Kern Council
Of Governments

Kern Council of Governments

COMMUTER RAIL FEASIBILITY STUDY

JULY 20, 2012

IBI GROUP

In association with:
Fehr & Peers

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Executive Summary

Kern Council of Governments (Kern COG) initiated the Commuter Rail Feasibility Study to examine a set of alternatives for providing commuter rail service within the Bakersfield metropolitan area and surrounding portions of Kern County, as well as within the Eastern region of the county. The study concludes that some commuter rail service in Kern warrants further study.

The study effort includes the review and summary of previous studies and reports that have identified potential transportation, land use and commuter rail development planning in Kern County. The report builds on the existing and forecast future demographic conditions within the county, as well as example commuter rail case studies throughout the country which are presented for comparison purposes.

Six potential commuter rail corridors are examined in the study effort, utilizing existing freight rail corridors. The objective of this study is to identify corridors that may be feasible for future commuter rail service, along with potential station locations that would serve these corridors. This study is intended to lay the groundwork for more detailed future study efforts that would define operational characteristics and costs at a greater level of detail within the corridors determined to be feasible.

This study included extensive involvement and input from Kern COG staff, as well as members of the study Steering Committee. This committee included representatives from Caltrans, Kern County, Golden Empire Transit, the California High-Speed Rail Authority, City of Bakersfield, City of Delano, Fresno Council of Governments (COG), County of Los Angeles, the Altamont Commuter Express, and the Southern California Regional Rail Authority.

STUDY AREA

This report focuses on examining the feasibility of implementing commuter rail service in Kern County. Five potential corridors focused on the metropolitan Bakersfield area are studied along with the expansion of the existing Metrolink Antelope Valley Line from its current terminus in Lancaster to Rosamond, Mojave, Tehachapi and California City. The proposed route alignments for the studied corridors are illustrated in Figure E.1 and E.2.

Figure E.1 - Study Area of Bakersfield Region

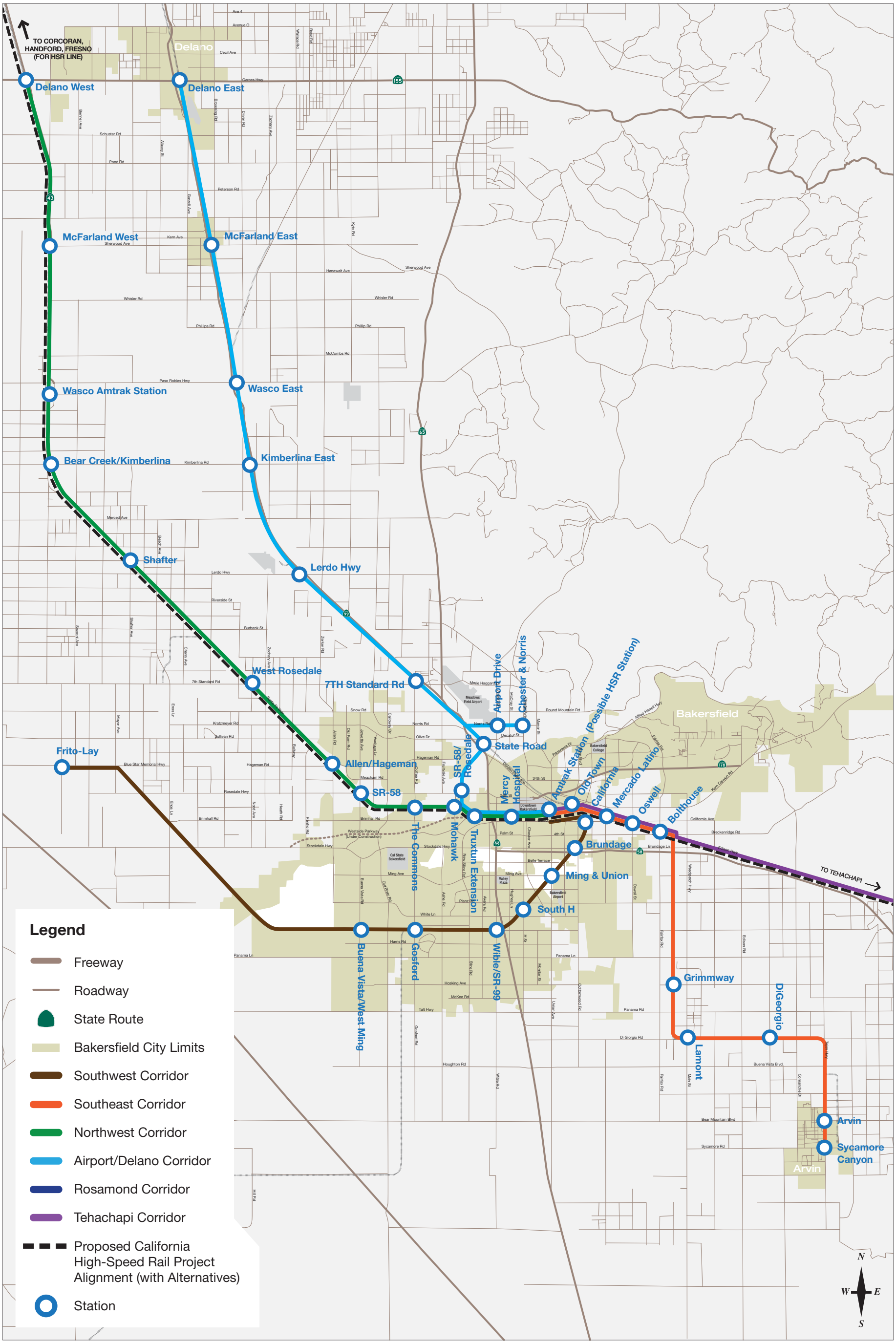

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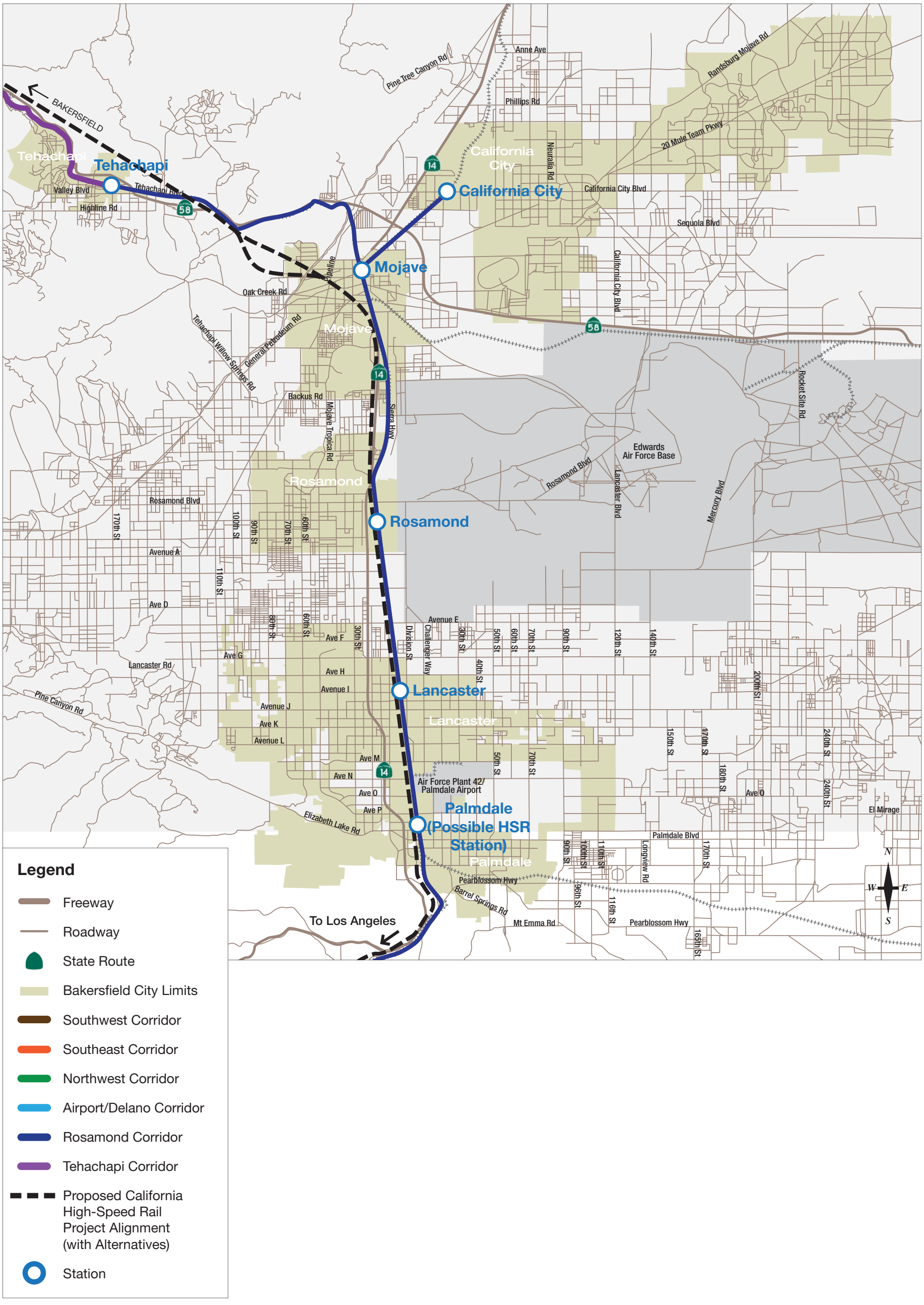
Figure E.2 - Study Area of Tehachapi Region



BACKGROUND REPORTS

A review of existing reports was conducted to capture transportation planning efforts in Kern County, which may influence or impact the assessment of commuter rail services. Several ongoing and current transportation plans were reviewed along with their results and recommendations in order to obtain a basic understanding of the previous work that has been completed in the study area. The reports used are summarized below:

- 2011 Kern COG Regional Transportation Plan - A commuter rail service was suggested as a post-2035 project.
- Golden Empire Transit (GET) Short-Range Transit Plan - Transit improvements such as improved routes to service employment clusters, implementation of bus lanes, local transit coordination.
- GET Metropolitan Bakersfield Transit System Long Range Plan - Focus on increased service frequency, grid network routing, and bus rapid transit (BRT) service.
- Metropolitan Bakersfield General Plan - Provide safe streets that create a positive image of Bakersfield. Improvements to increase transit, bicycles and walking also are recognized.
- Kern County General Plan - Plan for all transportation modes, reduce environmental effects and support of Land Use planning.
- Kern Regional Blueprint - The preferred growth alternative favors more walkable and transit accessible areas.
- Greater Bakersfield Vision 2020 - Recommendations include increasing pedestrian and bike routes, completion of Route 58, expansion of the public transportation system, and obtaining community input for the California station.
- San Joaquin Valley Commuter Express Transit Study - Explore subregional vanpool services, provide a vanpool and ridesharing match website, study express bus services between Lancaster and Edwards Air Force Base, and develop a plan for investing in commuter rail.
- California High-Speed Rail Authority (CAHSR) Business Plan - Plans for a station in Downtown Bakersfield. Completion of the “Bay to Basin” link between San Jose and the San Fernando Valley is proposed by 2027.
- Senate Bill 325: Central California Rail Authority - Maintain short freight rail corridors in service while preserving the existing right-of-way and acquire, own, operate and lease railroads within its jurisdiction.

CASE STUDIES

The proposed case studies identified in this report are intended to provide insight into the operational characteristics, cost information, and thresholds associated with commuter rail lines in the Western United States. Table E-1 summarizes nine existing commuter rail systems examined for this report.

Table E-1: Summary of Case Studies

Commuter Rail	Summary
North County Transit District (NCTD) Coaster	Commuter rail service connecting Oceanside in the north to Downtown San Diego in the south.
New Mexico Rail Runner Express	Diesel-electric locomotives operating on a combination of existing rail tracks and newly constructed tracks, providing commuter service between suburban areas south of Albuquerque, and Santa Fe.
Southern California Metrolink	An established regional commuter rail system serving Los Angeles and the surrounding areas of Southern California.
Utah FrontRunner	Connects the larger Salt Lake City region with 88 miles of track, parallel to I-15.
Altamont Commuter Express (ACE)	ACE serves an 86 mile corridor, connecting Stockton and San Jose. Provides connections to BART, Caltrain and Amtrak for daily commuters.
NCTD Sprinter	A diesel multiple unit (DMU) passenger rail line connecting Oceanside and Escondido in Northern San Diego County.
TriMet Westside Express Service (WES)	Serves the Portland, Oregon area as a suburban commuter rail using existing freight tracks. The 14.7 mile route provides cross-town rail service and does not serve downtown Portland.
Austin Capital MetroRail	Operates on 32 miles of existing freight tracks, serving the Greater Austin, Texas area.
Trinity Railway Express (TRE)	Connects the cities of Dallas and Fort Worth, Texas. The line has 10 stations and 34 miles of track, and operated since 1996.

By studying the above commuter rail systems, a few characteristics are noted for a potential commuter rail network implemented in Kern County. Some of these are:

- Each service (with exception of the Sprinter line in San Diego County) operates with an end destination at a major regional employment center or multiple employment centers.
- All the systems have distance based fares.
- Average station spacing is typically between 5.2 and 12.2 miles apart.
- The most common choice of train type is a diesel locomotive with bi-level passenger cars.

This analysis of existing commuter rail systems allows for identifying the most appropriate features to be planned for and eventually implemented within Kern County.

INITIAL SCREENING

The process for screening the proposed commuter rail corridors and stations involved a three- step process. The initial screening analyzes each corridor and proposed station based on a set of evaluation criteria (including socioeconomic data, costs, operations, etc.) to determine the “need” for a particular station and/or corridor based on forecast Year 2035 conditions. The secondary screening analyzes near term (Year 2020) conditions along the corridors at stations identified in the

initial screening as potentially feasible by 2035. This layer of screening also looked to identify a feasible and logical near-term commuter rail network for the region, based on socioeconomic data, travel patterns, availability of rail corridors, and construction and operational efficiency.

The first two layers of the screening process resulted in the identification of two alternatives for advancement to the ridership modeling stage, which represented the third layer of the screening process. These alternatives are shown in Figure E.3 and E.4. Discussions with Kern COG and the study Steering Committee resulted in the selection of Alternative 1 as the preferred choice for the ridership modeling effort conducted for this study. The remaining corridors were acknowledged as viable corridors and recommended for future study as part of follow-on study efforts.

Figure E.3 - Alternatives 1 and 2 in Bakersfield Region

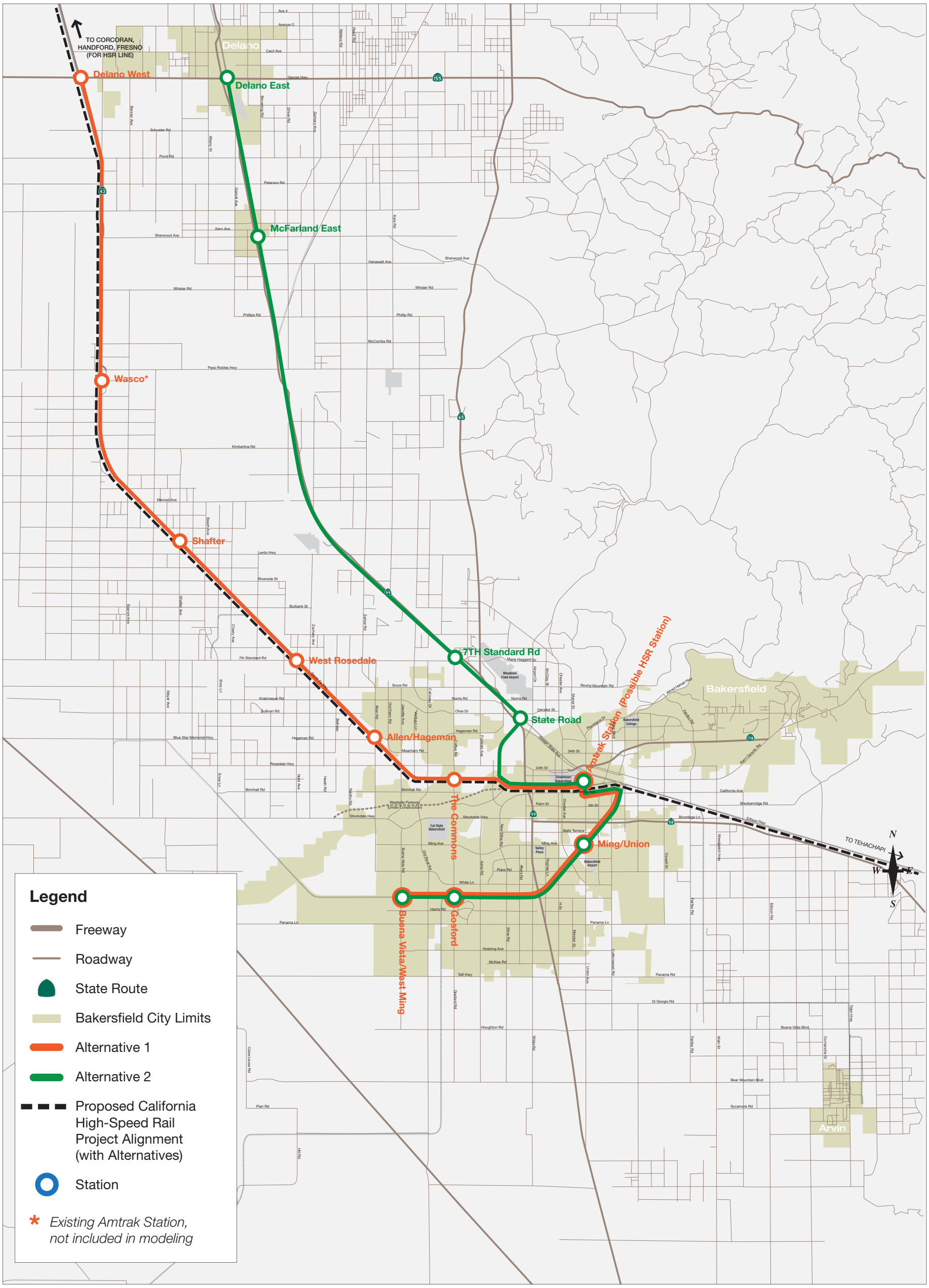
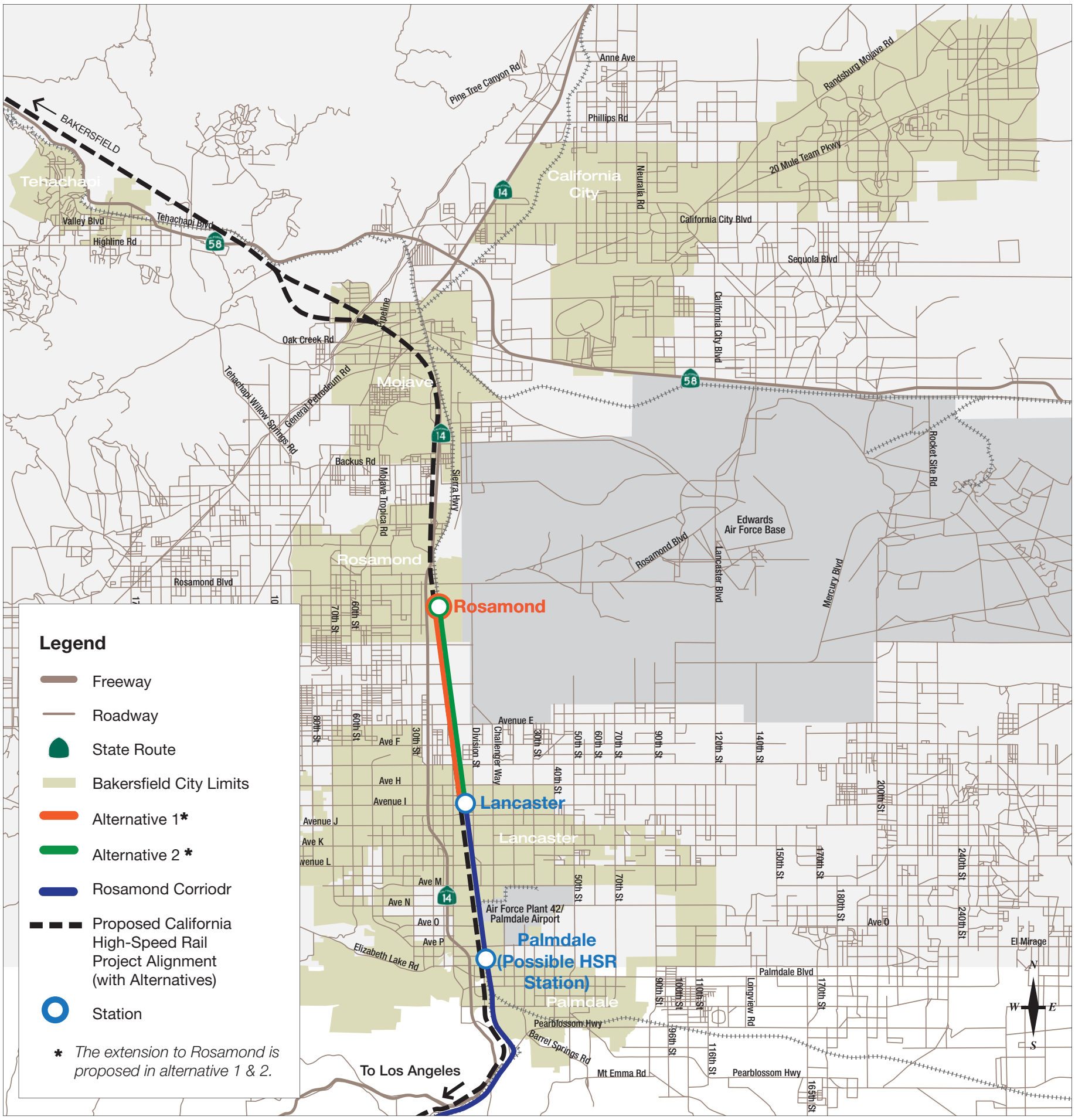


Figure E.4 - Alternatives 1 and 2 in Tehachapi Region



SYSTEM MODELING

The alignments selected for ridership modeling are the Northwest Corridor between Delano and Downtown Bakersfield, the Southwest Corridor between Buena Vista and Downtown, and an extension of the Metrolink Antelope Valley line to Rosamond. Station locations included in the development of ridership forecasts are shown in Figure E.5 and identified below:

- Northwest Corridor
  - Delano West
  - Wasco*
  - Shafter
  - West Rosedale
  - Allen/Hageman
  - The Commons
  - Downtown Bakersfield
- Southwest Corridor
  - Buena Vista
  - Gosford
  - Ming/Union
  - Downtown Bakersfield
- Rosamond Corridor
  - Rosamond

*Existing Amtrak Station, not included in modeling

The ridership modeling effort was completed using a sketch-planning model developed by IBI Group's sub-consultant Fehr & Peers. This model has been utilized previous for several other commuter rail properties in California. The ridership model used for the Altamont Commuter Express (ACE) was adapted for use in this study. Since this model has already been used in the San Joaquin Valley and the serve provides a similar operation, it was felt that this model would provide a reasonable forecast for Kern County.

Figure E.5 - Corridors and Stations Selected for Ridership Modeling

Weekday ridership forecasts for the Northwest, Southwest, and Rosamond corridor are shown in Table E-2 for a year 2035 condition both with and without the planned California High-Speed Rail project.

Table E-2: Year 2035 Ridership Model Forecasts (weekday boardings)

Corridor	2035 Weekday Boardings without CAHSR	2035 Weekday Boardings with CAHSR
Northwest	894	1,012
Southwest	511	620
Rosamond	273	333

These ridership forecasts shown in Table E-2 are lower from the opening year actual ridership figures experienced by several recently opened commuter rail services in the Western United States. Given the low ridership forecasts and significant costs associated with implementing commuter rail services, it would appear that implementation of commuter rail within the Metro Bakersfield portion of Kern County is not warranted before 2035. However, if implementation of the proposed California HSR Initial Construction Segment (ICS) moves forward, it could create a more reasonable environment for the implementation of commuter rail service between Delano and Bakersfield. At a minimum, the potential add stops to the existing Amtrak San Joaquin service northwest of Bakersfield, and the potential for reverse commute service warrants further study.

Additionally, the extension of commuter rail service from Lancaster to Rosamond appears to be conceptually feasible and potentially warranted depending on discussions with UP and the Southern California Regional Rail Authority (SCRRA) with regard to capacity (operational and physical) of the rail corridor between these two communities.

Strategies to increase potential ridership should focus on improving connections from proposed commuter rail stations to nearby employment centers (military, prisons, etc.). Other factors affecting ridership forecasts include the relatively limited levels of traffic congestion forecast in Kern County in 2035 and the absence of parking charges in Downtown Bakersfield. Increased traffic congestion and the introduction of parking costs could have a positive impact on anticipated ridership levels.

COORDINATION WITH HIGH-SPEED RAIL PROJECT

This feasibility study has taken an initial look at the operation of commuter rail services in the BNSF corridor (identified as the Northwest Corridor), which is used as the existing Amtrak San Joaquin corridor and parallel to the proposed alignment for the California HSR project. The initial service considered for ridership modeling assumed four peak period trains operating on weekdays. Inbound trips to Downtown Bakersfield would occur in the AM peak and outbound trips would occur in the PM peak.

There are two potential scenarios for this service to be accommodated within the BNSF corridor. The first scenario would be for the commuter rail service to operate within the BNSF corridor in addition to the existing six daily roundtrip Amtrak San Joaquin trains. This operation would require that Kern COG negotiate the use of four additional weekday round trip slots within the BNSF corridor. Discussions with BNSF regarding the capability or capacity of the corridor to accommodate these four additional round trip trains have not occurred as part of this study. These

discussions would be a key element of any follow-on study effort, particularly to determine if additional rail infrastructure, such as a second mainline track, would be necessary to accommodate the increased passenger service.

However, the low ridership forecasts identified in this report would not appear to justify implementation of a commuter rail service in the BNSF corridor within the Year 2035 time horizon in the absence of the California HSR project.

A second scenario for operations would be tied to the ICS of the California High-Speed Rail (HSR) project. Under this second scenario, the Amtrak San Joaquin trains would relocate from the BNSF corridor to the ICS corridor, allowing the six existing daily roundtrip slots in the BNSF corridor to be reallocated to a proposed commuter rail service in Kern County. This scenario does require the construction of a second mainline track in the BNSF corridor between Wasco and Calloway Drive in Bakersfield. Ridership forecasts with the HSR project are higher than those for the scenario without the service. Additionally, the desire to provide local connections via rail to the HSR service could help to justify potential implementation of commuter rail service if the California HSR project proceeds.

Figure E.6 illustrates the location of the proposed California HSR ICS. Additionally, this figure highlights the limits of a potential double track of the BNSF corridor necessary to close the gap between the ICS terminus near Wasco and Downtown Bakersfield. This gap closure would help to provide sufficient capacity within the rail corridor into Downtown Bakersfield until further extension of the HSR corridor occurs to Bakersfield and points south. Both scenarios would preserve passenger rail service to Wasco.

Figure E.6 - HSR ICS and Double-track in Bakersfield

RECOMMENDATIONS AND ACTION PLAN

The purpose of this study effort was to identify the initial feasibility of implementing commuter rail services within Kern County and to provide Kern COG with an action plan for advancing the planning and analysis of commuter rail services in specific corridors within the region.

The analysis completed as part of this study finds that limited implementation of commuter rail services within Kern County would be recommended only if certain conditions are present. Specifically, the potential feasibility of service is highly dependent on the presence and implementation of the California HSR project and potential future discussions and negotiations with BNSF, UP, and SCRRA (Metrolink) regarding potential capacity for operations.

In general, the forecasted ridership for the modeled corridors that would connect to Downtown Bakersfield would not appear to justify the significant costs associated with the implementation of a new commuter rail service, particularly given the cost of purchasing new rail vehicles. The low ridership forecasts anticipated through the year 2035 are a result on the low forecast levels of congestion in the region through this horizon year. Further study is recommended on adding stops to existing Amtrak San Joaquins inter-city rail service.

If the California HSR service is implemented before 2035, there may be justification for Kern COG to offer some limited commuter rail services between Bakersfield—Delano or Bakersfield—Wasco/West Delano, and perhaps to locations south of Bakersfield in Arvin and Buena Vista (southwest Bakersfield). In these cases, the commuter rail service could also serve as a local feeder to the HSR station in Bakersfield. Should this condition materialize additional study of the pros and cons and potential ridership for a commuter rail service in the BNSF corridor and UP corridor between Bakersfield and Delano/West Delano is warranted. This situation could also allow for Kern COG to lease unused Amtrak rail rolling stock, significantly reducing the start-up cost for commuter rail service.

Additionally, the extension of the Metrolink Antelope Valley Line from Lancaster to Rosamond may be feasible depending on the result of recommended discussions and negotiations between Kern COG and SCRRA and Union Pacific. The ridership forecast for this station is reasonable for a single station extension. However, there are significant operational and physical corridor questions that would need to be addressed through the recommended negotiations and a more detailed study of this connection. Ridership could benefit from a High Speed Rail Station in Palmdale if the project moves forward.

Based on these findings, the following recommendations and action plan are organized into short-term (1-5 years), mid-term (5-15 years), and long-term (15+ years) horizons with the objective of providing Kern COG with program to follow for further planning, identification of funding sources, and potential implementation of service by the year 2035.

Short-Term Recommendations (1-5 years)

- Initiate discussions with the Southern California Regional Rail Authority (SCRRA) regarding the future extension of the Metrolink Antelope Valley Line from Lancaster to Rosamond. This extension of service could require that Kern COG join the SCRRA JPA.

- Initiate discussions with Union Pacific (UP) regarding the availability of operating capacity and necessary track upgrades that may be required for the future extension of the Metrolink Antelope Valley Line from Lancaster to Rosamond.
- Initiate discussions with State to negotiate adding stops to the existing Amtrak San Joaquins service Between Bakersfield and Wasco.
- Continue to monitor the advancement of the California High-Speed Rail project, with a particular focus on understanding physical rail infrastructure improvements planned in Kern County and future operations. Feasibility of commuter rail service in the Bakersfield metropolitan area is highly reliant on the implementation of HSR service.
- If construction of the High-Speed Rail Initial Construction Segment proceeds, conduct a follow-on Phase 2 study of commuter rail services to further analyze the pros and cons of the BNSF and UP rail corridors between Bakersfield—Delano or Bakersfield—Wasco/West Delano, and to develop detailed ridership forecasts for these corridors.
- As part of the Phase 2 study above, initiate discussions with BNSF and UP regarding the negotiation of potential operating rights within these existing freight corridors. These discussions will also help to define whether additional mainline tracks are planned by either operator or would need to be implemented as part of a future commuter rail project.
- As part of a phase 2 study research the potential for a reverse commute train run to outlying employment centers (prisons, military bases, etc.) and the potential benefit of operating rail services in both directions.
- Initiate discussions with other COGs in the San Joaquin Valley to determine if support exists for the recently formed CCRA JPA or other entity to potentially serve as an operator of a future commuter rail service. This approach could also allow for future expansion of service into additional counties participating in the CCRA JPA if ridership demand warrants.
- Initiate discussions with COGs to the north to preserve and expand existing passenger rail service and analyzing extension of commuter rail service in the south valley counties.

Mid-Term Recommendations (5-15 years)

- Advance the design and definition of an extension of the Metrolink Antelope Valley Line to Rosamond.
- If the HSR ICS proceeds into construction:
    - Identify a preferred corridor (BNSF or UP) to connect Bakersfield and Delano with a new commuter rail/HSR feeder service.
    - Begin efforts to identify potential funding sources for any infrastructure improvements in the BNSF and/or UP corridors that would be necessary to permit initiation of commuter rail operations.
    - Work with GET, KRT, Amtrak Thru-Way Bus, and other local transit providers to develop a series of convenient circulator bus services that would connect riders at

destination stations with nearby employers that are located beyond walking distance from the commuter rail stations.

Long-Term Recommendations (15+ years)

- Finalize the necessary JPA requirements with SCRRA and implement the extension of Metrolink service to Rosamond.
- If the HSR ICS proceeds into construction:
    - Select the preferred governing and operating agency for a commuter rail service, whether this is the CCRA JPA, Kern Regional Transit, Golden Empire Transit, or another agency.
    - Select a preferred corridor (BNSF or UP) for the initial implementation of commuter rail services within the San Joaquin Valley portion of Kern County based on study efforts conducted in the Short-Term and Mid-Term horizons.
- Pursue the appropriate funding sources (Federal Small Starts, etc.) necessary to implement the proposed commuter rail improvements.
- Reassess the feasibility of commuter rail in the other studied corridors based on demographic growth experienced in the intervening 15 years and forecast growth through new established horizon years (2050, 2060, etc.).
- Explore the potential for purchasing the existing rail rights-of-way along the Southwest and Southeast corridors studied as part of this report. Purchasing the rail right-of-way would allow a local entity to own and operate rail services in the corridors and have control over operations, service availability, and frequencies. These purchases could be conducted by GET, KRT, CCRA or other local entity.

1.0 Introduction

Kern Council of Governments (Kern COG) initiated this Commuter Rail Feasibility Study to examine a set of alternatives for providing commuter rail service within the Bakersfield metropolitan area and surrounding portions of Kern County. The analysis, results, and recommendations in this final report will be used by Kern COG in the development of the 2014 Regional Transportation Plan (RTP) and the Sustainable Communities Strategy (SCS) for the Kern COG region. This report will also serve as the basis for more detailed studies of commuter rail services within the recommended corridors.

Commuter rail services operate in metropolitan regions throughout the United States, and typically are designed to serve longer distance commute trips. In some cases, this could include distances of 50 miles or more one-way. Commuter rail operations typically utilize existing freight rail corridors, as well as the existing physical infrastructure to allow for cost efficiency and phased implementation when compared to other forms of transit services that may require the acquisition of new right-of-way and construction of new physical infrastructure.

Within Kern County, commuter rail services are being examined for feasibility as part of several concurrent efforts identifying future transportation needs and the feasibility of specific transportation improvements. This study assesses the feasibility of commuter rail services to address future travel needs within the county. The objective is to document the study process and provide Kern COG with an action plan for subsequent steps that would be involved in further planning, design, and implementation of commuter rail services, should these services be identified as feasible. This report summarizes the following information:

- Overview of Potential Commuter Rail System and Stations – Multiple freight rail corridors in Kern County are to be analyzed in this study effort. Each corridor is described in this report and brief descriptions are provided of potential station locations.
- Data Collection – Background information has been collected regarding existing transit services, passenger rail services, socioeconomic data, and land uses within Kern County and adjacent to each of the proposed commuter rail corridors.
- Case Studies – Research has been collected about the characteristics of commuter rail systems operating throughout the Western United States, along with lessons learned and observations regarding strategies or operating characteristics that could be applied in Kern County.
- Evaluation of Corridors – Six potential commuter rail corridors were identified during the course of the study effort. Each corridor was evaluated using several factors, including population and employment density, costs, proximity to activity centers, and available of right-of-way for operations, stations, and park-and-ride facilities.
- Ridership Modeling Results – Following the evaluation and screening of the commuter rail corridors, the Steering Committee and the consultant team should prepare a short list of corridors and stations that shows promise for potential near-term implementation. Ridership forecasts were prepared for these corridors to understand the potential demand for commuter rail services in the study area.
- Recommendations - The analysis and findings of this study have resulted in a set of recommendations and actions for Kern COG to pursue in the further planning and development of commuter rail services in Kern COG.

The analysis in this study lays the groundwork for future planning, design, and pursuit of funding opportunities for specific commuter rail corridors.

This study included extensive involvement and input from Kern COG staff, as well as members of the study Steering Committee. This committee included representatives from Caltrans, Kern County, Golden Empire Transit, the California High-Speed Rail Authority, City of Bakersfield, City of Mojave, City of Delano, Fresno COG, County of Los Angeles, the Altamont Commuter Express, and the Southern California Regional Rail Authority.

1.1 STUDY AREA

This study is focused on identifying the feasibility of implementing commuter rail services within Kern County during the next 25 years. Commuter rail services are typically most cost effective when making use of existing rail corridors, avoiding the significant costs associated with acquiring new right-of-way and constructing new tracks. This study effort builds on previous efforts completed by Kern COG and other public agencies, while also considering the current plans for the California High-Speed Rail (CAHSR) project and the changes that this service would introduce to Amtrak operations and the quality and volume of rail service within Kern County.

Six potential commuter rail corridors are analyzed as part of this study effort. These corridors and potential stations along each corridor are shown in Figures 1.1 and 1.2 and described below:

- Northwest Bakersfield Corridor – This corridor would start in Downtown Bakersfield and then travel west and northwest along the existing BNSF freight rail corridor towards Shafter, Wasco, and Delano. This corridor is currently served by the Amtrak San Joaquin service. Stations along this corridor are proposed throughout Bakersfield, as well as in Shafter, Wasco, McFarland, and Delano.
- Airport/Delano Corridor – This corridor would connect Downtown Bakersfield, the airport, continuing north to Delano. Stations are proposed to run parallel to State Route 99 through the cities of McFarland and Delano.
- Southwest Bakersfield Corridor – The Southwest corridor would extend from Downtown Bakersfield to the Frito-Lay plant, serving several large employers in this area of the county.
- Southeast Bakersfield Corridor – This corridor would parallel State Route 58 and then turn south to serve Arvin, as well as several food packing and distribution facilities southeast of Bakersfield.
- Rosamond Corridor – This corridor would involve the extension of the existing Metrolink Antelope Valley line from its current terminus in Lancaster to Rosamond, Mojave, California City, and Tehachapi. A bus shuttle connection to Edwards Air Force Base is also proposed.
- Tehachapi Corridor – As a connection between Downtown Bakersfield and Tehachapi, this corridor would use the existing rail line to connect these two areas of Kern County. Stations are proposed in southeast Bakersfield before the long haul segment to Tehachapi.

Figure 1.1 - Study Area of Bakersfield Region

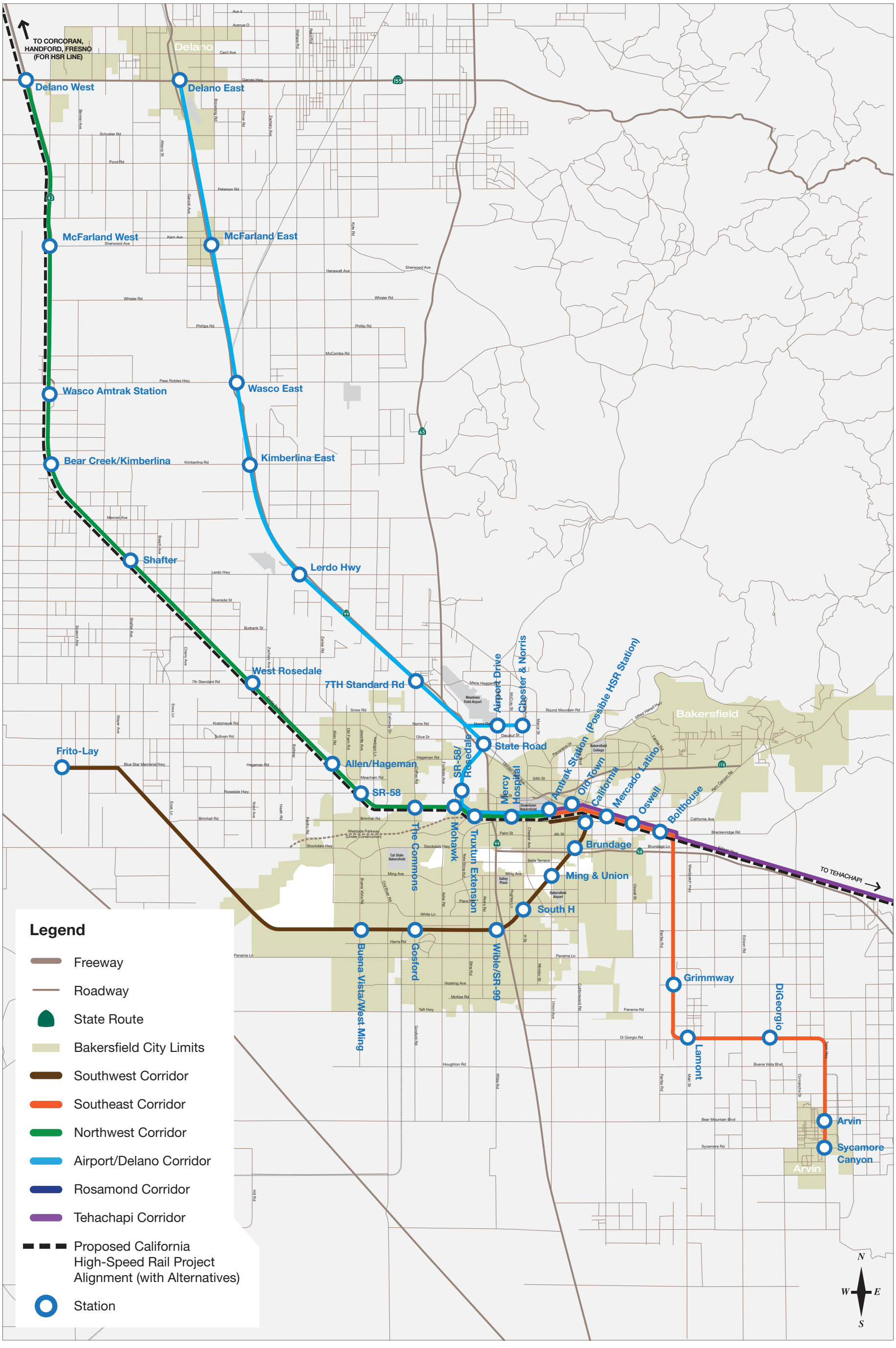


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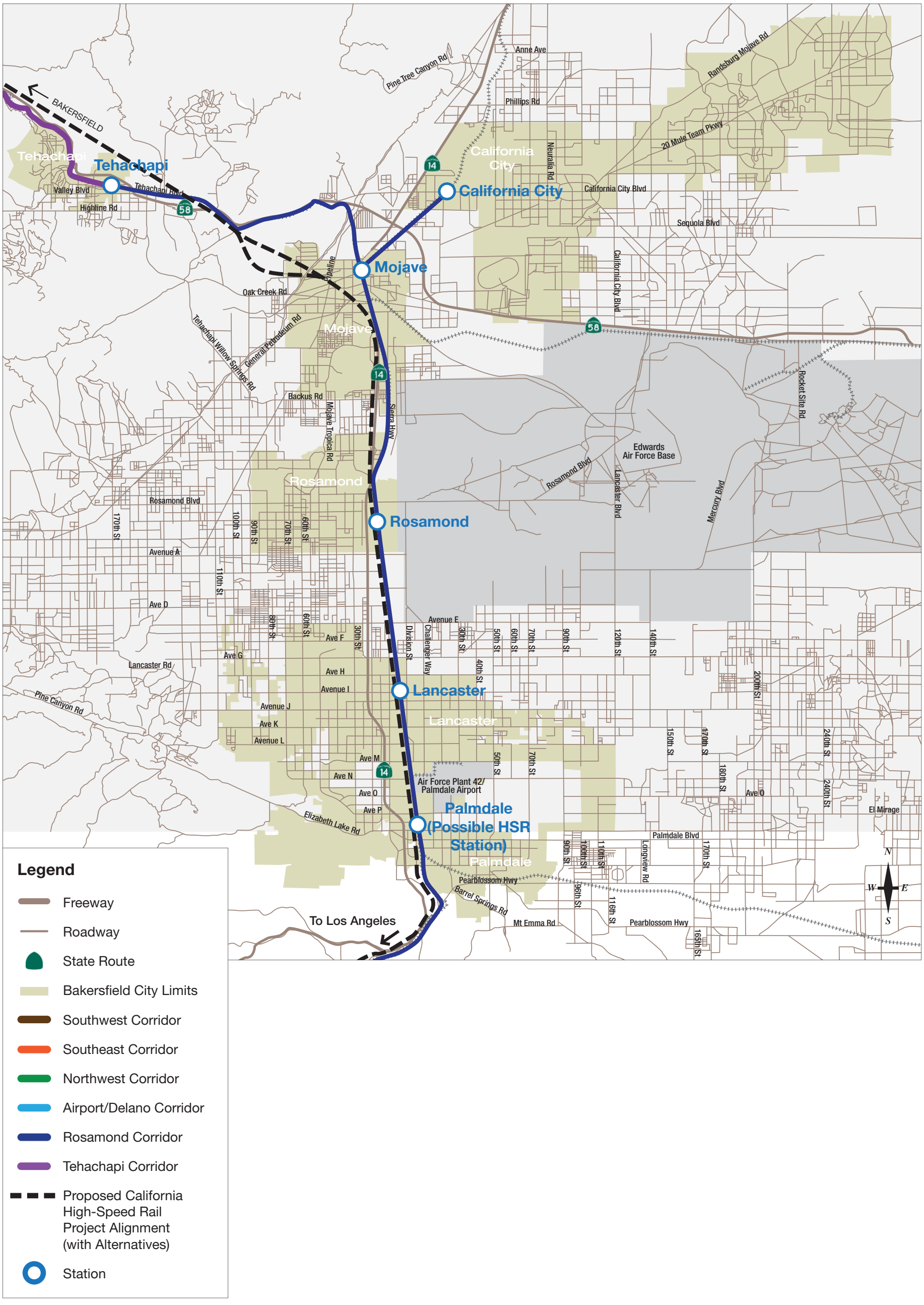
Figure 1.2 - Study Area of Tehachapi Region



2.0 Background Reports

This section identifies and summarizes previous and ongoing transportation planning efforts in Kern County, which may influence or impact the assessment of commuter rail services. These reports provide information on existing and forecast traffic volumes, transit ridership, planned transportation projects, and land use development patterns within the Metropolitan Bakersfield region. The reports to be analyzed are:

- 2011 Kern COG Regional Transportation Plan.
- Golden Empire Transit (GET) Short-Range Transit Plan.
- GET Metropolitan Bakersfield Transit System Long-Range Plan.
- Metropolitan Bakersfield General Plan.
- Kern County General Plan.
- Kern Regional Blueprint.
- Kern County Vision 2020.
- San Joaquin Valley Commuter Express Transit Study.
- California High-Speed Rail Authority (CHSRA) Business Plan.
- Senate Bill 325 – Central California Rail Authority.
- Assembly Bill 1779 – Creation of San Joaquin Joint Powers Authority.

2.1 2011 KERN COG REGIONAL TRANSPORTATION PLAN

Overview

The 2011 Regional Transportation Plan (RTP) is Kern COG's long-term planning tool for transportation improvements through the year of 2035. The RTP encompasses projects for all types of travel, including aviation and freight movement. The plan assesses environmental impacts of proposed projects and establishes air quality conformity as required by federal regulations. The plan also discusses inter-modal and multi-modal transportation project proposals.

The plan is updated regularly, and may be amended as a result of changes in projected federal, state and local funding, major improvement studies, Congestion Management Process plans, interchange justification studies, and environmental impact studies. The plan provides context for the region's Transportation Improvement Program (TIP), a short-range capital improvement program for implementing highway, transit, and bikeway projects.

In July 2010, Kern COG adopted the 2011 RTP. The plan was amended in May 2011 to comply with the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) planning regulations. The following is the summary of the 2011 RTP.

Transportation Challenges and Goals

According to the findings in Kern COG's 2011 RTP, the Kern COG region's population is anticipated to increase from 845,600 in 2010 to over 1.3 million residents in 2035. Accommodating this growth will create the need for additional transportation infrastructure.

The 2011 RTP guidelines address the mobility challenges created by region's growth. A total of seven policy goals are identified in 2011 RTP, these are:

1. Mobility – Improve the mobility of people and freight.
2. Accessibility – Improve accessibility to major employment and other regional activity centers.
3. Reliability – Improve the reliability and safety of the transportation system.
4. Efficiency – Maximize the efficiency of the existing and future transportation system.
5. Livability – Promote livable communities.
6. Sustainability – Minimize effects on the environment.
7. Equity – Ensure an equitable distribution of the benefits among various demographic and user groups.

Transportation Improvement Projects and Funding Allocation

The 2011 RTP proposed financially constrained and unconstrained transportation improvement projects for the Kern COG region. Constrained projects are those for which funding has been identified, while the unconstrained list provides projects necessary for Kern COG, but which have no identified funding source. Table 2-1 presents that funding allocation of financially constrained transportation improvement projects from 2011 through 2035.

Table 2-1: Funding allocation for transportation improvement programs (2011 – 2035)

Type of Improvements	YOE Cost ($)*	Percentage
Major Highway Improvements	3,723,482,000	69.9%
Local Streets and Roads	1,311,000,000	24.6%
Transit	112,800,000	2.1%
Non-Motorized	37,500,000	0.7%
Freight Rail	141,700,000	2.7%
Total	**5,326,482,000**	**100%**

* YOE: Year of Expenditure
(Source: 2011 Kern COG RTP)

As shown in Table 2-1, a total of $112.8 million is allocated for transit improvements. Among them, $103.8 million of the fund (92%) is allocated for replacing/purchasing vehicles. The remaining 8% of funds are distributed for construction of transfer stations, ITS improvements, and construction of park & ride lots. There is also $141.7 million allocated for improvements in freight rail corridors.

Commuter Rail

The 2011 RTP identifies a "feeder" commuter rail service that would connect several communities in Kern County to the planned California High-Speed Rail station in Downtown Bakersfield. The service

proposed in the 2011 RTP would follow the existing Burlington Northern Santa Fe (BNSF) rail corridor from Downtown Bakersfield to the northwest and southeast. These alignments would serve West Bakersfield, Shafter, and Wasco to the northwest and Arvin to the southeast. The northwest corridor alignment is currently used by the Amtrak San Joaquin inter-city passenger rail service. The feeder commuter rail service was proposed to provide more frequent stops than the current Amtrak operation.

This proposed commuter rail service was identified as a long-range Post-2035 project in the 2011 RTP, with direction to re-evaluate the feasibility of commuter rail in 2014, including the potential for service.

2.2 GOLDEN EMPIRE TRANSIT DISTRICT (GET) SHORT-RANGE TRANSIT PLAN

Overview

The Short-Range Transit Plan (SRTP) is the primary planning document used by GET to guide routine decisions associated with operating a public transit system. This document covers a five-year time horizon, and is updated annually.

Recommendations

The 2010/2011 GET SRTP is the most current SRTP. The main focus areas of this document is to support the Kern Regional Blueprint Program and SB375 target emission and vehicle miles traveled (VMT) reductions, and continuing to provide a sustainable transportation system. The short term recommendations in the 2010/2011 SRTP include:

- Completion of Long Range Transit Plan
  The Golden Empire Transit District in partnership with the Kern Council of Governments initiated the Metropolitan Bakersfield Transit System Long-Range Plan. The plan is scheduled for completion in 2012.
- Relocation of Southwest Transit Center
  Currently, there is limited space and no room for expansion of services to this transit center. A larger site would allow for expansion and improve operation of buses, but would require the revision of some route alignments.
- Service Changes for Bakersfield College
  The relocation of the campus stop to Panorama Drive occurred in April 2012 and required the realignment of some routes.
- Service to Employment Clusters
  Partnerships with major employment clusters will be pursued.
- Coordinate With Local Transit Operators
  GET will work with area transit operators so that service is coordinated among transit operators.
- Implementation of Bus Lanes
  Currently, GET does not have designated bus-only lanes. The potential exists for bus lanes to be planned in future highway projects, which will create the opportunity for future Bus Rapid Transit (BRT) services.

- Construction of Park and Ride Lots
  The region currently has only one official Park and Ride lot at the Bakersfield Auto Mall. A need has been identified for additional Park and Ride lots before new express bus service is implemented.
- Potential service expansion to the New Growth Areas
  Many of the new areas within the region are developing beyond existing transit services. Additional service to new areas will be evaluated and implemented as funding allows.
- Improve GET-A-Lift (ADA services)
  It is recommended that efforts to be made to improve efficiency and to maintain existing service levels.
- Mobility/Travel Training
  There are unmet transit needs where workers reside within the metro area and work at remote employment centers where no transit service exists. GET's goal is to expand express bus service to those remote employment locations and expand access to jobs from in and outside the metropolitan Bakersfield area.

2.3 GET METROPOLITAN BAKERSFIELD TRANSIT SYSTEM LONG-RANGE PLAN

Overview

The Long-Range Transit Plan (LRTP) is the primary planning document used by GET to guide route decisions associated with operating a public transit system. This document covers a 15-25 year horizon. This report was released in draft form in December 2011.

Recommendations

The Long-Term Service plan is financially unconstrained, focusing only on meeting the mobility, land use and environmental needs of the region without any financial restrictions. The long-term recommendations for 2025-2035 in the draft LRTP include:

- Frequent Service
  Transit service that is frequent and on-time provides a reliable system, riders can trust. The Long-Term Transit plan is to have service every 30 minutes or less with peak periods providing service every 15 minutes or less for seven days a week.
- Grid Network
  A grid based transit network creates multiple nodes for points to transfer rather than a few large transfer centers. Routes would also extend out from the grid area servicing towns and communities on the outskirts of Bakersfield.
- Introduction of Commuter Rail
  In the long term, commuter rail lines would be introduced and the bus rapid transit (BRT) service is planned to be upgraded to light rail transit. Commuter rails provide higher capacity than buses, which allows for cost-competitive rates on a per-passenger basis.
- Simplify Transit
  By making clear and easy-to-grasp routes and maps for users to naturally remember routes and connections, transit can become user friendly and enjoyable to use. Additionally, having a transit system that provides comfortable shelters at bus stops as well as real-time travel information reduces inconveniences and establishes loyal transit riders.

- CAHSR Transit Center
  The California High-Speed Rail station within Downtown Bakersfield is planned for 2021 and is envisioned as a multimodal transfer center.

2.4 BAKERSFIELD GENERAL PLAN

Overview

The City of Bakersfield General Plan is the guide for growth and development within the city. The Bakersfield General Plan was adopted by the City in December, 2002. According to the plan, the General Plan area covers approximately 408 square miles and coincides with the Bakersfield Metropolitan Priority Area of the Kern County General Plan.

Circulation Element

The Circulation Element provides the framework for policy decisions regarding Metropolitan Bakersfield's transportation system, which includes various transportation modes and related facilities. It also provides for coordination with other cities and the county, with the RTP and SRTP, and with State and Federal agencies that fund and manage transportation facilities within the study area.

The main theme of the Circulation Element is to improve its street system, as over 90% of all travel in the city occurs by automobile. The General Plan indicates that major circulation issue in Bakersfield metropolitan area is traffic congestion along freeways and major arterials, caused by increasing travel demands and deficient right-of-way widths on many arterials. To address these issues, the General Plan includes goals to address congestion that would result from built-out of the land use plan. The following are the some of the goals that apply to the Metropolitan Bakersfield street system improvements.

- Provide a safe and efficient street system that links all parts of the area for movement of people and goods.
- Provide a street system that creates a positive image of Bakersfield and contributes to residents' quality of life.
- Provide a system of freeways which maintains adequate travel times in and around the metropolitan area.
- Develop and maintain a circulation system that supports the land use plan shown in the general plan.

Although the General Plan focuses on improving the city's street system, the plan also recognizes the importance of alternative travel modes, such as transit, bicycles, and walking in serving diverse needs of Bakersfield residents. The following are the goals that apply to the Metropolitan Bakersfield transit improvements.

- Provide planning area residents with a choice of travel modes.
- Provide a street system and land development policies that support public transportation.
- Provide cost effective public transportation services.
- Reduce traffic congestion and parking requirements and improve air quality through improved transportation services.

- Enhance rail service capacities and usage in the planning area.

Currently, the City of Bakersfield is updating its General Plan to provide the policy framework for new growth, housing needs, environmental protection and infrastructure improvement for the next 20-30 years. The General Plan Update process began in May 2007 and the City and Kern COG conducted town hall meetings and public workshops through spring 2010. The new General Plan is scheduled to be adopted in 2012.

2.5 KERN COUNTY GENERAL PLAN

Overview

The current Kern County General Plan was adopted in 2004 to provide decision makers with a policy framework to guide specific, incremental decisions to achieve the goals set forth in the plan for the unincorporated portions of Kern County. The County General Plan consists of six elements, including the Circulation Element.

According to the plan, county population increased by 22 percent from 1990 to 2002. However, the growth is occurring predominantly in the incorporated cities rather than in the unincorporated County areas. During that same time period, the population of the unincorporated areas increased by approximately two percent.

Early 2010 United State Census Data continue to show strong population growth within the county. Between 2000 and 2010, the US Census Data reports a 26.9 percent growth in county population to nearly 840,000 residents.

Circulation Element

The Circulation Element is organized into five major sections: (1) Introduction, (2) Circulation Overview, (3) Highways, (4) Priority Focus Area Topic – Highways, (5) Other Modes. As evidenced from the composition of the Circulation Element, the highways were the major concern in circulation planning.

The objectives of the Kern County General Plan Circulation Element are:

- To make certain that transportation facilities needed to support development are available. To ensure that these facilities occur in a timely manner so as to avoid traffic degradation.
- Kern County intends to provide plans for circulation infrastructure in support of the Land Use, Open Space and Conservation Element.
- To plan for transportation modes available to all segments of the population, including people with restricted mobility.
- Kern County will plan for a reduction of environmental effects without accepting a lower quality of life in the process.
- Maintain a minimum Level of Service (LOS) of LOS D for all roads throughout the County.
- Coordinate with the California Department of Transportation (Caltrans) regarding various transportation developments within the County.

- Kern County through its representatives on the Kern COG Board of Directors shall coordinate with Kern County cities and Caltrans to develop more effective transportation planning and congestion management programs.

2.6 KERN REGIONAL BLUEPRINT PROGRAM FINAL REPORT

Overview

The Kern Regional Blueprint program is a part of San Joaquin Valley Blueprint process, which began in 2006. With funding from the California Regional Blueprint Planning Program, the process included three phases (1) Value and Vision, (2) Goals and Objectives, and Performance Measures, and (3) Evaluation of Alternative Growth Scenarios. The Kern Blueprint Final Report was completed in December 2008. Subsequently, the San Joaquin Valley Regional Policy Council, the decision making body for the Valley wide process, concluded the San Joaquin Valley Blueprint planning process in 2009.

Alternative Growth Scenario

The starting point for the Blueprint was a base case scenario (no change scenario), a projection of how the Kern COG region would grow if recent development trends continued through year 2050. One of the most interesting figures to arise from the study is that the population of the Kern COG region would nearly triple by 2050 from around 800,000 to 2.1 million residents. Other base case findings were:

- Vehicle miles traveled would nearly triple by the year 2050.
- Households would nearly triple by the year 2050.
- Over 90% of Kern's land would be built-out.

Realizing that existing development patterns could not be sustained, three alternative growth scenarios were identified; (1) some change, (2) moderate change, and (3) major change scenario. The four growth alternatives, including no change, were proposed to the public to collect inputs through town hall meetings, workshops and surveys. The results were then incorporated into the preferred alternative, which is a combination of four growth scenarios. The preferred growth alternative proposes more compact centers with walkable cores and coordinated access to transit and other services.

While the blueprint does not mandate policies for the local and regional levels, the preferred blueprint scenario depicts a way for the region to grow through year 2050. Moreover, the preferred blueprint scenario was used as the baseline for land use and growth projections for the RTP.

2.7 GREATER BAKERSFIELD VISION 2020

Overview

In 1999, a group of citizens formed a non-profit organization, Greater Bakersfield Vision 2020, Inc., to develop and facilitate an open and inclusive process for the community to create a vision for the future and an implementable action plan. The Greater Bakersfield Vision 2020 was developed through an 18-month planning process in coordination with Kern County and the City of Bakersfield.

Transportation Vision

The vision emphasizes the implementation of an efficient and environmentally friendly transportation system that serves all areas of the community. To achieve this vision, the plan calls for more compact and higher density development, especially around transit facilities in downtown Bakersfield. Transportation strategies include:

- Creating additional revenue sources to increase priority for state and federal transportation funding.
- Increasing pedestrian pathway and bike routes.
- Encouraging completion of Route 58.
- Recognizing the link between land use and transportation.
- Encouraging joint metropolitan transit policies, goals, and consensus between City, County, and the public.
- Expanding the public transportation system.
- Obtaining community consensus on the location for the station in the Greater Bakersfield area.

2.8 SAN JOAQUIN VALLEY COMMUTER EXPRESS TRANSIT STUDY

Overview

This study was completed in 2009 and proposed recommendations for inter-county commuter express transit services between counties in the San Joaquin Valley and between the Valley and other regions of California. The study included the participation of all counties in the San Joaquin Valley. Transit modes evaluated in the study include express bus service, subscription-based transit services, vanpools, and rail transit service.

Recommendations

Recommendations emerging from the study that are pertinent to Kern County included the following:

- Explore the formation of a joint powers authority (JPA) including Kings, Madera, Fresno, Tulare and Kern COGs to operate and oversee subregional vanpool services.
- Provide a vanpool and ridesharing match website
- Expand park-and-ride facilities
- Study express bus service between the Lancaster Metrolink station and Edwards Air Force Base.
- Develop a coordinated regional advocacy plan for investing in commuter rail.

The study recommendations also included further study and analysis of a commuter rail link between Merced and Sacramento. Outside of the express bus connection from the Lancaster Metrolink Station to Edwards Air Force Base, no commuter rail services were proposed in Kern County as part of this study.

2.9 HIGH-SPEED RAIL BUSINESS PLAN

Overview

The 2012 California High-Speed Rail Authority (CHSRA) Business Plan outlines the proposed plan for the design, construction, and delivery of the California High-Speed Rail project. The Business Plan identifies a priority to construct an Initial Operating Section (IOS), which would be the first segment of the statewide system that would include full electrification and operation of the High-Speed Rail service. Two alternatives for the IOS are identified in the Business Plan:

- San Jose to the Central Valley; and
- San Jose to the San Fernando Valley in Los Angeles County.

In addition to the IOS, the Business Plan also identifies the construction of the Initial Construction Section (ICS), a 130-mile alignment between north of Fresno and north of Bakersfield. The ICS would be the first section of the alignment to be constructed, and would likely be constructed separately and prior to either of the full IOS alternatives. This section of the alignment could be utilized by the Amtrak San Joaquin service until the full IOS is implemented.

Timeline

The Business Plan identifies the completion of the ICS between Fresno and Bakersfield by 2018. The IOS is proposed to be operational by 2022. Completion of the "Bay to Basin" link between San Jose and the San Fernando Valley is proposed by 2027.

Phased implementation of statewide service would culminate with the completion and operation of Phase 1 of the project between San Francisco and Anaheim by 2034.

Implications for Kern County

The California High-Speed Rail project includes a proposed station in Downtown Bakersfield. The proposed alignment for the service would extend northwest of Downtown, parallel to the existing BNSF rail corridor, connecting to Fresno and points north. The southern extension of the alignment would extend from Downtown Bakersfield to the southeast, traveling through Palmdale and the Antelope Valley to connect to San Fernando Valley and Greater Los Angeles.

2.10 SENATE BILL 325 – CENTRAL CALIFORNIA RAIL AUTHORITY

Overview

Senate Bill (SB) 325 authorized the creation of the Central California Rail Authority (CCRA). The CCRA is a JPA that includes the following agencies:

- Kern Council of Governments;
- Kings County Association of Governments;
- Tulare Association of Governments;
- Fresno Council of Governments; and
- Merced County Association of Governments.

Through this legislation, the CCRA is authorized to acquire, own, operate, and lease railroads within its jurisdiction and along corridors outside its jurisdiction to connect to other railroads. The primary purpose of the legislation is to allow CCRA to operate freight rail service within the San Joaquin Valley and help in the preservation of short-line freight rail corridors that might otherwise be abandoned and removed from service.

Maintaining these short-line freight rail corridors in service and preserving the right-of-way allows for future freight rail services. The rights-of-way may also be appropriate for passenger rail service, should travel demand warrant, assuming that the passenger rail service would not interfere with current or planned freight rail services.

The establishment of this JPA is pertinent to this Commuter Rail Feasibility study as this agency could be a partner in the acquisition of rail right-of-way within Kern County, and potentially in the operation of a future commuter rail service within these rights-of-way. The potential for this relationship will be explored more in future reports as part of discussion for different governance models of commuter rail systems.

2.11 ASSEMBLY BILL 1779 – CREATION OF SAN JOAQUIN JOINT POWERS AUTHORITY

The San Joaquin Rail Corridor is currently overseen by the California Department of Transportation Division of Rail. Assembly Bill 1779 (AB 1779) would enable the transfer of administrative responsibility of the San Joaquin intercity passenger rail service from the Department of Transportation to a new joint powers authority. AB 1779 creates the San Joaquin Joint Powers Authority (SJJPA), and enables regional governance/management of the San Joaquin intercity passenger rail service between Bakersfield-Fresno-Stockton-Sacramento-Oakland. AB 1779 ensures at least 5 years of state funding for intercity rail service to increase service and ridership, resulting in more jobs, improved air quality, and promoting sustainable development.

3.0 Data Collection & Analysis

The data collection effort for the commuter rail study is focused on identifying existing and future commuting patterns, traffic congestion forecasts, transit ridership patterns, and demographic (population and employment) projections for the Kern COG region. Data sources include origin-destination and travel volume information from the region's travel forecasting system and from the US Census in addition to other existing datasets. This information is analyzed to develop an understanding of travel demand, traffic congestion, and key origins and destinations within the study area. The data collected helps to form a "baseline" or no project condition, against which specific study alternatives can be analyzed and compared to determine their potential level of benefit. The data collected by the consultant team for existing and future conditions is summarized in this section.

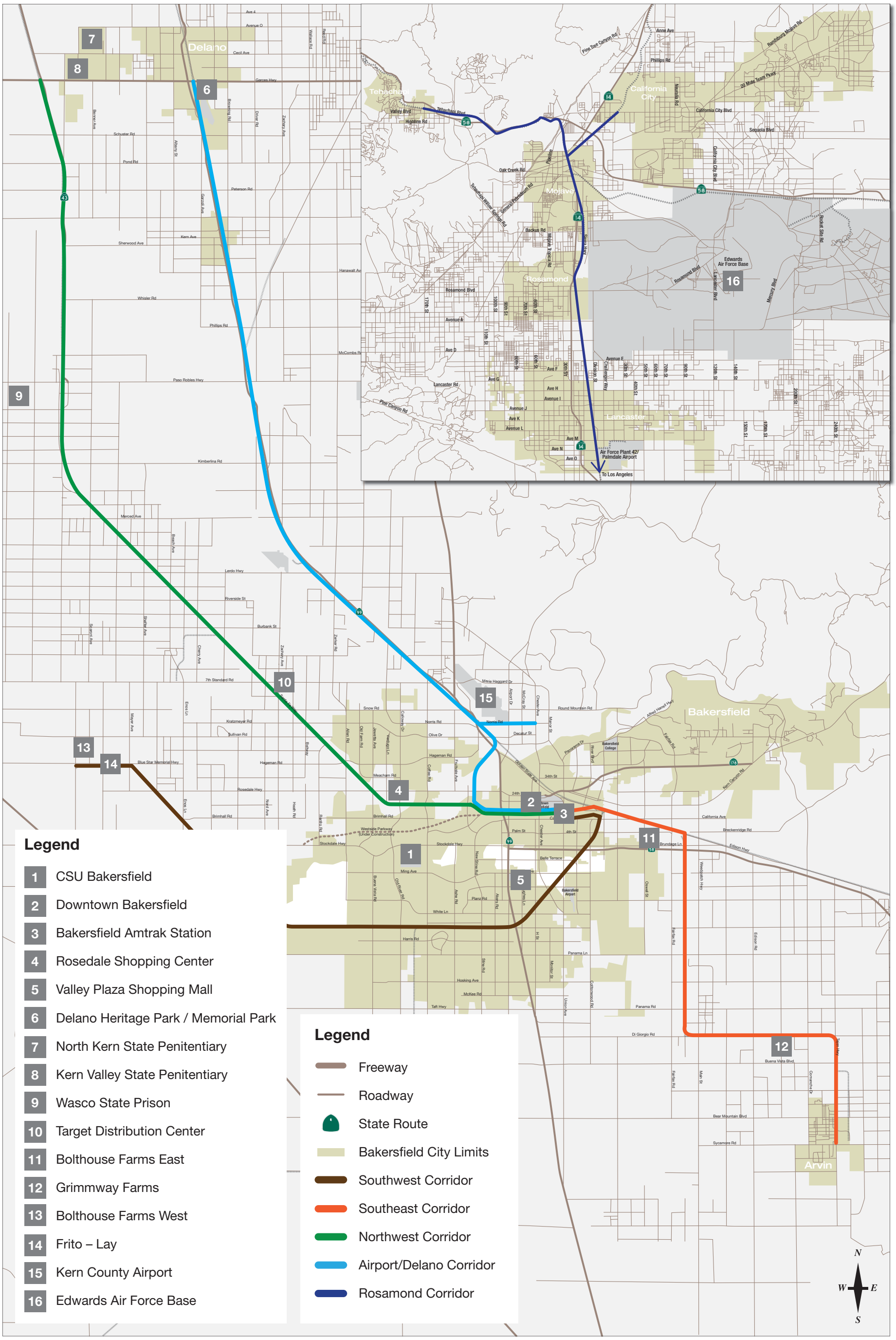
3.1 MAJOR ACTIVITY CENTERS

Within the study area and throughout the Kern County region, there are numerous activity centers, community centers and regional attractions that draw trips across from within the county. Major Activity centers that affect transportation in the city of Bakersfield and surrounding area are shown in Figure 3.1. A list and a short description of these activity centers are provided below.

- California State University (CSU) Bakersfield: Established in 1970, this public state university is located on the suburban west side of Bakersfield. The campus is on a 375-acre lot. As of fall 2010, the University enrolled about 7,600 students, offering degrees in 32 bachelors or 18 master degree programs.
- Downtown Bakersfield – Downtown offers a variety of attractions including the Crystal Palace and Museum, Kern County Museum, the historic Fox Theater and an upbeat shopping center. Downtown is also home to city and county government offices, which are significant regional employers.
- Bakersfield Amtrak Station – The southern terminus of the Amtrak San Joaquin rail line is Bakersfield. This transportation hub provides connections to local bus routes and Amtrak thruway bus services.
- Rosedale Shopping Center – Located along State Route 58 between Calloway Dr. and Coffee Road. This shopping center offers a Best Buy, Target, Kohl's, Grocery outlet and a variety of restaurants.
- Valley Plaza Shopping Mall – Just east just off the 99 Highway, this shopping mall provides a variety of stores including, Target, JC Penney, Game Stop among a diverse selection of food restaurants.
- Delano Heritage Park / Memorial Park – The Delano Historical Society is a private organization established in 1961, categorized as a museum. Memorial Park provides a recreational space for events and concerts in the city.
- North Kern State Penitentiary – Located in Delano, this correctional facility was opened in 1993 and covers 640 acres of land with a design capacity of 2,892 prisoners. As of Fiscal Year 2006/2007, there were 1,557 staff and 5,390 prisoners.

- Kern Valley State Penitentiary - Just 1 mile away from North Kern State Penitentiary, this prison is on 600 acres of land with a design capacity of 2,448 prisoners. As of Fiscal Year 2006/2007, there were 1,619 employed staff and just over 5,000 prisoners.
- Wasco State Prison – This facility opened in 1991 and covers 634 acres. As of Fiscal Year 2008/2009, there was 1,688 employed staff. The prison has a design capacity for 2,984 prisoners. However, there are currently almost 6,000 prisoners in the facility.
- Target Distribution Center – A major employer and distribution hub located in the City of Shafter, in close proximity to an existing rail line.
- Bolthouse Farms East/West – Founded in 1915, Bolthouse is a leading producer of carrots. Plants located on the east and west side of Bakersfield, in close proximity to the existing rail line and Highway 58. Bolthouse is a major employer in the Bakersfield region.
- Grimmway Farms – Located in the south east corridor of Bakersfield, this carrot, potatoes and citrus producer was formed in 1971 when carrot farming started to boom in the San Joaquin Valley. With over 5,000 employees, Grimmway is a major employer for Bakersfield and the surrounding area.
- Frito Lay Plant – North of Bakersfield, just off Highway 58 in Buttonwillow is the Frito-Lay packaging plant. Frito-Lay produces snack chip products, pretzels, nuts and a variety of other snack foods. This plant is a major employer in the area.
- Kern County Airport – This regional airport serves commercial air passenger traffic in Kern County and the southern San Joaquin Valley. Air service is offered between Bakersfield and Los Angeles, San Francisco, Denver, Houston, and Phoenix.
- Edwards Air Force Base – This major military installation is located just east of Rosamond, and could serve as a major attractor of trips along an extension of the Metrolink Antelope Valley line. The facility employs about 15,000 people when military and civilian employees are combined.

Figure 3.1 Major Activity and Employment Centers



3.2 YEAR 2006 DEMOGRAPHIC DATA

Existing population densities in the study area are observed to be highest within the limits of cities located in Kern County, including Bakersfield, Delano, Wasco and Lamont. While the highest population densities do exist within the zones of the City of Bakersfield, there are also a significant number of zones with high population densities outside of Bakersfield. In the year 2006, about 746,000 people resided within the county. A large number of these residents resided in the City of Bakersfield.

The range of population densities observed in the study area is low compared to other major cities within Southern California. Population densities range from less than 2 people per acre to about 30 people per acre in higher density areas. In Los Angeles County, population densities are as high as 145 people per acre in central Los Angeles. While the study area population density does not approach these levels, the observed densities in the 2 to 30 persons per acre range suggest an established pattern of lower density development throughout a majority of the study area.

Existing employment densities in the study area is mainly concentrated in central Bakersfield. The downtown region has small pockets of employment densities over 100 people per acre. Other major zones in the city see similar levels of employment, but the rest of the county rarely has areas of employment over 4 people per acre. Kern County provides over 286,000 jobs as of 2006.

Existing (year 2006) population and employment densities for the study area are shown in Figures 3.2, 3.3, 3.4 and 3.5.

Figure 3.2 - Existing Population Density for Kern County (2006)

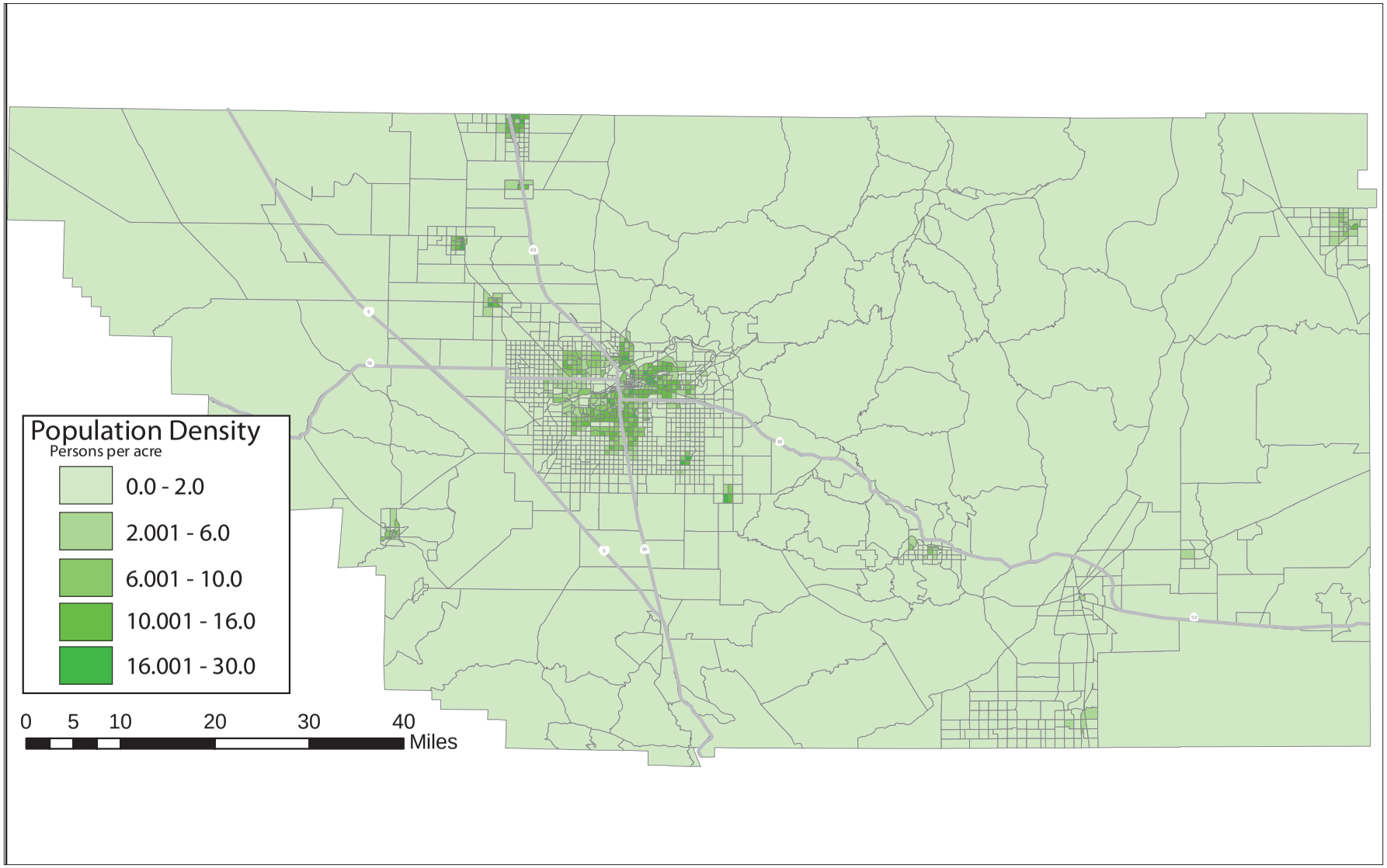


Figure 3.3 - Existing Population Density for Bakersfield (2006)

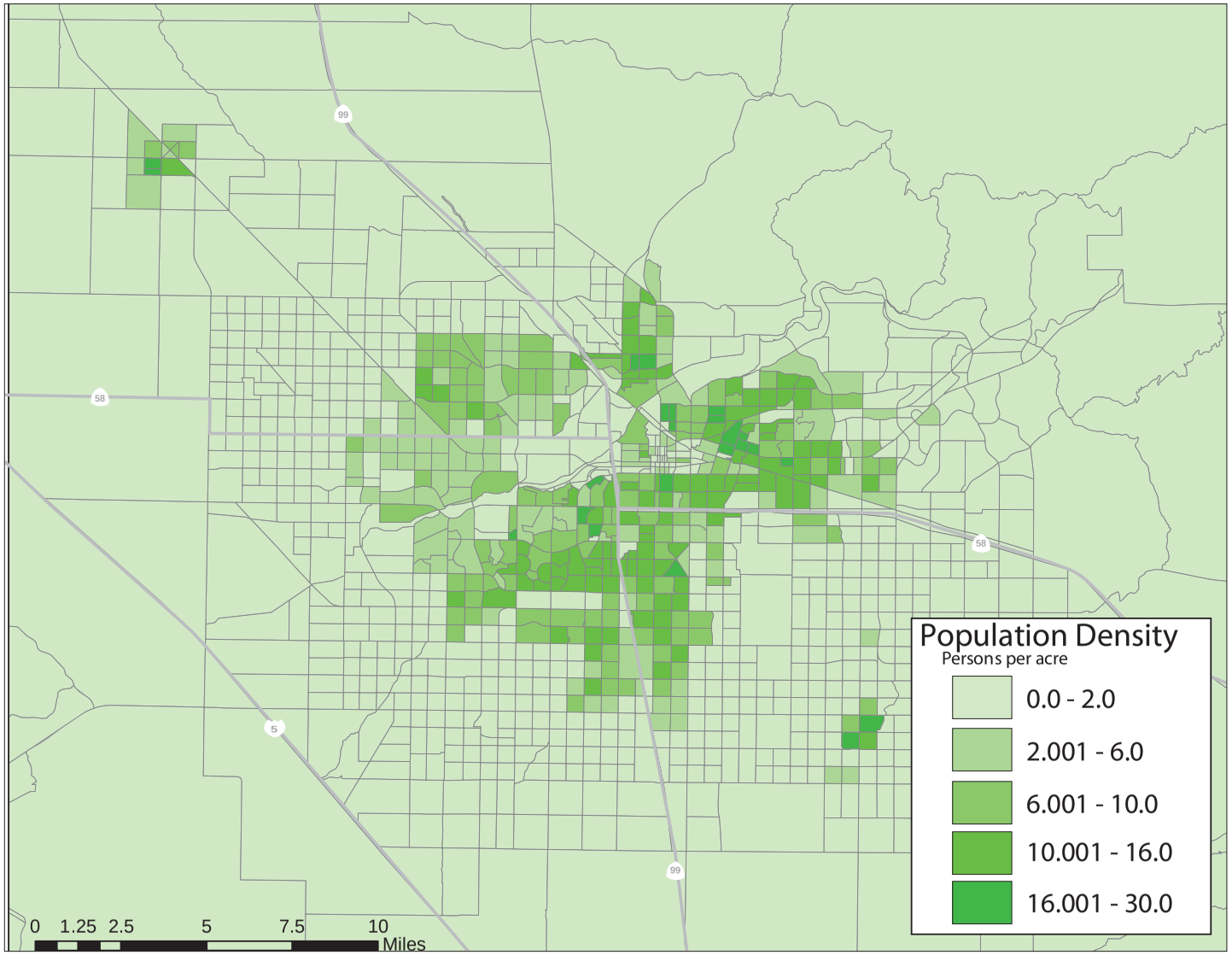


Figure 3.4 - Existing Employment Density for Kern County (2006)

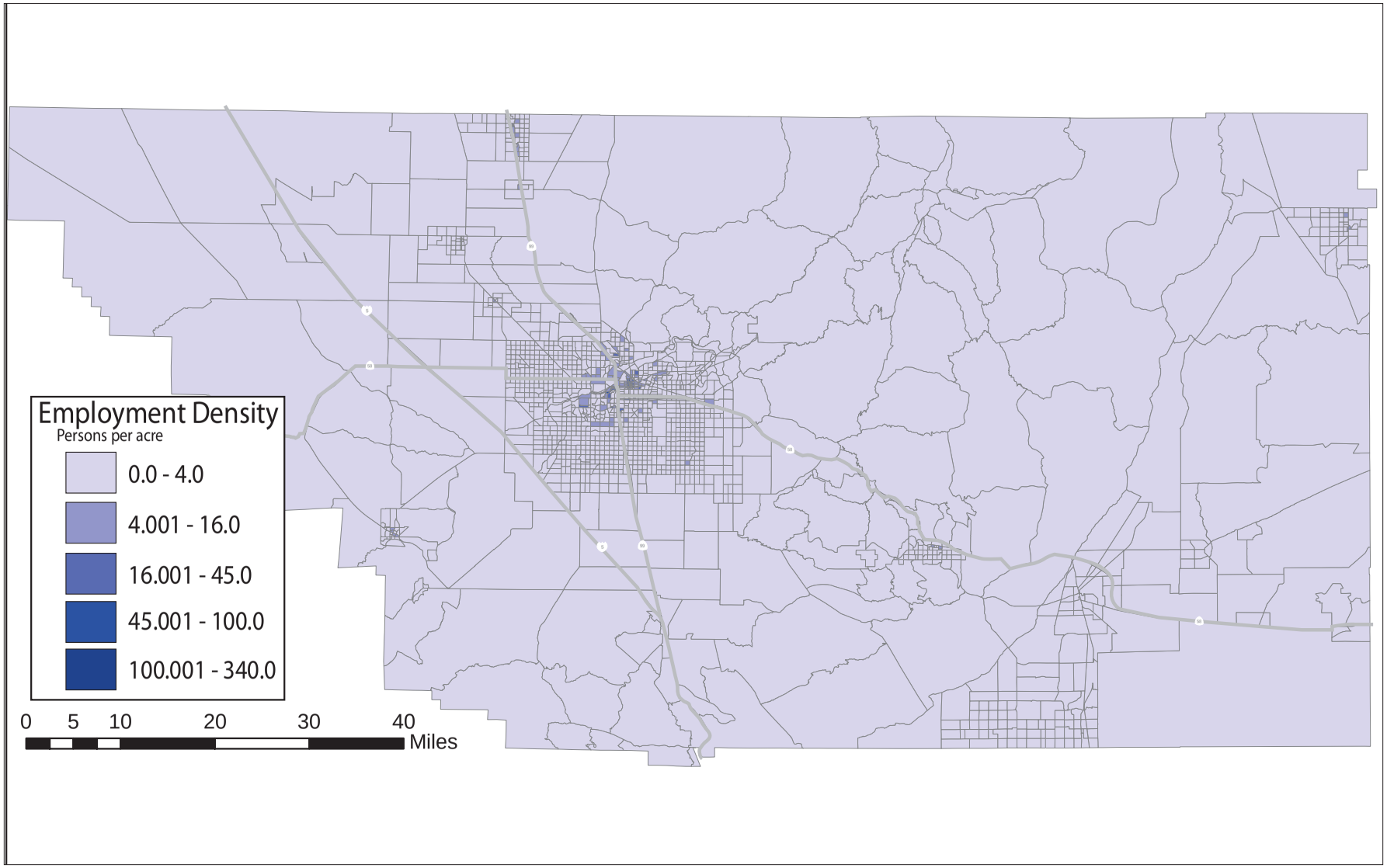
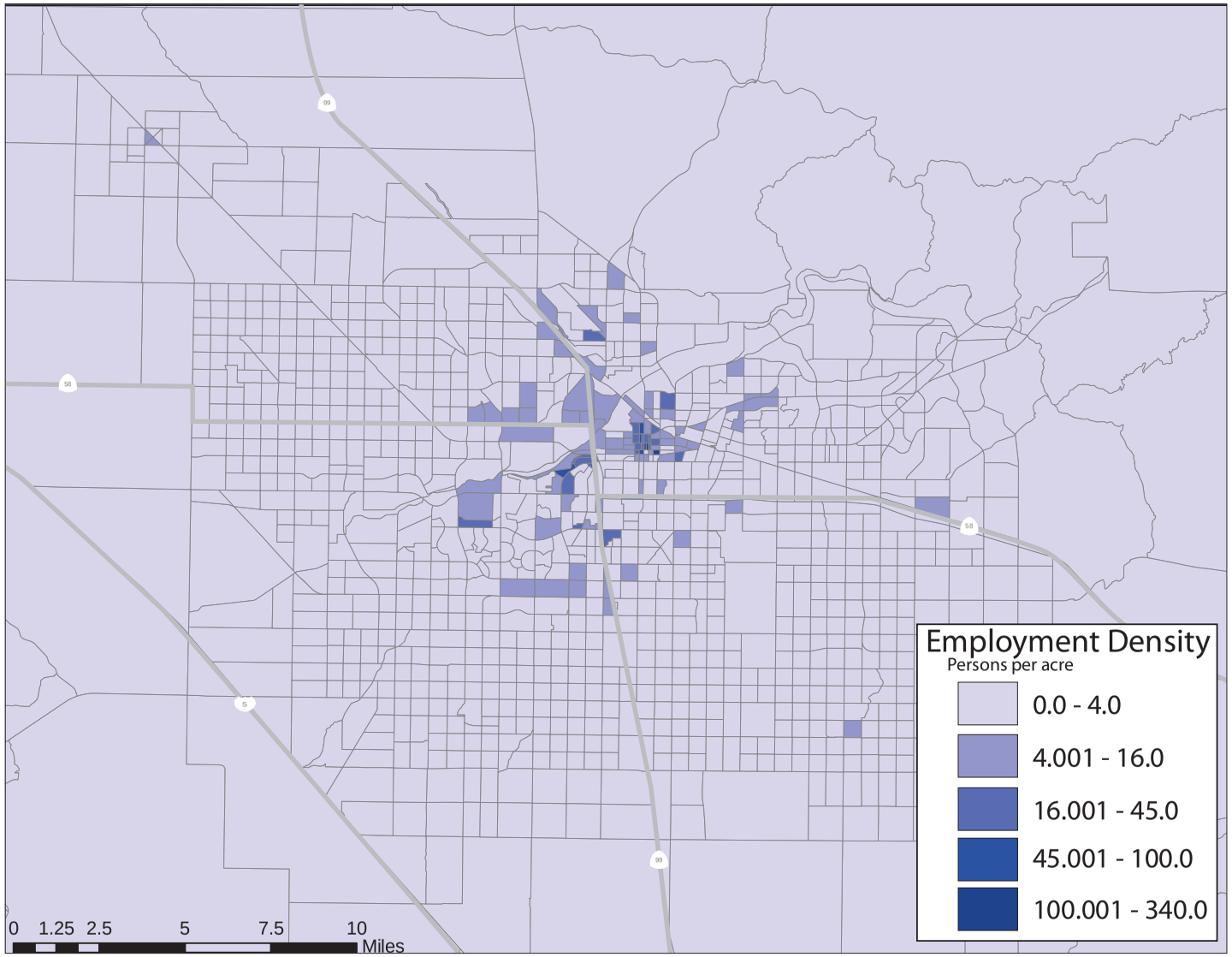


Figure 3.5 - Existing Employment Density for Bakersfield (2006)



3.3 YEAR 2035 DEMOGRAPHIC DATA

Steady population growth is forecast for the study area, averaging about 1.75% annually between 2006 and 2035. Over 1,321,000 residents are forecast to reside in the county in the year 2035, representing about a 50% overall increase in population. The highest population densities will continue to be located within the cities of Bakersfield, Delano, and Wasco, as well as other smaller city centers in Kern County.

Employment densities in the study area are also forecast to increase between the year 2006 and 2035. The downtown region of Bakersfield will continue to be a major employment center for the area. Increased employment of over 100 people per acre in zones closest to downtown Bakersfield is expected for 2035. Lower employment densities are present in the neighboring towns including Delano, Wasco, and Tehachapi.

Over 460,000 jobs are forecast to be located in the study area in 2035. The City of Bakersfield will be the location for most of these jobs, but a majority of the Kern County region will see an increase in employment and population. Population and employment densities for 2035 are shown in Figures 3.6, 3.7, 3.8 and 3.9.

Figure 3.6 - Future Population Density for Kern County (2035)

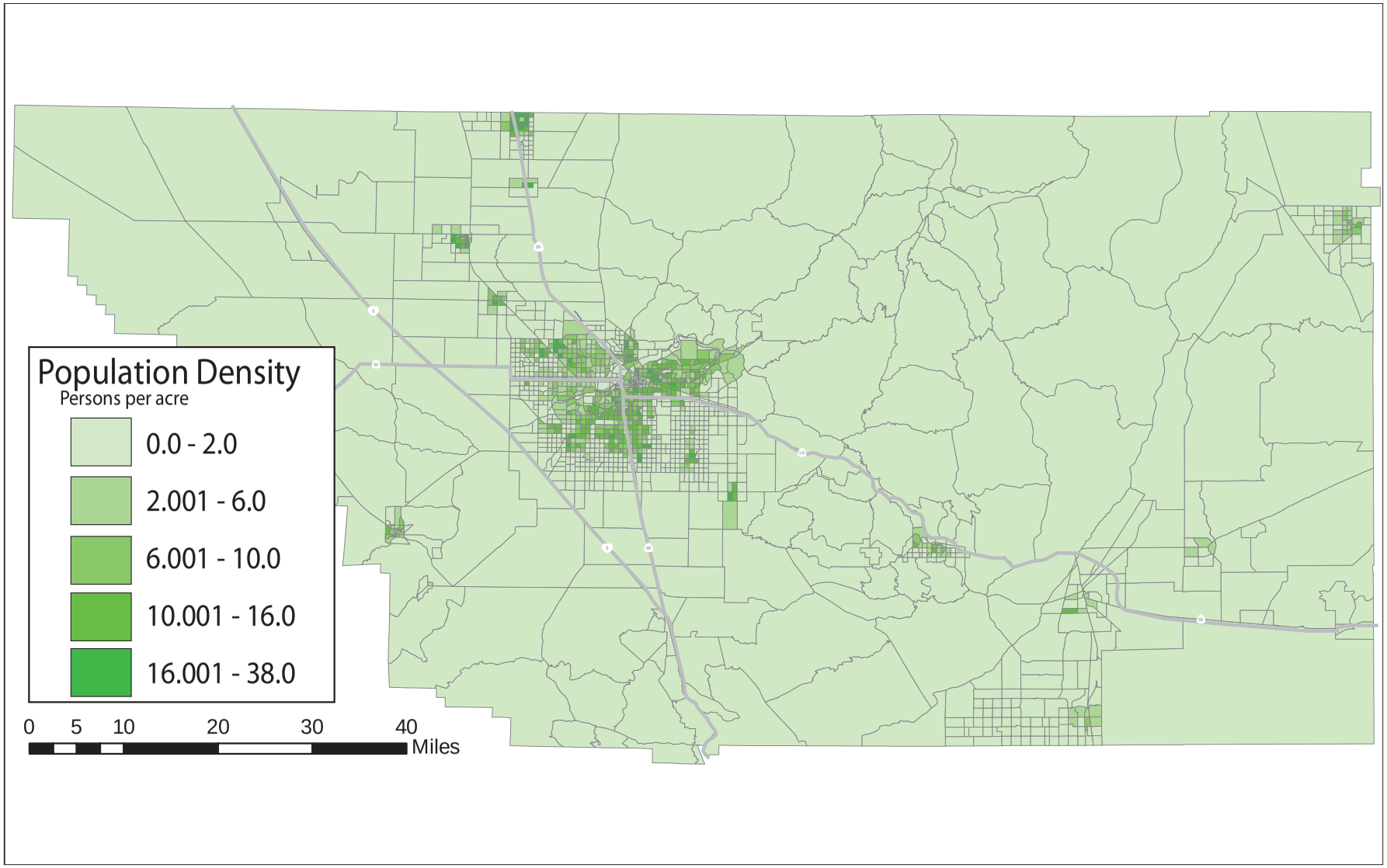


Figure 3.7 - Future Population Density for Bakersfield (2035)

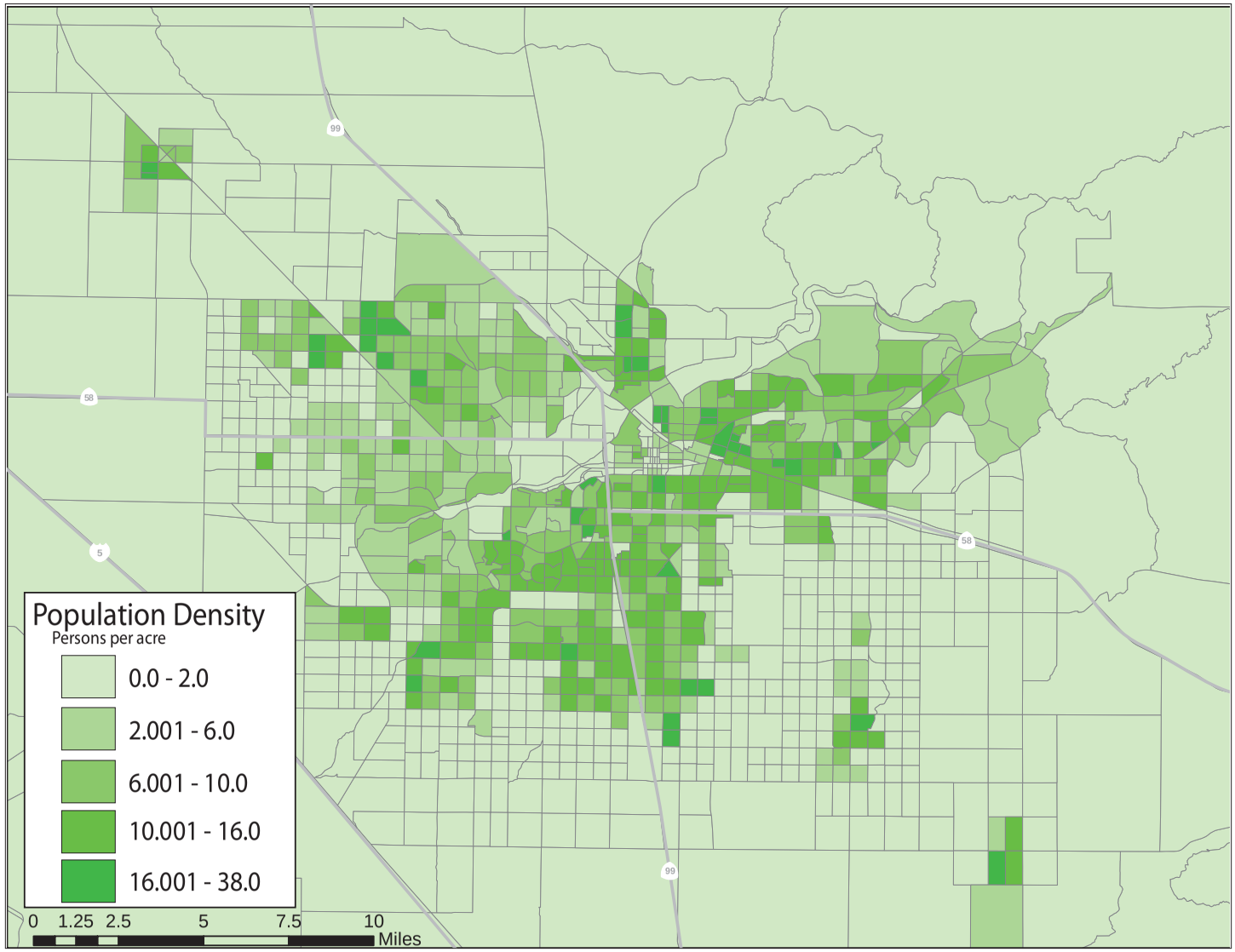


Figure 3.8 - Future Employment Density for Kern County (2035)

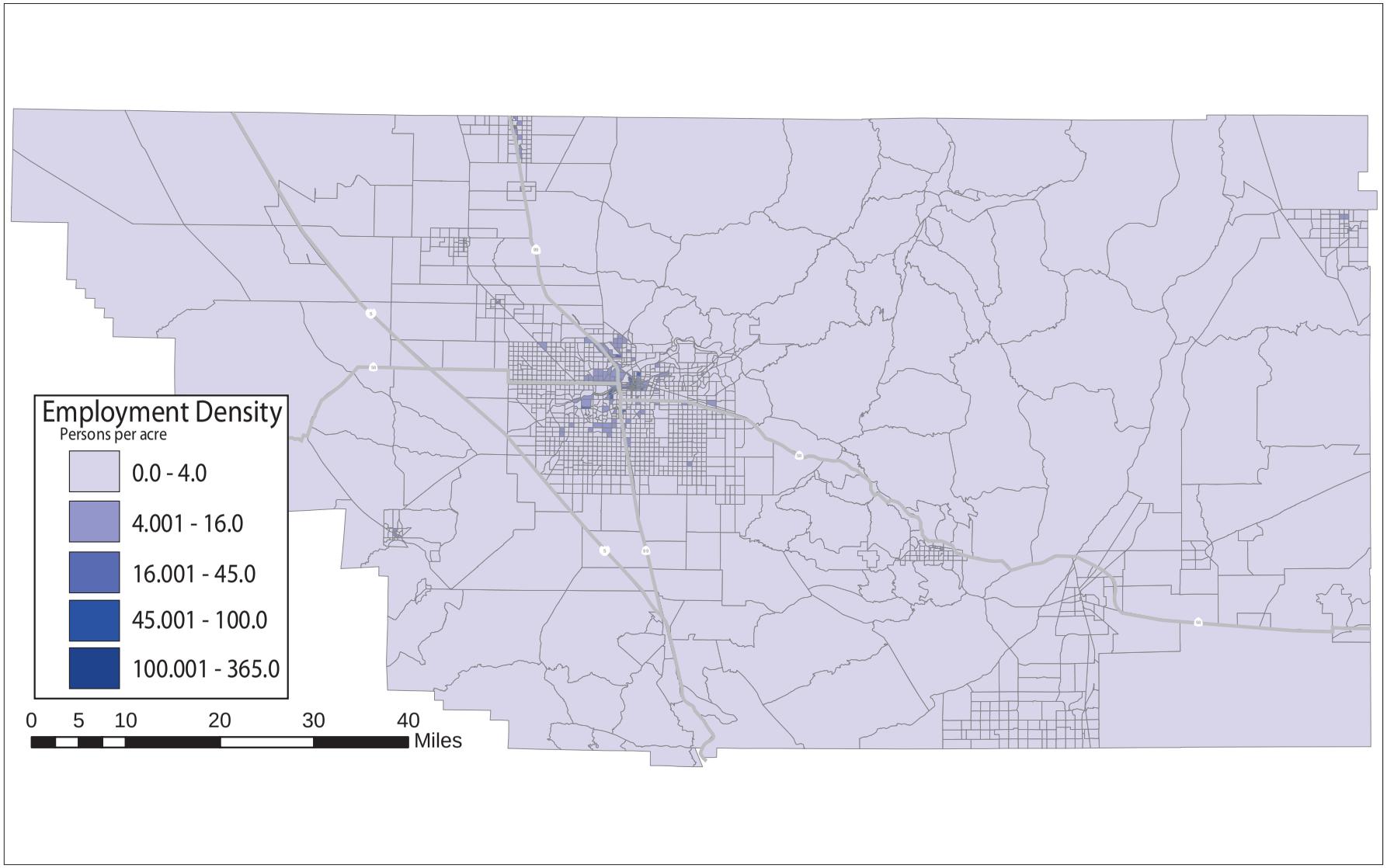
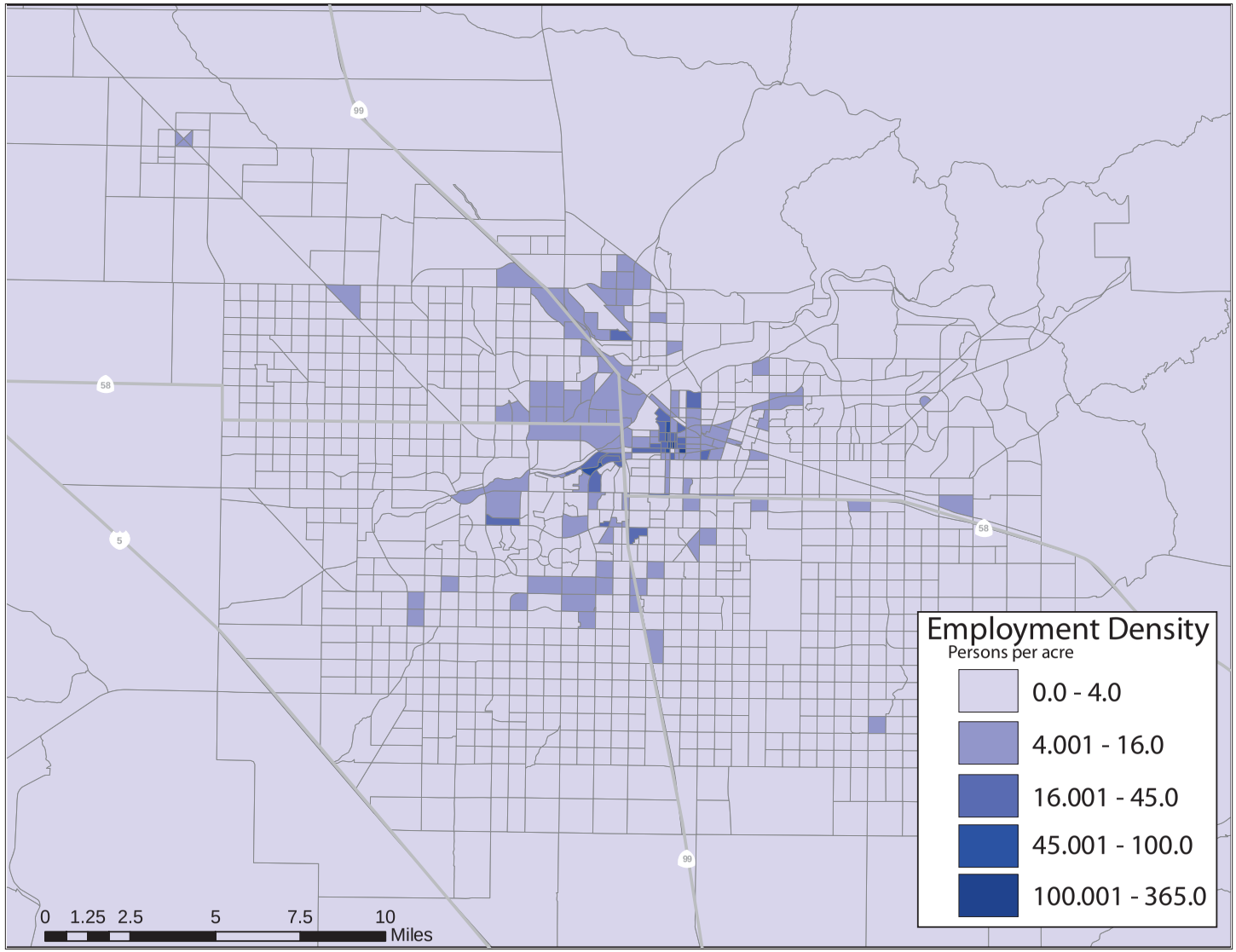


Figure 3.9 - Future Employment Density for Bakersfield (2035)



3.4 DEMOGRAPHIC CHANGES 2006 TO 2035

Population and employment figures within the Kern County study area are anticipated to experience steady growth in the time period between 2006 and 2035.

Within the study area, the largest population density growth will occur outside the Bakersfield metro area. Employment densities will also see the largest change in the zones surrounding Bakersfield. Forecasts for 2035 show a high percentage increase in growth around the city of Tehachapi and zones east and north of Bakersfield.

The greatest population growth from 2006 to 2035 is expected in northeast region in the City of Bakersfield. Figure 3.10, 3.11, 3.12 and 3.13 provide an overall comparison of the population and employment growth and change between 2006 and 2035 in the study area.

Figure 3.10 - Change in Population Density from 2006 to 2035 for Kern County

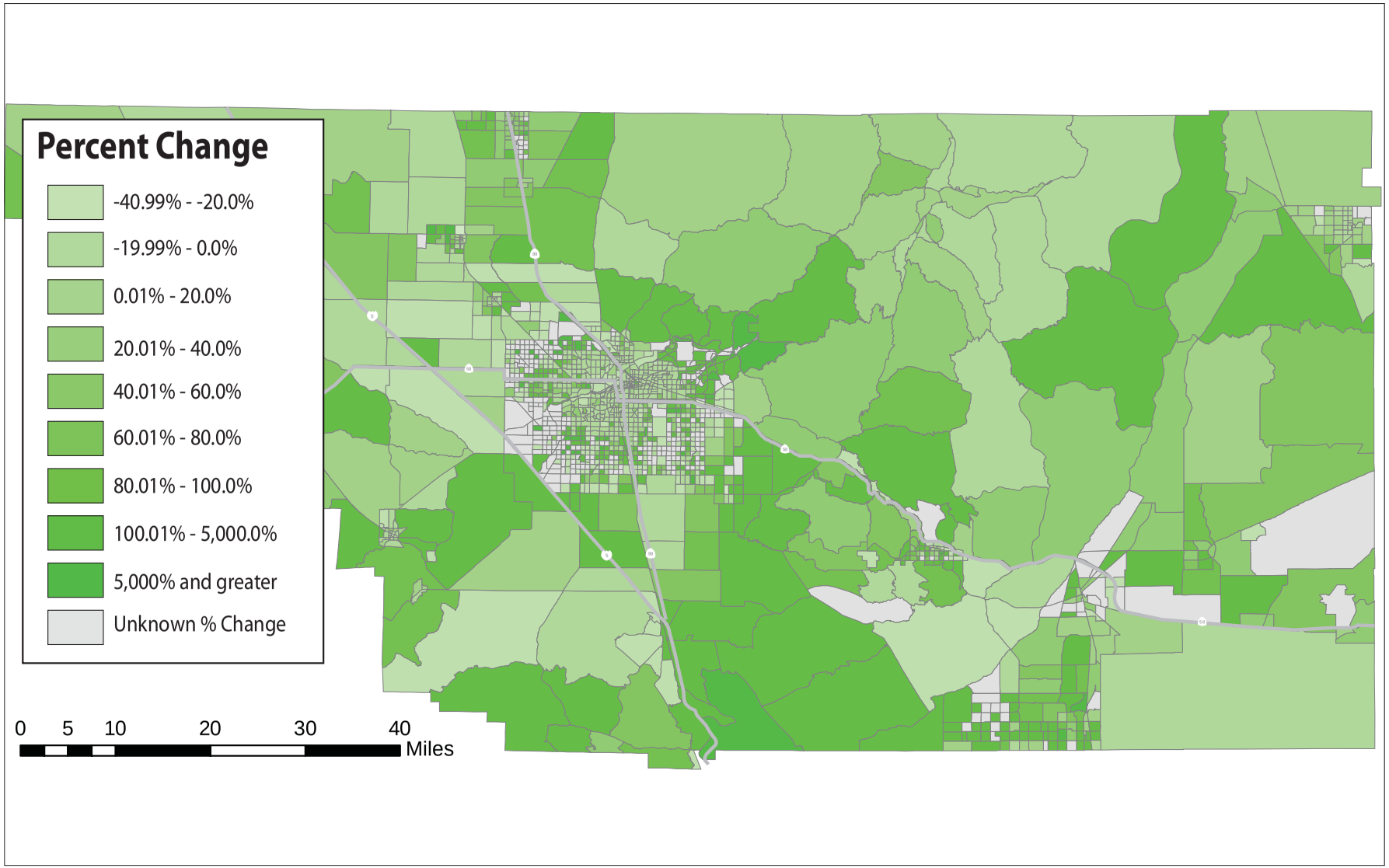


Figure 3.11 - Change in Population Density from 2006 to 2035 for Bakersfield

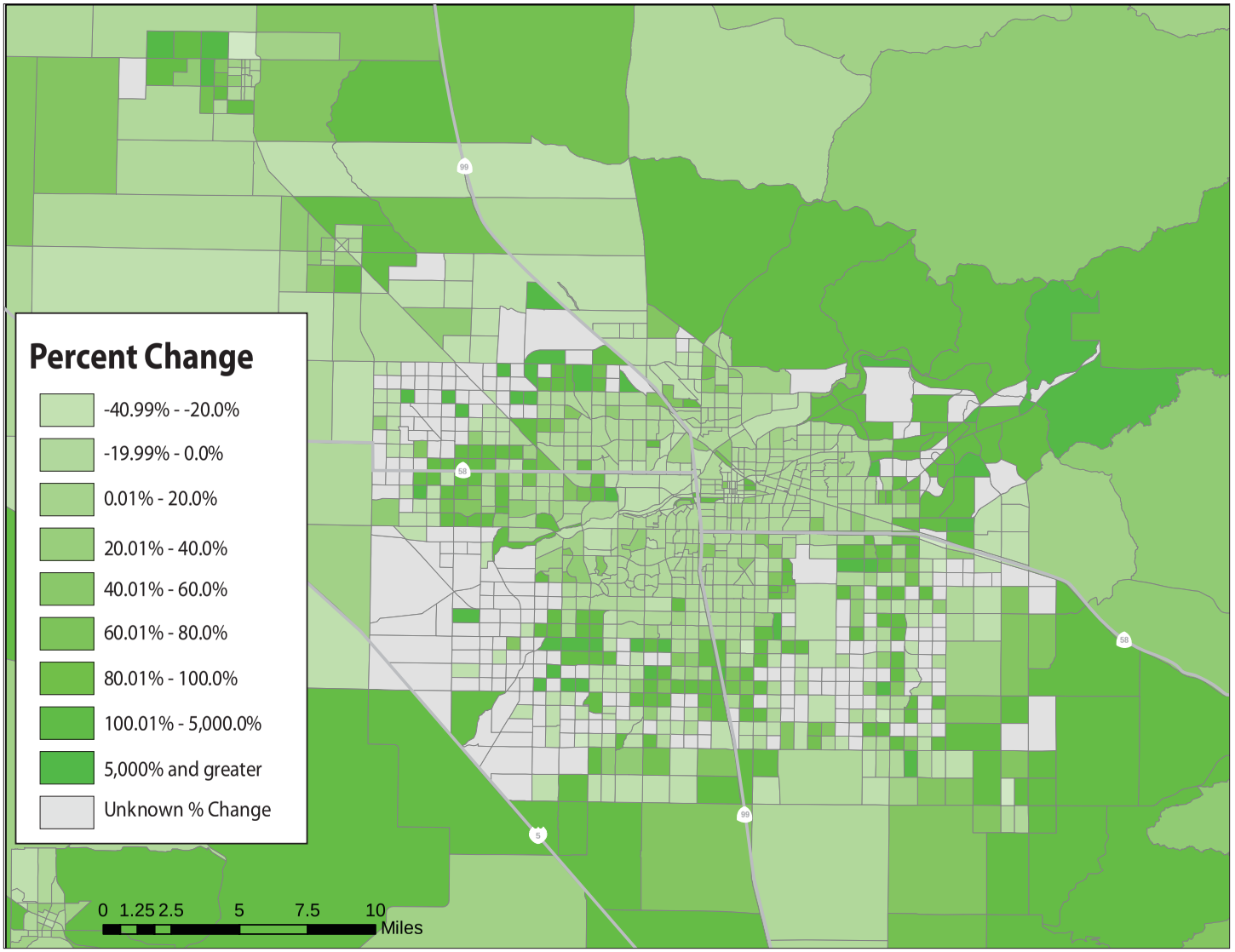


Figure 3.12 - Change in Employment Density from 2006 to 2035 for Kern County

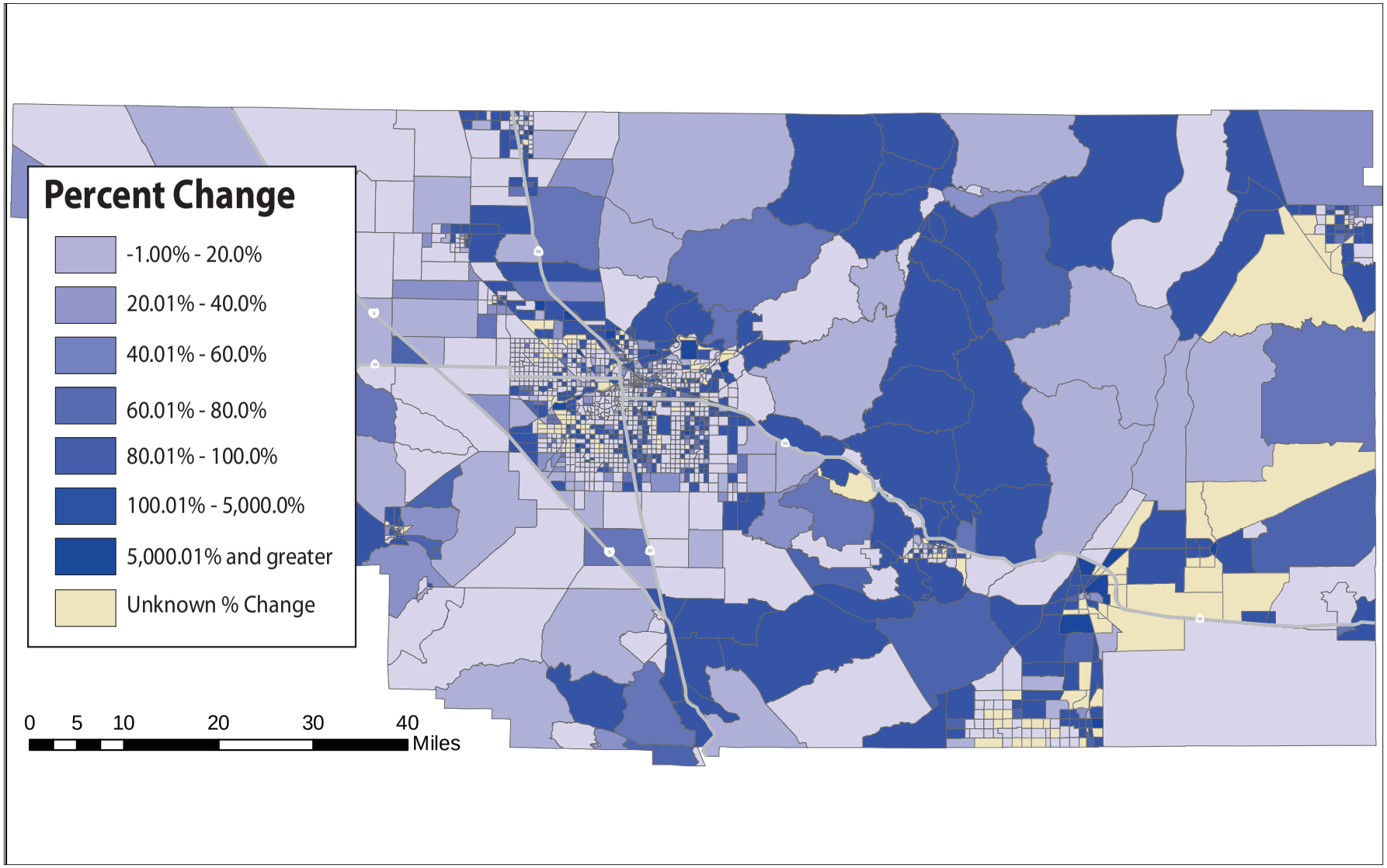
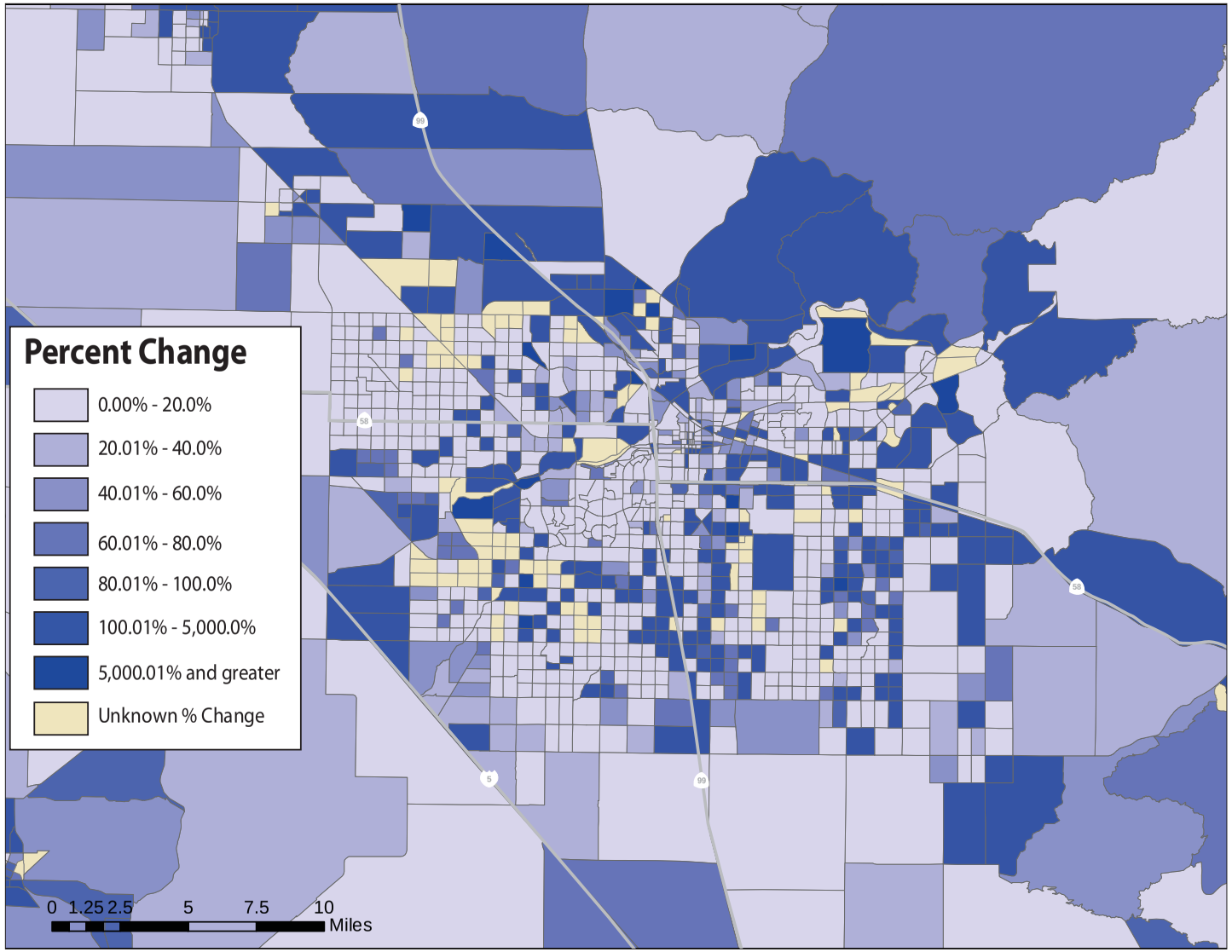


Figure 3.13 - Change in Employment Density from 2006 to 2035 for Bakersfield



3.5 IMPACT OF DEMOGRAPHIC GROWTH FORECASTS

The impact on demographic growth on the regional transportation network can be significant. The resulting affects can range from a change in the types of trips made to increases in travel time and miles traveled. Concentration of employment growth can lead to increased congestion during peak periods and a growing need for other modes of transportation to support the existing network. Population growth can also add more pressure on the transportation system and increase the need for added highway and roadway capacity, along with more transit services such as a commuter rail.

Study area employment growth is expected to be focused in and around the City of Bakersfield. Commuter rail services typically oriented to serve strong central employment centers, collecting passengers along the route to deliver them to a central business or employment district. Downtown Bakersfield will pay an important role in the feasibility and potential success of commuter rail service in Kern County.

There are a few examples of commuter rail lines serving corridors with more decentralized employment centers. The Metrolink Inland Empire-Orange County line is a good example, with residents of Riverside and San Bernardino Counties commuting along this corridor to a diverse group of smaller employment centers in Anaheim, Santa Ana, and Irvine. This type of corridor might serve as a model for a commuter rail service in Bakersfield, particularly along corridors that have several smaller employment centers outside of Downtown Bakersfield.

Population and employment densities are examined not only adjacent to proposed commuter rail stations, but within a defined distance that could be served via local feeder transit operations. These types of services would expand the reach and benefit of commuter rail services and allow for a greater numbers of residents and jobs to be served by a particular corridor. The objective is to identify development patterns and densities that would support placement of a commuter rail station and to assist in screening potential station locations.

3.6 EXISTING TRANSIT SERVICES

Existing public transportation services within Kern County encompass local and regional services, and include demand responsive services, fixed-route bus service (intra-city and inter-city), as well as services operated by private carriers such as Amtrak (rail) and Greyhound (bus). Each operator fills a specific role in the public transportation system, serving a different market for intra-county and inter-county trips.

The profile of existing transit services provides perspective of current travel patterns within Kern County, while establishing an understanding of the existing transit network and how a potential commuter rail system would fit within this network.

Commuter rail systems typically serve longer distance trips (primarily commute trips). Given this operation, commuter rail services could replace or supplement long-distance express bus routes and feed commuters into local bus services operating within individual cities.

3.7 BUS TRANSIT

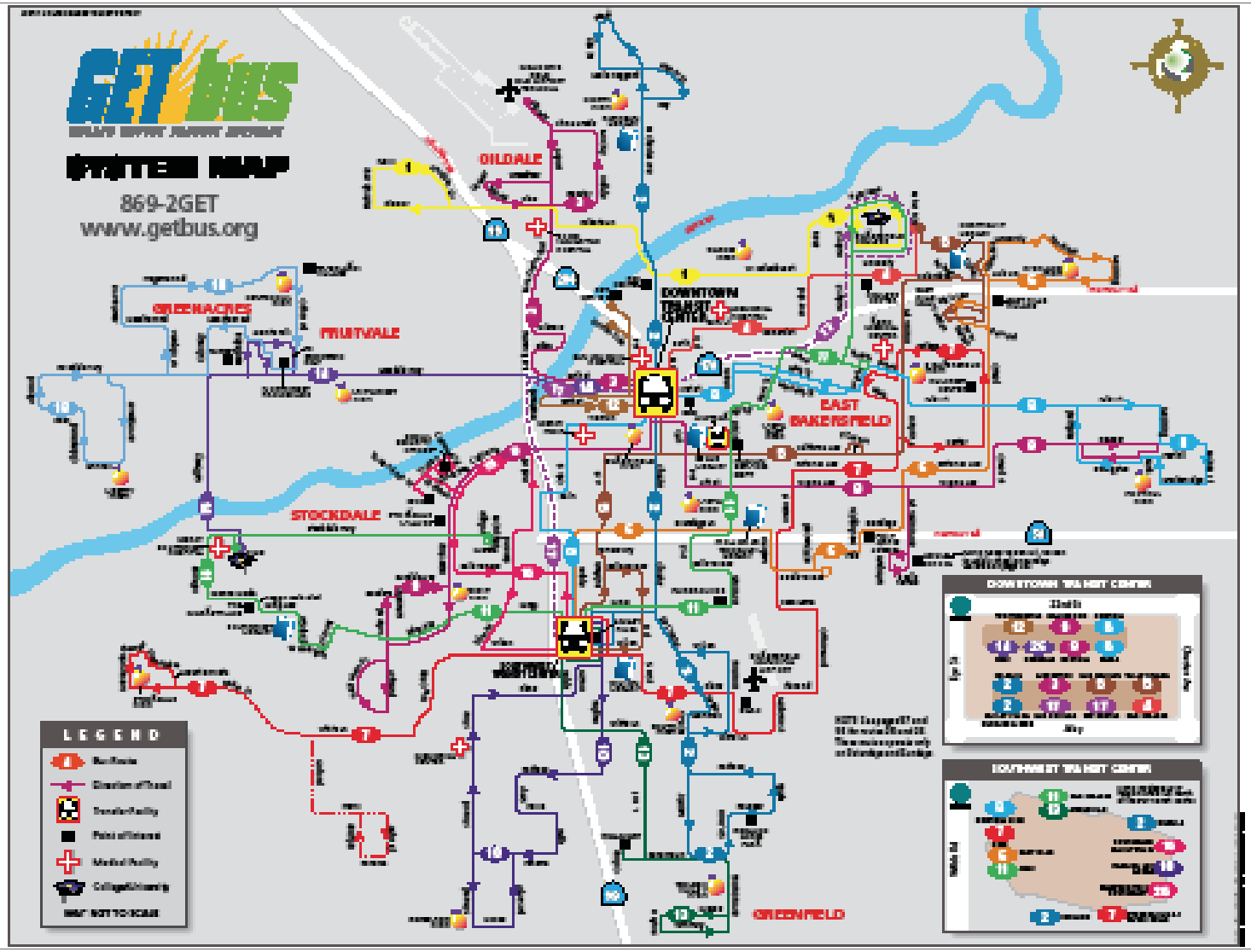
Bus transit service for the greater Bakersfield area is provided by Golden Empire Transit (GET). Regional and express bus services throughout Kern County are provided by Kern Regional Transit (KRT) system, operated by the County of Kern. KRT routes link smaller Kern County communities together, and provide long-distance bus service between these communities and Bakersfield. Profiles of the services offered by each operator are provided below.

Golden Empire Transit (GET)

Golden Empire Transit provides public transit service for the metropolitan Bakersfield area, and currently operates 18 bus routes (including two express routes) on weekdays, and 14 routes on weekend days. Figure 3.14 illustrates the existing GET bus system. Table 3-1 includes a summary of GET routes and services.

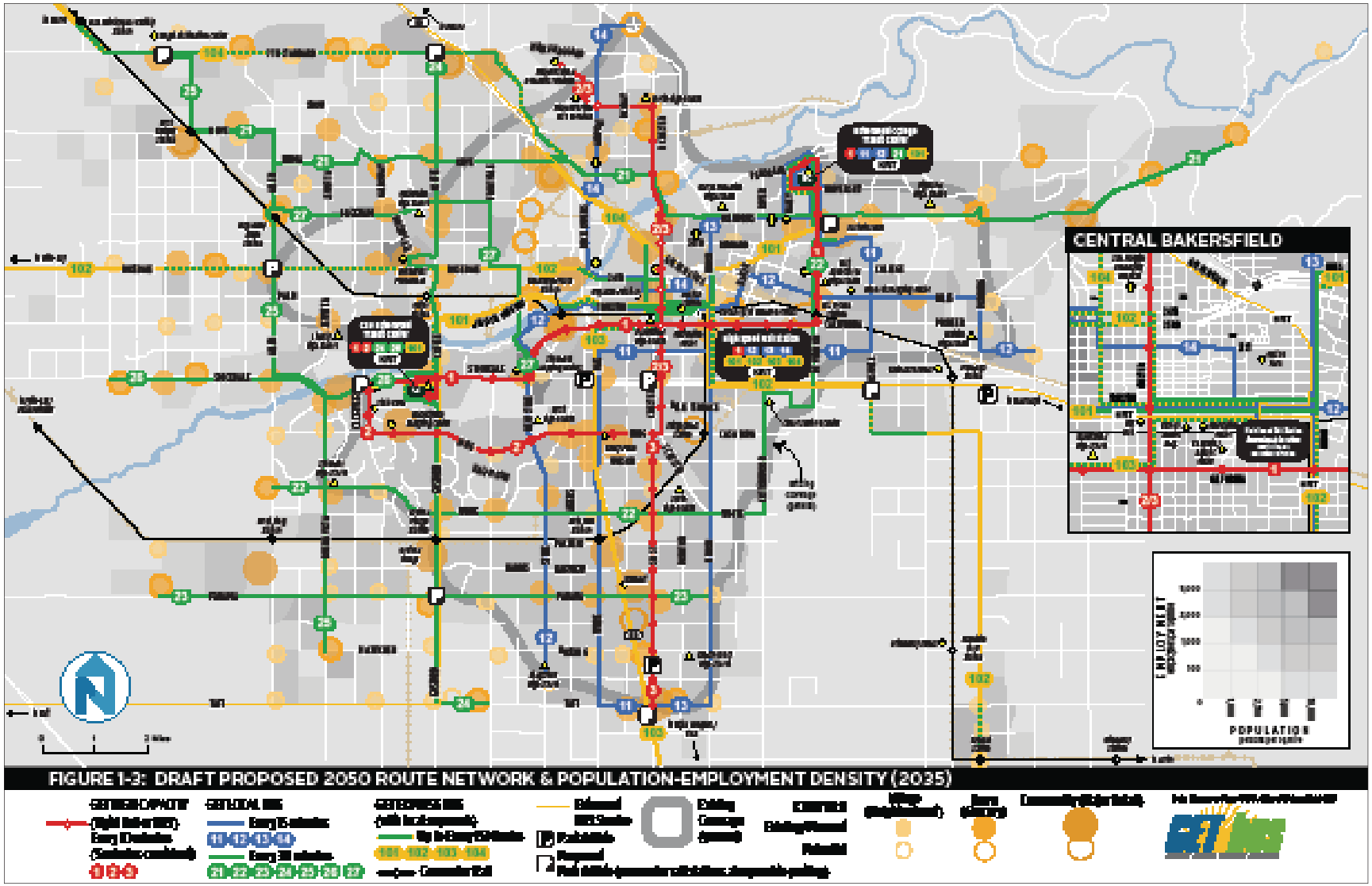
It should be noted that GET will soon be initiating significant changes to its bus services, based on the recommendations contained within the Draft Metropolitan Bakersfield Transit System Long Range Plan. The draft long-term bus route map proposed in this plan is shown in Figure 3.15.

Figure 3.14 - GET Bus System Map



Source: GET

Figure 3.15 - GET Draft Transit System Long Range Plan Bus Route Map



Source: GET

Table 3-1: Existing (2011) GET Bus System Service

Route	Weekday Service Hours	Weekday Peak Headway	Saturday Service Hours	Saturday Peak Headway	Sunday Service Hours	Sunday Peak Headway
RT. 1 – Olive Dr./Bakersfield College	6:25AM to 7:05PM	40 min.	7:00AM to 7:00 PM	40 min.	7:00AM to 7:00 PM	40 min.
RT. 2 – Chester Ave./Oildale (regular service)	6:20AM to 8:05PM	25 min.	6:20AM to 7:45PM	30 min.	6:45AM to 7:10PM	30 min.
RT. 2 – Chester Ave./Oildale (weekday evening service)	6:55PM to 11:05PM	60 min.	n.a	n.a	n.a	n.a
RT. 3 – Downtown	6:30AM to 7:15PM	30 min.	6:30AM to 7:15PM	60 min.	n.a	n.a
RT. 4 – Bakersfield College/Downtown (regular service)	6:35AM to 7:15PM	25 min.	6:45AM to 7:15PM	30 min.	6:45AM to 7:15PM	30 min.
RT. 4 – Bakersfield College/Downtown (weekday evening service)	7:20PM to 11:15PM	60 min.	n.a	n.a	n.a	n.a
RT. 5 – Bakersfield College/Valley Plaza (regular service)	6:35AM to 7:25PM	20 min.	6:30AM to 7:35PM	20 min.	7:20AM to 7:30PM	20 min.
RT. 5 – Bakersfield College/Valley Plaza (weekday evening service)	7:20PM to 11:15PM	60 min.	n.a	n.a	n.a	n.a
RT. 6 – Valley Plaza/East Hills	6:20AM to 6:35PM	30 min AM 60 min. PM	6:20AM to 6:35PM	30 min AM 60 min. PM	n.a	n.a
RT. 7 – Stockdale High/Kern Medical Ctr. (regular service)	5:55AM to 7:35PM	30 min.	6:25AM to 7:35PM	30 min.	7:00AM to 7:35PM	30 min.
RT. 7 – Stockdale High/Kern Medical Ctr. (weekday evening service)	6:20PM to 11:15PM	60 min.	n.a	n.a	n.a	n.a
RT. 8 – Foothill High/ Valley Plaza (regular service)	6:30AM to 8:00PM	30 min.	6:30AM to 8:00PM	30 min.	7:15AM to 7:15PM	30 min.
RT. 8 – Foothill High/ Valley Plaza (evening service)	7:00PM to 11:15PM	60 min.	7:00PM to 11:15PM	60 min.	n.a	n.a
RT. 9 – Foothill/Half Moon (regular service)	6:15AM to 8:00PM	30 min.	6:45AM to 7:40PM	30 min.	7:15AM to 7:10PM	60 min.
RT. 9 – Foothill/Half Moon (weekday evening service)	7:00PM to 11:05PM	60 min.	n.a	n.a	n.a	n.a
RT.10 – Panama Lane/Akers (regular service)	6:05AM to 8:05PM	30-40 min.	6:05AM to 8:40PM	30-40 min.	7:15AM to 7:35PM	30-40 min.
RT. 10 – Panama Lane/Akers (weekday evening service)	7:35PM to 11:05PM	70 min.	n.a	n.a	n.a	n.a
RT. 11 – Cal State/Bakersfield College (regular service)	6:00AM to 7:15PM	30 min.	6:00AM to 7:15PM	30 min.	7:00AM to 7:15PM	30 min.
RT. 11 – Cal State/Bakersfield College (weekday evening service)	7:20PM to 11:05PM	60 min.	n.a	n.a	n.a	n.a
RT. 12 – Westchester	7:00AM to 7:35PM	45 min.	n.a	n.a	n.a	n.a
RT. 13 – Greenfield/Valley Plaza (regular service)	5:50AM to 8:45PM	30 min.	5:50AM to 7:30PM	30 min.	6:50AM to 7:30PM	30 min.
RT. 13 – Greenfield/Valley Plaza (weekday evening service)	7:45PM to 11:15PM	30-60 min.	n.a	n.a	n.a	n.a
RT. 14 – Rosedale/Cal State	6:25AM to 7:45PM	45 min.	n.a	n.a	n.a	n.a
RT. 15 – Southwest/Valley Plaza	6:30AM to 7:30PM	60 min.	n.a	n.a	n.a	n.a
RT. 17 – Crosstown Express	6:30AM to 6:45PM	30 min.	n.a	n.a	n.a	n.a

Route	Weekday Service Hours	Weekday Peak Headway	Saturday Service Hours	Saturday Peak Headway	Sunday Service Hours	Sunday Peak Headway
RT. 18 – Rosedale Connector	6:05AM to 7:30PM	45 min.	n.a	n.a	n.a	n.a
X92 – Park and Drive / Tejon Complex	3:50AM to 12:10AM	120 min.	n.a	n.a	n.a	n.a
RT. 25 – Westchester/Southwest (replaces routes 12 and 15)	n.a	n.a	6:30AM to 7:10PM	90 min.	8:00AM to 7:10PM	90 min.
RT. 26 – Rosedale Weekends (replaces routes 14 and 18)	n.a	n.a	5:55AM to 8:05PM	45 min - 60 min.	9:05AM to 6:55PM	110 min.

Source: GET Timetables, www.getbus.org/maps-timetables
Notes: Hours of operation have been rounded to the closest 5. Peak headway is approximate.

GET also provides paratransit service for eligible users through the GET-A-LIFT program, and also for those that ride to and from the William Thomas Terminal. All GET vehicles are wheelchair accessible and all non-paratransit vehicles are equipped with bicycle racks.

The current fare structure (effective as of September 2011) for the fixed route bus service is provided in Table 3-2. GET also provides summer youth passes for riders up to the age of 18, allowing unlimited rides during the period between June 1 and August 31 at a discounted rate. This pass is not valid for route X92.

Table 3-2: GET Bus Fares

Type of Fare	Single Ride	Day Pass	31 Day Pass
Regular	$1.25	$3.00	$36.00
Reduced*	$0.75	$1.50	$18.00
Express Regular	$1.50	$5.00	$50.00
Express Reduced*	$0.75	$2.50	$25.00
GET-A-LIFT**	$2.50	n.a.	n.a.

*Reduced fares are issued to eligible passengers (seniors 65 years and older, Medicare Cardholders, and customers with disabilities).
** GET-A-LIFT 10 ride pass is equivalent to 10 individual passes. GET-A_LIFT pass not valid for route X92.

Transit services are mainly located in Bakersfield and include about 1,500 bus stops and two transit centers. The Downtown Transit Center is located on Chester Avenue, north of 21st Street and the Southwest Transit Center is located next to the Valley Plaza Mall. The GET maintenance facility is located in the northern portion of Bakersfield, on Golden State Avenue, between SR-99 and SR-178.

Transit ridership is based on the information contained in the GET SRTP. Ridership increased 8% from FY 2007/08 to FY 2008/09, reaching about 7.51 million riders. Weekday ridership averaged about 24,600 boardings, of which about 1,600 occurred during the evening. Saturday ridership was about 13,400 riders, and Sunday averaged about 9,300 boardings per day. Routes 5, 2 and 8 were the most boarded during this period, while routes 12, 18 and X92 had the lowest ridership. Peak hours for a typical weekday (FY08/09) occurred from 6:30AM to 7:30AM and from 3:30PM to 4:30PM.

Daily weekday ridership for Year 2011 is summarized in Table 3-3. The ridership is slightly lower than FY 2008/2008, averaging about 23,200 passengers, with routes 2, 5 and 11 serving the greatest number of riders.

Table 3-3: GET Bus Weekday Ridership (2011)

Route	Average Ridership
1	642
2	3,300
3	570
4	1,561
5	3,695
6	504
7	1,881
8	2,308
9	2,385
10	513
11	2,560
12	196
13	797
14	583
15	266
17	1,284
18	217
92	128

Source: GET Bus

For Fiscal Year 2008/09, GET-A-LIFT reported serving about 200 passengers per day on weekdays, 100 passengers on Saturdays and about 50 passengers per day on Sundays.

Kern Regional Transit

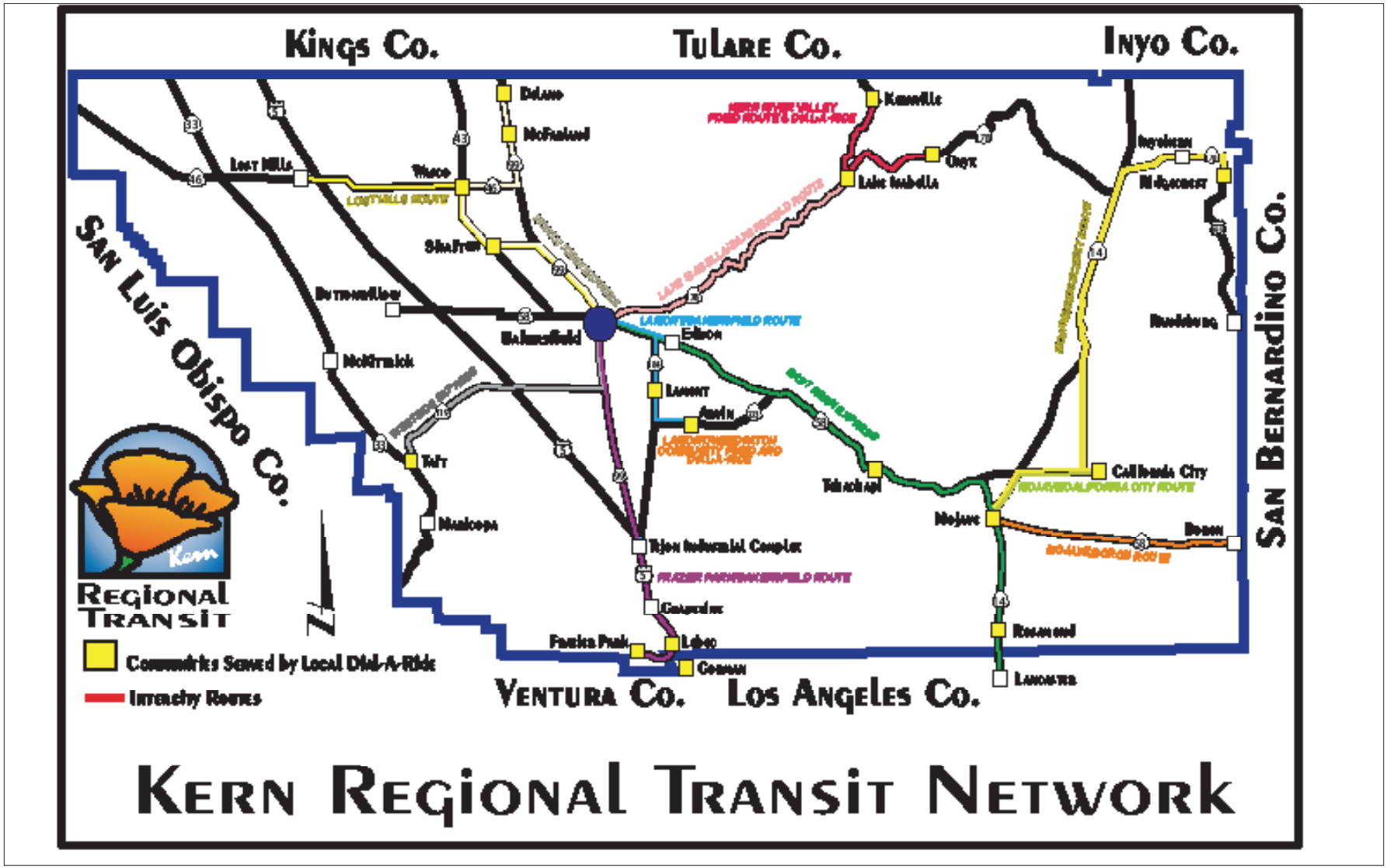
The County of Kern, though it's Transit Division, plans, coordinates, and administers Kern Regional Transit (KRT), the public transit system for the county's unincorporated areas. KRT provides a full range of transit services, including demand-response, fixed-route and inter-city services. KRT also administers the transit enterprise fund in Kern County. Figure 3.16 illustrates the KRT network. Table 3-4 includes a brief description of the services provided.

KRT contracts with the cities of Delano, Shafter, Taft and Ridgecrest to provide service for county residents in the surrounding area. The agency also contracts with Tehachapi to provide demand responsive services to its residents. This regional transit system connects to local systems such as the Golden Empire Transit (greater Bakersfield), Delano Area Rapid Transit, Antelope Valley Transit, Eastern Sierra Transit Authority and all local community dial-a-rides.

The current KRT fare structure varies by route and sometimes by destination, and fare categories are defined as general public, seniors (62 and over), disabled and youth (5 to 15). The discounted fare varies according to the service provided and the route.

The fixed route service provided by KRT currently serves around 400,000 passengers per year, and the demand response service serves over 250,000 passengers per year.

Figure 3.16 - KRT Bus System Map



Source: KRT

Table 3-4: Kern Regional Transit Bus Service

Route	Weekday Service Hours	Weekday Peak Headway	Saturday Service Hours	Saturday Peak Headway	Sunday Service Hours	Sunday Peak Headway
Boron - Mojave (intercity/deviated fixed route) – Wednesday only	4:40AM to 6:15PM	~ 4 hours	n.a	n.a	n.a	n.a
Buttonwillow (intercity) – Tuesday and Thursday only	9:00 AM to 5:00PM	9:00AM and 12:30PM	n.a	n.a	n.a	n.a
East Kern Express (intercity)	4:00AM to 10:00PM	8 trips ~2 hours	4:00AM to 9:10PM	3 trips ~4 to 5 hours	9:25AM to 7:00PM	2 trips - 4 hours
Edison-Bakersfield (fixed route) – Wednesday only	8:00AM to 4:45PM	3 trips ~3-4 hours	n.a	n.a	n.a	n.a
Frazier Park-Bakersfield (intercity)	4:40AM to 8:55PM	4 trips ~3-5 hours	4:40AM to 8:55PM	4 trips ~3-5 hours	n.a	n.a
Frazier Park Community Fixed (fixed route/intercity) – Thursday and Saturday only	8:50PM to 6:00PM	5 trips ~1.5 to 2.5 hours	8:50PM to 6:00PM	5 trips ~1.5 to 2.5 hours	n.a	n.a
Frazier Park Express (dial-a-ride)	4:40AM to 8:55PM	4 trips ~3-5 hours	4:40AM to 8:55PM	4 trips ~3-5 hours	n.a	n.a
Kern River Valley (intercity and dial-a-ride)	5:20AM to 7:50PM	17 trips ~1-1.5 hours	5:20AM to 7:50PM	17 trips ~1-1.5 hours	n.a	n.a
Lake Isabella-Bakersfield (intercity)	6:55AM to 6:30PM	4 trips ~1-1.5 hours	6:30AM to 6:30PM	4 trips ~1-1.5 hours	n.a	n.a
Lake Isabella-Bakersfield (dial-a-ride)	6:55AM to 6:30PM	4 trips ~ 1-1.5 hours	7:45AM to 6:30PM	4 trips ~1-1.5 hours	n.a	n.a
Lamont/Bakersfield (intercity)	5:55AM to 7:35PM	11 trips ~ 30 min -2 hours	5:55AM to 7:35PM	11 trips ~30 min -2 hours	n.a	n.a
Lamont/Bakersfield (intercity evening) – Monday to Thursday only	7:50PM to 10:20PM	1.5 hours	n.a	n.a	n.a	n.a
Lamont (dial-a-ride) and Arvin/Lamont - Bakersfield Sunday Service	n.a	n.a	n.a	n.a	8:00AM to 7:45PM	9 trips ~2 hours
Lamont-Weedpatch (intercity)	5:30AM to 6:55PM	10 trips ~1 to 1.5 hours	5:30AM to 6:55PM	10 trips ~1 to 1.5 hours	n.a	n.a
Lost Hills-Bakersfield (intercity) – Thursday and Saturday only	7:05AM to 7:20PM	5 trips ~2-4 hours	8:00AM to 5:50PM	3 trips ~4.5 to 5 hours	n.a	n.a
Mojave (dial-a-ride)	7:00AM to 6:00PM		7:00AM to 6:00PM		n.a	n.a
Mojave/California (intercity)	6:15AM to 7:45PM	7 trips ~2-3 hours	7:40AM to 6:25PM	3 trips ~3-7 hours	n.a	n.a
Mojave/Ridgecrest (intercity) – Monday, Wednesday, Friday only	4:20AM to 8:30PM	4:20AM and 5:25PM	n.a	n.a	n.a	n.a
North Kern Express	5:55AM to 7:50PM	7 trips ~1 to 4 hours	8:10 AM to 6:45 PM	3 trips ~4-5 hours	8:10 AM to 6:45 PM	3 trips ~4-5 hours
Rosamond (dial-a-ride)	6:30AM to 5:30PM		6:30AM to 5:30PM		n.a	n.a

Route	Weekday Service Hours	Weekday Peak Headway	Saturday Service Hours	Saturday Peak Headway	Sunday Service Hours	Sunday Peak Headway
Tehachapi (dial-a-ride)	5:30AM to 7:00PM		n.a	n.a	n.a	n.a
Westside Express	4:50AM to 8:35PM	5 trips ~ 1.5-6.5 hours	8:00AM to 7:53PM	3 trips ~4.5 -5 hours	n.a	n.a

Source: Kern Regional Transit Schedules, www.co.kern.ca.us/roads/kernregionaltransit.asp

Other Bus Transit Operators

The Delano Area Rapid Transit (DART) provides fixed route bus service and demand response service to the City of Delano and citizens residing in the immediate county area surrounding the city, within the boundaries of SR-43 (west), County Line Road (north), Pond Road (south) and Kyte Avenue (east). DART operates 4 fixed bus routes within the city and operation hours are Monday to Friday (7:00 AM to 5:30 PM) and Saturday (8:30 AM to 4:30 PM). There is no Sunday service. Annual boarding's to the system are close to 155,000 passengers. Fixed route fares are $0.90, and discounted fares are $0.75 for riders age 8-17 and $0.50 for seniors, disabled and Medicare riders. Dial-a-ride fares are $1.75 for general public, $1.00 for seniors, disabled and Medicare. Multiple ride passes are also available at discounted price.

The Eastern Sierra Transit Authority provides bus services for the Inyo and Mono Counties and interregional transportation for the Eastern Sierra Region. Service in Kern County consists of one route, from Mammoth and Lancaster, with stops at Inyokern Airport and in Mojave. The route runs once a day in each direction Monday, Wednesday and Friday, with southbound departure times in Kern County starting at 11:00 AM and northbound departures starting at 2:30 PM. Fares vary by destination, and discount fares are available to disabled, senior citizens (60 and over) and youths (ages 5 to 16). Fare from Inyokern to Mojave is $3.00 ($2.00 discount).

Greyhound Bus Service

Greyhound bus service is provided at the Bakersfield Greyhound Station, close to Downtown Bakersfield. Station hours are Monday to Sunday from 7:00 AM to 11:00 PM. Service is provided to major destinations within the State of California, as well as to other destinations.

3.8 RAIL TRANSIT

Rail transit services in Kern County are exclusively inter-county, with Amtrak providing connections between Bakersfield, Fresno, and Oakland and Sacramento via the San Joaquin service. The Metrolink commuter rail service, operated throughout the Los Angeles metropolitan region, does not serve Kern County, but the Metrolink Antelope Valley line terminates in Lancaster. Extensions of this service to Rosamond in Kern County have been previously explored. Profiles of both services are provided below.

Amtrak

Amtrak provides passenger rail to Kern County through the San Joaquin Line, with six daily round trip trains stopping at the Downtown Bakersfield station, operating as the sixth busiest rail corridor in the nation with 1,067,441 riders (FY2011). The Amtrak San Joaquin service route map is shown in Figure 3.17.

An additional Amtrak station in Kern County is located in Wasco. Boardings and alightings for the Downtown Bakersfield station were the 24th highest in the country for the most recent year available (FY2011), with 476,767 passengers. Wasco had 18,209 boarding and alightings (FY2011).

Amtrak also operates several connecting Thruway bus services from Bakersfield to San Francisco, Los Angeles, Palm Springs, Indio, Hemet, Santa Barbara, Las Vegas, and Victorville. Thruway bus tickets require a connecting train ride at one end of the trip.

Metrolink

The Metrolink Antelope Valley line connects Downtown Los Angeles with Santa Clarita and the Antelope Valley. The alignment and stations are shown in Figure 3.18. The line currently has 11 stations in the following locations:

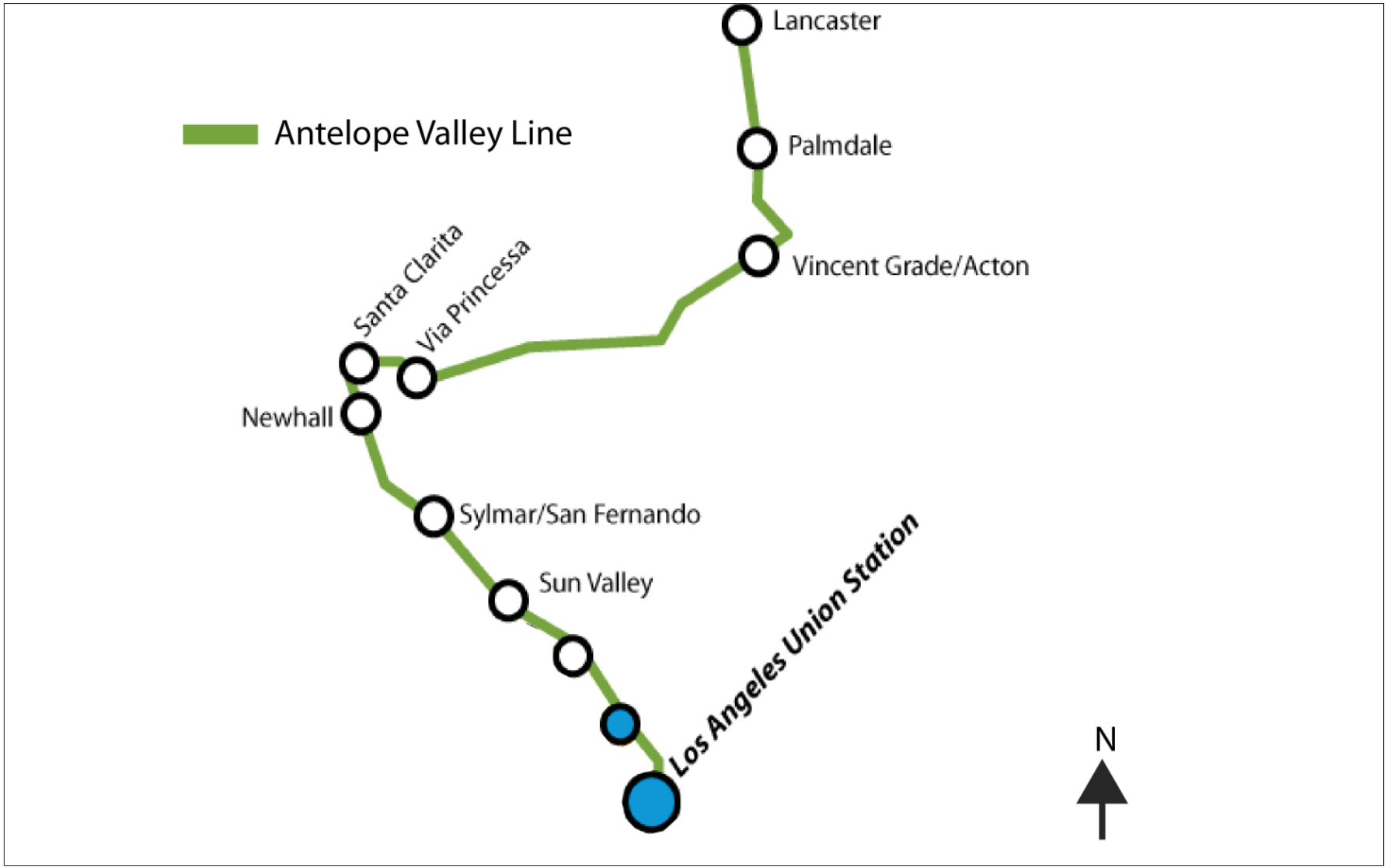
- Downtown Los Angeles (Union Station)
- Glendale
- Burbank
- Sun Valley
- San Fernando
- Santa Clarita, Santa Clarita
- Via Princessa, Santa Clarita
- South Palmdale
- Downtown Palmdale
- Lancaster

The Antelope Valley Line has 15 roundtrip trains per day. Service is focused in the AM and PM peak periods. Limited weekend service is also offered on Saturdays and Sundays.

Figure 3.17 - Amtrak San Joaquin Service Map

Source: Amtrak

Figure 3.18 - Metrolink Antelope Valley Line System Map



Source: MetroLink

4.0 Case Studies

A key element of the development process for study alternatives is the completion of a series of case studies that examine existing projects where commuter rail services have been implemented either in metropolitan areas similar to Bakersfield or in specific corridors that have similar characteristics (traffic patterns, adjacent land use, etc.) to corridors present in Bakersfield and surrounding communities. The case studies are intended to provide insight into the operational characteristics, cost information, and thresholds associated with commuter rail lines in the western United States.

The objective of this case study analysis is to examine similar existing examples of a particular strategy or form of service elsewhere in California or the United States. These case studies can provide valuable insight on operational characteristics, usage, costs (capital and operations), as well as lessons learned from other cities and public agencies that are responsible for implementation and operation. The information and knowledge gained from the review of case studies assists in the formulation of potential alternative corridors and services that would be studied as part of this project.

Summaries of nine case study projects are provided in the following sections. These commuter rail operations were selected in consultation with Kern COG staff, and provide a good cross section of potential service types with variations in system length, operations, vehicles, and metropolitan area development patterns. Table 4-1 summarizes the proposed case studies.

Table 4-1: Case Studies for Kern COG Commuter Rail Feasibility Study

Commuter Rail	Brief Description
North County Transit District (NCTD) Coaster	Commuter rail service connecting Oceanside in the north to Downtown San Diego in the south.
New Mexico Rail Runner Express	Diesel-electric locomotives operating on a combination of existing rail tracks and newly constructed tracks, providing commuter service between suburban areas south of Albuquerque, and Santa Fe.
Southern California Metrolink	A commuter rail system serving Los Angeles and the surrounding areas of Southern California.
Utah FrontRunner	Operated by the Utah Transit Authority, the FrontRunner connects the larger Salt Lake City region with 88 miles of track, most of which parallels I-15.
Altamont Commuter Express (ACE)	Serving 86 miles connecting Stockton and San Jose on existing rails owned by the Union Pacific Railroad. Provides connection to BART, Caltrain and Amtrak for daily commuters.
NCTD Sprinter	A diesel multiple unit (DMU) passenger rail line connecting Oceanside and Escondido in Northern San Diego County.
TriMet Westside Express Service (WES)	Serves the Portland, Oregon area as a suburban commuter rail using existing freight tracks. The 14.7 mile route provides crosstown rail service that does not directly serve downtown Portland.

Commuter Rail	Brief Description
Austin Capital MetroRail	Operating on 32 miles of existing freight tracks serving the Greater Austin, Texas area as a commuter rail line.
Trinity Railway Express	Connecting two Metroplex cities, Dallas and Fort Worth Texas, the 10 stations and 34 miles of track has provided a passenger rail service since 1996.

These case studies encompass a range of examples, including systems using new and existing tracks and systems using self-propelled (Diesel Multiple Unit) cars as well as locomotives and coaches. These case studies also reflect input and suggestions received from Kern COG. The case studies also represent a wide cross section of metropolitan areas and applications of commuter rail transit services.

4.1 NORTH COUNTY (SAN DIEGO) TRANSIT DISTRICT COASTER

Overview

The Coaster is a commuter rail service that operates in the Central and Northern coastal regions of San Diego County. The service is operated by TransitAmerica Services on contract with North County Transit District (NCTD). The COASTER covers 42 miles of track in less than 60 minutes, stopping at eight stations in five cities and making 11 round trips every weekday.

San Diego Northern Railway (SDNR) purchased the tracks used by COASTER from the Atchison, Topeka and Santa Fe Railway in 1994. The service began operation in 1995. NCTD originally contracted Amtrak to provide personnel for Coaster trains. On July 1, 2006, TransitAmerica took over the day-to-day operation of the commuter train, based on a five-year, $45 million contract with SDNR. The Coaster carried 700,000 passengers during its first year of operation. By 2004, it was carrying 1.4 million passengers annually. NCTD owns 62 miles of mainline track, as well as the 22-mile Escondido Branch that is served by the Sprinter, which began service in March 2008.

Destinations Served

Oceanside, Carlsbad, Encinitas, Solana Beach, Sorrento Valley, Downtown San Diego

Average Daily Weekday Ridership

Over 5,000 daily passenger boardings

Operational Characteristics

The COASTER makes eleven round trips on weekdays between 5 am and 8 pm and four round trips on weekends and holidays between 8 am and 8 pm.

Stations

- Downtown Stations: 2
    - Average Spacing: 3.5 miles
- Stations Outside of Downtown: 6
    - Average Spacing: 6.0 miles

Fleet Characteristics

Seven locomotives and 28 bi-level passenger coaches with approximately 135 seats each

Fare Structure

COASTER fares vary depending on the number of zones traveled. Regular one-way fares range from $5.00 for a one-zone trip to $6.50 for a four-zone trip. Senior or disabled fares are available from $2.50 to $3.25. Monthly passes are also available for regular passengers, youth and senior /disabled.

Project Funding

The COASTER project got started in 1995 with an original investment of $243 million, $90 million of that from TransNet funds from a half-cent sales tax approved in 1987. Of the COASTER's $61 million expenses for 2003, $12.9 million came from passenger fares and most of the rail's remaining revenues came from the state Transportation Development Act tax ($27.6 million) and the TransNet tax ($4.12 million).

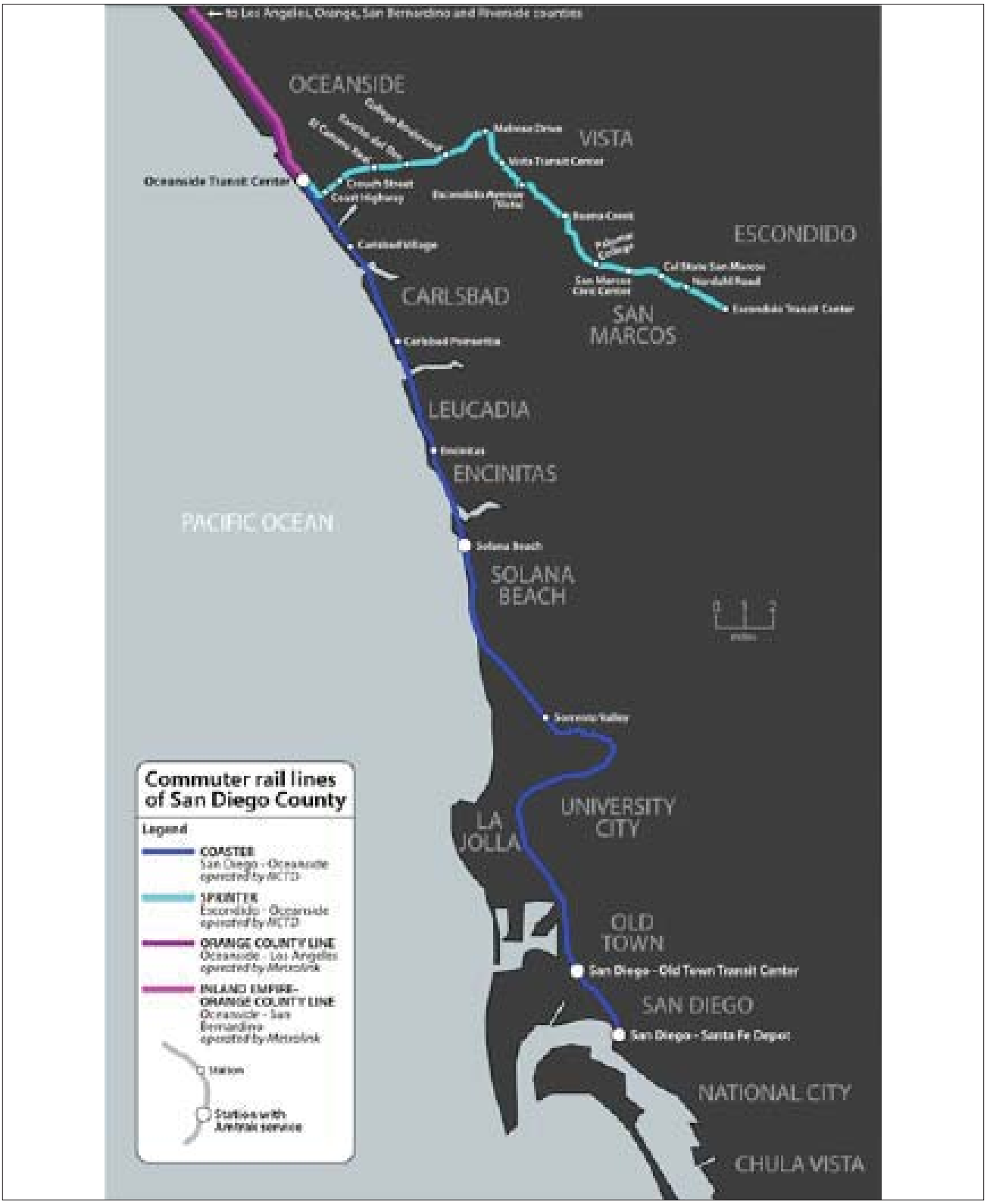
Website

http://www.gonctd.com/coaster

Contact

Tim McCormick, Director of Service Planning, Phone: (760) 966-6576, Email: tmccormick@nctd.org

Figure 4.1 - COASTER Route Map



Source: NCTD

4.2 NEW MEXICO RAIL RUNNER EXPRESS

Overview

The New Mexico Rail Runner Express is a commuter rail line that extends from Albuquerque northwards to Santa Fe and southwards to Belen, a total distance of about 96 miles. It is administered by the New Mexico Department of Transportation (NMDOT) and the Mid Region Council of Governments (MRCOG), a regional government planning association, and is managed by the Rio Metro Regional Transit District. Most of the route was originally built by the Atchison, Topeka & Santa Fe (AT&SF) Railway, which is now part of the Burlington Northern Santa Fe (BNSF) Railway. BNSF sold this route in 2006-07 to the state of New Mexico, but continues to operate some freight trains along it.

The first segment, between Downtown Albuquerque and Sandoval County / US 550, opened in July 2006. The line was extended southward to Los Lunas in December 2006 and to Belen in February 2007 and northward to Santa Fe in December 2008. Some intermediate stations opened after the sections of the line on which they are located. Two more stations are yet to open.

Destinations Served

Santa Fe, Santo Domingo Pueblo (recently renamed to Kewa), Bernalillo, Sandia Pueblo, Albuquerque, Los Lunas, Belen

Average Daily Weekday Ridership

4,400 daily passenger boardings

Operational Characteristics

Currently, the Rail Runner operates on weekdays with eight Albuquerque – Santa Fe roundtrips and five Belen – Albuquerque roundtrips. During the week, most trains run during the peak commuting periods, with extra trains running mid-day and in the evening. A reduced number of trips are operated on weekends.

Stations

- Downtown Stations: 3
  - Average Spacing: 2.5 miles
- Stations Outside of Downtown: 11
  - Average Spacing: 8.7 miles

Fleet Characteristics

The Rail Runner power includes nine Motive Power MPI MP36PH-3C diesel-electric locomotives that operate on diesel fuel. Passenger cars include thirteen bi-level Coaches (seating capacity of 151 passengers) and nine bi-level Cab cars (seating capacity of 141 passengers).

Fare Structure

Rail Runner fares vary depending on the number of zones traveled. Regular one-way fares range from $2.00 double check for a one-zone trip to $8.00 for a six-zone trip. Senior or disabled fares are available from $1.00 to $4.00. Day passes and Monthly passes are also available for adults, youth and seniors/disabled.

Project Funding

Capital Costs: $385 million, Operational Costs: $20 million

Website

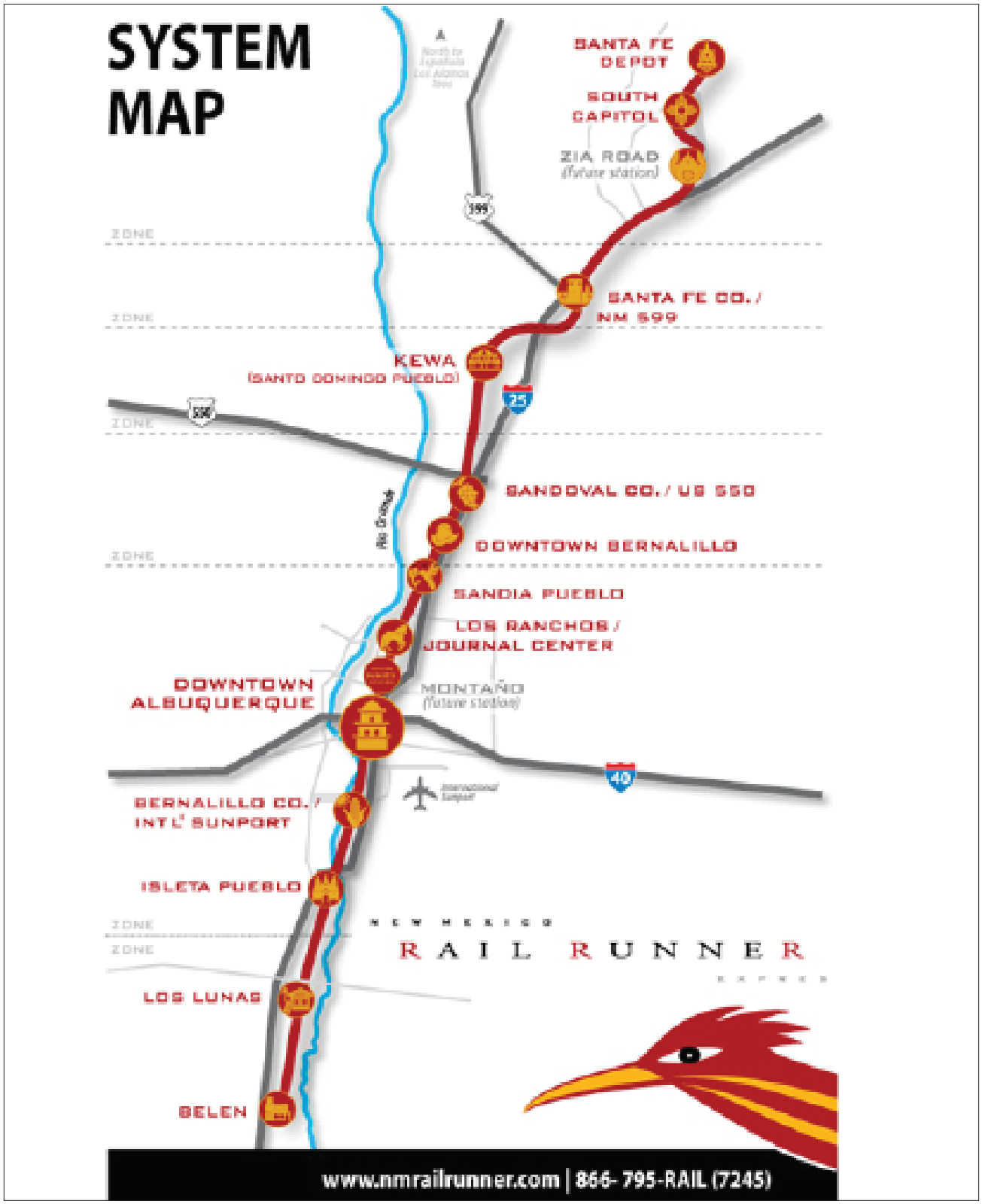
http://nmrailrunner.com

Contact

Jay Faught, Project Manager, Phone: (505) 247-1750, Email: railrunner@mrcog-nm.gov

Sources: Governor Richardson's Investment Partnership Plan (GRIP), Congestion Mitigation Air Quality (CMAQ)

Figure 4.2 - Rail Runner Route Map



Source: NMDOT

4.3 SOUTHERN CALIFORNIA METROLINK

Overview

Metrolink is a commuter rail system serving Los Angeles and the surrounding area of Southern California; it currently consists of six lines and 55 stations using 512 miles of track. It connects with the Metro Rail system which serves Los Angeles County, the San Diego Coaster and Sprinter commuter rail services which serves San Diego County, and Amtrak's Pacific Surfliner, Coast Starlight, Southwest Chief and Sunset Limited intercity rail services. A survey found that 90% of users during a typical weekday in 2009 would have previously driven alone or carpooled and the system replaced an estimated 25,000 vehicle trips.

The member agencies of the SCRRA purchased 175 miles of track, maintenance yards, and stations and other property from Southern Pacific for $450 million in 1990. The Authority began operation of the Ventura, Santa Clarita, and San Bernardino Lines on October 26, 1992 (the Santa Clarita Line later became the Antelope Valley Line) which were operated by Amtrak. In 1993 service was expanded to include the Riverside and Orange County Lines in 1994. The Inland Empire-Orange County Line opened in 1995, becoming the first suburb to suburb commuter rail line in the country. The system gained its current form in 2002 with the addition of the 91 Line.

Destinations Served

Los Angeles, Orange County, Oceanside, Riverside, San Bernardino, Ventura

Average Daily Weekday Ridership

Over 41,000 daily passenger boardings

Operation Characteristics

The rail system experiences its peak ridership during weekday mornings and afternoons. Most trains operate during the morning from 5 – 9 am and the afternoon from 3 – 9 pm. Service is provided on weekends.

Stations (Orange County Line)

- Number of Stations: 14
    - Average Spacing: 7.3 miles

Fleet Characteristics

The Metrolink fleet consists of 52 locomotives and 171 Bombardier bi-level Coaches with 117 Rotem bi-level cars on order.

Fare Structure

Metrolink's fare structure is based on a flat fee for boarding the train and an additional cost for distance with fares being calculated in 25-cent increments between stations.

Project Funding

Every year the Metrolink system requires $153 million to maintain operations. The cost per passenger mile is $0.41/mi, the farebox recovery is 43.9%, and the subsidy per boarding is $7.19. The total capital cost of the Metrolink system is approximately $1.2 billion.

Website

http://www.metrolinktrains.com

Contact

Kari Brozowski, SCRRA Board Secretary, Phone: (213) 452-0255, Email: brozowskik@scrra.net

Figure 4.3 - Metrolink Route Map

Source: MetroLink

4.4 UTAH FRONTRUNNER

Overview

FrontRunner is a commuter rail system operated by the Utah Transit Authority (UTA), serving the northern portion of the Wasatch Front from Salt Lake Central Station to Ogden Union Station. The system opened April 26, 2008. A future expansion will provide access south from Salt Lake City to Provo, via many Salt Lake and Provo suburbs, extending the line to a total of 88 miles.

Unlike TRAX, the region's light rail system, which is powered by overhead electrical wires, FrontRunner is a push/pull diesel locomotive system complete with bi-level cab cars and refurbished single-level vehicles. FrontRunner can travel up to 79 miles per hour along the corridor. Most of the FrontRunner line is single-tracked (though it runs parallel to UP tracks), with double track at stations and several other points along the line to allow trains to pass each other. Interstate 15 is parallel to FrontRunner for most of the route.

Destinations Served

Ogden, Roy, Clearfield, Layton, Farmington, Woods Cross, Salt Lake City

Average Daily Weekday Ridership

5,500 daily passenger boardings

Operational Characteristics

FrontRunner runs every 30 minutes in each direction Monday through Friday, approximately 4 am to 7 pm and hourly after 7 pm. Weekend (Saturday) trains operate hourly between 7 am and 10 pm. There are about 35 round trips on weekdays between Salt Lake City and Ogden.

Stations

- Number of Stations: 8
    - Average Spacing: 6.8 miles
    -

Fleet Characteristics

FrontRunner trains are powered by 11 MPXpress MP36PH diesel-electric locomotives. The FrontRunner vehicle fleet includes eight Bombardier bi-level coach cars and 12 bi-level cab cars.

Fare Structure

FrontRunner fares vary depending on the distance traveled. Regular one-way fares range from $2.25 for a one-station trip to $5.25 for an eight-station trip. Senior or disabled fares are available from $1.10 to $2.60. Monthly passes are also available for regular passengers, youth and senior or people with disabilities.

Project Funding

FrontRunner is funded with $489.3 million from the Full Funding Grant Agreement (FFGA) and local funds from a quarter-cent sales tax increase.

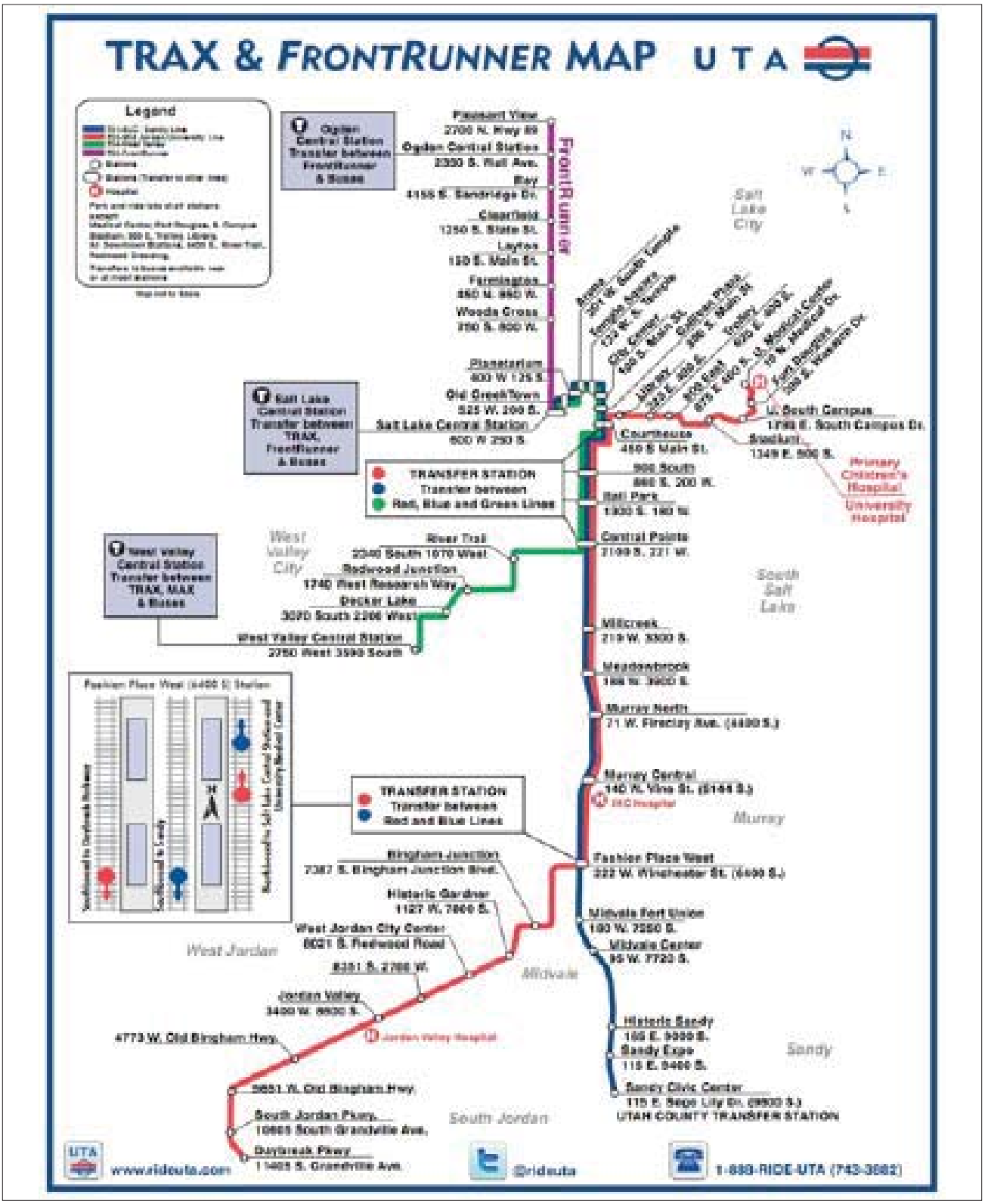
Website

http://www.rideuta.com/mc/?page=UTA-Home-FrontRunner

Contact

Steve Meyer, Project Manager, Phone: (801) 287-2538, Email: smeyer@rideuta.com

Figure 4.4 - FrontRunner Route Map



Source: UTA

4.5 ALTAMONT COMMUTER EXPRESS (ACE)

Overview

The current ACE system, which stretches 86 miles, serves 10 stations, and connects with the Capitol Corridor, Bay Area Rapid Transit (BART), and Caltrain in the Bay Area. Shuttle services are provided to employment centers in the Tri-Valley and Silicon Valley utilizing the Livermore Amador Valley Transportation Authority, Contra Costa County Transportation Authority, AC Transit, and Santa Clara Valley Transportation Authority (VTA).

The ACE Service is managed by the San Joaquin Regional Rail Commission (SJRRC), as stipulated in a Cooperative Services Agreement (CSA) between the three Counties along the ACE Service Corridor. SJRRC, the Alameda County Transportation Commission (ACTC) and VTA work within the framework of the CSA to identify how operating and capital expenses for the ACE service are to be funded by the three parties.

Service Start-Up

The start-up of the ACE service was financed primarily by San Joaquin County's ½ cent transportation sales tax, Measure-K approved by voters in 1990, with federal and state sources providing the balance of the funding. After start-up, additional revenues were provided by ACTC and VTA.

Destinations Served

San Jose, Santa Clara, Fremont, Pleasanton, Livermore, Tracy, Lathrop, Manteca, Stockton

Average Daily Weekday Ridership

3,200 daily passenger boardings

Operational Characteristics

Operating on the Union Pacific railroad track, ACE service consists of three morning trains originating in Stockton providing service to San Jose Diridon Station. Three afternoon trains provide return trip service from San Jose to Stockton. ACE service began in October 1998. Weekend service is not provided.

Stations

- Number of Stations: 10
    - Average Spacing: 12.2 miles

Fleet Characteristics

6 diesel locomotives and 28 bi-level passenger cars (total regular service seating capacity of 2,418)

Fare Structure

ACE fares vary depending on the number of zones traveled. Regular one-way fares range from $3.50 for a one-station trip to $11.75 for a nine-station trip. Senior or disabled fares are available from $1.75 to $6.00. Day passes and monthly passes are also available for regular passengers, youth and senior or people with disabilities.

Project Funding

Current SJRRC calculations estimate $250 million in expenditures to date for operating and capital improvements. This figure will go to just over $300 million with the completion of the new Maintenance Facility in 2013.

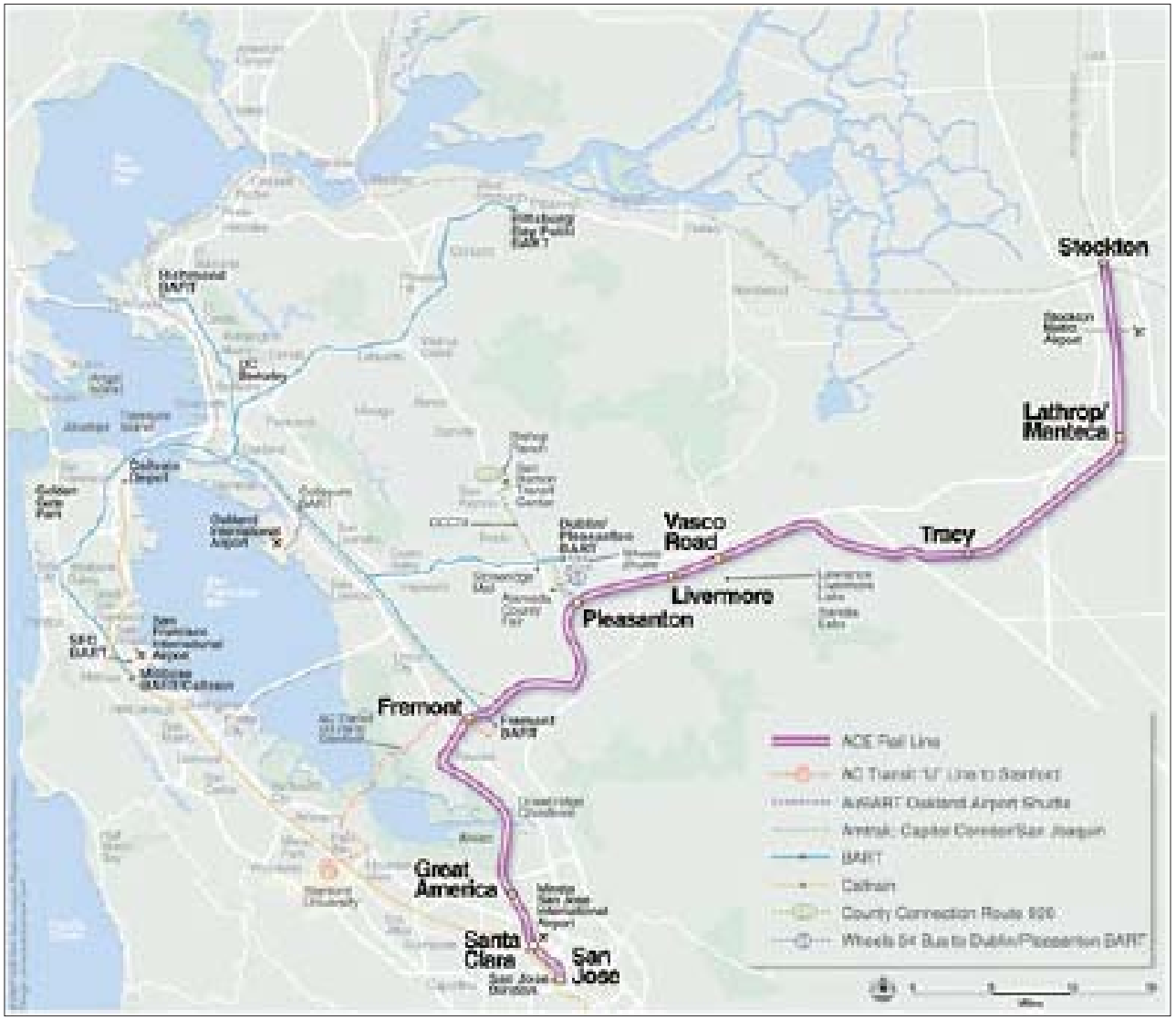
Website

http://www.acerail.com

Contact

Stacey Mortensen, Executive Director, Phone: (209) 944-6220, Email: stacey@acerail.com

Figure 4.5 - Altamont Commuter Express Route Map



Source: JPA

4.6 NORTH COUNTY (SAN DIEGO) TRANSIT DISTRICT SPRINTER

Overview

The 22-mile, 15-station Sprinter LRT service is a key component of the San Diego region's transit planning program that began in the mid-1980s. The east/west line connects with NCTD's existing Coaster commuter-rail line, which runs north/south from Oceanside to downtown San Diego, where it connects with the San Diego Trolley. Sprinter also connects with Amtrak and Metrolink service, and a bus rapid transit line that runs north/south from downtown San Diego to Escondido. Service began operations in 2008.

The Sprinter is a diesel operated passenger rail line operating between Oceanside and Escondido in San Diego County. The service uses the pre-existing 22 miles Escondido Branch track from the San Diego Northern Railroad. The Sprinter is operated by the North County Transit District (NCTD) of Oceanside, the area's public transit agency. The agency also operates the Coaster and Breeze Bus. Sprinter service is operated with diesel multiple units (DMU) manufactured by Siemens in Germany, where they are widely used by main-line regional railways.

Destinations Served

Oceanside Transit Center, Vista Transit Center, Palomar College, San Marcos Civic Center, Cal State San Marcos, Escondido Transit Center

Average Daily Weekday Ridership

Over 8,300 daily passenger boardings

Operation Characteristics

The SPRINTER runs every 30 minutes in each direction Monday through Friday, approximately 4 am to 9 pm. Weekend and Holiday trains operate every 30 minutes between 10 am and 6 pm and hourly before 10 am and after 6 pm.

Stations

- Number of Stations: 15
    - Average Spacing: 1.7 miles

Fleet Characteristics

The SPRINTER light rail vehicles, which began service in March 2008, are self-propelled diesel powered vehicles. The "Desiro" brand vehicles being purchased by NCTD from Siemens AG Transportation Systems, are new generation, mid-sized, modern diesel multiple units (DMUs).

Fare Structure

One Way: Adult $2.00; Senior/Disabled $1.00; Day Pass: Adult $5.00; Senior/Disabled $2.25

Project Funding

The $477 million project was partially funded through a $152 million Full Funding Grant Agreement from the Federal Transit Administration.

Website

http://www.gonctd.com/sprinter

Contact

Tim McCormick, Director of Service Planning, Phone: (760) 966-6576, Email: tmccormick@nctd.org

Figure 4.6 - Sprinter Route Map

Source: NCTD

4.7 TRIMET (PORTLAND, OR) WESTSIDE EXPRESS SERVICE

Overview

WES Commuter Rail uses existing freight tracks to serve the cities of Beaverton, Tigard, Tualatin and Wilsonville. This 14.7-mile suburban commuter line serves the heavily traveled Interstate 5 and Highway 217 corridor with weekday rush-hour service, connecting with MAX and buses in Beaverton and with bus service at the other stations. Service began February 2009 and has served more than 800,000 riders since opening. Ridership is up 44% since opening.

TriMet, the metropolitan area's regional transit agency, manages and funds the service, and also owns and maintains the railcars and stations, but Portland & Western Railroad (P&W) staff operates the vehicles. In planning since the mid-1990s, the line has five stations: two in Beaverton, one in Tigard, one in Tualatin, and one in Wilsonville. From the start of the first serious discussions of the idea, it took thirteen years and $166 million to get WES operational.

Destinations Served

Wilsonville, Tualatin, Tigard, Beaverton

Average Daily Weekday Ridership

Over 1,600 daily passenger boardings

Operational Characteristics

Weekday-only service from 5:30 – 10 am and 3:30 – 7 pm with a 30-minute headway during rush hour

Stations

- Number of Stations: 5
    - Average Spacing: 4.1 miles

Fleet Characteristics

3 Diesel Multiple Units (DMUs) and 1 trailer, plus 2 Rail Diesel Cars (RDCs) with 74 seats per car and 80 seats per coach

Fare Structure

WES fares vary depending on the number of zones traveled. Regular one-way fares range from $2.10 for a two-zone trip to $2.40 for a three-zone trip (Zone 1 trips are free). Senior or disabled fares are available for $1.00. Day passes and monthly passes are also available for regular passengers, youth and senior or people with disabilities.

Project Funding

This $163.2 million project was funded by Federal ($58.7 million), State ($35.3 million) and Local ($69.2 million) funds. The operating cost is about $33 per passenger on average.

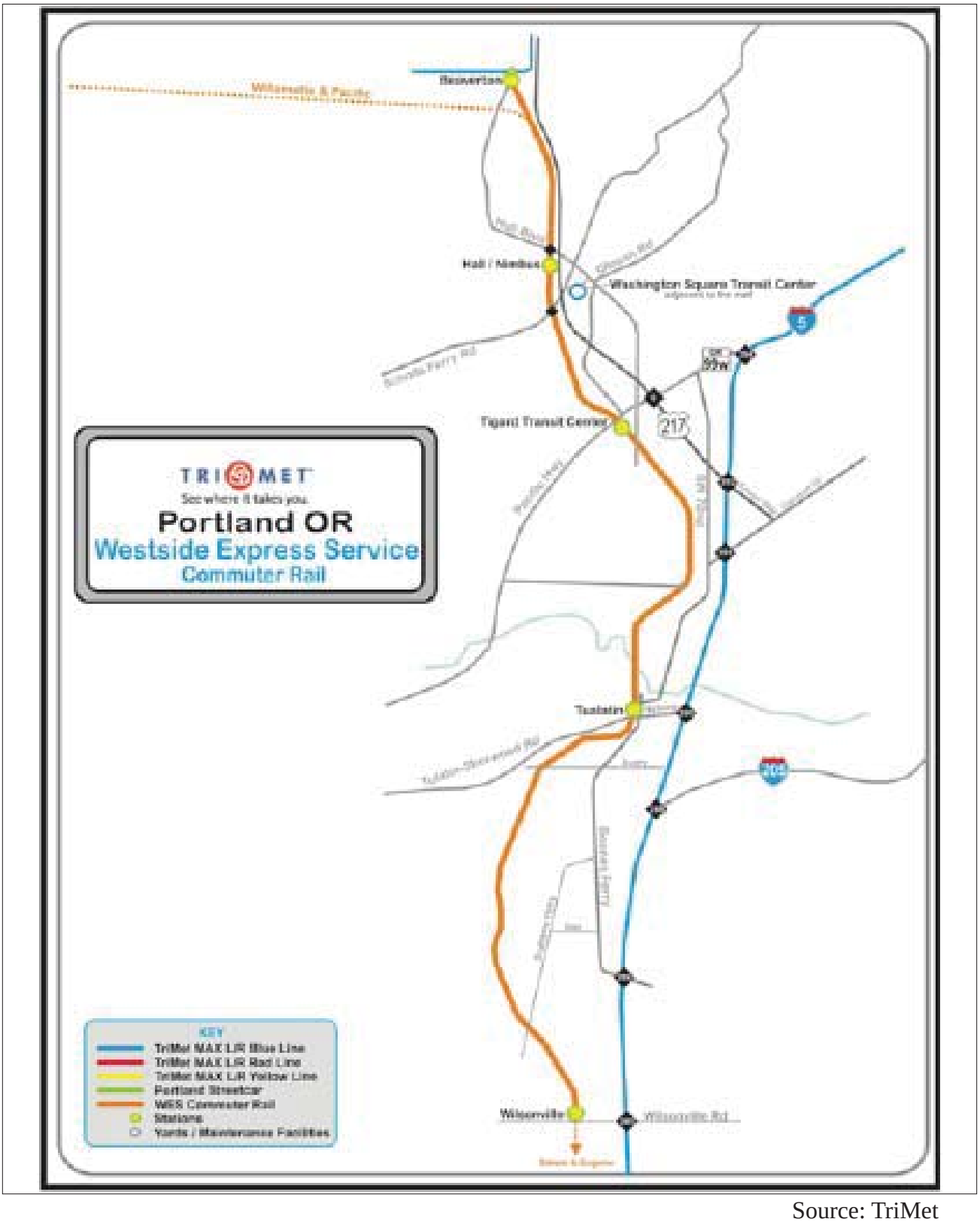
Website

http://www.trimet.org/wes

Contact

Steve Witter, Project Manager, Phone: (503) 709-2014, Email: witters@trimet.org

Figure 4.7 - Westside Express Route Map



Source: TriMet

4.8 AUSTIN CAPITAL METRORAIL

Overview

Capital MetroRail is a commuter rail system owned by the Capital Metropolitan Transportation Authority that serves the Greater Austin, Texas, area. The Red Line, Capital Metro's first and only rail line began operation in 2010, connecting Downtown Austin with Austin's northern suburbs. The line operates on 32 miles of existing freight tracks, and consists of nine stations.

Capital Metro originally planned MetroRail as a diesel light rail line, similar to New Jersey Transit's River LINE. The Federal Railroad Administration (FRA) gave NJT a waiver which exempted the railcars from meeting crashworthiness and other standards which normally apply to locomotives and passenger coaches that operate in mixed service with freight trains. However, the FRA refused to give Capital Metro a similar waiver, so they had to meet the same standards that apply to traditional commuter rail lines, which use locomotive-hauled coaches or electric multiple unit (EMU) trains. For this reason, and because the service pattern is similar to other low-traffic commuter rail lines (only a few trips, primarily inbound in the morning and outbound in the afternoon), Capital MetroRail is classified as a commuter rail line even though it was originally intended to be light rail.

Destinations Served

Downtown Austin, University of Texas, Highland Mall, Wells Branch, Jollyville, Cedar Park, Leander

Average Daily Weekday Ridership

1,600 daily passenger boardings

Operational Characteristics

MetroRail offers service weekdays between 5:50 am and 7:36 pm. The approximate travel time between Downtown Austin and Leander is one hour. No weekend service is provided.

Stations

- Downtown Stations: 3
  - Average Spacing: 1.5 miles
- Stations Outside of Downtown: 5
  - Average Spacing: 5.2 miles

Fleet Characteristics

Six Stadler GTW diesel-electric light regional railcars running on diesel-electric engines with a capacity of 200 passengers (108 seated and 92 standing)

Fare Structure

MetroRail fares vary depending on the number of zones traveled. Regular one-way fares range from $1.00 for a one-zone trip to $2.75 for a two-zone trip. Senior or disabled fares are available from $0.50 to $1.35. Day passes and Monthly passes are also available for adults, youth and seniors & disabled.

Project Funding

The project had capital costs of $120 million and its yearly operating costs are $14.3 million.

Website

http://www.capmetro.org/metrorail

Contact

Ella Rogers, Manager of Rail Operations, Phone: (512) 852-7258, Email: ella.rogers@capmetro.org

Figure 4.8 - Capital MetroRail Route Map

Source: Capital Metroplitan Transportation Authority

4.9 DALLAS-FORT WORTH TRINITY RAILWAY EXPRESS

Overview

Trinity Railway Express (TRE) provides passenger rail service between the Texas Metroplex cities of Dallas and Fort Worth. The 34-mile route serves 10 stations, and is anchored at each end by restored railroad stations. It was established through a local agreement between Dallas Area Rapid Transit (DART) and the Fort Worth Transportation Authority (The T). Each transit authority owns a 50% stake in the joint rail project and contractor Herzog Transit Services operates the line. The TRE began operating in December 1996 and is now the 14th most-ridden commuter rail system in the country with its annual ridership exceeding 2.5 million passengers.

Destinations Served

Dallas, Irving, Euless, Hurst, Richland Hills, Fort Worth

Average Daily Weekday Ridership

9,800 daily passenger boardings

Operation Characteristics

The trip from Union Station to T&P Station takes just over an hour, with scheduled trip times ranging from 63 minutes to 71 minutes. Weekday service is from 5 am to 11 pm with a 20-minute headway during rush hour. Weekend (Saturday) and Holiday trains operate approximately every 60 to 90 minutes between 6 am and 11 pm.

Stations

- Number of Stations Outside of Downtown: 8
    - Average Spacing: 4.7 miles

Fleet Characteristics

TRE operates nine Diesel Locomotives, 13 Diesel Multiple Units (DMUs), 15 bi-level Coaches and 10 bi-level Cab Cars. Seating capacity for cab and coach cars ranges from 123 to 152 passengers depending on the configuration of the car.

Fare Structure

TRE fares vary depending on the number of zones traveled. Regular one-way fares range from $3.50 for a one-zone trip to $5.00 for a two-zone trip. Senior or disabled fares are available from $0.75 to $0.85. Day passes and monthly passes are also available for adults, youth and seniors & disabled.

Project Funding

The project capital cost was approximately $218 million, funded by a combination of federal and local monies.

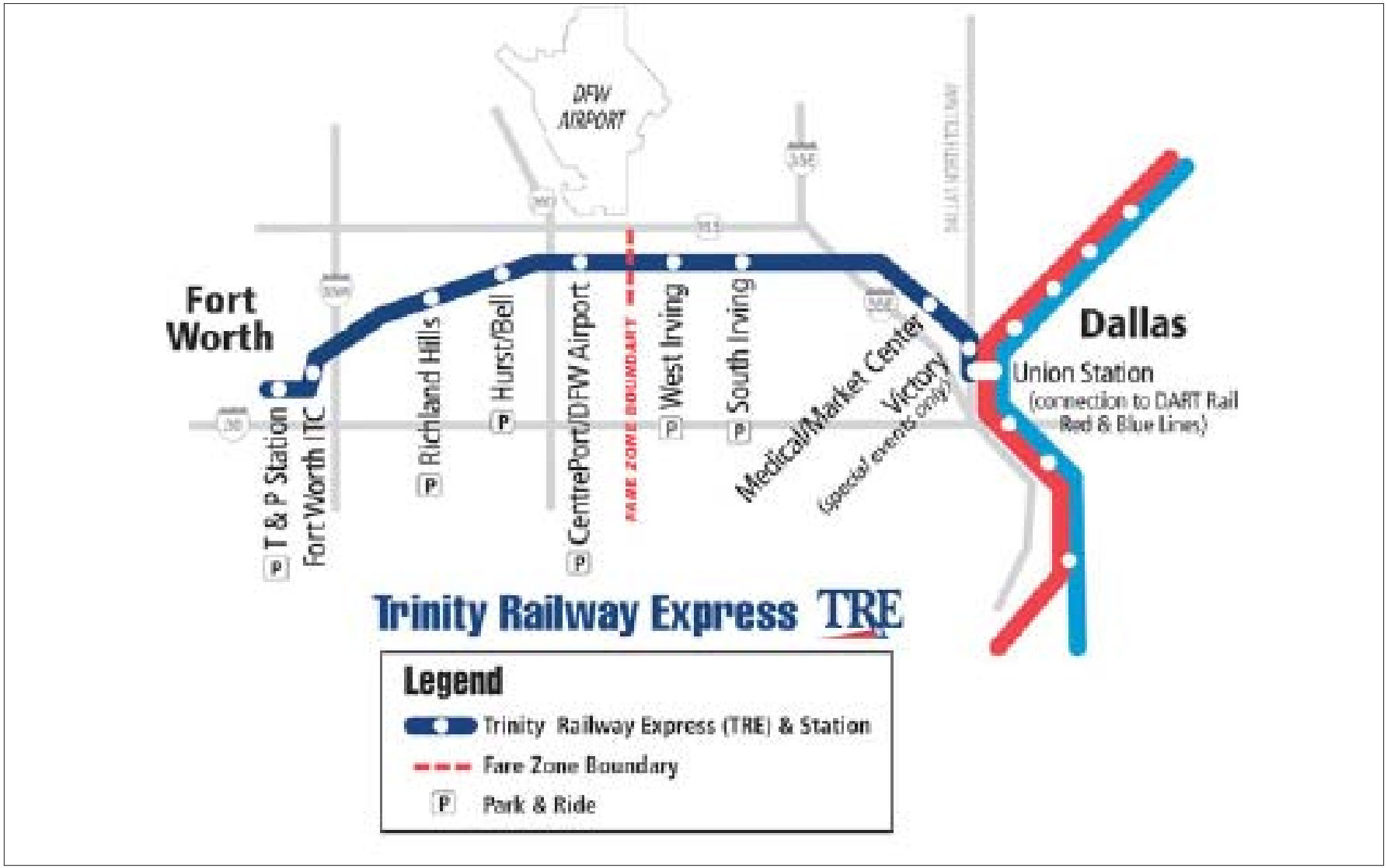
Website

http://www.trinityrailwayexpress.org

Contact

Morgan Lyons, Director, Media Relations, Dallas Area Rapid Transit (DART), Phone: (214) 749-2662, Email: mlyons@DART.org

Figure 4.9 - Trinity Railway Express Route Map



Source: DART

4.10 CASE STUDY LESSONS LEARNED

The review of existing commuter rail systems revealed several findings that should be considered in developing a commuter rail system in the study area.

- Most of the systems are operated by the regional transit agency. Only Metrolink and ACE are operated by agencies established specifically for the commuter rail service.
- All of the systems started on tracks located in existing railroad rights of way. With most of the systems operating on rail lines longer than 30 miles.
- All but Metrolink operate on a single line. Metrolink has six lines in its system with 512 miles of track.
- The most common choice for type of train is a diesel locomotive with bi-level passenger cars.
- It is desirable to have a strong downtown employment center on one end of the line. All of the systems have one, except for the NCTD SPRINTER and Portland WES. This creates a major attraction for commuters to use the train.
- Station spacing outside the downtown regions range from 5.2 to 12.2 miles not including the SPRINTER. The SPRINTER can be expected to have one to two-mile station spacing while the ACE train typically has about 12 miles between stations.
- Most of the systems operate service on weekends, except for ACE, WES, and Capital MetroRail.
- All of the systems have distance based fares
- All of the systems, except for Metrolink, carry about 1,600 to 10,000 riders per day. Metrolink carries 41,000 passengers per day.
- Five of the systems (RailRunner, FrontRunner, SPRINTER, WES, and Capital MetroRail) all opened between 2008 and 2010, making their development process and equipment more comparable to what might be deployed in Kern County.

5.0 Potential Commuter Rail Alternatives

The development process for the commuter rail corridor alternatives evaluated in this report included the identification of system alternatives and short range, long range, and build out options for each system alternative. The consultant team worked with Kern COG and the Steering Committee to identify and define the system alternatives, as well as the appropriate horizon years for the short-term, long-term, and build-out options. Requirements for supporting infrastructure for each alternative are also assessed. This supporting infrastructure includes commuter rail tracks and systems components, stations, maintenance facilities, and rolling stock requirements, etc.

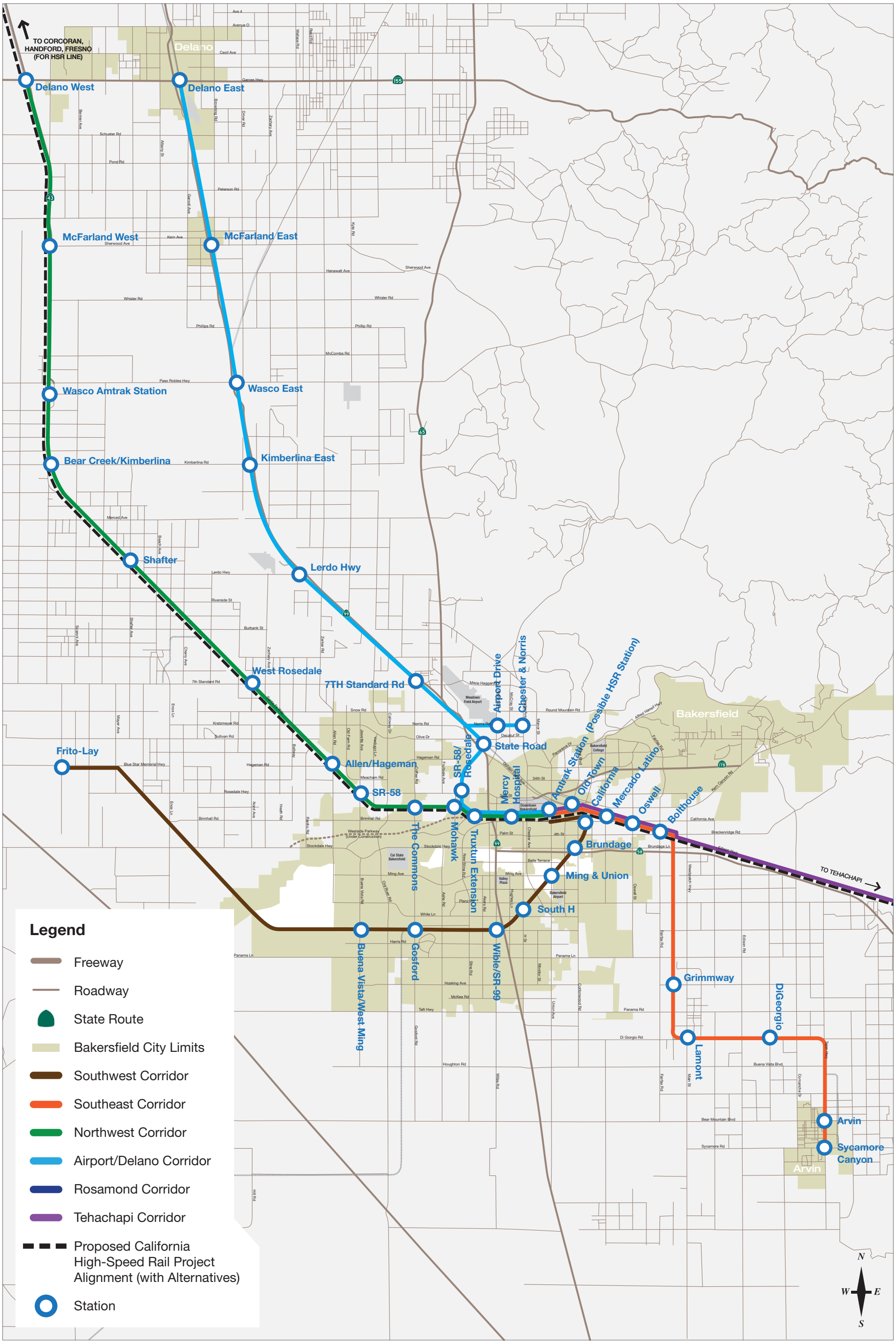
5.1 CORRIDOR OVERVIEW

Six potential commuter rail corridors are identified within Kern County. These corridors are:

- Northwest Corridor – Utilizing the Burlington Northern Santa Fe (BNSF) rail corridor between Downtown Bakersfield and west of Delano.
- Airport/Delano East Corridor – Utilizes the Union Pacific (UP) rail corridor parallel to State Route 99 to connect Downtown Bakersfield, Bakersfield Airport and Delano.
- Southwest Corridor – Connects Downtown Bakersfield, southern Bakersfield, and the packing facilities east of Buttonwillow near the Frito-Lay plant.
- Southeast Corridor – Links Downtown Bakersfield to Arvin.
- Tehachapi Corridor – Connects Downtown Bakersfield to Tehachapi.
- Rosamond Corridor – An extension of the existing Metrolink Antelope Valley line from Lancaster to Rosamond, Mojave, California City, and Tehachapi.

Within this section of the report, each of the six corridors is defined in terms of its alignment and potential locations for stations. Maps of the six studied corridors are provided in Figures 5.1 and 5.2.

Figure 5.1 - Commuter Rail Study Area of Bakersfield Region

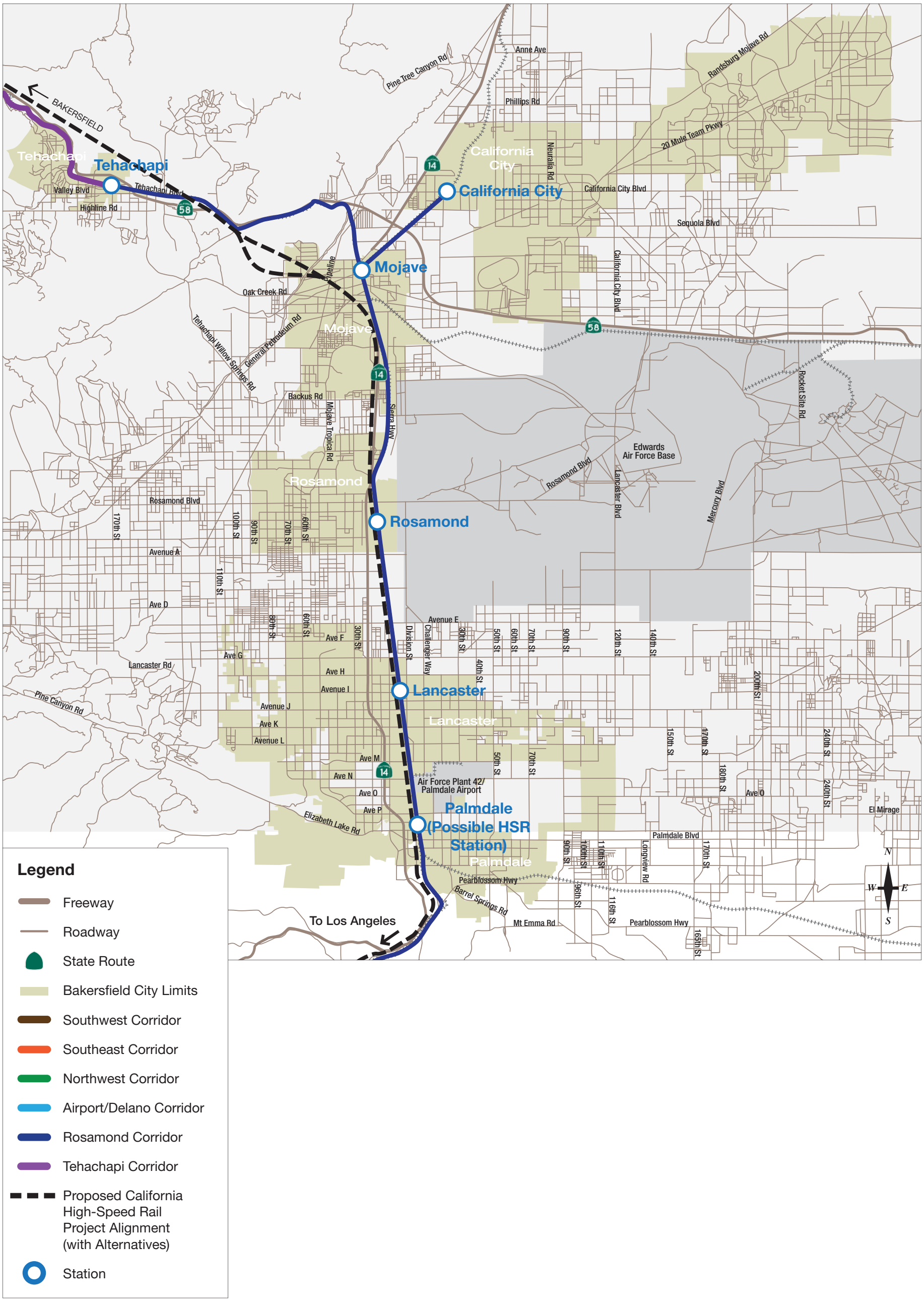


Kern Council of Governments

Commuter Rail Feasibility Study

IBI Group - July 2012

Figure 5.2 - Commuter Rail Study Area of Tehachapi Region



Legend

- Freeway
- Roadway
- State Route
- Bakersfield City Limits
- Southwest Corridor
- Southeast Corridor
- Northwest Corridor
- Airport/Delano Corridor
- Rosamond Corridor
- Tehachapi Corridor
- Proposed California High-Speed Rail Project Alignment (with Alternatives)
- Station

5.2 POTENTIAL COMMUTER RAIL STATIONS

Northwest Bakersfield Corridor

Delano West Station – The existing location is comprised primarily of farmland with room for a station and a park and ride. A bus shuttle would be needed to link the station to local destinations and the city of Delano. However, the station would be about a mile from two prisons, creating opportunities for reverse commute with a synchronized commuter rail schedule with prison employee shift times.

Proposed Delano West Station Site

McFarland West – Located near State Route 43 and Sheerwood Avenue. A shuttle would be required for in-town destinations. The existing site consists of mostly agricultural fields with a canal at the south end of the site.

Proposed McFarland West Station Site

Wasco Amtrak Station – The existing Amtrak station is small and located just one block east of downtown. Potential exists for expanding the existing parking facility to the south of the station. This station is served by the Amtrak San Joaquin line.

Wasco Amtrak Station Site

Bear Creek/Kimberlina – The site area has agricultural uses on three quadrants with maintenance use on the fourth. The available space allows room to create a station with easy access for parking.

Bear Creek/Kimberlina Proposed Station Site

Shafter – The existing site is constrained by a museum and nearby land uses. Additional right of way may also be required for parking. Other options include placing the station near the industrial area south of the existing tracks or near Lerdo, where more space may exist for a station and associated parking facilities.

Shafter Station Site

West Rosedale – A proposed station at 7th Standard Road will have grade separated tracks over the street. Space exists north of 7th Standard Road for a station adjacent to the International Trade and Transportation Center (ITTC). This site is also within walking distance of the two proposed Shafter High-Speed Rail Heavy Maintenance Facility and Maintenance of Way sites.

West Rosedale Proposed Station Site

Allen and Hageman – A proposed station would most likely use the existing right-of-way north of Hageman. Nearby lots are in use by industrial machinery businesses. While residential land use is in close proximity, a shuttle service may be necessary to effectively transport people to and from this station. Currently, construction is underway for a grade separation project south of Hageman.

Allen and Hageman Proposed Station Site

SR-58 – Site area offers potential space north of SR-58 for a commuter rail station. Residential housing and businesses are located in close proximity to this location. Well-developed housing community offers residential street access to site area. Limited right-of-way exists south of the highway.

SR-58 Proposed Station Site

The Commons – The existing site area consists of closed or non-operating offices and heavy industrial plants. A grade separation exists at Coffee Road, with right-of-way potentially available for commuter rail station development. This may require a bus shuttle to provide access to nearby attractions and destinations. Future plans include building a large mixed use housing/commercial project to the south. More recently, PG&E is demolishing the power plant.

The Commons Proposed Station Site

Mohawk – The Mohawk area south of the BNSF corridor has some existing development. A new bridge was built over the tracks as part of a Mohawk extension to Truxtun. A shuttle service would need to provide access to offices south of the corridor. Existing rail lines are heavily used by freight trains.

Mohawk Proposed Station Site

Truxtun Extension – This segment is grade separated with available right-of-way southeast of the tracks. This site offers convenient access to offices in the area, compared to Mohawk station. Right-of-way north of Truxtun is constrained due to the Kern River and nearby recreational land use.

Truxtun Extension Proposed Station Site

Mercy Hospital – A proposed station here would be located between A Street and D Street. There are limited opportunities for providing parking adjacent to the station. The proposed station would need access through the existing rail yard.

Mercy Hospital Proposed Station Site

Bakersfield Amtrak Station – Located in central Bakersfield, providing connections to Amtrak, GET local bus, KRT express bus, and taxi services. There is existing parking provided in two lots. Newly designed station building at 16th Street and S Street.

Bakersfield Amtrak Station Site

Airport Corridor

Chester and Norris – Site area consists of track alongside residential and commercial land use. Currently, one rail line travels along the south side of Norris Road with additional right-of-way unoccupied. Space appears to be available for a station and nearby parking facilities.

Chester and Norris Proposed Station Site

Airport Drive – Existing site conditions have a gas station, commercial development and residential housing nearby. This site area provides a convenient connection to Bakersfield Airport. Additional right-of-way would likely be needed for a parking facility.

Airport Drive Proposed Station Site

State Road – The site area limited some right-of-way in the northwest quadrant of the existing tracks with additional right-of-way on the west side of SR-99. The tracks run alongside light industrial and agricultural land uses with a grade separated bridge over State Road.

State Road Proposed Station Site

SR-58/Rosedale – This site area is surrounded by industrial land uses and in close proximity to hotels and retail outlets. Limited right-of-way exists in the northwest quadrant for a station and associated parking facilities.

SR-58/Rosedale Proposed Station Site

7th Standard Road – Just west of Meadows Field Airport, near the northern boundry of Bakersfield, is a area proposed for a station. Vacant lots near 7th Standard Road makes a station here ideal as an extension of the Airport Corridor.

7th Standard Road Proposed Station Site

Lerdo Hwy – Adjacent to SR-99 and Lerdo Hwy with available land access, this station is likely to provide local employees access to neighboring employment sites. The amount of open space gives options for parking facilities, kiosks and station platforms.

Lerdo Hwy Proposed Station Site

Kimberlina East – This station location is in close proximity to a Sun World International, producers of peppers and a variety of fruits. Open land and Orchards nearby provide an opportunity for future station development.

Kimberlina East Proposed Station Site

Wasco East – The undeveloped land to the west of the railroad tracks leaves room for a commuter rail station. Nearby the site are industrial facilities, farm land and a motel creating an environment for future growth with commuter rail access.

Wasco East Proposed Station Site

McFarland East – This proposed station location is in close proximity to a suburban neighborhood and State Route 99. The open space between the rail corridor and industrial street has availablity for a station.

McFarland East Proposed Station Site

Delano East – This station at the end of the line provides easy access to SR-99, Garces Hwy, residential and commercial employment regions. Current land use is open for station development at this location.

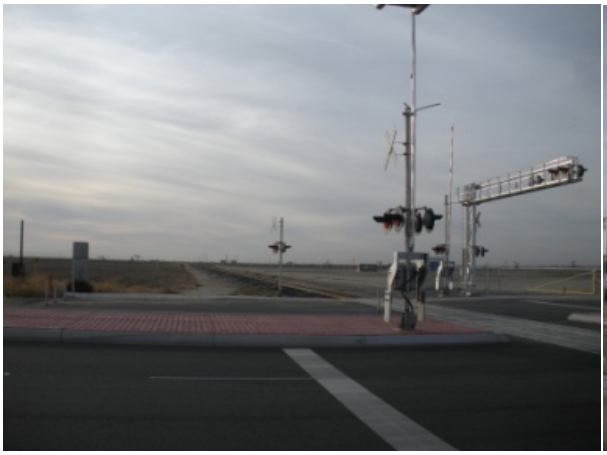
Delano East Proposed Station Site

Southwest Bakersfield Corridor

Frito Lay – This terminus station for the Southwest Corridor would serve existing distribution centers, including Bolthouse Farms and Frito-Lay. The potential station site is 8-10 miles east of Buttonwillow on SR-58, approximately five miles east of the SR-58 interchange with I-5.

Frito Lay Proposed Station Site

Buena Vista/ West Ming – This proposed station is located in a newly developing area with available right-of-way. A commuter rail station would provide a convenient connection to downtown Bakersfield.




Buena Vista/ West Ming Proposed Station Site

Gosford – The existing site area provides available land for a station platform and parking facilities. In the local vicinity are residential development, churches, and a shopping center.


Gosford Proposed Station Site

Wible/State Route 99 – The station area offers room for development on both sides of the existing rail line. Some older residential housing exists in the area, but there appears to be right-of-way available for development of a commuter rail station.

Wible/State Route 99 Proposed Station Site

South H – The existing site has tracks alongside a canal and future development areas. Minimal right-of-way exists for a station or parking facilities.

South H Proposed Station Site

Ming and Union – A full scale commuter rail station may require additional right-of-way at this location. Existing land uses are located close to the rail corridor. Residential housing is located northeast of the station site. Industrial uses predominate south of the site. The Kern County Fairgrounds are located to the northwest.

Ming and Union Proposed Station Site

Brundage – The site area is largely developed, but vacant land north of Brundage may allow for placement of a station and associated parking facilities. Proximity to SR-58 could create opportunities for connections to express bus services.

Brundage Proposed Station Site

California Ave – The site area is largely developed, with residential housing south of California Avenue and industrial uses to the north.

California Ave Proposed Station Site

Southeast Bakersfield Corridor

Old Town – The railroad right-of-way in this location is quite wide, and sufficient area appears to be available for locating a station platform and parking adjacent to the Baker Street crossing. Land uses in the area include older residential and deteriorated industrial areas south of the rail corridor.

Old Town Proposed Station Site

Mercado Latino – This station would be located parallel to Edison Highway, with a station platform site possible north of Edison near Chamberlain Avenue. The Mercado Latino is a significant regional commercial destination.

Mercado Latino Proposed Station Site

Oswell – This station area would be located north of Edison Highway, with space available for a platform and a limited amount of parking.

Oswell Proposed Station Site

Bolthouse – This is a similar station area to the Oswell station, with the cross street (Fairfax) grade separated from Edison Highway and the rail corridor. Space does exist for a station platform adjacent to the Bolthouse plant property. Perhaps opportunities exist for shared parking with Bolthouse.

Bolthouse Proposed Station Site

Grimmway – The rail corridor passes to the east of the existing Grimmway Plant. There is space available for a station platform to be located adjacent to the Grimmway property.

Grimmway Proposed Station Site

Lamont – The rail corridor in this location is located on the north side of DiGiorgio. A recently completed rail crossing is in place at the intersection of SR-184 and DiGiorgio. All four quadrants of this intersection are developed, but some space may be available for a station platform at the northeast corner.

Lamont Proposed Station Site

DiGeorgio – This station site is located adjacent to Grimmway farms, which occupies the Southwest corner of the intersection of DiGeorgio and Malaga. The station platform locations include a site on DiGiorgio across from the Grimmway administration parking lot/ plant entrance or on Malaga on the east side of the Grimmway plant near the shipping parking lot/ plant entrance.

DiGeorgio Proposed Station Site

Arvin – The proposed station would serve the main commercial district in Arvin. Most of the existing development is located to the west of the corridor. A possible station site would be near the intersection of Bear Mountain Boulevard and Tejon Highway.

Arvin Proposed Station Site

Sycamore Canyon – This station would be located near the intersection of Tejon Highway and Sycamore Road. Existing land uses are present in the northwest, northeast, and southwest quadrants of the intersection. An orchard occupies the southeast corner.

Sycamore Canyon Station Site

Rosamond Corridor

Tehachapi – The rail corridor in this area runs adjacent to Tehachapi Boulevard. Most of the existing commercial and residential development is located east and south of this site with only sparse residential, commercial, and industrial, and the wind farms to the west.

Tehachapi Proposed Station Site

California City – This rail corridor crosses California City Boulevard east of SR-14 and most existing development in California City. A shuttle link between a station along the rail corridor at the city may be warranted. The area is designated for industrial and commercial development.

California City Proposed Station Site

Mojave – This station site is proposed to be centrally located in Mojave north of the southern intersection of SR-14 and SR-58. Space is available between SR-14/SR-58 and the rail corridor for parking and a station site south of the Oak Creek Road overpass.

Mojave Proposed Station Site

Rosamond – Locating this proposed station near the intersection of Rosamond Blvd. & Sierra Highway would be preferable to be closer to existing development. There are vacant lots and an apparently vacant warehouse between Sierra Highway (eastside) and the rail corridor that may be usable for a station site and park & ride. Edwards AFB is located to the east and may be accessed to the site via shuttle.

Rosamond Proposed Station Site

Tehachapi Corridor

Proposed stations along the Tehachapi Corridor would overlap with those proposed as part of the Southeast Bakersfield and Rosamond corridors. Specific locations for proposed stations include the following:

- Downtown Bakersfield Amtrak Station
- Old Town
- Mercado Latino
- Oswell
- Bolthouse
- Tehachapi

6.0 Corridor Evaluation and Modeling

The six corridors and their associated stations described in Section 5.0 were evaluated first through a screening process that focused on the future feasibility and suitability of the corridors and station sites to served future commute travel demand and employment destinations. This screening process then resulted in a smaller "network" or commuter rail services with up to 10 proposed stations that were subjected to a ridership modeling analysis to determine potential ridership demand for the commuter rail services in 2035. The screening process and ridership modeling effort and results are summarized within this section.

6.1 SCREENING OF CORRIDORS

The process for screening the proposed commuter rail corridors and stations for inclusion in the ridership modeling effort involves a two-step method. The initial screening analyzes each corridor and proposed station based on a set of evaluation criteria (including socioeconomic data, costs, operations, etc.) to determine the "need" for a particular station and/or corridor based on forecast Year 2035 conditions. As part of this screening, specific stations and corridors are identified either as potentially feasible for implementation by 2035, based on the available data, or as not feasible in 2035. Those stations identified as not feasible in 2035 may still warrant consideration for implementation in a Post-2035 condition.

The secondary screening analyzes near term (Year 2020) conditions along the corridors at stations identified in the initial screening as potentially feasible by 2035. This layer of screening also looks to identify a feasible and logical near-term commuter rail network for the region, based on socioeconomic data, travel patterns, availability of rail corridors, and construction and operational efficiency. The objective of this secondary screening is to further refine the proposed corridors and stations down to only 10 stations for ridership modeling.

Screening Criteria

A defined set of criteria were selected for the initial screening and evaluation of the proposed stations. Many of these criteria are based on the measures utilized by the Federal Transit Administration (FTA) in evaluating projects that apply for funding through the Federal Small Starts transportation program. This program has been identified as a potential source of funding for the construction of a commuter rail service in Kern County. Given this potential, it is essential that the evaluation process consider the criteria by which a preferred project would be evaluated by FTA as part of a New Starts grant application.

The evaluation criteria used in the initial screening process can be broken down into the following general categories:

- Land Use/Socioeconomic Data
- Economic Development
- Cost
- Additional Criteria

Within each category, specific criteria are used to evaluate each station location. Each criterion is scored using a scale of -2 to +2 or a 0 to +2 ranking. The general scoring concept is described below.

+2	substantially positive
+1	somewhat positive
0	average
-1	somewhat negative
-2	substantially negative

Or

+2	substantially positive
+1	somewhat positive
0	neither positive nor negative

A description of each criterion and the metric for its scoring is provided below.

Population Density

The 2035 forecast population for transportation analysis zones (TAZs) in each corridor was compiled using GIS. TAZs within a 1 mile radius of the corridor were used. If any portion of a TAZ was within the corridor, the entire population of that TAZ was included in the summation. The population total was divided by the area of the TAZs to determine the population per square mile.

+2	145 (residents per square mile) or greater
+1	100 – 144
0	60 – 99
-1	20 – 59
-2	less than 20

Employment Density

The 2035 forecast employment for TAZs in each corridor was compiled using GIS. TAZ's within a 1 mile radius of the corridor were used. If any portion of a TAZ was within the corridor, the entire employment of that TAZ was included in the summation. The total number of employed people was divided by the area of the corridor to determine the employment density (employment per square mile).

+2	180 (employed persons per square mile) or greater
+1	110 – 179
0	60 – 109

-1 20 – 59

-2 less than 19

Station Density

Station spacing for a commuter rail line has opposing objectives. Closely spaced stations allow for commuters to travel short distances to access the rail service. However, frequent stops for the commuter rail service decreases travel speed and increases travel time for those already on board. Ideally, commuter rail stations are located about five miles apart to allow for convenient access and reasonable travel times.

+2 6 miles or greater

+1 4 – 6

0 4 or less

Activity Centers and Attractions

Activity centers in Kern County employ and attract residents from nearby communities on a regular basis and would benefit from being located in proximity to a commuter rail station. For this evaluation, the distance was measured between each proposed commuter rail station and each of the activity centers. The five closest centers were averaged to give each station a proximity distance to nearby activity centers. The following is the ranking classifications used for this criterion:

+2 4 miles or less

+1 4.01 – 8 miles

0 8.01 – 15 miles

-1 15.1 - 25 miles

-2 25+ miles

Pedestrian Accessibility

Existing pedestrian facilities were measured around each of the station locations. Stations that were located in close proximity to sidewalks or were easily accessed by foot were ranked with a +2 score. Stations with more limited pedestrian facilities, or facilities located further away from the proposed station location, were ranked a +1. In locations without safe pedestrian access present nearby, the area would require major improvements to provide a safe walking environment, and then the station ranking for pedestrian accessibility is assigned a zero.

+2 pedestrian accessible

+1 pedestrian potential in close proximity

0 no pedestrian infrastructure

Central Business District Parking Fees

Parking fees, meters or paid lots/garages can deter drivers from driving to an event or location by increasing the commute cost. Currently the City of Bakersfield offers substantial amounts of free parking within its downtown in off-street parking lots and along public streets. This policy encourages the use of automobiles. The following scale was used to rank parking fees near the commuter rail stations.

+2 Extensive fee based parking

+1 Limited fee based parking

0 Substantial free parking

Station Right of Way Availability

Existing and proposed land uses were examined around each proposed station location to assess the compatibility of the station with adjacent land uses to determine if sufficient vacant land is available to accommodate a station, train platforms, and parking facilities. Satellite images were analyzed to determine existing land use and available space at the proposed station locations. Locations with vacant property along rail corridors were scored higher than locations with residential housing and pre-existing buildings located in close proximity to the railroad corridor.

+2 No surrounding development

+1 Sufficient space available

0 Limited space available

-1 Occupied with limited infrastructure/buildings

-2 Occupied with established infrastructure/buildings/neighborhoods

Transit-Supportive Policies

Each station was evaluated based on completed and ongoing studies and plans (General Plans, Specific Plans, etc.). The level of interest and plans for transitive supportive policies were qualitatively considered and scored according to this metric:

+2 Multiple transit supportive policies/plans

+1 Single transit supportive policy/plan

0 No plans but possible

-1 Limited opportunities for supportive policies

-2 Supportive policies unlikely

Development Patterns and Transit Investment

This criterion attempts to qualitatively examine the extent to which the project may produce changes in development patterns and the transit investment around each station.

+2 Substantial potential for change in development patterns and intensity

+1 Limited potential for change in development patterns and intensity

0 No potential for change in development patterns and intensity

Planned 2035 Transit Routes

Connections to other services in the transit system were based on existing service and the GET Transit Long Range Plan. Most stations have some opportunity for connections, but stations with multiple potential connections are rated higher. A comparison was done against the planned 2050 GET and KRT routes in the LRTP. The following criteria were used to assign a ranking.

+2 2 or more bus routes identified within 1 mile radius

+1 1 bus route identified in 1 mile radius

0 No bus routes identified in 1 mile radius

Order of Magnitude Capital Cost

Initial investment in track, rolling stock, stations, and right-of-way costs were developed for each corridor. It was assumed that existing freight rail lines would typically be used to implement an initial commuter rail service in each corridor. Order-of-magnitude cost estimates were developed at a conceptual level, considering costs for new stations, parking facilities, vehicles (passenger cars and locomotives), and new/expanded grade crossings. In all cases, implementation of commuter rail service assumes the corridor could be operated using existing track signaling systems and mainline track. On longer corridors (greater than 30 miles in length), allocations were made to install a siding to allow for improved operations.

+2 Corridors under $2 million/mile

+1 Corridors between $2.01 and $3.5 million/mile

0 Corridors costing over $3.51 million/mile

Annual Operations and Maintenance Cost

Routine maintenance and operation costs for a commuter rail network are required. The operational cost assessment assumes an initial operation of three round trip trains each weekday within each corridor. The exception is the Rosamond corridor where two round trips trains each weekday were assumed to serve Tehachapi and an additional two round trip weekday trains would serve California City.

+2 Under $4 million annually

+1 Between $4 and $8 million annually

0 Over $8 million annually

Initial Screening Results

Using the method described above, the corridors were scored for each of the criteria and totaled for an overall score. The results are reported in Table 6-1.

Corridor	Station	Population Density	Employment Density	Station Density	Land Use	Planned Bus Routes	Activity Centers and Attractions	Pedestrian Accessibility	Central Business District Parking Supply Charges	Transit-Supportive Policies	Development Patterns and Transit Investment	Annualized Capital Cost	Annual Operations and Maintenance Cost	Total
Northwest Bakersfield Corridor	Delano West	-2	-2	1	2	0	0	0	1	0	0	1	1	2
	McFarland West	-2	-2	1	2	0	0	0	1	0	0	1	1	2
	Wasco Amtrak Station	2	-1	2	-1	1	0	0	1	0	1	1	1	7
	Bear Creek/Kimberlina	-2	-2	2	0	0	0	0	1	0	0	1	1	1
	Shafter	1	-1	1	-1	1	0	2	1	0	1	1	1	7
	West Rosedale	0	-2	1	1	1	1	0	1	0	1	1	1	6
	Allen and Hageman	2	-1	2	2	1	1	0	1	1	2	1	1	13
	SR-58	2	-1	0	1	1	1	0	1	0	2	1	1	9
	The Commons	0	0	0	1	1	2	0	1	1	2	1	1	10
	Mohawk	0	2	0	2	1	2	0	1	0	2	1	1	12
	Truxtun Extension	1	2	0	-1	2	2	0	1	0	2	1	1	11
	Mercy Hospital	2	2	0	-1	2	2	1	1	1	2	1	1	14
	Bakersfield Amtrak Station	2	2	0	2	2	2	2	1	1	2	1	1	18
Airport Corridor	Delano East	2	1	1	2	1	0	0	1	0	1	1	0	10
	McFarland East	-1	-2	0	-2	1	0	1	1	0	1	1	0	0
	Wasco East	-2	-2	1	-1	0	0	0	1	0	0	1	0	-2
	Kimberlina East	-2	-2	2	2	0	0	0	1	0	0	1	0	2
	Lerdo Hwy	-2	-2	1	2	0	0	0	1	0	1	1	0	2
	7th Standard Road	-1	-1	1	1	1	1	0	1	0	1	1	0	5
	Airport Drive	2	0	2	1	2	2	2	1	1	2	1	0	16
	Chester and Norris	2	-1	0	1	2	2	2	1	0	1	1	0	11
	State Road	1	1	0	0	2	2	0	1	0	2	1	0	10
	SR-58/Rosedale	-1	2	0	0	2	2	0	1	0	2	1	0	9
	Truxtun Extension	1	2	0	-1	2	2	0	1	0	2	1	0	10
	Mercy Hospital	2	2	0	-1	2	2	1	1	1	2	1	0	13
	Bakersfield Amtrak Station	2	2	0	2	2	2	2	1	1	2	1	1	18
Southwest Bakersfield Corridor	Frito-Lay	-2	-2	0	-2	0	0	1	1	0	0	1	1	-2
	Buena Vista	1	-1	1	-2	1	1	1	1	1	2	1	1	8
	Gosford	2	-1	2	-1	2	1	1	1	0	2	1	1	11
	Wible/State Route 99	2	0	0	0	2	1	1	1	0	2	1	1	11
	South H	2	0	0	1	2	2	1	1	0	2	1	1	13
	Ming and Union	2	0	0	1	2	2	0	1	0	2	1	1	12
	Brundage	2	0	0	0	2	2	1	1	0	1	1	1	11
	California	2	0	0	0	2	2	0	1	0	1	1	1	10
	Amtrak Station (SW)	2	2	0	2	2	2	2	1	1	2	1	1	18
Southeast Corridor	Amtrak Station (SE)	2	2	0	2	2	2	2	1	1	2	1	1	18
	Old Town (SE)	2	2	0	2	2	2	2	1	0	2	1	1	17
	Mercado Latino (SE)	2	2	0	1	2	2	0	1	0	1	1	1	13
	Oswell (SE)	2	0	0	-2	2	2	0	1	0	2	1	1	9
	Bolthouse (SE)	2	-1	0	-1	1	1	0	1	1	2	1	1	8
	Grimmway	2	-1	2	0	1	1	0	1	0	1	1	1	9
	Lamont	0	-2	2	1	2	1	0	1	0	1	1	1	8
	DiGeorgio	1	-2	0	1	1	0	0	1	0	1	1	1	5
	Arvin	-2	-2	2	1	1	0	0	1	0	2	1	1	5
	Sycamore Canyon	-1	-2	2	2	0	0	0	1	0	1	1	1	5
Metrolink Extension	Tehachapi (Metro)	-1	-2	0	1	1	0	0	1	1	1	2	2	6
	California City	0	-1	0	2	1	0	0	2	0	2	2	2	10
	Mojave	-2	-2	0	2	1	0	0	2	0	2	2	2	7
	Rosamond	-2	-2	0	2	1	1	2	2	0	2	2	2	10
Tehachapi Corridor	Bakersfield Amtrak Station	2	2	0	2	2	2	2	1	1	2	2	0	18
	Old Town	2	2	0	1	2	2	0	1	0	1	2	0	13
	Mercado Latino	2	0	0	-2	2	2	0	1	0	1	2	0	8
	Oswell	2	-1	0	-1	1	1	0	1	0	2	2	0	7
	Bolthouse	2	-1	0	0	1	2	0	1	1	2	2	0	10
	Tehachapi	0	-1	0	2	1	0	0	1	1	1	2	0	7

Stations identified as being recommended for consideration within the Year 2035 horizon as a result of the initial screening include the following:

- Northwest Corridor
  - Bakersfield Amtrak Station
  - Mercy Hospital
  - Mohawk
  - The Commons
  - Allen and Hageman
  - Wasco Amtrak Station
  - Delano West
- Airport Corridor
  - Bakersfield Amtrak Station
  - Mercy Hospital
  - State Road
  - Airport Drive
  - Chester and Norris
  - Delano East
- Southwest Corridor
  - Bakersfield Amtrak Station
  - California
  - Brundage
  - South H
  - Wible/SR-99
  - Gosford
  - Buena Vista/West Ming
- Southeast Corridor
  - Bakersfield Amtrak Station
  - Old Town
  - Mercado Latino
  - Oswell
  - Bolthouse
- Rosamond Corridor
  - Rosamond
  - California City
- Tehachapi Corridor
  - Bakersfield Amtrak Station
  - Old Town
  - Bolthouse

Secondary Screening

The second layer of screening is focused on identifying 10 stations for modeling of ridership estimates. These stations would be considered to be feasible for implementation in the near term (10 years). The selected stations should also seek to create an integrated corridor or network of commuter rail services with an obvious employment destination or multiple employment destinations served by the system.

Table 6-2 summarizes the original alternatives identified at the outset of work efforts, prior to the initiation of the screening and evaluation process.

Table 6-2: Proposed Commuter Rail Alternatives

Rail Corridor	2020		2035		2050	
	Alt 1	Alt 2	Alt 1	Alt 2	Alt 1	Alt 2
Northwest Corridor	Bus Only	To Wasco	To Wasco	Full Corridor	Full Corridor	n/a
Southwest Corridor	No	Bus Only	Bus Only	Bus Only	Full Corridor	n/a
Southeast Corridor	No	Bus Only	Bus Only	Full Corridor	Full Corridor	n/a
Airport Corridor	No	Bus Only	Full Corridor	Full Corridor	Full Corridor	n/a
Rosamond Corridor	To Rosamond	To Rosamond	To Tehachapi	To California City	Full Corridor	n/a
Tehachapi Corridor	Bus Only	Bus Only	Bus Only	Full Corridor	Full Corridor	

Existing population and employment densities within one mile of the proposed stations along each of six corridors were examined to assist in the secondary screening process. When considering near-term feasibility for transit services, the existing socioeconomic information is a key factor in the analysis.

Table 6-3 illustrates existing (Year 2006) population and employment density for a one mile radius around each proposed station.

Table 6-3: Population and Employment Density - 1 Mile Buffer

Rail Corridor	Station	1 Mile Buffer	
		2006 Population Density (persons/sq. acre)	2006 Employment Density (jobs/sq. acre)
Northwest Corridor	Delano West	0.10	0.06
	McFarland West	0.05	0.09
	Wasco West	185.08	28.15
	Bear Creek/Kimberlina	1.22	0.61
	Shafter	106.59	22.71
	West Rosedale	0.16	1.38
	Allen and Hageman	118.31	13.70
	West Rosedale/SR-58	139.55	27.22
	The Commons	62.97	65.08
	Mohawk	60.59	248.41
	Truxtun Extension	125.67	327.63
	Mercy Hospital	191.83	834.15
	Amtrak Station	286.74	970.02
Airport Corridor	Delano East	152.44	101.81
	McFarland East	40.21	6.39
	Wasco East	0.01	0.14
	Kimberlina East	0.02	0.17
	Lerdo Hwy	0.03	0.64

Rail Corridor	Station	1 Mile Buffer	
		2006 Population Density (persons/sq. acre)	2006 Employment Density (jobs/sq. acre)
	7th Standard Road	2.29	4.41
	Airport Drive	166.25	60.62
	Chester and Norris	187.42	22.74
	State Road	112.38	79.03
	SR-58/Rosedale	15.61	226.02
	Truxtun Extension	125.67	327.63
	Mercy Hospital	191.83	834.15
	Amtrak Station	286.74	970.02
Southwest Corridor	Frito-Lay	0.12	0.14
	Buena Vista/West Ming	66.98	3.11
	Gosford	204.63	41.82
	Wible/SR-99	267.28	77.75
	South H	246.68	61.35
	Ming and Union	204.90	36.65
	Brundage	163.69	36.83
	California	295.17	55.68
	Amtrak Station	286.74	970.02
Southeast Corridor	Amtrak Station	286.74	970.02
	Old Town	329.18	119.24
	Mercado Latino	394.44	41.72
	Oswell	187.23	18.88
	Bolthouse	184.96	16.63
	Grimmway	41.44	6.27
	Lamont	86.70	11.05
	DiGeorgio	0.43	1.50
	Arvin	42.18	4.98
	Sycamore Canyon	41.74	4.95
Rosamond Corridor	Tehachapi	65.70	20.85
	California City	0.14	0.01
	Mojave	9.74	4.90
	Rosamond	21.64	2.12
	Lancaster	N/A	N/A
Tehachapi Corridor	Amtrak Station	286.74	970.02
	Old Town	329.18	119.24
	Mercado Latino	394.44	41.72
	Oswell	187.23	18.88
	Bolthouse	184.96	16.63
	Tehachapi	65.70	20.85

The existing population and employment densities shown in Table 6-3 highlight the potential viability of the Northwest, Northeast, and Southwest corridors for near-term service. Based on this review, the

secondary screening process appears to reconfirm these alternatives as reasonable options, with some refinements. In particular, the Southwest Corridor scored well in the screening and service along this corridor could be considered in the near-term evaluation. For the ridership modeling effort, there are two alternatives developed. They are:

Alternative 1 – Northwest and Southwest

Northwest Corridor

Downtown Bakersfield to Delano West: Stations at Downtown Bakersfield, The Commons, Allen/Hageman, Shafter, and Delano West.

Southwest Corridor

Downtown Bakersfield to Buena Vista/ West Ming: Stations at Downtown Bakersfield, Ming and Union, Gosford, and Buena Vista/ West Ming

Rosamond

Extend to Rosamond: Station at Rosamond

Alternative 2 – Northeast and Southwest

Northeast Corridor

Downtown Bakersfield to Delano East: Stations at Delano East, McFarland East, 7th Standard Road, and State Road

Southwest Corridor

Downtown Bakersfield to Buena Vista/ West Ming: Stations at Downtown Bakersfield, Ming and Union, Gosford, and Buena Vista/ West Ming

Rosamond

Extend to Rosamond: Station at Rosamond

Alternative 1 and 2 are a result of a pre-screening of all the proposed corridors and stations that were conducted. This pre-screening effort examined the characteristics of the proposed corridors and stations, considering population and employment forecasts, origins and destinations, and travel patterns within the corridors. The pre-screening process filters out stations and/or corridors that would not be anticipated to generate significant commuter rail ridership, leaving only 10 candidate stations along one or more rail corridors as the preferred alternative for further evaluation. Figures 6.1 and 6.2 illustrate the two alternatives proposed for consideration.

Figure 6.1 - Alternatives 1 and 2 in Bakersfield Region

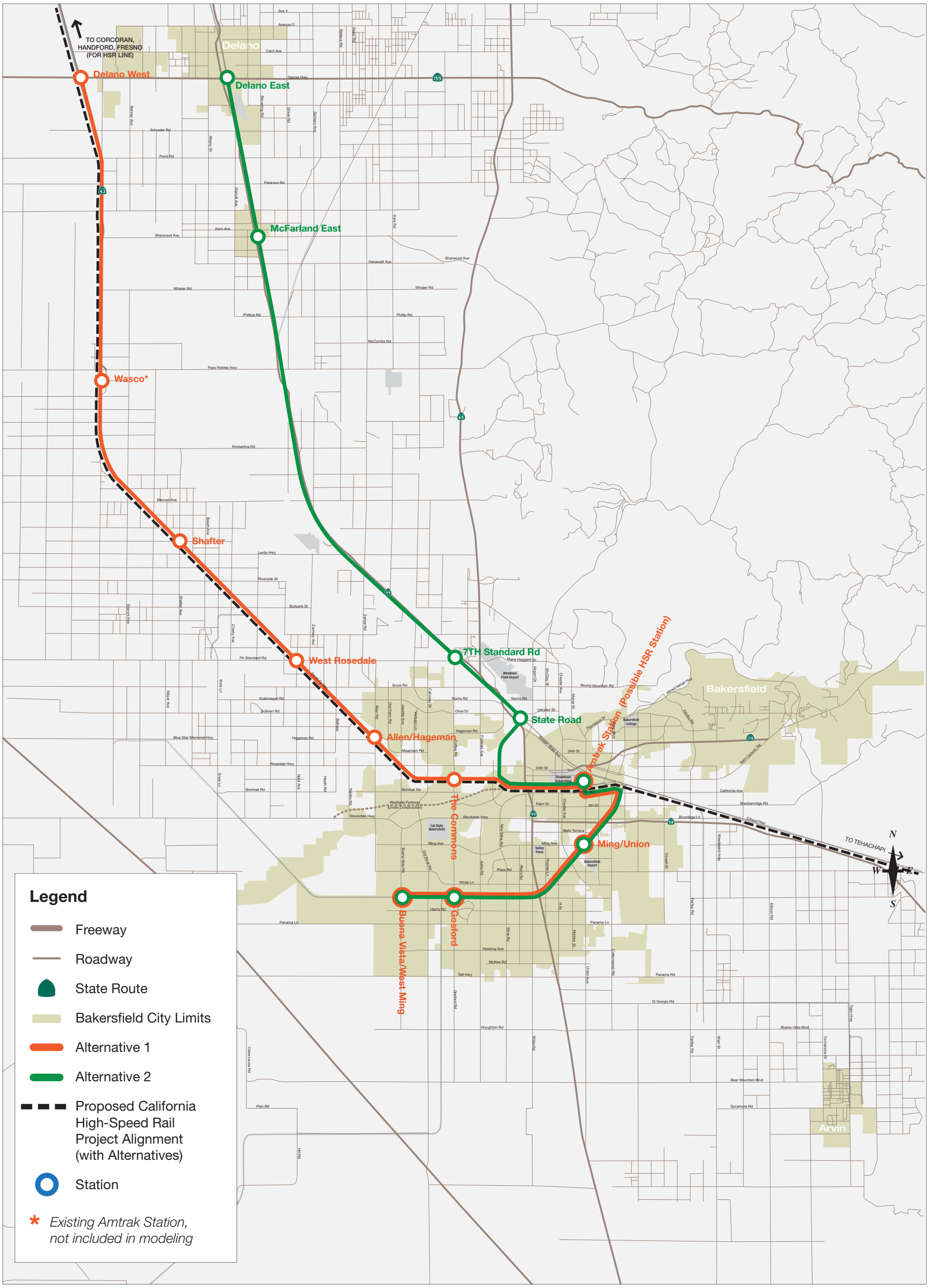
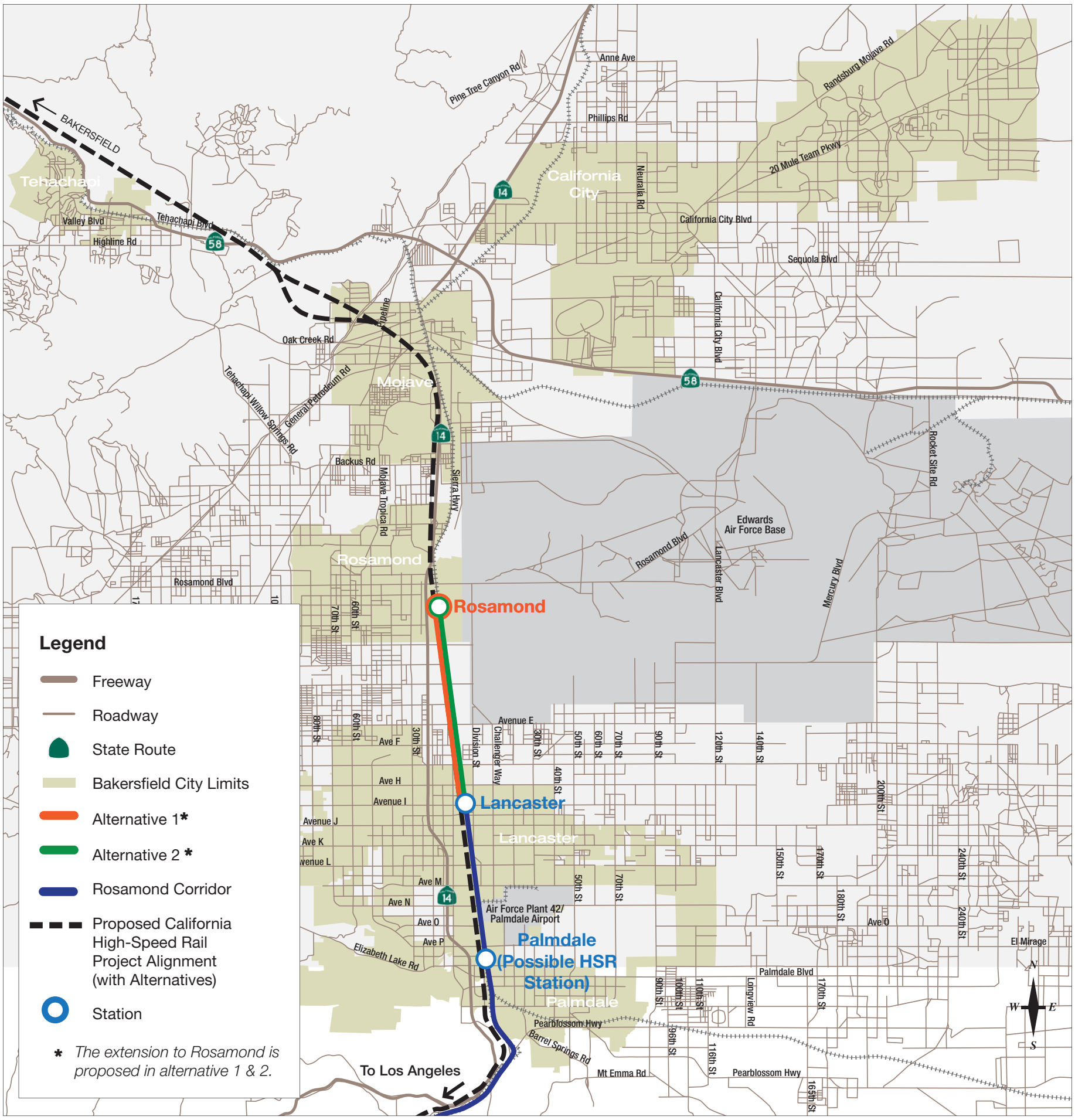


Figure 6.2 - Alternatives 1 and 2 in Tehachapi Region



6.2 CONCEPTUAL COSTS

Conceptual capital costs for the implementation of the commuter rail service are provided in the Appendix of this report. These conceptual costs were used as part of the evaluation of the proposed corridors summarized in Section 6.1. Conceptual costs are presented for an "opening year" scenario in each corridor, assuming a limited number of stations and acquisition of commuter rail rolling stock through leasing rather than purchase. Full-build-out costs are also presented, assuming construction of all proposed stations and rolling stock purchases.

These cost estimates are very preliminary as this study effort did not include an engineering component or the detailed review of track conditions in each corridor. Additionally, discussions with BNSF and UP would be required in prior to the operation of commuter rail service in any of the studied corridors, and Kern COG may be required to pay fees or costs related to track access and/or track upgrades that may not be accounted for in these preliminary estimates.

As part of the consideration of regional rail services and the potential implementation of the California HSR project, IBI has also prepared a high level conceptual cost estimate for double tracking the BNSF corridor between Wasco and Calloway Drive in Bakersfield. In this case, the double track cost is only provided as far north as Wasco as this location corresponds to the southern limits of the HSR project Initial Construction Segment (ICS). The purpose of this estimate is only to provide an order of magnitude cost for implementing improvements to extend the benefits of the HSR ICS into Downtown Bakersfield via a second mainline track. This extension would provide the ICS with independent utility and the ability to operate between Fresno and Bakersfield. This concept cost is also provided on a rough per mile basis and engineering design would be required in future study phases to further define and refine this cost.

These conceptual costs were used as part of the evaluation of the proposed corridors summarized in Section 6. The base capital cost for the Northwest Corridor (using the BNSF corridor) does not assume the implementation of a second main train between the northern terminus of the corridor in Delano and Calloway Drive in Bakersfield. Estimated costs for each corridor are provided in Table 6-4 below. All costs are in current year (2012) dollars and are not escalated for future years as specific implementation timeframe for service has not been identified.

Table 6-4: Opening Year and Build-Out Cost Estimates

Corridor	Opening Year		Build-Out	
	# of New Stations	Cost ($ millions)	# of New Stations	Cost ($ millions)
NW	5	$75.4	11	$220.5
Airport	5	$73.0	13	$224 - $317
SW	3	$114.5	8	$158.2
SE	0	$141.5	9	$162.4
Tehachapi	n/a	n/a	5	$255.6
Rosamond	1	$8.5	4	$126.7

Note: All costs are conceptual and in Year 2012 dollars

6.3 RIDERSHIP MODELING

Based on discussions with Kern COG and the Steering Committee, Alternative 1 was selected as the preferred alternative for ridership modeling as part of this study effort. The Northwest Corridor offers high connectivity to the northern cities of Shafter and Delano, while the Southwest Corridor provides growing residential neighborhoods in Southwest Bakersfield with a connection to the commuter rail network. Wasco West, an existing Amtrak station, was not included in the modeling but is expected to continue to provide service for Amtrak and a possible commuter rail. Alternative 2 was also identified as a promising alternative and it was acknowledged that potential ridership on the Airport and Southeast Corridors should be evaluated as part of future studies.

Ridership Model Overview

The ridership forecasting was completed by Fehr & Peers using their Direct Ridership Model (DRM), a sketch-planning model capable of forecasting commuter rail ridership along a particular corridor. The model is adjusted to reflect local conditions for land use and existing transportation systems and conditions along the study corridor.

This sketch-planning model has been utilized for other commuter rail and regional rail corridors in California, for example the Bay Area Rapid Transit (BART) and Altamont Commuter Express (ACE) services. The scale of this study effort did not allow for a full calibration and validation of the model directly applicable to conditions within Kern County, as no existing commuter rail service operates in the region.

Instead, the existing Altamont Commuter Express (ACE) DRM was selected as a reasonable alternative source for the modeling effort. The ACE train is a commuter rail system that travels from Stockton to Silicon Valley. The modeled system operated four AM inbound and four PM outbound trains on weekdays, transporting employees from residential areas to employment areas in Fremont, Milpitas, and San Jose. The model's R^2 value is 0.89, where R^2 represents the portion of ridership variation which is explained by the model, with possible values ranging from zero to 1. Thus, the ACE model explains ridership in Kern County with a high degree of confidence.

The operation of the ACE system is comparable to the operation proposed as part of Alternative 1 in that it would transport riders from outlying areas to central Bakersfield. This model would also be applicable to the Rosamond station in that one would expect nominal reverse commuting.

Modeling Assumptions

Commuter rail service along the Northwest and Southwest corridors was assumed to operate with four inbound (to Downtown Bakersfield) weekday trains during the AM peak period and four outbound (from Downtown Bakersfield) in the PM peak period. Service from Rosamond along the Metrolink Antelope Valley Line extension would be offered at the same frequency of the current Metrolink service to Lancaster. This is six trains inbound (to Los Angeles) during the AM peak and six trains outbound (from Los Angeles) in the PM peak.

The DRM required assumptions based on Kern County demographics. Some of these assumptions include:

- Population and employment values were based on catchment areas surrounding each of the stations
- People living closer to Downtown Bakersfield are less likely to take the train than those living farther away
- People with easy freeway access are more likely to take the freeway
- Number of parking spaces needed at each station

Details of all modeling assumptions can be seen in Appendix C.

Passenger Boarding Forecasts

Ridership forecasts for the Year 2035 condition are presented in Table 6-5. Ridership forecasts were developed for conditions in 2035 with and without the proposed California High-Speed Rail (HSR) project.

The limited level of traffic congestion forecast to occur in Kern County in the 2035 horizon contributes to lower ridership forecasts as even with increases in traffic congestion, freeway travel times between points along the Northwest and Southwest Corridors are still faster than rail travel times.

Table 6-5: Year 2035 Ridership Forecasts

Rail Corridor	Station	Weekday Boardings without HSR	Weekday Boardings with HSR
Northwest Corridor	Delano West	104	108
	Shafter	108	114
	Wasco East*	50	N/A
	West Rosedale	109	114
	Allen and Hageman	95	125
	The Commons	67	80
	Amtrak Station	411	470
	Total Ridership	894	1,012
Southwest Corridor	Amtrak Station	235	290
	Ming/Union	67	81
	Gosford	86	112
	Buena Vista	123	137
	Total Ridership	511	620
Rosamond Corridor	Rosamond	273	333

*Wasco East Station not modeled, ridership estimated based on existing Amtrak daily boardings

These ridership forecasts are quite low in comparison to other recent start-up commuter rail services, many of which are profiled in Section 4 of this report. The implementation of the proposed HSR service to Bakersfield does provide a positive bump in forecasted ridership, and may create an environment where commuter rail service to Bakersfield becomes feasible.

Ridership from Rosamond to Los Angeles is reasonable for a single station extension. The feasibility of this extension would ultimately be determined through discussions with Metrolink (SCRRA) regarding that agency's interest and capacity to extend commuter rail service north of Lancaster and UP's interest in negotiating operating rights along the portion of their rail corridor between Lancaster and Rosamond.

A key contributor to the low ridership forecasts is the absence of a developed distributor bus shuttle network within Downtown Bakersfield. The existing Amtrak station is located more than ½ mile away from many of the primarily employment locations within the downtown, limiting passenger access via walking. A limited feeder bus service was assumed as part of the modeling effort. The development and evaluation of a convenient bus shuttle system linking the Amtrak station to destinations within downtown would be anticipated to have a positive effect on potential ridership for commuter rail services.

Similar bus shuttle services currently operate at destination stations along the ACE line in Santa Clara County and the Metrolink line in Orange County. These bus shuttle services significantly increase the reach of the commuter rail services and make the service more attractive to a greater number of commuters.

Reverse commute trips could also contribute to increases in ridership forecasts. Operating trains that correspond to start and end times for shifts at major employers in Wasco, McFarland, and Delano could attract commuters living in Bakersfield and commuting to these employment destinations outside of the Metro Bakersfield area. Follow-on study efforts should also examine the value of a commuter rail service that links the Northwest and Southwest corridors to serve employment destinations both within and outside of Metro Bakersfield.

7.0 Coordination with Regional and High-Speed Rail

This section discusses additional planning efforts related to rail service in Kern County, in particular the California HSR project, and the potential implications of these planning efforts and projects on the feasibility of commuter rail in Kern County.

7.1 NEAR TERM SCENARIO TO MODIFY/PRESERVE EXISTING AMTRAK SERVICE IF HIGH-SPEED RAIL ICS MOVES FORWARD

Currently, the Amtrak San Joaquin line operates between the San Francisco Bay Area, Sacramento, Wasco and Bakersfield. This is the fifth busiest Amtrak line in the nation, serving over 1 million riders a year. Amtrak offers six round trips per day from Bakersfield to points north along the San Joaquin line. As an intercity rail service provider, Amtrak is required by law to maintain service in Bakersfield, Wasco, Corcoran, Hanford and Fresno.

The Amtrak San Joaquin service operates in the BNSF freight rail corridor between Bakersfield and Fresno. The BNSF corridor consists of a single mainline track north and west of Calloway Drive in Bakersfield. This condition places a constraint on the capacity of the corridor to serve both freight and passenger rail. Amtrak is currently allocated six daily round trip operating slots by BNSF in this corridor and currently utilizes all six slots for operating its existing service.

The California High-Speed Rail Authority (CHSRA) proposes to ultimately implement a High-Speed Rail service between the Bay Area, Sacramento, Los Angeles, and San Diego via the Central Valley. CHSRA is planning to spend $6 billion to build an Initial Construction Segment (ICS) of the High-Speed Rail to operate between North Fresno and Wasco, roughly parallel to the existing BNSF Rail Corridor. The construction of this additional rail line would permit the transfer the existing Amtrak San Joaquin service from the BNSF freight corridor to the newly constructed HSR corridor, allowing potential for five additional express trains per day to be added to the six round trips currently operating and stopping Bakersfield, Wasco, Corcoron, Handford, and Fresno.

However, the capacity of the ICS corridor would still be constrained by the presence of the single track BNSF corridor between Wasco and Calloway Drive in Bakersfield. In order for the ICS to have independent utility and operate passenger rail service between Fresno and Bakersfield, the double track alignment of the BNSF corridor would need to be extended from Calloway Drive to Wasco or wherever the ICS construction stops. This new alignment could provide capacity for additional express passenger rail service to operate on the BNSF freight line between Bakersfield and Fresno. If the HSR ICS is not constructed, the proposed double tracking would help existing Amtrak service on-time performance while providing increased capacity for freight rail to the Shafter ITTC.

Capital Costs for BNSF Double Track

The 12.7 mile second mainline track alignment between Wasco and downtown Bakersfield is estimated to cost about $8.12 million per mile to construct. This equates to a total estimated conceptual cost of $103 million. This per mile cost is similar to other projects recently implemented across the United States and proportional to the per mile costs assumed in the other corridors studied as part of this project that would require new track infrastructure. These costs include the estimated cost to construct the additional mainline track and modifying grade crossings. Additional elements like grade separations, bridges, and/or substantial upgrades to signalling and other systems would further increase this cost.

7.2 NEAR TERM SCENARIO FOR PROPOSED COMMUTER RAIL SERVICE IF HIGH-SPEED RAIL MOVES FORWARD

Proposed commuter rail services in Kern County should be coordinated with existing and planned long distance intercity rail services connecting to Bakersfield and nearby counties. While the commuter rail service would be oriented to facilitating journey to work trips for local commuters, the service could also serve as a convenient connecting line for travelers originating in smaller communities (Delano, McFarland, etc.) looking to access intercity rail services that stop in Bakersfield.

This feasibility study has taken an initial look at the operation of commuter rail services in the BNSF corridor (identified as the Northwest Corridor), which is used as the existing Amtrak San Joaquin corridor and parallel to the proposed alignment for the California HSR project. The initial service considered for ridership modeling assumed four peak period trains operating on weekdays. Inbound trips to Downtown Bakersfield would occur in the AM peak and outbound trips would occur in the PM peak.

There are two potential scenarios for this service to be accommodated within the BNSF corridor. The first scenario would be for the commuter rail service to operate within the BNSF corridor in addition to the existing six daily roundtrip Amtrak San Joaquin trains. This operation would require that Kern COG negotiate the use of four additional weekday round trip slots within the BNSF corridor. Discussions with BNSF regarding the capability or capacity of the corridor to accommodate these four additional round trip trains have not occurred as part of this study. These discussions would be a key element of any follow-on study effort, particularly to determine if additional rail infrastructure, such as a second mainline track, would be necessary to accommodate the increased passenger service.

However, the low ridership forecasts identified in this report would not appear to justify implementation of a commuter rail service in the BNSF corridor within the Year 2035 time horizon in the absence of the California HSR project.

A second scenario for operations would be tied to the ICS of the California High-Speed Rail (HSR) project. Under this second scenario, the Amtrak San Joaquin trains would relocate from the BNSF corridor to the ICS corridor, allowing the six existing daily roundtrip slots in the BNSF corridor to be reallocated to a proposed commuter rail service in Kern County. This scenario does require the construction of a second mainline track in the BNSF corridor between Wasco and Calloway Drive in Bakersfield. Ridership forecasts with the HSR project are higher than those for the scenario without the service. Additionally, the desire to provide local connections via rail to the HSR service to help increase ridership could help to justify potential implementation of commuter rail service if the California HSR project proceeds.

Figure 7.1 illustrates the location of the proposed California HSR ICS. Additionally, this figure highlights the limits of a potential double track of the BNSF corridor necessary to close the gap between the ICS terminus near Wasco and Downtown Bakersfield. This gap closure provides sufficient capacity within the rail corridor into Downtown Bakersfield until further extension of the HSR corridor occurs to Bakersfield and points south. Both scenarios would help preserve service to the existing Wasco Amtrak station

Figure 7.1 - California High Speed Rail Initial Construction Segment

Kern Council of Governments

Commuter Rail Feasibility Study

IBI Group - July 2012

8.0 Recommendations and Action Plan

The purpose of this study effort was to identify the initial feasibility of implementing commuter rail services within Kern County and to provide Kern COG with an action plan for advancing the planning and analysis of commuter rail services in specific corridors within the region.

The analysis completed as part of this study finds that limited implementation of commuter rail services within Kern County would be recommended only if certain conditions are present. Specifically, the potential feasibility of service is highly dependent on the presence and implementation of the California HSR project and potential future discussions and negotiations with BNSF, UP, and SCRRA (Metrolink) regarding potential capacity for operations.

In general, the forecasted ridership for the modeled corridors that would connect to Downtown Bakersfield would not appear to justify the significant costs associated with the implementation of a new commuter rail service, particularly given the cost of purchasing new rail vehicles. The low ridership forecasts anticipated through the year 2035 are a result on the low forecast levels of congestion in the region through this horizon year. Further study is recommended on adding stops to existing Amtrak San Joaquin inter-city rail service.

If the California HSR service is implemented before 2035, there may be justification for Kern COG to offer some limited commuter rail services between Bakersfield—Delano or Bakersfield—Wasco/West Delano, and perhaps to locations south of Bakersfield in Arvin and Buena Vista (southwest Bakersfield). In these cases, the commuter rail service could also serve as a local feeder to the HSR station in Bakersfield. Should this condition materialize additional study of the pros and cons and potential ridership for a commuter rail service in the BNSF corridor and UP corridor between Bakersfield and Delano/West Delano is warranted. This situation could also allow for Kern COG to lease unused Amtrak rail rolling stock, significantly reducing the start-up cost for commuter rail service.

Additionally, the extension of the Metrolink Antelope Valley Line from Lancaster to Rosamond may be feasible depending on the result of recommended discussions and negotiations between Kern COG and SCRRA and Union Pacific. The ridership forecast for this station is reasonable for a single station extension. However, there are significant operational and physical corridor questions that would need to be addressed through the recommended negotiations and a more detailed study of this connection. Ridership could benefit from a High Speed Rail Station in Palmdale if the project moves forward.

Based on these findings, the following recommendations and action plan are organized into short-term (1-5 years), mid-term (5-15 years), and long-term (15+ years) horizons with the objective of providing Kern COG with program to follow for further planning, identification of funding sources, and potential implementation of service by the year 2035.

Short-Term Recommendations (1-5 years)

- Initiate discussions with the Southern California Regional Rail Authority (SCRRA) regarding the future extension of the Metrolink Antelope Valley Line from Lancaster to Rosamond. This extension of service could require that Kern COG join the SCRRA JPA.

- Initiate discussions with Union Pacific (UP) regarding the availability of operating capacity and necessary track upgrades that may be required for the future extension of the Metrolink Antelope Valley Line from Lancaster to Rosamond.
- Initiate discussions with State to negotiate adding stops to the existing Amtrak San Joaquin service Between Bakersfield and Wasco.
- Continue to monitor the advancement of the California High-Speed Rail project, with a particular focus on understanding physical rail infrastructure improvements planned in Kern County and future operations. Feasibility of commuter rail service in the Bakersfield metropolitan area is highly reliant on the implementation of HSR service.
- If construction of the High-Speed Rail Initial Construction Segment proceeds, conduct a follow-on Phase 2 study of commuter rail services to further analyze the pros and cons of the BNSF and UP rail corridors between Bakersfield—Delano or Bakersfield—Wasco/West Delano, and to develop detailed ridership forecasts for these corridors.
- As part of the Phase 2 study above, initiate discussions with BNSF and UP regarding the negotiation of potential operating rights within these existing freight corridors. These discussions will also help to define whether additional mainline tracks are planned by either operator or would need to be implemented as part of a future commuter rail project.
- As part of a phase 2 study research the potential for a reverse commute train run to outlying employment centers (prisons, military bases, etc.) and the potential benefit of operating rail services in both directions.
- Initiate discussions with other COGs in the San Joaquin Valley to determine if support exists for the recently formed CCRA JPA or other entity to potentially serve as an operator of a future commuter rail service. This approach could also allow for future expansion of service into additional counties participating in the CCRA JPA if ridership demand warrants.
- Initiate discussions with COGs to the north to preserve and expand existing passenger rail service and analyzing extension of commuter rail service in the south valley counties.

Mid-Term Recommendations (5-15 years)

- Advance the design and definition of an extension of the Metrolink Antelope Valley Line to Rosamond.
- If the HSR ICS proceeds into construction:
    - Identify a preferred corridor (BNSF or UP) to connect Bakersfield and Delano with a new commuter rail/HSR feeder service.
    - Begin efforts to identify potential funding sources for any infrastructure improvements in the BNSF and/or UP corridors that would be necessary to permit initiation of commuter rail operations.
    - Work with GET, KRT, Amtrak Thru-Way Bus, and other local transit providers to develop a series of convenient circulator bus services that would connect riders at destination stations with nearby employers that are located beyond walking distance from the commuter rail stations.

Long-Term Recommendations (15+ years)

- Finalize the necessary JPA requirements with SCRRA and implement the extension of Metrolink service to Rosamond.
- If the HSR ICS proceeds into construction:
    - Select the preferred governing and operating agency for a commuter rail service, whether this is the CCRA JPA, Kern Regional Transit, Golden Empire Transit, or another agency.
    - Select a preferred corridor (BNSF or UP) for the initial implementation of commuter rail services within the San Joaquin Valley portion of Kern County based on study efforts conducted in the Short-Term and Mid-Term horizons.
- Pursue the appropriate funding sources (Federal Small Starts, etc.) necessary to implement the proposed commuter rail improvements.
- Reassess the feasibility of commuter rail in the other studied corridors based on demographic growth experienced in the intervening 15 years and forecast growth through new established horizon years (2050, 2060, etc.).
- Explore the potential for purchasing the existing rail rights-of-way along the Southwest and Southeast corridors studied as part of this report. Purchasing the rail right-of-way would allow a local entity to own and operate rail services in the corridors and have control over operations, service availability, and frequencies. These purchases could be conducted by GET, KRT, CCRA or other local entity.

Appendix A: Commuter Rail Conceptual Capital Cost Estimates

Appendix A — Commuter Rail Conceptual Capital Cost Estimates Summary

Item			Northwest Corridor	Airport-Delano Corridor	Southwest Corridor	Southeast Corridor	Tehachapi Corridor	Rosamond Corridor
Corridor Length (miles)			38.91	39.14	23.83	22.26	49.03	51.123
Subtotal-Civil			$0	$18,700,000	$500,000	$3,250,000	$0	$0
Subtotal-Utilities			$0	$0	$0	$0	$0	$0
Subtotal-Track			$0	$34,760,422	$580,000	$580,000	$37,972,310	$1,315,000
Subtotal-Stations			$31,680,000	$32,760,000	$24,700,000	$24,700,000	$13,650,000	$10,920,000
Subtotal-Controls & Signals			$0	$0	$0	$0	$0	$0
Subtotal Facilities			$42,500,000	$42,500,000	$42,500,000	$42,500,000	$42,500,000	$20,000,000
A. Construction Subtotal			**$74,180,000**	**$128,720,422**	**$68,280,000**	**$71,030,000**	**$94,122,310**	**$32,235,000**
Environmental Mitigation	Percent of A	3%	$2,225,400	$3,861,613	$2,048,400	$2,130,900	$2,823,669	$967,050
B. Construction Cost Subtotal			**$76,405,400**	**$132,582,034**	**$70,328,400**	**$73,160,900**	**$96,945,979**	**$33,202,050**
C. Right of Way Subtotal			**$5,775,000**	**$6,279,955**	**$4,534,934**	**$4,485,197**	**$3,653,270**	**$1,680,000**
D. Vehicles Subtotal			**$63,430,000**	**$63,430,000**	**$24,000,000**	**$23,500,000**	**$46,700,000**	**$53,010,000**
Cost Contingencies (Uncertainties, Changes)								
Design&Construction	Percent of B	25%	$19,101,350	$33,145,509	$17,582,100	$18,290,225	$24,236,495	$8,300,513
Right of Way	Percent of C	30%	$1,732,500	$1,883,987	$1,360,480	$1,345,559	$1,095,981	$504,000
Vehicle Cost	Percent of D	10%	$6,343,000	$6,343,000	$2,400,000	$2,350,000	$4,670,000	$5,301,000
Program Implementation (Agency Costs and Fees)								
Design&Construction	Percent of B	31%	$23,685,674	$41,100,431	$21,801,804	$22,679,879	$30,053,254	$10,292,636
Right of Way Purchase	Percent of C	15%	$866,250	$941,993	$680,240	$672,780	$547,991	$252,000
Vehicle Procurement	Percent of D	5%	$3,171,500	$3,171,500	$1,200,000	$1,175,000	$2,335,000	$2,650,500
E. Capital Cost Subtotal			**$200,510,674**	**$288,878,408**	**$143,887,959**	**$147,659,539**	**$210,237,970**	**$115,192,698**
Project Reserve	Percent of E	10%	$20,051,067	$28,887,841	$14,388,796	$14,765,954	$21,023,797	$11,519,270
F. Total Capital Cost			**$220,561,741**	**$317,766,249**	**$158,276,755**	**$162,425,493**	**$231,261,767**	**$126,711,968**
Cost Per Mile			**5,668,510.44**	**8,118,708.46**	**6,641,911.66**	**7,296,742.74**	**4,716,740.09**	**2,478,570.66**

Northwest Corridor		5280	Quantity	Phase 1
Alignment Breakdown				
Surface (main track)	linear foot	38.91	205444.8	205444.8
Surface (sidings)	linear foot			0
Bridges	each			0
Street Crossings	each			0
Freeway Crossings	linear foot			0
Total Ft				
Item	**Units**	**Avg.Unit Cost**		***Phase 1***
Sound Wall	linear foot	$137	0	$0
Grade Separations (undercrossing)	Each	$15,000,000	0	$0
Grade Separations (overcrossing)	Each	$12,000,000	0	$0
Earthwork	linear foot	$2	0	$0
New At-grade crossing	Each	$250,000	0	$0
Close existing crossing	Each	$140,000	0	$0
Waterway Crossing	Each	$5,400,000	0	$0
Flood Control Crossing	Each	$2,500,000	0	$0
Subtotal-Civil				**$0**
Utility Relocation - Hvy (above ground)	Surfc/Tun Rt Ft	$900	0	
Utility Relocation - Hvy (underground)	Surfc/Tun Rt Ft	$1,800	0	
Utility Relocation - Med (above ground)	Aerial Rt Ft	$450	0	
Utility Relocation	Linear ft	$165	0	$0
Subtotal-Utilities				**$0**
Track (ballasted)	linear foot	$145		$0
Street Crossing	linear foot	$2,000		$0
Special Trackwork	%	15%		$0
Crossover - Single	Each	$150,000		$0
Turnout Track #9	Each	$90,000		$0
Turnout Track #11	Each	$135,000		$0
Turnout Track #15	Each	$165,000		$0
Subtotal-Track				**$0**
New Station	Each	$2,000,000	11	$22,000,000
Transit Hub Station	Each	$4,000,000		$0
Central Terminal	Each	$10,000,000		$0
Surface Parking	Space	$3,000	2750	$8,250,000
Parking Structures	Space	$18,000	0	$0
Elevated Ped Xings	Each	$1,000,000	0	$0
Ticket Vending Machines	Each	$65,000	22	$1,430,000
Subtotal-Stations				**$31,680,000**
Centralized Traffic Control	linear foot	$140	0	$0
CTC Control Point	each	$750,000	0	$0
Signal Control and Switch points	each	$100,000	0	$0
Communications	linear foot	$170	0	$0
Wayside protection	linear foot	$16	0	$0
Interlockings	Each	$550,000	0	$0
Subtotal-C&S				**$0**
Maintenance/Storage	Each	$40,000,000	1	$40,000,000
Operations Control	Each	$5,000,000	0.5	$2,500,000
Subtotal Facilities				**$42,500,000**
A. Construction Subtotal				**$74,180,000**
Environmental Mitigation	Percent of A	3%		$2,225,400
B. Construction Cost Subtotal				**$76,405,400**
Maintenance/Storage Yard	Lump			$0
System Envelope	square foot	$6		$0
New Parking Spaces	square foot	$6	962,500.00	$5,775,000
Railway Easement	Lump			
Other Right of Way	Lump			
C. Right of Way Subtotal				**$5,775,000**
Revenue Vehicles (cab car, bi-level, 135 pass)	Each	$3,000,000	4	$12,000,000
Revenue Vehicles (non cab, bi-level, 135 pass.)	Each	$2,600,000	8	$20,800,000
Revenue Vehicles (loco)	Each	$4,000,000	4	$16,000,000
Revenue Vehicles (dmu cab single-level, 92 pass.)	Each	$5,000,000	0	$0
Revenue Vehicles (dmu cab bi-level, 185 pass)	Each	$6,000,000	0	$0
Revenue Vehicles (dmu, "Aero", 90 pass)	Each	$3,000,000	0	$0
Spare Parts	Percent	10%		$4,880,000
MOW Equipment	Rt Mile	$250,000	39	$9,750,000
D. Vehicles Subtotal				**$63,430,000**
Cost Contingencies (Uncertainties, Changes)				
Design&Construction	Percent of B	25%		$19,101,350
Right of Way	Percent of C	30%		$1,732,500
Vehicle Cost	Percent of D	10%		$6,343,000
Program Implementation (Agency Costs and Fees)				
Design&Construction	Percent of B	31%		$23,685,674
Right of Way Purchase	Percent of C	15%		$866,250
Vehicle Procurement	Percent of D	5%		$3,171,500
E. Capital Cost Subtotal				**$200,510,674**
Project Reserve	Percent of E	10%		$20,051,067
F. Total Capital Cost				**$220,561,741**
			Cost/Mile:	**$5,668,510**

Airport Delano Corridor		*5280*	***Quantity***	***Phase 1 - New Rail***
Alignment Breakdown				
Surface (main track)	linear foot	39.14	206659.2	206,659
Surface (sidings)	linear foot	0		0
Bridges	each	0		
Street Crossings	each	0		
Freeway Crossings	linear foot	0		
Total Ft				
Item	**Units**	**Avg. Unit Cost**		***Phase 1***
Sound Wall	linear foot	$137	0	$0
Grade Separations (undercrossing)	Each	$15,000,000	0	0
Grade Separations (overcrossing)	Each	$12,000,000	0	$0
Earthwork	linear foot	$2		$0
New At-grade crossing	Each	$250,000	10	$2,500,000
Close existing crossing	Each	$140,000	0	$0
Waterway Crossing	Each	$5,400,000	3	$16,200,000
Flood Control Crossing	Each	$2,500,000	0	$0
Subtotal-Civil				**$18,700,000**
Utility Relocation - Hvy (above ground)	Surfc/Tun Rt Ft	$900		$0
Utility Relocation - Hvy (underground)	Surfc/Tun Rt Ft	$1,800		$0
Utility Relocation - Med (above ground)	Aerial Rt Ft	$450		$0
Utility Relocation	Linear ft	$165		$0
Subtotal-Utilities				**$0**
Track (ballasted)	linear foot	$145	206659.2	$29,965,584
Street Crossing	linear foot	$2,000		$0
Special Trackwork	%	15%		$4,494,838
Crossover - Single	Each	$150,000	2	$300,000
Turnout Track #9	Each	$90,000		$0
Turnout Track #11	Each	$135,000		$0
Turnout Track #15	Each	$165,000		$0
Subtotal-Track				**$34,760,422**
New Station	Each	$2,000,000	12	$24,000,000
Central Terminal	Each	$10,000,000	0	$0
Surface Parking	Space	$3,000	2400	$7,200,000
Parking Structures	Space	$18,000		$0
Elevated Ped Xings	Each	$1,000,000		$0
Ticket Vending Machines	Each	$65,000	24	$1,560,000
Subtotal-Stations				**$32,760,000**
Centralized Traffic Control	linear foot	$140	0	$0
CTC Control Point	each	$750,000	0	$0
Signal Control and Switch points	each	$100,000	0	$0
Communications	linear foot	$170	0	$0
Wayside protection	linear foot	$16	0	$0
Interlockings	Each	$550,000	0	$0
Subtotal-C&S				**$0**
Maintenance/Storage	Each	$40,000,000	1	$40,000,000
Operations Control	Each	$5,000,000	0.5	$2,500,000
Subtotal Facilities				**$42,500,000**
A. Construction Subtotal				**$128,720,422**
Environmental Mitigation	Percent of A	3%		$3,861,613
B. Construction Cost Subtotal				**$132,582,034**
Maintenance/Storage Yard	Lump			$0
System Envelope	square foot	$6		$1,239,955
New Parking Spaces	square foot	$6	840000	$5,040,000
Railway Easement	Lump			
Other Right of Way	Lump			
C. Right of Way Subtotal				**$6,279,955**
Revenue Vehicles (cab car, bi-level, 135 pass)	Each	$3,000,000	4	$12,000,000
Revenue Vehicles (non cab, bi-level, 135 pass.)	Each	$2,600,000	8	$20,800,000
Revenue Vehicles (loco)	Each	$4,000,000	4	$16,000,000
Revenue Vehicles (dmu cab single-level, 92 pass.)	Each	$2,000,000		$0
Revenue Vehicles (dmu cab bi-level, 185 pass)	Each	$3,000,000		$0
Revenue Vehicles (dmu, "Aero", 90 pass)	Each	$3,000,000		$0
Spare Parts	Percent	10%		$4,880,000
MOW Equipment	Rt Mile	$250,000	39	$9,750,000
D. Vehicles Subtotal				**$63,430,000**
Cost Contingencies (Uncertainties, Changes)				
Design&Construction	Percent of B	25%		$33,145,509
Right of Way	Percent of C	30%		$1,883,987
Vehicle Cost	Percent of D	10%		$6,343,000
Program Implementation (Agency Costs and Fees)				
Design&Construction	Percent of B	31%		$41,100,431
Right of Way Purchase	Percent of C	15%		$941,993
Vehicle Procurement	Percent of D	5%		$3,171,500
E. Capital Cost Subtotal				**$288,878,408**
Project Reserve	Percent of E	10%		$28,887,841
F. Total Capital Cost				**$317,766,249**
			Cost/Mile:	**$8,118,708**

Southwest Corridor		*5280*	***Quantity***	***Phase 1***
Alignment Breakdown				
Surface (main track)	linear foot	23.83	125822.4	125,822
Surface (sidings)	linear foot	0		0
Bridges	each	0		
Street Crossings	each	0		0
Freeway Crossings	linear foot	0		
Total Ft				
Item	**Units**	**Avg. Unit Cost**		***Phase 1***
Sound Wall	linear foot	$137		$0
Grade Separations (undercrossing)	Each	$15,000,000		$0
Grade Separations (overcrossing)	Each	$12,000,000		$0
Earthwork	linear foot	$2		$0
New At-grade crossing	Each	$250,000	2	$500,000
Close existing crossing	Each	$140,000		$0
Waterway Crossing	Each	$5,400,000		$0
Flood Control Crossing	Each	$2,500,000		$0
Subtotal-Civil				**$500,000**
Utility Relocation - Hvy (above ground)	Surfc/Tun Rt Ft	$900		$0
Utility Relocation - Hvy (underground)	Surfc/Tun Rt Ft	$1,800		$0
Utility Relocation - Med (above ground)	Aerial Rt Ft	$450		$0
Utility Relocation	Linear ft	$165		$0
Subtotal-Utilities				**$0**
Track (ballasted)	linear foot	$145	1000	$145,000
Street Crossing	linear foot	$2,000		$0
Special Trackwork	%	15%		$0
Crossover - Single	Each	$150,000	2	$300,000
Turnout Track #9	Each	$90,000		$0
Turnout Track #11	Each	$135,000	1	$135,000
Turnout Track #15	Each	$165,000		$0
Subtotal-Track				**$580,000**
New Station	Each	$2,000,000	9	$18,000,000
Central Terminal	Each	$10,000,000		$0
Surface Parking	Space	$3,000	1800	$5,400,000
Parking Structures	Space	$18,000		$0
Elevated Ped Xings	Each	$1,000,000		$0
Ticket Vending Machines	Each	$65,000	20	$1,300,000
Subtotal-Stations				**$24,700,000**
Centralized Traffic Control	linear foot	$140		$0
CTC Control Point	each	$750,000		$0
Signal Control and Switch points	each	$100,000		$0
Communications	linear foot	$170		$0
Wayside protection	linear foot	$16		$0
Interlockings	Each	$550,000		$0
Subtotal-C&S				**$0**
Maintenance/Storage	Each	$40,000,000	1	$40,000,000
Operations Control	Each	$5,000,000	0.5	$2,500,000
Subtotal Facilities				**$42,500,000**
A. Construction Subtotal				**$68,280,000**
Environmental Mitigation	Percent of A	3%		$2,048,400
B. Construction Cost Subtotal				**$70,328,400**
Maintenance/Storage Yard	Lump			$0
System Envelope	square foot	$6		$754,934
New Parking Spaces	square foot	$6	630000	$3,780,000
Railway Easement	Lump			
Other Right of Way	Lump			
C. Right of Way Subtotal				**$4,534,934**
Revenue Vehicles (cab car, bi-level, 135 pass)	Each	$3,000,000		$0
Revenue Vehicles (non cab, bi-level, 135 pass.)	Each	$2,600,000		$0
Revenue Vehicles (loco)	Each	$4,000,000		$0
Revenue Vehicles (dmu cab single-level, 92 pass.)	Each	$2,000,000	9	$18,000,000
Revenue Vehicles (dmu cab bi-level, 185 pass)	Each	$3,000,000		$0
Revenue Vehicles (dmu, "Aero", 90 pass)	Each	$3,000,000		$0
Spare Parts	Percent	10%		$0
MOW Equipment	Rt Mile	$250,000	24	$6,000,000
D. Vehicles Subtotal				**$24,000,000**
Cost Contingencies (Uncertainties, Changes)				
Design&Construction	Percent of B	25%		$17,582,100
Right of Way	Percent of C	30%		$1,360,480
Vehicle Cost	Percent of D	10%		$2,400,000
Program Implementation (Agency Costs and Fees)				
Design&Construction	Percent of B	31%		$21,801,804
Right of Way Purchase	Percent of C	15%		$680,240
Vehicle Procurement	Percent of D	5%		$1,200,000
E. Capital Cost Subtotal				**$143,887,959**
Project Reserve	Percent of E	10%		$14,388,796
F. Total Capital Cost				**$158,276,755**
			Cost/Mile:	**$6,641,912**

Southeast Corridor		*5280*	***Quantity***	***Phase 1***
Alignment Breakdown				
Surface (main track)	linear foot	22.26	117532.8	117,533
Surface (sidings)	linear foot	0		0
Bridges	each	0		
Street Crossings	each	0		0
Freeway Crossings	linear foot	0		
Total Ft				
Item	**Units**	**Avg. Unit Cost**		***Phase 1***
Sound Wall	linear foot	$137		$0
Grade Separations (undercrossing)	Each	$15,000,000		$0
Grade Separations (overcrossing)	Each	$12,000,000		$0
Earthwork	linear foot	$2		$0
New At-grade crossing	Each	$250,000	13	$3,250,000
Close existing crossing	Each	$140,000		$0
Waterway Crossing	Each	$5,400,000		$0
Flood Control Crossing	Each	$2,500,000		$0
Subtotal-Civil				**$3,250,000**
Utility Relocation - Hvy (above ground)	Surfc/Tun Rt Ft	$900		$0
Utility Relocation - Hvy (underground)	Surfc/Tun Rt Ft	$1,800		$0
Utility Relocation - Med (above ground)	Aerial Rt Ft	$450		$0
Utility Relocation	Linear ft	$165		$0
Subtotal-Utilities				**$0**
Track (ballasted)	linear foot	$145	1000	$145,000
Street Crossing	linear foot	$2,000		$0
Special Trackwork	%	15%		$0
Crossover - Single	Each	$150,000	2	$300,000
Turnout Track #9	Each	$90,000		$0
Turnout Track #11	Each	$135,000	1	$135,000
Turnout Track #15	Each	$165,000		$0
Subtotal-Track				**$580,000**
New Station	Each	$2,000,000	9	$18,000,000
Central Terminal	Each	$10,000,000		$0
Surface Parking	Space	$3,000	1800	$5,400,000
Parking Structures	Space	$18,000		$0
Elevated Ped Xings	Each	$1,000,000		$0
Ticket Vending Machines	Each	$65,000	20	$1,300,000
Subtotal-Stations				**$24,700,000**
Centralized Traffic Control	linear foot	$140		$0
CTC Control Point	each	$750,000		$0
Signal Control and Switch points	each	$100,000		$0
Communications	linear foot	$170		$0
Wayside protection	linear foot	$16		$0
Interlockings	Each	$550,000		$0
Subtotal-C&S				**$0**
Maintenance/Storage	Each	$40,000,000	1	$40,000,000
Operations Control	Each	$5,000,000	0.5	$2,500,000
Subtotal Facilities				**$42,500,000**
A. Construction Subtotal				**$71,030,000**
Environmental Mitigation	Percent of A	3%		$2,130,900
B. Construction Cost Subtotal				**$73,160,900**
Maintenance/Storage Yard	Lump			$0
System Envelope	square foot	$6		$705,197
New Parking Spaces	square foot	$6	630000	$3,780,000
Railway Easement	Lump			
Other Right of Way	Lump			
C. Right of Way Subtotal				**$4,485,197**
Revenue Vehicles (cab car, bi-level, 135 pass)	Each	$3,000,000		$0
Revenue Vehicles (non cab, bi-level, 135 pass.)	Each	$2,600,000		$0
Revenue Vehicles (loco)	Each	$4,000,000		$0
Revenue Vehicles (dmu cab single-level, 92 pass.)	Each	$2,000,000	9	$18,000,000
Revenue Vehicles (dmu cab bi-level, 185 pass)	Each	$3,000,000		$0
Revenue Vehicles (dmu, "Aero", 90 pass)	Each	$3,000,000		$0
Spare Parts	Percent	10%		$0
MOW Equipment	Rt Mile	$250,000	22	$5,500,000
D. Vehicles Subtotal				**$23,500,000**
Cost Contingencies (Uncertainties, Changes)				
Design&Construction	Percent of B	25%		$18,290,225
Right of Way	Percent of C	30%		$1,345,559
Vehicle Cost	Percent of D	10%		$2,350,000
Program Implementation (Agency Costs and Fees)				
Design&Construction	Percent of B	31%		$22,679,879
Right of Way Purchase	Percent of C	15%		$672,780
Vehicle Procurement	Percent of D	5%		$1,175,000
E. Capital Cost Subtotal				**$147,659,539**
Project Reserve	Percent of E	10%		$14,765,954
F. Total Capital Cost				**$162,425,493**
			Cost/Mile:	**$7,296,743**

Rosamond Corridor	Existing Track	*5280*	***Quantity***	***Phase 1***
Alignment Breakdown				
Surface (main track)	linear foot	51.123	269929.44	269,929
Surface (sidings)	linear foot			0
Bridges	each	0		
Street Crossings	each	0		0
Freeway Crossings	linear foot	0		
Total Ft			**269929.44**	
Item	**Units**	**Avg. Unit Cost**		***Phase 1***
Sound Wall	linear foot	$137		$0
Grade Separations (undercrossing)	Each	$15,000,000		$0
Grade Separations (overcrossing)	Each	$12,000,000		$0
Earthwork	linear foot	$2		$0
New At-grade crossing	Each	$250,000		$0
Close existing crossing	Each	$140,000		$0
Waterway Crossing	Each	$5,400,000		$0
Flood Control Crossing	Each	$2,500,000		$0
Subtotal-Civil				**$0**
Utility Relocation - Hvy (above ground)	Surfc/Tun Rt Ft	$900		$0
Utility Relocation - Hvy (underground)	Surfc/Tun Rt Ft	$1,800		$0
Utility Relocation - Med (above ground)	Aerial Rt Ft	$450		$0
Utility Relocation	Linear ft	$165		$0
Subtotal-Utilities				**$0**
Track (ballasted)	linear foot	$145	4000	$580,000
Street Crossing	linear foot	$2,000		$0
Special Trackwork	%	15%		$0
Crossover - Single	Each	$150,000	4	$600,000
Turnout Track #9	Each	$90,000		$0
Turnout Track #11	Each	$135,000	1	$135,000
Turnout Track #15	Each	$165,000		$0
Subtotal-Track				**$1,315,000**
New Station	Each	$2,000,000	4	$8,000,000
Central Terminal	Each	$10,000,000		$0
Surface Parking	Space	$3,000	800	$2,400,000
Parking Structures	Space	$18,000		$0
Elevated Ped Xings	Each	$1,000,000		$0
Ticket Vending Machines	Each	$65,000	8	$520,000
Subtotal-Stations				**$10,920,000**
Centralized Traffic Control	linear foot	$140		$0
CTC Control Point	each	$750,000		$0
Signal Control and Switch points	each	$100,000		$0
Communications	linear foot	$170		$0
Wayside protection	linear foot	$16		$0
Interlockings	Each	$550,000		$0
Subtotal-C&S				**$0**
Maintenance/Storage	Each	$20,000,000	1	$20,000,000
Operations Control	Each	$5,000,000		$0
Subtotal Facilities				**$20,000,000**
A. Construction Subtotal				**$32,235,000**
Environmental Mitigation	Percent of A	3%		$967,050
B. Construction Cost Subtotal				**$33,202,050**
Maintenance/Storage Yard	Lump			$0
System Envelope	square foot	$6		$0
New Parking Spaces	square foot	$6	280000	$1,680,000
Railway Easement	Lump			
Other Right of Way	Lump			
C. Right of Way Subtotal				**$1,680,000**
Revenue Vehicles (cab car, bi-level, 135 pass)	Each	$3,000,000	3	$9,000,000
Revenue Vehicles (non cab, bi-level, 135 pass.)	Each	$2,600,000	6	$15,600,000
Revenue Vehicles (loco)	Each	$4,000,000	3	$12,000,000
Revenue Vehicles (dmu cab single-level, 92 pass.)	Each	$2,000,000		$0
Revenue Vehicles (dmu cab bi-level, 185 pass)	Each	$3,000,000		$0
Revenue Vehicles (dmu, "Aero", 90 pass)	Each	$3,000,000		$0
Spare Parts	Percent	10%		$3,660,000
MOW Equipment	Rt Mile	$250,000	51	$12,750,000
D. Vehicles Subtotal				**$53,010,000**
Cost Contingencies (Uncertainties, Changes)				
Design&Construction	Percent of B	25%		$8,300,513
Right of Way	Percent of C	30%		$504,000
Vehicle Cost	Percent of D	10%		$5,301,000
Program Implementation (Agency Costs and Fees)				
Design&Construction	Percent of B	31%		$10,292,636
Right of Way Purchase	Percent of C	15%		$252,000
Vehicle Procurement	Percent of D	5%		$2,650,500
E. Capital Cost Subtotal				**$115,192,698**
Project Reserve	Percent of E	10%		$11,519,270
F. Total Capital Cost				**$126,711,968**
			Cost/Mile:	**$2,478,571**

Tehachapi Corridor		*5280*	***Quantity***	***Phase 1***
Alignment Breakdown				
Surface (main track)	linear foot	49.03	258878.4	258,878
Surface (sidings)	linear foot			0
Bridges	each			
Street Crossings	each			0
Freeway Crossings	linear foot			
Total Ft				
Item	**Units**	**Avg. Unit Cost**		***Phase 1***
Sound Wall	linear foot	$137		$0
Grade Separations (undercrossing)	Each	$15,000,000		$0
Grade Separations (overcrossing)	Each	$12,000,000		$0
Earthwork	linear foot	$2		$0
New At-grade crossing	Each	$250,000		$0
Close existing crossing	Each	$140,000		$0
Waterway Crossing	Each	$5,400,000		$0
Flood Control Crossing	Each	$2,500,000		$0
Subtotal-Civil				**$0**
Utility Relocation - Hvy (above ground)	Surfc/Tun Rt Ft	$900		$0
Utility Relocation - Hvy (underground)	Surfc/Tun Rt Ft	$1,800		$0
Utility Relocation - Med (above ground)	Aerial Rt Ft	$450		$0
Utility Relocation	Linear ft	$165		$0
Subtotal-Utilities				**$0**
Track (ballasted)	linear foot	$145	258878	$37,537,310
Street Crossing	linear foot	$2,000		$0
Special Trackwork	%	15%		$0
Crossover - Single	Each	$150,000	2	$300,000
Turnout Track #9	Each	$90,000		$0
Turnout Track #11	Each	$135,000	1	$135,000
Turnout Track #15	Each	$165,000		$0
Subtotal-Track				**$37,972,310**
New Station	Each	$2,000,000	5	$10,000,000
Central Terminal	Each	$10,000,000		$0
Surface Parking	Space	$3,000	1000	$3,000,000
Parking Structures	Space	$18,000		$0
Elevated Ped Xings	Each	$1,000,000		$0
Ticket Vending Machines	Each	$65,000	10	$650,000
Subtotal-Stations				**$13,650,000**
Centralized Traffic Control	linear foot	$140		$0
CTC Control Point	each	$750,000		$0
Signal Control and Switch points	each	$100,000		$0
Communications	linear foot	$170		$0
Wayside protection	linear foot	$16		$0
Interlockings	Each	$550,000		$0
Subtotal-C&S				**$0**
Maintenance/Storage	Each	$40,000,000	1	$40,000,000
Operations Control	Each	$5,000,000	0.5	$2,500,000
Subtotal Facilities				**$42,500,000**
A. Construction Subtotal				**$94,122,310**
Environmental Mitigation	Percent of A	3%		$2,823,669
B. Construction Cost Subtotal				**$96,945,979**
Maintenance/Storage Yard	Lump			$0
System Envelope	square foot	$6		$1,553,270
New Parking Spaces	square foot	$6	350000	$2,100,000
Railway Easement	Lump			
Other Right of Way	Lump			
C. Right of Way Subtotal				**$3,653,270**
Revenue Vehicles (cab car, bi-level, 135 pass)	Each	$3,000,000	4	$12,000,000
Revenue Vehicles (non cab, bi-level, 135 pass.)	Each	$2,600,000	8	$20,800,000
Revenue Vehicles (loco)	Each	$4,000,000	4	$16,000,000
Revenue Vehicles (dmu cab single-level, 92 pass.)	Each	$2,000,000		$0
Revenue Vehicles (dmu cab bi-level, 185 pass)	Each	$3,000,000		$0
Revenue Vehicles (dmu, "Aero", 90 pass)	Each	$3,000,000		$0
Spare Parts	Percent	10%		$4,880,000
MOW Equipment	Rt Mile	$250,000	49	$12,250,000
D. Vehicles Subtotal				**$65,930,000**
Cost Contingencies (Uncertainties, Changes)				
Design&Construction	Percent of B	25%		$24,236,495
Right of Way	Percent of C	30%		$1,095,981
Vehicle Cost	Percent of D	10%		$6,593,000
Program Implementation (Agency Costs and Fees)				
Design&Construction	Percent of B	31%		$30,053,254
Right of Way Purchase	Percent of C	15%		$547,991
Vehicle Procurement	Percent of D	5%		$3,296,500
E. Capital Cost Subtotal				**$232,352,470**
Project Reserve	Percent of E	10%		$23,235,247
F. Total Capital Cost				**$255,587,717**
			Cost/Mile:	**$5,212,884**

Appendix A

Commuter Rail Opening Year Conceptual Capital Cost Estimates Summary

Item			Northwest Corridor	Airport-Delano Corridor	Southwest Corridor	Southeast Corridor	Tehachapi Corridor	Rosamond Corridor
Corridor Length (miles)			38.91	39.14	12.0805	22.26	49.03	51.123
Subtotal-Civil			$0	$18,700,000	$500,000	$3,250,000	$0	$0
Subtotal-Utilities			$0	$0	$0	$0	$0	$0
Subtotal-Track			$0	$35,060,422	$580,000	$580,000	$870,000	$1,450,000
Subtotal-Stations			$13,500,000	$10,620,000	$8,190,000	$22,300,000	$12,580,000	$2,880,000
Subtotal-Controls & Signals			$0	$0	$0	$0	$0	$0
Subtotal Facilities			$2,500,000	$2,500,000	$2,500,000	$0	$0	$0
A. Construction Subtotal			**$16,000,000**	**$66,880,422**	**$11,770,000**	**$26,130,000**	**$13,450,000**	**$4,330,000**
Environmental Mitigation	Percent of A	3%	$480,000	$2,006,413	$353,100	$783,900	$403,500	$129,900
B. Construction Cost Subtotal			**$16,480,000**	**$68,886,834**	**$12,123,100**	**$26,913,900**	**$13,853,500**	**$4,459,900**
C. Right of Way Subtotal			**$1,995,000**	**$2,709,955**	**$1,642,710**	**$705,197**	**$1,553,270**	**$525,000**
D. Vehicles Subtotal			**$34,787,500**	**$34,822,500**	**$72,020,125**	**$74,500,000**	**$46,700,000**	**$0**
Cost Contingencies (Uncertainties, Changes)								
Design&Construction	Percent of B	25%	$4,120,000	$17,221,709	$3,030,775	$6,728,475	$3,463,375	$1,114,975
Right of Way	Percent of C	30%	$598,500	$812,987	$492,813	$211,559	$465,981	$157,500
Vehicle Cost	Percent of D	10%	$3,478,750	$3,482,250	$7,202,013	$7,450,000	$4,670,000	$0
Program Implementation (Agency Costs and Fees)								
Design&Construction	Percent of B	31%	$5,108,800	$21,354,919	$3,758,161	$8,343,309	$4,294,585	$1,382,569
Right of Way Purchase	Percent of C	15%	$299,250	$406,493	$246,407	$105,780	$232,991	$78,750
Vehicle Procurement	Percent of D	5%	$1,739,375	$1,741,125	$3,601,006	$3,725,000	$2,335,000	$0
E. Capital Cost Subtotal			**$68,607,175**	**$151,438,771**	**$104,117,110**	**$128,683,219**	**$77,568,702**	**$7,718,694**
Project Reserve	Percent of E	10%	$6,860,718	$15,143,877	$10,411,711	$12,868,322	$7,756,870	$771,869
F. Total Capital Cost			**$75,467,893**	**$166,582,649**	**$114,528,821**	**$141,551,541**	**$85,325,572**	**$8,490,563**
Cost Per Mile			**1,939,550.05**	**4,256,071.76**	**9,480,470.23**	**6,359,009.04**	**1,740,272.74**	**166,081.09**

Northwest Corridor		*5280*	***Quantity***	***Phase 1***
Alignment Breakdown				
Surface (main track)	linear foot	38.91	205444.8	205444.8
Surface (sidings)	linear foot			0
Bridges	each			0
Street Crossings	each			0
Freeway Crossings	linear foot			0
Total Ft				
Item	**Units**	**Avg. Unit Cost**		***Phase 1***
Sound Wall	linear foot	$137	0	$0
Grade Separations (undercrossing)	Each	$15,000,000	0	$0
Grade Separations (overcrossing)	Each	$12,000,000	0	$0
Earthwork	linear foot	$2	0	$0
New At-grade crossing	Each	$250,000	0	$0
Close existing crossing	Each	$140,000	0	$0
Waterway Crossing	Each	$5,400,000	0	$0
Flood Control Crossing	Each	$2,500,000	0	$0
Subtotal-Civil				**$0**
Utility Relocation - Hvy (above ground)	Surfc/Tun Rt Ft	$900	0	
Utility Relocation - Hvy (underground)	Surfc/Tun Rt Ft	$1,800	0	
Utility Relocation - Med (above ground)	Aerial Rt Ft	$450	0	
Utility Relocation	Linear ft	$165	0	$0
Subtotal-Utilities				**$0**
Track (ballasted)	linear foot	$145		$0
Street Crossing	linear foot	$2,000		$0
Special Trackwork	%	15%		$0
Crossover - Single	Each	$150,000		$0
Turnout Track #9	Each	$90,000		$0
Turnout Track #11	Each	$135,000		$0
Turnout Track #15	Each	$165,000		$0
Subtotal-Track				**$0**
New Station	Each	$2,000,000	5	$10,000,000
Central Terminal	Each	$10,000,000		$0
Surface Parking	Space	$3,000	950	$2,850,000
Parking Structures	Space	$18,000	0	$0
Elevated Ped Xings	Each	$1,000,000	0	$0
Ticket Vending Machines	Each	$65,000	10	$650,000
Subtotal-Stations				**$13,500,000**
Centralized Traffic Control	linear foot	$140	0	$0
CTC Control Point	each	$750,000	0	$0
Signal Control and Switch points	each	$100,000	0	$0
Communications	linear foot	$170	0	$0
Wayside protection	linear foot	$16	0	$0
Interlockings	Each	$550,000	0	$0
Subtotal-C&S				**$0**
Maintenance/Storage	Each	$40,000,000		$0
Operations Control	Each	$5,000,000	0.5	$2,500,000
Subtotal Facilities				**$2,500,000**
A. Construction Subtotal				**$16,000,000**
Environmental Mitigation	Percent of A	3%		$480,000
B. Construction Cost Subtotal				**$16,480,000**
Maintenance/Storage Yard	Lump			$0
System Envelope	square foot	$6		$0
New Parking Spaces	square foot	$6	332,500.00	$1,995,000
Railway Easement	Lump			
Other Right of Way	Lump			
C. Right of Way Subtotal				**$1,995,000**
LeasedRevenue Vehicles (cab car, bi-level, 135 pass)	Per Day/Per Car	$300	7300	$2,190,000
Leased Revenue Vehicles (non cab, bi-level, 135 pass.)	Per Day/Per Car	$300	14600	$4,380,000
Leased Revenue Vehicles (loco)	Per Day/Per Loco	$350	7300	$2,555,000
Revenue Vehicles (dmu cab single-level, 92 pass.)	Each	$773,903	0	$0
Revenue Vehicles (dmu cab bi-level, 185 pass)	Each	$773,903	0	$0
Revenue Vehicles (dmu, "Aero", 90 pass)	Each	$773,903	0	$0
Spare Parts	Percent	10%		$912,500
MOW Equipment/Layover Tracks	Rt Mile	$250,000	39	$9,750,000
Maintenance Facility	Each	$15,000,000	1	$15,000,000
D. Vehicles Subtotal				**$34,787,500**
Cost Contingencies (Uncertainties, Changes)				
Design&Construction	Percent of B	25%		$4,120,000
Right of Way	Percent of C	30%		$598,500
Vehicle Cost	Percent of D	10%		$3,478,750
Program Implementation (Agency Costs and Fees)				
Design&Construction	Percent of B	31%		$5,108,800
Right of Way Purchase	Percent of C	15%		$299,250
Vehicle Procurement	Percent of D	5%		$1,739,375
E. Capital Cost Subtotal				**$68,607,175**
Project Reserve	Percent of E	10%		$6,860,718
F. Total Capital Cost				**$75,467,893**
			Cost/Mile:	**$1,939,550**

Airport Delano Corridor		*5280*	***Quantity***	***Phase 1 - New Rail***
Alignment Breakdown				
Surface (main track)	linear foot	39.14	206659.2	206,659
Surface (sidings)	linear foot	0		0
Bridges	each	0		
Street Crossings	each	0		
Freeway Crossings	linear foot	0		
Total Ft				
Item	**Units**	**Avg. Unit Cost**		***Phase 1***
Sound Wall	linear foot	$137	0	$0
Grade Separations (undercrossing)	Each	$15,000,000	0	0
Grade Separations (overcrossing)	Each	$12,000,000	0	$0
Earthwork	linear foot	$2		$0
New At-grade crossing	Each	$250,000	10	$2,500,000
Close existing crossing	Each	$140,000	0	$0
Waterway Crossing	Each	$5,400,000	3	$16,200,000
Flood Control Crossing	Each	$2,500,000	0	$0
Subtotal-Civil				**$18,700,000**
Utility Relocation - Hvy (above ground)	Surfc/Tun Rt Ft	$900		$0
Utility Relocation - Hvy (underground)	Surfc/Tun Rt Ft	$1,800		$0
Utility Relocation - Med (above ground)	Aerial Rt Ft	$450		$0
Utility Relocation	Linear ft	$165		$0
Subtotal-Utilities				**$0**
Track (ballasted)	linear foot	$145	206659.2	$29,965,584
Street Crossing	linear foot	$2,000		$0
Special Trackwork	%	15%		$4,494,838
Crossover - Single	Each	$150,000	4	$600,000
Turnout Track #9	Each	$90,000		$0
Turnout Track #11	Each	$135,000		$0
Turnout Track #15	Each	$165,000		$0
Subtotal-Track				**$35,060,422**
New Station	Each	$2,000,000	4	$8,000,000
Central Terminal	Each	$10,000,000	0	$0
Surface Parking	Space	$3,000	700	$2,100,000
Parking Structures	Space	$18,000		$0
Elevated Ped Xings	Each	$1,000,000		$0
Ticket Vending Machines	Each	$65,000	8	$520,000
Subtotal-Stations				**$10,620,000**
Centralized Traffic Control	linear foot	$140	0	$0
CTC Control Point	each	$750,000	0	$0
Signal Control and Switch points	each	$100,000	0	$0
Communications	linear foot	$170	0	$0
Wayside protection	linear foot	$16	0	$0
Interlockings	Each	$550,000	0	$0
Subtotal-C&S				**$0**
Maintenance/Storage	Each	$40,000,000		$0
Operations Control	Each	$5,000,000	0.5	$2,500,000
Subtotal Facilities				**$2,500,000**
A. Construction Subtotal				**$66,880,422**
Environmental Mitigation	Percent of A	3%		$2,006,413
B. Construction Cost Subtotal				**$68,886,834**
Maintenance/Storage Yard	Lump			$0
System Envelope	square foot	$6		$1,239,955
New Parking Spaces	square foot	$6	245000	$1,470,000
Railway Easement	Lump			
Other Right of Way	Lump			
C. Right of Way Subtotal				**$2,709,955**
LeasedRevenue Vehicles (cab car, bi-level, 135 pass)	Per Day/Per Car	$300	7300	$2,190,000
Leased Revenue Vehicles (non cab, bi-level, 135 pass.)	Per Day/Per Car	$300	14600	$4,380,000
Leased Revenue Vehicles (loco)	Per Day/Per Loco	$350	7300	$2,555,000
Revenue Vehicles (dmu cab single-level, 92 pass.)	Each	$773,903		$0
Revenue Vehicles (dmu cab bi-level, 185 pass)	Each	$773,903		$0
Revenue Vehicles (dmu, "Aero", 90 pass)	Each	$773,903		$0
Spare Parts	Percent	10%		$912,500
MOW Equipment	Rt Mile	$250,000	39.14	$9,785,000
Maintenance Facility	Each	$15,000,000	1	$15,000,000
D. Vehicles Subtotal				**$34,822,500**
Cost Contingencies (Uncertainties, Changes)				
Design&Construction	Percent of B	25%		$17,221,709
Right of Way	Percent of C	30%		$812,987
Vehicle Cost	Percent of D	10%		$3,482,250
Program Implementation (Agency Costs and Fees)				
Design&Construction	Percent of B	31%		$21,354,919
Right of Way Purchase	Percent of C	15%		$406,493
Vehicle Procurement	Percent of D	5%		$1,741,125
E. Capital Cost Subtotal				**$151,438,771**
Project Reserve	Percent of E	10%		$15,143,877
F. Total Capital Cost				**$166,582,649**
			Cost/Mile:	**$4,256,072**

Southwest Corridor		*5280*	***Quantity***	***Phase 1***
Alignment Breakdown				
Surface (main track)	linear foot	12.0805	63785.04	63,785
Surface (sidings)	linear foot	0		0
Bridges	each	0		
Street Crossings	each	0		0
Freeway Crossings	linear foot	0		
Total Ft				
Item	**Units**	**Avg. Unit Cost**		***Phase 1***
Sound Wall	linear foot	$137		$0
Grade Separations (undercrossing)	Each	$15,000,000		$0
Grade Separations (overcrossing)	Each	$12,000,000		$0
Earthwork	linear foot	$2		$0
New At-grade crossing	Each	$250,000	2	$500,000
Close existing crossing	Each	$140,000		$0
Waterway Crossing	Each	$5,400,000		$0
Flood Control Crossing	Each	$2,500,000		$0
Subtotal-Civil				**$500,000**
Utility Relocation - Hvy (above ground)	Surfc/Tun Rt Ft	$900		$0
Utility Relocation - Hvy (underground)	Surfc/Tun Rt Ft	$1,800		$0
Utility Relocation - Med (above ground)	Aerial Rt Ft	$450		$0
Utility Relocation	Linear ft	$165		$0
Subtotal-Utilities				**$0**
Track (ballasted)	linear foot	$145	1000	$145,000
Street Crossing	linear foot	$2,000		$0
Special Trackwork	%	15%		$0
Crossover - Single	Each	$150,000	2	$300,000
Turnout Track #9	Each	$90,000		$0
Turnout Track #11	Each	$135,000	1	$135,000
Turnout Track #15	Each	$165,000		$0
Subtotal-Track				**$580,000**
New Station	Each	$2,000,000	3	$6,000,000
Central Terminal	Each	$10,000,000		$0
Surface Parking	Space	$3,000	600	$1,800,000
Parking Structures	Space	$18,000		$0
Elevated Ped Xings	Each	$1,000,000		$0
Ticket Vending Machines	Each	$65,000	6	$390,000
Subtotal-Stations				**$8,190,000**
Centralized Traffic Control	linear foot	$140		$0
CTC Control Point	each	$750,000		$0
Signal Control and Switch points	each	$100,000		$0
Communications	linear foot	$170		$0
Wayside protection	linear foot	$16		$0
Interlockings	Each	$550,000		$0
Subtotal-C&S				**$0**
Maintenance/Storage	Each	$40,000,000		$0
Operations Control	Each	$5,000,000	0.5	$2,500,000
Subtotal Facilities				**$2,500,000**
A. Construction Subtotal				**$11,770,000**
Environmental Mitigation	Percent of A	3%		$353,100
B. Construction Cost Subtotal				**$12,123,100**
Maintenance/Storage Yard	Lump			$0
System Envelope	square foot	$6		$382,710
New Parking Spaces	square foot	$6	210000	$1,260,000
Railway Easement	Lump			
Other Right of Way	Lump			
C. Right of Way Subtotal				**$1,642,710**
Revenue Vehicles (cab car, bi-level, 135 pass)	Each	$773,903		$0
Revenue Vehicles (non cab, bi-level, 135 pass.)	Each	$773,903		$0
Revenue Vehicles (loco)	Each	$773,903		$0
Revenue Vehicles (dmu cab single-level, 92 pass.)	Each	$6,000,000	9	$54,000,000
Revenue Vehicles (dmu cab bi-level, 185 pass)	Each	$773,903		$0
Revenue Vehicles (dmu, "Aero", 90 pass)	Each	$773,903		$0
Spare Parts	Percent	10%		$0
MOW Equipment	Rt Mile	$250,000	12.0805	$3,020,125
Maintenance Facility	Each	$15,000,000	1	$15,000,000
D. Vehicles Subtotal				**$72,020,125**
Cost Contingencies (Uncertainties, Changes)				
Design&Construction	Percent of B	25%		$3,030,775
Right of Way	Percent of C	30%		$492,813
Vehicle Cost	Percent of D	10%		$7,202,013
Program Implementation (Agency Costs and Fees)				
Design&Construction	Percent of B	31%		$3,758,161
Right of Way Purchase	Percent of C	15%		$246,407
Vehicle Procurement	Percent of D	5%		$3,601,006
E. Capital Cost Subtotal				**$104,117,110**
Project Reserve	Percent of E	10%		$10,411,711
F. Total Capital Cost				**$114,528,821**
			Cost/Mile:	**$9,480,470**

Southeast Corridor		*5280*	***Quantity***	***Phase 1***
Alignment Breakdown				
Surface (main track)	linear foot	22.26	117532.8	117,533
Surface (sidings)	linear foot	0		0
Bridges	each	0		
Street Crossings	each	0		0
Freeway Crossings	linear foot	0		
Total Ft				
Item	**Units**	**Avg. Unit Cost**		***Phase 1***
Sound Wall	linear foot	$137		$0
Grade Separations (undercrossing)	Each	$15,000,000		$0
Grade Separations (overcrossing)	Each	$12,000,000		$0
Earthwork	linear foot	$2		$0
New At-grade crossing	Each	$250,000	13	$3,250,000
Close existing crossing	Each	$140,000		$0
Waterway Crossing	Each	$5,400,000		$0
Flood Control Crossing	Each	$2,500,000		$0
Subtotal-Civil				**$3,250,000**
Utility Relocation - Hvy (above ground)	Surfc/Tun Rt Ft	$900		$0
Utility Relocation - Hvy (underground)	Surfc/Tun Rt Ft	$1,800		$0
Utility Relocation - Med (above ground)	Aerial Rt Ft	$450		$0
Utility Relocation	Linear ft	$165		$0
Subtotal-Utilities				**$0**
Track (ballasted)	linear foot	$145	1000	$145,000
Street Crossing	linear foot	$2,000		$0
Special Trackwork	%	15%		$0
Crossover - Single	Each	$150,000	2	$300,000
Turnout Track #9	Each	$90,000		$0
Turnout Track #11	Each	$135,000	1	$135,000
Turnout Track #15	Each	$165,000		$0
Subtotal-Track				**$580,000**
New Station	Each	$2,000,000	9	$18,000,000
Central Terminal	Each	$10,000,000		$0
Surface Parking	Space	$3,000	1000	$3,000,000
Parking Structures	Space	$18,000		$0
Elevated Ped Xings	Each	$1,000,000		$0
Ticket Vending Machines	Each	$65,000	20	$1,300,000
Subtotal-Stations				**$22,300,000**
Centralized Traffic Control	linear foot	$140		$0
CTC Control Point	each	$750,000		$0
Signal Control and Switch points	each	$100,000		$0
Communications	linear foot	$170		$0
Wayside protection	linear foot	$16		$0
Interlockings	Each	$550,000		$0
Subtotal-C&S				**$0**
Maintenance/Storage	Each	$40,000,000		$0
Operations Control	Each	$5,000,000		$0
Subtotal Facilities				**$0**
A. Construction Subtotal				**$26,130,000**
Environmental Mitigation	Percent of A	3%		$783,900
B. Construction Cost Subtotal				**$26,913,900**
Maintenance/Storage Yard	Lump			$0
System Envelope	square foot	$6		$705,197
New Parking Spaces	square foot	$6		$0
Railway Easement	Lump			
Other Right of Way	Lump			
C. Right of Way Subtotal				**$705,197**
Revenue Vehicles (cab car, bi-level, 135 pass)	Each	$773,903		$0
Revenue Vehicles (non cab, bi-level, 135 pass.)	Each	$773,903		$0
Revenue Vehicles (loco)	Each	$773,903		$0
Revenue Vehicles (dmu cab single-level, 92 pass.)	Each	$6,000,000	9	$54,000,000
Revenue Vehicles (dmu cab bi-level, 185 pass)	Each	$773,903		$0
Revenue Vehicles (dmu, "Aero", 90 pass)	Each	$773,903		$0
Spare Parts	Percent	10%		$0
MOW Equipment	Rt Mile	$250,000	22	$5,500,000
Maintenance Facility	Each	$15,000,000	1	$15,000,000
D. Vehicles Subtotal				**$74,500,000**
Cost Contingencies (Uncertainties, Changes)				
Design&Construction	Percent of B	25%		$6,728,475
Right of Way	Percent of C	30%		$211,559
Vehicle Cost	Percent of D	10%		$7,450,000
Program Implementation (Agency Costs and Fees)				
Design&Construction	Percent of B	31%		$8,343,309
Right of Way Purchase	Percent of C	15%		$105,780
Vehicle Procurement	Percent of D	5%		$3,725,000
E. Capital Cost Subtotal				**$128,683,219**
Project Reserve	Percent of E	10%		$12,868,322
F. Total Capital Cost				**$141,551,541**
			Cost/Mile:	**$6,359,009**

Tehachapi Corridor		*5280*	***Quantity***	***Phase 1***
Alignment Breakdown				
Surface (main track)	linear foot	49.03	258878.4	258,878
Surface (sidings)	linear foot			0
Bridges	each			
Street Crossings	each			0
Freeway Crossings	linear foot			
Total Ft				
Item	**Units**	**Avg. Unit Cost**		***Phase 1***
Sound Wall	linear foot	$137		$0
Grade Separations (undercrossing)	Each	$15,000,000		$0
Grade Separations (overcrossing)	Each	$12,000,000		$0
Earthwork	linear foot	$2		$0
New At-grade crossing	Each	$250,000		$0
Close existing crossing	Each	$140,000		$0
Waterway Crossing	Each	$5,400,000		$0
Flood Control Crossing	Each	$2,500,000		$0
Subtotal-Civil				**$0**
Utility Relocation - Hvy (above ground)	Surfc/Tun Rt Ft	$900		$0
Utility Relocation - Hvy (underground)	Surfc/Tun Rt Ft	$1,800		$0
Utility Relocation - Med (above ground)	Aerial Rt Ft	$450		$0
Utility Relocation	Linear ft	$165		$0
Subtotal-Utilities				**$0**
Track (ballasted)	linear foot	$145	3000	$435,000
Street Crossing	linear foot	$2,000		$0
Special Trackwork	%	15%		$0
Crossover - Single	Each	$150,000	2	$300,000
Turnout Track #9	Each	$90,000		$0
Turnout Track #11	Each	$135,000	1	$135,000
Turnout Track #15	Each	$165,000		$0
Subtotal-Track				**$870,000**
New Station	Each	$2,000,000	5	$10,000,000
Central Terminal	Each	$10,000,000		$0
Surface Parking	Space	$3,000	600	$1,800,000
Parking Structures	Space	$18,000		$0
Elevated Ped Xings	Each	$1,000,000		$0
Ticket Vending Machines	Each	$65,000	12	$780,000
Subtotal-Stations				**$12,580,000**
Centralized Traffic Control	linear foot	$140		$0
CTC Control Point	each	$750,000		$0
Signal Control and Switch points	each	$100,000		$0
Communications	linear foot	$170		$0
Wayside protection	linear foot	$16		$0
Interlockings	Each	$550,000		$0
Subtotal-C&S				**$0**
Maintenance/Storage	Each	$40,000,000		$0
Operations Control	Each	$5,000,000		$0
Subtotal Facilities				**$0**
A. Construction Subtotal				**$13,450,000**
Environmental Mitigation	Percent of A	3%		$403,500
B. Construction Cost Subtotal				**$13,853,500**
Maintenance/Storage Yard	Lump			$0
System Envelope	square foot	$6		$1,553,270
New Parking Spaces	square foot	$6		$0
Railway Easement	Lump			
Other Right of Way	Lump			
C. Right of Way Subtotal				**$1,553,270**
LeasedRevenue Vehicles (cab car, bi-level, 135 pass)	Per Day/Per Car	$300	7300	$2,190,000
Leased Revenue Vehicles (non cab, bi-level, 135 pass.)	Per Day/Per Car	$300	14600	$4,380,000
Leased Revenue Vehicles (loco)	Per Day/Per Loco	$350	7300	$2,555,000
Revenue Vehicles (dmu cab single-level, 92 pass.)	Each	$773,903		$0
Revenue Vehicles (dmu cab bi-level, 185 pass)	Each	$773,903		$0
Revenue Vehicles (dmu, "Aero", 90 pass)	Each	$773,903		$0
Spare Parts	Percent	10%		$912,500
MOW Equipment	Rt Mile	$250,000	49	$12,250,000
Maintenance Facility	Each	$15,000,000	1	$15,000,000
D. Vehicles Subtotal				**$37,287,500**
Cost Contingencies (Uncertainties, Changes)				
Design&Construction	Percent of B	25%		$3,463,375
Right of Way	Percent of C	30%		$465,981
Vehicle Cost	Percent of D	10%		$3,728,750
Program Implementation (Agency Costs and Fees)				
Design&Construction	Percent of B	31%		$4,294,585
Right of Way Purchase	Percent of C	15%		$232,991
Vehicle Procurement	Percent of D	5%		$1,864,375
E. Capital Cost Subtotal				**$66,744,327**
Project Reserve	Percent of E	10%		$6,674,433
F. Total Capital Cost				**$73,418,760**
			Cost/Mile:	**$1,497,425**

Rosamond Corridor	Existing Track	*5280*	***Quantity***	***Phase 1***
Alignment Breakdown				
Surface (main track)	linear foot	51.123	269929.44	269,929
Surface (sidings)	linear foot			0
Bridges	each	0		
Street Crossings	each	0		0
Freeway Crossings	linear foot	0		
Total Ft			**269929.44**	
Item	**Units**	**Avg. Unit Cost**		***Phase 1***
Sound Wall	linear foot	$137		$0
Grade Separations (undercrossing)	Each	$15,000,000		$0
Grade Separations (overcrossing)	Each	$12,000,000		$0
Earthwork	linear foot	$2		$0
New At-grade crossing	Each	$250,000		$0
Close existing crossing	Each	$140,000		$0
Waterway Crossing	Each	$5,400,000		$0
Flood Control Crossing	Each	$2,500,000		$0
Subtotal-Civil				**$0**
Utility Relocation - Hvy (above ground)	Surfc/Tun Rt Ft	$900		$0
Utility Relocation - Hvy (underground)	Surfc/Tun Rt Ft	$1,800		$0
Utility Relocation - Med (above ground)	Aerial Rt Ft	$450		$0
Utility Relocation	Linear ft	$165		$0
Subtotal-Utilities				**$0**
Track (ballasted)	linear foot	$145	4000	$580,000
Street Crossing	linear foot	$2,000		$0
Special Trackwork	%	15%		$0
Crossover - Single	Each	$150,000	4	$600,000
Turnout Track #9	Each	$90,000		$0
Turnout Track #11	Each	$135,000	2	$270,000
Turnout Track #15	Each	$165,000		$0
Subtotal-Track				**$1,450,000**
New Station	Each	$2,000,000	1	$2,000,000
Central Terminal	Each	$10,000,000		$0
Surface Parking	Space	$3,000	250	$750,000
Parking Structures	Space	$18,000		$0
Elevated Ped Xings	Each	$1,000,000		$0
Ticket Vending Machines	Each	$65,000	2	$130,000
Subtotal-Stations				**$2,880,000**
Centralized Traffic Control	linear foot	$140		$0
CTC Control Point	each	$750,000		$0
Signal Control and Switch points	each	$100,000		$0
Communications	linear foot	$170		$0
Wayside protection	linear foot	$16		$0
Interlockings	Each	$550,000		$0
Subtotal-C&S				**$0**
Maintenance/Storage	Each	$40,000,000		$0
Operations Control	Each	$5,000,000		$0
Subtotal Facilities				**$0**
A. Construction Subtotal				**$4,330,000**
Environmental Mitigation	Percent of A	3%		$129,900
B. Construction Cost Subtotal				**$4,459,900**
Maintenance/Storage Yard	Lump			$0
System Envelope	square foot	$6		$0
New Parking Spaces	square foot	$6	87500	$525,000
Railway Easement	Lump			
Other Right of Way	Lump			
C. Right of Way Subtotal				**$525,000**
Revenue Vehicles (cab car, bi-level, 135 pass)	Each	$773,903	0	$0
Revenue Vehicles (non cab, bi-level, 135 pass.)	Each	$773,903	0	$0
Revenue Vehicles (loco)	Each	$773,903	0	$0
Revenue Vehicles (dmu cab single-level, 92 pass.)	Each	$773,903		$0
Revenue Vehicles (dmu cab bi-level, 185 pass)	Each	$773,903		$0
Revenue Vehicles (dmu, "Aero", 90 pass)	Each	$773,903		$0
Spare Parts	Percent	10%		$0
MOW Equipment	Rt Mile	$250,000		$0
D. Vehicles Subtotal				**$0**
Cost Contingencies (Uncertainties, Changes)				
Design&Construction	Percent of B	25%		$1,114,975
Right of Way	Percent of C	30%		$157,500
Vehicle Cost	Percent of D	10%		$0
Program Implementation (Agency Costs and Fees)				
Design&Construction	Percent of B	31%		$1,382,569
Right of Way Purchase	Percent of C	15%		$78,750
Vehicle Procurement	Percent of D	5%		$0
E. Capital Cost Subtotal				**$7,718,694**
Project Reserve	Percent of E	10%		$771,869
F. Total Capital Cost				**$8,490,563**
			Cost/Mile:	**$166,081**

Appendix B: Commuter Rail Conceptual Operating Cost Estimates

Commuter Rail - Fleet Sizing and O&M Estimate

Northwest Corridor

Item		
Travel/Track Miles of Line	37.92	37.92
Stations:		
* Surface	see total ----------	13
* Aerial	see total ----------	-
Operating Times:		
* 1-way run, minutes	*52.9*	
Round trip w/o recovery (min)	106	
* 2-way cycle, minutes	**106**	
Vehicle Fleet:		
* Trains in service (peak)	3	3
Pass Cars (3-car consist)	3	3
* Cars in service (peak)	9	9
* Fleet		11
Train & Car Hrs & Miles:		
* Train Hours:		
- Daily	6	6
* Car Hrs per day:		
- Base	54	54
- Peak	0	-
- Crush	0	-
- Total	54	54
* *Schedule* speed, mph	21.5	
* Car miles per day	1,161	1,161
* Annualization:		
- Car Hours	16,200	16,200
- Car Miles	348,300	348,300
O&M Cost Estimates:		
* Rev. Veh Hrs @ $491.34	$ 567.62	$ 9.2
* Rev Veh Mi @ $25.81	$ 18.79	$ 6.5
*** Total Annual O&M**		**$ 7.9**

Commuter Rail - Fleet Sizing and O&M Estimate

Airport/Delano Corridor

Item		
Travel/Track Miles of Line	39.14	39.14
Stations:		
* Surface	see total ----------	13
* Aerial	see total ----------	-
Operating Times:		
* 1-way run, minutes	*64.8*	
Round trip w/o recovery (min)	130	
* 2-way cycle, minutes	**130**	
Vehicle Fleet:		
* Trains in service (peak)	3	3
Pass Cars (3-car consist)	3	3
* Cars in service (peak)	9	9
* Fleet		11
Train & Car Hrs & Miles:		
* Train Hours:		
- Daily	7	7
* Car Hrs per day:		
- Base	63	63
- Peak	0	-
- Crush	0	-
- Total	63	63
* *Schedule* speed, mph	18.1	
* Car miles per day	1,140	1,140
* Annualization:		
- Car Hours	18,900	18,900
- Car Miles	342,000	342,000
O&M Cost Estimates:		
* Rev. Veh Hrs @ $491.34	$ 567.62	$ 10.7
* Rev Veh Mi @ $25.81	$ 18.79	$ 6.4
*** Total Annual O&M**		**$ 8.6**

Commuter Rail - Fleet Sizing and O&M Estimate

Southwest Corridor

Item		
Travel/Track Miles of Line	25.85	25.85
Stations:		
* Surface	see total ----------	8
* Aerial	see total ----------	-
Operating Times:		
* 1-way run, minutes	*41.6*	
Round trip w/o recovery (min)	83	
* 2-way cycle, minutes	***83.3***	
Vehicle Fleet:		
* Trains in service (peak)	3	3
Pass Cars (3-car consist)	3	3
* Cars in service (peak)	9	9
* Fleet		11
Train & Car Hrs & Miles:		
* Train Hours:		
- Daily	5	5
* Car Hrs per day:		
- Base	45	45
- Peak	0	-
- Crush	0	-
- Total	45	45
* *Schedule* speed, mph	18.6	
* Car miles per day	837	837
* Annualization:		
- Car Hours	13,500	13,500
- Car Miles	251,100	251,100
O&M Cost Estimates:		
* Rev. Veh Hrs @ $491.34	$ 567.62	$ 7.7
* Rev Veh Mi @ $25.81	$ 18.79	$ 4.7
*** Total Annual O&M**		**$ 6.2**

Commuter Rail - Fleet Sizing and O&M Estimate

Southeast Corridor

Item		
Travel/Track Miles of Line	22.26	22.26
Stations:		
* Surface	see total ----------	10
* Aerial	see total ----------	-
Operating Times:		
* 1-way run, minutes	*42.1*	
Round trip w/o recovery (min)	84	
* 2-way cycle, minutes	**84**	
Vehicle Fleet:		
* Trains in service (peak)	3	3
Pass Cars (3-car consist)	3	3
* Cars in service (peak)	9	9
* Fleet		11
Train & Car Hrs & Miles:		
* Train Hours:		
- Daily	5	5
* Car Hrs per day:		
- Base	45	45
- Peak	0	-
- Crush	0	-
- Total	45	45
* *Schedule* speed, mph	15.9	
* Car miles per day	716	716
* Annualization:		
- Car Hours	13,500	13,500
- Car Miles	214,800	214,800
O&M Cost Estimates:		
* Rev. Veh Hrs @ $491.34	$ 567.62	$ 7.7
* Rev Veh Mi @ $25.81	$ 18.79	$ 4.0
*** Total Annual O&M**		**$ 5.9**

Commuter Rail - Fleet Sizing and O&M Estimate

Metrolink Extension

Item		
Travel/Track Miles of Line	44.33	44.33
Stations:		
* Surface	see total ----------	3
* Aerial	see total ----------	-
Operating Times:		
* 1-way run, minutes	*50.0*	
Round trip w/o recovery (min)	100	
* 2-way cycle, minutes	**100**	
Vehicle Fleet:		
* Trains in service (peak)	2	2
Pass Cars (3-car consist)	3	3
* Cars in service (peak)	6	6
* Fleet		7
Train & Car Hrs & Miles:		
* Train Hours:		
- Daily	4	4
* Car Hrs per day:		
- Base	24	24
- Peak	0	-
- Crush	0	-
- Total	24	24
* *Schedule* speed, mph	26.6	
* Car miles per day	638	638
* Annualization:		
- Car Hours	7,200	7,200
- Car Miles	191,400	191,400
O&M Cost Estimates:		
* Rev. Veh Hrs @ $491.34	$ 567.62	$ 4.1
* Rev Veh Mi @ $25.81	$ 18.79	$ 3.6
*** Total Annual O&M**		**$ 3.9**

Commuter Rail - Fleet Sizing and O&M Estimate

Tehachapi Corridor

Item		
Travel/Track Miles of Line	49.03	49.03
Stations:		
* Surface	see total ----------	6
* Aerial	see total ----------	-
Operating Times:		
* 1-way run, minutes	*60.6*	
Round trip w/o recovery (min)	121	
* 2-way cycle, minutes	**121**	
Vehicle Fleet:		
* Trains in service (peak)	3	3
Pass Cars (3-car consist)	3	3
* Cars in service (peak)	9	9
* Fleet		11
Train & Car Hrs & Miles:		
* Train Hours:		
- Daily	7	7
* Car Hrs per day:		
- Base	63	63
- Peak	0	-
- Crush	0	-
- Total	63	63
* *Schedule* speed, mph	24.3	
* Car miles per day	1,531	1,531
* Annualization:		
- Car Hours	18,900	18,900
- Car Miles	459,300	459,300
O&M Cost Estimates:		
* Rev. Veh Hrs @ $491.34	$ 567.62	$ 10.7
* Rev Veh Mi @ $25.81	$ 18.79	$ 8.6
*** Total Annual O&M**		**$ 9.7**

Appendix C: Fehr & Peers Direct Ridership Forecasting Memorandum

FEHR PEERS

MEMORANDUM

Date: June 19, 2012

To: Bill Delo, IBI Group

From: Steve Crosley, Peter Carter and Mackenzie Watten

Subject: ***Kern COG Commuter Rail Feasibility Study - Direct Ridership Forecasting***

OC12-0203

The Kern COG Commuter Rail Feasibility Study is examining the long-range feasibility of implementing commuter rail service in Kern County. As part of the study, ridership at 10 stations that passed an initial screening process was forecast using a Direct Ridership Model (DRM). This memo explains the direct ridership forecasting approach and summarizes the preliminary ridership forecasts at the 10 potential stations for Year 2035. The stations are listed in Table 1 along with the route served by each station.

TABLE 1
STATION LIST AND ROUTE DESIGNATION

Station	Route
Delano West	Northwest
Shafter	Northwest
West Rosedale	Northwest
Allen and Hageman	Northwest
The Commons	Northwest
Amtrak Station	Northwest/Southwest
Ming/Union	Southwest
Gosford	Southwest
Buena Vista/West Ming	Southwest
Rosamond	Metrolink Antelope Valley

Source: IBI Group, 2012.

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The forecasts contained in this memo are for sketch planning purposes. Caution should be exercised when interpreting the ridership forecasts. We used a DRM developed for the Altamont Commuter Express (ACE) Commuter Rail corridor as the basis for the ridership forecasts presented herein. Since commuter rail currently does not exist in Kern County, it is not possible to develop a model specific to this geographic area. Instead, we used our extensive experience with DRM to select an existing model most applicable to Kern County based on demographic and operational similarities.

While a conservative estimate was attempted, actual boardings could still be lower due to differences in land use and travel characteristics between the Kern County and ACE commuter rail study areas. The choice between driving and transit is typically a function of both out-of-pocket cost and time cost, with convenience factored in. The Bakersfield metro area is characterized by a lack of roadway congestion (even in 2035) when compared to the ACE corridor. Further, population and employment are less dense in the Kern County study area, indicating that travel to a station origin could be onerous, especially if a freeway or arterial route to downtown is more direct. Thus, driving to a station (diverted freeway or arterial trip), parking, waiting for the train, taking a train that is slower than driving, and then being captive at the destination would imply that driving would likely be superior to what is seen along the ACE corridor, especially without parking charges at any destinations.

Less congestion and lower densities indicate that either the catchment assumptions and/or variable coefficients should be adjusted downward to account for higher competition from the automobile. Thus, we made local adjustments to the independent variables used in the model to better capture the unique characteristics of the Kern County commuter rail study area. While we are comfortable with the general reasonableness of these forecasts, they should be considered at the sketch planning level until a directly comparable system can be modeled, validated, calibrated (although no known system directly comparable to what is being considered for Bakersfield currently exists).

What is a Direct Ridership Model?

Direct Ridership Models use multivariate regression and other statistical models based on empirical local data to determine the station characteristics that most influence rail transit patronage. They respond directly to factors such as parking, feeder bus levels, station-area households and employment, and the effects of transit-oriented development (TOD). DRMs are a more efficient and responsive means of forecasting the effects of individual station activities than conventional transit patronage models. Rail ridership is traditionally forecast with region-wide travel demand models, which often represent transportation networks and land use at an aggregate scale. Such models are relatively unresponsive to changes in station-level land use and transit service characteristics. DRMs are directly and quantitatively responsive to land use and transit service characteristics within the immediate vicinity and/or within the catchment area of existing transit stations.

The ACE Direct Ridership Model

The DRM used in this study was initially developed for the ACE system and relates weekday daily train boardings to three station characteristics: catchment population, accessible catchment employment, and station parking spaces. ACE is a commuter rail system that travels from Stockton to Silicon Valley. The system, when modeled, ran four AM inbound and four PM outbound trains, transporting employees from residential areas of the Central Valley to employment areas in Fremont, Milpitas, and San Jose.

The development of the DRM involved trying many test cases including any number of combinations of data that could influence ridership. Some variables are chosen because logically they would affect ridership numbers. Because of this, the catchment population and employment variables were chosen to be in the ACE model at an early stage. After a large number of test cases, the only other variable that affected ridership in a statistically significant manner was the number of station parking spaces.

The operation of the conceptual commuter rail system in Kern County would be comparable to the ACE system in that it would transport riders from predominately residential areas to an employment center (in this case, central Bakersfield). This model would also be applicable to the Rosamond station, in that we would expect nominal reverse commuting (the ACE system does not run contraflow trains while Metrolink does). We have adjusted the Rosamond boardings figures for higher train frequency on the Metrolink Antelope Valley Line.

DATA COLLECTION

Data from IBI Group

IBI Group provided Fehr & Peers with data for 10 potential commuter rail stations being assessed in this study. The data included catchment population, catchment employment, and number of station parking spaces. Catchment areas are shown in Attachment A.

In Direct Ridership Modeling, it is common to assign a catchment area for each station in the system being studied. This catchment area represents the geographic bounds that the station effectively serves. These areas are usually measured in terms of population (for those wanting to use the station as their departure point) and employment (for those wanting to use the station as their arrival point).

<u>Population</u>

For population (Table 2), it is not always as simple as drawing buffers around each station and assigning the resulting populations to each station. The buffers can sometimes overlap, which results in the double counting of population. Further, if there is a population segment outside simple buffers, most of them will travel to the closest station.

TABLE 2
2035 CATCHMENT POPULATION

Station	Catchment Population
Delano West	94,605
Shafter	58,445
West Rosedale	48,134
Allen and Hageman	138,457
The Commons	120,900
Amtrak Station	261,763
Ming/Union	134,834
Gosford	118,594
Buena Vista/West Ming	66,797
Rosamond	106,612

Source: IBI Group, 2012.

Employment

For employment (Table 3), it is logical to assume that the area around the station would serve as the effective supply of employment for those departing the station. Because it is unlikely that a passenger would have a car at their arrival station (known as a "station car"), this area acts as a maximum distance a commuter rail passenger would either walk or ride a shuttle to complete the first/last mile connection from station to place of employment.

TABLE 3
2035 CATCHMENT EMPLOYMENT

Station	Catchment Employment
Delano West	743
Shafter	2,430
West Rosedale	6,565
Allen and Hageman	1,794
The Commons	8,715
Amtrak Station	13,846
Ming/Union	2,649
Gosford	5,931
Buena Vista/West Ming	2,581
Rosamond	3,760

Source: IBI Group, 2012.

Parking

Table 4 shows the number of parking spaces assumed at each station for purposes of ridership forecasting. It was expected that stations located further from Downtown Bakersfield would have more space for parking and more demand for parking than stations closer to the urban core since the attractiveness of commuter rail is positively correlated with trip distance.

TABLE 4
STATION PARKING

Station	Station Parking Spaces
Delano West	250
Shafter	250
West Rosedale	250
Allen and Hageman	100
The Commons	100
Amtrak Station	100
Ming/Union	100
Gosford	100
Buena Vista/West Ming	250
Rosamond	250

Source: IBI Group, Fehr & Peers, 2012.

Further Assumptions

Initially, all stations were assigned both population and employment catchment areas. The asymmetric operation of the Kern commuter rail system, primarily serving to transport people from outside Bakersfield to jobs in Downtown Bakersfield, required additional assumptions. These assumptions are described below. Table 5 contains the complete list of assumptions made on a station-by-station basis.

Population Assumptions

- Distance: People living closer to Downtown Bakersfield are less likely to take the train than those living farther out
- Distance: If the majority of the population within a catchment area is located far from a station location, people are more likely to drive
- Freeway proximity: People with easy freeway access are more likely to take the freeway
- Auto competition: When the train ride is slower than a car ride, people prefer to drive

Employment Assumptions

- Producer station: These stations are more likely the origin of trips than the destination of trips
- Attractor station: These stations are more likely the destination of trips than the origin of trips

TABLE 5
INPUT DATA ASSUMPTIONS

Station	Population Assumptions	Employment Assumptions
Delano West	Assumed 10% of total catchment population. While far from Bakersfield, most catchment population is close to the freeway in Delano East.	Assumed zero catchment employment (producer station, not attractor station).
Shafter	Assumed 25% of total catchment population. Proximity to the freeway and Wasco accounts for a large share of population in the catchment area.	Assumed zero catchment employment (producer station, not attractor station).
West Rosedale	Assumed 25% of total catchment population. Close to freeway and proximity to Bakersfield CBD indicates auto competition.	Assumed 15%. Producer station, not attractor station, yet some riders may alight here.
Allen and Hageman	Assumed 50% of total catchment population. Proximity to Bakersfield CBD indicates auto competition.	Unadjusted
The Commons	Assumed 25% of total catchment population. Proximity to Bakersfield CBD indicates auto competition.	Assumed 15%. Employment is industrial and spread out, not walkable from station despite proximity and difficult to serve with shuttle
Amtrak Station	Assumed zero catchment population. Attractor station.	Unadjusted
Ming/Union	Assumed 25% of total catchment population. Proximity to Bakersfield CBD indicates auto competition.	Unadjusted

TABLE 5
INPUT DATA ASSUMPTIONS

Station	Population Assumptions	Employment Assumptions
Gosford	Assumed 50% of total catchment population. Proximity to Bakersfield CBD indicates auto competition.	Assumed zero catchment employment (producer station, not attractor station).
Buena Vista/West Ming	Assumed 50% of total catchment population. Proximity to Bakersfield CBD indicates auto competition.	Assumed zero catchment employment (producer station, not attractor station).
Rosamond	Unadjusted	Assumed zero catchment employment (producer station, not attractor station).

Source: Fehr & Peers, 2012.

DIRECT RIDERSHIP FORECASTS

Off-Model Adjustment

Due to the differences between the ACE service and the commuter rail service in Kern County, several off-model adjustments were made to forecasts to account for factors not currently present in the ACE model. This section presents the off-model adjustments.

Directionality

Downtown Bakersfield is considered to be the primary destination for trips taken on commuter rail. As a consequence, the ridership at the Amtrak Station is expected to consist almost entirely of return trips. The Amtrak Station ridership forecast is assumed to equal 85% of the combined ridership of all other stations. This 85% equivalence is made for purposes of analysis, but it assumes that for employment concentrated outside a typical walk catchment area, shuttle service would be provided to make first/last mile connections for riders.

Increases in Train Frequency

No adjustment for train frequency was made for the commuter rail station forecasts because they are expected to be served by the same number of trains per day as the ACE train: four. An adjustment for train frequency was made to the Rosamond forecast because this station is expected to be served by nine Metrolink trains per day (round trips).

An elasticity for train frequency was obtained from Chapter 9 of TCRP-95[1], a trusted source for travel demand statistics pertaining to travelers' responses to transit service changes. The publication reports median transit frequency elasticities of between 0.4 and 0.5 in various studies performed from the 1960s to the present. For this analysis, we conservatively chose the lower end of this range, 0.4.

Addition of High Speed Rail (HSR)

The June 2010 HSR ridership forecast report predicts 9,200 daily boardings at Bakersfield and 8,200 boardings at Palmdale with the Altamont + Pacheco Pass alignment in Year 2035. To derive an estimate of typical weekday HSR passengers to and from Bakersfield, we assumed the following:

- The total potential commuter rail catchment population that could use both commuter rail and HSR is the sum of all station catchment populations, excluding The Commons, Amtrak Station, and Ming and Union. This represents 50% of the total catchment area population.
- 25% of the total potential population is likely to use commuter rail to get to HSR; 50% x 25% = 12.5%
- 900 HSR riders at the Bakersfield station are assumed to connect to HSR using another form of public transit.
- The percentage of HSR boardings that come from commuter rail is 12.5% x 900 = 113
- The per-station share of HSR trips is based on the ratio of station catchment population to total population.
- The daily total includes both inbound and outbound trips, equal to 226 trips

For the Rosamond station, it was assumed that 10% of the 600 predicted HSR riders who connect to transit at the Palmdale station will come from commuter rail.

Rail Ridership Estimates

Table 6 combines the DRM outputs with off-model adjustments, and presents forecasts both with and without the addition of HSR riders.

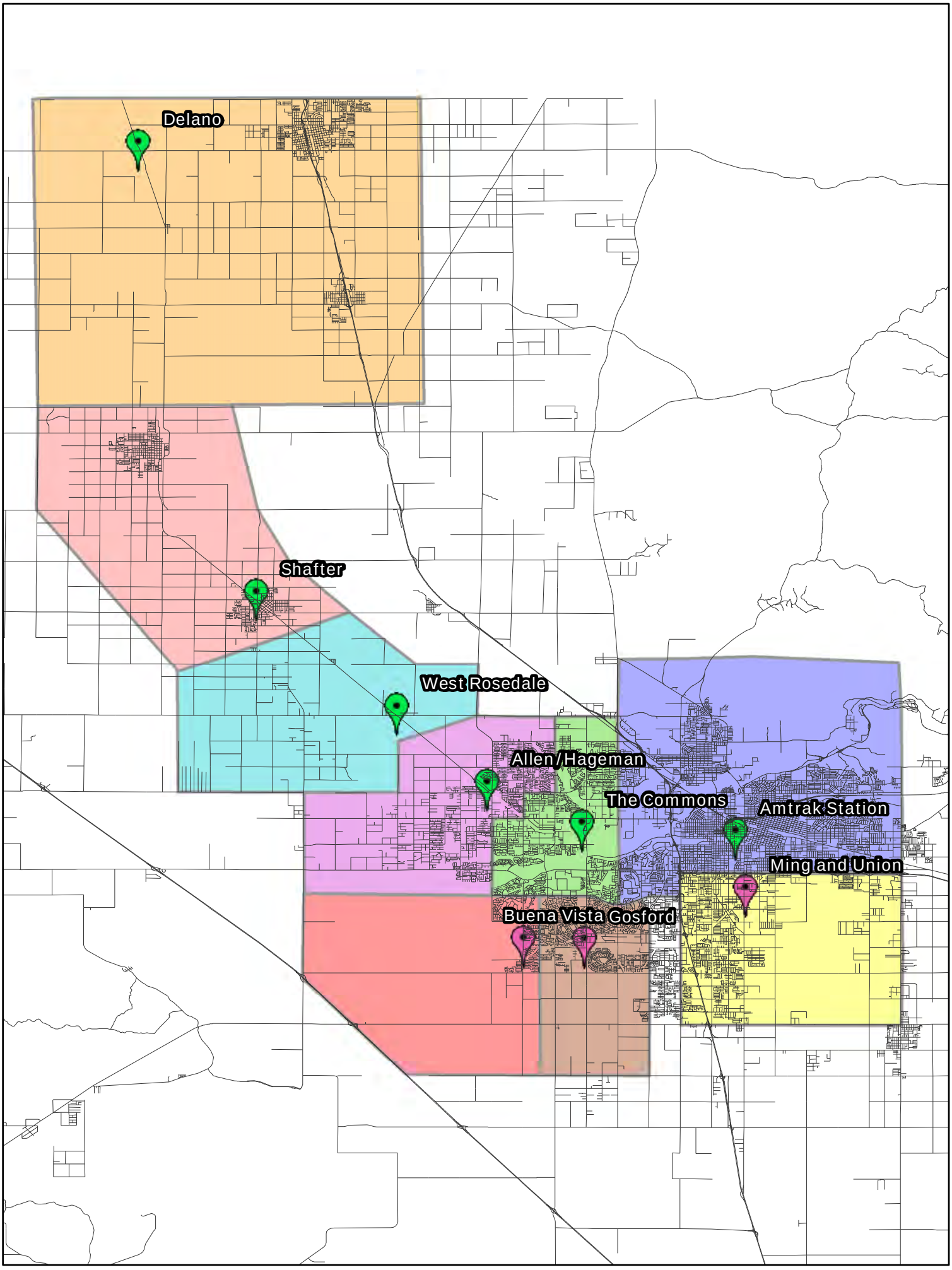
[1] Transit Cooperative Research Program, *Transit Scheduling and Frequency – Traveler Response to Transportation System Changes*

TABLE 6
YEAR 2035 WEEKDAY COMMUTER RAIL FORECASTS

Station	No HSR Boardings	HSR Boardings	Final Boardings
Northwest Corridor			
Delano West	104	4	108
Shafter	108	6	114
West Rosedale	109	5	114
Allen and Hageman	95	30	125
The Commons	67	13	80
Amtrak Station	411	58	469
Southwest Corridor			
Buena Vista/West Ming	123	14	137
Gosford	86	26	112
Ming/Union	67	15	81
Amtrak Station	235	55	290
Metrolink Antelope Valley			
Rosamond	273	60	333

Source: Fehr & Peers, 2012.

ATTACHMENT A


Delano
Shafter
West Rosedale
Allen/Hageman
The Commons
Amtrak Station
Ming and Union
Buena Vista Gosford