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California State Rail Plan 2013

California TRANSPORTATION PLAN 2040
Integrating California's Transportation Future

RAIL PLAN
California State Rail Plan

Caltrans

FEBRUARY 2013

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Appendix A

COUNTY POPULATION AND EMPLOYMENT

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Table A.1: County 2011 to 2040 Population and Non-Farm Employment Growth

County	2011 Population	2040 Population	2011-2040 Population Growth	2011-2040 Average Annual Population Growth	2011 Employment	2040 Employment	2011-2040 Employment Growth	2011-2040 Average Annual Employment Growth
Alameda	1,517,641	2,037,903	520,262	1.02%	628,555	802,319	173,764	0.84%
Alpine	1,016	756	-260	-1.02%	701	499	-202	-1.17%
Amador	38,496	46,139	7,643	0.62%	13,135	15,070	1,935	0.47%
Butte	222,357	285,043	62,686	0.86%	71,260	95,392	24,132	1.01%
Calaveras	48,020	65,132	17,112	1.05%	8,169	10,606	2,437	0.90%
Colusa	21,859	29,430	7,571	1.03%	8,676	11,181	2,505	0.87%
Contra Costa	1,069,666	1,534,806	465,140	1.25%	319,316	435,527	116,211	1.07%
Del Norte	29,273	33,058	3,785	0.42%	8,761	9,471	710	0.27%
El Dorado	182,871	261,569	78,698	1.23%	43,836	58,210	14,374	0.98%
Fresno	941,375	1,312,941	371,566	1.15%	284,584	416,983	132,399	1.32%
Glenn	28,628	34,075	5,447	0.60%	8,126	9,259	1,133	0.45%
Humboldt	130,270	138,404	8,134	0.21%	46,350	47,139	789	0.06%
Imperial	172,369	245,844	73,475	1.22%	45,252	71,070	25,818	1.56%
Inyo	17,142	16,236	-906	-0.19%	7,643	6,929	-714	-0.34%
Kern	831,111	1,155,657	324,546	1.14%	226,522	280,168	53,646	0.73%
Kings	152,959	216,591	63,632	1.20%	35,512	47,521	12,009	1.00%
Lake	66,533	85,072	18,539	0.85%	15,071	18,446	3,375	0.70%
Lassen	35,271	39,960	4,689	0.43%	11,464	12,433	969	0.28%
Los Angeles	10,048,450	13,317,360	3,268,910	0.97%	3,808,198	4,924,370	1,116,172	0.89%
Madera	154,957	279,177	124,220	2.03%	32,684	51,049	18,365	1.54%
Marin	253,792	295,499	41,707	0.52%	98,656	123,637	24,981	0.78%
Mariposa	17,998	20,138	2,140	0.39%	5,436	5,822	386	0.24%
Mendocino	86,481	88,372	1,891	0.07%	29,862	29,211	-651	-0.08%
Merced	253,633	367,413	113,780	1.28%	56,149	69,235	13,086	0.72%

Table A.1: County 2011 to 2040 Population and Employment Growth (continued)

County	2011 Population	2040 Population	2011-2040 Population Growth	2011-2040 Average Annual Population Growth	2011 Employment	2040 Employment	2011-2040 Employment Growth	2011-2040 Average Annual Employment Growth
Modoc	9,013	8,349	-664	-0.26%	2,839	2,518	-321	-0.41%
Mono	13,117	14,495	1,378	0.34%	6,839	7,234	395	0.19%
Monterey	414,492	533,337	118,845	0.87%	121,436	157,127	35,691	0.89%
Napa	137,124	175,218	38,094	0.85%	58,610	70,887	12,277	0.66%
Nevada	99,393	118,286	18,893	0.60%	28,081	31,991	3,910	0.45%
Orange	3,101,101	4,160,218	1,059,117	1.01%	1,368,994	1,780,376	411,382	0.91%
Placer	369,410	720,696	351,286	2.30%	115,626	209,420	93,794	2.05%
Plumas	20,028	18,188	-1,840	-0.33%	6,249	5,432	-817	-0.48%
Riverside	2,198,632	3,350,870	1,152,238	1.45%	546,817	815,405	268,588	1.38%
Sacramento	1,433,151	2,057,343	624,192	1.25%	550,714	733,944	183,230	0.99%
San Benito	55,012	55,809	797	0.05%	15,058	14,578	-480	-0.11%
San Bernardino	2,030,501	2,411,909	381,408	0.59%	569,048	661,353	92,305	0.52%
San Diego	3,123,356	4,618,560	1,495,204	1.35%	1,243,455	1,659,369	415,914	0.99%
San Francisco	831,934	1,060,064	228,130	0.84%	534,804	733,472	198,668	1.09%
San Joaquin	700,704	983,635	282,931	1.17%	189,297	246,353	57,056	0.91%
San Luis Obispo	279,276	419,253	139,977	1.40%	98,031	105,092	7,061	0.24%
San Mateo	730,077	901,666	171,589	0.73%	308,458	410,033	101,575	0.98%
Santa Barbara	415,936	536,647	120,711	0.88%	163,419	237,246	73,827	1.29%
Santa Clara	1,820,416	2,453,918	633,502	1.03%	857,394	1,102,954	245,560	0.87%
Santa Cruz	259,270	341,483	82,213	0.95%	87,550	127,486	39,936	1.30%
Shasta	183,115	218,904	35,789	0.62%	57,944	78,657	20,713	1.05%
Sierra	3,139	2,715	-424	-0.50%	904	748	-156	-0.65%
Siskiyou	44,642	45,393	751	0.06%	13,485	13,126	-359	-0.09%
Solano	409,023	462,390	53,367	0.42%	119,691	177,182	57,491	1.35%

Table A.1: County 2011 to 2040 Population and Employment Growth (continued)

County	2011 Population	2040 Population	2011-2040 Population Growth	2011-2040 Average Annual Population Growth	2011 Employment	2040 Employment	2011-2040 Employment Growth	2011-2040 Average Annual Employment Growth
Sonoma	482,117	652,643	170,526	1.04%	172,278	229,890	57,612	0.99%
Stanislaus	514,035	734,212	220,177	1.23%	147,145	212,213	65,068	1.26%
Sutter	95,799	114,183	18,384	0.61%	22,135	31,320	9,185	1.20%
Tehama	62,099	76,624	14,525	0.72%	16,134	19,057	2,923	0.57%
Trinity	14,251	16,930	2,679	0.59%	2,739	3,114	375	0.44%
Tulare	450,356	738,786	288,430	1.71%	105,952	158,376	52,424	1.39%
Tuolumne	55,620	58,387	2,767	0.17%	16,700	16,781	81	0.02%
Ventura	823,648	1,132,282	308,634	1.10%	275,559	437,550	161,991	1.59%
Yolo	205,583	331,563	125,980	1.65%	91,902	137,602	45,700	1.39%
Yuba	76,149	99,989	23,840	0.94%	14,174	22,094	7,920	1.53%
Total	**37,783,690**	**51,531,516**	**13,747,826**	**1.07%**	**13,743,379**	**18,201,526**	**4,458,147**	**0.97%**

Source: Moody's Economy.com, 2011.

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Appendix B

PUBLIC OUTREACH AND STAKEHOLDER INVOLVEMENT DETAILS

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APPENDIX PENDING

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Appendix C

SECTION 6.1 SUPPLEMENTAL INFORMATION:

RAIL NETWORK ATTRIBUTES AND BASE YEAR DATA

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C.1 Regional and Local Railroads

C.1.1 Arizona & California Railroad Co.

A RailAmerica property, the Arizona & California Railroad (ARZC) consists of a former Santa Fe secondary line between Cadiz in California, and Matthie and Phoenix in Arizona. Based in Parker, Arizona, ARZC operates 84 miles of tracks in California. From a junction with the BNSF Railway (BNSF) in Cadiz, the ARZC line extends 190 miles eastward through Rice; crosses the Colorado River at Parker, Arizona; and links with BNSF's Phoenix line at Matthie. ARZC uses trackage rights over BNSF to reach Phoenix. The ARZC moves about 12,000 railcars yearly, and primarily carries commodities such as petroleum gas, steel, and lumber.

C.1.2 Central Oregon and Pacific Railroad

The Central Oregon and Pacific Railroad (CORP), the only regional Class II railroad serving California, operates the former Southern Pacific (SP) Siskiyou line between Black Butte, California and Eugene, Oregon. Only 59 of its 389 miles of mainline track are located within California. Since 2008, the northern and southern sections of the line are out of service across 80 miles of difficult terrain around Siskiyou Summit. However, efforts to secure sufficient funding to restore operation of the line as a through route have recently succeeded, with the railroad receiving a $7 million TIGER 4 grant, matching $7 million in other public and private funding commitments. The combined $14 million investment will permit the resumption of regular operations over Siskiyou Summit by 2014.

CORP interchanges with the Union Pacific Railroad (UPRR) at its northern and southern termini, as well as with BNSF at Eugene. Lumber and related wood products are the mainstay of the railroad, which has handled approximately 17,000 cars annually in recent years.

C.1.3 Northwestern Pacific Railroad

The Northwestern Pacific Railroad (NWP) is a 271-mile regional railroad that serves the north coast of California. It has a long history dating back to the 1800s, with several ownership changes resulting from a changing economy and severe weather events. Following a period of dormancy, the NWP resumed freight operations in 2008 over a 60-mile stretch between Brazos and Windsor. Within these 60 miles, about 28 miles of tracks are leased from Sonoma-Marin Area Rail Transit (SMART) between Santa Rosa and Ignacio junction, with the rest of the tracks leased from the North Coast Railroad Authority (NCRA).

The railroad is a handling carrier, connecting with UPRR at Suisun-Fairfield, California via the California Northern Railway at Brazos (American Canyon, California). Almost all of the NWP's 1,000 annual carloads are inbound, with grain and lumber the dominant commodities.

C.1.4 San Diego and Imperial Valley Railroad

The RailAmerica-owned San Diego and Imperial Valley Railroad (SDIY) is located in San Diego and operates over three lines owned by the San Diego Metropolitan Transit System (SDMTS or San Diego Trolley). In addition to its primary route linking BNSF in downtown San Diego with the Carrizo Gorge Railway (CZRY) at San Ysidro/Tijuana on the Mexican border, SDIY also has two branches: the La Mesa Branch (downtown San Diego east to Santee) and the Coronado Branch (National City south to Imperial Beach).[1] The SDIY operates primarily during nighttime hours when the San Diego Trolley is not in

[1] Metropolitan Transit System, *Metropolitan Transit System: San Diego & Arizona Eastern (SD&AE) Railway*, February 2011.

operation. The SDIY handled approximately 6,000 carloads in 2010, with major commodities including propane, petroleum gases, corn syrup, malt, and wood pulp.

C.1.5 San Joaquin Valley Railroad Co.

California's longest short line from the standpoint of route-miles, the San Joaquin Valley Railroad (SJVR) operates 286.7 miles of mainline track in the Central Valley. Operated by RailAmerica, SJVR interchanges with the UPRR at Fresno, Goshen Junction, and Bakersfield, and with the BNSF at Fresno and Bakersfield. Reflective of its location in the Central Valley (the nation's top agricultural region and the State's largest oil producer), the SJVR service primarily carries petroleum products, cattle feed, building materials, food products, and dry and liquid fertilizer.

C.1.6 Santa Maria Valley Railroad

Santa Maria Valley Railroad (SMV) has 14.7 miles of mainline track between Guadalupe and Santa Maria in California. SMV serves freight customers in the Santa Maria Valley, and also maintains many sidings and spurs with capacity to store rail cars. The railroad handles fresh and frozen vegetables, lumber, building material, steel, machinery, asphalt, aluminum, fertilizer, propane, and other industrial products.

C.1.7 Sierra Northern Railway

The August 2003 merger of the Sierra Railroad Company and the Yolo Shortline Railroad resulted in the present-day Sierra Northern Railway (SERA). The railroad operates about 117 miles of track in northern California, interchanging with UPRR and BNSF at four locations:

- West Sacramento, which serves customers between West Sacramento and Woodland, including the Port of Sacramento.
- Oakdale, which serves customers between Oakdale and Sonora.
- Riverbank, which serves customers between Riverbank and Sonora, as well as the 170-acre Riverbank Industrial Complex.

SERA also provides switching services for the Department of Defense at the Naval Weapons Station in Concord, California.

The SERA primarily carries lumber, particle board, and other wood and building products, along with grains, fruits, and vegetables. The railroad has an annual volume of approximately 6,000 carloads.

C.1.8 Stockton Terminal & Eastern Railroad

The Stockton Terminal & Eastern Railroad (STE) provides rail freight service in the greater Stockton area of the Central Valley. Owned by the Denver-based short line holding company OmniTrax, STE operates on 25 miles of its own track and connects to the BNSF, UPRR, and the Central California Traction Company, a switching railroad jointly owned by UPRR and BNSF. The STE railroad primarily serves customers in agriculture, livestock, steel, chemical transportation, and food processing.

C.1.9 Trona Railway Company

The Trona Railway Company (TRC) provides freight service on 31 miles of mainline from Trona to a UPRR connection at Searles, California. Traffic includes sulfuric acid, soda ash, salt cake, coal, military equipment, and minerals, primarily on behalf of its owner, Searles Valley Minerals. While the railway is important for product delivery, it is also a critical means of transporting fuel and process chemicals to Searles Valley. Utilizing its own fleet of locomotives and railcars, TRC transports two million tons, or about 20,000 carloads, of freight annually. The railroad's remote location dictates that its 28 employees must perform all necessary operations and maintenance functions.

At present, most soda ash hauled by the railroad is exported to Asia through the ports of Long Beach and San Diego. The railroad serves the ACE Cogeneration Plant, which burns Utah coal to produce electricity and process steam for the Searles Valley Mineral Company's production facilities at Trona, Westend, and Argus.

C.1.10 Ventura County Railroad Company

The Ventura County Railroad (VCRR) operates over a 13-mile route in southwest Ventura County from an interchange with UPRR at Oxnard. The railroad transports goods in the industrial areas of south of Oxnard, the Port of Hueneme, and the U.S. Naval Base Ventura County. Almost 2,000 cars traveled over the VCRR in 2010, carrying automobiles, paper, petroleum, wood pulp, and frozen foods.

C.2 Switching and Terminal Railroads

Currently, there are nine switching and terminal railroads in California, a combined 345.5 miles of track. Even though these railroads have short or nonexistent mainlines, many of them handle significant volumes of freight. Notably, the Pacific Harbor Line, which serves the twin Ports of Los Angeles and Long Beach, handles more volume than all of California's railroads but BNSF and UPRR.

C.2.1 California Northern Railroad

The California Northern Railroad (CFNR) is a 218-mile switching and terminal railroad operated by RailAmerica. The CFNR interchanges with UPRR at Davis, Suisun-Fairfield, Tehama, and Tracy; with the Napa Valley Railroad at Rocktram; and with the Northwestern Pacific Railroad at Brazos Junction. The CFNR handles about 25,000 carloads per year, consisting primarily of food products (such as processed tomatoes, olives, rice, cheese, beer, wine, and wheat), along with some stone, petroleum products, and chemicals.

C.2.2 Central California Traction

The Central California Traction Company (CCT) operates two segments of track in northern California: the 20-mile Central Valley Branch between Stockton and Lodi (including a one-mile industrial lead into Lodi) and the Stockton Public Belt Railroad at the Port of Stockton. CCT provides switching service to Penny Newman Grain and Duraflame Products as the result of a lease of the UPRR Scotts Street lead. At the Port of Stockton, CCT serves as the switching carrier for the BNSF and UPRR over 76 miles of track, where it serves 55 customers. The primary commodities handled by the railroad at the port consist of export coal and iron ore. Service between Lodi and Sacramento was suspended in August of 1998, with the tracks still in place for potential future use. In recent years, CCT has handled approximately 55,000 carloads annually, with a work force of 27 people.

C.2.3 Los Angeles Junction Railway Company

The Los Angeles Junction Railway Company (LAJ) is a wholly-owned subsidiary of BNSF and provides switching service on 64 miles of track in the industrial areas around Vernon, California, southeast of Los Angeles. The LAJ was built in the early 1920s as the switching railroad for the Central Manufacturing District in the cities of Vernon, Maywood, Bell, and Commerce.

C.2.4 Modesto & Empire Traction Co.

Modesto & Empire Traction Company (M&ET) is a short line railroad situated in the 2,000-acre Beard Industrial District in Modesto, California. The M&ET operates freight and switching services from a connection with UPRR at Modesto to a connection with BNSF at Empire. Additionally, M&ET has a 70-acre rail/truck transload facility encompassing 6,000 feet of unloading/loading tracks. The railroad primarily handles commodities such as wine, canned goods, paper products, corn syrup, cooking oil, feed and grain, lumber, and packaging materials.

C.2.5 Oakland Terminal Railway

The Oakland Terminal Railway (OTR) is a terminal railroad associated with the Port of Oakland. It operates ten miles of switching track in West Oakland, performing switching activities for both UPRR and BNSF.

C.2.6 Pacific Harbor Line, Inc.

Pacific Harbor Line, Inc. (PHL) provides rail transportation, maintenance, and dispatching services to the Ports of Los Angeles and Long Beach. With a staff of 145, PHL handles a high volume of both intermodal and carload traffic on behalf of BNSF and UPRR. The railroad switches over 40,000 units of carload freight annually, with commodities including automobiles, bulk minerals, lumber, scrap, food products, cotton, chemicals, steel, petroleum products, and heavy equipment. Major customers include Amerigas, California Cartage, CertainTeed Roofing, ConocoPhillips, Del Monte, Fremont Forest Products, Hugo Neu, LA Grain, Toyota, Nissan, Pacific Coast Recycling, Potential Industries, Tesoro, U.S. Borax, and Westway Terminals.

PHL also provides rail switching services for nine on-dock intermodal terminals and provides dispatching services for about 90 intermodal or unit trains per day. Major customers include American President Lines, Cosco, Evergreen, America, Hanjin, K-Line, Maersk Sealand, Mediterranean Shipping, NYK Line, and Yang Ming.

C.2.7 Richmond Pacific Railroad Corp.

The Richmond Pacific Railroad Corporation (RPRC) is a terminal railroad owned by the Levin-Richmond Terminal Corporation. Located at the Port of Richmond, the railroad serves industries on ten miles of track in the port area, handling approximately 17,200 carloads per year, 15,000 inbound and 2,200 outbound. Commodities include ores, cement, food products, petroleum products, stone, and lumber.

The customers include Levin-Richmond Terminal Corporation’s cargo marine terminals, Cemex, Plains Marketing, Sims Metal Management, Chevron Products Co., Oxbow Carbon & Minerals, California Oils, Sasol Wax, General Chemical, Channel Lumber, Conoco Phillips, and others. RPRC interchanges with both UPRR and BNSF.

C.3 Geographic Region Definitions

C.3.1 Central Coast

The Central Coast region refers to the area inland from the Pacific Coast, from San Jose to the north and Los Angeles to the south. This region is served by the UPRR and the short line railroads Santa Maria Valley Railroad (SMV) and Ventura County Railroad (VCRR) as shown in Table C.1. Class I mainline subdivisions located in the region include the Ventura subdivision of the Southern California Regional Rail Authority (SCRRA) and UPRR’s Santa Barbara and Coast subdivisions. UPRR’s Niles subdivision and the SCRRA’s Valley subdivision act as end connectors at the northern and southern ends of the region, respectively.

Table C.1: Central Coast Class I Railroads and Short Lines

Name of Region	Class I Mainline Subdivisions	Major Freight Short Lines
Central Coast	Ventura, Santa Barbara, Coast	Santa Maria Valley Railroad, Ventura County Railroad Company

Source: Cambridge Systematics, Inc., 2012.

Originally constructed to provide faster passenger service between San Francisco and Los Angeles than was possible through the Central Valley, the Coast Line was absorbed by the UPRR through its 1996 acquisition of the SP. Today, the corridor is traversed by a mix of UPRR freight services, intercity passenger services (*Pacific Surfliner* and *Coast Starlight*), and Metrolink commuter rail. UPRR operates through and local freight services along the route, providing connections to the VCRR (serving Port Hueneme, industrial areas south of Oxnard, and the Naval Base Ventura County Port Hueneme Division) and the SMV in Guadalupe.

The Coast Line also connects at Montalvo with the Santa Paula branch, a line that once connected with SCRRA's Lancaster line at Santa Clarita. The Southern California Association of Governments and the Ventura County Transportation Commission have examined the potential for reestablishing this connection for potential passenger and freight services.[2]

C.3.2 San Joaquin Valley

The San Joaquin Valley comprises the eight counties between Bakersfield and Sacramento. It is the fastest growing region in California, and produces billions of dollars of agricultural product annually. The region is served by BNSF and UPRR and several short lines, including San Joaquin Valley Railroad (SJVR), Sierra Northern Railway (SERA), Modesto & Empire Traction (MET), Central California Traction (CCT), and Stockton Terminal & Eastern Railroad (STE), as shown in Table C.2.

The Class I railroad operating subdivisions of the region include BNSF's Bakersfield and Stockton subdivisions and UPRR's Fresno and Sacramento (partial) subdivisions. The rail corridors make end connections to the cities of Bakersfield, Fresno, Sacramento, and Richmond, and to the Mojave, Martinez, Niles, and Roseville subdivisions.

San Joaquin trains utilize BNSF tracks between Bakersfield and Port Chicago, and UPRR tracks between Port Chicago and Oakland (Oakland – Bakersfield trains) and between Stockton and Sacramento via Lodi (Sacramento – Bakersfield trains).

Table C.2: Central Valley Class I Railroads and Short Lines

Name of Region	Class I Mainline Subdivisions	Major Freight Short Lines
Central Valley	Bakersfield, Part of Stockton, Fresno, Part of Sacramento	California Northern Railroad (partial), Central California Traction, Modesto & Empire Traction Co., San Joaquin Valley Railroad Co., Sierra Northern Railway – Oakdale, Southwest Portland Cement Railroad, Stockton Terminal & Eastern Railroad, West Isle Line, Inc.

Source: Cambridge Systematics, Inc., 2012.

2 Sharon Green & Associates, PB, and InfraConsult LLC, *Ventura/Santa Barbara Rail Study – Final Report*, prepared for the Southern California Association of Governments, March 2008.

C.3.3 Northern California

At its north end, the northern California region is bounded by the Oregon state line, and at its south end by a line roughly paralleling the I-80 and I-5 corridors between Truckee and San Jose. It includes the entire San Francisco Bay Area, the Port of Stockton and the UPRR Roseville rail yard. Both BNSF and UPRR operate in the region, with a majority of tracks owned by UPRR. The region is also served by Oakland Terminal Railway (OTR), Richmond Pacific Railroad Corporation (RPRC), Northwestern Pacific Railroad (NWP), California Northern Railroad (CFNR), Sierra Northern Railway (SERA), and Central Oregon & Pacific Railroad (CORP), as shown in Table C.3.

This region includes UPRR's Martinez, Niles, Oakland, Tracy, Sacramento (partial), Roseville, Valley, Black Butte, Canyon, and Winnemucca subdivisions and BNSF's Gateway subdivision.

Multiple commuter and intercity rail passenger services operate in a shared-use environment. These include state-supported and long-distance Amtrak routes such as the *San Joaquin*, *Capitol Corridor*, *Coast Starlight*, and *California Zephyr*; Caltrain, which provides commuter service between Gilroy, San Jose, and San Francisco; and the Altamont Corridor Express (ACE) from San Jose to Stockton. In addition, Sonoma-Marin Transit (SMART), which is expected to initiate passenger operations in 2014 between San Rafael and Santa Rosa, leases tracks to the Northwestern Pacific Railroad (NWP).

C.3.4 Southern California

Southern California consists of the entire area southeast of Bakersfield, California and includes the Ports of Los Angeles and Long Beach, as well as the Los Angeles metropolitan region. This region includes BNSF and UPRR, and Pacific Harbor Line (PHL), Trona Railway Company (TRC), Arizona & California Railroad (ARZC), San Diego & Imperial Valley Railroad (SDIY), and Los Angeles Junction Railway (LAJ).

Class I railroad operating subdivisions located in the region include UPRR's Alhambra, Los Angeles, Mojave, Cima, and Yuma subdivisions, and BNSF's San Bernardino, Cajon, Mojave, and Needle subdivisions. In addition, the SCRRA operates three divisions—Valley, San Gabriel, and Orange—and the North County Transit District one (San Diego) as shown in Table C.4.

The Alameda Corridor, a 20-mile long triple-track line, links the Ports of Los Angeles and Long Beach to BNSF's and UPRR's transcontinental rail lines near Downtown Los Angeles. Between SR-91 in Carson and 25th Street in Los Angeles, the tracks lie in a ten-mile-long trench that eliminated more than 200 at-grade crossings. The corridor's owner, the Alameda Corridor Transportation Authority, recovers the cost of construction and maintenance through a user fee paid by rail traffic traversing the corridor.

Table C.3: Northern California Class I Railroads and Short Lines

Name of Region	Class I Mainline Subdivisions	Major Freight Short Lines
Northern California	Martinez, Roseville, Canyon, Winnemucca, Part of Sacramento, Part of Stockton, Niles, Valley, Oakland, Gateway, Tracy, Black Butte	California Northern Railroad (partial), Central Oregon & Pacific Railroad, Lake County Railway, Napa Valley Railroad, Northwestern Pacific Railroad, Oakland Terminal Railway, Quincy Railroad, Richmond Pacific Railroad Corp., Sacramento Valley Railroad, Sierra Northern Railway – California Western Railroad, Sierra Northern Railway – Western Sacramento/Woodland

Source: Cambridge Systematics, Inc., 2012.

Table C.4: Southern California Class I Railroads and Short Lines

Name of Region	Class I Mainline Subdivisions	Major Freight Short Lines
Southern California	Cajon, Needles, Yuma, San Bernardino, Alameda Corridor, Mojave – UPRR, Mojave – BNSF, Alhambra, Los Angeles, Cima, San Diego, Orange, SCRRA Valley, Olive, San Gabriel	Arizona & California Railroad Co., Los Angeles Junction Railway Company, Pacific Harbor Line, Inc., Pacific Sun Railroad, LLC., San Diego & Imperial Valley Railroad, Trona Railway Company

Source: Cambridge Systematics, Inc., 2012.

All SCRRA Metrolink trains, along with NCTD's COASTER and Sprinter services and the *Pacific Surfliner*, *Southwest Chief*, and *Sunset Limited*, share tracks with freight rail. Ownership of these lines varies by segment, with some owned by the private freight railroads and others by public agencies as described in Section 6.1.

C.4 Additional Freight Rail System Information

This section summarizes additional attributes of the State's rail system, including:

- Total Line/Track Miles. This refers to the mileage of track operated by each railroad. Federal Railroad Administration (FRA) Track Class: The FRA track safety standards, which apply to both freight and passenger train operations, specify the minimum allowable track conditions for operation at a particular speed for a given class of track. Measures for specifying track class fall into four general areas—track structure (ties, rail, switch conditions), track geometry (curvature, alignment, elevation, surface), road bed (drainage, vegetation, etc.), and inspection (frequency and inspect qualifications). The FRA has nine categories of track, with Class 1 being the least rigorous and Class 9 the most. The FRA also defines a tenth category, "Excepted," which falls under Track Class 1 and precludes passenger trains operations and handling of hazardous commodities.
- Maximum Allowable Gross Weight. This refers to the maximum permissible gross weight of a rail car (i.e., the weight transferred to rail by a four-axle car of specified length from the weight of the car and the lading within it). Until the mid-1990s, the standard maximum allowable weight throughout the U.S. rail network stood at 263,000 pounds. Since then, the standard grew to 286,000 pounds, a change that the Class I railroads accomplished with relative ease. Smaller railroads have been adapting to this higher weight more slowly due to the costs involved and generally inferior physical conditions of their infrastructure.
- Vertical Clearance. This refers to the restrictions placed on the maximum height of a loaded rail car measured from top of rail to the top of the cargo while seated and secured. For double-stack container operation, vertical clearances must be at least 18 feet and 6 inches for two stacked international (each 8 feet and 6 inches) containers, 19 feet and 6 inches for a combination international and domestic, and 20 feet and 8 inches for two domestic containers (each 9 feet and 6 inches in height). Tri-level auto-rack cars require 19 feet and 6 inches clearance. For a route to enjoy unrestricted vertical clearance, the AAR requires a minimum of 22 feet and 6 inches.

Table C.5 summarizes additional attribute information for the State's Class I system by California region and rail subdivision, and Table C.6 summarizes this information for the State's major short line railroads.

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Table C.5: Network Characteristics of Existing Major Class I Railroad Subdivisions and Major Freight Short Lines in California

			Average Number of Trains in Base Year			Number of Tracks		Mainline Class		Signal Type[a]		FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
Rail Subdivision Name	Total Line Miles Operated	Total Track Miles Operated	Freight	Passenger	Total	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Central Coast California Region																	
Ventura	35.5	35.5	6	30	36	1 Track	36	A (A-main)		CTC		1		315K	36.1	16-18 ft	36.1
						2 Tracks		B (B-main)		ABS	35.5	2		286K		19-20 ft	
						3 Tracks		C (C-main)	35.5	MAN		3	29.4	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	6.7	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5		No Data		No Data	
Santa Barbara	175.2	175.2	4	9	13	1 Track	175.2	A (A-main)		CTC		1		315K	169.9	16-18 ft	169.9
						2 Tracks		B (B-main)		ABS	175.2	2	1.4	286K		19-20 ft	
						3 Tacks		C (C-main)	175.2	MAN		3	111.8	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	61.2	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5		No Data		No Data	
Coast	234	239.1	2	3	5	1 Track	228.8	A (A-main)		CTC		1		315K	223.7	16-18 ft	223.7
						2 Tracks	5.1	B (B-main)		ABS	233.7	2	19.1	286K		19-20 ft	
						3 Tacks		C (C-main)	233.5	MAN	0.3	3	107.0	263K		21-22 ft	
						4 Tracks		G (A-branch)	0.2			4	108.9	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.3			5		No Data		No Data	
Subtotal	444.7	449.8	-	-	-	1 Track	440.0	A (A-main)	0.0	CTC	0.0	1	0.0	315K	429.7	16-18 ft	429.7
						2 Tracks	5.1	B (B-main)	0.0	ABS	444.4	2	20.5	286K	0.0	19-20 ft	0.0
						3 Tacks	0.0	C (C-main)	444.2	MAN	0.3	3	248.2	263K	0.0	21-22 ft	0.0
						4 Tracks		G (A-branch)	0.2			4	176.8	< 263K	0.0	> 22 ft	0.0
						>= 5 Tracks		H (B-branch)	0.3			5	0.0	No Data	0.0	No Data	0.0
Subtotal						1 Track	98.9%	A (A-main)	0.0%	CTC	0.0%	1	0.0%	315K	100.0%	16-18 ft	100.0%
						2 Tracks	1.1%	B (B-main)	0.0%	ABS	99.9%	2	4.6%	286K	0.0%	19-20 ft	0.0%
						3 Tacks	0.0%	C (C-main)	99.9%	MAN	0.1%	3	55.7%	263K	0.0%	21-22 ft	0.0%
						4 Tracks		G (A-branch)	0.0%			4	39.7%	< 263K	0.0%	> 22 ft	0.0%
						>= 5 Tracks		H (B-branch)	0.1%			5	0.0%	No Data	0.0%	No Data	0.0%
Central Valley California Region																	
Bakersfield	109.7	114.7	26	12	38	1 Track	104.6	A (A-main)	109.7	CTC	105.2	1		315K	100.7	16-18 ft	0.0
						2 Tracks	5.1	B (B-main)		ABS	4.5	2		286K		19-20 ft	
						3 Tacks		C (C-main)		MAN		3	2.3	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	5.8	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5	100.5	No Data		No Data	100.7
Part of Stockton	126	126	24	12	36	1 Track	126	A (A-main)	125.8	CTC	125.8	1		315K	125.6	16-18 ft	125.6
						2 Tracks		B (B-main)	0.1	ABS	0.1	2		286K		19-20 ft	
						3 Tacks		C (C-main)		MAN	0.2	3	10.0	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	3.4	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.1			5	112.3	No Data		No Data	

Table C.5: Network Characteristics of Existing Major Class I Railroad Subdivisions and Major Freight Short Lines in California (continued)

Rail Subdivision Name	Total Line Miles Operated	Total Track Miles Operated	Average Number of Trains in Base Year			Number of Tracks		Mainline Class		Signal Type[a]		FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
			Freight	Passenger	Total	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Fresno	274.7	304.3	22	0	22	1 Track	245.1	A (A-main)	274.1	CTC	250.9	1		315K	255.3	16-18 ft	
						2 Tracks	29.6	B (B-main)		ABS	23.4	2	1.4	286K		19-20 ft	255.3
						3 Tacks		C (C-main)		MAN	0.4	3	28.0	263K		21-22 ft	
						4 Tracks		G (A-branch)	0.2			4	97.2	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.4			5	146.9	No Data		No Data	
Part of Sacramento	44.3	44.3	6	4	10	1 Track	44.3	A (A-main)	44.3	CTC	44.3	1		315K		16-18 ft	
						2 Tracks		B (B-main)		ABS		2	6.0	286K	36.8	19-20 ft	
						3 Tacks		C (C-main)		MAN		3	6.8	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	32.0	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5		No Data		No Data	36.8
Subtotal	554.7	589.3	-	-	-	1 Track	520.0	A (A-main)	553.9	CTC	526.2	1	0.0	315K	481.6	16-18 ft	125.6
						2 Tracks	34.7	B (B-main)	0.1	ABS	28.0	2	7.4	286K	36.8	19-20 ft	255.3
						3 Tacks		C (C-main)		MAN	0.6	3	47.0	263K	0.0	21-22 ft	0.0
						4 Tracks		G (A-branch)	0.2			4	138.3	< 263K	0.0	> 22 ft	0.0
						>= 5 Tracks		H (B-branch)	0.5			5	359.6	No Data	0.0	No Data	137.5
Subtotal						1 Track	93.7%	A (A-main)	99.9%	CTC	94.8%	1	0.0%	315K	92.9%	16-18 ft	24.2%
						2 Tracks	6.3%	B (B-main)	0.02%	ABS	5.0%	2	1.3%	286K	7.1%	19-20 ft	49.2%
						3 Tacks		C (C-main)		MAN	0.1%	3	8.5%	263K	0.0%	21-22 ft	0.0%
						4 Tracks		G (A-branch)	0.04%			4	25.0%	< 263K	0.0%	> 22 ft	0.0%
						>= 5 Tracks		H (B-branch)	0.09%			5	65.1%	No Data	0.0%	No Data	26.5%
Northern California Region																	
Martinez	104.7	209	20	34	54	1 Track	0.5	A (A-main)	44.9	CTC		1	0.7	315K	97.7	16-18 ft	97.7
						2 Tracks	104.2	B (B-main)	59.4	ABS	104.5	2	3.4	286K		19-20 ft	
						3 Tacks		C (C-main)		MAN	0.2	3	37.9	263K		21-22 ft	
						4 Tracks		G (A-branch)	0.2			4	3.0	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.2			5	61.4	No Data		No Data	
Roseville	149.1	159.4	18	4	22	1 Track	138.7	A (A-main)	149.1	CTC	83.8	1		315K	149.1	16-18 ft	149.1
						2 Tracks	10.4	B (B-main)		ABS	65.3	2	78.8	286K		19-20 ft	
						3 Tacks		C (C-main)		MAN		3	80.6	263K		21-22 ft	
						4 Tracks		G (A-branch)				4		< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5		No Data		No Data	
Canyon	111.8	111.8	17	0	17	1 Track	111.8	A (A-main)	111.5	CTC	111.5	1		315K		16-18 ft	
						2 Tracks		B (B-main)		ABS		2	70.3	286K	97.3	19-20 ft	97.3
						3 Tacks		C (C-main)		MAN	0.3	3	21.7	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	21.5	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.3			5		No Data		No Data	

Table C.5: Network Characteristics of Existing Major Class I Railroad Subdivisions and Major Freight Short Lines in California (continued)

Rail Subdivision Name	Total Line Miles Operated	Total Track Miles Operated	Average Number of Trains in Base Year			Number of Tracks		Mainline Class		Signal Type[a]		FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
			Freight	Passenger	Total	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Winnemucca	56.0	56.0	16.0	0.0	16.0	1 Track	56.0	A (A-main)	56.0	CTC	56.0	1		315K	50.4	16-18 ft	50.4
						2 Tracks		B (B-main)		ABS		2		286K		19-20 ft	
						3 Tacks		C (C-main)		MAN		3	21.2	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	11.2	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5	18.0	No Data		No Data	
Part of Sacramento	65.7	65.7	16.0	2.0	18.0	1 Track	65.7	A (A-main)	65.7	CTC	65.7	1		315K		16-18 ft	
						2 Tracks		B (B-main)		ABS		2	3.3	286K	58.6	19-20 ft	
						3 Tacks		C (C-main)		MAN		3	6.1	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	2.0	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5	53.6	No Data		No Data	58.6
Part of Stockton	68.7	68.7	10	6	16	1 Track	68.7	A (A-main)		CTC		1		315K	67.6	16-18 ft	67.6
						2 Tracks		B (B-main)	67.1	ABS	67.1	2	1.5	286K		19-20 ft	
						3 Tacks		C (C-main)		MAN	1.6	3	10.9	263K		21-22 ft	
						4 Tracks		G (A-branch)	0.9			4	14.3	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.7			5	40.9	No Data		No Data	
Niles	29.7	37.7	8	18	26	1 Track	21.7	A (A-main)	7.9	CTC		1	2.5	315K	30.8	16-18 ft	
						2 Tracks	8	B (B-main)		ABS	29.6	2	1.4	286K		19-20 ft	0.3
						3 Tacks		C (C-main)	16.8	MAN	1.3	3	2.4	263K		21-22 ft	
						4 Tracks		G (A-branch)	4.9			4	24.6	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	1.3			5		No Data		No Data	30.5
Valley	208.7	208.8	10	2	12	1 Track	208.6	A (A-main)	208.7	CTC	208.6	1		315K	187.8	16-18 ft	187.8
						2 Tracks	0.1	B (B-main)		ABS	0.1	2	29.5	286K		19-20 ft	
						3 Tacks		C (C-main)		MAN		3	25.2	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	54.5	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5	100.7	No Data		No Data	
Oakland	82.1	87.5	7	6	13	1 Track	76.7	A (A-main)	5.4	CTC	74.4	1	20.7	315K		16-18 ft	81.7
						2 Tracks	5.4	B (B-main)	74.4	ABS	7.6	2	3.9	286K	81.7	19-20 ft	
						3 Tacks		C (C-main)	2.2	MAN	0.2	3	23.0	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	35.2	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.2			5		No Data		No Data	
Gateway	177.9	177.9	4	0	4	1 Track	177.9	A (A-main)	0.2	CTC	0.3	1		315K	169.9	16-18 ft	
						2 Tracks		B (B-main)		ABS		2	48.9	286K		19-20 ft	169.9
						3 Tacks		C (C-main)	0.2	MAN	177.5	3	38.6	263K		21-22 ft	
						4 Tracks		G (A-branch)	177.5			4	90.2	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5		No Data		No Data	

Table C.5: Network Characteristics of Existing Major Class I Railroad Subdivisions and Major Freight Short Lines in California (continued)

			Average Number of Trains in Base Year			Number of Tracks		Mainline Class		Signal Type[a]		FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
Rail Subdivision Name	Total Line Miles Operated	Total Track Miles Operated	Freight	Passenger	Total	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Tracy	58.2	58.2	0	1	1	1 Track	58.2	A (A-main)		CTC		1	2.9	315K	52.7	16-18 ft	
						2 Tracks		B (B-main)	1.2	ABS	56.6	2	49.1	286K		19-20 ft	
						3 Tacks		C (C-main)	5.3	MAN	1.6	3	1.6	263K		21-22 ft	
						4 Tracks		G (A-branch)	51.8			4	5.3	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5		No Data		No Data	52.7
Black Butte	87.9	87.9	8	2	10	1 Track	87.9	A (A-main)	87.8	CTC	87.8	1		315K	84.4	16-18 ft	84.4
						2 Tracks		B (B-main)		ABS	0.1	2	11.0	286K		19-20 ft	
						3 Tacks		C (C-main)		MAN		3	39.9	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	37.1	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.1			5		No Data		No Data	
Subtotal	1,200.6	1,328.7	-	-	-	1 Track	1,072.5	A (A-main)	737.3	CTC	688.2	1	26.8	315K	890.4	16-18 ft	718.7
						2 Tracks	128.1	B (B-main)	202.1	ABS	330.9	2	301.0	286K	237.6	19-20 ft	267.5
						3 Tacks	0.0	C (C-main)	24.5	MAN	182.7	3	309.0	263K	0.0	21-22 ft	0.0
						4 Tracks		G (A-branch)	235.3			4	298.9	< 263K	0.0	> 22 ft	0.0
						>= 5 Tracks		H (B-branch)	2.8			5	274.6	No Data	0.0	No Data	141.8
Subtotal						1 Track	89.3%	A (A-main)	61.3%	CTC	57.3%	1	2.2%	315K	78.9%	16-18 ft	63.7%
						2 Tracks	10.7%	B (B-main)	16.8%	ABS	27.5%	2	24.9%	286K	21.1%	19-20 ft	23.7%
						3 Tacks	0.0%	C (C-main)	2.0%	MAN	15.2%	3	25.5%	263K	0.0%	21-22 ft	0.0%
						4 Tracks		G (A-branch)	19.6%			4	24.7%	< 263K	0.0%	> 22 ft	0.0%
						>= 5 Tracks		H (B-branch)	0.2%			5	22.7%	No Data	0.0%	No Data	12.6%
Southern California Region																	
Cajon	88.6	154.1	56	2	58	1 Track	23.1	A (A-main)	88.6	CTC	88.6	1		315K	79.0	16-18 ft	78.4
						2 Tracks	65.5	B (B-main)		ABS		2		286K		19-20 ft	
						3 Tacks		C (C-main)		MAN	0.3	3	15.8	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	32.2	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.3			5	40.8	No Data		No Data	0.6
Needles	164.6	329.1	55	2	57	1 Track	0.2	A (A-main)	164.4	CTC	164.4	1		315K	173.6	16-18 ft	7.1
						2 Tracks	164.4	B (B-main)		ABS		2		286K		19-20 ft	
						3 Tacks		C (C-main)		MAN	0.2	3		263K		21-22 ft	
						4 Tracks		G (A-branch)	0.2			4	28.4	< 263K		> 22 ft	166.6
						>= 5 Tracks		H (B-branch)				5	145.2	No Data		No Data	
Yuma	195.5	246.7	44	1	45	1 Track	144.3	A (A-main)	195.3	CTC	195.3	1		315K	185.0	16-18 ft	185.0
						2 Tracks	51.2	B (B-main)		ABS		2		286K		19-20 ft	
						3 Tacks		C (C-main)		MAN	0.2	3	7.4	263K		21-22 ft	
						4 Tracks		G (A-branch)	0.2			4	81.6	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5	101.9	No Data		No Data	

Table C.5: Network Characteristics of Existing Major Class I Railroad Subdivisions and Major Freight Short Lines in California (continued)

Rail Subdivision Name	Total Line Miles Operated	Total Track Miles Operated	Average Number of Trains in Base Year			Number of Tracks		Mainline Class		Signal Type[a]		FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
			Freight	Passenger	Total	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
San Bernardino	67.9	144.6	36	31	67	1 Track	0	A (A-main)	66.6	CTC	67.8	1		315K	68.0	16-18 ft	68.0
						2 Tracks	58.9	B (B-main)		ABS		2	1.4	286K		19-20 ft	
						3 Tacks	9	C (C-main)	1.2	MAN	0.5	3	9.6	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	57.0	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.5			5		No Data		No Data	
Alameda Corridor	17.1	30.5	28	0	28	1 Track	3.6	A (A-main)		CTC	13.1	1	1.5	315K	19.0	16-18 ft	
						2 Tracks	13.5	B (B-main)	13.1	ABS		2	0.5	286K		19-20 ft	0.3
						3 Tacks		C (C-main)	0.9	MAN	4	3	15.3	263K		21-22 ft	
						4 Tracks		G (A-branch)	3			4		< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5		No Data		No Data	18.7
Mojave – UPRR	179.1	218.1	26	1	27	1 Track	140.2	A (A-main)	178.8	CTC	175.5	1		315K	175.9	16-18 ft	53.4
						2 Tracks	39	B (B-main)		ABS	3.3	2	24.5	286K		19-20 ft	122.5
						3 Tacks		C (C-main)		MAN	0.3	3	45.6	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	70.6	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	0.3			5	38.0	No Data		No Data	
Mojave – BNSF	65.3	65.3	26	0	26	1 Track	65.3	A (A-main)	65.3	CTC	65.3	1		315K	65.5	16-18 ft	
						2 Tracks		B (B-main)		ABS		2	7.1	286K		19-20 ft	
						3 Tacks		C (C-main)		MAN		3		263K		21-22 ft	
						4 Tracks		G (A-branch)				4	8.0	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5	52.9	No Data		No Data	65.5
Alhambra	54.7	67.5	26	4	30	1 Track	42	A (A-main)	36.7	CTC	54.7	1		315K	54.9	16-18 ft	
						2 Tracks	12.8	B (B-main)	18.1	ABS		2	2.9	286K		19-20 ft	54.9
						3 Tacks		C (C-main)		MAN	1	3	1.1	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	51.9	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	1			5		No Data		No Data	
Los Angeles	58.7	89.1	16	11	27	1 Track	28.3	A (A-main)	56.9	CTC	58.7	1	1.0	315K	47.0	16-18 ft	54.2
						2 Tracks	30.4	B (B-main)	0.7	ABS		2	1.8	286K	8.5	19-20 ft	1.3
						3 Tacks		C (C-main)	1.1	MAN		3	2.7	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	7.4	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5	46.4	No Data		No Data	
Cima	126.2	126.2	10	0	10	1 Track	126.2	A (A-main)	126.2	CTC	126.2	1		315K	121.0	16-18 ft	
						2 Tracks		B (B-main)		ABS		2	1.6	286K		19-20 ft	121.0
						3 Tacks		C (C-main)		MAN		3	4.8	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	11.6	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5	107.7	No Data		No Data	

Table C.5: Network Characteristics of Existing Major Class I Railroad Subdivisions and Major Freight Short Lines in California (continued)

Rail Subdivision Name	Total Line Miles Operated	Total Track Miles Operated	Average Number of Trains in Base Year			Number of Tracks		Mainline Class		Signal Type[a]		FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
			Freight	Passenger	Total	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
San Diego	59.9	61.2	5	42	47	1 Track	58.6	A (A-main)		CTC	59.9	1	7.5	315K		16-18 ft	56.4
						2 Tracks	1.3	B (B-main)		ABS		2	1.0	286K		19-20 ft	
						3 Tacks		C (C-main)	19.8	MAN		3	6.5	263K		21-22 ft	
						4 Tracks		G (A-branch)	40			4	50.5	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5		No Data	61.8	No Data	5.4
Orange	41.9	44.7	7	52	59	1 Track	39.1	A (A-main)		CTC	39.5	1		315K		16-18 ft	39.0
						2 Tracks	2.8	B (B-main)		ABS		2		286K		19-20 ft	
						3 Tacks		C (C-main)	34.3	MAN	2.4	3	16.8	263K	39.0	21-22 ft	
						4 Tracks		G (A-branch)	5.1			4	25.1	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	2.4			5		No Data		No Data	
SCRRA Valley	65.8	70.2	8	30	38	1 Track	56.9	A (A-main)		CTC		1		315K	65.3	16-18 ft	65.3
						2 Tracks	6.9	B (B-main)	6.9	ABS	63.3	2	8.9	286K		19-20 ft	
						3 Tacks		C (C-main)	56.4	MAN	2.4	3	29.6	263K		21-22 ft	
						4 Tracks		G (A-branch)				4	25.5	< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)	2.4			5		No Data		No Data	
Olive	5.4	5.4	4	14	18	1 Track	5.4	A (A-main)		CTC	5.4	1		315K		16-18 ft	
						2 Tracks		B (B-main)		ABS		2		286K		19-20 ft	
						3 Tacks		C (C-main)	5.4	MAN		3	5.4	263K		21-22 ft	
						4 Tracks		G (A-branch)				4		< 263K		> 22 ft	
						>= 5 Tracks		H (B-branch)				5		No Data	5.4	No Data	5.4
San Gabriel	51.3	51.3	N/A	N/A	N/A	1 Track	51.3	A (A-main)		CTC	11.1	1	1.8	315K		16-18 ft	
						2 Tracks		B (B-main)		ABS	23.2	2	1.6	286K		19-20 ft	
						3 Tacks		C (C-main)		MAN	17	3	29.9	263K		21-22 ft	
						4 Tracks		G (A-branch)	0.9			4	22.3	< 263K		> 22 ft	53.3
						>= 5 Tracks		H (B-branch)	50.4			5		No Data	53.3	No Data	
Subtotal	1,242.0	1,704.0	-	-	-	1 Track	784.5	A (A-main)	978.8	CTC	1,125.5	1	11.7	315K	1,054.0	16-18 ft	606.7
						2 Tracks	446.7	B (B-main)	38.8	ABS	89.8	2	51.4	286K	8.5	19-20 ft	299.9
						3 Tacks	9.0	C (C-main)	119.1	MAN	28.3	3	190.5	263K	39.0	21-22 ft	0.0
						4 Tracks		G (A-branch)	49.4			4	472.1	< 263K	0.0	> 22 ft	219.9
						>= 5 Tracks		H (B-branch)	57.3			5	533.0	No Data	120.5	No Data	95.6
Subtotal						1 Track	63.3%	A (A-main)	78.7%	CTC	90.5%	1	0.9%	315K	86.3%	16-18 ft	49.6%
						2 Tracks	36.0%	B (B-main)	3.1%	ABS	7.2%	2	4.1%	286K	0.7%	19-20 ft	24.5%
						3 Tacks	0.7%	C (C-main)	9.6%	MAN	2.3%	3	15.1%	263K	3.2%	21-22 ft	0.0%
						4 Tracks		G (A-branch)	4.0%			4	37.5%	< 263K	0.0%	> 22 ft	18.0%
						>= 5 Tracks		H (B-branch)	4.6%			5	42.3%	No Data	9.9%	No Data	7.8%

Table C.5: Network Characteristics of Existing Major Class I Railroad Subdivisions and Major Freight Short Lines in California (continued)

Rail Subdivision Name	Total Line Miles Operated	Total Track Miles Operated	Average Number of Trains in Base Year			Number of Tracks		Mainline Class		Signal Type[a]		FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
			Freight	Passenger	Total	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
All Regions																	
Grand Total	3,442.0	4,071.8	-	-	-	1 Track	2,817.0	A (A-main)	2,270.0	CTC	2,339.9	1	38.5	315K	2,855.8	16-18 ft	1,880.7
						2 Tracks	614.6	B (B-main)	241.0	ABS	893.1	2	380.2	286K	283.0	19-20 ft	822.8
						3 Tacks	9.0	C (C-main)	587.8	MAN	211.9	3	794.8	263K	39.0	21-22 ft	0.0
						4 Tracks		G (A-branch)	285.1			4	1,086.1	< 263K	0.0	> 22 ft	219.9
						>= 5 Tracks		H (B-branch)	60.9			5	1,167.2	No Data	120.5	No Data	374.9
Grand Total						1 Track	81.9%	A (A-main)	65.9%	CTC	67.9%	1	1.1%	315K	86.6%	16-18 ft	57.0%
						2 Tracks	17.9%	B (B-main)	7.0%	ABS	25.9%	2	11.0%	286K	8.6%	19-20 ft	24.9%
						3 Tacks	0.3%	C (C-main)	17.1%	MAN	6.2%	3	22.9%	263K	1.2%	21-22 ft	0.0%
						4 Tracks		G (A-branch)	8.3%			4	31.3%	< 263K	0.0%	> 22 ft	6.7%
						>= 5 Tracks		H (B-branch)	1.8%			5	33.7%	No Data	3.7%	No Data	11.4%

Note:

[a] Signal type" acronyms have the following meaning in this table: ABS – Automatic Block Signal; CTC – Centralized Traffic Control; MAN – Manual.

Sources: Oak Ridge National Laboratory (ORNL) rail network; Caltrans GIS rail network; AECOM and Cambridge Systematics, Inc, 2013

Table C.6: Network Characteristics of Existing Major Short Line Railroads in California, 2009

Name of Short Line	SCAC	Total Line Miles Owned	Total Track Miles Operated	FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
				Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Central Coast Region									
Santa Maria Valley Railroad	SMV	14.7	14.7	1	14.7	315K	14.7	16-18 ft	
				2		286K		19-20 ft	
				3		263K		21-22 ft	
				4		< 263K		> 22 ft	14.7
				5		No Data		No Data	
Ventura County Railroad Company	VCRR	13.0	13.0	1	13.0	315K		16-18 ft	
				2		286K		19-20 ft	
				3		263K		21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data	13.0	No Data	13.0
Santa Cruz Industrial Lead		0.0	12.8	1	12.8	315K		16-18 ft	
				2		286K		19-20 ft	12.8
				3		263K	12.8	21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data		No Data	

Table C.6: Network Characteristics of Existing Major Short Line Railroads in California, 2009 (continued)

Name of Short Line	SCAC	Total Line Miles Owned	Total Track Miles Operated	FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
				Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Subtotal		27.7	40.5	1	40.5	315K	14.7	16-18 ft	0.0
				2	0.0	286K	0.0	19-20 ft	12.8
				3	0.0	263K	12.8	21-22 ft	0.0
				4	0.0	< 263K	0.0	> 22 ft	14.7
				5	0.0	No Data	13.0	No Data	13.0
				1	100.0%	315K	36.3%	16-18 ft	0.0%
				2	0.0%	286K	0.0%	19-20 ft	31.6%
				3	0.0%	263K	31.6%	21-22 ft	0.0%
				4	0.0%	< 263K	0.0%	> 22 ft	36.3%
				5	0.0%	No Data	32.1%	No Data	32.1%
Central Valley Region									
San Joaquin Valley Railroad Co.	SJVR	258.0	286.7	1	158.1	315K	47.3	16-18 ft	2.5
				2	101.9	286K		19-20 ft	47.6
				3	26.7	263K	3.1	21-22 ft	
				4		< 263K	115.7	> 22 ft	
				5		No Data	120.7	No Data	236.7
California Northern Railroad	CFNR	58.2	58.2	1	4.4	315K	58.2	16-18 ft	
				2	53.8	286K		19-20 ft	58.2
				3		263K		21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data		No Data	

Table C.6: Network Characteristics of Existing Major Short Line Railroads in California, 2009 (continued)

Name of Short Line	SCAC	Total Line Miles Owned	Total Track Miles Operated	FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
				Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Sierra Northern Railway – Oakdale	SERA	48.4	48.4	1	20.3	315K		16-18 ft	
				2	28.1	286K		19-20 ft	
				3		263K		21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data	48.4	No Data	48.4
Central California Traction	CCT	15.0	15.0	1	15.0	315K		16-18 ft	
				2		286K		19-20 ft	
				3		263K		21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data	15.0	No Data	15.0
Modesto & Empire Traction Co.	MET	9.1	9.1	1	9.1	315K		16-18 ft	
				2		286K		19-20 ft	
				3		263K		21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data	9.1	No Data	9.1
Stockton Terminal & Eastern Railroad	STE	8.4	8.4	1	8.4	315K	8.4	16-18 ft	
				2		286K		19-20 ft	0.2
				3		263K		21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data		No Data	8.3
West Isle Line, Inc.	WFS	5.8	5.8	1	5.8	315K		16-18 ft	
				2		286K		19-20 ft	
				3		263K		21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data	5.8	No Data	5.8

Table C.6: Network Characteristics of Existing Major Short Line Railroads in California, 2009 (continued)

Name of Short Line	SCAC	Total Line Miles Owned	Total Track Miles Operated	FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
				Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Subtotal		402.9	431.7	1	221.1	315K	113.9	16-18 ft	2.5
				2	183.8	286K	0.0	19-20 ft	105.9
				3	26.7	263K	3.1	21-22 ft	0.0
				4	0.0	< 263K	115.7	> 22 ft	0.0
				5	0.0	No Data	199.0	No Data	323.3
				1	51.2%	315K	26.4%	16-18 ft	0.6%
				2	43%	286K	0.0%	19-20 ft	24.5%
				3	6%	263K	0.7%	21-22 ft	0.0%
				4	0%	< 263K	26.8%	> 22 ft	0.0%
				5	0%	No Data	46.1%	No Data	74.9%
Northern California Region									
California Northern Railroad	CFNR	149.9	160.3	1	23.3	315K	111.0	16-18 ft	
				2	58.3	286K		19-20 ft	111.0
				3	78.6	263K		21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data	49.1	No Data	49.1
Northwestern Pacific	NWP	70.9	60.5	1	45.1	315K		16-18 ft	
				2	14.9	286K		19-20 ft	
				3	0.6	263K	24.4	21-22 ft	
				4		< 263K	29.3	> 22 ft	
				5		No Data	6.8	No Data	60.5

Table C.6: Network Characteristics of Existing Major Short Line Railroads in California, 2009 (continued)

Name of Short Line	SCAC	Total Line Miles Owned	Total Track Miles Operated	FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
				Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Central Oregon & Pacific Railroad	CORP	58.9	58.9	1		315K		16-18 ft	
				2	58.9	286K		19-20 ft	
				3		263K	58.9	21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data		No Data	58.9
Lake County Railway (a division of Frontier Rail)	LCR/ LCY	41.1	41.1	1	41.1	315K		16-18 ft	
				2		286K		19-20 ft	
				3		263K		21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data	41.1	No Data	41.1
Sierra Northern Railway – California Western	SERA	39.6	39.6	1	17.6	315K		16-18 ft	39.6
				2	22.0	286K		19-20 ft	
				3		263K		21-22 ft	
				4		< 263K	39.6	> 22 ft	
				5		No Data		No Data	
Napa Valley Railroad	NVRR	21.7	21.7	1	6.0	315K		16-18 ft	
				2	15.6	286K		19-20 ft	
				3		263K		21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data	21.7	No Data	21.7
Sierra Northern Railway – Western Sacramento/ Woodland	SERA	16.3	16.3	1	11.7	315K		16-18 ft	
				2	4.6	286K		19-20 ft	
				3		263K		21-22 ft	
				4		< 263K	16.3	> 22 ft	16.3
				5		No Data		No Data	

Table C.6: Network Characteristics of Existing Major Short Line Railroads in California, 2009 (continued)

Name of Short Line	SCAC	Total Line Miles Owned	Total Track Miles Operated	FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
				Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Oakland Terminal Railway[a]	OTR	N/A	10.0	1	N/A	315K	N/A	16-18 ft	N/A
				2		286K		19-20 ft	
				3		263K		21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data		No Data	
Sacramento Valley Railroad[a]	SAV	N/A	7.0	1	N/A	315K	N/A	16-18 ft	N/A
				2		286K		19-20 ft	
				3		263K		21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data		No Data	
Richmond Pacific Railroad Corp.	RPRC	6.2	6.2	1	6.2	315K		16-18 ft	
				2		286K		19-20 ft	
				3		263K		21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data	6.2	No Data	6.2

Name of Short Line	SCAC	Total Line Miles Owned	Total Track Miles Operated	FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
				Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Quincy Railroad	QRR	3.1	3.1	1		315K		16-18 ft	
				2	3.1	286K		19-20 ft	
				3		263K		21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data	3.1	No Data	3.1
Subtotal		N/A	424.6	1	151.1	315K	111.0	16-18 ft	39.6
				2	177.3	286K	0.0	19-20 ft	111.0
				3	79.2	263K	83.3	21-22 ft	0.0
				4	0.0	< 263K	85.2	> 22 ft	16.3
				5	0.0	No Data	127.9	No Data	240.5
				1	37.1%	315K	27.2%	16-18 ft	9.7%
				2	44%	286K	0.0%	19-20 ft	27.2%
				3	19%	263K	20.4%	21-22 ft	0.0%
				4	0%	< 263K	20.9%	> 22 ft	4.0%
				5	0%	No Data	31.4%	No Data	59.0%
Southern California Region									
Arizona & California Railroad Co.	AZRC	83.8	83.8	1	17.1	315K		16-18 ft	
				2	55.1	286K		19-20 ft	
				3	11.6	263K	83.8	21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data		No Data	83.8
Los Angeles Junction Railway Company[a]	LAJ		64.0	1		315K	N/A	16-18 ft	N/A
				2		286K		19-20 ft	
				3		263K		21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data		No Data	

Table C.6: Network Characteristics of Existing Major Short Line Railroads in California, 2009 (continued)

Name of Short Line	SCAC	Total Line Miles Owned	Total Track Miles Operated	FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
				Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Pacific Sun Railroad, LLC	PSRR		62.0	1		315K	N/A	16-18 ft	N/A
				2		286K		19-20 ft	
				3		263K		21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data		No Data	
San Diego & Imperial Valley Railroad	SDIY	33.4	33.4	1	33.4	315K		16-18 ft	
				2		286K		19-20 ft	
				3		263K	14.4	21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data	19.1	No Data	33.4
Trona Railway Company	TRC	30.9	30.9	1		315K		16-18 ft	
				2	30.9	286K	30.9	19-20 ft	
				3		263K		21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data		No Data	30.9
Pacific Harbor Line, Inc.	PHL	18.9	18.9	1	4.8	315K	13.2	16-18 ft	
				2	14.1	286K		19-20 ft	8.2
				3		263K	1.9	21-22 ft	
				4		< 263K		> 22 ft	
				5		No Data	3.7	No Data	10.7

Table C.6: Network Characteristics of Existing Major Short Line Railroads in California, 2009 (continued)

Name of Short Line	SCAC	Total Line Miles Owned	Total Track Miles Operated	FRA Track Class		Maximum Gross Weight		Maximum Height Restriction	
				Type	Miles of the System	Type	Miles of the System	Type	Miles of the System
Subtotal		N/A	293.0	1	55.3	315K	13.2	16-18 ft	0.0
				2	100.1	286K	30.9	19-20 ft	8.2
				3	11.6	263K	100.0	21-22 ft	0.0
				4	0.0	< 263K	0.0	> 22 ft	0.0
				5	0.0	No Data	22.8	No Data	158.8
				1	33.1%	315K	7.9%	16-18 ft	0.0%
				2	60%	286K	18.5%	19-20 ft	4.9%
				3	7%	263K	59.9%	21-22 ft	0.0%
				4	0%	< 263K	0.0%	> 22 ft	0.0%
				5	0%	No Data	13.6%	No Data	95.1%
Grand Total		N/A	1,189.6	1	467.9	315K	252.8	16-18 ft	42.1
				2	461.3	286K	30.9	19-20 ft	237.8
				3	117.5	263K	199.2	21-22 ft	0.0
				4	0.0	< 263K	200.9	> 22 ft	31.0
				5	0.0	No Data	362.6	No Data	735.5
				1	44.7%	315K	24.2%	16-18 ft	4.0%
				2	44.1%	286K	3.0%	19-20 ft	22.7%
				3	11.2%	263K	19.0%	21-22 ft	0.0%
				4	0.0%	< 263K	19.2%	> 22 ft	3.0%
				5	0.0%	No Data	34.6%	No Data	70.3%

Sources: Caltrans, 2012.

SCAC = Standard Carrier Alpha Code.

C.4.1 Federal Railroad Administration Track Class

The FRA has established nine specific classes of track (Class 1 to Class 9). Each classification has a corresponding maximum allowable operating speed, as well as a corresponding track structure, geometry, and inspection frequency.[3] Every railroad determines the track class for each segment of track on their system. The FRA track class provides a proxy for the condition of a line segment. Higher levels of maintenance and better track conditions accompany each successively higher FRA track class. If a line is not maintained sufficiently for trains to be operated at the class of track associated with the published timetable speeds of the line, then speed reductions ("slow orders") must be placed on the tracks. Slow orders, typically temporary, are removed once the track defects have been corrected. However, along low-density rail lines, slow orders to take on a more permanent nature, resulting in typical actual conditions noted for a given segment below the stated FRA track class.

As shown in Table C.7, over 87.9 percent of Class I mainlines in the State have a maximum freight train speed of 40 mph or higher (Class 3), and about 65 percent of the Class I mainlines have a maximum freight train speed of 60 mph or higher (Class 4).

Table C.7: FRA Track Classification by Rail Type and Region, 2009

		Number of Line Miles by FRA Track Class (Maximum Freight Train Speed)					Percentage of Split by Length of FRA Track Class (Maximum Freight Train Speed)				
Name of Region	**Rail Type**	**1 (10 mph)**	**2 (25 mph)**	**3 (40 mph)**	**4 (60 mph)**	**5 (80 mph)**	**1 (10 mph)**	**2 (25 mph)**	**3 (40 mph)**	**4 (60 mph)**	**5 (80 mph)**
Central Coast	Class I[a]	0	20	248	177	0	0.0%	4.6%	55.7%	39.7%	0.0%
	Short Lines[b]	40.5	0.0	0.0	0.0	0.0	100.0%	0.0%	0.0%	0.0%	0.0%
Central Valley	Class I[a]	0	7	47	138	360	0.0%	1.3%	8.5%	25.0%	65.1%
	Short Lines[b]	221.1	183.8	26.7	0.0	0.0	51.2%	42.6%	6.2%	0.0%	0.0%
Northern California	Class I[a]	27	301	309	299	275	2.2%	24.9%	25.5%	24.7%	22.7%
	Short Lines[b]	95.6	162.4	78.6	0.0	0.0	28.4%	48.3%	23.3%	0.0%	0.0%
Southern California	Class I[a]	12	51	191	472	533	0.9%	4.1%	15.1%	37.5%	42.3%
	Short Lines[b]	55.3	100.1	11.6	0.0	0.0	33.1%	60.0%	6.9%	0.0%	0.0%
California Total	**Class I[a]**	**38**	**380**	**795**	**1,086**	**1,167**	**1.1%**	**11.0%**	**22.9%**	**31.3%**	**33.7%**
	Short Lines[b]	**412.4**	**446.4**	**116.9**	**0.0**	**0.0**	**42.3%**	**45.8%**	**12.0%**	**0.0%**	**0.0%**

[a] Track miles includes only line miles or the first mainline tracks of Class I mainline subdivisions. It does not include other mainline, passing, yard, or switching tracks.

[b] Track miles includes only line miles or the first mainline tracks of major freight short lines. It does not include other mainline, passing, yard, or switching tracks.

[c] Sources: 1) Caltrans' GIS rail lines data, rail.shp; 2) California Regional Timetable #20; 3) UPRR: http://www.up.com, California Subdivisions Map; 4) BNSF: http://www.bnsf.com, Timetable No. 1, February 2011, BNSF: California Operating Division map; 5) National Transportation Atlas Database (NTAD) GIS rail lines data, Rail_Lines.shp; 6) American Short Line and Regional Railroad Association (ASLRRA; and 7) California Short Line Railroad Association (CSLRA).

[3] *Federal Railroad Administration Track Safety Standards*.

Track class varies slightly between regions—for example, the Class I rail lines in the Central Valley have the highest average track class compared to the northern or southern regions. This may be due to a variety of factors, including the geography of each region (trains may move faster in flat, wide areas as opposed to over mountain passes), the population density of each region, or the volume of traffic using each rail line.

Additionally, Table C.7 shows that short lines in all regions of the State have lower track class and maximum train speeds than the Class I railroads. Almost 88 percent of the short line mileage operates at FRA track Class 2 or below, and all short line freight trains operate below 40 mph speeds (Class 3). The California Northern and Central Oregon and Pacific Railroads in northern California operate the highest freight train speeds among short line railroads.

C.4.2 Total Class I Track Miles

Table C.8 summarizes Class I track miles operated in each of the four regions. 3,000 of the 4,116 total Class I track miles in the State, are located in southern and northern California, with the remaining 1,000 miles split between the Central Coast and the Central Valley. Much of California's rail miles (about 82 percent) are single track—meaning that there is a single track with sidings placed at regular intervals to allow for trains to pass one another. However, certain areas—in particular, those near the San Pedro Bay Ports, the Port of Oakland, other traffic generating facilities, and BNSF's TRANSCON corridor—have two or three tracks. These areas are shown in Exhibit C.1.

Table C.8: Class I Railroad Track Miles Operated by Region, 2011

		Percentage of Split by Length of Number of Tracks		
Name of Region	**Track Miles Operated**[a,b]	**First Mainline**[b]	**Second Mainline**[b]	**Other Mainlines**[b]
Central Coast	450	98.9%	1.1%	
Central Valley	589	93.7%	6.3%	
Northern California	1,373	89.3%	10.7%	
Southern California	1,704	63.3%	36.7%	0.7%
California Total	**4,116**	**81.9%**	**17.9%**	**0.3%**

[a] Track miles includes only mainline tracks of Class I mainline subdivisions. It does not include passing, yard, or switching tracks.

[b] Oak Ridge National Laboratory (ORNL) National Rail Network; Cambridge Systematics, Inc., 2012.

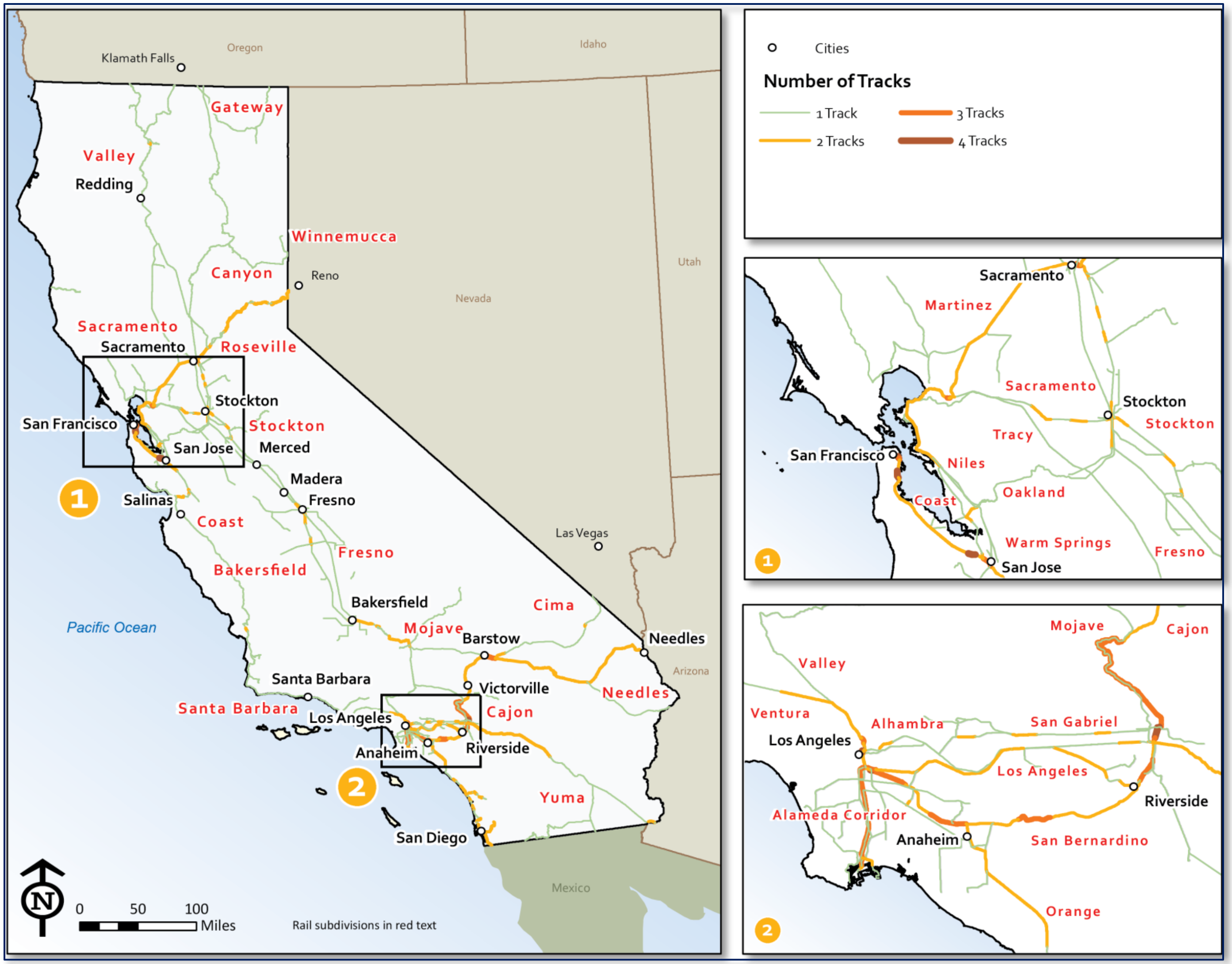

Exhibit C.1: Class I Rail System: Number of Tracks, 2011

Source: ORNL rail network.

C.4.3 Maximum Allowable Gross Weight

Every section of rail line has a maximum gross weight rating. Carrying weight in excess of this rating can lead to damaged rail infrastructure, or, in extreme cases, to catastrophic failure of tracks or bridges[4]. Nationwide, much of the Class I rail system is approved for heavy axle cars that can handle 286,000 pounds, or even 315,000 pounds, of gross weight. Similarly, in California, the vast majority of the Class I rail system (2,924 miles, or 87 percent of total rail miles) can carry up to 315,000 pounds, as shown in Table C.9 and Exhibit C.2. An additional 283 miles of track (8.4 percent) can carry only 286,000 pounds, with only a small percentage (39 miles or 1.2 percent of total miles) rated to less than 286,000 pounds.

Table C.9: Maximum Allowable Gross Weight by Rail Type and Region

		Number of Line Miles by Maximum Gross Weight Restriction Type[c]					Percentage of Split by Length of Maximum Gross Weight Restriction Type[c]				
Name of Region	**Rail Type**	**315,000 lbs**	**286,000 lbs**	**263,000 lbs**	**Less than 263,000 lbs**	**No Data**	**315,000 lbs**	**286,000 lbs**	**263,000 lbs**	**Less than 263,000 lbs**	**No Data**
Central Coast	Class I[a]	429.7	0.0	0.0	0.0	0.0	100.0%	0.0%	0.0%	0.0%	0.0%
	Short Lines[b]	14.7	0.0	12.8	0.0	13.0	36.3%	0.0%	31.6%	0.0%	32.1%
Central Valley	Class I[a]	481.6	36.8	0.0	0.0	0.0	92.9%	7.1%	0.0%	0.0%	0.0%
	Short Lines[b]	113.9	0.0	3.1	115.7	199.0	26.4%	0.0%	0.7%	26.8%	46.1%
Northern California	Class I[a]	958.6	237.6	0.0	0.0	0.0	80.1%	19.9%	0.0%	0.0%	0.0%
	Short Lines[b]	111.0	0.0	83.3	85.2	127.9	27.2%	0.0%	20.4%	20.9%	31.4%
Southern California	Class I[a]	1,054.0	8.5	39.0	0.0	120.5	86.3%	0.7%	3.2%	0.0%	9.9%
	Short Lines[b]	13.2	30.9	100.0	0.0	22.8	7.9%	18.5%	59.9%	0.0%	13.6%
California Total	**Class I[a]**	**2,924.0**	**283.0**	**39.0**	**0.0**	**120.5**	**86.9%**	**8.4%**	**1.2%**	**0.0%**	**3.6%**
	Short Lines[b]	**252.8**	**30.9**	**199.2**	**200.9**	**362.6**	**24.2%**	**3.0%**	**19.0%**	**19.2%**	**34.6%**

[a] Track miles includes only line miles or the first mainline tracks of Class I mainline subdivisions. It does not include other mainline, passing, yard, or switching tracks. BNSF and UPRR weight restrictions data belongs to the year 2012.

[b] Track miles includes only line miles or the first mainline tracks of major freight short lines. It does not include other mainline, passing, yard, or switching tracks. Weight restrictions data for short lines belongs to the year 2009.

[c] Sources: 1) Caltrans' GIS rail lines data,; 2) California Regional Timetable #20; 3) UPRR: California Subdivisions Map; 4) BNSF: Timetable No. 1, February 2011, BNSF: California Operating Division map; 5) National Transportation Atlas Database (NTAD) GIS rail lines data; 6) American Short Line and Regional Railroad Association (ASLRRA):; and 7) California Short Line Railroad Association (CSLRA).

[4] Union Pacific Railroad, *Allowable Gross Weight*.

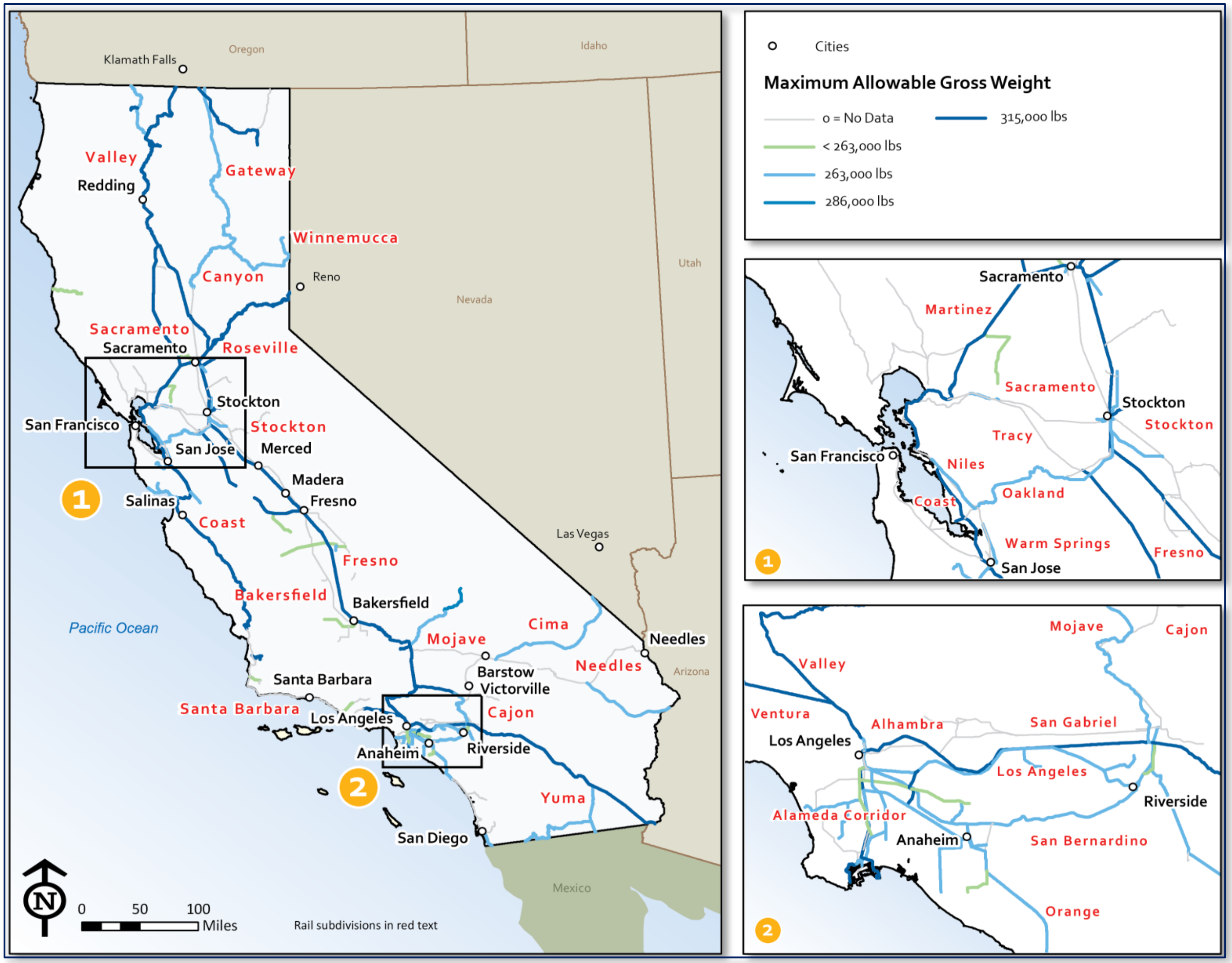

Exhibit C.2: Maximum Allowable Gross Weight

Note: BNSF and UPRR weight restrictions are for year 2012. Weight restrictions for short lines are for year 2009.

Source: Caltrans, 2012.

Short line railroads have a wider variety of track maximum weight ratings.[5] For those short lines reporting this information, roughly 253 miles (24 percent of total available short line rail miles) are rated to 315,000 pounds; 31 miles (3 percent of total) are rated to 286,000 pounds; and the remaining 400 miles (40 percent) are rated to 263,000 pounds or less.

C.4.4 Vertical Clearance

Vertical clearance refers to the height of a loaded train measured from the top of the rail to the top of the cargo while seated and secured on top of a rail car. Height restrictions dictate what type of traffic can move along a particular segment of rail. Table C.10 illustrates that almost 2,000 miles of track (56 percent) have height restrictions of between 16 to 18 feet. About 873 miles (26 percent) can accept car heights of 19 to 20 feet, sufficient for international double-stack service, and only a small portion (220 miles, or 6.5 percent) have height restrictions of more than 22 feet. This means that the majority of the freight rail system in California cannot accept domestic double-stack container traffic, which requires a minimum vertical clearance of 20 feet 6 inches. Exhibit C.3 displays vertical clearance for mainline track.

Table C.10: Maximum Height Restrictions by Rail Type and Region, 2009

		Number of Line Miles by Height Restriction Type[c]					Percentage of Split by Length of Height Restriction Type[c]				
Name of Region	**Rail Type**	**16-18 ft**	**19-20 ft**	**21-22 ft**	**>22 ft**	**No Data**	**16-18 ft**	**19-20 ft**	**21-22 ft**	**>22 ft**	**No Data**
Central Coast	Class I[a]	429.7	0.0	0.0	0.0	0.0	100.0%	0.0%	0.0%	0.0%	0.0%
	Short Lines[b]	0.0	12.8	0.0	14.7	13.0	0.0%	31.6%	0.0%	36.3%	32.1%
Central Valley	Class I[a]	125.6	255.3	0.0	0.0	137.5	24.2%	49.2%	0.0%	0.0%	26.5%
	Short Lines[b]	2.5	105.9	0.0	0.0	323.3	0.6%	24.5%	0.0%	0.0%	74.9%
Northern California	Class I[a]	736.5	317.9	0.0	0.0	141.8	61.6%	26.6%	0.0%	0.0%	11.9%
	Short Lines[b]	39.6	111.0	0.0	16.3	240.5	9.7%	27.2%	0.0%	4.0%	59.0%
Southern California	Class I[a]	606.7	299.9	0.0	219.9	95.6	49.6%	24.5%	0.0%	18.0%	7.8%
	Short Lines[b]	0.0	8.2	0.0	0.0	158.8	0.0%	4.9%	0.0%	0.0%	95.1%
California Total	**Class I[a]**	**1,898.5**	**873.2**	**0.0**	**219.9**	**374.9**	**56.4%**	**25.9%**	**0.0%**	**6.5%**	**11.1%**
	Short Lines[b]	**42.1**	**237.8**	**0.0**	**31.0**	**735.5**	**4.0%**	**22.7%**	**0.0%**	**3.0%**	**70.3%**

[a] Track miles includes only line miles or the first mainline tracks of Class I mainline subdivisions. It does not include other mainline, passing, yard, or switching tracks.

[b] Track miles includes only line miles or the first mainline tracks of major freight short lines. It does not include other mainline, passing, yard, or switching tracks.

[c] Sources; 1) Caltrans' GIS rail network; 2) California Regional Timetable #20; 3) UPRR: California Subdivisions Map; 4) BNSF:, Timetable No. 1, February 2011, BNSF: California Operating Division map; 5) National Transportation Atlas Database (NTAD) GIS rail lines data; 6) American Short Line and Regional Railroad Association (ASLRRA):; and 7) California Short Line Railroad Association (CSLRA)

[5] This information is not available for all short line railroads in California. Therefore, statistics offered on short line railroads are, in some cases, representative of only a portion of the total short line system.

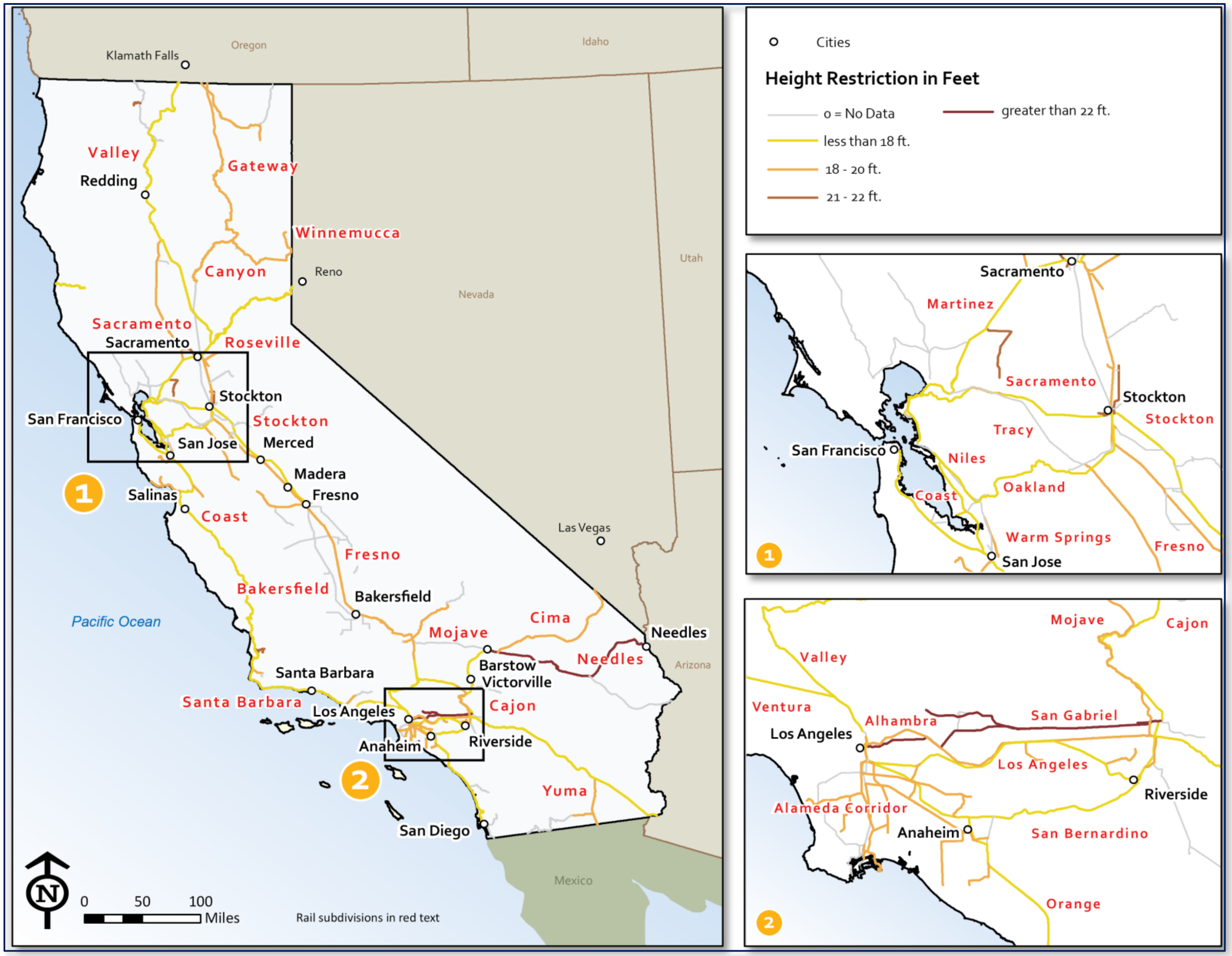

Exhibit C.3: Vertical Clearance Restrictions, 2009

Source: Caltrans, 2012.

C.5 Train Volumes

Table C.11 presents estimates of freight train volumes by train types for segments of track and by subdivision for the State's Class I rail mainlines.

Table C.11: Existing Train Volumes on Class I Rail Mainline Segments by Region, 2007

Segment From/To	Segment To/From	Subdivision	Base Year Intermodal Freight Train Count (Daily)	Base Year Freight Non-Intermodal Train Count (Daily)	Base Year Total Freight Train Count (Daily)
Central Coast Region					
Los Angeles Union Station	Burbank Downtown	SCRRA Valley	0	10	10
Burbank Downtown	Gemco Plant	Ventura	0	8	8
Gemco Plant	CP Davis	Ventura	0	6	6
CP Davis	East Ventura	Ventura	0	6	6
East Ventura	San Luis Obispo	Santa Barbara	0	6	6
San Luis Obispo	Callender	Coast	0	4	4
Callender	San Jose	Coast	0	2	2
Central Valley Region					
Bakersfield	Fresno	Bakersfield	14	12	26
Fresno	Stockton	Stockton	12	12	24
El Pinal	Sacramento	Sacramento	0	6	6
Bakersfield	Fresno	Fresno	8	10	18
Fresno	Stockton	Fresno	8	10	18
Stockton	El Pinal	Fresno	22	18	40
El Pinal	Sacramento	Fresno	22	12	34
Northern California Region					
Stockton	Port Chicago	Stockton	6	4	10
Port Chicago	Richmond	Stockton	6	4	10
Sacramento	Martinez	Martinez	10	8	18
Martinez	Richmond	Martinez	10	8	18
Richmond	El Cerrito	Martinez	10	8	18
El Cerrito	Oakland	Martinez	14	10	24
Oakland	Oakland Coliseum	Niles	2	6	8
Oakland Coliseum	Niles	Niles	2	6	8
Niles	San Jose	Niles	0	8	8

Table C.11: Existing Train Volumes on Class I Rail Mainline Segments by Region, 2007 (continued)

Segment From/To	Segment To/From	Subdivision	Base Year Intermodal Freight Train Count (Daily)	Base Year Freight Non-Intermodal Train Count (Daily)	Base Year Total Freight Train Count (Daily)
Niles	Lathrop	Oakland	2	2	4
Lathrop	Stockton	Oakland	10	14	24
Stockton	Port Chicago	Tracy	0	0	0
Port Chicago	Martinez	Tracy	0	0	0
Sacramento	Roseville	Roseville	18	14	32
Roseville	Auburn	Roseville	18	0	18
Auburn	Reno, NV	Roseville	18	0	18
Sacramento	Marysville	Sacramento	4	10	14
Roseville	Marysville	Valley	0	16	16
Marysville	Klamath Falls, OR	Valley	4	4	8
Marysville	Keddie	Canyon	0	18	18
Keddie	Flanigan, NV	Canyon/Winnemucca	0	16	16
Keddie	Klamath Falls, OR	Gateway	0	4	4
Southern California Region					
Hobart	Fullerton	San Bernardino	28	4	32
Fullerton	Atwood	San Bernardino	28	4	32
Atwood	W. Riverside	San Bernardino	28	6	34
W. Riverside	Riverside	San Bernardino	42	14	56
Riverside	Highgrove	San Bernardino	42	14	56
Colton	San Bernardino	San Bernardino	32	14	46
San Bernardino	Keenbrook	Cajon	36	16	52
Keenbrook	Silverwood	Cajon	36	16	52
Silverwood	Barstow	Cajon	38	20	58
Barstow	Yermo	Needles	46	18	64
Yermo	Needles	Needles	40	14	54
Barstow	Mojave	Mojave – BNSF	14	12	26
Mojave	Bakersfield	Mojave – UPRR	22	22	44
Lancaster	Mojave	Mojave – UPRR	8	10	18
Palmdale	Lancaster	Mojave – UPRR	8	10	18
Silverwood	Palmdale	Mojave – UPRR	0	12	12
Keenbrook	Silverwood	Mojave – UPRR	4	16	20
W. Colton	Keenbrook	Mojave – UPRR	4	16	20

Table C.11: Existing Train Volumes on Class I Rail Mainline Segments by Region, 2007 (continued)

Segment From/To	Segment To/From	Subdivision	Base Year Intermodal Freight Train Count (Daily)	Base Year Freight Non-Intermodal Train Count (Daily)	Base Year Total Freight Train Count (Daily)
East Los Angeles	Pomona	Los Angeles	12	2	14
Pomona	Montclair	Los Angeles	16	2	18
Montclair	Mira Loma	Los Angeles	16	4	20
Mira Loma	W. Riverside	Los Angeles	16	4	20
Santa Clarita	Palmdale	SCRRA Valley	0	6	6
Burbank Downtown	Santa Clarita	SCRRA Valley	0	6	6
Los Angeles	Burbank Downtown	SCRRA Valley	0	10	10
Fullerton	Orange	SCRRA Orange	0	6	6
Orange	Irvine	SCRRA Orange	0	8	8
Irvine	Laguna Niguel	SCRRA Orange	0	8	8
Laguna Niguel	Oceanside	SCRRA Orange	0	4	4
Oceanside	San Diego	NCTD San Diego	0	6	6
Atwood	Orange	SCRRA Olive	0	4	4
LATC	El Monte	Alhambra	16	6	22
El Monte	Bassett	Alhambra	16	6	22
Bassett	Industry	Alhambra	16	6	22
Industry	Pomona	Alhambra	20	8	28
Pomona	Montclair	Alhambra	16	8	24
Montclair	Kaiser	Alhambra	16	10	26
Kaiser	W. Colton	Alhambra	16	12	28
W. Colton	Colton	Alhambra	14	14	28
Yermo	Las Vegas, NV	Cima	6	4	10
Colton	Indio	Yuma	26	18	44
Indio	Yuma, AZ	Yuma	26	18	44

Sources: AECOM and Cambridge Systematics, Inc., 2012.

C.6 Surface Transportation Board Railroad Abandonment Filings

Table C.12 lists all of the Surface Transportation Board abandonment filings in California between 2005 and 2010. This list includes all segments covered by abandonment filings in this period, and may include cases where abandonment was denied. This list reveals no clear patterns or trends in abandonment filings. Miles of route proposed for abandonment changed sporadically from year to year, and short line railroads consistently (across the 2005 to 2010 timeframe) submitted more abandonment requests than Class I railroads. In fact, between 2005 and 2010, short line railroad abandonment requests affected almost 193 miles compared to only 83 miles attributed to Class I railroads. Discussions with Class I railroads suggest that many of these requests were for industrial leads or other connector facilities to individual industries and businesses.

Table C.12: Rail Line Abandonment Filings with FRA, 2005 to 2010

Name	Owner/Line	Year	Counties	City	Length
Almanor Railroad Co.		2010	Plumas, Lassen	Clear Creek	12.3
BNSF	Alameda Beltline RR	2010	Alameda		2.0
UPRR	Brea Chemical Industrial Lead	2010	Orange	Brea	1.2
UPRR	South San Francisco Industrial Lead	2010	San Mateo		0.6
San Diego Imperial Valley (SDIY)		2009	San Diego	Escondido	1.4
Arizona and California Railroad Co.		2009	San Bernardino and Riverside		49.4
Tulare Valley RR Co.		2009	Tulare	Ducor	5.9
UPRR	McHenry Industrial Lead	2009	San Joaquin and Stanislaus		5.2
UPRR (Nevada-CA)	Lassen Valley Railway LLC	2009			22.3
UPRR	Lakewood Industrial Lead	2008	Los Angeles	Lakewood	0.3
San Joaquin Valley RR Co.	South Exeter Branch	2008	Tulare		30.6
San Joaquin Valley RR Co.	South Exeter Branch	2008	Tulare		9.2
UPRR	Santa Monica Industrial Lead	2008	Los Angeles	Los Angeles	0.4
LA Metro	Santa Monica Industrial Lead	2008	Los Angeles		0.3
UPRR	Loyalton Industrial Lead	2007	Plumas and Sierra		11.1
UPRR	Loyalton Industrial Lead	2007	Sierra	Loyalton	0.7
BNSF		2007	Riverside	Riverside	0.5
UPRR	Riverside Industrial Lead	2007	Riverside		0.3
UPRR (Nevada-CA)	Flanigan Industrial Lead	2006			21.8
UPRR (Nevada-CA)	Susanville Industrial Lead	2006	Wendal, Lassen		0.6
UPRR	Pearson Industrial Lead	2006	Yuba		4.8
Sunset Railway Co/ San Joaquin Valley RR	Sunset Subdivision	2005	Kern	Levee	0.2
McCloud RR Co.		2005	Siskiyou, Shasta		80.0
Los Angeles Junction Railway		2005	Los Angeles	Maywood	0.5
Santa Clara Valley Transportation Authority	Industrial Line	2005	Santa Clara		0.2
Santa Clara Valley Transportation Authority	Milpitas Line	2005	Alameda	Fremont	2.8
UPRR	Tustin Industrial Lead	2005	Orange	Orange	1.5
UPRR	Holtville Industrial Lead	2005	Imperial County		9.38

Source: FRA Abandonment filings.

Appendix D

SECTION 6.2 SUPPLEMENTAL INFORMATION: FREIGHT DEMAND ANALYSIS AND POSITIVE TRAIN CONTROL

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D.1 Freight Demand Data and Methodology

D.1.1 Methodology and Data Sources

This section discusses the current and forecast (2040) commodity flows and train volumes over the freight rail system. The commodity flow analysis and forecasts used a blend of economic and commodity flow data sources, drawn from publicly available datasets as well as some specialized, confidential data provided to Caltrans for the development of the California State Rail Plan. Six main data sources support the commodity flow assessment:

1. 2007 Confidential Carload Waybill Sample – Surface Transportation Board (STB). The Association of American Railroads (AAR) collects Waybill data annually for the STB from railroads that have moved at least 4,500 carloads each year for each of the previous three years, or that move five percent or more of any state's total rail traffic. The Waybill dataset enabled assembly of county-to-county 2007 tonnage estimates of rail flows and information on railway routing, and Caltrans received this data under a confidential user agreement. This sample formed the basis for the base year (2007) freight rail traffic. This was then corroborated and augmented using Freight Analysis Framework Version 3 (FAF3) commodity flows database (2007 to 2040) and California's economic forecasts from TREDIS (2008-2041) to estimate the forecast year (2040) commodity flows.
2. Freight Analysis Framework (FAF3) – FHWA. Developed and provided by the Federal Highway Administration (FHWA), FAF3 provides tonnage estimates by commodity type, and mode for 123 U.S. regions consisting of major metropolitan areas, state remainders, and 16 entire states. The primary basis for FAF3 is a 2007 survey of the shipping behavior of 100,000 U.S. manufacturers and wholesalers (i.e., the Commodity Flow Survey), supplemented by *The Journal of Commerce*'s Port Import Export Reporting System (PIERS), the U.S. Army Corps of Engineers' Waterborne Commerce Database, and the STB's Carload Waybill Sample for rail. The forecast incorporated into FAF3, produced by IHS Global Insight using Q2 2010 as the base period, was applied to the 2007 Carload Waybill sample to project volumes in 2040, as well as the intermediate years of 2015, 2020, 2025, 2030, and 2035. The FAF3 growth rates were then adjusted using TREDIS economic data.
3. Class I Railroad Train Counts and Data – UPRR/BNSF. Representatives of the Union Pacific (UPRR) and BNSF Railway (BNSF) provided train count data for limited segments on the California rail network. These counts validated flows created through other data sources.
4. TREDIS Data. Caltrans and the University of California, Davis purchased this dataset in 2011, which includes output and demand forecasts by industrial sector for the years 2008 to 2041. These data formed the basis for understanding California's economy as well as adjusting commodity flow growth rates as suggested by the FAF3 dataset. Moody's Economy.com forecasts provide the actual basis for sector data incorporated in TREDIS. Using these forecasts to adjust the FAF3 commodity growth rates ensured that the freight forecasts were consistent with the passenger travel forecasts developed using Moody's employment data, and that the freight growth rates were based on more recent forecasts that take into account the slower recovery of the nation's and California's economy than is reflected in the FAF3 forecasts.
5. San Pedro Bay Port Forecasts. Freight rail forecasts for southern California, which are dominated by intermodal traffic from the San Pedro Bay Ports, generally match forecasts being used by these ports for environmental documents associated with port expansion projects. These port rail forecasts use container forecasts developed by The Tioga Group and IHS Global Insight and updated in July 2009 to reflect the impacts of the recent recession and the slowdown in international import trade.

6. Interviews with short line railroad managers/operators. Since our primary data source (the Carload Waybill sample) concentrates on Class I railroad data, a set of one-on-one interviews with short line rail managers supplemented available short line railroad information and commodity flow information. Although this information did not sufficiently identify the commodity flows and train volumes by line, it provided insight into current and future markets served by short line railroads in California as discussed in Section 6.2.2, as well as short line railroads' supporting role to the Class I railroads.

D.1.2 Goods Movement Analysis Zones

The freight commodity flow and market discussion uses six goods-movement analysis zones, as shown in Table D.1 and Exhibit D.1. These zones follow the FHWA's definition of California's economic geography in the FAF3 commodity flow database. Four represent the State's metropolitan regions, while the fifth zone—defined as "the remainder of California" in FAF3—is divided into two zones: the San Joaquin Valley (Valley) and the remaining non-urban counties that are not part of the San Joaquin Valley (i.e., the remainder of California). The San Joaquin Valley separation represents its importance as a distinctive economic region that stands apart from the other non-urbanized sections of California. The Valley's substantial agricultural production distinguishes the region from a freight perspective.[6]

The statewide rail-based commodity flows shown in Table D.2 were disaggregated to the goods movement analysis zones and then individual counties.

Table D.1: The Six Goods Movement Analysis Zones

Goods Movement Analysis Zone	Counties Included
Los Angeles/Long Beach	Los Angeles, Orange, Riverside, San Bernardino, Ventura
San Diego	San Diego
Sacramento	El Dorado, Nevada, Placer, Sacramento, Sutter, Yolo, Yuba
San Jose/San Francisco/Oakland	Alameda, Contra Costa, Marin, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano, Sonoma
San Joaquin Valley	Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, Tulare
Remainder of California	All counties not designated in the other five regions

Source: Cambridge Systematics, Inc, 2012.

6 In 2011, the agricultural output from the San Joaquin Valley was about $35 billion.

Exhibit D.1: The Six Goods Movement Analysis Zones

Source: Economic and Social Research Institute (ESRI) GIS data; Cambridge Systematics, Inc, 2012.

Table D.2: California Rail Flows and Percentage Growth for Highest-Volume[a] Commodities by Rail Service Type between 2007 and 2040

	Carload						Intermodal						Total		
	Ports Market			Domestic and Other Market			Ports Market			Domestic and Other Market					
SCTG2 Commodity	2007 Tons (000s)	2040 Tons (000s)	% Growth	2007 Tons (000s)	2040 Tons (000s)	% Growth	2007 Tons (000s)	2040 Tons (000s)	% Growth	2007 Tons (000s)	2040 Tons (000s)	% Growth	2007 Tons (000s)	2040 Tons (000s)	% Growth
Mixed Freight	28	56	99.6%	645	1,397	116.7%	54,635	161,599	195.8%	16,958	44,089	160.0%	72,266	207,141	186.6%
Cereal Grains (including seed)	160	210	30.9%	12,228	12,706	3.9%	1,942	3,646	87.7%	25	40	64.2%	14,355	16,602	15.7%
Other Prepared Foodstuffs, and Fats and Oils	187	371	98.5%	7,216	11,497	59.3%	305	542	77.8%	1,081	1,901	75.9%	8,789	14,311	62.8%
Wood Products	63	48	-24.1%	8,102	8,408	3.8%	135	311	130.1%	212	303	42.9%	8,512	9,069	6.5%
Motorized and Other Vehicles	856	1,409	64.6%	5,062	9,849	94.6%	264	485	83.5%	501	404	-19.4%	6,683	12,147	81.8%
Coal and Petroleum Products, n.e.c.	534	867	62.5%	5,425	7,542	39.0%	27	67	144.1%	17	26	54.4%	6,003	8,503	41.6%
Basic Chemicals	1,085	2,114	94.9%	4,299	6,593	53.4%	500	1,123	124.4%	118	201	69.7%	6,002	10,030	67.1%
Base Metal in Primary or Semi-Finished Forms	1,498	1,646	9.9%	3,804	4,677	23.0%	167	143	-13.9%	45	38	-14.9%	5,513	6,505	18.0%
Pulp, Newsprint, Paper, and Paperboard	6	9	40.9%	4,773	5,739	20.2%	141	116	-17.9%	142	112	-21.2%	5,062	5,975	18.0%
Other	1,422	2,618	84.1%	29,100	48,489	66.6%	2,998	10,314	244.0%	4,055	9,299	129.3%	37,575	70,720	88.2%
Total	**5,953**	**9,439**	**58.6%**	**84,912**	**120,622**	**42.1%**	**61,675**	**179,303**	**190.7%**	**23,220**	**56,503**	**143.3%**	**175,760**	**365,866**	**108.2%**

Source: Federal Highway Administration FAF3 database and STB Carload Waybill Sample.

[a] Highest-volume in terms of 2007 total rail-based flow volume in tons.

D.2 County-Level Rail Commodity Flows

D.2.1 2007 Outbound

Examination of county-level rail commodity flows provides insights into which regions depend most on freight rail, as well an initial indication of where potential bottlenecks in the network will be in the future.

Exhibit D.2 shows the origin of rail commodity tonnages by California county. Los Angeles County originates the greatest amount of rail tonnage (25 million to 50 million tons), reflecting the prominence of Los Angeles County as home to the two largest container ports in the U.S. (the Port of Los Angeles and the Port of Long Beach), as well as its position as the largest county in the U.S. in terms of manufacturing production. In fact, in 2007, the County produced $118 million of manufactured products.[7]

Rail-based imports from southern California ports, which primarily include mixed freight and automobiles and their parts, comprise the majority of outbound traffic from Los Angeles County. In addition, rail also handles goods manufactured in Los Angeles County—namely, base metal products, refined petroleum and related products, basic chemicals, motorized vehicles and their parts, and aircraft, space vehicles, missiles, and their parts, some of which are exported to other parts of the world. In addition, San Bernardino, San Joaquin, Kern, Contra Costa, and Alameda counties also originated significant tons of rail-carried commodities (10 million to 25 million tons).

- San Bernardino County is home to BNSF's San Bernardino intermodal yard, which generates a substantial portion of the county's mixed freight rail traffic. The next important commodity shipped by rail from San Bernardino County, nonmetallic minerals, includes manufactured cement, crushed stone, sand, and gravel for construction.[8]
- San Joaquin County generates a fair amount of outbound mixed freight traffic due to the presence of BNSF's Stockton and UPRR's Lathrop intermodal yards. Food manufacturing contributes most of the other rail flows from San Joaquin County, including prepared foodstuffs, alcoholic beverages, milled grain products, bakery products, and other agricultural products.
- Kern County extracts several nonmetallic minerals, including cement, gypsum, crushed stone, sand and gravel, sulfur, borates, silver, gold, and shale, much of which gets shipped by rail.[9] In addition, oil refineries near Bakersfield also depend on rail. Kern County also moves basic chemicals and other agricultural products by rail.
- Contra Costa County has several oil refineries located near Richmond, Martinez, Benicia and San Francisco that depend on rail for transportation. Contra Costa County also manufactures base metal products, some of which are exported out of the Port of Richmond's bulk terminal. In addition, motorized vehicles and their parts, basic chemicals, and some mixed freight moves out of the county by rail.
- Alameda County generates mixed freight from the Oakland International Gateway and Railport-Oakland intermodal yards at the Port of Oakland. Motorized vehicles and their parts, alcoholic beverages, basic chemicals, and waste and scrap also move from Alameda County by rail.

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[7] Los Angeles County Development Corporation and Kyser Center for Economic Research, *Manufacturing: Still a Force in Southern California*), 2011, Page 16/54 Chart 8, "LA County in 2007: Value of manufactured shipments is about $118 billion (excluding petroleum products manufacturing)."

[8] United States Geological Survey, *2008 Minerals Yearbook: California* (http://minerals.usgs.gov/minerals/pubs/state/2008/myb2-2008-ca.pdf), July 2012, Page ii.

[9] Ibid.

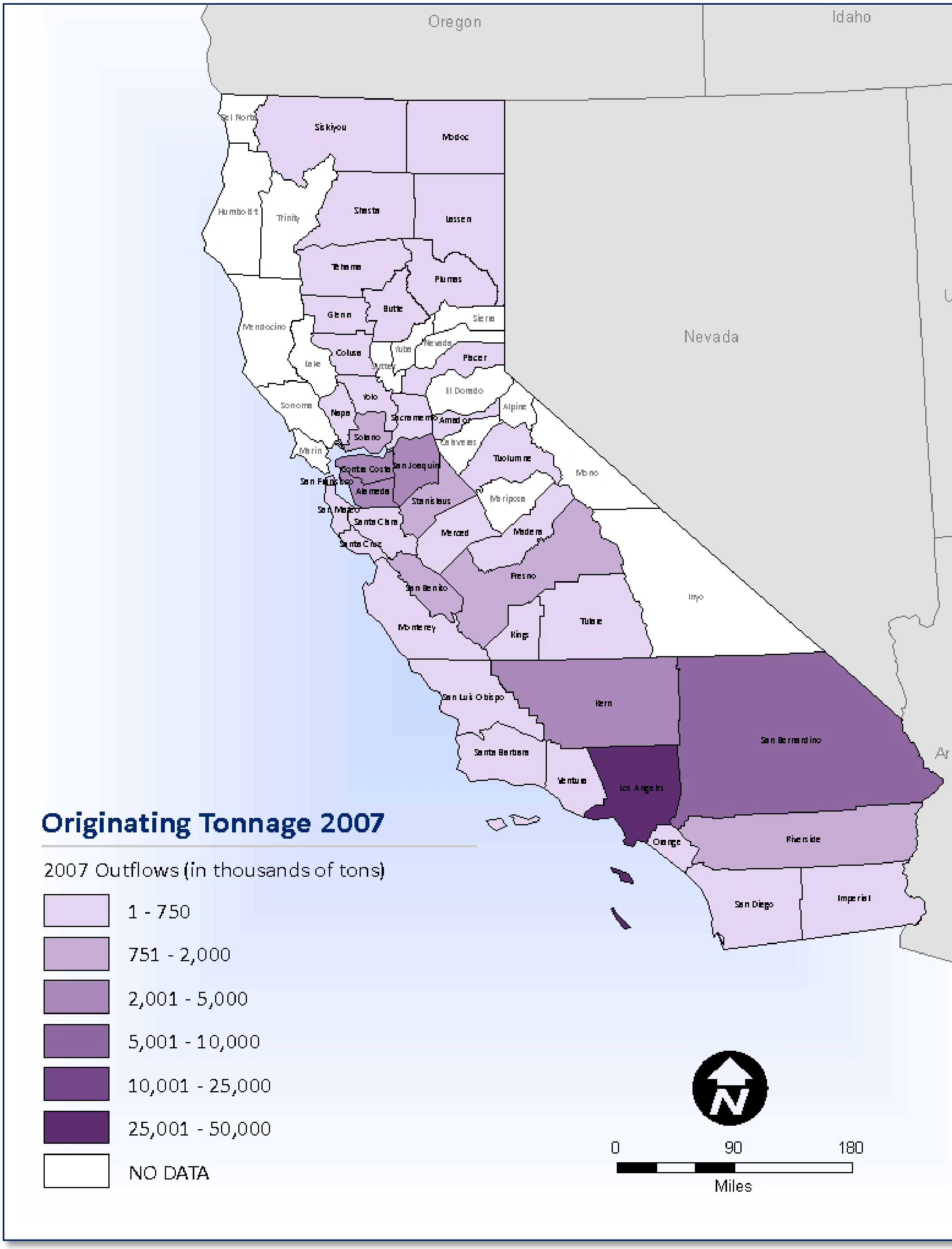

Exhibit D.2: California Rail Tonnage Origin by County, 2007 (in Thousands)

Source: Cambridge Systematics, Inc. (2012) using STB Carload Waybill Sample ESRI and GIS data.

D.2.2 2007 Inbound

Exhibit D.3 shows rail commodity tonnages by county destination in 2007. Los Angeles County and San Bernardino County received the highest overall rail tonnage, with 10 million to 50 million tons, respectively. San Joaquin and Alameda counties received five million to 10 million tons, respectively.

Incoming commodities for Los Angeles, San Bernardino, and San Joaquin counties include cereal grains (including seeds) and prepared foodstuffs, while meat, fish, and seafood are key incoming commodities for Alameda County. This includes cereal and foods bound both for export through the Ports of Los Angeles and Long Beach and the Port of Oakland, as well as the large population bases in the respective local markets. Manufacturing industries in San Bernardino County use base metals brought in by rail, while manufacturing industries in San Joaquin County and Alameda County mainly depend on nonmetallic mineral products and wood products supplied through rail.

In addition, animal feed and related products and a small amount of fertilizers transported by rail support the farming industries of some counties in the Central Valley (Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare). Rail supplies coal to power plants in San Bernardino and Contra Costa counties and to manufacturing industries in Kern and San Joaquin counties.

D.2.3 2040 Outbound

Exhibit D.4 shows the origin of rail commodity tonnages by California county in 2040. Los Angeles County, originates the most rail tonnage (50 million to 140 million tons), followed by San Bernardino, San Joaquin, and Alameda counties (25 million to 50 million tons). To a large extent this reflects the locations of major intermodal terminals and the continuing growth in importance of intermodal traffic in the State's rail system. Apart from the large growth in mixed freight traffic, a sizeable increase in rail shipments basic chemicals out of Los Angeles County will result from an increase in the export of these commodities. Los Angeles County expects moderate growth in the rail tons of motorized vehicles and their parts, and aircraft, space vehicles, missiles, and their parts, with lower growth in base metals and coal and petroleum products.

Aside from the large increase in intermodal mixed freight traffic, San Bernardino County is likely to have moderate growth in the transport of nonmetallic minerals, base metals, and related products by rail. However, only a small increase in the tons of basic chemicals transported by rail is expected.

Again, besides the high growth in mixed freight, San Joaquin County will experience fairly high growth in food manufacturing, especially alcoholic beverages. In addition to the base year rail traffic, San Joaquin County has potential to rail more agricultural products that are currently being moved by trucks, such as fruits and nuts, vegetables, grain, and meat products.[10]

D.2.4 2040 Inbound

Exhibit D.5 shows rail commodity tonnages by county destination in 2040. Los Angeles County will remain the largest single destination for rail tonnage (25 million to 50 million tons), followed by San Bernardino, San Joaquin, and Alameda counties (10 million to 25 million tons). Again, these forecasts reflect the continued growth in importance of intermodal traffic and the location of distribution facilities and ports serving the State's major population centers in the San Francisco Bay Area and Los Angeles Basin.

[10] Cambridge Systematics, Inc., *San Joaquin Valley Interregional Goods Movement Plan, Task 4: Commodity Flow Profile (Technical Memorandum)*, 2012.

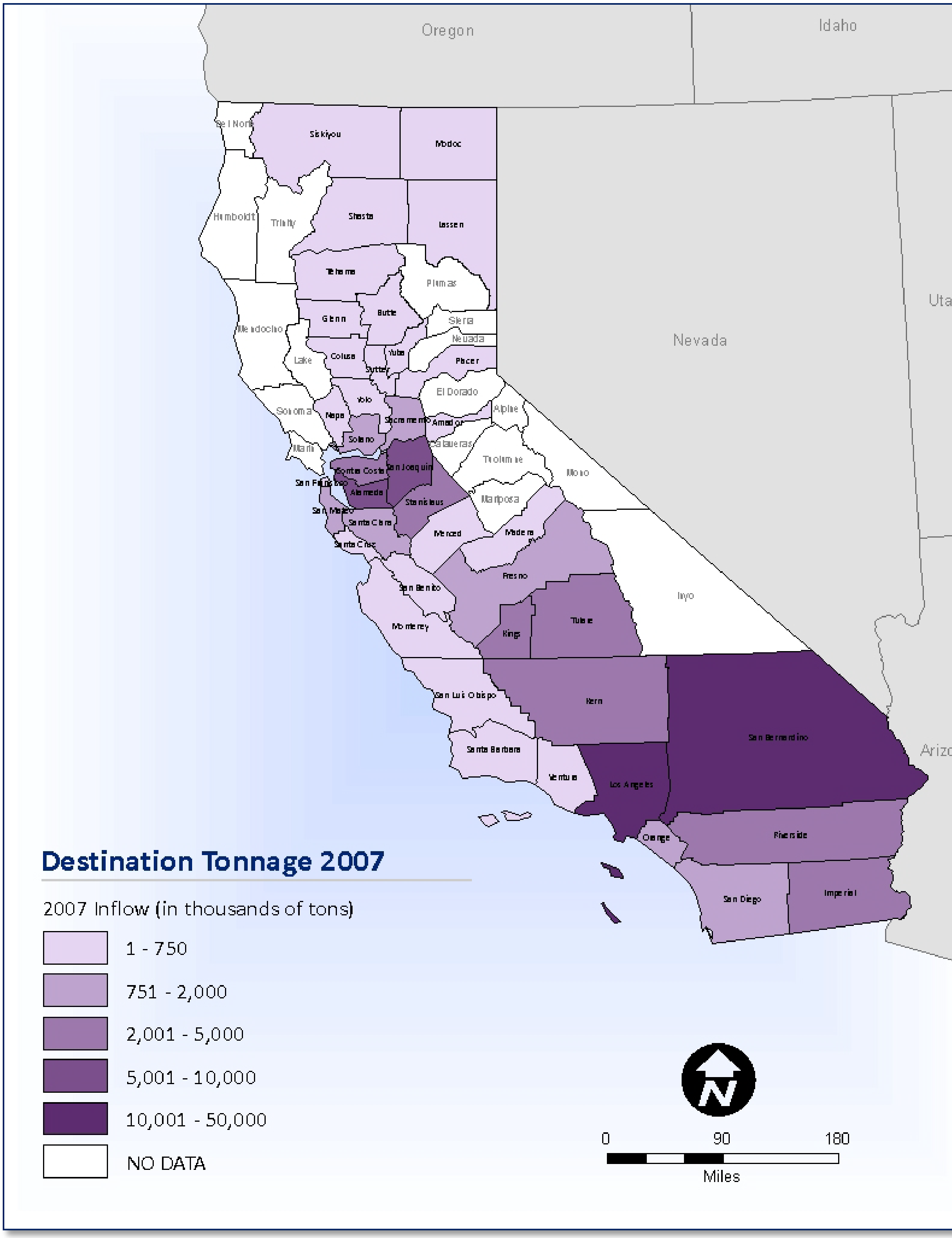

Exhibit D.3: California Rail Tonnage Destination by County, 2007 (in Thousands)

Source: Cambridge Systematics, Inc. (2012) using STB Carload Waybill Sample ESRI and GIS data.

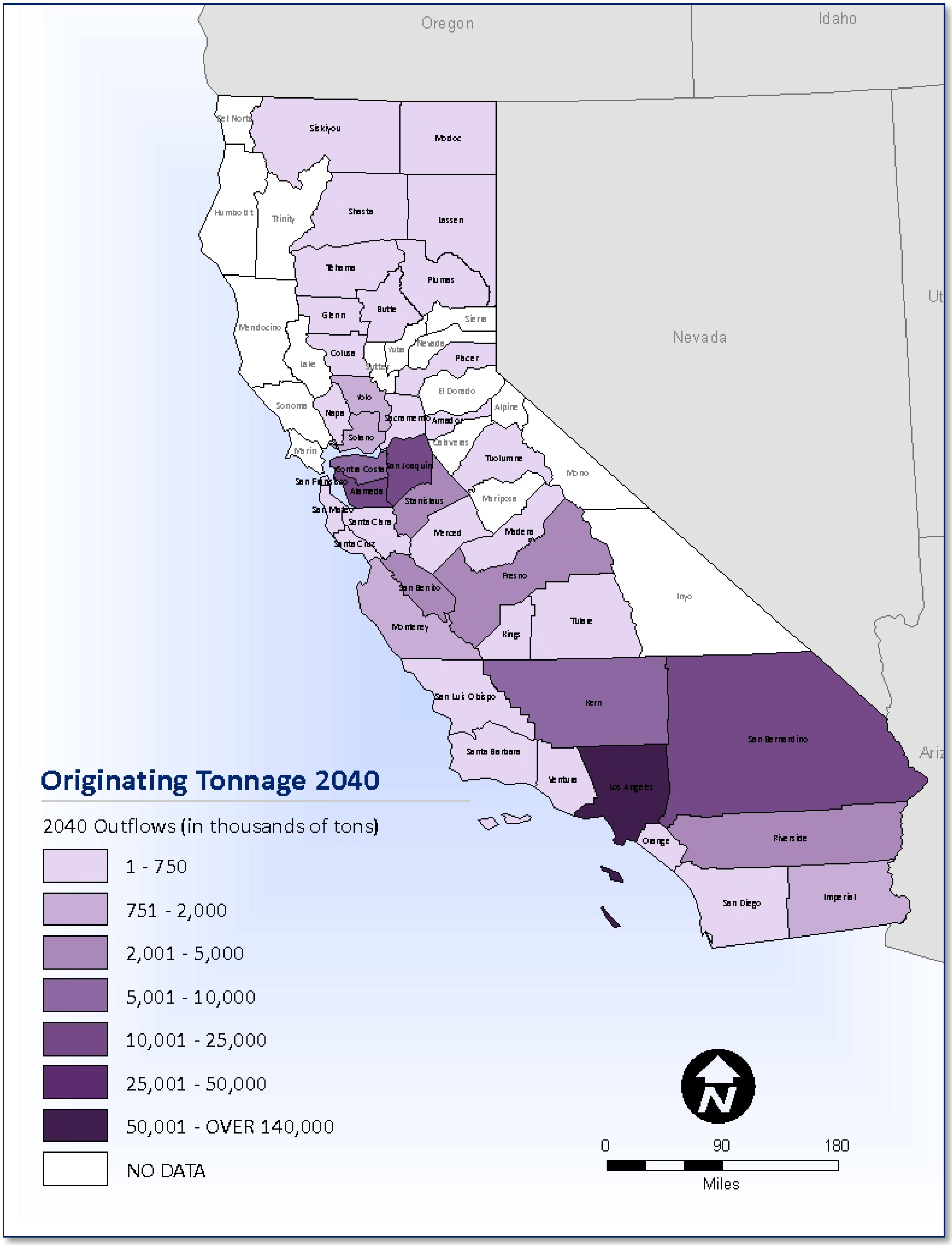

Exhibit D.4: California Rail Tonnage Originating by County, 2040 (in Thousands)

Source: Cambridge Systematics, Inc. (2012) using STB Carload Waybill Sample ESRI and GIS data.

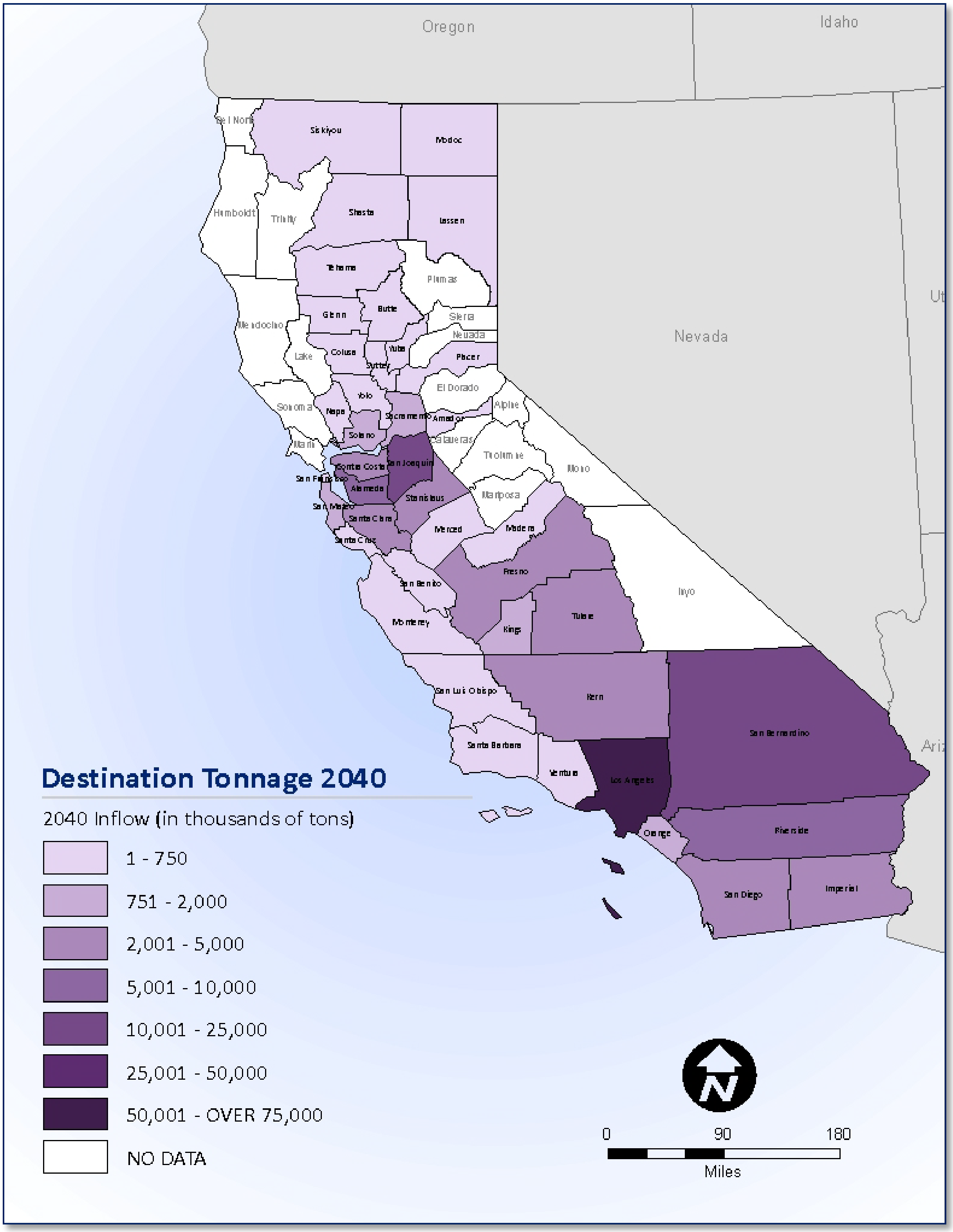

Exhibit D.5: California Rail Tonnage Destination by County, 2040 (in Thousands)

Source: Cambridge Systematics, Inc. (2012) using STB Carload Waybill Sample ESRI and GIS data.

Cereal grains (including seeds) and prepared foodstuffs show uneven growth across Los Angeles, San Bernardino, and San Joaquin counties. While inbound rail tons of cereal grains (including seeds) grow in Los Angeles and San Bernardino counties, they should decline in San Joaquin County and neighboring Central Valley counties. Meat, fish, and seafood destined for Alameda County by rail should rise. San Bernardino County's inbound rail tons of base metals, as well as the inbound rail tons of nonmetallic mineral products and wood products for San Joaquin and Alameda counties, show small changes.

Basic chemicals received by Los Angeles and Contra Costa counties by rail show growth, but the remaining counties (Kern, San Bernardino, and San Joaquin) show decline. Both animal feed and related products and fertilizers destined for Central Valley counties show a sharp decline, likely due to a shift in transportation logistics of the farming industry in this region, such as increased use of local suppliers and reduced dependence on rail services. Coal supplied by rail may decline in the State due to a change in sources of energy production, a trend that discussed elsewhere in Chapter 6.

D.3 Positive Train Control

Positive Train Control (PTC) refers to technology that is capable of preventing train-to-train collisions, over-speed derailments, and casualties or injuries to roadway workers (e.g., maintenance-of-way workers, bridge workers, and signal maintainers). The technology combines:

- Precise real-time locating (usually with GPS) of all trains and other vehicles occupying track.
- Cataloging of infrastructure, including turnouts, crossing junctions, grades, and associated permissible speeds.
- Algorithms that calculate the effective safe braking characteristics for each train en route in PTC territory.
- Wireless communications between all operating units, including engineers, dispatchers, and work crews.

Prior to October 2008, development of PTC systems proceeded haltingly on a voluntary basis among many of the major freight railroads and passenger operators. However, the Rail Safety Improvement Act of 2008 (RSIA) (signed by the President on October 16, 2008, as Public Law 110-432) mandated the widespread installation of PTC systems by December 2015 on all lines handling regularly scheduled passenger trains and/or toxic inhalation hazard (TIH) materials. Freight-only lines handling TIH materials with total freight volumes of five million or more gross tons annually also necessitate installation of PTC. This requirement effectively mandates PTC on most of the Class I rail network. In California, UPRR's and BNSF's mainlines, along with a few short line segments that host regularly scheduled passenger service, will require PTC installation.

Following the passage of RSIA, a series of FRA rules and industry dialogue have resulted in some clarifications and refinements to the initial requirements. These include establishment of minimum passenger and freight train volume thresholds under which carriers are exempt from implementing PTC (the most notable beneficiary being the Northern New England Passenger Rail Authority's Portland-Boston *Downeaster* service). The industry has also pushed strongly to reduce the mainline mileage requiring PTC, and, therefore, the cost of implementation, by arguing that declining volumes of TIH traffic since 2008 obviate the need to install PTC on some lines. This effort proved successful in March 2011, when the AAR reached agreement with the FRA to reduce the 73,000 route-miles over which PTC was to be installed by approximately 10,000 miles.

Although development of PTC technologies dates back to the 1980s, RSIA initiated a concerted industry effort to implement PTC within the specified timetable. However, the technology hurdles remain substantial, and major system elements, particularly communications radios and software, are still in the early stages of development. As currently conceived, PTC is being deployed by the freight carriers purely as an "overlay" over existing wayside signaling systems. This forces carriers to continue to maintain existing signal systems along with PTC, thereby offsetting potential savings and ancillary business benefits that may be incurred through the replacement of obsolete systems. An additional concern is the potential loss of line capacity resulting from the implementation of algorithms that ensure safe stopping distances under "worst case" conditions.

These issues have led many in industry to question the merits of the entire mandate. Research by the FRA and others has found that the costs of deployment, expected to be a minimum of $10 billion for the freight carriers, will far outweigh potential benefits at a ratio of 11:1 or more.[11] Without significant financial assistance from the federal government, implementation of PTC is effectively an unfunded mandate (with the railroad industry burdened with the full cost of its implementation), and one that would not be possible absent the Class I railroads' present strong financial condition. However, the financial demands of PTC certainly have an effect on the railroads' investment decisions, by diverting funds from other needs that may directly benefit capacity and service.

PTC systems are eligible for funding under the Railroad Rehabilitation and Improvement Financing Program (RRIF); however, no railroads have approached FRA for funding of PTC projects using this program. PL110-432 also authorized Railroad Safety Technology Grants that can be used to support PTC projects at $50 million per year from 2009 to 2013. Thus far, these funds were only appropriated once in FY 2010

With the increasing likelihood that the 2015 deadline will not be met, the freight carriers have increased pressure on public decision-makers to extend the implementation deadline. However, the deadline has, thus far, remained firm. The recent two-year extension of the surface transportation legislation (Moving Ahead for Progress in the 21st Century Act, or "MAP–21"), approved by Congress on June 29, 2012, does not include any statutory changes to the implementation timeline. Nevertheless, as the deadline looms ever closer, the pressure to defer the mandated completion date will grow.

Among short lines nationally, fewer than 100 among the 550 or so operating in the U.S. will require the installation of PTC. However, even those that do not require its installation may still incur PTC-related expenditures if their locomotives operate over Class I lines that are required to have PTC installed. Installation costs of on-board hardware are expected to be at least $50,000, and considerably more for older units that lack microprocessor control systems, still operated by many short lines.[12] Several California short lines will be impacted by this requirement, including the San Joaquin Valley Railroad, the Pacific Sun Railroad, and the San Diego and Imperial Valley Railroad.

All railroads, even those exempt from the PTC requirements, were required to submit an implementation plan to the FRA by April 15, 2010. Thus, in addition to the Class I railroads and passenger carriers, various short lines and their holding companies, such as Anacostia and Pacific and RailAmerica, responded with declarations of exemption and/or implementation plans. The following sections summarize information from the BNSF and UPRR submissions.

D.3.1 BNSF Railway

BNSF's Positive Train Control Implementation Plan (PTCIP) to FRA laid out the method, locations, and order in which BNSF plans to deploy its PTC system. The plan was subsequently revised several times

[11] William C. Vantuono, "PTC: Is Everyone on Board," *Railway Age*, May 2010, pp. 29-37. Also see "Assessment of the Commercial Benefits of Positive Train Control," Oliver Wyman Inc. for the Association of American Railroads, April 23, 2010.

[12] Ibid, p. 30.

in 2010 and 2011. In the submission from September 2011, BNSF laid out the following schedules for implementing PTC throughout its system:

- 2011 – 1 of 96 subdivisions to have completed PTC implementation – 1.0 percent.
- 2012 – 31 of 96 subdivisions to have completed PTC implementation – 32.3 percent.
- 2013 – 55 of 96 subdivisions to have completed PTC implementation – 57.3 percent.
- 2014 – 75 of 96 subdivisions to have completed PTC implementation – 78.1 percent.
- 2015 – 96 of 96 subdivisions to have completed PTC implementation – 100 percent.

In addition to the general schedule, BNSF also stated that, within California, it will install the wayside infrastructure portion of a PTC system on certain rail lines that share passenger and freight service in the Los Angeles Basin region of southern California by December 31, 2012. Although this means that BNSF will have the wayside physical infrastructure in place along the lines by that date, BNSF anticipates that its locomotive fleet will not be fully PTC-equipped until December 31, 2015, and, therefore, PTC will not be fully implemented on freight-only rail lines in the Los Angeles Basin earlier than this date.

D.3.2 Union Pacific

Similar to BNSF, UPRR's 2010 PTC Implementation Plan identified all line segments that will have PTC installed, and segments in which UPRR desired exemption or exclusion from the requirements. The railroad set forth the following yearly metrics for the number of line segments on which it shall have commissioned PTC operations subject to FRA's disposition of request for exclusion of certain line segments from the PTC baseline:

- 2012. Approximately 300 route-miles to have completed PTC implementation – 1.4 percent of network route-miles.
- 2013. Approximately 9,650 route-miles have completed PTC implementation – 37 percent of network route-miles.
- 2014. Approximately 14,100 route-miles have completed PTC implementation – 54 percent of network route-miles.
- 2015. Approximately 19,500 route-miles have completed PTC implementation – 75 percent of network route-miles.

In California, lines handling passenger service around the Bay Area and the Los Angeles region, along with the Sunset Corridor to Yermo, should receive PTC in the first implementation phase, according to current projections. Other lines include the San Joaquin, Cascade, and Donner Summit routes in the third phase, the Los Angeles and Salt Lake routes in the fourth phase, and the Feather River route in the fifth phase.

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Appendix E

SECTION 6.3 SUPPLEMENTAL INFORMATION: RAIL CAPACITY AND BOTTLENECK ANALYSIS

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E.1 Rail Capacity and Bottleneck Data and Methodology

Analysis of capacity and operational issues and needs used two principal approaches:

1. Review of Prior Analyses and Reports. Many of the capacity and operational issues described herein were previously identified in prior studies or plans. The primary source documents (along with technical memoranda, data, and analyses supporting these source documents) used to support the current analysis include:
   - SCAG Regional Transportation Plan, Goods Movement Appendix, 2012.
   - I-710 Railroad Goods Movement Study, 2009.
   - Multi-County Goods Movement Action Plan, Technical Memorandum #3, 2008.
   - San Joaquin Valley Goods Movement Study, Task 4, 2012.
   - Bay Area Goods Movement Strategy, 2007.
   - California State Transportation System Needs Assessment, 2011.
   - California State Rail Plan (August 2007 to 2008 to 2017 to 2018).
   - Trade Corridor Improvement Fund Updated Projects, 2012.
   - TIGER I/II/III/IV Projects Lists, 2009 to 2012.
   - San Pedro Bay Ports Rail Enhancement Program, 2006.
2. Simulation and capacity analysis method. Rail simulation modeling was conducted on four current or potential future intercity passenger rail corridors (*Pacific Surfliner* north corridor, *Pacific Surfliner* south corridor, *San Joaquin*, and *Coast Daylight*). The simulation models provide information used in the evaluation of alternatives for Service Development Plans (SDP) for these intercity corridors, such as identification of capacity bottlenecks. A more complete discussion of capacity issues in shared use corridors, as well as the simulation models in general, is provided in Chapter 7. In addition, the future year train volumes supported estimates of the degree of network saturation in terms of a volume-capacity ratio under the existing infrastructure condition (i.e., a “do-nothing” scenario).

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Appendix F

SECTION 6.4 SUPPLEMENTAL INFORMATION:

STATE AND FEDERAL REGULATORY BODIES AND

OTHER INSTITUTIONAL ARRANGEMENTS

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F.1 State Agencies Involved in Rail System Planning

The following state agencies are involved in rail system planning:

F.1.1 California Public Utilities Commission

The California Public Utilities Commission (CPUC) regulates public utilities, and regulates railroads and at-grade crossings. The CPUC employs federally certified staff inspectors and coordinates with the Federal Railroad Administration (FRA) (the largest participating state agency in the nation) to ensure that railroads comply with federal railroad safety regulations.

The CPUC's Rail Crossings Engineering Section (RCES) investigates and evaluates requests to construct new rail crossings or modify existing rail crossings. RCES engineers also investigate train-related incidents that occur at rail crossings and complaints regarding rail crossing safety. In addition, the RCES establishes and reviews the establishment of quiet zones within the approaches of rail grade crossings.

The RCES administers three funding programs for reducing hazards at highway-rail crossings:

- Section 130. As previously mentioned, this program provides funds to local governments (cities and counties) and any public entity to eliminate hazards at existing at-grade crossings between public highways and rail lines.
- Warning Device Maintenance Fund Program. This provides funds to railroads to pay for the local government's share of the costs of maintaining automatic warning devices at highway-rail crossings.
- Section 190 Grade Separation Program. This state-funded program is available for projects seeking to eliminate or grade-separate existing at-grade crossings, and includes both crossing consolidations or track removal projects. On July 28, 2011, the CPUC issued an Order Instituting Investigation (OII) for establishing the highway-rail Grade Separation Priority List (Priority List) for FY 2012-2013 and FY 2013-2014. The California Transportation Commission and the California Department of Transportation use the Priority List to allocate funds made available to the program to assist local governments in financing existing at-grade crossings of city streets, county roads, or state highways in need of separation, or existing separations in need of alterations or reconstruction, in accordance with Section 2452 of the California Streets and Highways Code. The list, which is usually created every two years, establishes the relative priorities for funding qualified projects to grade-separate railroad crossings or improve existing grade-separated crossings.

F.1.2 California Environmental Protection Agency

The California Environmental Protection Agency (Cal/EPA) develops, implements, and enforces the State's environmental laws that promote and protect clean air, clean water, clean soil, safe pesticides, and waste recycling and reduction. Cal/EPA actually refers to the Office of the Secretary and to the agency as a whole. In addition to the Office of the Secretary, the constituent entities of Cal/EPA are the Air Resources Board (ARB), State Water Resources Control Board, the Department of Pesticide Regulation, Department of Toxic Substances Control, and the Office of Environmental Health Hazard Assessment.

One of the key ways the Cal/EPA influences freight rail is through the ARB. The ARB enforces air emissions from both mobile sources (vehicles and equipment) and stationary sources. While the State has limited powers to regulate railroads due to federal preemption under the Clean Air Act and interstate commerce laws, ARB can help establish voluntary agreements (better known as Memorandums of Understanding) with the Class I railroads.

For instance, the ARB has entered into a pollution reduction agreement with Union Pacific and the BNSF Railway (BNSF) to reduce locomotive diesel particulate matter emissions near rail yards. As a result, the railroads have committed to implementing a package of related strategies, including idling limitations and idling reduction devices, use of lower sulfur diesel fuel, development of health risk assessments, fines for noncompliance, and other measures.[13]

In addition, several other regulations or voluntary agreements relate to locomotives. Since 2004, intrastate locomotives must use fuel that meets ARB diesel fuel specifications (starting in 2007).A1998 Memorandum of Understanding between the ARB and the Class I railroads accelerated the introduction of U.S. Environmental Protection Agency (EPA) Tier 2 locomotive standards for fleets in the South Coast Air Basin.[14] Finally, the ARB and Class I railroads have proposed 2010 Commitments to further reduce diesel particulate matter (PM) emissions at four high priority railyards, are all located in southern California.[15]

- One element of California's strategy to reduce emissions, the Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program), offers grant funding to industrial users to acquire technologies that reduce emissions from non-automotive combustion engines to levels that are lower than required through regulatory mandates. The ARB and regional emissions regulatory agencies such as the South Coast Air Quality Management District (SCAQMD) and the Bay Area Air Quality Management District (BAAQMD) cooperatively manage the program.[16] Both large and small freight railroads have received funding to retrofit and replace locomotives throughout the State. Among small railroads benefitting from the program, noteworthy examples include PHL, which now operates only low-emissions locomotives in its San Pedro location, and the MET in Modesto, which has done the same with a fleet of six new units acquired in 2011-2012.[17,18] The Carl Moyer program stands alone as the only state program that provides financial assistance of some form to smaller railroads.
- The Proposition 1B Goods Movement Emission Reduction Program also provides some assistance for freight rail, providing financial incentives to owners of equipment used in freight movement to upgrade to cleaner technologies through truck replacement, engine replacement, or retrofit. Projects funded under this program must achieve emission reductions more substantial than those required by law or regulation. Currently the Sacramento and South Coast Districts are completing projects to upgrade 19 locomotives in the Los Angeles/Inland Empire trade corridor, which will be operational in 2012. Contracts for additional locomotives in the corridor should be signed in late 2012.[19]

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[13] Air Resources Board, *Reducing Locomotive Emissions: New Actions Agreed to by UP and BNSF Railroads*, August 2005.

[14] Air Resources Board, *Locomotives*, October 18, 2011.

[15] Air Resources Board, *2010 Commitments to Further Reduce Diesel PM Emissions at Four High Priority Railyards*, November 28, 2011.

[16] Air Resources Board, *Carl Moyer Program Guidelines*, October 26, 2012.

[17] White, Ronald D., «Short rail line serving L.A. and Long Beach ports gets greener» *Los Angeles Times*, September 29, 2011.

[18] RJ Corman Railroad Group, *R. J. Corman Railpower Delivers First of Five Locomotives to M&ET* (press release), May 2, 2011.

[19] Air Resources Board, *Proposition 1B: Goods Movement Emission Reduction Program – June 2012 Semi-Annual Status Report,*

F.2 Federal Agencies Involved in Rail System Planning

The following federal agencies are involved in rail system planning:

F.2.1 U.S. Department of Transportation

Federal Railroad Administration

As one of the modal agencies within the U.S. Department of Transportation (DOT), the FRA holds responsibility for developing and enforcing railroad safety rules, managing the Railroad Rehabilitation and Improvement Financing (RRIF) program, providing oversight of Amtrak for U.S. DOT, and managing a small research program. With the passage of the Passenger Rail Improvement and Investment Act (PRIIA) in 2008, and the subsequent provision of capital funding for intercity passenger rail in the American Recovery and Reinvestment Act (ARRA), the FRA was tasked with managing these programs. Traditionally, the vast majority of FRA personnel and financial resources have been devoted to safety enforcement activities.

The FRA operates through seven divisions under the offices of the Administrator and Deputy Administrator. Out of these seven divisions, the Office of Railroad Policy and Development administers federal investment and assistance to the rail industry as well as the development and implementation of FRA policy concerning intercity passenger rail and high-speed rail (HSR). It also sponsors projects for rail safety research and provides investment opportunities for small freight railroad projects, primarily through the Railroad Rehabilitation and Improvement Financing Program (RRIF).

The Office of Railroad Safety promotes and regulates safety throughout the nation's railroad industry. It employs more than 415 federal safety inspectors, who operate out of eight regional offices nationally. FRA inspectors specialize in five safety disciplines (track, signal and train control, motive power and equipment, operating practices, and hazardous materials), and participates in numerous grade crossing and trespass-prevention initiatives. The Office of Railroad Safety also collects and compiles accident/ incident data from the railroads.

Surface Transportation Board

Established in 1996 as the successor to the long-lived Interstate Commerce Commission, the Surface Transportation Board (STB) adjudicates disputes over rates and services between shippers and carriers, and has administrative authority over rail restructuring transactions, including oversight of mergers and acquisitions, new line construction, and rail line abandonment; railroad rate regulation; and rate and service disputes involving shippers and railroads. In 2008, the PRIIA expanded the role of the STB into mediation of conflicts between passenger rail operators and freight rail owners. This provision is intended to address long-standing concerns about enforcement of Amtrak's statutory rights to operate passenger trains over the freight network. The STB functions as an independent agency, but is administratively affiliated with the U.S. DOT.

Pipeline and Hazardous Material Safety Administration

The Pipeline and Hazardous Material Safety Administration sets safety regulations for hazardous materials across all modes, including freight rail. More information on this is included in Section 6.5, Freight Rail Safety.

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http://www.arb.ca.gov/bonds/gmbond/docs/prop_1b_goods_movement_june_2012_semi_annual_report%20_to_dof.pdf.

F.2.2 Other Federal Department and Agencies

Department of Homeland Security

The Department of Homeland Security (DHS) through the Transportation Security Administration (TSA), in cooperation with the U.S. DOT, leads rail security, primarily a federal matter. Prior to the increased national attention to security after September 11, 2001, rail security concerns were mostly handled by the railroads themselves, in cooperation with a community of first responders responsible for addressing rail incidents involving hazardous materials.

Environmental Protection Agency

The EPA impacts railroads in a variety of ways, including regulation of locomotive emissions, which have a considerable impact on long-term investment strategies as well as day-to-day operations.

F.3 Best Practices: Rail Planning at the State Level

F.3.1 The Ohio Rail Development Commission

The Ohio Rail Development Commission (ORDC) is an independent agency of the Ohio DOT. The ORDC is charged with developing, promoting, and supporting safe, adequate, and efficient rail service in Ohio. The ORDC, the successor to the Ohio High-Speed Rail Authority and the Division of Rail Transportation within the Ohio DOT in 1994, combines all of Ohio's non-regulatory rail programs into one agency.

ORDC operates as an independent commission responsive to economic development and industry needs. The operational costs of the ORDC are part of the Ohio DOT appropriations, but the ORDC reports to a separate board. The ORDC focuses on the creation and preservation of Ohio jobs and improvement of Ohio's economic welfare. In order to achieve these goals, ORDC may acquire, construct, enlarge, improve, equip, and to sell, lease, exchange, or otherwise dispose of property, structures, equipment, and facilities for rail transportation.

F.3.2 Michigan Office of Rail, Freight Services, and Safety

Michigan DOT houses the Office of Rail, Freight Services and Safety, performing both regulatory and program functions. As part of their regulatory efforts, the Freight Services and Safety program monitors the physical condition of railroad crossings and facilitates reviews to determine if safety enhancements at crossings are needed. Program level efforts include providing funding for safety enhancements at railroad crossings, as well as rail infrastructure improvement and rail freight-related economic development loans.[20]

The State also has two freight-specific loan programs: the Freight Economic Development Program and the Michigan Rail Loan Assistance Program. The Freight Economic Development Program provides low-interest loans that can be converted to grants to rail users locating or expanding in the state and local government entities interested in helping these businesses. The Michigan Rail Loan Assistance Program provides zero-interest loans to enhance the efficiency or safety of existing freight rail service. Eligible applicants include railroads, local governments, economic development corporations, and current or prospective rail users. Eligible projects include any type of construction or rehabilitation work that is associated with permanently affixed track materials and related structures such as bridges and culverts.[21]

[20] Michigan Department of Transportation, *About Freight Services & Safety*.

[21] Ibid.

F.3.3 Minnesota's Office of Freight, Rail, and Waterways

Minnesota DOT's Office of Freight, Rail and Waterways houses the Freight Planning and Development Unit. This unit reviews Minnesota DOT's role in freight transportation and develops strategies for Minnesota DOT to improve its knowledge and integration of freight transportation into policy, planning, and investment processes, thereby improving economic competitiveness. In an effort to make better decisions that improve or augment freight transportation service productivity and safety the office builds partnerships that promote the exchange of information, ideas, and opportunities between the shipping community and Minnesota DOT. These partnerships; enhance the efficiency of goods movement; and promote both safety enhancements and innovation and research that improve the safety, efficiency and productivity of the system.[22]

F.4 Best Practices: Private Sector Rail Stakeholders in the Planning Process

The need to include private-sector viewpoints in the public planning process has evolved over the last decade, driven by the recognition that understanding private-sector needs can lead to a planning process that helps to maximize the economic benefits (e.g., jobs, GDP, etc.) of private industries. New funding arrangements such as Public-Private Partnerships have increased the desire of DOTs to involve the private sector in the planning process, as it can lead to a better use of shared resources to fund mutually beneficial projects.

Private-sector participation in the public planning process became more formalized through Section 6001 and 6002 of SAFETEA-LU.[23] Both of these sections include requirements for states and metropolitan planning organizations (MPOs) to develop long-range transportation plans in consultation with freight stakeholders, including freight railroads and shippers who utilize freight railroads.

In all, many states now recognize the benefit of including private-sector freight stakeholders in the public planning process. More specifically, many states have realized that a freight-specific advisory committee can allow for continuous, expert feedback into planned public infrastructure investments and improvements. Table F.1 outlines examples of these state groups.

Washington, in particular, serves as a good example because it has organized freight planning stakeholder groups at both the statewide and regional levels. The Freight Mobility Strategic Investment Board (FMSIB) offers freight-specific project prioritization at the state level, while the Freight Action Strategy for the Everett–Seattle–Tacoma (FAST) Corridor partnership and the Freight Mobility Roundtable offer venues for public and private freight stakeholder coordination in the Puget Sound region. Both of these groups have significant influence over ensuring freight needs are understood and are considered in regional and statewide transportation policy. In addition, all of the groups have a direct link to actual project implementation and funding sources.

[22] Minnesota Department of Transportation, *MnDOT Freight Planning & Development: Background*.

[23] Federal Highway Administration, *Fact Sheets on Highway Provisions: Statewide Planning.*

Table F.1: Public-Private Sector Coordination Efforts

	Formed By	Purpose	Meeting Frequency	Annual Budget Authority
Washington State FMSIB	Washington State Legislature	Advise legislature about project selection	Bimonthly	$6 million
FAST Corridor and Regional Freight Mobility Roundtable (Puget Sound Region)	Washington State DOT	Advise Washington State DOT and the Puget Sound Regional Council, on project selection	Bimonthly	Varies with member jurisdiction
Colorado Freight Advisory Council	Governor/DOT	A forum on freight movement and infrastructure	Quarterly	None
Minnesota Freight Advisory Committee	Minnesota DOT	A forum for discussion between Minnesota DOT and the private sector	Quarterly	None
Anchorage MPO Freight Advisory Committee	Anchorage Metropolitan Area Transportation Solutions (AMATS)	Air issues, discuss solutions, and evaluate technical project proposals	Quarterly	None

Source: Cambridge Systematics, Inc., 2012.

F.4.1 Washington State Freight Mobility Strategic Investment Board

The Washington State Freight Mobility Strategic Investment Board FMSIB, an independent agency created in 1998 by the Washington State Legislature, reviews, prioritizes, and recommends freight mobility transportation projects of strategic importance to the State of Washington. The Washington State Governor accepts nominations for and appoints the twelve members of the FMSIB. Members come from the general public; the trucking, rail, maritime, and port industries; and from local government (counties and cities); in addition to the DOT Secretary and Governor Representative. The group meets on a Friday approximately every other month to discuss projects and potential partnerships.

The Board evaluates and ranks eligible freight mobility and freight mitigation projects using a multi-criteria analysis and scoring method. In making its selections, the Board gives priority ranking to projects with the highest level of non-FMSIB funding, as well as those with private-sector participation. The board determines final project selection, as well as the State's share of project costs. The FMSIB's position as an independent state agency with funding authority means it can implement freight projects without competing with other transportation priorities (although all projects must still be part of a state or regional transportation plan).

According to the FMSIB 2011 Annual Report, the Board has assisted in bringing to completion 42 projects, with ten underway or ready to enter construction in 2012. Projects include grade separations, pedestrian overpasses, turning lane improvements, freeway ramps, and Intelligent Transportation Systems (ITS) projects. FMSIB has been able to leverage, on average, $5.00 of non-program funds for every $1.00 that it contributes to a capital project.

F.4.2 The Freight Action Strategy for the Everett-Seattle Tacoma Corridor (FAST Corridor)

The FAST Corridor partnership promotes freight mobility in the Puget Sound region. The FAST partnership, formed in 1998 has 26 members, including stakeholders from the federal, state, and regional levels; ports; cities and counties; and freight carriers. It is administered through the Puget Sound Regional Council, the MPO for the Puget Sound region. The FAST coordinates solutions to the region's freight mobility challenges by making targeted improvements to critical rail and truck corridors that connect Puget Sound ports to statewide, national, and international markets.

An important consultative body to the FAST partnership, the Puget Sound Regional Freight Mobility Roundtable, serves as a public-private forum to define freight mobility needs and recommendations in the region. The roundtable includes freight carriers of all modes; major regional shippers; the ports; and state, local, and federal agencies. FAST and the Regional Freight Mobility Roundtable coordinate their efforts through bimonthly meetings, where the two groups discuss freight trends and issues in the region, as well as ongoing planning activities like the Long-Range Transportation Plan.

Since 1998, the FAST partnership has successfully assembled about $568 million of funding from public and private sources, which have been used to complete nine projects and begin four more. The projects include grade separations, rail yard access projects, and ITS deployments.

F.4.3 The Colorado Freight Advisory Council (FAC)

The Colorado FAC grew out of the growing volumes of both domestic and international freight traffic crossing through the State. Because of its location near the geographic center of the U.S. and its relatively low population, Colorado, a "bridge state" experiences significant through freight traffic. The FAC was formed in 2003 with its primary purpose to serve as a forum for discussion regarding freight movement and infrastructure within the State. The FAC has 15 members drawn from the Colorado freight industry and local governments.

The FAC holds regular meetings approximately once per quarter. As a voluntary organization, the Colorado FAC serves in an advisory role. It does not have budget authority nor can it select specific freight projects for implementation. However, the Colorado FAC does feature extensive participation by the private sector. Twelve of its 15 members represent carriers, shippers, and other freight stakeholders, making the FAC a valuable resource for engaging the private sector and gathering input for freight planning efforts.

One key conclusion from the FAC was that Colorado needed to maintain better freight data in order to support an expanded planning effort. Accordingly, Colorado DOT produced a Freight Data Assessment Study in 2005 as a first step in defining a framework for a proper data collection program. This study identified current and ongoing freight data requirements for Colorado DOT; assessed the availability and quality of that data; and recommended a framework for Colorado DOT to collect, maintain, and distribute freight data.

F.4.4 Minnesota Freight Advisory Committee (MFAC)

The MFAC acts as a forum to exchange ideas between Minnesota DOT and the private-sector freight community. The MFAC, created in 1998, works to ensure that freight needs are addressed through transportation planning and programming and provides input to the Minnesota DOT freight investment committee on freight issues, needs, and policies. In addition to this, the MFAC helps develop guidelines to better address freight needs and recommends research tasks to be undertaken by Minnesota DOT. MFAC membership consists of a wide selection of freight stakeholders, including shippers, government, carriers, advocacy groups, consultants, brokers, and individuals from academia and research.

The MFAC meets on a quarterly basis to discuss relevant freight issues. Input provided by MFAC members feeds into Minnesota DOT's planning process, including the statewide transportation plan and studies. Essentially, the MFAC acts as a sounding board for statewide transportation plans by evaluating and commenting on it from the goods movement perspective.

F.4.5 The Anchorage MPO Freight Advisory Committee (FAC)

The Anchorage MPO FAC advises the Anchorage Metropolitan Area Transportation Solutions (AMATS) organization.[24] This committee includes personnel from the Port of Anchorage, the Alaska Railroad Corporation, the Alaska Trucking Association, and other representatives from the private sector that are directly involved with freight movement. The FAC ensures that freight interests are considered in AMATS policies, and advances project development through activities such as the Long-Range Transportation Plan. The FAC therefore provides a forum for the private freight industry (including rail) to air concerns, discuss issues, and suggest project solutions to local government. In addition, the FAC often reviews technical project proposals and to offer insights into improving access and freight circulation patterns for proposed projects. AMATS has a dedicated staff member that coordinates with the FAC and serves as an advocate for freight within the agency.

F.5 Best Practices: Short Line Rail Assistance Programs

F.5.1 Kansas State Rail Serve Improvement Fund

Kansas has the State Rail Service Improvement Fund (SRSIF), which provides $5 million annually in low-interest loans to railroads and port authorities operating within the State in order to help them improve their service.[25,26] The program assists in the rehabilitation of railroad tracks, bridges, yards, rail shops, buildings, and sidings of short line railroads operating in Kansas. Since the program's inception in 2000, SRSIF has funded between two and nine projects each fiscal year. These projects have contributed to the protection of short line service in communities across the State.

Kansas also operates the Local Rail Freight Assistance (LRFA) Program. This program began in 1991 through the FRA to assist railroads in their rehabilitation efforts. Funds from the federal LRFA Program are loaned to railroads at a rate below the prime interest rate and payments on the loan (including principal and interest) are used to generate additional loans. This loan program, currently totaling $3 million, allows the railroads to improve and rehabilitate their systems for more profit and safety. Such service contributes to the State's economy, enhances market competitiveness, attracts new industry, and encourages expansion of current business.

F.5.2 ConnectOregon Program

The ConnectOregon program is a lottery-bond-based initiative that generates revenues to invest in air, marine, rail, and transit infrastructure.[27] These investments improve connections between the highway system and other modes of transportation, facilitate the flow of commerce, and reduce delays. In 2005, the Oregon State Legislature authorized $100 million of lottery-backed bonds to fund the program, and

[24] Though AMATS is a regional (not state) agency, this example is included here because it is one of the few examples where a public agency asks freight stakeholders for their assessment and feedback on technical project submittals. It is, therefore, an innovative way of harnessing knowledge from private-sector freight stakeholders.

[25] Kansas Department of Transportation, *Railroad Assistance Program: State Rail Service Improvement Fund*.

[26] Ibid.

[27] Oregon Department of Transportation, *Transportation Development – Planning: ConnectOregon*.

the Oregon Transportation Commission approved funding for 39 projects, a number of which are completed or nearing completion. In 2007, the legislature authorized another $100 million of funding in lottery-backed bonds, and the OTC approved 30 projects for funding. In 2009, the legislature approved another $100 million in funding and, in 2011, $40 million was authorized. Public- and private-sector entities can apply for grants or loans under the ConnectOregon program, and are required to provide a match of at least 20 percent of the project cost if applying for grants.

Several short line rail projects received ConnectOregon awards in 2010, including a $4.7 million project for the Portland and Western Railroad, a $2.1 million project for the Prineville Railway, and a $2.6 million award for the Albany and Eastern Railroad Company.

F.5.3 The Wisconsin Freight Rail Infrastructure Improvement Program

Wisconsin DOT administers two freight rail assistance programs, including the Freight Rail Infrastructure Improvement Program (FRIIP). Wisconsin's original rail assistance program created in 1977 helped preserve freight rail service during an era when widespread railroad bankruptcies and line abandonments threatened the availability of rail service in Wisconsin. In 1992, the FRIIP loan program expanded the State's rail assistance programs. FRIIP loans enable the State to encourage a broader array of improvements to the rail system, particularly on privately-owned lines. It also provides funding for other rail-related projects, such as loading and transloading facilities.

Since 1992, $112 million in FRIIP loans have been awarded to projects that demonstrate that they:

- Help connect an industry to the national railroad system.
- Make improvements to enhance transportation efficiency, safety, and intermodal freight movement.
- Accomplish line rehabilitation.
- Develop the economy.

F.5.4 The Wisconsin Freight Rail Preservation Program

Wisconsin DOT also administers the Freight Rail Preservation Program (FRPP).[28] In 1992, this program replaced the original rail assistance grant program, providing grants to local units of government, industries, and railroads for the purpose of preserving essential rail lines and rehabilitating them following purchase.

Since 1980, under both the original rail assistance program and FRPP, $155 million in grants have been awarded for rail acquisition and rehabilitation projects. The FRPP provides grants up to 80 percent of the cost in order to purchase abandoned rail lines in an effort to continue freight service (or for the preservation of the opportunity for future service) and rehabilitate facilities such as tracks or bridges on publicly-owned rail lines. The 2011 to 2013 DOT budget provides bonding authority for $30 million.

F.5.5 Iowa's Railroad Revolving Loan and Grant Program

Iowa's Railroad Revolving Loan and Grant program provides assistance in different ways to projects that demonstrate benefits.[29] For example, for targeted job creation projects (those that provide immediate,

[28] Wisconsin Department of Transportation, *Freight Railroad Preservation Program*.

[29] Iowa Department of Transportation, *Railroad Revolving Loan (RRLG) Program*.

direct job opportunities), the program can provide assistance as either loans or grants, but grant funding is limited to 50 percent (with a 50-percent local match), while loans require a 20-percent matching contribution. Projects that will provide demonstrated rail network improvements, on the other hand, are only eligible for loans, offered at zero-percent interest, provided that there is a 20-percent local matching contribution. For FY 2013, the program has a minimum of $2 million available for projects and, for the first time, will offer a minimum $200,000 for rail port planning and development studies.

Iowa Rail Finance Authority (IRFA) Board administers the program with staff assistance from the Iowa DOT. Appropriations and repayments from previous Iowa DOT and IRFA loans fund the program.

Industries, railroads, local governments, and economic development agencies may apply for financial assistance for projects that build rail spurs to new or expanding development, build or rebuild sidings to accommodate growth, purchase or rehabilitate existing rail infrastructure, or rehabilitate existing rail lines to increase capacity, or for other targeted job creation projects related to rail network improvement.

F.5.6 The Indiana Industrial Rail Service Fund

The Indiana Industrial Rail Service Fund (IRSF) assists in the rehabilitation of railroad infrastructure or railroad construction of Class II and Class III railroads.[30] These grants help maintain and increase existing business shipping levels on the rail lines, and also assist with funding needed improvements related to maintaining rail service in Indiana. Eligible applicants are limited to port authorities and Class II and Class III railroads. Grants through the IRSF program can be used for the rehabilitation of railroad infrastructure or railroad construction. Examples of projects include bridge deck repair, new ties and ballast, and track upgrades. Railroads are limited to a grant award that does not exceed 75 percent of the total cost of the project. In FY 2011, grants totaled $1.5 million.

F.6 Best Practices: Public Private Partnerships

F.6.1 The Alameda Corridor

California's Alameda Corridor, one of the most well-known and successful public-private partnerships (PPP), consists of a 20-mile double- and triple-track rail corridor linking the Ports of Los Angeles and Long Beach to the transcontinental rail network in downtown Los Angeles that grade-separates freight trains from street traffic and passenger trains. The project was one of the largest design-build projects in the U.S., undertaken with the objectives of reducing port-related rail-traffic delays, achieving operational improvements and safety enhancements by elimination of at-grade crossings, mitigation environmental impacts through more efficient operations, and promoting economic development. The project involved consolidation of railroad traffic (90 miles of branch line tracks into one 20-mile corridor) and construction of grade separations (east-west street overpasses south of Route 91 and depressed rail trench from 25th street to Route 91) to separate freight trains from passenger trains and street traffic.

The Alameda Corridor serves as a model for applications of innovative financing techniques, involving contributions from private as well as federal, state, and local sources. The total cost of the project was close to $2.5 billion, funded through a combination of sources. These sources include the following:

- Revenue-backed bonds issued by the Alameda Corridor Transportation Authority (ACTA) and consisting of:

[30] Indiana Department of Transportation, *Industrial Rail Service Fund: Grant Application FY 2012,* http://www.in.gov/indot/files/Rail_IRSFApplication_111012.pdf.

  - Senior tax-exempt bonds ($494 million).
  - Senior taxable bonds ($500 million).
  - Subordinate bonds ($167 million).
- U.S. DOT loan ($400 million).
- Grants from the Ports of Los Angeles and Long Beach ($394 million).
- Grant from the Los Angeles Metropolitan Transportation Authority (Metro) ($347 million).
- Grants from interest income and other federal and state sources ($160 million).

User fees and container charges for the use of the system by the private railroads and the ports cover debt service costs for the project. A key aspect of the project financing, the loan agreement between ACTA and the federal government, involved leveraging of federal credit assistance. The federal government incurred a cost close to $59 million for the subsidy cost associated with making a $400 million subordinate loan, covered through a congressional appropriation. The federal government's junior-lien status for the debt provided key assistance to ACTA for implementing the project. This federal government action provided the model for the subsequently enacted TIFIA loan guarantee program.

F.6.2 The Chicago Regional Environmental and Transportation Efficiency Project (CREATE)

The Chicago Regional Environmental and Transportation Efficiency Project (CREATE) a PPP created by the State of Illinois, City of Chicago, Metra, and the railroad industry (BNSF, Canadian Pacific Railway, Canadian National, CSX Transportation, Norfolk Southern Corporation, and Union Pacific) funds improvements in five rail corridors, including one primarily for passenger trains; constructs 25 new grade separations to eliminate many commuter delays; and opens a key corridor in downtown Chicago for commercial development. The goals of this program:

- Reduce rail and motorist congestion.
- Improve passenger rail service.
- Enhance public safety.
- Promote economic development.
- Create jobs.
- Improve air quality.
- Reduce noise from idling or slow-moving trains.

At its inception, the total cost of the project was estimated at $1.5 billion. The financial contributions of both the private and the public sector depended on the economic benefits that each partner would receive from the projects. An analysis of public and private benefits indicated that the project would generate about $4 billion in benefits, with 95 percent of those benefits being public and five percent private. The railroads committed to funding a roughly proportional amount of the project cost as their derived benefit, which in this case equals $212 million. In reality, this is closer to 14 percent of the project costs. The public sector is expected to provide the remaining $1.3 billion, including $20 million from METRA, the commuter rail service in the Chicago area, with the remainder coming from local, state, and federal contributions.

F.6.3 The Reno Transportation Rail Access Corridor

The Reno Transportation Rail Access Corridor (ReTRAC) project offers another example of an innovative funding package to finance a large capital investment. The ReTRAC corridor involved the building of a 2.3-mile subsurface rail corridor through Reno, Nevada's downtown. The goals of the project included:

- Enhancing the mobility of the Nevada warehousing core in and near Reno;
- Minimizing impacts from pedestrian conflicts;
- Minimizing emergency vehicle delay;
- Minimizing train-related congestion;
- Reducing air emissions caused by delay and idling vehicles.
- Improving the aesthetics and continuity of the Reno Downtown region.

The major project sponsors of the Reno ReTRAC included federal and state transportation agencies, the City of Reno, the Union Pacific Railroad, and gaming-related businesses in downtown Reno. The funding program for the project is shown in Table F.2.

F.7 Best Practices: Multi-State Coalitions

F.7.1 Multi-State Coalitions

A multi-state initiative to plan, fund, and implement specific rail projects recognizes the multi-jurisdictional nature of freight rail movements, as well as the benefit of increased project partners to support, fund, or plan rail projects. Several multi-state consortiums offer innovative case studies of approaches to finance large-scale rail infrastructure projects that span, or benefit, several states, including the Midwest Regional Rail Initiative and the Mid-Atlantic Rail Operations Study (MAROps), shown in Table F.3.

Table F.2: Reno ReTRAC Funding Allocations

Funding/Finance Source	Amount	Percent of Project Cost
Sales Tax	$120 million	45%
Railroad Right-of-Way (ROW) and Lease	$87 million	33%
Special Assessment District Fees	$21 million	8%
Federal and State Transportation Funds	$21 million	8%
1% Room Tax	$13 million	5%
Interest Income	$2 million	1%
Total	**$264 million**	**100%**

Source: Reno ReTrac Website: https://www.reno.gov/Index.aspx?page=387

Table F.3: Multi-State and Multi-Partner Rail Financing Strategies

Multi-State Agreement	Proposed Financing Strategies
Midwest Regional Rail Initiative (MWRRI)	• Federal loans and grants, Grant Anticipation Notes, and TIFIA loans • State funding to purchase trainsets and to match federal funding for infrastructure improvements • State general funds • Capital and revenue generated from system-related activities, such as joint development
Mid-Atlantic Rail Operations Study (MAROps)	• Direct funding from railroad revenues • Direct funding from state and local appropriations • Federal rail programs, including the RRIF and TIFIA • Federal-aid grant programs, including CMAQ • Federal highway and rail safety programs • Federal tax credit bond programs • Toll or user charges to pay back loans, bonds, or state infrastructure bank (SIB) programs • Sale of freight assets for passenger-rail use • State-based approaches such as property tax relief to railroads in exchange for public-purpose improvements by railroads

Source: *Midwest Regional Rail System: Executive Report, Transportation Economics and Management Systems*, Inc., September 2004; -95 Corridor Coalition Database, http://www.i95coalition.org/i95/Projects/ProjectDatabase/tabid/120/agentType/View/PropertyID/178/Default.aspx.

F.7.2 The Midwest Regional Rail Initiative (MWRRI)

The Midwest Regional Rail Initiative, a nine-state initiative to improve and expand passenger rail is sponsored by the transportation agencies of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin. This multiagency effort began in 1996. Elements of the regional system include use of 3,000 miles of existing rail right of way to connect rural and urban areas, operation of a hub and spoke passenger rail system, introduction of high-speed trains operating at up to 110 mph, and multimodal connections to improve system accessibility. MWRRI is currently in its seventh phase, which involves the analysis of the area for the Milwaukee-Minneapolis/St. Paul segment of the HSR corridor to Chicago to assist Minnesota DOT, the FRA route analysis, and the selection of a preferred alternative.

Capital requirements are estimated at around $7.7 billion (in 2002 dollars), over a ten-year implementation period. Planned funding sources include federal loans and grants (including Grant Anticipation Notes, TIFIA loans, and Federal Funding Agreements); state funding in the form of state support to purchase trainsets and match federal funding for infrastructure improvements; general funds; and capital and revenue associated from system activities such as joint development proceeds. Federal support will be the major source of funding, and cover up to 80 percent of infrastructure costs.

F.7.3 The I-95 Corridor Coalition/Mid-Atlantic Rail Operations Study (MAROps)

The I-95 Corridor Coalition/Mid-Atlantic Rail Operations Study (MAROps) was a joint initiative of the I-95 Corridor Coalition's five member states (New Jersey, Pennsylvania, Delaware, Maryland and Virginia) and three railroads (Amtrak, CSX, and Norfolk Southern). The FRA and Federal Highway

Administration (FHWA) participated as advisors. Over a two-year period, the MAROps participants crafted a 20-year, $6.2 billion program of rail improvements aimed at improving north- south rail transportation for both passengers and freight in the Mid-Atlantic region and reducing truck traffic on the region's overburdened highway system. The study examined a number of national models for innovative, public-private financing of rail improvements and identified the following options as the most promising:

- Direct funding out of railroad revenues, state and local appropriations, and congressional earmarks, as available.
- Existing or pending federal rail assistance programs, including the RRIF, a $35 billion loan program, and TIFIA, which provides loans and loan guarantees for large projects. The proposed High-Speed Rail Infrastructure Improvement Act, which would authorize more than $71 billion in tax-exempt state bond financing, loans, and loan guarantees, would expand these assistance programs.
- Federal-aid formula grant programs such as the CMAQ program, which has been used to fund transportation improvements that reduce congestion and engine emissions in regions that do not meet national air quality standards.
- Highway and rail safety programs, which can be used to eliminate dangerous highway-rail grade crossings or improve grade separations.
- Federal tax credit bond programs, which could be used to generate capital for investment in rail infrastructure projects.
- Toll or user charges on increased rail freight traffic and revenue, which can be used to repay loans, bonds, and state infrastructure bank (SIB) programs.
- Sale of freight assets for passenger-rail use.
- State-based approaches, where states could elect to provide property tax relief to the railroads in exchange for public-purpose improvements by the railroads.

The MAROps findings offer a good overview of the emerging methods to finance freight rail projects. They also offer a case study of how a multi-state partnership can work in a coordinated fashion to address regional freight rail needs. The I-95 Coalition extended the MAROps approach to include the New England states (Northeast Rail Operations Study (NEROps)) and the Southeast states (Southeast Rail Operations Study (SEROps)). It also commissioned a second phase of work for MAROps, with the objective of developing specific institutional and funding approaches to implement the MAROps program.

F.8 Rail Safety and Security

F.8.1 Safety and Security Mandates

As described in Chapters 5 and 6, the RSIA of 2008 and the corresponding regulations issued by FRA require passenger and major freight railroads to implement PTC on most major track lines by December 31, 2015.

RSIA also directed the FRA, as defined under Section 202, to identify the ten states that have had the most highway-rail grade crossing collisions, on average, during 2006, 2007, and 2008. These states, including California, must prepare and submit a highway-rail grade crossing safety action plan that addresses the following requirements:

- Identifies specific solutions for improving safety at crossings, including highway-rail grade crossing closures or grade separations.
- Focuses on crossings that have experienced multiple accidents or are at high risk for such accidents.
- Covers a five-year time period.

States needed to submit their State Action to the FRA by August 27, 2011.

Rail security is primarily a federal matter led by the TSA in cooperation with the U.S. DOT. Prior to the increased national attention to security after September 11, 2001, rail security concerns were mostly handled by the railroads themselves, in cooperation with a community of first responders tasked with addressing rail incidents involving hazardous materials. Railroads responded quickly after the September 11, 2001 terrorist attacks to develop more robust security plans. These efforts were formalized through the enactment of the Implementing Recommendations of the 9/11 Commission (IRC) Act of 2007, which established requirements for rail security planning, information sharing, and hazardous material routing. Specifically, the Act requires the DHS/TSA to:

- Develop a national rail security strategy and risk assessment.
- Compel railroads to develop their own internal risk assessments.
- Develop new programs for rail security training, exercises, and testing.
- Support research and development efforts focused on rail security.[31]

The IRC Act also contains a clause that preempts state laws where they conflict with the federal regulations. In essence, the clause states that the federal requirements constitute a uniform national standard. States can only enact stricter regulations if they do not conflict with U.S. law; are necessary to address a local hazard; and do not place an unreasonable burden on interstate commerce.

F.8.2 Freight Rail Safety Statistics

Rail system safety is evaluated by measuring the number of incidents, accidents, fatalities, and injuries that occur on the system. These statistics can be subdivided into operational impacts (e.g., employee injuries, operational incidents resulting in railroad property damage, etc.) and third-party incidents (e.g., right-of-way incursions by motor vehicles and pedestrians, grade crossing accidents, etc.).

California's accident rate exceeds the national average in a number of categories, including the number of fatalities that occur per 1,000 route-miles. As shown in Table F.4, California's average annual fatality rate for all freight rail accidents and incidents over the last ten years far exceeds the national average. At 7.98 annual fatalities per 1,000 route-miles for all accident categories, the rate of fatalities on California track doubles the national average. "Other Incidents" account for over three-quarters of fatalities, with an average annual fatality rate of 6.14 from 2002 to 2011.[32] Nationally, between 2002 and 2011, "Other Incidents" accounted for approximately 60 percent of fatalities. Additionally, California has the highest number of fatalities occurring at grade crossings over the last three years. As required by federal law, California must prepare plans for reducing such crashes and incidents.

[31] Implementing Recommendations of the 9/11 Commission Act of 2007, 110 P.L. 53.

[32] "Other incidents" are defined as those other than collisions, derailments, and crossing incidents that cause physical harm to people.

Table F.4: California Freight Rail Accidents/Incidents, 2002 to 2011

Description	California	U.S.
Total Accidents/Incidents (10-year total)	**5,548**	**93,481**
Avg. Annual Accident/Incident Rate (per 1,000 route-miles)	81.09	54.84
Avg. Annual Fatality Rate (per 1,000 route-miles)	7.98	3.65
Avg. Annual Injury Rate (per 1,000 route-miles)	48.52	31.45
Train Accidents (collisions, derailments, and other accidents)	**1,422**	**24,613**
Avg. Annual Accident/Incident Rate (per 1,000 route-miles)	20.78	14.44
Avg. Annual Fatality Rate (per 1,000 route-miles)	0.12	0.04
Avg. Annual Injury Rate (per 1,000 route-miles)	1.15	1.64
Highway-Rail Incidents (10-year total)	**871**	**23,777**
Avg. Annual Accident/Incident Rate (per 1,000 route-miles)	12.73	13.95
Avg. Annual Fatality Rate (per 1,000 route-miles)	1.72	1.44
Avg. Annual Injury Rate (per 1,000 route-miles)	4.14	4.73
Other Incidents (5-year total)	**3,255**	**45,091**
Avg. Annual Accident/Incident Rate (per 1,000 route-miles)	47.57	26.45
Avg. Annual Fatality Rate (per 1,000 route-miles)	6.14	2.17
Avg. Annual Injury Rate (per 1,000 route-miles)	43.23	25.09

Source: U.S. Department of Transportation, Federal Railroad Administration, Office of Safety Analysis.

In response to safety concerns, the CPUC developed a Rail Safety Action Plan for fiscal years 2009 through 2012. The Safety Plan outlines a number of rail safety goals as well as action plan elements to help achieve those goals. Action items include:

- Conduct focused inspections and regular inspections of all railroad and light rail transit operations.
- Process all rail crossing improvement applications in a timely manner.
- Develop the CPUC Rail Safety Information Management System database/work module.
- Work with the FRA and affected freight railroads to develop a comprehensive inventory of highway-rail crossings in the State.
- Issue semi-annual and annual Rail Safety Activity Reports to the Commission.

As a result of these efforts, accidents, fatalities, and injuries in California have been declining at a faster rate than the national average, as shown in Exhibits F.1 and F.2. As shown in Table F.5, total freight rail accidents were reduced by over ten percent between 2010 and 2011 throughout the State, compared to 3.9 percent in the U.S. Additionally, fatalities are down by nearly 2 percent, compared to 1.8 percent across the country.

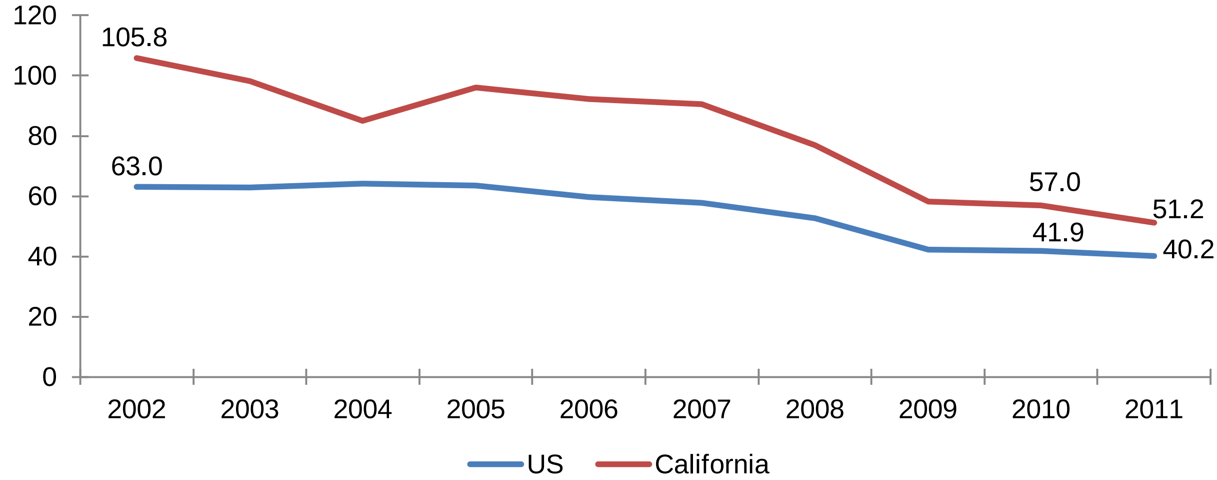

Exhibit F.1: Freight Rail Accident/Incident Rate per 1,000 Route-Miles, 2002 to 2011

Source: U.S. Department of Transportation, Federal Railroad Administration, Office of Safety Analysis.

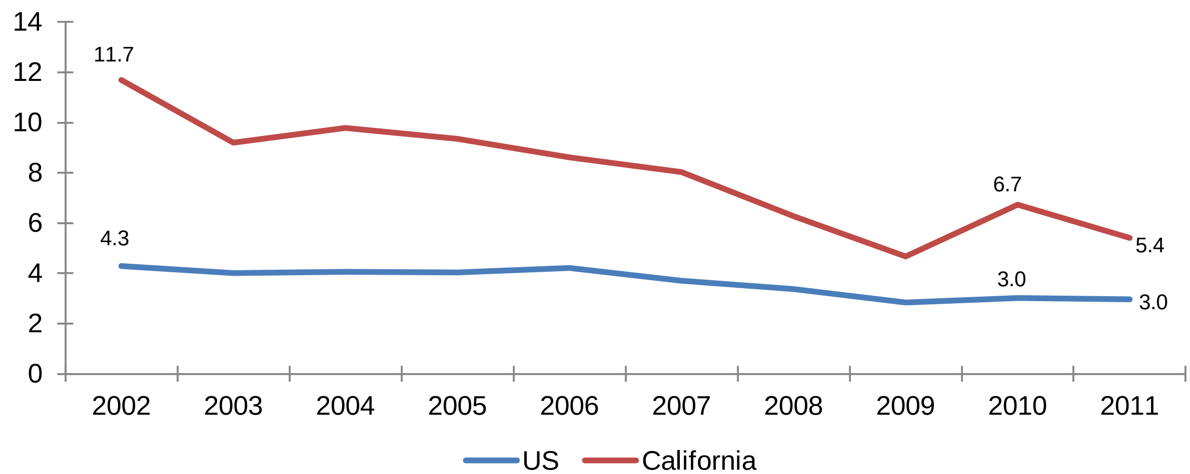

Exhibit F.2: Freight Rail Fatality Rate per 1,000 Route-Miles, 2002 to 2011

Source: U.S. Department of Transportation, Federal Railroad Administration, Office of Safety Analysis.

Table F.5: California Freight Rail Accidents/Incidents, 2011

Description	California	U.S.	California Change from 2010	U.S. Change from 2010
Total Accidents/Incidents	350	6,856	-10.3%	-3.9%
Fatalities	37	505	-19.6%	-1.8%
Injuries	209	3,827	-11.4%	-7.4%
Train Accidents (collisions, derailments, and other accidents)	77	1,810	0.0%	4.2%
Fatalities	0	6	-	50.0%
Injuries	4	62	0.0%	19.2%
Highway-Rail Incidents	66	1,729	-13.2%	-1.9%
Avg. Annual Fatalities	10	188	-9.1%	1.6%
Avg. Annual Injuries	22	650	-8.3%	-0.8%
Other Incidents	207	3,317	-12.7%	-8.8%
Avg. Annual Fatalities	27	311	-22.9%	-4.3%
Avg. Annual Injuries	183	3,115	-12.0%	-9.1%

Source: U.S. Department of Transportation, Federal Railroad Administration, Office of Safety Analysis.

F.8.3 Safety and Security Programs and Projects

Many of the federal and state programs described in Section 5.4 addressing passenger rail safety and security apply to freight rail, as well. These include the federal Section 130 Crossing Improvement Program and the state Section 190 Grade Separation Program, Highway-Railroad Crossing Safety Account (Proposition 1B), and Warning Device Maintenance Fund (refer to Section 5.4 for more detailed descriptions of these programs). This section summarizes the additional programs and projects that specifically address freight rail safety and security issues.

Freight Rail Security Grant Program

The Freight Rail Security Grant Program was authorized by the IRC Act of 2007 to provide funding for security initiatives of freight rail carriers transporting bulk poisonous-by-inhalation/toxic-inhalation-hazard materials. Congress appropriated $10 million to the program for FY 2011 to be administered by TSA.[33]

Rail Line Relocation Grants

The FRA's Rail Line Relocation Grant program provides states with funding to mitigate the adverse effects of rail traffic on safety, vehicle traffic flow, quality of life, or economic development by relocating rail lines away from downtown areas. Fifty percent of the funds are dedicated to projects of $20 million or less; states or non-federal entities must pay at least ten percent of project costs.

[33] Transportation Security Administration, *Fiscal Year 2011 Freight Rail Security Grant Program*.

Appendix G

DEMAND AND CAPACITY SUPPLEMENTAL INFORMATION

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G.1 *Pacific Surfliner* North Corridor

The following subsections outline issues and improvement needs for the *Pacific Surfliner* route north of Los Angeles Union Station (LAUS). This information was drawn from the *Pacific Surfliner North Service Development Plan* (2013) the 2010 *LOSSAN Corridor Strategic Assessment Report* and the 2007 *LOSSAN North Strategic Plan.*

G.1.1 Demand Issues

- The *Pacific Surfliner* north corridor is part of the *Pacific Surfliner* route, which is the second-most heavily traveled passenger rail route in the U.S., behind only the Boston–Washington, D.C. Northeast Corridor. The passenger rail demand is likely to grow with the increase in ridership.
- The traditional peak direction for Metrolink trains has mostly meant trips from Ventura and Orange counties to Downtown Los Angeles work centers. Over the long term, a stronger reverse commute from Los Angeles to Ventura County may occur.
- Long-term plans include introduction of new high-speed rail (HSR) service between LAUS and Burbank Junction, and provision of peak-period intercity service between the Ventura and Santa Barbara. The HSR service will be operating on dedicated tracks within the existing Metrolink-owned right-of-way across the San Fernando Valley and into LAUS.

G.1.2 Capacity, Operational, and Safety Issues and Needs

- More than 80 percent of the *Pacific Surfliner* north corridor service operates on a single-track basis; double-track operations are from LAUS to Moorpark. Double-track improvements are planned for segments between Control Point (CP) Raymer just north of Van Nuys Station and CP Bernson just south of Chatsworth, between Moorpark and Ventura.[34]
- Another constraint is that although there is double-track at Van Nuys Station, there is only a single platform south of the double track, requiring a train to "hold out," or stop short of the station, if an opposing train is already stopped there.
- Sidings are limited in number and length, and, in some instances, are not connected to the main line track, frequently requiring passenger trains to pull into sidings, wait, and then back out onto the main line to proceed. This is a constraint for the Ventura–Santa Barbara segment of the corridor.
- Some curve realignments are required to increase passenger train speeds and safety.
- Significant sections of single track still use Automatic Block System (ABS) and manual switches, requiring dispatch approval to proceed. In the long run, the Santa Barbara–San Luis Obispo segment of the corridor may need to replace the manual switches with either "island" or continuous Centralized Traffic Control that allows remotely located dispatchers to observe train progress electronically and remotely set siding switches.[35]

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[34] A Control Point is a location where signals and/or switches of a traffic control system are operated and/or controlled from a distant location by a train dispatcher.

[35] "Island" l operations describe lines that do not have Centralized Traffic Control installed along an entire route, but rather only in discrete or "island" segments, typically at sidings, junctions, and station areas. In the remaining segments, operations would be governed by manual dispatching techniques, typically track warrant control (TWC).

- The Southern California Regional Rail Authority (SCRRA) is developing a comprehensive strategy called the Metrolink Sealed Corridor Initiative to improve overall safety by overcoming the current “open” nature of the right-of-way (many grade crossings and frequent pedestrian and vehicular trespassing), which limits top operating speeds and reduces service reliability.

G.2 *Coast Daylight* Route

The proposed *Coast Daylight* passenger rail service will operate over the entire length of the *Pacific Surfliner* north corridor. The issues and needs for improvements identified for the *Pacific Surfliner* north corridor are also relevant to *Coast Daylight* trains. No additional rail infrastructure improvements would be needed for portions of the *Coast Daylight* route within the *Pacific Surfliner* operating area.

The following subsections outline issues and improvement needs for portions of the proposed *Coast Daylight* route north of San Luis Obispo. This information was drawn from the *Coast Daylight Service Development Plan (2013)*, the 2006 *Caltrain Extension to Monterey County Passenger Rail Stations Final Environmental Impact Repor*t, the 2001 *California Passenger Rail System (Amtrak) 20-Year Improvement Plan*, and ongoing environmental review for the segment between Salinas and San Luis Obispo.

G.2.1 Demand Issues

- At present, Amtrak’s daily Los Angeles to Seattle *Coast Starlight* service is the only passenger service available between San Luis Obispo and San Jose. With a single daily train, the range of travel needs by communities along the route cannot be met. Furthermore, due to the length of the route, trains are often subject to delays, particularly in the southbound direction. Implementation of the planned *Coast Daylight* trains will fill these gaps, thereby providing intercity rail service as a viable option for many travelers.
- Longer-term plans include the introduction of HSR services on the segment between Gilroy and San Francisco.

G.2.2 Capacity, Operational, and Safety Issues and Needs

- Outside the urbanized commuter rail territory, most of the corridor is single track; double-track exists between San Francisco and San Jose.
- Between San Jose and Gilroy, the only improvement project is double-tracking to be carried out by the Santa Clara Valley Transportation Authority, which has already been environmentally cleared. Environmental evaluation of additional service between Gilroy and Salinas will be addressed in an ongoing Environmental Assessment led by the Transportation Agency for Monterey County in coordination with the Federal Transit Administration (FTA).
- Improvements in the remaining 134 miles between Salinas and San Luis Obispo will be addressed in an ongoing Environmental Assessment led by the San Luis Obispo Council of Governments (SLOCOG), in coordination with Caltrans and the FRA. The SLOCOG Environmental Assessment is being managed by Caltrans.
- Sidings are limited in number and length.
- Significant sections still use Automatic Block Signaling (ABS) and manual switches, requiring dispatch approval to proceed.
- Some curve realignments are required to increase passenger train speeds and safety.
- Station improvements including providing new stations and transit connectivity are needed.

G.3 *Pacific Surfliner* South Corridor

Demand on the *Pacific Surfliner* route, SCRRA's proposed improvements, and ongoing Positive Train Control (PTC) installation on the entire *Pacific Surfliner* route were discussed earlier under the *Pacific Surfliner* north corridor. The following subsections outline issues and improvement needs for the *Pacific Surfliner* route south of LAUS. This information was drawn from the *Pacific Surfliner South Service Development Plan* (2013) and the 2010 *LOSSAN Corridor Strategic Assessment Report*.

G.3.1 Demand Issues

- For Metrolink, the traditional peak directions have mostly been trips from Ventura and Orange counties to Downtown Los Angeles work centers. However, new markets have been emerging, and over the longer term, a stronger reverse commute from Orange County to developing Inland Empire work centers may occur.
- The Orange County Transportation Authority (OCTA) is currently upgrading tracks and stations along the existing LOSSAN rail corridor from Fullerton to Laguna Niguel to provide for this new service, referred to subsequently in this study as the "Orange County Shuttle." The OCTA upgrades will also include new turnback and layover facilities at the both ends of the route.

G.3.2 Capacity, Operational, and Safety Issues and Needs

- Several segments of the *Pacific Surfliner* south corridor are currently constrained by the lack of passing or second main tracks. In San Diego County, 50 percent of the rail corridor is single track. Several segments between Laguna Niguel and San Diego require double-tracking to handle future passenger rail demand.
- The segment of track between Hobart Yard and Fullerton Junction includes sections of both double- and triple-track. The BNSF Railway (BNSF) and the Caltrans Division of Rail are currently designing and implementing a major improvement to the section of the LOSSAN rail corridor between Fullerton (Fullerton Junction) and Los Angeles (Redondo Junction). The project will complete a third main track for the entire section from Fullerton to Los Angeles, as well as grade separating or closing the remaining eight at-grade road crossings in this stretch of the corridor.
- Safety improvements are needed at the many grade crossings between Fullerton and Laguna Niguel.

G.4 *San Joaquin* Route

The following subsections outline issues and improvement needs for the *San Joaquin* route. This information was drawn from the *San Joaquin Service Development Plan* (2013), the 2011 *Draft San Joaquin Corridor Intercity Passenger Rail Programmatic Environmental Impact Review/Environmental Impact Statement*, the 2008 *San Joaquin Corridor Strategic Plan*, and the *California State Rail Plan* (2007-08 to 2017-18).

G.4.1 Demand Issues

- As per the 2011 *Draft San Joaquin Corridor Intercity Passenger Rail PEIR/EIS*, the passenger rail demand is likely to grow.

G.4.2 Capacity, Operational, and Safety Issues and Needs

- The average travel time between Oakland and Bakersfield is 6 hours and 13 minutes with an overall average speed, including station dwell time, of 50 miles per hour (mph). Between Sacramento and Bakersfield, the overall average speed is 53 mph. The maximum track speed on the *San Joaquin* route is 79 mph.
- The 2008 *San Joaquin Corridor Strategic Plan* based on a BNSF capacity and performance analysis using Berkeley Simulation Software's RTC simulation model identified a long-term need for complete double-tracking of the *San Joaquin* route, curve realignments, and signal control upgrades in order to handle future rail demand.
- The *San Joaquin Corridor Strategic Plan* notes that the *San Joaquin* route has over 400 public and private at-grade crossings throughout the corridor on both the Union Pacific (UPRR) and BNSF rail lines. On the BNSF route alone, there are 362 at-grade crossings with 255 public and 107 private crossings. In California, the *San Joaquin* route has three out of the top 10, and 8 out of the top 20 at-grade road crossings with the most accidents between 1995 and 2004.

G.5 *Capitol Corridor* Route

The following subsections outline issues and improvement needs for the *Capitol Corridor route*. This information was drawn from the 2010 *Capitol Corridor Service Expansion Plan – Service Development Plan*, the 2007 *California State Rail Plan* (2007/2008 to 2017/2018), and the 2005 *Capitol Corridor Joint Powers Authority Vision Plan*.

G.5.1 Demand Issues

- The *Capitol Corridor* is the third busiest service in the Amtrak system, after the Amtrak Northeast Corridor and the *Pacific Surfliner* route. The passenger rail demand is likely to grow with the increase in ridership.
- The *Capitol Corridor Service Development Plan* adopted an incremental approach to increase service frequencies (as well as reduce travel times and maintain the current high on-time performance), as guided by both the *CCJPA Vision Plan* (2005) and the *California State Rail Plan* (2007/2008 to 2017/2018).

G.5.2 Capacity, Operational, and Safety Issues and Needs

- The Capitol Corridor Joint Powers Authority (CCJPA) is currently maintaining an on-time performance of 92.4 percent. This is largely due to working with UPRR to eliminate slow orders and maintain the rail infrastructure to FRA Track Class V (90 mph maximum speed for passenger trains, 70 mph for freight) standards while operating at Class IV standards (80 mph maximum speed for passenger trains, 60 mph for freight). Similar collaborative efforts are needed in the future.
- The known impediment to frequency increases between Auburn and Sacramento and between Oakland and San Jose is constrained railroad capacity.
- For the Auburn–Sacramento segment, capacity constraints in the Auburn to Reno corridor, east of CCJPA's service area boundary in Auburn, constrain freight rail service, as well as the ability of CCJPA to implement additional service between Sacramento and Auburn. UPRR has funded and completed improvements on one of the main tracks between Auburn to Reno, which has freed up some of the congestion in the Roseville Yard and allowed CCJPA to operate one round

trip. Improvements to the second main track between Auburn and Reno need to be made in order to allow the additional round trip *Capitol Corridor* train between Sacramento to Auburn.

- For the Oakland–San Jose segment, CCJPA worked with both UPRR and Caltrain to identify the necessary capacity improvements to increase service from seven to eleven daily round trips.
- The *Capitol Corridor Service Development Plan* also proposes inclusion of a new station stop at Union City. This proposed station would be adjacent to the recently renovated Union City Bay Area Rapid Transit Station. Service to this station would required a slight rerouting from the existing Niles subdivision alignment on to the Oakland subdivision via a new alignment (termed the "Shinn Connection"), and then back to the Niles Subdivision.

G.6 Caltrain

The following subsections outline issues and improvement needs for Caltrain. This information was drawn from the 2012 *Draft Coast Daylight Service Development Plan*, the 2012 *Caltrain/California HSR Blended Operations Analysis*, and the *Caltrain Strategic Plan* (2004/2023).

G.6.1 Demand Issues

- Future Caltrain service improvements include electrification, track and station improvements, route extension to Salinas, and potential operation of HSR trains on the Caltrain right-of-way.

G.6.2 Capacity, Operational, and Safety Issues and Needs

- Environmental studies on some of the necessary capital improvements for Caltrain are underway as discussed in the 2012 *Draft Coast Daylight Service Development Plan*.
- According to the 2012 *Caltrain/California HSR Blended Operations Analysis* considered as a "proof of concept" for a "build-out" type scenario, the key findings are as follows:
    - A blended operation on the Caltrain route where Caltrain and high-speed trains are sharing tracks is conceptually feasible.
    - An electrified system with an advanced signal system and electric trains increases the ability to support future train growth in the corridor.
    - The blended system without passing tracks for train overtakes can reliably support up to six Caltrain trains and two HSR trains per hour per direction.
    - The blended system with passing tracks for overtakes can reliably support up to six Caltrain trains and four HSR trains per hour per direction.
- Supporting HSR trains results in non-uniform Caltrain headways.
- Increasing maximum speed from 79 mph to 110 mph decreases travel times for both rail services.

G.7 Altamont Corridor Express

The following subsections outline issues and improvement needs for the Altamont Corridor Express (ACE). This information was drawn from the *Preliminary Alternatives Analysis Report* of the 2011 *Altamont Corridor Rail Project EIR/EIS* and the 2007 *Bay Area Regional Rail Plan*.

G.7.1 Demand Issues

- A joint project between the California High-Speed Rail Authority (Authority) and the San Joaquin Regional Rail Commission to upgrade the Altamont rail corridor. The Authority is serving as the lead agency, conducting planning and for California Environmental Quality Act environmental work for the upgrade of the Altamont rail corridor. The *Preliminary Alternative Analysis Report* considered creating a new commuter and intercity train service connecting the Central Valley, Tri-Valley, and Silicon Valley as an evolution of the existing ACE rail service, serving both intercity travelers and commuters.

G.7.2 Capacity, Operational, and Safety Issues and Needs

- The Altamont Corridor Rail Project would incrementally upgrade ACE service on a separate, dedicated passenger track, and may ultimately be fully grade-separated, electrified, and compatible with HSR rolling stock.

G.8 Metrolink

The following subsections outline issues and improvement needs for Metrolink's routes as reported in the 2007 *SCRRA Strategic Assessment*.

G.8.1 Demand Issues

- According to SCCRA, a key unknown outcome is SCRRA's ability to grow its services on the freight railroads over which Metrolink operates. SCRRA is thus making an effort to determine how best to ramp up service levels, including off-peak and weekend trains, over the next 20 years.
- As mentioned earlier, the OCTA is making improvements to introduce a new Orange County Shuttle service between Fullerton and Laguna Niguel.

G.8.2 Capacity, Operational, and Safety Issues and Needs

- As seen earlier, capital improvements are underway for triple-tracking the BNSF mainline between Los Angeles and Fullerton, including a new Eastern Area Maintenance Facility, a maintenance-of-way (MOW) facility, and communications improvements.
- In the medium term, SCRRA is expecting improvements to LAUS between Fullerton and West Riverside, completion of double-tracking of the UPRR mainline between Los Angeles and West Riverside, and procurement of additional rolling stock.
- In the long term, SCRRA is anticipating a fourth main track between Los Angeles and Fullerton.
- As mentioned before, SCRRA is developing a comprehensive safety strategy as part of the Metrolink Sealed Corridor Initiative. SCRRA is also enhancing safety through modifications to rolling stock to incorporate crash energy management technologies to enhance crashworthiness.

G.9 COASTER

As the COASTER passenger rail service operates over a portion of the *Pacific Surfliner* south corridor, the issues and needs for improvements on have already been discussed under the *Pacific Surfliner* south corridor.

G.10 Coachella Valley

The following subsections outline issues and improvement needs for Metrolink's routes as reported in the *2010 Coachella Valley Rail Study Update*.

G.10.1 Demand Issues

- The route is proposed to connect Orange County and Riverside County to Coachella Valley, a route not currently met by the *Sunset Limited*.
- At Fullerton and Riverside (Downtown) Stations, the new train service will be able to connect with numerous other passenger rail services.
- Stops on this route have been planned to access major activity centers, with new stations at locations such as Loma Linda, where community support is strong.
- Amtrak has suggested that the minimum level of train service on a short-haul route like Coachella Valley service should consist of two round trips. However, in the *California State Rail Plan* (2007/2008 – 2017/2018), Caltrans proposed one daily round trip between Los Angeles and Indio. To avoid spending one night in Coachella Valley and to make same-day return trips to Orange County or Los Angeles possible, it is considered preferable to have two trips with trains originating at either end point and returning late in the afternoon or early evening.

G.10.2 Capacity, Operational, and Safety Issues and Needs

- During peak periods, it may be difficult to obtain a train slot between Fullerton and Los Angeles because of the various commuter and intercity trains operating during that period.
- Based upon a review of Amtrak, Metrolink, and UPRR train schedules and running times between Los Angeles, Fullerton, and Riverside and authorized passenger train speeds on the track between Colton and Indio, the total estimated travel time between Indio and Los Angeles, with all the stations identified in this review, is approximately three hours and 10 minutes, resulting in an average speed of 44.5 miles per hour.
- This service needs rolling stock, a layover facility, and station improvements (to protect passengers from severe summer conditions in the Coachella Valley).

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Appendix H

PLANNED OR PROGRAMMED GRADE SEPARATION PROJECTS

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Table H.1: Planned or Programmed Highway Rail Grade Separation Projects

Source[a]	County/ City	Project Description	Project Cost[b]	Committed Funds	Construction	
					Begin	End
HRCSA	Alameda	Kato Road Grade Separation	$52,265,000	$10,000,000	30-Aug-11	30-Dec-12
HRCSA	Alameda	Warren Ave. Grade Separation	$56,000,000	$9,600,000	25-Nov-11	25-Nov-14
MTC RTP	Alameda	7th St. Grade Crossing	$175,000,000			
TCIF	Contra Costa	Marina Bay Parkway Grade Separation	$37,950,000	$18,975,000	7-Jun-11	Oct 01, 201
HRCSA	Kern	BNSF Grade Separation at 7th Standard Road/ Santa Fe Way	$28,853,000	$9,926,000	10-Apr-10	1-Jul-11
KCOG RTP	Kern	At Union Pacific Railroad – Construct Grade Separation	$26,400,000		2025	
KCOG RTP	Kern	Rosedale Hwy. at Minkler Spur/Landco – Construct Grade Separation	$17,400,000		2013	
KCOG RTP	Kern	Hageman Road/BNSF Railroad Grade Separation	$39,500,000	$17,650,000	15-Dec-10	30-Jul-12
HRCSA	Los Angeles	Nogales Street Grade Separation	$85,430,000	$25,600,000	15-Feb-12	15-Oct-15
SCAG RTP	Los Angeles	Gateway (Valley View Grade Separation)	$75,177,000	$25,570,000	1-May-11	1-Aug-14
SCAG RTP	Los Angeles	Baldwin Ave. (El Monte)	$85,100,000			6-Jul-05
SCAG RTP	Los Angeles	Construction of Grade Separations on 35 Mile Freight Rail Corridor from los Angeles to Pomona	$959,000			
SCAG RTP	Los Angeles	Del Amo Blvd. from Madrona Ave. to Crenshaw Blvd. Construct 0 to 4 Lanes New Grade Separation	$32,439,000			2012
SCAG RTP	Los Angeles	Design and Construct a Grade Separation in South Wilmington	$69,029,000			
SCAG RTP	Los Angeles	La-Fullerton Triple Track and Grade Separation	$90,000,000			2015
SCAG RTP	Los Angeles	Mission Blvd. Grade Separation at SR 71, from UPRR Undercrossing to 9th St.	$51,000,000			2012
SCAG RTP	Los Angeles	North Main St. Grade Separation: Construct a New Grade Separation over UPRR and Metrolink	$91,280,000			2018
SCAG RTP	Los Angeles	Rancho Vista Blvd. (RVB) Grade Separation at Sierra Hwy./UPRR/Metrolink RR Crossing	$64,172,000			

Table H.1: Planned or Programmed Highway Rail Grade Separation Projects (continued)

Source[a]	County/ City	Project Description	Project Cost[b]	Committed Funds	Construction	
					Begin	End
SCAG RTP	Los Angeles	Reeves Grade Separation	$61,000,000			2014
SCAG RTP	Los Angeles	Valley Blvd. Grade Separation	$54,285,000			
HRCSA	Merced	G Street Undercrossing	$18,000,000	$9,000,000	15-Jun-10	15-Dec-11
SCAG RTP	Orange	BSNF Railway Line (Placentia) along SS of Orangethorpe. Grade Separation/Corridor Improvements	$78,230,000			2015
SCAG RTP	Orange	Kraemer Blvd. Grade Separation	$67,662,000			2015
SCAG RTP	Orange	Lakeview Ave. Grade Separation: Project Utilizing $1,938 Toll Credits for Row Phase in FY11/12	$99,763,000			2015
SCAG RTP	Orange	Orangethorpe Ave. Grade Separation: Construct a Grade Separation on Orangethorpe Ave. at the BSNF RR Tracks	$114,983,000	$48,020,000	1-Jul-12	1-Apr-15
SCAG RTP	Orange	Raymond Avenue Grade Separation	$76,792,000		1-Apr-13	1-Jan-16
SCAG RTP	Orange	Tustin Ave./Rose Drive Grade Separation	$92,193,000			2015
SCAG RTP	Orange	Tustin Avenue and Rose Drive Overcrossing	$92,193,000	$34,414,000	1-Mar-13	1-Sep-15
SACOG RTP	Placer	Midas Ave. Grade Separation – Midas Ave. from Pacific St. to Third St. Construct 2-Lane Grade Separation of UPRR Tracks including Right of Way	$7,054,487			2035
SCAG RTP	Riverside	Auto Center Drive Grade Separation	$32,675,000	$16,000,000	1-Nov-11	30-Apr-13
SCAG RTP	Riverside	Avenue 52 Grade Separation Project	$22,290,000	$10,000,000	1-Jul-13	1-Jul-14
SCAG RTP	Riverside	Clay Street Grade Separation	$35,827,000	$12,500,000	30-Mar-12	30-Sep-13
SCAG RTP	Riverside	Iowa Avenue Grade Separation	$32,168,000	$13,000,000	29-Feb-12	30-Jun-13
SCAG RTP	Riverside	Magnolia Avenue Grade Separation (Union Pacific Railroad)	$52,960,000	$20,000,000	1-Feb-10	1-Jan-12
SCAG RTP	Riverside	Riverside Avenue Grade Separation	$29,512,000	$8,500,000	1-Dec-11	1-Jun-13
SCAG RTP	Riverside	Streeter Avenue Grade Separation	$36,800,000	$15,500,000	30-Nov-12	30-May-14
SCAG RTP	Riverside	Sunset Avenue Grade Separation	$26,200,000	$10,000,000	15-Jan-12	31-Dec-14

Table H.1: Planned or Programmed Highway Rail Grade Separation Projects (continued)

Source[a]	County/ City	Project Description	Project Cost[b]	Committed Funds	Construction	
					Begin	End
SCAG RTP	Riverside	Avenue 56 Grade Separation Union Pacific Yuma Subdivision	$60,000,000	$10,000,000	28-Dec-12	28-Dec-14
SCAG RTP	Riverside	Grade Separation along Riverside Ave. between Merrill Ave. and 400 feet north of Elizabeth St.	$29,512,000			
SCAG RTP	Riverside	Grade Separation on Iowa Ave. between Spring St. and Palmyrita	$32,168,000			
SCAG RTP	Riverside	Grade Separation on Magnolia Ave. between Buchanan Ave.	$60,205,000			
SCAG RTP	Riverside	Grade Separation on Mary St. between Marguerite Ave. and Indiana Ave.	$38,000,000			
SCAG RTP	Riverside	In Eastern Riverside Co. in the Coachella Valley – 66th Ave. Grade Separation	$25,250,000			
SCAG RTP	Riverside	In the City of Coachella – Construct a New 6-Lane Ave. 52 Grade Separation Overhead Structure Spanning over UPRR Mainline Tracks	$22,290,000			
SCAG RTP	Riverside	Pierce St. from Magnolia Ave. to Indiana Ave. – Grade Separation	$75,947,000			22-Jul-05
SCAG RTP	Riverside	Riverside Countywide Grade Separation Improvements	$1,217,800,000			27-Jul-05
HRCSA	Sacramento	6th Street Overcrossing – Roadwork	$15,730,000	$7,865,000	8-Feb-12	8-Feb-13
SACOG RTP	Sacramento	New overcrossing: UPRR Grade Separation – A St..	$13,734,399			2035
SACOG RTP	Sacramento	Jackson Hwy. (SR 16) at Watt Ave. – Construct New Roadway Grade Separation Interchange at the Intersection of Jackson Hwy. and Watt Ave.	$3,426,489			
SCAG RTP	San Bernardino	Colton Crossing Grade Separation Project	$201,994,000	$91,305,000	30-Sep-11	30-Mar-14
SCAG RTP	San Bernardino	Glen Helen Parkway Railroad Grade Separation	$29,000,000	$7,172,000	1-Apr-12	1-Sep-13
SCAG RTP	San Bernardino	Laurel St. Grade Separation (BNSF)	$53,995,000	$11,917,000	10-Dec-12	21-May-14

Table H.1: Planned or Programmed Highway Rail Grade Separation Projects (continued)

Source[a]	County/ City	Project Description	Project Cost[b]	Committed Funds	Construction Begin	Construction End
SCAG RTP	San Bernardino	Lenwood Road Grade Separation	$31,732,000	$6,694,000	1-Apr-12	1-Sep-13
SCAG RTP	San Bernardino	Palm Avenue Railroad Grade Separation	$30,077,000	$9,390,000	1-Jul-12	30-Dec-13
SCAG RTP	San Bernardino	South Milliken Avenue Grade Separation at Union PACIFIC LOS ANGELES SUBDIVISION	$80,468,000	$14,521,000	1-Apr-13	1-Oct-15
SCAG RTP	San Bernardino	Glen Helen Parkway at UPRR and BSNF – Grade Separation	$29,000,000			
SCAG RTP	San Bernardino	Hunts Lane at Union Pacific Railroad Crossing – Grade Separation	$37,176,000			
SCAG RTP	San Bernardino	In Ontario: on Milliken at Union Pacific Railroad – Grade Separation	$73,983,000			
SCAG RTP	San Bernardino	Lenwood Grade Separation	$31,732,000			
SCAG RTP	San Bernardino	Main St. Grade Separation Widening	$20,435,000			
SCAG RTP	San Bernardino	Monte Vista Ave. at Union Pacific Railroad Crossing – Grade Separation	$18,100,000			
SCAG RTP	San Bernardino	Mt. Vernon Ave. Bridge (Overhead) at BSNF Replace Grade Separation	$40,112,000			
SCAG RTP	San Bernardino	Mt. View Ave. Railway Grade Crossing	$1,724,000			2014
SCAG RTP	San Bernardino	North Vineyard Ave. Grade Separation	$56,088,000			
SCAG RTP	San Bernardino	Palm Ave. Grade Separation	$30,077,000			
SCAG RTP	San Bernardino	Ramona Ave. at State St. – Railroad Crossing Grade Separation-Funded with TCRP	$22,408,000			
SCAG RTP	San Bernardino	S. Milliken Ave. Grade Separation	$80,468,000			

Table H.1: Planned or Programmed Highway Rail Grade Separation Projects (continued)

Source[a]	County/ City	Project Description	Project Cost[b]	Committed Funds	Construction	
					Begin	End
SCAG RTP	San Bernardino	South Archibald Ave. Grade Separation	$57,932,000			2014
SCAG RTP	San Bernardino	State St. from Adams North to Nolan/Short St. Grade Separation	$6,300,000			
SCAG RTP	San Bernardino	Vineyard Ave. Grade Separation at Union Pacific Alhambra Subdivision	$56,088,000	$6,884,000	1-Dec-12	31-Dec-14
SCAG RTP	San Bernardino	Vista Road Grade Separation-Widen 2-4 Lanes and Construct Grade Separation	$23,000,000			
SANDAG RTP	San Diego	10th Avenue at Harbor Drive Grade Separation Improvements	$66,000,000	$30,910,000	7-Nov-13	25-Aug-16
SANDAG RTP	San Diego	32nd St.. at Harbor Drive Grade Separation Improvements	$118,460,000	$50,665,000	7-Nov-13	25-Aug-16
SANDAG RTP	San Diego	Blue Line Rail Grade Separations (Taylor St., Washington/ Sassafras St., 28th St., 32nd St., E St., H St., Palomar St.)	$861,000,000			
SANDAG RTP	San Diego	Orange Line (Trolley) Rail Grade Separations (Euclid Ave., Broadway/Lemon Grove Ave., Allison Ave./ University Ave./La Mesa Blvd., Severin St.)	$491,000,000			
SANDAG RTP	San Diego	Rail Line Grade Separation/Barrio Logan Enhancement	$66,000,000			
SJCOG RTP	San Joaquin	Airport Way at UPRR – Construct 5-Lane Grade Separation	$21,492,318			
SJCOG RTP	San Joaquin	Airport Way at BNSF At-grade Crossing	$2,800,000			
SJCOG RTP	San Joaquin	Alpine Way at UPRR Construct Grade Separation	$31,400,000			
SJCOG RTP	San Joaquin	Daggett Road at BNSF – Construct Grade Separation	$12,460,000			
SJCOG RTP	San Joaquin	Eight Mile at UPRR (Easterly) – Construct Grade Separation	$42,400,000	$8,500,000	1-Oct-10	1-Nov-12

Table H.1: Planned or Programmed Highway Rail Grade Separation Projects (continued)

Source[a]	County/ City	Project Description	Project Cost[b]	Committed Funds	Construction Begin	Construction End
SJCOG RTP	San Joaquin	Eight Mile at UPRR (Westerly) – Construct Grade Separation	$39,400,000	$8,500,000	1-Oct-10	1-Nov-12
SJCOG RTP	San Joaquin	Harney Lane at UPRR – Construct Grade Separation	$18,502,089			
SJCOG RTP	San Joaquin	Lower Sacramento Road at UPRR – Construct Grade Separation	$40,000,000		2016	2020
SJCOG RTP	San Joaquin	Main Street at UPRR – Construct Grade Separation	$10,000,000			
SJCOG RTP	San Joaquin	Morada Ln. at UPRR – Construct Grade Separation	$34,600,000			
SJCOG RTP	San Joaquin	SR 12 at UPRR – Construct Grade Separation	$91,000,000			
SJCOG RTP	San Joaquin	Wilma Avenue at UPRR – Construct Grade Separation	$10,000,000			
SACOG RTP	Sutter	Rednail Road/UPRR Grade Crossing Safety – in Unincorporated Sutter County	$564,153			2020
HRCSA	Tulare	Bardsley Avenue Grade Separation	$14,486,000	$7,156,000	1-Apr-12	31-Oct-13
HRCSA	Tulare	Betty Drive Grade Separation	$27,418,000	$5,722,000	20-Dec-10	1-Jun-11
HRCSA	Tulare	Cartmill Avenue Grade Separation	$26,808,000	$11,293,000	1-Dec-10	31-May-12
SCAG RTP	Ventura	In Oxnard at Rice Ave. Railroad Grade Separation	$12,327,000			

[a] HRCSA – Highway Rail Grade Crossing Safety Account.
MTC RTP – Metropolitan Transportation Commission Regional Transportation Plan (RTP).
TCIF – Trade Corridor Improvement Fund.
KCOG RTP – Kern Council of Governments RTP.
SCAG RTP – Southern California Association of Governments RTP.
SANDAG RTP – San Diego Association of Governments RTP.
SACOG RTP – Sacramento Area Council of Governments RTP.
SJCOG RTP – San Joaquin Council of Governments RTP.

[b] Project costs are taken from the document noted in the "Source" column.

Appendix I

AIR QUALITY BENEFITS METHODOLOGY

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Appendix I. Air Quality Emission Benefits

The appendix describes the calculation methodology for air quality emissions benefits and provides result tables for each pollutant by geographic subregion, passenger rail corridor, and year.

I.1 Calculation Method

California is divided geographically into air basins for the purpose of managing the air resources of the State on a regional basis. Each air basin generally has similar meteorological and geographic conditions throughout. The State is currently divided into 15 air basins[36] with numerous subareas. In this analysis, the subareas are defined by EMFAC[37] and included in parentheses, for example "(SV)" which designates the Sacramento Valley air basin from EMFAC. Emission rates for each pollutant were estimated using EMFAC2011-SG for 2020, 2025, and 2035 at the county/subarea air basin level. These rates were then aggregated to generate composite emission factors for key subareas, and then further aggregated to each of seven reporting regions defined for the *California State Rail Plan* (CSRP).[38] These 7 reporting regions and component subareas are as follows:

- The Sacramento Region (2 total EMFAC subarea air basins)
  - Sacramento (SV).
  - Yolo (SV).
- The Bay Area (12 total EMFAC subarea air basins)
  - Alameda (SF).
  - Contra Costa (SF).
  - Marin (SF).
  - Napa (SF).
  - San Francisco (SF).
  - San Mateo (SF).
  - Santa Clara (SF).
  - Santa Cruz (NCC).
  - Solano (SF and SV).
  - Sonoma (NC and SF).

[36] The 15 air basins are Great Basin Valleys (GBV), Lake County (LC), Lake Tahoe (LT), Mojave Desert (MD), Mountain Counties (MC), North Central Coast (NCC), North Coast (NC), Northeast Plateau (NEP), Sacramento Valley (SV), Salton Sea (SS), San Diego (SD), San Francisco Bay (SF), San Joaquin Valleys (SJV), South Central Coast (SCC), and South Coast (SC). For further details, see: http://www.arb.ca.gov/desig/airbasins/airbasins.htm.

[37] EMFAC2011 is the latest installment of the EMFAC series of models, which is California Air Resources Board's tool for estimating emissions from on-road vehicles.

[38] Note, the subareas are a subset of the total air basins in the region and were selected specifically to cover air basins relevant for the CSRP.

- The Central Coast & Monterey Bay (4 EMFAC subarea air basins)
  - Monterey (NCC).
  - San Benito (NCC).
  - San Luis Obispo (SCC).
  - Santa Barbara (SCC).
- The San Joaquin Valley (11 EMFAC subarea air basins)
  - Calaveras (MC).
  - Fresno (SJV).
  - Kern (SJV).
  - Kings (SJV).
  - Madera (SJV).
  - Mariposa (MC).
  - Merced (SJV).
  - San Joaquin (SJV).
  - Stanislaus (SJV).
  - Tulare (SJV).
  - Tuolumne (MC).
- The Greater Los Angeles Region (12 EMFAC subarea air basins)
  - Imperial (SS).
  - Kern (MD).
  - Los Angeles (MD and SC).
  - Orange (SC).
  - Riverside (MD SCAQMD, SC, and SS).
  - San Bernardino (MD and SC).
  - Ventura (SCC).
- San Diego (1 EMFAC subarea air basins)
  - San Diego.
- The Rest of California (27 EMFAC subarea air basins)
  - Alpine (GBV).
  - Amador (MC).
  - Butte (SV).
  - Colusa (SV).
  - Del Norte (NC).
  - El Dorado (LT and MC).

- o Glenn (SV).
- o Humboldt (NC).
- o Inyo (GBV).
- o Lake (LC).
- o Lassen (NEP).
- o Mendocino (NC).
- o Modoc (NEP and GBV).
- o Nevada (MC).
- o Placer (LT, MC, and SV).
- o Plumas (MC).
- o Shasta (SV).
- o Sierra (MC).
- o Siskiyou (NEP).
- o Sutter (SV).
- o Tehama (SV).
- o Trinity (NC).
- o Yuba (SV).

2035 emissions rates were used as a reasonable approximation to 2040, as per standard practice. The emission certification standards and the phase-in schedule for those standards, do not change after 2025, providing additional justification for the use of 2035 emissions rates.

The reported emission reduction benefits in each table were estimated by combining region specific emission rates for each pollutant, with the estimated vehicle miles traveled (VMT) reductions reported in Chapter 10. This process assumes that the distribution of VMT by speed in each region is not altered significantly enough to affect regional emissions; this assumption was checked against travel model results.

The VMT and vehicle hours traveled (VHT) reductions were calculated using a three step process:

- The analysis used the High-Speed Rail (HSR) Ridership and Revenue Model to calculate 2020, 2025 and 2040 baseline–or “no action”-VMT and VHT. These no action values include socioeconomic forecasts for the respective years and 2013 passenger rail service levels.
- For the 2020 analysis, new passenger rail trips were calculated for the service plan assumptions using the methods described in Section 10.1. These forecasts reflected trip diversions from vehicle or air travel, or new induced rail trips. The diverted vehicle trips were used to calculate VMT and VHT for each origin destination pair to determine VMT and VHT reductions within each air basin.
- For the 2025 and 2040 analysis, the prior step was used to forecast VMT and VHT reduction associated with the *Pacific Surfliner* and *Coast Daylight* future year service plans. For other passenger rail routes, the HSR Ridership and Revenue Model was used to determine VMT and VHT reductions within each air basin.

For each step, a GIS overlay was used to aggregate county-level values within each air basin.

Two categories of emissions reductions were not accounted in this analysis:

- Emission reductions for changes to the State's goods movement system associated with freight rail improvements. It is assumed here that freight rail improvements will make the system more reliable, but not alter the quantity of goods shipped by rail enough to impact emissions.
- Emissions increases associated with more passenger locomotive miles. These are assumed to be trivial in comparison to the emission benefit of taking automobiles off of the road.

I.2 Results

Emission reduction benefits by six pollutant type are presented in the following tables:

- Table I.1: Carbon Dioxide (CO_2).
- Table I.2: Reactive Organic Gases (ROG).
- Table I.3: Oxides of Nitrogen (NOx).
- Table I.4: Carbon Monoxide (CO).
- Table I.5: Large Particles ($PM_{10)}$.
- Table I.6: Small Particles ($PM_{2.5}$).

Emissions reductions are presented for each of four service groupings:

- The *Pacific Surfliner*, South of Los Angeles.
- The *Coast Daylight* and *Pacific Surfliner*, North of Los Angeles.
- Combined HSR and Northern California Unified Rail Service (NCURS).
- The entire CSRP, including *Pacific Surfliner*, South of Los Angeles; *Pacific Surfliner*, North of Los Angeles; and HSR and NCURS.

For comparison purposes, the statewide on-road mobile source emission inventory from EMFAC2011-SG is also presented in each table. All units are in tons/year, and were annualized using a factor of 365 days per year.

The CSRP is estimated to reduce total vehicle-related emissions for all air pollutants by about 0.02 percent in 2020, 0.3 percent in 2025 and 0.9 percent in 2035. The emission reduction benefits of the plan increase over time as HSR is built and the system connectivity is improved.

Table I.1: CO_2 Emission Reductions by Passenger Rail Route

Year	Region	Emission Reduction for CSRP (tons per year from "No Action")				No Action EMFAC Emissions
		Pacific Surfliner, South of Los Angeles	*Coast Daylight* and *Pacific Surfliner*, North of Los Angeles	HSR & NCURS	TOTAL Emission Reduction	
2020	Sacramento Region	-	-	1,681	1,681	7,285,589
	Bay Area	<1	1,188	3,618	4,806	30,941,391
	San Joaquin Valley	8	1,195	14,574	15,776	25,218,416
	Central Coast & Monterey Bay	-	3,541	555	4,095	6,069,057
	Greater Los Angeles Region	2,811	1,285	3,095	7,191	81,411,927
	San Diego	3,302	294	36	3,632	13,946,906
	Rest of California	-	-	282	282	11,190,978
	Statewide Total	6,121	7,501	23,841	37,463	176,064,264
2025	Sacramento Region	18	-	16,760	16,778	7,330,885
	Bay Area	33	1,401	12,055	13,489	30,630,893
	San Joaquin Valley	1,147	1,630	278,953	281,730	26,889,497
	Central Coast & Monterey Bay	-	5,049	(5,827)	<1	6,034,012
	Greater Los Angeles Region	17,087	2,496	208,047	227,630	82,518,458
	San Diego	16,335	248	(5,745)	10,838	14,159,793
	Rest of California	-	-	23,417	23,417	11,518,071
	Statewide Total	34,621	10,823	527,659	573,103	179,081,609
2040	Sacramento Region	22	-	111,768	111,790	8,274,050
	Bay Area	40	2,419	446,579	449,038	33,194,061
	San Joaquin Valley	1,423	3,084	435,992	440,498	34,122,868
	Central Coast & Monterey Bay	-	7,775	50,113	57,887	6,506,767
	Greater Los Angeles Region	21,657	3,293	700,692	725,641	94,232,902
	San Diego	20,198	296	32,471	52,965	16,365,102
	Rest of California	-	-	41,217	41,217	13,359,842
	Statewide Total	43,340	16,866	1,818,831	1,879,036	206,055,591

Note: Table values are in tons per year.

Source: AECOM and Cambridge Systematics, Inc; 2013.

Table I.2: ROG Emission Reductions by Passenger Rail Route

Year	Region	Emission Reduction for CSRP (tons per year from "No Action")				No Action EMFAC Emissions
		Pacific Surfliner, South of Los Angeles	*Coast Daylight* and *Pacific Surfliner*, North of Los Angeles	HSR & NCURS	TOTAL Emission Reduction	
2020	Sacramento Region	-	-	1	1	3,704
	Bay Area	<1	1	2	3	19,137
	San Joaquin Valley	<1	1	7	7	11,294
	Central Coast & Monterey Bay	-	2	<1	2	3,227
	Greater Los Angeles Region	1	1	1	3	39,258
	San Diego	2	<1	<1	2	7,400
	Rest of California	-	-	<1	<1	7,081
	Statewide Total	3	4	12	19	91,101
2025	Sacramento Region	<1	-	7	7	3,246
	Bay Area	<1	1	7	7	16,693
	San Joaquin Valley	<1	1	107	108	10,271
	Central Coast & Monterey Bay	-	2	(3)	<1	2,722
	Greater Los Angeles Region	7	1	86	95	34,284
	San Diego	8	<1	(3)	5	6,583
	Rest of California	-	-	12	12	5,971
	Statewide Total	15	5	214	234	79,771
2040	Sacramento Region	<1	-	41	41	3,058
	Bay Area	<1	1	207	208	15,412
	San Joaquin Valley	<1	1	140	141	10,925
	Central Coast & Monterey Bay	-	3	18	21	2,392
	Greater Los Angeles Region	7	1	238	247	32,049
	San Diego	8	<1	13	21	6,535
	Rest of California	-	-	16	16	5,274
	Statewide Total	16	6	674	696	75,645

Note: Table values are in tons per year.

Source: AECOM and Cambridge Systematics, Inc; 2013.

Table I.3: NO_x Emission Reductions by Passenger Rail Route

Year	Region	Emission Reduction for CSRP (tons per year from "No Action")				No Action EMFAC Emissions
		Pacific Surfliner, South of Los Angeles	*Coast Daylight* and *Pacific Surfliner*, North of Los Angeles	HSR & NCURS	TOTAL Emission Reduction	
2020	Sacramento Region	-	-	2	2	7,587
	Bay Area	<1	1	4	5	34,780
	San Joaquin Valley	<1	2	21	23	36,349
	Central Coast & Monterey Bay	-	5	1	5	7,916
	Greater Los Angeles Region	3	1	4	8	93,138
	San Diego	3	<1	<1	4	13,932
	Rest of California	-	-	<1	<1	17,972
	Statewide Total	7	9	32	48	211,674
2025	Sacramento Region	<1	-	13	13	5,777
	Bay Area	<1	1	10	11	25,959
	San Joaquin Valley	1	2	282	285	27,178
	Central Coast & Monterey Bay	-	5	(6)	<1	5,734
	Greater Los Angeles Region	15	2	177	194	70,165
	San Diego	12	<1	(4)	8	10,702
	Rest of California	-	-	27	27	13,218
	Statewide Total	28	10	499	537	158,733
2040	Sacramento Region	<1	-	71	71	5,282
	Bay Area	<1	2	311	312	23,091
	San Joaquin Valley	1	3	388	392	30,365
	Central Coast & Monterey Bay	-	6	37	43	4,868
	Greater Los Angeles Region	16	2	515	534	69,325
	San Diego	13	<1	20	33	10,258
	Rest of California	-	-	37	37	12,132
	Statewide Total	30	13	1,381	1,423	155,320

Note: Table values are in tons per year.

Source: AECOM and Cambridge Systematics, Inc; 2013.

Table I.4: CO Emission Reductions by Passenger Rail Route

Year	Region	Emission Reduction for CSRP (tons per year from "No Action")				No Action EMFAC Emissions
		Pacific Surfliner, South of Los Angeles	*Coast Daylight* and *Pacific Surfliner*, North of Los Angeles	HSR & NCURS	TOTAL Emission Reduction	
2020	Sacramento Region	-	-	8	8	33,822
	Bay Area	<1	6	18	23	151,288
	San Joaquin Valley	<1	4	54	58	93,269
	Central Coast & Monterey Bay	-	18	3	21	31,621
	Greater Los Angeles Region	12	5	13	31	347,544
	San Diego	15	1	<1	16	63,086
	Rest of California	-	-	1	1	56,187
	Statewide Total	27	35	97	160	776,816
2025	Sacramento Region	<1	-	64	64	27,990
	Bay Area	<1	6	48	54	122,815
	San Joaquin Valley	3	5	830	838	80,006
	Central Coast & Monterey Bay	-	21	(24)	<1	24,812
	Greater Los Angeles Region	60	9	725	794	287,741
	San Diego	61	1	(22)	41	53,308
	Rest of California	-	-	88	88	43,444
	Statewide Total	125	41	1,711	1,876	640,117
2040	Sacramento Region	<1	-	353	353	26,149
	Bay Area	<1	8	1,478	1,486	109,835
	San Joaquin Valley	4	8	1,082	1,093	84,665
	Central Coast & Monterey Bay	-	25	160	185	20,837
	Greater Los Angeles Region	62	9	2,019	2,090	271,469
	San Diego	66	1	105	172	53,144
	Rest of California	-	-	118	118	38,331
	Statewide Total	132	51	5,315	5,498	604,430

Note: Table values are in tons per year.

Source: AECOM and Cambridge Systematics, Inc; 2013.

Table I.5: PM_{10} Emission Reductions by Passenger Rail Route

		Emission Reduction for CSRP (tons per year from "No Action")				
Year	Region	*Pacific Surfliner,* South of Los Angeles	*Coast Daylight* and *Pacific Surfliner*, North of Los Angeles	HSR & NCURS	TOTAL Emission Reduction	No Action EMFAC Emissions
2020	Sacramento Region	-	-	<1	<1	1,096
	Bay Area	<1	<1	1	1	4,700
	San Joaquin Valley	<1	<1	2	2	3,396
	Central Coast & Monterey Bay	-	1	<1	1	889
	Greater Los Angeles Region	<1	<1	<1	1	11,884
	San Diego	<1	<1	<1	1	2,021
	Rest of California	-	-	<1	<1	1,556
	Statewide Total	1	1	3	5	25,541
2025	Sacramento Region	<1	-	3	3	1,150
	Bay Area	<1	<1	2	2	4,865
	San Joaquin Valley	<1	<1	38	39	3,691
	Central Coast & Monterey Bay	-	1	(1)	<1	913
	Greater Los Angeles Region	3	<1	32	34	12,500
	San Diego	2	<1	(1)	2	2,155
	Rest of California	-	-	3	3	1,628
	Statewide Total	5	2	76	83	26,901
2040	Sacramento Region	<1	-	18	18	1,341
	Bay Area	<1	<1	73	73	5,430
	San Joaquin Valley	<1	<1	61	62	4,778
	Central Coast & Monterey Bay	-	1	8	9	1,013
	Greater Los Angeles Region	3	1	108	112	14,576
	San Diego	3	<1	5	8	2,586
	Rest of California	-	-	6	6	1,926
	Statewide Total	7	3	279	289	31,650

Note: Table values are in tons per year.

Source: AECOM and Cambridge Systematics, Inc; 2013.

Table I.6: $PM_{2.5}$ Emission Reductions by Passenger Rail Route

Year	Region	Emission Reduction for CSRP (tons per year from "No Action")				No Action EMFAC Emissions
		Pacific Surfliner, South of Los Angeles	*Coast Daylight* and *Pacific Surfliner*, North of Los Angeles	HSR & NCURS	TOTAL Emission Reduction	
2020	Sacramento Region	-	-	<1	<1	496
	Bay Area	<1	<1	<1	<1	2,144
	San Joaquin Valley	<1	<1	1	1	1,661
	Central Coast & Monterey Bay	-	<1	<1	<1	408
	Greater Los Angeles Region	<1	<1	<1	<1	5,526
	San Diego	<1	<1	<1	<1	914
	Rest of California	-	-	<1	<1	744
	Statewide Total	<1	1	2	3	11,892
2025	Sacramento Region	<1	-	1	1	517
	Bay Area	<1	<1	1	1	2,211
	San Joaquin Valley	<1	<1	18	19	1,781
	Central Coast & Monterey Bay	-	<1	<1	<1	414
	Greater Los Angeles Region	1	<1	15	16	5,809
	San Diego	1	<1	<1	1	971
	Rest of California	-	-	2	2	766
	Statewide Total	2	1	36	39	12,470
2040	Sacramento Region	<1	-	8	8	603
	Bay Area	<1	<1	33	33	2,471
	San Joaquin Valley	<1	<1	29	30	2,304
	Central Coast & Monterey Bay	-	1	4	4	460
	Greater Los Angeles Region	2	<1	51	52	6,805
	San Diego	1	<1	2	4	1,166
	Rest of California	-	-	3	3	904
	Statewide Total	3	1	130	134	14,712

Note: Table values are in tons per year.

Source: AECOM and Cambridge Systematics, Inc; 2013.

Appendix J

ECONOMIC BENEFITS METHODOLOGY

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Appendix J. Economic Benefits Methodology

Passenger and freight rail improvements will benefit the State in many measurable ways. For example, travelers who shift from their cars to rail due to enhanced passenger rail service experience an improvement in their travel time, cost, and/or quality.. Further, as more travelers shift to passenger rail, highway users enjoy the benefits of reduced congestion and shorter travel times. Finally, more passenger rail trips will also translate to accident reductions and reduced air emissions. All of these benefits can be projected using ridership and revenue forecasting results.

J.1 User Benefits

Benefits are commonly divided into the general categories of "user benefits" and "non-user benefits". User benefits are those accruing to passenger rail riders as they shift from airplanes or personal vehicles to passenger rail. These passengers place a value (a monetizable benefit) on riding comfortable, reliable, and safe trains above and beyond the fares paid. User benefits in this analysis include intercity rail passengers who shift to rail for their trips, plus induced travel (i.e., new trips that would not have taken place otherwise if the rail improvements had not been made). The passenger rail user benefits reflect these advantages and are measured by consumer surplus, which is the difference between how much passengers are willing to pay and the actual train fare that is paid. User benefits were estimated through a process known as log-sum calculation[39], which is derived from "values of time" and other mathematical equations in the ridership forecasting models.

User benefits are projected to total $47 million in 2020, $537 million in 2025, and 1.67 billion in 2040.

J.2 Non-User Benefits

Non-user benefits accrue to highway and air travelers in the form of reduced delays, lower air pollution, and fewer auto accidents and fatalities. Monetized "non-user" benefits in this analysis include the following:

- Accident and fatality reductions resulting in lower costs for property damage, healthcare, lost work, and lost lives.
- Lower public health, buildings, agriculture, and ecosystems costs arising from personal vehicle travel and associated air pollution; and
- Time savings for highway travelers due to reduced delay.

J.2.1 Accident and Air Pollution Reduction Benefits

Expanded passenger rail service will reduce vehicle miles traveled (VMT) and, by extension air pollution and crashes. For this analysis, VMT reductions were converted to monetary benefits using rates of 14.7 cents per mile for crash reduction[40] and 2.1 cents per mile for air pollution reduction[41] (both are in 2012

[39] An explanation of the log-sum process and its application to this analysis is available in "Economic Growth Effects Analysis for the Bay Area to Central Valley Program-Level Environmental Impact Report and Tier 1 Environmental Impact Statement", Appendix A, California High-Speed Rail Authority, July 2007.

[40] Federal Highway Administration, Highway Economic Requirements System.

[41] National Research Council, *Hidden Costs of Energy: Unpriced Consequences of Energy Production and Use*, Committee on Health, Environmental, and Other External Costs and Benefits of Energy Production and Consumption, 2009.

dollars). The monetized accident and pollution reduction benefits are shown by region in Tables J.1 and J.2, respectively.

By lowering personal vehicle usage, the CSRP generates accident reduction ranging from $11.7 million in 2020 to $179.8 million in 2025 and $647 million by 2040. The magnitude of air pollution benefits are smaller, ranging from $1.7 million in 2020 to $25.7 million in 2025 and $92.5 million by 2040.

J.2.2 Highway Delay Benefits

Traffic congestion is a perennial problem in California and it imposes costs on the State's people in the form of lost time. Hours not spent at work, with family or other activities such as exercising or entertainment, translate to economic and social losses for the State. Improved rail service will reduce traffic delays by diverting personal vehicle travel to intercity passenger rail.

Table J.1: Annual Crash Reduction Benefits for Highway Travelers

Region	2020	2025	2040
Sacramento Region	$0.6	$6.3	$43.2
Bay Area	$1.7	$5.0	$170.7
San Joaquin Valley	$4.3	$78.7	$125.4
Central Coast & Monterey Bay	$1.4	$(0.3)	$21.1
Greater Los Angeles Region	$2.4	$79.0	$253.8
San Diego	$1.3	$4.0	$20.3
Rest of California	$0.1	$7.1	$12.7
Statewide Total	$11.7	$179.8	$647.2

Note: Table values are in millions in year 2012 dollars.

Source: AECOM and Cambridge Systematics, Inc; 2013.

Table J.2: Annual Air Pollution Reduction Benefits

Region	2020	2025	2040
Sacramento Region	$0.1	$0.9	$6.2
Bay Area	$0.2	$0.7	$24.4
San Joaquin Valley	$0.6	$11.2	$17.9
Central Coast & Monterey Bay	$0.2	$(0.0)	$3.0
Greater Los Angeles Region	$0.3	$11.3	$36.3
San Diego	$0.2	$0.6	$2.9
Rest of California	$0.0	$1.0	$1.8
Statewide Total	$1.7	$25.7	$92.5

Note: Table values are in millions in year 2012 dollars.

Source: AECOM and Cambridge Systematics, Inc; 2013.

For this analysis, reductions in vehicle hours traveled by trip purpose were forecast as part of ridership and revenue process discussed in Chapter 10. These values were monetized using values of time (in 2012 dollars per hour) for intercity business and non-work trips of $72.36 and $20.97, respectively.[42] Table J.3 summarizes these results.

The year 2000 delay reduction benefit is forecast at $89.4 million, while the 2025 delay benefit is forecast at $1.96 billion and the 2040 benefit at $4.75 billion. Increases in ridership and the diversion of vehicles from California roadways result in a significant increase in highway delay benefits as high-speed rail is implemented.

J.3 Summary of User and Non-User Benefits

Table J.4 summarizes total benefits associated with the planning-level passenger rail service assumptions outlined in Chapter 10. Annual user and non-user benefits are projected to total $164 million in 2020, $2.5 billion in 2025, and almost $7.4 billion by 2040. The large benefit growth over time reflects inclusion of the high-speed rail (HSR) Initial Operating Section in the 2025 service plan assumptions and the HSR Phase 1 Blended in the 2040 service plan assumptions. The largest benefit category is for personal vehicle operators who continue to use California's roadways.

Table J.5 illustrates that year 2020 benefits are fairly evenly distributed across corridors. By 2025, the benefits increase markedly, and become much more concentrated in corridors served by HSR and the Northern California Unified Rail Service (NCURS).

Table J.3 Annual Delay Reduction Benefits

Region	**2020**	**2025**	**2040**
Sacramento Region	$3.3	$58.8	$294.4
Bay Area	$9.4	$138.9	$1,226.8
San Joaquin Valley	$20.6	$771.2	$951.1
Central Coast & Monterey Bay	$10.5	$11.5	$166.1
Greater Los Angeles Region	$23.6	$829.5	$1,846.3
San Diego	$21.4	$89.2	$176.9
Rest of California	$0.5	$63.3	$89.9
Statewide Total	$89.4	$1,962.4	$4,751.6

Note: Table values are in millions in year 2012 dollars.

Source: AECOM and Cambridge Systematics, Inc; 2013.

[42] The values of time were adjusted to 2012 dollars and sourced from, "Information Requested in —Section 3.2 Validation and Documentation of the Independent Peer Review of the California High Speed Rail Ridership and Revenue Forecasting Process, 2005-10, Draft Report for Internal Review," Cambridge Systematics, February 7, 2011, available on California High Speed Rail website

Table J.4 Summary of Annual User and Non-User Benefits

Region	Annual Benefits (in millions in 2012 dollars)		
	2020	**2025**	**2040**
User Benefits			
Intercity Passenger	$45	$533	$1,640
Urban Passenger	$2	$4	$26
Non-User Benefits			
Accident Reduction	$12	$179	$647
Pollution Reduction	$2	$26	$92
Highway Delay Reduction	$89	$1,962	$4,752
Statewide Total	***$150***	***$2,704***	***$7,157***

Source: AECOM and Cambridge Systematics, 2013.

Table J.5 Summary of Annual Total Benefits by Corridor

Region	Annual Benefits (in millions in 2012 dollars)		
	2020	**2025**	**2040**
Pacific Surfliner, South of Los Angeles	$26	$162	$429
Pacific Surfliner, North of Los Angeles	$14	$81	$215
Coast Daylight	$14	$81	$215
HSR & NCURS	$96	$2,380	$6,298
Statewide Total	***$150***	***$2,704***	***$7,157***

Source: AECOM and Cambridge Systematics, 2013.

- While this analysis forecast major benefit components for California's economy, data and analysis methods were not readily available to capture all potential benefits. Some examples are as follows:
- Increased rail usage may reduce highway maintenance.
- Reduced in-state air travel may lead to fewer in-state flights at California's congested. This situation might reduce delays for remaining flights or free up capacity for transcontinental and international flights.
- New highway-rail grade separations might reduce the projected number of train-vehicle crashes, further increasing the benefits shown in Table J-1.
- Improved rail operations might reduce fuel-related costs for freight and passenger rail operators.
- Potential economic development benefits from high speed rail that are expected to strengthen the competitiveness of California's industries, major metropolitan areas, and intermediate cities by more effectively connecting markets and encouraging business interactions that further stimulate growth.

Appendix K

BEST PRACTICES: SHORT LINE RAIL ASSISTANCE PROGRAMS

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K.1 Kansas State Rail Serve Improvement Fund

Kansas has the State Rail Service Improvement Fund (SRSIF)[43], which provides $5 million annually in low-interest loans to railroads and port authorities operating within the State in order to help them improve their service.[44] The intent of the program is to assist in the rehabilitation of railroad tracks, bridges, yards, rail shops, buildings, and sidings of short line railroads operating in Kansas. Since the program's inception in 2000, SRSIF has funded between two and nine projects each fiscal year. These projects have contributed to the protection of short line service in communities across the State.

Kansas also operates the Local Rail Freight Assistance (LRFA) Program. This program began in 1991 through the FRA to assist railroads in their rehabilitation efforts. Funds from the Federal LRFA Program are loaned to railroads at a rate below the prime interest rate, and payments on the loan (including principal and interest) are used to generate additional loans. The total number of dollars currently in this program for the State of Kansas is slightly more than $3 million. This loan program allows the railroads to improve and rehabilitate their systems for more profit and safety. Such service contributes to the State's economy, enhances market competitiveness, attracts new industry, and encourages expansion of current business.

K.2 ConnectOregon Program

The *Connect*Oregon[45] program is a lottery-bond-based initiative that generates revenues to invest in air, marine, rail, and transit infrastructure. These investments are intended to improve connections between the highway system and other modes of transportation, to facilitate the flow of commerce, and to reduce delays. In 2005, the Oregon State Legislature authorized $100 million of lottery-backed bonds to fund the program, and the Oregon Transportation Commission approved funding for 39 projects; a number of which are completed or nearing completion. In 2007, the legislature authorized another $100 million of funding in lottery-backed bonds, and the Oregon Transportation Commission approved 30 projects for funding. In 2009, the legislature approved another $100 million in funding and, in 2011, $40 million was authorized. Public- and private-sector entities can apply for grants or loans under the ConnectOregon program, and are required to provide a match of at least 20 percent of the project cost if applying for grants.

Several short line rail projects were recipients of *Connect*Oregon awards in 2010, including a $4.7 million project for the Portland and Western Railroad, a $2.1 million project for the Prineville Railway, and a $2.6 million award for the Albany and Eastern Railroad Company.

K.3 The Wisconsin Freight Rail Infrastructure Improvement Program

The Wisconsin Freight Rail Infrastructure Improvement Program (FRIIP)[46] is one of two freight rail assistance programs Wisconsin Department of Transportation (DOT) administers. Wisconsin's original rail assistance program was created in 1977 to help preserve freight rail service during an era when widespread railroad bankruptcies and line abandonments threatened the availability of rail service in Wisconsin. In 1992, the FRIIP loan program was added to the State's rail assistance program. FRIIP loans enable the State to encourage a broader array of improvements to the rail system, particularly on

[43] http://www.ksdot.org/burrail/rail/loans/srsif.asp.

[44] http://www.ksdot.org/burRail/rail/loans/srsif.asp.

[45] http://cms.oregon.egov.com/ODOT/TD/TP/Pages/ConnectOR.aspx.

[46] http://www.dot.wisconsin.gov/localgov/aid/friip.htm.

privately owned lines. It also provides funding for other rail-related projects, such as loading and transloading facilities.

Since 1992, $112 million in FRIIP loans have been awarded to projects that demonstrate that they: 1) help connect an industry to the national railroad system; 2) make improvements to enhance transportation efficiency, safety, and intermodal freight movement; 3) accomplish line rehabilitation; and 4) develop the economy.

K.4 The Wisconsin Freight Rail Preservation Program

Wisconsin DOT administers the Freight Rail Preservation Program (FRPP).[47] In 1992, this program replaced the original rail assistance grant program, providing grants to local units of government, industries, and railroads for the purpose of preserving essential rail lines and rehabilitating them following purchase.

Since 1980, under both the original rail assistance program and FRPP, $155 million in grants have been awarded for rail acquisition and rehabilitation projects. The FRPP provides grants up to 80 percent of the cost in order to: 1) purchase abandoned rail lines in an effort to continue freight service, or for the preservation of the opportunity for future service; and 2) to rehabilitate facilities, such as tracks or bridges, on publicly owned rail lines. The 2011 to 2013 DOT budget provides bonding authority for $30 million.

K.5 Iowa’s Railroad Revolving Loan and Grant Program

Iowa’s Railroad Revolving Loan and Grant program[48] provides assistance in different ways to projects that demonstrate benefits. For example, for targeted job creation projects (those that provide immediate, direct job opportunities, the program can provide assistance as either loans or grants, but grant funding is limited to 50 percent (with a 50-percent local match), and loans require a 20-percent matching contribution. Projects that will provide demonstrated rail network improvements, on the other hand, are only eligible for loans offered at 0 percent interest, provided that there is a 20-percent local matching contribution. For FY 2013, the program has a minimum of $2 million available for projects and, for the first time, will offer a minimum $200,000 for rail port planning and development studies.

The program is administered by the Iowa Rail Finance Authority (IRFA) Board with staff assistance from the Iowa DOT. The program is funded by appropriations and the repayments from previous Iowa DOT and IRFA loans.

Industries, railroads, local governments, or economic development agencies may apply for financial assistance for projects that build rail spurs to new or expanding development, build or rebuild sidings to accommodate growth, purchase or rehabilitate existing rail infrastructure, rehabilitate existing rail lines to increase capacity, or other targeted job creation of rail network improvement projects.

K.6 The Indiana Industrial Rail Service Fund

The Indiana Industrial Rail Service Fund (IRSF)[49] assists in the rehabilitation of railroad infrastructure or railroad construction of Class II and Class III railroads. These grants help maintain and increase existing business shipping levels on the rail lines, and also assist with the funding needed improvements related to maintaining rail service in Indiana. Eligible applicants are limited to Class II and Class III railroads and port authorities. Grants through the IRSF program can be used for the rehabilitation of railroad

[47] http://www.dot.wisconsin.gov/localgov/aid/frpp.htm.

[48] http://www.iowadot.gov/iowarail/assistance/rrlgp.htm.

[49] http://www.in.gov/indot/files/Rail_IRSFApplication_111012.pdf.

infrastructure or railroad construction. Examples of projects include bridge deck repair, new ties and ballast, and track upgrades. Railroads are limited to a grant award that does not exceed 75 percent of the total cost of the project. Grants totaled $1.5 million in FY 2011.

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