LOSSAN
NORTH CORRIDOR STRATEGIC PLAN

LOSSAN

Caltrans

LOS ANGELES - VENTURA - SANTA BARBARA - SAN LUIS OBISPO

Final – October, 2007

IBI GROUP

LOSSAN Rail Corridor Agency / California Department of Transportation

LOSSAN NORTH STRATEGIC PLAN

FINAL - OCTOBER 2007

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1 EXECUTIVE SUMMARY

The LOSSAN North Rail Corridor runs from Los Angeles to San Luis Obispo. It is the 222-mile northern portion of the 351-mile-long Los Angeles-San Diego-San Luis Obispo (LOSSAN) rail corridor, one of the busiest in the nation.[1] It serves a vital function in providing a rail link between the metropolitan areas of Southern California, the Central Coast, and the nation. It is home to intercity passenger rail, commuter rail, and freight rail services. **Figure ES-1** shows the LOSSAN North Rail Corridor study area and the rail services which operate over it.

The LOSSAN Rail Corridor Agency (LOSSAN) "is composed of elected officials representing rail owners, operators, and planning agencies along Amtrak's *Pacific Surfliner* corridor between San Diego and San Luis Obispo. The objective of the agency is to coordinate planning and programs that increase ridership, revenue, reliability, and safety on the coastal rail line from San Luis Obispo to Los Angeles to San Diego."[2]

The California Department of Transportation (Department), through its Division of Rail provides support to three California intercity rail services, including the *Pacific Surfliner*. This support includes planning and financial assistance for capital and operating expenses, consistent with its mission to "provide and promote intercity passenger rail services while improving, expanding, and integrating all rail service into California's transportation system."[3] The Department, in cooperation with LOSSAN, have determined that a Strategic Plan for the northern portion of the LOSSAN corridor is an important companion piece to the Strategic Plan previously completed in October 2003 for the 129-mile-long southern portion of the LOSSAN corridor between Los Angeles and San Diego (note that these will be referred to as LOSSAN North and LOSSAN South).

1.1 Objectives of the LOSSAN North Strategic Plan

The objectives of the LOSSAN North Strategic Plan include:

- Fostering better communication and understanding among stakeholders (owners and operators of the rail corridor, governmental agencies, elected representatives, and the public) about prioritization of needs, projects, and timelines for the corridor's improvement,
- Developing a plan for the continued improvement of the northern segment of the LOSSAN corridor between Los Angeles and San Luis Obispo that complements the LOSSAN South Strategic Plan,
- Developing an expanded corridor-wide summary document which integrates the major findings from both the LOSSAN South and LOSSAN North documents,
- Identifying project needs, benefits, and priorities, and
- Drafting an overall timeline and schedule for future projects.

[1] For planning purposes, the 351-mile LOSSAN corridor is split at Union Station in Los Angeles, with the 129-mile LOSSAN South portion running through south LA County, Orange, and San Diego counties, and, the 222-mile LOSSAN North portion operating in north LA County, Ventura, Santa Barbara, and San Luis Obispo counties.
[2] http://www.lossan.org
[3] http://www.amtrakcalifornia.com/rail/go/dor/index.cfm

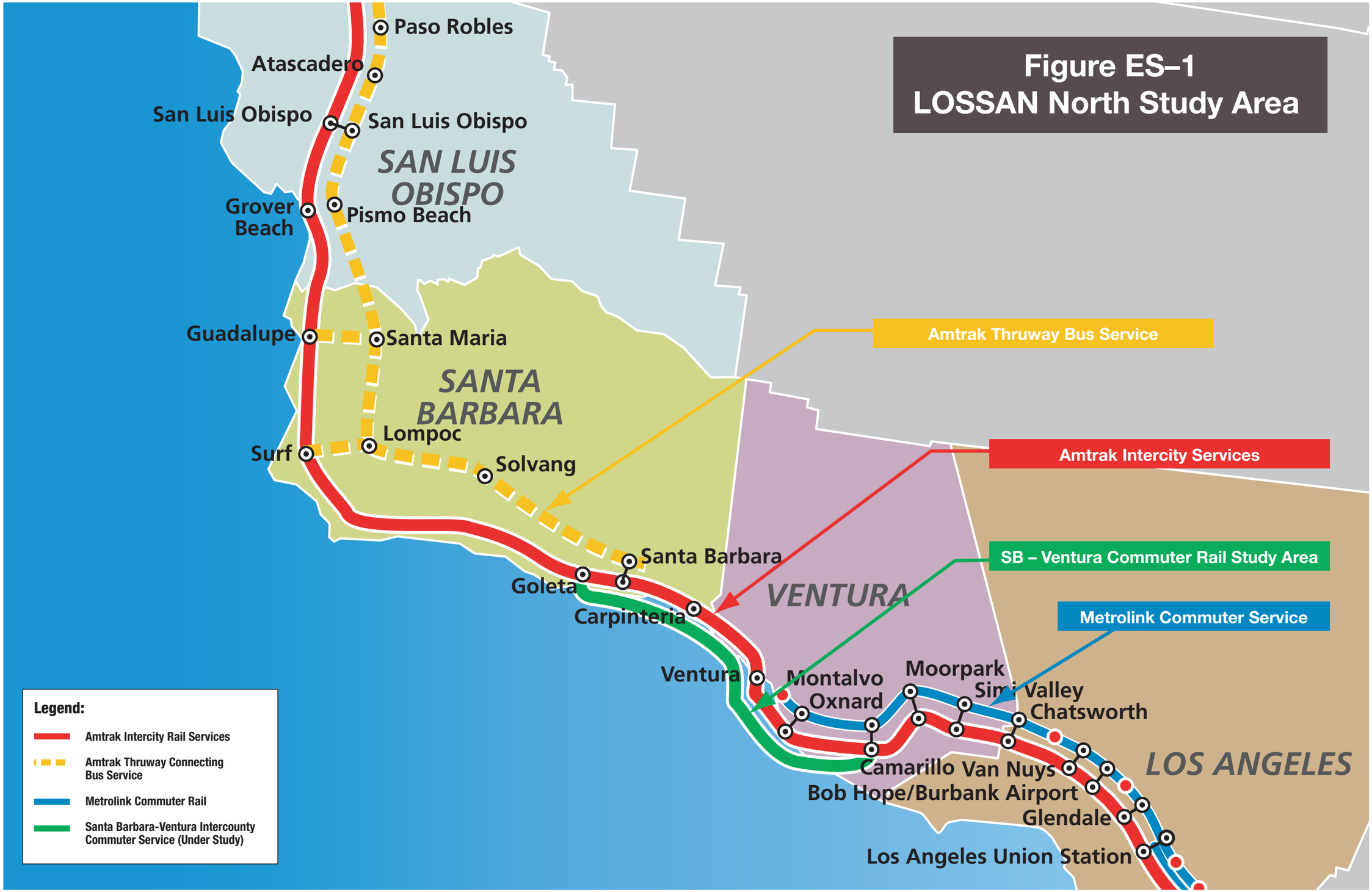
Figure ES–1
LOSSAN North Study Area
Paso Robles
Atascadero
San Luis Obispo
San Luis Obispo
SAN LUIS OBISPO
Grover Beach
Pismo Beach
Guadalupe
Santa Maria
SANTA BARBARA
Lompoc
Surf
Solvang
Santa Barbara
Goleta
Carpinteria
VENTURA
Ventura
Montalvo
Oxnard
Moorpark
Simi Valley
Chatsworth
Camarillo
Van Nuys
Bob Hope/Burbank Airport
Glendale
Los Angeles Union Station
LOS ANGELES
Amtrak Thruway Bus Service
Amtrak Intercity Services
SB – Ventura Commuter Rail Study Area
Metrolink Commuter Service
Legend:
Amtrak Intercity Rail Services
Amtrak Thruway Connecting Bus Service
Metrolink Commuter Rail
Santa Barbara-Ventura Intercounty Commuter Service (Under Study)

1.2 Overview of the LOSSAN North Corridor

The LOSSAN North rail corridor runs through four California counties:

- Los Angeles,
- Ventura,
- Santa Barbara, and
- San Luis Obispo.

The rail line traverses some of California's most scenic and environmentally-sensitive areas, including extended portions directly adjacent to the Pacific Ocean, and opportunities for expansion are limited. The northern LOSSAN corridor is largely single-tracked (80%) and is less developed than the southern portion between Los Angeles to San Diego, in terms of the track and signaling system. The rail line was initially laid in the latter portion of the 19th century and early 20th century. While the corridor is strenuously maintained to Federal Railroad Administration (FRA) standards, there are locations in the corridor which still have jointed track rather than continuously-welded rail, older signaling systems which require trains to wait for dispatcher approval by radio in order to advance, and even hand-thrown switches[4] rather than electrically-operated switches (also called turnouts). All of these reduce the maximum speed at which trains can travel, and increase the total travel time. Additionally, the long stretches of single-track and relatively short sidings currently found in many locations on the corridor require passenger trains to wait for longer freight trains to clear a section before continuing.

1.3 Corridor Ownership

The LOSSAN rail corridor is owned by a number of regional and local agencies, as well as by private freight railroad companies. From north to south, the Union Pacific (UP) Railroad (as part of its acquisition of the Southern Pacific Railroad in 1996) owns 175 miles of the 222-mile LOSSAN North corridor between San Luis Obispo and Moorpark. Ventura County Transportation Commission (VCTC), a member agency of the Southern California Regional Rail Authority (SCRRA, operator of Metrolink commuter rail service), owns 40 feet of the width of the 100-foot-wide Right-of-Way (ROW) from Moorpark to the Ventura/Los Angeles County Line, with UP owning the other 60 feet. The Los Angeles County Metropolitan Transportation Authority (MTA), also an SCRRA member agency, owns 40 feet of the width of the ROW from the Ventura/Los Angeles County Line to Burbank Junction, with UP owning the other 60 feet. Both SCRRA and UP have trackage rights. MTA owns 100% of the Right-of-Way (ROW) between Burbank Junction and Los Angeles Union Station.

Within SCRRA member agency-owned portions of the corridor, SCRRA provides dispatching and maintenance; UP pays SCRRA a fee for these functions related to the number of trains it operates in this section. In the UP-owned section of the corridor, UP provides dispatching and maintenance, and Amtrak pays a fee related to the number of trains it operates.

1.4 Rail Services along the LOSSAN North Corridor

A number of rail services operate on the LOSSAN North corridor. Amtrak's *Pacific Surfliner* (operated with state funding) is the primary intercity passenger rail service, and runs between San Luis Obispo, Santa Barbara, Ventura, and Los Angeles (with additional service to Orange County and San Diego). Amtrak's *Coast Starlight* (service between Los Angeles, the Bay Area, and Portland/Seattle, in addition to stops within the LOSSAN North corridor) also operates on the

[4] A switch allows a train to move from one track to another, such as between a main line track and a siding. Hand-thrown switches require the train to stop and for a member of the crew to manually align the switch. The train moves forward through the switch, and then waits again for the crew member to reset the switch into the default position and reboard the train.

corridor. Commuter rail service between Los Angeles and Ventura is provided by Metrolink. UP operates freight and goods movement service along the corridor.

The total number of trains running over the LOSSAN North rail corridor is expected to double over the next 20 years as existing intercity and commuter passenger rail services add frequencies to accommodate increased demand for business and recreational travel, and as freight service grows to accommodate increased goods movement.

Another potential service that could add to the train volumes on the corridor is new commuter rail service between Ventura and Santa Barbara Counties. As part of the development of the Strategic Plan, an assessment of alternatives for providing a rail-based commute option was conducted. This assessment and an associated ridership forecast are provided as **Appendix B**.

1.5 Impacts of Increased Rail Traffic on the LOSSAN North Corridor

The impacts of increased rail traffic on the LOSSAN North corridor are many. Without improvements to increase capacity (such as the projects under study in this Strategic Plan), there is a limit to the number of trains per day that can run on the existing single-track rail corridor. A rise in rail traffic volumes would impact reliability and on-time performance for all trains (intercity and commuter passenger rail, and freight), and increase trip times due to delays. Ultimately, capacity issues would preclude the expanded train volumes needed to meet demand and improve passenger rail service.

Over the next 20 years, planned expansions in existing intercity passenger rail and commuter rail services, as well as increases in freight rail service, will require an improved LOSSAN North corridor in order to efficiently operate. In addition to the existing rail services and potential expansions, two new services are proposed and/or under study[5]. It is in this context that potential improvements to the LOSSAN North rail corridor are considered.

1.6 Purpose and Need for Improvements

The purpose of improvements to the LOSSAN North rail corridor is to help meet the current and projected demand for travel within and between metropolitan areas of Southern California and the Central Coast between now and the Year 2025 by:

- Improving rail capacity to meet demand for all types of rail services, including: intercity, commuter, and freight/goods movement;
- Developing the LOSSAN North rail corridor in order to provide faster, safer, and more reliable passenger rail service; and
- Making rail travel a more-viable transportation alternative.

The need for improvements to the LOSSAN North corridor is driven by several factors, including:

- Growth in population, employment, and travel demand: Over the next 20 years, California's population is projected to rise from approximately 37.4 million in 2006 to over 46.4 million by 2025[6]. The LOSSAN North corridor has seen a dramatic increase in population, especially in Ventura County. Employment within the study area has also increased demand for travel. Major employment centers are found throughout the corridor, including within the metropolitan Los Angeles area, and in areas of Ventura, Santa Barbara, and San Luis Obispo Counties. Longer automobile commutes and increased traffic congestion on Highway 101, which generally parallels the rail line throughout the corridor, contribute to the demand for additional transportation alternatives.

[5] A discussion of these new services can be found in Section 4.4.
[6] Source: California Department of Finance, March 2007

- Capacity of the intercity transportation system: Current capacity is inadequate to meet the projected increase in travel demand, as well as the rising demand for goods movement as our economy (both in California and nationally) relies increasingly on imported goods shipped to Southern California ports and carried by rail.
- Travel time is an important factor of mode choice: The current travel time by rail between Los Angeles and Santa Barbara averages 2 hours 45 minutes, while Los Angeles to San Luis Obispo averages approximately 5 hours 35 minutes. The rail improvement projects in this Strategic Plan could reduce total travel time between Los Angeles, Santa Barbara, and San Luis Obispo by as much as 25 percent.
- Reliability: Maintaining on-time performance is a key consideration, and delays in one portion of the corridor have a ripple effect elsewhere. The *Pacific Surfliner*'s on-time performance goal for fiscal years 2006-2007 is 82%. Currently, on-time performance is less than that, and the projects in this Strategic Plan would significantly increase reliability and on-time performance.
- Cost-effectiveness: The State of California supports the *Pacific Surfliner* service. Improvements that increase capacity, reduce travel time, and improve reliability help maintain and attract ridership on the service. Additional ridership maximizes the cost-effectiveness of the state's funding (by reducing subsidies), allowing funds to be used on other rail improvements or to expand service.

Moreover, the efficiencies as a result of rail improvements carry over to all users of the rail corridor, and benefit commuter rail and freight services as well, making them even more cost-effective.

1.7 The Study Process

The Strategic Plan's development has been overseen by a Technical Working Group (TWG), comprising members of the LOSSAN Technical Advisory Committee (LOSSAN TAC). TWG members include representatives from:

- The Department's Division of Rail;
- LOSSAN Rail Corridor Agency (with staffing support provided through the San Diego Association of Governments - SANDAG);
- Ventura County Transportation Commission (VCTC);
- Santa Barbara County Association of Governments (SBCAG);
- San Luis Obispo Council of Governments (SLOCOG);
- Amtrak;
- Southern California Regional Rail Authority (SCRRA); and
- Union Pacific Railroad (UP).

The Draft LOSSAN North Strategic Plan was released in June 2005. Following a period of review and comment, the document was in the process of being finalized when the Department decided to incorporate into the Strategic Plan an analysis of potential alternatives for a Commuter Rail service between Ventura and Santa Barbara Counties, and to undertake detailed rail capacity modeling.

This rail capacity modeling has been a comprehensive and extremely valuable effort, in that it has refined and validated the program of projects contained in the Strategic Plan, as well as identified additional rail improvement projects needed to support rail services in the corridor. The complete Rail Modeling Report is provided as **Appendix C**.

1.8 Public Outreach Effort

The Public Outreach effort held during the Strategic Plan's development has been extensive and on-going. In March 2005, four public information meetings were held in corridor cities: one in Ventura County (Oxnard), two in Santa Barbara County (Santa Barbara and Santa Maria), and one in San Luis Obispo County (San Luis Obispo). These meetings provided attendees with an overview of the corridor and the rail improvements under study, including information on:

- The study context – the purpose of the study and the need for improvements to the corridor;
- Rail corridor facts;
- Current and projected train volumes (of existing and proposed rail services);
- Types of rail improvements under consideration;
- Existing timeline for proposed projects by county (San Luis Obispo, Santa Barbara, Ventura, and Los Angeles); and
- The planning process / next steps.

At each meeting, staff representing the Department, LOSSAN, the local transportation agency (VCTC, SBCAG, or SLOCOG), and the consultant were available to answer questions.

Additionally, status reports of the project and interim deliverables have been provided at LOSSAN joint powers authority (JPA) Board of Directors meetings, LOSSAN TAC meetings, and through specific presentations in the LOSSAN North Corridor. **Appendix A** provides a complete list of meetings held, including their dates and locations.

1.9 Rail Improvement Projects

As noted above, the recommended rail improvement projects described in this plan have been developed based on the results of extensive rail capacity modeling. This modeling effort simulated rail operations on the LOSSAN North corridor, and assessed operational impacts at proposed rail service levels. New infrastructure was added to the modeling where needed in order to facilitate more efficient train movements and to ensure that the network could support the proposed rail traffic volumes at an acceptable level of performance.

The rail modeling looked at three different time periods:

- 2006 – This established the Base Case, and modeled current train volumes for existing intercity, commuter, and freight services.
- 2015 – The cases in this time period examined the impacts of existing and new intercity services, expanded commuter rail service, and growth in freight services, as well as reviewed the three Ventura-Santa Barbara Inter-county Commuter Rail service alternatives.
- 2025 – The cases in this time period examined the impacts of proposed additional frequencies for all rail services over and beyond those proposed for 2015.

Many of the projects described in this plan were initially developed as part of the 2001 Amtrak-sponsored 20-Year Plan, and their need was validated by the rail modeling. These projects include: track and signal upgrades, construction of second main tracks, sidings and siding extensions, curve realignments, and other corridor-wide improvements. Other projects developed in the Amtrak 20-Year Plan, while not required from a rail capacity standpoint, would improve reliability and passenger comfort, as well as reduce travel time. These projects are included as "Non-Capacity

Related Projects." This document provides descriptions of all rail improvement projects studied, the proposed timeline for their potential construction/implementation, and their estimated costs.

The rail improvement projects are described in this document from north to south and organized by county, beginning with projects in San Luis Obispo County and ending with projects at Los Angeles Union Station. **Figures ES-2** and **ES-3** show the generalized locations of all the rail improvement projects studied in this plan, both those capacity projects identified through the rail modeling effort and those non-capacity projects identified through the Amtrak 20-Year Plan, respectively.

1.10 Timeline for Projects

The timeline for the projects identified in this plan are prioritized into three phases:

- Immediate – Projects in this category should be completed within 1 to 3 years, and are derived from the results of what is needed now as a result of the 2006 Base Case modeling.
- Near-term – Projects in this category should be completed within 4 to 8 years, to accommodate future train capacity needs derived from the 2015 modeling cases.
- Vision – Projects in this category would be completed within 9 to 20 years, to accommodate future train capacity needs derived from the 2025 modeling cases.

The proposed timeline category for each project assumes that funding for the projects would be available and programmed, and that each project had obtained all necessary environmental clearances and permits.

Figure ES–2
Capacity Projects
San Luis Obispo to Goleta – Continuous CTC
Paso Robles
Atascadero
San Luis Obispo
San Luis Obispo
SAN LUIS OBISPO
Grover Beach
Pismo Beach
Guadalupe
Santa Maria
SANTA BARBARA
Lompoc
Surf
Solvang
Santa Barbara
Goleta
Carpinteria
VENTURA
Ventura
Montalvo
Oxnard
Moorpark
Simi Valley
Chatsworth
Camarillo
Van Nuys
Bob Hope/Burbank Airport
Glendale
Los Angeles Union Station
LOS ANGELES
Guadalupe Siding Extension and Island CTC
Waldorf Siding Extension and Island CTC
Island CTC – Narlon, Honda, Concepcion
Capitan Siding Extension and Island CTC
Goleta Service Track Extension
Ortega Siding
Tangair – Siding Extension and Island CTC
Sandyland Siding
SB – Ventura Siding
Carpinteria Siding
Rincon Siding
Seacliff Siding Extension
Oxnard North Platform
Leesdale Siding Extension
Oxnard to Camarillo 2nd Main Track
CP Las Posas – MP 423 2nd Main Track
North Camarillo Crossover
Simi Valley to CP Strathearn 2nd Main Track
CP Davis to Simi Valley Station 2nd Main Track
CP Raymer to CP Bernson Second Main Track
Van Nuys North Platform
Burbank Junction Track Realignment
L.A. Union Station Run-Through Tracks
Legend:
Amtrak Intercity Rail Services
Amtrak Thruway Connecting Bus Service
Metrolink Commuter Rail
Santa Barbara-Ventura Intercounty Commuter Service (Under Study)
Recommended Project Implementation Timeline:
2006
2015
2025

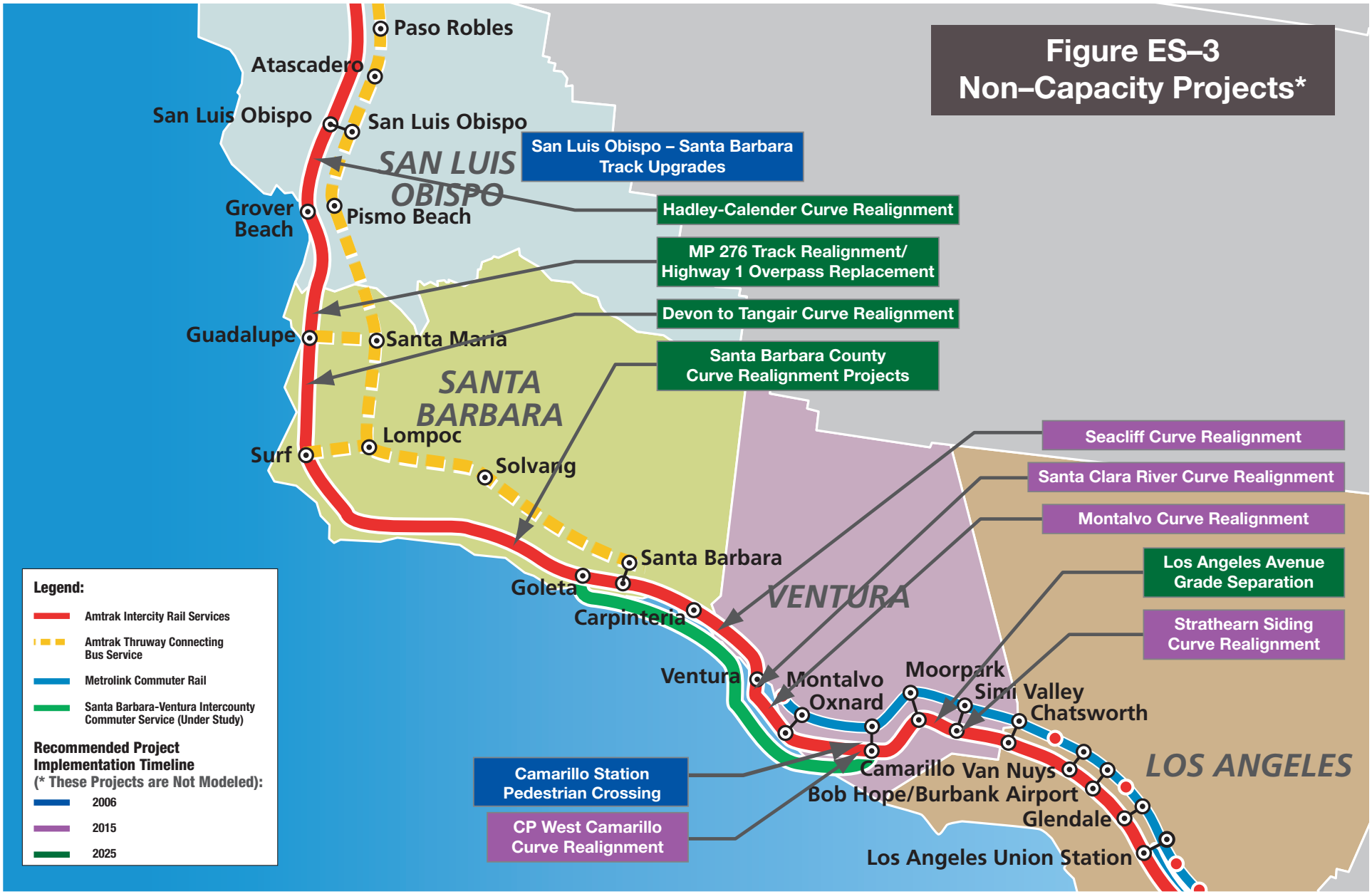
Figure ES–3
Non–Capacity Projects*
Paso Robles
Atascadero
San Luis Obispo
San Luis Obispo
SAN LUIS OBISPO
Grover Beach
Pismo Beach
Guadalupe
Santa Maria
SANTA BARBARA
Lompoc
Surf
Solvang
Santa Barbara
Goleta
Carpinteria
VENTURA
Ventura
Montalvo
Oxnard
Moorpark
Simi Valley
Chatsworth
Camarillo
Van Nuys
Bob Hope/Burbank Airport
Glendale
Los Angeles Union Station
LOS ANGELES
San Luis Obispo – Santa Barbara Track Upgrades
Hadley-Calender Curve Realignment
MP 276 Track Realignment/ Highway 1 Overpass Replacement
Devon to Tangair Curve Realignment
Santa Barbara County Curve Realignment Projects
Seacliff Curve Realignment
Santa Clara River Curve Realignment
Montalvo Curve Realignment
Los Angeles Avenue Grade Separation
Strathearn Siding Curve Realignment
Camarillo Station Pedestrian Crossing
CP West Camarillo Curve Realignment
Legend:
Amtrak Intercity Rail Services
Amtrak Thruway Connecting Bus Service
Metrolink Commuter Rail
Santa Barbara-Ventura Intercounty Commuter Service (Under Study)
Recommended Project Implementation Timeline
(* These Projects are Not Modeled):
2006
2015
2025

A complete description of the proposed rail improvement projects can be found in **Section 7**. **Tables ES-1** through **ES-4** identify rail improvement projects by the county in which they are located, their proposed timeline category: **Table ES-5** through **ES-8** categorize improvements by their recommended timeline for implementation: Immediate, Near-term, or Vision.

Table ES-1
San Luis Obispo County Projects

Project Number	Project Name	Current Timeline	Estimated Project Cost
SLO-1	San Luis Obispo – Santa Barbara Track Upgrades	Immediate	$50M
SLO-2	San Luis Obispo – Goleta – Continuous CTC	Vision	$80M
SLO-3	Hadley – Calendar Curve Realignments	Vision	$200M
	Estimated Total – San Luis Obispo County Projects		**$330M**

Table ES-2
Santa Barbara County Projects

Project Number	Project Name / Project Type	Current Timeline	Estimated Project Cost
SB-01	MP 276 Track Realignment and Highway 1 Overpass Replacement	Vision	$62M
SB-02	Guadalupe Siding Extension and Island CTC	Near-Term	$20M
SB-03	Waldorf Siding Extension and Island CTC	Near-Term	$12M
SB-04	Devon to Tangair Curve Realignments	Vision	$196M
SB-05	Tangair Siding Extension and Island CTC	Near-Term	$12M
SB-06	Santa Barbara County Curve Realignment Projects	Vision	$677M
SB-07	Narlon, Honda, Concepcion – Island CTC	Near-Term	$30M
SB-08	Capitan Siding Extension and Island CTC	Near-Term	$10M
SB-09	Goleta Service Track Extension	Near-Term	$10M
SB-10	Sandyland Siding	Near-Term	$15M
SB-11	Ortega Siding*	Near-Term	$20M
SB-12	Carpinteria Siding*	Near-Term	$10M
	Total Estimated Cost for Santa Barbara County Projects		**$1.1B**

* Depending on which siding project was selected to be completed as an either Immediate or Near-Term project, Ortega or Carpinteria Siding.

Table ES-3
Ventura County Projects

Project Number	Project Name / Project Type	Current Timeline	Estimated Project Cost
V-01	Rincon Siding	Vision	$10M
V-02	Seacliff Siding North	Near-Term	$18M
V-03	Seacliff Curves Realignments	Near-Term	$10M
V-04	Santa Clara River Curve Realignment	Near-Term	$6M
V-05	Montalvo Curve Realignments	Near-Term	$2M
V-06	Oxnard North Platform	Vision	$8-$15M[7]
V-07	Leesdale Siding Extension	Immediate*	$15M
V-08	Oxnard-Camarillo Second Main Track	Vision	$15M
V-09	North Camarillo Crossover	Vision	$1M
V-10	CP West Camarillo Curve Realignments	Near-Term	$5M
V-11	Camarillo Station Pedestrian Crossing	Immediate*	$1M
V-12	CP Las Posas to MP 423 Second Main Track	Vision	$51M
V-13	Simi Valley to CP Strathearn Second Main Track	Vision	$42M
V-14	Strathearn Siding Curve Realignment	Near-Term	$1M
V-15	Los Angeles Avenue Grade Separation	Vision	$93M
V-16	CP Davis to Simi Valley Station Second Main Track	Vision	$36M
	Total estimated costs for Ventura County Projects		**$314-321M**

* Project categorized from “Near-Term” based on capacity modeling, to “Immediate” based on local financial commitment.

Table ES-4
Los Angeles County Projects

Project Number	Project Name / Project Type	Current Timeline	Estimated Project Cost
LA-01	CP Raymer to CP Bernson Second Main Track	Immediate	$47M
LA-02	Van Nuys North Platform	Immediate	$13-$26M
LA-03	Burbank Junction Track Realignment	Vision	$9M
LA-04	Union Station Run-Through Tracks	Near-Term	$640M
	Total estimated costs for Los Angeles County Projects		**$709-722M**

[7] The estimated project cost is provided as a range. Costs would depend on whether an above-grade or below-grade pedestrian crossing was selected.

Table ES-5
Immediate Projects

Project Number	Project Name	Current Timeline	Estimated Project Cost
SLO-1	San Luis Obispo – Santa Barbara Track Upgrades	Immediate	$50M
SB-11 **or** SB-12	Santa Barbara – Ventura Siding (Ortega or Carpinteria Siding)*	Immediate	$10-20M
V-07	Leesdale Siding Extension**	Immediate	$15M
V-11	Camarillo Station Pedestrian Crossing**	Immediate	$1M
LA-01	CP Raymer to CP Bernson Second Main Track	Immediate	$47M
LA-02	Van Nuys North Platform	Immediate	$13-26M
	Estimated Total – Immediate Projects		**$136-159M**

Table ES-6
Near-Term Projects

Project Number	Project Name	Current Timeline	Estimated Project Cost
SB-02	Guadalupe Siding Extension and Island CTC	Near-Term	$20M
SB-03	Waldorf Siding Extension and Island CTC	Near-Term	$12M
SB-05	Tangair Siding Extension and Island CTC	Near-Term	$12M
SB-07	Narlon, Honda, Concepcion – Island CTC	Near-Term	$30M
SB-08	Capitan Siding Extension and Island CTC	Near-Term	$10M
SB-09	Goleta Service Track Extension	Near-Term	$10M
SB-10	Sandyland Siding	Near-Term	$15M
SB-11	Ortega Siding*	Near-Term	$20M
SB-12	Carpinteria Siding*	Near-Term	$10M
V-02	Seacliff Siding North	Near-Term	$18M
V-03	Seacliff Curve Realignments	Near-Term	$10M
V-04	Santa Clara River Curve Realignment	Near-Term	$6M
V-05	Montalvo Curve Realignments	Near-Term	$2M
V-10	CP West Camarillo Curve Realignments	Near-Term	$5M
V-14	Strathearn Siding Curve Realignment	Near-Term	$1M
LA-04	Union Station Run-Through Tracks	Near-Term	$640M
	Estimated Total – Near-Term Projects		**$821M**

* Depending on which siding project was selected to be completed as an either Immediate or Near-Term project, Ortega or Carpinteria Sidings.

** Project categorized from “Near-Term” based on capacity modeling, to “Immediate” based on local financial commitment.

Table ES-7
Vision Projects

Project Number	Project Name	Current Timeline	Estimated Project Cost
SLO-2	South San Luis Obispo – Goleta – Continuous CTC	Vision	$80M
SLO-3	Hadley – Calendar Curve Realignments	Vision	$200M
SB-01	MP 276 Track Realignment and Highway 1 Overpass Replacement	Vision	$62M
SB-04	Devon to Tangair Curve Realignments	Vision	$196M
SB-06	Santa Barbara County Curve Realignment Projects	Vision	$677M
V-01	Rincon Siding	Vision	$10M
V-06	Oxnard North Platform	Vision	$8-15M
V-08	Oxnard-Camarillo Second Main Track	Vision	$15M
V-09	North Camarillo Crossover	Vision	$1M
V-12	CP Las Posas to MP 423 Second Main Track	Vision	$51M
V-13	Simi Valley to CP Strathearn Second Main Track	Vision	$42M
V-15	Los Angeles Street Grade Separation	Vision	$93M
V-16	CP Davis to Simi Valley Station Second Main Track	Vision	$36M
LA-03	Burbank Junction Track Realignment	Vision	$9M
	Estimated Total – Vision Projects		**$1.5B**

Table ES-8
Summary of Projects by Timeline

Project Category	Estimated Project Cost
Immediate Projects	**$136-159M**
Near-Term Projects	**$821M**
Vision Projects	**$1.5B**
Estimated Total for all LOSSAN North Projects	**$2.5B**

1.11 Next Steps

Integration of the LOSSAN North and South Corridors

The executive summaries and other important highlights from both the LOSSAN North and LOSSAN South Strategic Plans have been combined to create a LOSSAN Corridorwide Strategic Summary. This document will serve as an introduction to and summary of both Strategic Plans and an overall guide to the entire 351-mile LOSSAN rail corridor.

For the LOSSAN South corridor, the Department, in partnership with the Federal Railroad Administration (FRA), is in the process of finalizing a Program Environmental Impact Statement/Environmental Impact Report (PEIR/PEIS). This program-level review comprises projects throughout the LOSSAN South portion of the corridor. The PEIR/PEIS considers cumulative potential impacts of the projects and identifies potential mitigation strategies, which will help expedite future project-level environmental clearance, and makes these projects available for federal rail funding.

The Department, in consultation with the appropriate stakeholder groups, could make a decision in the future as to whether or not a similar Program-level examination of the projects in the LOSSAN North corridor is desirable, or whether to move directly to individual project-level environmental review of projects, where required.

Implementing the Rail Improvement Projects

The LOSSAN North Strategic Plan documents the purpose and need and outlines a schedule for improvements to the rail corridor from Los Angeles to San Luis Obispo. The LOSSAN Corridorwide Strategic Plan will provide the Department, Amtrak, LOSSAN and its member agencies, UP, and BNSF with a program of priorities they can use in programming projects for implementation and construction. As federal, state, local and other funds become available, this document will serve as the first step in improvements to the LOSSAN rail corridor.

2 INTRODUCTION AND BACKGROUND

2.1 Introduction

The 351-mile-long LOSSAN rail corridor connects major metropolitan areas of Southern California and the Central Coast, serves some of the most populous areas of the state, and runs through six counties: San Luis Obispo, Santa Barbara, Ventura, Los Angeles, Orange, and San Diego (from North to South). Not only does the corridor pass through some of California's most densely populated regions, but it also traverses some of the most scenic and environmentally-sensitive areas in the state. **Figure 1-1** shows a map of the Southern California rail transportation network.

The rail corridor is home to a variety of rail services, including:

- Intercity passenger rail service;
- Commuter rail service; and
- Freight services.

Intercity passenger rail services are provided by the National Rail Passenger Corporation (Amtrak) and include: the *Pacific Surfliner* (with funding support from the State of California), the *Coast Starlight* and the *Southwest Chief*. The *Pacific Surfliner* service has enjoyed record ridership increases over the past seven years, with over 2.65 million passengers in Fiscal Year 2006 (October 2005 through September 2006), making it the second-busiest corridor in the nation.

Two commuter rail services operate on the LOSSAN corridor. The Southern California Regional Rail Authority's Metrolink serves five counties in Southern California: Ventura, Los Angeles, Orange, Riverside, and San Bernardino (with a connection to the Coaster in Oceanside). The North County Transit District's Coaster serves coastal San Diego County from Oceanside to San Diego.

Freight and goods movement rail services are operated on the LOSSAN corridor by the Union Pacific Railroad (UP) and the Burlington Northern Santa Fe Railway (BNSF).

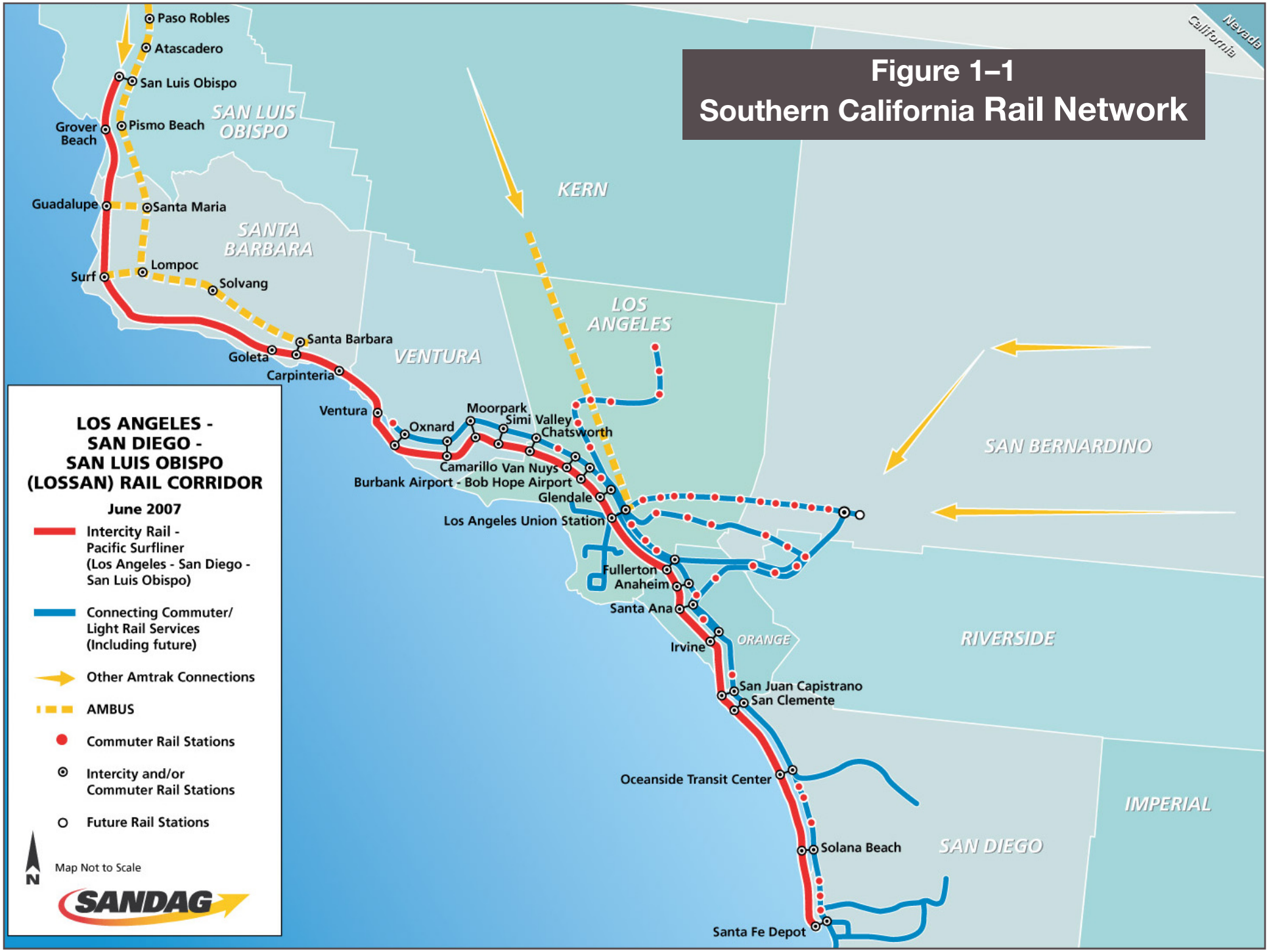
Figure 1–1
Southern California Rail Network
LOS ANGELES - SAN DIEGO - SAN LUIS OBISPO (LOSSAN) RAIL CORRIDOR
June 2007
Intercity Rail - Pacific Surfliner (Los Angeles - San Diego - San Luis Obispo)
Connecting Commuter/ Light Rail Services (Including future)
Other Amtrak Connections
AMBUS
Commuter Rail Stations
Intercity and/or Commuter Rail Stations
Future Rail Stations
N
Map Not to Scale
SANDAG
California
Nevada
SAN LUIS OBISPO
KERN
SANTA BARBARA
LOS ANGELES
VENTURA
SAN BERNARDINO
ORANGE
RIVERSIDE
IMPERIAL
SAN DIEGO
Paso Robles
Atascadero
San Luis Obispo
Grover Beach
Pismo Beach
Guadalupe
Santa Maria
Lompoc
Surf
Solvang
Santa Barbara
Goleta
Carpinteria
Ventura
Oxnard
Moorpark
Simi Valley
Chatsworth
Camarillo
Van Nuys
Burbank Airport - Bob Hope Airport
Glendale
Los Angeles Union Station
Fullerton
Anaheim
Santa Ana
Irvine
San Juan Capistrano
San Clemente
Oceanside Transit Center
Solana Beach
Santa Fe Depot

The LOSSAN North rail corridor runs through four counties: Los Angeles, Ventura, Santa Barbara, and San Luis Obispo.

The LOSSAN North corridor includes extended stretches where the rail line is directly adjacent to the Pacific Ocean, and opportunities for expanding the corridor are limited by proximity to the ocean, as well as to the 101 Freeway. North of Los Angeles the corridor is largely single-tracked (80%) and the track and signaling systems are less developed than the southern portion from Los Angeles to San Diego. The rail line was initially laid in the latter portion of the 19th century and early 20th century. While the corridor is strenuously maintained to Federal Railroad Administration (FRA) standards, there are locations in the corridor which still have jointed track rather than continuously welded rail, older signaling systems which require trains to wait for dispatcher approval by radio in order to advance, and hand-thrown switches rather than electrically-operated turnout switches. All of these factors reduce the maximum speed at which trains can travel, and increase the total travel time. Additionally, the long stretches of single-track and relatively short sidings currently found in many locations on the corridor require passenger trains to wait for freight trains to clear a section before continuing.

***Pacific Surfliner* passing through Vandenberg Air Force Base, northern Santa Barbara County.**
Photo Credit: Amtrak California

2.2 Strategic Planning for the LOSSAN Corridor

In 2001, the California Department of Transportation (the Department), began studying a series of improvements to the LOSSAN rail corridor as part of its support for the *Pacific Surfliner* service. This effort grew out of the Amtrak-sponsored California Passenger Rail System 20-Year Improvement Plan (discussed below). The Department's Proposed Rail Corridor Improvement Studies covered the portion of the LOSSAN corridor between Los Angeles Union Station and San Diego Santa Fe Depot (LOSSAN).

In October 2003, the Department completed the LOSSAN Strategic Business Plan, a more recent effort to study improvements in the Los Angeles to San Diego segment of the corridor (referred to in this document as the LOSSAN South Strategic Plan). In September 2003, as the LOSSAN South Strategic Plan was nearing completion, the Board of Directors of the LOSSAN Rail Corridor Agency discussed the need for an updated long-range vision for the entire rail corridor. In October 2004, the LOSSAN Agency's Technical Advisory Committee (LOSSAN TAC) received Board approval to expand the plan to represent the entire LOSSAN corridor, by completing a Strategic Plan for the northern segment, as well as a Corridorwide Summary Document highlighting both Strategic Plans.

2.2.1 PARTICIPATING AGENCIES AND ORGANIZATIONS (TECHNICAL WORKING GROUP)

The Department, through its Division of Rail, is the sponsoring agency for the LOSSAN North Strategic Plan and Corridorwide Summary document. The Department provides support, funding, and planning assistance for three intercity passenger rail services operated by Amtrak, including the *Pacific Surfliner*. This assistance includes operating assistance and capital funding for rail improvement projects, station construction and maintenance, and equipment purchases and maintenance.

Other agencies and organizations participating in the development of the Strategic Plan, and their roles are described in the paragraphs below. Representatives of each of the agencies formed a Technical Working Group (TWG) to provide technical input and oversight into the Strategic Plan's development.

The LOSSAN Rail Corridor Agency is a joint powers Authority (JPA) formed in 1989 to oversee the LOSSAN corridor. The agency's Board of Directors is composed of officials representing rail owners, operators, and planning agencies along Amtrak's *Pacific Surfliner* corridor between San Diego and San Luis Obispo. The objective of the agency is to coordinate planning and programs that increase ridership, revenue, reliability, and safety on the coastal rail line. The San Diego Association of Governments (SANDAG) provides staffing for the LOSSAN Rail Corridor Agency, and served as the Project Manager for the LOSSAN North Strategic Plan study.

The National Passenger Rail Corporation (Amtrak) provides two intercity passenger rail services on the LOSSAN North corridor: the *Pacific Surfliner* service between San Diego and San Luis Obispo (funding provided by the State of California under contract with the Department), and the *Coast Starlight*, which operates between Los Angeles and Seattle, Washington. Amtrak provided planning and technical assistance used in developing the LOSSAN North Strategic Plan.

The Southern California Regional Rail Authority (Metrolink) operates commuter rail service in five Southern California counties (including Los Angeles and Ventura counties within the study area). A Metrolink member agency owns a portion of the LOSSAN North corridor between Los Angeles and Moorpark, and Metrolink has a shared-use agreement with Union Pacific between Moorpark and Montalvo. Metrolink provided planning and technical assistance used in developing the LOSSAN North Strategic Plan.

The San Luis Obispo Council of Governments (SLOCOG), Santa Barbara County Association of Governments (SBCAG), and Ventura County Transportation Commission (VCTC) are Regional Transportation Planning Agencies and Metropolitan Planning Organizations within the LOSSAN North corridor study area. Representatives of these agencies provided technical and planning assistance, as well as facilitated and hosted stakeholder and public information meetings in cities throughout the LOSSAN North corridor.

The Union Pacific Railroad (UP) owns most of the rail right-of-way in the LOSSAN North corridor study area, and operates freight service along it. UP representatives provided information and assistance to the Technical Working Group.

2.3 Related Planning Studies

A number of previous studies and planning documents relating to the improvement of the LOSSAN North corridor are incorporated into this plan. They provide background about previous and ongoing efforts to improve the LOSSAN North corridor.

Brief descriptions of the relevant studies' contents are provided below, followed by a discussion of how their findings will be incorporated in the LOSSAN North Strategic Plan.

2.3.1 CALIFORNIA PASSENGER RAIL SYSTEM 20-YEAR IMPROVEMENT PLAN

Amtrak sponsored a collaborative effort with stakeholders that resulted in the development of the California Passenger Rail System 20-Year Improvement Plan (Amtrak 20-Year Plan), released in March 2001.

The Amtrak 20-Year Plan discussed the dramatic growth in California's population, and explained how this growth has led to a demand for transportation that exceeds the capacity of the transportation network. The plan noted how rail offers the ability to address the demand for

increased mobility in a very cost-effective way, as investments in rail improvement projects benefit both passenger rail (intercity and commuter) and freight rail services.

Finally, the plan modeled the corridors, estimated project costs, and using a three-increment system of Immediate (within the next 3 years), Near-term (within the next 4-8 years), and Vision (within the next 20 years) timelines, laid out a plan for the improvement of California's four major rail corridors:

- The *Capitol Corridor*, which operates between Auburn and San Jose;
- The *San Joaquins* Corridor, which operates between Bakersfield, Sacramento, and the San Francisco Bay Area (with connecting bus service between Los Angeles and Bakersfield);
- The *Pacific Surfliner* Corridor, which operates between San Diego and San Luis Obispo; and
- The Coast Corridor between Los Angeles and the San Francisco Bay Area.

The LOSSAN North Strategic Plan, using the same incremental timeline, updates appropriate *Pacific Surfliner* projects from the Amtrak 20-Year Plan to reflect their current status (such as eliminating those projects completed since the release of the Amtrak 20-Year Plan in 2001, and since the release of the Draft LOSSAN North Strategic Plan in June 2005). The costs associated with each project have been revised to Year 2006 dollars (from their original Year 2000 costs) to provide current information on corridor improvement projects.

The proposed *Coast Daylight* service, which would provide direct rail service between Los Angeles, the Central Coast, Salinas, San Jose, and San Francisco via the Coast Corridor is discussed in Section 4.5.1. Many of the proposed rail improvement projects in the LOSSAN North Corridor study area would help facilitate the creation of this important new service and improve the reliability of the current services. The additional train volumes projected for the *Coast Daylight* service were also taken into consideration when determining rail capacity requirements over the timeframe of the Strategic Plan.

The Amtrak 20-Year Plan also detailed how the improvement projects would lead to expansions in service capacity and would dramatically reduce travel times, providing increased mobility and attracting even higher levels of rail ridership.

2.3.2 CALIFORNIA STATE RAIL PLAN 2005-06 TO 2015-16

State law requires the Department to complete a ten year California State Rail Plan (CSRP) with elements for both passenger rail and freight services. This ten-year CSRP is updated every two years. The most recent version is the CSRP for the period between Fiscal Years 2005-2006 and 2015-16. The CSRP continues to be consistent with the Amtrak 20-Year Plan.

The CSRP serves as the overarching policy document for the Department's involvement in rail throughout the state, and discusses:

- The State's vision for intercity passenger rail
- The State's role in supporting rail passenger service
- The relationship between passenger rail services and freight rail companies, which in most areas own the lines on which the passenger rail services operate
- The available sources for funding intercity passenger rail
- The Intercity Rail Capital Program
- The Department's operating relationship with Amtrak, and issues relating to the debate regarding Amtrak's future.

For the *Pacific Surfliner* route, principal 2015-16 objectives from the CSRP include:

- Improve On-Time Performance (OTP) from the 82 percent goal in Federal Fiscal Year (FFY) 2006-07 to 90 percent.
- Improve passenger comfort, convenience, and information with improved services on-board (trains) and at stations.
- Improve intermodal connectivity (through better coordination with Metrolink and Coaster commuter rail service, corridor transit agencies, and Amtrak Thruway bus service).
- Reduce travel times (between Los Angeles to San Luis Obispo to 5 hours and 8 minutes – a reduction of 20 minutes).
- Increase ridership by 40 percent.
- Increase revenues by 60 percent.
- Increase revenue/cost ratio from 58.0 percent to 65.0 percent.
- Increase service frequency
    - Los Angeles to Santa Barbara/Goleta – from 5 to 6 daily roundtrips
    - Santa Barbara/Goleta to San Luis Obispo – from 2 to 3 daily roundtrips
- Add Coast Daylight service from San Luis Obispo to San Francisco (initial service by 2007-08, second daily roundtrip by 2013-14).

For the LOSSAN North Strategic Plan, information contained within the State Rail Plan was reviewed and incorporated where appropriate.

2.3.3 *PACIFIC SURFLINER* ROUTE FFY 2006-07 BUSINESS PLAN

A business plan for the enhancement of the *Pacific Surfliner* Route (*Pacific Surfliner* Business Plan) is produced biannually by the Department; the most recent being the Federal Fiscal Year (FFY) 2006-07 Business Plan. The *Pacific Surfliner* Business Plan details the Department's efforts to support existing and planned service levels, marketing, and connecting bus service, and includes a capital plan detailing expenditures for stations and related improvements, track and signal improvements, maintenance and layover facilities, and new equipment.

While both plans are consistent, the Department's California State Rail Plan looks at a longer-term 10-Year planning timeline for rail services. The *Pacific Surfliner* Business Plan allows for adjustments to programs and projects to address immediate needs. For example, of the long-term goals for the route described in the CSRP, the *Pacific Surfliner* Business Plan calls for the following actions during the period:

- Increase ridership by 12.3 percent, to 2.8M passengers annually.
- Increase farebox ratio from 59.1 percent in 2005-06 to 60.9 by 2006-07.
- Reach OTP performance goal of 82 percent in FFY 2006-07.

2.3.4 METROLINK COMMUTER RAIL STRATEGIC ASSESSMENT

The Southern California Regional Rail Authority (SCRRA) has completed a Strategic Assessment for its Metrolink commuter rail system, which was approved by the SCRRA Board in January 2007. This Strategic Assessment has developed future service scenarios for its lines, which discuss future

forecast ridership, service frequencies, and needed improvements to stations and infrastructure to support these forecasts[8].

In particular, future commuter rail service levels for the Ventura line as described in Metrolink's Strategic Assessment were used in determining the capacity constraints expected in the corridor, and support the need for new sidings, double-tracking, and other rail capacity improvements to allow for reliable operations of all rail services.

2.3.5 101 IN MOTION PROGRAM

The 101 In Motion Program, sponsored by SBCAG, began in October 2003 as an effort to identify short- and long-term mobility solutions for Santa Barbara County. The 101 Freeway is the major North-South link through Santa Barbara County. Increased congestion and delays associated with the growth in population in the "South Coast" area of Santa Barbara and Ventura County, as well as a lack of affordable housing in the South Coast area of the county are contributing to increased commuter travel times.

The 101 in Motion study's consensus recommendations and Action Plan have been approved by the SBCAG Board. These include the development of an additional High-Occupancy Vehicle lane in both directions, proposed commuter rail service between Ventura and Santa Barbara Counties, and various transit services throughout Santa Barbara County.

The proposed commuter rail service would share the same rail line with other passenger and freight services on the LOSSAN North Corridor. Consideration of its potential implications for rail capacity, as well as its impact on the need for improvements to the corridor makes inclusion of the proposed commuter rail service in the LOSSAN North Strategic Plan important.

[8] The SCRRA Board adopted the SCRRA Strategic Assessment on January 26, 2007. The document provides long-term growth options for Metrolink that balance the demand for growth with the operational and fiscal context in which that growth will occur. The Strategic Assessment is a conceptual plan for the development of the Metrolink commuter rail system through 2030. No commitment is implied for any agency. Projects or service levels may be advanced or delayed depending upon funding availability. The document is a resource for more detailed physical and fiscal planning needed to phase the implementation of the long-term direction selected by the member agencies and the SCRRA Board.

3 OVERVIEW OF THE LOSSAN NORTH CORRIDOR

The LOSSAN North rail corridor serves some of the most populous areas in the Southern and Central Coast regions of California, and traverses some of the most scenic and environmentally-sensitive areas in the state. This section will provide an overview of the corridor, by county, and includes information on the generalized land uses adjacent to the rail line, the communities through which the corridor passes, and the locations of rail stations (both intercity and commuter rail).

3.1 Corridor Ownership

The LOSSAN rail corridor is owned by a number of regional and local agencies, as well as by private freight railroad companies. From north to south, the Union Pacific Railroad (as part of its acquisition of the Southern Pacific Rail Road in 1996) owns the 175 miles of the 222-mile corridor between San Luis Obispo and Moorpark. The Los Angeles County Metropolitan Transportation Authority (MTA), a member agency of the Southern California Regional Rail Authority (SCRRA, operator of Metrolink) owns 100% of the right-of-way (ROW) between Burbank Junction and Los Angeles Union Station, and 40 feet of the width of the ROW from Burbank Junction to the Los Angeles/Ventura County Line, with UP owning the other 60 feet. Both SCRRA and UP have trackage rights. Ventura County Transportation Commission (VCTC), an SCRRA member agency, owns 40 feet of the width of the ROW from Moorpark to the Ventura/Los Angeles County Line, with UP owning the other 60 feet.

Within SCRRA member agency-owned portions of the corridor, SCRRA provides dispatching and track maintenance; UP pays a fee for these functions, related to the number of trains it operates in this section. In the UP-owned section of the corridor, it provides dispatching and track maintenance. Metrolink trains pay a fee to UP for these functions, and Amtrak trains pay UP an incremental cost for dispatching and maintenance on UP-owned sections of the corridor.

3.2 Overview of the Corridor by County

3.2.1 LOS ANGELES COUNTY

Land Uses

The LOSSAN North rail corridor begins at Los Angeles Union Station. There is a broad mix of land uses in this urbanized downtown area: from high-density residential, to commercial office and retail, industrial and institutional. From Los Angeles to Burbank, the general character adjacent to the rail corridor remains a mix of commercial and industrial uses.

North of Burbank (Bob Hope) Airport, the land uses next to the corridor begin to transition to a more suburban character. The density is greatly reduced, and the land uses are more light industrial, commercial/retail, and residential. By the time the corridor reaches the city of Chatsworth, the nature of the adjacent land use has transitioned from suburban to rural, with scattered residential development, parklands, agricultural uses, and open land.

Corridor Communities

In Los Angeles County, the LOSSAN North corridor passes through the cities and communities of:

- Los Angeles,
- Glendale,
- Burbank,
- Van Nuys,
- Northridge, and
- Chatsworth.

Current services that operate along the corridor in Los Angeles County include Amtrak intercity passenger rail service (*Pacific Surfliner* and *Coast Starlight*), Metrolink commuter rail service, and Union Pacific freight rail service.

Stations

Los Angeles County stations currently served by intercity and/or commuter rail services include:

- Los Angeles Union Station (LAUS),
- Glendale Station,
- Downtown Burbank Station (Metrolink Commuter Rail only),
- Burbank/Bob Hope Airport Station,
- Van Nuys Station,
- Northridge Station (Metrolink Commuter Rail only), and
- Chatsworth Station.

Los Angeles County Stations

Photo Credits: USA Rail Guide (Used with Permission)

3.2.2 VENTURA COUNTY

Land Uses

The land uses adjacent to the LOSSAN Corridor in the hilly, eastern portion of Ventura County are primarily rural, with scattered residential development, parklands, agricultural uses, and open land. As the corridor passes through the cities of Simi Valley and Moorpark, the land use intensifies to suburban again, with nearby commercial/retail and light industrial uses. Agricultural uses predominate as the corridor travels westward toward the Pacific Ocean, until it passes through the City of Camarillo, a rapidly growing city with increasing residential and associated commercial/retail uses. West of Camarillo, agricultural uses dominate again until the corridor reaches Oxnard.

Oxnard is Ventura County's largest city, and the land uses next to the LOSSAN North corridor reflect this increased density, and consist of residential, commercial and light industrial uses. The rail corridor then turns north, passes through the center of Oxnard parallel to the ocean, until it reaches Ventura and the 101 Freeway, where it turns westward again. From this point north, the rail corridor generally parallels the freeway.

The rail corridor passes through the Ventura County Fairgrounds (a station stop is located there). The corridor also passes adjacent to San Buenaventura State Beach Park.

At Ventura, the rail line begins to follow a coastal alignment as it moves northward. The rail right-of-way varies from being located on the ocean side of the 101 Freeway to being inland of the freeway, depending on the terrain. The rail line is also in close proximity to coastal bluffs, and is subject to slide movements, as was the case during the storms of winter 2005.

Corridor Communities

In Ventura County, the LOSSAN North corridor passes through the cities and communities of:

- Simi Valley,
- Moorpark,
- Camarillo,
- Oxnard, and
- Ventura.

Stations

Ventura County Stations currently served by intercity and/or commuter rail services include:

- Simi Valley Station,
- Moorpark Station,
- Camarillo Station,
- Oxnard Station, and
- Ventura Station.

Ventura County Stations

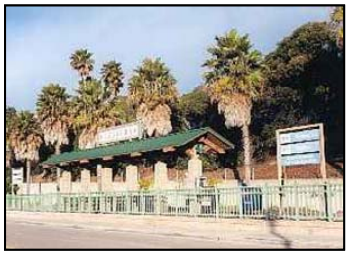

Photo Credits: USA Rail Guide (Used with Permission)

3.2.3 SANTA BARBARA COUNTY

Land Uses

The LOSSAN North Corridor is generally located directly along or very close to the coastline for much of its length in Santa Barbara County. Significant sections of the coastline rail corridor within Santa Barbara County are located directly adjacent to the ocean, on land that is subject to erosion. As noted in the Ventura County description, the 101 Freeway is adjacent to the rail line throughout this portion of the corridor, and both the rail line and the freeway are near eroding coastal bluffs. This is particularly evident at Ortega Hill near Summerland (as well as at Hollister Ranch, north of Santa Barbara along the Gaviota Coast, and in other locations)[9]. The nature of the land uses in the southern coastal portion are largely open space until Carpinteria, at which point the land uses become residential with supportive commercial and retail, as befits the nature of this small coastal community. This lower-density residential character continues through Montecito, and becomes more dense and urbanized as the corridor approaches Santa Barbara.

North of Santa Barbara the corridor parallels Highway 101 as it passes through the urbanized south coast. Residential and industrial uses border the corridor. At the Goleta rail station, there is a layover facility for *Pacific Surfliner* trains. After Goleta, the land uses become very rural, as the corridor winds its way along the coast.

The corridor passes through three units of the California State Park System (El Capitan Beach State Park, Refugio Beach State Park, and Gaviota State Park) Near Gaviota, the 101 Freeway turns inland, while the railroad continues next to the coast. The two corridors do not meet up again until near Pismo Beach in San Luis Obispo County. After Gaviota State Park, the LOSSAN North corridor crosses Vandenberg Air Force Base, staying along the coast until just south of San Luis Obispo county, near Guadalupe. Within Vandenberg, the land uses are institutional, with occasional military facilities near the rail line.

Corridor Communities

The LOSSAN North corridor passes through or next to the following Santa Barbara County communities:

- Carpinteria,
- Summerland,
- Montecito,
- Santa Barbara,
- Goleta,
- Vandenberg Air Force Base,
- Lompoc,
- Santa Maria, and
- Guadalupe.

[9] Coastal erosion will require on-going efforts to address erosion and drainage concerns and to ensure the stability of the bluffs on which the rail line is located. This represents a potential long-term cost concern, and these factors should be considered when estimating the need for, timing of, and engineering design alternatives associated with potential improvement projects.

Stations

Santa Barbara County stations served by intercity rail service (there is currently no commuter rail service in Santa Barbara County) include:

- Carpinteria Station,
- Santa Barbara Station,
- Goleta Station,
- Surf/Lompoc Station, and
- Guadalupe Station.

Santa Barbara County Stations

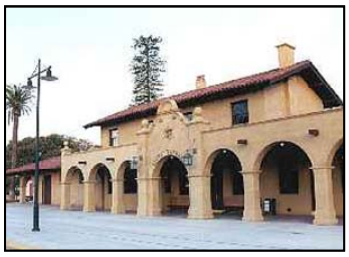

Photo Credits: USA Rail Guide (Used with Permission)

3.2.4 SAN LUIS OBISPO COUNTY

Land Uses

Southern coastal San Luis Obispo County is generally rural in character. The LOSSAN rail corridor remains inland north of Guadalupe. Land uses in this segment of the corridor remain scattered residential, agricultural, with occasional industrial uses.

The rail corridor returns to the coast as it passes through Oceano and Grover Beach. This area can be characterized as suburban in character, with residential, commercial, and retail. The Grover Beach rail station is located at the heart of the city's redevelopment area, and at a popular access point to Oceano Dunes State Vehicular Recreation Area. North of Grover Beach, the rail line passes next to, but not through, Pismo Beach State Beach. The rail corridor next passes through the coastal community of Pismo Beach. Pismo Beach features fairly dense residential, commercial/retail/hotel land uses. North of Pismo Beach, the LOSSAN North corridor returns to an inland alignment, paralleling Price Canyon Road and State Route 227, with limited residential development and agricultural land uses, as it nears San Luis Obispo. Finally, the LOSSAN North corridor enters the urbanized area of San Luis Obispo, with its mix of residential and commercial uses. The corridor ends at the San Luis Obispo rail station, where a layover facility is located to store one train overnight. Surrounding land uses include residential properties and a small commercial/retail district adjacent to the station.

Corridor Communities

The LOSSAN North corridor passes through or next to the following San Luis Obispo County communities:

- Arroyo Grande
- Grover Beach,
- Pismo Beach, and
- San Luis Obispo.

Stations

San Luis Obispo County stations currently served by intercity rail service include:

- Grover Beach Station, and
- San Luis Obispo Station.

San Luis Obispo County Stations

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3.3 Other Rail-Related Considerations

There are a number of other issues related to the operation of rail services on the LOSSAN North corridor that need to be recognized and considered in the development of projects, as well as during the environmental clearance phase of project development. These issues include noise, safety and enforcement, and environmental considerations.

3.3.1 NOISE

The noise associated with the operation of trains within the LOSSAN North corridor is particularly felt in residential neighborhoods through which the rail corridor runs, as well as near station areas and at-grade crossings. The biggest issue is the loudness and duration of the train's horn, which must (by FRA regulations) be sounded:

- Whenever the train begins to move (at a station, or after a stop enroute – such as at a siding);
- As the train approaches an at-grade crossing; or
- In other areas where it is necessary to sound a warning (such as locations where pedestrians have been seen trespassing on the rail right-of-way).

For safety reasons, the sound of the train's horn is deliberately loud, and, depending on the local conditions, it can be heard from quite a distance. Options available for reducing the times and locations at which a train needs to sound its horn include:

- Closing the crossing entirely;
- Grade separation, which would eliminate the need to sound the train horn by relocating the roadway over or under the rail line; or
- Establishment of a "Quiet Zone." The FRA has established a final rule which would allow communities to establish "Quiet Zones" (areas in which the train would not be required to sound its horn when approaching a road crossing) after certain safety measures have been undertaken. For more information on the Quiet Zone rule, visit http://www.fra.dot.gov/us/content/1318.

3.3.2 SAFETY AND ENFORCEMENT

Growth in the movement of people and goods by auto and rail over the next 20 years underscores the need for improved safety. With more vehicles crossing the tracks, and more frequent and faster trains, the potential for rail/automobile collisions increases.

Crossing improvement projects can greatly improve the safety of both train and automobile transportation. Examples of such projects include 4-quadrant crossing gates, medians to prevent cars from encroaching on a crossing when a train is approaching, or grade separations. Grade separations, although the most costly crossing safety improvement alternative, provide maximum safety to pedestrians, train passengers, and automobile drivers. Grade separations should be considered where appropriate as part of all corridor improvements.

Another safety issue is related to the "barrier effect" created by the rail line as it passes close to the coast or through a community. Locations where the public currently crosses the track to access their destination represent opportunities to improve pedestrian safety and access by constructing grade-separated pedestrian bridges or undercrossings. These would improve pedestrian safety, reduce trespasser issues, and could possibly reduce the need to use the locomotive horn to warn people of an approaching train. This, accompanied by increased enforcement, would improve pedestrian safety while increasing public beach access.

Identification of locations where pedestrians trespass across rail lines to get to their destination, and the provision of appropriate measures (pedestrian crossings, education programs, enforcement efforts, etc.) to reduce trespasser activity, should be a continuing effort.

State and Federal programs to provide funding for safety improvement projects include the Federal Section 1010/1103 Program and the Federal Section 130 Program, as well as the State Section 190 Program. The California Public Utilities Commission develops a biennial priority list of grade crossings[10] to receive funds from these programs.

3.3.3 ENVIRONMENTAL CONSIDERATIONS

The impacts of the rail line on wetlands, beaches, coastlines, wildlife habitats, and other environments will need to be considered and appropriate mitigation strategies identified as rail improvement projects move forward.

While increased utilization of rail services made possible through improvements to the LOSSAN Corridor can have a positive impact in reducing some automobile emissions, there would be an increase in emissions and particulate matter from diesel-powered trains, both while in transit as well as when idling at stations and sidings. Examination of these potential impacts should be included as part of any project-level environmental clearance.

[10] http://www.cpuc.ca.gov/word_pdf/FINAL_DECISION/57285.pdf

4 RAIL SERVICES ALONG THE LOSSAN NORTH CORRIDOR

There are three major categories of rail services provided on the LOSSAN North corridor: intercity passenger rail, commuter rail, and freight rail. The following sections provide a description of each, as well as information on the types of equipment used, numbers of trains per day, and assessments of future service levels. Additionally, this section discusses new intercity passenger rail and commuter rail services planned for or under study that would operate within the LOSSAN North corridor.

4.1 Intercity Passenger Rail

Intercity passenger rail service offers travelers a convenient way to move between major metropolitan areas. Intercity rail is another viable alternative to travel between cities by automobile, bus, or airplane.

In the LOSSAN North corridor, two intercity rail services exist, both operated by Amtrak. They are the *Pacific Surfliner* and the *Coast Starlight*. The following paragraphs provide descriptions and information on each service.

Amtrak *Pacific Surfliner*

Amtrak California's (a partnership of Amtrak and the State of California[11]) *Pacific Surfliner* service runs between San Diego and San Luis Obispo, and provides connectivity between the most populous counties in California. The *Pacific Surfliner* is California's most developed rail service in terms of service levels and passenger ridership, and is second in ridership only to Amtrak's Northeast Corridor services. The fare for travel between Los Angeles and points north on the *Pacific Surfliner* varies primarily by the distance traveled.

Equipment Used
The *Pacific Surfliner* operates with some of the newest, state-of-the-art rail equipment in America – its locomotives are F59PHI "California" locomotives, manufactured by General Motors, which operate the cleanest-burning diesel engines available, and are streamlined to reduce wind resistance.

Pacific Surfliner coaches are an Amtrak variation of the bi-level California Cars developed for use on the other two Department-sponsored intercity rail routes (the *Capitol Corridor* and the *San Joaquins*).

A typical regular *Surfliner* train consists of six rail vehicles: the locomotive, a Business Class car, a Café car, two Coach-Class cars, and a Cab Car from which the engineer can operate the locomotive. During holidays or other peak periods of service, an additional passenger car is added (for a total of seven rail vehicles).

Selected *Pacific Surfliner* Trains (798 and 799) operate with refurbished single-level "Horizon-class" coaches, pulled by twin General Electric P40 Genesis Locomotives.

The trains operate in a "Push/Pull" mode. Northbound trains have the locomotive in the lead position ("Pull") mode. On southbound trains, the engineer operates the train from the Cab Car, which is the leading car – the locomotive in this instance becomes the rear-most car ("Push" mode).

[11] The *Pacific Surfliner* is one of three Amtrak intercity services supported by the State of California through the Department. In 2000, the *Pacific Surfliner* service replaced the *San Diegan*, a Basic System service of Amtrak's since its inception. The State supports the service by providing 70% of the operating expenses for the service.

Operational Levels
The *Pacific Surfliner* runs 365 days a year, with five daily roundtrips between Los Angeles and Santa Barbara, two of which also travel as far north as San Luis Obispo[12].

Planned Operational Levels
The Amtrak 20-Year Plan and CSRP identify an increase in *Pacific Surfliner* service over the long-term (between 2010 and 2025) to seven daily roundtrips between Los Angeles and Santa Barbara, with a third roundtrip serving San Luis Obispo.

Ridership (Current and Projected)
Current *Pacific Surfliner* ridership (for the entire corridor between San Diego and San Luis Obispo) was over 2.65 million passengers in Fiscal Year 2006 (October 2005 through September 2006). Annual ridership is projected to grow to approximately 5.75 million passengers by 2020, associated with service level increases and trip time reductions.

Amtrak *Coast Starlight*

Amtrak's *Coast Starlight* Intercity Passenger Rail service is one of Amtrak's most popular rail services. It provides connectivity between Los Angeles, the San Francisco Bay Area, Portland, Oregon and Seattle, Washington.

For part of its route, it provides additional rail service between Los Angeles, Santa Barbara, and San Luis Obispo beyond that provided by the *Pacific Surfliner*, with a morning northbound service and an afternoon/evening southbound service.

As a longer-distance train, the *Coast Starlight* serves fewer Amtrak stations within the LOSSAN North corridor compared to the *Pacific Surfliner* service. Coast Starlight station stops include:

- Los Angeles Union Station (LAUS),
- Van Nuys,
- Simi Valley,
- Oxnard,
- Santa Barbara, and
- San Luis Obispo.

Equipment Used
A typical *Coast Starlight* trainset consists of five Amtrak Superliner bi-level coaches, four sleepers, as well as a dining car, Pacific Parlour car, Sightseer Lounge car, and a baggage car. The *Coast Starlight* is powered by two Genesis P40 (or P42) locomotives.

Operational Levels
The *Coast Starlight* service consists of two daily trains. The northbound departure (Train 11) leaves Los Angeles at 10:15 a.m., reaching Santa Barbara at 12:48 p.m., and San Luis Obispo by 3:43 p.m. The southbound departure (Train 14) leaves Seattle, Washington at 10:00 a.m., arriving at San Luis Obispo the next afternoon at 3:20 p.m., Santa Barbara at 6:17 p.m., and Los Angeles at 9:00 p.m.

[12] Amtrak Thruway bus service provides an additional daily late evening northbound trip from Los Angeles to Santa Barbara (with slightly later departures Saturdays and Sundays. Thruway bus service provides a non-rail connection between Santa Barbara and San Luis Obispo, which essentially provides five daily roundtrips between San Luis Obispo and Los Angeles.

4.2 Commuter Rail Service

Commuter rail service differs from intercity passenger rail service in a number of ways. While intercity rail service is designed for travel between metropolitan areas, commuter rail is generally designed for travel within a metropolitan area or between regions. Service levels are also substantially different. Whereas intercity rail service is provided seven days a week, with departures spread throughout the day and evening, commuter rail service is generally offered during the work week (Monday–Friday), with most trains during the morning and afternoon/evening commute peak hours, and with most service in the peak direction of travel (toward major employment centers in the morning, and away from them in the evening). Finally, commuter rail service generally stops more frequently, and it serves more stations than intercity rail.

Existing Service

The Southern California Regional Rail Authority, founded in 1991, provides Metrolink commuter rail service in six Southern California counties: Los Angeles, Ventura, San Bernardino, Riverside, Orange, and northern San Diego. Metrolink's Ventura County line operates on the LOSSAN North Corridor, with service between Los Angeles Union Station and Montalvo Station in Ventura County.

Under the terms of "Rail2Rail," a successful program developed as a cooperative partnership between the Department, SCRRA, and Amtrak, Metrolink monthly passholders and Amtrak ticketholders have access to either service (subject to the limitations of their tickets). This allows for more travel options and greater connectivity between services. Coaster riders also benefit from a similar program with Amtrak and the Department in San Diego County.

Equipment Used

Similar to Amtrak's *Pacific Surfliner* service, Metrolink operates F59PH and F59PHI "California" locomotives, manufactured by General Motors. Passenger cars are tri-level coaches manufactured by Bombardier.

Like intercity passenger rail trains on the LOSSAN North corridor, Metrolink trains operate in Push/Pull mode, depending on the direction of travel.

A typical Metrolink train on the Ventura County line consists of either a three- or four-car consist.

Operator

Veolia LLC currently provides the engineers and on-train staff for Metrolink service, under contract to SCRRA, as of July 1, 2005.

Operational Levels

The Ventura County line currently operates nine trains in each direction, Monday through Friday.

Planned Operational Levels

Metrolink's recently released Strategic Assessment (January 2007) plans for a doubling of service on the Ventura County line by 2025 to approximately 18 trains in each direction, Monday through Friday.[13]

[13] Weekday service levels (28 trains, total of both directions. 2015; 34 trains by 2020, 42 trains by 2030).

4.3 Freight Service

Freight service on the LOSSAN North Corridor is generally provided by the Union Pacific Railroad, though there is a small short-line railroad that carries some local service.

Union Pacific

The Union Pacific Railroad Company (UP) is America's largest freight operator. UP provides rail linkages between California, Canada, and Mexico, serves all California and West Coast ports, and provides four major linkages between the western United States and the rest of the country.

Coast Route

As part of its purchase of the Southern Pacific Railroad Company in 1996, UP acquired the Coast Route, between San Francisco, San Jose, Salinas and Southern California. The LOSSAN North rail corridor is a portion of the UP's Coast Route.

While the UP's primary California rail route runs through the Central Valley, the Coast Route serves markets along the coast, and acts as a secondary route, providing "surge capacity" between the LA Basin and points north to the San Francisco Bay area, northern California and the Pacific Northwest. **Figure 4-1** shows the UP's rail lines between Southern California and other parts of the Southwestern United States, as well as the Coast Route in relation to UP's other north-south routes.

Figure 4-1
Union Pacific Routes in California and Southwest

Whenever UP experiences a line outage on its Fresno Subdivision through the Central Valley, the Coast Route provides a readily available alternative. Likewise, when other UP routes that service the Basin are operating at capacity due to increased freight traffic volumes or freight traffic growth, this line is available.

Current Operational Levels

The Union Pacific operates an average of 13 freight trains on the LOSSAN North Corridor each day. These trains include both through trains (moving through but not stopping within the study area) and trains serving local customers.

Potential Future Operational Levels

The growth in goods imported to the United States from overseas (largely Asia) has been tremendous. According to the Federal Highway Administration, the Ports of Los Angeles and Long Beach are the nation's first and fifth busiest ports, respectively. The bulk of goods are shipped in containers, which are carried by train to centralized locations, and delivered by truck to their ultimate destinations.

Given this increased demand for freight service, and the utility and additional capacity for moving this freight provided by the Coast Route, it is likely that the number of average daily freight trains operating on the LOSSAN North corridor could rise over the next 20 years, depending on business conditions.

For the rail capacity modeling completed as part of the Strategic Plan's development, UP agreed that for planning purposes an estimated increase of two trains per day by 2015, and four trains per day by 2025 was appropriate.

Local Short-Line Railroads

The Ventura County Railway (VCRR) operates between the cities of Port Hueneme and Oxnard in western Ventura County. The line is currently used for freight service only, and is operated by the Rail America Corporation from the Port of Hueneme.

Should operations expand at the Port of Hueneme, the only deep-water port between San Pedro and Oakland, additional freight activity from the VCRR might be seen. This could increase the number of UP trains operating on the LOSSAN North corridor. Reconnection of the Santa Paula Branch Line (which ran from eastern Ventura to Santa Clarita, though portions are currently abandoned and the rail line would need to be restored) might provide an alternative rail line for both passenger and freight services in case of disruption to the Coast Main Line.

The Santa Maria Valley Railroad Company (SMVRC) is a local short-line railroad which operates between Guadalupe and Santa Maria. The SMVRC carries asphalt, petroleum products, scrap iron, gypsum wallboard, fertilizer, machinery, plastic, lumber, and fresh and frozen food products.

4.4 Potential Future Passenger Rail Services

Two additional rail services that would run on the LOSSAN North corridor are either planned for or under study. They include Amtrak's *Coast Daylight* intercity passenger rail service, and a Ventura-Santa Barbara inter-county commuter rail service.

Coast Daylight

Amtrak's *Coast Daylight* would provide intercity passenger rail service between downtown Los Angeles and downtown San Francisco (the Coast Starlight serves Oakland), with additional stops in Santa Barbara, San Luis Obispo, Salinas (with a possible extension to Monterey), and other intermediate destinations.

LOSSAN North corridor stations served by the *Coast Daylight* could include:

- Los Angeles
- Glendale,
- Burbank Airport,
- Van Nuys,
- Chatsworth,
- Simi Valley,
- Moorpark,
- Camarillo,
- Oxnard,
- Ventura,
- Santa Barbara,
- Guadalupe,
- Grover Beach, and
- San Luis Obispo.

Equipment Options

The *Coast Daylight* service could be operated with a number of different types of equipment, either the bi-level coaches used for the *Pacific Surfliner* service, or refurbished single-level Horizon equipment such as is being used on for the newest *Pacific Surfliner* roundtrip between Los Angeles and San Luis Obispo. Advantages of using the *Pacific Surfliner* equipment would include the benefits of having a common fleet, which would provide for better utilization and ease of maintenance.

Planned Operational Levels

The *Coast Daylight* service would initially consist of two trains per day (with a morning northbound departure from Los Angeles and an evening southbound departure from San Francisco).

Ventura-Santa Barbara Intercounty Commuter Rail

Commuter rail is being considered as one possible means by which to reduce traffic congestion on the crowded 101 Freeway between Ventura and Santa Barbara Counties. The 101 in Motion study, conducted on behalf of Santa Barbara County Association of Governments (SBCAG) includes a conceptual service which could run between Camarillo (in Ventura County) and Goleta (north of Santa Barbara, in Santa Barbara County).

The phased introduction of commuter rail service could offer three roundtrips per day (three trains northbound in the a.m. commute peak, and three trains southbound in the p.m. commute peak). The stations to be served by this proposed commuter rail service could include the following existing rail stations between Camarillo and Goleta:

- Camarillo;
- Oxnard;
- Ventura;
- Carpinteria;
- Santa Barbara; and
- Goleta.

The Department has made a commitment as part of the development of the LOSSAN North Strategic Plan to provide technical assistance in assessing alternatives for a rail-based commuter alternative in this area, and how the introduction of such a service might impact capacity and operations on the LOSSAN North corridor. This assessment is provided as **Appendix B**.

4.5 Impacts of Increased Rail Traffic on the LOSSAN North Corridor

Without improvements to the LOSSAN North rail corridor to increase capacity and improve reliability, there is a limit to the number of trains per day that could be run on the existing single-track rail corridor at an acceptable level of performance. A rise in rail traffic volumes would impact reliability (because track conditions might necessitate repairs and/or result in slow orders) and affect on-time performance for all trains (intercity and commuter passenger rail, and freight) as a result of delays. Ultimately, capacity constraints would preclude the ability to provide increased passenger rail frequencies to meet demand and improve service.

Agreement with the two host railroads (UP and SCRRA) on whose lines any additional passenger trains might run (UP and SCRRA) would include discussion and agreement on capital improvement projects to increase capacity sufficient to accommodate the additional train volumes without degrading the performance of either UP's freight operations or SCRRA's ability to provide

commuter rail service. Other issues that would need to be discussed and resolved with the host railroads would likely include:

- Potential line access fees[14];
- Maintenance and operating expenses; and
- Liability protection and insurance.

Current and Forecast Train Volumes

Table 4-1 shows the potential growth over the next 20 years in train volumes, as a result of planned service level changes and forecast increased demand for freight goods movement, from 43 trains per day to 89 trains per day – an increase of 106 percent. Assuring sufficient rail capacity, as well as projects to improve reliability and reduce travel time will be needed if these additional train volumes are to operate at an acceptable level of performance.

Table 4-1
2001 Daily Train Volumes vs. 2025 Potential Daily Train Volumes

2007 Daily Train Volumes		2025 Potential Daily Train Volumes	
Amtrak – *Pacific Surfliner*	10	Amtrak – *Pacific Surfliner*	14
Amtrak – *Coast Starlight*	2	Amtrak – *Coast Starlight*	2
Amtrak – *Coast Daylight*	N/A	Amtrak – *Coast Daylight*	2
Ventura – Santa Barbara Intercounty Commuter Rail	N/A	Ventura – Santa Barbara Intercounty Commuter Rail	8
Metrolink Commuter Rail	18	Metrolink Commuter Rail	36
Union Pacific Freight Service	13	Union Pacific Freight Service	17
Total 2007 Daily Train Volume	**43**[15]	**Total 2025 Potential Daily Train Volume**	**89**

[14] Amtrak is not required to pay access fees for operating its intercity services over any railroad in the United States.
[15] These train volumes are different that those contained in the Rail Capacity Modeling report (Appendix D), where the modeling's total train volumes include other trains operating on the LOSSAN North corridor between Burbank Junction and Los Angeles Union Station.

5 PURPOSE AND NEED FOR IMPROVEMENTS

This section provides the purpose and need for the rail improvement projects described in this Strategic Plan.

5.1 Purpose

The purpose of improvements to the LOSSAN North rail corridor is to help meet the current and projected demand for travel within and between metropolitan areas of Southern California and the Central Coast by:

- Improving rail capacity to meet demand for all types of rail services, including intercity, commuter, and freight/goods movement,
- Developing the LOSSAN North rail corridor in order to provide faster, safer, and more reliable passenger rail service, and
- Making rail travel a more-viable transportation alternative, and to provide congestion relief.

Improvement of the LOSSAN North rail corridor is supportive of California's vision for intercity passenger rail service. The vision of the *GoCalifornia* initiative[16] is to:

"Improve mobility and accessibility for people, goods, services, and information through a safe, integrated, multimodal, world-class transportation system that achieves the '3-E's':

- Prosperous Economy
- Quality Environment
- Social Equity"

GoCalifornia's objectives include:

- Address 20-year needs and reduce congestion below today's levels;
- Deploy demand-management strategies, use existing capacity more efficiently, and expand capacity; and
- Build a world-class transportation system that incorporates best research and technology.
  The purpose behind improvements to the LOSSAN North rail corridor is consistent with *GoCalifornia*'s vision for transportation.

5.2 The Need for Improvements

5.2.1 GROWTH IN POPULATION AND EMPLOYMENT

Growth in population and employment are important driving factors for the Strategic Plan. Over the next 20 years, California's population is projected to rise from approximately 37.4 million in 2006 to over 46.4 million by 2025[17]. Population along the LOSSAN North corridor has dramatically increased, especially in western Ventura County and northern Santa Barbara County. Growth in cities such as Simi Valley, Camarillo, Oxnard, and Santa Maria, is fueled by a combination of the attractive lifestyles they offer, and the relative affordability of their housing compared with prices in

[16] As described in the California State Rail Plan 2005-06 to 2015-16.
[17] Source: California Department of Finance, March 2007

other communities, particularly those in the South Coast area of Santa Barbara County. Employment within the study area has also increased, but is concentrated in employment centers within the metropolitan Los Angeles area, in eastern Ventura County, in the greater Santa Barbara/Goleta area, and in San Luis Obispo. Rising costs in California real estate values have led to increasing distances between home and work, resulting in longer commutes and increased traffic congestion.

5.2.2 GROWTH IN TRAVEL DEMAND

Travel demand between cities in California is projected to grow by 35 percent over the next 20 years, from 155 million trips to 209 million trips annually. Within the LOSSAN corridor, SBCAG has produced a Regional Travel Forecast that provides a representative assessment of travel demand within the corridor[18]. Between 2001 and 2030, average daily traffic volumes on Highway 101 at the junction of Ventura and Santa Barbara Counties are expected to increase by 61%, from 60,000 vehicles to 96,800. At the junction between Santa Barbara County and San Luis Obispo County, Highway 101, traffic volumes are forecast to rise by 63% over the same period, from 58,500 to 95,400 vehicles each day. This growth in forecast travel demand calls for solutions to provide transportation alternatives, such as improvements to the state-supported *Pacific Surfliner* passenger rail service.

5.2.3 CAPACITY OF THE INTERCITY TRANSPORTATION SYSTEM

In the LOSSAN North corridor, the intercity transportation system largely consists of the 101 Freeway and the LOSSAN rail corridor. The existing capacity of the intercity transportation system is not sufficient to accommodate the increasing demand for travel. Airport service in the LOSSAN North corridor is limited – flights into the San Luis Obispo and Santa Barbara airports are limited and more expensive than flights into other Southern California airports. While highway widening is a consideration, corridor agencies have determined that rail can also play a role in helping to meet the capacity challenges that beset traffic today, and which will only get worse over time. Lost time and productivity resulting from delays and congestion on the rail corridor and on the highways negatively impacts both California's economy and quality of life.

5.3 LOSSAN North Rail Corridor

The LOSSAN North rail corridor runs between Los Angeles Union Station and San Luis Obispo. Portions of the LOSSAN North rail corridor were constructed as early as 1887. Between Los Angeles and Goleta, the railroad includes modern segments, with sections of multiple main tracks, and Centralized Traffic Control (CTC)[19]. North of Goleta, to San Luis Obispo, the line is more suited to a railroading environment of the 1940s or earlier.

This portion north of Goleta, while maintained to Federal Railroad Administration standards, is characterized by:

- Short sidings. Of the 14 sidings on the 105-mile segment between Goleta and San Luis Obispo, five are shorter than the normal maximum freight train length of 5,500 feet. This limits a dispatcher's ability to make meets with other trains with minimum delay, even when providing priority to passenger trains. If the passenger train will better fit into the siding, it waits for the freight train to clear the line. Extending the length of existing sidings to allow for longer freight trains, and improving the condition of sidings to provide (where possible) opportunities for "running meets," in which case the train on the siding does not have to

[18] Source: "The 2030 Travel Forecast for Santa Barbara County," Santa Barbara County Association of Governments, September 2004.
[19]

come to a complete stop, but rather continues at a lower speed. These upgrades to sidings will increase capacity, improve reliability, and reduce travel times.

- Number of sidings. The number of sidings (14) on the LOSSAN North corridor is low, relative to more modernized rail corridors, and in some sections, existing sidings are widely spaced. While sidings are an average of approximately seven miles apart, on the 26-mile segment between Santa Barbara and Ventura, there is a single siding. Depending on allowed track speeds and the distance between sidings, trains can wait up to 20 minutes for the section of the track ahead of them to clear before continuing. Planned stops at sidings are incorporated into the schedule, but these delays add to the total trip time, making rail a less attractive travel option. Especially as train volumes increase, providing sufficient sidings spaced appropriately is an important means by which to ensure capacity.

- Manually-thrown switches. With the exception of a remote-controlled siding at Gaviota (MP 336.0), 20 of the switches between North Ellwood (MP 355.8) and South San Luis Obispo (MP 249.9) are non-powered, and must be manually operated. More-modern switches are remotely-controlled and electrically-operated. Based on the signal, switches are automatically configured for an approaching train. Manually-thrown switches result in delays: the train must stop, and a crew member must disembark the locomotive, properly align the switch, and reset the switch when the train has cleared it. While the number of switches that need to be manually-adjusted and the resulting delay varies by train depending on the locations at which scheduled meets and passes with other trains will occur), the time spent making these switching moves (an average of between 5-10 minutes per switch) lengthens the total travel time, which could be reduced through the installation of upgraded switches. Additionally, the speeds at which trains can move through these switches could be increased if they were replaced by higher-speed switches.

- Signaling System. Over the entire corridor, between San Luis Obispo and Los Angeles, as a train passes a signal, the Automatic Block Signal (ABS) system detects its passing and changes the signals to show the block of track as occupied. Dispatchers monitor and manage the progress of train by means of issuing movement authority under two different protocols.

  Between South San Luis Obispo and North Elwood (a distance of 104 miles), train movements are controlled via radio communication with UP dispatchers. This is technically called Track Warrant Control (TWC). Trains are authorized by the dispatcher to move between designated limits. When a train reaches the end of the designated limits for which they have been given authority to move, they must get additional authority to continue from the dispatcher.

  By contrast, the portion of the corridor between North Ellwood and Los Angeles Union Station (MP 0) is equipped for Centralized Traffic Control (CTC). With CTC, the dispatching of trains is controlled by the dispatcher, who can authorize movement by controlled signals and line remotely-controlled switches in advance of a train's movement. This dispatching is computer-driven, resulting in more-efficient and timely dispatching. CTC is the remote control of signals and switches, and is more expensive both to install and maintain than is TWC.

- A single track. All rail services on the LOSSAN North corridor (traveling both northbound and southbound) share a facility with limited passing sidings that is largely single-tracked – 175 miles of its 222-mile length (80%). The single-track layout constrains the movement of trains: by necessity, only a single train at a time can be present on a particular stretch of track. Other trains are forced to wait at locations where a second, parallel track exists, such as at a station or at a rail siding, and which can proceed only after the section of track is clear and a signal has been provided by a dispatcher. Improvement projects such as

lengthening existing sidings, adding new sidings and, where appropriate stretches of additional main track can make best use of the rail corridor and add capacity.

5.3.1 TRAVEL TIME

Total travel time (the time spent on the road or on a train, from the place of origin to the final destination) is an important determinant when selecting a trip mode (i.e., travel by train vs. by automobile). The scheduled running time for trains between Los Angeles and Santa Barbara is two hours 40 minutes, with an additional two hours and 47 minutes running time between Santa Barbara and San Luis Obispo. Reducing the number and duration of delays, such as at sidings, as mentioned above, would have a significant positive impact on travel time, as would speed increases made possible through track upgrades and curve realignment.

5.3.2 RELIABILITY

Reliability refers to the ability for trains to run according to their schedules. Having large sections of single-track and limited opportunities for trains to safely pass each other (at stations or at sidings) has an impact on reliability. This is compounded by the outdated track and signal conditions north of Goleta, which can also affect reliability. Trains are scheduled to arrive at sidings or stations at a particular time (called a “meet”). Given the volume of trains on the corridor, any delay in trains arriving at their scheduled “meets” has a ripple effect on other trains between San Luis Obispo and Los Angeles. Improving track and signal conditions where needed, providing additional new sidings and lengthening existing sidings can increase reliability and reduce delays.

Reliability also includes the confidence on the part of passengers that their train will arrive and depart as scheduled, and that the travel time will be the length they understand it to be before they board. This reliability is known as on-time performance or OTP.

Maintaining on-time performance is critical in attracting and maintaining ridership on the *Pacific Surfliner* service. The current (2006) on-time performance goal for the entire *Pacific Surfliner* corridor (San Diego to San Luis Obispo) is 82%, with a goal of improving to 90% by 2015-16[20]. Recent data for November 2006-January 2007 shows an average OTP for the *Pacific Surfliner* service of approximately 77%. Primary factors relating to OTP include interference with other trains (such as a result of delays at available sidings waiting for another train to pass), speed restrictions (from slow orders issued in areas where track repairs or improvements are underway), and from signal and communications problems. The capacity improvement projects proposed in this Plan would improve reliability, and the non-capacity projects (track upgrades and curve realignments) could significantly reduce travel time, with result positive impacts on OTP.

5.3.3 COST-EFFECTIVENESS

The *Pacific Surfliner* is one of three intercity passenger rail services supported by the State of California through the Department’s Division of Rail. Making improvements to the LOSSAN North corridor can increase the cost-effectiveness of the Department’s support for the service. Increased capacity and reduced travel time can provide for better utilization of trainsets and crew, which can reduce operating expenses. Reduced travel time can attract additional ridership, which can result in increased farebox recovery ratios. The result is that the Department’s funds available to support rail services are better utilized. Typically, increased efficiencies allow remaining monies to be spent on other improvements or additional service. Cost-effectiveness is especially important in the context of *GoCalifornia*’s desire to fund improvements to the transportation system in California that can help ensure a vibrant economy and encourage job development. The improvement projects recommended in this document would strongly assist in achieving the goals of *GoCalifornia*. In fact,

[20] California State Rail Plan 2005-06 to 2015-16, California Department of Transportation, December 2005

they are even more cost-effective, because their benefits accrue not just to intercity rail service, but extend to commuter rail and freight service/goods movement as well.

5.3.4 SAFETY

Nationally, passenger rail travel is one of the safest modes of transportation. However, continually improving safety is always an important consideration in the improvement of the LOSSAN North rail corridor. Projects that improve safety include track and signal upgrades, and grade separations which eliminate at-grade crossings between rail lines and roadways.

The California Public Utilities Commission (CPUC) is the state agency primarily responsible for rail safety issues. As part of that responsibility, a process for identifying and prioritizing safety improvements at crossings has been developed and funding mechanisms identified to pay for these improvements. For additional information on the process or to see the current list of crossings identified as priorities for upgrades, please visit:

http://www.cpuc.ca.gov/static/transportation/crossings/rr+crossing+funding+programs.htm

5.3.5 OTHER CONSIDERATIONS

Other considerations associated with the development of the LOSSAN North Strategic Plan include: increasing modal connections, protecting air quality and environmental resources, and identifying community concerns.

Increasing the modal connections between the rail service and passengers' points of origin (such as home or work) and their final destination makes rail a more attractive travel option. There is a need for increased coordination and planning between the rail service providers, local transit operators, and regional agencies. This effort should include review and coordination of train and bus service schedules so as to minimize transfer delays. As well, future station needs for bus access and circulation should be determined.

As the LOSSAN North rail corridor is enhanced and improved, projects will have benefits to air quality and the environment, as well as to rail performance. Projects that reduce delays (such new or extended sidings or grade separations, for example) will provide benefits to air quality by reducing emissions from idling trains and/or automobiles and trucks. In addition, reduced travel times make travel by train a more attractive alternative.

The highway system, rail system, and commercial airports serving the intercity travel market are currently operating at or near capacity and will require large public investments for maintenance and expansion in order to meet existing demand and future growth. Without improvements to the LOSSAN North rail corridor, as travel demand increases there will be negative impacts to the economy and quality of life given a transportation system that is less reliable, and deteriorating air quality in and around our metropolitan areas.

The overall goal of the LOSSAN North Strategic Plan is to improve mobility in this congested part of the state by improving the rail system in a cost-effective manner. The rail corridor improvement projects under study would provide a vastly improved mode of train travel, linking the major metropolitan areas of Los Angeles, Ventura, Santa Barbara, San Luis Obispo, and beyond; provide opportunities for better interface with mass transit; and provide added capacity to help meet increases in travel demand in California in a manner sensitive to, and protective of California's unique natural resources.

As rail corridor improvement projects are developed for the LOSSAN North corridor, the Public Outreach process has provided ample opportunities to identify community concerns. The public

meetings held during the development of the Strategic Plan provided the first set of opportunities for community concerns to be identified. Subsequent meetings and presentations have provided additional opportunities for input into the Plan's development. Continued opportunities for public involvement will be included as part of individual projects environmental clearance processes.

Public Outreach Efforts

The development of the Strategic Plan included a robust public outreach effort, including presentations and meetings with stakeholders, and a series of public information meetings held in cities throughout the LOSSAN North corridor. At each meeting, staff representing the Department, LOSSAN, the local transportation agency (VCTC, SBCAG, or SLOCOG), and the consultant were available to answer questions.

5.4 Stakeholder Meetings

PowerPoint presentations summarizing the goals, process, and schedule for the LOSSAN North Strategic Plan were made to stakeholders at meetings throughout the study area. The purpose of these presentations was to acquaint stakeholders with the project, and to solicit their input and comments regarding the study's scope and process. The dates and locations of stakeholder meetings held are provided in **Appendix A**.

5.5 Public Information Meetings

Four public information meetings were conducted over a three-day period in March 2005. These public information meetings provided the public with an overview of the LOSSAN North corridor and the rail improvement projects under study, including information on the following:

- The Study Context – the purpose of the study and the need for improvements to the corridor;
- Rail corridor facts;
- Current and projected train volumes (of existing and proposed rail services);
- Types of rail improvement under consideration;
- Proposed timeline for projects;
- Projects by county – Los Angeles, Ventura, Santa Barbara, and San Luis Obispo; and
- The Planning Process / Next Steps.

The dates and locations of public information meetings held are provided in **Appendix A**.

Comments Received

Comments gathered at the stakeholder and public information meetings were supportive of the strategic planning process, and the projects presented. Participants expressed the most interest in projects that improve reliability and those that provide additional information to passengers (such as electronic messaging boards and increased signage and literature in Spanish). There was significant interest at the Santa Barbara meeting about the potential for improvements that could be supportive of commuter rail. Specific comments included:

- A recommendation to include consideration of grade separating four grade crossings within the City of Oxnard.
- Consideration of a future station stop at one of the beaches in Santa Barbara County; for example Gaviota State Beach.

6 RAIL IMPROVEMENT PROJECTS

This section provides descriptions of the rail improvement projects studied, including the types of projects studied, the process by which they were identified, the recommended timelines for their construction, their location by county, and their costs.

Rail improvement projects are described in this document from north to south and organized by county, beginning with projects in San Luis Obispo County and ending with Los Angeles County projects.

6.1 Types of Rail Improvement Projects Studied

The individual rail improvement projects in this plan fall into six categories. Brief descriptions of each category are shown below:

Track Upgrades. The key to operating at maximum authorized speeds in mixed use (freight/passenger) territory is the condition of the infrastructure (rail, ties and sidings), track geometry, signal system and level of maintenance. Track conditions between LA and Santa Barbara are representative of an FRA Class IV railroad, but as with any transportation system, improvements must be ongoing in order to keep up with expanding needs of a rapid growing population. Improvements such as additional and extended sidings, double tracking wherever possible, curve realignments and tunnel improvements are all necessary in order to maintain a first rate passenger rail service. In addition to infrastructure expansions, there is a constant need to replace rail and ties in order to maintain the system at maximum allowable train speeds.

While UP has made infrastructure upgrades since its purchase of the line from Southern Pacific in 1996, track and signal system conditions north of Santa Barbara continue to lag behind those found elsewhere on the corridor. Much of the track is older, which requires a much greater level of maintenance to operate at maximum allowable speeds. The track geometry requires trains to operate at slower than maximum FRA allowable speed (79 mph) and siding lengths and conditions makes train meets both difficult and time consuming.

Signal Upgrades. Like the track system, the signal system between Los Angeles and Goleta is state of the art. The Centralized Traffic Control (CTC) is operated by a dispatcher who controls train movements from a remote location. North of North Ellwood, the signal system is Automatic Block System (ABS), requiring the dispatcher to communicate directly with each train crew before the train can obtain authority to proceed through "blocks" to their destination. Some locations, such as the Gaviota siding, have what is referred to as "island" CTC. This is when the switches, or control points, at a remote siding location are controlled by the dispatcher, minimizing the investment of installing CTC throughout a corridor. The use of Island CTC has been previously discussed with the Union Pacific Railroad for installation on the sidings between Gaviota and South San Luis Obispo as part of incremental upgrades over time. UP has stressed that Island CTC is not required to accommodate their current levels of freight traffic over the corridor, and the costs of these upgrades would need to be borne by others.

Siding and Siding Extensions. A siding is a short section of track adjacent to a main track, used for meeting or passing trains. Providing new sidings, and extending and upgrading some existing sidings where possible, would provide additional capacity, reduced trip times, and improve operational reliability for both passenger and freight traffic.

Siding spacing between Gaviota and San Luis Obispo averages 7.5 miles, among the best in the LOSSAN corridor. However, every siding between these two locations operates at 10 miles per hour and requires train crews to manually throw the switch at either end. Incremental siding

upgrades are a critical element to meeting the needs of the *Pacific Surfliner* service in the LOSSAN North corridor.

Siding length is another critical factor in mixed-use territory. Market factors (labor costs, locomotive fleet utilization, etc.) are resulting in increasingly long freight trains. The result is that passenger trains are more often forced into the siding when there is a meet, simply because the freight trains will not fit. Where siding lengths of 5,000' were sufficient at one time, freight trains now operate at lengths approaching 9,000'. Therefore, existing sidings should be extended to at least 10,000'-long, and new sidings with a minimum length of 10,000' constructed wherever required.

As sidings are lengthened, they will be upgraded to permit higher speeds. This effort includes moving to No. 24 turnout switches, which allow for trains to move over the switches at 40 mph, as well as upgrading the sidings rail and ties to permit higher speeds. This will provide opportunities at some sidings for trains to conduct moving meets. The train entering the siding would slow down, but not have to stop, shortening the delay. There are increased costs, both for the upgrading of the siding tracks as well as continuing maintenance to allow higher speeds. There will need to be an agreement with UP which would apportion the additional maintenance costs associated with these upgrades.

Construction of Second Main Tracks. Providing additional segments of mainline tracks in areas of heavy rail traffic is akin to providing more travel lanes on a roadway. Main tracks would provide opportunities for trains to travel at up to their maximum allowed speed. The benefits of additional main tracks are increased train frequencies, improved operational reliability, increased capacity, and decreased train delays.

Curve Realignments. In general, curve realignments are costly, require additional right-of-way, and can have environmental and local issues to overcome. Curve realignment project will require detailed cost/benefit analysis before proceeding. That said, curve realignments allow for reduced trip times by increasing train speeds on the curves. Straightening the train alignment would also prolong the life of the rail, reducing the frequency of track repairs or maintenance.

Grade Separations. At-grade crossings are locations at which a rail line and a roadway intersect. Grade separation is the elimination of this intersection. Because cars and trucks are less sensitive to grades, typically a grade separation eliminates an intersection between a railway and a roadway, putting the roadway underneath the rail line, increasing safety and benefiting train performance. Grade separations also provide community benefits, such as reducing noise (through the opportunity to reduce sounding the train's horn), and improve local traffic flow by reducing vehicular delays at crossings.

Station Improvements. Station improvements include providing additional parking, new or improved station platforms, improved transit connectivity, new electronic signage to provide up-to-date arrival and departure information, and automated ticket vending machines to reduce ticketing times at busy stations, provide for off-hours ticketing, and allow ticketing at unstaffed stations. Benefits of station improvements include improved customer information, operational reliability, and increased capacity and customer service.

6.2 Project Development Process

6.2.1 AMTRAK 20-YEAR IMPROVEMENT PLAN

Section 2.3.1 provides a description of the Amtrak 20-Year Plan. The majority of the projects described in this plan were initially developed as part of that process. As part of the development of the LOSSAN North Strategic Plan, many of these projects were later refined using rail capacity modeling, as detailed below. Other rail improvement projects were developed through the rail modeling effort, or were suggested by stakeholders during the Public Outreach effort.

Those projects which did not have a direct impact on capacity (track upgrades and curve realignments) were not modeled, though they are also important improvements to the LOSSAN North rail corridor. Non-capacity improvement projects don't increase the number of trains that can effectively operate over a given section of track; they provide increased reliability, reduced travel time, and improved passenger comfort and customer service.

6.2.2 RAIL CAPACITY MODELING

Rail capacity modeling, using the Rail Traffic Controller© (RTC) software created by Berkeley Simulation Software, LLC, simulated rail operations on the LOSSAN North corridor over three different periods of time:

- 2006;
- 2015; and
- 2025.

The modeling cases examined how well the rail network functions (or will function) given the infrastructure (tracks, signals, sidings, etc.) and train volumes for all services, existing, current and future. Each case provided a seven-day simulation period, during which trains are dispatched over the network. Where there was a dispatching conflict between trains, any delays were identified by time, duration, location, and their nature.

The 2006 modeling runs established the Base Case; that is to say, how well the LOSSAN North corridor functions today, given the current level of train volumes and the existing infrastructure. It also established the existing levels of delay for freight and passenger services, and made recommendations as to rail improvement projects immediately required to support the existing level of rail traffic on the LOSSAN North corridor.

Subsequent cases for 2015 and 2025 examined how well the network functioned with forecast increases in demand as a result of additional train volumes. After the initial runs in each case identified locations at which delays were seen, follow-on cases were run which suggested rail improvement projects required to ensure acceptable freight and passenger service performance levels.

The projects identified, if constructed and in place by their suggested year, will allow for the essential doubling of rail volumes over the LOSSAN North corridor by 2025, while holding delays to the levels seen in the 2006 Base Case.

While a complete description of the rail modeling process and the results of that effort can be found in **Appendix C**, this section provides a summary of the modeling efforts' major findings, by modeling case.

<u>2006 Base Case</u>

The 2006 Base Case provided a starting point for the modeling, and allowed a determination of how the "unimproved" LOSSAN North rail corridor is currently able to accommodate the rail services and existing volumes on the rail line today.

The 2006 Base Case quantified the number of trains operating over the LOSSAN North Network, the delay ratio[21] for passenger and freight trains, and the total hours per day spent delayed by each rail service type, as shown in **Table 6-1**.

Table 6-1
Network Performance (2006 Base Case)

Case	Number of Trains			Delay Ratio (Percent)		Delay Hours/Day	
	Avg. per Day	Avg. Rev. Psgr.	Avg. UP Freight	Psgr.	UP Freight	Psgr.	UP Freight
2006 Base Case	**65**	**52**	**13**	**5%**	**13%**	**4.0**	**4.7**

Chokepoints where most of today's delays could be seen were:

- Van Nuys (Los Angeles County), where a passenger platform only on the "southward" track creates a single-track railroad for passenger trains north of CP Woodman;
- Between Van Nuys and Chatsworth (Los Angeles County), where a second main track between CP Raymer and CP Bernson could provide additional needed capacity to meet the current train volumes; and
- Santa Barbara – Ventura County (Santa Barbara/Ventura Counties). The distance between Ventura and Santa Barbara is 26 miles. There is a single siding between these two cities, located at Seacliff, 8.5 miles north of Ventura. That leaves almost 17 miles without a siding (the average length between sidings is approximately seven miles). Delays increase because of the greater distance between available sidings. A solution to this situation is to provide an additional siding between Santa Barbara and Ventura. At the 2006 train volumes, the location of this siding is inconsequential. Project options could include either (listed from north to south, and not by preference): Ortega Siding or Carpinteria Siding.

2015 Cases

Performance between Los Angeles and San Luis Obispo deteriorates, given increased train volumes for all services (Amtrak, Metrolink, UP Freight) and the potential introduction of a new Ventura-Santa Barbara intercounty commuter rail service. An increase in train volumes of 12% over the 2006 Base Case puts additional strain on the existing infrastructure. Should the recommended 2006 improvement projects not be in place by 2015, delays between CP Raymer and CP Bernson would quadruple, and delays between Ventura and Santa Barbara would increase.

While most of the additional new train volumes would be seen in Metrolink territory (Los Angeles Union Station to Montalvo), two additional UP through freight trains and an additional *Pacific Surfliner* roundtrip to San Luis Obispo point out the need for improvements north of Santa Barbara. Delays are seen in meets and passes, and the duration of those delays increases.

[21] The delay ratio is obtained by dividing the delay time by the total elapsed time for trains on the network, to get a measure of the percentage of total time taken up by delay.

Beginning in 2015, "islands" of CTC will have started to be installed north of Goleta. These projects will improve the efficiency of dispatching over the corridor and increase capacity. Additionally, three siding projects in south Santa Barbara and north Ventura Counties will be required.

Finally, while the Los Angeles Union Station run-through tracks are not specifically identified as needed to support rail operations on the LOSSAN North corridor, this project would dramatically improve the efficiency of operations at Union Station, resulting in benefits to all rail services in both the LOSSAN North and LOSSAN South areas.

Table 6-2 shows the 2015 Case train volumes, delay ratios and hours of delay for passenger and freight services, both with and without the intercounty commuter rail service under study.

Table 6-2
Network Performance (2015 Cases)

Case	Number of Trains			Delay Ratio (Percent)		Delay Hours/Day	
	Avg. per Day	Avg. Rev. Psgr.	Avg. UP Freight	Psgr.	UP Freight	Psgr.	UP Freight
2006 Base Case	**65**	**52**	**13**	**5%**	**13%**	**4.0**	**4.7**
2015 Case (with V-SB Commuter Rail Service)	**85**	**69**	**16**	**7%**	**14%**	**7.0**	**8.3**
2015 Cases (without V-SB Commuter Rail Service)	**81**	**65**	**16**	**5%**	**14%**	**4.9**	**7.3**

2025 Cases

The significant increase in train volumes planned to occur between 2015 and 2025 would add additional strain to the LOSSAN North rail network, despite introduction of projects to add capacity based on the 2006 and 2015 modeling results. In particular this strain would be the result of significant increased train volumes proposed for Metrolink's Ventura County line service, as well growth trains added to the proposed Ventura-Santa Barbara County commuter rail service (should that service be established). This strain would be concentrated in the area between Goleta and Chatsworth. Required projects needed to address capacity constraints would include additional sidings, as well as four different projects to add lengths of second main track.

Table 6-3 shows the 2025 Case train volumes, delay ratios and hours of delay for passenger and freight services, as well as those for 2006 and 2015, for comparison purposes.

Table 6-3
Network Performance (2025 Cases)

Case	Number of Trains			Delay Ratio (Percent)		Delay Hours/Day	
	Avg. per Day	Avg. Rev. Psgr.	Avg. UP Freight	Psgr.	UP Freight	Psgr.	UP Freight
2006 Base Case	65	52	13	5%	13%	4.0	4.7
2015 Case (with V-SB Commuter Rail Service)	85	69	16	7%	14%	7.0	8.3
2015 Cases (without V-SB Commuter Rail Service)	81	65	16	5%	13%	4.9	7.3
2025 Cases (with V-SB Commuter Rail Service)	111	91	20	5%	8%	6.9	10.7
2025 Cases (without V-SB Commuter Rail Service)	106	85	20	6%	10%	7.3	14.6
2025 Cases (without V-SB Commuter Rail Service, but with their associated improvements)	106	85	20	5%	7%	5.7	10.3

6.2.3 ON-TIME PERFORMANCE

On-time performance of trains is important, both from the passenger's perspective as well as from a planning and operations perspective. Travelers who opt to take the train want to know that their trip will depart and arrive according to the schedule, and that they will not be unnecessarily delayed in route. From a planning and an operations perspective, the increasing train volumes on the LOSSAN North corridor make meeting OTP goals more critical, as a delay with one train can have a ripple effect on the schedules of other trains. Factors which affect the OTP of passenger trains include:

- Interference with other trains, both from passenger and freight;
- Temporary speed restrictions (called "slow orders"), as a result of train work or maintenance;
- Rail equipment failures;
- Trespasser issues; and
- Signal delays.

The modeling effort showed that adding railroad capacity through rail improvement projects can assist in maintaining OTP. Advancing the priority of these projects can provide a temporary increase in OTP, but that advantage is lost as train volumes rise and excess capacity is used.

An Ad Hoc committee formed by the LOSSAN Board of Directors is continuing to explore and discuss ways to improve OTP, both for current and future operations.

Options include:

- Providing additional rail improvement capacity projects beyond those identified in the rail modeling. Projects sufficient to support future growth in rail capacity without increasing delays were studied. Additional projects would provide "excess" capacity which could result in increased opportunities for trains to meet and pass, which could improve OTP.

- Increasing the dispatching priority of passenger trains beyond that currently used. While passenger trains are generally assigned a higher dispatching priority over freight service, this option would improve passenger train performance within the UP-dispatched portion of the LOSSAN North corridor by subordinating all freight trains to a lower priority than passenger trains. This action would significantly increase UP-freight delays. As the host railroad, UP could seek additional improvement projects to reduce these delays, and that could create additional rounds of infrastructure improvements. Additionally, this option might not have any impact on delays from interference with other passenger trains, particularly with the Metrolink-dispatched territory, where Metrolink commuter trains receive a higher dispatching priority over Amtrak intercity services.

- Refining the passenger train schedules. This option would adjust the existing and future *Pacific Surfliner* train schedules to add between 5 and 15 minutes of time to some trains, and the elimination of time spent waiting at stations for others. This refinement would allow trains to better adjust their end-to-end travel time, on which OTP is calculated, and stay within the 10-minute threshold beyond which a train is considered late. Again, in Metrolink-dispatched territory, this option might not prove effective. The OTP standards for commuter rail services are by necessity are more stringent than those for intercity services. Dispatchers will try to prevent other trains from becoming late at the expense of increasing the delay experienced by the original "late" train.

There is a need for continuing discussion and coordination between all rail services, to ensure that trains are dispatched most logically, regardless of their nature. For example, an intercity train often does not service all stations; therefore, dispatching it in front of a commuter train which will stop at all stations keeps both trains operating efficiently.

6.2.4 PROPOSED VENTURA-SANTA BARBARA COMMUTER RAIL SERVICE

While a complete discussion of the three potential alternatives for commuter rail service between Ventura and Santa Barbara Counties can be found in **Appendix B,** the following key findings of the service's impact on the LOSSAN North corridor, as derived from the rail capacity modeling are:

- Rail capacity modeling included the potential Ventura-Santa Barbara intercounty commuter rail service for its 2015 and 2025 modeling runs.
- For comparative purposes, two of the alternatives modeled explored network impacts of different equipment: "traditional" locomotives and bi-level coaches, and Diesel Multiple Units (self-powered rail vehicles, also known as DMUs. While there would be minor differences in non-revenue (not carrying paying customers, as at the beginning and end of each operating day when rail equipment moves between its storage facilities and its first station served) rail movements, both options would have similar capacity impacts.
- For 2015, an initial service schedule of three roundtrips per day was modeled. While not included in the 101 in Motion study, for 2025 (should the commuter rail service be established) an increase in service to four daily roundtrips was modeled.

- 2015 – With the commuter rail service, LOSSAN North train volumes over the 2006 Base Case would rise from 12% to 21%, with a resulting doubling of delays seen between Ventura and Santa Barbara.
- 2025 – The additional commuter rail roundtrip adds increased pressure on the corridor segment between Camarillo and Goleta.
- Four rail improvement projects would be needed to specifically support the proposed commuter rail service (though they would also benefit all other rail services). These projects include (from north to south)
    - Sandyland Siding;
    - Rincon Siding;
    - Oxnard-Camarillo Second Main Track; and
    - North Camarillo Crossover

Figures 6-1 and 6-2 show the generalized locations of all rail improvement projects. **Figure 6-1** shows the locations and proposed timeline of those projects recommended as part of the rail capacity modeling, and **Figure 6-2** shows the locations and timeline for non-capacity-related projects.

Figure 6–1
Capacity Projects
San Luis Obispo to Goleta – Continuous CTC
Paso Robles
Atascadero
San Luis Obispo
San Luis Obispo
SAN LUIS OBISPO
Grover Beach
Pismo Beach
Guadalupe
Santa Maria
SANTA BARBARA
Lompoc
Surf
Solvang
Santa Barbara
Goleta
Carpinteria
VENTURA
Ventura
Montalvo
Oxnard
Moorpark
Simi Valley
Chatsworth
Camarillo
Van Nuys
Bob Hope/Burbank Airport
Glendale
Los Angeles Union Station
LOS ANGELES
Guadalupe Siding Extension and Island CTC
Waldorf Siding Extension and Island CTC
Island CTC – Narlon, Honda, Concepcion
Capitan Siding Extension and Island CTC
Goleta Service Track Extension
Ortega Siding
Tangair – Siding Extension and Island CTC
Sandyland Siding
SB – Ventura Siding
Carpinteria Siding
Rincon Siding
Seacliff Siding Extension
Oxnard North Platform
Leesdale Siding Extension
Oxnard to Camarillo 2nd Main Track
CP Las Posas – MP 423 2nd Main Track
North Camarillo Crossover
Simi Valley to CP Strathearn 2nd Main Track
CP Davis to Simi Valley Station 2nd Main Track
CP Raymer to CP Bernson Second Main Track
Van Nuys North Platform
Burbank Junction Track Realignment
L.A. Union Station Run-Through Tracks
Legend:
Amtrak Intercity Rail Services
Amtrak Thruway Connecting Bus Service
Metrolink Commuter Rail
Santa Barbara-Ventura Intercounty Commuter Service (Under Study)
Recommended Project Implementation Timeline:
2006
2015
2025

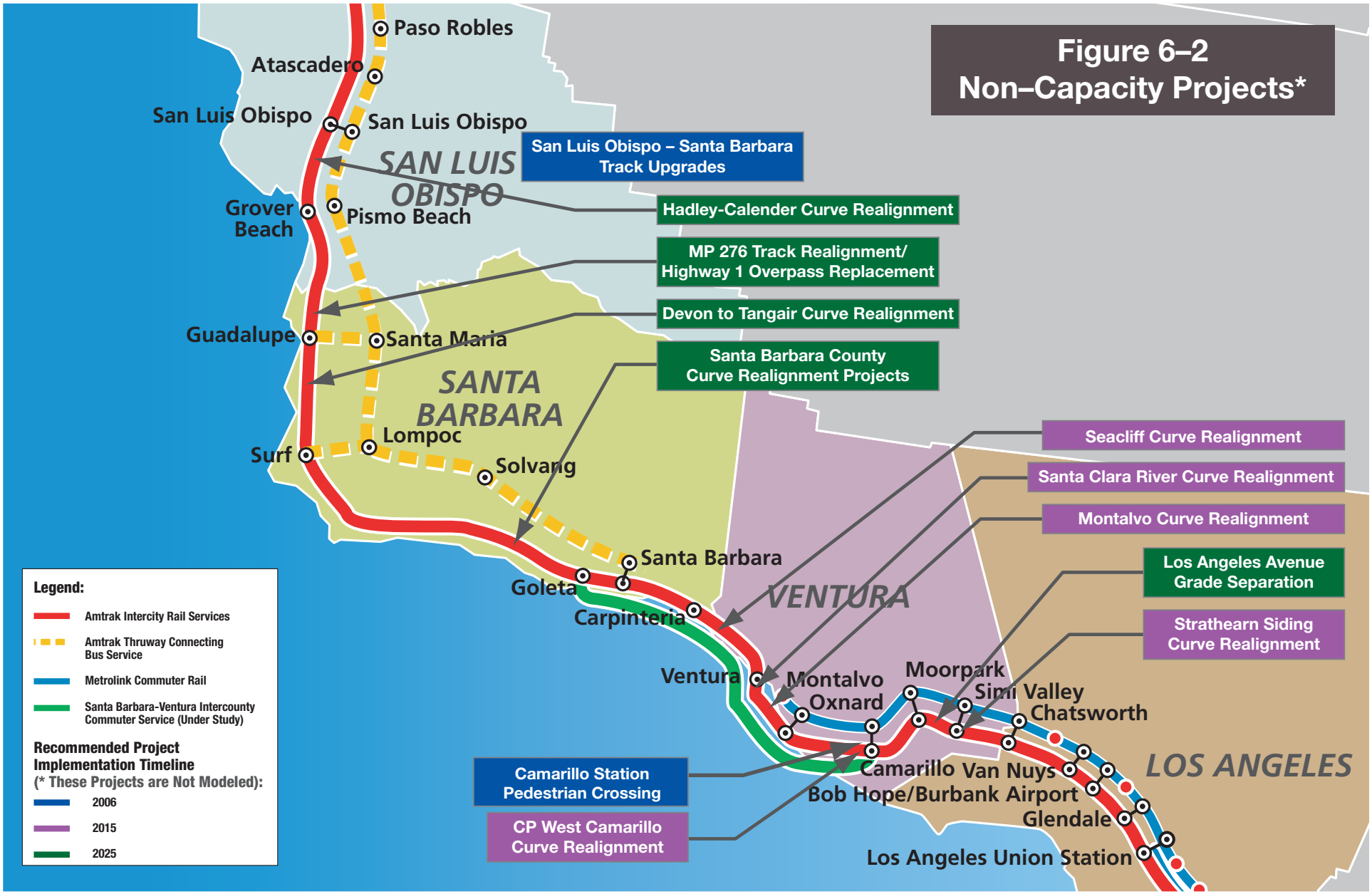
Figure 6–2
Non–Capacity Projects*
Paso Robles
Atascadero
San Luis Obispo
San Luis Obispo
SAN LUIS OBISPO
Grover Beach
Pismo Beach
Guadalupe
Santa Maria
SANTA BARBARA
Lompoc
Surf
Solvang
Santa Barbara
Goleta
Carpinteria
VENTURA
Ventura
Montalvo
Oxnard
Moorpark
Simi Valley
Chatsworth
Camarillo
Van Nuys
Bob Hope/Burbank Airport
Glendale
Los Angeles Union Station
LOS ANGELES
San Luis Obispo – Santa Barbara Track Upgrades
Hadley-Calender Curve Realignment
MP 276 Track Realignment/ Highway 1 Overpass Replacement
Devon to Tangair Curve Realignment
Santa Barbara County Curve Realignment Projects
Seacliff Curve Realignment
Santa Clara River Curve Realignment
Montalvo Curve Realignment
Los Angeles Avenue Grade Separation
Strathearn Siding Curve Realignment
Camarillo Station Pedestrian Crossing
CP West Camarillo Curve Realignment
Legend:
Amtrak Intercity Rail Services
Amtrak Thruway Connecting Bus Service
Metrolink Commuter Rail
Santa Barbara-Ventura Intercounty Commuter Service (Under Study)
Recommended Project Implementation Timeline
(* These Projects are Not Modeled):
2006
2015
2025

6.3 Timeline for Projects

The timeline for the projects identified in this plan are prioritized into three phases:

- Immediate – Projects in this category should be completed within 1 to 3 years, and are derived from the results of what is needed now as a result of the 2006 Base Case modeling.
- Near-term – Projects in this category should be completed within 4 to 8 years, to accommodate future train capacity needs derived from the 2015 modeling cases.
- Vision – Projects in this category would be completed within 9 to 20 years, to accommodate future train capacity needs derived from the 2025 modeling cases.

The proposed timeline category for each project assumes that funding for the projects would be available and programmed, and that each project had obtained all necessary environmental clearances and permits.

6.3.1 RAIL IMPROVEMENT PROJECT TIMELINES

The timelines for rail improvement projects described in this section were established from either the rail modeling effort or from the Amtrak 20-Year Plan. The recommended timeline for capacity projects was established through the various rail modeling cases. The timelines for non-capacity projects were established through the development of the Amtrak 20-Year Plan, and have been retained in this document.

6.3.2 COST ESTIMATES

The costs shown in this section are planning-level estimates. Costs would be further detailed and refined as part of their project development. For projects originally in the Amtrak 20-Year Plan, these costs represent a 91% escalation over their 2001 costs[22], using the Department's Price Index for Selected Highway Construction Items[23].

Tables 6-4, 6-5, 6-6, and 6-7 provide a listing of rail improvement projects and their estimated costs by their recommended timeline for implementation.

[22] This used 2000 dollar costs.
[23] http://www.dot.ca.gov/hq/esc/oe/contract_progress/cost-index-summary.pdf

Table 6-4
Immediate Projects

Project Number	Project Name	Current Timeline	Estimated Project Cost
SLO-1	San Luis Obispo – Santa Barbara Track Upgrades	Immediate	$50M
SB-11 **or** SB-12	Santa Barbara – Ventura Siding (Ortega or Carpinteria Siding)*	Immediate	$10-20M
V-07	Leesdale Siding Extension**	Immediate	$15M
V-11	Camarillo Station Pedestrian Crossing**	Immediate	$1M
LA-01	CP Raymer to CP Bernson Second Main Track	Immediate	$47M
LA-02	Van Nuys North Platform	Immediate	$13-26M
	Estimated Total – Immediate Projects		**$136-159M**

Table 6-5
Near-Term Projects

Project Number	Project Name	Current Timeline	Estimated Project Cost
SB-02	Guadalupe Siding Extension and Island CTC	Near-Term	$20M
SB-03	Waldorf Siding Extension and Island CTC	Near-Term	$12M
SB-05	Tangair Siding Extension and Island CTC	Near-Term	$12M
SB-07	Narlon, Honda, Concepcion – Island CTC	Near-Term	$30M
SB-08	Capitan Siding Extension and Island CTC	Near-Term	$10M
SB-09	Goleta Service Track Extension	Near-Term	$10M
SB-10	Sandyland Siding	Near-Term	$15M
SB-11	Ortega Siding*	Near-Term	$20M
SB-12	Carpinteria Siding*	Near-Term	$10M
V-02	Seacliff Siding North	Near-Term	$18M
V-03	Seacliff Curve Realignments	Near-Term	$10M
V-04	Santa Clara River Curve Realignment	Near-Term	$6M
V-05	Montalvo Curve Realignments	Near-Term	$2M
V-10	CP West Camarillo Curve Realignments	Near-Term	$5M
V-14	Strathearn Siding Curve Realignment	Near-Term	$1M
LA-04	Union Station Run-Through Tracks	Near-Term	$640M
	Estimated Total – Near-Term Projects		**$821M**

* Depending on which siding project was selected to be completed as an Immediate project: Ortega or Carpinteria.

** Project categorized from “Near-Term” based on capacity modeling, to “Immediate” based on local financial commitment.

Table 6-6
Vision Projects

Project Number	Project Name	Current Timeline	Estimated Project Cost
SLO-2	South San Luis Obispo – Goleta – Continuous CTC	Vision	$80M
SLO-3	Hadley – Calendar Curve Realignments	Vision	$200M
SB-01	MP 276 Track Realignment and Highway 1 Overpass Replacement	Vision	$62M
SB-04	Devon to Tangair Curve Realignments	Vision	$196M
SB-06	Santa Barbara County Curve Realignment Projects	Vision	$677M
V-01	Rincon Siding	Vision	$10M
V-06	Oxnard North Platform	Vision	$8-15M
V-08	Oxnard-Camarillo Second Main Track	Vision	$15M
V-09	North Camarillo Crossover	Vision	$1M
V-12	CP Las Posas to MP 423 Second Main Track	Vision	$51M
V-13	Simi Valley to CP Strathearn Second Main Track	Vision	$42M
V-15	Los Angeles Street Grade Separation	Vision	$93M
V-16	CP Davis to Simi Valley Station Second Main Track	Vision	$36M
LA-03	Burbank Junction Track Realignment	Vision	$9M
	Estimated Total – Vision Projects		**$1.5B**

Table 6-7
Summary of Projects by Timeline

Project Category	Estimated Project Cost
Immediate Projects	**$136-159M**
Near-Term Projects	**$821M**
Vision Projects	**$1.5B**
Estimated Total for all LOSSAN North Projects	**$2.5B**

6.4 Projects by County

6.4.1 SAN LUIS OBISPO COUNTY

Figure 6-3 provides a map showing the relative locations of rail improvement projects within San Luis Obispo County and the proposed timelines for their implementation. **Table 6-8** provides a summary of San Luis Obispo County projects, their timelines, and their estimated costs.

Table 6-8
San Luis Obispo County Projects

Project Number	Project Name	Current Timeline	Estimated Project Cost
SLO-1	San Luis Obispo – Santa Barbara Track Upgrades	Immediate	$50M
SLO-2	San Luis Obispo – Goleta – Continuous CTC	Vision	$80M
SLO-3	Hadley – Calendar Curve Realignments	Vision	$200M
	Estimated Total – San Luis Obispo County Projects		**$330M**

San Luis Obispo to Santa Barbara Track Upgrades (SLO-01 – Immediate): This project would upgrade track on the 107.36 miles between San Luis Obispo and Santa Barbara, from MP 248.44 to MP 355.80, from FRA Class 3 to Class 4 track standards (it would allow maximum train speeds up to 79mph). This project would improve operational reliability, reduce trip time and increase capacity between San Luis Obispo and Santa Barbara and builds upon track work completed by Union Pacific in 2005/2006. The estimated cost for this project is $50M.

South San Luis Obispo to Goleta – Continuous CTC (SLO-3 – Vision): This project would link the previously established CTC islands between South San Luis Obispo and Goleta, establishing continuous CTC throughout the LOSSAN corridor from San Luis Obispo to San Diego, greatly enhancing the efficiency and reliability of dispatching and increasing capacity. The estimated cost for this project is $80M.

Hadley to Callender Curve Realignments (SLO-3 – Vision): This project, located 12 miles south of San Luis Obispo, reduces curvature at three locations between MP 255.10 and MP 265.5. Six of the existing 12 curves would be eliminated and the remaining six would be reduced to a three-degree maximum curvature each. Three new concrete railroad trestles and a new highway overpass at Price Canyon Road would be constructed. This project would reduce trip times by allowing maximum train speeds to increase from 50 to 79 miles per hour (mph), with the possibility of future train speeds up to 90 mph[24] at a cost of $200M.

[24] This increase in maximum train speeds would be dependent on upgrading the signal system and track maintenance practices to FRA Class 5 standards.

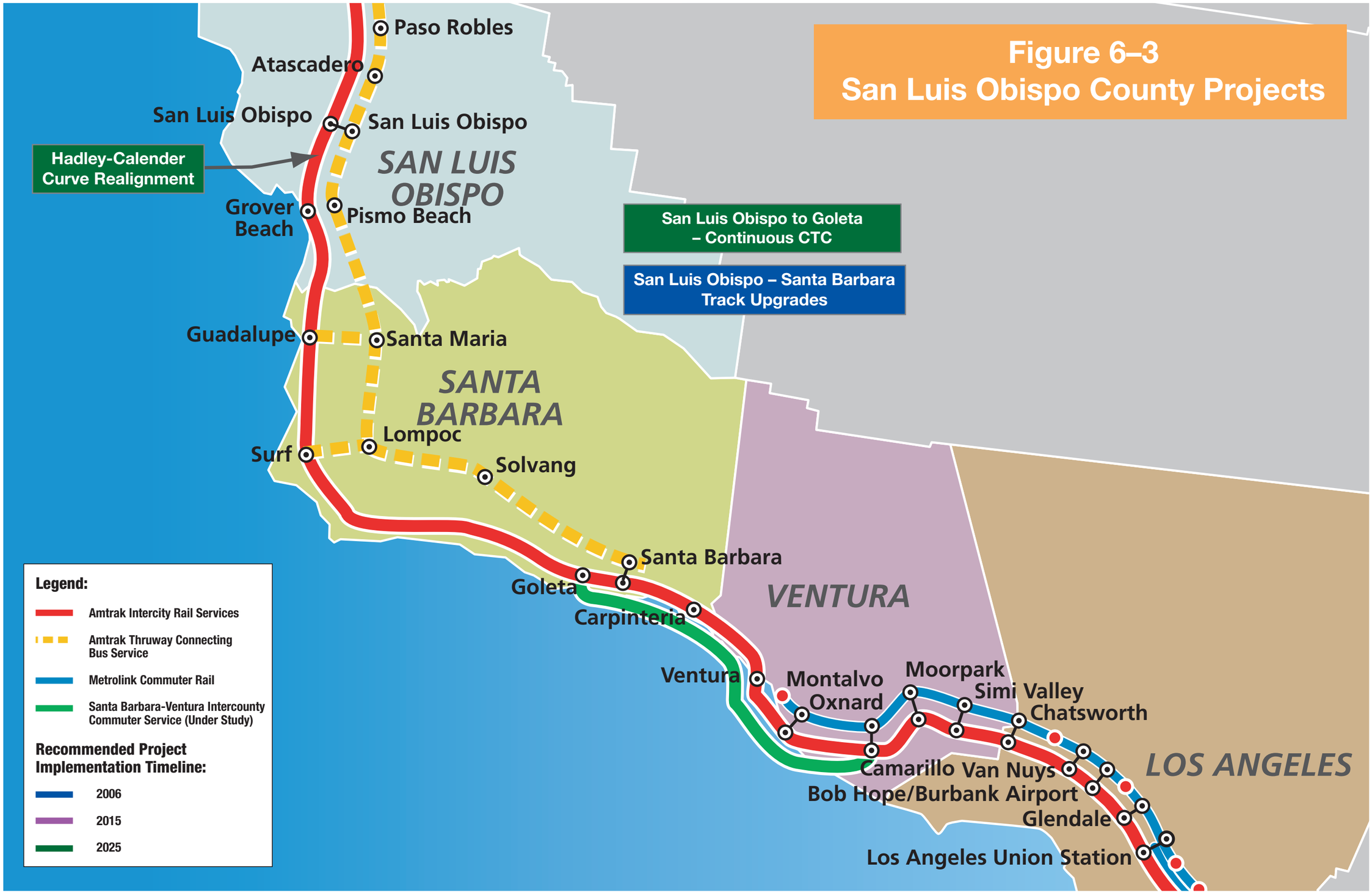
Figure 6–3
San Luis Obispo County Projects
Paso Robles
Atascadero
San Luis Obispo
San Luis Obispo
Hadley-Calender Curve Realignment
SAN LUIS OBISPO
Grover Beach
Pismo Beach
San Luis Obispo to Goleta – Continuous CTC
San Luis Obispo – Santa Barbara Track Upgrades
Guadalupe
Santa Maria
SANTA BARBARA
Lompoc
Surf
Solvang
Santa Barbara
Goleta
Carpinteria
VENTURA
Ventura
Montalvo
Oxnard
Moorpark
Simi Valley
Chatsworth
Camarillo
Van Nuys
Bob Hope/Burbank Airport
Glendale
Los Angeles Union Station
LOS ANGELES
Legend:
Amtrak Intercity Rail Services
Amtrak Thruway Connecting Bus Service
Metrolink Commuter Rail
Santa Barbara-Ventura Intercounty Commuter Service (Under Study)
Recommended Project Implementation Timeline:
2006
2015
2025

6.4.2 SANTA BARBARA COUNTY

Figure 6-4 provides a map showing the relative locations of rail improvement projects within Santa Barbara County and the proposed timelines for their implementation. **Table 6-9** provides a summary of Santa Barbara County projects, their timelines, and their estimated costs.

Table 6-9
Santa Barbara County Projects

Project Number	Project Name / Project Type	Current Timeline	Estimated Project Cost
SB-01	MP 276 Track Realignment and Highway 1 Overpass Replacement	Vision	$62M
SB-02	Guadalupe Siding Extension and Island CTC	Near-Term	$20M
SB-03	Waldorf Siding Extension and Island CTC	Near-Term	$12M
SB-04	Devon to Tangair Curve Realignments	Vision	$196M
SB-05	Tangair Siding Extension and Island CTC	Near-Term	$12M
SB-06	Santa Barbara County Curve Realignment Projects	Vision	$677M
SB-07	Narlon, Honda, Concepcion – Island CTC	Near-Term	$30M
SB-08	Capitan Siding Extension and Island CTC	Near-Term	$10M
SB-09	Goleta Service Track Extension	Near-Term	$10M
SB-10	Sandyland Siding*	Near-Term	$15M
SB-11	Ortega Siding*	Near-Term	$20M
SB-12	Carpinteria Siding	Near-Term	$10M
	Estimated Total - Santa Barbara County Projects		**$1.1B**

* Depending on which siding project was selected to be completed as an Immediate project: Ortega or Carpinteria. The Immediate siding need is shown on the Santa Barbara County Map as “SB-Ventura Siding.”

MP 276 Track Realignment and Highway 1 Overpass Replacement (SB-01 – Vision): This track realignment project, located 4 miles south of Guadalupe, would relocate 1.80 miles of main track between MP 275.2 to 277 to reduce the curvature. Two existing curves would be reduced to two degrees maximum, allowing maximum train speeds to increase from 45 to 79 mph with the possibility of future speeds up to 90 mph. The cost of this project, $62M, also includes the replacement of the Highway 1 overpass at MP 276.13, which would be required as part of the track realignment.

Guadalupe Siding Extension and Island CTC (SB-02 – Near-Term): This project, located at Guadalupe, would extend the existing Guadalupe siding to Waldorf Siding, and would install new power-operated Number 24 turnouts and control points. The estimated cost for this project is $20M.

Figure 6–4
Santa Barbara County Projects
Paso Robles
Atascadero
San Luis Obispo
San Luis Obispo
SAN LUIS OBISPO
Pismo Beach
Grover Beach
Guadalupe
Santa Maria
SANTA BARBARA
Lompoc
Surf
Solvang
Goleta
Santa Barbara
Carpinteria
Ventura
VENTURA
Montalvo
Oxnard
Moorpark
Simi Valley
Chatsworth
Camarillo
Van Nuys
Bob Hope/Burbank Airport
Glendale
Los Angeles Union Station
LOS ANGELES
MP 276 Track Realignment/ Highway 1 Overpass Replacement
Devon to Tangair Curve Realignment
Tangair – Siding Extension and Island CTC
Santa Barbara County Curve Realignment Projects
Guadalupe Siding Extension and Island CTC
Waldorf Siding Extension and Island CTC
Island CTC – Narlon, Honda, Concepcion
Capitan Siding Extension and Island CTS
Goleta Service Track Extension
Ortega Siding
Sandyland Siding
SB – Ventura Siding
Carpinteria Siding
Legend:
Amtrak Intercity Rail Services
Amtrak Thruway Connecting Bus Service
Metrolink Commuter Rail
Santa Barbara-Ventura Intercounty Commuter Service (Under Study)
Recommended Project Implementation Timeline:
2006
2015
2025

Waldorf Siding Extension and Island CTC (SB-03 – Near-Term): This infrastructure improvement project, located 30 miles south of San Luis Obispo and approximately four miles south of Guadalupe, would extend the current Waldorf siding one mile southward to MP 278.60, for a total siding length of 9,315'. New power-operated Number 24 turnouts would be installed at each end, as would CTC. This siding extension would be necessary to provide additional capacity and operational reliability for both passenger and freight traffic at an estimated cost of $12M. The current timetable calls for the southbound *Pacific Surfliner*, train #798, to pass the northbound Coast Starlight, train #14, in this vicinity. The hand-thrown switches cause significant delays and the upgrade to an island CTC signaling system is needed.

Devon to Tangair Curve Realignments (SB-04 – Vision): This major curve realignment project, located 14 miles south of Guadalupe, would relocate 12.10 miles of main line track between MP 279.80 to MP 296.80, to reduce track curvature. The project constructs 8.90 miles of new main track and 2.00 miles of retaining walls. The 24 existing curves would either be eliminated or reduced to three degrees maximum curvature each. This infrastructure improvement project would reduce trip times by allowing maximum train speeds to increase from 50 to 79 mph, with the possibility of future speeds up to 90 mph. The estimated cost for this project is $196M.

Tangair Siding Extension and Island CTC (SB-05 – Near-Term): This project, located 18 miles south of Guadalupe, is an approximate .85 mile extension northward of the existing Tangair siding for a total siding length of 10,790'. In addition to installing CTC at this location, a new power-operated Number 24 turnout would be installed at each end of the siding and the curve at MP 293.5 would be reduced from five degrees to two degrees. This siding extension would provide additional capacity and operational reliability for both freight and passenger traffic at a cost of $12M, and could be constructed within the existing right-of-way, facilitating the permitting process for this project.

Santa Barbara County Curve Realignment Projects (SB-06 – Vision): When the railroad was built along the coast in the 19th century, railroad builders followed the contours of the land to minimize earthmoving and tunnelling operations. This created many miles of curve along what is today the *Pacific Surfliner* Corridor. Straightening these curves would significantly reduce run times (trains can attain a higher speed) and would reduce maintenance costs (lessening the wear and maintenance required by tracks). For the purposes of the Strategic Plan, the individual projects below are combined as the Santa Barbara County Curve Realignment Projects. The estimated total cost for all the individual projects summarized as SB-6 is $677M.

- **Surf to Arguello Curve Realignments (SB-06A)**: This project, 67 miles north of Santa Barbara, would relocate 6.30 miles of main line track between MP 297.90 to MP 311.40. The geometry of the existing 16 curves would either be eliminated or reduced to two degrees maximum, allowing for maximum train speeds to increase from 60 mph to 79 mph, with the possibility of future speeds up to 90 mph.

- **Sudden to Concepcion Curve Realignments (SB-06B)**: This project would realign 3.50 miles of main line track between Sudden and Concepcion, 50 miles north of Santa Barbara, from MP 315.00 to MP 319.80, to reduce track curvature. This project would realign or eliminate 14 existing curves. The project would construct 3.50 miles of new main track and retaining walls. The curvature of six existing curves would be reduced to 1 degree, 30 minutes maximum each and eight existing curves would be eliminated. A new 900-foot concrete trestle would be constructed over Jalama Creek. This infrastructure improvement project would reduce trip times by allowing for maximum train speeds to increase from 60 mph to 79 mph, with the possibility of future speeds up to 90 mph.

- **Concepcion to Gato Curve Realignments (SB-06C)**: This project would realign 3.50 miles of main line track between MP 315.00 to MP 319.80. Of the 14 existing curves, eight would

be eliminated and the remaining six would be reduced to 1 degree, 30 minutes maximum. Included in this project would be a new 900-foot concrete trestle at Jalama Creek. This infrastructure improvement project would allow for maximum train speeds to increase from 60 mph to 79 mph, with the possibility of future speeds up to 90 mph.

- **San Augustine to Sacate Curve Realignments (SB-06D)**: This project, 35 miles north of Santa Barbara, would realign seven existing curves between MP 328.20 to MP 332.90 to a maximum of 1 degree, 30 minutes each, allowing for maximum train speeds to increase from 65 mph to 79mph, with the possibility of future train speeds up to90 mph.

- **Gaviota to Tajiguas Curve Realignments (SB-06E)**: This project, located 30 miles north of Santa Barbara, would realign four existing curves between MP 335.10 and 341.00 to a maximum 1 minute 30 degree curvature each. The project would require construction of 1.50 miles of retaining wall and the re-construction of 1.76 miles of rail. This project would allow for maximum train speeds to increase from 79 mph to a possible 90 mph.

- **Tajiguas to Ellwood Curve Realignments (SB-06F)**: This major curve realignment project, located 13 miles north of Santa Barbara, would realign eleven curves, totalling 4.70 miles of main line track, between Tajiguas and Ellwood, from MP 341.40 to MP 354.40, to reduce track curvature. The project would construct 3.20 miles of new main track and 3.00 miles of retaining walls. The curvature of eight existing curves would be reduced to two degrees maximum. The infrastructure improvement project would reduce trip times by allowing maximum train speeds to increase from 65 to 79 mph, with the possibility of future train speeds up to 90 mph.

Narlon, Honda, Concepcion – Island CTC (SB-07 – Near-Term): This project would upgrade three sidings in Northern Santa Barbara County to CTC. At each siding:

- Narlon – MP 289.90,
- Honda – MP 304.60, and
- Concepcion – MP 322.00.

New power-operated No. 24 turnouts and control points would be installed, and the track and ties on each siding would be replaced. This project is estimated to cost $30M.

Capitan Siding Extension and Island CTC (SB-08 – Near-Term): This project would extend the existing siding at Capitan, MP 346.50, to 9,000 feet. New power-operated Number 24 turnouts and control points would be installed, and the track and ties on this siding would be replaced. This project is estimated to cost $10M.

Goleta Service Track Extension (SB-09 – Near-Term): This project would extend the existing service track at Goleta Station, add a new power-operated Number 20 turnout at the current stub end, and relocate the existing train wash. This project is estimated to cost $10M.

Sandyland Siding (SB-10 – Vision): This project would add a new 11,000-foot siding from MP 373.25 to MP 378.10, north of the existing Carpinteria station, and would incorporate the Carpinteria siding **(SB-12)** built earlier. It would involve widening two pre-stressed concrete box bridges, one 36' and the other 65'. There are two road crossings within the siding, and it is bordered by a salt marsh that is managed by the University of California, Santa Barbara. Much of the siding would be hidden in the cut from Highway 101, minimizing visual impacts. Benefits of this project would be increased capacity, reduced trip times, and improved operational reliability. The siding would feature power-operated Number 24 turnouts and control points. The cost of this project is estimated to be $15M.

Ortega Siding (SB-11 – Near-Term): The south end of Ortega siding has been removed and the remaining portion is now used as a stub track for maintenance equipment. This project would

reconstruct and lengthen this siding to 9,240 feet. Power-operated Number 24 turnouts would be installed and control points. Benefits of the project, estimated at $20M, would be increased capacity and operational efficiency for all trains operating north of Los Angeles. The siding could be constructed within the existing right-of-way, facilitating the permitting process.

Carpinteria Siding (SB-12 – Near-Term): This project would construct a new siding at the Carpinteria Station. The siding would be 2,640-feet-long, and would include Number 24 power-operated turnouts, as well as a new passenger platform to facilitate use of both tracks. The estimated cost of this project is $10M.

6.4.3 VENTURA COUNTY

Figure 6-5 provides a map showing the relative location of rail improvement projects in Ventura County and the proposed timelines for their implementation. **Table 6-10** provides a summary of Ventura County projects, their timelines, and their estimated costs.

Table 6-10
Ventura County Projects

Project Number	Project Name / Project Type	Current Timeline	Estimated Project Cost
V-01	Rincon Siding	Vision	$10M
V-02	Seacliff Siding North	Near-Term	$18M
V-03	Seacliff Curves Realignments	Near-Term	$10M
V-04	Santa Clara River Curve Realignment	Near-Term	$6M
V-05	Montalvo Curve Realignments	Near-Term	$2M
V-06	Oxnard North Platform	Vision	$8-$15M[25]
V-07	Leesdale Siding Extension*	Immediate	$15M
V-08	Oxnard-Camarillo Second Main Track	Vision	$15M
V-09	North Camarillo Crossover	Vision	$1M
V-10	CP West Camarillo Curve Realignments	Near-Term	$5M
V-11	Camarillo Station Pedestrian Crossing*	Immediate	$1M
V-12	CP Las Posas to MP 423 Second Main Track	Vision	$51M
V-13	Simi Valley to CP Strathearn Second Main Track	Vision	$42M
V-14	Strathearn Siding Curve Realignment	Near-Term	$1M
V-15	Los Angeles Avenue Grade Separation	Vision	$93M
V-16	CP Davis to Simi Valley Station Second Main Track	Vision	$36M
	Estimated Total - Ventura County Projects		**$314-321M**

* Project categorized from “Near-Term” based on capacity modeling, to “Immediate” based on local financial commitment.

[25] The estimated project cost is provided as a range. Costs would depend on whether an above-grade or below-grade pedestrian crossing was selected.

Rincon Siding (V-01 – Vision): This proposed siding would be constructed to the south of the Carpinteria siding. This siding would begin at approximately MP 380.3 and run south to 381.3. There appears to be sufficient clearance beneath the Hwy 101 overpass in addition to sufficient right-of-way. Much of the siding would be hidden in the cut so any visual impact would be minimized. This siding would be roughly one mile long. Benefits from this project are increased capacity, reduced trip time, and improved operational reliability. The estimated cost for this project is $10M.

Seacliff Siding North (V-02 – Near-Term): This project extends the existing Seacliff siding north from the switch at MP 385.2 through the curve at MP 383.8. The tracks through the center of the curve at MP 384.5 would be relocated approximately 150' to the west, thereby minimizing the impacts of storm runoff, reducing curvature and increasing train speeds. This would become a 2.5-mile-long siding, having the capacity to hold freight trains so that passenger trains could pass. The estimated cost of this siding is $18M (not including the costs for right-of-way acquisition). This project would be needed in order to provide for the Ventura-Santa Barbara intercounty commuter rail service under study.

Seacliff Curves Realignments (V-03 – Near-Term): This project is located 6.5 miles north of Ventura, between MP 387.50 and MP 381.70. An additional 8.64 acres of right-of-way would need to be acquired to reduce track curvature from five degrees to two degrees maximum, allowing for maximum train speeds to increase to 79 mph, with the possibility of future maximum train speeds of 90 mph. The estimated cost of this time savings project is $10M.

Santa Clara River Curve Realignment (V-04 – Near-Term): This project, located two miles north of Oxnard Station, would realign approximately 0.40 mile of main line track east of the Santa Clara River, between MP 401.90 and MP 402.30, to reduce the maximum track curvature from three to two degrees. This project would construct 0.40 mile of new track to FRA Class 5 standards (allowing a maximum operating speed of 90mph). An additional 3.69 acres of right-of-way would be acquired. This infrastructure improvement would reduce trip times by increasing train speeds on the curve. The estimated cost for this project is $6M.

Montalvo Curve Realignment (V-05 – Near-Term): This project would realign 1.00 mile of main line track at Montalvo, between MP 398.10 and MP 399.10. The Montalvo Curve is located five miles north of Oxnard Station. This realignment would reduce the maximum track curvature from three degrees to two degrees. This project would construct 0.29 mile of new track to FRA Class 5 standards for a maximum speed for passenger trains of 90mph. An additional 0.29-acre of right-of-way would be acquired. This infrastructure improvement reduces trip times by increasing train speeds on the curve. The estimated cost for this project is $2M.

Oxnard Northbound Platform (V-06 – Vision): This project would provide for a second platform on the north track at the Oxnard Transportation Center, as well as a pedestrian overcrossing, relocation of track and related improvements. This project would eliminate a bottleneck identified in the 2006 Base Case rail capacity modeling. The estimated cost for this project would range from $8M-15M, depending on whether the pedestrian crossing was above-grade or below-grade.

Leesdale Siding Extension (V-07 – Immediate): This project would extend the existing 3700'-long Leesdale siding, between MP 409.16 and Las Posas Road. Power-operated Number 24 turnouts and control points would be installed. The resulting siding would provide additional capacity, and would facilitate better meets and passes between trains. SCRRA has completed a Project Study Report (PSR) for this project, with estimated costs of $15M.

Oxnard to Camarillo Second Main Track (V-08 – Vision): This project would build upon the Leesdale Siding Extension (Project V-07), resulting in continuous double tracking between Oxnard and Camarillo, to increase capacity. The estimated cost for this project is $15M.

North Camarillo Crossover (V-09 – Vision): This project would provide a crossover to facilitate efficient operations for trains at this location, including the proposed Ventura-Santa Barbara intercounty commuter rail service. The estimated cost for this project is $1M.

CP West Camarillo Curve Realignment (V-10 – Near-Term): This project, located seven miles south of Oxnard Station, would realign 0.50 mile of main line track at CP West Camarillo, between MP 411.50 and MP 412.00, to reduce the maximum track curvature from three degrees to two degrees. This project would construct 0.50 mile of new track to FRA Class 5 standards allowing for maximum speed for passenger trains of 90 mph. An additional 3.38 acres of right-of-way would be acquired. This infrastructure improvement would reduce trip times. The estimated cost for this project is $5M.

Camarillo Station Pedestrian Crossing (V-11 – Immediate): This project would provide an at-grade pedestrian crossing at the Camarillo Station to facilitate movement between the two track platforms. Signals and other safety equipment would be installed as part of this project, which is estimated at $1M.

CP Las Posas to MP 423 Second Main Track (V-12 – Vision): This improvement project, located in Moorpark, would construct a second main track from CP Posas to MP 423, 3.50 miles long, from MP 423.00 to MP 426.50. This second main track would be constructed with Number 24 power-operated turnouts on each end. New signals would be installed on both tracks west of Moorpark Station. The benefits of this project are improved operational reliability and increased capacity. The estimated cost for this project is $51M.

Simi Valley to CP Strathearn Second Main Track (V-13 – Vision): This project would construct a second main track from Simi Valley to CP Strathearn, 4.67 miles long, from MP 432.82 to MP 438.15. The track would be constructed to FRA Class 5 standards, allowing for a maximum train speeds for passenger trains of 90 mph. A new crossover would be installed. Seven rail/highway grade crossings would also be upgraded. This project would also construct a second passenger platform at Simi Valley Station adjacent to the new second main track. The benefits of this project would be improved operational reliability and increased capacity. The estimated cost for this project is $42M.

Strathearn Siding Curve Realignment (V-14 – Near-Term): This project, which is located five miles south of Moorpark Station, would realign 0.40 mile of main line track and the Strathearn Siding track, between MP 431.70 and MP 432.10, to reduce the maximum track curvature from three to two degrees. This project would construct 0.40 mile of new track to FRA Class 5 Standards allowing maximum train speed for passenger trains of 90 mph. This infrastructure improvement would reduce trip times by increasing train speeds on the curve. The estimated cost for this project is $1M.

Los Angeles Avenue Grade Separation (V-15 – Vision): This project would grade-separate Los Angeles Avenue (MP 437.70) in Simi Valley. This project would also realign the 0.30-mile-long curve south of Los Angeles Street. A new Los Angeles Avenue overpass would be constructed. The track realignment would construct 0.48 mile of new track to FRA Class 5 standards, allowing for a maximum train speed for passenger trains of 90 mph. This project would reduce trip time and increase public safety. The estimated cost for this project is $93M.

CP Davis to Simi Valley Station Second Main Track (V-16 – Vision): This improvement project, located adjacent to Simi Valley Station, would construct a second main track from CP Davis northward to Simi Valley Station, 1.00 mile long, from MP 439.10 to MP 438.10. This second main track would be constructed to FRA Class 5 standards allowing for a maximum train speed for passenger trains of 90 mph. The benefits of this project would be improved operational reliability and increased capacity. The estimated cost for this project is $36M.

Figure 6–5
Ventura County Projects
Paso Robles
Atascadero
San Luis Obispo
San Luis Obispo
SAN LUIS OBISPO
Grover Beach
Pismo Beach
Guadalupe
Santa Maria
SANTA BARBARA
Lompoc
Surf
Solvang
Santa Barbara
Goleta
Carpinteria
VENTURA
Ventura
Montalvo
Oxnard
Moorpark
Simi Valley
Chatsworth
Camarillo
Van Nuys
Bob Hope/Burbank Airport
Glendale
Los Angeles Union Station
LOS ANGELES
Rincon Siding
Seacliff Curve Realignment
Oxnard to Camarillo 2nd Main Track
North Camarillo Crossover
CP Las Posas – MP 423 2nd Main Track
Los Angeles Avenue Grade Separation
Simi Valley to CP Strathearn 2nd Main Track
CP Davis to Simi Valley Station 2nd Main Track
Strathearn Siding Curve Realignment
Santa Clara River Curve Realignment
Seacliff Siding Extension
Montalvo Curve Realignment
Oxnard North Platform
Leesdale Siding Extension
Camarillo Station Pedestrian Crossing
CP West Camarillo Curve Realignment
Legend:
Amtrak Intercity Rail Services
Amtrak Thruway Connecting Bus Service
Metrolink Commuter Rail
Santa Barbara-Ventura Intercounty Commuter Service (Under Study)
Recommended Project Implementation Timeline:
2006
2015
2025

6.4.4 LOS ANGELES COUNTY

Figure 6-6 provides a map showing the relative locations of rail improvement projects within Los Angeles County and the proposed timelines for their implementation. **Table 6-11** provides a summary of Los Angeles County projects, their timelines, and their estimated costs.

Table 6-11
Los Angeles County Projects

Project Number	Project Name / Project Type	Current Timeline	Estimated Project Cost
LA-01	CP Raymer to CP Bernson Second Main Track	Immediate	$47M
LA-02	Van Nuys North Platform	Immediate	$13-$26M
LA-03	Burbank Junction Track Realignment	Vision	$9M
LA-04	Union Station Run-Through Tracks	Near-Term	$640M
	Estimated Total - Los Angeles County Projects		**$709-$722M**

CP Raymer to CP Bernson Second Main Track (LA-01 – Near Term): This improvement project, located in Northridge, would construct a second main track from CP Raymer to CP Bernson, 6.50 miles long, from MP 446.60 to MP 453.10. This second main track would be constructed to FRA Class 5 standards, allowing for maximum train speeds of 90 mph. A new concrete bridge would also be constructed. The benefits of this project are improved operational reliability and increased capacity. The estimated cost for this project is $47M.

Van Nuys North Platform (LA-02 – Immediate): This improvement project would add a new north platform at the Van Nuys station, eliminating a chokepoint identified in the 2006 Base Case rail modeling. In addition to the north platform, this project would include relocation of the Gemco Yard track and a new bridge over Van Nuys Boulevard, as well as extending the adjoining Budweiser lead track to create a running track. The cost estimates for this project range between $13-26M.

Burbank Junction Track Realignment (LA-03 – Vision): Burbank Junction is the merge point between Metrolink's Antelope Valley line and its Ventura Subdivision, which is also used by long-distance trains and the *Pacific Surfliner*. Through this busy junction, the primary route over Metrolink's Ventura Subdivision diverges though low-speed turnouts to a reduced-speed curve to the west, while Antelope Valley trains continue on a straight line through the junction. The installation of new high-speed switches and a modest amount of track realignment on the curve would permit an upgrade of the track to FRA Class 5 standards, allowing for maximum train speeds of 90 mph) through the junction. This project would decrease travel time. The estimated cost for this project is $9M.

Union Station Run-Through Tracks (LA-04 – Near-Term): Today's LAUS serves far more passenger trains that at any point in its 70-plus years of existence. It also serves a more varied mix of trains, including *Pacific Surfliner* Corridor trains; Amtrak long-distance trains; and commuter trains moving north, south, and east of the station. When the terminal was constructed in the late 1930s, its primary function was to accommodate long-distance passenger trains. These trains required long loading times and time-consuming servicing within the station to support amenities such as baggage, mail and sleeping car/dining car operations. Today's trains load much more quickly, and providing run-through tracks would allow for a more rapid turnaround for them, as trains traveling from San Diego to San Luis Obispo, for example, would not need to back out of or into Union Station. This project would provide increased capacity, reduce trip times, provide additional operational reliability, and improve safety. The estimated cost for this project is $640M.

Figure 6–6
Los Angeles County Projects
Paso Robles
Atascadero
San Luis Obispo
San Luis Obispo
SAN LUIS OBISPO
Grover Beach
Pismo Beach
Guadalupe
Santa Maria
SANTA BARBARA
Lompoc
Surf
Solvang
Santa Barbara
Goleta
Carpinteria
VENTURA
Ventura
Montalvo
Oxnard
Moorpark
Simi Valley
Chatsworth
Camarillo
Van Nuys
Bob Hope/Burbank Airport
Glendale
Los Angeles Union Station
LOS ANGELES
CP Raymer to CP Bernson 2nd Main Track
Van Nuys North Platform
Burbank Junction Track Realignment
L.A. Union Station Run-Through Tracks
Legend:
Amtrak Intercity Rail Services
Amtrak Thruway Connecting Bus Service
Metrolink Commuter Rail
Santa Barbara-Ventura Intercounty Commuter Service (Under Study)
Recommended Project Implementation Timeline:
2006
2015
2025

6.4.5 CORRIDOR-WIDE IMPROVEMENTS

Electronic messaging boards and ticket vending machines are two additional improvement projects currently being implemented throughout the LOSSAN North corridor. The two corridorwide projects will improve customer service.

Electronic Messaging Boards
Electronic messaging boards provide information on arrival/departure times, alert passengers to approaching trains, and provide news and updates. Electronic messaging boards are located both inside stations and on the platforms.

Messaging boards are currently located at Metrolink stations throughout the LOSSAN North Corridor. Efforts are underway to jointly display both Metrolink and Amtrak information on the boards already found at Metrolink stations. The Department has set aside $1.9 million to install messaging boards at all *Pacific Surfliner* stations from San Luis Obispo to San Diego. Message Boards are currently installed at all LOSSAN North Stations. Real-time information is expected in the coming months.

Electronic Ticket Vending Machines (TVMs)
At staffed stations, TVMs will supplement station agents and help reduce lines at ticket counters, freeing the agents to concentrate on more-complex ticketing issues, and increase customer service and passenger satisfaction. At non-staffed stations (such as Grover Beach and Guadalupe, to name but two) TVMs are even more essential because they allow customers to purchase their tickets at the platform while waiting for the train, rather than once they board the train from a conductor or in advance through a travel agent or online. There is an additional charge for buying a ticket once onboard the train. The ease with which one could purchase a rail ticket through a TVM could also influence travel mode choice, increasing ridership.

The Department has encumbered funds for TVMs and associated software to be installed at stations throughout the entire LOSSAN corridor. Currently in the LOSSAN North corridor, TVMs are available only at Metrolink stations, and vend Metrolink commuter rail tickets only. Efforts are underway to upgrade the hardware and software of these TVMs so that it will be possible to vend both Metrolink and Amtrak tickets.

Feedback from the public meetings held in 2005 reaffirmed that the ongoing work on messaging boards and TVMs is seen as important in making it easier for customers to be informed of train arrivals and delays, and to facilitate purchasing tickets at stations.

Other Station Improvements
The expansion of existing rail services and the potential introduction of new services will require improvements to rail stations. These improvements may include:

- Lengthening platforms to accommodate longer train lengths
- Pedestrian and circulation improvements, such as pedestrian crossings and enhanced transit facilities, such as additional bus bays
- Additional parking

Other Needs
<u>Capital Funding for Additional *Pacific Surfliner* Trainsets</u>
The *Pacific Surfliner* fleet consists of ten trainsets (eight of which were purchased by Amtrak, and two by the State of California). Each trainset includes one locomotive, one Pacific Business

Class/Baggage Car, one Café Car, two Coach Cars, and a Coach/Cab Car. There are additional spare locomotives.

Currently, there are not enough *Pacific Surfliner* trainsets to operate the existing level of service. An additional Amtrak-owned trainset composed of refurbished Horizon-class cars (with Amtrak P40 Genesis locomotives, rather than the F59PHI's in standard *Surfliner* use) provides for the second daily roundtrip between Los Angeles and San Luis Obispo.

Typically, there is one "spare" trainset for every ten in service. This allows for scheduled maintenance or for replacement of a train that is damaged or requires non-scheduled maintenance. Especially during the peak summer travel months, all available train cars are in service. This does not provide opportunities for adequate scheduled maintenance as well as thorough cleaning and refurbishment. The result can be delays and/or train breakdowns. This has a ripple effect on the schedule, reduces on-time performance, and negatively impacts both customer satisfaction and ridership.

The funds for the original fleet of *Surfliner* trains came as a result of the passage of Proposition 116, the Clean Air and Transportation Improvement Act, which provided $1.99 billion for various rail and transit projects. This amount included $382 million for the acquisition of new rolling stock and locomotives (which included the *Surfliner* purchase).

In order to provide for continued reliability, increased frequencies, and to allow for the repair and refurbishment of existing rolling stock, new state and/or federal funding needs to be provided that can be used to purchase additional *Pacific Surfliner* trainsets.

Capital Funding for new *Coast Daylight* Trainsets

The *Coast Daylight* service will also require new trainsets (whether additional bi-level *Pacific Surfliner*-class or single-level tilt-train type remains to be determined). Additional state and/or federal funding needs to be allocated for such purposes. The *Coast Daylight* Implementation Plan identifies a need for a minimum of two trainsets in order to provide initial service.

7 THE PLANNING PROCESS / NEXT STEPS

Following a period of public comment and document revision, the LOSSAN North Strategic Plan will be finalized. The LOSSAN North Strategic Plan will be integrated with the Strategic Plan developed earlier for the LOSSAN South corridor. The combined documents will serve as an important tool for the future development of the LOSSAN rail corridor.

7.1 Integration of the LOSSAN North and South Corridors

The Department, in partnership with the Federal Railroad Administration (FRA), is in the process of finalizing a Program Environmental Impact Statement/Environmental Impact Report (PEIR/PEIS) for the LOSSAN South portion of the corridor, between Los Angeles and San Diego, comprising a program of projects for that portion of the corridor's development over the next 20 years. The program-level environmental clearance will make projects in the LOSSAN South corridor available for federal rail funding. The PEIR/PEIS considers cumulative potential impacts of the projects and identifies potential mitigation strategies, which can help expedite future project-level environmental clearance.

The Department, in consultation with the appropriate stakeholder groups, could make a decision in the future as to whether or not a similar program-level environmental review of the projects in the LOSSAN North corridor is desirable, or whether to move directly to individual project-level environmental review of projects.

7.1.1 LOSSAN CORRIDORWIDE STRATEGIC PLAN SUMMARY

The executive summaries and other important highlights from both the LOSSAN North and LOSSAN South Strategic Plans will be combined to create a LOSSAN Corridorwide Strategic Plan Summary. This document will serve as an introduction to and summary of the two Strategic Plans and an overall guide to the entire 351-mile LOSSAN rail corridor.

7.2 Implementing the Rail Improvement Projects

The LOSSAN North Strategic Plan has documented the purpose and need and outlined a schedule for improvements to the coastal rail corridor. The LOSSAN Corridor-wide Strategic Plan will provide the Department, Amtrak, LOSSAN and its member agencies, as well as SCRRA, NCTD, and UP with a program of projects and priorities they can use in programming projects for implementation and construction. As federal, state, local and other funds become available, this document will serve as the first step in improvements to the LOSSAN rail corridor. Depending on the availability of funds, as well as local needs, the recommended project timelines for a particular project or projects could be subject to change.

The LOSSAN North Strategic Plan represents just one phase of the Department's continuing study of improvements to the rail corridor and the intercity passenger rail services it supports. This document is meant to help advance the rail improvement projects from the conceptual and planning stages to the next phase of obtaining funding and gaining the appropriate environmental clearances necessary for construction and implementation.

There are a number of additional issues that will need to be addressed to advance these recommended projects, including:

- Identifying funding sources
- Programming projects

- Identifying lead agencies for projects
- Completing the environmental review process, and
- Resolving permitting Issues, and
- Identifying potential Amtrak-related Issues

7.2.1 SECURING FUNDING SOURCES

A number of sources are available to provide operating and capital funds for rail services. These come primarily from the State of California, but also include some federal funding sources. Brief descriptions of available state and federal funding programs (summarized from the California State Rail Plan 2005-06 to 2015-16) are provided below to show the range of programs that could be used to secure funding for rail improvement projects.

7.2.2 STATE FUNDING SOURCES

Public Transportation Account (PTA)

California's Proposition 116 designated the Public Transportation Account (PTA) as a trust fund to be used only for transportation planning and mass transportation purposes. The PTA receives its monies from gasoline and diesel fuel taxes. In 2000, the Traffic Congestion Relief Program (TCRP) reallocated some gasoline sales taxes that had previously gone to the General Fund to the PTA for use in transportation projects.

PTA monies are divided between assistance to local transit agencies, and intercity rail operations, mass transportation planning and staff, and mass transit capital projects. In recent years, the state's fiscal difficulties have resulted in delays of the transfer of these tax revenues to the TCRP and the Transportation Investment Fund (TIF). Proposition 42 requires PTA monies be included in the State Transportation Improvement Program (STIP).

State Highway Account (SHA)

The majority of funds in the State Highway Account provide for highway projects, but rail projects in the State Transportation Improvement Plan (STIP) are also eligible for SHA monies, which are also received from state gasoline and diesel fuel sales taxes, as well as vehicle weight fees and some Federal Trust Fund monies.

SHA funding can be used for "the research, planning, construction, and improvement of public mass transit guideways (which includes intercity, commuter and urban rail, and electric trolley bus services) and their fixed facilities." Funds from SHA cannot be used for the acquisition and maintenance of mass transit vehicles or for operating costs.

Traffic Congestion Relief Fund (TCRF)

Chapter 91, Statutes of 2000 (AB 2928 – Torlakson) established the Traffic Congestion Relief Program (TCRP) to be funded from the TCRF. The TCRP specified a list of projects to be funded from the program, including specific intercity rail capital projects. The PTA section (above) provides the sources for the TCRP. While money is scheduled to be provided to fund intercity rail projects in the coming fiscal year (2005-2006), it is uncertain given the State's fiscal situation if this will take place.

Tribal Compact Bonds

Chapter 91, Statutes of 2004 (AB 687 – Nunez) ratified the amendments to the State Gaming Compacts. The bill authorized the issuance of bonds to be secured by gaming revenue, whose proceeds would fund transportation improvement projects. According to the Statute, the PTA would receive $275 Million and the SHA would receive $457 Million. It is not clear when these revenues will materialize.

The Passenger Rail and Clean Air Bond Act of 1990 (Proposition 108)

The Passenger Rail and Clean Air Bond Act of 1990 was one of three bond measures put to the voters for approval (the other two, in 1992 and 1994, were not approved) to fund new rail projects and improvements. Funds from this bond measure have largely been expended.

Clean Air and Transportation Improvement Act of 1990 (Proposition 116)

This proposition provided a one-time source of funds for rail and transit totalling $1.99 Billion. Most of these funds have been allocated for intercity rail capital projects, urban and commuter rail projects, and transit and transit-related projects.

7.2.3 FEDERAL FUNDS

Federal funding for rail station projects has been provided in the past from the Federal Transit Administration's Section 5307 and 5309 capital programs. Unfortunately, funds from the Surface Transportation Program are not available to finance intercity rail projects.

Congressional bills under consideration include provisions that might allow for long-term bonding authority for rail capital projects on qualifying systems (the *Pacific Surfliner* and the other state-supported corridors would qualify). Tax credits would be provided in lieu of interest to the bondholders. Funds from these bonds could be used for the purchase of high-speed rail equipment, grade separations, stations, and other upgrades. The federal government would require a 20% state match to access these funds. This effort to provide an 80/20 match is being pursued in Senate Bill S 294 (the Passenger and Rail Improvements Act).

7.2.4 AMTRAK FUNDS

Amtrak supports 30% of the *Pacific Surfliner* Route. Amtrak's investment has largely been in the form of maintenance facilities and rolling stock. Amtrak's Five-Year Strategic Plan (FY 2005-2009) calls for $41.5 Million in spending on California projects (contingent on Amtrak receiving continued federal funding), and an additional $48.6 Million for projects that impact California indirectly.

It is anticipated that in the future, Amtrak's support of the *Pacific Surfliner* service will be reduced, with the state increasing its support, ultimately to 100%, as Amtrak concentrates its resources on longer-distance intercity services.

7.2.5 LOCAL FUNDS

Cities and communities throughout the state have expended local funds to help provide improvements within their cities (generally station, track, or signal improvements). Frequently, local monies are used in combination with available state funds to help pay for improvement projects.

In summary, given the state's current and foreseeable budget difficulties, and the relative lack of available funding as a result, it will be important for local leaders and regional transportation agencies to champion projects within their counties and provide local funding to leverage available

state and federal dollars. Using local sales tax revenues dedicated to fund transportation projects is one such potential means for bringing important projects on-line more quickly.

7.3 Programming Projects

The State Transportation Improvement Program (STIP) contains all the projects to be funded by the state. The process for projects moving through the STIP involves the:

- Prioritization of projects
- Programming of funds to pay for them
- Allocating the fund once the monies have been received
- Moving forward with a project.

The LOSSAN North Strategic Plan serves as an initial step in advancing projects through the STIP process, by providing a prioritization of rail improvement projects for the LOSSAN North corridor. LOSSAN member agencies are encouraged to use this plan as a guide, and to include recommended projects as they develop Regional Transportation Plans (RTPs) and as part of other detailed corridor planning.

7.4 Identifying Lead Agencies for Projects

Depending on the funding sources available, the Department, Amtrak, a regional transportation agency, a county, or a city may serve as the lead agency for a particular rail improvement project. Funding will likely be from a variety of sources (local, regional, state, and/or federal). Continuing coordination between all agencies and project stakeholders will be important.

7.5 The Environmental Review Process

All projects will need to have an appropriate level of environmental review. Some projects can be expedited, such as projects that can be completed within the existing right-of-way.

7.5.1 PERMITTING ISSUES

Identification of permitting issues for each project should be developed early in each project. This will facilitate timely discussions with those responsible agencies which would issue permits for construction of a project, such as the California Coastal Commission.

7.5.2 POTENTIAL AMTRAK-RELATED ISSUES

Amtrak is subject to an annual appropriation process. In recent years this process has been politically contentious, and support for Amtrak by the current administration has not been strong. The 110th Congress has proposed multi-year funding for Amtrak that would allow longer-term planning for operations and capital expenditures, as well as facilitate a potential program to provide matching funds for capital investments by individual states, such as California. Notwithstanding this proposed multi-year funding, if Amtrak does not receive federal funding in a particular year, the *Pacific Surfliner* service could face a shortfall. The *Pacific Surfliner*, as a State-supported service, would continue but could be impacted.

APPENDIX A – PUBLIC MEETINGS HELD

APPENDIX A: PUBLIC MEETINGS

This section provides additional detail on the meetings held during the development of the LOSSAN North Strategic Plan.

A.1Stakeholder Meetings

Table A-1 provides information on the dates and locations of stakeholder meetings and presentations.

Table A-1
LOSSAN North Stakeholder Meetings Held

Date	Meeting	Location
December 1, 2004	LOSSAN Joint Powers Authority (LOSSAN JPA) Board Meeting	Los Angeles Metropolitan Transportation Authority (MTA), Los Angeles
December 8, 2004	San Luis Obispo Council of Governments (SLOCOG)	San Luis Obispo Board of Supervisors Chamber, San Luis Obispo
December 16, 2004	Santa Barbara County Association of Governments (SBCAG)	County Administration Building, Santa Barbara
December 16, 2004	Santa Barbara Stakeholders Meeting	County Administration Building, Santa Barbara
January 21, 2005	Coast Rail Coordinating Council	The Inn at Spanish Bay, Pebble Beach
February 9, 2005	LOSSAN JPA	MTA, Los Angeles
April 19, 2005	LOSSAN Technical Advisory Committee (LOSSAN TAC)	MTA, Los Angeles
June 1, 2005	LOSSAN JPA	Orange County Transportation Authority (OCTA), Orange
June 14, 2005	LOSSAN TAC	MTA, Los Angeles
August 31, 2005	LOSSAN TAC	San Diego Association of Governments (SANDAG), San Diego
September 14, 2005	LOSSAN JPA	SBCAG, Santa Barbara
November 8, 2005	LOSSAN TAC	MTA, Los Angeles
December 7, 2005	LOSSAN JPA	MTA, Los Angeles
February 13, 2006	LOSSAN JPA	MTA, Los Angeles
March 21, 2006	LOSSAN TAC	MTA, Los Angeles
April 25, 2006	LOSSAN TAC	MTA, Los Angeles
May 10, 2006	LOSSAN JPA	SANDAG, San Diego
June 20, 2006	LOSSAN TAC	MTA, Los Angeles
August 29, 2006	LOSSAN TAC	MTA, Los Angeles
September 13, 2006	LOSSAN JPA	MTA, Los Angeles
November 7, 2006	LOSSAN TAC	MTA, Los Angeles
January 10, 2007	LOSSAN JPA	MTA, Los Angeles
February 14, 2007	SBCAG South Coast Subregional Planning Committee	Santa Barbara Metropolitan Transit District (MTD), Santa Barbara
April 4, 2007	SLOCOG	County Government Center, San Luis Obispo
April 17, 2007	LOSSAN TAC	MTA, Los Angeles

A.2 Public Information Meetings

Table A-2 shows details regarding the four public information meetings held early in the development of the Strategic Plan.

Table A-2
Public Information Meetings Held

City	Date	Time	Location
Oxnard	March 1, 2005	4:30-6:30 p.m.	Oxnard Public Library 251 S. A St., Room B
Santa Barbara	March 2, 2005	5:00-6:30 p.m.	County Administration Bldg. 105 E. Anapamu St.
Santa Maria	March 3, 2005	12:00 – 1:30 p.m.	County Government Center 511 E. Lakeside Parkway
San Luis Obispo	March 3, 2005	4:30 – 6:30 p.m.	City / County Library 995 Palm Street

Description of Presentation Boards and Materials

A series of presentation boards were developed for the public information meetings. The presentation boards provided attendees with information on the LOSSAN North corridor, including:

- The Study Context – This board detailed the purpose of the LOSSAN North Strategic Plan and the need for rail improvements within the corridor. The board provided information about the growth in population and employment within the corridor, and showed an increasing demand for rail travel and freight goods movement which is constrained by the existing conditions on the rail corridor. It noted the need for increased track capacity, upgraded track and signals, improvements to rail safety, and a desire for increased modal connectivity.
- Rail corridor facts – This board described current and proposed rail services, and some facts about the corridor (its length and existing conditions)
- Current and projected train volumes (of existing and proposed rail services)
- Types of rail improvement projects under consideration, including:
  - Track and signal upgrades
  - Construction of second/third main tracks
  - New sidings and extension of existing sidings
  - Curve realignments
  - Grade separations, and
  - Station improvements
- Proposed timeline for projects
- Projects by county – Los Angeles, Ventura, Santa Barbara, and San Luis Obispo
- The Planning Process / Next Steps

In addition to the presentation boards, copies of relevant reports relating to the LOSSAN North Strategic Plan were available. These reports included:

- The LOSSAN South Strategic Plan (October 2003);
- Amtrak 20-Year Plan; and
- California State Rail Plan.

APPENDIX B – VENTURA-SANTA BARBARA INTERCOUNTY COMMUTER RAIL SERVICE

DEPARTMENT OF TRANSPORTATION
DIVISION OF RAIL
1120 N STREET
P. O. BOX 942874 – MS 74
SACRAMENTO, CA 94274-0001
PHONE (916) 654-6542
FAX (916) 653-4572
TTY 711

Flex your power!
Be energy efficient!

August 2, 2007

Dear Stakeholder:

The LOSSAN North Strategic Plan (Plan) was initiated by the California Department of Transportation (Department) in 2004 to provide a comprehensive overview of the opportunities and challenges to improving intercity passenger rail operations on the coastal corridor between Los Angeles Union Station and San Luis Obispo. The Plan was intended to provide decision makers and stakeholders with a framework to assess the operational, programming, and financing needs of intercity passenger rail on the northern section of the LOSSAN Corridor.

As preparation of the Plan progressed, it became clear that many of the infrastructure improvements proposed for intercity rail services on the Coast Route would impact the commuter rail service being considered between Ventura and Santa Barbara Counties. The Department agreed, as part of the intercity passenger rail analysis, to review the issues surrounding implementation of a commuter rail service in the Ventura-Santa Barbara area.

This Appendix contains the results of that assessment. It attempts to identify the myriad of issues associated with implementation and operation of a commuter rail including operating subsidies, capital project costs, rolling stock and other equipment needs, right-of-way needs, and equipment maintenance costs. This assessment should not be considered a definitive analysis of the feasibility of commuter rail between Ventura and Santa Barbara—that was beyond the scope and the funding available for this intercity passenger rail planning document.

The assessment does, however, provide decision makers with an idea of the "order of magnitude" of many of the financial issues they will face as they evaluate proceeding further towards implementation of a commuter rail transportation option.

The Department remains available to facilitate further discussions among local agencies and stakeholders in the development and enhancement of passenger rail as a viable transportation option.

Sincerely,

WILLIAM D. BRONTE
Chief
Division of Rail

APPENDIX B: VENTURA-SANTA BARBARA INTERCOUNTY COMMUTER RAIL SERVICE

1.1 Introduction and Background

U.S. Highway 101 (U.S. 101), along with the LOSSAN North rail corridor, comprises the primary transportation corridor between Ventura and Santa Barbara Counties. It winds along the rocky coast, and shares an often narrow space between the Pacific Ocean and steep adjoining bluffs. The roadway is three lanes wide in Ventura County and within the City of Santa Barbara, but is only two-lanes-wide in each direction elsewhere. According to 2005 Caltrans data, peak hour daily traffic volume at the county border is 71,000 vehicles. The combination of these factors is heavy congestion during the morning and afternoon/evening peak commuter periods.

A significant number of those vehicles are people traveling between Ventura and Santa Barbara Counties as they make their way from their homes to work and back again. Many of those who work in the Santa Barbara/Goleta area live in Western Ventura County. This situation is documented and described in a July 2004 report called "Taking Action Regionally," prepared by the Inter-regional Partnership for Jobs, Housing & Mobility[1].

One means by which to reduce the congestion and provide an alternative to commuting by automobile is a successful express bus service operating on the 101 Corridor called the "Coastal Express." This service is provided by the Ventura County Transportation Commission (VCTC) and jointly funded by VCTC and the Santa Barbara County Association of Governments (SBCAG). Established in 2001, this service operates seven days a week and provides a one-seat commute alternative for those traveling between Ventura, Santa Barbara, and Goleta.

In addition to supporting this existing commuter express service, other long-term solutions to the congestion issues have been studied. The most recent effort has been a two-year Alternatives Analysis study conducted by SBCAG called "101 in Motion." This study has resulted in the identification of a locally preferred alternative dubbed "A Lane and a Train," which proposes:

- Construction of a new carpool/HOV lane (northbound and southbound) on Highway 101 from Santa Barbara to the Ventura County line; and
- Establishment of a commuter rail service between Camarillo and Goleta.

To date, VCTC has not taken an official position regarding the projects identified in the 101 in Motion study. An inter-county service such as envisioned by SBCAG would require joint agreement with VCTC on a wide range of issues, and while the two counties frequently meet to discuss issues of mutual concern, this item has not been fully discussed, and no decisions have as yet been made.

1.2 Purpose

Recognizing that the decision as to whether to establish a commuter rail service, and the form that service might take, is rightfully the purview of decision makers in both Ventura and Santa Barbara Counties, the purpose of this section is not to advocate for or against the proposed service, but rather to provide an objective assessment of three rail-based alternatives that might provide an additional commute option, and the impacts on such a service on other rail operations and capacity on the LOSSAN North corridor.

Given the Strategic Plan's objective to quantify future train volumes and to identify rail improvement projects that will provide sufficient rail capacity on the LOSSAN North rail corridor for all current and planned rail services, this assessment is timely and appropriate.

[1] Available for downloading from the Santa Barbara Association of Governments' website: www.sbcag.org/publications.html

As described in the Strategic Plan itself, over the next 20 years, rail volumes are expected to double on what is currently a largely single-track railroad. Projects have been identified that will provide for this increased rail traffic without a corresponding decrease in operating performance or an increase in delay.

So determining any additional improvements necessary in order to accommodate an additional three to four weekday roundtrips is an important part of the planning and implementation roles of the LOSSAN Rail Corridor Agency and Caltrans' Division of Rail.

It is not the intent of this assessment to make a recommendation as to a preferred commuter rail alternative, but rather to provide an objective overview of each alternative, and a description of any relative strengths or weaknesses, for comparative purposes.

1.3 Alternatives

The three alternatives for providing commuter rail service examined in this technical report are:

Amtrak intercity passenger rail service – This alternative would use the existing *Pacific Surfliner* intercity service, and would provide an additional roundtrip between Los Angeles to Santa Barbara/Goleta (and possibly to San Luis Obispo) that could serve commuters in addition to serving the existing intercity market of business and recreational travelers. The service would use the same rail equipment currently used on the route.

Metrolink commuter rail service – This second alternative would create a new Metrolink line between Camarillo and Goleta. This would necessitate Santa Barbara County joining the Southern California Regional Rail Authority (SCRRA), which operates Metrolink, or, alternatively, the service could be run under contract to SCRRA. A Metrolink service would likely use standard Bi-level commuter equipment such as that currently used on the Ventura County Line service.

Independent commuter rail service – This alternative would see the establishment of a new, stand-alone commuter rail service, like the Coaster in San Diego County, operated between Oceanside and San Diego by North County Transit District. Instead of expanding SCRRA, this alternative would create a new entity to oversee and/or operate a similar-type service between Camarillo and Goleta. To explore how using trains composed of Diesel Multiple Unit (DMU) equipment could provide another option, it was assumed for modeling purposes that this service would use DMUs, though the final choice of rail equipment remains to be determined. As an option the new organization could contract with another provider, such as SCRRA or Amtrak, to provide some or all of the elements of the service, providing crew and maintenance, for example.

While Amtrak offers *Pacific Surfliner* service 365 days a year, for each of the three alternatives a conceptual Monday-Friday initial service schedule is assumed.

1.4 Institutional Issues

As they determine whether or not to advance the idea of a Ventura-Santa Barbara commuter rail service, decision-makers in both counties and other involved parties will need to consider institutional issues associated with each of the alternatives, such as legal or regulatory restrictions or the need for intergovernmental agreements. The remainder of this section will discuss these issues, as well as the differences between commuter and intercity passenger rail service, key agencies and organizations, and other institutional considerations.

1.4.1 DEFINITION OF COMMUTER VERSUS INTERCITY PASSENGER RAIL SERVICES

While commuter rail and intercity rail may serve the same communities along a corridor, there are significant differences between them that should be defined. The California State Rail Plan (2005-2006 to 2015-2016) provides such a definition, which is reprinted here.

The Federal Rail Passenger Service Act (RPSA) and related legal decisions define commuter and intercity rail service. The RPSA (49 U.S.C. 24102) states that:

"Commuter rail passenger transportation" means short-haul rail passenger transportation in metropolitan and suburban areas usually having reduced fare, multiple-ride, and commuter tickets and morning and evening peak period operations.

The Penn Central Transportation Company Discontinuance decision (338 ICC 318) was issued by the Interstate Commerce Commission (ICC) after a 1971 investigation held to determine whether certain trains constituted commuter service, thus placing them outside the jurisdiction of Amtrak, which at the time had just been created.

Specifically, the ICC concluded that a commuter service would likely include some or all of the following features:

- The passenger service is primarily being used by patrons traveling on a regular basis either within a metropolitan area or between a metropolitan area and its suburbs
- The service is usually characterized by operations performed at morning and evening peak periods of travel.
- The service usually honors commutation or multiple-ride tickets at a fare reduced below the ordinary coach fare and carries the majority of its patrons on such a reduced fare basis.
- The service makes several stops at short intervals either within a zone or along the entire route.
- The equipment used may consist of little more than ordinary coaches.
- The service should not extend more than 100 miles at the most, except in rare instances; although service over shorter distances may not be commuter or short haul within the meaning of this exclusion.

The RPSA (49 U.S.C. 24102) also states that:

"Intercity rail passenger transportation" means rail passenger transportation, except commuter rail passenger transportation.

Thus, both the RPSA and the ICC specifically define commuter rail service in the manner detailed above, and state that intercity rail service is all other service not falling within the commuter rail definition. The inclusion of State-supported rail services under the RPSA definition of "intercity" is critical. This results from Amtrak's right under RPSA to access freight railroad tracks for the operation of intercity rail services. Also, Amtrak may only be charge the incremental cost to the railroad for such access.

Currently, there is no definition in (California) State law for commuter or intercity rail service. Prior definitions, which essentially referred to the federal definitions, were deleted under Chapter 622, Statutes of 1997 (SB 45 – Kopp).

Understanding the difference between commuter rail and intercity rail service is important because of the three alternatives, the Amtrak option would represent an expansion of intercity service, rather than a commuter rail service.

1.4.2 INVOLVED AGENCIES AND ORGANIZATIONS

A number of different agencies and organizations would likely be involved at various points in the establishment of a Santa Barbara – Ventura intercounty commuter rail service. This section provides a brief description of the key organizations and their interests and responsibilities.

Caltrans Division of Rail

The California Department of Transportation (The Department), through its Division of Rail, provides support, funding, and planning assistance for three intercity passenger rail services operated by Amtrak, including the Pacific Surfliner. This assistance includes operating assistance and capital funding for rail improvement projects, station construction, and maintenance and equipment purchases and maintenance. For the LOSSAN North Strategic Plan, Caltrans provided planning and technical assistance, as well as funding for the study.

Local and regional planning agencies are encouraged to work with the Department to identify and improve rail services in their respective areas. Local agencies often pay for station improvements, as well as plan and administer rail services that meet local or regional needs, such as commuter rail. However, the state does provide some operating and capital funds, such as through the State Transit Assistance (STA) program, as well as administers grant programs for commuter and urban rail systems.

For the Pacific Surfliner service, the State provides approximately 70 percent of its costs, with the remaining 30 percent paid by Amtrak; as described in the next subsection.

National Rail Passenger Corporation (Amtrak)

Created by Congress in 1970, Amtrak provides intercity passenger services throughout the United States. It operates two intercity passenger rail services on the LOSSAN North corridor: the Pacific Surfliner service between San Diego and San Luis Obispo, and the Coast Starlight, which operates between Los Angeles and Seattle, Washington.

Amtrak's establishing legislation, the Rail Passenger Service Act, gave Amtrak access rights to host railroads for the purpose of operating intercity passenger trains (49 USC 24308 (a)). These access rights are unique to Amtrak. As part of the RPSA legislation, Amtrak pays only the incremental costs for dispatching and track maintenance for the trains it operates on its "Basic System" of routes.

The "San Diegan" route between Los Angeles and San Diego was a part of that Basic System, which has expanded into today's Pacific Surfliner service, operating between San Diego, Orange County, Los Angeles, Ventura, Santa Barbara and San Luis Obispo. Amtrak pays approximately 30 percent of the costs of the Pacific Surfliner service, as part of its Basic System.

Southern California Regional Rail Authority (SCRRA/Metrolink)

Formed in 1991, the Southern California Regional Rail Authority (SCRRA) is a Joint Powers Authority, which plans, designs, builds, operates and maintains a regional commuter rail network (Metrolink) in six Southern California counties, including Los Angeles, Ventura, San Bernardino, Orange, Riverside, and Northern San Diego County. Within SCRRA member agency-owned portions of the corridor, it provides dispatching and track maintenance for all rail services.

On the LOSSAN North rail corridor, SCRRA operates the Ventura County Line Metrolink service, which runs between Los Angeles Union Station (LAUS) and Montalvo. Some Metrolink trainsets currently overnight at a layover facility at Montalvo. SCRRA also operates the Antelope Valley Line to Burbank Junction and 11 Burbank/ Bob Hope Airport trains in the corridor.

Maintenance of equipment is currently conducted at SCRRA's main Central Maintenance Facility at Taylor Yard, near LAUS.

Operating budget costs are shared by SCRRA member agencies using a detailed allocation formula which takes into consideration a number of factors such as train miles, unduplicated route miles, unduplicated stations, ridership, ticket vending machines, and revenue moves through Los Angeles Union Station. Capital improvements on individual lines are the responsibility of the county in which

the improvements are located with the exception of the San Bernardino Line and the Orange County and IEOC Lines on which cost are split on the basis of service provided on those lines by each county. Equipment purchase and shared facility costs are also shared by member agencies, except in select cases. An example of this is in Orange County, where Orange County Transportation Authority (OCTA) is expanding Metrolink services to provide 30-minute service. Because its expanded service is entirely within Orange County, OCTA paid the full costs of the additional equipment needed for that service.

The Ventura-Santa Barbara commuter route would be a “reverse-commute” by comparison with the Ventura County Line, and this service would require additional equipment beyond the rail fleet needs laid out in SCRRA’s current and future planning documents. Therefore VCTC and SBCAG would need to provide for the costs of the new rail equipment.

Union Pacific Railroad

The Union Pacific Railroad (UP) is the largest railroad company in the United States and operates freight services in 23 states. UP owns 175 miles of the LOSSAN North corridor between San Luis Obispo and Moorpark, and 50 percent of the right-of-way between Moorpark and Burbank Junction in Los Angeles (Ventura County Transportation Commission and the Los Angeles County Metropolitan Transportation Authority own the other 50 percent). Within its territory, UP provides train dispatching and track maintenance.

As part of its purchase of the Southern Pacific Railroad Company in 1996, UP acquired the Coast Route, between San Francisco, San Jose, Salinas, and Southern California. The LOSSAN North rail corridor is a portion of the UP’s Coast Route.

While the UP’s primary California rail route runs through the Central Valley, the Coast Route serves markets along the coast and acts as a secondary route, providing "surge capacity" between the Los Angeles Basin and the San Francisco Bay area, northern California and the Pacific Northwest.

Whenever UP experiences a line outage through the Central Valley, the Coast Route provides a readily available alternative route. Likewise, when other UP routes that service Los Angeles are operating at capacity due to increased freight traffic volumes or freight traffic growth, the Coast Route is available.

Ventura County Transportation Commission

Ventura County Transportation Commission (VCTC) develops and implements transportation policies, projects, funding and priorities for a wide variety of projects. The transportation issues the Commission is responsible for include highways, bus services, aviation services, commuter and freight railroads, bicycling and bike paths, as well as many other transportation areas.

VCTC also controls and reviews the use of federal, state, and local funds for transportation and related projects.

VCTC operates the Ventura Intercity Service Transit Authority (VISTA), which provides bus service on several routes within Ventura County and to neighboring counties. The Coastal Express is primarily a commuter service operating between Ventura County and Santa Barbara/Goleta, jointly funded by VCTC and Santa Barbara County Association of Governments (SBCAG).

The Coastal Express offers seven-days-a-week service, with 12 northbound trips and 13 southbound trips Monday through Friday, and eight roundtrips on weekends.

VCTC is an SCRRA member agency.

Santa Barbara County Association of Governments

The Santa Barbara County Association of Governments (SBCAG) is a regional planning agency comprised of Santa Barbara County and all eight incorporated cities within the county. SBCAG distributes local, state, and federal transportation funds and acts as a forum for addressing regional and multi-jurisdictional issues.

SBCAG has identified long-term solutions to traffic congestion issues on its main north-south freeway, U.S. Highway 101. This effort, called “101 in Motion,” has produced a recommendation to include consideration of commuter rail between Ventura and Santa Barbara Counties, in addition to construction of additional travel lanes on the freeway and other improvements.

As mentioned in the previous subsection, SBCAG partners with VCTC to fund the Coastal Express bus service.

1.4.3 KEY ISSUES

In addition to understanding the differences between commuter and intercity passenger rail services and lead agencies in the corridor, it also is important to know the key issues that will need to be addressed in order in order for commuter service to begin.

The key issues would be:

- Access rights and rail corridor ownership,
- Availability of local funding for capital and operating costs,
- Operating restrictions or limitations,
- Potential competition with existing transit services, and
- Existing and alternative organizational structures

These issues are discussed in the following subsections.

1.4.4 ACCESS RIGHTS AND RAIL CORRIDOR OWNERSHIP

One of the issues complicating provision of additional rail capacity and infrastructure improvement projects on the LOSSAN North rail corridor is the issue of who owns the rail right-of-way. The rail right-of-way between Los Angeles and San Luis Obispo has a variety of owners, both public and private.

Between Mission Tower at Los Angeles Union Station and Glendale, the rail corridor is owned by the Los Angeles County Metropolitan Transportation Authority (LACMTA), an SCRRA member agency. From Glendale to the Los Angeles/Ventura County line, the corridor is jointly owned by Union Pacific (UP) and LACMTA (which purchased a 40-foot-wide portion of UP’s rail line). From the Ventura County line to Moorpark, the corridor is jointly owned by UP and VCTC. Like LACMTA, VCTC owns a 40-foot-wide portion of the rail line. The remainder of the LOSSAN North corridor study area, between Moorpark and San Luis Obispo, is solely owned by UP.

1.4.5 WHY IS OWNERSHIP IMPORTANT?

Ownership confers rights. In this case, the ownership rights control dispatching of trains over one’s territory (which allows for the assignment of dispatching priorities), as well as controls access rights. Access rights determine the number of trains which can operate over a section of the railroad, their schedule times, and other factors.

Within SCRRA member agency-owned portions of the corridor, SCRRA provides dispatching and maintenance. In these portions, UP pays a fee for these functions related to the number of trains it operates in this section. Conversely, In the UP-owned section of the corridor, UP provides dispatching and maintenance, and SCRRA pays the fee.

Amtrak does not own any portion of the LOSSAN North rail corridor. As noted earlier, under the terms of its establishing legislation, Amtrak has rights of access to all rail lines in the United States for intercity passenger service. Throughout the LOSSAN North corridor, as elsewhere, Amtrak pays the rail owner an incremental fee related to the number of trains it operates.

However, providing additional train frequencies requires agreement between Amtrak and the Department (for State-supported services such as the Pacific Surfliner and the proposed Coast Daylight) and the rail owners/operators. Both SCRRA and UP would seek to ensure that there is no reduction of rail capacity available within their rights-of-way to operate their respective rail services at acceptable levels of performance.

Creating additional capacity by constructing rail improvement projects such as those put forward in this Strategic Plan is one means by which rail owners can continue to operate their rail services and also allow for additional rail services, whether intercity passenger, commuter rail (like the proposed Ventura-Santa Barbara intercounty service), or freight.

Another option, particularly to increase the level of passenger rail services, would be to expand the amount of the rail corridor in public ownership by purchasing additional segments from UP. This may be problematic and potentially very expensive. As noted earlier, the corridor is also UP's Coast Route, which serves freight customers and acts as a backup to UP's main north-south route through the Central Valley. UP recognizes the increasing value of this route, not only in the event of a breakdown or service disruption on its other route, but also because it provides surge capacity during peak traffic periods, or can be used to reposition equipment, freeing up capacity for revenue trains on the Central Valley route.

Whereas there was a time when the UP would have been potentially open to selling some or all of its line within the LOSSAN North corridor, increasing demand for goods movement originating through the Ports of Los Angeles and Long Beach makes having additional rail capacity in the form of the Coast Line a strategic asset for UP. This could make the price tag for acquiring ownership of the line, or portions thereof, very expensive. However, Union Pacific Railroad has indicated that they have no interest in selling any portion of their Coast Route.

As noted above, the LOSSAN Corridor is partially in public ownership from Moorpark to LAUS. The commuter service between Ventura and Santa Barbara Counties under study would run from Camarillo to Goleta; Operating Rights Agreements would need to be executed with UP and VCTC to run this service, or alternatively the right-of-way could be purchased in fee title.

As a representative example of the costs to purchase the rail corridor, the costs to SCRRA member agencies in acquiring what became its service territory totalled $510M (approximately 459 miles, at about $1.1M per mile, during the period 1990-1993). With inflation, this would equate to approximately $792M ($1.7M per mile) in 2006 dollars. Assuming a corridor length of 55 miles between Camarillo and Goleta, to purchase the corridor completely could easily cost $110M or more.

Regardless of the rail owner, there would also be a need to negotiate the costs of maintaining and operating the rail line, including dispatching and maintenance and rehabilitation costs that a commuter service would pay the UP, or vice versa, for operating over the other's railroad. Estimates for these costs are provided in Section 1.6.

1.4.6 AVAILABILITY OF LOCAL FUNDING

Section 1-6 details the capital and on-going costs that would be associated with the establishment of a commuter rail service. While the detail of how potential costs would be apportioned is not known, it is important to assess the available local funding which could be provided.

Many of the Southern California counties which have instituted commuter rail services, such as Metrolink and Coaster, have done so largely through the use of local transportation taxes. In Orange County, these taxes come through Measure "M"; in Los Angeles County, from Proposition C; and in San Diego County through "*TransNet*."

Santa Barbara County currently has a transportation tax mechanism in place, known as Measure D. Measure D, a ½ percent sales tax, is currently set to expire in 2010, absent its reauthorization. An effort to renew Measure D was put to the county's voters this past November (2006), but was unsuccessful. This measure would have included $358M of funding to advance the 101 in Motion Action Plan (which included establishment of a Santa Barbara-Ventura commuter rail service).

Ventura County has no such transportation tax available. Measure B, put before Ventura County voters in November 2004, was defeated.

The availability of a local funding resource for capital and ongoing operations and maintenance costs should be a major consideration in selecting a preferred alternative for a commuter service, or in determining whether it should be established at all.

1.4.7 OPERATING RESTRICTIONS OR LIMITATIONS

The Amtrak alternative could only provide for additional service in the context of its intercity role; any benefits that would accrue to commuters would be secondary. Amtrak's rights of access provide for running intercity services only; Amtrak can provide crew and staffing to operate commuter services under contract to other organizations (and has in the past, both for Metrolink and Coaster), Amtrak cannot operate commuter services directly.

If the Amtrak alternative was selected, there would likely need to be discussions and agreement between Amtrak, the Department, and UP to operate the additional frequencies. SCRRA would also be involved since particular time slots in the schedule are reserved for Metrolink trains. For example, the addition of the second roundtrip between Los Angeles and San Luis Obispo in November 2004 took the "slot" of an existing Metrolink train, and the Pacific Surfliner service correspondingly makes all Metrolink stops on its northbound run to compensate. Similar accommodations might be needed under this alternative.

Both the Metrolink and Independent alternatives would also require negotiation and an agreement with UP in order to run additional passenger services over its railroad. If DMU equipment were selected as the preferred rail vehicles to be used for the commuter service, railroad owners would also need to approve DMU equipment and signal system interfaces to ensure that the equipment would reliably inform the dispatch center of its track occupancy. Different railroads have individual requirements for the number of axles required to ensure safe operation.

1.4.8 POTENTIAL COMPETITION WITH EXISTING TRANSIT SERVICES

Another institutional issue to be considered is the impact of any of the three commuter rail alternatives on the existing commuter bus service provided by VCTC and jointly funded by SBCAG.

As both of these services would essentially cover the same territory, it is likely that some of the passengers for the rail service could result in lower ridership on the express bus service. One advantage of the express bus service, however, is the single-seat ride that it offers—any of the rail-based alternatives could require a transfer to/from transit for commuters.

The proposed “lane and train” option contemplated in the 101 in Motion effort would result in the construction of a High-Occupancy Vehicle (HOV) lane in both directions on Highway 101 between Santa Barbara and Ventura County. The Coastal Express buses would be able to use that new facility, which would significantly reduce the travel time for this service. According to VCTC staff, it is anticipated that this could allow for better utilization of the existing bus fleet, resulting in more daily trips between Ventura and Santa Barbara/Goleta, with minimal increased costs.

Further analysis of the opportunities for adding bus-based commuter service might represent a lower-cost alternative, and should be explored before advancing a rail-based alternative.

1.4.9 EXISTING AND ALTERNATIVE ADMINISTRATIVE ENTITIES AND OPERATING STRUCTURES

Finally, the last major institutional issue is the administrative entity and operating structure under which a commuter rail service would be operated and maintained. There are two main options (1) use an existing operating structure, or (2) use the example of the Coaster and create a alternative operating structure, through association with a transit agency or as a new entity.

The existing operating structures are Amtrak and Metrolink. VCTC and SBCAG would need to work with Amtrak and the Department in order to provide the additional subsidy payments for the commuter service under the Amtrak alternative (of $3.3M), which might be cumbersome and complicated. As well, the need to provide administrative, marketing, and ticket sales would conflict with the existing administration of the intercity service, necessitating a collaborative marketing effort between VCTC and SBCAG to promote the Amtrak service as a commuter option.

By contrast, Metrolink would offer an operating structure that could provide for a comparatively easy implementation of commuter service. From an operating, marketing, maintenance, engineering, and planning perspective, this alternative would be offer significant benefits because there would be no learning curve; this new route would be an expansion of the existing Metrolink territory.

SBCAG may apply to become a member agency of SCRRA. The agreement under which SCRRA was established does not provide reference to a process by which new member agencies might be admitted. It is likely that SBCAG’s application to join the SCRRA or request contracted service would require an amendment to the SCRRA Joint Exercise of Powers Agreement by the existing member agencies. An alternative might be an administrative and operating agreement negotiated with SBCAG, and voted upon by the SCRRA Board of Directors.

Under the Independent alternative, a new structure might need to be created. Considerations for how best to provide this structure might include:

- Whether to directly operate the service, or to contract with another organization (such as Amtrak or SCRRA) to provide the service, as described in the preceding paragraph.
- Whether to incorporate the service as part of one of the existing transit operators on the corridor. Given the need for close integration with transit services to better connect passengers between their origins and destinations, this could suggest that making the new commuter service an arm of either Santa Barbara’s Metropolitan Transit District (MTD) or VCTC’s Ventura Intercity Service Transit Authority (VISTA) could provide potential efficiencies in providing both rail and transit services.
- Allocation of costs and resources. Given the multi-county nature of this route, there would need to be discussions between VCTC and SBCAG on how to allocate the costs for commuter rail service, and how to provide the resources for it. This could involve a number of factors, and the SCRRA formula for allocating costs might provide an example that could be used.

- Governance. One option for overseeing this entity could be the creation of a Joint Powers Authority, with a Board of Directors composed of a representative from each County's Boards of Supervisors, as well as representatives from cities along the commuter service route. This would include the Cities of Goleta, Santa Barbara, Carpinteria, Ventura, Oxnard, and Camarillo.

1.4.10 SUMMARY OF INSTITUTIONAL ISSUES

In summary, consideration of the institutional issues discussed here may be helpful in determining which alternative would best serve the needs of commuters traveling between Ventura and Santa Barbara Counties. In particular, understanding:

- Needed access rights to the rail line, which could be obtained through agreement and payment to the rail owners, or through partial purchase of the corridor;
- Funding needs, both for capital purchases and for on-going operations and maintenance;
- Limitations of some options, such as the Amtrak alternative, which is only able to provide additional intercity service, rather than the flexibility in routing options available with the Metrolink and Independent alternatives.
- Consideration of the ridership impacts that a rail-based commuter service might have on the existing commuter bus service, to ensure that the two services could compliment each other rather than compete.
- How governance structures differ. Given the multi-county nature of the proposed service, finding an alternative that provided each county with representation and input, as well as appropriated distributed the costs of the service between them.

1.5 Points of Similarity

The three commuter rail alternatives share several points of similarity, including:

- Operating schedule,
- Stations served, and
- Need for integration with local transit services to circulate commuters between their station stop and their final destinations.

1.5.1 OPERATING SCHEDULE

All three alternatives would provide service during the a.m. and p.m. commute peak periods.

Of the operating schedules for the three commuter rail alternatives, two are the same (for the Metrolink and Independent commuter services), and the third is different, for the Amtrak alternative.

The Metrolink and Independent commuter services are initially anticipated to provide weekday service only, Monday through Friday in the a.m. and p.m. peak periods. It is possible that additional weekend frequencies could be added, based on ridership demand and available funding.

The proposed schedule developed for the 101 in Motion's Santa Barbara Commuter Rail Study was adopted in this assessment, as shown in **Table B-1**. Times are shown in 24-hour format (for example, 4:00 p.m. would be shown as 16:00).

Table B-2 shows the schedule for the Amtrak alternative. Since the *Pacific Surfliner* is an intercity service, each day's morning northbound departures would originate in Los Angeles, making all intermediate stops before entering the commuter rail service area at Camarillo. That requirement

would necessitate the relatively-early start time out of Los Angeles, as well as mean that only one additional train could reasonably serve the potential commuter market.

Table B-1
Initial Commuter Rail Conceptual Schedule – Metrolink/Independent Alternatives

Northbound A.M. (read up)			Station Stop	Southbound P.M. (read down)		
7:19	8:04	8:49	Goleta	16:35	17:20	17:55
7:08	7:53	8:38	Santa Barbara	16:48	17:33	18:08
6:52	7:37	8:22	Carpinteria	17:04	17:49	18:24
6:30	7:15	8:00	Ventura	17:26	18:11	18:40
6:16	7:01	7:46	Oxnard	17:40	18:25	19:00
6:05	6:50	7:35	Camarillo	17:49	18:34	19:09

Table B-2
Initial Commuter Rail Monday-Friday Conceptual Schedule – Amtrak Alternative

Northbound A.M. (read up)		Station Stop	Southbound P.M. (read down)	
Proposed	#799		#792	Proposed
	12:45 (p.m.)	San Luis Obispo	n/a	
Intermediate Stops[2]				
9:22	10:22	Goleta	4:15	5:29
9:11	10:11	Santa Barbara	4:29	5:40
8:54	9:54	Carpinteria	4:45	5:57
8:34	9:34	Ventura	5:06	6:17
8:20	9:20	Oxnard	5:20	6:34
8:08	9:08	Camarillo		6:46
Intermediate Stops[3]				
6:30	7:30	Los Angeles	7:40	8:45

Should either the Metrolink or Independent alternative be selected, it is likely that an agreement could be reached with the Department to participate in the Rail2Rail program. Under Rail2Rail, any monthly passholder would have access not only to the commuter rail service, but also to any Pacific Surfliner frequency; especially useful if a commuter is working early or late and cannot take their usual train.

[2] Intermediate stops between Goleta and San Luis Obispo include: Lompoc/Surf, Guadalupe, and Grover Beach.
[3] Intermediate stops between Los Angeles and Camarillo include: Glendale, Burbank Airport, Van Nuys, Chatsworth, Simi Valley, and Moorpark.

1.5.2 COMMUTER RAIL STATION STOPS

Station Stops for the each of the three commuter service alternatives would include (from south to north):

- Camarillo,
- Oxnard,
- Ventura,
- Carpinteria,
- Santa Barbara, and
- Goleta.

Each of these stops is an existing station currently served by Amtrak intercity services, including the *Pacific Surfliner*.

1.5.3 NEED FOR INTEGRATION WITH TRANSIT

All three alternatives would have a similar need to provide good connectivity with local transit. Unlike the existing Coastal Express commuter bus service, which provides a "single-seat trip" between the point of origin and the destination, there would be at least one transfer involved in commuting via rail. In order to reduce the total and perceived travel time, close coordination with transit could ensure that there was an efficient means by which to move commuters to and fro. Sufficient bus capacity would need to be available to meet each train and to quickly take all the waiting passengers toward their destinations. The extent of the transit service required, such as determination of major employment centers and destinations, any needed improvements to improve transit access at stations, and finally the costs associated with providing this connector service have not been determined as part of this effort, and will need to be studied.

1.6 Points of Comparison

The three alternatives also have several factors that differ between each option, including:

- Forecast ridership,
- Likely fares,
- Forecast revenue,
- Operational issues, and
- Costs (both capital and on-going costs for maintenance and operations).

This section will provide an overview of each of these factors, and will close with a summary table to allow side-by-side comparison of the three alternatives.

1.6.1 RIDERSHIP FORECAST

Amtrak Alternative

Amtrak provided a ridership forecast for the added commuter roundtrip that would be available as an option for travel between Camarillo and Goleta as part of an additional frequency on the Pacific Surfliner intercity service.

Amtrak's figures, based on their proprietary rail forecasting model, indicate that the additional roundtrip would attract 12,900 additional riders per year.

Assuming a Monday-Friday service, this would equate to a daily ridership of approximately 50 passengers (25 A.M. boardings northbound and 25 P.M. boardings southbound). This low number is partially the result of the early departure time from Los Angeles, and also relates to the arrival times at Santa Barbara and Goleta, which would be attractive to a smaller subset of commuters. The southbound frequencies would also be less attractive by comparison to the schedule offered by the other alternatives. The Amtrak forecast did not provide a breakdown of boardings and alightings by station.

It should be noted that the Amtrak model has proven accurate for intercity passenger ridership and may be limited when used to forecast commuter rail ridership.

Metrolink and Independent Alternatives

IBI Group prepared a ridership forecast, using the conceptual schedule prepared as part of the 101 in Motion commuter rail assessment. Consistent with the estimates prepared in the 101 in Motion effort, this forecast shows that there would be demand for travel between Ventura and Santa Barbara Counties. This ridership forecast looked only at the attractiveness of a rail-based service, and did not take into consideration the existing express bus service.[4] The complete technical memorandum detailing IBI Group's methodology and input assumptions used can be found in **Attachment 1**. Initial ridership is estimated to be approximately 2,500 passengers each day in 2010, rising to approximately 3,000 by 2030[5]. An expansion of the existing Coastal Express service could potentially reduce these forecast ridership numbers by half.

Table B-3 shows the ridership forecasts for the Ventura-Santa Barbara intercounty commuter rail service in the years 2010, 2020, and 2030, and estimated numbers for A.M. boardings and alightings at stations along the route. P.M. boardings and alightings would be the reverse of those in the A.M. The 1,250 A.M. peak ridership, combined with the same number of P.M. riders equals the estimated 2,500 total daily passengers estimated for 2010.

Table B-3
AM Peak Period Boards, Alights, and Total Ridership*

	2010		2020		2030	
Station	**Boards**	**Alights**	**Boards**	**Alights**	**Boards**	**Alights**
Camarillo	418	0	452	0	500	0
Oxnard	234	0	252	0	280	0
Ventura	461	0	498	0	550	0
Carpinteria	38	92	40	99	50	110
Santa Barbara	88	678	95	733	110	810
Goleta	0	480	0	518	0	570
Total AM Peak Ridership*	1250		1400		1490	

* Total daily ridership would be double the AM peak, and assumes that all passengers would make a roundtrip.

[4] The Santa Barbara Commuter Rail Study notes that HOV lane improvements that could improve express bus service would likely reduce the potential commuter rail ridership by approximately half. IBI Group concurs with that assessment. Express Bus offers a one-seat ride that carries commuters to within walking distance of their destination. With any of the three rail alternatives, there would likely be at least one transfer between the rail station and a commuter's final destination.
[5] 2010 and 2020 ridership figures were extrapolated from the 2030 results, using the same underlying methodology.

1.6.2 POTENTIAL FARES

The potential fares that might be charged with each alternative are provided below. There is a significant difference in the fare structure for the Amtrak alternative and when compared with the other two options. While the fares for a traditional commuter service, whether operated by Metrolink or an independent organization would likely be similar, the fares for intercity travel are higher.

Potential Amtrak Fares

Based on Amtrak's current fare structure, **Table B-4** shows the one-way intercity fare for a single trip between cities within the Commuter Rail study area, as derived from www.amtrak.com[6]

Table B-4
One-way Amtrak Fares between Corridor Cities

Station	Camarillo	Oxnard	Ventura	Carpinteria	Santa Barbara	Goleta
Camarillo		$ 7.50	$ 9.00	$12.00	$14.00	$14.00
Oxnard	$ 7.50		$ 7.50	$10.00	$13.00	$14.00
Ventura	$ 9.00	$ 7.50		$ 9.00	$11.00	$13.00
Carpinteria	$12.00	$10.00	$ 9.00		$ 6.00	$10.00
Santa Barbara	$14.00	$13.00	$11.00	$ 6.00		$ 6.50
Goleta	$14.00	$14.00	$13.00	$10.00	$ 6.50	

Source: Amtrak.com, June 2007

Discounts from the above fares are available, by purchasing either a 10-trip pass or a monthly pass. Amtrak figures indicate that only 7 percent of Pacific Surfliner passengers use a multi-trip (10 ride or monthly pass) ticket, meaning 93% of riders are using a single trip or roundtrip fare. Notwithstanding that fact, **Table B-5** provides a representative example of the potential savings that might be available to a commuter using a 10-trip or monthly pass for travel between corridor cities and Goleta (travel between other station pairs would be similarly discounted).

[6] Fares as of March 14, 2007.

Table B-5
Costs of 10-ride and Monthly Passes for Amtrak Travel between Corridor Cities and Goleta.

Station Pair	10-ride Pass	Monthly Pass
Camarillo-Goleta	$95.00	$265.00
Oxnard-Goleta	$66.00	$161.00
Ventura-Goleta	$59.00	$143.00
Carpinteria-Goleta	$48.00	$117.00
Santa Barbara-Goleta	$32.00	$76.00

Source: Amtrak.com, June 2007

Potential Metrolink and Independent Alternative Fares

Metrolink has moved from a fare structure based on a zone system to one that is more tied to the equivalent costs of driving. Potential fares calculated using this method would be substantially higher than those of the three-zone fare structure suggested in the 101 in Motion study's Commuter Rail Preliminary Analysis, which ranged from $1.75 to $3.25 for a one-way trip.[7]

Table B-6 shows the one-way fares that commuters would pay for travel for both the Metrolink and Independent Alternatives. The costs are derived from actual fares on Metrolink's website, as well as from an examination of Metrolink fares for travel over similar distances.

Table B-6
One-way Metrolink Fares between Corridor Cities

Station	Camarillo	Oxnard	Ventura	Carpinteria	Santa Barbara	Goleta
Camarillo		$ 5.75	$ 7.00	$ 7.75	$ 8.25	$ 9.50
Oxnard	$ 5.75		$ 5.75	$10.00	$13.00	$14.00
Ventura	$ 7.00	$ 7.50		$ 5.75	$11.00	$13.00
Carpinteria	$ 7.75	$10.00	$ 9.00		$ 5.75	$10.00
Santa Barbara	$ 8.25	$13.00	$11.00	$ 6.00		$ 5.75
Goleta	$ 9.50	$14.00	$13.00	$10.00	$ 6.50	

Source: www.metrolinktrains.com, June 2007

As with Amtrak, Metrolink offers multi-trip tickets and monthly passes at a discount over the equivalent single one-way trip fares. This option is very popular, and the majority of Metrolink riders opt to purchase a multiple trip ticket or monthly pass. The breakdown by fare type used is shown in **Table B-7**:

[7] San Diego County's Coaster commuter rail service, operated by North County Transit District, uses a four-zone fare structure, with one-way fares ranging from $4-$5.50, still higher than the proposed 101 in Motion study fares, which ranged from $1.75-$3.25.

Table B-7
Breakdown of Metrolink Ticket Sales by Fare Type

Ticket Type	Percentage of Metrolink Passengers Using This Ticket Type
Single trip	11%
Roundtrip	9%
10-trip	19%
Monthly	60%
Total	99%

Source: SCRRA, June 2007

Given this breakdown in ticket types used, Table B-8 shows the varying discounts available using travel on the Metrolink Ventura County Line between Moorpark and Los Angeles as a representative example:

Table B-8
Discount on Fare by Ticket Type (Moorpark – Los Angeles)

Ticket Type	Fare	Discounted Fare (on a per trip basis)	Discount
Single trip	$8.75		0%
Roundtrip	$16.50	$8.25	6%
10-trip	$76.00	$7.60	13%
Monthly	$241.25	$6.03	31%

Source: SCRRA, June 2007

Even with potential discounts, likely fares with both the Metrolink commuter rail alternative, these proposed fares would be substantially higher than the existing Coastal Express bus service, which charges a one-way fare of $2.00, and offers monthly passes for $75.00. Ventura County Transportation Commission notes that the average fare on Metrolink's Ventura County line would be $4.92. This fare is used in providing forecast revenue estimates.

1.6.3 FORECAST REVENUE

Annual forecast revenues for each of the three alternatives were determined by calculating the average one-way fare, taking into consideration the potential use of discounted multi-type fares using SCRRA's experience, and applying that to the forecast daily ridership and number of weekdays (254) in a year.

Table B-9 provides a comparison of forecast revenues for the three alternatives.

Table B-9
Forecast 2010 Revenues

Alternative	Forecast Annual 2010 Ridership	Average One-Way Fare	Forecast Annual Revenue
Amtrak[8]	12,900	$9.88	$127,452
Metrolink	635,000	$4.92[9]	$3,124,200
Independent	635,000	$4.92[10]	$3,124,200

1.6.4 CAPITAL COSTS

Capital costs associated with the commuter rail service would include:

- Rail improvement projects to provide additional LOSSAN North corridor rail capacity sufficient to support the additional train volumes of the service;
- Rail equipment; and
- Layover and maintenance facilities.

Rail Improvement Projects Needed to Support the Ventura-Santa Barbara Commuter Rail Service

The rail capacity modeling conducted for the LOSSAN North Strategic Plan identified four rail improvement projects that would be needed to support the proposed commuter rail service, in either the Metrolink or Independent Alternatives[11]. A complete description of these projects can be found in Section 7 of the Strategic Plan. The projects, their locations and their estimated costs are shown in **Table B-10**.

[8] Takes into consideration only the ridership of the early morning roundtrip frequency added for this alternative for all types of travel.
[9] Source: Ventura County Transportation Commission (VCTC).
[10] Source: VCTC.
[11] The single additional roundtrip in the Amtrak Alternative would not cause sufficient capacity constraints to require the projects that would be needed to support the higher-frequencies of the Metrolink and Independent Alternatives.

Table B-10
Rail Improvement Projects Needed to Support
Ventura-Santa Barbara Commuter Rail Service

Project	County	Estimated Cost[12]
Sandyland Siding	Santa Barbara	$24M
Rincon Siding	Santa Barbara	$5M
Oxnard-Camarillo Second Main Track	Ventura	$10M
North Camarillo Crossover	Ventura	$1M
Total Estimated Cost for All Projects		**$40M**

Rail Equipment Costs

Sufficient rail equipment (locomotives and passenger coaches) to provide for the estimated daily ridership would be required regardless of the alternative selected.

Amtrak Alternative

The ten existing Pacific Surfliner-class trainsets are insufficient to provide for current *Pacific Surfliner* frequencies. This lack of equipment necessitated use of refurbished single-level Horizon-class equipment to accommodate the roundtrip between Los Angeles and San Luis Obispo added in November 2004. It would be necessary to acquire and refurbish equipment to provide for the Monday-Friday early morning departure from Los Angeles and afternoon return contemplated in this alternative. Five Horizon-class passenger coaches and two locomotives would be required, if it is available from Amtrak (which is not guaranteed). The Horizon-class equipment does not provide a "cab car" from which the engineer can operate the train; therefore, two locomotives would be needed for the additional roundtrip.

Metrolink and Independent Alternatives

Three trainsets would be initially required to provide morning and afternoon service in both the Metrolink and Independent Alternatives, and a fourth trainset needed to provide the increased service levels modeled for 2025. While SCRRA has recently made an order for new equipment, this order was based on its own future fleet needs, and additional trainsets would need to be acquired. The lead time for new rail equipment could run between 36 and 48 months.

Diesel-multiple units (DMUs) are self-powered rail vehicles that do not require a locomotive. In order to operate over the LOSSAN North rail corridor, these vehicles would need to be compliant with Federal Railroad Administration standards. The only manufacturer of FRA-compliant DMUs is currently Colorado Railcars. DMUs could potentially represent a cost-savings over the heavier locomotive/bi-level coach equipment traditionally used for commuter rail service, and could be utilized in either the Metrolink or Independent Alternatives. Again, the determination as to which equipment will be used remains to be determined.

Table B-11 provides a summary of the rail equipment costs for each alternative.

[12] All costs in 2007$

Table B-11
Initial Rail Equipment Costs[13]

Rail Equipment Needed (number required)	Amtrak	Metrolink/Independent	DMU
Locomotives @ $4M each	$8M (2)	$12 (3)	
Refurbished Horizon-class Passenger Coaches at $1.4M each	$7M (5)		
Bi-level commuter rail coaches/cab cars @ average price of $2.1M each		$31.5M (15)	
Bi-level DMUs (Powered and Non-Powered) @ average $4M each			$48M (12)
Total Equipment Costs[14]	$15M	$43.5M	$48M

Layover Facilities

Regardless of the commuter rail alternative selected, there will be a need for layover facilities at which trains can be temporarily stored during the day or overnight. The needs and estimated costs for each of the required facilities are discussed below.

Goleta

A layover facility in Goleta would be required for both the Metrolink and Independent Alternatives. The existing Goleta layover facility currently features a train washer and service track for the overnight storage of Amtrak *Pacific Surfliner* trains, and would need to be expanded to provide daytime storage space for three (and potentially four by 2025) commuter trains. Amtrak trains would continue to overnight at this facility.

Expansion of any facility at this location will need to include relocation of an existing pipeline running beneath the site. This will add significantly to the costs of the expanded facility. Estimated relocation costs for the pipeline are estimated to be $1M per mile.

Construction costs for an expanded Goleta layover facility (not including land acquisition costs) are estimated to be $7M.

Montalvo

In the Metrolink Alternative, it is assumed that they would be stored with other Metrolink trains at an expanded Montalvo layover facility, which currently provides for the overnight storage of Metrolink Ventura County Line trains. SCRRA's Strategic Assessment calls for the Montalvo facility to be expanded eastward along the Santa Paula Branch Line, in order to accommodate up to ten trains as a result of increased Metrolink service levels for the Ventura County line. Should the Metrolink alternative be selected, this facility would need to accommodate up to four more trains. Exchanges of equipment to provide for their movement to SCRRA's Taylor Yard maintenance facility would occur at Montalvo.

[13] All costs in 2007$
[14] These costs are for the equipment only, and do not include costs associated with their procurement.

Expanding the Montalvo facility to provide sufficient storage for the additional four commuter trains is estimated to be approximately $6M (over and above the $35M SCRRA estimate cost for the expansion of the Montalvo layover facility).

Camarillo

If the Independent Alternative is selected, then a new storage and maintenance facility could need to be constructed[15]. Placing it near to the line's terminus at Camarillo would reduce deadhead (non-revenue movements) and associated costs, as well as facilitate storage and maintenance activities.

In the Independent Alternative, maintenance of trains could be provided under contract by another organization, such as SCRRA or Amtrak. Should this not be the case, the facility would need to include, inspection, repair and maintenance for locomotives and coaches. Given the potential number of trains and service frequencies, the recently completed facility NCTD constructed for its SPRINTER DMU service provides a representative example of the magnitude of cost likely, at $25M.

Port Hueneme

Potential passenger rail service on the Santa Paula Branch Line, which would run from Port Hueneme to Santa Clarita, has considered the use of Diesel Multiple Units (DMUs). A storage and maintenance facility has been considered for this service, which would be located off the LOSSAN Corridor at Port Hueneme (on the Ventura County Railroad, which would be a segment of the completed Santa Paula Branch Line). As an option, use of DMUs with the Independent Alternative might include expansion of this proposed facility to include the Ventura-Santa Barbara Commuter Rail service's trains. The estimated costs for a Port Hueneme facility are $25M.

Total Estimated Capital Costs

Table B-12 provides a summary of the capital costs associated with each alternative.

Table B-12
Estimated Capital Costs[16]

Item	Amtrak	Metrolink	Independent (DMU)
Rail Equipment	$15M	$43.5M	$48M
Layover Facilities			
Goleta		$7M	$7M
Montalvo		$6M	
Camarillo/Port Hueneme			$25M
Rail Improvement Projects		$40M	$40M
Total Capital Costs	**$15M**	**$96.5M**	**$120M**

[15] Alternatively, the operating entity could negotiate with SCRRA to store the trains at the Montalvo Metrolink facility.
[16] All costs in 2007$.

Operating and Maintenance Costs

Operating and Maintenance (O&M) costs include expenses for fuel and maintenance of rail equipment, and the labor costs of train crews. Additional costs would include annual payments to the host railroads for maintenance of way, as well as an access fee for use of the rail line. Maintenance of Way (MOW) includes inspection and maintenance of the track, signal and communications equipment, structures on the rail line, such as bridges and culverts, vegetation control, and rail flaw detection. General and Administrative costs (G&A) would cover those expenses not directly related to operating the trains, including overhead, personnel, tickets and marketing, etc.

Amtrak Alternative

As an intercity service, Amtrak's O&M costs would be based on the complete weekday (Monday-Friday) trip between Los Angeles and Goleta, rather than for just the portion between Camarillo and Goleta. Additionally, Amtrak's access rights provide that it pay only an incremental cost per train mile for its use of any railroad for intercity service. **Table B-13** provides an estimate of the annual O&M costs.

Metrolink/Independent Alternatives

Whether the commuter service was provided through SCRRA or as a stand-alone agency, its costs would be similar when using conventional Metrolink-type commuter rail equipment. **Table B-14** provides an estimate of the annual O&M costs, which for comparison purposes assumes that the rail corridor is publicly-owned, and thus would provide for all the costs associated with MOW.

Should the choice be made to use DMU equipment, **Table B-15** provides a summary of those costs. The estimate in this instance assumes that ownership of the rail line would remain as it is now, so payments would include access charges and a portion of the MOW costs, based on track miles.

Table B-13
Estimated Annual Operations and Maintenance (O&M) Costs - Amtrak[17]

Item	Cost/Measurement	Units/Cost	Estimated Annual Cost
Train and Engine Crew/On-Board Services Labor	$9 per train mile	58,240 miles	$525,000
Operations & Maintenance	$31 per train mile	58,240 miles	$1,800,000
Maintenance of Way/Access Charges	$10 per train-mile	58,240 miles	$582,000
General and Administrative	15% on other costs	$2,907,400	$436,000
Total O&M Costs			**$3,343,000**

Sources: IBI Group/Amtrak California

[17] All costs in 2007$.

Table B-14
Estimated Annual Operations & Maintenance (O&M) Costs
Metrolink/Independent

Item	Estimated Annual Cost
Operations & Equipment Maintenance	$5,329,275
Maintenance of Way	$1,200,000
General and Administrative	$1,200,000
Total O&M Costs	**$7,729,275**

Source: VCTC.

Table B-15
Estimated Annual Operations & Maintenance (O&M) Costs
Independent DMU Option

Item	Estimated Annual Cost
Operations & Equipment Maintenance	$5,329,275
Host Railroad Maintenance	$1,200,000
Access Charges	$839,000
General and Administrative	$1,200,000
Total O&M Costs	**$8,568,275**

Source: VCTC

Operating Subsidies Required / Farebox Recovery Ratio

Operating subsidies will be required to cover the difference between O&M costs and fare revenue. The difference can also be used to calculate farebox recovery ratios.

The Department uses a standard for its support of intercity rail programs that requires at least a 50% farebox recovery ratio. In the case of the Amtrak Alternative, because it receives State support, should the ridership not be sufficient to generate enough revenue to meet the 50% standard, Ventura and Santa Barbara Counties would need to jointly provide funding resources to make up the shortfall.

None of the commuter rail alternatives would meet the state's farebox recovery standard.

Table B-16 provides a comparison of the operating subsidies required for each of the alternatives, as well as their projected farebox recovery ratios.

Table B-16
Summary of Estimated Annual Operations & Maintenance (O&M) Costs

Alternative	Ridership	Farebox Revenue	O&M Costs	Subsidy Required	Farebox Recovery Ratio
Amtrak	12,900	$127,452	$3,343,000	$3,215,548	4%
Metrolink	635,000	$3,124,200	$7,729,275	$4,605,075	40%
Independent (DMU)	635,000	$3,124,200	$8,568,275	$5,444,075	36%

1.7 Next Steps

Developing and sustaining a commuter rail program between west Ventura County and Goleta is presented with many significant challenges. This report has documented the financial requirements that have to be addressed in order to make physical improvements to the rail line, secure equipment, and sustain rail operations. These investments are significant. Regional agencies in both counties will need to decide if this alternative is affordable with their anticipated revenue stream and work together to address inter-county travel. While there appears to be sufficient demand for commuter rail and institutional structures to deliver the service, absent significant reliable long-term funding allocated from both counties to develop and sustain a commuter rail service and direct support from Union Pacific, an incremental approach should be considered that enhances Amtrak intercity rail travel and regional bus service like the Coastal Express. Provision of additional intercity rail service with reliable on time performance at different times throughout the day, and closer to the commuter hours, may serve more employees in the future, as more and more employers incorporate flexible work schedules. If sufficient funding for commuter rail becomes available, SBCAG and VCTC should enter into a Joint Powers Authority (JPA) to take the next steps and assign roles to develop the infrastructure and secure the agreements from Union Pacific.

Attachment 1

LOSSAN North Strategic Plan

2030 COMMUTER RAIL RIDERSHIP FORECASTS

TECHNICAL MEMORANDUM

FEBRUARY 2006

IBI GROUP

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1. INTRODUCTION

This Technical Memorandum presents ridership forecasts for the proposed Ventura-Santa Barbara County commuter rail service for a 2030 forecast year. The line will comprise about 55 miles and six (existing) stations between Camarillo Station in Ventura County and Goleta Station in Santa Barbara County. The service is intended to provide commuter serve for residents in the east (i.e. Camarillo to Carpinteria Stations) for travel to the employment areas of Santa Barbara and Goleta.

The forecasts have been developed from an empirically-derived ridership model that relates both level of service and the socio-economic and land use characteristics surrounding the rail corridor. The level-of-service factors are derived from data collected from existing services. However, since there are currently no similar types of commuter rail facilities in Santa Barbara on which to calibrate trip rates and factors, it is necessary to rely on relationships developed in other cities with commuter rail facilities similar to the one proposed. The model is based primarily on commuter rail relationships between ridership and level of service/land use characteristics from the Greater Toronto Area (i.e. GO Transit). Previously, however, it has been applied and validated for rail transit ridership forecasts in Ottawa, Montreal, Israel and Texas (i.e. the Trinity Railway Express service in Dallas) with refinements made to the factors and process using observed data for the respective cities or regions. For this study, the Dallas (being the most representative peer city) model was first recalibrated to the Metrolink Ventura County service into Los Angeles, which overlaps a portion of the proposed line under study.

2. FORECAST MODEL

Commuter rail ridership forecasts have been developed using a Direct Demand Model (DDM). This approach is a practical and more straightforward alternative to the traditional four-stage travel forecasting modeling approach for obtaining high-capacity transit ridership estimates. In effect, the DDM combines the traditional trip generation and modal split steps into a single step by directly estimating ridership from land use and service characteristic inputs. The DDM is designed specifically for situations where a new mode is being introduced into an urban area and there are no local data for model calibration, or where the anticipated ridership represents a very small portion of the total travel in an urban area (e.g. less than 2%), but may dominate particular market segments (e.g. from outlying areas towards the CBD). The DDM approach also allows for very efficient testing of different level-of-service scenarios.

The methodology and parameters for the DDM are described below. This is followed by a description of the population and employment forecasts used as key inputs for the model under the proposed service scenarios.

2.1 Methodology

The basis of commuter rail DDMs is the application of a basic trip rate representing the number of trips produced per unit of population and/or employment. The basic trip rate is first determined based on the given train frequency and then is factored, cross-classified, etc. to represent the impact of differing level-of-service characteristics of the existing or proposed service, such as travel time savings relative to auto or access/egress distance.

The formulation of this DDM is as follows:

$$\text{AM Peak Period Trips} = \text{BasicTripRate} \times f_1 \times f_2 \times f_3 \times \ldots \times f_n$$

where:

BasicTripRate = AM peak period rail trips per capita, stratified by train frequency

f_1, f_2, f_3, ..., f_n = level-of-service factors to provide adjustments to the initial trip rate to capture specific service attributes

Exhibit 2-1 shows the base a.m. peak period trip rate for passenger boardings per 1,000 persons, which is stratified by the number of peak period trains (inclusive of any express trains), together with factors reflecting the distance to the boarding station, span of service, provision of express train service, travel time savings relative to auto, and the fact that part of the Ventura-Santa Barbara County commuter rail service will overlap reverse-direction service from the existing Metrolink Ventura County service into Los Angeles. These factors, originally developed from GO Transit relationships and recalibrated to the Metrolink Ventura County line, are discussed below:

- A distance factor incorporates a change in the base rail transit trip rate as the distance from the rail transit increases. Within one-quarter mile of stations, 100% of the base ridership rate is retained, representing the population with walk access. Moving outwards from the station, secondary and tertiary catchment areas are defined based on the local geographical features and the spacing of stations. Secondary areas represent an approximate six-mile radius (with adjustments for overlaps). Tertiary areas consist (roughly) of aggregations of traffic zones from the SBCAG travel demand model and are aligned for a morning commute towards the CBD; that is, the station is generally located near to the catchment area border closest to the CBD. Tertiary areas increase with size with distance from the CBD to capture the effects of reduced transport alternatives, increased park-and-ride facilities and increased station spacing. A separate, additional catchment area is also defined for Camarillo that encompasses Moorpark and Simi Valley, representing Population-based catchment areas are illustrated in Exhibit 2-2;

- A span-of-service factor is applied to the trip rates to account for the availability of off-peak service. This generally reflects an approximate hourly service throughout the off-peak periods;

- A third factor incorporates the provision of express train service to primary destinations in the AM peak period;

- A fourth factor incorporates travel time differences between rail and auto modes. For this model, total commuter rail travel time was obtained using the existing schedule information from the Amtrak Pacific Surfliner Train #799, which currently operates along the same alignment from Camarillo to Goleta between 9:08 a.m. and 10:22 a.m. daily. It is assumed that travel time in 2030 will be similar to the existing times. Travel times by auto were obtained from the SBCAG travel demand model and therefore incorporate all of the assumptions inherent to this model's base case forecasts (i.e. auto travel cost, auto occupancy, road/facility improvements, etc.); and

- A fifth factor reflects the overlap in commuter rail service at Oxnard and Camarillo Stations with the Metrolink Ventura County line by applying a reduction factor.

Exhibit 2-1: AM Peak Period Base Trip Rates per Person & Level-of-Service Adjustment Factors

No. of Peak Period Trains	Base Trip Rate (per 1,000 Population)
1	9
2	14
3	17
4	19.5
5	22.5
6	25
7	27
8 or more	28

Distance To Board Station Factors	
Catchment Area Type	Factor
Primary (0 to ¼ mile)	1.0
Secondary[1]	0.3
Tertiary[1]	1.3
Simi Valley/Moorpark[1]	0.1

[1] Catchment areas defined below.

Travel Time Savings Factors	
Travel Time Saved Relative to Auto Mode (min)	Factor
0 to 15	0.30
15 to 30	0.44
30 to 45	0.90
45 to 60	0.95
60 or more	1.15

Express Train Service Factors	
No. of Peak Period Express Trains	Factor
0	1.00
1	1.25
2 or more	1.35

Span of Service Factors	
Off–Peak Service Provision?	Factor
No	0.82
Yes	1.4

Service Overlap Factors	
Service Overlap?	Factor
No	1.0
Yes	0.7

Total population-based demand on the line is determined by summing passenger boardings for all stations in the corridor except Goleta Station. The total estimated ridership based on population represents a population-constrained total ridership for the system.

Trip alightings are determined in a similar manner to passenger boardings, but with the base trip rate based on employment rather than on population in employment-based catchment areas for each station. The main factors influencing employment-based ridership are distance from the alighting station to the final destination and the provision of high-quality rapid transit service from the alighting station to the final destination.

Exhibit 2-2: Population Catchment Areas

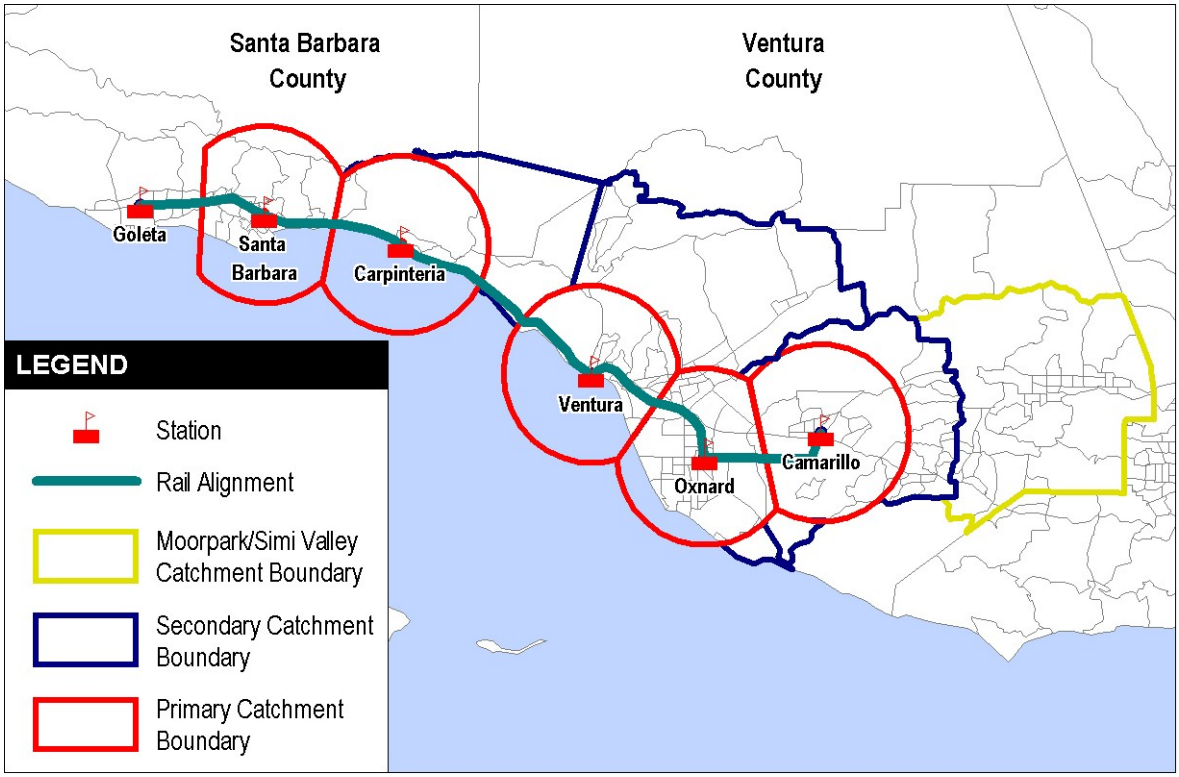

Exhibit 2-3 shows the base a.m. peak period trip rate for passenger alightings per 1,000 jobs, which is stratified by distance from the egress station to employment areas in Carpinteria, Santa Barbara and Goleta Stations (i.e. the anticipated destination stations for the line). The model assumes that ridership at the employment end of the trip is not as sensitive to the commuter rail service itself as the passenger-based model. It is, however, quite sensitive to the provision of destination-end rapid transit service, due to access between the workplace and the commuter rail station as well as for general increased mobility at the work end, reducing a commuter's need for a vehicle at work. This is reflected in a transit service provision adjustment factor applied to the base trip rate.

Exhibit 2-3: AM Peak Period Base Trip Rates per Job & Level-of-Service Adjustment Factors

Distance From Egress Station (mi)	Base Trip Rate (per 1,000 Jobs)
Primary (0 to ¼ mile)	195
Secondary (¼ to ½ miles)	92
Tertiary (½ to 2 miles)	13

Destination-End Rapid Transit Access Factors	
Rapid Transit Access?	Factor
Yes	1.25
No	0.5

Total employment-based demand on the line is determined by summing passenger alightings at Carpinteria, Santa Barbara and Goleta Stations. The total estimated ridership based on employment represents an employment-constrained total ridership for the system.

After total boardings and alightings are determined, the total line ridership is determined as the mid-point, or average, of the totals determined from the population- and employment-based estimates. Boardings and alightings at each station are then scaled to this overall control total. To obtain

weekday daily ridership estimates, a.m. peak period ridership is essentially doubled, corresponding to commuter rail systems with no off-peak service.

2.2 Input Assumptions

The DDM model uses basic socio-economic data in the vicinity of the rail stations as the basis for ridership estimates. The model uses these data for primary, secondary and tertiary catchment areas for each station used within the model, as discussed above. These data are presented in Exhibit 2-4. Data for Santa Barbara County were obtained from SBCAG while those for Ventura County were obtained from SCAG.

Exhibit 2-4: 2000 & 2030 Population & Employment by Catchment Area

A. Population

Station	2000			2030			Growth		
	Primary[1]	Secondary[2]	Tertiary[3]	Primary[1]	Secondary[2]	Tertiary[3]	Primary[1]	Secondary[2]	Tertiary[3]
Camarillo	1,390	84,040	73,080	2,120	119,130	87,310	52%	42%	19%
Oxnard	1,590	243,210	2,750	2,170	326,260	3,120	37%	34%	13%
Ventura	560	55,670	64,850	690	68,950	86,700	24%	24%	34%
Carpinteria	550	19,300	2,760	630	23,230	3,350	15%	20%	21%
Santa Barbara	1,860	106,510	0	2,110	124,050	0	13%	16%	N/A

[1] 0 to ¼ mile from station.
[2] ¼ to approximately six-miles from station.
[3] Defined in Exhibit 2-2.
Source: SCAG (Ventura County), SBCAG (Santa Barbara County).
Note: Only shows values for stations used in population-constrained model.

B. Employment

Station	2000			2030			Growth		
	Primary[1]	Secondary[2]	Tertiary[3]	Primary[1]	Secondary[2]	Tertiary[3]	Primary[1]	Secondary[2]	Tertiary[3]
Carpinteria	200	530	5,740	260	710	7,980	31%	34%	39%
Santa Barbara	610	5,660	43,400	820	7,410	58,110	34%	31%	34%
Goleta	1,000	2,170	29,840	1,430	3,170	42,390	43%	46%	42%

[1] 0 to ¼ mile from station.
[2] ¼ to ½ mile from station.
[3] ½ to 2 miles from station.
Source: SCAG (Ventura County), SBCAG (Santa Barbara County).
Note: Only shows values for stations used in employment-constrained model.

The service-related assumptions are presented in Exhibit 2-5. All assumptions except the travel time savings are the same for each station. Travel time savings are representative of those from each station to Santa Barbara/Goleta and reflect road congestion levels projected by the SBCAG model.

Exhibit 2-5: 2030 Service Assumptions

A. Global (All Stations)

Assumption	Value
No. of Peak Period Trains	3
No. of Peak Period Express Trains	0
Off-Peak Service	No
Rapid Transit at Destination End	No

B. Rail Travel Time Savings Relative to Auto

Station	Time Savings (min.)
Camarillo	2
Oxnard	9
Ventura	14
Carpinteria	1
Santa Barbara	8

Note: Values representative of time savings from each station to Santa Barbara/Goleta area.
Source: Rail from Amtrak Surfliner train #799; auto from 2030 SBCAG model (base case).

3. RESULTS

Application of the DDM produces the projected 2030 a.m. peak period commuter rail boardings and alightings by station and total line ridership shown in Exhibit 3-1. Of the approximate 1,500 riders expected, about 90% would board within the first three stations (Camarillo Station to Ventura Station), with about 150 riders using the service for much shorter trips. Santa Barbara and Goleta Stations will comprise the main destinations. This a.m. peak period ridership would correspond to about 3,000 daily riders.

Exhibit 3-1: 2030 AM Peak Period Boards, Alights & Total Ridership

Station	Boards	Alights
Camarillo	500	0
Oxnard	280	0
Ventura	550	0
Carpinteria	50	110
Santa Barbara	110	810
Goleta	0	570
Total	1,490	

4. COMPARISON TO OTHER SERVICES

Exhibit 4-1 presents selected operating and regional data from several existing commuter rail services for comparison purposes. Of the four systems shown, the known level of service and estimated performance characteristics of the proposed Ventura-Santa Barbara County commuter rail service are most similar to the San Jose Altamont Commuter Express service. With three a.m. peak period trains over an 82-mile corridor, it attracts slightly more daily ridership than the 3,000 expected for the proposed line in 2030. In terms of the ridership per population/employment, it also compares well with this line with about 350 riders per 100,000 population within a five-mile catchment area (not related to the areas utilized within the model) and 400 riders per 100,000 jobs.

Exhibit 4-1: Commuter Rail Peer Group Operating & Regional Data (2000/2001)

Criterion	Los Angeles Metrolink (Inland Empire to Orange County Line)	San Diego Coaster	San Jose Altamont Commuter Express	Dallas Trinity Railway Express
Line Length (miles)	59	43	82	25
Number of Stations	11	8	9	7
Average Weekday Riders	2,900	6,020	3,300	5,900
Year of Inception	1995	1995	1998	1996
Passenger Cars per Train	3 – 5	4 – 5	3	2 – 6
Weekday Span of Service	5:00 AM to 8:00 PM	5:20 AM to 7:45 PM	4:15 AM to 9:00 AM and 4:15 PM to 6:45 PM	5:00 AM to 12:30 AM
Trips per Weekday Day	6 inbound / 6 outbound	11 inbound / 11 outbound	3 inbound / 3 outbound	29 inbound / 27 outbound
Trips per Weekend Day	None	4 inbound / 4 outbound	None	18 inbound / 17 outbound
Annual Revenue Service Hours	22,300	24,500	11,800	17,200
Operating Cost per Passenger Mile	$0.26	$0.33	$0.36	$1.44
Capital Cost (year of expenditure dollars)	$84 million	$568 million	$56 million	$63 million
5–Mile Catchment Area Population	2,002,000	567,000	1,456,000	997,000
Catchment Area Population Density (persons/sq. mile)	3,200	3,800	1,600	3,100
5–Mile Catchment Area Employment	1,047,000	464,000	937,000	1,035,000
Catchment Area Employment Density (jobs/sq. mile)	1,700	3,100	1,100	3,200
Avg. Riders per 100,000 Catchment Area Persons	150	760	230	590
Avg. Riders per 100,000 Catchment Area Jobs	280	930	350	570
Avg. Riders per 100,000 Catchment Area Persons & Jobs	100	420	140	290

APPENDIX C – RAIL MODELING FINAL REPORT

RTC SIMULATIONS

LOSSAN North
RAILROAD CAPACITY AND PERFORMANCE ANALYSIS

Draft Final Report

2006 Base Case
2015 Planning cases
2025 Planning cases

Prepared for
LOSSAN Rail Corridor Agency
IBI Group

By

Washington Group International, Inc.

Last revised: 9 June 2007

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CHAPTER I – DESCRIPTION OF NETWORK AND FILES

Introduction

This report presents the results of modeling cases run using the RTC (Rail Traffic Controller)[1] simulation model. The simulated rail network consists of all tracks between San Luis Obispo and Los Angeles Union Passenger Terminal [LAUPT] on the Union Pacific Railroad (UP) and Southern California Regional Rail Authority, or "Metrolink" [with some exclusion of auxiliary tracks]. Cases were run using this network, the forecasted increases in demand, and proposed facility improvements during the 2006 to 2015 period, and the 2015 to 2025 period. A Base Case was run with actual 2006 train activity as a benchmark. The RTC rail networks for each simulation are shown in Appendix 1 -- Simulation Network Schematics .

Simulation methodology

One Base Case was run using a representation of train service levels in August 2006. Data was used from UP and Metrolink that described actual train movements or passenger schedules over their jurisdictions. The Base case represents a benchmark that calculates performance of existing trains on the existing network, before any traffic increases or proposed track improvements. A second Base Case was planned, to reflect operation of the *Coast* Starlight, but that train's performance has improved greatly of late. The difference between the Base cases is explained in greater detail below, in the section "Impact of Coast Starlight Operational Issues on Base Case".

Then, sets of cases were run using the train demand forecast for 2015 and 2025 schedule scenarios. Each successive set of Cases includes a Demand case, which incorporates the increased demand as foreseen by the planners for the period leading up to the Case date (i.e., 2015 incorporates changes in plant and demand between 2006 and 2015; 2025 incorporates the changes planned between 2015 and 2025, and so forth). Then an Investment case is run which suggests the required physical changes to the railroad plant required to insure acceptable Freight and Passenger service levels.

The simulation model actually processes 8.5 days of data, with one day at the start of the simulation for "warm-up", which loads the network before statistical data is gathered. There is also one-half day of "cooldown", where trains finish their runs without new trains being added. Statistics gathered during warm-up and cool-down are excluded, as these periods do not accurately represent full operations. The measured train performance covers the seven days between 12:01 a.m. Thursday, week 1, and 11:59 p.m. Wednesday, week 2. This includes a week end, necessary because of the lower number of passenger trains operated on the weekend.

RTC allows train departure times and station dwells to vary randomly within a defined range. Particularly useful for freight service, because of its greater irregularity, this randomization allows a more accurate representation of railroad operations. For each case, five runs were made with randomization of certain parameters, and then the results averaged arithmetically.

Rail Network

Union Pacific Railroad operates a 3,455-mile network of railroad lines in California, as shown below in Figure 1 -- Union Pacific Railroad lines in California. The simulation network between San Luis Obispo and Los Angeles is about 500 track-miles. Between Los Angeles and Goleta, the railroad includes modern segments, with multiple main track and Centralized Traffic Control [CTC]. North of Goleta, to San Luis Obispo, the line is more suited to a railroading environment

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[1] Rail Traffic Controller © Berkeley Simulation Software, LLC

in 1940], where many stations were manned by agents or operators, crews were larger, and freight trains were shorter and had cabooses. Operations have changed greatly since then, but that portion of the railroad still has short sidings, manual switches, and no traffic control system besides use of the radio to relay train movement instructions.

It is on the latter portion (San Luis Obispo – Goleta) that the performance is more irregular. In particular, individual freight train performance can vary widely day to day, depending on where meets and passes occur. Passenger train performance can vary also, even though they receive priority handling. On the Santa Barbara Subdivision, between South San Luis Obispo and Goleta, there is 105 miles of line with no remotely controlled switches, save for the sidings at Elwood and Gaviota. Of the 14 sidings here, five are less than the normal maximum freight train length of 5,500 feet. This limits the Dispatcher's ability to make meets with minimum delay, even when giving priority to Passenger trains.

Los Angeles Union Station, and Metrolink service

Full Metrolink service at Los Angeles Union Station (LAUS) has not been simulated. Only those Ventura Line and Antelope Valley trains (both freight and passenger) that operate over the route between LAUPT, Mission Tower, and Burbank Junction are included. However, included in these counts are most deadhead equipment moves between Union Station and Taylor Yard.

The impact on Union Station of the full 2015 and 2025 Metrolink service is beyond the scope of this study. However, the intercity train count increase is but a small percentage of the Metrolink Ventura and Antelope increases. As shown below in Table 6 -- Weekday scheduled trains, from 2006 to 2025, Metrolink Ventura weekday trains increase from 20 to 38. Additionally, Antelope trains [only modeled between Union Station and Sun Valley] increase from 32 to 44 trains. Surfliner service increases from 10 to 14 trains, all of which are extensions of existing San Diego – Los Angeles trains.

Proposed 2015 and 2025 Metrolink schedules were based on train count numbers supplied by Metrolink, with our best-guess estimates of proposed schedules. Additional rush-hour trains were run, compressing the rush-hour headways to as close as 20 minutes. Off peak trains were added to provide generally an hourly headway, taking into consideration the additional services provided by Surfliner trains.

Figure 1 -- Union Pacific Railroad lines in California

Rail Traffic Controller

Rail **T**raffic **C**ontroller© (**RTC**) is a computer program created by Berkeley Simulation Software, LLC, which simulates the operation of trains over a railroad network. Variations can be made in network track layouts, train consists and schedules, and operating rules and constraints, which allows the testing of such changes before they are implemented. RTC is used by all North American Class I railroads and many transit and commuter railroads [Including Metrolink] for evaluation and planning of their operations and capital expenditures.

Dispatching simulation

As the simulation "dispatcher" flows trains across the railroad, it resolves conflicts between trains, in the same manner as would an actual railroad dispatcher. But it is doing so with the full knowledge of ALL trains on the territory, and with the decision-making speed available to a powerful computer.

One important dispatching criterion is the Hours of Service limitation for the train's crew. Federal law prohibits a crew member from performing service if he has been on duty in excess of 12 hours. Prior to the expiration of that limit, either a new crew must be provided, or the train taken clear of the main track and properly secured.

Unless a train is badly delayed or nearing an hours-of-service limit, both actual railroad dispatchers and the simulation program "dispatcher" will generally give preference to passenger trains over expedited freight trains, and to expedited freight trains over lower priority manifest freight trains. These priorities are determined by the freight railroad and incorporated into the meet-pass logic used to resolve train conflicts.

Expedited trains are higher-priority freight trains, generally carrying intermodal traffic ["Piggyback"] or automobiles. *Manifest* trains have a priority lower than Expedited, and carry general freight, in equipment like boxcars, tank cars, or gondolas. *Local* freights perform retail handling of freight, gathering and distributing cars from a customer's track. They generally travel shorter distances, and are of lower priority than Expedited or Manifest trains.

RTC and human dispatchers make their decisions based on the many factors involved in a train's performance:

- Priority
- Type of train
- Time available for crew to legally work
- Train length and weight
- Locomotive power
- Scheduled work

All other elements equal, when making a decision about a conflict between trains, dispatchers will generally minimize the total cost of delay to the trains involved. They will do this for all the trains involved in the decision, and will in their minds move trains like chess pieces, until a satisfactory conflict resolution occurs.

But of course, dispatchers must make these decisions *before* the final conflict resolution occurs. The RTC simulation model has the luxury of revising its decisions until the delay cost for a conflict is minimized, and so can review all conflict resolution decisions and apply a relative cost to them. The human dispatcher lacks this advantage.

The end result is theoretically identical, but the human dispatcher is much more constrained by time, and may not have the same quality of information, especially about the state of adjacent dispatching territories.

In the occurrence of a particularly vexing series of conflicts, resolution may occur similarly for both RTC and human dispatchers: priorities may be reconsidered. If management assistance is needed, the actual dispatcher would appeal for guidance from the Corridor Manager. Similarly, review of simulation results may cause the analyst to alter a train's schedule or work.

General Description of Analysis – measures of performance

Each analysis below refers to data shown in summary tables and graphs throughout the report. The performance measures used, and displayed in the report, are:

Number of trains per day – the average number of trains per day operated and measured over the simulation period.

On Time Percentage – the percentage of trains that complete their overall schedule run on or ahead of schedule. If a train is late at any measuring point, it is considered late. In this study, typically, measuring points are only at origin and destination between San Luis Obispo and Los Angeles.

Delay Hours per day – time spent for meets and passes. Does not include Dwell or Wait on Schedule. A decrease is considered "good".

Delay Ratio, or Meet-pass delay percentage -- the proportion of *running* time that a train is stopped for meets and passes with other trains), *not for* station work (dwell) or waiting on schedule. A decrease is considered "good".

This index should be used for Case comparisons where a different number of trains are operated. All else equal, more trains will mean more total Delay Hours. But if each train is dispatched with equal efficiency in both cases, the Delay Percentages will be unchanged.

Appendix 4 – RTC Measurements provides a more detailed explanation of these and other performance indices created by RTC.

Data is gathered as the simulation progresses, from large summary groups to the performance of each specific train. In the discussions below, we'll generally focus only on the three major Train Groups, defined as shown below in Table 1 -- Train Groups and Train Types

Table 1 -- Train Groups and Train Types

Train Group	Train Type	Description
Passenger	Amtrak Intercity	*Coast Starlight* Trains 11 and 14
	Pacific Surfliner	San Luis Obispo-Los Angeles
	Metrolink	Montalvo and Sun Valley – Los Angeles
	Deadhead equipment moves	Deadhead moves between layover points and origin/termination stations
	Camarillo-Goleta	Commuter service between Camarillo, Ventura, Santa Barbara, and Goleta
Expedited	UP Priority Z	High priority Piggyback and Containers
	UP Intermodal	Piggyback and Containers
	UP Manifest Q	Quality Manifest – higher priority non-intermodal traffic
Manifest	UP Hauler	Short distance trains between major yards and industrial areas
	UP Manifest	General freight trains between major yards
	UP Local	“Retail” trains doing work in industrial areas.

Case Descriptions

List of Cases

Table 2 is a complete list of the cases included in the current study. "Demand" cases reflect the study period's traffic demand on the previous time period's plant. "Investment" cases include such plant and schedule changes in that time period that are needed to insure satisfactory network performance.

So, for an Investment case labeled "2025", the listed improvements and changes in traffic would happen at some time between 2015 and 2025. To accommodate the projected 2025 traffic, the improvements would need to be done by 2025.

In the effort to develop the proper proposed demand and investment scenarios, a total of 31 cases were run, with the results summarized in the 11 cases discussed in this report.

Table 2 -- List of Cases

Case	Description; Incremental Improvements	Type of Case
2006 A0a	**Base Case: 2006 track, signals, trains.**	Base
2015 A1	**2015 traffic on 2006 network** Existing switches Goleta-San Luis Obispo	Demand
2015 A2 [6]	**2015 traffic on 2015 network** CTC islands; some siding extensions	Investment
2015 A2 [7]	**2015 traffic on 2015 network.** CTC islands; some siding extensions. Faster curves south of Goleta.	Investment
2015 B1	**2015 traffic on 2015 network.** CTC islands; some siding extensions. Faster curves south of Goleta. **Leesdale ext.**	Investment
2015 B2	**2015 traffic on 2015 network.** CTC islands; some siding extensions. Faster curves south of Goleta. **Leesdale ext. 1 platform Oxnard.**	Investment
2015 C2	**Camarillo-Goleta trains on 2015-a2 [7] network**	Demand
2025 E2	**2025 traffic on 2015 network, plus improvements:** Additional 2nd MT; CTC Goleta-San Luis Obispo. Metrolink eqpt. on CG trains.	Investment
2025 E3	**2025 traffic on 2015 network, plus improvements:** Additional 2nd MT; CTC Goleta-San Luis Obispo. DMU eqpt. on CG trains.	Investment
2025 E5	**2025 traffic on 2015 network, plus improvements:** Additional 2nd MT; CTC Goleta-San Luis Obispo. Except: no CG trains. No CG improvements.	Investment
2025 E6	**2025 traffic on 2015 network, plus improvements:** Additional 2nd MT; CTC Goleta-San Luis Obispo. **Except: no CG trains.**	Investment

CHAPTER II -- RESULTS AND EVALUATION OF SIMULATION CASES

General Comments on the Cases

Throughout the study period, it is assumed that Union Pacific Manifest and Expedited traffic increases at a rate in general accord with the overall economic growth of California, including specific capacity reservations by Union Pacific. Local trains generally remain unchanged, as additional traffic can be handled simply by running more cars on existing trains.

Table 4 -- Network performance summarizes the number of trains dispatched and measured over the seven days of each Case, and the on-time percentage for passenger trains, delay ratios, and delay hours per day obtained with each Case. The delay hours represent freight train hours in the conventional (industry) sense; the delay ratios are obtained by dividing delay time by the total elapsed time of trains on the network, to obtain a measure that indicates the percentage of total time that is taken up by delay.

In addition to measures of delay, we also analyzed other typical indicators of railroad performance when reviewing each resolved case. These other indicators – which do not show in Table 4 -- include comparing the number of individual trains that suffered excessive delay from case to case, analyzing the maximum delay suffered by the worst performing train (as opposed to normalized delay, which is what is measured by the delay ratio), and looking at the number of trains (if any) that required re-crews due to reaching the statutory limit of 12 hours on duty that is mandated by the Federal Hours of Service Act. Generally speaking, we believe all these performance–related factors have to be assessed to determine how well the network is handling the demand: there is no single number that tells the whole story.

We will interpret the various measures at greater length in Chapter III, Findings.

Impact of Coast Starlight Operational Issues on Base Case

The "Coast Starlight" is Amtrak's long-haul service between Seattle and Los Angeles. In 2006 this train experienced significant delays north of San Luis Obispo. Its southbound departure times from San Luis Obispo in August 2006 ranged from four to ten hours late, which results in network operation with a very different pattern of meets and passes then when compared with a more on-time operation.

We had considered running two versions of the base case, one in which the Starlight operates more closely to its published schedule [one to three hours late at San Luis Obispo], and another with the delays mentioned above. The reason for this is to provide an accurate representation of the existing conditions on the LOSSAN North rail corridor, as well as to establish a benchmark against which future traffic volumes and schedules can be measured, given the current operations.

However, the train's performance since early September 2006 has improved dramatically, compared to August. Track work north of Dunsmuir, CA has largely been completed, which should restore performance to the level modeled in the simulation.

It is assumed that in the future 2015 and 2025 cases the Starlight will operate more closely to its published schedule. For all the cases, the southbound *Starlight* leaves San Luis Obispo as shown below.

Table 3 -- Coast Starlight modeled performance – departure times at San Luis Obispo

Day	Actual departure	Scheduled departure	Late hh:mm
1	3:20 PM	3:00 PM	00:20
2	5:00 PM	3:00 PM	02:00
3	4:30 PM	3:00 PM	01:30
4	5:15 PM	3:00 PM	02:15
5	7:10 PM	3:00 PM	04:10
6	6:30 PM	3:00 PM	03:30
7	5:00 PM	3:00 PM	02:00

Table 4 -- Network performance

		Number of Trains			On-time Pct.					Delay Ratio [Percent]		Delay Hours/Day	
Case	**Description; Incremental Improvements**	**Avg. per Day**	**Avg. Revenue Psgr**	**Avg. UP Freight**	**All Psgr**	**AM i/c**	**Surf liner**	**C-G**	**Metro link**	**Psgr**	**UP Freight**	**Psgr**	**UP Freight**
SLO-LA													
2006 A0a	**Base Case: 2006 track, signals, trains.**	65	52	13	85%	79%	71%		88%	5%	14%	4.0	5.0
2015 A1	**2015 traffic on 2006 network** Existing switches Goleta-San Luis Obispo	81	65	16	75%	31%	43%		78%	7%	19%	6.5	11.4
2015 A2 6	**2015 traffic on 2015 network** CTC islands; some siding extensions	81	65	16	83%	69%	69%		83%	5%	12%	4.7	7.2
2015 A2 7	**2015 traffic on 2015 network.** CTC islands; some siding extensions. Faster curves south of Goleta.	81	65	16	85%	79%	67%		85%	5%	11%	4.6	6.7
2015 B1	**2015 traffic on 2015 network.** CTC islands; some siding extensions. Faster curves south of Goleta. **Leesdale ext.**	81	65	16	83%	76%	65%		85%	4%	11%	4.0	6.6
2015 B2	**2015 traffic on 2015 network.** CTC islands; some siding extensions. Faster curves south of Goleta. **Leesdale ext. 1 platform Oxnard.**	81	65	16	84%	83%	68%		85%	4%	12%	4.0	6.9
2015 C2	**Camarillo-Goleta trains on 2015-a2 [7] network**	85	69	16	85%	79%	76%	67%	87%	5%	12%	5.1	7.1

		Number of Trains			On-time Pct.					Delay Ratio [Percent]		Delay Hours/Day	
Case	**Description; Incremental Improvements**	**Avg. per Day**	**Avg. Revenue Psgr**	**Avg. UP Freight**	**All Psgr**	**AM i/c**	**Surf liner**	**C-G**	**Metro link**	**Psgr**	**UP Freight**	**Psgr**	**UP Freight**
SLO-LA													
2025 E2	**2025 traffic on 2015 network, plus improvements:** Additional 2nd MT; CTC Goleta-San Luis Obispo. Metrolink eqpt. on CG trains.	111	91	20	81%	79%	57%	84%	84%	5%	13%	6.4	10.8
2025 E3	**2025 traffic on 2015 network, plus improvements:** Additional 2nd MT; CTC Goleta-San Luis Obispo. DMU eqpt. on CG trains.	111	91	20	83%	74%	65%	98%	86%	5%	13%	6.1	11.1
2025 E5	**2025 traffic on 2015 network, plus improvements:** Additional 2nd MT; CTC Goleta-San Luis Obispo. Except: no CG trains. No CG improvements.	106	85	20	75%	67%	40%		80%	6%	17%	7.3	14.6
2025 E6	**2025 traffic on 2015 network, plus improvements:** Additional 2nd MT; CTC Goleta-San Luis Obispo. **Except: no CG trains.**	106	85	20	80%	71%	60%		84%	5%	12%	5.7	10.3

Train counts

The projected train volume for all train types at certain stations over the 25-year study horizon is shown below in Table 5. The graph of all measured trains for each case is shown below in Figure 2. The largest component of the total train volume is the number of Passenger trains, which is expected grow significantly by 2025, as shown below in Figure 3. Keep in mind that these numbers are averages over 7 days. There are far fewer Metrolink trains on weekends. Table 6 indicates the *scheduled weekday* trains, but doesn't include deadhead equipment moves or local freight trains.

Table 5 -- Trains per day at certain Stations

Station	2006	2015	2015 C	2025
LAUS	81	99	99	121
Burbank	64	80	80	104
Moorpark	29	38	39	62
Oxnard	22	27	33	52
Santa Barbara	17	20	27	36
San Luis Obispo	11	16	16	20

Note: LAUS counts do not include Metrolink trains from lines other than Ventura and Antelope Valley.

Figure 2 – Average Trains per Day – All Trains – San Luis Obispo-Los Angeles

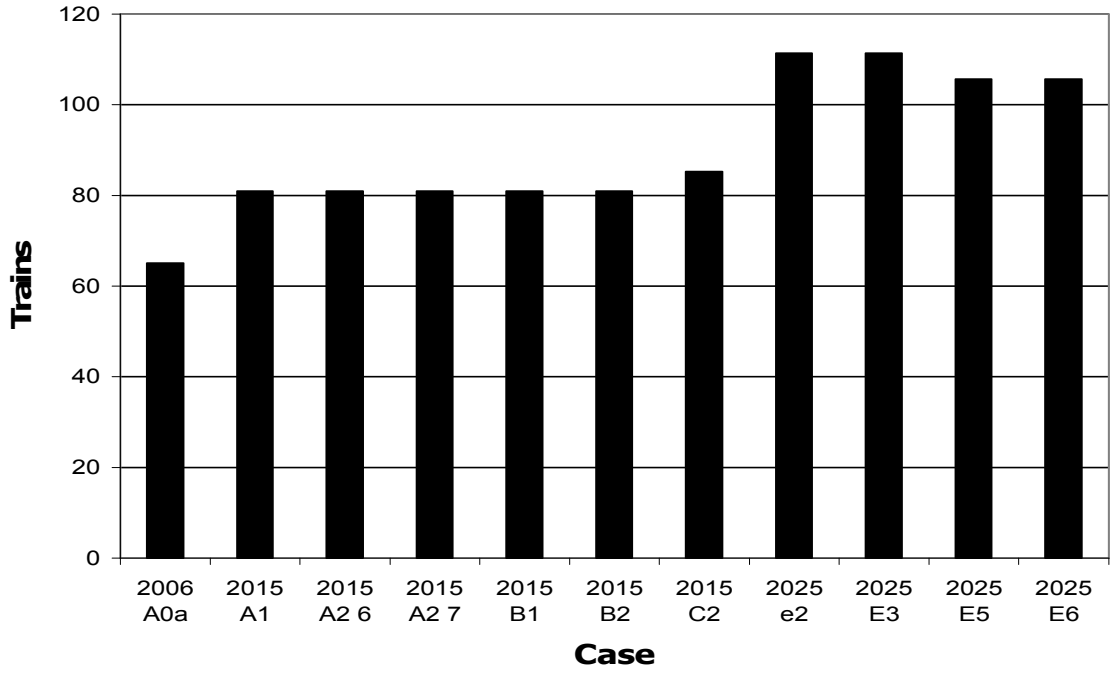


Figure 3 – Average Trains per Day – Passenger - San Luis Obispo-Los Angeles

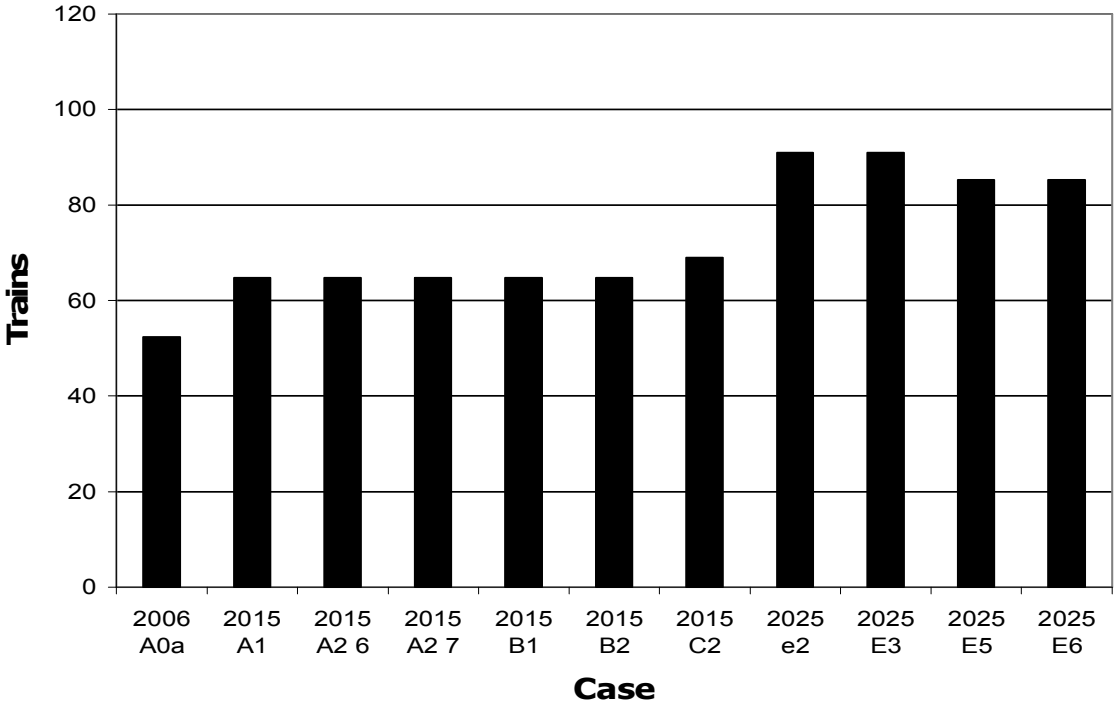


Table 6 -- Weekday scheduled trains

	Metrolink Ventura	Surfliner LAX-SBA	Surfliner GTA-SLO	Camarillo - Goleta	UP thru freight
2006	20	10	4	0	4
2015\A	26	12	6	0	6
2015\C	26	12	6	6	6
2025	38	14	8	8	8

Between 2006 and 2025, scheduled passenger train volume increases by 100%, as does UP through freight volume. Successfully accommodating this traffic increase requires all of the proposed LOSSAN track additions north of Burbank Jct.

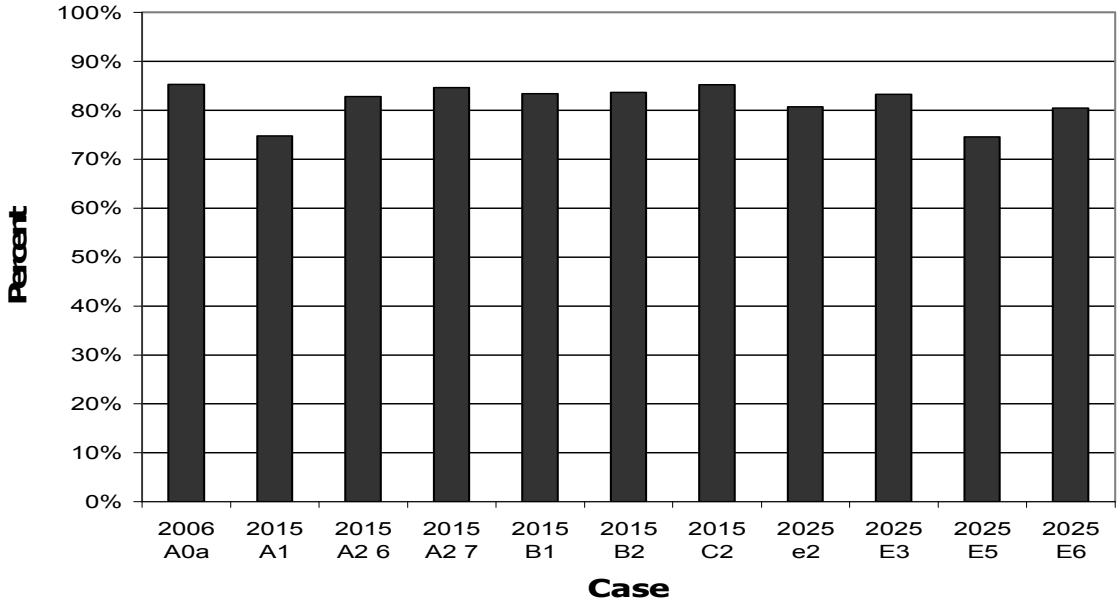
On Time Percentage

Figure 4 shows the On-Time Percentage (OTP) for Passenger rail services. This index is important both from a standpoint of both customer acceptance and cost-effectiveness. Especially in a commuter service, late performance will drive away customers.

OTP is calculated in RTC by comparing a train's scheduled and actual arrival time at its end points. If a train is late in excess of the allowable tolerance, it is considered "late". The schedule tolerance for all passenger service in this study is 6 minutes. Thus, if a train is due at 10:00 am, and arrives at 10:05:59, it is "on time". If it arrives at 10:06:01, it is "late". OTP is the percentage of trains arriving "on time". It does not indicate how late a train is. A train 12 hours late has the same OTP as a train that is 6 minutes 1 second late.

In the 2015\A1 case, projected 2015 traffic is run on the 2006 network. Given the nearly 50% increase in train volume, it isn't surprising that Passenger on-time percentage declines. But the improvements planned for 2015 mitigate the traffic increases. Similarly for 2025: the full set of improvements allows the network to satisfactorily accommodate the increased traffic.

Figure 4 -- Passenger On-Time Percentage



Delay Ratios and Network Delays

The goal of the exercise is to have Network delay ratios not increase as quickly as do train volumes: the increase in traffic is handled with some degree of success by the construction of numerous network and terminal improvements. The possibility that Delay Ratios may not remain as they were in 2006, however, indicates that new network capacity is fully consumed [and then some] by the increase in traffic.

If the proposed improvements were sufficient to handle all the projected traffic without any decline in service, the Delay Ratio would remain unchanged between all cases. If the Delay Ratio increases between cases, then the associated improvements were not sufficient to handle the projected traffic at the same level of service.

Shown below in Figure 5 and Figure 6 below are these indices for all Passenger trains. Figure 7and Figure 8 are the corresponding indices for UP freight service.

As we observed when considering the On-time Percentage for Passenger service, the Delay Ratio index for both 2015 and 2025 returns to at or near that observed in the Base case for 2006. The addition of the Camarillo-Goleta service in 2015 [case 2015\C] causes delays to increase, but the projected improvements in 2025 allow all Passenger Delay Ratios to return to the Base case level.

Figure 5 -- Delay Ratio – Passenger

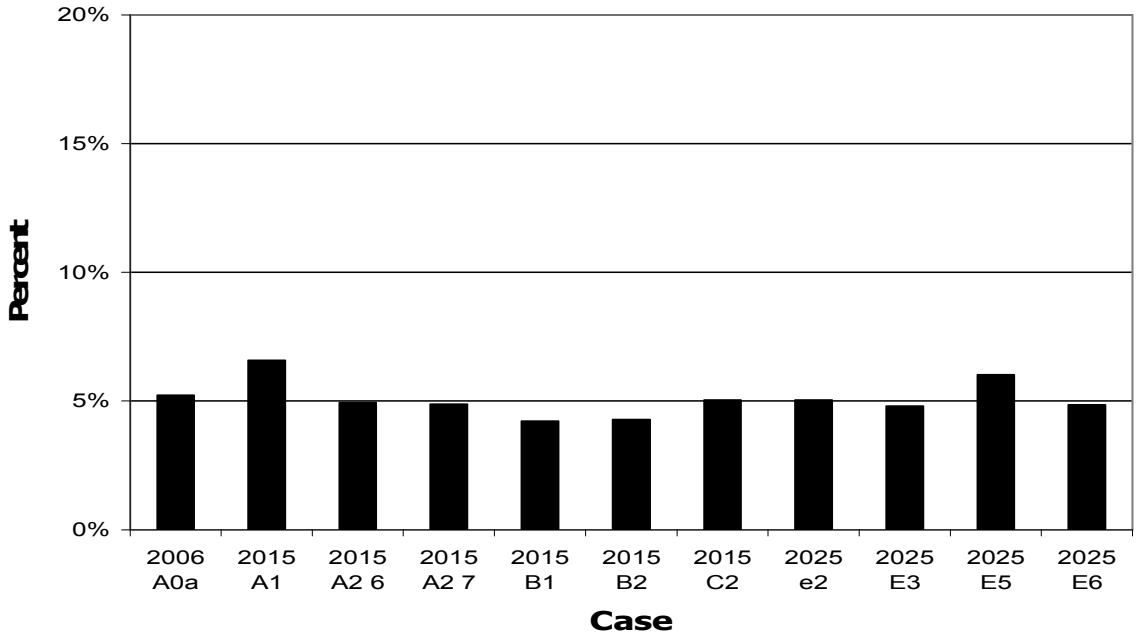
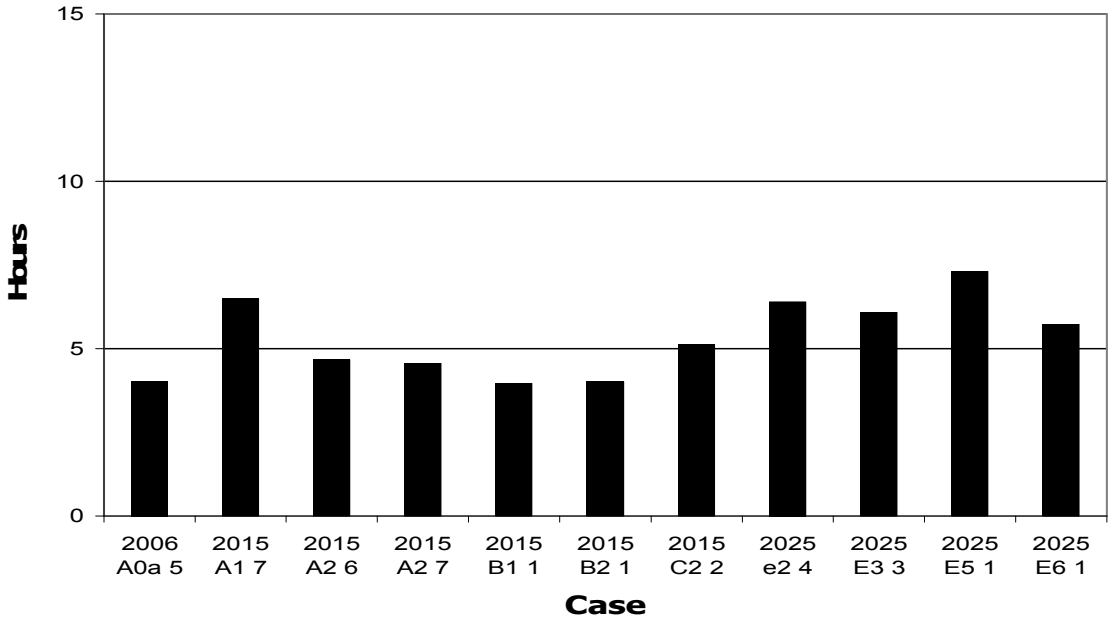


Figure 6 -- Delay Hours per Day – Passenger



Referring to Figure 7 and Figure 8 below, we see a similar pattern for UP freight service: the increase in trains in 2015 causes the UP freight Delay Ratio to increase. Projected 2015 improvements cause that index to return to the Base Case levels. The addition of Camarillo-Goleta service again adversely affects the index. The 2025 improvements mitigate the corresponding increase in traffic.

The 2025\E5 and \E6 cases were run to evaluate the impact of the improvements added for the proposed Camarillo-Goleta commuter trains. E5 deletes both the trains and the proposed improvements. E6 deletes only the trains. When the improvements are deleted, the Freight Delay Ratio increases from 12% to 17%, which is greater that the Base case Delay Ratio of 12%. The improvements identified for the commuter service are also needed to support the general increase of business for 2025.

When the 2025 improvements were developed, they were based on the existence in 2015 of a three-round-trip commuter schedule. The improvements designed for 2025 added a full second main track connecting Oxnard, Leesdale, and Camarillo. These improvements might also be considered for 2015, although they were not tested with that traffic level. They are definitely needed in 2025, whether or not the commuter trains are operated.

Note that while Delay Ratios are made whole by the proposed improvements, the Average Delay Hours per day continues to increase. That is completely due to the increase in train volumes.

Figure 7 -- Delay Ratio – Union Pacific Freight

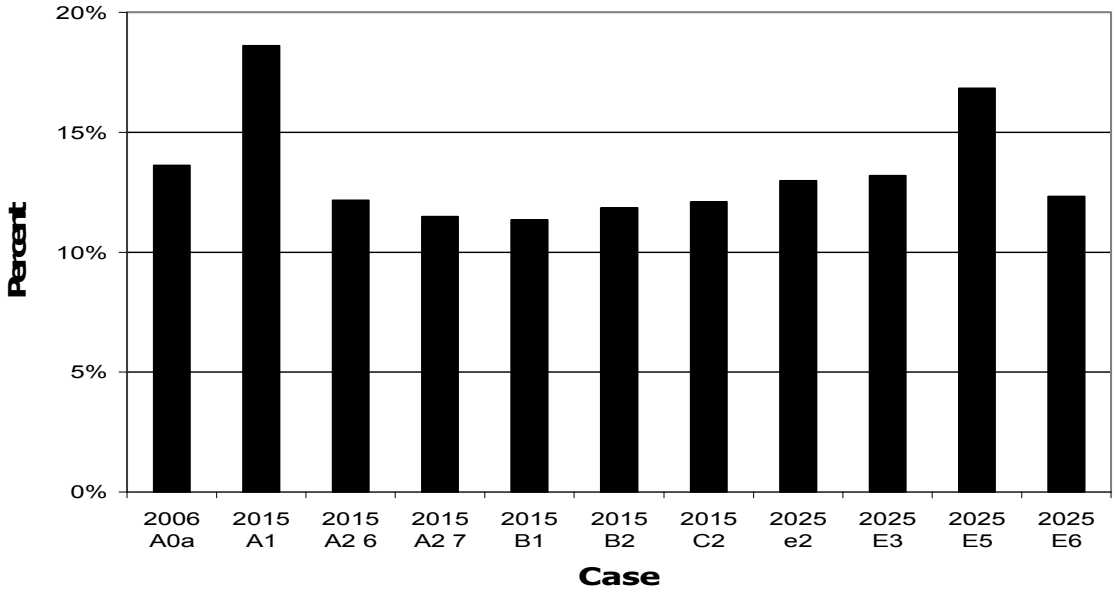
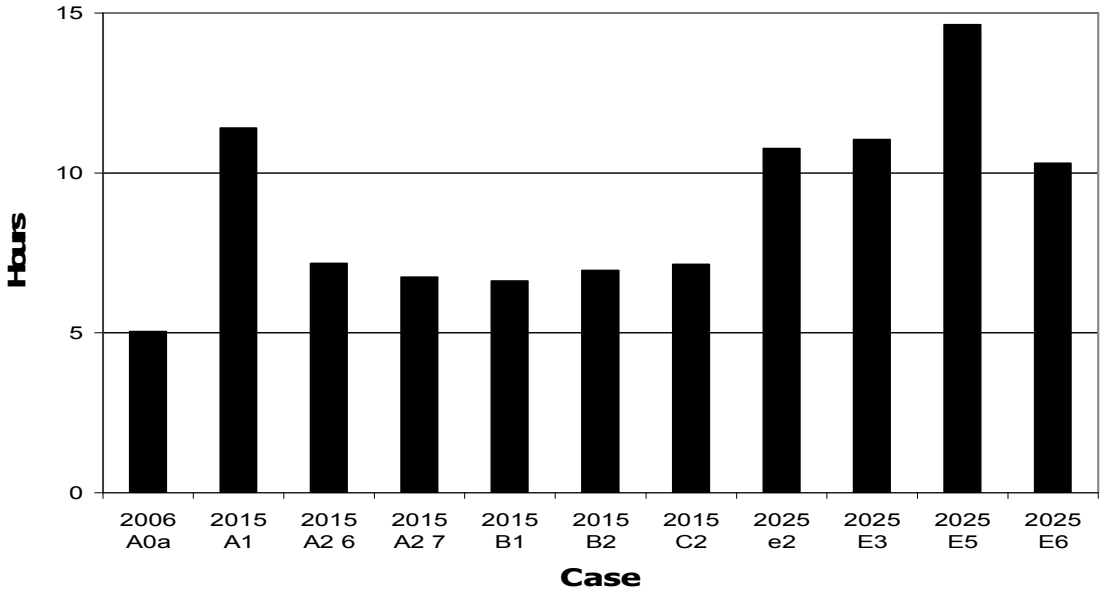


Figure 8 -- Delay Hours per Day – Union Pacific Freight



Choke points

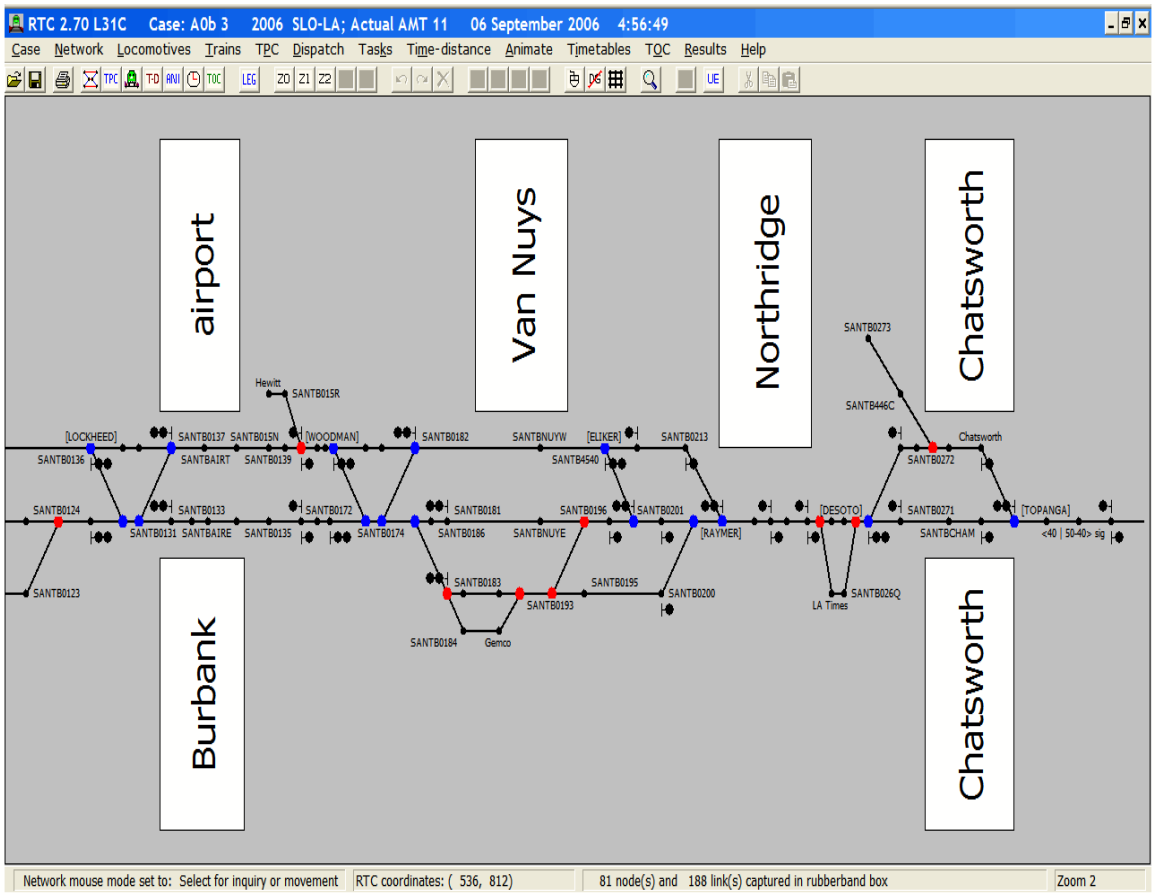
Burbank - Chatsworth

Figure 9 below is a schematic of the current network between Burbank and Chatsworth. At Van Nuys, the location of a platform only on the "southward" track means that there is a single-track railroad for passenger trains north of CP Woodman. While the two main tracks south of Woodman accommodates well the Burbank turns, we observe conflicts on the single track north of Woodman, even at today's traffic volume. Delays increase in the 2015 case.

The delays listed below in Table 7 – Delays on single-track choke points – All trains occur over the 7-day simulation period. Because of the 5-day nature of the Metrolink commute service, the delays are concentrated during the rush hours. And typically, at CP Eliker delays for northward trains are incurred by UP freight trains, as they are using the northward track.

Similarly, the single track between CP Raymer and CP Bernson [Chatsworth] causes delays to be incurred. With the present arrangement of platforms and crossovers, for Passenger trains stopping at Van Nuys, there is a single track railroad north of CP Woodman, with a "siding" between CP Eliker and CP *Raymer.* In the 2006 simulation, Metrolink on-time percentage was 94 %. By 2015, the OTP has declined to 87%, which may not be acceptable for a commute operation.

Figure 9 -- Burbank - Chatsworth



Ventura – Santa Barbara

The distance between Ventura and Santa Barbara is 26 miles. There is one siding Seacliff, 8.5 miles north of Ventura. There is no siding between Seacliff and Santa Barbara, a distance of 16.7 miles. Most sidings on the Coast are about 7 miles apart. Delays increase because of this greater distance. The LOSSAN North Strategic Corridor Plan considers additional sidings in this area.

Case 2015\A2 provides for the construction of a second Main Track between Van Nuys and Chatsworth, and sidings at Ortega and Carpinteria. Performance improves accordingly.

Case 2015\C1 adds the proposed three additional Camarillo-Goleta trains. As expected, delays between Ventura and Santa Barbara increase.

Case 2025\E2 adds the 2025 traffic, and these improvements: a siding at Rincon, a lengthened siding at Carpinteria [called “Sandyland”], and a second main track connecting Camarillo, Leesdale, and Oxnard. Passenger and Freight delay ratios are essentially the same as in the 2015 cases. Delay Hours per Day still increase, however, because of the additional trains. However, the on-time percentage of the four Camarillo-Goleta trains is a respectable 84%, a significant improvement over 2015's 67%.

The difference in OTP between DMU and conventional equipment appears to be caused by the different layover points and minor differences in dispatch conditions. Conventional equipment would lay over at an expanded Montalvo yard, and would travel the single-track Montalvo-Oxnard segment in both directions. DMU equipment would lay over in a yard on the Ventura County Railroad and would enter the main track at Oxnard. In the morning rush hour, there are greater opportunities for conflicts with Los Angeles-bound Metrolink trains also coming out of Montalvo.

Goleta – San Luis Obispo

In 2006, there is CTC only at Elwood [just north of Goleta] and Gaviota. The balance of the line, some 107 miles, has no power switches or controlled signal system. In 2015, we recommend certain siding extensions and “islands” of Centralized Traffic Control. By 2025, the traffic volume warrants an installation of full CTC between Elwood and San Luis Obispo. Note below that the improvements planned for 2015 make a significant reduction in delays on this line. Total delays increase in 2025, even with the improvements, due to the large increase in traffic. There aren’t any specific concentrations of delays at a station.

Table 7 – Delays on single-track choke points – All trains

Total delay over 7-day simulation

LINE	DELAY [h:mm]				
Case	2006	2015\A1	2015\A2	2015\C1	2025\E2
Van Nuys – Chatsworth	3:22	6:35	0:23	1:06	7:19
Ventura – Santa Barbara	7:23	18:25	7:38	11:23	18:40

Passenger running times

Proposed improvements for the LOSSAN North Corridor include curve re-alignment projects designed to increase the maximum speed for passenger trains. The simulation model was used to test the value of these improvements. All the curve re-alignments south of Goleta were installed in the network in the 2015\A2 7 case [and subsequent cases].

Shown below in Table 8 -- Passenger Train Running Times are the average running times of passenger trains over segments of the lines. No curve re-alignments were installed in the San Luis Obispo – Goleta segment.

Table 8 -- Passenger Train Running Times

`	2006	A0a 5	2015	A2 6	2015	A2 7	2025	E2 2
Conditions	Base case		current curves		fast curves; CTC islands		fast curves; full CTC	
Line	Hours	Min	Hours	Min	Hours	Min	Hours	Min
San Luis Obispo - Goleta	2	59	2	47	2	48	2	45
Goleta - Burbank Jct.	2	35	2	38	2	38	2	37
Burbank Jct. - Los Angeles Union Station	0	42	0	41	0	43	0	43
Total	6	16	6	7	6	9	6	5

South of Goleta, the speed increases allowed by the curve re-alignments have little impact on passenger train running times. By 2025, the extension of CTC is the most important means of maintaining running times, given the large increase in trains.

CHAPTER III - FINDINGS

Network Performance

As we said at the beginning of Chapter II, there is no single number or index that adequately captures railroad performance, and tells, at a glance, whether or not it is commercially and operationally acceptable. The *Average Delay Hours per day* tells us how much total delay is being experienced, and that's a useful measure of system congestion. It may also help measure things like environmental impacts from emissions. *Delay ratios* represent normalized delay – it's essentially a measure of how much delay any given train is likely to experience, or, if you will, the average delay per train.

2006 Base Case

One of the tools available to the analyst is "Animation", a mode of using RTC in which one can observe trains as they move across the network. Clock speeds can be varied from 1:1 to as high as 1200:1, which allows viewing of a week's movements in a short time.

Animation reveals certain "choke points" on the system that will likely become more troublesome in the future. Many of these have been identified in the LOSSAN North Corridor Draft Strategic Plan, so they likely won't come as a surprise. The modeling effort here will help determine the ability of suggested improvements to handle projected traffic growth.

At Van Nuys, the location of a platform only on the "southward" track means that there is a single-track railroad for passenger trains north of CP Woodman. While the two main tracks south of Woodman accommodates well the Burbank turns, we observe conflicts on the single track north of Woodman, even at today's traffic volume. A platform on the Northward track at Van Nuys would appear to help.

As passenger traffic increases, we'd expect the need will increase to connect CP Bernson and CP Raymer with a second main track.

One or more intermediate sidings between Santa Barbara and Ventura would likely improve performance.

2015 cases

For the 2015\A cases, projected train volumes were operated on the 2006 network, without any track improvements. As shown above in Table 6 -- Weekday scheduled trains, there was an increase in train service in all Train Groups between 2006 and 2015.

The schedule of all simulated revenue passenger trains is shown in Appendix 3 – Los Angeles – San Luis Obispo Passenger schedules – 2025. New trains in 2015 are shaded in yellow. Additional peak period directional trains were added, as were reverse commute trains on the Ventura line. And late evening trains were added on both lines. The intent was to make these two lines look more like the San Bernardino line, which has the most extensive service of any Metrolink route.

In general, as seen in the performance graphs in Chapter II, performance between San Luis Obispo and Los Angeles deteriorates, as we'd expect, given that daily train volume increases from 65 to 79, an increase of 21%. While most of the increase is Metrolink passenger trains, a daily increase from 13 to 16 UP freights can tax the capabilities of the line between Goleta and San Luis Obispo. Table 7 – Delays on single-track choke points – All trains quantifies the total delay on this portion.

The previously mentioned choke points [single platform at Van Nuys, single track between CP Raymer and CP Bernson, need for a siding between Ventura and Santa Barbara] are even more evident when the increased number of trains in 2015 are operated. Delays between Raymer and Bernson quadruple, and nearly double between Ventura and Santa Barbara. In the 2015\A2 case [proposed improvements] all these improvements are added.

The addition of two UP through freight round trips, and one additional Surfliner round trip between San Luis Obispo and Los Angeles points out the need for improvements north of Santa Barbara. Meets and passes take too long, and delays have increased with the additional trains.

Six cases were run with 2015 traffic volumes:

- 2015 traffic on the existing 2006 plant [the "Demand" case]
- 2015 traffic on a plant designed to maintain 2006 performance [the "Investment" case]
- 2015 traffic on a 2015 plant, plus improvements to curves south of Goleta, to permit faster train speeds
- 2015 traffic on a 2015 plant, with a new Leesdale siding, as described below.
- 2015 traffic, 2015 plant, Leesdale siding, and one platform at Oxnard.
- 2015 traffic, plus three rush hour round trips between Camarillo and Goleta

As might be expected, the traffic increase between 2006 and 2015, when run on the existing 2006 plant, resulted in a reduced performance level, as graphically displayed in Chapter II.

A series of improvements was installed on the 2006 network, striving to improve 2015 performance to the level of 2006. In general, these improvements are derived from the LOSSAN Draft Report.

Table 9 -- Proposed 2015 improvements

Sequence of addition	Improvement	Location
1	Leesdale siding; Camarillo pedestrian crossing	Leesdale; Camarillo
2	Platform on northward track	Van Nuys
3	6.3 miles new 2nd Main Track	CP Raymer - CP Bernson
4	New 9,240-ft. siding	Ortega
5	New 2,000-ft. siding	Carpinteria
6	5000-ft. Siding extension. Length now 10,000 ft.	Seacliff
7	11,000-ft. Siding extension and CTC. Length now 14,800 ft.	Waldorf
8	3600-ft. Siding extension and CTC. Length now 7,600 ft.	Guadalupe
9	CTC islands	Sidings Narlon, Honda, Concepcion
10	3,400-ft. Siding extension and CTC. Length now 8,500 ft.	Capitan
11	New south switch and CTC. Converts spur to siding.	Goleta depot
12	CTC	San Luis Obispo

In an attempt to determine whether any of the proposed 2015 improvements weren't necessary, they were installed in the sequence shown, and the simulation was run to evaluate them. But it required the full set of improvements listed above to bring freight Delay Ratio back to the 2006 Base case level, as shown in Table 4 -- Network performance.

We also studied the impact of curve re-alignment projects south of Goleta, which would allow operations of passenger trains at higher speeds. Curves with passenger speed restrictions of 50-55 mph were realigned to allow 80 mph passenger speeds. Delay ratios, running times, and On-Time Percentages did not change. See Table 8 -- Passenger Train Running Times above.

An additional 2015 case [2015\C] was run, which added the three Camarillo-Goleta commuter round trips. These trains operate on a 45-minute headway, and their inclusion was sufficient to cause Delay Ratios for both freight and passenger service to deteriorate. Even with a longer

siding at Seacliff, and a new siding at Ortega [between Ventura and Santa Barbara], the train volume and close rush-hour headways caused unacceptable delays to other trains. While not tested in the simulation, we might want to consider constructing the Sandyland and Rincon sidings, and Oxnard-Camarillo 2nd Main Track improvements for the 2015 traffic volume.

An additional case [2015\B1 1] was run, using the 2015 traffic volumes, to investigate the conversion of the storage track at Leesdale to a 10,000-foot controlled siding, This change is proposed to mitigate the creation of a pedestrian crossing at Camarillo, which would limit that siding's effective length to 6,500 feet for freight trains.

The current platform arrangement at Camarillo effectively means that only the main track platform can be used, as the trek between platforms to the siding platform requires a lengthy walk on an overhead crossing north of the 101 freeway. In 2015\B1, it was assumed that passengers could more easily get to either platform, and so train operations could be planned for southward trains to use the siding platform, and northward trains use the main track.

The Leesdale extension as a replacement for the full-length Camarillo siding satisfactorily preserves both Passenger train and UP Freight train performance levels.

Additionally, there had been some discussion in the January 2007 version of this report regarding the need for a second platform at Oxnard [see page 24]. The conclusion was made based on observations of train movements in dispatch animation.

A more thorough review was made, wherein a case [2015\B2 1] was run, specifically to evaluate this new Oxnard platform. As in the above Leesdale case, when two platforms were available, northward trains would use the siding, and southward trains the main track.

Delay ratios with or without the platform are very close. On Time Percentage improves slightly with the additional platform.

One observation from dispatch animation indicates that having the flexibility to use either track for either direction does lend some additional flexibility, but since there are directionally separate platforms, this flexibility comes at the cost of possibly having passengers change platforms as their train approaches. By 2025 the second platform at Oxnard is needed, and included in the 2025 suggested improvements.

2025 Cases

Five cases were planned with 2025 traffic volumes:

- 2025 traffic on the proposed 2015 plant [the "Demand" case]
- 2025 traffic on a plant designed to maintain 2006 performance [the "Investment" case], using conventional Metrolink equipment for the Camarillo-Goleta commute service.
- 2025 traffic with Diesel Multiple Unit [DMU] equipment for the Camarillo-Goleta commute service.
- 2025 traffic; no Camarillo-Goleta commuter trains; no "commuter train" improvements
- 2025 traffic; no Camarillo-Goleta commuter trains, but "commuter train" improvements retained.

There is a significant increase in passenger service on the line, as shown in Appendix 3 – Los Angeles – San Luis Obispo Passenger schedules – 2025. Trains planned for 2025 are shown in Light Blue. Trains shown in *italics* are projected additional schedules beyond those operated in 2006.)

The increases in 2025 traffic so overwhelmed the 2015 network that it was not possible to obtain a simulation that finished satisfactorily. So a set of improvements to the 2015 network was installed, as shown below:

Table 10 - Proposed 2025 improvements

Project number	Improvement	Location
V-07	3.4 mi. new 2nd Main Track	Moorpark to MP 423
V-08 and V-12	6.4 mi. new 2nd Main Track	Hasson to Simi Valley, and Simi Valley to Strathern
LA-04	Curve realignment to allow 55-mph passenger speed.	Burbank Jct.
LA-05	Run-through tracks	Los Angeles Union Station
SB-04	4,300-ft. siding extension and CTC. Length now 9,900 ft.	Tangair
SB-09	New 10,500-ft. siding	Sandyland
SB-10	New 4,750-ft. siding	Rincon
SLO-1	Full CTC	San Luis Obispo to Goleta
[V-14]	6.9 mi. new 2nd Main track	Oxnard to Camarillo
[V-15]	New crossover	West Camarillo
[V-15]	Conversion of siding turnouts into crossovers	North and South Leesdale
[LA-06]	Use of Budweiser lead for UP trains working. Will require additional construction.	Gemco [Van Nuys]

Note that the extension of the Leesdale siding in 2015 [or earlier], and its subsequent connection to Oxnard and Camarillo, removes the need for a second crossover at West Camarillo. Instead, trains crossing over would use the new crossover at S. Leesdale.

These improvements are all needed to restore freight and passenger performance to the Base Case levels.

The simulation revealed the need for three improvements not originally described in the LOSSAN Draft report; these are shown in [braces] above.

The full conversion of the San Luis Obispo – Goleta line to CTC is required to satisfactorily accommodate the 2025 traffic. This process would begin in 2015 with creation of “islands” of CTC, as identified in Table 9 -- Proposed 2015 improvements above, and would be completed by 2025. The daily scheduled train volume would be 16 trains [8 passenger; 8 freight, plus a UP “Guadalupe” local]. The high percentage of passenger service on the line is an important factor – the line would likely operate “OK” with less than the full CTC, but passenger train dependability would suffer. The investment in CTC would also likely convey additional line capacity beyond the 16 daily scheduled trains.

Camarillo-Goleta commuter service

The two additional sidings at Rincon and Sandyland are needed to accommodate the proposed Camarillo-Goleta service, which by 2025 will operate on a 30-minute headway.

The second Main Track between Oxnard and Camarillo similarly facilitates this service, which requires both a northward and a southward move between Montalvo or Oxnard, and Camarillo for every train, to position the equipment to and from its layover location. This improvement would also be required for either type of equipment, if it is stored overnight at Montalvo or Port Hueneme.

By 2025 there will be ten trains storing at Montalvo, which will require additional layover tracks and facilities for service. If DMU equipment is used, it would lay over at Port Hueneme on the Ventura County Railroad [VCR], and six Metrolink trains would lay over at Montalvo.

As noted earlier in Table 4 -- Network performance, there is a decline in performance of the network when the Camarillo-Goleta commuter trains are added, as seen when comparing the 2015\A2 and 2015\C1 cases. Passenger delay ratios increase from 5% to 7%. Total delays between Ventura and Santa Barbara also increase, as shown in Table 7 – Delays on single-track choke points – All trains.

A comparison was made under the 2025 traffic and track improvement scenario, to determine if there were any significant operating differences between conventional Metrolink and Diesel Multiple Unit [DMU] equipment. As in previous case analyses, network results are shown in Table 4, above.

The differences between these two types of equipment are insignificant. There is no difference in Delay Ratio indices or Average Speed [40 mph for both]. The On Tine Percentage is higher for DMU [98% vs. 84%], but this appears to be caused mainly by the different layover locations, which require the Metrolink equipment movement to and from Montalvo to traverse a busy single-track segment. It isn't a difference caused by the type of equipment.

While not tested in the simulation, we might want to consider constructing the Sandyland and Rincon sidings, and Oxnard-Camarillo 2nd Main Track improvements for the 2015 traffic volume.

Two additional cases [2025\E5 and \E6] were run to evaluate the impact of the improvements added for the proposed Camarillo-Goleta commuter trains. E5 deletes both the trains and the proposed improvements. E6 deletes only the trains.

The “commuter train” improvements include

- Lengthening the siding at Carpinteria to 10,000 feet [it is now named “Sandyland”]
- Construction of a 4,750-foot siding at Rincon
- Connecting Camarillo, Leesdale, and Oxnard with a second main track.
- Substitution of the second crossover at West Camarillo by the crossovers at North and South Leesdale, created by the connecting second main track.

When the improvements are deleted, the Freight Delay Ratio increases from 12% to 17%, which is greater that the Base case Delay Ratio of 12%. The improvements identified for the commuter service are also needed to support the general increase of business for 2025.

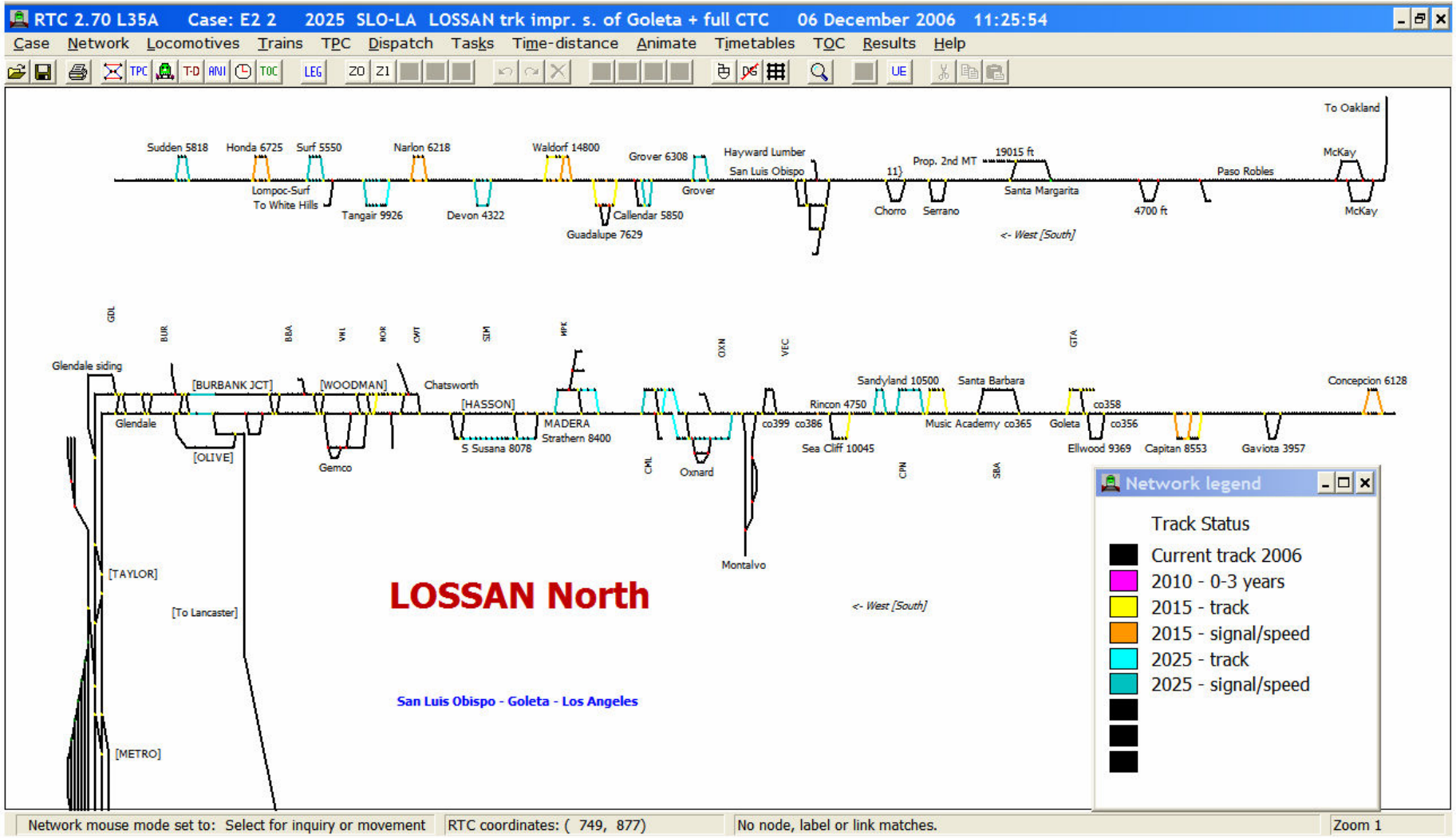
When the 2025 improvements were developed, they were based on the existence in 2015 of a three-round-trip commuter schedule. The improvements designed for 2025 added a full second main track connecting Oxnard, Leesdale, and Camarillo. They are definitely needed in 2025, whether or not the commuter trains are operated.

APPENDICES

Appendix 1 -- Simulation Network Schematics

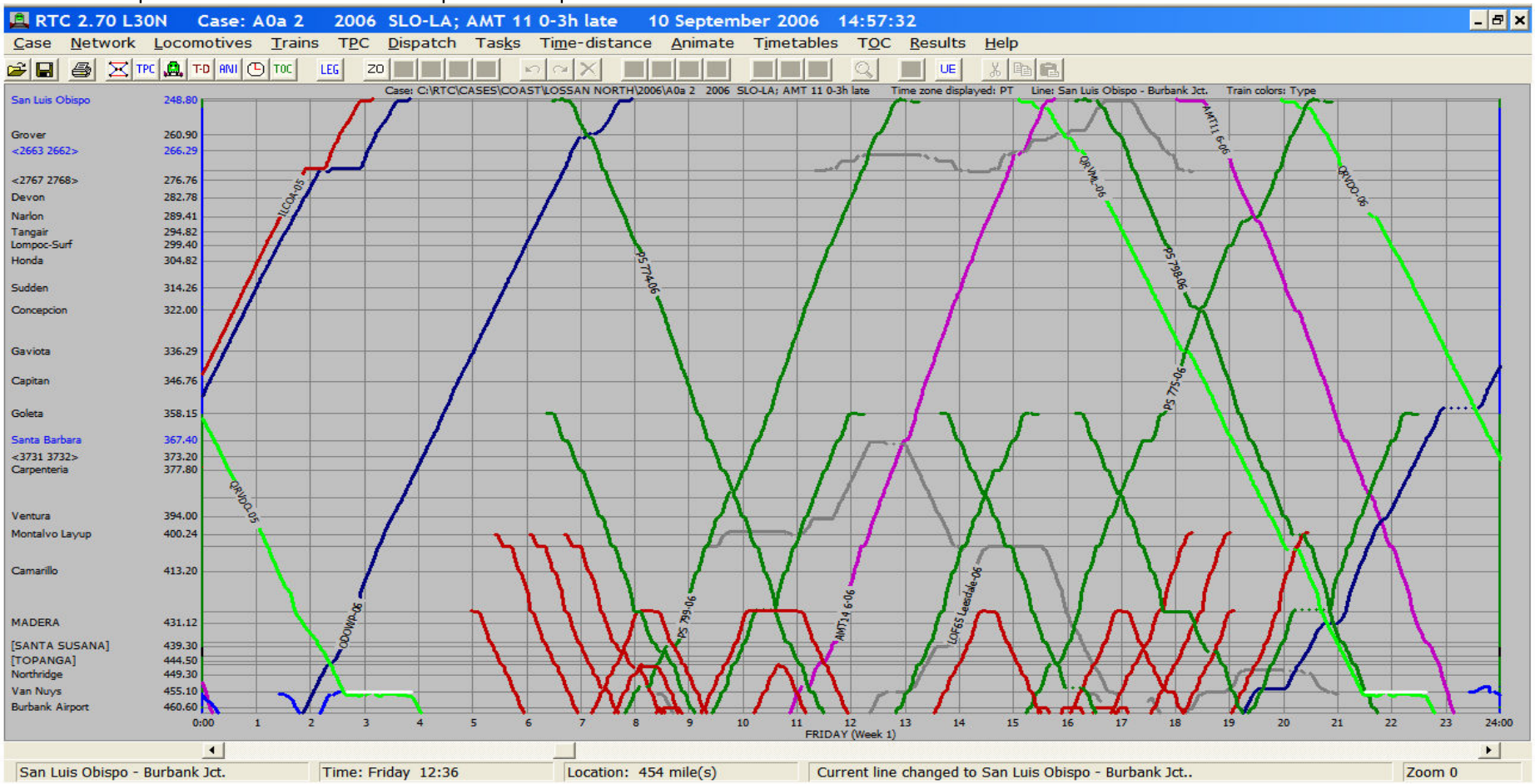
2006 to 2025

2025

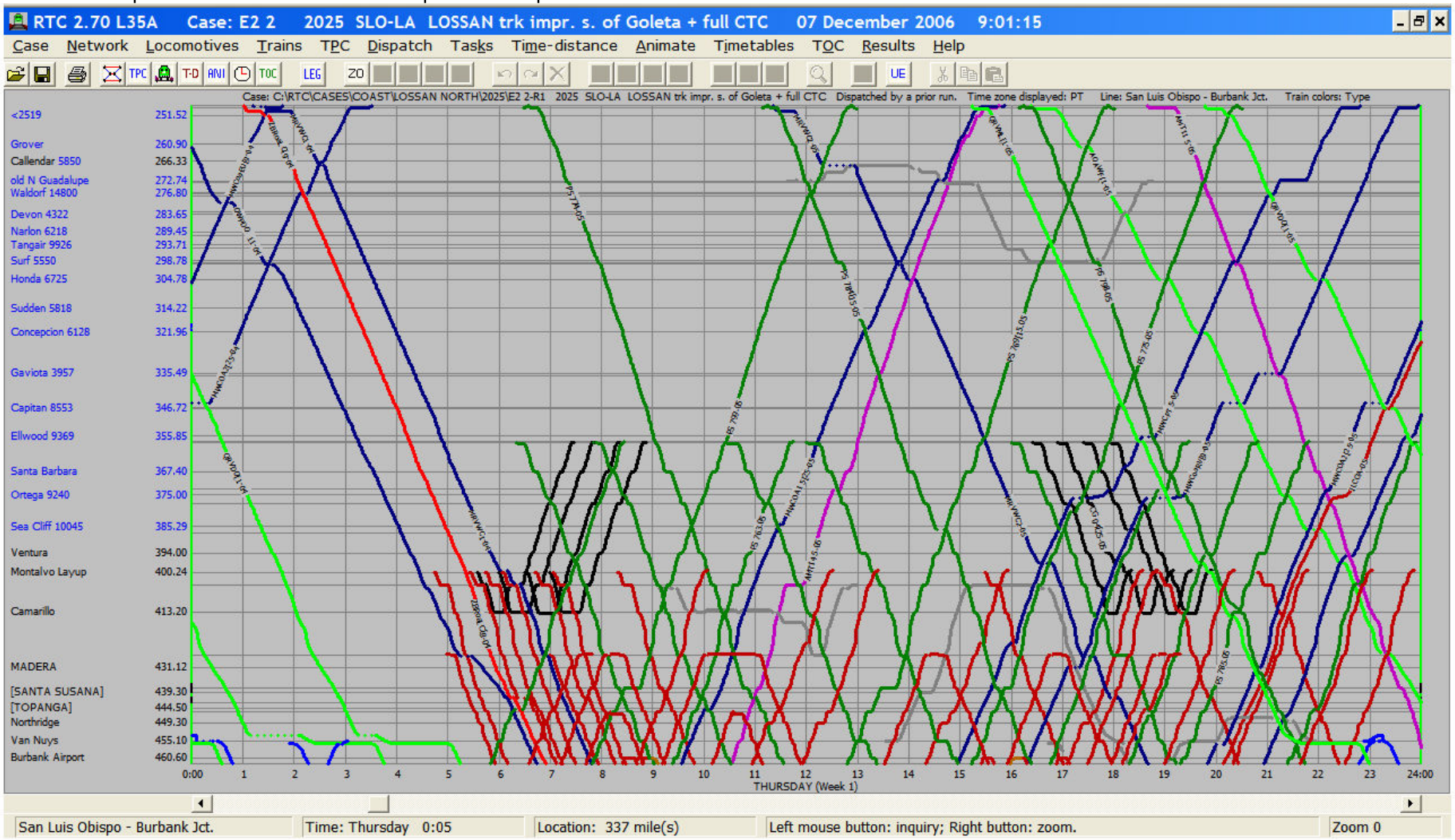

RTC 2.70 L35A Case: E2 2 2025 SLO-LA LOSSAN trk impr. s. of Goleta + full CTC 06 December 2006 11:25:54
Case Network Locomotives Trains TPC Dispatch Tasks Time-distance Animate Timetables TOC Results Help
To Oakland
Sudden 5818
Honda 6725
Surf 5550
Narlon 6218
Waldorf 14800
Grover 6308
Hayward Lumber
San Luis Obispo
Prop. 2nd MT
19015 ft
McKay
Paso Robles
Lompoc-Surf
To White Hills
Tangair 9926
Devon 4322
Guadalupe 7629
Callendar 5850
Grover
Chorro
Serrano
Santa Margarita
4700 ft
McKay
<- West [South]
GDL
BUR
BBA
VNL
MOR
CWT
SIM
MPK
OXN
VEC
GTA
Glendale siding
[BURBANK JCT]
[WOODMAN]
Chatsworth
[HASSON]
Sandyland 10500
Santa Barbara
Concepcion 6128
Rincon 4750
co358
Glendale
MADERA
Strathern 8400
co399
co386
Music Academy
co365
Goleta
co356
[OLIVE]
Gemco
S Susana 8078
Sea Cliff 10045
Ellwood 9369
Capitan 8553
Gaviota 3957
CML
Oxnard
CPN
SBA
Montalvo
[TAYLOR]
[To Lancaster]
LOSSAN North
<- West [South]
San Luis Obispo - Goleta - Los Angeles
[METRO]
Network legend
Track Status
Current track 2006
2010 - 0-3 years
2015 - track
2015 - signal/speed
2025 - track
2025 - signal/speed
Network mouse mode set to: Select for inquiry or movement
RTC coordinates: (749, 877)
No node, label or link matches.
Zoom 1

Appendix 2 – Sample Stringline diagrams

San Luis Obispo-Burbank Jct. – 2006 – sample 24-hour period



San Luis Obispo-Burbank Jct. – 2025 – sample 24-hour period



Appendix 3 – Los Angeles – San Luis Obispo Passenger schedules – 2025

In the schedules shown below, trains shown in *italics* are projected additional schedules beyond those operated in 2006. Trains planned for 2025 are shown in Light Blue

Train Number	200	100	100/2	200/3	900	202	102	202/2	102/2	204	104	204/2	104/2	206	106	206/2	106/2	208	902	108	768	110	210	110/2	772	212	112	212/2		Train Number
Sign	Lancaster	Moorpark	Montalvo	Lancaster	Burbank	Lancaster	Montalvo	Lancaster	Montalvo	Lancaster	Montalvo	Lancaster	Moorpark	Lancaster	Montalvo	Lancaster	Montalvo	Lancaster	BBA	Chatsworth	Goleta	Moorpark	Princessa	Montalvo	Goleta	Lancaster	Chatsworth	Lancaster		Sign
Frequency	XSS	XSS	XSS	XSS	XSS	XSS	XSS		XSS		XSS	XSS	XSS	XSS	XSS	XSS	XSS	XSS	XSS	XSS	Daily	XSS	XSS	XSS	Daily	XSS	XSS	XSS		Frequency
STATIONS																														**STATIONS**
															am		am							am		am	am			
San Luis Obispo																														San Luis Obispo
Grover																														Grover
Guadalupe																														Guadalupe
Surf																					am				am					Surf
Goleta																					6.30				8.00					Goleta
Santa Barbara																					6.45				8.15					Santa Barbara
Carpenteria																					7.01				8.31					Carpenteria
Ventura			am				am		am		am										7.22			am	8.52					Ventura
Montalvo			4.45				5.27		5.45		6.05				6.44		7.04				am			8.20						Montalvo
Oxnard			5.00				5.42		6.00		6.20				6.59		7.19				7.37			8.37	9.07					Oxnard
Camarillo		am	5.12				5.52		6.10		6.30		am		7.09		7.29				7.47	am		8.47	9.17					Camarillo
Moorpark		5.07	5.23				6.03		6.21		6.41		7.00		7.20		7.40				8.06	8.26		9.06	9.36					Moorpark
Simi Valley		5.19	5.35				6.15		6.33		6.53		7.12		7.32		7.52				8.20	8.39		9.20	9.50					Simi Valley
Chatsworth		5.30	5.46				6.26		6.44		7.04		7.23		7.43		8.03			8.25	8.35	8.51		9.35	10.05		10.45			Chatsworth
Northridge		5.36	5.52				6.32		6.50		7.10		7.29		7.49		8.09			8.31	8.41	8.58		9.42	10.12		10.51			Northridge
Van Nuys	am	5.44	6.00	am		am	6.40	am	6.58	am	7.18	am	7.37	am	7.57	am	8.17	am		8.39	8.50	9.05	am	9.50	10.20	am	10.59	am		Van Nuys
Sun Valley	5.25			6.05		6.35		6.50		7.17		7.35		7.48		8.00		8.20	am				9.20			10.21		11.21		Sun Valley
Burbank Airport		5.51	6.07		am		6.47		7.05		7.25		7.44		8.04		8.24		8.35	8.46	8.59	9.13		9.59	10.29		11.06			Burbank Airport
Downtown Burbank	5.31	5.55	6.11	6.11	6.16	6.41	6.51	6.56	7.10	7.23	7.30	7.41	7.49	7.54	8.08	8.07	8.28	8.26	8.39	8.50	9.03	9.17	9.26	10.04	10.34	10.27	11.10	11.27		Downtown Burbank
Glendale	5.37	6.01	6.17	6.17	6.22	6.47	6.57	7.02	7.16	7.29	7.36	7.47	7.55	8.00	8.14	8.15	8.34	8.32	8.45	8.56	9.10	9.23	9.32	10.06	10.36	10.33	11.16	11.33		Glendale
Los Angeles (LAUPT)	5.53	6.15	6.30	6.33	6.35	7.03	7.12	7.18	7.30	7.45	7.50	8.03	8.09	8.16	8.28	8.30	8.46	8.48	9.00	9.10	9.25	9.37	9.50	10.10	10.48	10.49	11.30	11.49		Los Angeles (LAUPT)
	am	am	am	am	am	am	am	am	am	am	am	am	am	am	am	am	am	am	am	am	am	am	am	am	am	am	am	am		
Equipment	201	101	cmf	w/ 200/2	103	203	cmf	cmf		cmf	905	cmf	cmf	105	cmf		cmf	205	107	306	SDG	cmf	cmf	cmf	SDG	cmf				*Equipment*

Train Number	774	114	214	778		214/2	216	782	116	904	218	906	784	116/2	908	218/2	220	118	220/2	792	02	04	06	08	222	122	222/2	11	798	226	124	Train Number
Sign	SLO	Moorpark	Lancaster	Goleta		Lancaster	Lancaster	Goleta	Moorpark	BBA	Princessa	BBA	SLO	Montalvo	BBA	Lancaster	S. Clarita	Moorpark	Lancaster	SLO	Camarillo	Camarillo	Camarillo	Camarillo	Lancaster	Moorpark	Lancaster	Seattle	SLO	Lancaster	Montalvo	Sign
Frequency	Daily	XSS	XSS	XSS		XSS	XSS	Daily	XSS	XSS	XSS	XSS	Daily	XSS	XSS	XSS	XSS	XSS	XSS	Daily	XSS	XSS	XSS	XSS	XSS	XSS	XSS	Daily	Daily	XSS		Frequency
STATIONS																																**STATIONS**
	am												am							pm								pm	pm			
San Luis Obispo	6.45												11.25							2.10								3.20	4.25			San Luis Obispo
Grover	7.05												11.45							2.30									4.45			Grover
Guadalupe	7.21												12.01							2.45									5.01			Guadalupe
Surf	7.55			am				pm					12.42							3.25	pm	pm	pm	pm					5.42			Surf
Goleta	9.03			10.40				12.15					1.50							4.15	4.35	5.05	5.35	6.05					6.50			Goleta
Santa Barbara	9.21			10.54				12.29					2.05							4.29	4.48	5.18	5.48	6.18				6.17	7.05			Santa Barbara
Carpenteria	9.37			11.10				12.45					2.21							4.45	5.04	5.34	6.04	6.34					7.21			Carpenteria
Ventura	9.58			11.35				1.10					2.42	pm						5.06	5.26	5.56	6.26	6.56		pm			7.42		pm	Ventura
Montalvo														3.30						pm						6.50					8.45	Montalvo
Oxnard	10.12			11.52				1.27					2.57	3.45						5.20	5.40	6.10	6.40	7.10		7.05		7.06	7.56		9.00	Oxnard
Camarillo	10.23	am		12.03				1.38	pm				3.08	3.55				pm		5.29	5.49	6.19	6.49	7.19		7.15			8.07		9.29	Camarillo
Moorpark		11.05		12.16				1.51	2.30				3.21	4.08				4.57		6.15	pm	pm	pm	pm		7.30					9.46	Moorpark
Simi Valley	10.51	11.17		12.31				2.06	2.42				3.36	4.20				5.09		6.29						7.42		7.38	8.35		10.00	Simi Valley
Chatsworth	11.03	11.28		12.44				2.19	2.53				3.49	4.31				5.24		6.44						7.53			8.47		10.15	Chatsworth
Northridge		11.34		1.21					2.59					4.37				5.03								7.59					10.21	Northridge
Van Nuys	11.18	11.42	pm	1.10		pm	pm	2.45	3.07		pm		4.15	4.45		pm	pm	5.48	pm	6.57					pm	8.07	pm	8.05	9.04	pm	10.30	Van Nuys
Sun Valley			12.53			1.53	3.05		3.14	pm	3.50	pm			pm	4.55	5.42		6.30						7.30		8.26			9.36		Sun Valley
Burbank Airport	11.27	11.49		1.20				2.55		3.37		4.15	4.25	4.52	5.05			5.55		7.06						8.14			9.13		10.40	Burbank Airport
Downtown Burbank		11.53	12.58			1.58	3.11		3.18	3.41	3.55	4.19		4.56	5.10	5.01	5.48	5.59	6.39						7.39	8.18	8.32			9.42	10.45	Downtown Burbank
Glendale	11.39	11.58	1.04	1.32		2.04	3.17	3.07	3.24	3.47	4.01	4.25	4.37	5.01	5.15	5.07	5.54	6.05	6.45	7.18					7.45	8.24	8.38		9.25	9.48	10.55	Glendale
Los Angeles (LAUPT)	12.10	12.20	1.20	1.50		2.20	3.33	3.25	3.40	4.00	4.19	4.40	4.55	5.20	5.30	5.23	6.10	6.20	7.00	7.40					8.00	8.40	8.50	9.00	9.45	10.00	11.10	Los Angeles (LAUPT)
	pm	pm	pm	pm		pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm					pm	pm	pm	pm	pm	pm	pm	
Equipment	SDG	cmf	50	SDG		105	217	SDG	113	316	215	115	SDG	cmf	324	[o/b trn]	219	119	cmf	SDG					223	123	223	yd	yd	cmf	cmf	*Equipment*

Train Number	901	01	099	03	761	05	201	07	101	103	799	203	905	103/2	203/2	907	105	763	205	107	14	205/2	107/2	107/3	207	769	207/2	109	209	109/2	209/2	Train Number
sign	Burbank	Goleta	Moorpark	Goleta	Goleta	Goleta	Lancaster	Goleta	Moorpark	Chatsworth	SLO	Princessa	BBA	Montalvo	Lancaster	BBA	Moorpark	Goleta	Lancaster	Chatsworth	Seattle	Lancaster	Montalvo	Montalvo	Lancaster	Goleta	Lancaster	Moorpark	Princessa	Montalvo	Princessa	sign
Frequency	XSS	XSS	XSS	XSS	Daily	XSS	XSS	XSS	XSS	XSS	Daily	XSS	XSS	XSS	XSS	XSS	XSS	Daily	XSS	XSS	Daily	XSS	XSS	XSS	XSS	Daily	XSS	XSS	XSS	XSS	XSS	Frequency
STATIONS																																**STATIONS**
Equipment	cmf		cmf		cmf		200		100	900	yd	202	104			405	206	SDG	206	902	yd	i/b			cmf	SDG	i/b	cmf	109		i/b	*Equipment*
	am		am		am		am		am	am	am	am	am		am	am	am	am	am	am	am	am	am	am	am	pm	pm	pm	pm	pm	pm	
Los Angeles (LAUPT)	5.48		6.15		5.45		6.35		6.50	7.15	7.30	7.37	8.00	8.15	8.20	8.25	8.50	9.05	9.20	9.50	10.15	10.30	10.35	11.35	11.40	12.30	12.45	1.10	1.50	2.00	2.45	Los Angeles (LAUPT)
Glendale	5.58		6.25		5.55		6.45		7.00	7.25	7.41	7.47	8.10	8.25	8.30	8.35	9.01	9.16	9.30	10.00		10.40	10.45	11.45	11.50	12.42	12.55	1.20	2.00	2.10	2.55	Glendale
Downtown Burbank	6.05		6.31		6.01		6.51		7.06	7.31	7.47	7.53	8.15	8.31	8.36	8.41	9.07		9.36	10.06		10.46	10.51	11.51	11.56		1.00	1.26	2.06	2.16	3.01	Downtown Burbank
Burbank Airport	am		6.35		6.05				7.10	7.35	7.52		8.25	8.35		8.50	9.12	9.28		10.11			10.55	11.55		12.54		1.30		2.20		Burbank Airport
Sun Valley							6.57				7.59	7.59	am		8.42	am			9.42			10.52			12.02		1.07		2.12		3.07	Sun Valley
Van Nuys			6.47		6.17		am		7.22	7.42	8.01	am		8.42	am		9.21	9.37	am	10.19	10.47	am	11.02	12.02	pm	1.03	pm	1.37	pm	2.27	pm	Van Nuys
Northridge			6.55		6.25				7.30	8.00	8.09			9.00			9.28			10.26			11.20	12.20				1.44		2.45		Northridge
Chatsworth			7.01		6.31				7.51	8.08	8.16			9.05			9.35	9.50		10.36			11.28	12.28		1.16		1.50		2.53		Chatsworth
Simi Valley			7.16		6.46				8.05	am	8.45			s			9.47	10.02		am	11.23		s	s		1.28		2.01		s		Simi Valley
Moorpark		am	7.30	am	6.59	am		am	am		8.57			s			10.02						s	s		1.42		2.20		s		Moorpark
Camarillo		6.05	am	6.35	7.05	7.35		8.05			9.08			s			am	10.26					s	s		1.54		pm		s		Camarillo
Oxnard		6.16		6.46	7.16	7.46		8.16			9.20			s				10.40			11.55		s	s		2.06				s		Oxnard
Montalvo														am									am	am	pm					pm		Montalvo
Ventura		6.30		7.00	7.30	8.00		8.30			9.34							10.54								2.19						Ventura
Carpenteria		6.52		7.22	7.52	8.22		8.52			9.54							11.14								2.45						Carpenteria
Santa Barbara		7.08		7.33	8.03	8.38		9.03			10.11							11.13			12.48					3.04						Santa Barbara
Goleta		7.19		7.43	8.13	8.49		9.13			10.22							11.45								3.20						Goleta
Surf		am		am	am	am		am			11.27							am								4.27						Surf
Guadalupe											12.02															5.02						Guadalupe
Grover											12.15															5.15						Grover
San Luis Obispo											12.45										3.30					5.45						San Luis Obispo

Train Number	775	909	111	211	213	779	911	213/2	113/2	215	115		215/2	115/2	215/3	217	117	783	217/2	219	119	785	219/2	221	119/2	223	123	225	125				Train Number
sign	SLO	BBA	Moorpark	Lancaster	S. Clarita	Goleta	BBA	Lancaster	Montalvo	Lancaster	Montalvo		Lancaster	Moorpark	Lancaster	Lancaster	Moorpark	Goleta	Lancaster	Lancaster	Montalvo	Goleta	Lancaster	Lancaster	Montalvo	Lancaster	Montalvo	Lancaster	Montalvo				sign
Frequency	Daily	XSS	XSS	XSS	XSS	Daily	XSS	XSS	XSS	XSS	XSS		XSS	XSS	XSS	XSS	XSS	XSS	XSS	XSS	XSS	Daily	XSS	XSS	XSS	XSS	XSS	XSS	XSS				Frequency
						[ML 113]																											
STATIONS																																	**STATIONS**
Equipment	SDG	cmf	cmf	cmf	cmf	SDG				214	906		cmf	cmf	cmf	216	910	SDG	cmf	118	118	SDG		cmf		222	122						*Equipment*
	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm		pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm				
Los Angeles (LAUPT)	2.55	3.05	3.35	3.45	4.10	4.26	4.33	4.40	4.45	5.00	5.10		5.20	5.25	5.30	5.40	5.47	5.58	6.00	6.30	6.40	7.00	7.05	7.35	8.00	9.00	9.10	10.00	10.10				Los Angeles (LAUPT)
Glendale	3.07	3.15	3.45	3.55	4.20	4.36	4.43	4.50	s	5.10	5.20		5.30	5.35	5.40	5.50	5.57	6.08	6.10	6.40	6.50	7.12	7.17	7.45	8.10	9.10	9.20	10.10	10.20				Glendale
Downtown Burbank		3.21	3.51	4.01	4.26	4.42	4.49	4.56	s	5.16	5.26		5.36	5.41	5.46	5.56	6.03	6.14	6.16	6.46	6.56	7.16	7.23	7.51	8.16	9.16	9.26	10.16	10.26				Downtown Burbank
Burbank Airport	3.19	3.27	3.55			4.46	4.57		s		5.30			5.45			6.08	6.18			7.00	7.24			8.20		9.30		10.30				Burbank Airport
Sun Valley		pm		4.07	4.32		pm	5.02		5.22			5.42		5.52	6.02			6.22	6.52			7.30	7.57		9.22		10.22					Sun Valley
Van Nuys	3.28		4.02	pm	pm	4.53		pm	s	pm	5.37		pm	5.52	pm	pm	6.17	6.25	pm	pm	7.07	7.33	pm	pm	8.27	pm	9.37	pm	10.37				Van Nuys
Northridge			4.09			5.01			s		5.45			6.00			6.24	6.33			7.15				8.35		9.45		10.45				Northridge
Chatsworth	3.41		4.18			5.07			s		5.51			6.06			6.30	6.39			7.21	7.46			8.41		9.51		10.51				Chatsworth
Simi Valley	3.59		4.28			5.18			s		6.02			6.17			6.41	6.50			7.32	7.58			8.52		10.02		11.02				Simi Valley
Moorpark			4.45			5.30			s		6.14			6.29			6.57	7.02			7.44				9.04		10.14		11.14				Moorpark
Camarillo	4.21		pm			5.43			s		6.27			s			pm	7.15			7.55	8.27			9.15		10.30		11.30				Camarillo
Oxnard	4.35					5.55			s		6.39			s				7.27			8.14	8.38			9.34		10.50		11.50				Oxnard
Montalvo									pm		6.55			s							8.35	pm			9.55		11.05		12.05				Montalvo
Ventura	4.49	pm		pm		6.10		pm		pm				pm				s		pm					pm		pm		am				Ventura
Carpenteria	5.10					6.30												s															Carpenteria
Santa Barbara	5.33					6.55												s															Santa Barbara
Goleta	5.47					7.10												s															Goleta
Surf	7.02					pm												pm															Surf
Guadalupe	7.39																																Guadalupe
Grover	7.55																																Grover
San Luis Obispo	8.30																																San Luis Obispo
	pm																																

Appendix 4 – RTC Measurements

RTC Statistical Output

RTC output provides a variety of operating statistics that are useful for evaluating the overall impact of changes to an operating plan and/or changes to the track infrastructure.

Each metric is available at the several levels of aggregation:
System level
Train group (Passenger, Expedited, Manifest freight)
Train type (Manifest, Intermodal, Local, Coal, etc.)
Individual train level

With the exception of true delay, all metrics are also available by corridor and subdivision.

RTC Measurements

Ideal minimum run time. This is the minimum amount of time that it would take for a train to go from origin to destination assuming that all switches and signals are lined favorably.

Simulated run time. This is the time it takes for a train to get from origin to destination with other traffic present. It accounts for conflict resolution, switch delay, acceleration and deceleration.

Minimum dwell time. Minimum dwell is the minimum amount of time that a train stops at a point for planned work: switching an industry, or entraining or detraining passengers at a depot. It is user specified for each train at en route locations.

Time waiting on schedule. This is the time spent waiting for a scheduled departure time. It is distinguished from minimum dwell as well as meet-pass delay. For example, suppose that a train arrives at an intermediate location at 1:50, but the minimum dwell time is 5 minutes and the protected departure time is 2:00. The train would be available for departure at 1:55, but it must wait on schedule an additional 5 minutes. Generally applicable only to passenger trains, as they don't want to leave a depot early.

Switch delay. This is the time associated with lining a switch that requires manual intervention, pulling a train forward to clear the switch, and then holding while a crewman walks back to the locomotive.

Stop delay. This is the amount of time a train spends at speed 0 waiting for conflicts to be resolved. It does not include acceleration and deceleration time.

True delay. This is the difference in time between the simulated run time and the ideal run time. It encompasses stop delay as well as time spent accelerating and decelerating.

Origin hold time. This is the time that a train is held at its origin location for traffic to clear so that a slot becomes available. It is distinguished from en route hold delay because a train experiencing origin hold may or may not be crewed, and therefore the statistics might be counted differently.

Entry delay time. This is the time that a train is held out of the network at its origin location for traffic to clear so that an initial slot becomes available. It is distinguished from origin-hold delay because a train experiencing entry hold cannot find an available initial track.

This category of delay also reflects situations where traffic levels are so high that RTC cannot accept a train into the network at the requested departure time. This is analogous to a dispatcher not accepting a train onto his territory due to congestion. In this case, the congestion need not be at the train's origin.

Average speed without dwell. This speed gives an indication of average speed when a train is actually en route and hopefully moving.

Average speed with dwell. This speed give an indication of how fast the actual trains are moving through a network. It includes management specified dwell time to perform work.

Meet-pass delay percentage. Loosely speaking, this is the percentage of time that a train experiences delay while it is en route. It excludes management mandated stop time for dwells and waiting on departure times. Stated another way, it is the percent of time that a train is delayed en route for meets and passes. The formula is:

MP delay % = 100 * True delay / (Total elapsed - Total dwell - Wait on schedule – En route delay)

Delay minutes per 100 Train-Miles. This is an older measurement dating back to the days of 100-mile crew districts. It is the minutes of delay incurred in a 'basic day' for a crew (nominally eight hours). It is meaningful on simple linear networks that do not have a lot of terminal details. It is meaningless in complex terminal areas such as Chicago.

Fuel consumption. This includes fuel burned while idling at meet-pass hold locations. Since RTC has a built in Train Performance Calculator, it also accounts for acceleration and deceleration after holds.

Appendix 5 – Railroad Definitions

Absolute Block
A length of track that no train is permitted to enter while the track is occupied by another train.

Absolute Signal
A block or interlocking signal without a number plate, or designated by an A marker.

Articulated
Permanently connected multiple unit cars that share a common truck.

Automatic Block Signal System (ABS)
A series of consecutive blocks governed by block signals, cab signals, or both. The signals are activated by a train or by certain conditions that affect the block use.

Automatic Cab Signal System (ACS)
A system that allows cab signals and the cab warning whistle to operate automatically.

Automatic Train Control (ATC)
A system to enforce compliance with cab and wayside signal indications. If the train exceeds a predetermined speed for a given signal indication and speed is not reduced at a sufficient rate, brakes are automatically applied.

Automatic Train Stop System (ATS)
A system activated by wayside inductors positioned to apply the brakes automatically until the train stops.

Block
A length of track:
Between consecutive block signals
Between a block signal and the end of block system limits
or In ATC limits, the use of which is governed by cab signals and/or block signals.

Block Signal
A fixed signal at the entrance of a block that governs trains entering and using that block.

Block System
A block or series of consecutive blocks within ABS, ACS, CTC, or interlocking limits.

Cars
Railroad cars.

Centralized Traffic Control (CTC)
A block system that uses block signal indications to authorize train movements.

Conductor
Employee in charge of train or yard movement.

Control Operator
Employee assigned to operate a CTC or interlocking control machine or authorized to grant track permits.

Control Point
The location of absolute signals controlled by a control operator.

Controlled Siding
A siding within CTC or interlocking limits where a signal indication authorizes the siding's use.

Controlled Signal
An absolute signal controlled by a control operator.

Crew Member
Conductors, assistant conductors, brakemen, engineers, remote control operators, yard engine foremen, switchmen, and yard helpers.

Crossings at Grade
Crossings that intersect at the same level.

Crossover
A combination of two switches that connect two adjacent tracks.

CTC
See Centralized Traffic Control.

Current of Traffic
The movement of trains in one direction on a main track, as specified by the rules.

Double Track
Two main tracks where the current of traffic on one track is in a specified direction and in the opposite direction on the other.

Dual Control Switch
A power-operated switch, moveable point frog, or derail that can also be operated by hand.

Electric Switch Lock
An electrically controlled lock that restricts the use of a hand-operated switch or derail.

Engine
A unit propelled by any form of energy or more than one of these units operated from a single control. Engines are used in train or yard service. Rules that apply to engines also apply to cab control cars.

Engineer
Also includes student engineers, firemen, hostlers, and remote control operators.

Equipment
Railroad equipment.

Fixed Signal
A signal that is fixed to a location permanently and that indicates a condition affecting train movement.

Flagman
Any employee providing flag protection as outlined in Rule 6.19 (Flag Protection) and for other purposes as outlined in the rules.

Foreman
Employee in charge of work.

Interlocking
Signal appliances that are interconnected so that each of their movements follows the other in a proper sequence. Interlockings may be operated manually or automatically.

Interlocking Limits
The tracks between outer opposing absolute signals of an interlocking.

Interlocking Signals
The fixed signals of an interlocking that govern trains using interlocking limits.

Hours of Service
Federal law prohibits any crew member from performing service if they have been on duty in excess of 12 hours. Prior to the expiration of that limit, either a new crew must be provided, or the train taken clear of the main track and properly secured.

Main Track
A track extending through yards and between stations that must not be occupied without authority or protection.

Men
Railroad employees

Men or Equipment
A term referring to Engineering Department employees and their related equipment.

Multiple Main Tracks
Two or more main tracks that are used according to the timetable.

Proceed Indication
Any block signal indication that allows a train to proceed without stopping.

Remote Control Operator (RCO)
An employee who may operate an engine with or without cars by means of a remote control transmitter.

Remote Control Transmitter
A device that gives the remote control operator control of a remote control engine.

Remote Control Zone (RCZ)
A portion of track(s) within definite limits designated in the timetable special instructions.

Reverse Movement
A movement opposite the authorized direction.

Siding
A track connected to the main track and used for meeting or passing trains. Locations of sidings are shown in the timetable.

Signal Aspect
The appearance of a fixed or cab signal.

Signal Indication
The action required by the signal aspect.

Single Track
A main track where trains are operated in both directions.

Special Instructions
Instructions contained in the timetable or other publication.

Spring Switch
A switch with a spring mechanism that returns the switch points to the original position after they are trailed through.

Station
A place designated by name in the timetable station column.

Switch Point Indicator
A light type indicator used during movement over certain switches to show that switch points fit properly.

Timetable
A publication with instructions on train, engine, or equipment movement. It also contains other essential information.

Track Bulletin
A notice of conditions affecting train movement. It may also authorize movement against the current of traffic where Rule 9.14 (Movement with the Current of Traffic) is in effect.

Track Occupancy Indicator
An indicator that tells whether a length of track is occupied or not.

Trackside Warning Detector
A device that indicates conditions such as overheated journals, dragging equipment, excess dimensions, shifted loads, high water, or slides.

Track Warrant Control (TWC)
A method to authorize train movements or protect men or machines on a main track within specified limits in a territory designated by the timetable.

Train
One or more engines coupled, with or without cars, displaying a marker, and authorized to operate on a main track. A term that when used in connection with speed restrictions, flag protection, and the observance of all signals and signal rules also applies to engines.

Variable Switch
A switch identified by a V or a bowl painted yellow. When trailed through, the switch points remain lined in the position they were forced.

Yard
A system of tracks, other than main tracks and sidings, used for making up trains, storing cars, and other purposes.

Yard Limits
A portion of main track designated by yard limit signs and timetable special instructions or a track bulletin.