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Caltrans

# California Department of Transportation

# Rail Right-of-Way and Abandoned Corridors Study

## FINAL REPORT

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# CHAPTER 1 INTRODUCTION

## Project Background and Purpose

California is served by a network of 7,635 railroad route miles,[1] including 4,751 miles in freight service, 2,884 miles in passenger service and 2,500 miles of shared freight and passenger track. Rail infrastructure represents a crucial component of the state's transportation and distribution systems.

Amtrak operates intercity passenger service on approximately 2,000 route miles of track statewide including both interstate and intrastate services. Amtrak is the operator of seven primary lines within the state: Coast Starlight (Los Angeles-Seattle), the California Zephyr (Chicago-Emeryville), the Capitol Corridor (Auburn-San Jose), the San Joaquins (Sacramento-Bakersfield), Pacific Surfliner (Paso Robles-San Diego), Sunset Limited (Los Angeles-Orlando) and Southwest Chief (Los Angeles-Chicago). Two of the Amtrak lines (San Joaquins and Pacific Surfliner) are operated under contract to the California Department of Transportation (Caltrans) Division of Rail (DOR). Also, the Capitol Corridor Joint Powers Authority contracts with Amtrak for the operation of the Capitol Corridor. In addition four commuter rail authorities: Los Angeles (Metrolink), San Diego (Coaster), San Joaquin (ACE) and San Jose-San Francisco (Caltrain) provide service over an additional 600-plus route miles. In the San Francisco Bay Area BART operates regional rail rapid transit service in four counties, with additional service to two new counties anticipated in the next decade. These "commuter" services may operate on their own exclusive tracks, on track that may be owned by the public authority administering the commuter line or by a freight railroad, with trackage rights leased to the passenger service. Much of the commuter railroad service in California has been implemented in the past few decades as a result of a resurgence of interest in commuter rail in the 1980s and 1990s as the benefits of rail service as a tool for congestion relief was realized along with a decline in the demand for freight rail services and a consolidation in freight rail operations.

State Sponsored Passenger Rail

[1] An additional 415 route miles in the rail database do not have attribute information for freight or passenger service.

Additional passenger rail service is provided in urban areas that have developed light rail systems. These local systems are primarily designed to serve trips within a single urban area. These light rail systems have often taken advantage, in part, of lightly used or abandoned railroad corridors, or surplus segments of railroad rights of way, including systems as diverse as those in Sacramento, San Francisco, San Jose and Los Angeles and San Diego.

Although the state has a reasonably well-developed passenger rail network, serving interstate, intercity and regional travel demand, most of the rail infrastructure in California is currently privately owned by the two major freight railroads (BNSF Railway and Union Pacific Railroad) and numerous short lines that serve the state. A relatively small amount of very important freight rail infrastructure is publicly owned, generally in the areas surrounding ports. Rail service consolidation and a decline in rail customers for freight service have resulted in substantial abandonment of freight rail infrastructure, including both formal and informal closures.

The combined railroad infrastructure in California, including both in-operation and out-of-operation or abandoned but intact rail right-of-way, represents a substantial potential resource. Increasingly, passenger and freight operations are sharing right-of-way as in several of the light rail lines in the Sacramento area. Separation between freight and passenger service, which is required for equipment that does not comply with Federal Railroad Administration (FRA) strength requirements, may occur either with additional trackage inside the railroad right-of-way or through separation by time of operation, making it possible to consider many different passenger options, even on existing freight lines. Given the limited opportunity to expand the highway system, and the relative economy of transit solutions, existing railroad right-of-way represents an extremely valuable resource for future mobility. Passenger rail options are increasingly being considered for their ability to relieve congestion, concentrate development patterns and contribute to the overall mobility and healthy economic climate in the state.

In addition to considering passenger service options, rail infrastructure offers a unique opportunity to enhance connectivity and mobility for other modes. The Rails-to-Trails Conservancy has provided national expertise on both "rail with trails" operations that involve enhanced pedestrian and bicycle access along active rail operations and "rails to trails" conversions of abandoned right of way to pathways enhancing bicycle and pedestrian circulation. Railroad rights-of-way are particularly attractive for non-motorized users, because they are relatively flat and straight (or gently curved), and are often separated from fast moving auto traffic.

**The issue of abandoned rail right-of-way is especially critical because this valuable resource can be lost forever as it is inevitably broken up and sold in parcels.**

The issue of abandoned rail right-of-way is especially critical because this valuable resource can be lost forever as it is inevitably broken up and sold in parcels.

This study was designed to meet a number of important objectives including the first statewide assessment of the potential for joint use and reuse of railroad right-of-way throughout California. Specific study objectives included:

- Develop a Geographic Information Systems (GIS) database and mapping to identify and describe all active, inactive and abandoned rail corridors in California. This data was derived from a variety of sources to include all of the factors necessary to evaluate the potential for passenger service, transit connectivity, and non-motorized use either in conjunction with or in place of freight service.
- Evaluate the potential for combining passenger rail service with active freight segments in areas with significant demand for passenger rail service in California.
- Evaluate the potential for passenger rail service on out-of-operation and abandoned rail corridors in California.
- Evaluate the potential for "rails with trails" and public transit linkage opportunities along existing operating rail corridors.
- Evaluate the potential for conversion of corridors without substantial potential as either freight or passenger service to trail and non-rail transit use. Evaluate the opportunities for joint use by multiple new uses on out-of-operation and abandoned rail corridors.

Item 2660-001-0703 of the Budget Act of 2001 contained a legislative augmentation to complete a study of abandoned rail corridors to evaluate their potential for non-motorized transportation and as links to improve access to public transit. In his message deleting this item, the Governor directed the California Department of Transportation (the Department) to update and expand the 1994 Proposition 116 rail right-of-way survey which was carried out to *"…identify the status of all the rail corridors in the state and evaluate their relative importance and potential for future rail passenger service."*

**As opportunities for roadway and highway expansion continue to diminish, it is imperative to continue to seek opportunities to improve mobility in other ways to ensure the continued economic and social health of California.**

The Governor also directed the Department to *"…identify abandoned rail corridors that have potential for use by non-motorized transportation and as links to improve access to public transit".* Once completed, Caltrans will provide this information to local transportation planning agencies for consideration in local planning efforts.

As opportunities for roadway and highway expansion continue to diminish, it is imperative to continue to seek opportunities to improve mobility in other ways to ensure the continued economic and social health of California. This study provides a high level, state-wide assessment of the potential uses for rail right-of-way in California. While the study does include an evaluation of all known rail right of way in the state, extensive project level analysis is required prior to implementing any of the potential joint use or reuse projects described in this report.

## Project Elements

The primary goals of the study were to create a comprehensive database of rail corridors and bicycle/pedestrian facilities, evaluate the rail corridors' potential for joint use and reuse and satisfy the legislative action that initiated the project. The process of addressing these goals included two key elements of the study: creating GIS databases for rails and trails and conducting a final evaluation.

## Rail and Trail Databases

Before assessing the potential for joint use and reuse of rail right-of-way, the study team created two databases by compiling rail and bicycle/pedestrian facility information from around the state. The final rail database includes data collected and digitized from various sources including Caltrans, rail freight and passenger operators and stakeholders. The bicycle/pedestrian trail database includes both existing and proposed trails with data collected from local jurisdictions, regional planning agencies and the Rails-to-Trails Conservancy database. An overview of information included in each of the databases and geographic representations of rails and trails can be found in Chapters 2 and 3 of this report.

## Evaluation

An important objective of this study was to identify the status of all rail corridors in the state and evaluate their potential for joint use or re-use for rail passenger service, non-motorized transport, or transit access links. The project team created a set of demand and feasibility criteria and conducted four evaluations that designated each rail corridor as having high, medium or low potential for joint use or re-use. Chapter 4 provides a summary of the evaluation process and findings.

## Public Involvement

Another critical element of the project was the creation and involvement of the Stakeholder Advisory Committee (SAC). The consulting team worked closely with Caltrans staff to identify potential SAC members with the goal of finding a well rounded group representing diverse perspectives needed for this study. SAC members included representatives from each of the Caltrans districts and headquarters, railroad representatives, public agencies involved with rail service, regional transportation planning agencies and community and advocacy groups with an interest in passenger or non-motorized transportation. A total of 150 SAC members were included in periodic email updates and were encouraged to offer input at various stages of the study. The

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panelists were invited to attend the three public meetings held over the course of the study. Locations of the meetings were selected to minimize travel burdens on SAC members by having meetings in Southern (Los Angeles) and Northern (Sacramento and Oakland) California. Panelists were also asked to participate outside of meetings by reviewing and offering comments on work in progress, and offering their expertise to ensure overall quality of the product. In addition, the consulting team created a project website that allowed stakeholders to access the latest GIS information and maps. Panelists were encouraged to submit comments and updates over the course of the project to ensure the overall quality of the database and maps.

# CHAPTER 2 RAIL DATABASE

This study created the single most comprehensive source of information about active, out-of-operation, and abandoned rail right-of-way in California. Beginning with the existing information from the Caltrans GIS Rail Coverage, the study updated and expanded data compiled from various sources from around the state. The final GIS database provides a comprehensive inventory of all rail lines in the state with descriptive attributes attached to each rail segment in the database.

**The process of "populating" or filling in the database involved collecting existing data from rail operators and Caltrans while working closely with stakeholders to identify additional rail right-of-way.**

## Data Sources

The process of "populating" or filling in the database involved collecting existing data from rail operators and Caltrans while working closely with stakeholders to identify additional rail right-of-way. A total of 24 attributes or descriptors were identified as important information about each rail line. A complete list of the attributes included in the database is shown in Figure 2-1. Rail lines were divided into "segments" each time any of these attributes changed. Segments are naturally broken at stations or places where rail lines cross or divide. Segmentation also occurs when any other piece of data such as right-of-way width, ownership or operator changes. Over the course of the project, the consulting team compiled a database of 3,441 rail segments that included in-service, out of service and abandoned segments, including rail sidings and spurs. Each segment is given a unique identification number in the database.

The rail data was compiled from the following sources:

- Caltrans GIS Rail Coverage
- Union Pacific (UP) Railroad
- BNSF Railway
- Amtrak
- Commuter rail services: Caltrain, Altamont Commuter Express (ACE), Metrolink, and Coaster
- BART

- California Regional Timetable, 15th Edition (Altamont Press, March 2004)
- Intermodal Transportation Management System (ITMS)
- California State Rail Plan
- Stakeholder input including Regional Transportation Planning Associations, Congestion Management Agencies and Metropolitan Planning Organizations as well as interested citizens

**Over the course of the project, the consulting team compiled a database of 3,441 rail segments that included in-service, out of service and abandoned segments, including rail sidings and spurs.**

In addition, the team compiled a light rail/light rail station database comprised of data and GIS layers from transit agencies currently operating or proposing light rail service.

The database was populated by collecting digitized (GIS shapefiles) and non-digitized data from a variety of sources and using this information to create a single comprehensive database. Collection of original data and field verification of the data was beyond the resources of this study. However every effort was made to ensure the most accurate and up to date information is presented. To provide additional reference, GIS specialists on the project team identified beginning and ending milepost designations for most of the rail segments in the state.

## Validation Process

Once the data was collected and the database fully populated, Caltrans staff and the project team performed an extensive validation process. Caltrans staff verified the attribute table information for every rail segment in the state focusing primarily on the variables of status and beginning and ending milepost designations. In addition to verifying the existing database information, Caltrans added a rail "subdivision" field to the database to assist with the identification of the geographic location of the rail segments.

The study relied on content experts and stakeholders to validate the information. Stakeholders reviewed the portion of the rail network (geometry, demand, frequency, abandonment information, etc.) relevant to their identified corridors. The project team provided updated maps and databases on

the project website allowing stakeholders an opportunity to send comments at several stages of the project. In addition, stakeholders were encouraged to provide additional comments at the three public meetings held throughout the course of the study. Updates to the database were made throughout the project. Maintaining and updating this information regularly is the key to the on-going utility of this information.

## Final Database Format

The maps shown in Figures 2-2 and 2-3 are geographic representations of the large quantity of data collected, digitized and validated for this study. Each of the 3,441 segments in the database contains information pertaining to 24 key attributes. Figure 2-1 displays the attributes and sources in the rail database. A complete list of rail right-of-way owners and operators is presented in Appendix B.

## Figure 2-1 Overview of Attribute Data Sources for Rail Database

| Attribute | Definition | Source(s) |
|---|---|---|
| Unique ID | Numeric field that is randomly assigned to each segment | Nelson\Nygaard |
| Beginning/Ending Milepost | Designations for beginning and ending points of rail segments | BNSF, UP, Caltrans 1982 State Rail Plan, Metrolink |
| ROW Owner | Owner of ROW | Caltrans |
| Subdivision | Subdivision boundary | California Regional Timetable 15 |
| Operators | Freight and passenger service operator | Caltrans |
| Passenger Service | Individual passenger line | Caltrans |
| Caltrans District | Caltrans district number | Caltrans |
| County | County Abbreviation | Caltrans |
| Description | Identifies railroad class | |
| Mainline | Class I | Caltrans, BNSF, UP |
| Regional | Class II | Caltrans |
| Shortline | Class III | Caltrans |
| Military | Military or government | Caltrans |
| Private | Private rail lines | Caltrans |
| Transit | Public transportation rail lines | Caltrans, transit agencies |
| Unknown | All rail lines without a specific classification | Caltrans |
| Status | Identifies status of railroad line | Caltrans, Rails to Trails |
| Active | | |
| Under Construction | | |
| Proposed | | |
| Abandoned | | |
| Out of service | | |
| Unknown | | |
| Tracktype | Identify railroad track type | |
| Principal | Mainline | BNSF, UP, Caltrans |
| Secondary | Regional or Shortline | Caltrans |
| Branch | Shortline or any line that ends | Caltrans |
| Transit | Public transportation rail lines | Caltrans, transit agencies |
| Abandoned | | |
| Unknown | | |
| Comments | Internal comments by Caltrans staff for validation | Caltrans & Nelson\Nygaard staff |
| Maximum Gross Weight | | Caltrans, ITMS |
| Passenger Speed | Maximum passenger timetable speed | California Regional Timetable 15 |
| Freight Speed | Maximum freight timetable speed | California Regional Timetable 15 |
| Pipe in ROW | Indicates presence of pipe in ROW | ITMS |
| Number of Tracks | | ITMS |
| Width Restriction | | ITMS |
| Height Restriction | | ITMS |
| Length in Meters and Miles | | Nelson\Nygaard |

# Figure 2-2
# Statewide Rail System by Status

Source: The Caltrans rail database was updated by the "California Region Timetable 15" book, ITMS, and Caltrans data in January, 2005 by Nelson|Nygaard Consulting. The rail database was updated using the most up to date information available at the time of this evaluation and was validated by the staff at the Division of Rail.

**Northern California**

# Figure 2-3
# Statewide Rail System by Status

Source: The Caltrans rail database was updated by the "California Region Timetable 15" book, ITMS, and Caltrans data in January, 2005 by Nelson/Nygaard Consulting. The rail database was updated using the most up to date information available at the time of this evaluation and was validated by the staff at the Division of Rail.

**Southern California**

# CHAPTER 3 BICYCLE/PEDESTRIAN TRAIL DATABASE

In order to assess the potential for joint use and reuse of rail right-of-way for non-motorized transportation, the study compiled bicycle and pedestrian facility information from around the state. The data collected represents both existing and planned (or proposed) facilities, and includes all classes of bikeways where that data was available:

(1) Class I Bikeway (Bike Path) -- a separated right of way for the exclusive use of bicycles and pedestrians

(2) Class II Bikeway (Bike Lane) -- a striped lane for one-way bike travel on a street or highway.

(3) Class III Bikeway (Bike Route) -- shared use with pedestrian or motor vehicle traffic (requires specific bike route signs).

In California, all conventional highways and expressways and approximately 25% of freeway miles are open to bicycle travel. Generally, these facilities are not signed or marked as Class I, II, or III bikeways.

The data focused on facilities that are on or adjacent to transportation corridors and did not attempt to provide a comprehensive list of all trails or other non-motorized facilities in the state, especially those in natural areas and parks. Most of the data included in the database were digitized as part of a bicycle and pedestrian planning process.

**The Rails-to-Trails Conservancy's (RTC) database has been compiled over the last 10-years through personal contact with rail-trail projects at various phases of development.**

## Data Sources

Non-motorized system data came from four primary sources:

1. Rails-to-Trails Conservancy's (RTC) Rail-Trail project database.
2. Municipal Planning Organizations (MPO) or Regional Transportation Planning Agencies (RTPA)
3. Local jurisdictions
4. Stakeholders (Trail Management agencies, Open Space organizations etc.)

RTC's database has been compiled over the last 10-years through personal contact with rail-trail projects at various phases of development. The projects include those that are actively being planned and others in very early stages of consideration.

RTC contacted MPO's and RTPA's throughout the state to gather digitized data from the agency or to inquire if there were jurisdictions within the region that had developed digitized bicycle and pedestrian data. Several MPO's and RTPA's responded with data they had collected in the process of completing regional bicycle and pedestrian plans; others were not able to respond in time to be included in this database, or did not have any digitized data available.

Several local jurisdictions have also digitized their trail and bicycle facility data in the process of developing bicycle plans.

Stakeholders were invited through the project's Study Advisory Committee, public meetings, the project website, personal contact with the study team and Rails-to-Trails Conservancy's electronic newsletter to provide bicycle and pedestrian data. (RTC's newsletter reaches 1500-2000 people statewide.) Several trail agencies and non-governmental organizations provided data through the process. Figure 3-1 displays the attributes and sources of the trails database. Figures 3-2 and 3-3 show geographic representations of the Bicycle/Pedestrian Trails database.

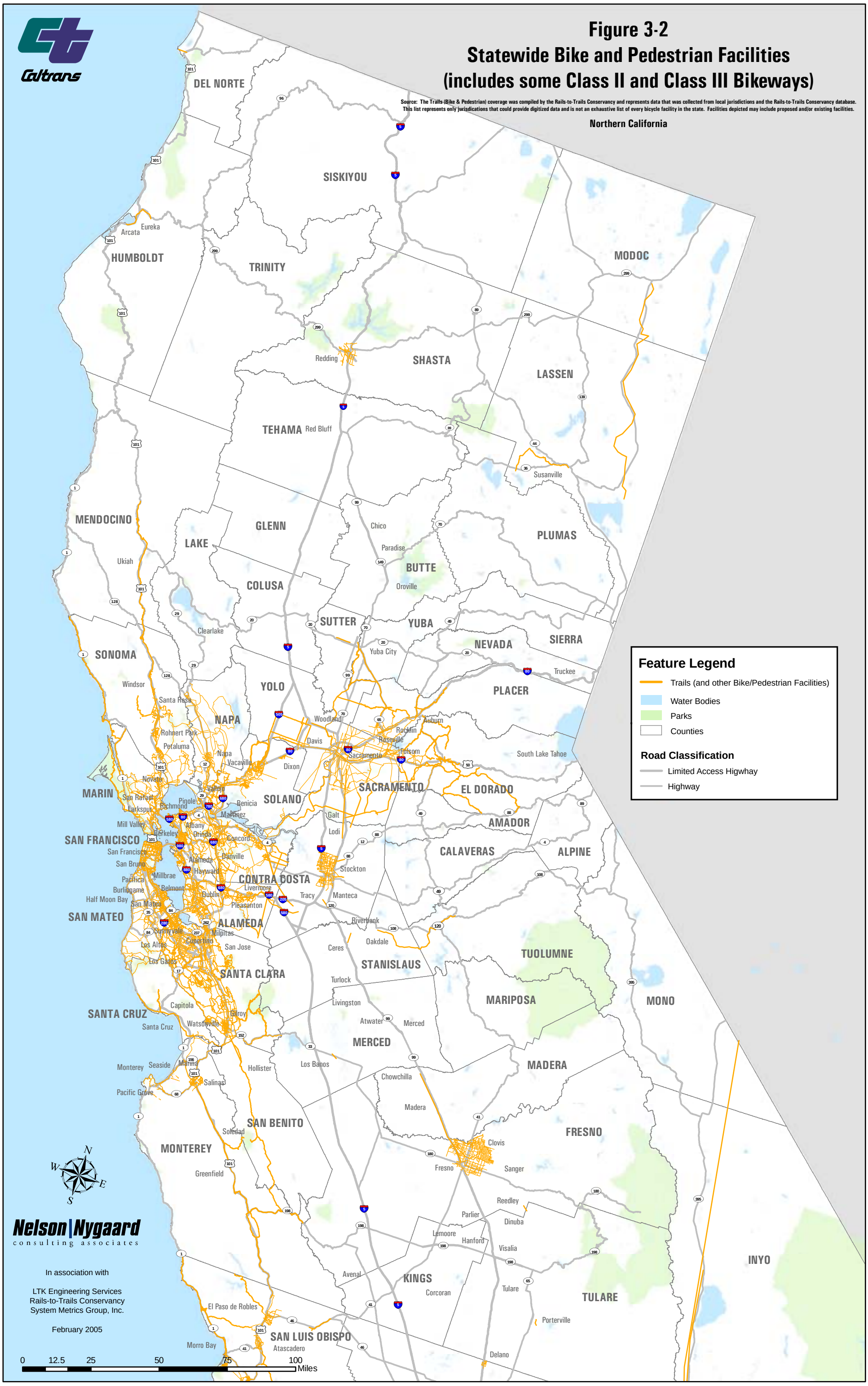
## Figure 3-1 Overview of Attribute Data Sources for Bicycle/Pedestrian Trails Database

| Attribute | Definition | Source(s) |
|---|---|---|
| Unique ID | Numeric field assigned randomly | Nelson\Nygaard |
| Name | Name of trail | Local jurisdiction |
| Status | Identifies the status of the particular trail/facility based upon information gathered from the source. Classified as existing, proposed, planned and unknown. | Local jurisdiction |
| Class | Utilized Caltrans bikeway definitions. Class I (Bike Path), Class II (Bike lane), Class III (Bike route). | Information was provided by the source, inferred from project descriptions, or classified N/A. |
| Type | Identifies the type of trail of facility | Local jurisdiction |
| County | Caltrans county abbreviations | Caltrans |
| Source | Identifies origin of data | Local jurisdiction |
| Updated | Identifies the last update to the data | Local jurisdiction |
| Surface | Identifies the surface type of the trail/facility | Local jurisdiction |
| Comments | Added comments from source | Local jurisdiction |
| Trail width | Identifies the width of the trail/facility | Local jurisdiction |
| Theme | The original theme used to populate database | Local jurisdiction |
| Info | Unique ID that identifies proposed projects for which additional information was collected. | Rails-to-Trails Conservancy |
| Length feet | Segment length in feet | Calculated by ArcView software |
| Length miles | Segment length in miles | Calculated by ArcView software |

# Figure 3-2
# Statewide Bike and Pedestrian Facilities
# (includes some Class II and Class III Bikeways)

Source: The Trails (Bike & Pedestrian) coverage was compiled by the Rails-to-Trails Conservancy and represents data that was collected from local jurisdictions and the Rails-to-Trails Conservancy database. This list represents only jurisdictions that could provide digitized data and is not an exhaustive list of every bicycle facility in the state. Facilities depicted may include proposed and/or existing facilities.

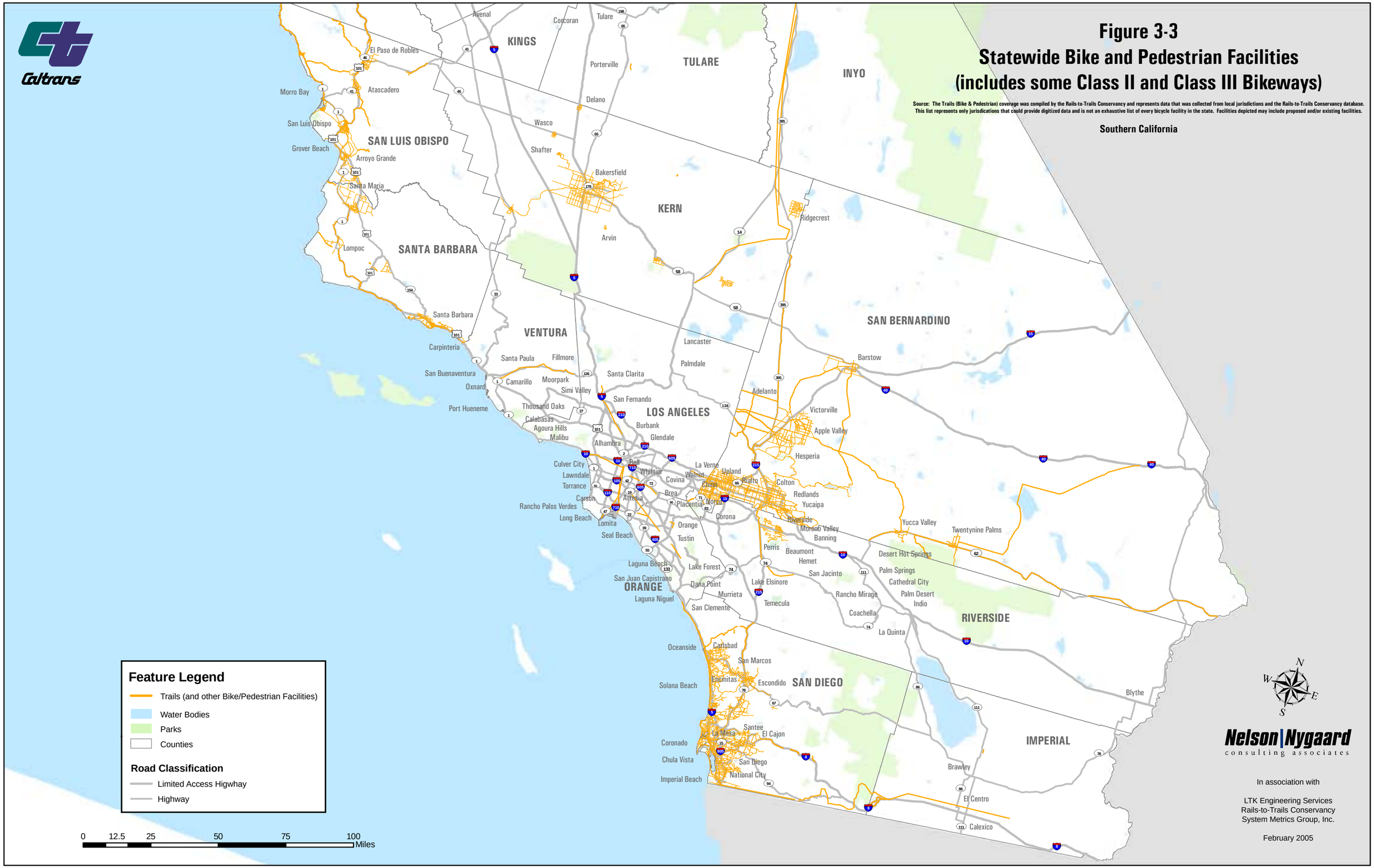
**Northern California**



# Figure 3-3
# Statewide Bike and Pedestrian Facilities
# (includes some Class II and Class III Bikeways)

Source: The Trails (Bike & Pedestrian) coverage was compiled by the Rails-to-Trails Conservancy and represents data that was collected from local jurisdictions and the Rails-to-Trails Conservancy database. This list represents only jurisdictions that could provide digitized data and is not an exhaustive list of every bicycle facility in the state. Facilities depicted may include proposed and/or existing facilities.

**Southern California**



# CHAPTER 4 EVALUATION PROCESS

The data collected in the first phase of the study was combined with demographic and travel demand information to evaluate rail corridors for potential joint use and reuse opportunities. Four different evaluations were completed:

1) In-operation railroad right-of-way with potential for passenger rail service (with current and proposed service)
2) In-operation railroad right-of-way with potential joint use for non-motorized transport and public transit links (with current and proposed service)
3) Out-of-operation and abandoned railroad right-of-way with potential for passenger rail service
4) Out-of-operation and abandoned railroad right-of-way with potential reuse for non-motorized or public transit links

In addition the potential for multiple new uses were also considered. The evaluation process and results are discussed below.

## Status of Rail Corridors

The first step in the evaluation process was the classification of rail corridors by status. During the database development phase of this project, three types of rail corridors were identified.

- **In-operation** – any active railroad right-of-way that is operated by a public, private, or non-profit railroad or agency and that serves public and/or private interests. In-operation also includes tourist and excursion trains in regular operation. For the purposes of this evaluation, passenger rail service that is proposed (including SMART commuter rail in Sonoma and Marin Counties) and segments currently under construction are identified independently and evaluated with the in-operation railroads.
- **Out-of-operation** – any inactive railroad right-of-way that remains in the jurisdiction of any public, private, or non-profit railroad or agency. This includes corridors that have been railbanked. Railbanking is a voluntary agreement between a railroad company and a trail agency to use an out-of-operation rail corridor

as a trail until some railroad might need the corridor again for rail service. Because a railbanked corridor is not considered abandoned, it can be sold, leased or donated to a trail manager and is considered still in transportation use. Other out-of-operation right-of-way may be in any stage of legal abandonment or transfer process.

- **Abandoned** – any railroad right-of-way that has been approved for the abandonment process by the Surface Transportation Board (STB) [or the former Interstate Commerce Commission (ICC)].

The three status classifications were then narrowed down to two groups in order to comply with the language of the legislative act that initiated this study:

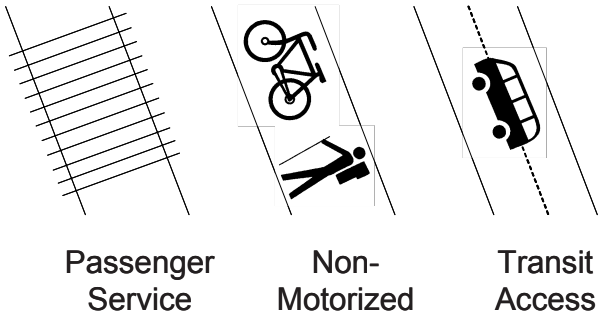
- In-operation rail (including active and proposed segments)
- Out-of-operation rail segments including formally abandoned and inactive segments

## Multiple Uses

In-operation rail corridors can be used by passenger rail service on the same tracks or on separate tracks within the right-of-way as a joint use operation. In-operation rail services can also be run in combination with non-motorized transport (bicycle and pedestrian facilities including access to transit, also called rails-with-trails) or with non-rail public transit access links (non-rail solutions, such as busways and other creative transit options). Joint use opportunities for trails or public transit service share the right-of-way with the rail service, but do not use the active tracks.

Non-motorized transport and public transit links can also be located on out-of-operation or formally abandoned corridors. In the case of non-motorized transport, these corridors are sometimes called rail-to-trails conversions. In addition, passenger services could be operated on out-of-operation or abandoned corridors. For the purposes of this study, joint use operations refer to corridors supporting two or more of the uses shown in Figure 4-1.

**Figure 4-1 Potential Uses for a Rail Corridor**




## Criteria for Evaluation

The results of an evaluation depend on the criteria used to compare entries. The criteria used in the four separate evaluations for this study were developed with input from stakeholders and Caltrans staff. Additional references were used to develop criteria including:

- California Public Utility Commission (CPUC) General Order and Federal Rail Administration (FRA) guidance for potential regulatory issues
- Standards in the California Highway Design Manual
- The Rails-with-Trails Best Practices Study
- Measures proposed by North County Transit District (NCTD) staff for the Coastal Rail Trail in San Diego County
- Criteria established by other transit and planning agencies
- Engineering and planning standards
- Available data (e.g., demand forecasts, population and employment forecasts, lists of railbanked corridors, ownership information, STB submittals, trail coverages, the USDOT rail crossing database, etc.).

Criteria were intended to reflect Caltrans' mission to improve mobility and its six goals related to safety, reliability, performance, flexibility, delivery, and stewardship.

The evaluation criteria reflect two different dimensions of potential:

- Demand – does the public want it?
- Feasibility – can it be done?

Demand can be measured several ways, such as the predicted usage, mode split, local priority, available alternatives, expected improvement in mobility, etc. Although the most direct measure is the predicted usage (future demand), this figure was not available on all corridors. To estimate demand, other factors were developed, such as the proximity to compatible land-uses, accessibility and connectivity to other services, and mobility for available alternatives.

Several factors influence the ability to develop a project along a corridor, such as the current ownership, willingness to reuse and safety considerations. Extra criteria (in-operation restrictions) were needed for corridors in-operation, to account for the difficulties of combining freight operators with other modes.

Figure 4-2 summarizes the selection criteria used to measure demand for each potential use (passenger service, non-motorized transport, and transit access link). The exhibit includes several direct and indirect measures. Demand measures do not change based on the status of the corridor. These measures include:

- Travel Demand: total expected travel along corridor (regardless of mode)
- Connectivity: links with complementing services or uses that may enhance demand
- Accessibility: type of development within a given distance of corridors (may be an indicator of demand in lieu of predicted ridership or usage)
- Local Support: whether corridors match regional priorities (may reflect public demand and interest)

The accessibility measures focus on land uses that may generate or attract traffic within a given distance of the proposed use. While the same criteria were used for each mode, the specific quantitative measure varied depending on whether

passenger rail, transit or non-motorized modes were considered. For example, for non-motorized transport the criteria used one mile as potential distance that someone would travel to access the right-of-way. For transit the standard was up to three miles and for passenger rail service the standard was five miles. Longer access links were allowed for transit and passenger rail service since passengers on these modes often have access to motorized modes, such as driving or transit.

Unlike demand measures, feasibility criteria are dependent on the status and configuration of the right-of-way. For example, a corridor may be predicted to have high demand for passenger rail, but high freight volumes and other conditions may make development less feasible. Figure 4-3 shows the criteria used for measuring feasibility by potential joint use or reuse. Feasibility criteria included several factors that may influence the feasibility of joint use or reuse:

- Geometrics: considerations other than in-operation restrictions that impact feasibility
- Conflicts with Freight Service: frequency restrictions for corridors with in-operation rail services (rails-with-trails in the case of non-motorized transport)
- Local Interest: the interest level assigned by stakeholders for corridors
- Safety: safety considerations beyond right-of-way width restrictions for non-motorized

Figures 4-4 through 4-6 show which criteria were applied in each of the evaluations done for this study.

## Figure 4-2 Summary of Selection Criteria for Demand

| Categories | Criteria | Measures | | |
|---|---|---|---|---|
| | | Passenger Rail | Non-Motorized | Transit Link |
| Travel Demand | Regional Trip Demand from ITMS/Regional Planning Models (indicate as low-medium-high) | Total regional trips along corridor in 2026 (arrayed) | | Total regional trips along corridor in 2026 (arrayed) |
| Connectivity | Connections with Similar Facilities | Rail service within 0.1 mile (yes/no) | Trails within 0.5 mile (yes/no) | Bus and rail transit within 0.5 mile (yes/no) |
| | Connections with Transit Stations | | # of passenger rail and LRT stations within 1 mile | # of passenger rail and LRT stations within 3 miles |
| Accessibility | Accessibility to Population Centers (DOF census track data, indicate as low- medium-high) | Population density within 5 miles in 2026 (arrayed) | | Population density within 3 miles in 2026 (arrayed) |
| | Accessibility to Destinations (e.g., hospitals, universities, retail centers, public buildings, recreational areas and parks) | | Destinations within 1 mile (yes/no) | Destinations within 3 miles (yes/no) |
| Local Support | Regional Planning Priorities | Appears on list (yes/no) | Appears on list (yes/no) | Appears on list (yes/no) |

## Figure 4-3 Summary of Selection Criteria for Feasibility

| Categories | Criteria | Measures | | |
|---|---|---|---|---|
| | | Passenger Rail | Non-Motorized | Transit Link |
| Geometrics | Height Restrictions | Adequate height (yes/no) | | Adequate height (yes/no) |
| Conflicts with Freight Service | Intensity of Freight Service | Type of railroad track and status in operation only | Type of railroad track and status in operation only | Type of railroad track and status in operation only |
| | Maximum Train Speed | | Maximum of max. speeds (arrayed) in operation only | Maximum of max. speeds (arrayed) in operation only |
| Local Interest | Level of Interest from Regional Agencies | Level of interest (low-medium-high) | Level of interest (low-medium-high) | Level of interest (low-medium-high) |
| Safety | Crossings | # Crossings/mile | # Crossings/mile | # Crossings/mile |
| | USDOT Accident Prediction Rating | DOT accident prediction (arrayed) | DOT accident prediction (arrayed) in operation only | DOT accident prediction (arrayed) in operation only |

## Figure 4-4 Selection Criteria for the Passenger Service Evaluations

| | In-Operation Evaluation | | Out-of-Operation and Abandoned ROW Evaluation | |
|---|---|---|---|---|
| | Demand | Feasibility | Demand | Feasibility |
| **Travel Demand** | Regional trip demand<br>Inter-regional trip demand | | Regional trip demand<br>Inter-regional trip demand | |
| **Connectivity** | Rail service within 0.1 mile | | Rail service within 0.1 mile | |
| **Accessibility** | Population density within 5 miles | | Population density within 5 miles | |
| **Local Support** | Appears on list of regional planning priorities | | Appears on list of regional planning priorities | |
| **Geometrics** | | Adequate height | | Adequate height |
| **Freight Conflicts** | | Intensity of freight service | | |
| **Local Interest** | | Level of interest | | Level of interest |
| **Safety** | | # Crossings/mile<br>DOT accident prediction score | | # Crossings/mile<br>DOT accident prediction score |

## Figure 4-5 Selection Criteria for the Non-Motorized Transport Evaluations

| | In-Operation Evaluation | | Out-of-Operation and Abandoned ROW Evaluation | |
|---|---|---|---|---|
| | Demand | Feasibility | Demand | Feasibility |
| **Travel Demand** | Regional trip demand | | Regional trip demand | |
| **Connectivity** | Trails within 0.5 mile<br># Transit stations within 1 mile | | Trails within 0.5 mile<br># Transit stations within 1 mile | |
| **Accessibility** | Population density within 1 mile<br>Destinations within 1 mile | | Population density within 1 mile<br>Destinations within 1 mile | |
| **Local Support** | Appears on list of regional planning priorities | | Appears on list of regional planning priorities | |
| **Geometrics** | | Adequate height | | Adequate height |
| **Freight Conflicts** | | Intensity of freight service<br>Maximum train speed | | |
| **Local Interest** | | Level of interest | | Level of interest |
| **Safety** | | # Crossings/mile<br>DOT accident prediction score | | # Crossings/mile |

## Figure 4-6 Selection Criteria Proposed for the Public Transit Access Link Evaluations

| | In-Operation Evaluation | | Out-of-Operation and Abandoned ROW Evaluation | |
|---|---|---|---|---|
| | **Demand** | **Feasibility** | **Demand** | **Feasibility** |
| **Travel Demand** | Regional trip demand | | Regional trip demand | |
| **Connectivity** | Bus and rail transit within 0.5 mile<br># Transit stations within 3 miles | | Bus and rail transit within 0.5 mile<br># Transit stations within 3 miles | |
| **Accessibility** | Population density within 3 miles<br>Destinations within 3 miles | | Population density within 3 miles<br>Destinations within 3 miles | |
| **Local Support** | Appears on list of regional planning priorities | | Appears on list of regional planning priorities | |
| **Geometrics** | | Adequate height | | Adequate height |
| **Freight Conflicts** | | Intensity of freight service<br>Maximum train speed | | |
| **Local Interest** | | Level of interest | | Level of interest |
| **Safety** | | # Crossings/mile<br>DOT accident prediction score | | # Crossings/mile |

## Evaluations Conducted

The project team conducted a total of four evaluations that were a product of the corridor status (in-operation, out-of-operation, and abandoned) and the potential uses (passenger service, non-motorized transport, and public transit access link). Figures 4-7 through 4-14 display statewide maps of the final evaluations.

The four evaluations include:

**Evaluation 1:** In-operation rail right-of-way with potential for passenger service (current and proposed service)

**Evaluation 2:** In-operation rail right-of-way with potential for joint-use for non-motorized transport or public transit access (current and proposed service)

**Evaluation 3:** Out-of-operation rail right-of-way or abandoned with potential for passenger service

**Evaluation 4:** Out-of-operation rail right-of-way or abandoned with potential for non-motorized transport or public transit access

The next section outlines the specific demand and feasibility criteria used for each of the four evaluations, showing which criteria contributed to corridors being assigned high, medium and low potential.

## Evaluation 1

**In-operation rail RIGHT-OF-WAY with potential for passenger service (current and proposed service)**

**Results are based on the following demand criteria:**

- Travel demand
- Rail service within .1 mile
- Population density within 5 miles
- Local support

**Results are based on the following feasibility criteria:**

- Adequate height
- Intensity of freight service
- Level of interest
- Number of crossings
- Caltrans accident prediction

## Evaluation 2

**In-operation rail RIGHT-OF-WAY with potential joint use for non-motorized and public transit links (current and proposed service)**

**Results are based on the following demand criteria** (demand is based on the highest potential between non-motorized and transit links):

Non-motorized:

- Trails within .5 mile
- Number of transit stations within 1 mile
- Destinations within 1 mile
- Local support

Transit:

- Bus and rail transit within .5 mile
- Number of transit stations within 3 miles
- Population density within 3 miles
- Destinations within 3 miles
- Local support

**Results are based on the following feasibility criteria** (feasibility is based on the highest potential between non-motorized and transit links):

Non-motorized:

- Intensity of freight service
- Maximum train speed
- Level of interest
- Number of crossings
- Caltrans accident prediction

Transit:

- Adequate height
- Intensity of freight service
- Maximum train speed
- Level of interest
- Number of crossings
- Caltrans accident report

## Evaluation 3

**Out-of-operation and abandoned railroad RIGHT-OF-WAY with potential for passenger rail service**

**Results are based on the following demand criteria:**

- Travel Demand
- Rail service within .1 mile
- Population density within 5 miles
- Local support

**Results are based on the following feasibility criteria:**

- Adequate height
- Level of interest
- Number of crossings
- Caltrans accident prediction

## Evaluation 4

**Out-of-operation and abandoned railroad RIGHT-OF-WAY with potential for non-motorized and public transit links**

**Results are based on the following demand criteria** (demand is based on the highest potential between non-motorized and transit links):

Non-motorized :

- Trails within .5 mile
- Number of transit stations within 1 mile
- Destinations within 1 mile
- Local support

Transit:

- Bus and rail transit within .5 mile
- Number of transit stations within 3 miles
- Population density within 3 miles
- Destinations within 3 miles
- Local support

**Results are based on the following feasibility criteria** (feasibility is based on the highest potential between non-motorized and transit links):

Non-motorized:

- Level of interest
- Number of crossings

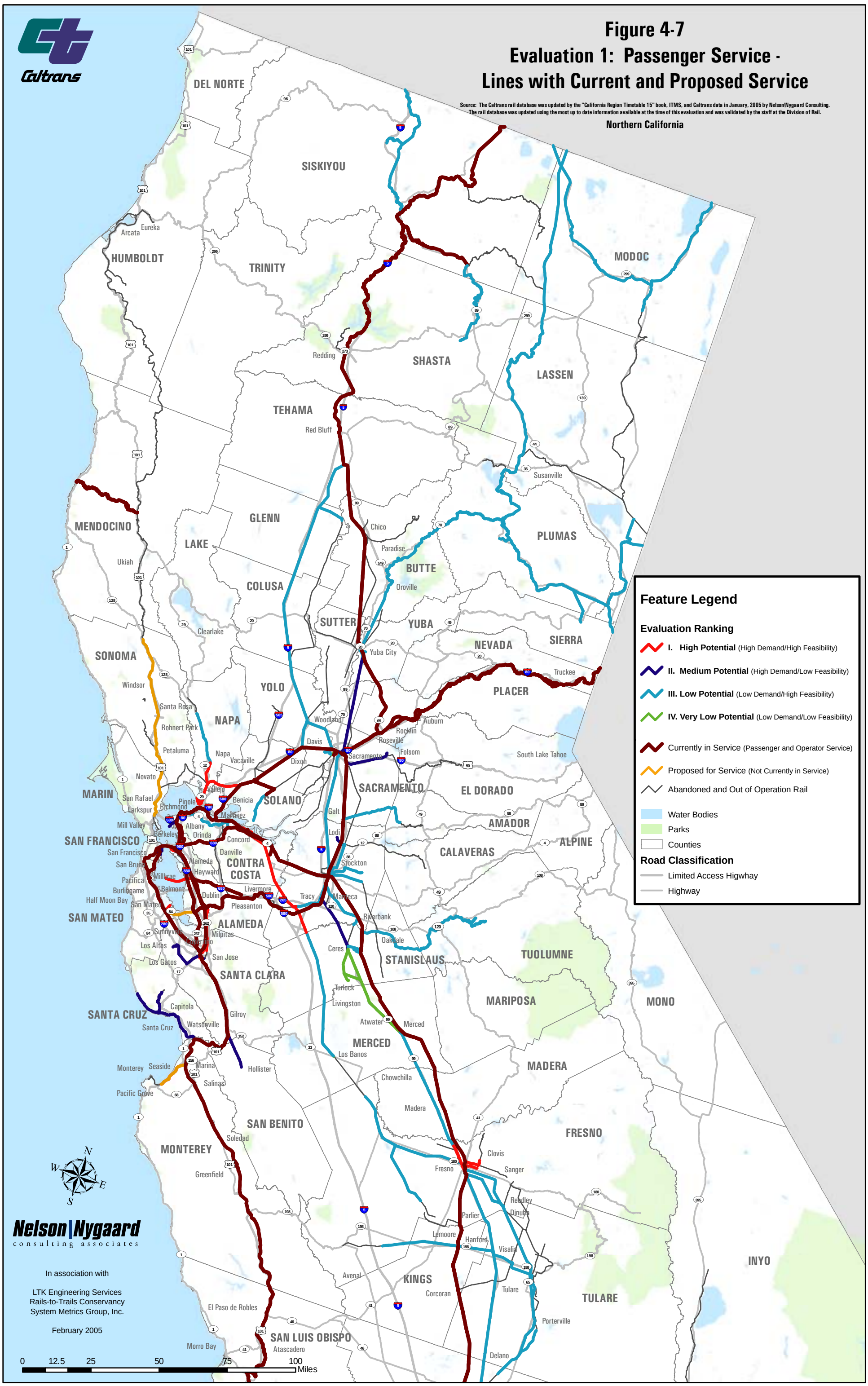
Transit:

- Adequate height
- Level of interest
- Number of crossings

# Figure 4-7
# Evaluation 1: Passenger Service - Lines with Current and Proposed Service

Source: The Caltrans rail database was updated by the "California Region Timetable 15" book, ITMS, and Caltrans data in January, 2005 by Nelson|Nygaard Consulting. The rail database was updated using the most up to date information available at the time of this evaluation and was validated by the staff at the Division of Rail.

**Northern California**



# Figure 4-8
# Evaluation 1: Passenger Service - Lines with Current and Proposed Service

Source: The Caltrans rail database was updated by the "California Region Timetable 15" book, ITMS, and Caltrans data in January, 2005 by Nelson/Nygaard Consulting. The rail database was updated using the most up to date information available at the time of this evaluation and was validated by the staff at the Division of Rail.

**Southern California**

In association with

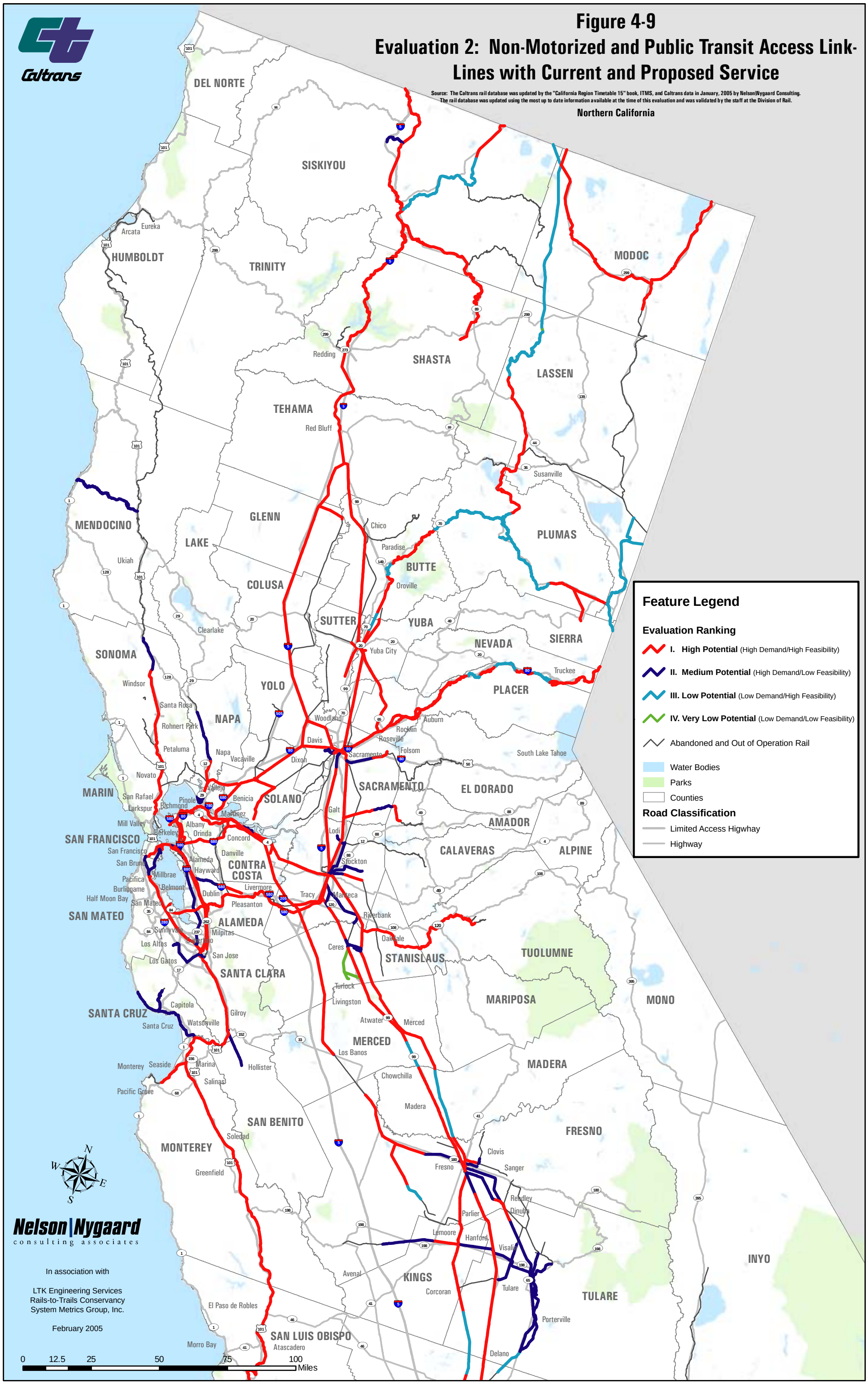
LTK Engineering Services
Rails-to-Trails Conservancy
System Metrics Group, Inc.

February 2005

# Figure 4-9
# Evaluation 2: Non-Motorized and Public Transit Access Link-Lines with Current and Proposed Service

Source: The Caltrans rail database was updated by the "California Region Timetable 15" book, ITMS, and Caltrans data in January, 2005 by Nelson\Nygaard Consulting. The rail database was updated using the most up to date information available at the time of this evaluation and was validated by the staff at the Division of Rail.

**Northern California**



# Figure 4-10
## Evaluation 2: Non-Motorized and Public Transit Access Link-Lines with Current and Proposed Service

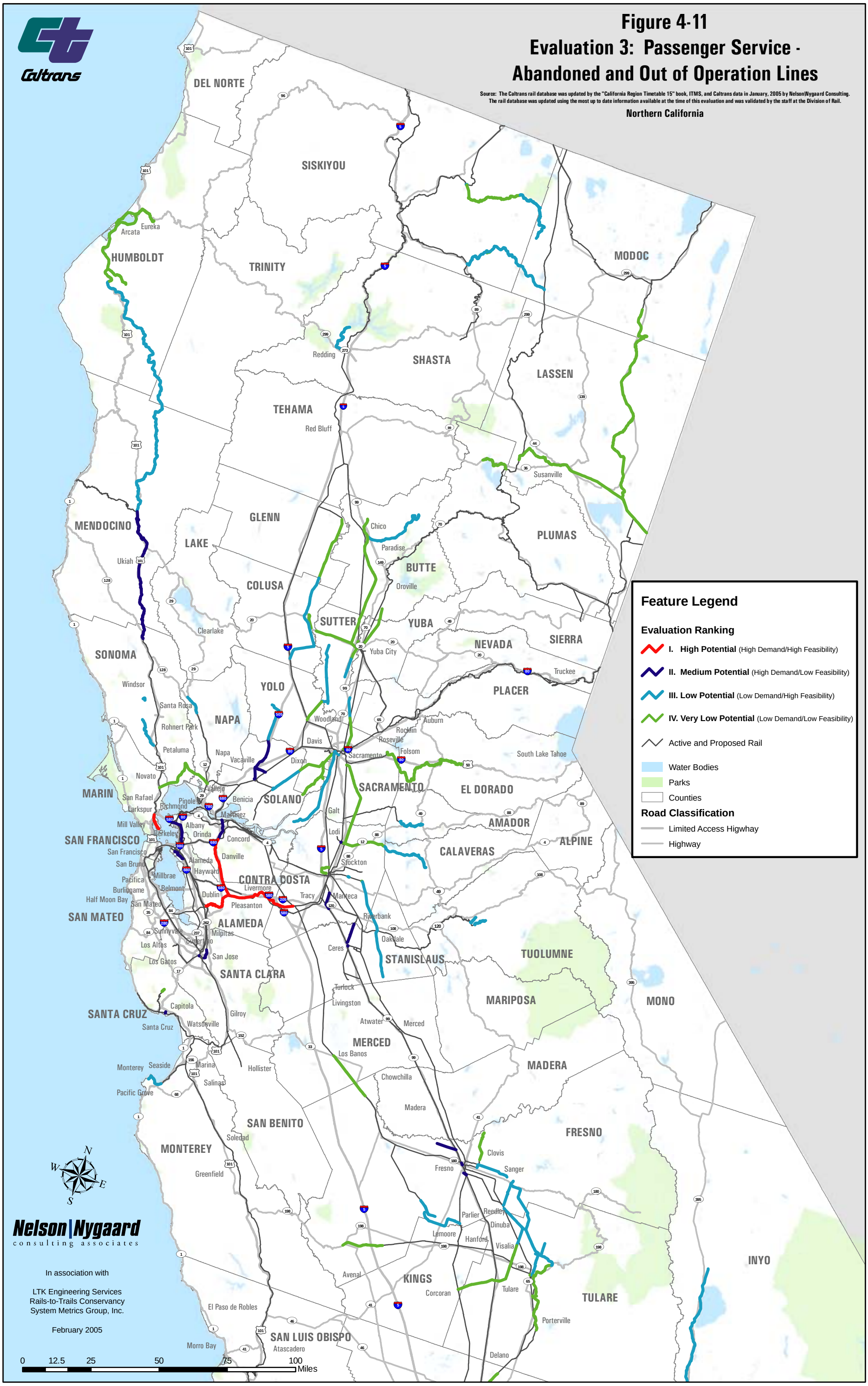
Source: The Caltrans rail database was updated by the "California Region Timetable 15" book, ITMS, and Caltrans data in January, 2005 by Nelson\Nygaard Consulting. The rail database was updated using the most up to date information available at the time of this evaluation and was validated by the staff at the Division of Rail.

**Southern California**

# Figure 4-11
# Evaluation 3: Passenger Service - Abandoned and Out of Operation Lines

Source: The Caltrans rail database was updated by the "California Region Timetable 15" book, ITMS, and Caltrans data in January, 2005 by Nelson|Nygaard Consulting. The rail database was updated using the most up to date information available at the time of this evaluation and was validated by the staff at the Division of Rail.

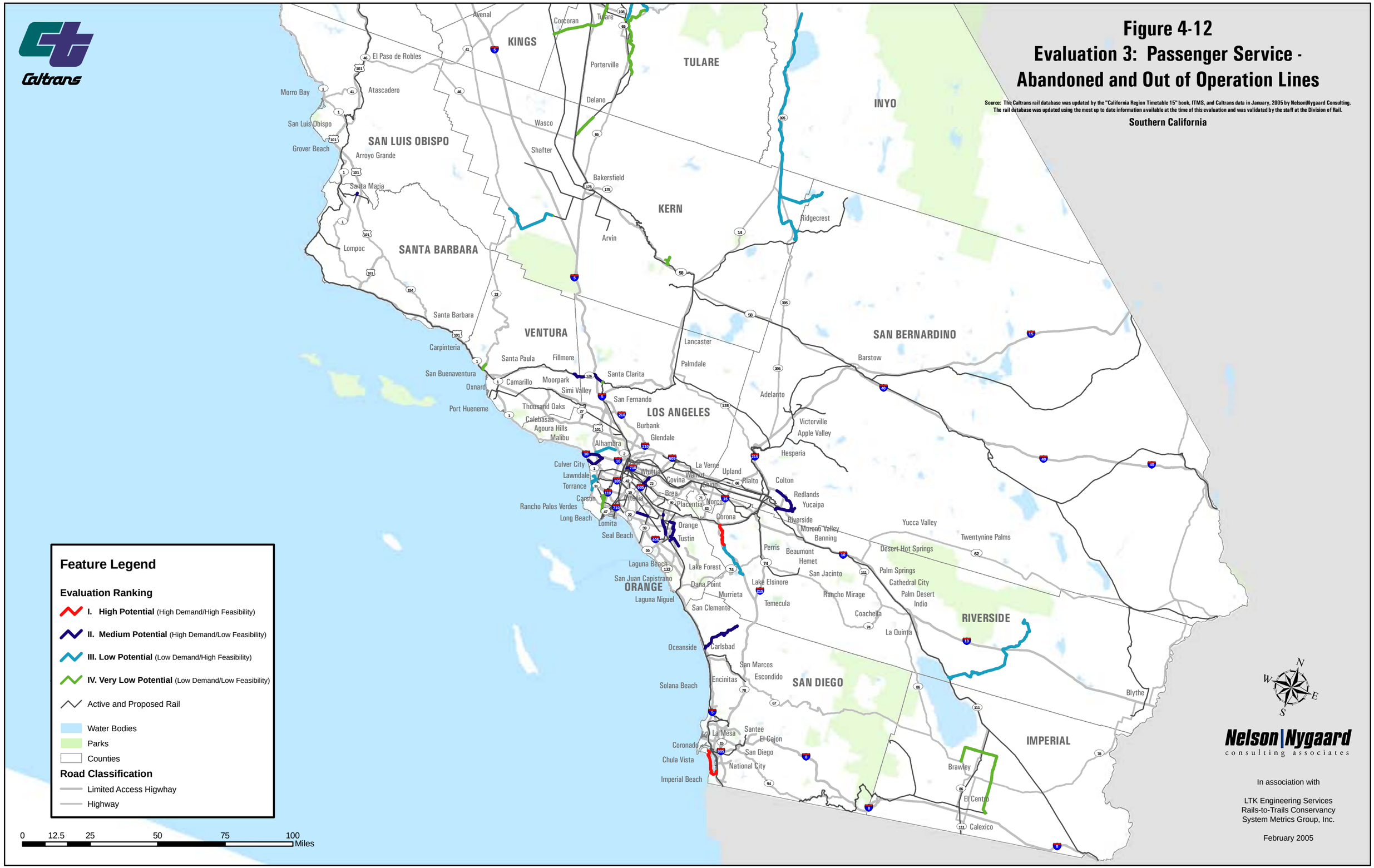
**Northern California**



# Figure 4-12
# Evaluation 3: Passenger Service - Abandoned and Out of Operation Lines

Source: The Caltrans rail database was updated by the "California Region Timetable 15" book, ITMS, and Caltrans data in January, 2005 by Nelson|Nygaard Consulting. The rail database was updated using the most up to date information available at the time of this evaluation and was validated by the staff at the Division of Rail.

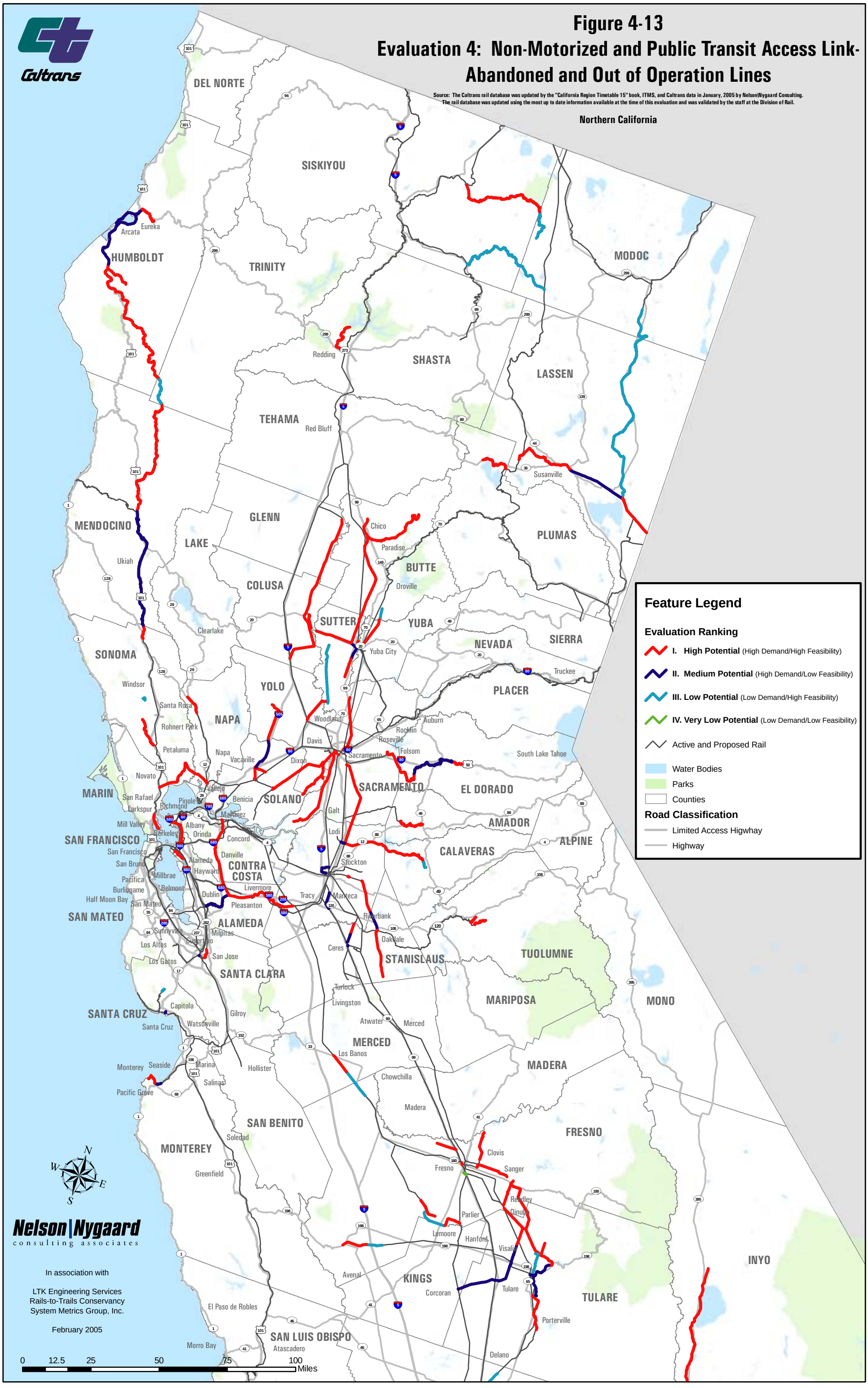
**Southern California**



# Figure 4-13
# Evaluation 4: Non-Motorized and Public Transit Access Link-Abandoned and Out of Operation Lines

Source: The Caltrans rail database was updated by the "California Region Timetable 15" book, ITMS, and Caltrans data in January, 2005 by Nelson|Nygaard Consulting. The rail database was updated using the most up to date information available at the time of this evaluation and was validated by the staff at the Division of Rail.

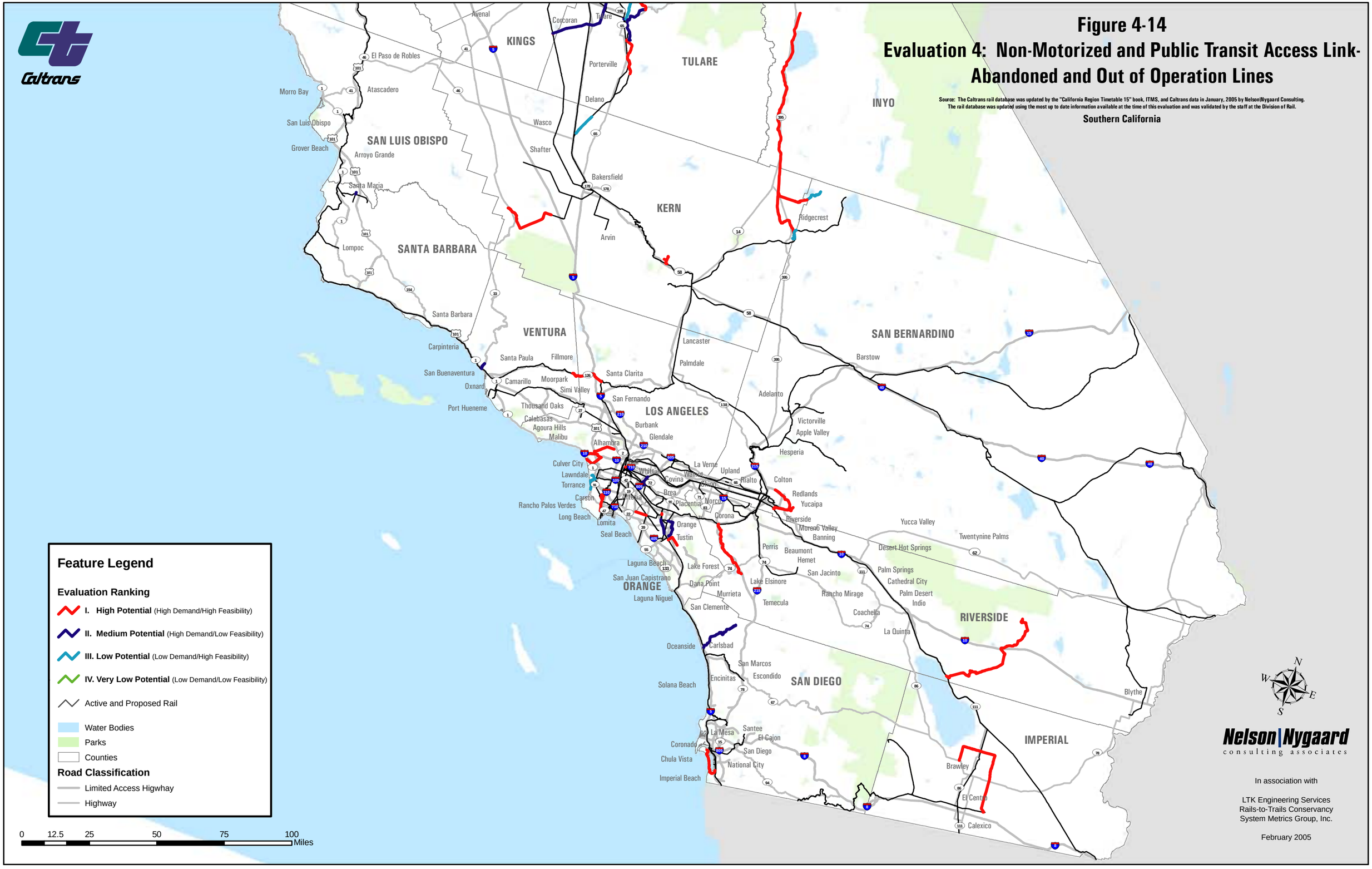
**Northern California**



# Figure 4-14
# Evaluation 4: Non-Motorized and Public Transit Access Link-Abandoned and Out of Operation Lines

Source: The Caltrans rail database was updated by the "California Region Timetable 15" book, ITMS, and Caltrans data in January, 2005 by Nelson\Nygaard Consulting. The rail database was updated using the most up to date information available at the time of this evaluation and was validated by the staff at the Division of Rail.

**Southern California**



# Evaluation Framework

## Combining Measures

No single criteria can fully capture the components of demand and feasibility especially since information is not uniformly available for any single criterion. To complete the evaluation, multiple criteria must be combined to form a single "score."

Most measures (such as travel demand or frequency of existing service) can be sorted in order. For these measures, the corridors were separated into three groups by arraying the data in order and finding the middle value. The median serves as a threshold that separates the data into top and bottom halves. For some measures, it was not possible to calculate a median value, in such cases a threshold was set using planning and engineering standards.

Another challenge was that in some cases there was not comprehensive or consistent data statewide for a particular measure. For this study the project team used two thresholds with an average rating. For measures that can be arrayed, the data were separated into thirds rather than in half. For other measures, two thresholds were set. For each measure, a corridor was assigned a number depending on which of the three groups it fell into:

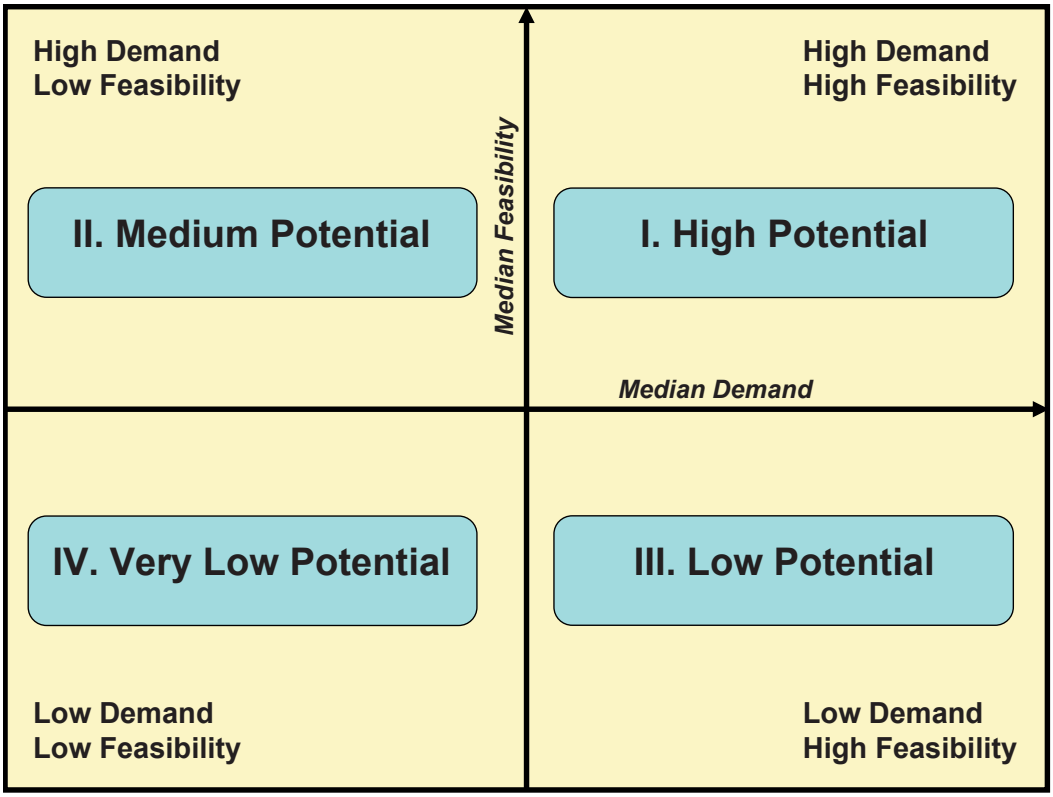
- Top third = 1
- Middle third = 0.5
- Bottom third = 0

The average of the scores across measures for which data are available to determine a composite score. Corridors can then be arrayed by the composite score. The half of the corridors having the highest composite score was considered to have high demand or feasibility, while the other half was considered to have low demand or feasibility.

## Demand and Feasibility Matrix

By arraying the measures of demand and feasibility into a matrix, as shown in Figure 4-15, the passenger service, non-motorized transport, and transit access potential for each corridor could be determined. The team conducted initial evaluations as a function of the corridor status (in-operation and out-of-operation/abandoned) and the potential uses (passenger service, non-motorized transport, and public transit access link), which were then applied to the four final evaluations. Demand and feasibility measures can be combined to give an overall score for the two measures of potential. Demand and feasibility scores were then combined to determine potential for joint use and reuse of rail right-of-way. In the illustration below, the demand score for each segment is arrayed in the X axis and feasibility score is arrayed on the Y axis. The two axes intersect at the median scores for both demand and feasibility.

**Figure 4-15 Classifying the Potential of Corridors Using Demand and Feasibility**



The four quadrants group the corridors into high, medium, and low potential for each of the four evaluations:

- **Quadrant I:** Areas with high demand and high feasibility mean that the public wants passenger services, non-motorized transport, or public transit access links and the services are possible to deliver. These corridors are areas with "high" potential.
- **Quadrant II:** For corridors with high demand and low feasibility, the public wants passenger services, non-motorized transport, or public transit access links, but the services would be difficult to deliver. These areas have "medium" potential. We might be able to meet the public's demand, but it will be challenging.
- **Quadrant III:** Corridors with high feasibility, but low demand for passenger services, non-motorized transport, or public transit access links will probably not be used by the public. In the future, there might be demand, which we will be able to address, but the demand is low right now. These corridors have "low" potential.
- **Quadrant IV:** Areas with low demand and low feasibility have little demand for passenger services, non-motorized transport, or public transit access links and the projects are hard to deliver. These areas have "very low" potential.

Areas that lie in Quadrant I for two or more uses have high potential for joint use, while those that lie in Quadrant IV for two or more uses have "low" potential. All other cases indicate moderate potential for joint use.

## Corridor Level Analysis

The final step in the evaluation process combined segments into a smaller number of rail right-of-way corridors. This was especially important for evaluating passenger rail service potential where a specific segment length is required to make rail service viable. Combining segments into corridors required "smoothing" scores across segments. For example, the original segment evaluation of the in-service freight rail corridor from Fresno to Hanford showed a variety of "low (III)" and "very low (IV)" potential segments. When viewed as an entire corridor, as shown in Figure 4-7, the same corridor is shown as entirely "low (III)." By "smoothing" scores throughout a corridor, it is possible to evaluate entire areas

for potential service at the scale a project would ultimately be developed. As projects move towards further consideration, more detailed evaluation of conditions within the corridor will need to be considered.

## Evaluation Results

The evaluation process is not intended to be a project-level evaluation nor result in a specific ranking of projects. The statewide scope of the study makes it impossible to collect detailed information and conduct a detailed evaluation for each rail project. Evaluation results are based on available data that the project team compiled. Field verification of the data and collection of original data were beyond the resources of the study. In addition, some comments regarding the results of the evaluation will be addressed during a clean-up phase after the completion of this study.

Two criteria that were initially part of the evaluation, but ultimately could not be included in the final evaluation were factors measuring environmental concerns along a corridor and rail right-of-way width. Sufficient statewide data related to these two factors was not available at the time of the evaluation. This information will need to be included in project level analysis.

Results from the four evaluations show the specific ranking of each corridor. Corridors that had the highest potential for reuse or joint use tended to be located in urban areas where demand for passenger service, non-motorized transport or transit would be greatest. Trail results (Evaluations 2 and 4) often show higher potential in rural areas due to the connectivity of the trail system in the region and support of the local communities for new trail projects. Although relatively few corridors were ranked as “very low" potential in the evaluations, "medium" ranked corridors reflect low feasibility while "low" ranked corridors reflect low demand. This distinction is important to note when viewing the overall results. The potential for corridors in less populated parts of the state often rank “Low (III)” due to the fact that reuse or joint use is feasible, but there is not sufficient population density to support corridor level projects.

## Evaluation 1 Results

*In-operation rail right-of-way with potential for passenger service (current and proposed service)*

Most rail corridors in Evaluation 1 ranked "low (III)", which indicates a low demand for passenger service, but a high feasibility. Corridors with the highest potential for joint use were located in the San Francisco Bay Area, Fresno area, and Los Angeles County (see Figure 4-16). The results show a correlation between population and the demand for passenger rail service as the higher potential corridors are located in or near urban areas.

Results also show a "high" potential for passenger service in the corridor from the Barstow area to the Nevada border. Although this corridor is located largely in an unpopulated area, the rail line would provide an important link between the greater Los Angeles area and Las Vegas.

Few corridors in the state ranked "very low." However, the evaluation results indicated that passenger rail service between Ceres and Atwater in Stanislaus and Merced Counties ranked "very low" due to the close proximity to Amtrak's San Joaquins service.

### Figure 4-16 Evaluation 1 Results

| Subdivsion | County | Ranking | Description |
|---|---|---|---|
| Vallejo | Napa - Solano | I | High demand/high feasibility |
| Schellville | Solano | I | High demand/high feasibility |
| Tracy | Contra Costa - Stanislaus | I | High demand/high feasibility |
| Fresno (section) | Fresno | I | High demand/high feasibility |
| Clovis | Fresno | I | High demand/high feasibility |
| Cima | San Bernardino (to Las Vegas) | I | High demand/high feasibility |
| Mojave | San Bernardino | I | High demand/high feasibility |
| N/A (mp 495 - 517) | Los Angeles - Orange | I | High demand/high feasibility |
| Sant Ana Ind Lead | Los Angeles | I | High demand/high feasibility |
| Torrance Ind Lead | Los Angeles | I | High demand/high feasibility |
| Harbor | Los Angeles | I | High demand/high feasibility |
| Miramar | San Diego | I | High demand/high feasibility |
| | | | |
| Sacramento (section) | Yuba - Sacramento | II | High demand/low feasibility |
| Placerville Ind Lead | Sacramento | II | High demand/low feasibility |
| Santa Cruz | Santa Cruz | II | High demand/low feasibility |

| Subdivsion | County | Ranking | Description |
|---|---|---|---|
| Vasona Industrial Lead | Santa Clara | II | High demand/low feasibility |
| Fresno (section) | San Joaquin - Stanislaus | II | High demand/low feasibility |
| Stanton Ind Lead | Orange | II | High demand/low feasibility |
| Santa Ana Ind Lead | Los Angeles - Orange | II | High demand/low feasibility |
| Hollister Ind Lead | San Benito | II | High demand/low feasibility |
| Siskiyou | Siskiyou | III | Low demand/high feasibility |
| Modoc | Modoc | III | Low demand/high feasibility |
| Gateway | Modoc - Lassen | III | Low demand/high feasibility |
| Canyon | Plumas | III | Low demand/high feasibility |
| Sacramento | Plumas - Yuba | III | Low demand/high feasibility |
| Reno Ind Lead | Lassen | III | Low demand/high feasibility |
| Loyalton Ind Lead | Plumas | III | Low demand/high feasibility |
| West Valley | Tehama - Yolo | III | Low demand/high feasibility |
| Woodland | Yolo | III | Low demand/high feasibility |
| Napa Valley | Napa | III | Low demand/high feasibility |
| Sacramento | Sacramento - San Joaquin | III | Low demand/high feasibility |
| Ione Ind Lead | Sacramento - Amador | III | Low demand/high feasibility |
| Tidewater | San Joaquin | III | Low demand/high feasibility |
| Stockton | Contra Costa | III | Low demand/high feasibility |
| West Side | Stanislaus - Fresno | III | Low demand/high feasibility |
| Fresno (section) | Merced - Fresno | III | Low demand/high feasibility |
| Riverdale | Fresno | III | Low demand/high feasibility |
| Exeter | Fresno - Tulare | III | Low demand/high feasibility |
| Hanford | Fresno - Kings | III | Low demand/high feasibility |
| Mojave | Fresno - Los Angeles | III | Low demand/high feasibility |
| Lone Pine | Kern | III | Low demand/high feasibility |
| Buntwillow | Kern | III | Low demand/high feasibility |
| Cadiz | San Bernardino | III | Low demand/high feasibility |
| Blythe | Riverside | III | Low demand/high feasibility |
| Main Line | Santa Barbara | III | Low demand/high feasibility |
| Lucerne Valley | San Bernardino | III | Low demand/high feasibility |
| Brea Chem Ind Lead | Orange | III | Low demand/high feasibility |
| Harbor | Los Angeles | III | Low demand/high feasibility |
| Desert | San Diego - Imperial | III | Low demand/high feasibility |
| El Centro | Imperial | III | Low demand/high feasibility |
| Calexico | Imperial | III | Low demand/high feasibility |
| Tidewater | Stanislaus | IV | Low demand/low feasibility |
| Fresno (section) | Stanislaus - Merced | IV | Low demand/low feasibility |
| Lompoc Ind Lead | Santa Barbara | IV | Low demand/low feasibility |

## Evaluation 2 Results

*In-operation rail right-of-way with potential for joint-use for non-motorized transport or public transit access (current and proposed service)*

The project team recognizes the complexity of rails with trails joint use projects, especially in corridors where rail speeds are high and the widths of the right-of-way are small. Although this evaluation takes into consideration maximum train speeds, there was not sufficient statewide data regarding rail right-of-way widths to include as criteria.

The results from Evaluation 2 show "high" potential for joint use throughout the state. In most cases, joint use projects were feasible due to a number of factors including level of interest from local communities and the relatively small number of railroad crossings on the corridor. Demand for projects in the less populated areas of the state proved to be lower, resulting in a number of “low (III)” ranked corridors in rural areas such as Lassen and eastern San Bernardino Counties.

Since non-motorized and transit projects are primarily local projects, a table representing corridor results will not be displayed for Evaluation 2. The geographic representation of the results is displayed in Figures 4-9 and 4-10.

## Evaluation 3 Results

*Out-of-operation and abandoned railroad right-of-way with potential for passenger rail service*

Demand for passenger rail service in Evaluation 3 was relatively low. Although corridors in Alameda and Contra Costa Counties had "high" potential for passenger rail service, most rail corridors across the state ranked either “low (III)” or “very low” (see Figure 4-17). The evaluation results show low demand for passenger service in less populated areas (Modoc, Lassen, and Imperial Counties) and along corridors that run parallel to existing Amtrak or commuter service.

## Figure 4-17 Evaluation 3 Results

| Subdivsion | County | Ranking | Description |
|---|---|---|---|
| Colma/Dublin | Alameda - San Joaquin | I | High demand/high feasibility |
| Tracy | Contra Costa - Alameda | I | High demand/high feasibility |
| Main Line (section) | Marin | I | High demand/high feasibility |
| N/A | Riverside | I | High demand/high feasibility |
| Coronado | San Diego | I | High demand/high feasibility |
| Main Line (section) | Mendocino - Sonoma | II | High demand/low feasibility |
| Martinez (section) | Solano | II | High demand/low feasibility |
| Tidewater (section) | Stanislaus | II | High demand/low feasibility |
| N/A | Los Angeles (mp 438 - 450) | II | High demand/low feasibility |
| N/A | San Bernardino | II | High demand/low feasibility |
| Fallbrook - Camp Pendleton | San Diego | II | High demand/low feasibility |
| N/A | Siskiyou - Modoc | III | Low demand/high feasibility |
| Hambone Line | Siskiyou - Modoc | III | Low demand/high feasibility |
| N/A | Butte | III | Low demand/high feasibility |
| Main Line (section) | Humboldt - Mendocino | III | Low demand/high feasibility |
| N/A | Colusa | III | Low demand/high feasibility |
| Martinez (section) | Yolo | III | Low demand/high feasibility |
| N/A (mp 3-15) | Sacramento | III | Low demand/high feasibility |
| N/A | Sutter | III | Low demand/high feasibility |
| N/A (mp 113-143) | Calaveras | III | Low demand/high feasibility |
| N/A (mp 109-130) | San Joaquin - Stanislaus | III | Low demand/high feasibility |
| N/A (mp 5-16) | Fresno | III | Low demand/high feasibility |
| Clovis (section) | Fresno | III | Low demand/high feasibility |
| N/A (mp 12-30) | Tulare | III | Low demand/high feasibility |
| Sunset | Kern | III | Low demand/high feasibility |
| N/A | Kern - Inyo | III | Low demand/high feasibility |
| N/A | Orange | III | Low demand/high feasibility |
| N/A | Riverside | III | Low demand/high feasibility |
| N/A | Siskiyou | IV | Low demand/low feasibility |
| Modoc (section) | Modoc - Lassen | IV | Low demand/low feasibility |
| Susanville Branch | Lassen | IV | Low demand/low feasibility |
| Main Line (section) | Humboldt | IV | Low demand/low feasibility |
| N/A | Butte | IV | Low demand/low feasibility |
| N/A | Glenn | IV | Low demand/low feasibility |
| N/A | Sacramento | IV | Low demand/low feasibility |
| N/A (mp 111-147) | El Dorado | IV | Low demand/low feasibility |
| Schellville | Sonoma - Napa | IV | Low demand/low feasibility |
| Main Track | Sacramento - San Joaquin | IV | Low demand/low feasibility |
| Loma Spur | Tulare | IV | Low demand/low feasibility |
| Tulare Valley | Tulare | IV | Low demand/low feasibility |
| N/A | Los Angeles | IV | Low demand/low feasibility |
| Westmoreland | Imperial | IV | Low demand/low feasibility |

## Evaluation 4 Results

*Out-of-operation and abandoned railroad right-of-way with potential for non-motorized and public transit links*

Evaluation 4 shows a high potential for non-motorized transport and public transit access links along the abandoned and out-of-operation rail lines. Corridors in or near urban areas represent key transit access and bicycle/pedestrian opportunities in rail right-of-way without active service. Although no corridors ranked "very low" in Evaluation 4, several corridors in far Northern California had low demand for reuse opportunities.

Since non-motorized and transit projects are primarily local projects, a table representing corridor results will not be displayed for Evaluation 4. The geographic representation of the results is displayed in Figures 4-13 and 4-14.

## Conclusion

The database developed for this project represents the most comprehensive unified source of information about rail right-of-way in the State of California. Combined with the demographic, and other data collected for evaluation, this presents a rich source of information at the statewide level. While this database is an important accomplishment, it is important to remember that information does constantly change, and must be maintained to retain its relevance. Continued input from stakeholders and interested parties should play an important role in the evolution of the database. A well defined public input process combined with a scheduled database maintenance program will allow the database to stay current and continue to be a useful tool for Caltrans and the public.

Over time, improvements and refinement to the database created for this study should also be addressed. Most importantly, a comprehensive validation of all of the rail milepost designations will need to be completed. Over the course of the study, the project team identified more than half of the beginning and ending mileposts designations for segments in the system; however, a complete database of mileposts will prove to be an important reference tool for future users. Also, rail-highway grade crossing locations and information should be added to the database. Finally, comprehensive information regarding rail right-of-way widths will also need to be added to the database as it will play an important role in evaluating rail right-of-way for joint use projects.

Rail rights-of-way represent a major opportunity for maintaining and enhancing mobility in California at a time when land is at a premium. This report represents a first step in preserving right-of-way with potential for success for a variety of alternative modes. As projects are considered, additional detail will be added to the database to more realistically evaluate the challenges of implementing a joint use or reuse project in a specific corridor. The primary conclusion from this evaluation is that every effort should be applied to maintain this critical resource for the public benefit as transportation demands outpace our ability to provide capacity.

# APPENDIX A

# GLOSSARY OF GIS TERMS

# APPENDIX A GLOSSARY OF GIS TERMS

| | |
|---|---|
| **Attribute Table** | A table containing descriptive attributes for a set of map features, usually arranged so that each row represents a feature and each column represents one attribute. |
| **GIS** | Geographic Information Systems is an organized collection of computer hardware, software, geographic data, and personnel designed to capture, store, manipulate, analyze, and display all forms of geographically referenced information. |
| **Map Features** | GIS map features are representations of real-world objects. They consist of points, lines, or polygons. |
| **Metadata** | Metadata is literally the data about data. It documents specifications for each element of the GIS database including the identification of source data, positional accuracy, date of last update, projection, coordinate system, etc. |
| **Populating** | Adding information to the attribute table, such as "status" or "tracktype." |
| **Segment** | A line that connects two points. Each segment in the Rail shapefile has a unique ID. |
| **Shapefile (layer)** | A type of file used for storing the location, shape, and attributes of geographic features. Extensions with a shapefile are .shp, .shx, .dbf, and can contain other if additional spatial queries have been made to the shapefile. |
| **Spatial Query** | The interrogation of a database. In the GIS context it is possible to query both the spatial database and the attribute database. An example of a spatial query is "show me all of the active rails within ¼ mile of a major destination". An example of an attribute query is "show me all of the rail segments with status as active." |
| **Tabular Data** | Descriptive information that is stored in rows and columns and can be linked to map features. |
| **Primary Key (Unique ID)** | The attribute column that uniquely identifies each row in a table, such as the unique number assigned to each rail segment in the state. |

# APPENDIX B

# RAIL RIGHT-OF-WAY OWNERS AND OPERATORS

# APPENDIX B RAIL RIGHT-OF-WAY OWNERS AND OPERATORS

| Code | Name |
|---|---|
| ABL | Alameda Belt Line |
| AL | Almanor Railroad Company |
| AMF | Amador Foothills Railroad (abandoned) |
| AMR | Arcata & Mad River Railroad (NCRA) |
| AMTZ | Amtrak |
| AZRC | Arizona and California Railroad Company |
| BAER | Bay Area Electric Railway (Western Railway Museum) |
| BART | Bay Area Rapid Transit |
| BNSF | Burlington Northern Santa Fe |
| CFNR | California Northern Railroad |
| CSRM | California State Railroad Museum |
| CCT | Central California Traction |
| CORP | Central Oregon and Pacific Railroad |
| CSRM | California Railroad Museum |
| CWR | California Western Railroad (Sierra Railroad) |
| CZRY | Carrizo Gorge Railway |
| FWRY | Fillmore and Western Railroad |
| GOVT | US Government/Military Railroad |
| JPBX | Peninsula Corridor Joint Powers Board transit, Caltrain |
| | San Mateo and Santa Clara Counties, freight |
| LCR | Lake County Railroad |
| LAJ | Los Angeles Junction Railway |
| MCR | McCloud Railway |
| MET | Modesto-Empire Traction |
| MTDB | Metropolitan Transit Development Board |
| NCRA | North Coast Railroad Authority |
| NCTD | North County Transit District (Coaster) |
| NVRR | Napa Valley Railroad |
| NCRY | Niles Canyon Railway |
| NWP | Northwestern Pacific Railroad |

| Code | Name |
|---|---|
| OERM | Orange Empire Railway Museum |
| OTR | Oakland Terminal Railway |
| PHL | Pacific Harbor Lines |
| PSRM | Pacific Southwest Railroad Museum |
| QRR | Quincy Railroad |
| RPRC | Richmond Pacific Railroad |
| RCBT | Roaring Camp & Big Trees Railroad |
| SSR | Sacramento Southern (California State Museum Railroad) |
| SDAE | San Diego & Arizona Eastern |
| SDIY | San Diego & Imperial Valley |
| SJVR | San Joaquin Valley Railroad |
| SCBG | Santa Cruz, Big Tree & Pacific RR |
| SMV | Santa Maria Valley Railroad |
| SERA | Sierra Railroad |
| SCRA | Southern California Regional Rail Authority (Metrolink) |
| SJRX | San Joaquin Regional Rail Commission (Altamont Commuter Express) |
| SN | Sacramento Northern Railroad |
| SP | Southern Pacific Transportation Company (abandoned) |
| SPBR | Stockton Public Belt (Port of Stockton) |
| STE | Stockton Terminal & Eastern Railroad |
| SUN | Sunset Railway (abandoned) |
| SWPX | Southwest Portland Cement Railroad |
| TRC | Trona Railway Co. |
| TS | Tidewater Southern |
| TVRR | Tulare Valley Railroad |
| UP | Union Pacific Railroad |
| VCTC | Ventura County Transportation Commission |
| VCRR | Ventura County Railroad |
| WFS | West Isle Line Incorporated |
| YMSP | Yosemite Mountain Sugar Pine Railroad |
| YSLR | Yolo Short Line RR (Sierra Railroad) |
| YW | Yreka Western Railroad |