City of Encinitas

Rail Corridor Vision Study

Part of the *Coastal Mobility & Livability Study*

COASTAL MOBILITY & LIVABILITY STUDY

Approved by Resolution 2018-18

February 14, 2018

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Executive Summary

The *Rail Corridor Vision Study (RCVS)* is the centerpiece of the *Coastal Mobility and Livability Study (CMLS),* a broad effort to examine mobility issues and opportunities in the Encinitas coastal rail corridor. This unique corridor is centered around the Los Angeles-San Diego-San Luis Obispo (LOSSAN) Rail Corridor and parallel roads Coast Highway 101 and Vulcan Avenue/San Elijo Avenue.

The *RCVS* has a broad focus, coordinating multiple infrastructure elements to create a unified vision for the rail corridor with both near-term and long-term objectives.

Guiding Policies

At the study's kickoff, the project team developed the following policies to guide the study and inform its technical and engagement activities:

- Increase east-west connections
- Improve pedestrian & bicycle facilities
- Provide adequate parking
- Balance mobility improvements with desired community character
- Promote health and safety

Stakeholder & Public Engagement

The *RCVS* relied heavily on input from community stakeholders and members of the public, including:

- **Coastal Mobility & Livability Working Group (CMLWG):** The core stakeholder team representing broad community interests presided over all elements of the *RCVS* and *CMLS*, meeting frequently to review technical work and provide guidance.
- **Public Visioning Activities:** Early in the study, the public was invited to discuss issues and opportunities in the corridor via five in-person workshops, nine "pop-up" workshops at community events, outreach to City commissions, and an eight-week online comment period through the PlaceSpeak website.
- **Public Open House Reviews:** Later in the study, two "open house" public forums presented and collected public feedback on proposed improvements and priorities.

Community members and stakeholders drove the study's process and conclusions.

- **Technical Support Group:** A committee of representatives from agencies with interest in the coastal corridor advised the project team and helped define the study's parameters and constraints.
- **City Council & Commissions Check-Ins:** The project team briefed the City Council on the study's progress at key milestones—including an interactive workshop to review proposed improvements—and presented to a wide range of City commissions.

Key Takeaways from Public Engagement

The public engagement activities significantly informed the *RCVS* process and recommendations, yielding the following key takeaways:

- Develop a long-term vision that fully resolves the community's concerns regarding the rail corridor, but also focuses on short-term improvements that can provide more immediate benefits.
- Implement a citywide quiet zone for trains at all vehicular at-grade crossings.
- Construct new pedestrian/bicycle crossings of the rail corridor to improve east-west connectivity.
- Enhance the safety and desirability of pedestrian and bicycle facilities through sound design ideas that provide a high-quality user experience and is sensitive to the surrounding environment.

Proposed Improvements

Several categories of access improvements are envisioned, aimed at improving both east-west connectivity *across* the corridor as well as north-south connectivity *along* the corridor. While establishing a long-term vision was a key part of the study, the project team and stakeholders also developed a set of improvements to deliver community benefits in the near term.

Long-Term Vision: Trenching or Moving the Rail Corridor

The CMLWG and other stakeholders largely agreed on two potential long-term solutions for the rail corridor. These are considered long-term solutions because the cost of these improvements makes them potentially infeasible, or at least not implementable in the foreseeable future.

- **Trench:** Lower the grade of the railroad tracks in Leucadia and Cardiff-by-the-Sea to create a covered, or partially covered, trench.
- **Move to Interstate 5 (I-5) Corridor:** Move the entire rail corridor into the I-5 right-of-way.

Near-Term Vision: Crossings, Quiet Zone & Active Transportation

The *RCVS* included a variety of solutions to improve mobility and quality of life in the near term:

- **Rail Corridor Crossing Policy:** A prerequisite to implementing new rail corridor crossings is developing a policy to guide their selection and design. The crossing policy ultimately envisions quarter-mile spacing between crossings, with initial priorities focused on creating crossings every half mile; serving the highest-activity areas; and equitably distributing new crossings among communities.
- **Rail Corridor Crossing Locations:** The study recommends a total of 21 crossings spanning the six-mile corridor:
  - Eight existing crossings, most of which include recommendations for additional pedestrian/bicycle improvements.
  - Three new undercrossings already in progress, at El Portal Street, Verdi Avenue, and the San Elijo Gateway location near the Solana Beach city limit.
  - Ten new crossings, with the specific location and type of crossing (at-grade or grade-separated) to be determined during the context-sensitive design process at each location:
    - Bishop's Gate Road
    - Grandview Street/Hillcrest Drive
    - Sanford Street/Jupiter Street
    - Phoebe Street/Glaucus Street
    - Daphne Street/Basil Street
    - Marcheta Street/Orpheus Avenue
    - A Street/Sunset Drive
    - H Street/I Street
    - Birmingham Drive
    - Norfolk Drive/Dublin Drive

- **Citywide Quiet Zone:** The study identified initial steps to implement a citywide Quiet Zone to reduce train noise and preserve community character. The project team held diagnostic meetings with key regulatory agencies —including the Federal Railroad Administration (FRA), California Public Utilities Commission (CPUC), and North County Transit District (NCTD)—and, as of January 2018, is currently developing concept designs for the required supplemental safety measures at three of the four vehicular at-grade crossings. The safety measures for the fourth crossing at Chesterfield Drive are currently in construction and expected to be complete by 2020.
- **Traffic Calming:** The study identified opportunities for traffic calming that preserve community character by reducing traffic speeds and promote pedestrian and bicycle usage, especially near crossing locations and along Vulcan Avenue and San Elijo Avenue.
- **Coastal Rail Trail & Multi-Use Paths:** The *RCVS* and *ATP* work efforts collaboratively developed a system of north-south paths in the corridor—including the regional Coastal Rail Trail—that increase separation from automobiles and integrate with citywide *ATP* networks.

Next Steps

The City Council's adoption of this *RCVS* report will complete the study, and the next phases of project development and implementation are recommended as follows:

- **Citywide Quiet Zone:** Schedule follow-up meetings with regulatory agencies to finalize the scope of safety improvements. Identify funding for design, permitting, and construction of improvements.
- **Rail Corridor Crossings:** Continue the designs of the El Portal Street and Verdi Avenue pedestrian/bicycle undercrossings and allocate funding for the Verdi Avenue construction phase. Identify funding to begin the context-sensitive design process for the next highest-priority rail crossings at Sanford Street/Jupiter Street and Birmingham Drive.
- **Traffic Calming & Active Transportation Projects:** Complete the citywide *ATP* including identification of early-action projects. Begin planning and design of highest-priority *ATP* projects in close coordination with quiet zone and rail corridor crossing projects.

Taken together, the *RCVS* proposed improvements comprise an integrated, balanced vision that was developed through an extensive, community-based process. The suite of recommended projects will improve mobility and quality of life in the Encinitas coastal rail corridor in the near term and for decades to come.

Contents

Purpose & Guiding Policies

The purpose of the *Rail Corridor Vision Study (RCVS)* is to develop an organized plan for multimodal access throughout the Encinitas coastal rail corridor, which is centered around the Los Angeles-San Diego-San Luis Obispo (LOSSAN) Rail Corridor and parallel roads Coast Highway 101 and Vulcan Avenue/San Elijo Avenue.

The rail corridor is an important facility with regional and statewide significance, but its north-south orientation also limits east-west connectivity for local travelers (Figure 1). The resulting disconnected street network and associated development patterns can discourage walking, biking, and opportunities to take public transit.

Encinitas residents, visitors, and businesses need a balanced, multimodal transportation system that provides connections both *across* and *along* the coastal rail corridor—including viable options for non-automobile travel—and improves quality of life for future generations.

The *RCVS* proposed improvements are focused specifically in the rail corridor and its immediate surroundings. However, the study analyzed the entire coastal corridor west of I-5 to better understand the area's context and mobility needs.

The Encinitas City Council approved this *RCVS* report on February 14, 2018, via Resolution 2018-18.

Figure 1: Shown here in 2012, the coastal rail corridor contains the LOSSAN Rail Corridor and two parallel roads—Coast Highway 101 and Vulcan Avenue/San Elijo Avenue—separating communities from the coast. (California Dept. of Transportation [Caltrans])

A Larger Effort for Coastal Mobility & Livability

The *RCVS* is the central component of the broader *Coastal Mobility and Livability Study (CMLS),* a City-sponsored visioning process—partially funded by the California Department of Transportation (Caltrans)—that invites residents, businesses, and other community members to create a new, integrated vision for infrastructure, mobility, and quality of life in the coastal corridor.

The *CMLS* incorporates three complementary studies:

- *RCVS*
- *Active Transportation Plan (ATP)*
- *Coastal Business Districts Parking Study*

By linking these studies together, the *CMLS* creates efficiencies in project schedules and outreach activities, and ensures vital integration among the complementary planning efforts.

Guiding Policies

At the study's kickoff, the project team developed the following policies to guide the study and inform its technical and engagement activities:

- **Increase East-West Connections:** Improve access across the rail corridor to beaches, schools, and commercial areas.
- **Improve Pedestrian & Bicycle Facilities:** Enhance the safety and desirability of these modes through facility design that provides separation from automobiles.
- **Provide Adequate Parking:** Ensure sufficient parking to enable access to the coast, Encinitas COASTER Station, and commercial areas.
- **Balance Mobility Improvements with Desired Community Character:** Focus on mobility improvements that minimize noise, respect community character (Figure 2), and preserve open space as much as possible.
- **Promote Health & Safety:** Create an environment where users of all ages and physical abilities can enjoy the coastal rail corridor.

Figure 2: At left, Old Encinitas, the city's historic center, exemplifies its unique community character. At right, the "Cardiff Kook" statue represents local surfing culture. (Wikimedia Commons; Flickr)

Process & Engagement

The *RCVS* employed a straightforward technical process anchored by robust efforts to engage community stakeholders and the broader public. City staff led the project team, which also included prime consultant WSP and subconsultants AECOM and KTUA.

Study Process

Figure 3 summarizes the *RCVS* technical process, which consisted of four phases:

- **Existing Conditions:** Assess current issues and opportunities.
- **Draft Improvements:** Develop initial concepts for corridor improvements.
- **Refined Improvements & Prioritization:** Refine draft improvements and develop phased project list.
- **Final Vision:** Combine all elements into a comprehensive plan and implementation strategy.

In each phase, the project team hosted meetings and other activities to provide information and solicit feedback on the study's progress.

As shown in Figure 3 and described below, the engagement efforts included the study's Coastal Mobility & Livability Working Group—comprised of community members and representatives from City commissions—the broader public, and the City Council as well as other stakeholder agencies.

The study included four phases, each with its own technical and engagement activities.

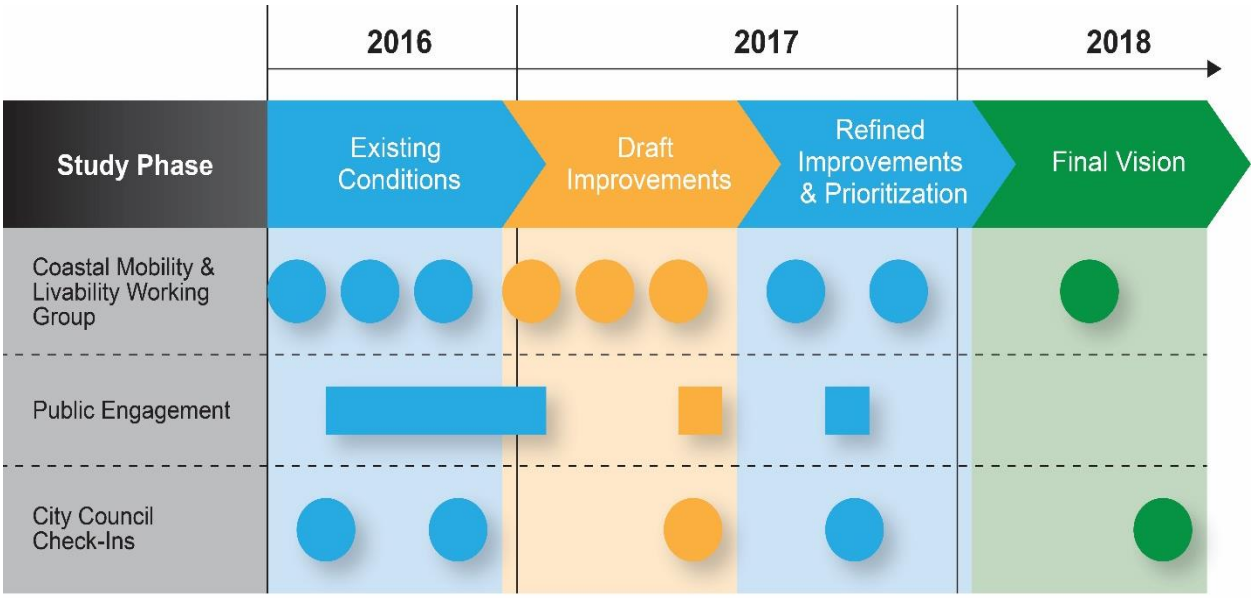

Figure 3: The study process contained four phases characterized by robust outreach activities.

Coastal Mobility & Livability Working Group

The Coastal Mobility and Livability Working Group (CMLWG) was the study's core advisory body and stakeholder team. Its work significantly informed the *RCVS* from beginning to end, guiding each of the study's phases and providing in-depth reviews of potential improvements.

Figure 4: The CMLWG met frequently to review the study's technical work and provide recommendations.

CMLWG members also served as *RCVS* ambassadors, helping to inform and engage the community as the study progressed.

Membership

The CMLWG included a broad range of community interests and organizations. Its 13 regular members represented the following stakeholder groups:

- Leucadia 101 Main Street Association
- Encinitas 101 Main Street Association
- Cardiff 101 Main Street
- Encinitas Chamber of Commerce
- Preserve Cardiff Rail Corridor
- Yes on the Rail Trail
- Cardiff by the Sea Town Council
- Leucadia-Encinitas Town Council
- Bike Walk Encinitas
- Paul Ecke Central Elementary School
- Latino/Hispanic community
- Engaged citizens (2)

The CMLWG was the study's primary source of stakeholder input and guidance.

The CMLWG also included ex-officio members representing the following City commissions:

- Planning
- Traffic and Safety
- Environmental
- Youth
- Parks and Recreation
- Senior
- Art

Meetings

The CMLWG met at key study milestones, participating in extensive briefings and interactive working sessions. Each meeting also included time for public comment.

- **Meeting 1:** Study kickoff and input on public participation strategy.
- **Meeting 2 (Two Sessions):** Discussion and demonstration of options for wayside horn warning system at potential Montgomery Avenue rail crossing.
- **Meeting 3:** Mapping of corridor issues and opportunities prior to the public visioning workshops.
- **Meeting 4:** Consideration of early action recommendations for quiet zone implementation and rail crossings at El Portal Street and Montgomery Avenue.

- **Meeting 5:** Review of quiet zone examples from San Clemente, preliminary design concepts for Verdi Avenue rail crossing, and guiding themes from visioning workshops.
- **Meeting 6 (Four Sessions):** Review of *RCVS* and *ATP* draft improvements.
- **Meeting 7:** Refinement of *RCVS* and *ATP* draft improvements, project list, and project phasing.
- **Meeting 8:** Continued review of second draft improvements, project list, and phasing, plus draft design guidelines.
- **Meeting 9:** Refinement of *RCVS* design guidelines and *ATP* and *Coastal Business Districts Parking Study* draft improvements.

Public Engagement

The *RCVS* relied heavily on community stakeholders and the public for feedback and guidance, during two study phases: Visioning activities to identify corridor issues and opportunities, and open house project reviews to provide feedback on proposed improvements.

Visioning Activities

Early in the study, the public was invited to identify their most important goals for the coastal corridor and discuss issues and opportunities. This wide-reaching effort consisted of three components:

- **Traditional Workshops:** Five in-person workshops—one in each community—consisting of informational stations and mapping activities (Figure 4).
- **"Pop-Up" Events:** Nine miniature workshops held at other community gathering places—such as farmers markets, popular restaurants, and retail centers—intended to meet people where they already are.
- **Online Engagement:** An eight-week online comment period through the PlaceSpeak website, coupled with additional outreach and promotion through the City's social media accounts.

Open House Project Reviews

Based on feedback from the visioning activities, the project team and CMLWG developed and refined a set of draft improvements. Two "open house" project review meetings presented and collected public feedback on the proposed improvements and priorities:

- **Open House 1:** Review of first draft improvements.
- **Open House 2:** Review of second draft improvements, project list, and phasing.

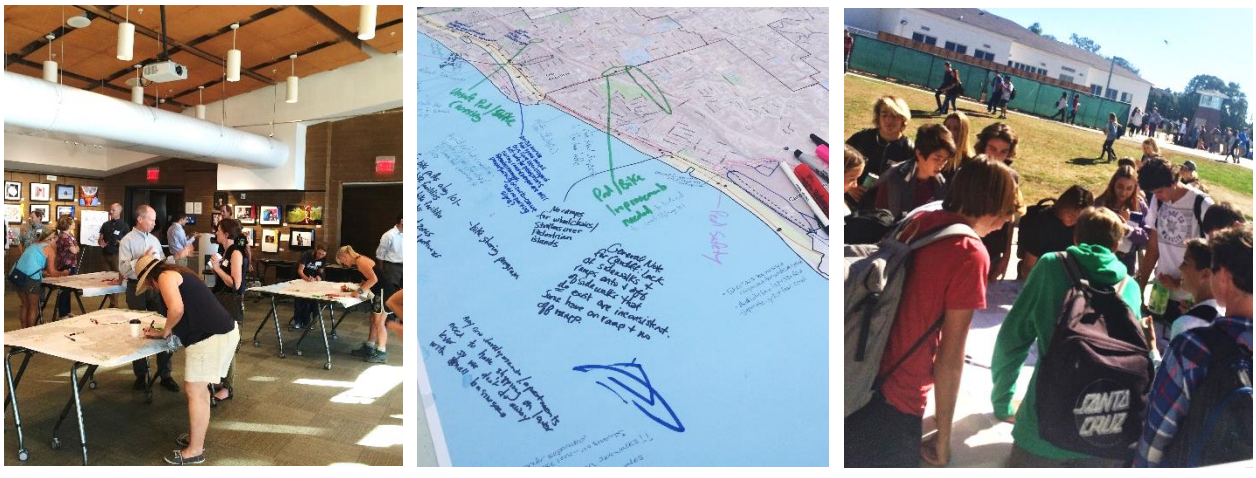

Figure 5: The Visioning Activities brought community members together to discuss corridor issues and opportunities in interactive workshops.

City & Agency Guidance

The City Council and stakeholder agencies provided valuable coordination and guidance throughout the *RCVS*.

City Council & Commissions

The project team delivered briefings to the City Council at key milestones to provide information and receive guidance, and presented study highlights to relevant City commissions. These check-ins kept leadership engaged and resulted in a more informed study.

- **City Council Check-Ins:** The project team briefed the City Council on the study's progress at key milestones, including an interactive workshop to review the first draft improvements.
- **Briefings to City Commissions:** The project team visited seven City commissions at various milestones throughout the study to provide updates and receive input.

Technical Support Group

The Technical Support Group was a committee of representatives from public agencies with interest or influence in the coastal corridor. They advised the project team on agency plans and helped to define the corridor's parameters and constraints, both in general meetings as well as focused agency meetings on specific issues. Coordination will continue as projects move into implementation.

Technical Support Group members included representatives from the following agencies:

- San Diego Association of Governments (SANDAG)
- California Department of Transportation (Caltrans)
- North County Transit District (NCTD)
- California Coastal Commission
- California State Parks
- City of Encinitas departments including Fire, Public Works, and Parks & Recreation

Existing Conditions

A key building block of the *RCVS* process was an initial assessment of the coastal corridor's existing conditions and planned projects.

Corridor Description

As shown in Figure 6, the coastal rail corridor is approximately six miles long, from its northern border at Batiquitos Lagoon to the southern shore of San Elijo Lagoon, and roughly three-quarters of a mile wide from the Pacific Ocean to I-5.

Communities

The coastal corridor contains a wide variety of land uses and activity centers arranged into three distinct coastal communities:

- **Leucadia:** A largely residential coastal community featuring art galleries and unique retail stores. Leucadia is also known for its popular restaurants and beaches, including Beacon's and Grandview.
- **Old Encinitas:** Also known as Downtown Encinitas, the historic city center contains many civic landmarks, public facilities, and popular retail and dining destinations.
- **Cardiff-by-the-Sea (Cardiff):** A residential community containing a large surfing culture with notable beaches like Swami's. Cardiff is home to many popular markets, retail, and dining destinations.

Transportation Barriers

West of I-5, three parallel transportation facilities transect the entire coastal corridor from north to south. Collectively they represent a significant barrier in the three coastal communities separating people from schools, transit, beaches, parks, and other activity centers. From west to east, they are:

- **Coast Highway 101:** A historic roadway parallel to the coast, providing scenic views and access to the City's beaches and local businesses. It serves as a lower-speed alternative to I-5 for north-south automobile travel and accommodates a wide variety of public transit, bicycle, and pedestrian facilities (Figure 7).
- **LOSSAN Rail Corridor:** A major railroad facility east of Coast Highway 101 containing both single- and double-tracked sections. NCTD owns the right-of-way, which varies considerably in width, from 100 feet in the northern corridor (Figure 8) to approximately 200 feet in the south. Three major operators use the corridor daily:
  - **Amtrak Pacific Surfliner:** Approximately 12 daily intercity trains in each direction.
  - **NCTD COASTER:** Approximately 11 daily commuter trains in each direction, including a stop at Encinitas Station.
  - **BNSF Freight:** Approximately 6-9 freight trains each night.
- **Vulcan Avenue/San Elijo Avenue:** A roadway corridor that effectively serves as a frontage road east of the LOSSAN Rail Corridor. It provides north-south mobility and serves mostly residential areas, plus the Encinitas COASTER Station and small commercial areas in Old Encinitas and Cardiff.

The corridor's three north-south transportation facilities create a significant barrier to corridor mobility.

Figure 6: Existing Conditions. The coastal rail corridor contains very few crossings and limited facilities for bicycles and pedestrians along its six-mile length.

Figure 7: Coast Highway 101 parallels the rail corridor in Cardiff. (Caltrans)

Figure 8: The rail corridor, shown here in Leucadia, is a barrier to reaching the coast and serves as an informal parking area for adjacent residences and businesses. (Caltrans)

Corridor Crossings

The rail corridor contains eight existing crossings, listed here and shown in Figure 6:

- **La Costa Avenue:** Grade-separated roadway
- **Leucadia Boulevard:** At-grade roadway
- **Encinitas Boulevard:** Grade-separated roadway
- **Encinitas Station:** Pedestrian at-grade crossing at station platform
- **D Street:** At-grade roadway
- **E Street:** At-grade roadway
- **Santa Fe Drive:** Pedestrian and bike undercrossing
- **Chesterfield Drive:** At-grade roadway

Even without a designated crossing, pedestrians can freely cross the rail corridor in many locations because most of its length is not surrounded by fencing. NCTD, the rail corridor's owner and primary operator, has recently expressed its intention to eventually fence the entire corridor.

Bicycle & Pedestrian Facilities

As shown in Figure 6, the coastal corridor has an incomplete network of bicycle and pedestrian facilities. The complementary *ATP* is developing a citywide strategy to expand and enhance these networks.

The RCVS integrates a wide range of projects into a comprehensive mobility plan for the rail corridor.

Ongoing & Planned Projects

The coastal corridor is host to a wide variety of ongoing and planned improvements, to be implemented by the City of Encinitas as well as state and regional agencies.

City of Encinitas Projects

The City maintains a large Capital Improvement Program that includes many ongoing and planned projects. Key projects in the coastal corridor include:

- **North Coast Highway 101 Streetscape:** A project for traffic calming and beautification improvements on Coast Highway 101 in Leucadia, from La Costa Avenue to A Street. Currently in the design and environmental process (Figure 9).
- **Drainage Improvements:** Focused on local streets.
- **Street Resurfacing:** An ongoing annual program throughout the city.

In addition, two new grade-separated, pedestrian and bicycle crossings of the rail corridor are in development:

- **El Portal Street:** In design and funded through construction.
- **Verdi Avenue:** In design. As of January 2018, construction funding has yet to be identified.

State & Regional Projects

In addition to the City's ongoing capital projects, several state and regional agencies are leading significant projects in Encinitas, including:

- **San Elijo Lagoon Double Track:** 1.5 miles of second main track on the LOSSAN Rail Corridor from Birmingham Drive to the Solana Beach city limit, including replacement of the lagoon rail bridge. Also includes improvements to the at-grade crossing at Chesterfield Drive including quiet zone

supplemental safety measures. Led by SANDAG and expected to be complete by 2020.

- **San Elijo Gateway Crossing:** A new undercrossing for pedestrians and bicycles along the south shore of San Elijo Lagoon near the Solana Beach city limit. Under construction by SANDAG as part of the San Elijo Lagoon Double Track project.
- **Batiquitos Lagoon Double Track:** 2.7 miles of second main track on the LOSSAN Rail Corridor from Avenida Encinas (Carlsbad) to Orpheus Avenue. Led by SANDAG, the north segment includes replacement of the Batiquitos Lagoon rail bridge and is expected to be complete by 2025. The south segment includes improvements at the La Costa Avenue crossing and is expected to be complete by 2030.
- **I-5 North Coast Corridor Express Lanes:** Two high-occupancy vehicle lanes in each direction from Oceanside to La Jolla, including replacement of the San Elijo Lagoon and Batiquitos Lagoon highway bridges. Led by Caltrans and spread across multiple phases, with the San Elijo Lagoon portion expected to be complete by 2020.
- **Coastal Rail Trail:** A north-south multi-use path roughly parallel to the LOSSAN Rail Corridor, both within the rail right-of-way and on adjacent City land. Led by SANDAG and spread across multiple phases:
  - **La Costa Avenue to Santa Fe Drive:** In preliminary planning.
  - **Santa Fe Drive to Chesterfield Drive:** In design and funded through construction. Expected to be complete in 2019.
- **San Elijo Lagoon Restoration Project:** Large-scale restoration constructed with the rail and highway bridge replacements. Led by the San Elijo Lagoon Conservancy and expected to be complete by 2020.

Up-to-Date Project Information

The *RCVS* employed an online mapping system to inventory all City and regional projects. The City is further developing this tool to provide the public with a clearer way to understand the corridor's context and see how the various projects fit together. The tool will be available on the City's projects website at:

https://www.encinitasca.gov/Government/Projects

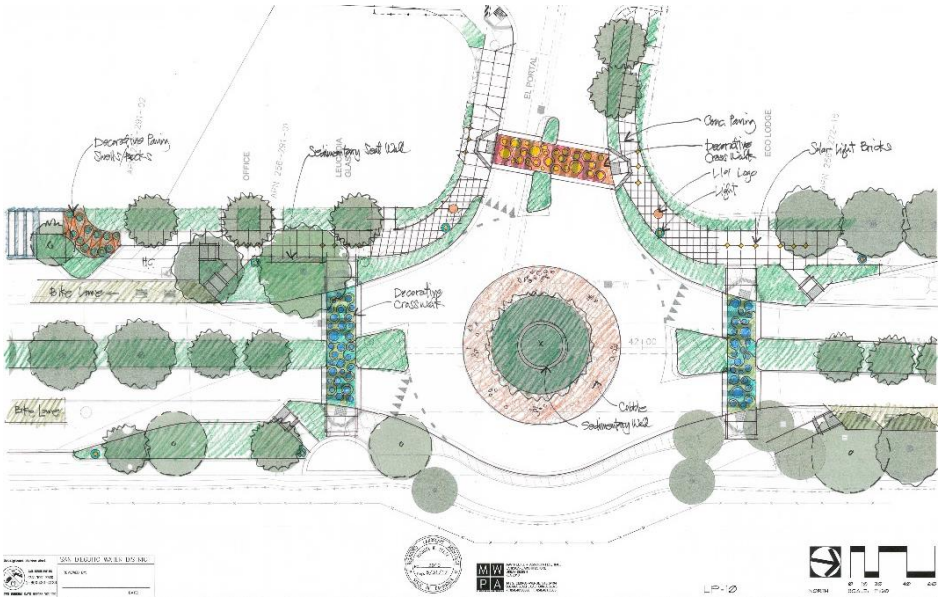

Figure 9: The North Coast Highway 101 Streetscape Plan will improve mobility, safety, and aesthetics in Leucadia.

Proposed Improvements

The *RCVS* includes a long-term vision for more costly and challenging improvements, plus a near-term vision to deliver early benefits.

Long-Term & Near-Term Visions

Long Term: Trenching or Moving the Rail Corridor

The CMLWG and other stakeholders largely agreed on two potential long-term solutions for the rail corridor. These are considered long-term solutions because their high cost makes them potentially infeasible or, at the very least, not implementable in the foreseeable future.

- **Trench:** Lower the grade of the tracks in Leucadia and Cardiff to create a covered or partially covered trench (Figure 10).
- **Move to I-5 Corridor:** Move the entire rail corridor to the I-5 right-of-way.

Near Term: Crossings, Quiet Zone & Active Transportation

As detailed in the sections below, the CMLWG and stakeholders agreed on several solutions to improve near-term mobility and quality of life:

- **Rail Corridor Crossings:** Two components:
  - **Crossing Policy:** A framework for planning and prioritizing new crossings.
  - **Crossing Locations:** 8 existing, 3 in design or construction, 10 proposed.
- **Citywide Quiet Zone:** Reducing train noise through safety improvements at at-grade vehicular crossings.
- **Traffic Calming:** Opportunities to enhance safety, preserve community character, and promote pedestrian and bicycle usage.
- **Coastal Rail Trail & Multi-Use Paths:** A system of north-south paths, integrated with the *ATP* planned networks, providing mobility for cyclists and pedestrians.

Figure 10: The rail corridor is in a depressed trench in Solana Beach, California, just south of Encinitas. (Caltrans)

The RCVS includes a near-term vision to deliver early community benefits.

Rail Corridor Crossings

Rail Corridor Crossing Policy

This policy provides a guiding framework for the comprehensive planning and implementation of new crossings of the coastal rail corridor.

Pedestrian Design & Spacing

A key to planning and designing pedestrian paths is directness of travel. Providing pathways that serve circulation demands and minimize out-of-direction travel will help maximize safe crossing behavior. Pedestrian planners generally agree that spacing of approximately a quarter-mile between crossings is desirable to achieve this aim. Using this distance as a rough guideline, the selection of actual crossing locations should be based on various factors, including:

- **Existing & Planned Transportation Networks:** Direct connections to streets and other multimodal facilities, both existing and planned, increase a crossing's circulation benefits. Conversely, barriers in the nearby transportation network—for example, a lack of crossings on adjacent Coast Highway 101—can inhibit circulation from a rail crossing.
- **Connections to Key Origins and Destinations:** Schools, beaches, parks, and commercial/civic land uses typically have high demand, with most trips originating from local residences and parking areas.
- **Existing Informal Crossing Locations:** Observing where pedestrians currently cross the tracks, albeit illegally (Figure 11), often indicates where demand is highest for new crossings.
- **Physical Geography:** The presence of geographic barriers (e.g. drainage, topography, environmentally sensitive areas) may limit the ability to add a crossing.

Safety is an overall consideration in identifying potential pedestrian rail crossing locations. Acknowledging that illegal crossings occur, and understanding where they occur, will help in developing recommendations on where formal crossings are needed, which in turn can improve compliance. Feasibility and cost will be important considerations as well, but first it is important to understand where rail crossings are needed to ensure that their selection leads to improvements in public safety.

Figure 11: Illegal crossings are common throughout the coastal rail corridor. (San Diego Union-Tribune)

Rail Operations: Grade-Separated Crossings

Grade-separated rail crossings, such as the recent project near Santa Fe Drive, typically do not affect rail operations following the completion of construction. Some locations may even require grade-separated crossings to accommodate sight lines for approaching trains. However, while often preferable, grade separations are significantly more expensive than at-grade crossings and take longer to implement.

Rail Operations: At-Grade Pedestrian/ Bicycle Crossings

Figure 12: An at-grade pedestrian rail crossing with numerous safety features in San Clemente, California.

At-grade pedestrian and bicycle crossings are regulated by California Public Utilities Commission (CPUC), whose overarching aim is to improve public safety in rail corridors. The agency heavily scrutinizes applications for new at-grade crossings, but approvals are possible if the applicant can show that implementation will result in a net safety improvement over existing conditions—such as by reducing illegal crossings—and that the community is supportive of the location and type of crossing.

One potential strategy is to package new at-grade pedestrian/bicycle crossings into a comprehensive rail-safety program that includes other measures such as barriers at non-crossing locations. The City of San Clemente used this approach to attain quiet zone status on its section of the LOSSAN Rail Corridor (Figure 12).

All new at-grade crossings should be considered for potential impacts on the City's quiet zone status. Pedestrian-only crossings will require additional coordination due to special regulatory requirements.

The RCVS recommends spacing of approximately one-quarter mile between rail crossings.

Prioritization & Phasing

As it is infeasible to construct all desired crossings at one time, the proposed crossings should be prioritized into groups based on an evaluation of policy goals and site-specific opportunities and constraints. In general, the prioritization goals are:

- Achieve roughly half-mile spacing across the whole corridor, then focus on quarter-mile spacing.
- Close significant gaps in crossings.
- Serve higher-demand areas and facilities.
- Improve access to beaches, commercial/civic areas, and transportation networks.
- Emphasize projects with higher feasibility and/or lower cost of implementation.
- Provide equity among communities with respect to the total number of crossings, as well as the overall level of investment.

Rail Corridor Crossing Locations

Consistent with the quarter-mile spacing recommended by the *Rail Corridor Crossing Policy,* the *RCVS* envisions a total of 21 crossings spanning the six-mile coastal corridor. Figure 13 and Table 1 show this corridorwide vision, which consists of:

- Eight existing crossings, most of which are recommended for additional pedestrian/ bicycle improvements (Table 2).
- Three crossings in progress: one in construction by SANDAG (San Elijo Gateway) and two in the planning and design stages by the City (El Portal Street and Verdi Avenue, Table 3).
- Ten new crossings to achieve roughly quarter-mile spacing (Table 3).

All new crossing projects and associated cost estimates include roadway crossings of the Coast Highway 101 and Vulcan Avenue/San Elijo Avenue corridors.

Crossing Type: At-Grade vs. Grade-Separated

For new crossings, the specific type—at-grade or grade-separated—is not yet identified due to the number of site-specific conditions and constraints at each location. Each crossing project should be developed using a context-sensitive design process that considers specific needs and develops a range of options for each location.

Recommended Prioritization & Phasing of New Crossings

The CMLWG developed recommendations for the prioritization and phasing of proposed new crossings, shown in Table 3. In accordance with the policy goal to provide equity among communities, the CMLWG categorized its phasing recommendations into independent north and south sections—with each crossing's recommended phase representing its relative priority within that section.

The CMLWG recommended phases are:

- **North:**
  - Phase 1A: Sanford Street/Jupiter Street
  - Phase 1B: Phoebe Street/East Glaucus Street
  - Phase 1C: Marcheta Street/Orpheus Avenue
  - Phase 1D: Grandview Street/Hillcrest Drive
  - Phase 1E: Daphne Street/Basil Street
  - Phase 2: A Street/Sunset Drive
  - Phase 3: Bishop's Gate Road
- **South:**
  - Phase 1: Birmingham Drive
  - Phase 2: H Street/I Street
  - Phase 3: Norfolk Drive/Dublin Drive

Figure 13: The rail corridor crossing vision is a system of 21 crossings spanning the six-mile corridor, including three new crossings in progress and ten new crossings proposed.

NOTE: Table 1 is a simplified project list. The Appendix contains a detailed project list with descriptions.

Table 1: Overall Rail Corridor Crossing Vision

Community & Location		Post Mile[1]	Proposed Improvement Type	High-Level Cost Estimate Range[2]
Leucadia	**La Costa Ave**	0.0	Existing Crossing – Improvements Proposed	$120k - $150k
	Bishop's Gate Rd	0.3	New Crossing	$3m - $10.5m
	Grandview St/Hillcrest Dr	0.5	New Crossing	$2.6m - $9.6m
	Sanford St or Jupiter St	0.7 or 0.8	New Crossing	$2.8m - $13.7m
	Phoebe St or E Glaucus St	1.0 or 1.1	New Crossing	$3.1m - $13.8m
	Leucadia Blvd	1.3	Existing Crossing – Improvements Proposed Quiet Zone Improvements	$855k – $1.6m
	Daphne St or Basil St	1.5 or 1.7	New Crossing	$3.1m - $13.8m
Old Encinitas	**El Portal St**	1.9	New Crossing – In Progress	*N/A (Fully Funded)*
	Marcheta St/Orpheus Ave	2.1	New Crossing	$3m - $10.5m
	A St/Sunset Dr	2.4	New Crossing	$3m - $13.8m
	Encinitas Blvd	2.5	Crossing Improvement	$50k - $100k
	Encinitas Station	2.6	Quiet Zone Improvements	$1.8m - $3m *(3 Crossings as 1 Quiet Zone Project)*
	D St	2.7	Quiet Zone Improvements	
	E St	2.8	Quiet Zone Improvements	
	H St or I St	3.1 or 3.2	New Crossing	$3.1m - $14.8m
Cardiff	**Santa Fe Drive**	3.4	Existing Crossing	*N/A (Existing)*
	Verdi Ave	4.0	New Undercrossing – In Progress	$6.0m - $12.1m
	Birmingham Dr	4.5	New Crossing	$3.4m - $14m
	Chesterfield Dr	4.7	Existing Crossing – Improvements Proposed	$25k - $50K
	Norfolk Dr or Dublin Dr	4.8 or 4.9	New Crossing	$3.4m - $14.3m
	San Elijo Gateway	6.0	New Crossing – In Progress	*N/A (Fully Funded)*
TOTAL HIGH-LEVEL COST ESTIMATE RANGE				**$33m - $146m**

[1] Crossing locations are listed from north to south by their linear position along the rail corridor, with La Costa Avenue at Mile 0.0 and the Solana Beach city limit at Mile 6.0.

[2] "High-level" cost estimates represent a range of probable costs based on the crossing type (at-grade or grade-separated) combined with rough dimensions and quantities. Future phases of project development will refine these estimates through site-specific engineering.

NOTE: Table 2 is a simplified project list. The Appendix contains a detailed project list with descriptions.

Table 2: Rail Corridor Proposed Improvements to Existing Crossings

Location	Post Mile[1]	Improvement Type	Phase	High-Level Cost Estimate Range[2]
La Costa Ave	0.0	New/widened sidewalks and traffic calming	1	$120k - $150k
Leucadia Blvd[3]	1.3	New sidewalk and crossing of Coast Highway 101[3]	1	$275k - $365k
Encinitas Blvd	2.5	Upgrade to protected bicycle lanes	1	$50k - $100k
Chesterfield Dr[3]	4.7	New crossing of Coast Highway 101[3]	1	$25k - $50K
TOTAL HIGH-LEVEL COST ESTIMATE RANGE				**$470k - $665k**

[1] Crossing locations are listed from north to south by their linear position along the rail corridor, with La Costa Avenue at Mile 0.0 and the Solana Beach city limit at Mile 6.0.

[2] "High-level" cost estimates represent a range of probable costs based on the crossing type (at-grade or grade-separated) combined with rough dimensions and quantities. Future phases of project development will refine these estimates through site-specific engineering.

[3] Several regulatory challenges may limit the feasibility of proposed improvements at Leucadia Boulevard and Chesterfield Drive, including potential conflicts with improvements required to achieve quiet zone status.

NOTE: Table 3 is a simplified project list. The Appendix contains a detailed project list with descriptions.

Table 3: Rail Corridor Proposed New Crossings

	Community & Location	Post Mile[1]	Improvement Type	Phase[2]	High-Level Cost Estimate Range[3]
North[2]	**Bishop's Gate Rd**	0.3	New Rail Crossing	3	$3m - $10.5m
	Grandview St/Hillcrest Dr	0.5	New Rail Crossing	1D	$2.6m - $9.6m
	Sanford St or Jupiter St	0.7 or 0.8	New Rail Crossing	1A	$2.8m - $13.7m
	Phoebe St or E Glaucus St	1.0 or 1.1	New Rail Crossing	1B	$3.1m - $13.8m
	Daphne St or Basil St	1.5 or 1.7	New Rail Crossing	1E	$3.1m - $13.8m
	El Portal St	1.9	New Rail Crossing – In Progress	*In Progress*	*Fully Funded*
	Marcheta St/Orpheus Ave	2.1	New Rail Crossing	1C	$3m - $10.5m
	A St/Sunset Dr	2.4	New Rail Crossing	2	$3m - $13.8m
South[2]	**H St or I St**	3.1 or 3.2	New Rail Crossing	2	$3.1m - $14.8m
	Verdi Ave	4.0	New Rail Crossing – In Progress	*In Progress*	$6.0m - $12.1m
	Birmingham Dr	4.5	New Rail Crossing	1	$3.4m - $14m
	Norfolk Dr or Dublin Dr	4.8 or 4.9	New Rail Crossing	3	$3.4m - $14.3m
	San Elijo Gateway	6.0	New Rail Crossing – In Progress	*In Progress*	*Fully Funded*
TOTAL HIGH-LEVEL COST ESTIMATE RANGE					**$30m - $141m**

[1] Crossing locations are listed from north to south by their linear position along the rail corridor, with La Costa Avenue at Mile 0.0 and the Solana Beach city limit at Mile 6.0.

[2] The CMLWG categorized its phasing recommendations into north and south sections, with each crossing's recommended phase representing its relative priority within that section.

[3] "High-level" cost estimates represent a range of probable costs based on the crossing type (at-grade or grade-separated) combined with rough dimensions and quantities. Future phases of project development will refine these estimates through site-specific engineering.

Citywide Quiet Zone

A quieter rail corridor is a key component of the *RCVS* recommendations.

Quiet Zone Basics

A "quiet zone" is a section of a rail line in which train horns are *not* routinely sounded when approaching at-grade crossings. Because train horns may still be sounded in emergency situations as determined by the train operator—and because quiet zones do not eliminate train bells at crossings—quiet zones may be more accurately described as "reduced noise zones."

Quiet zones require robust safety measures near at-grade crossings such as flashing lights, "quad" gates covering all traffic lanes, and center medians. The appendix contains *Quiet Zone 101,* a general guide to quiet zone requirements and implementation.

Proposed Improvements

There are five existing at-grade rail crossings in Encinitas:

- Leucadia Boulevard
- Encinitas Station
- D Street (Figure 14)
- E Street
- Chesterfield Drive

To achieve citywide quiet zone status, the *RCVS* recommends new safety improvements at all at-grade crossings except Chesterfield Drive—where quiet zone improvements are already in progress via the San Elijo Lagoon Double Track Project, expected to be complete in 2020.

Table 4 is a project list summarizing the proposed improvements. Figure 15 shows examples of typical quiet zone treatments that have been installed in similar locations.

Figure 14: The existing at-grade crossing at D Street will require additional safety improvements to achieve quiet zone status. (Caltrans)

Table 4: Quiet Zone Proposed Project List

Location	Description[1]	High-Level Cost Estimate Range[2]
Leucadia Blvd	Supplemental safety measures including quad gates	$580k - $1.2m
Encinitas Station **D St** **E St**	Supplemental safety measures including pedestrian crossing with signal gates and flashers at Encinitas Station, quad gates at D Street, and quad gates at E Street	$1.8m - $3m *(3 Crossings as 1 Quiet Zone Project)*
Chesterfield Dr	Supplemental safety measures in progress via San Elijo Lagoon Double Track Project	*N/A (Fully Funded)*
TOTAL HIGH-LEVEL COST ESTIMATE RANGE		**$2.4m - $4.2m**

[1] The specific supplemental safety measures listed are based on preliminary analysis, and are subject to change as a result of further project development including additional consultation with regulatory agencies.

[2] "High-level" cost estimates represent a range of probable costs based on rough dimensions and quantities. Future phases of project development will refine these estimates through site-specific engineering.

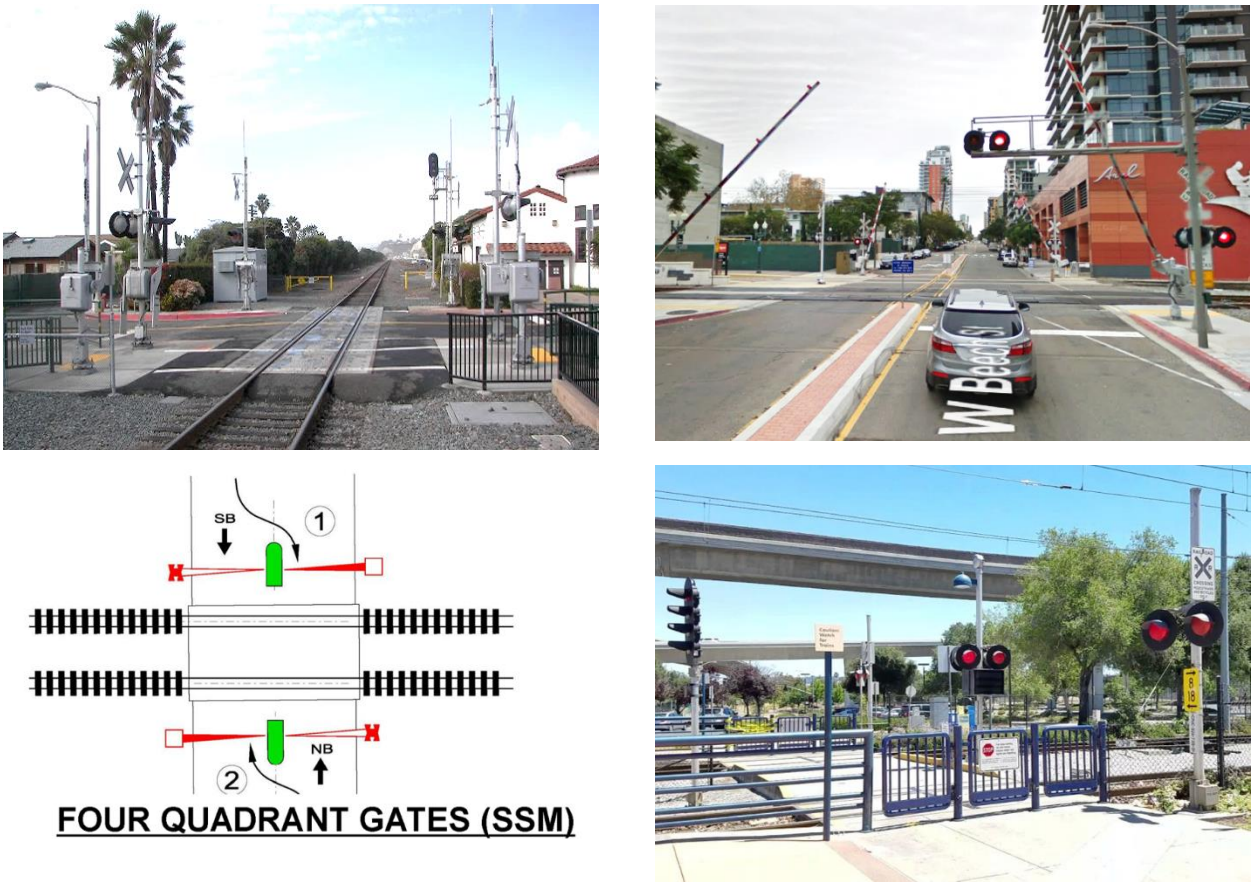

Figure 15: Typical quiet zone supplemental safety measures include (clockwise, from top left): quad gates, quad gates with raised median, pedestrian gates, and a quad gate schematic. (Caltrans; Google)

Traffic Calming

The *RCVS* identified complementary opportunities for traffic calming to reduce traffic speeds, promote pedestrian and bicycle usage, and preserve community character.

The Vulcan Avenue and San Elijo Avenue corridor is parallel to and east of the rail right-of-way. It is a major north-south circulation route for a broad mix of automobiles, cyclists, and pedestrians. The community engagement process identified a need for traffic calming along much of this corridor, and particularly at two locations:

- La Costa Avenue
- Sunset Avenue

These projects are listed in Table 5 and shown in Figure 19 and Figure 20 at the end of this section.

Coastal Rail Trail & Multi-Use Paths

The *ATP* is developing recommendations for a citywide bicycle and pedestrian network that will create better separation between cyclists, pedestrians, and automobiles (Figure 16). To align the *RCVS* and *ATP*, the CMLWG and stakeholders identified a set of active transportation projects for inclusion in both studies that provide critical north-south connectivity in the rail corridor.

These proposed improvements fall into three categories:

- Coastal Rail Trail location
- Coastal Rail Trail design recommendations
- Other multi-use paths

Figure 16: The RCVS and ATP active transportation recommendations will create better separation between cyclists and automobiles, including on Coast Highway 101 in Cardiff. (Caltrans)

Coastal Rail Trail Location

The Coastal Rail Trail is a SANDAG-led project to create a continuous, 44-mile bicycle route between Oceanside and downtown San Diego, roughly parallel to the LOSSAN Rail Corridor. The route is partially completed, with the segment from Santa Fe Drive to Chesterfield Drive currently in design. Other segments in Encinitas are planned but not funded.

The CMLWG developed the following recommendations for the location of the Coastal Rail Trail in Encinitas for SANDAG to consider:

- In general, a multi-use path is preferred on each side of the railroad tracks: one led by SANDAG to be designated the Coastal Rail Trail, and the second led by the City.
- If only one side is feasible, the east side is preferred as the Coastal Rail Trail.
- The west side is an acceptable alternative if the east side is infeasible.

The City will collaborate with SANDAG and NCTD to determine design feasibility and implement these new trails.

Coastal Rail Trail Design Recommendations

The CMLWG developed the following design recommendations for SANDAG's consideration as the Coastal Rail Trail projects move forward:

- **Fence:**
  - Keep it as close to the tracks as possible throughout the corridor.
  - Keep it as low and unobtrusive and natural as possible throughout the corridor.
- **Design Input:** Provide significant public outreach, allowing input and review from community on all phases of the design process (initial concept, 30%, 60%, 90%, and final construction documents).
- **Material:**
  - Colored concrete with design enhancements (finishes and textures).
  - Include decomposed granite path for pedestrians in addition to concrete path where feasible.
  - Enhance the trail with landscaping and urban design elements.
  - Provide infrastructure to allow for irrigation and lighting.
  - Use of reclaimed water and other sustainable design features wherever possible.
- **Width:** 12 feet is preferred for the paved multi-use bike path and no center stripe.

Other Multi-Use Paths

In addition to the Coastal Rail Trail and the second multi-use path in Leucadia, another multi-use path west of Coast Highway 101 in Cardiff would enhance connectivity between the rail crossings and along the north-south corridor.

The CMLWG and stakeholders developed these projects—listed in Table 6 and shown in Figure 19 and Figure 20 at the end of this section—in close coordination with the *ATP* to ensure seamless integration with planned citywide bicycle and pedestrian networks.

Table 5: Traffic Calming Proposed Project List

Name & Location	Description
Vulcan Ave from La Costa Ave to Encinitas Blvd	Traffic calming and safety improvements along Vulcan Ave to reduce traffic speeds and improve pedestrian crossings.
San Elijo Ave from Santa Fe Dr to Manchester Ave	Traffic calming and safety improvements along San Elijo Ave to reduce traffic speeds and improve pedestrian crossings.
Vulcan Ave at La Costa Ave	Traffic calming and safety improvements.
Sunset Dr at Vulcan Ave	Traffic calming and safety improvements.

Table 6: Coastal Rail Trail & Multi-Use Paths Proposed Project List

Name & Location	Description	Length (Miles)
Vulcan North Multi-Use Paths	3.8 miles of multi-use paths in Leucadia on the east and west sides of the railroad tracks.	3.8
Encinitas Boulevard/Vulcan Avenue Intersection	→ **Near Term:** At-grade crossing for cyclists and pedestrians such as a diagonal “scramble” crossing or protected “Danish intersection” (Figure 17). → **Long Term:** Two bicycle/pedestrian bridges crossing the intersection on the south and west sides (Figure 17).	-
Vulcan South Multi-Use Path	1.0 mile of multi-use paths in Old Encinitas along Vulcan Avenue.	1.0
Coastal Rail Trail Cardiff	1.4 miles of multi-use paths between Santa Fe Drive and Chesterfield Drive east of the railroad tracks. In progress by SANDAG.	1.4
Coast Highway 101 West Bluff Multi-Use Path	1.7 miles of multi-use paths and 0.4 miles of sidewalks on the west side of Coast Highway 101 in Cardiff.	2.2

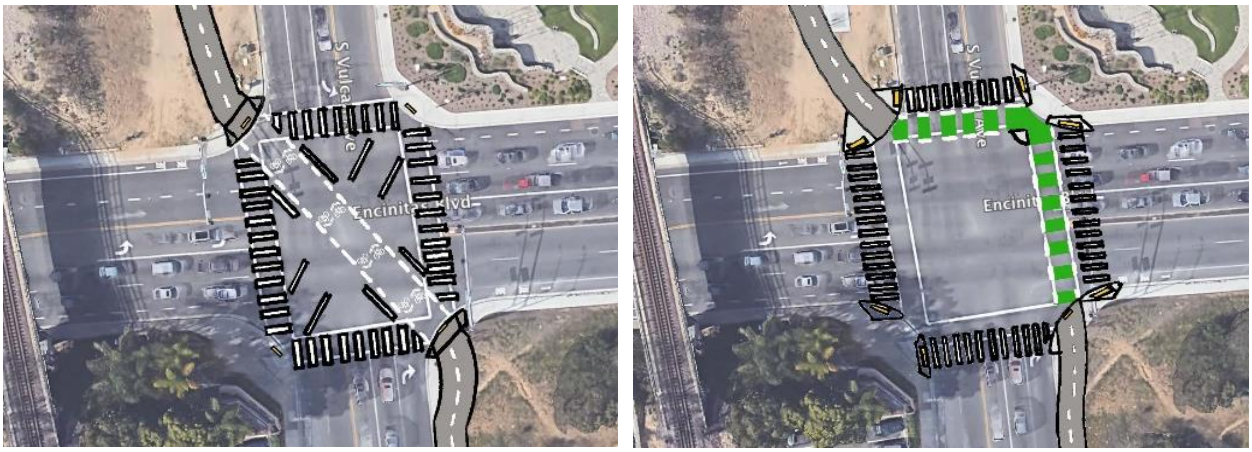

Figure 17: The proposed near-term improvement options for the Vulcan Avenue multi-use path at the intersection of Encinitas Boulevard include a diagonal "scramble" crossing (left) or a “Danish intersection” crossing (right).

Figure 18: The proposed long-term improvement for the Vulcan Avenue multi-use path at the intersection of Encinitas Boulevard is a set of bridges separating cyclists and pedestrians from motorized traffic.

Figure 19: Proposed Improvements, North. Leucadia features a system of rail corridor crossings connected by the Coastal Rail Trail and a second multi-use path on opposite sides of the railroad tracks.

Figure 20: Proposed Improvements, South. Cardiff improvements include the Coastal Rail Trail east of the railroad tracks and a multi-use path along the coastal bluff west of Coast Highway 101.

Rail Safety Education

Injuries and fatalities near railroads are preventable problems. Consistent training and reinforcement will help make safe behavior part of our culture and daily routines.

Operation Lifesaver is a nonprofit public safety education and awareness organization dedicated to reducing collisions, fatalities, and injuries at highway-rail crossings and trespassing on or near railroad tracks. They are the recognized leader in providing public safety education and ending deaths and injuries due to trespassing and collisions on tracks.

The Operation Lifesaver website contains a large library of free brochures, safety tips, videos, and other educational materials for audiences of all ages. The materials are divided into sections based on the intended audience:

- Pre-Kindergarten - 2nd Grade
- 3rd Grade - 5th Grade
- 6th Grade - 8th Grade
- 9th Grade - 12th Grade
- New Drivers
- General Adults
- Professional Drivers
- School Bus Drivers

Shown in Figure 21, the site is available at: https://oli.org/education-materials.

The City has conducted the following outreach activities related to rail safety education, and will consider delivering it on an annual basis:

- Email to school administrators for further distribution to parents and students
- Email to the City's electronic contact database
- Inclusion in the City Manager's periodic newsletter
- Creation of a dedicated page on the City website

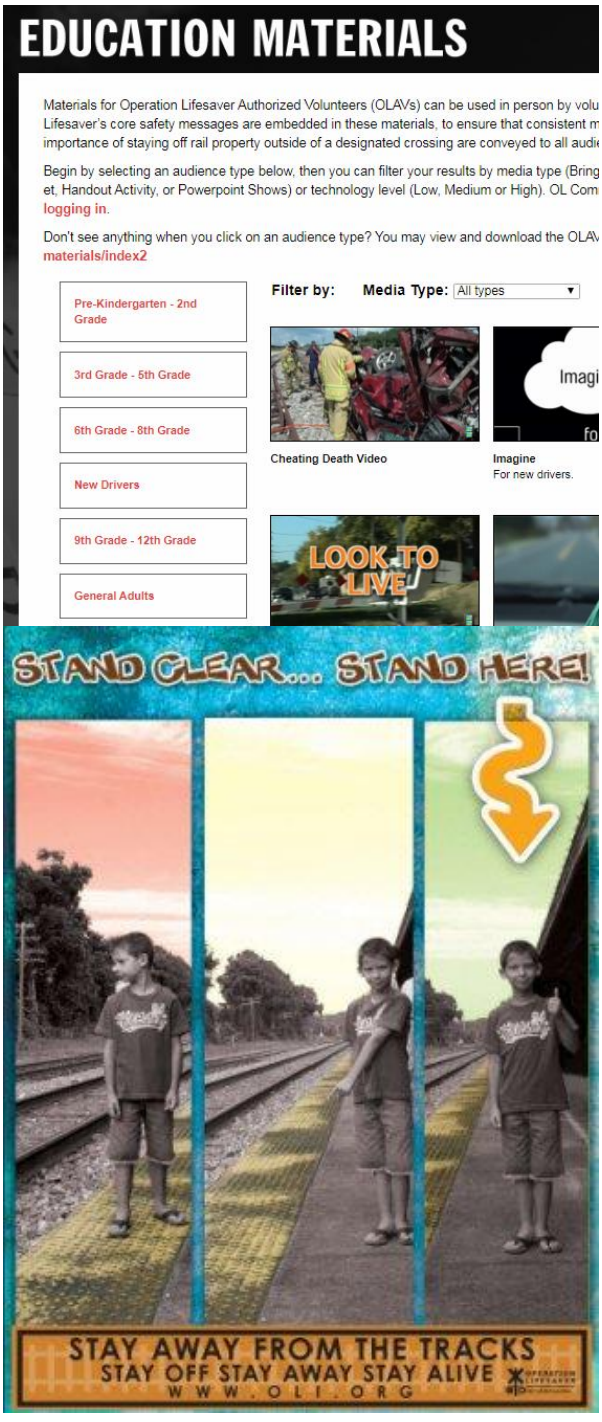

Figure 21: The Operation Lifesaver website contains a library of free educational materials.

Next Steps: Implementation

The next phases of project development are listed below for each category of recommended improvements.

Rail Corridor Crossings

The rail corridor crossing projects are divided into multiple phases due to the time and cost required to implement the full vision. The following actions are recommended to continue development of the first-phase projects.

Improvements to Existing Crossings

There are four existing crossing locations identified for additional pedestrian and bicycle improvements: La Costa Avenue, Leucadia Boulevard, Encinitas Boulevard, and Chesterfield Drive. The next step recommended for project development is:

- → Further project development and design of all four locations by working with the community and relevant agencies and creating design concepts to determine feasibility.

New Crossings

The *RCVS* envisions ten new crossings for pedestrians and bicycles to achieve roughly quarter-mile spacing throughout the corridor. The recommended next steps for the first-phase crossings are listed below by community.

Leucadia & Old Encinitas

The El Portal Street crossing is not included in the list below because it is already in design and funded through construction.

Sanford Street/Jupiter Street (in Progress)

Following construction of the Verdi Avenue crossing in Cardiff, the CMLWG identified the proposed new crossing at Sanford Street/Jupiter Street as the next-highest priority (Phase 1A).

Other Leucadia & Old Encinitas Crossings

Other new first-phase crossings in Leucadia and Old Encinitas, in order of CMLWG priority, are:

- → Phase 1B: Phoebe Street/East Glaucus Street
- → Phase 1C: Marcheta Street/Orpheus Avenue
- → Phase 1D: Grandview Street/Hillcrest Drive
- → Phase 1E: Daphne Street/Basil Street

The next recommended step to develop these projects is:

- → Further project development of all five locations by working with the community and relevant agencies; creating design concepts to determine feasibility; and identifying the preferred crossing type (at-grade or grade-separated). The City is currently applying for grant funding.

Cardiff

Due to the imminent construction of the Coastal Rail Trail in Cardiff and its associated fence, the CMLWG recommended Verdi Avenue as the highest-priority new crossing.

Verdi Avenue (in Progress)

- → Complete the final design of the concept plan that the CMLWG developed during the *RCVS*.
- → Pursue construction funding.

Birmingham Drive (Phase 1)

In accordance with the equity considerations in the Rail Corridor Crossing Policy, this project should begin after Leucadia receives an equitable share of crossing(s) constructed.

- → Further project development by working with the community and relevant agencies; creating design concepts to determine feasibility; and identifying the preferred crossing type (at-grade or grade-separated).

Citywide Quiet Zone

A key goal of the *RCVS* is to implement a citywide quiet zone for trains. The next recommended steps are:

- → Brief the City Council to receive direction and develop the optimal improvement strategy based on regulatory requirements.
- → Secure funding for design, permitting, and construction of the required supplemental safety measures.
- → Initiate and follow the required regulatory process, including notifications to regulatory agencies.
- → Proceed with final design, construction, and implementation of the quiet zone.

Traffic Calming

The Vulcan Avenue and San Elijo Avenue corridor is a major north-south circulation route for a broad mix of automobiles, cyclists, and pedestrians. The community engagement process identified a need for traffic calming along much of this corridor, and particularly at two locations: La Costa Avenue and Sunset Avenue.

The next recommended step to implement traffic calming measures along this corridor is:

- → Initiate project study report process, including conducting traffic studies to assess appropriate traffic calming solutions and identify a strategy for implementation.

Coastal Rail Trail & Multi-Use Paths

Coastal Rail Trail

The Coastal Rail Trail is a SANDAG-led project, with the segment from Santa Fe Drive to Chesterfield Drive in construction. Project development is ongoing for segments north of Santa Fe Drive, including:

- → SANDAG—in collaboration with the City of Encinitas, NCTD, California Coastal Commission (CCC), and other project partners—develop a feasibility and implementation plan for the remaining Coastal Rail Trail segments in Encinitas. City to partner with SANDAG to apply for grant funding in coordination with NCTD and CCC.
- → City to work with SANDAG to ensure consideration of the CMLWG design recommendations and location preferences.

Other Multi-Use Paths

The next recommended steps to implement the proposed multi-use paths are:

- → Pursue funding opportunities to advance these projects through design and construction.
- → Begin planning and design in close coordination with SANDAG and NCTD.

Taken together, the *RCVS* proposed improvements comprise an integrated, balanced vision that was developed through an extensive, community-based process. The suite of recommended projects will improve mobility and quality of life in the Encinitas coastal rail corridor in the near term and for decades to come.