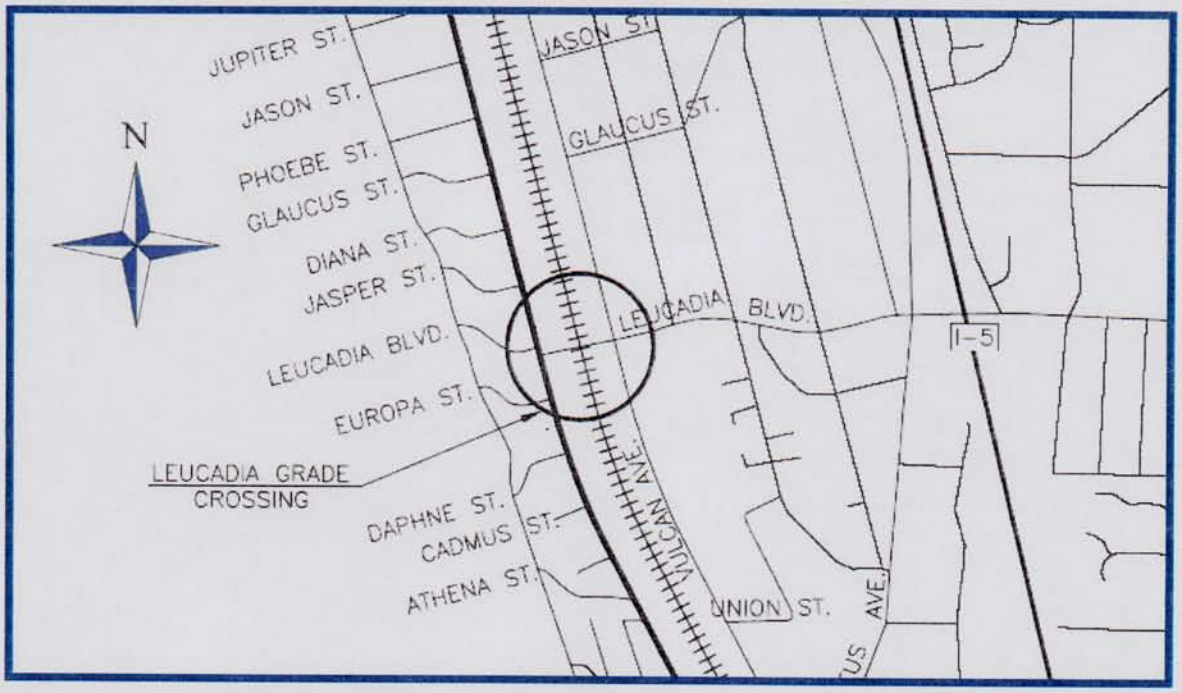
PROJECT STUDY REPORT



Leucadia Boulevard and Rail Corridor Grade Separation Study

On Leucadia Boulevard Between Vulcan Avenue and North Coast Highway 101

PREPARED BY:

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This Project Study Report has been prepared under the direction of the following Registered Engineer. The registered Civil Engineer attests to the technical information contained therein and has judged the qualifications of any technical specialists providing engineering data upon which recommendations, conclusions, and decisions are based.

Kenneth T. Steele
REGISTERED CIVIL ENGINEER

2/28/06
DATE

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1.0 INTRODUCTION

This project study report is prepared to evaluate various conceptual alternatives to grade separate the intersection of Leucadia Boulevard from the North County Transit District (NCTD) railroad tracks. The proposed grade separation is intended to improve the current and future vehicular and rail traffic operations as well enhance the safety of the intersection for the motorized and non-motorized public. A series of grade separation alternatives have been evaluated where the railroad tracks are raised over or lowered under Leucadia Boulevard. The costs for these alternatives range from $88 million to $160 million. Detailed descriptions of these alternatives are listed in Section 4 of this Project Study Report (PSR).

This project was initiated as a result of concerns about the rail grade crossing on Leucadia Boulevard. A memorandum of understanding (MOU) developed between the City of Encinitas and the North County Transit District (NCTD) in 2002 supported the evaluation and other future enhancements along the NCTD rail corridor within the City limits. Funding for the Leucadia Grade Separation Project Study Report (PSR) was made available through the California's Transportation Congestion Relief Fund. An application was filed with the California Public Utilities Commission (CPUC) for the CPUC's FY 2005 and 2006 Grade Separation Priority List requesting funding for grade separation of the intersection. Funding for construction of the grade separation has not yet been secured.

2.0 BACKGROUND

Leucadia Boulevard is currently a two lane east-west arterial roadway located in the City of Encinitas. The roadway runs from El Camino Real to Coast Highway 101 providing a major east-west linkage. The roadway provides a regional and local traffic route from eastern suburban areas of the city and adjacent northern San Diego County cities to coastal recreational and business areas on or adjacent to North Coast Highway 101 (see Exhibit 1). The roadway crosses the rail line at an existing at-grade crossing at the Los Angeles to San Diego and San Luis Obispo (LOSSAN) Rail Corridor milemarker 236.5 (CPUC #106-236.5 and USDOT #26-827-V). This segment of rail corridor is located between Vulcan Avenue and North Coast Highway 101. The

Leucadia Boulevard At-Grade Crossing

intersections of Leucadia Boulevard with Vulcan Avenue and North Coast Highway 101 are signalized. North Coast Highway 101 serves as a local and regional road parallel to the rail corridor and Interstate 5.

At the at-grade crossing intersection, Leucadia Boulevard contains four lanes which include two through traffic movements and dedicated left turn lanes to Vulcan Avenue and North Coast Highway 101. This segment of Leucadia Boulevard contains a severe crest at the railroad track then drops in elevations by approximately 8 feet down to Coast Highway 101 (See Exhibit 2).

The LOSSAN Rail Corridor is a major transportation resource in southern California utilized by Amtrak for intercity passenger rail service, the North County Transit District for commuter rail services, and Burlington Northern Santa Fe for freight rail. The LOSSAN Rail Corridor is second busiest passenger rail corridor in the United States, providing passenger and freight rail services within and between several of California's most populous cities and counties. This rail corridor is the only existing rail link between Los Angeles and San Diego.

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EXHIBIT 1
LEUCADIA BLVD AND RAIL CORRIDOR
GRADE SEPARATION STUDY
PROJECT VICINITY MAP

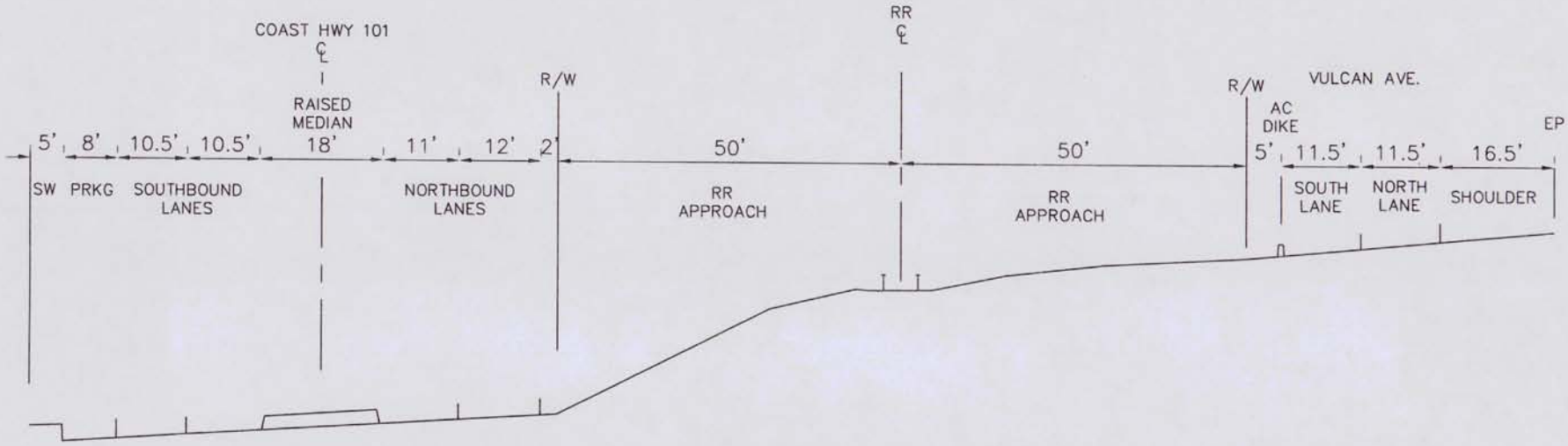

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EXHIBIT 2
EXISTING CROSS SECTION LEUCADIA
BLVD AT RAILROAD CROSSING

3.0 PROJECT NEED

3.1 Traffic Circulation

Leucadia Boulevard at Vulcan and Coast Hwy 101

The close proximity between the Vulcan Avenue and North Coast Highway 101 roadway alignments (approximately 125 feet) leaves very little storage capacity on Leucadia Boulevard between the two intersections. These conditions are exacerbated by the rail corridor, which is located between Vulcan Avenue and North Coast Highway 101. Storage capacity on Leucadia Boulevard between these two roadways is further reduced by the railroad crossing gates and warning striping which prohibit vehicles from stopping on the tracks. The at-grade rail operations disrupt vehicular and pedestrian/bicycle traffic circulation at this intersection. Furthermore, projected growth within the project area and region and the corresponding future automobile and rail traffic volumes would increase the potential for automobile/pedestrian/bicycle/rail conflicts, necessitating the need for a grade separation at this intersection. Table 3.1 summarizes existing and future rail traffic in the project area.

TABLE 3.1
EXISTING AND FUTURE RAIL TRAFFIC VOLUMES

Rail Mode and Service Provider	Average Daily Trips	
	Existing	Future
Passenger		
Amtrak	22-24	32
Coaster	26	54
Subtotal	**44-46**	**86**
Freight		
Burlington Northern Santa Fe	6-8	9-12 (dictated by market demands)
TOTAL	**50-54**	**95-98**

Source: City of Encinitas Application to the PUC for Leucadia Grade Separation. Draft EIR/EIS LOSSAN Proposed Rail Corridor Improvement Studies.

Under current conditions and by Federal Regulations, automobiles must yield to railroad operations, which utilize the railroad right-of-way that crosses Leucadia Boulevard. Such conditions frequently create lengthy vehicle queues and subsequent delays at the intersections of Leucadia Boulevard with Vulcan Avenue, the at-grade crossing of Leucadia Boulevard with the railroad, and North Coast Highway 101. Rail operations along the LOSSAN Rail Corridor (including the project area) and automobile traffic in the project area, are both projected to increase within the next 20 years. This growth in rail and vehicular traffic would further aggravate the traffic conditions in the project area. Table 3.2 outlines the existing and future traffic volumes in the project area.

TABLE 3.2
EXISTING AND FUTURE TRAFFIC VOLUMES

Roadway Segment	Existing ADT (2005)	Future ADT (2030)
North Coast Highway 101, north of Leucadia Boulevard	20,000	28,000
North Coast Highway 101, south of Leucadia Boulevard	19,000	24,000
Vulcan Avenue, north of Leucadia Boulevard	5,000	5,000
Vulcan Avenue, south of Leucadia Boulevard	6,000	9,000
Leucadia Boulevard at Vulcan and North Coast Highway 101	13,000	17,000

Source: City of Encinitas Genera Plan, January 2005.

3.2 Grade Break Near the Tracks

The severe grade break (high crest) at the Leucadia Boulevard Intersection restricts vehicles with low ground clearances. Although warning signs are posted to advise of this condition, several low bed trucks with trailers and other vehicles have been stuck over the tracks.

Warning signs for severe grade break

Automobiles, pedestrians, bicyclists and trains travel through this at grade crossing. Despite all of the CPUC approved safety precautions placed at at-grade crossings, these crossings pose safety concerns due to the intersection of various modes of transportation at a common geographical point.

3.3 Pedestrian and Bicycle Access

Leucadia Boulevard At-Grade Crossing

Pedestrian crossings of the railroad corridor within Encinitas are limited to the sidewalks or pathways adjacent to vehicle crossings. The limited number of CPUC-approved automobile/pedestrian crossings of the railroad right-of-way hinders east-west pedestrian movements which results in trespassing of the railroad right-of-way by pedestrians who cross tracks to reach nearby coastal recreation areas, businesses and other pedestrian thoroughfares. Such trespassing of the railroad right-of-way is monitored and prosecuted by the San Diego Sheriff's Department. Pedestrians also utilize area street system for informal recreational endeavors such as walking, jogging and mountain biking.

A pedestrian and bicycle count on a sample weekday and weekend was conducted during the study. The results are listed in Table 3.3 below. As indicated in this table, this area is frequently used by pedestrians and bicyclists to access the beach and other facilities. According to staff at the City of Encinitas, the volume of pedestrian and bicyclist crossings increase during the summer months because of the beach facilities in the area.

TABLE 3.3
LEUCADIA AT VULCAN AND NORTH COAST HIGHWAY 101
PEDESTRIAN AND BICYCLE COUNTS

Date of Count	Time Period	Westbound		Eastbound	
		Pedestrians	Bikes	Pedestrians	Bikes
Sat – Feb 25, 2005	6:00 AM – 6:00 PM	137	66	137	86
Wed – April 6, 2005	6:00 AM – 6:00 PM	103	54	95	45

Source: Actual counts conducted by Willdan, April 2005.

Automobile and pedestrian accident history at the Leucadia Boulevard at-grade crossing of the railroad corridor is provided between 1990 and 2003 in Table 3.4.

TABLE 3.4
AUTOMOBILE AND PEDESTRIAN ACCIDENT HISTORY
1990-2003

Date	Accident Type	Injury Report
October 3, 1990	Train vs. Truck-Trailer	0 fatalities, 13 injuries
August 1, 1991	Train vs. Truck-Trailer	0 fatalities, 0 injuries
September 15, 1992	Train vs. Other (not specified)	1 fatality, 0 injuries
October 23, 1996	Train vs. Semi Truck	0 fatalities, injuries unknown
April 2, 1997	Train vs. Pedestrian	1 fatality (suspected suicide)
August 27, 1997	Train vs. Automobile	0 fatalities, injuries unknown
February 6, 1998	Train vs. Pedestrian	1 fatality (suspected suicide)
July 7, 2001	Train vs. Auto Carrier	0 fatalities, 0 injuries
July 31, 2001	Train vs. Pedestrian	1 fatality (accidental death)
November 2, 2002	Train vs. Pedestrian	1 fatality (suspected suicide)
January 7, 2003	Train vs. Automobile	0 fatalities, 0 Injuries
April 22, 2003	Train vs. Pedestrian	1 fatality (suspected suicide)

Sources: San Diego County Sheriff Department.
National Transportation Safety Board Highway Accident Report, May 2, 1995.

3.4 Coastal Access

As described above, the existing at-grade crossing at Leucadia Boulevard impedes movements of automobiles, bicyclists and pedestrians through the railroad right-of-way. Several of these trips are heading westbound with a planned destination of coastal recreational facilities. The existing coastal access is somewhat constrained by the railroad corridor.

Construction of a grade separation at Leucadia Boulevard would address the operational and safety needs of this intersection by eliminating automobile, pedestrian and bicyclist conflicts with railroad operations. Furthermore, the construction of a proposed grade separation and associated improvements such as additional pedestrian and bicycle accommodations would result in enhanced coastal access.

4.0 PROJECT PURPOSE

The purpose of the Leucadia Boulevard Grade Separation Project is to improve safety and traffic conditions at the Leucadia Boulevard road crossing in order to accommodate existing and future automobile operations, improve pedestrian and bicycle access by eliminating the at-grade road crossing of the railroad corridor, and provide for railroad capacity enhancements within the project area. Additionally, a grade-separated road crossing would improve safety conditions by decreasing accident potential in the project area.

The implementation of the Leucadia Boulevard and Rail Corridor Grade Separation Study Project (proposed project) would enhance vehicular pedestrian/bicyclist and operations and safety, provide improved coastal access in the general vicinity of the project area, and improve goods and passenger movement. The project is consistent with adopted plans that recommend grade separations, including the LOSSAN Corridor Strategic Plan and the California State Rail Plan.

5.0 ALTERNATIVES

An alternatives constraint analysis was conducted in the early stages of the project in an effort to narrow down the number of feasible alternatives to be evaluated consistent with the amount of funding resources available for this study. A copy of this report is included under "Alternative Constraint Analysis". This study identified three alternatives that involved the raising and lowering of the tracks over and under Leucadia Boulevard respectively. These alternatives are listed as follows:

1. Railroad Underpass at Leucadia Boulevard (Trench)
2. Railroad Overpass at Leucadia Boulevard (Berm and Bridge)
3. Railroad tracks going under the One-Way Couplet

Alternatives proposing to lower or raise Leucadia Boulevard under or over the tracks

were considered to have significant impacts to the surrounding businesses and Leucadia Roadside Park and were therefore dropped from further analysis under this study. For more details, see the "Alternatives Constraints Analysis".

In addition to the grade separation alternatives, this PSR includes an evaluation of at-grade improvements that can be implemented at much lower costs. Although these at-grade improvements do not meet the full purpose and need of this project, they do provide some enhancements for pedestrian and vehicular traffic circulation and safety and can be considered an interim measure until funding for the grade separation can be secured. A detailed description of these at-grade improvements is provided in this PSR.

An environmental constraints analysis was also conducted to identify potential impacts of these conceptual alternatives. A copy of that study is included under "Environmental Constraints Analysis".

The study also included two public workshops that were held in the City of Encinitas to present the alternatives and to solicit input from the community. A summary of both of those workshops is included Under "Public Workshop Reports". A brief description of these workshops are provided later in Section 7.0 of this PSR.

5.1 Alternative 1 – Railroad Underpass at Leucadia Boulevard (Trench)

In Alternative 1, Leucadia Boulevard would remain at grade and the railroad tracks would be lowered to go under Leucadia Boulevard. The cost of this alternative is estimated at $150 million.

Roadway Features – Leucadia Boulevard would be widened to six lanes between Vulcan Avenue and North Coast Highway 101 to increase capacity and improve circulation. This would include one eastbound through/right-turn lane, one eastbound through lane, one eastbound left-turn lane, as well as a westbound left-turn lane, a westbound through/left-turn lane, and a westbound right-turn lane. The widening would extend to about 450 feet east of Vulcan Avenue to accommodate the proposed intersection configuration. The profile of Leucadia Boulevard at the railroad tracks would be adjusted to approximately 8 percent maximum grade to eliminate the severe grade break at the existing tracks. No other roadway improvements on Vulcan Avenue and North Coast Highway 101 are proposed at this time (see Conceptual Drawings Alternative 1).

Pedestrian/Bicycle Features –Bike lanes would be provided on both sides of the Leucadia Boulevard between Vulcan Avenue and North Coast Highway 101. A sidewalk would be placed only on the north side of Leucadia Boulevard in order to provide coordinated pedestrian circulation with traffic signal operations at the intersections of Leucadia Boulevard with Vulcan Avenue and North Coast Highway 101. These improvements would be coordinated with the City's future projects to add bike lanes and sidewalks within the project area.

The railroad corridor limits pedestrian and bicycle access across the railroad right-of-way. Although some pedestrians illegally cross the rail right-of-way at this time, access would be further limited with the construction of the railroad trench. Therefore, other crossing facilities would have to be implemented between La Costa Avenue, Leucadia Boulevard, and Encinitas Boulevard to accommodate pedestrian and bicycle flow. The cost of these facilities have not been included as part of this project.

A conceptual rendering of this alternative is provided in the following page.

Railroad Features – The proposed railroad trench would accommodate the existing track configuration consisting of a single track mainline as well as a future second main and a service road. The trench would be designed to include these features as well as any other facilities identified with more detailed engineering. For the purpose of this study, a minimum trench width of 55 feet is assumed, but is subject to change with more detailed analysis and engineering. The maximum width of the trench may vary based on the location of the shoofly and other facilities that may be placed within the railroad right-of-way to accommodate operations. These facilities may include drainage facilities as well as any required signal equipment and access needed along this segment of the corridor.

The horizontal footprint of the railroad trench, as measured along the NCTD railroad right-of-way, would extend from a point at its northerly limit approximately 2,993 feet south of the La Costa Avenue bridge, to a point approximately 440 feet north of the Encinitas Boulevard bridge, as measured along the railroad right-of-way, at its southerly limit. This is a total distance of approximately 1.90 linear miles (see Conceptual Drawings).

This alternative would require a temporary single-track, known as a "shoofly" during construction. The shoofly would be constructed to San Diego Northern Railway (SDNR) main line standards with new 136-pound, continuous-welded rail on concrete or wood ties. A temporary at-grade rail crossing would be constructed to facilitate the construction of the new Leucadia Boulevard grade separation structure. The shoofly would be located on the eastern side of the proposed trench. The maximum track shoofly design speed will be 90 miles per hour (MPH). Once the trench is built and the permanent track structure of concrete ties and 136-pound welded rail is in place, the track speed will be 90 MPH for passenger trains from La Costa Boulevard to Encinitas Boulevard, 80 MPH for passenger trains south of MP 237.4 and 55 MPH for freight trains.

Temporary railroad signals on the shoofly would be located adjacent to the existing westbound and eastbound intermediate signals at MP 236.8. Permanent signal locations would take into consideration the sight distance restrictions in the trench. One option would be to relocate the existing intermediate signals such that signals would be located on either side of the Leucadia Boulevard Bridge. Signals would be mounted on signal bridges that are cantilevered between the trench walls.

Clearances within the trench would adhere to SDNR standards and comply with CPUC General Order 26-D. The minimum vertical clearance within the trench would be 26

feet above the proposed top-of-rail elevation. Horizontal clearances would be a minimum of 10 feet to the side of the tracks and a minimum of 20 feet between track centerlines.

Access for routine track maintenance activities would be accommodated in the trench by the use of standard rail-mobile track machinery, as well as from a proposed service road. Routine railroad signal maintenance would be accommodated by means of vehicle access to signal equipment via the service road and a permanent stairway that leads to the walkway on the signal bridge. Signal equipment would be located on the signal bridge. Emergency access to the trench would be accommodated by stairways located at half-mile intervals.

Structural Features – Retaining walls would be required on each side of the railroad trench and must be constructed while maintaining operations on existing roadways and the temporary railroad shoofly. Given the expected trench width, live load surcharge and the available work area, likely wall types would include a soldier pile wall with tie-back anchors and shotcrete facing, a tie-back wall with shotcrete facing and a soil nail wall with shotcrete facing. These walls will be designed and constructed to accommodate loads from a crane lifting a locomotive from the tracks below if necessary. Soil nail lengths correspond to the wall height and will be placed to avoid existing utilities wherever possible. These walls would be constructed from the top down in lifts with similar construction techniques and finished product.

A new grade separated crossing bridge would be required over the trench for Leucadia Boulevard. Due to the proposed shoofly, this bridge would not be constructed over railroad traffic, therefore, cast-in-place concrete construction techniques may be utilized. The proposed bridge would be a single span cast-in-place reinforced concrete box girder structure (see Conceptual Drawings).

Based on available information, groundwater is anticipated at a depth of 10 feet below the original ground to below the bottom of the trench. Some form of dewatering would be required during construction of the trench walls and bridge. A permanent invert slab would be placed below the track section to balance hydrostatic pressure from below and control water intrusion into the track structural section. A permanent pump station would be located near the trench low point to drain the trench section of minor seepage and runoff.

Other Features – There are several considerations that need to be addressed in this alternative, including drainage and utility impacts, right-of-way requirements, and construction staging.

A conceptual drainage analysis has been conducted based on the City's current drainage improvement plans that are being developed by another consultant (see Drainage Report). Based on this analysis, an underground 84" diameter reinforced concrete pipe (RCP) would be placed adjacent to the east side of the railroad trench to capture the water flowing from the east Street A series of drainage inlets would have to be placed along Vulcan Avenue to capture the run off from the east Street This pipe would continue north alongside the trench and beyond to dispose the storm runoff into

the Batiquitos Lagoon on the north. Drainage runoff within the trench would be conveyed via either an underground system or an open ditch within the trench that will be directed to the pump station at the lowest point of the trench. The pump station would then pump the flows into the 84" diameter pipe. Existing ground water within the trench would be conveyed via a drainage system behind the walls that would drain into the drainage system within the trench.

There are several utilities within the project area that would have to be relocated in this alternative. These include overhead electrical lines, gas, water, sewer, and telephone lines.

The proposed alternative would increase the width of Leucadia Boulevard across NCTD right-of-way. In addition, the proposed drainage improvements require an easement from NCTD to install the RCP within its right-of-way.

The construction impacts for this alternative would need to be further analyzed during subsequent phases of this project. Implementation of this alternative would require an elaborate construction staging plan consisting of several phases of construction.

Compatibility with Future LOSSAN Corridor Projects – The LOSSAN Corridor Strategic Plan identified four alternatives alignments along this rail corridor. These include the no-build, at-grade with grade separations, a short cut and cover trench with grade separations and a long trench. The long trench alternative with grade separations was eliminated from further evaluation due to technical and cost considerations (LOSSAN Corridor Strategic Plan 2003). Alternative 1 is consistent with the implementation of any of the LOSSAN alternatives; however, there may be some compatibility issues at the southerly limit of this project with the proposed short trench alternative.

The limits of the open trench in Alternative 1 are based on the distance needed to gain the vertical separation at Leucadia Boulevard. The compatibility of this alternative with future track alignments proposed in the LOSSAN Corridor Strategic Plan would have to be further investigated in the subsequent phases of the design, if this alternative is selected for further analysis. At that time, a more detailed profile alignment can be generated and perhaps the plans for the continuation of the tracks south of this area can be better defined. Without detailed track profiles for the LOSSAN short trench alternative, it is difficult to predict exactly how this alternative would tie-in with that Project. Assuming that the existing grade separation at Encinitas Boulevard is to remain (i.e. with the railroad over the roadway), the elevation of the tracks north of Encinitas Boulevard need not change. In that case, Alternative 1 would not impact the LOSSAN short trench.

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Alternative 1 – Railroad Underpass at Leucadia Boulevard (Trench)

5.1 Alternative 2 – Railroad Overpass at Leucadia Boulevard (Berm and Bridge)

Under Alternative 2, Leucadia Boulevard would remain at grade and the railroad tracks would be raised to go over Leucadia Boulevard. A conceptual rendering of this alternative is provided in the following page. The estimated cost of this alternative is $88 million.

Roadway Features – The proposed Leucadia Boulevard widening between Vulcan Avenue and North Coast Highway 101 would be similar to that in Alternative 1 (see Conceptual Drawings).

Pedestrian/Bicycle Features – The pedestrian and bicycle facilities proposed on Leucadia Boulevard would be similar to those in Alternative 1.

Railroad Features – The railroad berm and bridge would include two tracks at 15-foot on center with a minimum 9 foot clearance from the center of the track to the face of the bridge barrier for a minimum width of 35 feet. The horizontal footprint of the railroad berm and bridge that would serve as an overhead grade separation would extend linearly along the NCTD railroad right-of-way, at its northerly limit from a point on the railroad approximately 283 feet north of Grandview Street's intersection with North Coast Highway 101, as measured along the railroad right-of-way, to a point, at its southerly limit, approximately 157 feet north of the intersection of Marcheta Street with North Coast Highway 101, which coincides with the intersection of Orpheus Avenue with Vulcan Avenue: a total distance of approximately 1.75 linear miles (see Conceptual Drawings).

The railroad overpass alternative would require a shoofly track as described in Alternative 1. The existing westbound and eastbound intermediate signals at MP 236.8 would best be relocated at the apex of the railroad bridge to ensure adequate sight distance in both directions.

Access to the railroad overpass for track maintenance purposes would be achieved by means of standard on-track equipment. Emergency access would be provided via the proposed walkway. Horizontal clearances on the bridge would exceed the minimums prescribed by CPUC General Order 26-D and comply with SDNR standards.

Structural Features – An underpass railroad bridge would be required over Leucadia Boulevard. This double track structure would be approximately 2,080 feet long in order to provide 16.5 feet of vertical clearance at the intersection with a maximum track grade of 1 percent. The proposed bridge would be a multi-span pre-cast, pre-stressed bulb-T girder bridge with large diameter cast-in-drilled-hole piles and multi-column bents. The bridge depth from top-of-rail to bottom of girder would be approximately 10 feet (see Conceptual Drawings).

Retaining walls would be required at the north and south approach to the bridge abutments. These walls would provide approximately 20 feet of fill between a 35-foot-wide double track section and would be designed for the earth pressures and railroad surcharge. Wall types could include conventional cast-in-place concrete cantilever, pre-cast segmental block and mechanically stabilized embankment.

Other Features – There would be impacts to the drainage system, utilities and right-of-way.

The conceptual drainage system proposed for this alternative is also based on the City's overall proposed improvements. In this alternative, the easterly storm flows could be intercepted in a similar underground conveyance system to Alternative 1 that would be placed under the railroad right-of-way adjacent to Vulcan Avenue. The surface run off from the elevated berm would be captured via a drainage system and discharged into the proposed underground system. This underground system would also run along the railroad right-of-way to be discharged into the Batiquitos Lagoon.

The relocation of some utilities would be required in this alternative. However, the impacts on existing utilities will not be as extensive as those resulting from the trench alternative.

The right-of-way impacts for this alternative would consist of the additional encroachment needed to widen Leucadia Boulevard as it crosses the NCTD right-of-way and any additional easements required for the proposed drainage modifications.

This alternative would also require considerations for phasing the construction in such a way as to minimize the impacts of construction.

There are also potential adverse visual and noise impacts along the Coastal Zone from construction of a berm and bridge.

Compatibility with Future LOSSAN Corridor Projects – Alternative 2 proposes raising the railroad onto a bridge over Leucadia Boulevard. While this is not consistent with the LOSSAN short trench alternative, it does not preclude implementation outside of these project limits. Grade separations at D and E streets south of the project should not impact the location of the beginning of the bridge to the north if Encinitas Boulevard grade separation is assumed to remain in place.

It is difficult in this phase of the project, due to grade differences, to determine how the tracks would tie into the future LOSSAN Corridor improvement without further defining the proposed rail corridor project and determining whether the Encinitas Boulevard grade separation will remain in place or would be modified in the future.

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Alternative 2 – Railroad Overpass at Leucadia Boulevard (Berm and Bridge)

5.3 Alternative 3 – Railroad tracks going under the One-Way Couplet

Alternative 3 consists of a new roadway circulation configuration with the railroad tracks going under two new street crossings. A conceptual rendering of this alternative is included in the following page. The estimated cost of this alternative is $160 million.

Roadway Features – In this alternative, Leucadia Boulevard would terminate before crossing the railroad tracks via a two-lane roundabout at the intersection of Leucadia Boulevard and Vulcan Avenue. Two new grade-separated crossings would be established at Europa and Jasper streets. Westbound traffic on Leucadia Boulevard would access North Coast Highway 101 by turning right on Vulcan Avenue and then turning left on Jasper Street (one-way crossing). Similarly, traffic on North Coast Highway 101 would access Vulcan Avenue and Leucadia Boulevard by turning onto Europa Street (one-way crossing) and then turning left on Vulcan Avenue to approach the roundabout. The new crossings would include two traffic lanes.

This alternative also proposes improvements along Vulcan Avenue and North Coast Highway 101 by adding additional turn lanes. A small sliver of NCTD right-of-way (approximately 4 feet) along the east side of the railroad corridor adjacent to North Coast Highway 101 would be impacted by this alternative. Additional analysis would be required to determine an alternative street configuration in order to avoid encroachment into the railroad right-of-way.

Parking along North Coast Highway 101 would be eliminated between Europa and Jasper streets, and the trees along the median would be removed.

This alternative also suggests providing one-way circulation around the Leucadia Roadside Park. Traffic exiting from West Leucadia Boulevard would be restricted to right-turn only movements and would access Leucadia Boulevard via Europa Street. This reconfiguration of West Leucadia Boulevard would allow for the addition of 14 parking spaces around the park to replace some of the parking loss on North Coast Highway 101.

Pedestrian/Bicycle Features – A bike lane and sidewalk are proposed on the outer sides of Jasper and Europa streets (right side of traffic) to separate pedestrian/bicycle circulation from vehicular circulation. The placement of the sidewalks and bike lanes along Europa and Jasper Streets would provide two opportunities for pedestrians and bicyclists to safely cross over the rail within a 900-foot distance. This will become a target crossing for pedestrians and bicyclists from further distances.

The proposed bridge structures for Jasper and Europa streets include an additional 11-foot-wide area beyond the sidewalk. This feature was conceptually included so that the bridge structure can be constructed as a more rectangular structure for ease of construction. Based on recent pedestrian counts and input from the City staff, the proposed 5-foot sidewalk is adequate for the number of pedestrians that would be crossing in this area.

The City of Encinitas has recently completed its Bikeway Master Plan, which indicates that Vulcan Avenue is a popular north-south route that is used by bicyclists who prefer not to ride on busier North Coast Highway 101. These segments are being further studied by the City as they are also identified in the North 101 Corridor and Downtown Encinitas Specific Plans.

Railroad Features – The width and configuration of the railroad trench would be similar to the one in Alternative 1. The horizontal footprint of the railroad underpass trench for proposed grade-separated crossings at Jasper Street and Europa Street would extend from a northerly limit located approximately 1,657 feet south of the La Costa Avenue bridge, to its southernmost point at approximately 60 feet north of the Encinitas Boulevard bridge, as measured along the railroad right-of-way: a total approximate distance of 2.18 linear miles.

A railroad shoofly track would be constructed as described in Alternative 1. Clearances also would follow those of Alternative 1. Two temporary at-grade crossings would be constructed in this Alternative at the newly constructed bridges at Jasper and Europa streets while the trench at Leucadia Boulevard is being constructed.

The configuration of the two separate couplet bridges presents design issues with respect to the location of the permanent railroad signals. Provisions must be made to ensure that the existing westbound and eastbound intermediate signals at MP 236.8 are relocated with adequate sight distance.

Access and maintenance issues related to the one-way couplet trench alternative are identical to those of Alternative 1.

Structural Features – Retaining walls would be required on each side of the railroad trench and must be constructed while maintaining operations on existing roadways and the temporary railroad shoofly. Given the expected trench width, live load surcharge and the available work area, likely wall types include a soldier pile wall with tie-back anchors and shotcrete facing, a tie-back wall with shotcrete facing and a soil nail wall with shotcrete facing. These walls will be designed and constructed to accommodate loads from a crane lifting a locomotive from the tracks below if necessary. Tiebacks and soil nail lengths would be approximately 18 feet long. These walls would be constructed from the top down in lifts with similar construction techniques and finished product.

New grade separated crossing bridges would be required over the trench for both Europa Street and Jasper Street. Due to the proposed shoofly, these bridges would not be constructed over railroad traffic, therefore, cast-in-place concrete construction techniques may be utilized. The proposed bridges would be single span cast-in-place reinforced concrete box girder structures.

Based on available information, groundwater is anticipated at a depth of 10 feet below the original ground to below the bottom of the trench. Some form of dewatering would be required during construction of the trench walls and bridge. A permanent invert slab

would be placed below the track section to balance hydrostatic pressure from below and control water intrusion into the track structural section.

Other Features – The drainage system proposed for this alternative is similar to that in Alternative 1. This alternative would also include a permanent pump station, which would be located near the trench low point to drain the trench section of minor seepage and runoff.

Utilities affected by this alternative are similar to those identified in Alternative 1. However, the extent of the impact would be somewhat larger because of the extended length of the trench in this alternative.

Railroad right-of-way impacts identified at this conceptual phase of the project would include the narrow segment (approximately 4 feet) needed adjacent to North Coast Highway 101, south of the intersection with Leucadia Boulevard and any additional easements required for the proposed drainage improvements. Further analysis would be required to develop a configuration that would avoid encroachment into the railroad right-of-way along North Coast Highway 101. This analysis can be conducted in the next phase of the grade separation project.

Because of the two-lane requirement of the roundabout, the two corner properties at the east side of intersection of Leucadia Boulevard and Vulcan Avenue also would be impacted by this project. The impacts may require a full take of each of these two corner properties. Further design and analysis will be required to make a full determination.

A comprehensive construction phasing plan would have to be developed for this alternative to minimize impact on vehicular and rail traffic, as well as pedestrians and bicyclists. Because the two new crossings could be built while Leucadia Boulevard crossing is still in place, there is a potential for a smaller amount of impacts due to construction activities.

Compatibility with Future LOSSAN Corridor Projects – Constructing Alternative 3 for this project would not preclude the implementation of any of the LOSSAN alternatives; however, there may be some compatibility issues related to the railroad track profile and alignment. The limits of the open trench in Alternative 3 are based on the distance needed to gain the vertical separation at Jasper and Europa streets. These limits may not coincide with the limits of the LOSSAN cut and cover short trench.

Similar to Alternative 1, the compatibility of the proposed alignment and its effect on the constructibility of the future LOSSAN Corridor improvements would be investigated further in the subsequent phases of these projects. Assuming that the existing grade separation at Encinitas Boulevard is to remain (i.e. with the railroad over the roadway), the elevation of the tracks north of Encinitas Boulevard need not change.

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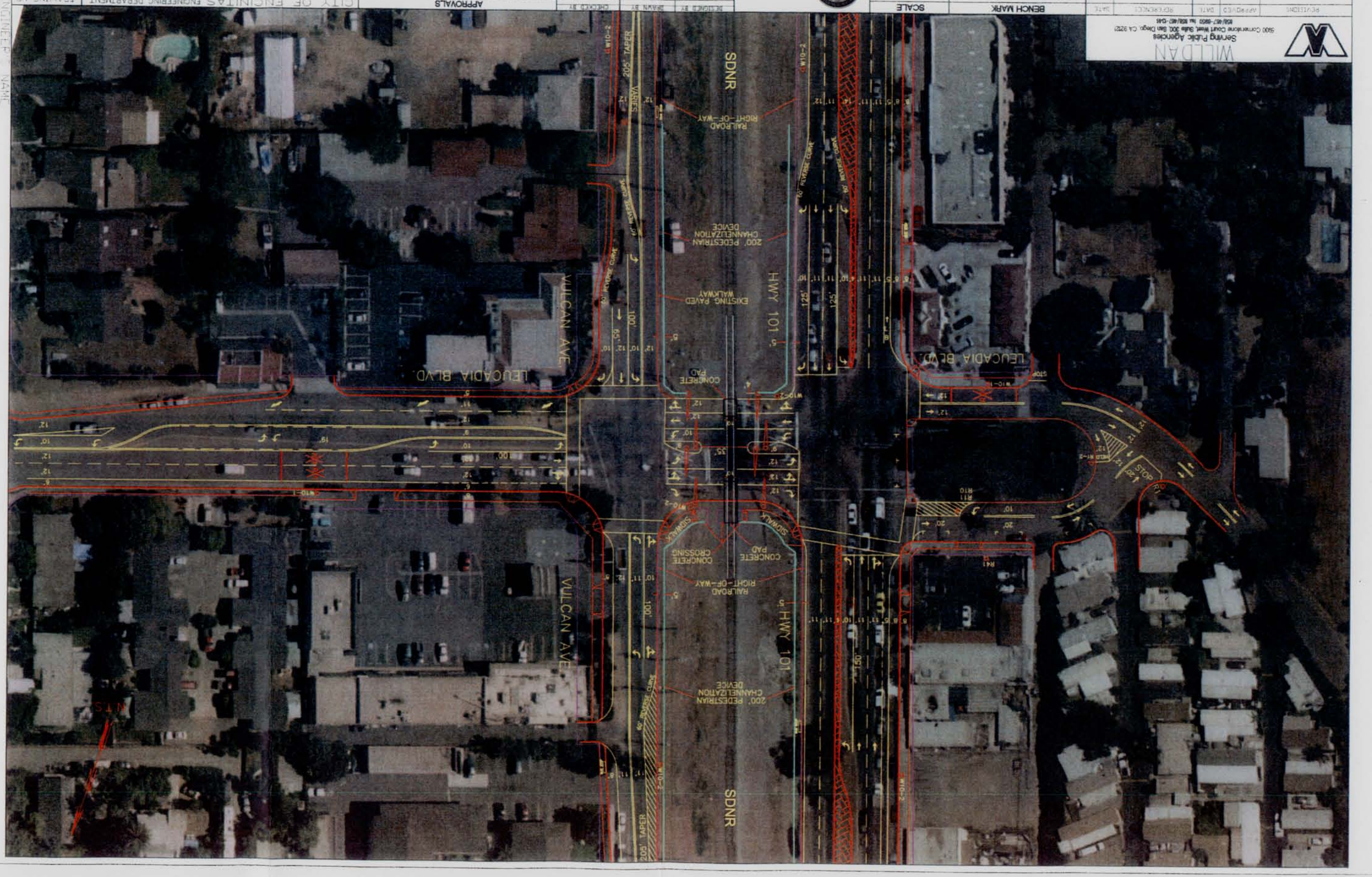
Alternative 3 – Jasper Street and Europa Street Railroad Underpass (One-way Couplet Trench)

5.4 At-Grade Improvements

Due to the high cost of the grade separation alternatives and possible difficulties in obtaining the necessary funds for this project in the near future, some at-grade improvements to the existing intersection were analyzed in order to improve pedestrian safety and vehicular traffic operations at the Leucadia Boulevard intersection with Vulcan Avenue and North Coast Highway 101 (see attached aerial photo). The estimated cost of these improvement are $6,580,000.

These improvements include mitigating the adverse grade-break at the existing tracks. The proposed at-grade improvements are described as follows:

Roadway Features – Similar to Alternative 1 and 2, Leucadia Boulevard would be widened to six lanes between Vulcan Avenue and North Coast Highway 101 to increase capacity and improve circulation (See Conceptual Drawings). This at-grade widening would include one eastbound (EB) through/right-turn lane, one EB through lane, one EB left-turn lane as well as a westbound (WB) left-turn lane, a WB through/left-turn lane, and a WB right-turn lane. The widening would extend to about 450 feet east of Vulcan Avenue to accommodate the proposed intersection configuration. In addition, the profiles of Leucadia Boulevard, North Coast Highway 101 and the tracks were adjusted to mitigate the adverse grade-break that exists at the existing crossing. This is one approach to mitigate this situation. Others may include adjusting the profile of just the tracks or just Leucadia Boulevard. However, the approach proposed for purposes of this study provide for a balance of the impacts to rail, and vehicular traffic operations as well as impacts to surrounding land uses.



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REVISIONS
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DATE
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DATE
BENCH MARK
SCALE
HORIZONTAL
VERTICAL
SANDAG
PLANS PREPARED UNDER SUPERVISION OF
RECOMMENDED
APPROVED
DESIGNED BY
DRAWN BY
CHECKED BY
APPROVALS
CITY OF ENCINITAS ENGINEERING DEPARTMENT
LEUCADIA BLVD. GRADE SEPARATION AND RAIL CORRIDOR
ENHANCEMENT STUDY - AT GRADE IMPROVEMENT
WORK PROJECT NO.
SHEET OF
DRAWING NO.
ENGINEER'S NAME
ADDRESS
PHONE NO.
SDNR
HWY 101
VULCAN AVE.
LEUCADIA BLVD.
RAILROAD RIGHT-OF-WAY
200' PEDESTRIAN CHANNELIZATION DEVICE
EXISTING PAVED WALKWAY
CONCRETE PAD
CONCRETE CROSSING
SIDWALK
205' TAPER
VARIES
STOP
NTS

Vulcan Avenue would be widened to the east to accommodate a left turn lane, a through, and a right turn lane at the intersection with Leucadia in the northbound (NB) direction. In the southbound (SB) direction, Vulcan will have a left turn lane and a through/right turn lane at the intersection with Leucadia.

North Coast Highway would be slightly widened to the west and restriped to accommodate an additional right turn lane in the NB direction at the intersection with Leucadia. Two through lanes and a left turn lane would be maintained in the NB and SB directions at the intersection. The raised median on the north side of North Coast Highway will be reconstructed to accommodate a 150-foot storage length for the left turn lane. The existing curb along the west side of North Coast Highway 101 will be reconstructed to accommodate the new lane configuration.

West Leucadia Boulevard (street system around the Leucadia Roadside Park) would be restriped with some on-street parking to continue to accommodate two way traffic. However, access from the northern leg of the street to North Coast Highway would be eliminated to improve the signal operations.

Pedestrian/Bicycle Features

Pedestrian Features - The proposed at-grade improvements provide for a delineated crosswalk system and paved sidewalks to direct the pedestrians to safely cross the tracks at Leucadia Boulevard intersection. Crosswalks are provided at the north, east, and south leg of the Leucadia Boulevard/Vulcan Avenue intersection. A paved sidewalk is proposed for the north leg of Vulcan Avenue along the east side of the street.

A paved sidewalk is also proposed on the north and south sides of Leucadia Boulevard, east of the intersection with Vulcan. Between Vulcan Avenue, and North Coast Highway 101, a sidewalk is proposed on the north side of Leucadia Boulevard. Pedestrian ramps are proposed at the curb returns where cross walks are proposed.
An eight-foot sidewalk is proposed along the west side of North Coast Highway, which is consistent with the "North 101 Corridor Specific Plan" adopted by the City of Encinitas in May 1997. On street parking along North Coast Highway 101 would be maintained on the west side of the street. The crosswalk across the north leg of North Coast Highway 101 would be set further back in order to better align the pedestrian path. No crosswalk is proposed on the south leg of North Coast Highway 101 in order to enhance signal operations.

A chainlink fence with a minimum height of 5 feet would be placed along the NCTD right-of-way line for a distance of 200 feet on each side in order to discourage pedestrians from crossing the tracks and to cross the street at Leucadia Boulevard. The exact placement of the fence would be determined in later phases of the project with more detailed information and design.

Bicycle Features – Due to limited widths in this area and in order to avoid any additional right-of-way encroachments, a 5-foot bicycle lane is proposed along the west

side of North Coast Highway 101 at this time. A bicycle lane is also proposed along the north side of the Leucadia Boulevard, which will end at the intersection with Vulcan. The City of Encinitas Bicycle Master Plan calls for bicycle lanes along 101 and Vulcan Avenue. However, implementation of these features would require additional right-of-way or a revised street configuration.

Railroad Features – A 9-foot wide median island would be placed on each side of the railroad tracks on Leucadia Boulevard between Vulcan Avenue and North Coast Highway as part of the Leucadia Boulevard widening. These islands will accommodate the placement of the railroad Quad Gates. The proposed islands are placed 35 feet apart to accommodate a potential second set of tracks that may be placed along the east side of the existing tracks to improve future rail operations.

Four sets of Quad Gates would be placed at this intersection as required by NCTD. The gates will be equipped with vehicle presence detection system to clear any errant vehicles that may be trapped between the gates.

If approved by the CPUC and NCTD, a second set of dummy tracks may be placed at the intersection at the time of construction of this project as an interim measure. Without the presence of the second tracks, the location of the islands and gates may have to be adjusted to provide the proper distance from the gates to the current tracks.

According to the NCTD Signal Engineering Standards and the CPUC, one set of flashing lights would be required per lane for more than two lanes of traffic. Therefore, a cantilevered structure would be required on each side to accommodate the flashing lights over the lanes. The exact location of these structures would have to be further analyzed due to the limited space with the installation of the second set of tracks between Vulcan and North Coast Highway 101.

Precast concrete panels (10-foot wide) would be placed along the tracks in the widened area of Leucadia Boulevard. It is our understanding that NCTD has plans to place the concrete panels along the entire length of crossing of Leucadia Boulevard in the near future.

Other Features – The proposed at-grade improvements do not significantly impact the drainage patterns in this area. A more detailed analysis of the drainage issues are recommended during the preliminary engineering and design phases of this project.

The traffic impacts of this project during construction would generally be limited to construction of the island and Quad Gate systems in the median of Leucadia Boulevard, the placement of the precast concrete panels and dummy tracks across Leucadia Boulevard, the outside widening of Leucadia and placement of curb and gutter at the proposed sidewalk locations. These improvements can be phased in order to minimize impacts to the traveling public.

6.0 TRAFFIC ANALYSIS

A conceptual traffic analysis was conducted for each of the study alternatives to compare its impacts on existing and future (2030) conditions. The analysis process included determining the operations at the study intersections for the AM and PM peak-hours and operations on adjacent roadway segments by using peak-hour and ADT volumes. Intersection operations were measured and quantified by using the Highway Capacity Methodology (HCM). The level of service for the signalized intersection was calculated using the methodologies described in Chapter 16 of the 2000 Highway Capacity Manual (HCM) (see Traffic Study).

The existing peak hour traffic volumes for the three area roadways near the Leucadia Boulevard railroad crossing is provided in Table 6.1.

TABLE 6.1
EXISTING AUTOMOBILE TRAFFIC VOLUMES (2005)

Intersection	Peak Hour	Peak Hour Volumes				Total
		NB	SB	EB	WB	
Leucadia Blvd @ Hwy 101	AM	290	1690	30	380	2390
	PM	870	750	80	480	2180
		NB	SB	EB	WB	
Leucadia Blvd @ Vulcan Ave	AM	160	320	340	480	1300
	PM	280	160	460	460	1360

Source: City of Encinitas Genera Plan, January 2005.

Based on the City of Encinitas Traffic Circulation Element of the General Plan, January 2005, this area will face growth in traffic volumes resulting in increased traffic congestion and reduced Level of Service at the study intersections. Tables 6.3 indicates the peak hour traffic volumes for Year 2030.

TABLE 6.3
FUTURE AUTOMOBILE TRAFFIC VOLUMES (2030)

Intersection	Peak Hour	Peak Hour Volumes				Total
		NB	SB	EB	WB	
Leucadia Blvd @ Hwy 101	AM	300	1930	30	440	2700
	PM	1160	1070	80	620	2930
		NB	SB	EB	WB	
Leucadia Blvd @ Vulcan Ave	AM	280	340	570	510	1700
	PM	540	180	620	530	1870

Source: City of Encinitas Genera Plan, January 2005.

The traffic analysis developed levels of service for both intersections using existing traffic volumes and 2030 volumes based on existing lane configurations. The results of that analysis is included in Table 6.4 below.

TABLE 6.4
EXISTING AND FUTURE YEAR (2030) LEVEL OF SERVICE
WITH EXISTING CONFIGURATION

Intersection		Peak Hour	Existing (2004)		Future (2030)	
			Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
1	Leucadia Boulevard @ Coast Highway 101	AM/PM	36.9/25.6	D/C	72.2/47.3	E/D
2	Leucadia Blvd @ Vulcan Avenue	AM/PM	48.4/31.5	D/C	49.6/50.7	D/D

As indicated, if no improvements were done at this intersection, the future Levels of Service for this at grade intersection would deteriorate. These results do not reflect impacts to the Level of Service due to railroad pre-emption. The disruption caused by the train crossing further lowers the Level of Service at this intersection and creates additional queues.

During train pre-emption, the existing traffic signals switch to a set sequence of special phasing. Initially, all signal indications go to red, except for those between Coast Highway 101 and Vulcan Avenue. These indications become green until the area over the tracks is cleared. Then all indications at both traffic signals change to flashing red. Once the train passes, the signals transition back to normal operations. During this time, approaching vehicles stack up on all approaches.

Since it is very difficult to simulate the effects of train operations on traffic patterns, Willdan assumed that whatever magnitude of service impacts results, it will be the same for similar future scenarios and will drop out for all comparisons. However, it should be noted that the increase in the volume of train traffic, outlined in Table 3.1 in this report, would cause longer queues at these intersections and will significantly increase the level of disruption to the vehicular traffic circulation as compared to current conditions.

With the proposed grade separation project, traffic patterns of automobiles, pedestrians and cyclists will not conflict with train operations in the vicinity of Leucadia Boulevard, thereby reducing queues at these intersections and improving the overall traffic operations.

6.1 Alternatives Analysis

Alternatives 1 and 2 both propose to widen Leucadia Boulevard to 6 lanes between Vulcan Avenue and North Coast Highway 101 while Alternative 3 proposes to close Leucadia at the grade crossing via a roundabout and divert traffic to the two adjacent crossings in the form of a one-way couplet. Table 6.5 shows the results of the Level of Service analysis for each of these alternatives based on 2030 traffic volumes. Those results are compared to the Level of Service without any improvements at the intersections.

TABLE 6.5
FUTURE YEAR (2030) LEVEL OF SERVICE
ONE-WAY COUPLET ALTERNATIVE

Intersection	Peak Hour	Future (2030) with Existing Configuration		2030 with Widening Leucadia (Alternatives 1 & 2)		2030 With Alternative 3 (One-Way Couplet)	
		Delay (sec/Veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Leucadia Boulevard @ Coast Highway 101	AM/PM	72.2/47.3	E/D	26.0/48.6	C/D	*	C/A
Leucadia Blvd @ Vulcan Avenue	AM/PM	49.6/50.7	D/D	29.4/19.1	C/B	**	A/B
Jasper @ Coast Highway	N/A	N/A	N/A	N/A	N/A	14.5/17.9	B/B
Jasper @ Vulcan	N/A	N/A	N/A	N/A	N/A	19.2/15.1	B/B
Europa @ Coast Highway	N/A	N/A	N/A	N/A	N/A	6.7/5.5	A/A
Europa @ Vulcan	N/A	N/A	N/A	N/A	N/A	1.1/1.1	A/A

* Unsignalized intersection
** *Multi-lane roundabout*

As indicated, this analysis identifies the operational benefits of a grade-separated crossing as opposed to the existing configuration. The delays at the intersection are reduced and the Level of Service is improved for both intersections. However, this analysis also shows that a grade separation alone will not mitigate forecasted traffic volumes as well as a One-Way Couplet System. This couplet system improves the traffic circulation to better Levels of Service and provides more opportunities for pedestrian and bicycle access by providing two crossings approximately 900 feet apart which will accommodate a larger sphere from which pedestrians will be willing to travel.

The improvements to the traffic circulation of these intersections are even greater because of the elimination of the railroad preemption and the reduction of the queues caused by the railroad operations. As indicated earlier, those results cannot be simulated with the software used for this study.

7.0 PUBLIC WORKSHOPS

Two public workshops were conducted during this study phase to present the alternative alignments and obtain feedback from the public.

7.1 Community Outreach Workshop Number 1

The first community workshop was held on July 15, 2004 at Encinitas City Hall. Approximately 30 members of the community attended, along with representatives from SANDAG, NCTD, the City of Encinitas and members of the consultant team. A presentation was made, which addressed an overview of the project alternatives, interim options and remaining tasks to be completed by the project team. A question and answer session was conducted following the presentation to encourage active participation by community members. A comment sheet was also provided to attendees to obtain their opinion of the project. Several comment letters were received by the project team. The community recognized the need for a grade-separated crossing, but had various opinions of a preferred alternative and associated concerns. The following general issues/concerns were raised by the community:

- Provision of pedestrian and bicycle crossings
- Noise generated by railroad operations
- Visual impacts associated with the project
- Potential impacts on the character of neighborhoods along Jasper and Europa Streets
- Improved bicycle and pedestrian circulation

7.2 Community Outreach Workshop 2

The second community workshop was held on February 22, 2005 at Paul Ecke Central Elementary School in Leucadia. Nearly 100 members of the community attended, along with representatives from SANDAG, NCTD, the City of Encinitas and members of the consultant team. A presentation was given, which included an overview of the project to date, remaining possible project alternatives and alternatives that were eliminated for further study. The ensuing question and answer session elicited active participation by community members. Comment sheets were once again provided. The following issues and concerns were raised in the comment letters:

- Visual impact of Alternative 2 (Bermand Bridge)
- Impacts of Alternative 3 (one-way couplet) on neighborhoods along Jasper and Europa Street
- Provision of safe pedestrian and bicycle crossings
- Consider railroad tunnel or covered trench with development above
- Implement interim improvements to address current concerns

8.0 SYSTEM PLANNING

The grade separation alternatives studied in this report are consistent with goals and policies within local, regional and state transportation plans, as described below.

8.1 LOSSAN Corridor Strategic Plan

The LOSSAN Corridor Strategic Plan (October 2003) provided a framework for the evaluation and screening of conventional rail improvements to the 127.5-mile portion of the LOSSAN Rail Corridor between Los Angeles Union Station and San Diego Santa Fe Depot. According to the Draft EIR/EIS LOSSAN Proposed Rail Corridor Improvement Studies (June 2004), improvements are needed to accommodate the projected increase in travel demand between Los Angeles and San Diego; to substantially reduce travel time; and to increase rail service reliability, safety and accessibility throughout the LOSSAN corridor. The LOSSAN Corridor Strategic Plan proposes improvements to the portion of the corridor that traverses the City of Encinitas, including double tracking and several design options at the Leucadia Boulevard at-grade rail crossing. One of these design options consists of a grade separation of Leucadia Boulevard.

8.2 California State Rail Plan 2001-02 to 2010-11

The Draft California State Rail Plan 2003-04 to 2013-14 (March 2004) was prepared by the California Department of Transportation (Caltrans) pursuant to Government Code Section 14036 and outlines a ten-year State Rail Plan addressing both passenger and freight rail service. The passenger element summarizes existing State-supported intercity passenger service operations and establishes a plan for capital improvements and service expansions. The freight rail element provides an overview of the State's freight rail system and addresses future needed improvements. The State Rail Plan discusses state and federal grade crossing improvement and separation programs noting that at-grade railroad crossings pose safety and operational considerations for passenger and freight rail, as well as road traffic. This plan outlines the State's priorities for implementing capital projects in the Rail Plan, which includes "Improving the safety of State-Supported intercity rail service, including grade crossing improvements and closures."

8.3 Coastal Rail Trail Project Study Report

The Coast Rail Trail is a multi-modal, non-motorized transportation facility that is proposed to be developed within the railroad right-of-way, if feasible. Due to railway, legal, and land use limitations, and in those segments of the railroad right-of-way not suitable or feasible for the Coastal Rail Trail alignment, the coastal cities intend to explore alternative alignments utilizing city, state, or federal highway, utility right-of-way, and private property. Its primary purpose is intended for pedestrian and bicycle access

to transit stations and for incidental recreational activities. The trail is proposed to extend from the San Luis Rey River in Oceanside through Solana Beach, and eventually to downtown San Diego. A separate plan review process is in place with each of the cities regarding development of the various city segments and phases of the Coastal Rail Trail.

8.4 City of Encinitas General Plan

The proposed project is consistent with several goals and policies contained within the Circulation Element of the City of Encinitas General Plan. Specifically, Policy 3.3 calls for the creation of a safe and convenient circulation system for pedestrians. Policy 3.5 recommends the development of a mass transit and transit access points along the existing I-5 freeway corridor or adjacent to the railroad right-of-way. Policy 3.7 requires the City's review of plans for transit service to identify and minimize any adverse visual, noise, land use or other development and operation impacts on the City's communities. In addition, Policy 6.4 states that the City will support increased public transportation service to shoreline recreational areas designated for increased visitation. Implementation of the grade separation of Leucadia would assist in achieving the goals of these policies.

9.0 ENVIRONMENTAL

An Environmental Constraints Analysis was conducted in this project. The study identified, in concept, the potential environmental issues of each alternative alignment as wells as the At-Grade Improvements based on the following elements (See the enclosed Environmental Constraints Report for more details):

- Traffic and Transportation
- Visual
- Noise
- Recreation
- Beach Replenishment
- Water Quality
- Air Quality
- Cultural/Archaeological Resources
- Public Utilities and Infrastructure
- Biological Resources
- Coastal Act Consistency
- Socioeconomics

Although a funding source has not yet been identified for this project, federal funding is anticipated. Due to the anticipated receipt of federal funding, compliance with the National Environmental Policy Act (NEPA) in addition to CEQA would be required. Therefore, the study determined that the anticipated

environmental document would be a joint Environmental Impact Report/Environmental Assessment (EIR/EA).

Social, economic, cultural, and environmental impacts of the alternatives would have to be evaluated through analyses in the various environmental documents and supporting technical studies. The proposed assessment and evaluation of impacts (EIR/EA) would take into account both positive and negative effects, direct and indirect impacts, short-term (construction) and long-term impacts, and cumulative effects. The subjects and level of detail addressed in the EIR/EA would be consistent with the NEPA/CEQA environmental requirements and other related regulations.

10.0 FUNDING

The construction of a grade separated alternative alignment at Leucadia Boulevard may be eligible for a variety of federal, state, and local funds. Because of the high cost of this project, a variety of funds and matches would need to be pursued in order to construct the project.

10.1 Federal Funds

The most recent version of the Federal Transportation Act, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), includes programs for rail related projects including grade separations through the Federal Railroad Administration (FRA). The details of this new bill are not yet released in order to determine the project's specific eligibility for such funds.

10.2 State Funds

The Public Utilities Commission (PUC) and the California Transportation Commission (CTC) control funding of grade separation projects. These funds are released for grade separation projects based on the PUC's priority ranking of all grade separation projects. Although these funds are typically limited to about $15 million per year and $5 million dollars per project, per year, they could serve as partial funding of the proposed project and a possible match to funds from other sources.

The Transportation Congestion Relief Fund may also be a source of funds, since this project provides for capacity enhancement of the rail corridor.

Other state funds include the State Transportation Improvement Program (STIP). However, because of the State's budget challenges at this time, these funds are limited to the current program and do not include allowance for new projects.

10.3 Regional Funds

This project may also be eligible for a variety of regional funds such at TransNet - Local Street and Road, Regional Grade Separations which is the regionally administered federal funds through the Federal Transportation Improvement Program (FTIP), and Congestion Mitigation and Air Quality (CMAQ) Improvement Program because of it potential improvement in air quality by reducing congestions and vehicle queues resulting from the railroad preemption.

10.4 Local Funds

The City of Encinitas recognizes the importance of this project to the local and regional mobility of vehicular traffic. The North Coast Highway 101 often acts as an alternate route to the congested I-5 freeway. The proposed improvements would provide for a better traffic circulation and enhanced mobility. The grade separation project will also provide enhanced rail capacity without further impacting the traffic circulations.

The City would be responsible for providing local matches for the various funding programs to the extent possible. This includes the City's portion of the TransNet funds.

The Encinitas CIP program has set aside $2.0 million in FY 07/08 through 08/09 under a project called "Leucadia Blvd/Vulcan Ave/ Coast Hwy 101 Intersection Improvements" to address the proposed improvements at this intersection. Although this amount is not nearly enough to accommodate the cost of the grade separation alternatives, perhaps a portion of these funds can be provided to implement the proposed At-Grade improvements.

10.5 Other Sources of Funds

In addition to the funds listed above, this project may be eligible for railroad funds related to grade separation safety. These sources may include BNSF and LOSSAN.

11.0 SCHEDULE

A preliminary project schedule had been developed based on known critical elements. In developing the schedule, the time frames associated with environmental documentation will vary depending on the preferred alternative and the potential impacts encountered with the preferred alternative once more detailed environmental analysis is performed.

The development of Plans, Specifications and Estimates (PS&E) will begin after the approval of the environmental documentation and after the railroad agreements are procured, P.U.C. orders and funding have been procured.

The right-of way must be finalized to allow for acquisition and utility relocation agreements, which typically take about 12 months.

Depending of the preferred alternative construction should take anywhere from 12 to 18 months.

12.0 PROJECT TEAM

This project is a collaborative effort between the lead agencies of San Diego Association of Governments (SANDAG), the Regional Planning Agency, the contract administrator, and the CPUC applicant and the City of Encinitas; as well as the North County Transit District (NCTD), the corridor owner and rail operator; and Caltrans, representing the interests of inter-city rail service. Together with the Willdan Team, they comprised the Project Development Team (PDT). The following is a listing of the members of the PDT.

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ALTERNATIVE COST ESTIMATES

CONCEPTUAL PROJECT COST ESTIMATE FOR LEUCADIA GRADE SEPARATION

PROJECT DESCRIPTION: Leucadia Boulevard and Railroad Corridor Grade Separation Study PSR
Proposed Improvement (Scope): Alternative 1 - Trench Alternative at Leucadia Boulevard

ALTERNATIVE 1
SUMMARY OF PROJECT COST ESTIMATE

TOTAL ROADWAY ITEMS	$98,783,730
TOTAL STRUCTURE ITEMS	$10,000,000
SUBTOTAL CONSTRUCTION COSTS	$108,783,730
TOTAL RIGHT-OF-WAY ITEMS	$2,000,000
TOTAL PROJECT CAPITAL OUTLAY COSTS	$110,783,730
SUPPORT COSTS (35% OF CONSTRUCTION COST)	38,774,305
TOTAL PROJECT COSTS	$149,558,035
USE	**$150,000,000**

CONCEPTUAL PROJECT COST ESTIMATE FOR LEUCADIA GRADE SEPARATION

I. ROADWAY ITEMS

Section 1 Earthwork	Quantity	Unit	Unit Price	Item Cost	Section Cost
Roadway Excavation	1,100,000	CY	$5.5	$6,050,000	
Clearing and Grubbing	1	LS	$100,000	$100,000	
Fill		CY		$0	
				Subtotal Earthwork	**$6,150,000**
Section 2 Structural Section	Quantity	Unit	Unit Price	Item Cost	Section Cost
Asphalt Concrete	450	TON	$70	$31,500	
Aggregate Base	150	CY	$85	$12,750	
				Subtotal Pavement Structural Section	**$44,250**
Section 3 Drainage	Quantity	Unit	Unit Price	Item Cost	Section Cost
Inlets	40	EA	$6,000	$240,000	
Remove Inlets	10	EA	$500	$5,000	
RCP -	9,000	LF	$2,000	$18,000,000	
Bridge Drains	300	LF	$60	$18,000	
Other Drainage Improvements (Filters)	40	EA	$500	$20,000	
Interceptor Channel	7,000	LF	$60	$420,000	
Pump Station	1	EA	$3,000,000	$3,000,000	
				Subtotal Drainage	**$21,703,000**

I. ROADWAY ITEMS (Continued)

Section 4 Specialty Items	Quantity	Unit	Unit Price	Item Cost	Section Cost
Curb and Gutter	900	LF	$20	$18,000	
Retaining Walls	1	LS	$41,408,200	$41,408,200	
Pump Station Structure	1	LS	$150,000	$150,000	
SWPPP	1	LS	$250,000	$250,000	
Architectural Treatment		LS		$0	
				Total Specialty Items	**$41,826,200**

I. ROADWAY ITEMS (Continued)

Section 5 Traffic	Quantity	Unit	Unit Price	Item Cost	Section Cost
Traffic Signals and Lighting	1	LS	$150,000	$150,000	
Overhead Sign Structures				$0	
Signing and Striping	1	LS	$20,000	$20,000	
Traffic Control System	1	LS	$500,000	$500,000	
Traffic Management Plan	1	LS		$ -	
				Subtotal Traffic	**$670,000**
				TOTAL SECTIONS 1-5	**$70,393,450**

I. ROADWAY ITEMS (Continued)

			Item Cost	Section Cost
Section 6 Minor Items (excludes retaining walls)				
	$28,985,250 (Subtotal Sections 1-5 minus retaining walls)	X (5%)	1,449,263	
			Total Minor Items	$1,449,263
Section 7 Roadway Mobilization (includes ret walls)				
	$71,842,713 (Subtotal Sections 1-6)	X (10%)	7,184,271	
			Total Roadway Mobilization	$7,184,271
Section 8 Roadway Additions				
Supplemental Work	$71,842,713 (Subtotal Sections 1-6)	X (0)	0	
Contingencies				
	$79,026,984 (Subtotal Sections 1-7)	X (25%)	$19,756,746	
			TOTAL ROADWAY ADDITIONS	**$28,390,280**
			TOTAL ROADWAY ITEMS	**$98,783,730**
			(Subtotal for Sections 1-8)	

ESTIMATE PREPARED BY: Sunnie House
DATE: Sept 2005

PHONE (858) 450-4700

CONCEPTUAL PROJECT COST ESTIMATE FOR LEUCADIA GRADE SEPARATION

II. STRUCTURES ITEMS

Structure
(1)
Bridge Name: Leucadia Blvd. Overhead

Structure Type:	CIP	Box Girder	and Tunnel	
Width (out to out) - (LF)	97.30			
Span Lengths - (LF)	61.00			
Total Area - (SF)	5,935.30			
Footing Type (pile/spread)				
Sub Total Cost for Structure	##########			
			SUBTOTAL STRUCTURES ITEMS (Sum of Total Cost for Structures)	$1,289,378
Railroad Related Costs:			5,919,324	$5,919,324
			TOTAL RAILROAD AND STRUCTURE ITEMS	$7,208,702
10% Mobilization				$720,870
25% Contingency				$1,982,392.96
			TOTAL STRUCTURES ITEMS	$9,911,965
			For Budget Purpose	$10,000,000

ESTIMATE PREPARED BY: Jim Frost PHONE (858) 566-3113
DATE: September 2005

CONCEPTUAL PROJECT COST ESTIMATE FOR LEUCADIA GRADE SEPARATION

III. RIGHT OF WAY ITEMS

	VALUE
A. Acquisition, including excess lands, damages to remainder (s) and goodwill	
B. Utility Relocation	$2,000,000
C. Relocation Assistance	$0
D. Clearance/Demolition	$0
E. Title and Escrow Fees	$0

TOTAL RIGHT OF WAY ITEMS (Escalated Value) $2,000,000

Anticipated Date of Right-of-Way Certification (Date to which Values are Escalated) 2005

ESTIMATE PREPARED BY: Sunnie House PHONE (858) 450-4700
DATE: September 2005

CONCEPTUAL PROJECT COST ESTIMATE FOR LEUCADIA GRADE SEPARATION

PROJECT DESCRIPTION: Leucadia Boulevard and Railroad Corridor Grade Separation Study PSR
Proposed Improvement (Scope): Alternative 2 - Berm and Bridge at Leucadia Boulevard

ALTERNATIVE 2
SUMMARY OF PROJECT COST ESTIMATE

TOTAL ROADWAY ITEMS	$41,509,171
TOTAL STRUCTURE ITEMS	$23,300,000
SUBTOTAL CONSTRUCTION COSTS	$64,809,171
TOTAL RIGHT-OF-WAY ITEMS	$250,000
TOTAL PROJECT CAPITAL OUTLAY COSTS	$65,059,171
SUPPORT COSTS (35% OF CONSTRUCTION COST)	22,770,710
TOTAL PROJECT COSTS	$87,829,881
USE	**$88,000,000**

CONCEPTUAL PROJECT COST ESTIMATE FOR LEUCADIA GRADE SEPARATION

I. ROADWAY ITEMS

Section 1 Earthwork	Quantity	Unit	Unit Price	Item Cost	Section Cost
Roadway Excavation	0	CY	$6	$0	
Clearing and Grubbing	1	LS	$75,000	$75,000	
Fill	8,100	CY	$45	$364,500	
				Subtotal Earthwork	**$439,500**

Section 2 Structural Section	Quantity	Unit	Unit Price	Item Cost	Section Cost
Asphalt Concrete	900	TON	$70	$63,000	
Aggregate Base	600	CY	$85	$51,000	
				Subtotal Pavement Structural Section	**$114,000**

Section 3 Drainage	Quantity	Unit	Unit Price	Item Cost	Section Cost
Inlets	40	EA	$6,000	$240,000	
RCP -	9,000	LF	$2,000	$18,000,000	
Other Drainage Improvements (Filters)	40	EA	$500	$20,000	
Pump Station		EA		$0	
				Subtotal Drainage	**$18,260,000**

I. ROADWAY ITEMS (Continued)

Section 4 Specialty Items	Quantity	Unit	Unit Price	Item Cost	Section Cost
Curb and Gutter	1,173	LF	$20	$23,460	
Construct PCC Sidewalk	5	CY	$1,000	$5,000	
Retaining Walls	1	LS	$9,700,930	$9,700,930	
Pump Station Structure	1	LS		$0	
Pump Station Equipment					
Erosion Control		LS		$0	
SWPPP	1	LS	$250,000	$250,000	
Architectural Treatment		LS		$0	
				Total Specialty Items	**$9,979,390**

I. ROADWAY ITEMS (Continued)

Section 5 Traffic	Quantity	Unit	Unit Price	Item Cost	Section Cost
Traffic Signals and Lighting	1	LS	$150,000	$150,000	
Overhead Sign Structures				$0	
Signing and Striping	1	LS	$20,000	$20,000	
Traffic Control System	1	LS	$250,000	$250,000	
Traffic Management Plan	1	LS		$ -	
				Subtotal Traffic	**$420,000**
				TOTAL SECTIONS 1-5	**$29,212,890**

I. ROADWAY ITEMS (Continued)

Section 6 Minor Items (excludes retaining walls)			Item Cost	Section Cost
	$19,511,960 (Subtotal Sections 1-5 minus retaining walls)	X (5%)	975,598	
			Total Minor Items	$975,598

Section 7 Roadway Mobilization (includes ret walls)				
	$30,188,488 (Subtotal Sections 1-6)	X (10%)	3,018,849	
			Total Roadway Mobilization	$3,018,849

Section 8 Roadway Additions				
Supplemental Work	$30,188,488 (Subtotal Sections 1-6)	X (0%)	0	
Contingencies	$33,207,337 (Subtotal Sections 1-7)	X (25%)	$8,301,834	
			TOTAL ROADWAY ADDITIONS	**$12,296,281**
			TOTAL ROADWAY ITEMS (Subtotal for Sections 1-8)	**$41,509,171**

ESTIMATE PREPARED BY: Sunnie House
DATE: September 2005

PHONE (858) 467-6950

CONCEPTUAL PROJECT COST ESTIMATE FOR LEUCADIA GRADE SEPARATION

II. STRUCTURES ITEMS

Structure
(1)
Bridge Name: Leucadia Blvd. Overhead

Structure Type:	CIP Box Girder and Tunnel		
Width (out to out) - (LF)	35.00		
Span Lengths - (LF)	2,080.00		
Total Area - (SF)	72,800.00		
Footing Type (pile/spread)			
Sub Total Cost for Structure	$11,798,156		
		SUBTOTAL STRUCTURES ITEMS (Sum of Total Cost for Structures)	$11,798,156
Railroad Related Costs:		5,134,778	$5,134,778
		TOTAL RAILROAD AND STRUCTURE ITEMS	$16,932,934
10% Mobilization			$1,693,293
25% Contingency			$4,656,557
Cost per m2 (incl. 10% mobilization and 20% contingency)			
		TOTAL STRUCTURES ITEMS	$23,282,784
		For Budget Purpose	$23,300,000

ESTIMATE PREPARED BY: Jim Frost PHONE (858) 566-3113
DATE: September 2005

CONCEPTUAL PROJECT COST ESTIMATE FOR LEUCADIA GRADE SEPARATION

III. RIGHT OF WAY ITEMS

	VALUE
A. Acquisition, including excess lands, damages to remainder (s) and goodwill	
B. Utility Relocation	$250,000
C. Relocation Assistance	$0
D. Clearance/Demolition	$0
E. Title and Escrow Fees	$0

TOTAL RIGHT OF WAY ITEMS (Escalated Value) $250,000

Anticipated Date of Right-of-Way Certification (Date to which Values are Escalated) 2004

ESTIMATE PREPARED BY: Sunnie House PHONE (858) 450-4700
DATE: September 2005

CONCEPTUAL PROJECT COST ESTIMATE FOR LEUCADIA GRADE SEPARATION

PROJECT DESCRIPTION: Leucadia Boulevard and Railroad Corridor Grade Separation Study PSR
Proposed Improvement (Scope): Alternative 3 - Trench Alternative with One-Way Couplet

ALTERNATIVE 3
SUMMARY OF PROJECT COST ESTIMATE

TOTAL ROADWAY ITEMS	$104,232,494
TOTAL STRUCTURE ITEMS	$11,300,000
SUBTOTAL CONSTRUCTION COSTS	$115,532,494
TOTAL RIGHT-OF-WAY ITEMS	$3,000,000
TOTAL PROJECT CAPITAL OUTLAY COSTS	$118,532,494
SUPPORT COSTS (35% OF CONSTRUCTION COST)	41,486,373
TOTAL PROJECT COSTS	$160,018,867
USE	**$160,000,000**

CONCEPTUAL PROJECT COST ESTIMATE FOR LEUCADIA GRADE SEPARATION

I. ROADWAY ITEMS

Section 1 Earthwork	Quantity	Unit	Unit Price	Item Cost	Section Cost
Roadway Excavation	1,343,000	CY	$5.5	$7,386,500	
Clearing and Grubbing	1	LS	$50,000	$50,000	
Fill		CY		$0	
				Subtotal Earthwork	**$7,436,500**
Section 2 Structural Section	Quantity	Unit	Unit Price	Item Cost	Section Cost
Asphalt Concrete	1,900	TON	$70	$133,000	
Aggregate Base	700	CY	$85	$59,500	
				Subtotal Pavement Structural Section	**$192,500**
Section 3 Drainage	Quantity	Unit	Unit Price	Item Cost	Section Cost
Inlets	40	EA	$6,000	$240,000	
Remove Inlets	10	EA	$500	$5,000	
RCP -	9,000	LF	$2,000	$18,000,000	
Bridge Drains	300	LF	$60	$18,000	
Other Drainage Improvements (Filters)	40	EA	$500	$20,000	
Interceptor Channel	7,500	LF	$60	$450,000	
Pump Station	1	EA	$3,000,000	$3,000,000	
				Subtotal Drainage	**$21,733,000**
Section 4 Specialty Items	Quantity	Unit	Unit Price	Item Cost	Section Cost
Curb and Gutter	7,500	LF	$20	$150,000	
Construct PCC Sidewalk	400	CY	$1,000	$400,000	
Retaining Walls	1	LS	$43,113,700	$43,113,700	
Pump Station Structure	1	LS	$150,000	$150,000	
SWPPP	1	LS	$250,000	$250,000	
Architectural Treatment		LS		$0	
				Total Specialty Items	**$44,063,700**

I. ROADWAY ITEMS (Continued)

Section 5 Traffic	Quantity	Unit	Unit Price	Item Cost	Section Cost
Traffic Signals and Lighting	1	LS	$300,000	$300,000	
Overhead Sign Structures				$0	
Signing and Striping	1	LS	$23,000	$23,000	
Traffic Control System	1	LS	$500,000	$500,000	
Traffic Management Plan	1	LS		$ -	
				Subtotal Traffic	**$823,000**
				TOTAL SECTIONS 1-5	**$74,248,700**

I. ROADWAY ITEMS (Continued)

			Item Cost	Section Cost
Section 6 Minor Items (excludes retaining walls)				
	$31,135,000 (Subtotal Sections 1-5 minus retaining walls)	X (5%)	1,556,750	
			Total Minor Items	$1,556,750
Section 7 Roadway Mobilization (includes ret walls)				
	$75,805,450 (Subtotal Sections 1-6)	X (10%)	7,580,545	
			Total Roadway Mobilization	$7,580,545
Section 8 Roadway Additions				
Supplemental Work	$75,805,450 (Subtotal Sections 1-6)	X (0%)	0	
Contingencies				
	$83,385,995 (Subtotal Sections 1-7)	X (25%)	$20,846,499	
			TOTAL ROADWAY ADDITIONS	**$29,983,794**
			TOTAL ROADWAY ITEMS (Subtotal for Sections 1-8)	**$104,232,494**

ESTIMATE PREPARED BY: Sunnie House
DATE: September 2005

PHONE (858) 450-4700

CONCEPTUAL PROJECT COST ESTIMATE FOR LEUCADIA GRADE SEPARATION

II. STRUCTURES ITEMS

Structure
(1)
Bridge Name: Leucadia Blvd. Overhead

Structure Type:	CIP Box Girder and Tunnel		
Width (out to out) - (LF)	96.84		
Span Lengths - (LF)	61.00		
Total Area - (SF)	5,907.24		
Footing Type (pile/spread)			
Sub Total Cost for Structure	$1,211,912.80		
		SUBTOTAL STRUCTURES ITEMS (Sum of Total Cost for Structures)	$1,211,913
Railroad Related Costs:		6,951,371	$6,951,371
		TOTAL RAILROAD AND STRUCTURE ITEMS	$8,163,284
10% Mobilization			$816,328
25% Contingency			$2,244,903.16
		TOTAL STRUCTURES ITEMS	$11,224,516
		For Budget Purpose	$11,300,000

ESTIMATE PREPARED BY: Jim Frost PHONE (858) 566-3113
DATE: September 2005

CONCEPTUAL PROJECT COST ESTIMATE FOR LEUCADIA GRADE SEPARATION

III. RIGHT OF WAY ITEMS

	VALUE
A. Acquisition, including excess lands, damages to remainder (s) and goodwill	$1,000,000
B. Utility Relocation	$2,000,000
C. Relocation Assistance	$0
D. Clearance/Demolition	$0
E. Title and Escrow Fees	$0

TOTAL RIGHT OF WAY ITEMS (Escalated Value) $3,000,000

Anticipated Date of Right-of-Way Certification (Date to which Values are Escalated) 2004

ESTIMATE PREPARED BY: Sunnie House PHONE (858) 450-4700
DATE: September 2005

CONCEPTUAL PROJECT COST ESTIMATE FOR LEUCADIA GRADE SEPARATION

PROJECT DESCRIPTION: Leucadia Blvd and Railroad Corridor Grade Separation Study Report
Proposed Improvement (Scope): At-Grade Improvement - Leucadia Blvd. Widening and Park

AT-GRADE IMPROVEMENT
SUMMARY OF PROJECT COST ESTIMATE

TOTAL ROADWAY ITEMS	$2,226,345
TOTAL STRUCTURE ITEMS	$0
SUBTOTAL CONSTRUCTION COSTS	**$2,226,345**
TOTAL RIGHT-OF-WAY ITEMS	$0
TOTAL PROJECT CAPITAL OUTLAY COSTS	$2,226,345
SUPPORT COSTS (35% OF CONSTRUCTION COST)	779,221
TOTAL PROJECT COSTS	**$3,005,565**
USE	**$3,000,000**

CONCEPTUAL PROJECT COST ESTIMATE FOR LEUCADIA GRADE SEPARATION

I. ROADWAY ITEMS

Section 1-Earthwork	Quantity	Unit	Unit Price	Item Cost	Section Cost
Roadway Excavation	0	CY	$6	$0	
Clearing and Grubbing	0	LS	$50,000	$0	
Fill		CY		$0	
				Subtotal Earthwork	**$0**

Section 2-Structural Section	Quantity	Unit	Unit Price	Item Cost	Section Cost
Asphalt Concrete (4")	570	TON	$70	$39,900	
Aggregate Base (6")	450	CY	$85	$38,250	
				Subtotal Pavement Structural Section	**$78,150**

Section 3-Drainage	Quantity	Unit	Unit Price	Item Cost	Section Cost
Inlets	0	EA	$6,000	$0	
Relocate Inlets	0	EA		$0	
Remove Inlets	0	EA	$500	$0	
Cap Inlets	0	EA		$0	
RCP -	0	LF	$2,100	$0	
Bridge Drains	0	LF	$60	$0	
Other Drainage Improvements (Filters)	0	EA	$500	$0	
Interceptor Channel	0	LF	$60	$0	
Pump Station	0	EA		$0	
				Subtotal Drainage	**$0**

Section 4-Specialty Items	Quantity	Unit	Unit Price	Item Cost	Section Cost
Curb and Gutter	3,000	LF	$20	$60,000	
Construct PCC Sidewalk	12,500	SF	$12	$150,000	
Retaining Walls	0	LS		$0	
Pump Station Structure	0	LS		$0	
Pump Station Equipment	0		$0	$0	
Erosion Control		LS		$0	
Driveway	875	SF	$6	$4,813	
Raised Median	7,200	SF	$20	$144,000	
Pedestrian Ramps	10	EACH	$1,200	$12,000	
				Total Specialty Items	**$370,813**

Section 5-Traffic Signing and Striping Items	Quantity	Unit	Unit Price	Item Cost	Section Cost
Traffic Signals and Lighting	2	LS	$250,000	$500,000	
Loops	56	EACH	$450	$25,200	
Signing, Striping, Pavement Legend	1	LS	$17,000	$17,000	
Traffic Control System	1	LS	$30,000	$30,000	
Traffic Management Plan	1	LS		$0	
Pull Box	14	EACH	$250	$3,500	
Traffic Management Plan	1	LS	$0	$0	
				Total Traffic Signing and Striping Items	**$575,700**

Section 6-Railroad Signal and Detection System Items	Quantity	Unit	Unit Price	Item Cost	Section Cost
Install pre-cast concrete panel track crossing, single track	96	TF	$600	$57,600	
Demolition of existing Track and Leucadia Blvd. Crossing	110	TF	$100	$11,000	
Signal controls for 4-quad gate system, including signal house	1	LS	$450,000	$450,000	
Walkout cantilever with flashing lights; separate gate-mast	2	EA	$40,000	$80,000	
Mast-mounted flashing light signals w/gate	6	EA	$8,000	$48,000	
Demolition of existing signals	1	LS	$25,000	$25,000	
				Total Railroad Signal and detection System Items	**$671,600**

TOTAL SECTIONS 1-5 **$1,696,263**

CONCEPTUAL PROJECT COST ESTIMATE FOR LEUCADIA GRADE SEPARATION

I. ROADWAY ITEMS (Continued)

	Quantity	Unit	Unit Price	Item Cost	Section Cost
Section 7-Minor Items		$1,696,263	X (5%)	84,813	
				Total Minor Items	**$84,813**
Section 8-Roadway Mobilization		$0	X (10%)	0	
				Total Roadway Mobilization	**$0**
Section 9-Roadway Additions					
Supplemental Work		$0	X (0%)	0	
				Total Raodway Additions	**$0**
				TOTAL SECTIONS 7-9	**$84,813**
				SUBTOTAL SECTIONS 1-9	**$1,781,076**
Contingencies			25%		**$445,269**
				SUBTOTAL ROADWAY ITEMS	**$2,226,345**

ESTIMATE PREPARED BY: Sunnie House
PHONE (858) 467-6950
DATE: September 2005