denver. Park-n-Ride lots would be located near most stations. This alternative would also require extensive local transit services within individual communities to connect to these regional corridors.

This alternative reflects the current vision of passenger rail services connecting the North Front Range and the Denver metro area. It also reflects the North I-25 FEIS, where commuter rail service is included, and the **Rocky Mountain Rail Authority High Speed Rail Feasibility Study** (2010), where high-speed rail is proposed along the I-25 corridor. In 2014, CDOT released a draft **Interregional Connectivity Study** which considered technologies, alignments, financing, and travel demand/ridership for the I-25 and I-70 corridors. The planning horizon for commuter rail service included in the North I-25 FEIS is 2075 and beyond the planning horizon of this current effort; however, regional and commuter rail should not be precluded from further study.

While a rail vision for the region has been studied, it is not included in this 2040 RTE analysis for three reasons:

1. Adequate analysis is beyond the scope and time horizon of this study, making accurate comparisons difficult; however, regional rail is being addressed outside of this planning effort. CDOT's Division of Transit and Rail completed the **Colorado State Freight and Passenger Rail Plan** in 2012. The approval of this plan by the Colorado Transportation Commission

in March 2012 allows CDOT to be eligible for Federal Railroad Administration (FRA) funds.

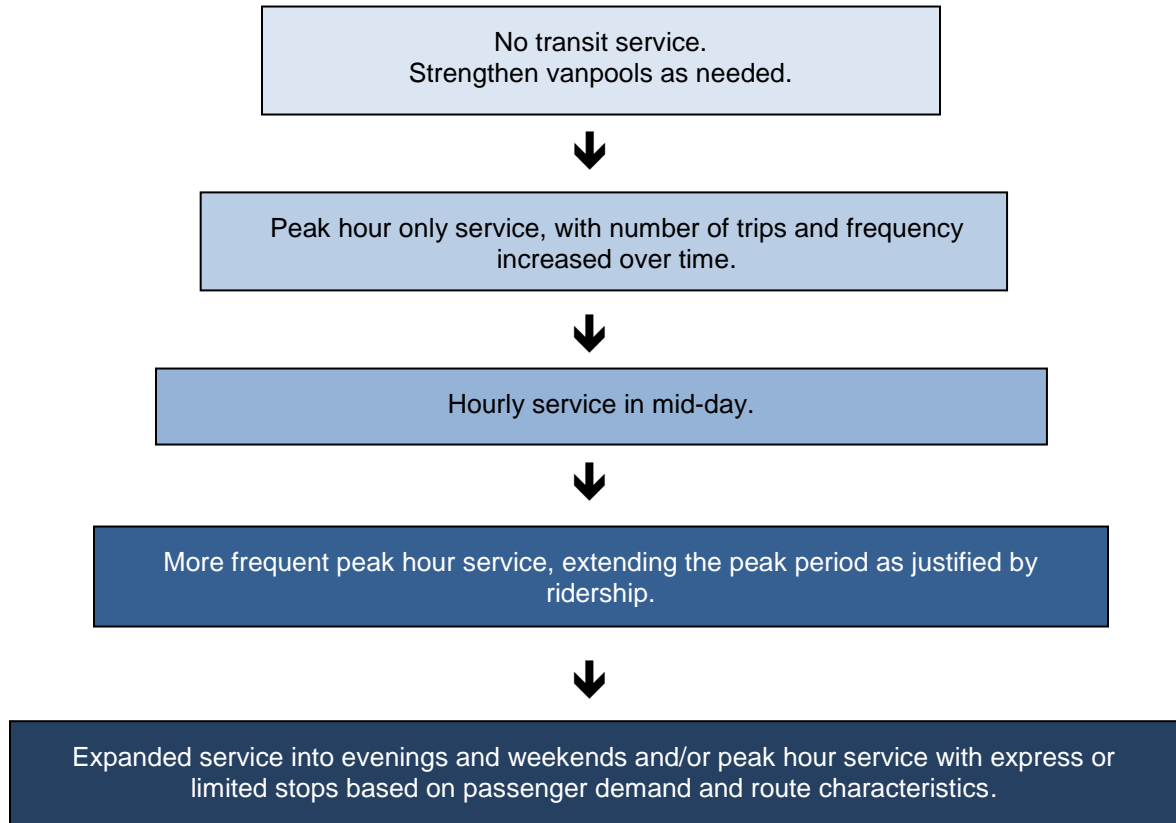
2. The stakeholders for such an analysis and the format for public participation and involvement are not adequate to address such a major regional policy discussion; and
3. The focus of this plan is on building a foundation for regional transit services.

COMPARING SELECTED SERVICE ALTERNATIVES

To function effectively in the transportation network, regional transit services must be integrated with local transit services, park-n-ride facilities, and with other travel modes including bicycle and pedestrian connections. In the Status Quo, Basic, and Moderate alternatives, vanpools and carpools will serve an important role in offering connections where transit services are limited, especially for areas without direct transit connections on one or both ends of the trip. Even with the High alternative, vanpools and carpools would continue to play an important role in providing a diverse range of transportation options. Active promotion of the linkages between modes, Transportation Demand Management (TDM) techniques, and support for pedestrians and bicyclists is essential at all service levels.

Specialized transportation will continue to be provided at the local level, with local providers connecting individuals who require assistance to regional trips. Volunteer driver programs will also continue to be an important part of the regional system. Specifics for which corridors will feature service are shown in **Table 5.1**. For the Basic alternative, only local connections and existing regional connections will be available for the general public. For the Moderate and High alternatives, scheduled trips are included between the most common destinations within the North Front Range region. The Moderate alternative includes three express trips per day in the busiest corridors within the region, one each in the morning, mid-day, and late afternoon. The High alternative expands this to five trips per day in the busiest corridors, with two trips in the morning and evening peaks, and one trip mid-day.

The development of transit service is illustrated in **Figure 4.4**. The growth and development of transit service in each corridor follows the same pattern. The application of this development for each alternative is illustrated in **Table 4.1**.

Figure 4.4 Development of Transit Service

For this analysis, it is useful to compare the estimated ridership for the four alternatives. **Table 4.1** identifies each corridor and the estimates for daily ridership demand in both directions. The estimates in **Table 4.1** reflect the ridership numbers from the NFRMPO travel demand model and the service levels discussed in detail in **Chapter 5**. The Status Quo alternative only considers additional FLEX service, which explains the lack of ridership on the eight corridors; however, as funding and service levels increase, ridership would increase as well.

Travel models are calibrated using real-world ridership and vehicle counts to ensure the ridership and traffic volumes predicted by the model match the observed volumes in the initial year. The difficulty with this method is that these are new transit service corridors with no ridership with which to compare.

Table 4.1 Comparison of Potential Daily Ridership by Corridor

Corridor	NFRMPO Travel Model Analysis for 2040			
	Status Quo	Basic	Moderate	High
1: Evans-to-Milliken-to-Berthoud along SH 60 and SH 56	0	0	203	37
2: Greeley/Evans-to-Denver along US 85	0	0	358	233
3: Greeley/Evans-to-Windsor-to-Fort Collins along SH 257 and Harmony Road	0	1,624	1,119	1,427
4: Greeley/Evans-to-Longmont along US 85, SH 66, and SH 119	0	0	0	300
5: Greeley/Evans-to-Loveland along US 34	0	1,581	1,535	2,270
6: Fort Collins-to-Bustang (Express Route)	0	4	18	2
7: Greeley/Evans-to-Bustang (Express Route)	0	0	71	6
8: Loveland-to-Bustang (Express Route)	0	0	38	4
FLEX Route	1,243	1,496	1,582	1,731
TOTAL	1,243	4,701	4,924	6,010

Source: NFRMPO 2040 Regional Travel Demand Model, 2015