

3.10 TRAFFIC AND CIRCULATION

Implementation of the Enhancement Project would require use of the local circulation system for construction activities and operations. This traffic analysis considers the construction impacts to the street system due to the construction-related activities. Operational impacts are not considered in this analysis as there would be no resulting project-related traffic once enhancement activities are completed. This section is based on the traffic analysis presented in *Transportation Impact Study, Buena Vista Lagoon Enhancement Project* (VRPA 2014), included as Appendix H. Traffic information for materials placement is also accounted for in the analysis and is referenced from the 2012 RBSP EA/Final EIR (SANDAG 2011). The Transportation Impact Study was prepared according to regional guidelines for the San Diego region, San Diego Traffic Engineers' Council (SANTEC) criteria for determining the significance of a project's traffic impacts. The SANTEC guidelines were developed jointly with the Institute of Transportation Engineers and offer a region-wide standard for determining traffic impacts, which promote consistency in traffic impact studies in the San Diego Region. Technical details of the traffic analysis and methodology are included in Appendix H of this EIR.

Given the 2013 approval of California Senate Bill No. 743, changes are pending in regard to thresholds for CEQA analysis of traffic. However, it is not yet clear what those thresholds will be. The baseline conditions for this project, including the thresholds, were established when the Notice of Preparation was published on April 25, 2013, per Section 15125 of the CEQA Guidelines (14 CCR Section 15125(a)). Because of these preestablished thresholds, and the fact that the lagoon restoration will not induce traffic beyond short-term construction impacts, no changes to this analysis are anticipated to be required by the new bill.

3.10.1 EXISTING CONDITIONS

The regulatory setting related to traffic and circulation is generally set forth through the traffic criteria adopted by local jurisdictions to define acceptable levels of operation for existing and future traffic conditions on their roadways. This information is provided in Section 3.10.2 below for the Cities of Carlsbad and Oceanside. Appendix B contains applicable regulatory requirements specific to individual topic areas.

Effective evaluation of the traffic impacts associated with the project requires an understanding of the existing transportation system within the project study area. This section describes the existing circulation system and traffic conditions of the project study area.

Buena Vista Lagoon Study Area

Study Area

Buena Vista Lagoon is located in northern San Diego County and spans the boundaries of the Cities of Carlsbad and Oceanside. The lagoon encompasses approximately 220 acres and is located within the Reserve managed by CDFW. The analysis of traffic impacts is focused on three general locations where four construction staging areas are proposed to be located and access is proposed to be provided from the local roadway system. These areas are the Weir Basin, Railroad Basin, Coast Highway Basin, and I-5 Basin. Existing conditions for each of these areas are described below.

Weir Basin

The Weir Basin is the westernmost of the four basins shown in Figure 2-2. Construction staging is proposed to occur at the south side of the basin. Access would be provided via Mountain View Drive, Ocean Street, Garfield Drive, and Carlsbad Boulevard. In the vicinity of the project site, Mountain View Drive and Ocean Street are one-lane, one-way local streets; Garfield Drive is a two-lane, two-way arterial; and Carlsbad Boulevard is a divided arterial with one lane of traffic in each direction.

Railroad and Coast Highway Basins

The Railroad and Coast Highway Basins are the middle two of the four basins. Construction staging for both of these basins is proposed to occur along Carlsbad Boulevard/South Coast Highway north of the existing Carlsbad Boulevard bridge. This roadway is named Carlsbad Boulevard in Carlsbad and South Coast Highway in Oceanside, and the proposed staging areas are near the boundary between the two cities. The open space area located on the northern shore of the lagoon in the Railroad Basin would be used for staging of construction activities in the Railroad Basin. As limited options are available for construction staging in the Coast Highway Basin, a staging area would be created through the temporary placement of fill that would be removed after construction. This staging area would be located adjacent to the lagoon and next to the Nature Center. In the vicinity of the project site, Carlsbad Boulevard is a two-lane arterial street with bicycle lanes in each direction and a multi-use bicycle/pedestrian pathway provided west of the roadway. Farther north in Oceanside, South Coast Highway transitions into a four-lane, undivided arterial.

I-5 Basin

The I-5 Basin is the easternmost of the four basins shown in Figure 2-2. Construction staging is proposed to occur at the north side of the basin along Lagoon View Drive in Carlsbad. Access would be provided via Jefferson Street toward SR 78 to the north and I-5 to the south and west. In the vicinity of the project site, Jefferson Street is a two-lane arterial with bicycle lanes in each direction of traffic.

Existing Level of Service

Existing traffic conditions for 2014 are documented in Table 3.10-1. The methodology for conducting this analysis can be described as follows:

- Existing daily traffic counts were obtained from the websites of Caltrans and SANDAG. Traffic counts were generally available only for years prior to 2014 and counts from previous years were updated to 2014 conditions using a growth factor of 2 percent per year. Traffic counts for some study area roadways were not available on the Caltrans and SANDAG websites and were estimated by VRPA Technologies.
- Capacity analysis was conducted using information contained in the SANTEC Guidelines.

Level of service (LOS) is the term used to denote the different operating conditions that occur on a given roadway segment under various traffic volume loads. It is a qualitative measure with designations ranging from A through F.

In traffic engineering methodology, roadway operations are rated in terms of LOS that ranges from LOS A (light traffic, minimal delays) to LOS F (traffic congestion, substantial delays). LOS D is the typical standard for urban and suburban design. The results shown in Table 3.10-1 indicate that several study area roadways operate at LOS E or F, indicating some level of traffic congestion, at least during the peak hours. These roadways include I-5, SR 78, Vista Way, South Coast Highway, and Carlsbad Boulevard. Other study area roadways were shown to be operating at LOS ranging from LOS A to LOS D, indicating that they would meet the typical design standards for traffic capacity.

**Table 3.10-1
Existing (2014) Street Segment Capacity Analysis**

Roadway	Location	Functional Classification	Daily Capacity at LOS E	Volume	LOS	V/C
Carlsbad Village Drive	Jefferson Street to I-5 SB Ramps	4-Lane Secondary Arterial/Collector	40,000	13,000	A	0.33
	Jefferson Street to I-5 SB Ramps	4-Lane Secondary Arterial/Collector	40,000	21,400	C	0.54
	Jefferson Street to I-5 SB Ramps	4-Lane Major Arterial	40,000	31,300	D	0.78
Interstate 5 (I-5)	SR 78 to Las Flores Drive	8-Lane Freeway	150,000	199,900	F	1.33
Jefferson Street	Jefferson Street to I-5 SB Ramps	4-Lane Major Arterial	40,000	20,000	B	0.50
	Jefferson Street to I-5 SB Ramps	2-Lane Collector	15,000	9,300	C	0.62
Lagoon View Drive	West of Jefferson Street	Local	2200 ⁽¹⁾	200 ⁽²⁾	C	0.10
Las Flores Drive	Jefferson Street to I-5 SB Ramps	2-Lane Collector	15,000	9,400	C	0.63
Mountain View Drive	Ocean Street to Carlsbad Boulevard	Local	1100 ⁽¹⁾	300 ⁽²⁾	C	0.27
South Coast Highway/ Carlsbad Boulevard	Jefferson Street to I-5 SB Ramps	2-Lane Collector	15,000	25,000	F	1.67
	Jefferson Street to I-5 SB Ramps	2-Lane Collector	15,000	19,400	F	1.29
	Jefferson Street to I-5 SB Ramps	2-Lane Collector	15,000	13,200	E	0.88
	Jefferson Street to I-5 SB Ramps	4-Lane Secondary Arterial/Collector	30,000	16,700	C	0.56
State Route 78	East of I-5	6-Lane Freeway	120,000	130,600	F	1.09
Vista Way	South Coast Highway to I-5	2-Lane Collector	15,000	18,500	F	1.23

Volume = Average Daily Traffic; LOS = level of service; SB = southbound; V/C = volume-to-capacity ratio

¹ Daily Capacity Estimated

² Existing Volume Estimated

Materials Disposal Study Area

This existing conditions section for traffic at the potential materials disposal study areas addresses onshore placement site access. As described in Section 2.8, the majority of work necessary for materials placement on onshore sites occurs offshore and minimal land transportation is required. Offshore and nearshore disposal/reuse materials placement would be accomplished via ocean barge and pipeline, and no land-based traffic would result; thus, offshore and nearshore scenarios are not further considered in this traffic analysis. Information specific to the onshore materials disposal/reuse study area discussion is referenced from the 2012 RBSP EA/Final EIR (SANDAG 2011).

Regional access to materials placement sites is provided via I-5. West of I-5, access is also provided via Coast Highway/Carlsbad Boulevard, which extends from Oceanside south to Solana Beach. The principal access routes from I-5 to each of the onshore disposal sites are identified in Table 3.10-2.

**Table 3.10-2
Principal Access Routes**

Receiver Site	Principal Access Route
Oceanside	Oceanside Boulevard
North Carlsbad	Carlsbad Village Drive

Existing traffic on beach access routes is often heavy, as most of the routes serve commercial, motel or camping, and residential uses as well as area beaches. Traffic is most congested on warm weekends, when residents from throughout San Diego County and adjacent areas use the beaches. During these peak use periods, beach parking areas often are filled to capacity.

3.10.2 SIGNIFICANCE CRITERIA

A significant impact related to traffic, access, and circulation would occur under CEQA if implementation of the Enhancement Project would:

- A. Conflict with an applicable congestion management program, including, but not limited to, LOS standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;
- B. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- C. Result in inadequate emergency access;
- D. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities;
or
- E. Result in a long-term impact to access routes, local streets, or parking areas in the vicinity of the project area.

These criteria were primarily derived from the sample questions in Appendix G of the CEQA Guidelines. Air traffic thresholds were not used because the project would be restricted to ground activities that would not affect air traffic, and an additional threshold addressing access and

parking was established to capture impacts associated with coastal access and parking that could result from the project.

According to the SANTEC criteria, a project is considered to have a significant impact (e.g., under Criterion A) if the new project traffic has decreased the operations of surrounding roadways by a defined threshold. The defined thresholds for roadway segments and intersections are defined in Table 3.10-3. If the project exceeds the thresholds in Table 3.10-3, then the project may be considered to have a significant project impact. In order to identify whether the project would have the potential to result in a significant impact, the SANTEC regional guidelines specify that detailed traffic analysis be conducted for any roadway segments or intersections where a project would add 50 or more trips in the peak hour in either direction of travel. The morning (inbound) peak hour is defined as 7:30 AM to 8:30 AM and the evening (outbound) peak hour is defined as 4:30 PM to 5:30 PM. Therefore, if a project would not add more than 50 trips in the peak hour, it would not have the potential to result in a significant impact under Criterion A and detailed traffic analysis is not considered to be warranted.

**Table 3.10-3
Traffic Impact Significance Thresholds**

Level of Service (LOS) with Project ¹	Allowable Increase Due to Project Impacts ²			
	Freeways	Roadway Segments	Intersections	Ramp Metering
	V/C	V/C	Delay (seconds)	Delay (minutes)
D, E, and F (or ramp meter delays above 15 minutes)	0.01	0.02	2	2

¹ All LOS measurements are based on Highway Capacity Manual procedures for peak-hour conditions. However, V/C ratios for roadway segments may be estimated on an average daily traffic/24-hour traffic volume basis (using this table or a similar LOS chart for each jurisdiction). The acceptable LOS for freeways, roadways, and intersections is generally "D" ("C" for undeveloped or not densely developed locations per jurisdiction definitions). For metered freeway ramps, LOS does not apply. However, ramp meter delays above 15 minutes are considered excessive.

² If a proposed project's traffic causes the values shown in the table to be exceeded, the impacts are deemed significant. These impact changes may be measured from appropriate computer programs or expanded manual spreadsheets.

V/C = volume to capacity ratio

Delay = Average stopped delay per vehicle measured in seconds for intersections, or minutes for ramp meters

3.10.3 IMPACT ANALYSIS

Lagoon Enhancement

This section analyzes the potential impacts associated with short-term construction activities of lagoon enhancement.

Trip Generation

Project trip generation was calculated separately for each of the four build alternatives (Freshwater Alternative; Saltwater Alternative; Hybrid Alternative, Option A; and Hybrid

Alternative, Option B) and each of the staging areas discussed in Section 3.10.1. The result is 12 different trip generation calculations, as shown in Tables 3.10-4 through 3.10-12. The following are construction characteristics of the project alternatives that would generate traffic in the project study area. Please refer to Appendix H for full calculation details.

Vegetation Clearing

Removal of vegetation would be required as one of the initial steps during construction of any of the Enhancement Project alternatives. Mobilization of construction equipment and material is expected to take 1 to 2 months to complete. It is estimated that the vegetation removal operation would take 2 to 3 months to complete. Vegetation material, consisting of stalk and root mass, would be removed and loaded onto dump trucks (typically with capacity of 12 cy) for disposal at the closest facility that accepts green waste (e.g., Sycamore Landfill). At staging areas with sufficient room (e.g., Coast Highway Basin and I-5 Basin), vegetation would be laid on the ground and/or picked up with slotted/holed picks/scoops to facilitate draining and/or drying of the vegetation and associated root mass. After draining and/or drying, the vegetation would be loaded onto dump trucks for subsequent transport to the green waste facility. At the smaller staging areas (e.g., Weir Basin and Railroad Basin), the vegetation would likely be loaded directly onto dump trucks for subsequent transport to the green waste facility.

As discussed in Section 3.10.2, the SANTEC guidelines specify that detailed traffic analysis be conducted for roadway segments or intersections where a project would add 50 or more trips in the peak hour in either direction of travel. The guidelines are not specific regarding whether the threshold would change depending on whether the trips to be generated would be auto trips or truck trips. However, it is common transportation engineering practice whenever truck traffic is a substantial portion of project traffic to use passenger car equivalents (PCEs) to estimate the impacts of combined auto and truck traffic. For the purposes of this study, each truck was considered the equivalent of two passenger cars. Each truck trip would be multiplied by a factor of two to represent the inbound loading trip and the outbound haul trip (two-way trip). A PCE factor of 3.0 would also be applied to the trip to represent the fact that heavy vehicles have an additional effect on traffic flow as compared to passenger cars and light trucks due to their diminished handling characteristics.

Dredging and Sediment Disposal/Reuse

Sediment removal of the lagoon would occur over all alternatives of the project. Dredging within the lagoon is anticipated to take 12 to 24 months to complete. The dredging operation would be limited in area to the immediate vicinity of the dredge and sediment discharge locations (beach, nearshore, offshore, and within the lagoon). Restricting construction to outside of the nesting

bird season (February 15 through September 30) would substantially increase the construction schedule and would double the time needed to restore the lagoon. Therefore, given the limited area and nature of this work, it is expected that the dredging operation would take place throughout the year with no shutdown during the nesting season. Demobilization of construction equipment and material is expected to take 1 to 2 months to complete. After vegetation removal from the lagoon, sediment removal would occur, primarily using water-based equipment such as dredges. Sediment would be dredged using a hydraulic cutterhead dredge from specific designated areas within each of the lagoon basins. Dredged materials would be directed via pipeline to the appropriate receiver beach or designated nearshore area for placement, an offshore disposal site, or an interior overdredge pit, depending on the construction approach and quality of material. Two options for the beneficial use and/or disposal of dredged sediment have been identified, as described in Section 2.7. The first approach would involve hydraulic dredging with beach nourishment and offshore placement. The second approach would involve hydraulic dredging with beach nourishment and lagoon placement (via the creation of an overdredge pit). For both approaches, sediment suitable (>80 percent sand) for beneficial use as beach placement would be dredged and transported via pipeline to the placement site on each beach, where it would be spread along the beach using conventional construction equipment such as bulldozers, scrapers, dump trucks, and graders. Traffic specific to materials placement on adjacent beaches is discussed below under Materials Disposal/Reuse.

Worker Trips

The total duration needed to complete lagoon enhancement is approximately 15 to 30 months. Typical work shifts during grading and dredging are expected to be 10 hours per day (start at 7 a.m. and end at 6 p.m., Monday through Friday), which differs slightly from shift durations that typically occur during hauling operations. The exception to this is dredging and sand placement operations, which could continue up to 24 hours a day/7 days a week due to issues associated with starting and stopping these activities (e.g., sand settlement in pipelines that then requires resuspension, adding to the potential for pipeline clogs). The total number of daily PCE trips generated by workers would vary and depend on the alternative and staging location chosen. The traffic analysis determined that there were no cases where the project would add 50 or more vehicles to the roadway network in the peak hour in either direction of traffic (VRPA 2014; Appendix H).

Freshwater Alternative

Carlsbad Boulevard Bridge Construction Impacts

Improvements to the Carlsbad Boulevard bridge would not occur under the Freshwater Alternative. As such, no traffic impacts would result. No new vehicle types (e.g., farm

equipment) are anticipated to use the bridge and no intersections would be added to the alignment. No changes would be made to the existing roadway configuration. No horizontal curves would be added to the project. **Therefore, no significant impacts would occur due to conflicts with applicable congestion management programs or increased hazards (Criteria A and B).**

Traffic Impacts

This section describes trips generated within each basin/staging area to determine impacts at a basin level.

Weir Basin

Construction of the new weir structure is anticipated to require approximately 1 to 2 months. Based on the calculations in the Transportation Impact Study (VRPA 2014; Appendix H), the Freshwater Alternative – Weir Basin would not add 50 or more vehicles to the roadway network in the peak hour in either direction of traffic. Table 3.10-4 shows that, under the Freshwater Alternative, a total of 48 two-way trips per day with an average of 6 inbound/6 outbound per hour are anticipated.

**Table 3.10-4
Project Trip Generation
Freshwater Alternative – Weir Basin**

Project Component	Trucks			Autos			Total PCEs		
	Daily	Peak Hour		Daily	Peak Hour		Daily	Peak Hour	
		In	Out		In	Out		In	Out
Vegetation Removal	8	1	1	8	1	1	24	3	3
Weir Replacement	8	1	1	8	1	1	24	3	3
Total	16	2	2	16	2	2	48	6	6

PCE = passenger car equivalent

Railroad and Coast Highway Basins

Based on the calculations, the Freshwater Alternative – Railroad and Coast Highway Basins would not add 50 or more vehicles to the roadway network in the peak hour in either direction of traffic. Table 3.10-5 shows that, under the Freshwater Alternative – Railroad and Coast Highway Basins, approximately 257 PCEs with an average of 18 inbound/22 outbound peak hour daily two-way trips are anticipated.

**Table 3.10-5
Project Trip Generation
Freshwater Alternative – Railroad and Coast Highway Basins**

Project Component	Trucks			Autos			Total PCEs		
	Daily	Peak Hour		Daily	Peak Hour		Daily	Peak Hour	
		In	Out		In	Out		In	Out
Vegetation Removal	84	5	5	10	1	1	178	11	11
Carlsbad Boulevard Bridge	16	1	1	15	2	4	47	4	6
Boardwalk	8	1	1	16	1	3	32	3	5
Total	108	7	7	41	4	8	257	18	22

PCE = passenger car equivalent

I-5 Basin

Based on the calculations, the Freshwater Alternative – I-5 Basin would not add 50 or more vehicles to the roadway network in the peak hour in either direction of traffic. Table 3.10-6 shows that, under the Freshwater Alternative – I-5 Basin, approximately 72 PCEs with an average of 9 inbound/9 outbound peak hour daily two-way trips are anticipated.

**Table 3.10-6
Project Trip Generation
Freshwater Alternative – I-5 Basin**

Project Component	Trucks			Autos			Total PCEs		
	Daily	Peak Hour		Daily	Peak Hour		Daily	Peak Hour	
		In	Out		In	Out		In	Out
Vegetation Removal	32	4	4	8	1	1	72	9	9
Total	32	4	4	8	1	1	72	9	9

PCE = passenger car equivalent

Under the Freshwater Alternative, use of the proposed staging areas throughout the lagoon basins would not add 50 or more trips to peak hour traffic on local roads, and would not conflict with an applicable congestion management program. A less than significant impact would result during pre-construction and construction activities (Criterion A).

Public Transportation Impacts

The NCTD operates bus service along Carlsbad Boulevard/South Coast Highway through the study area via Route 101. Project construction is not expected to affect bus travel times or existing bus stops and the project is not considered to have significant transit impacts. This is not

considered a significant conflict with policies or a decrease in the performance or safety of public transit opportunities. **No significant impacts would occur (Criterion D).**

Bicycle Impacts

No changes to bike routes or facilities would occur under the Freshwater Alternative; therefore, no significant impacts would occur (Criterion D).

Pedestrian Impacts

During construction of the Boardwalk, access may be shifted to the west side of Carlsbad Boulevard, but construction under the Freshwater Alternative would not substantially reduce pedestrian access along the lagoon. Improvements to the Carlsbad Boulevard bridge would not occur under the Freshwater Alternative, and **impacts to pedestrian facilities would be less than significant (Criterion D).**

Other Traffic and Circulation Considerations

Construction of the Freshwater Alternative would not generate traffic volumes that could cause poor traffic operating conditions in the study area. As such, this would not result in inadequate emergency access along these roadway segments. Further, a traffic management plan would be required by the Cities of Carlsbad and Oceanside that would detail how traffic flow would be maintained in each direction and would also outline safety and emergency procedures to ensure that adequate emergency access is available through the impacted areas. Measures in the traffic control plan may include informing and coordinating with emergency services provided in the area, use of flagmen to control traffic flow and allow passage for emergency vehicles, etc. Additionally, as described in Table 2-9, Standard Construction Practices, the contractor would coordinate as appropriate with applicable agencies regarding construction schedules and traffic control plans, including but not limited to, Oceanside Fire Department, Oceanside Police Department, Carlsbad Fire Department, and Carlsbad Police Department. Advanced coordination would ensure emergency service providers are aware of the roadway conditions and potential concerns can be addressed prior to initiation of work, which would minimize the potential for access conflicts. **Thus, impacts to emergency access during construction activities would be less than significant under the Freshwater Alternative (Criterion C).**

As noted in the traffic analysis, potential transportation impacts would only result during construction activities and no substantial generation of vehicle trips would occur once enhancement activities and weir replacement are complete. **Thus, no long-term impacts to**

access routes, local streets, or parking areas in the vicinity of the project area would occur and impacts would be less than significant (Criterion E).

Saltwater Alternative

Carlsbad Boulevard Bridge Construction Impacts

Replacement of the Carlsbad Boulevard bridge is anticipated to require approximately 6 to 9 months and would be phased. It is anticipated that, for the majority of time, one lane in each direction would remain open to vehicular and bicycle traffic. During construction, a flag person would be present to coordinate north-south traffic during those limited times that only a single lane is open. During the first phase of construction, anticipated to last approximately 4 months, half of the bridge would be demolished, and bridge abutment supports and piers would be drilled/driven at both ends of the structure and in the middle of the channel for half of the proposed bridge. The second phase of bridge construction would be anticipated to last another 4 to 5 months. Traffic would be detoured to the newly constructed portion of the bridge while the other half of the existing bridge was demolished, piles and bridge abutment supports driven/drilled, and the bridge deck constructed in a similar fashion as in Phase 1. No new vehicle types (e.g., farm equipment) are anticipated to use the bridge and no intersections would be added to the alignment. No horizontal curves would be added to the project with the exception of temporary detour lanes. In addition, the bridge alignment and approaches will conform to Caltrans standards for sight distance and vertical clearance (PDF-3). Temporary detours would likely require a temporary speed limit reduction for the detour approaches and exits, but would still conform to safe highway design speeds as described in the standard construction measures listed in Table 2-9. Appropriately designed speed limits would ensure motorists do not approach the construction zones at unsafe speeds, thus reducing potential hazards. **These features would not substantially increase hazards or introduce incompatible uses along Carlsbad Boulevard, and would represent a less than significant impact (Criterion B).**

Traffic Impacts

This section describes trips generated within each basin/staging area to determine impacts at a basin level.

Weir Basin

Since bridge construction is expected to begin during the first phase of project construction, traffic from bridge construction that would overlap with the project was included in the trip generation calculations. During construction, the roadway would include two 14-foot travel

lanes, one lane in each direction accommodating vehicle and bicycle traffic. Pedestrian travel would be prohibited along the roadway and the existing multi-use pathway located on the west side of Carlsbad Boulevard would be closed. It is estimated that this closure related to construction would last for a period of 9 months. The hourly average of overall daily truck trips was used to determine the AM and PM peak hour trips. This average was divided in two to represent the inbound and outbound average during the hour. Calculations determined a total of 48 two-way trips per day with an average of 6 inbound/6 outbound per hour, as shown in Table 3.10-7. This alternative would not add 50 or more trips in the peak hour in either direction of travel. Following construction, the roadway would be completely reopened to two-way traffic, as well as bike and pedestrian uses.

**Table 3.10-7
Project Trip Generation
Saltwater Alternative – Weir Basin**

Project Component	Trucks			Autos			Total PCEs		
	Daily	Peak Hour		Daily	Peak Hour		Daily	Peak Hour	
		In	Out		In	Out		In	Out
Vegetation Removal	8	1	1	8	1	1	24	3	3
Weir Removal	8	1	1	8	1	1	24	3	3
Total	16	2	2	16	2	2	48	6	6

PCE = passenger car equivalent

Railroad and Coast Highway Basins

Calculations for the Saltwater Alternative – Railroad and Coast Highway Basins determined a total of 398 two-way trips per day with an average of 24 inbound/32 outbound per hour, as shown in Table 3.10-8. Following construction, the roadway would be completely reopened to two-way traffic, as well as bike and pedestrian uses. This alternative would not add 50 or more trips in the peak hour in either direction of travel.

**Table 3.10-8
Project Trip Generation
Saltwater Alternative – Railroad and Coast Highway Basins**

Project Component	Trucks			Autos			Total PCEs		
	Daily	Peak Hour		Daily	Peak Hour		Daily	Peak Hour	
		In	Out		In	Out		In	Out
Vegetation Removal	84	5	5	10	1	1	178	11	11
Carlsbad Boulevard Bridge	64	4	4	60	2	8	188	10	16
Boardwalk	8	1	1	16	1	3	32	3	5
Total	156	10	10	86	4	12	398	24	32

PCE = passenger car equivalent

I-5 Basin

Calculations for the Saltwater Alternative – I-5 Basin determined a total of 72 two-way trips per day with an average of 9 inbound/9 outbound per hour, as shown in Table 3.10-9. This alternative would not add 50 or more trips in the peak hour in either direction of travel. Following construction, the roadway would be completely reopened to two-way traffic, as well as bike and pedestrian uses.

**Table 3.10-9
Project Trip Generation
Saltwater Alternative – I-5 Basin**

Project Component	Trucks			Autos			Total PCEs		
	Daily	Peak Hour		Daily	Peak Hour		Daily	Peak Hour	
		In	Out		In	Out		In	Out
Vegetation Removal	32	4	4	8	1	1	72	9	9
Total	32	4	4	8	1	1	72	9	9

PCE = passenger car equivalent

Under the Saltwater Alternative, use of the proposed staging areas throughout the lagoon basins would not add 50 or more trips to peak hour traffic on local roads and would not conflict with an applicable congestion management program. A less than significant impact would result during pre-construction and construction activities (Criterion A).

Transit Impacts

The NCTD operates bus service along Carlsbad Boulevard/South Coast Highway through the study area via Route 101. Although construction along Carlsbad Boulevard during bridge replacement would require limited lane closures, access would be maintained along the roadway and construction is not expected to substantially affect bus travel times or existing bus stops. No substantial conflicts with policies or a decrease in the performance or safety of public transit opportunities would occur. **No significant impacts would occur (Criterion D).**

Bicycle Impacts

As discussed, during construction of the replacement bridge along Carlsbad Boulevard, the roadway would include two 14-foot travel lanes, one lane in each direction for vehicle and bicycle traffic. It is estimated that this closure related to construction would last for a period of 9 months. Following construction, the roadway would be completely reopened to two-way traffic, as well as bike and pedestrian uses. The construction of the Carlsbad Boulevard bridge would affect recreational and commuter bicyclists. The multi-use pathway would be closed temporarily

during construction, even though bicycle traffic would be allowed in a shared travel lane, rather than having a separate bicycle lane. **The Saltwater Alternative would result in temporary significant impacts to bicycle facilities in the vicinity of the project area (Criterion D).**

Pedestrian Impacts

Improvements to the Carlsbad Boulevard bridge would result in closure of the existing multi-use pathway located on the west side of Carlsbad Boulevard and prohibition of pedestrian travel. It is estimated that this closure related to construction would last for a period of 9 months. **Temporary construction impacts to pedestrian facilities in the vicinity of the project area would be significant under the Saltwater Alternative (Criterion D).**

Other Traffic and Circulation Considerations

Construction of the Saltwater Alternative would not generate traffic volumes that could cause poor traffic operating conditions in the study area. As such, this would not result in inadequate emergency access along these roadway segments. Further, a traffic management plan would be required by the Cities of Carlsbad and Oceanside that would detail how traffic flow would be maintained in each direction and would also outline safety and emergency procedures to ensure that adequate emergency access is available through the impacted areas. Measures in the traffic control plan may include informing and coordinating with emergency services provided in the area, use of flagmen to control traffic flow and allow passage for emergency vehicles, etc. Additionally, as described in Table 2-9, Standard Construction Practices, the contractor would coordinate as appropriate with applicable agencies regarding construction schedules and traffic control plans, including but not limited to, Oceanside Fire Department, Oceanside Police Department, Carlsbad Fire Department, and Carlsbad Police Department. Advanced coordination would ensure emergency service providers are aware of the roadway conditions and potential concerns can be addressed prior to initiation of work, which would minimize the potential for access conflicts. **Thus, impacts to emergency access during construction activities related to the Saltwater Alternative would be less than significant (Criterion C).**

Inlet maintenance would be required under the Saltwater Alternative. Under the Saltwater Alternative, inlet maintenance would occur every 12 to 20 months and would take approximately 2 to 4 weeks. Land-based equipment would excavate sand accumulating in the inlet channel and place the material on trucks. These trucks would haul excavated material between the inlet channel and beach along the dirt access road south of the inlet and place the sand on North Carlsbad Beach to be spread. No transport along public roadways would be required. Traffic generated from inlet maintenance would be limited to worker trips for operating the equipment. As noted in the discussion of the traffic analysis, potential transportation impacts would only

result during construction activities as no substantial generation of vehicle trips would occur once enhancement activities and bridge replacement are complete. **Thus, the Enhancement Project would result in less than significant impacts to access routes, local streets, or parking areas in the vicinity of the project area (Criterion E).**

Hybrid Alternative

There are two options under the Hybrid Alternative (Options A and B) differentiated by work within the Weir Basin and the future maintenance requirement. Under the Hybrid Alternative, Option A, a channel would be constructed to connect the tidal inlet from the ocean area through the Weir Basin and into the Railroad Basin. The Hybrid Alternative, Option B would achieve tidal exchange in the same manner as the Saltwater Alternative with an open tidal inlet connecting the ocean to the Weir Basin. The channel constructed under the Hybrid Alternative, Option A would result in a perched water level within the Weir Basin that would have a substantially muted tide range compared to the Hybrid Alternative, Option B.

Carlsbad Boulevard Bridge Construction Impacts

Replacement of the Carlsbad Boulevard bridge is anticipated to require approximately 6 to 9 months and would be phased. It is anticipated that, for the majority of time, one lane in each direction would remain open to vehicular and bicycle traffic. As described in Table 2-9, Standard Construction Practices, a flag person would be present during construction to coordinate north-south traffic during those limited times that only a single lane is open. This would provide appropriate traffic control and direction to ensure motorists understand and safely follow the lane closure procedures. During the first phase of construction, anticipated to last approximately 4 months, half of the bridge would be demolished. The second phase of bridge construction is anticipated to last another 4 to 5 months. Traffic would be detoured to the newly constructed portion of the bridge while the other half of the existing bridge was demolished, piles and bridge abutment supports driven/drilled, and the bridge deck constructed in a similar fashion as in Phase 1. No new vehicle types (e.g., farm equipment) are anticipated to use the bridge and no intersections would be added to the alignment. No horizontal curves would be added to the project with the exception of temporary detour lanes. In addition, the bridge alignment and approaches will conform to Caltrans standards for sight distance and vertical clearance (PDF-3). Temporary detours would likely require a temporary speed limit reduction for the detour approaches and exits, but would still conform to safe highway design speeds, as described in Table 2-9, Standard Construction Practices. Appropriately designed speed limits would ensure motorists do not approach the construction zones at unsafe speeds, thus reducing potential hazards. **These features would not substantially increase hazards or introduce incompatible**

uses along Carlsbad Boulevard, and would represent a less than significant impact (Criterion B).

Traffic Impacts

This section describes trips generated within each basin/staging area to determine impacts at a basin level.

Weir Basin

Construction of the tidal inlet is anticipated to require approximately 3 to 5 months. Construction of the new weir structure under I-5 is anticipated to require approximately 2 to 3 months. For concrete and other/various truck trips, as well as dump truck trips, the average number of truck trips per day was calculated since these trips are expected to occur throughout the 12- to 24-month construction period. For base and asphalt truck trips, the number of trips expected during the 3 months of the second stage was included in Phase 2 to provide a conservative analysis. During construction, it is proposed that the roadway provided would include two 14-foot travel lanes, one lane in each direction for vehicle and bicycle traffic. Pedestrian travel would be prohibited and the existing multi-use pathway located on the west side of Carlsbad Boulevard would be closed. It is estimated that this closure related to construction would last for a period of 9 months. The hourly average of overall daily truck trips was used to determine the AM and PM peak hour trips. This average was divided in two to represent the inbound and outbound average during the hour. Calculations determined a total of 48 two-way trips per day with an average of 6 inbound/6 outbound per hour, as shown in Table 3.10-10. This alternative, under both options, would not add 50 or more trips in the peak hour in either direction of travel. Following construction, the roadway would be completely reopened to two-way traffic, as well as bike and pedestrian uses.

**Table 3.10-10
Project Trip Generation
Hybrid Alternative, Option A and Option B – Weir Basin**

Project Component	Trucks			Autos			Total PCEs		
	Daily	Peak Hour		Daily	Peak Hour		Daily	Peak Hour	
		In	Out		In	Out		In	Out
Vegetation Removal	8	1	1	8	1	1	24	3	3
Weir Removal	8	1	1	8	1	1	24	3	3
Total	16	2	2	16	2	2	48	6	6

PCE = passenger car equivalent

Railroad and Coast Highway Basins

Under the Hybrid Alternative (Options A and B), the railroad bridge would be improved as part of the LOSSAN corridor improvements and the I-5 bridge would be replaced as part of the North Coast Corridor Project. The channel extending under I-5 would remain at the existing width, and the bridge spanning it would be constructed by Caltrans to allow widening of the channel in the future as needed but the channel would not be widened as part of the Enhancement Project. Additionally, the Hybrid Alternative would include construction of a new water control structure (weir) at the I-5 bridge to maintain a freshwater hydrologic regime in the portion of the lagoon east of I-5. Calculations determined a total of 398 two-way trips per day with an average of 24 inbound/32 outbound per hour, as shown in Table 3.10-11. This alternative would not add 50 or more trips in the peak hour in either direction of travel. Following construction, the roadway would be completely reopened to two-way traffic, as well as bike and pedestrian uses.

**Table 3.10-11
Project Trip Generation
Hybrid Alternative, Option A and Option B – Railroad and Coast Highway Basins**

Project Component	Trucks			Autos			Total PCEs		
	Daily	Peak Hour		Daily	Peak Hour		Daily	Peak Hour	
		In	Out		In	Out		In	Out
Vegetation Removal	84	5	5	10	1	1	178	11	11
Carlsbad Boulevard Bridge	64	4	4	60	2	8	188	10	16
Boardwalk	8	1	1	16	1	3	32	3	5
Total	156	10	10	86	4	12	398	24	32

PCE = passenger car equivalent

I-5 Basin

Calculations for the Hybrid Alternative - I-5 Basin determined a total of 72 two-way trips per day with an average of 9 inbound/9 outbound per hour, as shown in Table 3.10-12. This alternative would not add 50 or more trips in the peak hour in either direction of travel. Following construction, the roadway would be completely reopened to two-way traffic, as well as bike and pedestrian uses.

Under the Hybrid Alternative (Option A and Option B), use of the proposed staging areas throughout the lagoon basins would not add 50 or more trips to peak hour traffic on local roads, and would not conflict with an applicable congestion management program. A less than significant impact would result during pre-construction and construction activities (Criterion A).

Table 3.10-12
Project Trip Generation
Hybrid Alternative, Option A and Option B – I-5 Basin

Project Component	Trucks			Autos			Total PCEs		
	Daily	Peak Hour		Daily	Peak Hour		Daily	Peak Hour	
		In	Out		In	Out		In	Out
Vegetation Removal	32	4	4	8	1	1	72	9	9
Total	32	4	4	8	1	1	72	9	9

PCE = passenger car equivalent

Transit Impacts

The NCTD operates bus service along Carlsbad Boulevard/South Coast Highway through the study area via Route 101. Project construction is not expected to affect bus travel times or existing bus stops and the project is not considered to have significant transit impacts. This is not considered a significant conflict with policies or a decrease in the performance or safety of public transit opportunities. **No significant impacts would occur (Criterion D).**

Bicycle Impacts

As discussed, it is proposed that the roadway would include two 14-foot travel lanes, one lane in each direction for vehicle and bicycle traffic. It is estimated that this closure related to construction would last for a period of 9 months. Following construction, the roadway would be completely reopened to two-way traffic, as well as bike and pedestrian uses. The construction of the Carlsbad Boulevard bridge would affect recreational and commuter bicyclists. The multi-use pathway would be closed temporarily during construction, even though bicycle traffic would be allowed in a shared travel lane, rather than having a separate bicycle lane. **The Hybrid Alternative (Option A and Option B) would result in temporary significant impacts to bicycle facilities in the vicinity of the project area (Criterion D).**

Pedestrian Impacts

Improvements to the Carlsbad Boulevard Bridge would result in closure of the existing multi-use pathway located on the west side of Carlsbad Boulevard and prohibition of pedestrian travel. It is estimated that this closure related to construction would last for a period of 9 months. **Temporary construction impacts to pedestrian facilities in the vicinity of the project area would be significant under the Hybrid Alternative (Criterion D).**

Other Traffic and Circulation Considerations

Construction of Hybrid Alternative (Option A and Option B) would not generate traffic volumes that could cause poor traffic operating conditions in the study area. As such, this would not result in inadequate emergency access along these roadway segments. Further, a traffic management plan would be required by the Cities of Carlsbad and Oceanside that would detail how traffic flow would be maintained in each direction and would also outline safety and emergency procedures to ensure that adequate emergency access is available through the impacted areas. Measures in the traffic control plan may include informing and coordinating with emergency services provided in the area, use of flagmen to control traffic flow and allow passage for emergency vehicles, etc. **Thus, impacts to emergency access during construction activities related to the Hybrid Alternative (Option A and Option B) would be less than significant (Criterion C).**

Inlet maintenance would be required under the Hybrid alternatives. Under the Hybrid Alternative (Option A and Option B), maintenance would occur every 12 to 20 months and would be accomplished via a pipeline discharging directly to the beach placement site. This would require equipment delivery and limited worker trips for the dredge (which requires few workers). Vegetation maintenance would be required under all alternatives. These haul trips would not use public roadways, and traffic generated from maintenance would be limited to worker trips for the dredge. As noted in the discussion of the traffic analysis, potential transportation impacts would only result during construction activities as no substantial generation of vehicle trips would occur once enhancement activities and bridge reconstruction are complete. **Thus, the Enhancement Project would result in less than significant impacts to access routes, local streets, or parking areas in the vicinity of the project area (Criterion E).**

No Project Alternative

The No Project Alternative would not result in the addition of construction-related vehicle trips or the modification of local roadways. **No impacts to traffic or circulation would result (Criteria A through E).**

Materials Disposal/Reuse

As noted in Section 3.10.1, offshore and nearshore disposal/reuse materials placement would be accomplished via ocean barge and pipeline, and minimal land-based traffic would result. Information for materials placement/disposal is largely referenced from the 2012 RBSP EA/Final EIR. Offshore and nearshore disposal/reuse materials placement would require delivery of construction equipment and commuting of work crews to the receiver sites. Construction

vehicles would be driven to and kept on-site for the duration of beach replenishment activities. At a maximum, 12 crew persons would be working at a placement site at any one time. Beach replenishment activities would not significantly affect traffic, as this would generate very few trips. The small increases in traffic volumes during replenishment would be localized and temporary; no long-term impacts to existing traffic and circulation patterns would occur. Construction personnel would park in public parking areas and would not create significant parking impacts given the small number of spaces required at each site. While sand placement would occur concurrently with lagoon enhancement activities, conflicts with access routes and parking would be minimal and limited to the localized areas where placement activities are occurring. Therefore, combined impacts of these activities are not anticipated to increase over those impacts identified above for each project component.

Subsequent to the completion of sand replenishment, some changes in traffic could occur. The replenishment of receiver sites where there is currently little sand could make these locations more attractive to both residents and tourists, and it is expected that traffic could increase accordingly. The use of parking would also increase. Some of the increase would come from new users, and some would come from users of adjacent, currently sandy, but less convenient beaches. In the latter case, some decrease in traffic would result at the adjacent beaches.

The replenishment of beaches with the most existing sand would also increase the attractiveness of the beach. However, the increase in use is likely to be less pronounced than at the currently rocky beaches, and increases in traffic and parking congestion would also be less.

The most severe traffic and parking congestion would continue to occur on warm summer weekends and holidays, and the improvement of the specific beaches with sand replenishment may induce additional use that would marginally increase the congestion. Traffic and parking congestion at beaches is an accepted occurrence, and it is not common practice to design infrastructure to accommodate these peak loads. Sand placed at individual receiver sites is anticipated for distribution throughout the littoral cell and would not remain at the specific placement beach permanently. The long-term impact of the proposed beach sand replenishment on traffic and parking would not be significant. Materials placement/disposal would not result in the substantial addition of construction-related vehicle trips or the modification of local roadways. No impacts to bicycle or pedestrian facilities would occur. No substantial changes to emergency access or public transit facilities would occur during or after construction. **Impacts to traffic or circulation would be less than significant (Criteria A through E).**

No Project Alternative

No materials would be dredged or excavated that would need to be disposed of or used for littoral cell nourishment under the No Project Alternative. As a result, **there would be no**

construction-related vehicle trips or modifications of local roadways or beach access. No impacts to traffic or circulation would occur (Criteria A through E).

3.10.4 MITIGATION MEASURES

Project design features would be incorporated into the project to avoid or minimize other traffic impacts, including maintaining two-way traffic during construction and conforming to standards regarding sight distance (PDF-3) and safe design speeds both during and after construction as described in Table 2-9, Standard Construction Practices. Mitigation measures Traffic-1 and Traffic-2 would be required to address significant and adverse temporary impacts associated with the decrease in performance and/or safety of bicycle facilities during replacement of the proposed Carlsbad Boulevard bridge under the Saltwater Alternative and Hybrid Alternatives (Options A and B). Mitigation Measure Traffic-3 would address significant and adverse temporary impacts related to the loss of pedestrian access due to proposed Carlsbad Boulevard bridge improvements under the Saltwater Alternative and Hybrid Alternatives (Options A and B).

Lagoon Enhancement

- Traffic-1 Prepare work zone traffic control plans for lane closures and related construction along Carlsbad Boulevard prior to construction. The work zone traffic control plans shall be prepared by the Contractor in accordance with current standards and best practices, including those contained in the California Manual of Uniform Traffic Control Devices (CAMUTCD), Caltrans Standard Plans (2010). These plans are intended to accommodate workers within the roadway, while facilitating continued circulation for road users (motorists, bicyclists, and pedestrians, including persons with disabilities in accordance with the ADA) through the work zone.
- Traffic-2 Provide advanced notification to motorists, bicyclists, and pedestrians along Carlsbad Boulevard that delays and traffic congestion will occur during bridge construction and retrofitting activities to encourage avoidance of the construction area. This notification may be accomplished through various measures such as information and detour routes included on the project website; traffic details included in notifications sent to local residents; traffic and alternative route information published in local media; and physical traffic control measures, such as temporary signage located at various distances from the construction area.
- Traffic-3 Construct the Boardwalk prior to initiation of the Carlsbad Boulevard bridge replacement. Route pedestrian traffic to the Boardwalk while the Carlsbad Boulevard bridge is under construction.

Typically, to lessen congestion impacts due to high traffic volume on a lower-capacity roadway, a project could decrease the trips it would generate through scaling back the project (e.g., reducing unit count, decreasing square footage, etc.). However, the Enhancement Project is not a high-volume, trip-generating type of project and the significant impact is a result of temporarily degraded bicycle facilities due to the bridge construction or retrofitting, not increased traffic volume; thus, typical measures to address volume to capacity ratio (V/C) issues would not be effective at reducing project impacts to a less than significant level. Other methods to eliminate significant traffic impacts include widening the roadway to provide pedestrian and separated bicycle facilities throughout construction. This would require the acquisition of right-of-way along the impacted roadway segments of Carlsbad Boulevard, which would disrupt local community, residents, and businesses and cause adverse effects on parking and access to the local beach and recreation areas. Such an acquisition would also be very expensive. For the above reasons, roadway widening is not a feasible solution for the temporary traffic impact. Temporary roadway modifications, such as restriping, use of roadway shoulders as lanes, or signal timing could be implemented to better handle increased bicycle volume on the existing roadway. However, potential safety implications from the limited space available in the impacted segments of Carlsbad Boulevard make these types of modifications inappropriate.

Based on the above discussion, there is no additional feasible mitigation to further reduce temporary direct impacts caused by the degradation of bicycle facilities associated with the construction of Carlsbad Boulevard bridge under the Saltwater Alternative and Hybrid Alternatives to less than significant. Impacts to pedestrian access would be reduced to less than significant with the implementation of Traffic-3, however, impacts to bicycle facilities would remain significant and unavoidable.

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