## 3.10 TRANSPORTATION

This section evaluates the existing and potential transportation impacts resulting from the resumption of operations of the railroad, routine maintenance and repair of the rail line during operations, rehabilitation activities at: Bakers Creek, Foss Creek, Black Point Bridge, and the new construction of Siding MP 1.0 – MP 2.0. This section is based on information provided in Appendix I: "*Traffic Impacts of North Coast Railroad Authority Russian River Division Freight Rail Project- Draft Technical Mem, Revision 2C*" prepared by Dowling Associates, May 12, 2008 (Traffic Technical Study).

### 3.10.1 Regulatory Setting

The regulatory setting is based on the information that was available in2008, when the March 9, 2009 DEIR was first prepared.

#### *3.10.1.1 Federal Regulations*

Federal Railroad Administration

The FRA was created by the Department of Transportation Act of 1966. The purpose of the FRA is to: promulgate and enforce rail safety regulations; administer railroad assistance programs; conduct research and development in support of improved railroad safety and national rail transportation policy; and consolidate government transportation activities.

Surface Transportation Board

The STB was created by the Interstate Commerce Commission Termination Act (ICCTA) of 1995. The STB was created to replace the Interstate Commerce Commission. The STB is an economic regulatory agency that Congress created to resolve railroad rate and service disputes and reviewing proposed railroad mergers. The STB is decisionally independent, although it is administratively affiliated with the Department of Transportation.

Federal Railroad Safety Act

The FRA, pursuant to the Federal Railroad Safety Act, promulgates railroad safety rules governing tracks, locomotives, train cars, braking systems, operating practices, and locomotive engineer certification. The FRA promotes education and enforcement of crossing safety, primarily through Operation Lifesaver, a private organization in 49 states. The FRA also promotes engineering improvements to crossings and sponsors research to improve warning devices and visibility at crossings.

Code of Federal Regulations

The CFR includes several sets of requirements for railway safety measures and emergency response, including the following:

- CFR, Title 49, Part 234, Grade Crossing Signal System Safety
- CFR, Title 49, Part 236, Rules, Standards, and Instructions Governing the Installation, Inspection, Maintenance, and Repair of Signal and Train Control Systems, Devices and Appliances
- The inspection, maintenance and repair of (49 CFR Parts 213, 214 and FRA's Emergency Order No. 21)
- CFR, Title 49, Subtitle B, Chapter 11, FRA Regulations
- Drug and Alcohol Regulations (49CFR Parts 40 and 219) with applicable exceptions
- Locomotive Engineer Certification (49CFR Part 240)
- Locomotive and freight car inspection requirements (49 CFR Parts 215, 218, 221, 229, 231 and 232)
- Track Safety Standards (49 CFR Part 213)
- Railroad Workplace Safety (49 CFR Part 214)
- Radio Communications (49 CFR Part 220).
- Track Inspection (49 CFR Part 213)
- Daily Locomotive Inspection (FRA, in 49 CFR Part 229.21)
- Periodic inspection, maintenance and repair of rolling stock including locomotives and freight cars (Title 49 CFR Parts 229, 231 and 232)
- Filing of operating rules with FRA and formal program of operational tests and inspections (49 CFR Part 217- Railroad Operating Rules)

- Periodic inspection of locomotives at specified time intervals (49 CFR Parts 229, 231 and 232)
- Activate the warning signals in sufficient time to provide the required minimum 20-second warning time (49 CFR Part 234.225)
- Requirements for a Track Safety Standards Program (49 CFR Part 213) and a Roadway Worker Safety Program (49 CFR Part 214)

### *3.10.1.2 State Regulations*

California Public Utilities Commission (CPUC)

The CPUC employs federally certified staff inspectors and coordinates with the FRA to ensure that railroads comply with federal railroad safety regulations. The Commission investigates railroad accidents and responds to safety related inquiries made by community officials, the general public and railroad labor organizations. The Commission is an active participant in Operation Lifesaver, an at-grade crossing awareness training program. The CPUC has adopted several General Orders addressing rail safety:

- CPUC General Order No. 72-B, Rules Governing the Construction and Maintenance of Crossings At-Grade of Railroads with Public Streets, Roads and Highways in the State of California;
- CPUC General Order No. 75-C, Regulations Governing the Protection of Crossings At-Grade of Roads, Highways and Streets with Railroads in the State of California;
- CPUC General Order No. 88-A, Rules For Altering Public Railroad-Highway Grade Crossings; and
- CPUC General Order No. 135, Rules Governing the Occupancy of Public Grade Crossings by Railroads.

### *3.10.1.3 State and Local Jurisdictional Agencies and Plans*

The proposed project corridor crosses several political boundaries which have designated transportation planning jurisdictions and plans. The state, regional, and local agencies responsible for transportation within the study area are listed in Table 3.10-1.

**Table 3.10-1**
**Agencies with Jurisdictional Authority**

| Agency | Jurisdiction |
|---|---|
| **Marin County** | |
| City of Novato Public Works Department | Streets & roads in city of Novato |
| County of Marin: Public Works | Streets & roads in unincorporated Marin Co. |
| Transportation Authority of Marin | Transportation planning agency for Marin Co. |
| **Mendocino County** | |
| City of Ukiah Public Works Department | Streets & roads in city of Ukiah |
| City of Willits Public Works Department | Streets & roads in city of Willits |
| Mendocino Council of Governments | Planning agency for Mendocino Co. |
| Mendocino County Department of Transportation | Streets & roads in unincorporated Mendocino Co. |
| **Napa County** | |
| Napa County Transportation Planning Agency | Transportation planning agency for Napa Co. |
| Napa County Department of Public Works | Streets & roads in city of Napa |
| **Sonoma County** | |
| City of Cloverdale Public Works Department | Streets & roads in city of Cloverdale |
| City of Cotati Public Works | Streets & roads in city of Cotati |
| City of Healdsburg Public Works Department | Streets & roads in city of Healdsburg |
| City of Petaluma Public Works Department | Streets & roads in city of Petaluma |
| City of Rohnert Park Public Works Department | Streets & roads in city of Rohnert Park |
| City of Santa Rosa Public Works Department | Streets & roads in city of Santa Rosa |
| Sonoma County Department of Transportation and Public Works | Streets & roads in unincorporated Sonoma Co. |
| Sonoma County Transportation Authority | Transportation planning agency for Sonoma Co. |
| Town of Windsor Public Works Department | Streets & roads in town of Windsor |
| **San Francisco Bay Area** | |
| Metropolitan Transportation Commission | Regional transportation planning and funding agency for nine-county San Francisco Bay Area |
| **State of California** | |
| California Department of Transportation, District 01 | State highways and transportation in Del Norte, Humboldt, Lake, and Mendocino counties. |
| California Department of Transportation, District 04 | State highways and transportation in nine-county San Francisco Bay Area |

These jurisdictions have participated in the development of transportation plans in compliance with CEQA, the State Transportation Improvement Plan (STIP), and the Regional Transportation Improvement Plan (RTIP). The transportation plans developed for the study area include the Regional Transportation Plan (RTP), the Napa County the Marin County Congestion Management Program (CMP), the Marin County and Sonoma County transportation plans, and city/town General Plans.

The California Air Resources Board issued the Emissions Reduction Plan for Ports and Goods Movement (CARB, 2006). Shifting freight from trucks to rail is part of the state-wide Goods Movement Action Plan (CARB, 2007).

## 3.10.2 Environmental Setting

The environmental setting is based on the information that was available in 2008, when the March 9, 2009 DEIR was first prepared.

This section describes the environmental setting of the existing roadway network and freight shipping operations within the proposed study area.

### *3.10.2.1 Roadway Network*

Highway 101

The majority of the proposed project corridor is located adjacent to Highway 101 (from Novato to Willits), which is the only continuous north-south thoroughfare serving the major urban areas in Marin, Sonoma and Mendocino counties. Within the proposed project corridor, Highway 101 extends from Novato north to Willits. This segment of Highway 101 is approximately 110 miles long. From the south to the north, Highway 101 maintains a minimum of four lanes (two in each direction) from Novato to the East Side Road Junction (approximately 12.5 miles north of Cloverdale). From East Side Road to Nelson Ranch Road, the Highway is reduced to two lanes (the Narrows) after which it becomes a four lane road north of Nelson Ranch Road. It again reduces to two lanes at Reeves Canyon Road across the mountainous segment between Redwood Valley and Willits. Lane restrictions within this mountainous segment reduce the effective transportation of freight by trucks.

The narrows section is a significant bottleneck to northbound and southbound traffic during peak hours. Other bottlenecks on sections parallel to the NCRA rail line occur in Petaluma, Rohnert Park, and Santa Rosa.

During commute hours and throughout the day, various segments of Highway 101 experience congestion due to directional peaking and limited roadway capacity. On a typical weekday, the peak commute direction on Highway 101 is southbound toward San Francisco and the Peninsula in the morning and northbound in the afternoon (Parsons Brinckerhoff, 2001). The a.m. and p.m. peak commute periods vary along the Highway 101 corridor. Based on traffic operations analysis for project study reports conducted for widening various segments of Highway 101, the peak traffic demand periods are becoming longer throughout the corridor. During the morning peak, southbound traffic demand has increased, resulting in a longer a.m. peak commute period that often extends past 9:00 a.m. The evening peak experiences similar traffic demand patterns, as northbound traffic levels have increased resulting in the p.m. commute becoming longer.

Highway 101 serves a substantial amount of recreational or non-commute travel, as the corridor has heavy travel demands on Thursday and Friday evenings in the northbound direction and on Sunday afternoons in the southbound direction. This corridor is the major access route for recreational areas in the North Bay and is often used to access northern coastal areas.

One significant highway project is currently in progress in Santa Rosa. Several overpasses of the highway are being widened to increase the number of lanes from two to three through the downtown area. This project is expected to significantly reduce congestion on Highway 101 in the Santa Rosa area upon completion.

Table 3.10-2 shows average annual daily traffic (AADT) and daily truck volumes at several points along the U.S. 101 corridor parallel to the NCRA rail line.

**Table 3.10-2**
**Average Annual Daily Traffic and Truck Volumes on U.S. 101, 2005**

| County | Milepost | Location | AADT | | |
|---|---|---|---|---|---|
| | | | Total | Truck | % truck |
| Marin | 19.085 | Novato, Jct. Rte. 37 East | 128,000 | 5,658 | 4.4% |
| Sonoma | 2.925 | South Petaluma Blvd | 80,000 | 5,096 | 6.4% |
| Sonoma | 3.664 | Petaluma, South Jct. Rte. 116 East | 91,000 | 4,550 | 5.0% |
| Sonoma | 7.651 | Petaluma, Old Redwood Highway | 102,000 | 5,722 | 5.6% |
| Sonoma | 12.682 | Cotati, North Jct. Rte. 116 | 100,000 | 5,710 | 5.7% |
| Sonoma | 19.646 | Santa Rosa, Jct. Rte. 12 | 106,000 | 6,360 | 6.0% |
| Sonoma | 20.74 | Santa Rosa, College Avenue | 114,000 | 5,928 | 5.2% |
| Sonoma | 27.618 | Shiloh Road South Healdsburg | 67,000 | 3,973 | 5.9% |
| Sonoma | R43.373 | Jct. Rte. 128 East Jct. Rte. 128 West | 25,000 | 2,163 | 8.7% |
| Sonoma | R54.201 | Jct. Rte. 128 West Hopland, Jct. Rte. 175 | 14,600 | 1,396 | 9.6% |
| Mendocino | 10.89 | Hopland, Jct. Rte. 175 East | 14,600 | 1,256 | 8.6% |
| Mendocino | R21.59 | Jct. Rte. 253 West Ukiah Jct. 222 East | 17,500 | 2,478 | 14.2% |
| Mendocino | R23.45 | Ukiah Jct. 222 East Jct. Rte. 20 East | 19,900 | 2,374 | 11.9% |

Source: Caltrans, Traffic and Vehicle Data Systems. 2005 Annual Average Daily Truck Traffic on the California State Highway System. November 2006.

<u>East-West Highways</u>

Several east-west state routes provide access to Highway 101. These include Highway 37, Highway 29, Highway 12, and Highway 121 from Lombard to Novato along with other local roadways with limited capacity. According to the SMART EIR analysis, these roadway segments currently operate at acceptable levels of service.

<u>Crossings</u>

A total of 99 roads and highways cross the rail line between Lombard and Willits. The crossings are variable in terms of volume and complexity. Some of the more complex crossings include: Highway 121 at Schellville where the rail line makes a sharp curve and crosses the highway twice within a short span; Highway 37 at Sears Point where the highway merges from two lanes to one at a signal; a 5-way intersection in downtown Healdsburg; and several crossings with frontage roads located near the rail line. The location of all 99 crossings are presented in the Traffic Analysis Report, Appendix I.

### 3.10.3 Impacts and Mitigation Measures

This section describes the potential impacts to transportation in four principle areas: vehicle delay, queuing at nearby traffic signals, emergency services, and truck traffic.

For impacts that are considered to be significant, mitigation measures are prescribed to reduce the impact to a less than significant level.

### *3.10.3.1 Significance Criteria*

Project impacts on traffic and circulation would be considered significant if the proposed project would:

- Cause an increase in traffic that is significant in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections);
- Exceed, either individually or cumulatively, a LOS standard established by the county congestion management agency for designated roads or highways;
- Result in a change in traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- Result in inadequate emergency access; and
- Conflict with adopted policies, plans or programs supporting alternative transportation.

### *3.10.3.2 Impact Assessment Methodology*

Selection of Key Grade Crossings

Detailed delay analysis was conducted for the 25 of the 99 grade crossings that were determined to have the greatest traffic volumes (Table 3.10-3). The 25 intersections were selected on the basis of discussions with staff at the various cities and counties that are crossed by the NWP line.

**Table 3.10-3**
**Key At-Grade Crossings and Maximum Train Speeds**

| No. | Location | | Train Speed (mph) |
|---|---|---|---|
| 4 | Sonoma Co. | SR 12/121 - Carneros Hwy. | 15 |
| 6 | Sonoma Co. | SR 37 Sears Point Rd. E of Arnold Dr. (SR 121) | 35 |
| 19 | Petaluma | D St. west of Lakeville St. | 25 |
| 20 | Petaluma | Washington St. west of Lakeville St. | 25 |
| 30 | Cotati | E Cotati Av. east of Industrial Av. | 25 |
| 31 | Rohnert Park | Southwest Blvd. east of Brenda Way | 40 |
| 33 | Rohnert Park | Rohnert Park Expwy. | 40 |
| 34 | Rohnert Park | Golf Course Dr. east of US-101 interchange | 40 |
| 36 | Sonoma Co. | Todd Rd. west of US-101 interchange | 40 |
| 39 | Santa Rosa | Hearn Ave. west of Dowd Dr. | 40 |
| 42 | Santa Rosa | 3rd St. west of Wilson St. | 25 |
| 46 | Santa Rosa | 9th St. west of Wilson | 25 |
| 47 | Santa Rosa | College Ave. west of Cleveland Ave. | 25 |
| 48 | Santa Rosa | Guerneville Rd. east of N Dutton Ave. | 40 |
| 49 | Santa Rosa | W Steele Ln. west of Coffey Ln. | 40 |
| 50 | Santa Rosa | Piner Rd. east of Plum Tree Ln. | 40 |
| 52 | Sonoma Co. | Fulton Rd. south of D St. | 40 |
| 53 | Sonoma Co. | River Rd. east of Hart Ln. | 40 |
| 54 | Sonoma Co. | Airport Blvd. west of US-101 interchange | 40 |
| 55 | Sonoma Co. | Aviation Blvd east of Concourse Blvd. | 40 |
| 56 | Windsor | Shiloh Rd. west of Conde Ln. | 40 |
| 64 | Healdsburg | Healdsburg Av. at Vine St & Mill St | 25 |
| 68 | Healdsburg | Dry Creek Rd. east of Grove St. | 40 |
| 84 | Ukiah | Talmage Rd. west of US-101 interchange | 25 |
| 86 | Ukiah | E Perkins St. at Clay St. | 25 |

Traffic Volumes at Key Grade Crossings

Traffic volume is a key determinant of vehicle delay and of the possibility that a queue from an intersection downstream of an at-grade crossing could back up across the railroad tracks. For this analysis, the worst-case traffic volume was used: i.e., the peak 15-minute volume at each grade crossing. Traffic volumes were projected to the opening year (2009) and the future year (2033) by calculating growth factors developed from local and regional travel models and applying these to peak-period traffic counts.

Lane Configurations at Key At-Grade Crossings

Lane configuration is also a key determinant of vehicle delay and queuing from nearby traffic signals. For this analysis, the number of lanes at each crossing was determined by site inspection. Future lane configurations were taken from the general plan of the appropriate jurisdiction.

Vehicle Delay Analysis Calculations

The weight and braking characteristics of freight trains require that they be given priority over vehicular traffic at at-grade crossings. The amount of delay to cross-street vehicles – the effective blockage time – is the sum of both fixed and variable components.

**Fixed components:** When a train is detected, lights will begin to flash at the crossing at least 20 seconds prior to the arrival of the train. At a crossing with automatic gates, the gate arms must be in their horizontal (full down) position at least five seconds before the arrival of the train. When the train completes passage across the intersection, there is a further brief delay as the gates rise to their vertical position, and drivers react to the clearance to proceed. This is typically on the order of five to eight seconds. The total gate down time would be about 25 seconds plus the train passage time. However, vehicles do not stop immediately upon the flashing of lights and ringing of bells. The NCRA Traffic Technical Study, therefore, estimates the overall fixed delay to be 22 seconds per crossing to account for gate closure time plus time needed for traffic to start up once the gates open.

**Variable component:** Delay time varies depending on the length of the train (e.g., how many cars there are), the speed of the train, and the width of the intersection. The variable blockage time is the length of train divided by its speed, plus the time taken for the end of the last rail car to clear the intersection. This time is added to the fixed component noted above to get the total blockage time.

The total delay in vehicle-hours for a given crossing for a single approach is given by the following formula:

$$D_{tot} = \frac{VS\left(t_c/3600\right)}{2\left(S-V\right)}$$

Where $D_{tot}$ is the total delay, $V$ is the approach traffic volume (vehicles per hour), $S$ is the saturation flow in vehicles per hour (the flow rate at which the queue clears after the gates open), and $t_c$ is the amount of time the crossing is blocked (in seconds). For this analysis, the saturation flow rate $S$ was assumed to be 1,800 vehicles per lane per hour. The approach volume was calculated as the peak 15-minute volume at that location.

The variable blockage time is a function of the length of the train and its speed. For this analysis, the train speeds shown in the Traffic Analysis Report (Appendix I) were assumed. Train operations assumed for this analysis are shown in Table 3.10-4. In accordance with the assumptions used for the air quality analysis, these operations were assumed for both the opening year (2009) and the cumulative impact year (2033) of service.

**Table 3.10-4**
**Summary of Train Operations**

| | **Train 1** (Continuation of Train 2 w/fewer cars) | **Train 2** | **Train 3** | **Train 4** |
|---|---|---|---|---|
| Begin | Redwood Valley | Lombard | Lombard | Lombard |
| End | Willits | Redwood Valley | Willits | Santa Rosa |
| Train crossings per day+ | 2 | 2 | 2 | 2 |
| Max cars per train | 10 | 25 | 60 | 60 |
| Length per car (ft) | 67.6 | 67.6 | 67.6 | 67.6 |
| No. engines | 1 | 1 | 2 | 2 |
| Engine length (ft) | 62.5 | 62.5 | 62.5 | 62.5 |
| Train length (ft) | 738 | 1,752 | 4,180 | 4,180 |

+ Assumes each train makes one crossing in each direction per day.

The train numbers in Table 3.10-4 refers to each of the four train segments described in Figure 2-3. Due to the change in length of the merchandise train at Redwood Valley the train was divided into two segments for the technical analysis.

For the crossings at SR 12/121 (Carneros Hwy) at Schellville, a special procedure was used to estimate train crossing time. At Schellville, the track crosses the highway from the southeast, makes a loop north of the highway, and crosses the highway again about 1,450 feet west of the first crossing. The total loop length is about 2,100 feet, or less than the lengths of trains 3 and 4 shown in the table above. These two crossings were treated as one. Total train crossing time was assumed to be from when the train encountered the first crossing to the time when it cleared the second crossing.

Traffic Signal Preemption

Where a traffic signal is located near an at-grade crossing, there is a possibility that the queue extending backward from the signal may extend over the track. The traffic analysis calculated the $95^{th}$ percentile queue lengths based on the maximum 15-minute traffic volumes at each at-grade crossing, the number of lanes of traffic, and the amount effective red time at the traffic signal. The $95^{th}$ percentile queue lengths are those queue lengths that will not be exceeded at least 95% of the time. Details of $95^{th}$ percentile queue length calculations are presented in the Traffic Analysis Report, Appendix I.

Emergency Services

Traffic blockage due to train crossings could interfere with movement of emergency vehicles. Emergency services were located by contacting the various jurisdictions through which NCRA service would operate.

Truck Traffic

Impacts on truck traffic were estimated by calculating the truckload equivalents hauled by each train. It was assumed that a truck would be displaced from the study area when cargo normally hauled by trucks are now hauled by rail. Therefore, the number of truckloads removed from the highway were estimated to be equivalent to the capacity of each freight each train. It was assumed that one merchandise freight train car would displace four trucks and that one solid waste train car would displace one solid waste truck.

### *3.10.3.3 Impacts and Mitigations*

Rehabilitation and Construction Activities

*Bakers Creek*

Rehabilitation activities at Bakers Creek involve the replacement of a culvert and rail embankment across the existing creek by constructing an arched structure that will allow Bakers Creek to flow through more naturally. The site is not located in a populated area, and most of the repairs will be conducted by rail-mounted equipment. There will not be an appreciable number of cars or trucks driving down the rural roads to the site at a given time. Therefore, impacts related to transportation are considered less than significant.

*Foss Creek*

Rehabilitation of the damaged segment will consist of driving sheet piles parallel to the creek, backfilling, replacement of ballast and track, and placement of rip rap at the base to prevent scour. The site is located in a rural area and not located near residences. Most of the repair activities will be conducted by rail-mounted equipment. There will not be an appreciable number of cars or trucks driving down the rural roads to the site at a given time. Therefore, impacts related to transportation are considered less than significant.

*Black Point Bridge*

Rehabilitation of the Black Point Bridge is limited to modification and rehabilitation of the electrical and mechanical elements required to move the bridge. Work will be conducted on the bridge. Schedules will be coordinated with the U.S. Coast Guard, and river traffic will not be impeded. Therefore, impacts related to transportation are considered less than significant.

*Lombard Siding (MP 1.0 – MP 2.0)*

Construction of the siding from MP 1.0 to MP 2.0 will include grading, placement of track ballast and clean fill, placement of 5,300 feet of new track, extending a culvert, reestablishing drainage ditches, widening an existing timber deck bridge, the embankment, and constructing culverts. The site is located in a rural area, with two private at-grade crossings for local farms that are seldom used. Therefore, impacts related to transportation are considered less than significant.

*Novato Consent Decree (MP 35.5 – MP 18.7)*

Improvements required by the Novato Consent Decree include establishing quiet zones involving improvements at fourteen or more crossings, welding of rails, fencing as required for safety, and landscaping to reduce the effects of glare from trains running after dusk. The existing crossings identified in the Novato Consent Decree include six paved public roads, six private crossings, and two pedestrian or trail crossings. An unspecified number of additional crossings may also be required or recommended by the regulatory agencies (see Section 2.0, Project Description, for specific descriptions and mile posts).

The crossings are either developed (paved roads) or unpaved roads and trails where the ground has been disturbed by vehicular or pedestrian traffic. Specific improvements at crossings include construction of short mountable medians, 3-feet wide medians, quad gates, short pedestrian gates and swing gates. Except for part of a 200 feet median strip that extends off of the railroad right-of-way at Hanna Ranch Road, road improvements, gates, and signage will be constructed on existing roads or disturbed areas adjacent to the crossings. Construction of some of the medians may cause local temporary traffic delays particularly if construction occurs during peak hours.

**Impact T-NCD1:** Traffic delays may occur during the construction of quiet zone improvements roughly between MP 28.5 and MP 21.9. ***[Less Than Significant Impact with Mitigation Measure T-NCD1]***

**Mitigation T-NCD1:** The appropriate construction permits shall be obtained from the City of Novato. As part of the permit approval process, a traffic control plan shall be prepared and implemented. Construction activities shall be conducted outside of peak commute hours.

Operations

*Truck Traffic*

Future freight operations would have a beneficial impact by diverting freight that would otherwise travel by truck to freight trains. Because freight cars are larger (more volume) than a typical truck and can carry greater weight and bulk than are normally allowed on a highway, each full freight car diverted from the highway has the potential for eliminating up to four truck trips. For solid waste trains, one railcar is equivalent to one truck, since NCRA anticipates placing each enclosed truck trailer on one flatcar. Existing solid waste trucks always return to Sonoma County empty, since they are not suited to carrying other types of goods.

Table 3.10-5 shows the estimated number of truck equivalents per train for planned rail service. The number of trucks displaced by trains entering and leaving the service area is based on the following facts and assumptions:

1. Transportation patterns within the Highway 101 service area along the Russian River Division are very restricted and unique to the Bay Area. It is accessed primarily by one route: Highway 101. Virtually all goods transported to and from the service area is transported along Highway 101 or Highway 37, with both highways running close to and parallel to the rail line. (In contrast, the San Francisco peninsula is linked to the East Bay by three bridges, and two major freeways run north and south). Therefore, there is a close spatial relationship between the hauling of goods by trucks and trains. Except for trucks service to businesses within the service area, trucks generally follow the same route as the rail line.
2. The market for commodities or solid waste that may be shipped by truck within the Highway 101 service corridor is finite. On a given day there are a fixed number of shipments requiring delivery to or from a business. The number of trucks required to provide transportation service to these customers is strictly dependent on the number of shipments available, and the schedule for hauling is set in advance by dispatch. If a load that previously was hauled by a truck is captured by the railroad, the load is lost and no truck will be dispatched. A truck that finds a new customer in the service area will displace another truck that would previously have hauled that load. Therefore, there is no mechanism to replace a load that has been hauled by the railroad.
3. The railroad will service a focused part of the transportation market. For the most part, and with the exception of solid waste, the railroad will service businesses located on or near the rail line that have direct access by spur or siding. It will also service businesses needing shipments to be transported into or outside of the service area. It is usually not cost effective to ship goods relatively short distances within the service area by rail; nor can the railroad directly service clients away from the rail line easily. Therefore, the trucks that will be displaced are those that bring goods into or out of the service area.

4. Economic considerations require that trucks and rail cars are fully loaded, particularly when transport involves long distances such as those transporting goods into and out of the service area.
5. There is no alternative mode of transportation for the type of goods transported by rail. These goods must either be transported by rail or truck. Transportation by water or air is not an option for these types of goods. Therefore, transportation of goods by rail displaces trucks only, not other forms of transportation.

As a result, there is a direct relationship between rail cars and trucks. For solid waste, one truck will be displaced for every full container leaving the service area because specialized waste trucks hauling waste out of Sonoma County would return empty to continue pick up service. For other loads (merchandise), four trucks will be displaced for every loaded rail car entering the service area, and four trucks will be displaced for every loaded rail car leaving the service area.

**Table 3.10-5**
**Truck Equivalents Per Train**

| | **Train 1** (Continuation of Train 2 w/fewer cars) | **Train 2** | **Train 3** | **Train 4** |
|---|---|---|---|---|
| Termini | Redwood Valley – Willits | Lombard – Redwood Valley | Lombard – Willits | Lombard – Santa Rosa |
| Max cars per train | 10 | 25 | 60 | 60 |
| Truck equiv. Per car | 4 | 4 | 4 | 1 |
| Truck equiv. Per train | 40 | 100 | 240 | 60 |
| Total truck equiv (both directions) | 80 | 200 | 480 | 120 |

Note: Assumes each train makes one crossing in each direction per day.

To put this in perspective, Caltrans estimates that in 2005 there were about 3,200 trips by large trucks (with 3 or more axles) in both directions in the Marin-Sonoma Narrows of Highway 101 on an average day, and 3,600 large truck trips on the Cotati grade.[1] Hence, the maximum equivalent volume of trucks removed from these locations would be between 20% and 25% of 3+ axle trucks on Highway 101 on an average day in 2005, assuming these freight projections are realized.

[1] Caltrans 2006 Truck Counts. http://traffic-counts.dot.ca.gov/

This is a beneficial impact on the North Bay's transportation system both for congestion relief and pavement wear. According to the 2000 edition of the Highway Capacity Manual, each truck is equivalent to 1.5 passenger cars on flat terrain, and 2.5 passenger cars in rolling terrain.[2] For long upgrades of approximately three percent (e.g., Cotati grade) a single truck uses the same amount of highway capacity as three passenger cars.

*Delays at Crossings*

The operation of freight trains would not significantly increase delays to motor vehicles, pedestrians, and cyclists at the 25 key grade crossings.

Estimated worst-case motor vehicle delay for 2009 peak traffic volumes is shown in Table 3.10-6. Delay is expressed seconds of delay per blocked vehicle. These estimates assume auto traffic volumes at the crossings equal to the estimated peak 15-minute volumes. This would not in fact occur because not all trains would be crossing during the peak 15-minutes. Hence, these delay estimates can be considered as very conservative upper bounds on actual delay that would be experienced.

The average delay per vehicle that is stopped is about half the gate closure time, or 40 to 50 seconds. At the SR 12/121 crossing, because of the special circumstances involving the double crossing at that site, the blockage time would be slightly over 2 minutes for the longest trains. But the expected delay taken over all vehicles that pass through each grade crossing in a day is much smaller than this. A maximum of 6 trains would pass through each grade crossing in a day. Most vehicles passing through each grade crossing would not encounter a train crossing. Hence, the expected delay per vehicle for all vehicles that pass through any of these crossings would be on the order of 1 – 2 seconds or less.

[2] Transportation Research Board. Highway Capacity Manual. Washington, DC: 2000.

**Table 3.10-6**
**Estimated Worst-Case Motor Vehicle Delay Added Per Day At Key Grade Crossings, 2009 – With Proposed Project**

| No. | Location | | Delay (seconds) |
|---|---|---|---|
| 4 | Sonoma County | SR 12/121 (Carneros Hwy) at E 8th St (Schellville Rd) (2 crossings) | 136 |
| 6 | Sonoma County | Sears Point Rd. (SR 37) near Arnold Dr. | N/A |
| 19 | Petaluma | D St. west of Lakeville St. | 57 |
| 20 | Petaluma | Washington St. west of Lakeville St. | 57 |
| 30 | Rohnert Park | E Cotati Ave east of Industrial Ave. | 57 |
| 31 | Rohnert Park | Southwest Blvd. east of Brenda Wy. | 57 |
| 33 | Rohnert Park | Rohnert Park Expwy. | 40 |
| 34 | Rohnert Park | Golf Course Dr. east of US-101 interchange | 40 |
| 36 | Santa Rosa | Todd Rd. west of US-101 interchange | 40 |
| 39 | Santa Rosa | Hearn Ave. west of Dowd Dr. | 40 |
| 42 | Santa Rosa | 3rd St. west of Wilson St. | 57 |
| 46 | Santa Rosa | 9th St. west of Wilson | 51 |
| 47 | Santa Rosa | College Ave. west of Cleveland Ave. | 51 |
| 48 | Santa Rosa | Guerneville Rd. east of N Dutton Ave. | 36 |
| 49 | Santa Rosa | W Steele Ln. west of Coffey Ln. | 36 |
| 50 | Santa Rosa | Piner Rd. east of Plum Tree Ln. | 36 |
| 52 | Fulton | Fulton Rd. south of D St. | 36 |
| 53 | Fulton | River Rd. east of Hart Ln. | 36 |
| 54 | Windsor | Airport Blvd. west of US-101 interchange (east of Regional Pkwy) | 36 |
| 55 | Windsor | Aviation Blvd east of Concourse Blvd. | 36 |
| 56 | Windsor | Shiloh Rd. west of Conde Ln. | 36 |
| 64 | Healdsburg | Healdsburg Ave at Vine St & Mill St | 51 |
| 68 | Healdsburg | Dry Creek Rd. east of Grove St. | 36 |
| 84 | Ukiah | Talmage Rd. west of US-101 interchange | 51 |
| 86 | Ukiah | E Perkins St. at Clay St. | 51 |

Note: The above delay estimates reflect a worst-case assuming each train passes through the crossing during the peak 15 minutes of traffic. Actual total delay would be less than the numbers shown in the table.

**Impact T-OP1.** Traffic queue lengths at the intersections shown in Table 3.10-7 could exceed the available storage area (roadway space available for vehicles to wait) in the opening year of NCRA freight operations, causing traffic to back up across the at-grade crossing upstream from the traffic signal. ***[Less Than Significant with Mitigation Measure T-OP1]***

**Table 3.10-7**
**Study Intersections Where Traffic Queue May Exceed Storage Area, 2009**

| Grade crossing | | | Intersection |
|---|---|---|---|
| **No.** | **City/County** | **Location** | |
| 6 | Sonoma County | Sears Point Road (SR 37) Near Arnold Drive (SR-121) | Sears Point Road and Arnold Drive |
| 31 | Rohnert Park | Southwest Boulevard East of Brenda Way | Southwest Boulevard and Seed Farm Drive |
| 34 | Rohnert Park | Golf Course Drive East of US-101 Interchange | Golf Course Drive and Roberts Lake Road |
| | | | Golf Course Drive and Commerce Boulevard |
| 39 | Santa Rosa | Hearn Avenue West of Dowd Drive | Hearn Avenue and Dowd Drive |
| 42 | Santa Rosa | 3rd Street West of Wilson Street | 3rd Street and Wilson Street |
| 47 | Santa Rosa | College Avenue West of Cleveland Avenue | College Avenue and Cleveland Avenue |
| | | | College Avenue and North Dutton Avenue |
| 48 | Santa Rosa | Guerneville Road East of North Dutton Avenue | Guerneville Road and Coffey Lane |
| | | | Guerneville Road and North Dutton Avenue |
| 49 | Santa Rosa | West Steele Lane West of Coffey Lane | West Steele Lane and Coffey Lane |
| 53 | Sonoma Co. | River Road East of Hart Lane | River Road and Fulton Road |
| 56 | Windsor | Shiloh Road West of Conde Lane | Shiloh Road and Conde Lane |
| 86 | Ukiah | East Perkins Street at Clay Street | East Perkins Street and Hospital Drive |

**Mitigation T-OP1:** In cooperation with local jurisdictions, interconnects between traffic signals and train crossing signals shall be installed to preempt normal signal operations and allow queues to clear before the train crosses.

**Impact T-OP2:** Road blockages due to NCRA freight operations could interfere with movement of emergency service vehicles near the rail line.

In response to concerns about the implications of potential emergency vehicle delays at grade-crossings for the SMART project, SMART interviewed operations professionals with other agencies in the Bay Area that provide passenger/commuter or freight rail service were interviewed. Persons contacted included: Robert Doty, Director of Rail Transportation at Caltrain, Brian Schmidt, Director of Rail Services at Altamont Commuter Express (ACE), David Kutrosky, Deputy Director of Finance and Planning with the Capitol Corridor, and Bill Capps, Service Planning Manager with the Valley Transportation Authority (VTA).

All four agency representatives stated that emergency vehicle delays created by rail service had not presented significant issues or problems in the jurisdictions through which they operate. All four also confirmed that there is currently no mechanism that would allow trains to yield to emergency vehicles at grade crossings.

These agency representatives, however, did suggest that a key step to minimize the possibility of delay due to passenger train service was to ensure, through station design, that trains "fit" and do not block existing streets when they dwell at stations. For freight service it is assumed that trains would not be stopping at sidings that block crossing streets.

With respect to emergency vehicles dispatched from fire stations, the larger cities along the proposed project corridor right-of-way, including Novato, Petaluma, Rohnert Park, and Santa Rosa, all have multiple (ranging from three to eight) fire stations with at least one on each side of the railroad tracks. This distributed approach to fire service coverage, and in some cases paramedic services as well, minimizes the probability of these emergency responders needing to cross tracks and potentially encountering a grade-crossing delay. ***[Less Than Significant with Mitigation Measure T-OP2]***

**Mitigation T-OP2:** The emergency services operations that would be affected by the proposed project shall be provided with an emergency hotline to NCRA's operator's dispatcher so that trains can be stopped or held back in the event of an emergency.